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Ryzen 3 2200G 2021

AMD Ryzen 3 2200G testing with a ASUS PRIME B350M-E (5220 BIOS) and ASUS AMD Radeon Vega / Mobile 2GB on Ubuntu 20.10 via the Phoronix Test Suite.

Automated Executive Summary

1 had the most wins, coming in first place for 40% of the tests.

Based on the geometric mean of all complete results, the fastest (1) was 1.006x the speed of the slowest (2). 3 was 0.995x the speed of 1 and 2 was 0.999x the speed of 3.

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

Redis (Test: LPOP) at 1.797x
Kripke at 1.543x
LeelaChessZero (Backend: BLAS) at 1.224x
LeelaChessZero (Backend: Eigen) at 1.188x
Redis (Test: GET) at 1.07x
oneDNN (Harness: Matrix Multiply Batch Shapes Transformer - Data Type: u8s8f32 - Engine: CPU) at 1.05x
Sunflow Rendering System (Global Illumination + Image Synthesis) at 1.049x
Node.js V8 Web Tooling Benchmark at 1.049x
OSBench (Test: Memory Allocations) at 1.048x

oneDNN (Harness: IP Shapes 1D - Data Type: u8s8f32 - Engine: CPU) at 1.039x.

Test Systems:

1

2

3

Processor: AMD Ryzen 3 2200G @ 3.50GHz (4 Cores), Motherboard: ASUS PRIME B350M-E (5220 BIOS), Chipset: AMD Raven/Raven2, Memory: 6GB, Disk: Samsung SSD 970 EVO 250GB, Graphics: ASUS AMD Radeon Vega / Mobile 2GB (1100/1600MHz), Audio: AMD Raven/Raven2/Fenghuang, Monitor: G237HL, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 20.10, Kernel: 5.8.0-38-generic (x86_64), Desktop: GNOME Shell 3.38.1, Display Server: X Server 1.20.9, Display Driver: modesetting 1.20.9, OpenGL: 4.6 Mesa 20.2.6 (LLVM 11.0.0), Vulkan: 1.2.131, Compiler: GCC 10.2.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-JvwpWM/gcc-10-10.2.0/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-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 ondemand (Boost: Enabled) - CPU Microcode: 0x8101016
Graphics Notes: GLAMOR
Java Notes: OpenJDK Runtime Environment (build 11.0.9.1+1-Ubuntu-0ubuntu1.20.10)
Python Notes: Python 3.8.6
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: disabled RSB filling + srbds: Not affected + tsx_async_abort: Not affected

	1	2	3
Algebraic Multi-Grid Benchmark (Figure Of Merit)	**213491533**	**214232233**	214072633
Normalized	99.65%	100%	99.93%
Standard Deviation	0.3%	0.4%	0.4%
dav1d - Chimera 1080p (FPS)	**184.25**	184.17	**183.88**
Normalized	100%	99.96%	99.8%
Standard Deviation	0%	1.7%	1.8%
dav1d - Summer Nature 4K (FPS)	**51.92**	52.00	**52.09**
Normalized	99.67%	99.83%	100%
Standard Deviation	1.2%	1.2%	1.5%
dav1d - S.N.1 (FPS)	**182.89**	183.50	**184.81**
Normalized	98.96%	99.29%	100%

Standard Deviation	0.8%	0.3%	0.3%
dav1d - C.1.1.b (FPS)	52.55	**52.39**	**53.51**
Normalized	98.21%	97.91%	100%
Standard Deviation	0.5%	0.7%	1%
Warsow - 1920 x 1080 (FPS)	**158.1**	**159.4**	**159.4**
Normalized	99.18%	100%	100%
Standard Deviation	1.4%	0.1%	0.1%
yquake2 - OpenGL 3.x - 1920 x 1080 (FPS)	**814.1**	**807.2**	807.9
Normalized	100%	99.15%	99.24%
Standard Deviation	0.9%	0.7%	1%
yquake2 - Software CPU - 1920 x 1080 (FPS)	**92.9**	**93.3**	**93.3**
Normalized	99.57%	100%	100%
Standard Deviation	0.7%	0.1%	0.1%
AOM AV1 - Speed 4 Two-Pass (FPS)	**1.38**	**1.38**	**1.40**
Normalized	98.57%	98.57%	100%
Standard Deviation	0.7%	0%	0.7%
AOM AV1 - Speed 6 Realtime (FPS)	10.13	**10.12**	**10.25**
Normalized	98.83%	98.73%	100%
Standard Deviation	0.7%	1.4%	2.1%
AOM AV1 - Speed 6 Two-Pass (FPS)	**2.22**	**2.22**	**2.24**
Normalized	99.11%	99.11%	100%
Standard Deviation	0.3%	0%	0.7%
AOM AV1 - Speed 8 Realtime (FPS)	27.20	**27.18**	**27.29**
Normalized	99.67%	99.6%	100%
Standard Deviation	0.1%	0.2%	0.1%
Embree - Pathtracer - Crown (FPS)	**2.7601**	2.7659	**2.7779**
Normalized	99.36%	99.57%	100%
Standard Deviation	0.9%	0.3%	0.5%
Embree - Pathtracer ISPC - Crown (FPS)	2.5819	**2.5670**	**2.5828**
Normalized	99.97%	99.39%	100%
Standard Deviation	0.3%	0.7%	1.1%
Embree - Pathtracer - Asian Dragon (FPS)	3.3140	**3.3113**	**3.3432**
Normalized	99.13%	99.05%	100%
Standard Deviation	1%	0.8%	1.5%
Embree - Pathtracer - Asian Dragon Obj	**2.9903**	**2.9682**	2.9782
Normalized	100%	99.26%	99.6%
Standard Deviation	1.4%	0.8%	1.3%
Embree - Pathtracer ISPC - Asian Dragon (FPS)	**3.2431**	**3.2504**	3.2482
Normalized	99.78%	100%	99.93%
Standard Deviation	0.7%	0.7%	0.1%
Embree - Pathtracer ISPC - Asian Dragon Obj (FPS)	2.8199	**2.8371**	**2.8151**
Normalized	99.39%	100%	99.22%
Standard Deviation	0.7%	1%	0.9%
Kvazaar - Bosphorus 4K - Medium (FPS)	**1.49**	**1.49**	**1.50**
Normalized	99.33%	99.33%	100%
Standard Deviation	0%	0%	0.4%
Kvazaar - Bosphorus 1080p - Medium (FPS)	**6.51**	**6.51**	**6.50**
Normalized	100%	100%	99.85%
Standard Deviation	0.3%	0.3%	0.5%
Kvazaar - Bosphorus 4K - Very Fast (FPS)	**3.94**	**3.94**	**3.95**
Normalized	99.75%	99.75%	100%
Standard Deviation	0.1%	0.1%	0.4%
Kvazaar - Bosphorus 4K - Ultra Fast (FPS)	6.84	**6.85**	**6.83**

Normalized	99.85%	100%	99.71%
Standard Deviation	0.5%	1%	0.5%
Kvazaar - Bosphorus 1080p - Very Fast (FPS)	15.60	**15.52**	**15.62**
Normalized	99.87%	99.36%	100%
Standard Deviation	0.6%	0.7%	0.4%
Kvazaar - Bosphorus 1080p - Ultra Fast	**27.01**	**27.07**	27.05
Normalized	99.78%	100%	99.93%
Standard Deviation	1%	0.3%	0.2%
rav1e - 5 (FPS)	**0.848**	0.844	**0.839**
Normalized	100%	99.53%	98.94%
Standard Deviation	0.2%	0.2%	0%
rav1e - 6 (FPS)	**1.082**	1.083	**1.089**
Normalized	99.36%	99.45%	100%
Standard Deviation	0.8%	0.1%	0.4%
rav1e - 10 (FPS)	2.573	**2.566**	**2.639**
Normalized	97.5%	97.23%	100%
Standard Deviation	1%	0.5%	0.5%
x265 - Bosphorus 4K (FPS)	**4.81**	**4.83**	**4.83**
Normalized	99.59%	100%	100%
Standard Deviation	0.5%	0.4%	0.8%
x265 - Bosphorus 1080p (FPS)	**19.49**	19.60	**19.71**
Normalized	98.88%	99.44%	100%
Standard Deviation	1.4%	0.7%	1%
simdjson - Kostya (GB/s)	0.38	0.38	0.38
Standard Deviation	0%	0%	0%
simdjson - LargeRand (GB/s)	0.35	0.35	0.35
Standard Deviation	0%	0%	1.7%
simdjson - PartialTweets (GB/s)	0.45	0.45	0.45
Standard Deviation	1.3%	0%	0%
simdjson - DistinctUserID (GB/s)	0.46	0.46	0.46
Standard Deviation	0%	0%	0%
Coremark - CoreMark Size 666 - I.P.S (Iterations/Sec)	**102524**	**101766**	102339
Normalized	100%	99.26%	99.82%
Standard Deviation	1.4%	0.5%	0.6%
BYTE Unix Benchmark - Dhrystone 2 (LPS)	35499453	**35791749**	**35427649**
Normalized	99.18%	100%	98.98%
Standard Deviation	1.4%	1%	2.5%
IndigoBench - CPU - Bedroom (M samples/s)	**0.494**	**0.494**	**0.498**
Normalized	99.2%	99.2%	100%
Standard Deviation	0.4%	0.1%	0.6%
IndigoBench - CPU - Supercar (M samples/s)	**1.107**	**1.098**	1.106
Normalized	100%	99.19%	99.91%
Standard Deviation	0.6%	1.4%	0.2%
LZ4 Compression - 1 - Compression Speed (MB/s)	**7994**	8015	**8022**
Normalized	99.65%	99.91%	100%
Standard Deviation	1.1%	0.9%	2%
LZ4 Compression - 1 - D.S (MB/s)	**8722**	**8646**	8690
Normalized	100%	99.13%	99.63%
Standard Deviation	0.1%	0.2%	1.1%
LZ4 Compression - 3 - Compression Speed (MB/s)	**42.77**	42.34	**41.81**
Normalized	100%	98.99%	97.76%
Standard Deviation	2.3%	3.9%	6%

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LZ4 Compression - 3 - D.S (MB/s)	**8554**	8548	**8547**
Normalized	100%	99.92%	99.92%
Standard Deviation	0.5%	0.4%	0.3%
LZ4 Compression - 9 - Compression Speed (MB/s)	**42.22**	**41.02**	41.23
Normalized	100%	97.16%	97.66%
Standard Deviation	6.2%	5.2%	4.4%
LZ4 Compression - 9 - D.S (MB/s)	**8565**	**8552**	8563
Normalized	100%	99.85%	99.97%
Standard Deviation	0.3%	0.3%	0.2%
Zstd Compression - 3 (MB/s)	2346	**2358**	**2324**
Normalized	99.49%	100%	98.57%
Standard Deviation	2.1%	1.2%	0.6%
Zstd Compression - 19 (MB/s)	**14.0**	**14.2**	**14.2**
Normalized	98.59%	100%	100%
Standard Deviation	2.9%	0.4%	0.7%
Sockperf - Throughput (Messages/sec)	**555055**	**559663**	557665
Normalized	99.18%	100%	99.64%
Standard Deviation	2.7%	1.4%	1.3%
FFTE - N.2.3.C.F.R (MFLOPS)	**15393**	**15756**	15437
Normalized	97.7%	100%	97.98%
Standard Deviation	1.4%	1.2%	1.8%
LibRaw - P.P.B (Mpix/sec)	**19.36**	19.66	**19.79**
Normalized	97.83%	99.34%	100%
Standard Deviation	0.5%	0.9%	1.1%
LeelaChessZero - BLAS (Nodes/s)	**432**	374	**353**
Normalized	100%	86.57%	81.71%
Standard Deviation	3%	4.8%	1.2%
LeelaChessZero - Eigen (Nodes/s)	**448**	380	**377**
Normalized	100%	84.82%	84.15%
Standard Deviation	1.9%		4.1%
Crafty - Elapsed Time (Nodes/s)	6274275	**6255015**	**6322069**
Normalized	99.24%	98.94%	100%
Standard Deviation	0.1%	0.6%	0.6%
Stockfish - Total Time (Nodes/s)	**5718169**	**5628220**	5648589
Normalized	100%	98.43%	98.78%
Standard Deviation	1.5%	2.3%	1.2%
asmFish - 1.H.M.2.D (Nodes/s)	7748047	**7802828**	**7669043**
Normalized	99.3%	100%	98.29%
Standard Deviation	0.6%	1.1%	0.7%
GROMACS - Water Benchmark (Ns/Day)	**0.333**	0.330	**0.326**
Normalized	100%	99.1%	97.9%
Standard Deviation	1%	1.1%	2.7%
LAMMPS Molecular Dynamics Simulator - Rhodopsin Protein (ns/day)	2.603	**2.586**	**2.613**
Normalized	99.62%	98.97%	100%
Standard Deviation	1%	2%	2%
KeyDB (Ops/sec)	**265074**	267213	**269044**
Normalized	98.52%	99.32%	100%
Standard Deviation	2.1%	1.3%	1.2%
Hierarchical INTegration - FLOAT (QUIPs)	301333350	**301687480**	**301185317**
Normalized	99.88%	100%	99.83%
Standard Deviation	0.1%	0.1%	0.4%
Redis - LPOP (Reqs/sec)	**2261211**	**1258381**	1275489
Normalized	100%	55.65%	56.41%

Standard Deviation	1.3%	1.6%	1.2%
Redis - SADD (Reqs/sec)	1735687	**1758201**	**1734496**
Normalized	98.72%	100%	98.65%
Standard Deviation	1.2%	2.1%	0.4%
Redis - LPUSH (Reqs/sec)	1216336	**1213155**	**1223284**
Normalized	99.43%	99.17%	100%
Standard Deviation	2.3%	0.4%	0.6%
Redis - GET (Reqs/sec)	**2064795**	1931045	**1930168**
Normalized	100%	93.52%	93.48%
Standard Deviation	2.9%	2.7%	2%
Redis - SET (Reqs/sec)	**1489969**	1486412	**1472540**
Normalized	100%	99.76%	98.83%
Standard Deviation	0.7%	2.2%	2.9%
Node.js V8 Web Tooling Benchmark (runs/s)	**7.38**	**7.74**	**7.38**
Normalized	95.35%	100%	95.35%
Standard Deviation	1.8%	0.7%	2.5%
GLmark2 - 1920 x 1080 (Score)	**1849**	1851	**1852**
Normalized	99.84%	99.95%	100%
Numpy Benchmark (Score)	242.34	**241.36**	**243.26**
Normalized	99.62%	99.22%	100%
Standard Deviation	0.2%	0.2%	0.4%
PHPBench - P.B.S (Score)	**508106**	506055	**504159**
Normalized	100%	99.6%	99.22%
Standard Deviation	0.1%	0.7%	0.8%
CLOMP - Static OMP Speedup (Speedup)	2	2.0	2
Standard Deviation		2.9%	
Kripke (Throughput FoM)	**4811563**	**3117717**	
Normalized	100%	64.8%	
Standard Deviation	1.1%	2%	
InfluxDB - 4 - 10000 - 2,5000,1 - 10000	**706036**	**696010**	700555
Normalized	100%	98.58%	99.22%
Standard Deviation	2.1%	1.6%	1.4%
InfluxDB - 64 - 10000 - 2,5000,1 - 10000 (val/sec)	**721428**	**725224**	723222
Normalized	99.48%	100%	99.72%
Standard Deviation	0.5%	0.4%	0.8%
VKMark - 1920 x 1080 (VKMark Score)	**1199**	**1199**	**1196**
Normalized	100%	100%	99.75%
Google SynthMark - VoiceMark_100 (Voices)	596.254	**596.615**	**593.909**
Normalized	99.94%	100%	99.55%
Standard Deviation	0.5%	0.3%	0.3%
LULESH (z/s)	**1180**	**1208**	1208
Normalized	97.66%	100%	99.97%
Standard Deviation	0.1%	0.1%	0.3%
NAMD - ATPase Simulation - 327,506 Atoms (days/ns)	**6.75407**	6.79902	**6.83284**
Normalized	100%	99.34%	98.85%
Standard Deviation	0.4%	1%	2.9%
WebP Image Encode - Default (Encode Time - sec)	**1.648**	**1.662**	1.657
Normalized	100%	99.16%	99.46%
Standard Deviation	0.2%	0.3%	1%

WebP Image Encode - Quality 100 (Encode Time - sec)	2.595	**2.601**	**2.590**
Normalized	99.81%	99.58%	100%
Standard Deviation	0.6%	0.5%	0.2%
WebP Image Encode - Q.1.L (Encode Time - sec)	**24.894**	**24.957**	24.900
Normalized	100%	99.75%	99.98%
Standard Deviation	0.2%	0.7%	1.5%
WebP Image Encode - Q.1.H.C (Encode Time - sec)	**8.872**	8.871	**8.869**
Normalized	99.97%	99.98%	100%
Standard Deviation	0%	0.2%	0.3%
WebP Image Encode - Q.1.L.H.C (Encode Time - sec)	**57.670**	**57.216**	57.452
Normalized	99.21%	100%	99.59%
Standard Deviation	0.8%	0.1%	0.3%
TensorFlow Lite - SqueezeNet (us)	**467745**	**461955**	467404
Normalized	98.76%	100%	98.83%
Standard Deviation	0.1%	0.5%	0.2%
TensorFlow Lite - Inception V4 (us)	6441017	**6389943**	**6468567**
Normalized	99.21%	100%	98.78%
Standard Deviation	0.7%	0.2%	0.1%
TensorFlow Lite - NASNet Mobile (us)	316112	**317213**	**315790**
Normalized	99.9%	99.55%	100%
Standard Deviation	0.5%	0.2%	0.3%
TensorFlow Lite - Mobilenet Float (us)	309946	**306270**	**313216**
Normalized	98.81%	100%	97.78%
Standard Deviation	0.1%	1%	1.3%
TensorFlow Lite - Mobilenet Quant (us)	**328733**	**318685**	327187
Normalized	96.94%	100%	97.4%
Standard Deviation	0.6%	0.6%	1%
TensorFlow Lite - I.R.V (us)	5691310	**5697083**	**5689070**
Normalized	99.96%	99.86%	100%
Standard Deviation	0.1%	0.1%	0.2%
Caffe - AlexNet - CPU - 100 (ms)	**41877**	41672	**41573**
Normalized	99.27%	99.76%	100%
Standard Deviation	0.8%	0.4%	0.6%
Caffe - GoogleNet - CPU - 100 (ms)	**110084**	**110320**	110157
Normalized	100%	99.79%	99.93%
Standard Deviation	0.2%	0.1%	0.4%
oneDNN - IP Shapes 1D - f32 - CPU (ms)	**16.5429**	16.5558	**16.6108**
Normalized	100%	99.92%	99.59%
Standard Deviation	1.8%	1.9%	2.5%
oneDNN - IP Shapes 3D - f32 - CPU (ms)	**13.0736**	13.1685	**13.3661**
Normalized	100%	99.28%	97.81%
Standard Deviation	5.4%	5%	0.7%
oneDNN - IP Shapes 1D - u8s8f32 - CPU (ms)	**14.6322**	14.8700	**15.1975**
Normalized	100%	98.4%	96.28%
Standard Deviation	1.3%	1.5%	1.3%
oneDNN - IP Shapes 3D - u8s8f32 - CPU (ms)	5.81417	**5.84129**	**5.79119**
Normalized	99.6%	99.14%	100%
Standard Deviation	0.6%	0.4%	0.4%
oneDNN - C.B.S.A - f32 - CPU (ms)	**23.0213**	**23.6791**	23.6697
Normalized	100%	97.22%	97.26%
Standard Deviation	2.5%	1.5%	1.1%

oneDNN - D.B.s - f32 - CPU (ms)	22.5413	**22.3144**	**22.6619**
Normalized	98.99%	100%	98.47%
Standard Deviation	2%	3.1%	1.1%
oneDNN - D.B.s - f32 - CPU (ms)	**30.8073**	**31.4147**	30.8208
Normalized	100%	98.07%	99.96%
Standard Deviation	0.8%	1.6%	0.8%
oneDNN - C.B.S.A - u8s8f32 - CPU (ms)	38.8392	**38.9728**	**38.5055**
Normalized	99.14%	98.8%	100%
Standard Deviation	0.8%	1%	2.3%
oneDNN - D.B.s - u8s8f32 - CPU (ms)	**36.5596**	35.8461	**33.0587**
Normalized	90.42%	92.22%	100%
Standard Deviation	16.8%	19.1%	15.1%
oneDNN - D.B.s - u8s8f32 - CPU (ms)	29.7098	**29.8889**	**29.1210**
Normalized	98.02%	97.43%	100%
Standard Deviation	0.5%	0.8%	1.7%
oneDNN - R.N.N.T - f32 - CPU (ms)	**8437**	**8278**	8343
Normalized	98.11%	100%	99.22%
Standard Deviation	2.7%	1.8%	1.3%
oneDNN - R.N.N.I - f32 - CPU (ms)	**7721**	7794	**7838**
Normalized	100%	99.06%	98.51%
Standard Deviation	0.3%	1.9%	0.7%
oneDNN - R.N.N.T - u8s8f32 - CPU (ms)	**8194**	8356	**8420**
Normalized	100%	98.05%	97.31%
Standard Deviation	2.7%	3%	0.6%
oneDNN - R.N.N.I - u8s8f32 - CPU (ms)	**7747**	7726	**7702**
Normalized	99.42%	99.69%	100%
Standard Deviation	0.9%	0.6%	0.4%
oneDNN - M.M.B.S.T - f32 - CPU (ms)	7.35744	**7.36061**	**7.31351**
Normalized	99.4%	99.36%	100%
Standard Deviation	0.6%	0.2%	0.2%
oneDNN - R.N.N.T - bf16bf16bf16 - CPU (ms)	**8195**	**8439**	8427
Normalized	100%	97.12%	97.25%
Standard Deviation	2.7%	3%	1%
oneDNN - R.N.N.I - bf16bf16bf16 - CPU (ms)	**7914**	**7668**	7750
Normalized	96.9%	100%	98.93%
Standard Deviation	2.2%	0.5%	0.3%
oneDNN - M.M.B.S.T - u8s8f32 - CPU (ms)	**14.8215**	15.0825	**15.5619**
Normalized	100%	98.27%	95.24%
Standard Deviation	5.6%	4.6%	1%
Mobile Neural Network - SqueezeNetV1.0	9.732	**9.613**	**9.867**
Normalized	98.78%	100%	97.43%
Standard Deviation	2.3%	0.7%	1.2%
Mobile Neural Network - resnet-v2-50 (ms)	**50.216**	50.269	**50.489**
Normalized	100%	99.89%	99.46%
Standard Deviation	1.8%	1.1%	0.9%
Mobile Neural Network - MobileNetV2_224	**5.424**	5.419	**5.398**
Normalized	99.52%	99.61%	100%
Standard Deviation	0.6%	1.2%	1.2%
Mobile Neural Network - mobilenet-v1-1.0	7.395	**7.526**	**7.313**
Normalized	98.89%	97.17%	100%
Standard Deviation	0.5%	1.5%	0.7%
Mobile Neural Network - inception-v3 (ms)	63.415	**63.997**	**63.269**
Normalized	99.77%	98.86%	100%
Standard Deviation	0.5%	0.9%	0.5%
NCNN - CPU - mobilenet (ms)	**46.83**	46.49	**46.32**

Normalized	98.91%	99.63%	100%
Standard Deviation	1.7%	0.2%	0.2%
NCNN - CPU-v2-v2 - mobilenet-v2 (ms)	**11.20**	**10.91**	11.04
Normalized	97.41%	100%	98.82%
Standard Deviation	2.1%	1.3%	0.9%
NCNN - CPU-v3-v3 - mobilenet-v3 (ms)	**9.67**	**9.49**	9.59
Normalized	98.14%	100%	98.96%
Standard Deviation	1.2%	0.9%	0.6%
NCNN - CPU - shufflenet-v2 (ms)	**12.65**	**12.89**	12.70
Normalized	100%	98.14%	99.61%
Standard Deviation	1.6%	1.9%	1.9%
NCNN - CPU - mnasnet (ms)	**10.50**	10.34	**10.25**
Normalized	97.62%	99.13%	100%
Standard Deviation	0.8%	1.7%	1%
NCNN - CPU - efficientnet-b0 (ms)	**17.07**	**16.76**	16.89
Normalized	98.18%	100%	99.23%
Standard Deviation	1.5%	0.3%	1.3%
NCNN - CPU - blazeface (ms)	3.31	**3.33**	**3.29**
Normalized	99.4%	98.8%	100%
Standard Deviation	0.6%	1.7%	1.8%
NCNN - CPU - googlenet (ms)	32.59	**32.79**	**32.43**
Normalized	99.51%	98.9%	100%
Standard Deviation	0.9%	0.3%	0.9%
NCNN - CPU - vgg16 (ms)	**117.19**	**119.38**	117.45
Normalized	100%	98.17%	99.78%
Standard Deviation	0.3%	0.3%	0.2%
NCNN - CPU - resnet18 (ms)	**29.04**	**29.04**	**29.18**
Normalized	100%	100%	99.52%
Standard Deviation	1%	0.7%	2%
NCNN - CPU - alexnet (ms)	**23.30**	23.42	**23.51**
Normalized	100%	99.49%	99.11%
Standard Deviation	0.8%	0.5%	0.5%
NCNN - CPU - resnet50 (ms)	72.55	**73.14**	**71.82**
Normalized	98.99%	98.2%	100%
Standard Deviation	2%	0.9%	0.5%
NCNN - CPU - yolov4-tiny (ms)	**59.28**	**59.42**	**59.28**
Normalized	100%	99.76%	100%
Standard Deviation	0.2%	0.2%	0.2%
NCNN - CPU - squeezenet_ssd (ms)	59.39	**59.71**	**59.34**
Normalized	99.92%	99.38%	100%
Standard Deviation	0.1%	0.6%	0.8%
NCNN - CPU - regnety_400m (ms)	**19.11**	18.87	**18.75**
Normalized	98.12%	99.36%	100%
Standard Deviation	0.7%	0.9%	1.7%
NCNN - Vulkan GPU - mobilenet (ms)	46.40	**47.01**	**46.32**
Normalized	99.83%	98.53%	100%
Standard Deviation	0.1%	2.8%	0.3%
NCNN - Vulkan GPU-v2-v2 - mobilenet-v2	10.88	**11.30**	**10.68**
Normalized	98.16%	94.51%	100%
Standard Deviation	0.2%	3.8%	6.2%
NCNN - Vulkan GPU-v3-v3 - mobilenet-v3	**9.59**	**9.69**	9.60
Normalized	100%	98.97%	99.9%
Standard Deviation	2.3%	2.9%	1.7%
NCNN - Vulkan GPU - shufflenet-v2 (ms)	**12.63**	**12.98**	12.75
Normalized	100%	97.3%	99.06%

Standard Deviation	1.3%	2.5%	2.8%
NCNN - Vulkan GPU - mnasnet (ms)	**10.38**	**10.44**	10.43
Normalized	100%	99.43%	99.52%
Standard Deviation	1.4%	3.8%	1.2%
NCNN - Vulkan GPU - efficientnet-b0 (ms)	**16.98**	16.95	**16.90**
Normalized	99.53%	99.71%	100%
Standard Deviation	0.7%	3.1%	1.5%
NCNN - Vulkan GPU - blazeface (ms)	**3.25**	3.31	**3.33**
Normalized	100%	98.19%	97.6%
Standard Deviation	0.8%	1.4%	1.6%
NCNN - Vulkan GPU - googlenet (ms)	**32.56**	**32.64**	32.59
Normalized	100%	99.75%	99.91%
Standard Deviation	1.1%	0.7%	0.7%
NCNN - Vulkan GPU - vgg16 (ms)	**117.46**	**118.91**	118.04
Normalized	100%	98.78%	99.51%
Standard Deviation	0.5%	0.4%	0.2%
NCNN - Vulkan GPU - resnet18 (ms)	29.17	**29.08**	**29.28**
Normalized	99.69%	100%	99.32%
Standard Deviation	1.5%	0.9%	0.1%
NCNN - Vulkan GPU - alexnet (ms)	23.46	**23.24**	**23.48**
Normalized	99.06%	100%	98.98%
Standard Deviation	0.6%	0.3%	0.2%
NCNN - Vulkan GPU - resnet50 (ms)	**71.68**	**74.10**	71.69
Normalized	100%	96.73%	99.99%
Standard Deviation	0.5%	1.7%	0.7%
NCNN - Vulkan GPU - yolov4-tiny (ms)	**59.00**	**59.40**	59.28
Normalized	100%	99.33%	99.53%
Standard Deviation	0.1%	0.2%	0.5%
NCNN - Vulkan GPU - squeezenet_ssd (ms)	59.28	**59.16**	**59.50**
Normalized	99.8%	100%	99.43%
Standard Deviation	0.2%	0.5%	0.5%
NCNN - Vulkan GPU - regnety_400m (ms)	**18.88**	19.06	**19.07**
Normalized	100%	99.06%	99%
Standard Deviation	0.8%	1.6%	0.1%
TNN - CPU - MobileNet v2 (ms)	279.339	**279.626**	**279.278**
Normalized	99.98%	99.88%	100%
Standard Deviation	0%	0.3%	0.2%
TNN - CPU - SqueezeNet v1.1 (ms)	**287.255**	287.063	**286.140**
Normalized	99.61%	99.68%	100%
Standard Deviation	0.1%	0.2%	0%
OSBench - Memory Allocations (Ns/Event)	**81.742684**	81.999382	**85.632006**
Normalized	100%	99.69%	95.46%
Standard Deviation	0%	0.2%	2.9%
RealSR-NCNN - 4x - No (sec)	**63.028**	63.023	**63.002**
Normalized	99.96%	99.97%	100%
Standard Deviation	0.1%	0.1%	0.1%
RealSR-NCNN - 4x - Yes (sec)	482.609	**482.839**	**482.551**
Normalized	99.99%	99.94%	100%
Standard Deviation	0%	0%	0%
Waifu2x-NCNN Vulkan - 2x - 3 - No (sec)	**4.115**	4.110	**4.097**
Normalized	99.56%	99.68%	100%
Standard Deviation	1%	0.2%	0.2%
Waifu2x-NCNN Vulkan - 2x - 3 - Yes (sec)	26.675	**26.685**	**26.673**
Normalized	99.99%	99.96%	100%
Standard Deviation	0%	0%	0%

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CloverLeaf - L.E.H (sec)	191.41	**191.45**	**191.01**
Normalized	99.79%	99.77%	100%
Standard Deviation	0.2%	0.1%	0.1%
CP2K Molecular Dynamics - Fayalite-FIST Data (sec)	**1449**	**1462**	1452
Normalized	100%	99.09%	99.73%
Dolfyn - C.F.D (sec)	21.069	**21.139**	**20.988**
Normalized	99.62%	99.29%	100%
Standard Deviation	0.6%	0.4%	0.3%
Timed HMMer Search - P.D.S (sec)	**127.149**	**127.645**	127.385
Normalized	100%	99.61%	99.81%
Standard Deviation	0%	0.3%	0.1%
Incompact3D - Cylinder (sec)	**810.954712**	**821.055725**	820.322815
Normalized	100%	98.77%	98.86%
Standard Deviation	0.8%	2.1%	0.5%
Timed MAFFT Alignment - M.S.A - LSU RNA (sec)	**15.042**	**15.000**	15.035
Normalized	99.72%	100%	99.77%
Standard Deviation	2.5%	0.7%	1.2%
Monte Carlo Simulations of Ionised Nebulae - Dust 2D tau100.0 (sec)	**342**	**340**	341
Normalized	99.42%	100%	99.71%
Standard Deviation		0.9%	0.3%
OpenFOAM - Motorbike 30M (sec)	**342.98**	339.54	**338.27**
Normalized	98.63%	99.63%	100%
Standard Deviation	0.8%	0.1%	1.1%
Timed FFmpeg Compilation - Time To Compile (sec)	**182.189**	**183.024**	182.601
Normalized	100%	99.54%	99.77%
Standard Deviation	0.3%	0.2%	0.7%
Timed Godot Game Engine Compilation - Time To Compile (sec)	**501.200**	**503.977**	502.608
Normalized	100%	99.45%	99.72%
Standard Deviation	0.1%	0.1%	0.1%
Build2 - Time To Compile (sec)	**514.482**	**516.516**	514.799
Normalized	100%	99.61%	99.94%
Standard Deviation	0.1%	0.7%	0.4%
Timed Eigen Compilation - Time To Compile (sec)	113.520	**113.654**	**112.964**
Normalized	99.51%	99.39%	100%
Standard Deviation	0.8%	0.3%	0.3%
Monkey Audio Encoding - WAV To APE (sec)	**15.955**	15.994	**15.995**
Normalized	100%	99.76%	99.75%
Standard Deviation	0.7%	1.1%	0.7%
Opus Codec Encoding - WAV To Opus Encode (sec)	**8.936**	8.923	**8.915**
Normalized	99.76%	99.91%	100%
Standard Deviation	0.8%	0.8%	0.5%
eSpeak-NG Speech Engine - T.T.S.S (sec)	**35.134**	**35.319**	35.312
Normalized	100%	99.48%	99.5%
Standard Deviation	0.6%	0.7%	0.6%
RNNoise (sec)	**22.238**	**22.693**	22.580
Normalized	100%	97.99%	98.49%
Standard Deviation	0.2%	2.9%	2.7%

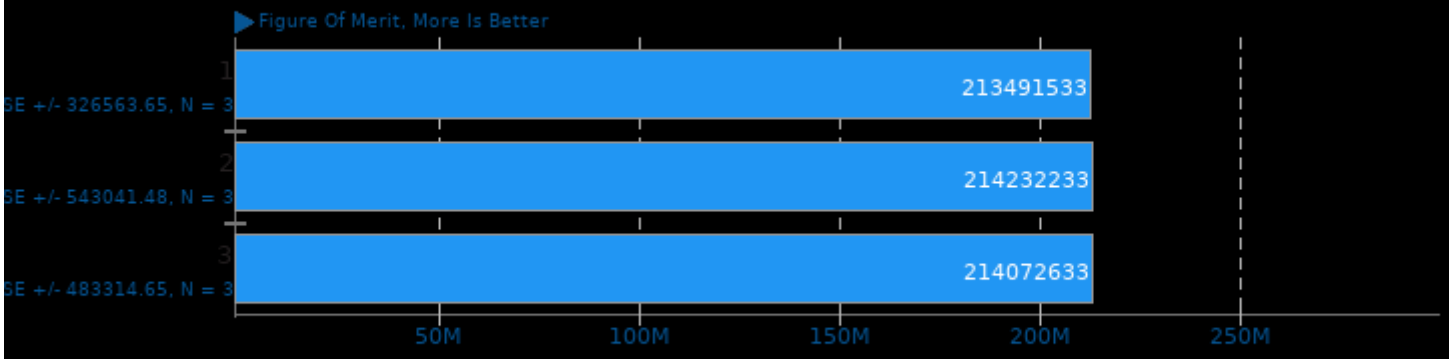
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ASTC Encoder - Fast (sec)	9.75	**9.74**	**9.80**
Normalized	99.9%	100%	99.39%
Standard Deviation	1.2%	0.8%	1.1%
ASTC Encoder - Medium (sec)	12.77	**12.83**	**12.75**
Normalized	99.84%	99.38%	100%
Standard Deviation	0.4%	0.5%	0.4%
ASTC Encoder - Thorough (sec)	**84.33**	**84.61**	84.49
Normalized	100%	99.67%	99.81%
Standard Deviation	0.4%	0.4%	0.1%
ASTC Encoder - Exhaustive (sec)	696.05	**697.50**	**695.24**
Normalized	99.88%	99.68%	100%
Standard Deviation	0.3%	0.1%	0.1%
Basis Universal - ETC1S (sec)	**82.060**	**82.178**	82.076
Normalized	100%	99.86%	99.98%
Standard Deviation	0.1%	0.3%	0.1%
Basis Universal - UASTC Level 0 (sec)	11.898	**12.054**	**11.863**
Normalized	99.71%	98.42%	100%
Standard Deviation	0.3%	1.4%	0%
Basis Universal - UASTC Level 2 (sec)	86.479	**86.540**	**86.340**
Normalized	99.84%	99.77%	100%
Standard Deviation	0.5%	0.4%	0.3%
SQLite Speedtest - Timed Time - Size 1,000 (sec)	**81.222**	81.423	**81.933**
Normalized	100%	99.75%	99.13%
Standard Deviation	0.3%	1.6%	1.5%
Darktable - Boat - CPU-only (sec)	**25.206**	**25.901**	25.451
Normalized	100%	97.32%	99.04%
Standard Deviation	0.6%	3.5%	0.6%
Darktable - Masskrug - CPU-only (sec)	**24.172**	**24.518**	24.194
Normalized	100%	98.59%	99.91%
Standard Deviation	0.2%	0.3%	0.6%
Darktable - Server Rack - CPU-only (sec)	**0.339**	0.342	**0.344**
Normalized	100%	99.12%	98.55%
Standard Deviation	0.7%	0.6%	2%
Darktable - Server Room - CPU-only (sec)	**20.695**	**21.008**	20.739
Normalized	100%	98.51%	99.79%
Standard Deviation	1.7%	1%	1.6%
GIMP - resize (sec)	12.855	**12.866**	**12.826**
Normalized	99.77%	99.69%	100%
Standard Deviation	1.2%	0.9%	1.4%
GIMP - rotate (sec)	**14.487**	14.470	**14.424**
Normalized	99.57%	99.68%	100%
Standard Deviation	0.1%	0.5%	0.4%
GIMP - auto-levels (sec)	**15.924**	**15.853**	15.894
Normalized	99.55%	100%	99.74%
Standard Deviation	0.1%	1.2%	0.7%
GIMP - unsharp-mask (sec)	**17.332**	**17.317**	17.328
Normalized	99.91%	100%	99.94%
Standard Deviation	0.2%	0.4%	0.2%
Hugin - P.P.A.S.T (sec)	**82.006**	**83.581**	82.188
Normalized	100%	98.12%	99.78%
Standard Deviation	1.2%	0.5%	0.3%
OCRMyPDF - P.6.P.P.D (sec)	**52.675**	52.741	**52.986**
Normalized	100%	99.87%	99.41%
Standard Deviation	0.4%	0.3%	0.3%

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RawTherapee - T.B.T (sec)	**123.684**	123.405	**123.339**
Normalized	99.72%	99.95%	100%
Standard Deviation	0.1%	0.3%	0.2%
WavPack Audio Encoding - WAV To WavPack (sec)	15.082	**15.077**	**15.174**
Normalized	99.97%	100%	99.36%
Standard Deviation	0.1%	0.2%	2.6%
Sunflow Rendering System - G.I.I.S (sec)	3.206	**3.148**	**3.302**
Normalized	98.19%	100%	95.34%
Standard Deviation	2.2%	1.8%	3.3%
Unpacking Firefox - firefox-84.0.source.tar.xz (sec)	**23.847**	**23.799**	23.806
Normalized	99.8%	100%	99.97%
Standard Deviation	0.2%	0.3%	0.7%
OSBench - Create Files (us/Event)	**18.245888**	18.315846	**18.441862**
Normalized	100%	99.62%	98.94%
Standard Deviation	2.2%	2%	1.2%
OSBench - Create Threads (us/Event)	**14.920235**	**14.823278**	14.909108
Normalized	99.35%	100%	99.42%
Standard Deviation	0.3%	1.1%	1.7%
OSBench - Launch Programs (us/Event)	**81.523260**	81.967513	**82.073212**
Normalized	100%	99.46%	99.33%
Standard Deviation	0.6%	0.1%	0.2%
OSBench - Create Processes (us/Event)	**26.190281**	26.479562	**26.857058**
Normalized	100%	98.91%	97.52%
Standard Deviation	0.6%	0.2%	1.3%
Sockperf - Latency Ping Pong (usec)	**6.927**	**6.751**	6.790
Normalized	97.46%	100%	99.43%
Standard Deviation	2.1%	1.6%	2.4%
Sockperf - Latency Under Load (usec)	**53.775**	52.758	**50.699**
Normalized	94.28%	96.1%	100%
Standard Deviation	18.7%	17.8%	19.1%

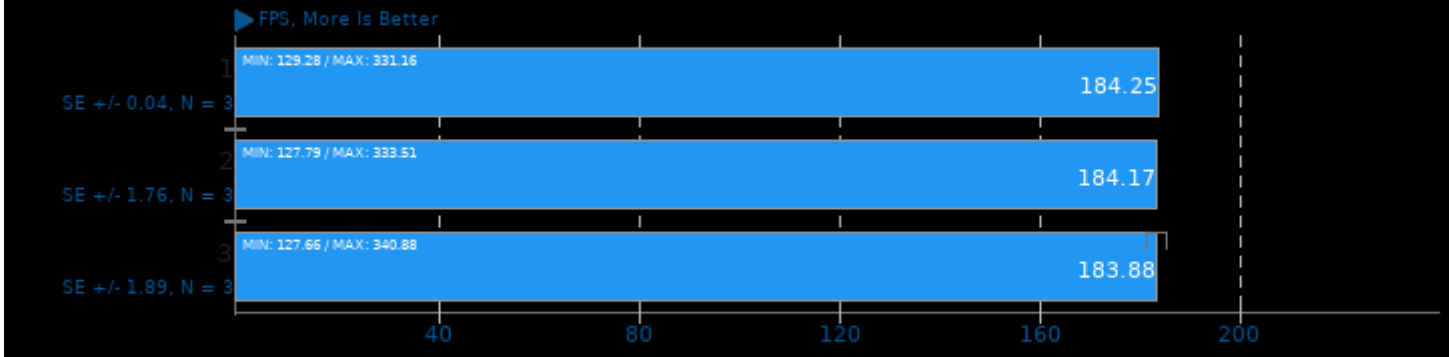
Algebraic Multi-Grid Benchmark 1.2



1. (CC) gcc options: -lparcsr_ls -lparcsr_mv -lseq_mv -lIJ_mv -lkrylov -lHYPRE_utilities -lm -fopenmp -pthread -lmpi

dav1d 0.8.1

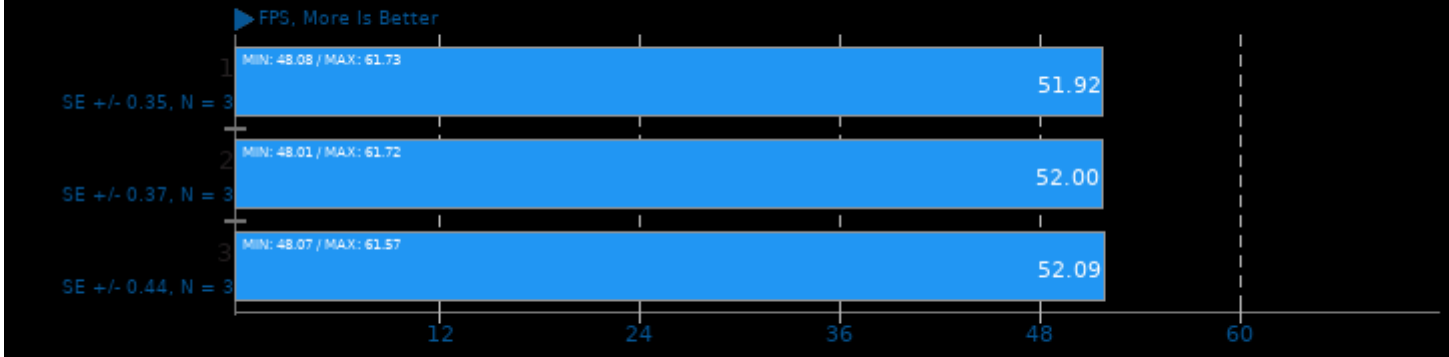
Video Input: Chimera 1080p



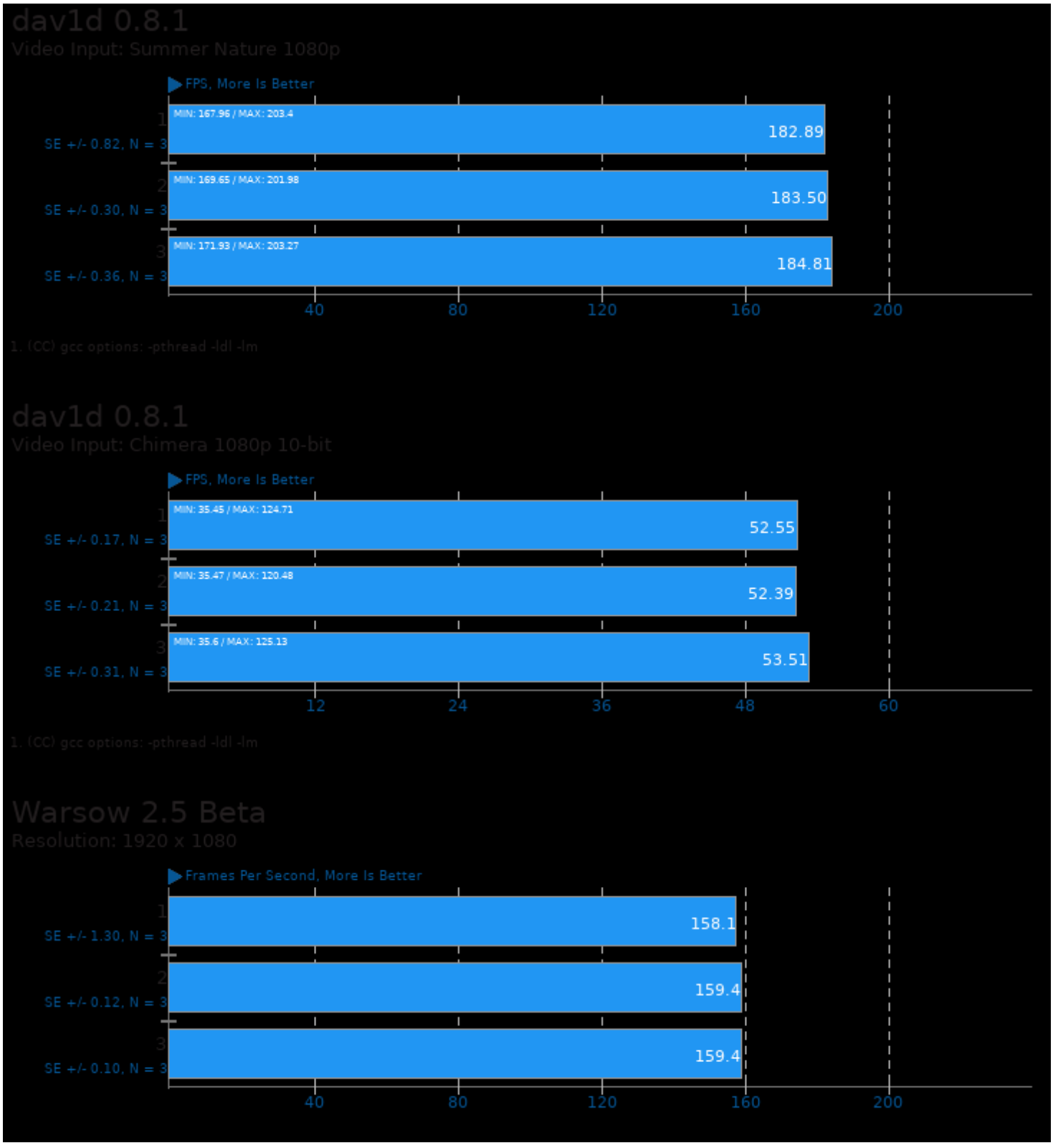
1. (CC) gcc options: -pthread -ldl -lm

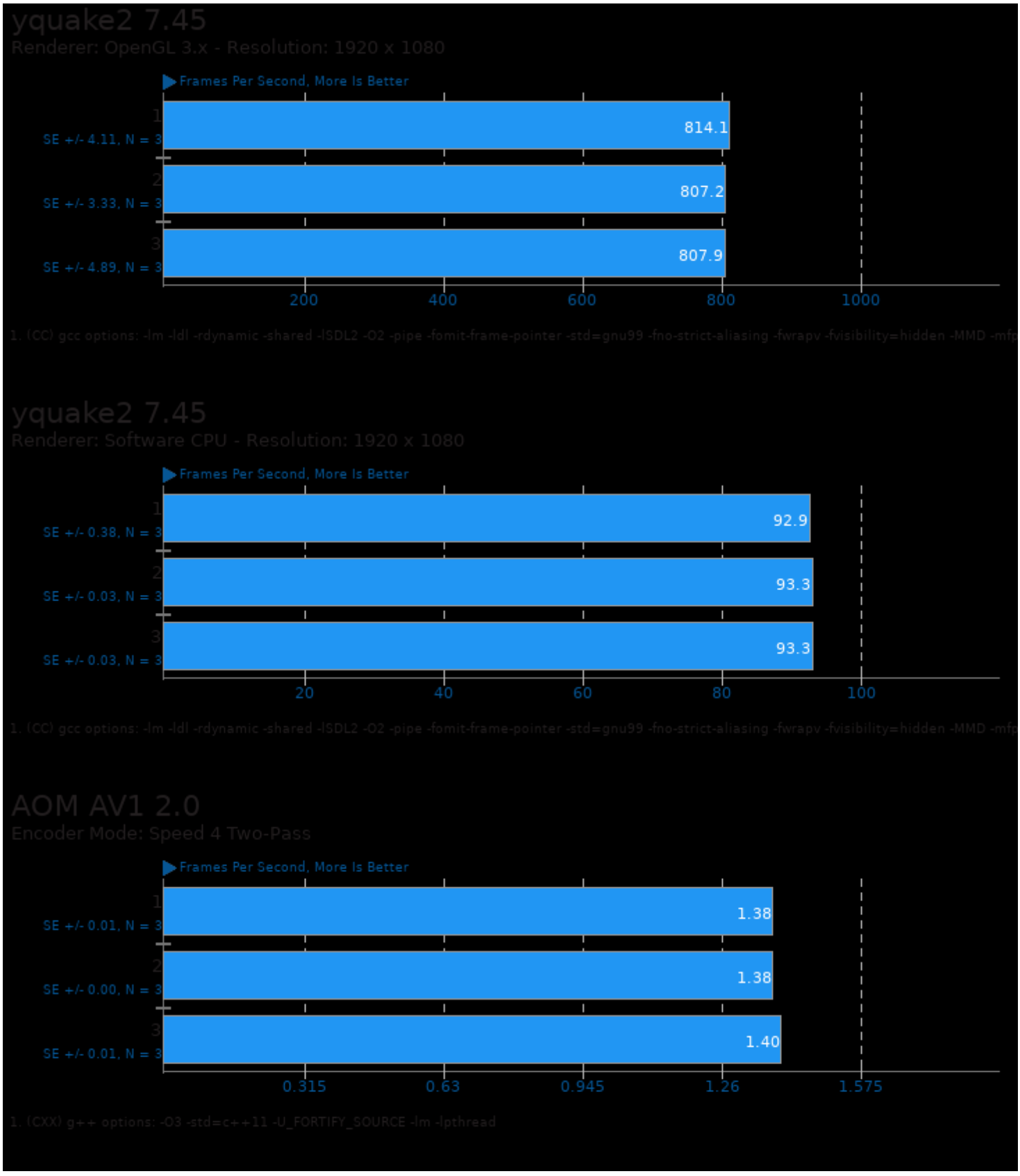
dav1d 0.8.1

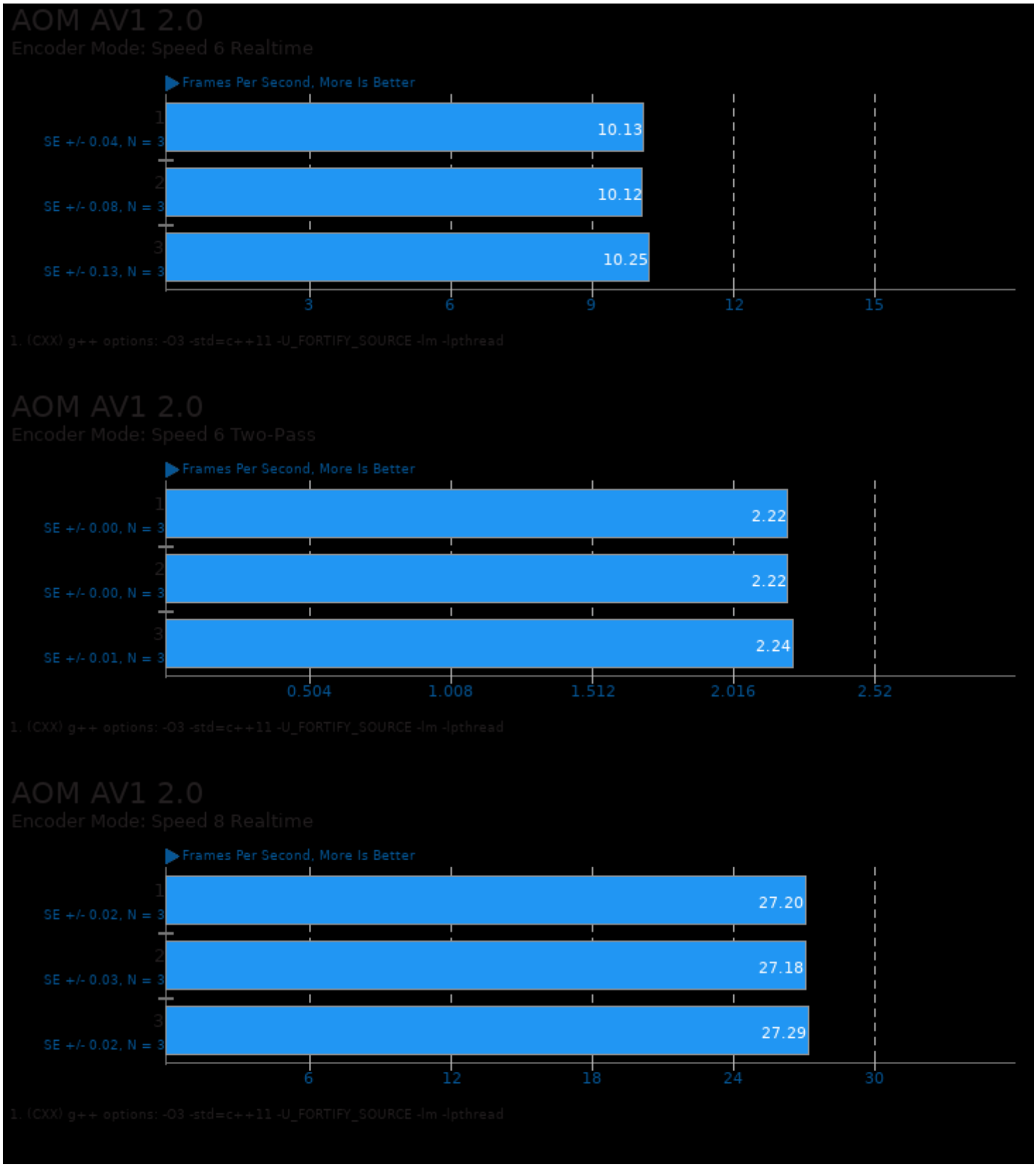
Video Input: Summer Nature 4K

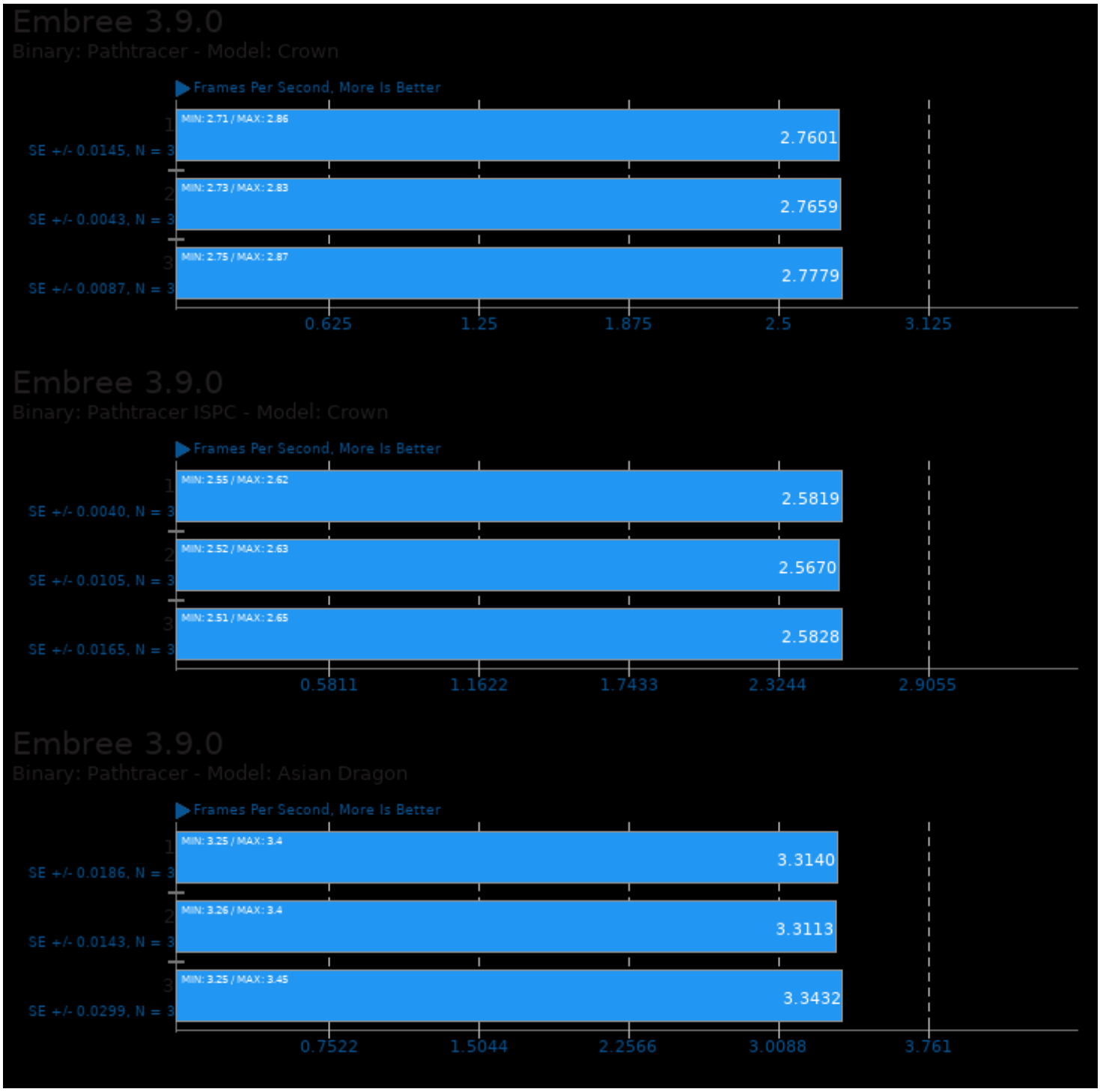


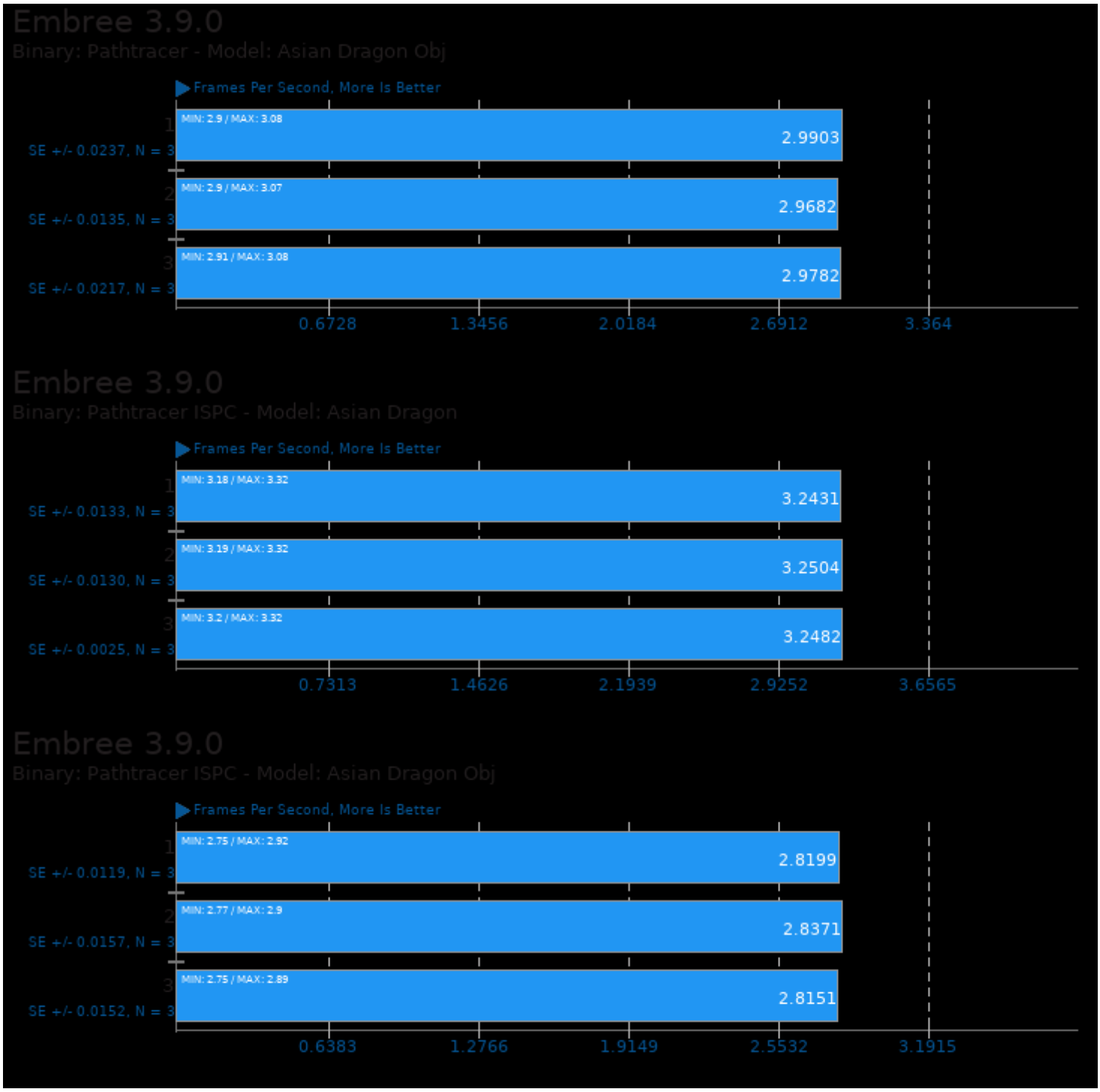
1. (CC) gcc options: -pthread -ldl -lm

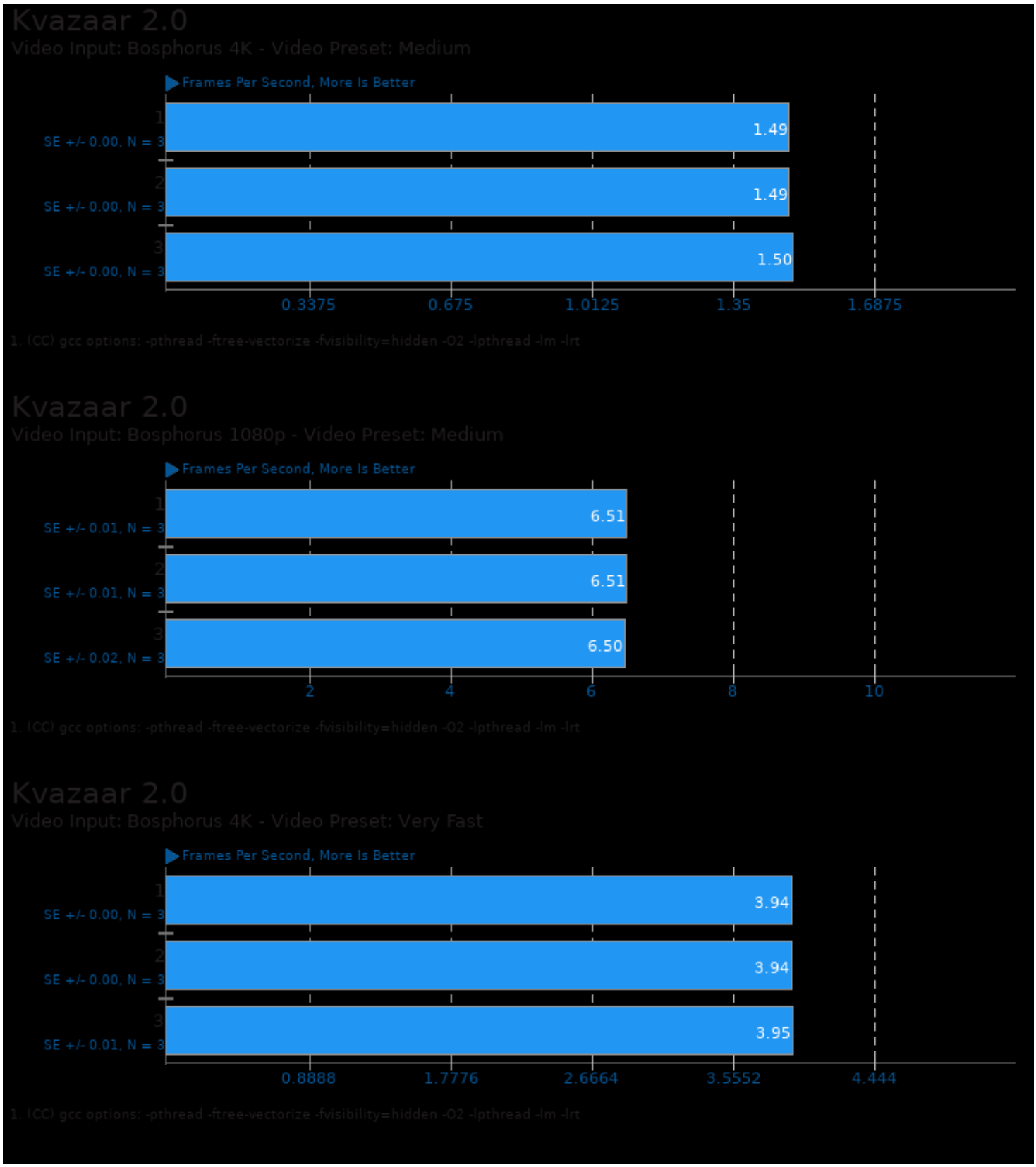

dav1d 0.8.1
Video Input: Summer Nature 1080p
FPS, More Is Better
1
MIN: 167.96 / MAX: 203.4
182.89
SE +/- 0.82, N = 3
2
MIN: 169.65 / MAX: 201.98
183.50
SE +/- 0.30, N = 3
3
MIN: 171.93 / MAX: 203.27
184.81
SE +/- 0.36, N = 3
40
80
120
160
200
1. (CC) gcc options: -pthread -ldl -lm
dav1d 0.8.1
Video Input: Chimera 1080p 10-bit
FPS, More Is Better
1
MIN: 35.45 / MAX: 124.71
52.55
SE +/- 0.17, N = 3
2
MIN: 35.47 / MAX: 120.48
52.39
SE +/- 0.21, N = 3
3
MIN: 35.6 / MAX: 125.13
53.51
SE +/- 0.31, N = 3
12
24
36
48
60
1. (CC) gcc options: -pthread -ldl -lm
Warsow 2.5 Beta
Resolution: 1920 x 1080
Frames Per Second, More Is Better
1
158.1
SE +/- 1.30, N = 3
2
159.4
SE +/- 0.12, N = 3
3
159.4
SE +/- 0.10, N = 3
40
80
120
160
200

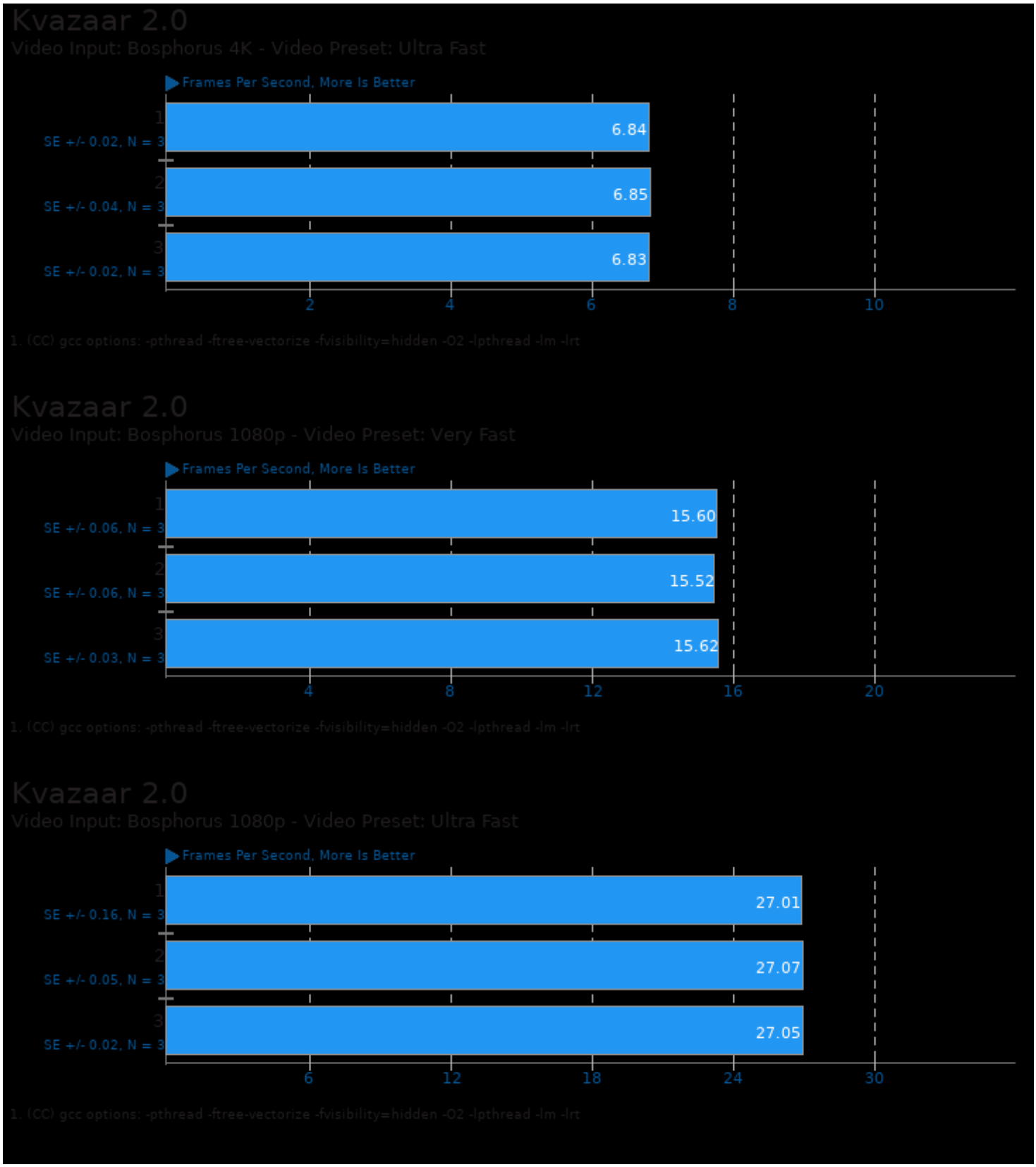

yquake2 7.45
Renderer: OpenGL 3.x - Resolution: 1920 x 1080
Frames Per Second, More Is Better
1
SE +/- 4.11, N = 3
814.1
2
SE +/- 3.33, N = 3
807.2
3
SE +/- 4.89, N = 3
807.9
200
400
600
800
1000
1. (CC) gcc options: -lm -ldl -rdynamic -shared -lSDL2 -O2 -pipe -fomit-frame-pointer -std=gnu99 -fno-strict-aliasing -fwrapv -fvisibility=hidden -MMD -mf
yquake2 7.45
Renderer: Software CPU - Resolution: 1920 x 1080
Frames Per Second, More Is Better
1
SE +/- 0.38, N = 3
92.9
2
SE +/- 0.03, N = 3
93.3
3
SE +/- 0.03, N = 3
93.3
20
40
60
80
100
1. (CC) gcc options: -lm -ldl -rdynamic -shared -lSDL2 -O2 -pipe -fomit-frame-pointer -std=gnu99 -fno-strict-aliasing -fwrapv -fvisibility=hidden -MMD -mf
AOM AV1 2.0
Encoder Mode: Speed 4 Two-Pass
Frames Per Second, More Is Better
1
SE +/- 0.01, N = 3
1.38
2
SE +/- 0.00, N = 3
1.38
3
SE +/- 0.01, N = 3
1.40
0.315
0.63
0.945
1.26
1.575
1. (CXX) g++ options: -O3 -std=c++11 -U_FORTIFY_SOURCE -lm -lpthread

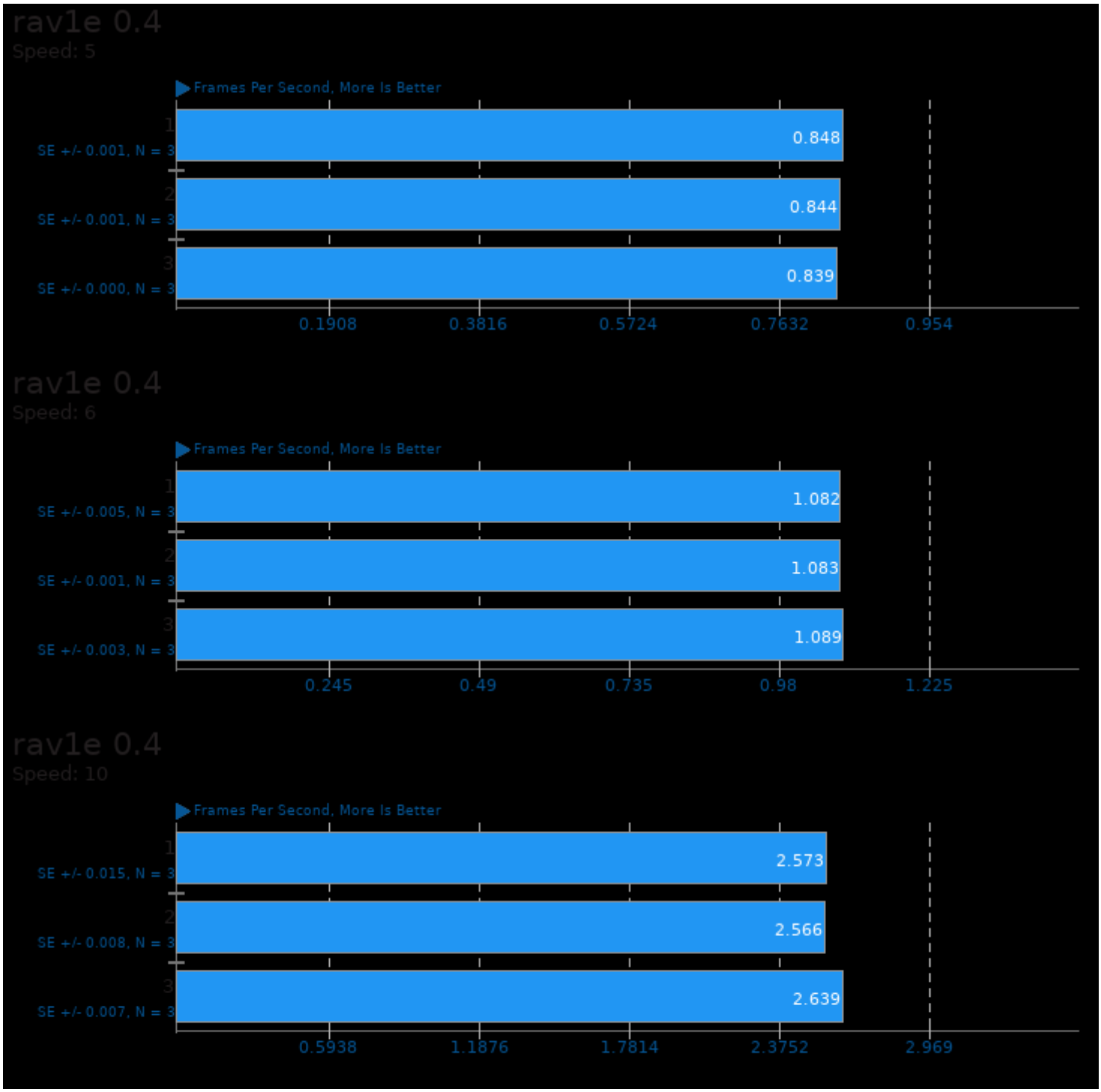

AOM AV1 2.0
Encoder Mode: Speed 6 Realtime
Frames Per Second, More Is Better
1
SE +/- 0.04, N = 3
10.13
2
SE +/- 0.08, N = 3
10.12
3
SE +/- 0.13, N = 3
10.25
3
6
9
12
15
1. (CXX) g++ options: -O3 -std=c++11 -U_FORTIFY_SOURCE -lm -lpthread
AOM AV1 2.0
Encoder Mode: Speed 6 Two-Pass
Frames Per Second, More Is Better
1
SE +/- 0.00, N = 3
2.22
2
SE +/- 0.00, N = 3
2.22
3
SE +/- 0.01, N = 3
2.24
0.504
1.008
1.512
2.016
2.52
1. (CXX) g++ options: -O3 -std=c++11 -U_FORTIFY_SOURCE -lm -lpthread
AOM AV1 2.0
Encoder Mode: Speed 8 Realtime
Frames Per Second, More Is Better
1
SE +/- 0.02, N = 3
27.20
2
SE +/- 0.03, N = 3
27.18
3
SE +/- 0.02, N = 3
27.29
6
12
18
24
30
1. (CXX) g++ options: -O3 -std=c++11 -U_FORTIFY_SOURCE -lm -lpthread


Embree 3.9.0
Binary: Pathtracer - Model: Crown
Frames Per Second, More Is Better
1
MIN: 2.71 / MAX: 2.86
2.7601
SE +/- 0.0145, N = 3
2
MIN: 2.73 / MAX: 2.83
2.7659
SE +/- 0.0043, N = 3
3
MIN: 2.75 / MAX: 2.87
2.7779
SE +/- 0.0087, N = 3
0.625
1.25
1.875
2.5
3.125
Embree 3.9.0
Binary: Pathtracer ISPC - Model: Crown
Frames Per Second, More Is Better
1
MIN: 2.55 / MAX: 2.62
2.5819
SE +/- 0.0040, N = 3
2
MIN: 2.52 / MAX: 2.63
2.5670
SE +/- 0.0105, N = 3
3
MIN: 2.51 / MAX: 2.65
2.5828
SE +/- 0.0165, N = 3
0.5811
1.1622
1.7433
2.3244
2.9055
Embree 3.9.0
Binary: Pathtracer - Model: Asian Dragon
Frames Per Second, More Is Better
1
MIN: 3.25 / MAX: 3.4
3.3140
SE +/- 0.0186, N = 3
2
MIN: 3.26 / MAX: 3.4
3.3113
SE +/- 0.0143, N = 3
3
MIN: 3.25 / MAX: 3.45
3.3432
SE +/- 0.0299, N = 3
0.7522
1.5044
2.2566
3.0088
3.761


Embree 3.9.0
Binary: Pathtracer - Model: Asian Dragon Obj
Frames Per Second, More Is Better
1
MIN: 2.9 / MAX: 3.08
2.9903
SE +/- 0.0237, N = 3
2
MIN: 2.9 / MAX: 3.07
2.9682
SE +/- 0.0135, N = 3
3
MIN: 2.91 / MAX: 3.08
2.9782
SE +/- 0.0217, N = 3
0.6728
1.3456
2.0184
2.6912
3.364
Embree 3.9.0
Binary: Pathtracer ISPC - Model: Asian Dragon
Frames Per Second, More Is Better
1
MIN: 3.18 / MAX: 3.32
3.2431
SE +/- 0.0133, N = 3
2
MIN: 3.19 / MAX: 3.32
3.2504
SE +/- 0.0130, N = 3
3
MIN: 3.2 / MAX: 3.32
3.2482
SE +/- 0.0025, N = 3
0.7313
1.4626
2.1939
2.9252
3.6565
Embree 3.9.0
Binary: Pathtracer ISPC - Model: Asian Dragon Obj
Frames Per Second, More Is Better
1
MIN: 2.75 / MAX: 2.92
2.8199
SE +/- 0.0119, N = 3
2
MIN: 2.77 / MAX: 2.9
2.8371
SE +/- 0.0157, N = 3
3
MIN: 2.75 / MAX: 2.89
2.8151
SE +/- 0.0152, N = 3
0.6383
1.2766
1.9149
2.5532
3.1915

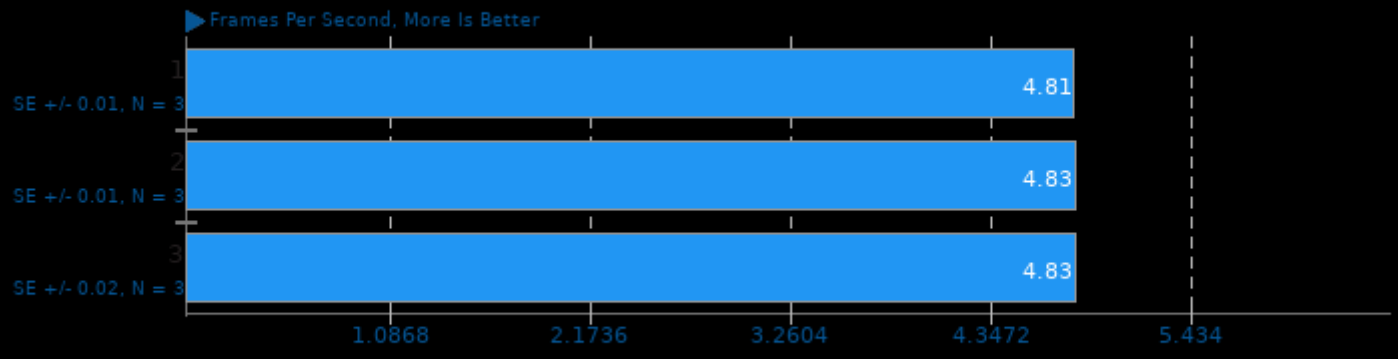

Kvazaar 2.0
Video Input: Bosphorus 4K - Video Preset: Medium
Frames Per Second, More Is Better
1
SE +/- 0.00, N = 3
1.49
2
SE +/- 0.00, N = 3
1.49
3
SE +/- 0.00, N = 3
1.50
0.3375
0.675
1.0125
1.35
1.6875
1. (CC) gcc options: -pthread -ftree-vectorize -fvisibility=hidden -O2 -lpthread -lm -lrt
Kvazaar 2.0
Video Input: Bosphorus 1080p - Video Preset: Medium
Frames Per Second, More Is Better
1
SE +/- 0.01, N = 3
6.51
2
SE +/- 0.01, N = 3
6.51
3
SE +/- 0.02, N = 3
6.50
2
4
6
8
10
1. (CC) gcc options: -pthread -ftree-vectorize -fvisibility=hidden -O2 -lpthread -lm -lrt
Kvazaar 2.0
Video Input: Bosphorus 4K - Video Preset: Very Fast
Frames Per Second, More Is Better
1
SE +/- 0.00, N = 3
3.94
2
SE +/- 0.00, N = 3
3.94
3
SE +/- 0.01, N = 3
3.95
0.8888
1.7776
2.6664
3.5552
4.444
1. (CC) gcc options: -pthread -ftree-vectorize -fvisibility=hidden -O2 -lpthread -lm -lrt


Kvazaar 2.0
Video Input: Bosphorus 4K - Video Preset: Ultra Fast
Frames Per Second, More Is Better
1
SE +/- 0.02, N = 3
6.84
2
SE +/- 0.04, N = 3
6.85
3
SE +/- 0.02, N = 3
6.83
2
4
6
8
10
1. (CC) gcc options: -pthread -ftree-vectorize -fvisibility=hidden -O2 -lpthread -lm -lrt
Kvazaar 2.0
Video Input: Bosphorus 1080p - Video Preset: Very Fast
Frames Per Second, More Is Better
1
SE +/- 0.06, N = 3
15.60
2
SE +/- 0.06, N = 3
15.52
3
SE +/- 0.03, N = 3
15.62
4
8
12
16
20
1. (CC) gcc options: -pthread -ftree-vectorize -fvisibility=hidden -O2 -lpthread -lm -lrt
Kvazaar 2.0
Video Input: Bosphorus 1080p - Video Preset: Ultra Fast
Frames Per Second, More Is Better
1
SE +/- 0.16, N = 3
27.01
2
SE +/- 0.05, N = 3
27.07
3
SE +/- 0.02, N = 3
27.05
6
12
18
24
30
1. (CC) gcc options: -pthread -ftree-vectorize -fvisibility=hidden -O2 -lpthread -lm -lrt


rav1e 0.4
Speed: 5
Frames Per Second, More Is Better
1
SE +/- 0.001, N = 3
0.848
2
SE +/- 0.001, N = 3
0.844
3
SE +/- 0.000, N = 3
0.839
0.1908
0.3816
0.5724
0.7632
0.954
rav1e 0.4
Speed: 6
Frames Per Second, More Is Better
1
SE +/- 0.005, N = 3
1.082
2
SE +/- 0.001, N = 3
1.083
3
SE +/- 0.003, N = 3
1.089
0.245
0.49
0.735
0.98
1.225
rav1e 0.4
Speed: 10
Frames Per Second, More Is Better
1
SE +/- 0.015, N = 3
2.573
2
SE +/- 0.008, N = 3
2.566
3
SE +/- 0.007, N = 3
2.639
0.5938
1.1876
1.7814
2.3752
2.969

x265 3.4

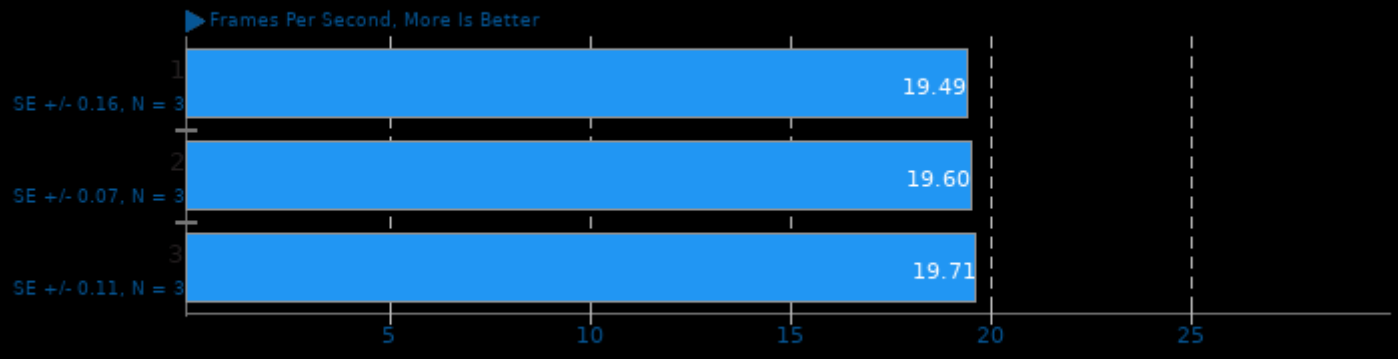
Video Input: Bosphorus 4K



1. (CXX) g++ options: -O3 -rdynamic -lpthread -lrt -ldl -lnuma

x265 3.4

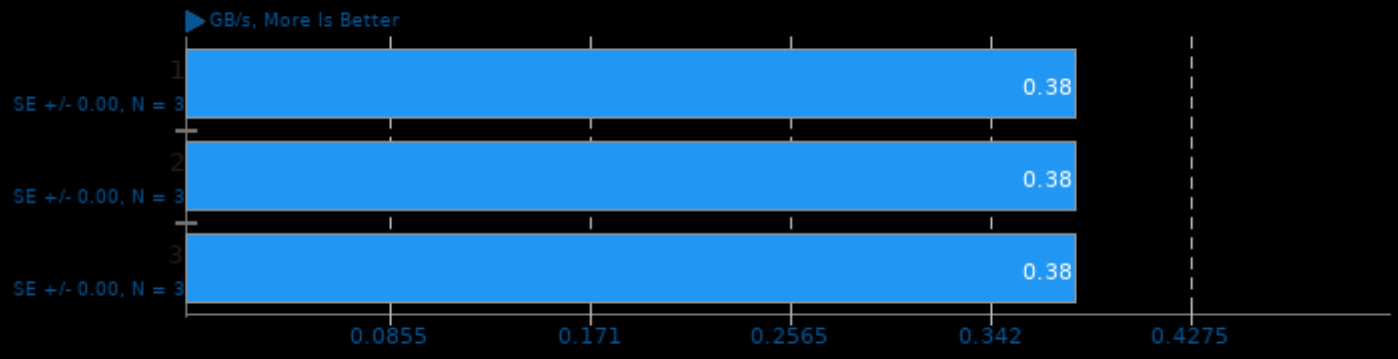
Video Input: Bosphorus 1080p



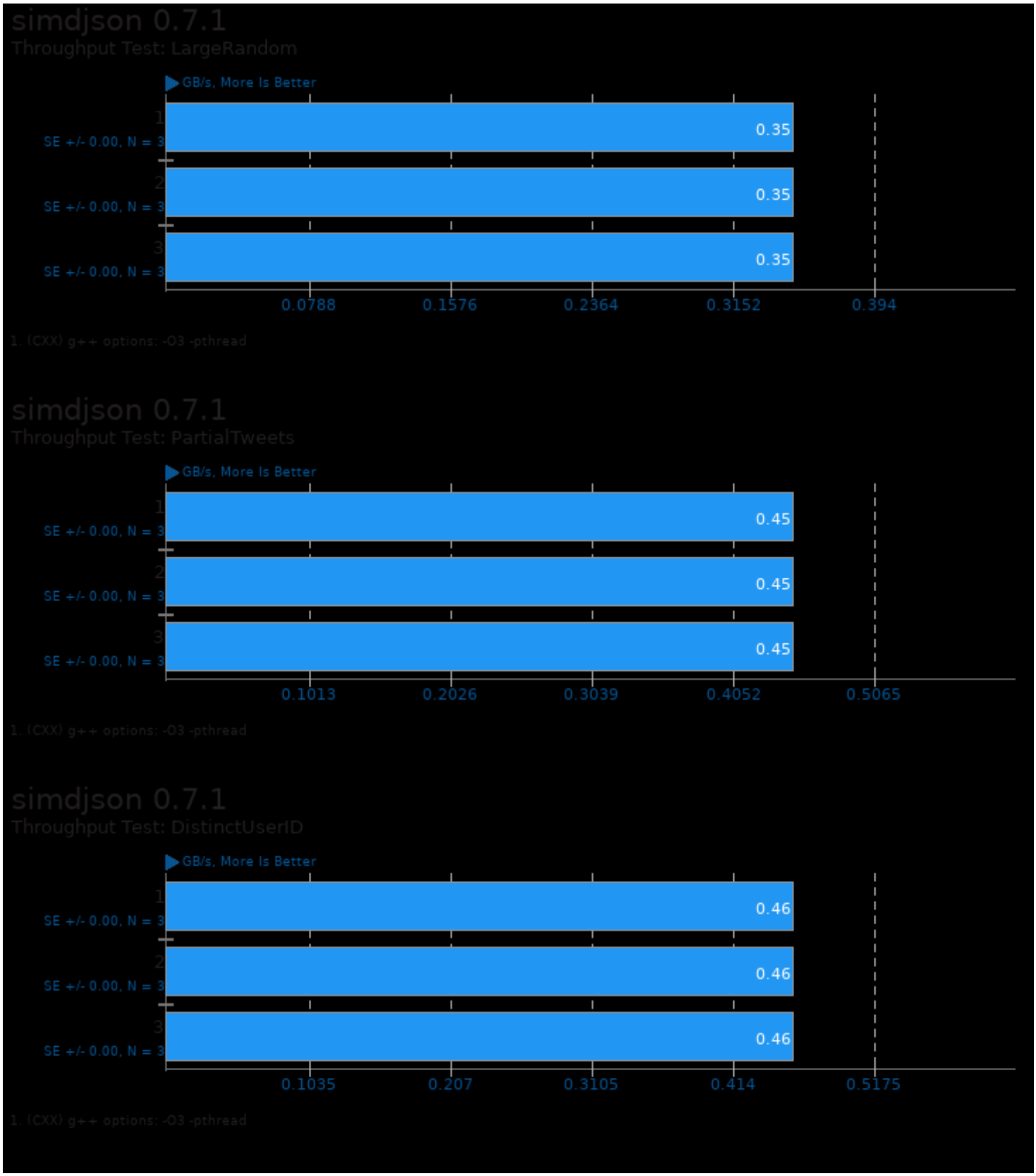
1. (CXX) g++ options: -O3 -rdynamic -lpthread -lrt -ldl -lnuma

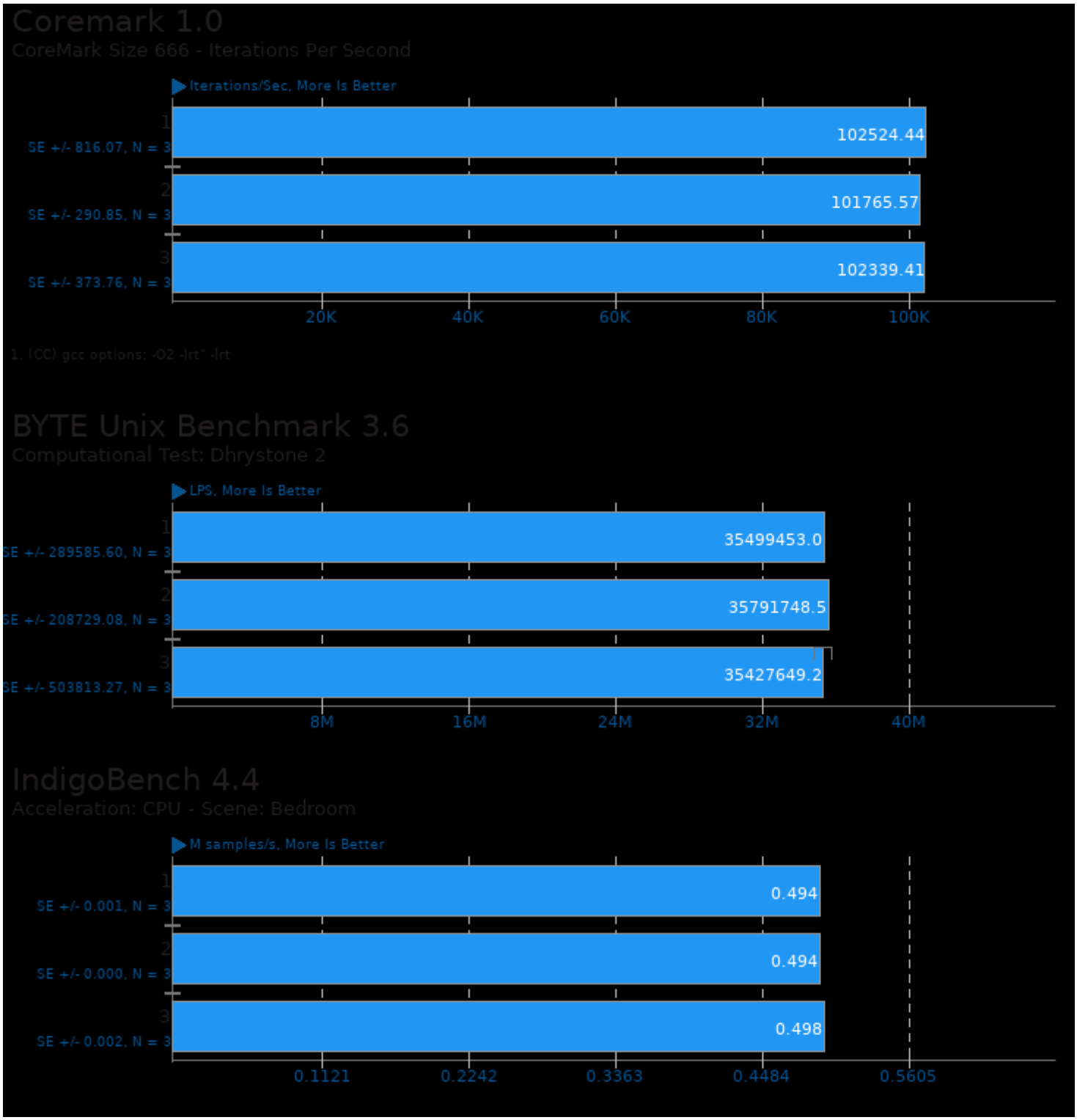
simdjson 0.7.1

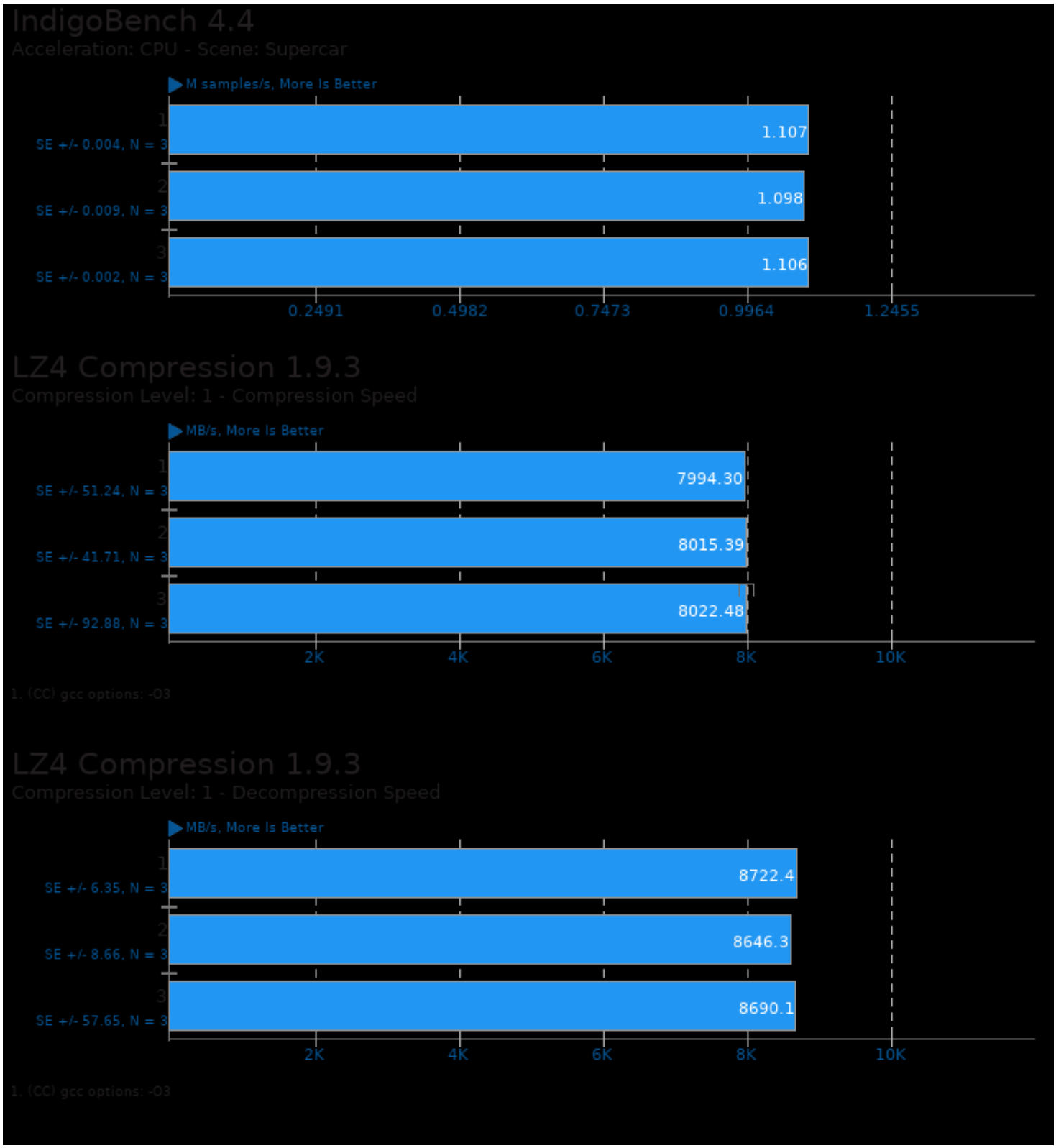
Throughput Test: Kostya

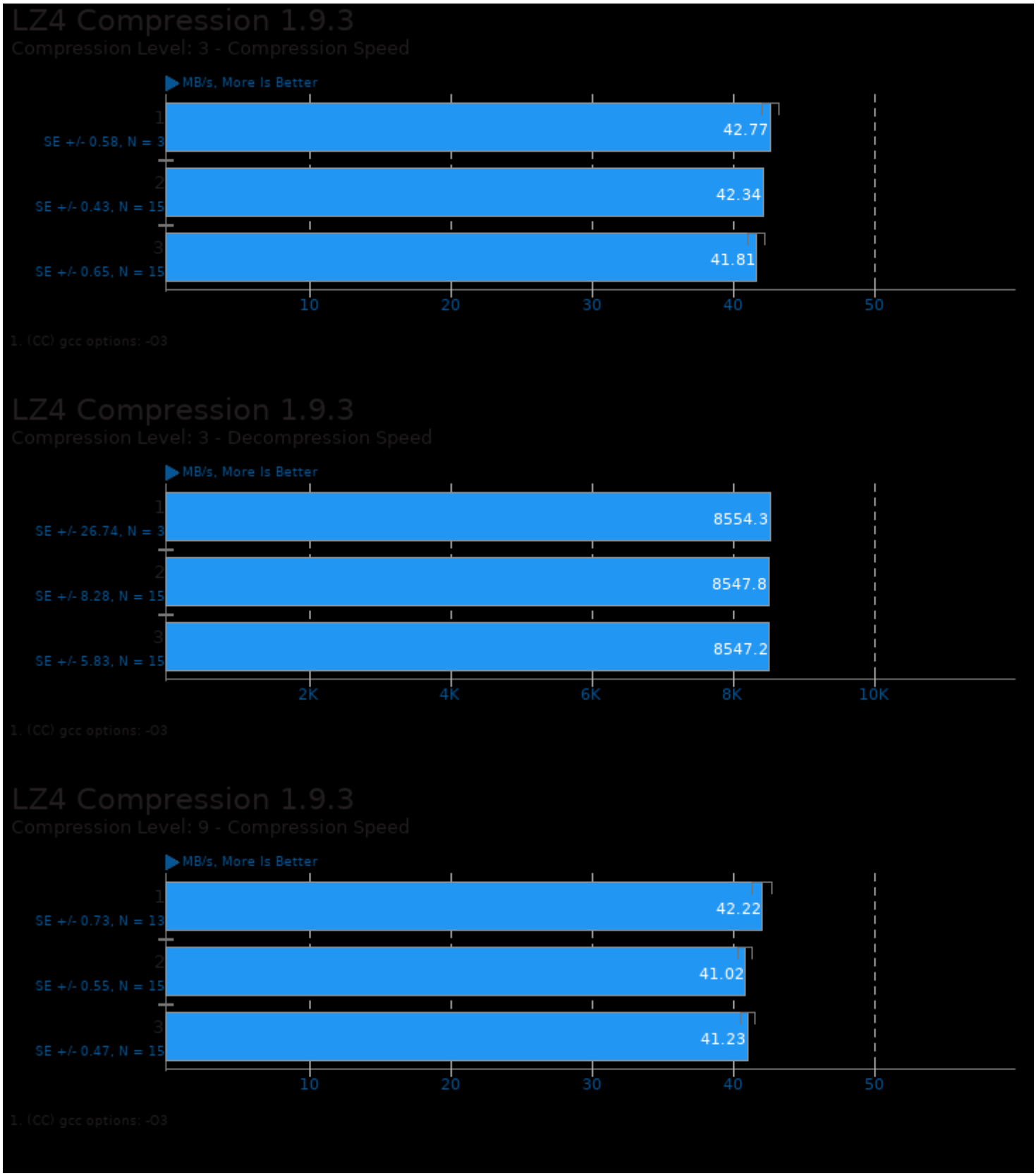


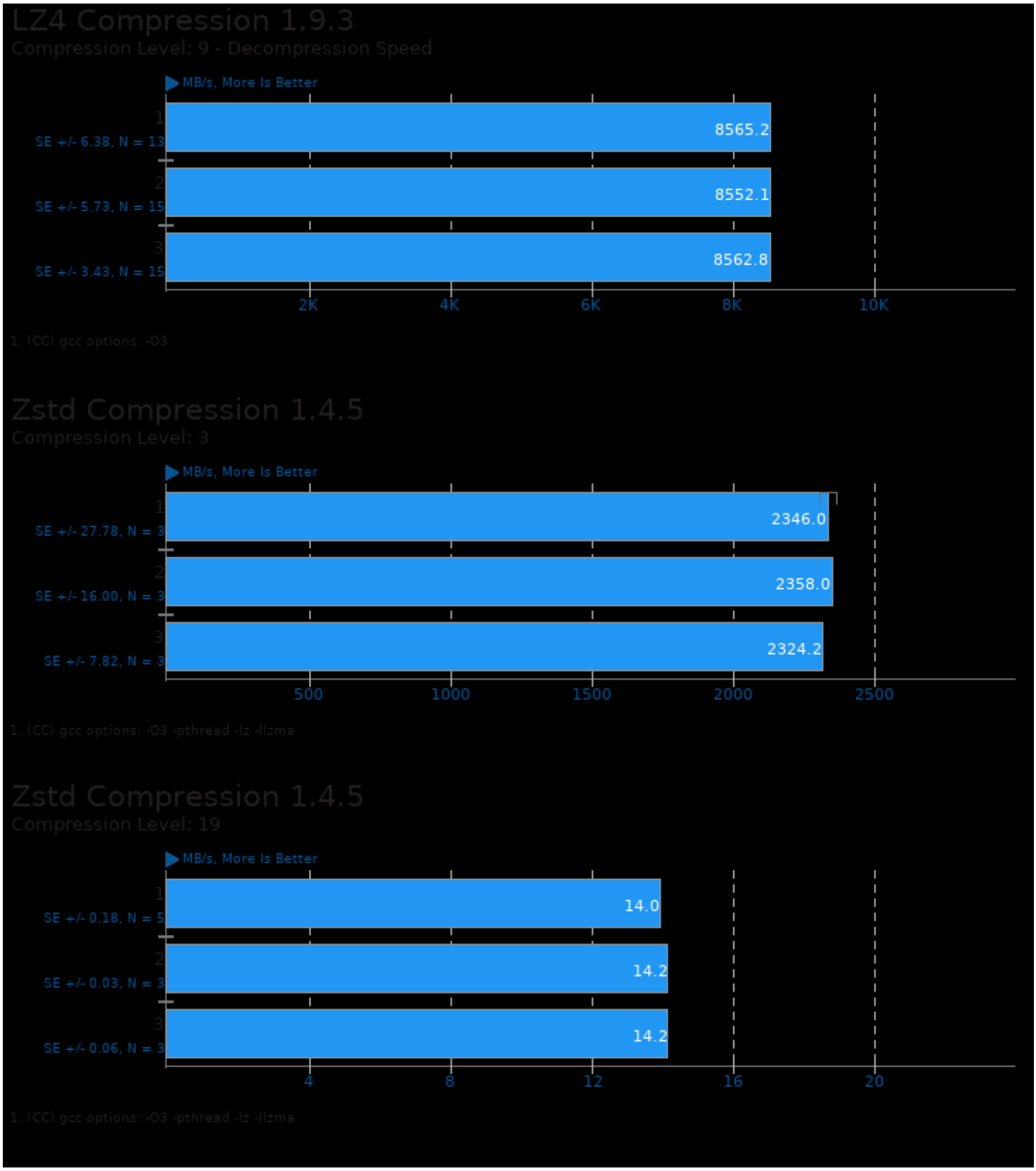
1. (CXX) g++ options: -O3 -pthread


simdjson 0.7.1
Throughput Test: LargeRandom
GB/s, More Is Better
1
SE +/- 0.00, N = 3
0.35
2
SE +/- 0.00, N = 3
0.35
3
SE +/- 0.00, N = 3
0.35
0.0788
0.1576
0.2364
0.3152
0.394
1. (CXX) g++ options: -O3 -pthread
simdjson 0.7.1
Throughput Test: PartialTweets
GB/s, More Is Better
1
SE +/- 0.00, N = 3
0.45
2
SE +/- 0.00, N = 3
0.45
3
SE +/- 0.00, N = 3
0.45
0.1013
0.2026
0.3039
0.4052
0.5065
1. (CXX) g++ options: -O3 -pthread
simdjson 0.7.1
Throughput Test: DistinctUserID
GB/s, More Is Better
1
SE +/- 0.00, N = 3
0.46
2
SE +/- 0.00, N = 3
0.46
3
SE +/- 0.00, N = 3
0.46
0.1035
0.207
0.3105
0.414
0.5175
1. (CXX) g++ options: -O3 -pthread


Coremark 1.0
CoreMark Size 666 - Iterations Per Second
Iterations/Sec, More Is Better
1
SE +/- 816.07, N = 3
102524.44
2
SE +/- 290.85, N = 3
101765.57
3
SE +/- 373.76, N = 3
102339.41
20K
40K
60K
80K
100K
1. (CC) gcc options: -O2 -lrt" -lrt
BYTE Unix Benchmark 3.6
Computational Test: Dhrystone 2
LPS, More Is Better
1
SE +/- 289585.60, N = 3
35499453.0
2
SE +/- 208729.08, N = 3
35791748.5
3
SE +/- 503813.27, N = 3
35427649.2
8M
16M
24M
32M
40M
IndigoBench 4.4
Acceleration: CPU - Scene: Bedroom
M samples/s, More Is Better
1
SE +/- 0.001, N = 3
0.494
2
SE +/- 0.000, N = 3
0.494
3
SE +/- 0.002, N = 3
0.498
0.1121
0.2242
0.3363
0.4484
0.5605

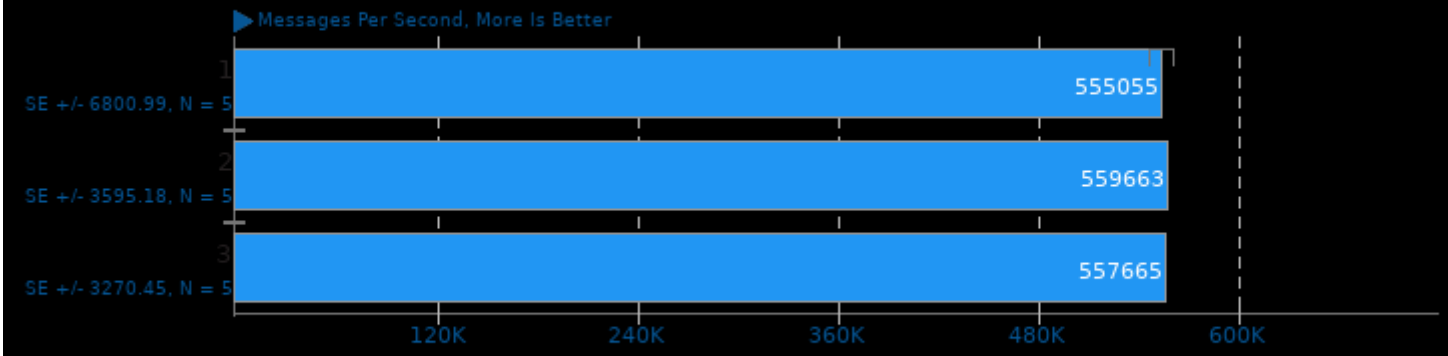

IndigoBench 4.4
Acceleration: CPU - Scene: Supercar
M samples/s, More Is Better
1
SE +/- 0.004, N = 3
1.107
2
SE +/- 0.009, N = 3
1.098
3
SE +/- 0.002, N = 3
1.106
0.2491
0.4982
0.7473
0.9964
1.2455
LZ4 Compression 1.9.3
Compression Level: 1 - Compression Speed
MB/s, More Is Better
1
SE +/- 51.24, N = 3
7994.30
2
SE +/- 41.71, N = 3
8015.39
3
SE +/- 92.88, N = 3
8022.48
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
1
SE +/- 6.35, N = 3
8722.4
2
SE +/- 8.66, N = 3
8646.3
3
SE +/- 57.65, N = 3
8690.1
2K
4K
6K
8K
10K
1. (CC) gcc options: -O3


LZ4 Compression 1.9.3
Compression Level: 3 - Compression Speed
MB/s, More Is Better
1
SE +/- 0.58, N = 3
42.77
2
SE +/- 0.43, N = 15
42.34
3
SE +/- 0.65, N = 15
41.81
10
20
30
40
50
1. (CC) gcc options: -O3
LZ4 Compression 1.9.3
Compression Level: 3 - Decompression Speed
MB/s, More Is Better
1
SE +/- 26.74, N = 3
8554.3
2
SE +/- 8.28, N = 15
8547.8
3
SE +/- 5.83, N = 15
8547.2
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
1
SE +/- 0.73, N = 13
42.22
2
SE +/- 0.55, N = 15
41.02
3
SE +/- 0.47, N = 15
41.23
10
20
30
40
50
1. (CC) gcc options: -O3


LZ4 Compression 1.9.3
Compression Level: 9 - Decompression Speed
MB/s, More Is Better
1
SE +/- 6.38, N = 13
8565.2
2
SE +/- 5.73, N = 15
8552.1
3
SE +/- 3.43, N = 15
8562.8
2K
4K
6K
8K
10K
1. (CC) gcc options: -O3
Zstd Compression 1.4.5
Compression Level: 3
MB/s, More Is Better
1
SE +/- 27.78, N = 3
2346.0
2
SE +/- 16.00, N = 3
2358.0
3
SE +/- 7.82, N = 3
2324.2
500
1000
1500
2000
2500
1. (CC) gcc options: -O3 -pthread -lz -llzma
Zstd Compression 1.4.5
Compression Level: 19
MB/s, More Is Better
1
SE +/- 0.18, N = 5
14.0
2
SE +/- 0.03, N = 3
14.2
3
SE +/- 0.06, N = 3
14.2
4
8
12
16
20
1. (CC) gcc options: -O3 -pthread -lz -llzma

Sockperf 3.4

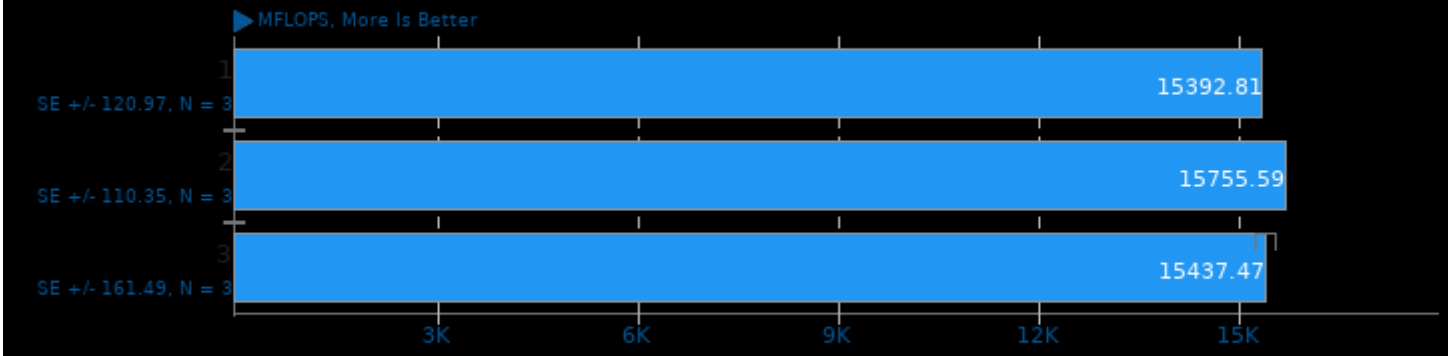
Test: Throughput



1. (CXX) g++ options: --param -O3 -rdynamic -ldl -lpthread

FFTE 7.0

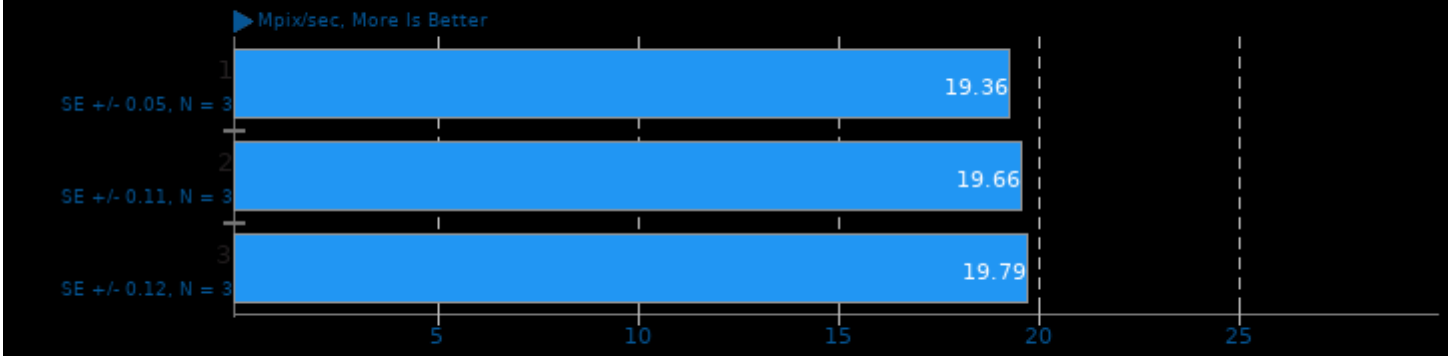
N=256, 3D Complex FFT Routine



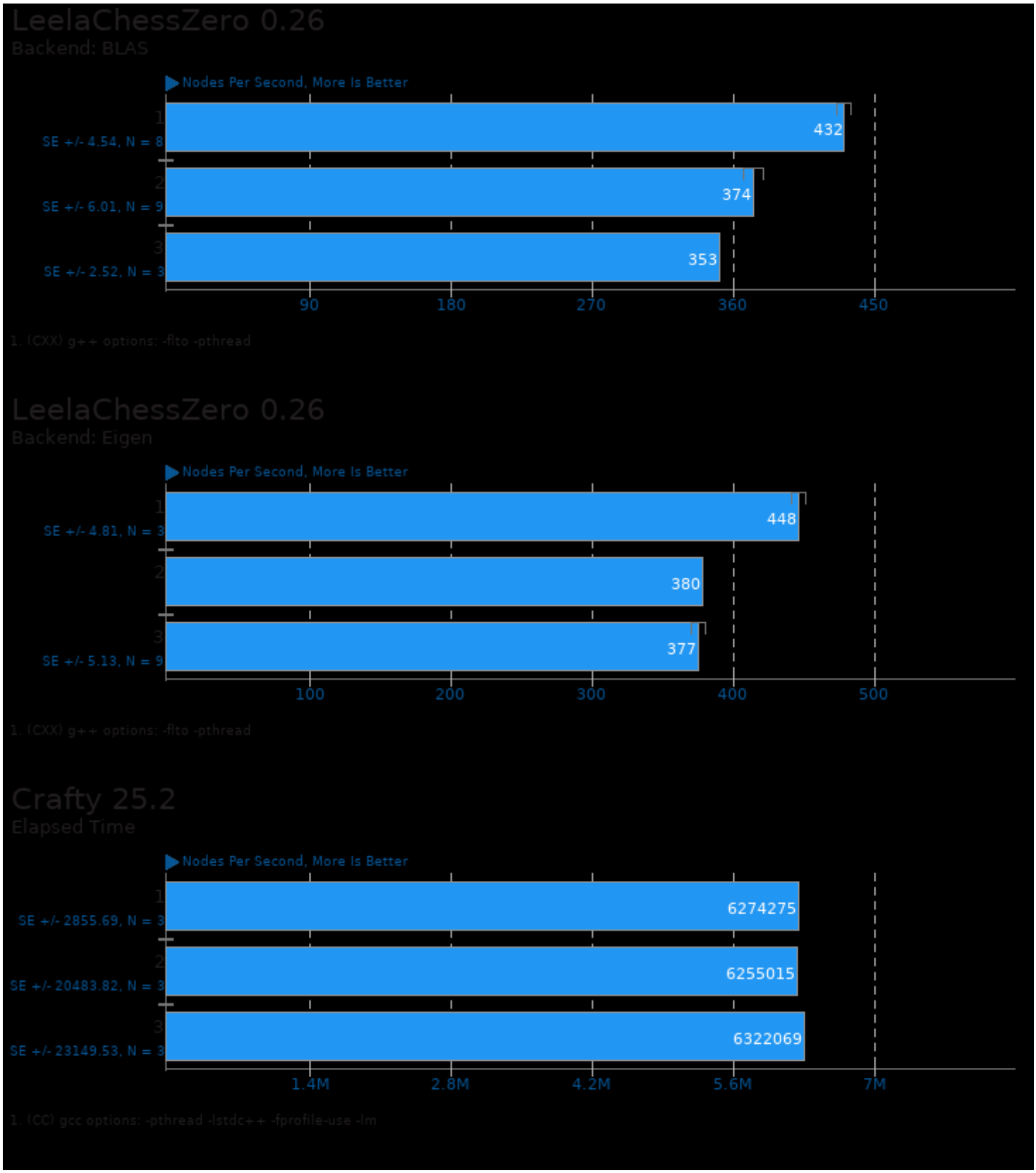
1. (F9X) gfortran options: -O3 -fomit-frame-pointer -fopenmp

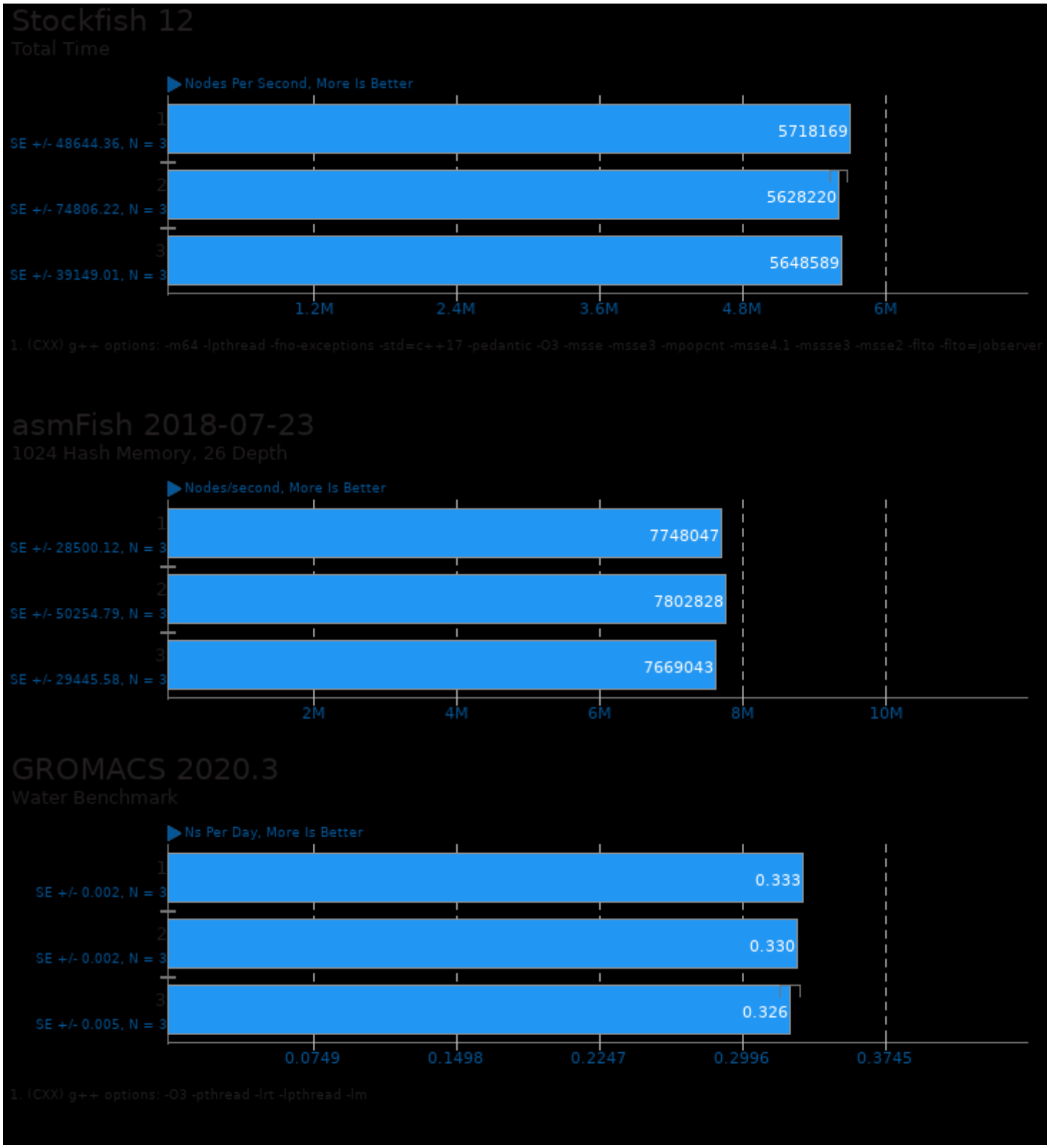
LibRaw 0.20

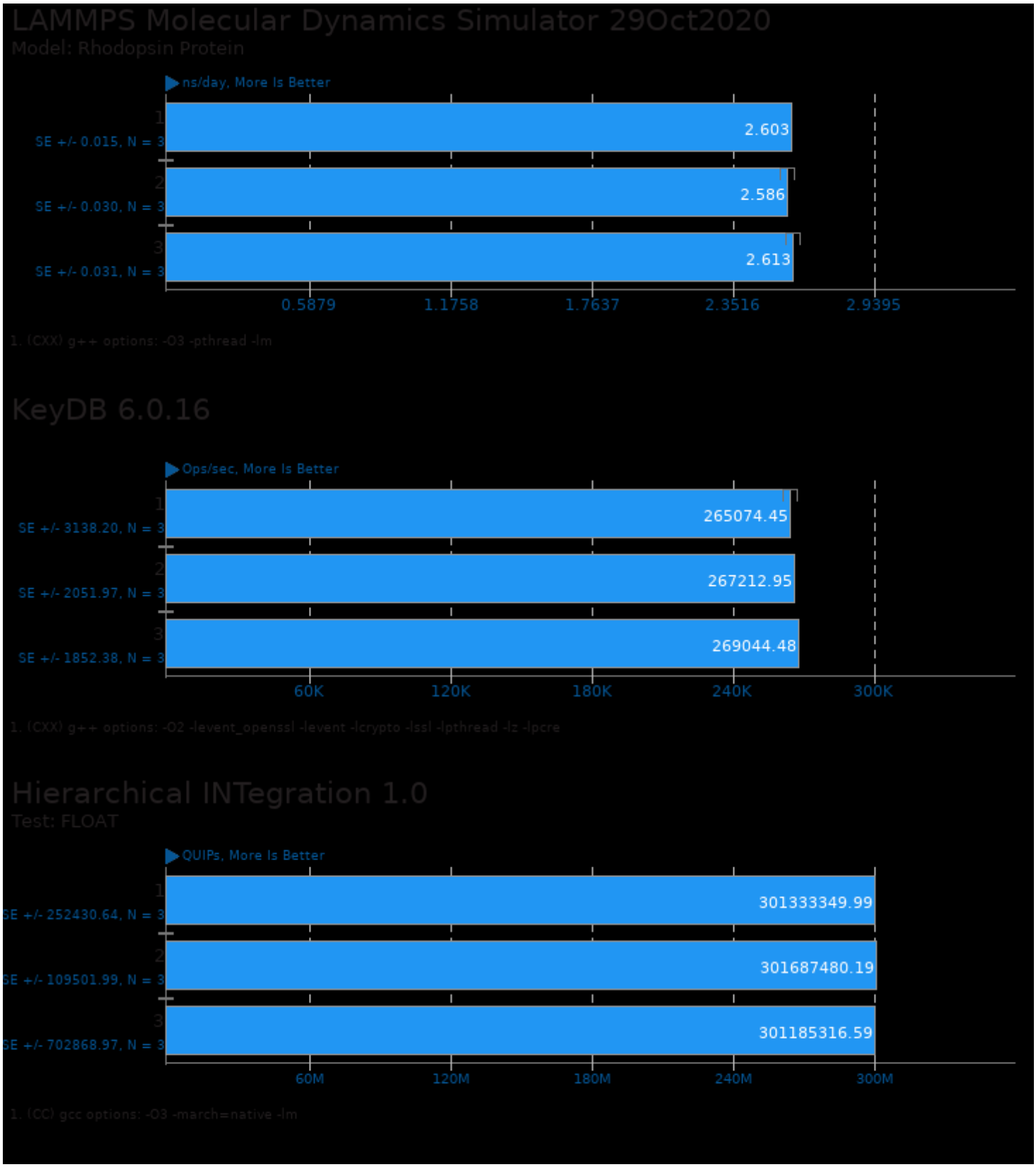
Post-Processing Benchmark

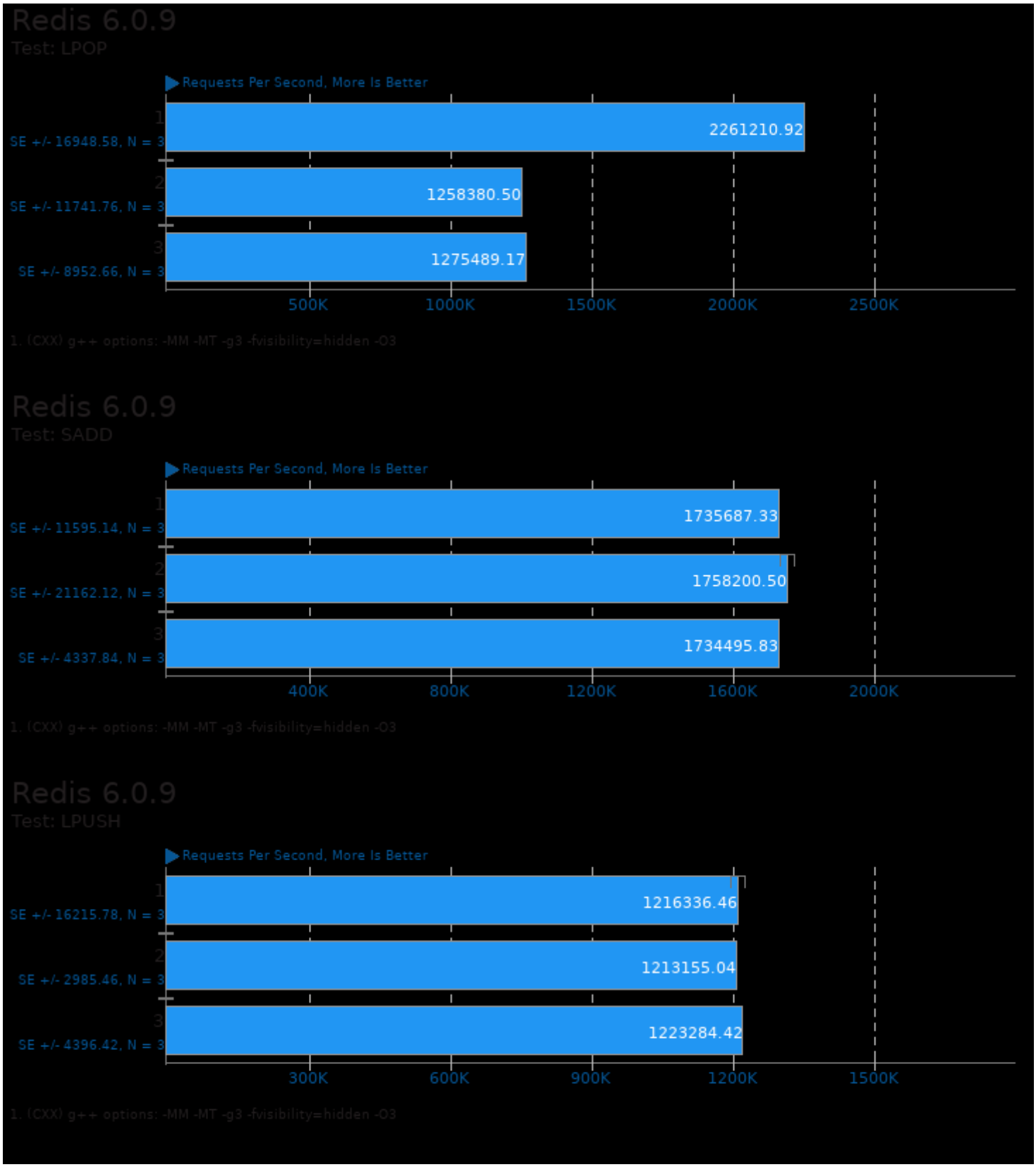


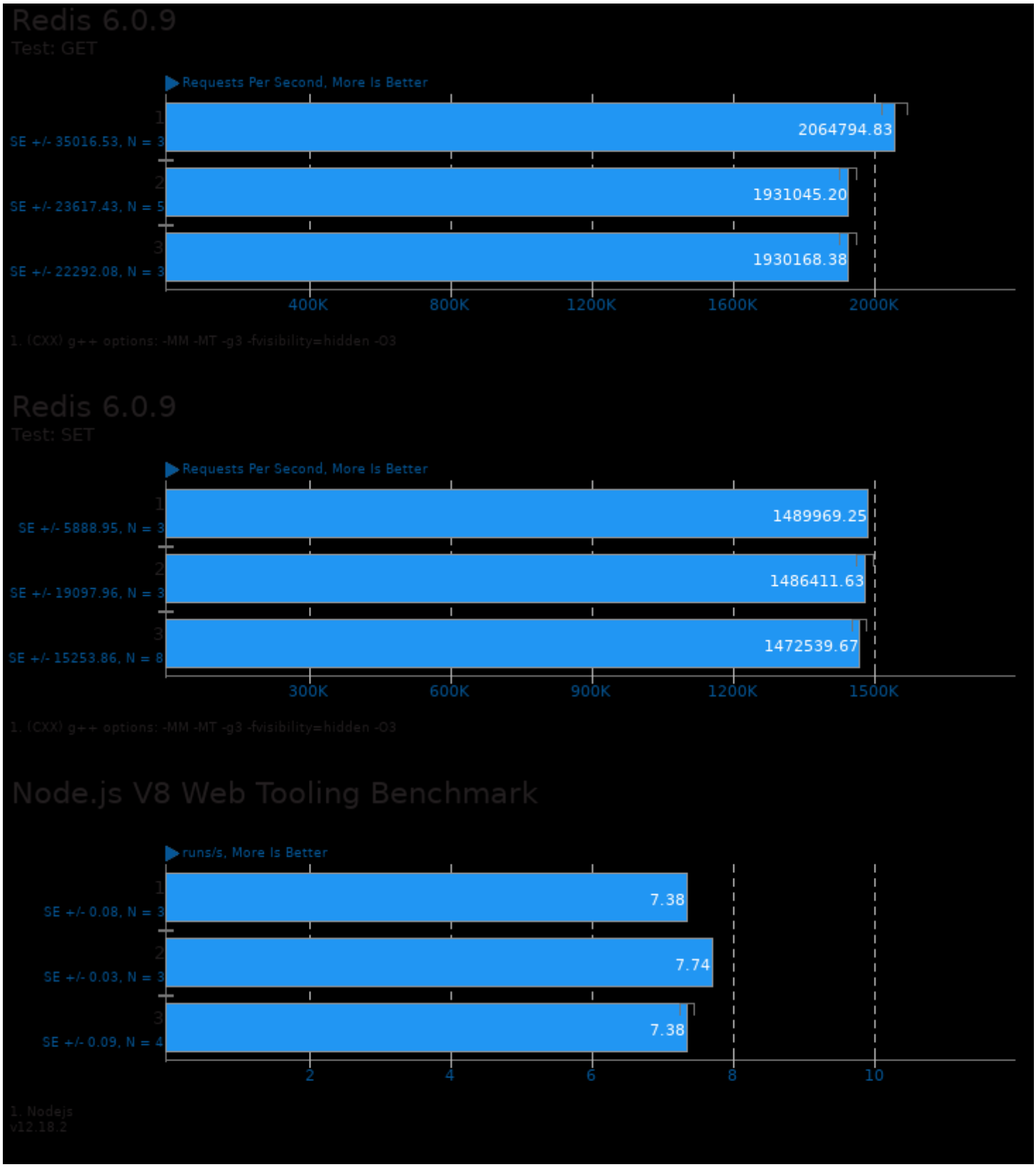
1. (CXX) g++ options: -O2 -fopenmp -ljpeg -lz -lm

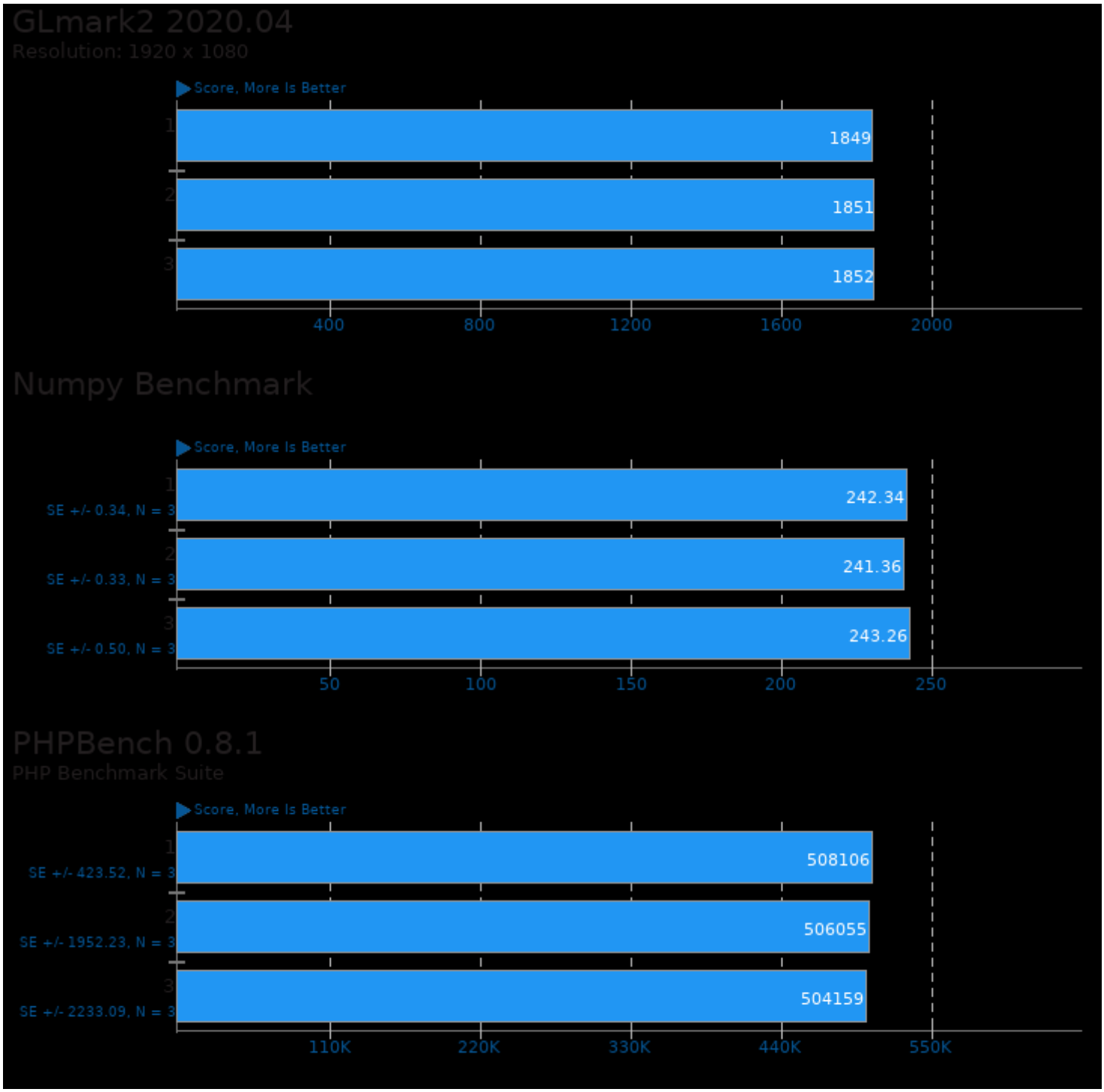

LeelaChessZero 0.26
Backend: BLAS
Nodes Per Second, More Is Better
1
SE +/- 4.54, N = 8
432
2
SE +/- 6.01, N = 9
374
3
SE +/- 2.52, N = 3
353
90
180
270
360
450
1. (CXX) g++ options: -flto -pthread
LeelaChessZero 0.26
Backend: Eigen
Nodes Per Second, More Is Better
1
SE +/- 4.81, N = 3
448
2
380
3
SE +/- 5.13, N = 9
377
100
200
300
400
500
1. (CXX) g++ options: -flto -pthread
Crafty 25.2
Elapsed Time
Nodes Per Second, More Is Better
1
SE +/- 2855.69, N = 3
6274275
2
SE +/- 20483.82, N = 3
6255015
3
SE +/- 23149.53, N = 3
6322069
1.4M
2.8M
4.2M
5.6M
7M
1. (CC) gcc options: -pthread -lstdc++ -fprofile-use -lm

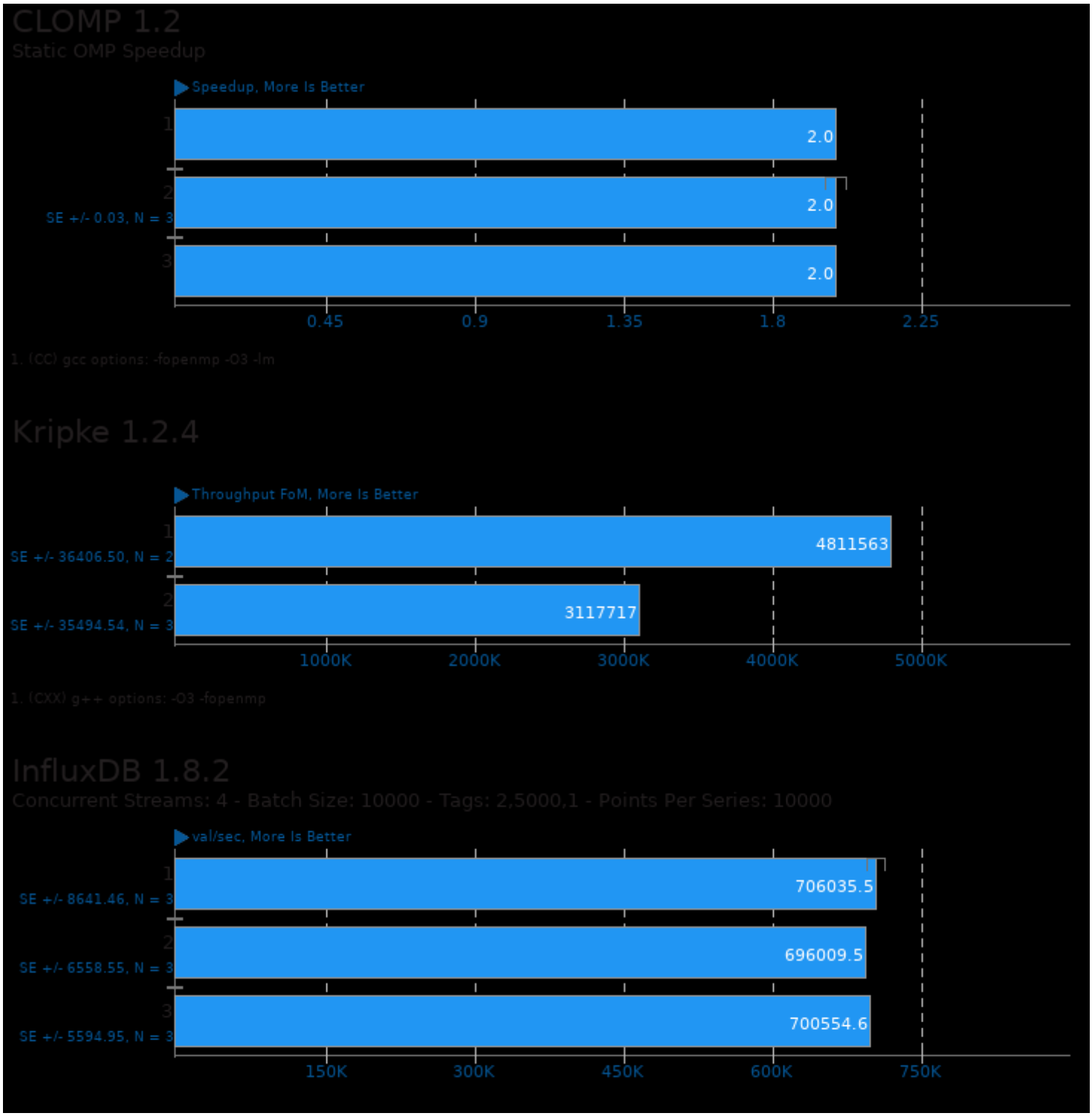

Stockfish 12
Total Time
Nodes Per Second, More Is Better
1
SE +/- 48644.36, N = 3
5718169
2
SE +/- 74806.22, N = 3
5628220
3
SE +/- 39149.01, N = 3
5648589
1.2M
2.4M
3.6M
4.8M
6M
1. (CXX) g++ options: -m64 -lpthread -fno-exceptions -std=c++17 -pedantic -O3 -msse -msse3 -mpopcnt -msse4.1 -mssse3 -msse2 -flto -flto=jobserver
asmFish 2018-07-23
1024 Hash Memory, 26 Depth
Nodes/second, More Is Better
1
SE +/- 28500.12, N = 3
7748047
2
SE +/- 50254.79, N = 3
7802828
3
SE +/- 29445.58, N = 3
7669043
2M
4M
6M
8M
10M
GROMACS 2020.3
Water Benchmark
Ns Per Day, More Is Better
1
SE +/- 0.002, N = 3
0.333
2
SE +/- 0.002, N = 3
0.330
3
SE +/- 0.005, N = 3
0.326
0.0749
0.1498
0.2247
0.2996
0.3745
1. (CXX) g++ options: -O3 -pthread -lrt -lpthread -lm


LAMMPS Molecular Dynamics Simulator 29Oct2020
Model: Rhodopsin Protein
ns/day, More Is Better
1
2.603
SE +/- 0.015, N = 3
2
2.586
SE +/- 0.030, N = 3
3
2.613
SE +/- 0.031, N = 3
0.5879
1.1758
1.7637
2.3516
2.9395
1. (CXX) g++ options: -O3 -pthread -lm
KeyDB 6.0.16
Ops/sec, More Is Better
1
265074.45
SE +/- 3138.20, N = 3
2
267212.95
SE +/- 2051.97, N = 3
3
269044.48
SE +/- 1852.38, N = 3
60K
120K
180K
240K
300K
1. (CXX) g++ options: -O2 -levent_openssl -levent -lcrypto -lssl -lpthread -lz -lpcre
Hierarchical INTegration 1.0
Test: FLOAT
QUIPs, More Is Better
1
301333349.99
SE +/- 252430.64, N = 3
2
301687480.19
SE +/- 109501.99, N = 3
3
301185316.59
SE +/- 702868.97, N = 3
60M
120M
180M
240M
300M
1. (CC) gcc options: -O3 -march=native -lm


Redis 6.0.9
Test: LPOP
Requests Per Second, More Is Better
1
2261210.92
SE +/- 16948.58, N = 3
2
1258380.50
SE +/- 11741.76, N = 3
3
1275489.17
SE +/- 8952.66, N = 3
500K
1000K
1500K
2000K
2500K
1. (CXX) g++ options: -MM -MT -g3 -fvisibility=hidden -O3
Redis 6.0.9
Test: SADD
Requests Per Second, More Is Better
1
1735687.33
SE +/- 11595.14, N = 3
2
1758200.50
SE +/- 21162.12, N = 3
3
1734495.83
SE +/- 4337.84, N = 3
400K
800K
1200K
1600K
2000K
1. (CXX) g++ options: -MM -MT -g3 -fvisibility=hidden -O3
Redis 6.0.9
Test: LPUSH
Requests Per Second, More Is Better
1
1216336.46
SE +/- 16215.78, N = 3
2
1213155.04
SE +/- 2985.46, N = 3
3
1223284.42
SE +/- 4396.42, N = 3
300K
600K
900K
1200K
1500K
1. (CXX) g++ options: -MM -MT -g3 -fvisibility=hidden -O3

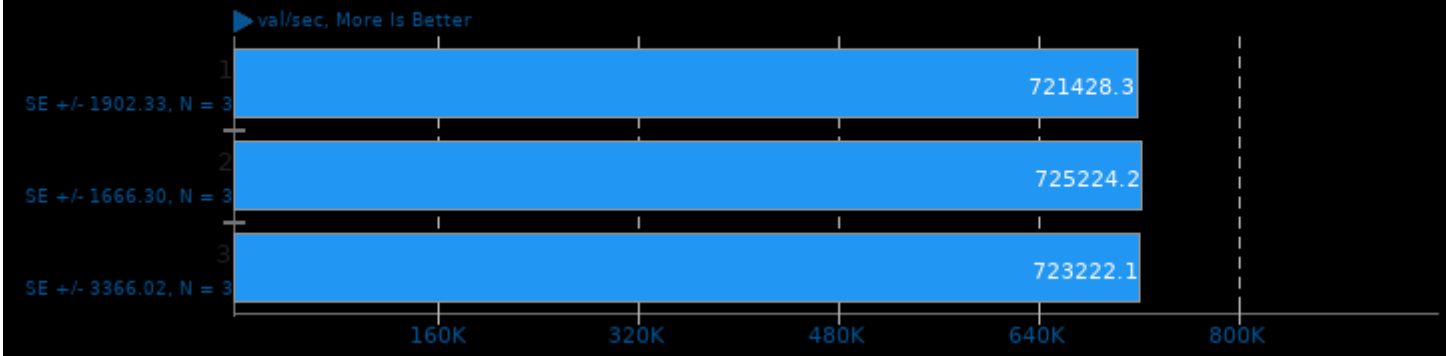

Redis 6.0.9
Test: GET
Requests Per Second, More Is Better
1
SE +/- 35016.53, N = 3
2064794.83
2
SE +/- 23617.43, N = 5
1931045.20
3
SE +/- 22292.08, N = 3
1930168.38
400K
800K
1200K
1600K
2000K
1. (CXX) g++ options: -MM -MT -g3 -fvisibility=hidden -O3
Redis 6.0.9
Test: SET
Requests Per Second, More Is Better
1
SE +/- 5888.95, N = 3
1489969.25
2
SE +/- 19097.96, N = 3
1486411.63
3
SE +/- 15253.86, N = 8
1472539.67
300K
600K
900K
1200K
1500K
1. (CXX) g++ options: -MM -MT -g3 -fvisibility=hidden -O3
Node.js V8 Web Tooling Benchmark
runs/s, More Is Better
1
SE +/- 0.08, N = 3
7.38
2
SE +/- 0.03, N = 3
7.74
3
SE +/- 0.09, N = 4
7.38
2
4
6
8
10
1. Nodejs
v12.18.2


GLmark2 2020.04
Resolution: 1920 x 1080
Score, More Is Better
1
1849
2
1851
3
1852
400
800
1200
1600
2000
Numpy Benchmark
Score, More Is Better
1
SE +/- 0.34, N = 3
242.34
2
SE +/- 0.33, N = 3
241.36
3
SE +/- 0.50, N = 3
243.26
50
100
150
200
250
PHPBench 0.8.1
PHP Benchmark Suite
Score, More Is Better
1
SE +/- 423.52, N = 3
508106
2
SE +/- 1952.23, N = 3
506055
3
SE +/- 2233.09, N = 3
504159
110K
220K
330K
440K
550K


CLOMP 1.2
Static OMP Speedup
Speedup, More Is Better
1
2
3
2.0
2.0
2.0
SE +/- 0.03, N = 3
0.45
0.9
1.35
1.8
2.25
1. (CC) gcc options: -fopenmp -O3 -lm
Kripke 1.2.4
Throughput FoM, More Is Better
1
2
4811563
3117717
SE +/- 36406.50, N = 2
SE +/- 35494.54, N = 3
1000K
2000K
3000K
4000K
5000K
1. (CXX) g++ options: -O3 -fopenmp
InfluxDB 1.8.2
Concurrent Streams: 4 - Batch Size: 10000 - Tags: 2,5000,1 - Points Per Series: 10000
val/sec, More Is Better
1
2
3
706035.5
696009.5
700554.6
SE +/- 8641.46, N = 3
SE +/- 6558.55, N = 3
SE +/- 5594.95, N = 3
150K
300K
450K
600K
750K

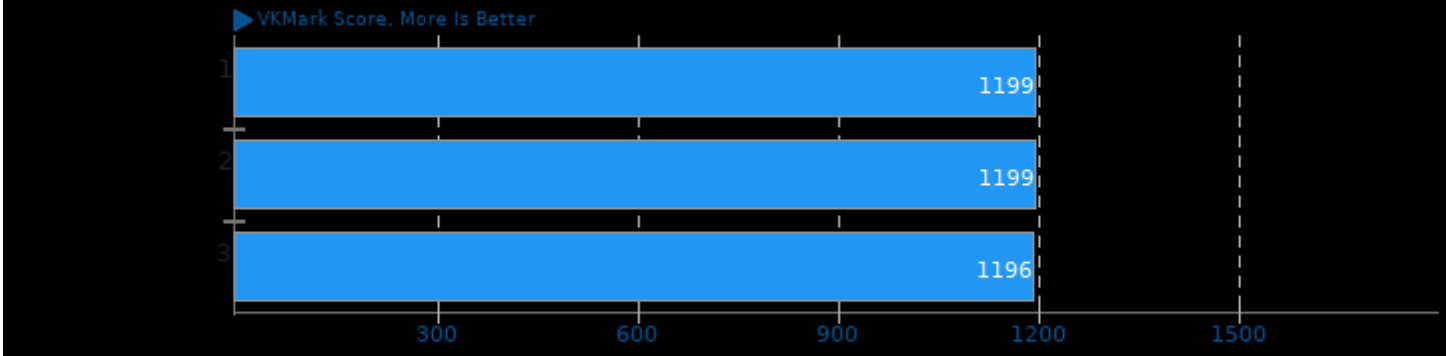
InfluxDB 1.8.2

Concurrent Streams: 64 - Batch Size: 10000 - Tags: 2,5000,1 - Points Per Series: 10000



VKMark 2020-05-21

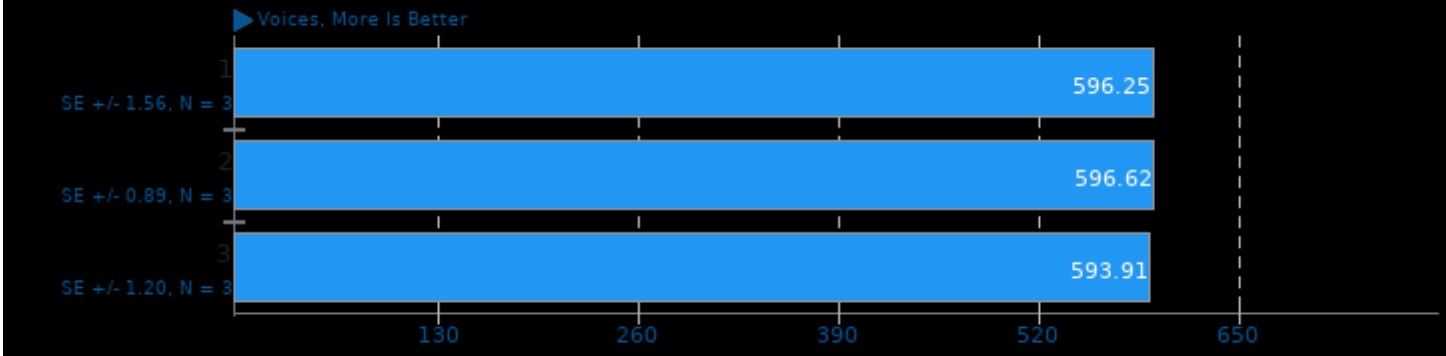
Resolution: 1920 x 1080



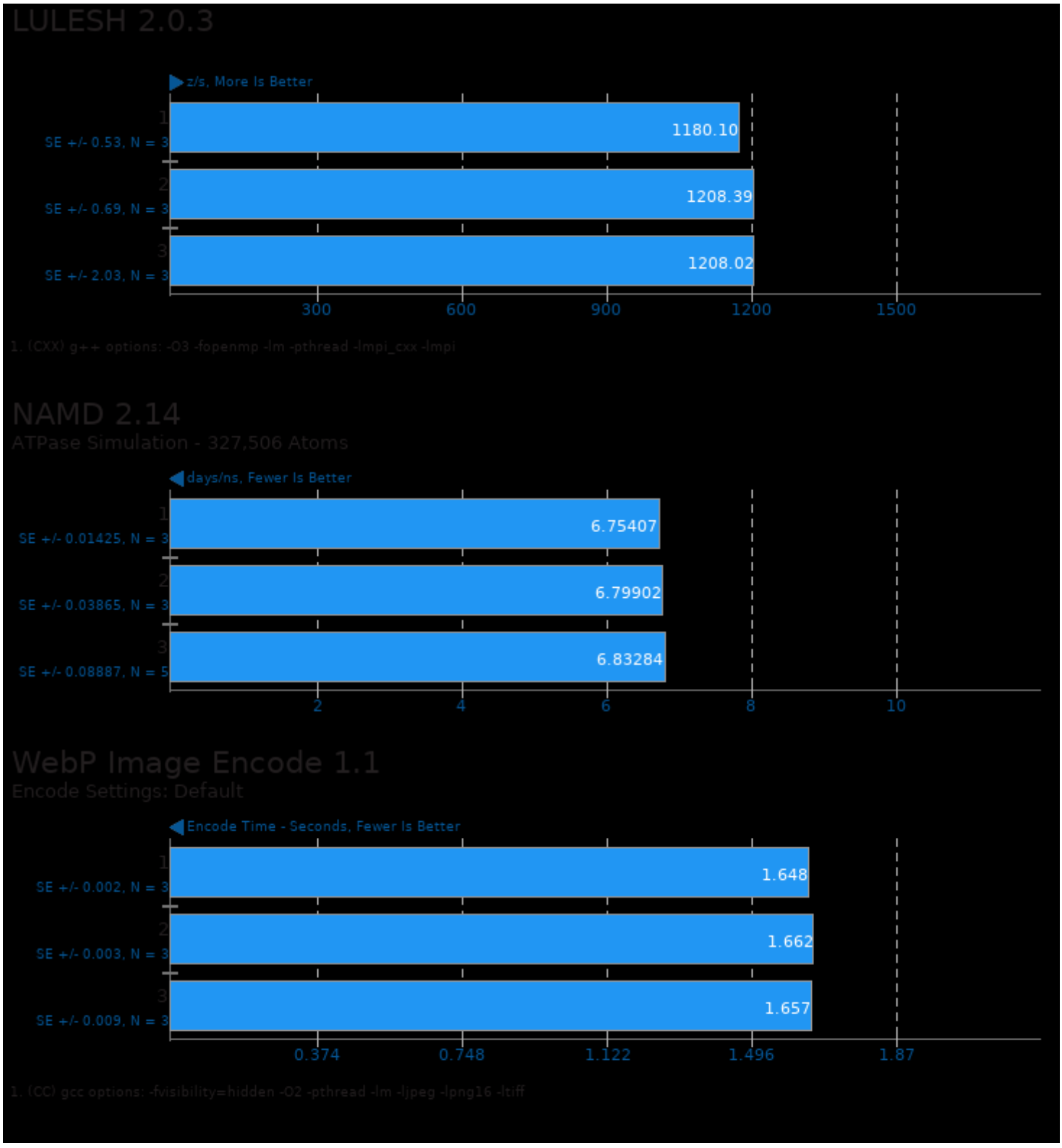
1. (CXX) g++ options: -pthread -ldl -pipe -std=c++14 -MD -MQ -MF

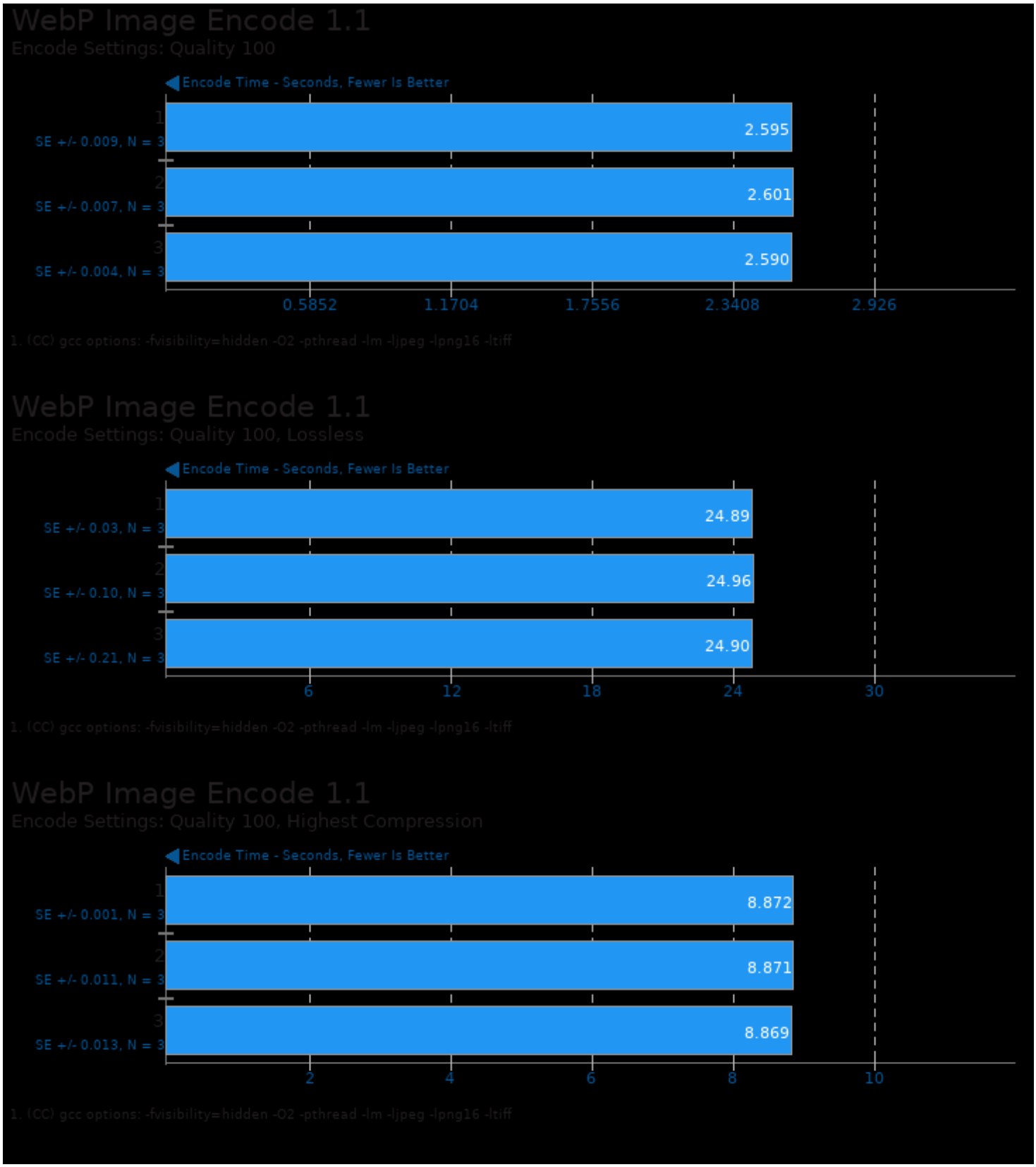
Google SynthMark 20201109

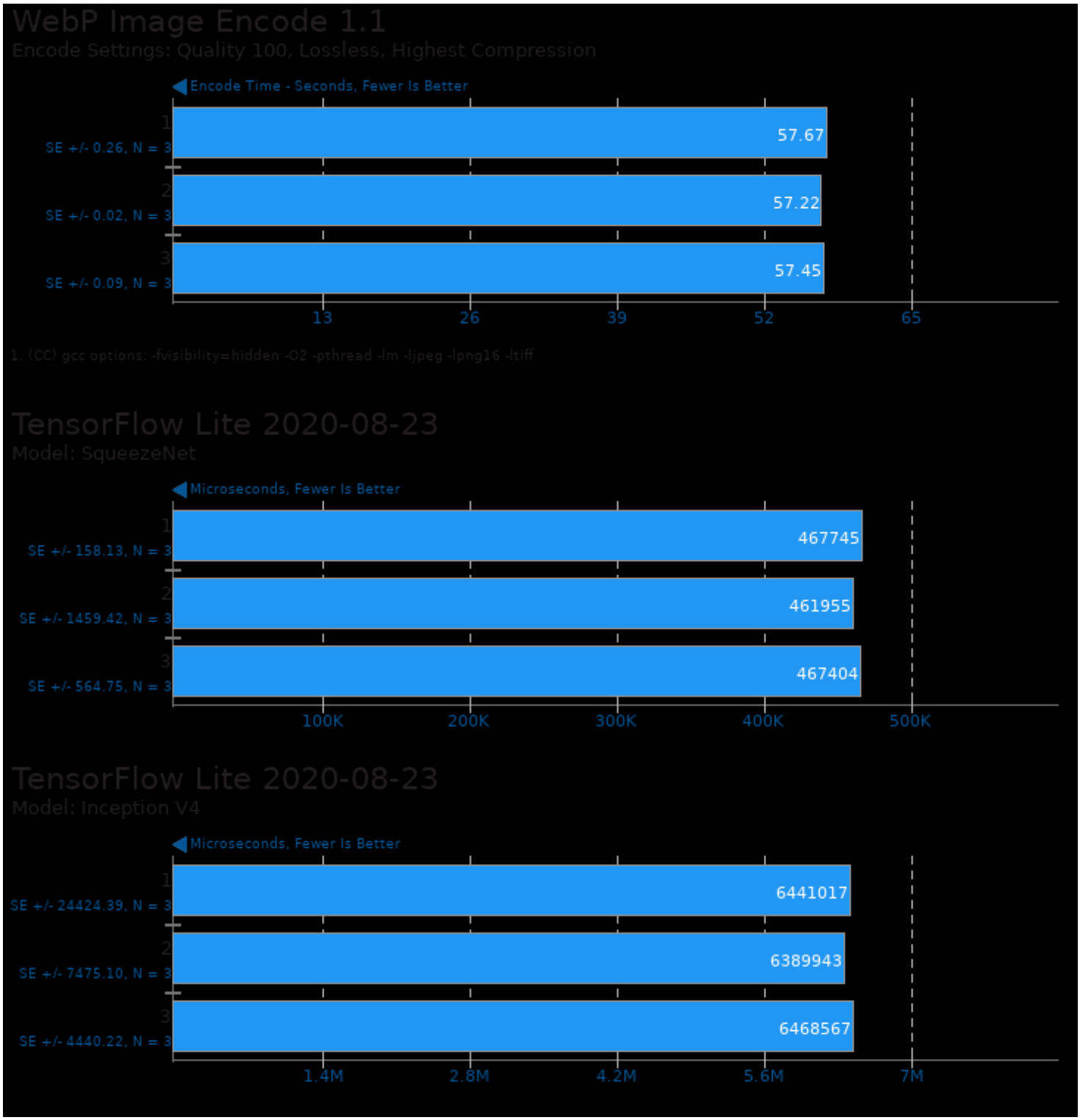
Test: VoiceMark_100

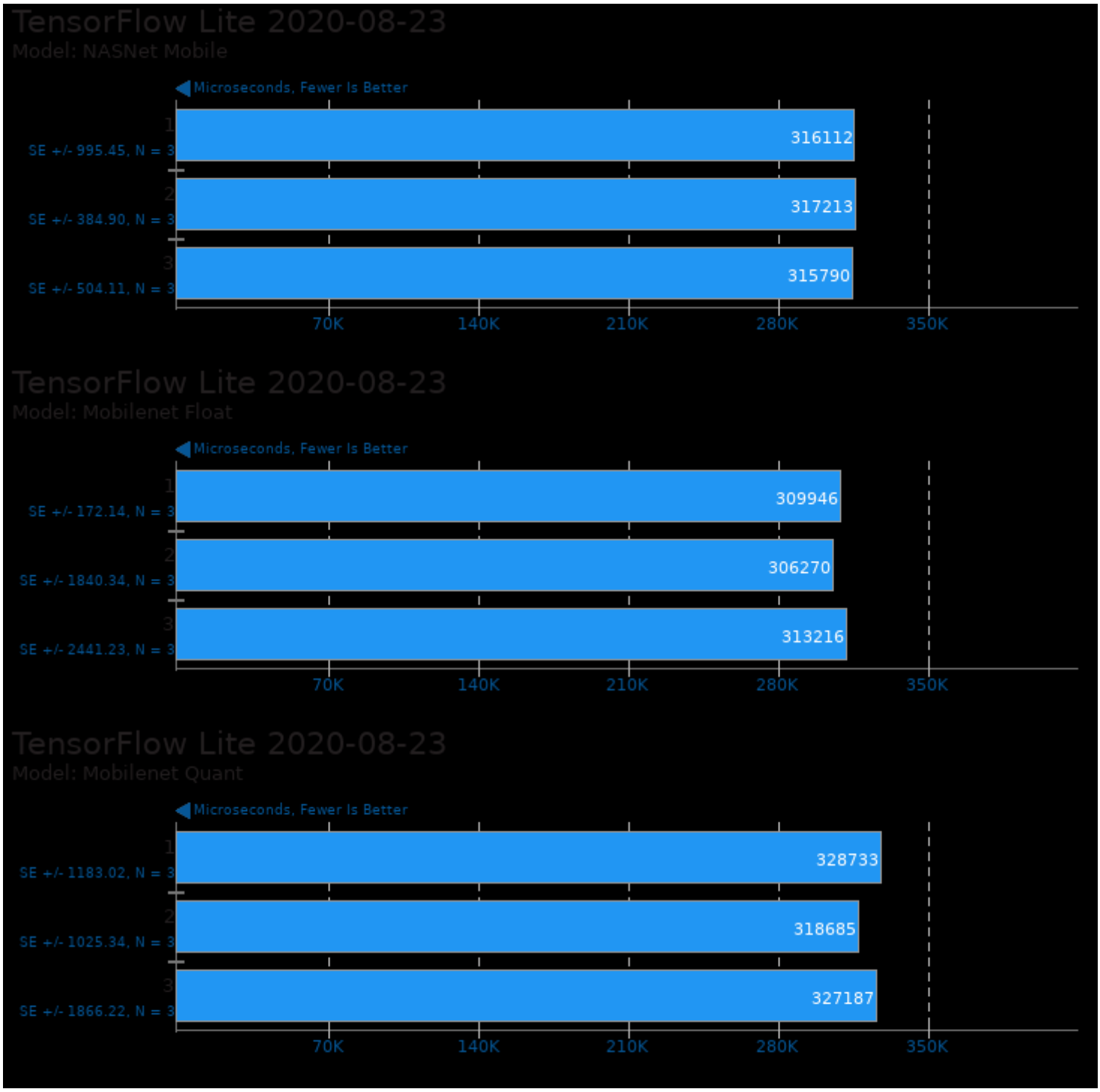


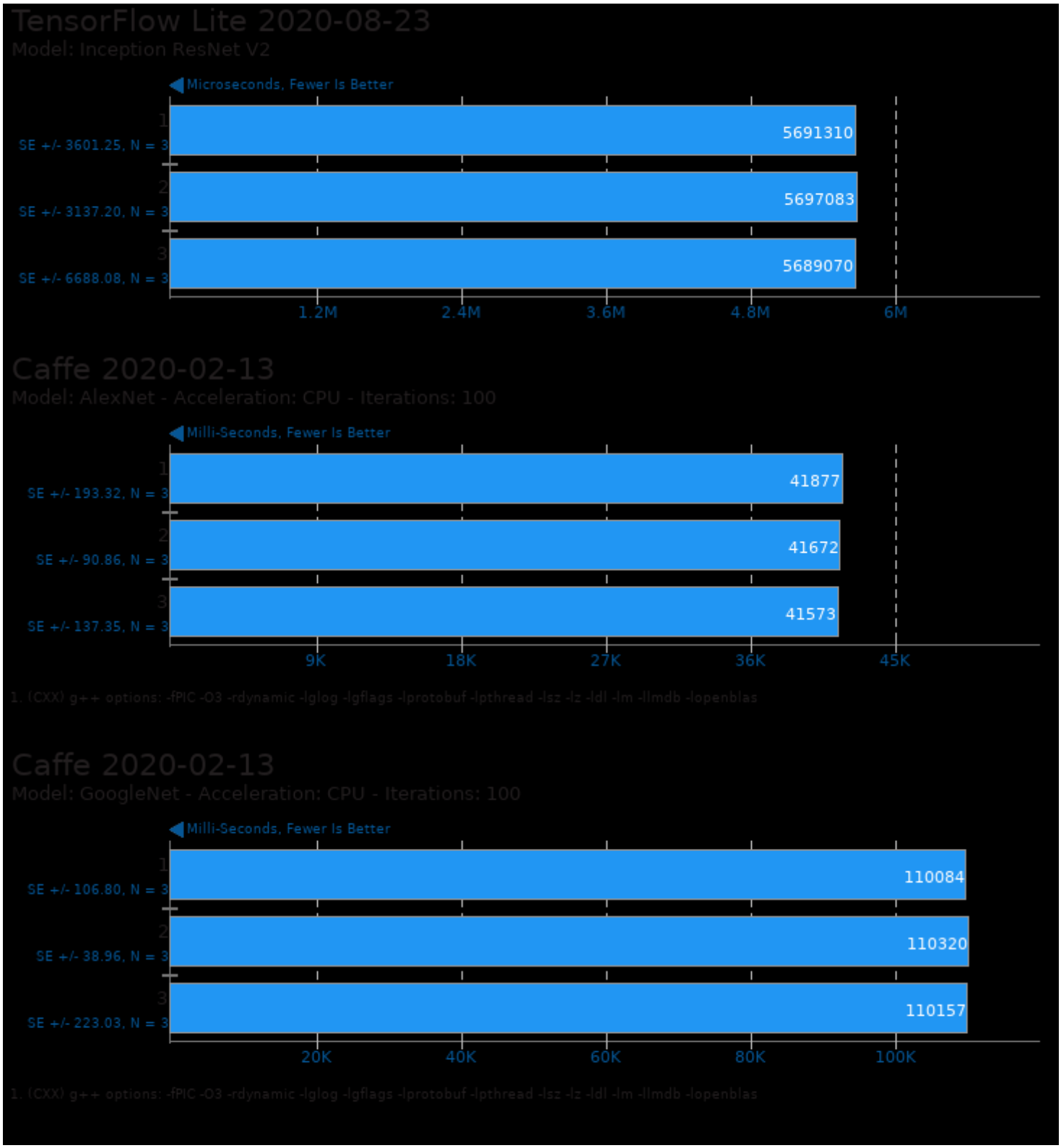
1. (CXX) g++ options: -lm -lpthread -std=c++11 -Ofast

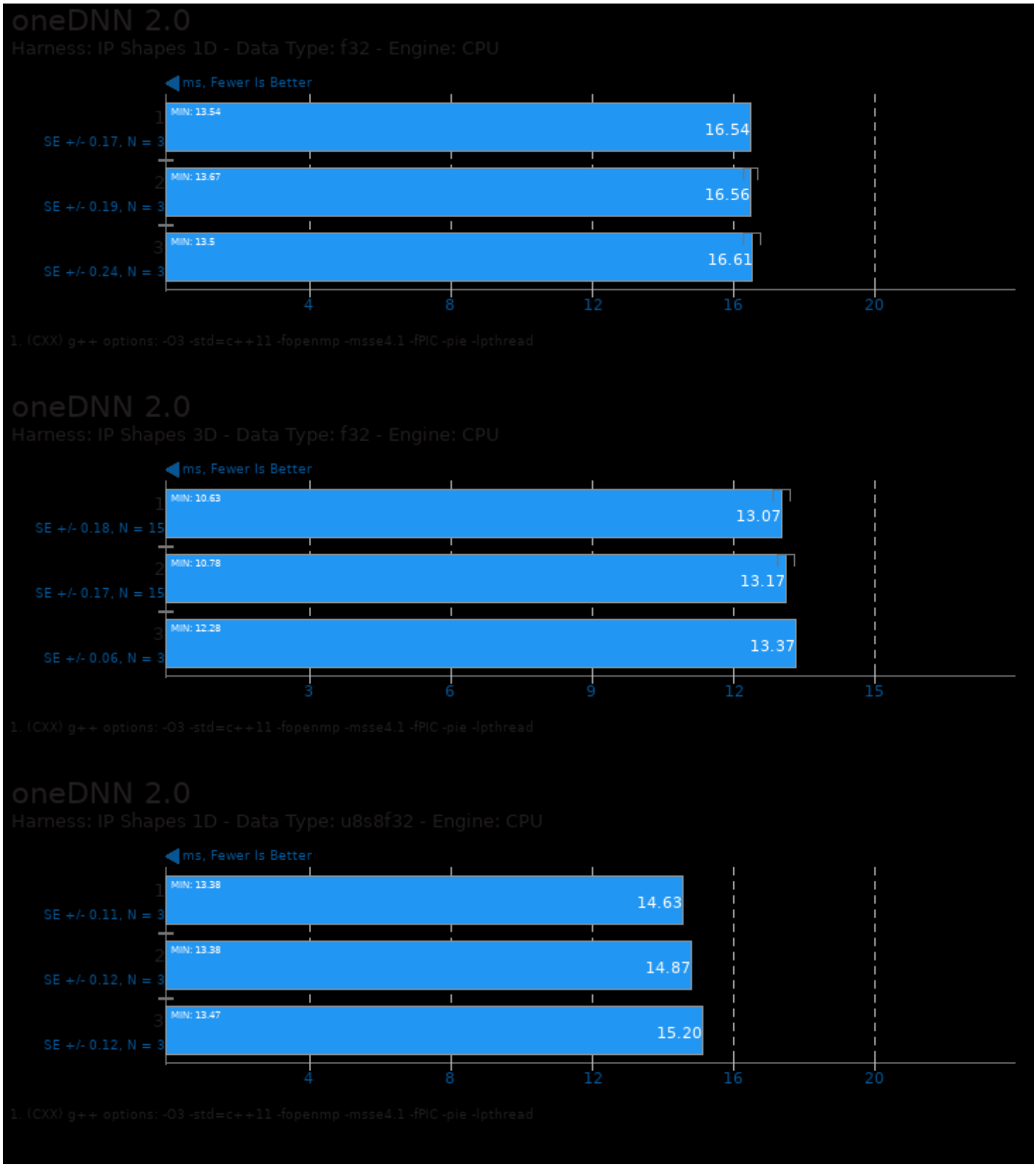

LULESH 2.0.3
z/s, More Is Better
1
SE +/- 0.53, N = 3
1180.10
2
SE +/- 0.69, N = 3
1208.39
3
SE +/- 2.03, N = 3
1208.02
300
600
900
1200
1500
1. (CXX) g++ options: -O3 -fopenmp -lm -pthread -lmpi_cxx -lmpi
NAMD 2.14
ATPase Simulation - 327,506 Atoms
days/ns, Fewer Is Better
1
SE +/- 0.01425, N = 3
6.75407
2
SE +/- 0.03865, N = 3
6.79902
3
SE +/- 0.08887, N = 5
6.83284
2
4
6
8
10
WebP Image Encode 1.1
Encode Settings: Default
Encode Time - Seconds, Fewer Is Better
1
SE +/- 0.002, N = 3
1.648
2
SE +/- 0.003, N = 3
1.662
3
SE +/- 0.009, N = 3
1.657
0.374
0.748
1.122
1.496
1.87
1. (CC) gcc options: -fvisibility=hidden -O2 -pthread -lm -ljpeg -lpng16 -ltiff

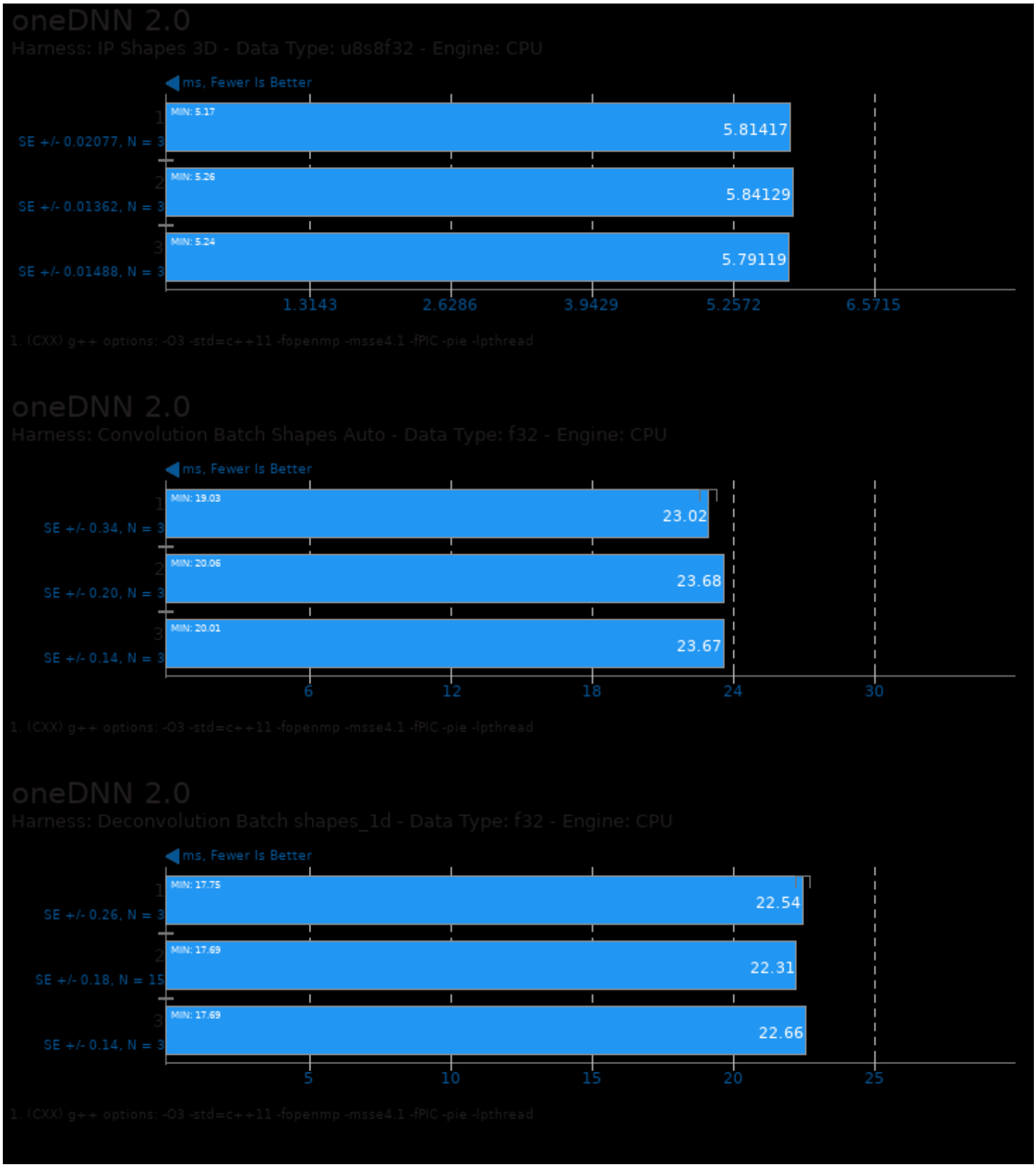

WebP Image Encode 1.1
Encode Settings: Quality 100
Encode Time - Seconds, Fewer Is Better
1
SE +/- 0.009, N = 3
2.595
2
SE +/- 0.007, N = 3
2.601
3
SE +/- 0.004, N = 3
2.590
0.5852
1.1704
1.7556
2.3408
2.926
1. (CC) gcc options: -fvisibility=hidden -O2 -pthread -lm -ljpeg -lpng16 -ltiff
WebP Image Encode 1.1
Encode Settings: Quality 100, Lossless
Encode Time - Seconds, Fewer Is Better
1
SE +/- 0.03, N = 3
24.89
2
SE +/- 0.10, N = 3
24.96
3
SE +/- 0.21, N = 3
24.90
6
12
18
24
30
1. (CC) gcc options: -fvisibility=hidden -O2 -pthread -lm -ljpeg -lpng16 -ltiff
WebP Image Encode 1.1
Encode Settings: Quality 100, Highest Compression
Encode Time - Seconds, Fewer Is Better
1
SE +/- 0.001, N = 3
8.872
2
SE +/- 0.011, N = 3
8.871
3
SE +/- 0.013, N = 3
8.869
2
4
6
8
10
1. (CC) gcc options: -fvisibility=hidden -O2 -pthread -lm -ljpeg -lpng16 -ltiff

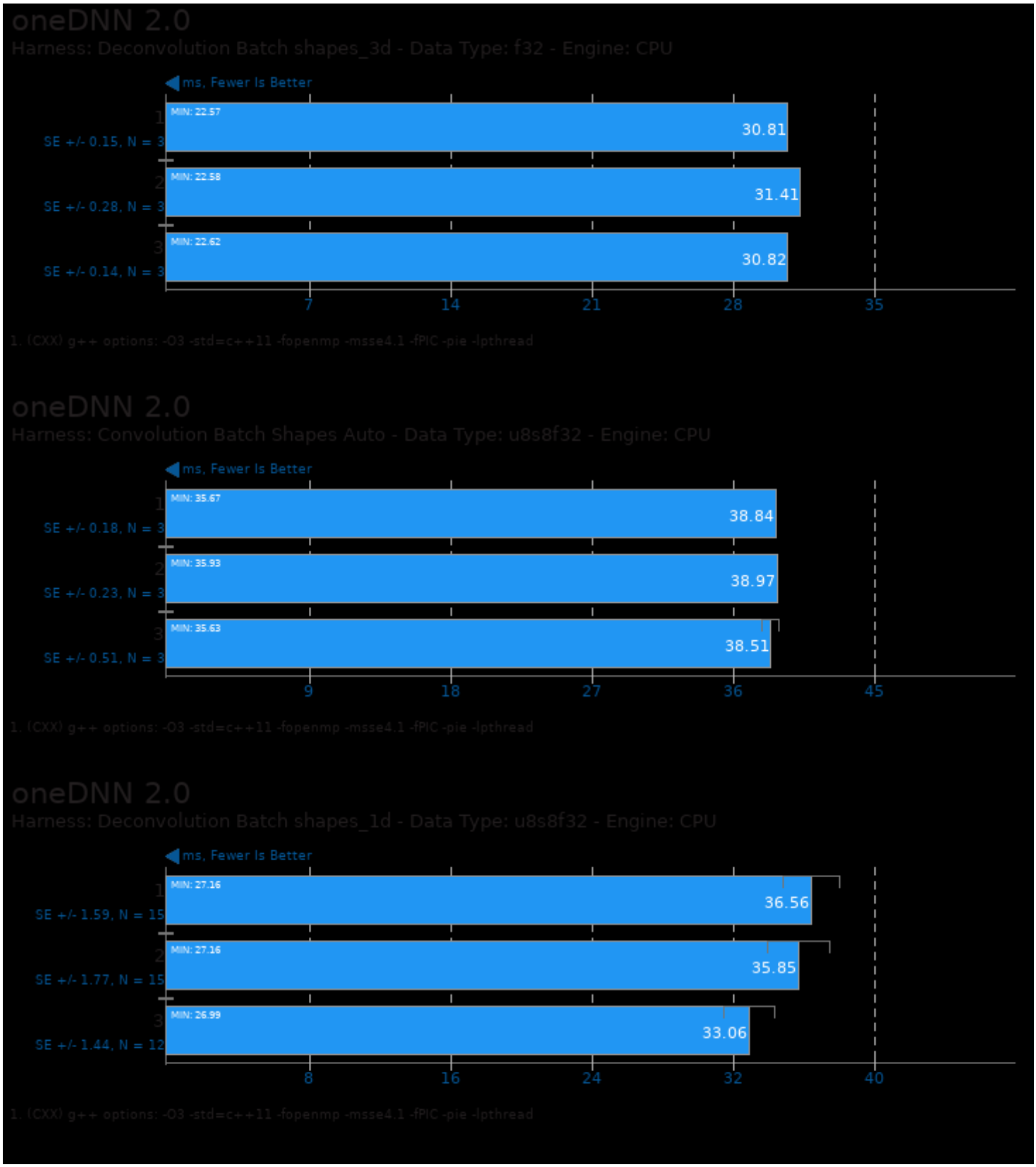

WebP Image Encode 1.1
Encode Settings: Quality 100, Lossless, Highest Compression
Encode Time - Seconds, Fewer Is Better
1
SE +/- 0.26, N = 3
57.67
2
SE +/- 0.02, N = 3
57.22
3
SE +/- 0.09, N = 3
57.45
13
26
39
52
65
1. (CC) gcc options: -fvisibility=hidden -O2 -pthread -lm -ljpeg -lpng16 -ltiff
TensorFlow Lite 2020-08-23
Model: SqueezeNet
Microseconds, Fewer Is Better
1
SE +/- 158.13, N = 3
467745
2
SE +/- 1459.42, N = 3
461955
3
SE +/- 564.75, N = 3
467404
100K
200K
300K
400K
500K
TensorFlow Lite 2020-08-23
Model: Inception V4
Microseconds, Fewer Is Better
1
SE +/- 24424.39, N = 3
6441017
2
SE +/- 7475.10, N = 3
6389943
3
SE +/- 4440.22, N = 3
6468567
1.4M
2.8M
4.2M
5.6M
7M

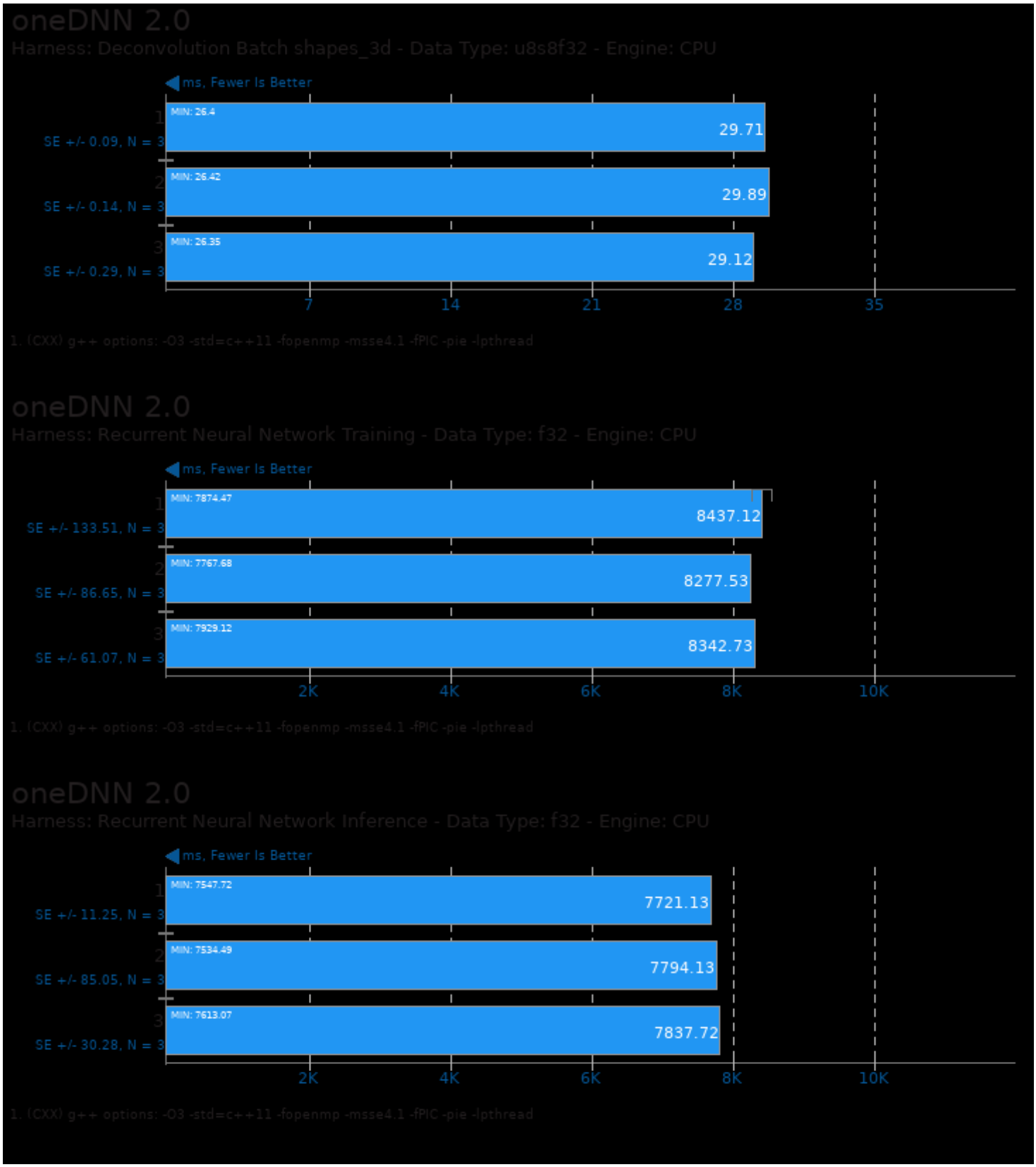

TensorFlow Lite 2020-08-23
Model: NASNet Mobile
Microseconds, Fewer Is Better
1
SE +/- 995.45, N = 3
316112
2
SE +/- 384.90, N = 3
317213
3
SE +/- 504.11, N = 3
315790
70K
140K
210K
280K
350K
TensorFlow Lite 2020-08-23
Model: Mobilenet Float
Microseconds, Fewer Is Better
1
SE +/- 172.14, N = 3
309946
2
SE +/- 1840.34, N = 3
306270
3
SE +/- 2441.23, N = 3
313216
70K
140K
210K
280K
350K
TensorFlow Lite 2020-08-23
Model: Mobilenet Quant
Microseconds, Fewer Is Better
1
SE +/- 1183.02, N = 3
328733
2
SE +/- 1025.34, N = 3
318685
3
SE +/- 1866.22, N = 3
327187
70K
140K
210K
280K
350K

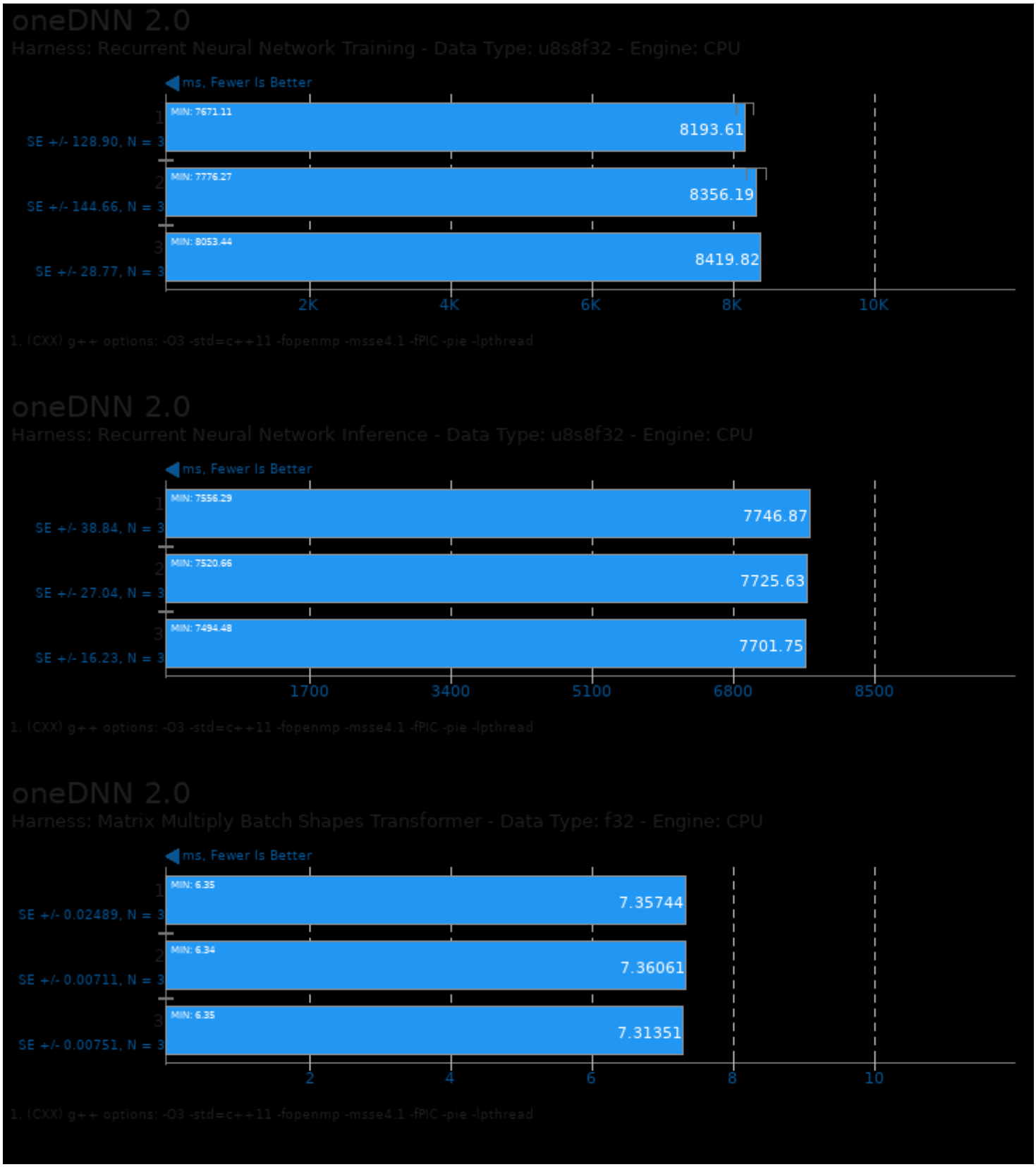

TensorFlow Lite 2020-08-23
Model: Inception ResNet V2
Microseconds, Fewer Is Better
1
SE +/- 3601.25, N = 3
5691310
2
SE +/- 3137.20, N = 3
5697083
3
SE +/- 6688.08, N = 3
5689070
1.2M
2.4M
3.6M
4.8M
6M
Caffe 2020-02-13
Model: AlexNet - Acceleration: CPU - Iterations: 100
Milli-Seconds, Fewer Is Better
1
SE +/- 193.32, N = 3
41877
2
SE +/- 90.86, N = 3
41672
3
SE +/- 137.35, N = 3
41573
9K
18K
27K
36K
45K
1. (CXX) g++ options: -fPIC -O3 -rdynamic -lglog -lgflags -lprotobuf -lpthread -lsz -lz -ldl -lm -llmdb -lopenblas
Caffe 2020-02-13
Model: GoogleNet - Acceleration: CPU - Iterations: 100
Milli-Seconds, Fewer Is Better
1
SE +/- 106.80, N = 3
110084
2
SE +/- 38.96, N = 3
110320
3
SE +/- 223.03, N = 3
110157
20K
40K
60K
80K
100K
1. (CXX) g++ options: -fPIC -O3 -rdynamic -lglog -lgflags -lprotobuf -lpthread -lsz -lz -ldl -lm -llmdb -lopenblas

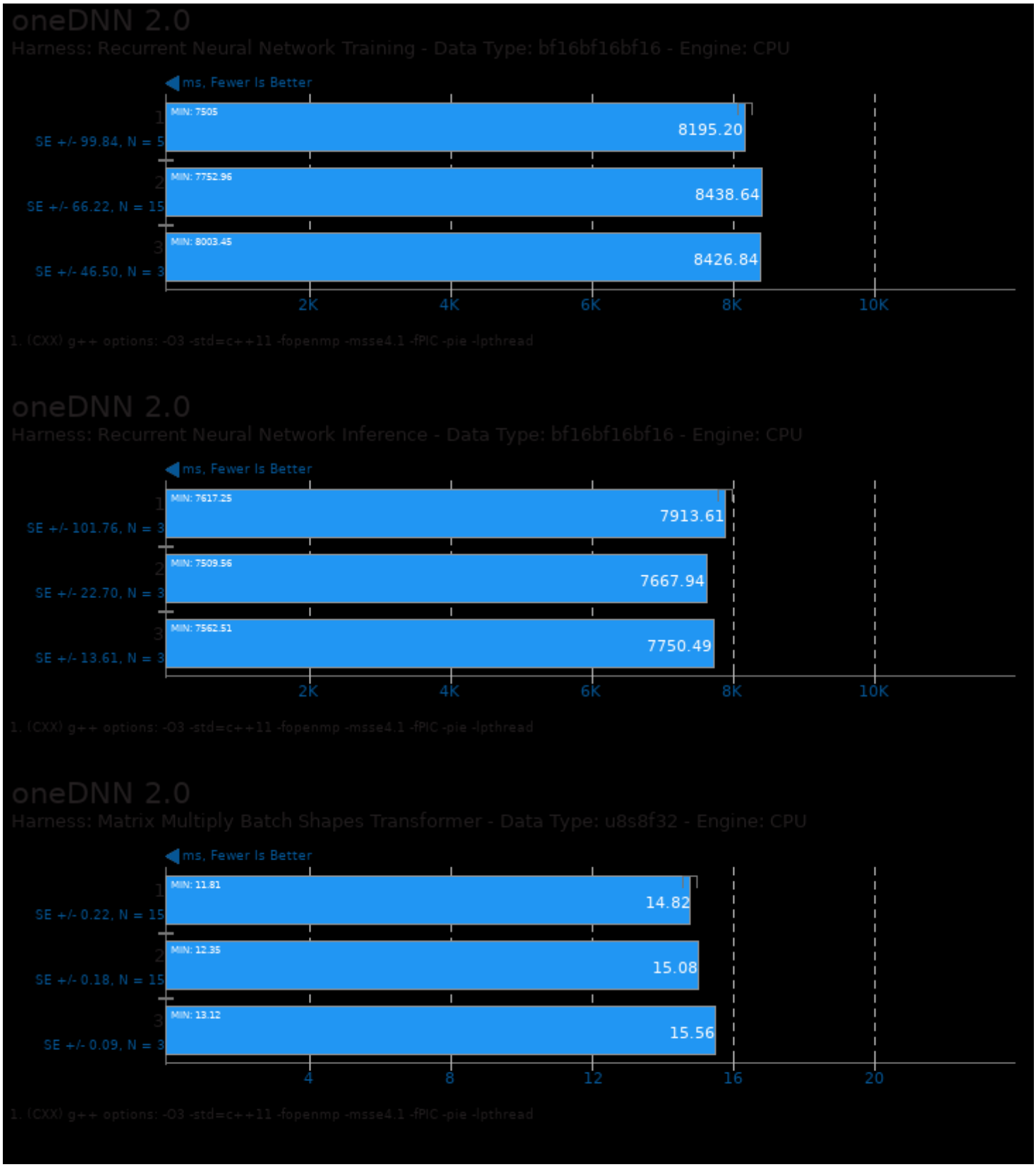

oneDNN 2.0
Harness: IP Shapes 1D - Data Type: f32 - Engine: CPU
ms, Fewer Is Better
1
MIN: 13.54
16.54
SE +/- 0.17, N = 3
2
MIN: 13.67
16.56
SE +/- 0.19, N = 3
3
MIN: 13.5
16.61
SE +/- 0.24, N = 3
4
8
12
16
20
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread
oneDNN 2.0
Harness: IP Shapes 3D - Data Type: f32 - Engine: CPU
ms, Fewer Is Better
1
MIN: 10.63
13.07
SE +/- 0.18, N = 15
2
MIN: 10.78
13.17
SE +/- 0.17, N = 15
3
MIN: 12.28
13.37
SE +/- 0.06, N = 3
3
6
9
12
15
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread
oneDNN 2.0
Harness: IP Shapes 1D - Data Type: u8s8f32 - Engine: CPU
ms, Fewer Is Better
1
MIN: 13.38
14.63
SE +/- 0.11, N = 3
2
MIN: 13.38
14.87
SE +/- 0.12, N = 3
3
MIN: 13.47
15.20
SE +/- 0.12, N = 3
4
8
12
16
20
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread

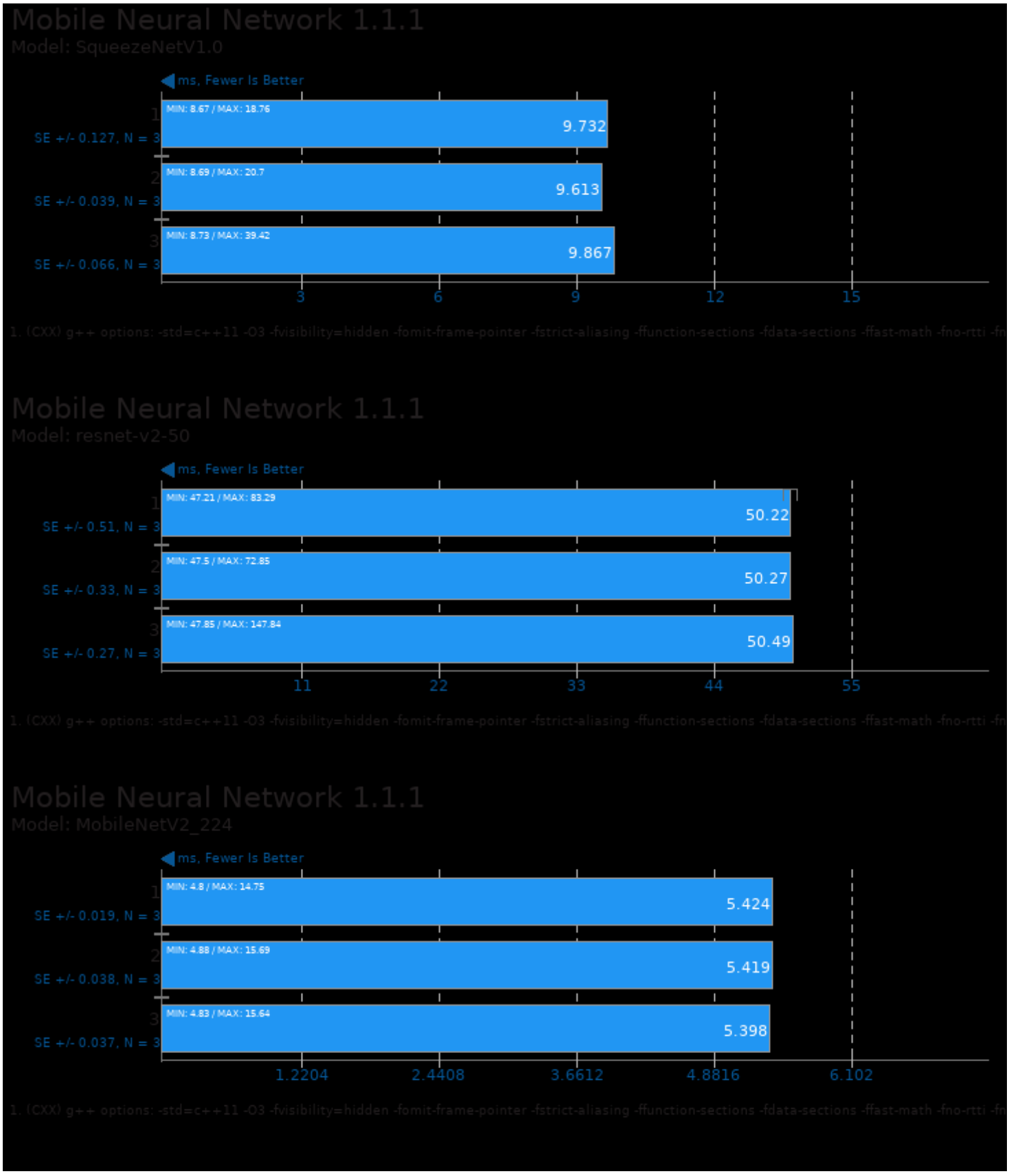

oneDNN 2.0
Harness: IP Shapes 3D - Data Type: u8s8f32 - Engine: CPU
ms, Fewer Is Better
1
MIN: 5.17
5.81417
SE +/- 0.02077, N = 3
2
MIN: 5.26
5.84129
SE +/- 0.01362, N = 3
3
MIN: 5.24
5.79119
SE +/- 0.01488, N = 3
1.3143
2.6286
3.9429
5.2572
6.5715
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread
oneDNN 2.0
Harness: Convolution Batch Shapes Auto - Data Type: f32 - Engine: CPU
ms, Fewer Is Better
1
MIN: 19.03
23.02
SE +/- 0.34, N = 3
2
MIN: 20.06
23.68
SE +/- 0.20, N = 3
3
MIN: 20.01
23.67
SE +/- 0.14, N = 3
6
12
18
24
30
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread
oneDNN 2.0
Harness: Deconvolution Batch shapes_1d - Data Type: f32 - Engine: CPU
ms, Fewer Is Better
1
MIN: 17.75
22.54
SE +/- 0.26, N = 3
2
MIN: 17.69
22.31
SE +/- 0.18, N = 15
3
MIN: 17.69
22.66
SE +/- 0.14, N = 3
5
10
15
20
25
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread


oneDNN 2.0
Harness: Deconvolution Batch shapes_3d - Data Type: f32 - Engine: CPU
ms, Fewer Is Better
1
MIN: 22.57
30.81
SE +/- 0.15, N = 3
2
MIN: 22.58
31.41
SE +/- 0.28, N = 3
3
MIN: 22.62
30.82
SE +/- 0.14, N = 3
7
14
21
28
35
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread
oneDNN 2.0
Harness: Convolution Batch Shapes Auto - Data Type: u8s8f32 - Engine: CPU
ms, Fewer Is Better
1
MIN: 35.67
38.84
SE +/- 0.18, N = 3
2
MIN: 35.93
38.97
SE +/- 0.23, N = 3
3
MIN: 35.63
38.51
SE +/- 0.51, N = 3
9
18
27
36
45
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread
oneDNN 2.0
Harness: Deconvolution Batch shapes_1d - Data Type: u8s8f32 - Engine: CPU
ms, Fewer Is Better
1
MIN: 27.16
36.56
SE +/- 1.59, N = 15
2
MIN: 27.16
35.85
SE +/- 1.77, N = 15
3
MIN: 26.99
33.06
SE +/- 1.44, N = 12
8
16
24
32
40
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread


oneDNN 2.0
Harness: Deconvolution Batch shapes_3d - Data Type: u8s8f32 - Engine: CPU
ms, Fewer Is Better
1
MIN: 26.4
29.71
SE +/- 0.09, N = 3
2
MIN: 26.42
29.89
SE +/- 0.14, N = 3
3
MIN: 26.35
29.12
SE +/- 0.29, N = 3
7
14
21
28
35
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread
oneDNN 2.0
Harness: Recurrent Neural Network Training - Data Type: f32 - Engine: CPU
ms, Fewer Is Better
1
MIN: 7874.47
8437.12
SE +/- 133.51, N = 3
2
MIN: 7767.68
8277.53
SE +/- 86.65, N = 3
3
MIN: 7929.12
8342.73
SE +/- 61.07, N = 3
2K
4K
6K
8K
10K
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread
oneDNN 2.0
Harness: Recurrent Neural Network Inference - Data Type: f32 - Engine: CPU
ms, Fewer Is Better
1
MIN: 7547.72
7721.13
SE +/- 11.25, N = 3
2
MIN: 7534.49
7794.13
SE +/- 85.05, N = 3
3
MIN: 7613.07
7837.72
SE +/- 30.28, N = 3
2K
4K
6K
8K
10K
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread

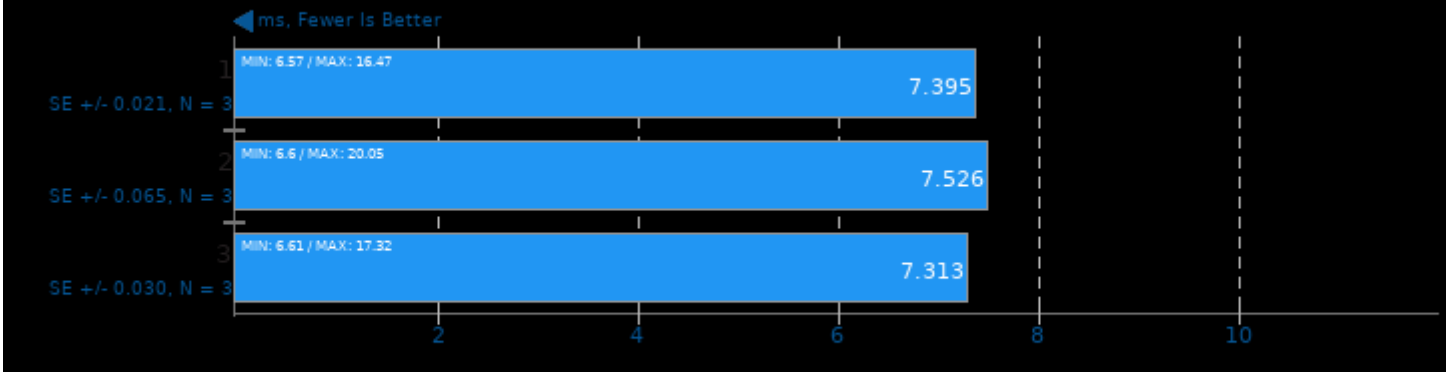

oneDNN 2.0
Harness: Recurrent Neural Network Training - Data Type: u8s8f32 - Engine: CPU
ms, Fewer Is Better
1
MIN: 7671.11
8193.61
SE +/- 128.90, N = 3
2
MIN: 7776.27
8356.19
SE +/- 144.66, N = 3
3
MIN: 8053.44
8419.82
SE +/- 28.77, N = 3
2K
4K
6K
8K
10K
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread
oneDNN 2.0
Harness: Recurrent Neural Network Inference - Data Type: u8s8f32 - Engine: CPU
ms, Fewer Is Better
1
MIN: 7556.29
7746.87
SE +/- 38.84, N = 3
2
MIN: 7520.66
7725.63
SE +/- 27.04, N = 3
3
MIN: 7494.48
7701.75
SE +/- 16.23, N = 3
1700
3400
5100
6800
8500
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread
oneDNN 2.0
Harness: Matrix Multiply Batch Shapes Transformer - Data Type: f32 - Engine: CPU
ms, Fewer Is Better
1
MIN: 6.35
7.35744
SE +/- 0.02489, N = 3
2
MIN: 6.34
7.36061
SE +/- 0.00711, N = 3
3
MIN: 6.35
7.31351
SE +/- 0.00751, N = 3
2
4
6
8
10
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread


oneDNN 2.0
Harness: Recurrent Neural Network Training - Data Type: bf16bf16bf16 - Engine: CPU
ms, Fewer Is Better
1
MIN: 7505
8195.20
SE +/- 99.84, N = 5
2
MIN: 7752.96
8438.64
SE +/- 66.22, N = 15
3
MIN: 8003.45
8426.84
SE +/- 46.50, N = 3
2K
4K
6K
8K
10K
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread
oneDNN 2.0
Harness: Recurrent Neural Network Inference - Data Type: bf16bf16bf16 - Engine: CPU
ms, Fewer Is Better
1
MIN: 7617.25
7913.61
SE +/- 101.76, N = 3
2
MIN: 7509.56
7667.94
SE +/- 22.70, N = 3
3
MIN: 7562.51
7750.49
SE +/- 13.61, N = 3
2K
4K
6K
8K
10K
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread
oneDNN 2.0
Harness: Matrix Multiply Batch Shapes Transformer - Data Type: u8s8f32 - Engine: CPU
ms, Fewer Is Better
1
MIN: 11.81
14.82
SE +/- 0.22, N = 15
2
MIN: 12.35
15.08
SE +/- 0.18, N = 15
3
MIN: 13.12
15.56
SE +/- 0.09, N = 3
4
8
12
16
20
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread


Mobile Neural Network 1.1.1
Model: SqueezeNetV1.0
ms, Fewer Is Better
1
MIN: 8.67 / MAX: 18.76
9.732
SE +/- 0.127, N = 3
2
MIN: 8.69 / MAX: 20.7
9.613
SE +/- 0.039, N = 3
3
MIN: 8.73 / MAX: 39.42
9.867
SE +/- 0.066, N = 3
3
6
9
12
15
1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fv
Mobile Neural Network 1.1.1
Model: resnet-v2-50
ms, Fewer Is Better
1
MIN: 47.21 / MAX: 83.29
50.22
SE +/- 0.51, N = 3
2
MIN: 47.5 / MAX: 72.85
50.27
SE +/- 0.33, N = 3
3
MIN: 47.85 / MAX: 147.84
50.49
SE +/- 0.27, N = 3
11
22
33
44
55
1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fv
Mobile Neural Network 1.1.1
Model: MobileNetV2_224
ms, Fewer Is Better
1
MIN: 4.8 / MAX: 14.75
5.424
SE +/- 0.019, N = 3
2
MIN: 4.88 / MAX: 15.69
5.419
SE +/- 0.038, N = 3
3
MIN: 4.83 / MAX: 15.64
5.398
SE +/- 0.037, N = 3
1.2204
2.4408
3.6612
4.8816
6.102
1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fv

Mobile Neural Network 1.1.1

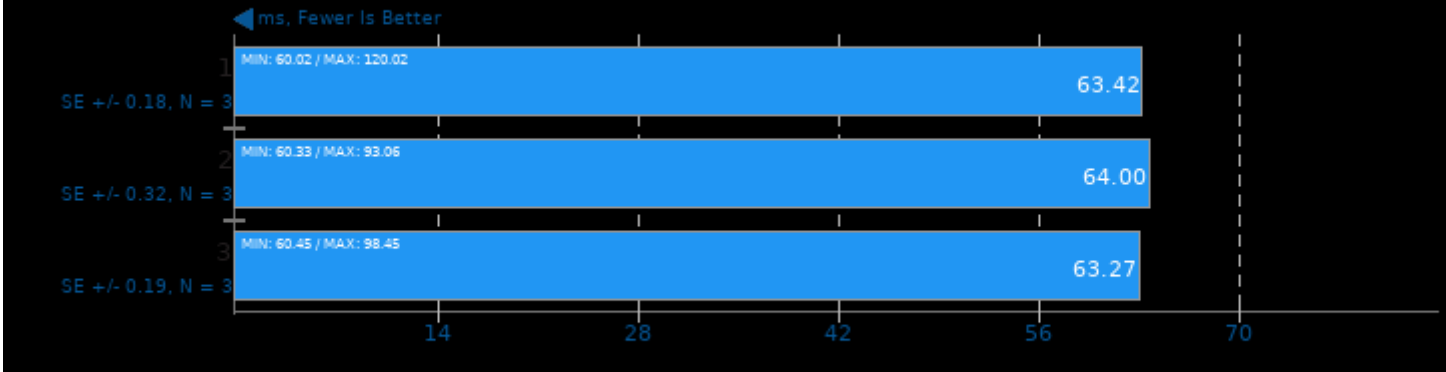
Model: mobilenet-v1-1.0



1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fv

Mobile Neural Network 1.1.1

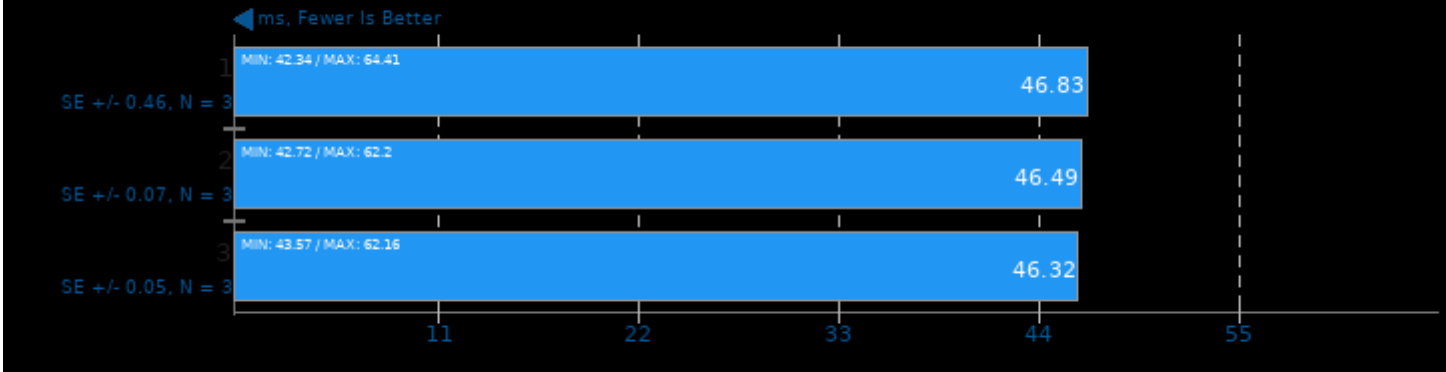
Model: inception-v3



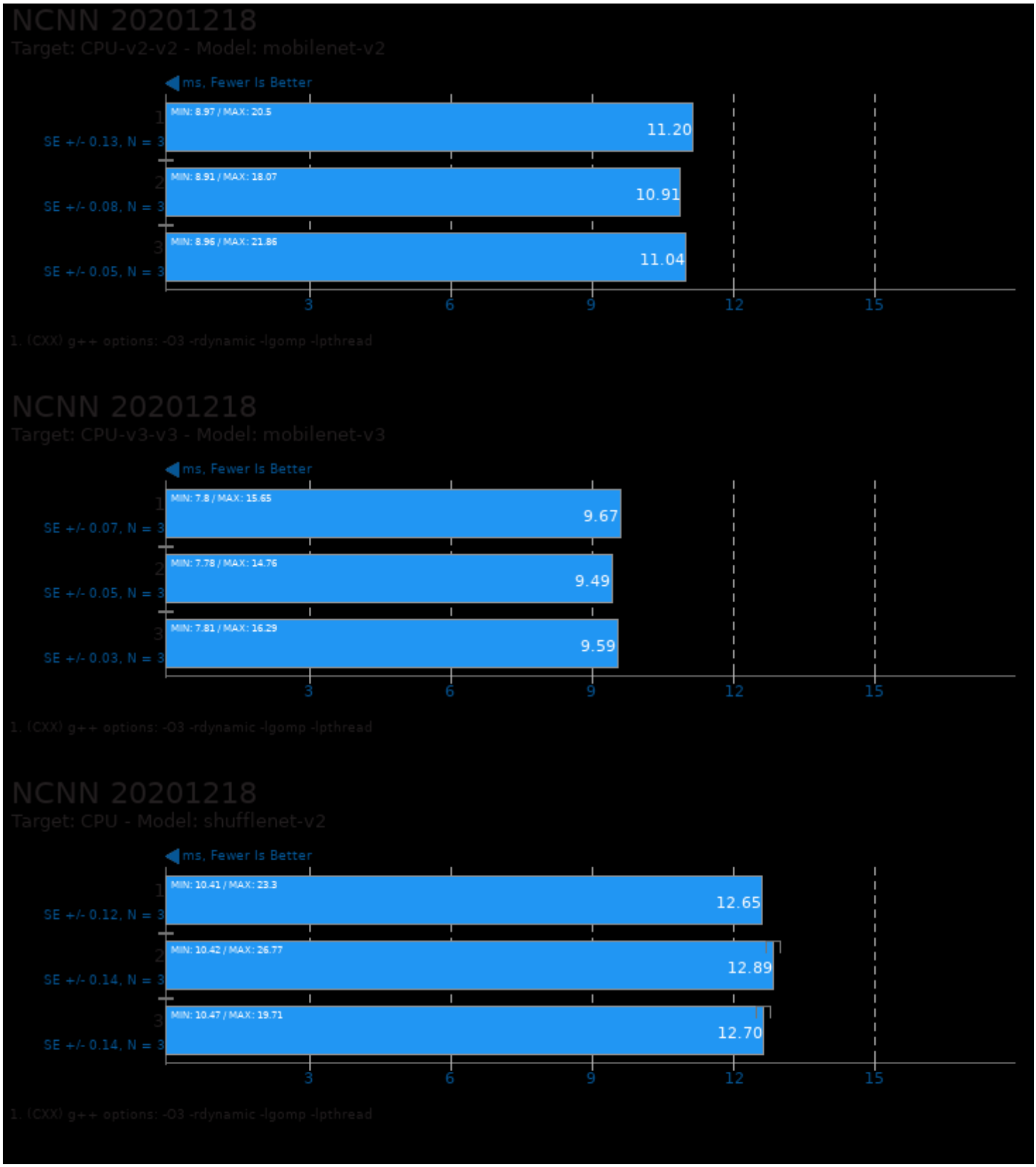
1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fv

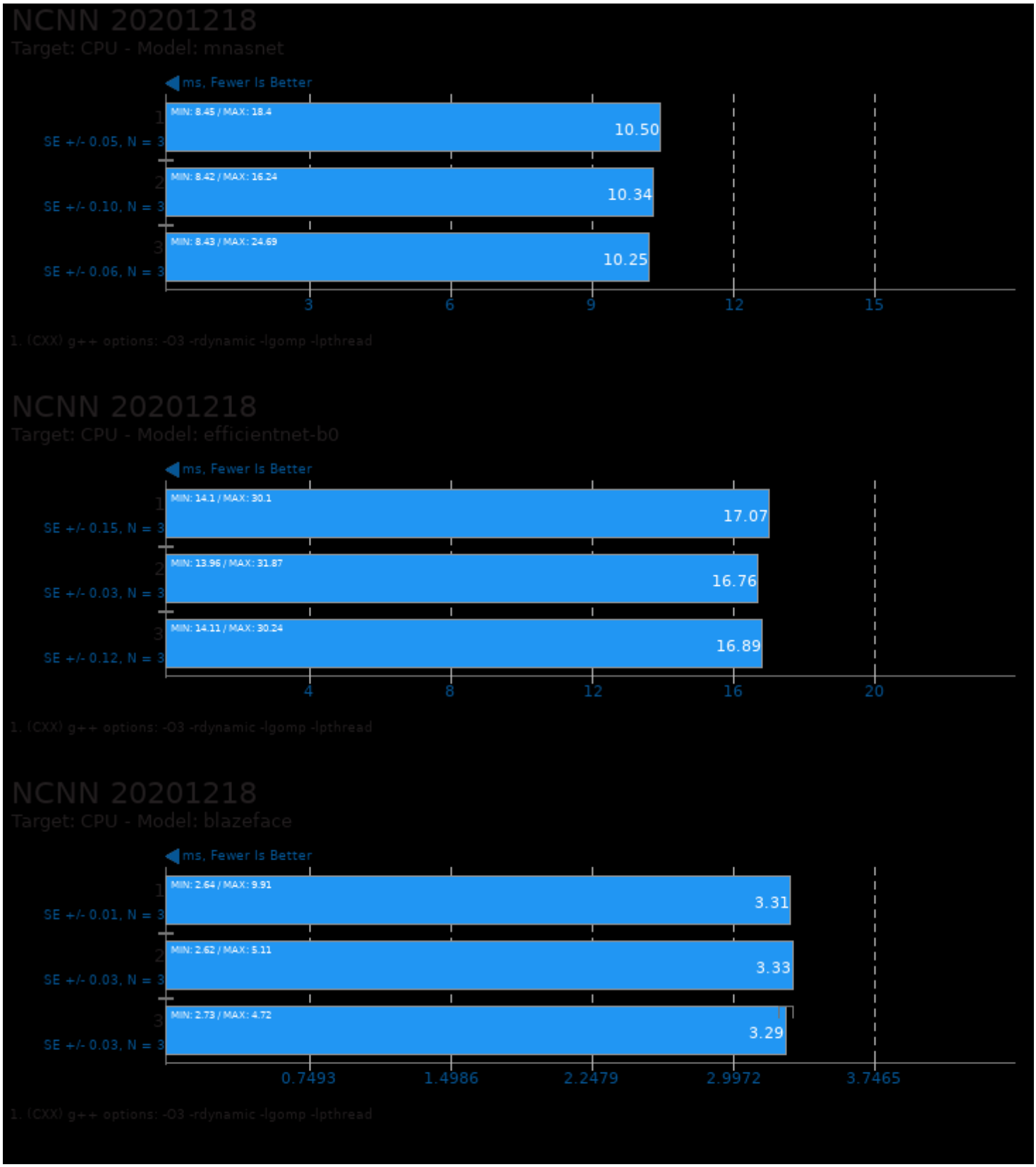
NCNN 20201218

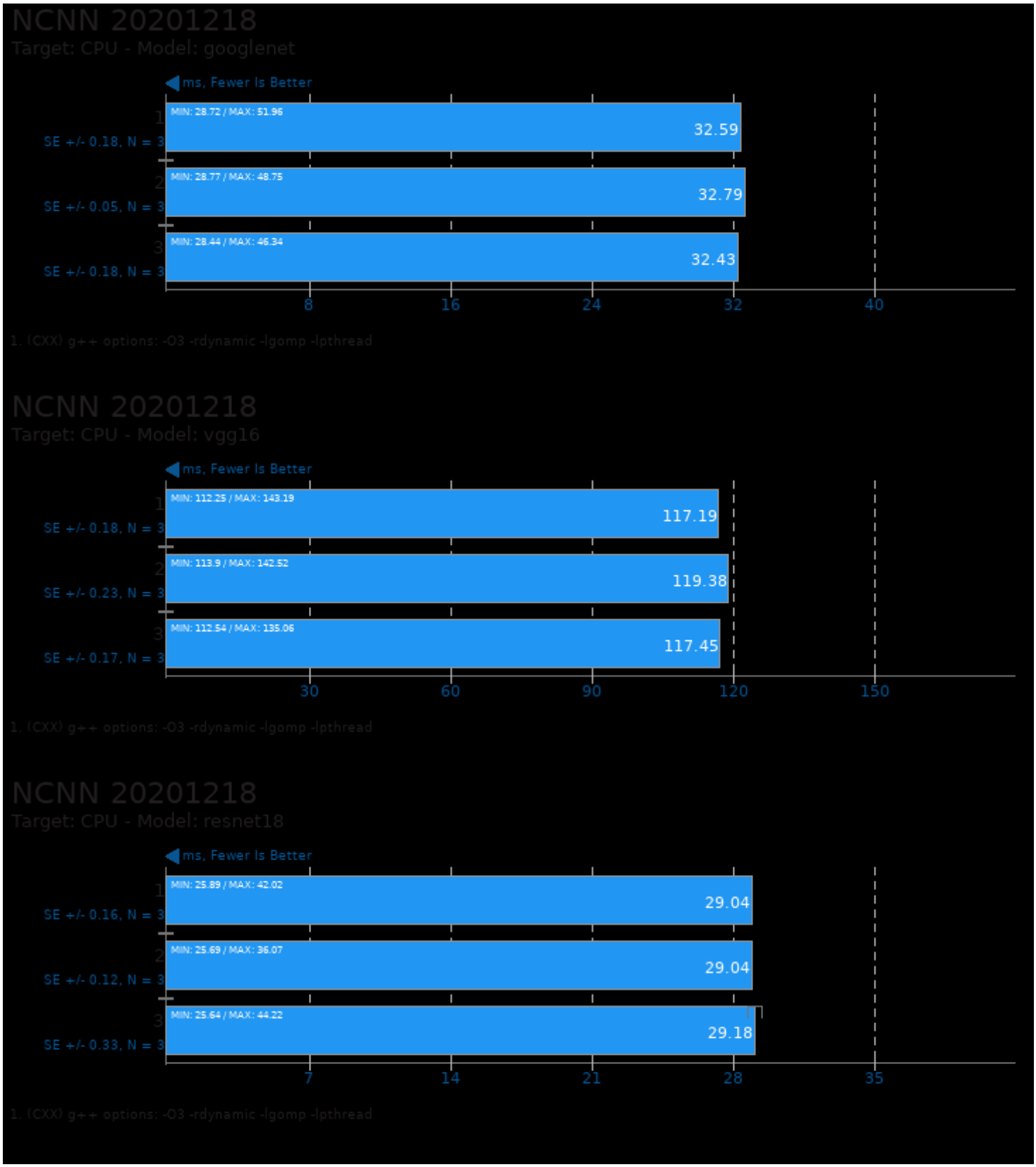
Target: CPU - Model: mobilenet

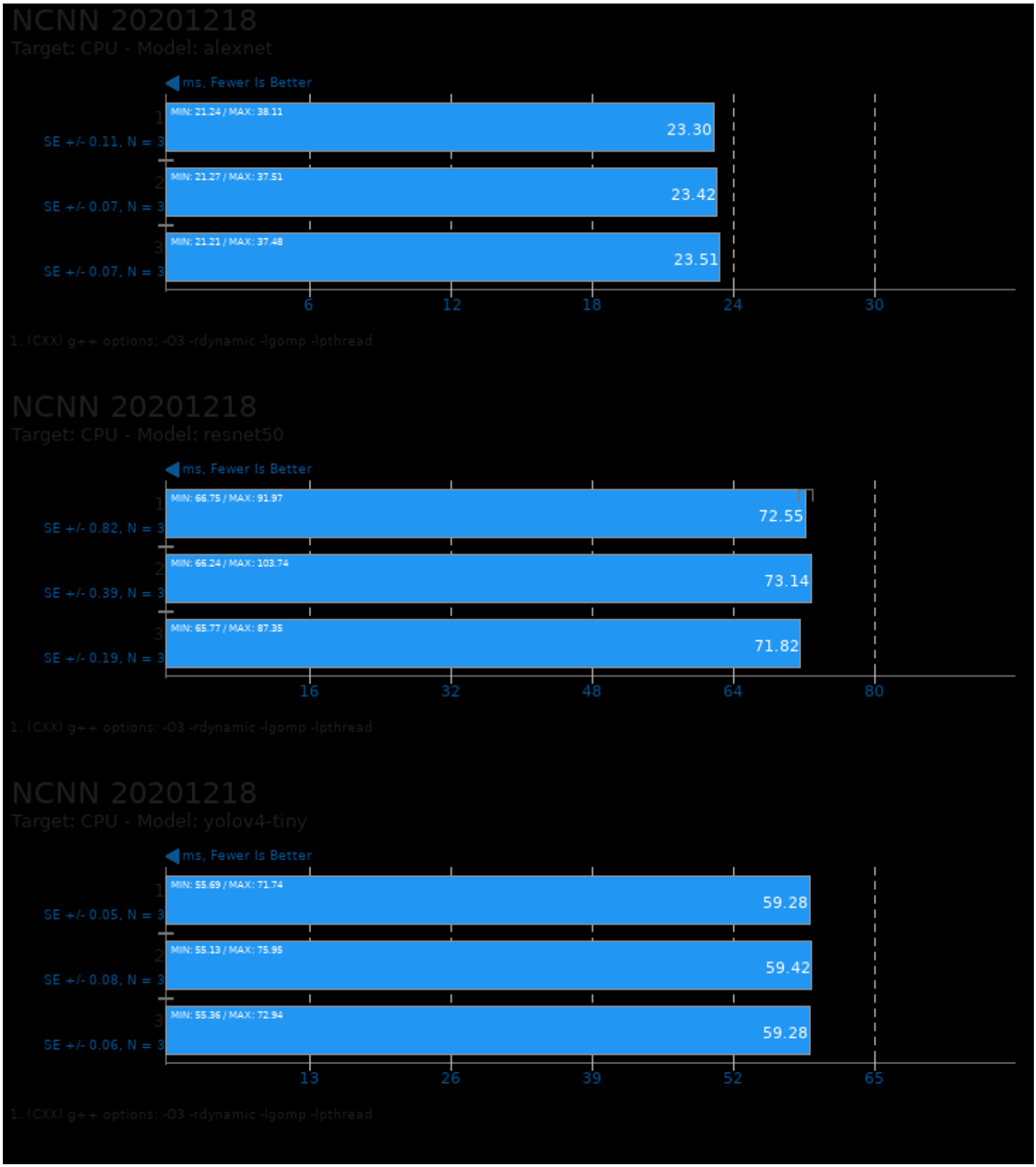


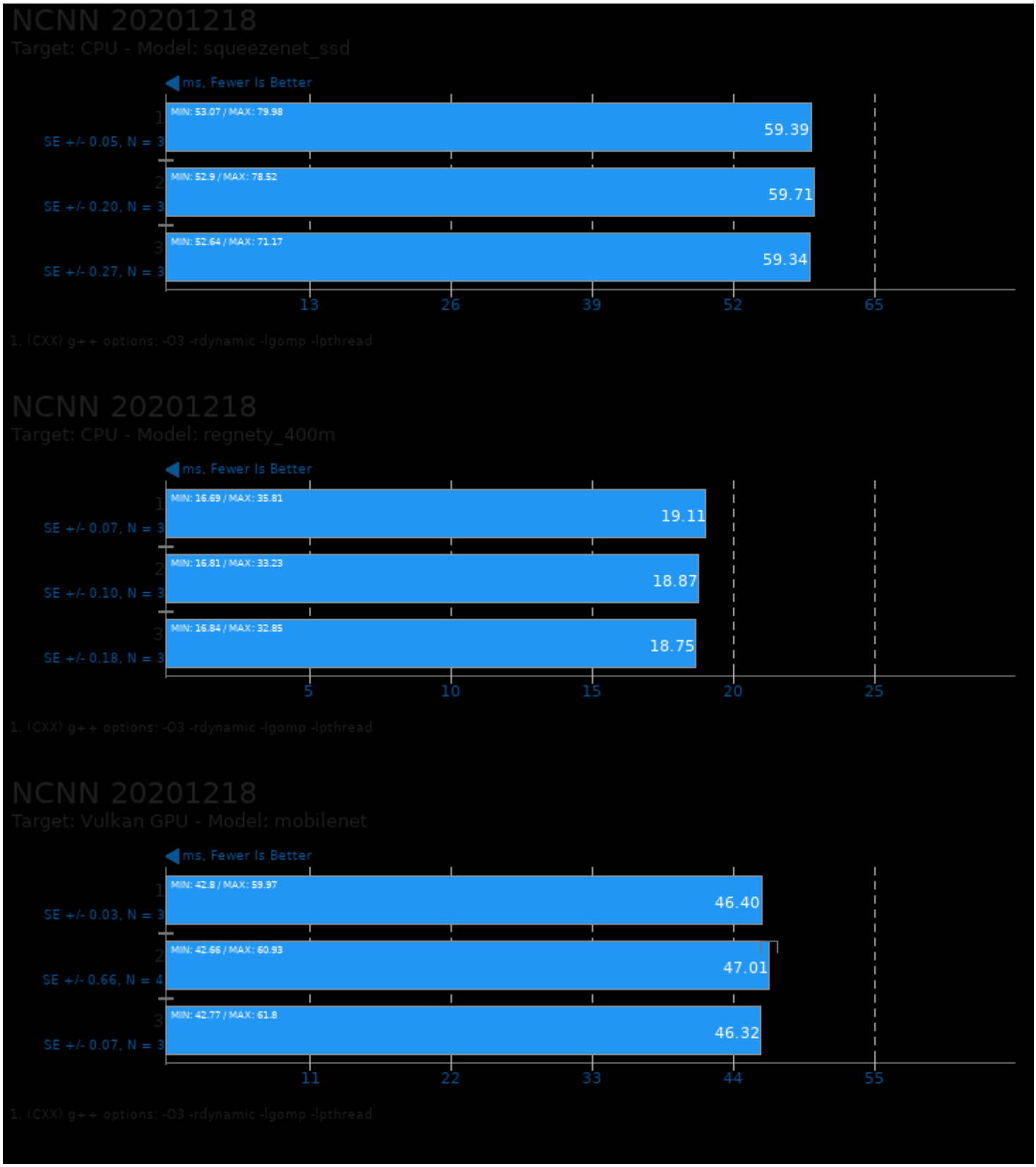
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread

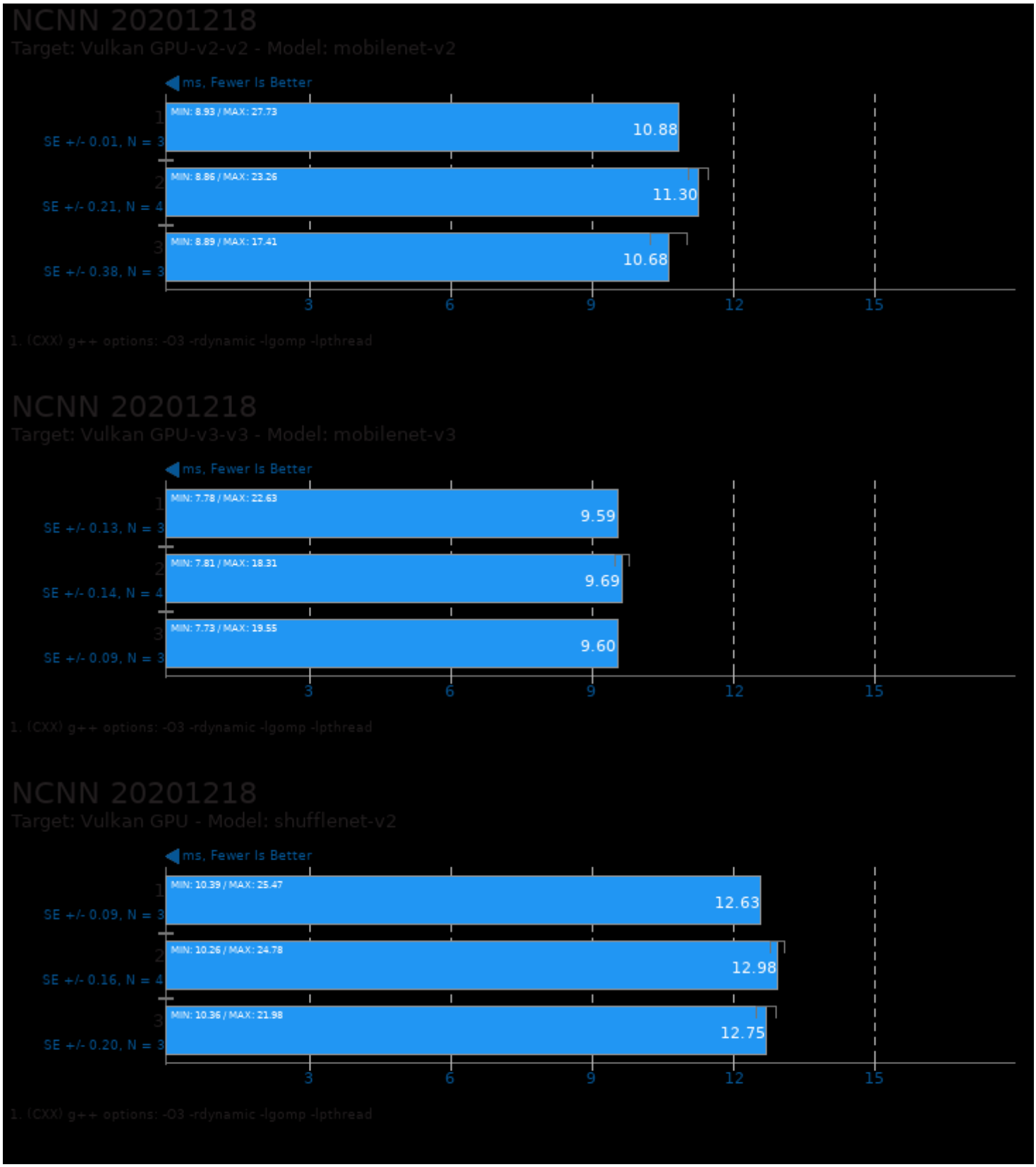

NCNN 20201218
Target: CPU-v2-v2 - Model: mobilenet-v2
ms, Fewer Is Better
1
MIN: 8.97 / MAX: 20.5
11.20
SE +/- 0.13, N = 3
2
MIN: 8.91 / MAX: 18.07
10.91
SE +/- 0.08, N = 3
3
MIN: 8.96 / MAX: 21.86
11.04
SE +/- 0.05, N = 3
3
6
9
12
15
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: CPU-v3-v3 - Model: mobilenet-v3
ms, Fewer Is Better
1
MIN: 7.8 / MAX: 15.65
9.67
SE +/- 0.07, N = 3
2
MIN: 7.78 / MAX: 14.76
9.49
SE +/- 0.05, N = 3
3
MIN: 7.81 / MAX: 16.29
9.59
SE +/- 0.03, N = 3
3
6
9
12
15
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: CPU - Model: shufflenet-v2
ms, Fewer Is Better
1
MIN: 10.41 / MAX: 23.3
12.65
SE +/- 0.12, N = 3
2
MIN: 10.42 / MAX: 26.77
12.89
SE +/- 0.14, N = 3
3
MIN: 10.47 / MAX: 19.71
12.70
SE +/- 0.14, N = 3
3
6
9
12
15
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread

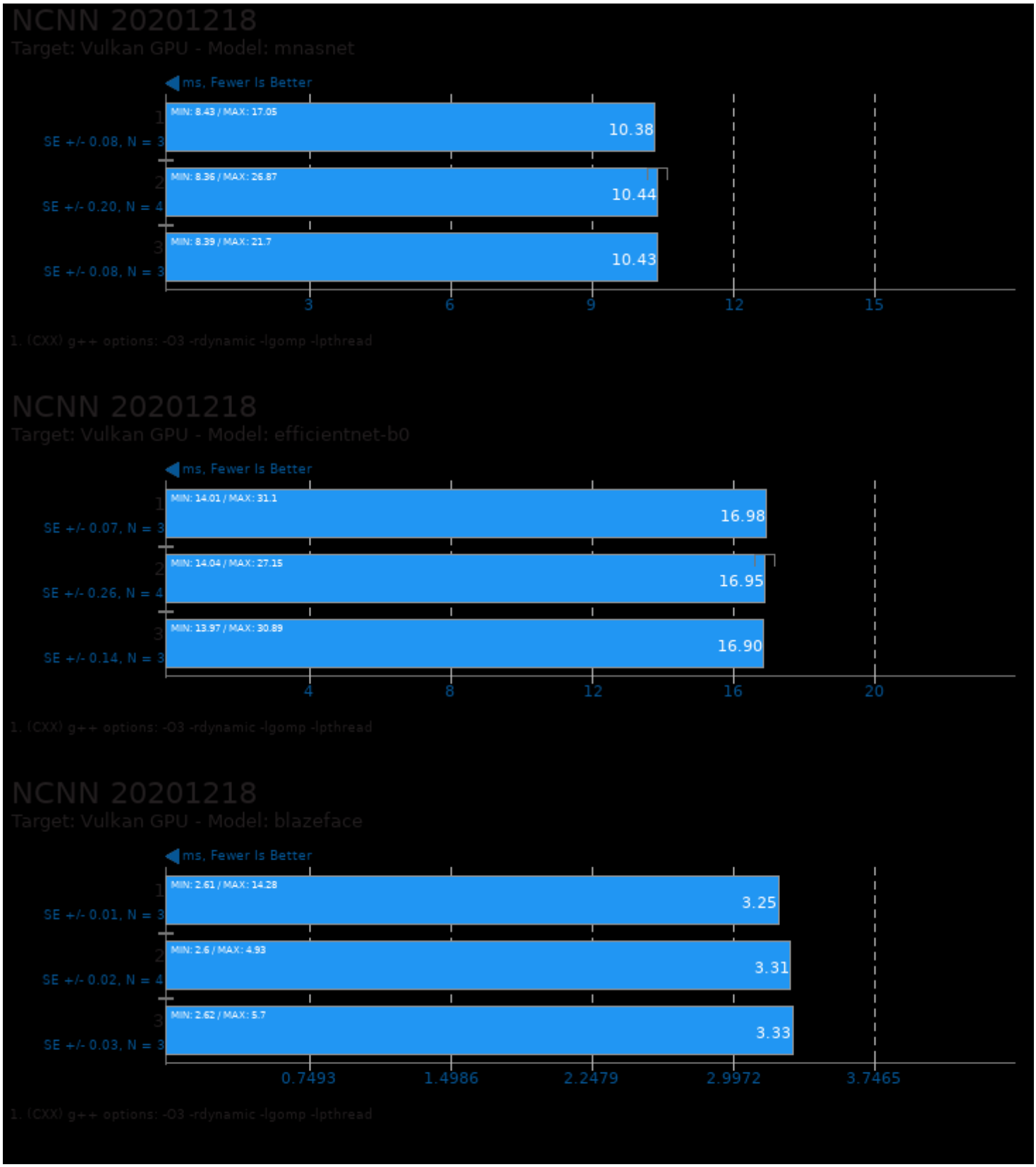

NCNN 20201218
Target: CPU - Model: mnasnet
ms, Fewer Is Better
MIN: 8.45 / MAX: 18.4
10.50
SE +/- 0.05, N = 3
MIN: 8.42 / MAX: 16.24
10.34
SE +/- 0.10, N = 3
MIN: 8.43 / MAX: 24.69
10.25
SE +/- 0.06, N = 3
3
6
9
12
15
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: CPU - Model: efficientnet-b0
ms, Fewer Is Better
MIN: 14.1 / MAX: 30.1
17.07
SE +/- 0.15, N = 3
MIN: 13.96 / MAX: 31.87
16.76
SE +/- 0.03, N = 3
MIN: 14.11 / MAX: 30.24
16.89
SE +/- 0.12, N = 3
4
8
12
16
20
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: CPU - Model: blazeface
ms, Fewer Is Better
MIN: 2.64 / MAX: 9.91
3.31
SE +/- 0.01, N = 3
MIN: 2.62 / MAX: 5.11
3.33
SE +/- 0.03, N = 3
MIN: 2.73 / MAX: 4.72
3.29
SE +/- 0.03, N = 3
0.7493
1.4986
2.2479
2.9972
3.7465
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread

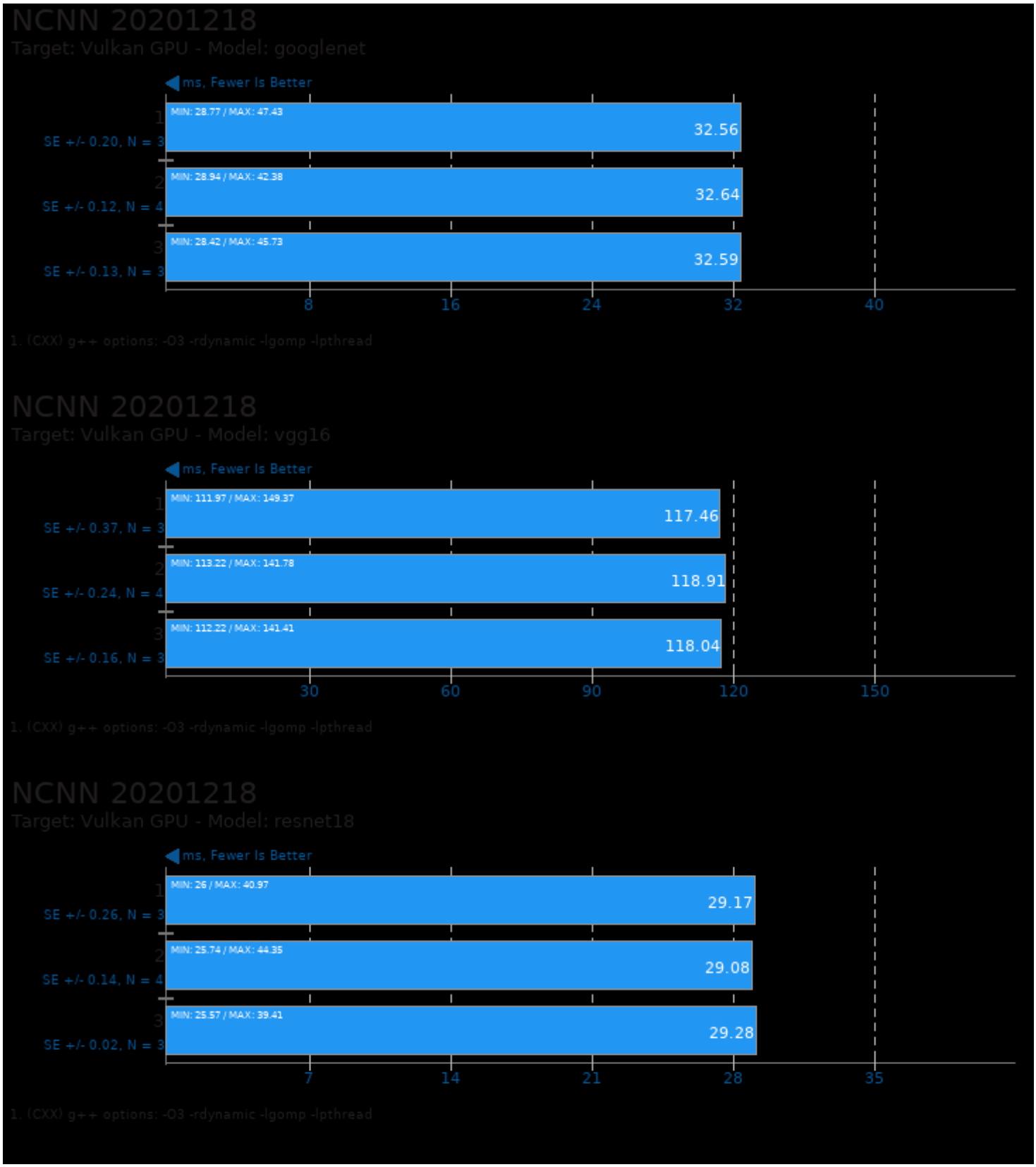

NCNN 20201218
Target: CPU - Model: googlenet
ms, Fewer Is Better
1
MIN: 28.72 / MAX: 51.96
32.59
SE +/- 0.18, N = 3
2
MIN: 28.77 / MAX: 48.75
32.79
SE +/- 0.05, N = 3
3
MIN: 28.44 / MAX: 46.34
32.43
SE +/- 0.18, N = 3
8
16
24
32
40
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: CPU - Model: vgg16
ms, Fewer Is Better
1
MIN: 112.25 / MAX: 143.19
117.19
SE +/- 0.18, N = 3
2
MIN: 113.9 / MAX: 142.52
119.38
SE +/- 0.23, N = 3
3
MIN: 112.54 / MAX: 135.06
117.45
SE +/- 0.17, N = 3
30
60
90
120
150
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: CPU - Model: resnet18
ms, Fewer Is Better
1
MIN: 25.89 / MAX: 42.02
29.04
SE +/- 0.16, N = 3
2
MIN: 25.69 / MAX: 36.07
29.04
SE +/- 0.12, N = 3
3
MIN: 25.64 / MAX: 44.22
29.18
SE +/- 0.33, N = 3
7
14
21
28
35
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread

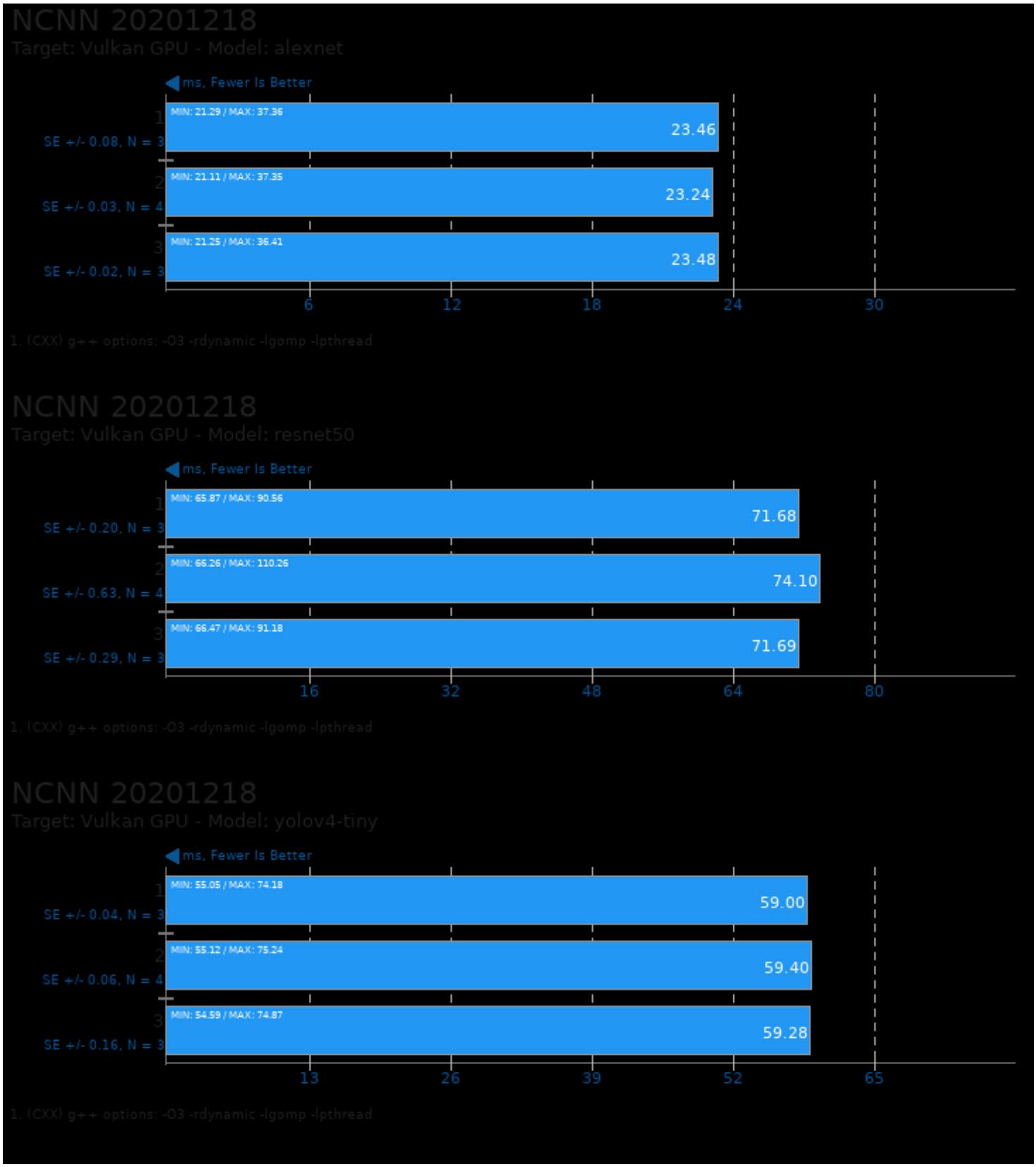

NCNN 20201218
Target: CPU - Model: alexnet
ms, Fewer Is Better
1
MIN: 21.24 / MAX: 38.11
23.30
SE +/- 0.11, N = 3
2
MIN: 21.27 / MAX: 37.51
23.42
SE +/- 0.07, N = 3
3
MIN: 21.21 / MAX: 37.48
23.51
SE +/- 0.07, N = 3
6
12
18
24
30
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: CPU - Model: resnet50
ms, Fewer Is Better
1
MIN: 66.75 / MAX: 91.97
72.55
SE +/- 0.82, N = 3
2
MIN: 66.24 / MAX: 103.74
73.14
SE +/- 0.39, N = 3
3
MIN: 65.77 / MAX: 87.35
71.82
SE +/- 0.19, N = 3
16
32
48
64
80
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: CPU - Model: yolov4-tiny
ms, Fewer Is Better
1
MIN: 55.69 / MAX: 71.74
59.28
SE +/- 0.05, N = 3
2
MIN: 55.13 / MAX: 75.95
59.42
SE +/- 0.08, N = 3
3
MIN: 55.36 / MAX: 72.94
59.28
SE +/- 0.06, N = 3
13
26
39
52
65
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread

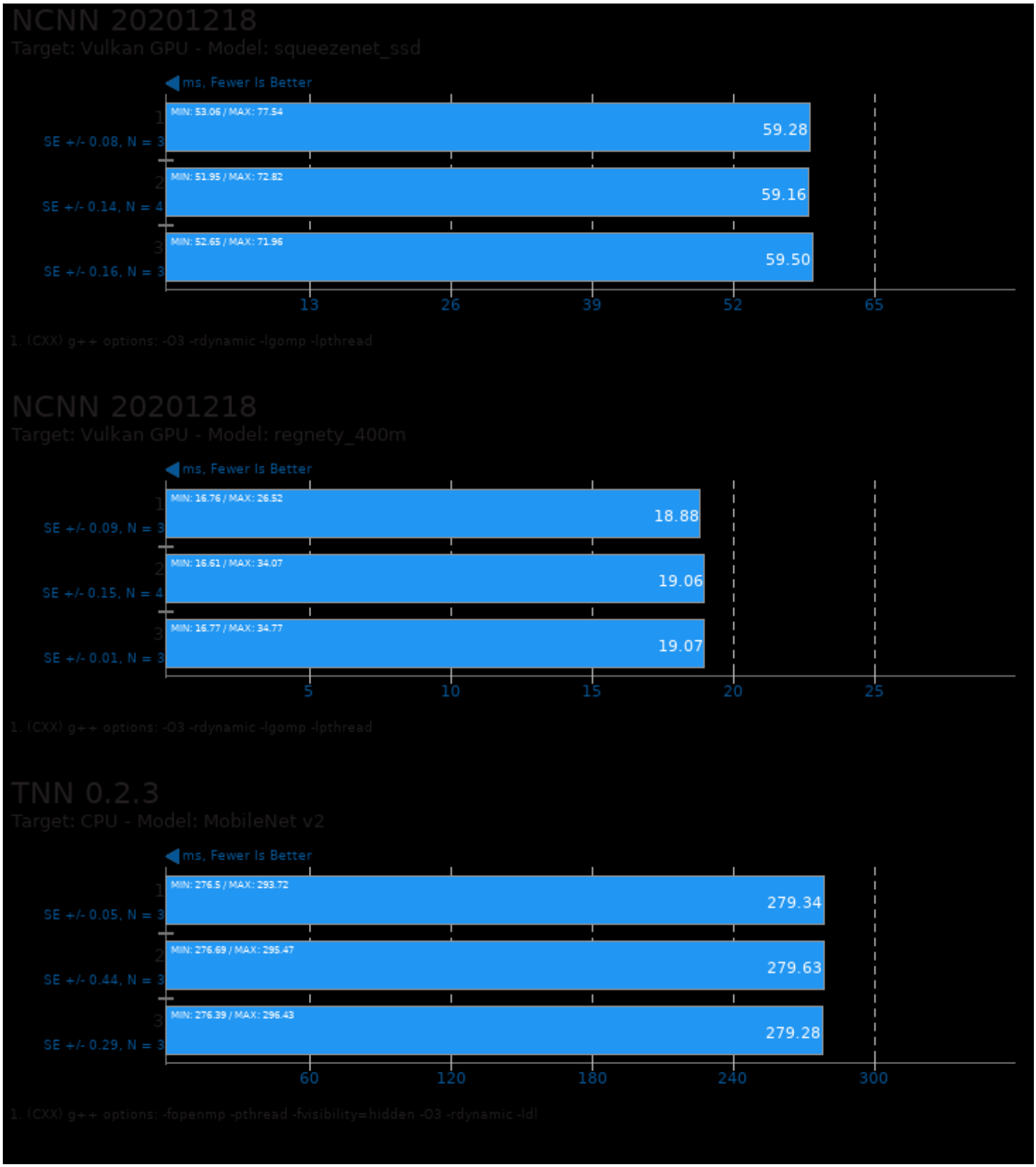

NCNN 20201218
Target: CPU - Model: squeezenet_ssd
ms, Fewer Is Better
MIN: 53.07 / MAX: 79.98
59.39
SE +/- 0.05, N = 3
MIN: 52.9 / MAX: 78.52
59.71
SE +/- 0.20, N = 3
MIN: 52.64 / MAX: 71.17
59.34
SE +/- 0.27, N = 3
13
26
39
52
65
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: CPU - Model: regnety_400m
ms, Fewer Is Better
MIN: 16.69 / MAX: 35.81
19.11
SE +/- 0.07, N = 3
MIN: 16.81 / MAX: 33.23
18.87
SE +/- 0.10, N = 3
MIN: 16.84 / MAX: 32.85
18.75
SE +/- 0.18, N = 3
5
10
15
20
25
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: Vulkan GPU - Model: mobilenet
ms, Fewer Is Better
MIN: 42.8 / MAX: 59.97
46.40
SE +/- 0.03, N = 3
MIN: 42.66 / MAX: 60.93
47.01
SE +/- 0.66, N = 4
MIN: 42.77 / MAX: 61.8
46.32
SE +/- 0.07, N = 3
11
22
33
44
55
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread


NCNN 20201218
Target: Vulkan GPU-v2-v2 - Model: mobilenet-v2
ms, Fewer Is Better
1
SE +/- 0.01, N = 3
MIN: 8.93 / MAX: 27.73
10.88
2
SE +/- 0.21, N = 4
MIN: 8.86 / MAX: 23.26
11.30
3
SE +/- 0.38, N = 3
MIN: 8.89 / MAX: 17.41
10.68
3
6
9
12
15
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: Vulkan GPU-v3-v3 - Model: mobilenet-v3
ms, Fewer Is Better
1
SE +/- 0.13, N = 3
MIN: 7.78 / MAX: 22.63
9.59
2
SE +/- 0.14, N = 4
MIN: 7.81 / MAX: 18.31
9.69
3
SE +/- 0.09, N = 3
MIN: 7.73 / MAX: 19.55
9.60
3
6
9
12
15
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: Vulkan GPU - Model: shufflenet-v2
ms, Fewer Is Better
1
SE +/- 0.09, N = 3
MIN: 10.39 / MAX: 25.47
12.63
2
SE +/- 0.16, N = 4
MIN: 10.26 / MAX: 24.78
12.98
3
SE +/- 0.20, N = 3
MIN: 10.36 / MAX: 21.98
12.75
3
6
9
12
15
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread


NCNN 20201218
Target: Vulkan GPU - Model: mnasnet
ms, Fewer Is Better
1
SE +/- 0.08, N = 3
MIN: 8.43 / MAX: 17.05
10.38
2
SE +/- 0.20, N = 4
MIN: 8.36 / MAX: 26.87
10.44
3
SE +/- 0.08, N = 3
MIN: 8.39 / MAX: 21.7
10.43
3
6
9
12
15
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: Vulkan GPU - Model: efficientnet-b0
ms, Fewer Is Better
1
SE +/- 0.07, N = 3
MIN: 14.01 / MAX: 31.1
16.98
2
SE +/- 0.26, N = 4
MIN: 14.04 / MAX: 27.15
16.95
3
SE +/- 0.14, N = 3
MIN: 13.97 / MAX: 30.89
16.90
4
8
12
16
20
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: Vulkan GPU - Model: blazeface
ms, Fewer Is Better
1
SE +/- 0.01, N = 3
MIN: 2.61 / MAX: 14.28
3.25
2
SE +/- 0.02, N = 4
MIN: 2.6 / MAX: 4.93
3.31
3
SE +/- 0.03, N = 3
MIN: 2.62 / MAX: 5.7
3.33
0.7493
1.4986
2.2479
2.9972
3.7465
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread

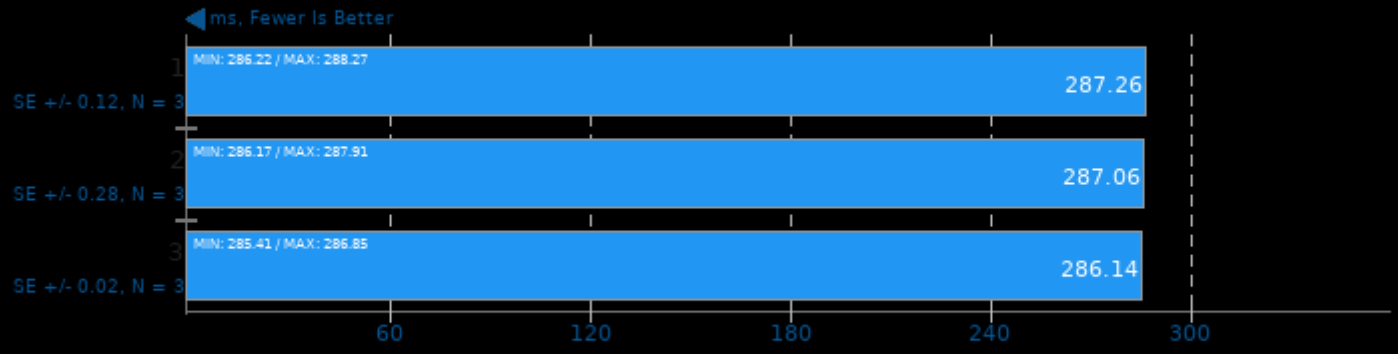

NCNN 20201218
Target: Vulkan GPU - Model: googlenet
ms, Fewer Is Better
1
SE +/- 0.20, N = 3
MIN: 28.77 / MAX: 47.43
32.56
2
SE +/- 0.12, N = 4
MIN: 28.94 / MAX: 42.38
32.64
3
SE +/- 0.13, N = 3
MIN: 28.42 / MAX: 45.73
32.59
8
16
24
32
40
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: Vulkan GPU - Model: vgg16
ms, Fewer Is Better
1
SE +/- 0.37, N = 3
MIN: 111.97 / MAX: 149.37
117.46
2
SE +/- 0.24, N = 4
MIN: 113.22 / MAX: 141.78
118.91
3
SE +/- 0.16, N = 3
MIN: 112.22 / MAX: 141.41
118.04
30
60
90
120
150
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: Vulkan GPU - Model: resnet18
ms, Fewer Is Better
1
SE +/- 0.26, N = 3
MIN: 26 / MAX: 40.97
29.17
2
SE +/- 0.14, N = 4
MIN: 25.74 / MAX: 44.35
29.08
3
SE +/- 0.02, N = 3
MIN: 25.57 / MAX: 39.41
29.28
7
14
21
28
35
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread


NCNN 20201218
Target: Vulkan GPU - Model: alexnet
ms, Fewer Is Better
1
MIN: 21.29 / MAX: 37.36
23.46
SE +/- 0.08, N = 3
2
MIN: 21.11 / MAX: 37.35
23.24
SE +/- 0.03, N = 4
3
MIN: 21.25 / MAX: 36.41
23.48
SE +/- 0.02, N = 3
6
12
18
24
30
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: Vulkan GPU - Model: resnet50
ms, Fewer Is Better
1
MIN: 65.87 / MAX: 90.56
71.68
SE +/- 0.20, N = 3
2
MIN: 66.26 / MAX: 110.26
74.10
SE +/- 0.63, N = 4
3
MIN: 66.47 / MAX: 91.18
71.69
SE +/- 0.29, N = 3
16
32
48
64
80
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: Vulkan GPU - Model: yolov4-tiny
ms, Fewer Is Better
1
MIN: 55.05 / MAX: 74.18
59.00
SE +/- 0.04, N = 3
2
MIN: 55.12 / MAX: 75.24
59.40
SE +/- 0.06, N = 4
3
MIN: 54.59 / MAX: 74.87
59.28
SE +/- 0.16, N = 3
13
26
39
52
65
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread


NCNN 20201218
Target: Vulkan GPU - Model: squeezenet_ssd
ms, Fewer Is Better
1
SE +/- 0.08, N = 3
MIN: 53.06 / MAX: 77.54
59.28
2
SE +/- 0.14, N = 4
MIN: 51.95 / MAX: 72.82
59.16
3
SE +/- 0.16, N = 3
MIN: 52.65 / MAX: 71.96
59.50
13
26
39
52
65
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: Vulkan GPU - Model: regnety_400m
ms, Fewer Is Better
1
SE +/- 0.09, N = 3
MIN: 16.76 / MAX: 26.52
18.88
2
SE +/- 0.15, N = 4
MIN: 16.61 / MAX: 34.07
19.06
3
SE +/- 0.01, N = 3
MIN: 16.77 / MAX: 34.77
19.07
5
10
15
20
25
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
TNN 0.2.3
Target: CPU - Model: MobileNet v2
ms, Fewer Is Better
1
SE +/- 0.05, N = 3
MIN: 276.5 / MAX: 293.72
279.34
2
SE +/- 0.44, N = 3
MIN: 276.69 / MAX: 295.47
279.63
3
SE +/- 0.29, N = 3
MIN: 276.39 / MAX: 296.43
279.28
60
120
180
240
300
1. (CXX) g++ options: -fopenmp -pthread -fvisibility=hidden -O3 -rdynamic -ldl

TNN 0.2.3

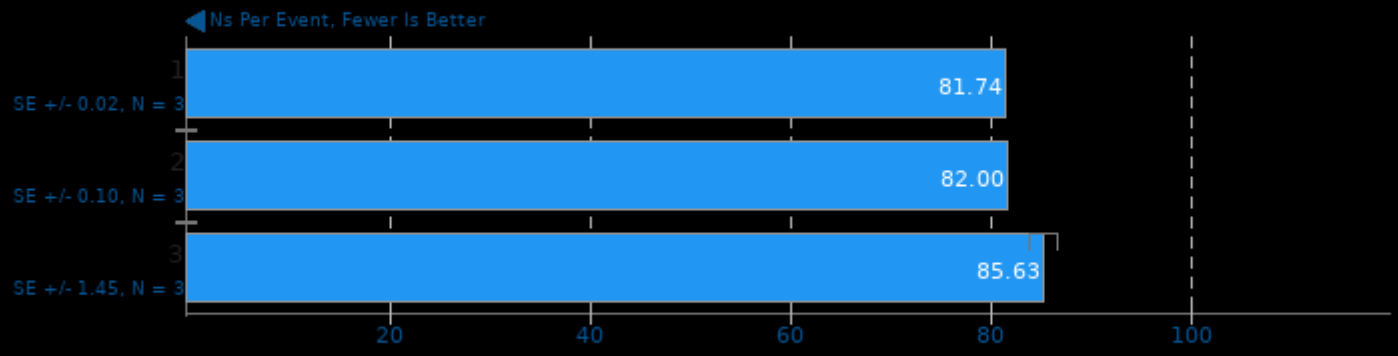
Target: CPU - Model: SqueezeNet v1.1



1. (CXX) g++ options: -fopenmp -pthread -fvisibility=hidden -O3 -rdynamic -ldl

OSBench

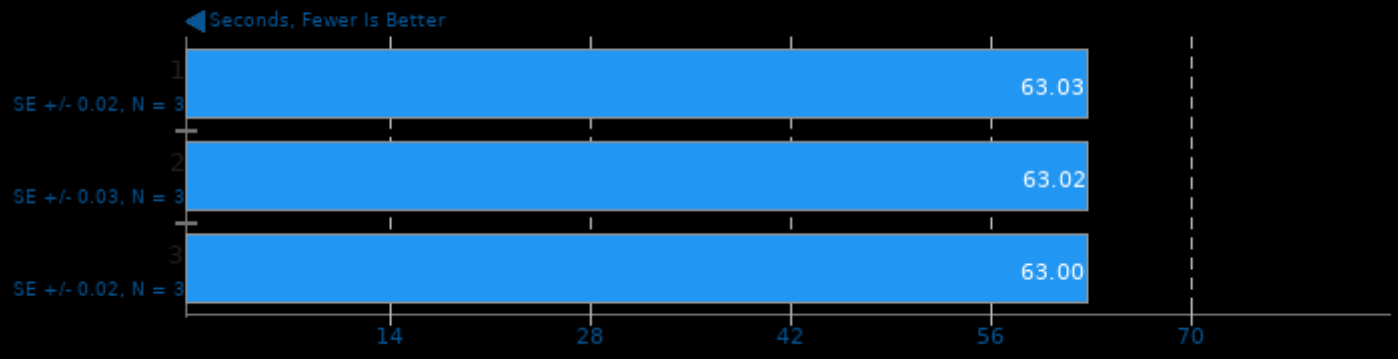
Test: Memory Allocations

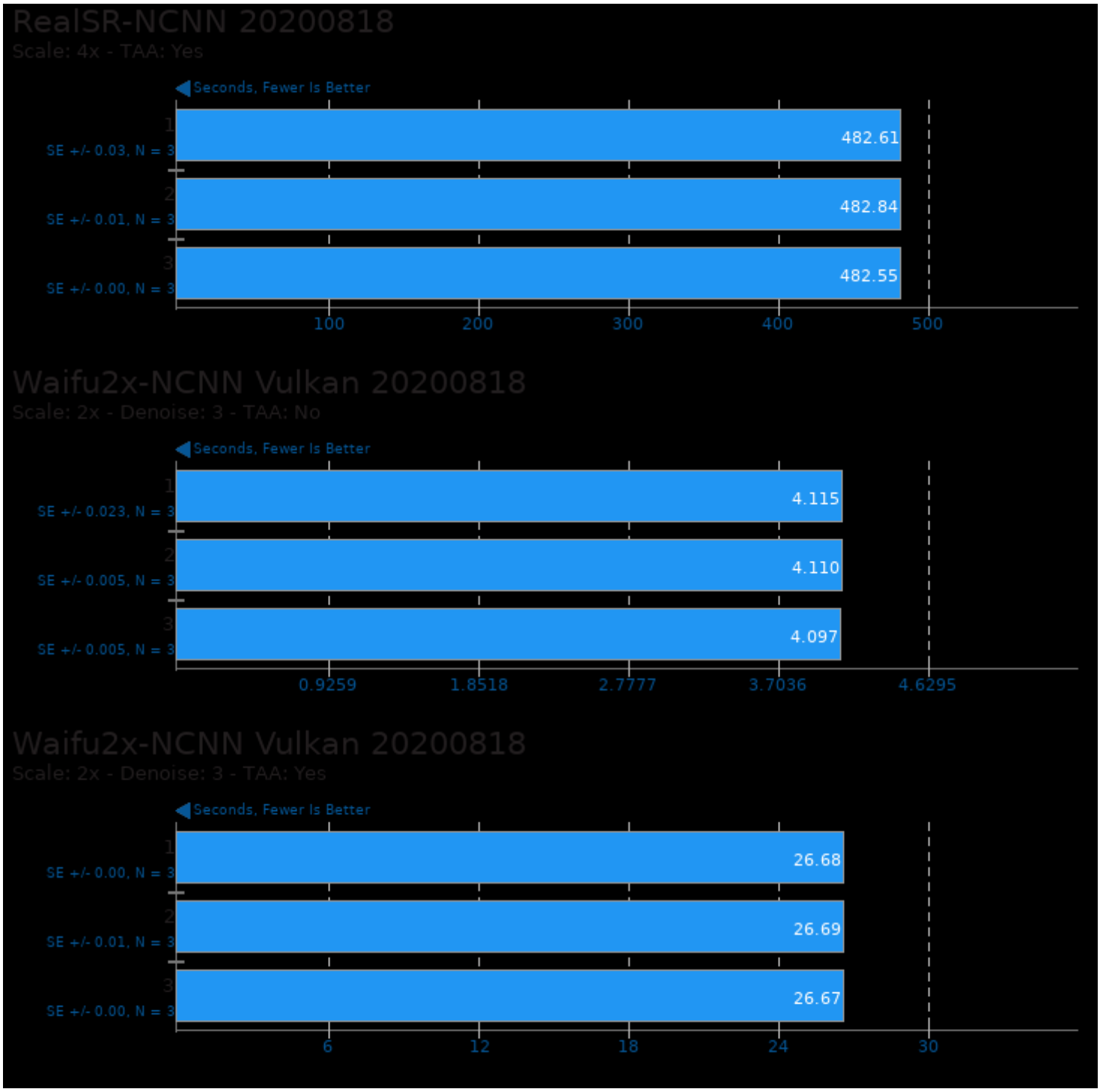


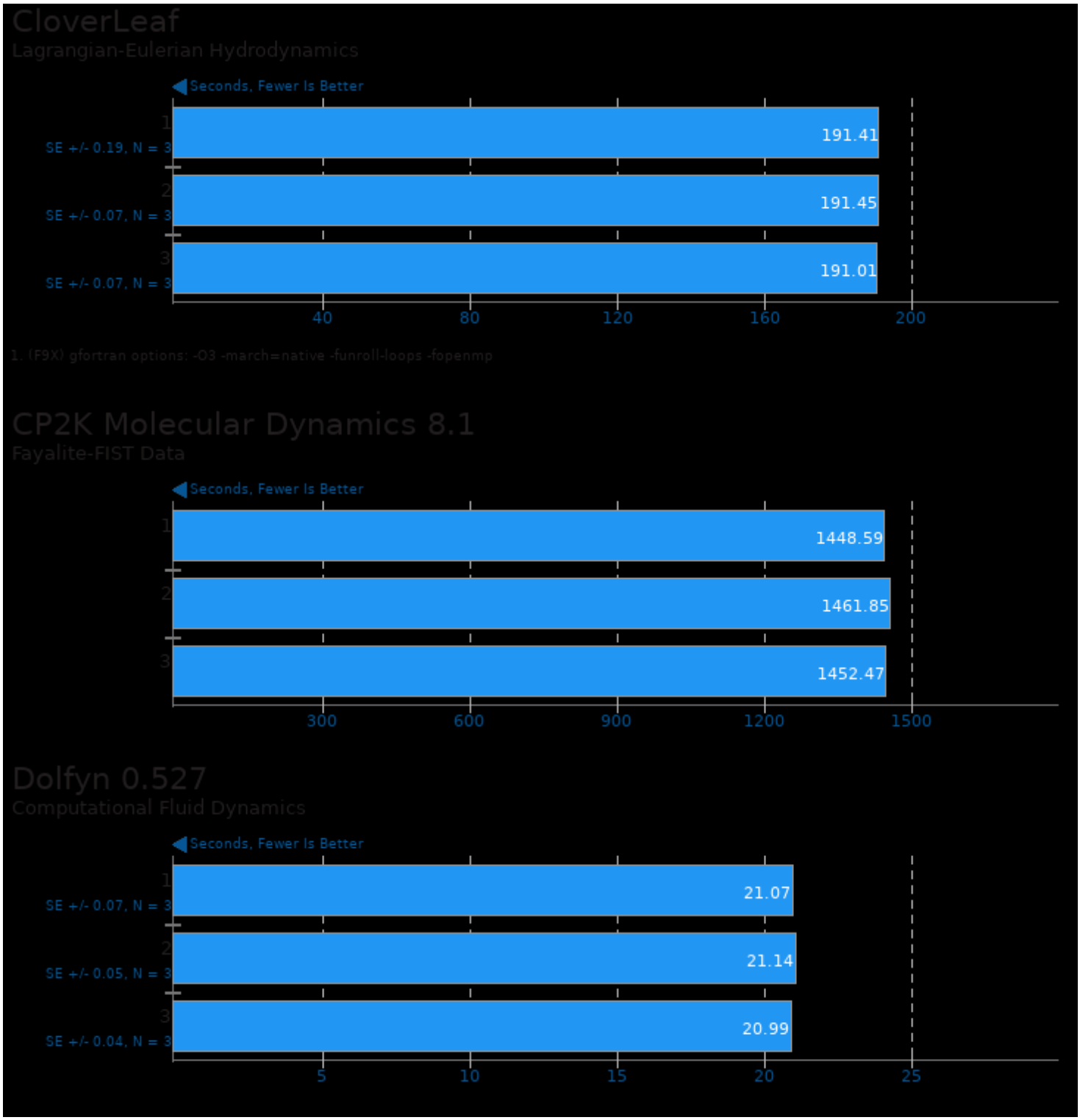
1. (CC) gcc options: -lm

RealSR-NCNN 20200818

Scale: 4x - TAA: No

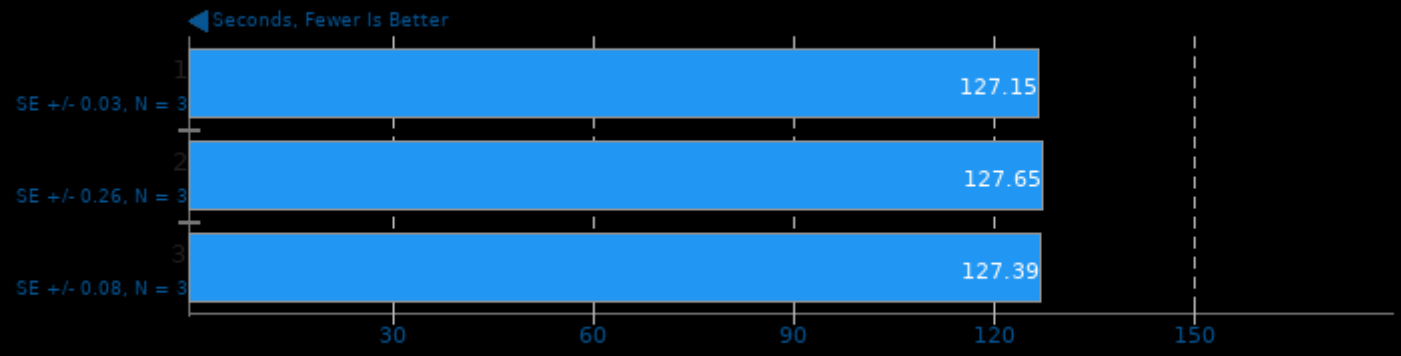



RealSR-NCNN 20200818
Scale: 4x - TAA: Yes
Seconds, Fewer Is Better
1
SE +/- 0.03, N = 3
482.61
2
SE +/- 0.01, N = 3
482.84
3
SE +/- 0.00, N = 3
482.55
100
200
300
400
500
Waifu2x-NCNN Vulkan 20200818
Scale: 2x - Denoise: 3 - TAA: No
Seconds, Fewer Is Better
1
SE +/- 0.023, N = 3
4.115
2
SE +/- 0.005, N = 3
4.110
3
SE +/- 0.005, N = 3
4.097
0.9259
1.8518
2.7777
3.7036
4.6295
Waifu2x-NCNN Vulkan 20200818
Scale: 2x - Denoise: 3 - TAA: Yes
Seconds, Fewer Is Better
1
SE +/- 0.00, N = 3
26.68
2
SE +/- 0.01, N = 3
26.69
3
SE +/- 0.00, N = 3
26.67
6
12
18
24
30


CloverLeaf
Lagrangian-Eulerian Hydrodynamics
Seconds, Fewer Is Better
1
SE +/- 0.19, N = 3
191.41
2
SE +/- 0.07, N = 3
191.45
3
SE +/- 0.07, N = 3
191.01
40
80
120
160
200
1. (F9X) gfortran options: -O3 -march=native -funroll-loops -fopenmp
CP2K Molecular Dynamics 8.1
Fayalite-FIST Data
Seconds, Fewer Is Better
1
1448.59
2
1461.85
3
1452.47
300
600
900
1200
1500
Dolfyn 0.527
Computational Fluid Dynamics
Seconds, Fewer Is Better
1
SE +/- 0.07, N = 3
21.07
2
SE +/- 0.05, N = 3
21.14
3
SE +/- 0.04, N = 3
20.99
5
10
15
20
25

Timed HMMer Search 3.3.1

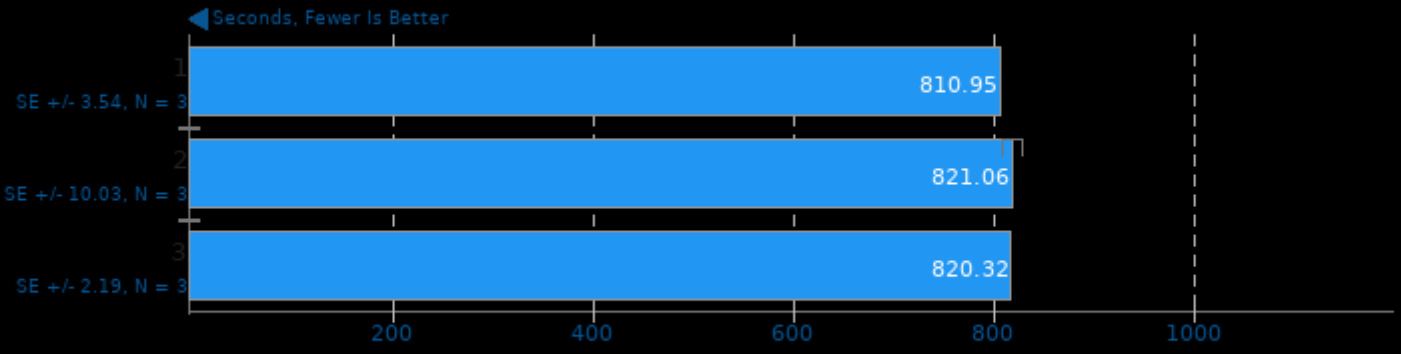
Pfam Database Search



1. (CC) gcc options: -O3 -pthread -lhmmer -leasel -lm

Incompact3D 2020-09-17

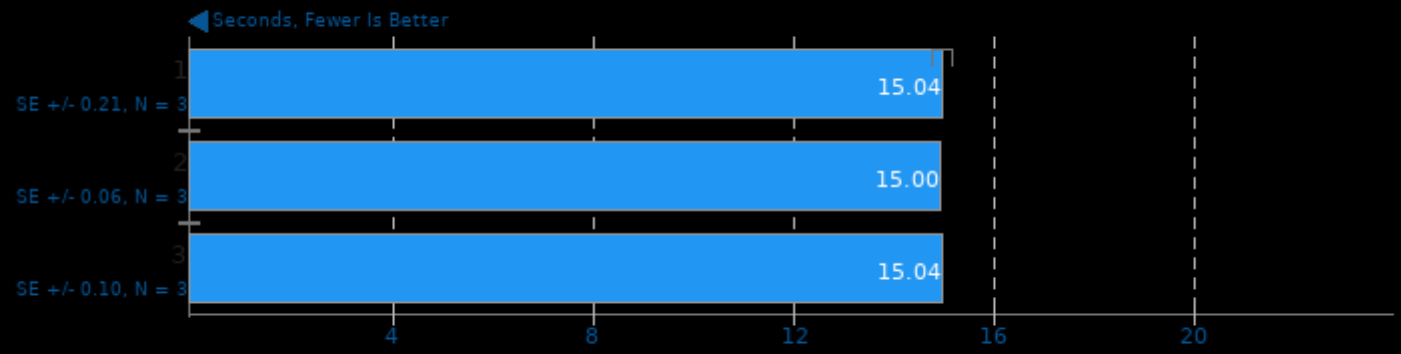
Input: Cylinder



1. (F9X) gfortran options: -cpp -funroll-loops -floop-optimize -fcray-pointer -fbacktrace -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi -lopen-rte -lopen-pal

Timed MAFFT Alignment 7.471

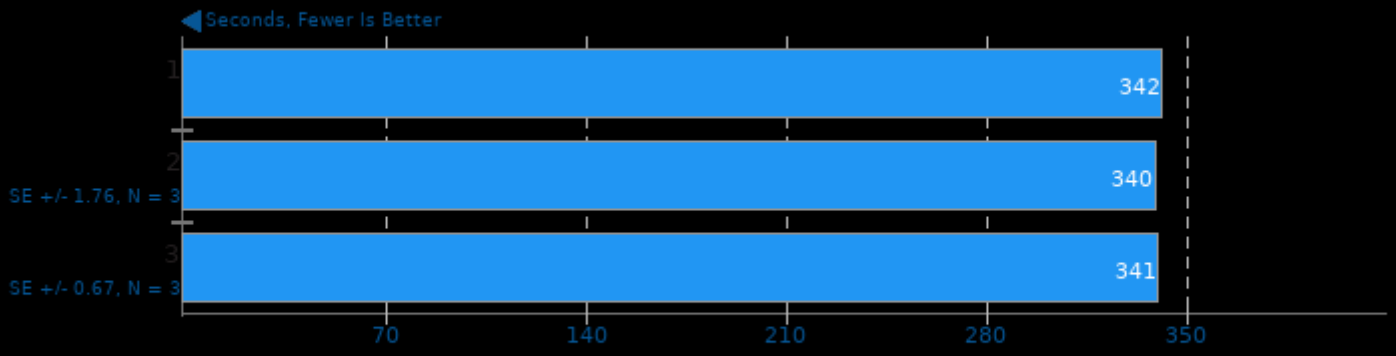
Multiple Sequence Alignment - LSU RNA



1. (CC) gcc options: -std=c99 -O3 -lm -lpthread

Monte Carlo Simulations of Ionised Nebulae 2019-03-24

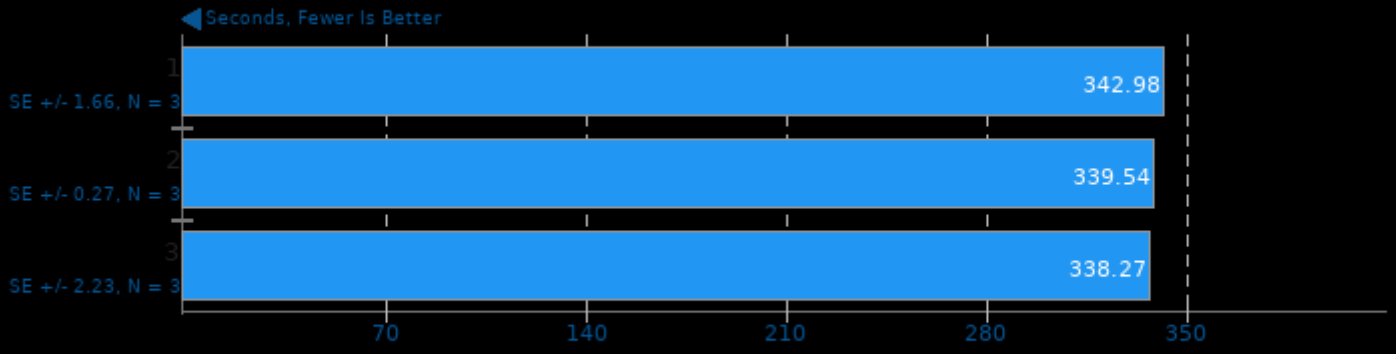
Input: Dust 2D tau100.0



1. (F9X) gfortran options: -cpp -Jsource/ -ffree-line-length-0 -lm -std=legacy -O3 -O2 -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi -lopen-rte -lopen-pal -lh

OpenFOAM 8

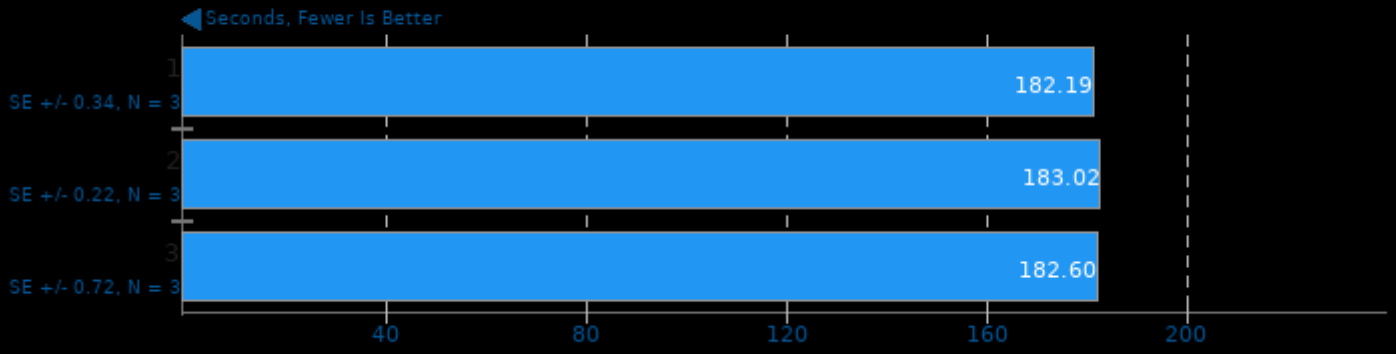
Input: Motorbike 30M

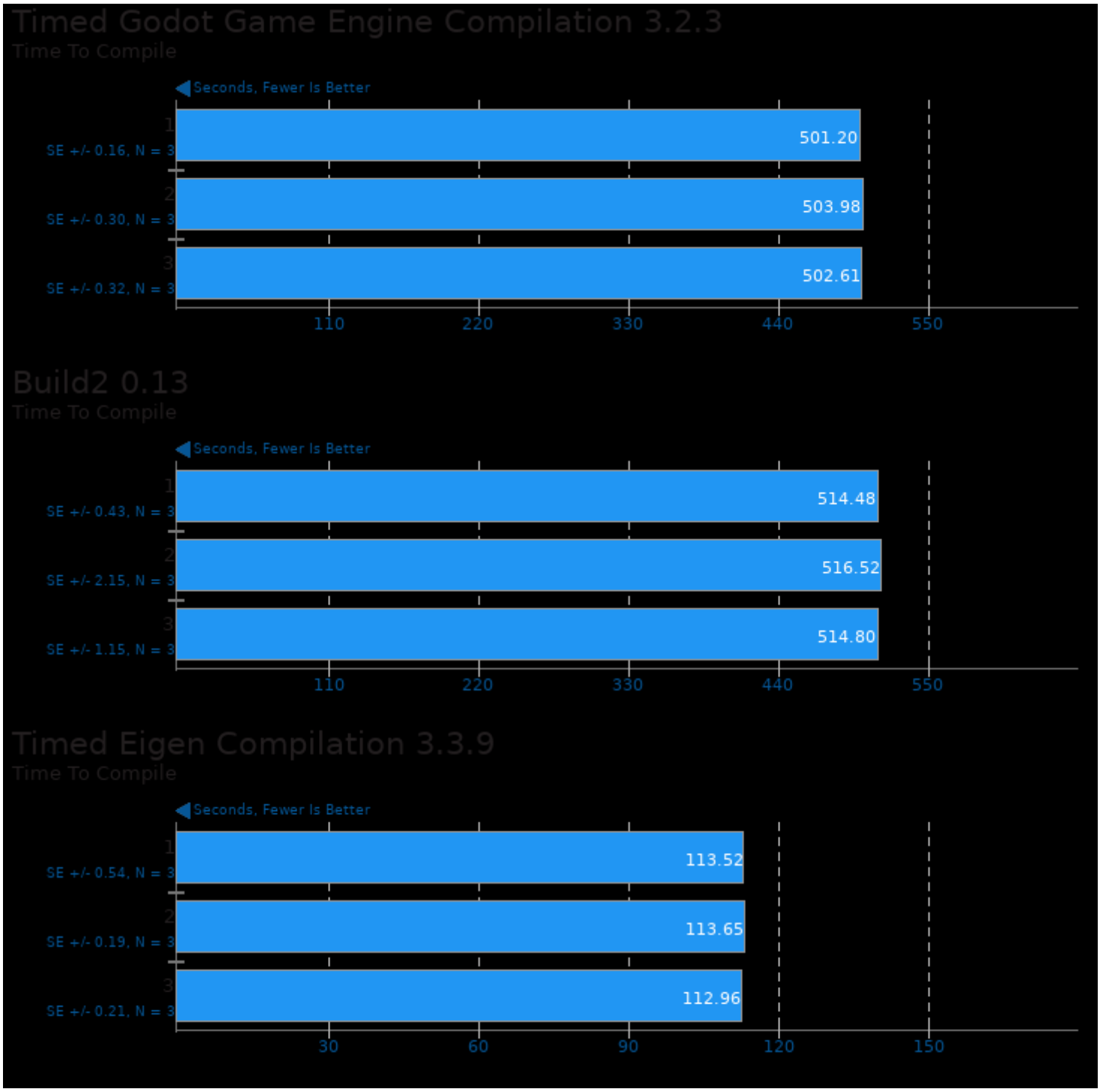


1. (CXX) g++ options: -std=c++11 -m64 -O3 -ftemplate-depth-100 -fPIC -fuse-ld=bfd -Xlinker --add-needed --no-as-needed -ldynamicMesh -lgenericPatch

Timed FFmpeg Compilation 4.2.2

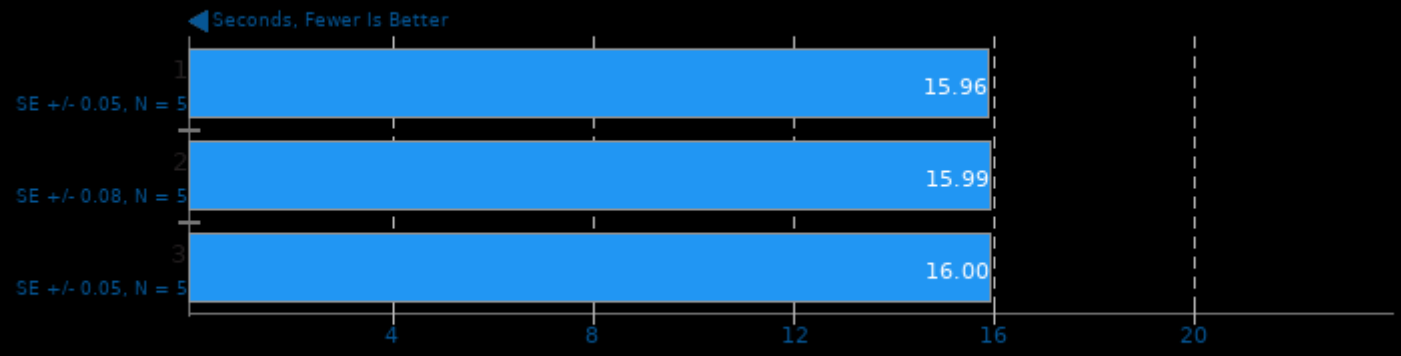
Time To Compile




Timed Godot Game Engine Compilation 3.2.3
Time To Compile
Seconds, Fewer Is Better
1
SE +/- 0.16, N = 3
501.20
2
SE +/- 0.30, N = 3
503.98
3
SE +/- 0.32, N = 3
502.61
110
220
330
440
550
Build2 0.13
Time To Compile
Seconds, Fewer Is Better
1
SE +/- 0.43, N = 3
514.48
2
SE +/- 2.15, N = 3
516.52
3
SE +/- 1.15, N = 3
514.80
110
220
330
440
550
Timed Eigen Compilation 3.3.9
Time To Compile
Seconds, Fewer Is Better
1
SE +/- 0.54, N = 3
113.52
2
SE +/- 0.19, N = 3
113.65
3
SE +/- 0.21, N = 3
112.96
30
60
90
120
150

Monkey Audio Encoding 3.99.6

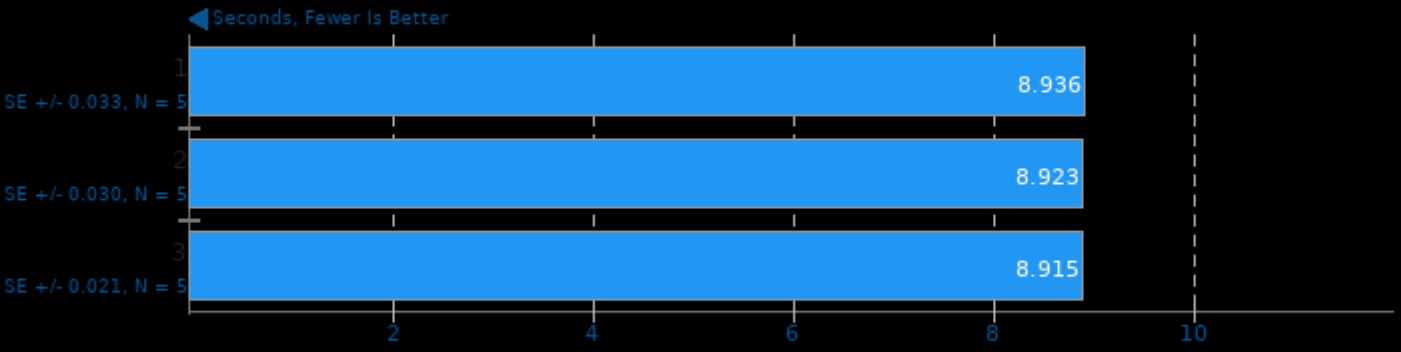
WAV To APE



1. (CXX) g++ options: -O3 -pedantic -rdynamic -lrt

Opus Codec Encoding 1.3.1

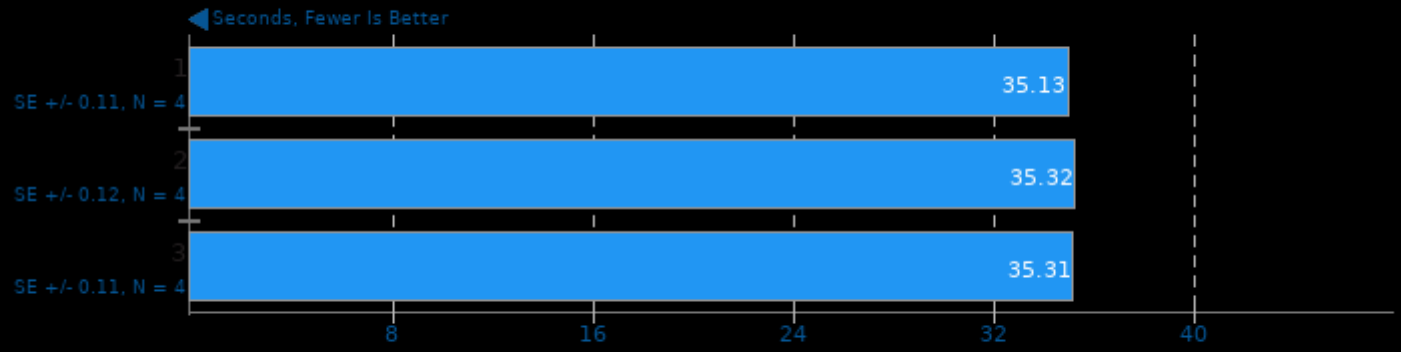
WAV To Opus Encode



1. (CXX) g++ options: -fvisibility=hidden -logg -lm

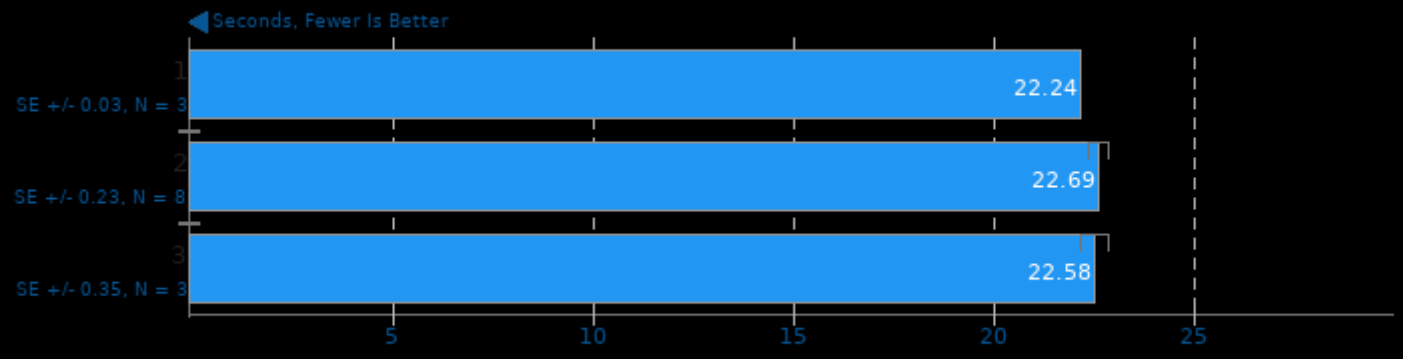
eSpeak-NG Speech Engine 20200907

Text-To-Speech Synthesis



1. (CC) gcc options: -O2 -std=c99

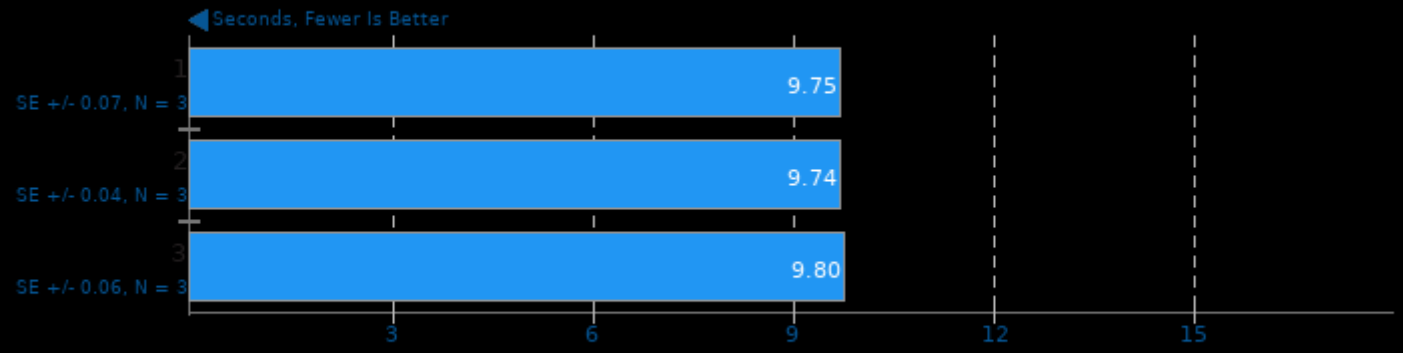
RNNoise 2020-06-28



1. (CC) gcc options: -O2 -pedantic -fvisibility=hidden

ASTC Encoder 2.0

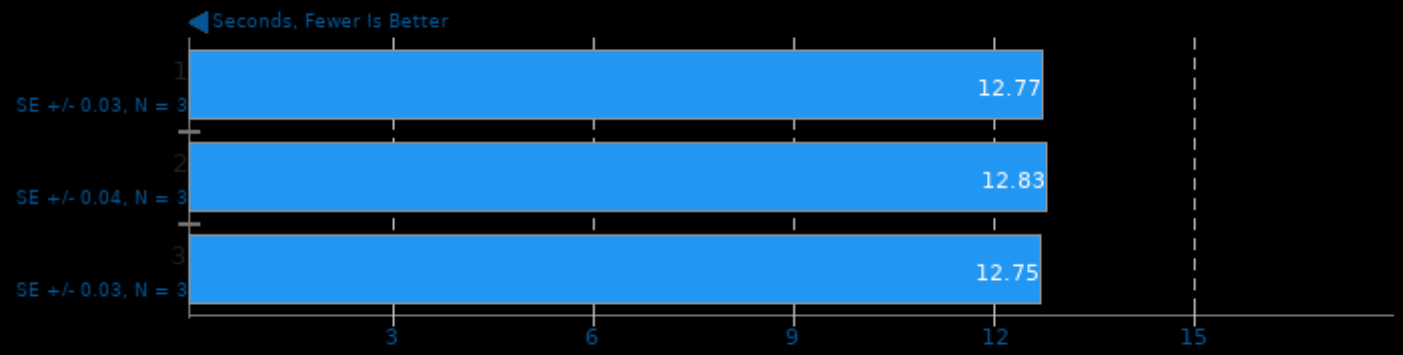
Preset: Fast



1. (CXX) g++ options: -std=c++14 -fvisibility=hidden -O3 -flto -mfpmath=sse -mavx2 -mpopcnt -lpthread

ASTC Encoder 2.0

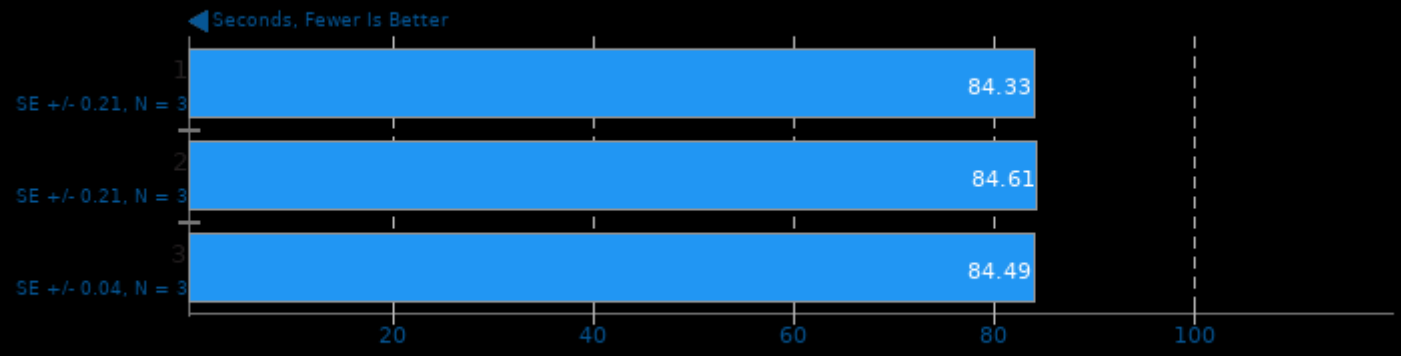
Preset: Medium



1. (CXX) g++ options: -std=c++14 -fvisibility=hidden -O3 -flto -mfpmath=sse -mavx2 -mpopcnt -lpthread

ASTC Encoder 2.0

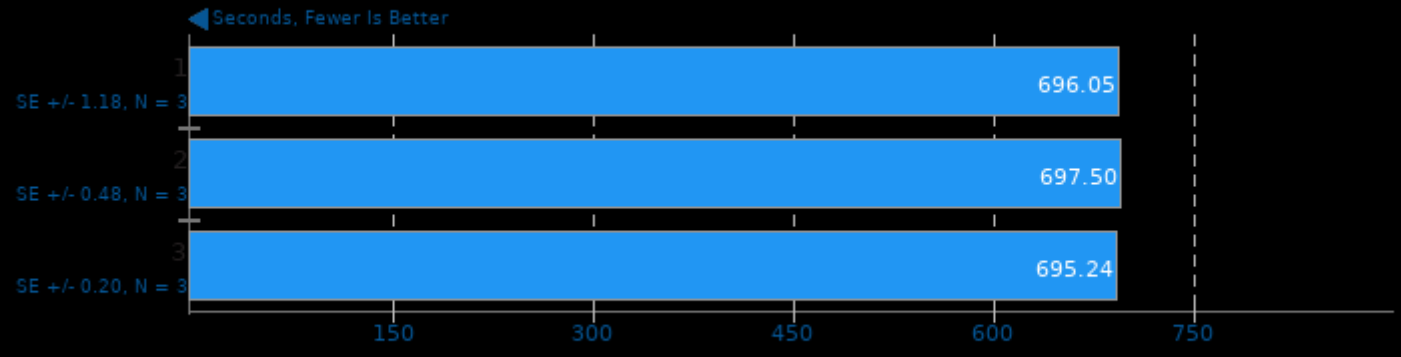
Preset: Thorough



1. (CXX) g++ options: -std=c++14 -fvisibility=hidden -O3 -flto -mfpmath=sse -mavx2 -mpopcnt -lpthread

ASTC Encoder 2.0

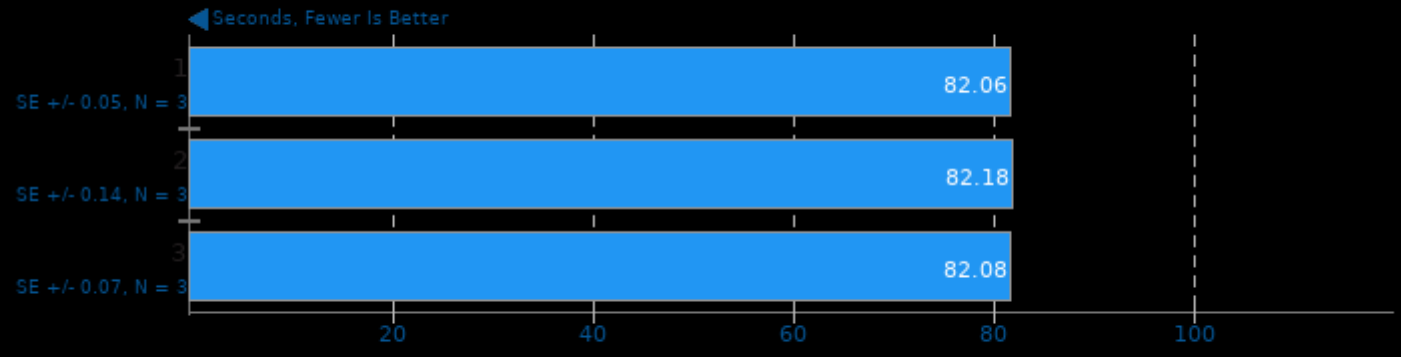
Preset: Exhaustive



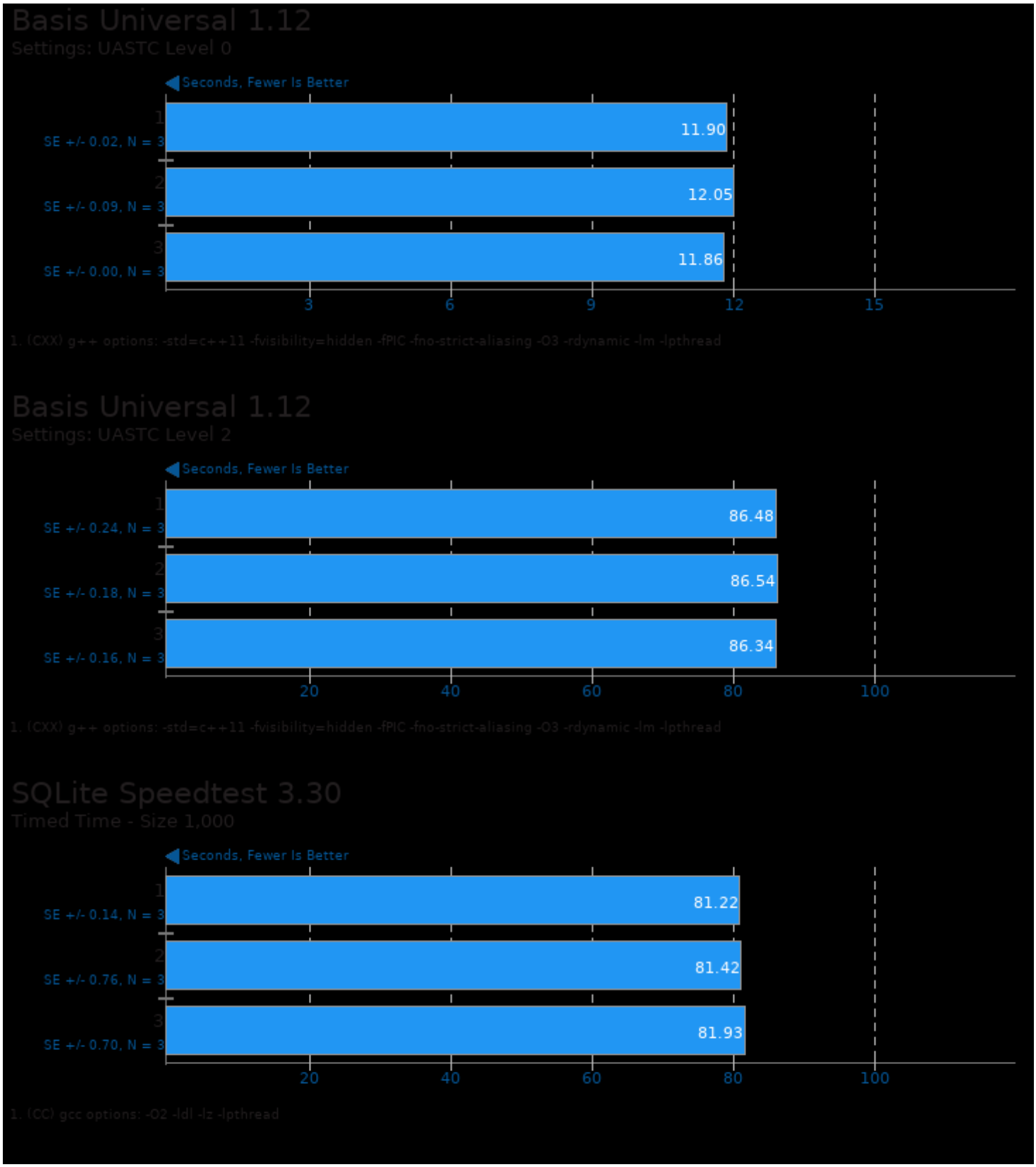
1. (CXX) g++ options: -std=c++14 -fvisibility=hidden -O3 -flto -mfpmath=sse -mavx2 -mpopcnt -lpthread

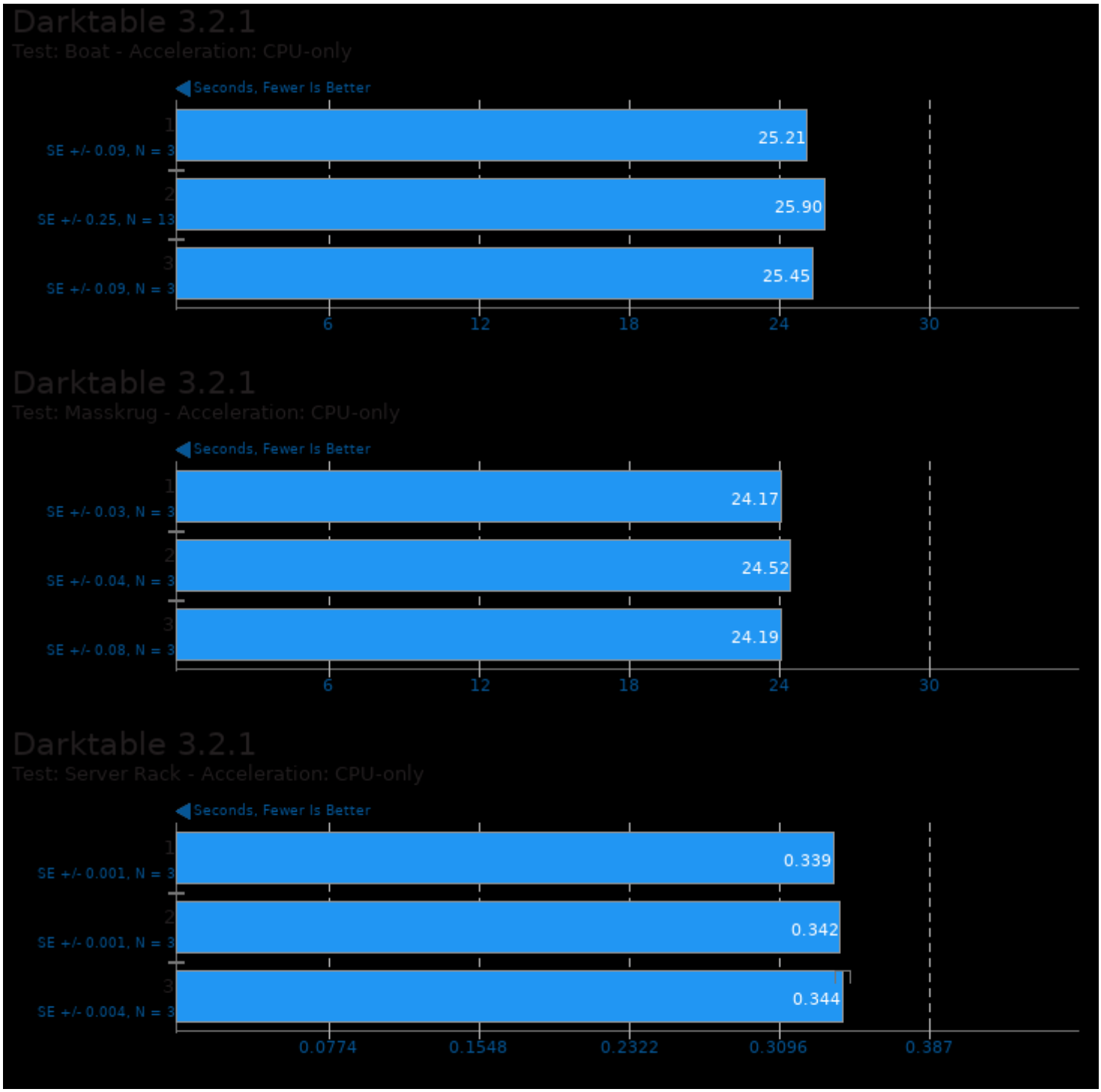
Basis Universal 1.12

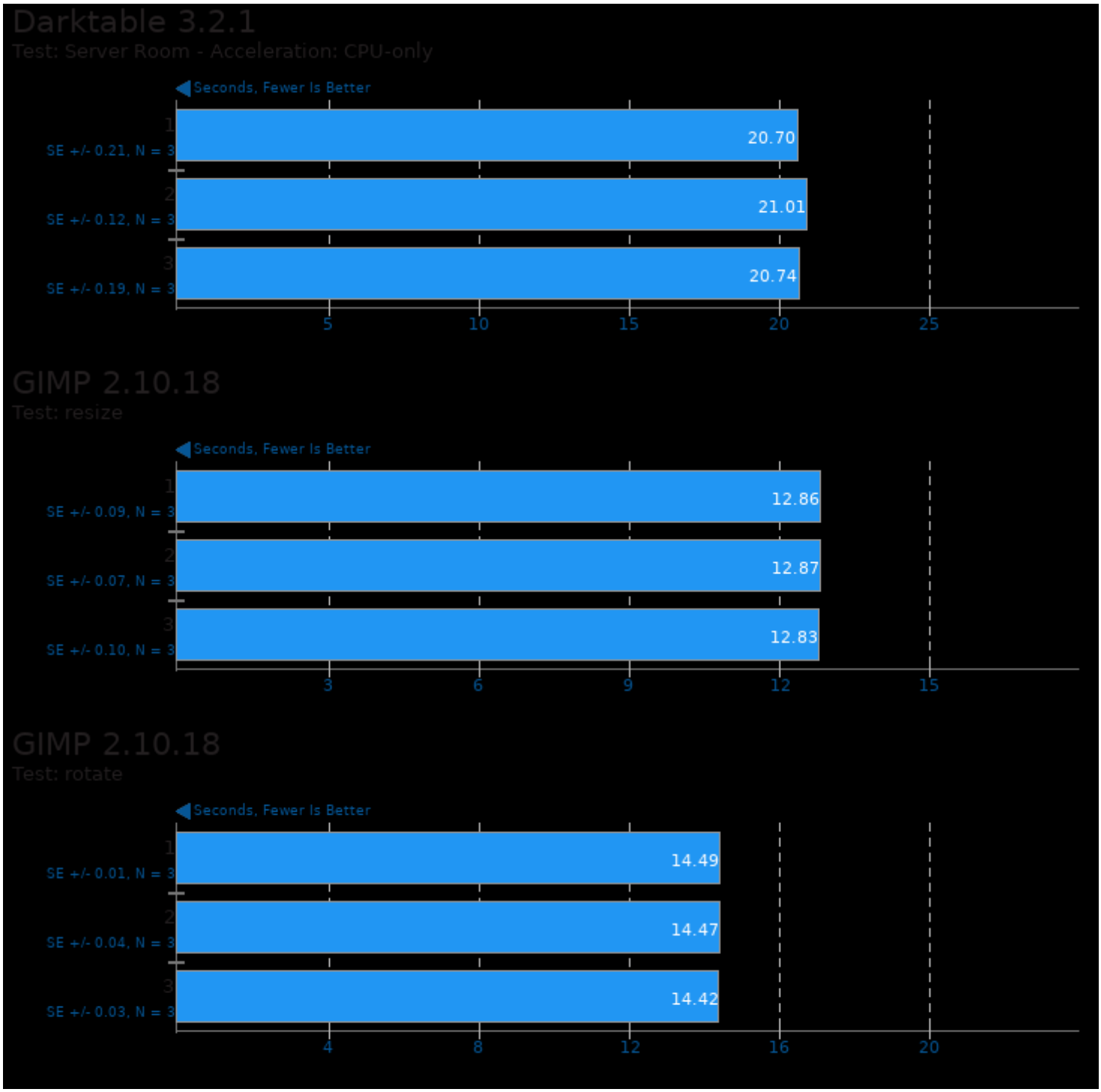
Settings: ETC1S

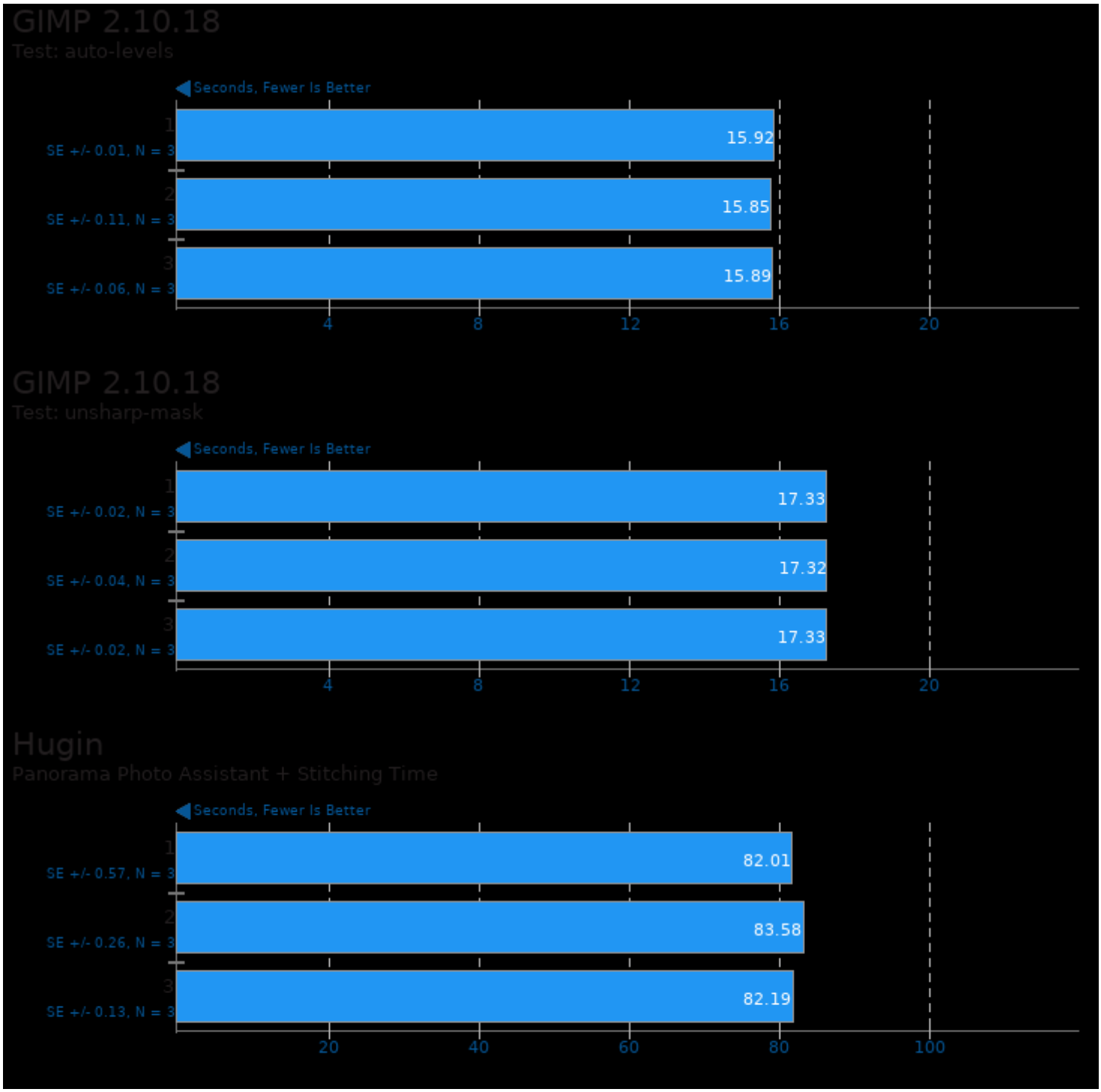


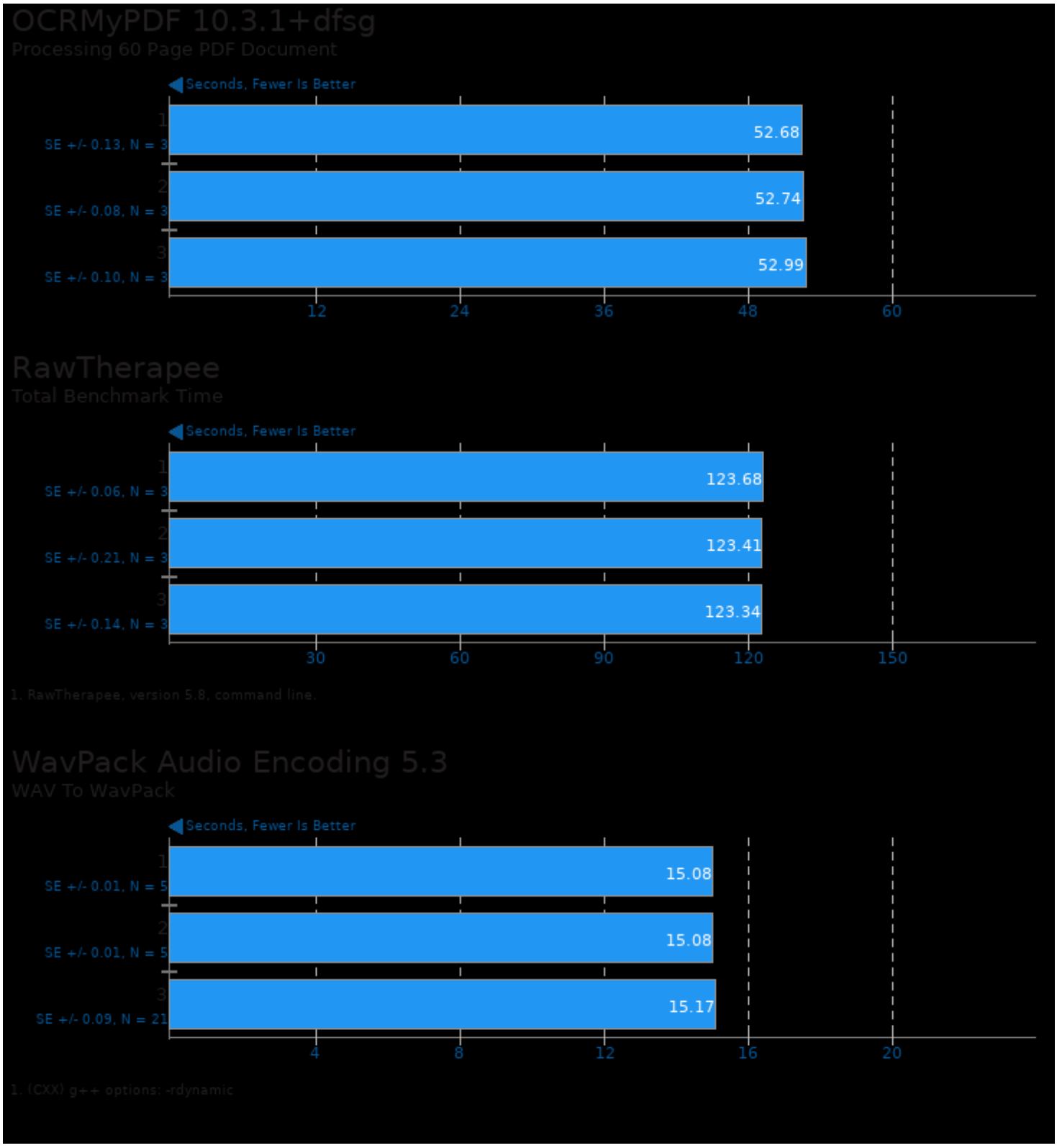
1. (CXX) g++ options: -std=c++11 -fvisibility=hidden -fPIC -fno-strict-aliasing -O3 -rdynamic -lm -lpthread

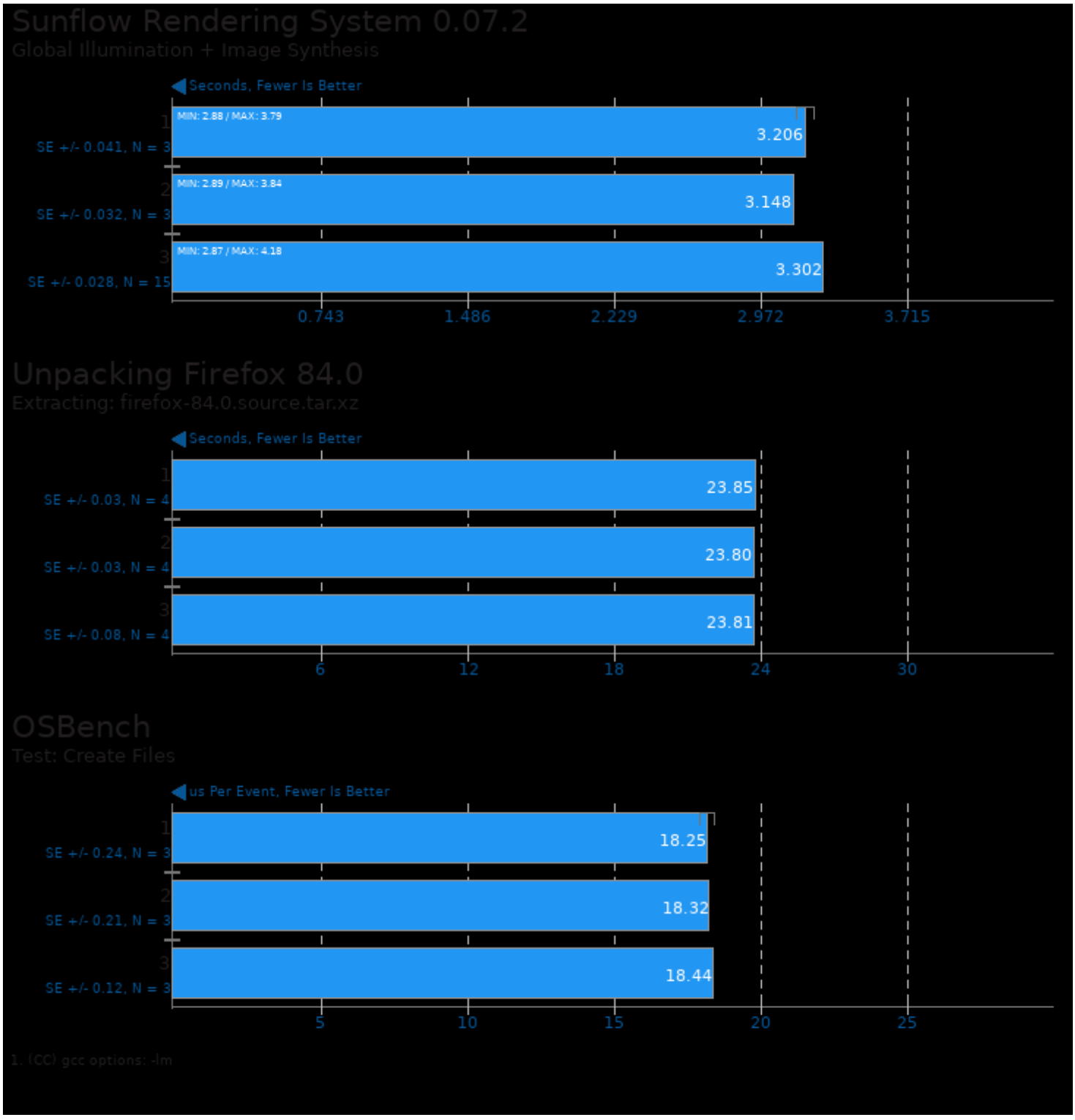

Basis Universal 1.12
Settings: UASTC Level 0
Seconds, Fewer Is Better
1
SE +/- 0.02, N = 3
11.90
2
SE +/- 0.09, N = 3
12.05
3
SE +/- 0.00, N = 3
11.86
3
6
9
12
15
1. (CXX) g++ options: -std=c++11 -fvisibility=hidden -fPIC -fno-strict-aliasing -O3 -rdynamic -lm -lpthread
Basis Universal 1.12
Settings: UASTC Level 2
Seconds, Fewer Is Better
1
SE +/- 0.24, N = 3
86.48
2
SE +/- 0.18, N = 3
86.54
3
SE +/- 0.16, N = 3
86.34
20
40
60
80
100
1. (CXX) g++ options: -std=c++11 -fvisibility=hidden -fPIC -fno-strict-aliasing -O3 -rdynamic -lm -lpthread
SQLite Speedtest 3.30
Timed Time - Size 1,000
Seconds, Fewer Is Better
1
SE +/- 0.14, N = 3
81.22
2
SE +/- 0.76, N = 3
81.42
3
SE +/- 0.70, N = 3
81.93
20
40
60
80
100
1. (CC) gcc options: -O2 -ldl -lz -lpthread

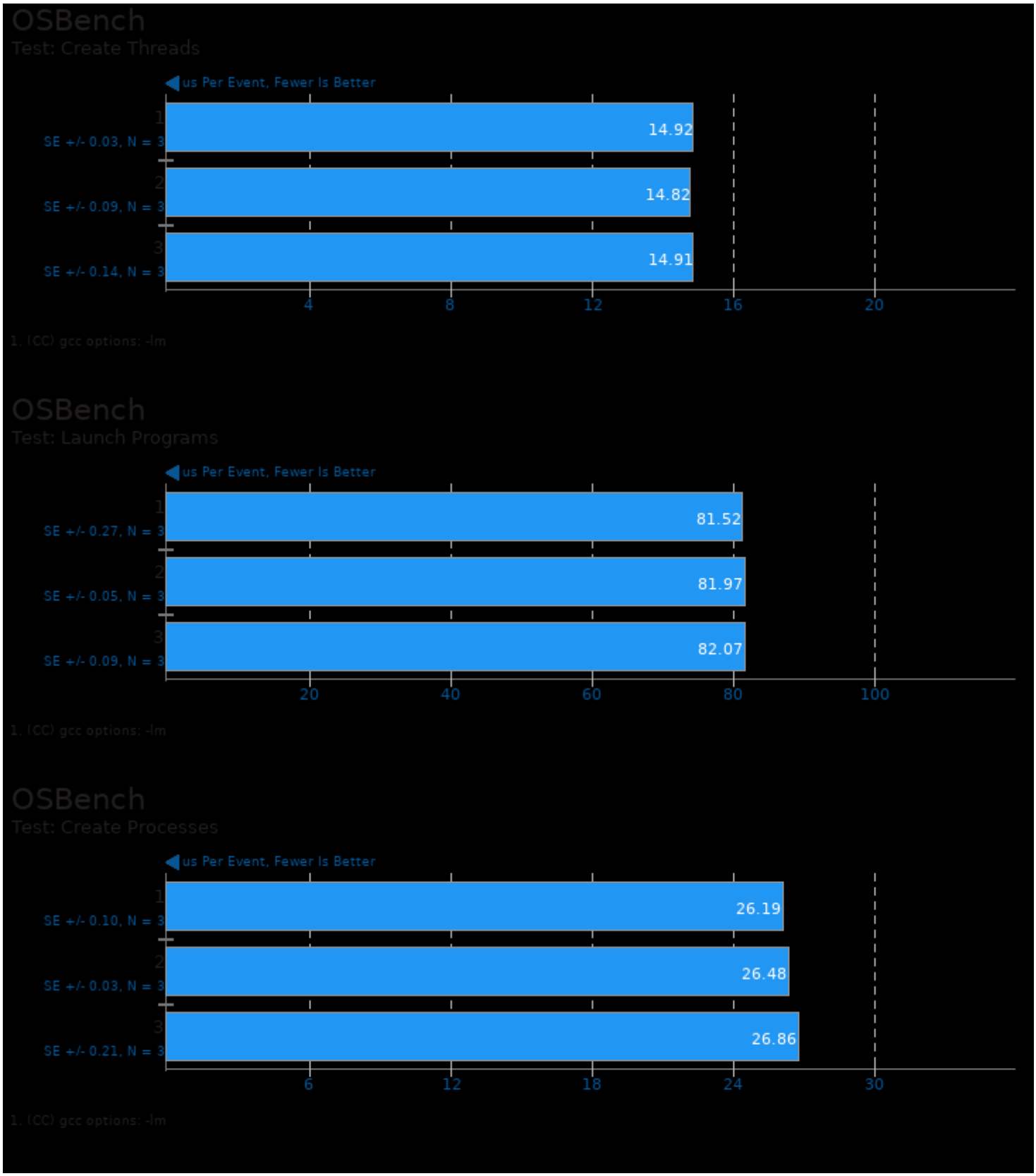

Darktable 3.2.1
Test: Boat - Acceleration: CPU-only
Seconds, Fewer Is Better
1
SE +/- 0.09, N = 3
25.21
2
SE +/- 0.25, N = 13
25.90
3
SE +/- 0.09, N = 3
25.45
6
12
18
24
30
Darktable 3.2.1
Test: Masskrug - Acceleration: CPU-only
Seconds, Fewer Is Better
1
SE +/- 0.03, N = 3
24.17
2
SE +/- 0.04, N = 3
24.52
3
SE +/- 0.08, N = 3
24.19
6
12
18
24
30
Darktable 3.2.1
Test: Server Rack - Acceleration: CPU-only
Seconds, Fewer Is Better
1
SE +/- 0.001, N = 3
0.339
2
SE +/- 0.001, N = 3
0.342
3
SE +/- 0.004, N = 3
0.344
0.0774
0.1548
0.2322
0.3096
0.387

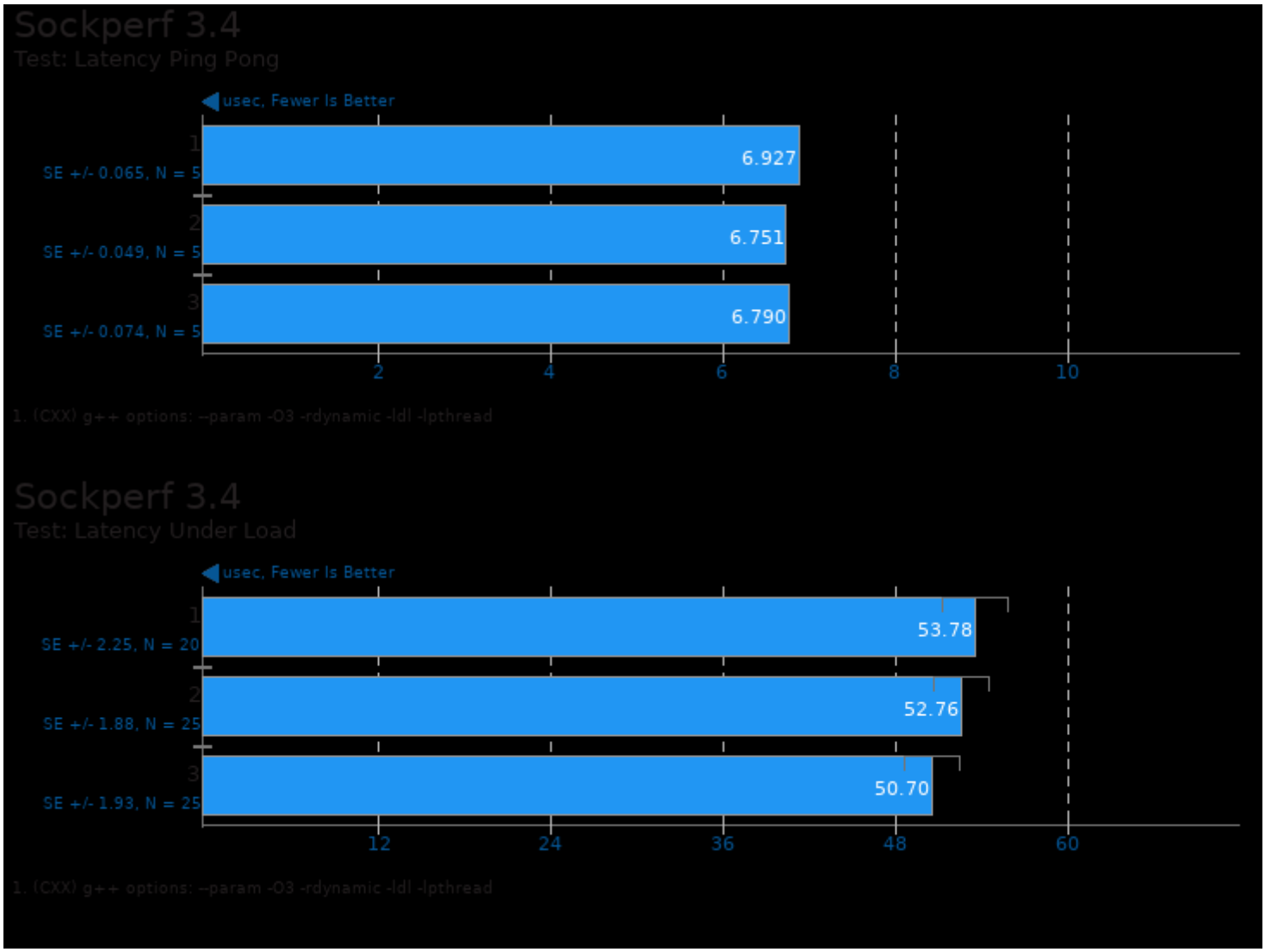

Darktable 3.2.1
Test: Server Room - Acceleration: CPU-only
Seconds, Fewer Is Better
1
SE +/- 0.21, N = 3
20.70
2
SE +/- 0.12, N = 3
21.01
3
SE +/- 0.19, N = 3
20.74
5
10
15
20
25
GIMP 2.10.18
Test: resize
Seconds, Fewer Is Better
1
SE +/- 0.09, N = 3
12.86
2
SE +/- 0.07, N = 3
12.87
3
SE +/- 0.10, N = 3
12.83
3
6
9
12
15
GIMP 2.10.18
Test: rotate
Seconds, Fewer Is Better
1
SE +/- 0.01, N = 3
14.49
2
SE +/- 0.04, N = 3
14.47
3
SE +/- 0.03, N = 3
14.42
4
8
12
16
20


GIMP 2.10.18
Test: auto-levels
Seconds, Fewer Is Better
1
SE +/- 0.01, N = 3
15.92
2
SE +/- 0.11, N = 3
15.85
3
SE +/- 0.06, N = 3
15.89
4
8
12
16
20
GIMP 2.10.18
Test: unsharp-mask
Seconds, Fewer Is Better
1
SE +/- 0.02, N = 3
17.33
2
SE +/- 0.04, N = 3
17.32
3
SE +/- 0.02, N = 3
17.33
4
8
12
16
20
Hugin
Panorama Photo Assistant + Stitching Time
Seconds, Fewer Is Better
1
SE +/- 0.57, N = 3
82.01
2
SE +/- 0.26, N = 3
83.58
3
SE +/- 0.13, N = 3
82.19
20
40
60
80
100

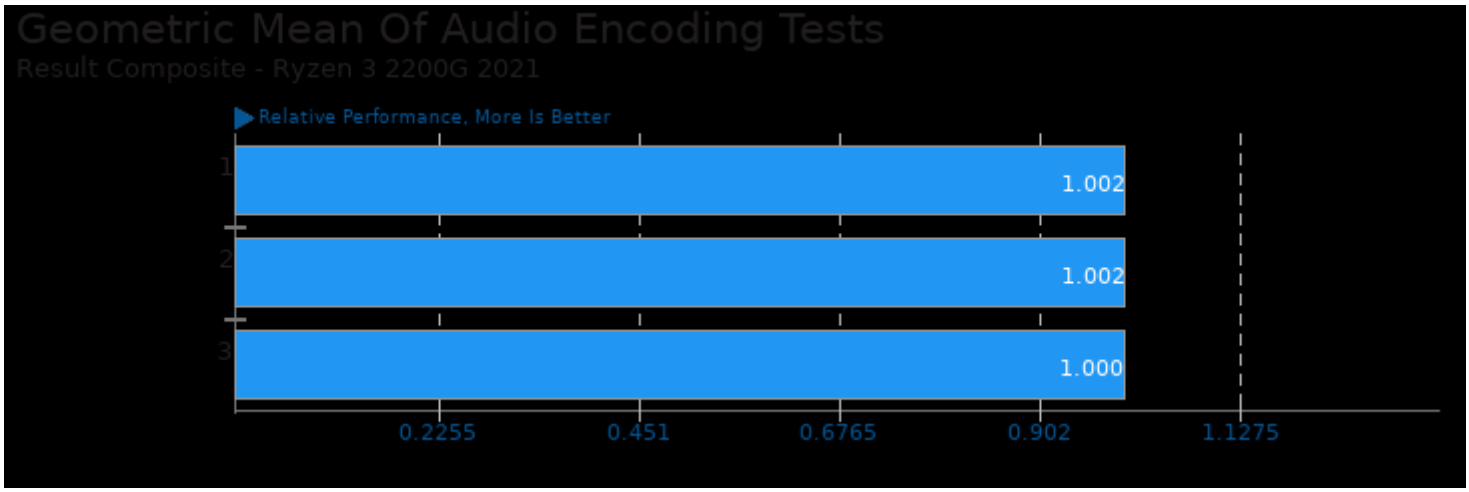

OCRMyPDF 10.3.1+dfsg
Processing 60 Page PDF Document
Seconds, Fewer Is Better
1
SE +/- 0.13, N = 3
52.68
2
SE +/- 0.08, N = 3
52.74
3
SE +/- 0.10, N = 3
52.99
12
24
36
48
60
RawTherapee
Total Benchmark Time
Seconds, Fewer Is Better
1
SE +/- 0.06, N = 3
123.68
2
SE +/- 0.21, N = 3
123.41
3
SE +/- 0.14, N = 3
123.34
30
60
90
120
150
1. RawTherapee, version 5.8, command line.
WavPack Audio Encoding 5.3
WAV To WavPack
Seconds, Fewer Is Better
1
SE +/- 0.01, N = 5
15.08
2
SE +/- 0.01, N = 5
15.08
3
SE +/- 0.09, N = 21
15.17
4
8
12
16
20
1. (CXX) g++ options: -rdynamic


Sunflow Rendering System 0.07.2
Global Illumination + Image Synthesis
Seconds, Fewer Is Better
MIN: 2.88 / MAX: 3.79
3.206
SE +/- 0.041, N = 3
MIN: 2.89 / MAX: 3.84
3.148
SE +/- 0.032, N = 3
MIN: 2.87 / MAX: 4.18
3.302
SE +/- 0.028, N = 15
0.743
1.486
2.229
2.972
3.715
Unpacking Firefox 84.0
Extracting: firefox-84.0.source.tar.xz
Seconds, Fewer Is Better
23.85
SE +/- 0.03, N = 4
23.80
SE +/- 0.03, N = 4
23.81
SE +/- 0.08, N = 4
6
12
18
24
30
OSBench
Test: Create Files
us Per Event, Fewer Is Better
18.25
SE +/- 0.24, N = 3
18.32
SE +/- 0.21, N = 3
18.44
SE +/- 0.12, N = 3
5
10
15
20
25
1. (CC) gcc options: -lm

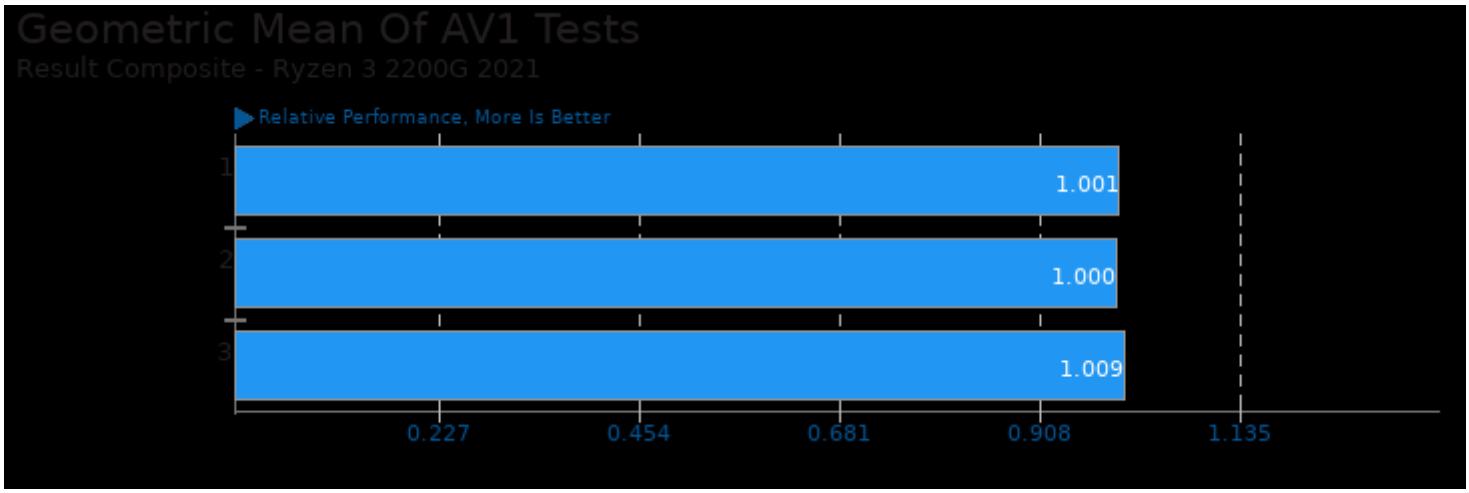

OSBench
Test: Create Threads
us Per Event, Fewer Is Better
1
SE +/- 0.03, N = 3
14.92
2
SE +/- 0.09, N = 3
14.82
3
SE +/- 0.14, N = 3
14.91
4
8
12
16
20
1. (CC) gcc options: -lm
OSBench
Test: Launch Programs
us Per Event, Fewer Is Better
1
SE +/- 0.27, N = 3
81.52
2
SE +/- 0.05, N = 3
81.97
3
SE +/- 0.09, N = 3
82.07
20
40
60
80
100
1. (CC) gcc options: -lm
OSBench
Test: Create Processes
us Per Event, Fewer Is Better
1
SE +/- 0.10, N = 3
26.19
2
SE +/- 0.03, N = 3
26.48
3
SE +/- 0.21, N = 3
26.86
6
12
18
24
30
1. (CC) gcc options: -lm


Sockperf 3.4
Test: Latency Ping Pong
usec, Fewer Is Better
1
SE +/- 0.065, N = 5
6.927
2
SE +/- 0.049, N = 5
6.751
3
SE +/- 0.074, N = 5
6.790
2
4
6
8
10
1. (CXX) g++ options: -param -O3 -rdynamic -ldl -lpthread
Sockperf 3.4
Test: Latency Under Load
usec, Fewer Is Better
1
SE +/- 2.25, N = 20
53.78
2
SE +/- 1.88, N = 25
52.76
3
SE +/- 1.93, N = 25
50.70
12
24
36
48
60
1. (CXX) g++ options: -param -O3 -rdynamic -ldl -lpthread

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



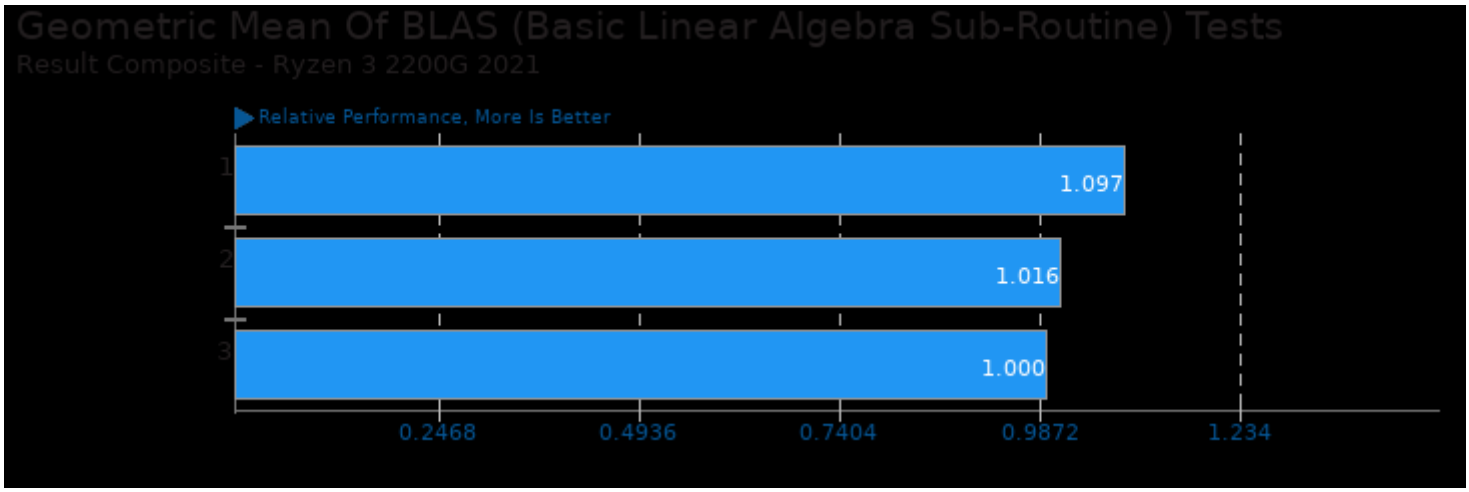
Geometric mean based upon tests: pts/encode-ape, pts/encode-wavpack and pts/encode-opus



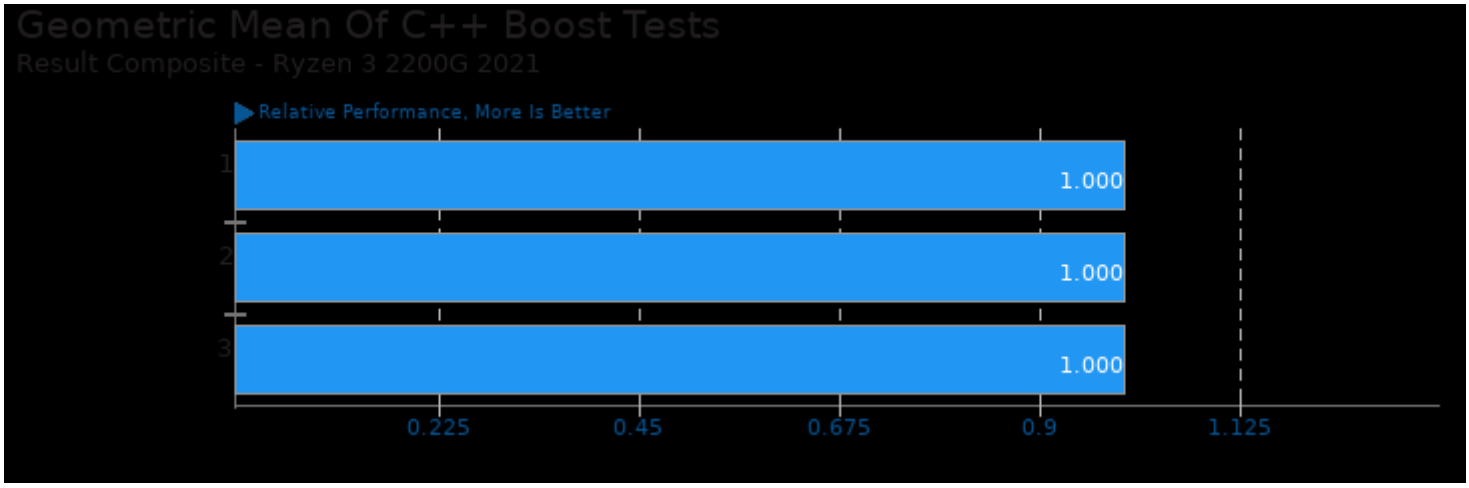
Geometric mean based upon tests: pts/dav1d, pts/aom-av1 and pts/rav1e



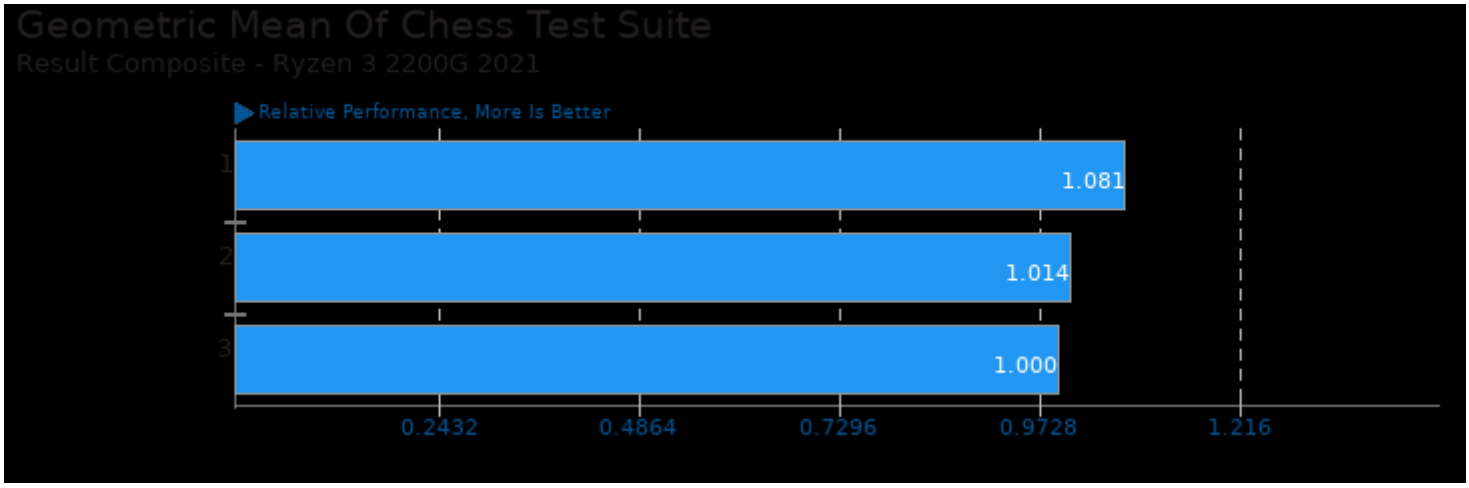
Geometric mean based upon tests: pts/hmmer and pts/mafft



Geometric mean based upon tests: pts/lczero and pts/caffe



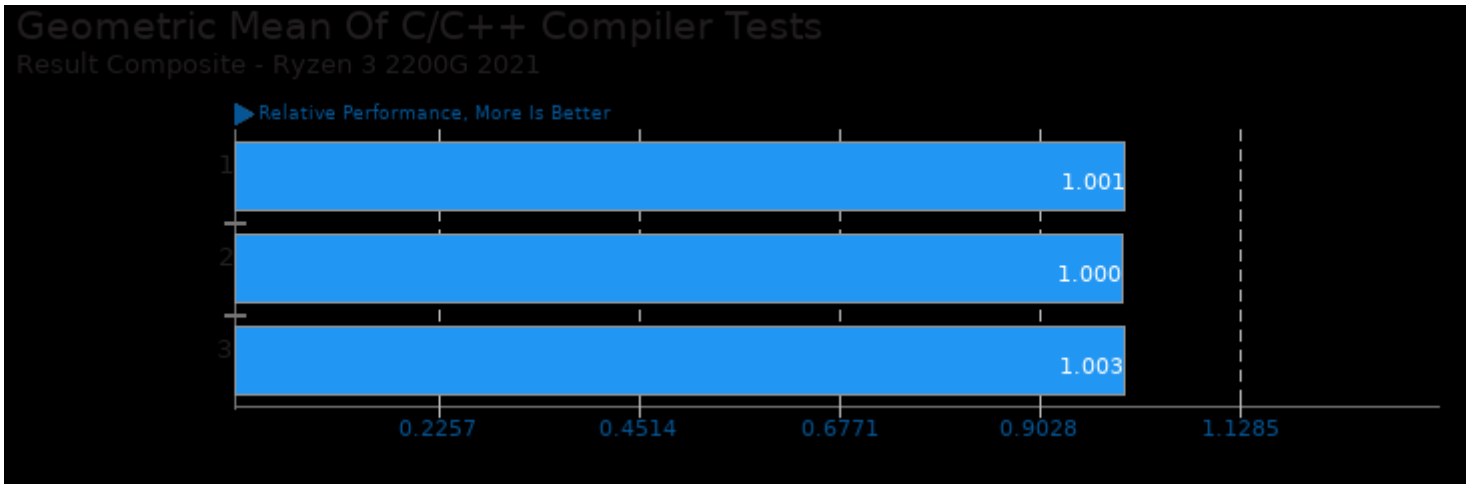
Geometric mean based upon tests: pts/caffe and pts/openfoam



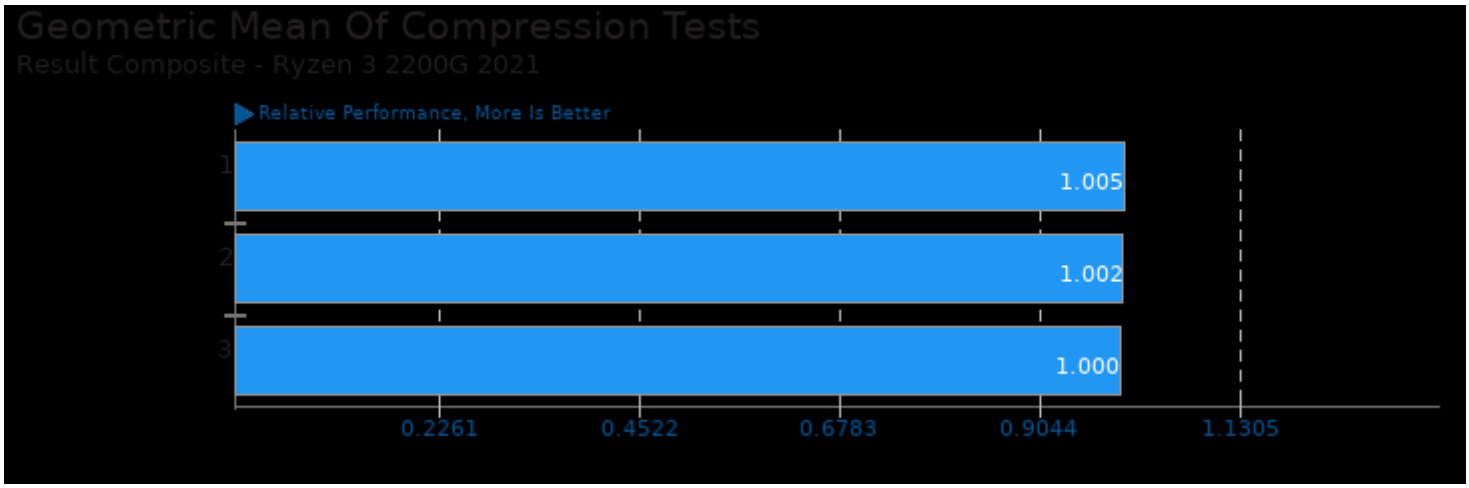
Geometric mean based upon tests: pts/crafty, pts/lczero, pts/stockfish and pts/asmfish



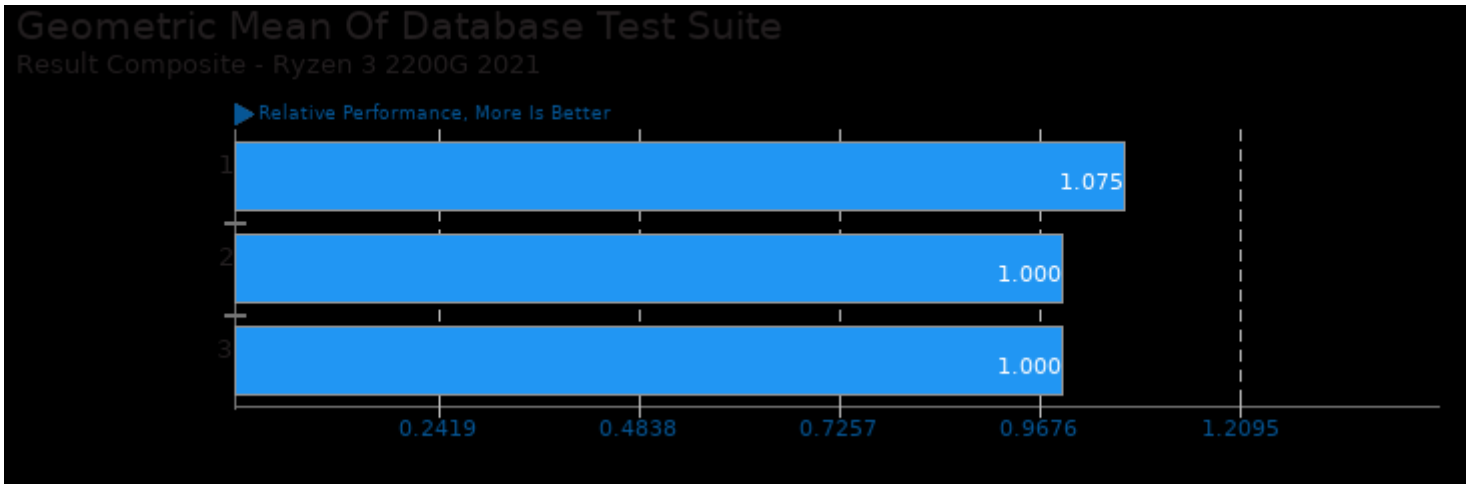
Geometric mean based upon tests: pts/build-eigen, pts/build-ffmpeg, pts/build2 and pts/build-godot



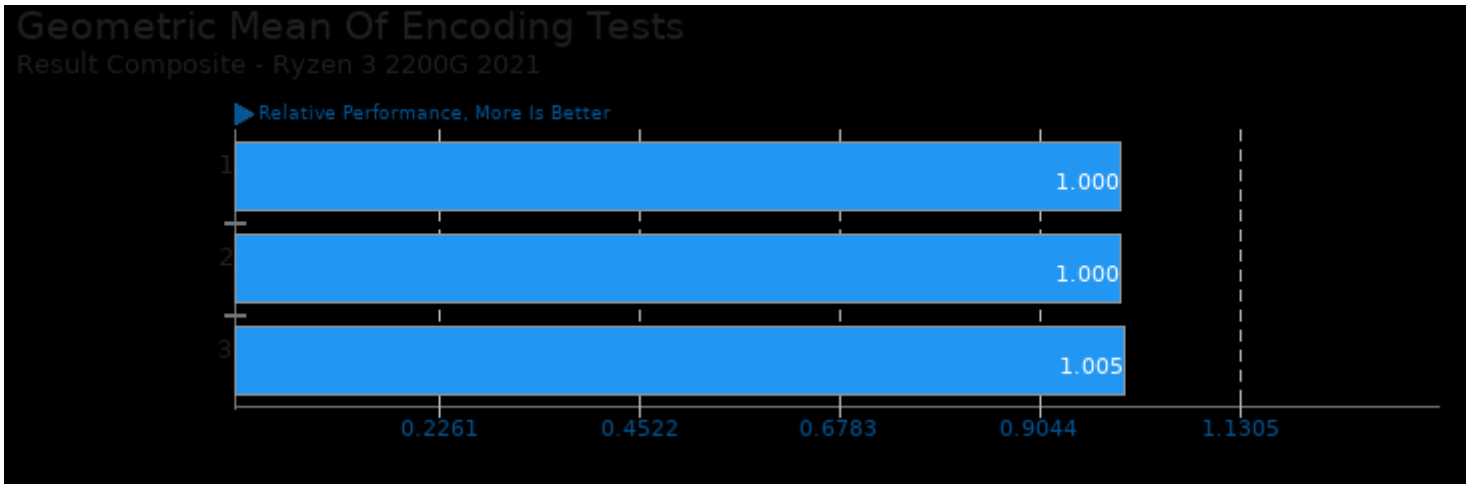
Geometric mean based upon tests: pts/mafft, pts/stockfish, pts/hmmer, pts/sqlite-speedtest, pts/dav1d, pts/x265, pts/kvazaar, pts/clomp, pts/compress-zstd, pts/lammps, pts/aom-av1, pts/gromacs, pts/build-ffmpeg, pts/keydb and pts/basis



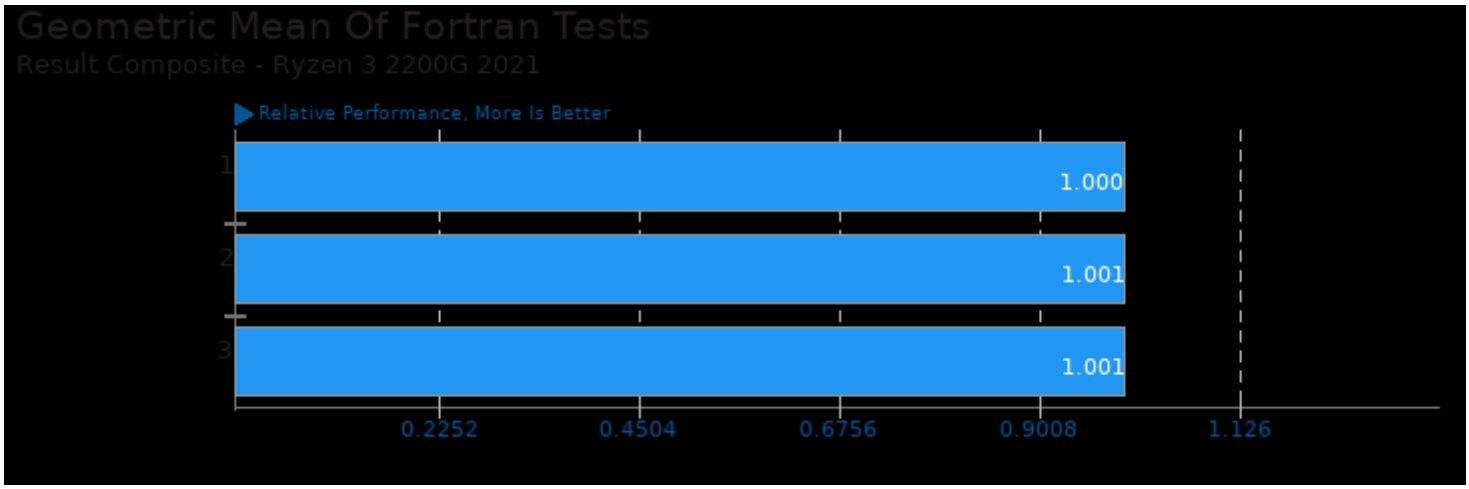
Geometric mean based upon tests: pts/compress-zstd and pts/compress-lz4



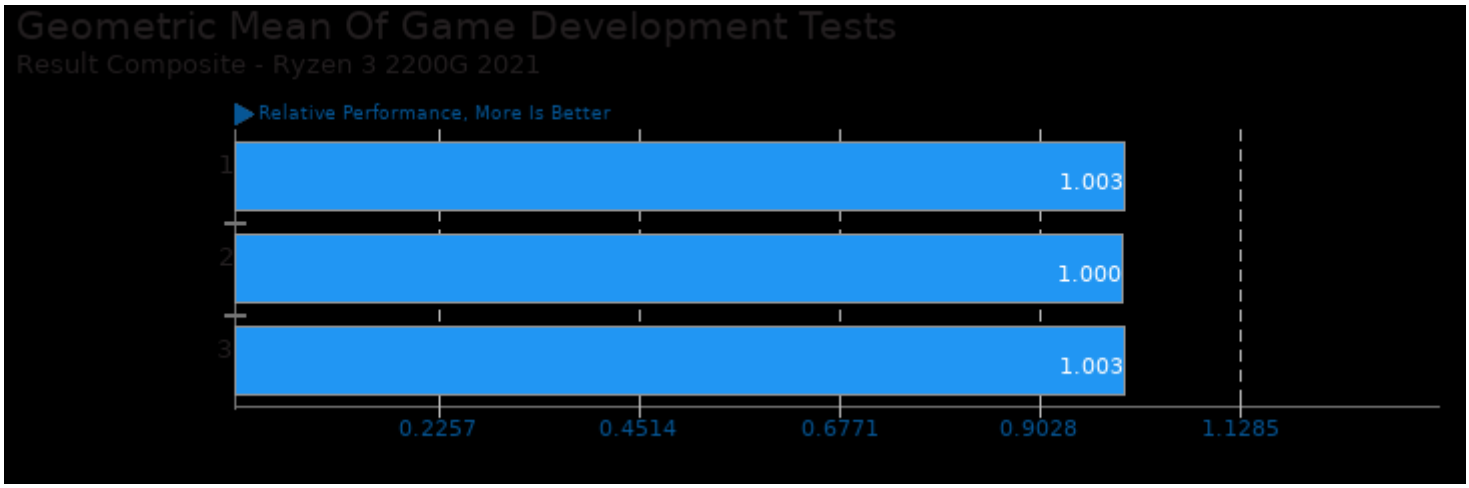
Geometric mean based upon tests: pts/sqlite-speedtest, pts/redis, pts/keydb and pts/influxdb



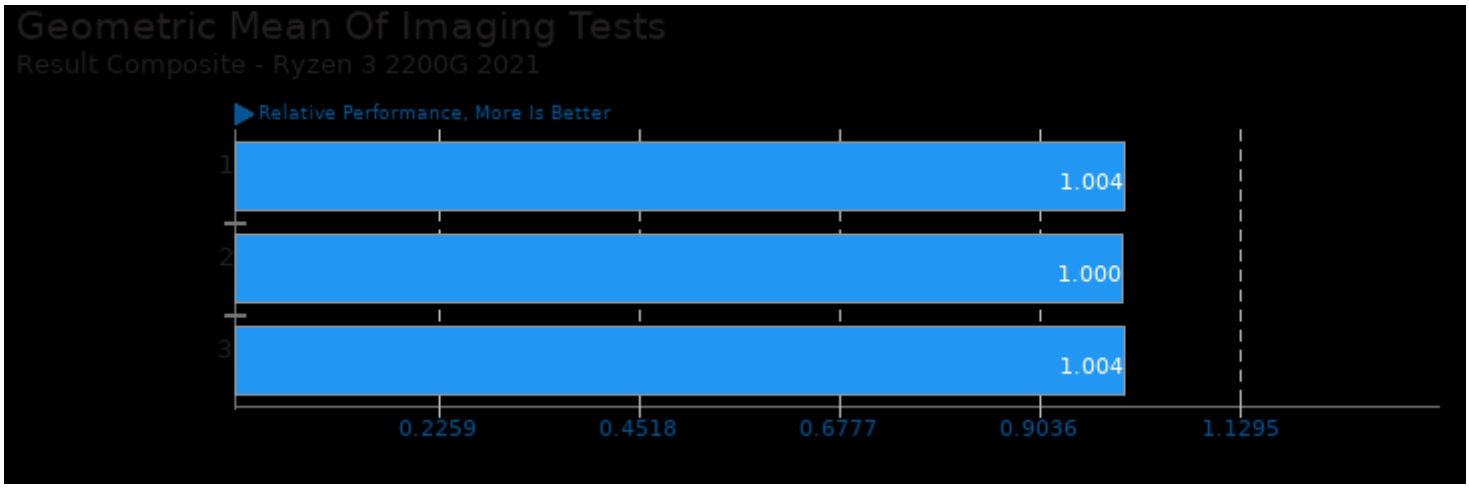
Geometric mean based upon tests: pts/encode-ape, pts/encode-wavpack, pts/encode-opus, pts/x265, pts/kvazaar, pts/dav1d, pts/aom-av1 and pts/rav1e



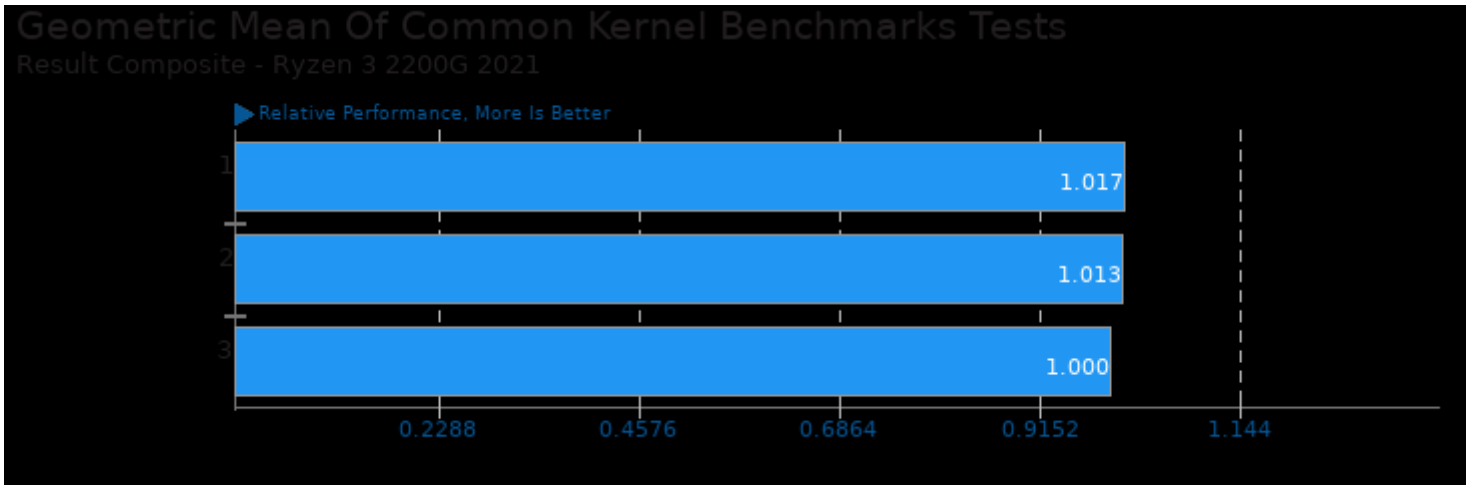
Geometric mean based upon tests: pts/ffte, pts/lammps, pts/cloverleaf, pts/dolfyn, pts/incompact3d and pts/mocassin



Geometric mean based upon tests: pts/basis, pts/astcenc and pts/build-godot



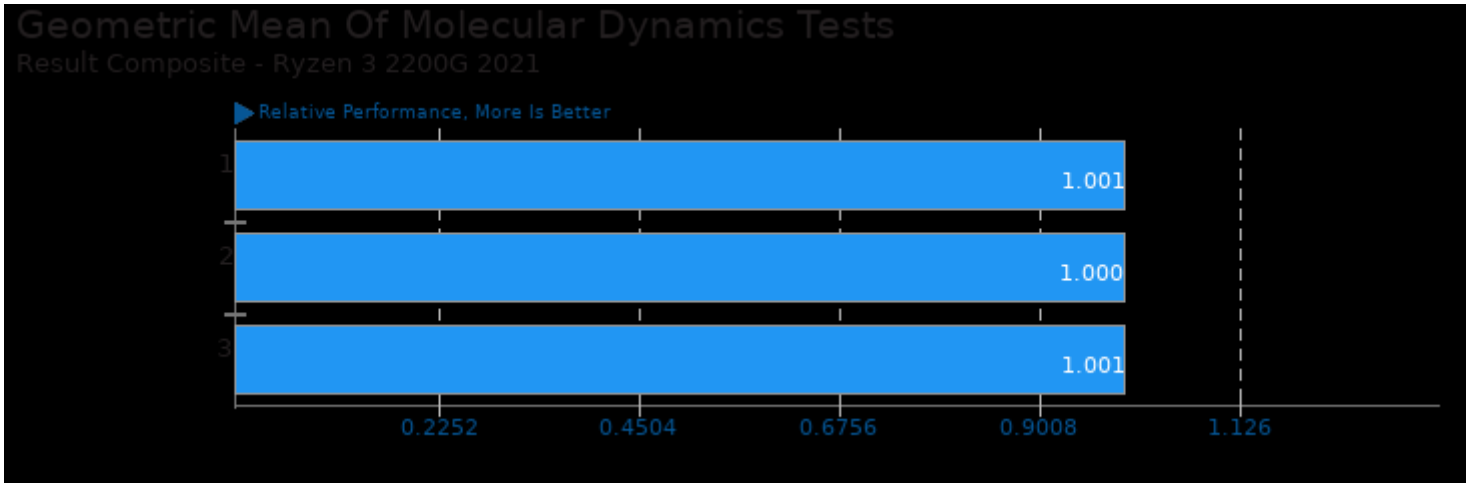
Geometric mean based upon tests: pts/libraw, pts/webp, system/rawtherapee, system/gimp, system/hugin and system/darktable



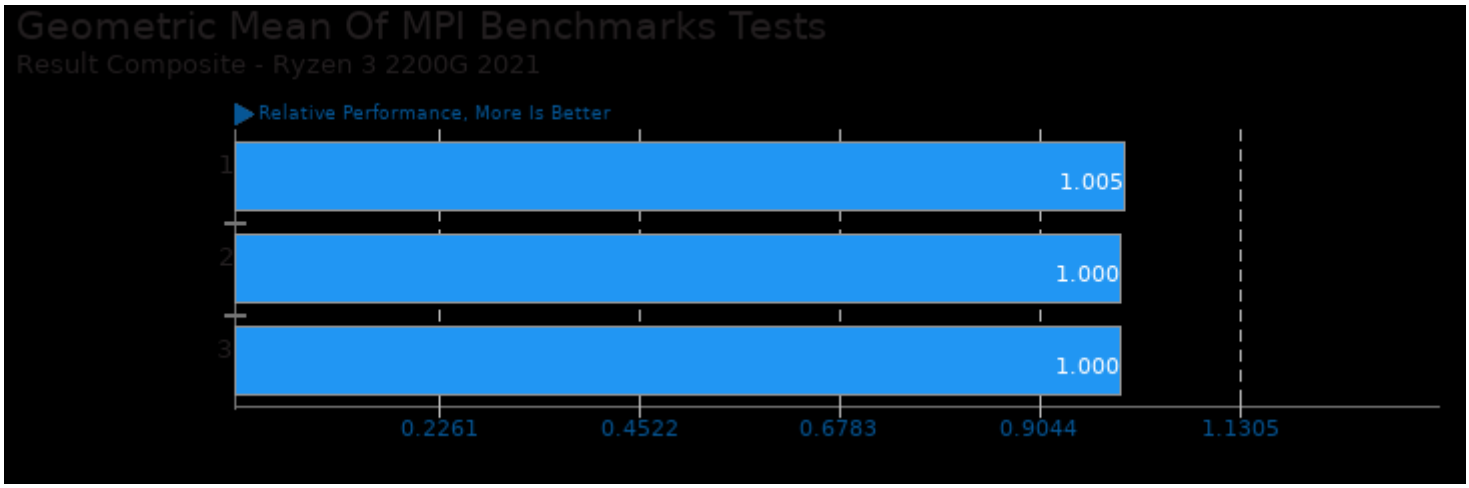
Geometric mean based upon tests: pts/sqlite-speedtest and pts/osbench



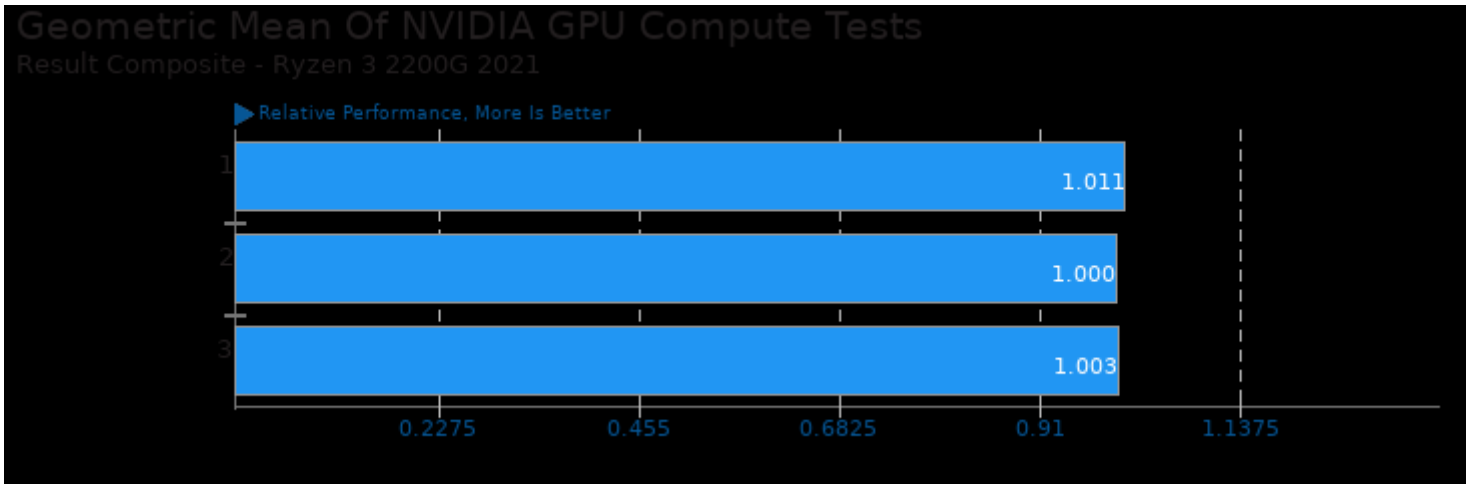
Geometric mean based upon tests: pts/mnn, pts/ncnn, pts/tnn, pts/caffe, pts/numpy, pts/rnnoise, pts/tensorflow-lite, pts/onednn and pts/lczero



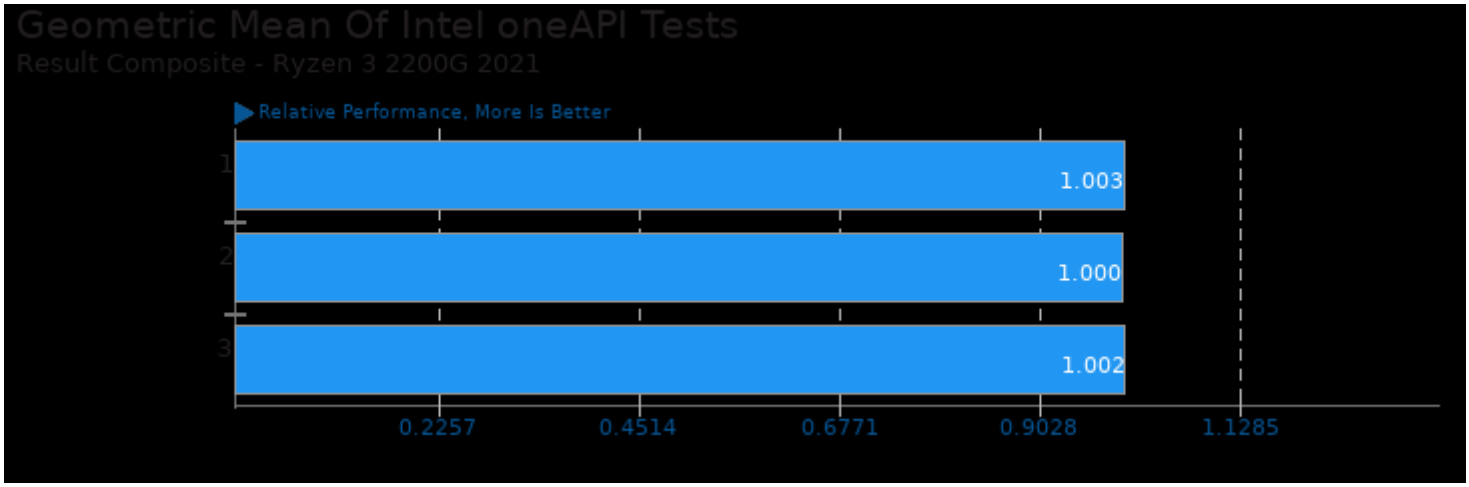
Geometric mean based upon tests: pts/namd, pts/gromacs, pts/cp2k, pts/dolfyn, pts/cloverleaf, pts/lammps, pts/lulesh, pts/incompact3d and pts/openfoam



Geometric mean based upon tests: pts/lammps, pts/incompact3d, pts/mocassin and pts/gromacs



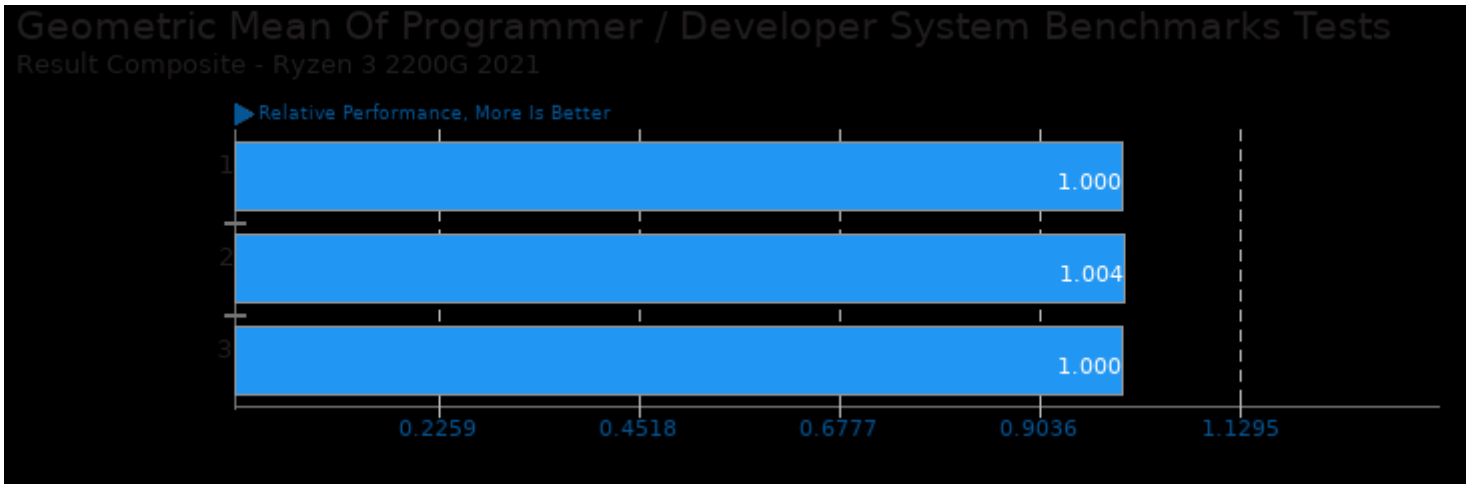
Geometric mean based upon tests: pts/gromacs, pts/lczero, pts/indigobench, pts/caffe, pts/ncnn, pts/realsr-ncnn and pts/waifu2x-ncnn



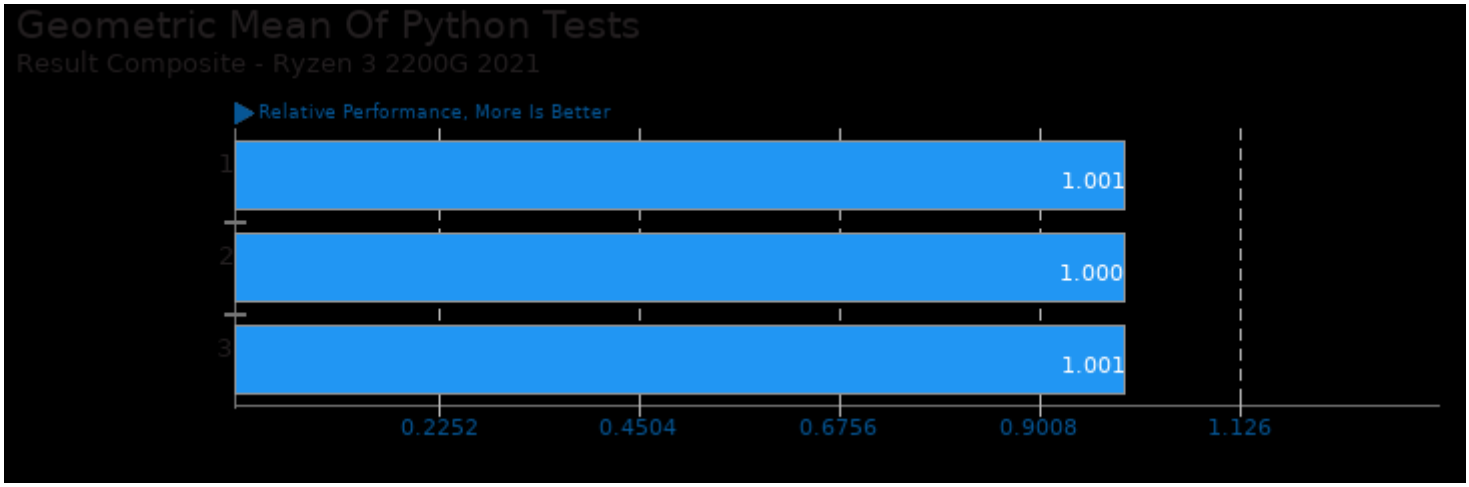
Geometric mean based upon tests: pts/embree and pts/onednn



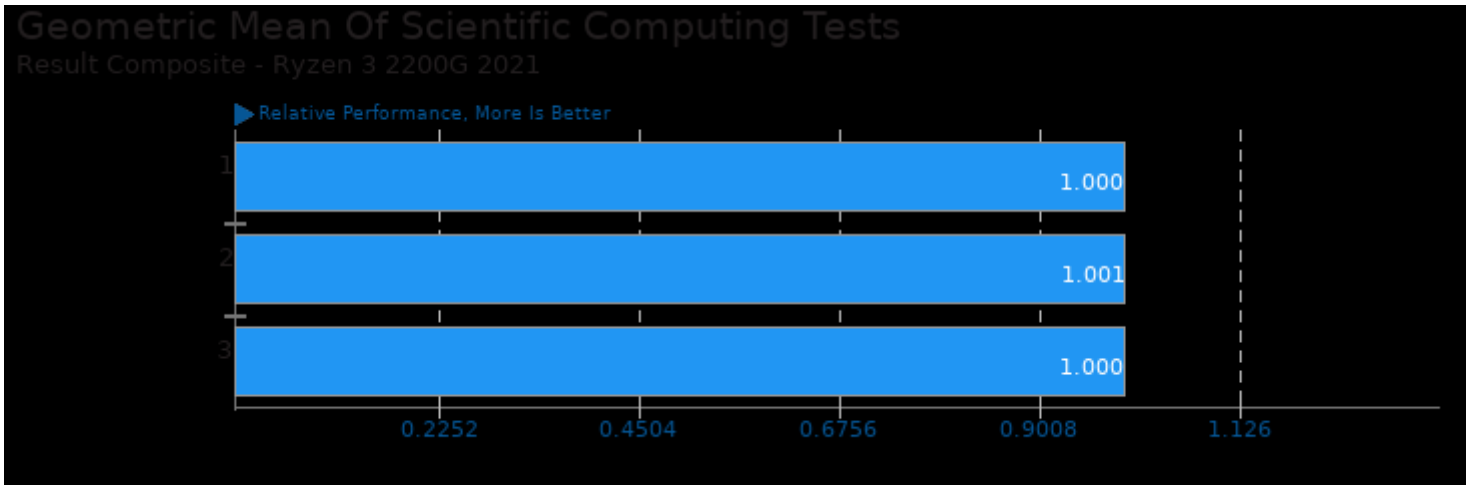
Geometric mean based upon tests: pts/amg, pts/gromacs, pts/lammps, pts/lulesh, pts/cloverleaf, pts/cp2k, pts/incompact3d, pts/mocassin and pts/openfoam



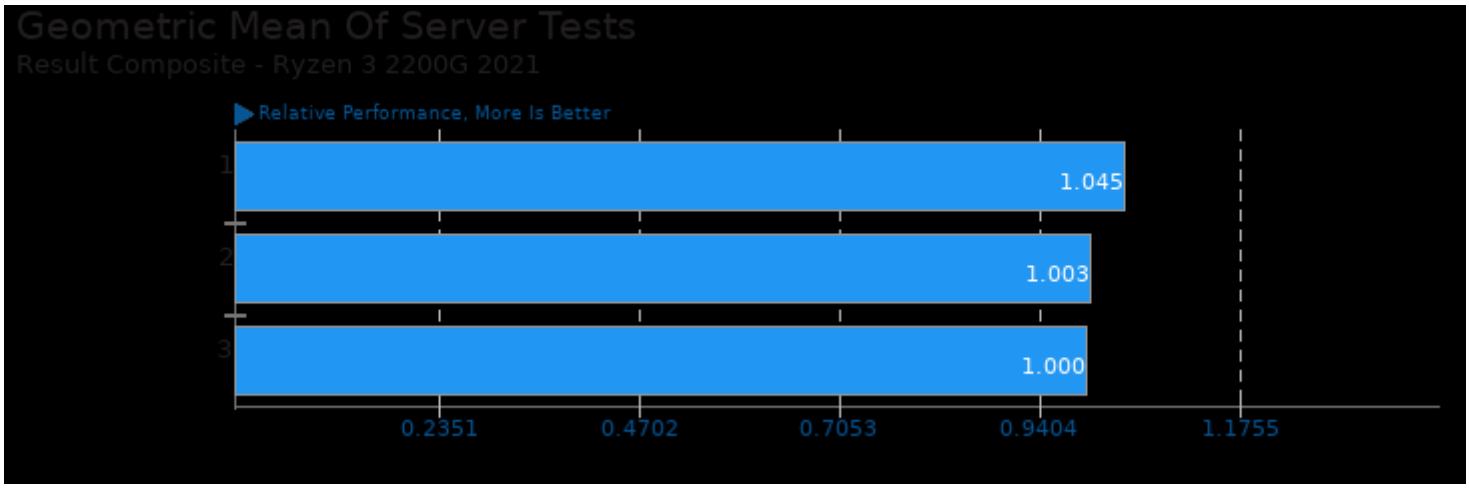
Geometric mean based upon tests: pts/simdjson, pts/sqlite-speedtest, pts/node-web-tooling, pts/compress-zstd, pts/build-eigen, pts/build-ffmpeg, pts/build2, pts/build-godot and pts/amg



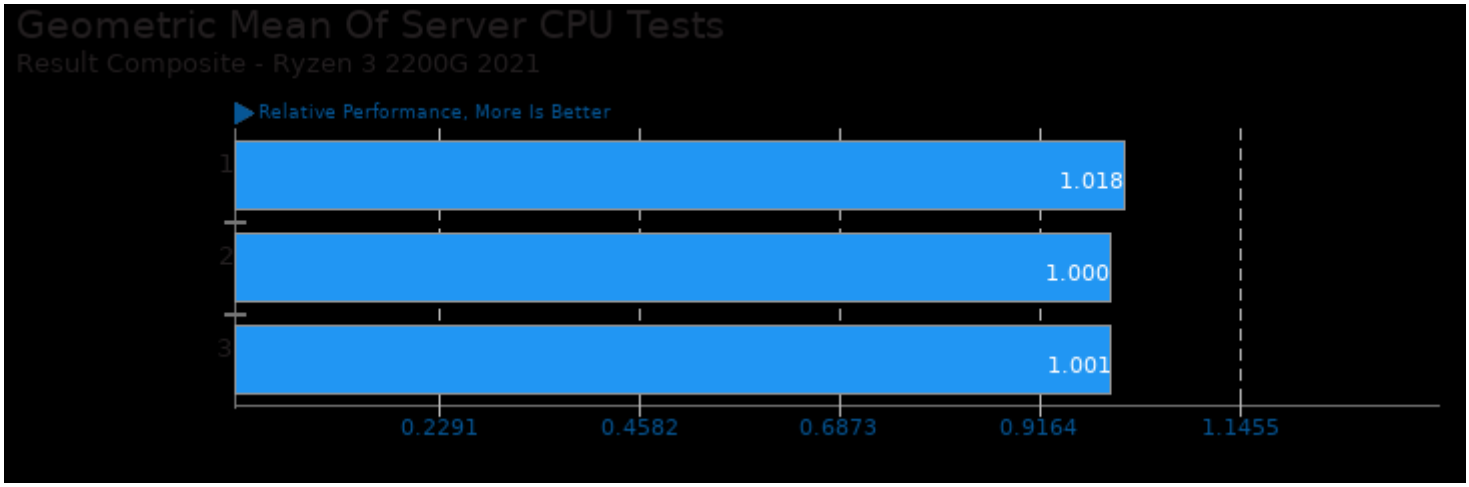
Geometric mean based upon tests: pts/glmark2, pts/numpy, pts/caffe, pts/build-godot and system/ocrmypdf



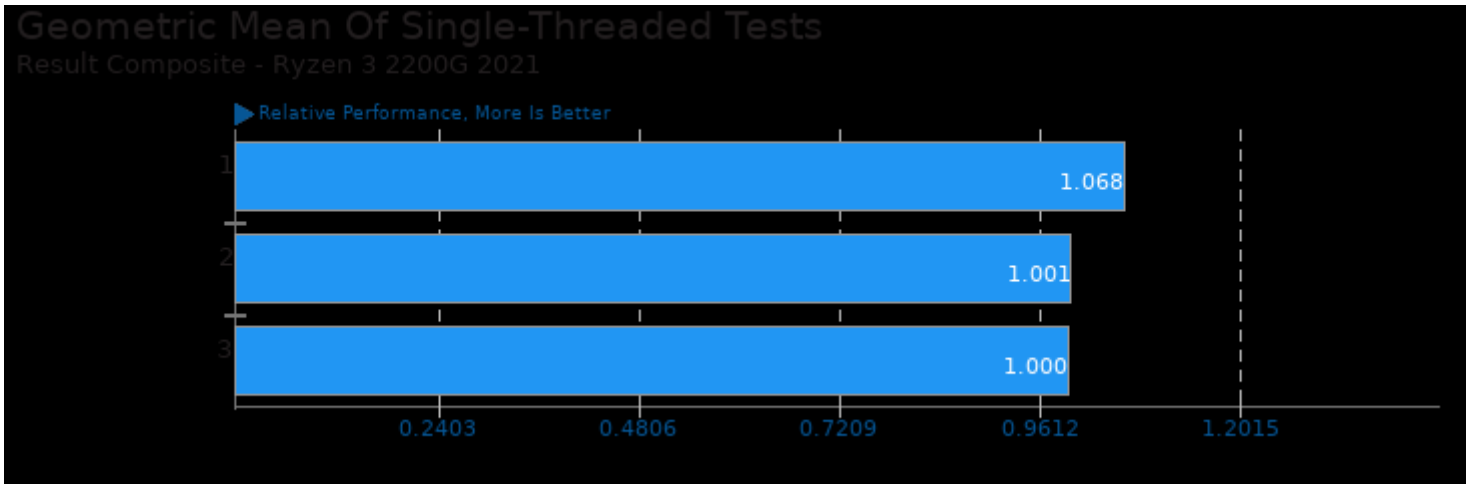
Geometric mean based upon tests: pts/ffte, pts/amg, pts/namd, pts/gromacs, pts/cp2k, pts/dolfyn, pts/cloverleaf, pts/lammps, pts/lulesh, pts/incompact3d, pts/openfoam, pts/hmmer, pts/mafft, pts/mocassin and pts/kripke



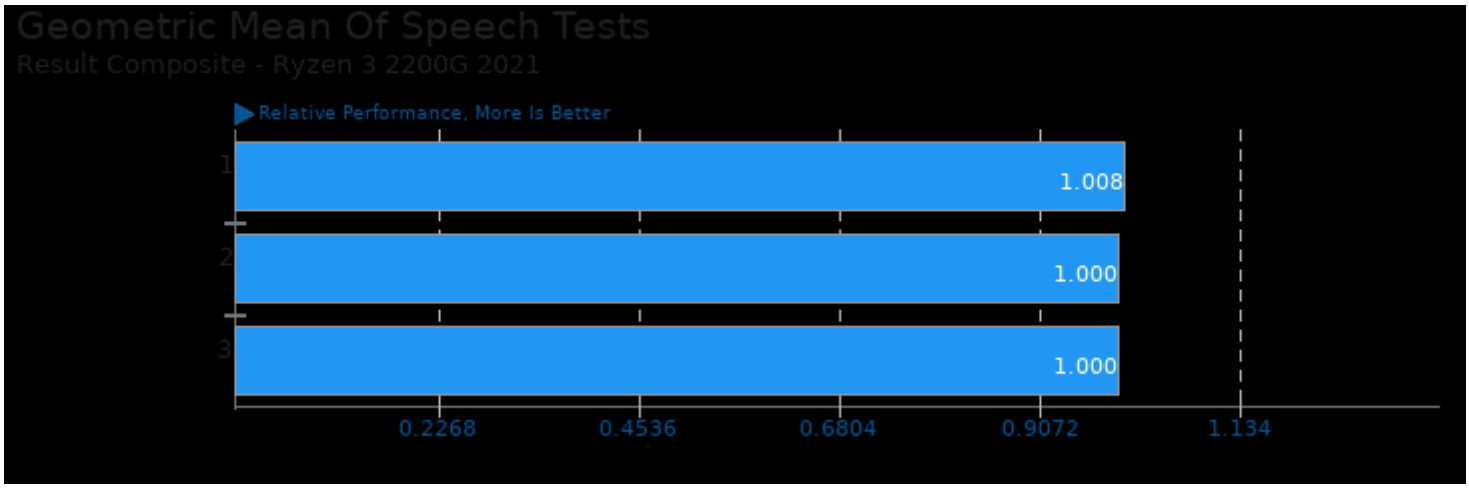
Geometric mean based upon tests: pts/redis, pts/keydb, pts/phpbench, pts/simdjson, pts/node-web-tooling, pts/sqlite-speedtest and pts/influxdb



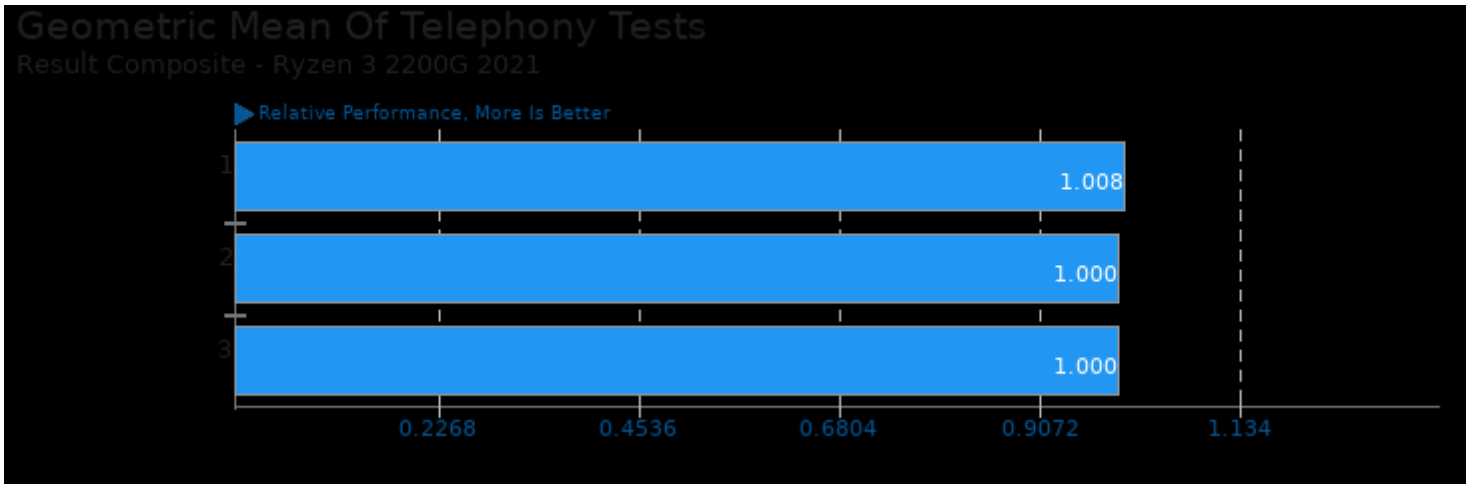
Geometric mean based upon tests: pts/cp2k, pts/namd, pts/onednn, pts/x265, pts/dav1d, pts/stockfish, pts/asmfish, pts/compress-zstd, system/gimp, pts/redis, pts/numpy and pts/phpbench



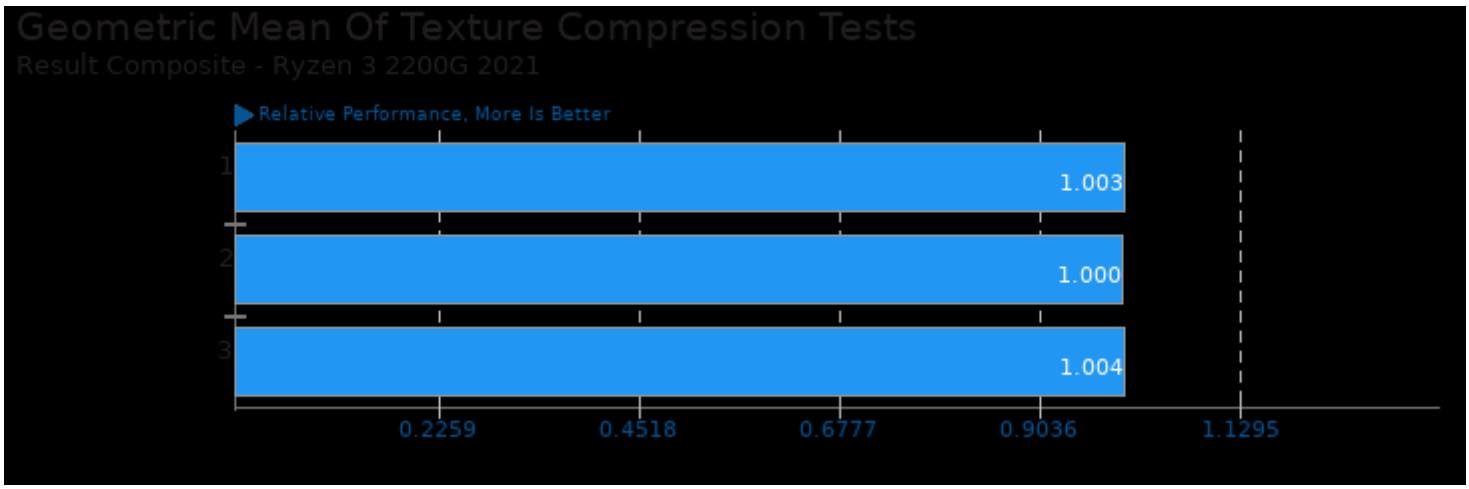
Geometric mean based upon tests: pts/byte, pts/numpy, pts/espeak, pts/redis, pts/phpbench and pts/hint



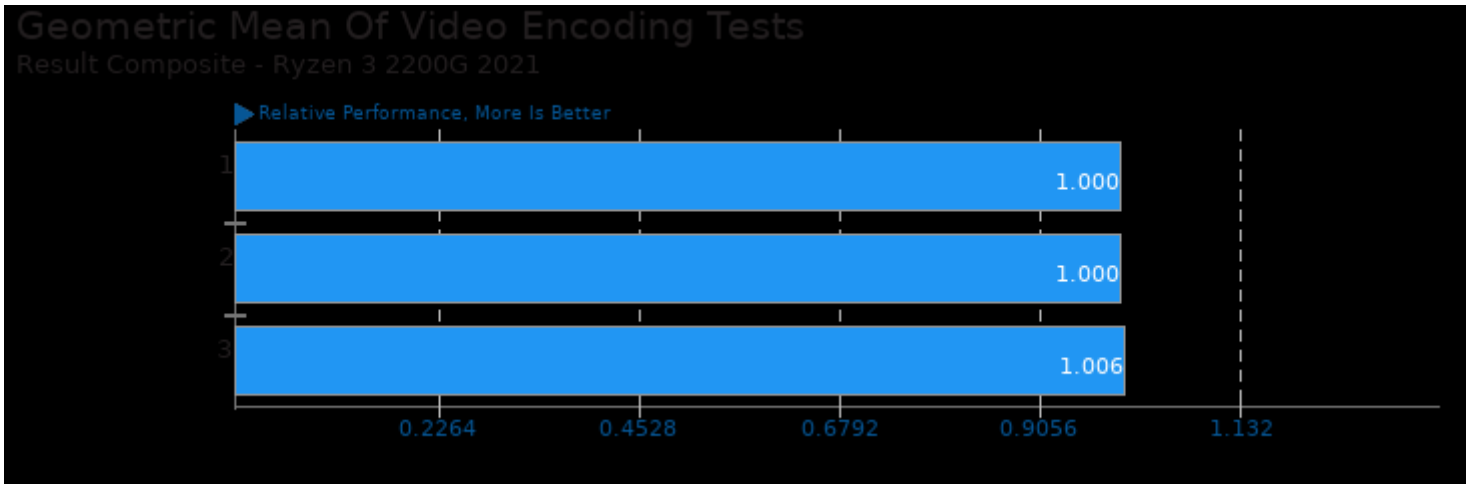
Geometric mean based upon tests: pts/espeak, pts/rnnoise and pts/synthmark



Geometric mean based upon tests: pts/espeak, pts/rnnoise and pts/synthmark



Geometric mean based upon tests: pts/basis and pts/astcenc



Geometric mean based upon tests: pts/x265, pts/kvazaar, pts/dav1d, pts/aom-av1 and pts/rav1e



Geometric mean based upon tests: pts/ncnn, pts/realsr-ncnn and pts/waifu2x-ncnn

This file was automatically generated via the Phoronix Test Suite benchmarking software on Friday, 29 March 2024 11:22.