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FreeBSD 12.0 Benchmarks - Intel Xeon Platinum 8280 Cascade Lake

2 x Intel Xeon Platinum 8280 testing on Linux and FreeBSD 12.0 for a future article on Phoronix.

Automated Executive Summary

Clear Linux 28660 had the most wins, coming in first place for 48% of the tests.

Based on the geometric mean of all complete results, the fastest (Clear Linux 28660) was 1.849x the speed of the slowest (FreeBSD 12.0). Ubuntu 18.04.2 LTS was 0.889x the speed of Clear Linux 28660, openSUSE Leap 15.0 was 0.993x the speed of Ubuntu 18.04.2 LTS, CentOS 7 was 0.839x the speed of openSUSE Leap 15.0, FreeBSD 12.0 - GCC 8.3 was 0.745x the speed of CentOS 7, FreeBSD 12.0 was 0.98x the speed of FreeBSD 12.0 - GCC 8.3.

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

TTSIOD 3D Renderer (Phong Rendering With Soft-Shadow Mapping) at 35.022x
Stress-NG (Test: Socket Activity) at 32.401x
Scikit-Learn at 27.642x
Stress-NG (Test: Glibc C String Functions) at 14.576x
LLVM Test Suite (Time To Run) at 11.335x
GraphicsMagick (Operation: Sharpen) at 11.095x
GraphicsMagick (Operation: Noise-Gaussian) at 8.607x
GraphicsMagick (Operation: Enhanced) at 8.3x

Stress-NG (Test: Context Switching) at 6.503x
Timed HMMer Search (Pfam Database Search) at 6.072x.

Test Systems:

CentOS 7

Processor: 2 x Intel Xeon Platinum 8280 @ 4.00GHz (56 Cores / 112 Threads), Motherboard: GIGABYTE MD61-SC2-00 v01000100 (T15 BIOS), Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 386048MB, Disk: Samsung SSD 970 PRO 512GB, Graphics: ASPEED Family, Monitor: VE228, Network: 2 x Intel X722 for 1GbE + 2 x QLogic FastLinQ QL41000 10/25/40/50GbE

OS: CentOS Linux 7, Kernel: 3.10.0-957.10.1.el7.x86_64 (x86_64), Desktop: GNOME Shell 3.28.3, Display Server: X Server 1.20.1, Display Driver: modesetting 1.20.1, Compiler: GCC 4.8.5 20150623, File-System: xfs, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-redhat-linux --disable-libgcj --disable-libunwind-exceptions --enable-__cxa_atexit --enable-bootstrap --enable-checking=release --enable-gnu-indirect-function --enable-gnu-unique-object --enable-initfini-array --enable-languages=c,c++,objc,obj-c++,java,fortran,ada,go,lto --enable-plugin --enable-shared --enable-threads=posix --mandir=/usr/share/man --with-arch_32=x86-64 --with-linker-hash-style=gnu --with-tune=generic
Disk Notes: NONE / attr2,inode64,noquota,relatime,rw,seclabel
Processor Notes: Scaling Governor: intel_pstate powersave
Python Notes: Python 2.7.5 + Python 3.6.6
Security Notes: SELinux

Clear Linux 28660

Processor: 2 x Intel Xeon Platinum 8280 @ 4.00GHz (56 Cores / 112 Threads), Motherboard: GIGABYTE MD61-SC2-00 v01000100 (T15 BIOS), Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 386048MB, Disk: Samsung SSD 970 PRO 512GB, Graphics: ASPEED Family, Monitor: VE228, Network: 2 x Intel X722 for 1GbE + 2 x QLogic FastLinQ QL41000 10/25/40/50GbE

OS: Clear Linux OS 28660, Kernel: 5.0.6-726.native (x86_64), Desktop: GNOME Shell 3.32.0, Display Server: X Server 1.20.4, Display Driver: modesetting 1.20.4, Compiler: GCC 8.3.1 20190404 + Clang 7.0.1 + LLVM 7.0.1, File-System: ext4, Screen Resolution: 1920x1080

Environment Notes:
CFFLAGS=-g-O3-feliminate-unused-debug-types-pipe-Wall-Wp-D_FORTIFY_SOURCE=2-fexceptions-fstack-protector--param=ssp-buffer-size=32-Wl--copy-dt-needed-entries-m64-fasynchronous-unwind-tables-Wp-D_REENTRANT-ftree-loop-distribute-patterns-Wl-z-Wl now-Wl-z-Wl relro-malign-data=abi-fno-semantic-interposition-ftree-vectorize-ftree-loop-vectorize-Wl-sort-common-Wl--enable-new-dtags
FFLAGS=-g-O3-feliminate-unused-debug-types-pipe-Wall-Wp-D_FORTIFY_SOURCE=2-fexceptions-fstack-protector--param=ssp-buffer-size=32-Wl--copy-dt-needed-entries-m64-fasynchronous-unwind-tables-Wp-D_REENTRANT-ftree-loop-distribute-patterns-Wl-z-Wl relro-malign-data=abi-fno-semantic-interposition-ftree-vectorize-ftree-loop-vectorize-Wl--enable-new-dtags
CXXFLAGS=-g-O3-feliminate-unused-debug-types-pipe-Wall-Wp-D_FORTIFY_SOURCE=2-fexceptions-fstack-protector--param=ssp-buffer-size=32-Wformat-Wformat-security-Wl--copy-dt-needed-entries-m64-fasynchronous-unwind-tables-Wp-D_REENTRANT-ftree-loop-distribute-patterns-Wl-z-Wl relro-fno-semantic-interposition-ffat-lto-objects-fno-signed-zeros-fno-trapping-math-fassociative-math-Wl-sort-common-Wl--enable-new-dtags-mtune=skylake-fvisibility-inlines-hidden-Wl--enable-new-dtags
CFLAGS=-g-O3-feliminate-unused-debug-types-pipe-Wall-Wp-D_FORTIFY_SOURCE=2-fexceptions-fstack-protector--param=ssp-buffer-size=32-Wformat-Wformat-security-Wl--copy-dt-needed-entries-m64-fasynchronous-unwind-tables-Wp-D_REENTRANT-ftree-loop-distribute-patterns-Wl-z-Wl relro-fno-semantic-interposition-ffat-lto-objects-fno-signed-zeros-fno-trapping-math-fassociative-math-Wl-sort-common-Wl--enable-new-dtags-mtune=skylake THEANO_FLAGS=floatX=float32 openmp=true gcc.cxxflags="-ftree-vectorize-mavx"
Compiler Notes: --build=x86_64-generic-linux --disable-libmpx --disable-libunwind-exceptions --disable-multiarch --disable-vtable-verify --enable-__cxa_atexit --enable-bootstrap --enable-cet --enable-clocale=gnu --enable-gnu-indirect-function --enable-languages=c,c++,fortran,go --enable-ld=default --enable-libstdcxx-pch --enable-lto --enable-multilib --enable-plugin --enable-shared --enable-threads=posix --exec-prefix=/usr --includedir=/usr/include --target=x86_64-generic-linux --with-arch=westmere --with-glibc-version=2.19 --with-gnu-ld --with-isl --with-ppl=yes --with-tune=haswell
Disk Notes: MQ-DEADLINE / relatime,rw,stripe=256
Processor Notes: Scaling Governor: intel_pstate performance
Python Notes: Python 3.7.2

Security Notes: __user pointer sanitization + Enhanced IBRS IBPB: conditional RSB filling + SSB disabled via prctl and seccomp

openSUSE Leap 15.0

Processor: 2 x Intel Xeon Platinum 8280 @ 4.00GHz (56 Cores / 112 Threads), Motherboard: GIGABYTE MD61-SC2-00 v01000100 (T15 BIOS), Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 386048MB, Disk: Samsung SSD 970 PRO 512GB, Graphics: ASPEED Family, Monitor: VE228, Network: 2 x Intel X722 for 1GbE + 2 x QLogic FastLinQ QL41000 10/25/40/50GbE

OS: openSUSE Leap 15.0, Kernel: 4.12.14-lp150.12.48-default (x86_64), Compiler: GCC 7.3.1 20180323 [gcc-7-branch revision 258812], File-System: xfs, Screen Resolution: 1920x1080

Environment Notes: LIBGL_DEBUG=quiet
Compiler Notes: --build=x86_64-suse-linux --disable-libcc1 --disable-libssp --disable-libstdcxx-pch --disable-libvtv --disable-plugin --disable-werror --enable-__cxa_atexit --enable-checking=release --enable-gnu-indirect-function --enable-languages=c,c++,objc,fortran,obj-c++,ada,go --enable-libstdcxx-allocator=new --enable-linux-futex --enable-multilib --enable-offload-targets=hsa,nvptx-none=/usr/nvptx-none, --enable-ssp --enable-version-specific-runtime-libs --host=x86_64-suse-linux --mandir=/usr/share/man --with-arch-32=x86-64 --with-gcc-major-version-only --with-slibdir=/lib64 --with-tune=generic --without-cuda-driver --without-system-libunwind
Disk Notes: NONE / attr2,inode64,noquota,relatime,rw
Processor Notes: Scaling Governor: intel_pstate powersave
Python Notes: Python 2.7.14 + Python 3.6.5
Security Notes: __user pointer sanitization + Enhanced IBRS IBPB: conditional RSB filling + SSB disabled via prctl and seccomp

Ubuntu 18.04.2 LTS

Processor: 2 x Intel Xeon Platinum 8280 @ 4.00GHz (56 Cores / 112 Threads), Motherboard: GIGABYTE MD61-SC2-00 v01000100 (T15 BIOS), Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 386048MB, Disk: Samsung SSD 970 PRO 512GB, Graphics: ASPEED Family, Monitor: VE228, Network: 2 x Intel X722 for 1GbE + 2 x QLogic FastLinQ QL41000 10/25/40/50GbE

OS: Ubuntu 18.04, Kernel: 4.18.0-17-generic (x86_64), Desktop: GNOME Shell 3.28.3, Display Server: X Server 1.20.1, Display Driver: modesetting 1.20.1, Compiler: GCC 7.3.0, 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++ --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: intel_pstate powersave
Python Notes: Python 2.7.15rc1 + Python 3.6.7
Security Notes: __user pointer sanitization + Enhanced IBRS IBPB STIBP + SSB disabled via prctl and seccomp

FreeBSD 12.0

Processor: Intel Xeon Platinum 8280 @ 2.70GHz (112 Cores), Motherboard: GIGABYTE S451-3R0-00 0100, Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 391936MB, Disk: Samsung SSD 970 PRO 512GB, Graphics: ASPEED Family

OS: FreeBSD, Kernel: 12.0-RELEASE (x86_64), Compiler: Clang 6.0.1 (SVN 335540), File-System: zfs, Screen Resolution: 800x600

Python Notes: Python 2.7.16 + Python 3.6.8

FreeBSD 12.0 - GCC 8.3

Processor: Intel Xeon Platinum 8280 @ 2.70GHz (112 Cores), Motherboard: GIGABYTE S451-3R0-00 0100, Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 391936MB, Disk: Samsung SSD 970 PRO 512GB, Graphics: ASPEED Family

FreeBSD 12.0 Benchmarks - Intel Xeon Platinum 8280 Cascade Lake

OS: FreeBSD, Kernel: 12.0-RELEASE (x86_64), Compiler: GCC 8.3.0 + Clang 6.0.1 (SVN 335540), File-System: zfs, Screen Resolution: 800x600

Compiler Notes: --build=x86_64-portbld-freebsd12.0 --disable-nls --enable-gnu-indirect-function --enable-languages=c,c++,objc,fortran --enable-multilib --localstatedir=/var --mandir=/usr/local/man --with-as=/usr/local/bin/as --with-build-config=bootstrap-debug --with-gmp=/usr/local --with-ld=/usr/local/bin/ld
Python Notes: Python 2.7.16 + Python 3.6.8

	CentOS 7	Clear Linux 28660	openSUSE Leap 15.0	Ubuntu 18.04.2 LTS	FreeBSD 12.0	FreeBSD 12.0 - GCC 8.3
SQLite - T.S.I (sec)	**65.41**	47.22	46.32	47.20	**44.67**	45.11
Normalized	68.29%	94.6%	96.44%	94.64%	100%	99.02%
Standard Deviation	0.9%	0.5%	0.6%	0.4%	0.5%	0.6%
BlogBench - Read (Final Score)	1675566	1719409	**2126384**	2009467	**518527**	520459
Normalized	78.8%	80.86%	100%	94.5%	24.39%	24.48%
Standard Deviation	4%	2.2%	2.5%	1%	2.5%	0.7%
BlogBench - Write (Final Score)	11997	45324	12131	**51060**	**8501**	8671
Normalized	23.5%	88.77%	23.76%	100%	16.65%	16.98%
Standard Deviation	0.5%	1.7%	1.5%	3.6%	2.1%	1.5%
IOzone - 4Kb - 8GB - Write Performance (MB/s)	902	974	**1071**	994	608	**597**
Normalized	84.22%	90.94%	100%	92.81%	56.77%	55.74%
Standard Deviation	2.8%	2.9%	2.3%	0.4%	6.4%	6.2%
Compile Bench - Compile (MB/s)	**1663**	1803	**2259**	1899	1678	1673
Normalized	73.62%	79.81%	100%	84.06%	74.28%	74.06%
Standard Deviation	1.1%	1.4%	2.9%	0.3%	1%	0.7%
Compile Bench - Initial Create (MB/s)	258	586	435	**606**	212	**210**
Normalized	42.57%	96.7%	71.78%	100%	34.98%	34.65%
Standard Deviation	0.8%	0.9%	2.4%	0.7%	0.3%	0.3%
Compile Bench - Read Compiled Tree (MB/s)	2027	**2968**	2733	2811	981	**979**
Normalized	68.3%	100%	92.08%	94.71%	33.05%	32.99%
Standard Deviation	2.9%	1.6%	5.3%	1.1%	0.7%	0.3%
PostMark - D.T.P (TPS)	**4411**	5859	**6303**	6097	5515	5474
Normalized	69.98%	92.96%	100%	96.73%	87.5%	86.85%
Standard Deviation	1%	1.4%	1.5%		1.3%	1.3%
GNU MPC - M.P.B (Global Score)	9277	**9393**		9270	**6183**	6340
Normalized	98.77%	100%		98.69%	65.83%	67.5%
Standard Deviation	0.1%	0.1%			0.1%	0.2%
PolyBench-C - 3.M.M (sec)	**2.95**	**2.95**	3.06	3.19	**4.18**	4.11
Normalized	100%	100%	96.41%	92.48%	70.57%	71.78%
Standard Deviation	0.2%	0.3%	1.6%	2.9%	0.4%	0.1%
FFTW - Stock - 1D FFT Size 32 (Mflops)	**9752**	8965	6598	8014		**5773**
Normalized	100%	91.93%	67.66%	82.18%		59.2%
Standard Deviation	0%	0.5%	0.2%	20.6%		2.4%

FFTW - Stock - 2D FFT Size 32 (Mflops)	10333	8759	10319	10041		5919
Normalized	100%	84.77%	99.86%	97.17%		57.28%
Standard Deviation	0.3%	1.1%	0.7%	1.6%		0.5%
FFTW - Stock - 1D FFT Size 4096 (Mflops)	7677	3110	7696	7732		4815
Normalized	99.29%	40.22%	99.53%	100%		62.27%
Standard Deviation	0.2%	0.1%	2.9%	0.2%		0.2%
FFTW - Stock - 2D FFT Size 4096 (Mflops)	5156	2728	5497	4977		3882
Normalized	93.8%	49.63%	100%	90.54%		70.62%
Standard Deviation	0.5%	1.8%	0.6%	0.5%		3.4%
Timed HMMer Search - P.D.S (sec)	15.09	3.88	11.85	11.43	22.10	23.56
Normalized	25.71%	100%	32.74%	33.95%	17.56%	16.47%
Standard Deviation	0.8%	0.2%	0.3%	1%	5.5%	2.1%
BLAKE2 (Cycles/Byte)	3.50	4.08	4.36	4.07	4.40	5.74
Normalized	100%	85.78%	80.28%	86%	79.55%	60.98%
Standard Deviation	0.2%	0%	12.9%	0.1%	0%	0%
Go Benchmarks - http	9687	9881	137303	138298	138658	
Normalized	100%	98.04%	7.06%	7%	6.99%	
Standard Deviation	0.6%	0.8%	321.7%	321%	0.9%	
Go Benchmarks - json	1959230	1611520	1586206	1599130	1857557	
Normalized	80.96%	98.43%	100%	99.19%	85.39%	
Standard Deviation	2.2%	0.3%	0.4%	2.9%	1.7%	
Go Benchmarks - build	22628681879	20044335365	19942427121	20308755875	32618048342	
Normalized	88.13%	99.49%	100%	98.2%	61.14%	
Standard Deviation	0.2%	0.6%	0.9%	0.2%	0.2%	
Go Benchmarks - garbage (ns/op)	1106004	725710	775645	740732	1011572	
Normalized	65.62%	100%	93.56%	97.97%	71.74%	
Standard Deviation	0.7%	2.3%	0.6%	1.1%	2.8%	
Java SciMark - Composite (Mflops)	2234	2346	2239	2187	1632	
Normalized	95.23%	100%	95.44%	93.22%	69.57%	
Standard Deviation	0.2%	1.7%	0.1%	1%	2%	
Bork File Encrypter - F.E.T (sec)	9.37	7.46	8.91	7.79	23.21	
Normalized	79.62%	100%	83.73%	95.76%	32.14%	
Standard Deviation	0.2%	0.7%	1%	1.2%	0.6%	
DaCapo Benchmark - H2 (msec)	11654	4771	11024	8885	6427	
Normalized	40.94%	100%	43.28%	53.7%	74.23%	
Standard Deviation	2.1%	2%	3%	0.7%	4.6%	
DaCapo Benchmark - Jython (msec)	4520	3638	4305	4687	6517	
Normalized	80.49%	100%	84.51%	77.62%	55.82%	
Standard Deviation	1.1%	1.6%	2.1%	1.1%	0.6%	
DaCapo Benchmark - Eclipse (msec)	19682	17867	21045		23336	
Normalized	90.78%	100%	84.9%		76.56%	
Standard Deviation	1%	0.4%	1.3%		0.4%	

Fhourstones - C.C.4.S (Kpos / sec)	14865	**15642**	14606	14121	11338	**11217**
Normalized	95.03%	100%	93.38%	90.28%	72.48%	71.71%
Standard Deviation	0.1%	0.1%	1.5%	0.1%	0.3%	0.3%
BYTE Unix Benchmark - Dhrystone 2 (LPS)	36667602	**51001206**	34441532	36336102		**26024175**
Normalized	71.9%	100%	67.53%	71.25%		51.03%
Standard Deviation	0%	1.1%	2.9%	0.1%		0.1%
LuaJIT - Composite (Mflops)	1445	1444	1448	**1469**	**1008**	1009
Normalized	98.37%	98.3%	98.57%	100%	68.62%	68.69%
Standard Deviation	0.1%	0.2%	0.2%	0.1%	0.1%	0.2%
SciMark - Composite	656	**2228**	639	637	488	**439**
Normalized	29.44%	100%	28.68%	28.59%	21.9%	19.7%
Standard Deviation	0%	1.8%	0.2%	0.1%	0.2%	0.3%
Botan - KASUMI - Encrypt (MiB/s)	81.16	88.81	86.15	**88.97**	**58.90**	58.91
Normalized	91.22%	99.82%	96.83%	100%	66.2%	66.21%
Standard Deviation	0.1%	0.1%	2.9%	0.1%	0%	0%
Botan - KASUMI - Decrypt (MiB/s)	76.59	**86.63**	84.24	85.92	**57.82**	57.83
Normalized	88.41%	100%	97.24%	99.18%	66.74%	66.76%
Standard Deviation	0%	0%	3.9%	0%	0%	0%
Botan - AES-256 - Encrypt (MiB/s)	**3817**	3815	3793	3785	**2467**	2471
Normalized	100%	99.95%	99.37%	99.16%	64.63%	64.74%
Standard Deviation	0.1%	0%	0%	0%	0.3%	0%
Botan - AES-256 - Decrypt (MiB/s)	**3815**	3808	3802	3798	2474	**2473**
Normalized	100%	99.82%	99.66%	99.55%	64.85%	64.82%
Standard Deviation	0%	0%	0%	0%	0.1%	0.1%
Botan - Twofish - Encrypt (MiB/s)	334	348	340	**349**	**202**	203
Normalized	95.7%	99.71%	97.42%	100%	57.88%	58.17%
Standard Deviation	0.1%	0.1%	2.8%	0.1%	0%	0%
Botan - Twofish - Decrypt (MiB/s)	342	**349**	346	348	**205**	**205**
Normalized	97.99%	100%	99.14%	99.71%	58.74%	58.74%
Standard Deviation	0.1%	0.1%	2.2%	0.1%	0%	0%
Botan - Blowfish - Encrypt (MiB/s)	**291**	287	275	275	**181**	**181**
Normalized	100%	98.63%	94.5%	94.5%	62.2%	62.2%
Standard Deviation	0%	0%	0%	0%	0%	0%
Botan - Blowfish - Decrypt (MiB/s)	**291**	277	276	276	**181**	**181**
Normalized	100%	95.19%	94.85%	94.85%	62.2%	62.2%
Standard Deviation	0.1%	0.1%	0.1%	0%	0%	0%
Botan - CAST-256 - Encrypt (MiB/s)	128.51	134	134.55	**135**	**87.22**	87.23
Normalized	95.19%	99.26%	99.67%	100%	64.61%	64.61%
Standard Deviation	0%	0%	0.1%	0%	0%	0%
Botan - CAST-256 - Decrypt (MiB/s)	128.71	133	134.88	**135**	**87.60**	**87.60**
Normalized	95.34%	98.52%	99.91%	100%	64.89%	64.89%

Standard Deviation	0%	0%	0%	0.1%	0%	0%
Numpy Benchmark (Nanoseconds)	11808287	5015309	5484875	4975204	8927600	
Normalized	42.13%	99.2%	90.71%	100%	55.73%	
TTSIOD 3D Renderer - P.R.W.S.S.M (FPS)	1008	915	995.49	997	28.77	943.02
Normalized	100%	90.81%	98.8%	98.95%	2.86%	93.59%
Standard Deviation	1.2%	1.6%	2.7%	2.5%	0.2%	1.8%
x264 - H.2.V.E (FPS)		171	122	118	171	171
Normalized		100%	71.35%	69.01%	100%	100%
Standard Deviation		0.5%	1.6%	0.6%	9.6%	9.6%
x265 - H.2.1.V.E (FPS)		60.57	10.76	32.61	53.06	53.19
Normalized		100%	17.76%	53.84%	87.6%	87.82%
Standard Deviation		0.4%	0.1%	0.2%	0.1%	0.4%
GraphicsMagick - Swirl (Iterations/min)	227	256		223	48	171
Normalized	88.67%	100%		87.11%	18.75%	66.8%
Standard Deviation	0.8%			0.3%		
GraphicsMagick - Rotate (Iterations/min)	237	255		223	192	190
Normalized	92.94%	100%		87.45%	75.29%	74.51%
Standard Deviation		0.2%		0.4%		
GraphicsMagick - Sharpen (Iterations/min)	177	233		207	21	157
Normalized	75.97%	100%		88.84%	9.01%	67.38%
Standard Deviation	0.9%	0.2%		0.7%		
GraphicsMagick - Enhanced (Iterations/min)	223	249		219	30	165
Normalized	89.56%	100%		87.95%	12.05%	66.27%
Standard Deviation	0.7%					
GraphicsMagick - Resizing (Iterations/min)	230	246		209	98	170
Normalized	93.5%	100%		84.96%	39.84%	69.11%
Standard Deviation	0.7%			1%		
GraphicsMagick - Noise-Gaussian (Iterations/min)	191	241		201	28	164
Normalized	79.25%	100%		83.4%	11.62%	68.05%
Standard Deviation		0.2%		0.3%		
GraphicsMagick - HWB Color Space (Iterations/min)	249	269		245	120	181
Normalized	92.57%	100%		91.08%	44.61%	67.29%
Standard Deviation	0.6%			0.2%		
Himeno Benchmark - P.P.S (MFLOPS)	2775	2900	2845	2827	2081	2474
Normalized	95.69%	100%	98.1%	97.48%	71.76%	85.31%
Standard Deviation	0.2%	0.4%	0.3%	0.2%	0.1%	0.3%
7-Zip Compression - C.S.T (MIPS)	262739	270092	268083	226939		189988
Normalized	97.28%	100%	99.26%	84.02%		70.34%
Standard Deviation	0.2%	1.1%	0.2%	0.5%		2.2%

FreeBSD 12.0 Benchmarks - Intel Xeon Platinum 8280 Cascade Lake

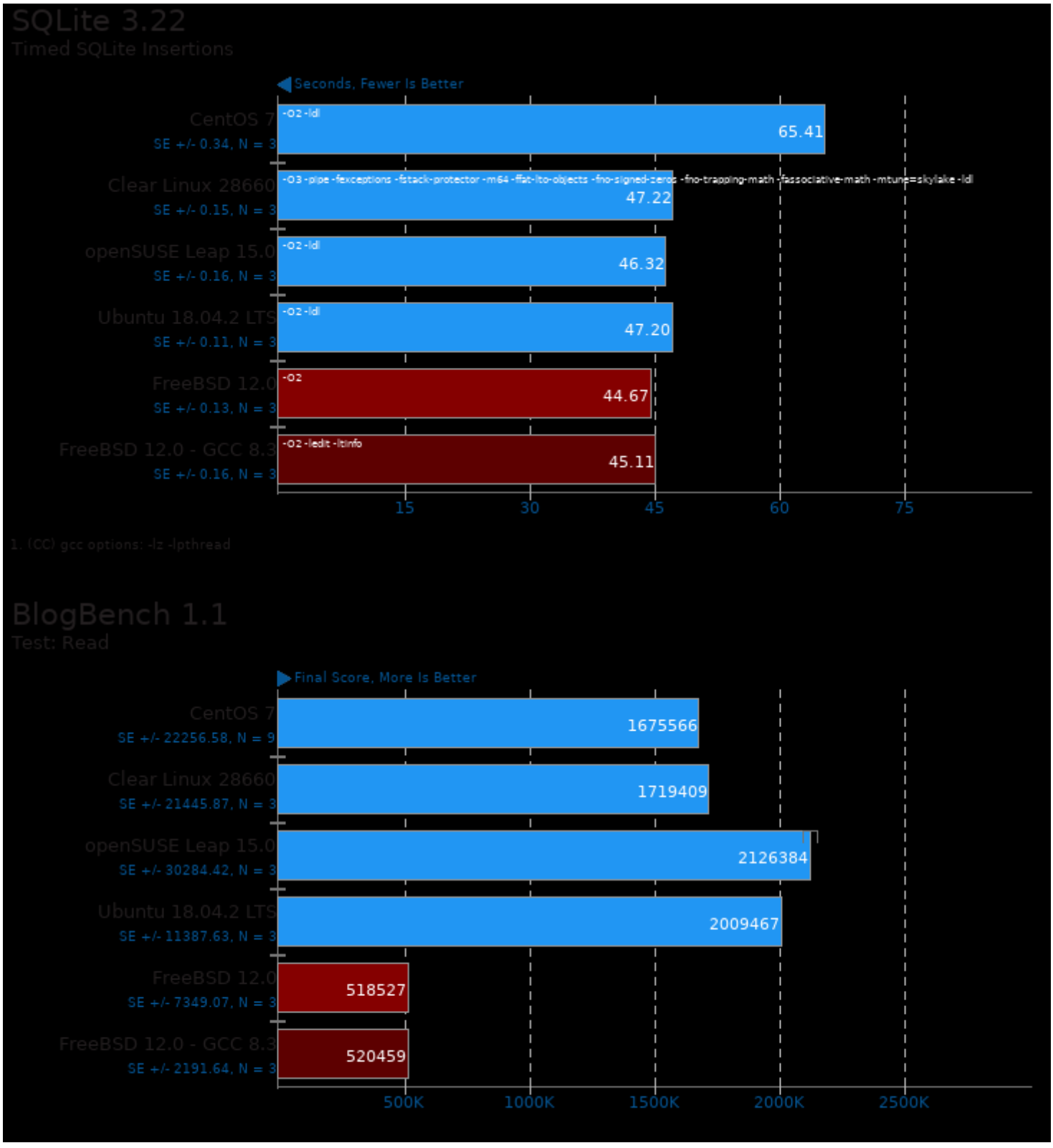
Stockfish - Total Time (Nodes/s)	130522916	**131448084**	130180910	123920849	**114084018**	118289537
Normalized	99.3%	100%	99.04%	94.27%	86.79%	89.99%
Standard Deviation	1.2%	1%	0.5%	0.5%	2.5%	2.7%
asmFish - 1.H.M.2.D	**135951371**	**142351217**	139270290	136704424		
Normalized	95.5%	100%	97.84%	96.03%		
Standard Deviation	1.7%	1.3%	2.8%	2%		
Timed LLVM Compilation - Time To Compile (sec)		**201**	**107**	114	111	131
Normalized		53.23%	100%	93.86%	96.4%	81.68%
Timed PHP Compilation - Time To Compile (sec)	**38.96**	68.20	42.42	43.64	**83.74**	67.75
Normalized	100%	57.13%	91.84%	89.28%	46.52%	57.51%
Standard Deviation	0.6%	1.3%	0.6%	0.4%	0.8%	0.2%
C-Ray - Total Time - 4.1.R.P.P (sec)	**14.56**	16.10	**16.39**	16.30		
Normalized	100%	90.43%	88.83%	89.33%		
Standard Deviation	0.3%	1.5%	0.2%	0%		
LLVM Test Suite - Time To Run (sec)		**218**	249	247	**2471**	773
Normalized		100%	87.55%	88.26%	8.82%	28.2%
Standard Deviation		0.2%	0.6%	0.3%	0.1%	0.1%
Primesieve - 1.P.N.G (sec)		4.74	**4.61**	4.75	**7.71**	7.50
Normalized		97.26%	100%	97.05%	59.79%	61.47%
Standard Deviation		0.5%	0.4%	0.6%	0.9%	1.7%
Rust Mandelbrot - T.T.C.S.P.M (sec)	**40.92**	41.55	41.84	41.93	**59.77**	
Normalized	100%	98.48%	97.8%	97.59%	68.46%	
Standard Deviation	0%	1%	0.3%	0.6%	0.5%	
Rust Prime Benchmark - P.N.T.T.2.0.0 (sec)	**2.44**	**2.44**	2.46	2.79	**2.98**	
Normalized	100%	100%	99.19%	87.46%	81.88%	
Standard Deviation	0.6%	1%	0.1%	8.4%	0.1%	
Smallpt - G.I.R.1.S (sec)	**100.30**	4.78	**2.55**	3.34	4.51	3.28
Normalized	2.54%	53.35%	100%	76.35%	56.54%	77.74%
Standard Deviation	9.6%	5%	7%	11.3%	1.5%	1.2%
AOBench - 2048 x 2048 - Total Time (sec)	50.21	48.77	**35.58**	40.37	57.77	**58.99**
Normalized	70.86%	72.95%	100%	88.13%	61.59%	60.32%
Standard Deviation	0%	0.1%	3%	0.2%	0%	0%
Gzip Compression - L.S.T.A.T.t.g (sec)	38.48	**8.07**	37.29	36.48	**54.84**	
Normalized	20.97%	100%	21.64%	22.12%	14.72%	
Standard Deviation	0.5%	10.5%	2.9%	0.1%	0.6%	
LZMA Compression - 2.F.C (sec)	**224**	230	226	240	**342**	321
Normalized	100%	97.39%	99.12%	93.33%	65.5%	69.78%
Standard Deviation	0.1%	1.6%	0.9%	0.3%	0.2%	0.9%
XZ Compression - C.u.1.0.3.s.i.i.C.L.9 (sec)	84.87	90.39	**82.36**	94.61	95.99	**99.47**
Normalized	97.04%	91.12%	100%	87.05%	85.8%	82.8%
Standard Deviation	2.9%	2.6%	1.2%	0.3%	6%	7.7%

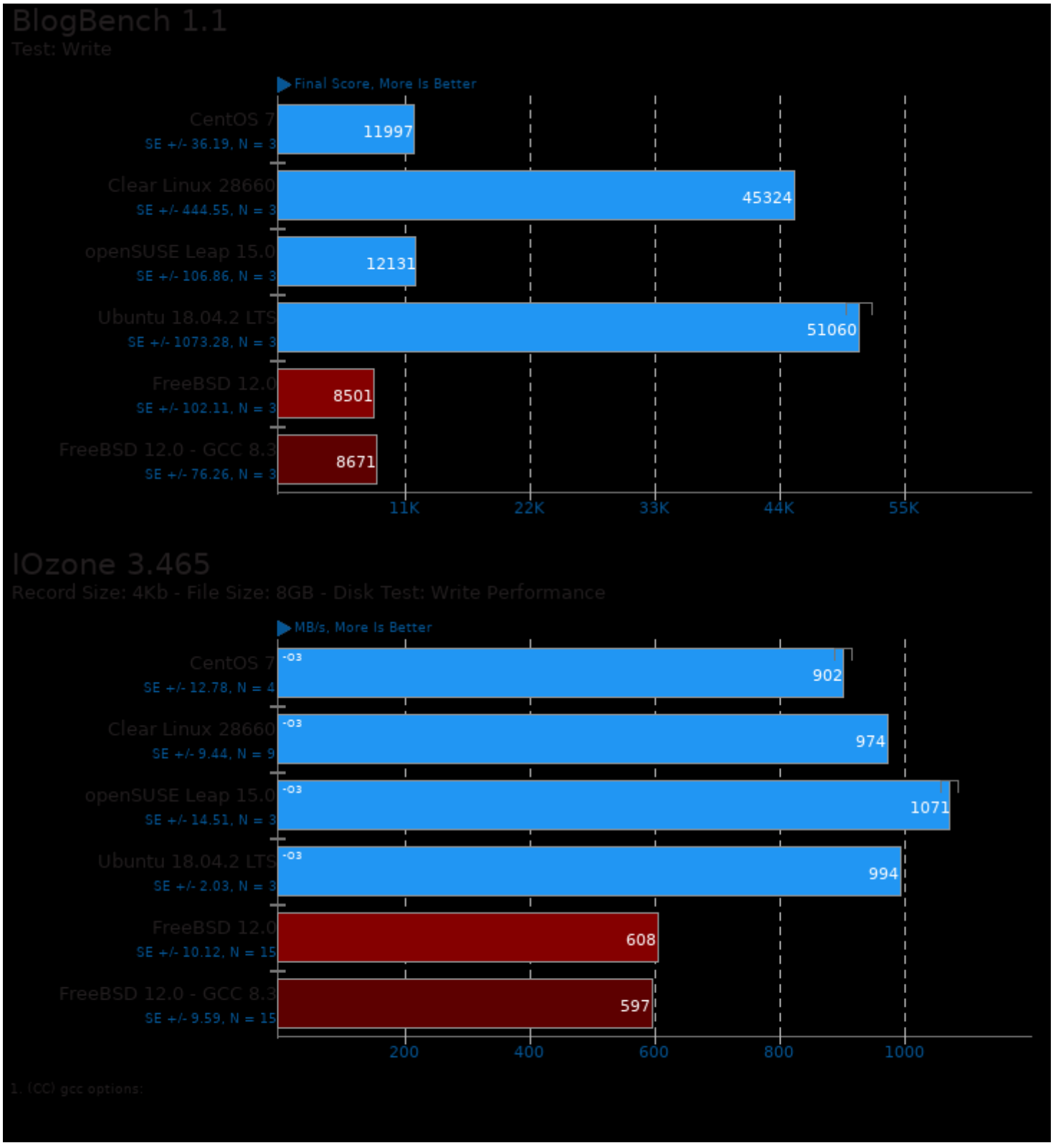
Zstd Compression - C.u.1.0.3.s.i.i.C.L.1 (sec)	**8.26**	8.51	8.27	**9.22**		
Normalized	100%	97.06%	99.88%	89.59%		
Standard Deviation	1.9%	1.4%	0.8%	0.6%		
dcraw - R.T.P.I.C (sec)	42.02	**12.29**	41.04	42.20	55.08	**61.24**
Normalized	29.25%	100%	29.95%	29.12%	22.31%	20.07%
Standard Deviation	0.1%	0.1%	0.1%	1.2%	0%	0.9%
FLAC Audio Encoding - WAV To FLAC (sec)	10.74	**9.11**	9.52	9.61	**16.26**	13.33
Normalized	84.82%	100%	95.69%	94.8%	56.03%	68.34%
Standard Deviation	0.2%	0.4%	1%	0.2%	0.1%	0.4%
LAME MP3 Encoding - WAV To MP3 (sec)	30.42	**9.31**	29.86	30.12	13.72	**44.03**
Normalized	30.6%	100%	31.18%	30.91%	67.86%	21.14%
Standard Deviation	0.1%	0.4%	0%	0.2%	0.5%	0%
m-queens - Time To Solve (sec)	16.38	16.66	**16.31**	16.63		**20.30**
Normalized	99.57%	97.9%	100%	98.08%		80.34%
Standard Deviation	0.4%	1.7%	0.1%	1.5%		0.2%
Perl Benchmarks - Pod2html (sec)	0.12355494	**0.10675900**	0.10946922	0.10884435	**0.20645215**	
Normalized	86.41%	100%	97.52%	98.08%	51.71%	
Standard Deviation	0.7%	0.2%	2.4%	0.2%	0.1%	
Perl Benchmarks - Interpreter (sec)	0.00263771	**0.00110222**	**0.00305180**	0.00282793	0.00203344	
Normalized	41.79%	100%	36.12%	38.98%	54.2%	
Standard Deviation	2.1%	1.1%	0.5%	0.6%	0.9%	
OpenSSL - R.4.b.P	**13930**	13625	13916	13876	**11548**	11561
Normalized	100%	97.81%	99.9%	99.61%	82.9%	82.99%
Standard Deviation	0.2%	0.5%	0.5%	0.3%	0%	0%
libjpeg-turbo tjbench - D.T (Megapixels/sec)	168	**173**	166	166	**112**	117
Normalized	97.11%	100%	95.95%	95.95%	64.74%	67.63%
Standard Deviation	0.3%	0.2%	0.3%	0.5%	0%	0.1%
PostgreSQL pgbench - Buffer Test - Normal Load - Read Only (TPS)	583996	880190		**931112**	**527411**	530916
Normalized	62.72%	94.53%		100%	56.64%	57.02%
Standard Deviation	3.5%	0.7%		1.2%	0.6%	2.4%
PostgreSQL pgbench - Buffer Test - Normal Load - Read Write (TPS)	**11797**	11605		8593	**1425**	1430
Normalized	100%	98.37%		72.84%	12.08%	12.12%
Standard Deviation	2.1%	2%		13.2%	4.7%	3.8%
PostgreSQL pgbench - Buffer Test - Single Thread - Read Only (TPS)	18974	**24935**		19534	12626	**12508**
Normalized	76.09%	100%		78.34%	50.64%	50.16%
Standard Deviation	0.6%	0.6%		1%	3%	2.9%

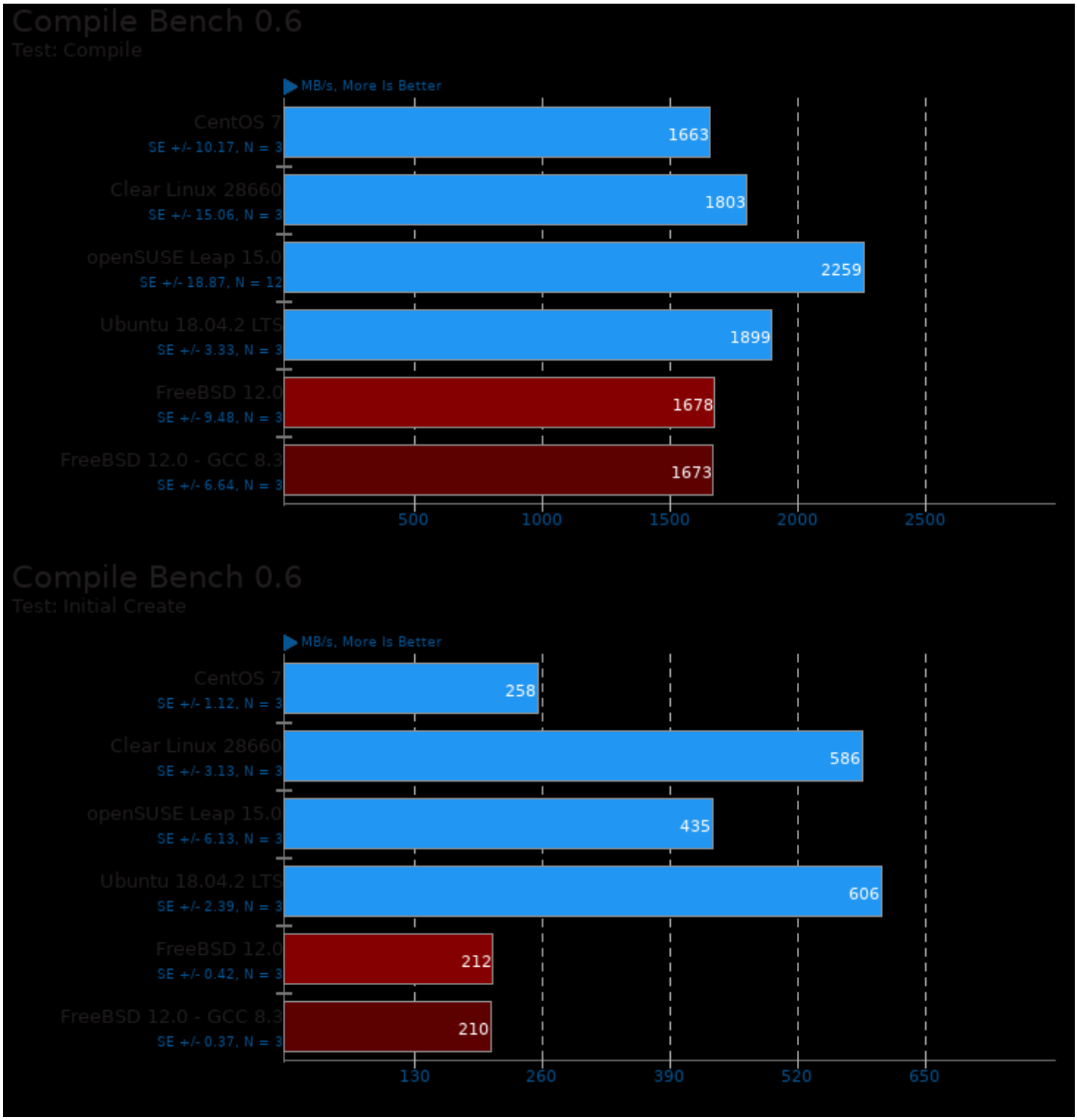
PostgreSQL pgbench - Buffer Test - Single Thread - Read Write (TPS)	415	472		**551**	**365**	**365**
Normalized	75.32%	85.66%		100%	66.24%	66.24%
Standard Deviation	0.8%	2.8%		2.7%	0.2%	0.5%
CppPerformanceBenchmarks - Atol (sec)	62.37	**62.22**	64.86	63.86	**93.41**	92.89
Normalized	99.76%	100%	95.93%	97.43%	66.61%	66.98%
Standard Deviation	0.2%	0.1%	1.6%	0%	0%	0%
CppPerformanceBenchmarks - Ctype (sec)	33.22	32.99	32.07	**31.92**	94.33	**99.87**
Normalized	96.09%	96.76%	99.53%	100%	33.84%	31.96%
Standard Deviation	0.4%	0%	2.5%	0%	0%	0%
CppPerformanceBenchmarks - Math Library (sec)	472	**286**	437	371	632	**648**
Normalized	60.59%	100%	65.45%	77.09%	45.25%	44.14%
Standard Deviation	0.3%	0.1%	0.9%	0.1%	0.1%	0.1%
CppPerformanceBenchmarks - Stepanov Vector (sec)	93.58	**67.12**	90.07	90.48	119.79	**134.42**
Normalized	71.72%	100%	74.52%	74.18%	56.03%	49.93%
Standard Deviation	0.3%	0%	0%	0%	0%	0%
CppPerformanceBenchmarks - Function Objects (sec)	15.36	**14.88**	15.05	14.98	**22.39**	20.64
Normalized	96.88%	100%	98.87%	99.33%	66.46%	72.09%
Standard Deviation	0.3%	0%	0%	0%	0%	0%
CppPerformanceBenchmarks - S.A (sec)	35.50	**23.96**	36.30	36.28	48.14	**53.28**
Normalized	67.49%	100%	66.01%	66.04%	49.77%	44.97%
Standard Deviation	0.2%	0%	0%	0%	0%	0%
Stress-NG - Bsearch (Bogo Ops/s)	18707	34575	**38168**	33020	**11908**	13357
Normalized	49.01%	90.59%	100%	86.51%	31.2%	35%
Standard Deviation	1.8%	0.1%	0%	0.8%	0%	0.3%
Stress-NG - Forking (Bogo Ops/s)	61523	62260	64829	**71911**	12757	**12361**
Normalized	85.55%	86.58%	90.15%	100%	17.74%	17.19%
Standard Deviation	2.6%	6.8%	4.3%	3.7%	2.2%	4%
Stress-NG - Hsearch (Bogo Ops/s)	**326978**	291243	314128	305997	**286374**	292357
Normalized	100%	89.07%	96.07%	93.58%	87.58%	89.41%
Standard Deviation	0.2%	0.4%	0.5%	2.3%	0.1%	0.2%
Stress-NG - Lsearch (Bogo Ops/s)	**755**	742	749	658	**560**	562
Normalized	100%	98.28%	99.21%	87.15%	74.17%	74.44%
Standard Deviation	0.2%	0.9%	0.6%	4.4%	0.1%	0.2%
Stress-NG - Tsearch (Bogo Ops/s)	**997**	1181	1197	1221	**1372**	1312
Normalized	72.67%	86.08%	87.24%	88.99%	100%	95.63%
Standard Deviation	0.2%	1.6%	0%	0.3%	0.1%	0.1%
Stress-NG - CPU Stress (Bogo Ops/s)	18200	**18549**	17903	17996	**13705**	14265
Normalized	98.12%	100%	96.52%	97.02%	73.89%	76.9%
Standard Deviation	0.5%	0.6%	0.4%	1%	0%	0%

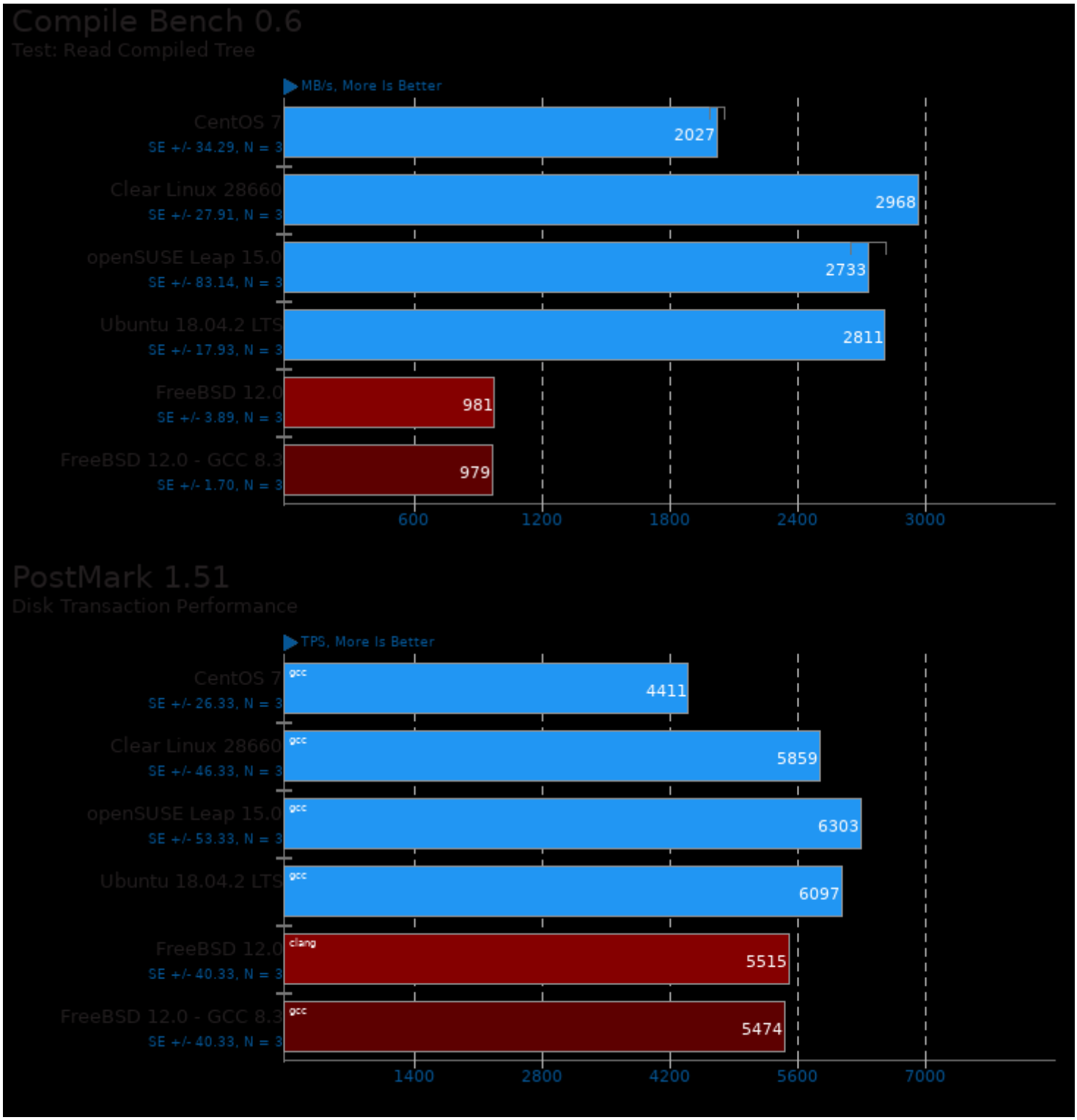
Stress-NG - Matrix Math (Bogo Ops/s)	356471	**383235**	364922	360834	337083	**326176**
Normalized	93.02%	100%	95.22%	94.15%	87.96%	85.11%
Standard Deviation	0.1%	0.2%	0.2%	0.7%	0.1%	0.1%
Stress-NG - Vector Math (Bogo Ops/s)	**100023**	131959	120957	118915	**279832**	100492
Normalized	35.74%	47.16%	43.22%	42.5%	100%	35.91%
Standard Deviation	0.3%	0.1%	0.1%	0.2%	0%	0%
Stress-NG - Memory Copying (Bogo Ops/s)	4542	6490	10736	**11391**	9603	**4182**
Normalized	39.87%	56.97%	94.25%	100%	84.3%	36.71%
Standard Deviation	0.4%	32.7%	0.7%	0.9%	1.4%	2.2%
Stress-NG - Socket Activity (Bogo Ops/s)	3077	**37617**	7887	22637	**1161**	1162
Normalized	8.18%	100%	20.97%	60.18%	3.09%	3.09%
Standard Deviation	131.8%	0.1%	1.7%	21.3%	1.2%	1.2%
Stress-NG - Context Switching (Bogo Ops/s)	25186102	**44103030**	38969100	**6782342**	25653126	25590462
Normalized	57.11%	100%	88.36%	15.38%	58.17%	58.02%
Standard Deviation	1.7%	9.1%	0.1%	42.4%	1.7%	1.9%
Stress-NG - G.C.S.F (Bogo Ops/s)	2421420	**4282284**	3760823	3912573	294413	**293800**
Normalized	56.55%	100%	87.82%	91.37%	6.88%	6.86%
Standard Deviation	0.5%	3.6%	2.2%	1%	0%	0%
Stress-NG - G.Q.D.S (Bogo Ops/s)	**799**	848	800	825	1160	**1346**
Normalized	59.36%	63%	59.44%	61.29%	86.18%	100%
Standard Deviation	0.2%	0.3%	0.5%	0.6%	0%	0.1%
Optcarrot - O.B (FPS)	94.02	**137**	108.41	120	**76.31**	76.42
Normalized	68.63%	100%	79.13%	87.59%	55.7%	55.78%
Standard Deviation	0.3%	0.3%	1%	0.7%	0.1%	0.2%
Blender - BMW27 - CPU-Only (sec)	46.37	**46.07**	46.17	**47.11**		
Normalized	99.35%	100%	99.78%	97.79%		
Blender - Classroom - CPU-Only (sec)	**95.06**	**93.62**	94.13	94.63		
Normalized	98.49%	100%	99.46%	98.93%		
Blender - Fishy Cat - CPU-Only (sec)	71.89	71.15	**71.09**	**72.58**		
Normalized	98.89%	99.92%	100%	97.95%		
Blender - Barbershop - CPU-Only (sec)	216	214	**213**	**223**		
Normalized	98.61%	99.53%	100%	95.52%		
Blender - Pabellon Barcelona - CPU-Only (sec)	116	116	**114**	**117**		
Normalized	98.28%	98.28%	100%	97.44%		
PyBench - T.F.A.T.T (Milliseconds)	1401	**1008**	1327	1063	**2448**	
Normalized	71.95%	100%	75.96%	94.83%	41.18%	
Standard Deviation	0.3%	0.2%	0%	0.3%	0.2%	

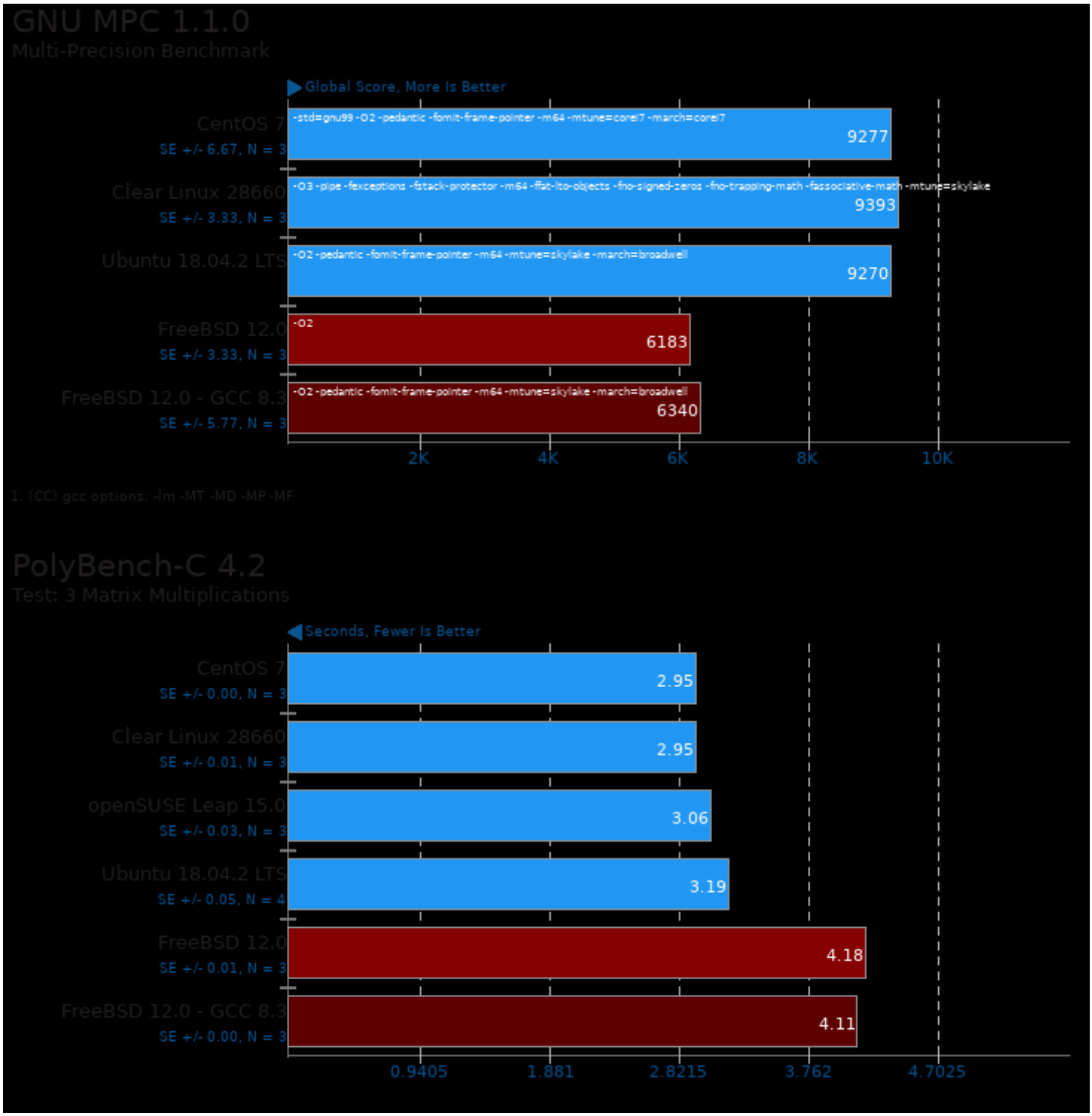
Hierarchical INTegration - FLOAT (QUIPs)	**413955250**	403132657	383496584	390988393	**212786117**	264521791
Normalized	100%	97.39%	92.64%	94.45%	51.4%	63.9%
Standard Deviation	0.1%	0.2%	2.1%	0.5%	0%	0.3%
Hierarchical INTegration - DOUBLE (QUIPs)	**921744337**	906016728	882180266	887298913	**567929345**	611630965
Normalized	100%	98.29%	95.71%	96.26%	61.61%	66.36%
Standard Deviation	0.2%	0.4%	0.6%	0.1%	0%	0.1%
Apache Benchmark - S.W.P.S (Reqs/sec)	**16152**	29555		25885	30461	**31922**
Normalized	50.6%	92.59%		81.09%	95.42%	100%
Standard Deviation	0.6%	1.2%		0.6%	3%	2.1%
PHPBench - P.B.S (Score)	**225175**	**790066**	665536	653899	324865	
Normalized	28.5%	100%	84.24%	82.77%	41.12%	
Standard Deviation	0.3%	0.1%	0.3%	0.2%	0%	
Git - T.T.C.C.G.C (sec)	5.80	**5.48**	6.02	5.78	**9.19**	
Normalized	94.48%	100%	91.03%	94.81%	59.63%	
Standard Deviation	1.4%	1.1%	0.8%	0.7%	1.9%	
PHP Micro Benchmarks - Zend bench (sec)	**1.20**	**0.23**	0.42	0.42	0.85	
Normalized	19.17%	100%	54.76%	54.76%	27.06%	
Standard Deviation	0.3%	0.3%	1.5%	0.1%	0.1%	
PHP Micro Benchmarks - Zend micro_bench (sec)	**5.88**	**1.61**	2.01	2.07	4.20	
Normalized	27.38%	100%	80.1%	77.78%	38.33%	
Standard Deviation	2.8%	0.2%	0.4%	0.4%	0%	
Scikit-Learn (sec)		**8.08**		166.73	**223.35**	
Normalized		100%		4.85%	3.62%	
Standard Deviation		2.1%		0.3%	0.3%	
Chaos Group V-RAY - CPU (sec)	**21.71**	21.24	**20.42**	20.92		
Normalized	94.06%	96.14%	100%	97.61%		
Standard Deviation	2.3%	1%	0.8%	0.1%		
OSBench - Create Files (us/Event)		13.74	27.80	**13.37**	**66.45**	63.13
Normalized		97.31%	48.09%	100%	20.12%	21.18%
Standard Deviation		0.6%	2.9%	0.4%	0.5%	0.3%
OSBench - Create Threads (us/Event)		**16.31**	17.83	20.19	60.06	**60.88**
Normalized		100%	91.48%	80.78%	27.16%	26.79%
Standard Deviation		1.9%	7.7%	1.8%	0.4%	1.9%
OSBench - Launch Programs (us/Event)		**38.85**	57.80	43.57	156.48	**159.46**
Normalized		100%	67.21%	89.17%	24.83%	24.36%
Standard Deviation		2.8%	0.7%	2.1%	0.5%	0.1%
OSBench - Create Processes (us/Event)		**36.32**	37.66	38.33	72.68	**78.47**
Normalized		100%	96.44%	94.76%	49.97%	46.29%
Standard Deviation		1.8%	1.9%	0.8%	2.8%	0.8%
OSBench - Memory Allocations (Ns/Event)		62.30	83.87	**85.63**	47.76	**46.88**
Normalized		75.25%	55.9%	54.75%	98.16%	100%
Standard Deviation		0.2%	0.8%	0.5%	4.8%	0%

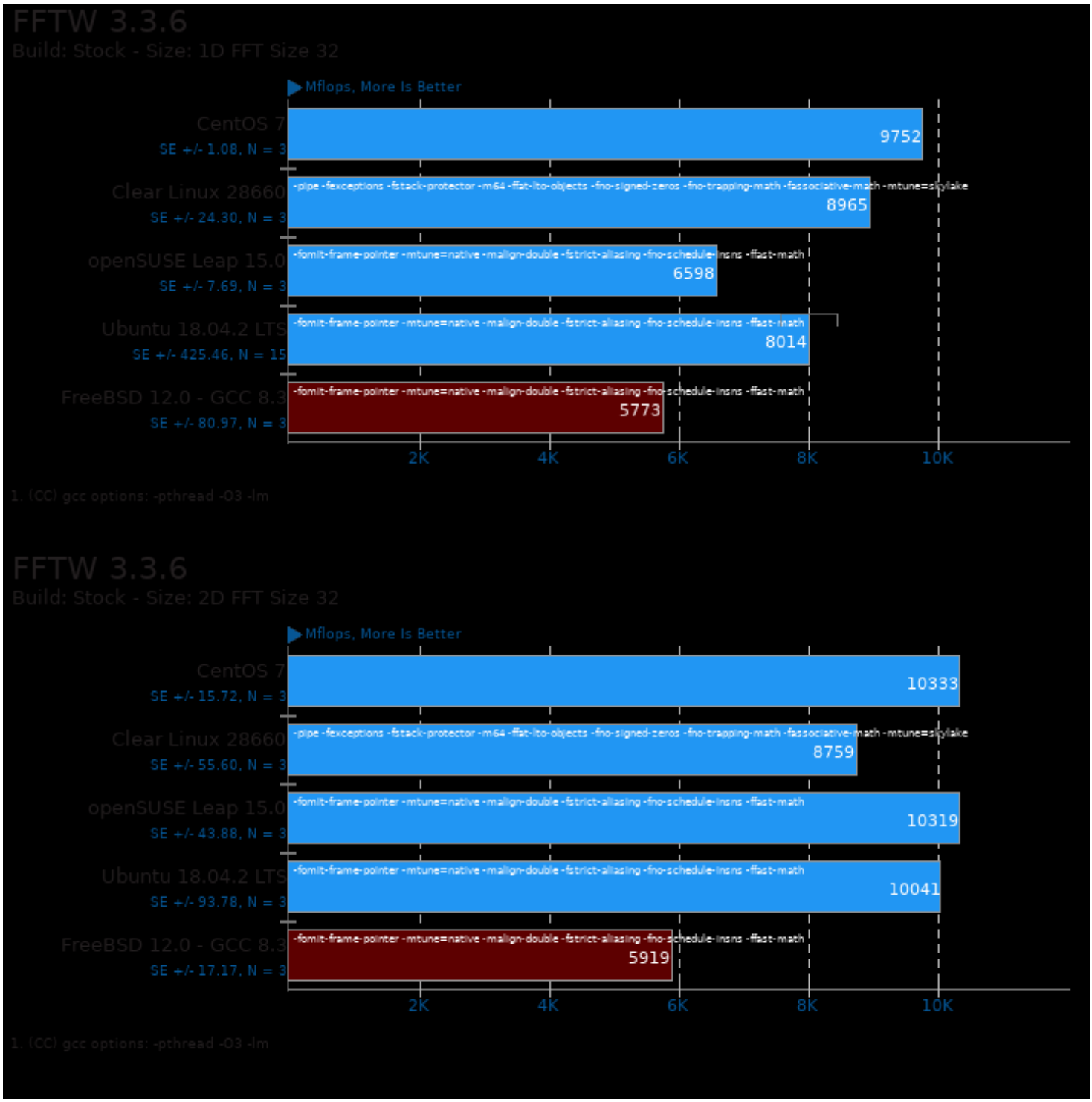

SQLite 3.22
Timed SQLite Insertions
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.34, N = 3
-O2 -ldl
65.41
Clear Linux 28660
SE +/- 0.15, N = 3
-O3 -pipe -fexceptions -fstack-protector -m64 -ffat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -ldl
47.22
openSUSE Leap 15.0
SE +/- 0.16, N = 3
-O2 -ldl
46.32
Ubuntu 18.04.2 LTS
SE +/- 0.11, N = 3
-O2 -ldl
47.20
FreeBSD 12.0
SE +/- 0.13, N = 3
-O2
44.67
FreeBSD 12.0 - GCC 8.3
SE +/- 0.16, N = 3
-O2 -ledit -ltinfo
45.11
15
30
45
60
75
1. (CC) gcc options: -lz -lpthread
BlogBench 1.1
Test: Read
Final Score, More Is Better
CentOS 7
SE +/- 22256.58, N = 9
1675566
Clear Linux 28660
SE +/- 21445.87, N = 3
1719409
openSUSE Leap 15.0
SE +/- 30284.42, N = 3
2126384
Ubuntu 18.04.2 LTS
SE +/- 11387.63, N = 3
2009467
FreeBSD 12.0
SE +/- 7349.07, N = 3
518527
FreeBSD 12.0 - GCC 8.3
SE +/- 2191.64, N = 3
520459
500K
1000K
1500K
2000K
2500K

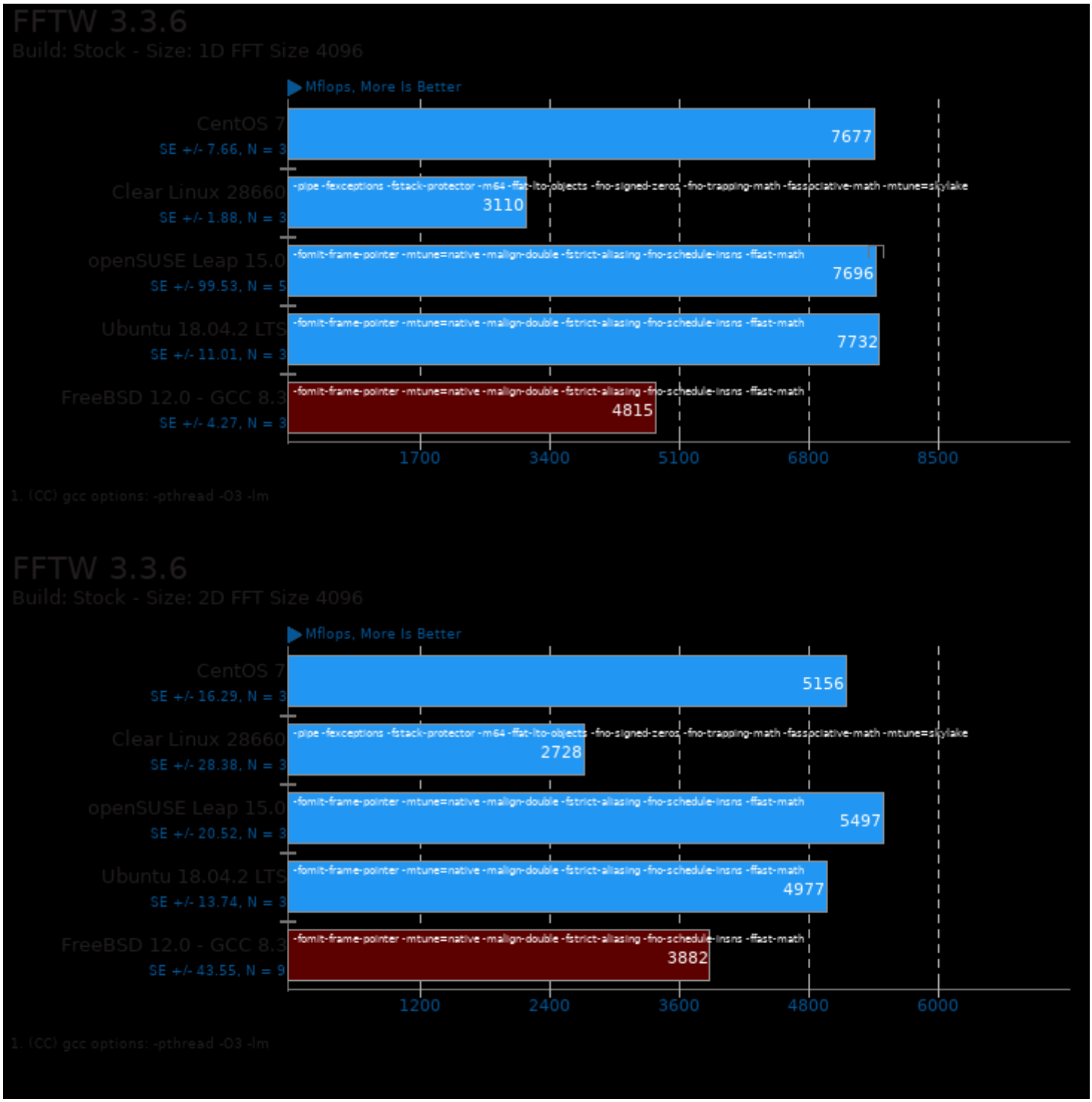

BlogBench 1.1
Test: Write
Final Score, More Is Better
CentOS 7
SE +/- 36.19, N = 3
11997
Clear Linux 28660
SE +/- 444.55, N = 3
45324
openSUSE Leap 15.0
SE +/- 106.86, N = 3
12131
Ubuntu 18.04.2 LTS
SE +/- 1073.28, N = 3
51060
FreeBSD 12.0
SE +/- 102.11, N = 3
8501
FreeBSD 12.0 - GCC 8.3
SE +/- 76.26, N = 3
8671
11K
22K
33K
44K
55K
IOzone 3.465
Record Size: 4Kb - File Size: 8GB - Disk Test: Write Performance
MB/s, More Is Better
CentOS 7
SE +/- 12.78, N = 4
-O3
902
Clear Linux 28660
SE +/- 9.44, N = 9
-O3
974
openSUSE Leap 15.0
SE +/- 14.51, N = 3
-O3
1071
Ubuntu 18.04.2 LTS
SE +/- 2.03, N = 3
-O3
994
FreeBSD 12.0
SE +/- 10.12, N = 15
608
FreeBSD 12.0 - GCC 8.3
SE +/- 9.59, N = 15
597
200
400
600
800
1000
1. (CC) gcc options:

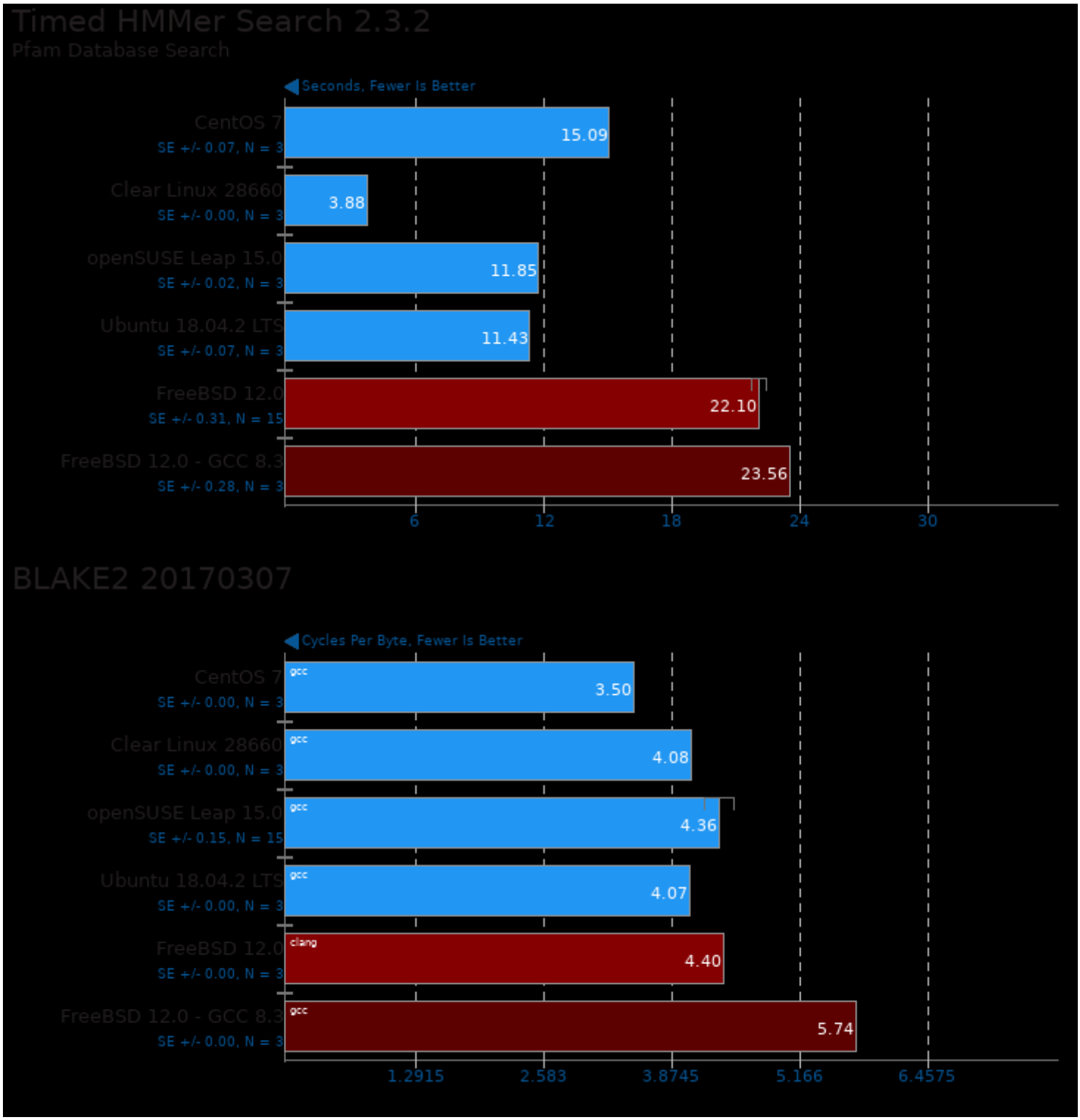

Compile Bench 0.6
Test: Compile
MB/s, More Is Better
CentOS 7
SE +/- 10.17, N = 3
1663
Clear Linux 28660
SE +/- 15.06, N = 3
1803
openSUSE Leap 15.0
SE +/- 18.87, N = 12
2259
Ubuntu 18.04.2 LTS
SE +/- 3.33, N = 3
1899
FreeBSD 12.0
SE +/- 9.48, N = 3
1678
FreeBSD 12.0 - GCC 8.3
SE +/- 6.64, N = 3
1673
500
1000
1500
2000
2500
Compile Bench 0.6
Test: Initial Create
MB/s, More Is Better
CentOS 7
SE +/- 1.12, N = 3
258
Clear Linux 28660
SE +/- 3.13, N = 3
586
openSUSE Leap 15.0
SE +/- 6.13, N = 3
435
Ubuntu 18.04.2 LTS
SE +/- 2.39, N = 3
606
FreeBSD 12.0
SE +/- 0.42, N = 3
212
FreeBSD 12.0 - GCC 8.3
SE +/- 0.37, N = 3
210
130
260
390
520
650

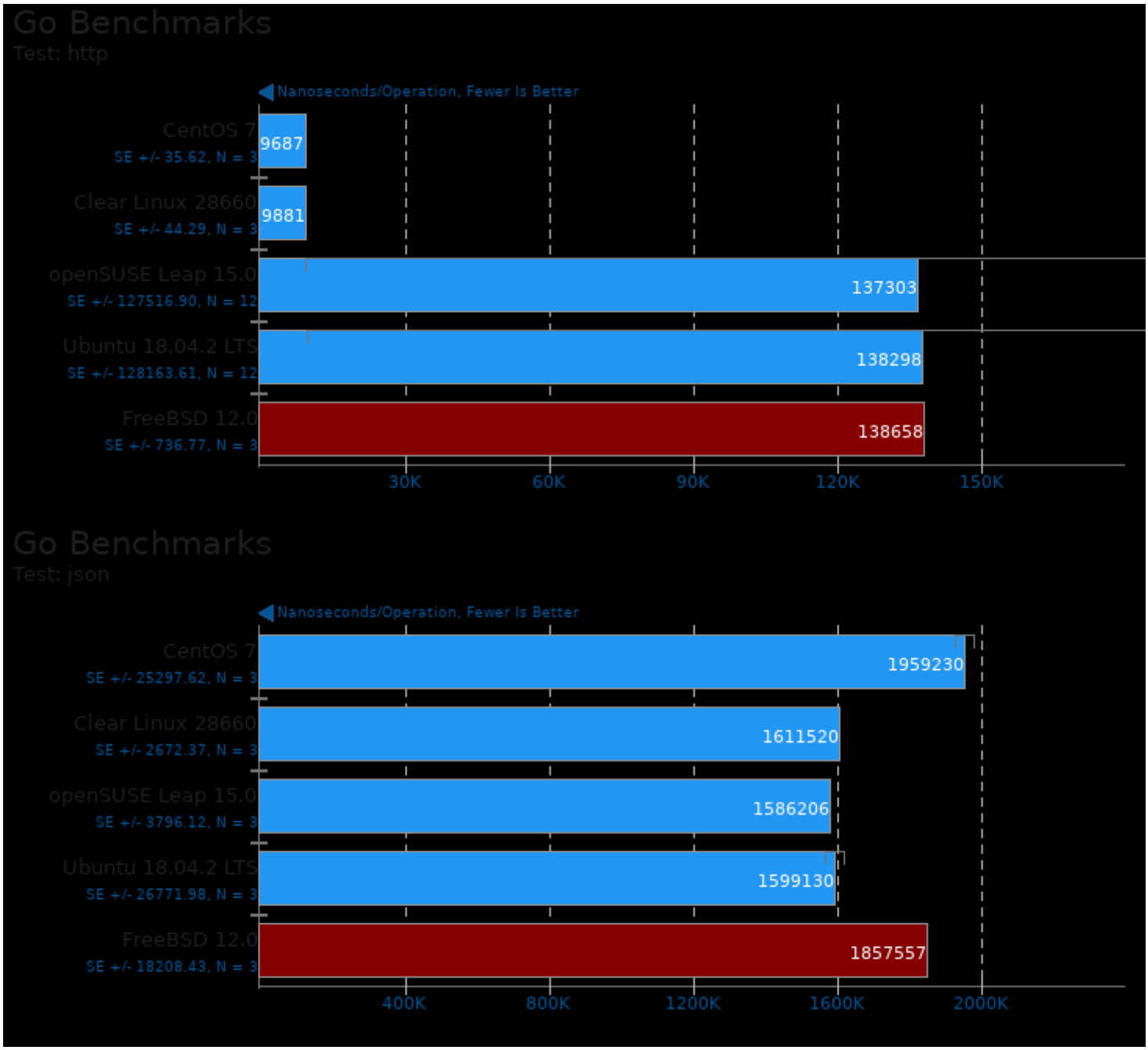

Compile Bench 0.6
Test: Read Compiled Tree
MB/s, More Is Better
CentOS 7
SE +/- 34.29, N = 3
2027
Clear Linux 28660
SE +/- 27.91, N = 3
2968
openSUSE Leap 15.0
SE +/- 83.14, N = 3
2733
Ubuntu 18.04.2 LTS
SE +/- 17.93, N = 3
2811
FreeBSD 12.0
SE +/- 3.89, N = 3
981
FreeBSD 12.0 - GCC 8.3
SE +/- 1.70, N = 3
979
600
1200
1800
2400
3000
PostMark 1.51
Disk Transaction Performance
TPS, More Is Better
CentOS 7
SE +/- 26.33, N = 3
gcc
4411
Clear Linux 28660
SE +/- 46.33, N = 3
gcc
5859
openSUSE Leap 15.0
SE +/- 53.33, N = 3
gcc
6303
Ubuntu 18.04.2 LTS
gcc
6097
FreeBSD 12.0
SE +/- 40.33, N = 3
clang
5515
FreeBSD 12.0 - GCC 8.3
SE +/- 40.33, N = 3
gcc
5474
1400
2800
4200
5600
7000

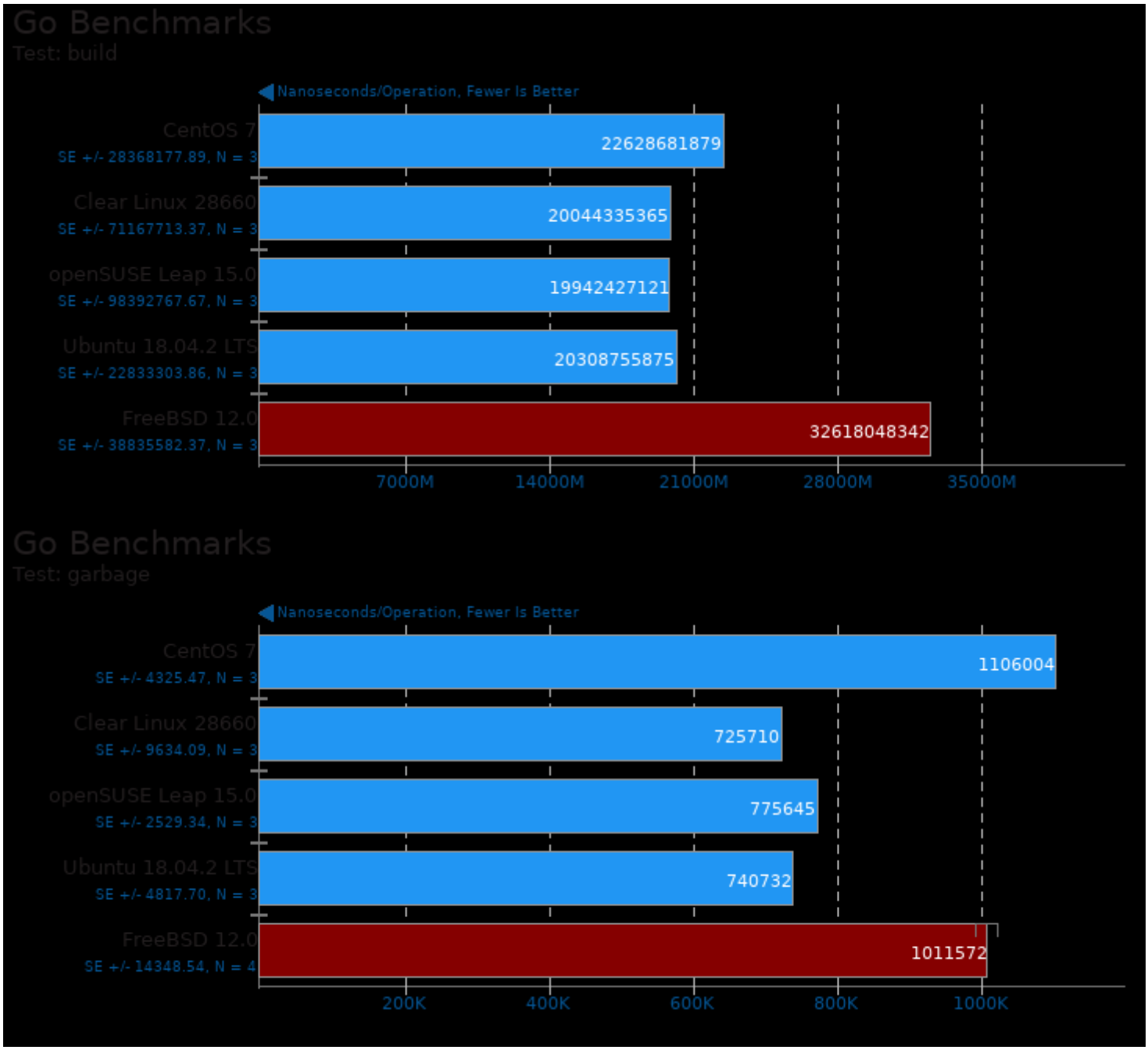

GNU MPC 1.1.0
Multi-Precision Benchmark
Global Score, More Is Better
CentOS 7
SE +/- 6.67, N = 3
-std=gnu99 -O2 -pedantic -fomit-frame-pointer -m64 -mtune=corei7 -march=corei7
9277
Clear Linux 28660
SE +/- 3.33, N = 3
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
9393
Ubuntu 18.04.2 LTS
-O2 -pedantic -fomit-frame-pointer -m64 -mtune=skylake -march=broadwell
9270
FreeBSD 12.0
SE +/- 3.33, N = 3
-O2
6183
FreeBSD 12.0 - GCC 8.3
SE +/- 5.77, N = 3
-O2 -pedantic -fomit-frame-pointer -m64 -mtune=skylake -march=broadwell
6340
2K
4K
6K
8K
10K
1. (CC) gcc options: -lm -MT -MD -MP -MF
PolyBench-C 4.2
Test: 3 Matrix Multiplications
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.00, N = 3
2.95
Clear Linux 28660
SE +/- 0.01, N = 3
2.95
openSUSE Leap 15.0
SE +/- 0.03, N = 3
3.06
Ubuntu 18.04.2 LTS
SE +/- 0.05, N = 4
3.19
FreeBSD 12.0
SE +/- 0.01, N = 3
4.18
FreeBSD 12.0 - GCC 8.3
SE +/- 0.00, N = 3
4.11
0.9405
1.881
2.8215
3.762
4.7025

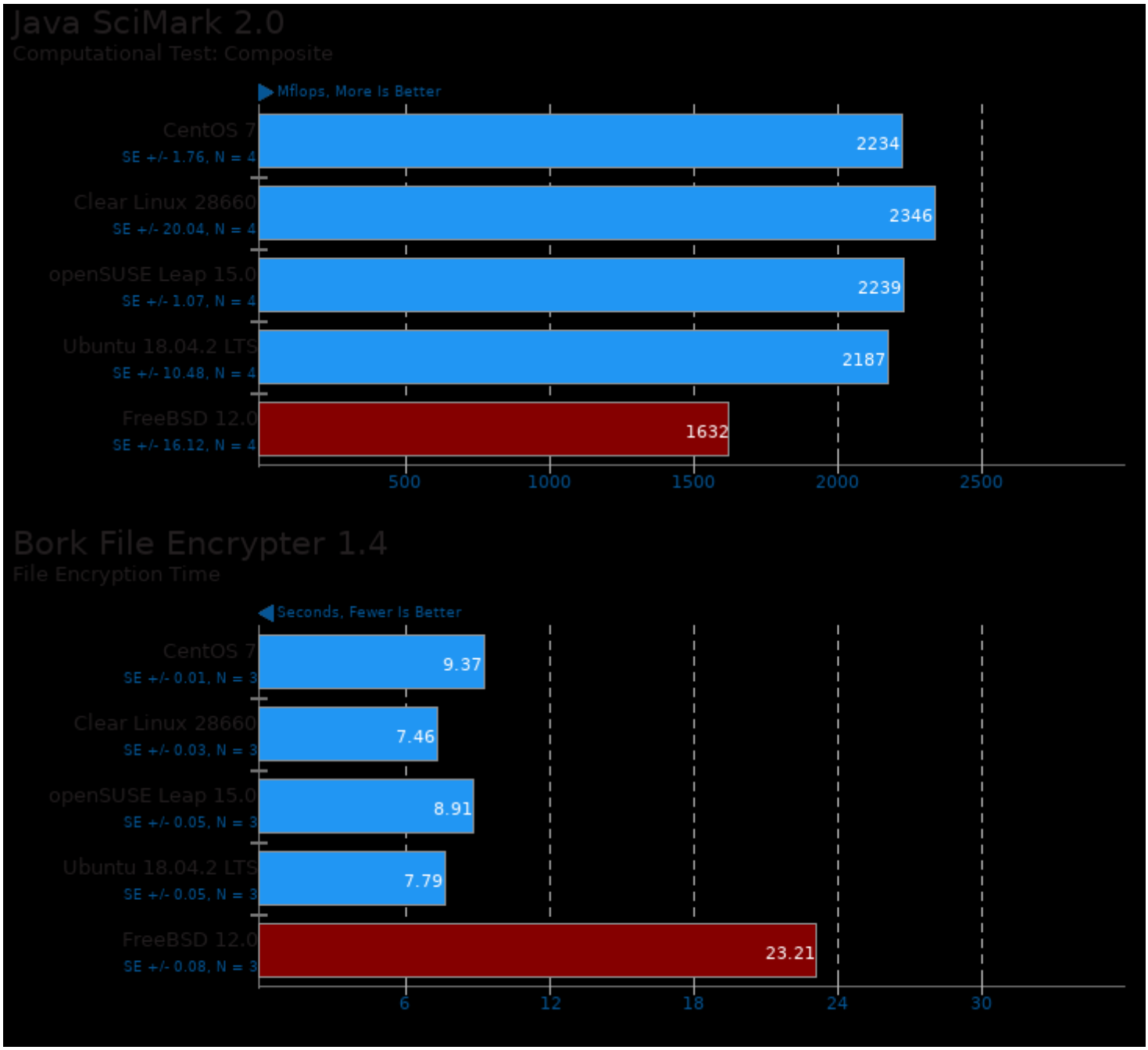

FFTW 3.3.6
Build: Stock - Size: 1D FFT Size 32
Mflops, More Is Better
CentOS 7
SE +/- 1.08, N = 3
9752
Clear Linux 28660
SE +/- 24.30, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
8965
openSUSE Leap 15.0
SE +/- 7.69, N = 3
-fomit-frame-pointer -mtune=native -malign-double -fstrict-aliasing -fno-schedule-insns -ffast-math
6598
Ubuntu 18.04.2 LTS
SE +/- 425.46, N = 15
-fomit-frame-pointer -mtune=native -malign-double -fstrict-aliasing -fno-schedule-insns -ffast-math
8014
FreeBSD 12.0 - GCC 8.3
SE +/- 80.97, N = 3
-fomit-frame-pointer -mtune=native -malign-double -fstrict-aliasing -fno-schedule-insns -ffast-math
5773
2K
4K
6K
8K
10K
1. (CC) gcc options: -pthread -O3 -lm
FFTW 3.3.6
Build: Stock - Size: 2D FFT Size 32
Mflops, More Is Better
CentOS 7
SE +/- 15.72, N = 3
10333
Clear Linux 28660
SE +/- 55.60, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
8759
openSUSE Leap 15.0
SE +/- 43.88, N = 3
-fomit-frame-pointer -mtune=native -malign-double -fstrict-aliasing -fno-schedule-insns -ffast-math
10319
Ubuntu 18.04.2 LTS
SE +/- 93.78, N = 3
-fomit-frame-pointer -mtune=native -malign-double -fstrict-aliasing -fno-schedule-insns -ffast-math
10041
FreeBSD 12.0 - GCC 8.3
SE +/- 17.17, N = 3
-fomit-frame-pointer -mtune=native -malign-double -fstrict-aliasing -fno-schedule-insns -ffast-math
5919
2K
4K
6K
8K
10K
1. (CC) gcc options: -pthread -O3 -lm

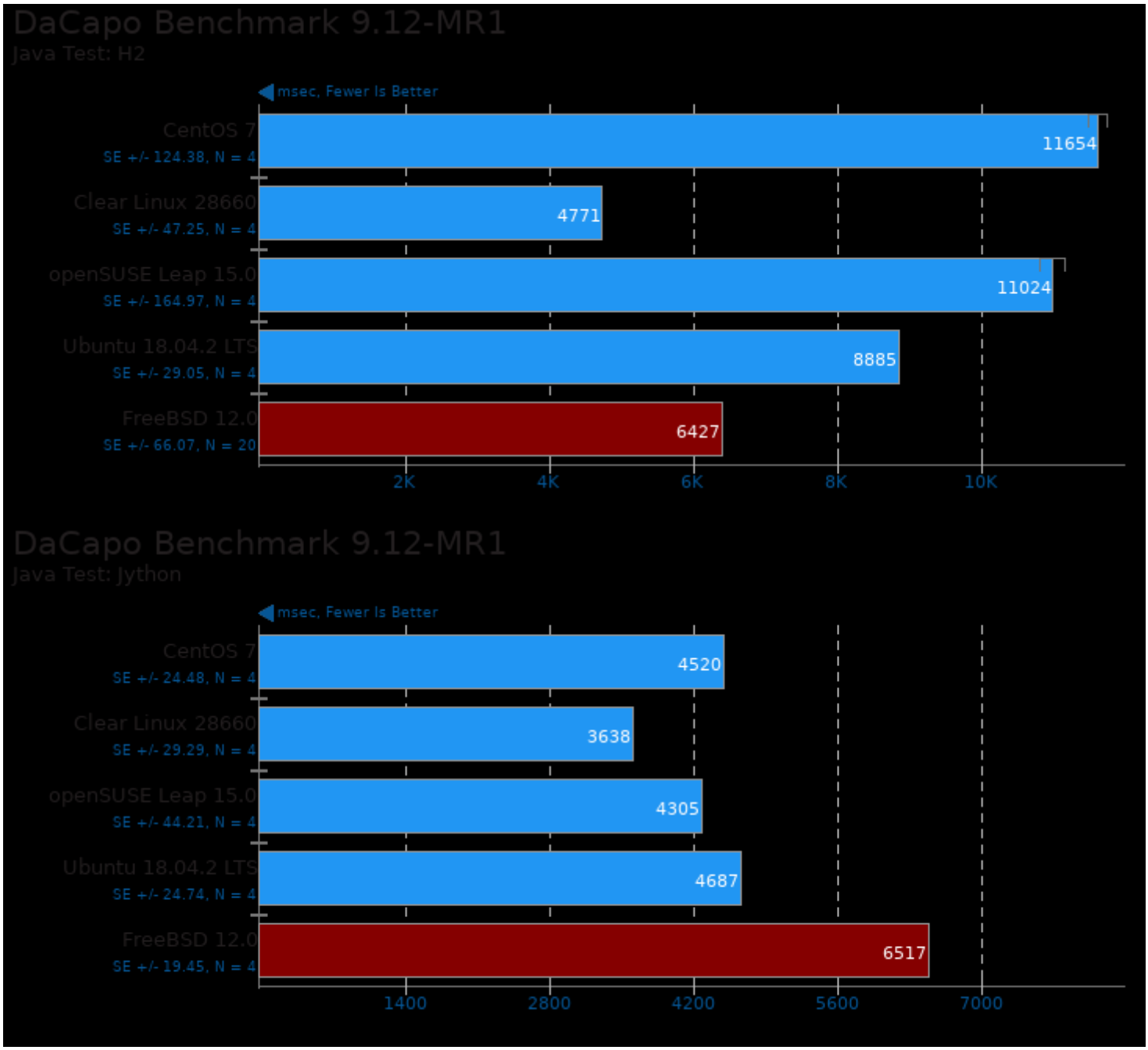

FFTW 3.3.6
Build: Stock - Size: 1D FFT Size 4096
Mflops, More Is Better
CentOS 7
SE +/- 7.66, N = 3
7677
Clear Linux 28660
SE +/- 1.88, N = 3
-pipe -fexceptions -fstack-protector -m64 -flto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
3110
openSUSE Leap 15.0
SE +/- 99.53, N = 5
-fomit-frame-pointer -mtune=native -malign-double -fstrict-aliasing -fno-schedule-insns -ffast-math
7696
Ubuntu 18.04.2 LTS
SE +/- 11.01, N = 3
-fomit-frame-pointer -mtune=native -malign-double -fstrict-aliasing -fno-schedule-insns -ffast-math
7732
FreeBSD 12.0 - GCC 8.3
SE +/- 4.27, N = 3
-fomit-frame-pointer -mtune=native -malign-double -fstrict-aliasing -fno-schedule-insns -ffast-math
4815
1700
3400
5100
6800
8500
1. (CC) gcc options: -pthread -O3 -lm
FFTW 3.3.6
Build: Stock - Size: 2D FFT Size 4096
Mflops, More Is Better
CentOS 7
SE +/- 16.29, N = 3
5156
Clear Linux 28660
SE +/- 28.38, N = 3
-pipe -fexceptions -fstack-protector -m64 -flto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
2728
openSUSE Leap 15.0
SE +/- 20.52, N = 3
-fomit-frame-pointer -mtune=native -malign-double -fstrict-aliasing -fno-schedule-insns -ffast-math
5497
Ubuntu 18.04.2 LTS
SE +/- 13.74, N = 3
-fomit-frame-pointer -mtune=native -malign-double -fstrict-aliasing -fno-schedule-insns -ffast-math
4977
FreeBSD 12.0 - GCC 8.3
SE +/- 43.55, N = 9
-fomit-frame-pointer -mtune=native -malign-double -fstrict-aliasing -fno-schedule-insns -ffast-math
3882
1200
2400
3600
4800
6000
1. (CC) gcc options: -pthread -O3 -lm

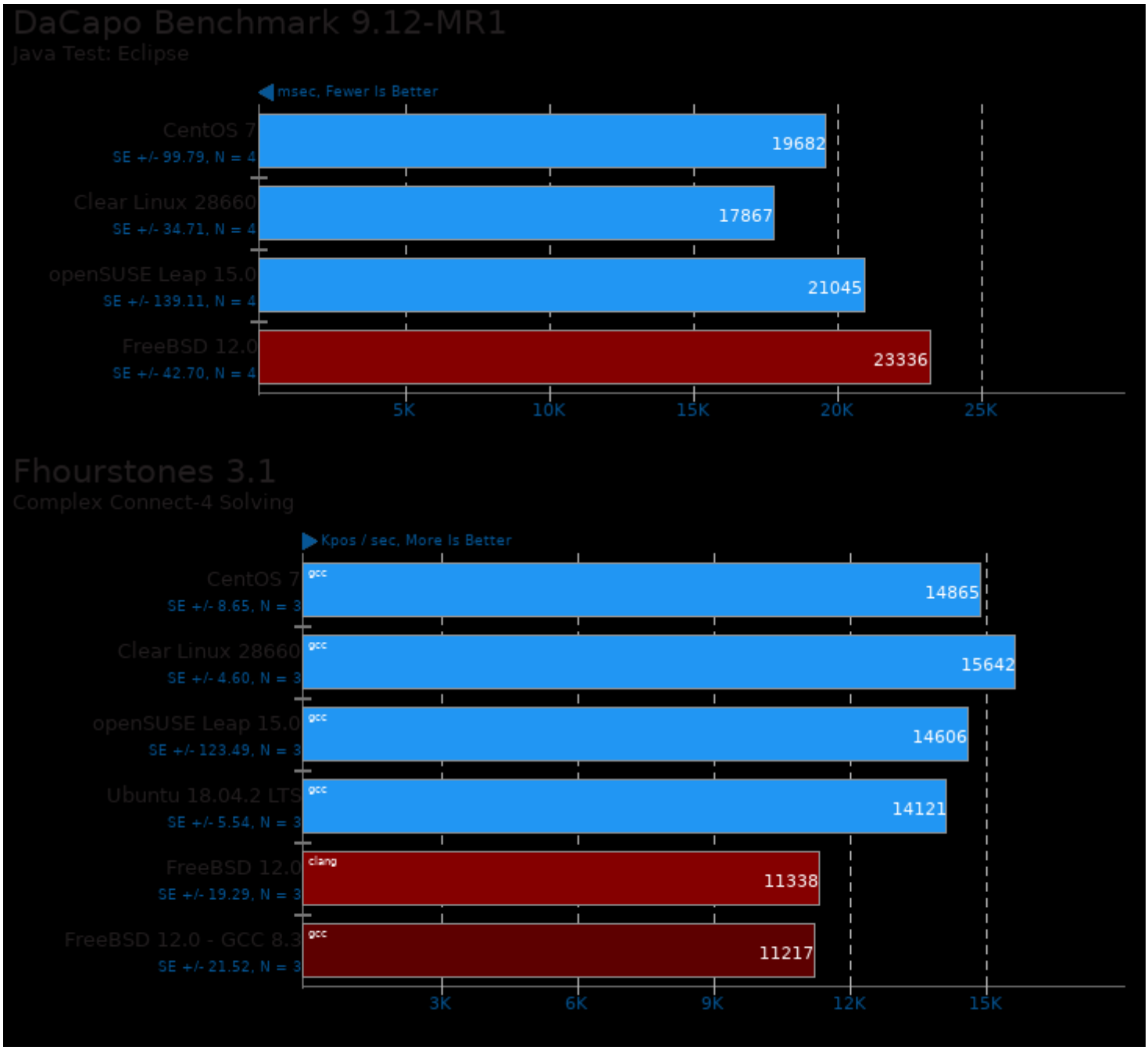

Timed HMMer Search 2.3.2
Pfam Database Search
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.07, N = 3
15.09
Clear Linux 28660
SE +/- 0.00, N = 3
3.88
openSUSE Leap 15.0
SE +/- 0.02, N = 3
11.85
Ubuntu 18.04.2 LTS
SE +/- 0.07, N = 3
11.43
FreeBSD 12.0
SE +/- 0.31, N = 15
22.10
FreeBSD 12.0 - GCC 8.3
SE +/- 0.28, N = 3
23.56
6
12
18
24
30
BLAKE2 20170307
Cycles Per Byte, Fewer Is Better
CentOS 7
SE +/- 0.00, N = 3
gcc
3.50
Clear Linux 28660
SE +/- 0.00, N = 3
gcc
4.08
openSUSE Leap 15.0
SE +/- 0.15, N = 15
gcc
4.36
Ubuntu 18.04.2 LTS
SE +/- 0.00, N = 3
gcc
4.07
FreeBSD 12.0
SE +/- 0.00, N = 3
clang
4.40
FreeBSD 12.0 - GCC 8.3
SE +/- 0.00, N = 3
gcc
5.74
1.2915
2.583
3.8745
5.166
6.4575

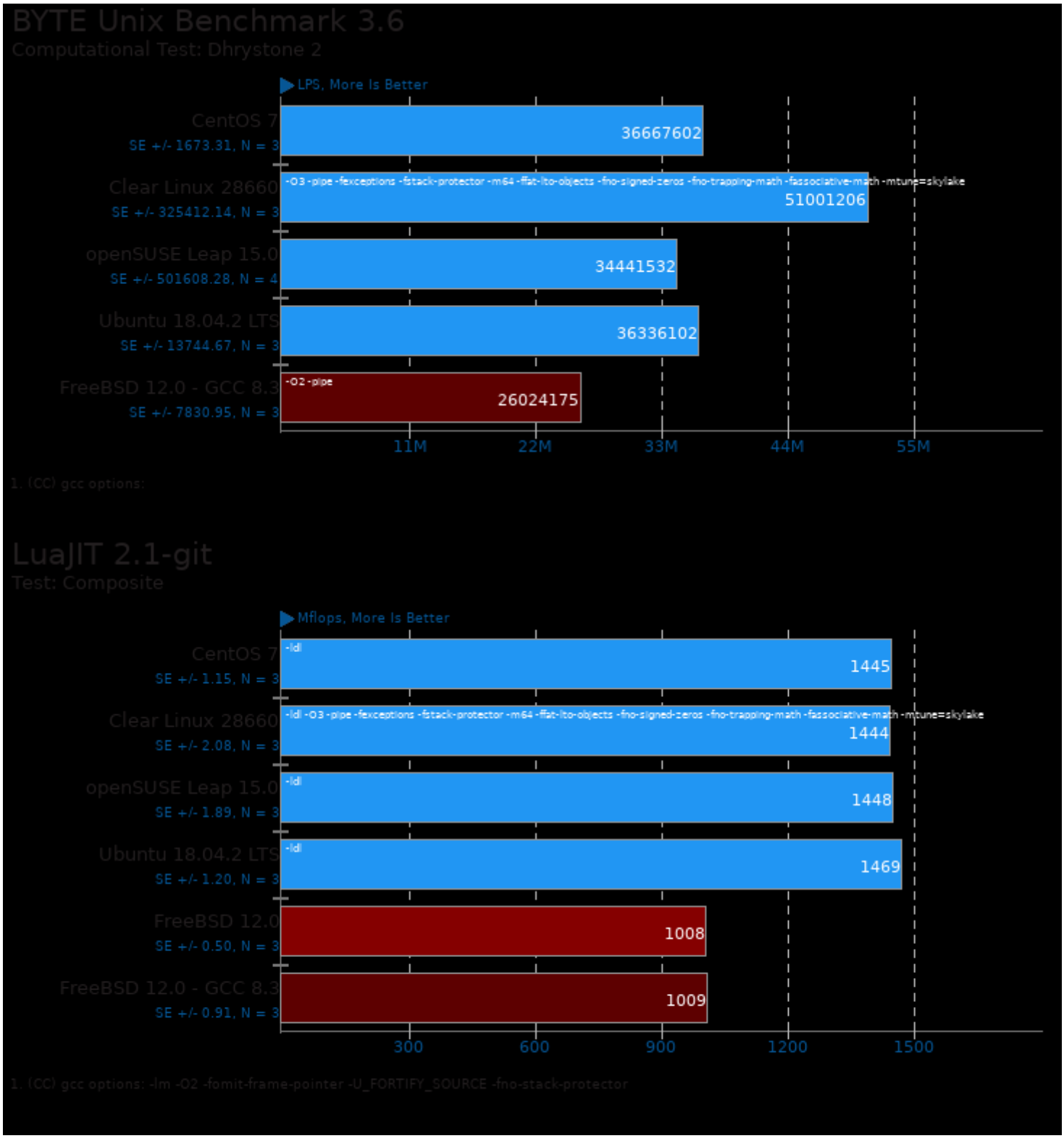

Go Benchmarks
Test: http
Nanoseconds/Operation, Fewer Is Better
CentOS 7
SE +/- 35.62, N = 3
9687
Clear Linux 28660
SE +/- 44.29, N = 3
9881
openSUSE Leap 15.0
SE +/- 127516.90, N = 12
137303
Ubuntu 18.04.2 LTS
SE +/- 128163.61, N = 12
138298
FreeBSD 12.0
SE +/- 736.77, N = 3
138658
30K
60K
90K
120K
150K
Go Benchmarks
Test: json
Nanoseconds/Operation, Fewer Is Better
CentOS 7
SE +/- 25297.62, N = 3
1959230
Clear Linux 28660
SE +/- 2672.37, N = 3
1611520
openSUSE Leap 15.0
SE +/- 3796.12, N = 3
1586206
Ubuntu 18.04.2 LTS
SE +/- 26771.98, N = 3
1599130
FreeBSD 12.0
SE +/- 18208.43, N = 3
1857557
400K
800K
1200K
1600K
2000K

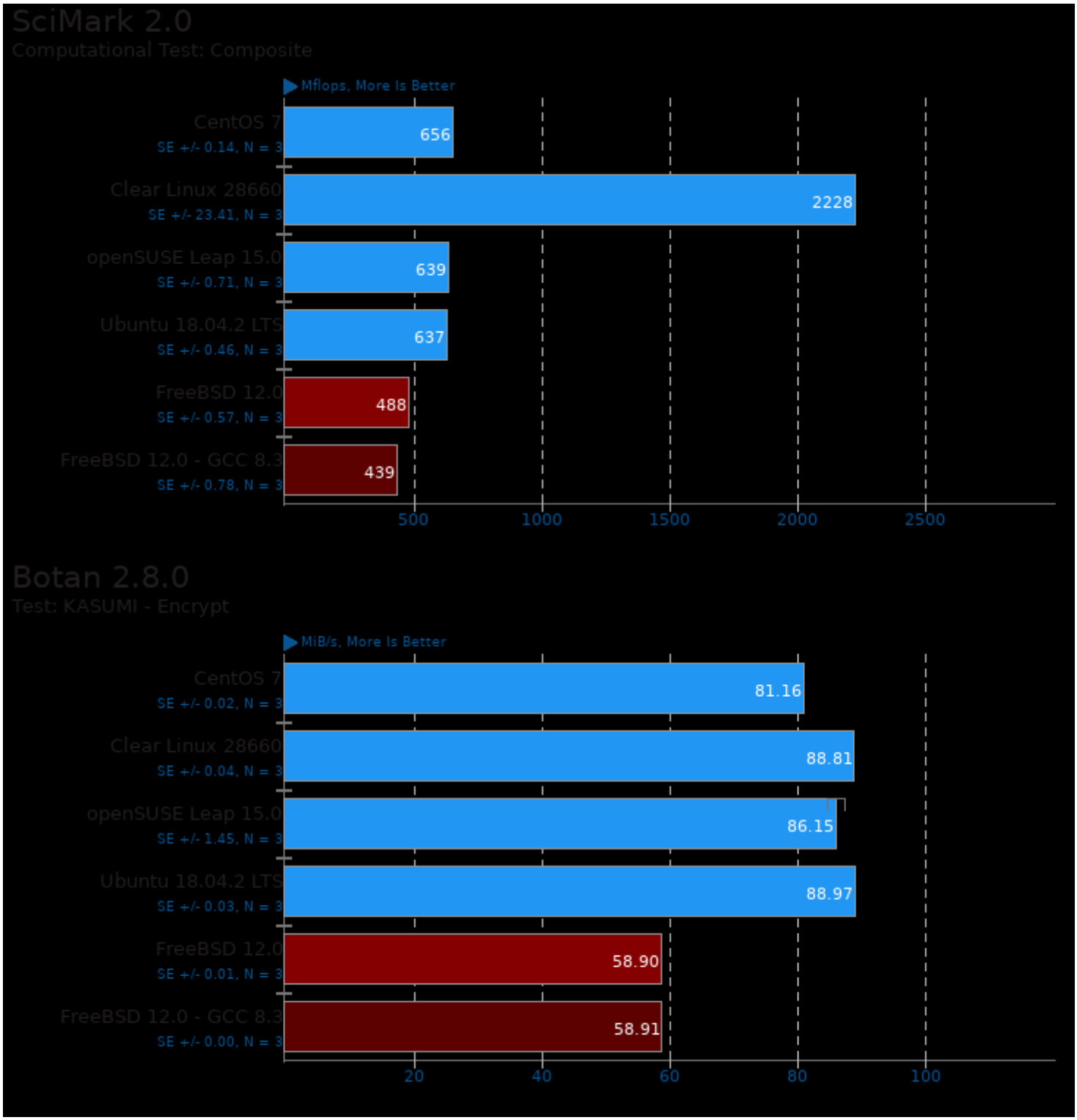

Go Benchmarks
Test: build
Nanoseconds/Operation, Fewer Is Better
CentOS 7
SE +/- 28368177.89, N = 3
22628681879
Clear Linux 28660
SE +/- 71167713.37, N = 3
20044335365
openSUSE Leap 15.0
SE +/- 98392767.67, N = 3
19942427121
Ubuntu 18.04.2 LTS
SE +/- 22833303.86, N = 3
20308755875
FreeBSD 12.0
SE +/- 38835582.37, N = 3
32618048342
7000M
14000M
21000M
28000M
35000M
Go Benchmarks
Test: garbage
Nanoseconds/Operation, Fewer Is Better
CentOS 7
SE +/- 4325.47, N = 3
1106004
Clear Linux 28660
SE +/- 9634.09, N = 3
725710
openSUSE Leap 15.0
SE +/- 2529.34, N = 3
775645
Ubuntu 18.04.2 LTS
SE +/- 4817.70, N = 3
740732
FreeBSD 12.0
SE +/- 14348.54, N = 4
1011572
200K
400K
600K
800K
1000K

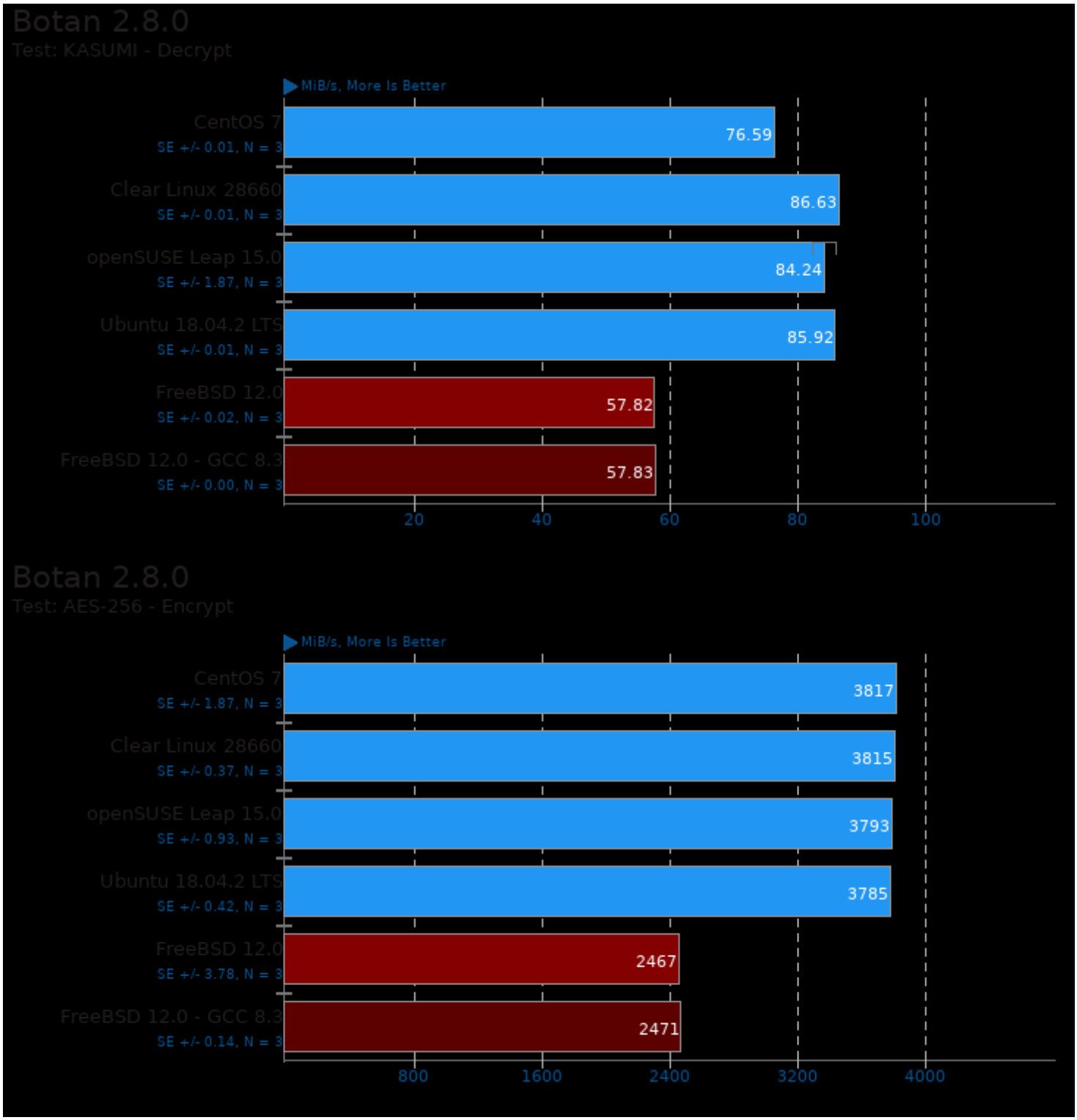

Java SciMark 2.0
Computational Test: Composite
Mflops, More Is Better
CentOS 7
SE +/- 1.76, N = 4
2234
Clear Linux 28660
SE +/- 20.04, N = 4
2346
openSUSE Leap 15.0
SE +/- 1.07, N = 4
2239
Ubuntu 18.04.2 LTS
SE +/- 10.48, N = 4
2187
FreeBSD 12.0
SE +/- 16.12, N = 4
1632
500
1000
1500
2000
2500
Bork File Encrypter 1.4
File Encryption Time
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.01, N = 3
9.37
Clear Linux 28660
SE +/- 0.03, N = 3
7.46
openSUSE Leap 15.0
SE +/- 0.05, N = 3
8.91
Ubuntu 18.04.2 LTS
SE +/- 0.05, N = 3
7.79
FreeBSD 12.0
SE +/- 0.08, N = 3
23.21
6
12
18
24
30

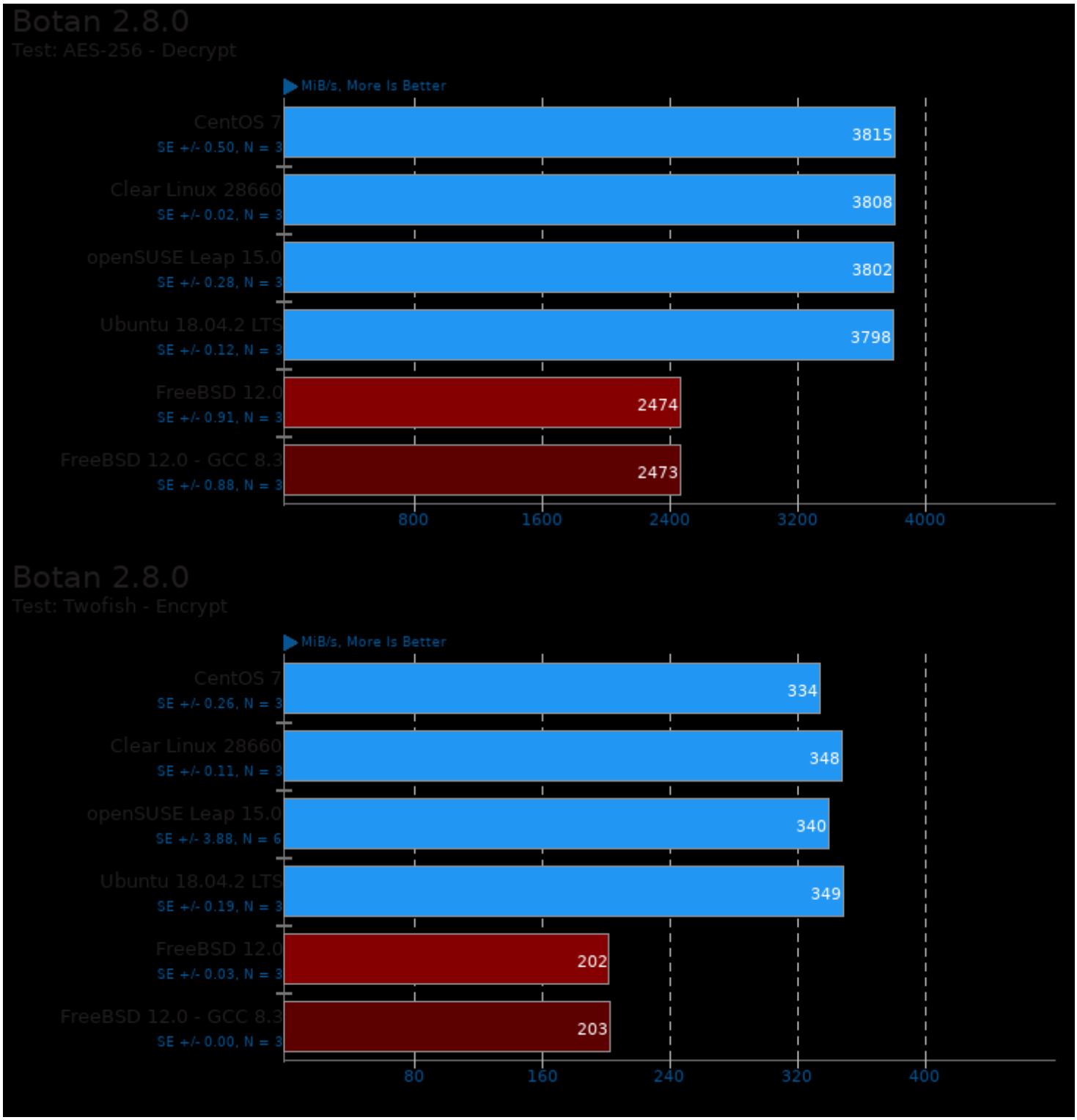

DaCapo Benchmark 9.12-MR1
Java Test: H2
msec, Fewer Is Better
CentOS 7
SE +/- 124.38, N = 4
11654
Clear Linux 28660
SE +/- 47.25, N = 4
4771
openSUSE Leap 15.0
SE +/- 164.97, N = 4
11024
Ubuntu 18.04.2 LTS
SE +/- 29.05, N = 4
8885
FreeBSD 12.0
SE +/- 66.07, N = 20
6427
2K
4K
6K
8K
10K
DaCapo Benchmark 9.12-MR1
Java Test: Jython
msec, Fewer Is Better
CentOS 7
SE +/- 24.48, N = 4
4520
Clear Linux 28660
SE +/- 29.29, N = 4
3638
openSUSE Leap 15.0
SE +/- 44.21, N = 4
4305
Ubuntu 18.04.2 LTS
SE +/- 24.74, N = 4
4687
FreeBSD 12.0
SE +/- 19.45, N = 4
6517
1400
2800
4200
5600
7000

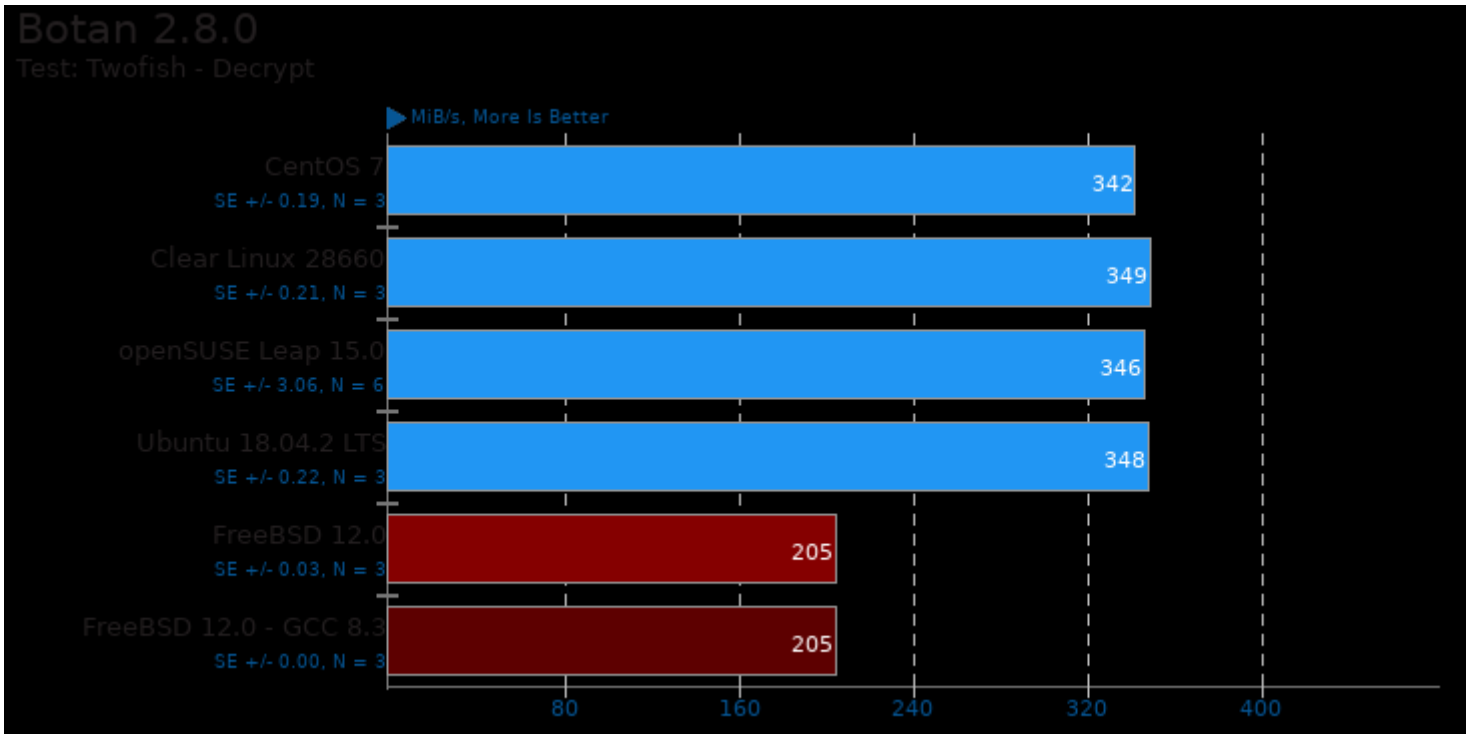

DaCapo Benchmark 9.12-MR1
Java Test: Eclipse
msec, Fewer Is Better
CentOS 7
SE +/- 99.79, N = 4
19682
Clear Linux 28660
SE +/- 34.71, N = 4
17867
openSUSE Leap 15.0
SE +/- 139.11, N = 4
21045
FreeBSD 12.0
SE +/- 42.70, N = 4
23336
5K
10K
15K
20K
25K
Fhourstones 3.1
Complex Connect-4 Solving
Kpos / sec, More Is Better
CentOS 7
SE +/- 8.65, N = 3
gcc
14865
Clear Linux 28660
SE +/- 4.60, N = 3
gcc
15642
openSUSE Leap 15.0
SE +/- 123.49, N = 3
gcc
14606
Ubuntu 18.04.2 LTS
SE +/- 5.54, N = 3
gcc
14121
FreeBSD 12.0
SE +/- 19.29, N = 3
clang
11338
FreeBSD 12.0 - GCC 8.3
SE +/- 21.52, N = 3
gcc
11217
3K
6K
9K
12K
15K

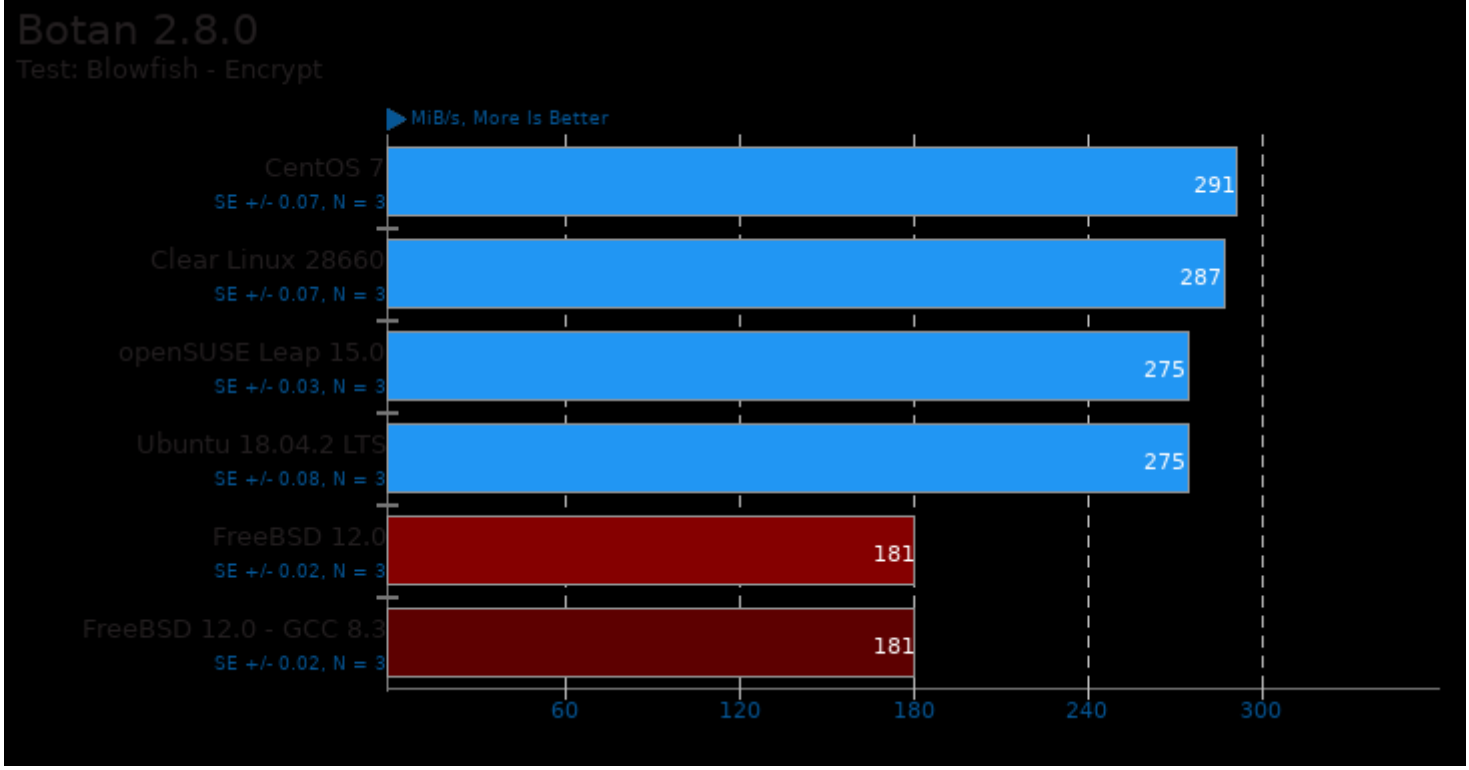

BYTE Unix Benchmark 3.6
Computational Test: Dhrystone 2
LPS, More Is Better
CentOS 7
SE +/- 1673.31, N = 3
36667602
Clear Linux 28660
SE +/- 325412.14, N = 3
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
51001206
openSUSE Leap 15.0
SE +/- 501608.28, N = 4
34441532
Ubuntu 18.04.2 LTS
SE +/- 13744.67, N = 3
36336102
FreeBSD 12.0 - GCC 8.3
SE +/- 7830.95, N = 3
-O2 -pipe
26024175
11M
22M
33M
44M
55M
1. (CC) gcc options:
LuaJIT 2.1-git
Test: Composite
Mflops, More Is Better
CentOS 7
SE +/- 1.15, N = 3
-ldl
1445
Clear Linux 28660
SE +/- 2.08, N = 3
-ldl -O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
1444
openSUSE Leap 15.0
SE +/- 1.89, N = 3
-ldl
1448
Ubuntu 18.04.2 LTS
SE +/- 1.20, N = 3
-ldl
1469
FreeBSD 12.0
SE +/- 0.50, N = 3
1008
FreeBSD 12.0 - GCC 8.3
SE +/- 0.91, N = 3
1009
300
600
900
1200
1500
1. (CC) gcc options: -lm -O2 -fomit-frame-pointer -U_FORTIFY_SOURCE -fno-stack-protector

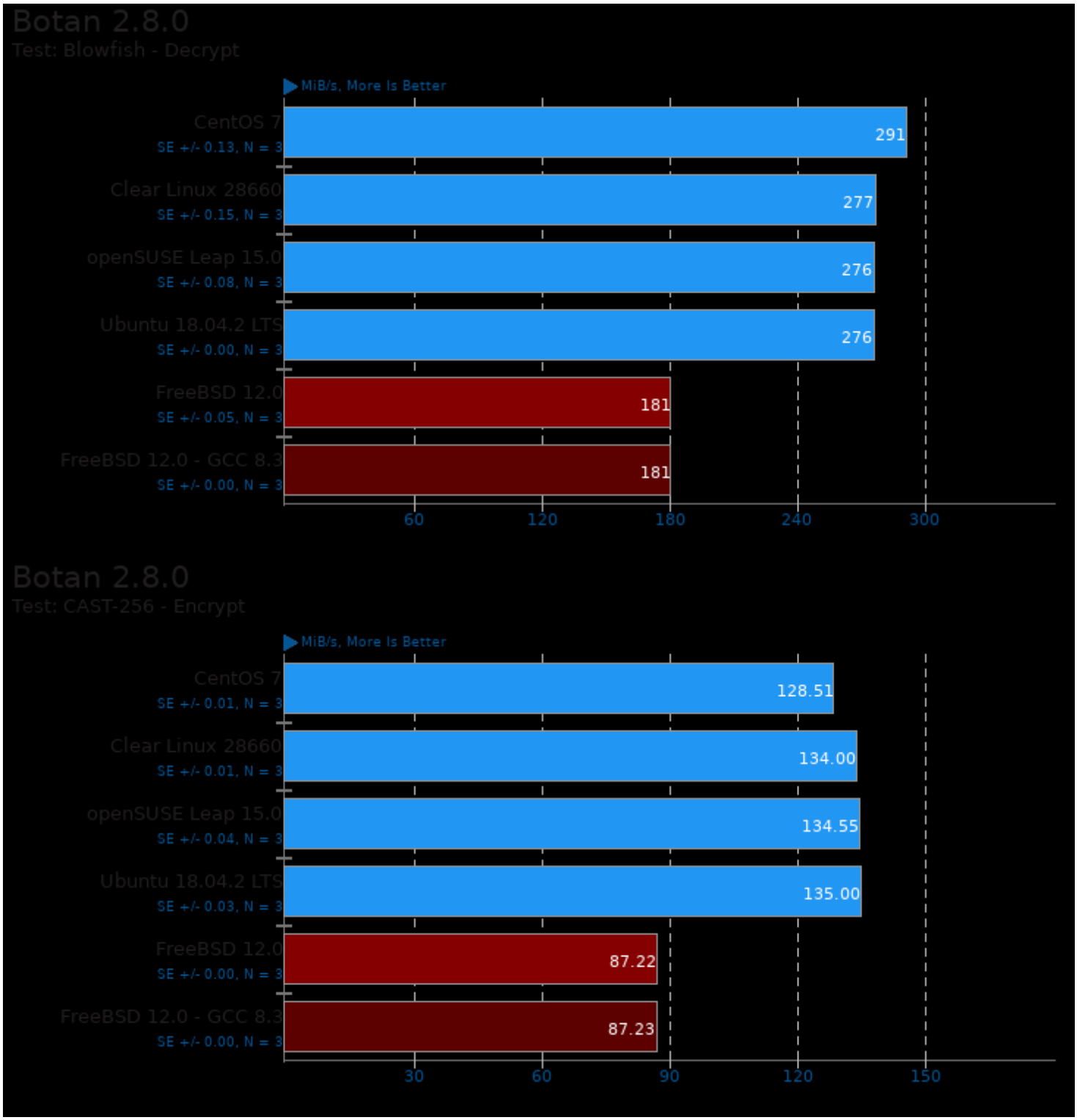

SciMark 2.0
Computational Test: Composite
Mflops, More Is Better
CentOS 7
SE +/- 0.14, N = 3
656
Clear Linux 28660
SE +/- 23.41, N = 3
2228
openSUSE Leap 15.0
SE +/- 0.71, N = 3
639
Ubuntu 18.04.2 LTS
SE +/- 0.46, N = 3
637
FreeBSD 12.0
SE +/- 0.57, N = 3
488
FreeBSD 12.0 - GCC 8.3
SE +/- 0.78, N = 3
439
500
1000
1500
2000
2500
Botan 2.8.0
Test: KASUMI - Encrypt
MiB/s, More Is Better
CentOS 7
SE +/- 0.02, N = 3
81.16
Clear Linux 28660
SE +/- 0.04, N = 3
88.81
openSUSE Leap 15.0
SE +/- 1.45, N = 3
86.15
Ubuntu 18.04.2 LTS
SE +/- 0.03, N = 3
88.97
FreeBSD 12.0
SE +/- 0.01, N = 3
58.90
FreeBSD 12.0 - GCC 8.3
SE +/- 0.00, N = 3
58.91
20
40
60
80
100

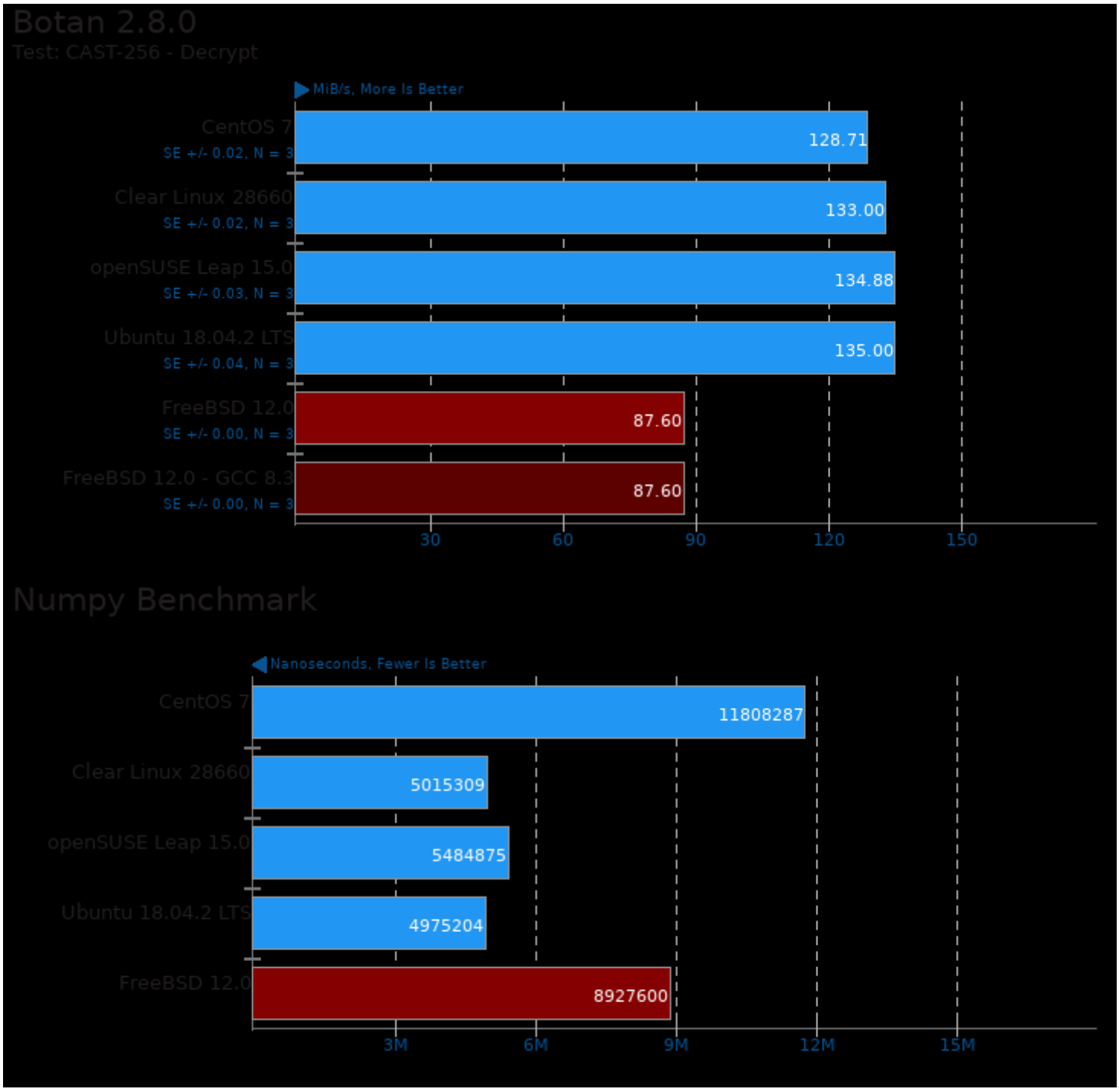

Botan 2.8.0
Test: KASUMI - Decrypt
MiB/s, More Is Better
CentOS 7
SE +/- 0.01, N = 3
76.59
Clear Linux 28660
SE +/- 0.01, N = 3
86.63
openSUSE Leap 15.0
SE +/- 1.87, N = 3
84.24
Ubuntu 18.04.2 LTS
SE +/- 0.01, N = 3
85.92
FreeBSD 12.0
SE +/- 0.02, N = 3
57.82
FreeBSD 12.0 - GCC 8.3
SE +/- 0.00, N = 3
57.83
20
40
60
80
100
Botan 2.8.0
Test: AES-256 - Encrypt
MiB/s, More Is Better
CentOS 7
SE +/- 1.87, N = 3
3817
Clear Linux 28660
SE +/- 0.37, N = 3
3815
openSUSE Leap 15.0
SE +/- 0.93, N = 3
3793
Ubuntu 18.04.2 LTS
SE +/- 0.42, N = 3
3785
FreeBSD 12.0
SE +/- 3.78, N = 3
2467
FreeBSD 12.0 - GCC 8.3
SE +/- 0.14, N = 3
2471
800
1600
2400
3200
4000

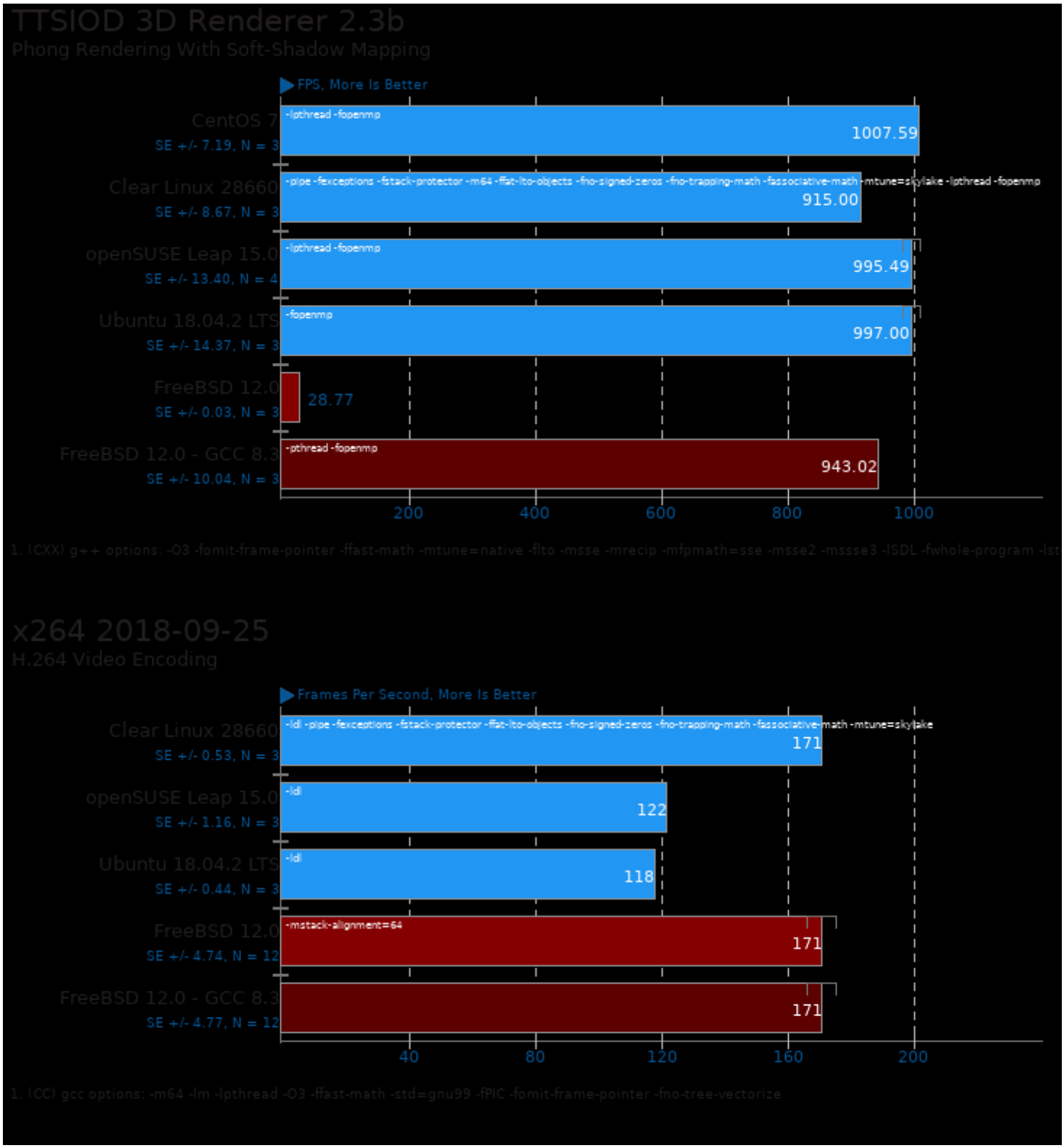

Botan 2.8.0
Test: AES-256 - Decrypt
MiB/s, More Is Better
CentOS 7
SE +/- 0.50, N = 3
3815
Clear Linux 28660
SE +/- 0.02, N = 3
3808
openSUSE Leap 15.0
SE +/- 0.28, N = 3
3802
Ubuntu 18.04.2 LTS
SE +/- 0.12, N = 3
3798
FreeBSD 12.0
SE +/- 0.91, N = 3
2474
FreeBSD 12.0 - GCC 8.3
SE +/- 0.88, N = 3
2473
800
1600
2400
3200
4000
Botan 2.8.0
Test: Twofish - Encrypt
MiB/s, More Is Better
CentOS 7
SE +/- 0.26, N = 3
334
Clear Linux 28660
SE +/- 0.11, N = 3
348
openSUSE Leap 15.0
SE +/- 3.88, N = 6
340
Ubuntu 18.04.2 LTS
SE +/- 0.19, N = 3
349
FreeBSD 12.0
SE +/- 0.03, N = 3
202
FreeBSD 12.0 - GCC 8.3
SE +/- 0.00, N = 3
203
80
160
240
320
400

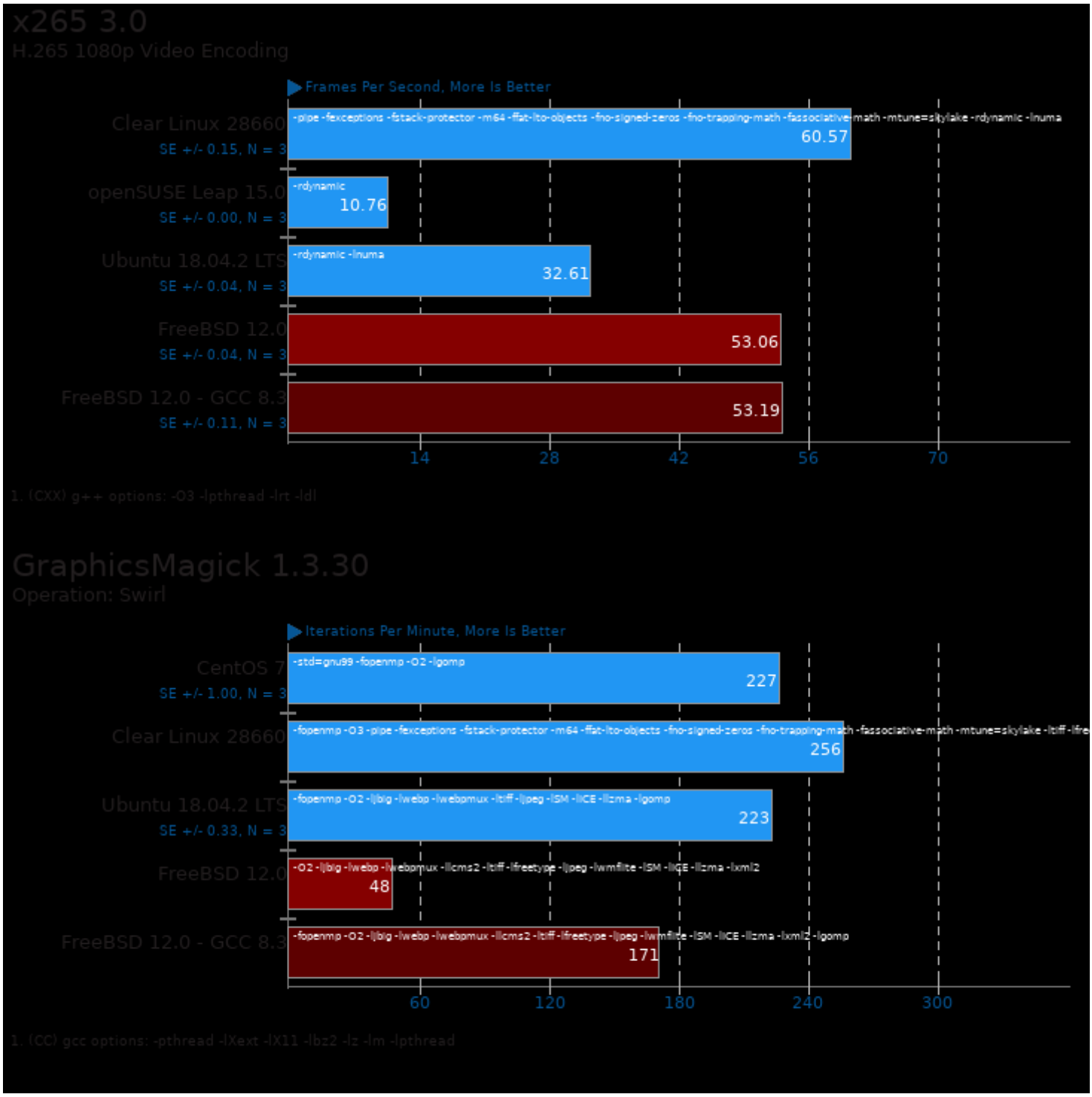

Botan 2.8.0
Test: Twofish - Decrypt
MiB/s, More Is Better
CentOS 7
SE +/- 0.19, N = 3
342
Clear Linux 28660
SE +/- 0.21, N = 3
349
openSUSE Leap 15.0
SE +/- 3.06, N = 6
346
Ubuntu 18.04.2 LTS
SE +/- 0.22, N = 3
348
FreeBSD 12.0
SE +/- 0.03, N = 3
205
FreeBSD 12.0 - GCC 8.3
SE +/- 0.00, N = 3
205
80
160
240
320
400

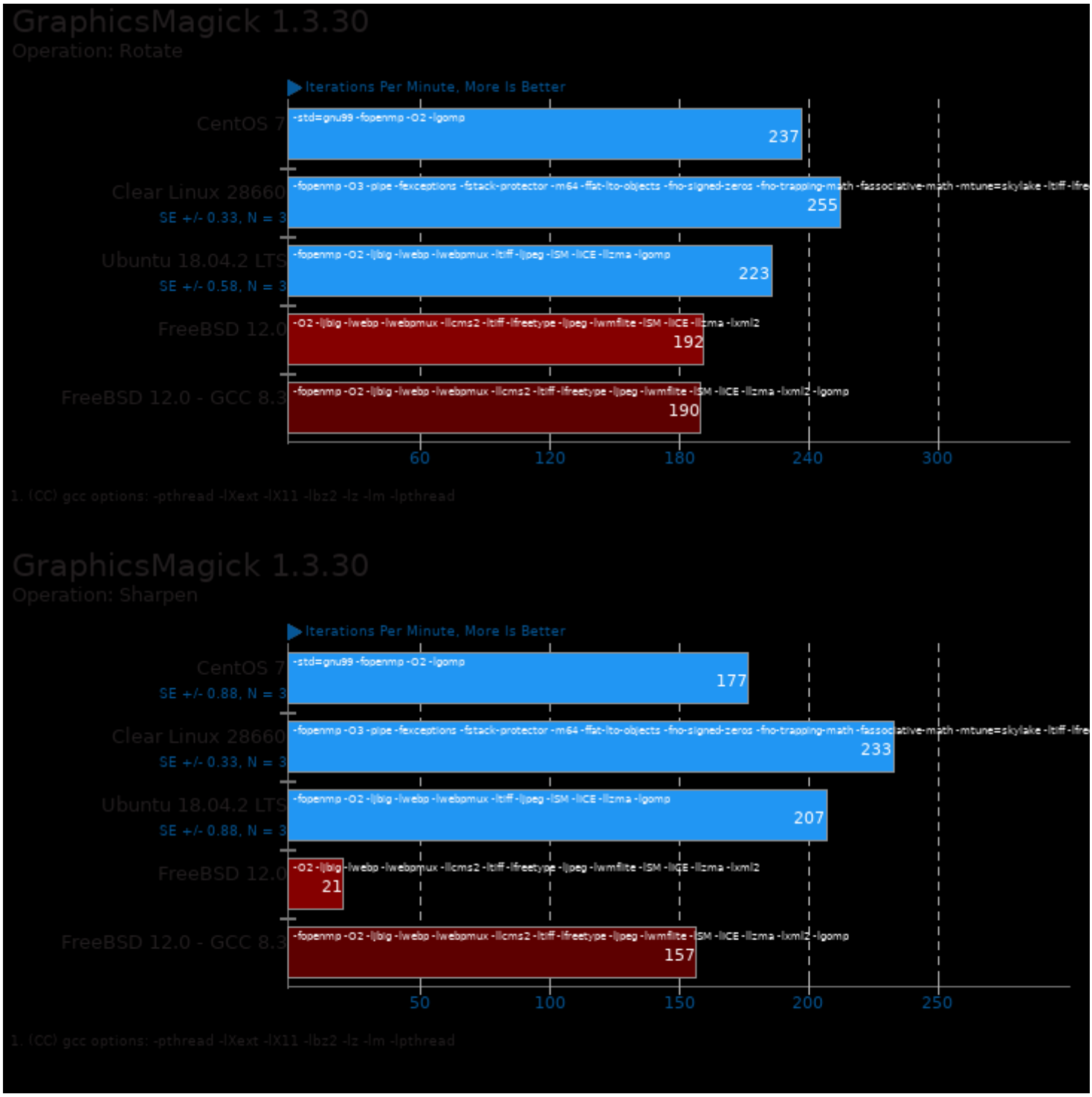

Botan 2.8.0
Test: Blowfish - Encrypt
MiB/s, More Is Better
CentOS 7
SE +/- 0.07, N = 3
291
Clear Linux 28660
SE +/- 0.07, N = 3
287
openSUSE Leap 15.0
SE +/- 0.03, N = 3
275
Ubuntu 18.04.2 LTS
SE +/- 0.08, N = 3
275
FreeBSD 12.0
SE +/- 0.02, N = 3
181
FreeBSD 12.0 - GCC 8.3
SE +/- 0.02, N = 3
181
60
120
180
240
300

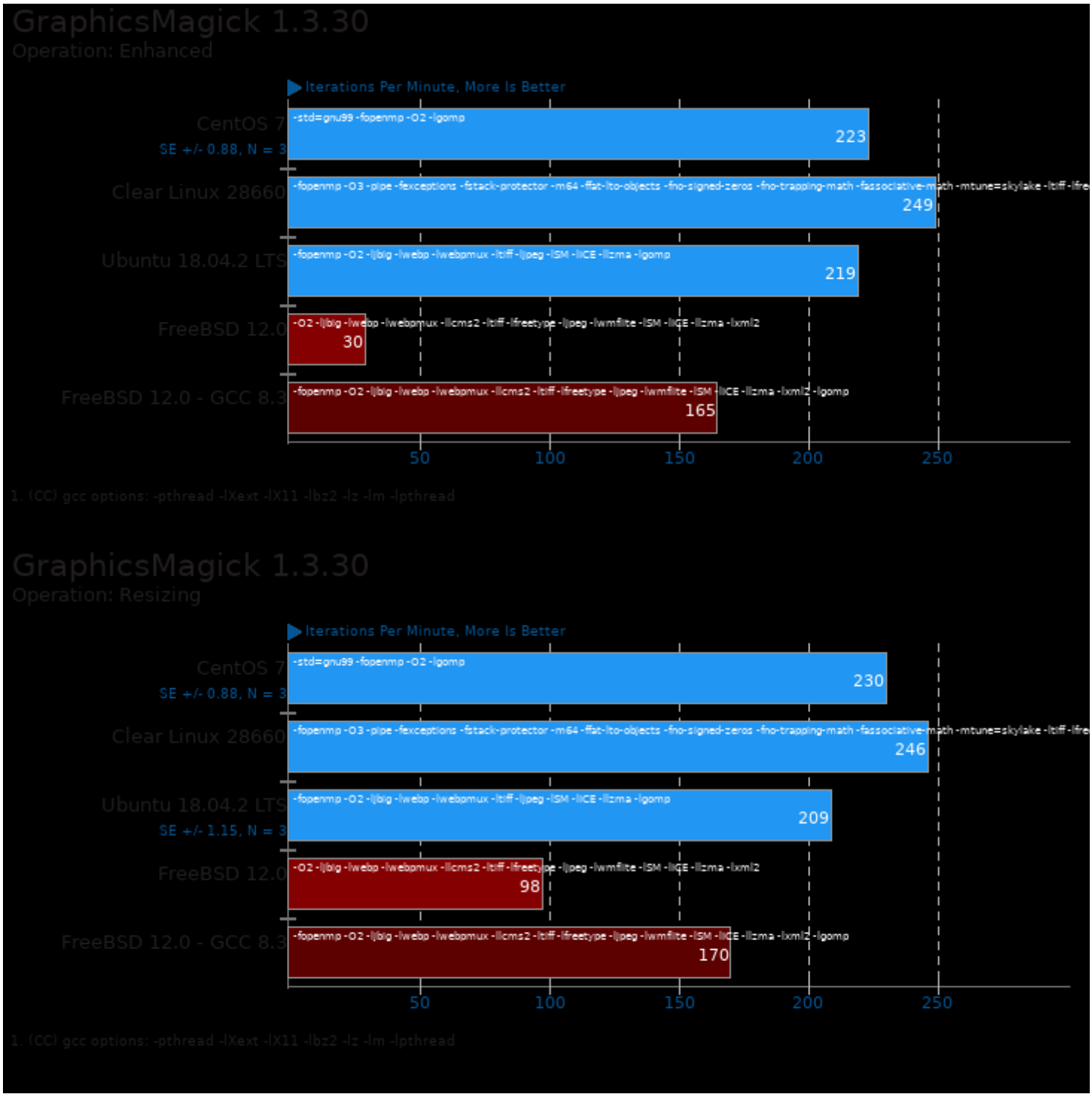

Botan 2.8.0
Test: Blowfish - Decrypt
MiB/s, More Is Better
CentOS 7
SE +/- 0.13, N = 3
291
Clear Linux 28660
SE +/- 0.15, N = 3
277
openSUSE Leap 15.0
SE +/- 0.08, N = 3
276
Ubuntu 18.04.2 LTS
SE +/- 0.00, N = 3
276
FreeBSD 12.0
SE +/- 0.05, N = 3
181
FreeBSD 12.0 - GCC 8.3
SE +/- 0.00, N = 3
181
60
120
180
240
300
Botan 2.8.0
Test: CAST-256 - Encrypt
MiB/s, More Is Better
CentOS 7
SE +/- 0.01, N = 3
128.51
Clear Linux 28660
SE +/- 0.01, N = 3
134.00
openSUSE Leap 15.0
SE +/- 0.04, N = 3
134.55
Ubuntu 18.04.2 LTS
SE +/- 0.03, N = 3
135.00
FreeBSD 12.0
SE +/- 0.00, N = 3
87.22
FreeBSD 12.0 - GCC 8.3
SE +/- 0.00, N = 3
87.23
30
60
90
120
150

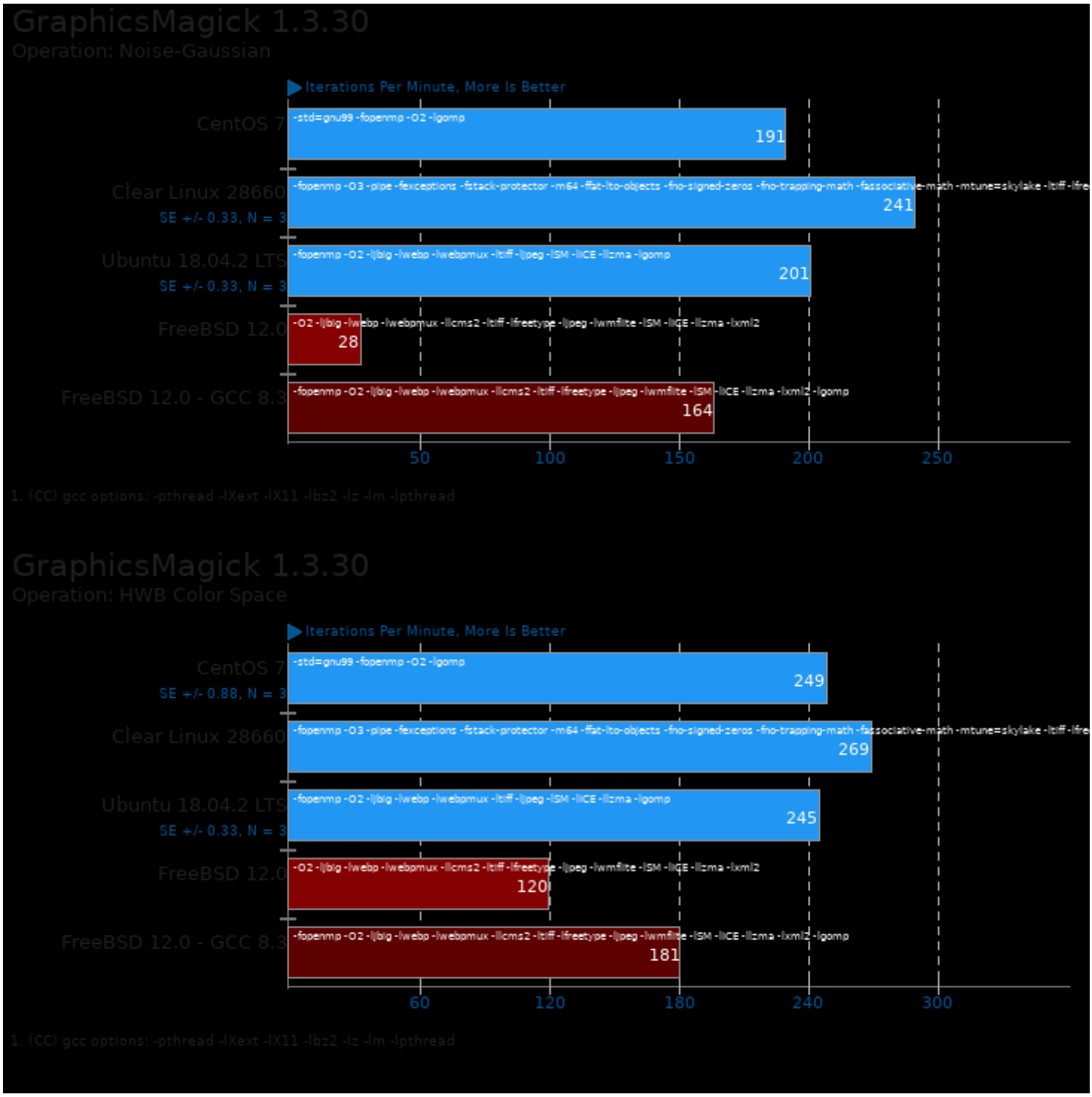

Botan 2.8.0
Test: CAST-256 - Decrypt
MiB/s, More Is Better
CentOS 7
SE +/- 0.02, N = 3
128.71
Clear Linux 28660
SE +/- 0.02, N = 3
133.00
openSUSE Leap 15.0
SE +/- 0.03, N = 3
134.88
Ubuntu 18.04.2 LTS
SE +/- 0.04, N = 3
135.00
FreeBSD 12.0
SE +/- 0.00, N = 3
87.60
FreeBSD 12.0 - GCC 8.3
SE +/- 0.00, N = 3
87.60
30
60
90
120
150
Numpy Benchmark
Nanoseconds, Fewer Is Better
CentOS 7
11808287
Clear Linux 28660
5015309
openSUSE Leap 15.0
5484875
Ubuntu 18.04.2 LTS
4975204
FreeBSD 12.0
8927600
3M
6M
9M
12M
15M

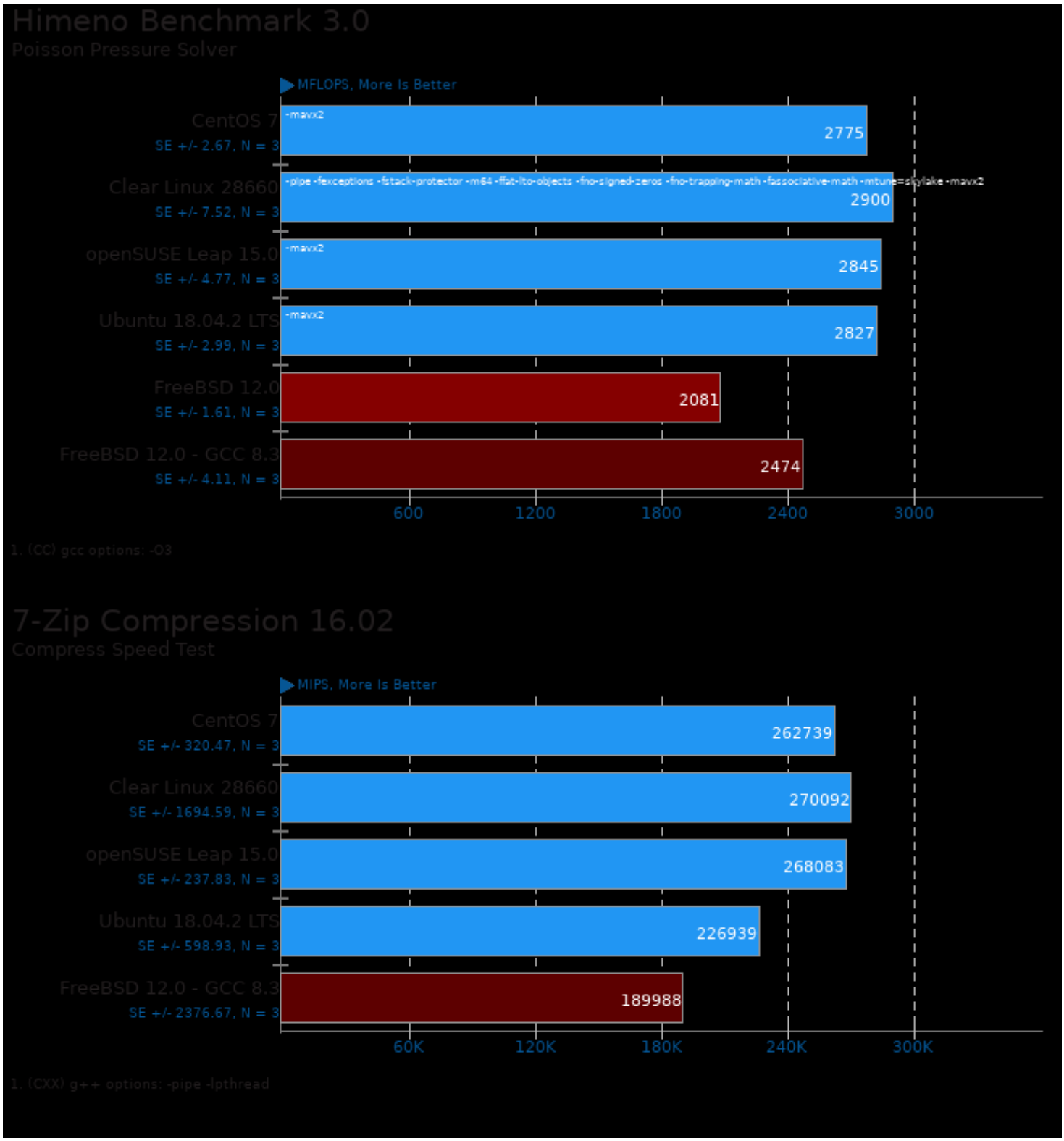

TTSIOD 3D Renderer 2.3b
Phong Rendering With Soft-Shadow Mapping
FPS, More Is Better
CentOS 7
SE +/- 7.19, N = 3
-lpthread -fopenmp
1007.59
Clear Linux 28660
SE +/- 8.67, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -lpthread -fopenmp
915.00
openSUSE Leap 15.0
SE +/- 13.40, N = 4
-lpthread -fopenmp
995.49
Ubuntu 18.04.2 LTS
SE +/- 14.37, N = 3
-fopenmp
997.00
FreeBSD 12.0
SE +/- 0.03, N = 3
28.77
FreeBSD 12.0 - GCC 8.3
SE +/- 10.04, N = 3
-pthread -fopenmp
943.02
200
400
600
800
1000
1. (CXX) g++ options: -O3 -fomit-frame-pointer -ffast-math -mtune=native -flto -msse -mrecip -mfpmath=sse -msse2 -mssse3 -lSDL -fwhole-program -lst
x264 2018-09-25
H.264 Video Encoding
Frames Per Second, More Is Better
Clear Linux 28660
SE +/- 0.53, N = 3
-ldl -pipe -fexceptions -fstack-protector -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
171
openSUSE Leap 15.0
SE +/- 1.16, N = 3
-ldl
122
Ubuntu 18.04.2 LTS
SE +/- 0.44, N = 3
-ldl
118
FreeBSD 12.0
SE +/- 4.74, N = 12
-mstack-alignment=64
171
FreeBSD 12.0 - GCC 8.3
SE +/- 4.77, N = 12
171
40
80
120
160
200
1. (CC) gcc options: -m64 -lm -lpthread -O3 -ffast-math -std=gnu99 -fPIC -fomit-frame-pointer -fno-tree-vectorize

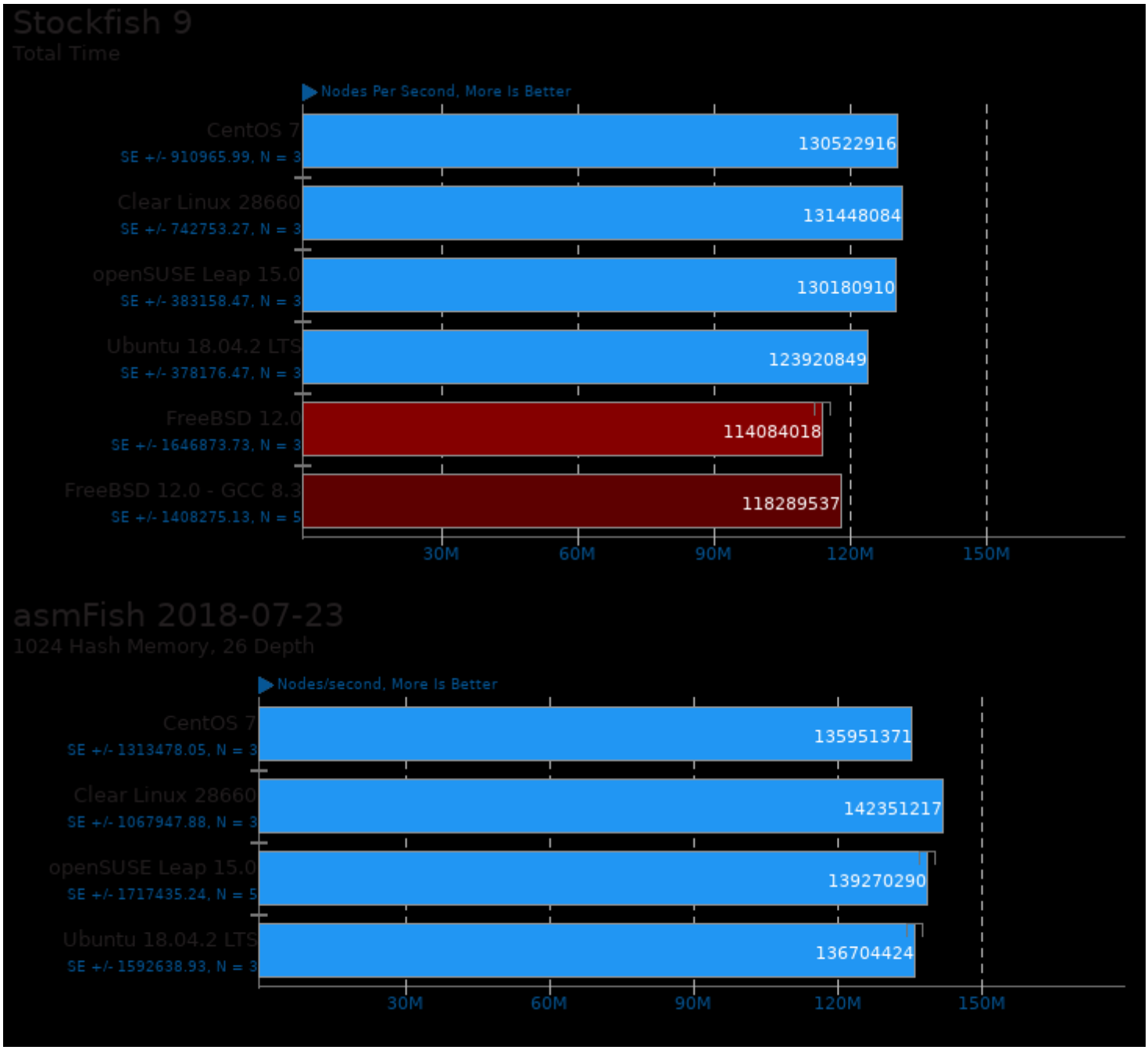

x265 3.0
H.265 1080p Video Encoding
Frames Per Second, More Is Better
Clear Linux 28660
SE +/- 0.15, N = 3
-pipe -fexceptions -fstack-protector -m64 -flto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -rdynamic -lnuma
60.57
openSUSE Leap 15.0
SE +/- 0.00, N = 3
-rdynamic
10.76
Ubuntu 18.04.2 LTS
SE +/- 0.04, N = 3
-rdynamic -lnuma
32.61
FreeBSD 12.0
SE +/- 0.04, N = 3
53.06
FreeBSD 12.0 - GCC 8.3
SE +/- 0.11, N = 3
53.19
14
28
42
56
70
1. (CXX) g++ options: -O3 -lpthread -lrt -ldl
GraphicsMagick 1.3.30
Operation: Swirl
Iterations Per Minute, More Is Better
CentOS 7
SE +/- 1.00, N = 3
-std=gnu99 -fopenmp -O2 -lgomp
227
Clear Linux 28660
-fopenmp -O3 -pipe -fexceptions -fstack-protector -m64 -flto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -ltiff -lfre
256
Ubuntu 18.04.2 LTS
SE +/- 0.33, N = 3
-fopenmp -O2 -ljbig -lwebp -lwebpmux -ltiff -ljpeg -ISM -lICE -llzma -lgomp
223
FreeBSD 12.0
-O2 -ljbig -lwebp -lwebpmux -llcms2 -ltiff -lfreetype -ljpeg -lwmflite -lSM -lICE -llzma -lxml2
48
FreeBSD 12.0 - GCC 8.3
-fopenmp -O2 -ljbig -lwebp -lwebpmux -llcms2 -ltiff -lfreetype -ljpeg -lwmflite -lSM -lICE -llzma -lxml2 -lgomp
171
60
120
180
240
300
1. (CC) gcc options: -pthread -lXext -lX11 -lbz2 -lz -lm -lpthread

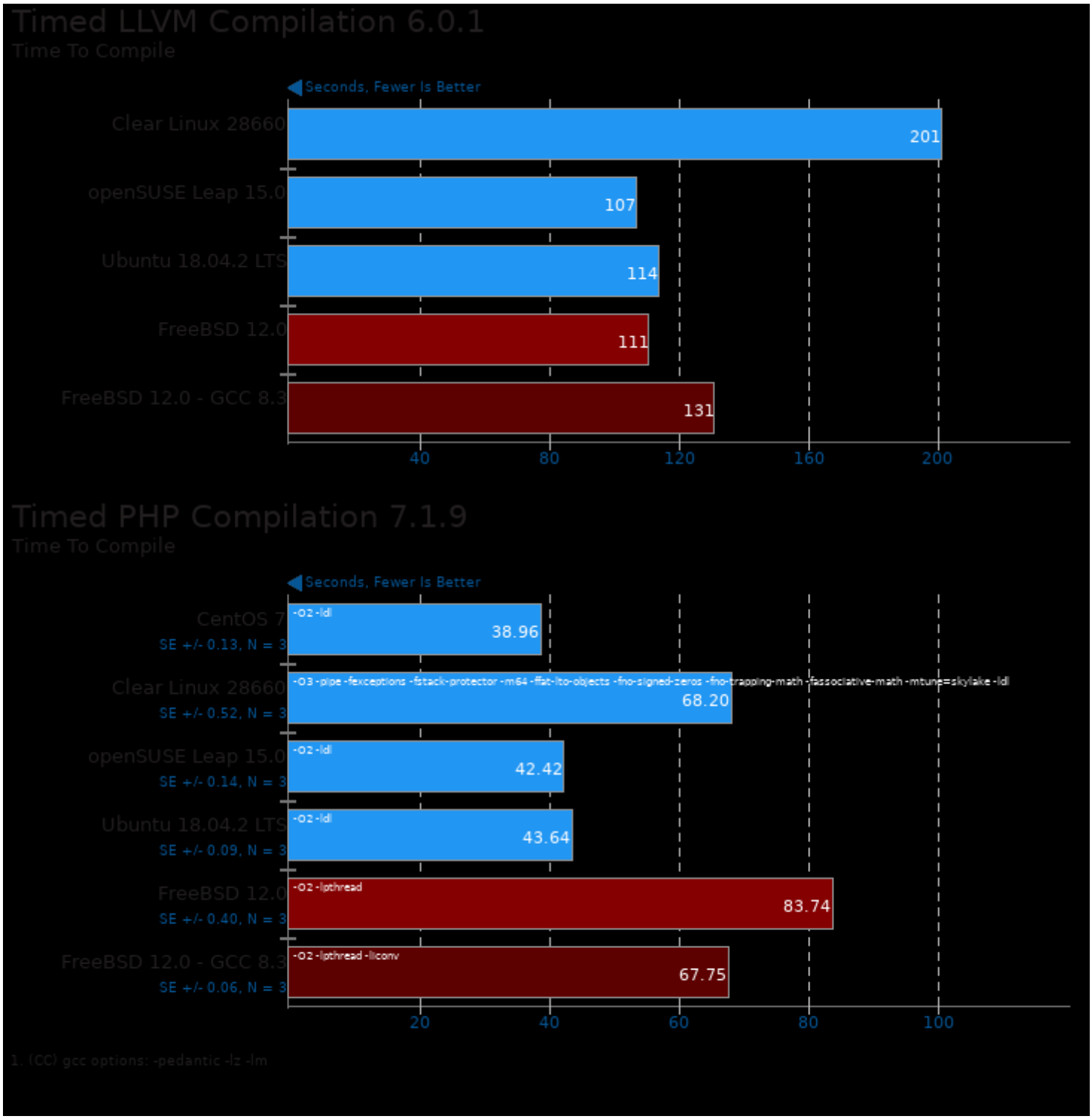

GraphicsMagick 1.3.30
Operation: Rotate
Iterations Per Minute, More Is Better
CentOS 7
-std=gnu99 -fopenmp -O2 -lgomp
237
Clear Linux 28660
SE +/- 0.33, N = 3
-fopenmp -O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -ltiff -lfre
255
Ubuntu 18.04.2 LTS
SE +/- 0.58, N = 3
-fopenmp -O2 -ljbig -lwebp -lwebpmux -ltiff -ljpeg -ISM -lICE -llzma -lgomp
223
FreeBSD 12.0
-O2 -ljbig -lwebp -lwebpmux -llcms2 -ltiff -lfreetype -ljpeg -lwmflite -lSM -lICE -llzma -lxml2
192
FreeBSD 12.0 - GCC 8.3
-fopenmp -O2 -ljbig -lwebp -lwebpmux -llcms2 -ltiff -lfreetype -ljpeg -lwmflite -lSM -lICE -llzma -lxml2 -lgomp
190
60
120
180
240
300
1. (CC) gcc options: -pthread -lXext -lX11 -lbz2 -lz -lm -lpthread
GraphicsMagick 1.3.30
Operation: Sharpen
Iterations Per Minute, More Is Better
CentOS 7
SE +/- 0.88, N = 3
-std=gnu99 -fopenmp -O2 -lgomp
177
Clear Linux 28660
SE +/- 0.33, N = 3
-fopenmp -O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -ltiff -lfre
233
Ubuntu 18.04.2 LTS
SE +/- 0.88, N = 3
-fopenmp -O2 -ljbig -lwebp -lwebpmux -ltiff -ljpeg -ISM -lICE -llzma -lgomp
207
FreeBSD 12.0
-O2 -ljbig -lwebp -lwebpmux -llcms2 -ltiff -lfreetype -ljpeg -lwmflite -lSM -lICE -llzma -lxml2
21
FreeBSD 12.0 - GCC 8.3
-fopenmp -O2 -ljbig -lwebp -lwebpmux -llcms2 -ltiff -lfreetype -ljpeg -lwmflite -lSM -lICE -llzma -lxml2 -lgomp
157
50
100
150
200
250
1. (CC) gcc options: -pthread -lXext -lX11 -lbz2 -lz -lm -lpthread

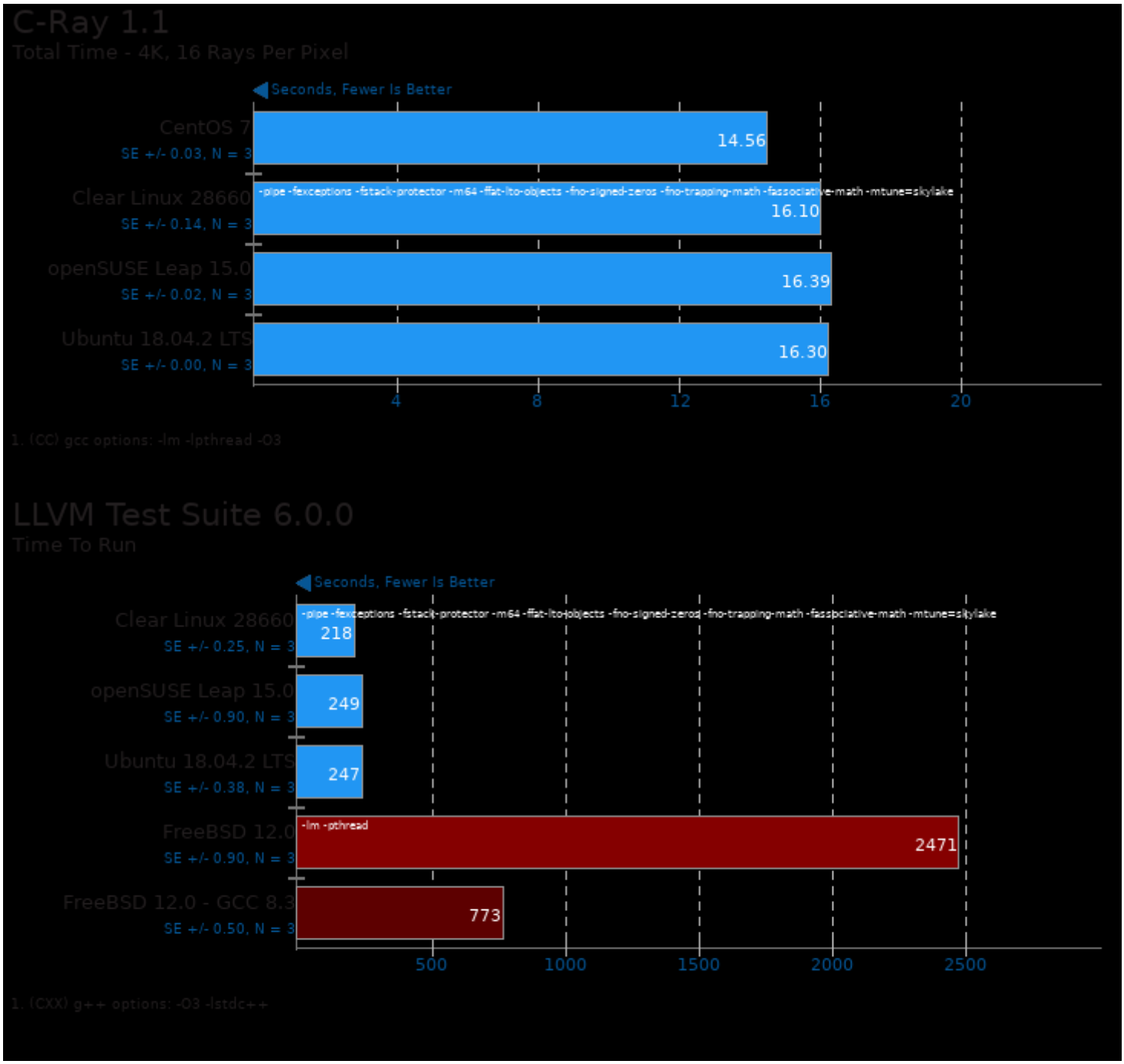

GraphicsMagick 1.3.30
Operation: Enhanced
Iterations Per Minute, More Is Better
CentOS 7
SE +/- 0.88, N = 3
-std=gnu99 -fopenmp -O2 -lgomp
223
Clear Linux 28660
-fopenmp -O3 -pipe -fexceptions -fstack-protector -m64 -flto=auto -ffat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -ltiff -lfre
249
Ubuntu 18.04.2 LTS
-fopenmp -O2 -ljbig -lwebp -lwebpmux -ltiff -ljpeg -ISM -lICE -llzma -lgomp
219
FreeBSD 12.0
-O2 -ljbig -lwebp -lwebpmux -llcms2 -ltiff -lfreetype -ljpeg -lwmflite -ISM -lICE -llzma -lxml2
30
FreeBSD 12.0 - GCC 8.3
-fopenmp -O2 -ljbig -lwebp -lwebpmux -llcms2 -ltiff -lfreetype -ljpeg -lwmflite -ISM -lICE -llzma -lxml2 -lgomp
165
50
100
150
200
250
1. (CC) gcc options: -pthread -lXext -lX11 -lbz2 -lz -lm -lpthread
GraphicsMagick 1.3.30
Operation: Resizing
Iterations Per Minute, More Is Better
CentOS 7
SE +/- 0.88, N = 3
-std=gnu99 -fopenmp -O2 -lgomp
230
Clear Linux 28660
-fopenmp -O3 -pipe -fexceptions -fstack-protector -m64 -flto=auto -ffat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -ltiff -lfre
246
Ubuntu 18.04.2 LTS
SE +/- 1.15, N = 3
-fopenmp -O2 -ljbig -lwebp -lwebpmux -ltiff -ljpeg -ISM -lICE -llzma -lgomp
209
FreeBSD 12.0
-O2 -ljbig -lwebp -lwebpmux -llcms2 -ltiff -lfreetype -ljpeg -lwmflite -ISM -lICE -llzma -lxml2
98
FreeBSD 12.0 - GCC 8.3
-fopenmp -O2 -ljbig -lwebp -lwebpmux -llcms2 -ltiff -lfreetype -ljpeg -lwmflite -ISM -lICE -llzma -lxml2 -lgomp
170
50
100
150
200
250
1. (CC) gcc options: -pthread -lXext -lX11 -lbz2 -lz -lm -lpthread

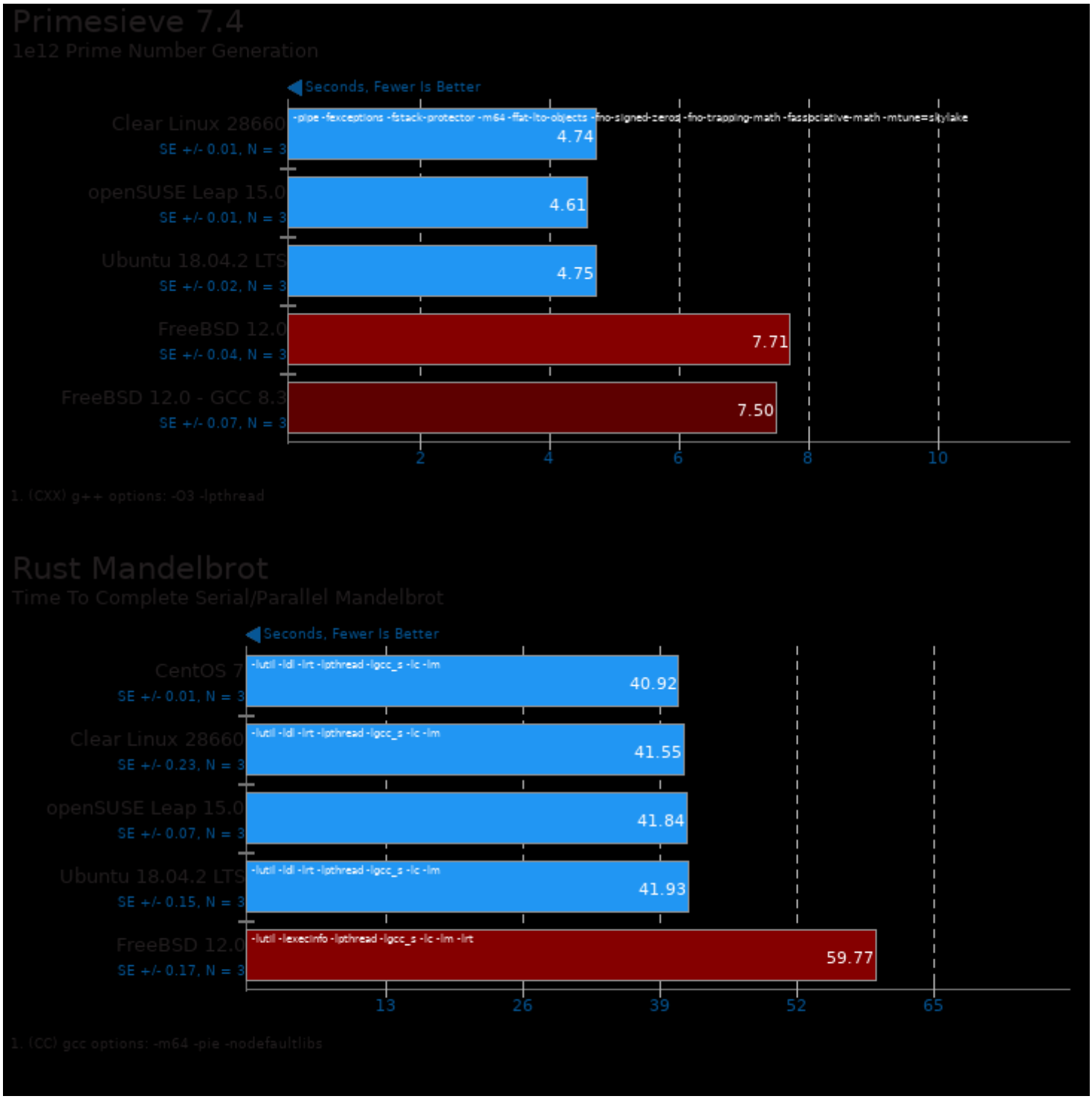

GraphicsMagick 1.3.30
Operation: Noise-Gaussian
Iterations Per Minute, More Is Better
CentOS 7
-std=gnu99 -fopenmp -O2 -lgomp
191
Clear Linux 28660
-fopenmp -O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -ltiff -lfre
241
SE +/- 0.33, N = 3
Ubuntu 18.04.2 LTS
-fopenmp -O2 -ljbig -lwebp -lwebpmux -ltiff -ljpeg -ISM -lICE -llzma -lgomp
201
SE +/- 0.33, N = 3
FreeBSD 12.0
-O2 -ljbig -lwebp -lwebpmux -llcms2 -ltiff -lfreetype -ljpeg -lwmflite -ISM -lICE -llzma -lxml2
28
FreeBSD 12.0 - GCC 8.3
-fopenmp -O2 -ljbig -lwebp -lwebpmux -llcms2 -ltiff -lfreetype -ljpeg -lwmflite -ISM -lICE -llzma -lxml2 -lgomp
164
50
100
150
200
250
1. (CC) gcc options: -pthread -lXext -lX11 -lbz2 -lz -lm -lpthread
GraphicsMagick 1.3.30
Operation: HWB Color Space
Iterations Per Minute, More Is Better
CentOS 7
-std=gnu99 -fopenmp -O2 -lgomp
249
SE +/- 0.88, N = 3
Clear Linux 28660
-fopenmp -O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -ltiff -lfre
269
Ubuntu 18.04.2 LTS
-fopenmp -O2 -ljbig -lwebp -lwebpmux -ltiff -ljpeg -ISM -lICE -llzma -lgomp
245
SE +/- 0.33, N = 3
FreeBSD 12.0
-O2 -ljbig -lwebp -lwebpmux -llcms2 -ltiff -lfreetype -ljpeg -lwmflite -ISM -lICE -llzma -lxml2
120
FreeBSD 12.0 - GCC 8.3
-fopenmp -O2 -ljbig -lwebp -lwebpmux -llcms2 -ltiff -lfreetype -ljpeg -lwmflite -ISM -lICE -llzma -lxml2 -lgomp
181
60
120
180
240
300
1. (CC) gcc options: -pthread -lXext -lX11 -lbz2 -lz -lm -lpthread

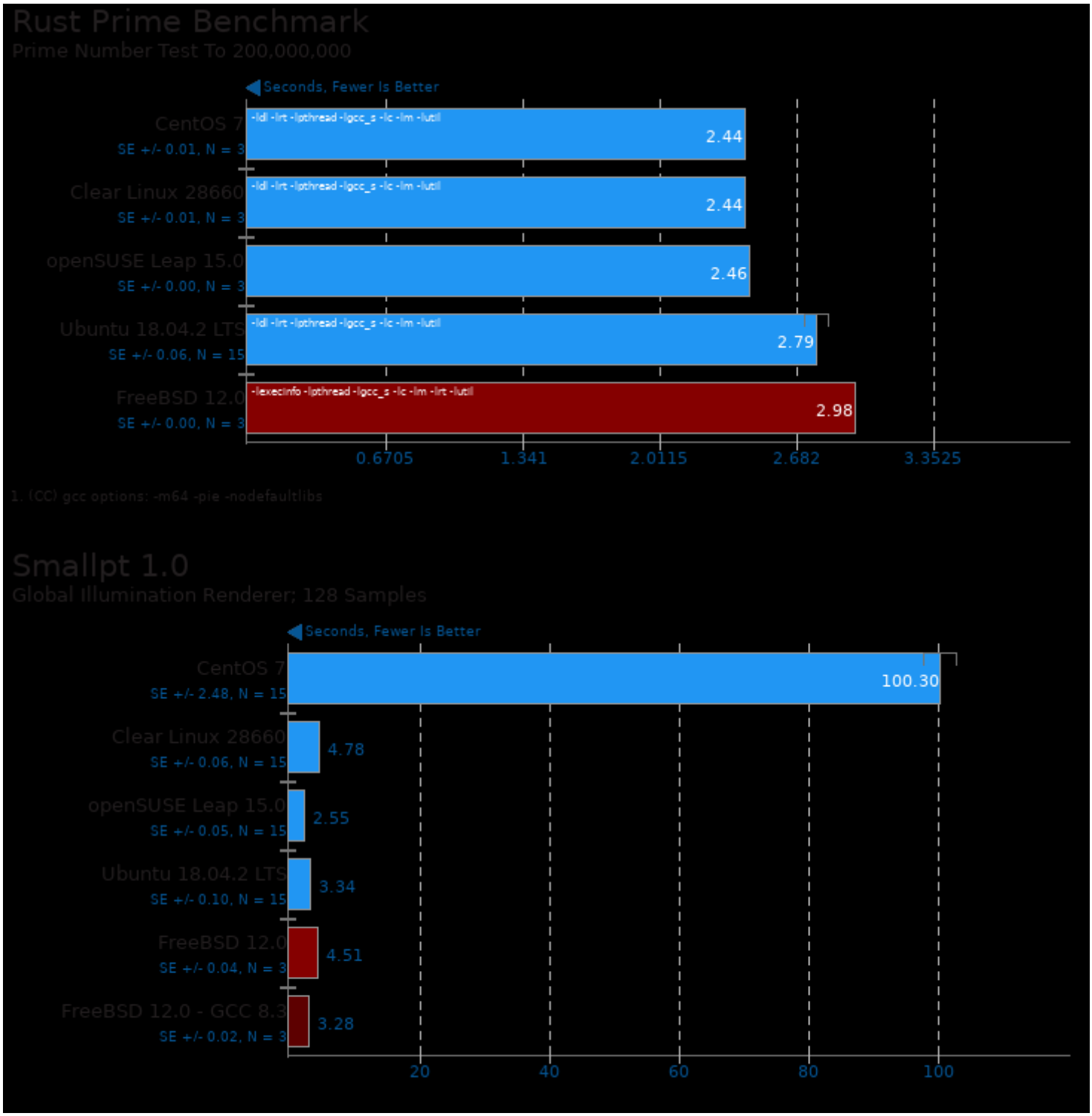

Himeno Benchmark 3.0
Poisson Pressure Solver
MFLOPS, More Is Better
CentOS 7
SE +/- 2.67, N = 3
-mavx2
2775
Clear Linux 28660
SE +/- 7.52, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -mavx2
2900
openSUSE Leap 15.0
SE +/- 4.77, N = 3
-mavx2
2845
Ubuntu 18.04.2 LTS
SE +/- 2.99, N = 3
-mavx2
2827
FreeBSD 12.0
SE +/- 1.61, N = 3
2081
FreeBSD 12.0 - GCC 8.3
SE +/- 4.11, N = 3
2474
600
1200
1800
2400
3000
1. (CC) gcc options: -O3
7-Zip Compression 16.02
Compress Speed Test
MIPS, More Is Better
CentOS 7
SE +/- 320.47, N = 3
262739
Clear Linux 28660
SE +/- 1694.59, N = 3
270092
openSUSE Leap 15.0
SE +/- 237.83, N = 3
268083
Ubuntu 18.04.2 LTS
SE +/- 598.93, N = 3
226939
FreeBSD 12.0 - GCC 8.3
SE +/- 2376.67, N = 3
189988
60K
120K
180K
240K
300K
1. (CXX) g++ options: -pipe -lpthread

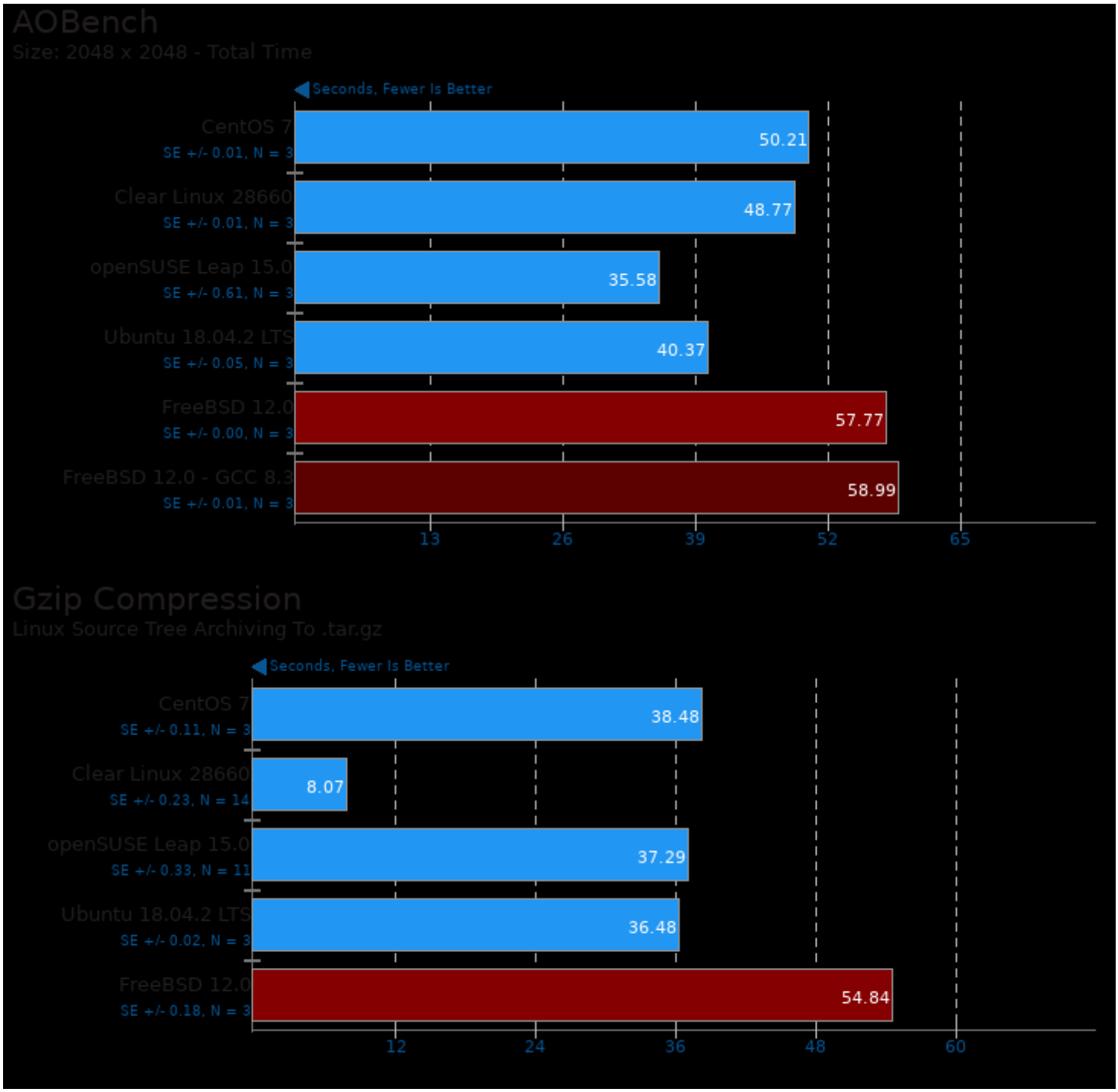

Stockfish 9
Total Time
Nodes Per Second, More Is Better
CentOS 7
SE +/- 910965.99, N = 3
130522916
Clear Linux 28660
SE +/- 742753.27, N = 3
131448084
openSUSE Leap 15.0
SE +/- 383158.47, N = 3
130180910
Ubuntu 18.04.2 LTS
SE +/- 378176.47, N = 3
123920849
FreeBSD 12.0
SE +/- 1646873.73, N = 3
114084018
FreeBSD 12.0 - GCC 8.3
SE +/- 1408275.13, N = 5
118289537
30M
60M
90M
120M
150M
asmFish 2018-07-23
1024 Hash Memory, 26 Depth
Nodes/second, More Is Better
CentOS 7
SE +/- 1313478.05, N = 3
135951371
Clear Linux 28660
SE +/- 1067947.88, N = 3
142351217
openSUSE Leap 15.0
SE +/- 1717435.24, N = 5
139270290
Ubuntu 18.04.2 LTS
SE +/- 1592638.93, N = 3
136704424
30M
60M
90M
120M
150M

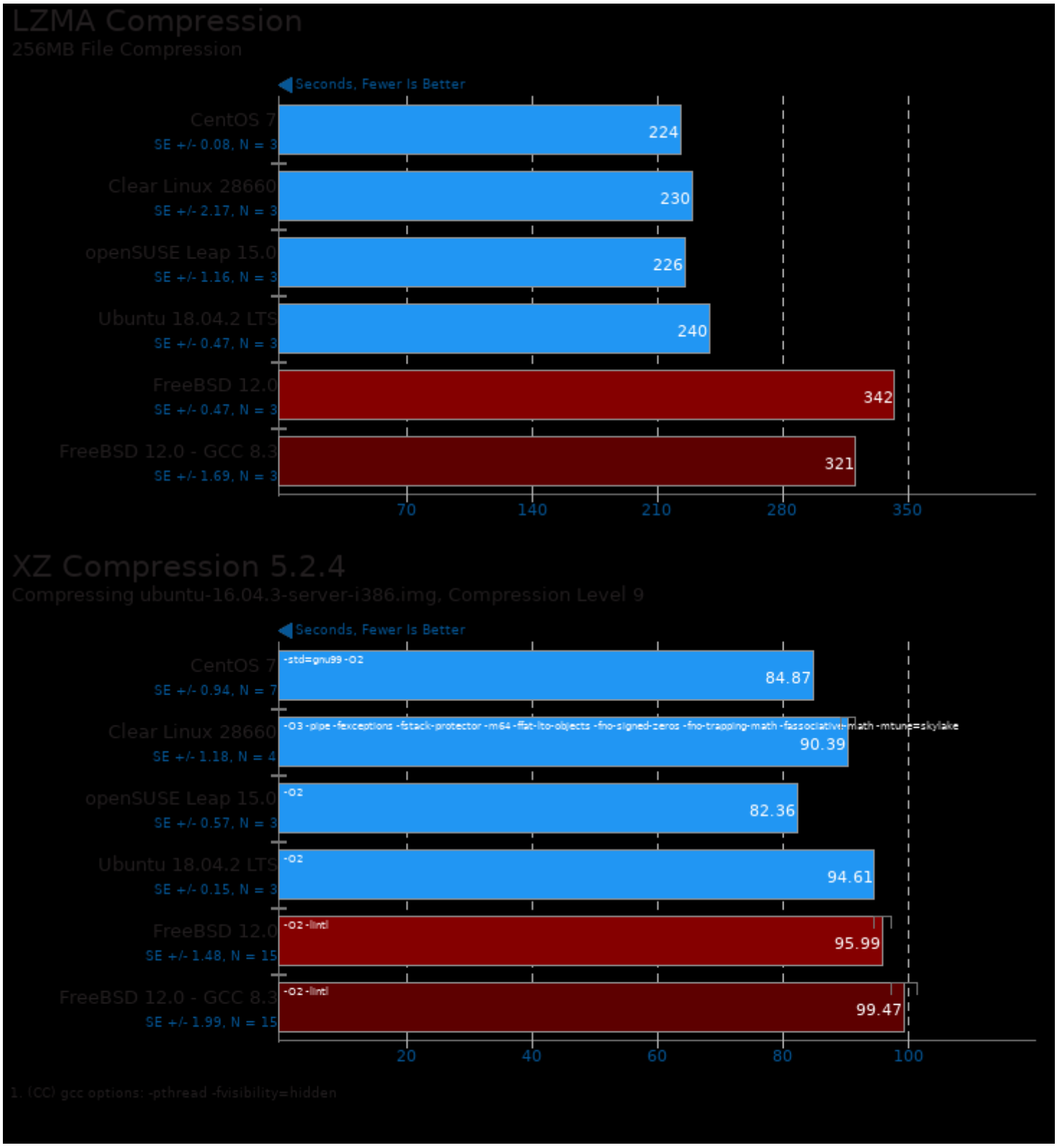

Timed LLVM Compilation 6.0.1
Time To Compile
Seconds, Fewer Is Better
Clear Linux 28660
201
openSUSE Leap 15.0
107
Ubuntu 18.04.2 LTS
114
FreeBSD 12.0
111
FreeBSD 12.0 - GCC 8.3
131
40
80
120
160
200
Timed PHP Compilation 7.1.9
Time To Compile
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.13, N = 3
-O2 -ldl
38.96
Clear Linux 28660
SE +/- 0.52, N = 3
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -ldl
68.20
openSUSE Leap 15.0
SE +/- 0.14, N = 3
-O2 -ldl
42.42
Ubuntu 18.04.2 LTS
SE +/- 0.09, N = 3
-O2 -ldl
43.64
FreeBSD 12.0
SE +/- 0.40, N = 3
-O2 -lpthread
83.74
FreeBSD 12.0 - GCC 8.3
SE +/- 0.06, N = 3
-O2 -lpthread -liconv
67.75
20
40
60
80
100
1. (CC) gcc options: -pedantic -lz -lm

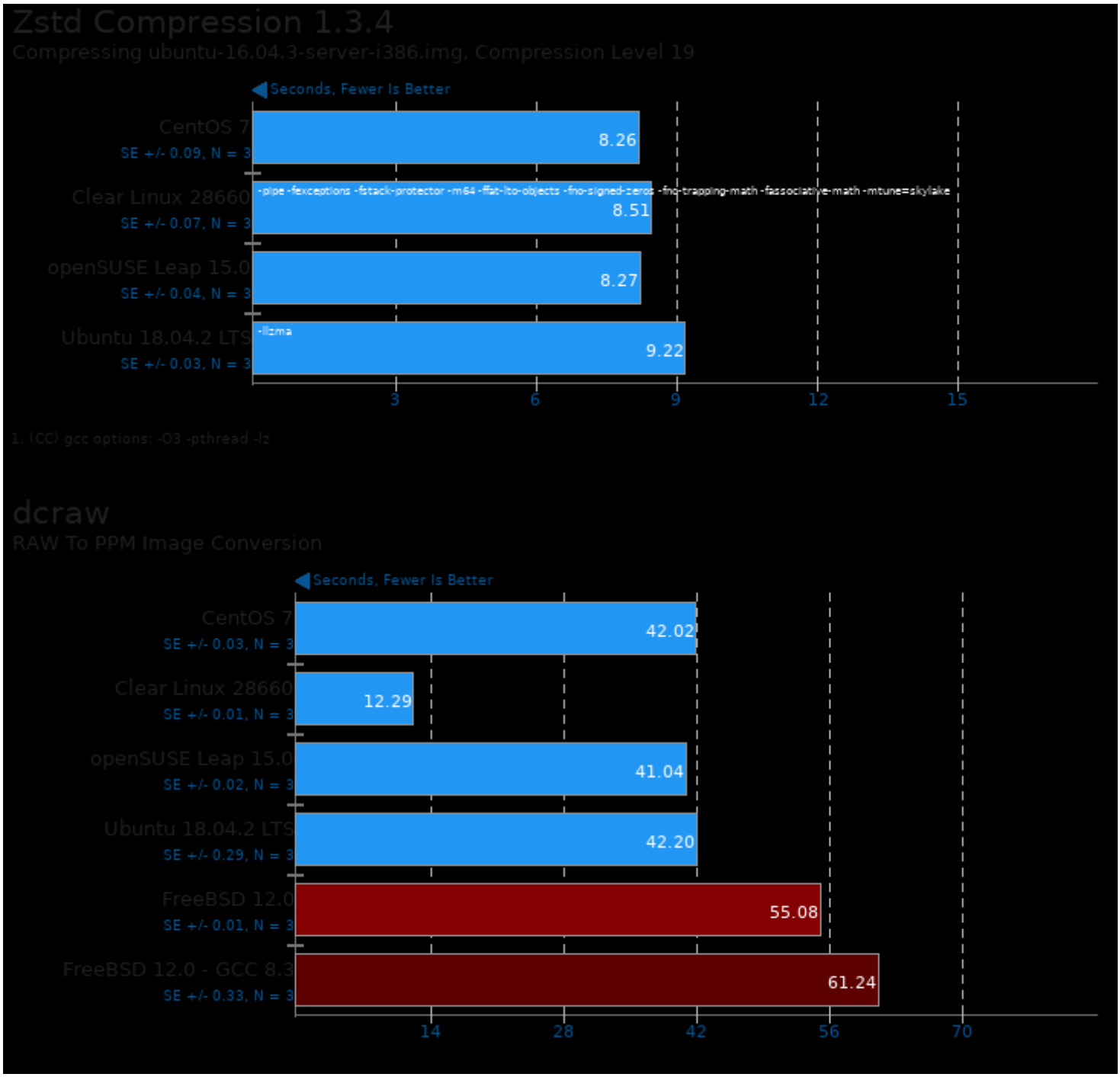

C-Ray 1.1
Total Time - 4K, 16 Rays Per Pixel
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.03, N = 3
14.56
Clear Linux 28660
SE +/- 0.14, N = 3
-pipe -fexceptions -fstack-protector -m64 -flto=jobserver -flto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
16.10
openSUSE Leap 15.0
SE +/- 0.02, N = 3
16.39
Ubuntu 18.04.2 LTS
SE +/- 0.00, N = 3
16.30
4
8
12
16
20
1. (CC) gcc options: -lm -lpthread -O3
LLVM Test Suite 6.0.0
Time To Run
Seconds, Fewer Is Better
Clear Linux 28660
SE +/- 0.25, N = 3
-pipe -fexceptions -fstack-protector -m64 -flto=jobserver -flto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
218
openSUSE Leap 15.0
SE +/- 0.90, N = 3
249
Ubuntu 18.04.2 LTS
SE +/- 0.38, N = 3
247
FreeBSD 12.0
SE +/- 0.90, N = 3
-lm -pthread
2471
FreeBSD 12.0 - GCC 8.3
SE +/- 0.50, N = 3
773
500
1000
1500
2000
2500
1. (CXX) g++ options: -O3 -lstdc++

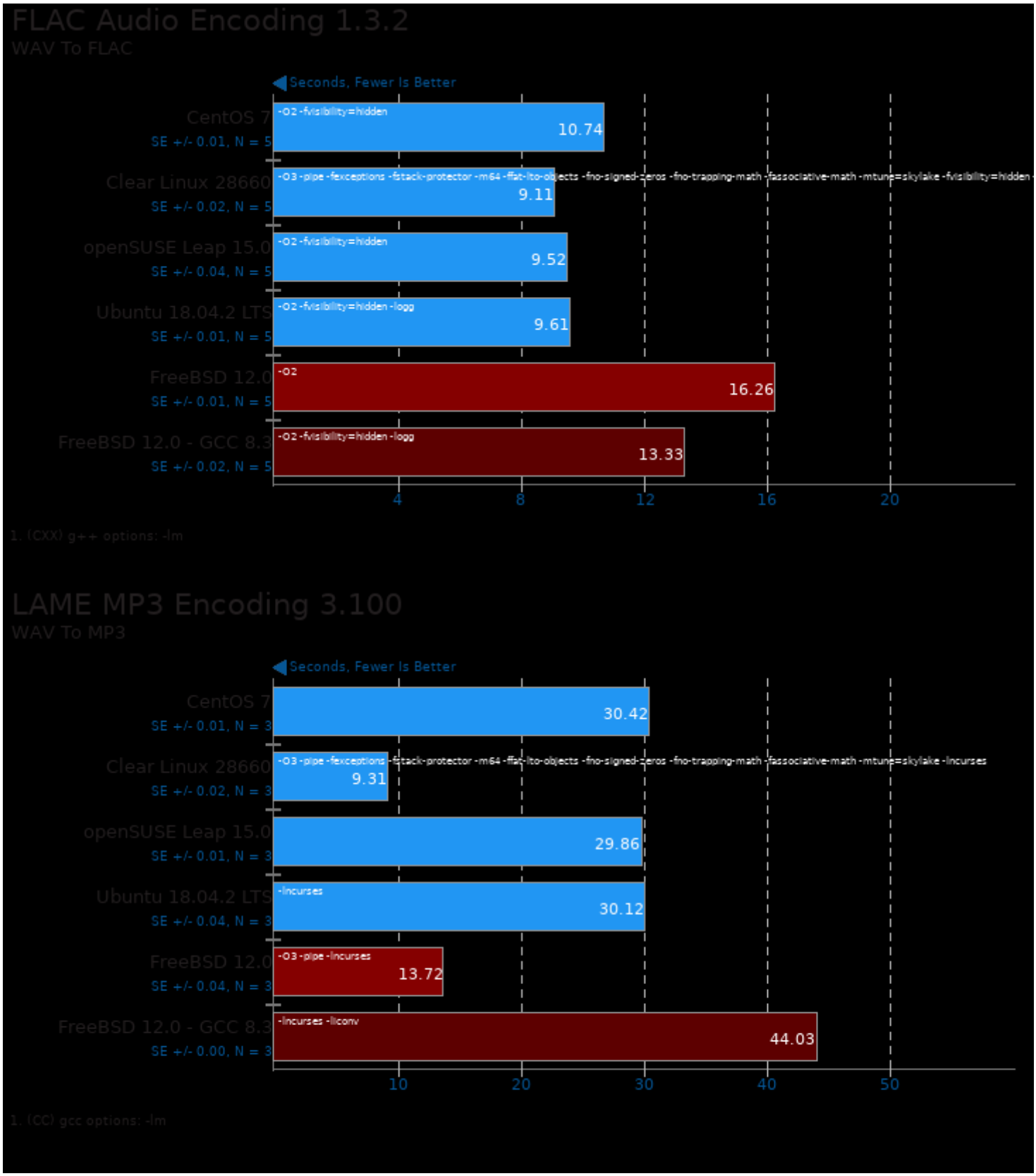

Primesieve 7.4
1e12 Prime Number Generation
Seconds, Fewer Is Better
-pipe -fexceptions -fstack-protector -m64 -flto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
Clear Linux 28660
SE +/- 0.01, N = 3
4.74
openSUSE Leap 15.0
SE +/- 0.01, N = 3
4.61
Ubuntu 18.04.2 LTS
SE +/- 0.02, N = 3
4.75
FreeBSD 12.0
SE +/- 0.04, N = 3
7.71
FreeBSD 12.0 - GCC 8.3
SE +/- 0.07, N = 3
7.50
2
4
6
8
10
1. (CXX) g++ options: -O3 -lpthread
Rust Mandelbrot
Time To Complete Serial/Parallel Mandelbrot
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.01, N = 3
-lutil -ldl -lrt -lpthread -lgcc_s -lc -lm
40.92
Clear Linux 28660
SE +/- 0.23, N = 3
-lutil -ldl -lrt -lpthread -lgcc_s -lc -lm
41.55
openSUSE Leap 15.0
SE +/- 0.07, N = 3
41.84
Ubuntu 18.04.2 LTS
SE +/- 0.15, N = 3
-lutil -ldl -lrt -lpthread -lgcc_s -lc -lm
41.93
FreeBSD 12.0
SE +/- 0.17, N = 3
-lutil -lexecinfo -lpthread -lgcc_s -lc -lm -lrt
59.77
13
26
39
52
65
1. (CC) gcc options: -m64 -pie -nodefaultlibs

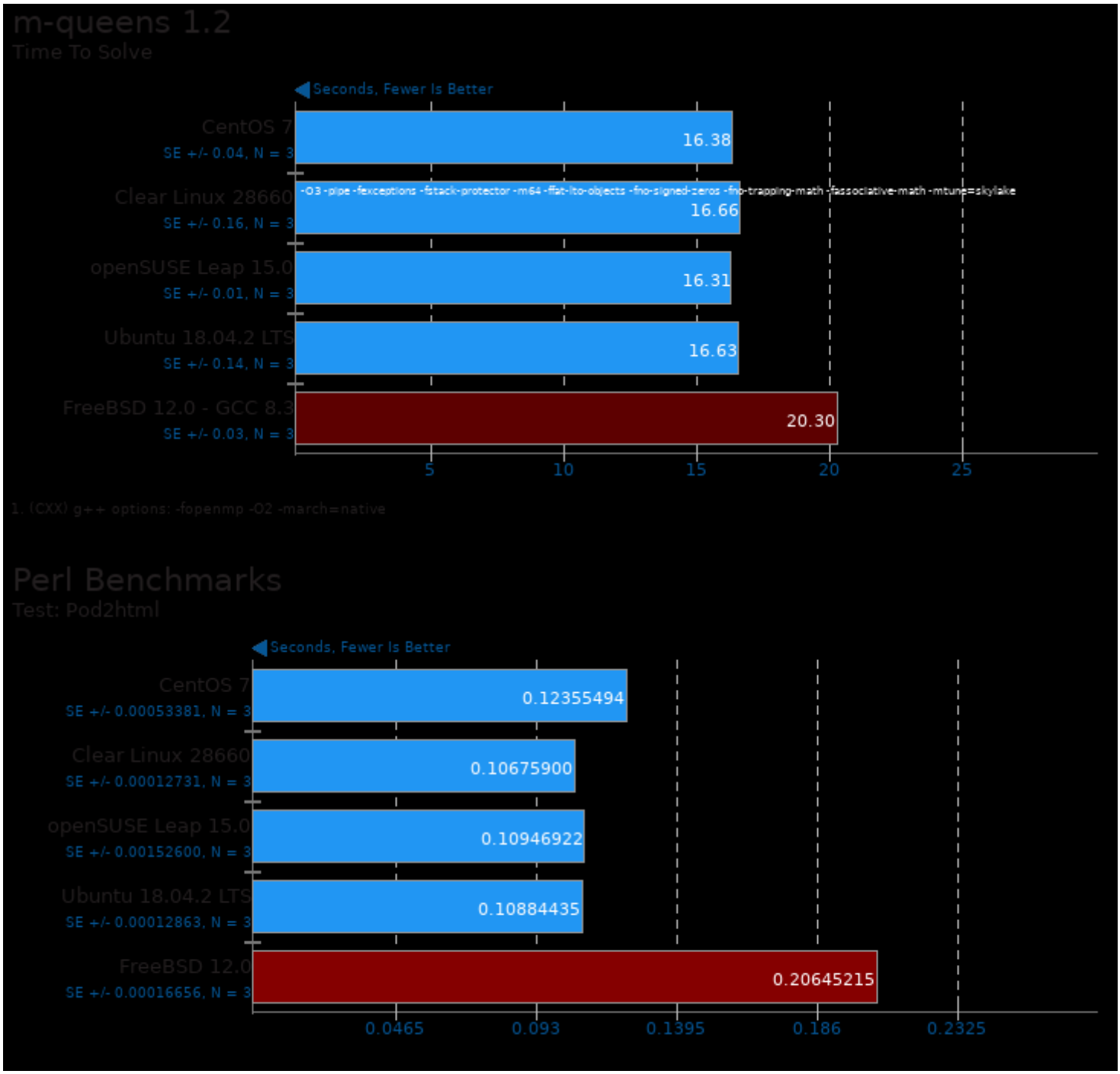

Rust Prime Benchmark
Prime Number Test To 200,000,000
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.01, N = 3
-ldl -lrt -lpthread -lgcc_s -lc -lm -lutil
2.44
Clear Linux 28660
SE +/- 0.01, N = 3
-ldl -lrt -lpthread -lgcc_s -lc -lm -lutil
2.44
openSUSE Leap 15.0
SE +/- 0.00, N = 3
2.46
Ubuntu 18.04.2 LTS
SE +/- 0.06, N = 15
-ldl -lrt -lpthread -lgcc_s -lc -lm -lutil
2.79
FreeBSD 12.0
SE +/- 0.00, N = 3
-lexecinfo -lpthread -lgcc_s -lc -lm -lrt -lutil
2.98
0.6705
1.341
2.0115
2.682
3.3525
1. (CC) gcc options: -m64 -pie -nodefaultlibs
Smallpt 1.0
Global Illumination Renderer; 128 Samples
Seconds, Fewer Is Better
CentOS 7
SE +/- 2.48, N = 15
100.30
Clear Linux 28660
SE +/- 0.06, N = 15
4.78
openSUSE Leap 15.0
SE +/- 0.05, N = 15
2.55
Ubuntu 18.04.2 LTS
SE +/- 0.10, N = 15
3.34
FreeBSD 12.0
SE +/- 0.04, N = 3
4.51
FreeBSD 12.0 - GCC 8.3
SE +/- 0.02, N = 3
3.28
20
40
60
80
100

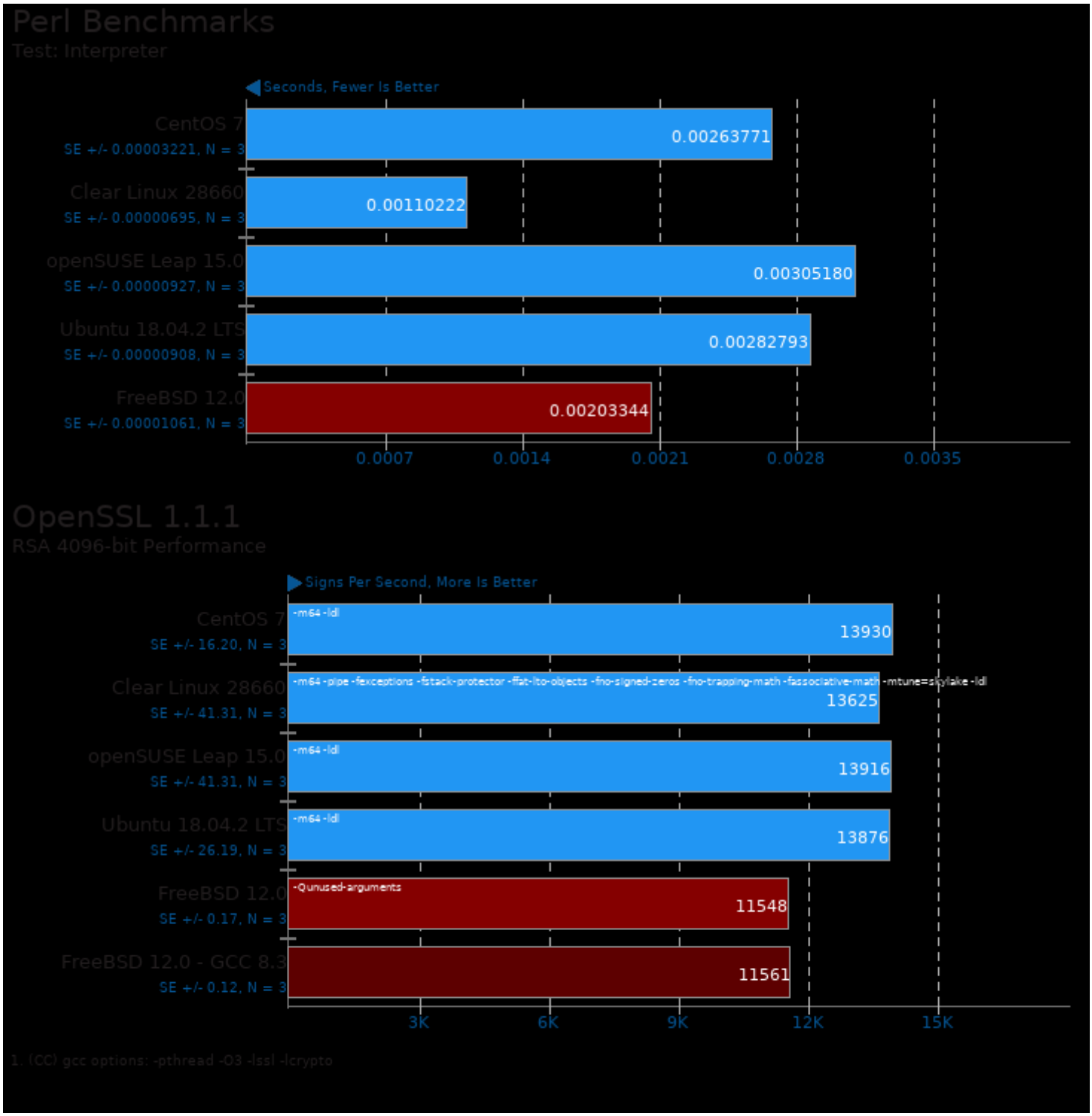

AOBench
Size: 2048 x 2048 - Total Time
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.01, N = 3
50.21
Clear Linux 28660
SE +/- 0.01, N = 3
48.77
openSUSE Leap 15.0
SE +/- 0.61, N = 3
35.58
Ubuntu 18.04.2 LTS
SE +/- 0.05, N = 3
40.37
FreeBSD 12.0
SE +/- 0.00, N = 3
57.77
FreeBSD 12.0 - GCC 8.3
SE +/- 0.01, N = 3
58.99
13
26
39
52
65
Gzip Compression
Linux Source Tree Archiving To .tar.gz
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.11, N = 3
38.48
Clear Linux 28660
SE +/- 0.23, N = 14
8.07
openSUSE Leap 15.0
SE +/- 0.33, N = 11
37.29
Ubuntu 18.04.2 LTS
SE +/- 0.02, N = 3
36.48
FreeBSD 12.0
SE +/- 0.18, N = 3
54.84
12
24
36
48
60

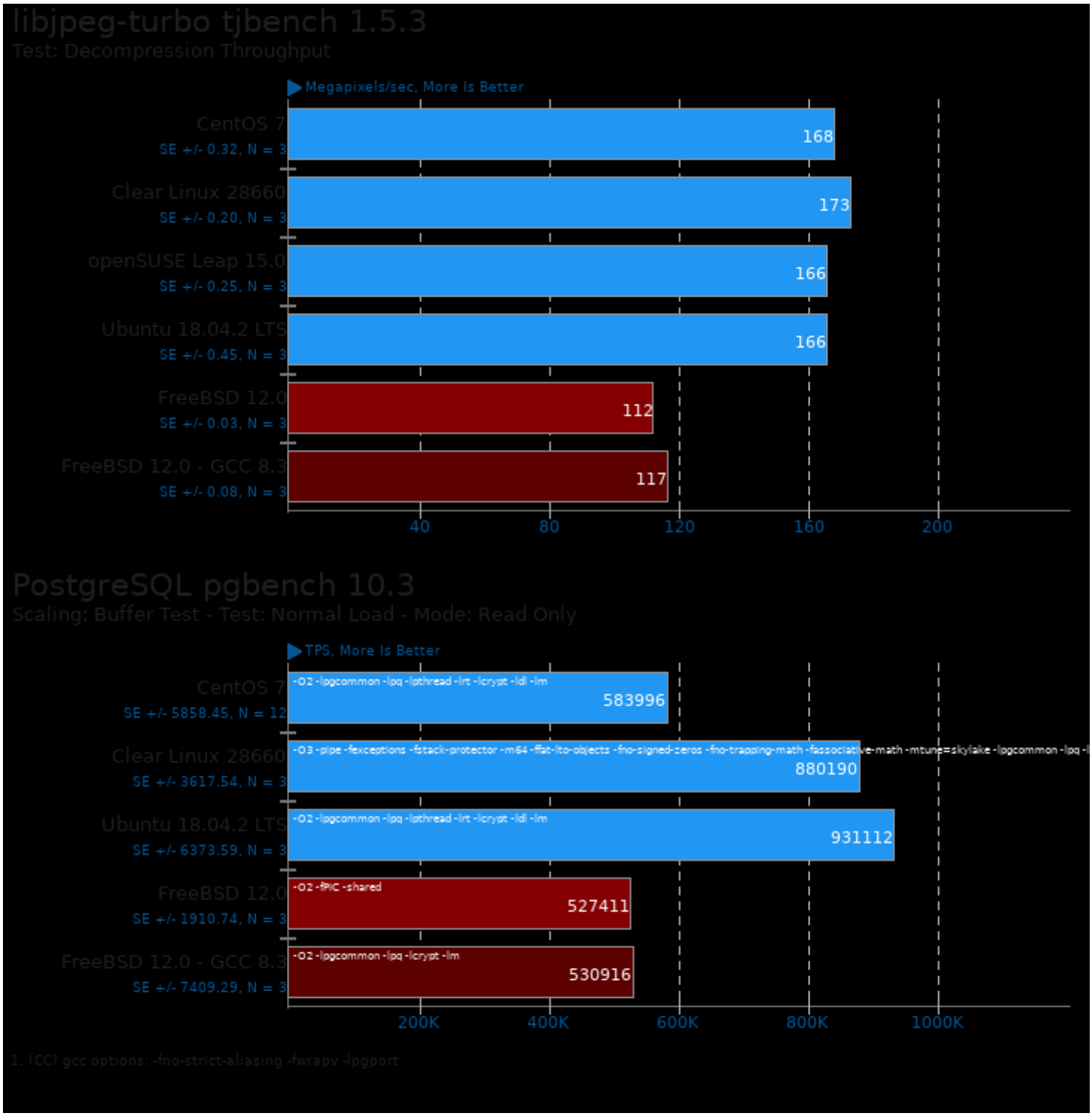

LZMA Compression
256MB File Compression
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.08, N = 3
224
Clear Linux 28660
SE +/- 2.17, N = 3
230
openSUSE Leap 15.0
SE +/- 1.16, N = 3
226
Ubuntu 18.04.2 LTS
SE +/- 0.47, N = 3
240
FreeBSD 12.0
SE +/- 0.47, N = 3
342
FreeBSD 12.0 - GCC 8.3
SE +/- 1.69, N = 3
321
70
140
210
280
350
XZ Compression 5.2.4
Compressing ubuntu-16.04.3-server-i386.img, Compression Level 9
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.94, N = 7
-std=gnu99 -O2
84.87
Clear Linux 28660
SE +/- 1.18, N = 4
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
90.39
openSUSE Leap 15.0
SE +/- 0.57, N = 3
-O2
82.36
Ubuntu 18.04.2 LTS
SE +/- 0.15, N = 3
-O2
94.61
FreeBSD 12.0
SE +/- 1.48, N = 15
-O2 -lintl
95.99
FreeBSD 12.0 - GCC 8.3
SE +/- 1.99, N = 15
-O2 -lintl
99.47
20
40
60
80
100
1. (CC) gcc options: -pthread -fvisibility=hidden

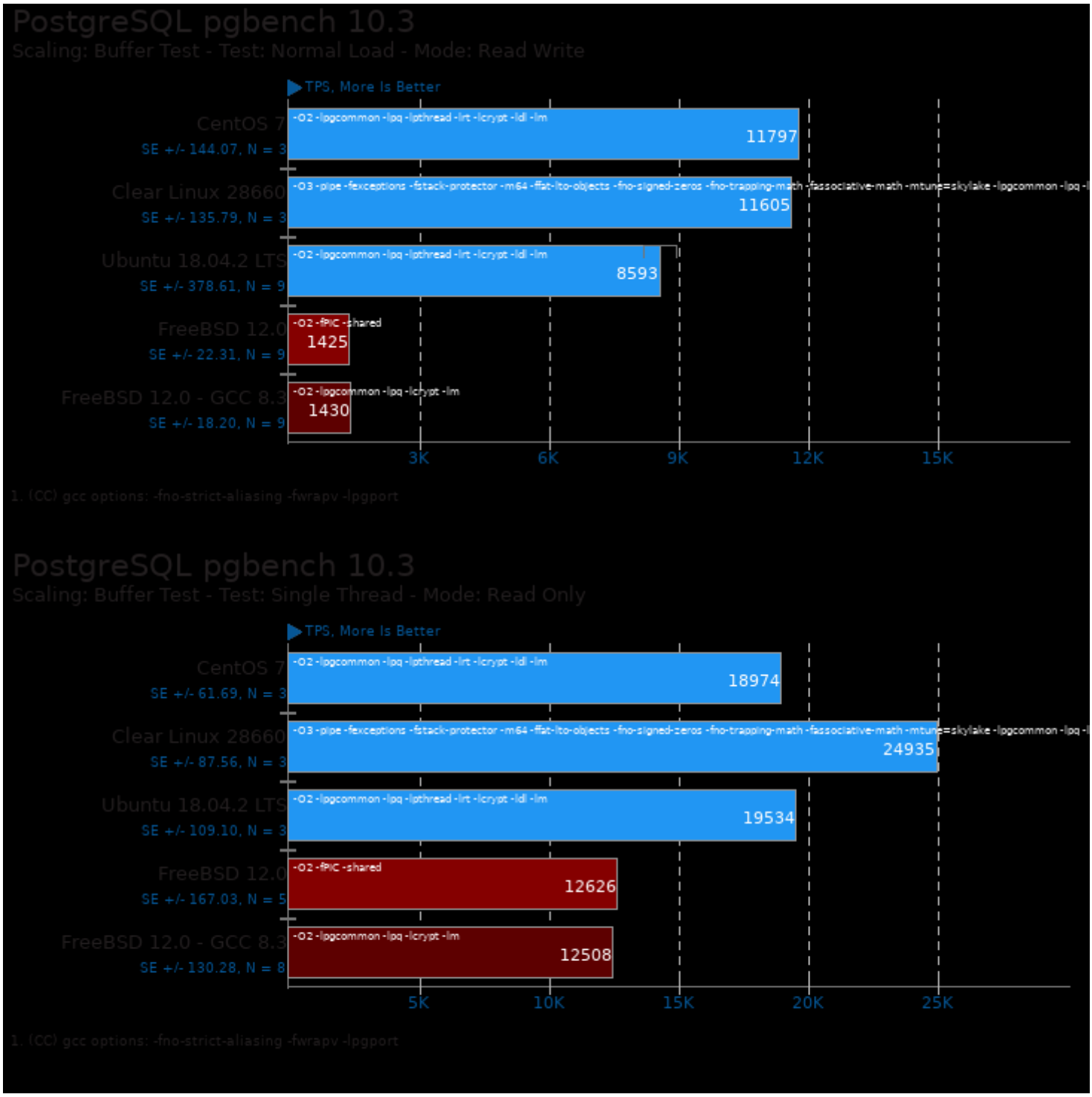

Zstd Compression 1.3.4
Compressing ubuntu-16.04.3-server-i386.img, Compression Level 19
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.09, N = 3
8.26
Clear Linux 28660
SE +/- 0.07, N = 3
-pipe -fexceptions -fstack-protector -m64 -flto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
8.51
openSUSE Leap 15.0
SE +/- 0.04, N = 3
8.27
Ubuntu 18.04.2 LTS
SE +/- 0.03, N = 3
-llzma
9.22
3
6
9
12
15
1. (CC) gcc options: -O3 -pthread -lz
dcraw
RAW To PPM Image Conversion
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.03, N = 3
42.02
Clear Linux 28660
SE +/- 0.01, N = 3
12.29
openSUSE Leap 15.0
SE +/- 0.02, N = 3
41.04
Ubuntu 18.04.2 LTS
SE +/- 0.29, N = 3
42.20
FreeBSD 12.0
SE +/- 0.01, N = 3
55.08
FreeBSD 12.0 - GCC 8.3
SE +/- 0.33, N = 3
61.24
14
28
42
56
70

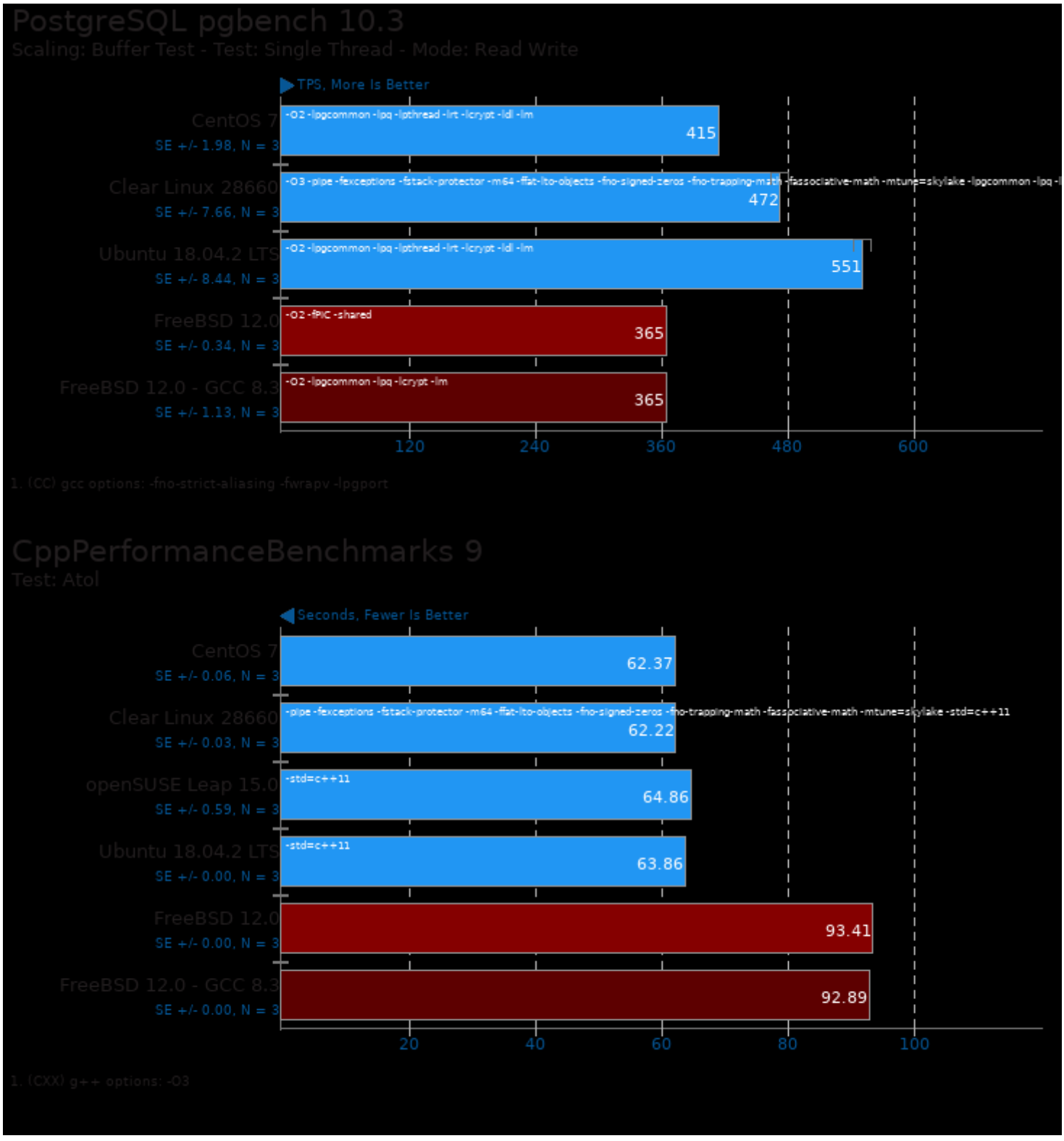

FLAC Audio Encoding 1.3.2
WAV To FLAC
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.01, N = 5
-O2 -fvisibility=hidden
10.74
Clear Linux 28660
SE +/- 0.02, N = 5
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -fvisibility=hidden
9.11
openSUSE Leap 15.0
SE +/- 0.04, N = 5
-O2 -fvisibility=hidden
9.52
Ubuntu 18.04.2 LTS
SE +/- 0.01, N = 5
-O2 -fvisibility=hidden -logg
9.61
FreeBSD 12.0
SE +/- 0.01, N = 5
-O2
16.26
FreeBSD 12.0 - GCC 8.3
SE +/- 0.02, N = 5
-O2 -fvisibility=hidden -logg
13.33
4
8
12
16
20
1. (CXX) g++ options: -lm
LAME MP3 Encoding 3.100
WAV To MP3
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.01, N = 3
30.42
Clear Linux 28660
SE +/- 0.02, N = 3
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -lncurses
9.31
openSUSE Leap 15.0
SE +/- 0.01, N = 3
29.86
Ubuntu 18.04.2 LTS
SE +/- 0.04, N = 3
-lncurses
30.12
FreeBSD 12.0
SE +/- 0.04, N = 3
-O3 -pipe -lncurses
13.72
FreeBSD 12.0 - GCC 8.3
SE +/- 0.00, N = 3
-lncurses -liconv
44.03
10
20
30
40
50
1. (CC) gcc options: -lm

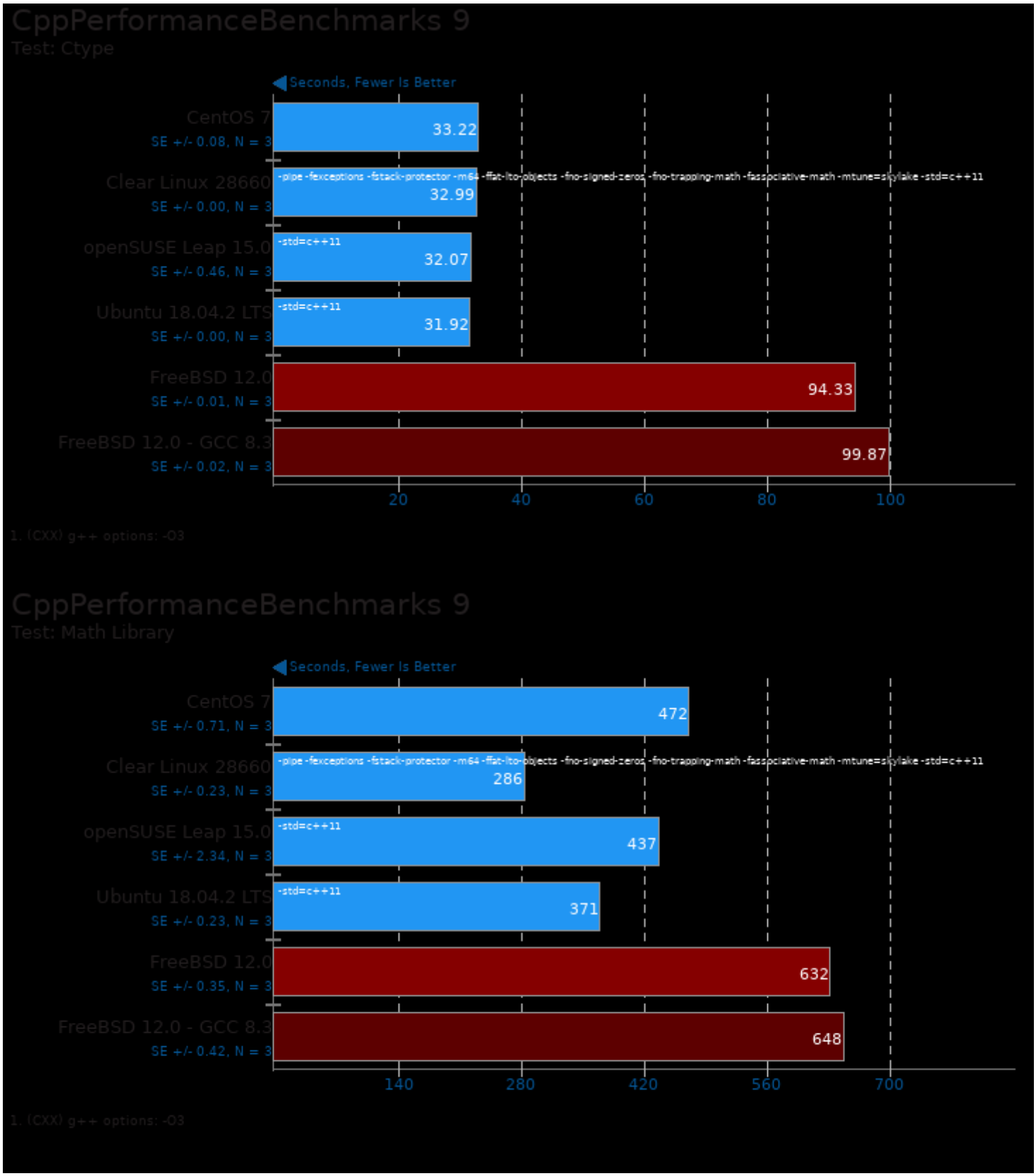

m-queens 1.2
Time To Solve
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.04, N = 3
16.38
Clear Linux 28660
SE +/- 0.16, N = 3
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
16.66
openSUSE Leap 15.0
SE +/- 0.01, N = 3
16.31
Ubuntu 18.04.2 LTS
SE +/- 0.14, N = 3
16.63
FreeBSD 12.0 - GCC 8.3
SE +/- 0.03, N = 3
20.30
5
10
15
20
25
1. (CXX) g++ options: -fopenmp -O2 -march=native
Perl Benchmarks
Test: Pod2html
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.00053381, N = 3
0.12355494
Clear Linux 28660
SE +/- 0.00012731, N = 3
0.10675900
openSUSE Leap 15.0
SE +/- 0.00152600, N = 3
0.10946922
Ubuntu 18.04.2 LTS
SE +/- 0.00012863, N = 3
0.10884435
FreeBSD 12.0
SE +/- 0.00016656, N = 3
0.20645215
0.0465
0.093
0.1395
0.186
0.2325

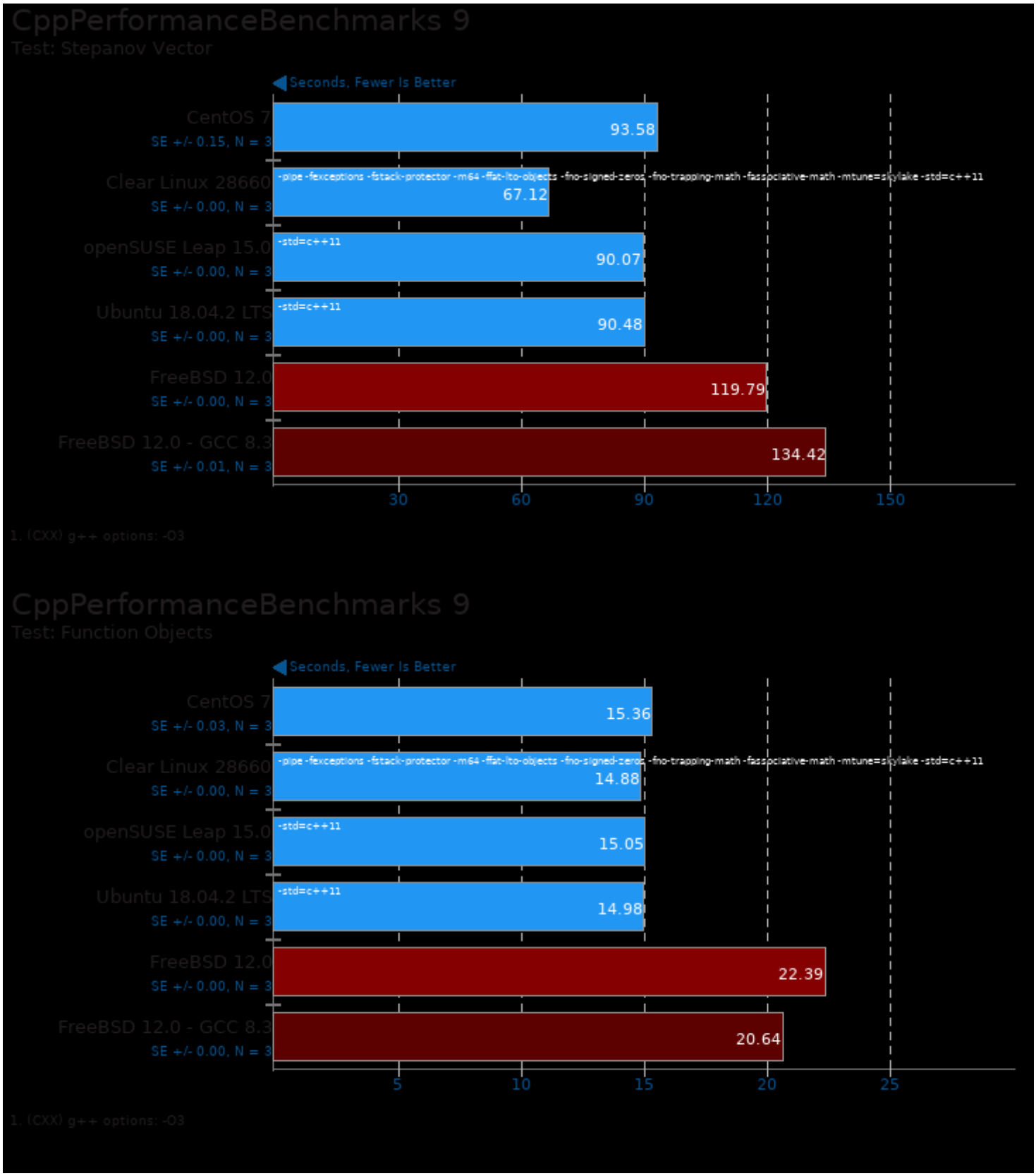

Perl Benchmarks
Test: Interpreter
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.00003221, N = 3
0.00263771
Clear Linux 28660
SE +/- 0.00000695, N = 3
0.00110222
openSUSE Leap 15.0
SE +/- 0.00000927, N = 3
0.00305180
Ubuntu 18.04.2 LTS
SE +/- 0.00000908, N = 3
0.00282793
FreeBSD 12.0
SE +/- 0.00001061, N = 3
0.00203344
0.0007
0.0014
0.0021
0.0028
0.0035
OpenSSL 1.1.1
RSA 4096-bit Performance
Signs Per Second, More Is Better
CentOS 7
SE +/- 16.20, N = 3
-m64 -ldl
13930
Clear Linux 28660
SE +/- 41.31, N = 3
-m64 -pipe -fexceptions -fstack-protector -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -ldl
13625
openSUSE Leap 15.0
SE +/- 41.31, N = 3
-m64 -ldl
13916
Ubuntu 18.04.2 LTS
SE +/- 26.19, N = 3
-m64 -ldl
13876
FreeBSD 12.0
SE +/- 0.17, N = 3
-Qunused-arguments
11548
FreeBSD 12.0 - GCC 8.3
SE +/- 0.12, N = 3
11561
3K
6K
9K
12K
15K
1. (CC) gcc options: -pthread -O3 -lssl -lcrypto

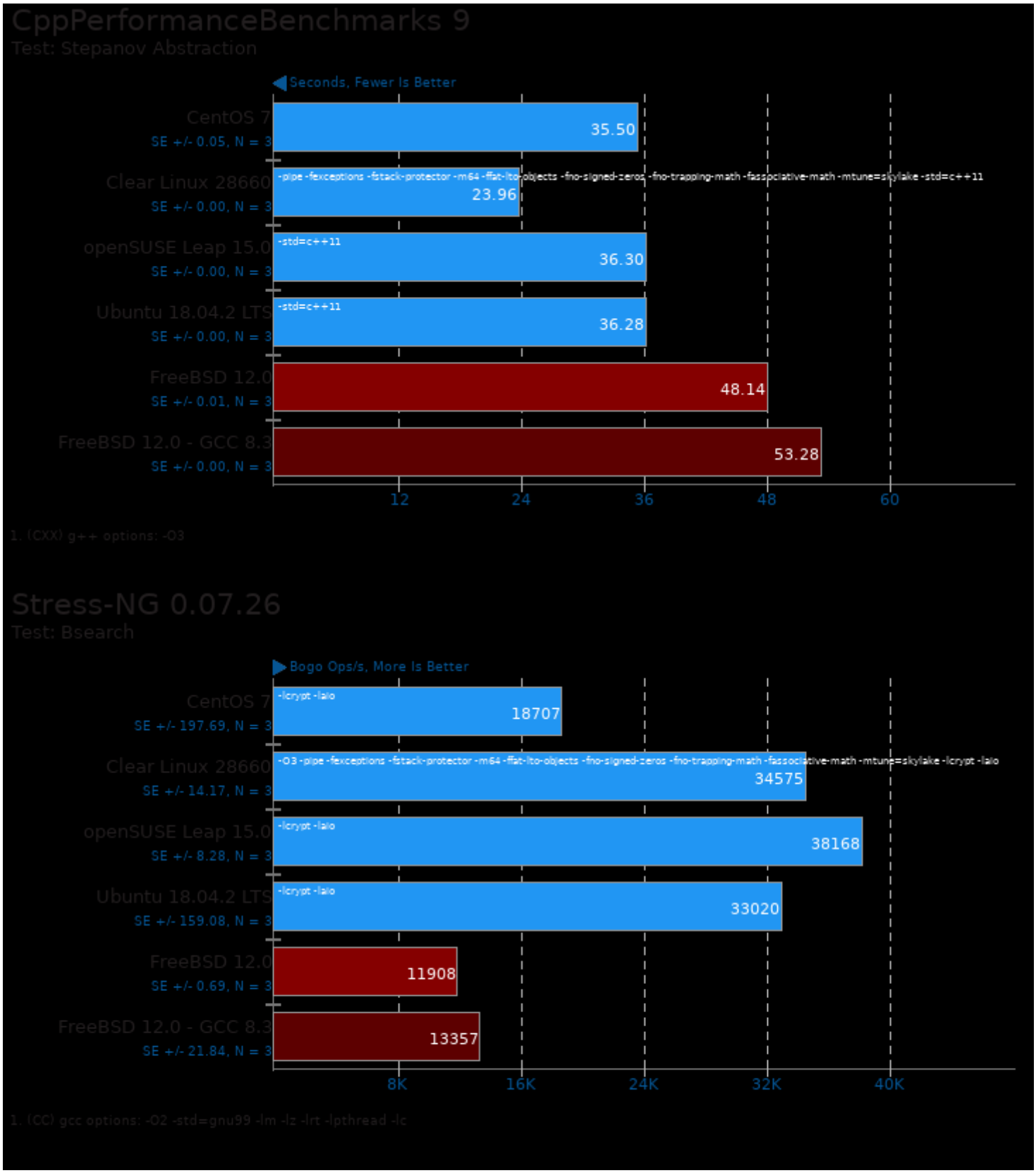

libjpeg-turbo tjbench 1.5.3
Test: Decompression Throughput
Megapixels/sec, More Is Better
CentOS 7
SE +/- 0.32, N = 3
168
Clear Linux 28660
SE +/- 0.20, N = 3
173
openSUSE Leap 15.0
SE +/- 0.25, N = 3
166
Ubuntu 18.04.2 LTS
SE +/- 0.45, N = 3
166
FreeBSD 12.0
SE +/- 0.03, N = 3
112
FreeBSD 12.0 - GCC 8.3
SE +/- 0.08, N = 3
117
40
80
120
160
200
PostgreSQL pgbench 10.3
Scaling: Buffer Test - Test: Normal Load - Mode: Read Only
TPS, More Is Better
CentOS 7
SE +/- 5858.45, N = 12
-O2 -lpgcommon -lpq -lpthread -lrt -lcrypt -ldl -lm
583996
Clear Linux 28660
SE +/- 3617.54, N = 3
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -lpgcommon -lpq
880190
Ubuntu 18.04.2 LTS
SE +/- 6373.59, N = 3
-O2 -lpgcommon -lpq -lpthread -lrt -lcrypt -ldl -lm
931112
FreeBSD 12.0
SE +/- 1910.74, N = 3
-O2 -fPIC -shared
527411
FreeBSD 12.0 - GCC 8.3
SE +/- 7409.29, N = 3
-O2 -lpgcommon -lpq -lcrypt -lm
530916
200K
400K
600K
800K
1000K
1. (CC) gcc options: -fno-strict-aliasing -fwrapv -lpgport

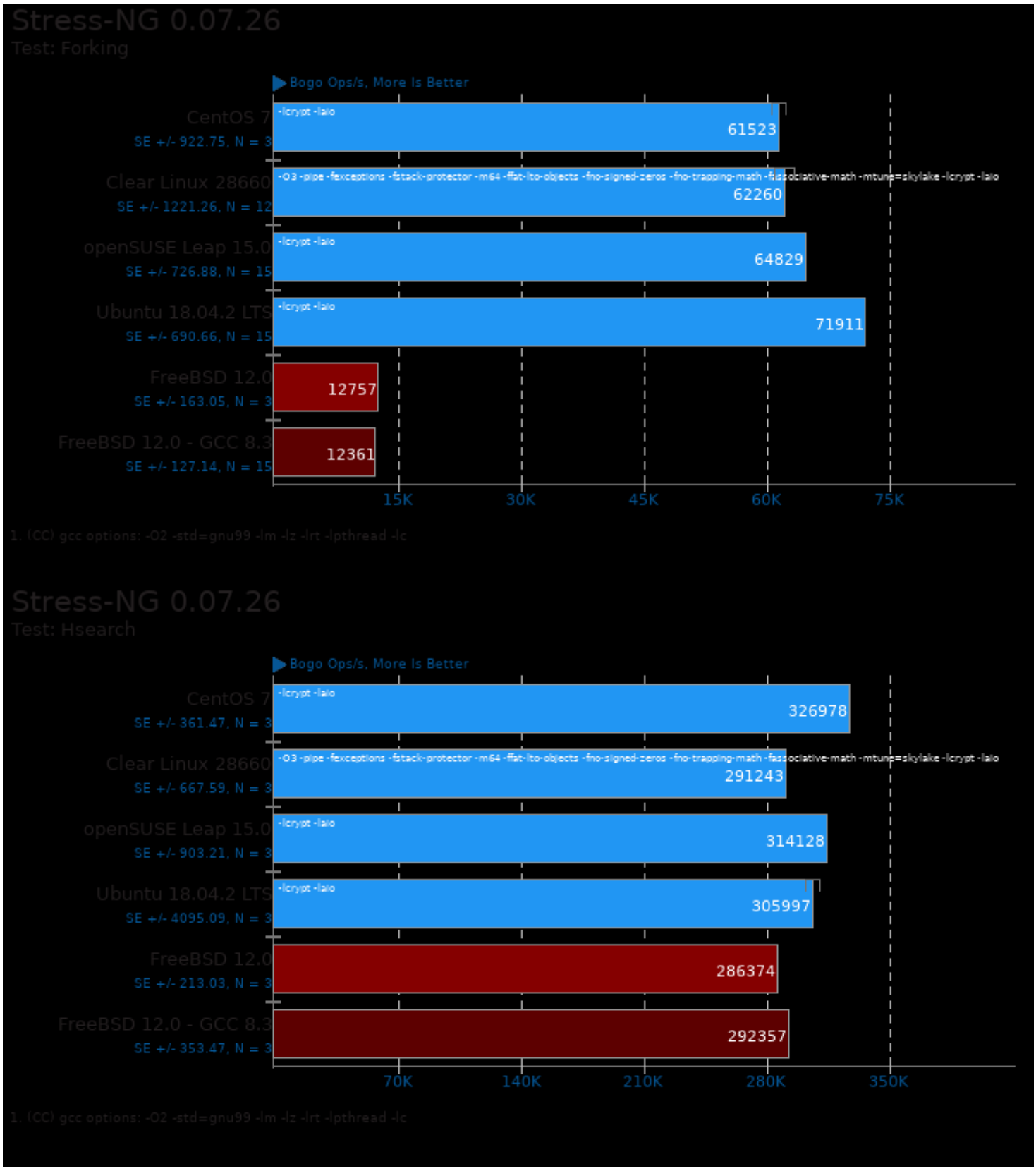

PostgreSQL pgbench 10.3
Scaling: Buffer Test - Test: Normal Load - Mode: Read Write
TPS, More Is Better
CentOS 7
SE +/- 144.07, N = 3
-O2 -lpgcommon -lpq -lpthread -lrt -lcrypt -ldl -lm
11797
Clear Linux 28660
SE +/- 135.79, N = 3
-O3 -pipe -fexceptions -fstack-protector -m64 -ffat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -lpgcommon -lpq
11605
Ubuntu 18.04.2 LTS
SE +/- 378.61, N = 9
-O2 -lpgcommon -lpq -lpthread -lrt -lcrypt -ldl -lm
8593
FreeBSD 12.0
SE +/- 22.31, N = 9
-O2 -fPIC -shared
1425
FreeBSD 12.0 - GCC 8.3
SE +/- 18.20, N = 9
-O2 -lpgcommon -lpq -lcrypt -lm
1430
3K
6K
9K
12K
15K
1. (CC) gcc options: -fno-strict-aliasing -fwrapv -lpgport
PostgreSQL pgbench 10.3
Scaling: Buffer Test - Test: Single Thread - Mode: Read Only
TPS, More Is Better
CentOS 7
SE +/- 61.69, N = 3
-O2 -lpgcommon -lpq -lpthread -lrt -lcrypt -ldl -lm
18974
Clear Linux 28660
SE +/- 87.56, N = 3
-O3 -pipe -fexceptions -fstack-protector -m64 -ffat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -lpgcommon -lpq
24935
Ubuntu 18.04.2 LTS
SE +/- 109.10, N = 3
-O2 -lpgcommon -lpq -lpthread -lrt -lcrypt -ldl -lm
19534
FreeBSD 12.0
SE +/- 167.03, N = 5
-O2 -fPIC -shared
12626
FreeBSD 12.0 - GCC 8.3
SE +/- 130.28, N = 8
-O2 -lpgcommon -lpq -lcrypt -lm
12508
5K
10K
15K
20K
25K
1. (CC) gcc options: -fno-strict-aliasing -fwrapv -lpgport

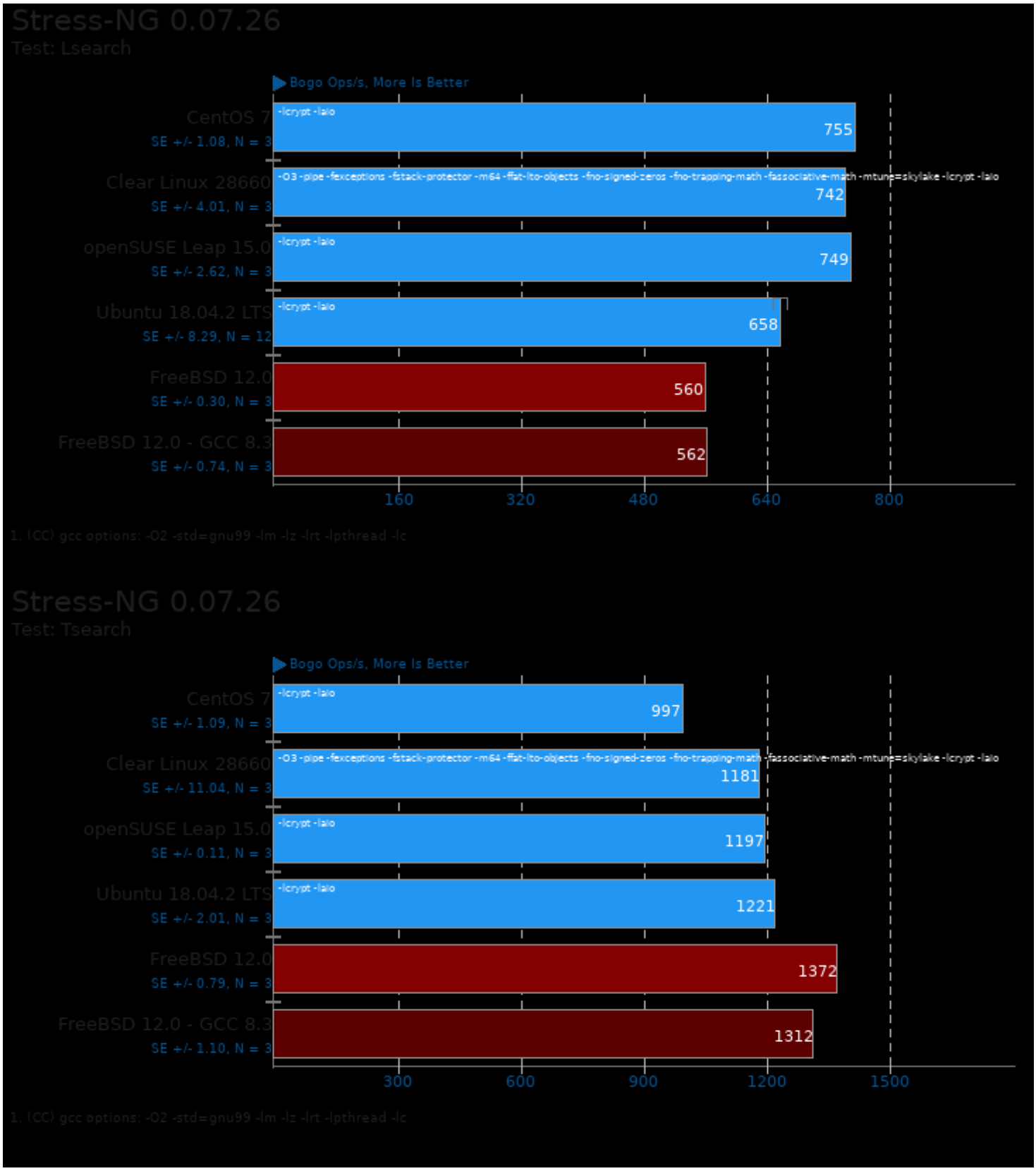

PostgreSQL pgbench 10.3
Scaling: Buffer Test - Test: Single Thread - Mode: Read Write
TPS, More Is Better
CentOS 7
SE +/- 1.98, N = 3
-O2 -lpgcommon -lpq -lpthread -lrt -lcrypt -ldl -lm
415
Clear Linux 28660
SE +/- 7.66, N = 3
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -lpgcommon -lpq
472
Ubuntu 18.04.2 LTS
SE +/- 8.44, N = 3
-O2 -lpgcommon -lpq -lpthread -lrt -lcrypt -ldl -lm
551
FreeBSD 12.0
SE +/- 0.34, N = 3
-O2 -fPIC -shared
365
FreeBSD 12.0 - GCC 8.3
SE +/- 1.13, N = 3
-O2 -lpgcommon -lpq -lcrypt -lm
365
120
240
360
480
600
1. (CC) gcc options: -fno-strict-aliasing -fwrapv -lpgport
CppPerformanceBenchmarks 9
Test: Atol
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.06, N = 3
62.37
Clear Linux 28660
SE +/- 0.03, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -std=c++11
62.22
openSUSE Leap 15.0
SE +/- 0.59, N = 3
-std=c++11
64.86
Ubuntu 18.04.2 LTS
SE +/- 0.00, N = 3
-std=c++11
63.86
FreeBSD 12.0
SE +/- 0.00, N = 3
93.41
FreeBSD 12.0 - GCC 8.3
SE +/- 0.00, N = 3
92.89
20
40
60
80
100
1. (CXX) g++ options: -O3

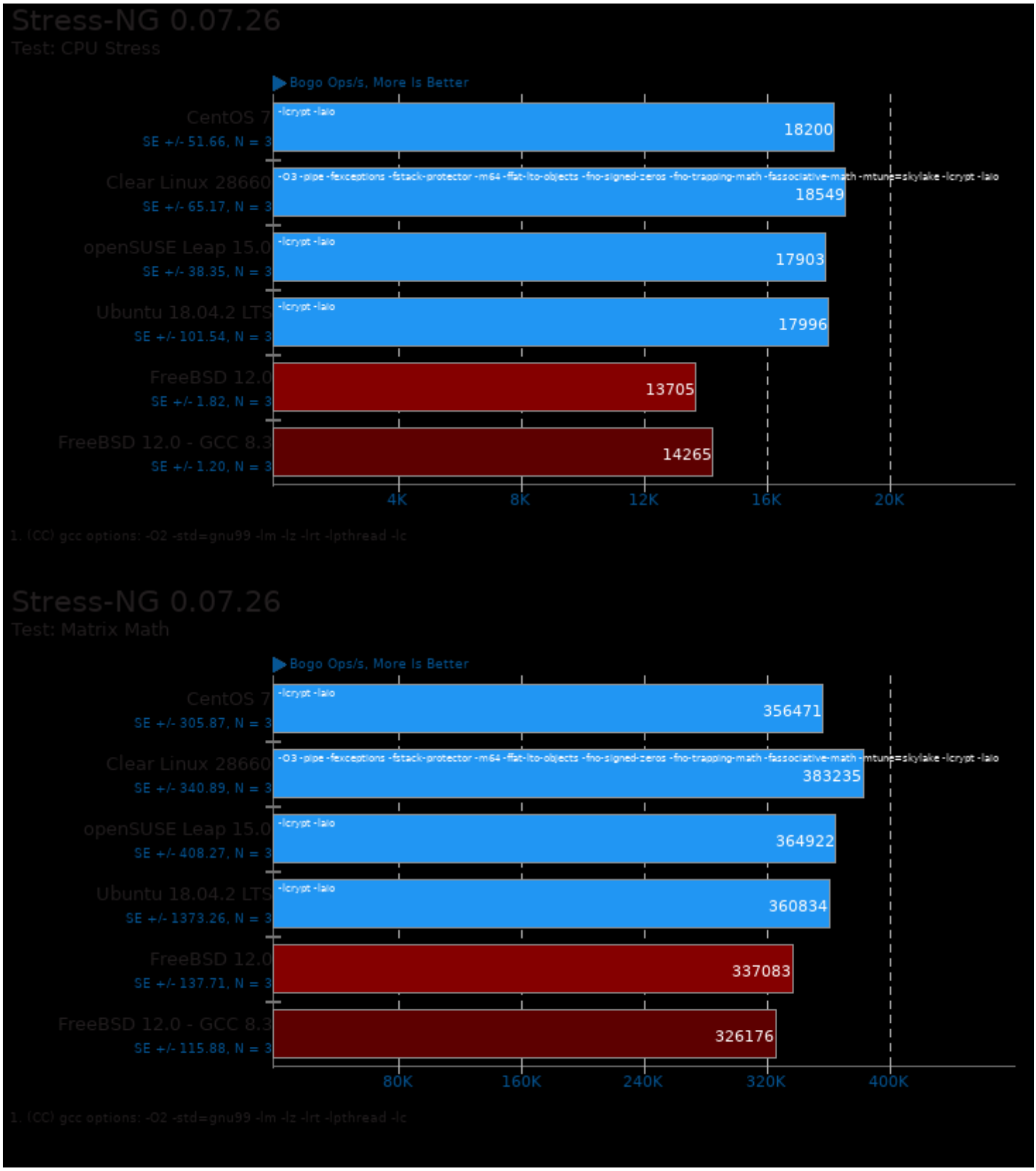

CppPerformanceBenchmarks 9
Test: Ctype
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.08, N = 3
33.22
Clear Linux 28660
SE +/- 0.00, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -std=c++11
32.99
openSUSE Leap 15.0
SE +/- 0.46, N = 3
-std=c++11
32.07
Ubuntu 18.04.2 LTS
SE +/- 0.00, N = 3
-std=c++11
31.92
FreeBSD 12.0
SE +/- 0.01, N = 3
94.33
FreeBSD 12.0 - GCC 8.3
SE +/- 0.02, N = 3
99.87
20
40
60
80
100
1. (CXX) g++ options: -O3
CppPerformanceBenchmarks 9
Test: Math Library
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.71, N = 3
472
Clear Linux 28660
SE +/- 0.23, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -std=c++11
286
openSUSE Leap 15.0
SE +/- 2.34, N = 3
-std=c++11
437
Ubuntu 18.04.2 LTS
SE +/- 0.23, N = 3
-std=c++11
371
FreeBSD 12.0
SE +/- 0.35, N = 3
632
FreeBSD 12.0 - GCC 8.3
SE +/- 0.42, N = 3
648
140
280
420
560
700
1. (CXX) g++ options: -O3

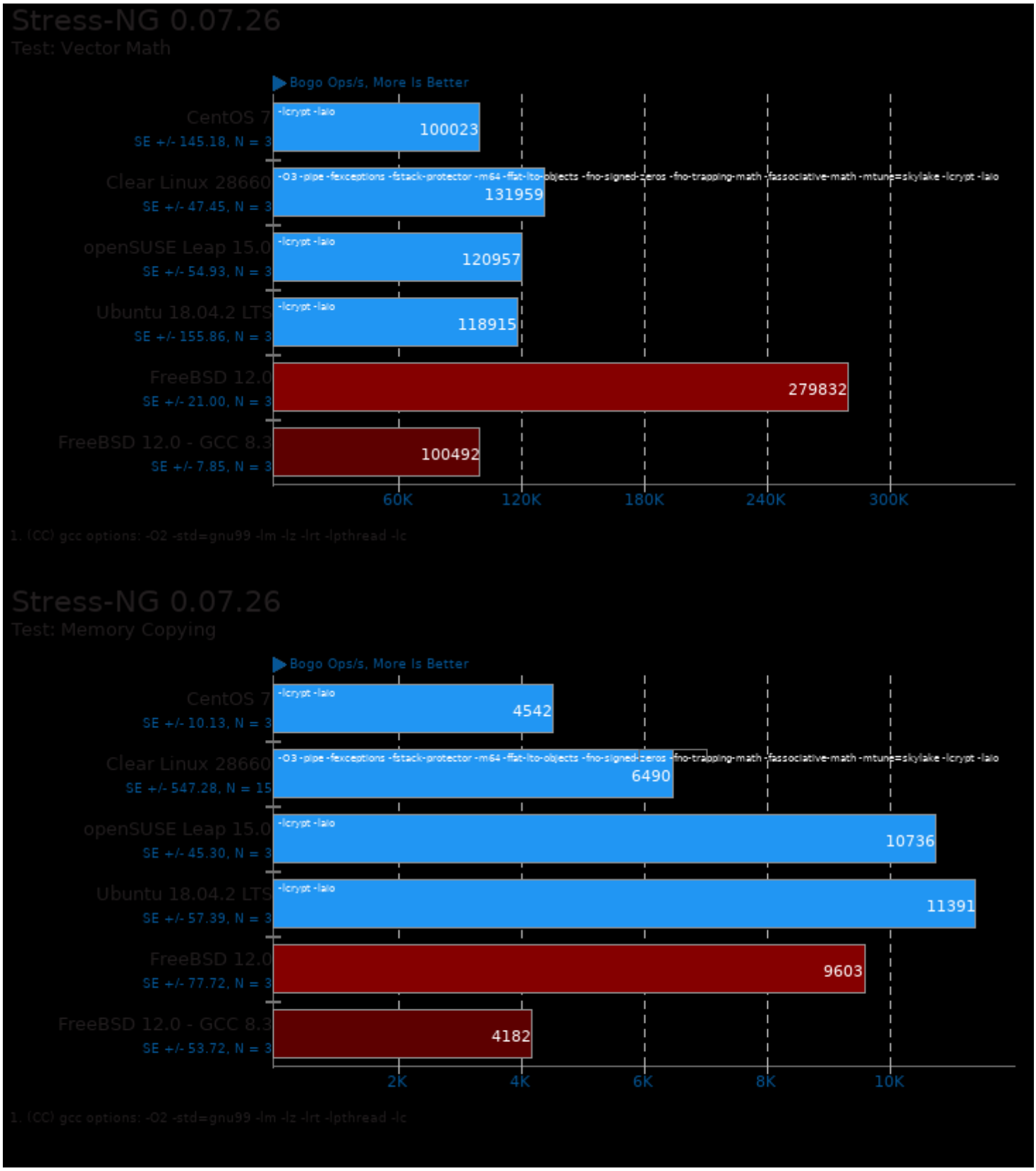

CppPerformanceBenchmarks 9
Test: Stepanov Vector
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.15, N = 3
93.58
Clear Linux 28660
SE +/- 0.00, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -std=c++11
67.12
openSUSE Leap 15.0
SE +/- 0.00, N = 3
-std=c++11
90.07
Ubuntu 18.04.2 LTS
SE +/- 0.00, N = 3
-std=c++11
90.48
FreeBSD 12.0
SE +/- 0.00, N = 3
119.79
FreeBSD 12.0 - GCC 8.3
SE +/- 0.01, N = 3
134.42
30
60
90
120
150
1. (CXX) g++ options: -O3
CppPerformanceBenchmarks 9
Test: Function Objects
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.03, N = 3
15.36
Clear Linux 28660
SE +/- 0.00, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -std=c++11
14.88
openSUSE Leap 15.0
SE +/- 0.00, N = 3
-std=c++11
15.05
Ubuntu 18.04.2 LTS
SE +/- 0.00, N = 3
-std=c++11
14.98
FreeBSD 12.0
SE +/- 0.00, N = 3
22.39
FreeBSD 12.0 - GCC 8.3
SE +/- 0.00, N = 3
20.64
5
10
15
20
25
1. (CXX) g++ options: -O3

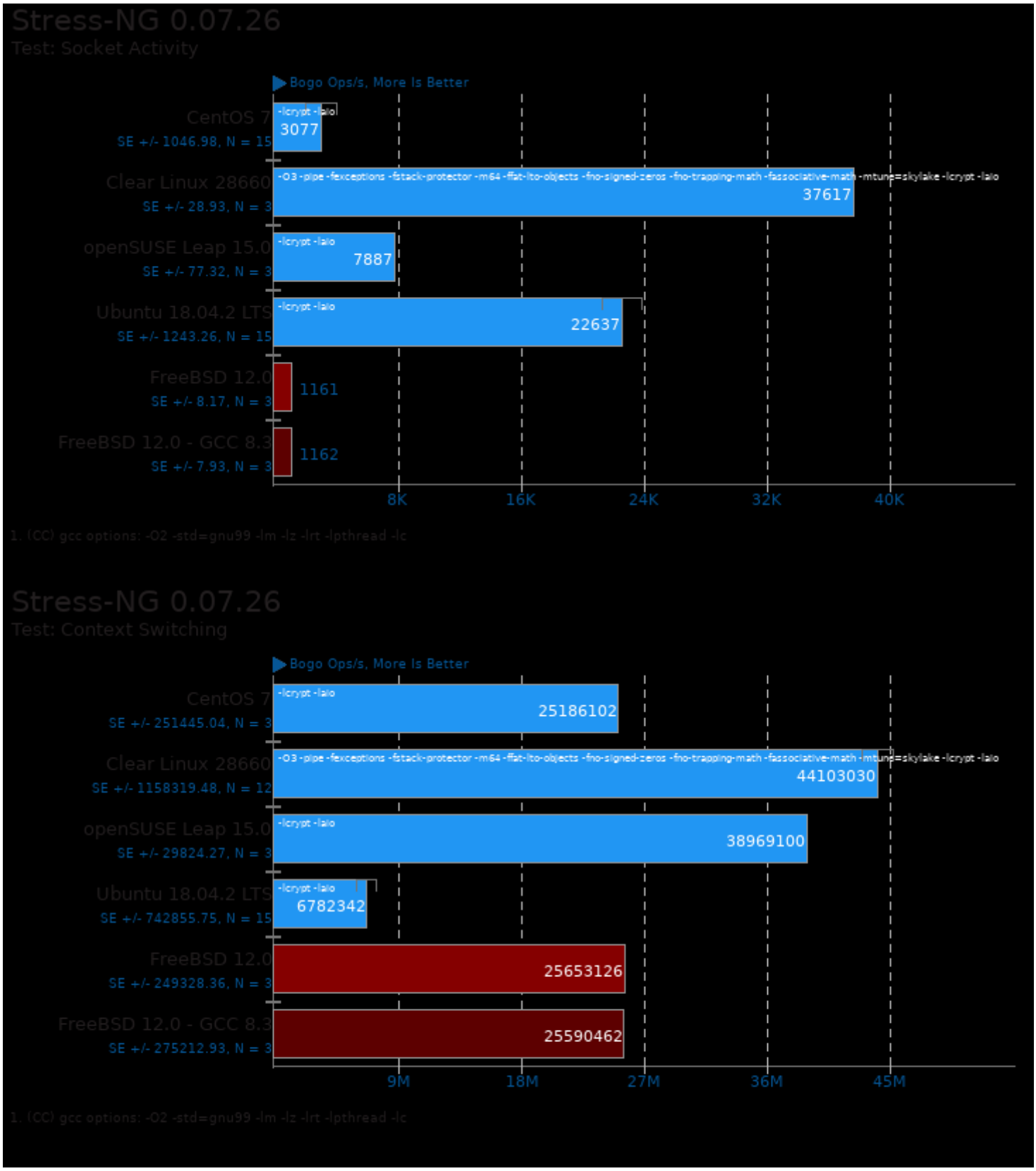

CppPerformanceBenchmarks 9
Test: Stepanov Abstraction
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.05, N = 3
35.50
Clear Linux 28660
SE +/- 0.00, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -std=c++11
23.96
openSUSE Leap 15.0
SE +/- 0.00, N = 3
-std=c++11
36.30
Ubuntu 18.04.2 LTS
SE +/- 0.00, N = 3
-std=c++11
36.28
FreeBSD 12.0
SE +/- 0.01, N = 3
48.14
FreeBSD 12.0 - GCC 8.3
SE +/- 0.00, N = 3
53.28
12
24
36
48
60
1. (CXX) g++ options: -O3
Stress-NG 0.07.26
Test: Bsearch
Bogo Ops/s, More Is Better
CentOS 7
SE +/- 197.69, N = 3
-lcrypt -lalo
18707
Clear Linux 28660
SE +/- 14.17, N = 3
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -lcrypt -lalo
34575
openSUSE Leap 15.0
SE +/- 8.28, N = 3
-lcrypt -lalo
38168
Ubuntu 18.04.2 LTS
SE +/- 159.08, N = 3
-lcrypt -lalo
33020
FreeBSD 12.0
SE +/- 0.69, N = 3
11908
FreeBSD 12.0 - GCC 8.3
SE +/- 21.84, N = 3
13357
8K
16K
24K
32K
40K
1. (CC) gcc options: -O2 -std=gnu99 -lm -lz -lrt -lpthread -lc

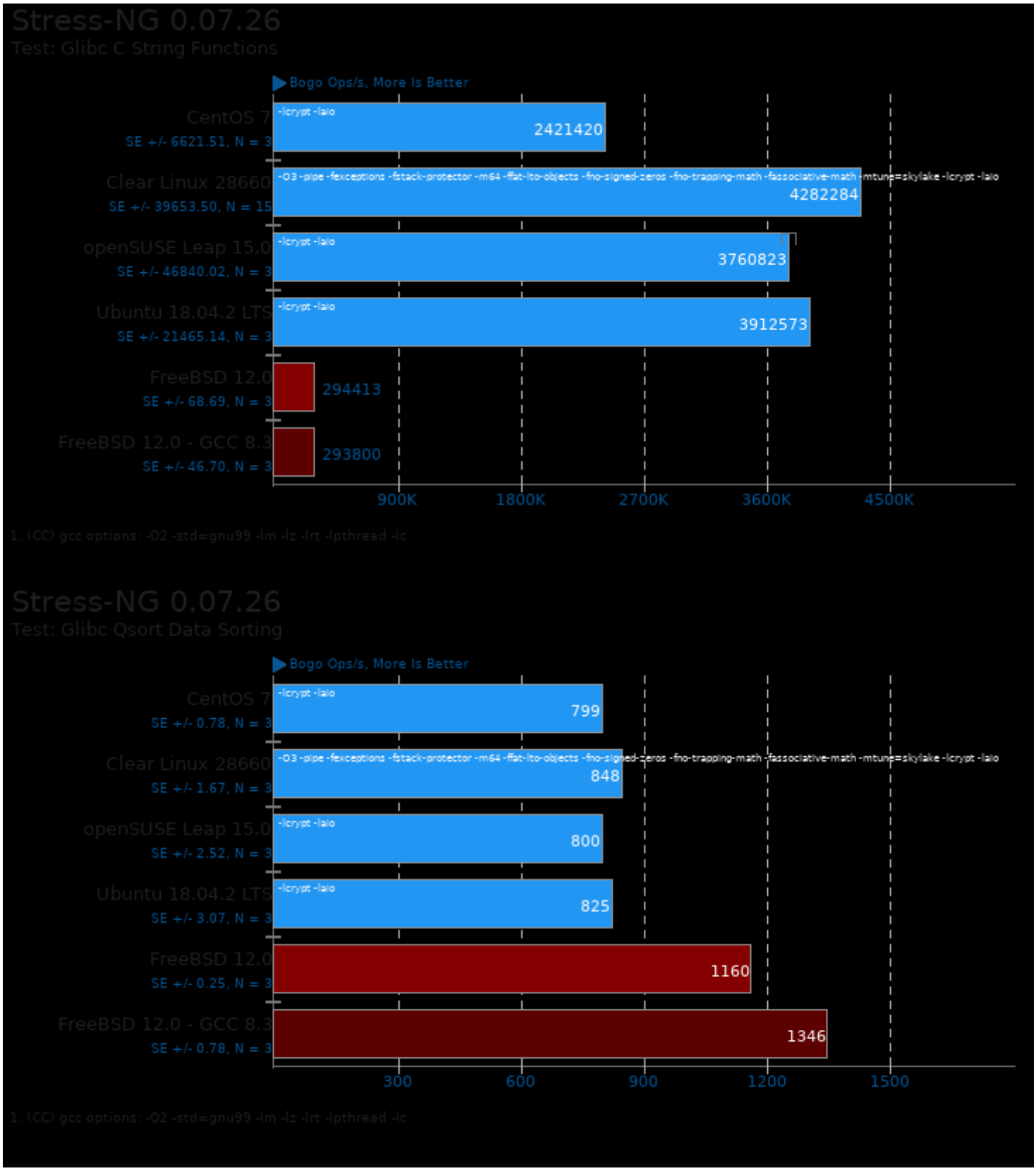

Stress-NG 0.07.26
Test: Forking
Bogo Ops/s, More Is Better
CentOS 7
SE +/- 922.75, N = 3
-lcrypt -lalo
61523
Clear Linux 28660
SE +/- 1221.26, N = 12
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -lcrypt -lalo
62260
openSUSE Leap 15.0
SE +/- 726.88, N = 15
-lcrypt -lalo
64829
Ubuntu 18.04.2 LTS
SE +/- 690.66, N = 15
-lcrypt -lalo
71911
FreeBSD 12.0
SE +/- 163.05, N = 3
12757
FreeBSD 12.0 - GCC 8.3
SE +/- 127.14, N = 15
12361
15K
30K
45K
60K
75K
1. (CC) gcc options: -O2 -std=gnu99 -lm -lz -lrt -lpthread -lc
Stress-NG 0.07.26
Test: Hsearch
Bogo Ops/s, More Is Better
CentOS 7
SE +/- 361.47, N = 3
-lcrypt -lalo
326978
Clear Linux 28660
SE +/- 667.59, N = 3
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -lcrypt -lalo
291243
openSUSE Leap 15.0
SE +/- 903.21, N = 3
-lcrypt -lalo
314128
Ubuntu 18.04.2 LTS
SE +/- 4095.09, N = 3
-lcrypt -lalo
305997
FreeBSD 12.0
SE +/- 213.03, N = 3
286374
FreeBSD 12.0 - GCC 8.3
SE +/- 353.47, N = 3
292357
70K
140K
210K
280K
350K
1. (CC) gcc options: -O2 -std=gnu99 -lm -lz -lrt -lpthread -lc

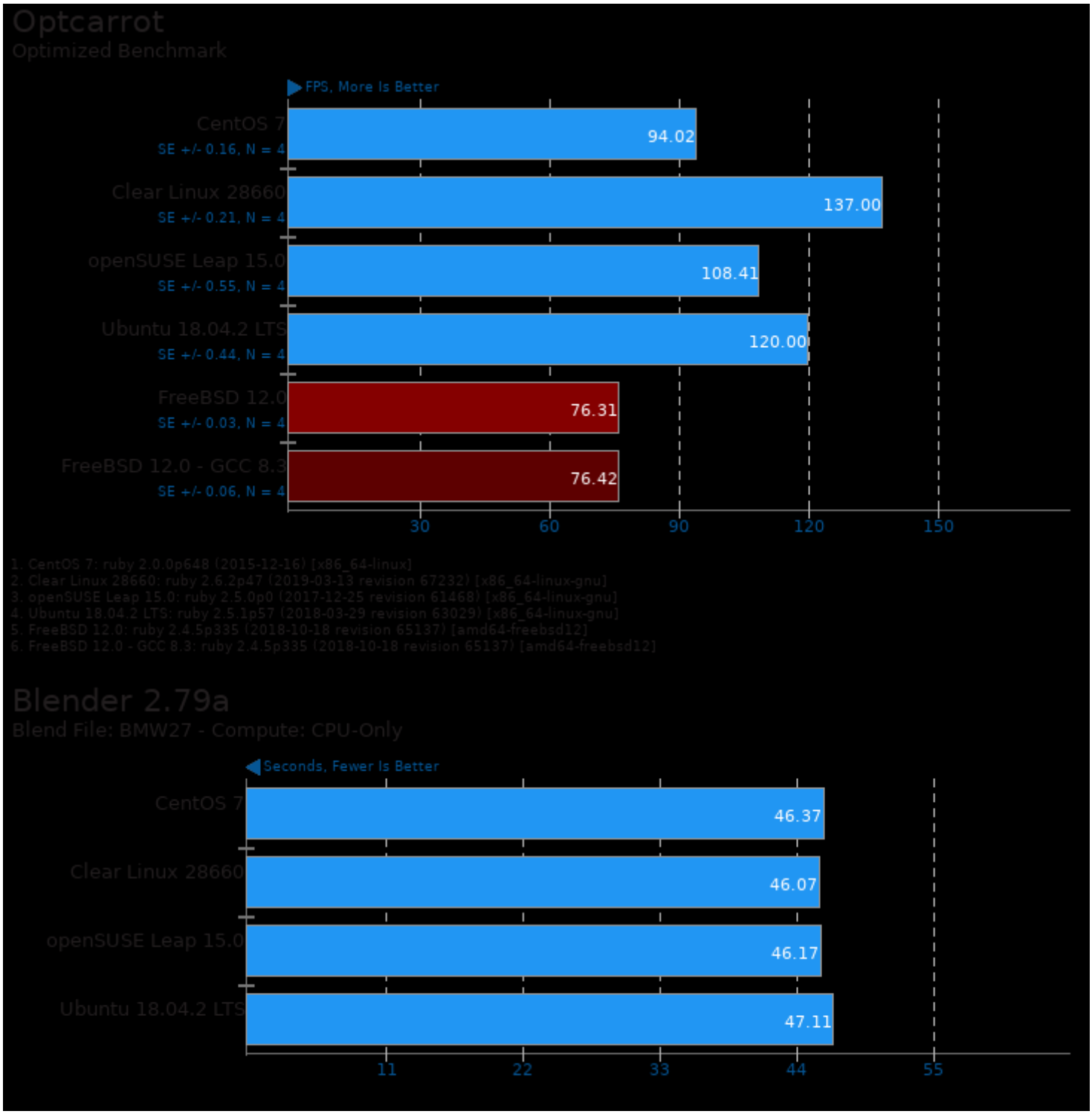

Stress-NG 0.07.26
Test: Lsearch
Bogo Ops/s, More Is Better
CentOS 7
SE +/- 1.08, N = 3
-lcrypt -lalo
755
Clear Linux 28660
SE +/- 4.01, N = 3
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -lcrypt -lalo
742
openSUSE Leap 15.0
SE +/- 2.62, N = 3
-lcrypt -lalo
749
Ubuntu 18.04.2 LTS
SE +/- 8.29, N = 12
-lcrypt -lalo
658
FreeBSD 12.0
SE +/- 0.30, N = 3
560
FreeBSD 12.0 - GCC 8.3
SE +/- 0.74, N = 3
562
160
320
480
640
800
1. (CC) gcc options: -O2 -std=gnu99 -lm -lz -lrt -lpthread -lc
Stress-NG 0.07.26
Test: Tsearch
Bogo Ops/s, More Is Better
CentOS 7
SE +/- 1.09, N = 3
-lcrypt -lalo
997
Clear Linux 28660
SE +/- 11.04, N = 3
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -lcrypt -lalo
1181
openSUSE Leap 15.0
SE +/- 0.11, N = 3
-lcrypt -lalo
1197
Ubuntu 18.04.2 LTS
SE +/- 2.01, N = 3
-lcrypt -lalo
1221
FreeBSD 12.0
SE +/- 0.79, N = 3
1372
FreeBSD 12.0 - GCC 8.3
SE +/- 1.10, N = 3
1312
300
600
900
1200
1500
1. (CC) gcc options: -O2 -std=gnu99 -lm -lz -lrt -lpthread -lc

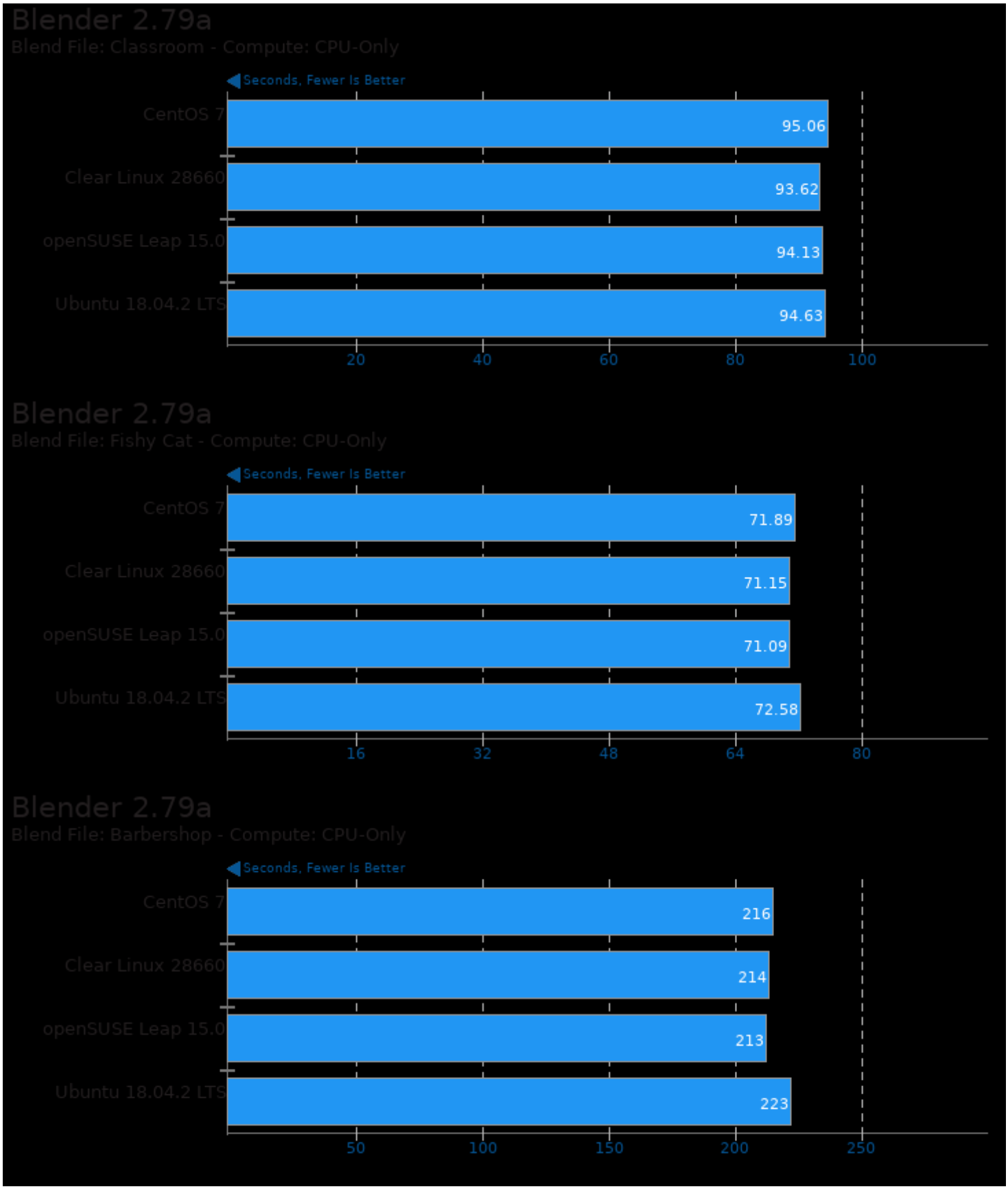

Stress-NG 0.07.26
Test: CPU Stress
Bogo Ops/s, More Is Better
CentOS 7
SE +/- 51.66, N = 3
-lcrypt -lalo
18200
Clear Linux 28660
SE +/- 65.17, N = 3
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -lcrypt -lalo
18549
openSUSE Leap 15.0
SE +/- 38.35, N = 3
-lcrypt -lalo
17903
Ubuntu 18.04.2 LTS
SE +/- 101.54, N = 3
-lcrypt -lalo
17996
FreeBSD 12.0
SE +/- 1.82, N = 3
13705
FreeBSD 12.0 - GCC 8.3
SE +/- 1.20, N = 3
14265
4K
8K
12K
16K
20K
1. (CC) gcc options: -O2 -std=gnu99 -lm -lz -lrt -lpthread -lc
Stress-NG 0.07.26
Test: Matrix Math
Bogo Ops/s, More Is Better
CentOS 7
SE +/- 305.87, N = 3
-lcrypt -lalo
356471
Clear Linux 28660
SE +/- 340.89, N = 3
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -lcrypt -lalo
383235
openSUSE Leap 15.0
SE +/- 408.27, N = 3
-lcrypt -lalo
364922
Ubuntu 18.04.2 LTS
SE +/- 1373.26, N = 3
-lcrypt -lalo
360834
FreeBSD 12.0
SE +/- 137.71, N = 3
337083
FreeBSD 12.0 - GCC 8.3
SE +/- 115.88, N = 3
326176
80K
160K
240K
320K
400K
1. (CC) gcc options: -O2 -std=gnu99 -lm -lz -lrt -lpthread -lc


Stress-NG 0.07.26
Test: Vector Math
Bogo Ops/s, More Is Better
CentOS 7
SE +/- 145.18, N = 3
-lcrypt -lalo
100023
Clear Linux 28660
SE +/- 47.45, N = 3
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -lcrypt -lalo
131959
openSUSE Leap 15.0
SE +/- 54.93, N = 3
-lcrypt -lalo
120957
Ubuntu 18.04.2 LTS
SE +/- 155.86, N = 3
-lcrypt -lalo
118915
FreeBSD 12.0
SE +/- 21.00, N = 3
279832
FreeBSD 12.0 - GCC 8.3
SE +/- 7.85, N = 3
100492
60K
120K
180K
240K
300K
1. (CC) gcc options: -O2 -std=gnu99 -lm -lz -lrt -lpthread -lc
Stress-NG 0.07.26
Test: Memory Copying
Bogo Ops/s, More Is Better
CentOS 7
SE +/- 10.13, N = 3
-lcrypt -lalo
4542
Clear Linux 28660
SE +/- 547.28, N = 15
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -lcrypt -lalo
6490
openSUSE Leap 15.0
SE +/- 45.30, N = 3
-lcrypt -lalo
10736
Ubuntu 18.04.2 LTS
SE +/- 57.39, N = 3
-lcrypt -lalo
11391
FreeBSD 12.0
SE +/- 77.72, N = 3
9603
FreeBSD 12.0 - GCC 8.3
SE +/- 53.72, N = 3
4182
2K
4K
6K
8K
10K
1. (CC) gcc options: -O2 -std=gnu99 -lm -lz -lrt -lpthread -lc

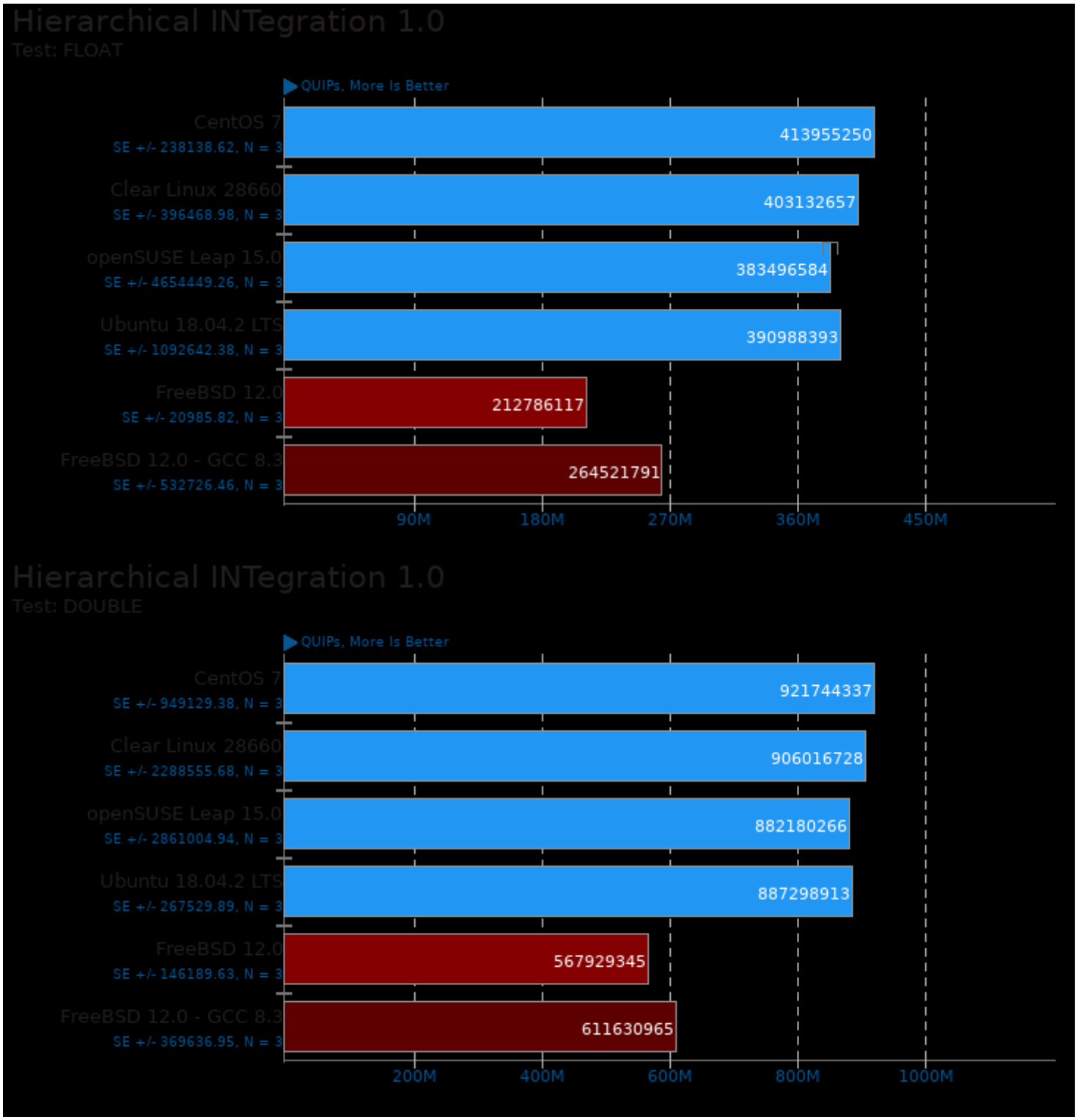

Stress-NG 0.07.26
Test: Socket Activity
Bogo Ops/s, More Is Better
CentOS 7
SE +/- 1046.98, N = 15
-lcrypt -lalo
3077
Clear Linux 28660
SE +/- 28.93, N = 3
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -lcrypt -lalo
37617
openSUSE Leap 15.0
SE +/- 77.32, N = 3
-lcrypt -lalo
7887
Ubuntu 18.04.2 LTS
SE +/- 1243.26, N = 15
-lcrypt -lalo
22637
FreeBSD 12.0
SE +/- 8.17, N = 3
1161
FreeBSD 12.0 - GCC 8.3
SE +/- 7.93, N = 3
1162
8K
16K
24K
32K
40K
1. (CC) gcc options: -O2 -std=gnu99 -lm -lz -lrt -lpthread -lc
Stress-NG 0.07.26
Test: Context Switching
Bogo Ops/s, More Is Better
CentOS 7
SE +/- 251445.04, N = 3
-lcrypt -lalo
25186102
Clear Linux 28660
SE +/- 1158319.48, N = 12
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -lcrypt -lalo
44103030
openSUSE Leap 15.0
SE +/- 29824.27, N = 3
-lcrypt -lalo
38969100
Ubuntu 18.04.2 LTS
SE +/- 742855.75, N = 15
-lcrypt -lalo
6782342
FreeBSD 12.0
SE +/- 249328.36, N = 3
25653126
FreeBSD 12.0 - GCC 8.3
SE +/- 275212.93, N = 3
25590462
9M
18M
27M
36M
45M
1. (CC) gcc options: -O2 -std=gnu99 -lm -lz -lrt -lpthread -lc

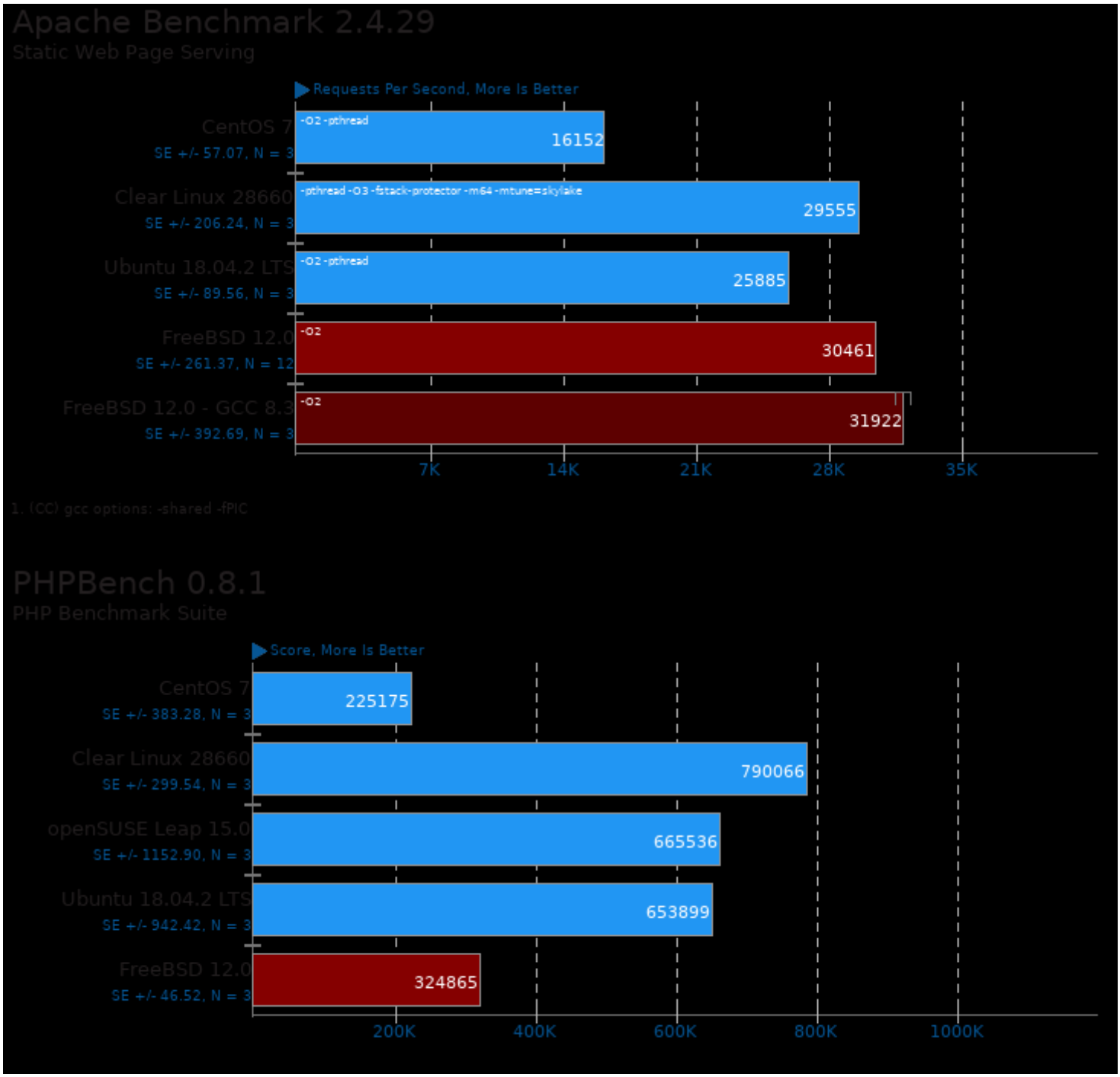

Stress-NG 0.07.26
Test: Glibc C String Functions
Bogo Ops/s, More Is Better
CentOS 7
SE +/- 6621.51, N = 3
-lcrypt -lalo
2421420
Clear Linux 28660
SE +/- 39653.50, N = 15
-O3 -pipe -fexceptions -fstack-protector -m64 -ffat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -lcrypt -lalo
4282284
openSUSE Leap 15.0
SE +/- 46840.02, N = 3
-lcrypt -lalo
3760823
Ubuntu 18.04.2 LTS
SE +/- 21465.14, N = 3
-lcrypt -lalo
3912573
FreeBSD 12.0
SE +/- 68.69, N = 3
294413
FreeBSD 12.0 - GCC 8.3
SE +/- 46.70, N = 3
293800
900K
1800K
2700K
3600K
4500K
1. (CC) gcc options: -O2 -std=gnu99 -lm -lz -lrt -lpthread -lc
Stress-NG 0.07.26
Test: Glibc Qsort Data Sorting
Bogo Ops/s, More Is Better
CentOS 7
SE +/- 0.78, N = 3
-lcrypt -lalo
799
Clear Linux 28660
SE +/- 1.67, N = 3
-O3 -pipe -fexceptions -fstack-protector -m64 -ffat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -lcrypt -lalo
848
openSUSE Leap 15.0
SE +/- 2.52, N = 3
-lcrypt -lalo
800
Ubuntu 18.04.2 LTS
SE +/- 3.07, N = 3
-lcrypt -lalo
825
FreeBSD 12.0
SE +/- 0.25, N = 3
1160
FreeBSD 12.0 - GCC 8.3
SE +/- 0.78, N = 3
1346
300
600
900
1200
1500
1. (CC) gcc options: -O2 -std=gnu99 -lm -lz -lrt -lpthread -lc

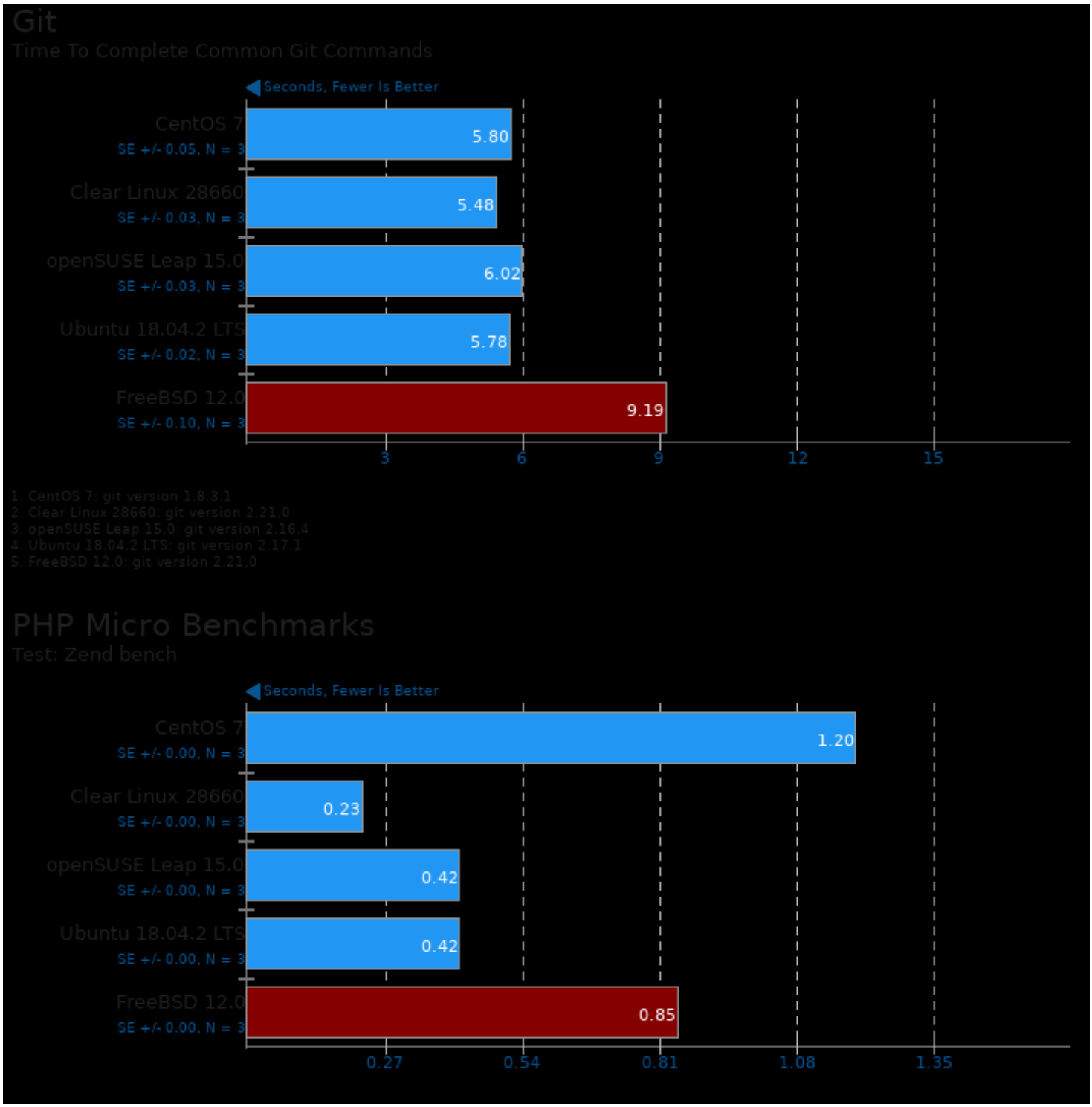

Optcarrot
Optimized Benchmark
FPS, More Is Better
CentOS 7
SE +/- 0.16, N = 4
94.02
Clear Linux 28660
SE +/- 0.21, N = 4
137.00
openSUSE Leap 15.0
SE +/- 0.55, N = 4
108.41
Ubuntu 18.04.2 LTS
SE +/- 0.44, N = 4
120.00
FreeBSD 12.0
SE +/- 0.03, N = 4
76.31
FreeBSD 12.0 - GCC 8.3
SE +/- 0.06, N = 4
76.42
30
60
90
120
150
1. CentOS 7: ruby 2.0.0p648 (2015-12-16) [x86_64-linux]
2. Clear Linux 28660: ruby 2.6.2p47 (2019-03-13 revision 67232) [x86_64-linux-gnu]
3. openSUSE Leap 15.0: ruby 2.5.0p0 (2017-12-25 revision 61468) [x86_64-linux-gnu]
4. Ubuntu 18.04.2 LTS: ruby 2.5.1p57 (2018-03-29 revision 63029) [x86_64-linux-gnu]
5. FreeBSD 12.0: ruby 2.4.5p335 (2018-10-18 revision 65137) [amd64-freebsd12]
6. FreeBSD 12.0 - GCC 8.3: ruby 2.4.5p335 (2018-10-18 revision 65137) [amd64-freebsd12]
Blender 2.79a
Blend File: BMW27 - Compute: CPU-Only
Seconds, Fewer Is Better
CentOS 7
46.37
Clear Linux 28660
46.07
openSUSE Leap 15.0
46.17
Ubuntu 18.04.2 LTS
47.11
11
22
33
44
55

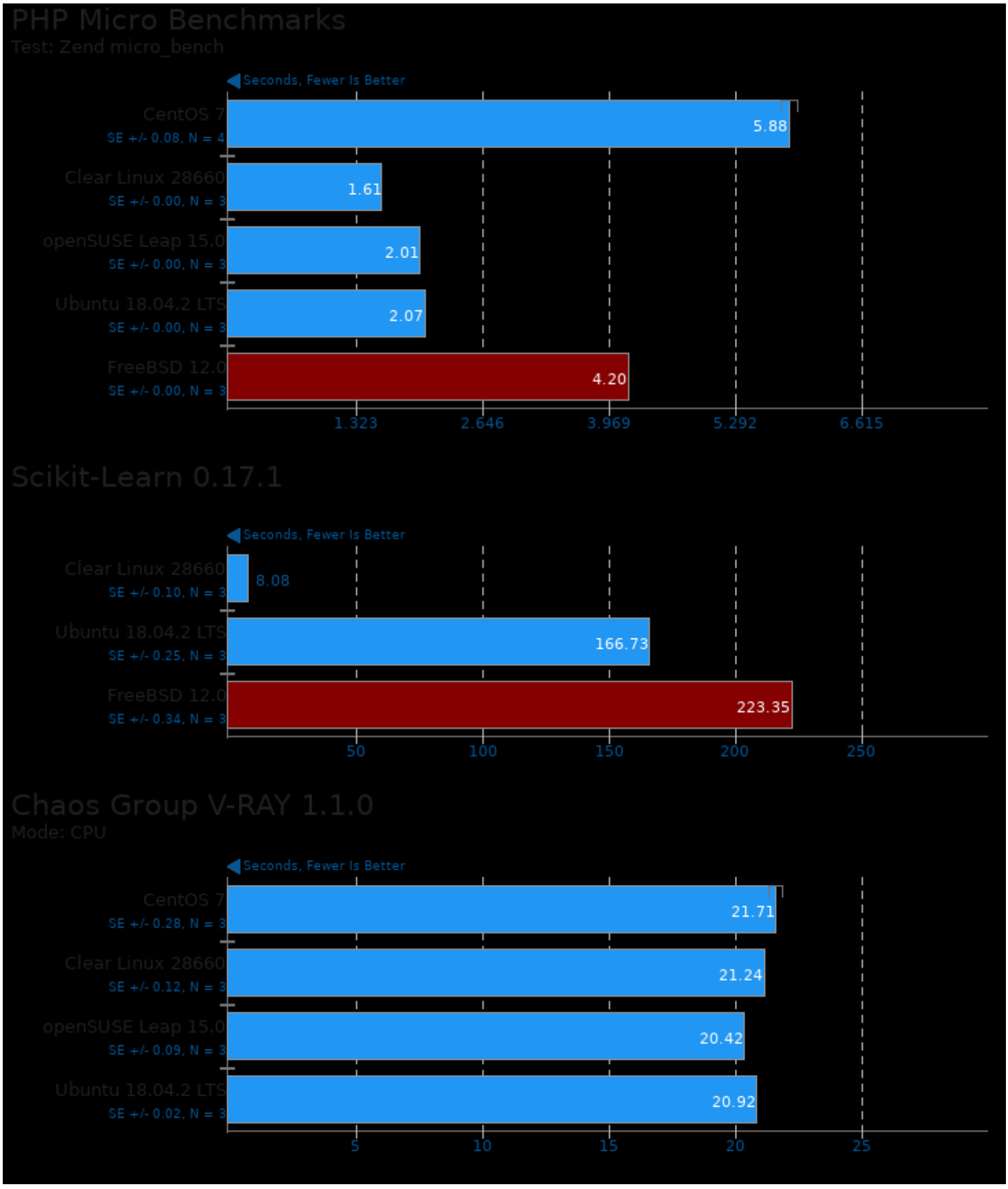

Blender 2.79a
Blend File: Classroom - Compute: CPU-Only
Seconds, Fewer Is Better
CentOS 7
Clear Linux 28660
openSUSE Leap 15.0
Ubuntu 18.04.2 LTS
95.06
93.62
94.13
94.63
20
40
60
80
100
Blender 2.79a
Blend File: Fishy Cat - Compute: CPU-Only
Seconds, Fewer Is Better
CentOS 7
Clear Linux 28660
openSUSE Leap 15.0
Ubuntu 18.04.2 LTS
71.89
71.15
71.09
72.58
16
32
48
64
80
Blender 2.79a
Blend File: Barbershop - Compute: CPU-Only
Seconds, Fewer Is Better
CentOS 7
Clear Linux 28660
openSUSE Leap 15.0
Ubuntu 18.04.2 LTS
216
214
213
223
50
100
150
200
250

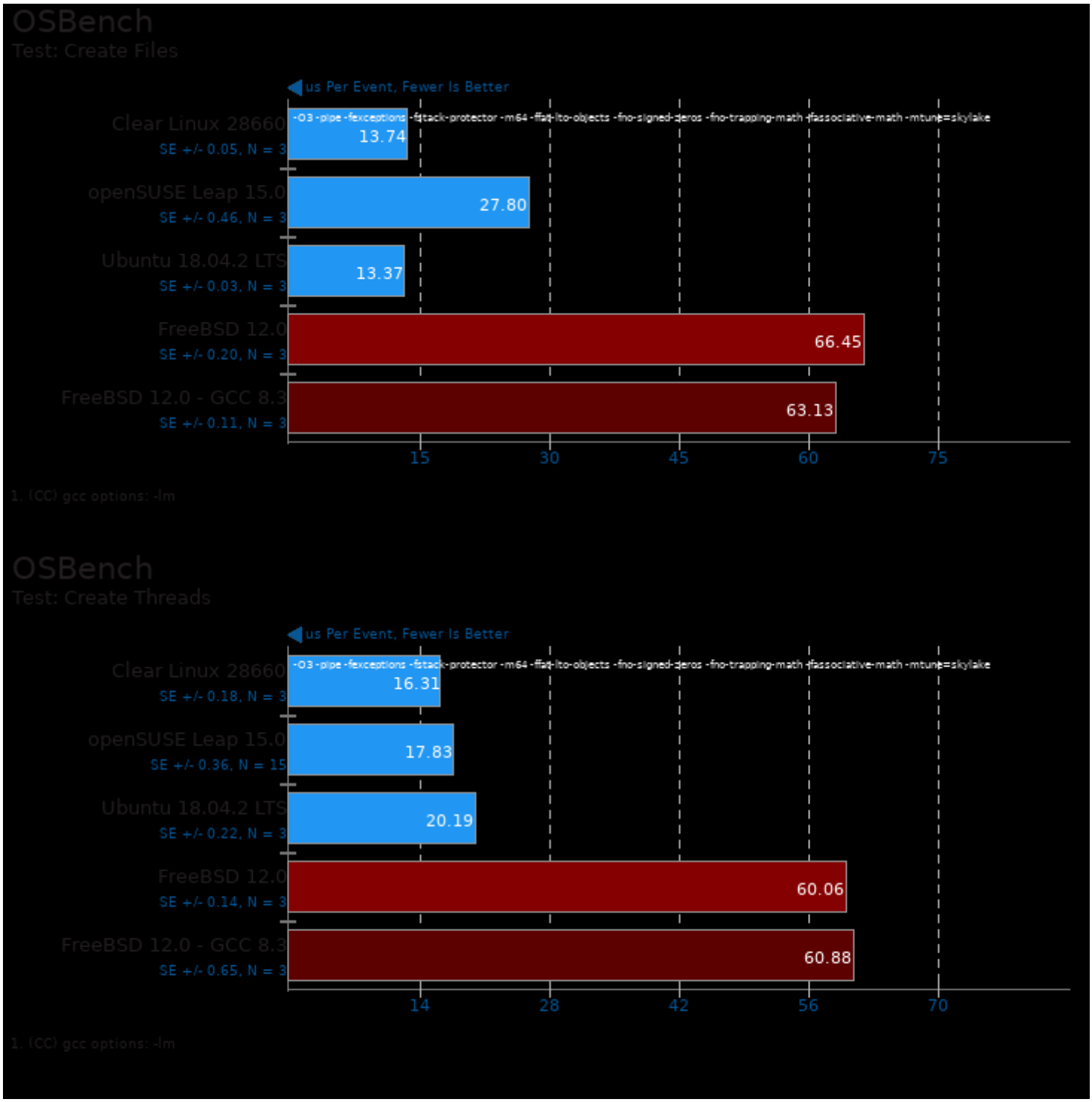

Blender 2.79a
Blend File: Pabellon Barcelona - Compute: CPU-Only
Seconds, Fewer Is Better
CentOS 7
116
Clear Linux 28660
116
openSUSE Leap 15.0
114
Ubuntu 18.04.2 LTS
117
30
60
90
120
150
PyBench 2018-02-16
Total For Average Test Times
Milliseconds, Fewer Is Better
CentOS 7
SE +/- 2.67, N = 3
1401
Clear Linux 28660
SE +/- 1.20, N = 3
1008
openSUSE Leap 15.0
SE +/- 0.33, N = 3
1327
Ubuntu 18.04.2 LTS
SE +/- 1.73, N = 3
1063
FreeBSD 12.0
SE +/- 2.65, N = 3
2448
500
1000
1500
2000
2500

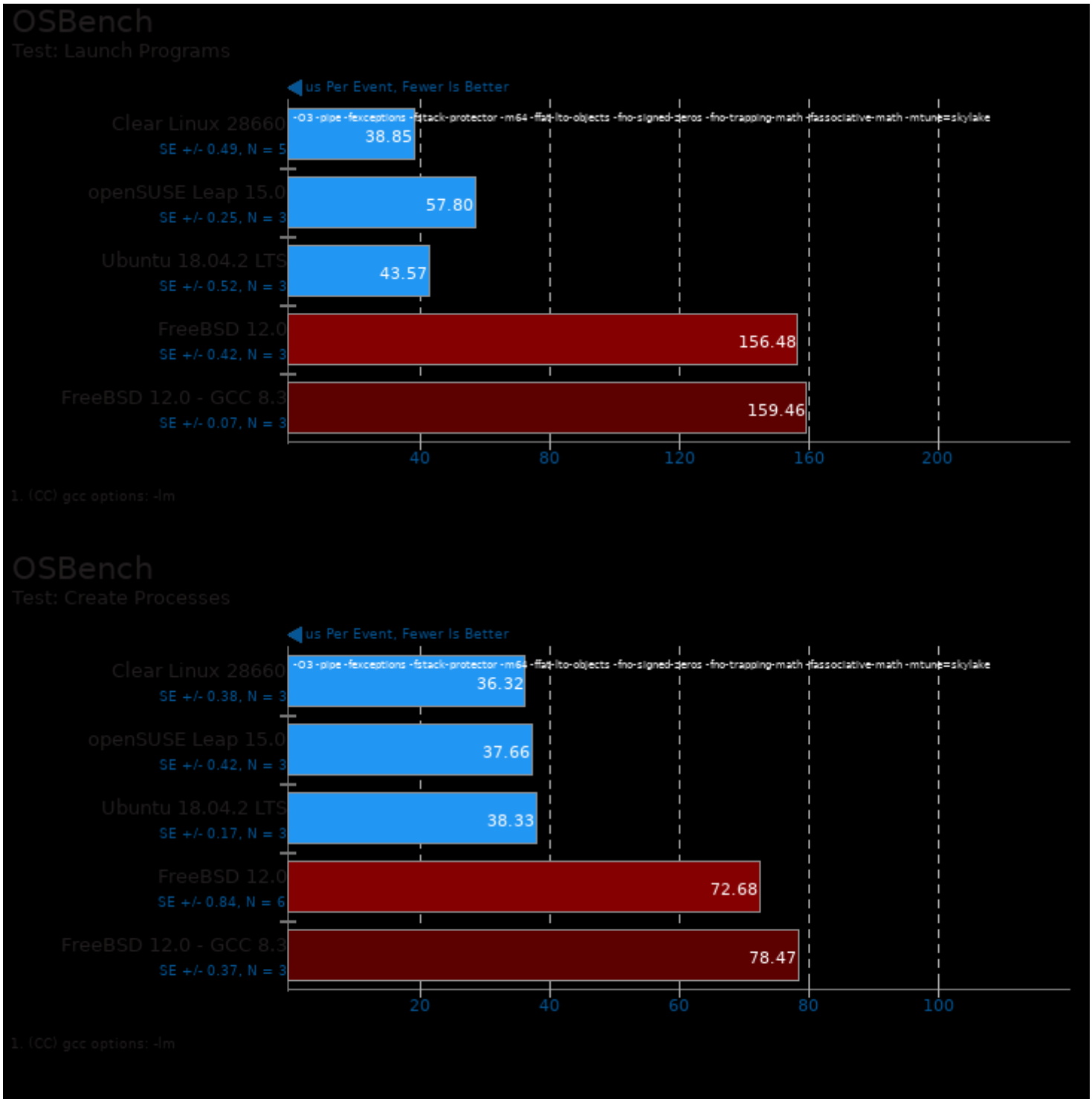

Hierarchical INTegration 1.0
Test: FLOAT
QUIPs, More Is Better
CentOS 7
SE +/- 238138.62, N = 3
413955250
Clear Linux 28660
SE +/- 396468.98, N = 3
403132657
openSUSE Leap 15.0
SE +/- 4654449.26, N = 3
383496584
Ubuntu 18.04.2 LTS
SE +/- 1092642.38, N = 3
390988393
FreeBSD 12.0
SE +/- 20985.82, N = 3
212786117
FreeBSD 12.0 - GCC 8.3
SE +/- 532726.46, N = 3
264521791
90M
180M
270M
360M
450M
Hierarchical INTegration 1.0
Test: DOUBLE
QUIPs, More Is Better
CentOS 7
SE +/- 949129.38, N = 3
921744337
Clear Linux 28660
SE +/- 2288555.68, N = 3
906016728
openSUSE Leap 15.0
SE +/- 2861004.94, N = 3
882180266
Ubuntu 18.04.2 LTS
SE +/- 267529.89, N = 3
887298913
FreeBSD 12.0
SE +/- 146189.63, N = 3
567929345
FreeBSD 12.0 - GCC 8.3
SE +/- 369636.95, N = 3
611630965
200M
400M
600M
800M
1000M

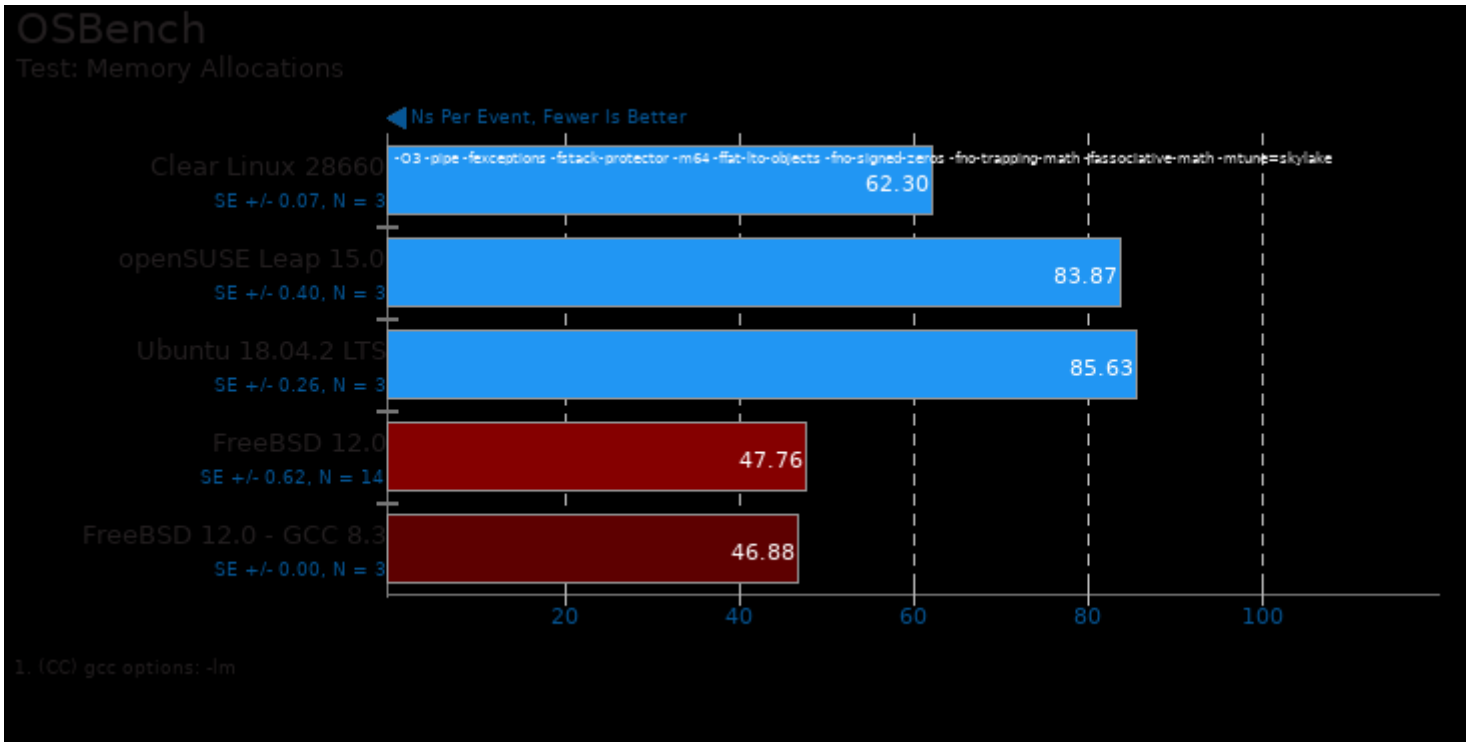

Apache Benchmark 2.4.29
Static Web Page Serving
Requests Per Second, More Is Better
CentOS 7
SE +/- 57.07, N = 3
-O2 -pthread
16152
Clear Linux 28660
SE +/- 206.24, N = 3
-pthread -O3 -fstack-protector -m64 -mtune=skylake
29555
Ubuntu 18.04.2 LTS
SE +/- 89.56, N = 3
-O2 -pthread
25885
FreeBSD 12.0
SE +/- 261.37, N = 12
-O2
30461
FreeBSD 12.0 - GCC 8.3
SE +/- 392.69, N = 3
-O2
31922
7K
14K
21K
28K
35K
1. (CC) gcc options: -shared -fPIC
PHPBench 0.8.1
PHP Benchmark Suite
Score, More Is Better
CentOS 7
SE +/- 383.28, N = 3
225175
Clear Linux 28660
SE +/- 299.54, N = 3
790066
openSUSE Leap 15.0
SE +/- 1152.90, N = 3
665536
Ubuntu 18.04.2 LTS
SE +/- 942.42, N = 3
653899
FreeBSD 12.0
SE +/- 46.52, N = 3
324865
200K
400K
600K
800K
1000K


Git
Time To Complete Common Git Commands
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.05, N = 3
5.80
Clear Linux 28660
SE +/- 0.03, N = 3
5.48
openSUSE Leap 15.0
SE +/- 0.03, N = 3
6.02
Ubuntu 18.04.2 LTS
SE +/- 0.02, N = 3
5.78
FreeBSD 12.0
SE +/- 0.10, N = 3
9.19
3
6
9
12
15
1. CentOS 7: git version 1.8.3.1
2. Clear Linux 28660: git version 2.21.0
3. openSUSE Leap 15.0: git version 2.16.4
4. Ubuntu 18.04.2 LTS: git version 2.17.1
5. FreeBSD 12.0: git version 2.21.0
PHP Micro Benchmarks
Test: Zend bench
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.00, N = 3
1.20
Clear Linux 28660
SE +/- 0.00, N = 3
0.23
openSUSE Leap 15.0
SE +/- 0.00, N = 3
0.42
Ubuntu 18.04.2 LTS
SE +/- 0.00, N = 3
0.42
FreeBSD 12.0
SE +/- 0.00, N = 3
0.85
0.27
0.54
0.81
1.08
1.35

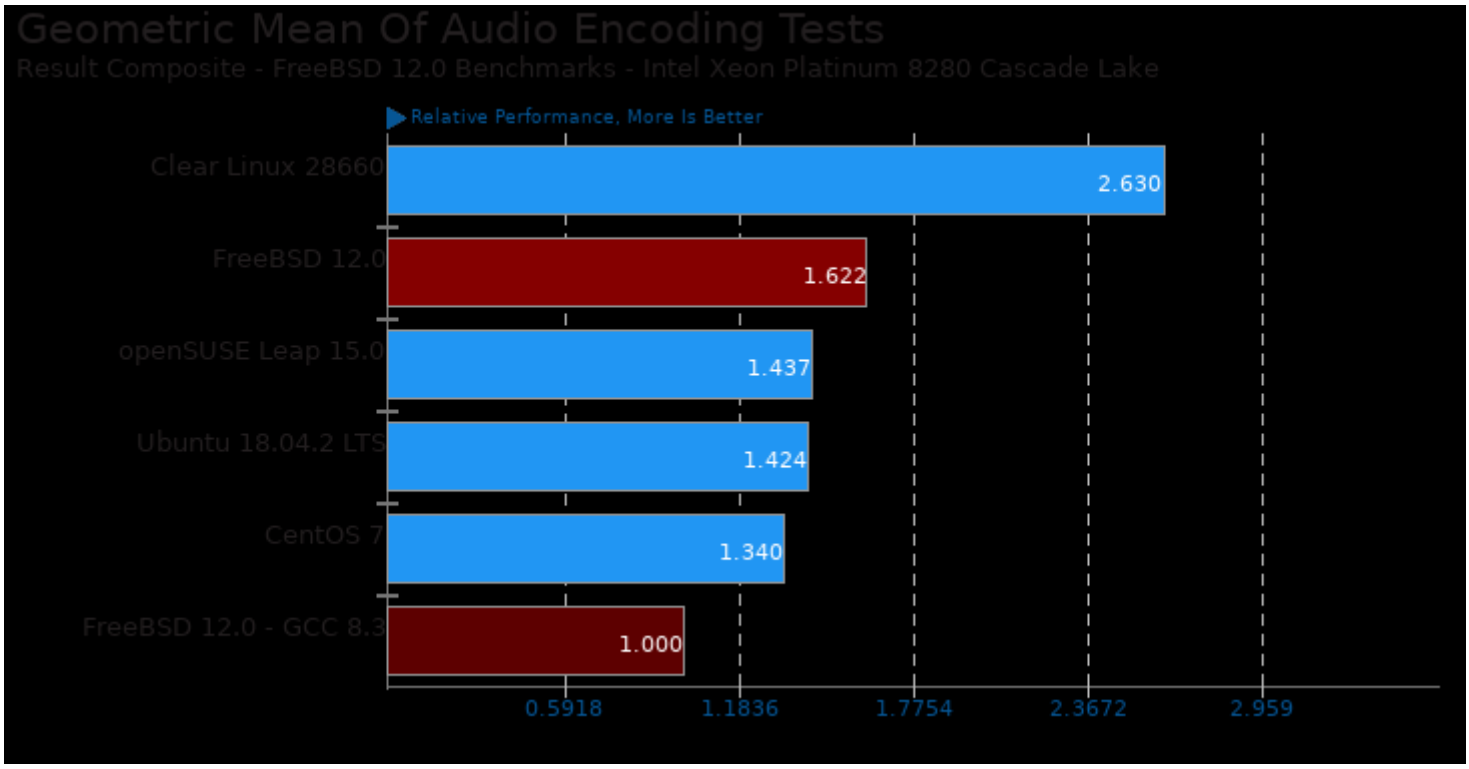

PHP Micro Benchmarks
Test: Zend micro_bench
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.08, N = 4
5.88
Clear Linux 28660
SE +/- 0.00, N = 3
1.61
openSUSE Leap 15.0
SE +/- 0.00, N = 3
2.01
Ubuntu 18.04.2 LTS
SE +/- 0.00, N = 3
2.07
FreeBSD 12.0
SE +/- 0.00, N = 3
4.20
1.323
2.646
3.969
5.292
6.615
Scikit-Learn 0.17.1
Seconds, Fewer Is Better
Clear Linux 28660
SE +/- 0.10, N = 3
8.08
Ubuntu 18.04.2 LTS
SE +/- 0.25, N = 3
166.73
FreeBSD 12.0
SE +/- 0.34, N = 3
223.35
50
100
150
200
250
Chaos Group V-RAY 1.1.0
Mode: CPU
Seconds, Fewer Is Better
CentOS 7
SE +/- 0.28, N = 3
21.71
Clear Linux 28660
SE +/- 0.12, N = 3
21.24
openSUSE Leap 15.0
SE +/- 0.09, N = 3
20.42
Ubuntu 18.04.2 LTS
SE +/- 0.02, N = 3
20.92
5
10
15
20
25


OSBench
Test: Create Files
us Per Event, Fewer Is Better
-O3 -pipe -fexceptions -fstack-protector -m64 -flto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
Clear Linux 28660
SE +/- 0.05, N = 3
13.74
openSUSE Leap 15.0
SE +/- 0.46, N = 3
27.80
Ubuntu 18.04.2 LTS
SE +/- 0.03, N = 3
13.37
FreeBSD 12.0
SE +/- 0.20, N = 3
66.45
FreeBSD 12.0 - GCC 8.3
SE +/- 0.11, N = 3
63.13
15
30
45
60
75
1. (CC) gcc options: -lm
OSBench
Test: Create Threads
us Per Event, Fewer Is Better
-O3 -pipe -fexceptions -fstack-protector -m64 -flto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
Clear Linux 28660
SE +/- 0.18, N = 3
16.31
openSUSE Leap 15.0
SE +/- 0.36, N = 15
17.83
Ubuntu 18.04.2 LTS
SE +/- 0.22, N = 3
20.19
FreeBSD 12.0
SE +/- 0.14, N = 3
60.06
FreeBSD 12.0 - GCC 8.3
SE +/- 0.65, N = 3
60.88
14
28
42
56
70
1. (CC) gcc options: -lm

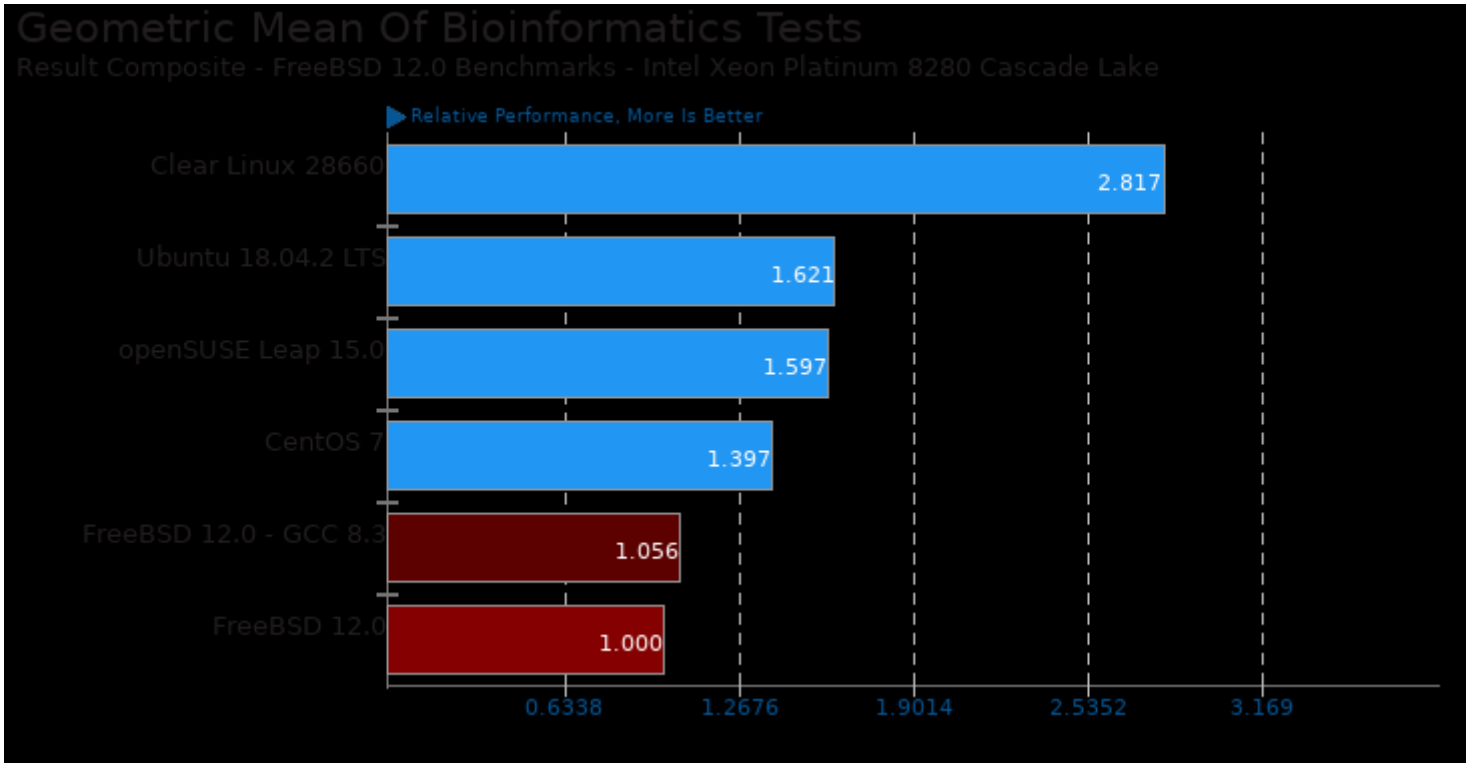

OSBench
Test: Launch Programs
us Per Event, Fewer Is Better
-O3 -pipe -fexceptions -fstack-protector -m64 -flto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
Clear Linux 28660
SE +/- 0.49, N = 5
38.85
openSUSE Leap 15.0
SE +/- 0.25, N = 3
57.80
Ubuntu 18.04.2 LTS
SE +/- 0.52, N = 3
43.57
FreeBSD 12.0
SE +/- 0.42, N = 3
156.48
FreeBSD 12.0 - GCC 8.3
SE +/- 0.07, N = 3
159.46
40
80
120
160
200
1. (CC) gcc options: -lm
OSBench
Test: Create Processes
us Per Event, Fewer Is Better
-O3 -pipe -fexceptions -fstack-protector -m64 -flto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
Clear Linux 28660
SE +/- 0.38, N = 3
36.32
openSUSE Leap 15.0
SE +/- 0.42, N = 3
37.66
Ubuntu 18.04.2 LTS
SE +/- 0.17, N = 3
38.33
FreeBSD 12.0
SE +/- 0.84, N = 6
72.68
FreeBSD 12.0 - GCC 8.3
SE +/- 0.37, N = 3
78.47
20
40
60
80
100
1. (CC) gcc options: -lm


OSBench
Test: Memory Allocations
Ns Per Event, Fewer Is Better
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
Clear Linux 28660
SE +/- 0.07, N = 3
62.30
openSUSE Leap 15.0
SE +/- 0.40, N = 3
83.87
Ubuntu 18.04.2 LTS
SE +/- 0.26, N = 3
85.63
FreeBSD 12.0
SE +/- 0.62, N = 14
47.76
FreeBSD 12.0 - GCC 8.3
SE +/- 0.00, N = 3
46.88
20
40
60
80
100
1. (CC) gcc options: -lm

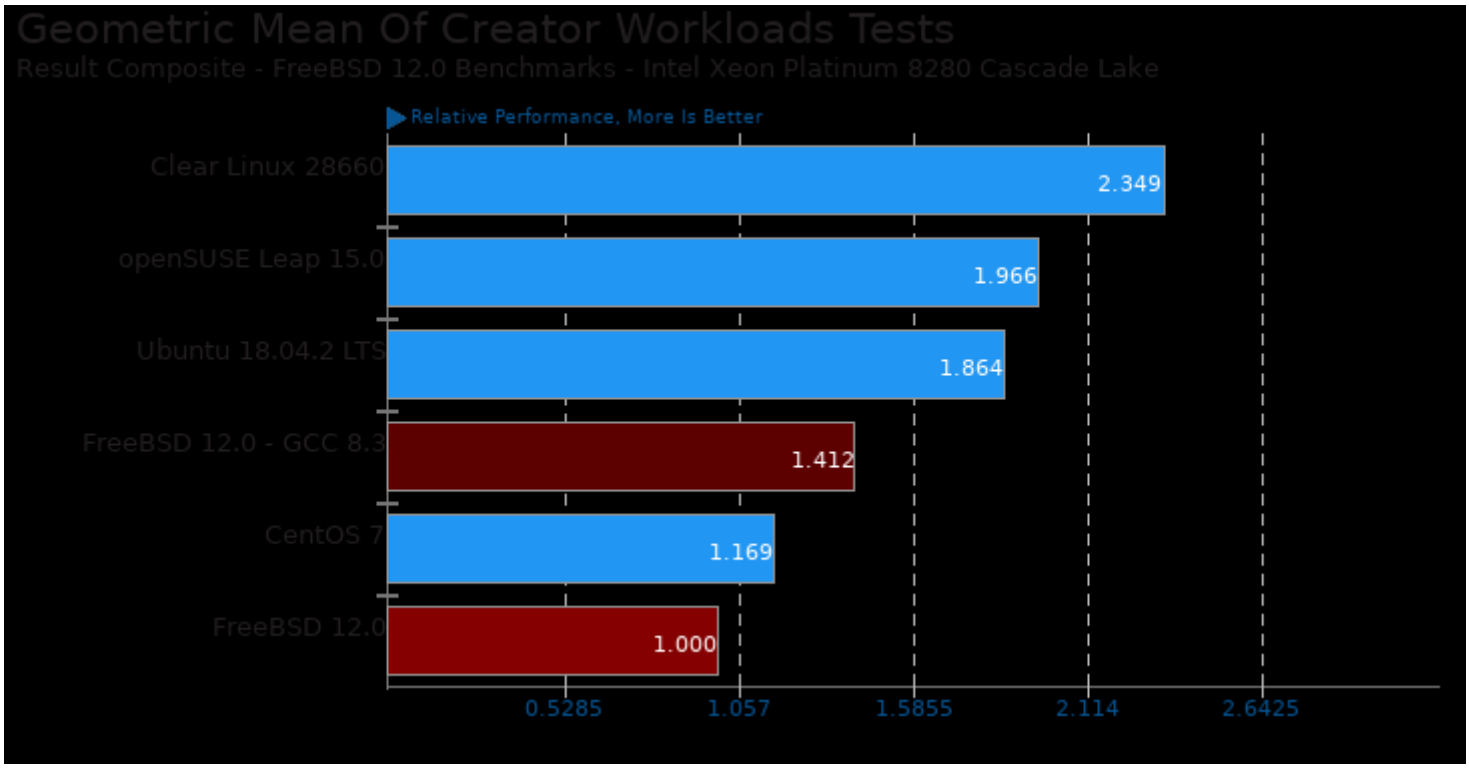
These geometric means are based upon test groupings / test suites for this result file.



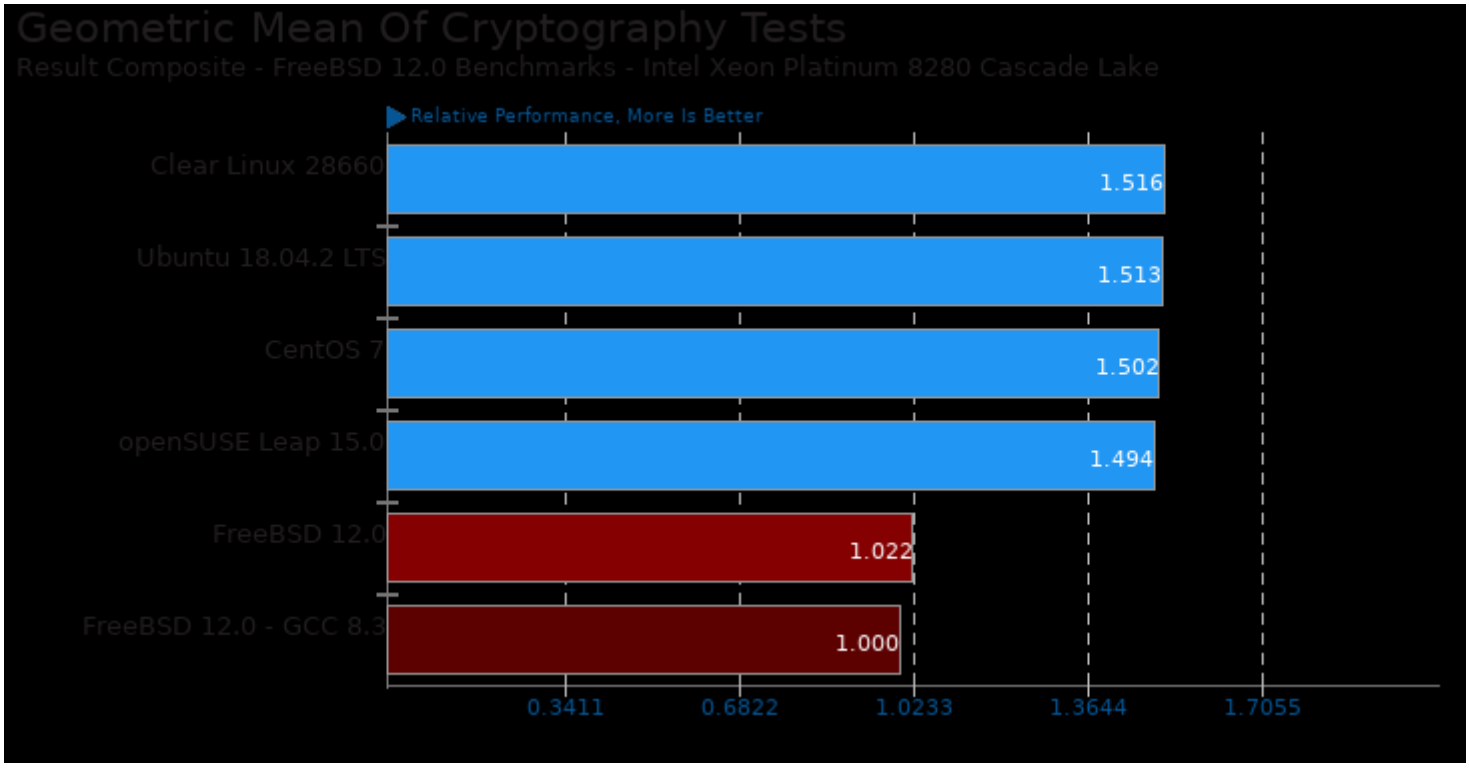
Geometric mean based upon tests: pts/encode-mp3 and pts/encode-flac



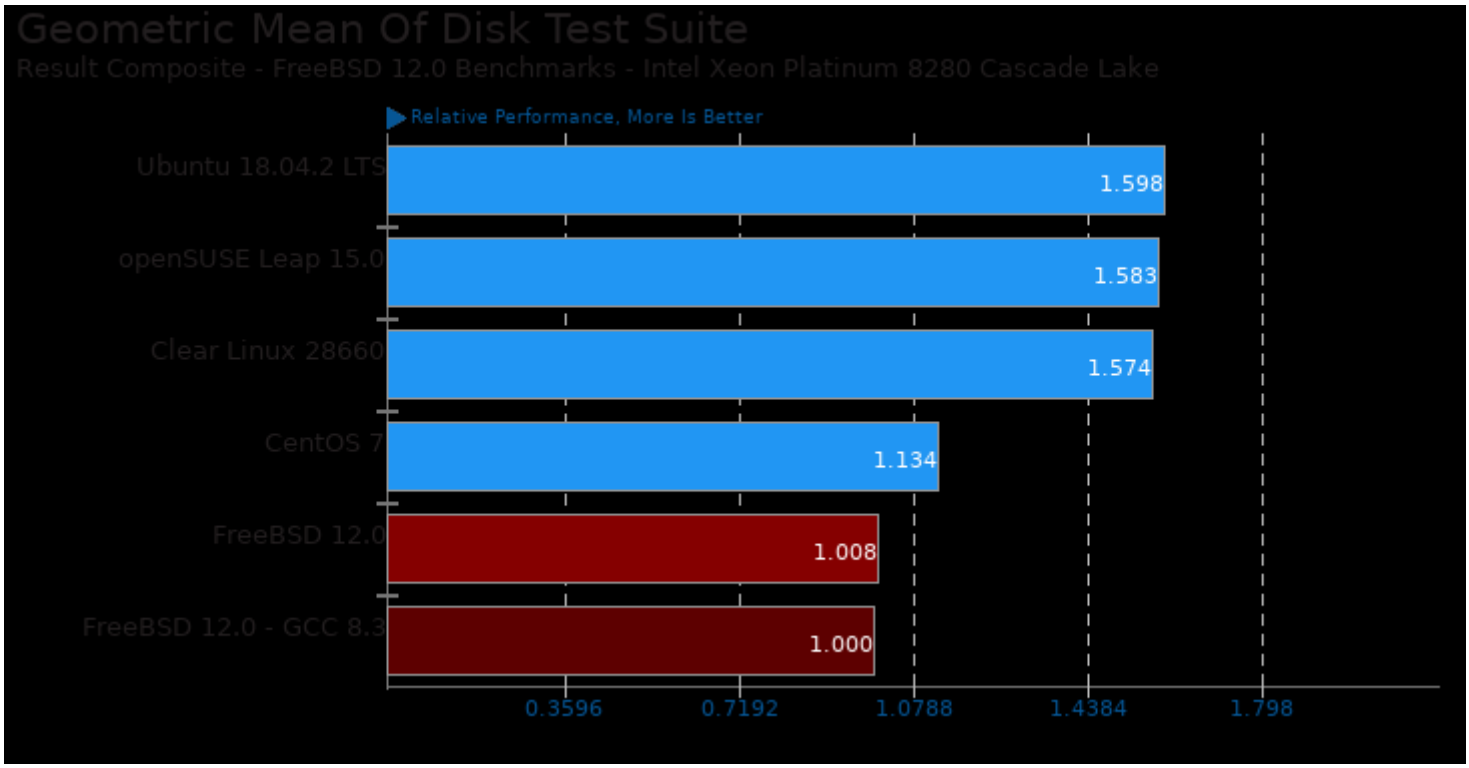
Geometric mean based upon tests: pts/himeno and pts/hmmer



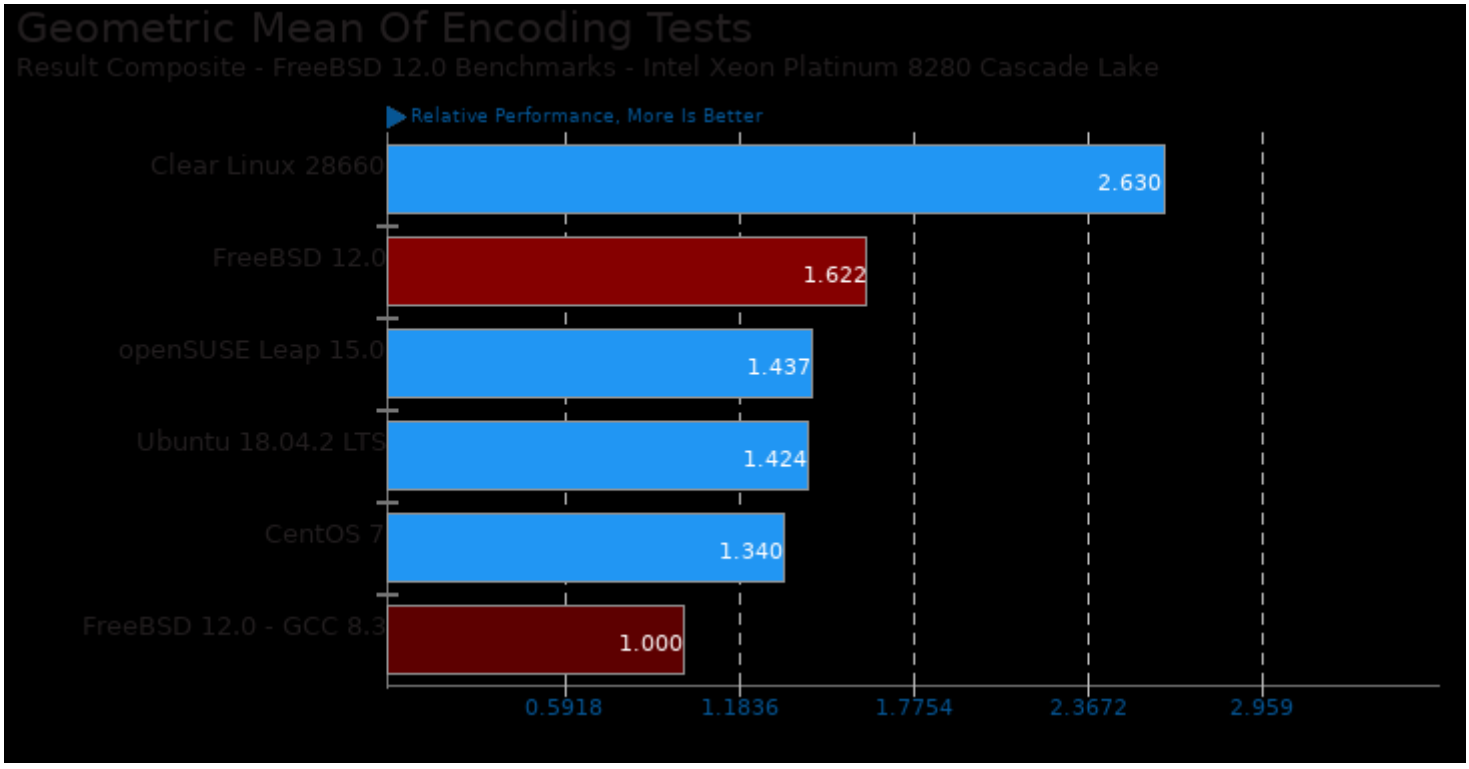
Geometric mean based upon tests: pts/c-ray, pts/blender, pts/aobench, pts/smallpt, pts/ttsiod-renderer, pts/v-ray, pts/x264, pts/x265, pts/encode-mp3, pts/encode-flac, pts/graphics-magick, pts/tjbench, pts/dcraw and pts/luajit



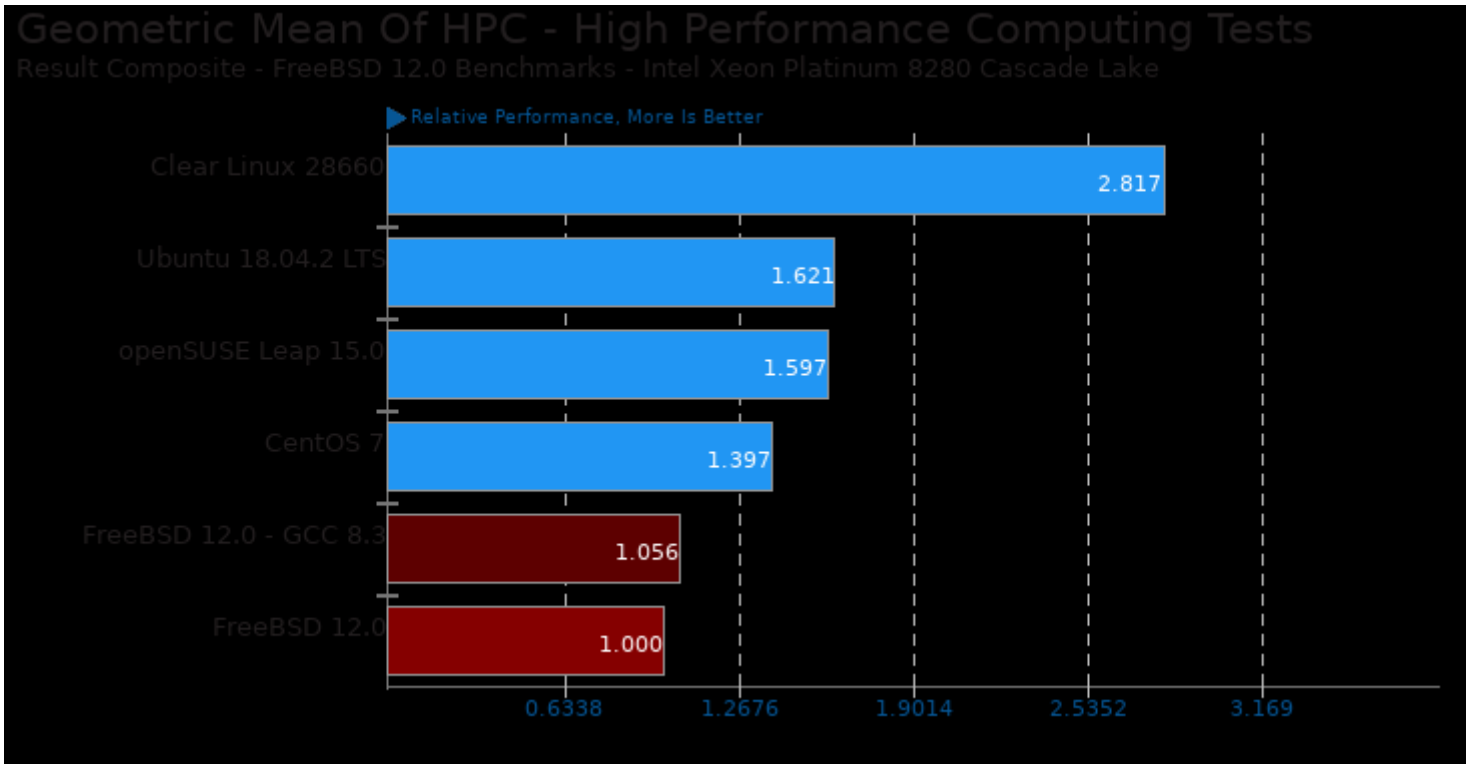
Geometric mean based upon tests: pts/openssl, pts/blake2, pts/botan and pts/bork



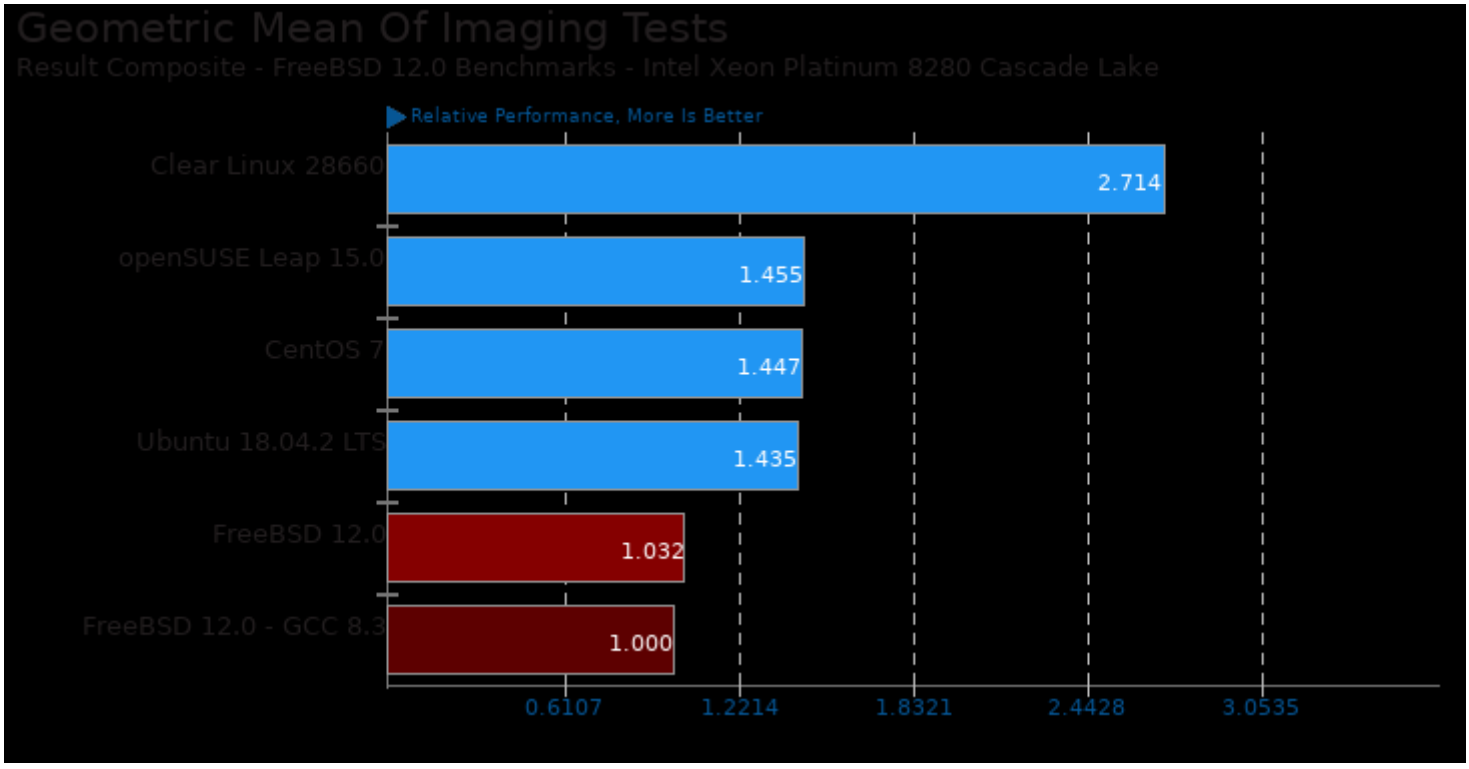
Geometric mean based upon tests: pts/sqlite, pts/compilebench, pts/iozone and pts/postmark



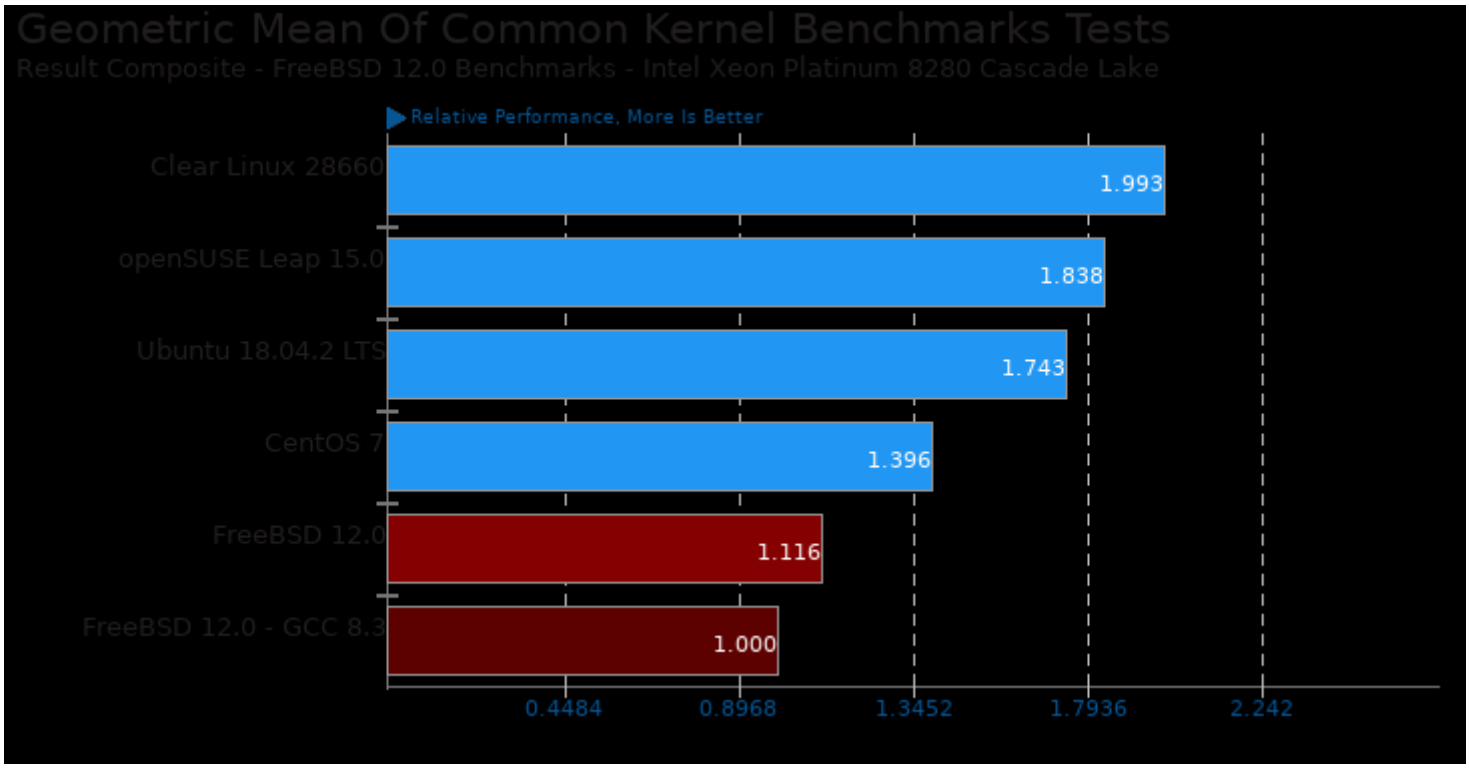
Geometric mean based upon tests: pts/encode-mp3, pts/encode-flac, pts/x264 and pts/x265



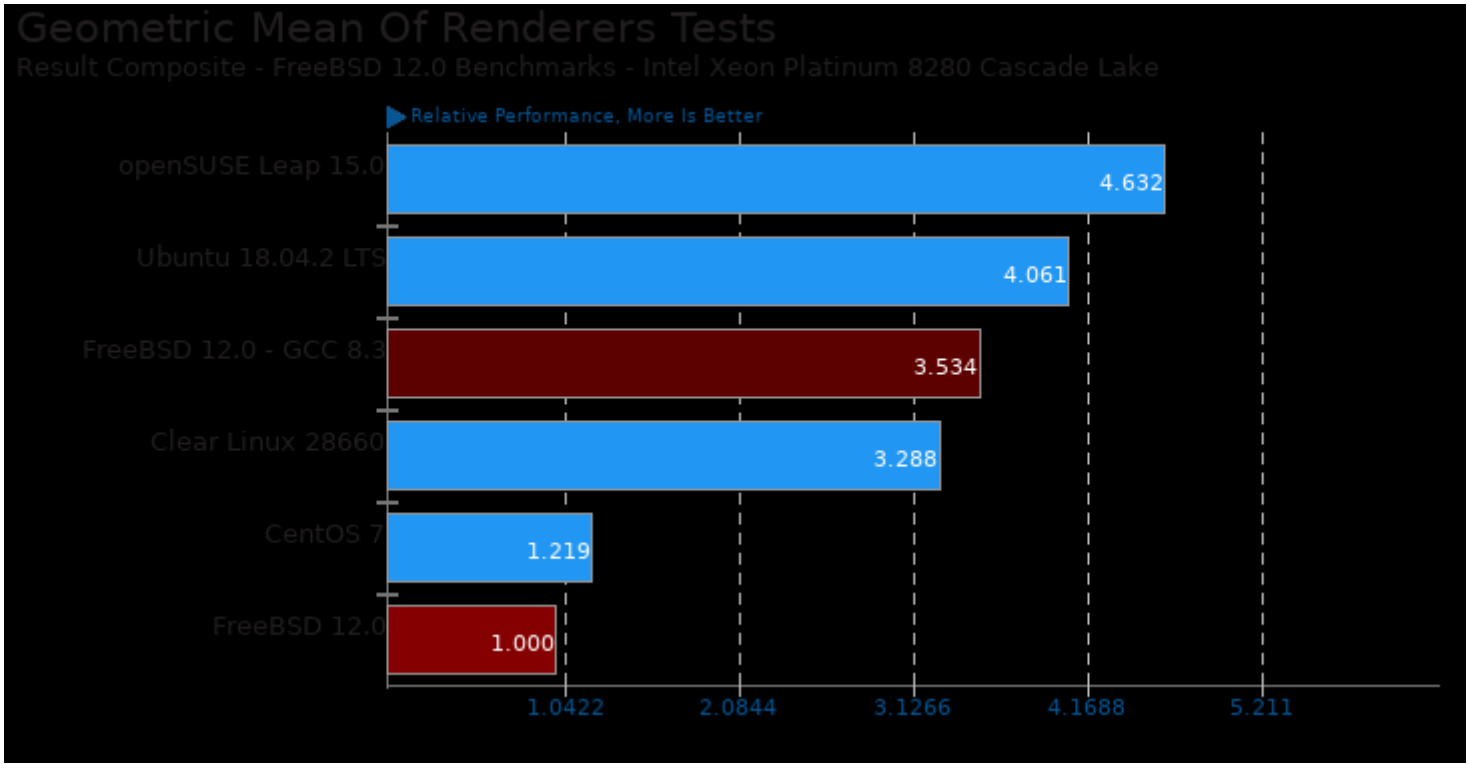
Geometric mean based upon tests: pts/fftw, pts/himeno, pts/hmmer, pts/numpy and pts/scikit-learn



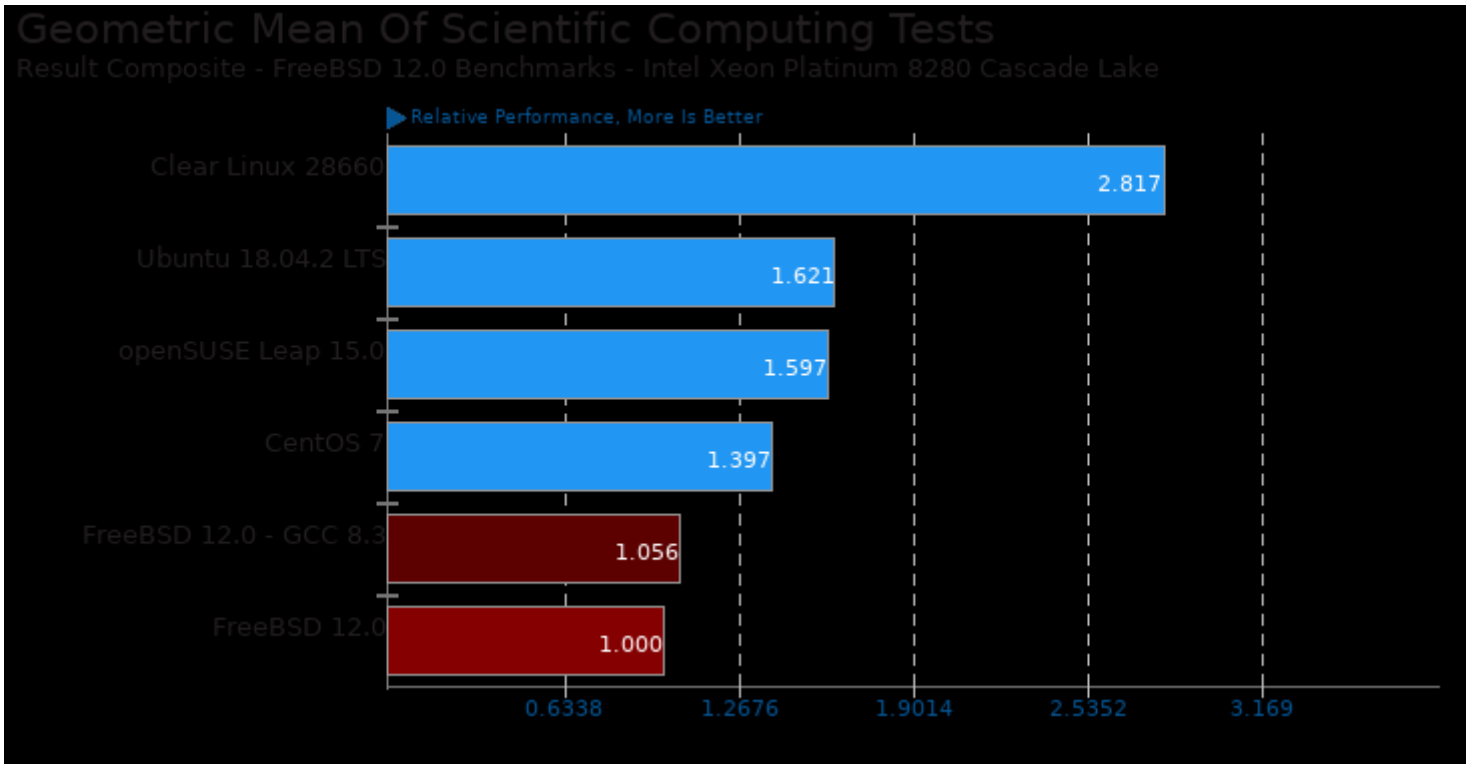
Geometric mean based upon tests: pts/graphics-magick, pts/tjbench and pts/dcraw



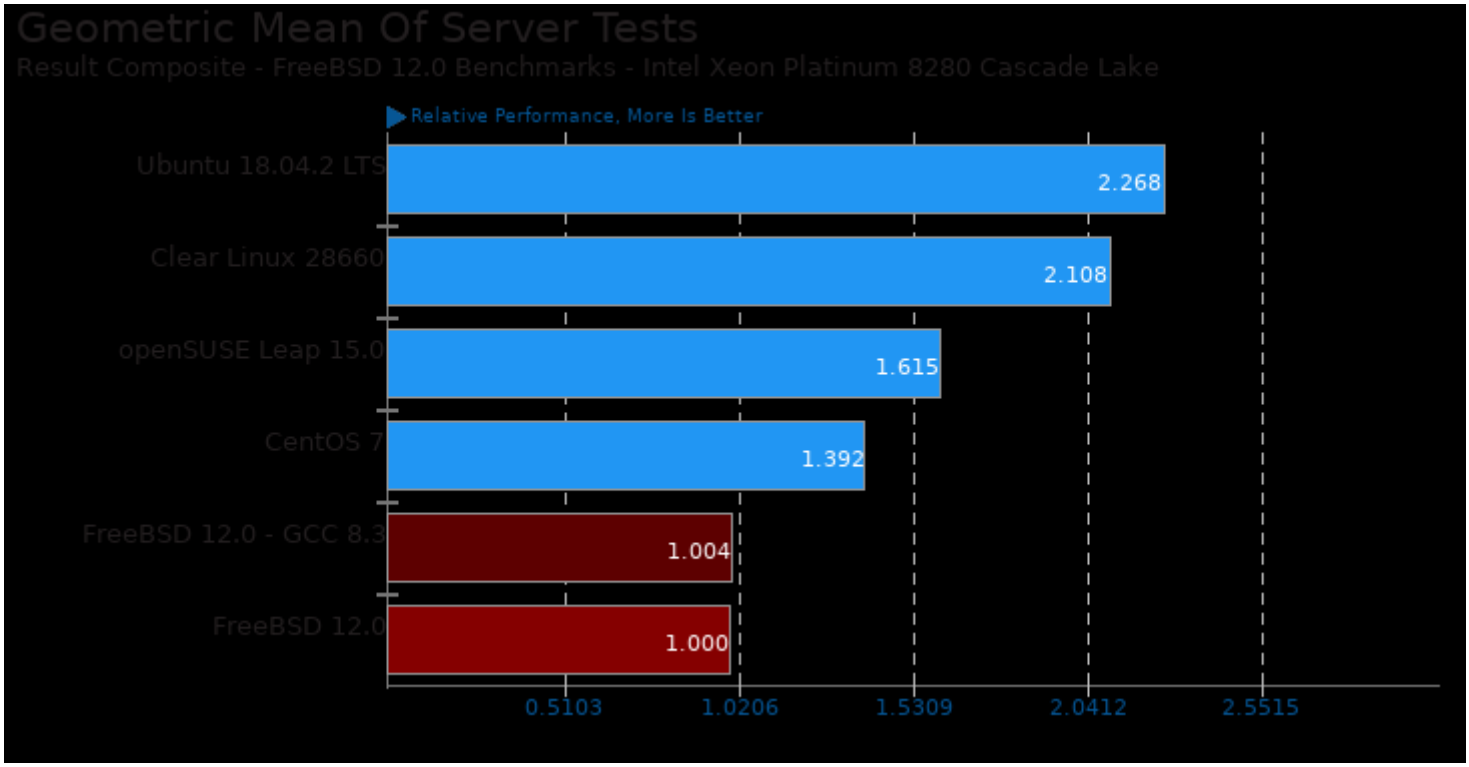
Geometric mean based upon tests: pts/apache, pts/postmark, pts/pgbench, pts/openssl, pts/stress-ng and pts/osbench



Geometric mean based upon tests: pts/c-ray, pts/blender, pts/aobench, pts/smallpt, pts/ttsiod-renderer and pts/v-ray



Geometric mean based upon tests: pts/fftw, pts/himeno and pts/hmmer



Geometric mean based upon tests: pts/apache, pts/blogbench, pts/pgbench, pts/php, pts/phpbench, pts/openssl, pts/perl-benchmark and pts/sqlite

This file was automatically generated via the Phoronix Test Suite benchmarking software on Friday, 29 March 2024 10:24.