Open-E JovianDSS

Seagate® Exos® X18 HDD

Certification Report

Release date: 2022.08.04

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1. Introduction

Seagate® Exos® X18 is an enterprise drive, designed for maximum storage capacity and the highest rack-space efficiency. The drive provides password protection and AES-256 hardware encryption (SED / Self-Encrypting Drive feature).

The following applications were considered during the Open-E certification process:

- **data storage drive**

Validation was performed for both the Single node (functional tests) and HA Non-Shared Storage Cluster (functional and performance tests) configurations.

2. Device Under Test Description

The following table includes the **Seagate® Exos® X18** drive hardware specification.

Table 1. Seagate® Exos® X18 specification.

Product name	Seagate® Exos® X18
Model name	ST18000NM001J-2T
Storage capacity	18 TB
Form factor	HDD 3.5”
Interface	SATA
SED	Yes

3. Test Environment Description

Hardware specification for environments used during certification testing are included in table 2a. Fio configuration is presented in table 2b.

Table 2a. Per node hardware specification

System name	Supermicro SuperServer 6028U-TR4T+
Motherboard	Supermicro X10DRU-i+
CPU	2x Intel Xeon CPU E5-2620 v3 @ 2.40GHz
RAM	64 GB - 8x Micron 18ASF1G72PZ-2G1A2 8 GB 1866 MHz
Storage controller	Broadcom 9400-8i8e Tri-Mode Host Bus Adapter
Drives	2x Seagate® Exos® X18 2x Toshiba PX02SMU020 (read cache and write log)
System	Open-E JovianDSS up29r2 b48155

Table 2b. Fio test tool configuration

Version	3.28
Test size	200 GB
Block size	4 kB (random workload); 1 MB (sequential workload)
Ramp size	30 s
Runtime	90 s
IOengine	libaio
Direct IO	yes

4. Single Node Compatibility Test

4.1. Test Description

An examination of how the **Seagate® Exos® X18** drive operated when used in conjunction with Open-E JovianDSS was conducted through functional testing, shown in Table 3.

Table 3. Functional test results

Functional aspect	Result
Open-E JovianDSS system compatibility	passed
Stripe, mirror, and RAIDZ compatibility	passed
System stability	passed
Drive failure simulation with replacement	passed
Disk activity and health monitoring	passed
SED	passed

5. HA Non-Shared Storage Cluster Compatibility Test

In order to ensure proper operation of the **Seagate® Exos® X18** drive in Open-E JovianDSS High Availability Non-Shared Storage cluster environment, various compatibility tests were performed.

5.1. Functional Tests

All essential and critical cluster mechanisms were examined to ensure proper operation with the tested devices. List of checked functionalities is presented in Table 4.

Table 4. Results for the HA Non-Shared Storage Cluster compatibility test.

Tested functionality	Result
Open-E JovianDSS system compatibility	passed
Stripe, mirror, and RAIDZ compatibility	passed
System stability	passed
Drive failure simulation with replacement	passed
Disk activity and health monitoring	passed

5.2. Performance Tests

Included test cases are described in Table 5. In all instances every combination of thread numbers (1, 4, 8, 16) and queue depths (1, 16, 64, 128) was applied to the fio test tool. All tests were performed locally on the Open-E JovianDSS system.

Table 5. Test cases description for raw disk tests.

Test case	IO pattern	Read to write %	Block size
Random read	random	100/0	4 kB
Random write	random	0/100	4 kB
Sequential read	sequential	100/0	1 MB

Sequential write	sequential	0/100	1 MB

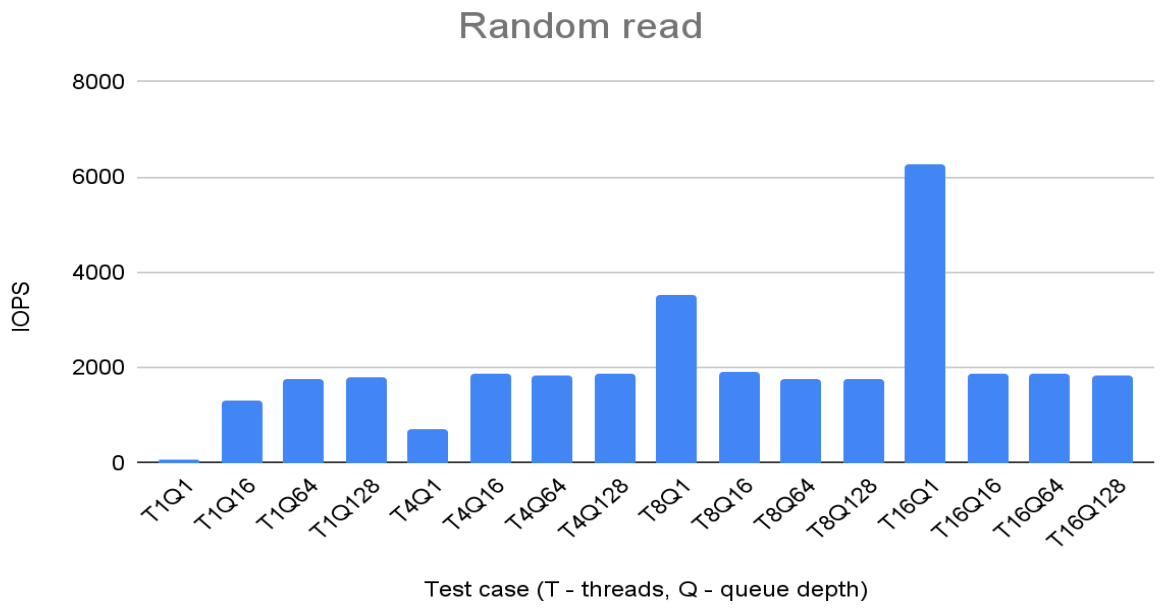
The following table presents the ZFS configuration used for testing:

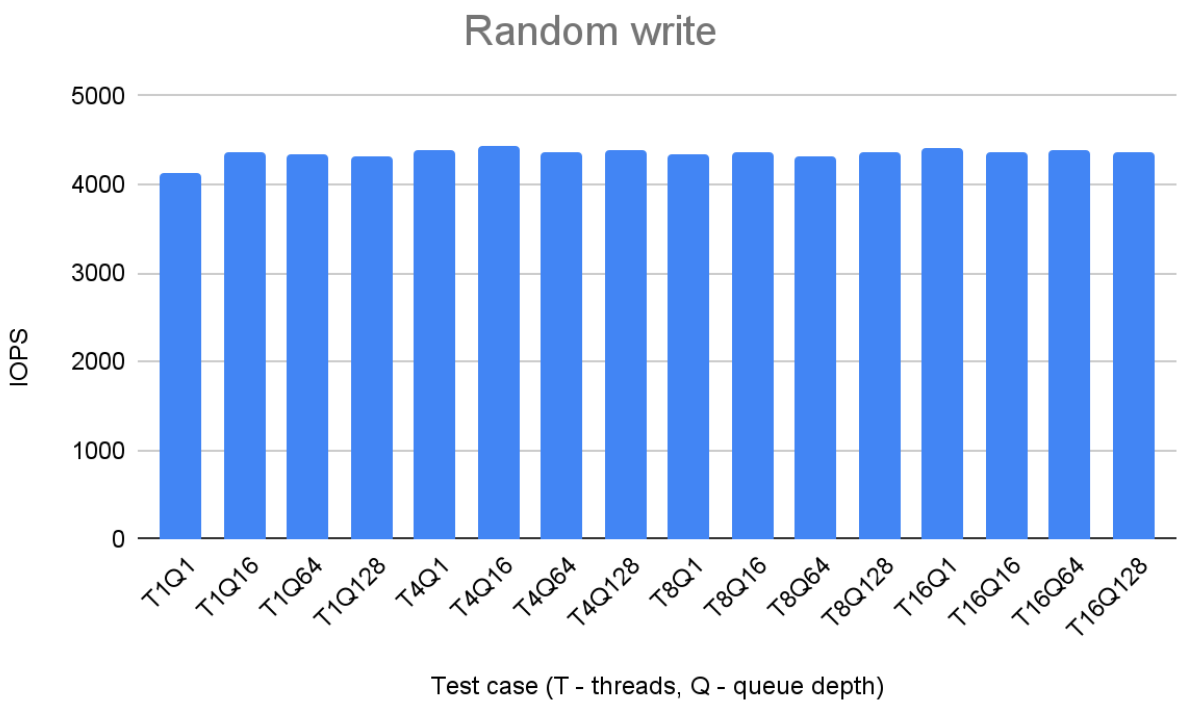
Table 6. Fio test tool configuration.

ZPool configuration	2x 2-way mirror
Write log	Yes (Toshiba PX02SMU020)
Read cache	Yes (Toshiba PX02SMU020)
Zvol size	200 GB
Sync	Always
Provisioning	Thin
Compression	lz4

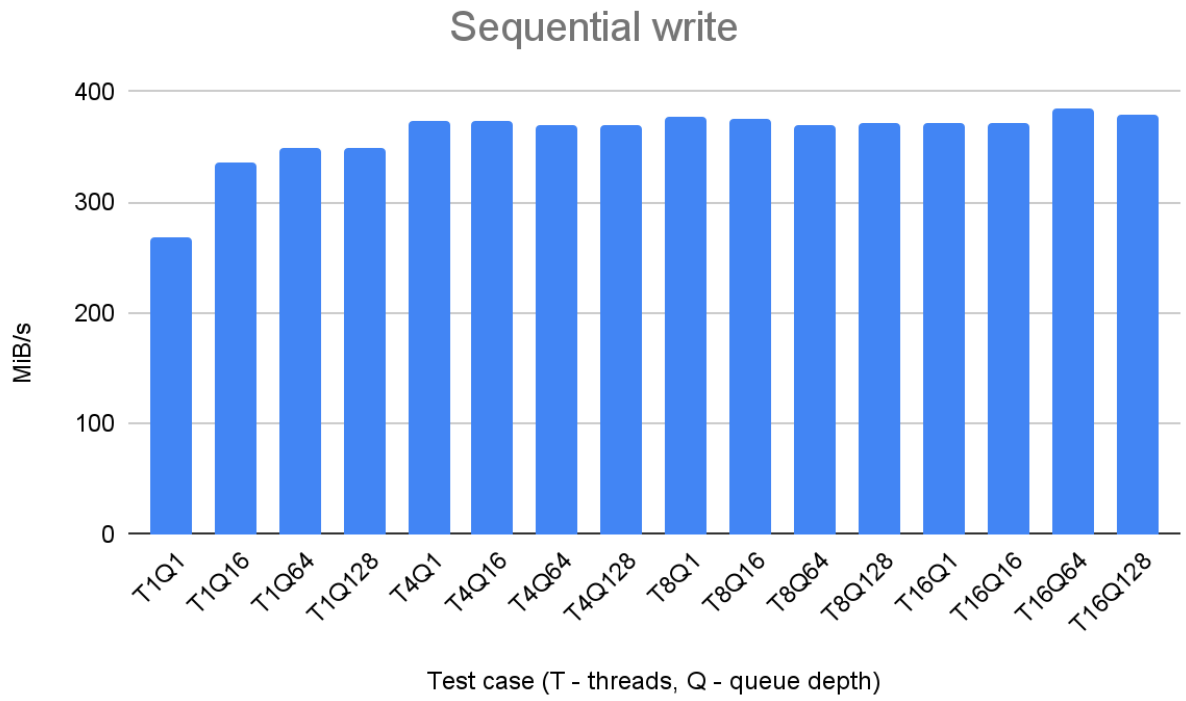
Zvol was initialized by writing data to it before tests began.

The following charts present performance results.




Random write
IOPS
5000
4000
3000
2000
1000
0
T1Q1
T1Q16
T1Q64
T1Q128
T4Q1
T4Q16
T4Q64
T4Q128
T8Q1
T8Q16
T8Q64
T8Q128
T16Q1
T16Q16
T16Q64
T16Q128
Test case (T - threads, Q - queue depth)


Sequential read
MiB/s
800
600
400
200
0
T1Q1
T1Q16
T1Q64
T1Q128
T4Q1
T4Q16
T4Q64
T4Q128
T8Q1
T8Q16
T8Q64
T8Q128
T16Q1
T16Q16
T16Q64
T16Q128
Test case (T - threads, Q - queue depth)



5.3. Test Conclusions

Compatibility of the tested device with essential HA cluster operations was extensively checked. None of the test cases described in Table 3 showed any undesirable behavior, indicating full compatibility with Open-E JovianDSS in cluster configurations.

Performance results are adequate for this type of storage solution.

6. Summary

Seagate® Exos® X18 presents expected performance for HDD-based storage solutions powered by Open-E JovianDSS, along with great storage density and SED functionality.