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TrueNAScore51922

Xen HVM domU 4.13 testing on Ubuntu 20.04 via the Phoronix Test Suite.

Automated Executive Summary

Testing TrueNAS Core 12.0 performance had the most wins, coming in first place for 50% of the tests.

Based on the geometric mean of all complete results, the fastest (Testing TrueNAS Core 13 performace after in-place upgrade) was 1.013x the speed of the slowest (Testing TrueNAS Core 13 after a ZFS pool feature flag update). Testing TrueNAS Core 12.0 performance was 0.998x the speed of Testing TrueNAS Core 13 performace after in-place upgrade and Testing TrueNAS Core 13 after a ZFS pool feature flag update was 0.989x the speed of Testing TrueNAS Core 12.0 performance.

The results with the greatest spread from best to worst included:

Flexible IO Tester (Type: Random Write - Engine: Linux AIO - Buffered: No - Direct: No - Block Size: 128KB - Disk Target: Default Test Directory) at 1.034x
Flexible IO Tester (Type: Random Write - Engine: Linux AIO - Buffered: No - Direct: No - Block Size: 128KB - Disk Target: Default Test Directory) at 1.033x
Flexible IO Tester (Type: Random Read - Engine: Linux AIO - Buffered: No - Direct: No - Block Size: 1MB - Disk Target: Default Test Directory) at 1.029x
Flexible IO Tester (Type: Random Read - Engine: Linux AIO - Buffered: No - Direct: No - Block Size: 1MB - Disk Target:

Default Test Directory) at 1.028x
Flexible IO Tester (Type: Sequential Read - Engine: Linux AIO - Buffered: No - Direct: No - Block Size: 128KB - Disk Target: Default Test Directory) at 1.027x
Flexible IO Tester (Type: Sequential Read - Engine: Linux AIO - Buffered: No - Direct: No - Block Size: 128KB - Disk Target: Default Test Directory) at 1.027x
Flexible IO Tester (Type: Sequential Read - Engine: Linux AIO - Buffered: No - Direct: No - Block Size: 4KB - Disk Target: Default Test Directory) at 1.016x
Flexible IO Tester (Type: Sequential Read - Engine: Linux AIO - Buffered: No - Direct: No - Block Size: 4KB - Disk Target: Default Test Directory) at 1.014x
Flexible IO Tester (Type: Sequential Read - Engine: Linux AIO - Buffered: No - Direct: No - Block Size: 1MB - Disk Target: Default Test Directory) at 1.009x
Flexible IO Tester (Type: Sequential Read - Engine: Linux AIO - Buffered: No - Direct: No - Block Size: 1MB - Disk Target: Default Test Directory) at 1.009x.

Test Systems:

Testing TrueNAS Core 12.0 performance

Testing TrueNAS Core 13 performace after in-place upgrade

Testing TrueNAS Core 13 after a ZFS pool feature flag update

Processor: AMD Ryzen 5 5600G (8 Cores), Motherboard: Xen HVM domU v4.13, Chipset: Intel 440FX 82441FX PMC, Memory: 836MB, Disk: 29GB, Graphics: bochs-drmdrmfb

OS: Ubuntu 20.04, Kernel: 5.4.0-110-generic (x86_64), Vulkan: 1.1.182, Compiler: GCC 9.4.0, File-System: ext4, Screen Resolution: 1024x768, System Layer: Xen HVM domU 4.13

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-Av3uEd/gcc-9-9.4.0/debian/tmp-nvptx/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-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
Processor Notes: CPU Microcode: 0xa50000b
Disk Mount Options Notes: relatime,rw
Disk Details Notes: Block Size: 4096
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: disabled RSB filling + srbds: Not affected + tsx_async_abort: Not affected

TrueNAScore51922

	Testing TrueNAS Core 12.0 performance	Testing TrueNAS Core 13 performace after in-place	Testing TrueNAS Core 13 after a ZFS pool feature flag
Flexible IO Tester - Rand Write - Linux AIO - No - No - 1MB (IOPS)	**801**	**753**	**753**
Normalized	100%	94.01%	94.01%
Standard Deviation	22.2%	15.5%	20.3%
Flexible IO Tester - Rand Write - Linux AIO - No - No - 1MB (MB/s)	**804**	**757**	**757**
Normalized	100%	94.15%	94.15%
Standard Deviation	22.1%	15.4%	20.2%
Flexible IO Tester - Seq Write - Linux AIO - No - No - 1MB (IOPS)	735	**814**	**693**
Normalized	90.29%	100%	85.14%
Standard Deviation	16.3%	5.9%	17.2%
Flexible IO Tester - Seq Write - Linux AIO - No - No - 1MB (MB/s)	738	**817**	**697**
Normalized	90.33%	100%	85.31%
Standard Deviation	16.2%	5.9%	17.1%
Flexible IO Tester - Rand Write - Linux AIO - No - No - 128KB (IOPS)	**7698**	**7958**	7913
Normalized	96.73%	100%	99.43%
Standard Deviation	5.6%	4.5%	1.5%
Flexible IO Tester - Rand Write - Linux AIO - No - No - 128KB (MB/s)	**963**	**995**	990
Normalized	96.78%	100%	99.5%
Standard Deviation	5.6%	4.5%	1.5%
Flexible IO Tester - Rand Write - Linux AIO - No - No - 4KB (IOPS)	**66964**	70740	**73667**
Normalized	90.9%	96.03%	100%
Standard Deviation	21.2%	8.4%	1.7%
Flexible IO Tester - Rand Write - Linux AIO - No - No - 4KB (MB/s)	**261.6**	276	**288**
Normalized	90.83%	95.83%	100%
Standard Deviation	21.2%	8.5%	1.8%
Flexible IO Tester - Seq Write - Linux AIO - No - No - 4KB (IOPS)	**132600**	**138333**	137000
Normalized	95.86%	100%	99.04%
Standard Deviation	7%	1.5%	6.5%
Flexible IO Tester - Seq Write - Linux AIO - No - No - 4KB (MB/s)	**518**	**541**	536
Normalized	95.75%	100%	99.08%
Standard Deviation	6.9%	1.5%	6.5%
Flexible IO Tester - Rand Read - Linux AIO - No - No - 4KB (IOPS)	**95400**	88767	**87667**
Normalized	100%	93.05%	91.89%
Standard Deviation	0.5%	13%	12.6%
Flexible IO Tester - Rand Read - Linux AIO - No - No - 4KB (MB/s)	**373**	347	**342**
Normalized	100%	93.03%	91.69%
Standard Deviation	0.5%	13%	12.7%

TrueNAScore51922

Flexible IO Tester - Seq Write - Linux AIO - No - No - 128KB (IOPS)	**6562**	6478	**6303**
Normalized	100%	98.72%	96.05%
Standard Deviation	4.3%	1.7%	9%
Flexible IO Tester - Seq Write - Linux AIO - No - No - 128KB (MB/s)	**821**	810	**788**
Normalized	100%	98.66%	95.98%
Standard Deviation	4.3%	1.7%	9%
Flexible IO Tester - Rand Read - Linux AIO - No - No - 128KB (IOPS)	8816	**8757**	**8831**
Normalized	99.83%	99.16%	100%
Standard Deviation	0.6%	1.2%	0.5%
Flexible IO Tester - Rand Read - Linux AIO - No - No - 128KB (MB/s)	1102	**1095**	**1104**
Normalized	99.82%	99.18%	100%
Standard Deviation	0.6%	1.2%	0.5%
Flexible IO Tester - Rand Read - Linux AIO - No - No - 1MB (IOPS)	**1080**	**1050**	1074
Normalized	100%	97.22%	99.44%
Standard Deviation	1.3%		2.3%
Flexible IO Tester - Rand Read - Linux AIO - No - No - 1MB (MB/s)	**1083**	**1054**	1078
Normalized	100%	97.32%	99.54%
Standard Deviation	1.3%		2.2%
Flexible IO Tester - Seq Read - Linux AIO - No - No - 1MB (IOPS)	**1073**	1064	**1063**
Normalized	100%	99.16%	99.07%
Standard Deviation	1.2%	2%	2.3%
Flexible IO Tester - Seq Read - Linux AIO - No - No - 1MB (MB/s)	**1077**	1068	**1067**
Normalized	100%	99.16%	99.07%
Standard Deviation	1.1%	1.9%	2.3%
Flexible IO Tester - Seq Read - Linux AIO - No - No - 4KB (IOPS)	164333	**165667**	**163000**
Normalized	99.19%	100%	98.39%
Standard Deviation	0.7%	1.8%	0.6%
Flexible IO Tester - Seq Read - Linux AIO - No - No - 4KB (MB/s)	641	**647**	**638**
Normalized	99.07%	100%	98.61%
Standard Deviation	0.9%	1.8%	0.6%
Flexible IO Tester - Seq Read - Linux AIO - No - No - 128KB (IOPS)	**8721**	**8488**	8526
Normalized	100%	97.33%	97.76%
Standard Deviation	1.3%	2.5%	2.1%
Flexible IO Tester - Seq Read - Linux AIO - No - No - 128KB (MB/s)	**1090**	**1061**	1066
Normalized	100%	97.34%	97.8%
Standard Deviation	1.3%	2.5%	2.1%

TrueNAScore51922

Flexible IO Tester 3.29

Type: Random Write - Engine: Linux AIO - Buffered: No - Direct: No - Block Size: 1MB - Disk Target: Default Test Directory



1. (CC) gcc options: -rdynamic -lrt -lz -lpthread -lm -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -march=native

Flexible IO Tester 3.29

Type: Random Write - Engine: Linux AIO - Buffered: No - Direct: No - Block Size: 1MB - Disk Target: Default Test Directory



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Flexible IO Tester 3.29

Type: Sequential Write - Engine: Linux AIO - Buffered: No - Direct: No - Block Size: 1MB - Disk Target: Default Test Directory

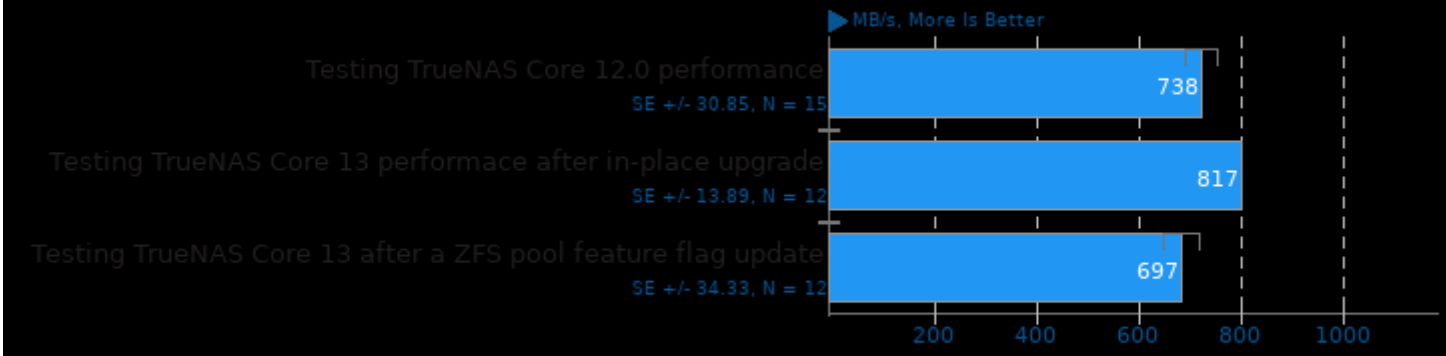


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Flexible IO Tester 3.29

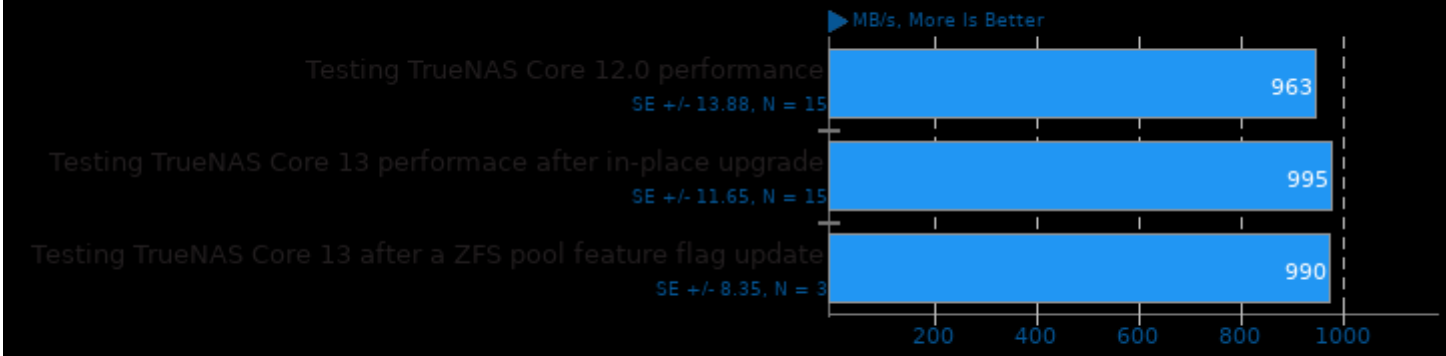
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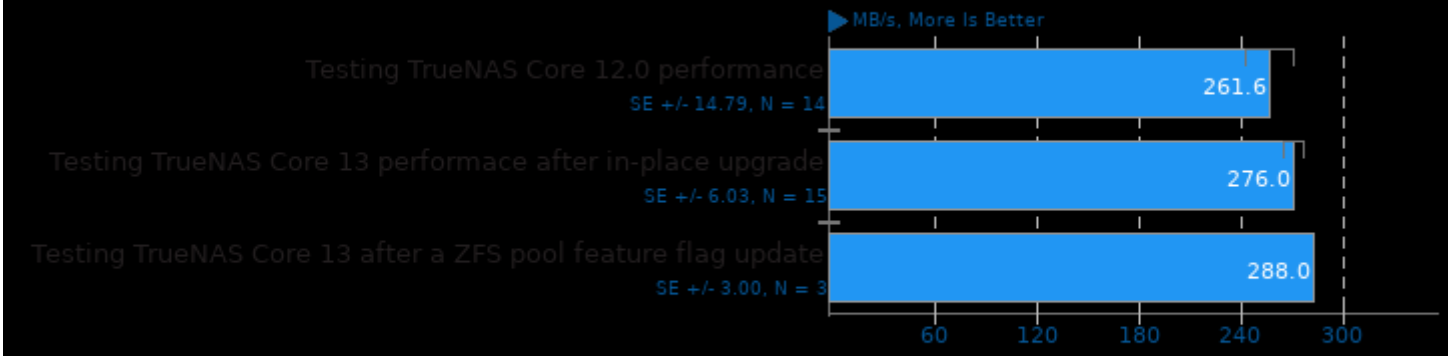
Type: Random Write - Engine: Linux AIO - Buffered: No - Direct: No - Block Size: 4KB - Disk Target: Default Test Directory



1. (CC) gcc options: -rdynamic -lrt -lz -lpthread -lm -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -march=native

Flexible IO Tester 3.29

Type: Random Write - Engine: Linux AIO - Buffered: No - Direct: No - Block Size: 4KB - Disk Target: Default Test Directory



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Flexible IO Tester 3.29

Type: Sequential Write - Engine: Linux AIO - Buffered: No - Direct: No - Block Size: 4KB - Disk Target: Default Test Directory

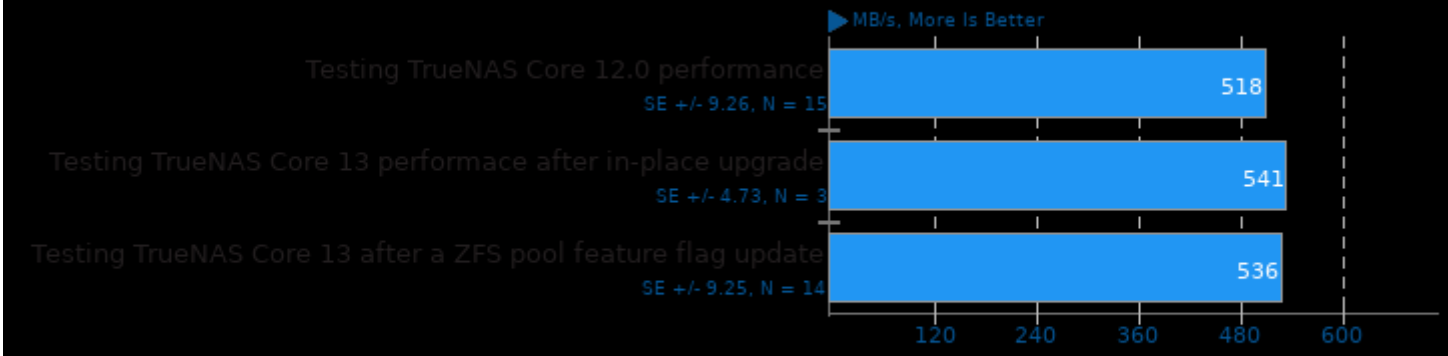


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Flexible IO Tester 3.29

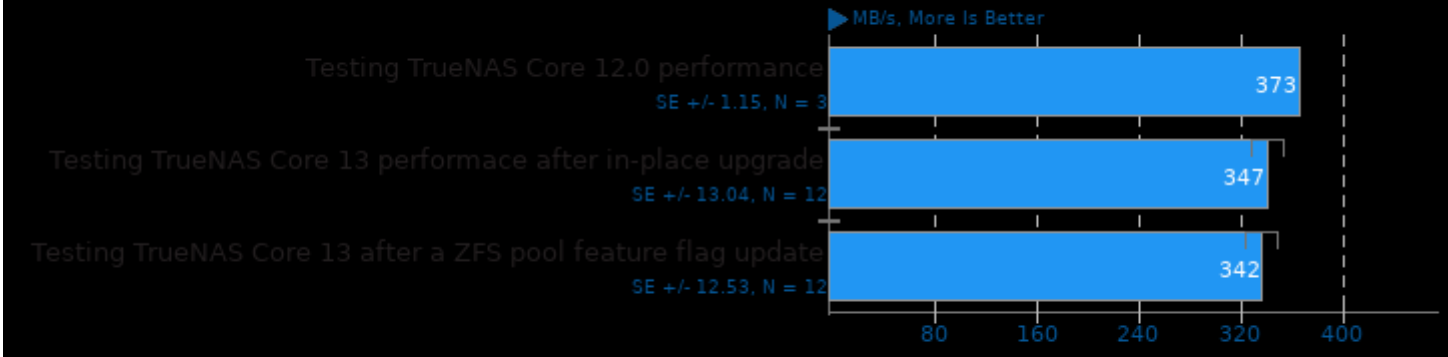
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Flexible IO Tester 3.29

Type: Sequential Write - Engine: Linux AIO - Buffered: No - Direct: No - Block Size: 128KB - Disk Target: Default Test Directory



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Flexible IO Tester 3.29

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Flexible IO Tester 3.29

Type: Random Read - Engine: Linux AIO - Buffered: No - Direct: No - Block Size: 128KB - Disk Target: Default Test Directory



1. (CC) gcc options: -rdynamic -lrt -lz -lpthread -lm -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -march=native

Flexible IO Tester 3.29

Type: Random Read - Engine: Linux AIO - Buffered: No - Direct: No - Block Size: 1MB - Disk Target: Default Test Directory



1. (CC) gcc options: -rdynamic -lrt -lz -lpthread -lm -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -march=native

Flexible IO Tester 3.29

Type: Random Read - Engine: Linux AIO - Buffered: No - Direct: No - Block Size: 1MB - Disk Target: Default Test Directory



1. (CC) gcc options: -rdynamic -lrt -lz -lpthread -lm -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -march=native

Flexible IO Tester 3.29

Type: Sequential Read - Engine: Linux AIO - Buffered: No - Direct: No - Block Size: 1MB - Disk Target: Default Test Directory



1. (CC) gcc options: -rdynamic -lrt -lz -lpthread -lm -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -march=native

Flexible IO Tester 3.29

Type: Sequential Read - Engine: Linux AIO - Buffered: No - Direct: No - Block Size: 1MB - Disk Target: Default Test Directory



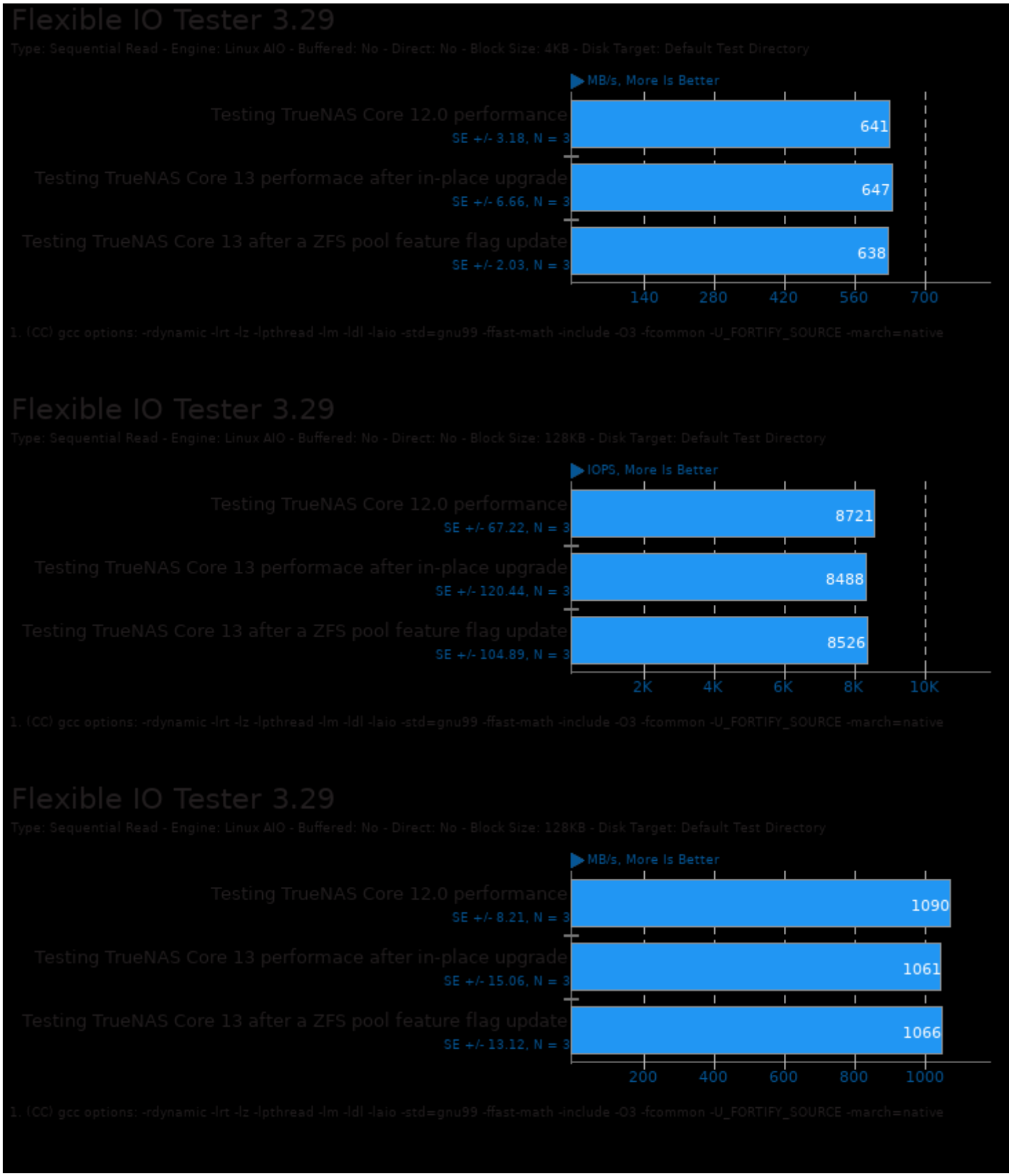
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Flexible IO Tester 3.29

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