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Windows 10 vs. Ubuntu 21.04 Linux - AMD Threadripper 3990X

AMD Ryzen Threadripper 3990X benchmarks on Windows and Linux for a future article by Michael Larabel.

Automated Executive Summary

Ubuntu 21.04 had the most wins, coming in first place for 82% of the tests.

Based on the geometric mean of all complete results, the fastest (Ubuntu 21.04) was 1.417x the speed of the slowest (Windows 10 b21382). Windows 10 b19042 was 0.798x the speed of Ubuntu 21.04 and Windows 10 b21382 was 0.884x the speed of Windows 10 b19042.

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

GraphicsMagick (Operation: Sharpen) at 3.971x
GraphicsMagick (Operation: HWB Color Space) at 3.84x
SVT-AV1 (Encoder Mode: Preset 8 - Input: Bosphorus 4K) at 3.261x
GraphicsMagick (Operation: Noise-Gaussian) at 2.88x
SVT-AV1 (Encoder Mode: Preset 4 - Input: Bosphorus 4K) at 2.787x
John The Ripper (Test: MD5) at 2.299x
Zstd Compression (Compression Level: 8, Long Mode - Compression Speed) at 2.275x
GraphicsMagick (Operation: Rotate) at 2.223x
Sudokut (Total Time) at 2.208x

GraphicsMagick (Operation: Enhanced) at 2.128x.

Test Systems:

Windows 10 b19042

Processor: AMD Eng Sample: 100-000000163_43/29_Y @ 2.90GHz (64 Cores / 128 Threads), Motherboard: Gigabyte TRX40 AORUS PRO WIFI (F4p BIOS), Memory: 4 x 32768 MB 3000MHz CMK64GX4M2D3000C16, Disk: 15GB Corsair Voyager 3.0 USB + 466GB Samsung SSD 970 EVO Plus 500GB, Graphics: AMD Radeon RX 5700 + AMD Radeon RX 5700 4GB, Audio: AMD HD Audio Device + USB Audio 2.0, Monitor: DELL 415Q, Network: Intel Wi-Fi 6 AX200 160MHz + Intel I211 Gigabit Connection

OS: Microsoft Windows 10 Pro Build 19042, Kernel: 10.0 (x86_64), Display Driver: 27.20.1034.6, OpenCL: OpenCL 2.1 AMD-APP (3075.13), File-System: NTFS, Screen Resolution: 3840x2160

Processor Notes: CPU Microcode: 3910300800000000
Java Notes: operable program or batch file.
Python Notes: Python 3.7.1
Security Notes: __user pointer sanitization: Disabled + Retpoline: Full + IBPB: Always + STIBP: Enabled

Windows 10 b21382

Processor: AMD Eng Sample: 100-000000163_43/29_Y @ 2.90GHz (64 Cores / 128 Threads), Motherboard: Gigabyte TRX40 AORUS PRO WIFI (F4p BIOS), Memory: 4 x 32768 MB 3000MHz CMK64GX4M2D3000C16, Disk: 15GB Corsair Voyager 3.0 USB + 466GB Samsung SSD 970 EVO Plus 500GB, Graphics: AMD Radeon RX 5700 + AMD Radeon RX 5700 4GB, Audio: AMD HD Audio Device + USB Audio 2.0, Monitor: DELL 415Q, Network: Intel I211 Gigabit Connection + Intel Wi-Fi 6 AX200 160MHz

OS: Microsoft Windows 10 Pro Build 21382, Kernel: 10.0 (x86_64), Display Driver: 27.20.21002.2004, OpenCL: OpenCL 2.1 AMD-APP (3240.6), Compiler: GCC 8.3.0, File-System: NTFS, Screen Resolution: 3840x2160

Processor Notes: CPU Microcode: 3910300800000000
Java Notes: OpenJDK Runtime Environment 18.9 (build 11.0.6+10-LTS)
Python Notes: Python 3.7.1
Security Notes: __user pointer sanitization: Disabled + Retpoline: Full + IBPB: Always + STIBP: Enabled

Ubuntu 21.04

Processor: AMD Ryzen Threadripper 3990X 64-Core @ 2.90GHz (64 Cores / 128 Threads), Motherboard: Gigabyte TRX40 AORUS PRO WIFI (F4p BIOS), Chipset: AMD Starship/Matisse, Memory: 126GB, Disk: Samsung SSD 970 EVO Plus 500GB, Graphics: AMD Radeon RX 5600 OEM/5600 XT / 5700/5700 8GB (1750/875MHz), Audio: AMD Navi 10 HDMI Audio, Monitor: DELL P2415Q, Network: Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 21.04, Kernel: 5.11.0-17-generic (x86_64), Desktop: GNOME Shell 3.38.4, Display Server: X Server + Wayland, OpenGL: 4.6 Mesa 21.0.1 (LLVM 11.0.1), Vulkan: 1.2.145, Compiler: GCC 10.3.0, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug

--enable-libstdcxx-time=yes --enable-link-mutex --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-gDeRY6/gcc-10-10.3.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-gDeRY6/gcc-10-10.3.0/debian/tmp-gcn/usr, hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-build-config=bootstrap-lto-lean --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq schedutil (Boost: Enabled) - CPU Microcode: 0x8301039
Java Notes: OpenJDK Runtime Environment (build 11.0.11+9-Ubuntu-0ubuntu2)
Python Notes: Python 3.9.4
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional STIBP: conditional RSB filling + srbds: Not affected + tsx_async_abort: Not affected

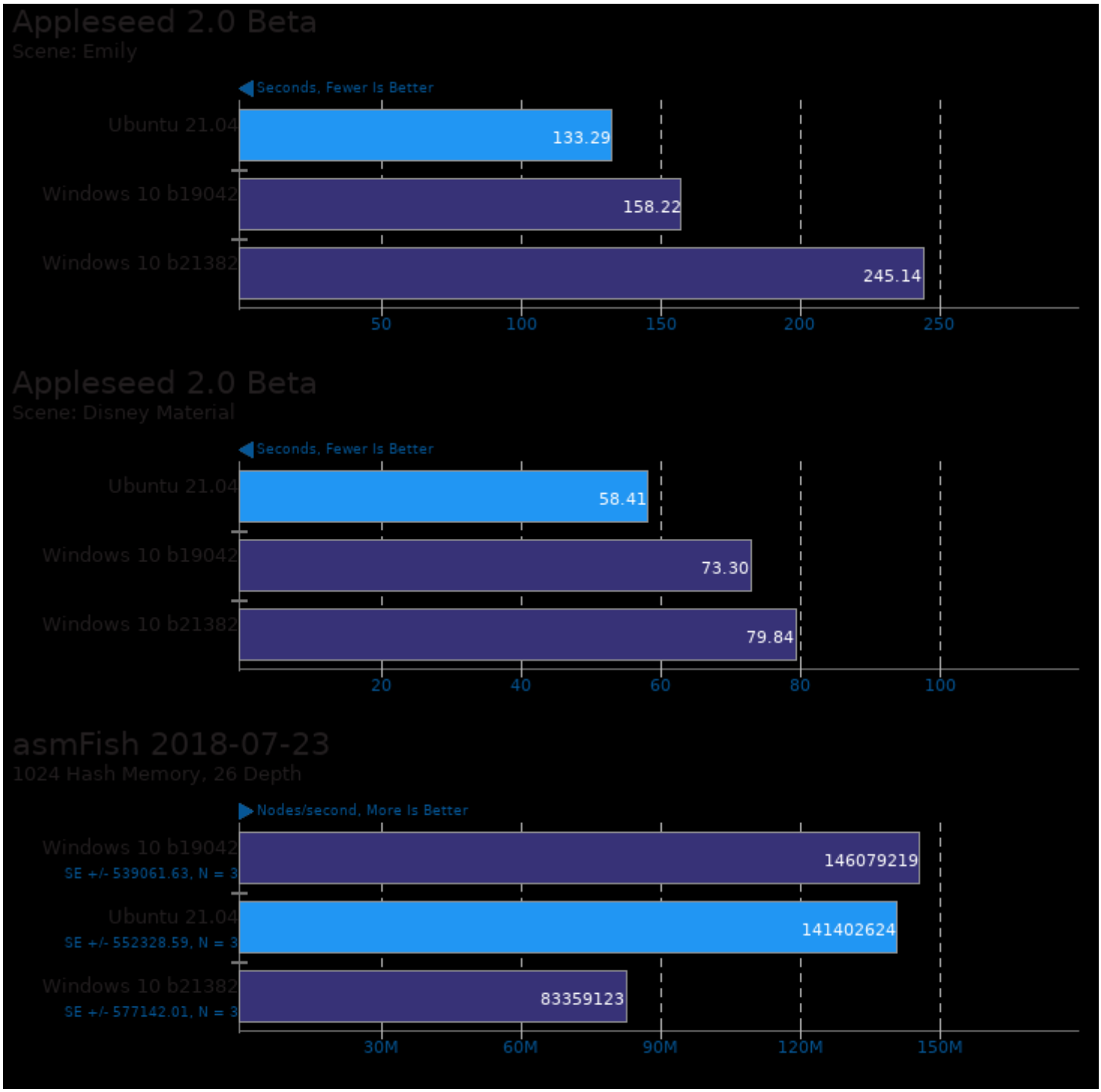
	Windows 10 b19042	Windows 10 b21382	Ubuntu 21.04
Appleseed - Emily (sec)	158.224	**245.144**	**133.292583**
Normalized	84.24%	54.37%	100%
Appleseed - Disney Material (sec)	73.302	**79.839**	**58.409713**
Normalized	79.68%	73.16%	100%
asmFish - 1.H.M.2.D (Nodes/s)	**146079219**	**83359123**	141402624
Normalized	100%	57.06%	96.8%
Standard Deviation	0.6%	1.2%	0.7%
Basis Universal - ETC1S (sec)	25.438	**26.995**	**24.209**
Normalized	95.17%	89.68%	100%
Standard Deviation	0.6%	0.4%	1.9%
Basis Universal - UASTC Level 0 (sec)	7.211	**7.295**	**6.398**
Normalized	88.73%	87.7%	100%
Standard Deviation	0.5%	0.2%	0.2%
Basis Universal - UASTC Level 2 (sec)	13.947	**14.173**	**10.448**
Normalized	74.91%	73.72%	100%
Standard Deviation	0.7%	0.2%	0.3%
Basis Universal - UASTC Level 3 (sec)	22.126	**22.175**	**14.823**
Normalized	66.99%	66.85%	100%
Standard Deviation	0.8%	0.9%	0.3%
Blender - BMW27 - CPU-Only (sec)	41.04	**52.34**	**32.90**
Normalized	80.17%	62.86%	100%
Standard Deviation	0.4%	2.1%	0.5%
Blender - Classroom - CPU-Only (sec)	103.25	**139.15**	**86.26**
Normalized	83.54%	61.99%	100%
Standard Deviation	0.8%	0.5%	0.8%
Blender - Fishy Cat - CPU-Only (sec)	57.70	**73.40**	**47.03**
Normalized	81.51%	64.07%	100%
Standard Deviation	0.5%	2%	0.2%
Blender - Barbershop - CPU-Only (sec)	153.77	**214.42**	**124.77**
Normalized	81.14%	58.19%	100%
Standard Deviation	0.4%	1.2%	0.5%
Blender - Pabellon Barcelona - CPU-Only	118.47	**172.16**	**100.92**
Normalized	85.19%	58.62%	100%
Standard Deviation	0.7%	2.4%	0.5%
Chaos Group V-RAY - CPU (vsamples)	48980	**29944**	**51437**
Normalized	95.22%	58.21%	100%
Standard Deviation	0.8%	5.8%	1.7%
Cpuminer-Opt - Magi (kH/s)	**470.41**	565.46	**2758**
Normalized	17.06%	20.5%	100%
Standard Deviation	58.8%	45.2%	1.3%
Cpuminer-Opt - x25x (kH/s)	878.93	**697.66**	**1648**

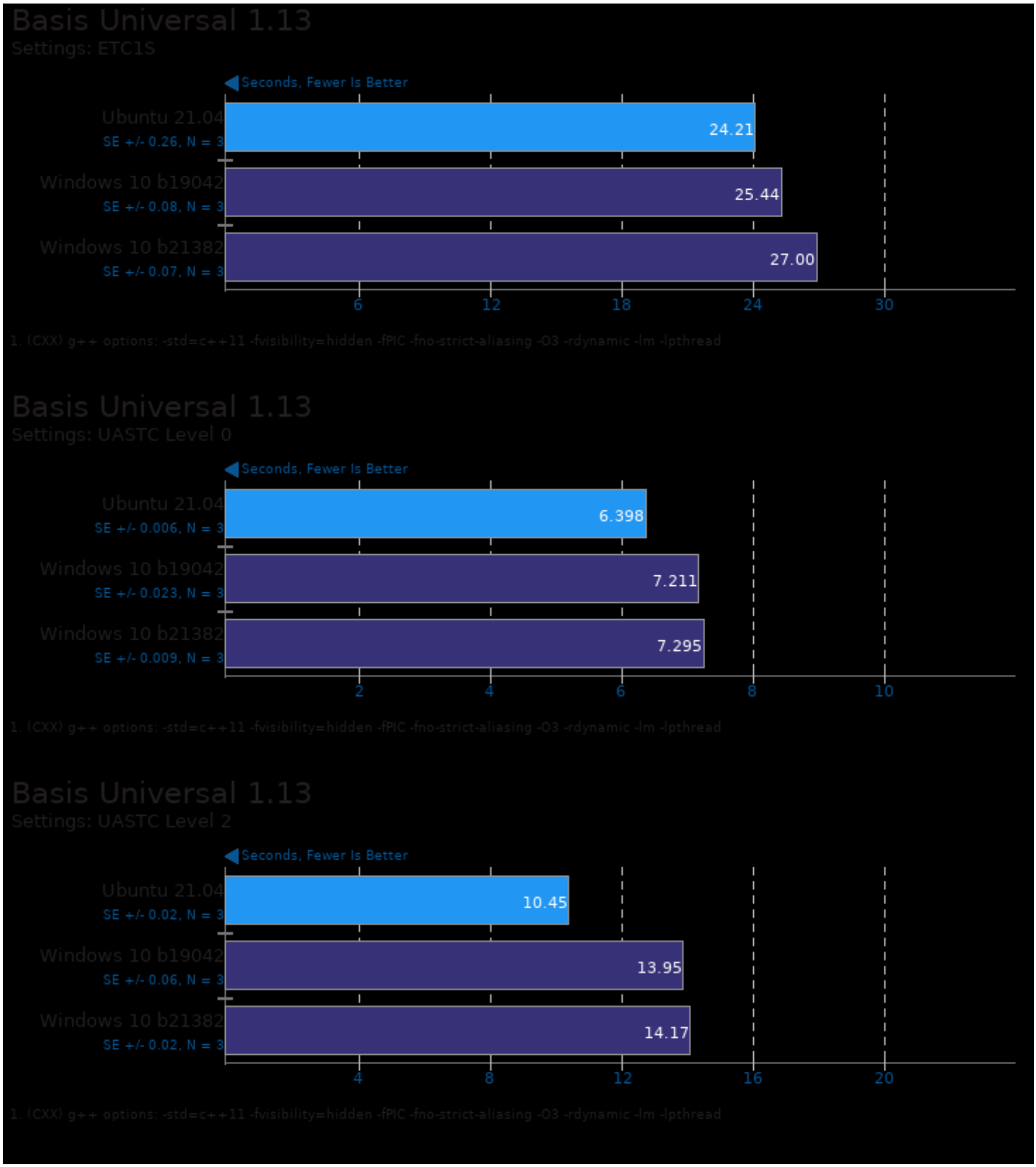
Normalized	53.32%	42.32%	100%
Standard Deviation	51.5%	75%	5.3%
Cpuminer-Opt - Deepcoin (kH/s)	**3103**	3575	**53950**
Normalized	5.75%	6.63%	100%
Standard Deviation	39.7%	92.2%	0.9%
Cpuminer-Opt - Ringcoin (kH/s)	2098	**1631**	**3628**
Normalized	57.83%	44.97%	100%
Standard Deviation	46.5%	64.9%	2.5%
Crafty - Elapsed Time (Nodes/s)	8398685	**7792272**	**8449770**
Normalized	99.4%	92.22%	100%
Standard Deviation	0.4%	0.2%	0.2%
DaCapo Benchmark - H2 (msec)	**3617**	3697	**4373**
Normalized	100%	97.84%	82.71%
Standard Deviation	2.1%	4.1%	0.7%
DaCapo Benchmark - Jython (msec)	**4839**	4661	**4157**
Normalized	85.91%	89.19%	100%
Standard Deviation	4.4%	1.3%	0.7%
DaCapo Benchmark - Tradebeans (msec)	**3122**	3825	**4999**
Normalized	100%	81.62%	62.45%
Standard Deviation	1.3%	2.4%	1%
dav1d - Summer Nature 4K (FPS)	**413.23**	404.21	**390.62**
Normalized	100%	97.82%	94.53%
Standard Deviation	0.2%	0.4%	0.4%
dav1d - S.N.1 (FPS)	**1489**	1410	**958.44**
Normalized	100%	94.64%	64.35%
Standard Deviation	0.2%	0.1%	0.2%
Embree - Pathtracer - Crown (FPS)	52.0790	**47.9578**	**54.7720**
Normalized	95.08%	87.56%	100%
Standard Deviation	0.6%	0.4%	0.9%
Embree - Pathtracer ISPC - Crown (FPS)	48.7715	**44.9993**	**49.7871**
Normalized	97.96%	90.38%	100%
Standard Deviation	0.4%	0.1%	0.5%
Embree - Pathtracer - Asian Dragon (FPS)	42.7692	**42.0337**	**44.3828**
Normalized	96.36%	94.71%	100%
Standard Deviation	0.1%	0.7%	0.2%
Embree - Pathtracer - Asian Dragon Obj	36.9222	**36.6534**	**38.2850**
Normalized	96.44%	95.74%	100%
Standard Deviation	0.1%	1%	0.1%
Embree - Pathtracer ISPC - Asian Dragon (FPS)	41.0387	**40.0374**	**42.4765**
Normalized	96.62%	94.26%	100%
Standard Deviation	0.2%	0.1%	0.3%
Embree - Pathtracer ISPC - Asian Dragon Obj (FPS)	35.5374	**35.1232**	**36.4448**
Normalized	97.51%	96.37%	100%
Standard Deviation	0%	0.6%	0.2%
FLAC Audio Encoding - WAV To FLAC (sec)	8.140	**8.407**	**7.934**
Normalized	97.47%	94.37%	100%
Standard Deviation	0.4%	0.5%	0.5%
GraphicsMagick - Rotate (Iterations/min)	335	**301**	**669**
Normalized	50.07%	44.99%	100%
Standard Deviation	0.5%		0.4%
GraphicsMagick - Sharpen (Iterations/min)	**173**	**173**	**687**
Normalized	25.18%	25.18%	100%
Standard Deviation	1.2%	1.5%	1%

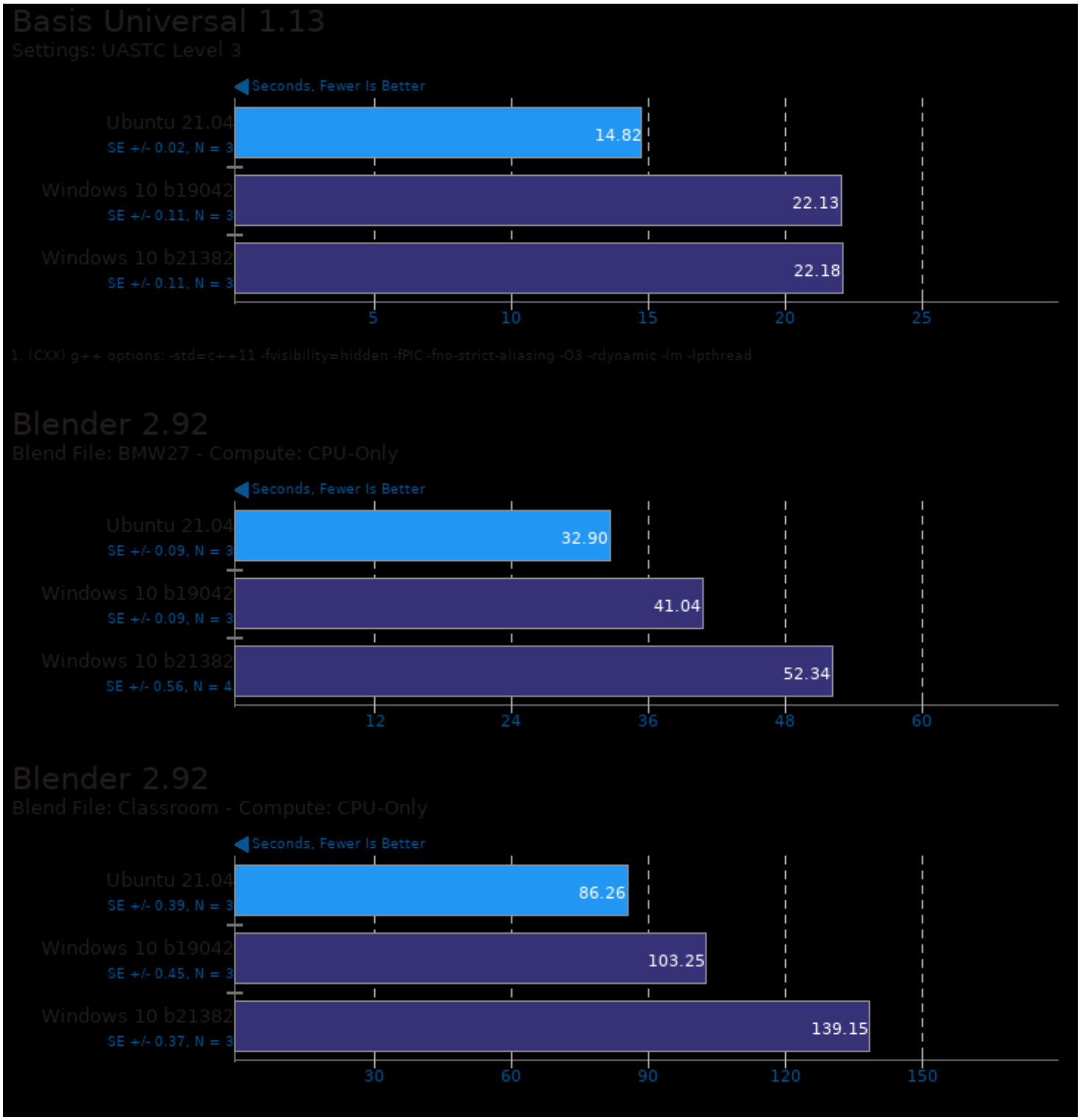
GraphicsMagick - Enhanced (Iterations/min)	512	**492**	**1047**
Normalized	48.9%	46.99%	100%
Standard Deviation	3.7%	1.2%	0.6%
GraphicsMagick - Resizing (Iterations/min)	655	**620**	**883**
Normalized	74.18%	70.22%	100%
Standard Deviation	0.3%	1.6%	7.1%
GraphicsMagick - Noise-Gaussian (Iterations/min)	271	**251**	**723**
Normalized	37.48%	34.72%	100%
Standard Deviation		2.1%	0.3%
GraphicsMagick - HWB Color Space (Iterations/min)	413	**356**	**1367**
Normalized	30.21%	26.04%	100%
Standard Deviation	0.6%	0.7%	0.3%
IndigoBench - CPU - Bedroom (M samples/s)	9.832	**8.933**	**10.395**
Normalized	94.58%	85.94%	100%
Standard Deviation	0.6%	1.5%	0.9%
IndigoBench - CPU - Supercar (M samples/s)	21.114	**20.028**	**22.215**
Normalized	95.04%	90.16%	100%
Standard Deviation	1.2%	1.3%	0.9%
Intel Open Image Denoise - Memorial (Images / Sec)	29.32	**25.74**	**30.63**
Normalized	95.72%	84.04%	100%
Standard Deviation	0.2%	2.3%	0.4%
John The Ripper - Blowfish (Real C/S)	66509	**61246**	**90882**
Normalized	73.18%	67.39%	100%
Standard Deviation	1.5%	0.9%	1.6%
John The Ripper - MD5 (Real C/S)	2874750	**2429333**	**5584333**
Normalized	51.48%	43.5%	100%
Standard Deviation	2.3%	0.6%	1%
LAME MP3 Encoding - WAV To MP3 (sec)	9.073	**9.351**	**7.466**
Normalized	82.29%	79.84%	100%
Standard Deviation	0.7%	0.4%	0.4%
libavif avifenc - 0 (sec)	54.055	**56.651**	**48.848**
Normalized	90.37%	86.23%	100%
Standard Deviation	0.9%	1%	0.6%
libavif avifenc - 2 (sec)	28.920	**30.094**	**25.815**
Normalized	89.26%	85.78%	100%
Standard Deviation	0.4%	0.9%	0.3%
libavif avifenc - 6 (sec)	11.229	**11.537**	**9.745**
Normalized	86.78%	84.47%	100%
Standard Deviation	1.6%	0.7%	0.7%
libavif avifenc - 10 (sec)	4.065	**4.140**	**3.316**
Normalized	81.57%	80.1%	100%
Standard Deviation	1.6%	0.4%	0.5%
libavif avifenc - 6, Lossless (sec)	28.627	**29.473**	**27.598**
Normalized	96.41%	93.64%	100%
Standard Deviation	0.5%	0.9%	0.5%
libavif avifenc - 10, Lossless (sec)	6.651	**6.776**	**5.852**
Normalized	87.99%	86.36%	100%
Standard Deviation	1.4%	0.7%	1%
LZ4 Compression - 1 - Compression Speed (MB/s)	**10618**	10534	**10252**
Normalized	100%	99.21%	96.56%
Standard Deviation	1.8%	0.1%	0.3%

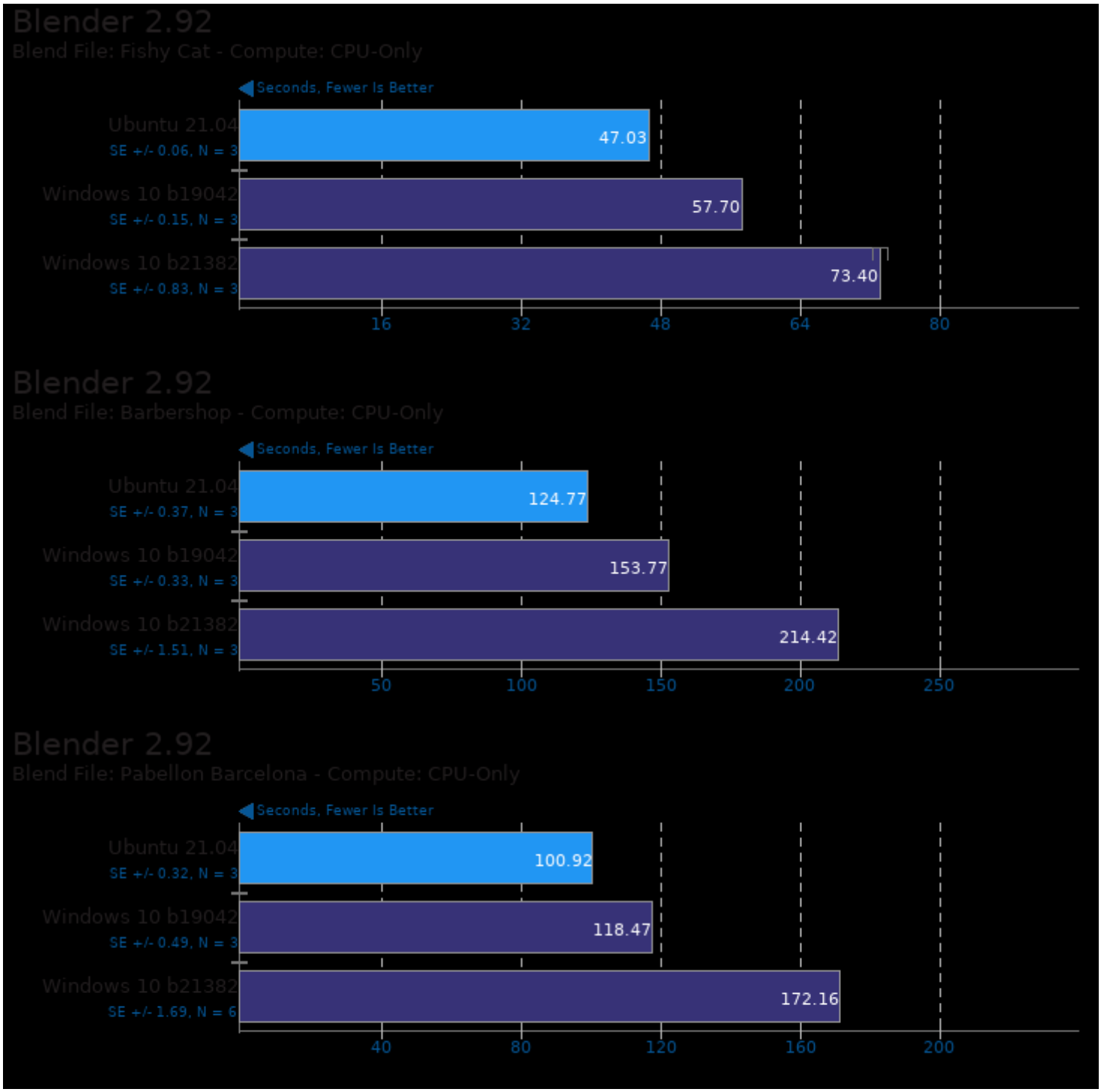
LZ4 Compression - 1 - D.S (MB/s)	**12181**	12055	**11961**
Normalized	100%	98.96%	98.19%
Standard Deviation	1.8%	0.3%	0.4%
LZ4 Compression - 3 - Compression Speed (MB/s)	57.84	**57.14**	**58.66**
Normalized	98.6%	97.41%	100%
Standard Deviation	0.9%	0.9%	2.1%
LZ4 Compression - 3 - D.S (MB/s)	**11621**	**11379**	11489
Normalized	100%	97.92%	98.87%
Standard Deviation	0.3%	0.5%	1.1%
LZ4 Compression - 9 - Compression Speed (MB/s)	56.25	**54.92**	**56.39**
Normalized	99.75%	97.39%	100%
Standard Deviation	1.2%	1.9%	1.4%
LZ4 Compression - 9 - D.S (MB/s)	**11555**	**11420**	11457
Normalized	100%	98.83%	99.15%
Standard Deviation	0.9%	0.3%	0.6%
Minion - Graceful (sec)	48.355	**49.182**	**41.220308**
Normalized	85.25%	83.81%	100%
Standard Deviation	0.9%	0.4%	0.3%
Minion - Solitaire (sec)	**48.665**	50.591	**62.307110**
Normalized	100%	96.19%	78.11%
Standard Deviation	1.6%	2.2%	1.1%
Minion - Quasigroup (sec)	111.094	**112.997**	**105.466724**
Normalized	94.93%	93.34%	100%
Standard Deviation	0.4%	0.1%	0.9%
Opus Codec Encoding - WAV To Opus Encode (sec)	9.903	**10.193**	**7.299**
Normalized	73.7%	71.61%	100%
Standard Deviation	0.4%	0.5%	0.4%
Primesieve - 1.P.N.G (sec)	**6.657**	6.440	**3.834**
Normalized	57.59%	59.53%	100%
Standard Deviation	0.8%	3.1%	0.9%
PyBench - T.F.A.T.T (Milliseconds)	1460	**1475**	**966**
Normalized	66.16%	65.49%	100%
Standard Deviation	0.7%	1%	0.8%
Stockfish - Total Time (Nodes/s)	152809742	**84248194**	**163071576**
Normalized	93.71%	51.66%	100%
Standard Deviation	3.2%	3.1%	2%
Sudokut - Total Time (sec)	25.323	**27.395**	**12.405**
Normalized	48.99%	45.28%	100%
Standard Deviation	0.7%	0.7%	0.1%
SVT-AV1 - Preset 4 - Bosphorus 4K (FPS)	1.811	**1.698**	**4.732**
Normalized	38.27%	35.88%	100%
Standard Deviation	0.6%	2.2%	1.1%
SVT-AV1 - Preset 8 - Bosphorus 4K (FPS)	20.689	**15.789**	**51.494**
Normalized	40.18%	30.66%	100%
Standard Deviation	0%	0%	0.8%
SVT-AV1 - Preset 4 - Bosphorus 1080p (FPS)	8.225	**7.504**	**10.352**
Normalized	79.45%	72.49%	100%
Standard Deviation	2.6%	2.4%	1%
SVT-AV1 - Preset 8 - Bosphorus 1080p (FPS)	127.983	**82.137**	**132.098**
Normalized	96.88%	62.18%	100%
Standard Deviation	10.7%	6.4%	0.8%

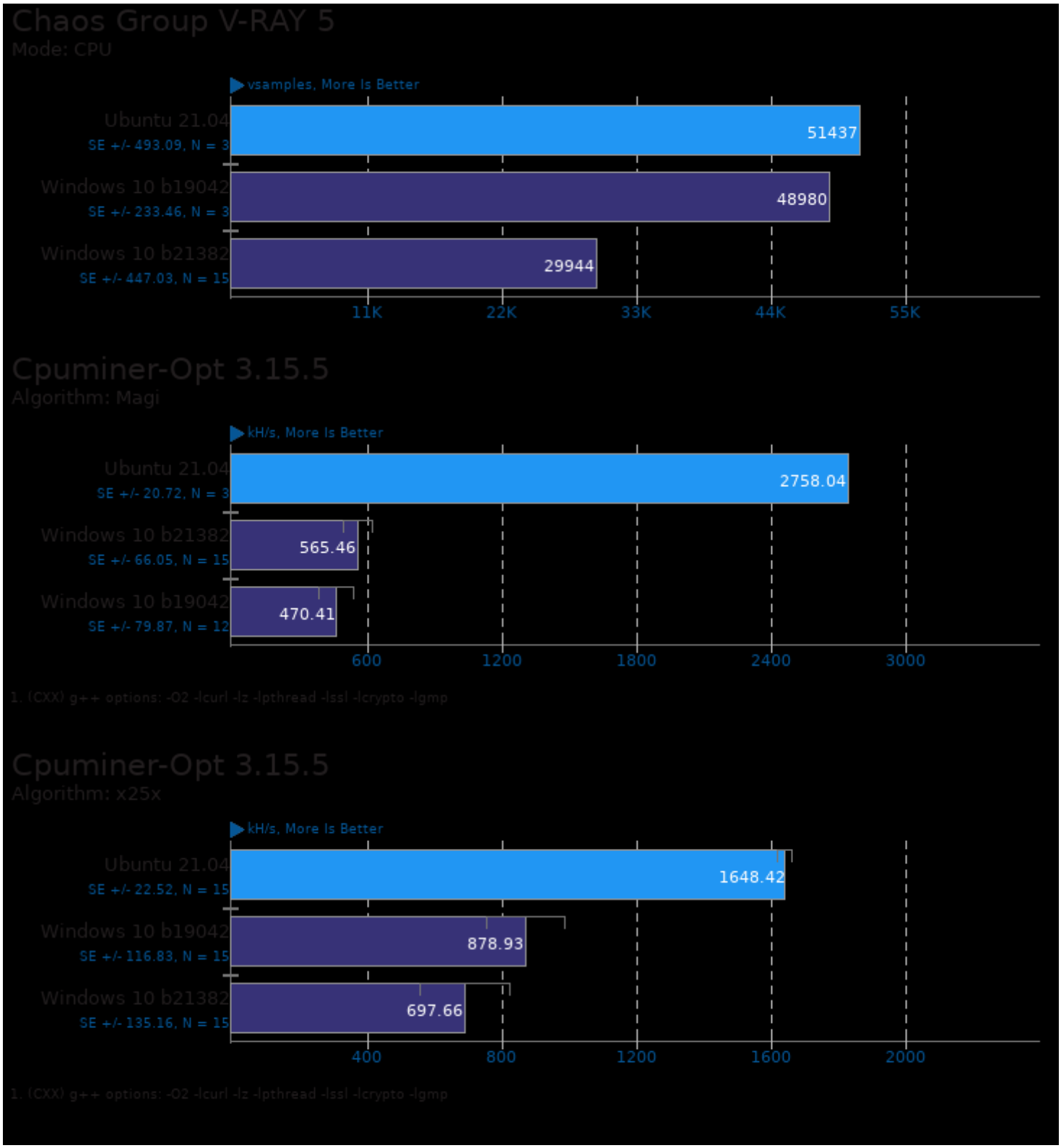
TSCP - A.C.P (Nodes/s)	1219662	**1176374**	**1292928**
Normalized	94.33%	90.99%	100%
Standard Deviation	0.7%	0.1%	0.5%
WebP Image Encode - Q.1.L (Encode Time - sec)	16.774	**29.853**	**16.313**
Normalized	97.25%	54.64%	100%
Standard Deviation	1.9%	1.5%	0.8%
WebP Image Encode - Q.1.H.C (Encode Time - sec)	**7.433**	**7.653**	7.471
Normalized	100%	97.13%	99.49%
Standard Deviation	0.4%	0.1%	0.5%
WebP Image Encode - Q.1.L.H.C (Encode Time - sec)	36.589	**62.489**	**34.048**
Normalized	93.06%	54.49%	100%
Standard Deviation	1.9%	2.5%	0.4%
x264 - H.2.V.E (FPS)	**250.26**	221.08	**195.38**
Normalized	100%	88.34%	78.07%
Standard Deviation	1.1%	0.3%	5.3%
Zstd Compression - 19 - Compression Speed (MB/s)	76.3	**62.1**	**84.3**
Normalized	90.51%	73.67%	100%
Standard Deviation	0.6%	0.2%	0.5%
Zstd Compression - 19 - D.S (MB/s)	3101	**2391**	**3174**
Normalized	97.7%	75.35%	100%
Standard Deviation	0.3%	0.2%	0.2%
Zstd Compression - 3, Long Mode - Compression Speed (MB/s)	872.7	**898.3**	**554.8**
Normalized	97.15%	100%	61.76%
Standard Deviation	12.6%	2.2%	0.7%
Zstd Compression - 3, Long Mode - D.S	3647	**3526**	**3761**
Normalized	96.96%	93.76%	100%
Standard Deviation	0.5%	0%	0.8%
Zstd Compression - 8, Long Mode - Compression Speed (MB/s)	**1034**	**454.5**	568.9
Normalized	100%	43.95%	55.01%
Standard Deviation	1%	1%	0.6%
Zstd Compression - 8, Long Mode - D.S	3800	**3622**	**3895**
Normalized	97.56%	92.99%	100%
Standard Deviation	0.7%	0.5%	0.6%
Zstd Compression - 19, Long Mode - Compression Speed (MB/s)	39.8	**36.1**	**44.3**
Normalized	89.84%	81.49%	100%
Standard Deviation	0.6%	0.4%	0.1%
Zstd Compression - 19, Long Mode - D.S (MB/s)	3165	**2662**	**3240**
Normalized	97.68%	82.16%	100%
Standard Deviation	0%	0.1%	0.3%
Geometric Mean Of All Test Results - Result Composite - W.1.v.U.2.0.L - A.T.3 (Geometric Mean)	86.662	**76.652**	**108.621**
Normalized	79.78%	70.57%	100%

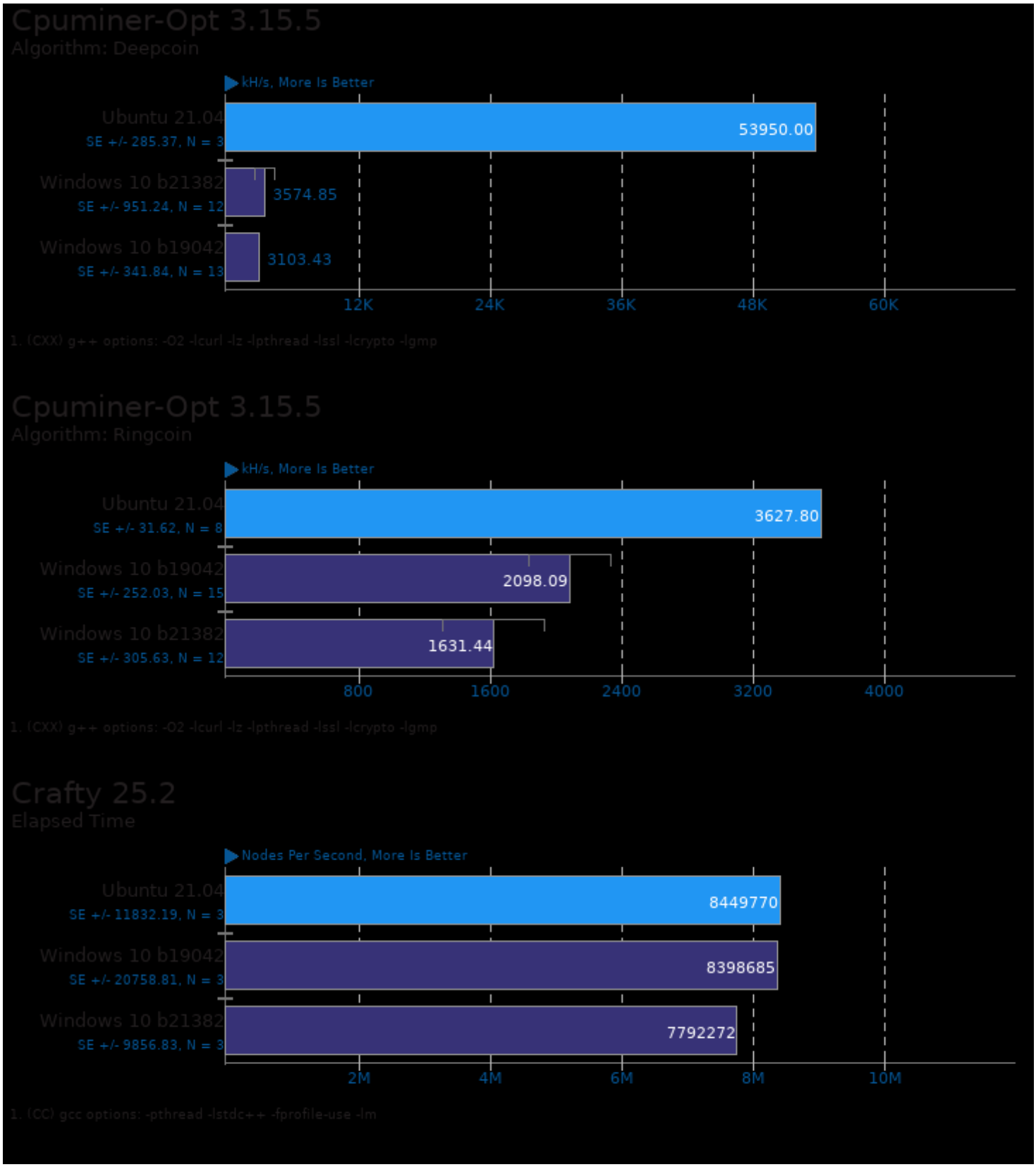

Appleseed 2.0 Beta
Scene: Emily
Seconds, Fewer Is Better
Ubuntu 21.04
133.29
Windows 10 b19042
158.22
Windows 10 b21382
245.14
50
100
150
200
250
Appleseed 2.0 Beta
Scene: Disney Material
Seconds, Fewer Is Better
Ubuntu 21.04
58.41
Windows 10 b19042
73.30
Windows 10 b21382
79.84
20
40
60
80
100
asmFish 2018-07-23
1024 Hash Memory, 26 Depth
Nodes/second, More Is Better
Windows 10 b19042
SE +/- 539061.63, N = 3
146079219
Ubuntu 21.04
SE +/- 552328.59, N = 3
141402624
Windows 10 b21382
SE +/- 577142.01, N = 3
83359123
30M
60M
90M
120M
150M

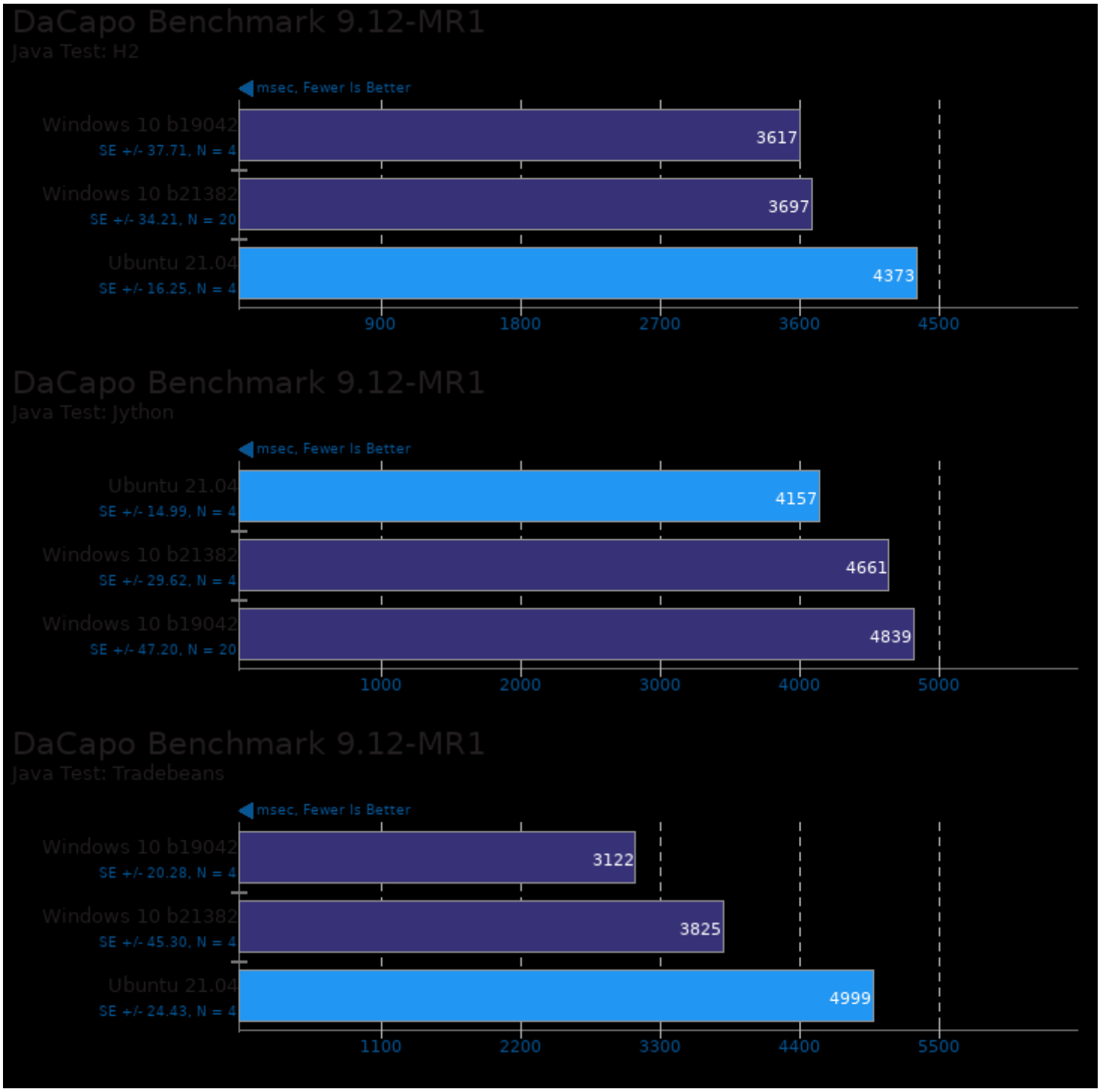

Basis Universal 1.13
Settings: ETC1S
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.26, N = 3
24.21
Windows 10 b19042
SE +/- 0.08, N = 3
25.44
Windows 10 b21382
SE +/- 0.07, N = 3
27.00
6
12
18
24
30
1. (CXX) g++ options: -std=c++11 -fvisibility=hidden -fPIC -fno-strict-aliasing -O3 -rdynamic -lm -lpthread
Basis Universal 1.13
Settings: UASTC Level 0
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.006, N = 3
6.398
Windows 10 b19042
SE +/- 0.023, N = 3
7.211
Windows 10 b21382
SE +/- 0.009, N = 3
7.295
2
4
6
8
10
1. (CXX) g++ options: -std=c++11 -fvisibility=hidden -fPIC -fno-strict-aliasing -O3 -rdynamic -lm -lpthread
Basis Universal 1.13
Settings: UASTC Level 2
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.02, N = 3
10.45
Windows 10 b19042
SE +/- 0.06, N = 3
13.95
Windows 10 b21382
SE +/- 0.02, N = 3
14.17
4
8
12
16
20
1. (CXX) g++ options: -std=c++11 -fvisibility=hidden -fPIC -fno-strict-aliasing -O3 -rdynamic -lm -lpthread

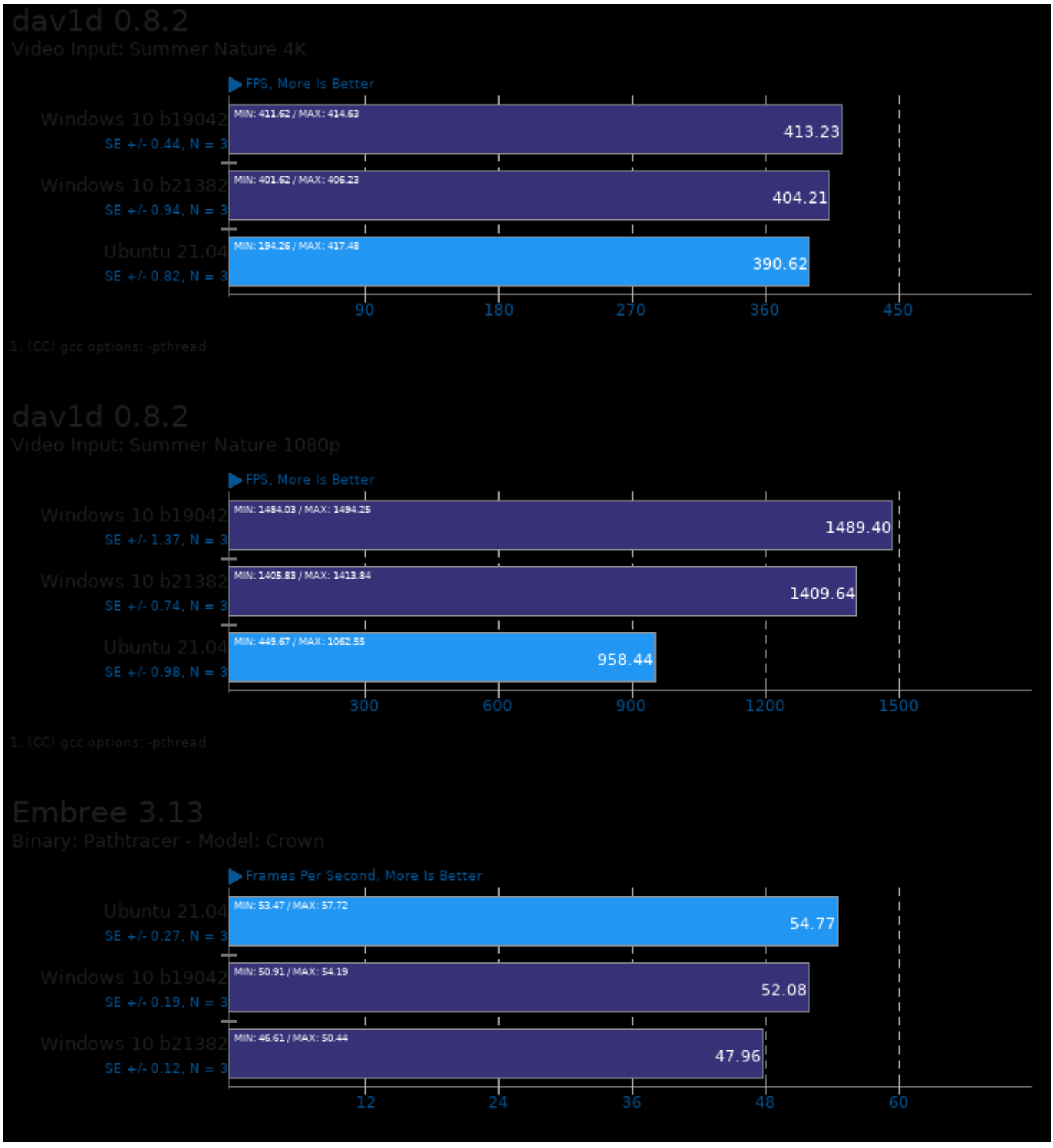

Basis Universal 1.13
Settings: UASTC Level 3
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.02, N = 3
14.82
Windows 10 b19042
SE +/- 0.11, N = 3
22.13
Windows 10 b21382
SE +/- 0.11, N = 3
22.18
5
10
15
20
25
1. (CXX) g++ options: -std=c++11 -fvisibility=hidden -fPIC -fno-strict-aliasing -O3 -rdynamic -lm -lpthread
Blender 2.92
Blend File: BMW27 - Compute: CPU-Only
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.09, N = 3
32.90
Windows 10 b19042
SE +/- 0.09, N = 3
41.04
Windows 10 b21382
SE +/- 0.56, N = 4
52.34
12
24
36
48
60
Blender 2.92
Blend File: Classroom - Compute: CPU-Only
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.39, N = 3
86.26
Windows 10 b19042
SE +/- 0.45, N = 3
103.25
Windows 10 b21382
SE +/- 0.37, N = 3
139.15
30
60
90
120
150

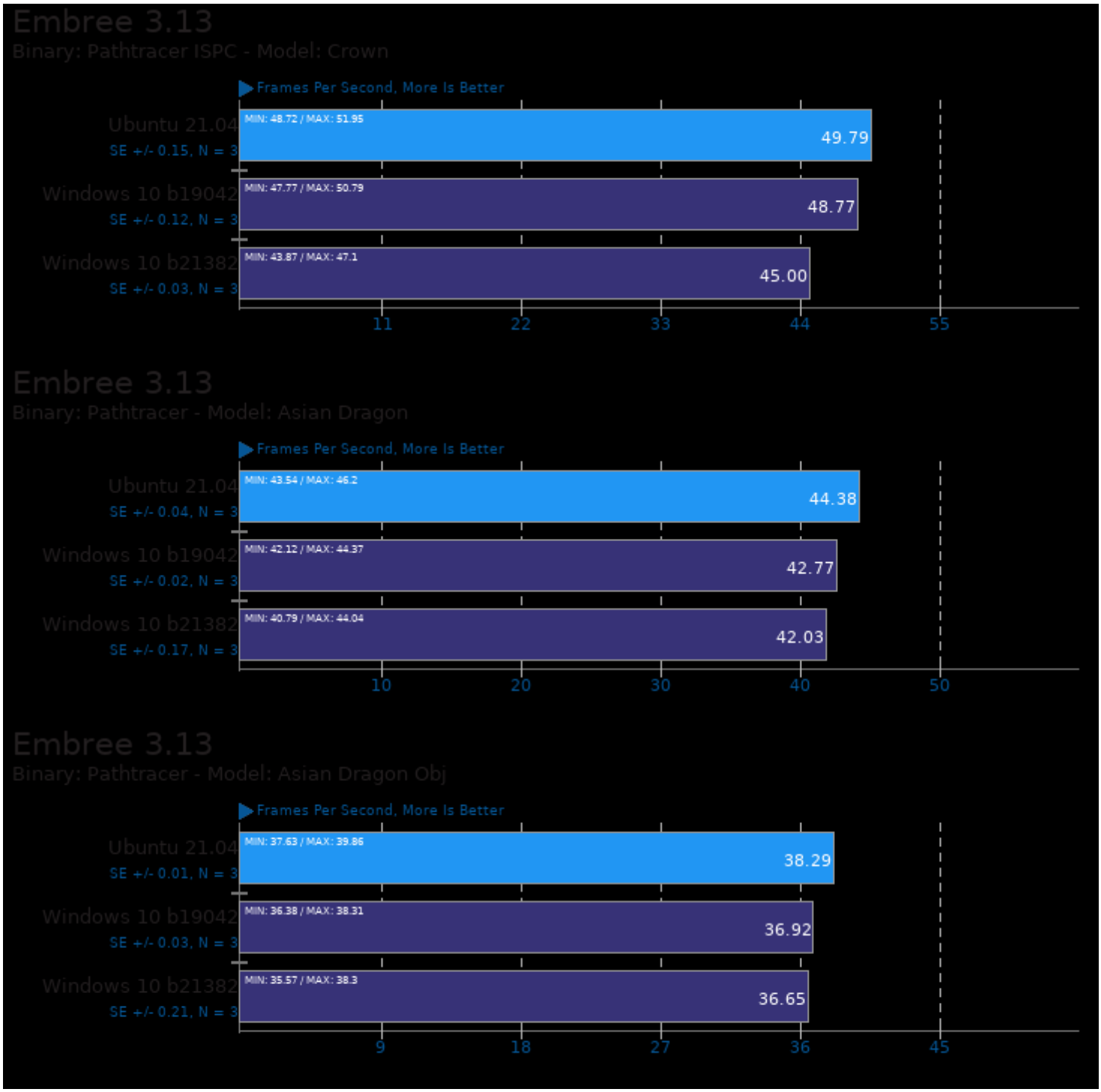

Blender 2.92
Blend File: Fishy Cat - Compute: CPU-Only
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.06, N = 3
47.03
Windows 10 b19042
SE +/- 0.15, N = 3
57.70
Windows 10 b21382
SE +/- 0.83, N = 3
73.40
16
32
48
64
80
Blender 2.92
Blend File: Barbershop - Compute: CPU-Only
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.37, N = 3
124.77
Windows 10 b19042
SE +/- 0.33, N = 3
153.77
Windows 10 b21382
SE +/- 1.51, N = 3
214.42
50
100
150
200
250
Blender 2.92
Blend File: Pabellon Barcelona - Compute: CPU-Only
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.32, N = 3
100.92
Windows 10 b19042
SE +/- 0.49, N = 3
118.47
Windows 10 b21382
SE +/- 1.69, N = 6
172.16
40
80
120
160
200

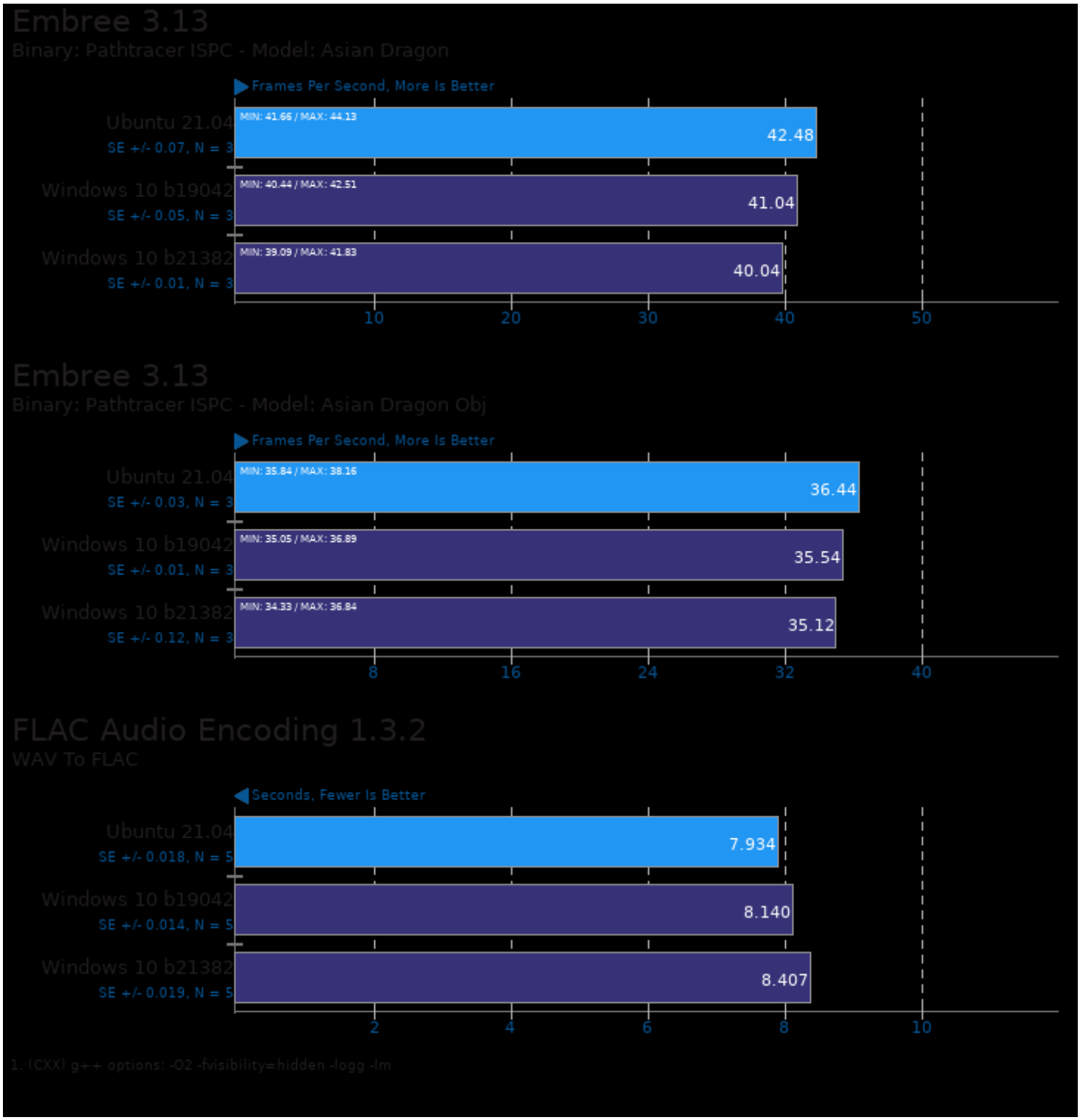

Chaos Group V-RAY 5
Mode: CPU
vsamples, More Is Better
Ubuntu 21.04
SE +/- 493.09, N = 3
51437
Windows 10 b19042
SE +/- 233.46, N = 3
48980
Windows 10 b21382
SE +/- 447.03, N = 15
29944
11K
22K
33K
44K
55K
Cpuminer-Opt 3.15.5
Algorithm: Magi
kH/s, More Is Better
Ubuntu 21.04
SE +/- 20.72, N = 3
2758.04
Windows 10 b21382
SE +/- 66.05, N = 15
565.46
Windows 10 b19042
SE +/- 79.87, N = 12
470.41
600
1200
1800
2400
3000
1. (CXX) g++ options: -O2 -lcurl -lz -lpthread -lssl -lcrypto -lgmp
Cpuminer-Opt 3.15.5
Algorithm: x25x
kH/s, More Is Better
Ubuntu 21.04
SE +/- 22.52, N = 15
1648.42
Windows 10 b19042
SE +/- 116.83, N = 15
878.93
Windows 10 b21382
SE +/- 135.16, N = 15
697.66
400
800
1200
1600
2000
1. (CXX) g++ options: -O2 -lcurl -lz -lpthread -lssl -lcrypto -lgmp

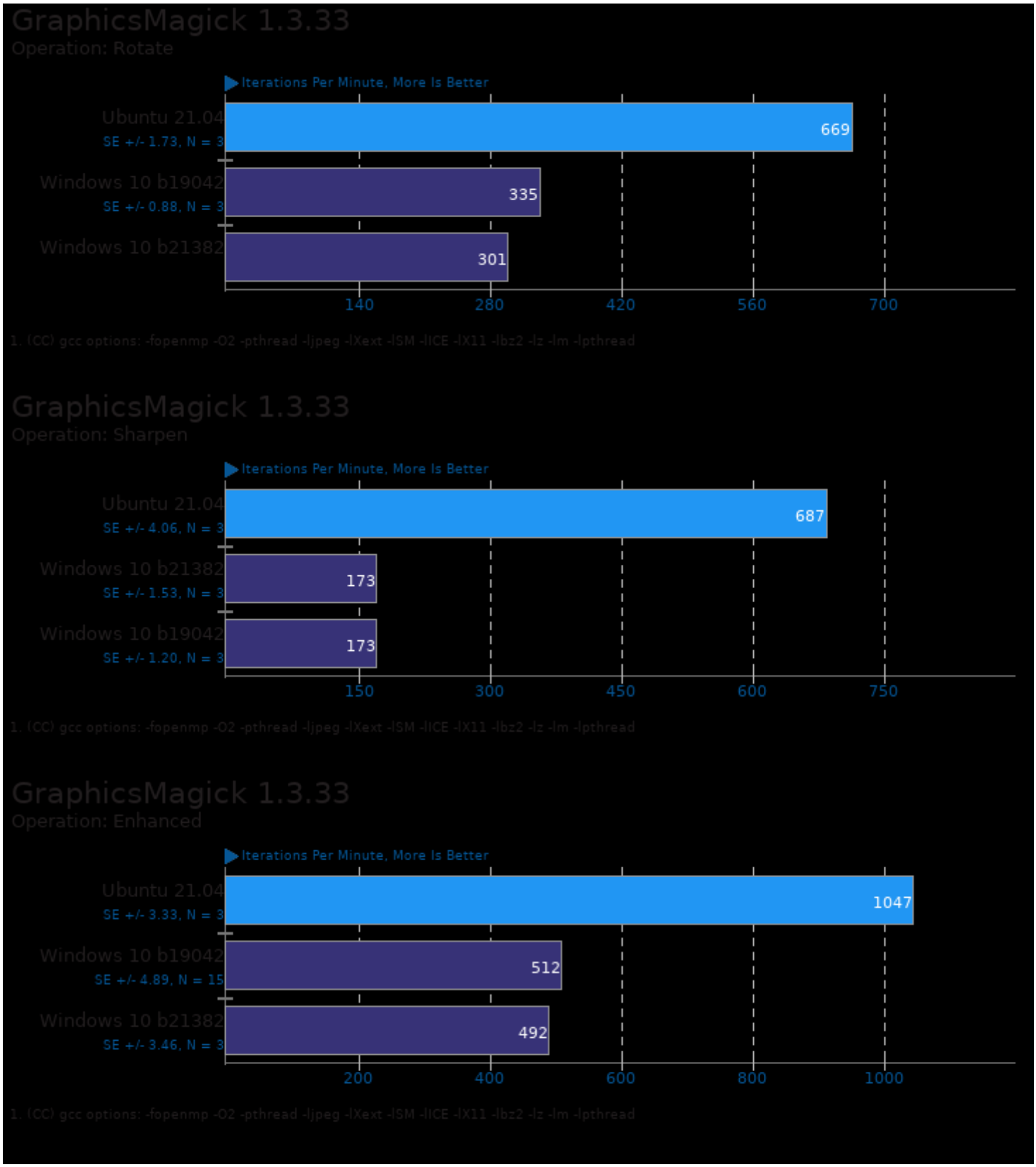

Cpuminer-Opt 3.15.5
Algorithm: Deepcoin
kH/s, More Is Better
Ubuntu 21.04
SE +/- 285.37, N = 3
53950.00
Windows 10 b21382
SE +/- 951.24, N = 12
3574.85
Windows 10 b19042
SE +/- 341.84, N = 13
3103.43
12K
24K
36K
48K
60K
1. (CXX) g++ options: -O2 -lcurl -lz -lpthread -lssl -lcrypto -lgmp
Cpuminer-Opt 3.15.5
Algorithm: Ringcoin
kH/s, More Is Better
Ubuntu 21.04
SE +/- 31.62, N = 8
3627.80
Windows 10 b19042
SE +/- 252.03, N = 15
2098.09
Windows 10 b21382
SE +/- 305.63, N = 12
1631.44
800
1600
2400
3200
4000
1. (CXX) g++ options: -O2 -lcurl -lz -lpthread -lssl -lcrypto -lgmp
Crafty 25.2
Elapsed Time
Nodes Per Second, More Is Better
Ubuntu 21.04
SE +/- 11832.19, N = 3
8449770
Windows 10 b19042
SE +/- 20758.81, N = 3
8398685
Windows 10 b21382
SE +/- 9856.83, N = 3
7792272
2M
4M
6M
8M
10M
1. (CC) gcc options: -pthread -lstdc++ -fprofile-use -lm

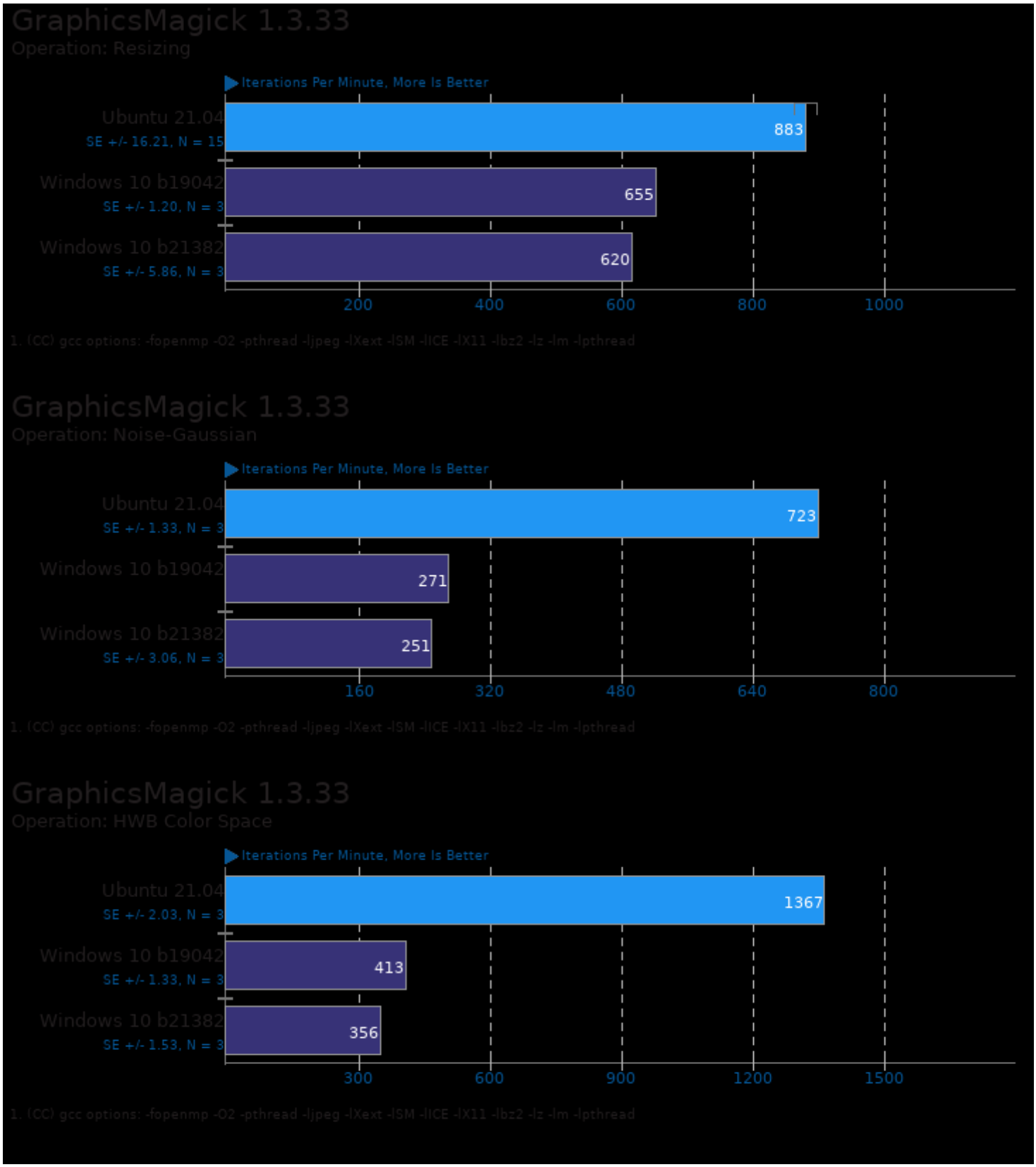

DaCapo Benchmark 9.12-MR1
Java Test: H2
msec, Fewer Is Better
Windows 10 b19042
SE +/- 37.71, N = 4
3617
Windows 10 b21382
SE +/- 34.21, N = 20
3697
Ubuntu 21.04
SE +/- 16.25, N = 4
4373
900
1800
2700
3600
4500
DaCapo Benchmark 9.12-MR1
Java Test: Jython
msec, Fewer Is Better
Ubuntu 21.04
SE +/- 14.99, N = 4
4157
Windows 10 b21382
SE +/- 29.62, N = 4
4661
Windows 10 b19042
SE +/- 47.20, N = 20
4839
1000
2000
3000
4000
5000
DaCapo Benchmark 9.12-MR1
Java Test: Tradebeans
msec, Fewer Is Better
Windows 10 b19042
SE +/- 20.28, N = 4
3122
Windows 10 b21382
SE +/- 45.30, N = 4
3825
Ubuntu 21.04
SE +/- 24.43, N = 4
4999
1100
2200
3300
4400
5500

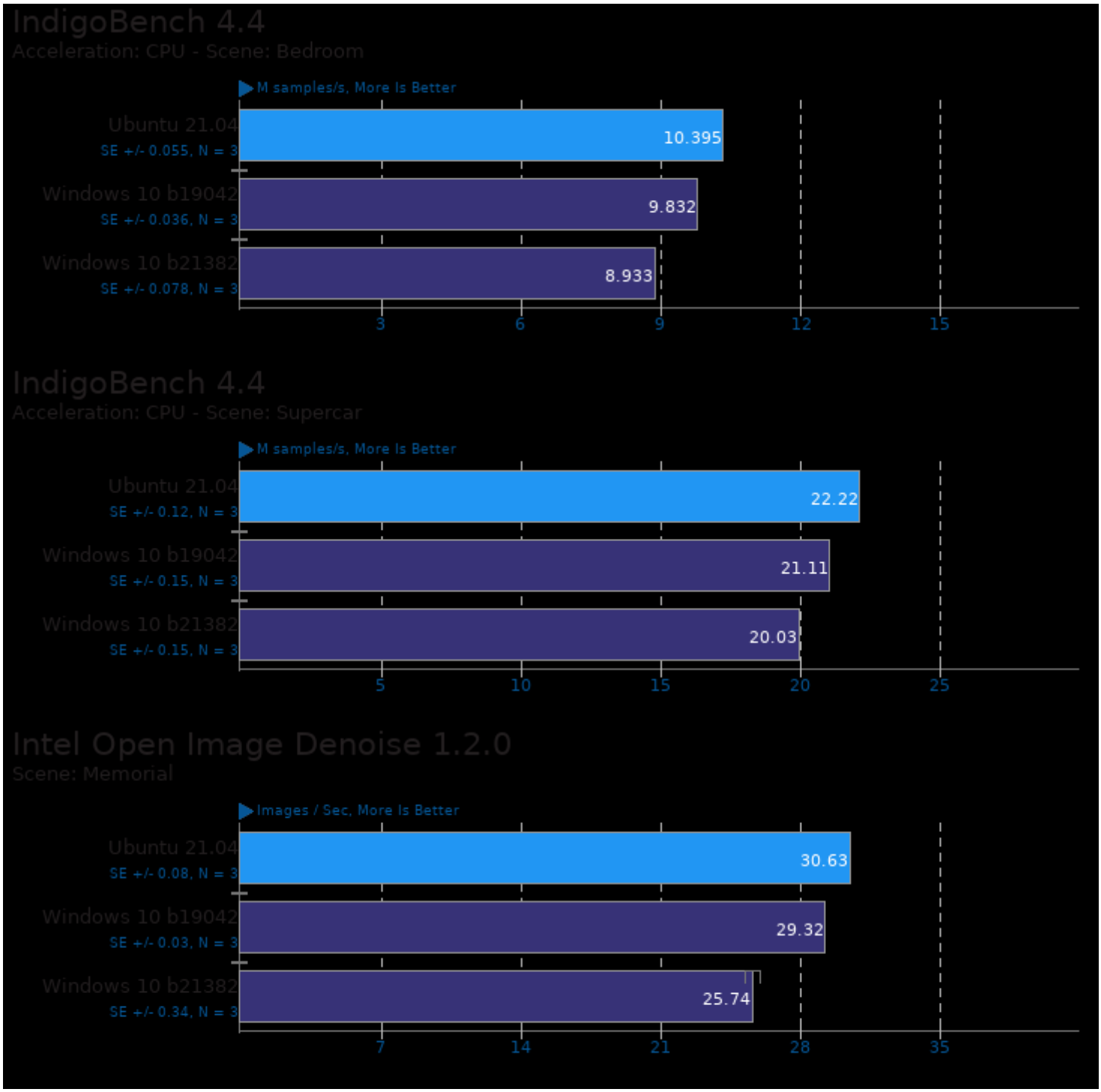

dav1d 0.8.2
Video Input: Summer Nature 4K
FPS, More Is Better
Windows 10 b19042
SE +/- 0.44, N = 3
MIN: 411.62 / MAX: 414.63
413.23
Windows 10 b21382
SE +/- 0.94, N = 3
MIN: 401.62 / MAX: 406.23
404.21
Ubuntu 21.04
SE +/- 0.82, N = 3
MIN: 194.26 / MAX: 417.48
390.62
90
180
270
360
450
1. (CC) gcc options: -pthread
dav1d 0.8.2
Video Input: Summer Nature 1080p
FPS, More Is Better
Windows 10 b19042
SE +/- 1.37, N = 3
MIN: 1484.03 / MAX: 1494.25
1489.40
Windows 10 b21382
SE +/- 0.74, N = 3
MIN: 1405.83 / MAX: 1413.84
1409.64
Ubuntu 21.04
SE +/- 0.98, N = 3
MIN: 449.67 / MAX: 1062.55
958.44
300
600
900
1200
1500
1. (CC) gcc options: -pthread
Embree 3.13
Binary: Pathtracer - Model: Crown
Frames Per Second, More Is Better
Ubuntu 21.04
SE +/- 0.27, N = 3
MIN: 53.47 / MAX: 57.72
54.77
Windows 10 b19042
SE +/- 0.19, N = 3
MIN: 50.91 / MAX: 54.19
52.08
Windows 10 b21382
SE +/- 0.12, N = 3
MIN: 46.61 / MAX: 50.44
47.96
12
24
36
48
60

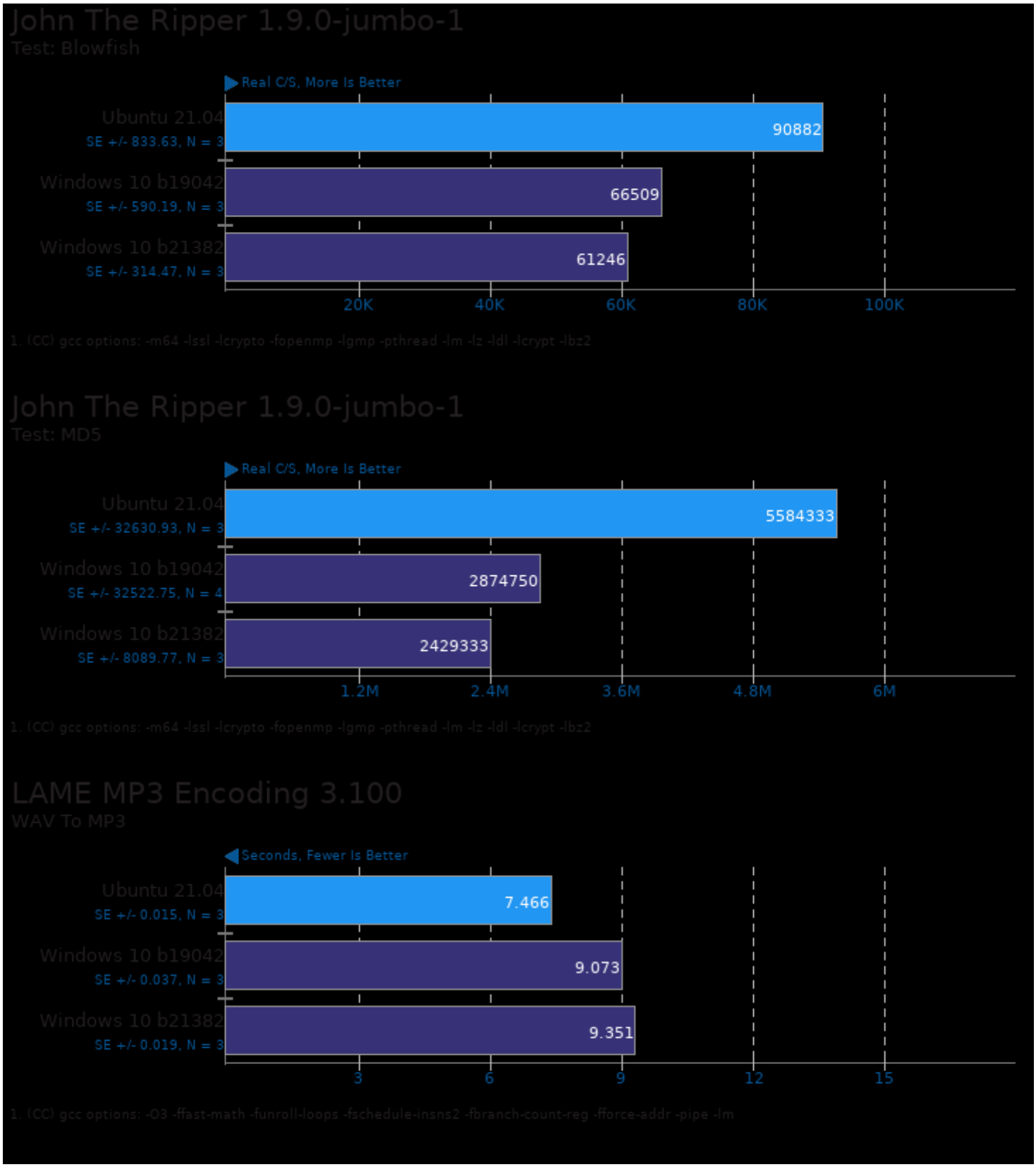

Embree 3.13
Binary: Pathtracer ISPC - Model: Crown
Frames Per Second, More Is Better
Ubuntu 21.04
SE +/- 0.15, N = 3
MIN: 48.72 / MAX: 51.95
49.79
Windows 10 b19042
SE +/- 0.12, N = 3
MIN: 47.77 / MAX: 50.79
48.77
Windows 10 b21382
SE +/- 0.03, N = 3
MIN: 43.87 / MAX: 47.1
45.00
11
22
33
44
55
Embree 3.13
Binary: Pathtracer - Model: Asian Dragon
Frames Per Second, More Is Better
Ubuntu 21.04
SE +/- 0.04, N = 3
MIN: 43.54 / MAX: 46.2
44.38
Windows 10 b19042
SE +/- 0.02, N = 3
MIN: 42.12 / MAX: 44.37
42.77
Windows 10 b21382
SE +/- 0.17, N = 3
MIN: 40.79 / MAX: 44.04
42.03
10
20
30
40
50
Embree 3.13
Binary: Pathtracer - Model: Asian Dragon Obj
Frames Per Second, More Is Better
Ubuntu 21.04
SE +/- 0.01, N = 3
MIN: 37.63 / MAX: 39.86
38.29
Windows 10 b19042
SE +/- 0.03, N = 3
MIN: 36.38 / MAX: 38.31
36.92
Windows 10 b21382
SE +/- 0.21, N = 3
MIN: 35.57 / MAX: 38.3
36.65
9
18
27
36
45

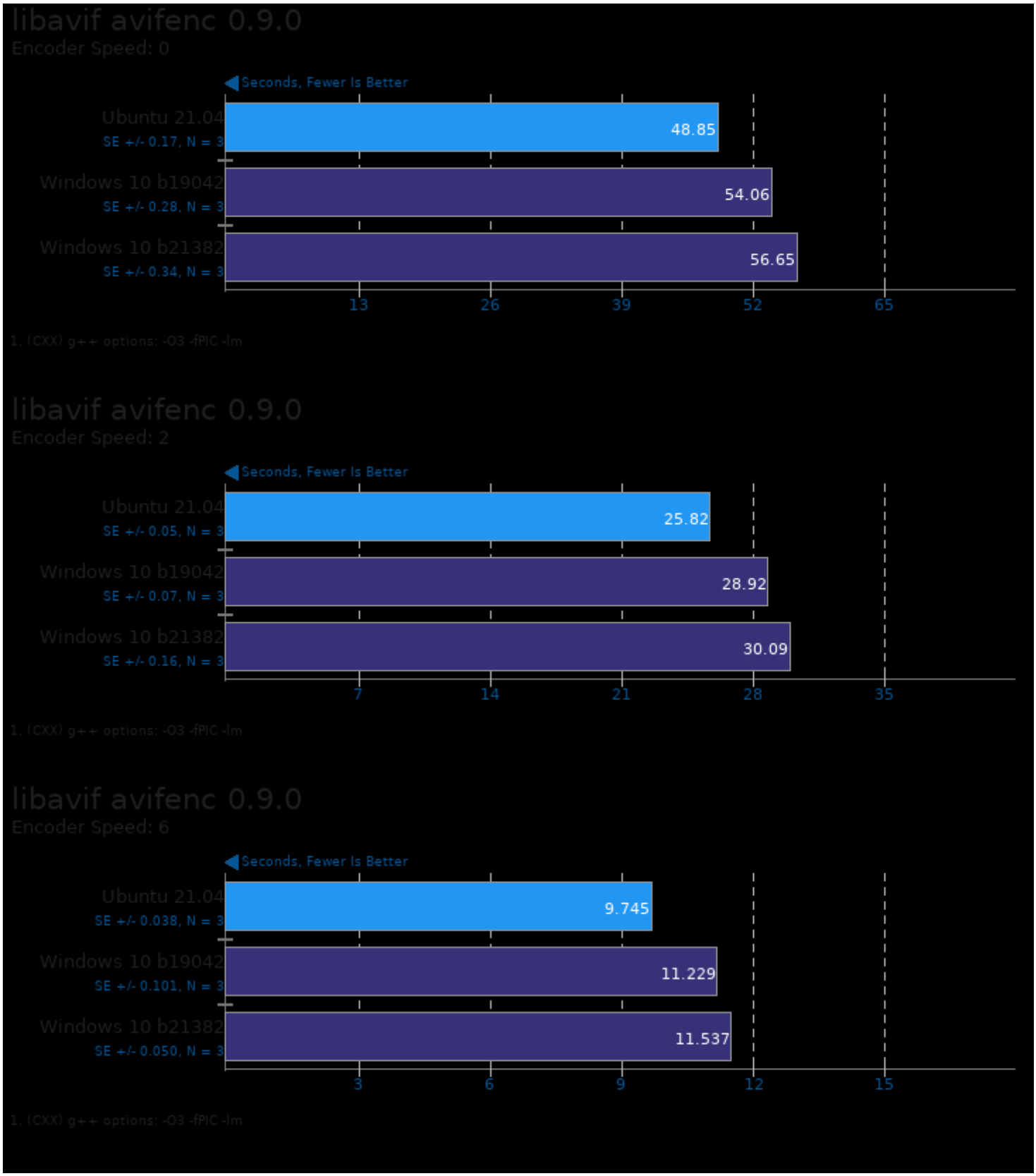

Embree 3.13
Binary: Pathtracer ISPC - Model: Asian Dragon
Frames Per Second, More Is Better
Ubuntu 21.04
SE +/- 0.07, N = 3
MIN: 41.66 / MAX: 44.13
42.48
Windows 10 b19042
SE +/- 0.05, N = 3
MIN: 40.44 / MAX: 42.51
41.04
Windows 10 b21382
SE +/- 0.01, N = 3
MIN: 39.09 / MAX: 41.83
40.04
10
20
30
40
50
Embree 3.13
Binary: Pathtracer ISPC - Model: Asian Dragon Obj
Frames Per Second, More Is Better
Ubuntu 21.04
SE +/- 0.03, N = 3
MIN: 35.84 / MAX: 38.16
36.44
Windows 10 b19042
SE +/- 0.01, N = 3
MIN: 35.05 / MAX: 36.89
35.54
Windows 10 b21382
SE +/- 0.12, N = 3
MIN: 34.33 / MAX: 36.84
35.12
8
16
24
32
40
FLAC Audio Encoding 1.3.2
WAV To FLAC
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.018, N = 5
7.934
Windows 10 b19042
SE +/- 0.014, N = 5
8.140
Windows 10 b21382
SE +/- 0.019, N = 5
8.407
2
4
6
8
10
1. (CXX) g++ options: -O2 -fvisibility=hidden -logg -lm

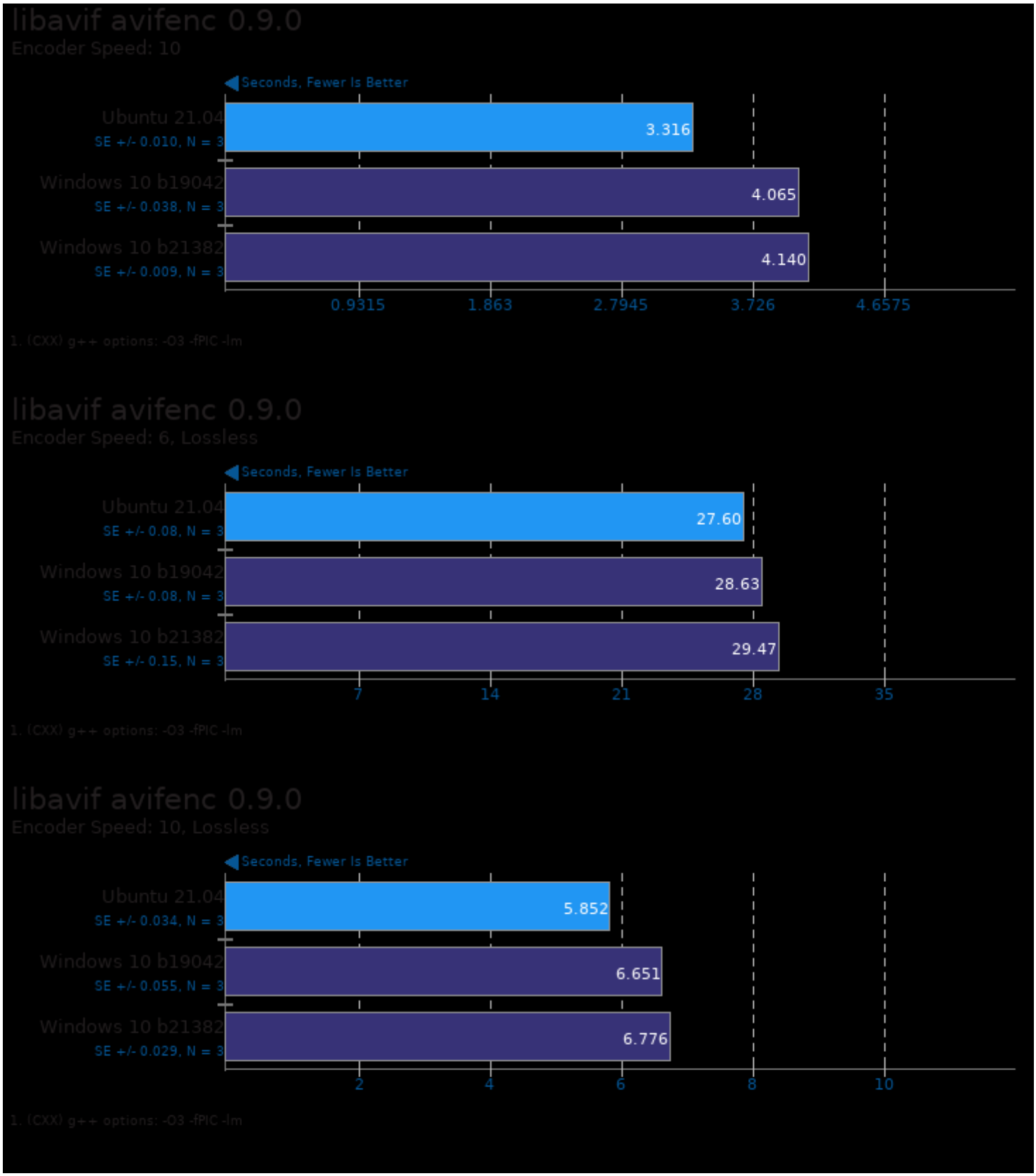

GraphicsMagick 1.3.33
Operation: Rotate
Iterations Per Minute, More Is Better
Ubuntu 21.04
SE +/- 1.73, N = 3
669
Windows 10 b19042
SE +/- 0.88, N = 3
335
Windows 10 b21382
301
140
280
420
560
700
1. (CC) gcc options: -fopenmp -O2 -pthread -ljpeg -lXext -lSM -lICE -lX11 -lbz2 -lz -lm -lpthread
GraphicsMagick 1.3.33
Operation: Sharpen
Iterations Per Minute, More Is Better
Ubuntu 21.04
SE +/- 4.06, N = 3
687
Windows 10 b21382
SE +/- 1.53, N = 3
173
Windows 10 b19042
SE +/- 1.20, N = 3
173
150
300
450
600
750
1. (CC) gcc options: -fopenmp -O2 -pthread -ljpeg -lXext -lSM -lICE -lX11 -lbz2 -lz -lm -lpthread
GraphicsMagick 1.3.33
Operation: Enhanced
Iterations Per Minute, More Is Better
Ubuntu 21.04
SE +/- 3.33, N = 3
1047
Windows 10 b19042
SE +/- 4.89, N = 15
512
Windows 10 b21382
SE +/- 3.46, N = 3
492
200
400
600
800
1000
1. (CC) gcc options: -fopenmp -O2 -pthread -ljpeg -lXext -lSM -lICE -lX11 -lbz2 -lz -lm -lpthread

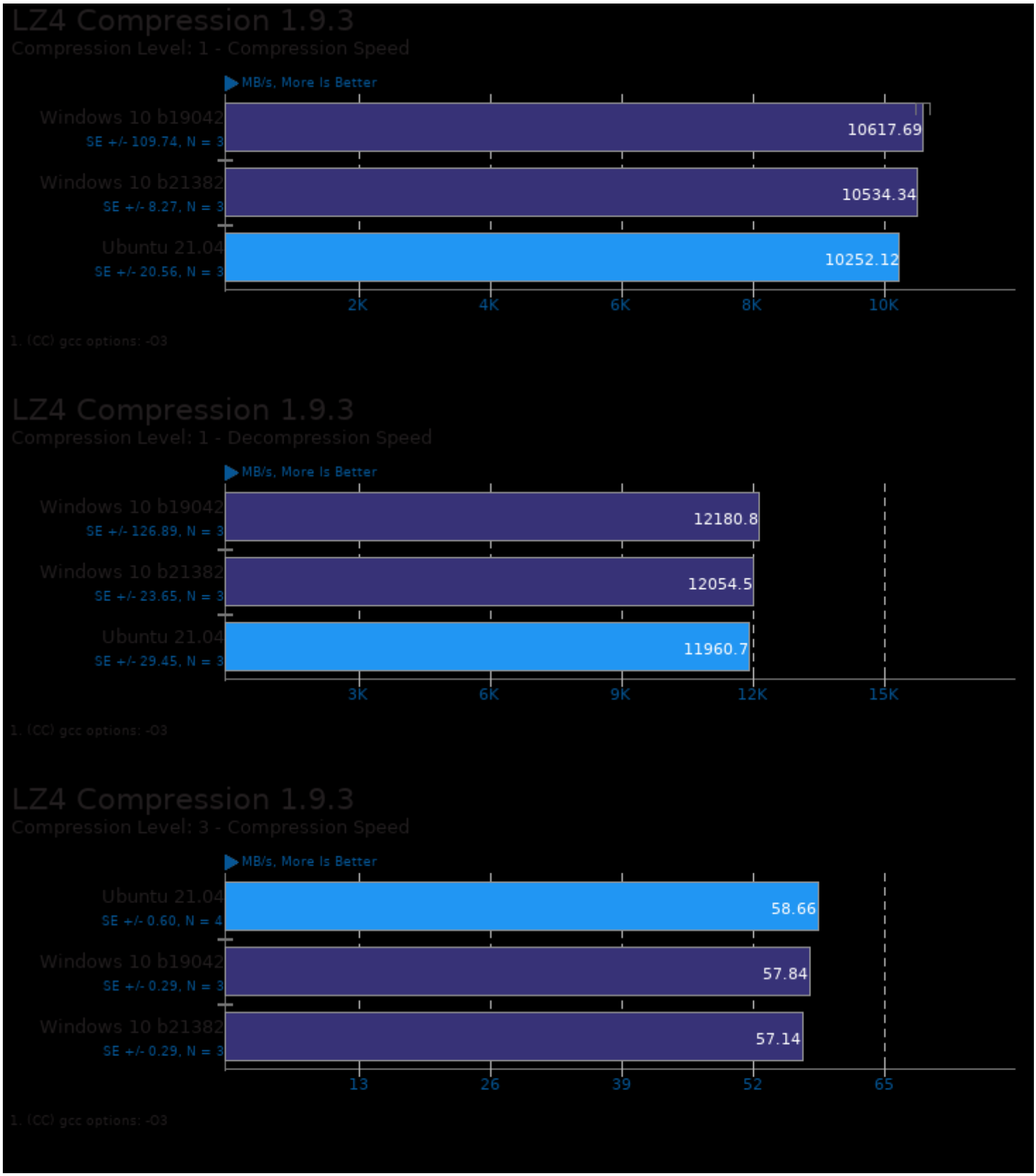

GraphicsMagick 1.3.33
Operation: Resizing
Iterations Per Minute, More Is Better
Ubuntu 21.04
SE +/- 16.21, N = 15
883
Windows 10 b19042
SE +/- 1.20, N = 3
655
Windows 10 b21382
SE +/- 5.86, N = 3
620
200
400
600
800
1000
1. (CC) gcc options: -fopenmp -O2 -pthread -ljpeg -lXext -lSM -lICE -lX11 -lbz2 -lz -lm -lpthread
GraphicsMagick 1.3.33
Operation: Noise-Gaussian
Iterations Per Minute, More Is Better
Ubuntu 21.04
SE +/- 1.33, N = 3
723
Windows 10 b19042
271
Windows 10 b21382
SE +/- 3.06, N = 3
251
160
320
480
640
800
1. (CC) gcc options: -fopenmp -O2 -pthread -ljpeg -lXext -lSM -lICE -lX11 -lbz2 -lz -lm -lpthread
GraphicsMagick 1.3.33
Operation: HWB Color Space
Iterations Per Minute, More Is Better
Ubuntu 21.04
SE +/- 2.03, N = 3
1367
Windows 10 b19042
SE +/- 1.33, N = 3
413
Windows 10 b21382
SE +/- 1.53, N = 3
356
300
600
900
1200
1500
1. (CC) gcc options: -fopenmp -O2 -pthread -ljpeg -lXext -lSM -lICE -lX11 -lbz2 -lz -lm -lpthread

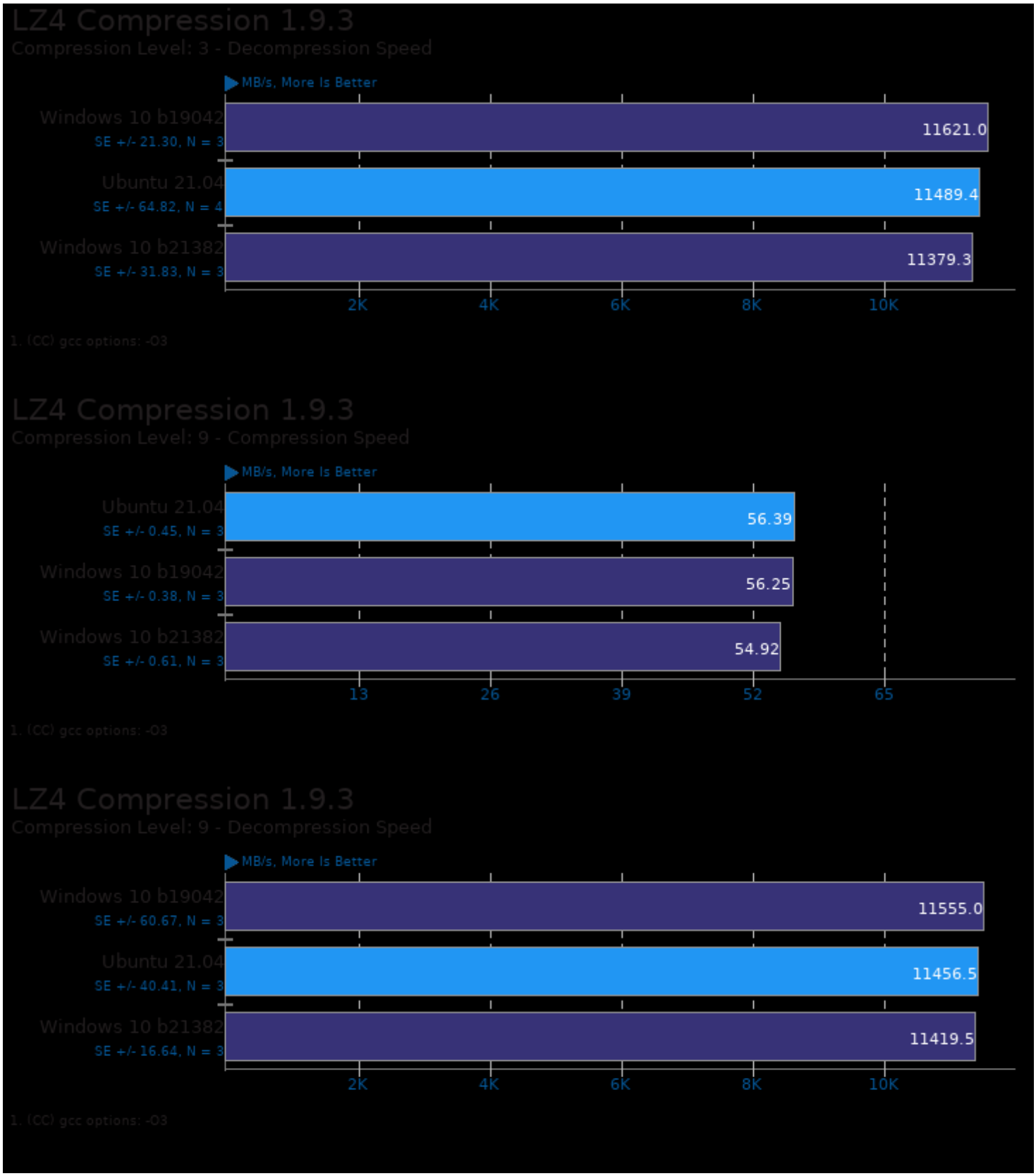

IndigoBench 4.4
Acceleration: CPU - Scene: Bedroom
M samples/s, More Is Better
Ubuntu 21.04
SE +/- 0.055, N = 3
10.395
Windows 10 b19042
SE +/- 0.036, N = 3
9.832
Windows 10 b21382
SE +/- 0.078, N = 3
8.933
3
6
9
12
15
IndigoBench 4.4
Acceleration: CPU - Scene: Supercar
M samples/s, More Is Better
Ubuntu 21.04
SE +/- 0.12, N = 3
22.22
Windows 10 b19042
SE +/- 0.15, N = 3
21.11
Windows 10 b21382
SE +/- 0.15, N = 3
20.03
5
10
15
20
25
Intel Open Image Denoise 1.2.0
Scene: Memorial
Images / Sec, More Is Better
Ubuntu 21.04
SE +/- 0.08, N = 3
30.63
Windows 10 b19042
SE +/- 0.03, N = 3
29.32
Windows 10 b21382
SE +/- 0.34, N = 3
25.74
7
14
21
28
35

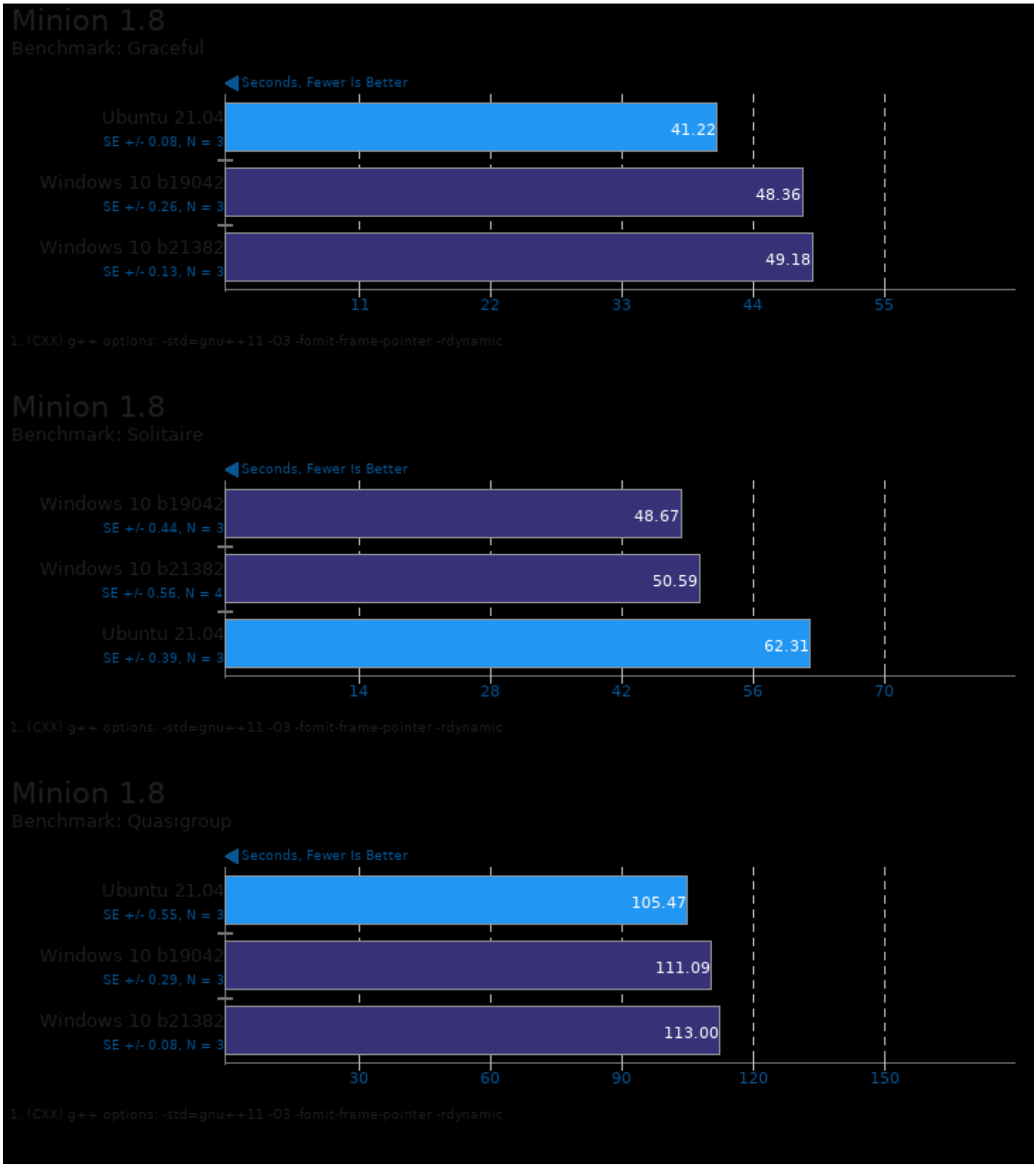

John The Ripper 1.9.0-jumbo-1
Test: Blowfish
Real C/S, More Is Better
Ubuntu 21.04
SE +/- 833.63, N = 3
90882
Windows 10 b19042
SE +/- 590.19, N = 3
66509
Windows 10 b21382
SE +/- 314.47, N = 3
61246
20K
40K
60K
80K
100K
1. (CC) gcc options: -m64 -lssl -lcrypto -fopenmp -lgmp -pthread -lm -lz -ldl -lcrypt -lbz2
John The Ripper 1.9.0-jumbo-1
Test: MD5
Real C/S, More Is Better
Ubuntu 21.04
SE +/- 32630.93, N = 3
5584333
Windows 10 b19042
SE +/- 32522.75, N = 4
2874750
Windows 10 b21382
SE +/- 8089.77, N = 3
2429333
1.2M
2.4M
3.6M
4.8M
6M
1. (CC) gcc options: -m64 -lssl -lcrypto -fopenmp -lgmp -pthread -lm -lz -ldl -lcrypt -lbz2
LAME MP3 Encoding 3.100
WAV To MP3
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.015, N = 3
7.466
Windows 10 b19042
SE +/- 0.037, N = 3
9.073
Windows 10 b21382
SE +/- 0.019, N = 3
9.351
3
6
9
12
15
1. (CC) gcc options: -O3 -ffast-math -funroll-loops -fschedule-insns2 -fbranch-count-reg -fforce-addr -pipe -lm

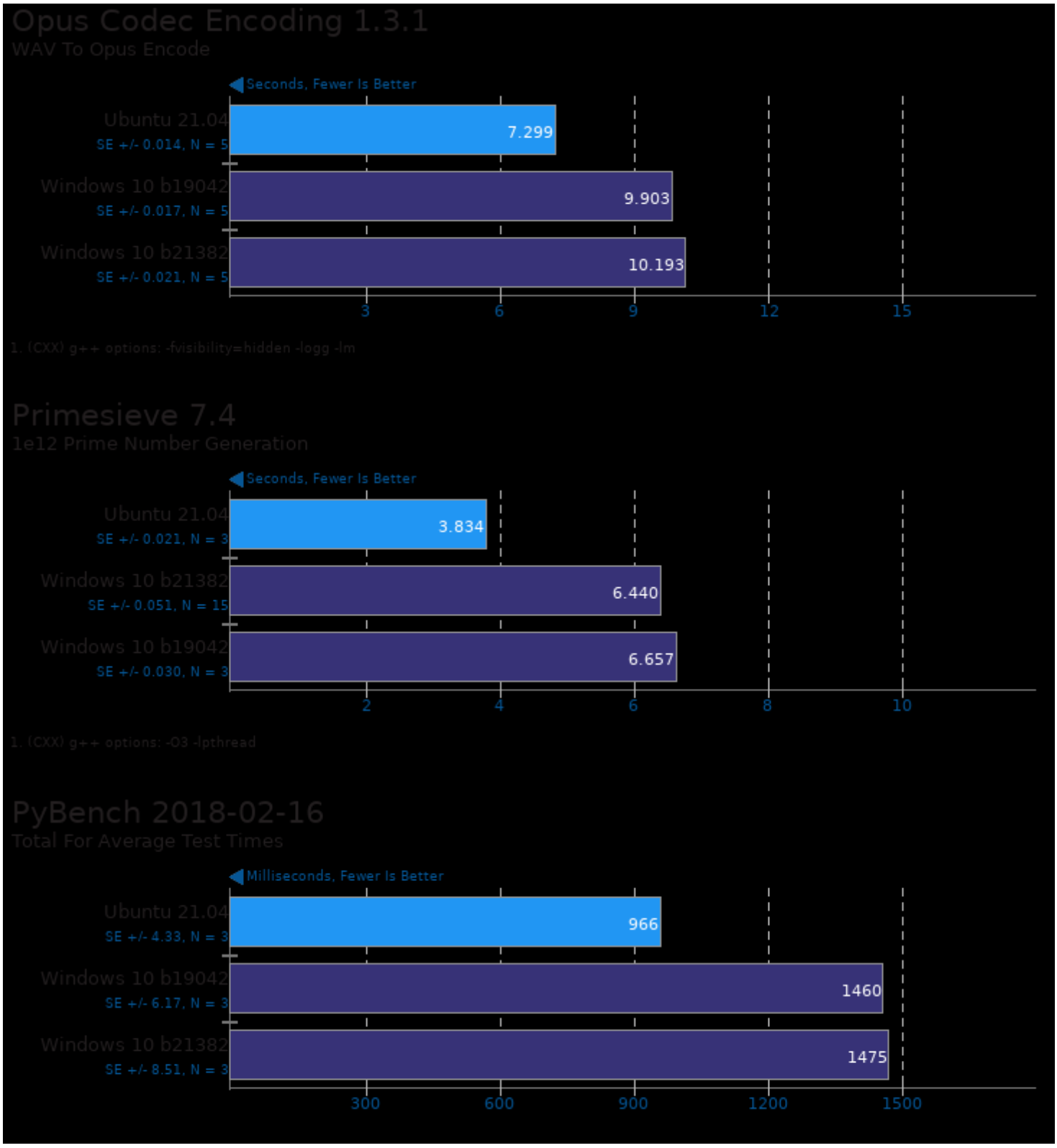

libavif avifenc 0.9.0
Encoder Speed: 0
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.17, N = 3
48.85
Windows 10 b19042
SE +/- 0.28, N = 3
54.06
Windows 10 b21382
SE +/- 0.34, N = 3
56.65
13
26
39
52
65
1. (CXX) g++ options: -O3 -fPIC -lm
libavif avifenc 0.9.0
Encoder Speed: 2
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.05, N = 3
25.82
Windows 10 b19042
SE +/- 0.07, N = 3
28.92
Windows 10 b21382
SE +/- 0.16, N = 3
30.09
7
14
21
28
35
1. (CXX) g++ options: -O3 -fPIC -lm
libavif avifenc 0.9.0
Encoder Speed: 6
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.038, N = 3
9.745
Windows 10 b19042
SE +/- 0.101, N = 3
11.229
Windows 10 b21382
SE +/- 0.050, N = 3
11.537
3
6
9
12
15
1. (CXX) g++ options: -O3 -fPIC -lm

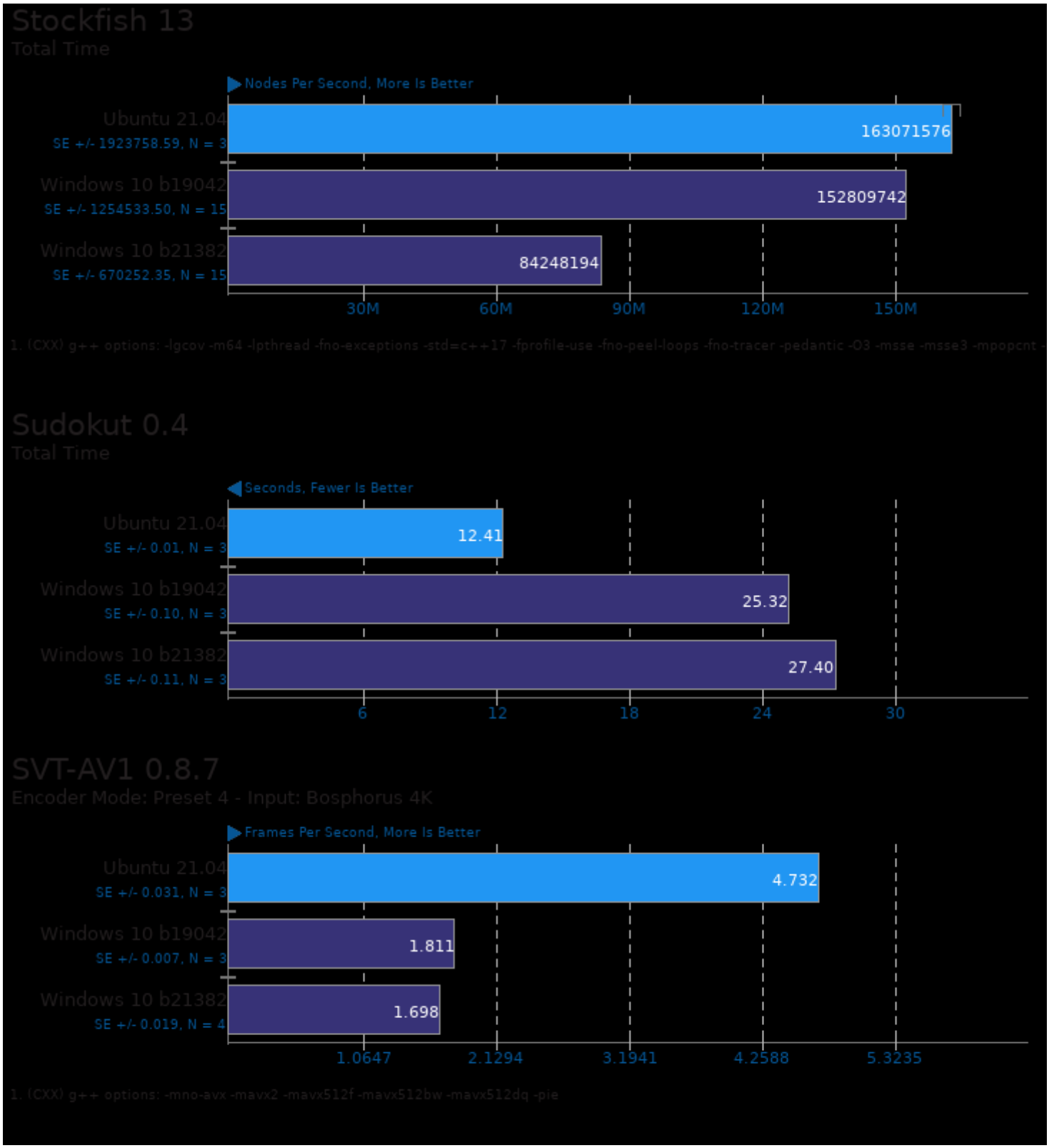

libavif avifenc 0.9.0
Encoder Speed: 10
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.010, N = 3
3.316
Windows 10 b19042
SE +/- 0.038, N = 3
4.065
Windows 10 b21382
SE +/- 0.009, N = 3
4.140
0.9315
1.863
2.7945
3.726
4.6575
1. (CXX) g++ options: -O3 -fPIC -lm
libavif avifenc 0.9.0
Encoder Speed: 6, Lossless
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.08, N = 3
27.60
Windows 10 b19042
SE +/- 0.08, N = 3
28.63
Windows 10 b21382
SE +/- 0.15, N = 3
29.47
7
14
21
28
35
1. (CXX) g++ options: -O3 -fPIC -lm
libavif avifenc 0.9.0
Encoder Speed: 10, Lossless
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.034, N = 3
5.852
Windows 10 b19042
SE +/- 0.055, N = 3
6.651
Windows 10 b21382
SE +/- 0.029, N = 3
6.776
2
4
6
8
10
1. (CXX) g++ options: -O3 -fPIC -lm

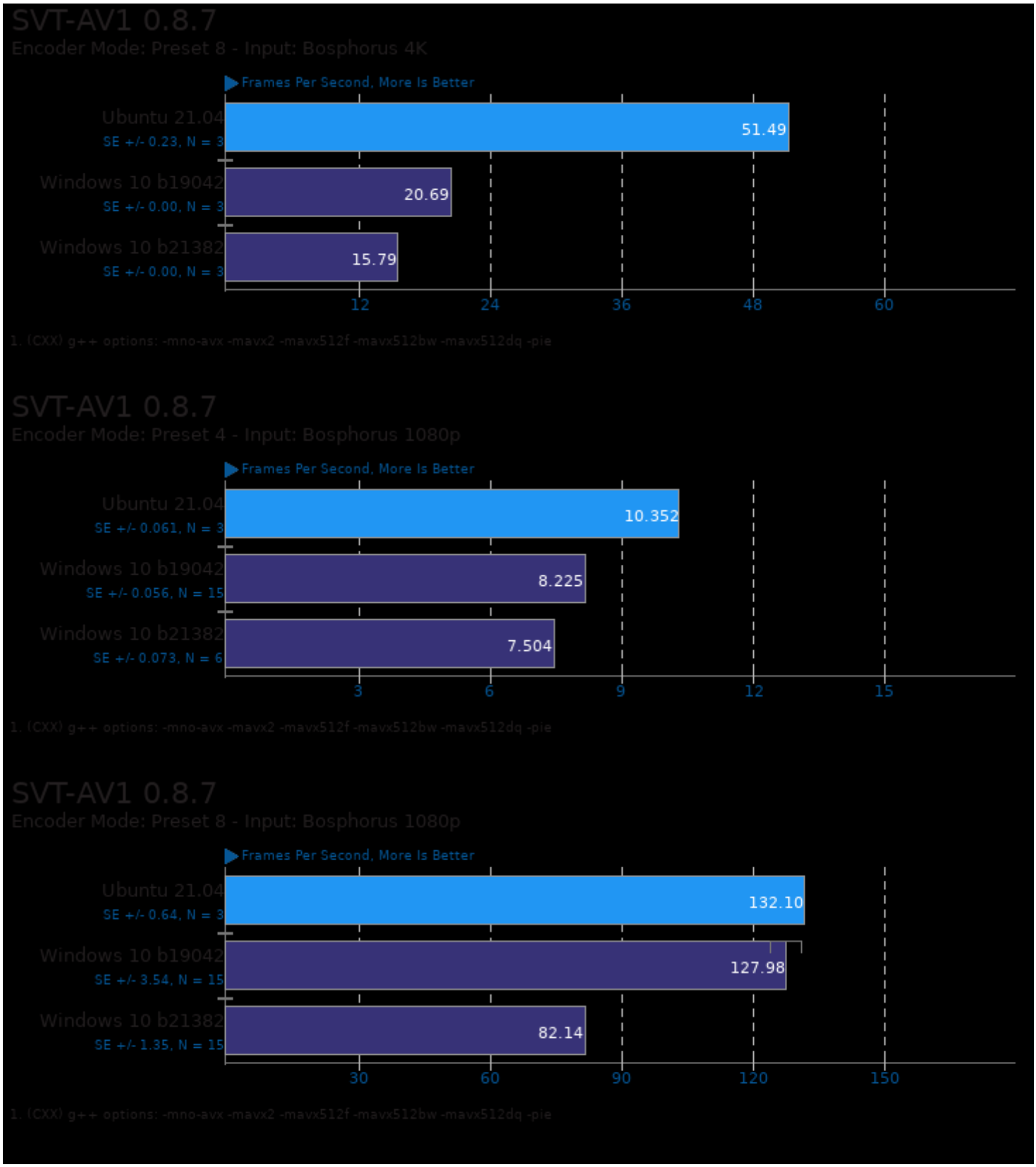

LZ4 Compression 1.9.3
Compression Level: 1 - Compression Speed
MB/s, More Is Better
Windows 10 b19042
SE +/- 109.74, N = 3
10617.69
Windows 10 b21382
SE +/- 8.27, N = 3
10534.34
Ubuntu 21.04
SE +/- 20.56, N = 3
10252.12
2K
4K
6K
8K
10K
1. (CC) gcc options: -O3
LZ4 Compression 1.9.3
Compression Level: 1 - Decompression Speed
MB/s, More Is Better
Windows 10 b19042
SE +/- 126.89, N = 3
12180.8
Windows 10 b21382
SE +/- 23.65, N = 3
12054.5
Ubuntu 21.04
SE +/- 29.45, N = 3
11960.7
3K
6K
9K
12K
15K
1. (CC) gcc options: -O3
LZ4 Compression 1.9.3
Compression Level: 3 - Compression Speed
MB/s, More Is Better
Ubuntu 21.04
SE +/- 0.60, N = 4
58.66
Windows 10 b19042
SE +/- 0.29, N = 3
57.84
Windows 10 b21382
SE +/- 0.29, N = 3
57.14
13
26
39
52
65
1. (CC) gcc options: -O3

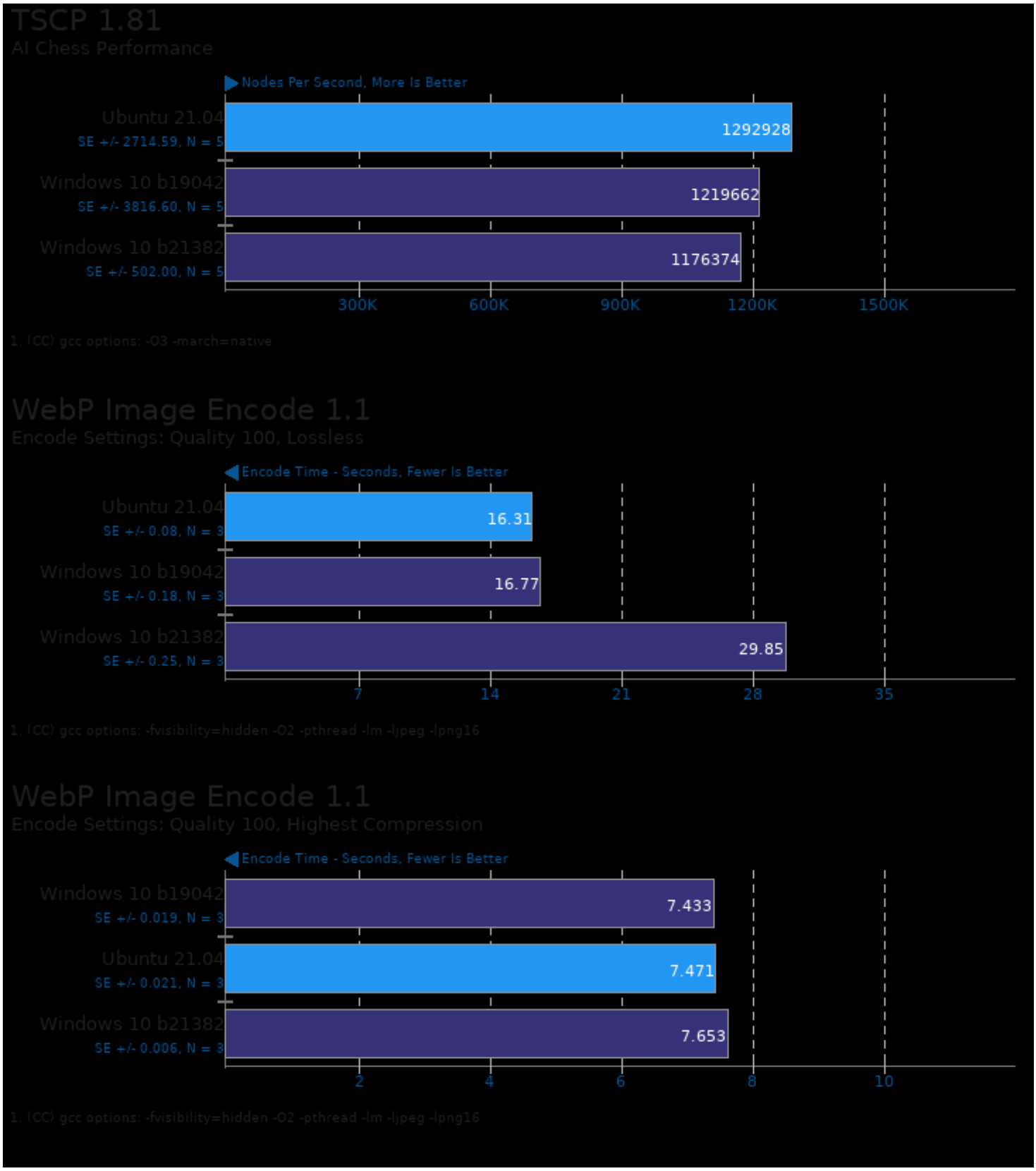

LZ4 Compression 1.9.3
Compression Level: 3 - Decompression Speed
MB/s, More Is Better
Windows 10 b19042
SE +/- 21.30, N = 3
11621.0
Ubuntu 21.04
SE +/- 64.82, N = 4
11489.4
Windows 10 b21382
SE +/- 31.83, N = 3
11379.3
2K
4K
6K
8K
10K
1. (CC) gcc options: -O3
LZ4 Compression 1.9.3
Compression Level: 9 - Compression Speed
MB/s, More Is Better
Ubuntu 21.04
SE +/- 0.45, N = 3
56.39
Windows 10 b19042
SE +/- 0.38, N = 3
56.25
Windows 10 b21382
SE +/- 0.61, N = 3
54.92
13
26
39
52
65
1. (CC) gcc options: -O3
LZ4 Compression 1.9.3
Compression Level: 9 - Decompression Speed
MB/s, More Is Better
Windows 10 b19042
SE +/- 60.67, N = 3
11555.0
Ubuntu 21.04
SE +/- 40.41, N = 3
11456.5
Windows 10 b21382
SE +/- 16.64, N = 3
11419.5
2K
4K
6K
8K
10K
1. (CC) gcc options: -O3


Minion 1.8
Benchmark: Graceful
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.08, N = 3
41.22
Windows 10 b19042
SE +/- 0.26, N = 3
48.36
Windows 10 b21382
SE +/- 0.13, N = 3
49.18
11
22
33
44
55
1. (CXX) g++ options: -std=gnu++11 -O3 -fomit-frame-pointer -rdynamic
Minion 1.8
Benchmark: Solitaire
Seconds, Fewer Is Better
Windows 10 b19042
SE +/- 0.44, N = 3
48.67
Windows 10 b21382
SE +/- 0.56, N = 4
50.59
Ubuntu 21.04
SE +/- 0.39, N = 3
62.31
14
28
42
56
70
1. (CXX) g++ options: -std=gnu++11 -O3 -fomit-frame-pointer -rdynamic
Minion 1.8
Benchmark: Quasigroup
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.55, N = 3
105.47
Windows 10 b19042
SE +/- 0.29, N = 3
111.09
Windows 10 b21382
SE +/- 0.08, N = 3
113.00
30
60
90
120
150
1. (CXX) g++ options: -std=gnu++11 -O3 -fomit-frame-pointer -rdynamic


Opus Codec Encoding 1.3.1
WAV To Opus Encode
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.014, N = 5
7.299
Windows 10 b19042
SE +/- 0.017, N = 5
9.903
Windows 10 b21382
SE +/- 0.021, N = 5
10.193
3
6
9
12
15
1. (CXX) g++ options: -fvisibility=hidden -logg -lm
Primesieve 7.4
1e12 Prime Number Generation
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.021, N = 3
3.834
Windows 10 b21382
SE +/- 0.051, N = 15
6.440
Windows 10 b19042
SE +/- 0.030, N = 3
6.657
2
4
6
8
10
1. (CXX) g++ options: -O3 -lpthread
PyBench 2018-02-16
Total For Average Test Times
Milliseconds, Fewer Is Better
Ubuntu 21.04
SE +/- 4.33, N = 3
966
Windows 10 b19042
SE +/- 6.17, N = 3
1460
Windows 10 b21382
SE +/- 8.51, N = 3
1475
300
600
900
1200
1500

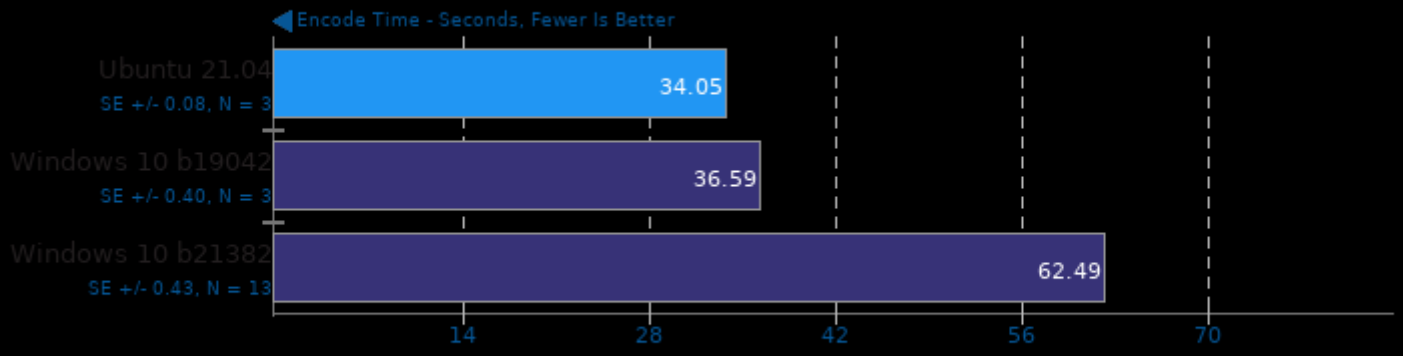

Stockfish 13
Total Time
Nodes Per Second, More Is Better
Ubuntu 21.04
SE +/- 1923758.59, N = 3
163071576
Windows 10 b19042
SE +/- 1254533.50, N = 15
152809742
Windows 10 b21382
SE +/- 670252.35, N = 15
84248194
30M
60M
90M
120M
150M
1. (CXX) g++ options: -lgcov -m64 -lpthread -fno-exceptions -std=c++17 -fprofile-use -fno-peel-loops -fno-tracer -pedantic -O3 -msse -msse3 -mpopcnt
Sudokut 0.4
Total Time
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.01, N = 3
12.41
Windows 10 b19042
SE +/- 0.10, N = 3
25.32
Windows 10 b21382
SE +/- 0.11, N = 3
27.40
6
12
18
24
30
SVT-AV1 0.8.7
Encoder Mode: Preset 4 - Input: Bosphorus 4K
Frames Per Second, More Is Better
Ubuntu 21.04
SE +/- 0.031, N = 3
4.732
Windows 10 b19042
SE +/- 0.007, N = 3
1.811
Windows 10 b21382
SE +/- 0.019, N = 4
1.698
1.0647
2.1294
3.1941
4.2588
5.3235
1. (CXX) g++ options: -mno-avx -mavx2 -mavx512f -mavx512bw -mavx512dq -pie


SVT-AV1 0.8.7
Encoder Mode: Preset 8 - Input: Bosphorus 4K
Frames Per Second, More Is Better
Ubuntu 21.04
SE +/- 0.23, N = 3
51.49
Windows 10 b19042
SE +/- 0.00, N = 3
20.69
Windows 10 b21382
SE +/- 0.00, N = 3
15.79
12
24
36
48
60
1. (CXX) g++ options: -mno-avx -mavx2 -mavx512f -mavx512bw -mavx512dq -pie
SVT-AV1 0.8.7
Encoder Mode: Preset 4 - Input: Bosphorus 1080p
Frames Per Second, More Is Better
Ubuntu 21.04
SE +/- 0.061, N = 3
10.352
Windows 10 b19042
SE +/- 0.056, N = 15
8.225
Windows 10 b21382
SE +/- 0.073, N = 6
7.504
3
6
9
12
15
1. (CXX) g++ options: -mno-avx -mavx2 -mavx512f -mavx512bw -mavx512dq -pie
SVT-AV1 0.8.7
Encoder Mode: Preset 8 - Input: Bosphorus 1080p
Frames Per Second, More Is Better
Ubuntu 21.04
SE +/- 0.64, N = 3
132.10
Windows 10 b19042
SE +/- 3.54, N = 15
127.98
Windows 10 b21382
SE +/- 1.35, N = 15
82.14
30
60
90
120
150
1. (CXX) g++ options: -mno-avx -mavx2 -mavx512f -mavx512bw -mavx512dq -pie


TSCP 1.81
AI Chess Performance
Nodes Per Second, More Is Better
Ubuntu 21.04
SE +/- 2714.59, N = 5
1292928
Windows 10 b19042
SE +/- 3816.60, N = 5
1219662
Windows 10 b21382
SE +/- 502.00, N = 5
1176374
300K
600K
900K
1200K
1500K
1. (CC) gcc options: -O3 -march=native
WebP Image Encode 1.1
Encode Settings: Quality 100, Lossless
Encode Time - Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.08, N = 3
16.31
Windows 10 b19042
SE +/- 0.18, N = 3
16.77
Windows 10 b21382
SE +/- 0.25, N = 3
29.85
7
14
21
28
35
1. (CC) gcc options: -fvisibility=hidden -O2 -pthread -lm -ljpeg -lpng16
WebP Image Encode 1.1
Encode Settings: Quality 100, Highest Compression
Encode Time - Seconds, Fewer Is Better
Windows 10 b19042
SE +/- 0.019, N = 3
7.433
Ubuntu 21.04
SE +/- 0.021, N = 3
7.471
Windows 10 b21382
SE +/- 0.006, N = 3
7.653
2
4
6
8
10
1. (CC) gcc options: -fvisibility=hidden -O2 -pthread -lm -ljpeg -lpng16

WebP Image Encode 1.1

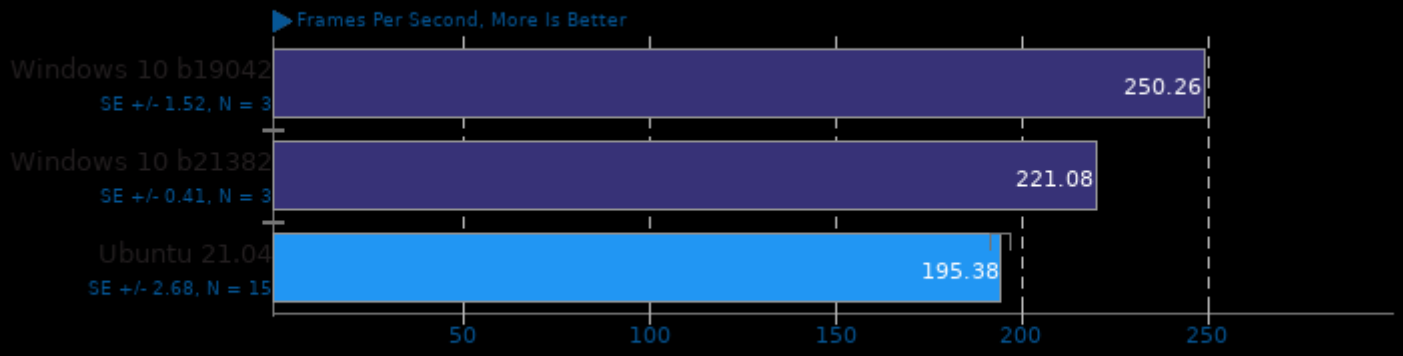
Encode Settings: Quality 100, Lossless, Highest Compression



1. (CC) gcc options: -fvisibility=hidden -O2 -pthread -lm -ljpeg -lpng16

x264 2019-12-17

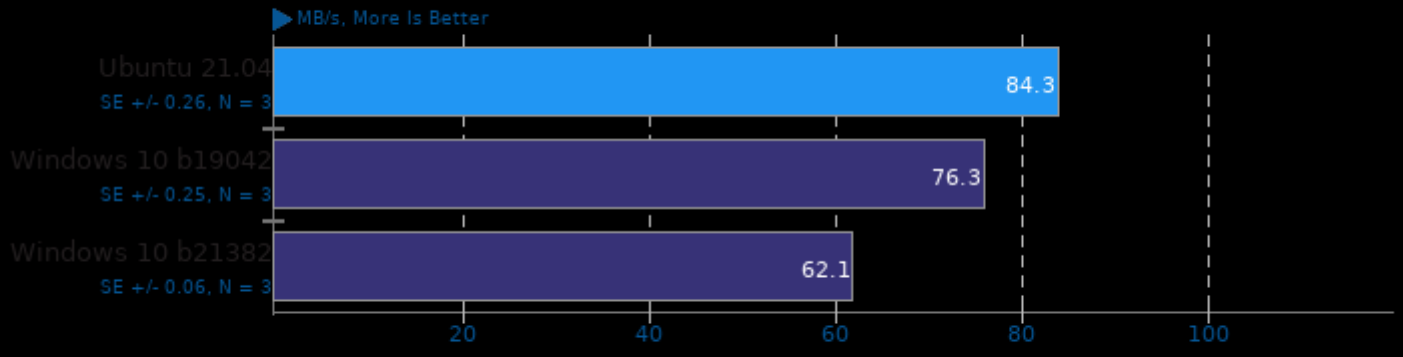
H.264 Video Encoding



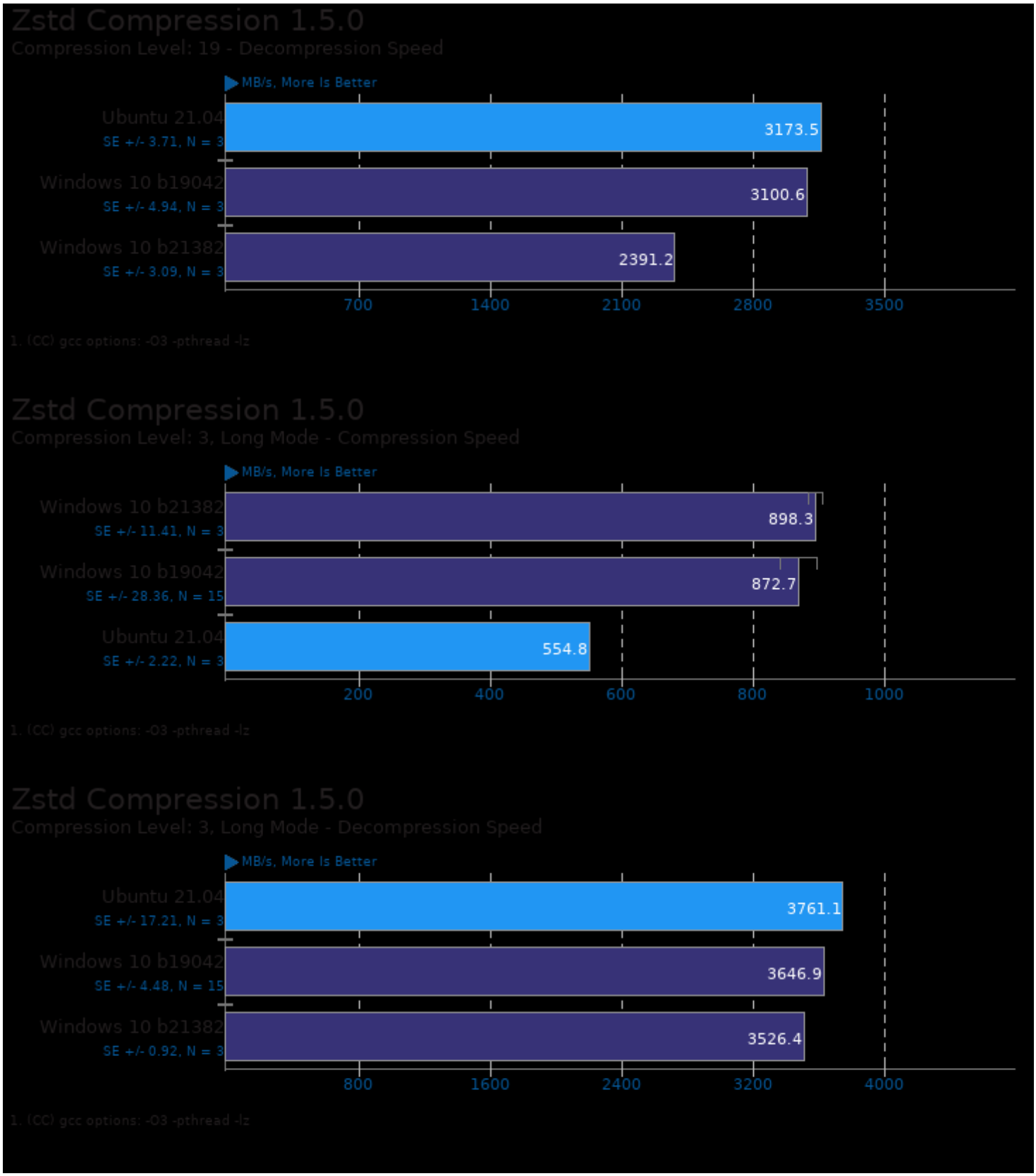
1. (CC) gcc options: -ldl -m64 -lm -lpthread -O3 -ffast-math -std=gnu99 -fPIC -fomit-frame-pointer -fno-tree-vectorize

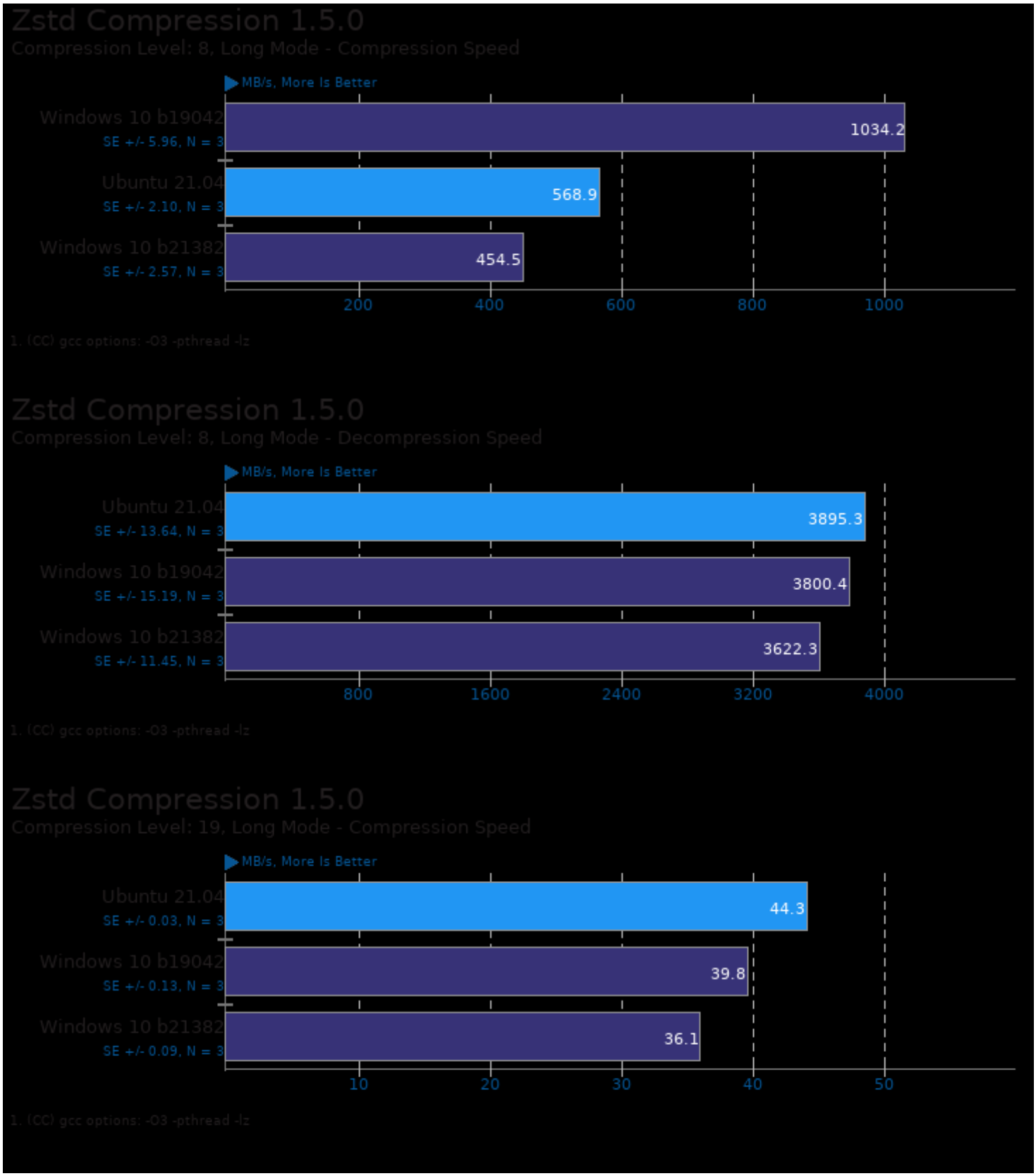
Zstd Compression 1.5.0

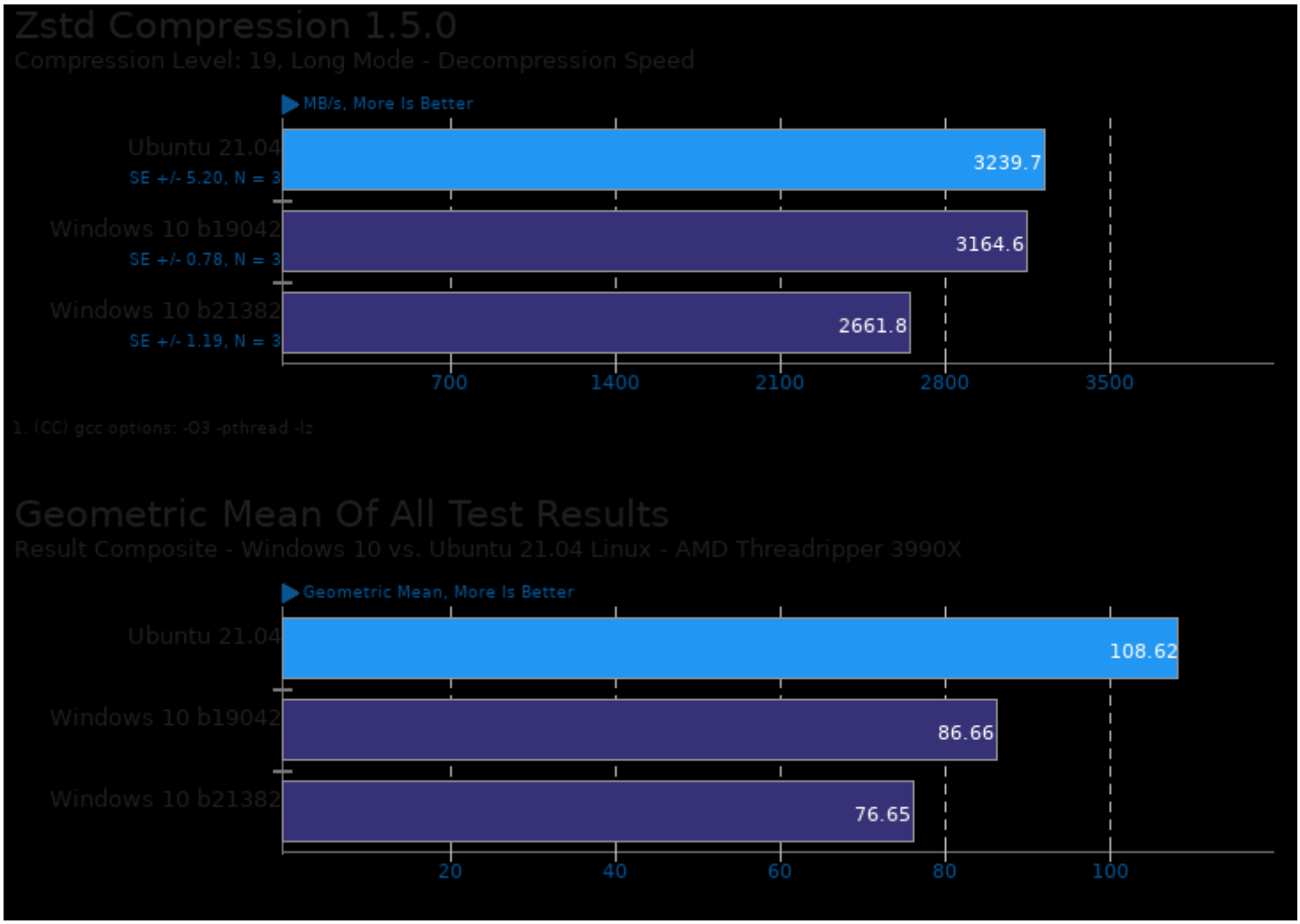
Compression Level: 19 - Compression Speed

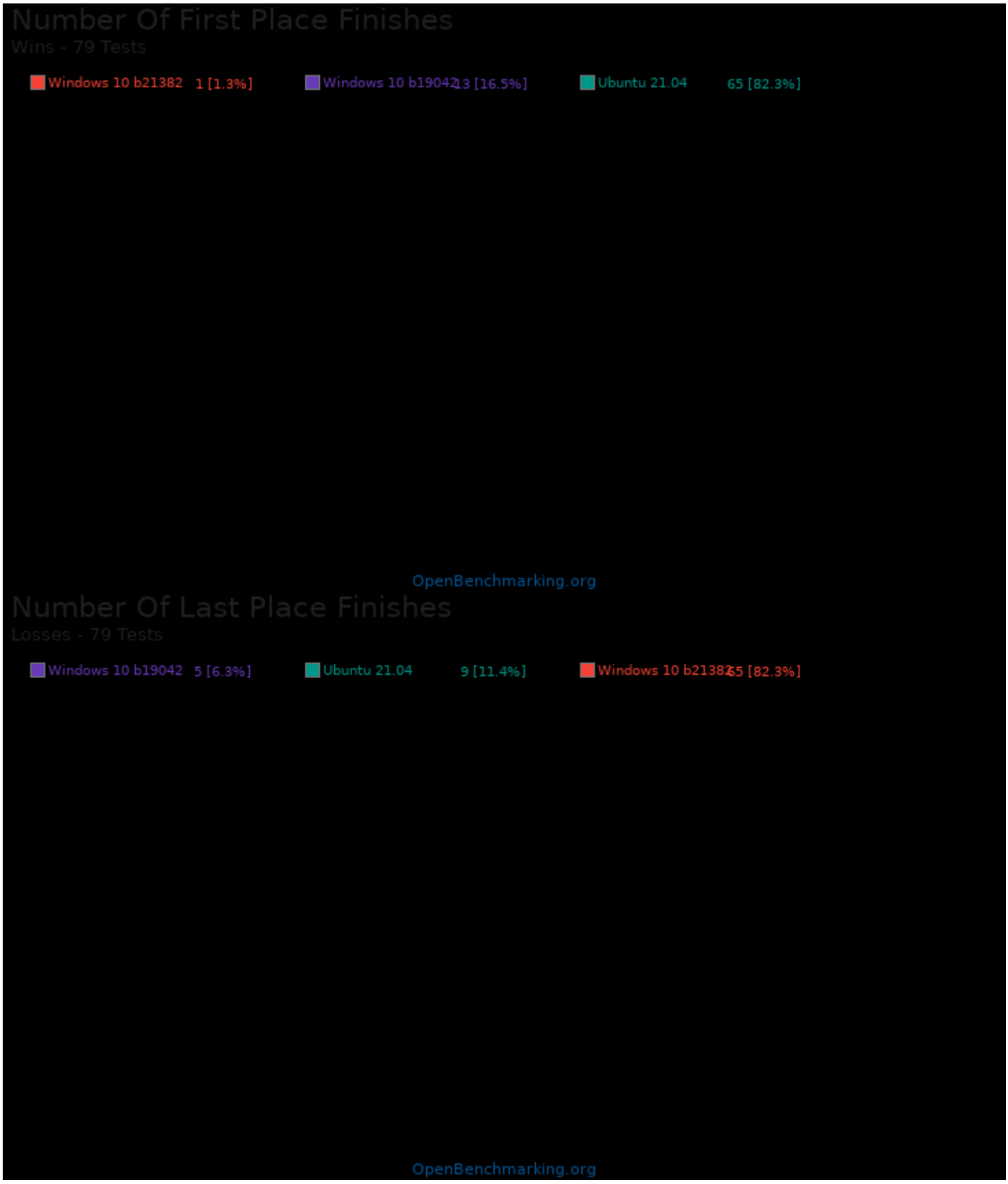


1. (CC) gcc options: -O3 -pthread -lz

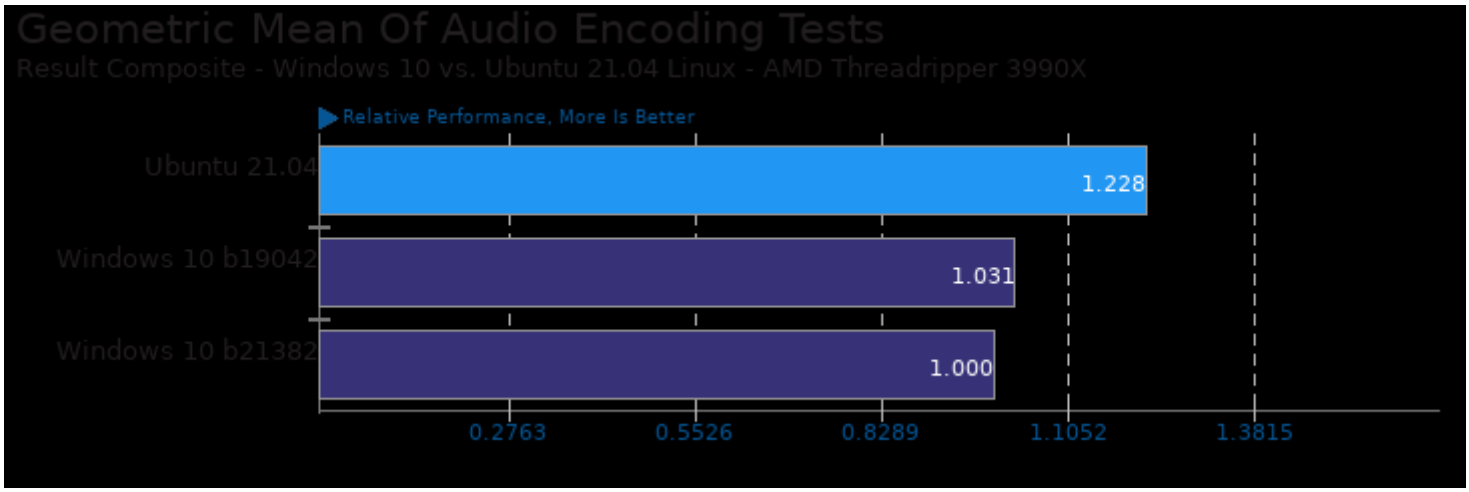

Zstd Compression 1.5.0
Compression Level: 19 - Decompression Speed
MB/s, More Is Better
Ubuntu 21.04
SE +/- 3.71, N = 3
3173.5
Windows 10 b19042
SE +/- 4.94, N = 3
3100.6
Windows 10 b21382
SE +/- 3.09, N = 3
2391.2
700
1400
2100
2800
3500
1. (CC) gcc options: -O3 -pthread -lz
Zstd Compression 1.5.0
Compression Level: 3, Long Mode - Compression Speed
MB/s, More Is Better
Windows 10 b21382
SE +/- 11.41, N = 3
898.3
Windows 10 b19042
SE +/- 28.36, N = 15
872.7
Ubuntu 21.04
SE +/- 2.22, N = 3
554.8
200
400
600
800
1000
1. (CC) gcc options: -O3 -pthread -lz
Zstd Compression 1.5.0
Compression Level: 3, Long Mode - Decompression Speed
MB/s, More Is Better
Ubuntu 21.04
SE +/- 17.21, N = 3
3761.1
Windows 10 b19042
SE +/- 4.48, N = 15
3646.9
Windows 10 b21382
SE +/- 0.92, N = 3
3526.4
800
1600
2400
3200
4000
1. (CC) gcc options: -O3 -pthread -lz


Zstd Compression 1.5.0
Compression Level: 8, Long Mode - Compression Speed
MB/s, More Is Better
Windows 10 b19042
SE +/- 5.96, N = 3
1034.2
Ubuntu 21.04
SE +/- 2.10, N = 3
568.9
Windows 10 b21382
SE +/- 2.57, N = 3
454.5
200
400
600
800
1000
1. (CC) gcc options: -O3 -pthread -lz
Zstd Compression 1.5.0
Compression Level: 8, Long Mode - Decompression Speed
MB/s, More Is Better
Ubuntu 21.04
SE +/- 13.64, N = 3
3895.3
Windows 10 b19042
SE +/- 15.19, N = 3
3800.4
Windows 10 b21382
SE +/- 11.45, N = 3
3622.3
800
1600
2400
3200
4000
1. (CC) gcc options: -O3 -pthread -lz
Zstd Compression 1.5.0
Compression Level: 19, Long Mode - Compression Speed
MB/s, More Is Better
Ubuntu 21.04
SE +/- 0.03, N = 3
44.3
Windows 10 b19042
SE +/- 0.13, N = 3
39.8
Windows 10 b21382
SE +/- 0.09, N = 3
36.1
10
20
30
40
50
1. (CC) gcc options: -O3 -pthread -lz

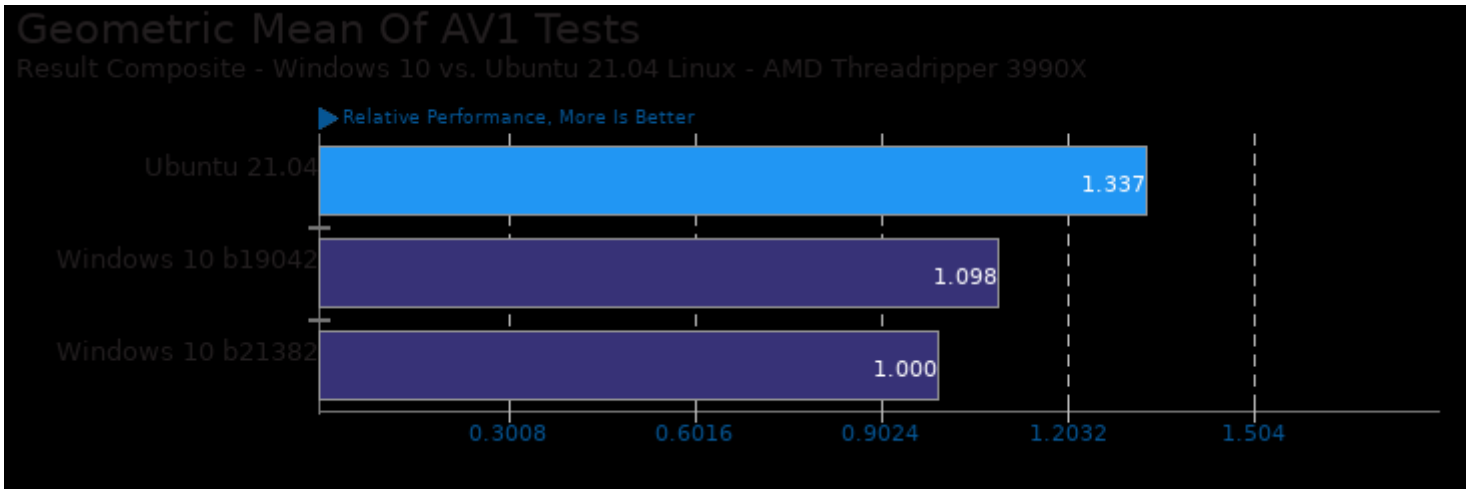

Zstd Compression 1.5.0
Compression Level: 19, Long Mode - Decompression Speed
MB/s, More Is Better
Ubuntu 21.04
SE +/- 5.20, N = 3
3239.7
Windows 10 b19042
SE +/- 0.78, N = 3
3164.6
Windows 10 b21382
SE +/- 1.19, N = 3
2661.8
700
1400
2100
2800
3500
1. (CC) gcc options: -O3 -pthread -lz
Geometric Mean Of All Test Results
Result Composite - Windows 10 vs. Ubuntu 21.04 Linux - AMD Threadripper 3990X
Geometric Mean, More Is Better
Ubuntu 21.04
108.62
Windows 10 b19042
86.66
Windows 10 b21382
76.65
20
40
60
80
100


Number Of First Place Finishes
Wins - 79 Tests
Windows 10 b21382 1 [1.3%]
Windows 10 b19042 13 [16.5%]
Ubuntu 21.04 65 [82.3%]
OpenBenchmarking.org
Number Of Last Place Finishes
Losses - 79 Tests
Windows 10 b19042 5 [6.3%]
Ubuntu 21.04 9 [11.4%]
Windows 10 b21382 65 [82.3%]
OpenBenchmarking.org

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



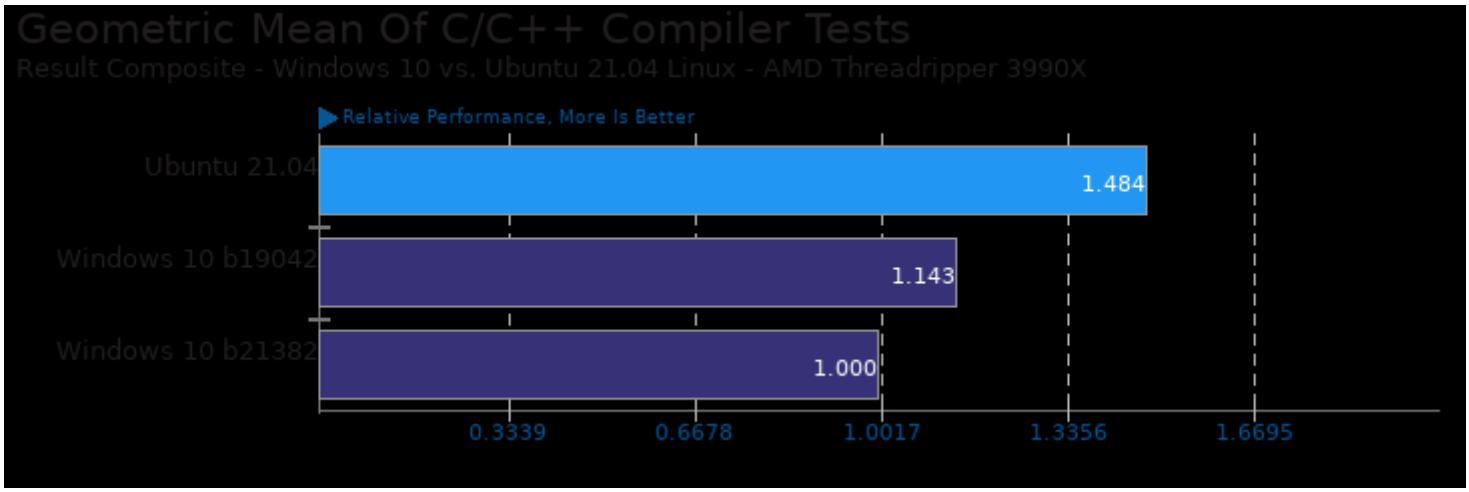
Geometric mean based upon tests: pts/encode-mp3, pts/encode-flac and pts/encode-opus



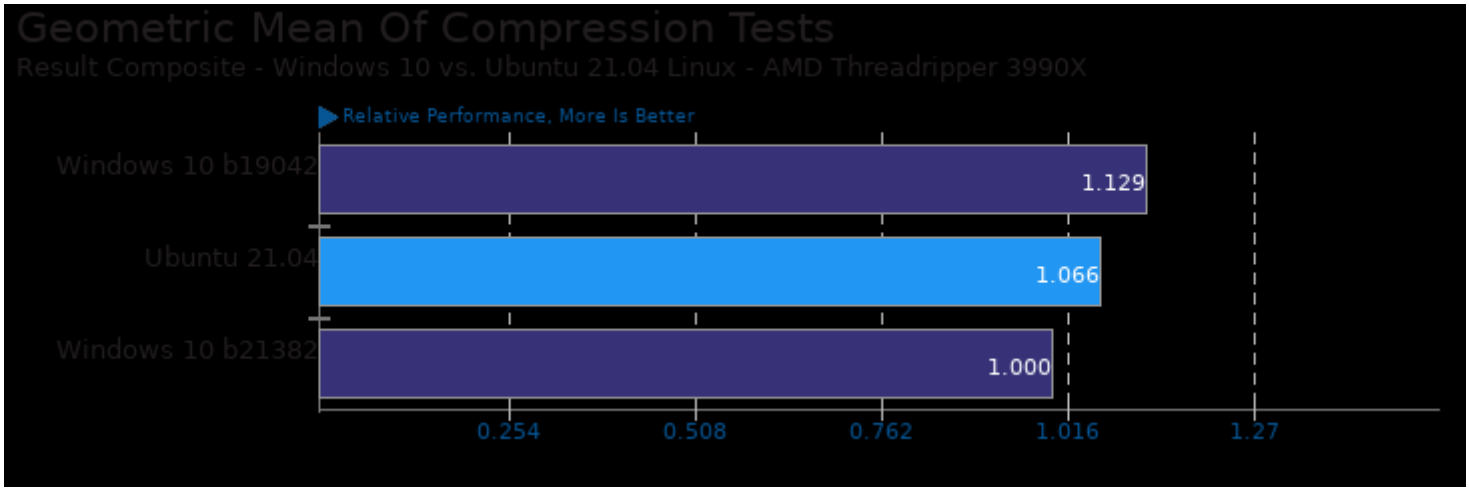
Geometric mean based upon tests: pts/dav1d, pts/svt-av1 and pts/avifenc



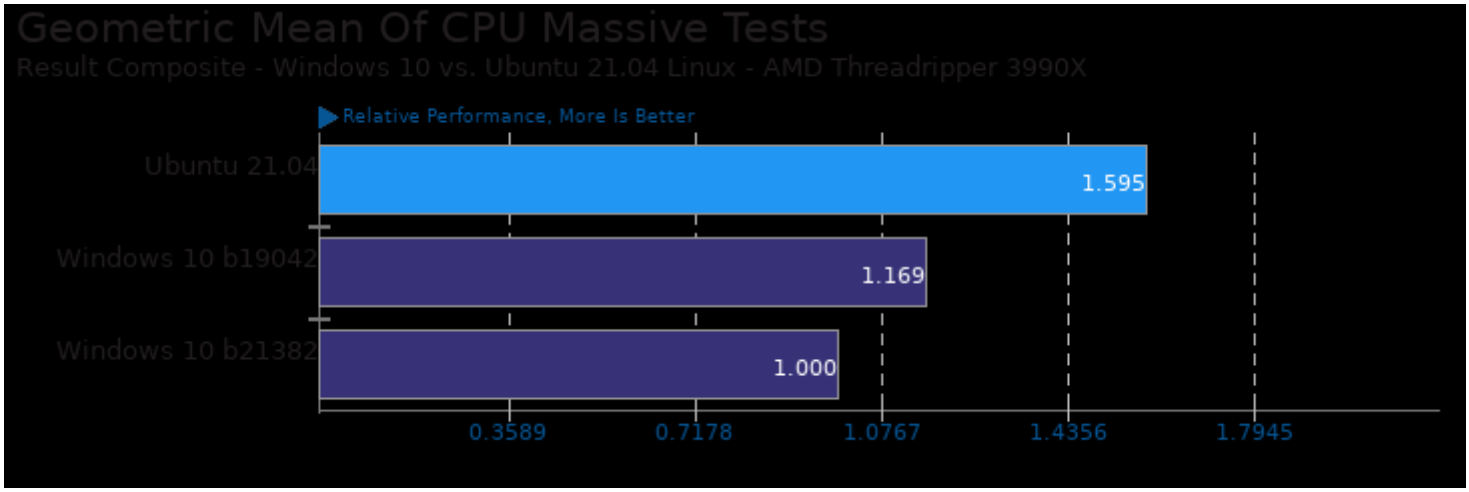
Geometric mean based upon tests: pts/crafty, pts/tscp, pts/stockfish and pts/asmfish



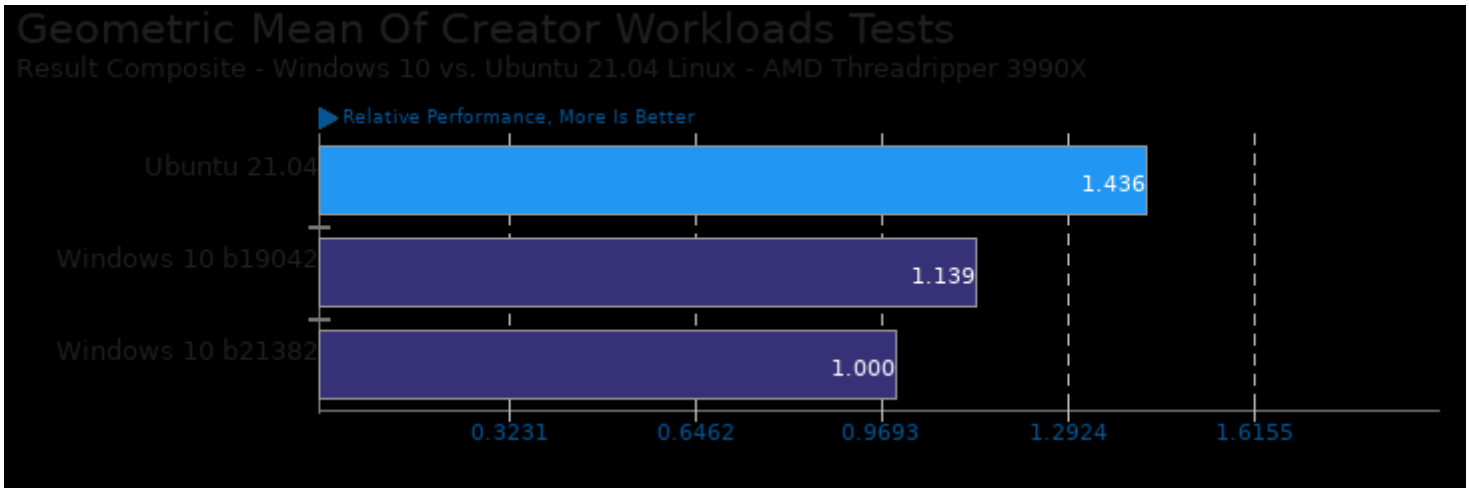
Geometric mean based upon tests: pts/tscp, pts/graphics-magick, pts/stockfish, pts/encode-mp3, pts/encode-flac, pts/john-the-ripper, pts/dav1d, pts/x264, pts/compress-zstd, pts/svt-av1 and pts/basis



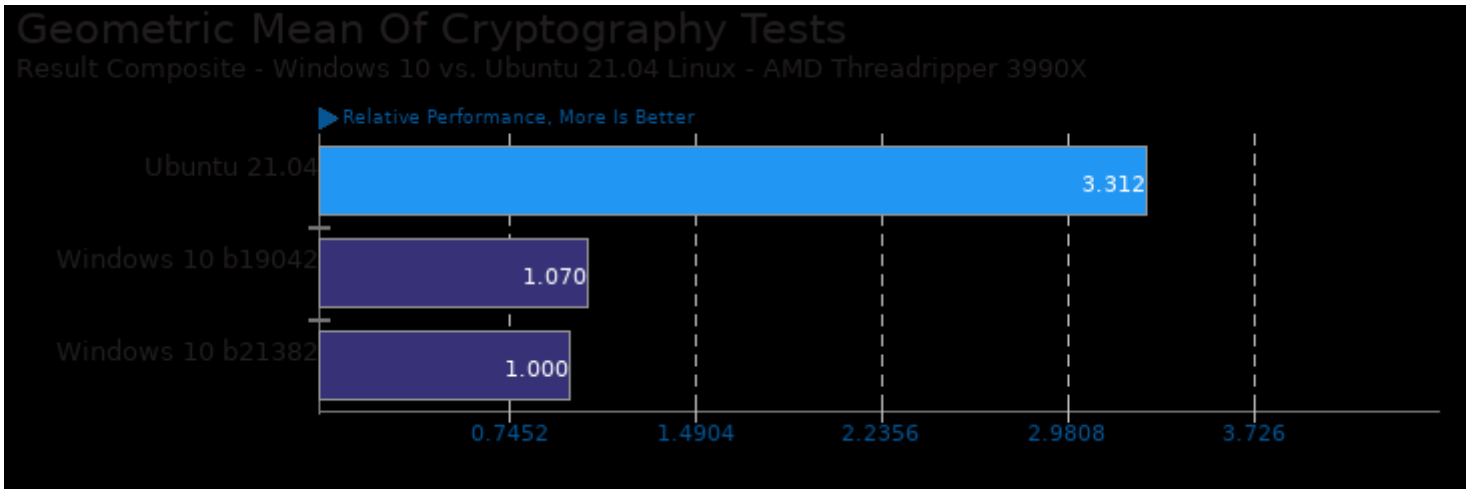
Geometric mean based upon tests: pts/compress-zstd and pts/compress-lz4



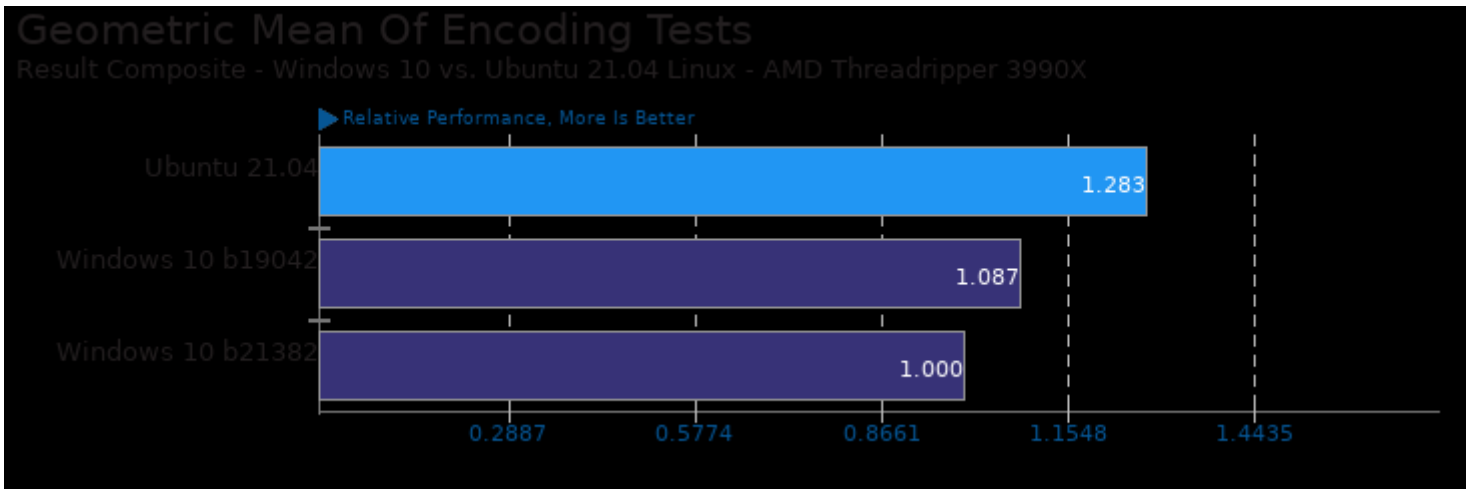
Geometric mean based upon tests: pts/asmfish, pts/compress-zstd, pts/crafty, pts/dacapobench, pts/dav1d, pts/svt-av1, pts/x264, pts/encode-flac, pts/encode-mp3, pts/graphics-magick, pts/john-the-ripper, pts/minion, pts/primesieve, pts/stockfish, pts/v-ray, pts/blender and pts/cpuminer-opt



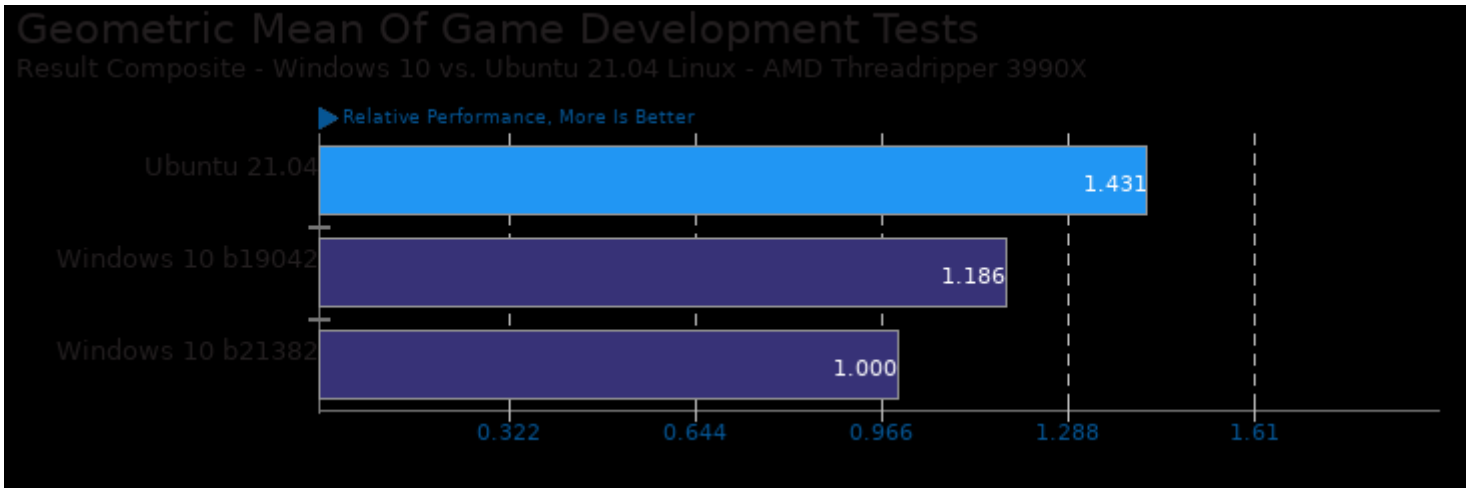
Geometric mean based upon tests: pts/blender, pts/appleseed, pts/v-ray, pts/indigobench, pts/x264, pts/dav1d, pts/svt-av1, pts/avifenc, pts/encode-mp3, pts/encode-flac, pts/encode-opus, pts/graphics-magick, pts/webp, pts/embree, pts/oidn and pts/basis



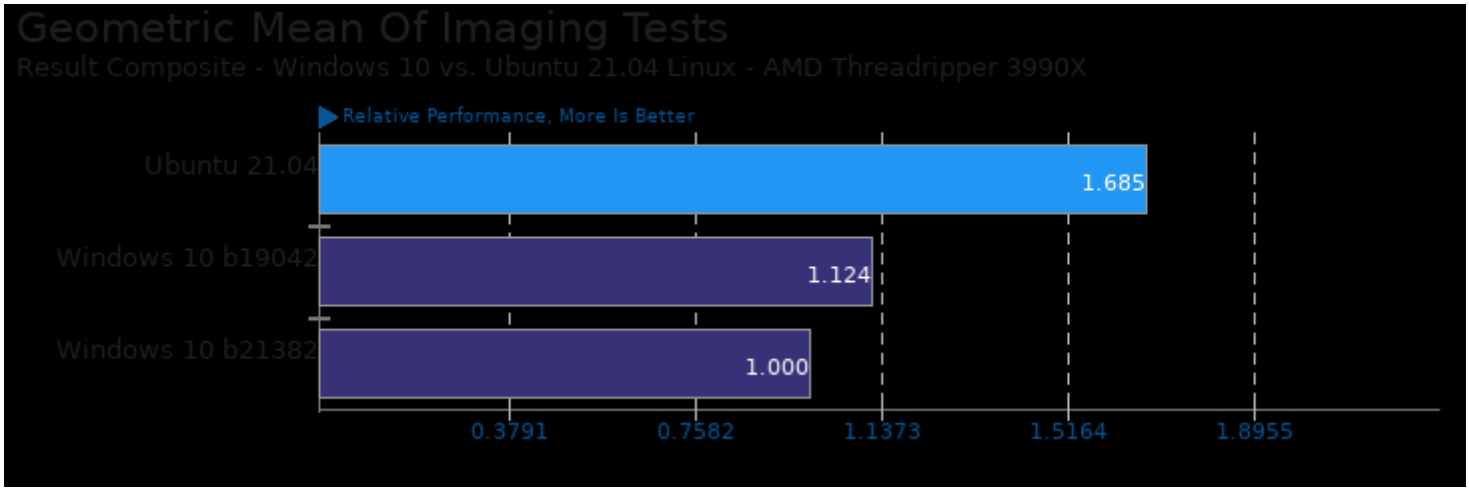
Geometric mean based upon tests: pts/john-the-ripper and pts/cpuminer-opt



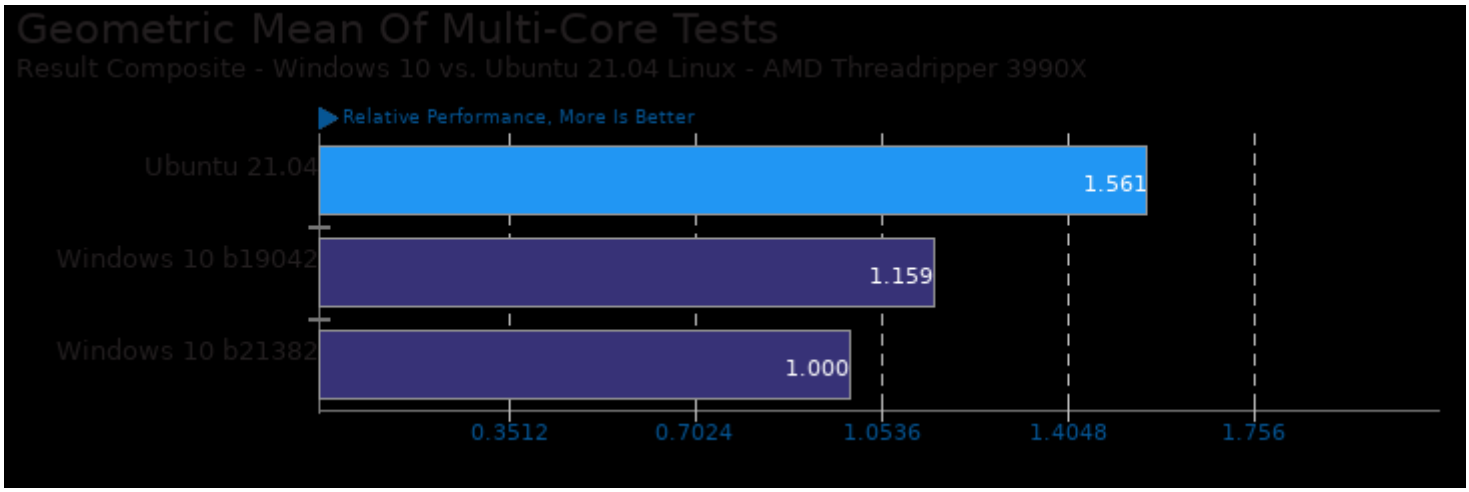
Geometric mean based upon tests: pts/encode-mp3, pts/encode-flac, pts/encode-opus, pts/x264, pts/dav1d, pts/svt-av1 and pts/avifenc



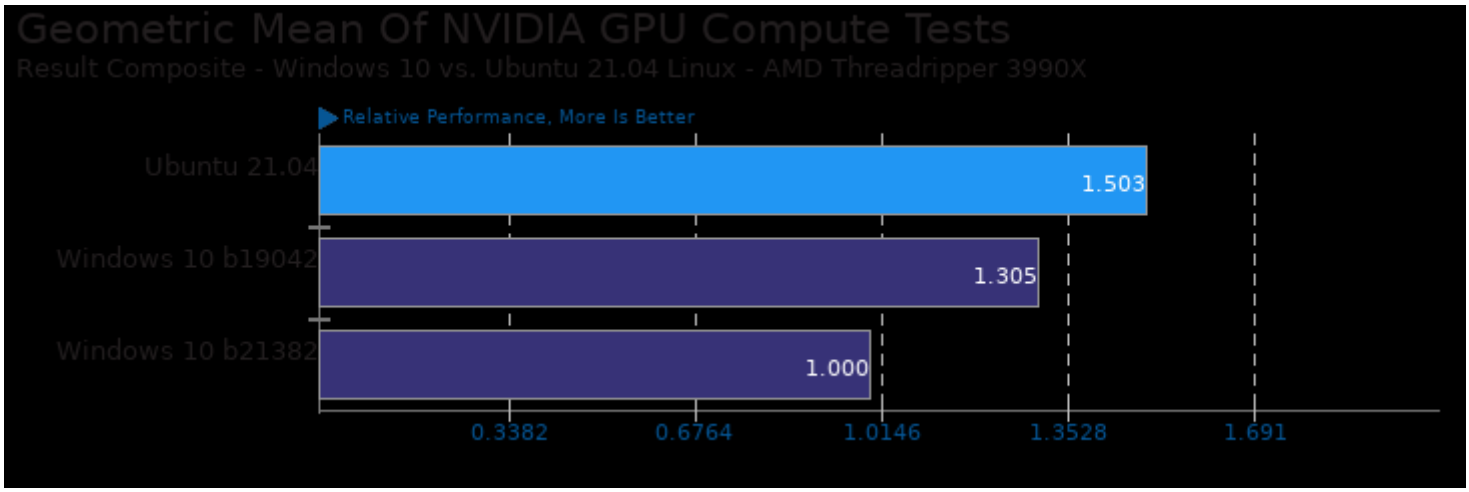
Geometric mean based upon tests: pts/basis, pts/blender and pts/oidn



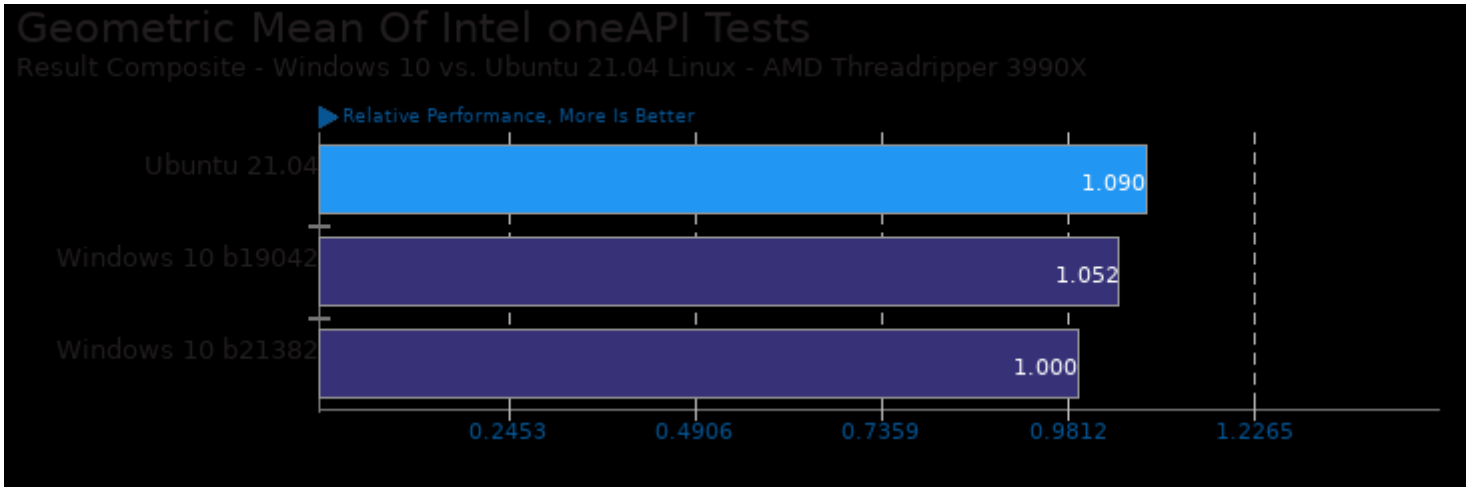
Geometric mean based upon tests: pts/graphics-magick, pts/webp and pts/avifenc



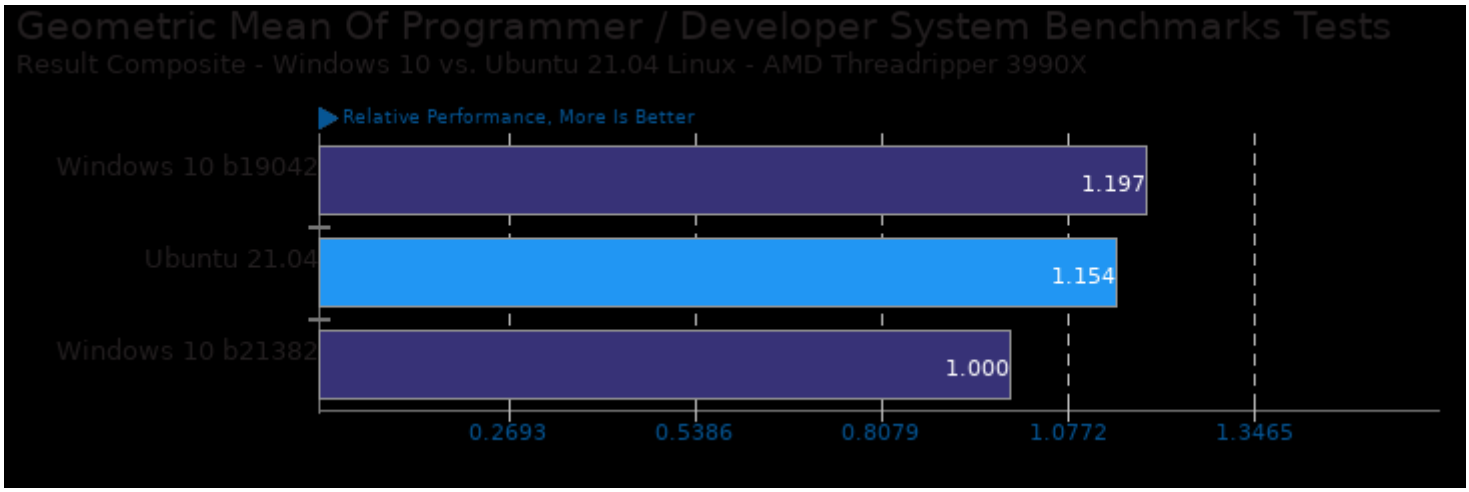
Geometric mean based upon tests: pts/blender, pts/cpuminer-opt, pts/stockfish, pts/x264, pts/dav1d, pts/svt-av1, pts/avifenc, pts/primesieve, pts/john-the-ripper, pts/asmfish, pts/graphics-magick, pts/compress-zstd, pts/appleseed, pts/v-ray, pts/indigobench, pts/embree and pts/oidn



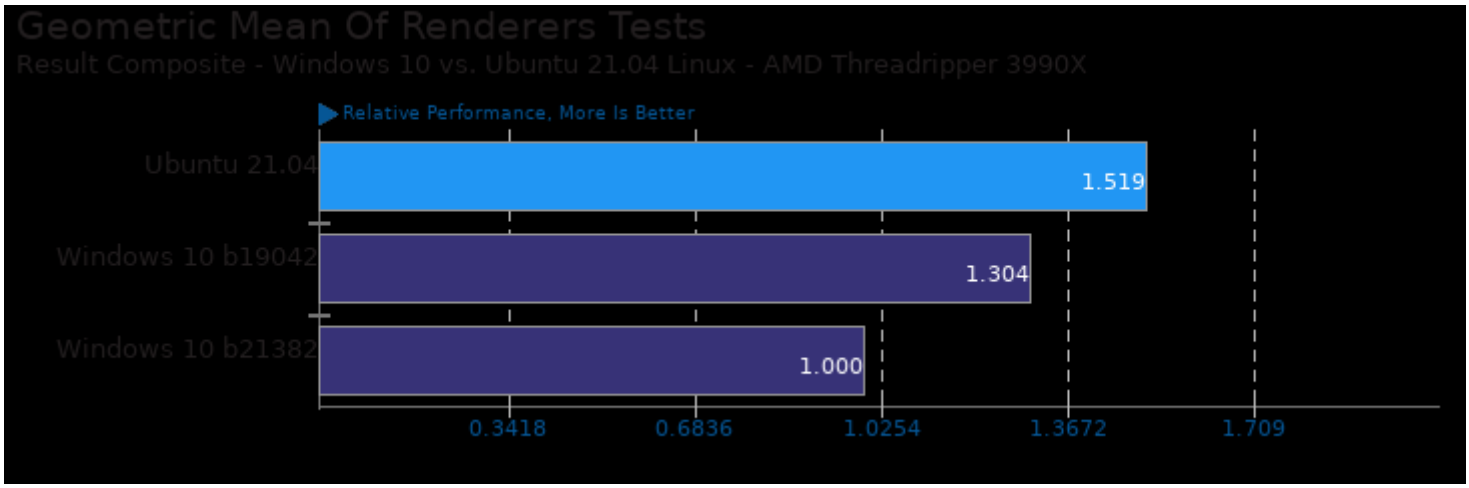
Geometric mean based upon tests: pts/indigobench, pts/v-ray and pts/blender



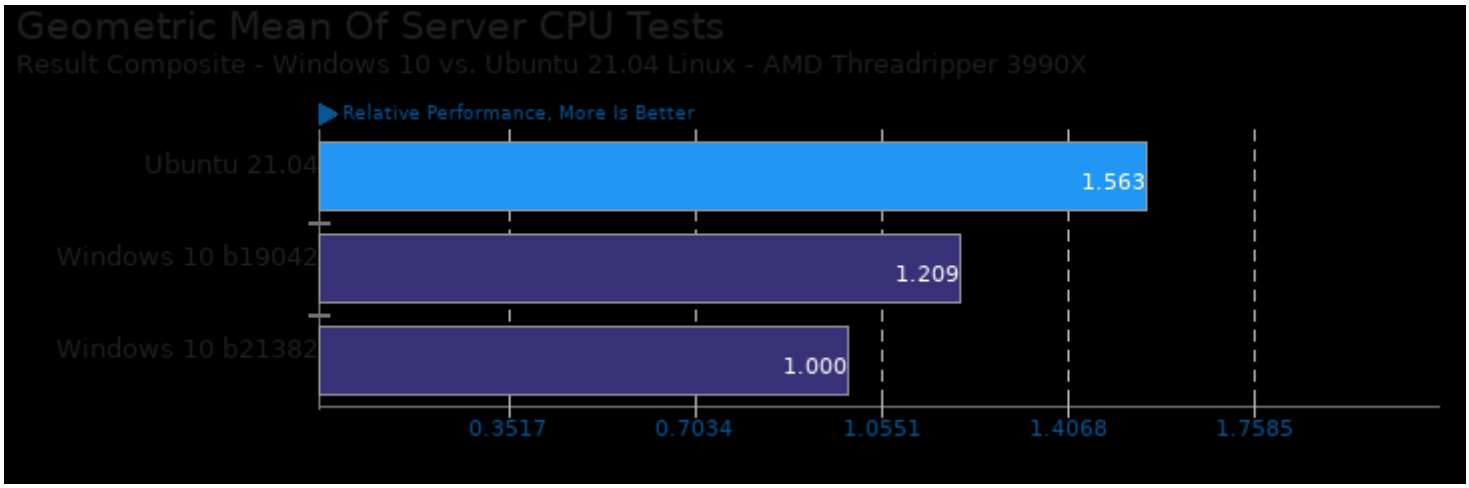
Geometric mean based upon tests: pts/embree and pts/oidn



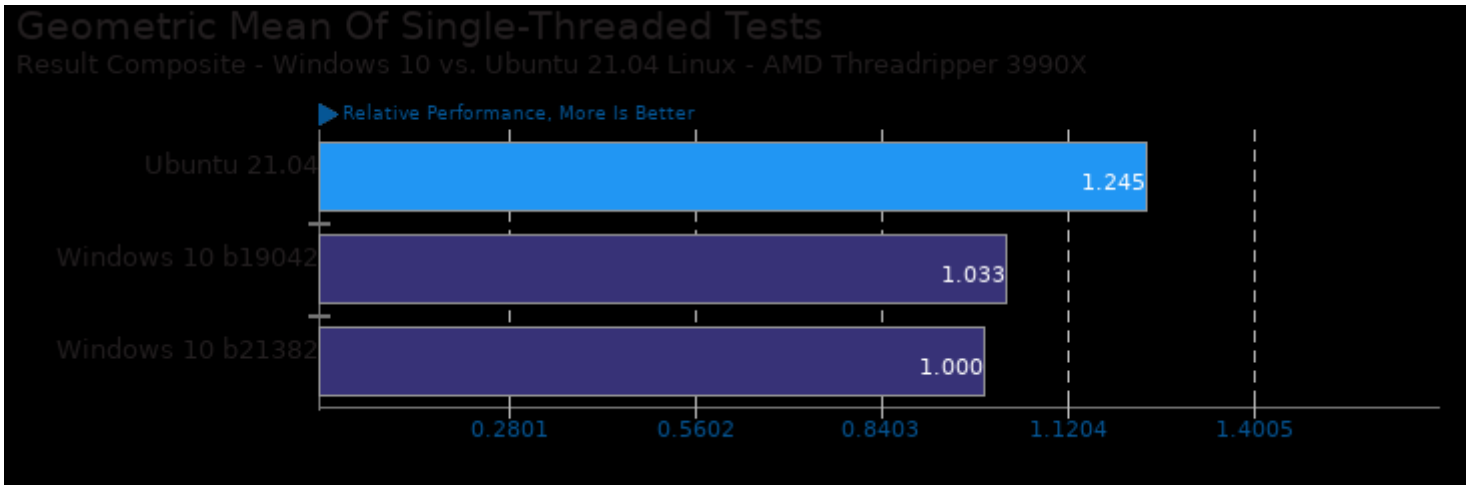
Geometric mean based upon tests: pts/compress-zstd and pts/pybench



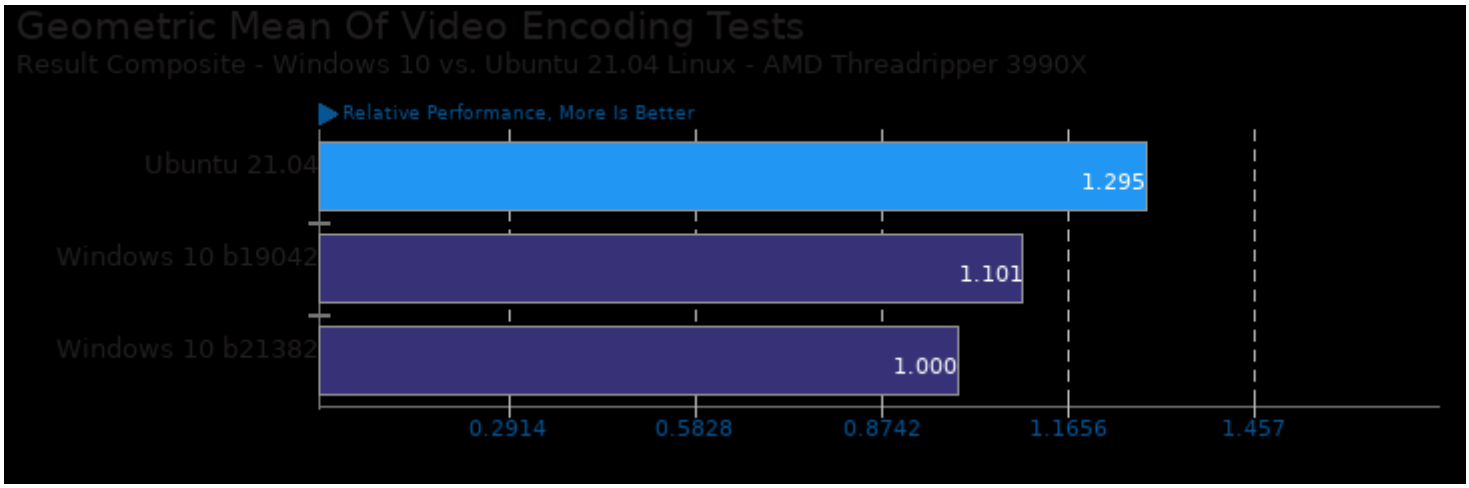
Geometric mean based upon tests: pts/blender, pts/appleseed, pts/v-ray and pts/indigobench



Geometric mean based upon tests: pts/dacapobench, pts/john-the-ripper, pts/svt-av1, pts/x264, pts/dav1d, pts/stockfish, pts/asmfish, pts/compress-zstd, pts/blender, pts/appleseed, pts/pybench and pts/cpuminer-opt



Geometric mean based upon tests: pts/encode-flac, pts/encode-mp3, pts/minion, pts/sudokut and pts/pybench



Geometric mean based upon tests: pts/x264, pts/dav1d, pts/svt-av1 and pts/avifenc

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