RAG281 / RSG281



RAG361 / RSG361

iSCSI GbE to SATA II / SAS RAID Controller

User Manual

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Preface

About this manual

This manual is the introduction of **iSCSI series** controller, and to help user to know the operation of the disk array system easily. Information contained in the manual has been reviewed for accuracy, but not for product warranty because of the various envir onments / OS / settings, Information and specification will be changed without further notice. For any update information, please visit <u>www.rackmountmart.com</u> and your contact windows.

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Model comparison

	RAG281	RAG361
	RSG281	RSG361
Minimum	DDR-333	DDR2-533
RAM	512MB	1GB
Backplane	Backplane	Backplane
iSCSI Data ports	2	4
Single-node or Multi-node	Single	Multi
Trunking / LACP	Yes	Yes
MTU	1500~9000	1500~8000
Snapshot (ESnap)	Yes	Yes
QCopy	Yes	No
S.M.A.R.T. Web page	Yes	No
HDD auto spindown	Yes	No
SAF-TE or SES	SES	SES

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Chapter 1 RAID introduction

1.1 Features

iSCSI series controller is a high-performance RAID controller.

- Backplane solution
 - RAG281: Gigabit LAN (x2) -to- SATA II (x8 bays) RAID controller.
 - **RSG281**: Gigabit LAN (x2) -to- SATA II (x8 bays) RAID controller.
 - **RAG361**: Gigabit LAN (x2) -to- SATA II (x16 bays) RAID controller.
 - **RSG361**: Gigabit LAN (x4) -to- SATA II/SAS (x16 bays) RAID controller.

iSCSI series controller features:

- RAID 6 ready.
- Snapshot-on-the-box (ESnap) / rollback. (not supported on E320-IP)
- QCopy remote replication (not supported on E320-IP)
- SATA II support with SATA I backward compatible.
- N-way mirror.
- On-line volume expansion and RAID level migration.
- Global/dedicated cache configuration by volume.
- S.M.A.R.T. enabled.
- Support SES.
- Support Microsoft VDS (Virtual Disk Service).
- Disk roaming.
- MPIO ready (initiator driver support needed).
- MC/S ready (initiator driver support needed).
- Support iSCSI header and data digest.
- Support CHAP authentication.
- Support Link Aggregation/Trunking.

With proper configuration, **iSCSI Series** controller can provide non-stop service with a high degree of fault tolerance by the use of **iSCSI Series** RAID technology and advanced array management features. The controller features are slightly different between the backplane solution and cable solution.

iSCSI series controller connects to the host system in iSCSI interface. It can be configured to any RAID level. IP series controller provides reliable data protection for servers and the **RAID 6** function ready. The RAID 6 function allows two HDD failures without any impact on the existing data. Data can be recovered from the

remaining data and parity drives. (Data can be recovered from the rest disks/drives.)

Snapshot-on-the-box (ESnap) is a fully usable copy of a defined collection of data that contains an image of the data as it appeared at the point in time, which means a point-in-time data replication. It provides consistent and instant copies of data volumes without any system downtime. Snapshot-on-the-box (ESnap) can keep up to 32 snapshots (ESnap) for all data volumes. **Rollback** feature is provided for restoring the previously-snapshot (ESnap) data easily while continuously using the volume for further data access. The data access is regular as usual including read/write without any impact to end users. The "on-the-box" terminology implies that it does not require any proprietary agents installed at host side. The snapshot (ESnap) is taken at target side and done by **iSCSI** controller. It will not consume anyhost CPU time thus the server is dedicated to the specific or other application. The snapshot (ESnap) copies can be taken manually or by schedule every hour or everyday, depends on the modification.

QCopy service is to build a proprietary replication mechanism for created UDVs. It will copy the logical user volume data exactly to the remote place. The QCopy is built-in service without any host-based application for the data replication and it has easy configuration setup from the Web GUI.

iSCSI Series RAID controller is the most cost-effective disk array controller with completely integrated high-performance and data-protection capabilities which meet or exceed the highest industry standards, and **the best data solution for small/medium business (SMB) users.**



Caution

Snapshot (ESnap) / rollback features need **512MB** RAM or more. Please refer to RAM certification list in Appendix A for more detail.

1.2 Terminology

The document uses the following terms:

RAID	RAID is the abbreviation of " R edundant A rray of I ndependent
	Disks". There are different RAID levels with different degree
	of the data protection, data availability, performance to host
	environment.

PD	The P hysical D isk belongs to the member disk of one specific volume group.		
VG	Volume Group. A collection of removable media. One VG consists of a set of UDVs and owns one RAID level attribute.		
UDV	U ser D ata V olume. Each VG could be divided into several UDVs. The UDVs from one VG share the same RAID level, but may have different volume capacity.		
CV	C ache Volume. The RAID controller uses the on board memory as cache. All RAM (except for the part which is occupied by the controller) can be used as cache. User can divide the cache for one UDV or sharing among all UDVs. Each UDV will be associated with one CV for data transaction. Each CV could be assigned different cache memory size.		
LUN	Logical Unit Number. A logical unit number (LUN) is an unique identifier used on a iSCSI connection which enables it to differentiate among separate devices (each of which is a logical unit).		
GUI	Graphic User Interface.		
RAID width, RAID copy, RAID row (RAID cell in one row)	 RAID width, copy and row are used to describe one VG. E.g.: One 4-disk RAID 0 volume: RAID width= 4; RAID copy=1; RAID row=1. One 3-way mirroring volume: RAID width=1; RAID copy=3; RAID row=1. 		
	 One RAID 10 volume over 3 4-disk RAID 1 volume: RAID width=1; RAID copy=4; RAID row=3. 		
WT	Write-Through cache write policy. A caching technique in which the completion of a write request is not signaled until data is safely stored on non-volatile media. Each data is synchronized in both data cache and the accessed physical disks.		
WB	Write-Back cache write policy. A caching technique in which the completion of a write request is signaled as soon as the data is in cache and actual writing to non-volatile media occurs at a later time. It speeds up system write performance		

	but needs to bear the risk where data may be inconsistent between data cache and the physical disks in one short time interval.		
RO	Set the volume to be R ead- O nly.		
DS	Dedicated S pare disks. The spare disks are only used by one specific VG. Others could not use these dedicated spare disks for any rebuilding purpose.		
GS	G lobal S pare disks. GS is shared for rebuilding purpose. If some VGs need to use the global spare disks for rebuilding, they could get the spare disks out from the common spare disks pool for such requirement.		
DC	Dedicated Cache.		
GC	Global Cache.		
DG	D e G raded mode. Not all of the array's member disks are functioning, but the array is able to respond to application read and write requests to its virtual disks.		
	Self-Monitoring Analysis and Reporting Technology.		
S.M.A.R.T.	Self-Monitoring Analysis and Reporting Technology.		
S.M.A.R.T. WWN	Self-Monitoring Analysis and Reporting Technology. World Wide Name.		
S.M.A.R.T. WWN HBA	Self-Monitoring Analysis and Reporting Technology. World Wide Name. Host Bus Adapter.		
S.M.A.R.T. WWN HBA MPIO	Self-Monitoring Analysis and Reporting Technology. World Wide Name. Host Bus Adapter. Multi-Path Input/Output.		
S.M.A.R.T. WWN HBA MPIO MC/S	Self-Monitoring Analysis and Reporting Technology. World Wide Name. Host Bus Adapter. Multi-Path Input/Output. Multiple Connections per Session		
S.M.A.R.T. WWN HBA MPIO MC/S S.E.S	Self-Monitoring Analysis and Reporting Technology. World Wide Name. Host Bus Adapter. Multi-Path Input/Output. Multiple Connections per Session SCSI Enclosure Services.		
S.M.A.R.T. WWN HBA MPIO MC/S S.E.S NIC	Self-Monitoring Analysis and Reporting Technology. World Wide Name. Host Bus Adapter. Multi-Path Input/Output. Multiple Connections per Session SCSI Enclosure Services. Network Interface Card.		
S.M.A.R.T. WWN HBA MPIO MC/S S.E.S NIC iSCSI	Self-Monitoring Analysis and Reporting Technology.World Wide Name.Host Bus Adapter.Multi-Path Input/Output.Multiple Connections per SessionSCSI Enclosure Services.Network Interface Card.Internet Small Computer Systems Interface.		
S.M.A.R.T. WWN HBA MPIO MC/S S.E.S NIC iSCSI LACP	Self-Monitoring Analysis and Reporting Technology.World Wide Name.Host Bus Adapter.Multi-Path Input/Output.Multiple Connections per SessionSCSI Enclosure Services.Network Interface Card.Internet Small Computer Systems Interface.Link Aggregation Control Protocol.		
S.M.A.R.T. WWN HBA MPIO MC/S S.E.S NIC iSCSI LACP MTU	Self-Monitoring Analysis and Reporting Technology.World Wide Name.Host Bus Adapter.Multi-Path Input/Output.Multiple Connections per SessionSCSI Enclosure Services.Network Interface Card.Internet Small Computer Systems Interface.Link Aggregation Control Protocol.Maximum Transmission Unit.		

	system over the iSCSI data ports.		
iSNS	Internet Storage Name Service.		
SAS	Serial Attached SCSI.		

1.3 RAID levels

RAID 0	Disk striping. RAID 0 needs at least one hard drive.		
RAID 1	Disk mirroring over two disks. RAID 1 needs at least two hard drives.		
N-way mirror	Extension to RAID 1 level. It has N copies of the disk.		
RAID 3	Striping with parity on the dedicated disk. RAID 3 needs at least three hard drives.		
RAID 5	Striping with interspersed parity over the member disks. RAID 3 needs at least three hard drives.		
RAID 6	2-dimensional parity protection over the member disks. RAID 6 needs at least four hard drives.		
RAID 0+1	Mirroring of the member RAID 0 volumes. RAID 0+1 needs at least four hard drives.		
RAID 10	Striping over the member RAID 1 volumes. RAID 10 needs at least four hard drives.		
RAID 30	Striping over the member RAID 3 volumes. RAID 30 needs at least six hard drives.		
RAID 50	Striping over the member RAID 5 volumes. RAID 50 needs at least six hard drives.		
RAID 60	Striping over the member RAID 6 volumes. RAID 60 needs at least eight hard drives.		
JBOD	The abbreviation of " J ust a B unch O f D isks". JBOD needs at least one hard drive.		

Chapter 2 Getting started

2.1 Before starting

Before starting, prepare the following items.

- 1. Check the **"Certification list"** in Appendix A to confirm the hardware setting is fully supported.
- 2. Read the latest release notes before upgrading. Release notes accompany with release firmware.
- 3. A server with a NIC or iSCSI HBA.
- 4. CAT 5e, or CAT 6 network cables for management port and iSCSI data ports. Recommend CAT 6 cables for best performance.
- 5. Prepare storage system configuration plan.
- 6. Management and iSCSI data ports network information. When using static IP, please prepare static IP addresses, subnet mask, and default gateway.
- 7. Gigabit LAN switches. (Recommended) or Gigabit LAN switches with VLAN/LCAP/Trunking functions. (Optional)
- 8. CHAP security information, including CHAP usernames and secrets. (Optional)
- 9. Setup the hardware connection before power up servers and THE controllers. Connect console cable, management port cable, and iSCSI data port cables first.

2.2 iSCSI introduction

iSCSI (Internet SCSI) is a protocol which encapsulates SCSI (Small Computer System Interface) commands and data in TCP/IP packets for linking storage devices with servers over common IP infrastructures. iSCSI provides high performance SANs over standard IP networks like LAN, WAN or the Internet.

IP SANs are true SANs (Storage Area Networks) which allow few of servers to attach to an infinite number of storage volumes by using iSCSI over TCP/IP networks. IP SANs can scale the storage capacity with any type and brand of storage system. In addition, using any type of network (Ethernet, Fast Ethernet, Gigabit Ethernet) and combining operating systems (Microsoft Windows, Linux, Solaris, ...etc.) within the SAN network. IP-SANs also include mechanisms for security, data replication, multi-path and high availability.

Storage protocol, such as iSCSI, has "two ends" in the connection. These ends are the initiator and the target. In iSCSI we call them iSCSI initiator and iSCSI target. The iSCSI initiator requests or initiates any iSCSI communication. It requests all SCSI operations like read or write. An initiator is usually located on the host/server side (either an iSCSI HBA or iSCSI SW initiator).

The iSCSI target is the storage device itself or an appliance which controls and serves volumes or virtual volumes. The target is the device which performs SCSI commands or bridges it to an attached storage device. iSCSI targets can be disks, tapes, RAID arrays, tape libraries, and etc.



Figure 2.2.1

The host side needs an iSCSI initiator. The initiator is a driver which handles the SCSI traffic over iSCSI. The initiator can be software or hardware (HBA). Please refer to the certification list of iSCSI HBA(s) in Appendix A. OS native initiators or other software initiators use the standard TCP/IP stack and Ethernet hardware, while iSCSI HBA(s) use their own iSCSI and TCP/IP stacks on board.

Hardware iSCSI HBA(s) would provide its initiator tool. Please refer to the vendors' HBA user manual. **Microsoft**, **Linux** and **Mac** provide software iSCSI initiator driver. Below are the available links:

1. Link to download the Microsoft iSCSI software initiator: <u>http://www.microsoft.com/downloads/details.aspx?FamilyID=12cb3c1a-15d6-4585-b385-befd1319f825&DisplayLang=en</u>

Please refer to Appendix D for Microsoft iSCSI initiator installation procedure.

 Linux iSCSI initiator is also available. For different kernels, there are different iSCSI drivers. Please check Appendix A for software iSCSI initiator certification list. If user needs the latest Linux iSCSI initiator, please visit Open-iSCSI project for most update information. LinuxiSCSI (sfnet) and Open-iSCSI projects merged in April 11, 2005.

Open-iSCSI website: http://www.open-iscsi.org/ Open-iSCSI README: http://www.open-iscsi.org/docs/README Features: http://www.open-iscsi.org/cgi-bin/wiki.pl/Roadmap Support Kernels: http://www.open-iscsi.org/cgi-bin/wiki.pl/Supported_Kernels Google groups: http://groups.google.com/group/open-iscsi/threads?gvc=2 http://groups.google.com/group/open-iscsi/topics Open-iSCSI Wiki: http://www.open-iscsi.org/cgi-bin/wiki.pl

 ATTO iSCSI initiator is available for Mac. Website: <u>http://www.attotech.com/xtend.html</u>

2.3 Management methods

There are three management methods to manage **P Series** controller, describe in the following:

2.3.1 Web GUI

IP Series controllers support graphic user interface to manage the system. Be sure to connect LAN cable. The default setting of management port IP is DHCP and the DHCP address displays on LCM; user can check LCM for the IP first, then open the browser and type the DHCP address: (The DHCP address is dynamic and user may need to check every time after reboot again.) When DHCP service is not available, IP series controllers use zero config (Zeroconf) to get an IP address.

E.g., on LCM.

192.168.0.200	
RAG281	\leftarrow

http://192.168.0.200

or https://192.168.0.200 (https: connection with encrypted Secure Sockets Layer (SSL). Please be aware of the https function is slower than http.)

Click any function at the first time; it will pop up a dialog to authenticate current user.

Login name: **admin** Default password: **1234**

Or login with the read-only account which only allows seeing the configuration and cannot change setting.

Login name: **user** Default password: **1234**

2.3.2 Console serial port

Use NULL modem cable to connect console port. The console setting is baud rate: **115200**, 8 bits, 1 stop bit, and no parity. Terminal type: **vt100** Login name: **admin** Default password: **1234**

2.3.3 Remote control – secure shell

SSH (secure shell) is required for **iSCSI** controllers to remote login. The SSH client software is available at the following web site: SSHWinClient WWW: <u>http://www.ssh.com/</u> Putty WWW: <u>http://www.chiark.greenend.org.uk/</u>

Host name: **192.168.0.200 (Please check your DHCP address for this field.)** Login name: **admin** Default password: **1234**



Tips RAG281/RAG361/RSG281/RSG361series controller support SSH for remote control. For using SSH, the IP address and the password is required for login.

2.4 Enclosure

2.4.1 LCM

There are four buttons to control theLCM (LCD Control Module), including: ▲ (up), ▼ (down), **ESC** (Escape), and **ENT** (Enter).

After booting up the system, the following screen shows management port IP and model name:

192.168.0.200 RAG281 ←

Press "ENT", the LCM functions "Alarm Mute", "Reset/Shutdown", "Quick Install", "View IP Setting", "Change IP Config" and "Reset to Default" will rotate by pressing \blacktriangle (up) and \blacktriangledown (down).

When there is WARNING or ERROR level of event happening, the LCM shows the event log to give users more detail from front panel too.

The following table is function description.

Alarm Mute	Mute alarm when error occurs.	
Reset/Shutdown	Reset or shutdown controller.	
Quick Install	Quick three steps to create a volume. Please refer to section 3.3 for operation in web UI.	
View IP Setting	Display current IP address, subnet mask, and gateway.	
Change IP Config	Set IP address, subnet mask, and gateway. There are 2 selections, DHCP (Get IP address from DHCP server) or set static IP.	
Reset to Default	Reset to default sets password to default: 1234 , and set IP address to default as DHCP setting. Default IP address: 192.168.0.200 Default subnet mask: 255.255.255.0 Default gateway: 192.168.0.1	

The following is LCM menu hierarchy.

Enhance	[Alarm Mute]	[▲Yes No▼]		
Technology	[Docot/Shutdown]	[Reset]	[▲Yes No▼]	
▲ ▼	[Reset/Shuldown]	[Shutdown]	[▲Yes No▼]	
	[Quick Install]	RAID 0	Volume Size	Adjust Volume
		(RAID 1/RAID 3/	(xxxxxx G)	Size

		RAID 5/RAID 6) xxxxxx GB	Apply The Config	[▲Yes No▼]
		[IP Config] [Static IP]		
	[View IP Setting]	[IP Address] [192.168.010.050]		
		[IP Subnet Mask] [255.255.255.0]		
		[IP Gateway] [192.168.010.254]		
	[Change IP Config]	[DHCP]	[≜Yes No▼]	
			[IP Address]	Adjust IP address
		[Statia ID]	[IP Subnet Mask]	Adjust Submask IP
			[IP Gateway]	Adjust Gateway IP
			[Apply IP Setting]	[▲Yes No▼]
	[Reset to Default]	[▲Yes No▼]		

Caution

Before power off, it is better to execute **"Shutdown"** to flush the data from cache to physical disks.

2.4.2 System buzzer

The system buzzer features are describing in the following:

- 1. The system buzzer alarms 1 second when system boots up successfully.
- 2. The system buzzer alarms continuously when there is error level event happened. The alarm will be stopped after mute.
- 3. The alarm will be muted automatically when the error situation is resolved. E.g., when RAID 5 is degraded and alarm rings immediately, after user changes/adds one physical disk for rebuilding, and when the rebuilding is done, the alarm will be muted automatically.

2.4.3 LED

The LED features are describing as follows:

- 1. **Marquee/Disk Status/Disk Rebuilding LED**: The Marquee/Disk Status/Disk Rebuilding LEDs are displayed in the same LEDs. The LEDs behave for different functions in different stages.
 - I. **Marquee LEDs**: When system powers on and succeeds to boot up, the Marquee LED acts until the system is booting successful.
 - II. **Disk status LEDs**: the LEDs reflect the disk status for the tray. Only On/Off situation.
 - III. **Disk rebuilding LEDs**: the LEDs are blinking when the disks are under rebuilding.
- 2. Disk Access LED: Hardware activated LED when accessing disks (IO).
- 3. **Disk Power LED**: Hardware activated LED when the disks are plugged in and powered.
- 4. **System status LED**: Used to reflect the system status by turn on the LED when error occurs or RAID malfunctioning happens.
- 5. **Management LAN port LED**: GREEN LED is for LAN transmit/receive indication. ORANGE LED is for LAN port 10/100 LINK indication.
- 6. **BUSY LED**: Hardware activated LED when the front-end channel is busy.
- 7. **POWER LED**: Hardware activated LED when system is powered on.

Chapter 3 Web GUI guideline

3.1 IP-series GUI hierarchy

The below table is the hierarchy of IP-series GUI.

Quick Install		→	Step 1 / Step 2 / Step 3 / Confirm
System Config			
	System name	→	System name
	IP address	\rightarrow	DHCP / Static / Address / Mask / Gateway / DNS /
		、	HTTP port / HTTPS port / SSH port
	Language	₹	Language
	Login config	~	Auto logout / Login lock
	Password	→	Old password / Password / Confirm
	Date	→	Time zone / Date / Time / NTP Server
	Mail	→	Mail-from address / Mail-to address / Sent events / SMTP relay / SMTP server / Authentication / Account / Password / Confirm / Send test mail
	SNMP	₹	SNMP trap address / Community / Send events
	Messenger	₹	Messenger IP/hostname / Send events
	System log	→	Server IP/hostname / Port / Facility / Event level
	Server	<u>ـ</u>	Filter / Download / Mute / Clear
	Eventiog	7	Filler / Download / Mule / Clear
iSCSI config		、	
	Entity Property	~	Entity name / ISNS IP
	NIC	→	Aggregation / IP settings for ISCSI ports / Become
	Node	→	(IP-4 series) User / Create / Delete / Rename /
	neae	-	Change Authentication
			(IP series) Change Authentication
	Session	\rightarrow	Delete
	CHAP account	\rightarrow	(IP-4 series) Create / Delete / Modify user information
			(IP series) Create /Delete
Volume config	.	、	Free distant (Olahal anama (Dadia tada anama (Mana
	Physical disk	7	Free disks / Global spares / Dedicated spares / More
	Volume aroup	→	Create / Delete / More information / Rename / Migrate
	User data	→	Attach / Snapshot / Create / Delete / More information
	Volume	_	/ Rename / Extend / Set read/write mode / Set priority
		_	/ Resize Snapshot space / Auto Snapshot
	Cache volume	→	Create / Delete / More information / Resize
	Logical unit	\rightarrow	Attach / Detach
Enclosure man	agement		
	SES config	→	Enable / Disable
	Hardware	→	Auto shutdown
	monitor		

	S.M.A.R.T. → UPS →	(Only for SATA disks, IP series) UPS Type / Shutdown Battery Level / Shutdown Delay / Shutdown UPS
Maintenance		
	Upgrade →	Browse the firmware to upgrade / Export config
	Info →	System information
	Reset to default \rightarrow	Sure to reset to factory default?
	Config import & \rightarrow	Import/Export / Import file
	export	
	Shutdown →	Reboot / Shutdown
Logout		Sure to logout?

3.2 Login

iSCSI series controller supports graphic user interface (GUI) to operate the system. Be sure to connect the LAN cable. The default IP setting is **STATIC**; open the browser and enter:

http://192.168.0.200 (Please check the DHCP address first on LCM)

Click any function at the first time; it will pop up a dialog for authentication.

Login name: admin Default password: 1234

After login, you can choose the function blocks on the left side of window to do configuration.





There are six indicators at the top-right corner for backplane solutions, and cabling solutions have three indicators at the top-right corner.



- 1. **RAID light:** Green means RAID works well. Red represents RAID failure happening.
- 2. **Temperature light:** Green is normal. Red represents abnormal temperature.
- 3. **Voltage light:** Green is normal. Red represents abnormal voltage status.
- 4. **UPS light:** Green is normal. Red represents abnormal UPS status.
- 5. **Fan light:** Green is normal. Red represents abnormal fan status. (Only for backplane solution)
- 6. **Power light:** Green is normal. Red represents abnormal power status. **(Only for backplane solution)**

3.3 Quick install

It is easy to use "Quick install" function to create a volume. Depend on how many physical disks or how many residual spaces on created VGs are free, the system will calculate maximum spaces on RAID levels 0/1/3/5/6. "Quick install" function will occupy all residual VG space for one UDV, and it has no space for snapshot (ESnap) and spare. If snapshot (ESnap) function is needed, please create volumes by manual, and refer to section 4.4 for more detail.

Quick Install function has a smarter policy. When the system is full inserted with 8 HDD or 16 HDD, and all HDD are in the same size, **Quick Install** function lists all possibilities and sizes among different RAID levels, **Quick Install** will use all available HDD for the RAID level which user decides. But, when the system is inserted with different sizes of HDD, e.g., 8*200G HDD and 8*80G, The controller also lists all possibilities and combinations of different RAID Level and different sizes. After user chooses RAID level, user may finds there are still some HDD

are not used (Free Status). The result is from the smarter policy on **Quick Install** which gives user:

- 1. Biggest capacity of RAID level which user chooses and,
- 2. The fewest disk number for the RAID level/volume size.

E.g., user chooses RAID 5 and the controller has 12*200G HDD + 4*80HDD inserted. Then if using all 16 HDD for a RAID 5, then the volume max size is 1200G (80G*15). But in controller, we do smarter check and find out the most efficient use of HDDs, which results controller only use the 200G HDD (Volume size is 200G*11=2200G). Then, the volume size is bigger, and full use of HDD capacity.

Step 1: Select "**Quick install**" then choose the RAID level to set. Please refer to Figure 3.3.1. After choosing the RAID level, click "<u>Next >> •</u>", which links to another page, user can set up "LUN" here.



Figure 3.3.1

Step 2: Please select a LUN number. Access control of host would show as a wildcard "*", which means every host can access this volume. In this page, the "Volume size" can be changed. The maximum volume size is shown. To re-enter the size be sure it has to be less or equal to maximum volume size. Then click

Step 3: Confirm page. Click "<u>Confirm</u>" if all setups are correct. Then a page with the "User data volume" just been created will be shown as Figure 3.3.2.

Done. You can start to use the system now.

No.	Name	Size (GB)	Status	1	2	з <mark>R</mark> %	RAID	#LUN	Snapshot (GB)	VG name	C¥ (MB)
1	QUICK68809	609	Online	0 WB	HI D		RAID 0	1	0.00/0.00	QUICK45427	663

(Figure 3.3.2: A RAID 0 user data volume with the UDV name "QUICK68809", named by the system itself, with the total available volume size 609GB.)

3.4 System configuration

"System config" selection is for the setup of "System name", "IP address", "Language", "Login config", "Password", "Date", "Mail", "SNMP", "Messenger", "System log server" and view "Event log".

<u>System name</u>	System name for identification
<u>IP address</u>	Internet Protocol(IP) address for remote administration
<u>Language</u>	Language preference for WebUI
<u>Login config</u>	Configuration for auto logout and login lock
Password	Administrator's password
Date	System time for event log
<u>Mail</u>	Alert by e-mail
<u>SNMP</u>	Alert via Simple Network Management Protocol(SNMP)
Messenger	Transmits net send and Alerter service messages between clients and servers
System log server	Alert to remote system log server
<u>Event log</u>	System event log to record critical events

Figure 3.4.1

3.4.1 System name

Select "**System name**" to change system name. Default system name composed by model name and serial number of this system, e.g.: P200C-A00001.

/ System config / System name				
System name :	P200C-A00001			
Figure 3.4.1.1				

3.4.2 IP address

Select "**IP** address" to change IP address for remote administration usage. There are 2 selections, DHCP (Get IP address from DHCP server) or static IP. The default setting is DHCP enabled. User can change the HTTP, HTTPS, and SSH port number when the default port number is not allowed on host/server.

/ System config / IP add	dress				
OHCP					
O Static					
Address :					
Mask :					
Gateway :					
DNS:					
MAC:	00:13:78:00:00:DB				
HTTP port :	80				
HTTPS port :	443				
SSH port :	22				
Eiguro 2424					

Figure 3.4.2.1

3.4.3 Language

Select **"Language"** is to set the language shown in Web UI. The option "Auto Detect" will be detected by browser language setting.

/ System config / Language					
Language :	Auto Detect				
	English Simplified Chinese				

Figure 3.4.3.1

3.4.4 Login config

Select "**Login config**" is to set only one admin and set the auto logout timing. The only one admin can prevent multiple users access the same controller in the same time.

- 1. Auto logout: The options are (1) Disable; (2) 5 mins; (3) 30 mins; (4) 1 hour. The system will log out automatically when the user is no response for a period of time.
- 2. Login lock: Disable/Enable. When the login lock is enabled, the system allows only one user to login/modify the system settings.

/ System config / Login config						
Auto logout :	- Disable - 💌					
Login lock :	- Disable - 💌					
	- Disable -					
	- Enable -					

Figure 3.4.4.1

3.4.5 Password

Select **"Password"** is for changing administrator password. The maximum length of admin password is 12 characters.

/ System config / Password	
Old password :	
Password :	
Confirm :	

Figure 3.4.5.1

3.4.6 Date

Select "**Date**" to set up the current date, time, and time zone before using or synchronize time from NTP(Network Time Protocol) server.

/ System config / Date								
Now :	2007/8/1 16:16:18							
Time zone :	Asia/Taipei					•		
Setup date and time	Setup date and time manually							
Date :	2007		1	8		1	1	
Time :	16	;	15		:	53		
O NTP								
Server :								

Figure 3.4.6.1

3.4.7 Mail

Select "**Mail**" to enter at most 3 mail addresses for receiving the event notification. Some mail servers would check "**Mail-from address**" and need authentication for anti-spam. Please fill the necessary fields and select "**Send test mail**" to check whether the email works fine. User can also select which levels of event logs are needed to be sent out by Mail. Default setting is only ERROR and WARNING event logs enabled.

/ System config / Mail	
Mail-from address :	mailman@controller
Mail-to address 1 :	
Send events 1 :	INFO 🗆 WARNING 🗹 ERROR 🗹
Mail-to address 2 :	
Send events 2 :	INFO 🗆 WARNING 🗹 ERROR 🗹
Mail-to address 3 :	
Send events 3 :	INFO 🗆 WARNING 🗹 ERROR 🗹
SMTP relay :	
SMTP server :	
Authentication :	None 🔽
Account :	
Password :	
Confirm :	
Send test mail :	

Figure 3.4.7.1

3.4.8 SNMP

Select "**SNMP**" to set up SNMP trap for alert via SNMP. It allows up to 3 SNMP trap addresses. Default community setting is "public". User can choose the event log levels and the default value of SNMP is INFO event log enabled only.

/ System config / SNMP	
SNMP trap address 1 :	
SNMP trap address 2 :	
SNMP trap address 3 :	
Community :	public
Send events :	INFO 🗹 WARNING 🗖 ERROR 🗖

Figure 3.4.8.1

There are many SNMP tools. The following web sites are for reference:

SNMPc: <u>http://www.snmpc.com/</u> Net-SNMP: <u>http://net-snmp.sourceforge.net/</u>

3.4.9 Messenger

Select "**Messenger**" to set up pop-up message alert via Windows messenger (not MSN). User must enable the service "Messenger" in Windows (Start \rightarrow Control Panel \rightarrow Administrative Tools \rightarrow Services \rightarrow Messenger), and then event logs can be received. It allows up to 3 messenger addresses. User can choose the event log levels and the default values are WARNING and ERROR event logs enabled only.

/ System config / Messenger	
Messenger IP/hostname 1 :	
Messenger IP/hostname 2 :	
Messenger IP/hostname 3 :	
Send events :	INFO 🗖 WARNING 🗹 ERROR 🗹

Figure 3.4.9.1

3.4.10 System log server

Select **"System log server"** to set up alert via syslog protocol. The default port of syslog is 514. User can choose the facility and the event log level. The default values of event level are INFO, WARNING and ERROR event logs enabled.

/ System config / System log server				
Server IP/hostname :				
Port :	514			
Facility :	Local4 💌			
Event level :	INFO 🗹 WARNIN	NG 🗹 ERROR 🗹		

Figure 3.4.10.1

There are some syslog server tools. The following web sites are for reference: WinSyslog: <u>http://www.winsyslog.com/</u>

Kiwi Syslog Daemon: <u>http://www.kiwisyslog.com/</u> Most UNIX systems build in syslog daemon.

3.4.11 Event log

Select "**Event log**" to view the event messages. Press "**Filter**" button to choose the display. Press "**Download**" button will save the whole event log as text file with file name "log-ModelName-SerialNumber-Date-Time.txt" (e.g., log-P200C-A00001-20070801-120000.txt). Press "**Clear**" button will clear event log. Press "**Mute**" button will stop alarm if system alerts.

Filter •	Download •	Mute 🔹	Clear •
INFO:Wed, 08 Aug 2007 18:04:25 CST UDV QUICK68809 has been created. INFO:Wed, 08 Aug 2007 18:04:25 CST			
VG QUICK45427 has been created.			
INFO:Wed, 08 Aug 2007 18:01:17 CST admin login from 192.168.10.121 via Web UI			
	Eiguro 2 / 11 1		

Figure 3.4.11.1

For customizing your own display of event logs, there are total three display methods, on Web UI/Console event log page, popup windows on Web UI, and on LCM. The default setting of these three displays is WARNING and ERROR event logs enabled on Web UI and LCM. The popup is default disabled.

Show events : Pop up events : Show on LCM :	INFO 🗖 INFO 🗖 INFO 🗖	WARNING 🗹 WARNING 🗖 WARNING 🗹		ERRO ERRO ERRO	DR 🗹 DR 🗖 DR 🔽			
			<< Back	0		Confirm	0	

Figure 3.4.11.2

The event log is displayed in reverse order which means the latest event log is on the first page. The event logs are actually saved in the first four hard drives; each hard drive has one copy of event log. For one controller, there are four copies of event logs to guarantee users can check event log most of the time when there is/are failed disk(s).



Tips

Please plug-in anyone of first four hard drives, and then event logs can be saved and appeared in next system boot up. Otherwise, event logs would be gone.

3.5 iSCSI config

"iSCSI config" selection is for the setup of "Entity Property", "NIC", "Node", "Session", and "CHAP account".

Entity property	iSCSI entity property
NIC	iSCSI portal configuration
Node	iSCSI node configuration
Session	iSCSI session information
<u>CHAP account</u>	Add/Remove account for iSCSI node

Figure 3.5.1

3.5.1 Entity property

Select "Entity property" to view the view the entity name of the controller, and setup "**iSNS IP**" for iSNS (Internet Storage Name Service). Add an iSNS server IP address to the iSNS servers list which the iSCSI initiator service can send queries. The entity name of **RSG361** can be changed, but **RAG281/RAG361** can not.

/ iSCSI config / E	ntity property	0	0		<mark>○</mark> 4	<mark>)</mark> %	O
Entity name : iSNS IP :	iqn.1997-10.com.enhance-	tech:ultrastorrs	16i4-	-000a	a6d020)	
					Confirr	n	0

Figure 3.5.1.1

3.5.2 NIC

Select "NIC" to change IP addresses of iSCSI data ports. **RSG361** has four gigabit LAN ports to transmit data, but RAG281/RAG361 have two ports. Each of them must be assigned to one IP address in multi-homed mode unless the link aggregation or trunking mode has been selected. If any two or more ports are set

in link aggregation or trunking mode, they will combine to one line displayed in the screen.

/ iscs:	l confi	g / NIC	-	_	_	_	-) \$
								Aggregat	ion •
Name	LAG	LAG No	DHCP	IP address	Netmask	Gateway	мти	MAC address	Link
LAN1	no	N/A	no	192.168.1.2	255.255.255.0	192.168.1.254	1500	00:13:78:a6:00:94	up
LAN2	no	N/A	no	192.168.2.1	255.255.255.0	192.168.2.254	1500	00:13:78:a6:00:95	down
LAN3	no	N/A	no •	192.168.3.1	255.255.255.0	192.168.3.254	1500	00:13:78:a6:00:96	down
LAN4	no	N/A	no	192.168.4.1	255.255.255.0	192.168.4.254	1500	00:13:78:a6:00:97	down
								Aggregat	ion 🔹

Figure 3.5.2.1

(Figure 3.5.2.1: RSG281 / RSG361, there are 4 iSCSI data ports. Each of them is set to static IP. MTU is 1500.)

No.	Port	Aggregation	DHCP	IP address	Netmask	Gateway	MTU	MAC address
1	LAN1	no	no	192.168.11.193	255.255.255.0	192.168.11.254	1500	00:13:78:00:07:04
2	LAN2	no	no •	192.168.12.193	255.255.255.0	192.168.12.254	1500	00:13:78:00:07:05
Enti	ity name :							

Figure	3.5.2.3
i igai o	0.0.2.0

(Figure 3.5.2.3: RAG281 / RAG361, there are 2 iSCSI data ports. MTU is 1500.)

User can change IP address by clicking the button "**DHCP**" in the "**DHCP**" column. There are 2 selections, DHCP (Get IP address from DHCP server) or static IP.

/ iSCSI config / NIC / IP address				
O DHCP				
 Static 				
Address :	192.168.1.1			
Mask :	255.255.255.0			
Gateway :	192.168.1.254			

Figure 3.5.2.3

Default gateway can be changed by clicking the button " " " " in the "Gateway" column. There is only one default gateway.

MTU (Maximum Transmission Unit) size can be changed by clicking the button " in the "MTU" column.

/ iSCSI config / NIC / MTU				
LAN1	MTU :	1500 - 1500		
		2000 - 4000 6000		



There are some different of supporting MTU size on every models. The range of MTU size on **RSG/281RSG361** is between from 1500 to 8000. **RAG281/RAG361** is between from 1500 to 9000. Default MTU size is 1500. If ti is changed, the setting of MTU size on switching hub and HBA should be set to the same size.



In **RSG/281/RSG361**, Trunking/LACP setting can be changed by clicking the button " Aggregation • ".

/ iSCSI config / NIC / Aggregation		
Aggregation :	• Trunking O LACP	
Address :	192.168.1.1	
Mask :	255.255.255.0	
Gateway :	192.168.1.254	
NIC:	🗖 LAN1 🗖 LAN2 🗖 LAN3 🗖 LAN4	

Figure 3.5.2.5

(Figure 3.5.2.5: RSG281/RSG361, there are 4 iSCSI data ports, select at least two NICs for link aggregation.)

/ iSCSI config / NIC / Aggregati	on
Aggregation :	● Trunking O LACP
Address :	192.168.10.73
Mask :	255.255.255.0
Gateway :	192.168.10.254
NIC :	🗖 LAN1 🗖 LAN2

Figure 3.5.2.6

(Figure 3.5.2.6: RAG281/RAG361, there are 2iSCSI data ports, select two NICs for link aggregate.)

Name	LAG	LAG No	DHCP	IP address	Netmask	Gateway	MTU	MAC address	Link
LAN1	Trunking	ο	no •	192.168.1.1	255.255.255.0	192.168.1.254	1500	00:13:78:a6:00:60	down
LAN2	Trunking	Ο	no •	192.168.1.1	255.255.255.0	192.168.1.254	1500	00:13:78:a6:00:60	down
LAN3	LACP	1	no •	192.168.3.1	255.255.255.0	192.168.3.254	1500	00:13:78:a6:00:62	down
LAN4	LACP	1	no •	192.168.3.1	255.255.255.0	192.168.3.254	1500	00:13:78:a6:00:62	down



(Figure 3.5.2.7: RSG281/RSG361, LAN1 and LAN2 set as Trunking mode. LAN3 and LAN4 set asLACP mode.)

Take an example of **RSG281/RSG361**, LAN1 and LAN2 set as Trunking mode. LAN3 and LAN4 set as LACP mode. To remove Trunking/LACP setting can click the button " • " in the "**LAG**" column, and then will pop up a message to confirm.

In **RSG361**, Trunking/LACP setting can be changed by clicking the button " in the "**Aggregation**" column.

/ iSCSI config / NIC / Aggregation	
Aggregation :	© Multi-homed O Trunking O LACP



(Figure 3.5.2.7: RSG361, select aggregation mode.)

- 1. **Multi-homed**: Default mode. Each of iSCSI data ports is connected by itself and is not link aggregation. Select this mode can remove Trunking/LACP setting.
- 2. **Trunking**: defines the use of multiple iSCSI data ports in parallel to increase the link speed beyond the limits of any one single port.
- 3. **LACP**: The Link Aggregation Control Protocol (LACP) is part of IEEE specification 802.3ad that allows bundling several physical ports together to form a single logical channel. LACP allows a network switch to negotiate an automatic bundle by sending LACP packets to the peer. The advantages of LACP are (1) increases bandwidth. (2) failover when link status fails on a port. For detailed setup steps, please refer to Appendix E: Trunking/LACP setup instructions.



Caution

In **RSG361**, each of iSCSI data ports must be set in different subnet. The other models do not have such limitation.

3.5.3 Node

Single-node / Multi-node:

Select "**Node**" to view the target name for iSCSI initiator. **IP series controller** supports single-node. The node name of **RAG281 and RAG361** exists by default and can not be changed.

/ iSCSI config / E	ntity property		0	0	•	•	0
Entity name : iSNS IP :	iqn.1997-10.com.enhance-tech:ultr	astorrs16i	p-00	0a20	475		
					Confir	rm.	0

Figure 3.5.3.1

(Figure 3.5.3.1: RAG281, RAG361 single-mode.)

RSG281, **RSG361** series controller supports multi-node. There is no default node name on **RSG281 & RSG361** It must be created first before it can be used. When using "Quick install" function, a node name will be created automatically.

	Name	Auth	Po	rtal
-	iqn.1997-10.com.enhance-tech:ultrastorrs16i4-000a6d020:target1	CHAP	192.168.1.1:326	50, 192.168.1.1:0
-	iqn.1997-10.com.enhance-tech:ultrastorrs16i4-000a6d020:target2	CHAP	192.168.1.1:326	50, 192.168.1.1:0

Figure 3.5.3.2

(Figure 3.5.3.2: RSG361, multi-node with two nodes and CHAP enabled.)

/ iSCSI config / Node /	Create
Name :	
Authentication :	None 💌
Portal :	 192.168.1.1:3260 (LAN 1, DHCP: no, MTU: 1500) 192.168.2.1:3260 (LAN 2, DHCP: no, MTU: 1500) 192.168.3.1:3260 (LAN 3, DHCP: no, MTU: 1500) 192.168.4.1:3260 (LAN 4, DHCP: no, MTU: 1500)

Figure 3.5.3.3

(Figure 3.5.3.3: RS16 IP-4, press "Create" to create a node.)

CHAP:

CHAP is the abbreviation of **C**hallenge **H**andshake **A**uthorization **P**rotocol. CHAP is a strong authentication method used with point-to-point for user login. It's a type of authentication in which the authentication server sends the client a key to be used for encrypting the username and password. CHAP enables the username and password to transmitting in an encrypted form for protection.

In **RAG261/RAG361**, to use CHAP authentication, please follow the procedures.

- 1. Click " " in Auth column.
- 2. Select "CHAP".
- 3. Go to / iSCSI config / CHAP page to create account and password.

/ iSCSI config / Node	/ Change Authentication
Authentication :	None CHAP
C :	- 2 5 2 4



4. Select "**None**" to disable CHAP.

In **RSG361**, to use CHAP authentication, please follow the procedures.

- 1. Click " " in Auth column.
- 2. Select "CHAP".
- 3. Go to / iSCSI config / CHAP page to create account and password.

/ iSCSI config / Node ,	/ Change Authentication
Authentication :	None 💌
	None
	CHAP

4. Select the checkbox which enabled CHAP.

			Name			Auth		Porta	I
	iqn.1997-10	com.enhance-tec	ch:ultrastorrs16i4-00	0a6d020:target1		CHAP	192.168	.1.1:3260,	192.168.1.1:0
	iqn.1997-10	com.enhance-tec	ch:ultrastorrs16i4-00	0a6d020:target2		CHAP	192.168	.1.1:3260,	192.168.1.1:0
		llcor			User	0	Create	0	Delete
5. Clic	k "	User	• "		User	0	Create	0	Delete
5. Clic	k "	User	• ". Ser		User	0	Create	0	Delete
5. Clic	k "	User Us cha	• ". ser ap1		User	•	Create	0	Delete



6. Select CHAP user(s) which will use. It's a multi option, can be one or more. If choosing none, CHAP function can not work.



P

After setting CHAP, the initiator in host/server should be set the same Account/Password. Otherwise, user cannot login.

3.5.4 Session

Enter **"Session"** function; it will display iSCSI session and connection information, including the following items:

1. Host (Initiator Name)

Tips

- 2. Error Recovery Level
- 3. Error Recovery Count
- 4. Detail of Authentication status and Source IP: port number.
Delete 🔹

No	Initiator name	TPGT	Error recovery level	Error recovery count
0 1	iqn.1987-05.com.cisco:01.c047c42de54	0x02	0	0
1 1	iqn.1987-05.com.cisco:01.c047c42de54	0x02	0	0
2 1	iqn.1987-05.com.cisco:01.c047c42de54	0×00	0	0

Delete 🔹

Figure 3.5.4.1

(Figure 3.5.4.1: iSCSI Session.)

Pressing the button " will display connection(s).

3.5.5 CHAP account

Enter **"CHAP account"** function to create/delete a CHAP account for authentication. **RAG281/RAG361** can create one CHAP account only, but **RSG361** can create multiple CHAP accounts.

/ iSCSI config / CHAP account / Create								
User :	chap1		(max: 223)					
Secret :	*****	(min: 12, max:	16)					
Confirm :	*****	(min: 12, max:	16)					

Figure 3.5.5.1

(Figure 3.5.5.1:RAG281/RAG361, press "Create" to create a CHAP account.)

	Create •	Delete 🔹
Uran		
chap1		
Figure 3 5 5 2	Create •	Delete •

Figure 3.5.5.2

(Figure 3.5.5.2: create a CHAP account named "chap1".)

RSG361 supports many CHAP accounts; the setting of CHAP account is different from **RSG281/RSG361**

/ iSCSI config / CHAP account / Create									
User :	chap2		(max: 223)						
Secret :	*****	(min: 12, max:	16)						
Confirm :	*****	(min: 12, max:	16)						
Node :	all 1112 1314 ign.2004-08.tw.co	om.qsan:p200c	-000a6d021:target0 👻						

Figure 3.5.5.3

(Figure 3.5.5.3: RSG361, press "Create" to create a CHAP account. It can be enabled by a "Node name" here or empty (disabled). When selecting empty, it can be enabled in "/ iSCSI config / NIC" page later.)

User	Node name
user1	iqn.1997-10.com.enhance-tech:ultrastorrs16i4-000a6d020:target1
user2	

Figure 3.5.5.4

(Figure 3.5.5.4: RSG361, create two CHAP accounts named "user1" and "user2". "user1" is enabled by node name iqn.1997-10.com.enhance-tech:ultrastorRS16 IP-4-000a6d020:target1")

3.6 Volume configuration

"Volume config" selection is for the setup of volume configurations including "Physical disk", "Volume group", "User data volume", "Cache volume", and "Logical unit" functions.

<u>Physical disk</u>	Hard disks to store data
<u>Volume group</u>	Sets of physical disks with RAID functions
<u>User data volume</u>	Slices of volume groups
<u>Cache volume</u>	Dedicated or global cache space for user data volume
Logical unit	Target volumes for hosts access

Figure 3.6.1

3.6.1 Volume relationship diagram



The above diagram describes the relationship of RAID components. One VG (Volume Group) consists of a set of UDVs (User Data Volume) and owns one RAID level attribute. Each VG can be divided into several UDVs. The UDVs from one VG share the same RAID level, but may have different volume capacity. Each UDV will be associated with one specific CV (Cache Volume) to execute the data transaction. Each CV could have different cache memory size from user's modification/setting. LUN is the logical volume/unit, which the users could access through SCSI commands.

3.6.2 Physical disk

Enter **"Physical disk"** to view the status of hard drives inserted in the system. The following are operation tips:

- 1. Multiple select. Select one or more checkboxes in front of the slot number. Or select the checkbox at the top left corner will select all. Check again will select none.
- The list box will disappear if there is no VG or only VG of RAID 0, JBOD. Because these RAID levels cannot be set as dedicated spare disk.
- 3. These three functions **"Free disks"**, **"Global spares**", **"Dedicated spares**" can do multiple selects, too.
- 4. The operations of the other web pages (e.g.: volume config of VG, UDV, CV, LUN pages) are similar to previous steps.

	- Select - 💌	Fre	ee disks 🔹 🔹	Global spa	res o Dei	dicat	ed spares 🔹 🔹
Slat	WWN	Size	VG	Statuc	1	2	Sneed
1	2071001278-98-002	(GB)	name	Good		2	3 OGb
 2	20/10013/0808002	7.4	040	Good			3,868
•	207c001378a8a002	74	VG-R0		🚺 RD		3.0Gb
3	207b001378a8a002	74	VG-R0	Good	🚺 RD		3.0Gb
4	207a001378a8a002	74	VG-R0	Good	🚺 RD		3.0Gb
5	2079001378a8a002	74		Good	🛙 FR		3.0Gb
6	207d001378a8a002	74	VG-R6	Good	🚺 RD		3.0Gb
7	206f001378a8a002	74	VG-R6	Good	🚺 RD		3.0Gb
8	2070001378a8a002	74	VG-R6	Good	🚺 RD		3.0Gb
9	2078001378a8a002	74	VG-R6	Good	🚺 RD		3.0Gb
10	2072001378a8a002	74		Good	🛙 FR		3.0Gb
11	2073001378a8a002	74	VG-R6	Good	🛙 DS		3.0Gb
12	2074001378a8a002	74		Good	🛛 FR		3.0Gb
13	2075001378a8a002	74		Good	🛛 FR		3.0Gb
14	2076001378a8a002	74		Good	🛛 FR		3.0Gb
15	2077001378a8a002	74		Good	🛛 FR		3.0Gb
16	20f5001378a8a002	74		Good	🛛 FR		3.0Gb
 Auto spindo	wn : <u>Disabled</u>						
	- Select - 💌	Fre	ee disks 🔹 💿	Global spa	res o Dei	dicat	ed spares 🔹
	E:		4				



(Figure 3.6.2.1: Physical disks of slot 1,2,3,4 are created for a VG named "VG-R0". Physical disks of slot 6,7,8,9 are created for a VG named "VG-R6". Slot 11 is set as dedicated spare disk of VG named "VG-R6". The others are free disks.)

• PD column description:

Slot	The position of hard drives. The number of slot begins from left to right at the front side. The button next to the number of slot is " More Information " indication. It shows the details of the hard drive.
------	--

WWN	World Wide Name.						
Size (GB)	Capacity of hard drive.						
VG Name	Related volume group name.						
Status	 The status of hard drive. "GOOD" → the hard drive is good. "DEFECT" → the hard drive has the bad blocks. "FAIL" → the hard drive cannot work in the respective volume. 						
Status 1	 "RD" → RAID Disk. This hard drive has been set to RAID. "FR" → FRee disk. This hard drive is free for use. "DS" → Dedicated Spare. This hard drive has been set to the dedicated spare of the VG. "GS" → Global Spare. This hard drive has been set to a global spare of all VGs. "RS" → ReServe. The hard drive contains the VG information but cannot be used. It may be caused by an uncompleted VG set, or hot-plug of this disk in the running time. In order to protect the data in the disk, the status changes to reserve. It can be reused after setting it to "FR" manually. 						
Status 2	 "R" → Rebuild. The hard drive is doing rebuilding. "M"→ Migration. The hard drive is doing migration. 						
Speed	 3.0G → From SATA ATAPI standard, if the disk can support ATAPI IDENTIFY PACKET DEVICE command, and the speed can achieve Serial ATA Gen-2 signaling speed (3.0Gbps). 1.5G → From SATA ATAPI standard, if the disk can support ATAPI IDENTIFY PACKET DEVICE command, and the speed can achieve Serial ATA Gen-1 signaling speed (1.5Gbps). Unknown → The disk doesn't support above command, so the speed is defined as unknown. 						

• PD operations description:

Free disks	Make the selected hard drive to be free for use.
Global spares	Set the selected hard drive(s) to global spare of all VGs.
Dedicated spares	Set hard drive(s) to dedicated spare of selected VGs.

In this page, Syneger Global Tech. controller also provides HDD auto spindown down function to save power. The default value is disabled. User can set up in physical disk page, too. Auto spin-down are supported on RAG281/RAG361 RSG281/RSG361 do not have this feature.

Auto spindown : Disabled	
- Select - 💌	Free disks Global spares Dedicated spares Figure 3.6.2.2
/ Volume config /	' Physical disk / Auto spindown
Auto spindown :	Disabled - Disabled
	30 sec 1 min 5 min 30 min

Figure 3.6.2.3

3.6.3 Volume group

Enter "Volume group" to view the status of each volume group.

• VG column description:

						Create •				Delete •
No.	Name	Total (GB)	Free (GB)	#PD	#UDV	Status	1	2	3	RAID
1	VG-R0	297	267	4	1	Online				RAID 0
2	VG-R6	148	128	4	1	Online				RAID 6
						Create •				Delete •



(Figure 3.6.3.1: There is a RAID 0 with 4 physical disks, named "VG-R0", total size is 297GB, free size is 267GB, related to 1 UDV. Another is a RAID 6 with 4 physical disks, named "VG-R6".)

No.	Number of volume group. The button next to the No. is "More Information" indication. It shows the details of the volume group.			
Name	Volume group name. The button next to the Name is "Rename" function.			
Total(GB)	Total capacity of this volume group.			
Free(GB)	Free capacity of this volume group.			
#PD	The number of physical disks of the volume group.			
#UDV	The number of user data volumes related to the volume group.			
Status	The status of volume group. "Online" → volume group is online. "Fail" → volume group is fail.			
Status 1	"DG" → DeGraded mode. This volume group is not completed. The reason could be lack of one disk or failure of disk.			
Status 2	" \mathbf{R} " \rightarrow \mathbf{R} ebuild. This volume group is doing rebuilding.			
Status 3	"M" → Migration. This volume group is doing migration.			

RAID	The RAID level of the volume group. The button next to the RAID level is " Migrate " function. Click
	" Migrate " can add disk(s) to do expansion or change the RAID level of the Volume group.

• VG operations description:

Create	Create a volume group
Delete	Delete a volume group

3.6.4 User data volume

Enter "User data volume" function to view the status of each user data volume.

		At	tach (Snap	shot	0	(Create	0	Delete	0
No.	Name	Size (GB)	Status	1	2	3	R %	RAID	#LUN	Snapshot (GB)	VG	C ¥ (MB)
1	UDV-01	30	Online	0 WB •	0 HI •			RAID 0	1	9.99/10.00	VG-R0	663
2	UDV-02	20	Online	0 WB	0 HI •	I	46%	RAID 6	1	10.00/10.00) VG-R6	663
		At	tach		Snan	shot		(reste		Delete	
		At	tach d	•	snap T:	snot	•	,	reate	•	Delete	0



(Figure 3.6.4.1: Create a UDV named "UDV-01", related to "VG-R0", size is 30GB, status is online, write back, high priority, related to 1 LUN, with cache volume 663MB, 10GB snapshot (ESnap) space. The other UDV is named "UDV-02", initializing to 46%. E320-IP does not support snapshot feature.)

• UDV column description:

No.	Number of this user data volume. The button in below to the UDV No. is " More Information " indication. In shows the details of the User data volume.	
Name	Name of this user data volume. The button in below to	

	the UDV Name is " Rename " function.
Size(GB)	Total capacity of this user data volume. The button in below to the size is " Extend " function.
Status	The status of this user data volume. "Online" → user data volume is online. "Fail" → user data volume is failed.
Status 1	 "WT" → Write Through. "WB" → Write Back. "RO" → Read Only. The button in below to the status1 is "Set read/write mode" function.
Status 2	 "HI" → HIgh priority. "MD" → MiD priority. "LO" → LOw priority. The button in below to the status2 is "Set Priority" function.
Status 3	 "I" → user data volume is doing initializing. "R" → user data volume is doing rebuilding. "M" → user data volume is doing migration. "P" → user data volume is doing QCopy.
R %	Ratio of initializing or rebuilding.
RAID	The RAID levels that user data volume is using.
#LUN	Number of LUN(s) that data volume is attaching.
Snapshot (ESnap)(GB)	The user data volume size that used for snapshot (ESnap). The button next to the snapshot (ESnap) is " Resize " function to decide the snapshot (ESnap) space. The button next to the resize function is " Auto snapshot (ESnap) " function to setup the frequency of taking snapshots (ESnap). The number means " Free snapshot (ESnap) space " / " Total snapshot (ESnap) space ". If the snapshot (ESnap) UDV has been created, this column will be the creation time.

QCopy	Remote replication function.				
VG name	The VG name of the user data volume.				
CV (MB)	The cache volume of the user data volume.				

• UDV operations description:

Attach	Attach to a LUN.			
Snapshot	hoose a UDV to execute snapshot (ESnap).			
Create	Create a user data volume function.			
Delete	Delete a user data volume function.			

3.6.5 Cache volume

Enter "Cache volume" function to view the status of cache volume.

The global cache volume is a default cache volume, which is created after power on automatically, and cannot be deleted. The size of global cache is based on the RAM size. It is total memory size minus the system usage.

			Create •	Delete 🔹	
	No.	Size	UDV nar	ne	
	1	663	Global		
Free : O (M	в)	1			
			Create •	Delete •	
		Figure 3.6.5.1			

• CV column description:

No.	Number of the Cache volume. The button next to the
	CV No. is "More Information" indication. It shows the

	details of the cache volume.
Size(MB)	Total capacity of the cache volume The button next to the CV size is " Resize " function. The CV size can be adjusted.
UDV Name	Name of the UDV.

• CV operations description:

Create	Create a cache volume function.
Delete	Delete a cache volume function.

If there is no free space for creating a new dedicated cache volume, cut down the global cache size first. After resized, then dedicated cache volume can be created.

Tips The minimum size of global cache volume is **40MB**. The minimum size of dedicated cache volume is **20MB**.

3.6.6 Logical unit number

Enter "Logical unit" function to view the status of attached logical unit number of each UDV.

User can attach LUN by clicking the "<u>Attach</u>". Please refer to Figure 3.6.6.1. "**Host**" must input an initiator node name for access control, or fill-in wildcard "*", which means every host can access the volume. Choose LUN number and permission, then click "<u>Confirm</u>". Please refer to Figure 3.6.6.2. User can assign up to 256 LUNs per system (controller). For the host connection, the host number limitation is 32 per system (controller) in the same time, and 8 for single user data volume (UDV) which means 8 hosts can access the same UDV in the same time.

UDV:	UDV-01 (30GB) 🔽	
Host :	k	
Target :	iqn.2004-08.tw.com.qsan:p200c-000a6d021:target0 💌	
LUN:	- 0 -	
Permission :	Read-only 🙆 Read-write	
	<< Back Confirm	_



(Figure 3.6.6.1: P200C needs to select "Target" (Multi-node), the other models (Single-node) do not have such selection.

		Atta	ch	•	Deta	ch 🔹
_						
	Host	Target	LUN	Permission	UDV name	#Session
	*	iqn.2004-08.tw.com.qsan:p200c-000a6d021:target0	0	Read write	UDV-01	0
	iqn.1991-05.com.microsoft:demo	all	1	Read write	UDV-02	0
		Atta	ch	0	Deta	ch 🔹

Figure 3.6.6.2

(Figure 3.6.6.2: P200C, UDV-01 is attached to LUN 0 with every host can access. UDV-02 is attached to LUN 1 with only initiator note named "iqn.1991-05.com.microsoft:demo" can access. The other models do not display "Target" column.)

• LUN operations description:

Attach	Attach a logical unit number to a user data volume.
Detach	Detach a logical unit number from a user data volume.

The matching rules of access control are from top to down by sequence. For example: there are 2 rules for the same UDV, one is "*", LUN 0; the other is "iqn.host1", LUN 1. The other host "iqn.host2" can login because it matches the rule 1.

The access will be denied when there is no matching rule.

3.6.7 Examples

The followings are examples for creating volumes. Example 1 is to create two UDVs sharing the same CV (global cache volume) and set a global spare disk. Example 2 is to create two UDVs. One shares global cache volume, the other uses dedicated cache volume. Set a dedicated spare disk.

• Example 1

Example 1 is to create two UDVs in one VG, each UDV uses global cache volume. Global cache volume is created after system boots up automatically. So, no action is needed to set CV. Then set a global spare disk. The last, delete all of them.

Step 1: Create VG (Volume Group).

To create the volume group, please follow the procedures:

Name :		VG-5										
RAID Leve	el :	RAID 5	•									
RAID PD 9	slot :	1234						Sele	ct PD		0	
				Figur	e 3.6.7.	1	<< Back	0			Next >>	•
1.	Sele	ct " / Volu	me con	fig / Vo	lume	group".						
2. 3. 4	Click Inpu "	t a VG I Selec Next :	Create Name, t PD • >> •	choose " to c ". Press	a RA hoose "	AID leve the RA	el from AID PD	the slo	e p ot(s) if a	oicl),	klist, pr then pr setups	ess ess are
••	corre	ect.		1 1000							ootapo	are
5.	Done	e. A VG h	as been	created	d.							
							Create	•			Delete	
	No.	Name	Total (GB)	Free (GB)	#PD	#UDV	Status	1	2	з	RAID	
	1	VG-5	114	114	4	0	Online				RAID 5	
							Create	0			Delete	0

Figure 3.6.7.2

(Figure 3.6.7.2: Creating a RAID 5 with 4 physical disks, named "VG-R5". The total size is 114GB. Because of no related UDV there, free size still remains 114GB.)

Step 2: Create UDV (User Data Volume).

To create a data user volume, please follow the procedures.

Name :	UDV-R5-1
VG name :	VG-5 💌
CV No.:	Global (120 MB)
Capacity (GB) :	50
Stripe height (KB) :	64 💌
Block size (B) :	512 💌
Read/Write :	C Write-through cache C Write-back cache
Priority :	High priority O Middle priority O Low priority

Figure 3.6.7.3

<< Back •

Confirm o

- 1. Select "/ Volume config / User data volume".
- Create Click " • " 2.
- 3. Input a UDV name, choose a VG Name and input a size to the UDV; decide the stripe high, block size, read/write mode and set priority, Confirm • " finally click "
- Done. A UDV has been created. 4.
- 5. Do one more time to create another UDV.

No.	Name	Size (GB)	Status	1	2	3	R %	RAID	#LUN	Snapshot (GB)	VG name	CV (MB)
1	UDV-R5-1	50 •	Online	0 WB	0 HI 0	D I	4%	RAID 5	o	0.00/0.00	VG-5	120
2	UDV-R5-2	64	Online	0 WB	0 HI •	I	0%	RAID 5	o	0.00/0.00	VG-5	120



(Figure 3.6.7.4: Create UDVs named "UDV-R5-1" and "UDV-R5-2", related to "VG-R5", the size of "UDV-R5-1" is 50GB, the size of "UDV-R5-2" is 64GB. The status of these UDVs are online, write back, high priority with cache volume 120MB. "UDV-R5-1" is initialing about 4%. There is no LUN attached.)

Step 3: Attach LUN to UDV.

There are 2 methods to attach LUN to UDV.

- 1. In "/ Volume config / User data volume", press " Attach • "
- 2. In "/ Volume config / Logical unit", press "Attach ".

The procedures are as follows:

UDV:	UDV-R5-1 (50GB)
Host :	*
LUN:	- 0 -
Permission :	C Read-only Read-write

Figure 3.6.7.5

- 1. Select a UDV.
- Input "Host", which is an initiator node name for access control, or fillin wildcard "*", which means every host can access this volume. Choose LUN and permission, then click "Confirm .".
- 3. Done.

		Attac	h •	Detach •
Host	LUN	Permission	UDV name	#Session
*	0	Read write	UDV-R5-1	1 •
ign.1991-05.microsoft.com:demo	1	Read write	UDV-R5-2	0

Figure 3.6.7.6

Attach

.

Detach •

(Figure 3.6.7.6: UDV-R5-1 is attached to LUN 0 with any hosts can access. UDV-R5-2 is attached to LUN 1 with only initiator note named "iqn.1991-05.com.microsoft:demo" can access.)



Tips The matching rules of access control are from top to down by sequence. Please refer 3.6.6 for details.

Step 4: Set global spare disk.

To set global spare disks, please follow the procedures.

- 1. Select "/ Volume config / Physical disk".
- Select the free disk(s) by clicking the checkbox of the row, then click
 " Global spares " to set as global spares.
- 3. There is a "GS" icon shown up at status 1 column.

	- Select - 💌 Fre	ee disks 🔹 🔹	Glob	al spares 🔹	Dedicate	ed si	pares 🔹
Slot	WWN	Size (GB)	VG name	Status	1	2	Speed
1	2007001378a40040	38	VG-R5	Good	🖸 RD		1.5Gb
2	2017001378a202d9	38	VG-R5	Good	🖸 RD		1.5Gb
3	2018001378a202d9	38	VG-R5	Good	🖸 RD		1.5Gb
4	2019001378a202d9	38	VG-R5	Good	🖸 RD		1.5Gb
5	201a001378a202d9	38		Good	Ø GS		1.5Gb
6	20c4001378000108	38		Good	🛙 FR		1.5Gb
7	201c001378a202d9	38		Good	🛙 FR		1.5Gb
8	201b001378a202d9	38		Good	🛛 FR		1.5Gb

Figure 3.6.7.7

(Figure 3.6.7.7: Slot 5 is set as global spare disk.)

Step 5: Done. They can be used as iSCSI disks.

Delete UDVs, VG, please follow the steps.

Step 6: Detach LUN from UDV.

In "/ Volume config / Logical unit",

			Attac	h •	Detach •
	Host	LUN	Permission	UDV name	#Session
	*	0	Read write	UDV-R5-1	1 •
~	ign.1991-05.microsoft.com:demo	1	Read write	UDV-R5-2	0
			Attac	h •	Detach •



- Select LUNs by clicking the checkbox of the row, then click
 "Detach ". There will pop up a confirm page.
- 2. Choose "OK".
- 3. Done.

Step 7: Delete UDV (User Data Volume).

To delete the user data volume, please follow the procedures:

- 1. Select "/ Volume config / User data volume".
- 2. Select UDVs by clicking the checkbox of the row.
- 3. Click "______Delete ____". There will pop up a confirm page.
- 4. Choose "OK".

Tips

5. Done. Then, the UDVs are deleted.



When deleting UDV, the attached LUN(s) related to this UDV will be detached automatically, too.

Step 8: Delete VG (Volume Group).

To delete the volume group, please follow the procedures:

- 1. Select "/ Volume config / Volume group".
- 2. Select a VG by clicking the checkbox of the row, make sure that there is no UDV on this VG, or the UDV(s) on this VG must be deleted first.
- 3. Click " Delete ". There will pop up a confirmation page.
- 4. Choose "OK"
- 5. Done. The VG has been deleted.



Tips The action of deleting one VG will succeed only when all of the related UDV(s) are deleted in this VG. Otherwise, it will have an error when deleting this VG.

Step 9: Free global spare disk.

To free global spare disks, please follow the procedures.

- 1. Select "/ Volume config / Physical disk".
- Select the global spare disk by clicking the checkbox of the row, then click "Free disks • "to free disk.

Step 10: Done, all volumes have been deleted.

• Example 2

Example 2 is to create two UDVs in one VG. One UDV shares global cache volume, the other uses dedicated cache volume. First, dedicated cache volume should be created; it can be used in creating UDV. The last, delete them.

Each UDV is associated with one specific CV (cache volume) to execute the data transaction. Each CV could have different cache memory size. If there is no special request in UDVs, it uses global cache volume. Or user can create a dedicated cache for indivifual UDV manually. Using dedicated cache volume, the performance would not be affected by the other UDV's data access.

The total cache size depends on the RAM size and set all to global cache automatically. To create a dedicated cache volume, first step is to cut down global cache size for the dedicated cache volume. Please follow the procedures.

			Create • Delete				
	No.	Size	UDV name				
	1	40	Global				
	2	20	(Empty)				
Free : 603	(MB)						
			Create • Delete				

Step 1: Create dedicated cache volume.

Figure 3.6.7.9

- 1. Select "/ Volume config / Cache volume".
- If there is no free space for creating a new dedicated cache volume, cut down the global cache size first by clicking the button """ in the size column. After resized, click "Confirm "" to return to cache volume page.
- 3. Click "Create " to enter the setup page.
- 4. Fill in the size and click " Confirm ".
- 5. Done. A new dedicated cache volume has been set.



The minimum size of global cache volume is **40MB**. The minimum size of dedicated cache volume is **20MB**.

Step 2: Create VG (Volume Group).

Tips

Please refer to Step 1 of Example 1 to create VG.

Step 3: Create UDV (User Data Volume).

Please refer to Step 2 of Example 1 to create UDV. To create a data user volume with dedicated cache volume, please follow the below procedures.

Name :	UDV-R5-2
VG name :	VG-5 🔽
CV No.:	Dedicated (20 MB)
Capacity (GB) :	64
Stripe height (KB) :	64 💌
Block size (B) :	512 🔽
Read/Write :	O Write-through cache 💿 Write-back cache
Priority :	High priority Middle priority C Low priority
	<< Back Confirm



- 1. Select "/ Volume config / User data volume".
- 2. Click "Create ".
- Input a UDV name, choose a VG Name, select **Dedicated** cache which is created at Step 1, and input the size for the UDV; decide the stripe height, block size, read/write mode and set priority, finally click "Confirm .

No.	Name	Size (GB)	Status	1	2	3	R %	RAID	#LUN	Snapshot (GB)	VG name	C¥ (MB)
1	UDV-R5-1	50	Online	0 WB	0 HI 0			RAID 5	1	0.00/0.00	VG-5	40
2	UDV-R5-2	64 •	Online	() WB	0 HI 0	D I	5%	RAID 5	O	0.00/0.00	VG-5	20

4. Done. A UDV using dedicated cache has been created.

Figure 3.6.7.11

(Figure 3.6.7.11: UDV named "UDV-R5-1" uses global cache volume 40MB, and "UDV-R5-2" uses dedicated cache volume 20MB. "UDV-R5-2" is initialing about 5%.)

			Create •	Delete •
	No.	Size	UDV nam	e
	1	40	Global	
	2	20	UDV-R5-2	2
Free : 603	(MB)			
			Create	Delete

Figure 3.6.7.12

(Figure 3.6.7.12: In "/ Volume config / Cache volume", UDV named "UDV-R5-2" uses dedicated cache volume 20MB.)

Step 4: Attach LUN to UDV.

Please refer to Step 3 of Example 1 to attach LUN.

Step 5: Set dedicated spare disk.

To set dedicated spare disks, please follow the procedures:

- 1. Select "/ Volume config / Physical disk".
- Select a VG from the list box, then select the free disk(s), click
 <u>"Dedicated spares</u> " to set as dedicated spare for the selected VG.
- 3. There is a "DS" icon shown up at status 1 column.

	- Select - 💌 Fre	e disks 🔹 💿	Glob	al spares 🔹	Dedicate	ed si	pares 🔹
Slot	WWN	Size (GB)	¥G name	Status	1	2	Speed
1	2007001378a40040	38	VG-R5	Good	🚺 RD		1.5Gb
2	2017001378a202d9	38	VG-R5	Good	🖸 RD		1.5Gb
3	2018001378a202d9	38	VG-R5	Good	🛙 RD		1.5Gb
4	2019001378a202d9	38	VG-R5	Good	🖸 RD		1.5Gb
5	201a001378a202d9	38	VG-R5	Good	🛙 DS		1.5Gb
6	20c4001378000108	38		Good	🛛 FR		1.5Gb
7	201c001378a202d9	38		Good	🛛 FR		1.5Gb
8	201b001378a202d9	38		Good	🛙 FR		1.5Gb
	Slot 1 2 3 4 5 6 7 7 8 8	Solet Free Slot WWN 1 2007001378a40040 2 2017001378a202d9 3 2018001378a202d9 4 2019001378a202d9 5 201a001378a202d9 6 20c4001378a00108 7 201c001378a202d9 8 201b001378a202d9	Free disks Slot WWN Size (cB) 1 2007001378a40040 38 2 2017001378a202d9 38 3 2018001378a202d9 38 4 2019001378a202d9 38 5 201a001378a202d9 38 6 20c400137800108 38 7 201c001378a202d9 38 8 201b001378a202d9 38	Free disks Glob Slot WWN Size (GB) YG name 1 2007001378a40040 38 VG-R5 2 2017001378a202d9 38 VG-R5 3 2018001378a202d9 38 VG-R5 4 2019001378a202d9 38 VG-R5 5 201a001378a202d9 38 VG-R5 6 20c4001378a202d9 38 VG-R5 7 201c001378a202d9 38 VG-R5 8 201b001378a202d9 38 Image: Comparison of the c	Free disks Global spares Slot WWN Size (GB) YG name Status 1 2007001378a40040 38 VG-R5 Good 2 2017001378a202d9 38 VG-R5 Good 3 2018001378a202d9 38 VG-R5 Good 4 2019001378a202d9 38 VG-R5 Good 5 201a001378a202d9 38 VG-R5 Good 6 20c4001378a202d9 38 VG-R5 Good 7 201a001378a202d9 38 VG-R5 Good 7 201c001378a202d9 38 VG-R5 Good 8 20c4001378a202d9 38 VG-R5 Good 7 201c001378a202d9 38 I Good 8 201b001378a202d9 38 I Good	Select - Free disks Global spares Dedicate Slot WWN Size (GB) VG name Status 1 1 2007001378a40040 38 VG-R5 Good I RD I	Free disks Global spares Dedicated spares Slot WWN Size (GB) VG name Status 1 2 1 2007001378a40040 38 VG-R5 Good 1 RD 1 2 2017001378a202d9 38 VG-R5 Good 1 RD 1 3 2018001378a202d9 38 VG-R5 Good 1 RD 1 4 2019001378a202d9 38 VG-R5 Good 1 RD 1 4 2019001378a202d9 38 VG-R5 Good 1 RD 1 5 201a001378a202d9 38 VG-R5 Good 1 RD 1 6 20c400137800108 38 VG-R5 Good 1 RD 1 6 20c400137800108 38 VG-R5 Good 1 RD 1 7 201c001378a202d9 38 VG-R5 Good 1 FR 1 8 201b001378a202d9 38 I.St Good 1 FR

Figure 3.6.7.13

(Figure 3.6.7.13: Slot 5 has been set as dedicated spare disk of VG named "VG-R5".)

Step 6: Done. The PDs can be used as iSCSI disks.

Delete UDVs, VG, please follow the steps.

Step 7: Detach LUN from UDV.

Please refer to Step 6 of Example 1 to detach LUN.

Step 8: Delete UDV (User Data Volume).

Please refer to Step 7 of Example 1 to delete UDV.

Step 9: Delete VG (User Data Volume).

Please refer to Step 8 of Example 1 to delete VG.

Step 10: Free dedicated spare disk.

To free dedicated spare disks, please follow the procedures:

- 1. Select "/ Volume config / Physical disk".
- Select the dedicated spare disk by clicking the checkbox of the row, then click "Free disks • " to free disk.

Step 11: Delete dedicated cache volume.

To delete the cache volume, please follow the procedures:

- 1. Select "/ Volume config / Cache volume".
- 2. Select a CV by clicking the checkbox of the row.
- 3. Click " Delete ". There will pop up a confirmation page.
- 4. Choose "OK".
- 5. Done. The CV has been deleted.



Caution Global cache volume cannot be deleted.

Step 12: Done, all volumes have been deleted.

3.7 Enclosure management

"Enclosure management" function allows managing enclosure information including **"SES config"**, **"Hardware monitor"**, **"S.M.A.R.T."** and **"UPS"** functions. For the enclosure management, there are many sensors for different purposes, such as temperature sensors, voltage sensors, hard disks, fan sensors, power sensors, and LED status. And due to the hardware characteristics are different among these sensors, for different sensors, they have different polling intervals. Below is the detail polling time intervals:

- 1. Temperature sensors: 1 minute.
- 2. Voltage sensors: 1 minute.
- 3. Hard disk sensors: 10 minutes.
- 4. Fan sensors: 10 seconds, when there are continuous 3 times of error, controller sends ERROR event log.
- 5. Power sensors: 10 seconds, when there are continuous 3 times of error, controller sends ERROR event log.
- 6. LED status: 10 seconds.

<u>SES config</u>	Access control for SES management
Hardware monitor	System monitored voltage, temperature and battery backup module
S.M.A.R.T.	Self-monitoring analysis and reporting technology for physical disks
UPS	Uninterruptible power supply

Figure 3.7.1

3.7.1 SES configuration

SES represents **S**CSI Enclosure **S**ervices, one of the enclosure management standards. Enter "**SES config**" function can enable or disable the management of SES.

		_	Enable e	Disable •
Host	LUN	Permission		UDV name
*	0	Read write		(SES)
 			Enable	Disable •

Figure 3.7.1.1

(Figure 3.7.1.1: Enable SES in LUN 0, and can be accessed from every host.)

The SES client software is available at the following web site:

SANtools: http://www.santools.com/

3.7.2 Hardware monitor

Enter "Hardware monitor" function to view the information of current voltage and temperature.

/ Enclosure management / Hardware monitor	
Item	Information
+1.5V:	+1.52 V (min = +1.44 V, max = +1.63 V)
+3.3V:	+3.28 V (min = +3.10 V, max = +3.55 V)
+5V:	+5.02 V (min = +4.80 V, max = +5.35 V)
+12V:	+12.08 V (min = +11.40 V, max = +12.80 V)
+2.5V:	+2.54 V (min = +2.45 V, max = +2.75 V)
PSU +5V(Backplane):	+5.10 V (min = +4.70 V, max = +5.35 V)
PSU +12V(Backplane):	+12.23 V (min = +11.40 V, max = +12.80 V)
PSU +3.3V(Backplane):	+3.31 V (min = +3.10 V, max = +3.55 V)
Daughter Board:	+43.0 (C) (hyst = +0.0 (C), high = +70.0 (C))
PCI-X BRG:	+33.5 (C) (hyst = +0.0 (C), high = +60.0 (C))
Core Processor:	+46.0 (C) (hyst = +0.0 (C), high = +75.0 (C))
Location 1(Backplane):	+29.0 (C) (hyst = +0.0 (C), high = +45.0 (C))
Location 2(Backplane):	+29.0 (C) (hyst = +0.0 (C), high = +45.0 (C))
Location 3(Backplane):	+29.5 (C) (hyst = +0.0 (C), high = +45.0 (C))
PSU1 (Backplane):	good
PSU2 (Backplane):	good
FAN1(Backplane):	good
FAN2(Backplane):	good
FAN3(Backplane):	good

Auto shutdown :

Figure 3.7.2.1

If "Auto shutdown" has been checked, the system will shutdown automatically when voltage or temperature is out of the normal range. For better data protection, please check "Auto Shutdown".

For better protection and to avoid single short period of high temperature triggering Auto shutdown, ENHANCE TECH controllers use multiple condition judgments for Auto shutdown, below is the detail of when the Auto shutdown will be triggered.

- 1. There are 3 sensors placed on controllers for temperature checking, on core processor, on PCI-X bridge, and on daughter board. ENHANCE TECH controller will check each sensor every 30 seconds. When one of there sensor is over the high temperature value for continuous 3 minutes, the Auto shutdown will be triggered immediately.
- 2. The core processor temperature limit is 85 °C . The PCI-X bridge temperature limit is 80 °C . The daughter board temperature limit is 80 °C .
- 3. If the high temperature situation doesn't last for 3 minutes, ENHANCE TECH controller will not do auto shutdown.

3.7.3 Hard drive S.M.A.R.T. function support

S.M.A.R.T. (Self-Monitoring Analysis and Reporting Technology) is a diagnostic tool for hard drives to give advanced warning of drive failures. **S.M.A.R.T.** provides users chances to take actions before possible drive failure.

S.M.A.R.T. measures many attributes of the hard drive all the time and decide the hard drives which are close to out of tolerance. The advanced notice of possible hard drive failure can allow users to back up hard drive or replace the hard drive. This is much better than hard drive crash when it is writing data or rebuilding a failed hard drive.

Enter **"S.M.A.R.T."** function will display S.M.A.R.T. information of hard drives. The number is the current value; the number in parenthesis is the threshold value. The threshold values of hard drive vendors are different, please refer to vendors' specification for details.

S.M.A.R.T. web page is supported on RS8/RS16 IP. RS16 IP-4 do not have this page because S.M.A.R.T. is only defined for SATA disks.

/ End	closure manac	ement / S	ΜΔΡΤ	_				00
7 EIK	liosure munug	cincin y 3.	PIDALDA I .			=		* 9
Slot	Read error rate	Spin up time	Reallocated sector	Seek error rate	Spin up retries	Calibration retries	Temperature (C)	Status
1		203(63)	253(63)	253(0)	253(157)	253(223)	41	Good
2	100(16)	107(24)	100(5)	100(67)	100(60)		31	Good
3	100(16)	104(24)	100(5)	100(67)	100(60)		32	Good
4	70(6)	96(0)	100(36)	75(30)	100(97)		31	Good
5	100(16)	102(24)	100(5)	100(67)	100(60)		32	Good
6		203(63)	253(63)	253(0)	253(157)	253(223)	28	Good
7	94(16)	99(24)	100(5)	100(67)	100(60)		31	Good
8	200(51)	171(21)	200(140)	200(51)	100(51)	100(51)	30	Good
			Fi	igure 3.7.3. ⁻	1			

3.7.4 UPS

Enter "UPS" function will set UPS (Uninterruptible Power Supply).

UPS Type :	None
Shutdown Battery Level (%) :	5 💌
Shutdown Delay (s):	0
Shutdown UPS :	OFF 🔽
Status :	
Battery Level (%) :	

Figure 3.7.4.1

Confirm •

Currently, the system only support and communicate with smart-UPS function of APC (American Power Conversion Corp.) UPS. Please check detail from http://www.apc.com/.

First, connect the system and APC UPS via RS-232 for communication. Then set up the shutdown values when the power is gone. UPS of other vendors can work fine, but they have no such function of communication.

UPS Type	Select UPS Type. Choose Smart-UPS for APC, None for other vendors or no UPS.					
Shutdown Battery Level (%)	When below the setting level, the system will shutdown. Setting level to " 0 " will disable UPS function.					
Shutdown Delay (s)	If power failure occurred, and the system can not return back to the setting value period, the system will shutdown. Setting delay to " 0 " will disable the function.					
Shutdown UPS	Select ON, when power is gone, UPS will shutdown by itself after the system shutdown successfully. After power comes back, UPS will start working and notify system to boot up. OFF will not.					
Status	The status of UPS. "Detecting" "Running" "Unable to detect UPS" "Communication lost" "UPS reboot in progress" "UPS shutdown in progress"					

	"Batteries failed. Please change them NOW!"
Battery Level (%)	Current percentage of battery level.

3.8 System maintenance

"Maintenance" function allows operation of the system functions including "Upgrade" to the latest firmware, "Info" to show the system version, "Reset to default" to reset all controller configuration values to origin settings, "Config import & export" to export and import all controller configuration except for VG/UDV setting and LUN setting, and "Shutdown" to either reboot or shutdown the system.

Upgrade	Remote upload firmware
<u>Info</u>	System information
<u>Reset to default</u>	Reset to factory default
Config import & export	Import/export configurations
<u>Shutdown</u>	Reboot or shutdown system

Figure 3.8.1

3.8.1 Upgrade

Enter "**Upgrade**" function to upgrade firmware. Please prepare new firmware file named "**xxxx.bin**" in local hard drive, then press "Browse..." to select the file. Click "Confirm •", it will pop up a message "Upgrade system now? If you want to downgrade to the previous FW later, please export your system config first", click "**Cancel**" to export system config first, then click "**OK**" to start to upgrade firmware.

Browse the firmware to upgrade :	Browse
Export config	

Figure 3.8.1.1

Confirm



Figure 3.8.1.2

When upgrading, there is a progress bar running. After finished upgrading, the system must reboot manually.



Please contact with Enhance Tech for latest firmware.

3.8.2 Info

Enter **"Info"** function will display system information (including firmware version), CPU type, installed system memory, and controller serial number.

3.8.3 Reset to default

Enter "**Reset to default**" function, it allows user to reset controller to the factory default setting.

Sure to reset to factory default?

Figure 3.8.3.1

Confirm •

Reset to default sets password to default: **1234**, and set IP address to default as DHCP setting.

Default IP address: 192.168.0.200

Default subnet mask: 255.255.255.0

Default gateway: 192.168.0.1

3.8.4 Config import & export

Enter "**Config import & export**" function, it allows user to save system configurable values: export function, and to apply all configuration: import function. For the volume config setting, the values are available in export function and not available in import function which can avoid confliction/date-deleting between two controllers. That says if one controller already has valuable data on the disks and user may forget it, use import function could return to the original config. If the volume setting was also imported, the user's current data will be cleared.

Import/Export :	Import	
Import file :	Import Import Logical unit only Export	Browse
		Confirm



- 1. **Import:** Import all system configurations including volume config.
- 2. Import Logical unit only: No system and volume configurations.
- 3. **Export:** Export all configurations to a file.



Caution

Import function will import all system configurations including volume config, the user's current data will be cleared.

3.8.5 Shutdown

Enter **"Shutdown"** function; it will display **"Reboot"** and **"Shutdown"** buttons. Before power off, it's better to press "Shutdown" to flush the data from cache to physical disks. The step is better for the data protection.



Figure 3.8.5.1

3.9 Logout

For security reason, **"Logout"** function will allow logout while no user is operating the system. Re-login the system, please enter username and password again.

Chapter 4 Advanced operation

4.1 Rebuild

If one physical disk of the VG which is set as protected RAID level (e.g.: RAID 3, RAID 5, or RAID 6) is FAILED or has been unplugged/removed, then, the VG status is changed to degraded mode, the system will search/detect spare disk to **rebuild** the degraded VG to a complete one. It will detect dedicated spare disk as rebuild disk first, then global spare disk.

RAG/RSG Series controllers support Auto-Rebuild function. When the RAID level allows disk failures which the VG is protected, such as RAID 3, RAID 5, RAID 6, and etc, THE controller starts Auto-Rebuild as below scenario:

Take RAID 6 for example:

1. When there is no global spare disk or dedicated spare disk on the system, THE controller will be in degraded mode and wait until (A) there is one disk assigned as spare disk, or (B) the failed disk is removed and replaced with new clean disk, then the Auto-Rebuild starts. The new disk will be a spare disk to the original VG automatically.

a. If the new added disk is not clean (with other VG information), it would be marked as RS (reserved) and the system will not start "auto-rebuild".

b. If this disk is not belonging to any existing VG, it would be FR (Free) disk and the system will start Auto-Rebuild function.

c. if user only removes the failed disk and plugs the same failed disk in the same slot again, the auto-rebuild will start by this case. But rebuilding in the same failed disk may impact customer data later from the unstable disk status. **RAG/RSG Series** suggests all customers not to rebuild in the same failed disk for better data protection.

2. When there is enough global spare disk(s) or dedicated spare disk(s) for the degraded array, THE controller starts Auto-Rebuild immediately. And in RAID 6, if there is another disk failure happening during the time of rebuilding, THE controller will starts the above Auto-Rebuild scenario as well. And the Auto-Rebuild feature only works at "RUNTIME". It will not work the downtime. Thus, it will not conflict with the "Roaming" function.

In degraded mode, the status of VG is "DG".

When rebuilding, the status of PD/VG/UDV is "**R**"; and "**R%**" in UDV will display the ratio in percentage. After complete rebuilding, "**R**" and "**DG**" will disappear. VG will become complete one.



Tips The list box doesn't exist if there is no VG or only VG of RAID 0, JBOD. Because user cannot set dedicated spare disk for these RAID levels.

Sometimes, rebuild is called recover; these two have the same meaning. The following table is the relationship between RAID levels and rebuild.

RAID 0	Disk striping. No protection of data. VG fails if any hard drive fails or unplugs.
RAID 1	Disk mirroring over 2 disks. RAID 1 allows one hard drive fails or unplugging. Need one new hard drive to insert to the system and rebuild to be completed.
N-way mirror	Extension to RAID 1 level. It has N copies of the disk. N-way mirror allows N-1 hard drives fails or unplugging.
RAID 3	Striping with parity on the dedicated disk. RAID 3 allows one hard drive fail or unplugging.
RAID 5	Striping with interspersed parity over the member disks. RAID 5 allows one hard drive fail or unplugging.
RAID 6	2-dimensional parity protection over the member disks. RAID 6 allows two hard drives fails or unplugging. If it needs to rebuild two hard drives at the same time, it will rebuild the first one, then the other by sequence.
RAID 0+1	Mirroring of the member RAID 0 volumes. RAID 0+1 allows two hard drives fails or unplugging, but at the same array.
RAID 10	Striping over the member RAID 1 volumes. RAID 10 allows two hard drives fails or unplugging, but at different arrays.
RAID 30	Striping over the member RAID 3 volumes. RAID 30 allows two hard drives fails or unplugging, but at different arrays.

RAID 50	Striping over the member RAID 5 volumes. RAID 50 allows two hard drives fails or unplugging, but at different arrays.
RAID 60	Striping over the member RAID 6 volumes. RAID 40 allows four hard drives fails or unplugging, but each two at different arrays.
JBOD	The abbreviation of " J ust a B unch O f D isks". No protection of data. VG fails if any hard drive fails or unplugs.

4.2 VG migration and expansion

To migrate the RAID level, please follow the below procedures. If the VG migrates to the same RAID level of the original VG, it is expansion.

- 1. Select "/ Volume config / Volume group".
- 2. Decide which VG to be migrated, click the button " in the RAID column next the RAID level.
- 3. Change the RAID level by clicking the down arrow mark "RAID 5 ". There will be a pup-up which shows if the HDD is not enough to support the new setting RAID level, click "Select PD " to increase hard drives, then click "Confirm " to go back to setup page. When doing migration to lower RAID level, such as the original RAID level is RAID 6 and user wants to migrate to RAID 0, the controller will evaluate this operation is safe or not, and display "Sure to migrate to a lower protection array?" to give user warning.
- Double check the setting of RAID level and RAID PD slot. If no problem, click "<u>Next >></u>".
- 5. Finally a confirmation page shows detail RAID info. If no problem, click "Confirm • " to start migration. Controller also pops up a message of "Warning: power lost during migration may cause damage of data!" to give user warning. When the power is abnormally off during migration, the data is in high risk.
- Migration starts and it can be seen from the "status 3" of a VG with a running square and an "M". In "/ Volume config / User data volume", it displays an "M" in "Status 4" and complete percentage of migration in "R%".

Name RAID	: Level :	VG-R0 RAID 5	•								
RAID	PD slot :	12345						Sel	ect PD 🛛		
				Fiç	gure 4.2	2.1	<< Back	0		Next >>	0
/ Volur	ne config / \	/olume group	-				Create	•		● ● À ∲ Delete	•
	No.	Name	Total (GB)	Free (GB)	#PD	#UDV	Status	1	2 3	RAI	D
	1	VG-R0	76	71	3	1	Online		M	RAID	5
							Create			Delete	0
				Fig	gure 4.2	.2					

(Figure 4.2.2: A RAID 0 with 2 physical disks migrates to RAID 5 with 3 physical disks.)

No. Name Size (GB) Status 1 2 3 R RAID #LUN Snapshot (GB)	
	VG
1 UDV-R0 5 0.00/0.00	VG-R0

(Figure 4.2.3: A RAID 0 migrates to RAID 5, complete percentage is 12%.)

To do migration/expansion, the total size of VG must be larger or equal to the original VG. It does not allow expanding the same RAID level with the same hard disks of original VG.

During setting migration, if user doesn't setup correctly, controller will pop up warning messages. Below is the detail of messages.

- 1. Invalid VG ID: Source VG is invalid.
- 2. **Degrade VG not allowed:** Source VG is degraded.
- 3. **Initializing/rebuilding operation's going:** Source VG is initializing or rebuilding.

- 4. **Migration operation's going:** Source VG is already in migration.
- Invalid VG raidcell parameter: Invalid configuration. E.g., New VG's capacity < Old VG's capacity, New VG's stripe size < Old VG's stripe size. Or New VG's configuration == Old VG's configuration.
- 6. **Invalid PD capacity:** New VG's minimum PD capacity < Old VG's minimum PD capacity.



Caution

VG Migration cannot be executed during rebuild or UDV extension.

4.3 UDV Extension

To extend UDV size, please follow the procedures.

- 1. Select "/ Volume config / User data volume".
- 2. Decide which UDV to be extended, click the button " "" in the Size column next the number.
- 3. Change the size. The size must be larger than the original, and then click "Confirm " to start extension.
- 4. Extension starts. If UDV needs initialization, it will display an "I" in "Status 3" and complete percentage of initialization in "R%".

/ Volume config /	User data volume / Extend		0 131	0	0	 ● ▲ 	*	• Ø
Size :	10							
Free :	71 (GB)							
		<< Back	0			Confi	rm	0

Figure 4.3.1

/ Vo	lume co	nfig / User d	lata volume	-					-			• •	 ● ●	0 0
			Attach	0	S	napshot	0		Cre	ate	0		Delete	0
	No.	Name	Size (GB)	Status	1	2	3	R %	RAID	#LUN		Snapshot (GB)	VG	CV (MB)
	1	UDV-R0	10	Online	0 WB	HI •	01	58%	RAID 5	0		0.00/0.00	VG-R0	100
1			Attach	0	S	napshot	0		Cre	ate	0		Delete	0
Figure 4.3.2

(Figure 4.3.2: Extend UDV-R0 from 5GB to 10GB.)



4.4 Snapshot (ESnap)/Rollback

RAG/RSG SeriesSnapshot-on-the-box (ESnap) captures the instant state of data in the target volume in a logical sense. The underlying logic is Copy-on-Write -moving out the to-be-written data to certain location whenever a write action occurs since the time of data capture. The certain location, named as **snap UDV**, is essentially a new UDV, which can be attached to a LUN thus provisioned to a host as a disk just like other ordinary UDVs in the system. **Rollback** function restores the data back to the state of any point in time previously captured for whatever unfortunate reason it might be (e.g. virus attack, data corruption, human errors and so on). Snap UDV is allocated within the same VG in which the snapshot (ESnap) is taken, we suggest to reserve **20%** of VG size or more for snapshot (ESnap) space. Please refer to Figure 4.4.1 for snapshot (ESnap) concept.

RAG281/RAG361/RSG281/RSG361 support snapshot / rollback.





Caution

Snapshot (ESnap) / rollback features need **512MB** RAM at least. Please also refer to RAM certification list in Appendix A.

4.4.1 Create snapshot (ESnap) volume

To take a snapshot (ESnap) of the data, please follow the procedures.

- 1. Select "/ Volume config / User data volume".
- Choose a UDV to do snapshot (ESnap) by clicking the button " in the "Snapshot (ESnap) (GB)" column, it will direct to a setup page. The maximum snapshot (ESnap) space is 2TB which user can setup the space no bigger than 2048GB.
- 3. Set up the size for snapshot (ESnap). The size is suggested to be 20% of UDV size at least, then click "Confirm . It will go back to the UDV page and the size will show in snapshot (ESnap) column. It may not be the same as the number entered because some is reserved for snapshot (ESnap) internal usage. There will be 2 numbers in "Snapshot (ESnap) (GB)" column. These numbers mean "Free snapshot (ESnap) space" and "Total snapshot (ESnap) space".
- Choose a UDV by clicking the checkbox of the row and then click
 "
- 5. A snapshot (ESnap) UDV is created with the date and time taken snapshot (ESnap) of the chosen UDV. The snapshot (ESnap) UDV

size is the same as the chosen UDV no matter the actual snapshot (ESnap) UDV data occupies.

6. Attach LUN to UDV, please refer to section 3.6.6 Logical unit number for more detail.

/ Vo	lume co	nfig / User data	a volume							((()	<mark>0</mark>	0	 ● ●	O
			Attach •	_	Snaps	shot e		C	reate	0		0	Delete	0
	No.	Name	Size (GB)	Status	1	2	3 R %	RAID	#LUN	S	napsl (GB)	not	VG	CV (MB
	1	UDV-R0	10 ◎ ₩₩	Online	0 WB •	0 HI •		RAID 0	1	10	.00/1 ©	0.00 ©	VG-R0	100
	2 .	UDV-R-1713	10 ● ≕ ₩	Online	🛙 RO	Ø HI		RAID 0	0	02/1	4 17:	13:35	VG-R0	100
			Attach •		Snaps	shot •		C	reate	0		1	Delete	0
				F	igure	4.4.1.	1							

7. Done. It can be used as a disk.

(Figure 4.4.1.1: No.1 is a RAID 0 UDV. Set snapshot (ESnap) space to 10GB. And now its space is free to snapshot (ESnap). No.2 is a snap UDV taken on 02/14 17:13:35.)

Snapshot (ESnap) has some constraints as the following:

- 1. Minimum RAM size of enabling snapshot (ESnap) function is **512MB**.
- For performance concern and future rollback, the system saves snapshot (ESnap) with names in sequences. For example: three snapshots (ESnap) has been taken and named "snap1"(first), "snap2" and "snap3"(last). When deleting "snap2", both of "snap1" and "snap2" will be deleted because "snap1" are related to "snap2".
- 3. For resource concern, the max number of snapshots (ESnap) is **32**.
- 4. If snapshot (ESnap) space is full, controller will send a warning message about space full and the new taken snapshot (ESnap) will replace the oldest snapshot (ESnap) by rotation sequence.
- 5. Snap UDV cannot be migrated, when doing migration of related VG, snap UDV will fail.
- 6. Snap UDV cannot be extended.

4.4.2 Auto snapshot (ESnap)

The snapshot (ESnap) copies can be taken manually or by schedule such as hourly or daily. Please follow the procedures.

1. Select "/ Volume config / User data volume".

- 2. Create a snapshot (ESnap) space. Please refer to section 4.4.1 for more detail.
- 3. Click " ^(C)" in **"Snapshot (ESnap) (GB)"** column to set auto snapshot (ESnap).
- 4. The auto snapshot (ESnap) can be set at the period of monthly, weekly, daily, or hourly.
- 5. Done. It will take snapshots (ESnap) automatically.

/ Volume config / User data volu	me / Auto Snapshot	● ≝	• • • •	●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●<	O
Months to take snapshots :	☑ All ☑ 01 ☑ 02 ☑ 03 ☑ 04 ☑ 05 ☑ 06 ☑ 07 ☑ 08 ☑ 09 ☑ 10 ☑ 11 ☑ 12				
Weeks to take snapshots :	□ All □ 1 □ 2 □ 3 □ 4 □ 5				
Days to take snapshots :	□ All □ Sun □ Mon □ Tue □ Wed □ Thu □ Fri □ Sat				
Hours to take snapshots :	All 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23				
		<< Back •	1	Confirm	0

Figure 4.4.2.1

(Figure 4.4.2.1: It will take snapshots (ESnap) every month, and keep the last 32 snapshot (ESnap) copies.)



4.4.3 Rollback

The data in snapshot (ESnap) UDV can rollback to original UDV. Please follow the procedures.

- 1. Select "/ Volume config / User data volume".
- 2. Take one or more snapshots (ESnap). Please refer to section 4.4.1 for more detail.
- 3. Click "**Snapshot (ESnap) (GB)**" column to rollback the data, which user can recover data to the time that snapshot (ESnap) is taken.

Rollback function has some constraints as described in the following:

- 1. Minimum RAM size of enabling rollback function is **512MB**.
- 2. When doing rollback, the original UDV cannot be accessed for a while. At the same time, the system connects original UDV and snap UDV, and then starts rollback.
- 3. During rollback data from snap UDV to original UDV, the original UDV can be accessed and the data in it just like it finished rollback. At the same time, the other related snap UDV(s) can not be accessed.
- 4. After rollback process finished, the other related snap UDV(s) will be deleted, and snapshot (ESnap) space will be set to **0**.



Caution

Before executing rollback, it is better to dismount file system for flushing data from cache to disks in OS first. The controller also sends pop-up message when user checks rollback function.

4.5 QCopy remote replication

RAG/RSG Series QCopy service is to build a proprietary replication mechanism for created UDVs. It will copy the logical user volume data exactly to the remote place. The QCopy is built-in service without any host-based application for the data replication and it has easy configuration setup from web UIs. The first QCopy version supports copy from one snapshot (ESnap) UDVs of the source device to the remote target device.

QCopy supports 2 copying tasks in the system which user can setup QCopy to 2 snapshot (ESnap) UDVs for replication at the same time. The target device capacity needs to be greater or equal to the source capacity. (The target UDV capacity is equal or larger than the source UDV capacity.)

To do a QCopy task, please follow the below steps:

1. Take snapshot (ESnap) on the source UDV, for detail setup steps of snapshot (ESnap), please refer to section 4.4.1. When setup UDV block

size, please set 512B for the block size. The QCopy now supports 512B block size only.

- 2. Click QCopy icon "
- 3. Input the remote iSCSI target IP, Click "<u>Next >> •</u>", and wait for a while, when webui recieves the target UDV information and corresponding LUN
- 4. Select remote target LUN of the target UDV which is for QCopy, Click "Confirm •", then there will be a pop-up window to ask user to dismount the target UDV from host/server first. This dismount step is to avoid any data inconsistence from others. After the target UDV is dismounted from host/server, then click "Yes" for confirmation.
- 5. When the QCopy is processing data, on the **\Volume config\User data volume** status colume, there will be an indicator " for QCopy and completed percertage.
- 6. The source system will issue one "INFO" event describes the replication setting.
- 7. If the replication has been completed successfully, the source system will issue one "INFO" event describes the replication started at what time and completed at what time.
- 8. The source system will try to reconect the target system when there is any network error or unstable transferring. And if the replication has been stopped for some interrupts, the source system will issue one "WARNING" event describes the possibility of the interrupts to stop the replication. The possibility to stop the replication may be "network link failure", "the target system not reachable", "connection fail", and etc.
- 9. When the causes to the interrupts have been removed, the users can manually activate the QCopy replication again to restart the replication work. The source system will issue one "INFO" event describes the replication has been resumed.

When the QCopy is completed, user can delete the LUN of the source UDV for avoiding wrong operation or deleting data. When recovery is needed, the operation steps are the same as replication steps, user only needs to setup the QCopy service from target system in reversely.

QCopy is only supported by RAG281/RAG361 only.

		Attac	n e	Sna	apshot	.0		Creat	e •	Dele	te	0
	No.	Name	Size (GB)	Status	1	2	з <mark>R</mark> %	RAID	#LUN	Snapshot (GB)	VG	C¥ (MB)
	1	u1 •	100	Online	0 WB	0 HI •		RAID 0	O	49.99/50.00	v1	611
	2	u1-1716	100 • 🔁 🖶	Online	Ø RO	🛙 ні		RAID 0	о	09/17 17:16:48	v1	611
Rem	ote Cop [.]	y Node Name	: iqn.1997-1	.0.com.en	hance-ti	ech:ultra	astorr	s16ip-00	0a2047	'5:refinitiator.001	-	

Figure 4.5.1 (Figure 4.5.1: setup QCopy on selected snapshot (ESnap) UDV)

Volume config / L	Jser data volume / Remote Copy		6	0	 •	0
Target IP :	192.168.1.2					
Port :	3260					
Direction :	Replicate 💌					

Figure 4.5.2 (Figure 4.5.2: input the target system data port IP address)

'olume config / User	data volume / Remote Copy	0	6		•	6
Target LUN :	0 (300 GB) 💌					
	<< Ba	ck o	_	Confi	irm	

Figure 4.5.3

(Figure 4.5.3: select the target UDV LUN, the target UDV capacity must be equal or larger than the source UDV capacity.)



Figure 4.5.4

(Figure 4.5.4: click OK after the target UDV is dismounted from host/server.)

		Atta	ch 🔹	9	inapsho	it e			Create		Delet	:e	0
	No.	Name	Size (GB)	Status	1	2	3	R %	RAID	#LUN	Snapshot (GB)	VG	CV (MB
	1	u1	100	Online	0 WB •	0 HI •			RAID 0	0	49.99/50.00 • 😮	v1	61
	2	u1-1716	100 •	Online	Ø RO	Ю ні	P	4%	RAID 0	o	09/17 17:16:48	v1	61
Rem	ote Cop	y Node Name	e: iqn.1997	7-10.com.e	enhance	e-tech:u	tras	torrs1	.6ip-000)a20475	5:refinitiator.001		

Figure 4.5.5

(Figure 4.5.5: QCopy is copying, and the completed percentage it 4%)



Enhance Remote Replication supports **512B block size** only for both source and target side.

Caution

Before executing Enhance Remote Replication, it is better to dismount target file system for avoiding any inconsistent data IO. The controller also send pop-up message when user

4.6 Disk roaming

Physical disks can be re-sequenced in the same system or move whole physical disks from system-1 to system-2. This is called disk roaming. Disk roaming has some constraints as described in the following:

- 1. Check the firmware of two systems first. It is better that both have same firmware version or newer.
- 2. Whole physical disks of related VG should be moved from system-1 to system-2 together. The configuration of both VG and UDV will be kept but LUN configuration will be cleared to avoid conflict with system-2.

4.7 Support Microsoft MPIO and MC/S

MPIO (Multi-Path Input/Output) and MC/S (Multiple Connections per Session) both use multiple physical paths to create logical "paths" between the server and the storage device. In the case which one or more of these components fails, causing the path to fail, multi-path logic uses an alternate path for I/O so that applications can still access their data.

Microsoft iSCSI initiator supports multi-path function. Please follow the procedures to use MPIO feature.

- 1. A host with dual LAN ports connects cables to **Enhance Tech** IP/IP-4 series controller.
- 2. Create a VG/UDV, attach this UDV to the host.
- 3. When installing "**Microsoft iSCSI initiator**", please install MPIO driver at the same time.
- 4. Logon to target separately on each port. When logon to target, check "Enable multi-path". Please refer to Appendix D, step 6.
- 5. MPIO mode can be selected on Targets \rightarrow Details \rightarrow Devices \rightarrow Advanced.
- 6. Rescan disk.
- 7. There will be one disk running MPIO.

For detailed setup steps, please refer to Appendix F: MPIO and MC/S setup instructions. MC/S setup steps are very similar to MPIO, please also refer to Appendix: F.

Appendix

A. Certification list

• RAM

RAG281/RAG361RAM Spec: 184pins, DDR333(PC2700), Reg.(register) or UB(Unbufferred), ECC or Non-ECC, from 64MB to 1GB, 32-bit or 64-bit data bus width, x8 or x16 devices, 9 to 11 bits column address.

Vendor	Model
ATP	AG64L72T8SQC4S, 512MB DDR-400 (ECC) with Samsung
ATP	AG28L64T8SHC4S, 1GB DDR-400 with Samsung
ATP	AG28L72T8SHC4S, 1GB DDR-400 (ECC) with Samsung
ATP	AB28L72Q8SHC4S, 1GB DDR-400 (ECC, Reg.) with Samsung
Trenscend	256MB DDR-333 (ECC, Reg.) with PSC
Trenscend	512MB DDR-333 (ECC, Reg.) with Winbond
Trenscend	1GB DDR-333 (ECC, Reg.) with Micron
Unigen	UG732D6688KN-DH, 256MB DDR-333 (Unbuffered) with Hynix
Unigen	UG732D7588KZ-DH, 256MB DDR-333 (ECC, Reg.) with Elpida
Unigen	UG764D7588KZ-DH, 512MB DDR-333 (ECC, Reg.) with Elpida
Unigen	UG7128D7588LZ-DH, 1GB DDR-333 (ECC, Reg.) with Hynix
Unigen	UG7128D7488LN-GJF, 1GB DDR-400 (ECC) with Hynix
Unigen	UG7128D7588LZ-GJF, 1GB DDR-400 (ECC, Reg.) with Hynix
Unigen	UG7128D7588LZ-GJF, 1GB DDR-400 (ECC, Reg.) with Elpida
Unigen	UG732D6688KS-DH, 256MB DDR-333 (Unbuffered, Low profile)
	with Hynix
Unigen	UG764D6688LS-DH, 512MB DDR-333 (Unbuffered, Low profile)
	with Hynix
Unigen	UG718D6688LN-GJF, 1GB DDR-400 with Hynix
Unigen	UG718D6688LN-GJF, 1GB DDR-400 with Elpida

RSG281/RSG361RAM Spec: 240-pin, DDR2-533(PC4300), Reg.(register), UB(Unbufferred), ECC, up to 2GB, 64-bit data bus width (and also 32-bit memory support), x8 or x16 devices, 36-bit addressable, up to 14-bit row address and 10-bit column address.

Vendor	Model
ATP	AJ28K64E8BHE6S, 1GB DDR2-667 (Unbuffered, non-ECC) with SEC
ATP	AJ28K72G8BHE6S, 1GB DDR2-667 (Unbuffered, ECC) with SEC
ATP	AJ64K72F8BHE6S, 512MB DDR2-667 (Unbuffered, ECC) with SEC
Unigen	UG64T7200L8DU-6AL, 512MB DDR2-667 (Unbuffered, ECC) with Elpida

Unigen	UG12T7200L8DU-5AM, 1GB DDR2-533 (Unbuffered, ECC) with
	Elpida
Unigen	UG12T7200L8DR-5AC, 1GB DDR2-533 (Registered, ECC) with
	Elpida

• iSCSI Initiator (Software)

OS	Software/Release Number
Microsoft Windows	Microsoft iSCSI Software Initiator Version 2.04
	System Requirements:
	1. Windows XP Professional with SP2
	2. Windows 2000 Server with SP4
	3. Windows Server 2003 with SP1
	4. Windows Server 2003 R2
Linux	The iSCSI Initiators are different for different Linux Kernels.
	1. For Red Hat Enterprise Linux 3 (Kernel 2.4), install linux-iscsi- 3.6.3 tar
	 For Red Hat Enterprise Linux 4 (Kernel 2.6), use the build-in iSCSI initiator iscsi-initiator-utils-4.0.3.0-4 in kernel 2.6.9
	 For Red Hat Enterprise Linux 5 (Kernel 2.6), use the build-in iSCSI initiator iscsi-initiator-utils-6.2.0.695-0.7.e15 in kernel 2.6.18
Mac	ATTO XTEND 2.0x SAN / Mac iSCSI Initiator
	System Requirements: 1. Mac® OS X v10.3.5 or later

For ATTO initiator, it is not free. Please contact your local distributor for ATTO initiator.

• iSCSI HBA card

Vendor	Model
Adaptec	ASC-7211C (PCI-X, Gigabit, 1 port, TCP/IP offload, iSCSI offload)
HP	NC380T (PCI-Express, Gigabit, 2 ports, TCP/IP offload, iSCSI
	offload)
QLogic	QLA4010C (PCI-X, Gigabit, 1 port, TCP/IP offload, iSCSI offload)
QLogic	QLA4052C (PCI-X, Gigabit, 2 ports, TCP/IP offload, iSCSI offload)

For detailed setup steps of Qlogic QLA4010C, please refer to Appendix G: QLogic QLA4010C setup instructions.

• NIC

Vendor	Model
D-Link	DGE-530T (PCI, Gigabit, 1 port)
HP	NC7170 (PCI-X, Gigabit, 2 ports)
HP	NC360T (PCI-Express, Gigabit, 2 ports, TCP/IP offload)
IBM	NetXtreme 1000 T (73P4201) (PCI-X, Gigabit, 2 ports, TCP/IP
	offload)
Intel	PWLA8490MT (PCI-X, Gigabit, 1 port, TCP/IP offload)
Intel	PWLA8492MT (PCI-X, Gigabit, 2 ports, TCP/IP offload)
Intel	PWLA8494MT (PCI-X, Gigabit, 4 ports, TCP/IP offload)

GbE Switch

Vendor	Model	
Dell	PowerConnect 5324	
Dell	PowerConnect 2724	
Dell	PowerConnect 2708	
HP	ProCurve 1800-24G	
D-Link	DGS-3024	

• Hard drive

Vendor	Model		
Hitachi	Deskstar 7K250, HDS722580VLSA80, 80GB, 7200RPM, SATA, 8M		
Hitachi	Deskstar 7K80, HDS728080PLA380, 80GB, 7200RPM, SATA-II, 8M		
Hitachi	Deskstar E7K500, HDS725050KLA360, 500G, 7200RPM, SATA-II, 16M		
Hitachi	Deskstar 7K80, HDS728040PLA320, 40G, 7200RPM, SATA-II, 2M		
Hitachi	Deskstar T7K500, HDT725032VLA360, 320G, 7200RPM, SATA-II, 16M		
Maxtor	DiamondMax Plus 9, 6Y080M0, 80G, 7200RPM, SATA, 8M		
Maxtor	DiamondMax 11, 6H500F0, 500G, 7200RPM, SATA 3.0Gb/s, 16M		
Samsung	SpinPoint P80, HDSASP0812C, 80GB,7200RPM, SATA, 8M		
Seagate	Barracuda 7200.7, ST380013AS, 80G, 7200RPM, SATA 1.5Gb/s, 8M		
Seagate	Barracuda 7200.7, ST380817AS, 80G, 7200RPM, SATA 1.5Gb/s, 8M,		
	NCQ		
Seagate	Barracuda 7200.8, ST3400832AS, 400G, 7200RPM, SATA 1.5Gb/s,		
	8M, NCQ		
Seagate	Barracuda 7200.9, ST3500641AS, 500G, 7200RPM, SATA 3Gb/s, 16M,		
	NCQ		
Seagate	NL35, ST3400633NS, 400G, 7200RPM, SATA 3Gb/s, 16M		
Seagate	NL35, ST3500641NS, 500G, 7200RPM, SATA 3Gb/s, 16M		
Westem Digital	Caviar SE, WD800JD, 80GB, 7200RPM, SATA, 8M		
Westem Digital	Caviar SE, WD1600JD, 160GB, 7200RPM, SATA, 8M		

Westem Digital	Raptor, WD360GD, 36.7GB, 10000RPM, SATA, 8M
Westem Digital	Caviar RE2, WD4000YR, 400GB, 7200RPM, SATA, 16M, NCQ
Westem Digital	Caviar RE2, WD4000YS, 400GB, 7200RPM, SATA, 16M, NCQ

RSG281/RSG361 support SAS disk.

Vendor	Model	
Fujitsu	MAX3036RC, 36.7G, 15000RPM, SAS, 16M	
Fujitsu	MAX3073RC, 73.5G, 15000RPM, SAS, 16M	
Fujitsu	MAX3147RC, 147.0G, 15000RPM, SAS, 16M	
Hitachi	Ultrastar 15K147, HUS151436VLS300, 36G, 15000RPM, SAS, 16M	
Seagate	Cheetah 15K.4, ST336754SS, 36G, 15000RPM, SAS, 8M	
Seagate	Cheetah 15K.4, ST373455SS, 73G, 15000RPM, SAS, 8M	

Some of SAS commands in Fujitsu SAS disks do not follow SAS standard. Fujitsu SAS disks are not recommended.

B. Event notifications

Level	Туре	Description
Info	Disk inserted	Info: Disk <slot> is inserted.</slot>
Info	Disk removed	Info: Disk <slot> is removed.</slot>
Warning	S.M.A.R.T. threshold exceed condition	 Warning: Disk <slot> S.M.A.R.T. threshold exceed condition occurred for attribute of</slot> 1. read error rate 2. spin up time 3. reallocated sector count 4. seek error rate 5. spin up retries 6. calibration retries
Warning	S.M.A.R.T.	Warning: Disk <slot>: Failure to get S.M.A.R.T</slot>

• PD/S.M.A.R.T. events

• Physical HW events

Level	Туре	Description
Warning	ECC error	Warning: Single-bit ECC error is detected.
Error	ECC error	Error: Multi-bit ECC error is detected.
Info	ECC DIMM	Info: ECC Memory is installed.
	Installed	-

Info	Non-ECC installed	Info: Non-ECC Memory is installed.
Error	Host chip failure	Error: Host channel chip failed.
Error	Drive chip failure	Error: Drive channel chip failed.
Warning	Ethernet port failure	Warning: GUI Ethernet port failed.

• HDD IO events

Level	Туре	Description
Warning	Disk error	Error: Disk <slot> read block error.</slot>
Warning	Disk error	Error: Disk <slot> writes block error.</slot>
Warning	HDD failure	Error: Disk <slot> is failed.</slot>
Warning	Channel error	Error: Disk <slot> IO incomplete.</slot>

• SES events

Level	Туре	Description
Info	SES load conf. OK	Info: SES configuration has been loaded.
Warning	SES Load Conf.	Error: Failed to load SES configuration. The
_	Failure	SES device is disabled.
Info	SES is disabled	Info: The SES device is disabled.
Info	SES is enabled	Info: The SES device is enabled

• Environmental events

Level	Туре	Description
Info	Admin Login OK	Info: Admin login from <ip console="" or="" serial=""> via <web console="" or="" ui="">.</web></ip>
Info	Admin Logout OK	Info: Admin logout from <ip console="" or="" serial=""> via <web console="" or="" ui="">.</web></ip>
Info	iSCSI data port login	Info: iSCSI login from <iqn> (<ip:port Number>) succeeds.</ip:port </iqn>
Warning	iSCSI data port login reject	 Warning: iSCSI login from <iqn> (<ip:port Number>) was rejected, reason of</ip:port </iqn> 1. initiator error 2. authentication failure 3. authorization failure 4. target not found 5. unsupported version 6. too many connections 7. missing parameter 8. session does not exist 9. target error 10. out of resources 11. unknown
Error	Thermal critical	Error: System Overheated!!! The system will do the auto shutdown immediately.

Warning	Thermal warning	Warning: System temperature is a little bit
Error	Voltage critical	Error: System voltages failed!!! The system will do the auto shutdown immediately
Warning	Voltage warning	Warning: System voltage is a little bit higher/lower.
Info	PSU restore	Info: Power <number> is restored to work.</number>
Error	PSU Fail	Error: Power <number> is out of work.</number>
Info	Fan restore	Info: Fan <number> is restore to work.</number>
Error	Fan Fail	Error: Fan <number> is out of work.</number>
Error	Fan non-exist	Error: System cooling fan is not installed.
Error	AC Loss	Error: AC loss for the system is detected.
Info	UPS Detection OK	Info: UPS detection succeed
Warning	UPS Detection Fail	Warning: UPS detection failed
Error	AC Loss	Error: AC loss for the system is detected
Error	UPS power low	Error: UPS Power Low!!! The system will do the auto shutdown immediately.
Info	Mgmt Lan Port Active	Info: Management LAN Port is active.
Warning	Mgmt Lan Port Failed	Warning: Fail to manage the system via the LAN Port.
Info	RTC Device OK	Info: RTC device is active.
Warning	RTC Access Failed	Warning: Fail to access RTC device
Info	Reset Password	Info: Reset Admin Password to default.
Info	Reset IP	Info: Reset network settings set to default.

• System config events

Level	Туре	Description
Info	Sys Config. Defaults Restored	Info: Default system configurations restored.
Info	Sys NVRAM OK	Info: The system NVRAM is active.
Error	Sys NVRAM IO Failed	Error: Can't access the system NVRAM.
Warning	Sys NVRAM is full	Warning: The system NVRAM is full.

• System maintenance events

Level	Туре	Description
Info	Firmware Upgraded	Info: System firmware has been upgraded
Error	Firmware Upgraded Failed	Error: System firmware upgrade failed.
Info	System reboot	Info: System has been rebooted
Info	System shutdown	Info: System has been shutdown.
Info	System Init OK	Info: System has been initialized OK.
Error	System Init Failed	Error: System cannot be initialized in the last boot up.

• LVM events

Level	Туре	Description
		· · · · ·
Info	VG Created OK	Info: VG <name> has been created.</name>
Warning	VG Created Fail	Warning: Fail to create VG <name>.</name>
Info	VG Deleted	Info: VG <name> has been deleted.</name>
Info	UDV Created OK	Info: UDV <name> has been created.</name>
Warning	UDV Created Fail	Warning: Fail to create UDV <name>.</name>
Info	UDV Deleted	Info: UDV <name> has been deleted.</name>
Info	UDV Attached OK	Info: UDV <name> has been LUN-attached.</name>
Warning	UDV Attached Fail	Warning: Fail to attach LUN to UDV <name>.</name>
Info	UDV Detached OK	Info: UDV <name> has been detached.</name>
Warning	UDV Detached Fail	Warning: Fail to detach LUN from Bus
_		<number> SCSI_ID <number> LUN <number>.</number></number></number>
Info	UDV_OP Rebuild	Info: UDV <name> starts rebuilding.</name>
	Started	
Info	UDV_OP Rebuild	Info: UDV <name> completes rebuilding.</name>
	Finished	
Warning	UDV_OP Rebuild	Warning: Fail to complete UDV <name></name>
	Fail	rebuilding.
Info	UDV_OP Migrate	Info: UDV <name> starts migration.</name>
	Started	
Info	UDV_OP Migrate	Info: UDV <name> completes migration.</name>
	FINISNED	Maming: Fail to complete LIDV/ chames
warning	UDV_OP Migrate	warning: Fail to complete UDV <name></name>
Warning		Marning: VC champes is under degraded mode
Warning		Warning: VG <name> is under degraded mode.</name>
warning	UDV Degraded	
Info	LIDV/Init OK	Info: LIDV <names completes="" initialization<="" th="" the=""></names>
Warning		Warning: Fail to complete LIDV <name></name>
warning	Initialization	initialization
Warning		Frror: IO failure for stripe number <number> in</number>
Warning		UDV <name></name>
Warning	VG Failed	Error: Fail to access VG <name>.</name>
Warning	UDV Failed	Error: Fail to access UDV <name>.</name>
Warning	Global CV	Error: Fail to adjust the size of the global cache.
5	Adjustment Failed	
Info	Global Cache	Info: The global cache is OK.
Error	Global CV Creation	Error: Fail to create the global cache.
	Failed	
Info	UDV Rename	Info: UDV <name> has been renamed as</name>
		<name>.</name>
Info	VG Rename	Info: VG <name> has been renamed as</name>
		<name>.</name>
Info	Set VG Dedicated	Info: Assign Disk <slot> to be VG <name></name></slot>
	Spare Disks	dedicated spare disk.
Info	Set Global Disks	Info: Assign Disk <slot> to the Global Spare</slot>
		Disks.
Info	UDV Read-Only	Info: UDV <name> is a read-only volume.</name>

Info	WRBK Cache	Info: Use the write-back cache policy for UDV
	Policy	<name>.</name>
Info	WRTHRU Cache	Info: Use the write-through cache policy for UDV
	Policy	<name>.</name>
Info	High priority UDV	Info: UDV <name> is set to high priority.</name>
Info	Mid Priority UDV	Info: UDV <name> is set to mid priority.</name>
Info	Low Priority UDV	Info: UDV <name> is set to low priority.</name>
Error	PD configuration	Error: PD <slot> lba <#> length <#> config</slot>
	read/write error	<read write="" =""> failed.</read>
Error	PD read/write error	Error: PD <#> lba <#> length <#> <read write="" =""></read>
		error.
Error	UDV recoverable	Error: UDV <name> stripe <#> PD <#> lba <#></name>
	read/write error	length <#> <read write="" =""> recoverable</read>
Error	UDV unrecoverable	Error: UDV <#> stripe <#> PD <#> lba <#>
	read/write error	length <#> <read write="" =""> unrecoverable</read>
Info	UDV stripe rewrite	Info: UDV <name> stripe <#> rewrite column</name>
	start/fail/succeed	bitmap <bitmap> <started failed="" finished="" ="">.</started></bitmap>

• Snapshot (ESnap) events

Level	Туре	Description
Warning	Allocate Snapshot (ESnap) Mem Failed	Warning: Fail to allocate snapshot (ESnap) memory for UDV <name>.</name>
Warning	Allocate Snapshot (ESnap) Space Failed	Warning: Fail to allocate snapshot (ESnap) space for UDV <name>.</name>
Warning	Reach Snapshot (ESnap) Threshold	Warning: The threshold of the snapshot (ESnap) of UDV <name> has been reached.</name>
Info	Snapshot (ESnap) Delete	Info: The snapshot (ESnap) of UDV <name> has been deleted.</name>
Info	Snapshot (ESnap) replaced	Info: The oldest snapshot (ESnap) version of UDV <name> has been replaced by the new one.</name>
Info	Take a Snapshot (ESnap)	Info: Take a snapshot (ESnap) to UDV <name>.</name>
Info	Set Size for Snapshot (ESnap)	Info: Set the snapshot (ESnap) size of UDV <name> to <number> GB.</number></name>
Info	Snapshot (ESnap) rollback start	Info: The snapshot (ESnap) of UDV <name> rollback start.</name>
Info	Snapshot (ESnap) rollback finish	Info: The snapshot (ESnap) of UDV <name> rollback finish.</name>

QCopy events

Level	Туре	Description
Info	QCopy Starts	Info: QCopy start, Target <node name="">, IP x.x.x.x ,Type Duplicate</node>
Info	QCopy Restarts	Info: QCopy restart, Target <node name="">, IP</node>

		x.x.x.x,Type Duplicate
Warning	QCopy Connection	Warning: QCopy connection fail
	Down	
Warning	QCopy Connection	Warning: QCopy task was aborted
	Retry	
Warning	QCopy Task	Warning: QCopy task was aborted.
U	Setting	reason :UDV LBA block size ONLY support 512
		bytes

C. Known issues

1. Microsoft MPIO is not supported on Windows XP or Windows 2000 Professional.

Workaround solution: Using Windows Server 2003 or Windows 2000 server to run MPIO.

D. Microsoft iSCSI Initiator

Here is the step by step to setup Microsoft iSCSI Initiator. Please visit Microsoft website for latest iSCSI initiator. The following setup may not use the latest Microsoft iSCSI initiator.

- 1. Run Microsoft iSCSI Initiator version 2.03. Please see Figure D.1.
- 2. Click "**Discovery**".

iSCSI Initiator Properties	×
General Discovery Targets Persistent Targets Bound Volum	nes/Devices
The iSCSI protocol uses the following information to unividentify this initiator and authenticate targets.	quely
Initiator Node Name: iqn. 1991-05. com.microsoft: demo	
To rename the initiator node, click Change.	hange
To authenticate targets using CHAP, click Secret to specify a CHAP secret.	Secret
To configure IPSec Tunnel Mode addresses, click	unnel
OK Cancel	Apply
	1477J

Figure D.1

3. Click "**Add**". Input IP address or DNS name of iSCSI storage device. Please see Figure D.2.

Type the IP address or DNS nam want to add. Click Advanced to s session to the portal.	e and socket numbe select specific setting	r of the portal you gs for the discovery
IP address or DNS name:	Port:	
192.168.11.229	3260	<u>A</u> dvanced

4. Click "**OK**". Please see Figure D.3.

192.	ress 168.11.22	Port 9 3260	Adapter Default	IP Address Default
	Add		<u>R</u> emove	Refresh
jSNS : Nam	Servers — ne			

Figure D.3

5. Click "**Targets**". Please see Figure D.4.

Figure D.4

6. Click "Log On". Please see Figure D.5. Check "Enable multi-path" if running MPIO.



Figure D.5

7. Click "**Advance...**" if CHAP information is needed. Please see Figure D.6.

Land a dark	
Local <u>a</u> dapter:	Default
Source <u>I</u> P:	Default
<u>T</u> arget Portal:	Default
CRC / Checksur	n
Data digest	Header digest
CHAP logon	information
CHAP helps ens	ure data security by providing authentication between
a target and an specify the same for this initiator.	nitiator trying to establish a connection. To use it a target CHAP secret that was configured on the target
a target and an specify the same for this initiator.	nitiator trying to establish a connection. To use it e target CHAP secret that was configured on the target iqn.1991-05.com.microsoft:demo
a target and an specify the same for this initiator. User name: Target <u>s</u> ecret:	nutator trying to establish a connection. To use it e target CHAP secret that was configured on the target iqn.1991-05.com.microsoft.demo
a target and an specify the same for this initiator. User name: Target <u>s</u> ecret: <u>P</u> erform muti	nutator trying to establish a connection. To use it e target CHAP secret that was configured on the target iqn.1991-05.com.microsoft.demo

Figure D.6

- 8. Click "OK". The status would be "Connected". Please see Figure D.7.
- 9. Done, it can connect to an iSCSI disk.

General Discovery Targets Persistent Targ	jets Bound Volumes/Devices
Select a target and click Log On to access the target. Click details to see information about the devices for that target.	storage devices for that e sessions, connections and
Targets:	
Lign 2004-08 twi com gsam p60e-0000000ed d	Status
Details	og On Rgfresh

Figure D.7

The following procedure is to log off iSCSI device.

1. Click "**Details**". Please see Figure D.8.

get Properties		2
essions Devices Properti	es	
This target has the following	sessions;	
Identifier		
fffffff8577c684-4000	01370000000a	
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
	Log off	Refresh
Session Properties		
Target Portal Group:	1	
Status:	Connected	
Connection Count:	1	
- Session Connections	and a second second second	
this session are load balar	nections within need, click	Connections
Connections.	-	
	OK Cancel	Apply

Figure D.8

- 2. Check the Identifier, which will be deleted.
- 3. Click "Log off".
- 4. Done, the iSCSI device log off successfully.

E. Trunking/LACP setup instructions

Here is the step by step to setup Trunking and LACP. There are 2 kinds of scenarios for Trunking/LACP. Please see Figure E.1.



The setup instructions are in the following figures.

1. Create a VG with RAID 5, using 3 HDDs.

/ Volur	ne config / V	/olume group		-	-	-	_	0	0	0	 <!--</th--><th></th><th>O Ø</th>		O Ø
							Create (Delet	e	0
	No.	Name	Total (GB)	Free (GB)	#PD	#UDV	Status	1	2	3	F	RAID	J.
	1	R5	76	76	3	0	Online				RA	AID 5	5
							Create d				Delet	e	0
				Fig	ure E.2								

2. Create a UDV by using the RAID 5 VG.

/ Vol	lume coi	nfig / User o	lata volume	-		-		-	-	0	0 5		● ◆	0 0
-1			Attach	0	Sn	apshot	0		Creat	e o		De	lete	0
	No.	Name	Size	Status	1	2	3	R %	RAID	#LUN	Snap (G	shot ^{B)}	VG	CV (MB)
	1	R5 •	10 ● ⇄ ₩	Online	0 WB •	0 HI 0	1	14%	RAID 5	0	0.00/	0.00 ©	R5	100
			Attach	0	Sr	apshot	0		Creat	:e o		De	lete	0
					Fig	jure E.	3							

3. Run Microsoft iSCSI initiator 2.03 and check the Initiator Node Name.

iSCSI Initiator Properties	×
General Discovery Targets Persistent Targets Bound Volume	es/Devices
The iSCSI protocol uses the following information to uniq identify this initiator and authenticate targets.	uely
Initiator Node Name: iqn. 1991-05. com. microsoft: qa-chrischou	a
To rename the initiator node, click Change.	ange
To authenticate targets using CHAP, click Secret to <u>S</u> ecrify a CHAP secret.	ecret
To configure IPSec Tunnel Mode addresses, click	unnel
OK Cancel	Apply

Figure E.4

4. Attaching LUN to R5 UDV. Input the Initiator Node Name in the Host field.

/ Volume config / Lo	ogical unit / Attach	_	0	0 6	0	 	•	0 0
UDV :	R5 (10GB) 🔽							
Host :	iqn.1991-05.com.microsoft:demo							
LUN:	- 0 -							
Permission :	O Read-only							
		<< Back	0		1	Confi	rm	0

Figure E.5

5. Done, please check the settings.

/ Volume	e config / Logical unit			● ● ≣ - -	
			Attach	0	Detach 🔹
	Host	LUN	Permission	UDV name	#Session
	iqn.1991-05.com.microsoft:demo	0	Read write	R5	1 <u>Session</u>
			Attach	0	Detach 🔹



6. Check iSCSI settings. The IP address of iSCSI data port 1 is 192.168.11.229. Using port 1 as Trunking or LACP. Click the blue square in "Aggregation" field to set Trunking or LACP.

/ S ¹	ystem (config / iSCSI		_	_	_	0	
						iSNS	0	Authentication •
No.	Port	Aggregation	DHCP	IP address	Netmask	Gateway	мти	MAC address
1	LAN1	no Im	no	192.168.11.229	255.255.255.0	192.168.11.229	1500	00:13:78:00:02:00
2	LAN2	no	no	192.168.12.229	255.255.255.0	192.168.12.254 •	1500 •	00:13:78:00:02:01
Enti	ty name	e :	iqn.2004	-08.tw.com.qsan:p	120c-000a00021			
						iSNS	0	Authentication •

Figure E.7

7. Select "Trunking". If LACP is needed, please see Figure E.12.

/ Syste	em config / iSCSI / A	ggregation	_	-		0	0	○ ≩	•	0 Ø
LAN1	Aggregation :	O Multi-homed Trunking O LACP								
0				<< Back	0		9	Confi	rm	0
			Figure E.8			8				

8. Now, the setting is in Trunking mode.

/ Syster	n config / iSCSI			-		0 111	
					iSNS	0	Authentication
No. Por	Aggregation	DHCP	IP address	Netmask	Gateway	мти	MAC address
1 lag0	Trunking	no	192.168.11.229	255.255.255.0	192.168.11.229	1500 ©	00:13:78:00:02:00
Entity na	me:	iqn.2004	4-08.tw.com.qsan:p	120c-000a00021			
i.					iSNS	0	Authentication •
				Figure E.9			

9. Enable switch Trunking function of port 21 and 23. Below is an example of Dell PowerConnect 5324. Go to Figure E.14 for next step.



Figure E.10

10. Select "LACP". If Trunking is needed, please see Figure E.8.

/ Syste	em config / iSCSI / A	lggregation	-	01	0	0	 		O
LAN1	Aggregation :	O Multi-homed O Trunking ⊙ LACP							
			<< Back	0		(Confir	m	0



11. Now, the setting is LACP mode.

/ s	ystem	config / iSCSI		_	_	_	0	
						iSNS	0	Authentication •
No.	Port	Aggregation	DHCP	IP address	Netmask	Gateway	мти	MAC address
1	lag0	LACP	no	192.168.11.229	255.255.255.0	192.168.11.229	1500 ®	00:13:78:00:02:00
Enti	ty nam	ie :	iqn.2004	4-08.tw.com.qsan:p	120c-000a00021			
						iSNS	0	Authentication •

Figure E.12

12. Enable switch LACP function of port 21 and 23. Below is an example of Dell PowerConnect 5324.

🖉 Dell OpenManage Switch A	dministrator - Microsoft Internet Explorer		<u>-0×</u>
<u>File E</u> dit <u>View</u> F <u>a</u> vorites	Tools Help		
🔇 Back 🔹 🕤 👻 😰 🏠	- 🔑 Search 🔅 Favorites 🙆 🖓 🤹	∃ <mark>, </mark>	
Address) http://192.168.10.2	52/		✓ OG Links ※
Dell OpenManage Switc	h Administrator	Support Help	About Log Out
DØLL			PowerConnect 5324
192.168.10.252	LAG Membership		
Home System Switch Address Tables Address	LAG Membership	Apply (Manges	Print Refresh 20 21 22 23 24 L L 1 1
			Turnshad alter
iej javascript:pre5ubmit();			V Trusted sites

Figure E.13

13. Add Target Portals in Microsoft iSCSI initiator 2.03.

Address	Port	Adapter	IP Addre
Add SNS Servers Name	<u>}</u>	Bemove	Refresh
bbA	1	Bemove	Befresh

Figure E.14

14. Input the IP address of iSCSI data port 1 (192.168.11.229 as mentioned in previous page).

address or DNS name: 92.168.11.229	Port: 3260	Advanced
	ОК.	Cancel
-iSNS Servers		
Name		
	1.1	

Figure E.15

15. Click "Targets" to log on.

192	ess 168.11.22	Port 9 3260	Adapter Default		IP Address Default
		1	Parraus	1	-61
jsns s	Gervers -				
Nam	e				
	- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1		Descente	B	strach

16. Log on.

Discourse in the second			
aeneral Discovery	raigets Persistent Tai	rgets Bound Volume	es/Device
Select a target and o target. Click details to devices for that targe	lick Log On to access th o see information about th at.	e storage devices foi he sessions, connect	that ons and
Targets:			
Name		Status	
ign.2004-08.tw.com	h.qsan:p60c-b3ca0001e:	def Inactive	
	r 10	1	_
	<u>D</u> etails <u>I</u>	_og On R <u>e</u>	fresh
	Details I	eog On.	fresh
	<u>D</u> etails <u>I</u>	<u>og On</u>	fresh

Figure E.17

17. Click "Advanced".

SCSI Initiator Proper	ties		×
Log On to Target			×
Target name:			
iqn.2004-08.tw.com.	qsan:p60c-b3ca0001e:	default-target	
Automatically rest	ore this connection whe	n the system bo	ots
🔲 Enable multi-path			
Only select this o	ption if iSCSI multi-path	software is alrea	ady installed
 on your computer 	·		
Advanced		ОК	Cancel
		1993	
1	[1	
	<u>D</u> etails	Log Un	Hetresh
	OK	Cancel	Apply
	2.		

Figure E.18

18. Select Target Portal to iSCSI data port 1 (192.168.11.229). Then click "OK".

Courses have been	
Connect by using	
Local <u>a</u> dapter:	Microsoft iSCSI Initiator
Source <u>I</u> P:	192.168.11.34
Target Portal:	192.168.11.229 / 3260
CRC / Checksun	n
Data digest	Header digest
CHAP logon	information
CHAP logon CHAP helps ensi- a target and an i specify the same for this initiator.	information ure data security by providing authentication between nitiator trying to establish a connection. To use it target CHAP secret that was configured on the target
CHAP logon CHAP helps ensi- a target and an i specify the same for this initiator.	information ure data security by providing authentication between nitiator trying to establish a connection. To use it target CHAP secret that was configured on the target fign.1991-05.com.microsoft.ga-chrischou3
CHAP logon CHAP helps ensi- a target and an i specify the same for this initiator. User name: Target secret:	information ure data security by providing authentication between nitiator trying to establish a connection. To use it target CHAP secret that was configured on the target [iqn.1991-05.com.microsoft.qa-chrischou3
CHAP logon CHAP helps ensi- a target and an it specify the same for this initiator. User name: Target secret:	information ure data security by providing authentication between nitiator trying to establish a connection. To use it target CHAP secret that was configured on the target [iqn.1991-05.com.microsoft:qa-chrischou3] al authentication

19. The setting is completed.

eneral Discovery T	argets Persistent Targ	ets Bound Volumes/Dev	/ice
Select a target and cliu target. Click details to devices for that target. Targets:	ck Log On to access the see information about the	storage devices for that e sessions, connections ar	nd
Name		Status	٦
ign.2004-08.tw.com.	qsan:p60c-b3ca0001e:d	lef Connected	-
	Details	Gancel	

- .
- 20. Run "Computer Management" in Windows. Make sure the disks are available. Then the disks can be tested for performance by IOMETER.

📮 Computer Management						- O ×
📃 Eile Action View Window H	elp					<u>_8×</u>
⇔ → € 🖪 🕄 🖸 🗙 🖆	' 🖻 🔍 😼					
Computer Management (Local) Computer Management (Local) Computer Management Computer Viewer Computer Vie	Volume QA TOOLS (F:) WINDOWS2003 (D:) Windows 2000 (C:)	Layout Partition Partition Partition Partition	Type File Basic NTI Basic FA Basic FA Basic NTI	e System FS T32 T32 T32 FS	Status Healthy Healthy (Boot) Healthy (System)	Capacity 19.53 GB 15.88 GB 19.52 GB 19.53 GB
	Image: Constraint of the second se	indows : .53 GB N ealthy (Sy 2.87 GB eallocated	WINDOW 19.53 GB Healthy (F	V: F 19,53 Bi Healt	QA TOOL 15,90 GB Healthy	
	Unallocated Prim	ary partition	i 📕 Extende	ed partitior	n 📕 Logical drive	

Figure E.21

F. MPIO and MC/S setup instructions

Here is the step by step to setup MPIO. There are 2 kinds of scenarios for MPIO. Please see Figure F.1. **RAG/RSG Series** suggests using scenario 2 for better performance.

- ŝ š Host 1 Host Read or Write Read or Write -Gigabit Switch-Read or Write Gigabit Switch-QSAN P series QSAN P series 1. Dual ports with MPIO 2. Dual ports with MPIO (Via switches, host has 2 (Direct connect, host has 2 LAN ports, read or write in LAN ports, read or write in one UDV) one UDV) Figure F.1
- Network diagram of MPIO.

•

The setup instructions are in the following figures.

1. Create a VG with RAID 5, using 3 HDDs.

/ Volur	ne config / V	/olume group		-	-	-		(())	0	0	●) () A ()
							Create	0			Delete	0
	No.	Name	Total (GB)	Free (GB)	#PD	#UDV	Status	1	2	3	R/	ID
	1	R5	76	76	3	0	Online				RAI	D 5 //平
						_	Create	•			Delete	0
				Fig	ure F.2							

2. Create a UDV by using RAID 5 VG.

/ Vol	lume cor	nfig / User (lata volume	-					-	0	0 6		● **	0 0
-1			Attach	0	Sn	apshot	0		Creat	e e		Del	ete	0
	No.	Name	Size	Status	1	2	3	R %	RAID	#LUN	Snaps (GB	hot	VG	CV (MB)
	1	R5 •	10 ● ≓ ₩	Online	0 WB •	0 HI 0		14%	RAID 5	o	0.00/0	0.00 °	R5	100
			Attach	0	Sr	apshot	0		Creat	:e o		Del	ete	0
					Fig	jure F.	3							

3. Run Microsoft iSCSI initiator 2.03 and check the Initiator Node Name.

iSCSI Initiator Properties	×
General Discovery Targets Persistent Targets Bound Volumes/D	vevices
The iSCSI protocol uses the following information to uniquely identify this initiator and authenticate targets.	8
Initiator Node Name: iqn.1991-05.com.microsoft:qa-chrischou3	
To rename the initiator node, click Change.]
To authenticate targets using CHAP, click Secret to <u>S</u> ecret specify a CHAP secret.	t
To configure IPSec Tunnel Mode addresses, click	3
OK Cancel	pply

Figure F.4

4. Attaching LUN to R5 UDV. Input the Initiator Node Name in Host field.

/ Volume config / Lo	ogical unit / Attach	_	1	6	8	4	*	G
UDV:	R5 (10GB) 💟							
Host :	iqn.1991-05.com.microsoft:demo							
LUN:	- 0 -							
Permission :	O Read-only							
19.		<< Back	0			Confin	m	0

Figure F.5

5. The volume config setting is done.
| / Volume | e config / Logical unit | | _ | <mark>⊙ ⊙</mark>
≣ ↓ | |
|----------|--------------------------------|-----|------------|-------------------------|------------------|
| | | | Attach | 0 | Detach 🔹 |
| | Host | LUN | Permission | UDV name | #Session |
| | iqn.1991-05.com.microsoft:demo | 0 | Read write | R5 | 1 <u>Session</u> |
| | | | Attach | 0 | Detach 🔹 |
| | | | | | |

Figure F.6

6. Check iSCSI settings. The IP address of iSCSI data port 1 is 192.168.11.229, port 2 is 192.168.12.229 for example.

/ s	ystem	config / iSCSI						5 H # \$ 6
						iSNS	0	Authentication
No.	Port	Aggregation	DHCP	IP address	Netmask	Gateway	мти	MAC address
1	LAN1	no Ma	no	192.168.11.229	255.255.255.0	192.168.11.229	1500	00:13:78:00:02:00
2	LAN2	no	no	192.168.12.229	255.255.255.0	192.168.12.254 •	1500	00:13:78:00:02:01
Enti	ty name	2:	iqn.2004	-08.tw.com.qsan:p	120c-000a00021			
1						iSNS	0	Authentication

Figure F.7

7. Add Target Portals on Microsoft iSCSI initiator 2.03.

Address	Port	Adapter	IP Address
<u>Add</u>	<u></u>	<u>R</u> emove	R <u>e</u> fresh
Name			
A <u>d</u> d		Remove	Refresh



8. Input the IP address of iSCSI data port 1 (192.168.11.229 as mentioned in previous page).

92.168.11.229		Advanced
	с	Cancel
jSNS Servers		
Indite		

Figure F.9

9. Add second Target Portals on Microsoft iSCSI initiator 2.03.

Address 192.168.11.22	Port 9 3260	Adapter Default	IP Addre Default
Add NS Servers -		<u>R</u> emove	R <u>e</u> fresh
Name			
	1		1 Defeat

10. Input the IP address of iSCSI data port 2 (192.168.12.229 as mentioned in previous page).

iSCSI Initiator Properties			×
Add Target Portal			×
Type the IP address or DNS nar want to add. Click Advanced to session to the portal. IP address or DNS name: 192.168.12.229	ne and socket nu select specific se Port: 3260	mber of the portal you ttings for the discovery Advanced.	,
ISNS Servers		OK Cancel	
Name			
Add	Remove	Refresh	
	ОК	Cancel Ap	ply
F	igure F.11		

11. The initiator setting is done.

Address	Port 229 3260	Adapter	IP Address Default
192.168.12.2	29 3260	Default	Default
Add		<u>R</u> emove	Refresh
jSNS Servers			
Add	1	Remove	Re <u>f</u> resh

Figure F.12

12. Log on.

SI Initiator Proper	ties	<u>></u>
General Discovery	Targets Persistent Targets	Bound Volumes/Devices
Select a target and cl target. Click details to devices for that targe	lick Log On to access the sto see information about the se t.	orage devices for that essions, connections and
Iargets:		
Name		Status

Figure F.13

13. Enable "Enable multi-path" checkbox. Then click "Advanced".

			×
arget name:			
iqn.2004-08.tw.com	.qsan:p60c-b3ca0	001e:default-target	
Automatically res	tore this connection	n when the system	boots
🗸 Enable multi-path			
Only select this a	option if iSCSI multi er.	i-path software is al	ready installed
in your compact			
Advanced		ОК	Cancel
	Details	100 Dn	Refresh
	<u>D</u> etails	Log On	R <u>e</u> fresh
	<u>D</u> etails	Log On	R <u>e</u> fresh

Figure F.14

14. Select Target Portal to iSCSI data port 1 (192.168.11.229). Then click "OK"

Local adapter:	TO A FY READ AND A TO A CONTRACT WAS CONTRACT.
Local <u>a</u> daptor.	Microsoft iSCSI Initiator
Source <u>I</u> P:	192.168.11.34
<u>T</u> arget Portal:	192.168.11.229 / 3260
CBC / Checksu	m
Data digest	 Header digest
a target and an	initiator trying to establish a connection. To use it
for this initiator.	e target CHAP secret that was configured on the targe
for this initiator.	e target CHAP secret that was configured on the targe iqn.1991-05.com.microsoft:qa-chrischou3
for this initiator. User name: Target <u>s</u> ecret:	e target CHAP secret that was configured on the targe iqn.1991-05.com.microsoft:qa-chrischou3
for this initiator. User name: Target <u>s</u> ecret:	e target CHAP secret that was configured on the targe iqn.1991-05.com.microsoft:qa-chrischou3 ual authentication

15. Log on "Enable multi-path" again.

	arties	
General Discovery	Targets Persistent Targets	Bound Volumes/Device
Select a target and target. Click details devices for that targ	click Log On to access the sto to see information about the se jet.	rage devices for that ssions, connections and
Name		Status
ign.2004-08.tw.co	m.gsan:p60c-b3ca0001e:def	Connected
	Details	n] <u>Re</u> fresh
	Details C Log O	n

16. Enable "Enable multi-path" checkbox. Then click "Advanced...".

arget name:			
iqn.2004-08.tw.com	.qsan:p60c-b3ca00)01e:default-targ	jet
Automatically res	ore this connection	when the syste	m boots
Enable multi-nath		ramon die syste	
Only select this o	: option if iSCSI multi-	path software is	already installed
on your compute	er.		
Advanged		ОК	Cancel
		- 20 - C	
	Detaile	Log Op	Pefrach
	Details	<u>L</u> og On	
	<u>D</u> etails	Log On	<u>Re</u> fresh
	Details	Log On	Refresh

17. Select Target Portal to iSCSI data port 2 (192.168.12.229). Then select "OK"

Local <u>a</u> dapter:	Microsoft iSCSI Initiator
Source <u>I</u> P:	192.168.12.34
Target Portal:	192.168.12.229 / 3260
CRC / Checksur	n
□ <u>D</u> ata digest	Header digest
CHAP logon	information
CHAP helps ens a target and an i specify the same for this initiator.	ure data security by providing authentication between nitiator trying to establish a connection. To use it a target CHAP secret that was configured on the target target CHAP secret that was configured to the target target CHAP secret target target CHAP secret target tar
CHAP helps ens a target and an i specify the same for this initiator.	ure data security by providing authentication between nitiator trying to establish a connection. To use it a target CHAP secret that was configured on the target iqn.1991-05.com.microsoft.qa-chrischou3
CHAP helps ens a target and an i specify the same for this initiator. User name: Target secret:	ure data security by providing authentication between nitiator trying to establish a connection. To use it arget CHAP secret that was configured on the target iqn. 1991-05.com.microsoft:qa-chrischou3
CHAP helps ens a target and an i specify the same for this initiator. User name: Target secret: Eerform mutu	ure data security by providing authentication between nitiator trying to establish a connection. To use it a target CHAP secret that was configured on the target iqn.1991-05.com.microsoft:qa-chrischou3 ual authentication.

Figure F.18

18. iSCSI device is connected. Click "Details".

SI Initiator Prope	erties		
ieneral Discovery	Targets Persistent T	argets Bound	Volumes/Device
Select a target and target. Click details devices for that targ	click Log On to access to see information about jet.	the storage dev the sessions, c	vices for that connections and
Targets:			
Name		Status	
		<u>L</u> og On	R <u>e</u> fresh

19. Click "Device" tab, then click "Advanced".

arget Properties			×
Sessions Devices Pr	operties		
These are the devices Advanced to view info multipath policy.	s exposed by iSCSI sessio ormation about the device	ns to the target. Clic and configure the	k
Device Name		MPIO Capable	
OSANTech P60C	SCSI Disk Device	Multi-Path Suppo	rt
QSANTECH POUL	SCSI DISK Device	Muiti-Path Suppo	rt
		<u>_Advan</u>	ced

Figure F.20

20. Click "MPIO" tab, select "Load Balance Policy" to "Round Robin".

vice Detail	5			
Seneral MP	10			
Load Baland	e Policy :			
Fail Over C	nly			•
Fail Over C	inly			
Round Rob	in			2
Round Rob	in With Subs ie Depth	et		r0
Weighted R	Paths			
Least Block	s	223		
	-			
This device	has the follo	wing paths:		
Path Id	Status	Туре	Weight	Session ID
0x20000	Conne	Active	n/a	fffffffff880e87c-400001
0x20001	Conne	Standby	n/a	fffffffff880e87c-400001
4				
				L
			De	ataile Edit
			<u></u>	stalls Eultrin

Figure F.21

21. Click "Apply".

Seneral MP	5 10			
Load Balanc	e Policy :			
Round Rob	in			
Descriptio	n ———			
The roun	d robin policy	/ attempts	to evenly dis	tribute incoming
requests	to all proces	sing paths.		
This <u>d</u> evice	has the follo	wing paths I –	-	
Path Id	Status	Type	Weight	Session ID
0x20000	Conne	Active	n/a	ffffffffffffffffffffffffffffffffffffff
4				
			De	taile Edit
Land				LUIL LUIL
Landa				
Linda			ок	Cancel Apply

22. Run "**Device Manage**" in Windows. Make sure MPIO device is available. Then the disk can be tested performance by IOMETER.



Figure F.23

The **MC/S** setup instructions are very similar to MPIO, detail steps are in the following figures. For the target side setting, the steps are exactly the same as MPIO. Please refer to **Figure F.1 to Figure F.9**.

- 1. Create a VG with RAID 5, using 3 HDDs.
- 2. Create a UDV by using RAID 5 VG.
- 3. Run Microsoft iSCSI initiator 2.03 and check the Initiator Node Name.
- 4. Attaching LUN to R5 UDV. Input the Initiator Node Name in Host field.
- 5. The volume config setting is done.
- 6. Check iSCSI settings. The IP address of iSCSI data port 1 is 192.168.11.229, port 2 is 192.168.12.229 for example.
- 7. Add Target Portals on Microsoft iSCSI initiator 2.03.
- 8. Input the IP address of iSCSI data port 1 (192.168.11.229 as mentioned in previous pages). For MC/S, there is only ONE "**Target Portals**" in the "**Discovery**" tab.

192.168.11	.229 3260	Adapter Default	IP Address Default
	<u>_</u> _	<u>R</u> emove	R <u>e</u> fresh
iSNS Servers	:]

Figure F.24

9. Log on.

- 51 Iniciator Properti	es 💆
General Discovery T	argets Persistent Targets Bound Volumes/Devices
Select a target and clic target. Click details to s devices for that target.	k Log On to access the storage devices for that ee information about the sessions, connections and
Targets:	
Name	Status

Figure F.25

10. Then click "Advanced...".

SCSI Initiator Propert	ies			2
og On to Target				×
Target name:				
iqn.2004-08.tw.com.q	san:p60c-b3ca0)001e:default-ta	arget	
 Automatically restor Enable multi-path Only select this opl on your computer. 	re this connectio	on when the sys	tem boots is already insta	alled
Advanced		ОК	Cancel	
	<u>D</u> etails	Log On	Refres	:h
	OK	. Car	icel	pply

Figure F.26

11. Select set Local Adapter, Source IP, and Target Portal to iSCSI data port 1 (192.168.11.229). Then click "**OK**".

Connect by usin	9
Local <u>a</u> dapter:	Microsoft iSCSI Initiator
Source <u>I</u> P:	192.168.11.34
<u>T</u> arget Portal:	192.168.11.229 / 3260
Data digest	m Header digest
CHAP logor	information
CHAP logor CHAP helps en: a target and a specify the sam for this initiator. User name:	information ture data security by providing authentication between initiator trying to establish a connection. To use it a target CHAP secret that was configured on the targe iqn. 1991-05.com.microsoft:qa-chrischou3
CHAP logor CHAP helps en: a target and an specify the sam for this initiator. User name: Target secret:	information sure data security by providing authentication between initiator trying to establish a connection. To use it a target CHAP secret that was configured on the target iqn.1991-05.com.microsoft:qa-chrischou3
CHAP logor CHAP helps en: a target and an specify the sam for this initiator. User name: Target secret: Berform mut	information ture data security by providing authentication between initiator trying to establish a connection. To use it a target CHAP secret that was configured on the targe iqn.1991-05.com.microsoft:qa-chrischou3 ual authentication

12. After connected, click "Details", then in the "Session" tab, click "Connections".

I Initiator Prope	rties		
eneral Discovery	Targets Persistent Ta	rgets Bound Volumes/De	evice
Select a target and c arget. Click details b devices for that targe	lick Log On to access th see information about t at.	e storage devices for that he sessions, connections a	and
Laigets.		Statue	_
iqn.2004-08.tw.cor	n.qsan:p60c-b3ca0001e	:def Connected	
	Details	og On Befresh	-
		1	
	OK	Cancel App	
			oly

13. Choose "Round Robin" for Load Balance Policy

ssion Connec	tions				2
onnections					
oad Balance Polic	y:				
Round Robin					-
Fail Over Only					
Round Robin Round Robin With Least Queue Dep Weighted Paths	th the set				
This session has t	ne following <u>c</u>	onnections :	Type	Weight	Copp
102 168 10	102 168	Coope	Active	n/a	Ov3
<u>र</u>]	.007)	>
	Ad		Demove	- Edu	
	Au		Kemove		une:
		確定	取消		€用(<u>A</u>)

14. "Add" Source Portal for the iSCSI data port 2(192.168.12.229)

ssion Conne	ctions				
onnections					
oad Balance Po	blicy:				
Round Robin	81				~
Description The round ro requests to a	bin policy atte	empts to ev oaths.	enly distrib	ute incoming	
his session has	the following	connection Status	s: Type	Weight	Connec
192, 168, 1	192,168	Conne	Active	n/a	0x3
		<u>v</u> d	Remove) dit
	ſ	確定			套用(A)
	, L	HEAL			24711(11)
	F	-iaure I	F.30		

Add Connection

Figure F.31

15. Select Local adapter, Source IP, and Target Portal to iSCSI data port 2 (192.168.12.229). Then select "**OK**".

)
Local <u>a</u> dapter:	Microsoft iSCSI Initiator
Source <u>I</u> P:	192.168.12.34
<u>T</u> arget Portal:	192.168.12.229 / 3260
CBC / Checksun	2
Data digest	Header digest
CHAP helps ensi a target and an it specify the same for this initiator.	are data security by providing authentication between nitiator trying to establish a connection. To use it target CHAP secret that was configured on the target
	ign. 1991-05. com. microsoft: ga-chrischou3
∐ser name:	
∐ser name: Target <u>s</u> ecret:	
User name: Target <u>s</u> ecret: Perform mutu	al authentication

Figure F.32

16. The MC/S setting is done.

G. QLogic QLA4010C setup instructions

The following is the step by step setup of Qlogic QLA4010C.

1. Log on the iSCSI HBA Manager and the current state shows "**No Connection Active**".

0 0					∞
Connect <u>R</u> efresh					QLOC
CSIHBA	Target Information	-UN List			
Host qsan-qa222 🗯 HBA 0: QLA4010: R	e HBA Model:	QLA4010	iSCSI Port Alias Name:	qlogic-1	
Port 0: glogic-1 Poly and target:	S State:	Ready,Link Up	IP Address:	192. 168.	11. 11
QLOUIC	HBA ISCSI Name:	qsan-qa222			
\smile	Vendor:	Not Available	Product Revision:	Not Available	
	Product ID:	Not Available	Target Alias Name:	Not Available	
POWERED BY	State:	No Connection Active	IP Address:	192. 168.	11. 210
QLOGIC	Target iSCSI Name:	Not Available			
\bigcirc					
POWERED BY					
QLOGIC					
\frown					

Figure G.1

2. Click "Target settings". Then select the target and click "Config Parameters".

👙 SANsurfer iSCSI HBA Mai	nager									_ 8 ×
File Host View Wizard	Help								φL	
ISCSI HBA	Port Options	Port Information	Target Settings	Target Infor	mation Statistic	s Diagnosti	CS			
Host qsan-qa222 - HBA 0: QLA4010: Re	HBA Model:	QLA4010	Ì			iSCSI Port Alia	as Name:	qlogic-1		
OLO GIC Send targets	State: HBA iSCSI Nar	<mark>Ready,L</mark> ne: qsan-qa	nk Up 222			IP Address:		192. 168.	11.	11
POWERED BY	-Target Configur -Disable of Auto -Only 64 devices Note: Right click	ation - a saved bl discover does no can be persister on entry for addi	ank iSCSI Name will at apply to SendTarg Mound. Any change tional features. p-bind Discovered Ta	issue a Send ets with CHAP es made to de argets 🔲 Au	Targets command. entries. vices not bound wil	l not persist ac cover prior Ser	ross card re ndTargets on	sets. I save)		
	Bind Enal	ble Dynamic	IP Address	Port	iSCSI Name	Target ID	Alias	State		
			0.0.0.0	0 N	Ą	(NA	Reserved for Fa	ast!UT	
			0.0.0.0	0 N	Ą	1	NA	Reserved for Fa	ast!UT	
	V V		192.168.11.210	3260		1	2	No Connection	Active	4-
			Con	fig Parameter	s Config Aut	nentication				
Rout 0: slogic 1				<u>R</u> efresh	<u>S</u> ave Sett	ings				

Figure G.2

🎒 qsan-qa222 Target Para	ameters									×
							Immediate	Execution	Max	First
Target	TargetID	Bind	Enable	Dynamic	Snack	Initial R2T	Data	Throttle	Burst	Burs
									Len	Len
192.168.11.210:3260 Ta	2	2	V				V	64	512	
4		1								
۹		1								

3. Disable "Immediate Data" and enable "Initial R2T".

Figure G.3

4. Click "**OK**".

👙 qsan-qa222 Target Para	ımeters									x
Target	TargetID	Bind	Enable	Dynamic	Snack	Initial R2T	Immediate Data	Execution Throttle	Max Burst	First Burst
192.168.11.210:3260 Ta	2	V	V			K		64	512	Len
•		ĺ								•
				ок	Ca	ncel				



5. Click "**Save settings**" and click "**Yes**" on next page.

SANsurfer iSCSI HBA Ma File Hos <u>t V</u> iew <u>W</u> izard	nager <u>H</u> elp								_ 8
0 •									X
Connect <u>R</u> efresh									QLOGI
ISCSI HBA	Port Options	Port Informat	ion Target Settings	Target Inform	ation Statistics	5 Diagnosti	cs		
Host qsan-qa222 HBA 0: QLA4010: Re	HBA Mode	: QLA4	010			iSCSI Port Ali	as Name:	qlogic-1	
Send targets	State:	Read	ly,Link Up			IP Address:		192. 168.	11. 11
	-Disable of A -Only 64 devi	guration - a save uto-discover doe ces can be persi	d blank ISCSI Name will s not apply to SendTarg sted/bound. Any chang	ets with CHAP e es made to devid	rgets command. ntries. ces not bound will	not persist ac	ross card re	sets.	
	-Disable of A -Only 64 devi Note: Bight c	uto-discover doe ces can be persi lick on entry for a	s not apply to SendTarg sted/bound. Any chang additional features	ets with CHAP e es made to devid	ntries. ces not bound will	not persist ac	ross card re	sets.	
QLOGIC		V	Auto-bind Discovered T	argets 🔲 Auto	-discover (Re-dis	cover prior Se	ndTargets or	i save)	
	Bind	Enable Farget Dynan	nic IP Address	Port	ISCSI Name	Target ID	Alias	State	
			0.0.0	0 NA			D NA	Reserved for Fa	st!UT
			0.0.0.0	0 NA			1 NA	Reserved for Fa	st!UT
			Cor	nigParameters	Config Auth	entication			
				<u>R</u> efresh	Save Setti	ngs			

Figure G.5

6. Click "**Refresh**" and find a new target with iSCSI name.

lost qsan-qa222 ■ HBA 0: QLA4010: Re ► ► Port 0: qlogic-1	HBA Model: State: HBA iSCSI Nam	QLA4010 Ready,Ll ne: qsan-qal	nk Up			iSCSI Port Ali	as Name:	qlogic-1		
HBA 0: QLA4010: Re	HBA Model: State: HBA iSCSI Nam	QLA4010 Ready,Ll ne: qsan-qa:	n <mark>k Up</mark>			iSCSI Port Ali	as Name:	qlogic-1		
QLOGIC	State: HBA ISCSI Nam	<mark>Ready,L</mark> i ne: qsan-qai	nk Up 222			IP Address:				
QLOGIC	HBA ISCSI Nam	ne: qsan-qai	222					192. 1	68. 1	11. 1
	HBA ISCSI Nam	ne: qsan-qa.	22							
	.Target Configura	ation , a saved bl	ank iSCSI Name will	lissue a Send	Fargets command	4.				
	-Target Coningura	duun - a saveu m	ann iscsi Name wii t annluta CondTara	i issue a seriu	argets command	<i>.</i>				
	-Disable of Auto-0	alscover does he	it apply to Send Larg	jets with CHAF	entries.					
	-Uniy 64 devices	can be persiste	ubound. Any chang	es made to de	vices not bound v	vill not persist ac	ross card re	sets.		
	Note: Right click	on entry for addi	tional features.							
OWERED BY		v Aut								
			o-bind Discovered 1	araets 🛛 🔲 Au	to-discover (Re-d	liscover prior Se	ndTargets or	save)		
PLOGIC		P Hut	o-bind Discovered 1	argets 🔲 Au	to-discover (Re-d	liscover prior Se	ndTargets or	i save)		
PLOGIC	Enab	ole	o-bind Discovered 1	argets 📃 Au	to-discover (Re-d	liscover prior Se	ndTargets or	i save)		
plogic	Bind Targ	ole Dynamic	IP Address	argets 🔲 Au Port	to-discover (Re-d	Target ID	ndTargets or Alias	i save)	State	
	Bind Targ	ole Jet Dynamic	IP Address	Port	to-discover (Re-d iSCSI Name A	Target ID	Alias	Reserved	State for Fast	!!UT]
	Bind Enab Targ	ple Dynamic	IP Address 0.0.0.0 0.0.0.0	Port	to-discover (Re-d iSCSI Name A A	Target ID	Alias	Reserved Reserved	State for Fast for Fast	IUT
	Bind Enab Targ	ole Dynamic	IP Address 0.0.0.0 0.0.0.0 192.168.11.210	Port 0 N 0 N 3260	to-discover (Re-d iSCSI Name A A	Target ID	Alias	Reserved No Conne	State for Fast for Fast action Ac	IUT IUT tive
	Bind Enab Targ	ole Dynamic	IP Address 0.0.0.0 0.0.0.0 192.168.11.210 192.168.11.210	Port 0 N 0 N 3260 3260 ic	to-discover (Re-d iSCSI Name A A n.2004-08.tw.com	Target ID	Alias	Reserved Reserved No Conne Session A	State for Fast for Fast action Ac Active	I!UT I!UT tive
	Bind Enab Targ	Dynamic Dynamic	IP Address 0.0.0.0 0.0.0.0 192.168.11.210 192.168.11.210	Port Port 0 N 3260 3260 10 0 N 0 N	to-discover (Re-d iSCSI Name A A n.2004-08.tw.com	Target ID	Alias Alias D NA 1 NA 2 4	Reserved Reserved No Conne Session A	State for Fast for Fast action Ac Active	IUT IUT tive
	Bind Enab Targ	Dynamic Dynamic	IP Address 0.0.0.0 0.0.00 192.168.11.210 192.168.11.210	Port Port 0 N 0 N 3260 3260 ic	to-discover (Re-d iSCSI Name A A n.2004-08.tw.com	Target ID	Alias DNA 1 NA 2	Reserved Reserved No Conne Session A	State for Fast for Fast ection Ac Active	IUT IUT tive
	Bind Enab Targ	ple pet Dynamic	IP Address 0.0.0.0 0.0.0.0 192.168.11.210 192.168.11.210	Port Port 0 N 3260 3260 ic	to-discover (Re-d ISCSI Name A A n.2004-08.tw.com	Target ID	Alias O NA 1 NA 2	Reserved Reserved No Conne Session A	State for Fast for Fast action Ac Active	tiUT tiUT titive
OWERED BY	Bind Enab Targ	Dynamic Dynamic	IP Address 0.0.0.0 0.0.0.1 192.168.11.210 192.168.11.210	Port 0 N 3260 3260 0 r 0 r	to-discover (Re-d iSCSI Name A A n.2004-08.tw.com	Target ID	Alias Alias NA 1 NA 2 4	Reserved Reserved No Conne Session A	State for Fast for Fast action Ac Active	tiUT tiUT tive
	Bind Enab Targ	ole Dynamic	IP Address 0.0.0.0 0.0.0 192.168.11.210 192.168.11.210	Port Port 0 N 3260 3260 ic	to-discover (Re-d ISCSI Name A n.2004-08.tw.com	Target ID	Alias Alias D NA 1 NA 2 4	Reserved Reserved No Conne Session A	State for Fast for Fast action Ac	tiUT tiUT tive
STOGIC	Bind Enab Targ	Dynamic Dynamic	IP Address 0.0.0.0 0.0.0.0 192.168.11.210 192.168.11.210	Port 0 N 0 N 3260 3260 ic	to-discover (Re-d ISCSI Name A A n.2004-08.tw.com	Target ID	Alias Alias 0 NA 1 NA 2	Reserved Reserved No Conne Session A	State for Fast for Fast action Ac	tiut tiut tive
	Bind Targ	Die Dynamic	IP Address 0.0.0.0 0.0.0 192.168.11.210 192.168.11.210	Port 0 N 0 N 3260 ic	to-discover (Re-d ISCSI Name A A n.2004-08.tw.com	Target ID	Alias Alias 0 NA 1 NA 2 4	Reserved Reserved No Conne Session A	State for Fast for Fast action Ac Active	tUT tUT titve

Figure G.6

7. Check the parameters which "**Initial R2T**" are enabled.

📥 qsan-qa222 Target Par	ameters									x
							Immediate	Execution	Max	First
Target	TargetID	Bind	Enable	Dynamic	Snack	Initial R2T	Data	Throttle	Burst	Burst
									Len	Len
192.168.11.210:3260 Ta	. 2	K	~			V		64	512	
192.168.11.210:3260 Ta	. 64	V	V			V		64	512	
4		1		06		ncel				
						_				

Figure G.7

8. Check **"Target Information"** again and the state changed to **"Session Active"**.

👙 SANsurfer iSCSI HBA Man	ager					_ & ×
Eile Host View Wizard H Connect Refresh	Help				QI	
ISCSI HBA	Target Information	UN List				
Host qsan-qa222 HBA 0: QLA4010: Re Port 0: qlogic-1 Send targets Composition of the send targets Composition of the send targets	HBA Model: State: HBA iSCSI Name:	QLA4010 Ready,Link Up qsan-qa222	iSCSI Port Alias Name: IP Address:	qlogic-1 192. 168	. 11.	11
POWERED BY QLOGIC	Vendor: Product ID: State: Target iSCSI Name:	QSANTech P60C <mark>Session Active</mark> ign.2004-08.tw.com.gsan;p60c-00000000d4;default-target	Product Revision: Target Alias Name: IP Address:	0.9 Not Available 192 164	ə 8. 11.	210
POWERED BY						
Device (iqn.2004-08.tw.com.qs	an:p60c-0000000d4:defa	ult-target)				

Figure G.8

9. Then, run "**Computer Management**" in Windows. Make sure the disk appears.

📮 Computer Management					
📃 Eile Action View Window H	elp				<u>_8×</u>
⇔ → 🗈 🖬 😫 🐼 X 🖆	' 🖻 🔍 😼				
Computer Management (Local) System Tools System Tools Shared Folders Cocal Users and Groups Performance Logs and Alert: Device Manager Storage	Volume QA TOOLS (F:) WINDOW52003 (D:) Windows 2000 (C:)	Layout Partition Partition Partition Partition	Type File System Basic NTF5 Basic FAT32 Basic FAT32 Basic NTF5	Status Healthy Healthy (Boot) Healthy (System)	Capacity 19.53 GB 15.88 GB 19.52 GB 19.53 GB
 	▲ Basic 74.50 GB Online Wi 19 He	indows : .53 GB N althy (Sy	WINDOW: (E:) 19.53 GB F 19.5 Healthy (Bi Healt	3 GB N/ hy	
	Disk 1Basic152.87 GBOnline	2.87 GB allocated	6		
	Unallocated 📕 Prim	ary partition	Extended partition	n <mark>–</mark> Logical drive	

Figure G.9

H. Installation Steps for Large Volume (TB)

Introduction:

Enhance Tech controllers are capable to support large volumes (>2TB) on all product lines. When connecting controllers to 64bit OS installed host/server, the host/server is inherently capable for large volumes from the 64bit address. On the other side, if the host/server is installed with 32bit OS, user has to change the block size to 1KB, 2KB or 4KB to support volumes up to 4TB, 8TB or 16TB, for the 32bit host/server is not LBA (Logical Block Addressing) 64bit supported. For detail installation steps, please check below.

Step A: configure your target

1. Go to **/ Volume config / Volume group**, create a VG.

Volu	ime conf	ig / Volume g	roup			-	Create	•	5	D	elete	
	No.	Name	Total (GB)	Free (GB)	#PD	#UDV	Status		1 2	3	RAIL)
							Create	0		D	elete	

Figure H.1

2. Choose RAID level and disks.

Name :	VG01	
RAID Level :	RAID 6	
RAID PD slot :	9 10 11 12 13 14 15 16	Select PD
		cc Back A Next >> A

Figure H.2

3. Confirm VG settings.

RAID width: 8 RAID copy: 1 RAID row: 1	idth: 8 ipy: 1 w: 1 O slot: 9 10 11 12 13 14 15 16	Create VG01 :	RAID 6			
RAID copy: 1 RAID row: 1	py: 1 w: 1 > slot: 9 10 11 12 13 14 15 16	RAID width :	8			
RAID row: 1	w: 1 > slot: 9 10 11 12 13 14 15 16	RAID copy :	1			
	D slot : 9 10 11 12 13 14 15 16	RAID row :	1			
RAID PD SIOT: 9 10 11 12 13 14 15 16		RAID PD slot :	9 10 11 12 13 14 15 16			



4. A RAID 6 VG is created.

/ Volu	me config /	Volume group						1	6	8	Ă	
							Create				Delete	
	No.	Name	Total (GB)	Free (GB)	#PD	#UDV	Status	1	2	3	RAID	
		VG01	2793	2793	8	O	Online				RAID 6	
							Create	0			Delete	0
				Fig	ure H.4							

5. Go to / Volume config / User data volume, create a UDV

/ Vol	ume conf	fig / User dat	a volume									
					ŀ	Attac	ch	0	Cre	ate •	Dele	ete o
	No.	Name	Size (GB)	Status	1	2	3	R %	RAID	#LUN	VG name	С¥ (МВ)
					ŀ	Attac	ch	0	പ്പം Cre	ate o	Dele	ete o
					- :				U U			

Figure H.5

6. Setup capacity, stripe height, and block size for UDV.

/ Volume config / User	· data volume / Create	(j))	6	H	₽
Name :	UDV01				
VG name :	VG01 💌				
C¥ No.:	Global (136 MB) 💌				
Capacity (GB) :	2793 I				
Stripe height (KB) :	64 💌				
Block size (B) :	512 💌				
Read/Write :	C Write-through cache . Write-back cache				
Priority :	• High priority • Middle priority • Low priority				

Figure H.6



Tips

When the OS is 64bit, user can set the block size to any available value. If the OS is 32bit, user must change the block size to larger values than 512B. There will be a confirmation pop-up when UDV size is over 2TB for reminding.

<< Back

Confirm

Microsof	it Internet Explorer 🔀
?	LBA 64 support? Choose OK if using OS such as Windows 64 bits, Windows Server 2003 SP1, Linux kernel 2.6.x, FreeBSD 5.2.1 or latter. Choose Cancel. It will change the sector size to 4K. The maximum capacity is up to 16 TB. This volume can not be Dynamic Disk.
	Cancel

(Figure H.7: choose "OK" for 64bit OS, choose "Cancel" for 32bit OS, this step will change block size to 4K automatically.)

7. A 2.793TB UDV is created.

				Al	ttach	0	С	reate 🔹		Delete	0
No.	Name	Size (GB)	Status	1	2	3	R %	RAID	#LUN	¥G name	С¥ (MB)
1	UDV01	2793	Online	0 WB	0 HI •	1	1%	RAID 6	o	VG01	136

Figure H.8: a 2793G UDV is created.

8. Check the detail information.

DV:																				
ID	No.	Name	Size (GB)	Status	1	2	з	R %	Strp (KB)	RAID	#LUN	Snap (GB)	Туре	VG ID	VG Name	CV ID	CV (MB)	Config	Block Size	Create Time
1021826050	1	UDV01	2793	Online	WB	HI	Ι	1%	64	RAID 6	0	0.00	NORMAL	345494528	VG01	452869120	136	41	512	1173345654

Figure H.9

(Figure H.9: block size = 512B, for 64bit OS setting.)

ID	No.	Name	Size (GB)	Status	1	2	з <mark>R</mark> %	Strp (KB)	RAID	#LUN	Snap (GB)	Туре	VG ID	VG Name	CV ID	CV (MB)	Config	Block Size	Create Time
891804674	1	UDV01	2793	Online	WB	ΗI	I 1%	64	RAID 6	O	0.00	NORMAL	345494528	VG01	452869120	136	41	4096 N	1173347651

Figure H.10

(Figure H.10: block size = 4K, for 32bit OS setting.)

9. Attach LUN.

			1	At	ttach	0	C	reate e		Delete	(
No.	Name	Size (GB)	Status	1	2	3	R %	RAID	#LUN	¥G name	С¥ (мв)
1	UDV01	2793	Online	() WB	HI D		1%	RAID 6	O	VG01	136

Figure H.11

י ער	LIDV/01 (2793GB) V	UDV:	UDV01(2793GB)
	00001(2/3330)	Bus :	- 1 - 💌
st :	*	SCSLID -	- 0 - 💌
N :	-0-	565110.	
rmission :	C Read-only © Read-write	LUN :	- 0 - 💟



(Figure H.12: Left: P series; Right: S series attach LUN.)

Step B: configure your host/server

- For S Series controller (SCSI), the host/server side may need reboot or setup SCSI HBA BIOS to make volumes available. Please refer to your SCSI HBA manual for more detail. For P Series (iSCSI), user needs to setup software iscsi initiator or iSCSI HBA first.
- 2. Below is the configuration for Windows Server 2003 R2 with Microsoft iscsi initiator. Please install the latest Microsoft iscsi initiator from below link.

http://www.microsoft.com/downloads/details.aspx?FamilyID=12cb3c1a-15d6-4585-b385-befd1319f825&DisplayLang=en

iSCSI Initiator Properties 🔀	iSCSI Initiator Properties
General Discovery Targets Persistent Targets Bound Volumes/Devices	Add Target Portal
The iSCSI protocol uses the following information to uniquely identify this initiator and authenticate targets.	Type the IP address or DNS name and socket number of the portal you want to add. Click Advanced to select specific settings for the discovery session to the portal.
Initiator Node Name: ign.1991-05.com.microsoft:demo	IP address or DNS name: Port:
*	192.168.11.229 3260 <u>A</u> dvanced
To rename the initiator node, click Change. Change To authenticate targets using CHAP, click Secret to specify a CHAP secret. Secret To configure IPSec Tunnel Mode addresses, click Iunnel Tunnel. Iunnel	OK Cancel
	DK Cancel Apply

Figure H.13

(Figure H.13: Run MS iSCSI initiator, go to "Discovery" tab, add target portal (iSCSI data).)

CSI Initiator Properties	×	iSCSI Initiator Properties
General Discovery Targets Persistent Targets E Select a target and click Log On to access the storag target. Click details to see information about the sessi devices for that target.	Bound Volumes/Devices ge devices for that ons, connections and	Log On to Target X Target name: Ign.2004-08.tw.com.qsan:p100c-0000000ce:default-target Automatically restore this connection when the system boots Enable multi-nath
Name	Status	Chapter independent Only select this option if iSCSI multi-path software is already installed
		Advanced
<u> </u>	H <u>e</u> tresh	Details Log On Refresh

Figure H.14

(Figure H.14: go to "Targets" tab, click "Refresh", and then "Log On..." the target.)

.51 milliacor Properc	ies	
General Discovery T	argets Persistent Targets	Bound Volumes/Devices
Select a target and clin target. Click details to devices for that target.	ck Log On to access the sto see information about the so	orage devices for that essions, connections and
Largets: Name		Status
ign.2004-08.tw.com.	qsan:p6Uc-UUUUUUUucd:def	. Connected
	Details Log (Dn Refresh
	Details Log (Dn R <u>e</u> fresh
	Details Log (Dn <u>Re</u> fresh

Figure H.15

(Figure H.15: Status is "Connected", the initiator setting is done.)

Step C: Initialize/Format/Mount the disk

1. Go to Start → Control Panel → Computer Management → Device Manger → Disk drives



(Figure H.16: Disk drive status of ENHANCE TECH controller.)

2. Go to Start → Control Panel → Computer Management → Disk Management, it displays a new disk.

📮 Computer Management									
📃 Eile Action View Window H	elp								
← → 🗈 💽 😫 🖬 🔮 🖆	* 😼								
Computer Management (Local) System Tools Shared Folders Computer Shared Folders Computer Shared Folders For Shared Folders For Shared Folders For Storage For Storage For Storage For Storage	Volume (C:) (D:) (E:) (F:) EN_OS_2939.2 (0)	Layout Typ Partition Basi Partition Basi Partition Basi Partition Basi 5:) Partition Basi	e File System c FAT32 c FAT32 c C c NTFS c UDF	Status Healthy (System) Healthy (Boot) Healthy Healthy Healthy	Capacity 19.52 GB 19.52 GB 19.53 GB 18.08 GB 3.20 GB	Free Space 17.01 GB 16.32 GB 19.53 GB 16.40 GB 0 MB	% Free 87 % 83 % 100 % 90 % 0 %	Fault Tolerance No No No No No	Overhead O% 0% 0% 0% 0% 0% 0% 0% 0%
Ervices and Applications	Cisk 0 Basic 76.68 GB Online	(C:) 19.53 GB FAT32 Healthy (System)		(D:) 19.53 GB FAT3 Healthy (Boot)	32)	11 14	(E:) 9.53 GB ealthy		(F:) 18.08 GB NTFS Healthy
	Cisk 1 Unknown 2792.99 GB Not Initialized	2792.99 GB Unallocated	New Dis						
	DVD 3.20 GB Online	EN_05_2939.2 3.20 GB UDF Healthy	(6:)						
		Figu	re H.17						

3. Initialize disk.

CBDisk 0 Basic 76.68 GB Online	(C:) 19.53 GB FAT32 Healthy (System)	(D:) 19.53 GB FAT32 Healthy (Boot)	(E:) 19.53 GB Healthy	(F:) 18.08 GB NTF5 Healthy
Contemporary Conte	Initialize Disk			
Not Initialized	Properties			
DVD 3.20 GB Online	Help 17-05-2555-2 (G:) 3.20 GB UDF Healthy			

- Figure H.18
- 4. Convert to GPT disk for over 2TB capacity. For more detail information about GPT, please visit http://www.microsoft.com/whdc/device/storage/GPT_FAQ.mspx

CPDISK U Basic 76.68 GB Online	(C:) 19.53 GB FAT32 Healthy (System)	(D:) 19.53 GB FAT32 Healthy (Boot)	(E:) 19.53 GB Healthy	(F: 18.0 Hea) 18 GB NTFS thy
Cisk 1 Basic 2792.92 GB Online	Convert to Dynamic Disk Convert to GPT Disk			744.96 GB Unallocated	
SCD-ROM 0	Properties				
OVD 3.20 GB	Нер				
Online	Healthy				

Figure H.19

5. Format disk.

Contraction Disk 0 Basic 76.68 GB Online	(C:) 19.53 GB FAT32 Healthy (System)	(D:) 19.53 GB FAT32 Healthy (Boot)	(E:) 19.53 GB Healthy	(F:) 18.08 GB NTFS Healthy
CPDisk 1 Basic 2792.88 GB Online	2792.88 GB Unallocated	New Partition		
		Properties		
DVD	EN_05_2939.2 (G:)	Help		
0nline	3.20 GB UDF Healthy			

Figure H.20

6. Format disk is done.

Contemporary Disk 0 Basic 76.68 GB Online	(C:) 19.53 GB FAT32 Healthy (System)	(D:) 19.53 GB FAT32 Healthy (Boot)	(E:) 19.53 GB Healthy	(F:) 18.08 GB NTF5 Healthy		
CDISK 1 Basic 2792.87 GB Online	New Yolume (H:) 2792.87 GB NTF5 Healthy					
DVD 3.20 GB Online	EN_05_2939.2 (G:) 3.20 GB UDF Healthy					



7. The new disk is ready to go, available size = 2.72TB.

9	🦻 🎤 Search 💋 Folde	rs 🕼 🔉 🗙 🌱 🖸	
Address 😼 My Com	puter		
Name	Туре	Total Size	Free Space
Hard Disk Drives			
☞Local Disk (C:)	Local Disk	19.5 GB	17.0 GE
🍛 Local Disk (D:)	Local Disk	19.5 GB	16.2 GE
🍛 Local Disk (E:)	Local Disk		
☞Local Disk (F:)	Local Disk	18.0 GB	16.4 G
New Volume (H:)	Local Disk	2.72 TB	2.72 TE
Devices with Re	Free Space: 2,72 TB		
	Total Size: 2.72 TB		
31/2 Floppy (A:)	5K vgqor right SK		

Figure H.22



Caution

if user setup 512B block size for UDV and the host/server OS is 32bit, in the last step of formatting disk, user will find OS cannot format the area after 2048GB (2TB).

8. Wrong setting result: OS can not format area after 2048GB(2TB).

Disk 0 Basic 76.68 GB Online	(C:) 19.53 GB FAT32 Healthy (System)	(D:) 19.53 GB FAT32 Healthy (Boot)	(E:) 19.53 GB Healthy	j	(F:) 18.08 GB NTFS Healthy	
CDisk 1 Basic 2792.99 GB Online	New Volume (H:) 2048.00 GB NTFS Healthy			744.99 GB Unallocated	×	OS cannot format this area!
DVD 3.20 GB Online	EN_05_2939.2 (G:) 3.20 GB UDF Healthy					

Figure H	1.23
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