QSM Hybrid SSD Cache Application Note

Unified storage series

QSAN

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Introduction

QSAN unified storage system is a powerful yet simple storage system that provides consolidated solutions for both file sharing access and block level access at the same time. Powerful and efficient storage pool design includes enterprise storage functions such as thin provisioning, deduplication, compression and SSD caching. In this article we will explain how to deploy SSD cache and where SSD cache will make the most difference in performance.

How it works?

In QSAN unified storage system, we divide the SSD into several partition to satisfy read and write cache in one SSD at the same time, and these partition can also be allocated to every pools in your system, which means with the minimum one SSD you can apply both read and write cache on your storage no matter how many pools you have. This mechanism not only can improve the performance but also greatly improves the utilization efficiency of disks, giving more flexibility to your storage.
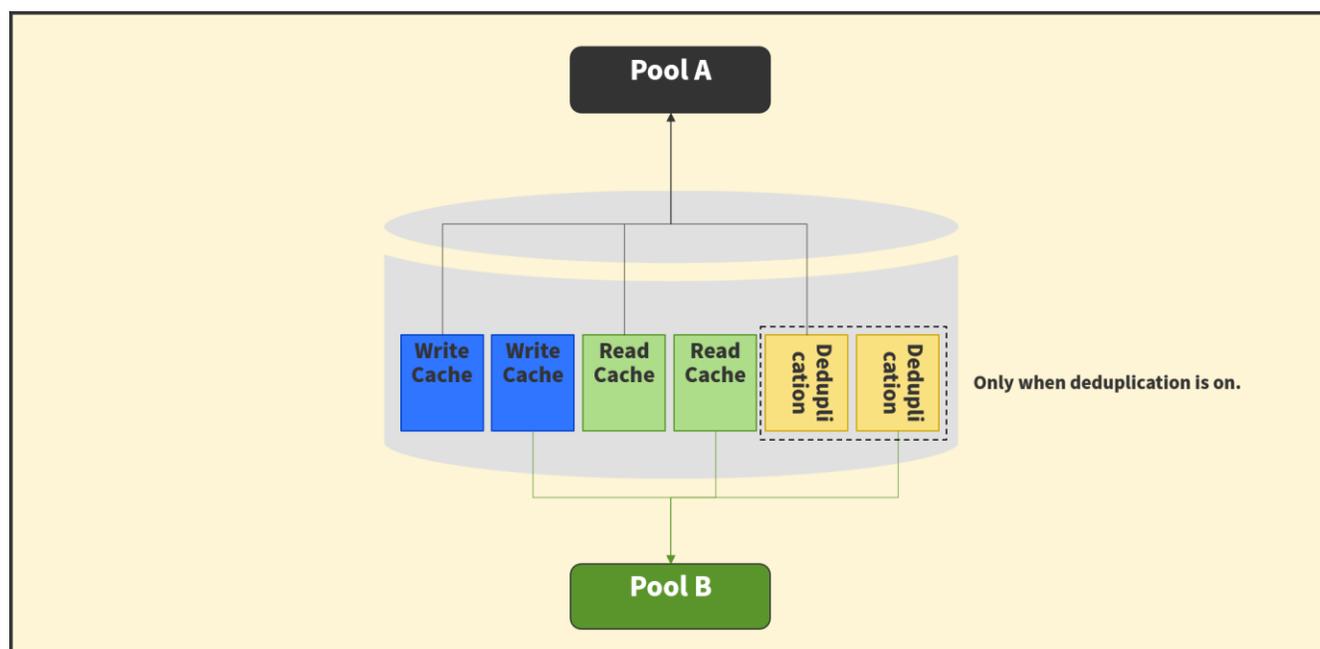
Now we get back to data I/O viewpoint, QSAN SSD cache, there are two types of SSD cache :

1. **Read cache**

    Read cache is specifically helpful in duplicated data scenario. It is because every time your data is read, it will be recorded and next time it's read, system can quickly find in from record and find the data, we call it a

cache hit. All the record will save in your read cache SSD, the size keeps growing as more data being read and if your applications are high duplicated, the more cache hit happen and better performance it will be.

QSAN SSD cache allows all pool to benefit from read cache with minimum one SSD and really cut back the access time of fetching data from the disks. If you want to use read cache to improve performance, we suggest using read cache in duplicated applications such as data backup.

2. **Write cache**

When enable write cache, the data in the memory will be synchronized to the write cache SSD, and when the stored data is too much, time is too long, or other circumstances, it will trigger the write back and write the data to the hard disk. In this way, when an accident happens and causes the system shut down, the transferring data will be safely stored in the SSD. On the contrary, if the SSD broke, your data will still be in the memory. Helping data writes more secure.

QSAN Hybrid SSD cache sits between main memory and the hard drives and acts as a buffer to keep frequently accessed data that are not in the main memory. Because of its global characteristics, create a hybrid storage pool solution is now more cost‐effective, power‐efficient and high‐performing and affordable.

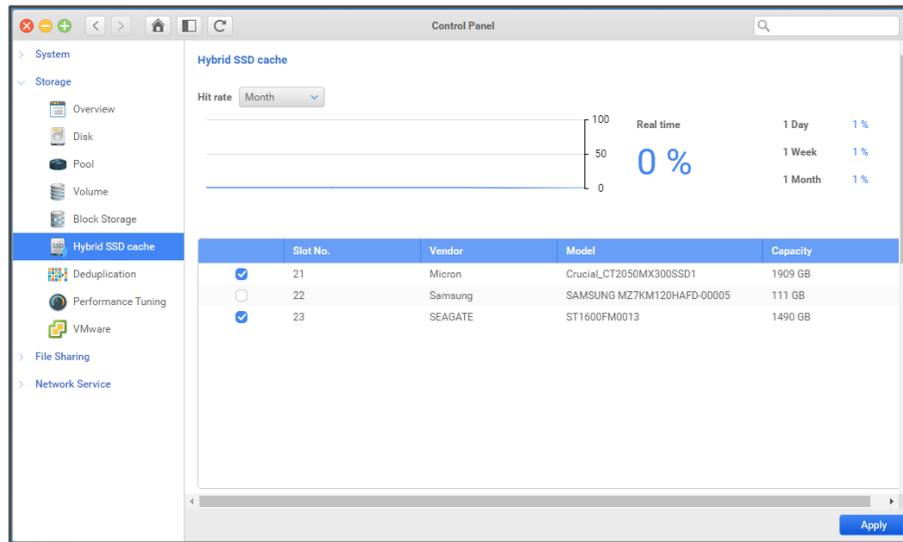# How to setup with XCubeNAS/XCubeNXT

1. **Rquirement :**

XCubeNAS/NXT	
Firmware	QSM 3.3.7 or later
SSD numbers	**1 or above**

2. **Setup steps:**

   o   Go to Control Panel

   o   Selecet Storage > Hybrid SSD Cache

   o   You will see a SSD list below, selecet the SSD that you wanna apply to Hybrid SSD cache.

- o Click Apply and finish the setup.

3. How to replace your SSD cache

- o Hybrid SSD cache will removed your failed or broken disk automatically first.

- o Take out the broken disk from slot, then put a new one in.

- o Go to Web UI and do the setup steps again.

4. What should be awared

To summarize the above, list the following cautions and limitations.

- o If you upgrade to QSM 3.3.7 or later from QSM 3.3.5 or below, QSM will disable your SSD cache and infrom you to apply with new Hybrid SSD cache.

- o Hybrid SSD cache will automatically remove SSD, when the SSD is fail or removed from slots. To avoid cache lost, before remove SSD from slot please disable it in UI first.

- o If you wanna apply deduplication, please at least selecet two SSDs with minimum 480GB, please refer to the [deduplication application note](#).

- o Remove all SSD from SSD cache will disable this function, please be aware when you moving any SSD.

- o You can't remove all SSD when you enable deduplication, this will cause pool fail and data lost.

- o You can't setup Hybrid SSD cache when your SSD is locked by SED, please unlock them first.

Conclusion

In QSAN technology, Hybrid SSD cache function (L2ARC & ZIL) is can built to serve for both read and write cache in one SSD. It enables user to easily build up hybrid storage pool and offer high capacity, low cost with low I/O latency, power saving SSD drives to form a cost effective solution. L2ARC read cache is typically suitable for deduplication applications such as data backup. ZIL write cache can give you an edge in synchronous write applications such as database and NFS.

SSD cache is not a general‑purpose tool that can boost performance under all circumstances. Please take precaution to apply it to proper applications to benefit from this evolving technology.

Appendix

Related Documents

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

- [All Unified Storage Documents](#)
- [Unified Storage QIG (Quick Installation Guide)](#)
- [Unified Storage Hardware Manual](#)
- [Unified Storage Configuration Worksheet](#)
- [QSM Software Manual](#)
- [Compatibility Matrix](#)
- [White Papers](#)
- [Application Notes](#)

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