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Samsung 970 EVO Plus benchmarks by Michael Larabel for a future article on Phoronix.com.

Automated Executive Summary

Samsung 970 PRO 512GB had the most wins, coming in first place for 35% of the tests.

Based on the geometric mean of all complete results, the fastest (Intel DC P3600 800GB) was 11.124x the speed of the slowest (Samsung 850 PRO 256GB). Intel Optane 900p 280GB was 0.877x the speed of Intel DC P3600 800GB, Samsung 970 PRO 512GB was 0.786x the speed of Intel Optane 900p 280GB, Samsung 970 EVO Plus 500GB was 0.9x the speed of Samsung 970 PRO 512GB, JNJT Evo 970 Plus 500GB Linux Mint 20 was 0.835x the speed of Samsung 970 EVO Plus 500GB, Samsung 970 EVO 500GB was 0.887x the speed of JNJT Evo 970 Plus 500GB Linux Mint 20, Intel 600p 512GB was 0.892x the speed of Samsung 970 EVO 500GB, Samsung 970 EVO 250GB was 0.869x the speed of Intel 600p 512GB, Samsung 850 PRO 256GB was 0.253x the speed of Samsung 970 EVO 250GB.

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

Flexible IO Tester (Type: Random Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory) at 62.651x
FS-Mark (Test: 4000 Files, 32 Sub Dirs, 1MB Size) at 27.853x
FS-Mark (Test: 1000 Files, 1MB Size) at 25.123x
Application Start-up Time (Background I/O Mix: Sequential Reads + Writes - Application To Start: GNOME Terminal -

Disk Target: Default Test Directory) at 21.968x
SQLite (Timed SQLite Insertions) at 21.532x
PostgreSQL pgbench (Scaling: Mostly RAM - Test: Normal Load - Mode: Read Write) at 20.329x
Flexible IO Tester (Type: Random Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory) at 16.97x
Flexible IO Tester (Type: Random Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory) at 16.942x
Flexible IO Tester (Type: Sequential Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory) at 16.238x
SQLite (Performance / Cost - Timed SQLite Insertions) at 15.833x.

Test Systems:

Intel 600p 512GB

Processor: AMD Ryzen Threadripper 2990WX 32-Core @ 3.00GHz (32 Cores / 64 Threads), Motherboard: ASUS ROG ZENITH EXTREME (1601 BIOS), Chipset: AMD Family 17h, Memory: 4 x 8192 MB DDR4-1600MT/s F4-3200C14-8GFX, Disk: 512GB INTEL SSDPEKNW512G8, Graphics: llvmpipe, Audio: Realtek ALC1220, Network: Intel I211 + Qualcomm Atheros QCA6174 802.11ac + Wilocity Wil6200 802.11ad

OS: Ubuntu 18.04, Kernel: 5.0.0-050000rc6-generic (x86_64) 20190210, Desktop: GNOME Shell 3.28.3, Display Server: X Server 1.19.6, Display Driver: modesetting 1.19.6, OpenGL: 3.3 Mesa 18.0.5 (LLVM 6.0 128 bits), Compiler: GCC 7.3.0, File-System: ext4, Screen Resolution: 1280x1024

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++ --enable-libmpx --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none --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 --with-tune=generic --without-cuda-driver -v
Disk Notes: NONE / relatime,rw
Processor Notes: Scaling Governor: acpi-cpufreq ondemand
Python Notes: Python 2.7.15rc1 + Python 3.6.7
Security Notes: __user pointer sanitization + Full AMD retpoline IBPB: conditional STIBP: disabled RSB filling + SSB disabled via prctl and seccomp

Intel DC P3600 800GB

Processor: AMD Ryzen Threadripper 2990WX 32-Core @ 3.00GHz (32 Cores / 64 Threads), Motherboard: ASUS ROG ZENITH EXTREME (1601 BIOS), Chipset: AMD Family 17h, Memory: 4 x 8192 MB DDR4-1600MT/s F4-3200C14-8GFX, Disk: 800GB INTEL SSDPE2ME800G4, Graphics: llvmpipe, Audio: Realtek ALC1220, Network: Intel I211 + Qualcomm Atheros QCA6174 802.11ac + Wilocity Wil6200 802.11ad

OS: Ubuntu 18.04, Kernel: 5.0.0-050000rc6-generic (x86_64) 20190210, Desktop: GNOME Shell 3.28.3, Display Server: X Server 1.19.6, Display Driver: modesetting 1.19.6, OpenGL: 3.3 Mesa 18.0.5 (LLVM 6.0 128 bits), Compiler: GCC 7.3.0, File-System: ext4, Screen Resolution: 1280x1024

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++ --enable-libmpx --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none --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 --with-tune=generic --without-cuda-driver -v
Disk Notes: NONE / relatime,rw

Processor Notes: Scaling Governor: acpi-cpufreq ondemand
Python Notes: Python 2.7.15rc1 + Python 3.6.7
Security Notes: __user pointer sanitization + Full AMD retpoline IBPB: conditional STIBP: disabled RSB filling + SSB disabled via prctl and seccomp

Intel Optane 900p 280GB

Processor: AMD Ryzen Threadripper 2990WX 32-Core @ 3.00GHz (32 Cores / 64 Threads), Motherboard: ASUS ROG ZENITH EXTREME (1601 BIOS), Chipset: AMD Family 17h, Memory: 4 x 8192 MB DDR4-1600MT/s F4-3200C14-8GFX, Disk: 280GB INTEL SSDPE21D280GA, Graphics: llvmpipe, Audio: Realtek ALC1220, Network: Intel I211 + Qualcomm Atheros QCA6174 802.11ac + Wilocity Wil6200 802.11ad

OS: Ubuntu 18.04, Kernel: 5.0.0-050000rc6-generic (x86_64) 20190210, Desktop: GNOME Shell 3.28.3, Display Server: X Server 1.19.6, Display Driver: modesetting 1.19.6, OpenGL: 3.3 Mesa 18.0.5 (LLVM 6.0 128 bits), Compiler: GCC 7.3.0, File-System: ext4, Screen Resolution: 1280x1024

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++ --enable-libmpx --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none --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 --with-tune=generic --without-cuda-driver -v
Disk Notes: NONE / relatime,rw,stripe=256
Processor Notes: Scaling Governor: acpi-cpufreq ondemand
Python Notes: Python 2.7.15rc1 + Python 3.6.7
Security Notes: __user pointer sanitization + Full AMD retpoline IBPB: conditional STIBP: disabled RSB filling + SSB disabled via prctl and seccomp

Samsung 850 PRO 256GB

Processor: AMD Ryzen Threadripper 2990WX 32-Core @ 3.00GHz (32 Cores / 64 Threads), Motherboard: ASUS ROG ZENITH EXTREME (1601 BIOS), Chipset: AMD Family 17h, Memory: 4 x 8192 MB DDR4-1600MT/s F4-3200C14-8GFX, Disk: 256GB Samsung SSD 850, Graphics: llvmpipe, Audio: Realtek ALC1220, Network: Intel I211 + Qualcomm Atheros QCA6174 802.11ac + Wilocity Wil6200 802.11ad

OS: Ubuntu 18.04, Kernel: 5.0.0-050000rc6-generic (x86_64) 20190210, Desktop: GNOME Shell 3.28.3, Display Server: X Server 1.19.6, Display Driver: modesetting 1.19.6, OpenGL: 3.3 Mesa 18.0.5 (LLVM 6.0 128 bits), Compiler: GCC 7.3.0, File-System: ext4, Screen Resolution: 1280x1024

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++ --enable-libmpx --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none --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 --with-tune=generic --without-cuda-driver -v
Disk Notes: MQ-DEADLINE / relatime,rw,stripe=8191
Processor Notes: Scaling Governor: acpi-cpufreq ondemand
Python Notes: Python 2.7.15rc1 + Python 3.6.7
Security Notes: __user pointer sanitization + Full AMD retpoline IBPB: conditional STIBP: disabled RSB filling + SSB disabled via prctl and seccomp

Samsung 970 EVO 250GB

Processor: AMD Ryzen Threadripper 2990WX 32-Core @ 3.00GHz (32 Cores / 64 Threads), Motherboard: ASUS ROG ZENITH EXTREME (1601 BIOS), Chipset: AMD Family 17h, Memory: 4 x 8192 MB DDR4-1600MT/s F4-3200C14-8GFX, Disk: Samsung SSD 970 EVO 250GB, Graphics: llvmpipe, Audio: Realtek ALC1220, Network: Intel I211 + Qualcomm Atheros QCA6174 802.11ac + Wilocity Wil6200 802.11ad

OS: Ubuntu 18.04, Kernel: 5.0.0-050000rc6-generic (x86_64) 20190210, Desktop: GNOME Shell 3.28.3, Display Server: X Server 1.19.6, Display Driver: modesetting 1.19.6, OpenGL: 3.3 Mesa 18.0.5 (LLVM 6.0 128 bits), Compiler: GCC 7.3.0, File-System: ext4, Screen Resolution: 1280x1024

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++ --enable-libmpx --enable-libstdcxx-debug --enable-libstdcxx-time=yes

--enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none --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 --with-tune=generic --without-cuda-driver -v
Disk Notes: NONE / relatime,rw
Processor Notes: Scaling Governor: acpi-cpufreq ondemand
Python Notes: Python 2.7.15rc1 + Python 3.6.7
Security Notes: __user pointer sanitization + Full AMD retpoline IBPB: conditional STIBP: disabled RSB filling + SSB disabled via prctl and seccomp

Samsung 970 EVO 500GB

Processor: AMD Ryzen Threadripper 2990WX 32-Core @ 3.00GHz (32 Cores / 64 Threads), Motherboard: ASUS ROG ZENITH EXTREME (1601 BIOS), Chipset: AMD Family 17h, Memory: 4 x 8192 MB DDR4-1600MT/s F4-3200C14-8GFX, Disk: Samsung SSD 970 EVO 500GB, Graphics: llvmpipe, Audio: Realtek ALC1220, Network: Intel I211 + Qualcomm Atheros QCA6174 802.11ac + Wilocity Wil6200 802.11ad

OS: Ubuntu 18.04, Kernel: 5.0.0-050000rc6-generic (x86_64) 20190210, Desktop: GNOME Shell 3.28.3, Display Server: X Server 1.19.6, Display Driver: modesetting 1.19.6, OpenGL: 3.3 Mesa 18.0.5 (LLVM 6.0 128 bits), Compiler: GCC 7.3.0, File-System: ext4, Screen Resolution: 1280x1024

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++ --enable-libmpx --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none --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 --with-tune=generic --without-cuda-driver -v
Disk Notes: NONE / errors=remount-ro,relatime,rw
Processor Notes: Scaling Governor: acpi-cpufreq ondemand
Python Notes: Python 2.7.15rc1 + Python 3.6.7
Security Notes: __user pointer sanitization + Full AMD retpoline IBPB: conditional STIBP: disabled RSB filling + SSB disabled via prctl and seccomp

Samsung 970 EVO Plus 500GB

Processor: AMD Ryzen Threadripper 2990WX 32-Core @ 3.00GHz (32 Cores / 64 Threads), Motherboard: ASUS ROG ZENITH EXTREME (1601 BIOS), Chipset: AMD Family 17h, Memory: 4 x 8192 MB DDR4-1600MT/s F4-3200C14-8GFX, Disk: Samsung SSD 970 EVO Plus 500GB, Graphics: llvmpipe, Audio: Realtek ALC1220, Network: Intel I211 + Qualcomm Atheros QCA6174 802.11ac + Wilocity Wil6200 802.11ad

OS: Ubuntu 18.04, Kernel: 5.0.0-050000rc6-generic (x86_64) 20190210, Desktop: GNOME Shell 3.28.3, Display Server: X Server 1.19.6, Display Driver: modesetting 1.19.6, OpenGL: 3.3 Mesa 18.0.5 (LLVM 6.0 128 bits), Compiler: GCC 7.3.0, File-System: ext4, Screen Resolution: 1280x1024

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++ --enable-libmpx --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none --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 --with-tune=generic --without-cuda-driver -v
Disk Notes: NONE / relatime,rw
Processor Notes: Scaling Governor: acpi-cpufreq ondemand
Python Notes: Python 2.7.15rc1 + Python 3.6.7
Security Notes: __user pointer sanitization + Full AMD retpoline IBPB: conditional STIBP: disabled RSB filling + SSB disabled via prctl and seccomp

Samsung 970 PRO 512GB

Processor: AMD Ryzen Threadripper 2990WX 32-Core @ 3.00GHz (32 Cores / 64 Threads), Motherboard: ASUS ROG ZENITH EXTREME (1601 BIOS), Chipset: AMD Family 17h, Memory: 4 x 8192 MB DDR4-1600MT/s F4-3200C14-8GFX, Disk: Samsung SSD 970 PRO 512GB, Graphics: llvmpipe, Audio: Realtek ALC1220, Network: Intel I211 + Qualcomm Atheros QCA6174 802.11ac + Wilocity Wil6200 802.11ad

OS: Ubuntu 18.04, Kernel: 5.0.0-050000rc6-generic (x86_64) 20190210, Desktop: GNOME Shell 3.28.3, Display Server: X Server 1.19.6, Display Driver: modesetting 1.19.6, OpenGL: 3.3 Mesa 18.0.5 (LLVM 6.0 128 bits), Compiler: GCC 7.3.0, File-System: ext4, Screen Resolution: 1280x1024

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++ --enable-libmpx --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none --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 --with-tune=generic --without-cuda-driver -v
Disk Notes: NONE / relatime,rw
Processor Notes: Scaling Governor: acpi-cpufreq ondemand
Python Notes: Python 2.7.15rc1 + Python 3.6.7
Security Notes: __user pointer sanitization + Full AMD retpoline IBPB: conditional STIBP: disabled RSB filling + SSB disabled via prctl and seccomp

JNJT Evo 970 Plus 500GB Linux Mint 20

Processor: Intel Core i7-6700T @ 3.60GHz (4 Cores / 8 Threads), Motherboard: HP 8169 (N22 Ver. 02.20 BIOS), Chipset: Intel Xeon E3-1200 v5/E3-1500, Memory: 1 x 8192 MB DDR4-2133MT/s HMA41GS6AFR8N-TF, Disk: Samsung SSD 970 EVO Plus 500GB + 1000GB Western Digital WD10JPVX-00J, Graphics: Intel HD 530 3GB (1100MHz), Audio: Realtek ALC221, Monitor: SMBX2231, Network: Intel I219-LM

OS: Linuxmint 20, Kernel: 5.4.0-58-generic (x86_64), Display Server: X Server 1.20.8, Display Driver: modesetting 1.20.8, OpenGL: 4.6 Mesa 20.0.8, Vulkan: 1.2.131, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 1920x1080

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-HskZEa/gcc-9-9.3.0/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
Disk Notes: NONE / errors=remount-ro,relatime,rw
Processor Notes: Scaling Governor: intel_pstate performance - CPU Microcode: 0xe2 - Thermald 1.9.1
Python Notes: Python 3.8.5
Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + l1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT vulnerable + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Mitigation of PTI + 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 generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + srbds: Mitigation of Microcode + tsx_async_abort: Mitigation of Clear buffers; SMT vulnerable

	Intel 600p 512GB	Intel DC P3600 800GB	Intel Optane 900p 280GB	Samsung 850 PRO 256GB	Samsung 970 EVO 250GB	Samsung 970 EVO 500GB	Samsung 970 EVO Plus 500GB	Samsung 970 PRO 512GB	JNJT Evo 970 Plus 500GB Linux Mint 20
Application Start-up Time - O.S.R - xterm (sec)	0.73	0.35	0.53	**1.89**	0.93	0.61	0.36	**0.25**	0.399444
Normalized	34.25%	71.43%	47.17%	13.23%	26.88%	40.98%	69.44%	100%	62.59%
Standard Deviation	1.1%	2.4%	0.4%	2.6%	29.6%	3%	10.7%	3.3%	3.7%
Application Start-up Time - O.S.R - GNOME Terminal (sec)	3.16	1.35	2.07	**8.28**	4.62	2.36	1.50	**0.98**	1.51111
Normalized	31.01%	72.59%	47.34%	11.84%	21.21%	41.53%	65.33%	100%	64.85%
Standard Deviation	1.3%	0.9%	0.6%	1%	1.4%	0.7%	1.4%	2.3%	0.6%

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Application Start-up Time - O.S.R - LibreOffice Writer (sec)	2.33	1.16	1.40	**6.17**	4.04	1.99	1.23	**0.86**	1.19334
Normalized	36.91%	74.14%	61.43%	13.94%	21.29%	43.22%	69.92%	100%	72.07%
Standard Deviation	0.4%	0.7%	1.1%	0.8%	0.8%	0.9%	1%	0.6%	2.7%
Application Start-up Time - S.R.W - GNOME Terminal (sec)	**2.51**	2.83	3.62	**55.14**	3.88	3.22	2.83	3.22	4.22394
Normalized	100%	88.69%	69.34%	4.55%	64.69%	77.95%	88.69%	77.95%	59.42%
Standard Deviation	1.4%	1.1%	16.2%	6.8%	0.7%	1.8%	2.5%	0.9%	2.9%
Application Start-up Time - S.R.W - LibreOffice Writer (sec)	**2.03**	2.60	2.08	**39.81**	3.13	3.03	2.16	2.35	3.05417
Normalized	100%	78.08%	97.6%	5.1%	64.86%	67%	93.98%	86.38%	66.47%
Standard Deviation	12.9%	3.2%	17.7%	9.4%	1.1%	15.7%	6.1%	2.5%	2.8%
SQLite - T.S.I (sec)	14.57	2.36	**2.35**	**50.60**	37.09	36.15	33.59	43.84	37.619
Normalized	16.13%	99.58%	100%	4.64%	6.34%	6.5%	7%	5.36%	6.25%
Standard Deviation	2.1%	0.3%	1.5%	4.2%	0.6%	0.3%	0.3%	0.2%	0.3%
Flexible IO Tester - Rand Read - Linux AIO - No - Yes - 2MB (MB/s)	1608	2379	2338	**531**	3292	3354	**3413**	**3413**	
Normalized	47.11%	69.7%	68.5%	15.56%	96.45%	98.27%	100%	100%	
Standard Deviation		0.2%			0.6%				
Flexible IO Tester - Rand Read - Linux AIO - No - Yes - 4KB (MB/s)	**321**	1005	**1081**	374	420	702	723	752	
Normalized	29.69%	92.97%	100%	34.6%	38.85%	64.94%	66.88%	69.57%	
Standard Deviation		1.8%	0.4%	0.2%		0.4%	0.6%	0.5%	
Flexible IO Tester - Rand Read - Linux AIO - No - Yes - 4KB (IOPS)	**82200**	257333	**276667**	95833	108000	179667	185333	192000	
Normalized	29.71%	93.01%	100%	34.64%	39.04%	64.94%	66.99%	69.4%	
Standard Deviation		1.8%	0.4%	0.1%		0.3%	0.6%	0.5%	
Flexible IO Tester - Rand Write - Linux AIO - No - Yes - 2MB (MB/s)	943	890	1302	**49.64**	1464	2372	**3110**	2228	
Normalized	30.32%	28.62%	41.86%	1.6%	47.07%	76.27%	100%	71.64%	
Standard Deviation	0.1%		0.9%	22.7%	0%	0.1%	0%	0.2%	

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Flexible IO Tester - Rand Write - Linux AIO - No - Yes - 4KB (MB/s)	833	610	442	**58.08**	974	976	947	**984**	
Normalized	84.65%	61.99%	44.92%	5.9%	98.98%	99.19%	96.24%	100%	
Standard Deviation	1.3%	3.5%	0.1%	3.3%	0.9%	1.6%	2.3%	1.2%	
Flexible IO Tester - Rand Write - Linux AIO - No - Yes - 4KB (IOPS)	213333	156364	113000	**14850**	249333	249667	242667	**252000**	
Normalized	84.66%	62.05%	44.84%	5.89%	98.94%	99.07%	96.3%	100%	
Standard Deviation	1.4%	3.5%		3.1%	0.9%	1.6%	2.3%	1.2%	
Flexible IO Tester - Seq Read - Linux AIO - No - Yes - 2MB (MB/s)	**236**	1892	**2334**	507	557	1031	912	1381	
Normalized	10.11%	81.06%	100%	21.72%	23.86%	44.17%	39.07%	59.17%	
Standard Deviation			0%					0.1%	
Flexible IO Tester - Seq Write - Linux AIO - No - Yes - 2MB (MB/s)	943	874	1278	**193**	1464	2399	**3134**	2234	
Normalized	30.09%	27.89%	40.78%	6.16%	46.71%	76.55%	100%	71.28%	
Standard Deviation		5.8%	0%	21.1%		0.3%	0%	0.2%	
FS-Mark - 1.F.1.S (Files/s)	350	**650.93**	594.77	**25.91**	221	231	244.07	197	235.8
Normalized	53.77%	100%	91.37%	3.98%	33.95%	35.49%	37.5%	30.26%	36.23%
Standard Deviation	1.6%	3.5%	0.9%	6.8%	0.5%	1.4%	1.1%	0.4%	0.6%
FS-Mark - 4.F.3.S.D.1.S (Files/s)	360	**707.47**	583.66	**25.40**	219	126	243.70	197	236.2
Normalized	50.89%	100%	82.5%	3.59%	30.96%	17.81%	34.45%	27.85%	33.39%
Standard Deviation	1%	0.8%	3.5%	2%	0.1%	20.7%	0.6%	0.7%	0.4%
BlogBench - Write (Final Score)	13165	46360	23826	**4505**	16724	30687	37563	**54241**	38313
Normalized	24.27%	85.47%	43.93%	8.31%	30.83%	56.58%	69.25%	100%	70.63%
Standard Deviation	5.2%	1.1%	2%	1.5%	1.8%	5.6%	4.4%	1.3%	7.8%
IOzone - 1MB - 8GB - Write Performance (MB/s)	235	744.28	1071	**36.60**	369	643	924.36	**1535**	954.23
Normalized	15.31%	48.49%	69.77%	2.38%	24.04%	41.89%	60.22%	100%	62.16%
Standard Deviation	33.2%	7.3%	0.2%	18.3%	27.9%	8.9%	12.1%	2.8%	6.9%
Compile Bench - Compile (MB/s)	1474	1895	2041	1327	1688	1937	**2056**	2037	**1249**
Normalized	71.69%	92.17%	99.27%	64.54%	82.1%	94.21%	100%	99.08%	60.73%
Standard Deviation	6.4%	3%	0.9%	1.1%	9.2%	0.6%	2%	1.4%	0.9%

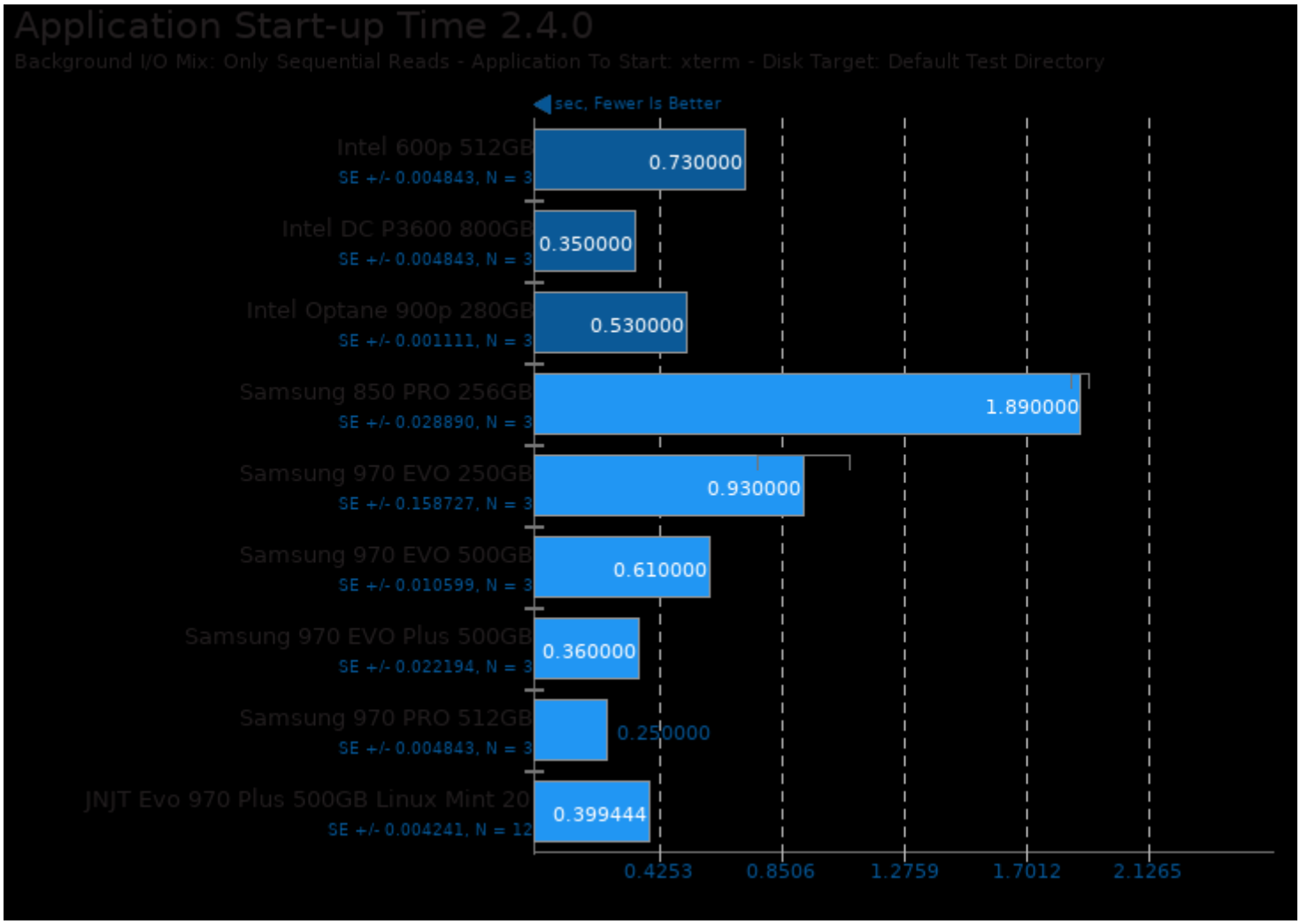
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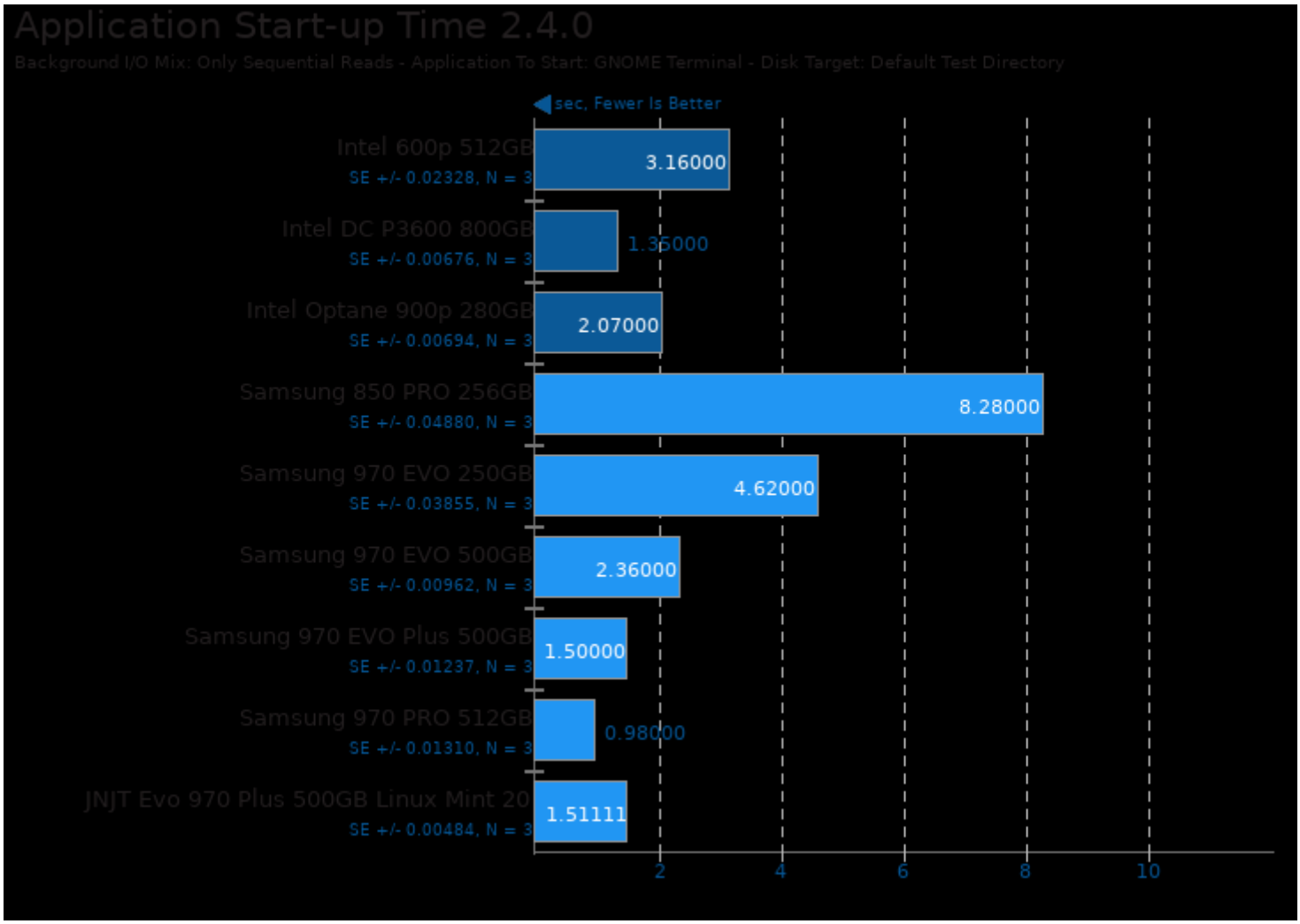
PostgreSQL pgbench - Mostly RAM - Normal Load - Read Write (TPS)	968	19678	19247	1292	4000	4959	6513	7595	3183
Normalized	4.92%	100%	97.81%	6.57%	20.33%	25.2%	33.1%	38.6%	16.17%
Standard Deviation		0.5%	0.8%	1.4%	1.5%	15.7%	2.3%	3.8%	2.3%
Application Start-up Time - Performance / Cost - O.S.R - xterm (sec x Dollar)			143.09		91.84	103.69	46.80	57.29	
Normalized			32.71%		50.96%	45.13%	100%	81.69%	
Application Start-up Time - Performance / Cost - O.S.R - GNOME Terminal (sec x Dollar)			558.88		456.23	401.18	194.99	224.57	
Normalized			34.89%		42.74%	48.6%	100%	86.83%	
Application Start-up Time - Performance / Cost - O.S.R - LibreOffice Writer (sec x Dollar)			377.99		398.95	338.28	159.89	197.07	
Normalized			42.3%		40.08%	47.27%	100%	81.13%	
Application Start-up Time - Performance / Cost - S.R.W - GNOME Terminal (sec x Dollar)			977.36		383.15	547.37	367.87	737.86	
Normalized			37.64%		96.01%	67.21%	100%	49.86%	
Application Start-up Time - Performance / Cost - S.R.W - LibreOffice Writer (sec x Dollar)			561.58		309.09	515.07	280.78	538.50	
Normalized			50%		90.84%	54.51%	100%	52.14%	
SQLite - Performance / Cost - T.S.I (sec x Dollar)			634.48		3663	6145	4366	10046	
Normalized			100%		17.32%	10.32%	14.53%	6.32%	
Flexible IO Tester - Performance / Cost - Rand Read - Linux AIO - No - Yes - 2MB (MB/s/Dollar)			8.66		33.34	19.73	26.26	14.89	
Normalized			25.97%		100%	59.18%	78.76%	44.66%	

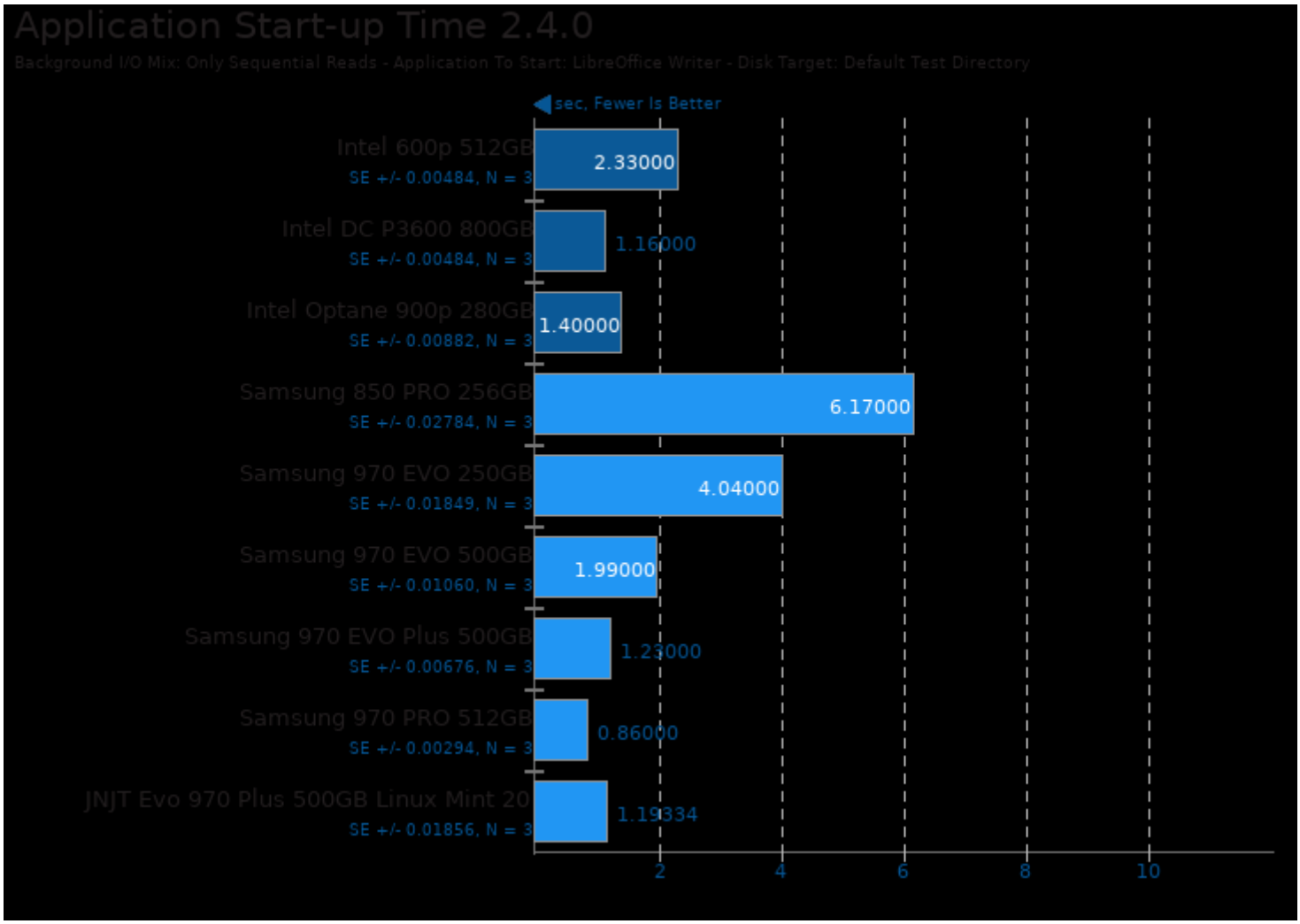
Flexible IO Tester - Performance / Cost - Rand Read - Linux AIO - No - Yes - 4KB (MB/s/Dollar)	4.00	4.25	4.13	**5.56**	**3.28**
Normalized	71.94%	76.44%	74.28%	100%	58.99%
Flexible IO Tester - Performance / Cost - Rand Read - Linux AIO - No - Yes - 4KB (IOPS/Dollar)	1025	1094	1057	**1426**	**837.88**
Normalized	71.87%	76.71%	74.13%	100%	58.77%
Flexible IO Tester - Performance / Cost - Rand Write - Linux AIO - No - Yes - 2MB (MB/s/Dollar)	**4.82**	14.83	13.95	**23.92**	9.72
Normalized	20.15%	62%	58.32%	100%	40.64%
Flexible IO Tester - Performance / Cost - Rand Write - Linux AIO - No - Yes - 4KB (MB/s/Dollar)	**1.64**	**9.86**	5.74	7.29	4.29
Normalized	16.63%	100%	58.22%	73.94%	43.51%
Flexible IO Tester - Performance / Cost - Rand Write - Linux AIO - No - Yes - 4KB (IOPS/Dollar)	**418.53**	**2525**	1469	1867	1100
Normalized	16.58%	100%	58.17%	73.94%	43.56%
Flexible IO Tester - Performance / Cost - Seq Read - Linux AIO - No - Yes - 2MB (MB/s/Dollar)	**8.64**	**5.64**	6.07	7.02	6.03
Normalized	100%	65.28%	70.25%	81.25%	69.79%
Flexible IO Tester - Performance / Cost - Seq Write - Linux AIO - No - Yes - 2MB (MB/s/Dollar)	**4.73**	14.83	14.11	**24.11**	9.75
Normalized	19.62%	61.51%	58.52%	100%	40.44%
FS-Mark - Performance / Cost - 1.F.1.S	2.20	**2.24**	1.36	1.88	**0.86**
Normalized	98.21%	100%	60.71%	83.93%	38.39%

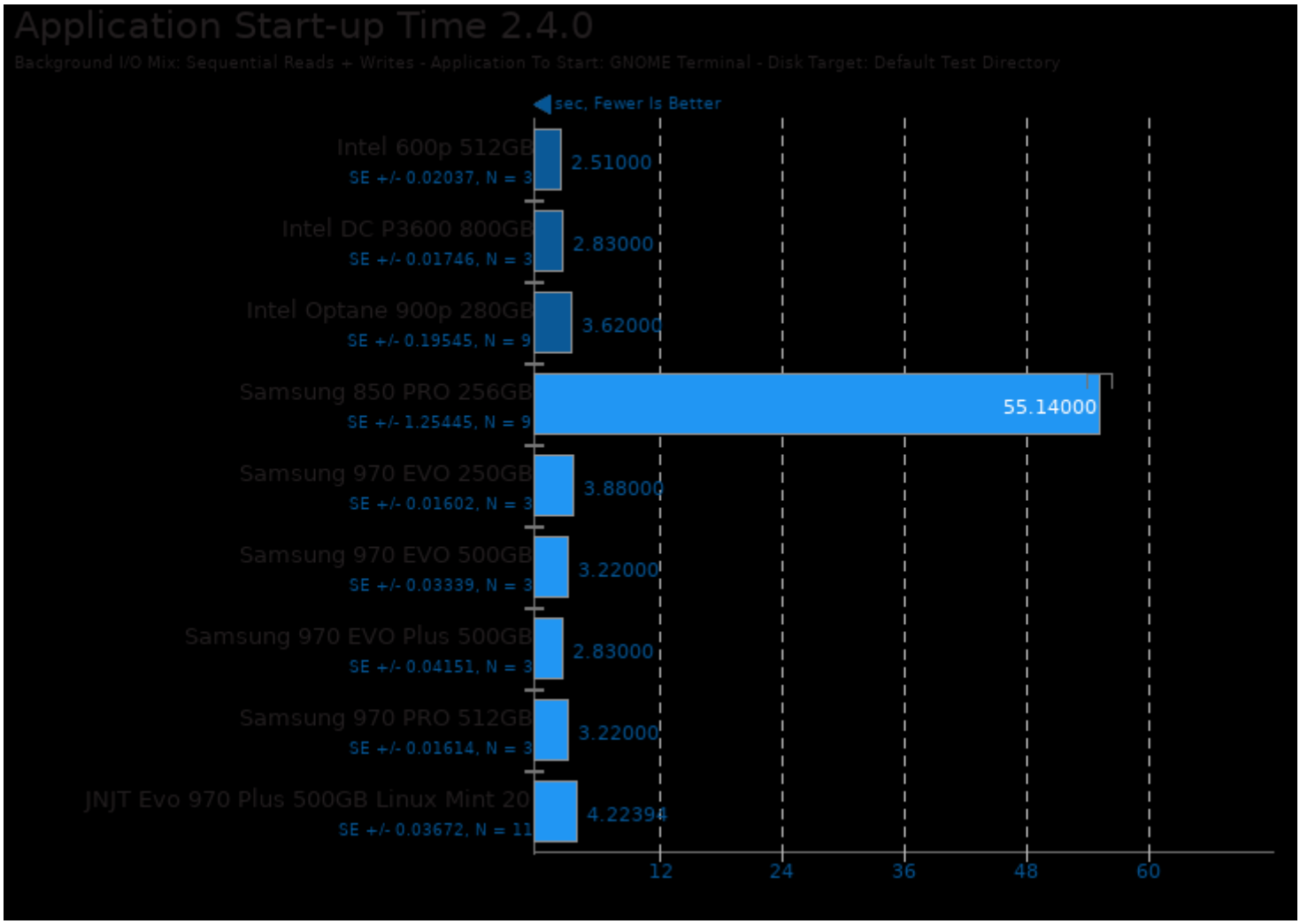
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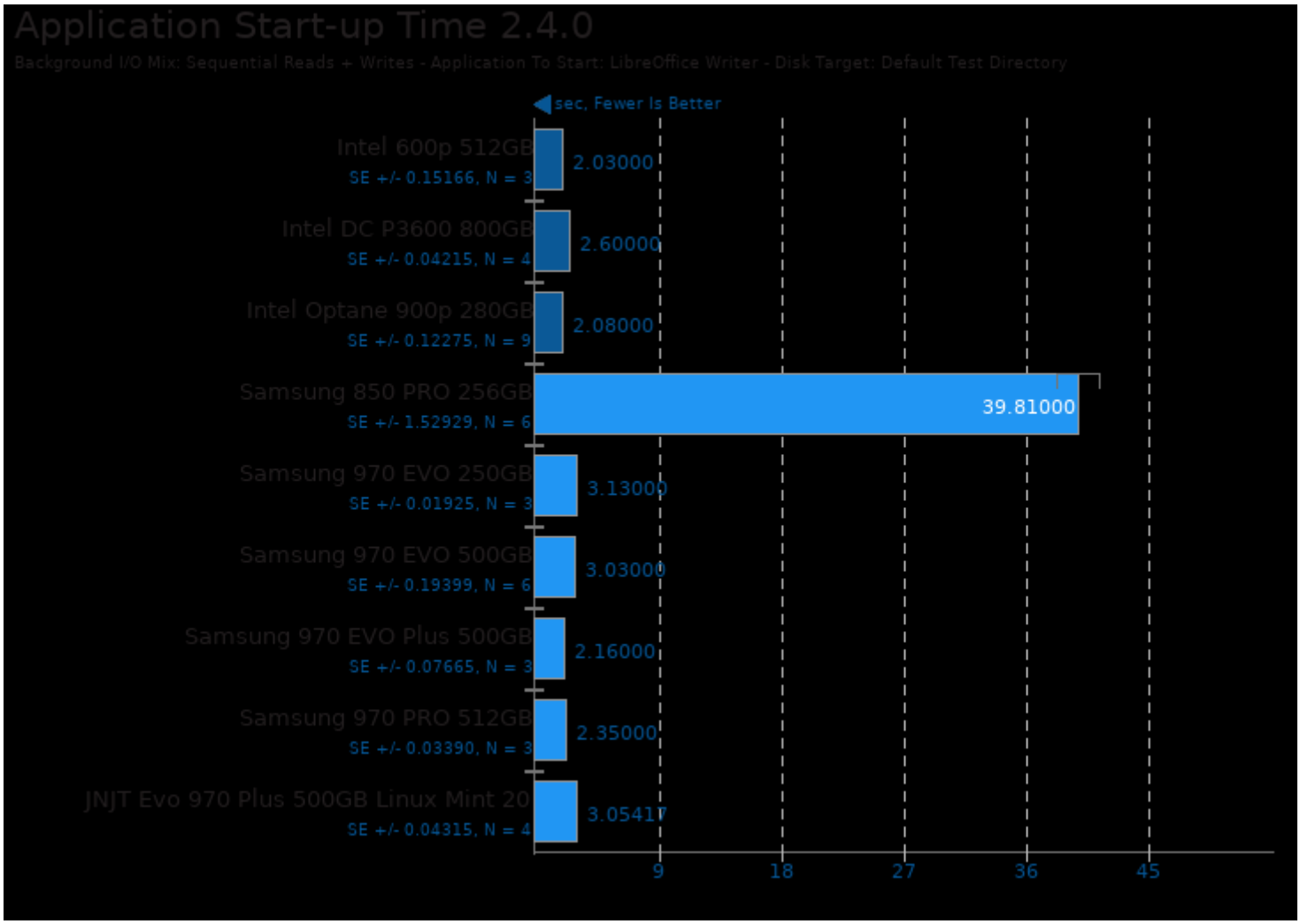
FS-Mark - Performance / Cost - 4.F.3.S.D.1.S (Files/s/Dollar)	2.16	**2.22**	**0.74**	1.87	0.86
Normalized	97.3%	100%	33.33%	84.23%	38.74%
BlogBench - Performance / Cost - Write (Final Score/Dollar)	**88.25**	169.36	180.52	**288.97**	236.71
Normalized	30.54%	58.61%	62.47%	100%	81.92%
IOzone - Performance / Cost - 1MB - 8GB - Write Performance	3.97	**3.74**	3.78	**7.11**	6.70
Normalized	55.84%	52.6%	53.16%	100%	94.23%
Compile Bench - Performance / Cost - Compile	**7.56**	**17.09**	11.39	15.82	8.89
Normalized	44.24%	100%	66.65%	92.57%	52.02%
PostgreSQL pgbench - Performance / Cost - Mostly RAM - Normal Load - Read Write	**71.29**	40.51	**29.17**	50.10	33.14
Normalized	100%	56.82%	40.92%	70.28%	46.49%


Application Start-up Time 2.4.0
Background I/O Mix: Only Sequential Reads - Application To Start: xterm - Disk Target: Default Test Directory
sec, Fewer Is Better
Intel 600p 512GB
SE +/- 0.004843, N = 3
0.730000
Intel DC P3600 800GB
SE +/- 0.004843, N = 3
0.350000
Intel Optane 900p 280GB
SE +/- 0.001111, N = 3
0.530000
Samsung 850 PRO 256GB
SE +/- 0.028890, N = 3
1.890000
Samsung 970 EVO 250GB
SE +/- 0.158727, N = 3
0.930000
Samsung 970 EVO 500GB
SE +/- 0.010599, N = 3
0.610000
Samsung 970 EVO Plus 500GB
SE +/- 0.022194, N = 3
0.360000
Samsung 970 PRO 512GB
SE +/- 0.004843, N = 3
0.250000
JNJT Evo 970 Plus 500GB Linux Mint 20
SE +/- 0.004241, N = 12
0.399444
0.4253
0.8506
1.2759
1.7012
2.1265

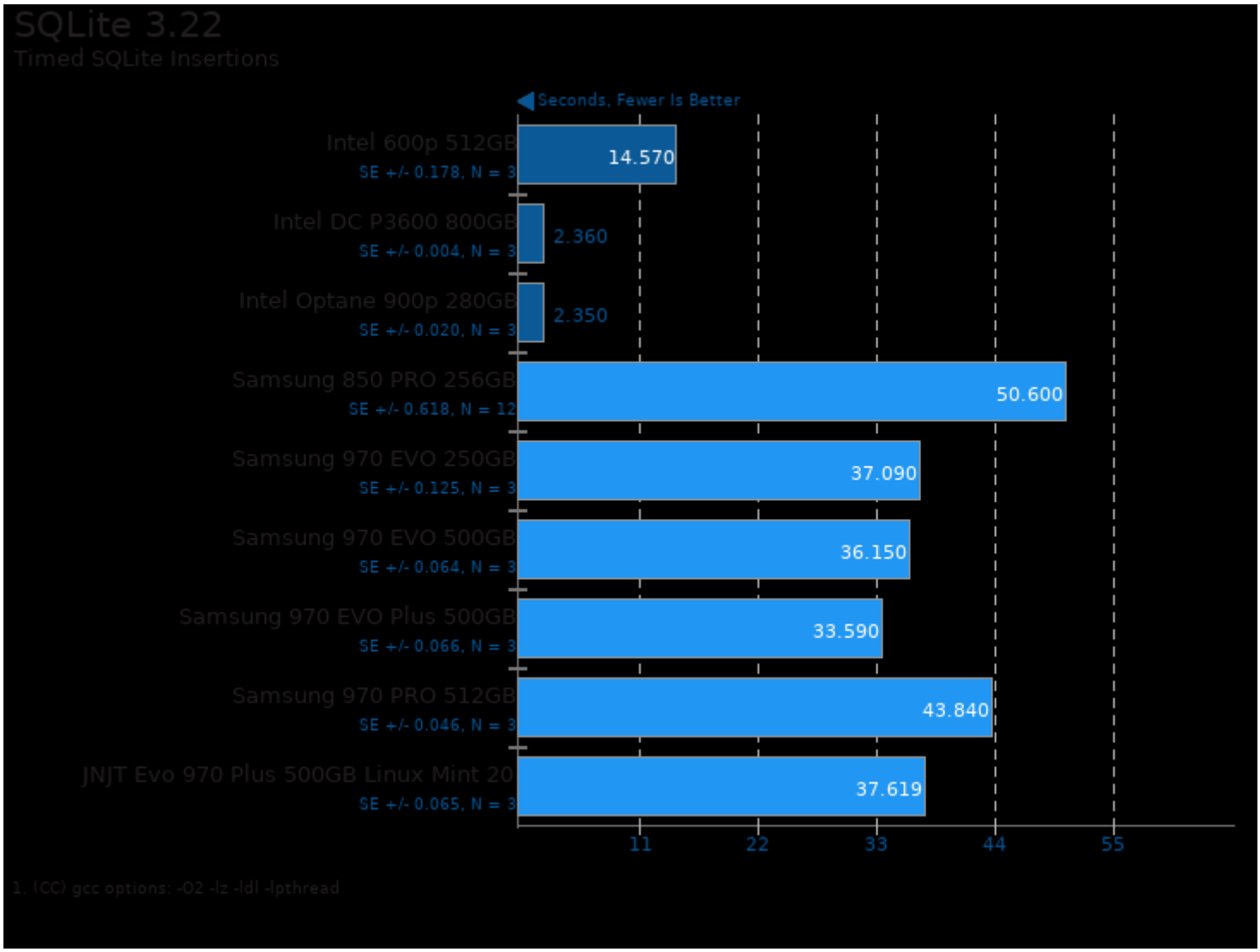

Application Start-up Time 2.4.0
Background I/O Mix: Only Sequential Reads - Application To Start: GNOME Terminal - Disk Target: Default Test Directory
sec, Fewer Is Better
Intel 600p 512GB
SE +/- 0.02328, N = 3
3.16000
Intel DC P3600 800GB
SE +/- 0.00676, N = 3
1.36000
Intel Optane 900p 280GB
SE +/- 0.00694, N = 3
2.07000
Samsung 850 PRO 256GB
SE +/- 0.04880, N = 3
8.28000
Samsung 970 EVO 250GB
SE +/- 0.03855, N = 3
4.62000
Samsung 970 EVO 500GB
SE +/- 0.00962, N = 3
2.36000
Samsung 970 EVO Plus 500GB
SE +/- 0.01237, N = 3
1.50000
Samsung 970 PRO 512GB
SE +/- 0.01310, N = 3
0.98000
JNJT Evo 970 Plus 500GB Linux Mint 20
SE +/- 0.00484, N = 3
1.51111
2
4
6
8
10


Application Start-up Time 2.4.0
Background I/O Mix: Only Sequential Reads - Application To Start: LibreOffice Writer - Disk Target: Default Test Directory
sec, Fewer Is Better
Intel 600p 512GB
SE +/- 0.00484, N = 3
2.33000
Intel DC P3600 800GB
SE +/- 0.00484, N = 3
1.16000
Intel Optane 900p 280GB
SE +/- 0.00882, N = 3
1.40000
Samsung 850 PRO 256GB
SE +/- 0.02784, N = 3
6.17000
Samsung 970 EVO 250GB
SE +/- 0.01849, N = 3
4.04000
Samsung 970 EVO 500GB
SE +/- 0.01060, N = 3
1.99000
Samsung 970 EVO Plus 500GB
SE +/- 0.00676, N = 3
1.23000
Samsung 970 PRO 512GB
SE +/- 0.00294, N = 3
0.86000
JNJT Evo 970 Plus 500GB Linux Mint 20
SE +/- 0.01856, N = 3
1.19334
2
4
6
8
10

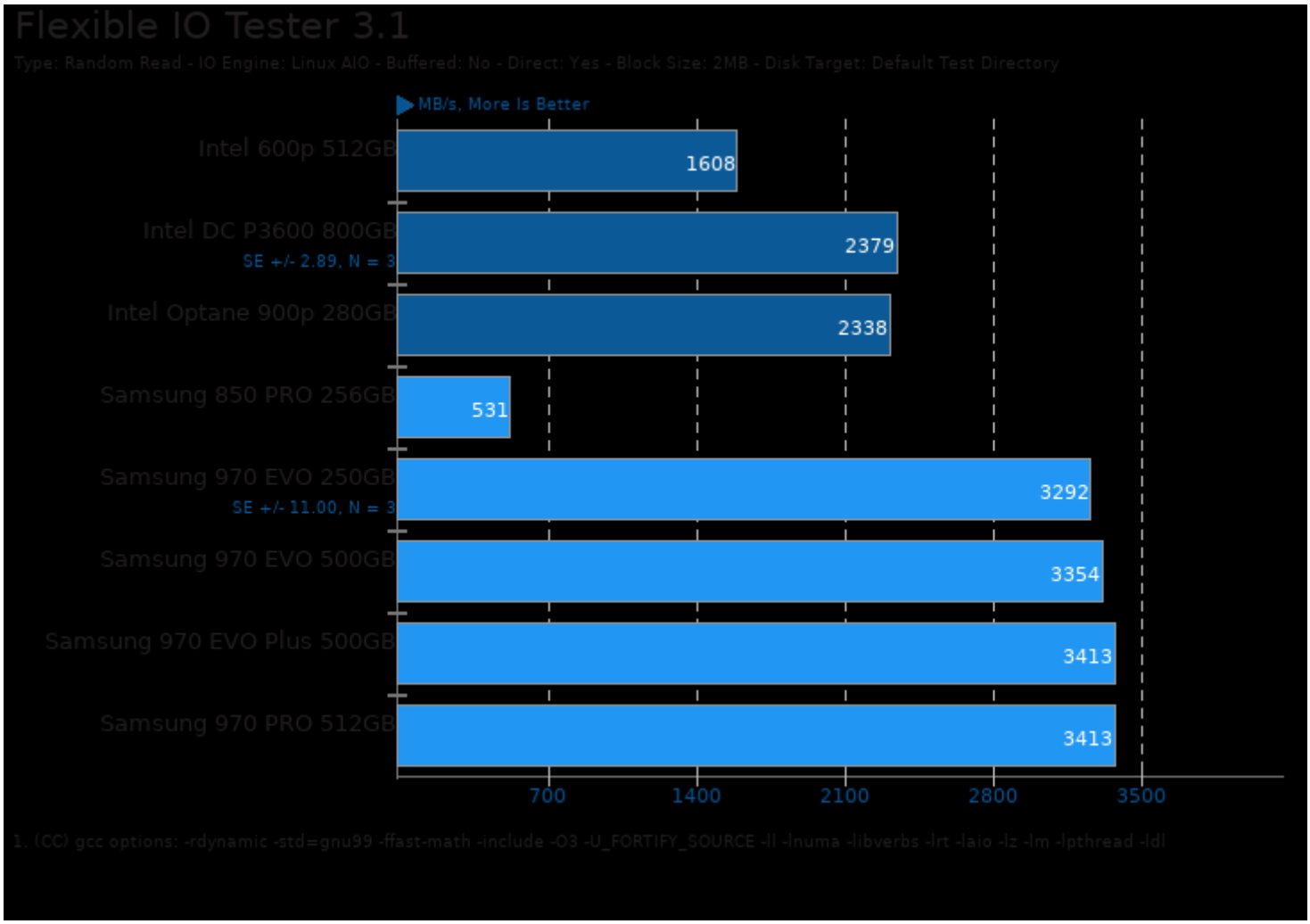

Application Start-up Time 2.4.0
Background I/O Mix: Sequential Reads + Writes - Application To Start: GNOME Terminal - Disk Target: Default Test Directory
sec, Fewer Is Better
Intel 600p 512GB
SE +/- 0.02037, N = 3
2.51000
Intel DC P3600 800GB
SE +/- 0.01746, N = 3
2.83000
Intel Optane 900p 280GB
SE +/- 0.19545, N = 9
3.62000
Samsung 850 PRO 256GB
SE +/- 1.25445, N = 9
55.14000
Samsung 970 EVO 250GB
SE +/- 0.01602, N = 3
3.88000
Samsung 970 EVO 500GB
SE +/- 0.03339, N = 3
3.22000
Samsung 970 EVO Plus 500GB
SE +/- 0.04151, N = 3
2.83000
Samsung 970 PRO 512GB
SE +/- 0.01614, N = 3
3.22000
JNJT Evo 970 Plus 500GB Linux Mint 20
SE +/- 0.03672, N = 11
4.22394
12
24
36
48
60


Application Start-up Time 2.4.0
Background I/O Mix: Sequential Reads + Writes - Application To Start: LibreOffice Writer - Disk Target: Default Test Directory
sec, Fewer Is Better
Intel 600p 512GB
SE +/- 0.15166, N = 3
2.03000
Intel DC P3600 800GB
SE +/- 0.04215, N = 4
2.60000
Intel Optane 900p 280GB
SE +/- 0.12275, N = 9
2.08000
Samsung 850 PRO 256GB
SE +/- 1.52929, N = 6
39.81000
Samsung 970 EVO 250GB
SE +/- 0.01925, N = 3
3.13000
Samsung 970 EVO 500GB
SE +/- 0.19399, N = 6
3.03000
Samsung 970 EVO Plus 500GB
SE +/- 0.07665, N = 3
2.16000
Samsung 970 PRO 512GB
SE +/- 0.03390, N = 3
2.35000
JNJT Evo 970 Plus 500GB Linux Mint 20
SE +/- 0.04315, N = 4
3.05417
9
18
27
36
45

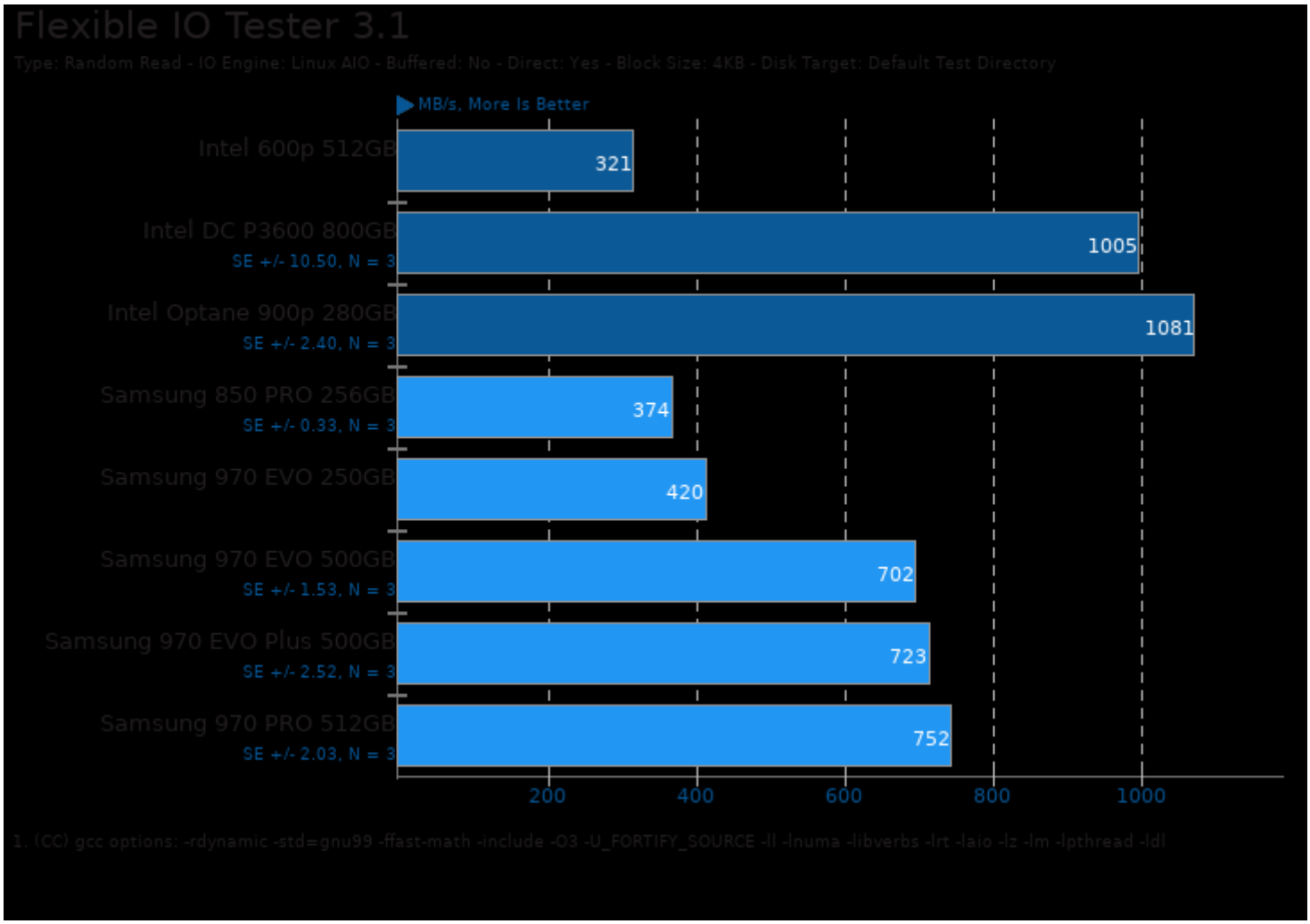
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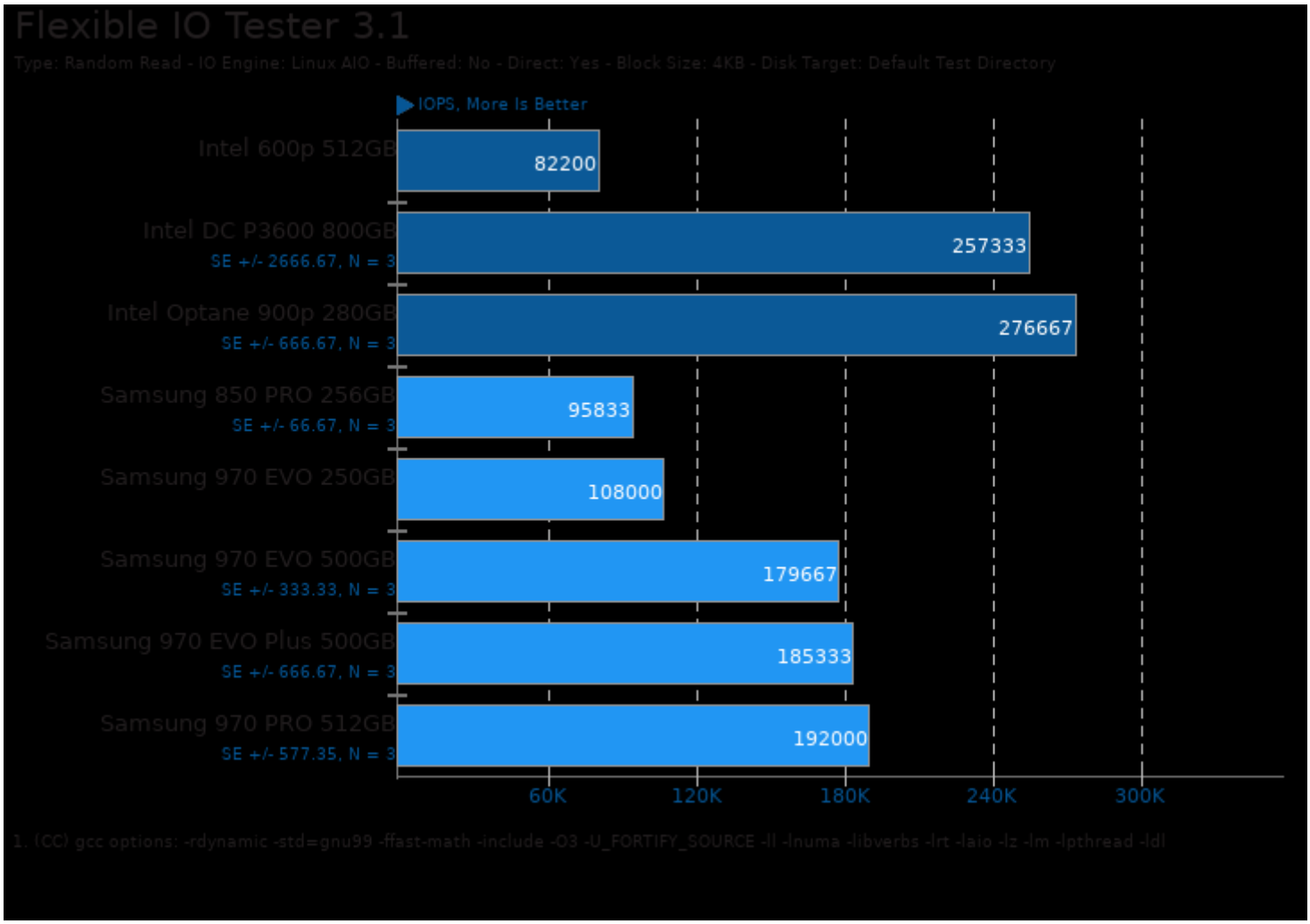
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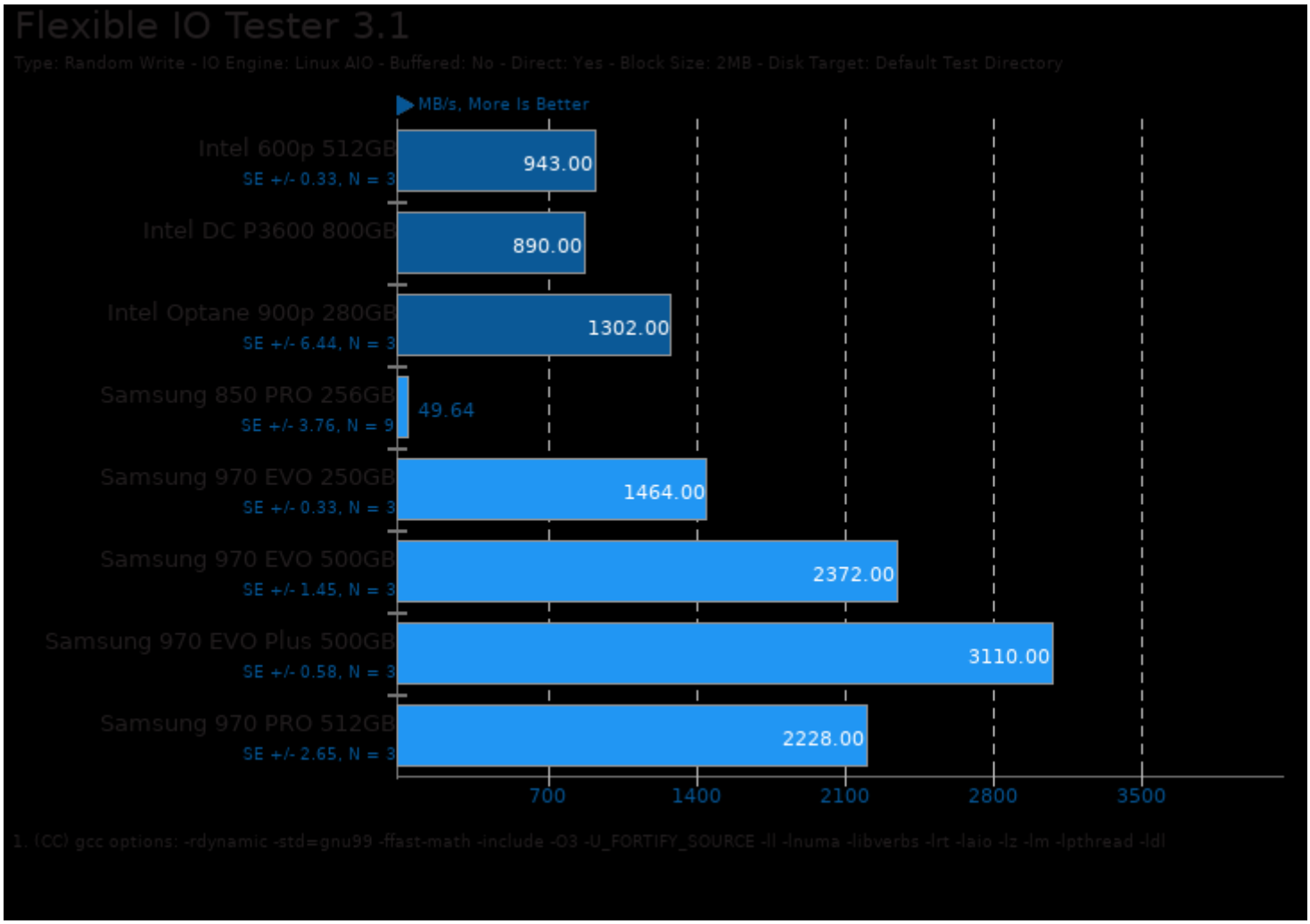
SSD February 2019



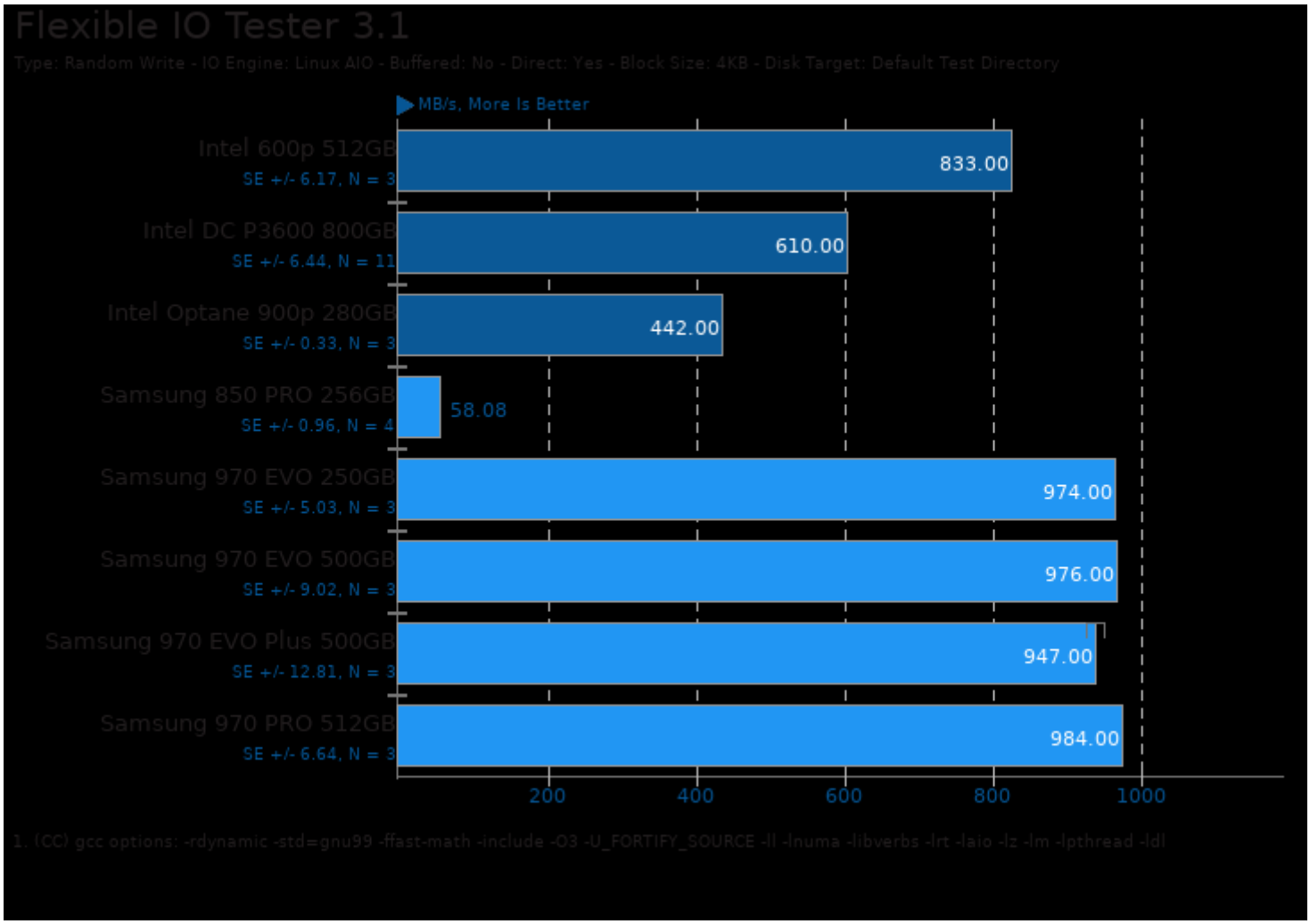
SSD February 2019



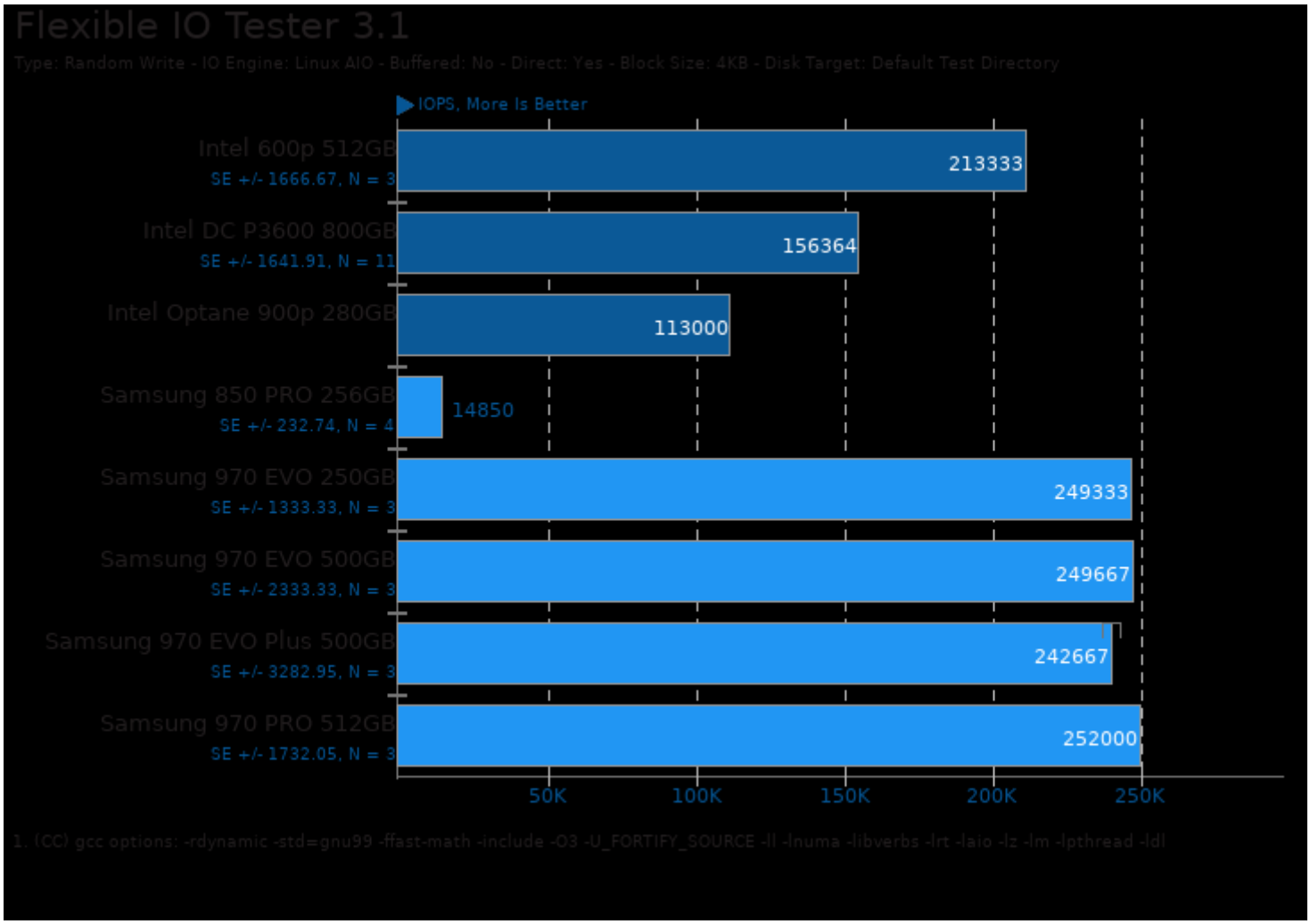
SSD February 2019

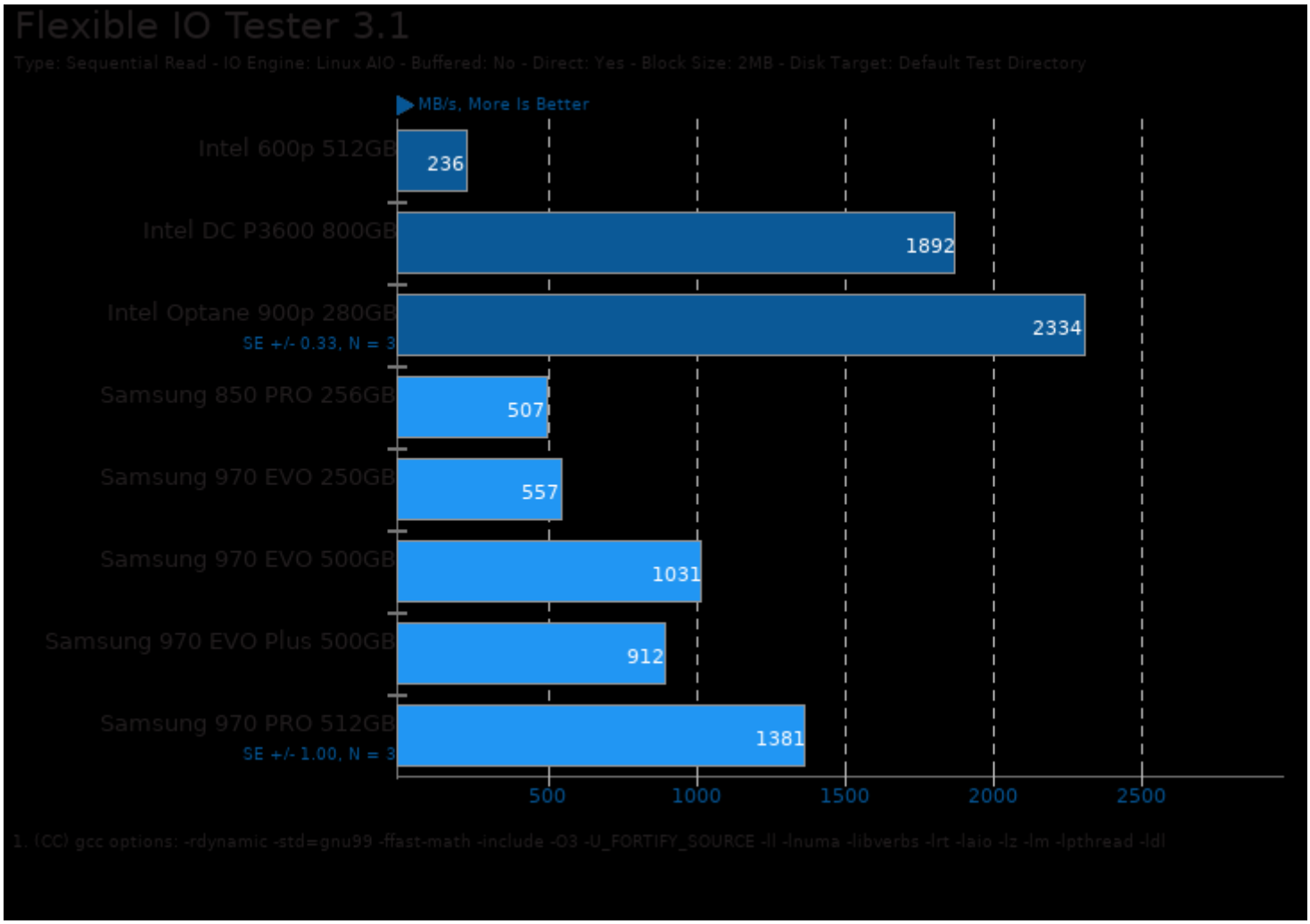


SSD February 2019

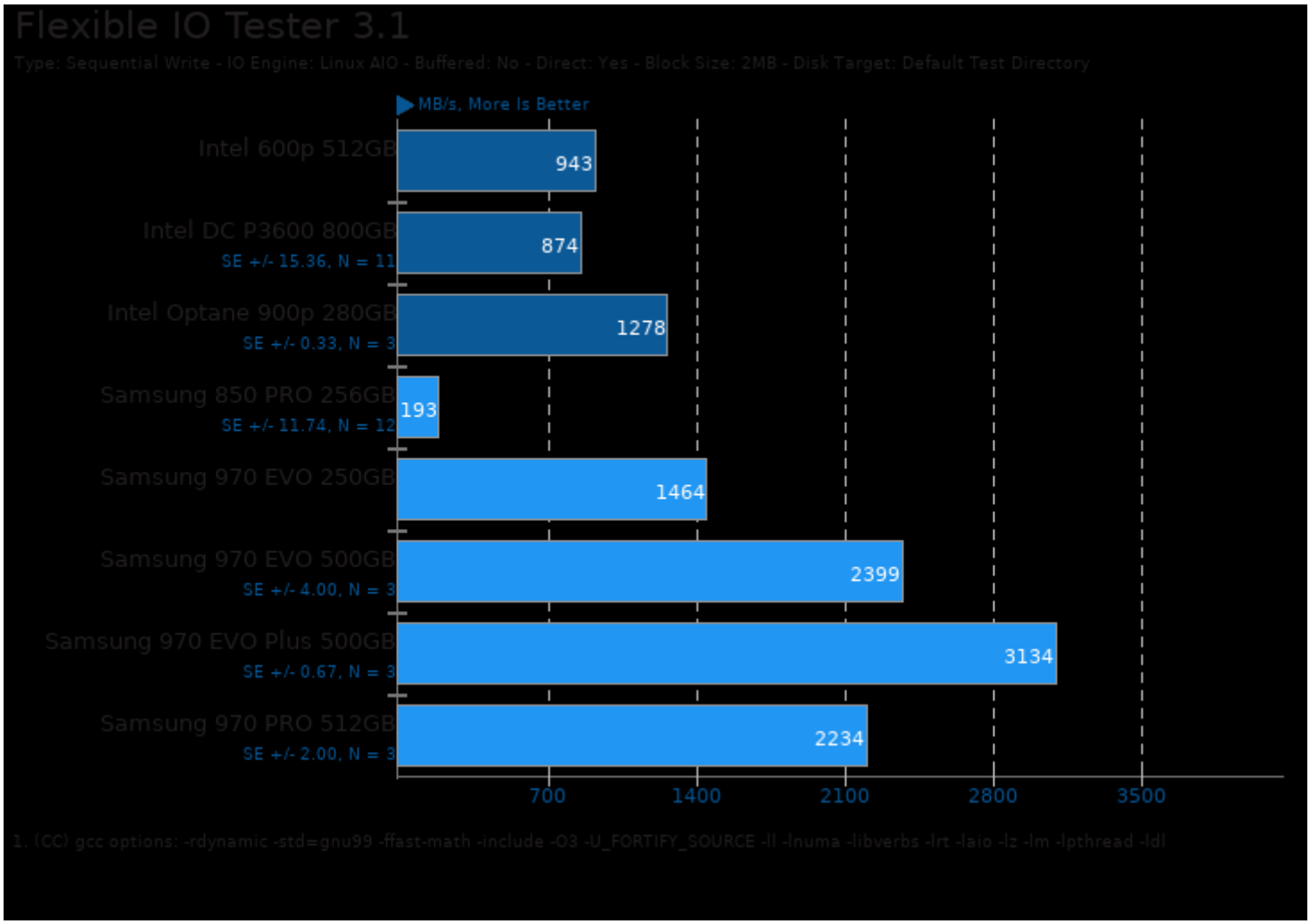


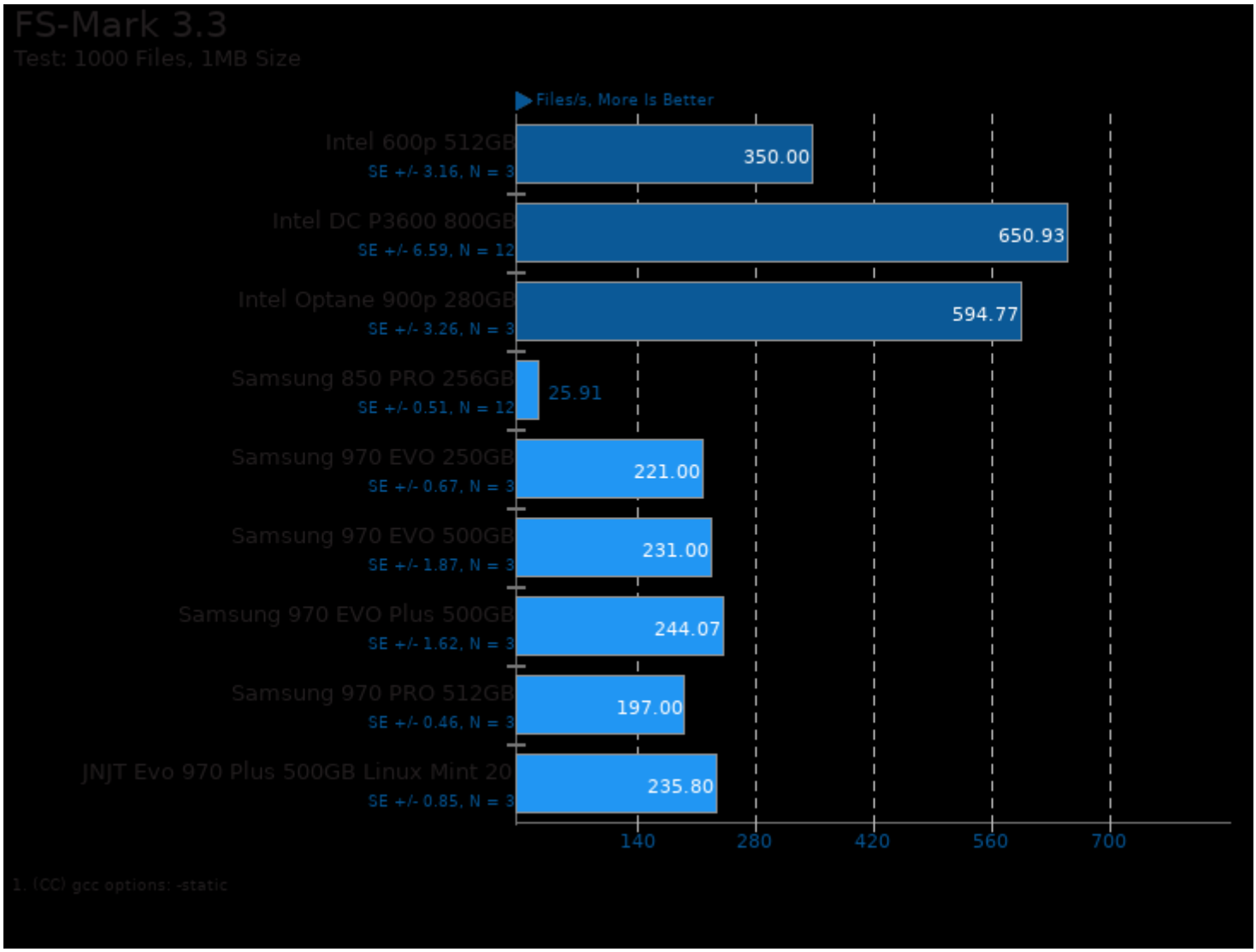
SSD February 2019

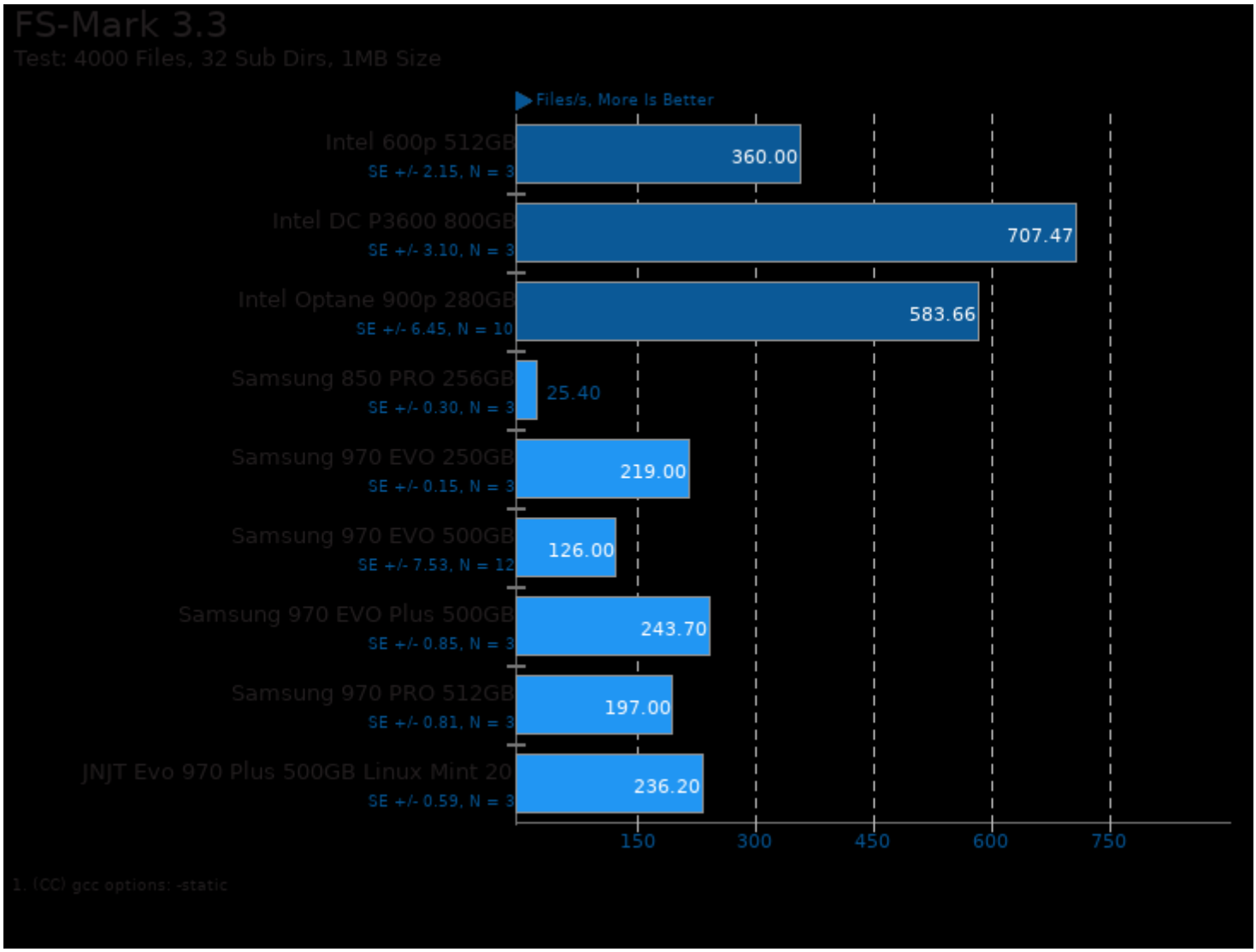



Flexible IO Tester 3.1
Type: Sequential Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory
MB/s, More Is Better
Intel 600p 512GB
236
Intel DC P3600 800GB
1892
Intel Optane 900p 280GB
SE +/- 0.33, N = 3
2334
Samsung 850 PRO 256GB
507
Samsung 970 EVO 250GB
557
Samsung 970 EVO 500GB
1031
Samsung 970 EVO Plus 500GB
912
Samsung 970 PRO 512GB
SE +/- 1.00, N = 3
1381
500
1000
1500
2000
2500
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -ll -lnuma -libverbs -lrt -laio -lz -lm -lpthread -ldl

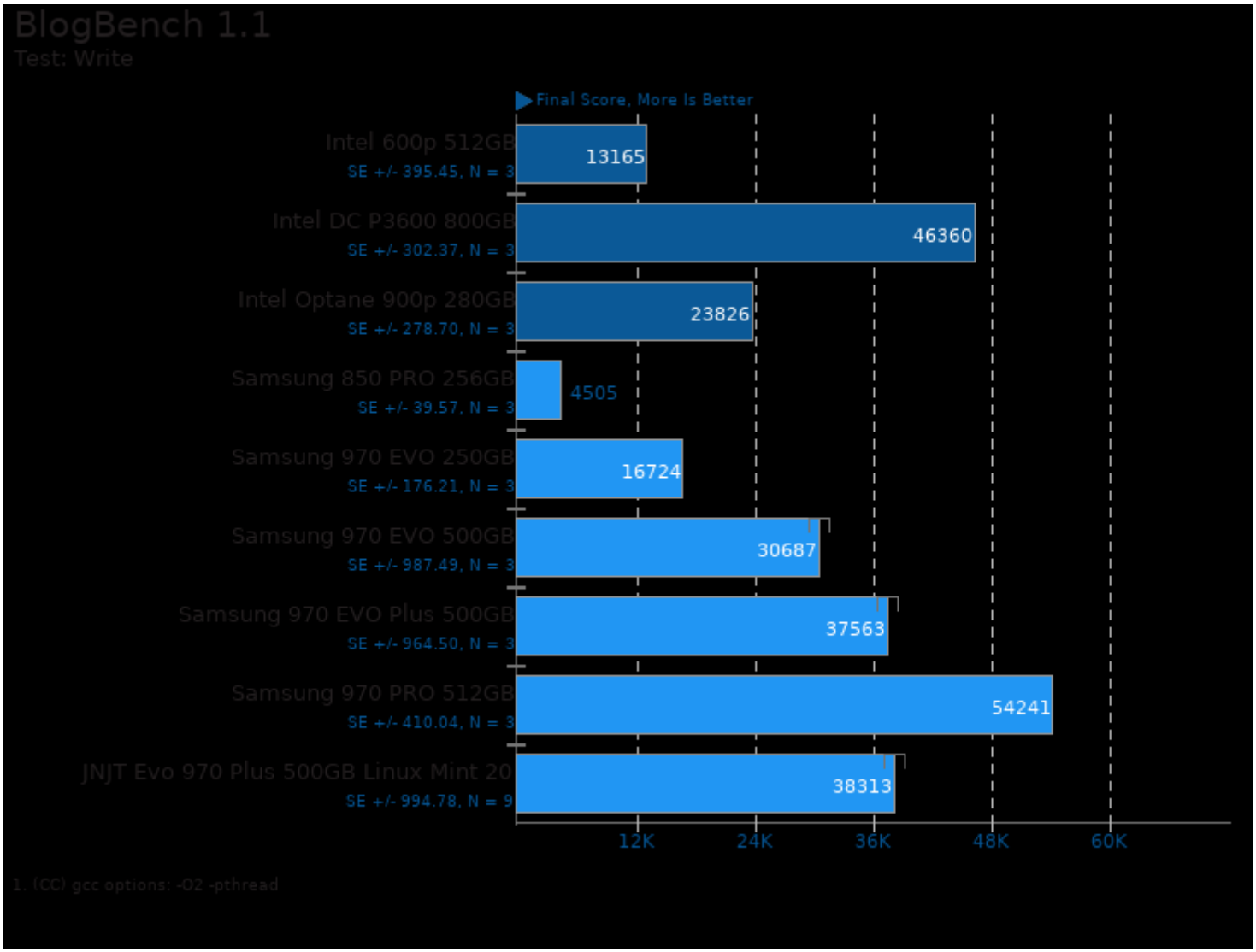
SSD February 2019

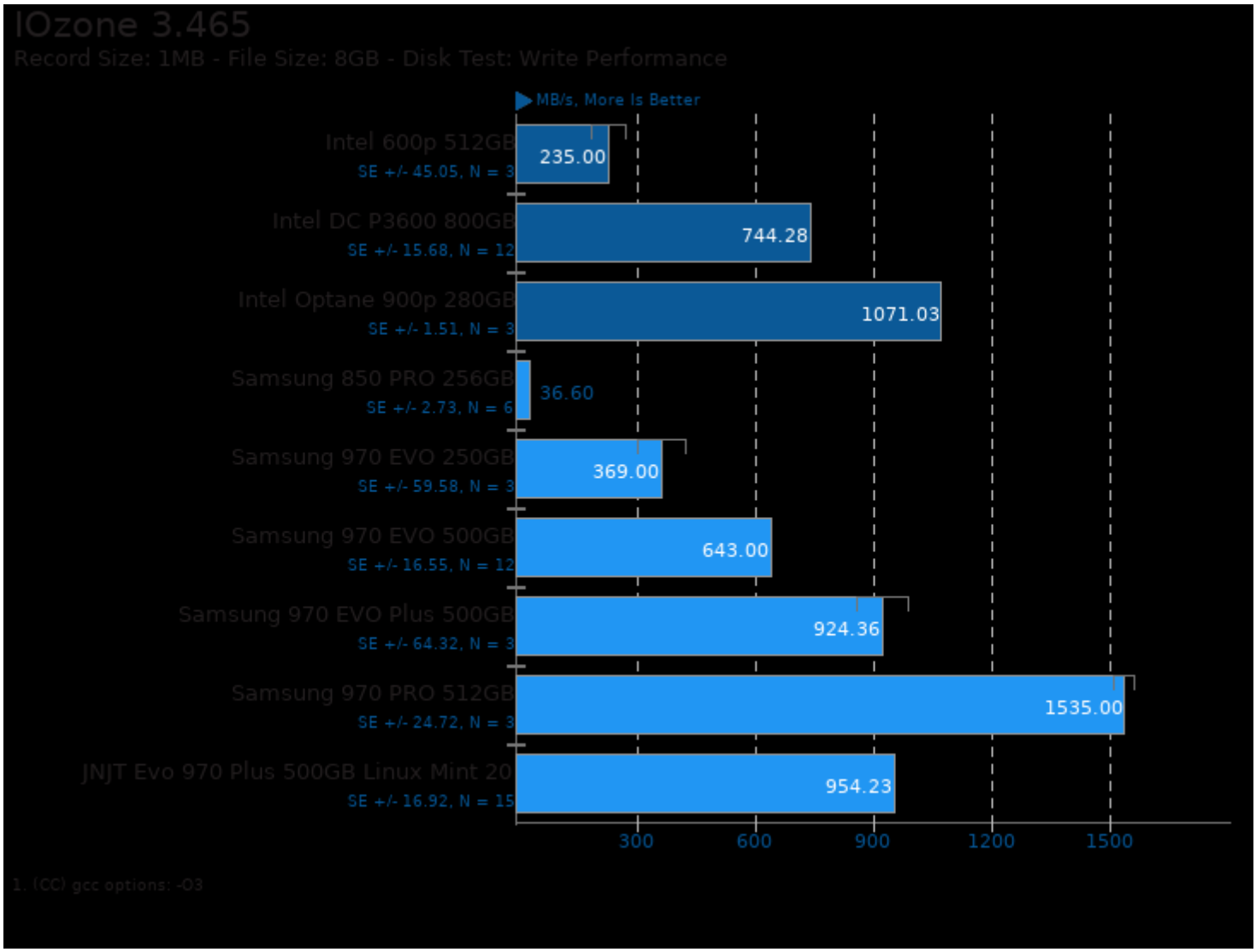



FS-Mark 3.3
Test: 1000 Files, 1MB Size
Files/s, More Is Better
Intel 600p 512GB
SE +/- 3.16, N = 3
350.00
Intel DC P3600 800GB
SE +/- 6.59, N = 12
650.93
Intel Optane 900p 280GB
SE +/- 3.26, N = 3
594.77
Samsung 850 PRO 256GB
SE +/- 0.51, N = 12
25.91
Samsung 970 EVO 250GB
SE +/- 0.67, N = 3
221.00
Samsung 970 EVO 500GB
SE +/- 1.87, N = 3
231.00
Samsung 970 EVO Plus 500GB
SE +/- 1.62, N = 3
244.07
Samsung 970 PRO 512GB
SE +/- 0.46, N = 3
197.00
JNJT Evo 970 Plus 500GB Linux Mint 20
SE +/- 0.85, N = 3
235.80
140
280
420
560
700
1. (CC) gcc options: -static

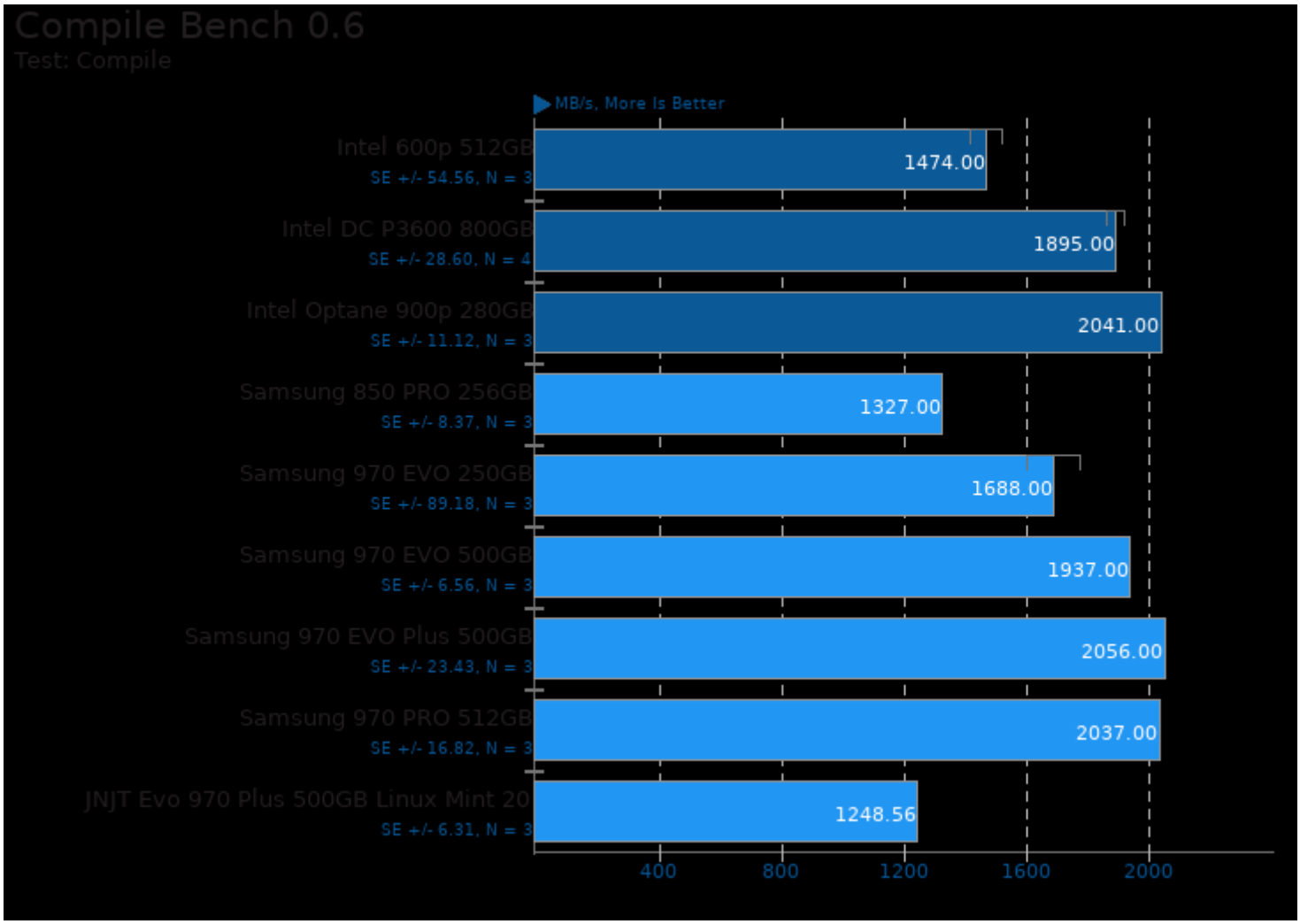

FS-Mark 3.3
Test: 4000 Files, 32 Sub Dirs, 1MB Size
Files/s, More Is Better
Intel 600p 512GB
SE +/- 2.15, N = 3
360.00
Intel DC P3600 800GB
SE +/- 3.10, N = 3
707.47
Intel Optane 900p 280GB
SE +/- 6.45, N = 10
583.66
Samsung 850 PRO 256GB
SE +/- 0.30, N = 3
25.40
Samsung 970 EVO 250GB
SE +/- 0.15, N = 3
219.00
Samsung 970 EVO 500GB
SE +/- 7.53, N = 12
126.00
Samsung 970 EVO Plus 500GB
SE +/- 0.85, N = 3
243.70
Samsung 970 PRO 512GB
SE +/- 0.81, N = 3
197.00
JNJT Evo 970 Plus 500GB Linux Mint 20
SE +/- 0.59, N = 3
236.20
150
300
450
600
750
1. (CC) gcc options: -static

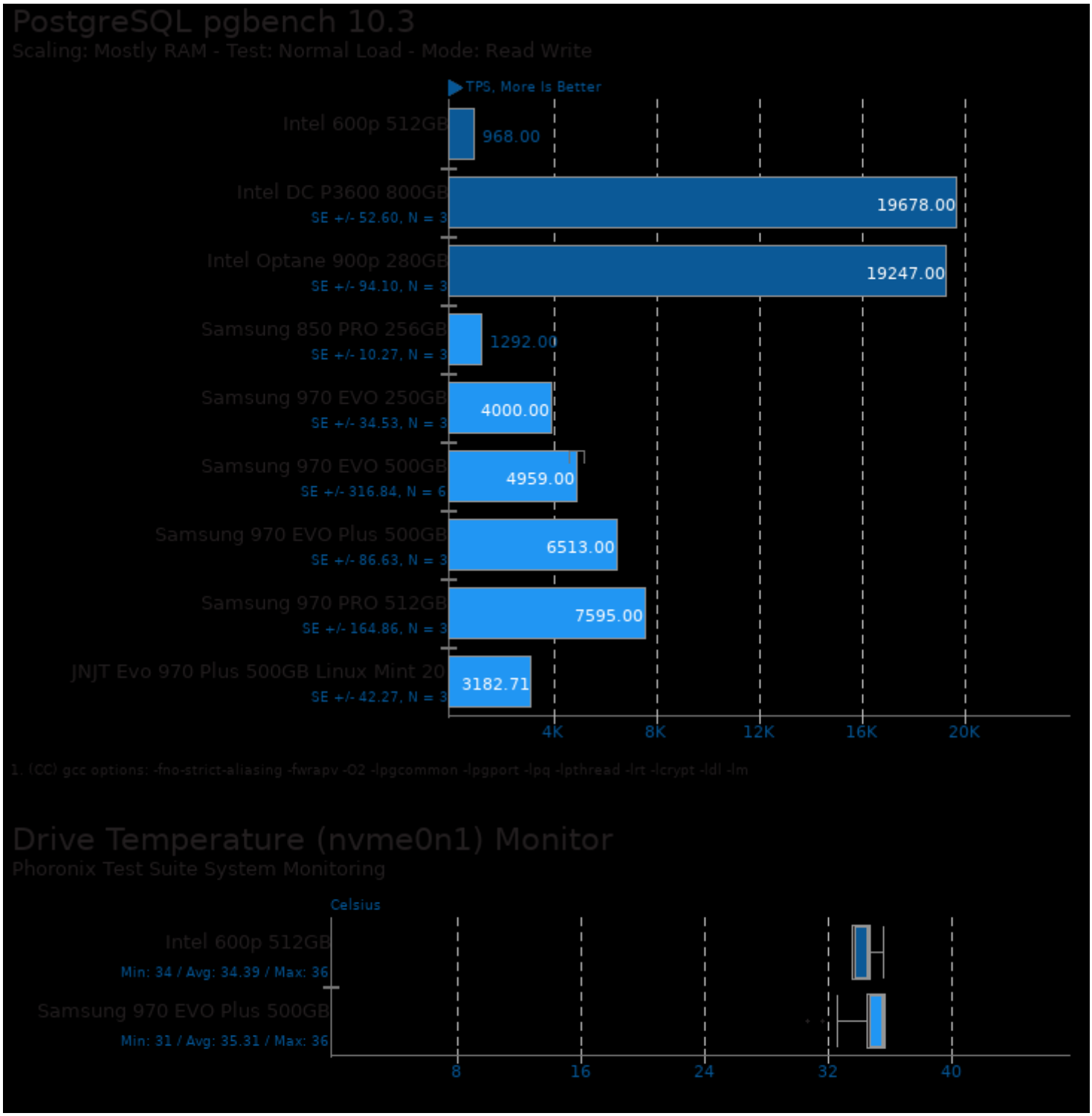
SSD February 2019

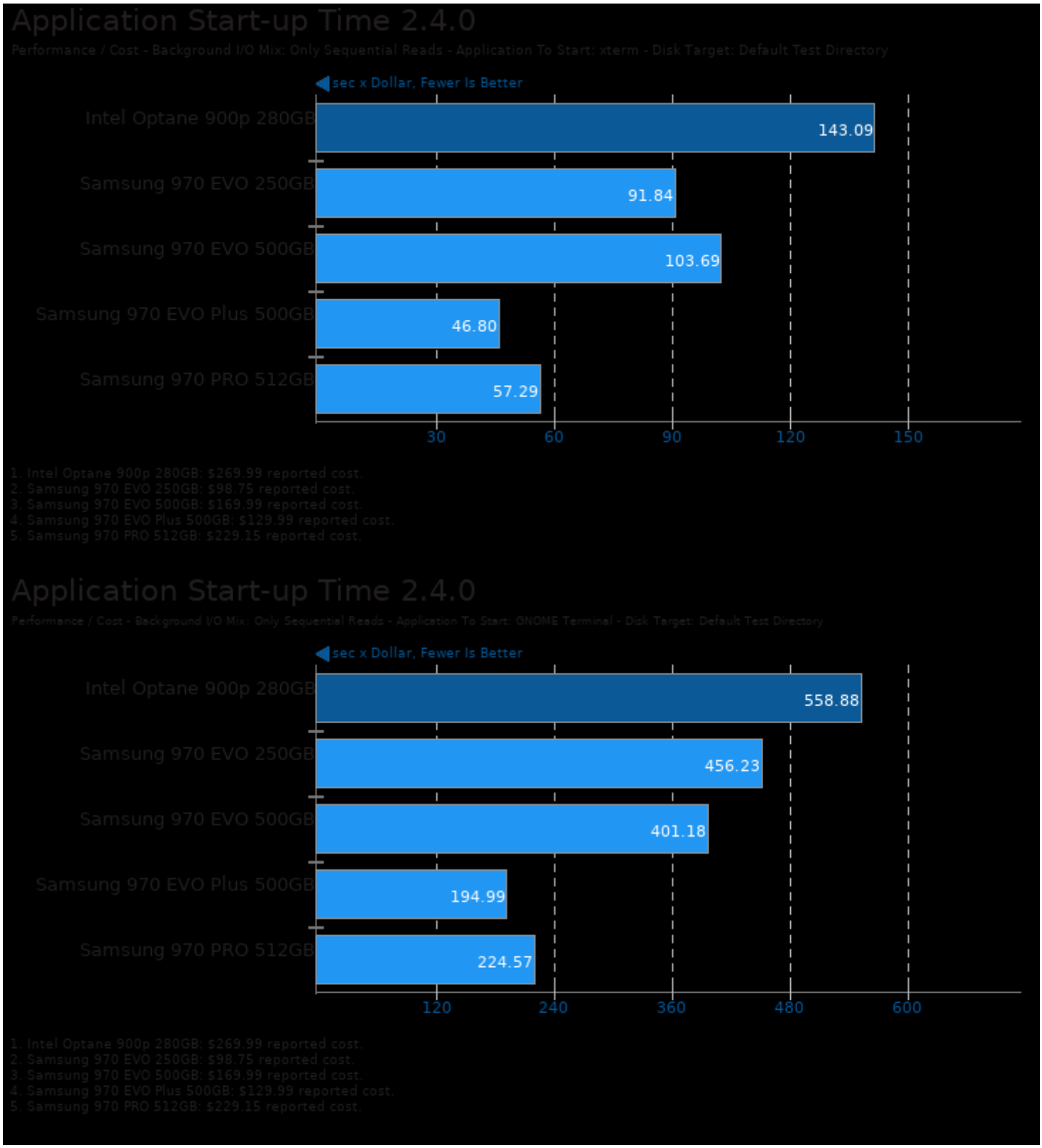


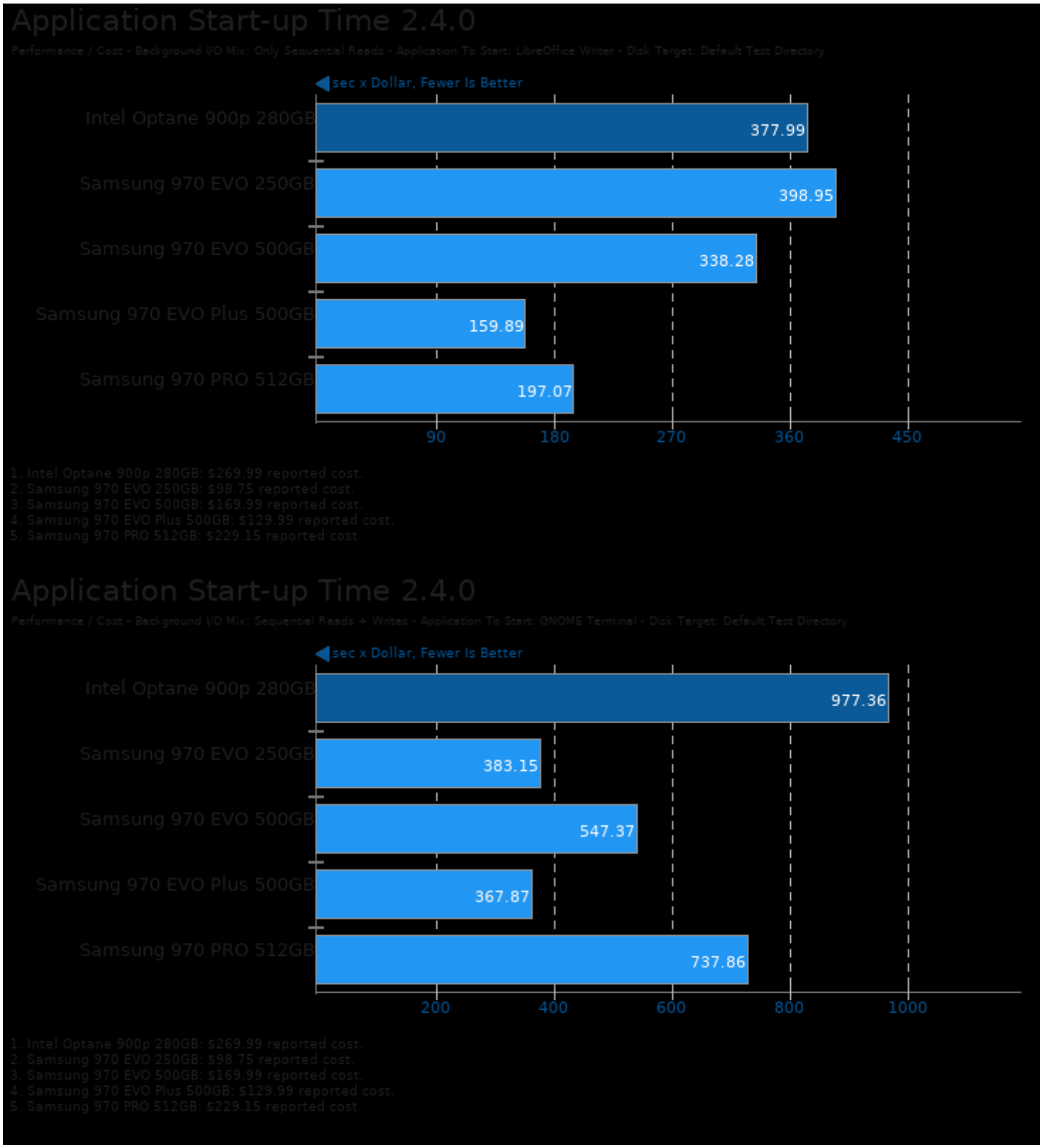

IOzone 3.465
Record Size: 1MB - File Size: 8GB - Disk Test: Write Performance
MB/s, More Is Better
Intel 600p 512GB
SE +/- 45.05, N = 3
235.00
Intel DC P3600 800GB
SE +/- 15.68, N = 12
744.28
Intel Optane 900p 280GB
SE +/- 1.51, N = 3
1071.03
Samsung 850 PRO 256GB
SE +/- 2.73, N = 6
36.60
Samsung 970 EVO 250GB
SE +/- 59.58, N = 3
369.00
Samsung 970 EVO 500GB
SE +/- 16.55, N = 12
643.00
Samsung 970 EVO Plus 500GB
SE +/- 64.32, N = 3
924.36
Samsung 970 PRO 512GB
SE +/- 24.72, N = 3
1535.00
JNJT Evo 970 Plus 500GB Linux Mint 20
SE +/- 16.92, N = 15
954.23
300
600
900
1200
1500
1. (CC) gcc options: -O3

SSD February 2019



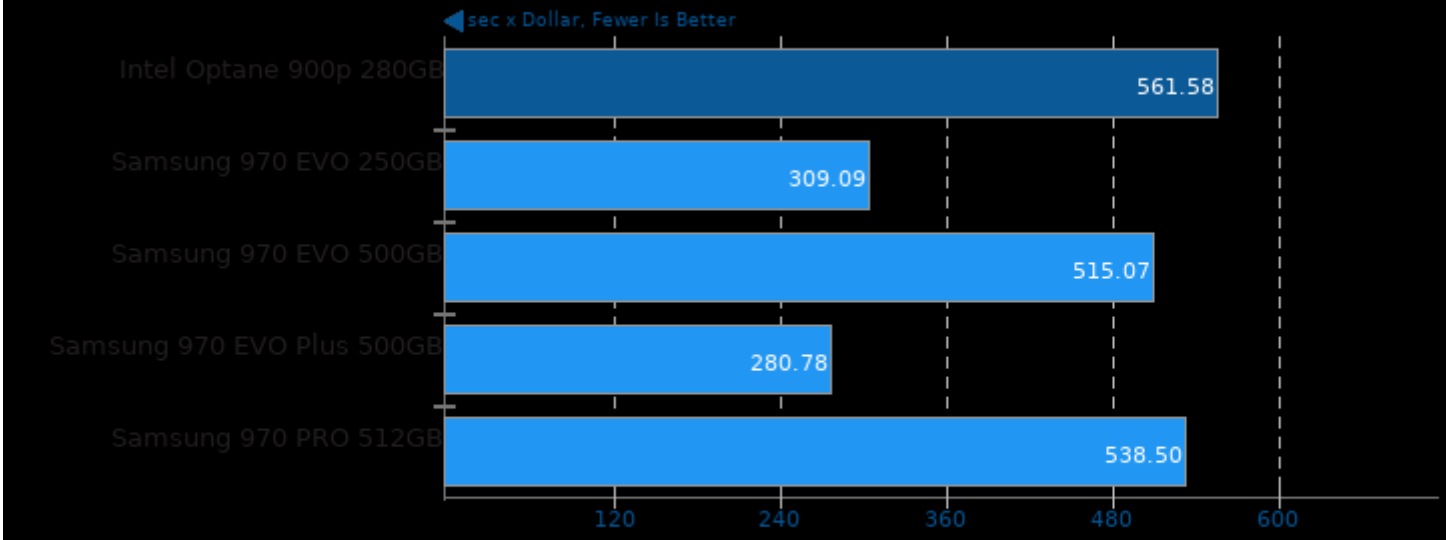

PostgreSQL pgbench 10.3
Scaling: Mostly RAM - Test: Normal Load - Mode: Read Write
TPS, More Is Better
Intel 600p 512GB
968.00
Intel DC P3600 800GB
SE +/- 52.60, N = 3
19678.00
Intel Optane 900p 280GB
SE +/- 94.10, N = 3
19247.00
Samsung 850 PRO 256GB
SE +/- 10.27, N = 3
1292.00
Samsung 970 EVO 250GB
SE +/- 34.53, N = 3
4000.00
Samsung 970 EVO 500GB
SE +/- 316.84, N = 6
4959.00
Samsung 970 EVO Plus 500GB
SE +/- 86.63, N = 3
6513.00
Samsung 970 PRO 512GB
SE +/- 164.86, N = 3
7595.00
JNJT Evo 970 Plus 500GB Linux Mint 20
SE +/- 42.27, N = 3
3182.71
4K
8K
12K
16K
20K
1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -lcrypt -ldl -lm
Drive Temperature (nvme0n1) Monitor
Phoronix Test Suite System Monitoring
Celsius
Intel 600p 512GB
Min: 34 / Avg: 34.39 / Max: 36
Samsung 970 EVO Plus 500GB
Min: 31 / Avg: 35.31 / Max: 36
8
16
24
32
40


Application Start-up Time 2.4.0
Performance / Cost - Background I/O Mix: Only Sequential Reads - Application To Start: xterm - Disk Target: Default Test Directory
sec x Dollar, Fewer Is Better
Intel Optane 900p 280GB
143.09
Samsung 970 EVO 250GB
91.84
Samsung 970 EVO 500GB
103.69
Samsung 970 EVO Plus 500GB
46.80
Samsung 970 PRO 512GB
57.29
30
60
90
120
150
1. Intel Optane 900p 280GB: $269.99 reported cost.
2. Samsung 970 EVO 250GB: $98.75 reported cost.
3. Samsung 970 EVO 500GB: $169.99 reported cost.
4. Samsung 970 EVO Plus 500GB: $129.99 reported cost.
5. Samsung 970 PRO 512GB: $229.15 reported cost.
Application Start-up Time 2.4.0
Performance / Cost - Background I/O Mix: Only Sequential Reads - Application To Start: GNOME Terminal - Disk Target: Default Test Directory
sec x Dollar, Fewer Is Better
Intel Optane 900p 280GB
558.88
Samsung 970 EVO 250GB
456.23
Samsung 970 EVO 500GB
401.18
Samsung 970 EVO Plus 500GB
194.99
Samsung 970 PRO 512GB
224.57
120
240
360
480
600
1. Intel Optane 900p 280GB: $269.99 reported cost.
2. Samsung 970 EVO 250GB: $98.75 reported cost.
3. Samsung 970 EVO 500GB: $169.99 reported cost.
4. Samsung 970 EVO Plus 500GB: $129.99 reported cost.
5. Samsung 970 PRO 512GB: $229.15 reported cost.


Application Start-up Time 2.4.0
Performance / Cost - Background I/O Mix: Only Sequential Reads - Application To Start: LibreOffice Writer - Disk Target: Default Test Directory
sec x Dollar, Fewer Is Better
Intel Optane 900p 280GB
Samsung 970 EVO 250GB
Samsung 970 EVO 500GB
Samsung 970 EVO Plus 500GB
Samsung 970 PRO 512GB
377.99
398.95
338.28
159.89
197.07
90
180
270
360
450
1. Intel Optane 900p 280GB: $269.99 reported cost.
2. Samsung 970 EVO 250GB: $98.75 reported cost.
3. Samsung 970 EVO 500GB: $169.99 reported cost.
4. Samsung 970 EVO Plus 500GB: $129.99 reported cost.
5. Samsung 970 PRO 512GB: $229.15 reported cost.
Application Start-up Time 2.4.0
Performance / Cost - Background I/O Mix: Sequential Reads + Writes - Application To Start: GNOME Terminal - Disk Target: Default Test Directory
sec x Dollar, Fewer Is Better
Intel Optane 900p 280GB
Samsung 970 EVO 250GB
Samsung 970 EVO 500GB
Samsung 970 EVO Plus 500GB
Samsung 970 PRO 512GB
977.36
383.15
547.37
367.87
737.86
200
400
600
800
1000
1. Intel Optane 900p 280GB: $269.99 reported cost.
2. Samsung 970 EVO 250GB: $98.75 reported cost.
3. Samsung 970 EVO 500GB: $169.99 reported cost.
4. Samsung 970 EVO Plus 500GB: $129.99 reported cost.
5. Samsung 970 PRO 512GB: $229.15 reported cost.

Application Start-up Time 2.4.0

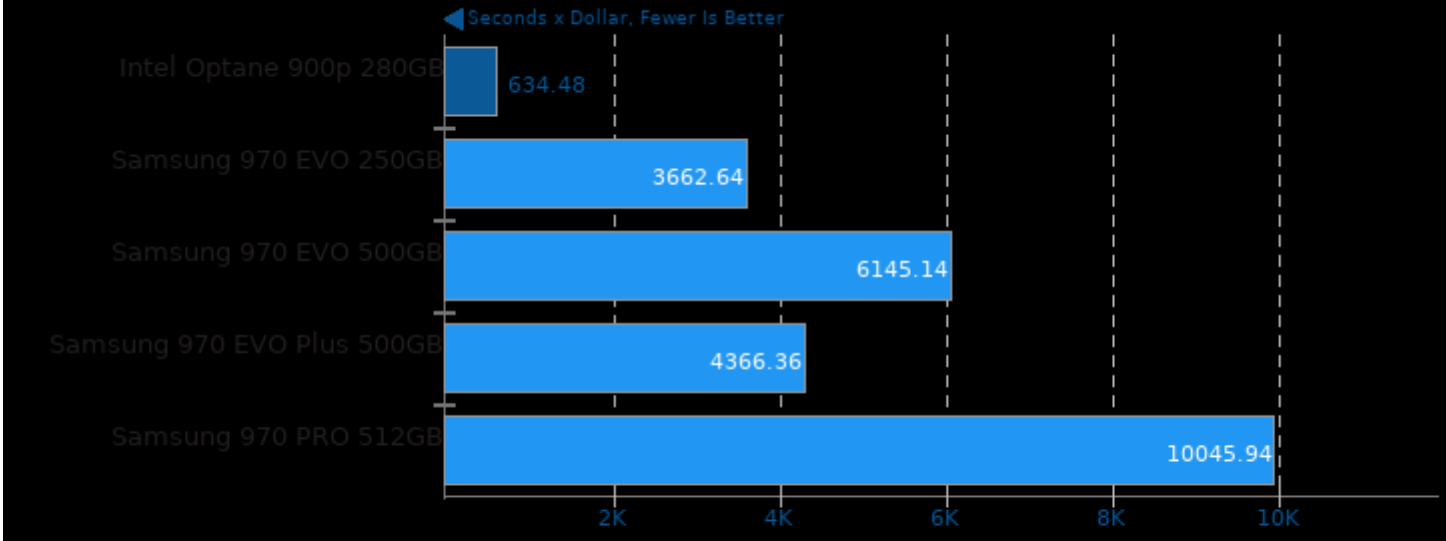
Performance / Cost - Background I/O Mix: Sequential Reads + Writes - Application To Start: LibreOffice Writer - Disk Target: Default Test Directory



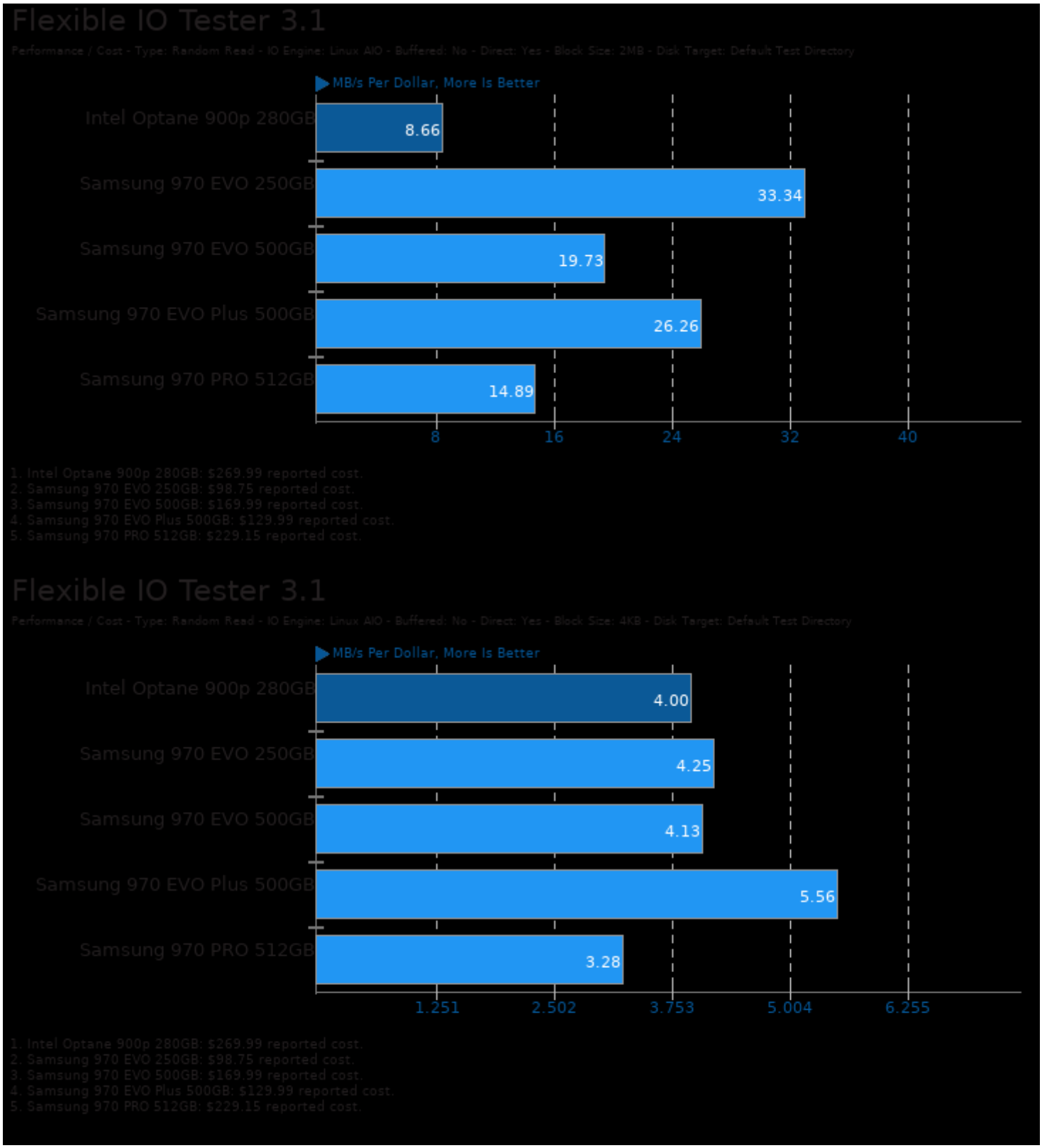
1. Intel Optane 900p 280GB: $269.99 reported cost.
2. Samsung 970 EVO 250GB: $98.75 reported cost.
3. Samsung 970 EVO 500GB: $169.99 reported cost.
4. Samsung 970 EVO Plus 500GB: $129.99 reported cost.
5. Samsung 970 PRO 512GB: $229.15 reported cost.

SQLite 3.22

Performance / Cost - Timed SQLite Insertions

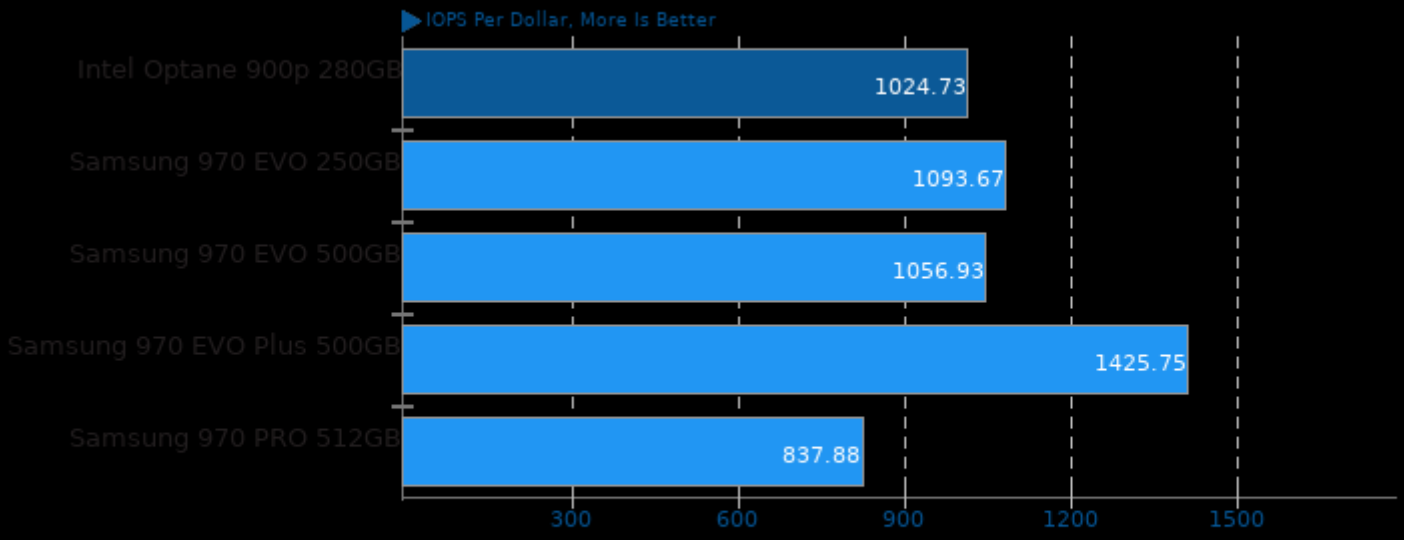


1. Intel Optane 900p 280GB: $269.99 reported cost.
2. Samsung 970 EVO 250GB: $98.75 reported cost.
3. Samsung 970 EVO 500GB: $169.99 reported cost.
4. Samsung 970 EVO Plus 500GB: $129.99 reported cost.
5. Samsung 970 PRO 512GB: $229.15 reported cost.


Flexible IO Tester 3.1
Performance / Cost - Type: Random Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory
MB/s Per Dollar, More Is Better
Intel Optane 900p 280GB
8.66
Samsung 970 EVO 250GB
33.34
Samsung 970 EVO 500GB
19.73
Samsung 970 EVO Plus 500GB
26.26
Samsung 970 PRO 512GB
14.89
8
16
24
32
40
1. Intel Optane 900p 280GB: $269.99 reported cost.
2. Samsung 970 EVO 250GB: $98.75 reported cost.
3. Samsung 970 EVO 500GB: $169.99 reported cost.
4. Samsung 970 EVO Plus 500GB: $129.99 reported cost.
5. Samsung 970 PRO 512GB: $229.15 reported cost.
Flexible IO Tester 3.1
Performance / Cost - Type: Random Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory
MB/s Per Dollar, More Is Better
Intel Optane 900p 280GB
4.00
Samsung 970 EVO 250GB
4.25
Samsung 970 EVO 500GB
4.13
Samsung 970 EVO Plus 500GB
5.56
Samsung 970 PRO 512GB
3.28
1.251
2.502
3.753
5.004
6.255
1. Intel Optane 900p 280GB: $269.99 reported cost.
2. Samsung 970 EVO 250GB: $98.75 reported cost.
3. Samsung 970 EVO 500GB: $169.99 reported cost.
4. Samsung 970 EVO Plus 500GB: $129.99 reported cost.
5. Samsung 970 PRO 512GB: $229.15 reported cost.

Flexible IO Tester 3.1

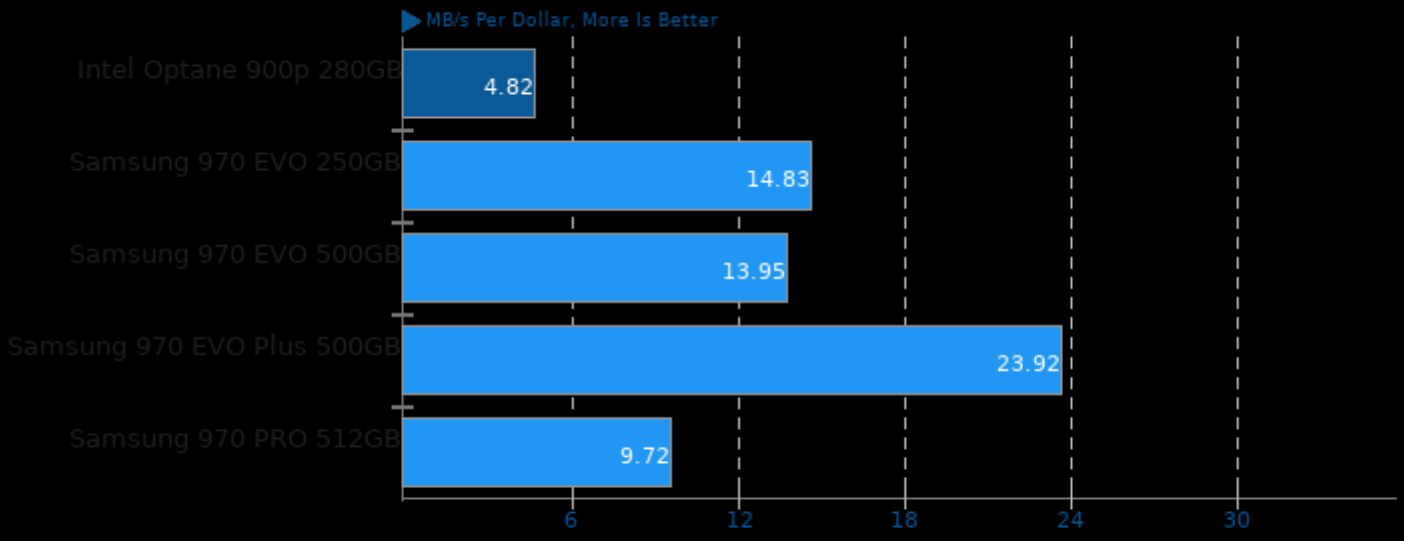
Performance / Cost - Type: Random Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory



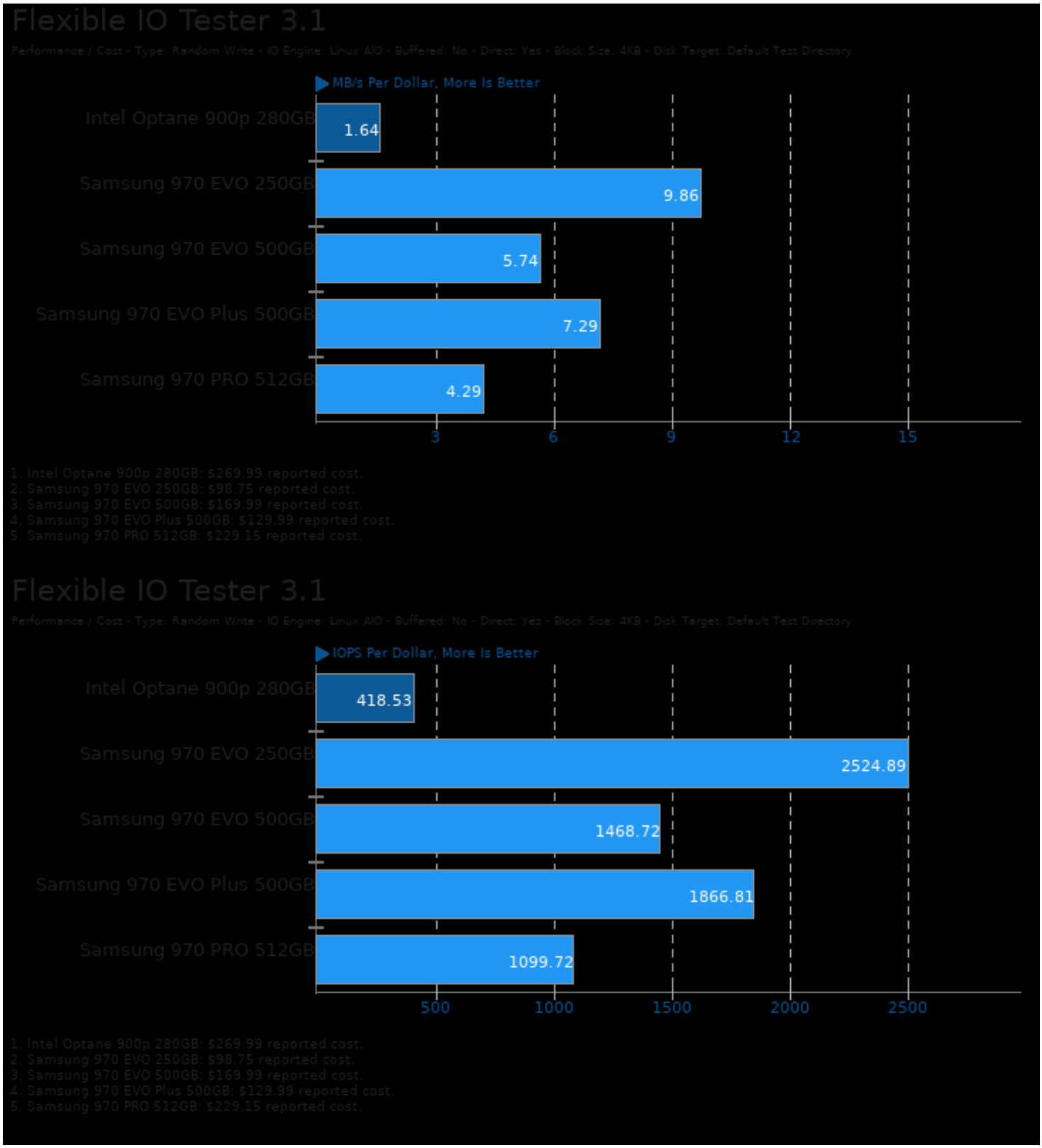
1. Intel Optane 900p 280GB: $269.99 reported cost.
2. Samsung 970 EVO 250GB: $98.75 reported cost.
3. Samsung 970 EVO 500GB: $169.99 reported cost.
4. Samsung 970 EVO Plus 500GB: $129.99 reported cost.
5. Samsung 970 PRO 512GB: $229.15 reported cost.

Flexible IO Tester 3.1

Performance / Cost - Type: Random Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory

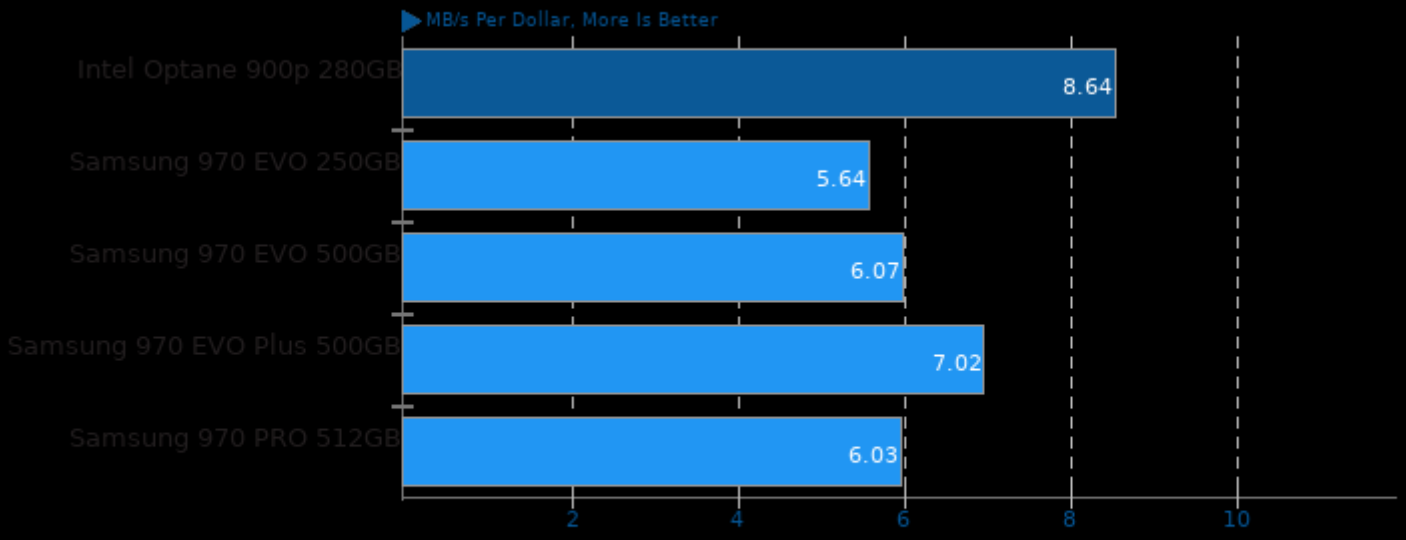


1. Intel Optane 900p 280GB: $269.99 reported cost.
2. Samsung 970 EVO 250GB: $98.75 reported cost.
3. Samsung 970 EVO 500GB: $169.99 reported cost.
4. Samsung 970 EVO Plus 500GB: $129.99 reported cost.
5. Samsung 970 PRO 512GB: $229.15 reported cost.


Flexible IO Tester 3.1
Performance / Cost - Type: Random Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory
MB/s Per Dollar, More Is Better
Intel Optane 900p 280GB
1.64
Samsung 970 EVO 250GB
9.86
Samsung 970 EVO 500GB
5.74
Samsung 970 EVO Plus 500GB
7.29
Samsung 970 PRO 512GB
4.29
3
6
9
12
15
1. Intel Optane 900p 280GB: $269.99 reported cost.
2. Samsung 970 EVO 250GB: $98.75 reported cost.
3. Samsung 970 EVO 500GB: $169.99 reported cost.
4. Samsung 970 EVO Plus 500GB: $129.99 reported cost.
5. Samsung 970 PRO 512GB: $229.15 reported cost.
Flexible IO Tester 3.1
Performance / Cost - Type: Random Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory
IOPS Per Dollar, More Is Better
Intel Optane 900p 280GB
418.53
Samsung 970 EVO 250GB
2524.89
Samsung 970 EVO 500GB
1468.72
Samsung 970 EVO Plus 500GB
1866.81
Samsung 970 PRO 512GB
1099.72
500
1000
1500
2000
2500
1. Intel Optane 900p 280GB: $269.99 reported cost.
2. Samsung 970 EVO 250GB: $98.75 reported cost.
3. Samsung 970 EVO 500GB: $169.99 reported cost.
4. Samsung 970 EVO Plus 500GB: $129.99 reported cost.
5. Samsung 970 PRO 512GB: $229.15 reported cost.

Flexible IO Tester 3.1

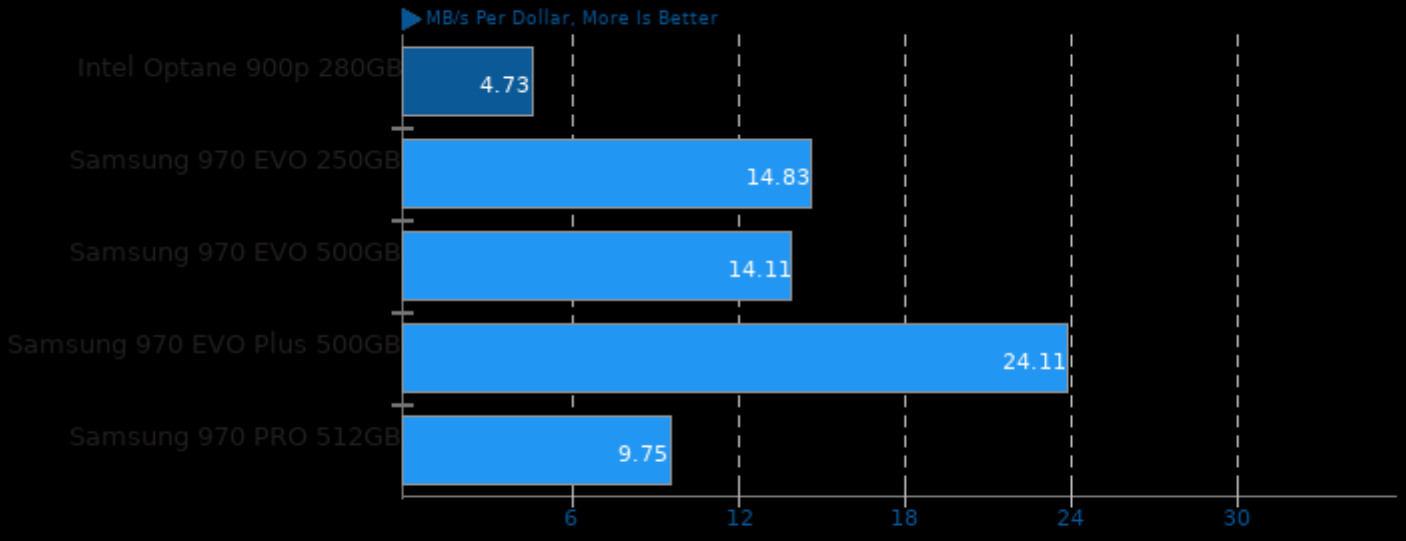
Performance / Cost - Type: Sequential Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory



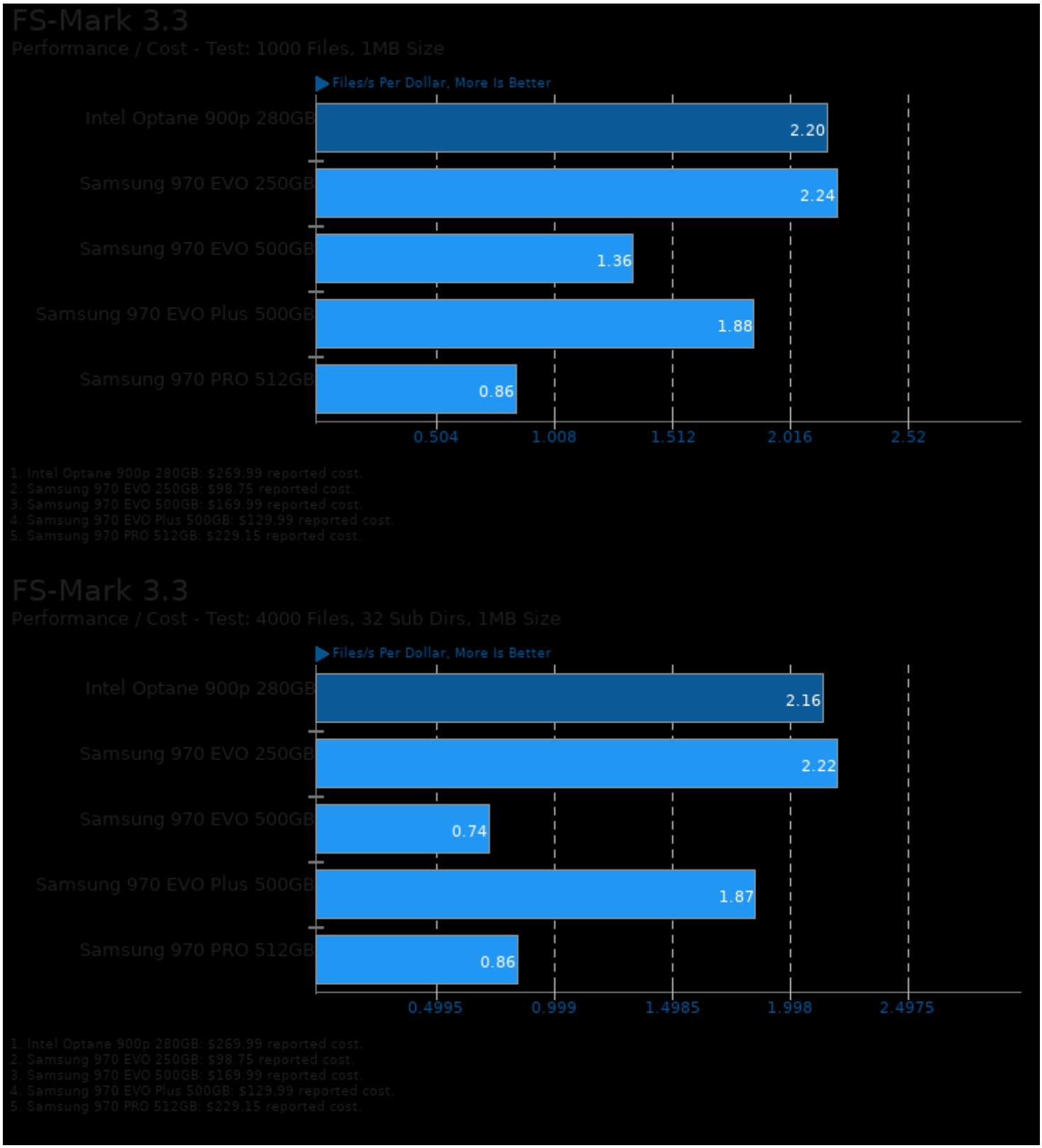
1. Intel Optane 900p 280GB: $269.99 reported cost.
2. Samsung 970 EVO 250GB: $98.75 reported cost.
3. Samsung 970 EVO 500GB: $169.99 reported cost.
4. Samsung 970 EVO Plus 500GB: $129.99 reported cost.
5. Samsung 970 PRO 512GB: $229.15 reported cost.

Flexible IO Tester 3.1

Performance / Cost - Type: Sequential Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory

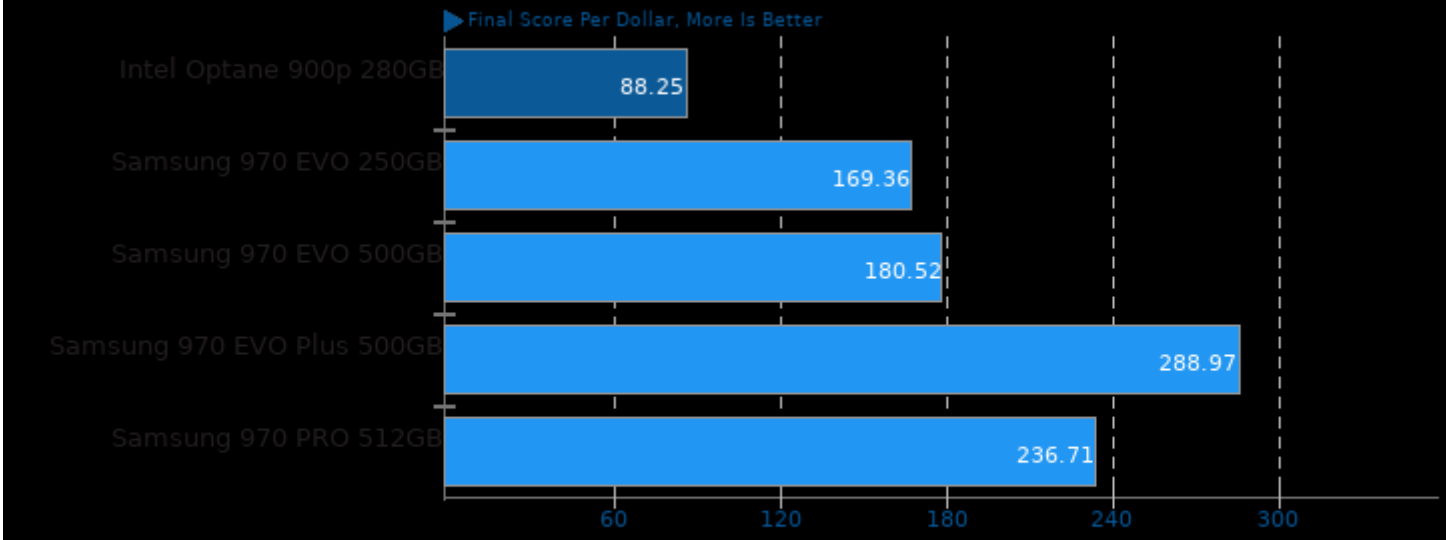


1. Intel Optane 900p 280GB: $269.99 reported cost.
2. Samsung 970 EVO 250GB: $98.75 reported cost.
3. Samsung 970 EVO 500GB: $169.99 reported cost.
4. Samsung 970 EVO Plus 500GB: $129.99 reported cost.
5. Samsung 970 PRO 512GB: $229.15 reported cost.


FS-Mark 3.3
Performance / Cost - Test: 1000 Files, 1MB Size
Files/s Per Dollar, More Is Better
Intel Optane 900p 280GB
2.20
Samsung 970 EVO 250GB
2.24
Samsung 970 EVO 500GB
1.36
Samsung 970 EVO Plus 500GB
1.88
Samsung 970 PRO 512GB
0.86
0.504
1.008
1.512
2.016
2.52
1. Intel Optane 900p 280GB: $269.99 reported cost.
2. Samsung 970 EVO 250GB: $98.75 reported cost.
3. Samsung 970 EVO 500GB: $169.99 reported cost.
4. Samsung 970 EVO Plus 500GB: $129.99 reported cost.
5. Samsung 970 PRO 512GB: $229.15 reported cost.
FS-Mark 3.3
Performance / Cost - Test: 4000 Files, 32 Sub Dirs, 1MB Size
Files/s Per Dollar, More Is Better
Intel Optane 900p 280GB
2.16
Samsung 970 EVO 250GB
2.22
Samsung 970 EVO 500GB
0.74
Samsung 970 EVO Plus 500GB
1.87
Samsung 970 PRO 512GB
0.86
0.4995
0.999
1.4985
1.998
2.4975
1. Intel Optane 900p 280GB: $269.99 reported cost.
2. Samsung 970 EVO 250GB: $98.75 reported cost.
3. Samsung 970 EVO 500GB: $169.99 reported cost.
4. Samsung 970 EVO Plus 500GB: $129.99 reported cost.
5. Samsung 970 PRO 512GB: $229.15 reported cost.

BlogBench 1.1

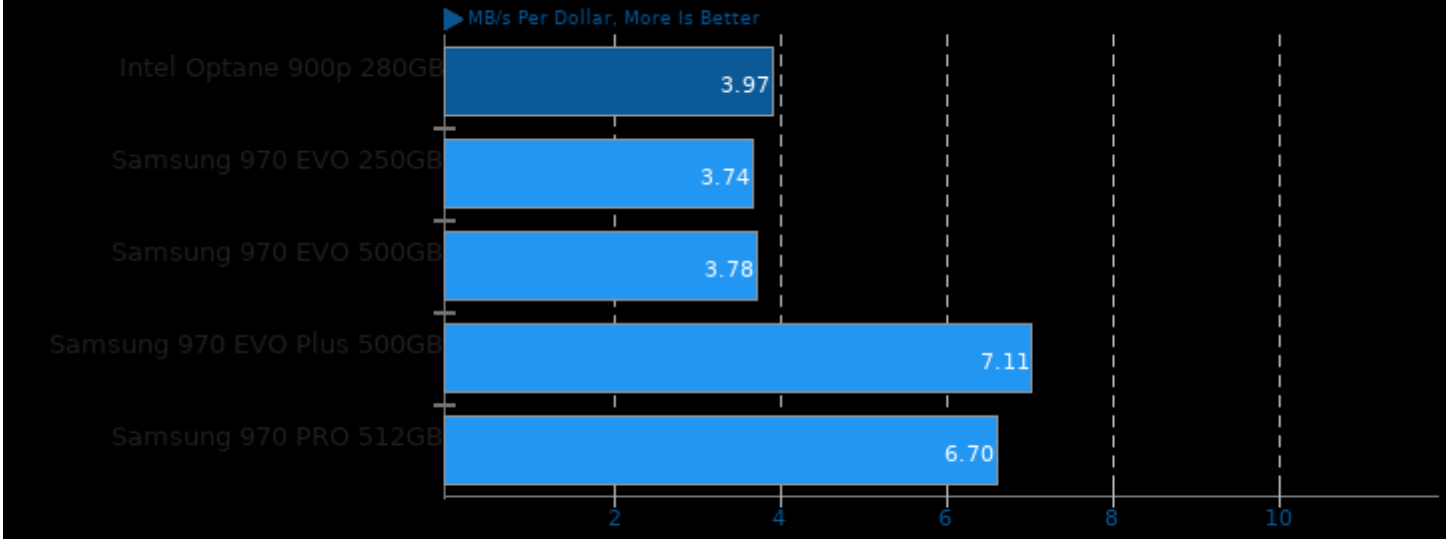
Performance / Cost - Test: Write



1. Intel Optane 900p 280GB: $269.99 reported cost.
2. Samsung 970 EVO 250GB: $98.75 reported cost.
3. Samsung 970 EVO 500GB: $169.99 reported cost.
4. Samsung 970 EVO Plus 500GB: $129.99 reported cost.
5. Samsung 970 PRO 512GB: $229.15 reported cost.

IOzone 3.465

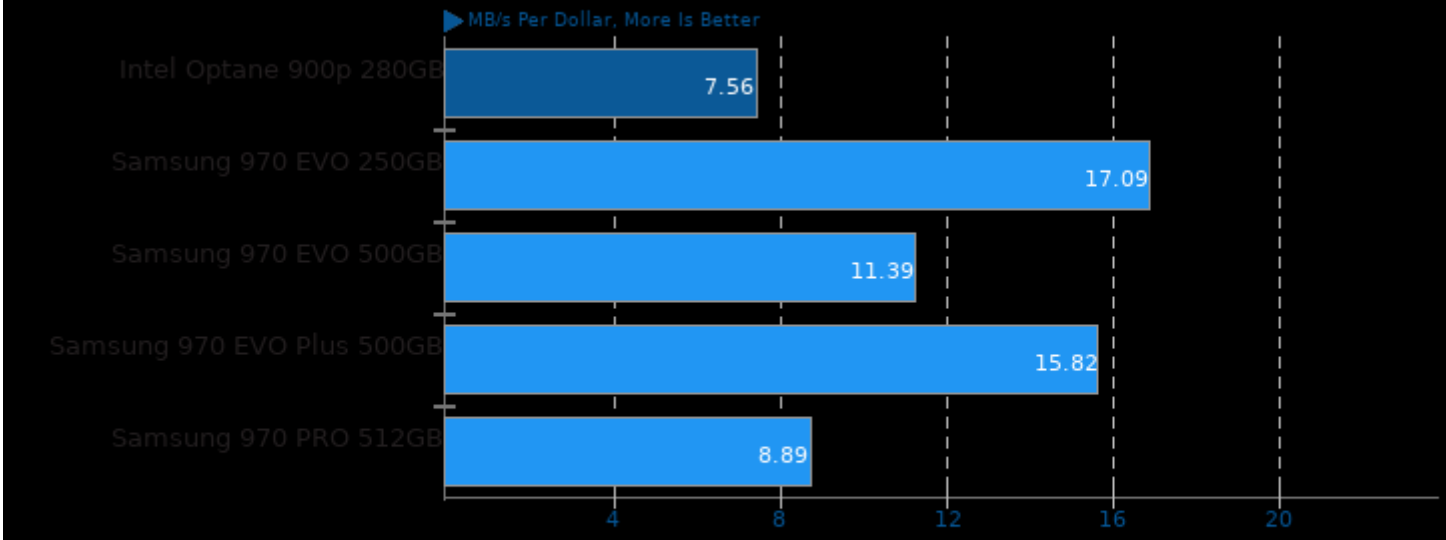
Performance / Cost - Record Size: 1MB - File Size: 8GB - Disk Test: Write Performance



1. Intel Optane 900p 280GB: $269.99 reported cost.
2. Samsung 970 EVO 250GB: $98.75 reported cost.
3. Samsung 970 EVO 500GB: $169.99 reported cost.
4. Samsung 970 EVO Plus 500GB: $129.99 reported cost.
5. Samsung 970 PRO 512GB: $229.15 reported cost.

Compile Bench 0.6

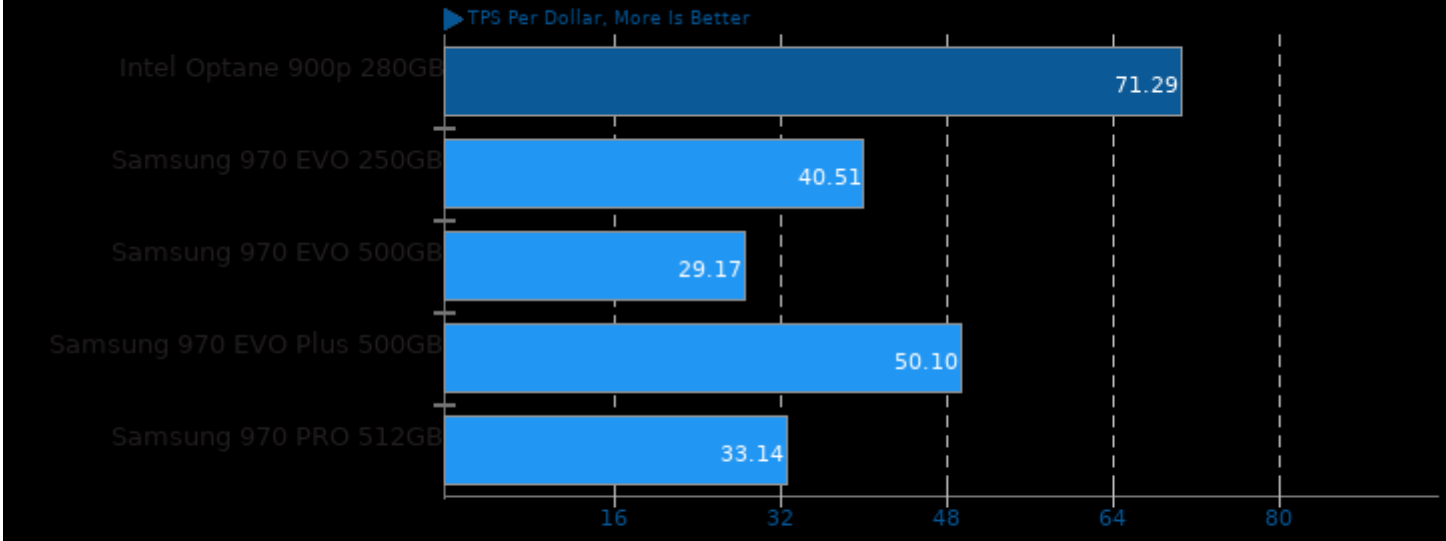
Performance / Cost - Test: Compile



1. Intel Optane 900p 280GB: $269.99 reported cost.
2. Samsung 970 EVO 250GB: $98.75 reported cost.
3. Samsung 970 EVO 500GB: $169.99 reported cost.
4. Samsung 970 EVO Plus 500GB: $129.99 reported cost.
5. Samsung 970 PRO 512GB: $229.15 reported cost.

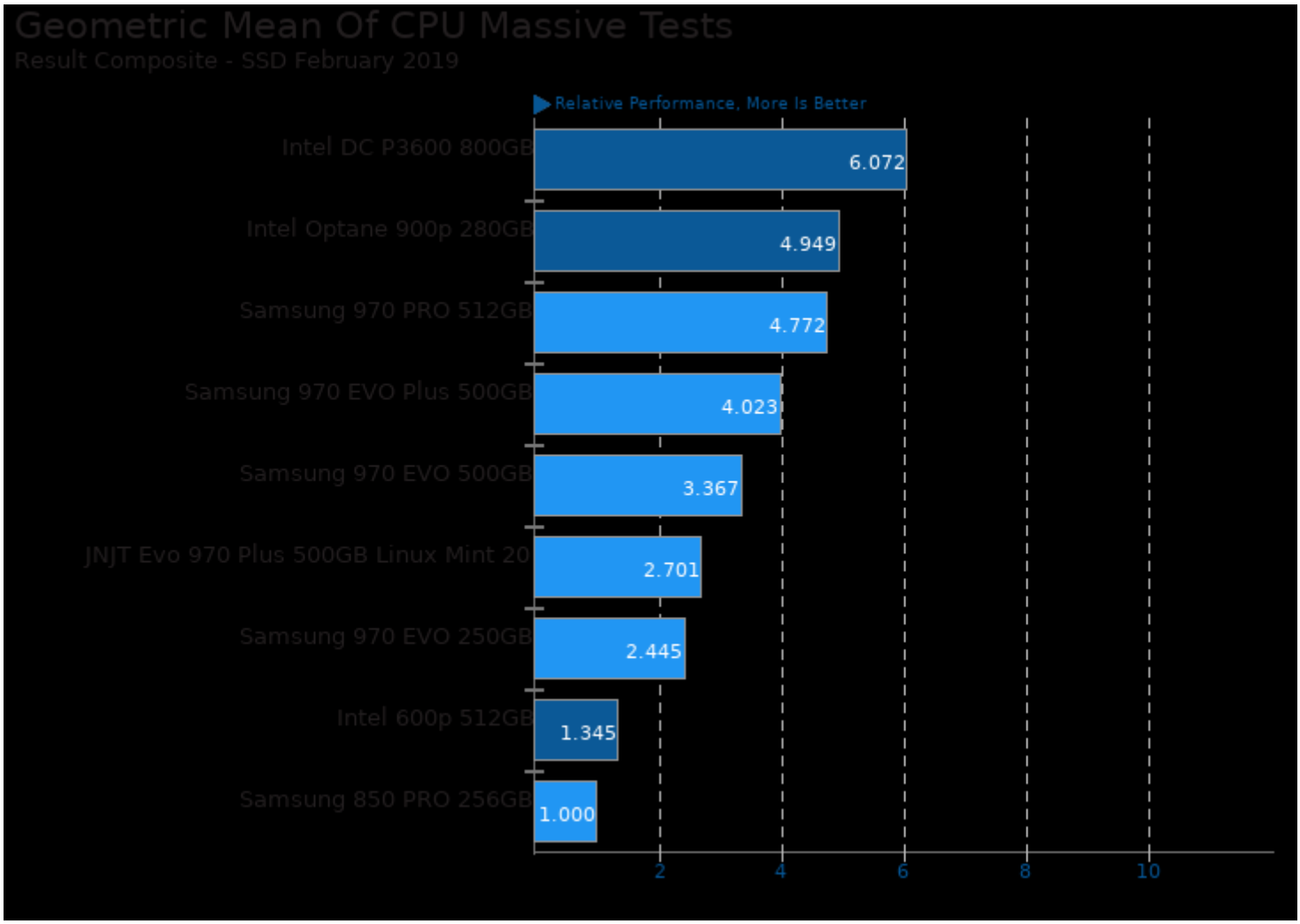
PostgreSQL pgbench 10.3

Performance / Cost - Scaling: Mostly RAM - Test: Normal Load - Mode: Read Write

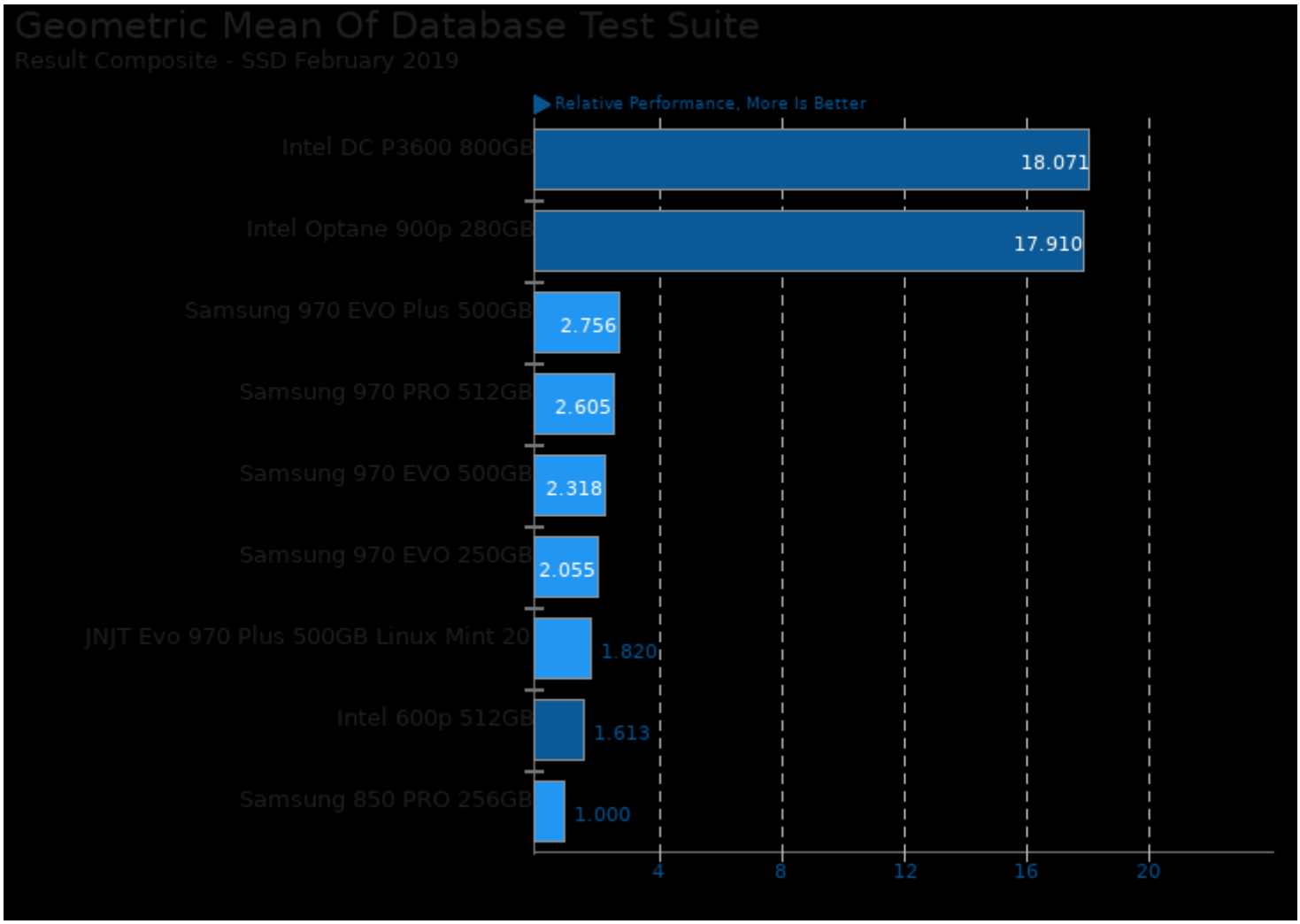


1. Intel Optane 900p 280GB: $269.99 reported cost.
2. Samsung 970 EVO 250GB: $98.75 reported cost.
3. Samsung 970 EVO 500GB: $169.99 reported cost.
4. Samsung 970 EVO Plus 500GB: $129.99 reported cost.
5. Samsung 970 PRO 512GB: $229.15 reported cost.

These geometric means are based upon test groupings / test suites for this result file.

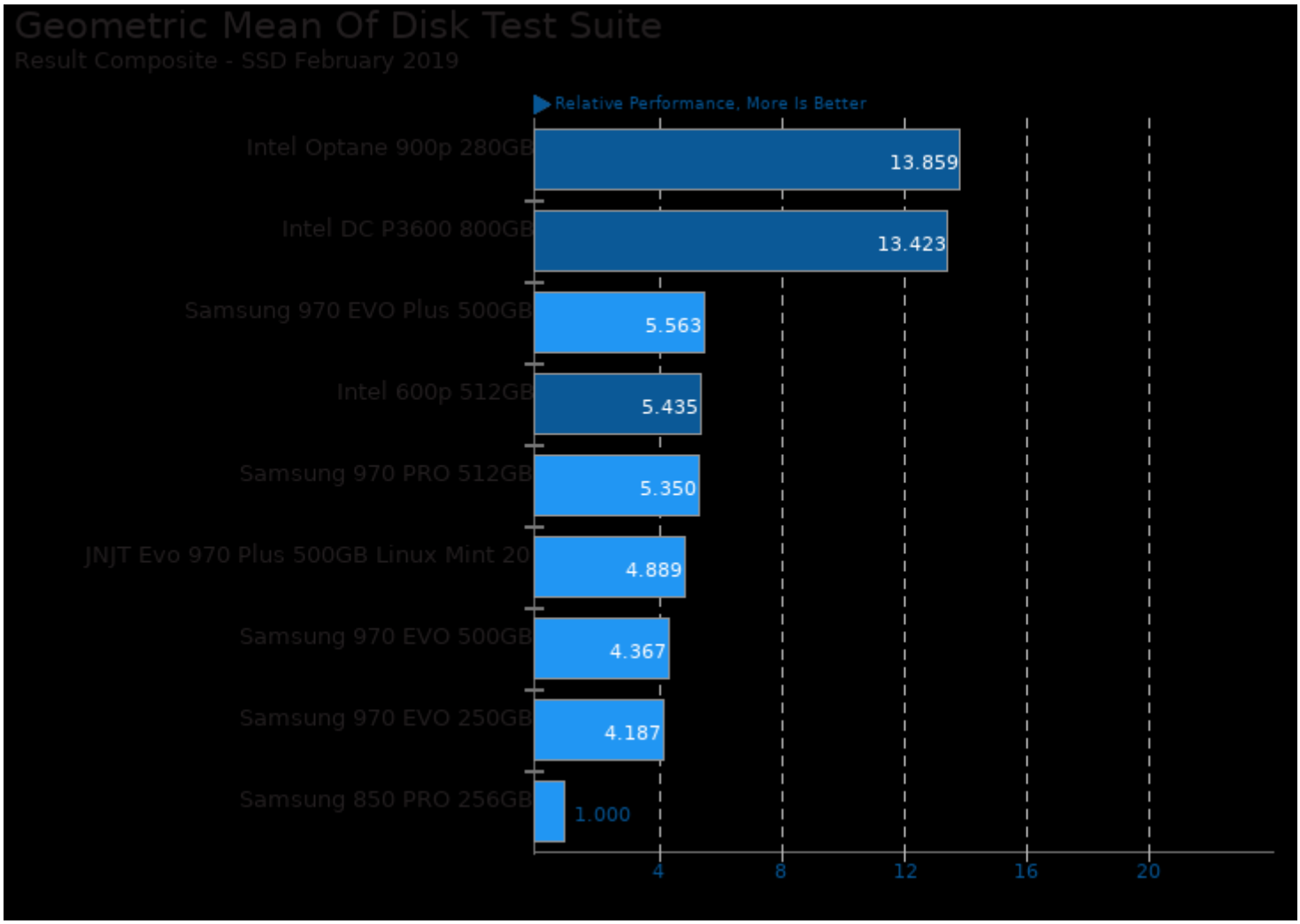


Geometric mean based upon tests: pts/blogbench, pts/compilebench and pts/pgbench



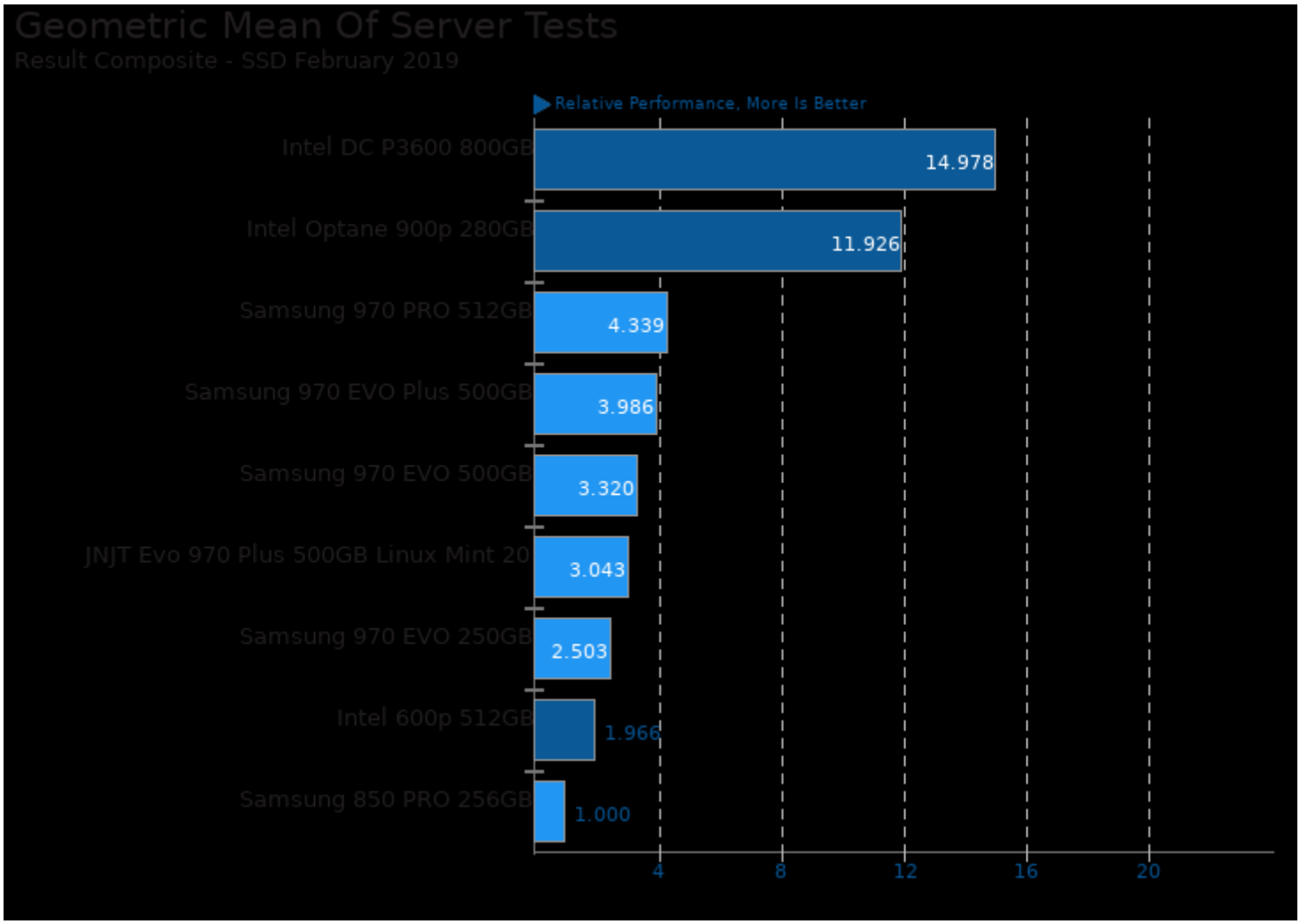
Geometric mean based upon tests: pts/sqlite and pts/pgbench

SSD February 2019



Geometric mean based upon tests: pts/sqlite, pts/fs-mark, pts/compilebench, pts/iozone and pts/fio

SSD February 2019



Geometric mean based upon tests: pts/blogbench, pts/pgbench and pts/sqlite

This file was automatically generated via the Phoronix Test Suite benchmarking software on Friday, 29 March 2024 11:16.