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WSL2 Windows 11 vs. Ubuntu Linux Benchmarks

WSL2 Windows vs. Linux benchmarking by Michael Larabel.

Automated Executive Summary

Ubuntu 20.04.2 LTS had the most wins, coming in first place for 38% of the tests.

Based on the geometric mean of all complete results, the fastest (Ubuntu 20.04.2 LTS) was 1.137x the speed of the slowest (Windows 11 22000.51). Ubuntu 21.04 was 0.991x the speed of Ubuntu 20.04.2 LTS, Windows 10 21H1 was 0.927x the speed of Ubuntu 21.04, Windows 11 22000.51 was 0.958x the speed of Windows 10 21H1.

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

SQLite Speedtest (Timed Time - Size 1,000) at 3.785x
Git (Time To Complete Common Git Commands) at 2.74x
Timed Godot Game Engine Compilation (Time To Compile) at 2.07x
Timed Node.js Compilation (Time To Compile) at 1.495x
PJSIP (Method: INVITE) at 1.252x
Chia Blockchain VDF (Test: Square Assembly Optimized) at 1.246x
VP9 libvpx Encoding (Speed: Speed 5 - Input: Bosphorus 4K) at 1.183x
C-Blosc (Compressor: blosclz) at 1.18x
AOM AV1 (Encoder Mode: Speed 9 Realtime - Input: Bosphorus 4K) at 1.164x

PJSIP (Method: OPTIONS, Stateful) at 1.15x.

Test Systems:

Windows 10 21H1

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Memory: 32GB, Disk: 466GB

OS: Ubuntu 20.04, Kernel: 4.4.0-19041-Microsoft (x86_64), Compiler: GCC 9.3.0, File-System: wslfs, System Layer: wsl

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEa/gcc-9-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: CPU Microcode: 0xffffffff
Python Notes: Python 3.8.5

Windows 11 22000.51

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Memory: 32GB, Disk: 466GB

OS: Ubuntu 20.04, Kernel: 4.4.0-22000-Microsoft (x86_64), Compiler: GCC 9.3.0, File-System: wslfs, System Layer: wsl

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEa/gcc-9-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: CPU Microcode: 0xffffffff
Python Notes: Python 3.8.5

Ubuntu 20.04.2 LTS

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (3302 BIOS), Chipset: AMD Starship/Matisse, Memory: 32GB, Disk: 500GB Western Digital WDS500G3X0C-00SJG0, Graphics: AMD Radeon RX 5600 OEM/5600 XT / 5700/5700 8GB (2055/875MHz), Audio: AMD Navi 10 HDMI Audio, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.04, Kernel: 5.8.0-59-generic (x86_64), Desktop: GNOME Shell 3.36.9, Display Server: X Server 1.20.9, Vulkan: 1.2.131, Compiler: GCC 9.3.0, 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-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEa/gcc-9-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Disk Notes: NONE / errors=remount-ro,relatime,rw / Block Size: 4096
Processor Notes: Scaling Governor: acpi-cpufreq ondemand (Boost: Enabled) - CPU Microcode: 0xa201009
Python Notes: Python 3.8.10
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

WSL2 Windows 11 vs. Ubuntu Linux Benchmarks

Ubuntu 21.04

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (3302 BIOS), Chipset: AMD Starship/Matisse, Memory: 32GB, Disk: 500GB Western Digital WDS500G3X0C-00SJG0, Graphics: AMD Radeon RX 5600 OEM/5600 XT / 5700/5700 (2100/875MHz), Audio: AMD Navi 10 HDMI Audio, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 21.04, Kernel: 5.11.0-22-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
Disk Notes: NONE / errors=remount-ro,relatime,rw / Block Size: 4096
Processor Notes: Scaling Governor: acpi-cpufreq schedutil (Boost: Enabled) - CPU Microcode: 0xa201009
Python Notes: Python 3.9.5
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

	Windows 10 21H1	Windows 11 22000.51	Ubuntu 20.04.2 LTS	Ubuntu 21.04
C-Blosc - blosclz (MB/s)	**25887**	26576	**30550**	28807
Normalized	84.74%	86.99%	100%	94.29%
Standard Deviation	0.2%	1.2%	0.4%	0.9%
NAMD - ATPase Simulation - 327,506 Atoms (days/ns)	1.08557	**1.09619**	**1.07253**	1.08976
Normalized	98.8%	97.84%	100%	98.42%
Standard Deviation	0.7%	1%	0.6%	0.4%
Chia Blockchain VDF - Square Plain C++ (IPS)	**221700**	218667	211433	**210767**
Normalized	100%	98.63%	95.37%	95.07%
Standard Deviation	0.4%	0.2%	0.1%	0.7%
Chia Blockchain VDF - S.A.O (IPS)	**213300**	208300	**171167**	182267
Normalized	100%	97.66%	80.25%	85.45%
Standard Deviation	0.2%	0.2%	0.5%	1.3%
Zstd Compression - 19 - Compression Speed (MB/s)	**49.5**	**49.5**	**51.2**	51.1
Normalized	96.68%	96.68%	100%	99.8%
Standard Deviation	0.5%	1.4%	0.3%	0.2%
Zstd Compression - 19 - D.S (MB/s)	**4115**	4091	**4031**	4083
Normalized	100%	99.42%	97.95%	99.23%
Standard Deviation	0.3%	0.4%	1.3%	1.1%
Zstd Compression - 19, Long Mode - Compression Speed (MB/s)	35.5	**34.9**	**36.2**	**36.2**
Normalized	98.07%	96.41%	100%	100%
Standard Deviation	0.3%	0.5%	0.3%	0%

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Zstd Compression - 19, Long Mode - D.S (MB/s)	4174	4145	4100	4086
Normalized	100%	99.31%	98.22%	97.89%
Standard Deviation	0.5%	0.1%	1.1%	1.4%
AOM AV1 - Speed 6 Realtime - Bosphorus 4K (FPS)	22.38	21.78	20.95	21.25
Normalized	100%	97.32%	93.61%	94.95%
Standard Deviation	0.2%	1%	0.7%	2%
AOM AV1 - Speed 8 Realtime - Bosphorus 4K (FPS)	53.27	52.64	57.44	53.80
Normalized	92.74%	91.64%	100%	93.66%
Standard Deviation	0.3%	0.3%	0.7%	5.6%
AOM AV1 - Speed 9 Realtime - Bosphorus 4K (FPS)	65.46	64.41	73.01	62.71
Normalized	89.66%	88.22%	100%	85.89%
Standard Deviation	0.4%	0.1%	0.3%	1%
Embree - Pathtracer - Crown (FPS)	23.3711	22.5042	23.7523	24.0420
Normalized	97.21%	93.6%	98.8%	100%
Standard Deviation	0.5%	0.5%	0.3%	0.4%
Embree - Pathtracer ISPC - Crown (FPS)	21.9030	21.2182	22.2058	22.3829
Normalized	97.86%	94.8%	99.21%	100%
Standard Deviation	0.3%	0.2%	0.4%	0.5%
Embree - Pathtracer - Asian Dragon (FPS)	24.3007	23.7718	24.5817	24.9421
Normalized	97.43%	95.31%	98.56%	100%
Standard Deviation	0.4%	0.2%	0.9%	0.5%
Embree - Pathtracer ISPC - Asian Dragon (FPS)	22.8986	22.2733	23.1245	22.9713
Normalized	99.02%	96.32%	100%	99.34%
Standard Deviation	0.3%	0.4%	0.5%	0.3%
SVT-AV1 - Preset 4 - Bosphorus 4K (FPS)	2.209	2.126	2.124	2.144
Normalized	100%	96.24%	96.15%	97.06%
Standard Deviation	0.4%	0.2%	0.1%	0.4%
SVT-AV1 - Preset 8 - Bosphorus 4K (FPS)	23.463	22.900	23.485	22.600
Normalized	99.91%	97.51%	100%	96.23%
Standard Deviation	0.8%	1.3%	0.3%	0.8%
VP9 libvpx Encoding - Speed 0 - Bosphorus 4K (FPS)	7.89	7.52	8.31	8.28
Normalized	94.95%	90.49%	100%	99.64%
Standard Deviation	2.1%	0.4%	0.7%	0.3%
VP9 libvpx Encoding - Speed 5 - Bosphorus 4K (FPS)	18.32	17.18	20.06	20.33
Normalized	90.11%	84.51%	98.67%	100%
Standard Deviation	0.2%	0.5%	1.3%	0.4%
Coremark - CoreMark Size 666 - I.P.S (Iterations/Sec)	837126	814921	829936	807167
Normalized	100%	97.35%	99.14%	96.42%
Standard Deviation	0.2%	1.2%	0.1%	0.2%
Stockfish - Total Time (Nodes/s)	54764581	52481105	53394741	57445220
Normalized	95.33%	91.36%	92.95%	100%

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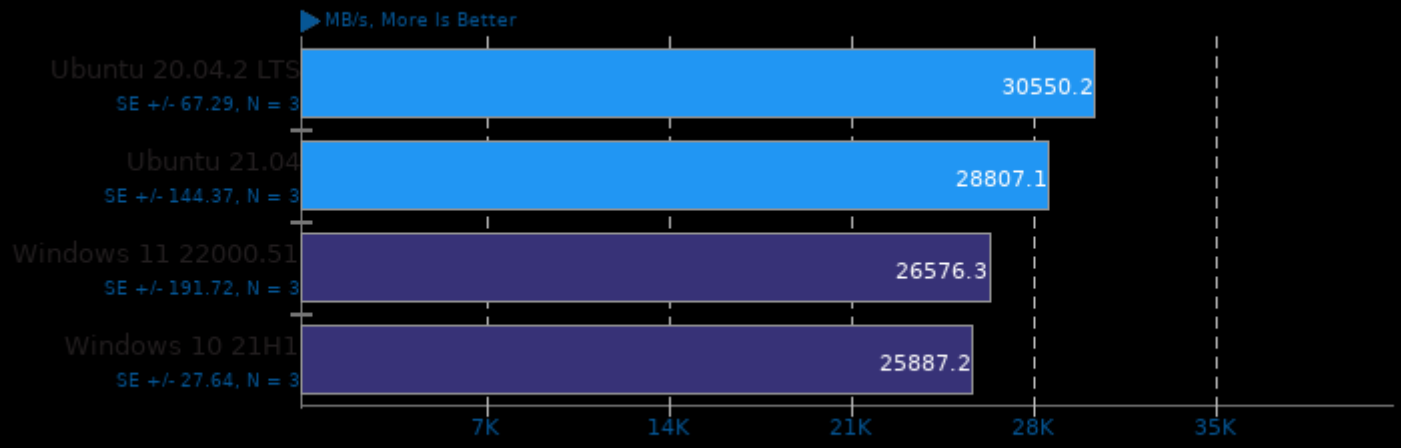
Standard Deviation	1.2%	0.5%	1.7%	3.8%
PJSIP - INVITE (Responses/sec)	4875	4220	5285	5006
Normalized	92.24%	79.85%	100%	94.72%
Standard Deviation	0.5%	1.4%	4.4%	2.3%
PJSIP - OPTIONS, Stateful (Responses/sec)	8741	7957	9153	8075
Normalized	95.5%	86.93%	100%	88.22%
Standard Deviation	1.2%	1%	1.1%	0.7%
Timed Godot Game Engine Compilation - Time To Compile (sec)	122.280	149.563	76.194	72.247
Normalized	59.08%	48.31%	94.82%	100%
Standard Deviation	1.1%	1.8%	0.4%	0.3%
Timed Linux Kernel Compilation - Time To Compile (sec)	96.847	110.257	47.717	46.824
Normalized	48.35%	42.47%	98.13%	100%
Standard Deviation	3.9%	6.2%	1.2%	1.1%
Timed Node.js Compilation - Time To Compile (sec)	332.275	361.755	245.939	241.899
Normalized	72.8%	66.87%	98.36%	100%
Standard Deviation	0.6%	1%	0.1%	0.2%
SecureMark - SecureMark-TLS	342518	341291	323292	321021
Normalized	100%	99.64%	94.39%	93.72%
Standard Deviation	1%	0.6%	1.4%	0.5%
Node.js V8 Web Tooling Benchmark (runs/s)	15.46	14.95	16.56	14.89
Normalized	93.36%	90.28%	100%	89.92%
Standard Deviation	0.7%	1.5%	0.8%	1.4%
GROMACS - MPI CPU - water_GMX50_bare (Ns/Day)	1.259	1.254	1.277	1.254
Normalized	98.59%	98.2%	100%	98.2%
Standard Deviation	0.4%	0.4%	0.2%	0%
SQLite Speedtest - Timed Time - Size 1,000 (sec)	164.296	164.236	43.488	43.404
Normalized	26.42%	26.43%	99.81%	100%
Standard Deviation	1.3%	0.3%	0.7%	0.5%
KTX-Software toktx - UASTC 3 (sec)	6.794	6.859	6.398	6.455
Normalized	94.17%	93.28%	100%	99.12%
Standard Deviation	0.1%	0.3%	0.4%	0%
KTX-Software toktx - Zstd Compression 9 (sec)	2.238	2.265	2.147	2.136
Normalized	95.44%	94.3%	99.49%	100%
Standard Deviation	0.1%	0.3%	0.6%	0.4%
KTX-Software toktx - Z.C.1 (sec)	14.301	14.606	14.751	14.536
Normalized	100%	97.91%	96.95%	98.38%
Standard Deviation	0.1%	0.2%	0.5%	2.3%
KTX-Software toktx - U.3.Z.C.1 (sec)	10.915	11.062	10.565	10.548
Normalized	96.64%	95.35%	99.84%	100%
Standard Deviation	0.1%	0.2%	1.3%	0.4%
KTX-Software toktx - U.4.Z.C.1 (sec)	156.505	158.929	156.190	156.850
Normalized	99.8%	98.28%	100%	99.58%
Standard Deviation	0.2%	0.3%	0.2%	0.2%
Google Draco - Lion (ms)	4127	4152	4207	4102
Normalized	99.39%	98.8%	97.5%	100%
Standard Deviation	0.3%	0%		2.3%

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Google Draco - Church Facade (ms)	5343	5420	**5297**	**5441**
Normalized	99.14%	97.73%	100%	97.35%
Standard Deviation	0.1%	0.2%	2.5%	0.9%
TNN - CPU - DenseNet (ms)	**2347**	2389	**2401**	2400
Normalized	100%	98.27%	97.77%	97.81%
Standard Deviation	0.1%	0.6%	0.3%	0.4%
TNN - CPU - MobileNet v2 (ms)	**216.955**	220.551	223.568	**224.537**
Normalized	100%	98.37%	97.04%	96.62%
Standard Deviation	0.1%	0.2%	0%	0.8%
TNN - CPU - SqueezeNet v2 (ms)	**46.191**	47.230	49.316	**50.556**
Normalized	100%	97.8%	93.66%	91.37%
Standard Deviation	2.4%	2.6%	1.9%	1.4%
TNN - CPU - SqueezeNet v1.1 (ms)	**202.263**	206.597	**210.212**	207.870
Normalized	100%	97.9%	96.22%	97.3%
Standard Deviation	0%	2%	0.4%	1.6%
Git - T.T.C.C.G.C (sec)	63.598	**103.497**	38.439	**37.777**
Normalized	59.4%	36.5%	98.28%	100%
Standard Deviation	2%	2.4%	0.3%	0.5%
Geometric Mean Of All Test Results - Result Composite - W.W.1.v.U.L.B (Geometric Mean)	43.136	**41.306**	**46.963**	46.550
Normalized	91.85%	87.95%	100%	99.12%

C-Blosc 2.0

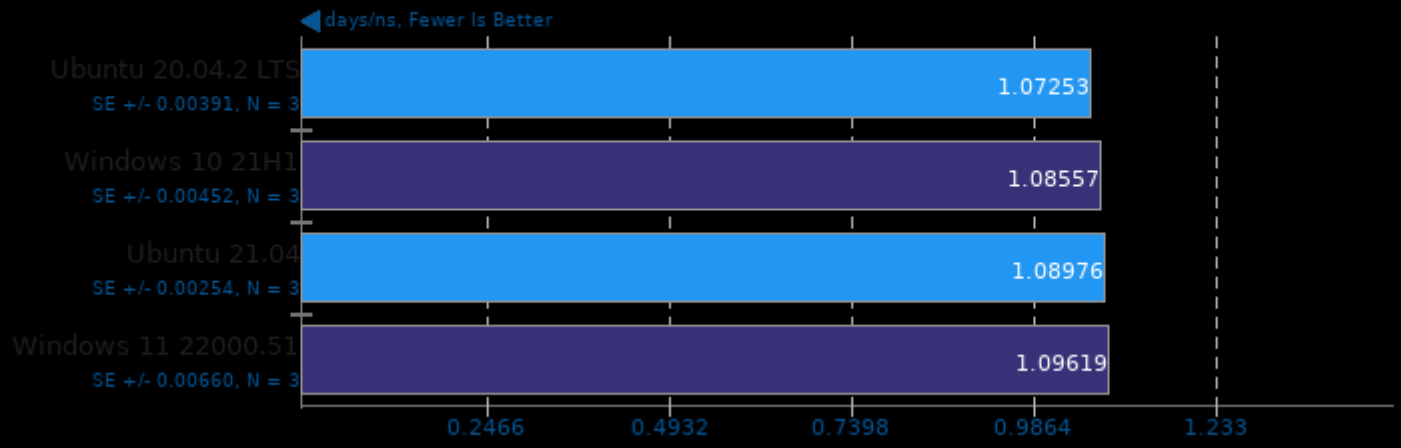
Compressor: blosclz



1. (CC) gcc options: -std=gnu99 -O3 -pthread -lrt -lm

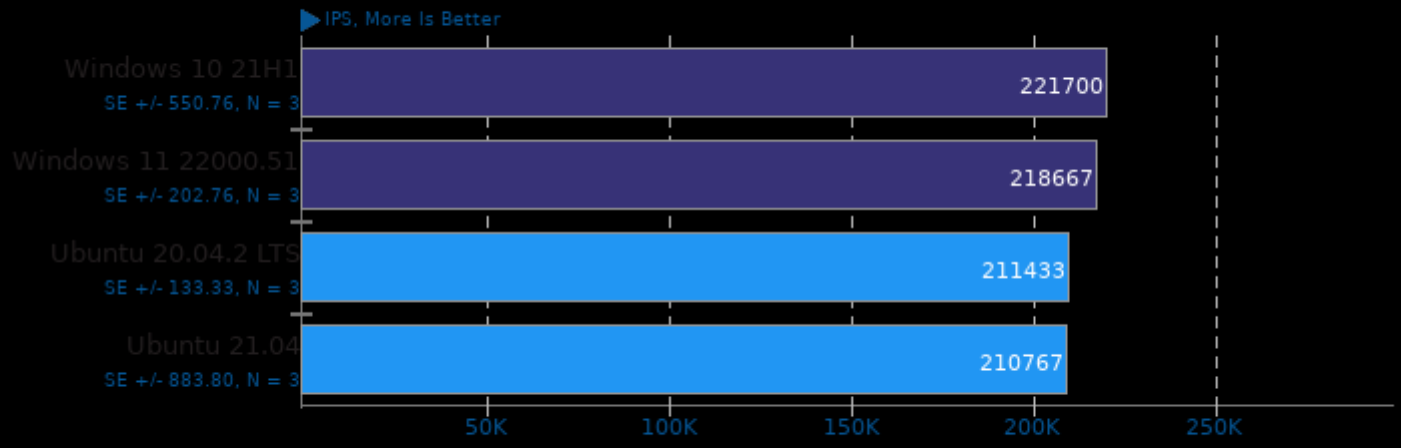
NAMD 2.14

ATPase Simulation - 327,506 Atoms

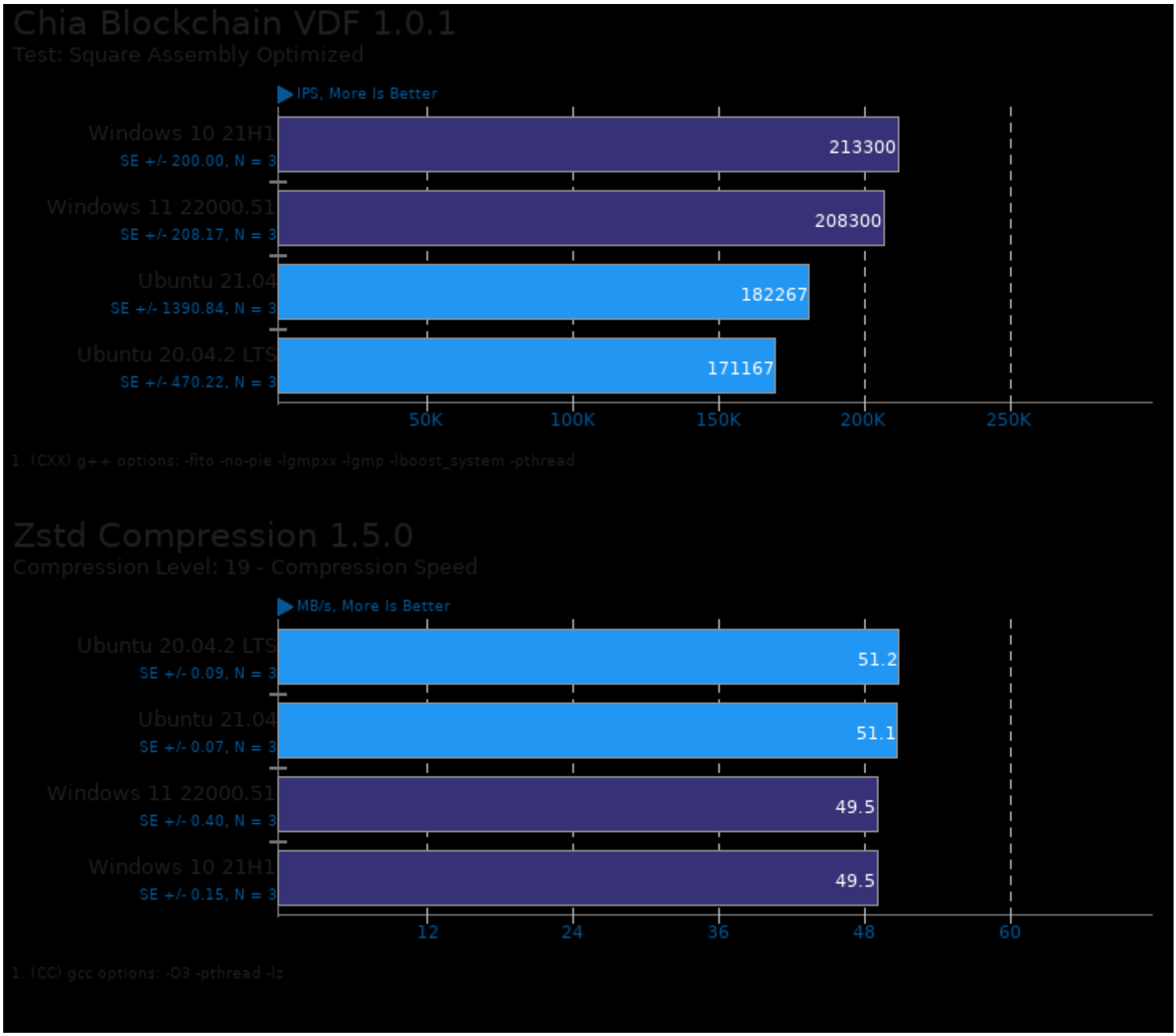


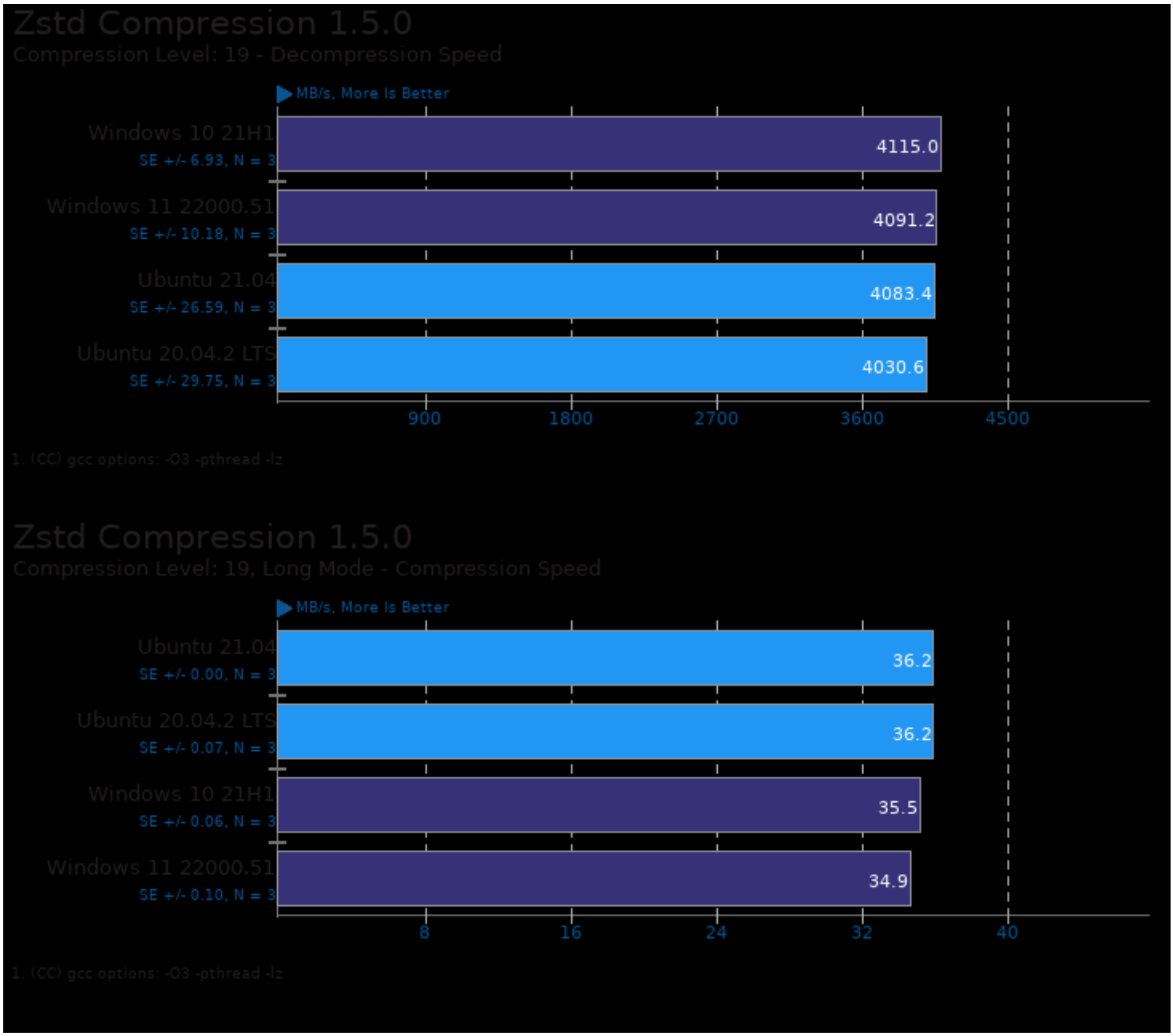
Chia Blockchain VDF 1.0.1

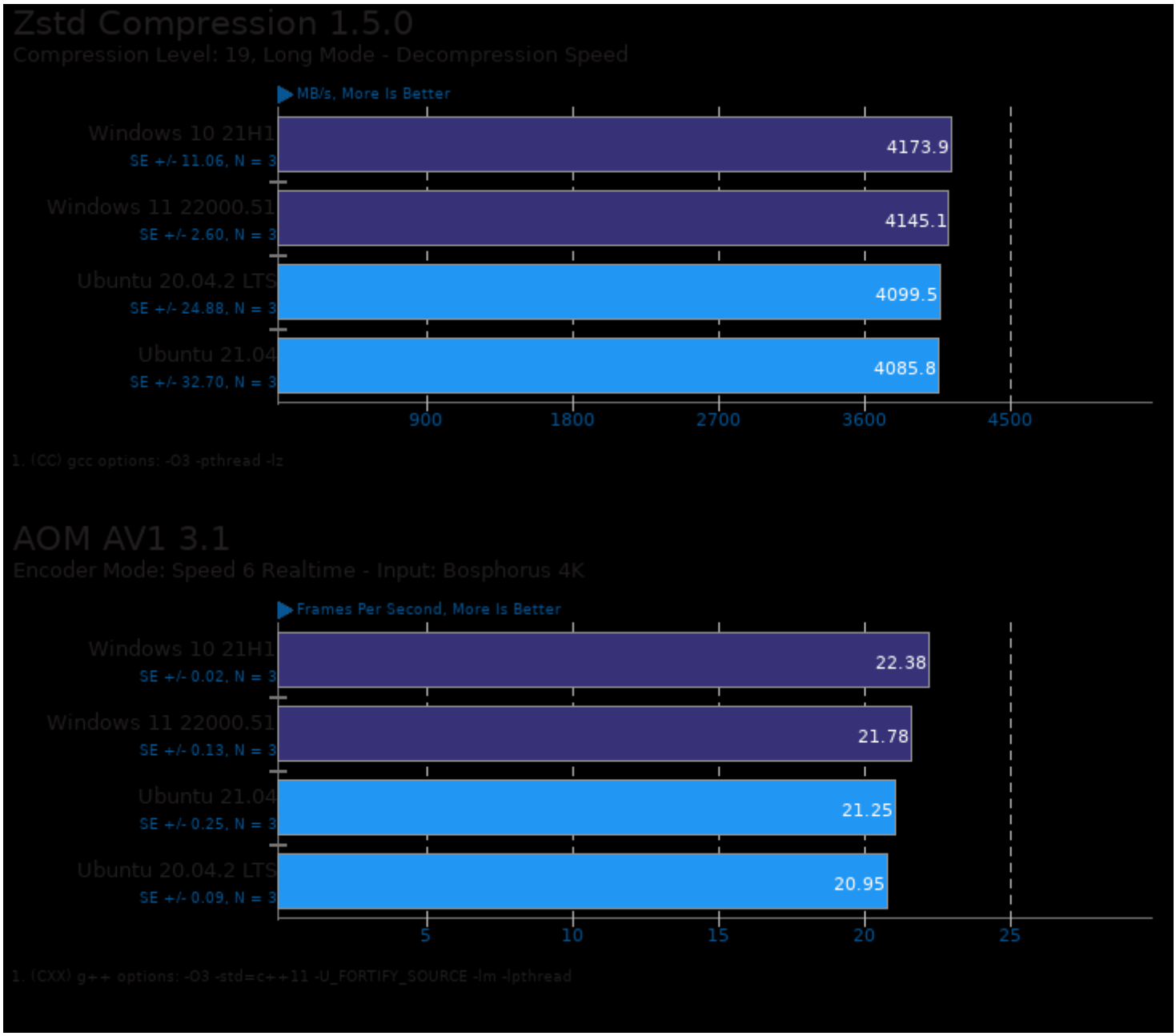
Test: Square Plain C++

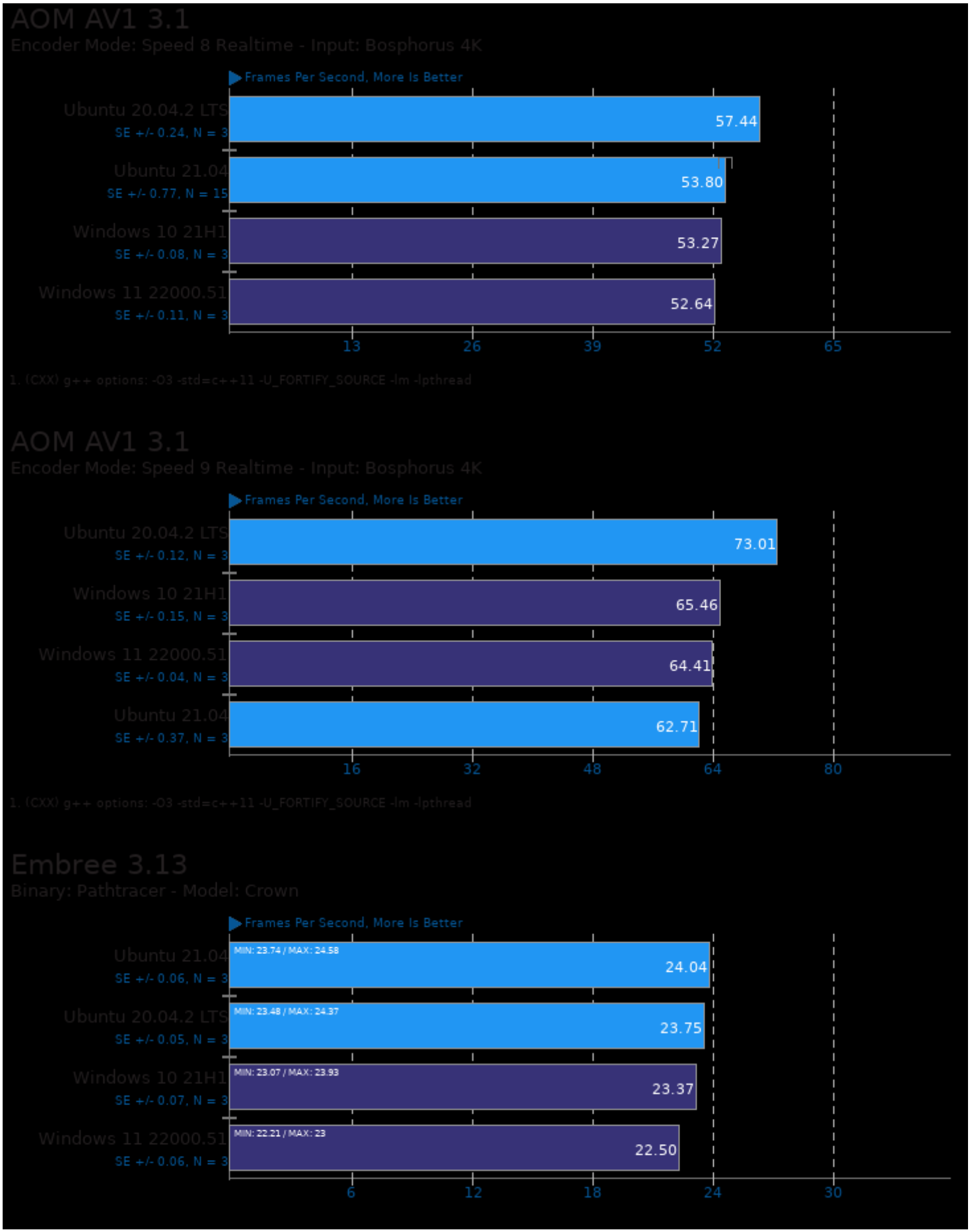


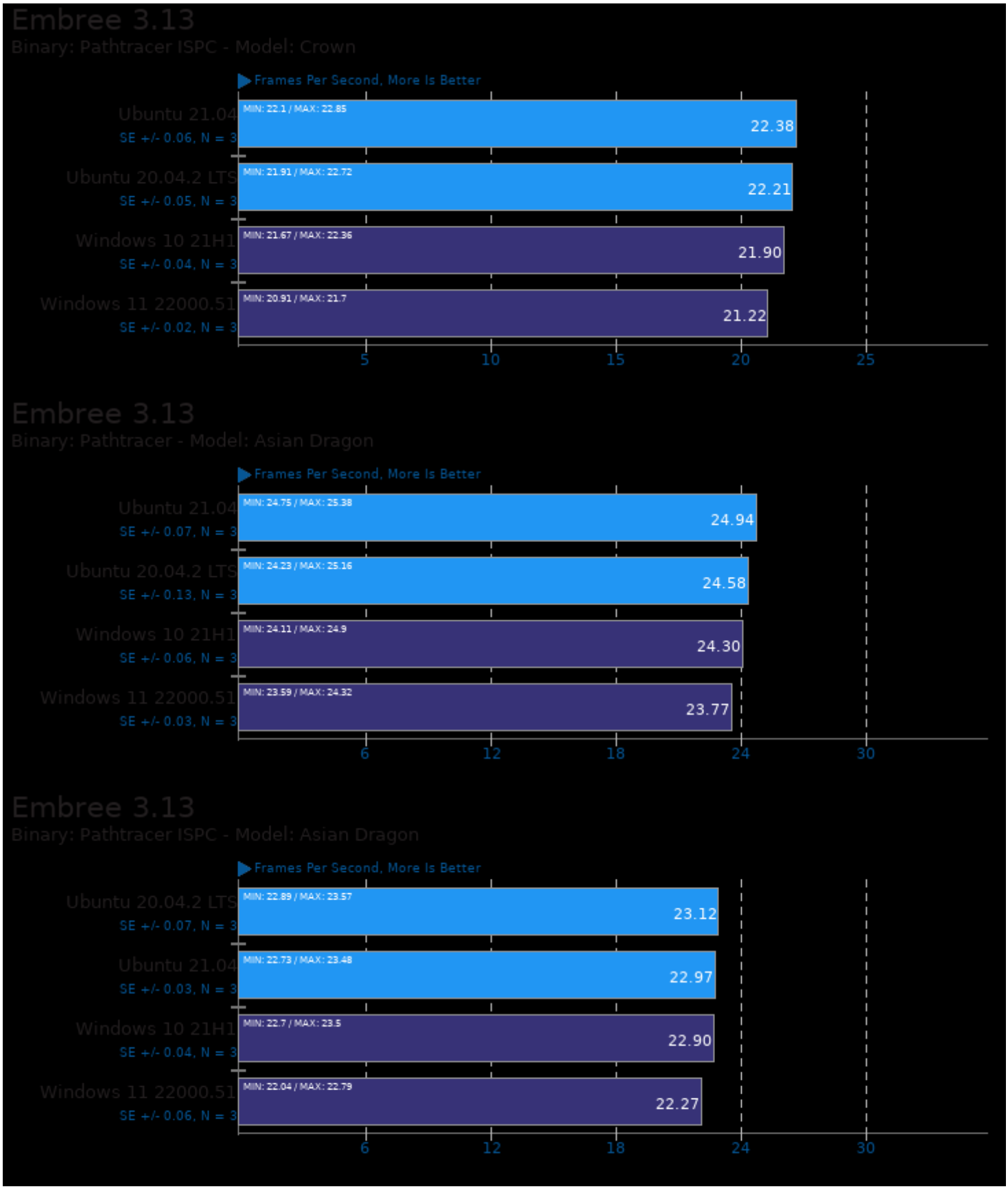
1. (CXX) g++ options: -flto -no-pie -lgmpxx -lgmp -lboost_system -pthread

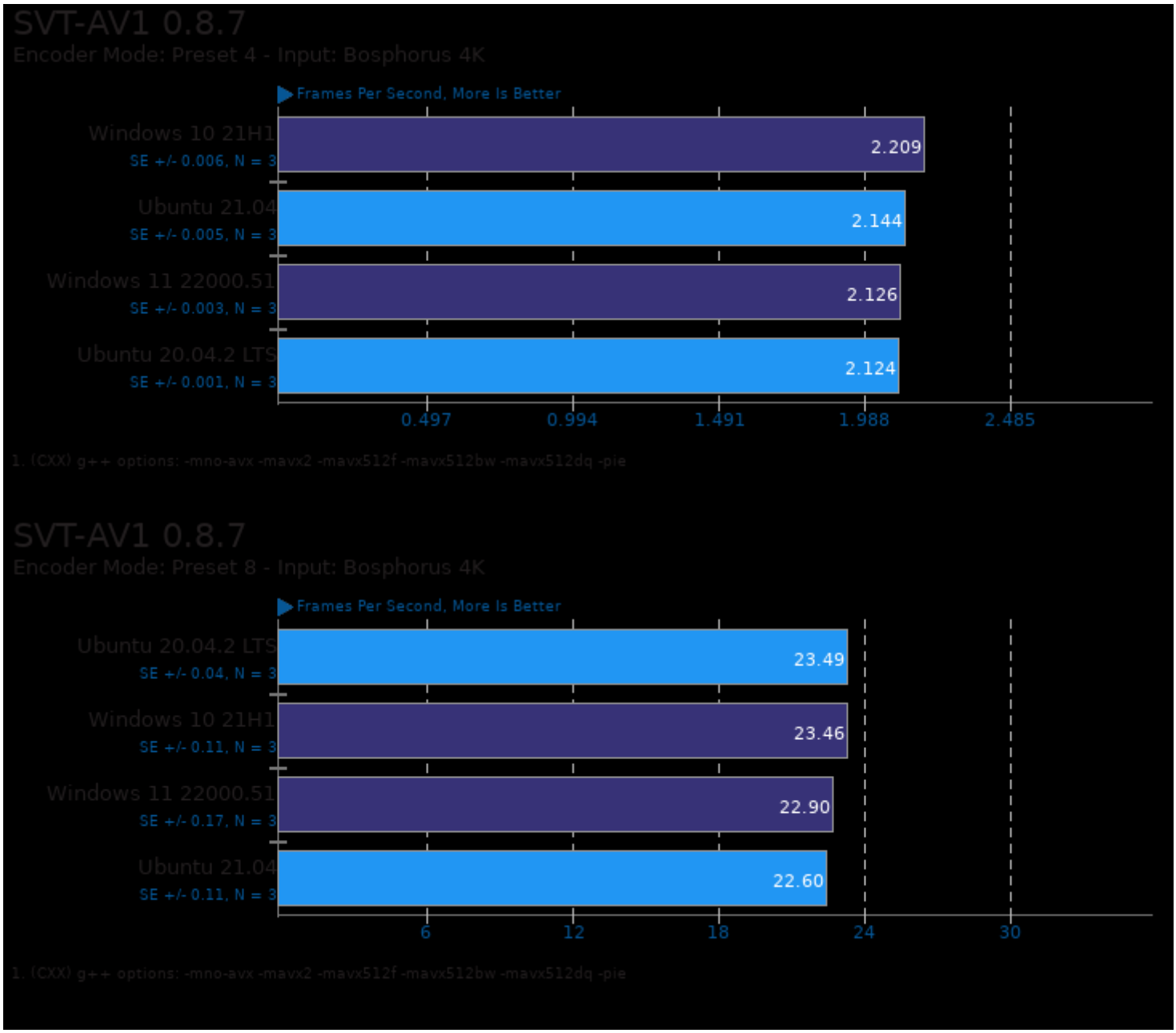

Chia Blockchain VDF 1.0.1
Test: Square Assembly Optimized
IPS, More Is Better
Windows 10 21H1
SE +/- 200.00, N = 3
213300
Windows 11 22000.51
SE +/- 208.17, N = 3
208300
Ubuntu 21.04
SE +/- 1390.84, N = 3
182267
Ubuntu 20.04.2 LTS
SE +/- 470.22, N = 3
171167
50K
100K
150K
200K
250K
1. (CXX) g++ options: -flto -no-pie -lgmpxx -lgmp -lboost_system -pthread
Zstd Compression 1.5.0
Compression Level: 19 - Compression Speed
MB/s, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.09, N = 3
51.2
Ubuntu 21.04
SE +/- 0.07, N = 3
51.1
Windows 11 22000.51
SE +/- 0.40, N = 3
49.5
Windows 10 21H1
SE +/- 0.15, N = 3
49.5
12
24
36
48
60
1. (CC) gcc options: -O3 -pthread -lz

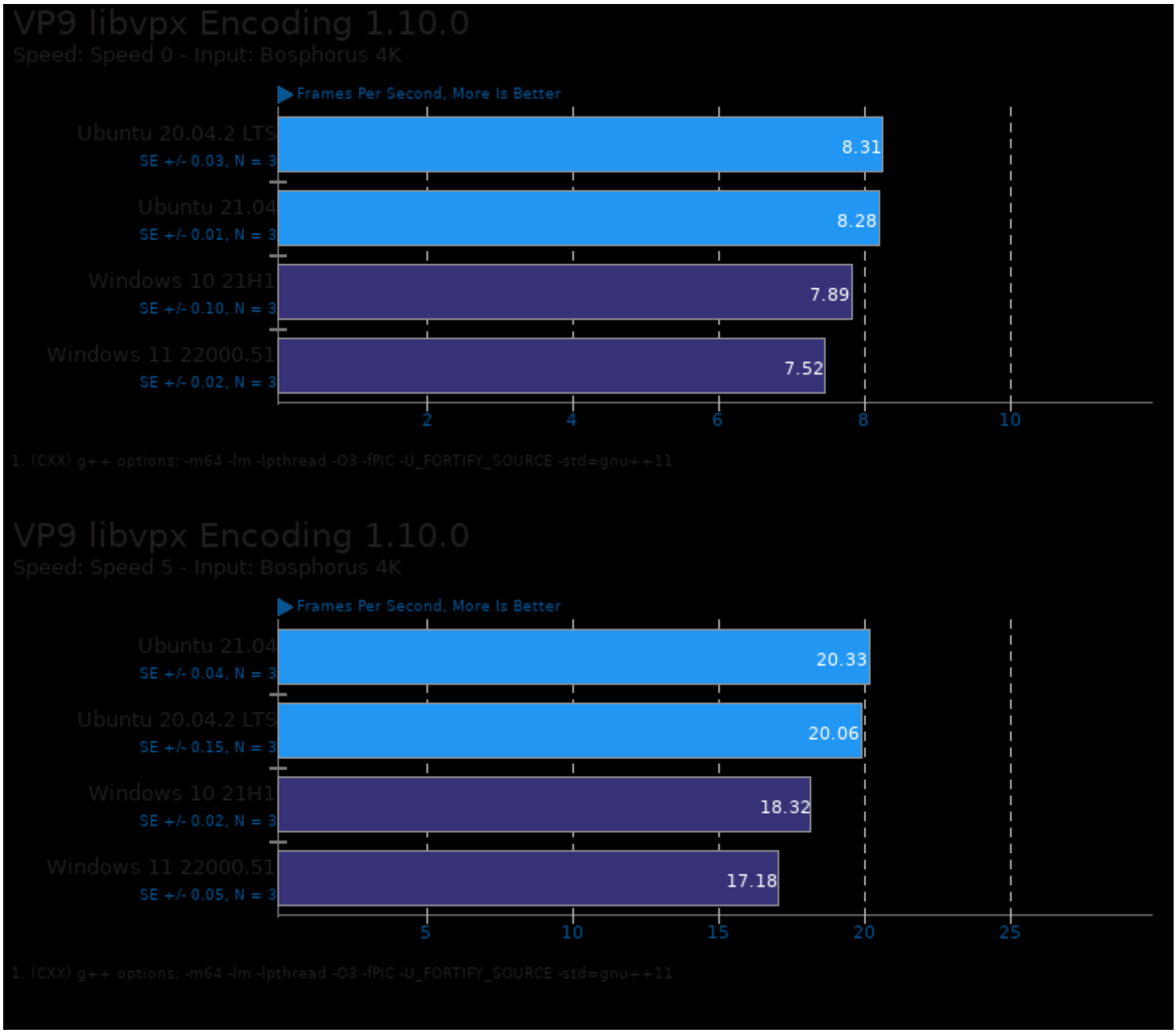

Zstd Compression 1.5.0
Compression Level: 19 - Decompression Speed
MB/s, More Is Better
Windows 10 21H1
SE +/- 6.93, N = 3
4115.0
Windows 11 22000.51
SE +/- 10.18, N = 3
4091.2
Ubuntu 21.04
SE +/- 26.59, N = 3
4083.4
Ubuntu 20.04.2 LTS
SE +/- 29.75, N = 3
4030.6
900
1800
2700
3600
4500
1. (CC) gcc options: -O3 -pthread -lz
Zstd Compression 1.5.0
Compression Level: 19, Long Mode - Compression Speed
MB/s, More Is Better
Ubuntu 21.04
SE +/- 0.00, N = 3
36.2
Ubuntu 20.04.2 LTS
SE +/- 0.07, N = 3
36.2
Windows 10 21H1
SE +/- 0.06, N = 3
35.5
Windows 11 22000.51
SE +/- 0.10, N = 3
34.9
8
16
24
32
40
1. (CC) gcc options: -O3 -pthread -lz

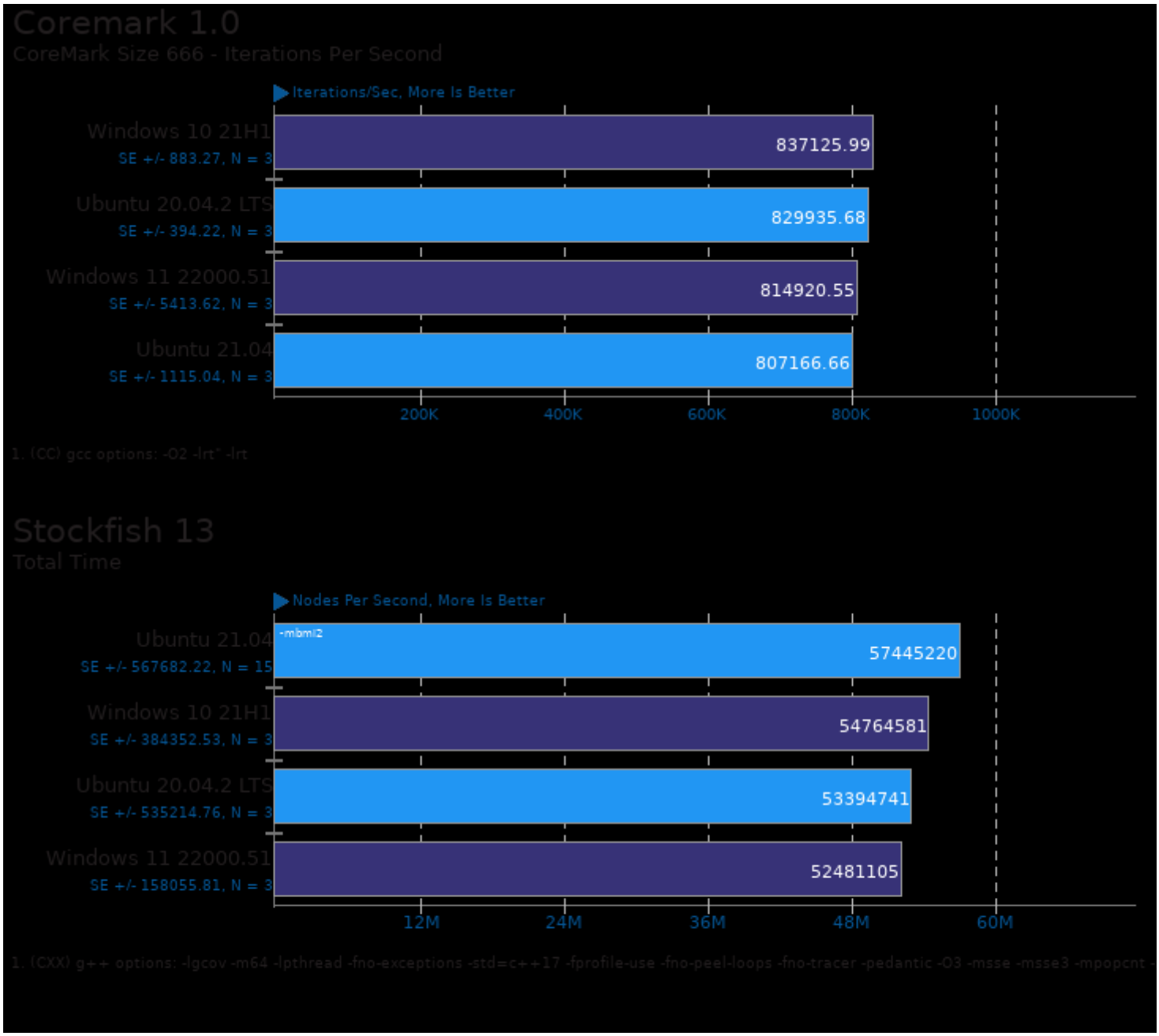

Zstd Compression 1.5.0
Compression Level: 19, Long Mode - Decompression Speed
MB/s, More Is Better
Windows 10 21H1
SE +/- 11.06, N = 3
4173.9
Windows 11 22000.51
SE +/- 2.60, N = 3
4145.1
Ubuntu 20.04.2 LTS
SE +/- 24.88, N = 3
4099.5
Ubuntu 21.04
SE +/- 32.70, N = 3
4085.8
900
1800
2700
3600
4500
1. (CC) gcc options: -O3 -pthread -lz
AOM AV1 3.1
Encoder Mode: Speed 6 Realtime - Input: Bosphorus 4K
Frames Per Second, More Is Better
Windows 10 21H1
SE +/- 0.02, N = 3
22.38
Windows 11 22000.51
SE +/- 0.13, N = 3
21.78
Ubuntu 21.04
SE +/- 0.25, N = 3
21.25
Ubuntu 20.04.2 LTS
SE +/- 0.09, N = 3
20.95
5
10
15
20
25
1. (CXX) g++ options: -O3 -std=c++11 -U_FORTIFY_SOURCE -lm -lpthread

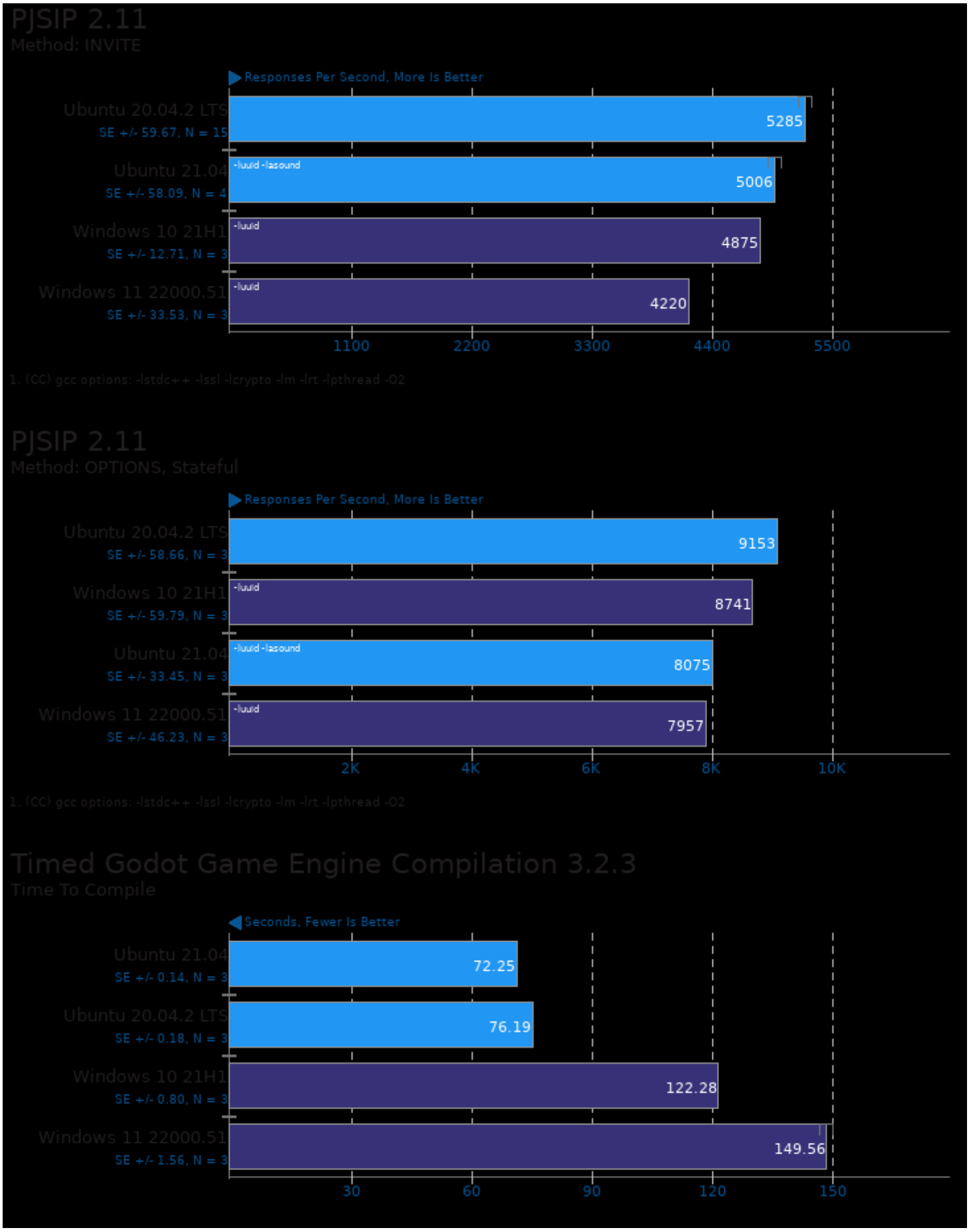

AOM AV1 3.1
Encoder Mode: Speed 8 Realtime - Input: Bosphorus 4K
Frames Per Second, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.24, N = 3
57.44
Ubuntu 21.04
SE +/- 0.77, N = 15
53.80
Windows 10 21H1
SE +/- 0.08, N = 3
53.27
Windows 11 22000.51
SE +/- 0.11, N = 3
52.64
13
26
39
52
65
1. (CXX) g++ options: -O3 -std=c++11 -U_FORTIFY_SOURCE -lm -lpthread
AOM AV1 3.1
Encoder Mode: Speed 9 Realtime - Input: Bosphorus 4K
Frames Per Second, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.12, N = 3
73.01
Windows 10 21H1
SE +/- 0.15, N = 3
65.46
Windows 11 22000.51
SE +/- 0.04, N = 3
64.41
Ubuntu 21.04
SE +/- 0.37, N = 3
62.71
16
32
48
64
80
1. (CXX) g++ options: -O3 -std=c++11 -U_FORTIFY_SOURCE -lm -lpthread
Embree 3.13
Binary: Pathtracer - Model: Crown
Frames Per Second, More Is Better
Ubuntu 21.04
SE +/- 0.06, N = 3
MIN: 23.74 / MAX: 24.58
24.04
Ubuntu 20.04.2 LTS
SE +/- 0.05, N = 3
MIN: 23.48 / MAX: 24.37
23.75
Windows 10 21H1
SE +/- 0.07, N = 3
MIN: 23.07 / MAX: 23.93
23.37
Windows 11 22000.51
SE +/- 0.06, N = 3
MIN: 22.21 / MAX: 23
22.50
6
12
18
24
30

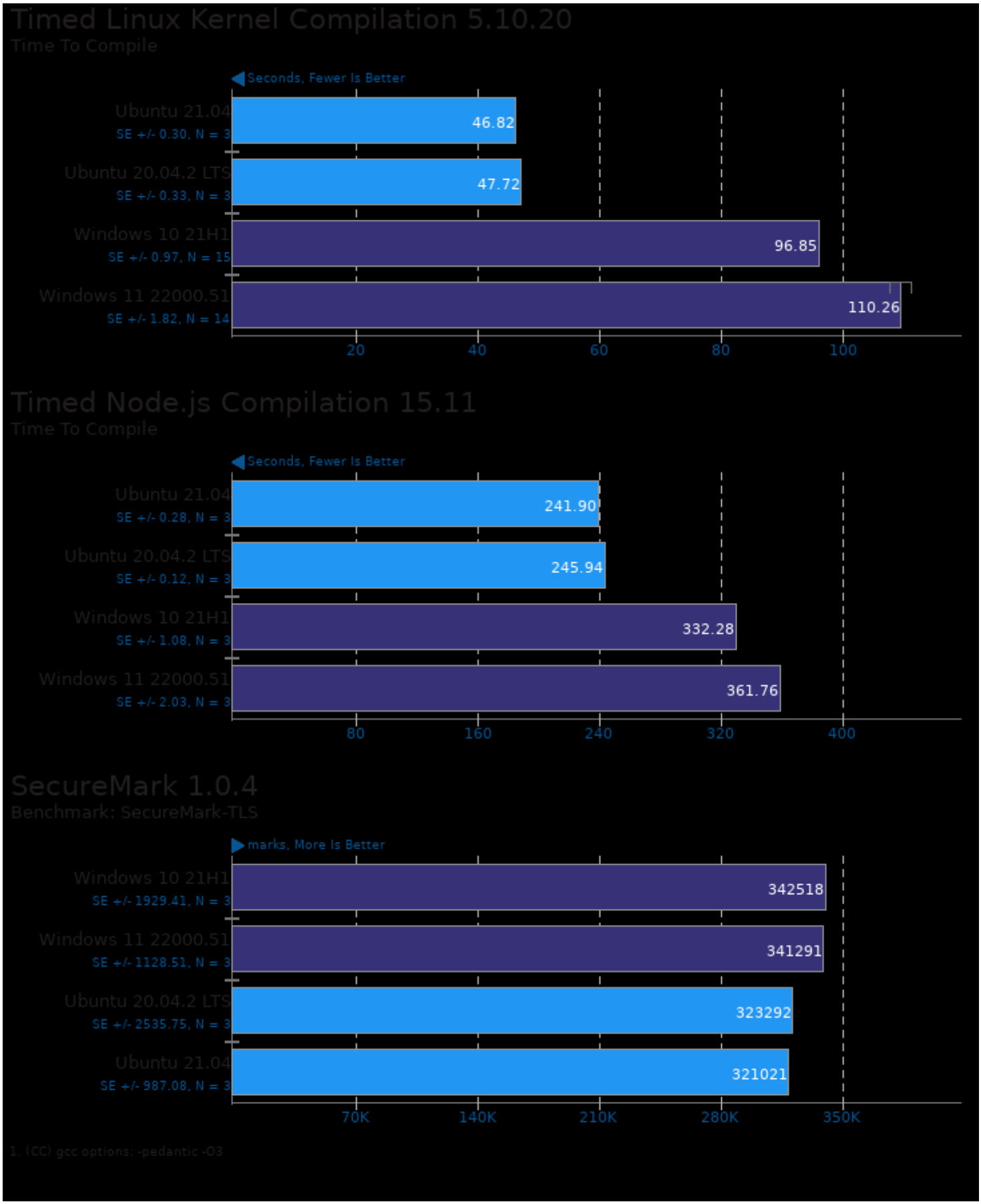

Embree 3.13
Binary: Pathtracer ISPC - Model: Crown
Frames Per Second, More Is Better
Ubuntu 21.04
SE +/- 0.06, N = 3
MIN: 22.1 / MAX: 22.85
22.38
Ubuntu 20.04.2 LTS
SE +/- 0.05, N = 3
MIN: 21.91 / MAX: 22.72
22.21
Windows 10 21H1
SE +/- 0.04, N = 3
MIN: 21.67 / MAX: 22.36
21.90
Windows 11 22000.51
SE +/- 0.02, N = 3
MIN: 20.91 / MAX: 21.7
21.22
5
10
15
20
25
Embree 3.13
Binary: Pathtracer - Model: Asian Dragon
Frames Per Second, More Is Better
Ubuntu 21.04
SE +/- 0.07, N = 3
MIN: 24.75 / MAX: 25.38
24.94
Ubuntu 20.04.2 LTS
SE +/- 0.13, N = 3
MIN: 24.23 / MAX: 25.16
24.58
Windows 10 21H1
SE +/- 0.06, N = 3
MIN: 24.11 / MAX: 24.9
24.30
Windows 11 22000.51
SE +/- 0.03, N = 3
MIN: 23.59 / MAX: 24.32
23.77
6
12
18
24
30
Embree 3.13
Binary: Pathtracer ISPC - Model: Asian Dragon
Frames Per Second, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.07, N = 3
MIN: 22.89 / MAX: 23.57
23.12
Ubuntu 21.04
SE +/- 0.03, N = 3
MIN: 22.73 / MAX: 23.48
22.97
Windows 10 21H1
SE +/- 0.04, N = 3
MIN: 22.7 / MAX: 23.5
22.90
Windows 11 22000.51
SE +/- 0.06, N = 3
MIN: 22.04 / MAX: 22.79
22.27
6
12
18
24
30

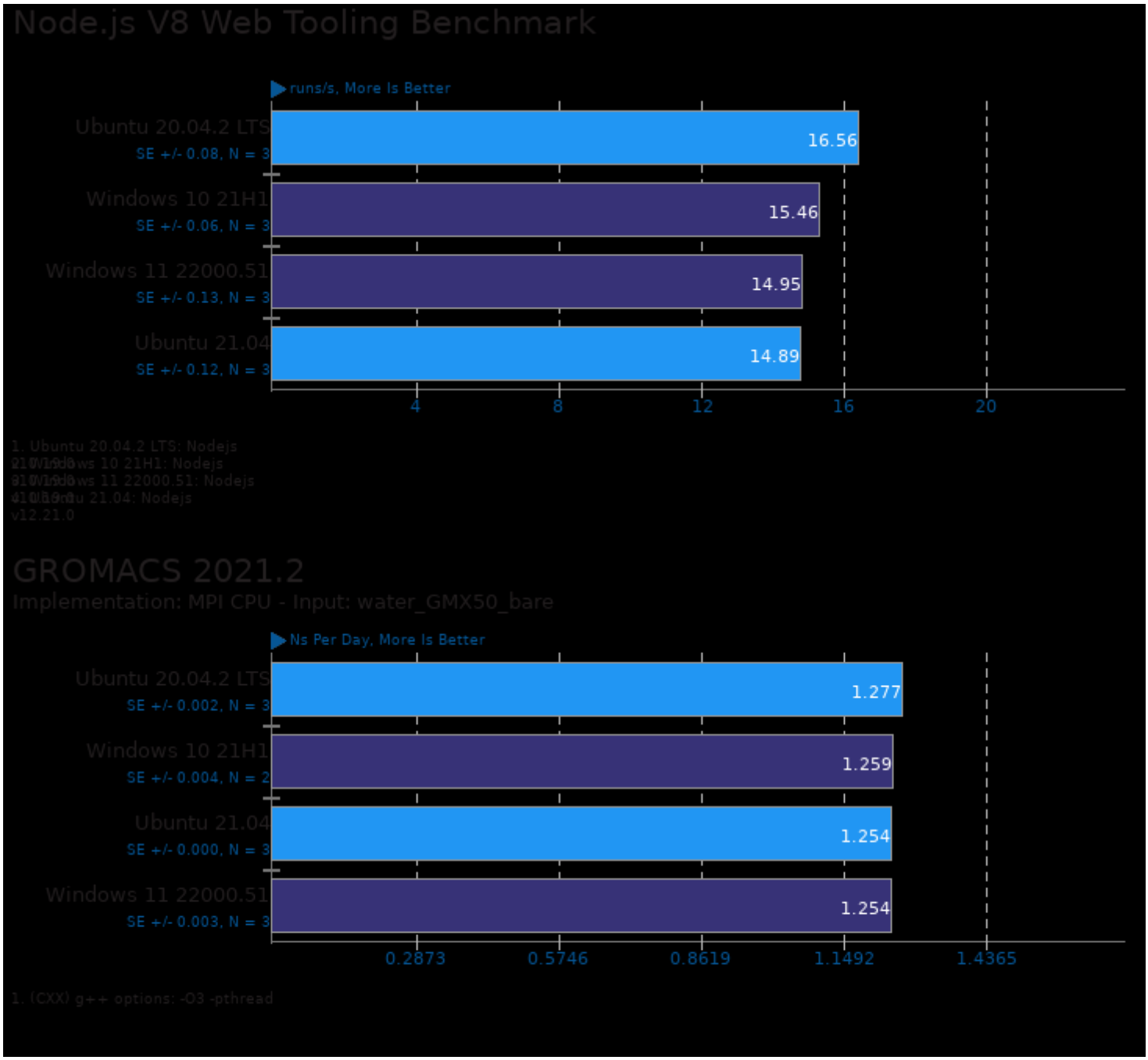

SVT-AV1 0.8.7
Encoder Mode: Preset 4 - Input: Bosphorus 4K
Frames Per Second, More Is Better
Windows 10 21H1
SE +/- 0.006, N = 3
2.209
Ubuntu 21.04
SE +/- 0.005, N = 3
2.144
Windows 11 22000.51
SE +/- 0.003, N = 3
2.126
Ubuntu 20.04.2 LTS
SE +/- 0.001, N = 3
2.124
0.497
0.994
1.491
1.988
2.485
1. (CXX) 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 20.04.2 LTS
SE +/- 0.04, N = 3
23.49
Windows 10 21H1
SE +/- 0.11, N = 3
23.46
Windows 11 22000.51
SE +/- 0.17, N = 3
22.90
Ubuntu 21.04
SE +/- 0.11, N = 3
22.60
6
12
18
24
30
1. (CXX) g++ options: -mno-avx -mavx2 -mavx512f -mavx512bw -mavx512dq -pie

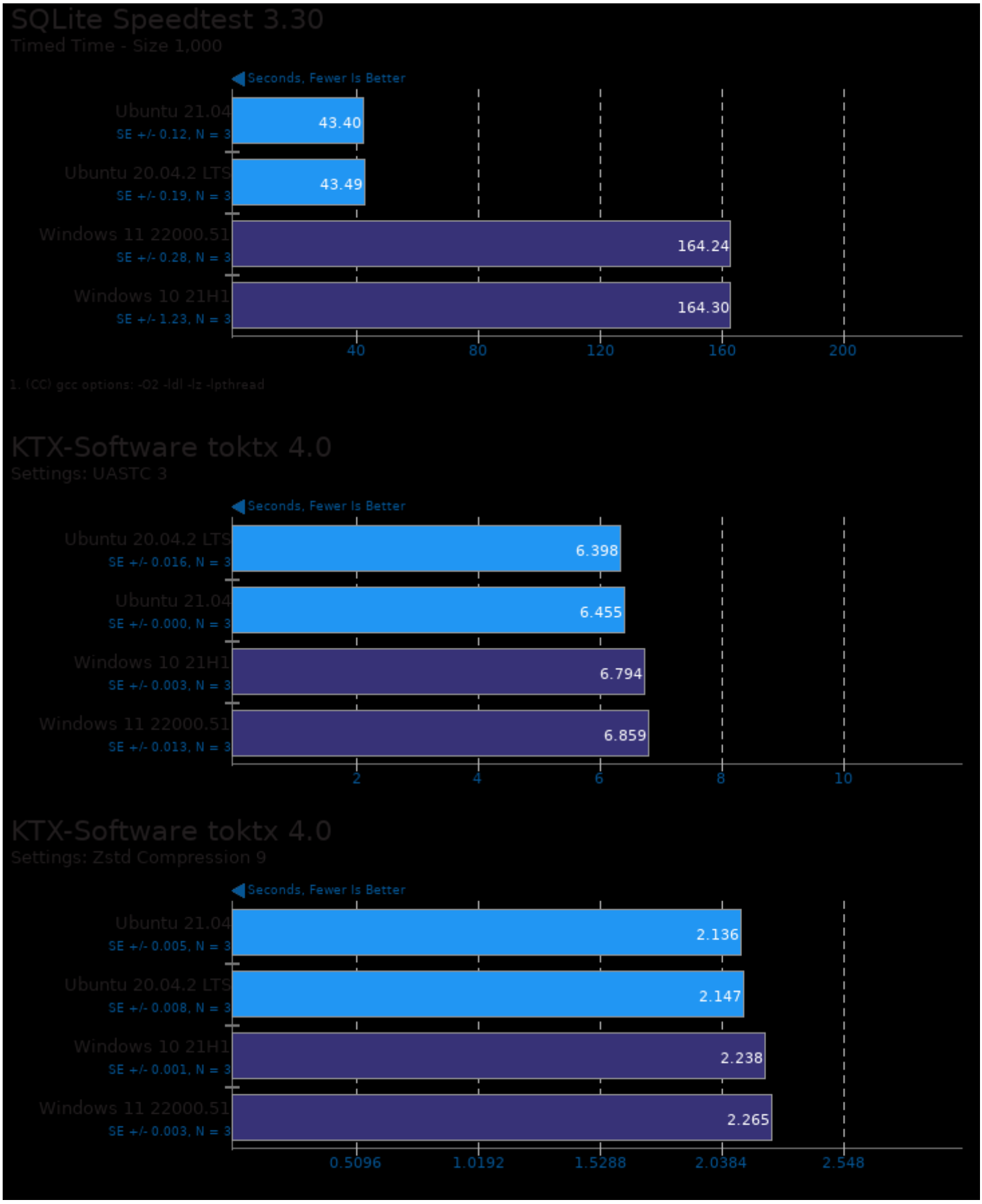

VP9 libvpx Encoding 1.10.0
Speed: Speed 0 - Input: Bosphorus 4K
Frames Per Second, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.03, N = 3
8.31
Ubuntu 21.04
SE +/- 0.01, N = 3
8.28
Windows 10 21H1
SE +/- 0.10, N = 3
7.89
Windows 11 22000.51
SE +/- 0.02, N = 3
7.52
2
4
6
8
10
1. (CXX) g++ options: -m64 -lm -lpthread -O3 -fPIC -U_FORTIFY_SOURCE -std=gnu++11
VP9 libvpx Encoding 1.10.0
Speed: Speed 5 - Input: Bosphorus 4K
Frames Per Second, More Is Better
Ubuntu 21.04
SE +/- 0.04, N = 3
20.33
Ubuntu 20.04.2 LTS
SE +/- 0.15, N = 3
20.06
Windows 10 21H1
SE +/- 0.02, N = 3
18.32
Windows 11 22000.51
SE +/- 0.05, N = 3
17.18
5
10
15
20
25
1. (CXX) g++ options: -m64 -lm -lpthread -O3 -fPIC -U_FORTIFY_SOURCE -std=gnu++11


Coremark 1.0
CoreMark Size 666 - Iterations Per Second
Iterations/Sec, More Is Better
Windows 10 21H1
SE +/- 883.27, N = 3
837125.99
Ubuntu 20.04.2 LTS
SE +/- 394.22, N = 3
829935.68
Windows 11 22000.51
SE +/- 5413.62, N = 3
814920.55
Ubuntu 21.04
SE +/- 1115.04, N = 3
807166.66
200K
400K
600K
800K
1000K
1. (CC) gcc options: -O2 -lrt" -lrt
Stockfish 13
Total Time
Nodes Per Second, More Is Better
Ubuntu 21.04
SE +/- 567682.22, N = 15
-mbmi2
57445220
Windows 10 21H1
SE +/- 384352.53, N = 3
54764581
Ubuntu 20.04.2 LTS
SE +/- 535214.76, N = 3
53394741
Windows 11 22000.51
SE +/- 158055.81, N = 3
52481105
12M
24M
36M
48M
60M
1. (CXX) g++ options: -lgcov -m64 -lpthread -fno-exceptions -std=c++17 -fprofile-use -fno-peel-loops -fno-tracer -pedantic -O3 -msse -msse3 -mpopcnt

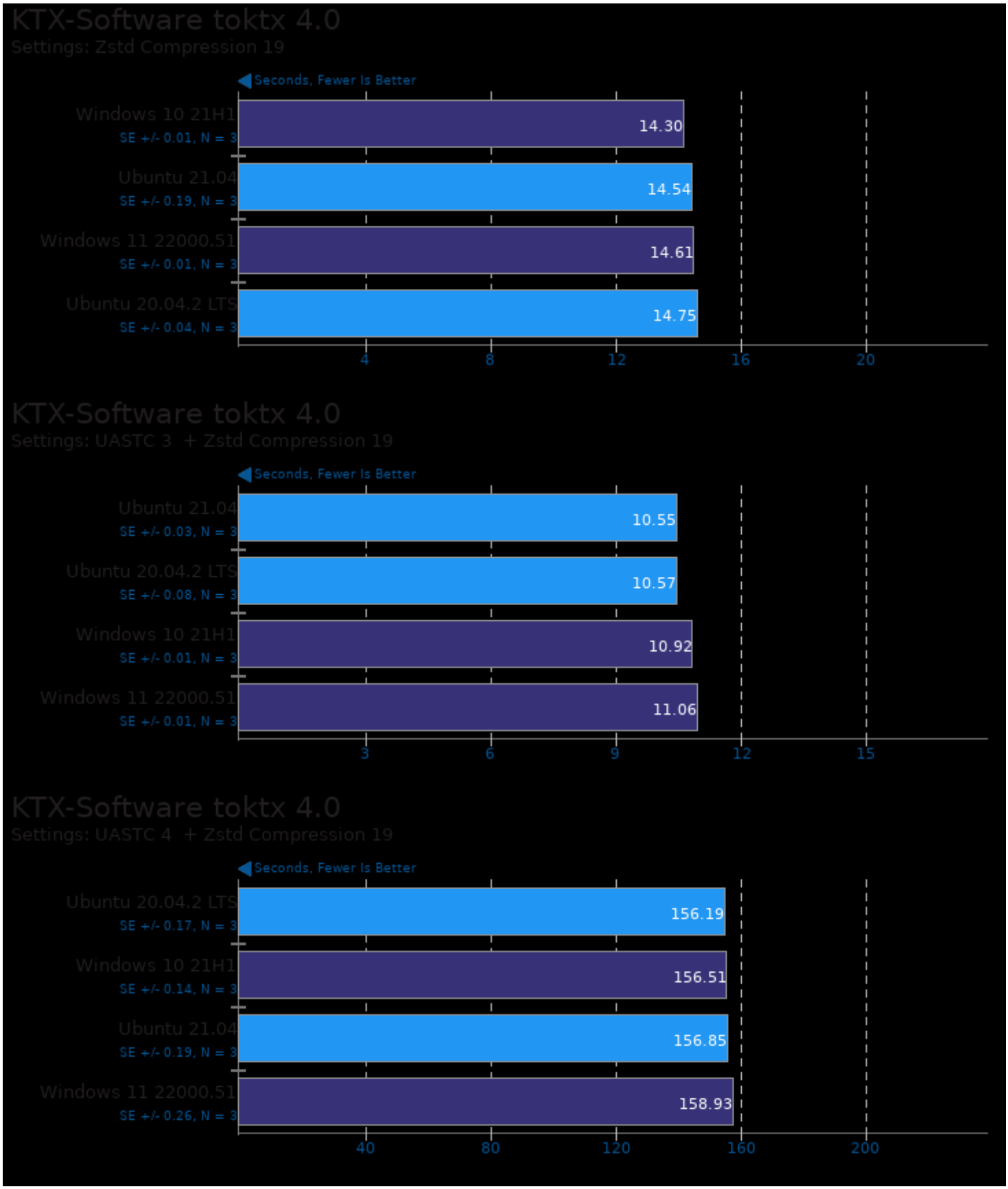

PJSIP 2.11
Method: INVITE
Responses Per Second, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 59.67, N = 15
5285
Ubuntu 21.04
SE +/- 58.09, N = 4
-luuid -lasound
5006
Windows 10 21H1
SE +/- 12.71, N = 3
-luuid
4875
Windows 11 22000.51
SE +/- 33.53, N = 3
-luuid
4220
1100
2200
3300
4400
5500
1. (CC) gcc options: -lstdc++ -lssl -lcrypto -lm -lrt -lpthread -O2
PJSIP 2.11
Method: OPTIONS, Stateful
Responses Per Second, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 58.66, N = 3
9153
Windows 10 21H1
SE +/- 59.79, N = 3
-luuid
8741
Ubuntu 21.04
SE +/- 33.45, N = 3
-luuid -lasound
8075
Windows 11 22000.51
SE +/- 46.23, N = 3
-luuid
7957
2K
4K
6K
8K
10K
1. (CC) gcc options: -lstdc++ -lssl -lcrypto -lm -lrt -lpthread -O2
Timed Godot Game Engine Compilation 3.2.3
Time To Compile
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.14, N = 3
72.25
Ubuntu 20.04.2 LTS
SE +/- 0.18, N = 3
76.19
Windows 10 21H1
SE +/- 0.80, N = 3
122.28
Windows 11 22000.51
SE +/- 1.56, N = 3
149.56
30
60
90
120
150

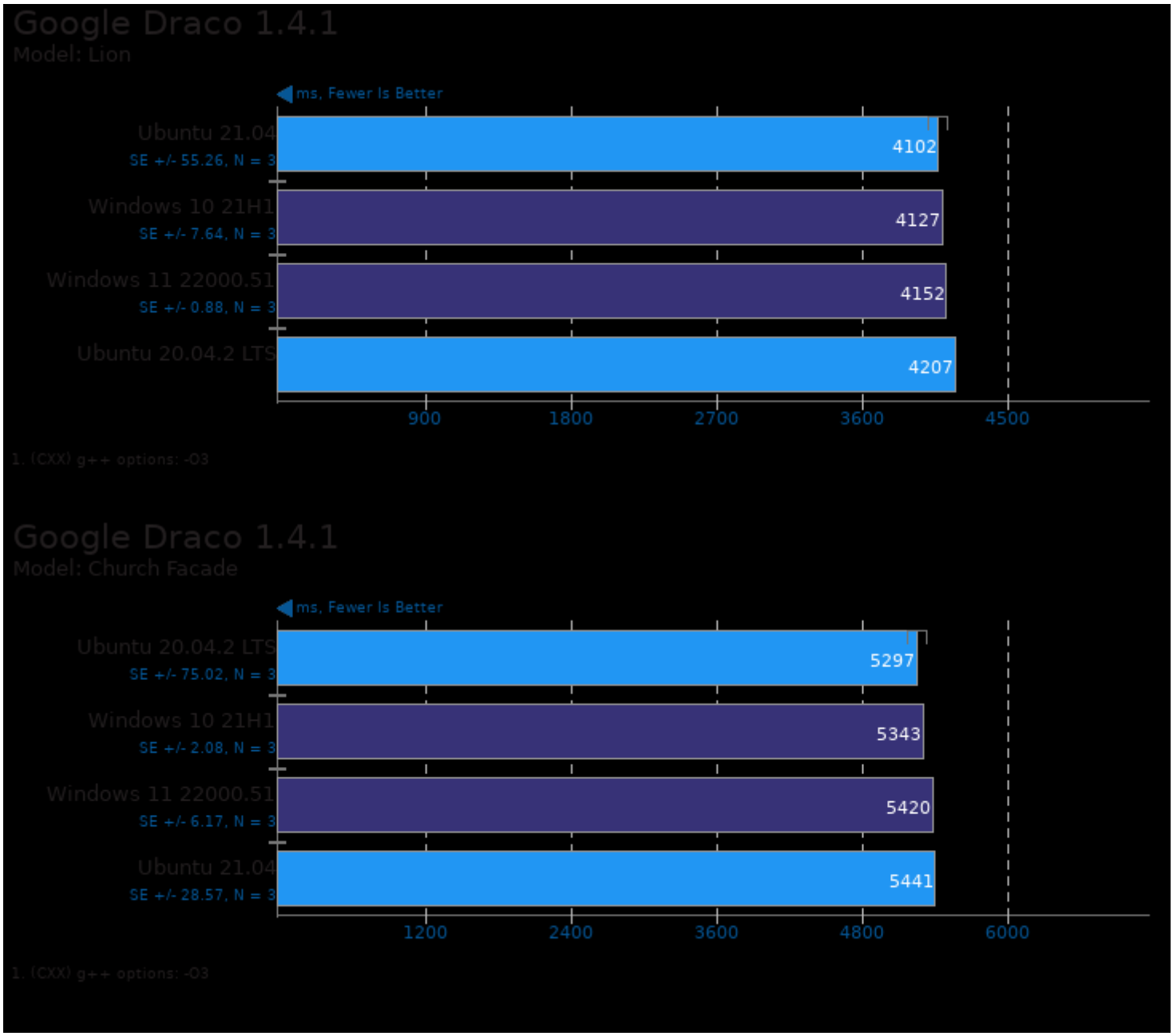

Timed Linux Kernel Compilation 5.10.20
Time To Compile
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.30, N = 3
46.82
Ubuntu 20.04.2 LTS
SE +/- 0.33, N = 3
47.72
Windows 10 21H1
SE +/- 0.97, N = 15
96.85
Windows 11 22000.51
SE +/- 1.82, N = 14
110.26
20
40
60
80
100
Timed Node.js Compilation 15.11
Time To Compile
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.28, N = 3
241.90
Ubuntu 20.04.2 LTS
SE +/- 0.12, N = 3
245.94
Windows 10 21H1
SE +/- 1.08, N = 3
332.28
Windows 11 22000.51
SE +/- 2.03, N = 3
361.76
80
160
240
320
400
SecureMark 1.0.4
Benchmark: SecureMark-TLS
marks, More Is Better
Windows 10 21H1
SE +/- 1929.41, N = 3
342518
Windows 11 22000.51
SE +/- 1128.51, N = 3
341291
Ubuntu 20.04.2 LTS
SE +/- 2535.75, N = 3
323292
Ubuntu 21.04
SE +/- 987.08, N = 3
321021
70K
140K
210K
280K
350K
1. (CC) gcc options: -pedantic -O3

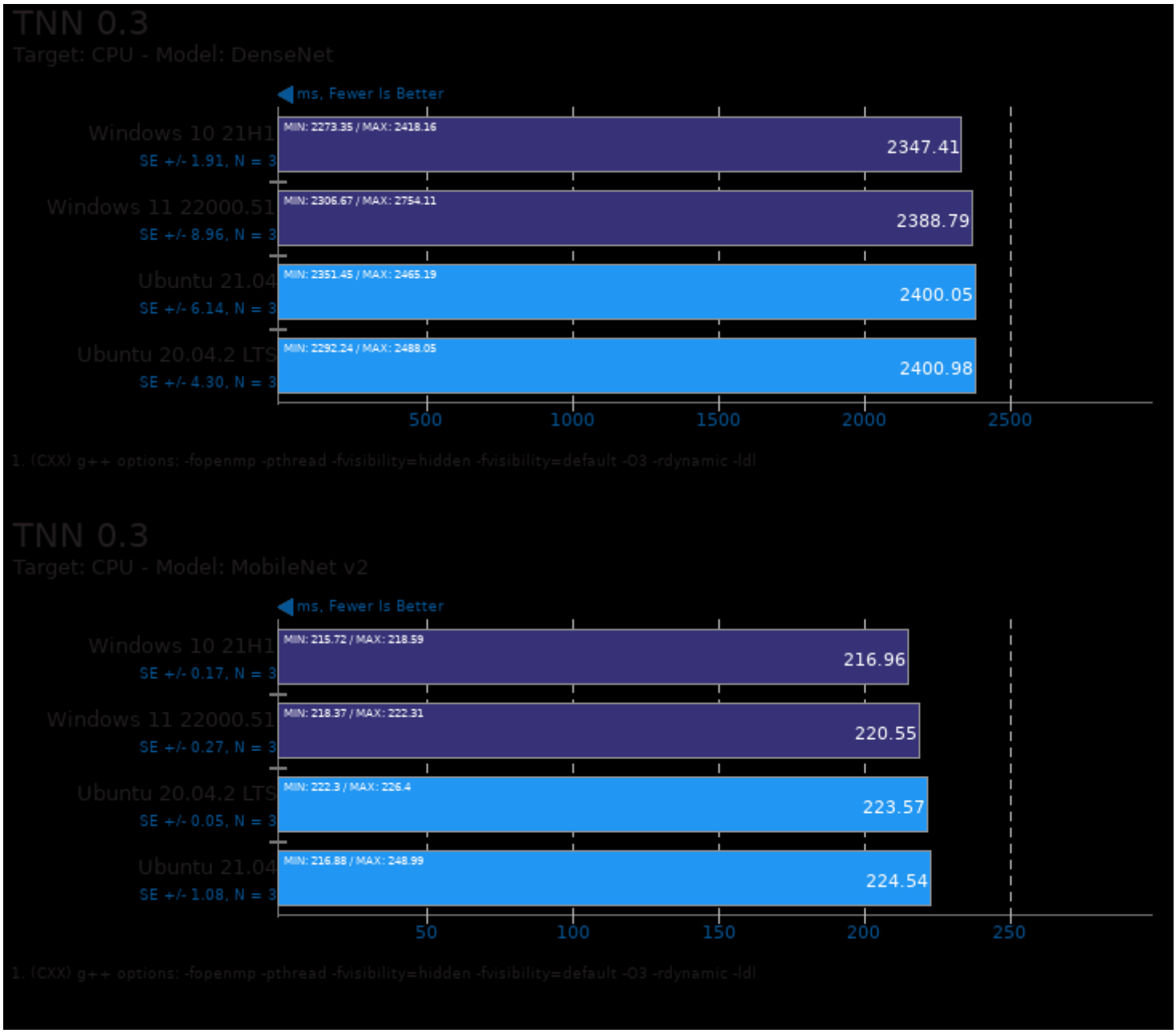

Node.js V8 Web Tooling Benchmark
runs/s, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.08, N = 3
16.56
Windows 10 21H1
SE +/- 0.06, N = 3
15.46
Windows 11 22000.51
SE +/- 0.13, N = 3
14.95
Ubuntu 21.04
SE +/- 0.12, N = 3
14.89
4
8
12
16
20
1. Ubuntu 20.04.2 LTS: Nodejs
v12.21.0
GROMACS 2021.2
Implementation: MPI CPU - Input: water_GMX50_bare
Ns Per Day, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.002, N = 3
1.277
Windows 10 21H1
SE +/- 0.004, N = 2
1.259
Ubuntu 21.04
SE +/- 0.000, N = 3
1.254
Windows 11 22000.51
SE +/- 0.003, N = 3
1.254
0.2873
0.5746
0.8619
1.1492
1.4365
1. (CXX) g++ options: -O3 -pthread

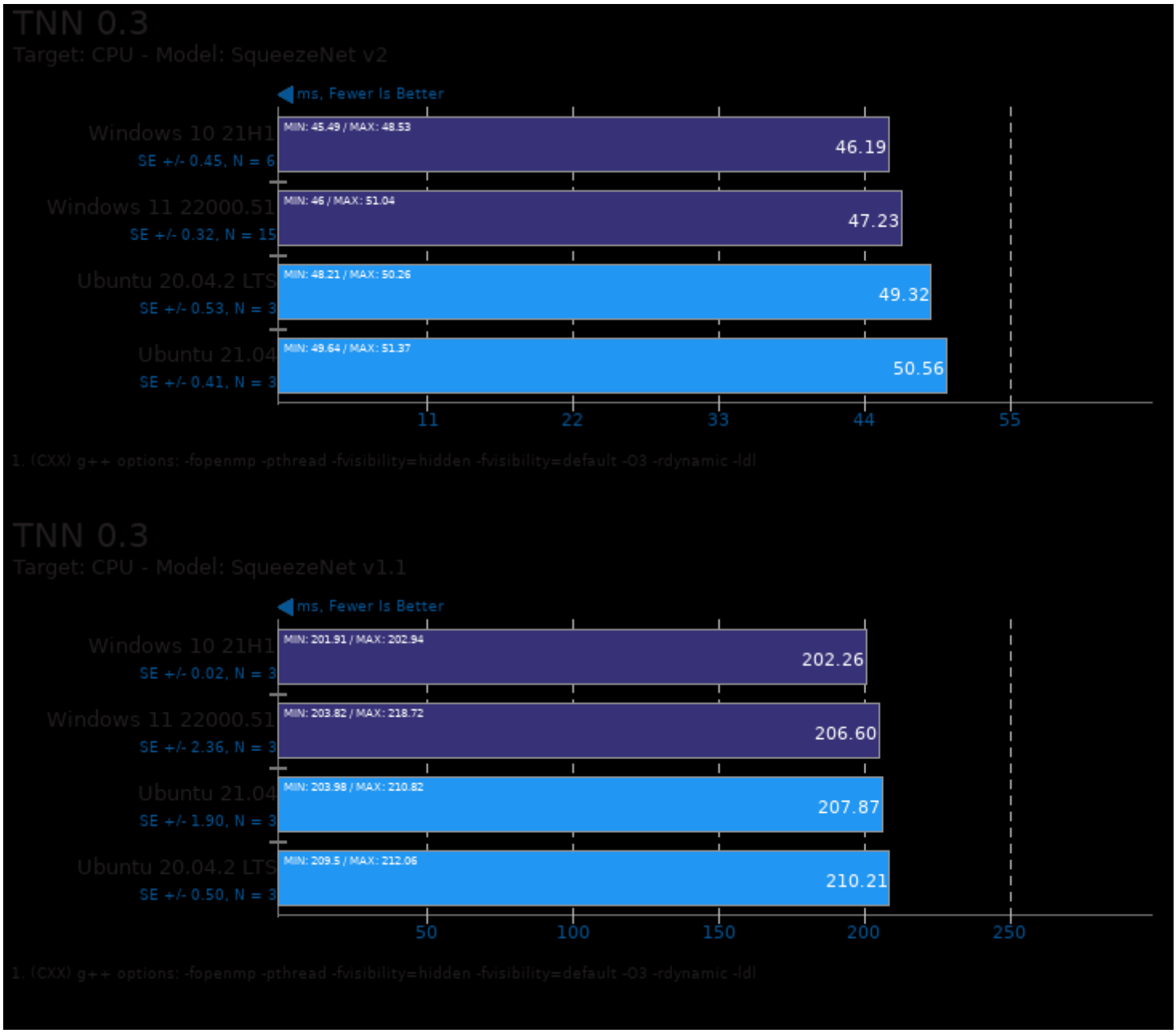

SQLite Speedtest 3.30
Timed Time - Size 1,000
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.12, N = 3
43.40
Ubuntu 20.04.2 LTS
SE +/- 0.19, N = 3
43.49
Windows 11 22000.51
SE +/- 0.28, N = 3
164.24
Windows 10 21H1
SE +/- 1.23, N = 3
164.30
40
80
120
160
200
1. (CC) gcc options: -O2 -ldl -lz -lpthread
KTX-Software toktx 4.0
Settings: UASTC 3
Seconds, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.016, N = 3
6.398
Ubuntu 21.04
SE +/- 0.000, N = 3
6.455
Windows 10 21H1
SE +/- 0.003, N = 3
6.794
Windows 11 22000.51
SE +/- 0.013, N = 3
6.859
2
4
6
8
10
KTX-Software toktx 4.0
Settings: Zstd Compression 9
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.005, N = 3
2.136
Ubuntu 20.04.2 LTS
SE +/- 0.008, N = 3
2.147
Windows 10 21H1
SE +/- 0.001, N = 3
2.238
Windows 11 22000.51
SE +/- 0.003, N = 3
2.265
0.5096
1.0192
1.5288
2.0384
2.548

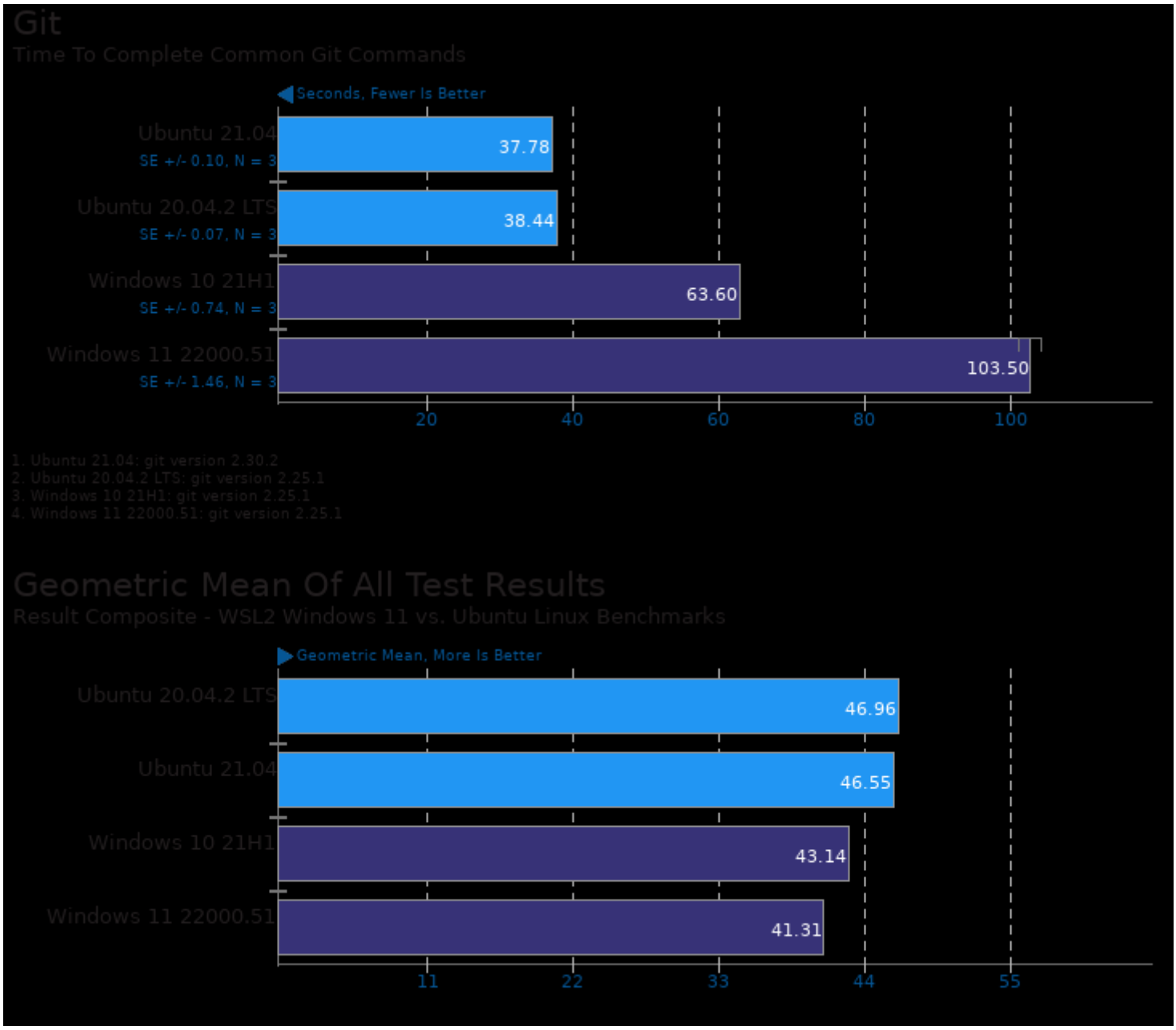
WSL2 Windows 11 vs. Ubuntu Linux Benchmarks



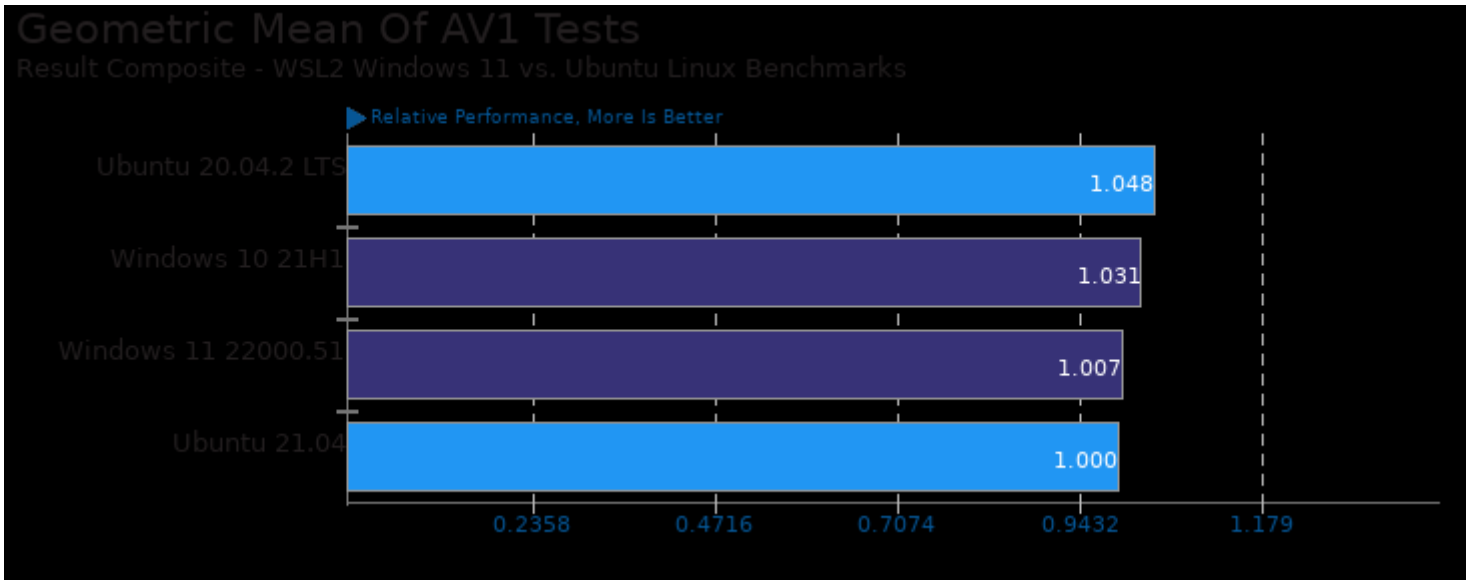

Google Draco 1.4.1
Model: Lion
ms, Fewer Is Better
Ubuntu 21.04
SE +/- 55.26, N = 3
4102
Windows 10 21H1
SE +/- 7.64, N = 3
4127
Windows 11 22000.51
SE +/- 0.88, N = 3
4152
Ubuntu 20.04.2 LTS
4207
900
1800
2700
3600
4500
1. (CXX) g++ options: -O3
Google Draco 1.4.1
Model: Church Facade
ms, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 75.02, N = 3
5297
Windows 10 21H1
SE +/- 2.08, N = 3
5343
Windows 11 22000.51
SE +/- 6.17, N = 3
5420
Ubuntu 21.04
SE +/- 28.57, N = 3
5441
1200
2400
3600
4800
6000
1. (CXX) g++ options: -O3


TNN 0.3
Target: CPU - Model: DenseNet
ms, Fewer Is Better
Windows 10 21H1
SE +/- 1.91, N = 3
MIN: 2273.35 / MAX: 2418.16
2347.41
Windows 11 22000.51
SE +/- 8.96, N = 3
MIN: 2306.67 / MAX: 2754.11
2388.79
Ubuntu 21.04
SE +/- 6.14, N = 3
MIN: 2351.45 / MAX: 2465.19
2400.05
Ubuntu 20.04.2 LTS
SE +/- 4.30, N = 3
MIN: 2292.24 / MAX: 2488.05
2400.98
500
1000
1500
2000
2500
1. (CXX) g++ options: -fopenmp -pthread -fvisibility=hidden -fvisibility=default -O3 -rdynamic -ldl
TNN 0.3
Target: CPU - Model: MobileNet v2
ms, Fewer Is Better
Windows 10 21H1
SE +/- 0.17, N = 3
MIN: 215.72 / MAX: 218.59
216.96
Windows 11 22000.51
SE +/- 0.27, N = 3
MIN: 218.37 / MAX: 222.31
220.55
Ubuntu 20.04.2 LTS
SE +/- 0.05, N = 3
MIN: 222.3 / MAX: 226.4
223.57
Ubuntu 21.04
SE +/- 1.08, N = 3
MIN: 216.88 / MAX: 248.99
224.54
50
100
150
200
250
1. (CXX) g++ options: -fopenmp -pthread -fvisibility=hidden -fvisibility=default -O3 -rdynamic -ldl

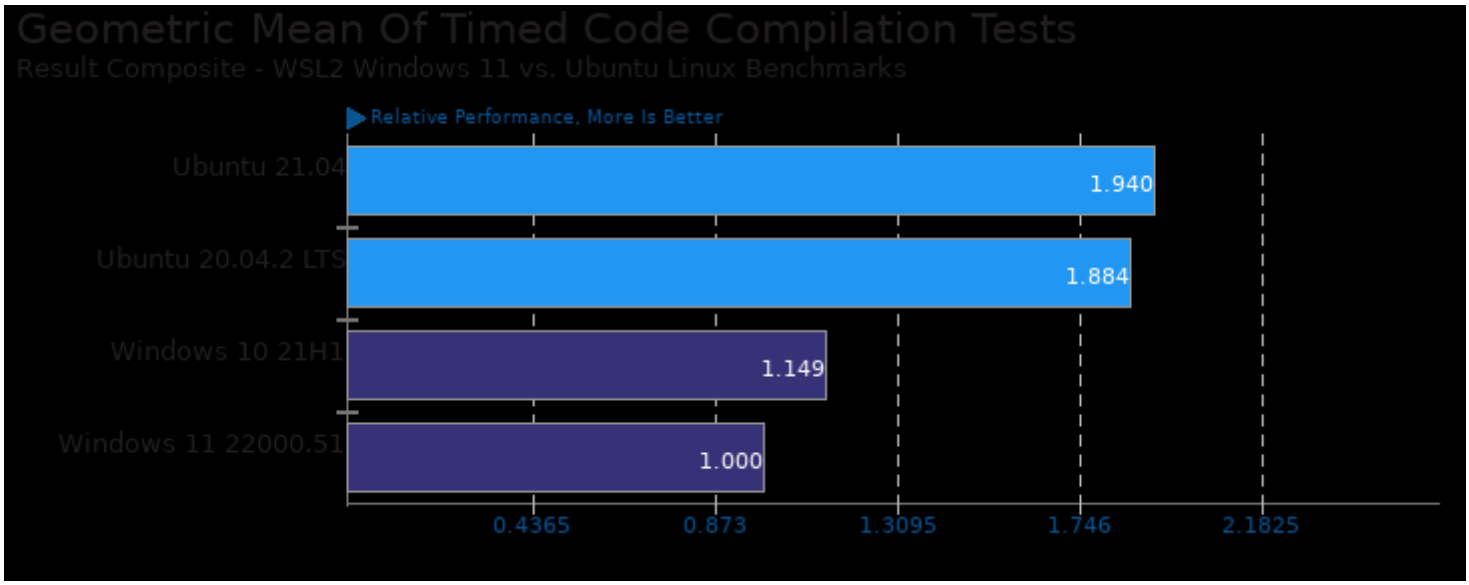

TNN 0.3
Target: CPU - Model: SqueezeNet v2
ms, Fewer Is Better
Windows 10 21H1
SE +/- 0.45, N = 6
MIN: 45.49 / MAX: 48.53
46.19
Windows 11 22000.51
SE +/- 0.32, N = 15
MIN: 46 / MAX: 51.04
47.23
Ubuntu 20.04.2 LTS
SE +/- 0.53, N = 3
MIN: 48.21 / MAX: 50.26
49.32
Ubuntu 21.04
SE +/- 0.41, N = 3
MIN: 49.64 / MAX: 51.37
50.56
11
22
33
44
55
1. (CXX) g++ options: -fopenmp -pthread -fvisibility=hidden -fvisibility=default -O3 -rdynamic -ldl
TNN 0.3
Target: CPU - Model: SqueezeNet v1.1
ms, Fewer Is Better
Windows 10 21H1
SE +/- 0.02, N = 3
MIN: 201.91 / MAX: 202.94
202.26
Windows 11 22000.51
SE +/- 2.36, N = 3
MIN: 203.82 / MAX: 218.72
206.60
Ubuntu 21.04
SE +/- 1.90, N = 3
MIN: 203.98 / MAX: 210.82
207.87
Ubuntu 20.04.2 LTS
SE +/- 0.50, N = 3
MIN: 209.5 / MAX: 212.06
210.21
50
100
150
200
250
1. (CXX) g++ options: -fopenmp -pthread -fvisibility=hidden -fvisibility=default -O3 -rdynamic -ldl


Git
Time To Complete Common Git Commands
Seconds, Fewer Is Better
Ubuntu 21.04
SE +/- 0.10, N = 3
37.78
Ubuntu 20.04.2 LTS
SE +/- 0.07, N = 3
38.44
Windows 10 21H1
SE +/- 0.74, N = 3
63.60
Windows 11 22000.51
SE +/- 1.46, N = 3
103.50
20
40
60
80
100
1. Ubuntu 21.04: git version 2.30.2
2. Ubuntu 20.04.2 LTS: git version 2.25.1
3. Windows 10 21H1: git version 2.25.1
4. Windows 11 22000.51: git version 2.25.1
Geometric Mean Of All Test Results
Result Composite - WSL2 Windows 11 vs. Ubuntu Linux Benchmarks
Geometric Mean, More Is Better
Ubuntu 20.04.2 LTS
46.96
Ubuntu 21.04
46.55
Windows 10 21H1
43.14
Windows 11 22000.51
41.31
11
22
33
44
55

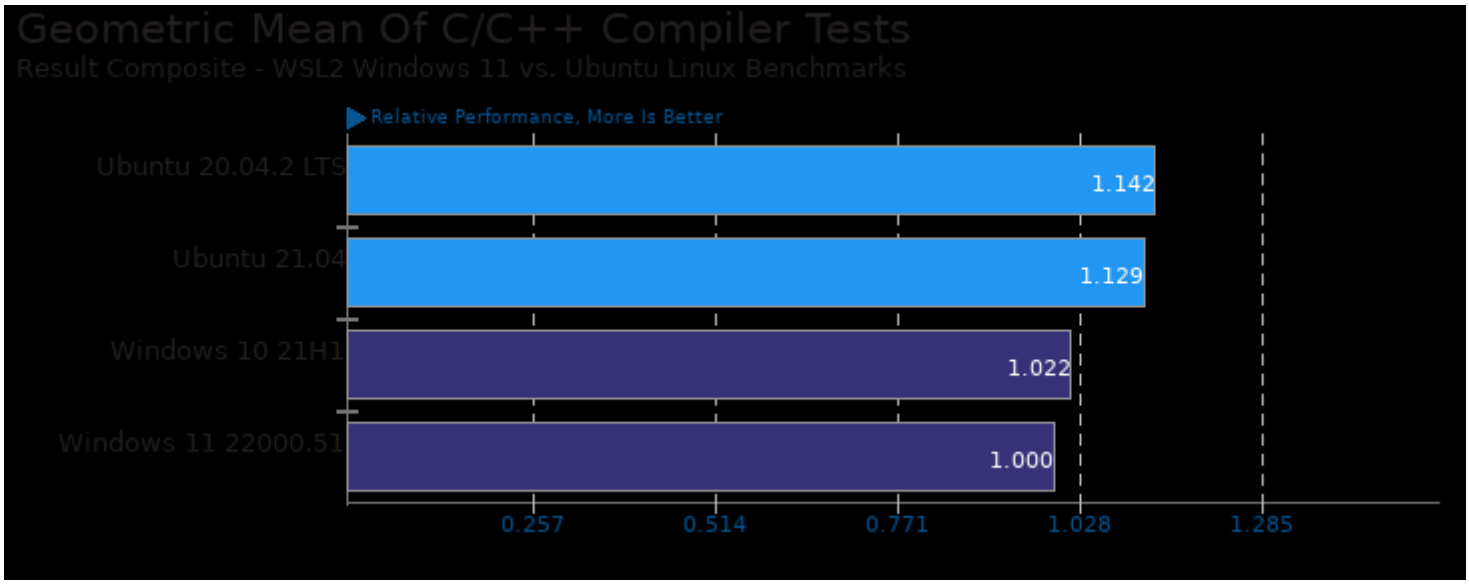
These geometric means are based upon test groupings / test suites for this result file.



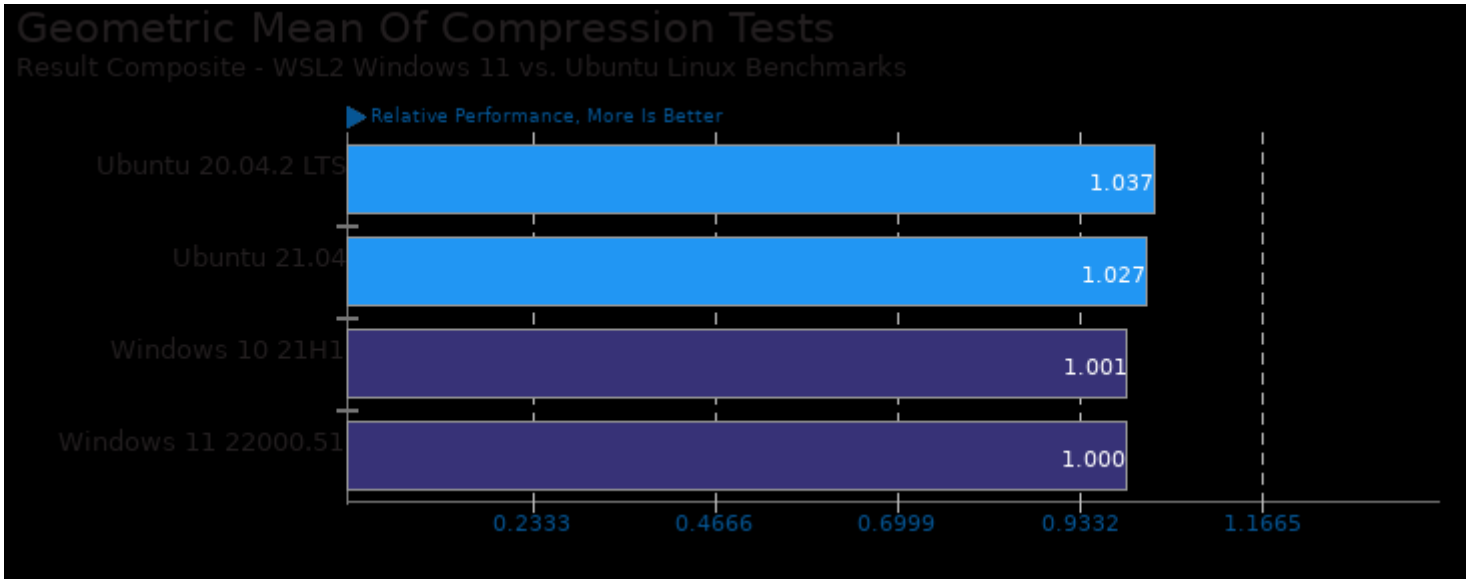
Geometric mean based upon tests: pts/aom-av1 and pts/svt-av1



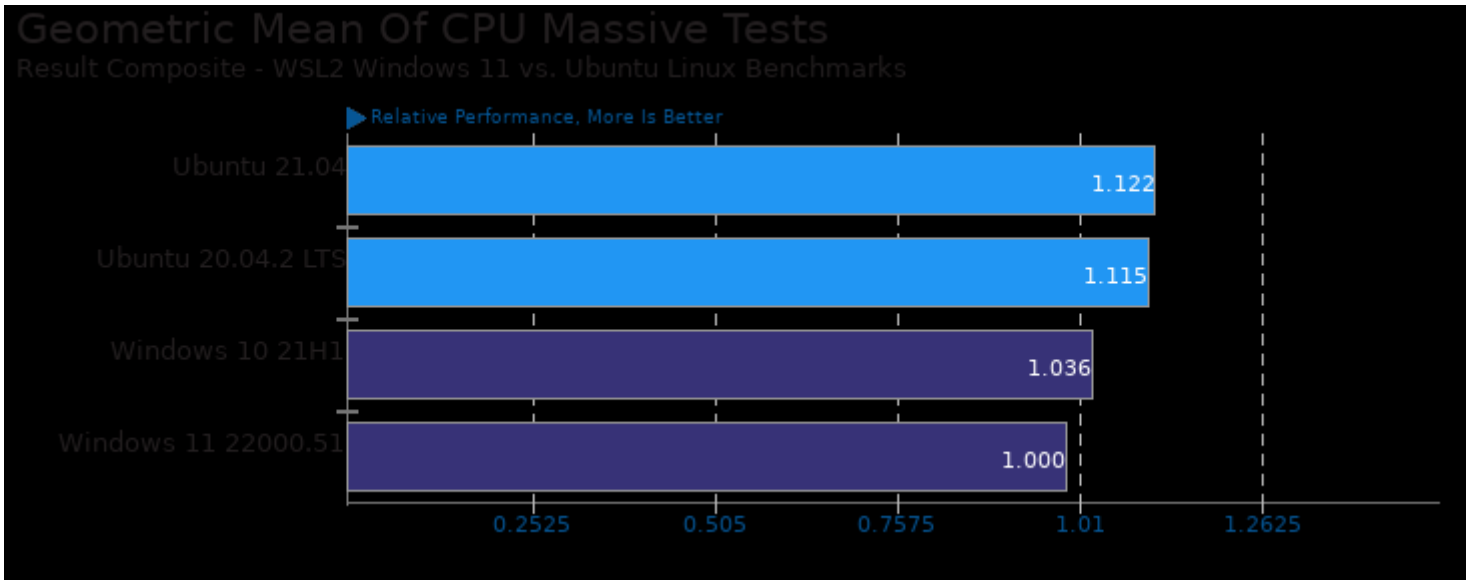
Geometric mean based upon tests: pts/build-linux-kernel, pts/build-godot and pts/build-nodejs



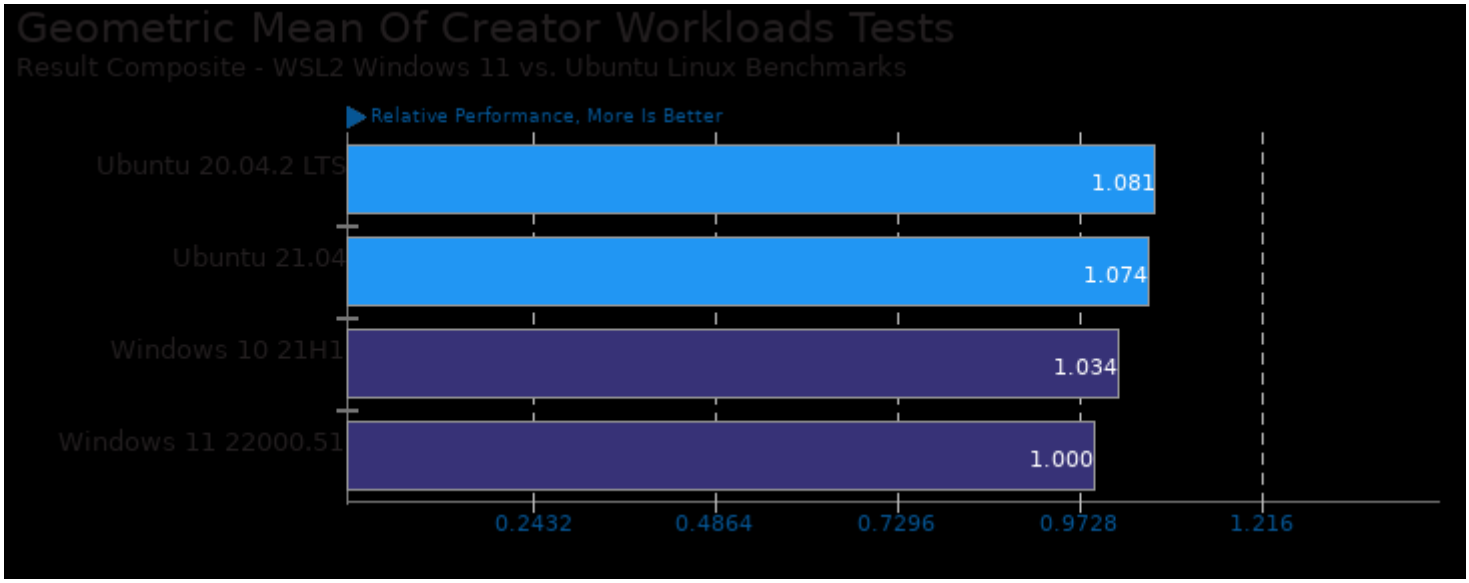
Geometric mean based upon tests: pts/vpxenc, pts/stockfish, pts/sqlite-speedtest, pts/compress-zstd, pts/aom-av1, pts/svt-av1 and pts/gromacs



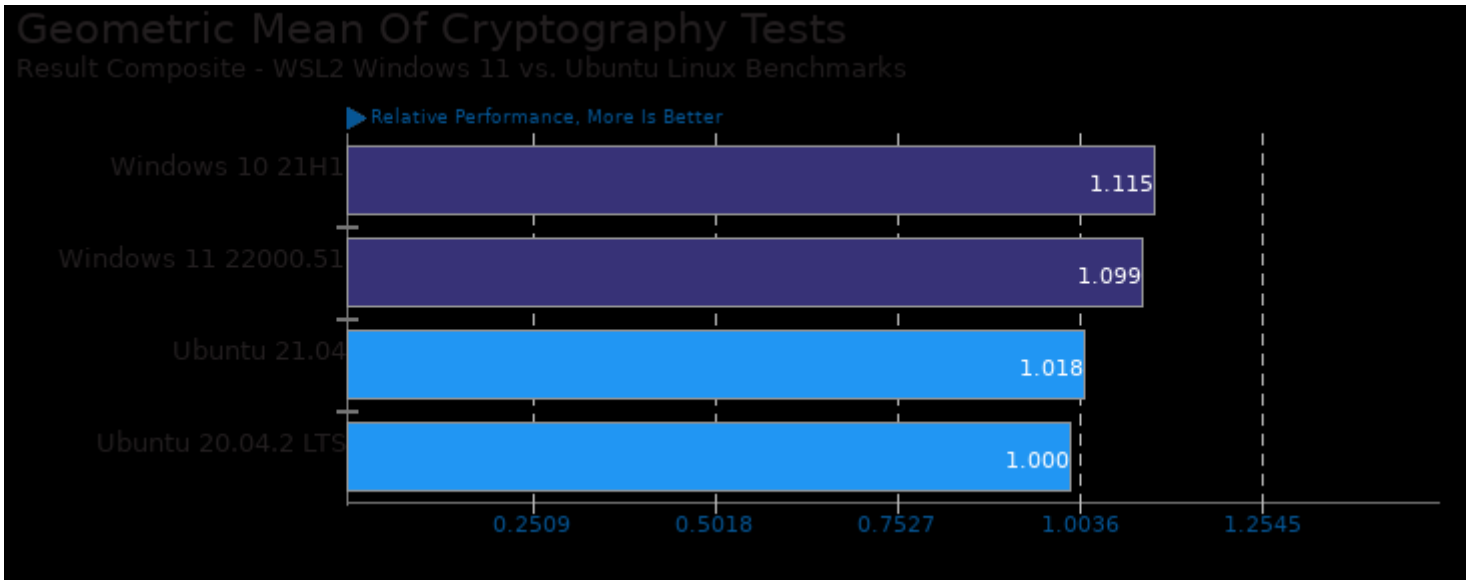
Geometric mean based upon tests: pts/compress-zstd and pts/blosc



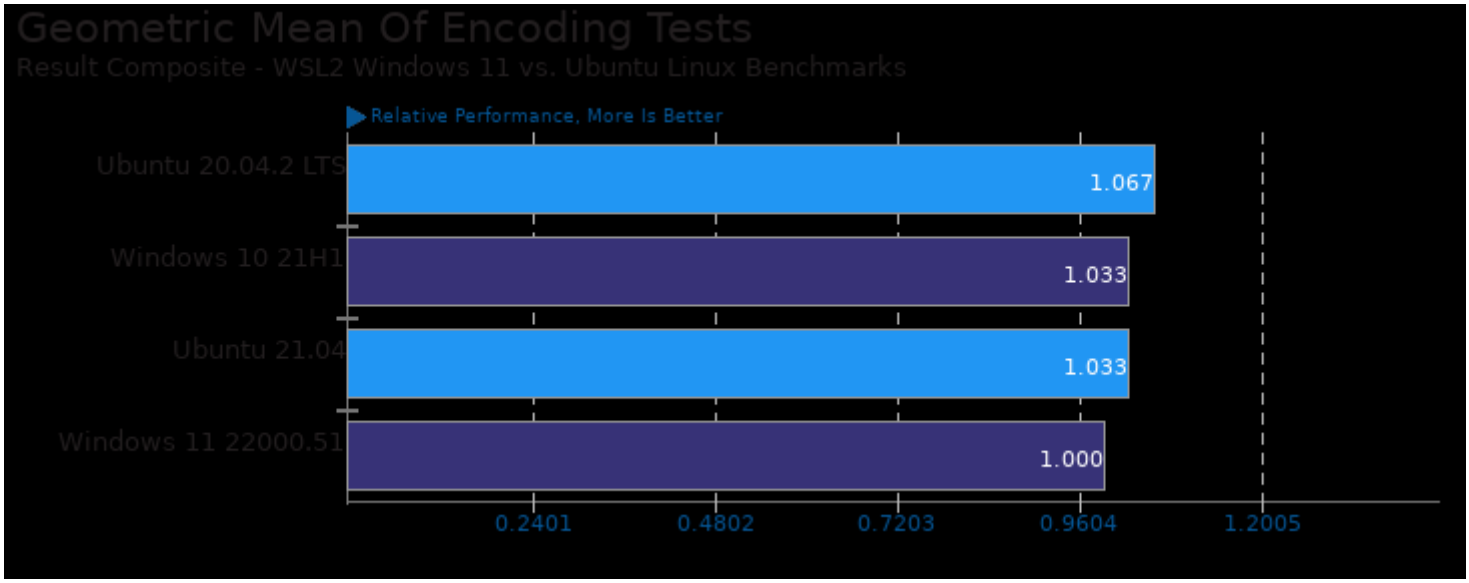
Geometric mean based upon tests: pts/build-linux-kernel, pts/compress-zstd, pts/svt-av1, pts/vpxenc, pts/namd and pts/stockfish



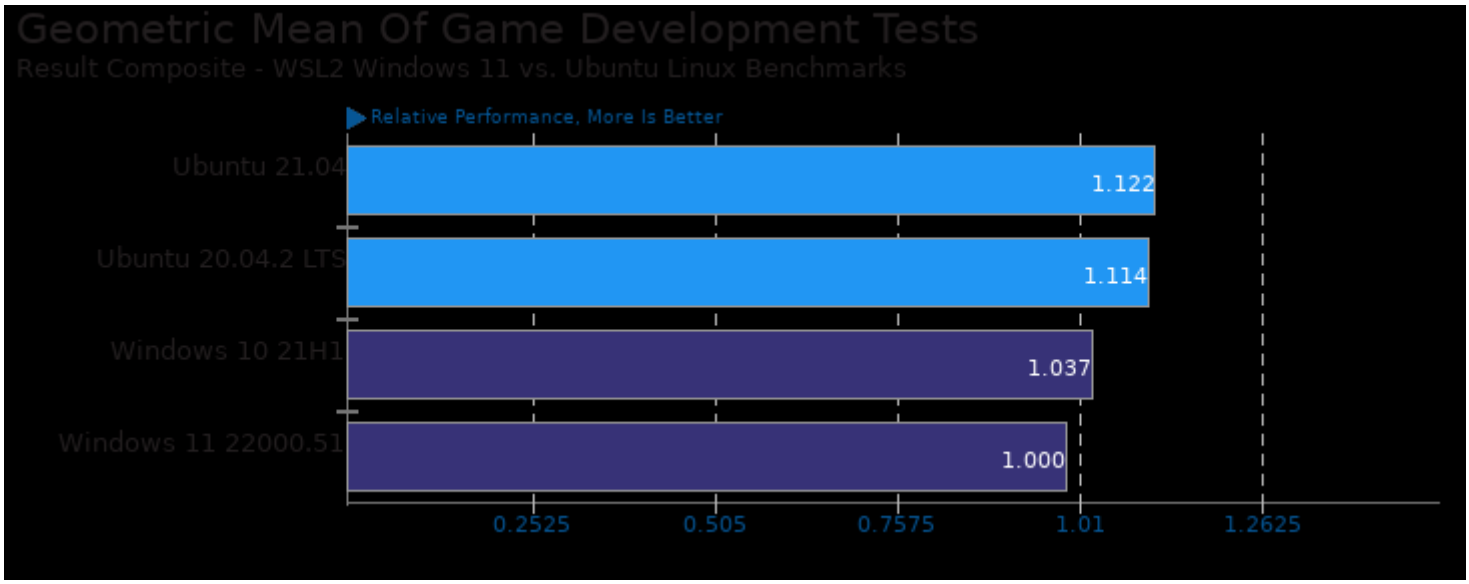
Geometric mean based upon tests: pts/vpxenc, pts/aom-av1, pts/svt-av1, pts/embree, pts/toktx, pts/draco and pts/build-godot



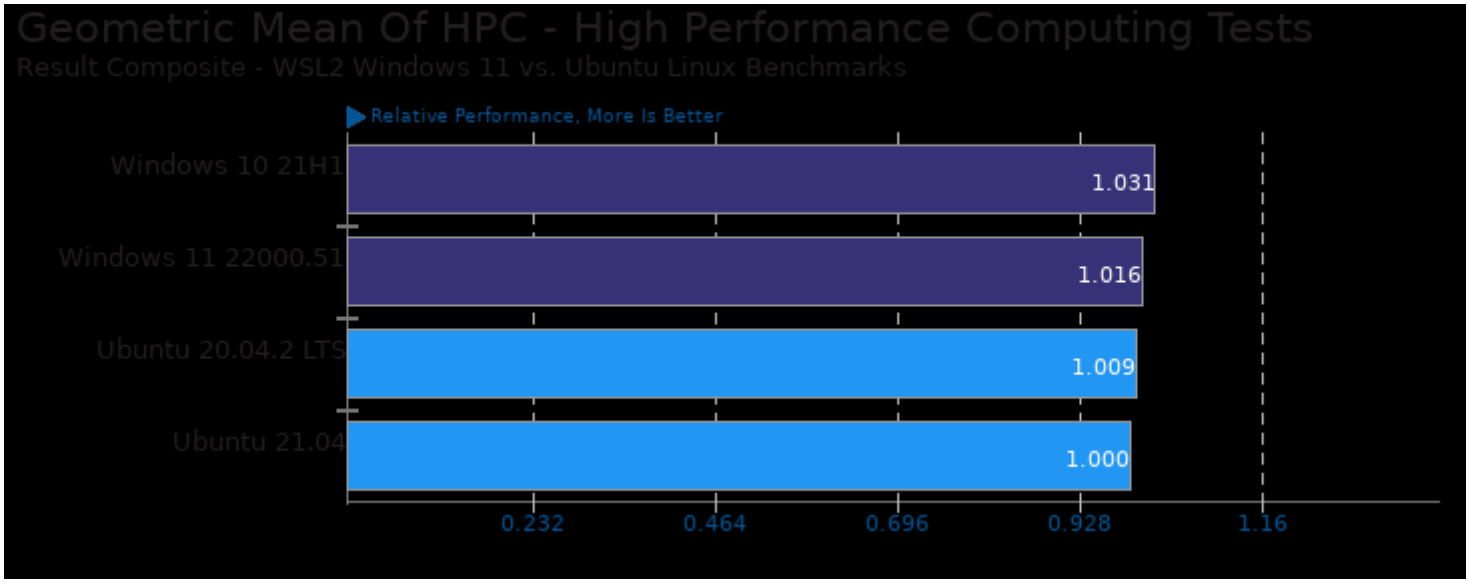
Geometric mean based upon tests: pts/securemark and pts/chia-vdf



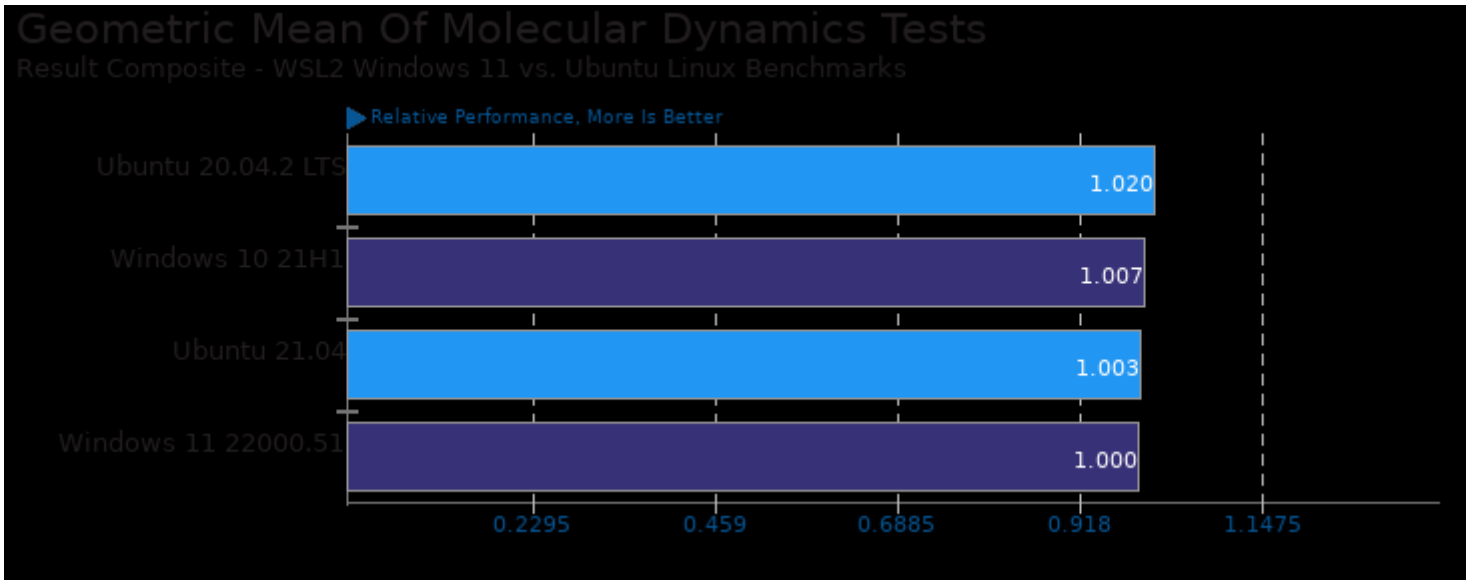
Geometric mean based upon tests: pts/vpxenc, pts/aom-av1 and pts/svt-av1



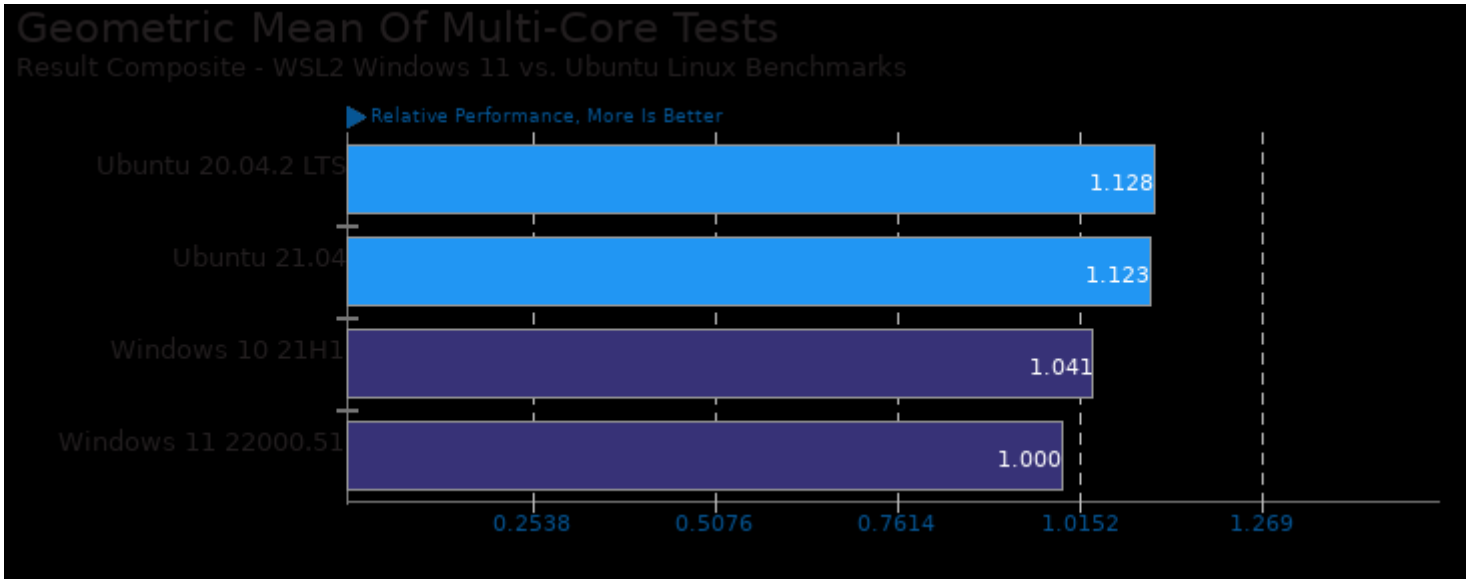
Geometric mean based upon tests: pts/toktx, pts/draco and pts/build-godot



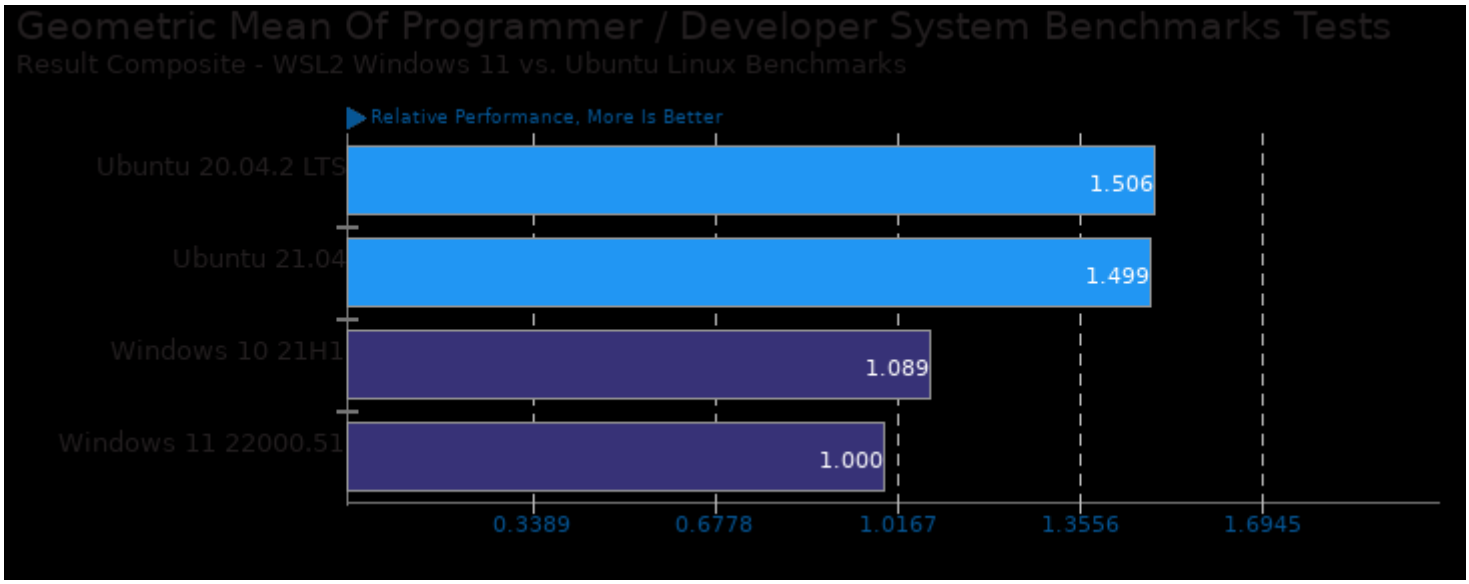
Geometric mean based upon tests: pts/namd, pts/gromacs and pts/tnn



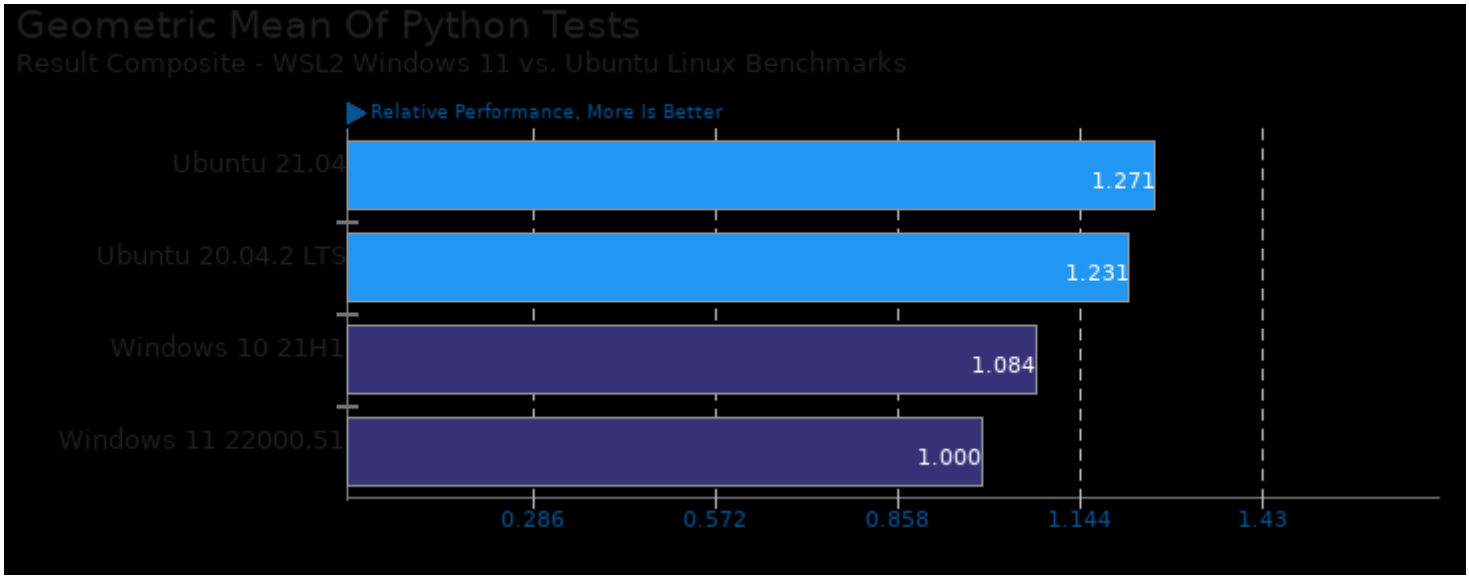
Geometric mean based upon tests: pts/namd and pts/gromacs



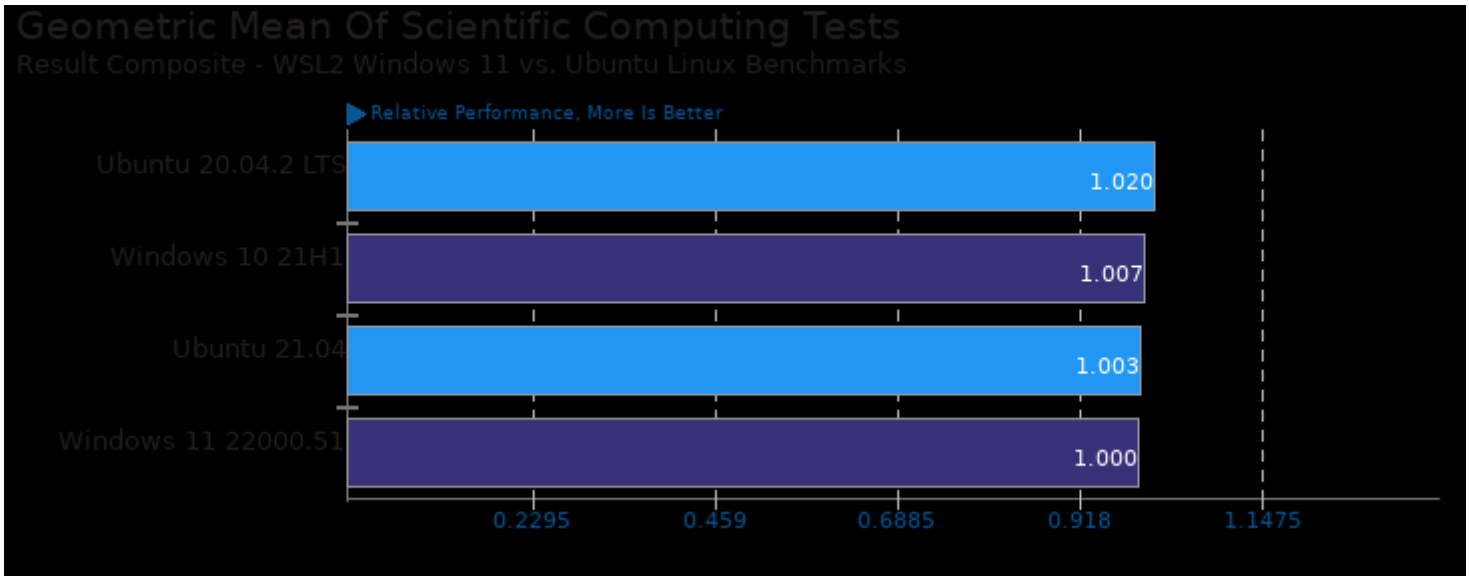
Geometric mean based upon tests: pts/stockfish, pts/coremark, pts/vpxenc, pts/aom-av1, pts/svt-av1, pts/namd, pts/gromacs, pts/compress-zstd, pts/build-linux-kernel, pts/build-godot, pts/build-nodejs and pts/embree



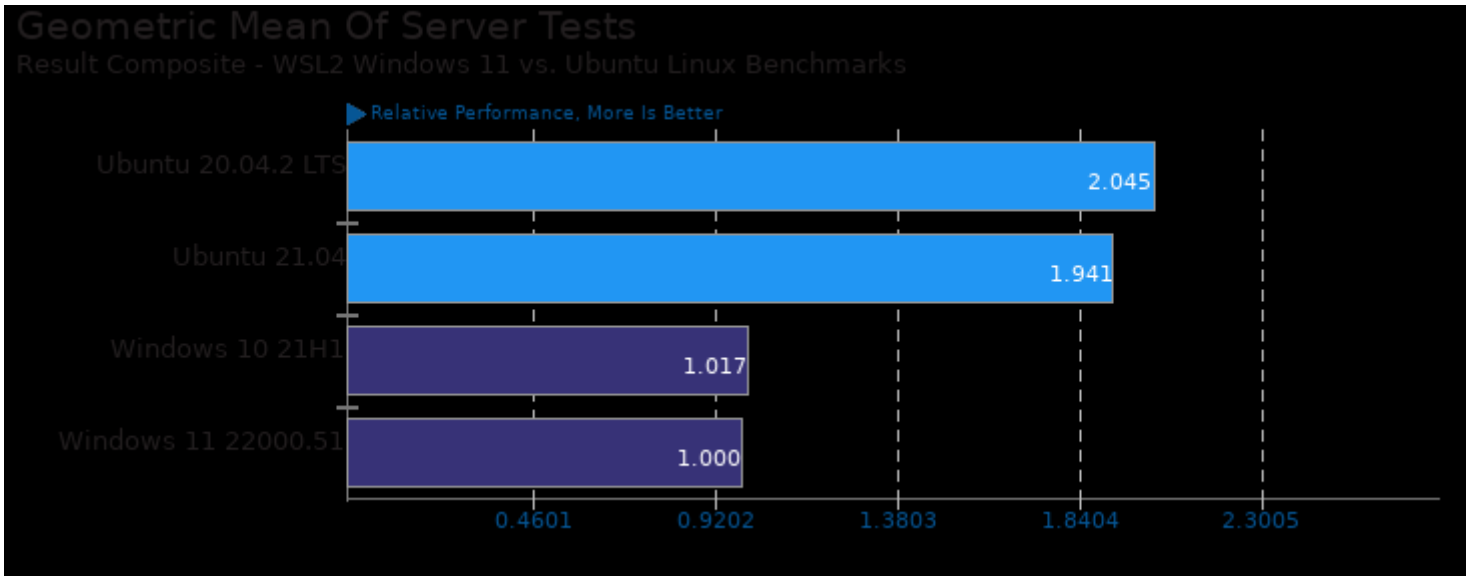
Geometric mean based upon tests: pts/sqlite-speedtest, pts/node-web-tooling, pts/git, pts/blosc, pts/compress-zstd, pts/build-linux-kernel, pts/build-godot and pts/build-nodejs



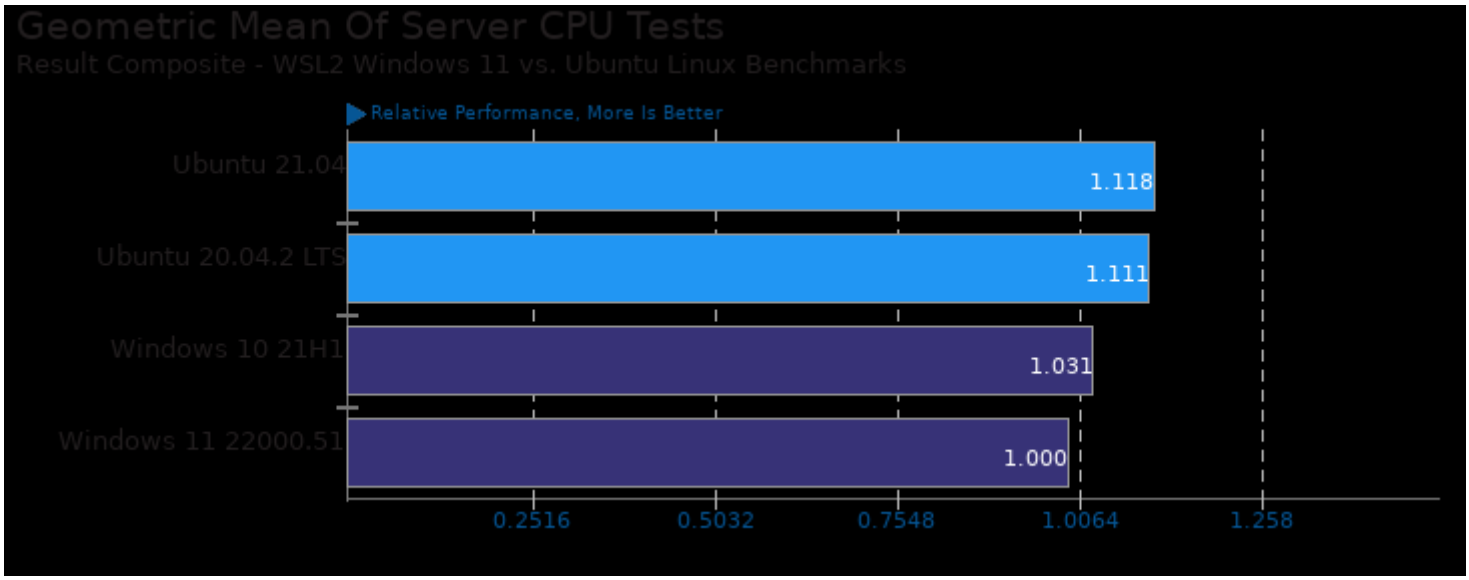
Geometric mean based upon tests: pts/chia-vdf, pts/build-godot and pts/build-nodejs



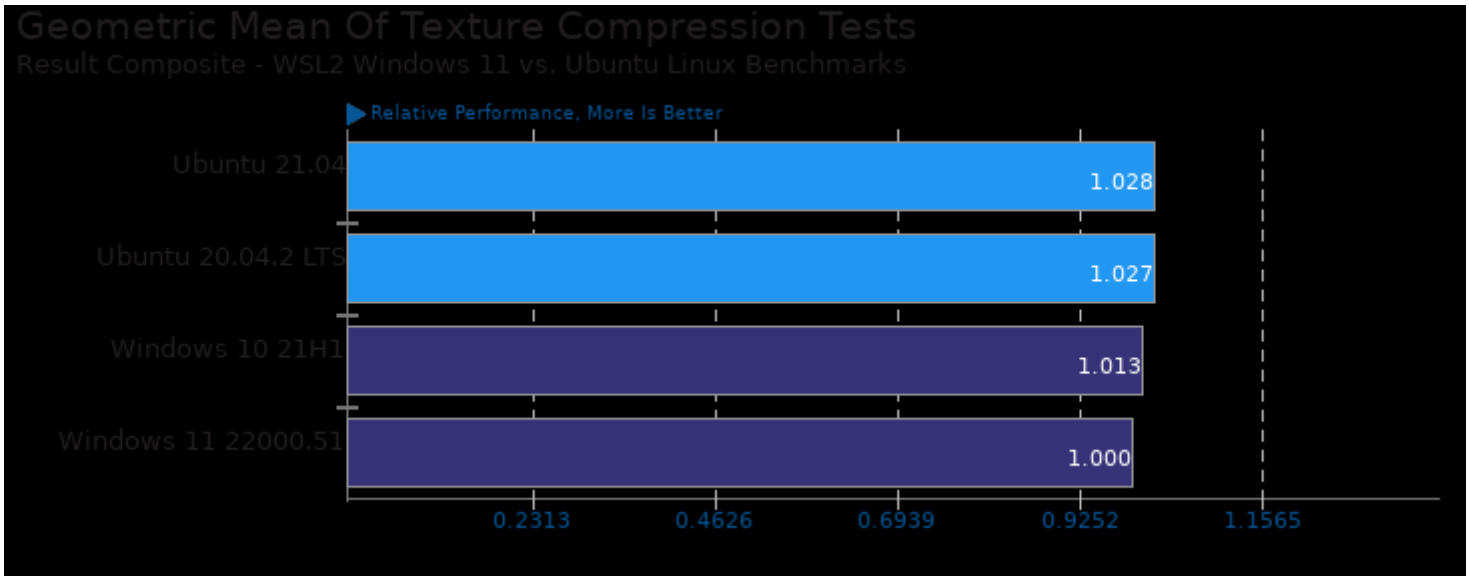
Geometric mean based upon tests: pts/namd and pts/gromacs



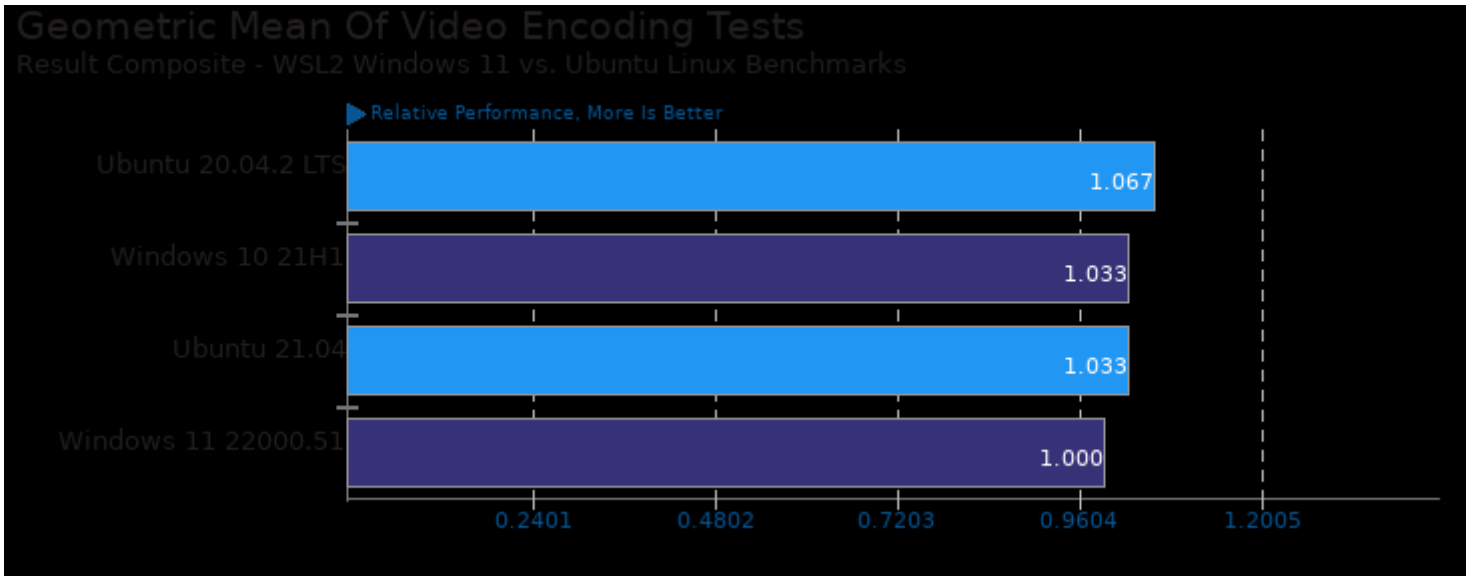
Geometric mean based upon tests: pts/node-web-tooling and pts/sqlite-speedtest



Geometric mean based upon tests: pts/namd, pts/svt-av1, pts/stockfish, pts/build-linux-kernel and pts/compress-zstd



Geometric mean based upon tests: pts/toktx and pts/draco



Geometric mean based upon tests: pts/vpxenc, pts/aom-av1 and pts/svt-av1

This file was automatically generated via the Phoronix Test Suite benchmarking software on Thursday, 28 March 2024 06:31.