



XCubeFAS Series White Paper

QSLife Technology



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This XCubeFAS series white paper is applicable to the following XCubeFAS model:

XCubeSAN Storage System 2U 19" Rack Mount Models

Model Name	Controller Type	Form Factor, Bay Count, and Rack Unit
XF2026D	Dual Controller	SFF 26-disk 2U Chassis

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QSLife Technology

Executive Summary

The SSD (Solid-State Drive) has been the most popular storage device since these years. It consists mainly of a control chip and flash memory. Compared with traditional hard drives, SSDs offer the advantages of higher performance, lower power consumption and higher impact resistance. Despite this, the lifespan and reliability of SSDs is still lower than traditional hard drives. That's why we need a specific tool to monitor SSDs for users.

Audience

This document is applicable for QSAN customers and partners who are interested in learning about QSLife for solving the problem of monitoring the life endurance of SSDs. It assumes the reader is familiar with QSAN products and has General IT experience, including knowledge as a system or network administrator. If there is any question, please refer to the user manuals of products, or contact QSAN support for further assistance.

Overview

QSLife (QSAN SSD Life) is based on a specific algorithm to decrypt the attributes within the SSD to display detailed information. SSD has become the basic usage of storage system as a mature and reliable data protection device. However, with the rapid growth in data storage capacity demand and the emergence of higher performance applications in recent years, SSDs have gradually exposed their flaws.

SSDs today are almost universally comprised of NAND flash, which wears out with use. Each flash memory cell can only be written specific times before it becomes unreliable. As the number of I/O increases, the number of SSDs writes also increases significantly. This is one of the toughest issues in enterprise storage management today. In the past few days when SSDs were only written from 10GB to 100GB, the lifespan of SSDs was not a problem without special attention. However, as daily writes grow to hundreds of gigabytes or even terabytes, SSD's remaining life management will be one of the major issues in storage management.

Theory of Operation

QSLife monitors SSDs of your storage system all the day. By analyzing and reorganizing the information provided by SSDs, QSAN provides accurate SSD remaining life for each disk in a clear and understandable manner. With the QSLife feature, users can easily understand the disks which need to be replaced in time, or customize the threshold for replacing SSDs.

Measuring SSD Endurance

SSD endurance is usually measured in two ways.

1. DWPD (Drive Writes Per Day): It measures how much of the disk can be written to everyday and still be expected to function within the warranty period.
2. TBW (TeraBytes Written): It measures how many terabytes can be written to the disk before it will begin to malfunction.

Usually when researching SSDs, we try to look for the stat TBW or DWPD to find the endurance of an SSD. Both of these two are based on the manufacturer's warranty period for the SSDs, it is also known as "lifetime" or "remaining life". The equation is on the following.

$$TBW = DWPD * Warranty (year) * 365 * Capacity (GB) / 1,000$$

For example, suppose the capacity of the SSD is 150GB, the warranty is 5 years, and its DWPD is 3.

$$TBW = 3 * 5 \text{ years} * 365 * 150GB / 1,000 = 821.25TB$$

That means you may need to replace the SSD before writing 821.25TB.

Why Decrypting SSD

As you can see, if you know the capacity and the warranty of the SSD, you can roughly go from DWPD to TBW with some simple multiplication or division, and vice versa. The two measurements are rough but similar.

However, enterprises can't just pay for the endurance of SSDs every day, and the usage of enterprise storage is obviously amazing. To solve this problem, we have designed a unique algorithm to measure the remaining life of most popular SSDs on the market.

Introduce QSLife Functions

This section will describe the operations of checking SSDs' status and the threshold settings. Click the **QSLife icon** to popup a window.



Figure 1 QSLife Icon

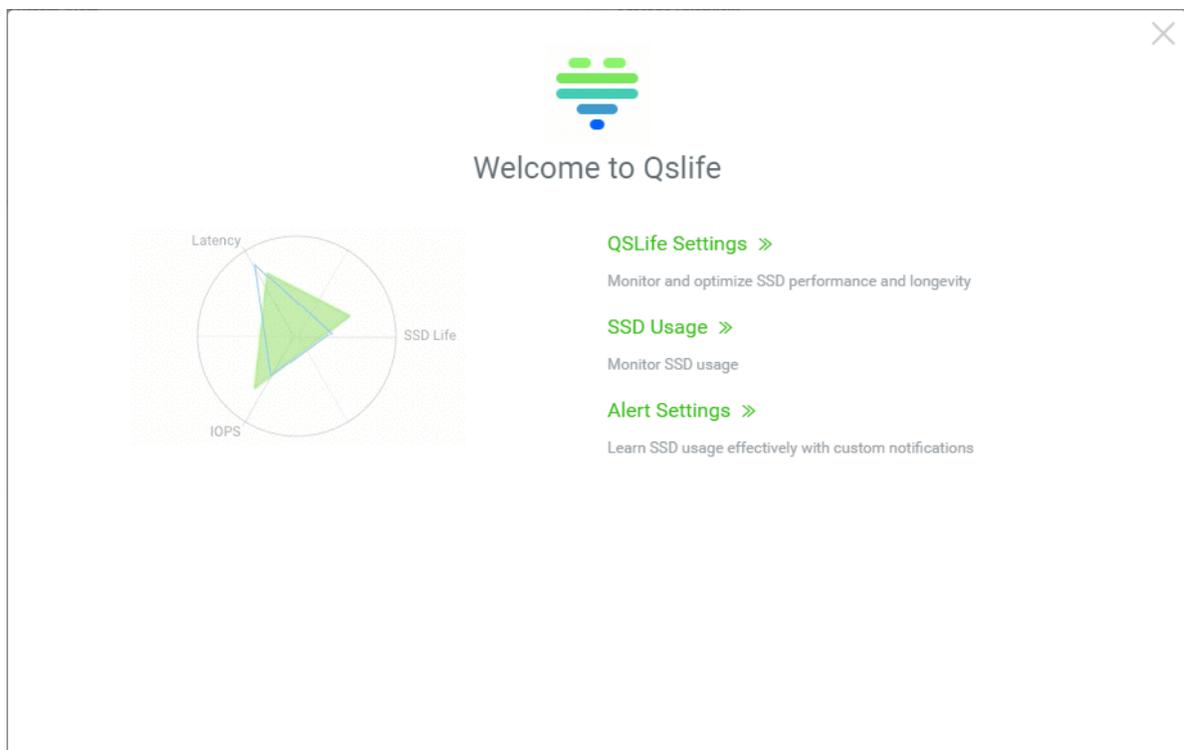


Figure 2 QSLife Popup Window

Check Life Remaining of SSD

Select the **QSLife Settings** function menu in the **QSLife** popup window. It will go to **QSLife Settings** function tab which is used to monitor and optimize SSD performance and longevity. Here is an example of checking the life remaining of the SSD.

1. Select a unit at the **Array** function submenu. It will scan and display all SSDs of this unit.

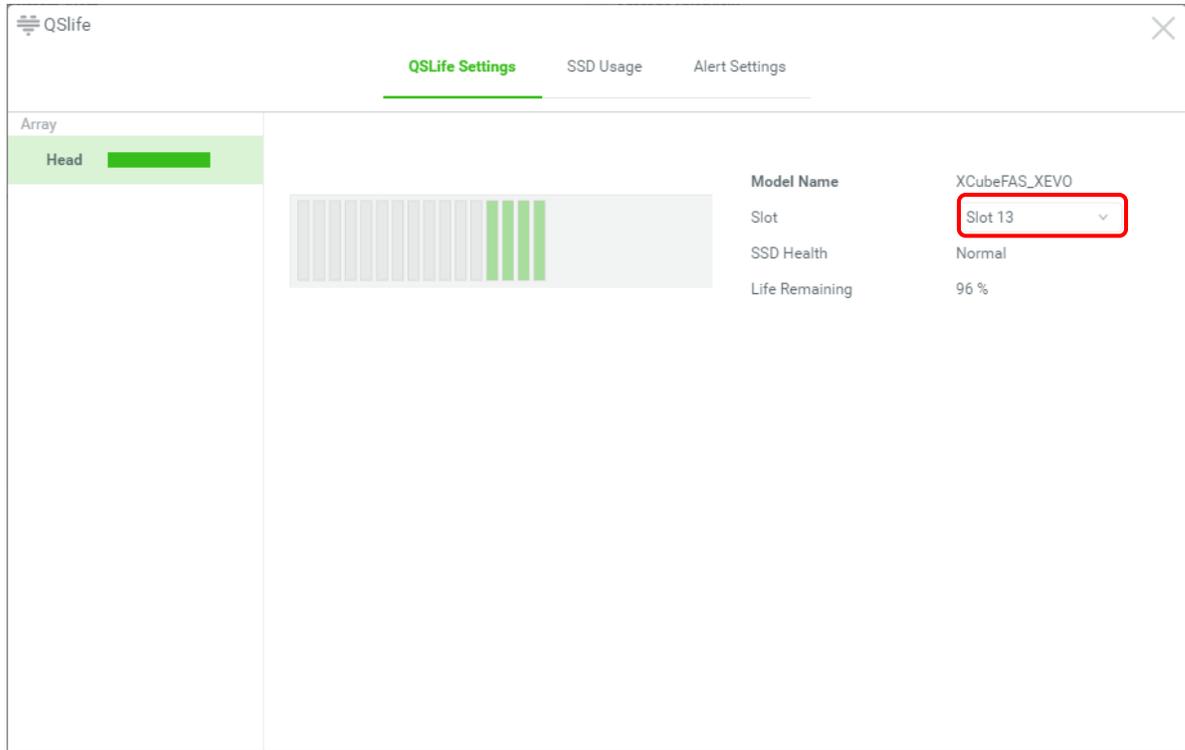


Figure 3 QSLife Settings

2. Select an SSD which you want to watch in **Slot**, the system will display the health status and the life remaining of the SSD. It is highly recommended to replace the SSD if the life remaining is under 10%.

Check SSD Usage

Select the **SSD Usage** function tab in the **QSLife** to be used to monitor the SSD usage status and history. With this information, we can easily estimate the actual DWPD required for a more accurate procurement strategy. Here is an example of checking the SSD usage.

1. Select a unit at the **Array** function submenu. It will scan and display all SSDs of this unit.

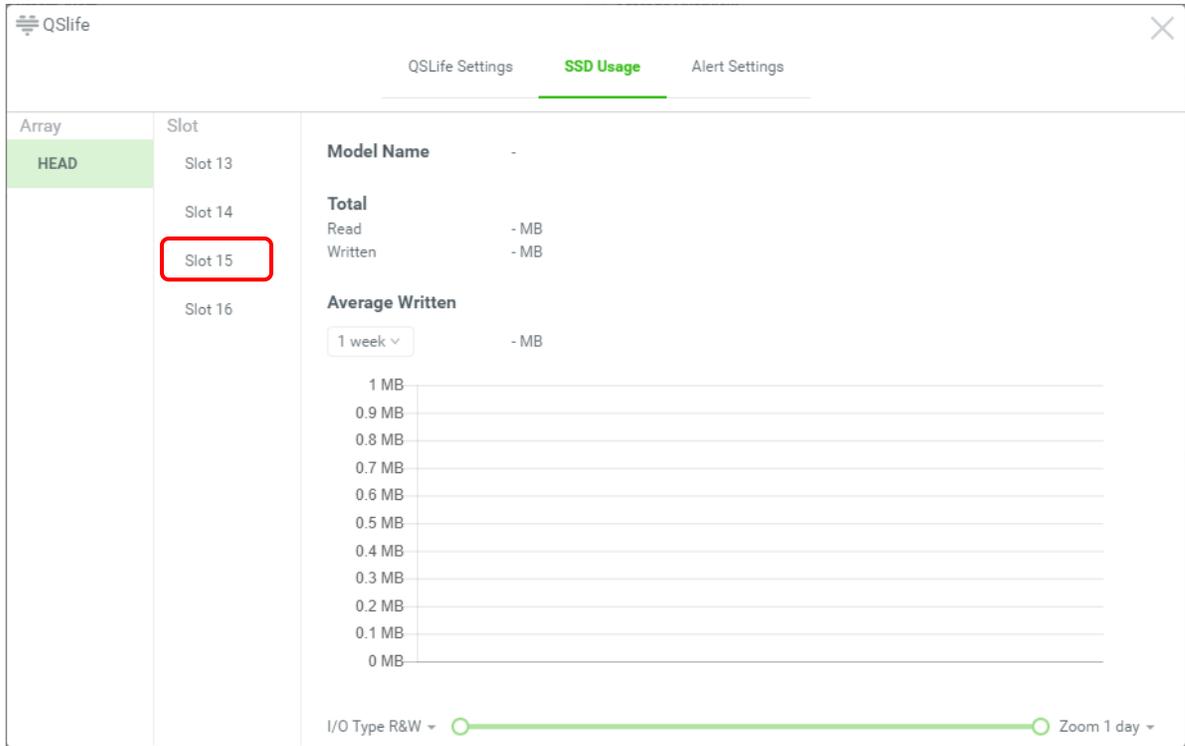


Figure 4 SSD Usage Step 1

2. Select an SSD which you want to watch in **Slot**, the system will display the SSD usage information. It includes a usage history of up to 1 year for analyzing the actual usage of your business.

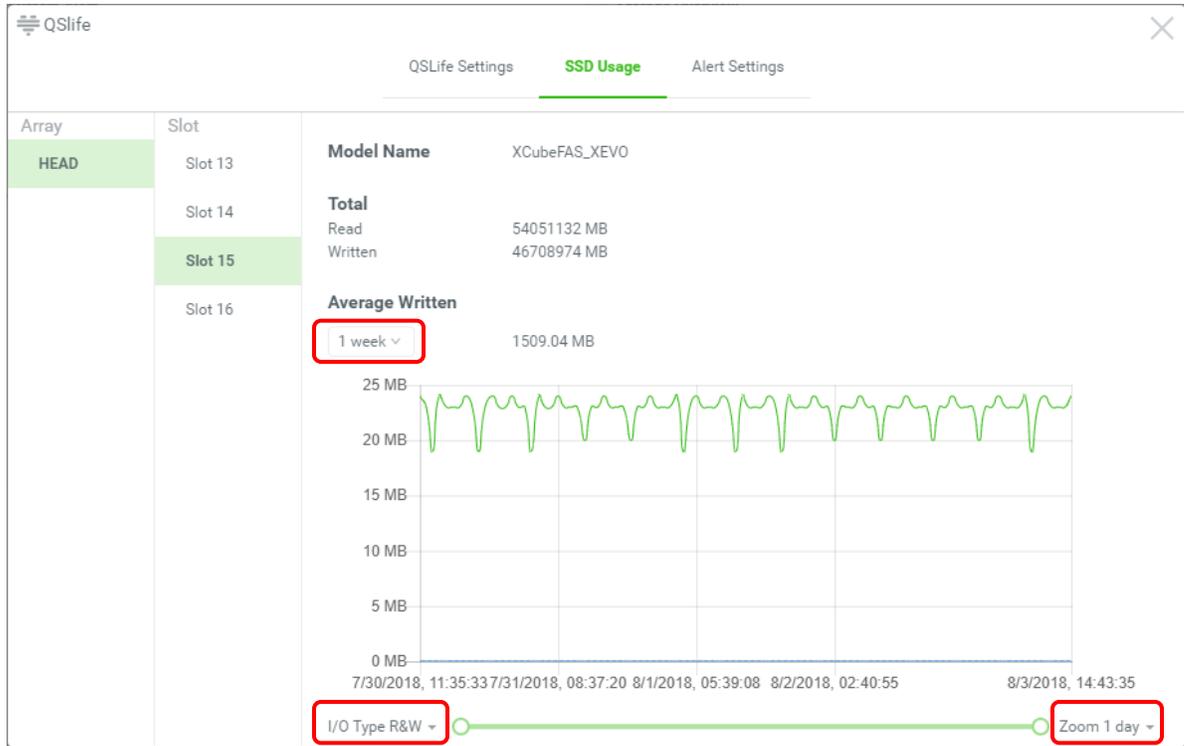


Figure 5 SSD Usage Step 2

3. It displays the **Total** read and written bytes of the SSD from the beginning.

Options on SSD Usage

- **Average Written:** The period of average written can be changed to display the current average written bytes. The options are average 1 week, 1 month, and 1 year.
- **I/O Type:** The I/O type of the SSD usage can be changed in the diagram for different viewpoint. The options are Read, Written, and R&W (Read & Written).
- **Zoom:** The period of the SSD usage can be changed in the diagram to watch the usage in the different period. The options are 1 day, 1 week, 1 month, and 1 year.

Alert Settings

Select the **Alert Settings** function tab in the **QSLife** to be used to learn SSD usage effectively with custom notifications. User can customize the SSD endurance threshold settings at this page. Here is an example of setting the SSD alert.

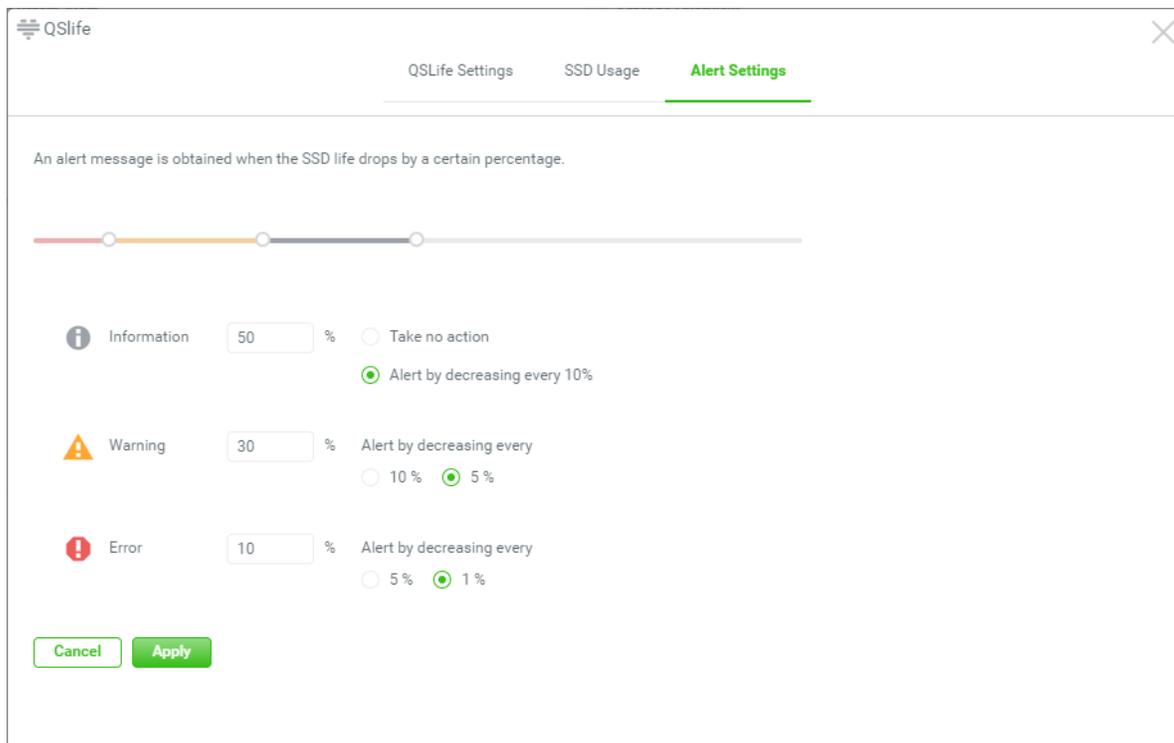


Figure 6 Alert Settings

1. There are three levels of the alert can be set. The options include **Information**, **Warning**, and **Error**. Drag the dot on the slide bar or enter the percentages of the SSD endurance thresholds. The actions can also be changed in every alert level.
2. Then press the **Apply** button to confirm your configurations.

If you use the default alert settings, the Information level sets 50% and the option sets **Alert by decreasing every 10%**, you will receive the notifications when the life remaining of every SSD reaches 50%, 40%, and 30% in the **Information** level. Alert by decreasing every **5%** during 30% to 10% in the **Warning** level. Finally, you may receive the notifications by decreasing every **1%** in the **Error** level. The purpose is to keep you informed that the SSD should be replaced during the life remaining counts down.

Conclusion

As SSDs become more popular in the storage industry, data protection issues become very important. The more data you put into an SSD, the less endurance of the SSD you get. Having a general solution for monitoring the endurance of SSDs is an immediate matter that every IT manager should be concerned about. QSLife can improve SSD management and



prevent human negligence. QSLife can help users develop appropriate purchasing strategies. QSLife technology analyzes the details of most popular SAS SSDs for each user, making it easier to manage storage than ever before.

Apply To

- XCubeFAS XF2026 FW 1.0.0 and later

Reference

SSD (Solid-State Drive)

- https://en.wikipedia.org/wiki/Solid-state_drive

Appendix

Related Documents

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

- [XCubeFAS QIG \(Quick Installation Guide\)](#)
- [XCubeFAS Hardware Owner's Manual](#)
- [Compatibility Matrix](#)
- [White Papers](#)
- [Application Notes](#)

Technical Support

Do you have any questions or need help trouble-shooting a problem? Please contact QSAN Support, we will reply to you as soon as possible.

- Via the Web: <https://qsan.com/support>
- Via Telephone: +886-2-7720-2118 extension 136
(Service hours: 09:30 - 18:00, Monday - Friday, UTC+8)
- Via Skype Chat, Skype ID: qsan.support
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- Via Email: support@qsan.com