# Open-E JovianDSS
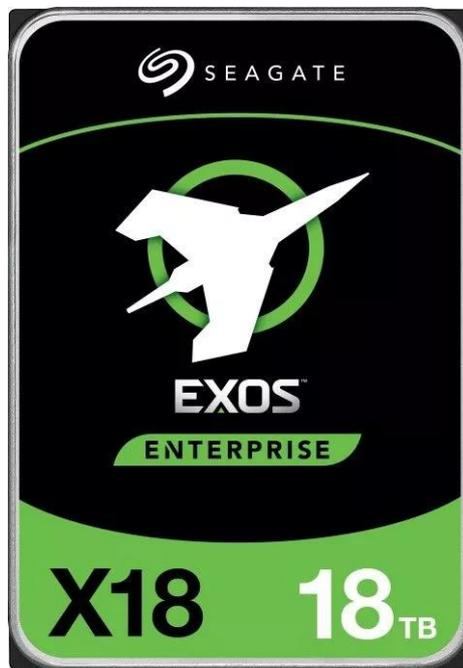# Seagate® Exos® X18 HDD



## Certification Report
Release date: 2022.08.04

# Table of Contents

# 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<br><br>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:
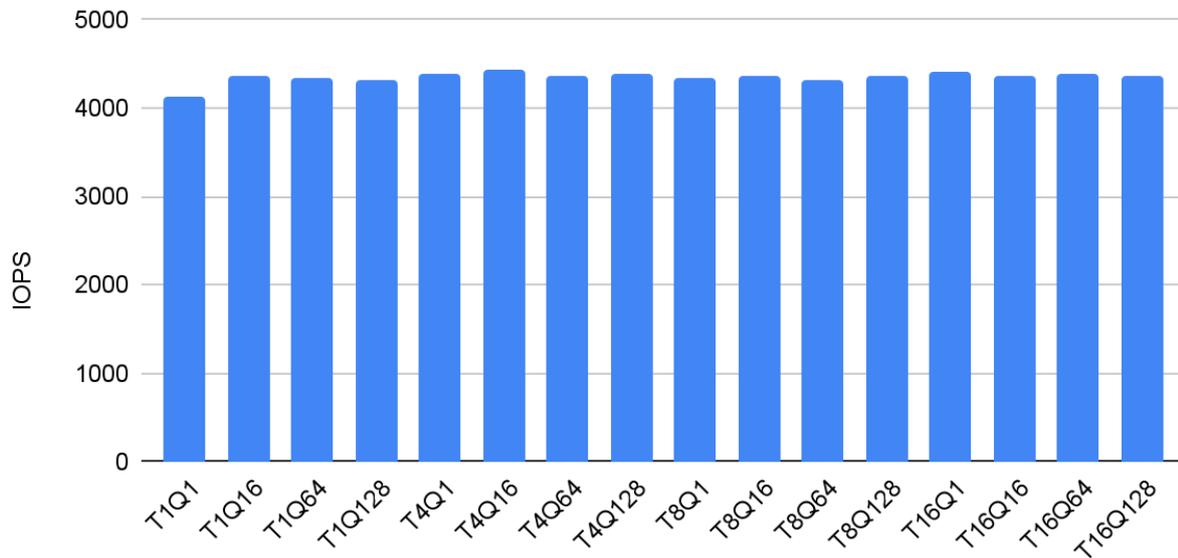
*Table 6. Fio test tool configuration.*

| | |
|---|---|
| **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.
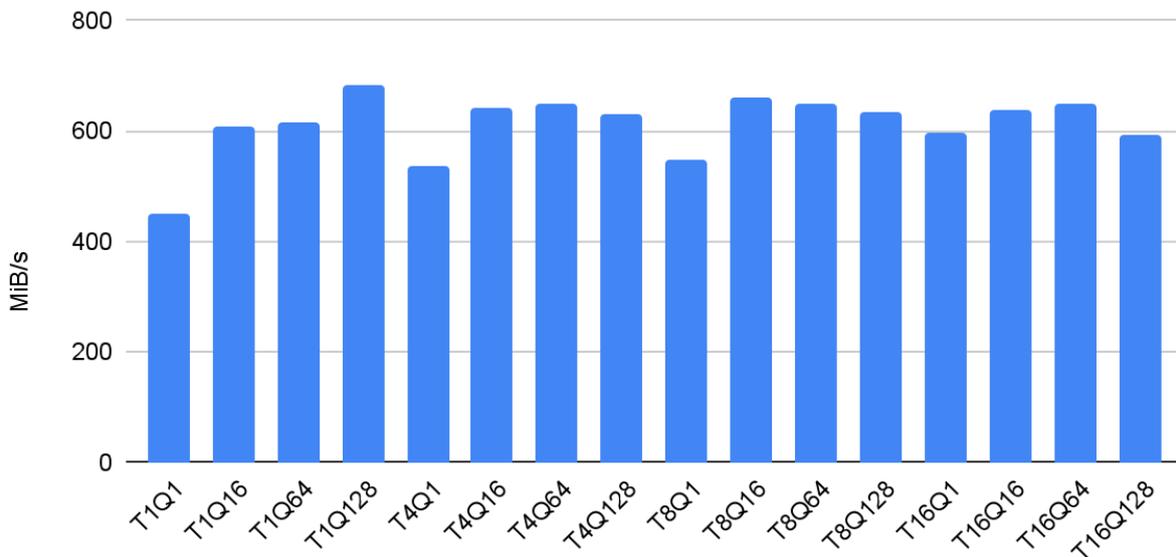
The following charts present performance results.
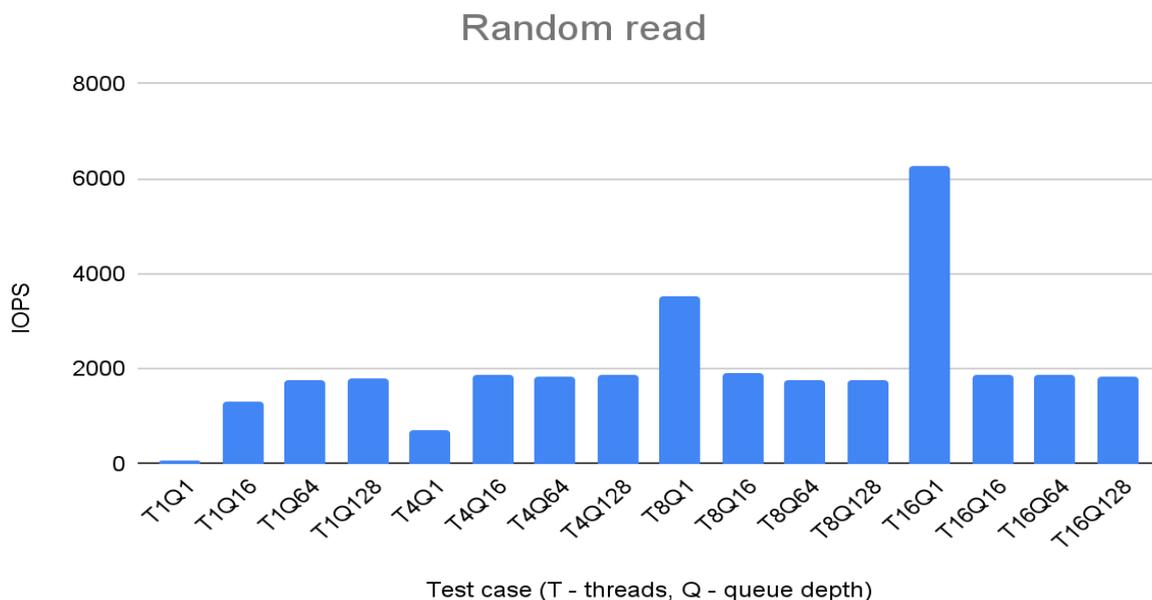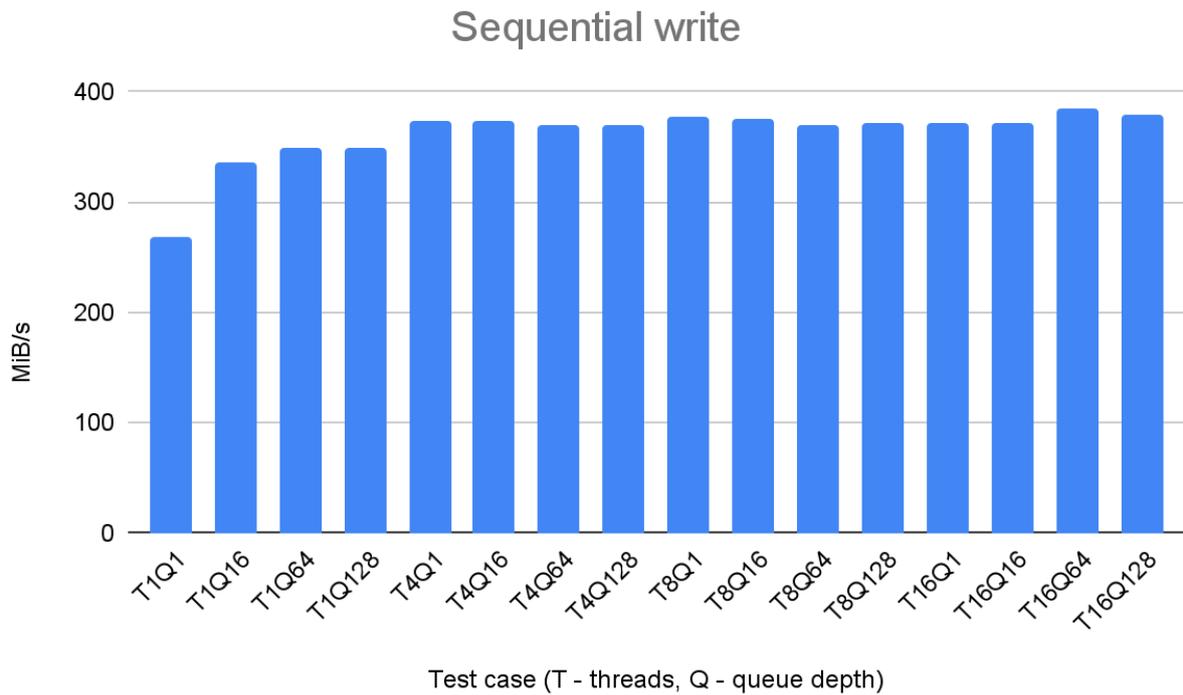
## Random write



## Sequential read

## Sequential write



### 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.