

XN8126D vs. XN8026D

Performance Comparison

Lab Report

July, 2024

ANNOUNCEMENT

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PREFACE

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- (Service hours: 09:30 - 18:00, Monday - Friday, UTC+8)
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- Via Email: support@qsan.com

Information, Tip, and Caution

This document 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.

1. OVERVIEW

1.1. Introduction to XN8126D

The XCubeNXT 8126D (2.5" 2U 26-bay) is the latest generation of XCubeNXT that is flexible for diverse workloads that are more performance demanding. It delivers low latency like an all-flash array. Ultra-high performance is designed to be the ideal solution for applications in mission-critical data centers, high-performance computing, virtualization, or media editing environments. XN8126D is a 4-core processor model, and XN8126D_8C is an 8-core processor model. In this comparison, we tested the XN8126D_8C against the previous generation XN8026D_8C.

1.2. Specifications Comparison

Continuing the XCubeNXT series, the following table lists the hardware specifications of XN8126D_8C and XN8026D_8C for reference.

Table 1-1 Hardware Specifications of XN8126D_8C and XN8026D_8C

MODEL NAME	XN8126D_8C	XN8026D_8C
Processor	Intel® Xeon® 64-bit 8-core	Intel® Xeon® 64-bit 8-core
Memory	16GB (up to 256 GB)	16 GB (up to 128 GB)
Drive Bays	2.5" Slot x 26	2.5" Slot x 26
Max. Drive Bays w/ Expansion Unit	546	434
Onboard Connectivity	10 GbE (SFP+) x 8 1 GbE (RJ45)	10 GbE (RJ45) x 4 1 GbE (RJ45)
Capacity Expansion	12 Gb/s SAS Wide Port x 4	12 Gb/s SAS Wide Port x 4

PCIe Expansion	(Gen3x8 Slot) x 4	(Gen3x8 Slot) x 2, (Gen2x4 Slot) x 2
Versatile Host Connectivity	32 Gb / 16 Gb Fibre Channel 25 GbE / 10 GbE	16 Gb Fibre Channel 25 GbE / 10 GbE
Max. Host Connectivity	24 (8 + 16)	20 (4 + 16)
Max. Sequential Read IOPS	1,016,183	N/A
Max. Sequential Write IOPS	744,954	N/A
Max. Random Read IOPS	544,538	65,600
Max. Random Write IOPS	163,406	23,337

Equipping with 4 host card slots for expansion connections, the new generation XN8126D_8C is designed with 4 full Gen3x8 slots. Besides, the XN8126D_8C gets onboard 10 GbE (SFP+) x 8 ports with higher bandwidth than the 10 GbE (RJ45) x 4 ports in the XN8026D_8C.

2. PERFORMANCE DATA

2.1. Performance Comparison

Considering the performance enhancement, the XN8126D_8C improves performance by upgrading the PCIe generation and upgrading the operating and file system to the latest QSM (Data Management System). The following is a comparison of XN8126D_8C and XN8026D_8C under different test items.

2.1.1. I/O Comparison

IOPS for iSCSI

Table 2-1 XN8126D_8C vs. XN8026D_8C Random IOPS for iSCSI-1

Onboard Connection	XN8126D_8C	XN8026D_8C
Random Read 4K	504,200	43,500
Random Write 4K	154,000	12,604

In the 4K random I/O test under the onboard connected iSCSI protocol, the random read of the XN8126D_8C reaches 504K IOPS, which is approximately **1,059%** higher than the XN8026D_8C. For the random write test item, XN8126D_8C reaches 154K IOPS. It's about **1,122%** improved than XN8026D_8C.

Table 2-2 XN8126D_8C vs. XN8026D_8C Random IOPS for iSCSI-2

16 GbE FC HBA Connection	XN8126D_8C	XN8026D_8C
Random Read 4K	548,051	65,600
Random Write 4K	165,035	23,337

In the random I/O test with a 4-port fibre channel host card connected, the random read 4K of the XN8126D_8C achieves 548K IOPS, which is approximately **735%** higher than the XN8026D_8C. In the random write test, XN8126D_8C comes to 165K IOPS, a significantly improvement of **607%** over the XN8026D_8C.

Random IOPS for CIFS

Table 2-3 XN8126D_8C vs. XN8026D_8C Random IOPS for CIFS

32 GbE FC HBA Connection	XN8126D_8C	XN8026D_8C
Random Read 4K	289,100	35,891
Random Write 4K	126,300	11,975

In the random read 4K test with CIFS protocol, the IOPS of the XN8126D_8C reaches 289,100 IOPS, which is about **705%** higher than the XN8026D_8C. The random write also gets **955%** higher, achieving 126K IOPS than the legacy model.

Random IOPS for NFS

Table 2-4 XN8126D_8C vs. XN8026D_8C Random IOPS for NFS

32 GbE FC HBA Connection	XN8126D_8C	XN8026D_8C
Random Read 4K	82,100	29,027
Random Write 4K	73,540	12,185

In the random read 4K test using NFS protocol, the XN8126D_8C reaches 82,100 IOPS, which is about **183%** higher than the XN8026D_8C. The random write also improved **504%** over the old model, achieving 73K IOPS.

2.1.2. Sequential I/O Comparison

Sequential Throughput for iSCSI

Table 2-5 XN8126D_8C vs. XN8026D_8C Sequential Throughput for iSCSI-1

Onboard Connection	XN8126D_8C	XN8026D_8C
Sequential Read 128K	6,910 MB/s	2,046 MB/s
Sequential Write 128K	4,706 MB/s	2,079 MB/s

In the sequential read 128K test with iSCSI protocol, the throughput of the XN8126D_8C reaches 6,910 MB/s, which is approximately **238%** higher than the XN8026D_8C. The random write speed is also up **126%** higher, achieving 4,706 MB/s than the legacy model.

Table 2-6 XN8126D_8C vs. XN8026D_8C Sequential Throughput for iSCSI-2

16 GbE FC HBA Connection	XN8126D_8C	XN8026D_8C
Sequential Read 128K	10,190 MB/s	2,843 MB/s
Sequential Write 128K	7,093 MB/s	1,783 MB/s

Conducting the throughput test using a 16 GbE fibre channel host card, we can see that the XN8126_8C has improved read and write throughput by **258%** and **298%** at 10,190 MB/s and 7,093 MB/s respectively.

Sequential Throughput for CIFS

Table 2-7 XN8126D_8C vs. XN8026D_8C Sequential Throughput for CIFS

32 GbE FC HBA Connection	XN8126D_8C	XN8026D_8C
Sequential Read 128K	6,488 MB/s	1,555 MB/s
Sequential Write 128K	4,581 MB/s	994 MB/s

Comparing the throughput under the CIFS protocol, the XN8126D_8C gets 6,488 MB/s throughput, which is **317%** higher than the XN8026D_8C. The write test throughput of XN8126D_8C gets 4,581 MB/s, a **361%** improvement over the older model.

Sequential Throughput for NFS

Table 2-8 XN8126D_8C vs. XN8026D_8C Sequential Throughput for NFS

32 GbE FC HBA Connection	XN8126D_8C	XN8026D_8C
Sequential Read 128K	5,377 MB/s	2,054 MB/s
Sequential Write 128K	2,405 MB/s	1,259 MB/s

In the last test, the NFS throughput performance of XN8126D_8C increased by approximately **162%** and **91%** in the sequential read and write test.

2.2. Performance Summary

The table below summarizes the performance comparison.

Table 2-9 Performance Summary of XN8126D_8C and XN8026D_8C

ITEM	XN8126D_8C	XN8026D_8C	% IMPROVEMENT
Random Read 4K (iSCSI)	504,200 IOPS	43,500 IOPS	1,059%
Random Write 4K (iSCSI)	154,000 IOPS	12,604 IOPS	1,122%
Random Read 4K (iSCSI) / 16Gb FC	548,051 IOPS	65,600 IOPS	735%
Random Write 4K (iSCSI) / 16Gb FC	165,035 IOPS	23,337 IOPS	607%
Random Read 4K (CIFS)	289,100 IOPS	35,891 IOPS	705%
Random Write 4K (CIFS)	126,300 IOPS	11,975 IOPS	955%
Random Read 4K (NFS)	82,100 IOPS	29,027 IOPS	183%
Random Write 4K (NFS)	73,540 IOPS	12,185 IOPS	504%
Sequential Read 128K (iSCSI)	6,910 MB/s	2,046 MB/s	238%
Sequential Write 128K (iSCSI)	4,706 MB/s	2,079 MB/s	126%
Sequential Read 64K (iSCSI) / 16Gb FC	10,190 MB/s	2,843 MB/s	258%
Sequential Write 64K (iSCSI) / 16Gb FC	7,093 MB/s	1,783 MB/s	298%
Sequential Read 128K (CIFS)	6,488 MB/s	1,555 MB/s	317%
Sequential Write 128K (CIFS)	4,581 MB/s	994 MB/s	361%
Sequential Read 128K (NFS)	5,377 MB/s	2,054 MB/s	162%
Sequential Write 128K (NFS)	2,405 MB/s	1,259 MB/s	91%

Overall, the newly designed XN8126D_8C delivers better performance than XN8026D_8C in terms of both IOPS and throughput.

3. CONCLUSION

The XN8100 series has excellent hardware design and outstanding performance. Comes with intuitive QSM storage management system. It's an ideal solution for applications in mission-critical data centers, high-performance computing, virtualization, or media environments.

4. APPENDIX

4.1. Reference

Product Page

- [XCubeNXT 8100 Series](#)
- [XN8126 Product Model](#)