

HDD Testing Report

ST24000NM000C-3WD103 | SN: ZXA0G33K

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2024-10-31 13:29:57

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1. hdparm

hdparm - get/set SATA/IDE device parameters

hdparm [options] [device ...]

-t

Perform timings of device reads for benchmark and comparison purposes. For meaningful results, this operation should be repeated 2–3 times on an otherwise inactive system (no other active processes) with at least a couple of megabytes of free memory. This displays the speed of reading through the buffer cache to the disk without any prior caching of data. This measurement is an indication of how fast the drive can sustain sequential data reads under Linux, without any filesystem overhead. To ensure accurate measurements, the buffer cache is flushed during the processing of -t using the BLKFLSBUF ioctl.

-T

Perform timings of cache reads for benchmark and comparison purposes. For meaningful results, this operation should be repeated 2–3 times on an otherwise inactive system (no other active processes) with at least a couple of megabytes of free memory. This displays the speed of reading directly from the Linux buffer cache without disk access. This measurement is essentially an indication of the throughput of the processor, cache, and memory of the system under test.

--direct

Use the kernel's "O_DIRECT" flag when performing a -t timing test. This bypasses the page cache, causing the reads to go directly from the drive into hdparm's buffers, using so-called "raw" I/O. In many cases, this can produce results that appear much faster than the usual page cache method, giving a better indication of raw device and driver performance.

— hdparm, <https://man7.org/linux/man-pages/man8/hdparm.8.html>

1.1. 'hdparm -I /dev/sda'

/dev/sda:

ATA device, with non-removable media

Model Number: ST24000NM000C-3WD103

Serial Number: ZXA0G33K

Firmware Revision: SN02

Transport: Serial, ATA8-AST, SATA 1.0a, SATA II Extensions, SATA Rev 2.5,
SATA Rev 2.6, SATA Rev 3.0

Standards:

Used: unknown (minor revision code 0xffff)

Supported: 12 11 10 9 8 7 6 5

Likely used: 12

Configuration:

Logical max current

cylinders 16383 16383

heads 16 16

sectors/track 63 63

--

CHS current addressable sectors: 16514064

LBA user addressable sectors: 268435455

LBA48 user addressable sectors: 46875541504

Logical Sector size: 512 bytes [Supported: 256 2048]

Physical Sector size: 4096 bytes

Logical Sector-0 offset: 0 bytes

device size with M = 1024*1024: 22888448 MBytes

device size with M = 1000*1000: 24000277 MBytes (24000 GB)

cache/buffer size = unknown

Form Factor: 3.5 inch

Nominal Media Rotation Rate: 7200

Capabilities:

LBA, IORDY(can be disabled)

Queue depth: 32

Standby timer values: spec'd by Standard, no device specific minimum

R/W multiple sector transfer: Max = 16 Current = 16

Recommended acoustic management value: 254, current value: 0

DMA: mdma0 mdma1 mdma2 udma0 udma1 udma2 udma3 udma4 udma5 *udma6

Cycle time: min=120ns recommended=120ns

PIO: pio0 pio1 pio2 pio3 pio4

Cycle time: no flow control=120ns IORDY flow control=120ns

Commands/features:

Enabled Supported:

- * SMART feature set
- Security Mode feature set
- * Power Management feature set
- * Write cache
- * Look-ahead
- * WRITE_BUFFER command
- * READ_BUFFER command

- * DOWNLOAD_MICROCODE
- Power-Up In Standby feature set
- * SET_FEATURES required to spinup after power up
- SET_MAX security extension
- * 48-bit Address feature set
- * Mandatory FLUSH_CACHE
- * FLUSH_CACHE_EXT
- * SMART error logging
- * SMART self-test
- * Media Card Pass-Through
- * General Purpose Logging feature set
- * WRITE_{DMA|MULTIPLE}_FUA_EXT
- * 64-bit World wide name
- * IDLE_IMMEDIATE with UNLOAD
- Write-Read-Verify feature set
- * WRITE_UNCORRECTABLE_EXT command
- * {READ,WRITE}_DMA_EXT_GPL commands
- * Segmented DOWNLOAD_MICROCODE
- * unknown 119[6]
- * unknown 119[7]
- unknown 119[8]
- unknown 119[9]
- unknown 119[10]
- * Gen1 signaling speed (1.5Gb/s)
- * Gen2 signaling speed (3.0Gb/s)
- * Gen3 signaling speed (6.0Gb/s)
- * Native Command Queueing (NCQ)
- * Phy event counters
- * Idle-Unload when NCQ is active
- * NCQ priority information
- * READ_LOG_DMA_EXT equivalent to READ_LOG_EXT
- * DMA Setup Auto-Activate optimization
- Device-initiated interface power management
- * Software settings preservation
- unknown 78[7]
- * SMART Command Transport (SCT) feature set
- * SCT Write Same (AC2)
- * SCT Error Recovery Control (AC3)
- * SCT Features Control (AC4)
- * SCT Data Tables (AC5)
- unknown 206[7]
- unknown 206[12] (vendor specific)
- unknown 206[14] (vendor specific)
- * SANITIZE_ANTIFREEZE_LOCK_EXT command
- * SANITIZE feature set
- * OVERWRITE_EXT command
- * All write cache is non-volatile
- * Extended number of user addressable sectors

Security:

Master password revision code = 65534
supported

```
not enabled
not locked
not frozen
not expired: security count
supported: enhanced erase
2110min for SECURITY ERASE UNIT. 2110min for ENHANCED SECURITY ERASE UNIT.
Logical Unit WWN Device Identifier: 5000c500e864b5a8
NAA      : 5
IEEE OUI  : 000c50
Unique ID  : 0e864b5a8
Checksum: correct
```

1.2. 'hdparm -t /dev/sda'

```
/dev/sda:
Timing buffered disk reads: 682 MB in 3.00 seconds = 227.10 MB/sec
```

1.3. 'hdparm -t /dev/sda'

```
/dev/sda:
Timing buffered disk reads: 696 MB in 3.00 seconds = 231.82 MB/sec
```

1.4. 'hdparm -t /dev/sda'

```
/dev/sda:
Timing buffered disk reads: 716 MB in 3.00 seconds = 238.40 MB/sec
```

1.5. 'hdparm -t --direct /dev/sda'

```
/dev/sda:
Timing O_DIRECT disk reads: 718 MB in 3.01 seconds = 238.83 MB/sec
```

1.6. 'hdparm -t --direct /dev/sda'

```
/dev/sda:
Timing O_DIRECT disk reads: 700 MB in 3.00 seconds = 233.20 MB/sec
```

1.7. 'hdparm -t --direct /dev/sda'

```
/dev/sda:  
Timing O_DIRECT disk reads: 716 MB in 3.00 seconds = 238.57 MB/sec
```

1.8. 'hdparm -T /dev/sda'

```
/dev/sda:  
Timing cached reads: 23252 MB in 1.99 seconds = 11660.28 MB/sec
```

1.9. 'hdparm -T /dev/sda'

```
/dev/sda:  
Timing cached reads: 23242 MB in 1.99 seconds = 11654.62 MB/sec
```

1.10. 'hdparm -T /dev/sda'

```
/dev/sda:  
Timing cached reads: 23462 MB in 1.99 seconds = 11765.83 MB/sec
```

2. Fio Charts

NOTE

To **don't write any data to disk**, intentionally were performed tests of **read** and **randread** type only.

Fio type of I/O pattern. Accepted values are:

read

Sequential reads.

write

Sequential writes.

trim

Sequential trims (Linux block devices and SCSI character devices only).

randread

Random reads.

randwrite

Random writes.

randtrim

Random trims (Linux block devices and SCSI character devices only).

rw,readwrite

Sequential mixed reads and writes.

randrw

Random mixed reads and writes.

trimwrite

Sequential trim+write sequences. Blocks will be trimmed first, then the same blocks will be written to.

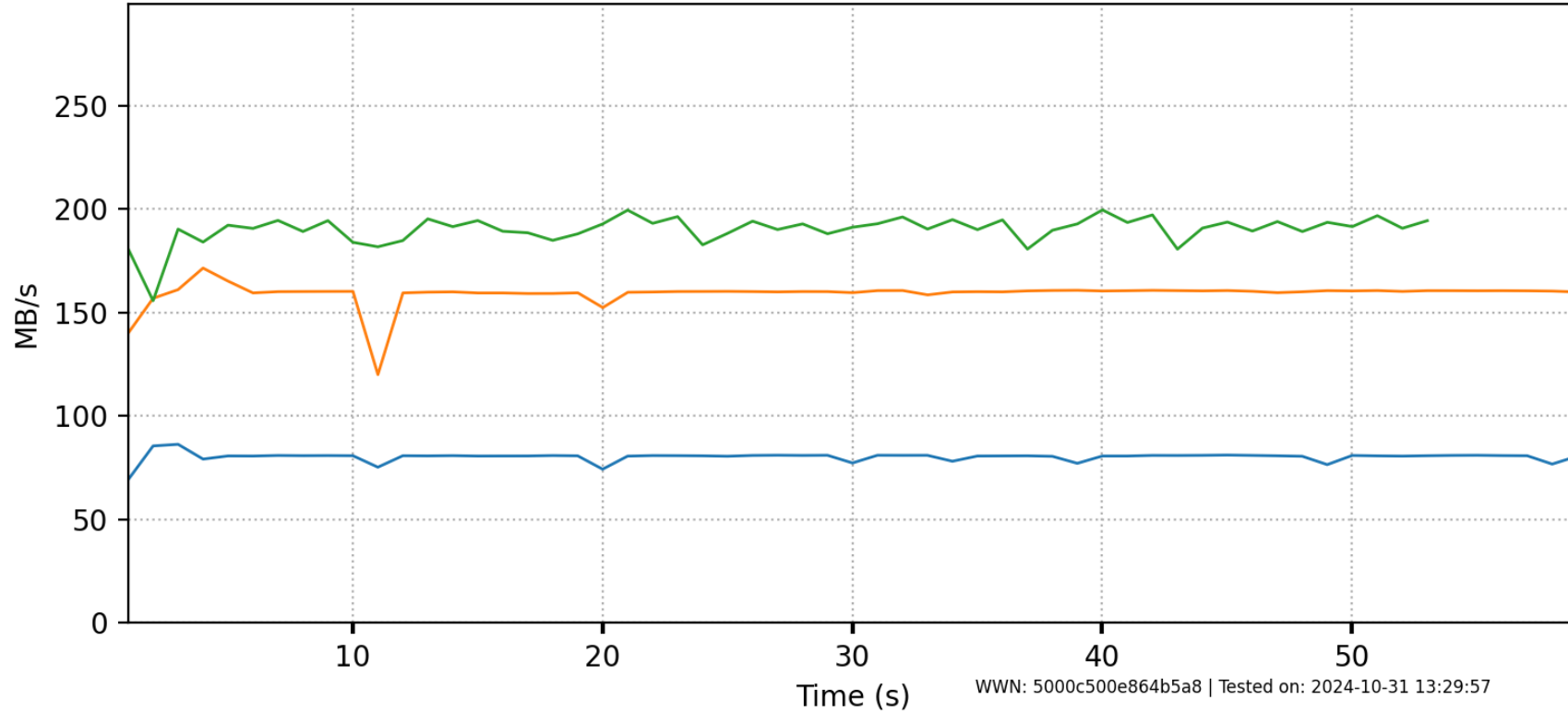
Fio defaults to read if the option is not specified. For the mixed I/O types, the default is to split them 50/50. For certain types of I/O the result may still be skewed a bit, since the speed may be different.

— fio - flexible I/O tester, <https://github.com/axboe/fio#overview-and-history>

2.1. read-g-bw-d

HDD: ST24000NM000C-3WD103 | 24.0 TB | 7200 rpm

| rw read | bs 4k | iodepth 1, 2, 4 | numjobs 1 | type bw | filter read, write |



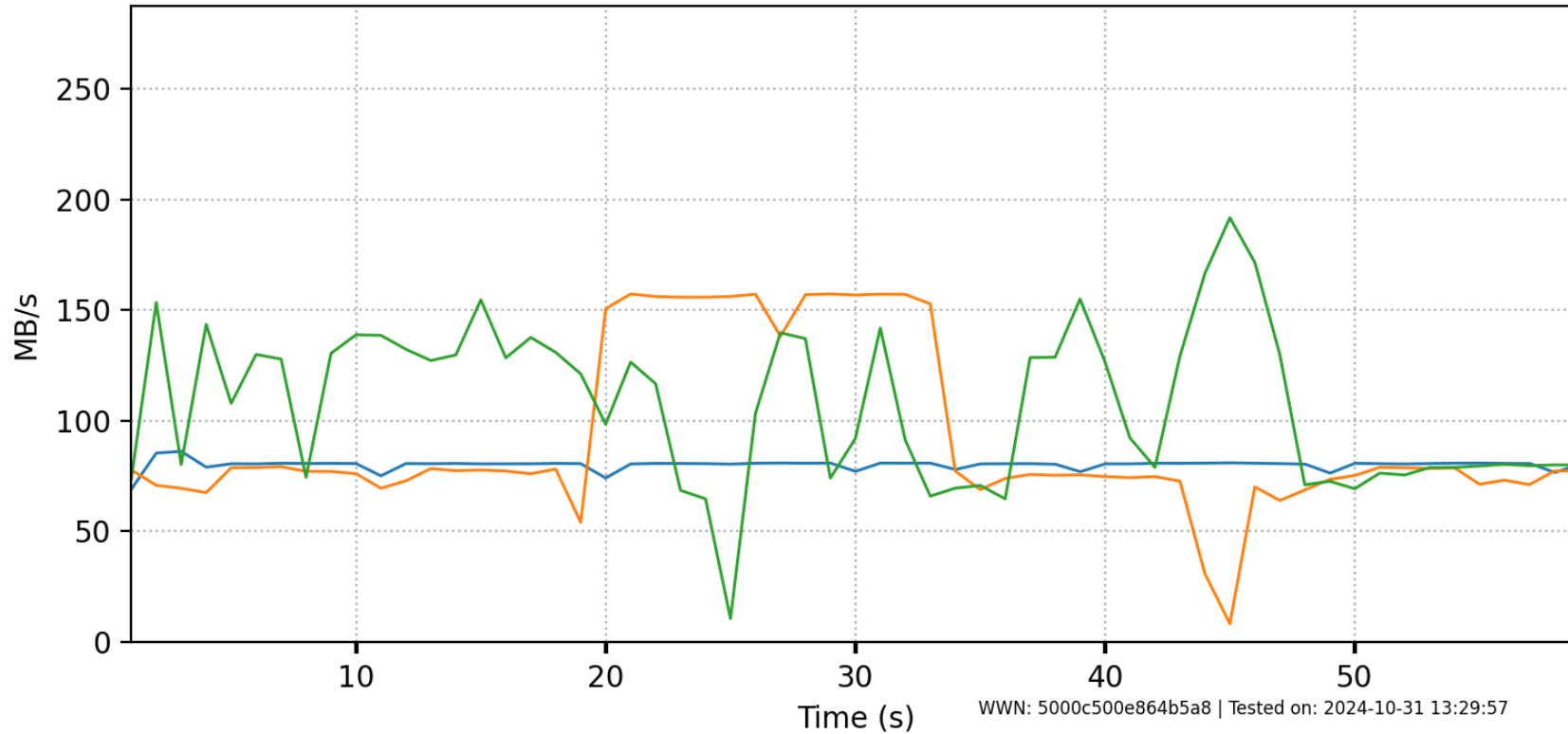
	name	rw	type	qd	nj	mean	std%	P99.99		name	rw	type	qd	nj	mean	std%	P99.99	
—	ST24000NM000C-3WD103_ZXA0G33K	read	bw	1	1	80	2.88	86		—	ST24000NM000C-3WD103_ZXA0G33K	read	bw	4	1	190	3.49	200
—	ST24000NM000C-3WD103_ZXA0G33K	read	bw	2	1	159	3.84	171										

Figure 1. read-g-bw-d

2.2. read-g-bw-n

HDD: ST24000NM000C-3WD103 | 24.0 TB | 7200 rpm

| rw read | bs 4k | iodepth 1 | numjobs 1, 2, 4 | type bw | filter read, write |



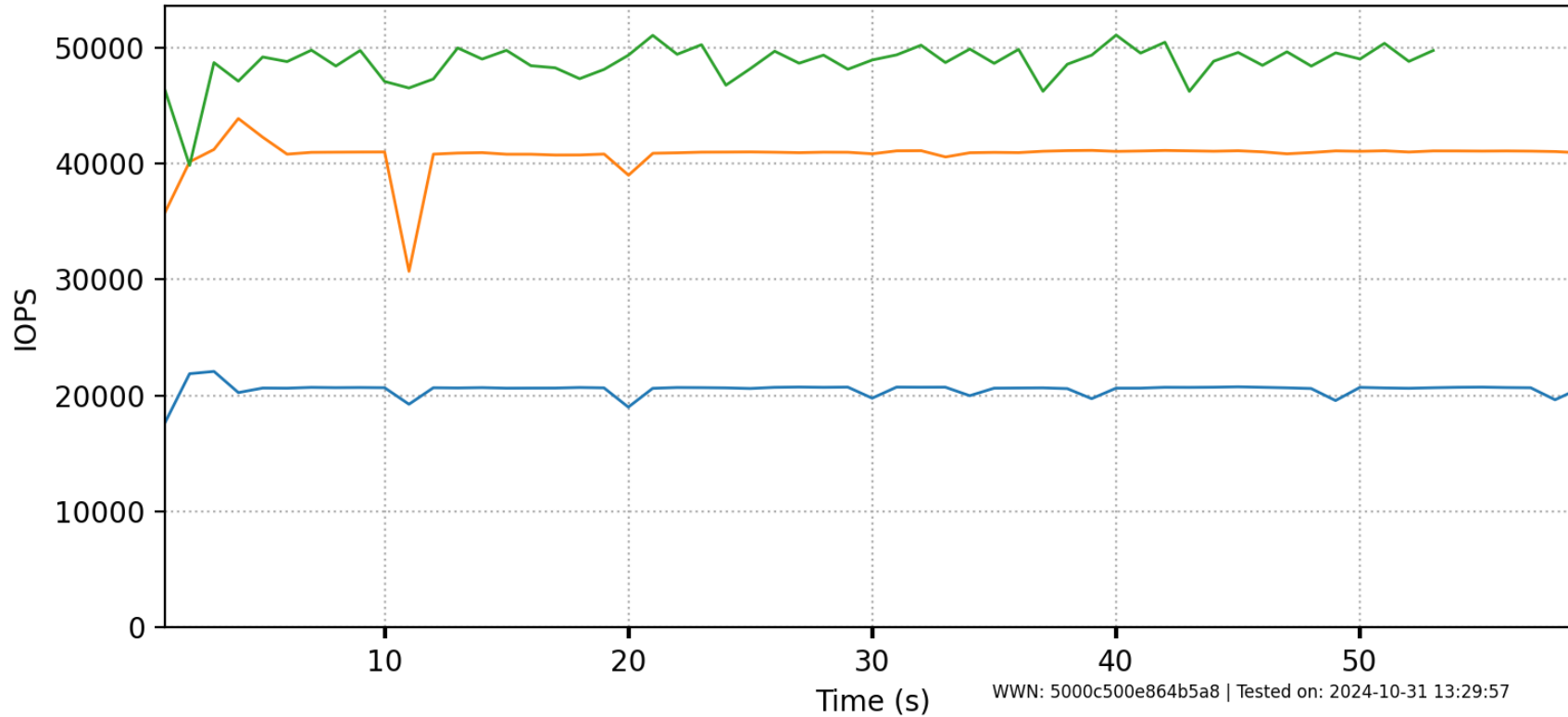
	name	rw	type	qd	nj	mean	std%	P99.99		name	rw	type	qd	nj	mean	std%	P99.99
—	ST24000NM000C-3WD103_ZXA0G33K	read	bw	1	1	80	2.88	86	—	ST24000NM000C-3WD103_ZXA0G33K	read	bw	1	4	107	32.54	192
—	ST24000NM000C-3WD103_ZXA0G33K	read	bw	1	2	92	40.39	157									

Figure 2. read-g-bw-n

2.3. read-g-iops-d

HDD: ST24000NM000C-3WD103 | 24.0 TB | 7200 rpm

| rw read | bs 4k | iodepth 1, 2, 4 | numjobs 1 | type iops | filter read, write |



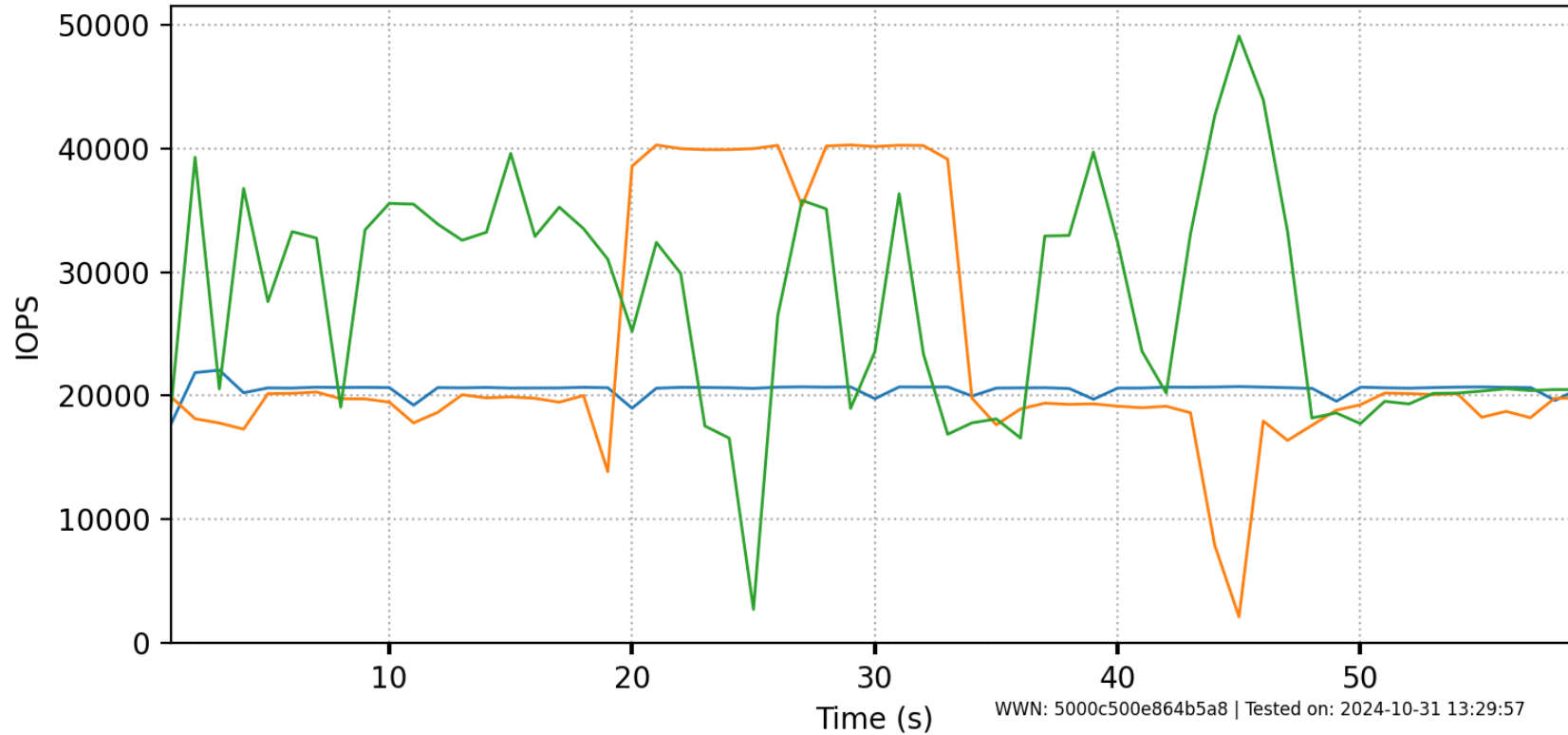
	name	rw	type	qd	nj	mean	std%	P99.99		name	rw	type	qd	nj	mean	std%	P99.99
—	ST24000NM000C-3WD103_ZXA0G33K	read	iops	1	1	20510	2.88	22063	—	ST24000NM000C-3WD103_ZXA0G33K	read	iops	4	1	48675	3.49	51079
—	ST24000NM000C-3WD103_ZXA0G33K	read	iops	2	1	40737	3.84	43871									

Figure 3. read-g-iops-d

2.4. read-g-iops-n

HDD: ST24000NM000C-3WD103 | 24.0 TB | 7200 rpm

| rw read | bs 4k | iodepth 1 | numjobs 1, 2, 4 | type iops | filter read, write |



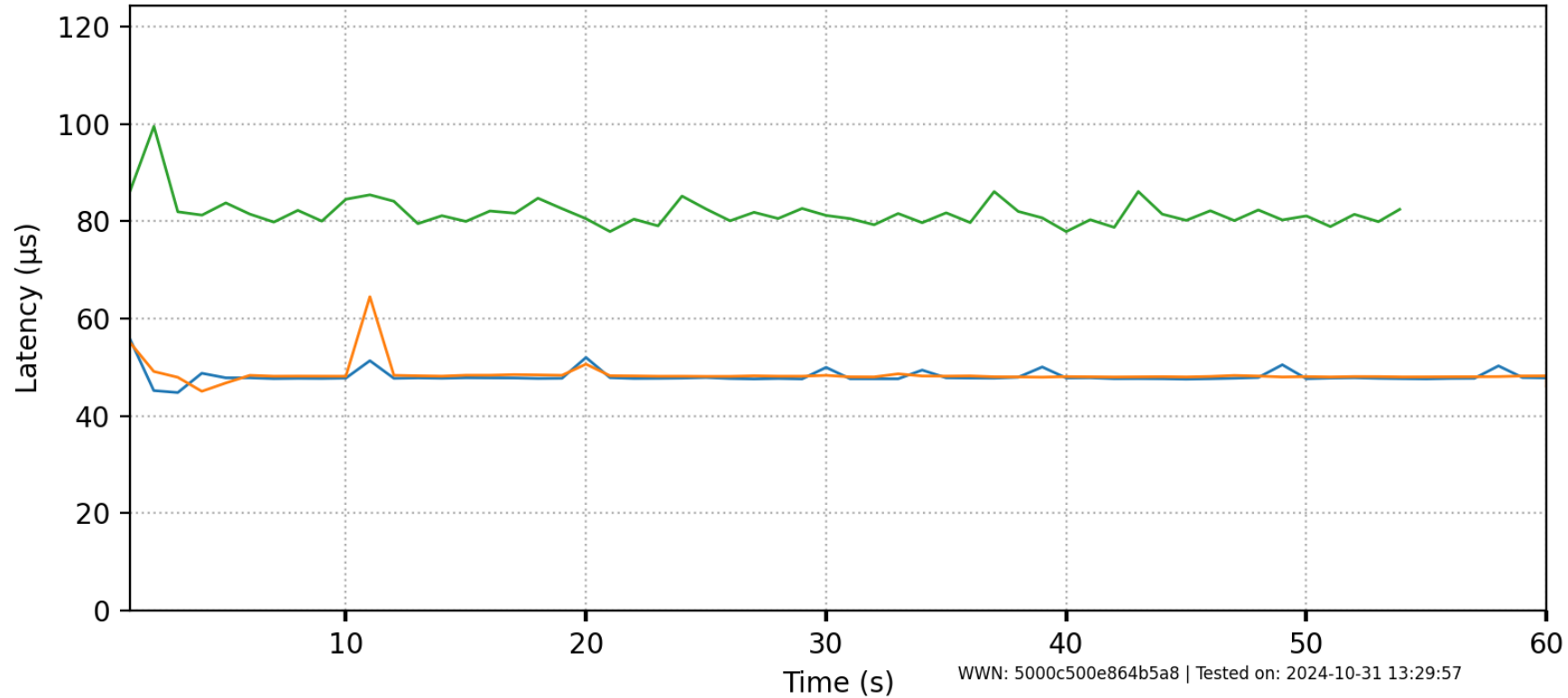
name	rw	type	qd	nj	mean	std%	P99.99	name	rw	type	qd	nj	mean	std%	P99.99
ST24000NM000C-3WD103_ZXA0G33K	read	iops	1	1	20510	2.88	22063	ST24000NM000C-3WD103_ZXA0G33K	read	iops	1	4	27420	32.54	49070
ST24000NM000C-3WD103_ZXA0G33K	read	iops	1	2	23429	40.39	40277								

Figure 4. read-g-iops-n

2.5. read-g-lat-d

HDD: ST24000NM000C-3WD103 | 24.0 TB | 7200 rpm

| rw read | bs 4k | iodepth 1, 2, 4 | numjobs 1 | type lat | filter read, write |



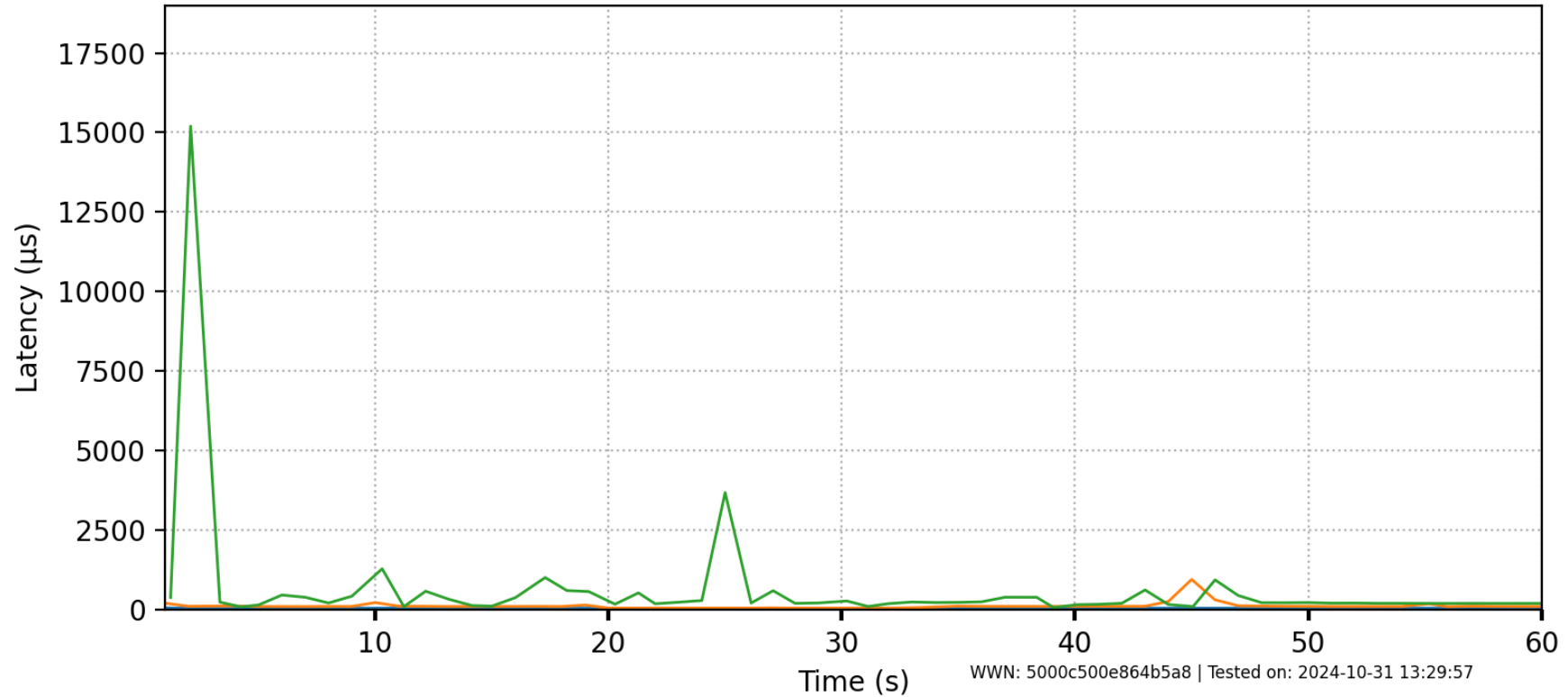
	name	rw	type	qd	nj	mean	std%	P99.99		name	rw	type	qd	nj	mean	std%	P99.99
—	ST24000NM000C-3WD103_ZXA0G33K	read	lat	1	1	48	3.09	56	—	ST24000NM000C-3WD103_ZXA0G33K	read	lat	4	1	82	3.84	99
—	ST24000NM000C-3WD103_ZXA0G33K	read	lat	2	1	48	4.82	64									

Figure 5. read-g-lat-d

2.6. read-g-lat-n

HDD: ST24000NM000C-3WD103 | 24.0 TB | 7200 rpm

| rw read | bs 4k | iodepth 1 | numjobs 1, 2, 4 | type lat | filter read, write |



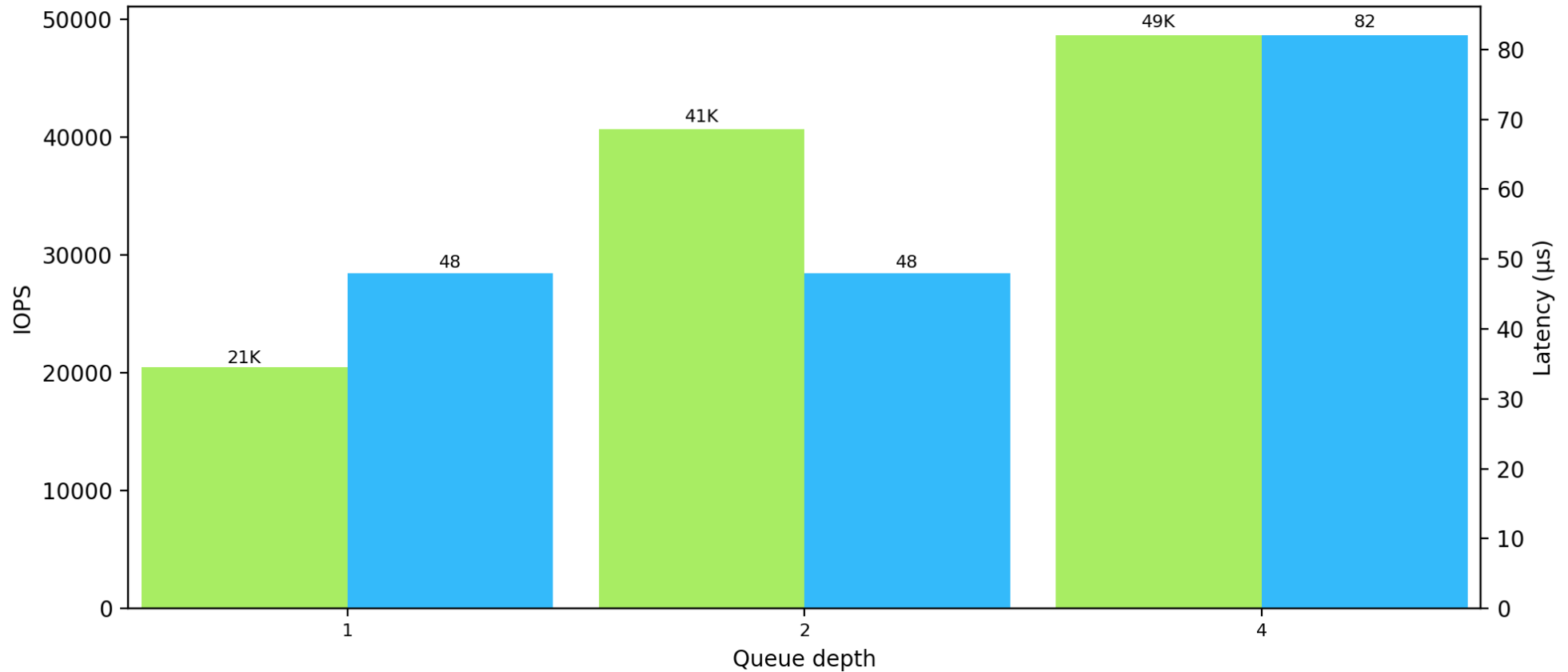
	name	rw	type	qd	nj	mean	std%	P99.99		name	rw	type	qd	nj	mean	std%	P99.99	
—	ST24000NM000C-3WD103_ZXA0G33K	read	lat	1	1	48	3.09	56		—	ST24000NM000C-3WD103_ZXA0G33K	read	lat	1	4	612	320.58	15129
—	ST24000NM000C-3WD103_ZXA0G33K	read	lat	1	2	117	101.09	946										

Figure 6. read-g-lat-n

2.7. read-l

HDD: ST24000NM000C-3WD103 | 24.0 TB | 7200 rpm

| rw read | bs 4k | numjobs 1 |



Tested on: 2024-10-31 13:29:57 | SATA 3.3, 6.0 Gb/s (current: 6.0 Gb/s) | Firmware: SN02 | SN: ZXA0G33K | WWN: 5000c500e864b5a8

■ IOPS
■ Latency (µs)

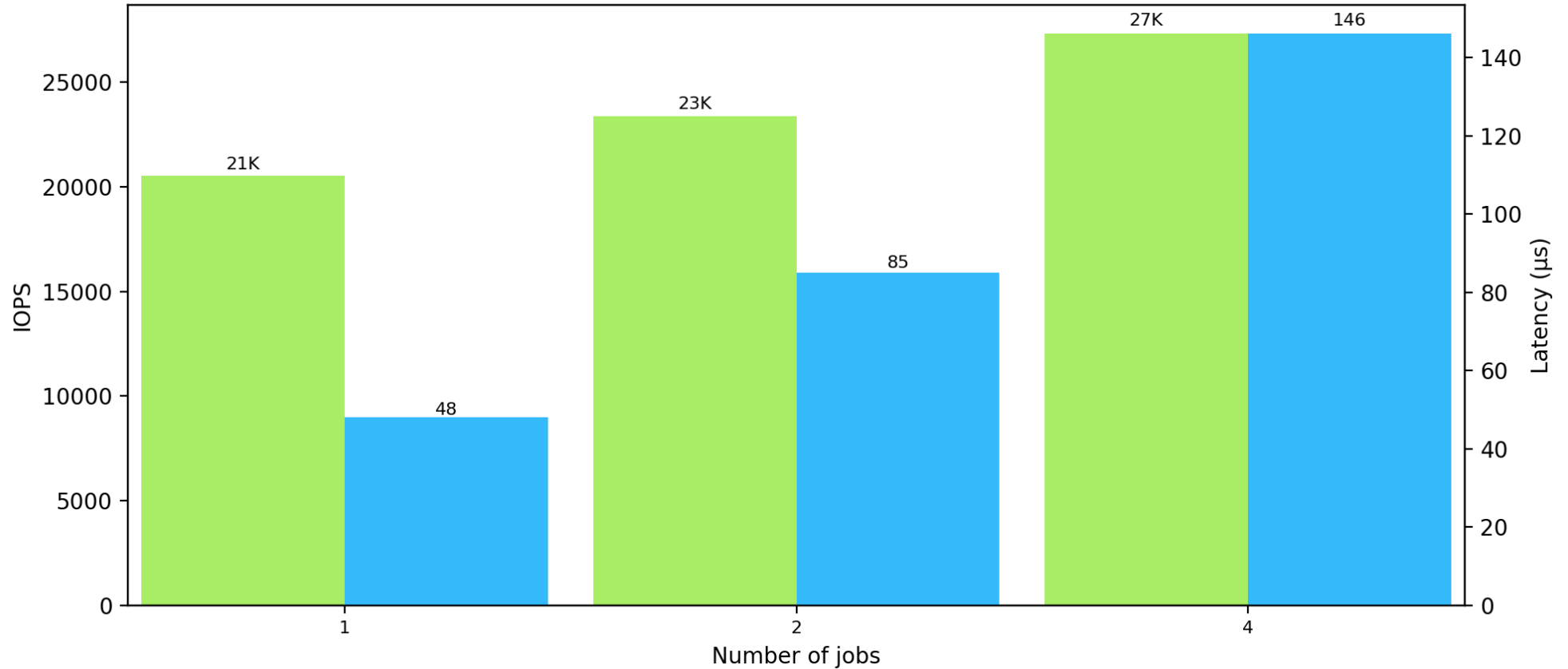
Queue depth	1	2	4
IOP/s σ %	3	4	4
Latency σ %	85	96	587

Figure 7. read-l

2.8. read-N

HDD: ST24000NM000C-3WD103 | 24.0 TB | 7200 rpm

| rw read | bs 4k | iodepth 1 |



Tested on: 2024-10-31 13:29:57 | SATA 3.3, 6.0 Gb/s (current: 6.0 Gb/s) | Firmware: SN02 | SN: ZXA0G33K | WWN: 5000c500e864b5a8

■ IOPS
■ Latency (µs)

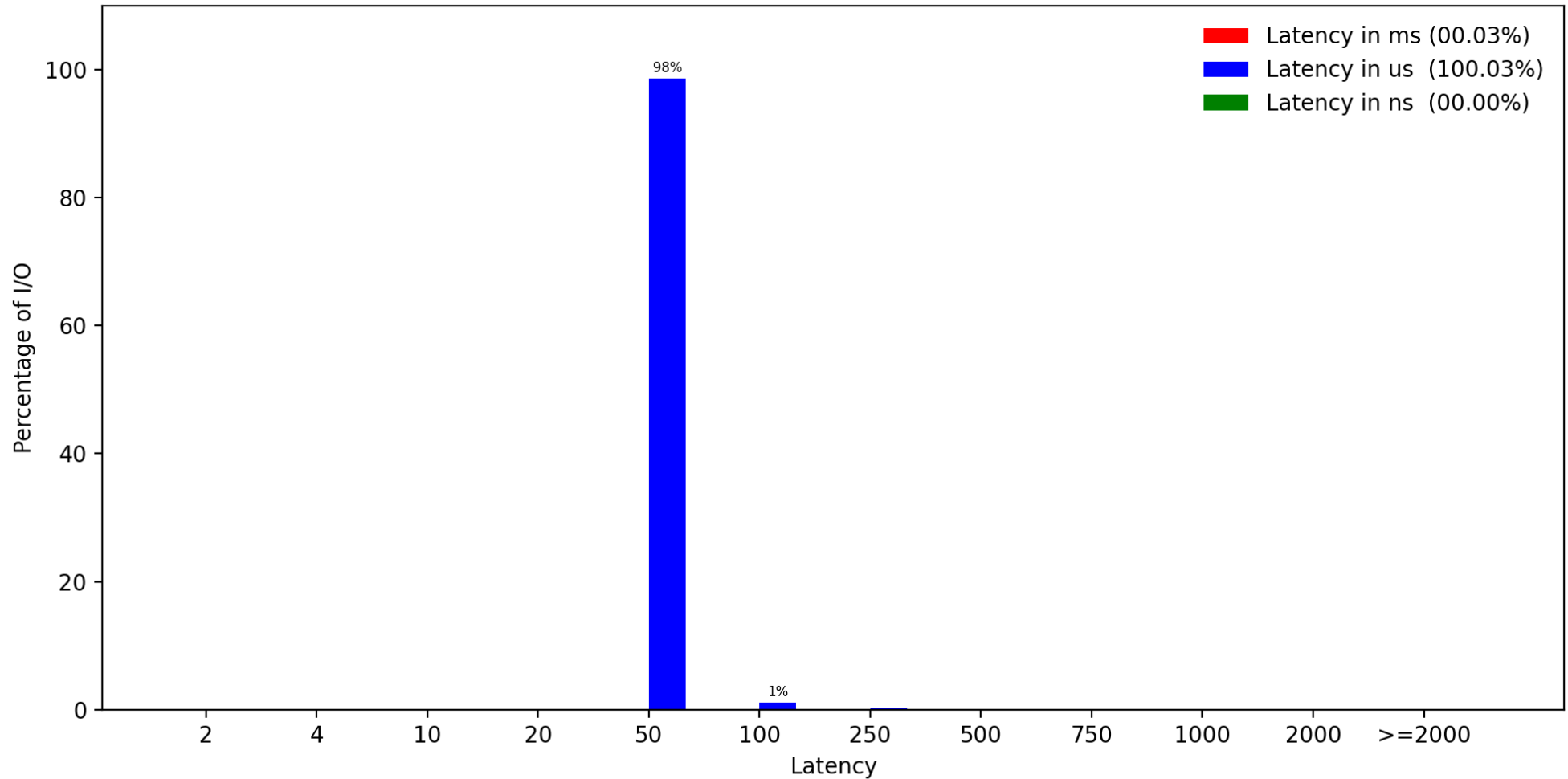
Number of jobs	1	2	4
IOP/s σ %	3	22	19
Latency σ %	85	1538	3140

Figure 8. read-N

2.9. read-H

HDD: ST24000NM000C-3WD103 | 24.0 TB | 7200 rpm

| rw read | bs ['type', 'filter'] | iodepth 1, 2, 4 | numjobs 1, 2, 4 | filter read, write |



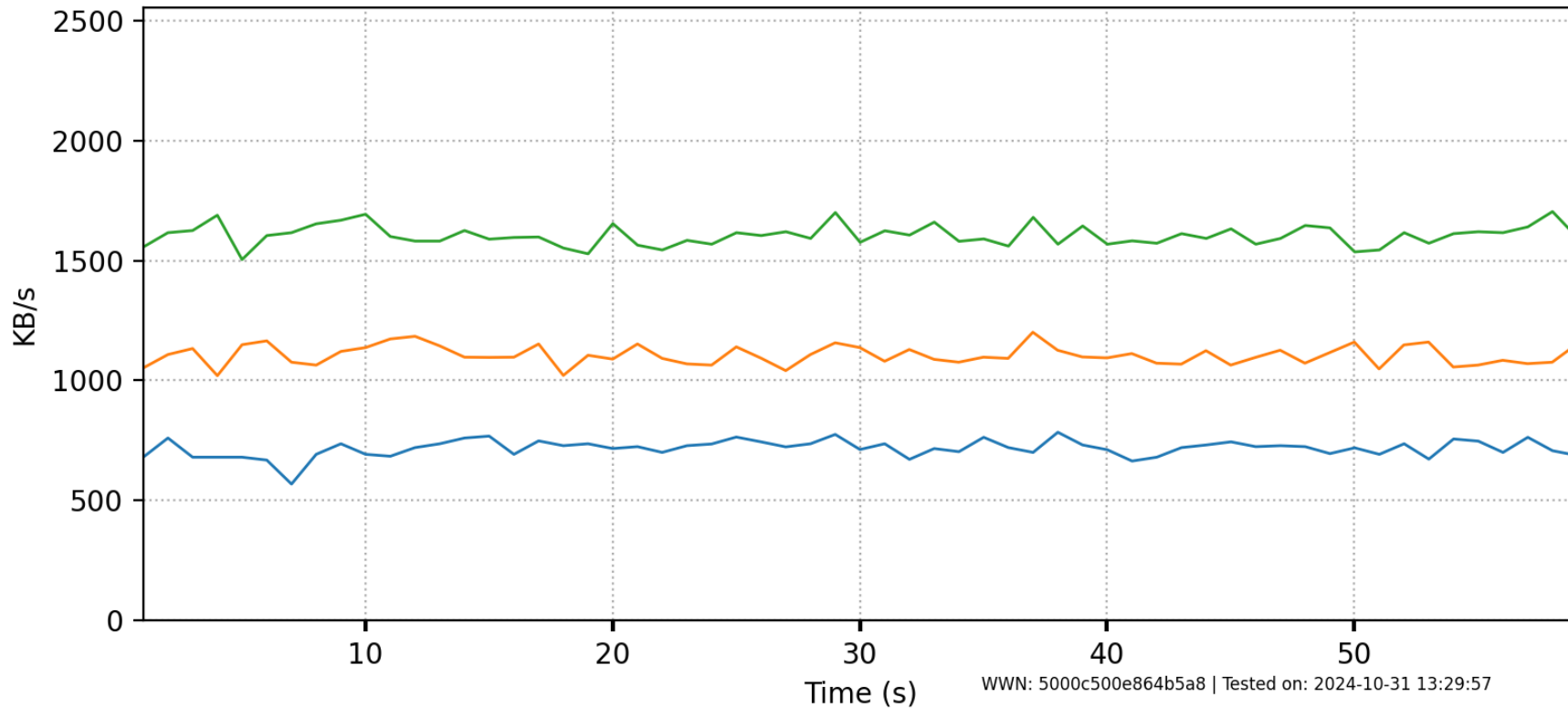
Tested on: 2024-10-31 13:29:57 | SATA 3.3, 6.0 Gb/s (current: 6.0 Gb/s) | Firmware: SN02 | SN: ZXAG33K | WWN: 5000c500e864b5a8

Figure 9. read-H

2.10. randread-g-bw-d

HDD: ST24000NM000C-3WD103 | 24.0 TB | 7200 rpm

| rw randread | bs 4k | iodepth 1, 2, 4 | numjobs 1 | type bw | filter read, write |



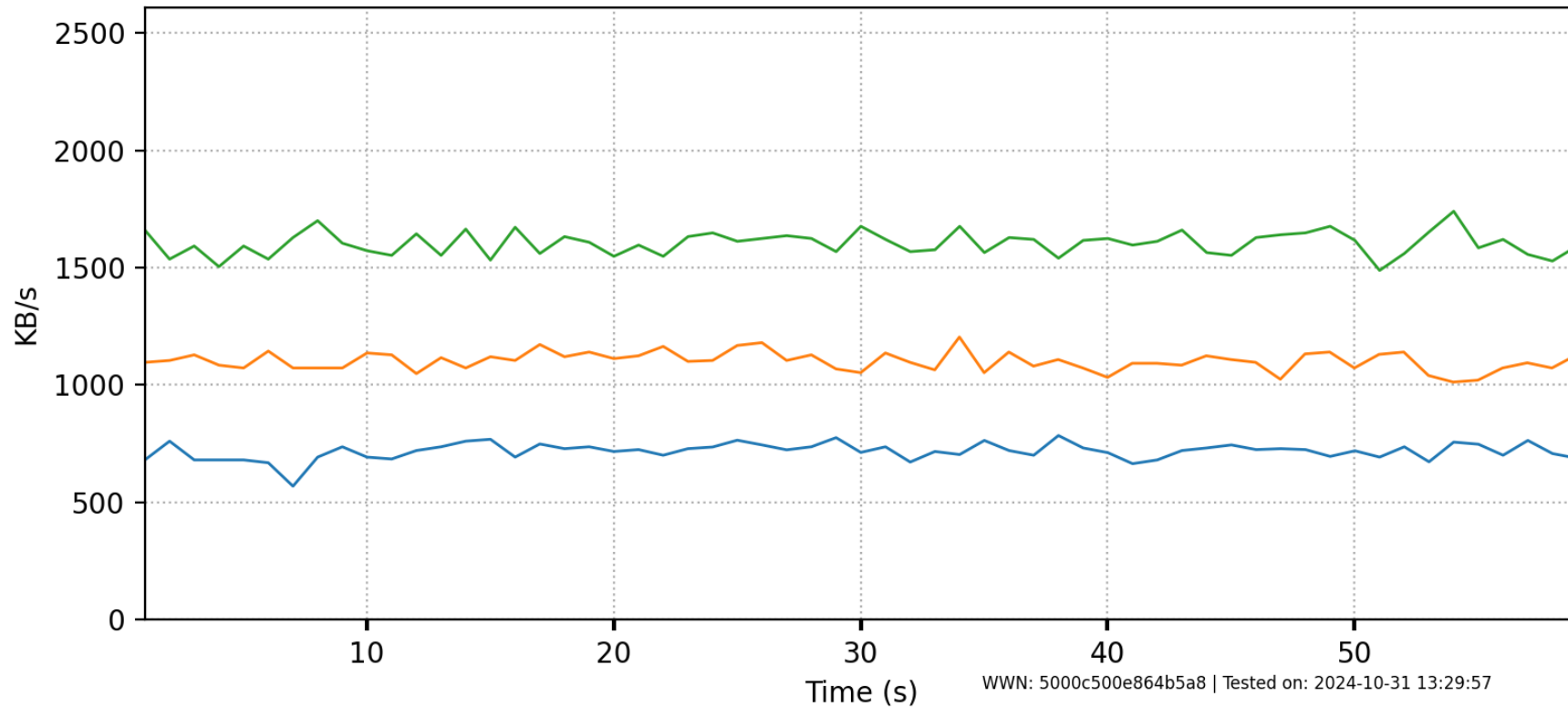
	name	rw	type	qd	nj	mean	std%	P99.99		name	rw	type	qd	nj	mean	std%	P99.99	
—	ST24000NM000C-3WD103_ZXA0G33K	read	bw	1	1	717	4.92	784		—	ST24000NM000C-3WD103_ZXA0G33K	read	bw	4	1	1604	2.68	1704
—	ST24000NM000C-3WD103_ZXA0G33K	read	bw	2	1	1105	3.64	1201										

Figure 10. randread-g-bw-d

2.11. randread-g-bw-n

HDD: ST24000NM000C-3WD103 | 24.0 TB | 7200 rpm

| rw randread | bs 4k | iodepth 1 | numjobs 1, 2, 4 | type bw | filter read, write |



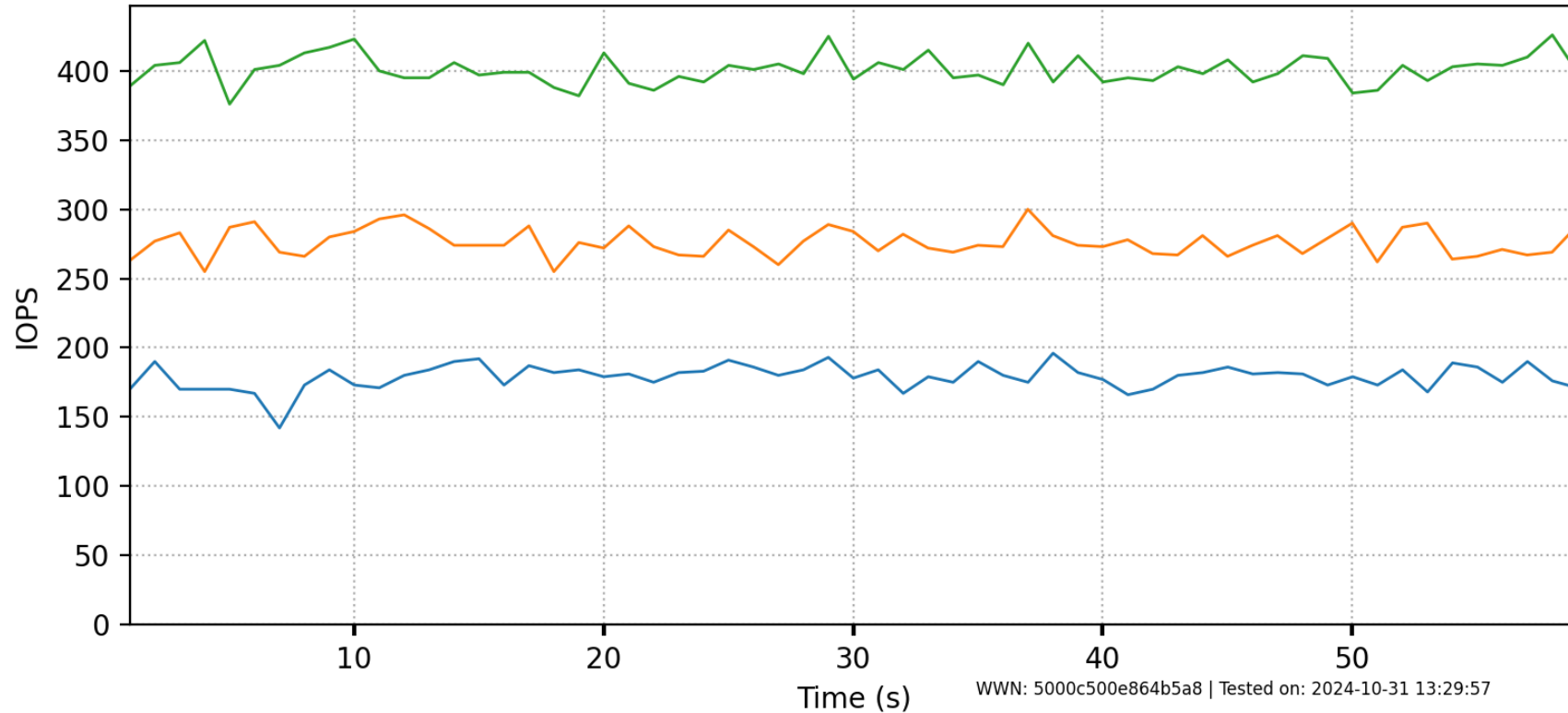
	name	rw	type	qd	nj	mean	std%	P99.99		name	rw	type	qd	nj	mean	std%	P99.99	
—	ST24000NM000C-3WD103_ZXA0G33K	read	bw	1	1	717	4.92	784		—	ST24000NM000C-3WD103_ZXA0G33K	read	bw	1	4	1603	3.15	1740
—	ST24000NM000C-3WD103_ZXA0G33K	read	bw	1	2	1101	3.66	1204										

Figure 11. randread-g-bw-n

2.12. randread-g-iops-d

HDD: ST24000NM000C-3WD103 | 24.0 TB | 7200 rpm

| rw randread | bs 4k | iodepth 1, 2, 4 | numjobs 1 | type iops | filter read, write |



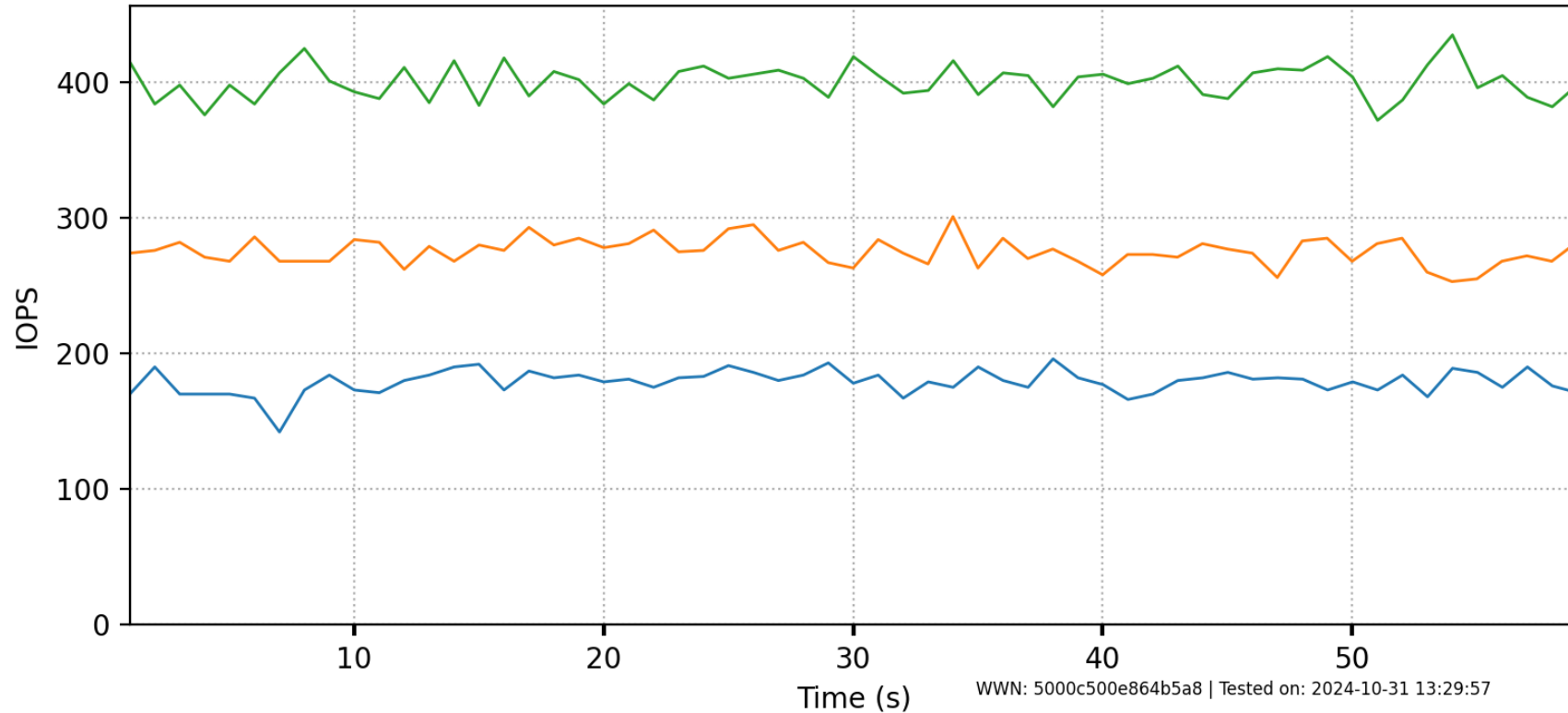
	name	rw	type	qd	nj	mean	std%	P99.99		name	rw	type	qd	nj	mean	std%	P99.99	
—	ST24000NM000C-3WD103_ZXA0G33K	read	iops	1	1	179	4.91	196		—	ST24000NM000C-3WD103_ZXA0G33K	read	iops	4	1	401	2.67	426
—	ST24000NM000C-3WD103_ZXA0G33K	read	iops	2	1	276	3.64	300										

Figure 12. randread-g-iops-d

2.13. randread-g-iops-n

HDD: ST24000NM000C-3WD103 | 24.0 TB | 7200 rpm

| rw randread | bs 4k | iodepth 1 | numjobs 1, 2, 4 | type iops | filter read, write |



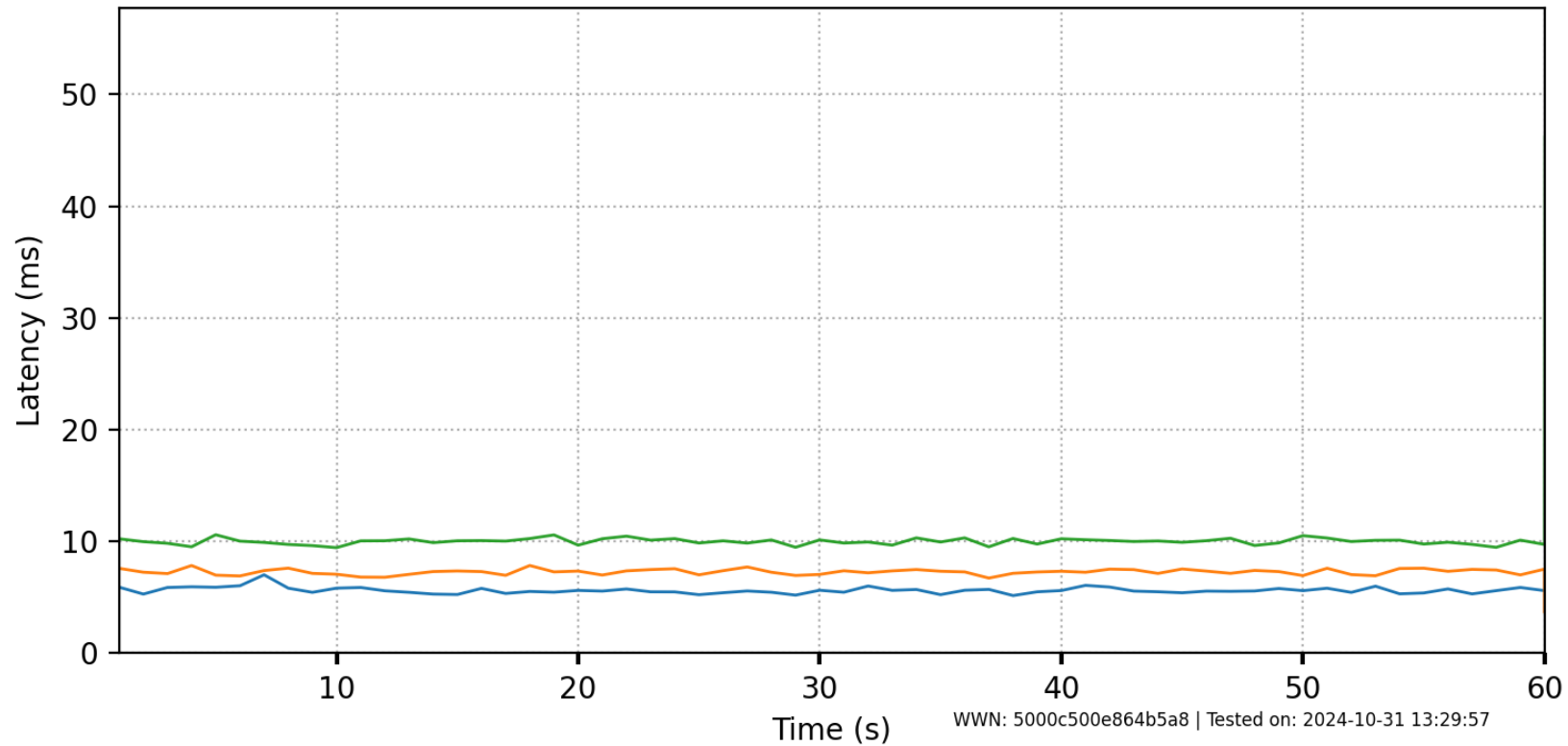
	name	rw	type	qd	nj	mean	std%	P99.99		name	rw	type	qd	nj	mean	std%	P99.99
—	ST24000NM000C-3WD103_ZXA0G33K	read	iops	1	1	179	4.91	196	—	ST24000NM000C-3WD103_ZXA0G33K	read	iops	1	4	400	3.18	435
—	ST24000NM000C-3WD103_ZXA0G33K	read	iops	1	2	275	3.65	301									

Figure 13. randread-g-iops-n

2.14. randread-g-lat-d

HDD: ST24000NM000C-3WD103 | 24.0 TB | 7200 rpm

| rw randread | bs 4k | iodepth 1, 2, 4 | numjobs 1 | type lat | filter read, write |



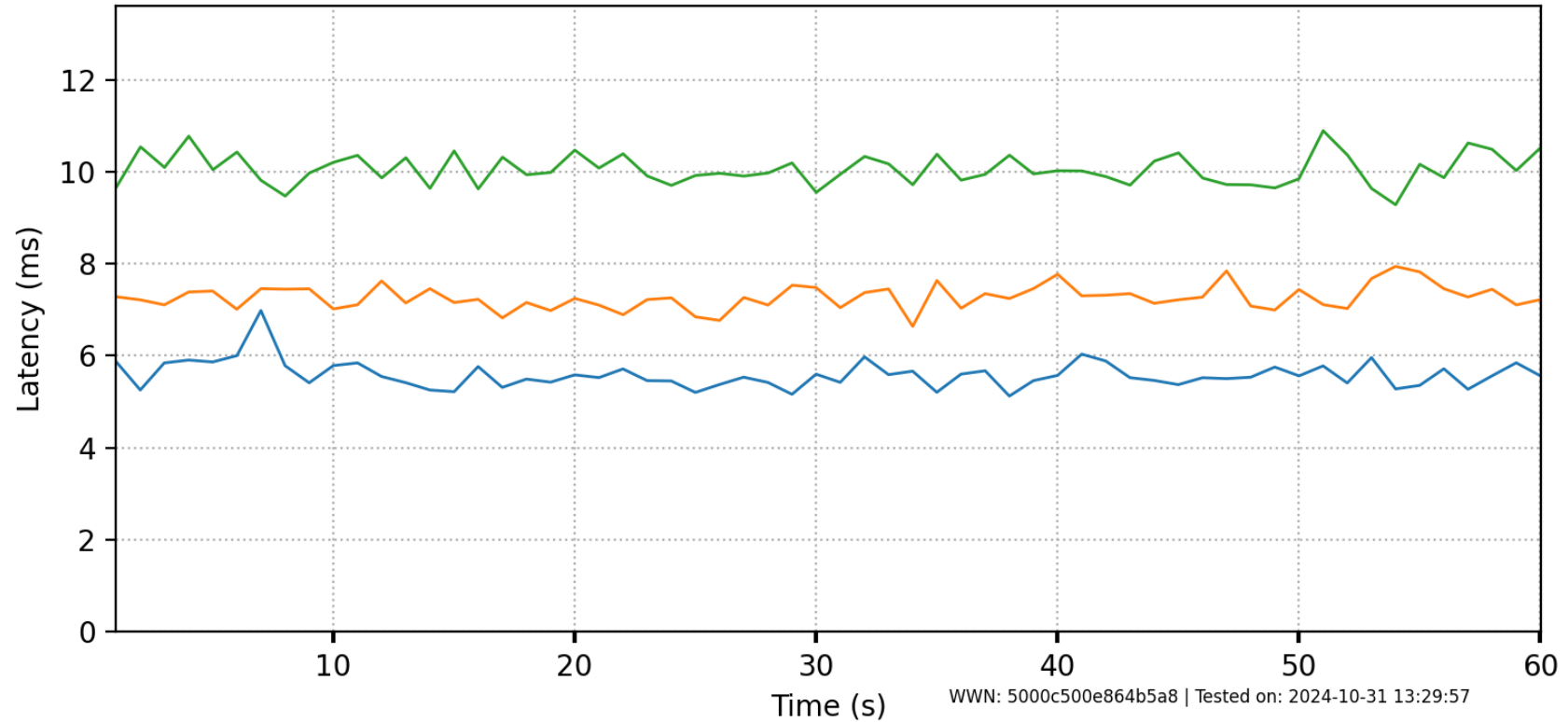
	name	rw	type	qd	nj	mean	std%	P99.99		name	rw	type	qd	nj	mean	std%	P99.99	
—	ST24000NM000C-3WD103_ZXA0G33K	read	lat	1	1	5.59	5.23	6.98		—	ST24000NM000C-3WD103_ZXA0G33K	read	lat	4	1	10.57	43.65	46
—	ST24000NM000C-3WD103_ZXA0G33K	read	lat	2	1	7.19	7.2	7.81										

Figure 14. randread-g-lat-d

2.15. randread-g-lat-n

HDD: ST24000NM000C-3WD103 | 24.0 TB | 7200 rpm

| rw randread | bs 4k | iodepth 1 | numjobs 1, 2, 4 | type lat | filter read, write |



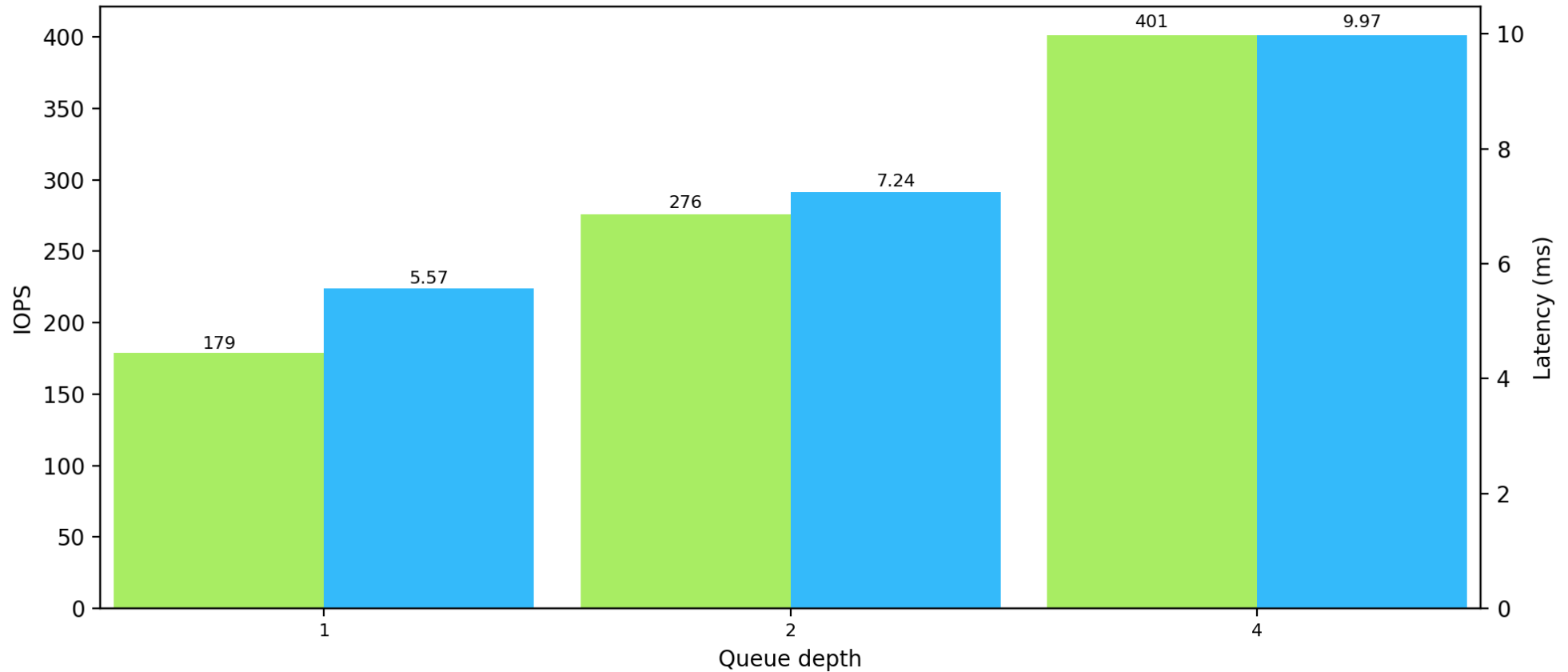
	name	rw	type	qd	nj	mean	std%	P99.99		name	rw	type	qd	nj	mean	std%	P99.99
—	ST24000NM000C-3WD103_ZXA0G33K	read	lat	1	1	5.59	5.23	6.98	—	ST24000NM000C-3WD103_ZXA0G33K	read	lat	1	4	10.06	3.31	10.9
—	ST24000NM000C-3WD103_ZXA0G33K	read	lat	1	2	7.27	3.61	7.94									

Figure 15. randread-g-lat-n

2.16. randread-l

HDD: ST24000NM000C-3WD103 | 24.0 TB | 7200 rpm

| rw randread | bs 4k | numjobs 1 |



Tested on: 2024-10-31 13:29:57 | SATA 3.3, 6.0 Gb/s (current: 6.0 Gb/s) | Firmware: SN02 | SN: ZXA0G33K | WWN: 5000c500e864b5a8

■ IOPS
■ Latency (ms)

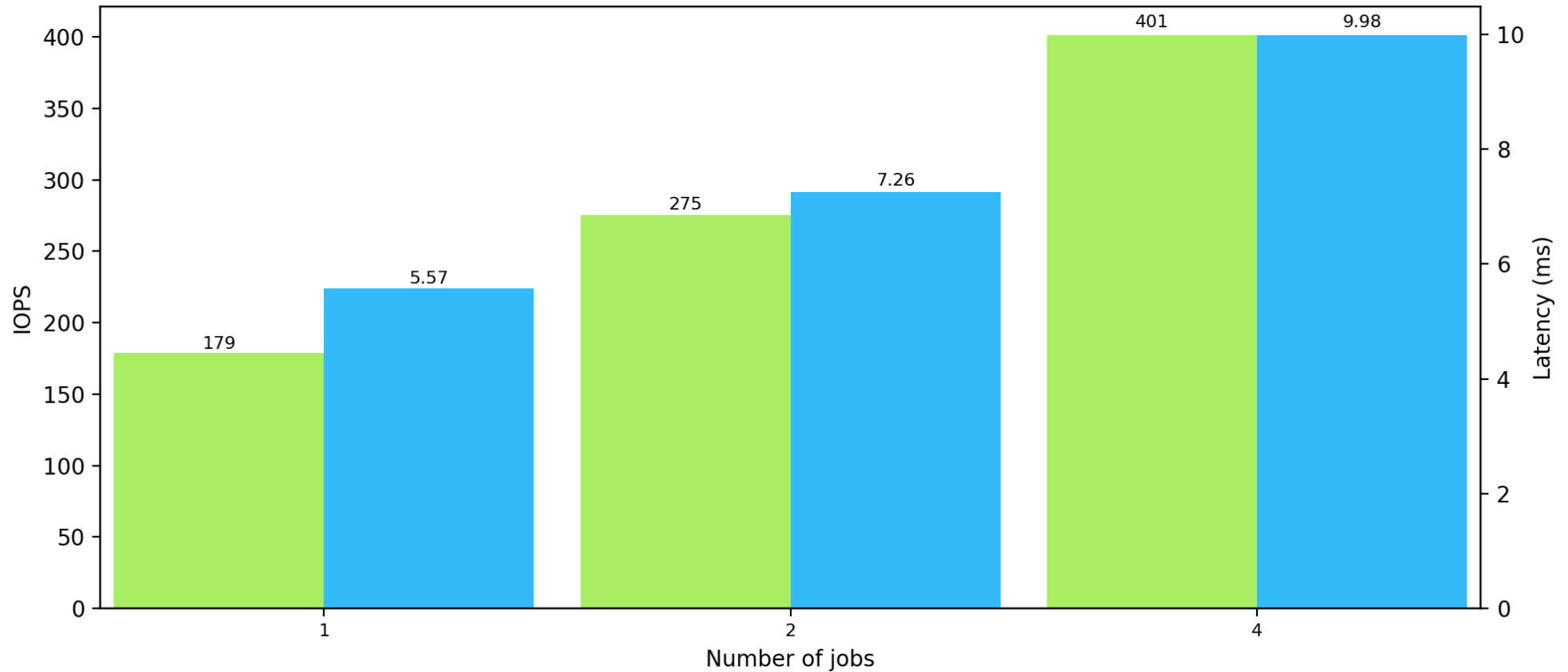
Queue depth	1	2	4
IOP/s σ %	4	4	2
Latency σ %	60	57	89

Figure 16. randread-l

2.17. randread-N

HDD: ST24000NM000C-3WD103 | 24.0 TB | 7200 rpm

| rw randread | bs 4k | iodepth 1 |



Tested on: 2024-10-31 13:29:57 | SATA 3.3, 6.0 Gb/s (current: 6.0 Gb/s) | Firmware: SN02 | SN: ZXA0G33K | WWN: 5000c500e864b5a8

■ IOPS
■ Latency (ms)

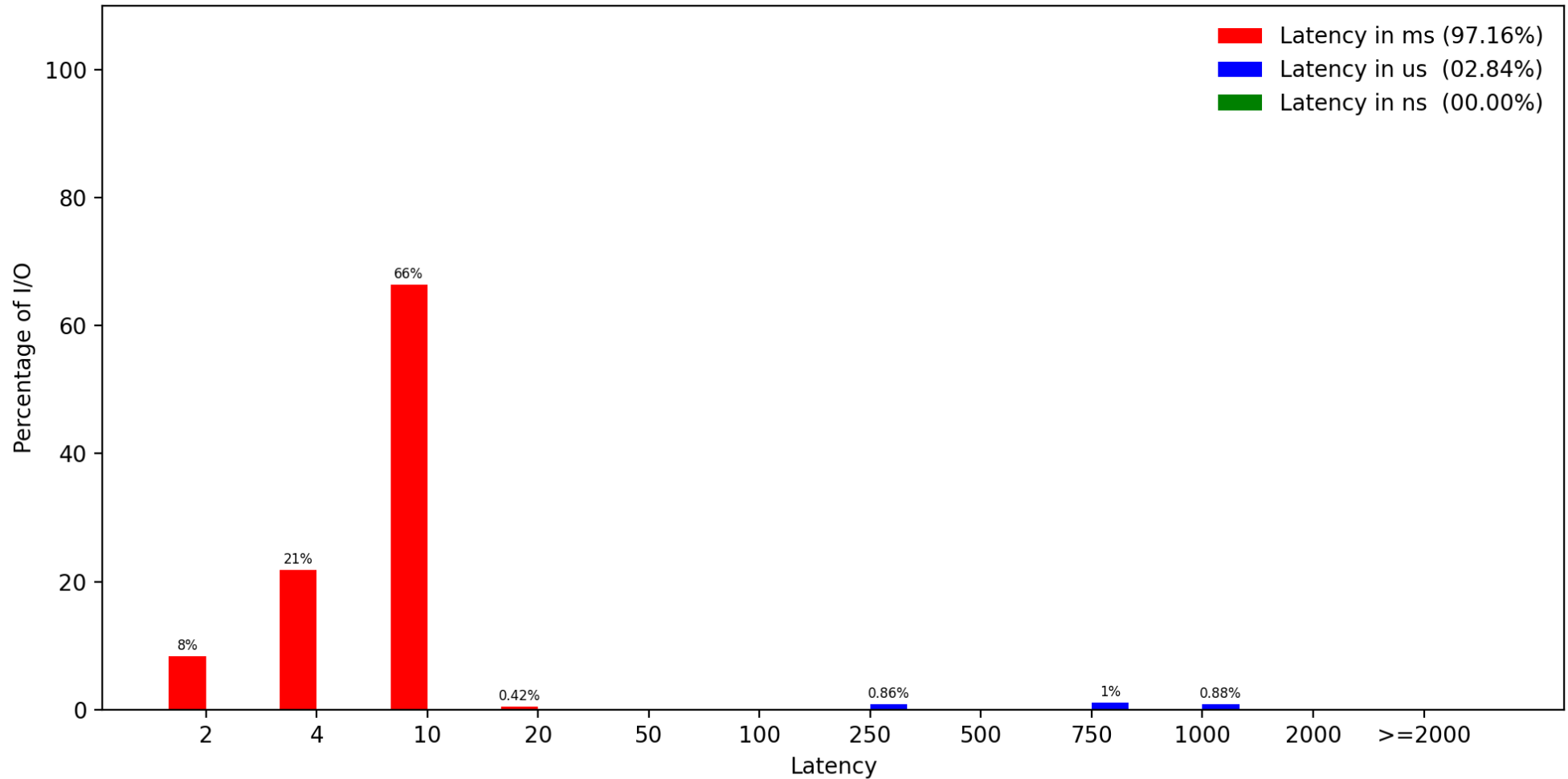
Number of jobs	1	2	4
IOP/s σ %	4	2	2
Latency σ %	60	57	89

Figure 17. randread-N

2.18. randread-H

HDD: ST24000NM000C-3WD103 | 24.0 TB | 7200 rpm

| rw randread | bs ['type', 'filter'] | iodepth 1, 2, 4 | numjobs 1, 2, 4 | filter read, write |



Tested on: 2024-10-31 13:29:57 | SATA 3.3, 6.0 Gb/s (current: 6.0 Gb/s) | Firmware: SN02 | SN: ZXA0G33K | WWN: 5000c500e864b5a8

Figure 18. randread-H

3. smartctl

smartctl controls the Self-Monitoring, Analysis and Reporting Technology (SMART) system built into most ATA/SATA and SCSI/SAS hard drives and solid-state drives.

The purpose of SMART is to monitor the reliability of the hard drive and predict drive failures, and to carry out different types of drive self-tests.

— smartctl - Control and Monitor Utility for SMART Disks, <https://www.smartmontools.org>

3.1. 'smartctl -T verypermissive -x /dev/sda'

```
smartctl 7.2 2020-12-30 r5155 [x86_64-linux-5.15.0-124-generic] (local build)
Copyright (C) 2002-20, Bruce Allen, Christian Franke, www.smartmontools.org

--- START OF INFORMATION SECTION ---
Device Model:      ST24000NM000C-3WD103
Serial Number:    ZXA0G33K
LU WWN Device Id: 5 000c50 0e864b5a8
Firmware Version: SN02
User Capacity:    24,000,277,250,048 bytes [24.0 TB]
Sector Sizes:    512 bytes logical, 4096 bytes physical
Rotation Rate:   7200 rpm
Form Factor:     3.5 inches
Device is:       Not in smartctl database [for details use: -P showall]
ATA Version is:  ACS-5 (minor revision not indicated)
SATA Version is: SATA 3.3, 6.0 Gb/s (current: 6.0 Gb/s)
Local Time is:   Thu Oct 31 13:55:11 2024 CET
SMART support is: Available - device has SMART capability.
SMART support is: Enabled
AAM feature is:  Unavailable
APM feature is:  Unavailable
Rd look-ahead is: Enabled
Write cache is:  Enabled
DSN feature is:  Disabled
ATA Security is: Disabled, NOT FROZEN [SEC1]
Write SCT (Get) Feature Control Command failed: scsi error badly formed scsi
parameters
Wt Cache Reorder: Unknown (SCT Feature Control command failed)

--- START OF READ SMART DATA SECTION ---
SMART overall-health self-assessment test result: PASSED

General SMART Values:
Offline data collection status: (0x82) Offline data collection activity
was completed without error.
```

Auto Offline Data Collection: Enabled.

Self-test execution status: (0) The previous self-test routine completed without error or no self-test has ever been run.

Total time to complete Offline data collection: (575) seconds.

Offline data collection capabilities: (0x7b) SMART execute Offline immediate. Auto Offline data collection on/off support. Suspend Offline collection upon new command. Offline surface scan supported. Self-test supported. Conveyance Self-test supported. Selective Self-test supported.

SMART capabilities: (0x0003) Saves SMART data before entering power-saving mode. Supports SMART auto save timer.

Error logging capability: (0x01) Error logging supported. General Purpose Logging supported.

Short self-test routine recommended polling time: (2) minutes.

Extended self-test routine recommended polling time: (2362) minutes.

Conveyance self-test routine recommended polling time: (3) minutes.

SCT capabilities: (0x50bd) SCT Status supported. SCT Error Recovery Control supported. SCT Feature Control supported. SCT Data Table supported.

SMART Attributes Data Structure revision number: 10

Vendor Specific SMART Attributes with Thresholds:

ID#	ATTRIBUTE_NAME	FLAGS	VALUE	WORST	THRESH	FAIL	RAW_VALUE
1	Raw_Read_Error_Rate	POSR--	080	074	044	-	101253600
3	Spin_Up_Time	PO----	096	096	000	-	0
4	Start_Stop_Count	-O--CK	100	100	020	-	4
5	Reallocated_Sector_Ct	PO--CK	100	100	010	-	0
7	Seek_Error_Rate	POSR--	062	060	045	-	1642496
9	Power_On_Hours	-O--CK	100	100	000	-	3
10	Spin_Retry_Count	PO--C-	100	100	097	-	0
12	Power_Cycle_Count	-O--CK	100	100	020	-	4
18	Unknown_Attribute	PO-R--	100	100	050	-	0
187	Reported_Uncorrect	-O--CK	100	100	000	-	0
188	Command_Timeout	-O--CK	100	100	000	-	0
190	Airflow_Temperature_Cel	-O---K	065	047	000	-	35 (Min/Max 26/35)
192	Power-Off_Retract_Count	-O--CK	100	100	000	-	4
193	Load_Cycle_Count	-O--CK	100	100	000	-	4
194	Temperature_Celsius	-O---K	035	053	000	-	35 (0 26 0 0 0)
197	Current_Pending_Sector	-O--C-	100	100	000	-	0
198	Offline_Uncorrectable	----C-	100	100	000	-	0

```

199 UDMA_CRC_Error_Count -OSRCK 200 200 000 - 0
200 Multi_Zone_Error_Rate PO---K 100 100 001 - 0
240 Head_Flying_Hours ----- 100 100 000 - 3 (109 123 0)
241 Total_LBAs_Written ----- 100 253 000 - 42197470
242 Total_LBAs_Read ----- 100 253 000 - 4468286289

```

```

|||||_ K auto-keep
|||||__ C event count
|||___ R error rate
||____ S speed/performance
||_____ O updated online
|_____ P prefailure warning

```

General Purpose Log Directory Version 1

SMART Log Directory Version 1 [multi-sector log support]

Address	Access	R/W	Size	Description
0x00	GPL,SL	R/O	1	Log Directory
0x01	SL	R/O	1	Summary SMART error log
0x02	SL	R/O	5	Comprehensive SMART error log
0x03	GPL	R/O	5	Ext. Comprehensive SMART error log
0x04	GPL	R/O	256	Device Statistics log
0x04	SL	R/O	8	Device Statistics log
0x06	SL	R/O	1	SMART self-test log
0x07	GPL	R/O	1	Extended self-test log
0x08	GPL	R/O	2	Power Conditions log
0x09	SL	R/W	1	Selective self-test log
0x0a	GPL	R/W	8	Device Statistics Notification
0x0c	GPL	R/O	2048	Pending Defects log
0x0f	GPL	R/O	2	Sense Data for Successful NCQ Cmds log
0x10	GPL	R/O	1	NCQ Command Error log
0x11	GPL	R/O	1	SATA Phy Event Counters log
0x13	GPL	R/O	1	SATA NCQ Send and Receive log
0x21	GPL	R/O	1	Write stream error log
0x22	GPL	R/O	1	Read stream error log
0x24	GPL	R/O	768	Current Device Internal Status Data log
0x2f	GPL	-	1	Set Sector Configuration
0x30	GPL,SL	R/O	9	IDENTIFY DEVICE data log
0x80-0x9f	GPL,SL	R/W	16	Host vendor specific log
0xa1	GPL,SL	VS	160	Device vendor specific log
0xa2	GPL	VS	16320	Device vendor specific log
0xa4	GPL,SL	VS	160	Device vendor specific log
0xa6	GPL	VS	192	Device vendor specific log
0xa8-0xa9	GPL,SL	VS	136	Device vendor specific log
0xab	GPL	VS	1	Device vendor specific log
0xad	GPL	VS	16	Device vendor specific log
0xb1	GPL,SL	VS	160	Device vendor specific log
0xb4	GPL,SL	VS	16	Device vendor specific log
0xb6	GPL	VS	1920	Device vendor specific log
0xbc	GPL	VS	1	Device vendor specific log
0xbe-0xbf	GPL	VS	65535	Device vendor specific log
0xc1	GPL,SL	VS	8	Device vendor specific log
0xc3	GPL,SL	VS	96	Device vendor specific log

```

0xc6    GPL    VS    5184 Device vendor specific log
0xc7    GPL,SL VS     8 Device vendor specific log
0xc9    GPL,SL VS     8 Device vendor specific log
0xca    GPL,SL VS    16 Device vendor specific log
0xcd    GPL,SL VS     1 Device vendor specific log
0xce    GPL    VS     1 Device vendor specific log
0xcf    GPL    VS    512 Device vendor specific log
0xd1    GPL    VS    360 Device vendor specific log
0xd2    GPL    VS  10256 Device vendor specific log
0xd4    GPL    VS   2048 Device vendor specific log
0xda    GPL,SL VS     1 Device vendor specific log
0xe0    GPL,SL R/W    1 SCT Command/Status
0xe1    GPL,SL R/W    1 SCT Data Transfer

```

SMART Extended Comprehensive Error Log Version: 1 (5 sectors)
No Errors Logged

SMART Extended Self-test Log Version: 1 (1 sectors)

Num	Test_Description	Status	Remaining	LifeTime(hours)	
	LBA_of_first_error				
# 1	Conveyance offline	Completed without error	00%	3	-
# 2	Short offline	Completed without error	00%	3	-
# 3	Short offline	Completed without error	00%	0	-

SMART Selective self-test log data structure revision number 1

SPAN	MIN_LBA	MAX_LBA	CURRENT_TEST_STATUS
1	0	0	Not_testing
2	0	0	Not_testing
3	0	0	Not_testing
4	0	0	Not_testing
5	0	0	Not_testing

Selective self-test flags (0x0):

After scanning selected spans, do NOT read-scan remainder of disk.
If Selective self-test is pending on power-up, resume after 0 minute delay.

```

SCT Status Version:          3
SCT Version (vendor specific): 522 (0x020a)
Device State:                Active (0)
Current Temperature:         35 Celsius
Power Cycle Min/Max Temperature: 26/35 Celsius
Lifetime Min/Max Temperature: 26/53 Celsius
Specified Max Operating Temperature: 60 Celsius
Under/Over Temperature Limit Count: 0/0
SMART Status:                0xc24f (PASSED)
Vendor specific:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 02 00 00 00 00 00 00 00 00 00 00

```

```

SCT Temperature History Version: 2
Temperature Sampling Period:     1 minute
Temperature Logging Interval:    59 minutes

```

```

Min/Max recommended Temperature:    10/40 Celsius
Min/Max Temperature Limit:          10/60 Celsius
Temperature History Size (Index):    128 (11)

```

```

Index    Estimated Time    Temperature Celsius
  12    2024-10-26 09:20    ? -
  ...    ..(114 skipped).    .. -
 127    2024-10-31 01:25    ? -
   0    2024-10-31 02:24    33 *****
   1    2024-10-31 03:23    ? -
   2    2024-10-31 04:22    33 *****
   3    2024-10-31 05:21    ? -
   4    2024-10-31 06:20    33 *****
   5    2024-10-31 07:19    ? -
   6    2024-10-31 08:18    31 *****
   7    2024-10-31 09:17    51 *****
   8    2024-10-31 10:16    52 *****
   9    2024-10-31 11:15    53 *****
  10    2024-10-31 12:14    ? -
  11    2024-10-31 13:13    26 *****

```

SCT Error Recovery Control:

```

      Read:    70 (7.0 seconds)
      Write:   70 (7.0 seconds)

```

Device Statistics (GP Log 0x04)

```

Page  Offset Size      Value Flags Description
0x01  ----= =          = --- == General Statistics (rev 1) ==
0x01  0x008 4           4 --- Lifetime Power-On Resets
0x01  0x010 4           3 --- Power-on Hours
0x01  0x018 6       42197470 --- Logical Sectors Written
0x01  0x020 6        54985 --- Number of Write Commands
0x01  0x028 6    4468286289 --- Logical Sectors Read
0x01  0x030 6    23622486 --- Number of Read Commands
0x01  0x038 6           - --- Date and Time TimeStamp
0x03  ----= =          = --- == Rotating Media Statistics (rev 1) ==
0x03  0x008 4           3 --- Spindle Motor Power-on Hours
0x03  0x010 4           3 --- Head Flying Hours
0x03  0x018 4           4 --- Head Load Events
0x03  0x020 4           0 --- Number of Reallocated Logical Sectors
0x03  0x028 4           0 --- Read Recovery Attempts
0x03  0x030 4           0 --- Number of Mechanical Start Failures
0x03  0x038 4           0 --- Number of Realloc. Candidate Logical Sectors
0x03  0x040 4           4 --- Number of High Priority Unload Events
0x04  ----= =          = --- == General Errors Statistics (rev 1) ==
0x04  0x008 4           0 --- Number of Reported Uncorrectable Errors
0x04  0x010 4           0 --- Resets Between Cmd Acceptance and Completion
0x04  0x018 4           0 -D- Physical Element Status Changed
0x05  ----= =          = --- == Temperature Statistics (rev 1) ==
0x05  0x008 1          35 --- Current Temperature
0x05  0x010 1           - --- Average Short Term Temperature

```

```

0x05 0x018 1 - --- Average Long Term Temperature
0x05 0x020 1 53 --- Highest Temperature
0x05 0x028 1 27 --- Lowest Temperature
0x05 0x030 1 - --- Highest Average Short Term Temperature
0x05 0x038 1 - --- Lowest Average Short Term Temperature
0x05 0x040 1 - --- Highest Average Long Term Temperature
0x05 0x048 1 - --- Lowest Average Long Term Temperature
0x05 0x050 4 0 --- Time in Over-Temperature
0x05 0x058 1 60 --- Specified Maximum Operating Temperature
0x05 0x060 4 0 --- Time in Under-Temperature
0x05 0x068 1 10 --- Specified Minimum Operating Temperature
0x06 ----= = = --- == Transport Statistics (rev 1) ==
0x06 0x008 4 0 --- Number of Hardware Resets
0x06 0x010 4 1 --- Number of ASR Events
0x06 0x018 4 0 --- Number of Interface CRC Errors
0xff ----= = = --- == Vendor Specific Statistics (rev 1) ==
0xff 0x008 7 0 --- Vendor Specific
0xff 0x010 7 0 --- Vendor Specific
0xff 0x018 7 0 --- Vendor Specific
|||_ C monitored condition met
||__ D supports DSN
|___ N normalized value

```

Pending Defects log (GP Log 0x0c)

No Defects Logged

SATA Phy Event Counters (GP Log 0x11)

ID	Size	Value	Description
0x000a	2	2	Device-to-host register FISes sent due to a COMRESET
0x0001	2	0	Command failed due to ICRC error
0x0003	2	0	R_ERR response for device-to-host data FIS
0x0004	2	0	R_ERR response for host-to-device data FIS
0x0006	2	0	R_ERR response for device-to-host non-data FIS
0x0007	2	0	R_ERR response for host-to-device non-data FIS
0x000b	2	0	CRC errors within host-to-device FIS
0x000d	2	0	Non-CRC errors within host-to-device FIS

3.2. 'smartctl -T verypermissive --identify=wb /dev/sda'

```

smartctl 7.2 2020-12-30 r5155 [x86_64-linux-5.15.0-124-generic] (local build)
Copyright (C) 2002-20, Bruce Allen, Christian Franke, www.smartmontools.org

```

```

--- ATA IDENTIFY DATA ---

```

Word	Bit	Value	Description
0	-	0x0c5a	General configuration
0	15	0	Device identifier: 0 = ATA, 1 = ATAPI
0	14:8	0x0c	Vendor specific [RET-3]
0	7	0	Removable media device [OBS-8]

0	6	1	Not removable controller and/or device [OBS-6]
0	5:3	0x3	Vendor specific [RET-3]
0	2	0	Response incomplete
0	1	1	Vendor specific [RET-3]
0	0	0	Reserved
1	-	0x3fff	Cylinders [OBS-6]
2	-	0xc837	Specific configuration (0x37c8/738c/8c73/c837)
3	-	0x0010	Heads [OBS-6]
4	-	0x0000	Vendor specific [RET-3]
5	-	0x0000	Vendor specific [RET-3]
6	-	0x003f	Sectors per track [OBS-6]
7-8	-	0x00...	Reserved for CFA (Sectors per card)
9	-	0x0000	Vendor specific [RET-4]
10-19	-	.	Serial number (String)
10-13	.	0x2020:2020:2020:2020	" "
14-17	.	0x2020:2020:5a58:4130	" ZXA0"
18-19	.	0x4733:334b	"G33K"
20	-	0x0000	Vendor specific [RET-3]
21	-	0x0000	Vendor specific [RET-3]
22	-	0x0000	Vendor specific bytes on READ/WRITE LONG [OBS-4]
23-26	-	.	Firmware revision (String)
23-26	.	0x534e:3032:2020:2020	"SN02 "
27-46	-	.	Model number (String)
27-30	.	0x5354:3234:3030:304e	"ST24000N"
31-34	.	0x4d30:3030:432d:3357	"M000C-3W"
35-38	.	0x4431:3033:2020:2020	"D103 "
39-42	.	0x2020:2020:2020:2020	" "
43-46	.	0x2020:2020:2020:2020	" "
47	-	0x8010	READ/WRITE MULTIPLE support
47	15:8	0x80	Must be set to 0x80
47	7:0	0x10	Maximum sectors per DRQ on READ/WRITE MULTIPLE
48	-	0x4000	Trusted Computing feature set options
48	15:14	0x1	Must be set to 0x1
48	13:1	0x0000	Reserved for the Trusted Computing Group
48	0	0	Trusted Computing feature set supported

49	-	0x2f00	Capabilities
49	15:14	0x0	Reserved for IDENTIFY PACKET DEVICE
49	13	1	Standard standby timer values supported
49	12	0	Reserved for IDENTIFY PACKET DEVICE
49	11	1	IORDY supported
49	10	1	IORDY may be disabled
49	9	1	LBA supported
49	8	1	DMA supported
49	7:2	0x00	Reserved
49	1:0	0x0	Long Phy Sector Alignment Error reporting
50	-	0x4000	Capabilities
50	15:14	0x1	Must be set to 0x1
50	13:2	0x000	Reserved
50	1	0	Reserved [OBS-6]
50	0	0	Vendor specific minimum standby timer value
51	-	0x0200	PIO data transfer mode [OBS-5]
52	-	0x0200	Single Word DMA data transfer mode [OBS-3]
53	-	0x0007	Field validity / Free-fall Control
53	15:8	0x00	Free-fall Control sensitivity
53	7:3	0x00	Reserved
53	2	1	Word 88 (Ultra DMA modes) is valid
53	1	1	Words 64-70 (PIO modes) are valid
53	0	1	Words 54-58 (CHS) are valid [OBS-6]
54	-	0x3fff	Current cylinders [OBS-6]
55	-	0x0010	Current heads [OBS-6]
56	-	0x003f	Current sectors per track [OBS-6]
57-58	-	.	Current capacity in sectors (DWord) [OBS-6]
57-58	.	0xfc10:00fb	(16514064)
59	-	0x5d10	Sanitize Device - READ/WRITE MULTIPLE support
59	15	0	BLOCK ERASE EXT supported
59	14	1	OVERWRITE EXT supported
59	13	0	CRYPTO SCRAMBLE EXT supported
59	12	1	Sanitize Device feature set supported
59	11	1	Cmds during sanitize as specified by this standard
59	10	1	SANITIZE ANTIFREEZE LOCK EXT supported
59	9	0	Reserved
59	8	1	Bits 7:0 are valid [OBS-ACS-4]
59	7:0	0x10	Current number of sectors per DRQ [OBS-ACS-4]
60-61	-	.	User addressable sectors for 28-bit commands (DWord)
60-61	.	0xffff:0fff	(268435455)

62	-	0x0000	Single Word DMA modes [OBS-3]
63	-	0x0007	Multiword DMA modes
63	15:11	0x00	Reserved
63	10	0	Multiword DMA mode 2 selected
63	9	0	Multiword DMA mode 1 selected
63	8	0	Multiword DMA mode 0 selected
63	7:3	0x00	Reserved
63	2	1	Multiword DMA mode 2 and below supported
63	1	1	Multiword DMA mode 1 and below supported
63	0	1	Multiword DMA mode 0 supported
64	-	0x0003	PIO modes
64	15:2	0x0000	Reserved
64	1	1	PIO mode 4 supported
64	0	1	PIO mode 3 supported
65	-	0x0078	Minimum Multiword DMA cycle time per word in ns
66	-	0x0078	Recommended Multiword DMA cycle time in ns
67	-	0x0078	Minimum PIO cycle time without flow control in ns
68	-	0x0078	Minimum PIO cycle time with IORDY flow control in ns
69	-	0x000c	Additional support
69	15	0	CFast specification supported
69	14	0	Deterministic data after trim supported
69	13	0	LPS Alignment Error Reporting Control supported
69	12	0	DCO IDENTIFY/SET DMA supported [OBS-ACS-3]
69	11	0	READ BUFFER DMA supported
69	10	0	WRITE BUFFER DMA supported
69	9	0	SET MAX SET PASSWORD/UNLOCK DMA supported [OBS-ACS-3]
69	8	0	DOWNLOAD MICROCODE DMA supported
69	7	0	Reserved for IEEE 1667
69	6	0	Optional ATA device 28-bit commands supported
69	5	0	Trimmed LBA range(s) returning zeroed data supported
69	4	0	Device encrypts all user data
69	3	1	Extended number of user addressable sectors supported
69	2	1	ALL write cache is non-volatile
69	1:0	0x0	Zoned Capabilities
70	-	0x0000	Reserved
71-74	-	0x00...	Reserved for IDENTIFY PACKET DEVICE
75	-	0x001f	Queue depth
75	15:5	0x000	Reserved
75	4:0	0x1f	Maximum queue depth - 1

76	-	0x9d0e	Serial ATA capabilities
76	15	1	READ LOG DMA EXT as equiv to READ LOG EXT supported
76	14	0	Device Auto Partial to Slumber transitions supported
76	13	0	Host Auto Partial to Slumber transitions supported
76	12	1	NCQ priority information supported
76	11	1	Unload while NCQ commands are outstanding supported
76	10	1	Phy Event Counters supported
76	9	0	Receipt of host initiated PM requests supported
76	8	1	NCQ feature set supported
76	7:4	0x0	Reserved for Serial ATA
76	3	1	SATA Gen3 signaling speed (6.0 Gb/s) supported
76	2	1	SATA Gen2 signaling speed (3.0 Gb/s) supported
76	1	1	SATA Gen1 signaling speed (1.5 Gb/s) supported
76	0	0	Must be set to 0
77	-	0x0046	Serial ATA additional capabilities
77	15:9	0x00	Reserved for Serial ATA
77	8	0	Power Disable feature always enabled
77	7	0	DevSleep to ReducedPwrState supported
77	6	1	RECEIVE/SEND FPDMA QUEUED supported
77	5	0	NCQ Queue Management supported
77	4	0	NCQ Streaming supported
77	3:1	0x3	Current Serial ATA signal speed
77	0	0	Must be set to 0
78	-	0x00cc	Serial ATA features supported
78	15:13	0x0	Reserved for Serial ATA
78	12	0	Power Disable feature supported
78	11	0	Rebuild Assist feature set supported
78	10	0	Reserved for Serial ATA
78	9	0	Hybrid Information supported
78	8	0	Device Sleep feature supported
78	7	1	NCQ Autosense supported
78	6	1	Software Settings Preservation supported
78	5	0	Hardware Feature Control supported
78	4	0	In-order data delivery supported
78	3	1	Device initiated power management supported
78	2	1	DMA Setup auto-activation supported
78	1	0	Non-zero buffer offsets supported
78	0	0	Must be set to 0
79	-	0x0044	Serial ATA features enabled
79	15:12	0x0	Reserved for Serial ATA
79	11	0	Rebuild Assist feature set enabled
79	10	0	Power Disable feature enabled
79	9	0	Hybrid Information enabled
79	8	0	Device Sleep feature enabled
79	7	0	Automatic Partial to Slumber transitions enabled
79	6	1	Software Settings Preservation enabled
79	5	0	Hardware Feature Control enabled
79	4	0	In-order data delivery enabled

79	3	0	Device initiated power management enabled
79	2	1	DMA Setup auto-activation enabled
79	1	0	Non-zero buffer offsets enabled
79	0	0	Must be set to 0
80	-	0x1fe0	Major version number
80	15:12	0x1	Reserved
80	11	1	ACS-4 supported
80	10	1	ACS-3 supported
80	9	1	ACS-2 supported
80	8	1	ATA8-ACS supported
80	7	1	ATA/ATAPI-7 supported [OBS-ACS-4]
80	6	1	ATA/ATAPI-6 supported [OBS-ACS-4]
80	5	1	ATA/ATAPI-5 supported [OBS-ACS-4]
80	4	0	ATA/ATAPI-4 supported [OBS-8]
80	3	0	ATA-3 supported [OBS-7]
80	2	0	ATA-2 supported [OBS-6]
80	1	0	ATA-1 supported [OBS-5]
80	0	0	Reserved
81	-	0xffff	Minor version number
82	-	0x306b	Commands and feature sets supported
82	15	0	IDENTIFY DEVICE DMA supported [OBS-4]
82	14	0	NOP supported
82	13	1	READ BUFFER supported
82	12	1	WRITE BUFFER supported
82	11	0	WRITE VERIFY supported [OBS-4]
82	10	0	HPA feature set supported [OBS-ACS-3]
82	9	0	DEVICE RESET supported
82	8	0	SERVICE interrupt supported [OBS-ACS-2]
82	7	0	Release interrupt supported [OBS-ACS-2]
82	6	1	Read look-ahead supported
82	5	1	Volatile write cache supported
82	4	0	PACKET feature set supported
82	3	1	Power Management feature set supported
82	2	0	Removable Media feature set supported [OBS-8]
82	1	1	Security feature set supported
82	0	1	SMART feature set supported
83	-	0x7561	Commands and feature sets supported
83	15:14	0x1	Must be set to 0x1
83	13	1	FLUSH CACHE EXT supported
83	12	1	FLUSH CACHE supported
83	11	0	DCO feature set supported [OBS-ACS-3]
83	10	1	48-bit Address feature set supported
83	9	0	AAM feature set supported [OBS-ACS-2]
83	8	1	SET MAX security extension supported [OBS-ACS-3]
83	7	0	Reserved for Addr Offset Resvd Area Boot [OBS-ACS-3]
83	6	1	SET FEATURES subcommand required to spin-up
83	5	1	PUIS feature set supported

83	4	0	Removable Media Status Notification supported [OBS-8]
83	3	0	APM feature set supported
83	2	0	CFA feature set supported
83	1	0	TCQ feature set supported [OBS-ACS-2]
83	0	1	DOWNLOAD MICROCODE supported
84	-	0x6173	Commands and feature sets supported
84	15:14	0x1	Must be set to 0x1
84	13	1	IDLE IMMEDIATE with UNLOAD feature supported
84	12:11	0x0	Reserved for TLC [OBS-ACS-3]
84	10	0	URG bit for WRITE STREAM (DMA) EXT supported [OBS-8]
84	9	0	URG bit for READ STREAM (DMA) EXT supported [OBS-8]
84	8	1	64-bit World Wide Name supported
84	7	0	WRITE DMA QUEUED FUA EXT supported [OBS-ACS-2]
84	6	1	WRITE DMA/MULTIPLE FUA EXT supported
84	5	1	GPL feature set supported
84	4	1	Streaming feature set supported
84	3	0	Media Card Pass Through Command supported [OBS-ACS-2]
84	2	0	Media serial number supported [RES-ACS-3]
84	1	1	SMART self-test supported
84	0	1	SMART error logging supported
85	-	0x3069	Commands and feature sets supported or enabled
85	15	0	IDENTIFY DEVICE DMA supported [OBS-4]
85	14	0	NOP supported
85	13	1	READ BUFFER supported
85	12	1	WRITE BUFFER supported
85	11	0	WRITE VERIFY supported [OBS-4]
85	10	0	HPA feature set supported [OBS-ACS-3]
85	9	0	DEVICE RESET supported
85	8	0	SERVICE interrupt enabled [OBS-ACS-2]
85	7	0	Release interrupt enabled [OBS-ACS-2]
85	6	1	Read look-ahead enabled
85	5	1	Write cache enabled
85	4	0	PACKET feature set supported
85	3	1	Power Management feature set supported
85	2	0	Removable Media feature set supported [OBS-8]
85	1	0	Security feature set enabled
85	0	1	SMART feature set enabled
86	-	0xb441	Commands and feature sets supported or enabled
86	15	1	Words 119-120 are valid
86	14	0	Reserved
86	13	1	FLUSH CACHE EXT supported
86	12	1	FLUSH CACHE supported
86	11	0	DCO feature set supported [OBS-ACS-3]
86	10	1	48-bit Address features set supported
86	9	0	AAM feature set enabled [OBS-ACS-2]
86	8	0	SET MAX security extension enabled [OBS-ACS-3]
86	7	0	Reserved for Addr Offset Resvd Area Boot [OBS-ACS-3]
86	6	1	SET FEATURES subcommand required to spin-up

86	5	0	PUIS feature set enabled
86	4	0	Removable Media Status Notification enabled [OBS-8]
86	3	0	APM feature set enabled
86	2	0	CFA feature set supported
86	1	0	TCQ feature set supported [OBS-ACS-2]
86	0	1	DOWNLOAD MICROCODE supported
87	-	0x6173	Commands and feature sets supported or enabled
87	15:14	0x1	Must be set to 0x1
87	13	1	IDLE IMMEDIATE with UNLOAD FEATURE supported
87	12:11	0x0	Reserved for TLC [OBS-ACS-3]
87	10	0	URG bit for WRITE STREAM (DMA) EXT supported [OBS-8]
87	9	0	URG bit for READ STREAM (DMA) EXT supported [OBS-8]
87	8	1	64-bit World Wide Name supported
87	7	0	WRITE DMA QUEUED FUA EXT supported [OBS-ACS-2]
87	6	1	WRITE DMA/MULTIPLE FUA EXT supported
87	5	1	GPL feature set supported
87	4	1	Valid CONFIGURE STREAM has been executed [OBS-8]
87	3	0	Media Card Pass Through Command supported [OBS-ACS-2]
87	2	0	Media serial number is valid
87	1	1	SMART self-test supported
87	0	1	SMART error logging supported
88	-	0x407f	Ultra DMA modes
88	15	0	Reserved
88	14	1	Ultra DMA mode 6 selected
88	13	0	Ultra DMA mode 5 selected
88	12	0	Ultra DMA mode 4 selected
88	11	0	Ultra DMA mode 3 selected
88	10	0	Ultra DMA mode 2 selected
88	9	0	Ultra DMA mode 1 selected
88	8	0	Ultra DMA mode 0 selected
88	7	0	Reserved
88	6	1	Ultra DMA mode 6 and below supported
88	5	1	Ultra DMA mode 5 and below supported
88	4	1	Ultra DMA mode 4 and below supported
88	3	1	Ultra DMA mode 3 and below supported
88	2	1	Ultra DMA mode 2 and below supported
88	1	1	Ultra DMA mode 1 and below supported
88	0	1	Ultra DMA mode 0 supported
89	-	0x841f	SECURITY ERASE UNIT time
89	15	1	Bits 14:8 of value are valid
89	14:0	0x041f	SECURITY ERASE UNIT time value
90	-	0x841f	ENHANCED SECURITY ERASE UNIT time
90	15	1	Bits 14:8 of value are valid
90	14:0	0x041f	ENHANCED SECURITY ERASE UNIT time value
91	-	0x0000	Current APM level
91	15:8	0x00	Reserved

91	7:0	0x00	Current APM level value
92	-	0xffff	Master Password Identifier
93	-	0x0000	Hardware reset result (PATA)
93	15:14	0x0	Must be set to 0x1
93	13	0	Device detected CBLID- above(1)/below(0) ViHB
93	12	0	Reserved
93	11	0	Device 1 asserted PDIAG-
93	10:9	0x0	Device 1 detection method: -, Jumper, CSEL, other
93	8	0	Must be set to 1
93	7	0	Reserved
93	6	0	Device 0 responds when device 1 selected
93	5	0	Device 0 detected the assertion of DASP-
93	4	0	Device 0 detected the assertion of PDIAG-
93	3	0	Device 0 passed diagnostics
93	2:1	0x0	Device 0 detection method: -, Jumper, CSEL, other
93	0	0	Must be set to 1
94	-	0xfe00	AAM level [OBS-ACS-2]
94	15:8	0xfe	Recommended AAM level [OBS-ACS-2]
94	7:0	0x00	Current AAM level [OBS-ACS-2]
95	-	0x1000	Stream Minimum Request Size
96	-	0x0000	Streaming Transfer Time - DMA
97	-	0x0000	Streaming Access Latency - DMA and PIO
98-99	-	.	Streaming Performance Granularity (DWord)
98-99	.	0x2710:0000	(10000)
100-103	-	.	User addressable sectors for 48-bit commands (QWord)
100-103	.	0x0000:ea00:000a:0000	(46875541504)
104	-	0x0000	Streaming Transfer Time - PIO
105	-	0x0000	Max blocks of LBA Range Entries per DS MANAGEMENT cmd
106	-	0x6003	Physical sector size / logical sector size
106	15:14	0x1	Must be set to 0x1
106	13	1	Multiple logical sectors per physical sector
106	12	0	Logical Sector longer than 256 words
106	11:4	0x00	Reserved
106	3:0	0x3	2^X logical sectors per physical sector
107	-	0x0000	Inter-seek delay for ISO 7779 acoustic testing
108-111	-	.	World Wide Name
108-111	.	0x5000:c500:e864:b5a8	

112-115	-	0x00...	Reserved
116	-	0x0000	Reserved for TLC [OBS-ACS-3]
117-118	-	0x00...	Logical sector size (DWord)
119	-	0x47de	Commands and feature sets supported
119	15:14	0x1	Must be set to 0x1
119	13:10	0x1	Reserved
119	9	1	DSN feature set supported
119	8	1	Accessible Max Address Config feature set supported
119	7	1	Extended Power Conditions feature set supported
119	6	1	Sense Data Reporting feature set supported
119	5	0	Free-fall Control feature set supported
119	4	1	DOWNLOAD MICROCODE with mode 3 supported
119	3	1	READ/WRITE LOG DMA EXT supported
119	2	1	WRITE UNCORRECTABLE EXT supported
119	1	1	Write-Read-Verify feature set supported
119	0	0	Reserved for DDT [OBS-ACS-3]
120	-	0x40dc	Commands and feature sets supported or enabled
120	15:14	0x1	Must be set to 0x1
120	13:10	0x0	Reserved
120	9	0	DSN feature set enabled
120	8	0	Reserved
120	7	1	Extended Power Conditions feature set enabled
120	6	1	Sense Data Reporting feature set enabled
120	5	0	Free-fall Control feature set enabled
120	4	1	DOWNLOAD MICROCODE with mode 3 supported
120	3	1	READ/WRITE LOG DMA EXT supported
120	2	1	WRITE UNCORRECTABLE EXT supported
120	1	0	Write-Read-Verify feature set enabled
120	0	0	Reserved for DDT [OBS-ACS-3]
121-126	-	0x00...	Reserved
127	-	0x0000	Removable Media Status Notification [OBS-8]
127	15:1	0x0000	Reserved
127	0	0	Removable Media Status Notification supported
128	-	0x0021	Security status
128	15:9	0x00	Reserved
128	8	0	Master password capability: 0 = High, 1 = Maximum
128	7:6	0x0	Reserved
128	5	1	Enhanced security erase supported
128	4	0	Security count expired
128	3	0	Security frozen
128	2	0	Security locked
128	1	0	Security enabled
128	0	1	Security supported

129-159	-	.	Vendor specific
129-132	.	0x0000:ea00:0000:ea00	
133-136	.	0x2020:0002:0140:0100	
137-140	.	0x5000:3c06:3c0a:0000	
141-144	.	0x0078:0000:0008:0000	
145-148	.	0x0000:fdff:0280:0000	
149-152	.	0x0470:0008:0000:0000	
153-156	.	0x1eb3:0000:8008:0000	
157-159	.	0x02f7:d600:8048	
160	-	0x0000	CFA power mode
161-167	-	0x00...	Reserved for CFA
168	-	0x0002	Form factor
168	15:4	0x000	Reserved
168	3:0	0x2	Nominal form factor: -, 5.25, 3.5, 2.5, 1.8, ...
169	-	0x0000	DATA SET MANAGEMENT command support
169	15:1	0x0000	Reserved
169	0	0	Trim bit in DATA SET MANAGEMENT command supported
170-173	-	0x00...	Additional product identifier (String)
174-175	-	0x00...	Reserved
176-205	-	0x00...	Current media serial number (String)
206	-	0x50bd	SCT Command Transport
206	15:12	0x5	Vendor specific
206	11:8	0x0	Reserved
206	7	1	Reserved for Serial ATA
206	6	0	Reserved
206	5	1	SCT Data Tables supported
206	4	1	SCT Feature Control supported
206	3	1	SCT Error Recovery Control supported
206	2	1	SCT Write Same supported
206	1	0	SCT Read/Write Long supported [OBS-ACS-2]
206	0	1	SCT Command Transport supported
207-208	-	0x00...	Reserved
209	-	0x4000	Alignment of logical sectors
209	15:14	0x1	Must be set to 0x1
209	13:0	0x0000	Logical sector offset
210-211	-	0x00...	Write-Read-Verify sector count mode 3 (DWord)
212-213	-	0x00...	Write-Read-Verify sector count mode 2 (DWord)
214	-	0x0000	NV Cache capabilities [OBS-ACS-3]

214	15:12	0x0	NV Cache feature set version [OBS-ACS-3]
214	11:8	0x0	NV Cache Power Mode feature set version [OBS-ACS-3]
214	7:5	0x0	Reserved [OBS-ACS-3]
214	4	0	NV Cache feature set enabled [OBS-ACS-3]
214	3:2	0x0	Reserved
214	1	0	NV Cache Power Mode feature set enabled [OBS-ACS-3]
214	0	0	NV Cache Power Mode feature set supported [OBS-ACS-3]
215-216	-	0x00...	NV Cache size in logical blocks (DWord) [OBS-ACS-3]
217	-	0x1c20	Nominal media rotation rate
218	-	0x0000	Reserved
219	-	0x0000	NV Cache options [OBS-ACS-3]
219	15:8	0x00	Reserved [OBS-ACS-3]
219	7:0	0x00	Estimated time to spin up in seconds [OBS-ACS-3]
220	-	0x0000	Write-Read-Verify mode
220	15:8	0x00	Reserved
220	7:0	0x00	Write-Read-Verify feature set current mode
221	-	0x0000	Reserved
222	-	0x11ff	Transport major version number
222	15:12	0x1	Transport: 0x0 = Parallel, 0x1 = Serial, 0xe = PCIe
222	11:9	0x0	Reserved Reserved
222	8	1	Reserved SATA 3.3
222	7	1	Reserved SATA 3.2
222	6	1	Reserved SATA 3.1
222	5	1	Reserved SATA 3.0
222	4	1	Reserved SATA 2.6
222	3	1	Reserved SATA 2.5
222	2	1	Reserved SATA II: Extensions
222	1	1	ATA/ATAPI-7 SATA 1.0a
222	0	1	ATA8-APT ATA8-AST
223	-	0x0000	Transport minor version number
224-229	-	0x00...	Reserved
230-233	-	.	Extended number of user addressable sectors (QWord)
230-233	.	0x0000:ea00:000a:0000	(46875541504)
234	-	0x0000	Minimum blocks per DOWNLOAD MICROCODE mode 3 command
235	-	0x0000	Maximum blocks per DOWNLOAD MICROCODE mode 3 command
236-254	-	0x00...	Reserved
255	-	0x39a5	Integrity word

```
255      15:8      0x39    Checksum
255      7:0        0xa5    Signature
```

3.3. 'smartctl -T verypermissive -l gplog,0x30,9 /dev/sda'

```
smartctl 7.2 2020-12-30 r5155 [x86_64-linux-5.15.0-124-generic] (local build)
Copyright (C) 2002-20, Bruce Allen, Christian Franke, www.smartmontools.org

General Purpose Log 0x30 has only 9 sectors, output skipped
```

3.4. 'smartctl -T verypermissive -P show /dev/sda'

```
smartctl 7.2 2020-12-30 r5155 [x86_64-linux-5.15.0-124-generic] (local build)
Copyright (C) 2002-20, Bruce Allen, Christian Franke, www.smartmontools.org

No presets are defined for this drive.  Its identity strings:
MODEL:      ST24000NM000C-3WD103
FIRMWARE:   SN02
do not match any of the known regular expressions.
Use -P showall to list all known regular expressions.
```

3.5. 'smartctl -T verypermissive -t short /dev/sda'

```
smartctl 7.2 2020-12-30 r5155 [x86_64-linux-5.15.0-124-generic] (local build)
Copyright (C) 2002-20, Bruce Allen, Christian Franke, www.smartmontools.org

--- START OF OFFLINE IMMEDIATE AND SELF-TEST SECTION ---
Sending command: "Execute SMART Short self-test routine immediately in off-line mode".
Drive command "Execute SMART Short self-test routine immediately in off-line mode"
successful.
Testing has begun.
Please wait 2 minutes for test to complete.
Test will complete after Thu Oct 31 13:57:11 2024 CET
Use smartctl -X to abort test.
```

3.6. 'smartctl -T verypermissive -t conveyance /dev/sda'

```
smartctl 7.2 2020-12-30 r5155 [x86_64-linux-5.15.0-124-generic] (local build)
Copyright (C) 2002-20, Bruce Allen, Christian Franke, www.smartmontools.org

--- START OF OFFLINE IMMEDIATE AND SELF-TEST SECTION ---
```

```
Sending command: "Execute SMART Conveyance self-test routine immediately in off-line mode".
Drive command "Execute SMART Conveyance self-test routine immediately in off-line mode" successful.
Testing has begun.
Please wait 3 minutes for test to complete.
Test will complete after Thu Oct 31 14:00:41 2024 CET
Use smartctl -X to abort test.
```

3.7. 'smartctl -T verypermissive -l selftest /dev/sda'

```
smartctl 7.2 2020-12-30 r5155 [x86_64-linux-5.15.0-124-generic] (local build)
Copyright (C) 2002-20, Bruce Allen, Christian Franke, www.smartmontools.org
```

```
--- START OF READ SMART DATA SECTION ---
SMART Self-test log structure revision number 1
Num Test_Description      Status                    Remaining  LifeTime(hours)  LBA_of_first_error
# 1 Conveyance offline    Completed without error   00%          3                 -
# 2 Short offline         Completed without error   00%          3                 -
# 3 Conveyance offline    Completed without error   00%          3                 -
# 4 Short offline         Completed without error   00%          3                 -
# 5 Short offline         Completed without error   00%          0                 -
```

3.8. 'smartctl -T verypermissive -l error /dev/sda'

```
smartctl 7.2 2020-12-30 r5155 [x86_64-linux-5.15.0-124-generic] (local build)
Copyright (C) 2002-20, Bruce Allen, Christian Franke, www.smartmontools.org
```

```
--- START OF READ SMART DATA SECTION ---
SMART Error Log Version: 1
No Errors Logged
```