



Toshiba MG10ACA20TE HDD

Certification Report

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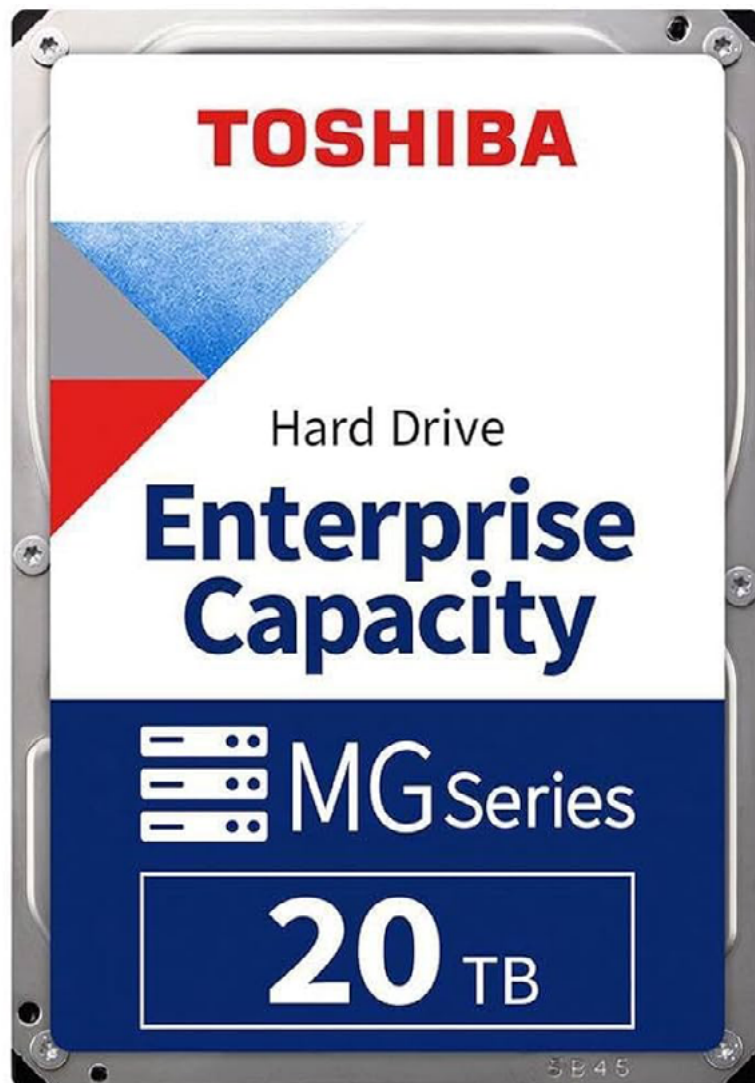


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1. INTRODUCTION

This report describes in detail the tests and the results of integrating the **Toshiba MG10ACA20TE Hard Disk Drives with the Open-E JovianDSS software platform**. With its fourth-generation, 10-disk Helium-sealed design, the Toshiba MG10 Series improves the density of Conventional Magnetic Recording (CMR) to 2 TB per disk, **reaching a maximum capacity of 20 TB**, and the model with that capacity was tested during the certification process.

Open-E conducted the certification tests under the assumption that the drives were suitable for a data group (data storage drive) due to their extensive capacity and evaluated their performance in this role.

The certification scope included a series of **functional and performance tests on both Single-Node systems and High-Availability data storage clusters** to ensure compatibility and reliability under various operational conditions.

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

- **data storage drive**

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2. TESTED DEVICE DESCRIPTION

Table 1. Toshiba MG10ACA20TE HDD specification.

Product name	Toshiba MG10ACA20TE HDD
Model name	MG10ACA20TE
Storage capacity	20 TB
Form factor	HDD 3.5"
Interface	SATA
SED	No
Rotational speed	7200 RPM
Memory disk buffer size	512 MB
Power consumption	9.3 W
Mean Time To Failure (MTTF)	2,500,000 hours
Workload Rate Limit	550 TB/year

3. TEST ENVIRONMENT DESCRIPTION

Table 2 provides a detailed list of the hardware specifications for the environments used during the certification testing. Table 3 shows the general configuration settings for Fio, which was the tool for performance benchmarking.

Table 2. Single node hardware specification

System name	Supermicro SuperServer 6028U-TR4T+
Motherboard	Supermicro X9DRD-7LN4F(-JBOD)/X9DRD-EF
CPU	2x Intel(R) Xeon(R) CPU E5-2620 v2 @ 2.10GHz
RAM	64GB - 8x Kingston 8 GB 1600 MHz
Storage controller	HBA Broadcom (LSI) SAS 9400-8i8e SAS 12Gb/s
Drives	4x Toshiba MG10ACA20TE 2x NVMe Intel Optane SSD P1600X Series
System	Open-E JovianDSS up29r4

Table 3. Fio test tool configuration

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

4. FUNCTIONALITY TESTS

Open-E performed functional testing, shown in Table 4, to examine the performance of the Toshiba MG10ACA20TE HDD drives with Open-E JovianDSS.

Table 4. Functional test results

Functional aspect	Result
Open-E JovianDSS system compatibility	passed
Stripe compatibility	passed
Mirror compatibility	passed
RAID-Z1 compatibility	passed
RAID-Z2 compatibility	passed
System stability	passed
Drive failure simulation with the replacement	passed
Disk activity and health monitoring	passed
Disk write-back cache management	passed
LED's management functionality	passed
SED	Not supported

5. HA NON-SHARED STORAGE CLUSTER TEST

Open-E performed various compatibility tests to ensure the proper operation of the Toshiba MG10ACA-20TE HDDs in the Open-E JovianDSS High Availability Non-Shared Storage Cluster environment.

All the essential and critical cluster mechanisms with the tested devices were tested. Table 5 shows the list of checked functionalities.

Table 5. Results for the HA Non-shared Storage Cluster compatibility test.

Tested functionality	Result
Manual Failover	passed
Remote disk support	passed
Automatic Failover triggered after network failure	passed
Automatic Failover triggered after system shutdown	passed
Automatic Failover triggered after system reboot	passed
Automatic Failover triggered after system power-off	passed
Automatic Failover triggered after I/O failure	passed
Failover operations under heavy load (stress test)	passed

6. PERFORMANCE TESTS

The test cases are described in Table 6. Open-E applied every combination of thread numbers (1, 4, 8, 16) and queue depths (1, 16, 64, 128) to the Fio test tool in all instances. All tests were performed locally on the Open-E JovianDSS system.

Table 6. Test cases description

Test case	IO pattern	Read to write %	Block size
Mixed	random	70/30	4 kB
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

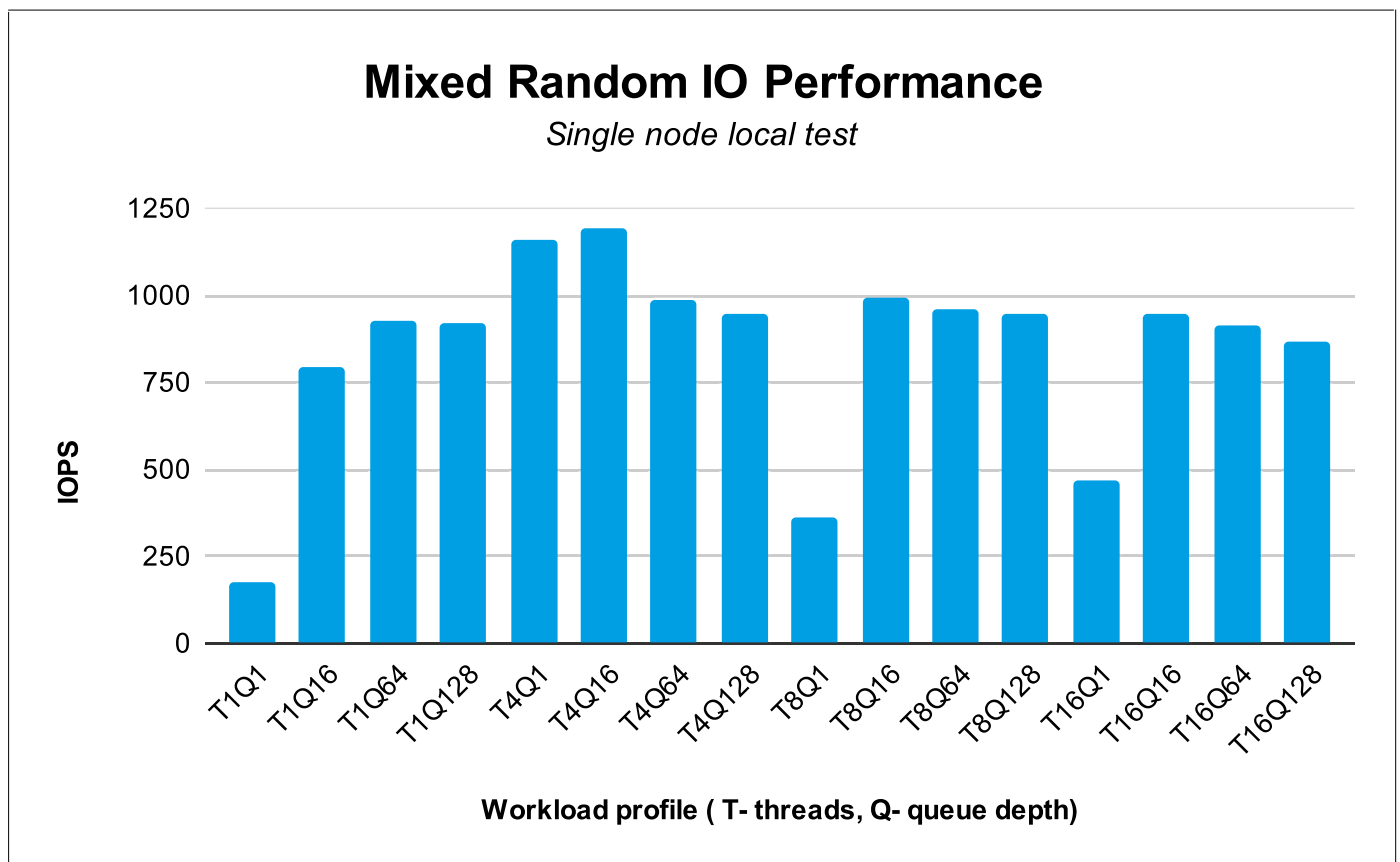
The table below presents the ZFS configuration used for testing.

Table 7. Tested pool configuration

Zpool configuration	RAID-Z2
Write log	Yes (NVMe Intel Optane SSD P1600X Series)
Read cache	Yes (NVMe Intel Optane SSD P1600X Series)
Zvol size	200 GB
Sync	Always
Provisioning	Thin
Compression	lz4
Zvol initialization	Zvol was initialized by writing data to it before tests began.

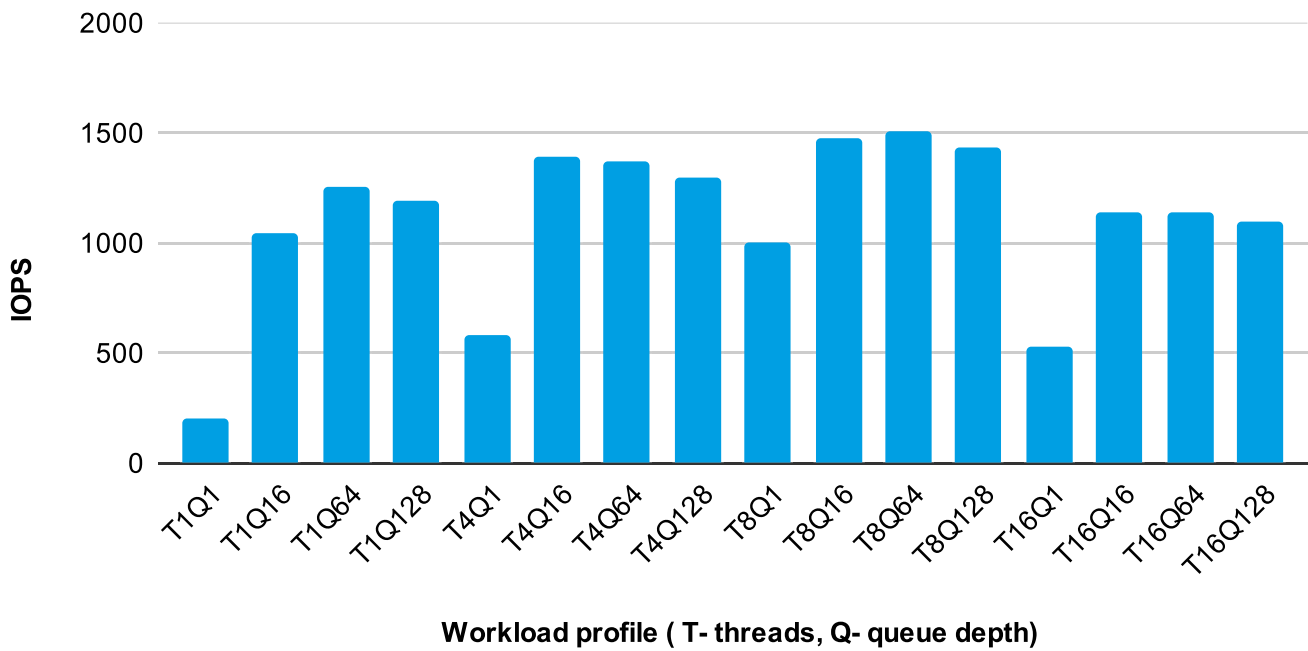
The charts below present the following performance results:

- **Mixed Random IO Performance**
- **Random Read IO Performance**
- **Random Write IO Performance**
- **Sequential Read MB/s Performance**
- **Sequential Write MB/s Performance**



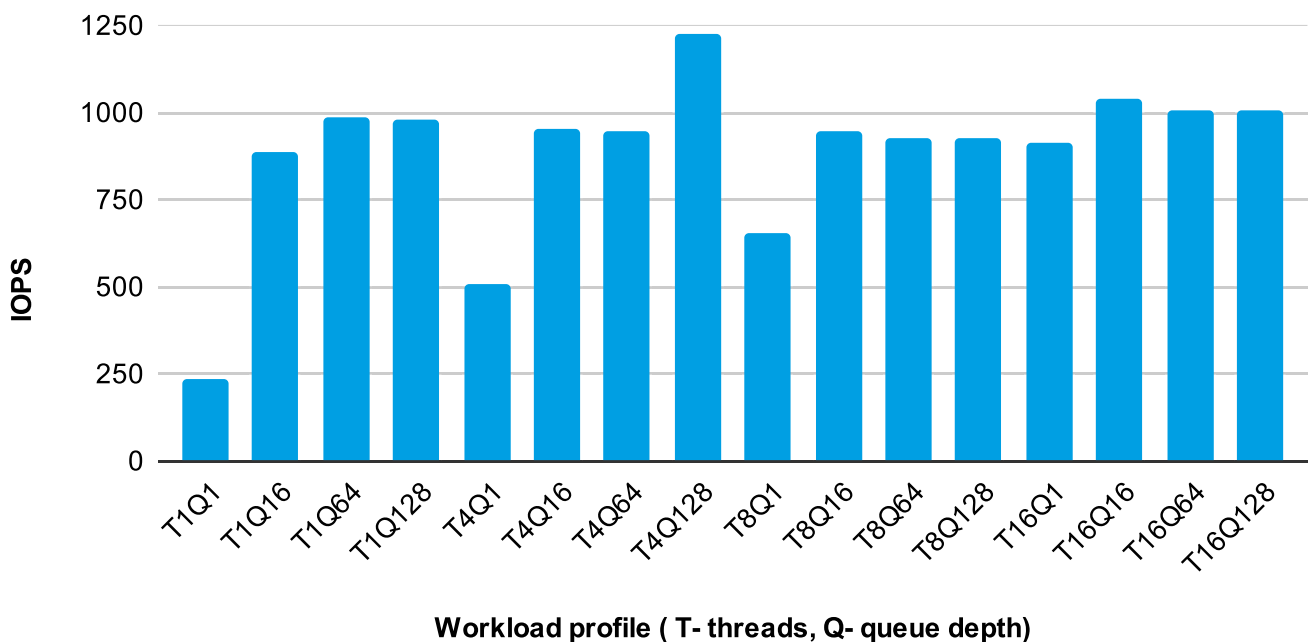
Random Read IO Performance

Single node local test



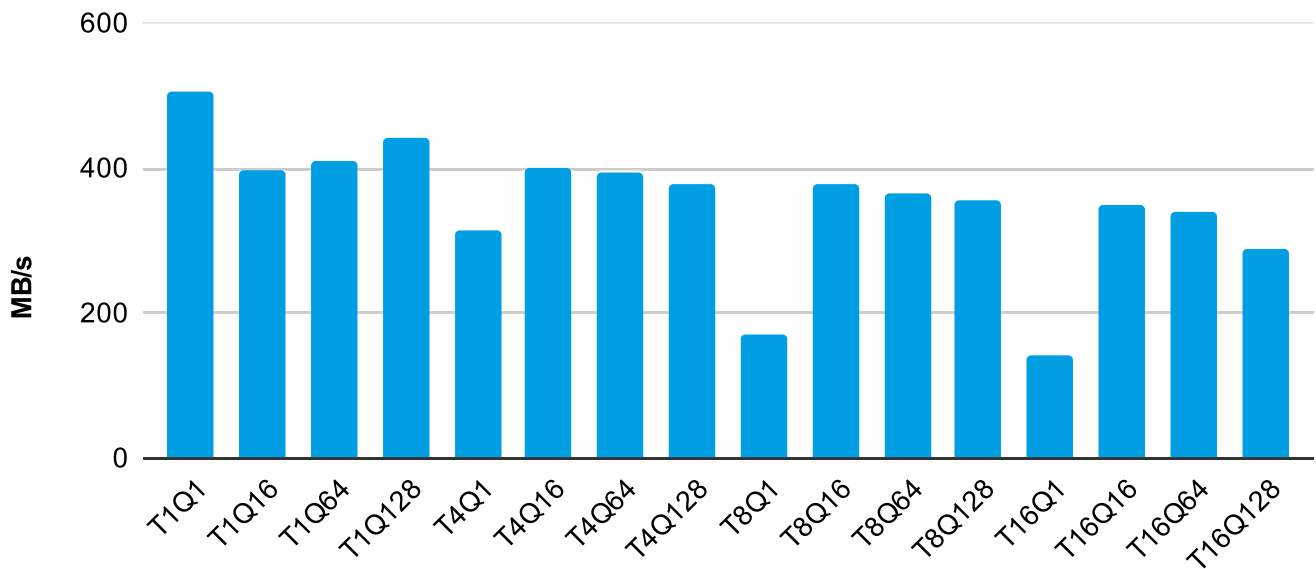
Random Write IO Performance

Single node local test



Sequential Read MB/s Performance

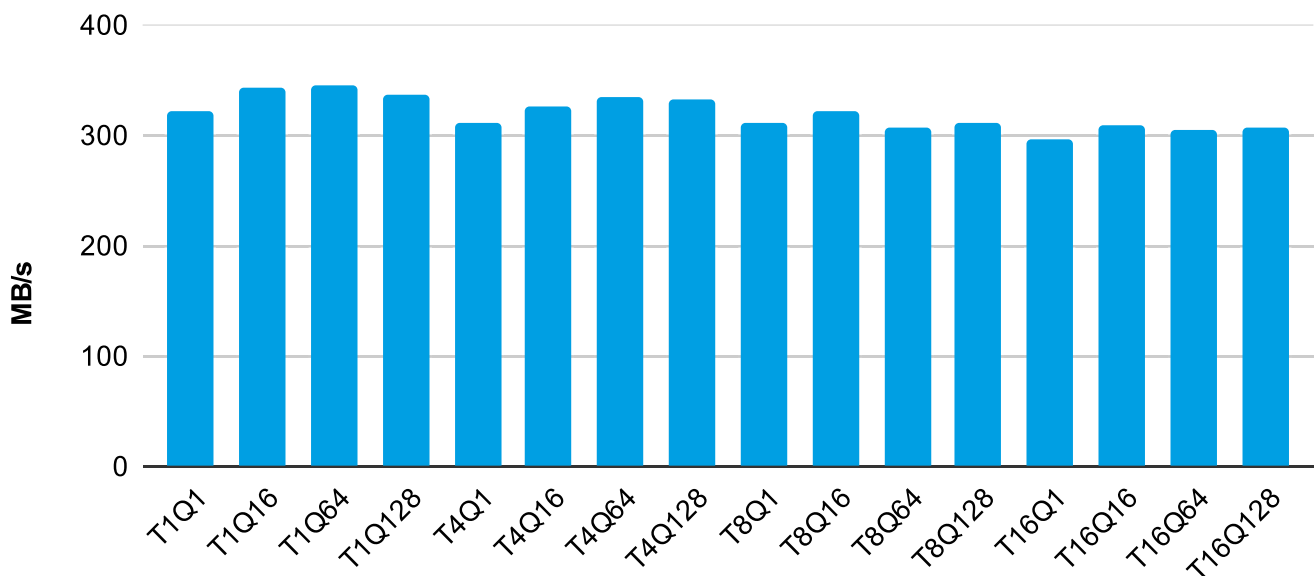
Single node local test



Workload profile (T- threads, Q- queue depth)

Sequential Write MB/s Performance

Single node local test



Workload profile (T- threads, Q- queue depth)

7. TESTS CONCLUSIONS

The Toshiba MG10ACA20TE HDD has shown good performance in a comprehensive suite of tests, proving its reliability as a data storage solution. The disks have well endurance, speed, and consistency, making them a great choice for environments that need high data integrity, capacity, and availability.

The testing regimen, which included stress tests, read/write operations, and long-term reliability assessments, has confirmed that this HDD model is a high-quality, enterprise device. The results show that the Toshiba MG10ACA20TE HDD can handle the demanding workloads of both Single-Node and High-Availability configurations in Open-E JovianDSS systems.

The Toshiba MG10ACA20TE HDD is a good choice for those who value high storage capacity, consistent performance, and reliability in a hard disk drive.

Based on the test results, and the drive specification, Open-E recommends using the certified model in:

- Massive enterprise-scale storage infrastructures
- Business-critical servers, and data storage setups
- File and Block data storage solutions
- CCTV solutions

After passing the certification tests, Open-E added the Toshiba MG10ACA20TE to the Hardware Certification List and granted it the “Certified by Open-E” status.

8. DISCLAIMER

Due to the large capacity of the single disk, which leads to a longer replacement time in case of its failure, we recommend using data groups with at least two disks of redundancy. For this purpose, the best group is the RAID-Z2, which we tested above, or at least a 3-way mirror if you use mirror groups.