



XCubeSAN SANOS RESTful API Software Manual

Applicable Models:

XS5224D, XS5216D, XS5212D, XS5212S, XS5226D, XS5226S
XS3224D, XS3224S, XS3216D, XS3216S, XS3212D, XS3212S
XS3226D, XS3226S, XS1224D, XS1224S, XS1216D, XS1216S
XS1212D, XS1212S, XS1226D, XS1226S



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Notices

This XCubeSAN SANOS 4.0 user's manual is applicable to the following XCubeSAN models:

XCubeSAN Storage System 4U 19" Rack Mount Models

Model Name	Controller Type	Form Factor, Bay Count, and Rack Unit
XS5224D	Dual Controller	LFF 24-disk 4U Chassis
XS3224D	Dual Controller	LFF 24-disk 4U Chassis
XS3224S	Single Controller	LFF 24-disk 4U Chassis
XS1224D	Dual Controller	LFF 24-disk 4U Chassis
XS1224S	Single Controller	LFF 24-disk 4U Chassis

XCubeSAN Storage System 3U 19" Rack Mount Models

Model Name	Controller Type	Form Factor, Bay Count, and Rack Unit
XS5216D	Dual Controller	LFF 16-disk 3U Chassis
XS3216D	Dual Controller	LFF 16-disk 3U Chassis
XS3216S	Single Controller	LFF 16-disk 3U Chassis
XS1216D	Dual Controller	LFF 16-disk 3U Chassis
XS1216S	Single Controller	LFF 16-disk 3U Chassis

XCubeSAN Storage System 2U 19" Rack Mount Models

Model Name	Controller Type	Form Factor, Bay Count, and Rack Unit
XS5212D	Dual Controller	LFF 12-disk 2U Chassis
XS5212S	Single Controller	LFF 12-disk 2U Chassis
XS3212D	Dual Controller	LFF 12-disk 2U Chassis
XS3212S	Single Controller	LFF 12-disk 2U Chassis
XS1212D	Dual Controller	LFF 12-disk 2U Chassis
XS1212S	Single Controller	LFF 12-disk 2U Chassis
XS5226D	Dual Controller	SFF 26-disk 2U Chassis
XS5226S	Single Controller	SFF 26-disk 2U Chassis
XS3226D	Dual Controller	SFF 26-disk 2U Chassis
XS3226S	Single Controller	SFF 26-disk 2U Chassis
XS1226D	Dual Controller	SFF 26-disk 2U Chassis

XS1226S	Single Controller	SFF 26-disk 2U Chassis
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Preface

About This Manual

This manual provides technical guidance for designing and implementing QSAN XCubeSAN series SAN system, and it is intended for use by system administrators, SAN designers, storage consultants, or anyone who has purchased these products and is familiar with servers and computer networks, network administration, storage system installation and configuration, storage area network management, and relevant protocols.

Related Documents

There are related documents which can be downloaded from the website.

- ☞ [All XCubeSAN Documents](#)
- ☞ [XCubeSAN OIG \(Quick Installation Guide\)](#)
- ☞ [XCubeSAN Hardware Manual](#)
- ☞ [XCubeSAN Configuration Worksheet](#)
- ☞ [XCubeSAN SANOS 4.0 Software Manual](#)
- ☞ [Compatibility Matrix](#)
- ☞ [White Papers](#)
- ☞ [Application Notes](#)

Technical Support

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- ☞ Via the Web: https://www.qsan.com/technical_support
- ☞ Via Telephone: +886-2-77206355
(Service hours: 09:30 - 18:00, Monday - Friday, UTC+8)
- ☞ Via Skype Chat, Skype ID: qsan.support
(Service hours: 09:30 - 02:00, Monday - Friday, UTC+8, Summer time: 09:30 - 01:00)
- ☞ Via Email: support@qsan.com

Information, Tip and Caution

This manual uses the following symbols to draw attention to important safety and operational information.



INFORMATION:

INFORMATION provides useful knowledge, definition, or terminology for reference.



TIP:

TIP provides helpful suggestions for performing tasks more effectively.



CAUTION:

CAUTION indicates that failure to take a specified action could result in damage to the system.

Conventions

The following table describes the typographic conventions used in this manual.

Conventions	Description
Bold	Indicates text on a window, other than the window title, including menus, menu options, buttons, fields, and labels. Example: Click the OK button.
<Italic>	Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: copy <source-file> <target-file>.
[] square brackets	Indicates optional values. Example: [a b] indicates that you can choose a, b, or nothing.
{ } braces	Indicates required or expected values. Example: { a b } indicates that you must choose either a or b.
vertical bar	Indicates that you have a choice between two or more options or

	arguments.
/ Slash	Indicates all options or arguments.
underline	Indicates the default value. Example: [<u>a</u> b]

1. RESTful API Overview

QSAN meets the trend of the times and supports the RESTful API which is becoming the most popular API design specification.

1.1. What is RESTful API

A RESTful API is based on REST (REpresentational State Transfer) technology, an architectural style and approach to communications often used in web services development. A RESTful API is an API (Application Program Interface) that uses HTTP requests to GET, POST, PUT, and DELETE data.

RESTful API design is designed to take advantage of existing protocols. It usually takes advantage of HTTP when used for Web APIs. This means that developers do not need to install libraries or additional software in order to take advantage of a REST API design. REST API is notable for its incredible layer of flexibility and leverages less bandwidth, making it more suitable for internet usage. Since data is not tied to methods and resources, REST has the ability to handle multiple types of calls, return different data formats and even change structurally with the correct implementation of hypermedia.

1.2. How RESTful API Work

A RESTful API breaks down a transaction to create a series of small modules. Each module addresses a particular underlying part of the transaction. This modularity provides developers with a lot of flexibility, but it can be challenging for developers to design from scratch.

A RESTful API explicitly takes advantage of HTTP methodologies. They use GET to retrieve a resource; PUT to change the state of or update a resource, which can be an object, file or block; POST to create that resource; and DELETE to remove it.

2. Getting Started with RESTful API

There are some useful API tools to test before developing an application using the RESTful API. API testing is a software testing type which focuses on the determination if the developed APIs meet expectations regarding the functionality, reliability, performance, and security of the application. The following provides some API testing tools that testing teams can select to suit your needs.

Postman

Website: <https://www.getpostman.com/>

Postman is an easy-to-use REST client and rich interface which makes it easy to use.

SoapUI

Website: <https://www.soapui.org/>

SoapUI is a headless functional testing tool dedicated to API testing, allowing users to test REST and SOAP APIs and Web Services easily.

Katalon Studio

Website: <https://www.katalon.com>

Katalon Studio is a free test automation tool for API, Web and Mobile applications.

3. RESTful API Sets

This chapter is to help you find an API by name. Each API topic includes one or more of the following sections:

API	The Application Program Interface
Description	The API's purpose and note about usage
Parameters	Descriptions of API's parameters
Example	One or more examples of API's usage

The usage of each API is described in the following.

3.1. Login

API

POST <baseurl>/rest/login/account/<\$username>/password/<\$password>

Description

Login the system.

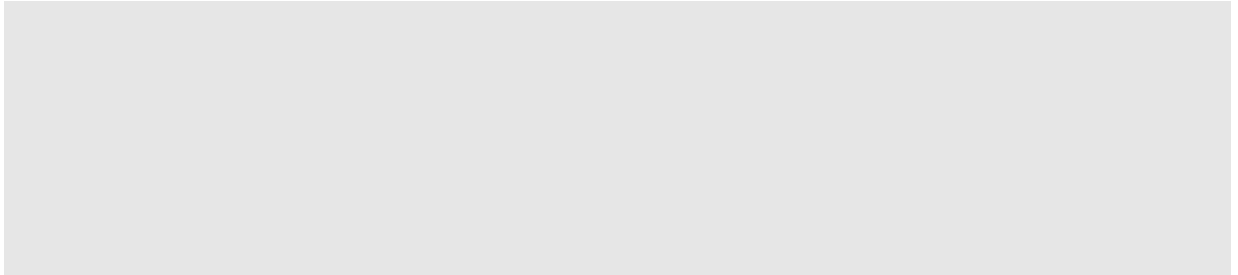
Parameters

Table 3-1 Login Parameters

Name	Type	Description
\$username	string	Login account
\$password	string	Login password

Example

For security reasons, you have to login the system for authentication before you can execute other RESTful APIs.



3.2. Help

API

GET <baseurl>/rest/

Description

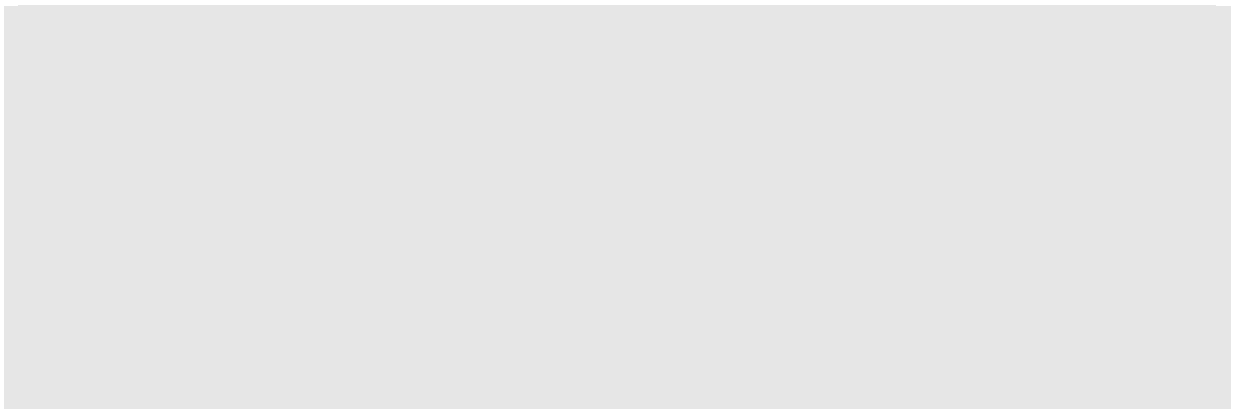
Show all APIs.

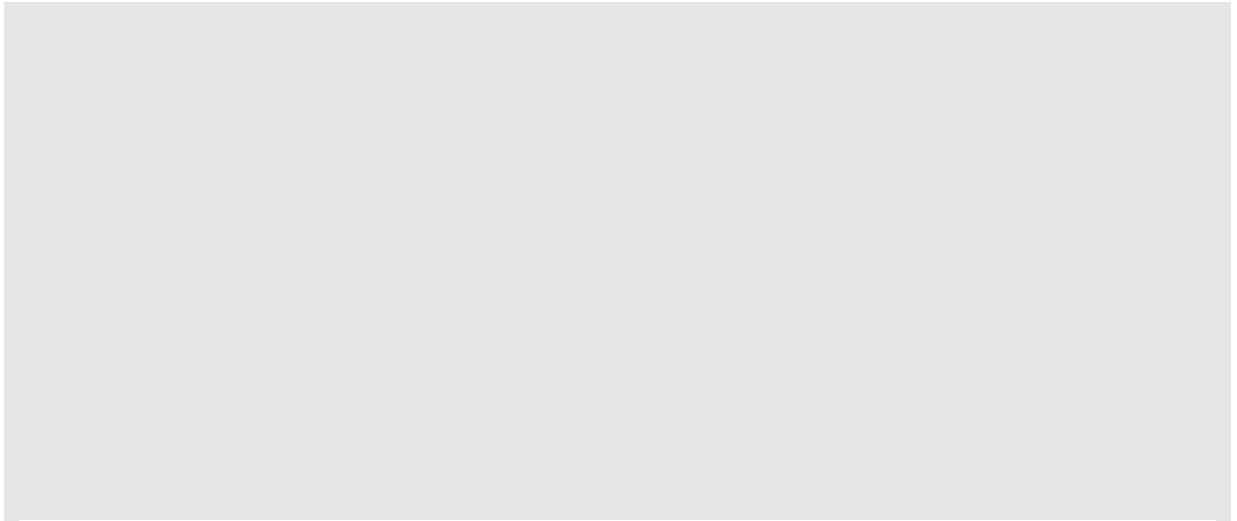
Parameters

None.

Example

Display all RESTfull APIs.





3.3. Dashboard

This section includes the following API sets.

GET

- ☒ **systeminfo** : Show system information.
- ☒ **hwmonitor** : Show hardware monitoring information.

3.3.1. System Information

API

GET <baseurl>/rest/dashboard/systeminfo

Description

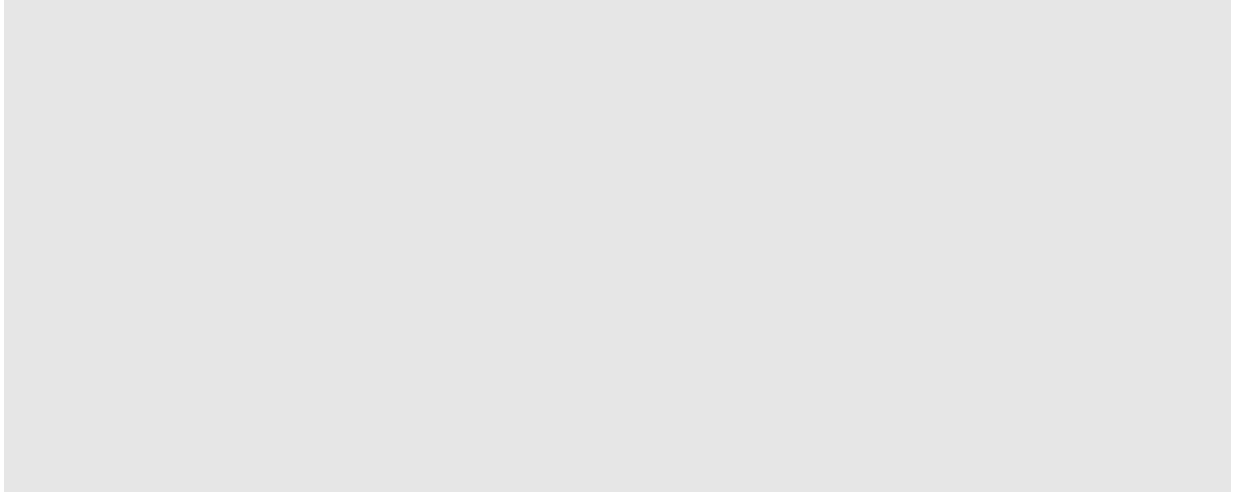
Show system information.

Parameters

None.

Example

Display the basic information of the system.



3.3.2. Hardware Monitor

API

GET <baseurl>/rest/dashboard/hwmonitor

Description

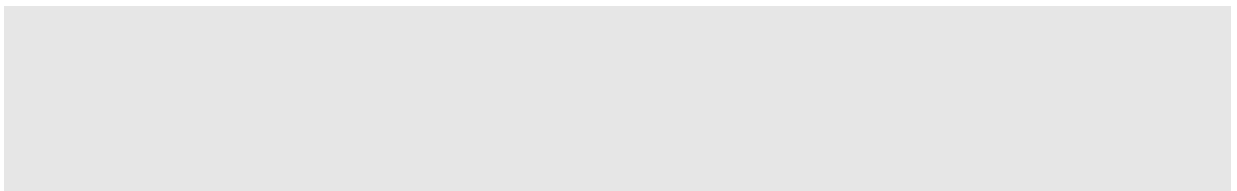
Show hardware monitoring information.

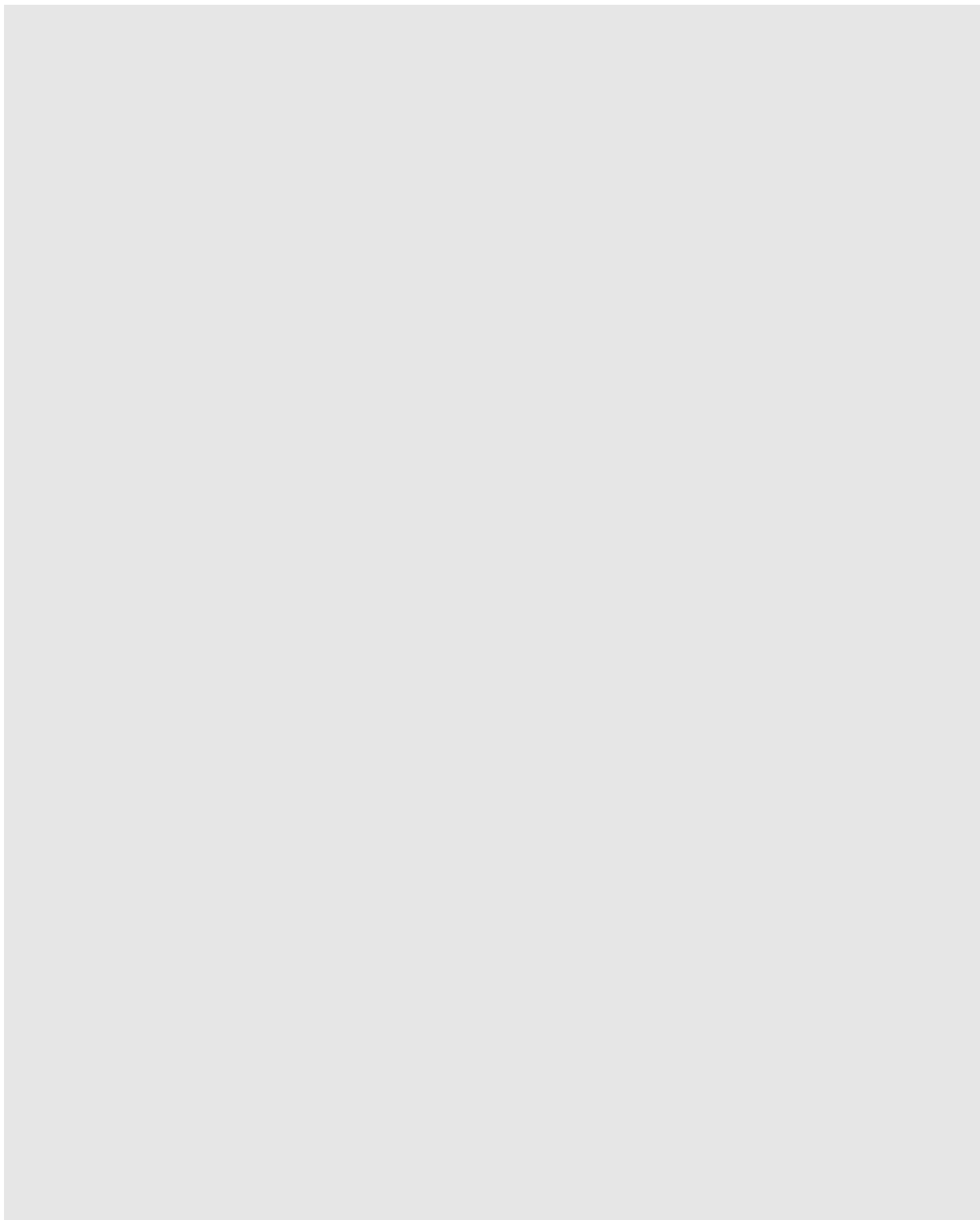
Parameters

None.

Example

Show summary status of all enclosures. There are current voltage, temperature, status of fan module, and power supply.





3.4. List Event Logs

API

GET <baseurl>/rest/log/list/<\$page_num>

Description

Show system event logs.

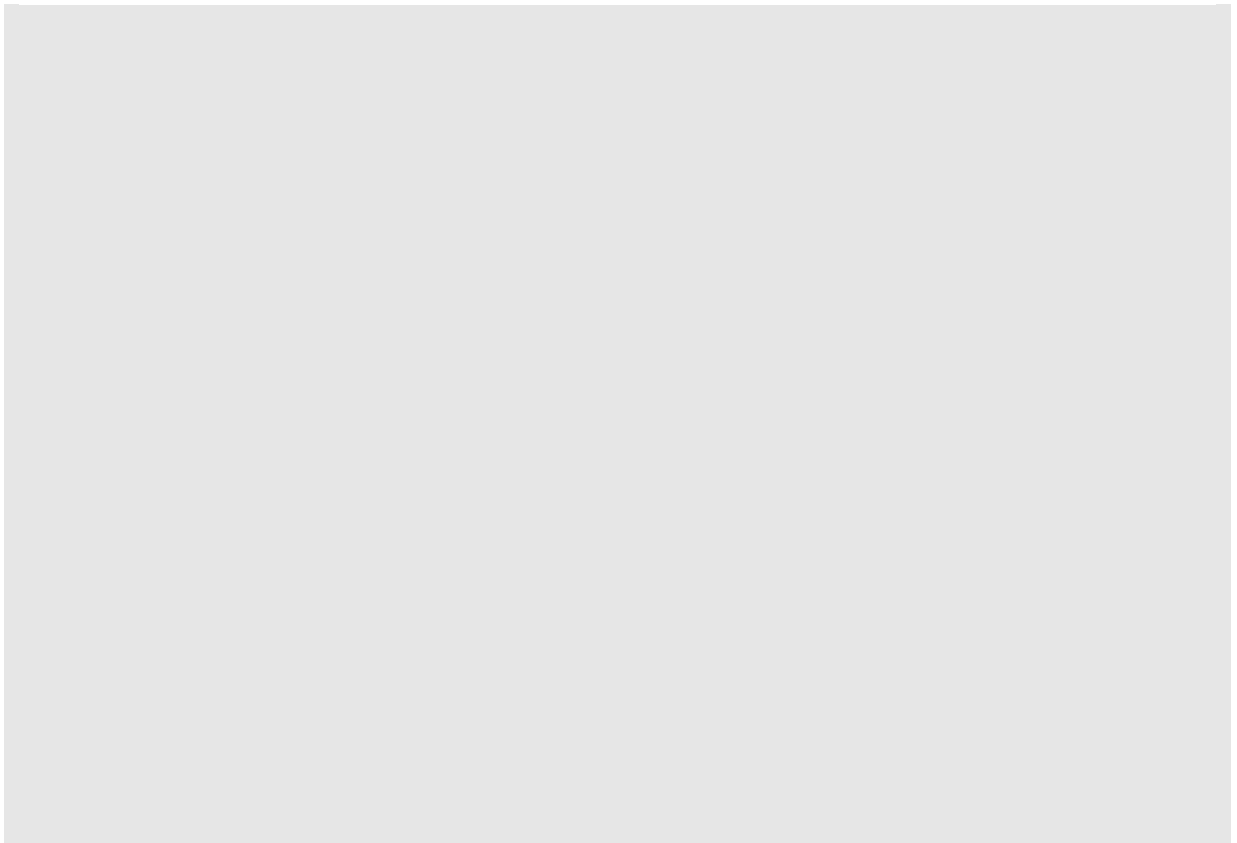
Parameters

Table 3-2 List Event Parameters

Name	Type	Description
\$page_num	integer	Event log page number

Example

Display the event logs for the first page.



3.5. Storage

This section includes the following API sets.

GET

- ⌘ **diskinfo** : Show disk information.
- ⌘ **disksmart** : Show the S.M.A.R.T. information of the disk.
- ⌘ **poolinfo** : Show pool information.
- ⌘ **volumeinfo** : Show volume information.
- ⌘ **snapshot** : Show snapshot information.
- ⌘ **availtarget** : Show available target information.
- ⌘ **avaiilun** : Show available LUN information.
- ⌘ **lunmappinginfo** : Show LUN mapping information.

POST

- ⌘ **snapshot** : Take a snapshot.
- ⌘ **snapspace** : Set snapshot space.
- ⌘ **maplun** : Map a LUN.
- ⌘ **unmaplun** : Unmap the LUN.

3.5.1. Disk Information

API

GET <baseurl>/rest/storage/diskinfo

Description

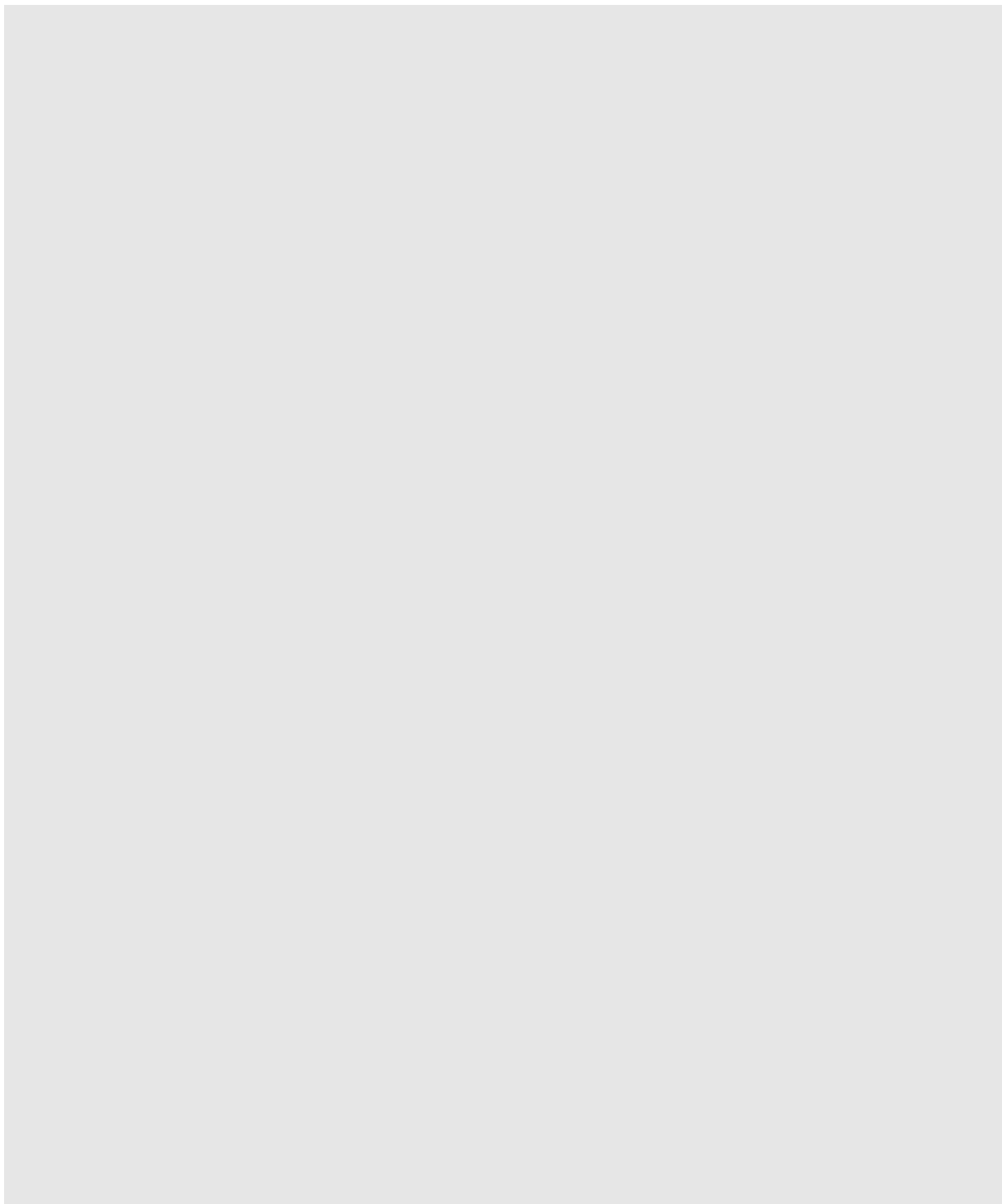
Show all disk information.

Parameters

None.

Example

Display all disk information of all enclosures.



3.5.2. Disk S.M.A.R.T.

API

GET <baseurl>/rest/storage/disksmart

Description

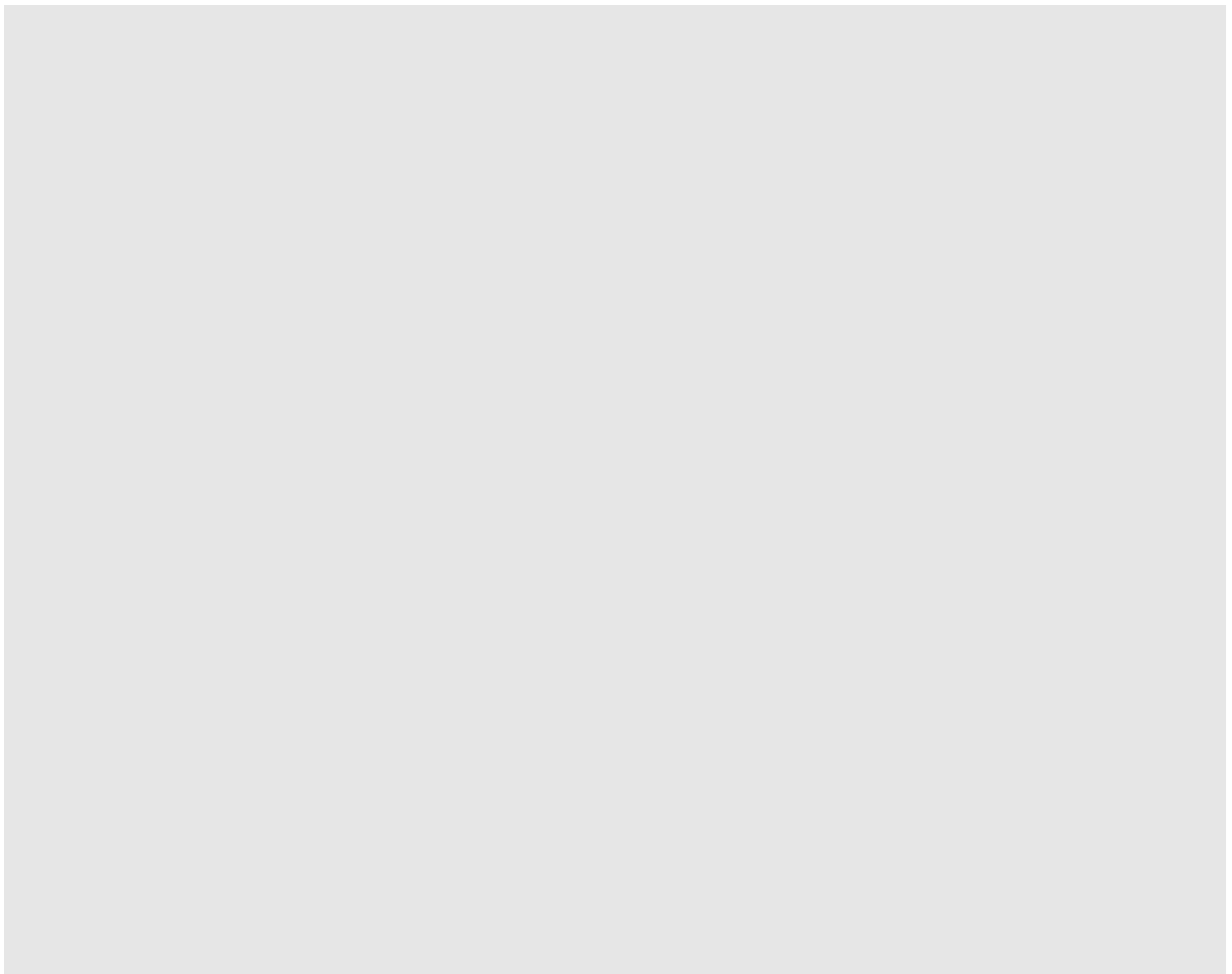
Show the disk S.M.A.R.T. information.

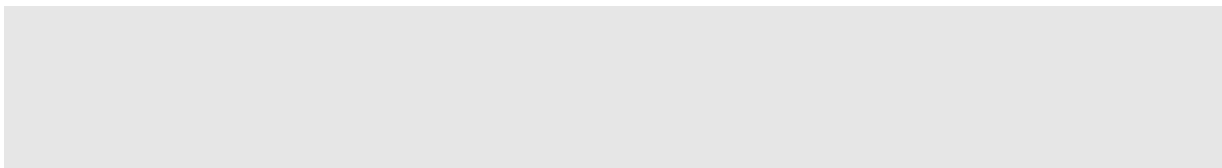
Parameters

None.

Example

Display disk S.M.A.R.T. information of all enclosures.





3.5.3. Pool Information

API

GET <baseurl>/rest/storage/poolinfo

Description

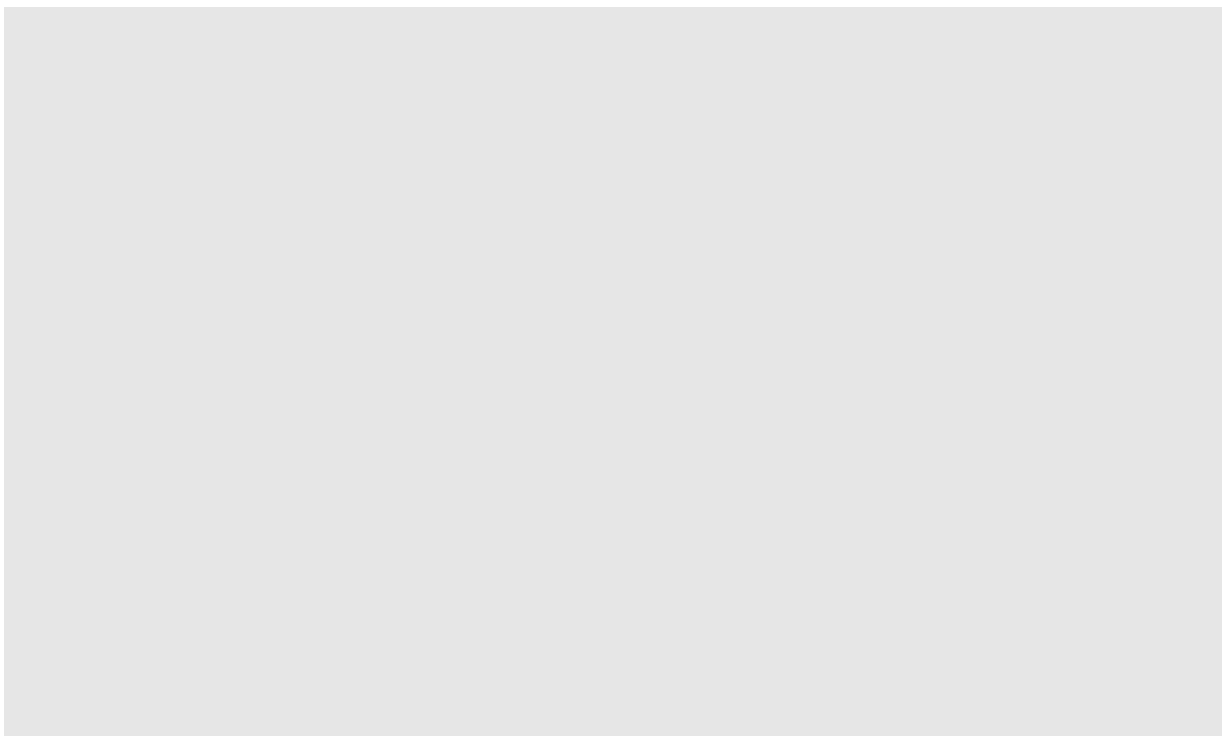
Show the pool information.

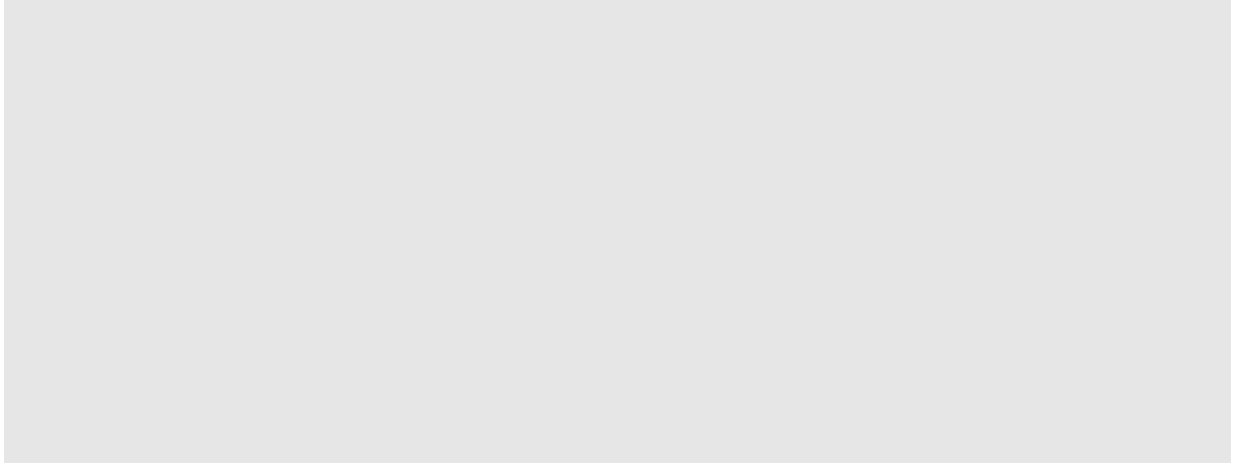
Parameters

None.

Example

Display all pools of the system.





3.5.4. Volume Information

API

GET <baseurl>/rest/storage/volumeinfo

Description

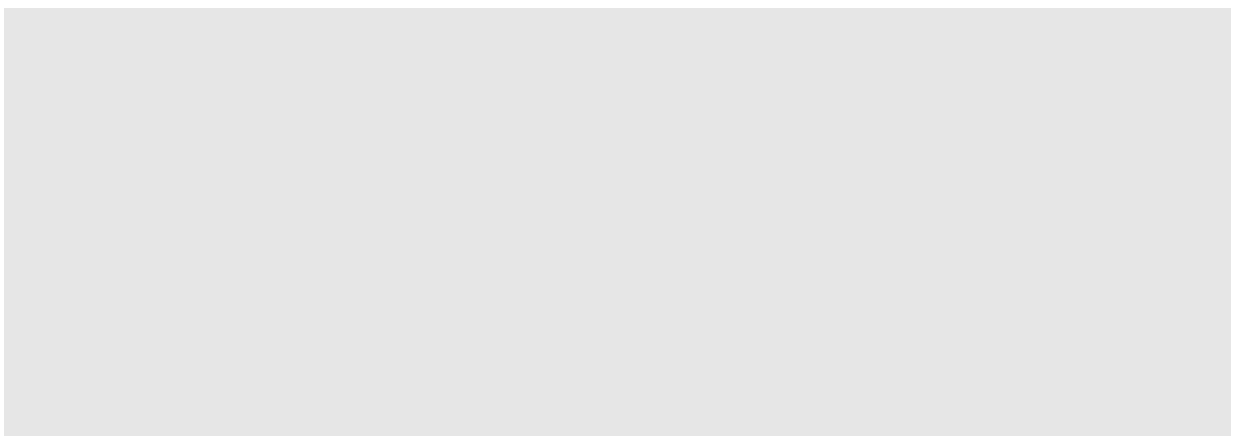
Show the system information.

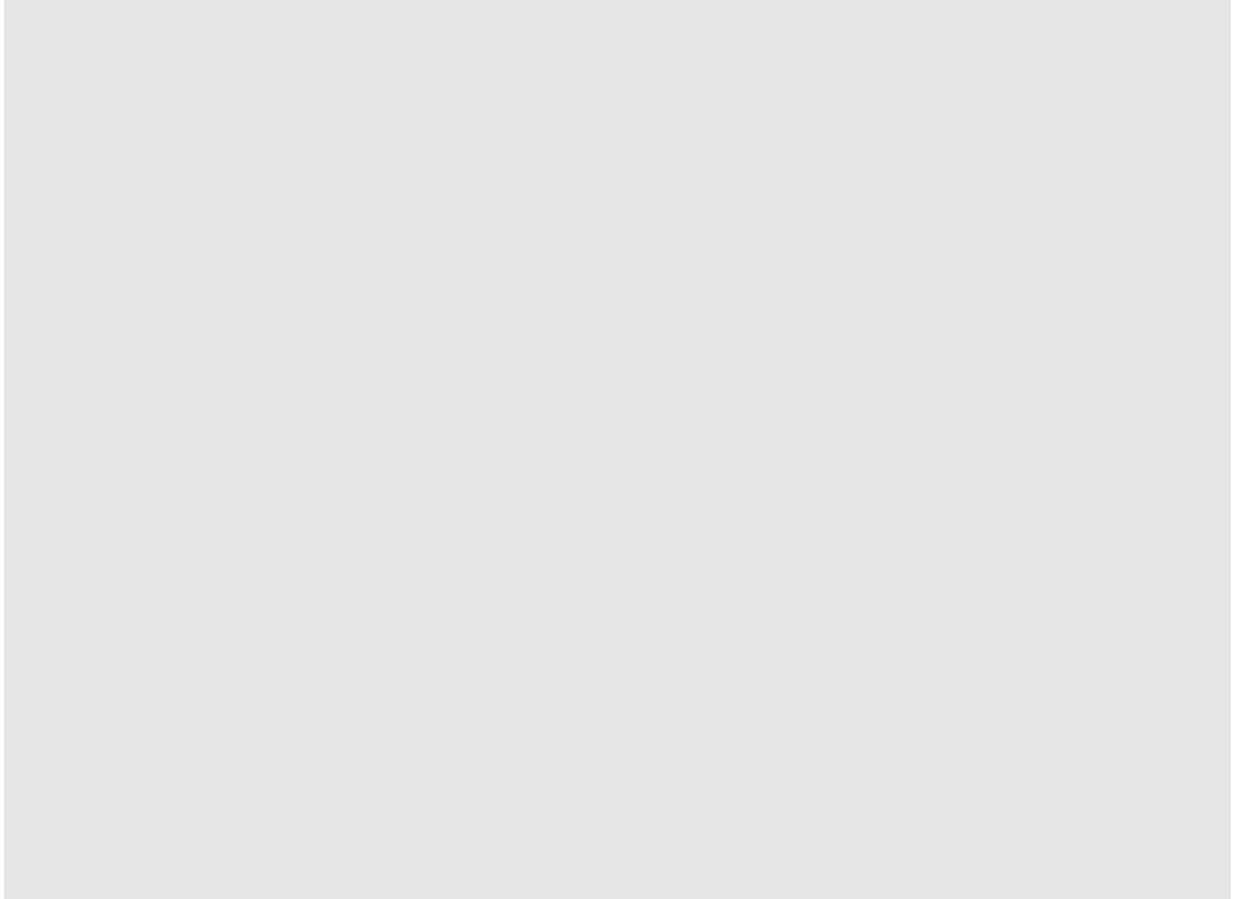
Parameters

None.

Example

Display all volumes of the system.





3.5.5. Snapshot Information

API

GET <baseurl>/rest/storage/snapshot/vdid/\$vdid

Description

Show the snapshots of the volume.

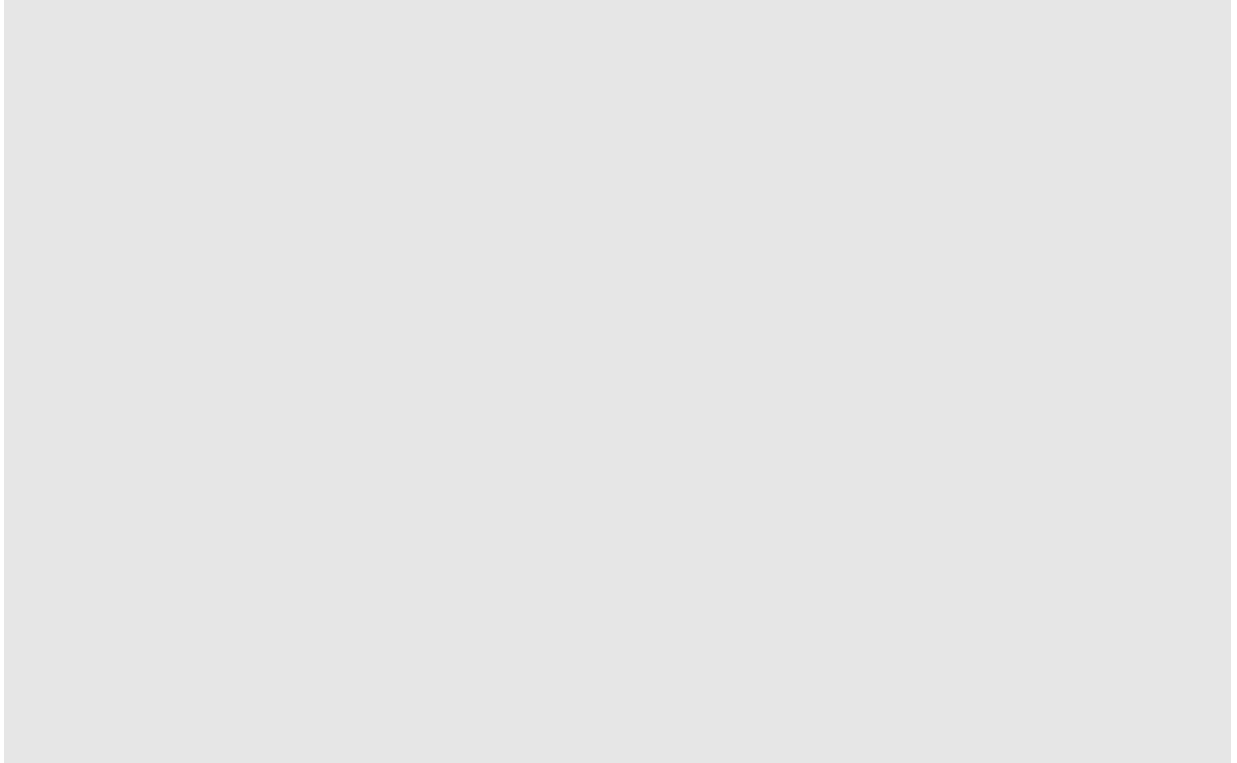
Parameters

Table 3-3 *Snapshot Information Parameters*

Name	Type	Description
\$vdid	integer	Volume ID

Example

Display all taken snapshots of the volume.



3.5.6. List Targets

API

GET <baseurl>/rest/storage/availtarget

Description

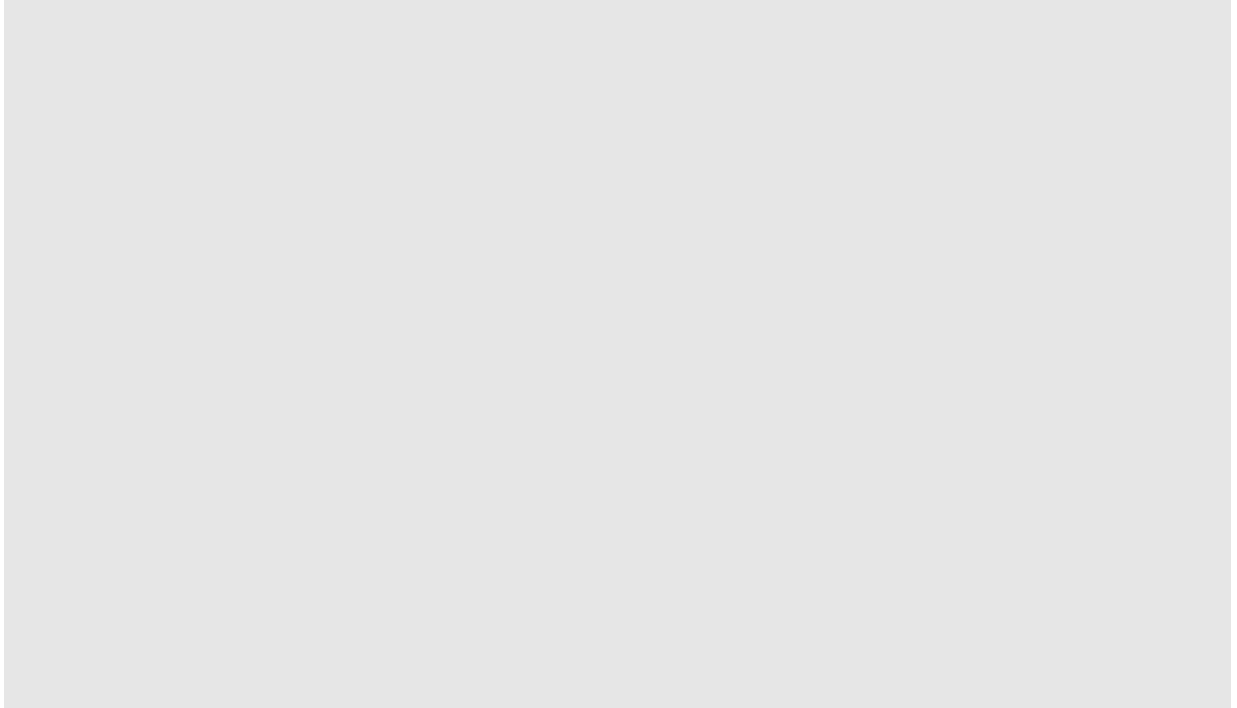
List all available targets.

Parameters

None.

Example

Display all targets of the system.



3.5.7. List Target LUNs

API

GET <baseurl>/storage/availlun/targetid/\$target_id

Description

List all available LUNs of the target.

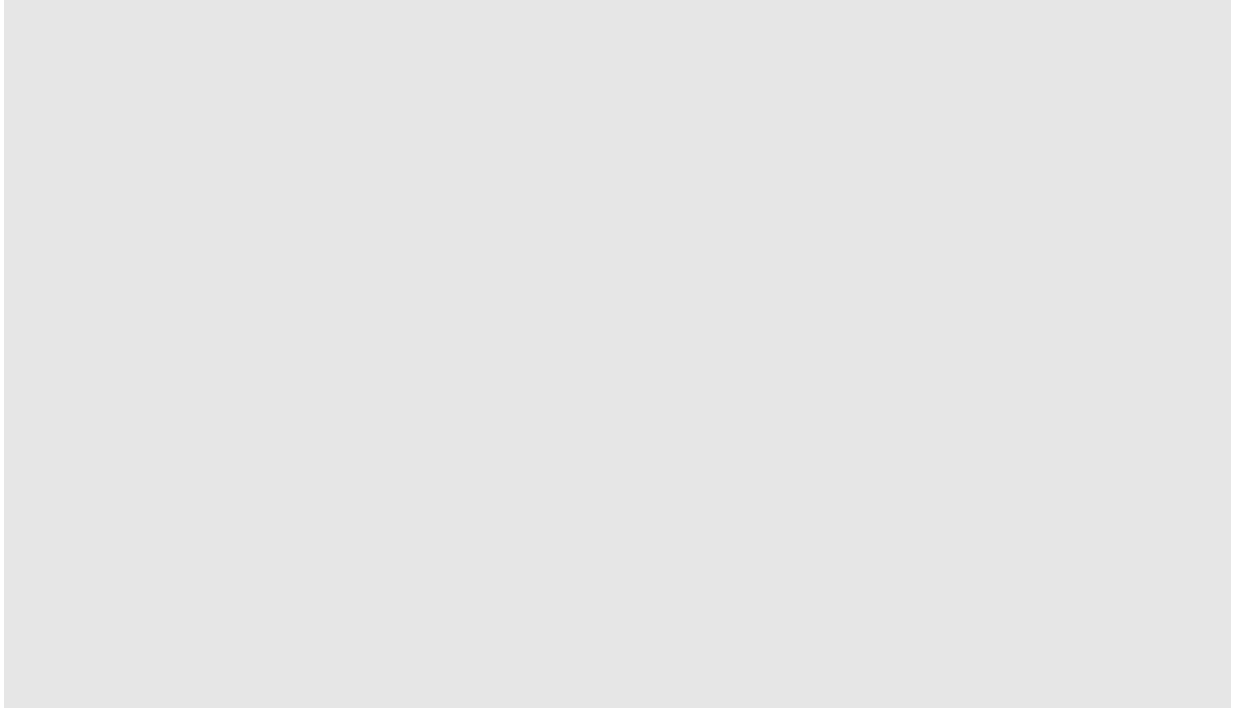
Parameters

Table 3-4 List Target LUN Parameters

Name	Type	Description
\$target_id	integer	Target ID

Example

Display all LUNs of the target.



3.5.8. List LUN Mappings

API

GET <baseurl>/rest/storage/lunmappinginfo

Description

Show all LUN mappings.

Parameters

None.

Example

Display all LUN mappings.



3.5.9. Set Snapshot Space

API

POST <baseurl>/rest/storage/snapspace/vdid/<\$vdid>/sizegb/<\$sizegb>

Description

Set snapshot space 20GB for the volume.

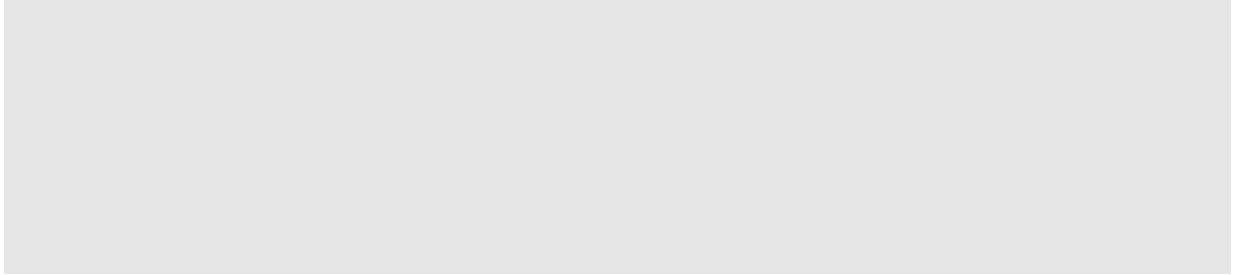
Parameters

Table 3-5 Set Snapshot Space Parameters

Name	Type	Description
\$vdid	integer	Volume ID
\$sizegb	integer	Snapshot space size in GB

Example

Set snapshot space for the volume ID "1059612626".



3.5.10. Take a Snapshot

4. Support and Other Resources

4.1. Getting Technical Support

After installing your device, locate the serial number on the sticker located on the side of the chassis or from the SANOS UI -> **MAINTINANCE** > **System Information** and use it to register your product at https://www.qsan.com/business_partnership. We recommend registering your product in QSAN partner website for firmware updates, document download, and latest news in eDM. To contact QSAN Support, please use the following information.

☒ Via the Web: https://www.qsan.com/technical_support

☒ Via Telephone: +886-2-77206355

(Service hours: 09:30 - 18:00, Monday - Friday, UTC+8)

☒ Via Skype Chat, Skype ID: qsan.support

(Service hours: 09:30 - 02:00, Monday - Friday, UTC+8, Summer time: 09:30 - 01:00)

☒ Via Email: support@qsan.com

Information to Collect

- ☒ Product name, model or version, and serial number
- ☒ Operating system name and version
- ☒ Firmware version
- ☒ Error messages or capture screenshots
- ☒ Product-specific reports and logs
- ☒ Add-on products or components installed
- ☒ Third-party products or components installed

Information for Technical Support

The following system information is necessary for technical support. Please refer to following for what and where to get the information of your XCubeSAN Series model.

If the technical support requests you to download the Service Package, please navigate in the SANOS UI -> **SYSTEM SETTING**> **Maintenance** -> **System Information** , and then click the **Download Service Package** button to download. Then the system will automatically generate a zip file the default download location of your web browser.

System	
Item	Information
System Name	XS5216-D40000
Model Name	XS5216
System Serial Number	QW3160160I0021001
System Controller Status	Dual Controller, Active-Active
Master Controller	Controller 1
Controller 1	
Item	Information
Controller Serial Number	50013780080A0440
CPU	Intel(R) Xeon(R) Processor D-1500 4 Cores
Memory	8 GB
Host Card Slot 1	Empty
Host Card Slot 2	Empty
Firmware Version	1.2.0
SAS IOC Firmware Version	07.00.01.00
SAS Expander Firmware Version	1000
Controller 2	
Item	Information
Controller Serial Number	50013780080A0380
CPU	Intel(R) Xeon(R) Processor D-1500 4 Cores
Memory	8 GB
Host Card Slot 1	Empty
Host Card Slot 2	Empty
Firmware Version	1.2.0
SAS IOC Firmware Version	07.00.01.00
SAS Expander Firmware Version	1000
Backplane	
Item	Information
Backplane Serial Number	001378D40000
Backplane ID	QW316
MCU Version	1.2.0
Licenses	
Item	Information
SSD Cache	Enabled
Auto Tiering	Enabled
Download Service Package	

Figure 4-1 Download Service Package in the SANOS UI

4.2. Online Customer Support

For better customer support, every XCubeSAN series models include the console cable (two for dual controller models), one for single controller models) for online support. Please follow the procedures below to setup the online help environment for QSAN support team.

The following procedure will help you to setup the serial console via the console cable that is enclosed in the shipping carton. The following image is the appearance of the console cable.



Figure 4-2 Appearance of a Console Cable

Procedures to Setup the Serial Console

1. Setup the serial cable between the controller and one server/host like in the below image.

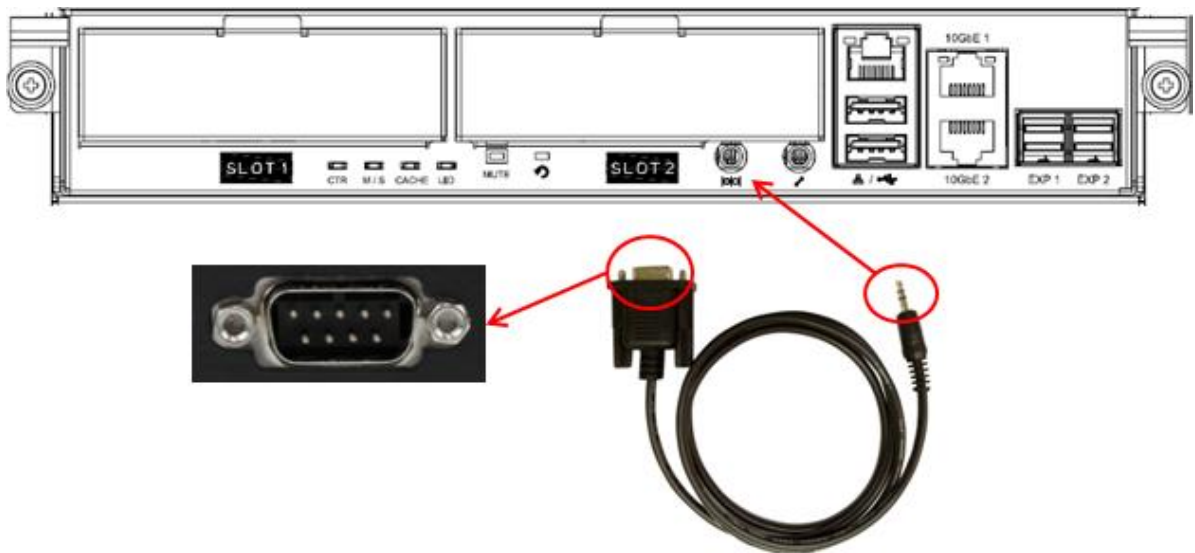


Figure 4-3 Connect the Console Cable

2. You must use terminal software such as HyperTerminal or Putty to open the console after the connection is made.



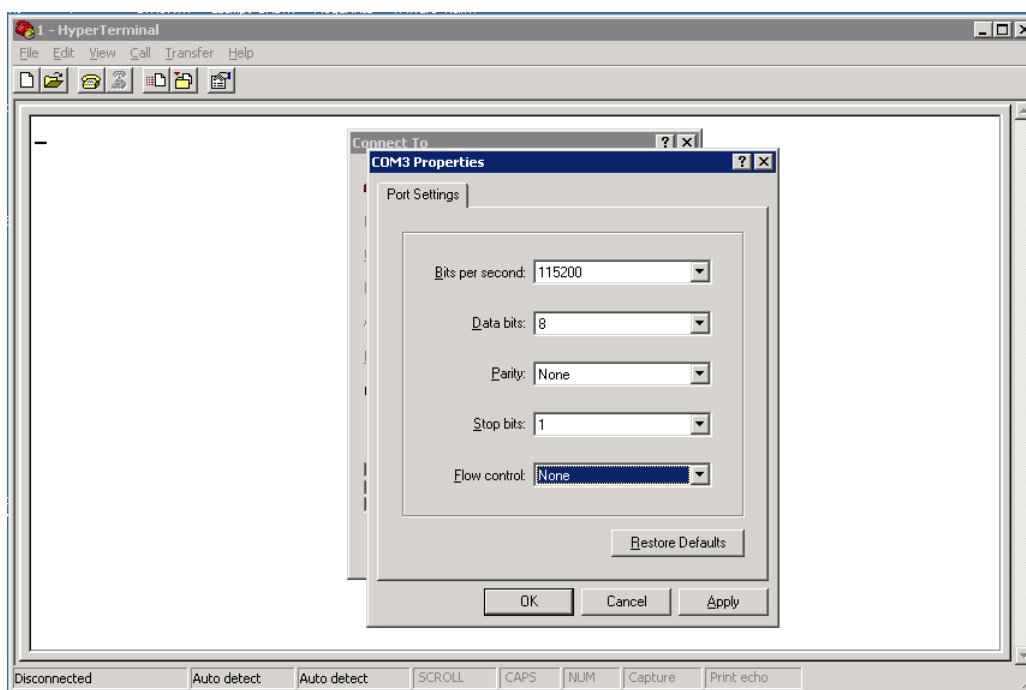
INFORMATION:

For more information about terminal software, please refer to

HyperTerminal: <http://www.hilgraeve.com/hyperterminal/>

PuTTY: <http://www.putty.org/>

3. Here we first demonstrate HyperTerminal. The console settings are on the following.
 Baud rate: 115200, 8 data bit, no parity, 1 stop bit, and no flow control
 Terminal type: vt100



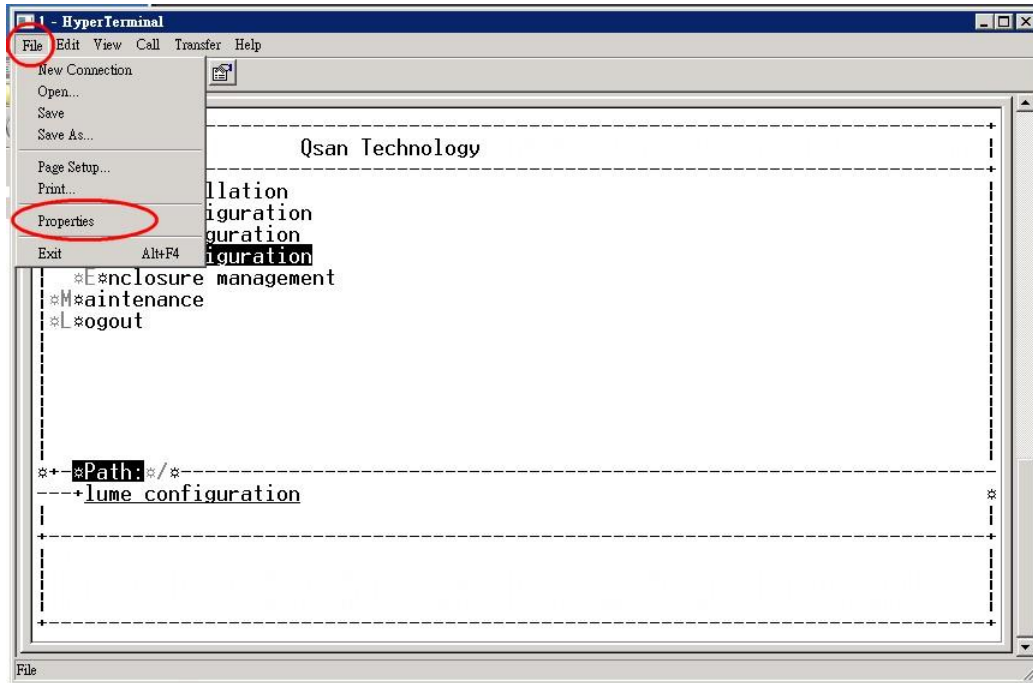
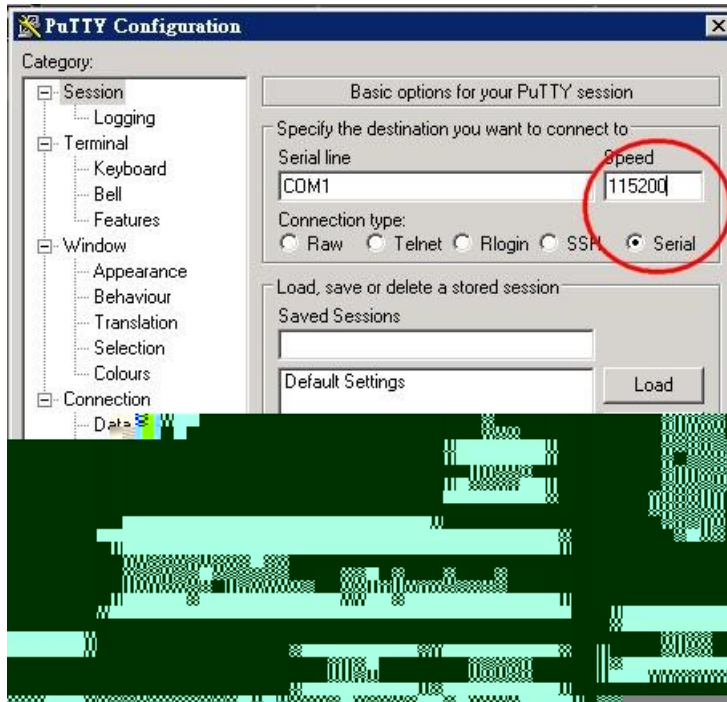


Figure 4-4 The Procedures of Setup Serial Console by HyperTerminal

4. If you are using PuTTY instead, please refer to below



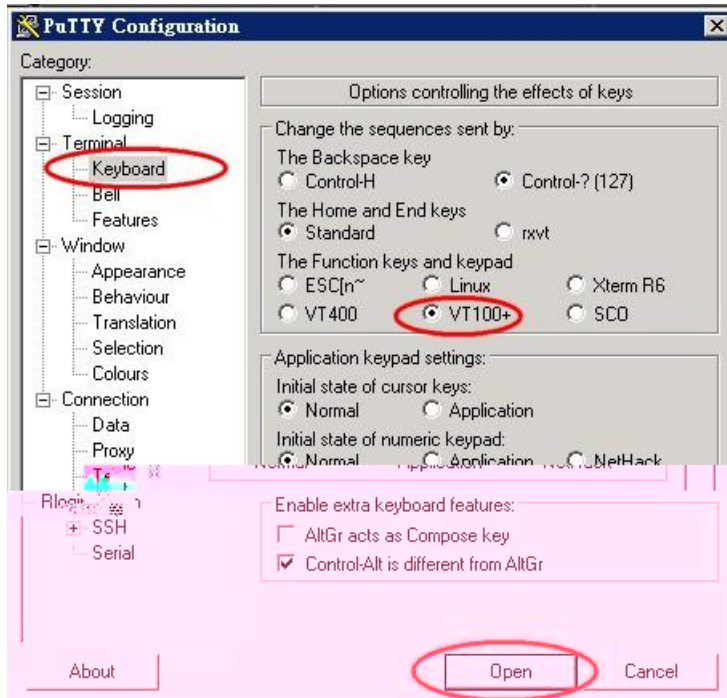


Figure 4-5 The Procedures of Setup Serial Console by PuTTY

5. Users should be able to login the controller system via console cable by following the procedures above.

Setup the Connection for Online Support

Following is the procedure to setup the connection for online support via TeamViewer:

1. Please download the TeamViewer from following hyper link:
<https://www.teamviewer.com/en/download/>
2. Install TeamViewer.
3. Please provide the ID/password showed on the application to QSAN support team member to join the online support session.

4.3. Accessing Product Updates

To download product updates, please visit QSAN website:

https://www.qsan.com/download_center

4.4. Documentation Feedback

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When submitting your feedback, include the document title, part number, revision, and publication date located on the front cover of the document.

Appendix

Glossary and Acronym List

Common Terminology

Item	Description
RAID	Redundant Array of Independent Disks. There are different RAID levels with different degree of data protection, data availability, and performance to host environment.
Disk	The Physical Disk belongs to the member disk of one specific RAID group.
Pool	A collection of removable media. One pool consists of a set of volumes and owns one RAID level attribute.
Volume	Each pool could be divided into several volumes. The volumes from one pool have the same RAID level, but may have different volume capacity.
LUN	Logical Unit Number. A logical unit number (LUN) is a unique identifier which enables it to differentiate among separate devices (each one is a logical unit).
WebUI	Web User Interface.
WT	Write-Through cache-write policy. A cache technique in which the completion of a write request is not signaled until data is safely stored in non-volatile media. Each data is synchronized in both data cache and accessed physical disks.
WB	Write-Back cache-write policy. A cache 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 Read-Only.
DS	Dedicated Spare disks. The spare disks are only used by one specific

	RAID group. Others could not use these dedicated spare disks for any rebuilding purpose.
LS	Local Spare disks. The spare disks are only used by the RAID groups of the local enclosure. Other enclosure could not use these local spare disks for any rebuilding purpose.
GS	Global Spare disks. It is shared for rebuilding purpose. If some RAID groups 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.
DG	DeGraded 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.
SCSI	Small Computer System Interface
SAS	Serial Attached SCSI
S.M.A.R.T.	Self-Monitoring Analysis and Reporting Technology
WWN	World Wide Name
HBA	Host Bus Adapter
SES	SCSI Enclosure Services
NIC	Network Interface Card
BBM	Battery Backup Module
SCM	Super Capacitor Module

FC / iSCSI / SAS Terminology

Item	Description
FC	Fibre Channel
FC-P2P	Point-to-Point
FC-AL	Arbitrated Loop
FC-SW	Switched Fabric
iSCSI	Internet Small Computer Systems Interface
LACP	Link Aggregation Control Protocol
MPIO	Multipath Input/Output
MC/S	Multiple Connections per Session
MTU	Maximum Transmission Unit
CHAP	Challenge Handshake Authentication Protocol. An optional security

	mechanism to control access to an iSCSI storage system over the iSCSI data ports.
iSNS	Internet Storage Name Service
SAS	Serial Attached SCSI

Dual Controller Terminology

Item	Description
SBB	Storage Bridge Bay. The objective of the Storage Bridge Bay Working Group (SBB) is to create a specification that defines mechanical, electrical and low-level enclosure management requirements for an enclosure controller slot that will support a variety of storage controllers from a variety of independent hardware vendors ("IHVs") and system vendors.
6G MUX	Bridge board is for SATA II disk to support dual controller mode.

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