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vm-disk-tests

AMD Ryzen 9 5900X 12-Core testing with a QEMU Standard PC (Q35 + ICH9 2009) pc-q35-3.1 and Intel 82G33/G31/P35/P31 DRAM on FreeBSD via the Phoronix Test Suite.

Automated Executive Summary

debian nvme had the most wins, coming in first place for 50% of the tests.

Test Systems:

debian-defaults

Processor: AMD Ryzen 9 5900X 12-Core (2 Cores), Motherboard: QEMU Standard PC (Q35 + ICH9 2009) (0.0.0 BIOS), Chipset: Intel 82G33/G31/P35/P31 + ICH9, Memory: 16GB, Disk: 62GB, Graphics: bochs-drmdrmfb, Network: Intel 82540EM

OS: Debian 11, Kernel: 5.10.0-9-amd64 (x86_64), Vulkan: 1.0.2, Compiler: GCC 10.2.1 20210110, File-System: ext4, Screen Resolution: 1024x768, System Layer: KVM

Kernel Notes: Transparent Huge Pages: always
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: 0xa201016
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 Full AMD retpoline IBPB: conditional IBRS_FW STIBP: disabled RSB filling + srbds: Not affected + tsx_async_abort: Not affected

debian-nvme

debian nvme

Processor: AMD Ryzen 9 5900X 12-Core (2 Cores), Motherboard: QEMU Standard PC (Q35 + ICH9 2009) (0.0.0 BIOS), Chipset: Intel 82G33/G31/P35/P31 + ICH9, Memory: 16GB, Disk: 34GB QEMU NVMe Ctrl, Graphics: bochs-drmdrmfb, Network: Intel 82540EM

OS: Debian 11, Kernel: 5.10.0-9-amd64 (x86_64), Vulkan: 1.0.2, Compiler: GCC 10.2.1 20210110, File-System: ext4, Screen Resolution: 1024x768, System Layer: KVM

Kernel Notes: Transparent Huge Pages: always
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: 0xa201016
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 Full AMD retpoline IBPB: conditional IBRS_FW STIBP: disabled RSB filling + srbds: Not affected + tsx_async_abort: Not affected

debian virtio

Processor: AMD Ryzen 9 5900X 12-Core (2 Cores), Motherboard: QEMU Standard PC (Q35 + ICH9 2009) (0.0.0 BIOS), Chipset: Intel 82G33/G31/P35/P31 + ICH9, Memory: 16GB, Disk: 62GB, Graphics: bochs-drmdrmfb, Network: Intel 82540EM

OS: Debian 11, Kernel: 5.10.0-9-amd64 (x86_64), Vulkan: 1.0.2, Compiler: GCC 10.2.1 20210110, File-System: ext4, Screen Resolution: 1024x768, System Layer: KVM

Kernel Notes: Transparent Huge Pages: always
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: 0xa201016
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 Full AMD retpoline IBPB: conditional IBRS_FW STIBP: disabled RSB filling + srbds: Not affected + tsx_async_abort: Not affected

bsd-defaults

Processor: AMD Ryzen 9 5900X 12-Core (2 Cores), Motherboard: QEMU Standard PC (Q35 + ICH9 2009) pc-q35-3.1,

Chipset: Intel 82G33/G31/P35/P31 DRAM, Memory: 16GB, Disk: 191GB, Graphics: Intel 82G33/G31/P35/P31 DRAM, Network: Intel PRO/1000 Connection

OS: FreeBSD, Kernel: 12.2-RELEASE-p11 (x86_64), Compiler: Clang 10.0.1, File-System: zfs, Screen Resolution: 800x600

bsd defaults

Processor: AMD Ryzen 9 5900X 12-Core (2 Cores), Motherboard: QEMU Standard PC (Q35 + ICH9 2009) pc-q35-3.1, Chipset: Intel 82G33/G31/P35/P31 DRAM, Memory: 16GB, Disk: 190GB, Graphics: Intel 82G33/G31/P35/P31 DRAM, Network: Intel PRO/1000 Connection

OS: FreeBSD, Kernel: 12.2-RELEASE-p11 (x86_64), Compiler: Clang 10.0.1, File-System: zfs, Screen Resolution: 800x600

bsd12 nvme

bsd12 nvme-fixed

Processor: AMD Ryzen 9 5900X 12-Core (2 Cores), Motherboard: QEMU Standard PC (Q35 + ICH9 2009) pc-q35-3.1, Chipset: Intel 82G33/G31/P35/P31 DRAM, Memory: 16GB, Disk: Generic NVMe Device, Graphics: Intel 82G33/G31/P35/P31 DRAM, Network: Intel PRO/1000 Connection

OS: FreeBSD, Kernel: 12.2-RELEASE-p11 (x86_64), Compiler: Clang 10.0.1, File-System: zfs, Screen Resolution: 800x600

bsd12 virtio

Processor: AMD Ryzen 9 5900X 12-Core (2 Cores), Motherboard: QEMU Standard PC (Q35 + ICH9 2009) pc-q35-3.1, Chipset: Intel 82G33/G31/P35/P31 DRAM, Memory: 16GB, Disk: 190GB, Graphics: Intel 82G33/G31/P35/P31 DRAM, Network: Intel PRO/1000 Connection

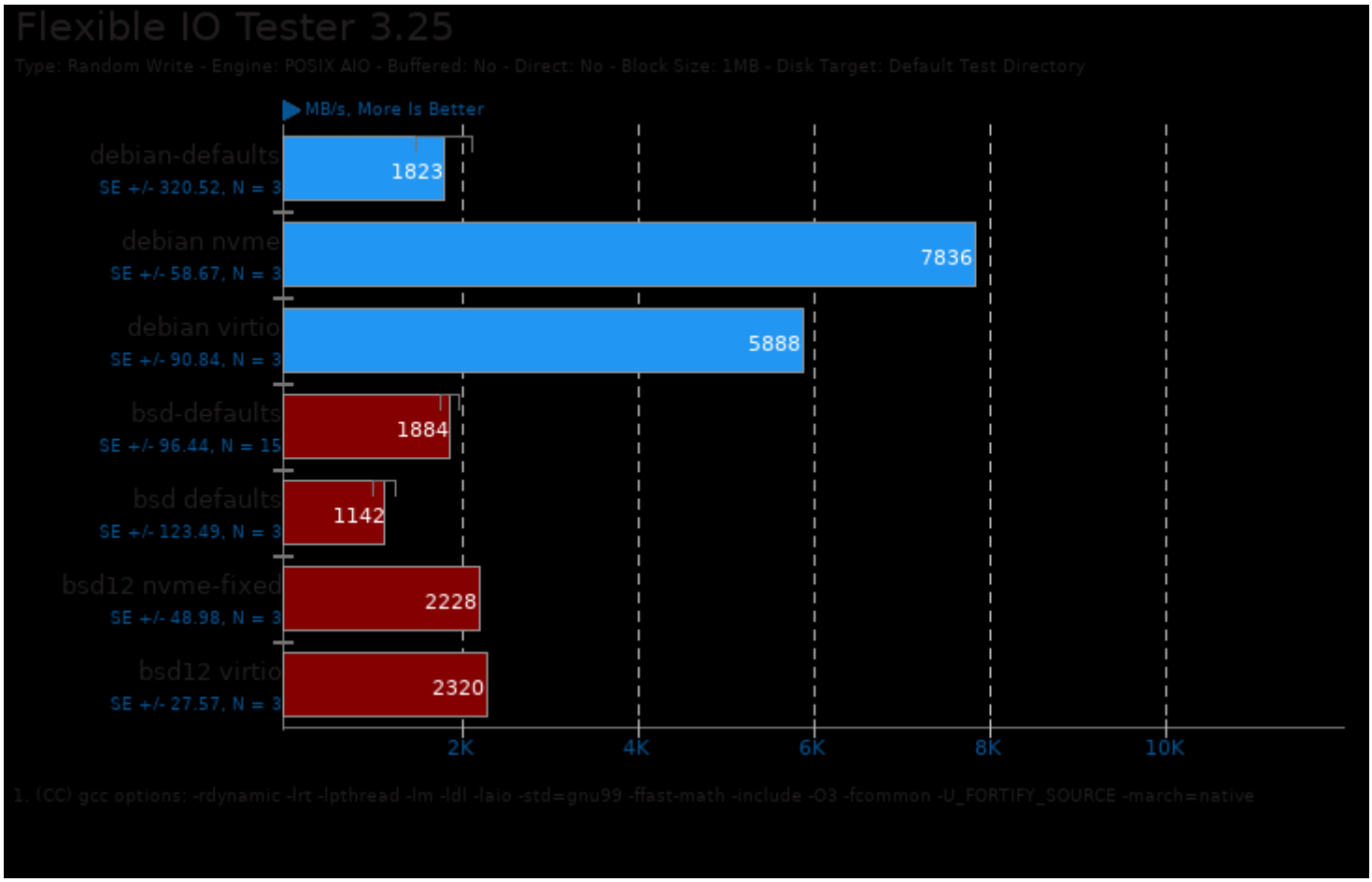
OS: FreeBSD, Kernel: 12.2-RELEASE-p11 (x86_64), Compiler: Clang 10.0.1, File-System: zfs, Screen Resolution: 800x600

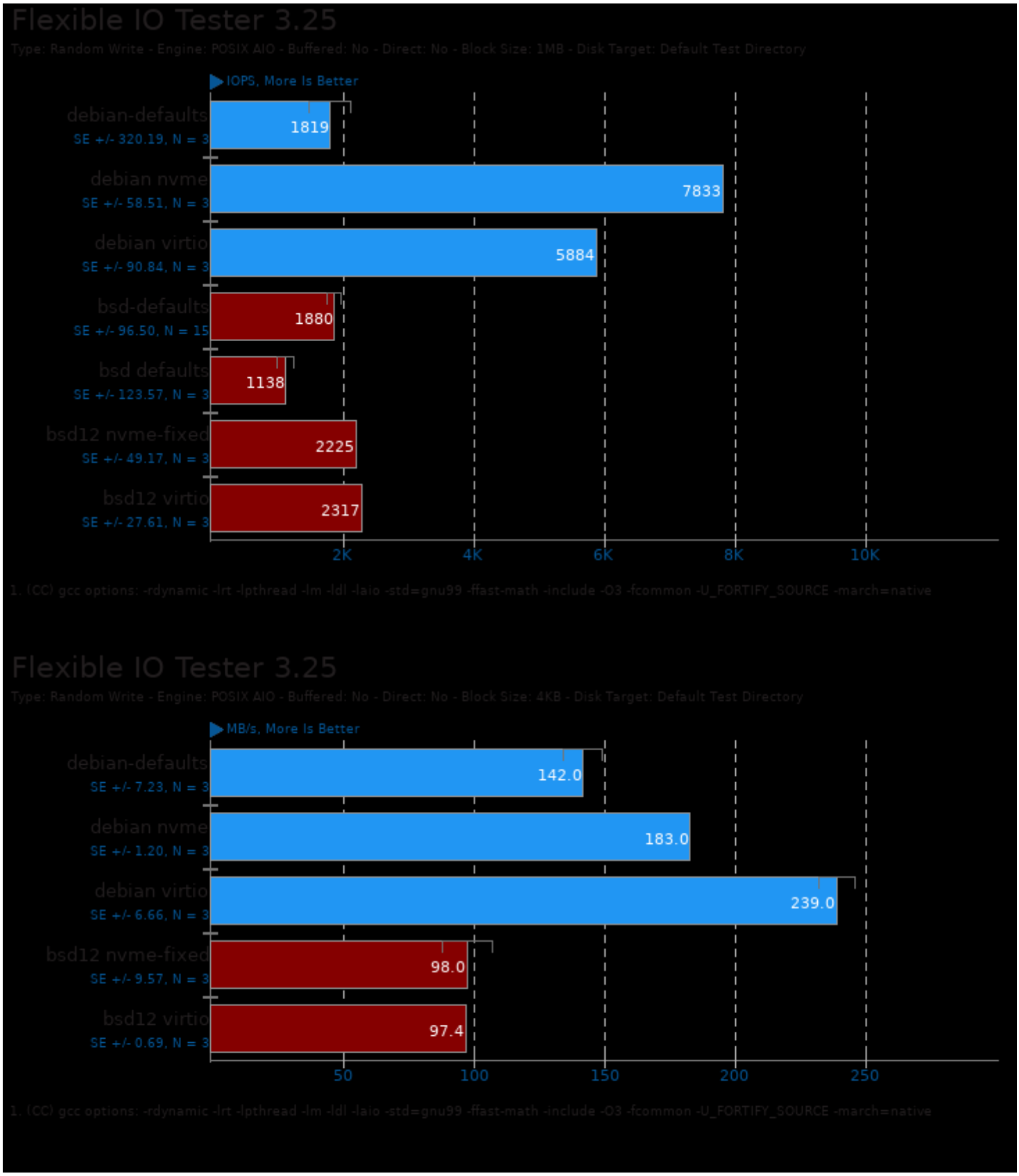
	debian-defaults	debian-nvme	debian nvme	debian virtio	bsd-defaults	bsd defaults	bsd12 nvme	bsd12 nvme-fixed	bsd12 virtio

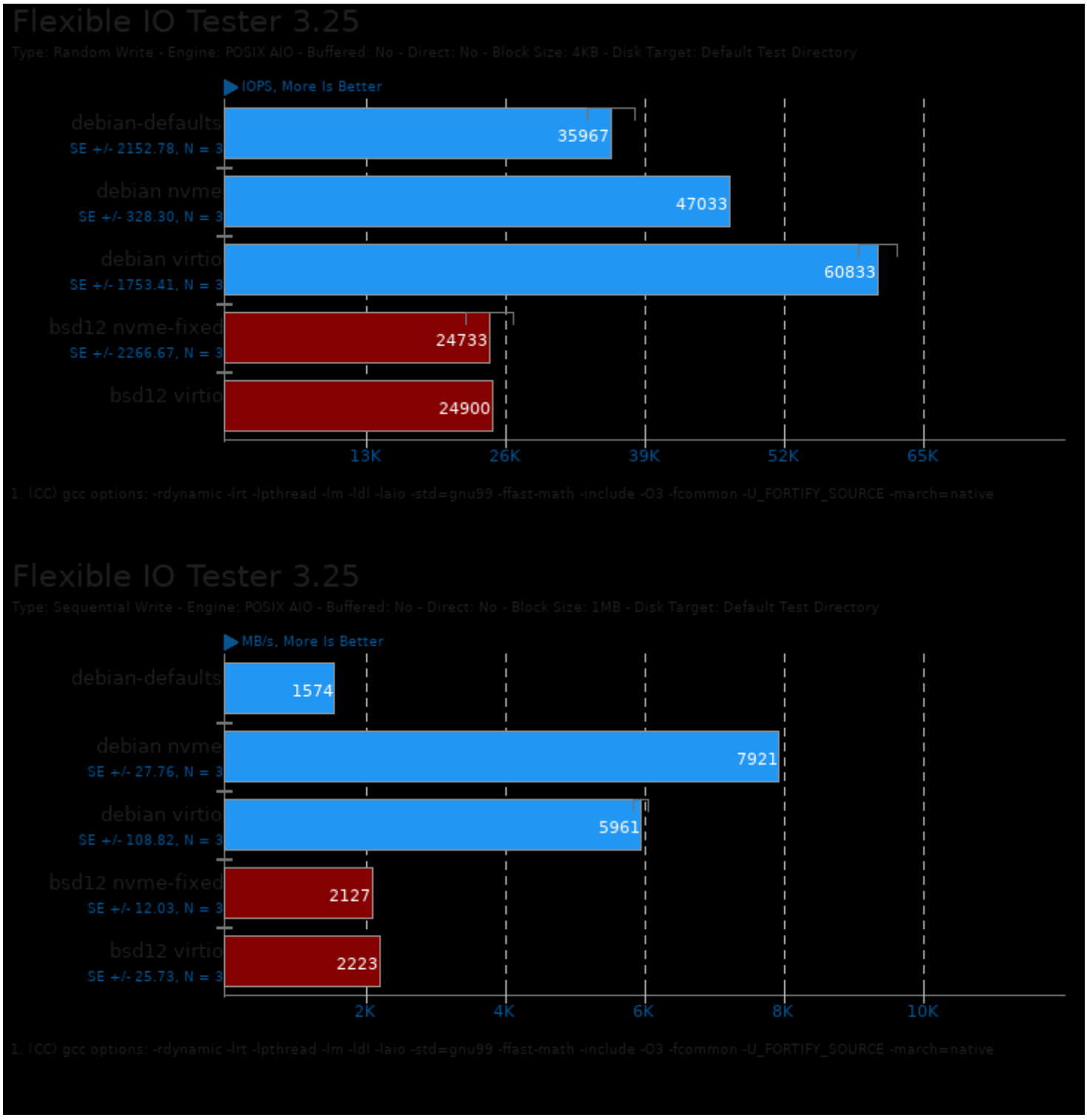
vm-disk-tests

Flexible IO Tester - Rand Write - POSIX AIO - No - No - 1MB (MB/s)	1823	**7836**	5888	1884	**1142**	2228	2320
Normalized	23.26%	100%	75.14%	24.04%	14.57%	28.43%	29.61%
Standard Deviation	30.5%	1.3%	2.7%	19.8%	18.7%	3.8%	2.1%
Flexible IO Tester - Rand Write - POSIX AIO - No - No - 1MB (IOPS)	1819	**7833**	5884	1880	**1138**	2225	2317
Normalized	23.22%	100%	75.12%	24%	14.53%	28.41%	29.58%
Standard Deviation	30.5%	1.3%	2.7%	19.9%	18.8%	3.8%	2.1%
Flexible IO Tester - Rand Write - POSIX AIO - No - No - 4KB (MB/s)	142	183	**239**			98.0	**97.4**
Normalized	59.41%	76.57%	100%			41%	40.75%
Standard Deviation	8.8%	1.1%	4.8%			16.9%	1.2%
Flexible IO Tester - Rand Write - POSIX AIO - No - No - 4KB (IOPS)	35967	47033	**60833**			**24733**	24900
Normalized	59.12%	77.31%	100%			40.66%	40.93%
Standard Deviation	10.4%	1.2%	5%			15.9%	
Flexible IO Tester - Seq Write - POSIX AIO - No - No - 1MB (MB/s)	**1574**	**7921**	5961			2127	2223
Normalized	19.87%	100%	75.26%			26.85%	28.06%
Standard Deviation		0.6%	3.2%			1%	2%
Flexible IO Tester - Seq Write - POSIX AIO - No - No - 1MB (IOPS)	**1570**	**7917**	5958			2123	2219
Normalized	19.83%	100%	75.26%			26.82%	28.03%
Standard Deviation		0.6%	3.2%			1%	2%
Flexible IO Tester - Seq Write - POSIX AIO - No - No - 4KB (MB/s)	**182**	189	234			396	**424**
Normalized	42.92%	44.58%	55.19%			93.4%	100%
Standard Deviation	5.7%	2.1%	2.6%			4.9%	3.3%
Flexible IO Tester - Seq Write - POSIX AIO - No - No - 4KB (IOPS)	**46533**	48333	59967			101533	**108667**
Normalized	42.82%	44.48%	55.18%			93.43%	100%
Standard Deviation	5.7%	2.2%	2.5%			5.1%	3.5%

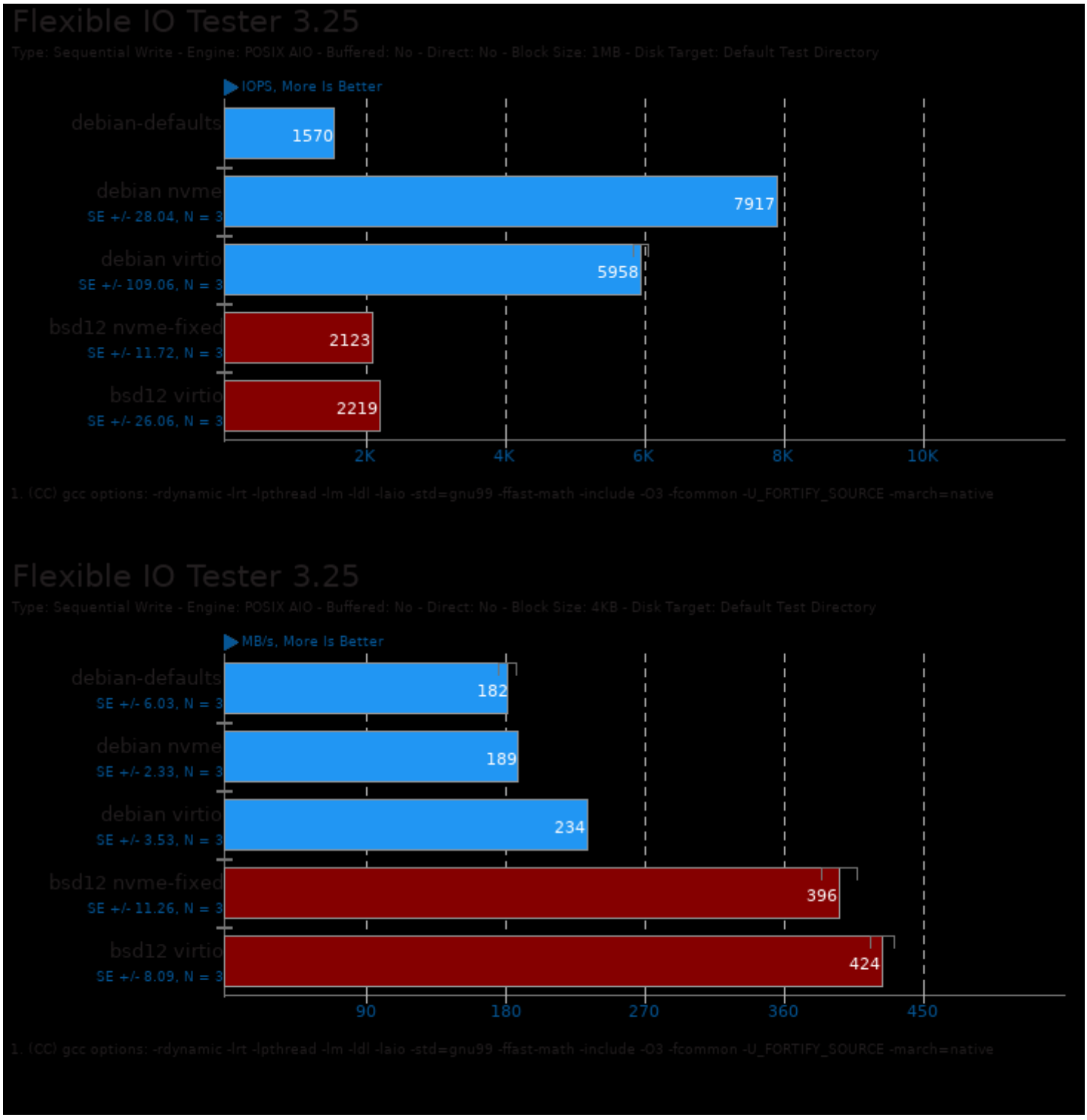
vm-disk-tests

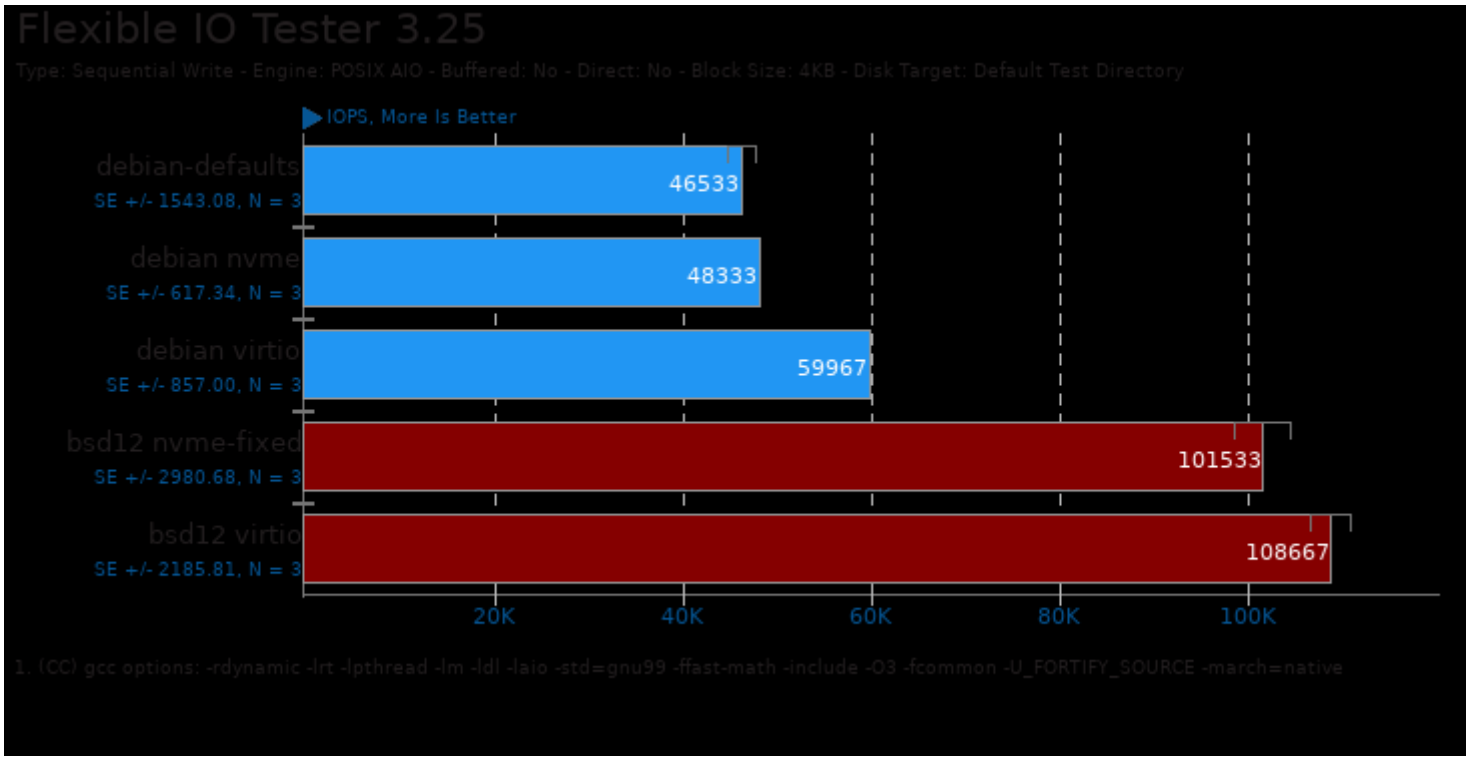



Flexible IO Tester 3.25
Type: Random Write - Engine: POSIX AIO - Buffered: No - Direct: No - Block Size: 1MB - Disk Target: Default Test Directory
IOPS, More Is Better
debian-defaults
SE +/- 320.19, N = 3
1819
debian nvme
SE +/- 58.51, N = 3
7833
debian virtio
SE +/- 90.84, N = 3
5884
bsd-defaults
SE +/- 96.50, N = 15
1880
bsd defaults
SE +/- 123.57, N = 3
1138
bsd12 nvme-fixed
SE +/- 49.17, N = 3
2225
bsd12 virtio
SE +/- 27.61, N = 3
2317
2K
4K
6K
8K
10K
1. (CC) gcc options: -rdynamic -lrt -lpthread -lm -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -march=native
Flexible IO Tester 3.25
Type: Random Write - Engine: POSIX AIO - Buffered: No - Direct: No - Block Size: 4KB - Disk Target: Default Test Directory
MB/s, More Is Better
debian-defaults
SE +/- 7.23, N = 3
142.0
debian nvme
SE +/- 1.20, N = 3
183.0
debian virtio
SE +/- 6.66, N = 3
239.0
bsd12 nvme-fixed
SE +/- 9.57, N = 3
98.0
bsd12 virtio
SE +/- 0.69, N = 3
97.4
50
100
150
200
250
1. (CC) gcc options: -rdynamic -lrt -lpthread -lm -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -march=native


Flexible IO Tester 3.25
Type: Random Write - Engine: POSIX AIO - Buffered: No - Direct: No - Block Size: 4KB - Disk Target: Default Test Directory
IOPS, More Is Better
debian-defaults
SE +/- 2152.78, N = 3
35967
debian nvme
SE +/- 328.30, N = 3
47033
debian virtio
SE +/- 1753.41, N = 3
60833
bsd12 nvme-fixed
SE +/- 2266.67, N = 3
24733
bsd12 virtio
24900
13K
26K
39K
52K
65K
1. (CC) gcc options: -rdynamic -lrt -lpthread -lm -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -march=native

Flexible IO Tester 3.25
Type: Sequential Write - Engine: POSIX AIO - Buffered: No - Direct: No - Block Size: 1MB - Disk Target: Default Test Directory
MB/s, More Is Better
debian-defaults
1574
debian nvme
SE +/- 27.76, N = 3
7921
debian virtio
SE +/- 108.82, N = 3
5961
bsd12 nvme-fixed
SE +/- 12.03, N = 3
2127
bsd12 virtio
SE +/- 25.73, N = 3
2223
2K
4K
6K
8K
10K
1. (CC) gcc options: -rdynamic -lrt -lpthread -lm -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -march=native


Flexible IO Tester 3.25
Type: Sequential Write - Engine: POSIX AIO - Buffered: No - Direct: No - Block Size: 1MB - Disk Target: Default Test Directory
IOPS, More Is Better
debian-defaults
1570
debian nvme
SE +/- 28.04, N = 3
7917
debian virtio
SE +/- 109.06, N = 3
5958
bsd12 nvme-fixed
SE +/- 11.72, N = 3
2123
bsd12 virtio
SE +/- 26.06, N = 3
2219
2K
4K
6K
8K
10K
1. (CC) gcc options: -rdynamic -lrt -lpthread -lm -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -march=native
Flexible IO Tester 3.25
Type: Sequential Write - Engine: POSIX AIO - Buffered: No - Direct: No - Block Size: 4KB - Disk Target: Default Test Directory
MB/s, More Is Better
debian-defaults
SE +/- 6.03, N = 3
182
debian nvme
SE +/- 2.33, N = 3
189
debian virtio
SE +/- 3.53, N = 3
234
bsd12 nvme-fixed
SE +/- 11.26, N = 3
396
bsd12 virtio
SE +/- 8.09, N = 3
424
90
180
270
360
450
1. (CC) gcc options: -rdynamic -lrt -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 Thursday, 28 March 2024 20:12.