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45drivesxl60

2 x AMD EPYC 7513 32-Core testing with a Dell PowerEdge R7525 [0590KW] (2.6.6 BIOS) and Matrox G200eW3 on Debian GNU/Linux 11 via the Phoronix Test Suite.

Automated Executive Summary

Mirrors had the most wins, coming in first place for 25% of the tests.

Based on the geometric mean of all complete results, the fastest (Mirrors) was 24.262x the speed of the slowest (DELL ENT NVME SSD1).

Test Systems:

10 Per VDEV RaidZ2

5 Per VDEV RaidZ2

Mirrors

Processor: Intel Xeon Silver 4216 (32 Cores), Motherboard: 45Drives XL60 0123456789, Memory: 256GB, Disk: 742117GB

OS: FreeBSD, Kernel: 12.2-RELEASE-p10 (x86_64), Compiler: Clang 10.0.1, File-System: zfs

DELL ENT NVME SSD1

DELL SAMSUNG SSD4

DELL ENTERPRISE NVME

Processor: 2 x AMD EPYC 7513 32-Core (64 Cores / 128 Threads), Motherboard: Dell PowerEdge R7525 [0590KW] (2.6.6 BIOS), Chipset: AMD Starship/Matisse, Memory: 8 x 64 GB DDR4-3200MT/s 36ASF8G72PZ-3G2B2, Disk: 240GB DELLBOSS VD + 2 x 1920GB Dell Ent NVMe CM + 2 x 3841GB SAMSUNG MZQL23T8, Graphics: Matrox G200eW3, Monitor: DELL E172FP, Network: 4 x Intel X710 for 10GBASE-T + 2 x Broadcom NetXtreme BCM5720 2-port PCIe

OS: Debian GNU/Linux 11, Kernel: 5.15.30-2-pve (x86_64), Vulkan: 1.0.2, Compiler: GCC 10.2.1 20210110, File-System: ext4, Screen Resolution: 1280x1024

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-link-mutex --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-Km9U7s/gcc-10-10.2.1/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-Km9U7s/gcc-10-10.2.1/debian/tmp-gcn/usr, hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-build-config=bootstrap-lto-lean --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Disk Notes: MQ-DEADLINE / errors=remount-ro,relatime,rw / Block Size: 4096
Processor Notes: CPU Microcode: 0xa00115d
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Retpolines IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

SAMSUNG ZFS MIRROR

DELLENT ZFS MIRROR

Processor: 2 x AMD EPYC 7513 32-Core (64 Cores / 128 Threads), Motherboard: Dell PowerEdge R7525 [0590KW] (2.6.6 BIOS), Chipset: AMD Starship/Matisse, Memory: 8 x 64 GB DDR4-3200MT/s 36ASF8G72PZ-3G2B2, Disk: 240GB DELLBOSS VD + 2 x 1920GB Dell Ent NVMe CM + 2 x 3841GB SAMSUNG MZQL23T8, Graphics: Matrox G200eW3, Monitor: DELL E172FP, Network: 4 x Intel X710 for 10GBASE-T + 2 x Broadcom NetXtreme BCM5720 2-port PCIe

OS: Debian GNU/Linux 11, Kernel: 5.15.30-2-pve (x86_64), Vulkan: 1.0.2, Compiler: GCC 10.2.1 20210110, File-System: zfs, Screen Resolution: 1280x1024

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-link-mutex --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-Km9U7s/gcc-10-10.2.1/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-Km9U7s/gcc-10-10.2.1/debian/tmp-gcn/usr, hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-build-config=bootstrap-lto-lean --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Disk Notes: MQ-DEADLINE / errors=remount-ro,relatime,rw / Block Size: 131072

Processor Notes: CPU Microcode: 0xa00115d
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Retpolines IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

PERC RAID1 SAMSUNG 256-A-D-C

PERC RAID1 DELL ENT. H755

Processor: 2 x AMD EPYC 7513 32-Core (64 Cores / 128 Threads), Motherboard: Dell PowerEdge R7525 [0590KW] (2.6.6 BIOS), Chipset: AMD Starship/Matisse, Memory: 8 x 64 GB DDR4-3200MT/s 36ASF8G72PZ-3G2B2, Disk: 240GB DELLBOSS VD + 2 x 1920GB Dell Ent NVMe CM + 2 x 3841GB SAMSUNG MZQL23T8, Graphics: Matrox G200eW3, Monitor: DELL E172FP, Network: 4 x Intel X710 for 10GBASE-T + 2 x Broadcom NetXtreme BCM5720 2-port PCIe

OS: Debian GNU/Linux 11, Kernel: 5.15.30-2-pve (x86_64), Vulkan: 1.0.2, Compiler: GCC 10.2.1 20210110, File-System: ext4, Screen Resolution: 1280x1024

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-link-mutex --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-Km9U7s/gcc-10-10.2.1/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-Km9U7s/gcc-10-10.2.1/debian/tmp-gcn/usr, hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-build-config=bootstrap-lto-lean --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Disk Notes: MQ-DEADLINE / errors=remount-ro,relatime,rw / Block Size: 4096
Processor Notes: CPU Microcode: 0xa00115d
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Retpolines IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

4xNVME ZFS MIRROR

DELLENT ZFS MIRROR2

SAMSUNG ZFS MIRROR2

Processor: 2 x AMD EPYC 7513 32-Core (64 Cores / 128 Threads), Motherboard: Dell PowerEdge R7525 [0590KW] (2.6.6 BIOS), Chipset: AMD Starship/Matisse, Memory: 8 x 64 GB DDR4-3200MT/s 36ASF8G72PZ-3G2B2, Disk: 240GB DELLBOSS VD + 2 x 1920GB Dell Ent NVMe CM + 2 x 3841GB SAMSUNG MZQL23T8, Graphics: Matrox G200eW3, Monitor: DELL E172FP, Network: 4 x Intel X710 for 10GBASE-T + 2 x Broadcom NetXtreme BCM5720 2-port PCIe

OS: Debian GNU/Linux 11, Kernel: 5.15.30-2-pve (x86_64), Vulkan: 1.0.2, Compiler: GCC 10.2.1 20210110, File-System: zfs, Screen Resolution: 1280x1024

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-link-mutex --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-Km9U7s/gcc-10-10.2.1/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-Km9U7s/gcc-10-10.2.1/debian/tmp-gcn/usr, hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-build-config=bootstrap-lto-lean --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Disk Notes: MQ-DEADLINE / errors=remount-ro,relatime,rw / Block Size: 131072
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Phoronix Test Suite

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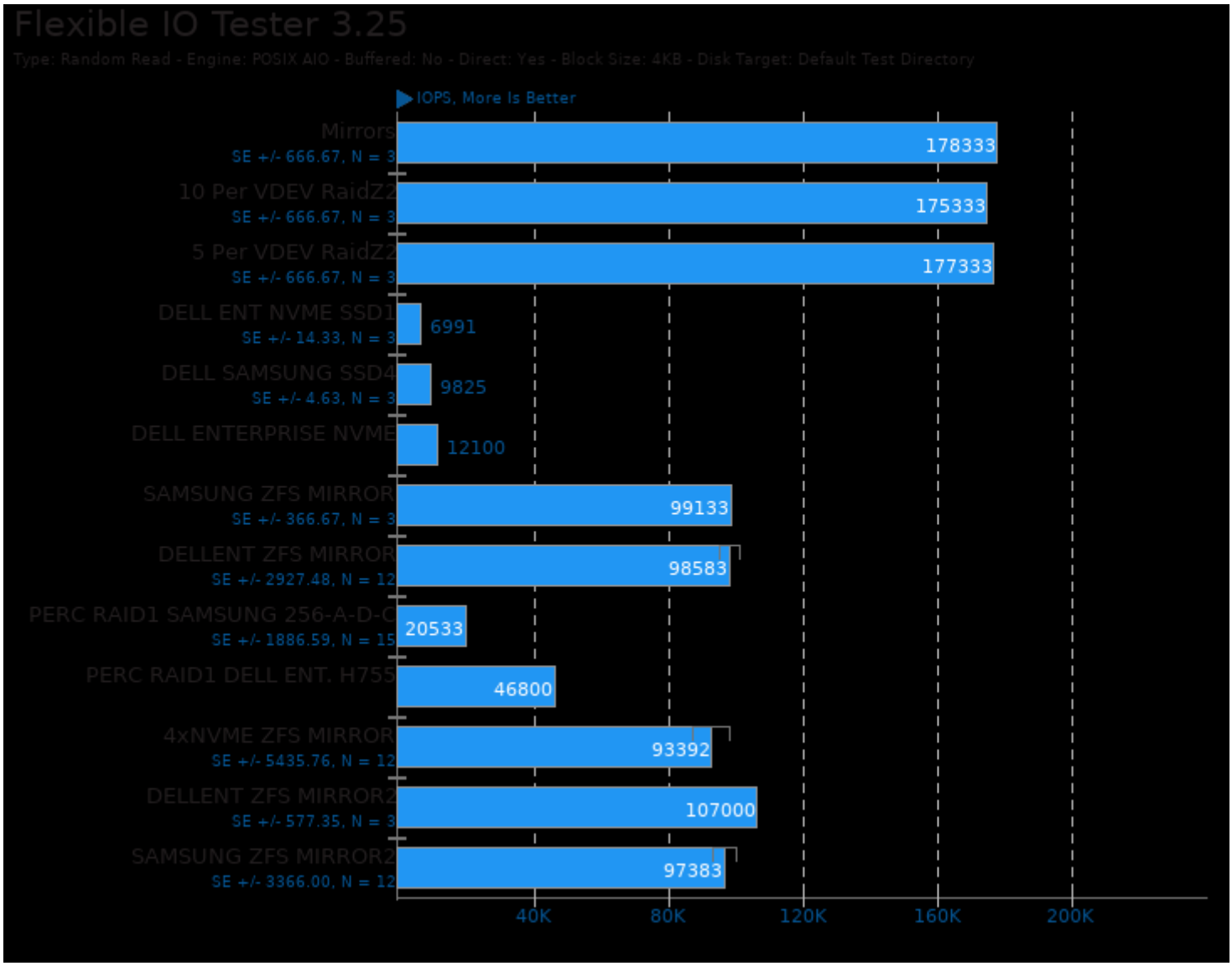
	10 Per VDEV RaidZ2	5 Per VDEV RaidZ2	Mirrors	DELLENT NVME SSD1	DELL SAMSUNG SSD4	DELL ENTERPRISE NVME	SAMSUNG ZFS MIRROR	DELLENT ZFS MIRROR	PERC RAID1 SAMSUNG 256-A-D-C	PERC RAID1 DELL ENT. H755	4xNVME ZFS MIRROR	DELLENT ZFS MIRROR2	SAMSUNG ZFS MIRROR2
Flexible IO Tester - Rand Read - POSIX AIO - No - Yes - 4KB (IOPS)	175333	177333	**178667**	**6991**	9825	12100	99133	98583	20533	46800	93392	107000	97383
Normalized	98.13%	99.25%	100%	3.91%	5.5%	6.77%	55.48%	55.18%	11.49%	26.19%	52.27%	59.89%	54.51%
Standard Deviation	0.7%	0.7%	0.6%	0.4%	0.1%		0.6%	10.3%	35.6%		20.2%	0.9%	12%
Flexible IO Tester - Rand Write - POSIX AIO - No - Yes - 4KB (IOPS)	92300	110333	129333	18260	**6242**	61233	180000	**185000**	32633	42942	118800	182000	180333
Normalized	49.89%	59.64%	69.91%	9.87%	3.37%	33.1%	97.3%	100%	17.64%	23.21%	64.22%	98.38%	97.48%
Standard Deviation	0.8%	1.4%	1.9%	4.7%	0.1%	0.2%		1.4%	3.4%	8.5%	4.3%	4.1%	2.6%
Flexible IO Tester - Rand Read - POSIX AIO - No - Yes - 128KB (IOPS)	156667	**157000**	156333	**1561**	6327	7633	58733	57367	9613	12767	57225	57167	57600
Normalized	99.79%	100%	99.58%	0.99%	4.03%	4.86%	37.41%	36.54%	6.12%	8.13%	36.45%	36.41%	36.69%
Standard Deviation	0.4%	0.6%	0.4%	0.3%	1.2%	0.1%	1.8%	1.7%	0.5%	0.5%	2.3%	1.2%	1.7%
Flexible IO Tester - Rand Write - POSIX AIO - No - Yes - 128KB (IOPS)	72700	93500	**95733**	**1617**	16400	18300	49633	51633	22400	18700	44233	51433	51867
Normalized	75.94%	97.67%	100%	1.69%	17.13%	19.12%	51.85%	53.93%	23.4%	19.53%	46.2%	53.73%	54.18%
Standard Deviation	2.1%	1.4%	0.9%	1.1%			0.4%	1.6%		0.5%	2.1%	1%	1.1%
Flexible IO Tester - Seq Read - POSIX AIO - No - Yes - 4KB (IOPS)	188000	188000	189333	**7183**	63067	22500	440133	434467	34367	52100	459867	423929	**461000**
Normalized	40.78%	40.78%	41.07%	1.56%	13.68%	4.88%	95.47%	94.24%	7.45%	11.3%	99.75%	91.96%	100%
Standard Deviation	0.5%	0.5%	0.3%	0.3%	0.1%		9.6%	7.1%	0.2%	0.3%	7.3%	9.8%	0.6%
Flexible IO Tester - Seq Write - POSIX AIO - No - Yes - 4KB (IOPS)	127000	135667	137667	17871	**6385**	61500	**353917**	333333	39767	48167	315333	319600	335000
Normalized	35.88%	38.33%	38.9%	5.05%	1.8%	17.38%	100%	94.18%	11.24%	13.61%	89.1%	90.3%	94.65%
Standard Deviation		0.4%	0.4%	3.8%	0%	0.2%	5.3%	3.6%	1.7%	0.7%	8.6%	5.4%	2.5%

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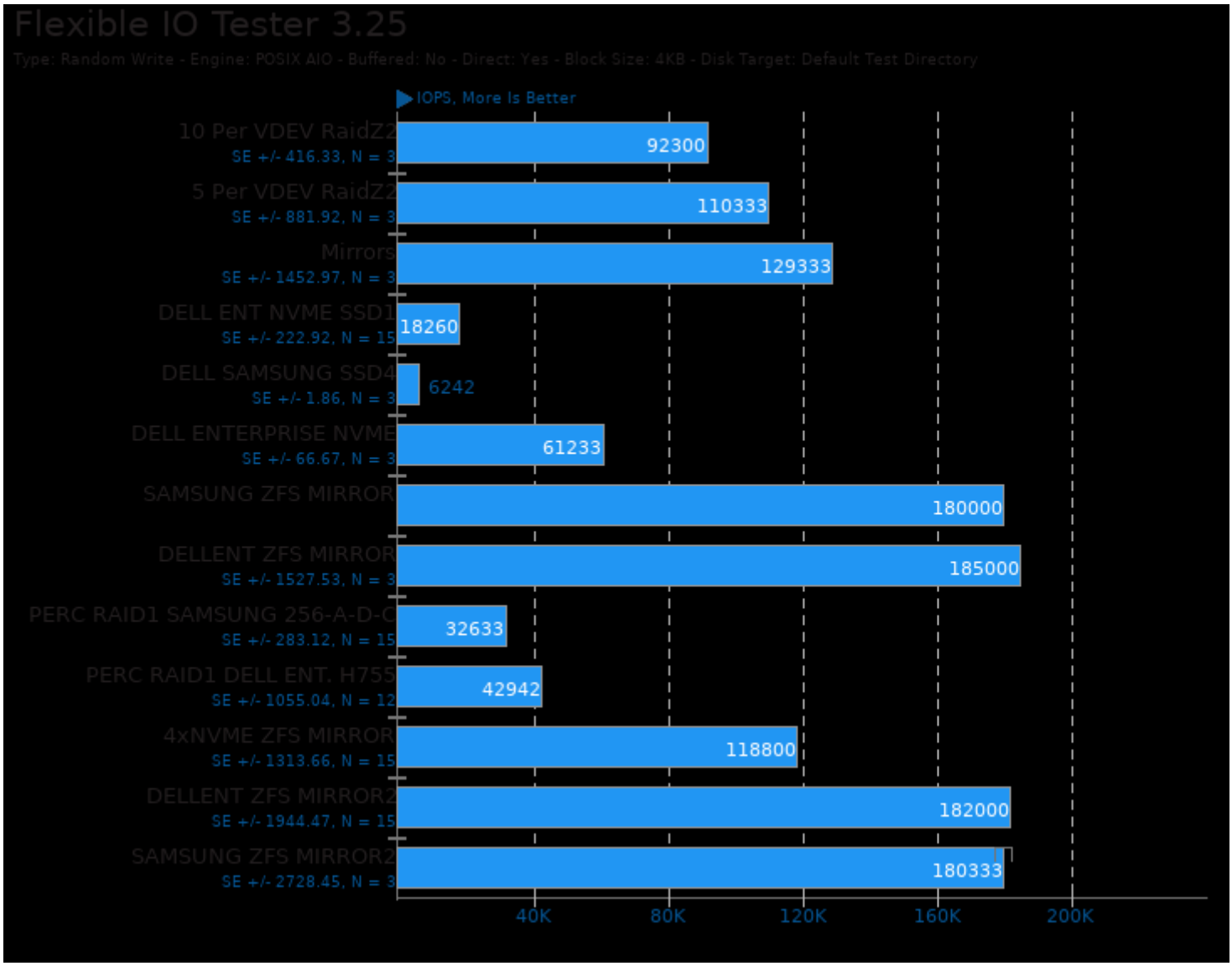
Flexible IO Tester - Seq Read - POSIX AIO - No - Yes - 128KB (IOPS)	**146933**	131333	132600	**1553**	17133	9457	54433	52847	21700	13167	53707	53575	52067
Normalized	100%	89.38%	90.25%	1.06%	11.66%	6.44%	37.05%	35.97%	14.77%	8.96%	36.55%	36.46%	35.44%
Standard Deviation	6.2%	0.4%	2.4%	0.5%	0.3%	0.1%	2.2%	3.8%	2.8%	1.2%	4%	2.5%	6.2%
Flexible IO Tester - Seq Write - POSIX AIO - No - Yes - 128KB (IOPS)	73033	91300	**99900**	**1623**	16633	18300	49140	48446	22400	19787	38433	49700	48936
Normalized	73.11%	91.39%	100%	1.62%	16.65%	18.32%	49.19%	48.49%	22.42%	19.81%	38.47%	49.75%	48.98%
Standard Deviation	2.2%	1.3%	1.9%	0.5%	0.3%		2.4%	5.6%		2.8%	0.6%	1.2%	4.8%
Flexible IO Tester - Rand Read - POSIX AIO - No - Yes - 4KB (MB/s)	685	692	**697**	**27.3**	38.4	47.2	388	386	80.5	183	365	418	381
Normalized	98.28%	99.28%	100%	3.92%	5.51%	6.77%	55.67%	55.38%	11.55%	26.26%	52.37%	59.97%	54.66%
Standard Deviation	0.8%	0.7%	0.7%	0.4%	0%	0%	0.6%	10.4%	35.4%		20.1%	0.9%	12%
Flexible IO Tester - Rand Write - POSIX AIO - No - Yes - 4KB (MB/s)	360	432	505	71.3	**24.4**	240	703	**721**	128	168	464	711	704
Normalized	49.93%	59.92%	70.04%	9.89%	3.38%	33.29%	97.5%	100%	17.75%	23.3%	64.36%	98.61%	97.64%
Standard Deviation	0.8%	0.9%	1.9%	4.7%	0%	0.2%	0.2%	1.5%	3.2%	8.5%	4.1%	4.1%	2.5%
Flexible IO Tester - Rand Write - POSIX AIO - No - Yes - 128KB (MB/s)	**9083**			**203**	2054	2286	6210	6454	2798	2334	5530	6430	6482
Normalized	100%			2.23%	22.61%	25.17%	68.37%	71.06%	30.8%	25.7%	60.88%	70.79%	71.36%
Standard Deviation	2.1%			1.2%		0.1%	0.4%	1.6%	0.1%	0.5%	2.1%	1.1%	1.1%
Flexible IO Tester - Seq Read - POSIX AIO - No - Yes - 4KB (MB/s)	735	735	739	**28.1**	246	87.6	1720	1698	134	204	1797	1656	**1801**
Normalized	40.81%	40.81%	41.03%	1.56%	13.66%	4.86%	95.5%	94.28%	7.44%	11.33%	99.78%	91.95%	100%
Standard Deviation	0.4%	0.4%	0.4%	0.4%	0.2%	0.6%	9.6%	7%		0.3%	7.3%	9.8%	0.7%

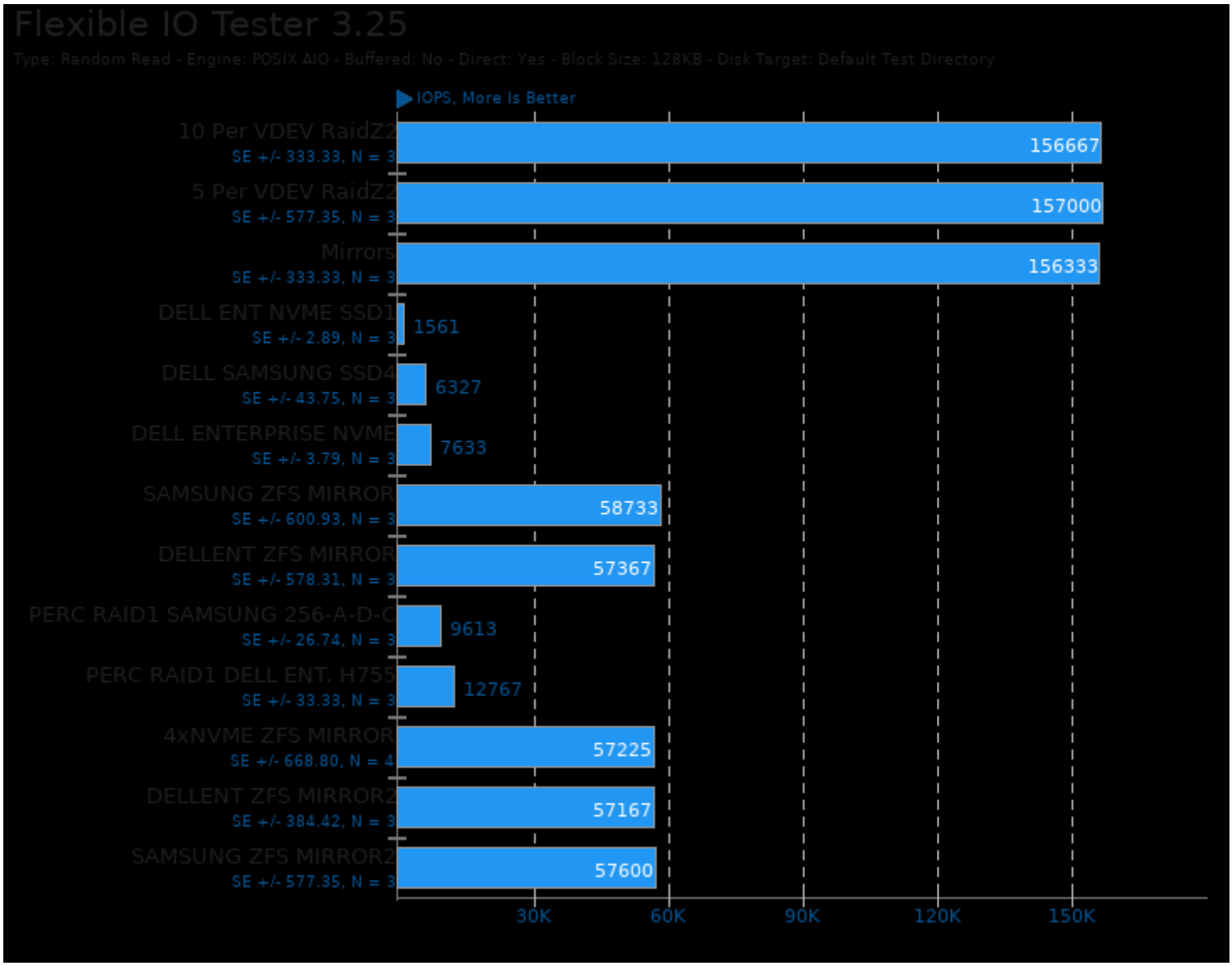
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Flexible IO Tester - Seq Write - POSIX AIO - No - Yes - 4KB (MB/s)	495	529	537	70.3	**24.3**	240	**1382**	1302	157	188	1232	1248	1309
Normalized	35.82%	38.28%	38.86%	5.09%	1.76%	17.37%	100%	94.21%	11.36%	13.6%	89.15%	90.3%	94.72%
Standard Deviation			0.4%	3.9%	2.1%		5.3%	3.6%		0.6%	8.6%	5.4%	2.5%
Flexible IO Tester - Seq Write - POSIX AIO - No - Yes - 128KB (MB/s)	**9131**			**203**	2080	2285	6145	6074	2801	2475	4805	6213	6117
Normalized	100%			2.22%	22.78%	25.02%	67.3%	66.52%	30.68%	27.11%	52.62%	68.04%	66.99%
Standard Deviation	2.2%			0.6%	0.1%	0.1%	2.4%	5.1%	0.1%	2.8%	0.6%	1.2%	4.8%
Flexible IO Tester - Rand Read - POSIX AIO - No - Yes - 128KB (MB/s)				**196**	791	955	**7340**	7172	1202	1591	7155	7146	7198
Normalized				2.67%	10.78%	13.01%	100%	97.71%	16.38%	21.68%	97.48%	97.36%	98.07%
Standard Deviation				0.3%	1.1%	0.1%	1.8%	1.7%	0.5%	0.3%	2.3%	1.2%	1.7%
Flexible IO Tester - Seq Read - POSIX AIO - No - Yes - 128KB (MB/s)				**195**	2138	1182	**6804**	6622	2754	1645	6724	6698	6511
Normalized				2.87%	31.42%	17.37%	100%	97.33%	40.48%	24.18%	98.82%	98.44%	95.69%
Standard Deviation					0.3%	0.1%	2.3%	3.5%	0.4%	0.8%	4%	2.5%	6.2%

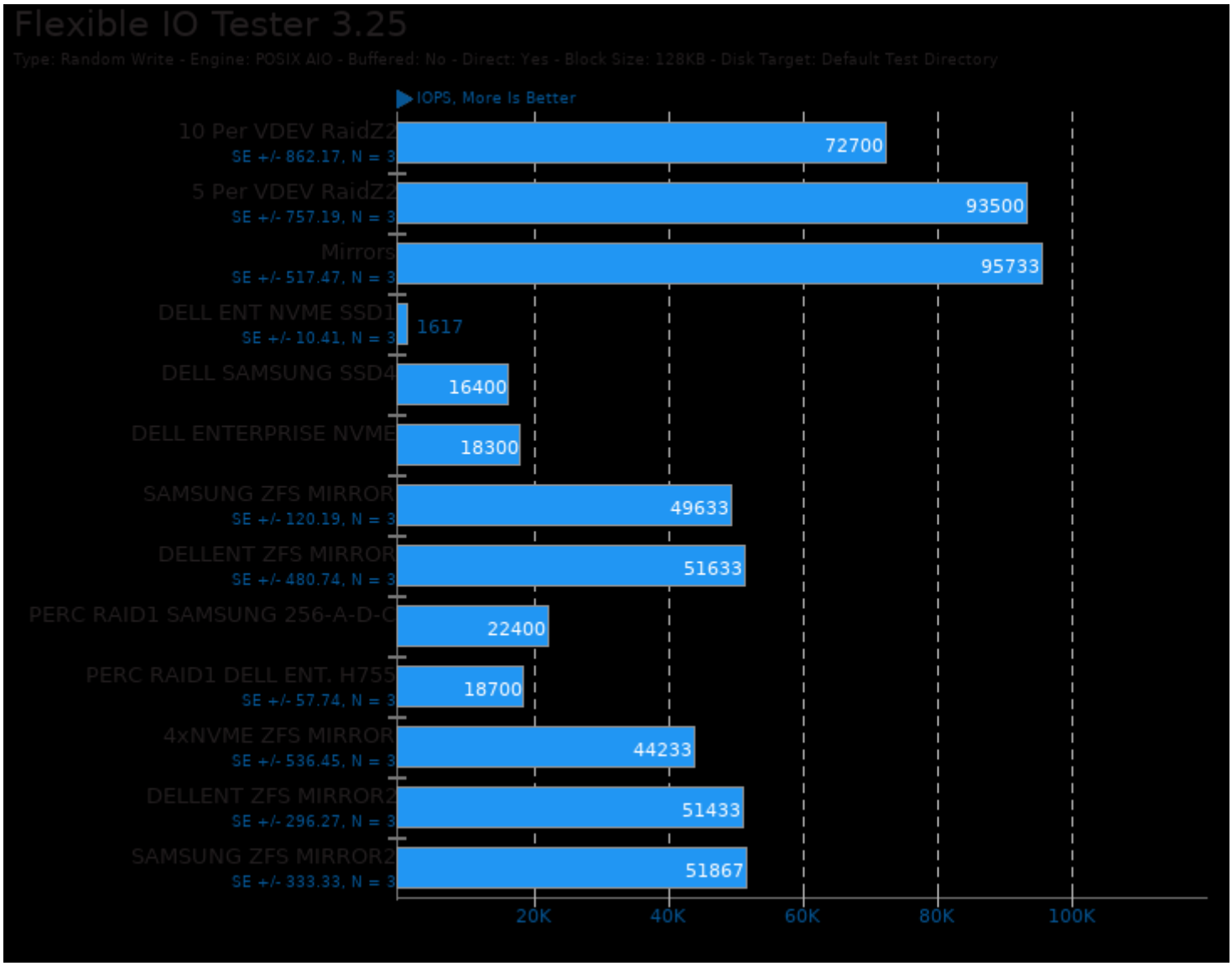

Flexible IO Tester 3.25
Type: Random Read - Engine: POSIX AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory
IOPS, More Is Better
Mirrors
SE +/- 666.67, N = 3
178333
10 Per VDEV RaidZ2
SE +/- 666.67, N = 3
175333
5 Per VDEV RaidZ2
SE +/- 666.67, N = 3
177333
DELL ENT NVME SSD1
SE +/- 14.33, N = 3
6991
DELL SAMSUNG SSD4
SE +/- 4.63, N = 3
9825
DELL ENTERPRISE NVME
12100
SAMSUNG ZFS MIRROR
SE +/- 366.67, N = 3
99133
DELLENT ZFS MIRROR
SE +/- 2927.48, N = 12
98583
PERC RAID1 SAMSUNG 256-A-D-C
SE +/- 1886.59, N = 15
20533
PERC RAID1 DELL ENT. H755
46800
4xNVME ZFS MIRROR
SE +/- 5435.76, N = 12
93392
DELLENT ZFS MIRROR2
SE +/- 577.35, N = 3
107000
SAMSUNG ZFS MIRROR2
SE +/- 3366.00, N = 12
97383
40K
80K
120K
160K
200K

45drivesxl60

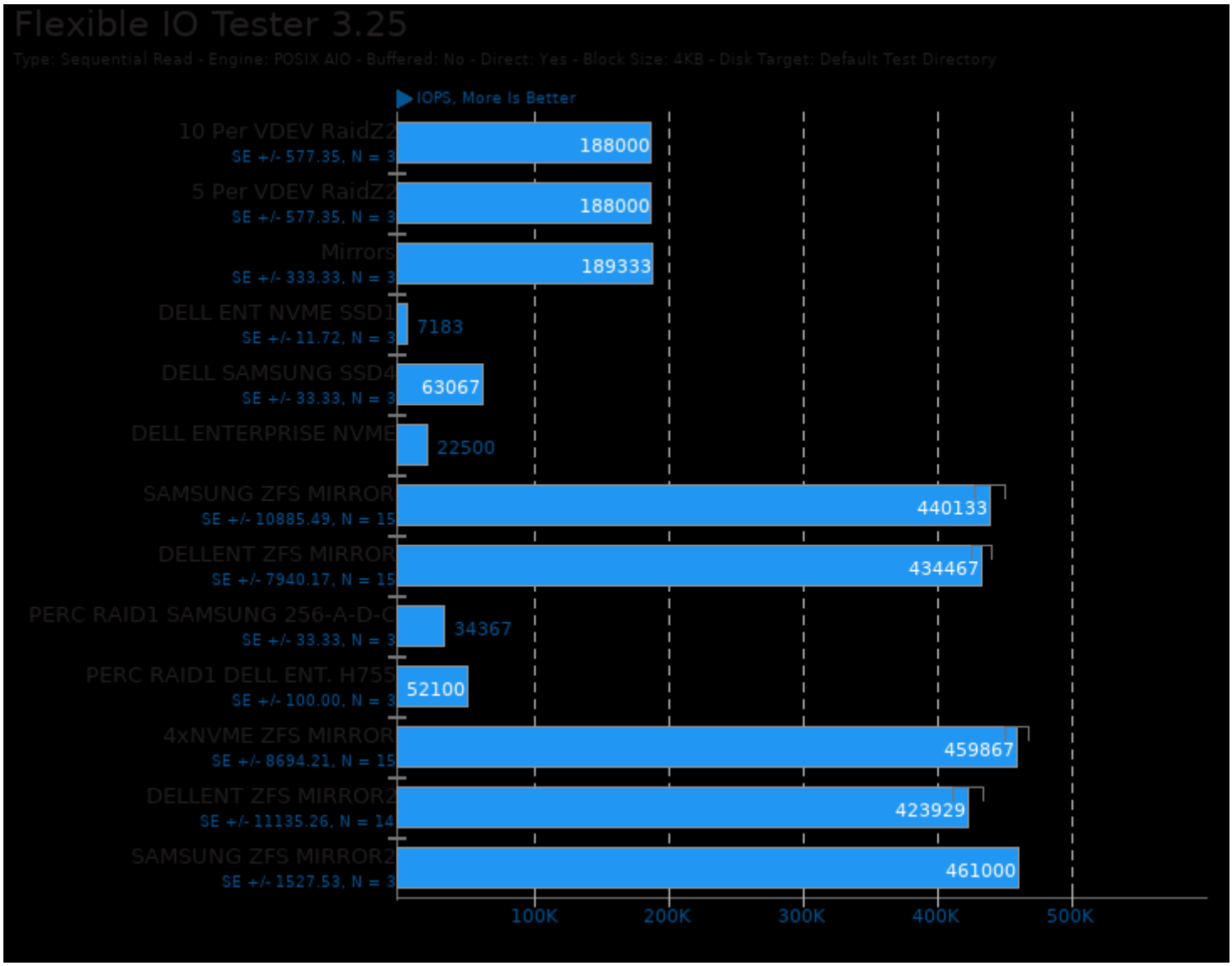



Flexible IO Tester 3.25
Type: Random Read - Engine: POSIX AIO - Buffered: No - Direct: Yes - Block Size: 128KB - Disk Target: Default Test Directory
IOPS, More Is Better
10 Per VDEV RaidZ2
SE +/- 333.33, N = 3
156667
5 Per VDEV RaidZ2
SE +/- 577.35, N = 3
157000
Mirrors
SE +/- 333.33, N = 3
156333
DELL ENT NVME SSD1
SE +/- 2.89, N = 3
1561
DELL SAMSUNG SSD4
SE +/- 43.75, N = 3
6327
DELL ENTERPRISE NVME
SE +/- 3.79, N = 3
7633
SAMSUNG ZFS MIRROR
SE +/- 600.93, N = 3
58733
DELLENT ZFS MIRROR
SE +/- 578.31, N = 3
57367
PERC RAID1 SAMSUNG 256-A-D-C
SE +/- 26.74, N = 3
9613
PERC RAID1 DELL ENT. H755
SE +/- 33.33, N = 3
12767
4xNVME ZFS MIRROR
SE +/- 668.80, N = 4
57225
DELLENT ZFS MIRROR2
SE +/- 384.42, N = 3
57167
SAMSUNG ZFS MIRROR2
SE +/- 577.35, N = 3
57600
30K
60K
90K
120K
150K

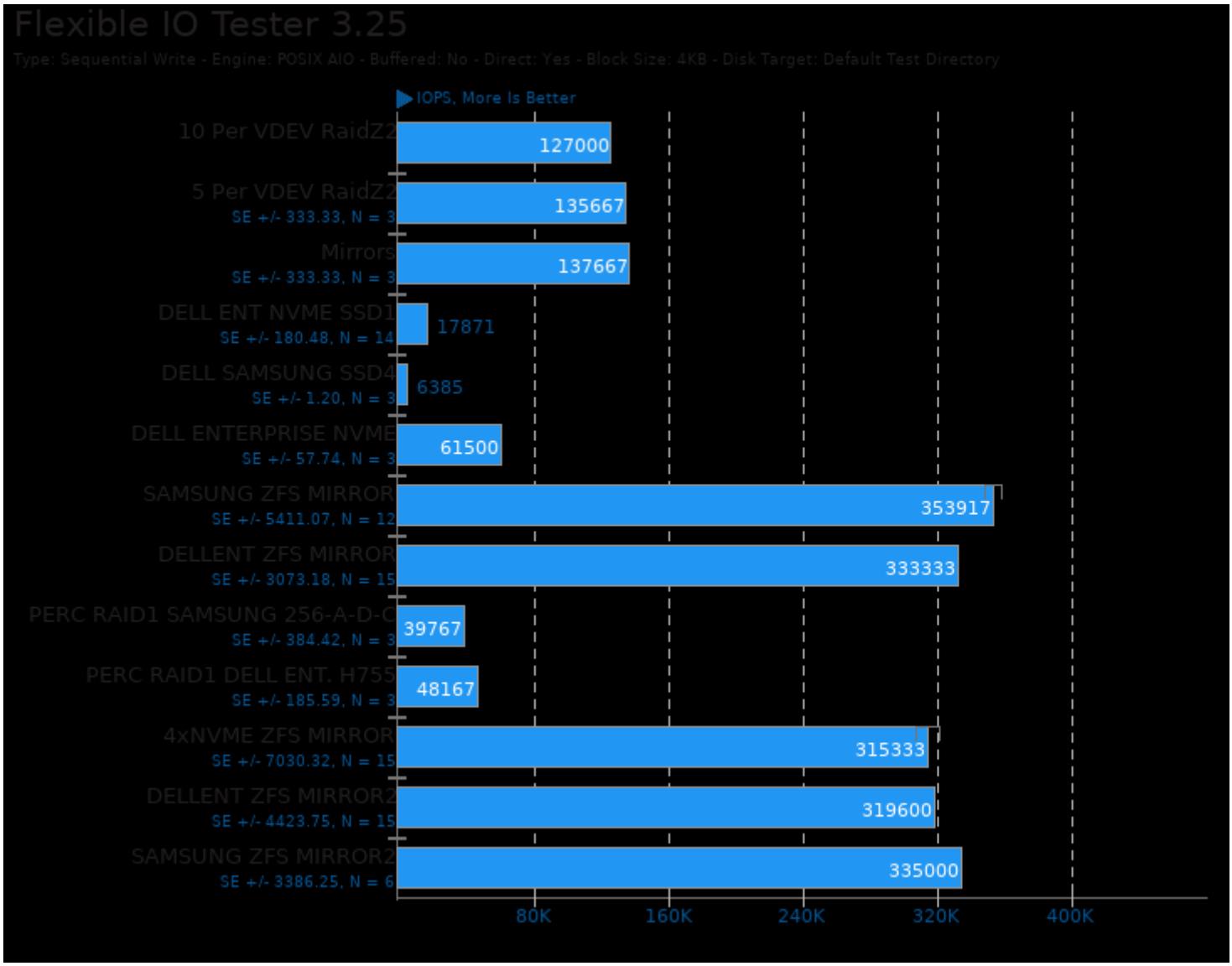
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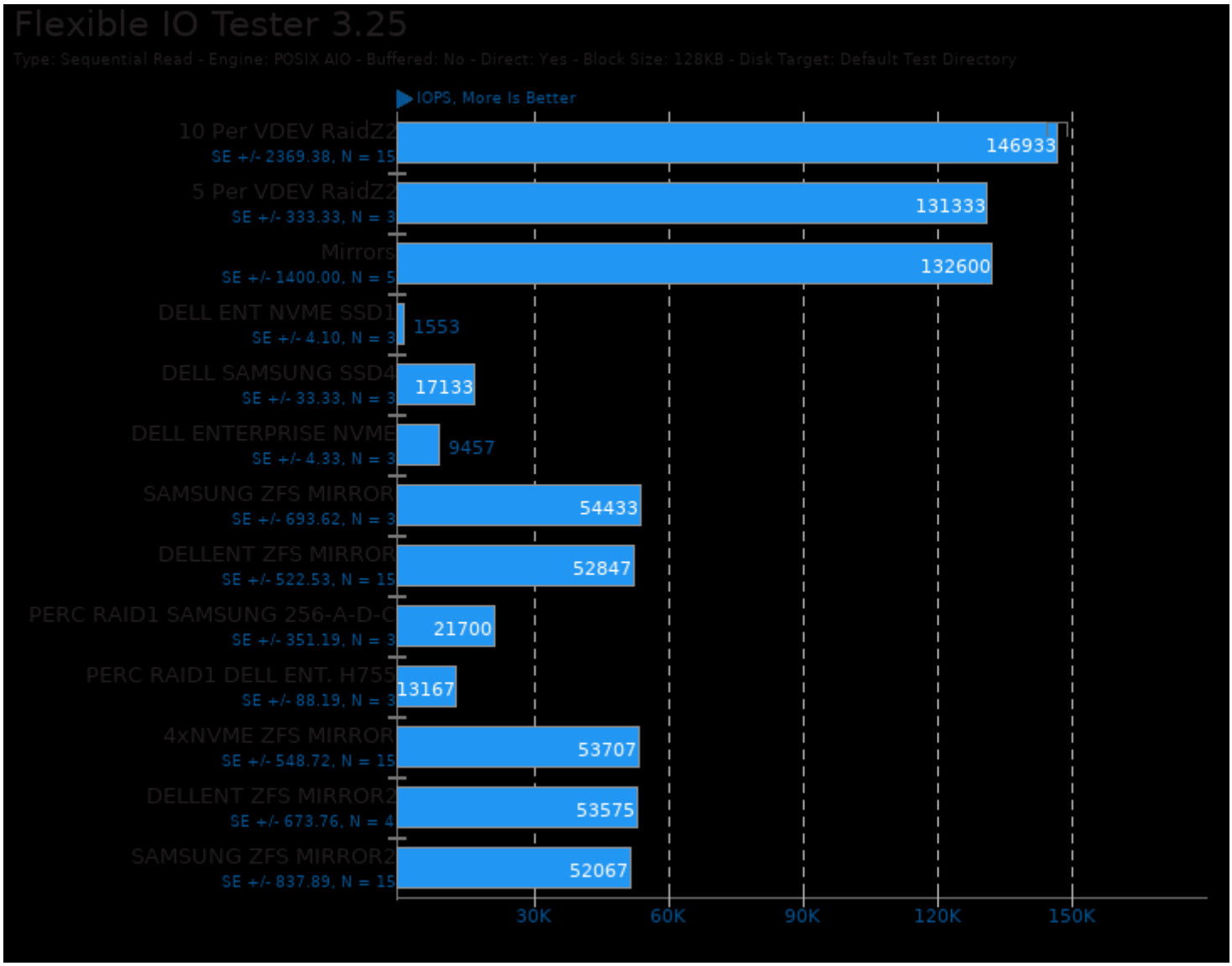


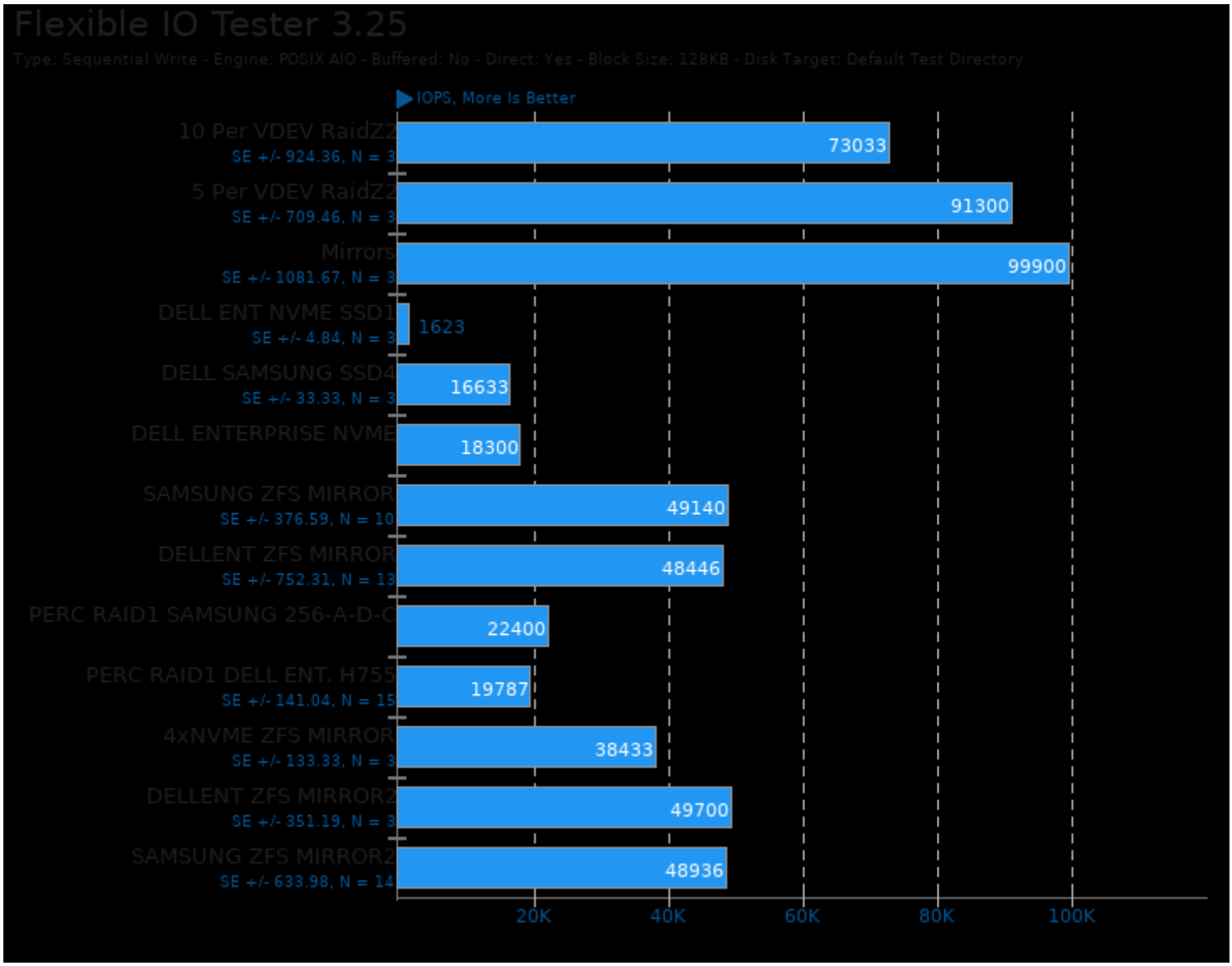
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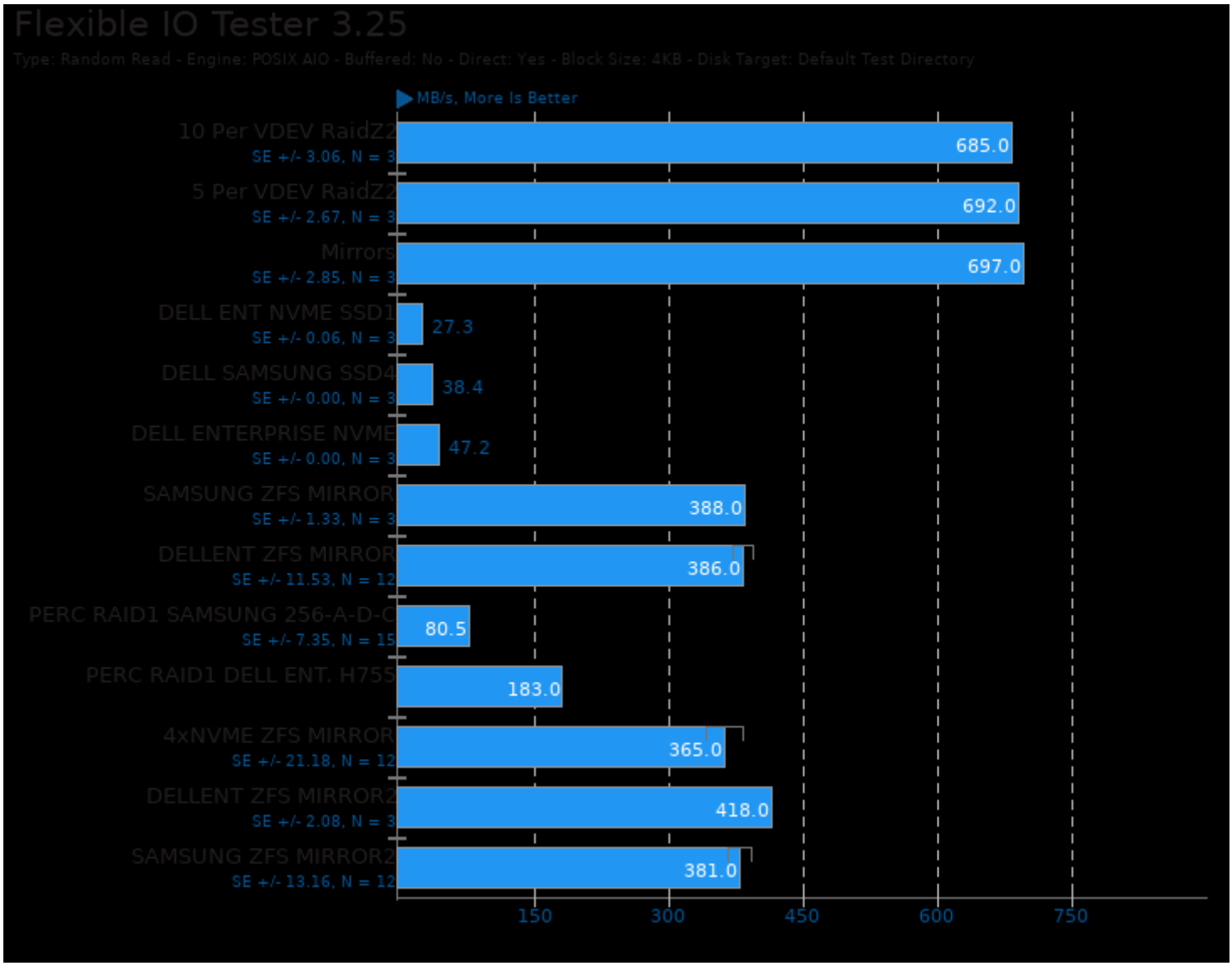
45drivesxl60



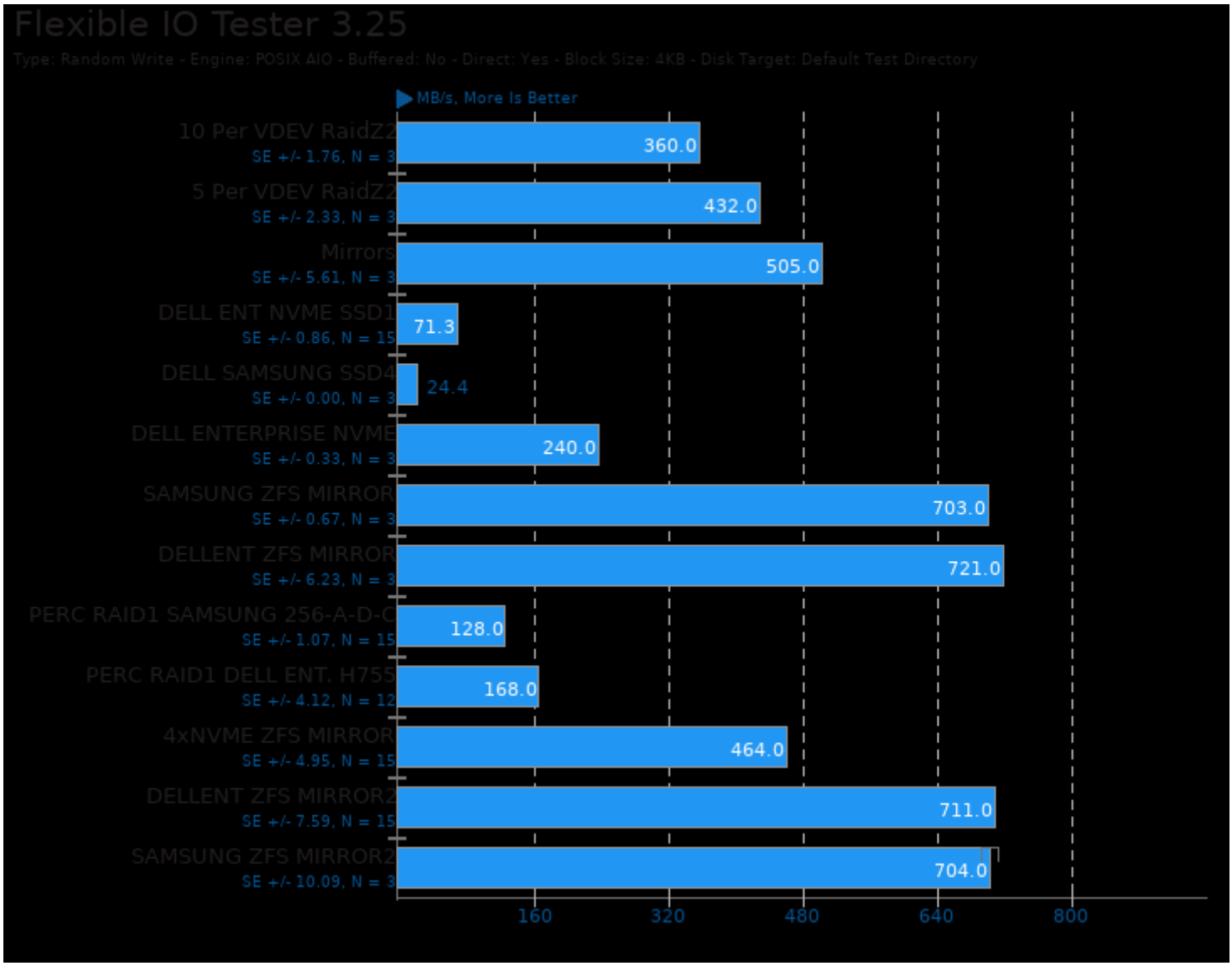

Flexible IO Tester 3.25
Type: Sequential Read - Engine: POSIX AIO - Buffered: No - Direct: Yes - Block Size: 128KB - Disk Target: Default Test Directory
IOPS, More Is Better
10 Per VDEV RaidZ2
SE +/- 2369.38, N = 15
146933
5 Per VDEV RaidZ2
SE +/- 333.33, N = 3
131333
Mirrors
SE +/- 1400.00, N = 5
132600
DELL ENT NVME SSD1
SE +/- 4.10, N = 3
1553
DELL SAMSUNG SSD4
SE +/- 33.33, N = 3
17133
DELL ENTERPRISE NVME
SE +/- 4.33, N = 3
9457
SAMSUNG ZFS MIRROR
SE +/- 693.62, N = 3
54433
DELLENT ZFS MIRROR
SE +/- 522.53, N = 15
52847
PERC RAID1 SAMSUNG 256-A-D-C
SE +/- 351.19, N = 3
21700
PERC RAID1 DELL ENT. H755
SE +/- 88.19, N = 3
13167
4xNVME ZFS MIRROR
SE +/- 548.72, N = 15
53707
DELLENT ZFS MIRROR2
SE +/- 673.76, N = 4
53575
SAMSUNG ZFS MIRROR2
SE +/- 837.89, N = 15
52067
30K
60K
90K
120K
150K

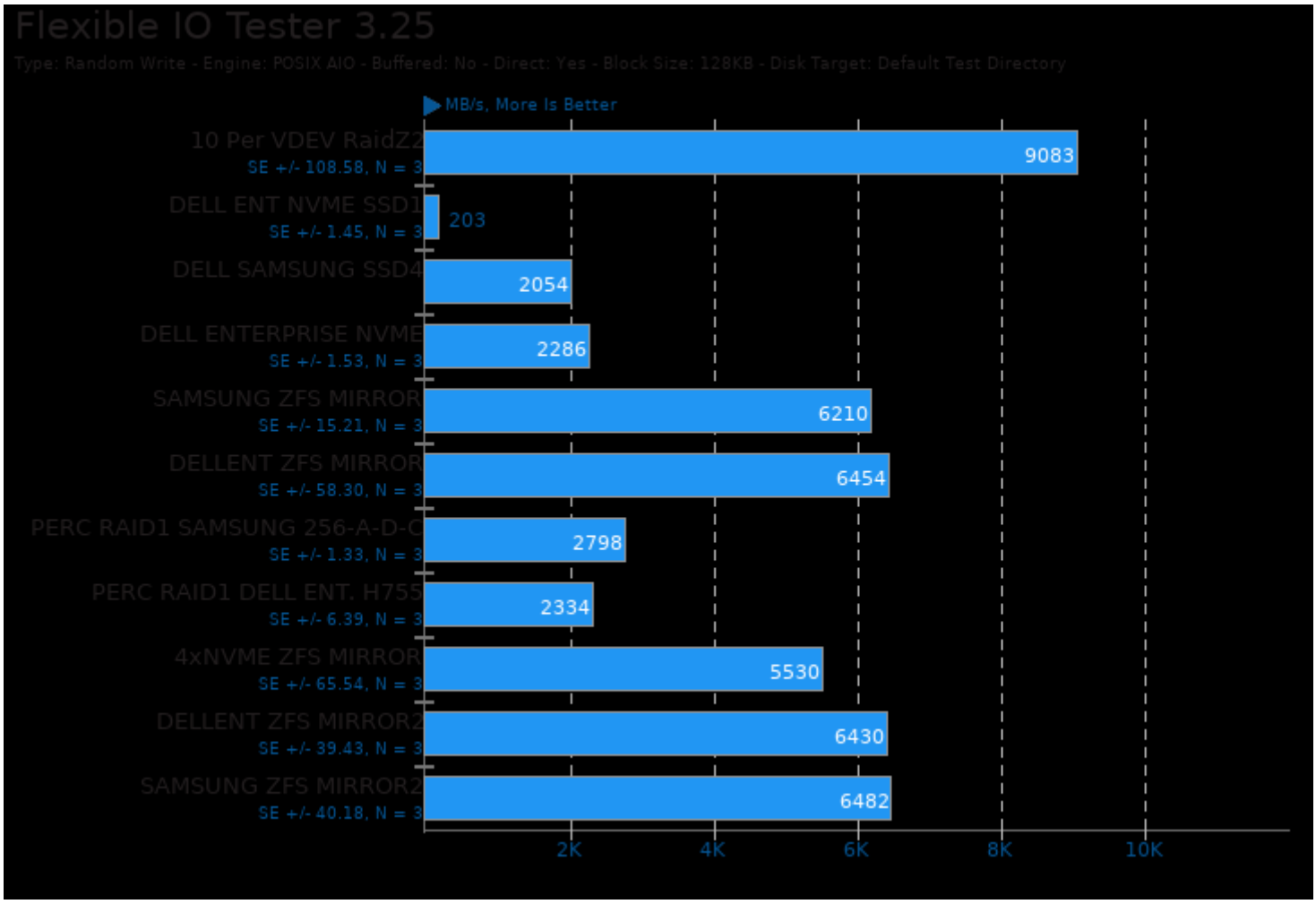

Flexible IO Tester 3.25
Type: Sequential Write - Engine: POSIX AIO - Buffered: No - Direct: Yes - Block Size: 128KB - Disk Target: Default Test Directory
IOPS, More Is Better
10 Per VDEV RaidZ2
SE +/- 924.36, N = 3
73033
5 Per VDEV RaidZ2
SE +/- 709.46, N = 3
91300
Mirrors
SE +/- 1081.67, N = 3
99900
DELL ENT NVME SSD1
SE +/- 4.84, N = 3
1623
DELL SAMSUNG SSD4
SE +/- 33.33, N = 3
16633
DELL ENTERPRISE NVME
18300
SAMSUNG ZFS MIRROR
SE +/- 376.59, N = 10
49140
DELLENT ZFS MIRROR
SE +/- 752.31, N = 13
48446
PERC RAID1 SAMSUNG 256-A-D-C
22400
PERC RAID1 DELL ENT. H755
SE +/- 141.04, N = 15
19787
4xNVME ZFS MIRROR
SE +/- 133.33, N = 3
38433
DELLENT ZFS MIRROR2
SE +/- 351.19, N = 3
49700
SAMSUNG ZFS MIRROR2
SE +/- 633.98, N = 14
48936
20K
40K
60K
80K
100K

45drivesxl60

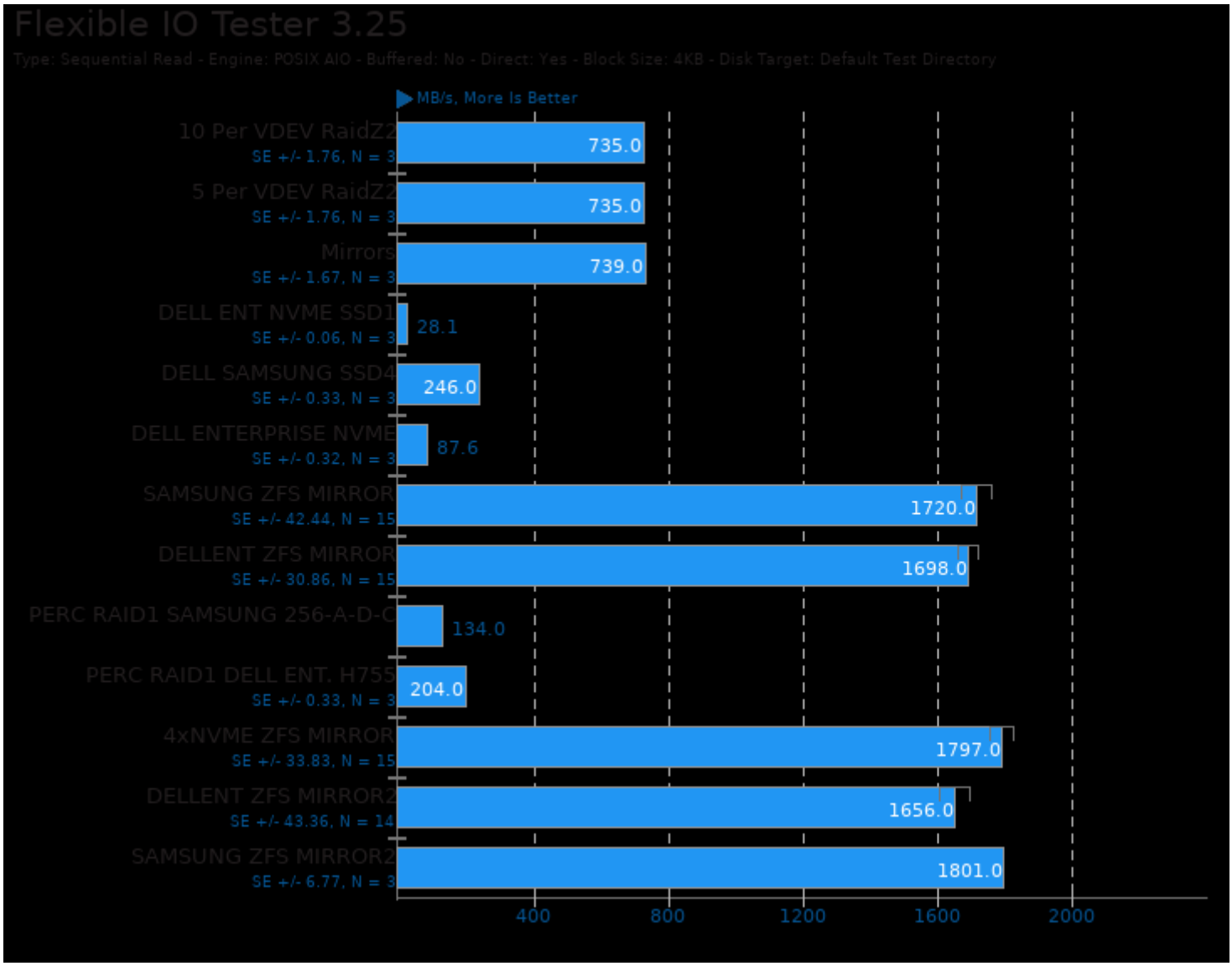


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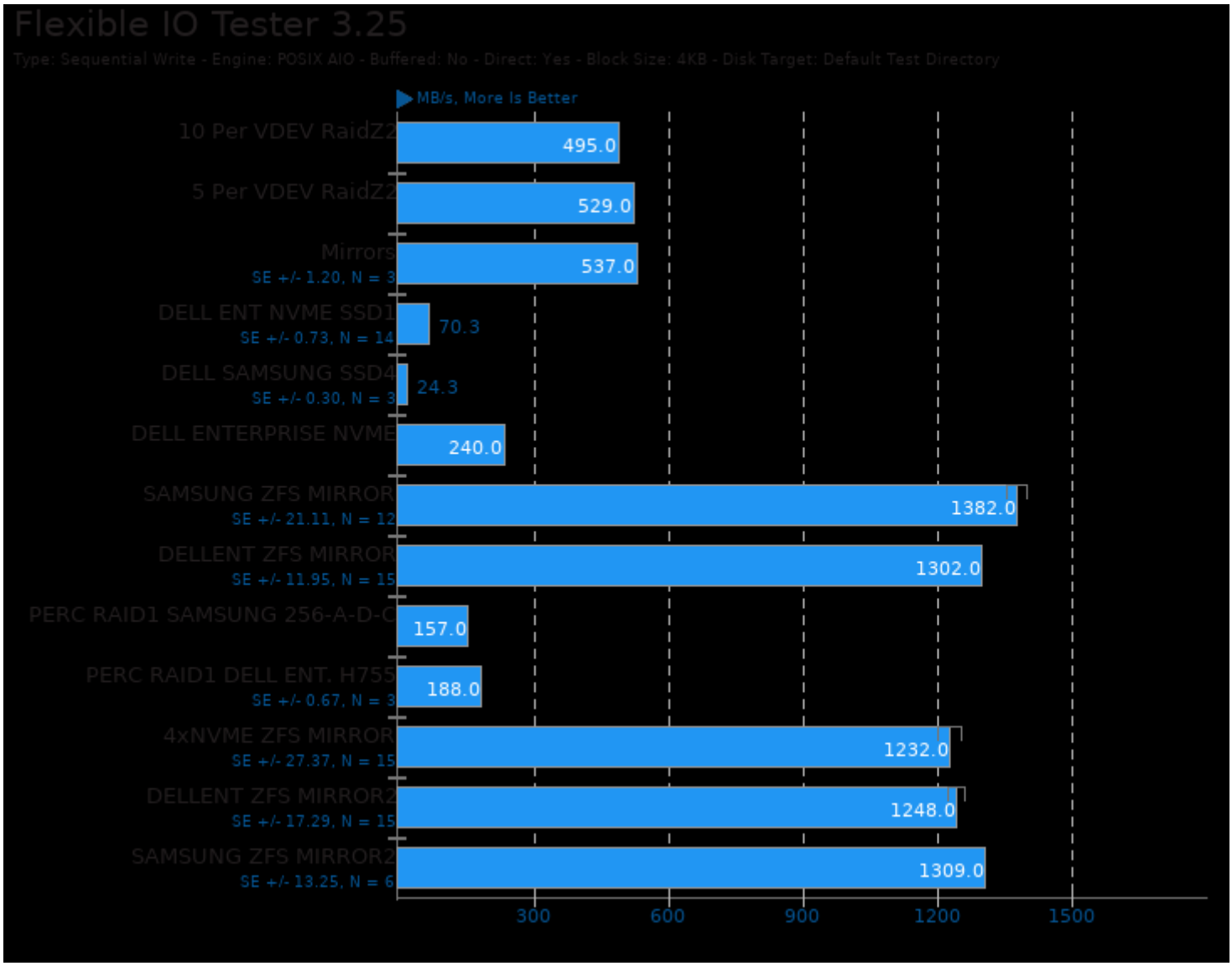



Flexible IO Tester 3.25
Type: Random Write - Engine: POSIX AIO - Buffered: No - Direct: Yes - Block Size: 128KB - Disk Target: Default Test Directory
MB/s, More Is Better
10 Per VDEV RaidZ2
SE +/- 108.58, N = 3
9083
DELL ENT NVME SSD1
SE +/- 1.45, N = 3
203
DELL SAMSUNG SSD4
2054
DELL ENTERPRISE NVME
SE +/- 1.53, N = 3
2286
SAMSUNG ZFS MIRROR
SE +/- 15.21, N = 3
6210
DELLENT ZFS MIRROR
SE +/- 58.30, N = 3
6454
PERC RAID1 SAMSUNG 256-A-D-C
SE +/- 1.33, N = 3
2798
PERC RAID1 DELL ENT. H755
SE +/- 6.39, N = 3
2334
4xNVME ZFS MIRROR
SE +/- 65.54, N = 3
5530
DELLENT ZFS MIRROR2
SE +/- 39.43, N = 3
6430
SAMSUNG ZFS MIRROR2
SE +/- 40.18, N = 3
6482
2K
4K
6K
8K
10K

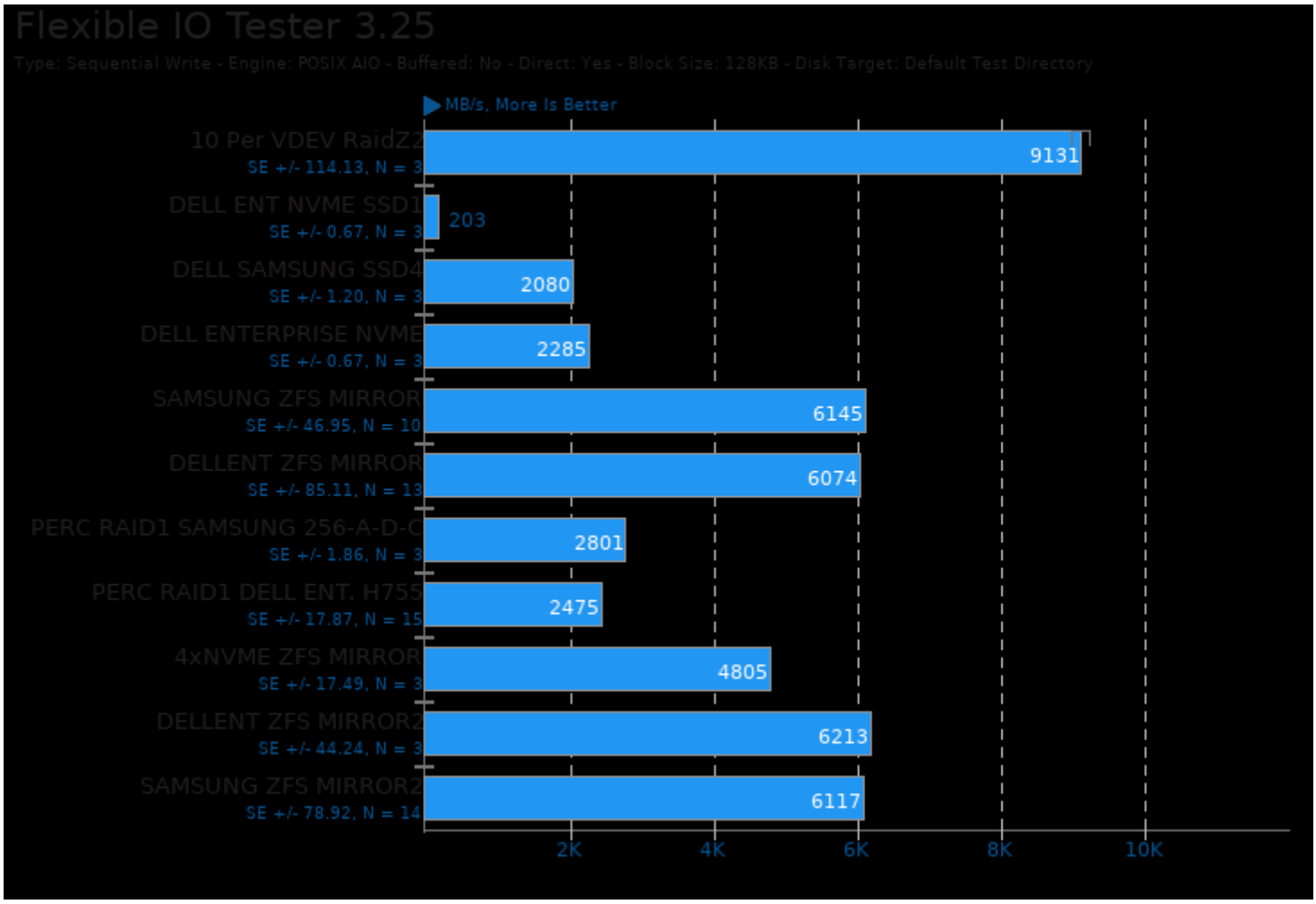
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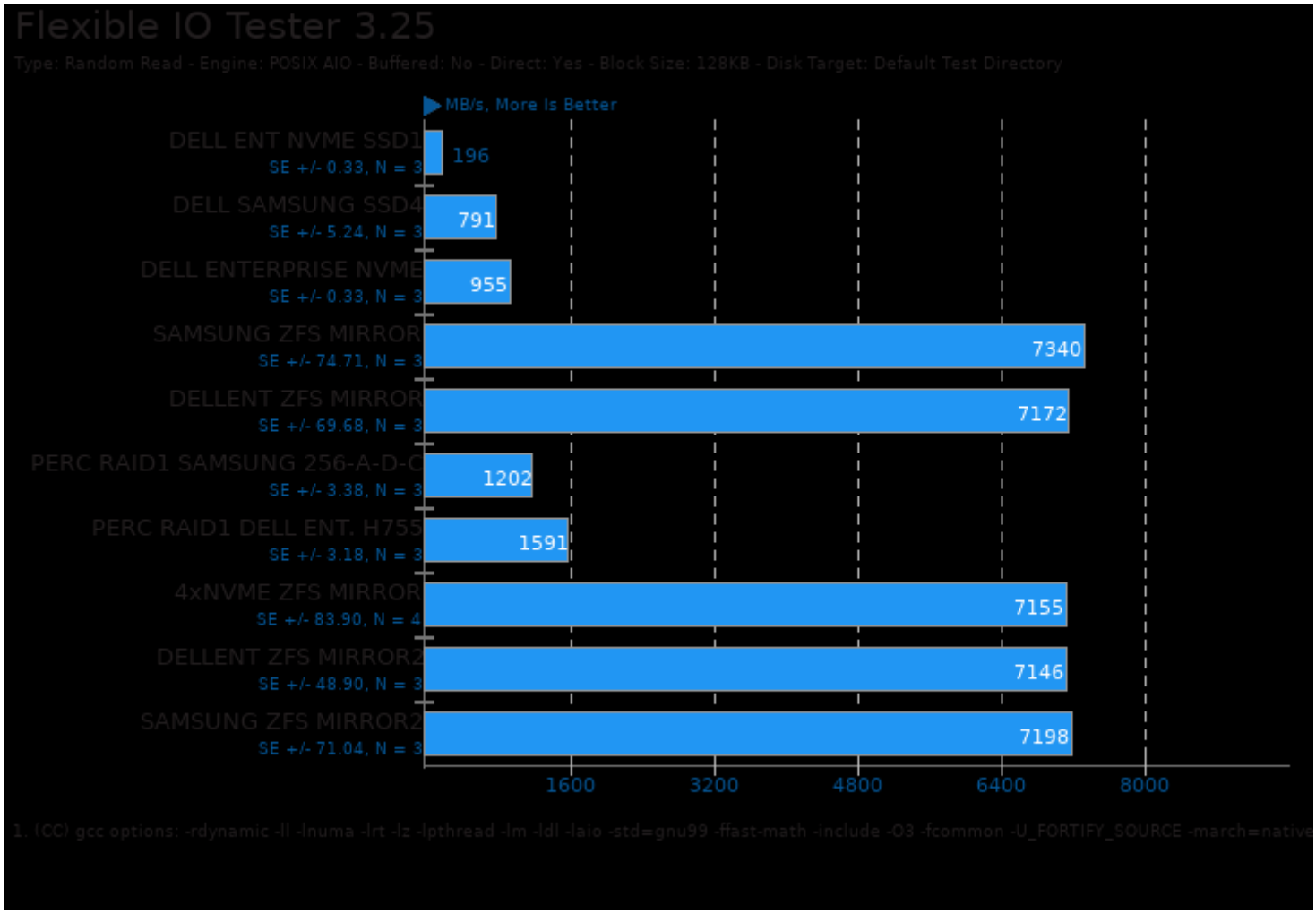


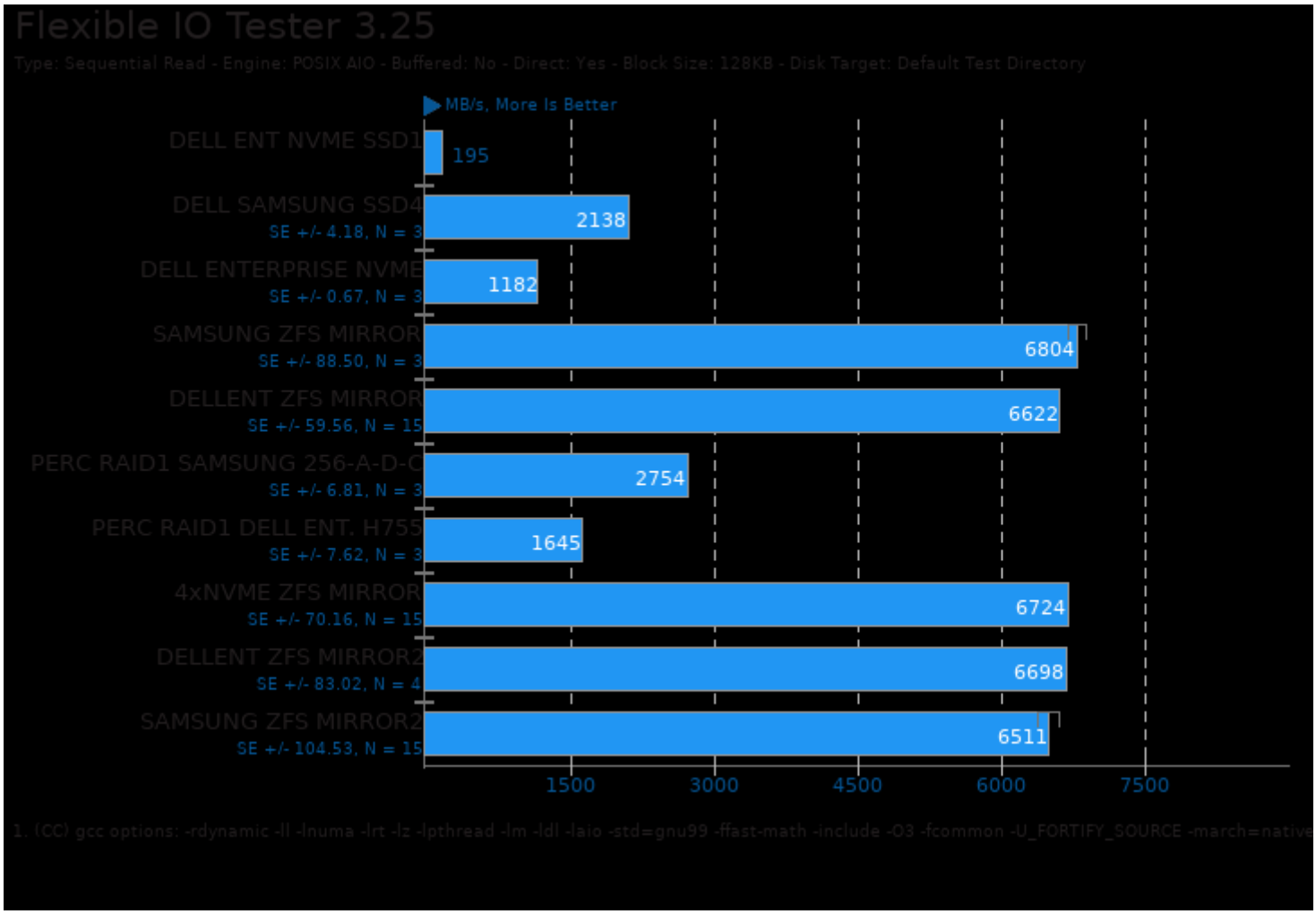
45drivesxl60



45drivesxl60




Flexible IO Tester 3.25
Type: Random Read - Engine: POSIX AIO - Buffered: No - Direct: Yes - Block Size: 128KB - Disk Target: Default Test Directory
MB/s, More Is Better
DELL ENT NVME SSD1
SE +/- 0.33, N = 3
196
DELL SAMSUNG SSD4
SE +/- 5.24, N = 3
791
DELL ENTERPRISE NVME
SE +/- 0.33, N = 3
955
SAMSUNG ZFS MIRROR
SE +/- 74.71, N = 3
7340
DELLENT ZFS MIRROR
SE +/- 69.68, N = 3
7172
PERC RAID1 SAMSUNG 256-A-D-C
SE +/- 3.38, N = 3
1202
PERC RAID1 DELL ENT. H755
SE +/- 3.18, N = 3
1591
4xNVME ZFS MIRROR
SE +/- 83.90, N = 4
7155
DELLENT ZFS MIRROR2
SE +/- 48.90, N = 3
7146
SAMSUNG ZFS MIRROR2
SE +/- 71.04, N = 3
7198
1600
3200
4800
6400
8000
1. (CC) gcc options: -rdynamic -ll -lnuma -lrt -lz -lpthread -lm -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -march=native



This file was automatically generated via the Phoronix Test Suite benchmarking software on Friday, 29 March 2024 10:44.