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5950X ASUS ROG CROSSHAIR VIII HERO WiFi BIOS

AMD Ryzen 9 5950X 16-Core testing with a ASUS ROG CROSSHAIR VIII HERO (WI-FI) (3202 BIOS) and AMD Radeon RX 5600 OEM/5600 XT / 5700/5700 8GB on Ubuntu 20.10 via the Phoronix Test Suite.

Automated Executive Summary

3003 had the most wins, coming in first place for 61% of the tests.

Based on the geometric mean of all complete results, the fastest (3003) was 1.004x the speed of the slowest (3202).

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

IOR (Block Size: 2MB - Disk Target: Default Test Directory) at 1.109x
IOR (Block Size: 256MB - Disk Target: Default Test Directory) at 1.071x
OpenFOAM (Input: Motorbike 30M) at 1.068x
IOR (Block Size: 4MB - Disk Target: Default Test Directory) at 1.066x
ONNX Runtime (Model: bertsquad-10 - Device: OpenMP CPU) at 1.06x
HPC Challenge (Test / Class: Random Ring Bandwidth) at 1.051x
HPC Challenge (Test / Class: G-Ffte) at 1.051x
oneDNN (Harness: Deconvolution Batch shapes_3d - Data Type: u8s8f32 - Engine: CPU) at 1.042x
IOR (Block Size: 512MB - Disk Target: Default Test Directory) at 1.039x
HPC Challenge (Test / Class: EP-STREAM Triad) at 1.039x.

Test Systems:

3003

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (3003 BIOS), Chipset: AMD Starship/Matisse, Memory: 32GB, Disk: 2000GB Corsair Force MP600 + 2000GB, Graphics: AMD Radeon RX 5600 OEM/5600 XT / 5700/5700 8GB (2100/875MHz), Audio: AMD Navi 10 HDMI Audio, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.10, Kernel: 5.11.0-051100rc2daily20210108-generic (x86_64) 20210107, Desktop: GNOME Shell 3.38.1, Display Server: X Server 1.20.9, Display Driver: amdgpu 19.1.0, OpenGL: 4.6 Mesa 21.0.0-devel (git-f01bca8 2021-01-08 groovy-oibaf-ppa) (LLVM 11.0.1), Vulkan: 1.2.164, Compiler: GCC 10.2.0, File-System: ext4, Screen Resolution: 3840x2160

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 schedutil (Boost: Enabled) - CPU Microcode: 0xa201009
Graphics Notes: GLAMOR
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 IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

3202

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (3202 BIOS), Chipset: AMD Starship/Matisse, Memory: 32GB, Disk: 2000GB Corsair Force MP600 + 2000GB, Graphics: AMD Radeon RX 5600 OEM/5600 XT / 5700/5700 8GB (2100/875MHz), Audio: AMD Navi 10 HDMI Audio, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.10, Kernel: 5.11.0-051100rc2daily20210108-generic (x86_64) 20210107, Desktop: GNOME Shell 3.38.1, Display Server: X Server 1.20.9, Display Driver: amdgpu 19.1.0, OpenGL: 4.6 Mesa 21.0.0-devel (git-f01bca8 2021-01-08 groovy-oibaf-ppa) (LLVM 11.0.1), Vulkan: 1.2.164, Compiler: GCC 10.2.0, File-System: ext4, Screen Resolution: 3840x2160

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
Disk Notes: NONE / errors=remount-ro,relatime,rw / Block Size: 4096
Processor Notes: Scaling Governor: acpi-cpufreq schedutil (Boost: Enabled) - CPU Microcode: 0xa201009
Graphics Notes: GLAMOR
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 IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

5950X ASUS ROG CROSSHAIR VIII HERO WiFi BIOS

Phoronix Test Suite

	3003	3202
ET: Legacy - Renderer2 - 3840 x 2160 (FPS)	224.3	
Tesseract - 3840 x 2160 (FPS)	356.1715	353.5707
Normalized	100%	99.27%
Standard Deviation	3.8%	4.6%
Warsow - 3840 x 2160 (FPS)	429.6	430.5
Normalized	99.79%	100%
Standard Deviation	0.3%	0.3%
Xonotic - 3840 x 2160 - Ultimate (FPS)	257.4557090	288.9672535
Normalized	89.1%	100%
Standard Deviation	7.3%	2.3%
yquake2 - OpenGL 3.x - 3840 x 2160 (FPS)	979.3	986.5
Normalized	99.27%	100%
Standard Deviation	0.2%	0.2%
HPC Challenge - G-HPL (GFLOPS)	53.16620	53.16863
Normalized	100%	100%
Standard Deviation	0.3%	0.2%
HPC Challenge - G-Ffte (GFLOPS)	6.23452	6.55050
Normalized	95.18%	100%
Standard Deviation	3%	0.7%
HPC Challenge - EP-DGEMM (GFLOPS)	16.85917	16.57023
Normalized	100%	98.29%
Standard Deviation	1.1%	1.8%
HPC Challenge - G-Ptrans (GB/s)	2.45326	2.47841
Normalized	98.99%	100%
Standard Deviation	0.3%	0.7%
HPC Challenge - EP-STREAM Triad (GB/s)	1.42468	1.47956
Normalized	96.29%	100%
Standard Deviation	0.1%	0.1%
HPC Challenge - G-Rand Access (GUP/s)	0.04998	0.04973
Normalized	100%	99.5%
Standard Deviation	1.6%	0.6%
HPC Challenge - R.R.L (usecs)	0.48933	0.49204
Normalized	100%	99.45%
Standard Deviation	1.4%	0.8%
HPC Challenge - R.R.B (GB/s)	1.92562	2.02474
Normalized	95.1%	100%
Standard Deviation	2.4%	2.5%
HPC Challenge - M.P.P.B (MB/s)	34205	34167
Normalized	100%	99.89%
Standard Deviation	0.7%	0.7%
CloverLeaf - L.E.H (sec)	136.80	134.74
Normalized	98.49%	100%
Standard Deviation	0%	0.3%
CP2K Molecular Dynamics - Fayalite-FIST Data (sec)	787.495	801.638
Normalized	100%	98.24%
NAMD - ATPase Simulation - 327,506 Atoms (days/ns)	1.07519	1.08736
Normalized	100%	98.88%
Standard Deviation	0.4%	0.8%
Dolfyn - C.F.D (sec)	12.898	13.292
Normalized	100%	97.04%
Standard Deviation	1.3%	0.2%
Algebraic Multi-Grid Benchmark (Figure Of Merit)	207261167	210165200
Normalized	98.62%	100%
Standard Deviation	1.8%	0.5%

5950X ASUS ROG CROSSHAIR VIII HERO WiFi BIOS

QMCPACK - simple-H2O (Execution Time - sec)	**22.312**	**22.371**
Normalized	100%	99.74%
Standard Deviation	2.5%	1.1%
Timed HMMer Search - P.D.S (sec)	**82.704**	**82.928**
Normalized	100%	99.73%
Standard Deviation	0.3%	0.1%
OpenFOAM - Motorbike 30M (sec)	**104.48**	**97.87**
Normalized	93.67%	100%
Standard Deviation	0.1%	0.3%
OpenFOAM - Motorbike 60M (sec)	**1391**	**1380**
Normalized	99.2%	100%
Standard Deviation	0.1%	0.1%
Quantum ESPRESSO - AUSURF112 (sec)	**1199**	**1221**
Normalized	100%	98.21%
Standard Deviation	0.1%	0.5%
RELION - Basic - CPU (sec)	**1893**	**1875**
Normalized	99.09%	100%
Standard Deviation	0.4%	0.6%
LAMMPS Molecular Dynamics Simulator - 20k Atoms (ns/day)	**13.539**	**13.390**
Normalized	100%	98.9%
Standard Deviation	1%	0.4%
LAMMPS Molecular Dynamics Simulator - Rhodopsin Protein (ns/day)	**13.104**	**13.113**
Normalized	99.93%	100%
Standard Deviation	4.5%	3.7%
LULESH (z/s)	**5042**	**5067**
Normalized	99.51%	100%
Standard Deviation	2.1%	2.3%
WebP Image Encode - Quality 100 (Encode Time - sec)	**1.741**	**1.729**
Normalized	99.31%	100%
Standard Deviation	0.1%	0.4%
WebP Image Encode - Q.1.L (Encode Time - sec)	**13.039**	**12.873**
Normalized	98.73%	100%
Standard Deviation	0.2%	0.7%
WebP Image Encode - Q.1.H.C (Encode Time - sec)	**5.465**	**5.360**
Normalized	98.08%	100%
Standard Deviation	1.9%	2%
WebP Image Encode - Q.1.L.H.C (Encode Time - sec)	**27.225**	**27.522**
Normalized	100%	98.92%
Standard Deviation	0.3%	0.3%
LZ4 Compression - 1 - Compression Speed (MB/s)	**11911**	**11855**
Normalized	100%	99.53%
Standard Deviation	0.7%	0.9%
LZ4 Compression - 1 - D.S (MB/s)	**13410**	**13320**
Normalized	100%	99.32%
Standard Deviation	0.3%	0.3%
LZ4 Compression - 3 - Compression Speed (MB/s)	**68.88**	**69.10**
Normalized	99.68%	100%
Standard Deviation	2.3%	0.5%
LZ4 Compression - 3 - D.S (MB/s)	**13085**	**12946**
Normalized	100%	98.94%
Standard Deviation	0.1%	0%
LZ4 Compression - 9 - Compression Speed (MB/s)	**68.57**	**66.95**
Normalized	100%	97.64%

Standard Deviation	4.1%	0.5%
LZ4 Compression - 9 - D.S (MB/s)	**13093**	**12949**
Normalized	100%	98.9%
Standard Deviation	0.3%	0.2%
Zstd Compression - 3 (MB/s)	**4724**	**4738**
Normalized	99.69%	100%
Standard Deviation	0.3%	0.5%
Zstd Compression - 19 (MB/s)	**43.4**	**43.3**
Normalized	100%	99.77%
Standard Deviation	0.1%	0.2%
LibRaw - P.P.B (Mpix/sec)	**52.99**	**53.09**
Normalized	99.81%	100%
Standard Deviation	0.3%	0.8%
Crafty - Elapsed Time (Nodes/s)	**11736507**	**11427830**
Normalized	100%	97.37%
Standard Deviation	1.6%	0.6%
oneDNN - IP Shapes 1D - f32 - CPU (ms)	**3.98022**	**3.97992**
Normalized	99.99%	100%
Standard Deviation	0.7%	0.4%
oneDNN - IP Shapes 3D - f32 - CPU (ms)	**9.48452**	**9.51868**
Normalized	100%	99.64%
Standard Deviation	0.3%	0.1%
oneDNN - IP Shapes 1D - u8s8f32 - CPU (ms)	**0.816147**	**0.832251**
Normalized	100%	98.07%
Standard Deviation	0.4%	0.3%
oneDNN - IP Shapes 3D - u8s8f32 - CPU (ms)	**0.477138**	**0.484368**
Normalized	100%	98.51%
Standard Deviation	0.8%	2.7%
oneDNN - C.B.S.A - f32 - CPU (ms)	**17.2340**	**17.2901**
Normalized	100%	99.68%
Standard Deviation	0.1%	0.2%
oneDNN - D.B.s - f32 - CPU (ms)	**2.38690**	**2.43213**
Normalized	100%	98.14%
Standard Deviation	0.2%	0.7%
oneDNN - D.B.s - f32 - CPU (ms)	**3.50445**	**3.53182**
Normalized	100%	99.23%
Standard Deviation	0.3%	0.2%
oneDNN - C.B.S.A - u8s8f32 - CPU (ms)	**19.1307**	**19.2565**
Normalized	100%	99.35%
Standard Deviation	0.2%	0.3%
oneDNN - D.B.s - u8s8f32 - CPU (ms)	**2.95002**	**2.99402**
Normalized	100%	98.53%
Standard Deviation	0.4%	0.5%
oneDNN - D.B.s - u8s8f32 - CPU (ms)	**1.53431**	**1.59818**
Normalized	100%	96%
Standard Deviation	0.2%	0.2%
oneDNN - R.N.N.T - f32 - CPU (ms)	**2754**	**2749**
Normalized	99.84%	100%
Standard Deviation	0.9%	0.2%
oneDNN - R.N.N.I - f32 - CPU (ms)	**1810**	**1823**
Normalized	100%	99.26%
Standard Deviation	1.5%	0.9%
oneDNN - R.N.N.T - u8s8f32 - CPU (ms)	**2753**	**2764**
Normalized	100%	99.6%
Standard Deviation	0.7%	0.6%

5950X ASUS ROG CROSSHAIR VIII HERO WiFi BIOS

oneDNN - R.N.N.I - u8s8f32 - CPU (ms)	**1784**	**1789**
Normalized	100%	99.69%
Standard Deviation	0.8%	1.6%
oneDNN - M.M.B.S.T - f32 - CPU (ms)	**0.625862**	**0.636735**
Normalized	100%	98.29%
Standard Deviation	0.2%	0.1%
oneDNN - R.N.N.T - bf16bf16bf16 - CPU (ms)	**2769**	**2762**
Normalized	99.74%	100%
Standard Deviation	0.6%	0.3%
oneDNN - R.N.N.I - bf16bf16bf16 - CPU (ms)	**1818**	**1795**
Normalized	98.75%	100%
Standard Deviation	2%	2.2%
oneDNN - M.M.B.S.T - u8s8f32 - CPU (ms)	**1.45970**	**1.48786**
Normalized	100%	98.11%
Standard Deviation	0.1%	0.2%
dav1d - Chimera 1080p (FPS)	**590.32**	**592.56**
Normalized	99.62%	100%
Standard Deviation	0.2%	0.2%
dav1d - Summer Nature 4K (FPS)	**224.40**	**228.62**
Normalized	98.15%	100%
Standard Deviation	0.4%	0.3%
dav1d - S.N.1 (FPS)	**534.95**	**535.52**
Normalized	99.89%	100%
Standard Deviation	1.4%	0.5%
dav1d - C.1.1.b (FPS)	**96.35**	**96.66**
Normalized	99.68%	100%
Standard Deviation	0.1%	0.1%
rav1e - 5 (FPS)	**1.497**	**1.505**
Normalized	99.47%	100%
Standard Deviation	0.6%	0.9%
rav1e - 6 (FPS)	**1.958**	**1.965**
Normalized	99.64%	100%
Standard Deviation	0.5%	1.5%
rav1e - 10 (FPS)	**3.362**	**3.446**
Normalized	97.56%	100%
Standard Deviation	1.9%	4.1%
x265 - Bosphorus 4K (FPS)	**24.57**	**24.18**
Normalized	100%	98.41%
Standard Deviation	2.4%	2.1%
x265 - Bosphorus 1080p (FPS)	**47.87**	**47.62**
Normalized	100%	99.48%
Standard Deviation	0.3%	0.8%
Coremark - CoreMark Size 666 - I.P.S (Iterations/Sec)	**829763**	**815726**
Normalized	100%	98.31%
Standard Deviation	0.4%	0.1%
Timed Godot Game Engine Compilation - Time To Compile (sec)	**79.198**	**80.072**
Normalized	100%	98.91%
Standard Deviation	0.3%	0.7%
Timed Linux Kernel Compilation - Time To Compile	**45.787**	**46.410**
Normalized	100%	98.66%
Standard Deviation	1.6%	1.8%
Build2 - Time To Compile (sec)	**79.997**	**81.883**
Normalized	100%	97.7%
Standard Deviation	0.2%	0.3%

5950X ASUS ROG CROSSHAIR VIII HERO WiFi BIOS

Numpy Benchmark (Score)	**514.13**	**514.08**
Normalized	100%	99.99%
Standard Deviation	0.2%	1.4%
Timed Eigen Compilation - Time To Compile (sec)	**60.052**	**61.251**
Normalized	100%	98.04%
Standard Deviation	0.6%	0%
DeepSpeech - CPU (sec)	**70.48086**	**70.53470**
Normalized	100%	99.92%
Standard Deviation	0.2%	0.1%
Monkey Audio Encoding - WAV To APE (sec)	**9.805**	**9.851**
Normalized	100%	99.53%
Standard Deviation	1%	0.9%
Opus Codec Encoding - WAV To Opus Encode (sec)	**6.126**	**6.150**
Normalized	100%	99.61%
Standard Deviation	1.2%	1.5%
eSpeak-NG Speech Engine - T.T.S.S (sec)	**21.560**	**21.692**
Normalized	100%	99.39%
Standard Deviation	0.7%	0.8%
RNNoise (sec)	**15.181**	**15.234**
Normalized	100%	99.65%
Standard Deviation	0.8%	2.1%
Google SynthMark - VoiceMark_100 (Voices)	**958.662**	**957.951**
Normalized	100%	99.93%
Standard Deviation	0.5%	0.9%
GROMACS - Water Benchmark (Ns/Day)	**1.275**	**1.258**
Normalized	100%	98.67%
Standard Deviation	0.1%	0.2%
ASTC Encoder - Fast (sec)	**4.11**	**4.10**
Normalized	99.76%	100%
Standard Deviation	0.4%	1.2%
ASTC Encoder - Medium (sec)	**5.35**	**5.43**
Normalized	100%	98.53%
Standard Deviation	1.4%	0.6%
ASTC Encoder - Thorough (sec)	**12.47**	**12.67**
Normalized	100%	98.42%
Standard Deviation	0.5%	0.2%
ASTC Encoder - Exhaustive (sec)	**99.00**	**100.90**
Normalized	100%	98.12%
Standard Deviation	0.2%	0.3%
SQLite Speedtest - Timed Time - Size 1,000 (sec)	**41.631**	**42.862**
Normalized	100%	97.13%
Standard Deviation	1.4%	2.2%
Mobile Neural Network - SqueezeNetV1.0 (ms)	**5.232**	**5.153**
Normalized	98.49%	100%
Standard Deviation	2%	0.7%
Mobile Neural Network - resnet-v2-50 (ms)	**24.036**	**23.630**
Normalized	98.31%	100%
Standard Deviation	1.8%	1.4%
Mobile Neural Network - MobileNetV2_224 (ms)	**3.402**	**3.325**
Normalized	97.74%	100%
Standard Deviation	2.4%	2%
Mobile Neural Network - mobilenet-v1-1.0 (ms)	**2.501**	**2.481**
Normalized	99.2%	100%
Standard Deviation	6.5%	1.9%
Mobile Neural Network - inception-v3 (ms)	**31.005**	**30.332**

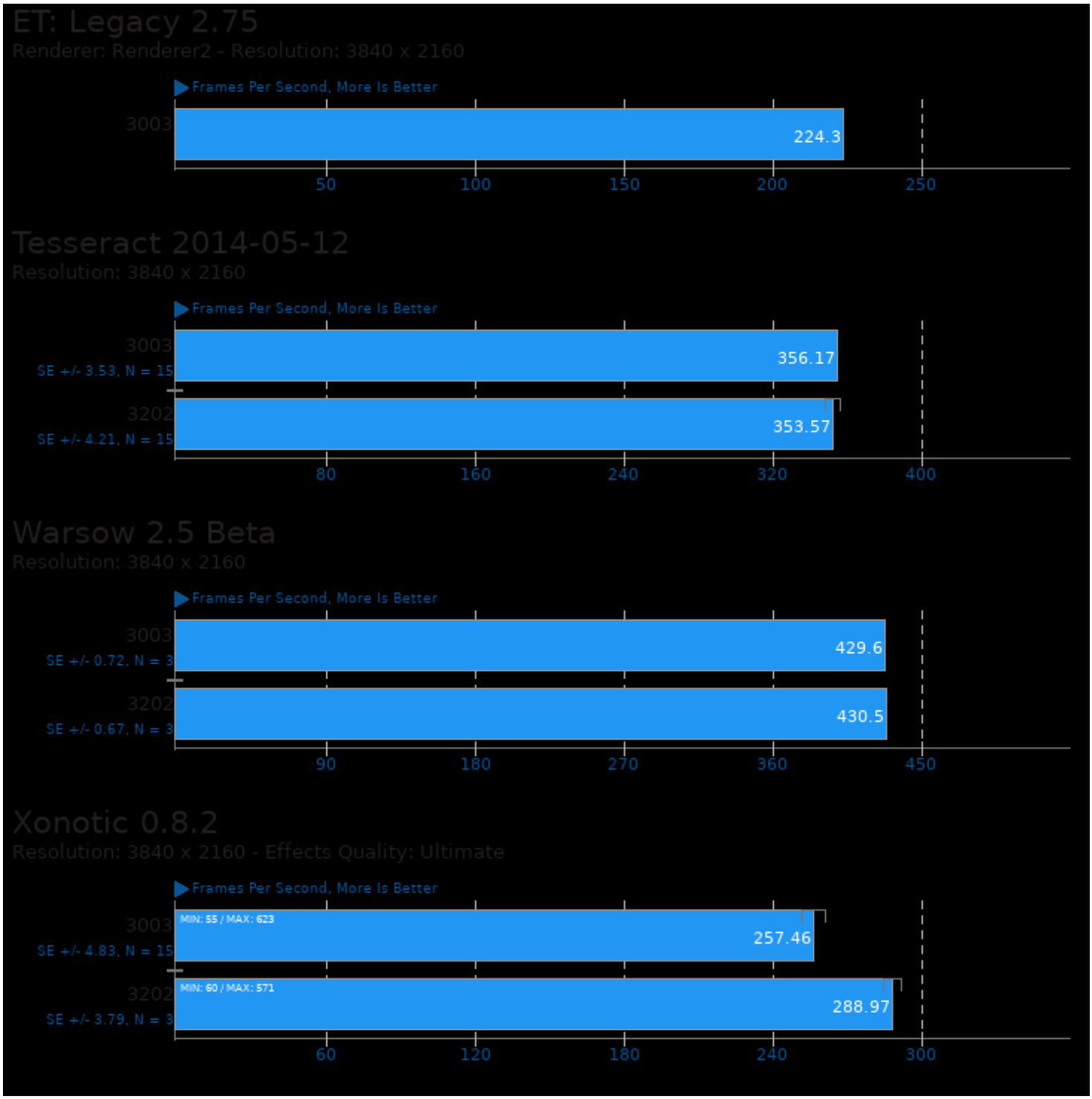
Normalized	97.83%	100%
Standard Deviation	1%	1.5%
NCNN - CPU - mobilenet (ms)	**12.04**	**11.99**
Normalized	99.58%	100%
Standard Deviation	2.1%	0.2%
NCNN - CPU-v2-v2 - mobilenet-v2 (ms)	**4.38**	**4.46**
Normalized	100%	98.21%
Standard Deviation	0.2%	0.3%
NCNN - CPU-v3-v3 - mobilenet-v3 (ms)	**4.07**	**4.15**
Normalized	100%	98.07%
Standard Deviation	0.2%	0.1%
NCNN - CPU - shufflenet-v2 (ms)	**4.38**	**4.42**
Normalized	100%	99.1%
Standard Deviation	0.2%	0.5%
NCNN - CPU - mnasnet (ms)	**3.90**	**3.96**
Normalized	100%	98.48%
Standard Deviation	0.1%	0.4%
NCNN - CPU - efficientnet-b0 (ms)	**5.29**	**5.37**
Normalized	100%	98.51%
Standard Deviation	0.1%	0.3%
NCNN - CPU - blazeface (ms)	**1.80**	**1.82**
Normalized	100%	98.9%
Standard Deviation	0.3%	0.3%
NCNN - CPU - googlenet (ms)	**12.99**	**13.00**
Normalized	100%	99.92%
Standard Deviation	0%	0.3%
NCNN - CPU - vgg16 (ms)	**60.60**	**59.90**
Normalized	98.84%	100%
Standard Deviation	0.4%	0.3%
NCNN - CPU - resnet18 (ms)	**14.51**	**14.57**
Normalized	100%	99.59%
Standard Deviation	0.1%	0.1%
NCNN - CPU - alexnet (ms)	**11.04**	**11.26**
Normalized	100%	98.05%
Standard Deviation	0.1%	3.6%
NCNN - CPU - resnet50 (ms)	**25.05**	**25.00**
Normalized	99.8%	100%
Standard Deviation	0.9%	1.2%
NCNN - CPU - yolov4-tiny (ms)	**21.14**	**21.29**
Normalized	100%	99.3%
Standard Deviation	0.9%	0.7%
NCNN - CPU - squeezenet_ssd (ms)	**14.64**	**14.60**
Normalized	99.73%	100%
Standard Deviation	0.4%	0.5%
NCNN - CPU - regnety_400m (ms)	**17.67**	**17.95**
Normalized	100%	98.44%
Standard Deviation	0.4%	1.3%
TNN - CPU - MobileNet v2 (ms)	**218.293**	**220.329**
Normalized	100%	99.08%
Standard Deviation	0.3%	0.5%
TNN - CPU - SqueezeNet v1.1 (ms)	**211.459**	**212.620**
Normalized	100%	99.45%
Standard Deviation	0.4%	0.3%
IndigoBench - CPU - Bedroom (M samples/s)	**4.175**	**4.132**
Normalized	100%	98.97%

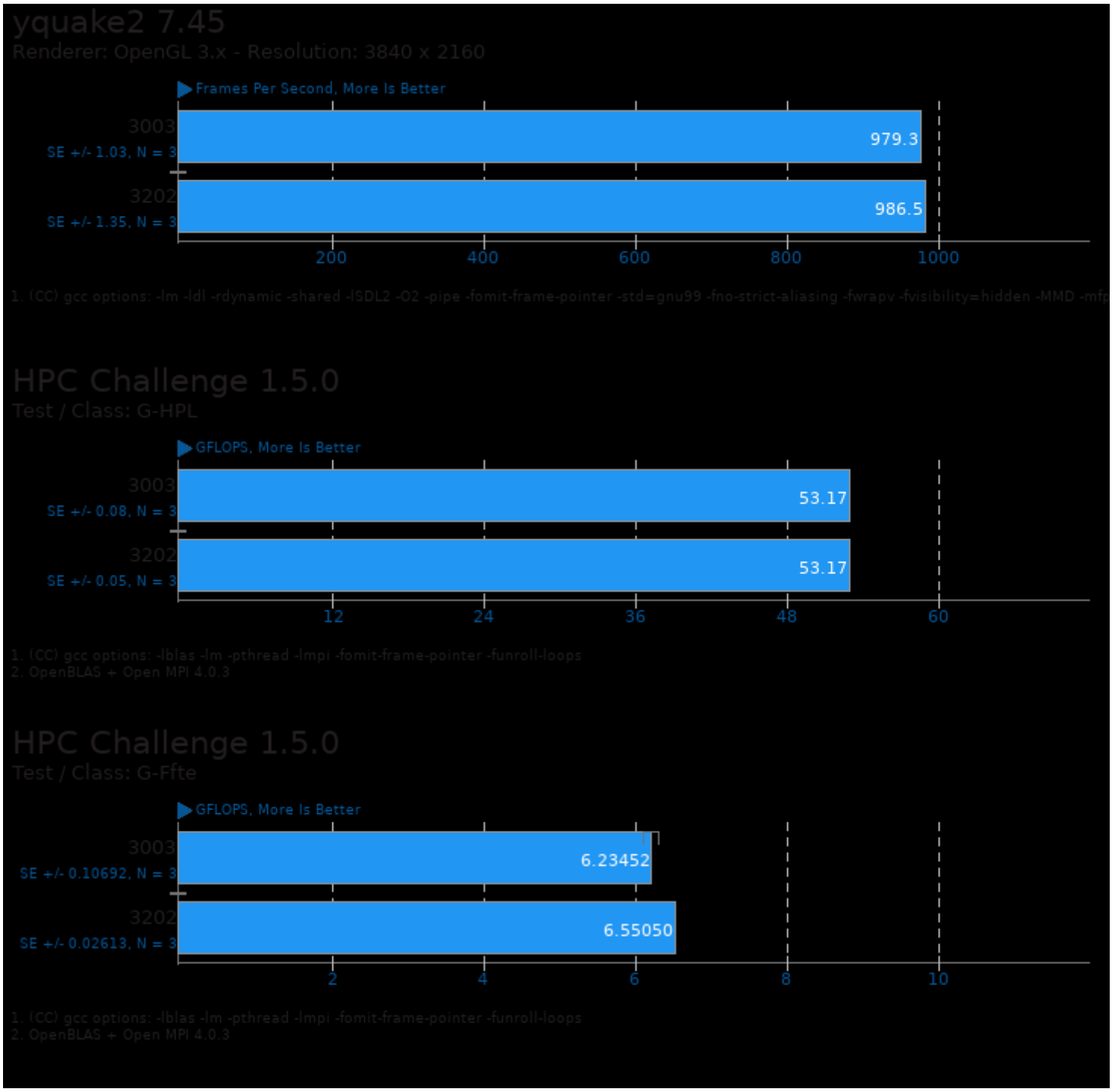
Standard Deviation	0.3%	0.7%
IndigoBench - CPU - Supercar (M samples/s)	**8.803**	**8.669**
Normalized	100%	98.48%
Standard Deviation	0.2%	0.2%
ONNX Runtime - yolov4 - OpenMP CPU	**438**	**428**
Normalized	100%	97.72%
Standard Deviation	0.5%	1.4%
ONNX Runtime - bertsquad-10 - OpenMP CPU (Inferences/min)	**705**	**665**
Normalized	100%	94.33%
Standard Deviation	0.3%	5.7%
ONNX Runtime - fcn-resnet101-11 - OpenMP CPU (Inferences/min)	**99**	**98**
Normalized	100%	98.99%
Standard Deviation	0.6%	
ONNX Runtime - shufflenet-v2-10 - OpenMP CPU (Inferences/min)	**16013**	**15863**
Normalized	100%	99.06%
Standard Deviation	0.2%	0.7%
ONNX Runtime - super-resolution-10 - OpenMP CPU (Inferences/min)	**7056**	**7324**
Normalized	96.34%	100%
Standard Deviation	10%	8.3%
PHPBench - P.B.S (Score)	**831939**	**834019**
Normalized	99.75%	100%
Standard Deviation	1.7%	1.6%
WavPack Audio Encoding - WAV To WavPack (sec)	**10.947**	**11.112**
Normalized	100%	98.52%
Standard Deviation	1.2%	0.5%
Kripke (Throughput FoM)	**72385553**	**72580800**
Normalized	99.73%	100%
Standard Deviation	2.4%	0.8%
BRL-CAD - V.P.M (VGR Performance Metric)	**265419**	**262742**
Normalized	100%	98.99%
Etcpak - DXT1 (Mpx/s)	**1532**	**1563**
Normalized	98.05%	100%
Standard Deviation	0.3%	2.4%
Etcpak - ETC1 (Mpx/s)	**382.932**	**387.141**
Normalized	98.91%	100%
Standard Deviation	0.9%	0.7%
Etcpak - ETC2 (Mpx/s)	**236.507**	**244.998**
Normalized	96.53%	100%
Standard Deviation	0.4%	1.2%
Etcpak - ETC1 + Dithering (Mpx/s)	**349.700**	**355.439**
Normalized	98.39%	100%
Standard Deviation	0.2%	1.9%
IOR - 2MB (MB/s)	**1540**	**1389**
Normalized	100%	90.16%
Standard Deviation	0.3%	1.8%
IOR - 4MB (MB/s)	**1580**	**1483**
Normalized	100%	93.84%
Standard Deviation	0.7%	2.5%
IOR - 8MB (MB/s)	**1601**	**1461**
Normalized	100%	91.25%
Standard Deviation	0.7%	7.1%

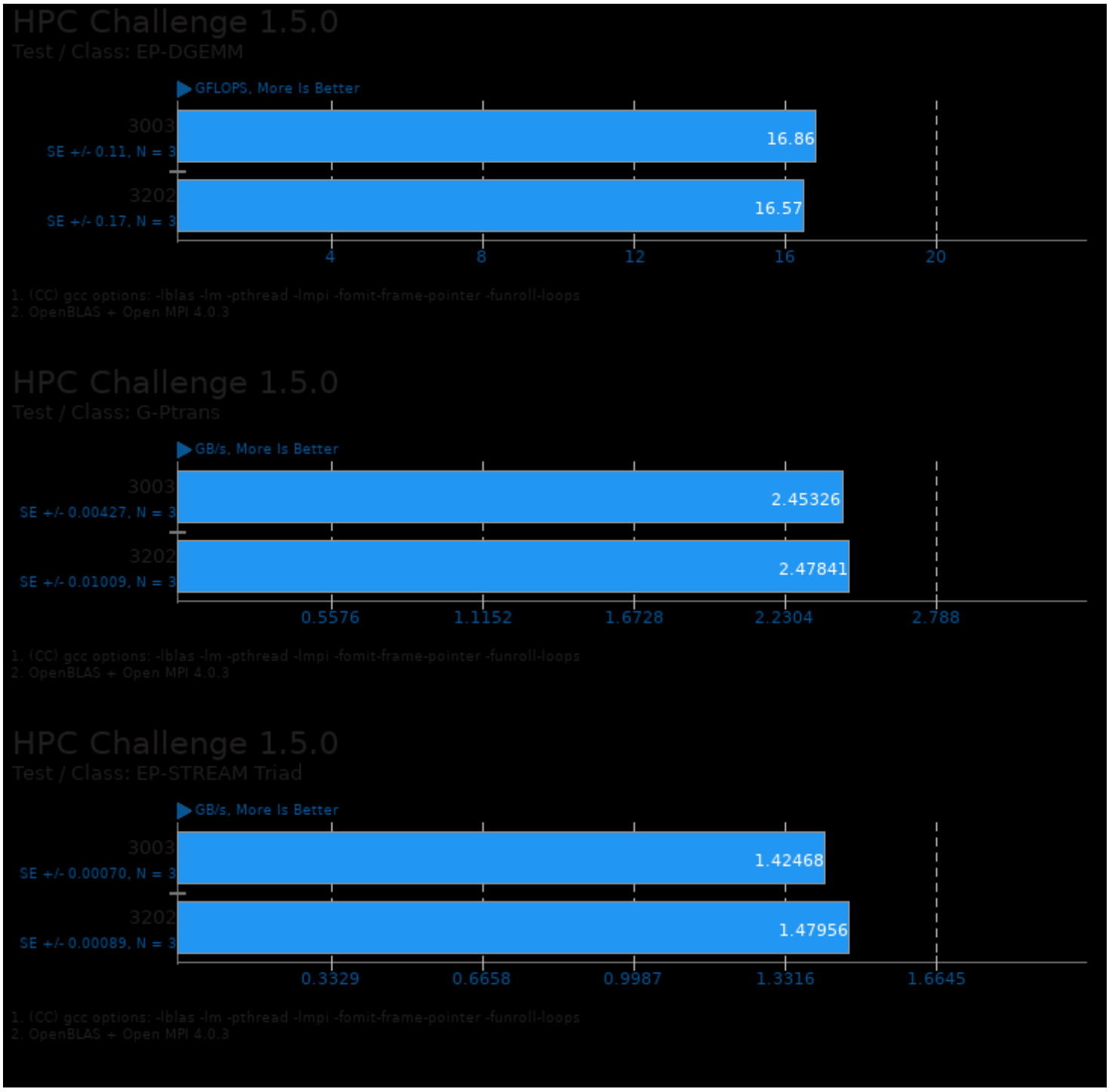
5950X ASUS ROG CROSSHAIR VIII HERO WiFi BIOS

IOR - 256MB (MB/s)	**1340**	**1252**
Normalized	100%	93.41%
Standard Deviation	4.3%	3.4%
IOR - 512MB (MB/s)	**1748**	**1683**
Normalized	100%	96.26%
Standard Deviation	1.2%	4%

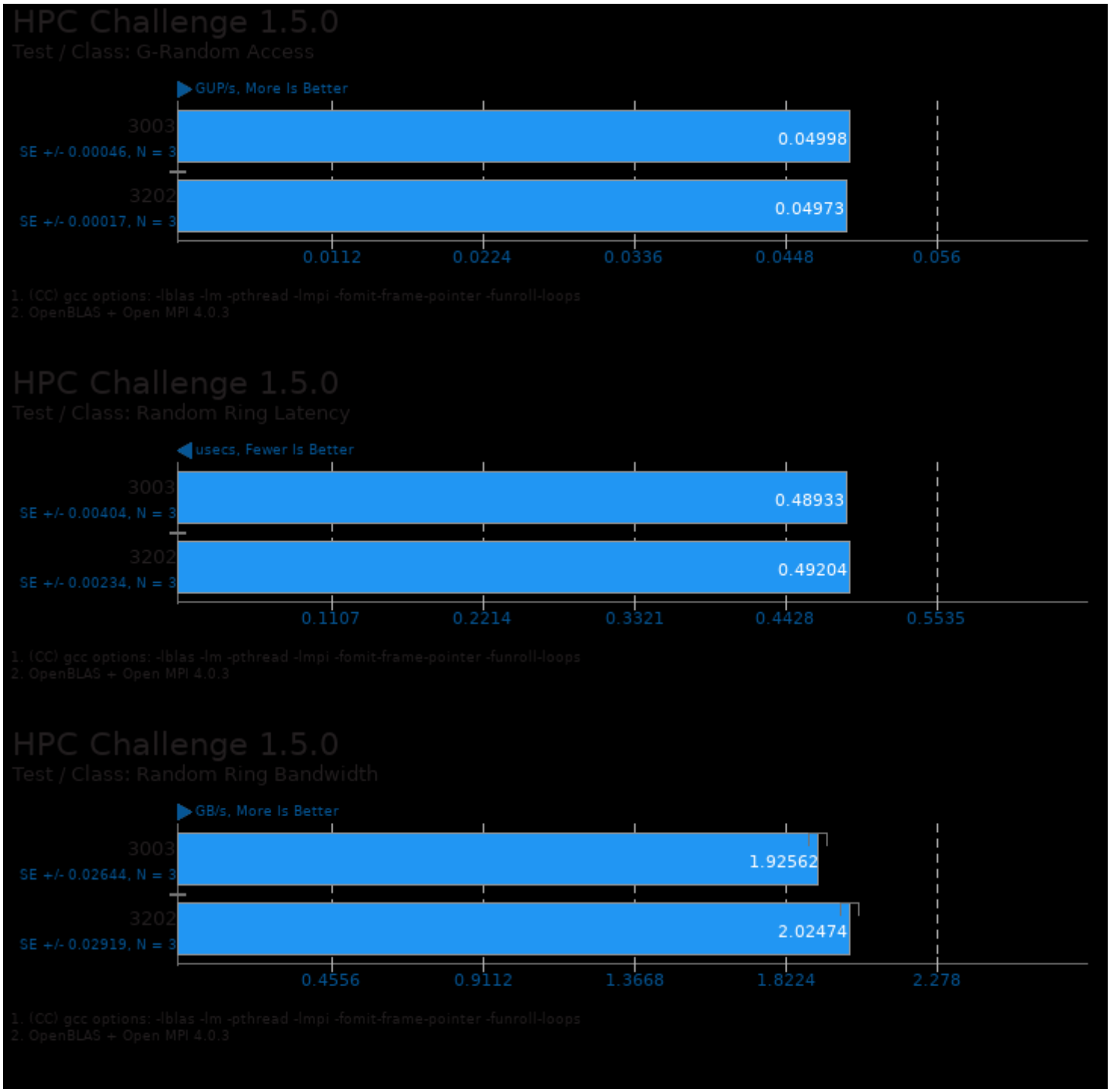
5950X ASUS ROG CROSSHAIR VIII HERO WiFi BIOS




yquake2 7.45
Renderer: OpenGL 3.x - Resolution: 3840 x 2160
Frames Per Second, More Is Better
3003
SE +/- 1.03, N = 3
979.3
3202
SE +/- 1.35, N = 3
986.5
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
HPC Challenge 1.5.0
Test / Class: G-HPL
GFLOPS, More Is Better
3003
SE +/- 0.08, N = 3
53.17
3202
SE +/- 0.05, N = 3
53.17
12
24
36
48
60
1. (CC) gcc options: -lblas -lm -pthread -lmpi -fomit-frame-pointer -funroll-loops
2. OpenBLAS + Open MPI 4.0.3
HPC Challenge 1.5.0
Test / Class: G-Ffte
GFLOPS, More Is Better
3003
SE +/- 0.10692, N = 3
6.23452
3202
SE +/- 0.02613, N = 3
6.55050
2
4
6
8
10
1. (CC) gcc options: -lblas -lm -pthread -lmpi -fomit-frame-pointer -funroll-loops
2. OpenBLAS + Open MPI 4.0.3

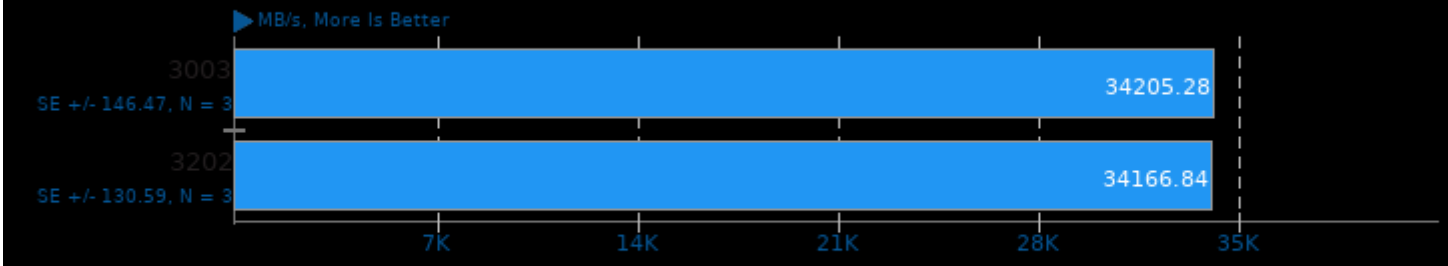

HPC Challenge 1.5.0
Test / Class: EP-DGEMM
GFLOPS, More Is Better
3003
SE +/- 0.11, N = 3
16.86
3202
SE +/- 0.17, N = 3
16.57
4
8
12
16
20
1. (CC) gcc options: -lblas -lm -pthread -lmpi -fomit-frame-pointer -funroll-loops
2. OpenBLAS + Open MPI 4.0.3
HPC Challenge 1.5.0
Test / Class: G-Ptrans
GB/s, More Is Better
3003
SE +/- 0.00427, N = 3
2.45326
3202
SE +/- 0.01009, N = 3
2.47841
0.5576
1.1152
1.6728
2.2304
2.788
1. (CC) gcc options: -lblas -lm -pthread -lmpi -fomit-frame-pointer -funroll-loops
2. OpenBLAS + Open MPI 4.0.3
HPC Challenge 1.5.0
Test / Class: EP-STREAM Triad
GB/s, More Is Better
3003
SE +/- 0.00070, N = 3
1.42468
3202
SE +/- 0.00089, N = 3
1.47956
0.3329
0.6658
0.9987
1.3316
1.6645
1. (CC) gcc options: -lblas -lm -pthread -lmpi -fomit-frame-pointer -funroll-loops
2. OpenBLAS + Open MPI 4.0.3

5950X ASUS ROG CROSSHAIR VIII HERO WiFi BIOS



HPC Challenge 1.5.0

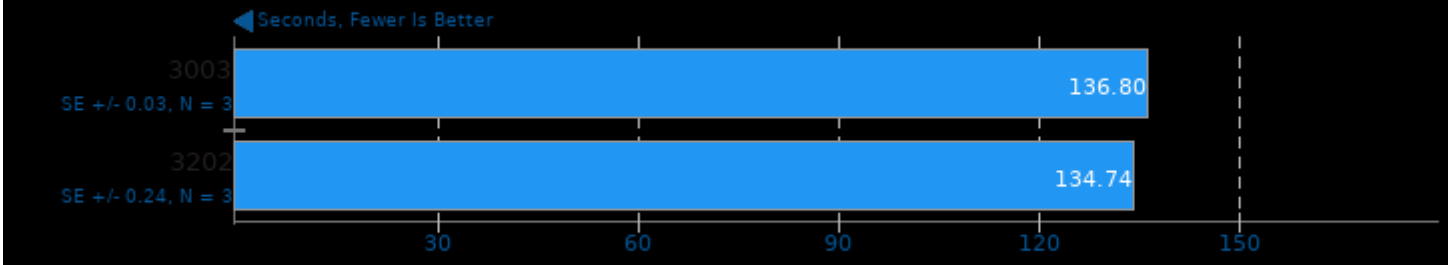
Test / Class: Max Ping Pong Bandwidth



1. (CC) gcc options: -lblas -lm -pthread -lmpi -fomit-frame-pointer -funroll-loops
2. OpenBLAS + Open MPI 4.0.3

CloverLeaf

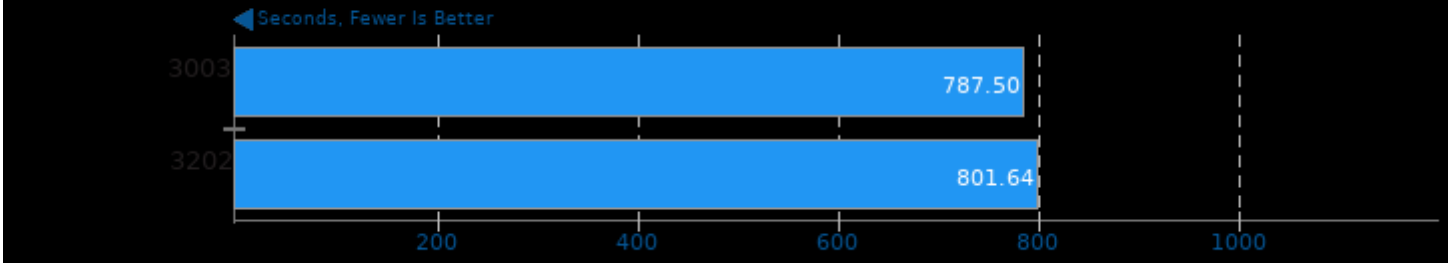
Lagrangian-Eulerian Hydrodynamics



1. (F9X) gfortran options: -O3 -march=native -funroll-loops -fopenmp

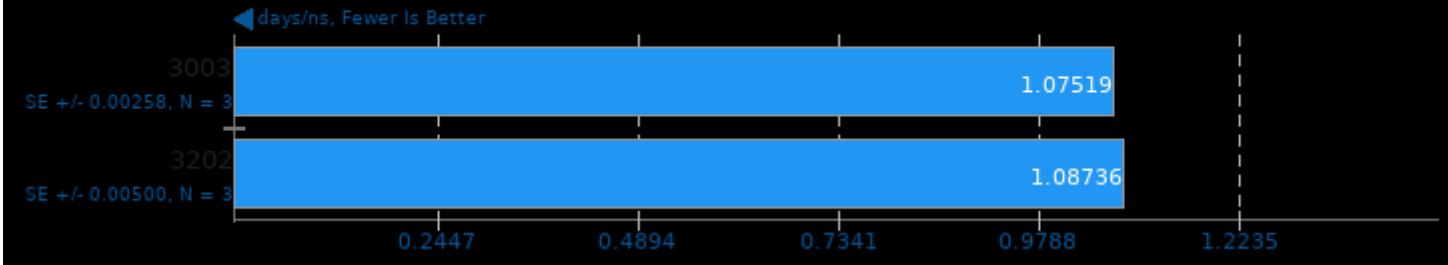
CP2K Molecular Dynamics 8.1

Fayalite-FIST Data



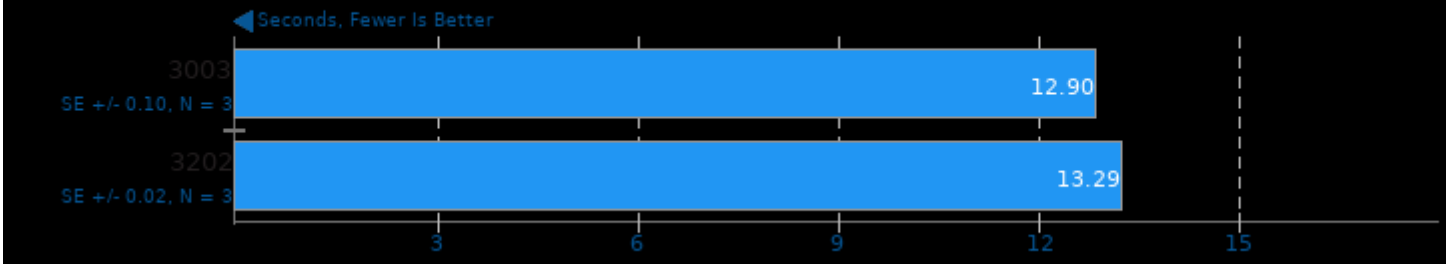
NAMD 2.14

ATPase Simulation - 327,506 Atoms

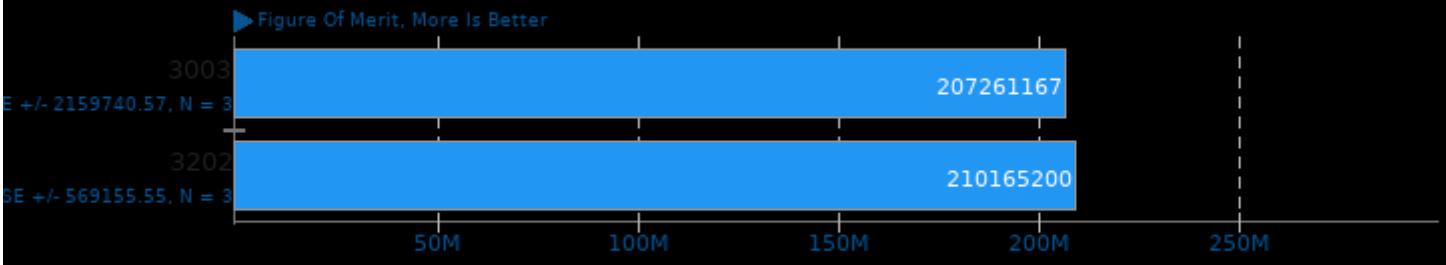


Dolfyn 0.527

Computational Fluid Dynamics



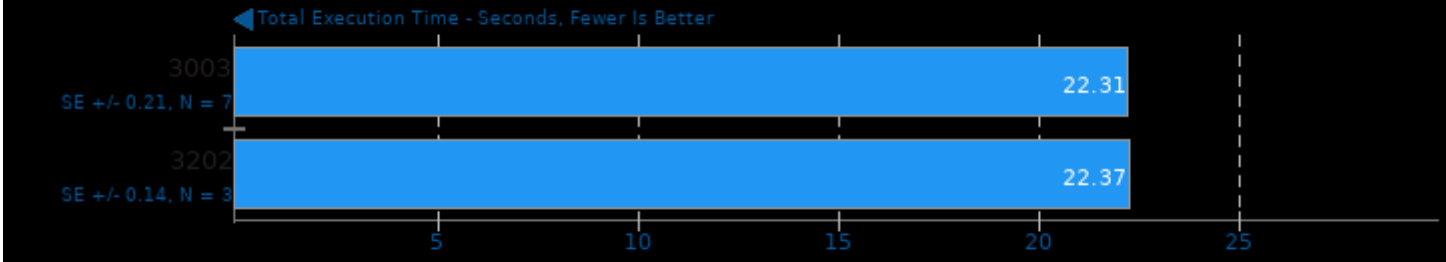
Algebraic Multi-Grid Benchmark 1.2



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

QMCPACK 3.10

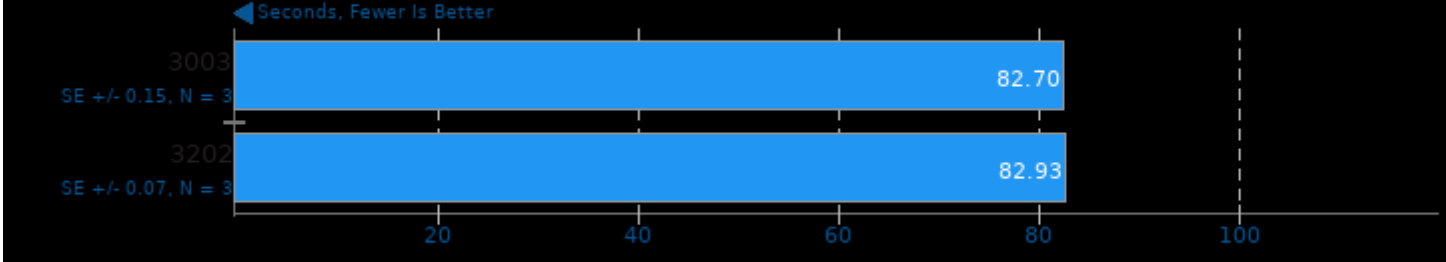
Input: simple-H2O



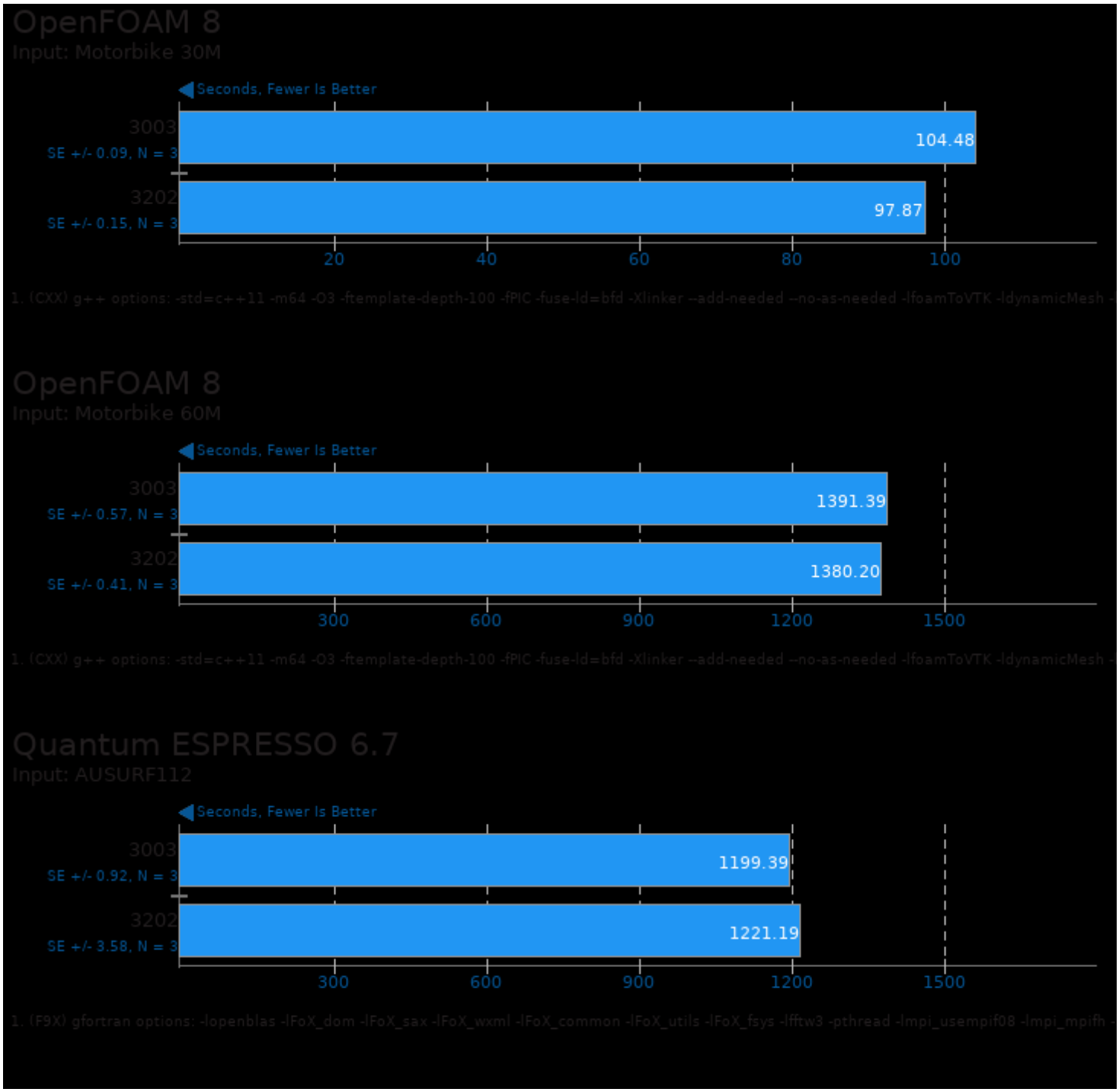
1. (CXX) g++ options: -fopenmp -finline-limit=1000 -fstrict-aliasing -funroll-all-loops -march=native -O3 -fomit-frame-pointer -ffast-math -pthread -lm

Timed HMMer Search 3.3.1

Pfam Database Search

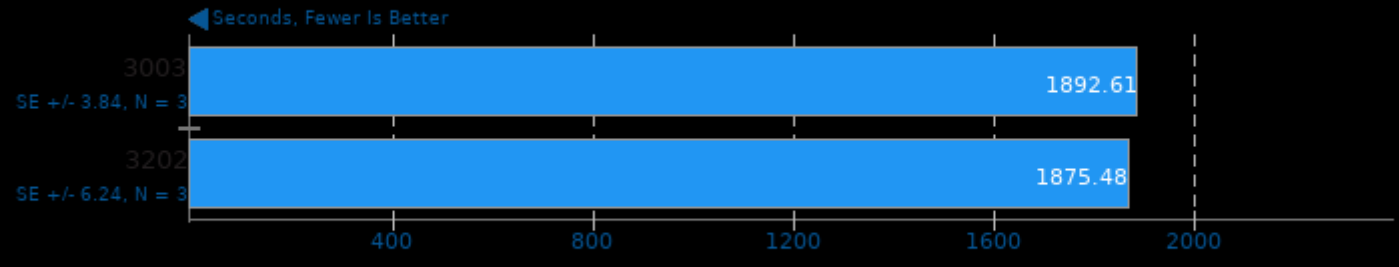


1. (CC) gcc options: -O3 -pthread -lhmmer -leasel -lm


OpenFOAM 8
Input: Motorbike 30M
Seconds, Fewer Is Better
3003
SE +/- 0.09, N = 3
104.48
3202
SE +/- 0.15, N = 3
97.87
20
40
60
80
100
1. (CXX) g++ options: -std=c++11 -m64 -O3 -ftemplate-depth-100 -fPIC -fuse-ld=bfd -Xlinker --add-needed --no-as-needed -lfoamToVTK -ldynamicMesh
OpenFOAM 8
Input: Motorbike 60M
Seconds, Fewer Is Better
3003
SE +/- 0.57, N = 3
1391.39
3202
SE +/- 0.41, N = 3
1380.20
300
600
900
1200
1500
1. (CXX) g++ options: -std=c++11 -m64 -O3 -ftemplate-depth-100 -fPIC -fuse-ld=bfd -Xlinker --add-needed --no-as-needed -lfoamToVTK -ldynamicMesh
Quantum ESPRESSO 6.7
Input: AUSURF112
Seconds, Fewer Is Better
3003
SE +/- 0.92, N = 3
1199.39
3202
SE +/- 3.58, N = 3
1221.19
300
600
900
1200
1500
1. (F9X) gfortran options: -lopenblas -lFoX_dom -lFoX_sax -lFoX_wxml -lFoX_common -lFoX_utils -lFoX_fsys -lfftw3 -pthread -lmpi_usempif08 -lmpi_mpifh

RELION 3.1.1

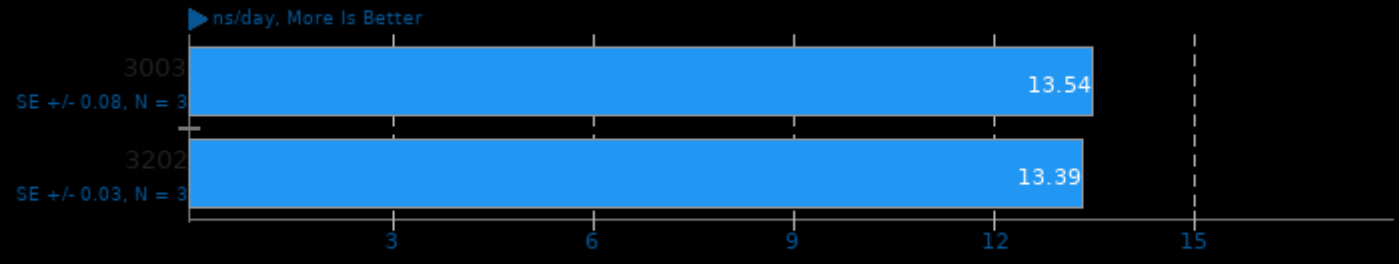
Test: Basic - Device: CPU



1. (CXX) g++ options: -fopenmp -std=c++0x -O3 -rdynamic -ldl -ltiff -lfftw3f -lfftw3 -lpng -pthread -lmpi_cxx -lmpi

LAMMPS Molecular Dynamics Simulator 29Oct2020

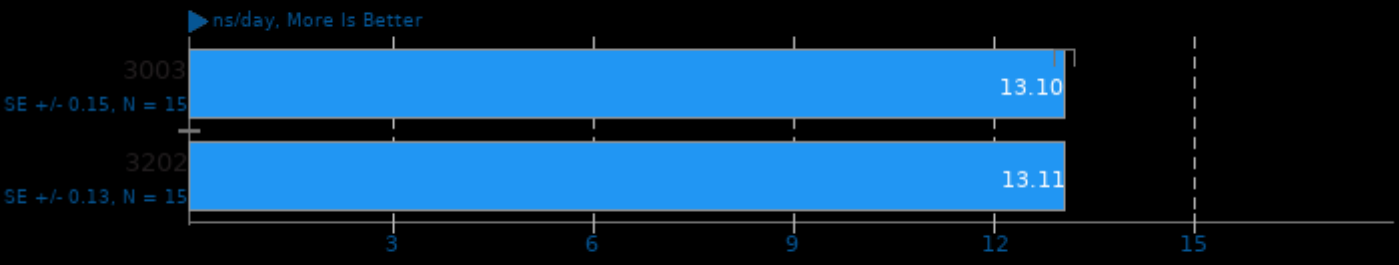
Model: 20k Atoms



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

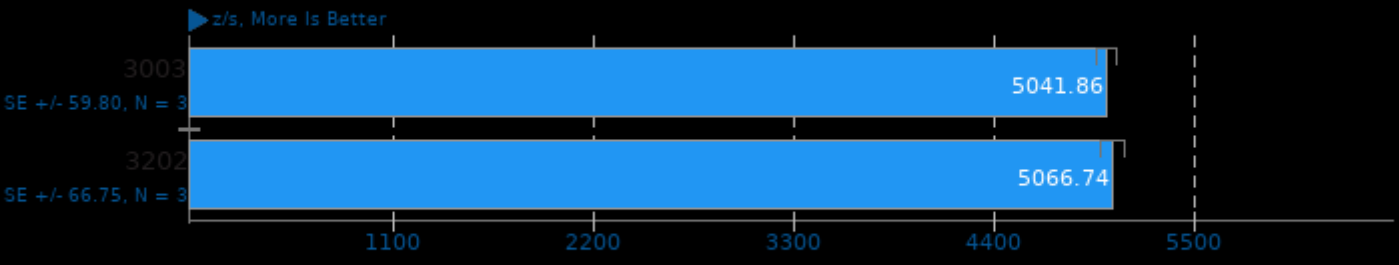
LAMMPS Molecular Dynamics Simulator 29Oct2020

Model: Rhodopsin Protein

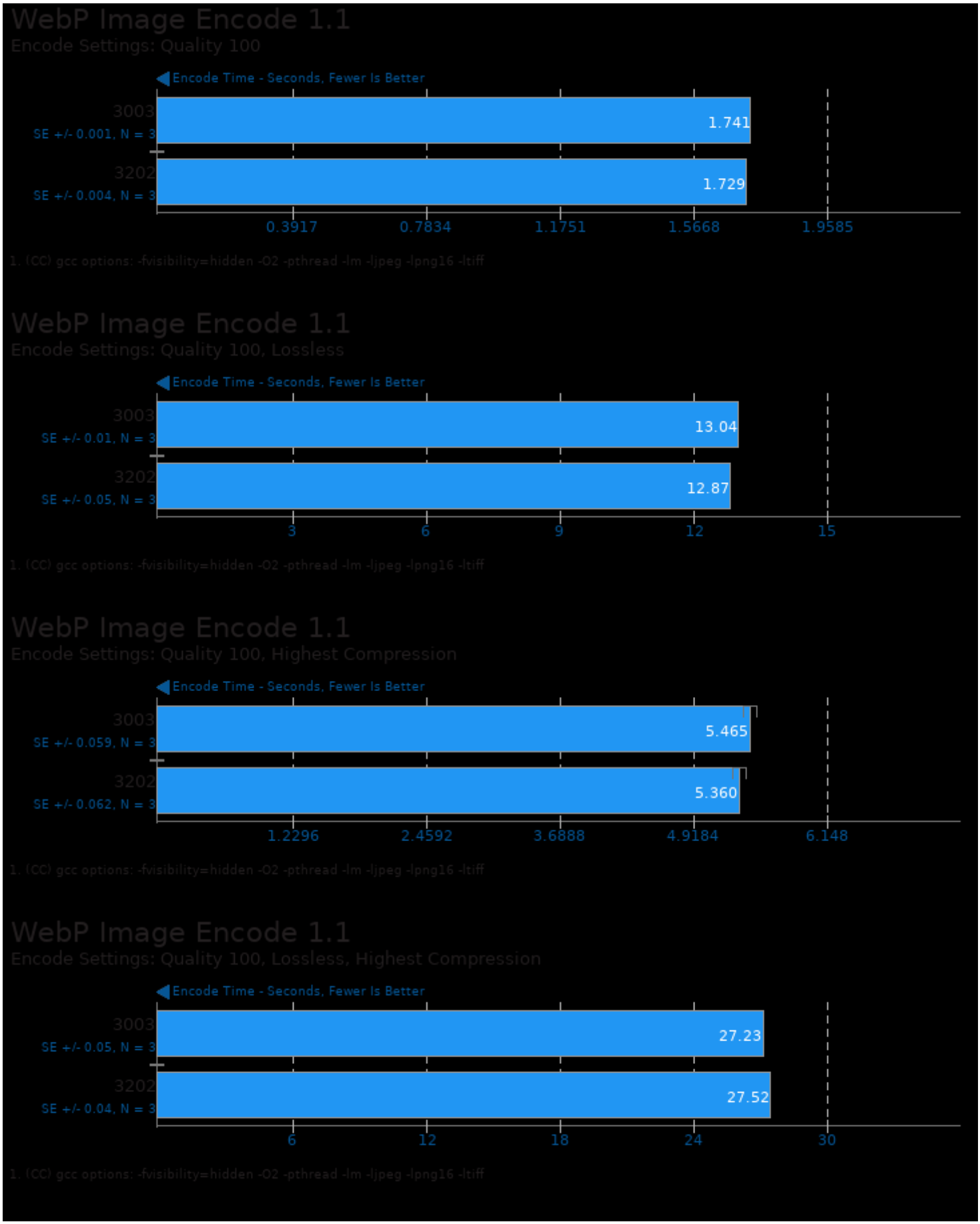


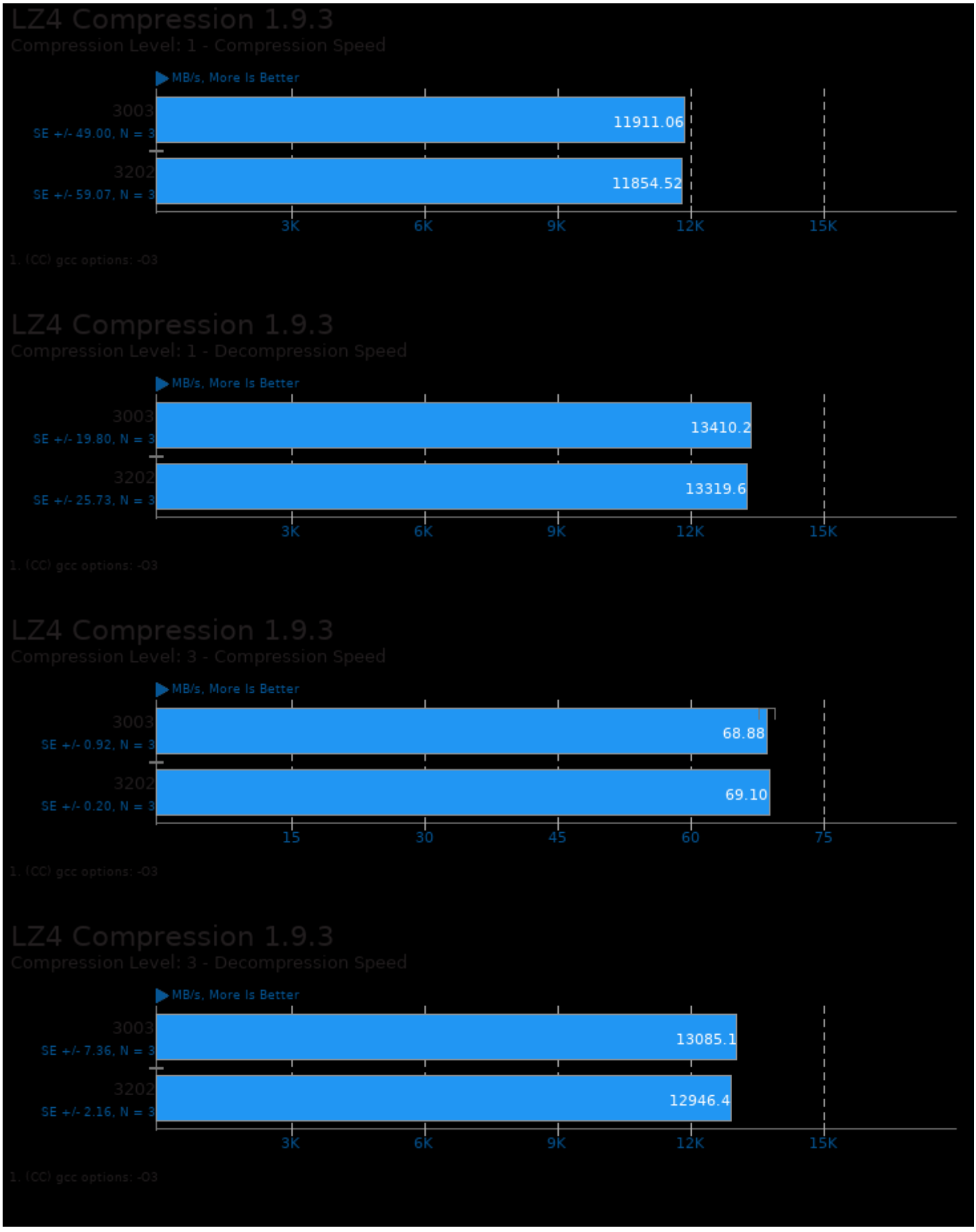
1. (CXX) g++ options: -O3 -pthread -lm

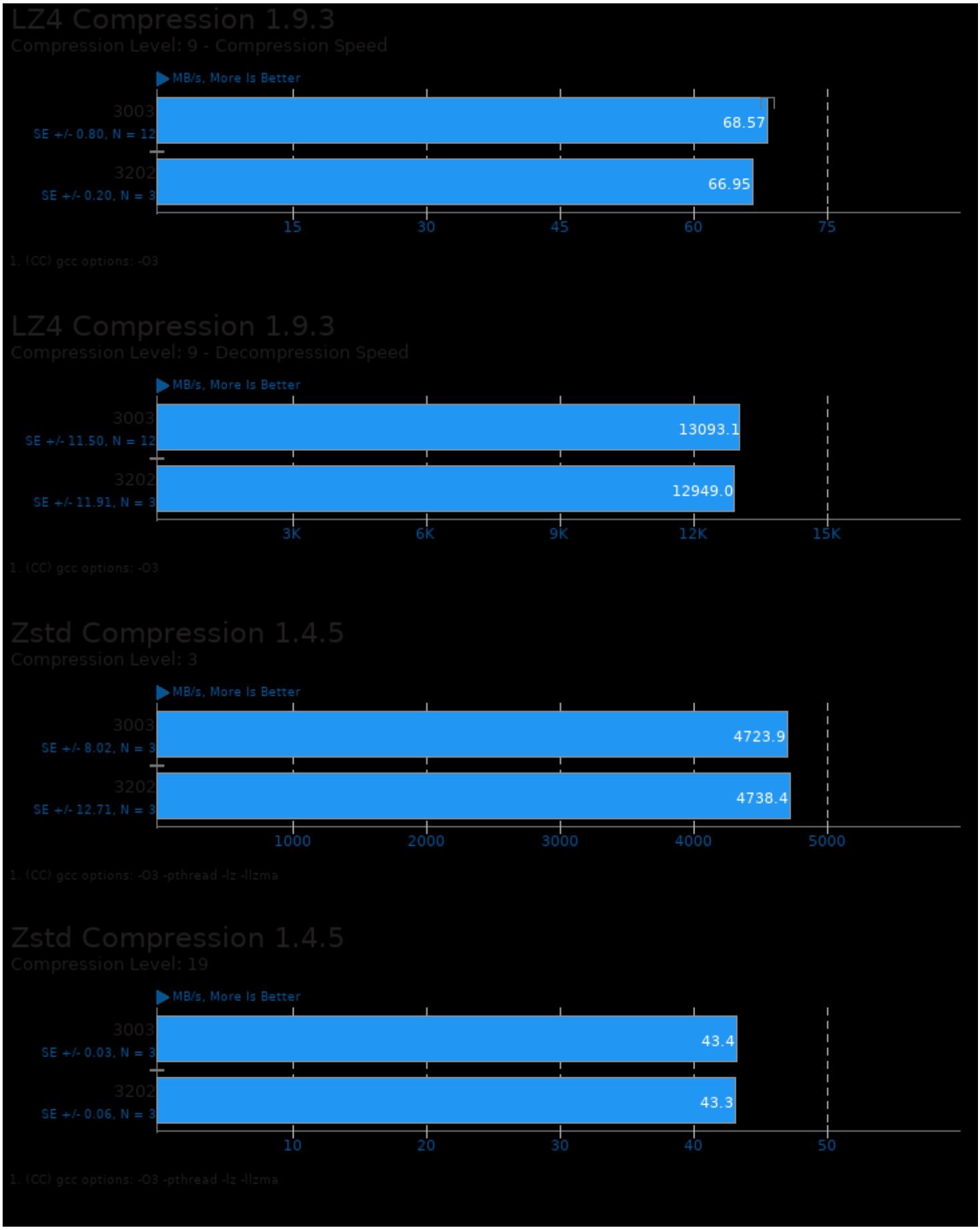
LULESH 2.0.3



1. (CXX) g++ options: -O3 -fopenmp -lm -pthread -lmpi_cxx -lmpi

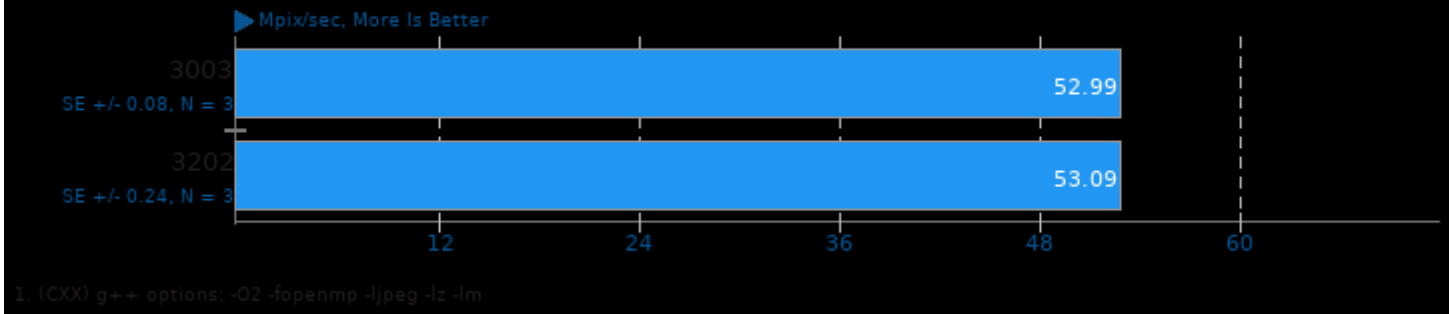

WebP Image Encode 1.1
Encode Settings: Quality 100
Encode Time - Seconds, Fewer Is Better
3003
SE +/- 0.001, N = 3
1.741
3202
SE +/- 0.004, N = 3
1.729
0.3917
0.7834
1.1751
1.5668
1.9585
1. (CC) gcc options: -fvisibility=hidden -O2 -pthread -lm -ljpeg -lpng16 -ltiff
WebP Image Encode 1.1
Encode Settings: Quality 100, Lossless
Encode Time - Seconds, Fewer Is Better
3003
SE +/- 0.01, N = 3
13.04
3202
SE +/- 0.05, N = 3
12.87
3
6
9
12
15
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
3003
SE +/- 0.059, N = 3
5.465
3202
SE +/- 0.062, N = 3
5.360
1.2296
2.4592
3.6888
4.9184
6.148
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
3003
SE +/- 0.05, N = 3
27.23
3202
SE +/- 0.04, N = 3
27.52
6
12
18
24
30
1. (CC) gcc options: -fvisibility=hidden -O2 -pthread -lm -ljpeg -lpng16 -ltiff


LZ4 Compression 1.9.3
Compression Level: 1 - Compression Speed
MB/s, More Is Better
3003
SE +/- 49.00, N = 3
11911.06
3202
SE +/- 59.07, N = 3
11854.52
3K
6K
9K
12K
15K
1. (CC) gcc options: -O3
LZ4 Compression 1.9.3
Compression Level: 1 - Decompression Speed
MB/s, More Is Better
3003
SE +/- 19.80, N = 3
13410.2
3202
SE +/- 25.73, N = 3
13319.6
3K
6K
9K
12K
15K
1. (CC) gcc options: -O3
LZ4 Compression 1.9.3
Compression Level: 3 - Compression Speed
MB/s, More Is Better
3003
SE +/- 0.92, N = 3
68.88
3202
SE +/- 0.20, N = 3
69.10
15
30
45
60
75
1. (CC) gcc options: -O3
LZ4 Compression 1.9.3
Compression Level: 3 - Decompression Speed
MB/s, More Is Better
3003
SE +/- 7.36, N = 3
13085.1
3202
SE +/- 2.16, N = 3
12946.4
3K
6K
9K
12K
15K
1. (CC) gcc options: -O3


LZ4 Compression 1.9.3
Compression Level: 9 - Compression Speed
MB/s, More Is Better
3003
SE +/- 0.80, N = 12
68.57
3202
SE +/- 0.20, N = 3
66.95
15
30
45
60
75
1. (CC) gcc options: -O3
LZ4 Compression 1.9.3
Compression Level: 9 - Decompression Speed
MB/s, More Is Better
3003
SE +/- 11.50, N = 12
13093.1
3202
SE +/- 11.91, N = 3
12949.0
3K
6K
9K
12K
15K
1. (CC) gcc options: -O3
Zstd Compression 1.4.5
Compression Level: 3
MB/s, More Is Better
3003
SE +/- 8.02, N = 3
4723.9
3202
SE +/- 12.71, N = 3
4738.4
1000
2000
3000
4000
5000
1. (CC) gcc options: -O3 -pthread -lz -llzma
Zstd Compression 1.4.5
Compression Level: 19
MB/s, More Is Better
3003
SE +/- 0.03, N = 3
43.4
3202
SE +/- 0.06, N = 3
43.3
10
20
30
40
50
1. (CC) gcc options: -O3 -pthread -lz -llzma

LibRaw 0.20

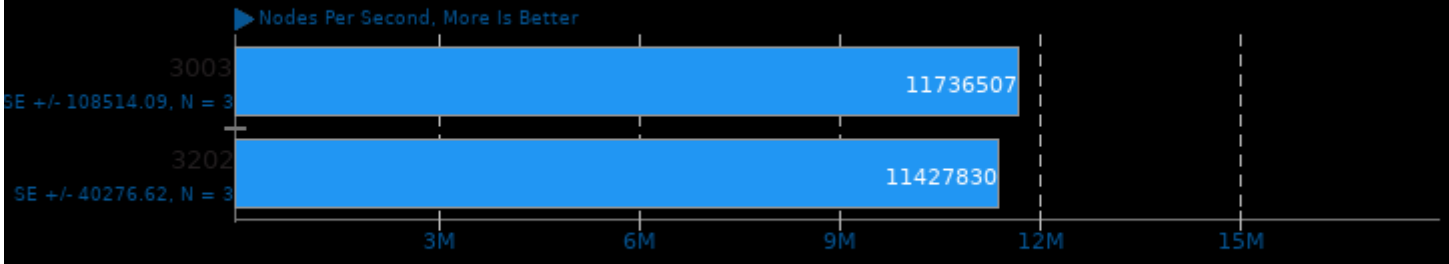
Post-Processing Benchmark



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

Crafty 25.2

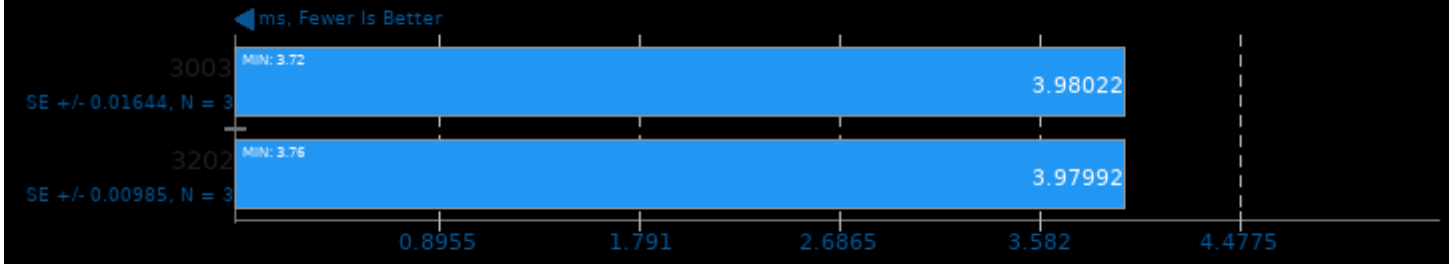
Elapsed Time



1. (CC) gcc options: -pthread -lstdc++ -fprofile-use -lm

oneDNN 2.0

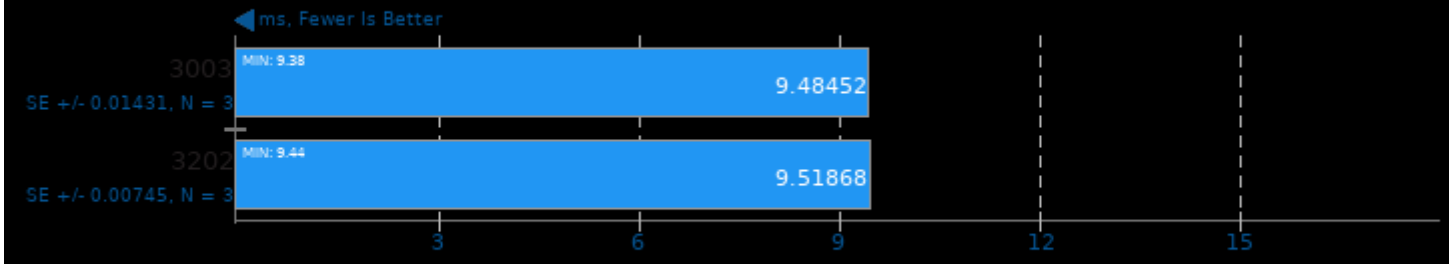
Harness: IP Shapes 1D - Data Type: f32 - Engine: CPU



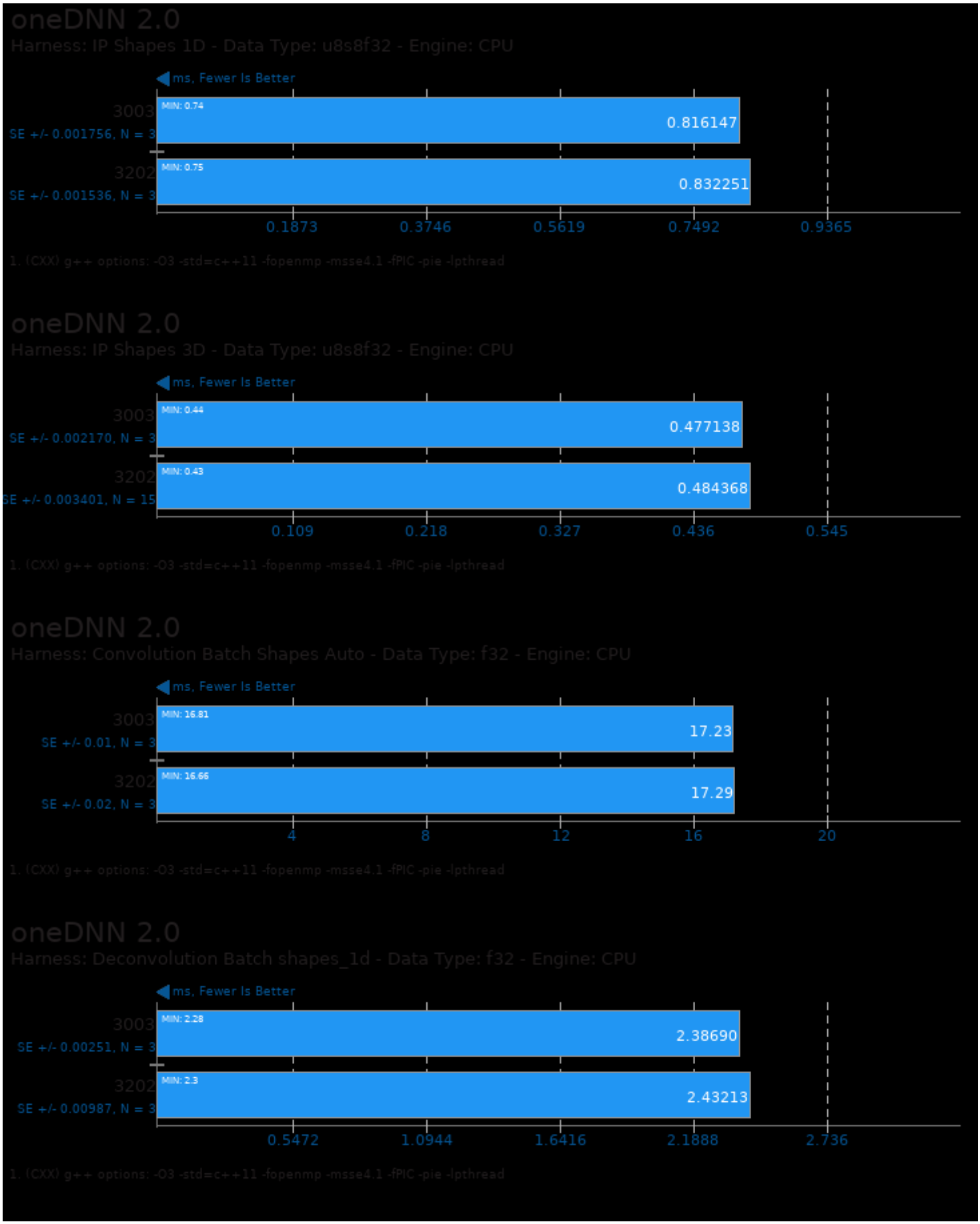
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread

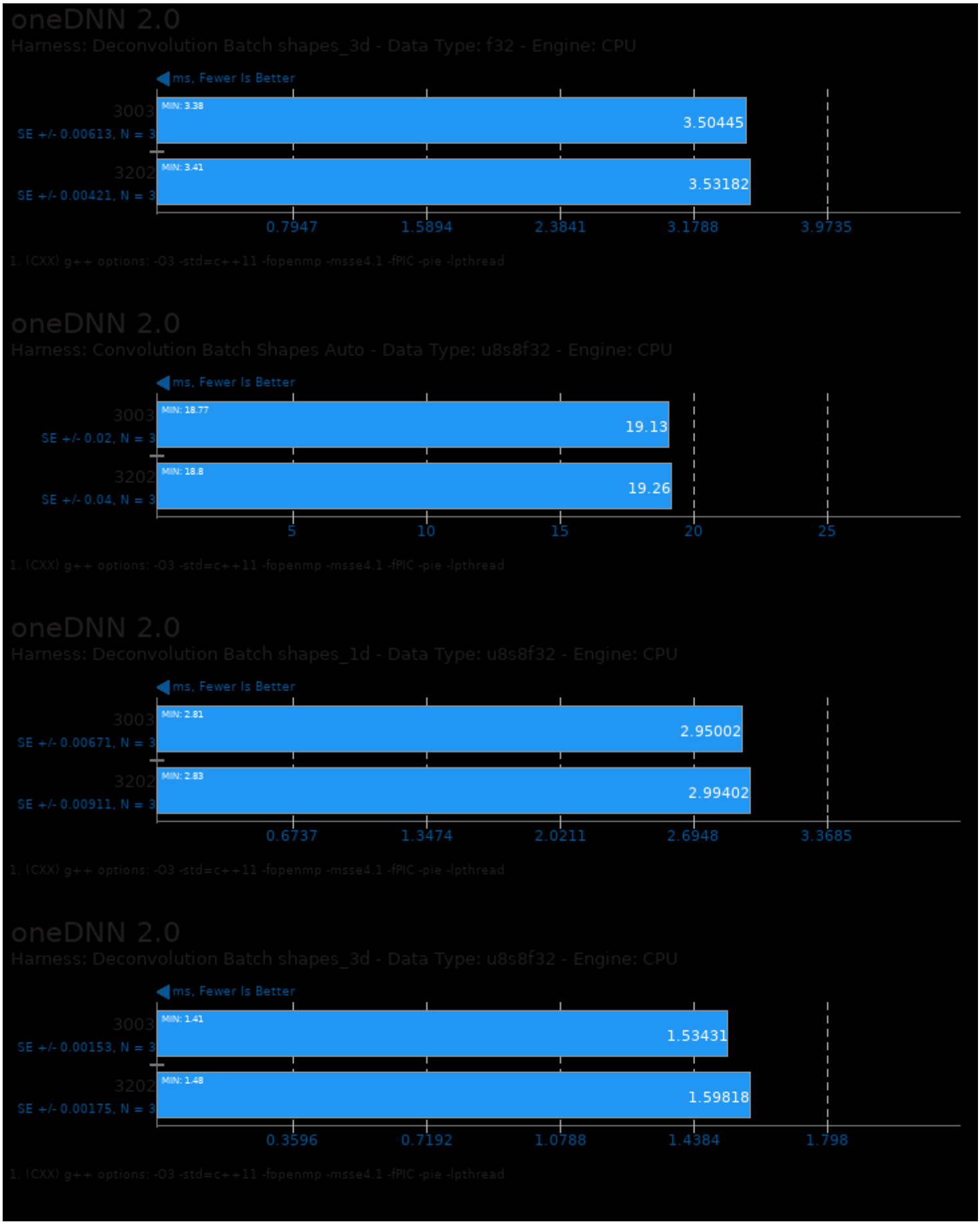
oneDNN 2.0

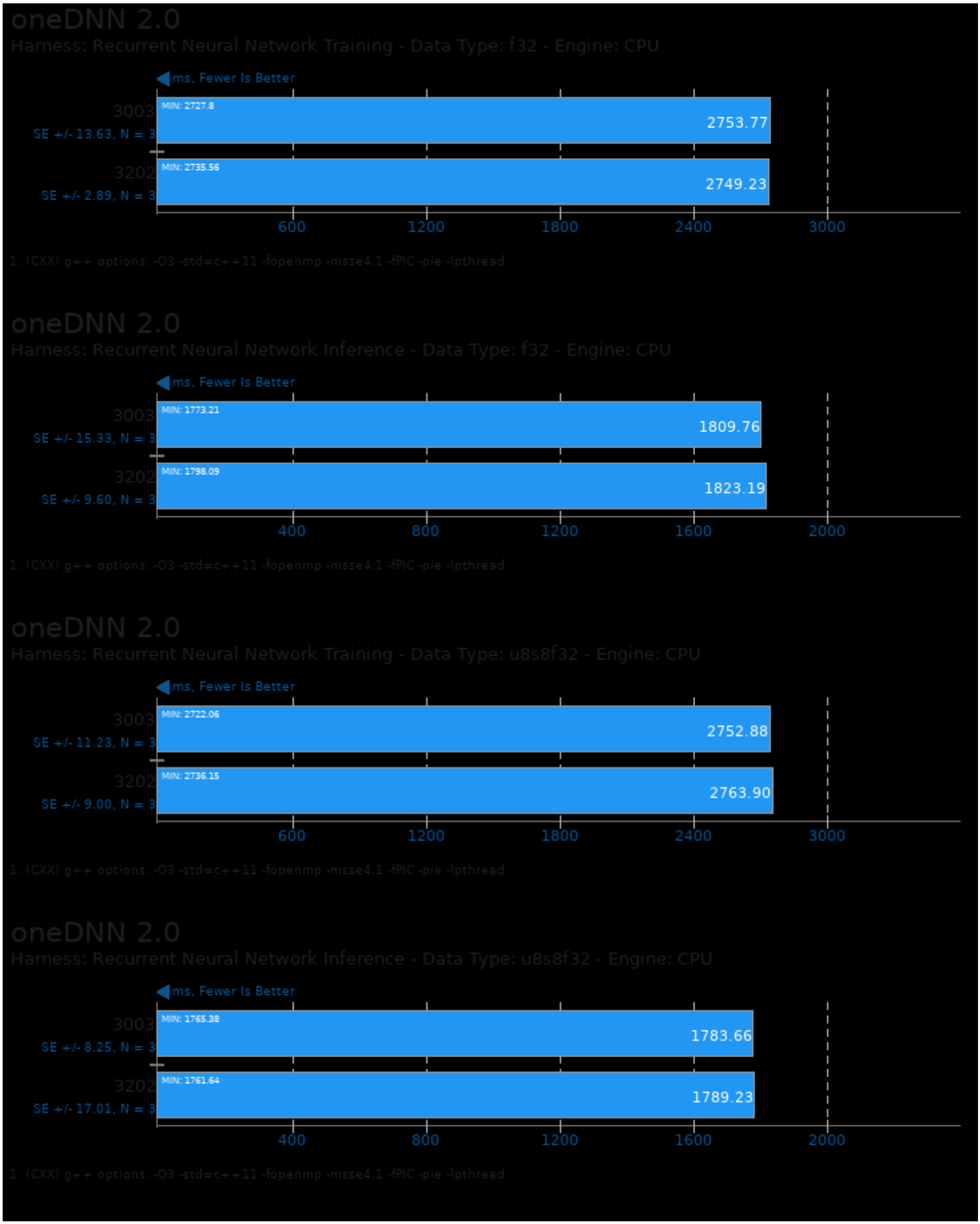
Harness: IP Shapes 3D - Data Type: f32 - Engine: CPU

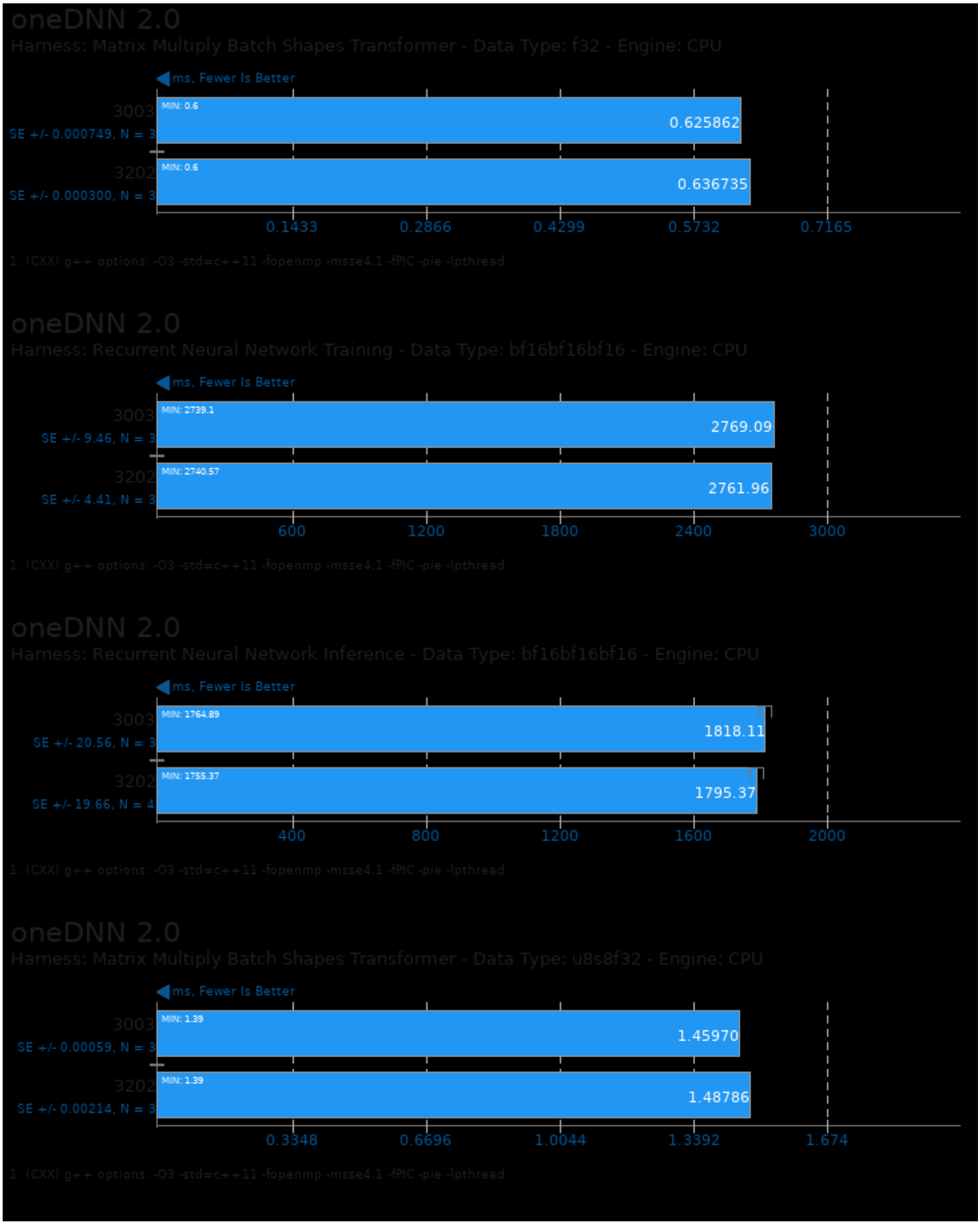


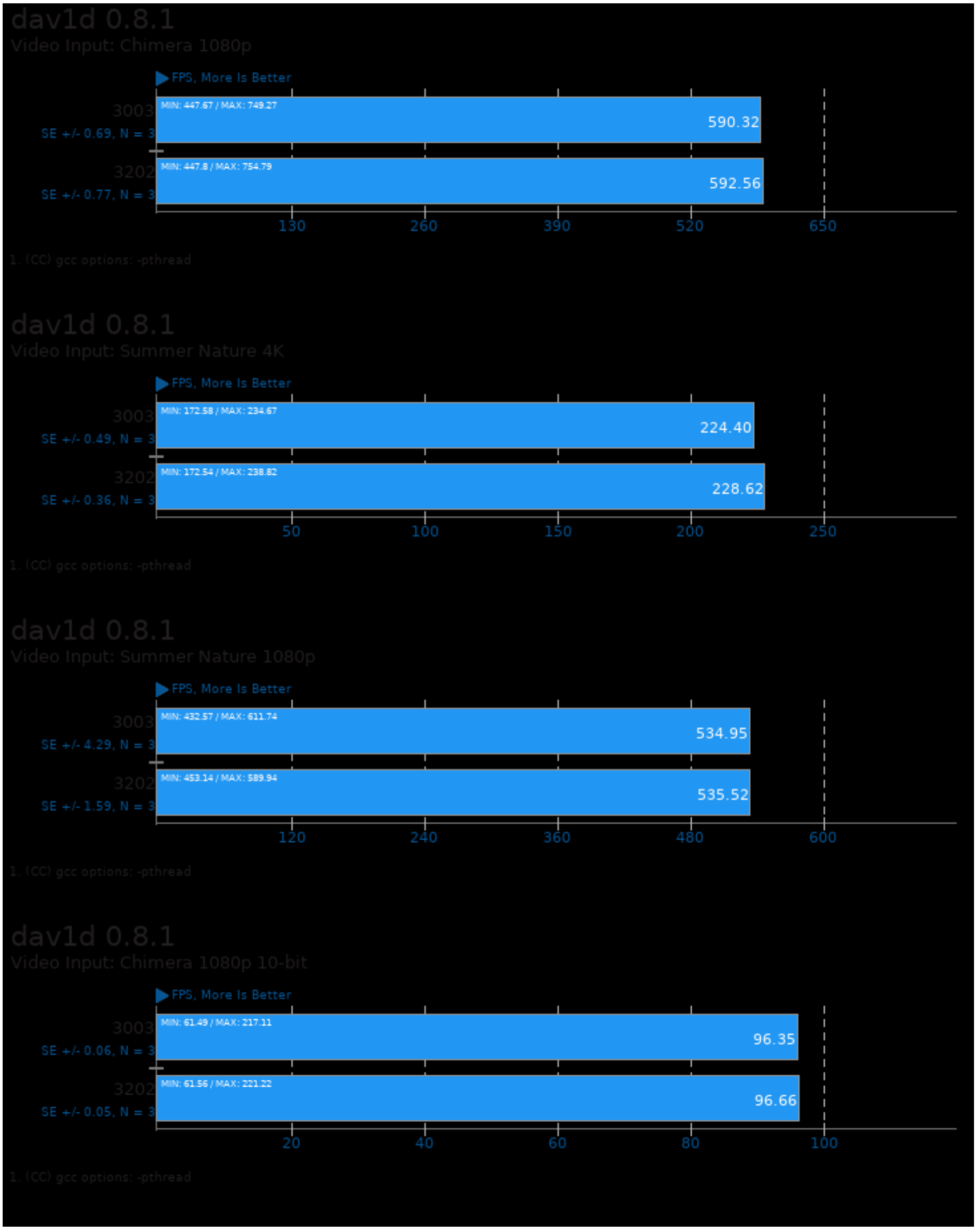
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread

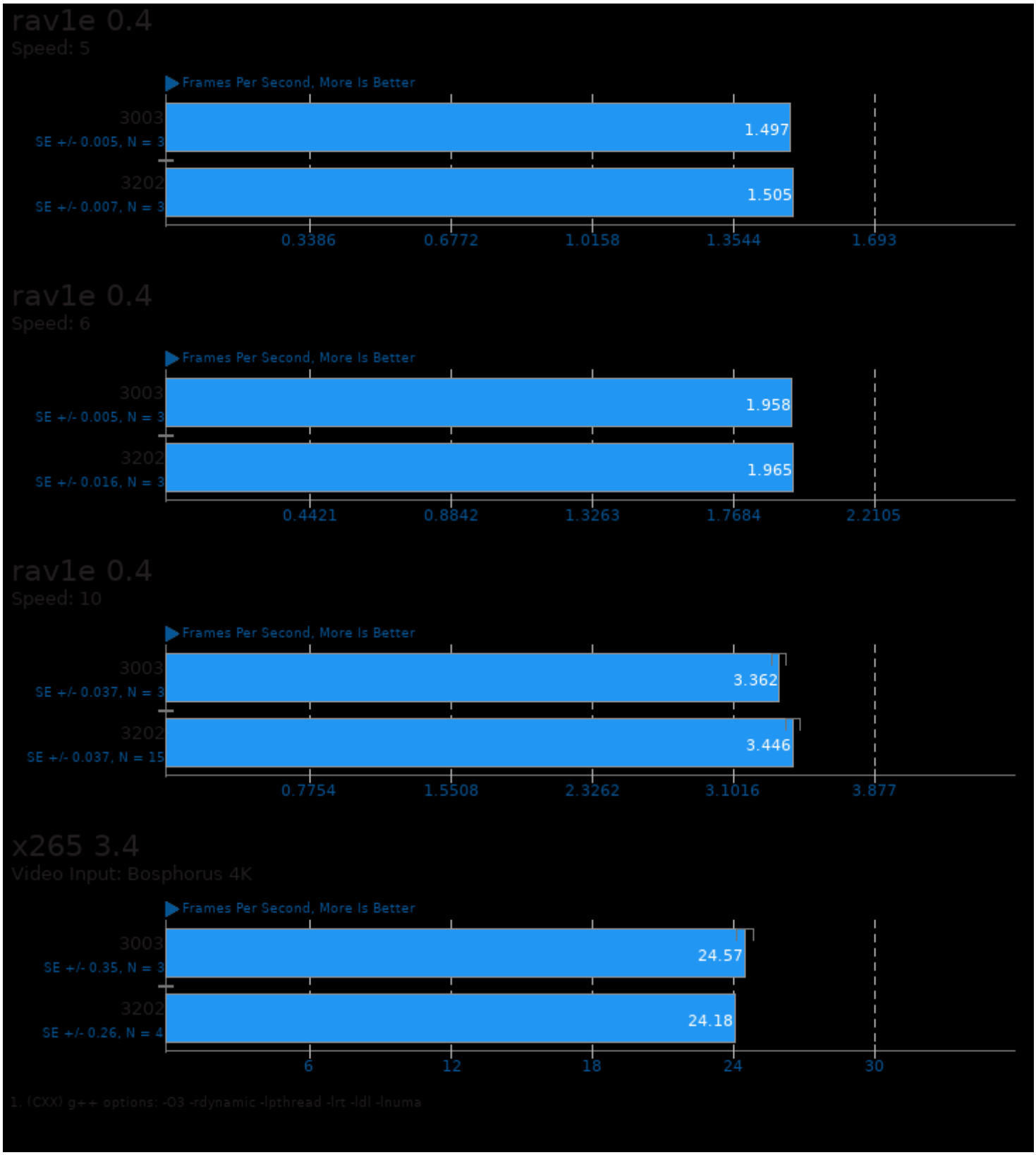

oneDNN 2.0
Harness: IP Shapes 1D - Data Type: u8s8f32 - Engine: CPU
ms, Fewer Is Better
3003
MIN: 0.74
0.816147
SE +/- 0.001756, N = 3
3202
MIN: 0.75
0.832251
SE +/- 0.001536, N = 3
0.1873
0.3746
0.5619
0.7492
0.9365
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread
oneDNN 2.0
Harness: IP Shapes 3D - Data Type: u8s8f32 - Engine: CPU
ms, Fewer Is Better
3003
MIN: 0.44
0.477138
SE +/- 0.002170, N = 3
3202
MIN: 0.43
0.484368
SE +/- 0.003401, N = 15
0.109
0.218
0.327
0.436
0.545
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
3003
MIN: 16.81
17.23
SE +/- 0.01, N = 3
3202
MIN: 16.66
17.29
SE +/- 0.02, 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: Deconvolution Batch shapes_1d - Data Type: f32 - Engine: CPU
ms, Fewer Is Better
3003
MIN: 2.28
2.38690
SE +/- 0.00251, N = 3
3202
MIN: 2.3
2.43213
SE +/- 0.00987, N = 3
0.5472
1.0944
1.6416
2.1888
2.736
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
3003
MIN: 3.38
3.50445
SE +/- 0.00613, N = 3
3202
MIN: 3.41
3.53182
SE +/- 0.00421, N = 3
0.7947
1.5894
2.3841
3.1788
3.9735
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
3003
MIN: 18.77
19.13
SE +/- 0.02, N = 3
3202
MIN: 18.8
19.26
SE +/- 0.04, 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_1d - Data Type: u8s8f32 - Engine: CPU
ms, Fewer Is Better
3003
MIN: 2.81
2.95002
SE +/- 0.00671, N = 3
3202
MIN: 2.83
2.99402
SE +/- 0.00911, N = 3
0.6737
1.3474
2.0211
2.6948
3.3685
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
3003
MIN: 1.41
1.53431
SE +/- 0.00153, N = 3
3202
MIN: 1.48
1.59818
SE +/- 0.00175, N = 3
0.3596
0.7192
1.0788
1.4384
1.798
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
3003
SE +/- 13.63, N = 3
MIN: 2727.8
2753.77
3202
SE +/- 2.89, N = 3
MIN: 2735.56
2749.23
600
1200
1800
2400
3000
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
3003
SE +/- 15.33, N = 3
MIN: 1773.21
1809.76
3202
SE +/- 9.60, N = 3
MIN: 1798.09
1823.19
400
800
1200
1600
2000
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
3003
SE +/- 11.23, N = 3
MIN: 2722.06
2752.88
3202
SE +/- 9.00, N = 3
MIN: 2736.15
2763.90
600
1200
1800
2400
3000
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
3003
SE +/- 8.25, N = 3
MIN: 1765.38
1783.66
3202
SE +/- 17.01, N = 3
MIN: 1761.64
1789.23
400
800
1200
1600
2000
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread

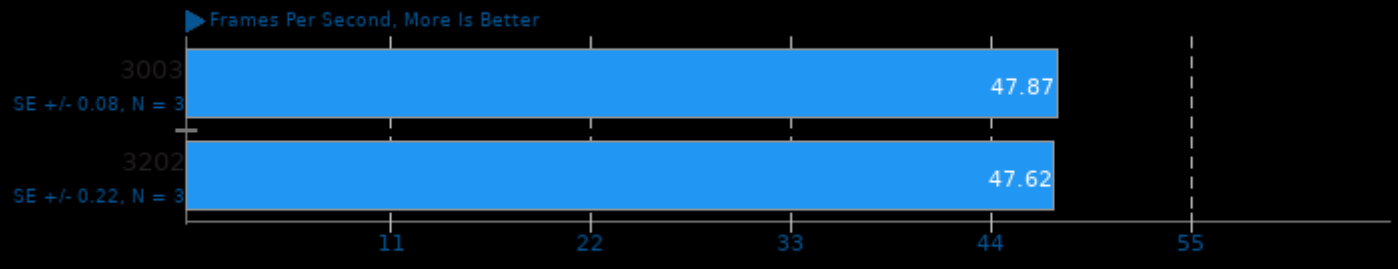

oneDNN 2.0
Harness: Matrix Multiply Batch Shapes Transformer - Data Type: f32 - Engine: CPU
ms, Fewer Is Better
3003
MIN: 0.6
0.625862
SE +/- 0.000749, N = 3
3202
MIN: 0.6
0.636735
SE +/- 0.000300, N = 3
0.1433
0.2866
0.4299
0.5732
0.7165
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread
oneDNN 2.0
Harness: Recurrent Neural Network Training - Data Type: bf16bf16bf16 - Engine: CPU
ms, Fewer Is Better
3003
MIN: 2739.1
2769.09
SE +/- 9.46, N = 3
3202
MIN: 2740.57
2761.96
SE +/- 4.41, N = 3
600
1200
1800
2400
3000
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
3003
MIN: 1764.89
1818.11
SE +/- 20.56, N = 3
3202
MIN: 1755.37
1795.37
SE +/- 19.66, N = 4
400
800
1200
1600
2000
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
3003
MIN: 1.39
1.45970
SE +/- 0.00059, N = 3
3202
MIN: 1.39
1.48786
SE +/- 0.00214, N = 3
0.3348
0.6696
1.0044
1.3392
1.674
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread


dav1d 0.8.1
Video Input: Chimera 1080p
FPS, More Is Better
3003
MIN: 447.67 / MAX: 749.27
590.32
SE +/- 0.69, N = 3
3202
MIN: 447.8 / MAX: 754.79
592.56
SE +/- 0.77, N = 3
130
260
390
520
650
1. (CC) gcc options: -pthread
dav1d 0.8.1
Video Input: Summer Nature 4K
FPS, More Is Better
3003
MIN: 172.58 / MAX: 234.67
224.40
SE +/- 0.49, N = 3
3202
MIN: 172.54 / MAX: 238.82
228.62
SE +/- 0.36, N = 3
50
100
150
200
250
1. (CC) gcc options: -pthread
dav1d 0.8.1
Video Input: Summer Nature 1080p
FPS, More Is Better
3003
MIN: 432.57 / MAX: 611.74
534.95
SE +/- 4.29, N = 3
3202
MIN: 453.14 / MAX: 589.94
535.52
SE +/- 1.59, N = 3
120
240
360
480
600
1. (CC) gcc options: -pthread
dav1d 0.8.1
Video Input: Chimera 1080p 10-bit
FPS, More Is Better
3003
MIN: 61.49 / MAX: 217.11
96.35
SE +/- 0.06, N = 3
3202
MIN: 61.56 / MAX: 221.22
96.66
SE +/- 0.05, N = 3
20
40
60
80
100
1. (CC) gcc options: -pthread


rav1e 0.4
Speed: 5
Frames Per Second, More Is Better
3003
SE +/- 0.005, N = 3
1.497
3202
SE +/- 0.007, N = 3
1.505
0.3386
0.6772
1.0158
1.3544
1.693
rav1e 0.4
Speed: 6
Frames Per Second, More Is Better
3003
SE +/- 0.005, N = 3
1.958
3202
SE +/- 0.016, N = 3
1.965
0.4421
0.8842
1.3263
1.7684
2.2105
rav1e 0.4
Speed: 10
Frames Per Second, More Is Better
3003
SE +/- 0.037, N = 3
3.362
3202
SE +/- 0.037, N = 15
3.446
0.7754
1.5508
2.3262
3.1016
3.877
x265 3.4
Video Input: Bosphorus 4K
Frames Per Second, More Is Better
3003
SE +/- 0.35, N = 3
24.57
3202
SE +/- 0.26, N = 4
24.18
6
12
18
24
30
1. (CXX) g++ options: -O3 -rdynamic -lpthread -lrt -ldl -lnuma

x265 3.4

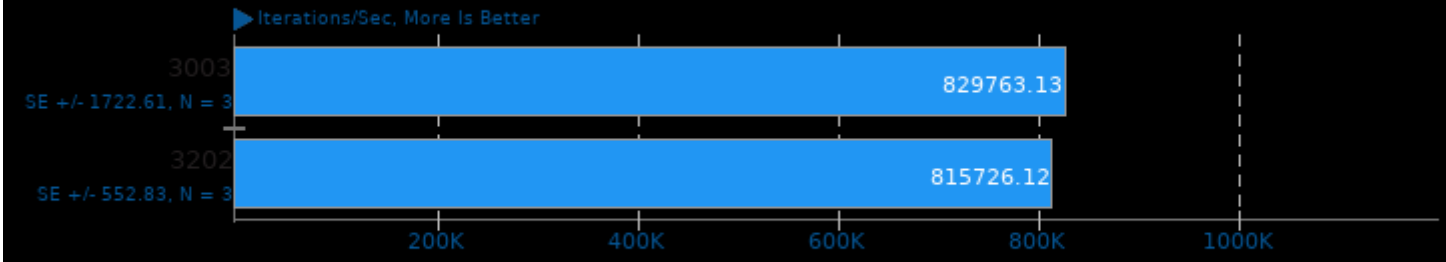
Video Input: Bosphorus 1080p



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

Coremark 1.0

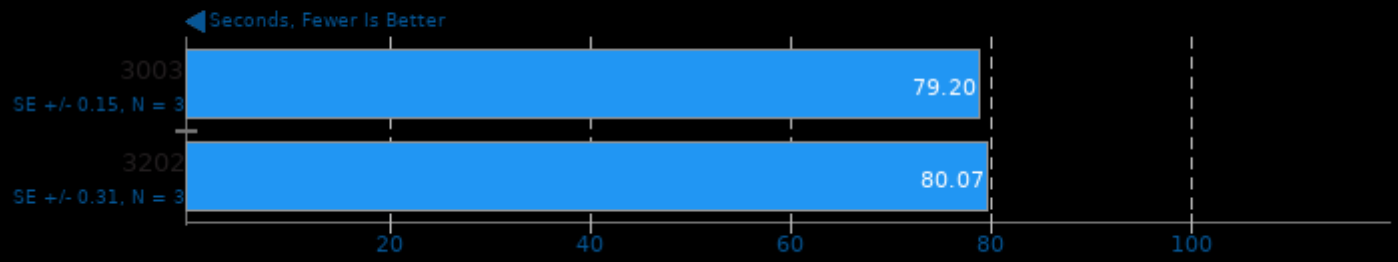
CoreMark Size 666 - Iterations Per Second



1. (CC) gcc options: -O2 -lrt" -lrt

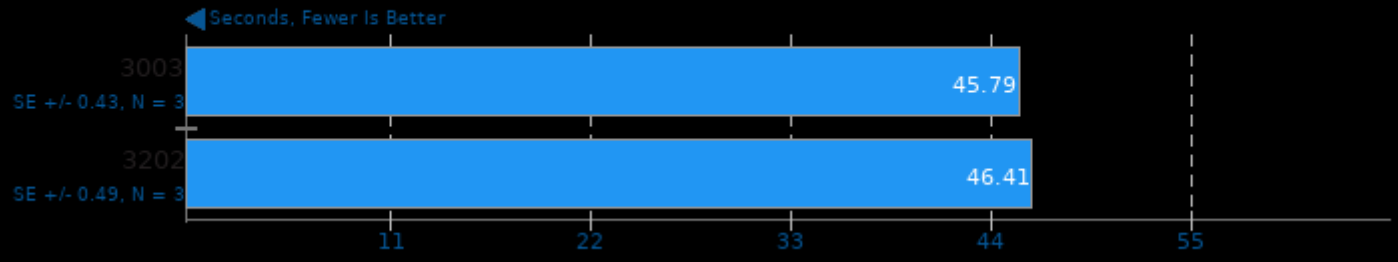
Timed Godot Game Engine Compilation 3.2.3

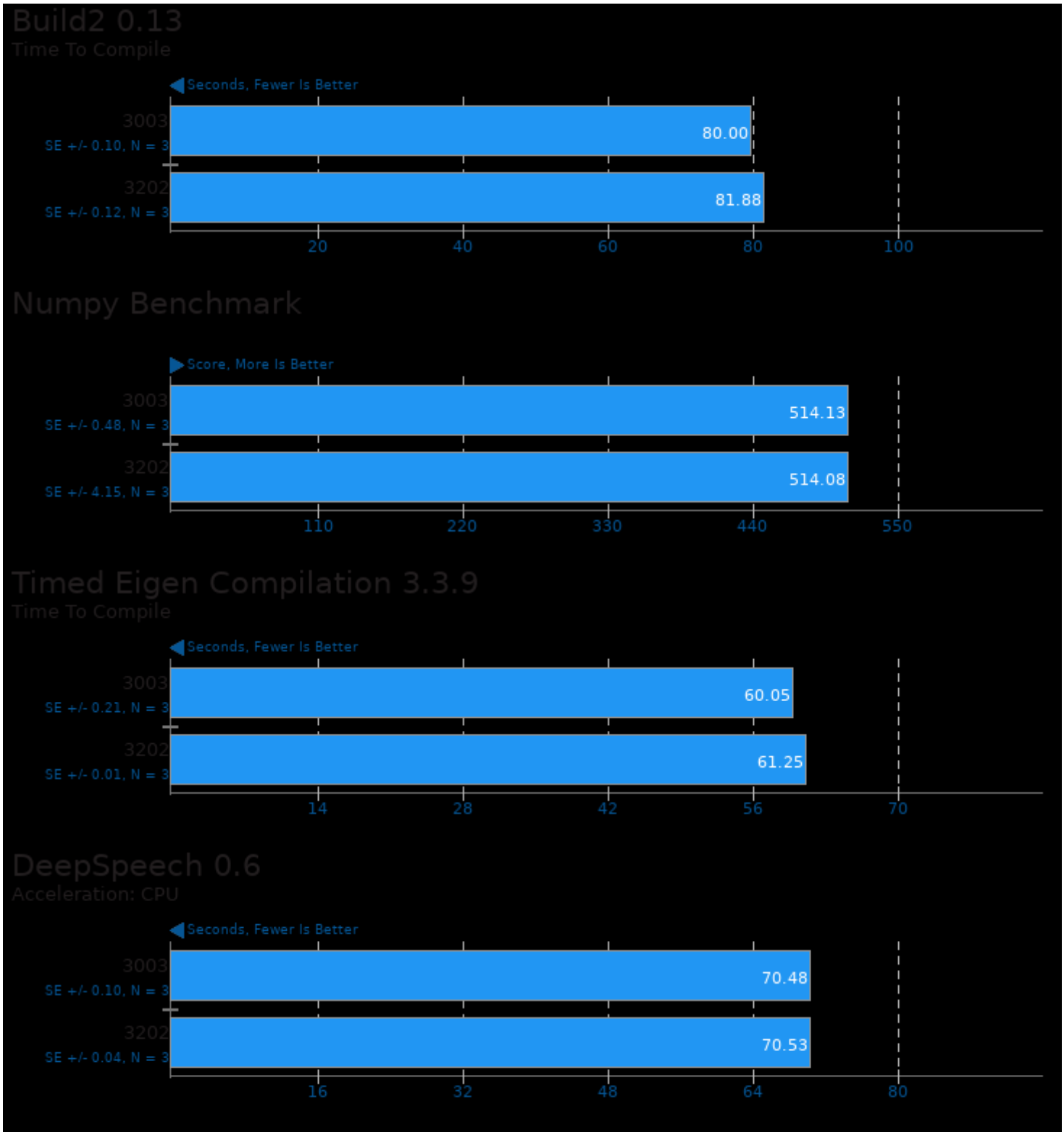
Time To Compile



Timed Linux Kernel Compilation 5.4

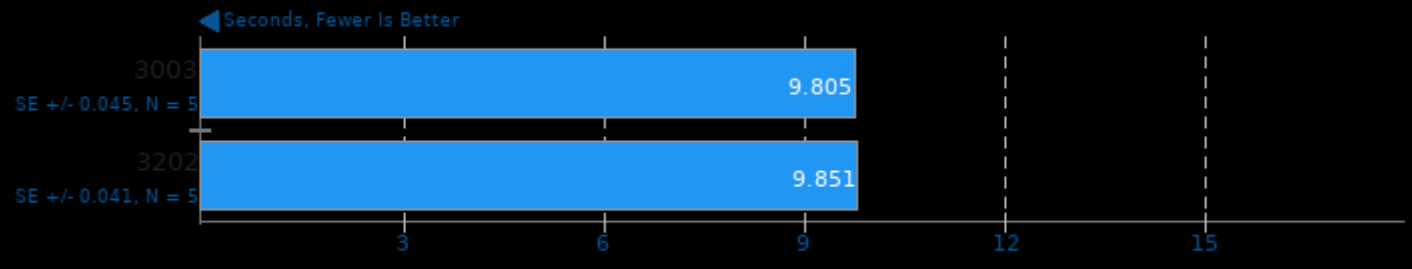
Time To Compile




Build2 0.13
Time To Compile
Seconds, Fewer Is Better
3003
SE +/- 0.10, N = 3
80.00
3202
SE +/- 0.12, N = 3
81.88
20
40
60
80
100
Numpy Benchmark
Score, More Is Better
3003
SE +/- 0.48, N = 3
514.13
3202
SE +/- 4.15, N = 3
514.08
110
220
330
440
550
Timed Eigen Compilation 3.3.9
Time To Compile
Seconds, Fewer Is Better
3003
SE +/- 0.21, N = 3
60.05
3202
SE +/- 0.01, N = 3
61.25
14
28
42
56
70
DeepSpeech 0.6
Acceleration: CPU
Seconds, Fewer Is Better
3003
SE +/- 0.10, N = 3
70.48
3202
SE +/- 0.04, N = 3
70.53
16
32
48
64
80

Monkey Audio Encoding 3.99.6

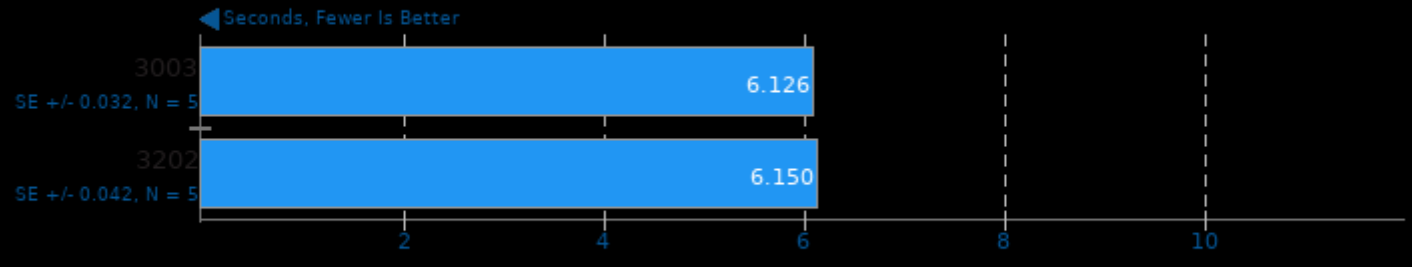
WAV To APE



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

Opus Codec Encoding 1.3.1

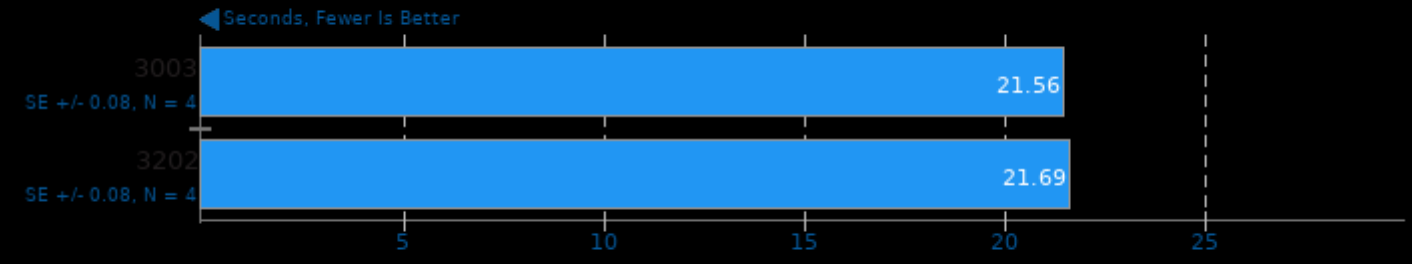
WAV To Opus Encode



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

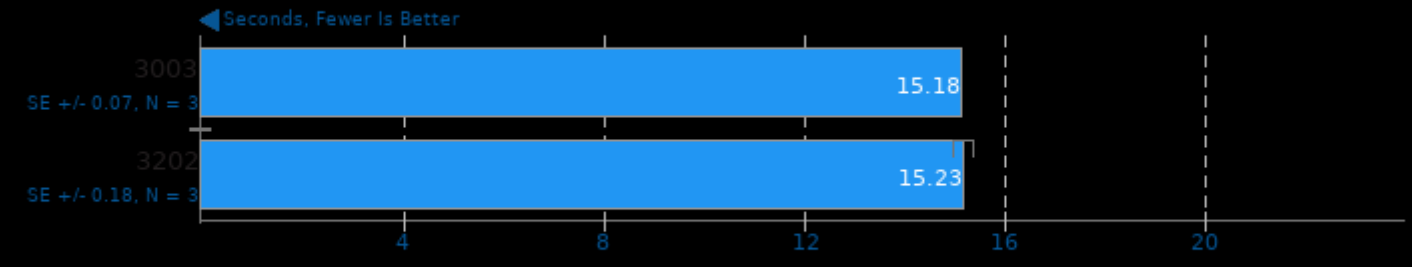
eSpeak-NG Speech Engine 20200907

Text-To-Speech Synthesis



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

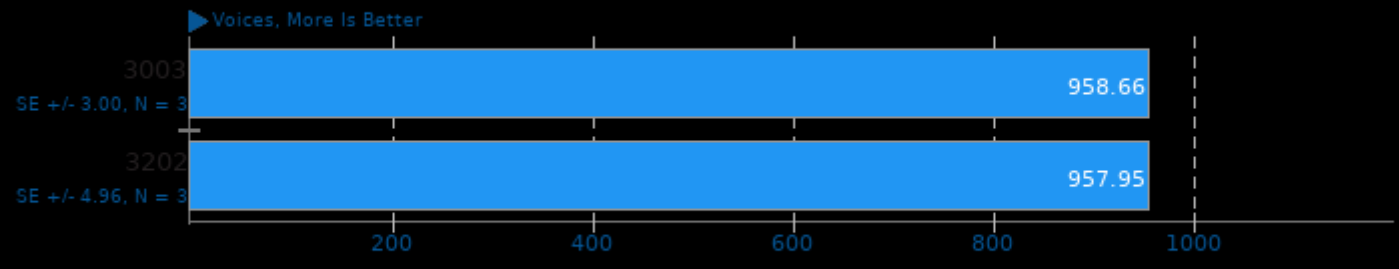
RNNoise 2020-06-28



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

Google SynthMark 20201109

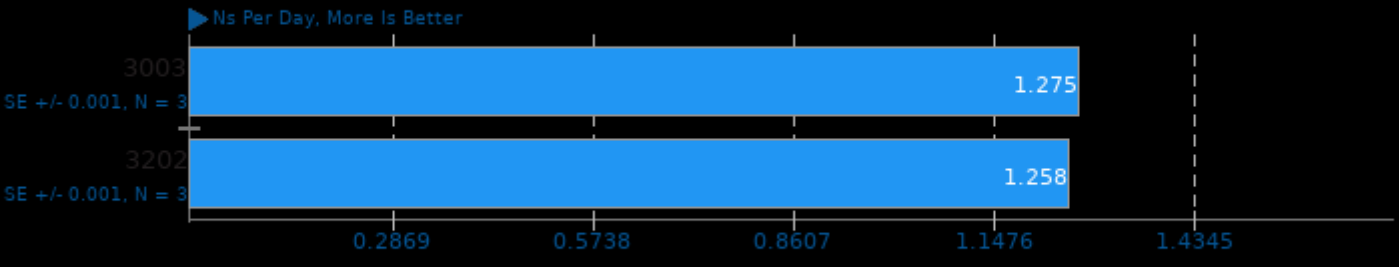
Test: VoiceMark_100



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

GROMACS 2020.3

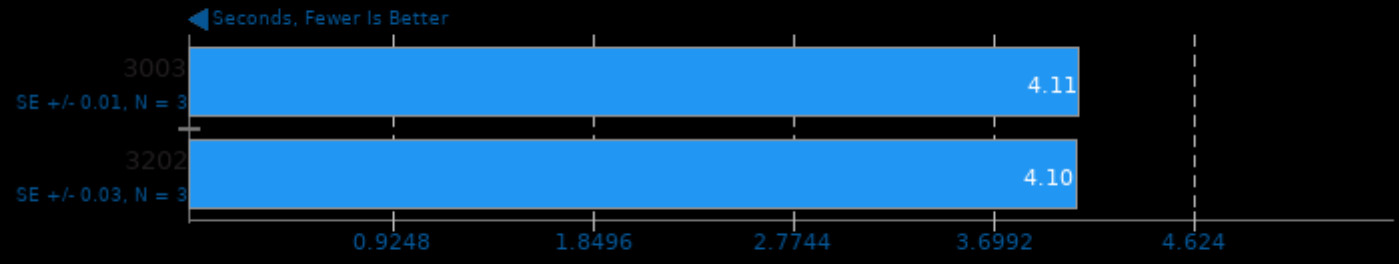
Water Benchmark



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

ASTC Encoder 2.0

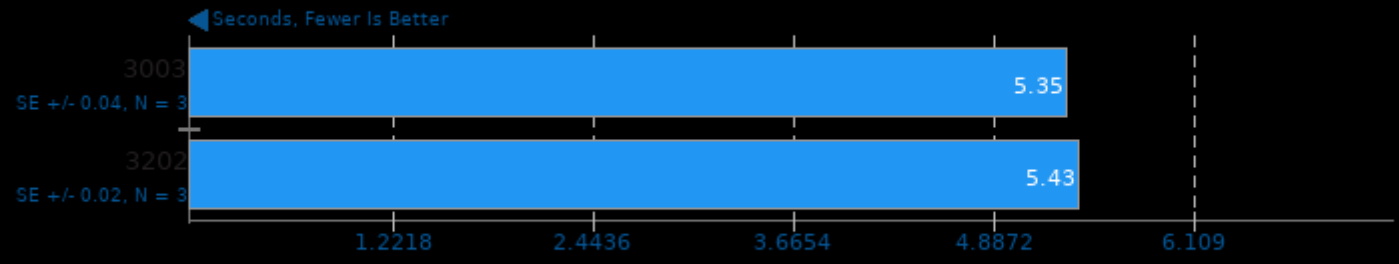
Preset: Fast



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

ASTC Encoder 2.0

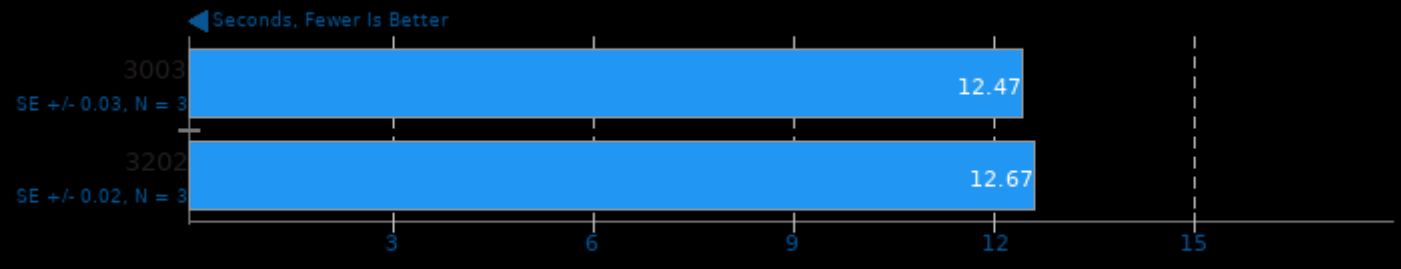
Preset: Medium



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

ASTC Encoder 2.0

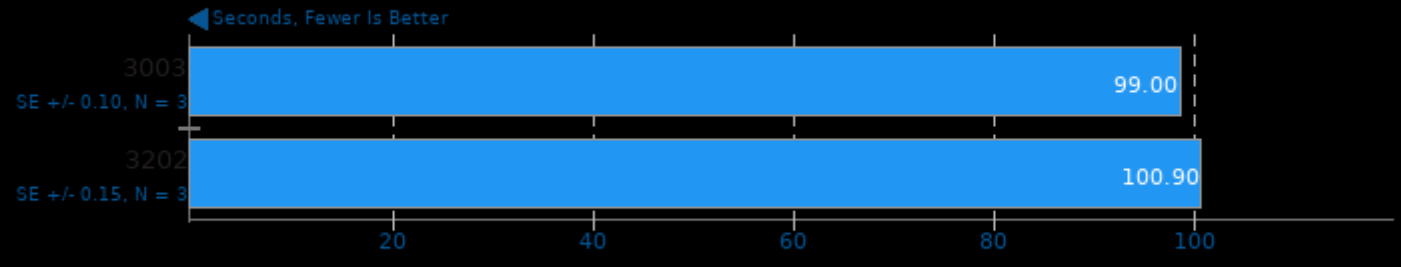
Preset: Thorough



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

ASTC Encoder 2.0

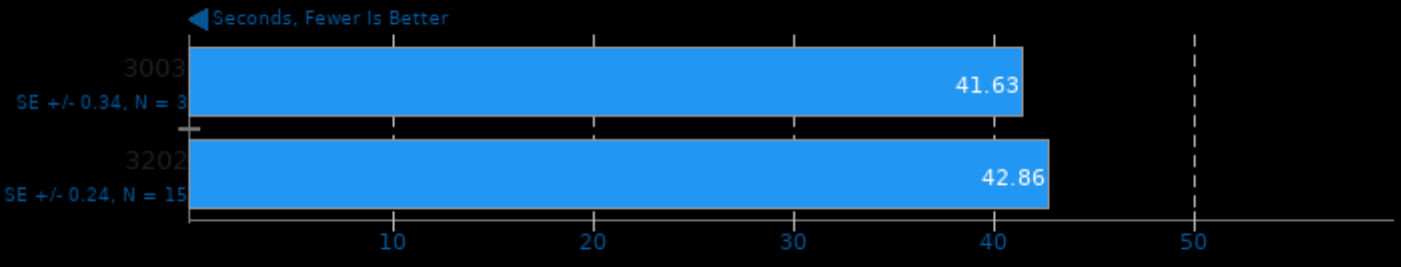
Preset: Exhaustive



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

SQLite Speedtest 3.30

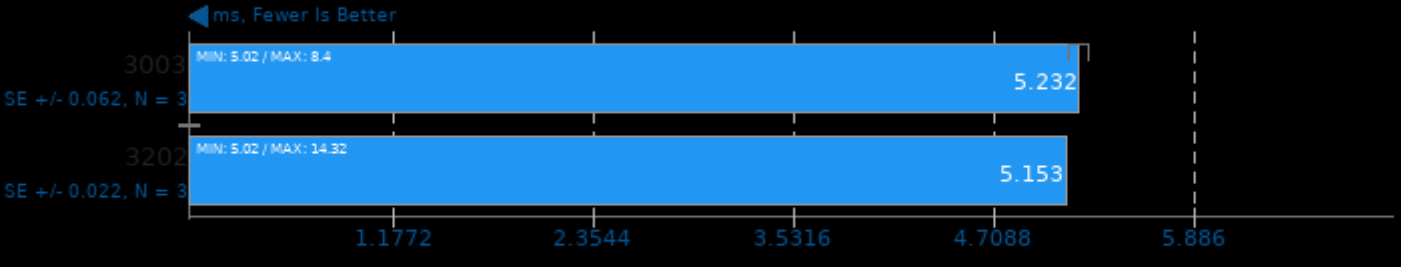
Timed Time - Size 1,000



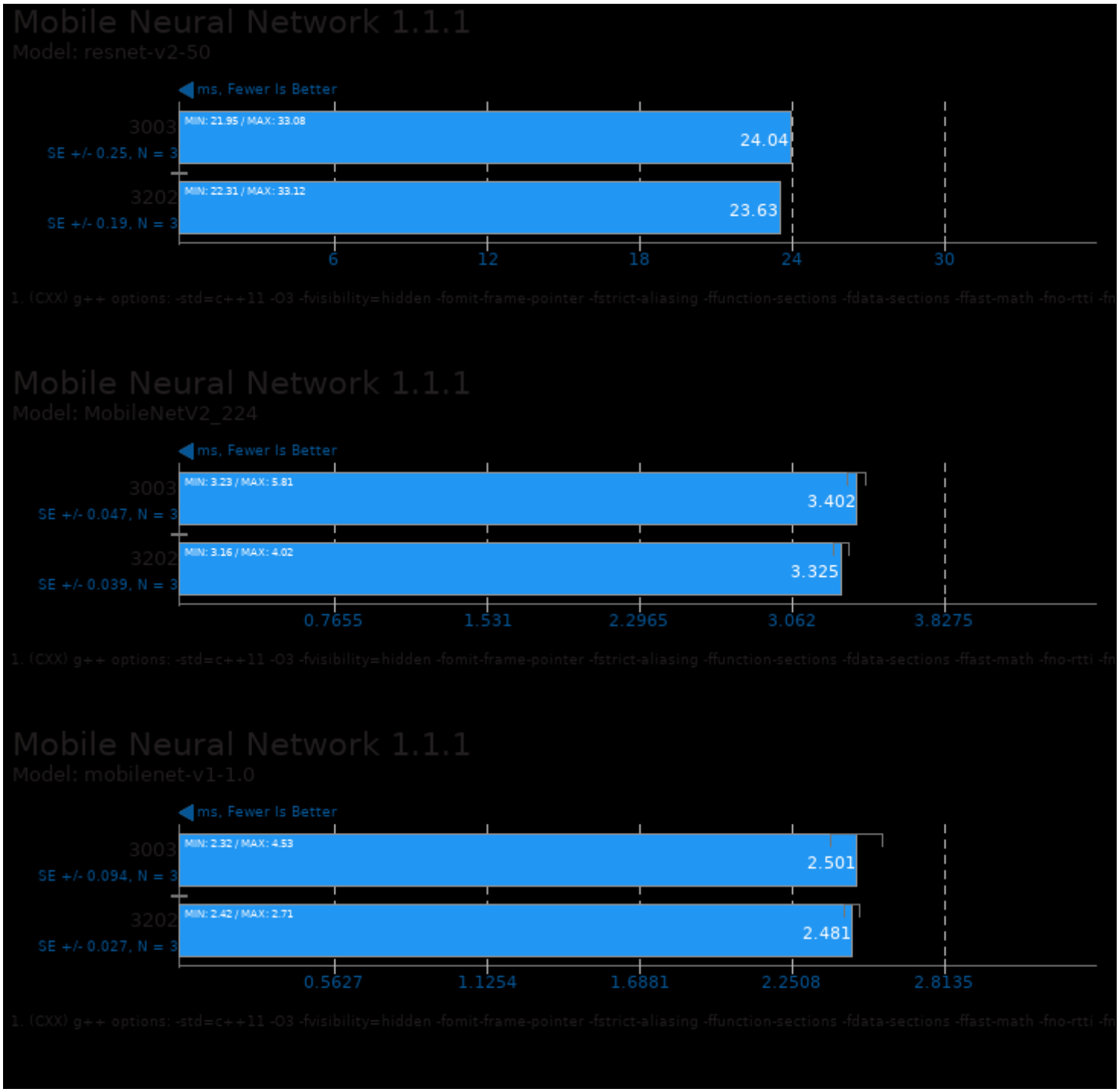
1. (CC) gcc options: -O2 -ldl -lz -lpthread

Mobile Neural Network 1.1.1

Model: SqueezeNetV1.0

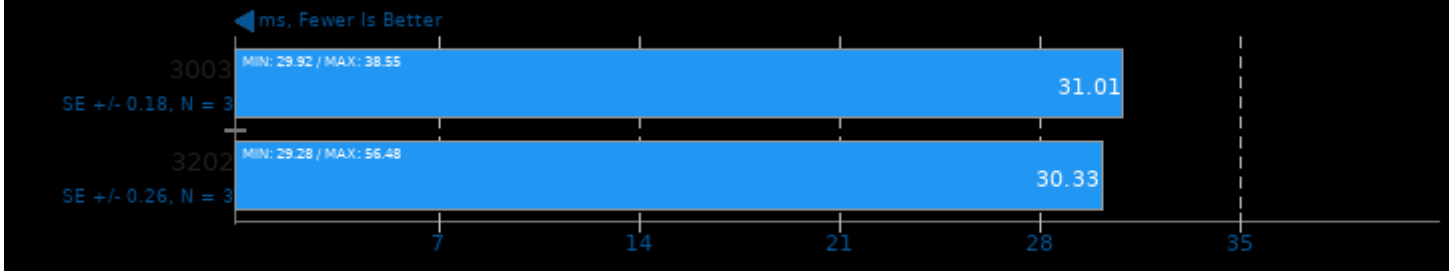


1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fv


Mobile Neural Network 1.1.1
Model: resnet-v2-50
ms, Fewer Is Better
3003
MIN: 21.95 / MAX: 33.08
24.04
SE +/- 0.25, N = 3
3202
MIN: 22.31 / MAX: 33.12
23.63
SE +/- 0.19, N = 3
6
12
18
24
30
1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fn
Mobile Neural Network 1.1.1
Model: MobileNetV2_224
ms, Fewer Is Better
3003
MIN: 3.23 / MAX: 5.81
3.402
SE +/- 0.047, N = 3
3202
MIN: 3.16 / MAX: 4.02
3.325
SE +/- 0.039, N = 3
0.7655
1.531
2.2965
3.062
3.8275
1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fn
Mobile Neural Network 1.1.1
Model: mobilenet-v1-1.0
ms, Fewer Is Better
3003
MIN: 2.32 / MAX: 4.53
2.501
SE +/- 0.094, N = 3
3202
MIN: 2.42 / MAX: 2.71
2.481
SE +/- 0.027, N = 3
0.5627
1.1254
1.6881
2.2508
2.8135
1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fn

Mobile Neural Network 1.1.1

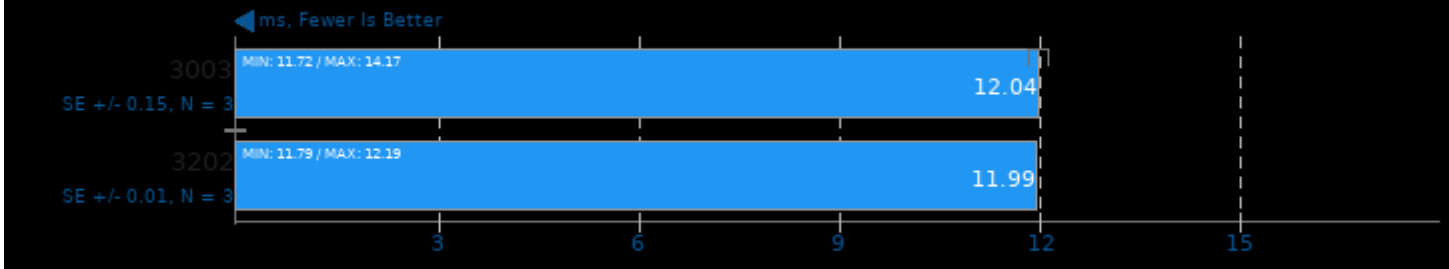
Model: inception-v3



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

NCNN 20201218

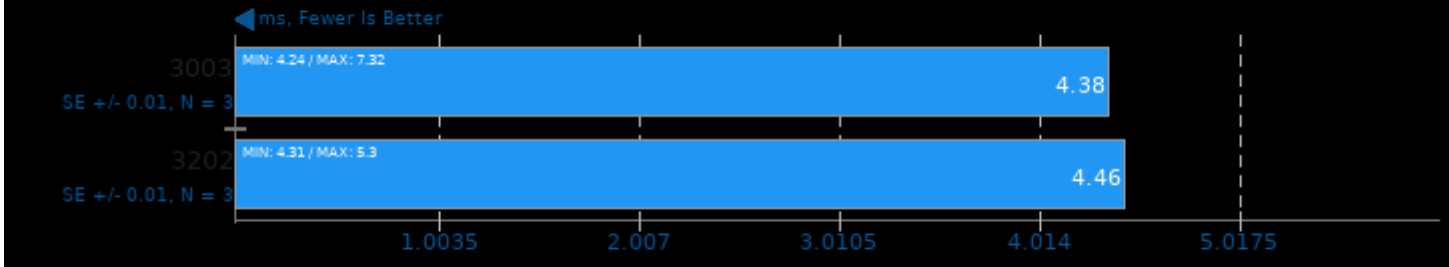
Target: CPU - Model: mobilenet



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

NCNN 20201218

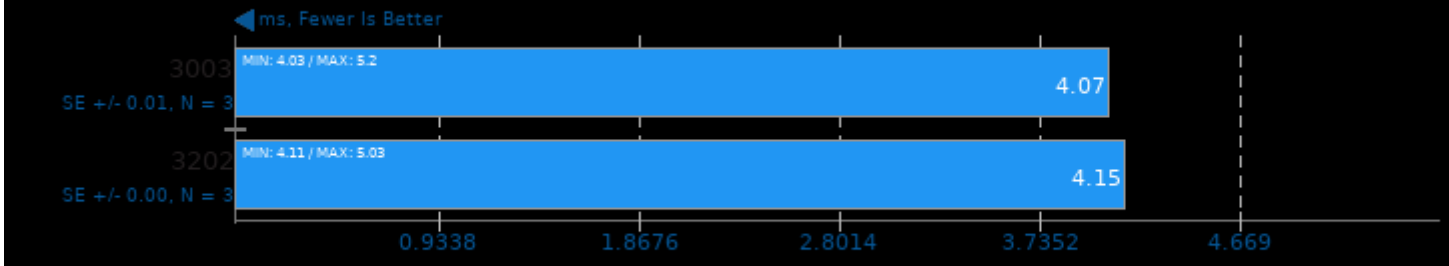
Target: CPU-v2-v2 - Model: mobilenet-v2



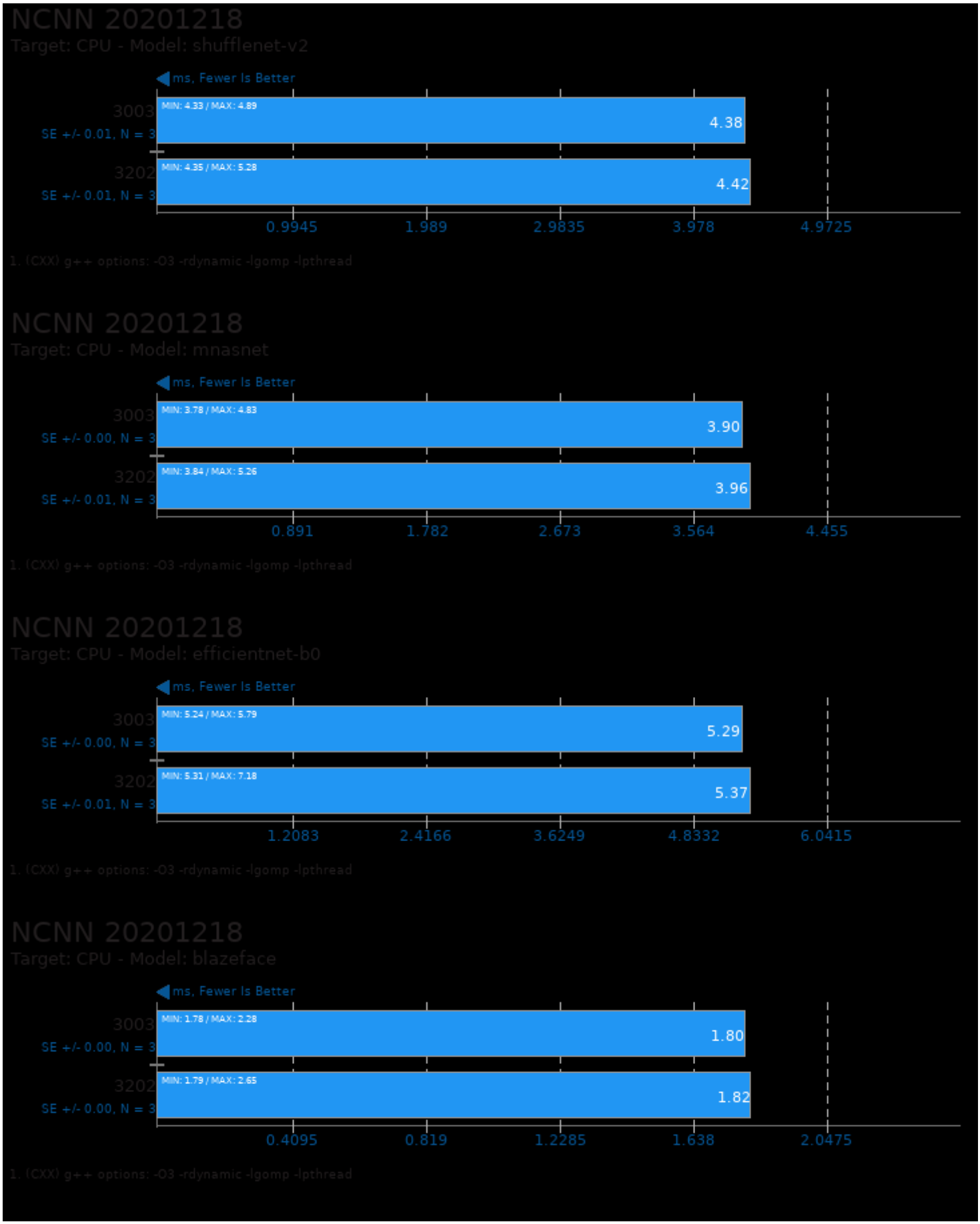
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread

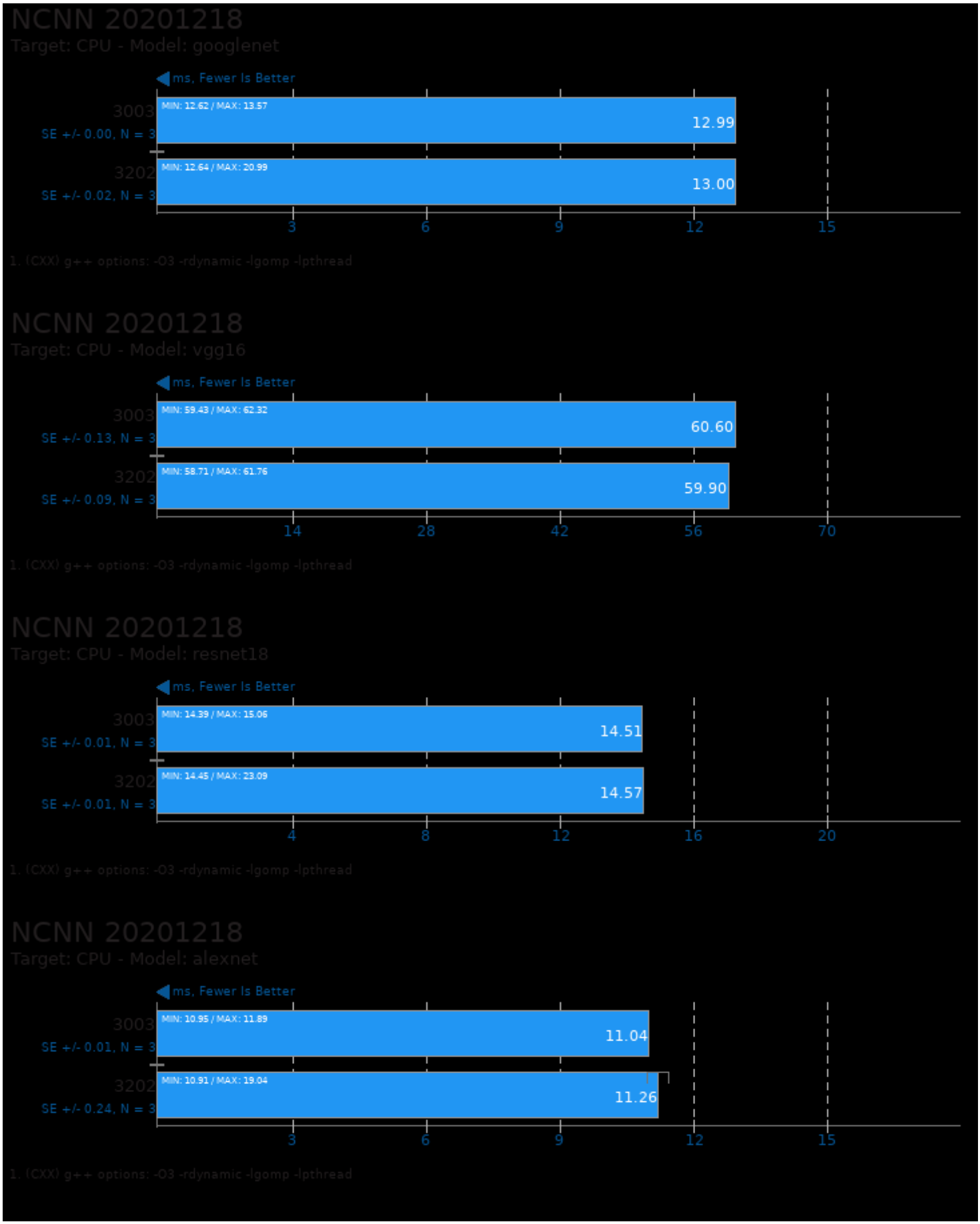
NCNN 20201218

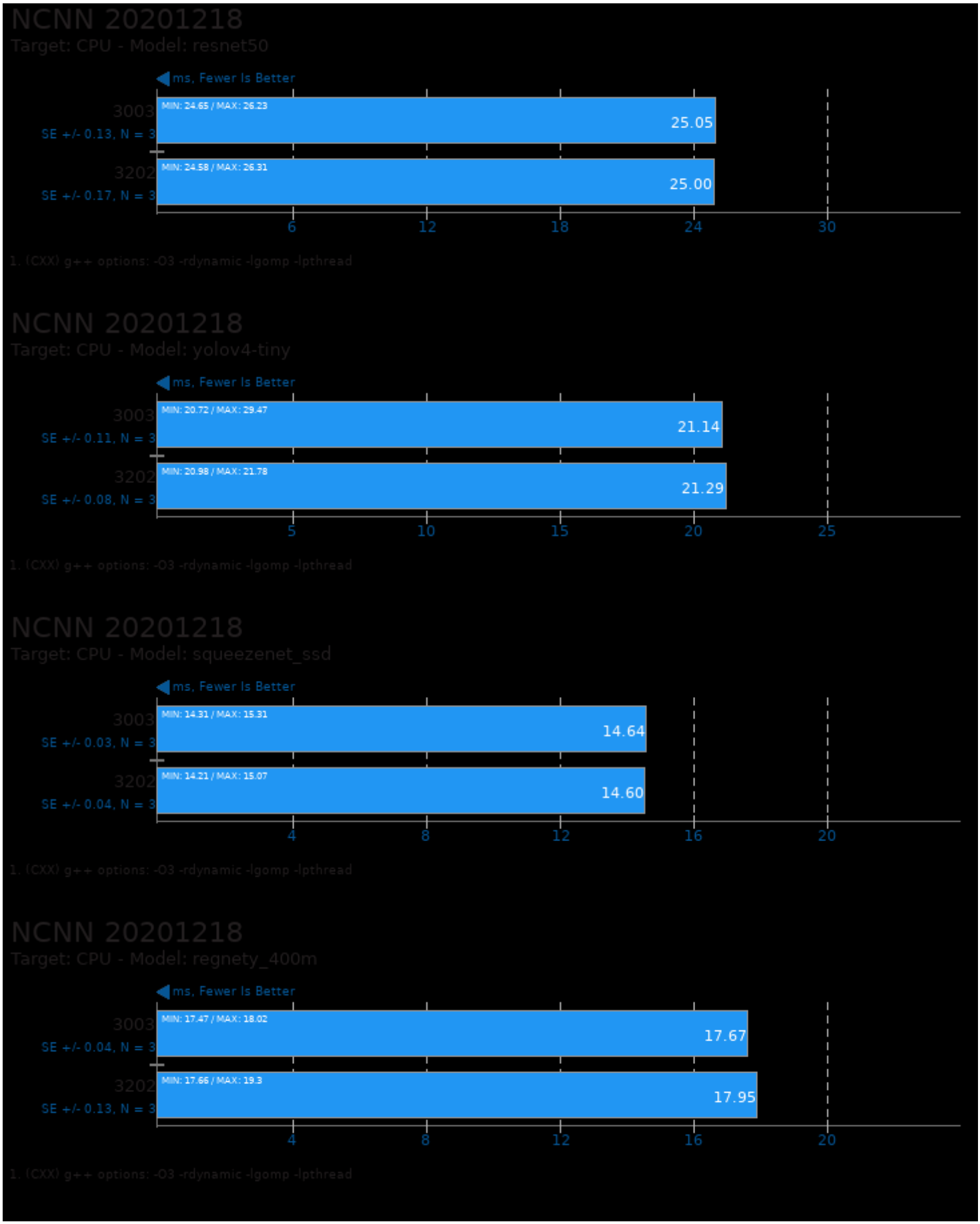
Target: CPU-v3-v3 - Model: mobilenet-v3

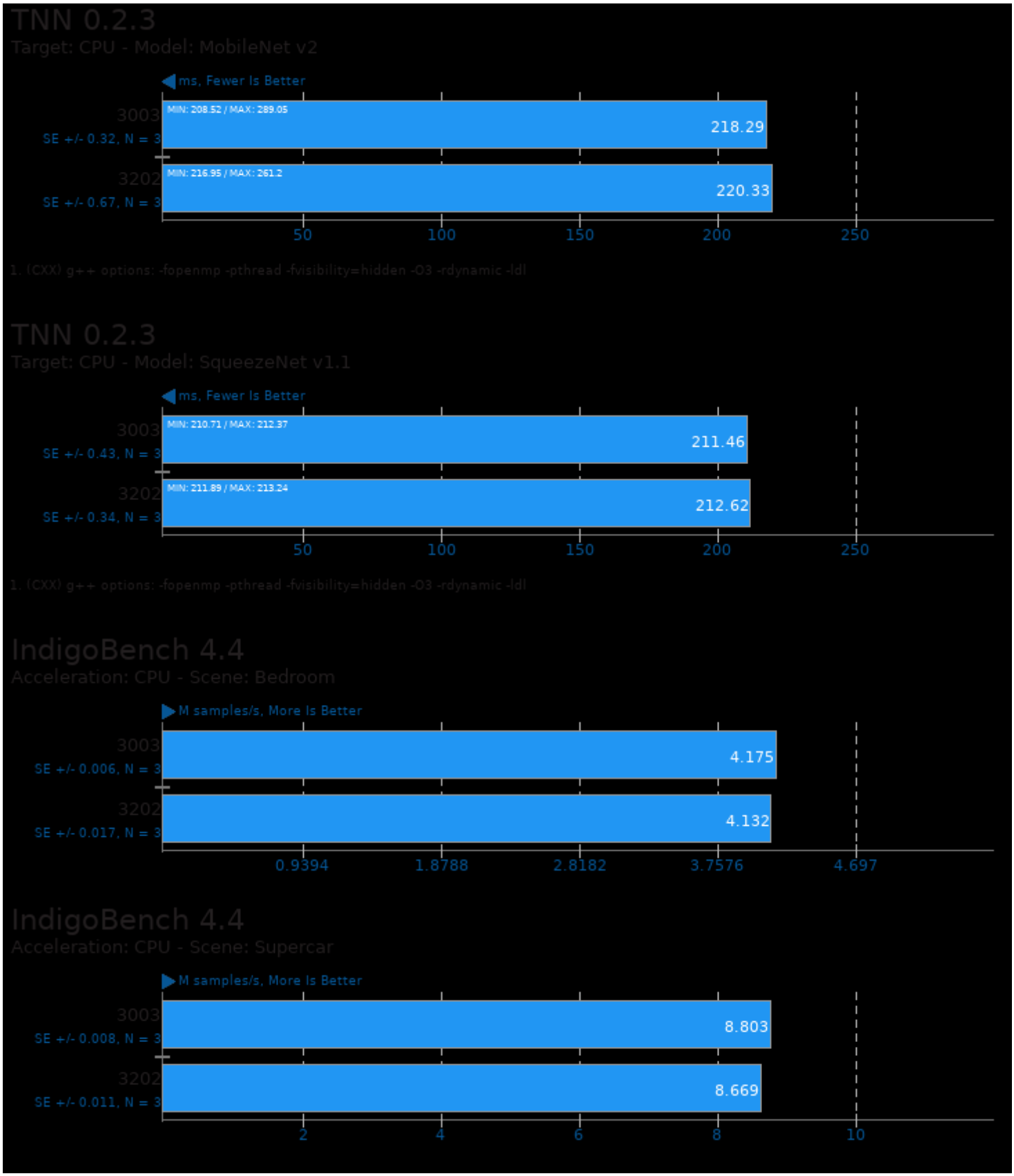


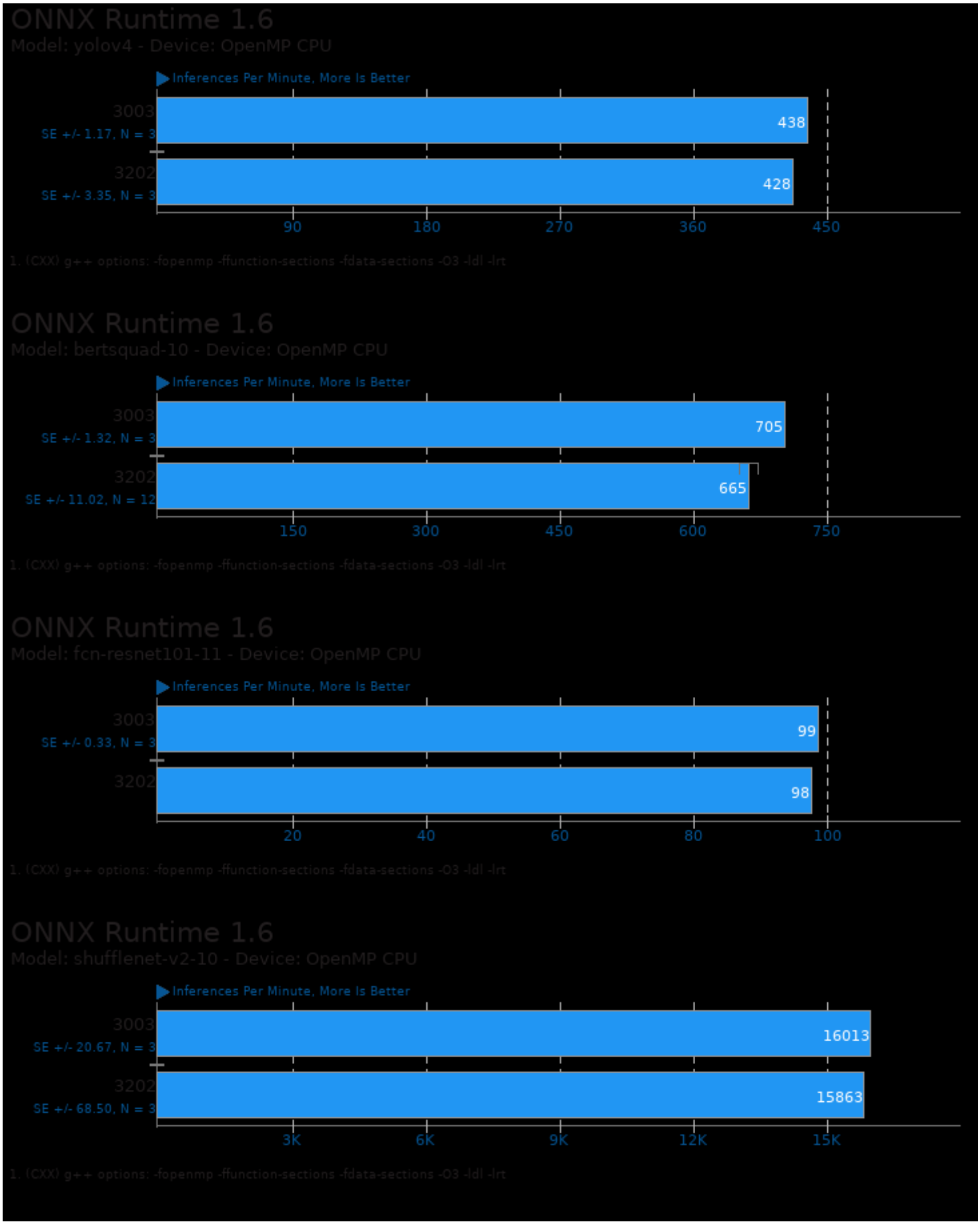
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread


NCNN 20201218
Target: CPU - Model: shufflenet-v2
ms, Fewer Is Better
3003
SE +/- 0.01, N = 3
MIN: 4.33 / MAX: 4.89
4.38
3202
SE +/- 0.01, N = 3
MIN: 4.35 / MAX: 5.28
4.42
0.9945
1.989
2.9835
3.978
4.9725
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: CPU - Model: mnasnet
ms, Fewer Is Better
3003
SE +/- 0.00, N = 3
MIN: 3.78 / MAX: 4.83
3.90
3202
SE +/- 0.01, N = 3
MIN: 3.84 / MAX: 5.26
3.96
0.891
1.782
2.673
3.564
4.455
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: CPU - Model: efficientnet-b0
ms, Fewer Is Better
3003
SE +/- 0.00, N = 3
MIN: 5.24 / MAX: 5.79
5.29
3202
SE +/- 0.01, N = 3
MIN: 5.31 / MAX: 7.18
5.37
1.2083
2.4166
3.6249
4.8332
6.0415
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: CPU - Model: blazeface
ms, Fewer Is Better
3003
SE +/- 0.00, N = 3
MIN: 1.78 / MAX: 2.28
1.80
3202
SE +/- 0.00, N = 3
MIN: 1.79 / MAX: 2.65
1.82
0.4095
0.819
1.2285
1.638
2.0475
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread


NCNN 20201218
Target: CPU - Model: googlenet
ms, Fewer Is Better
3003
SE +/- 0.00, N = 3
MIN: 12.62 / MAX: 13.57
12.99
3202
SE +/- 0.02, N = 3
MIN: 12.64 / MAX: 20.99
13.00
3
6
9
12
15
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: CPU - Model: vgg16
ms, Fewer Is Better
3003
SE +/- 0.13, N = 3
MIN: 59.43 / MAX: 62.32
60.60
3202
SE +/- 0.09, N = 3
MIN: 58.71 / MAX: 61.76
59.90
14
28
42
56
70
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: CPU - Model: resnet18
ms, Fewer Is Better
3003
SE +/- 0.01, N = 3
MIN: 14.39 / MAX: 15.06
14.51
3202
SE +/- 0.01, N = 3
MIN: 14.45 / MAX: 23.09
14.57
4
8
12
16
20
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: CPU - Model: alexnet
ms, Fewer Is Better
3003
SE +/- 0.01, N = 3
MIN: 10.95 / MAX: 11.89
11.04
3202
SE +/- 0.24, N = 3
MIN: 10.91 / MAX: 19.04
11.26
3
6
9
12
15
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread

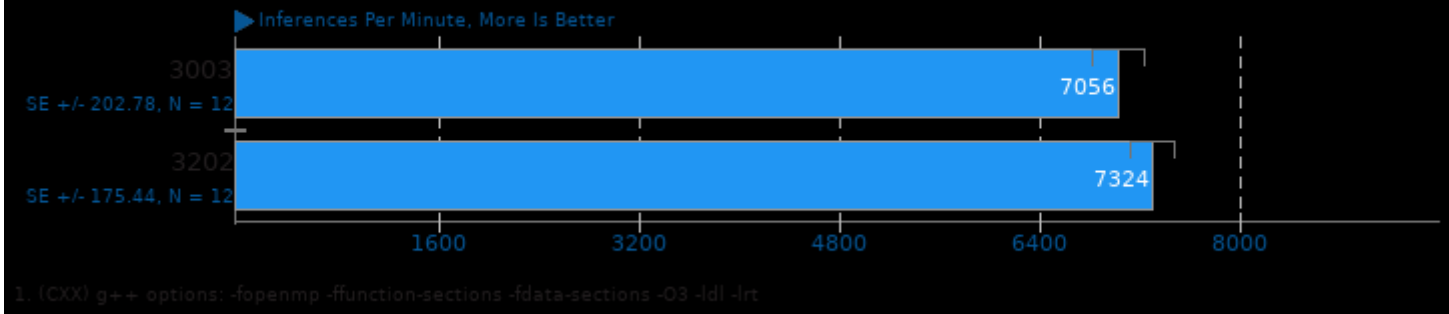

NCNN 20201218
Target: CPU - Model: resnet50
ms, Fewer Is Better
3003
SE +/- 0.13, N = 3
MIN: 24.65 / MAX: 26.23
25.05
3202
SE +/- 0.17, N = 3
MIN: 24.58 / MAX: 26.31
25.00
6
12
18
24
30
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: CPU - Model: yolov4-tiny
ms, Fewer Is Better
3003
SE +/- 0.11, N = 3
MIN: 20.72 / MAX: 29.47
21.14
3202
SE +/- 0.08, N = 3
MIN: 20.98 / MAX: 21.78
21.29
5
10
15
20
25
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: CPU - Model: squeezenet_ssd
ms, Fewer Is Better
3003
SE +/- 0.03, N = 3
MIN: 14.31 / MAX: 15.31
14.64
3202
SE +/- 0.04, N = 3
MIN: 14.21 / MAX: 15.07
14.60
4
8
12
16
20
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20201218
Target: CPU - Model: regnety_400m
ms, Fewer Is Better
3003
SE +/- 0.04, N = 3
MIN: 17.47 / MAX: 18.02
17.67
3202
SE +/- 0.13, N = 3
MIN: 17.66 / MAX: 19.3
17.95
4
8
12
16
20
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread


TNN 0.2.3
Target: CPU - Model: MobileNet v2
ms, Fewer Is Better
3003
MIN: 208.52 / MAX: 289.05
218.29
SE +/- 0.32, N = 3
3202
MIN: 216.95 / MAX: 261.2
220.33
SE +/- 0.67, N = 3
50
100
150
200
250
1. (CXX) g++ options: -fopenmp -pthread -fvisibility=hidden -O3 -rdynamic -ldl
TNN 0.2.3
Target: CPU - Model: SqueezeNet v1.1
ms, Fewer Is Better
3003
MIN: 210.71 / MAX: 212.37
211.46
SE +/- 0.43, N = 3
3202
MIN: 211.89 / MAX: 213.24
212.62
SE +/- 0.34, N = 3
50
100
150
200
250
1. (CXX) g++ options: -fopenmp -pthread -fvisibility=hidden -O3 -rdynamic -ldl
IndigoBench 4.4
Acceleration: CPU - Scene: Bedroom
M samples/s, More Is Better
3003
4.175
SE +/- 0.006, N = 3
3202
4.132
SE +/- 0.017, N = 3
0.9394
1.8788
2.8182
3.7576
4.697
IndigoBench 4.4
Acceleration: CPU - Scene: Supercar
M samples/s, More Is Better
3003
8.803
SE +/- 0.008, N = 3
3202
8.669
SE +/- 0.011, N = 3
2
4
6
8
10


ONNX Runtime 1.6
Model: yolov4 - Device: OpenMP CPU
Inferences Per Minute, More Is Better
3003
SE +/- 1.17, N = 3
438
3202
SE +/- 3.35, N = 3
428
90
180
270
360
450
1. (CXX) g++ options: -fopenmp -ffunction-sections -fdata-sections -O3 -ldl -lrt
ONNX Runtime 1.6
Model: bertsquad-10 - Device: OpenMP CPU
Inferences Per Minute, More Is Better
3003
SE +/- 1.32, N = 3
705
3202
SE +/- 11.02, N = 12
665
150
300
450
600
750
1. (CXX) g++ options: -fopenmp -ffunction-sections -fdata-sections -O3 -ldl -lrt
ONNX Runtime 1.6
Model: fcn-resnet101-11 - Device: OpenMP CPU
Inferences Per Minute, More Is Better
3003
SE +/- 0.33, N = 3
99
3202
98
20
40
60
80
100
1. (CXX) g++ options: -fopenmp -ffunction-sections -fdata-sections -O3 -ldl -lrt
ONNX Runtime 1.6
Model: shufflenet-v2-10 - Device: OpenMP CPU
Inferences Per Minute, More Is Better
3003
SE +/- 20.67, N = 3
16013
3202
SE +/- 68.50, N = 3
15863
3K
6K
9K
12K
15K
1. (CXX) g++ options: -fopenmp -ffunction-sections -fdata-sections -O3 -ldl -lrt

ONNX Runtime 1.6

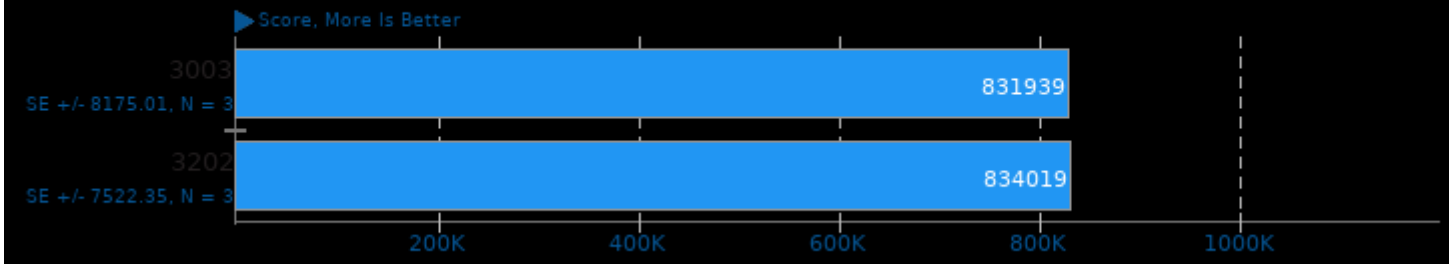
Model: super-resolution-10 - Device: OpenMP CPU



1. (CXX) g++ options: -fopenmp -ffunction-sections -fdata-sections -O3 -ldl -lrt

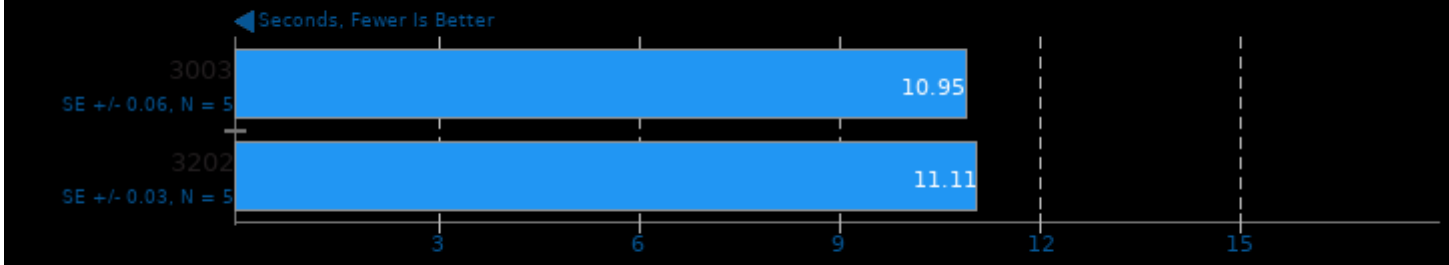
PHPBench 0.8.1

PHP Benchmark Suite



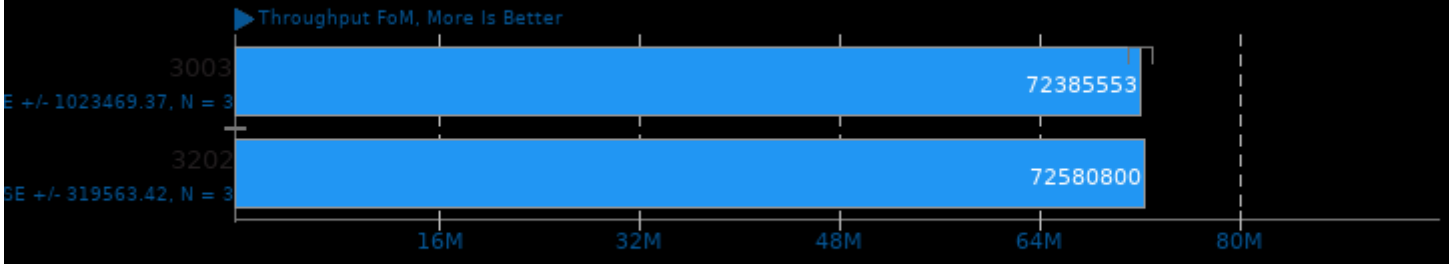
WavPack Audio Encoding 5.3

WAV To WavPack

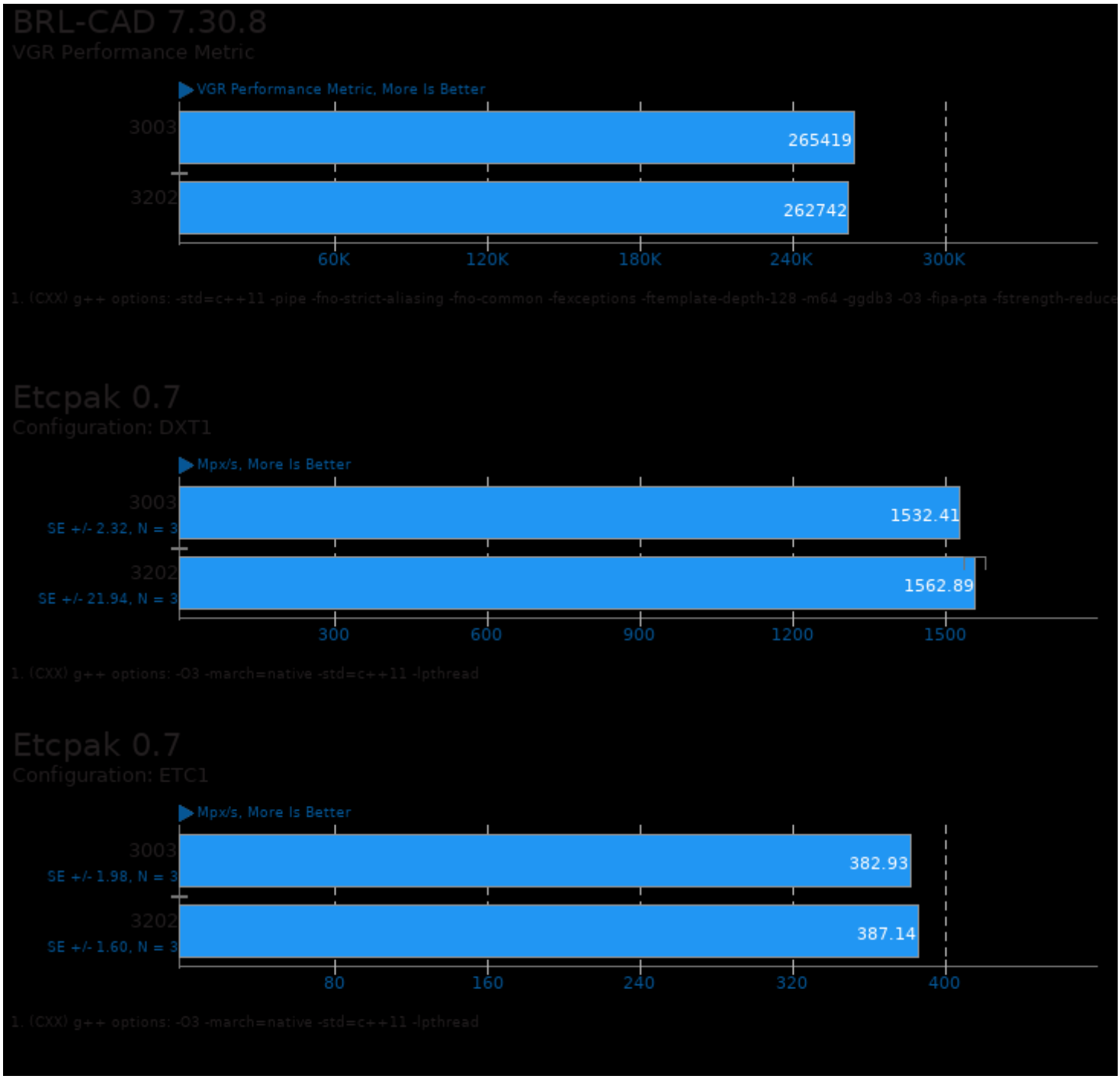


1. (CXX) g++ options: -rdynamic

Kripke 1.2.4

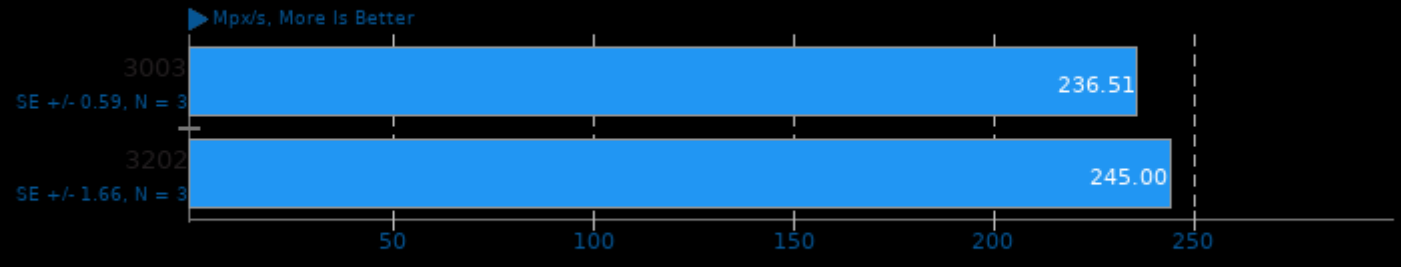


1. (CXX) g++ options: -O3 -fopenmp


BRL-CAD 7.30.8
VGR Performance Metric
VGR Performance Metric, More Is Better
3003
265419
3202
262742
60K
120K
180K
240K
300K
1. (CXX) g++ options: -std=c++11 -pipe -fno-strict-aliasing -fno-common -fexceptions -ftemplate-depth-128 -m64 -ggdb3 -O3 -fipa-pta -fstrength-reduce
Etcpak 0.7
Configuration: DXT1
Mpx/s, More Is Better
3003
SE +/- 2.32, N = 3
1532.41
3202
SE +/- 21.94, N = 3
1562.89
300
600
900
1200
1500
1. (CXX) g++ options: -O3 -march=native -std=c++11 -lpthread
Etcpak 0.7
Configuration: ETC1
Mpx/s, More Is Better
3003
SE +/- 1.98, N = 3
382.93
3202
SE +/- 1.60, N = 3
387.14
80
160
240
320
400
1. (CXX) g++ options: -O3 -march=native -std=c++11 -lpthread

Etcpak 0.7

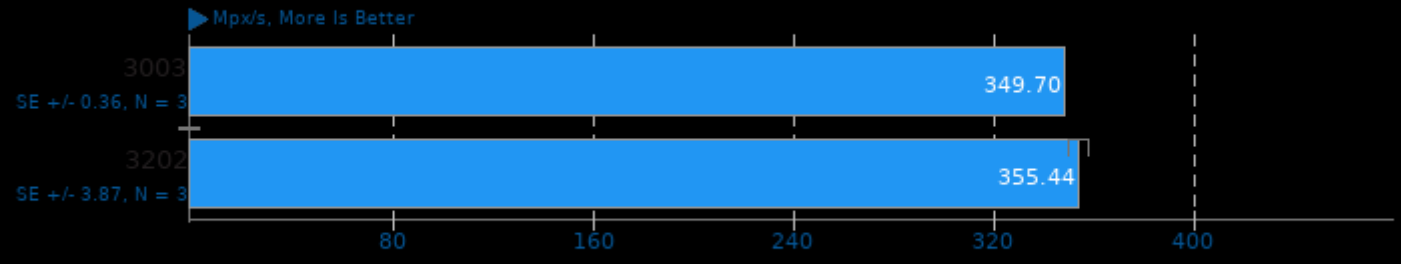
Configuration: ETC2



1. (CXX) g++ options: -O3 -march=native -std=c++11 -lpthread

Etcpak 0.7

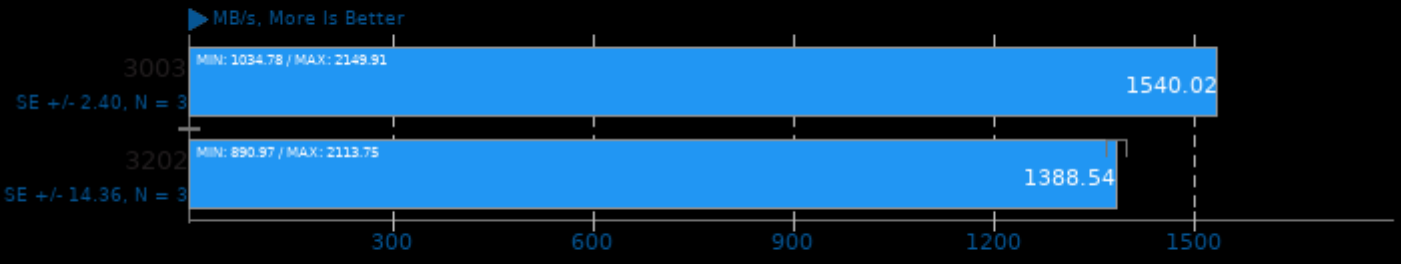
Configuration: ETC1 + Dithering



1. (CXX) g++ options: -O3 -march=native -std=c++11 -lpthread

IOR 3.3.0

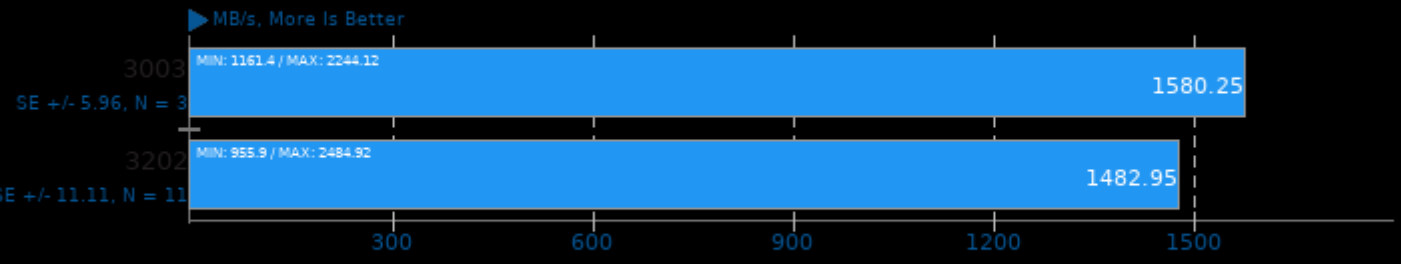
Block Size: 2MB - Disk Target: Default Test Directory



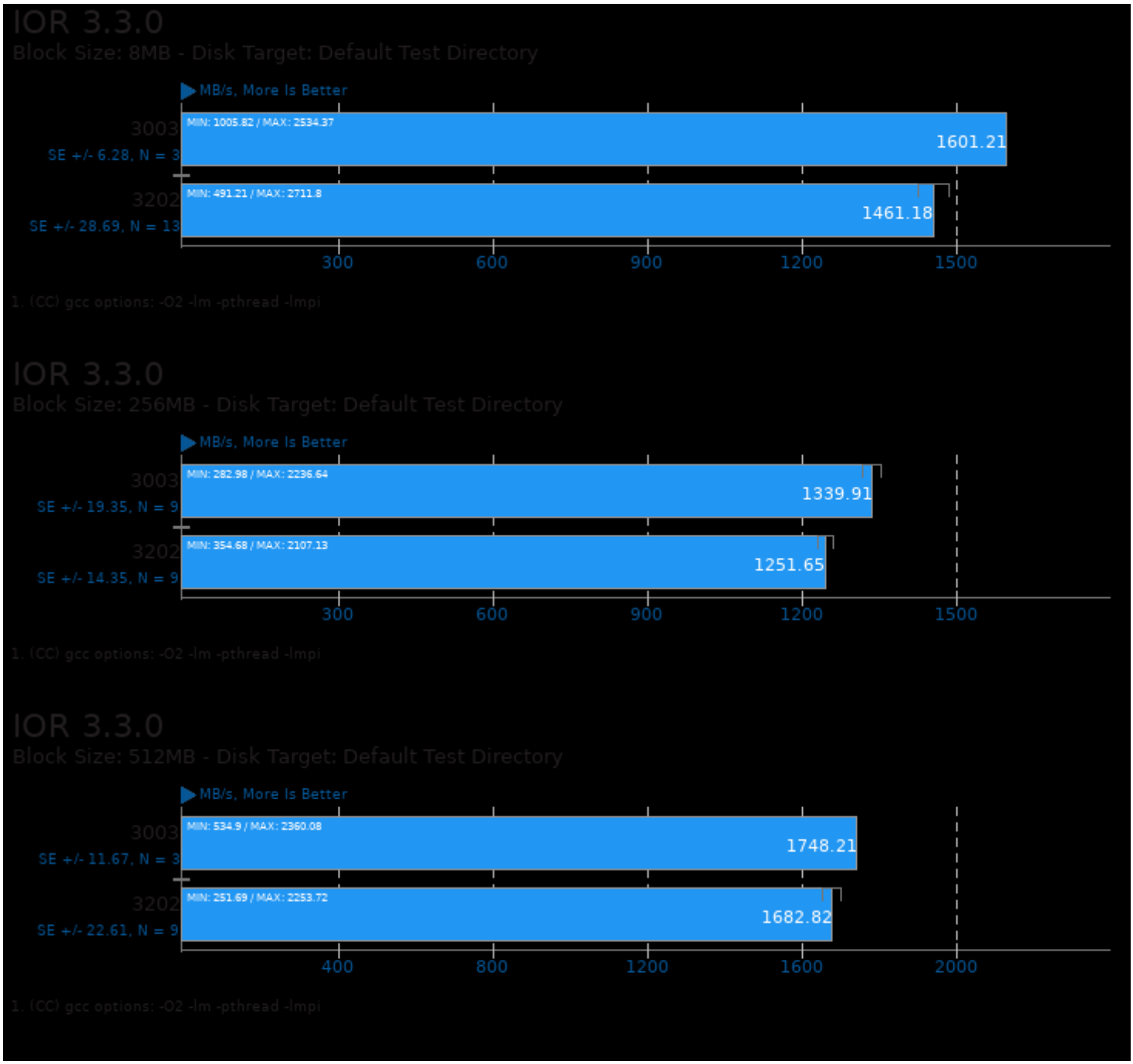
1. (CC) gcc options: -O2 -lm -pthread -lmpi

IOR 3.3.0

Block Size: 4MB - Disk Target: Default Test Directory

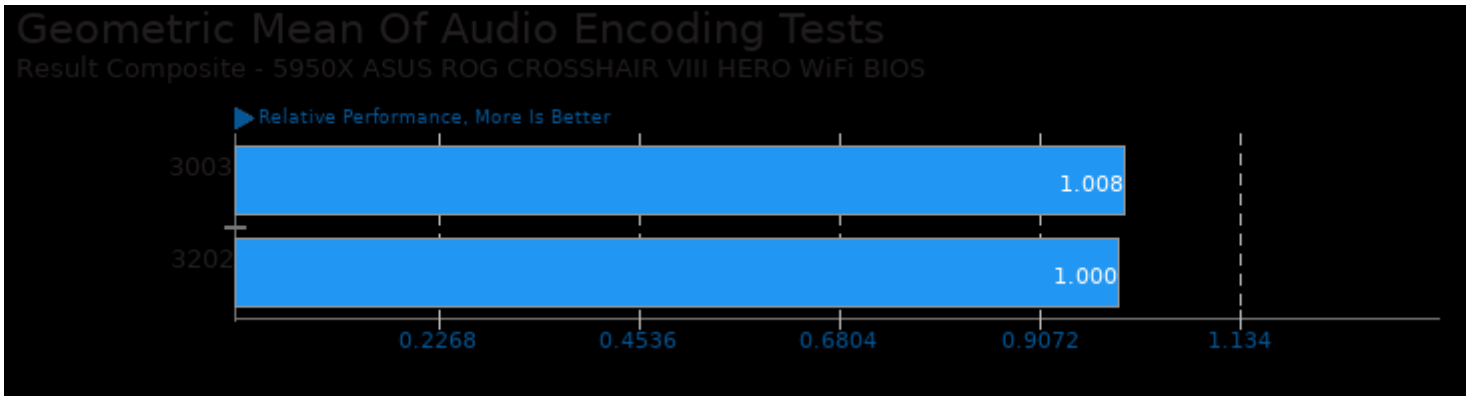


1. (CC) gcc options: -O2 -lm -pthread -lmpi

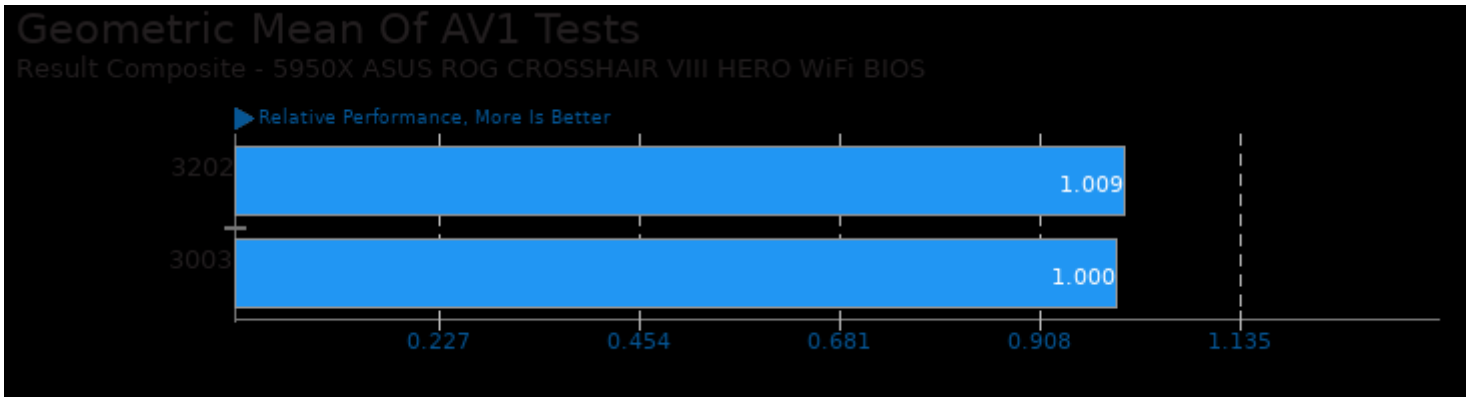

IOR 3.3.0
Block Size: 8MB - Disk Target: Default Test Directory
MB/s, More Is Better
3003
MIN: 1005.82 / MAX: 2534.37
1601.21
SE +/- 6.28, N = 3
3202
MIN: 491.21 / MAX: 2711.8
1461.18
SE +/- 28.69, N = 13
300
600
900
1200
1500
1. (CC) gcc options: -O2 -lm -pthread -lmpi
IOR 3.3.0
Block Size: 256MB - Disk Target: Default Test Directory
MB/s, More Is Better
3003
MIN: 282.98 / MAX: 2236.64
1339.91
SE +/- 19.35, N = 9
3202
MIN: 354.68 / MAX: 2107.13
1251.65
SE +/- 14.35, N = 9
300
600
900
1200
1500
1. (CC) gcc options: -O2 -lm -pthread -lmpi
IOR 3.3.0
Block Size: 512MB - Disk Target: Default Test Directory
MB/s, More Is Better
3003
MIN: 534.9 / MAX: 2360.08
1748.21
SE +/- 11.67, N = 3
3202
MIN: 251.69 / MAX: 2253.72
1682.82
SE +/- 22.61, N = 9
400
800
1200
1600
2000
1. (CC) gcc options: -O2 -lm -pthread -lmpi

5950X ASUS ROG CROSSHAIR VIII HERO WiFi BIOS

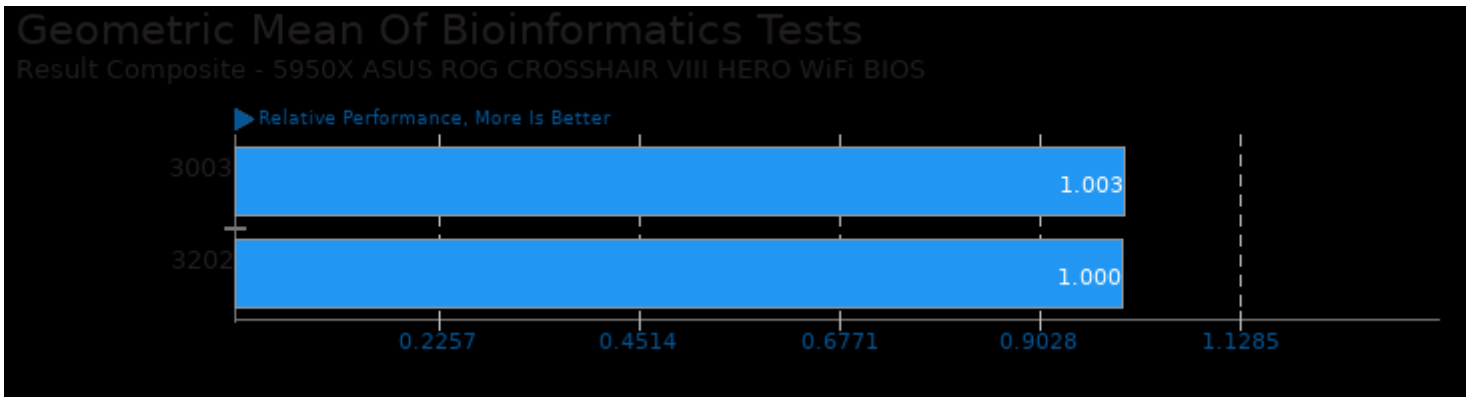
These geometric means are based upon test groupings / test suites for this result file.



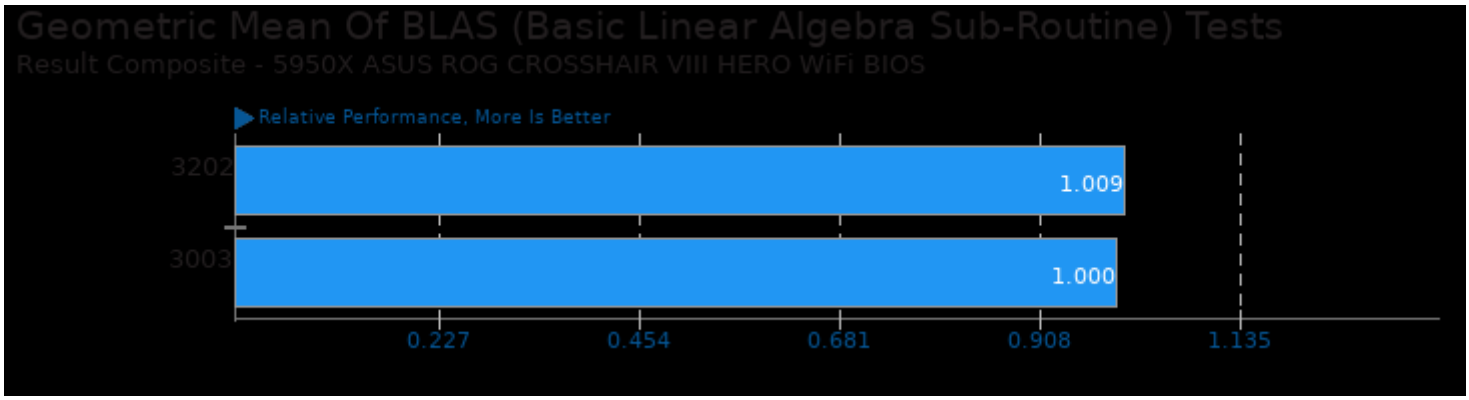
Geometric mean based upon tests: pts/encode-ape, pts/encode-wavpack and pts/encode-opus



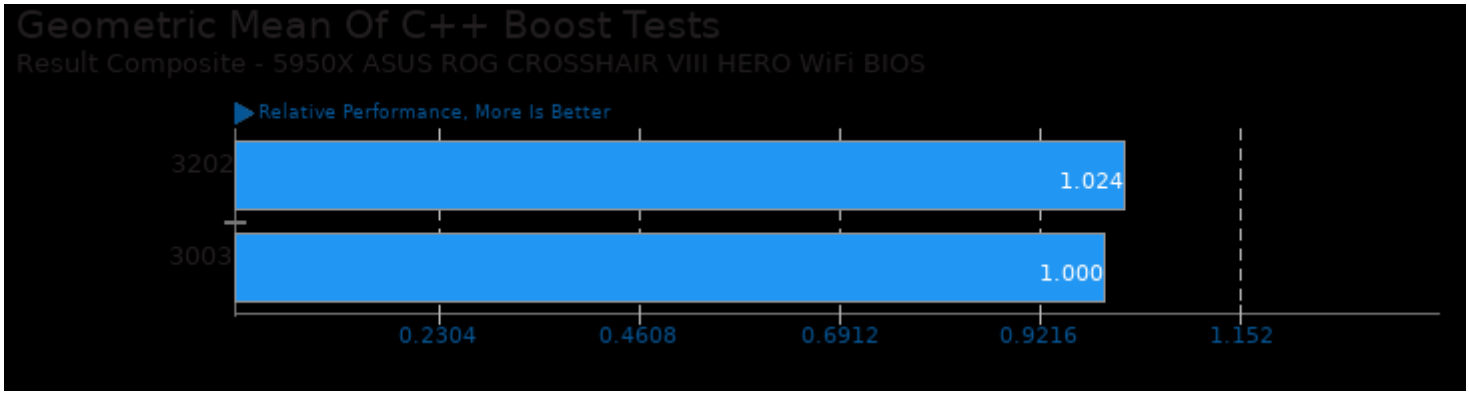
Geometric mean based upon tests: pts/dav1d and pts/rav1e



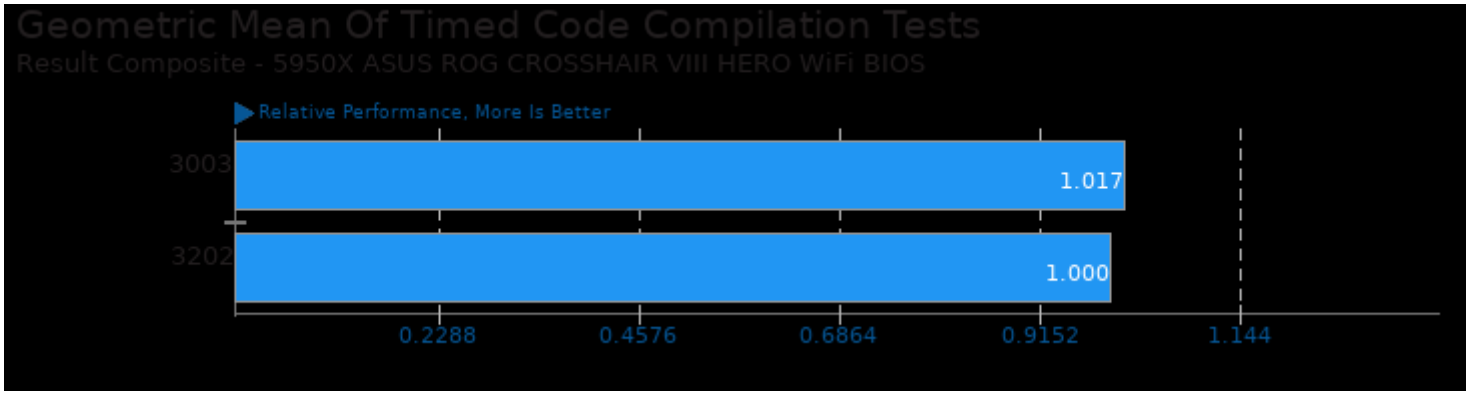
Geometric mean based upon tests: pts/hmmer and pts/qmcpack



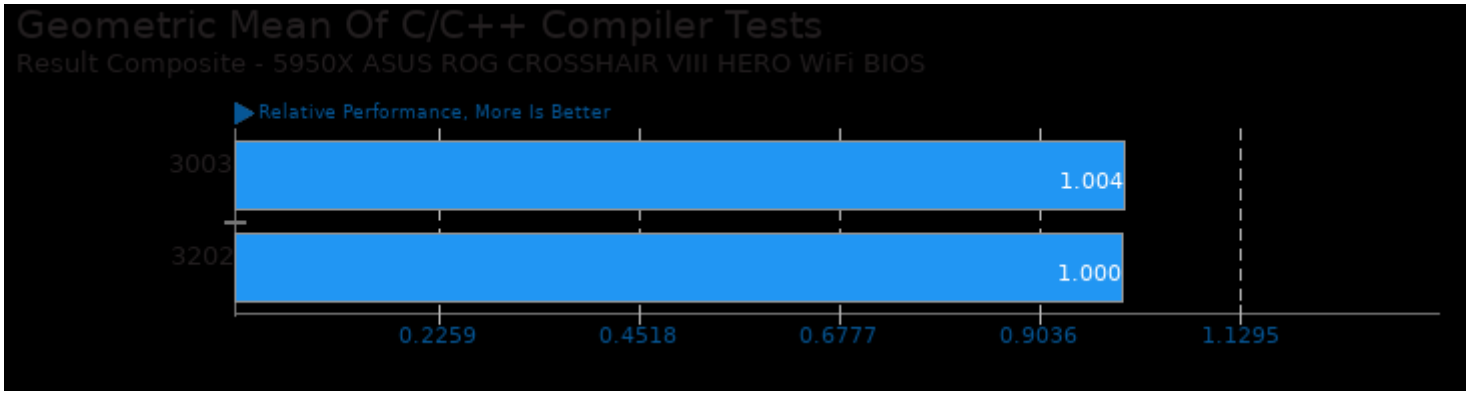
Geometric mean based upon tests: pts/hpcc, pts/qmcpack and pts/qe



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

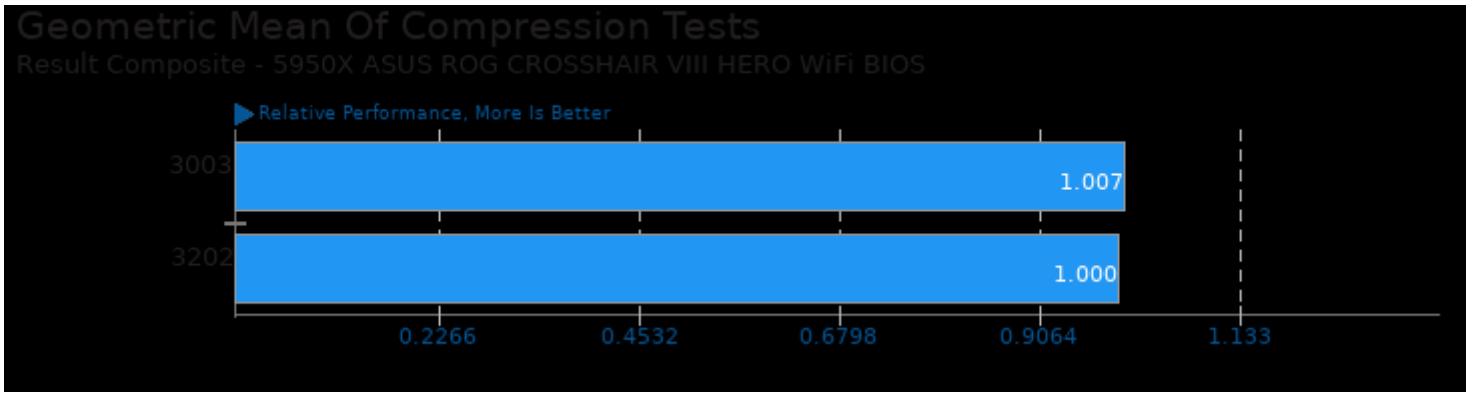


Geometric mean based upon tests: pts/build-eigen, pts/build-linux-kernel, pts/build2 and pts/build-godot

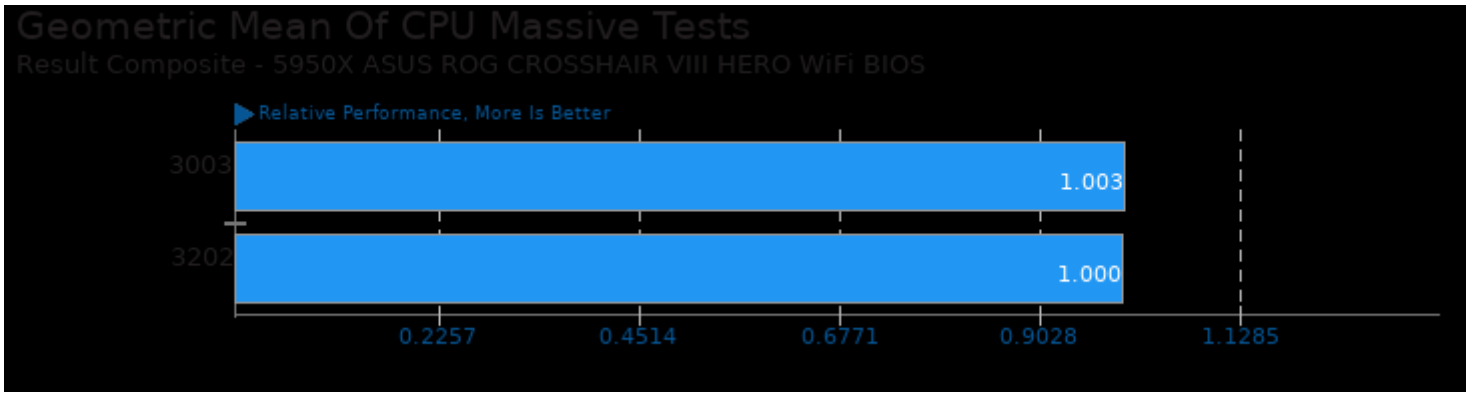


Geometric mean based upon tests: pts/hmmer, pts/sqlite-speedtest, pts/dav1d, pts/x265, pts/compress-zstd, pts/lammps and pts/gromacs

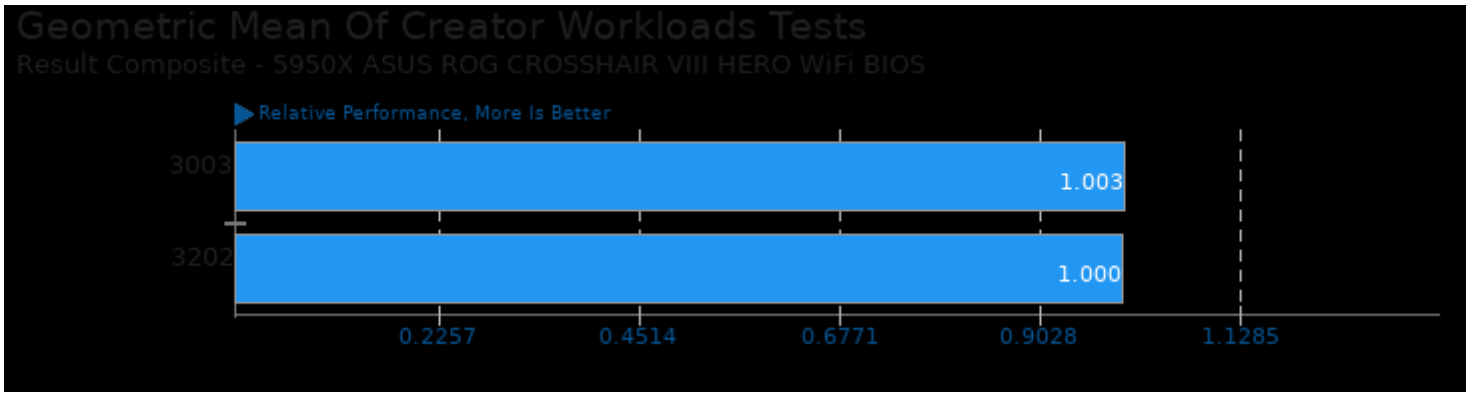
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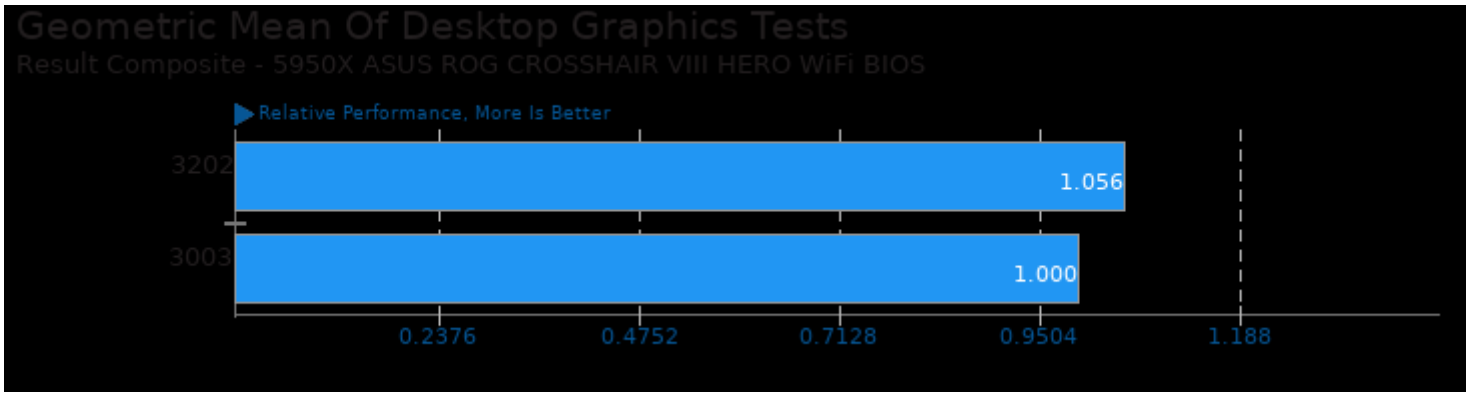
Geometric mean based upon tests: pts/compress-zstd and pts/compress-lz4



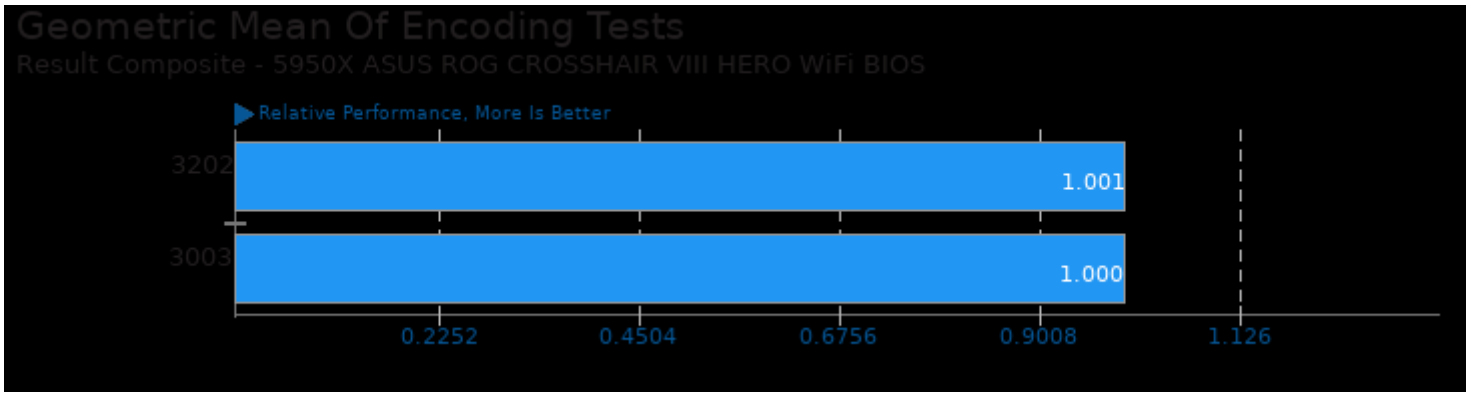
Geometric mean based upon tests: pts/brl-cad, pts/build-linux-kernel, pts/cloverleaf, pts/compress-zstd, pts/crafty, pts/dav1d, pts/x265, pts/dolfyn, pts/hmmer, pts/hpcc, pts/lammps, pts/onednn, pts/namd, pts/numpy and pts/phpbench



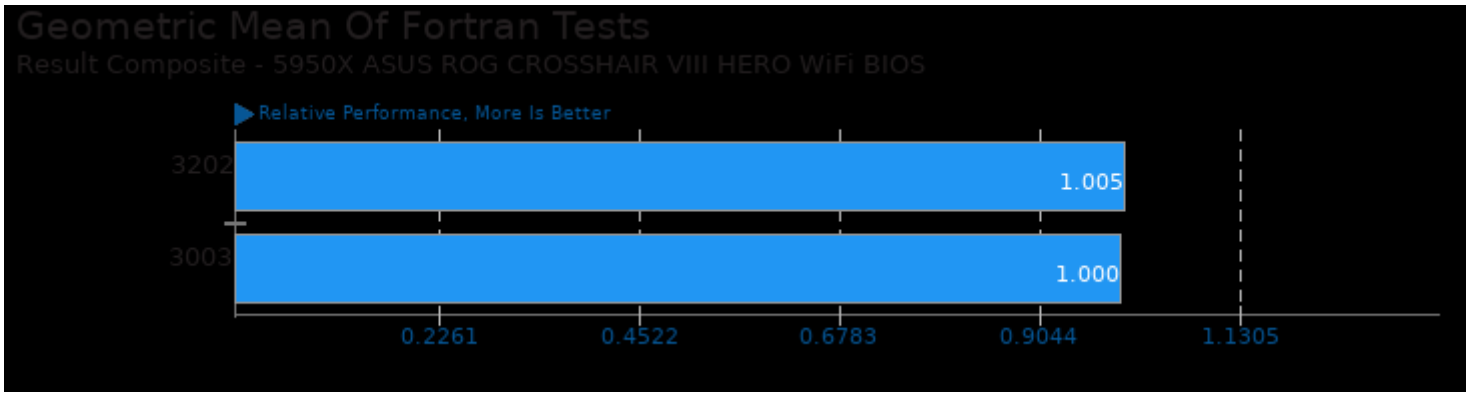
Geometric mean based upon tests: pts/indigobench, pts/x265, pts/dav1d, pts/rav1e, pts/encode-ape, pts/encode-wavpack, pts/encode-opus, pts/libraw, pts/webp, pts/onednn, pts/astcenc, pts/etcpak, pts/build-godot, pts/espeak, pts/deepspeech, pts/rnnoise, pts/synthmark and pts/brl-cad



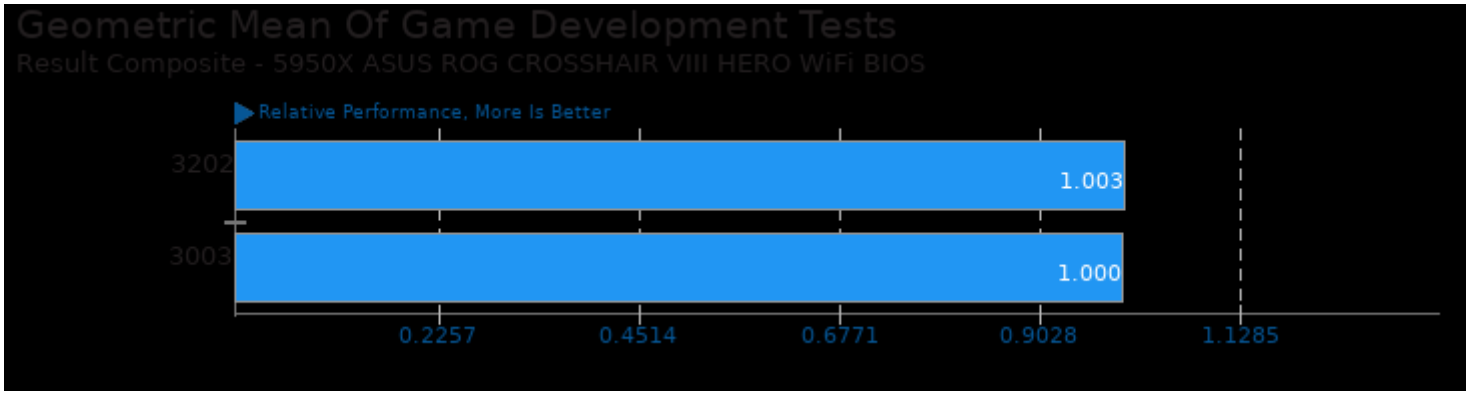
Geometric mean based upon tests: pts/xonotic and pts/tesseract



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

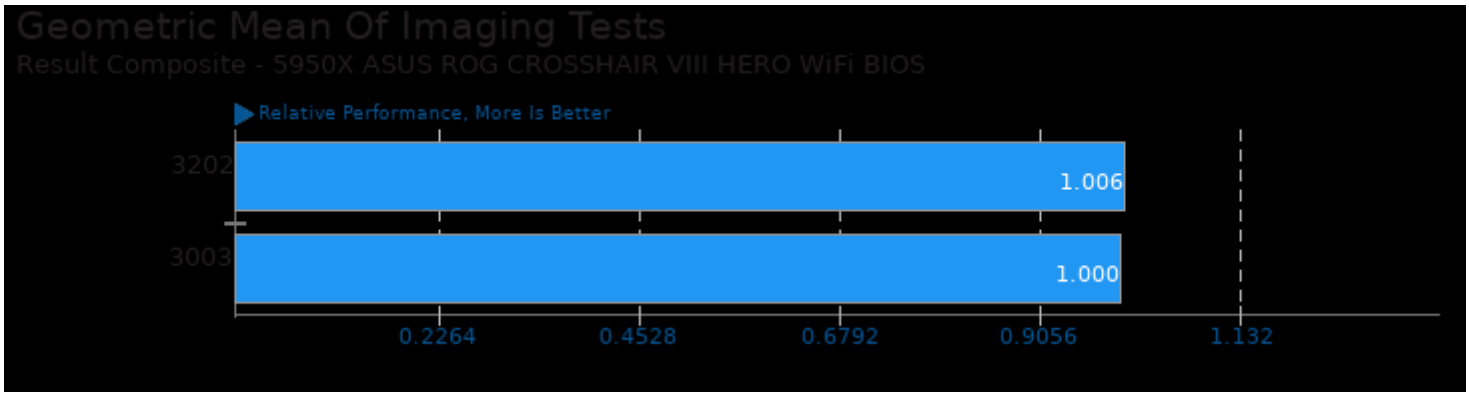


Geometric mean based upon tests: pts/hpcc, pts/cloverleaf, pts/dolfyn, pts/qe and pts/lammps

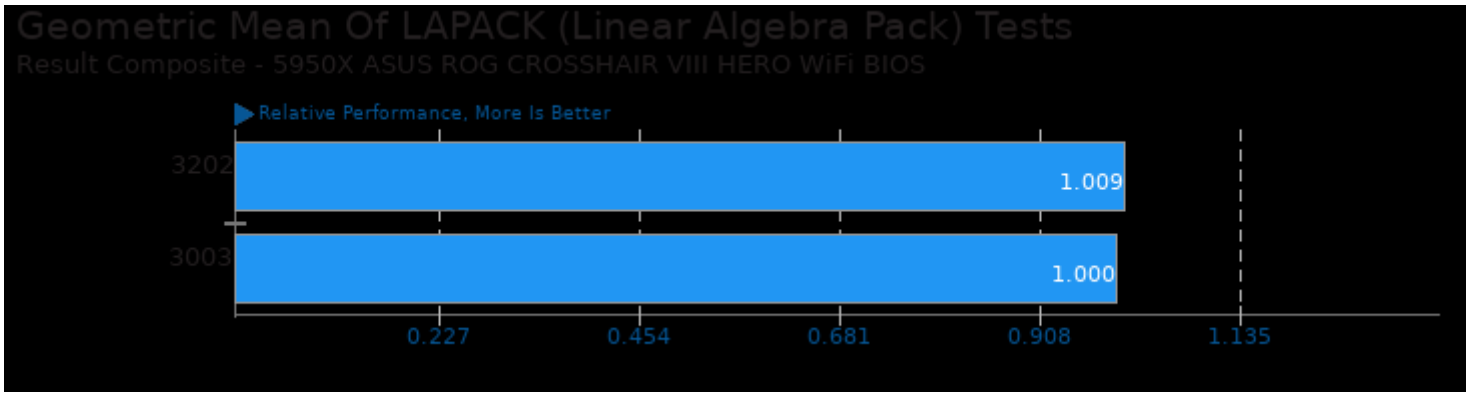


Geometric mean based upon tests: pts/astcenc, pts/etcpak and pts/build-godot

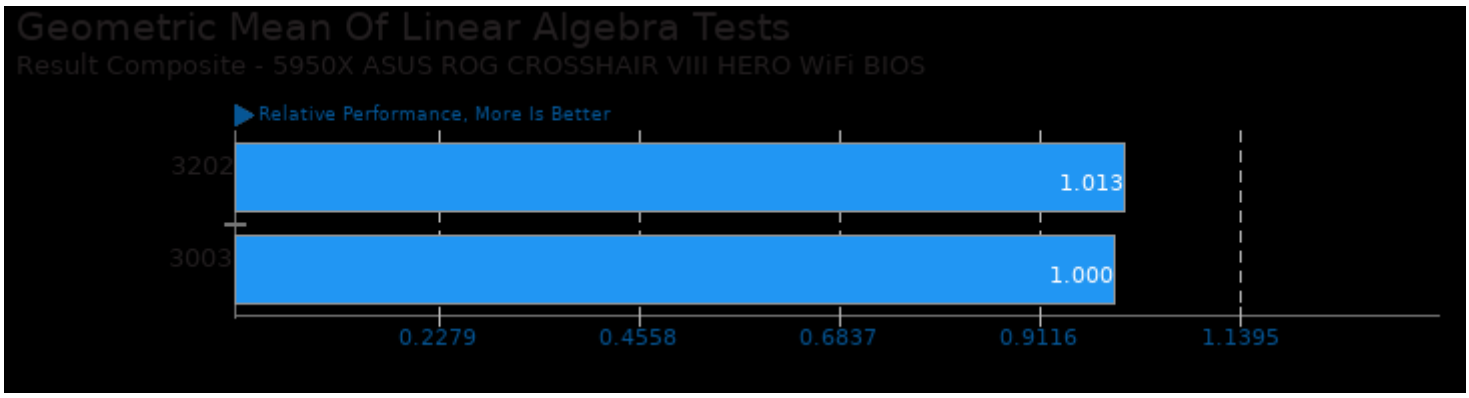
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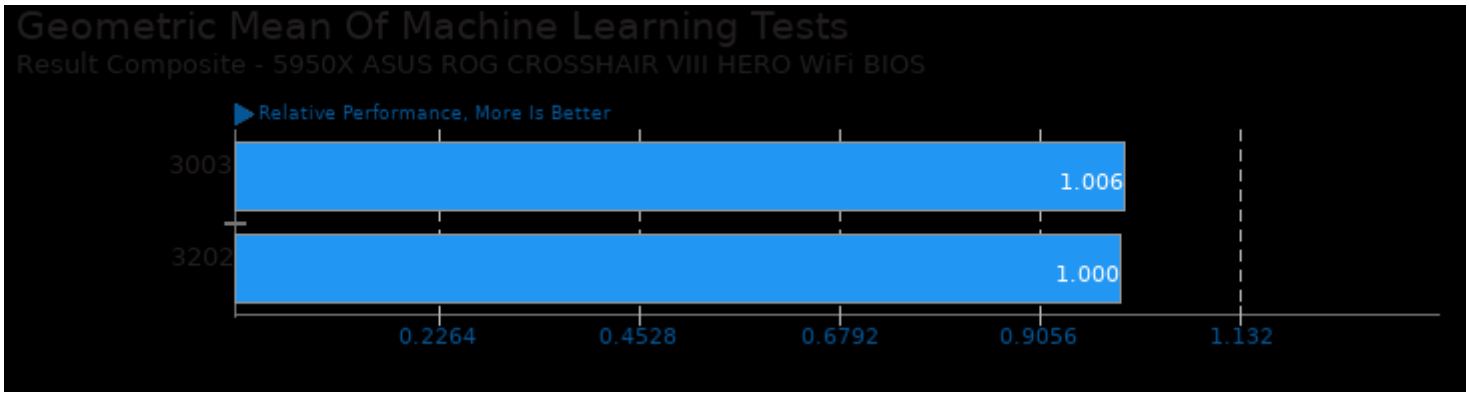
Geometric mean based upon tests: pts/libraw and pts/webp



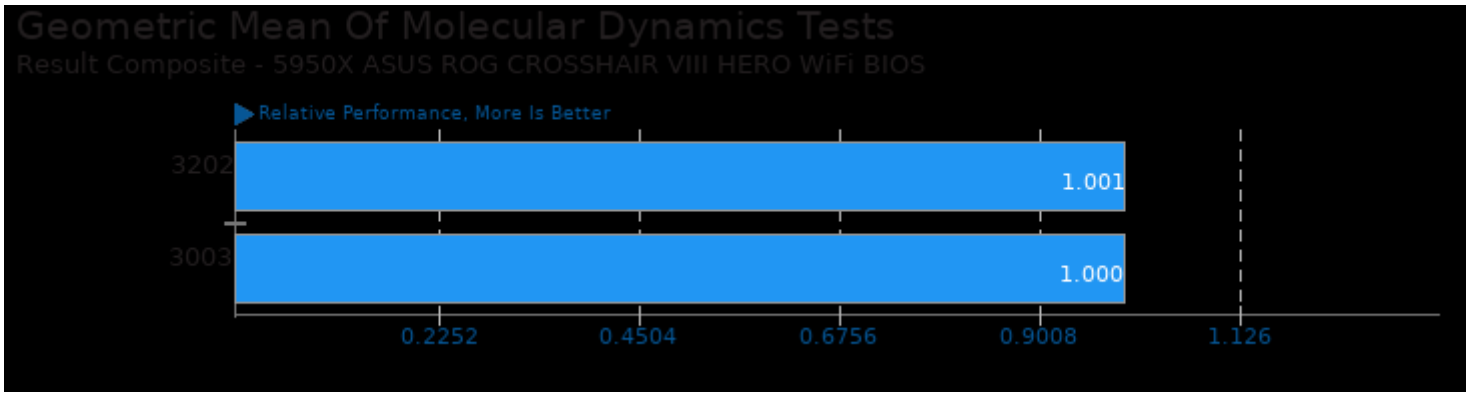
Geometric mean based upon tests: pts/hpcc, pts/qmcpack and pts/qe



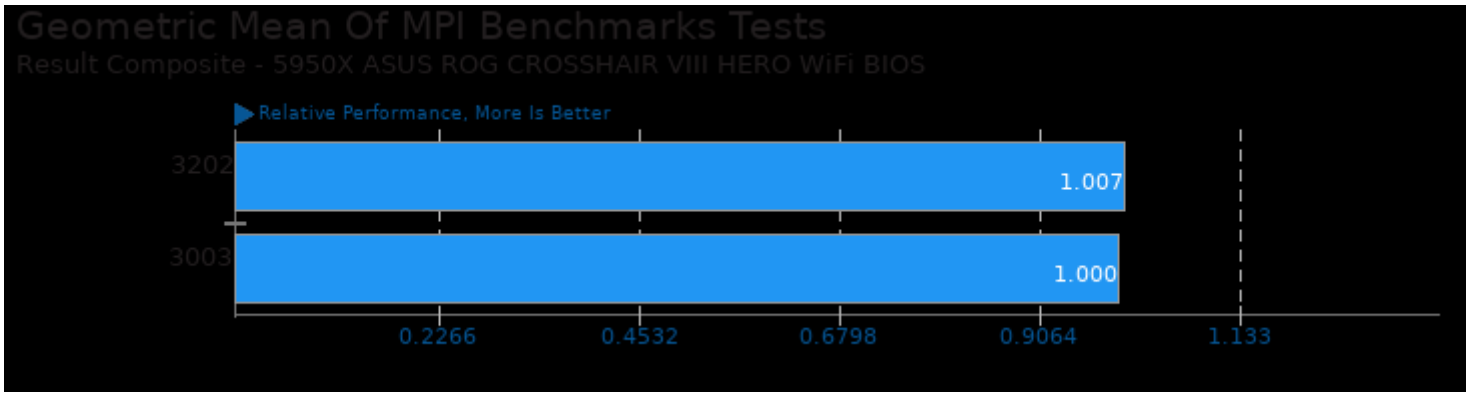
Geometric mean based upon tests: pts/amg and pts/hpcc



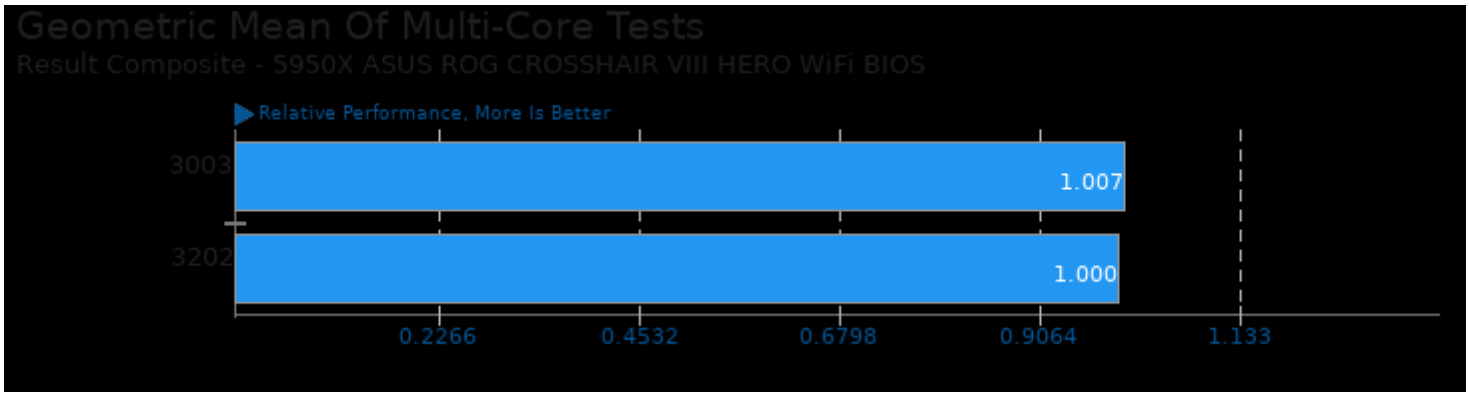
Geometric mean based upon tests: pts/mnn, pts/ncnn, pts/tnn, pts/numpy, pts/deepspeech, pts/rnnoise, pts/onednn and pts/onnx



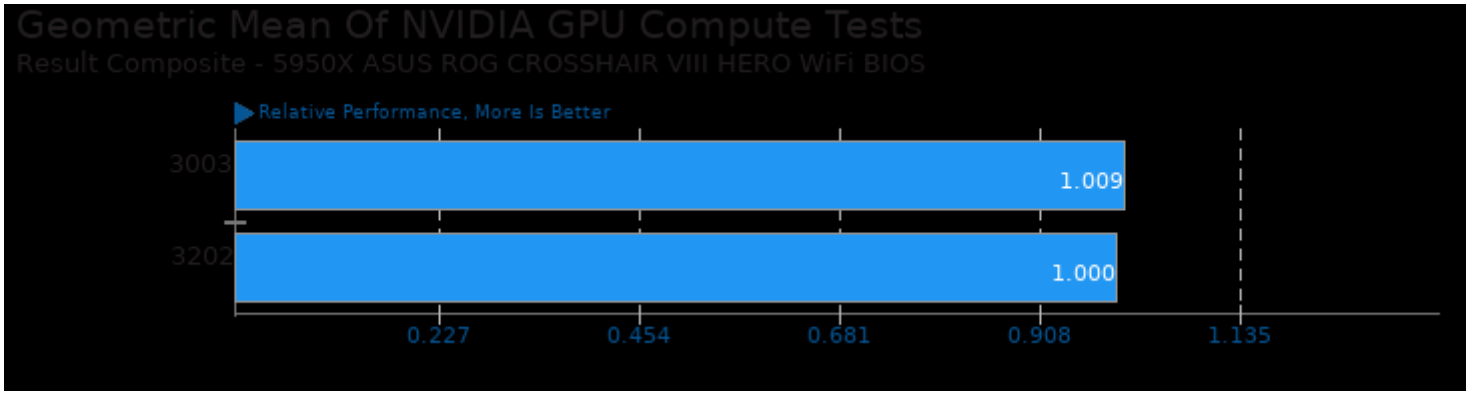
Geometric mean based upon tests: pts/namd, pts/gromacs, pts/cp2k, pts/dolfyn, pts/cloverleaf, pts/lammps, pts/lulesh and pts/openfoam



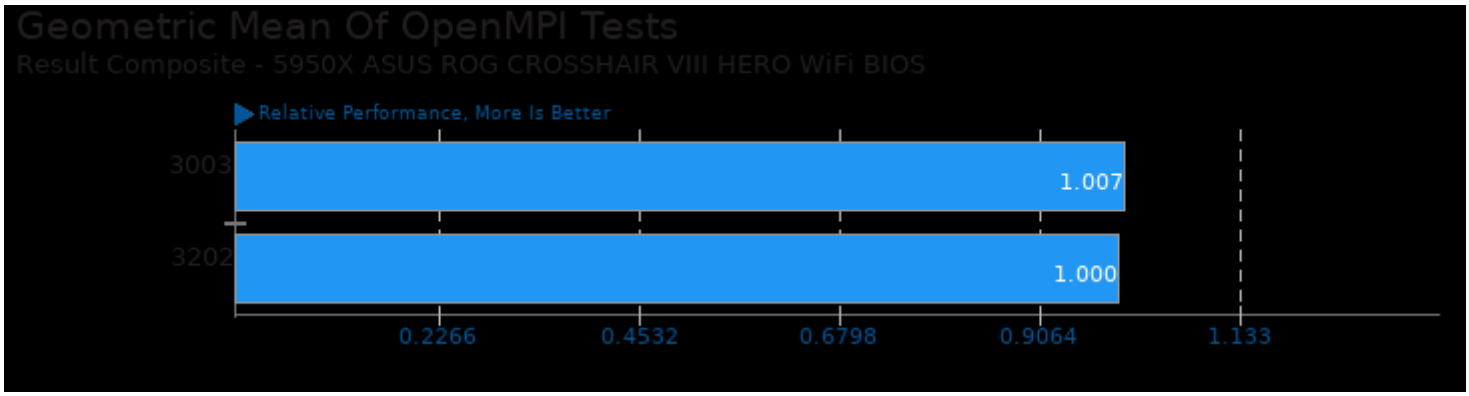
Geometric mean based upon tests: pts/lammps, pts/hpcc, pts/gromacs and pts/qmcpack



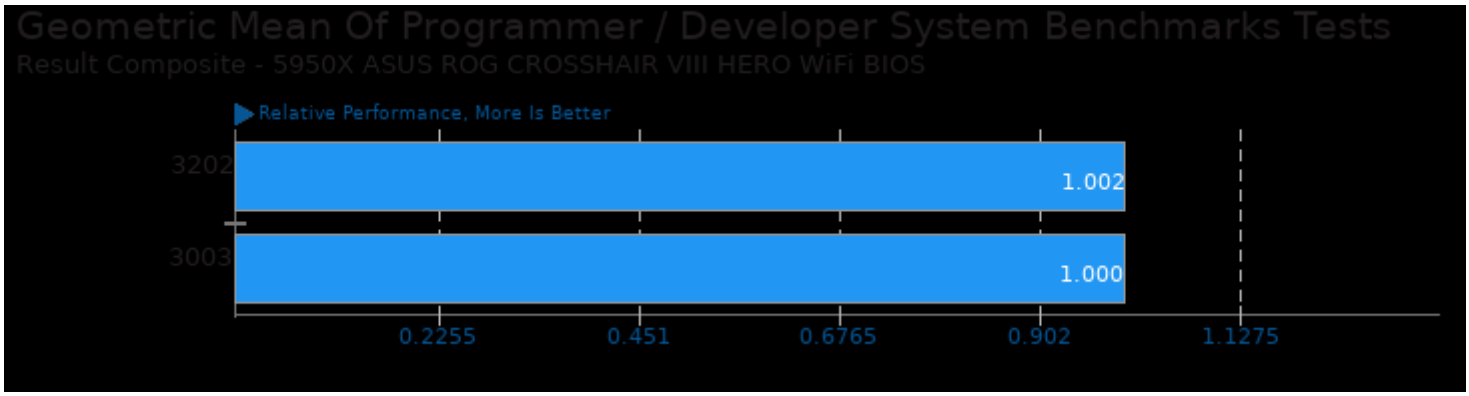
Geometric mean based upon tests: pts/coremark, pts/x265, pts/dav1d, pts/rav1e, pts/namd, pts/onednn, pts/lammps, pts/gromacs, pts/compress-zstd, pts/build-eigen, pts/build-linux-kernel, pts/build2, pts/build-godot and pts/indigobench



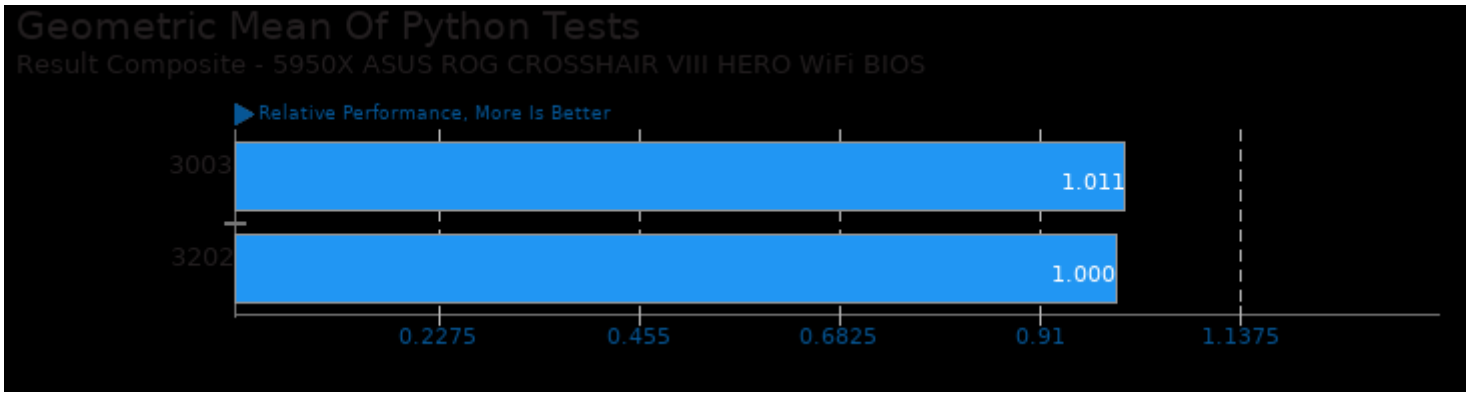
Geometric mean based upon tests: pts/gromacs, pts/indigobench and pts/ncnn



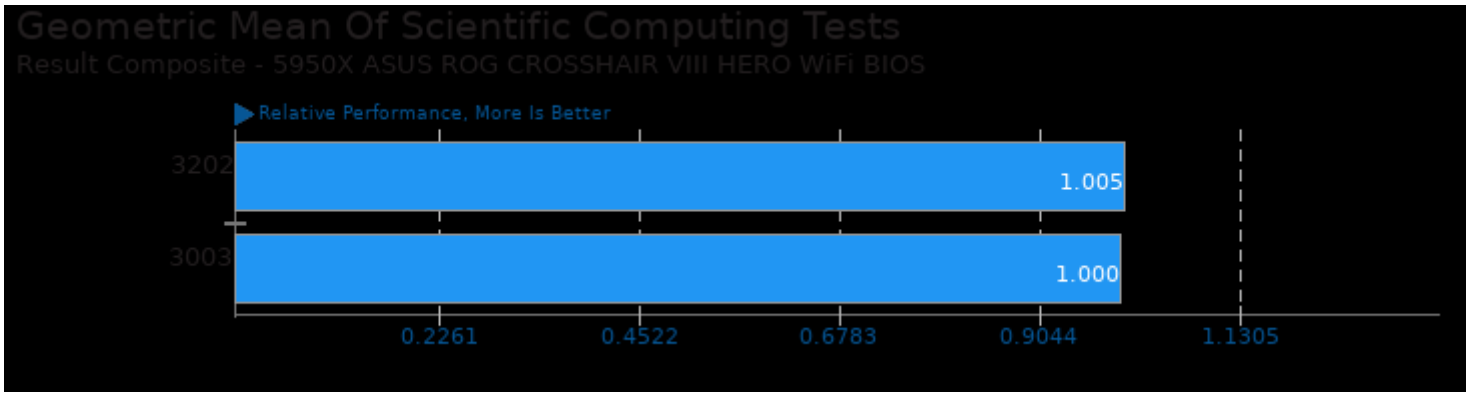
Geometric mean based upon tests: pts/hpcc, pts/cloverleaf, pts/cp2k, pts/amg, pts/qmcpack, pts/openfoam, pts/qe, pts/relion, pts/lammps, pts/lulesh, pts/gromacs and pts/ior



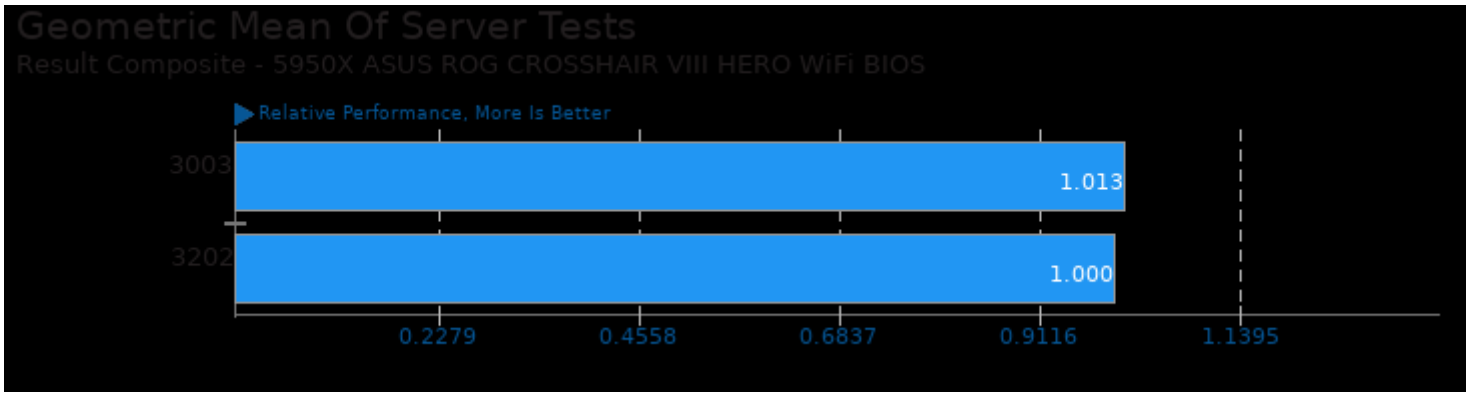
Geometric mean based upon tests: pts/sqlite-speedtest, pts/compress-zstd, pts/build-eigen, pts/build-linux-kernel, pts/build2, pts/build-godot, pts/amg and pts/hpcc



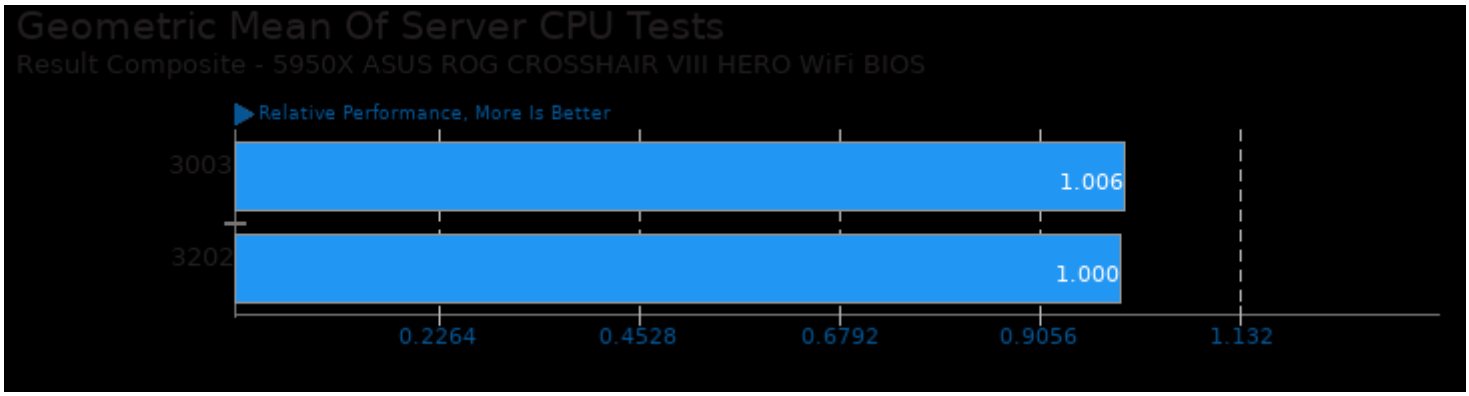
Geometric mean based upon tests: pts/build-godot, pts/numpy and pts/onnx



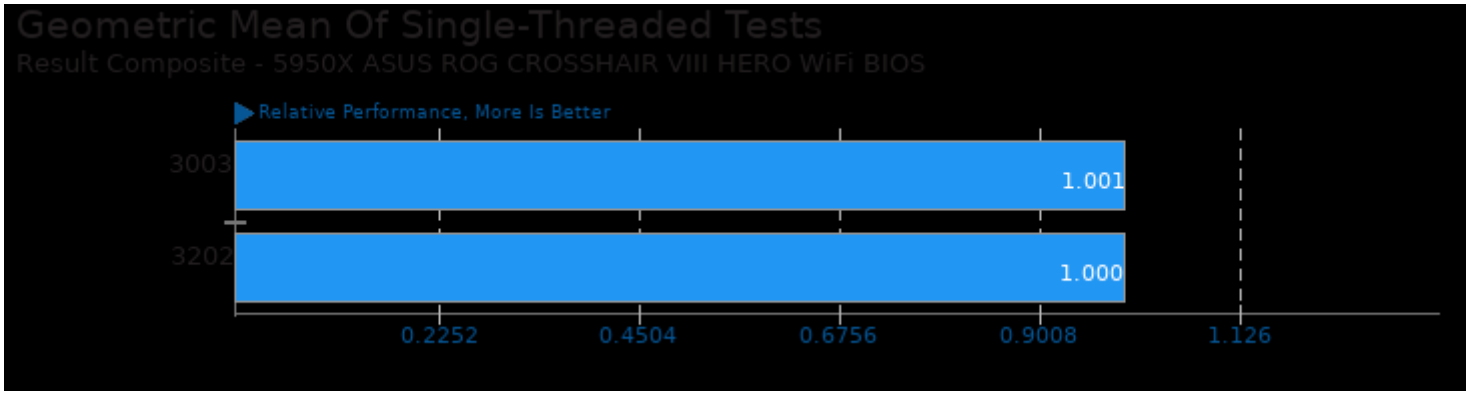
Geometric mean based upon tests: pts/amg, pts/hpcc, pts/namd, pts/gromacs, pts/cp2k, pts/dolfyn, pts/cloverleaf, pts/lammps, pts/lulesh, pts/openfoam, pts/hmmer, pts/qmcpack, pts/qe and pts/kripke



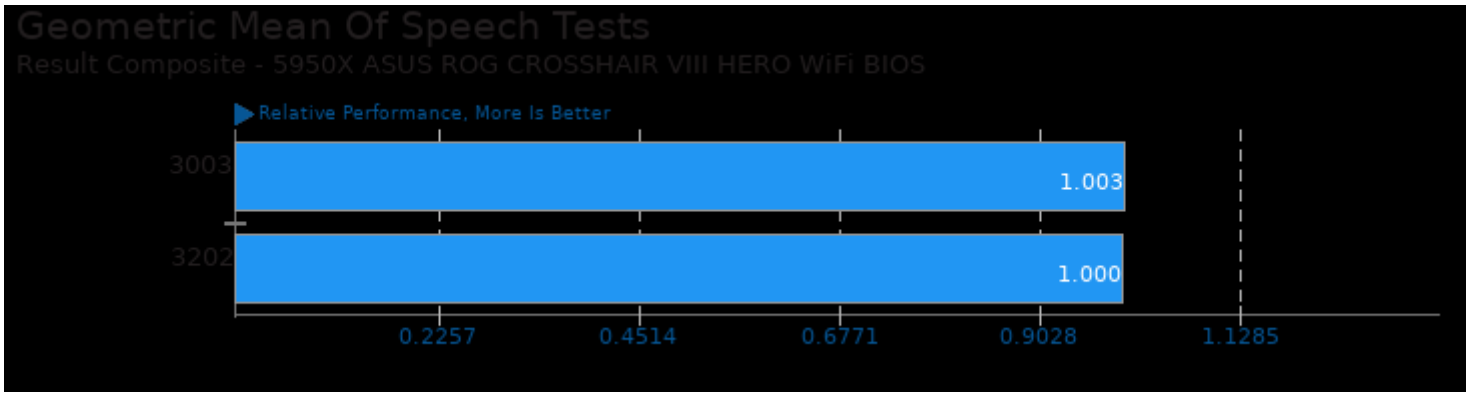
Geometric mean based upon tests: pts/phpbench and pts/sqlite-speedtest



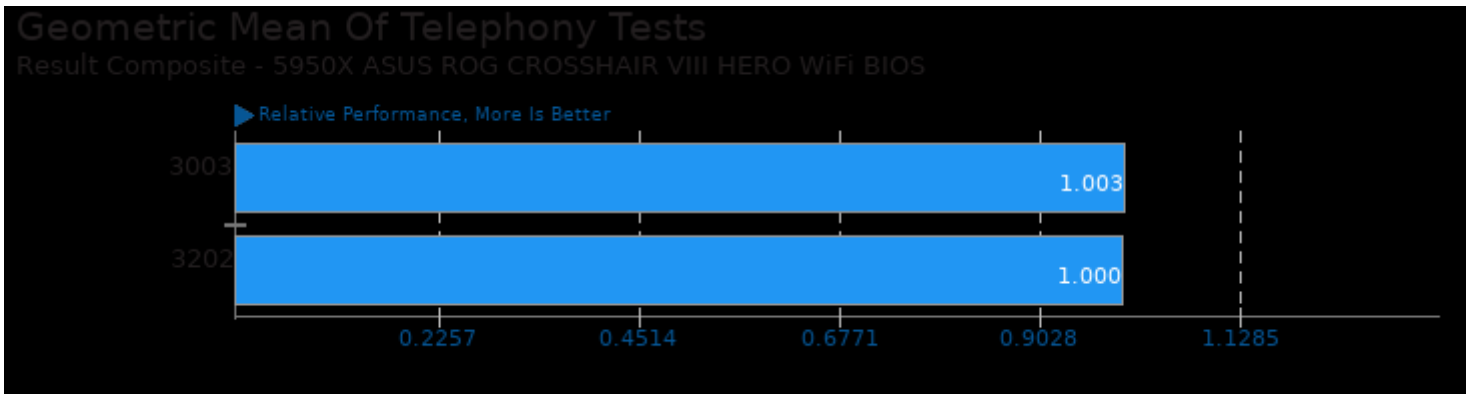
Geometric mean based upon tests: pts/cp2k, pts/namd, pts/onednn, pts/x265, pts/dav1d, pts/build-linux-kernel, pts/compress-zstd, pts/numpy and pts/phpbench



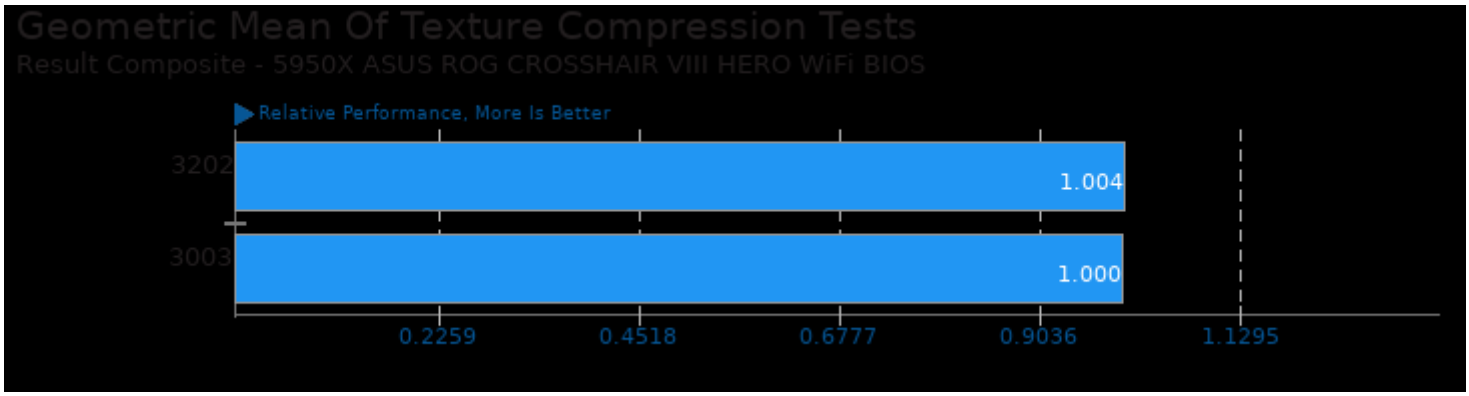
Geometric mean based upon tests: pts/numpy, pts/deepspeech, pts/espeak and pts/phpbench



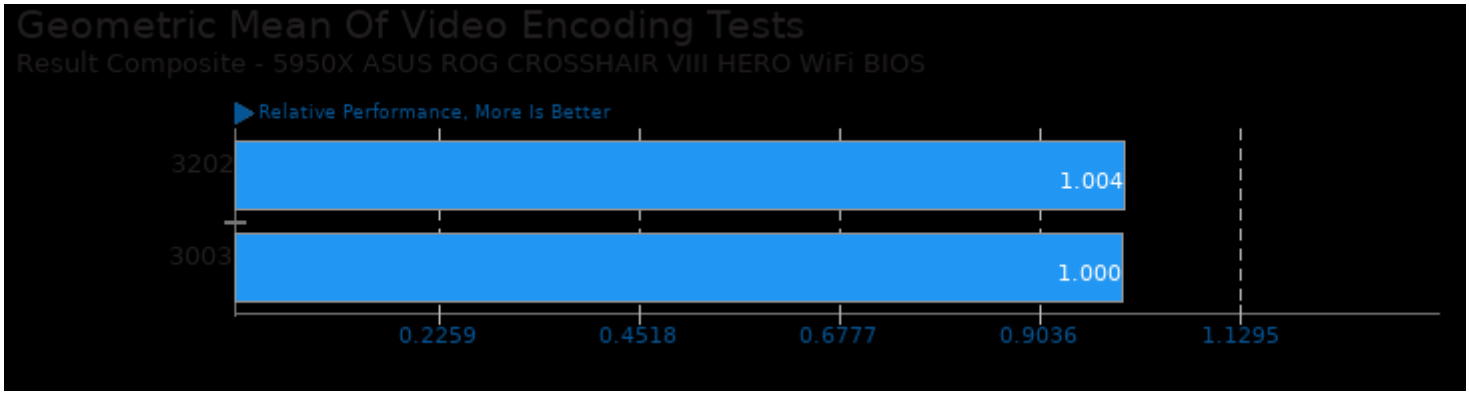
Geometric mean based upon tests: pts/espeak, pts/deepspeech, pts/rnnoise and pts/synthmark



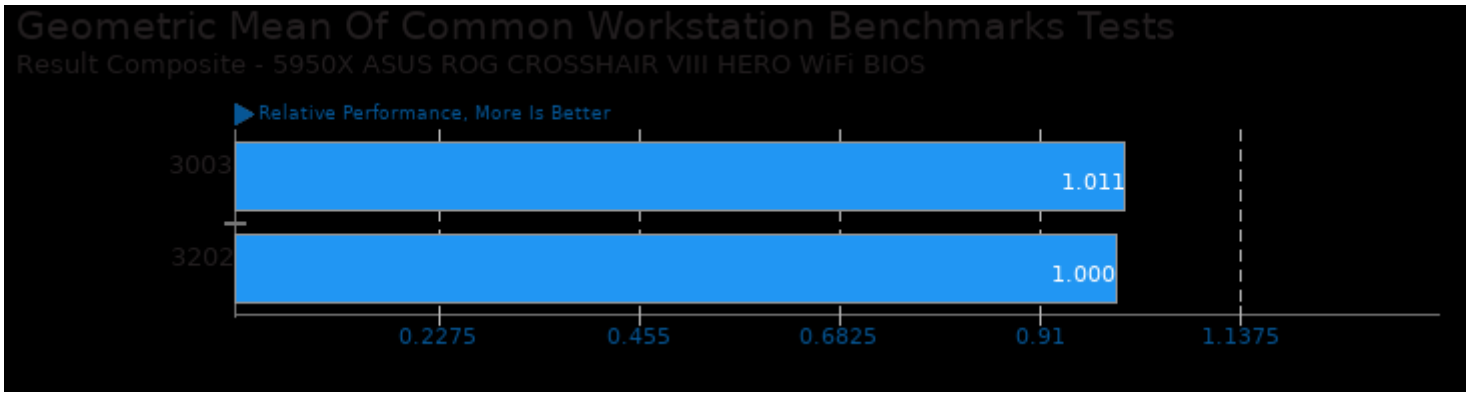
Geometric mean based upon tests: pts/espeak, pts/deepspeech, pts/rnnoise and pts/synthmark



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



Geometric mean based upon tests: pts/x265, pts/dav1d and pts/rav1e



Geometric mean based upon tests: pts/brl-cad and pts/x265

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