QSAN Unified Storage Series
Application Note

Connect to Western Digital® Ultrastar®
Hybrid Storage Platform Guide

QSAN Technology, Inc.
www.QSAN.com

QSAN

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Apply models:

XCubeNAS Rackmount series and XCubeNXT series.

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Connect to WD Ultrastar Data60 / Data102 Guide

Executive Summary

This application note provides technical guidance for connecting to Western Digital Ultrastar hybrid storage platform, Data60 (hereinafter referred to as WD Data60) and Data102 (hereinafter referred to as WD Data102), which are fully redundant hybrid 4U JBOD disk enclosures, as expansion solutions of QSAN unified storage series. The new expansion solutions expand the capacity of QSAN's storage with high density.

Audience

This document is applicable for QSAN customers and partners who are interested in purchasing WD Data60 / WD Data102 as the expansion units of unified storage series. 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

With today's rapid increase in data volumes, our partnership with Western Digital ensures that our joint enterprise customers receive high density expansion solution at a highly competitive price point. Western Digital Ultrastar Data60 / Data102 hybrid storage platform has dual IO modules with 6 Mini-SAS HD ports per module and can be populated with up to 60/102 SAS/SATA drives, respectively. Ultrastar Data60 / Data102's compact and efficient form factor provides the flexibility to specify the HDD and SSD combinations for balancing capacity, performance, and cost.

Guidelines

Expansion Configuration Rules

According to chapter 5 in the WD Data60 / Data102 user guide, the Ultrastar Data60 / Data102 supports configurations up to four enclosures daisy chained together using active cables. The expansion capability is up to 4 expansion units using WD Data60 / Data102, whether or not there are mixed XCubeDAS series models.

INFORMATION:

Western Digital Ultrastar Data60 user guide, please refer to
https://documents.westerndigital.com/content/dam/doc-library/en_us/assets/public/western-digital/product/platforms/ultrastar-data60-hybrid-platform/user-guide-ultrastar-data60.pdf

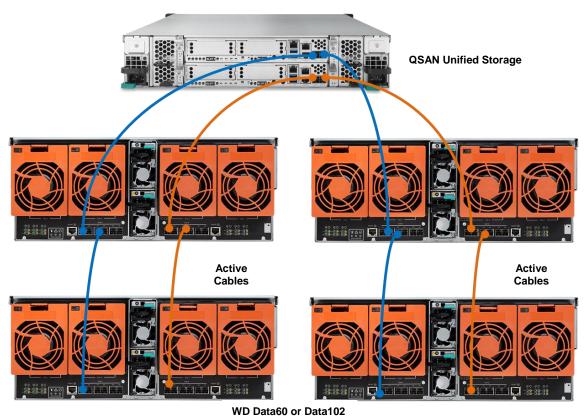Western Digital Ultrastar Data102 user guide, please refer to
https://documents.westerndigital.com/content/dam/doc-library/en_us/assets/public/western-digital/product/platforms/ultrastar-data102-hybrid-platform/user-guide-ultrastar-data102.pdf

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The Advantage of WD JBOD with QSAN Unified Storage

Scale Out for High Capacity

By connecting up to 4 expansion units of WD Data60 / Data102, XCubeNAS/XCubeNXT can support up to 266 / 434 disk drives or up to 4.8PB / 7.8PB of raw storage space when using 18TB Ultrastar DC HC550 HDDs.

Maximum 4 WD Data102 with 2U26 Unified Storage

Performance Table

Assume we use full disk create RAID 5 by 18TB Ultrastar DC HC550 SAS HDD. The transfer rate is 269/257 and IOPS is 50/50, so we can calculate the MBPS by the formula. [N(disk number) – 1] x speed = MBPS
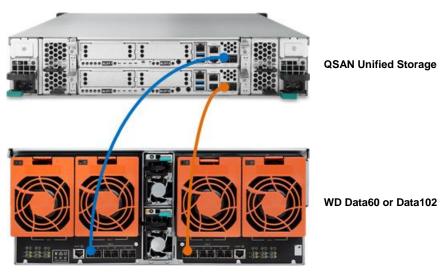
	Read	Write	IOPS Read	IOPS Write
WD Data60	15,871	15,163	2,950	2,950
WD Data102	27,169	25,957	5,050	5,050

Expansion Topology and Deployment

The following images illustrate some examples of deployment types for dual controller Unified storage series plus WD Data60 / Data102 expansion units. MPIO (MultiPath I/O) configurations are designed to provide HA (High Availability) data connections to ensure data consistency in the rare event of a failure in the host connectivity from a single path.

One Unified Storage / One WD Data60 or Data102 / Dual Path

The following figure shows an example of an Unified storage series connected to a WD Data60 or Data102 using mini SAS HD to mini SAS HD cable (SAS 12G expansion cable, SFF-8644 to SFF-8644).

QSAN Unified Storage

WD Data60 or Data102

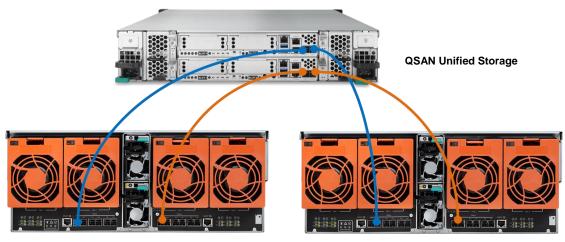*One Unified Storage / One WD Data60 or Data102 / Dual Path*

⚠️ **CAUTION:**

1. WD Data60 / Data102 do not support SAS 12G expansion cable with Wake-on-SAS.

2. If your storage uses port 1 of controller 1 to connect to controller 1 of JBOD, and the controller 2 of storage must use port 1 to connect to controller 2 of JBOD.

One Unified Storage / Two WD Data60 or Data102 / Dual Path

The following figure shows an example of an unified storage series connected to a WD Data60 or Data102 using mini SAS HD to mini SAS HD cable (SAS 12G expansion cable, SFF-8644 to SFF-8644) which is in turn connected to the second WD Data60 or Data102 using mini SAS HD to mini SAS HD cable (SAS 12G expansion active cable, SFF-8644 to SFF-8644).
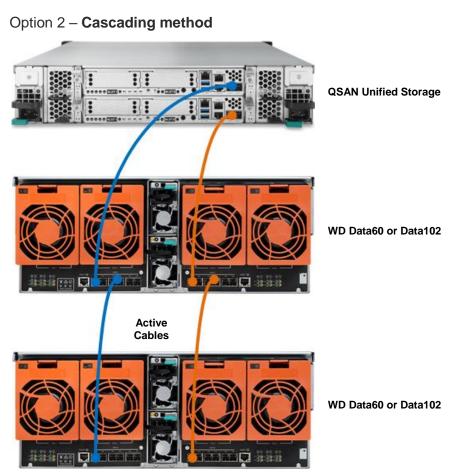
Option 1 – **For lower latency**

One unified storage / Two WD Data60 or Data102 / Dual Path

Option 2 – **Cascading method**

QSAN Unified Storage

WD Data60 or Data102

**Active
Cables**

WD Data60 or Data102

One unified storage / Two WD Data60 or Data102 / Dual Path

INFORMATION:
Using active cables between two WD Data60(s) / Data102(s).

INFORMATION:
Using active cables between two WD Data60(s) / Data102(s).

> **TIP:**
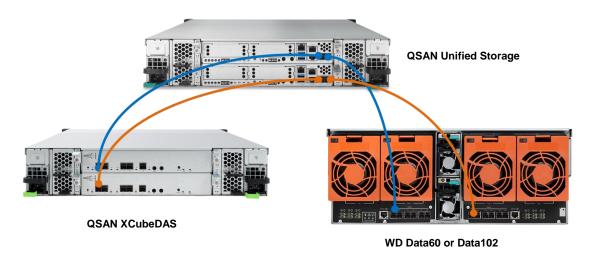> For lower latency, please set your system with option 1.

> **CAUTION:**
> QSAN unified storage does not support active cables.

One unified storage / One XCubeDAS / One WD Data60 or Data102 / Dual Path

The following figure shows an example of an Unified storage series connected to an XCubeDAS XD5300 series which is in turn connected to the second WD Data60 / Data102 using mini SAS HD to mini SAS HD cable (SAS 12G expansion cable, SFF-8644 to SFF-8644).

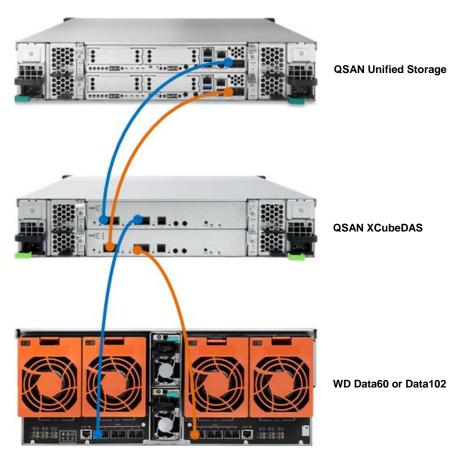Option 1 – **For lower latency**

One unified storage / One XCubeDAS / One WD Data60 or Data102 / Dual Path

Option 2 – **Cascading method**

One unified storage / One XCubeDAS / One WD Data60 or Data102 / Dual Path

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TIP:
If you have multiple XCubeDAS and WD Data60 / Data102 as the expansion units of unified storage series, connect XCbueDAS series models before WD Data60 / Data102.

> **TIP:**
> For better performance, please set your system with option 1.

Cautions and Limitations

List the following cautions and limitations. You should be aware of the purchase and installation of WD Data60 / Data102.

1. The expansion capability is up to 4 expansion units using WD Data60 / Data102 whether or not there are mixed XCubeDAS series models.
2. The recommended maximum number of pools is 4.
3. WD Data60 / Data102 support up to 24 SSDs (SAS or SATA), according to the official datasheet.
4. The deployment must follow the topology in this document.

> **INFORMATION:**
> Western Digital Ultrastar Data60 datasheet, please refer to
> https://documents.westerndigital.com/content/dam/doc-library/en_us/assets/public/western-digital/product/platforms/ultrastar-data60-hybrid-platform/data-sheet-ultrastar-data60-storage-platform.pdf
>
> Western Digital Ultrastar Data102 datasheet, please refer to
> https://documents.westerndigital.com/content/dam/doc-library/en_us/assets/public/western-digital/product/platforms/ultrastar-data102-hybrid-platform/data-sheet-ultrastar-data102-storage-platform.pdf

5. QSM does not support firmware update for WD Data60 / Data102.
6. Unified Storage does not support active cables.
7. WD Data60 / Data102 do not support SAS 12G expansion cable with Wake-on-SAS.
8. If you have multiple XCubeDAS and WD Data60 / Data102 as the expansion units of unified storage series, connect XCbueDAS series models before WD Data60 / Data102.
9. If you are experiencing poor performance when connecting to WD Data60 / Data102, you can try shorter length cables, such as 1.5M or 1M.
10. Avoiding to create pool with disk in storage and JBOD at the same time.

11. Do not connect 2 SAS ports on the same controller of the storage to the same controller of the JBOD.

Installation Suggestions

Due to the short cable length between XCubeNXT/NAS and WD Data60 / Data102, it is recommended to install WD Data60 / Data102 on top of XCubeNXT/NAS to better replace the HDD in the cabinet. The following image shows the installation diagram.

Apply To

- XCubeNAS Rackmount series FW version: 3.3.0 to support WD Data60
- XCubeNXT FW version: 3.3.1 to support WD Data60
- Western Digital Ultrastar Data60
  - ◦ HW date code: 2819 or higher
  - ◦ FW version: 2.0.4 or later

- XCubeNAS Rackmount FW series version: 3.3.0 to support WD Data012
- XCubeNXT FW version: 3.3.1 to support WD Data102
- Western Digital Ultrastar Data102
  - HW date code: 2619 or higher
  - FW version: 2.0.4 or later

References

Western Digital Ultrastar Data60
- [Western Digital Ultrastar Data60 Datasheet](#)
- [Western Digital Ultrastar Data60 User Guide](#)

Western Digital Ultrastar Data102
- [Western Digital Ultrastar Data102 Datasheet](#)
- [Western Digital Ultrastar Data102 User Guide](#)

Appendix

Related Documents

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

- [All Unified storage Documents](#)
- [XCubeNAS QIG (Quick Installation Guide)](#)
- [XCubeNXT QIG (Quick Installation Guide)](#)
- [XCubeNAS Hardware Manual](#)
- [XCubeNXT Hardware Manual](#)
- [QSM Software 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://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