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# Big Comparison Core i9 10900K vs. Ryzen 9 3950X Linux Benchmarks

Tests fot a future article on Phoronix by Michael Larabel.

**Automated Executive Summary**

*Core i9 10900K had the most wins, coming in first place for 55% of the tests.*

*Based on the geometric mean of all complete results, the fastest (Ryzen 9 3950X) was 1.014x the speed of the slowest (Core i9 10900K).*

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

*ebizzy at 2.769x*
*CP2K Molecular Dynamics (Fayalite-FIST Data) at 2.639x*
*ParaView (Test: Wavelet Volume - Resolution: 3840 x 2160) at 2.487x*
*ParaView (Test: Wavelet Volume - Resolution: 3840 x 2160) at 2.486x*
*Cpuminer-Opt (Algorithm: m7m) at 2.057x*
*Parboil (Test: OpenMP CUTCP) at 2.052x*
*Mlpack Benchmark (Benchmark: scikit_linearridgeregression) at 1.985x*
*GraphicsMagick (Operation: Swirl) at 1.904x*
*BLAKE2 at 1.896x*
*Facebook RocksDB (Test: Random Fill Sync) at 1.791x.*

# Test Systems:

## Core i9 10900K

Processor: Intel Core i9-10900K @ 5.30GHz (10 Cores / 20 Threads), Motherboard: Gigabyte Z490 AORUS MASTER (F3 BIOS), Chipset: Intel Comet Lake PCH, Memory: 16GB, Disk: Samsung SSD 970 EVO 250GB, Graphics: AMD Radeon RX 5600 OEM/5600 XT / 5700/5700 8GB (2060/875MHz), Audio: Realtek ALC1220, Network: Intel Device 15f3 + Intel Wi-Fi 6 AX201

OS: Ubuntu 20.04, Kernel: 5.7.0-999-generic (x86_64) 20200519, Desktop: GNOME Shell 3.36.1, Display Server: X Server 1.20.8, Display Driver: amdgpu 19.1.0, OpenGL: 4.6 Mesa 20.0.4 (LLVM 9.0.1), Compiler: GCC 9.3.0, 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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,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
Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0xc8
Java Notes: OpenJDK Runtime Environment (build 11.0.7+10-post-Ubuntu-3ubuntu1)
Python Notes: Python 2.7.18rc1 + Python 3.8.2
Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + 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 Enhanced IBRS IBPB: conditional RSB filling + tsx_async_abort: Not affected

## Ryzen 9 3950X

Processor: AMD Ryzen 9 3950X 16-Core @ 3.50GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (1201 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: Samsung SSD 970 EVO 250GB, Graphics: AMD Radeon RX 5600 OEM/5600 XT / 5700/5700 8GB (2060/875MHz), Audio: AMD Navi 10 HDMI Audio, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.04, Kernel: 5.7.0-999-generic (x86_64) 20200519, Desktop: GNOME Shell 3.36.1, Display Server: X Server 1.20.8, Display Driver: amdgpu 19.1.0, OpenGL: 4.6 Mesa 20.0.4 (LLVM 9.0.1), Compiler: GCC 9.3.0, 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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,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
Processor Notes: Scaling Governor: acpi-cpufreq ondemand - CPU Microcode: 0x8701013
Graphics Notes: GLAMOR
Java Notes: OpenJDK Runtime Environment (build 11.0.7+10-post-Ubuntu-3ubuntu1)
Python Notes: Python 2.7.18rc1 + Python 3.8.2
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional STIBP: conditional RSB filling + tsx_async_abort: Not affected

| | Core i9 10900K | Ryzen 9 3950X |
|---|---|---|
| **IOR - Write Test (MB/s)** | 249.66 | 279.04 |
| **Normalized** | 89.47% | 100% |
| **Standard Deviation** | 0.2% | 1% |

| | | |
|---|---|---|
| **IOR - Read Test (MB/s)** | **867.37** | **1083** |
| **Normalized** | 80.06% | 100% |
| **Standard Deviation** | 4.7% | 0.1% |
| **ET: Legacy - Renderer2 - 3840 x 2160 (FPS)** | **288.5** | **255.8** |
| **Normalized** | 100% | 88.67% |
| **Standard Deviation** | 6.5% | 1.8% |
| **Tesseract - 3840 x 2160 (FPS)** | **431.0337** | **364.8969** |
| **Normalized** | 100% | 84.66% |
| **Standard Deviation** | 2.8% | 1.1% |
| **Unigine Heaven - 1920 x 1080 - Windowed - OpenGL (FPS)** | **160.184** | **158.578** |
| **Normalized** | 100% | 99% |
| **Standard Deviation** | 0.1% | 0.2% |
| **Unigine Superposition - 1920 x 1080 - Windowed - Low - OpenGL (FPS)** | **229.3** | **176.2** |
| **Normalized** | 100% | 76.84% |
| **Standard Deviation** | 0.5% | 0.1% |
| **Unigine Superposition - 1920 x 1080 - Windowed - High - OpenGL (FPS)** | **77.7** | **82.2** |
| **Normalized** | 94.53% | 100% |
| **Standard Deviation** | 0.3% | 0.1% |
| **Unigine Superposition - 1920 x 1080 - Windowed - Ultra - OpenGL (FPS)** | 34.3 | 34.3 |
| **Standard Deviation** | 0.2% | 0.2% |
| **Unigine Superposition - 1920 x 1080 - Windowed - Medium - OpenGL (FPS)** | **113.6** | **118.2** |
| **Normalized** | 96.11% | 100% |
| **Standard Deviation** | 0.8% | 0% |
| **Unigine Valley - 1920 x 1080 - Windowed - OpenGL (FPS)** | **176.703** | **160.954** |
| **Normalized** | 100% | 91.09% |
| **Standard Deviation** | 0.4% | 0.3% |
| **Xonotic - 3840 x 2160 - Low (FPS)** | **532.2734013** | **544.3905119** |
| **Normalized** | 97.77% | 100% |
| **Standard Deviation** | 0.7% | 0.5% |
| **Xonotic - 3840 x 2160 - High (FPS)** | **438.9449334** | **442.1980742** |
| **Normalized** | 99.26% | 100% |
| **Standard Deviation** | 0.5% | 0.5% |
| **Xonotic - 3840 x 2160 - Ultra (FPS)** | **398.0959725** | **393.3117643** |
| **Normalized** | 100% | 98.8% |
| **Standard Deviation** | 0.5% | 0.4% |
| **Xonotic - 3840 x 2160 - Ultimate (FPS)** | **318.7844013** | **308.6831229** |
| **Normalized** | 100% | 96.83% |
| **Standard Deviation** | 0.5% | 0.1% |
| **ParaView - Many Spheres - 3840 x 2160 (Frames / Sec)** | **63.28** | **65.30** |
| **Normalized** | 96.91% | 100% |
| **Standard Deviation** | 4.6% | 0.4% |
| **ParaView - Many Spheres - 3840 x 2160 (MiPolys /** | **6344** | **6547** |
| **Normalized** | 96.91% | 100% |
| **Standard Deviation** | 4.6% | 0.4% |
| **ParaView - Wavelet Volume - 3840 x 2160 (Frames /** | **81.60** | **202.90** |
| **Normalized** | 40.22% | 100% |
| **Standard Deviation** | 2.2% | 4.1% |

| | | |
|---|---|---|
| **ParaView - Wavelet Volume - 3840 x 2160 (MiVoxels / Sec)** | **1306** | **3246** |
| **Normalized** | 40.22% | 100% |
| **Standard Deviation** | 2.2% | 4.1% |
| **ParaView - Wavelet Contour - 3840 x 2160 (Frames / Sec)** | **188.23** | **189.67** |
| **Normalized** | 99.24% | 100% |
| **Standard Deviation** | 1.9% | 1.3% |
| **ParaView - Wavelet Contour - 3840 x 2160 (MiPolys / Sec)** | **1962** | **1977** |
| **Normalized** | 99.24% | 100% |
| **Standard Deviation** | 1.9% | 1.3% |
| **Sockperf - Throughput (Messages/sec)** | **639629** | **590729** |
| **Normalized** | 100% | 92.35% |
| **Standard Deviation** | 1.6% | 3.5% |
| **Sockperf - Latency Ping Pong (usec)** | **3.222** | **3.835** |
| **Normalized** | 100% | 84.02% |
| **Standard Deviation** | 1.3% | 2.4% |
| **Sockperf - Latency Under Load (usec)** | **17.423** | **14.949** |
| **Normalized** | 85.8% | 100% |
| **Standard Deviation** | 20.1% | 27.8% |
| **C-Blosc - blosclz (MB/s)** | **10910** | **11288** |
| **Normalized** | 96.65% | 100% |
| **Standard Deviation** | 0.3% | 0.2% |
| **IPC_benchmark - TCP Socket - 4096 (Messages/sec)** | **1575932** | **1445302** |
| **Normalized** | 100% | 91.71% |
| **Standard Deviation** | 0.5% | 0.8% |
| **IPC_benchmark - Unnamed Pipe - 4096** | **1460097** | **2268105** |
| **Normalized** | 64.38% | 100% |
| **Standard Deviation** | 0.8% | 0.6% |
| **IPC_benchmark - FIFO Named Pipe - 4096 (Messages/sec)** | **1462821** | **2260588** |
| **Normalized** | 64.71% | 100% |
| **Standard Deviation** | 0.4% | 1.3% |
| **IPC_benchmark - U.U.D.S - 4096 (Messages/sec)** | **1260891** | **1088654** |
| **Normalized** | 100% | 86.34% |
| **Standard Deviation** | 0.6% | 1.1% |
| **Crypto++ - All Algorithms (MiB/s)** | **1962** | **1784** |
| **Normalized** | 100% | 90.95% |
| **Standard Deviation** | 0% | 0.1% |
| **Crypto++ - Keyed Algorithms (MiB/s)** | **789.168824** | **697.187580** |
| **Normalized** | 100% | 88.34% |
| **Standard Deviation** | 0% | 0.3% |
| **Crypto++ - Unkeyed Algorithms (MiB/s)** | **407.907548** | **389.039005** |
| **Normalized** | 100% | 95.37% |
| **Standard Deviation** | 0% | 0.2% |
| **Crypto++ - I.E.C.P.K.A (MiB/s)** | **6378** | **5494** |
| **Normalized** | 100% | 86.15% |
| **Standard Deviation** | 0.1% | 2.5% |
| **High Performance Conjugate Gradient (GFLOP/s)** | **4.36353** | **4.58602** |
| **Normalized** | 95.15% | 100% |
| **Standard Deviation** | 0.3% | 0% |
| **NAS Parallel Benchmarks - BT.C (Mop/s)** | **26329** | **22727** |
| **Normalized** | 100% | 86.32% |
| **Standard Deviation** | 0.1% | 0.2% |

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|---|---|---|
| **NAS Parallel Benchmarks - EP.C (Mop/s)** | **1829** | **1077** |
| Normalized | 100% | 58.91% |
| Standard Deviation | 0.4% | 0.1% |
| **NAS Parallel Benchmarks - EP.D (Mop/s)** | **1792** | **1071** |
| Normalized | 100% | 59.75% |
| Standard Deviation | 2.8% | 0.2% |
| **NAS Parallel Benchmarks - FT.C (Mop/s)** | **11106** | **11558** |
| Normalized | 96.09% | 100% |
| Standard Deviation | 0.1% | 0% |
| **NAS Parallel Benchmarks - MG.C (Mop/s)** | **11256** | **10836** |
| Normalized | 100% | 96.27% |
| Standard Deviation | 0.4% | 0.1% |
| **NAS Parallel Benchmarks - SP.B (Mop/s)** | **5284** | **8390** |
| Normalized | 62.97% | 100% |
| Standard Deviation | 0.2% | 0.1% |
| **LeelaChessZero - BLAS (Nodes/s)** | **378** | **380** |
| Normalized | 99.47% | 100% |
| Standard Deviation | 0.7% | 2.9% |
| **LeelaChessZero - Eigen (Nodes/s)** | **607** | **400** |
| Normalized | 100% | 65.9% |
| Standard Deviation | 2.6% | 1.8% |
| **LeelaChessZero - Rand (Nodes/s)** | **231501** | **185500** |
| Normalized | 100% | 80.13% |
| Standard Deviation | 0.4% | 0% |
| **Parboil - OpenMP LBM (sec)** | **165.151103** | **160.964244** |
| Normalized | 97.46% | 100% |
| Standard Deviation | 0% | 0.1% |
| **Parboil - OpenMP CUTCP (sec)** | **2.718560** | **1.324664** |
| Normalized | 48.73% | 100% |
| Standard Deviation | 0.1% | 0.5% |
| **Parboil - OpenMP Stencil (sec)** | **16.403124** | **15.106023** |
| Normalized | 92.09% | 100% |
| Standard Deviation | 1.1% | 0.8% |
| **Parboil - O.M.G (sec)** | **54.937194** | **31.274319** |
| Normalized | 56.93% | 100% |
| Standard Deviation | 6.5% | 0.7% |
| **CP2K Molecular Dynamics - Fayalite-FIST Data (sec)** | **855.403** | **324.193** |
| Normalized | 37.9% | 100% |
| **Rodinia - OpenMP LavaMD (sec)** | **21.053** | **14.967** |
| Normalized | 71.09% | 100% |
| Standard Deviation | 0.8% | 0.2% |
| **Rodinia - OpenMP CFD Solver (sec)** | **18.283** | **10.914** |
| Normalized | 59.69% | 100% |
| Standard Deviation | 0.2% | 0.3% |
| **Rodinia - O.S (sec)** | **17.306** | **25.517** |
| Normalized | 100% | 67.82% |
| Standard Deviation | 0.1% | 0.3% |
| **NAMD - ATPase Simulation - 327,506 Atoms (days/ns)** | **1.20434** | **1.11719** |
| Normalized | 92.76% | 100% |
| Standard Deviation | 0.4% | 0.3% |
| **Nebular Empirical Analysis Tool (sec)** | **13.970** | **12.957** |
| Normalized | 92.75% | 100% |
| Standard Deviation | 0.1% | 0.9% |
| **Polyhedron Fortran Benchmarks - ac (sec)** | **4.34** | **5.89** |
| Normalized | 100% | 73.68% |

| | | |
|---|---|---|
| **Polyhedron Fortran Benchmarks - air (sec)** | **1.95** | **1.62** |
| Normalized | 83.08% | 100% |
| **Polyhedron Fortran Benchmarks - mdbx (sec)** | **3.87** | **4.27** |
| Normalized | 100% | 90.63% |
| **Polyhedron Fortran Benchmarks - doduc (sec)** | **6.13** | **6.56** |
| Normalized | 100% | 93.45% |
| **Polyhedron Fortran Benchmarks - linpk (sec)** | **2.31** | **3.05** |
| Normalized | 100% | 75.74% |
| **Polyhedron Fortran Benchmarks - aermod (sec)** | **4.57** | **5.49** |
| Normalized | 100% | 83.24% |
| **Polyhedron Fortran Benchmarks - rnflow (sec)** | **12.58** | **15** |
| Normalized | 100% | 83.87% |
| **Polyhedron Fortran Benchmarks - induct2 (sec)** | **14.45** | **21.35** |
| Normalized | 100% | 67.68% |
| **Polyhedron Fortran Benchmarks - protein (sec)** | **11.62** | **12.37** |
| Normalized | 100% | 93.94% |
| **Polyhedron Fortran Benchmarks - channel2 (sec)** | **43.45** | **42.71** |
| Normalized | 98.3% | 100% |
| **Polyhedron Fortran Benchmarks - fatigue2 (sec)** | **36.69** | **46.89** |
| Normalized | 100% | 78.25% |
| **Polyhedron Fortran Benchmarks - gas_dyn2 (sec)** | **39.99** | **41.78** |
| Normalized | 100% | 95.72% |
| **Polyhedron Fortran Benchmarks - test_fpu2 (sec)** | **28.67** | **26.44** |
| Normalized | 92.22% | 100% |
| **Polyhedron Fortran Benchmarks - mp_prop_design** | **49.13** | **53.27** |
| Normalized | 100% | 92.23% |
| **toyBrot Fractal Generator - TBB (ms)** | **79924** | **46547** |
| Normalized | 58.24% | 100% |
| Standard Deviation | 1.5% | 1.1% |
| **toyBrot Fractal Generator - OpenMP (ms)** | **80088** | **47670** |
| Normalized | 59.52% | 100% |
| Standard Deviation | 0% | 0.7% |
| **toyBrot Fractal Generator - C++ Tasks (ms)** | **79172** | **46370** |
| Normalized | 58.57% | 100% |
| Standard Deviation | 0.1% | 0.3% |
| **toyBrot Fractal Generator - C++ Threads (ms)** | **79413** | **46331** |
| Normalized | 58.34% | 100% |
| Standard Deviation | 0.1% | 0.3% |
| **lzbench - XZ 0 - Compression (MB/s)** | **51** | **43** |
| Normalized | 100% | 84.31% |
| Standard Deviation | | 2.7% |
| **lzbench - XZ 0 - Decompression (MB/s)** | **138** | **136** |
| Normalized | 100% | 98.55% |
| **lzbench - Zstd 1 - Compression (MB/s)** | **615** | **568** |
| Normalized | 100% | 92.36% |
| Standard Deviation | | 1.3% |
| **lzbench - Zstd 1 - Decompression (MB/s)** | **1776** | **1563** |
| Normalized | 100% | 88.01% |
| Standard Deviation | 0.3% | 1% |
| **lzbench - Zstd 8 - Compression (MB/s)** | **104** | **111** |
| Normalized | 93.69% | 100% |
| Standard Deviation | | 0.9% |
| **lzbench - Zstd 8 - Decompression (MB/s)** | **1884** | **1714** |
| Normalized | 100% | 90.98% |

| | | |
|---|---|---|
| Standard Deviation | 0.2% | 0.5% |
| lzbench - Crush 0 - Compression (MB/s) | 131 | 114 |
| Normalized | 100% | 87.02% |
| Standard Deviation | | 1% |
| lzbench - Crush 0 - Decompression (MB/s) | 612 | 529 |
| Normalized | 100% | 86.44% |
| Standard Deviation | 0.2% | 0.3% |
| lzbench - Brotli 0 - Compression (MB/s) | 543 | 555 |
| Normalized | 97.84% | 100% |
| Standard Deviation | 0.2% | 0.4% |
| lzbench - Brotli 0 - Decompression (MB/s) | 783 | 661 |
| Normalized | 100% | 84.42% |
| Standard Deviation | 0.1% | |
| lzbench - Brotli 2 - Compression (MB/s) | 233 | 222 |
| Normalized | 100% | 95.28% |
| lzbench - Brotli 2 - Decompression (MB/s) | 908 | 780 |
| Normalized | 100% | 85.9% |
| Standard Deviation | 0.1% | 0.5% |
| lzbench - Libdeflate 1 - Compression (MB/s) | 290 | 271 |
| Normalized | 100% | 93.45% |
| Standard Deviation | 0.4% | |
| lzbench - Libdeflate 1 - Decompression (MB/s) | 1482 | 1298 |
| Normalized | 100% | 87.58% |
| SMHasher - wyhash (MiB/sec) | 18893 | |
| Standard Deviation | 1.7% | |
| SMHasher - wyhash (cycles/hash) | 24.548 | |
| Standard Deviation | 0% | |
| SMHasher - MeowHash (MiB/sec) | 40765 | |
| Standard Deviation | 0.3% | |
| SMHasher - MeowHash (cycles/hash) | 51.813 | |
| Standard Deviation | 0.2% | |
| SMHasher - Spooky32 (MiB/sec) | 15361 | |
| Standard Deviation | 1.8% | |
| SMHasher - Spooky32 (cycles/hash) | 41.073 | |
| Standard Deviation | 0% | |
| SMHasher - fasthash32 (MiB/sec) | 7843 | |
| Standard Deviation | 0.1% | |
| SMHasher - fasthash32 (cycles/hash) | 31.994 | |
| Standard Deviation | 0% | |
| SMHasher - t1ha2_atonce (MiB/sec) | 17288 | |
| Standard Deviation | 0.8% | |
| SMHasher - t1ha2_atonce (cycles/hash) | 32.065 | |
| Standard Deviation | 0% | |
| SMHasher - t1ha0_aes_avx2 (MiB/sec) | 46159 | |
| Standard Deviation | 2.9% | |
| SMHasher - t1ha0_aes_avx2 (cycles/hash) | 32.315 | |
| Standard Deviation | 0.1% | |
| Algebraic Multi-Grid Benchmark (Figure Of Merit) | 23127 | 26110 |
| Normalized | 88.57% | 100% |
| Standard Deviation | 1.4% | 0% |
| FFTW - Stock - 2D FFT Size 4096 (Mflops) | 6969 | 6458 |
| Normalized | 100% | 92.66% |
| Standard Deviation | 0.6% | 0.5% |
| FFTW - Float + SSE - 2D FFT Size 4096 (Mflops) | 27489 | 21239 |

| | | |
|---|---|---|
| Normalized | 100% | 77.26% |
| Standard Deviation | 1.6% | |
| **Pennant - sedovbig (Hydro Cycle Time - sec)** | **4228** | **4298** |
| Normalized | 100% | 98.38% |
| Standard Deviation | 0.1% | 0% |
| **Pennant - leblancbig (Hydro Cycle Time - sec)** | **3918** | **4113** |
| Normalized | 100% | 95.26% |
| Standard Deviation | 0.3% | 0% |
| **Timed MrBayes Analysis - P.P.A (sec)** | **63.719** | **70.989** |
| Normalized | 100% | 89.76% |
| Standard Deviation | 0.1% | 0.6% |
| **NWChem - C240 Buckyball (sec)** | **12612** | **9795** |
| Normalized | 77.66% | 100% |
| **Timed HMMer Search - P.D.S (sec)** | **4.281** | **5.086** |
| Normalized | 100% | 84.17% |
| Standard Deviation | 0.4% | 1.6% |
| **LULESH (z/s)** | **11.960647** | **9.8209433** |
| Normalized | 100% | 82.11% |
| Standard Deviation | 1.6% | 0.1% |
| **BLAKE2 (Cycles/Byte)** | **4.03** | **7.64** |
| Normalized | 100% | 52.75% |
| Standard Deviation | 0% | 0.6% |
| **libgav1 - Chimera 1080p (FPS)** | **83.73** | **51.13** |
| Normalized | 100% | 61.07% |
| Standard Deviation | 8.7% | 0% |
| **libgav1 - Summer Nature 4K (FPS)** | **34.85** | **24.18** |
| Normalized | 100% | 69.38% |
| Standard Deviation | 1.3% | 0.2% |
| **libgav1 - S.N.1 (FPS)** | **135.37** | **78.41** |
| Normalized | 100% | 57.92% |
| Standard Deviation | 0.6% | 0.1% |
| **libgav1 - C.1.1.b (FPS)** | **31.25** | **21.19** |
| Normalized | 100% | 67.81% |
| Standard Deviation | 0.3% | 0.3% |
| **Go Benchmarks - json (ns/op)** | **3100011** | **2321631** |
| Normalized | 74.89% | 100% |
| Standard Deviation | 0.6% | 0.1% |
| **Go Benchmarks - garbage (ns/op)** | **788879** | **750702** |
| Normalized | 95.16% | 100% |
| Standard Deviation | 0.4% | 0.7% |
| **Java SciMark - Composite (Mflops)** | **3053** | **3116** |
| Normalized | 97.98% | 100% |
| Standard Deviation | 0.5% | 2% |
| **Java SciMark - Monte Carlo (Mflops)** | **1259** | **1753** |
| Normalized | 71.8% | 100% |
| Standard Deviation | 0% | 1.7% |
| **Java SciMark - F.F.T (Mflops)** | **1930** | **2134** |
| Normalized | 90.45% | 100% |
| Standard Deviation | 0.9% | 2.1% |
| **Java SciMark - S.M.M (Mflops)** | **2780** | **2784** |
| Normalized | 99.85% | 100% |
| Standard Deviation | 0.3% | 1.8% |
| **Java SciMark - D.L.M.F (Mflops)** | **7302** | **6835** |
| Normalized | 100% | 93.6% |
| Standard Deviation | 1% | 2.9% |

| | | |
|---|---|---|
| **Java SciMark - J.S.O.R (Mflops)** | **1994** | **2074** |
| Normalized | 96.15% | 100% |
| Standard Deviation | 0.1% | 1.4% |
| **Bork File Encrypter - F.E.T (sec)** | **5.124** | **8.578** |
| Normalized | 100% | 59.73% |
| Standard Deviation | 1.5% | 2.9% |
| **Java Gradle Build - Reactor (sec)** | **188.102** | **251.425** |
| Normalized | 100% | 74.81% |
| Standard Deviation | 2.8% | 4% |
| **DaCapo Benchmark - H2 (msec)** | **2615** | **3293** |
| Normalized | 100% | 79.41% |
| Standard Deviation | 8.2% | 1.7% |
| **DaCapo Benchmark - Jython (msec)** | **3319** | **4010** |
| Normalized | 100% | 82.77% |
| Standard Deviation | 0.8% | |
| **DaCapo Benchmark - Tradesoap (msec)** | **2889** | **3442** |
| Normalized | 100% | 83.93% |
| Standard Deviation | 1.4% | 1.5% |
| **DaCapo Benchmark - Tradebeans (msec)** | **2478** | **4064** |
| Normalized | 100% | 60.97% |
| Standard Deviation | 3.4% | 0.9% |
| **Renaissance - Scala Dotty (ms)** | **1339** | **1368** |
| Normalized | 100% | 97.93% |
| Standard Deviation | 2.3% | 2.3% |
| **Renaissance - Rand Forest (ms)** | **1465** | **1816** |
| Normalized | 100% | 80.72% |
| Standard Deviation | 1.8% | 4.1% |
| **Renaissance - Apache Spark ALS (ms)** | **1654** | **1950** |
| Normalized | 100% | 84.84% |
| Standard Deviation | 1.4% | 0.8% |
| **Renaissance - Apache Spark Bayes (ms)** | **1704** | **2728** |
| Normalized | 100% | 62.47% |
| Standard Deviation | 3% | 19.6% |
| **Renaissance - Savina Reactors.IO (ms)** | **15777** | **10636** |
| Normalized | 67.41% | 100% |
| Standard Deviation | 2% | 6.1% |
| **Renaissance - A.S.P (ms)** | **2895** | **3302** |
| Normalized | 100% | 87.68% |
| Standard Deviation | 2% | 6.7% |
| **Renaissance - T.H.R (ms)** | **2004** | **2094** |
| Normalized | 100% | 95.69% |
| Standard Deviation | 1.3% | 0.9% |
| **Renaissance - I.M.D.S (ms)** | **2968** | **3622** |
| Normalized | 100% | 81.95% |
| Standard Deviation | 12.2% | 1.3% |
| **Renaissance - A.U.C.T (ms)** | **9185** | **11097** |
| Normalized | 100% | 82.77% |
| Standard Deviation | 3.8% | 1.8% |
| **Renaissance - G.A.U.J.F (ms)** | **1249** | **1725** |
| Normalized | 100% | 72.43% |
| Standard Deviation | 4% | 1.8% |
| **Fhourstones - C.C.4.S (Kpos / sec)** | **17312** | **14987** |
| Normalized | 100% | 86.57% |
| Standard Deviation | 0.1% | 0.2% |
| **CacheBench - Read (MB/s)** | **4322** | **3052** |

| | | |
|---|---|---|
| Normalized | 100% | 70.62% |
| Standard Deviation | 0% | 2.9% |
| **CacheBench - Write (MB/s)** | **36212** | **31703** |
| Normalized | 100% | 87.55% |
| Standard Deviation | 0% | 0.3% |
| **CacheBench - R.M.W (MB/s)** | **55906** | **61492** |
| Normalized | 90.92% | 100% |
| Standard Deviation | 0% | 0.6% |
| **Nettle - aes256 (Mbyte/s)** | **8094** | **6114** |
| Normalized | 100% | 75.54% |
| Standard Deviation | 0% | 0.1% |
| **Nettle - chacha (Mbyte/s)** | **1360** | **992.023** |
| Normalized | 100% | 72.96% |
| Standard Deviation | 0% | 0.1% |
| **Nettle - sha512 (Mbyte/s)** | **639.74** | **640.16** |
| Normalized | 99.93% | 100% |
| Standard Deviation | 0.4% | 2.9% |
| **Nettle - poly1305-aes (Mbyte/s)** | **3726** | **2711** |
| Normalized | 100% | 72.77% |
| Standard Deviation | 0.3% | 0.2% |
| **Botan - KASUMI (MiB/s)** | **115.381** | **101.025** |
| Normalized | 100% | 87.56% |
| Standard Deviation | 0.3% | 0.3% |
| **Botan - AES-256 (MiB/s)** | **4925** | **5865** |
| Normalized | 83.98% | 100% |
| Standard Deviation | 0% | 0.1% |
| **Botan - Twofish (MiB/s)** | **446.240** | **393.003** |
| Normalized | 100% | 88.07% |
| Standard Deviation | 0.3% | 0.1% |
| **Botan - Blowfish (MiB/s)** | **556.522** | **479.252** |
| Normalized | 100% | 86.12% |
| Standard Deviation | 0.1% | 0.1% |
| **Botan - CAST-256 (MiB/s)** | **175.908** | **156.180** |
| Normalized | 100% | 88.79% |
| Standard Deviation | 0.1% | 0.2% |
| **TSCP - A.C.P (Nodes/s)** | **1623785** | **1320223** |
| Normalized | 100% | 81.31% |
| Standard Deviation | 0.5% | 0.7% |
| **John The Ripper - Blowfish (Real C/S)** | **23257** | **27740** |
| Normalized | 83.84% | 100% |
| Standard Deviation | 0% | 0.4% |
| **John The Ripper - MD5 (Real C/S)** | **1383667** | **1771667** |
| Normalized | 78.1% | 100% |
| Standard Deviation | 0% | 0.2% |
| **GraphicsMagick - Swirl (Iterations/min)** | **529** | **1007** |
| Normalized | 52.53% | 100% |
| Standard Deviation | 0.2% | 0.1% |
| **GraphicsMagick - Rotate (Iterations/min)** | **888** | **730** |
| Normalized | 100% | 82.21% |
| Standard Deviation | | 2.9% |
| **GraphicsMagick - Sharpen (Iterations/min)** | **175** | **248** |
| Normalized | 70.56% | 100% |
| Standard Deviation | | 0.2% |
| **GraphicsMagick - Enhanced (Iterations/min)** | **269** | **400** |
| Normalized | 67.25% | 100% |

| | | |
|---|---|---|
| **GraphicsMagick - Resizing (Iterations/min)** | **1266** | **1774** |
| Normalized | 71.36% | 100% |
| Standard Deviation | 0.2% | 0.2% |
| **GraphicsMagick - Noise-Gaussian (Iterations/min)** | **317** | **455** |
| Normalized | 69.67% | 100% |
| Standard Deviation | 0.2% | |
| **GraphicsMagick - HWB Color Space (Iterations/min)** | **1219** | **1507** |
| Normalized | 80.89% | 100% |
| Standard Deviation | 0.2% | 0.3% |
| **oneDNN MKL-DNN - IP Batch 1D - f32 (ms)** | **3.30905** | **4.58909** |
| Normalized | 100% | 72.11% |
| Standard Deviation | 0.6% | 0.1% |
| **oneDNN MKL-DNN - IP Batch All - f32 (ms)** | **56.9110** | **50.1698** |
| Normalized | 88.15% | 100% |
| Standard Deviation | 0.2% | 0.3% |
| **oneDNN MKL-DNN - IP Batch 1D - u8s8f32 (ms)** | **1.17466** | **1.34228** |
| Normalized | 100% | 87.51% |
| Standard Deviation | 0% | 0.2% |
| **oneDNN MKL-DNN - IP Batch All - u8s8f32 (ms)** | **19.0225** | **19.8851** |
| Normalized | 100% | 95.66% |
| Standard Deviation | 0.1% | 0.2% |
| **oneDNN MKL-DNN - D.B.d - f32 (ms)** | **3.03768** | **2.55517** |
| Normalized | 84.12% | 100% |
| Standard Deviation | 0.2% | 0.4% |
| **oneDNN MKL-DNN - D.B.d - f32 (ms)** | **4.76923** | **4.37431** |
| Normalized | 91.72% | 100% |
| Standard Deviation | 0.3% | 0.3% |
| **oneDNN MKL-DNN - D.B.d - u8s8f32 (ms)** | **121.267** | **69.5926** |
| Normalized | 57.39% | 100% |
| Standard Deviation | 9.8% | 0.1% |
| **oneDNN MKL-DNN - D.B.d - u8s8f32 (ms)** | **2.23525** | **2.63474** |
| Normalized | 100% | 84.84% |
| Standard Deviation | 0.4% | 0.2% |
| **oneDNN MKL-DNN - R.N.N.T - f32 (ms)** | **169.855** | **190.560** |
| Normalized | 100% | 89.13% |
| Standard Deviation | 0.9% | 0.3% |
| **oneDNN MKL-DNN - R.N.N.I - f32 (ms)** | **28.0154** | **26.6223** |
| Normalized | 95.03% | 100% |
| Standard Deviation | 0.1% | 0.2% |
| **dav1d - Chimera 1080p (FPS)** | **700.92** | **519.76** |
| Normalized | 100% | 74.15% |
| Standard Deviation | 0.1% | 0.5% |
| **dav1d - Summer Nature 4K (FPS)** | **177.43** | **187.35** |
| Normalized | 94.71% | 100% |
| Standard Deviation | 0.1% | 0.5% |
| **dav1d - S.N.1 (FPS)** | **671.39** | **547.69** |
| Normalized | 100% | 81.58% |
| Standard Deviation | 0.2% | 0.3% |
| **dav1d - C.1.1.b (FPS)** | **131.44** | **113.65** |
| Normalized | 100% | 86.47% |
| Standard Deviation | 0.1% | 0.4% |
| **TTSIOD 3D Renderer - P.R.W.S.S.M (FPS)** | **706.616** | **834.379** |
| Normalized | 84.69% | 100% |
| Standard Deviation | 0.2% | 0.2% |
| **AOM AV1 - Speed 0 Two-Pass (FPS)** | **0.35** | **0.34** |

| | | |
|---|---|---|
| Normalized | 100% | 97.14% |
| Standard Deviation | 1.6% | 0% |
| **AOM AV1 - Speed 4 Two-Pass (FPS)** | **2.93** | **2.71** |
| Normalized | 100% | 92.49% |
| Standard Deviation | 0.4% | 0.2% |
| **AOM AV1 - Speed 6 Realtime (FPS)** | **25.31** | **19.22** |
| Normalized | 100% | 75.94% |
| Standard Deviation | 0.8% | 0.7% |
| **AOM AV1 - Speed 6 Two-Pass (FPS)** | **4.66** | **4.16** |
| Normalized | 100% | 89.27% |
| Standard Deviation | 0.3% | 0.8% |
| **AOM AV1 - Speed 8 Realtime (FPS)** | **49.01** | **38.24** |
| Normalized | 100% | 78.02% |
| Standard Deviation | 0.5% | 1.6% |
| **Embree - Pathtracer - Crown (FPS)** | **15.4524** | **20.8580** |
| Normalized | 74.08% | 100% |
| Standard Deviation | 0.2% | 0.3% |
| **Embree - Pathtracer ISPC - Crown (FPS)** | **17.7342** | **20.0572** |
| Normalized | 88.42% | 100% |
| Standard Deviation | 0.2% | 0.8% |
| **Embree - Pathtracer - Asian Dragon (FPS)** | **17.5550** | **21.4302** |
| Normalized | 81.92% | 100% |
| Standard Deviation | 0.7% | 0.2% |
| **Embree - Pathtracer - Asian Dragon Obj (FPS)** | **16.1775** | **19.6503** |
| Normalized | 82.33% | 100% |
| Standard Deviation | 0.2% | 0.3% |
| **Embree - Pathtracer ISPC - Asian Dragon (FPS)** | **20.5126** | **21.3600** |
| Normalized | 96.03% | 100% |
| Standard Deviation | 0.7% | 0.2% |
| **Embree - Pathtracer ISPC - Asian Dragon Obj (FPS)** | **18.2419** | **19.0858** |
| Normalized | 95.58% | 100% |
| Standard Deviation | 0.2% | 0.2% |
| **rav1e - 1 (FPS)** | **0.205** | **0.193** |
| Normalized | 100% | 94.15% |
| Standard Deviation | 0% | 0.3% |
| **rav1e - 5 (FPS)** | **0.670** | **0.626** |
| Normalized | 100% | 93.43% |
| Standard Deviation | 0.1% | 0.1% |
| **rav1e - 6 (FPS)** | **1.622** | **1.497** |
| Normalized | 100% | 92.29% |
| Standard Deviation | 0.1% | 0.1% |
| **rav1e - 10 (FPS)** | **3.460** | **3.241** |
| Normalized | 100% | 93.67% |
| Standard Deviation | 0.2% | 0.2% |
| **VP9 libvpx Encoding - Speed 0 (FPS)** | **8.20** | **7.79** |
| Normalized | 100% | 95% |
| Standard Deviation | 0.6% | 0.1% |
| **VP9 libvpx Encoding - Speed 5 (FPS)** | **30.43** | **25.53** |
| Normalized | 100% | 83.9% |
| Standard Deviation | 0.3% | 0.4% |
| **x264 - H.2.V.E (FPS)** | **126.49** | **159.92** |
| Normalized | 79.1% | 100% |
| Standard Deviation | 2.9% | 2.9% |
| **x265 - H.2.1.V.E (FPS)** | **72.38** | **62.85** |
| Normalized | 100% | 86.83% |

| | | |
|---|---|---|
| Standard Deviation | 1% | 0.8% |
| **ACES DGEMM - S.F.P.R (GFLOP/s)** | **5.351115** | **5.537606** |
| Normalized | 96.63% | 100% |
| Standard Deviation | 1% | 5.3% |
| **Intel Open Image Denoise - Memorial (Images / Sec)** | **11.12** | **12.73** |
| Normalized | 87.35% | 100% |
| Standard Deviation | 0% | 0.3% |
| **OpenVKL - vklBenchmark (Items / Sec)** | **192.83** | **234.25** |
| Normalized | 82.32% | 100% |
| Standard Deviation | 0.4% | 0.2% |
| **Coremark - CoreMark Size 666 - I.P.S (Iterations/Sec)** | **517909** | **711755** |
| Normalized | 72.77% | 100% |
| Standard Deviation | 0.4% | 0.2% |
| **LuxCoreRender - DLSC (M samples/sec)** | **2.19** | **3.29** |
| Normalized | 66.57% | 100% |
| Standard Deviation | 2% | 1.3% |
| **LuxCoreRender - R.C.a.P (M samples/sec)** | **2.47** | **3.56** |
| Normalized | 69.38% | 100% |
| Standard Deviation | 0.4% | 0.1% |
| **Himeno Benchmark - P.P.S (MFLOPS)** | **4395** | **4966** |
| Normalized | 88.49% | 100% |
| Standard Deviation | 0.1% | 2.8% |
| **7-Zip Compression - C.S.T (MIPS)** | **65002** | **90026** |
| Normalized | 72.2% | 100% |
| Standard Deviation | 0.6% | 0.7% |
| **Stockfish - Total Time (Nodes/s)** | **35260191** | **50373394** |
| Normalized | 70% | 100% |
| Standard Deviation | 1.7% | 0.5% |
| **asmFish - 1.H.M.2.D (Nodes/s)** | **39969419** | **51867171** |
| Normalized | 77.06% | 100% |
| Standard Deviation | 3% | 0.6% |
| **Swet - Average (Operations/sec)** | **972233554** | **816912713** |
| Normalized | 100% | 84.02% |
| Standard Deviation | 0.3% | 1.9% |
| **ebizzy (Records/s)** | **495906** | **1373026** |
| Normalized | 36.12% | 100% |
| Standard Deviation | 2.9% | 0.8% |
| **Timed Apache Compilation - Time To Compile (sec)** | **17.907** | **20.240** |
| Normalized | 100% | 88.47% |
| Standard Deviation | 0.2% | 0.4% |
| **Timed FFmpeg Compilation - Time To Compile (sec)** | **46.059** | **35.442** |
| Normalized | 76.95% | 100% |
| Standard Deviation | 1.1% | 1% |
| **Timed GCC Compilation - Time To Compile (sec)** | **716.255** | **731.029** |
| Normalized | 100% | 97.98% |
| Standard Deviation | 0.2% | 0.3% |
| **Timed GDB GNU Debugger Compilation - Time To Compile (sec)** | **77.059** | **88.759** |
| Normalized | 100% | 86.82% |
| Standard Deviation | 0.2% | 0.1% |
| **Timed ImageMagick Compilation - Time To Compile** | **25.033** | **20.860** |
| Normalized | 83.33% | 100% |
| Standard Deviation | 0.8% | 0.1% |
| **Timed Linux Kernel Compilation - Time To Compile** | **61.708** | **45.114** |
| Normalized | 73.11% | 100% |

| | | |
|---|---|---|
| Standard Deviation | 0.9% | 2.9% |
| **Timed LLVM Compilation - Time To Compile (sec)** | **505.431** | **365.636** |
| Normalized | 72.34% | 100% |
| Standard Deviation | 1.1% | 0.4% |
| **Timed MPlayer Compilation - Time To Compile (sec)** | **29.273** | **20.967** |
| Normalized | 71.63% | 100% |
| Standard Deviation | 0.2% | 0.3% |
| **Timed PHP Compilation - Time To Compile (sec)** | **47.704** | **42.697** |
| Normalized | 89.5% | 100% |
| Standard Deviation | 0.8% | 0.9% |
| **Build2 - Time To Compile (sec)** | **84.939** | **70.665** |
| Normalized | 83.19% | 100% |
| Standard Deviation | 1.6% | 1.8% |
| **C-Ray - Total Time - 4.1.R.P.P (sec)** | **52.130** | **31.594** |
| Normalized | 60.61% | 100% |
| Standard Deviation | 0% | 0.1% |
| **Parallel BZIP2 Compression - 2.F.C (sec)** | 3.118 | |
| Standard Deviation | 2.5% | |
| **Primesieve - 1.P.N.G (sec)** | **17.181** | **11.821** |
| Normalized | 68.8% | 100% |
| Standard Deviation | 0.6% | 0.6% |
| **Smallpt - G.I.R.1.S (sec)** | **7.852** | **5.237** |
| Normalized | 66.7% | 100% |
| Standard Deviation | 0.1% | 0.1% |
| **Tungsten Renderer - Hair (sec)** | **20.2258** | **13.6067** |
| Normalized | 67.27% | 100% |
| Standard Deviation | 0.4% | 0.2% |
| **Tungsten Renderer - Water Caustic (sec)** | **23.6946** | **21.3900** |
| Normalized | 90.27% | 100% |
| Standard Deviation | 0.6% | 0.5% |
| **Tungsten Renderer - Non-Exponential (sec)** | **5.14902** | **4.40751** |
| Normalized | 85.6% | 100% |
| Standard Deviation | 0.2% | 0.4% |
| **Tungsten Renderer - Volumetric Caustic (sec)** | **6.98866** | **5.53479** |
| Normalized | 79.2% | 100% |
| Standard Deviation | 0.3% | 1.6% |
| **YafaRay - T.T.F.S.S (sec)** | **108.878** | **81.477** |
| Normalized | 74.83% | 100% |
| Standard Deviation | 0.1% | 0.9% |
| **rays1bench - Large Scene (mrays/s)** | **81.82** | **108.20** |
| Normalized | 75.62% | 100% |
| Standard Deviation | 0% | 0.1% |
| **Numpy Benchmark (Score)** | **444.12** | **414.61** |
| Normalized | 100% | 93.36% |
| Standard Deviation | 1.3% | 1.4% |
| **AOBench - 2048 x 2048 - Total Time (sec)** | **27.170** | **31.131** |
| Normalized | 100% | 87.28% |
| Standard Deviation | 0.2% | 0.6% |
| **Bullet Physics Engine - Raytests (sec)** | **2.043963** | **2.084161** |
| Normalized | 100% | 98.07% |
| Standard Deviation | 0.4% | 0.4% |
| **Bullet Physics Engine - 3000 Fall (sec)** | **3.359547** | **3.367286** |
| Normalized | 100% | 99.77% |
| Standard Deviation | 1.1% | 0.4% |
| **Bullet Physics Engine - 1000 Stack (sec)** | **3.810223** | **4.047731** |

| | | |
|---|---|---|
| Normalized | 100% | 94.13% |
| Standard Deviation | 0.4% | 0.5% |
| **Bullet Physics Engine - 1000 Convex (sec)** | **3.584657** | **3.745295** |
| Normalized | 100% | 95.71% |
| Standard Deviation | 0.1% | 0.4% |
| **Bullet Physics Engine - 136 Ragdolls (sec)** | **2.233182** | **2.150808** |
| Normalized | 96.31% | 100% |
| Standard Deviation | 0.8% | 0.4% |
| **Bullet Physics Engine - Prim Trimesh (sec)** | **0.782503** | **0.788758** |
| Normalized | 100% | 99.21% |
| Standard Deviation | 0.9% | 0.4% |
| **Bullet Physics Engine - Convex Trimesh (sec)** | **0.937118** | **0.943135** |
| Normalized | 100% | 99.36% |
| Standard Deviation | 0.8% | 0.5% |
| **Gzip Compression - L.S.T.A.T.t.g (sec)** | **28.833** | **33.392** |
| Normalized | 100% | 86.35% |
| Standard Deviation | 2.7% | 3.3% |
| **XZ Compression - C.u.1.0.3.s.i.i.C.L.9 (sec)** | **22.326** | **24.112** |
| Normalized | 100% | 92.59% |
| Standard Deviation | 0.5% | 0.3% |
| **Zstd Compression - C.u.1.0.3.s.i.i.C.L.1 (sec)** | **21.925** | **15.514** |
| Normalized | 70.76% | 100% |
| Standard Deviation | 0.2% | 0.7% |
| **Cython benchmark (sec)** | **35.064** | **38.658** |
| Normalized | 100% | 90.7% |
| Standard Deviation | 0.6% | 1.2% |
| **DeepSpeech - CPU (sec)** | **78.36647** | **64.61712** |
| Normalized | 82.46% | 100% |
| Standard Deviation | 1.9% | 0.8% |
| **FLAC Audio Encoding - WAV To FLAC (sec)** | **7.699** | **8.250** |
| Normalized | 100% | 93.32% |
| Standard Deviation | 2.6% | 3.4% |
| **LAME MP3 Encoding - WAV To MP3 (sec)** | **6.974** | **6.954** |
| Normalized | 99.71% | 100% |
| Standard Deviation | 0.2% | 2.3% |
| **FFmpeg - H.2.H.T.N.D (sec)** | **4.562** | **7.197** |
| Normalized | 100% | 63.39% |
| Standard Deviation | 2.1% | 1.5% |
| **GnuPG - 2.F.E (sec)** | **7.949** | **11.194** |
| Normalized | 100% | 71.01% |
| Standard Deviation | 0.4% | 1.9% |
| **Hackbench - 1 - Thread (sec)** | **2.245** | **3.016** |
| Normalized | 100% | 74.44% |
| Standard Deviation | 0.5% | 1.1% |
| **Hackbench - 1 - Process (sec)** | **2.029** | **2.711** |
| Normalized | 100% | 74.84% |
| Standard Deviation | 0.2% | 1.8% |
| **Hackbench - 32 - Process (sec)** | **49.161** | **54.263** |
| Normalized | 100% | 90.6% |
| Standard Deviation | 0.2% | 2.7% |
| **m-queens - Time To Solve (sec)** | **59.649** | **34.304** |
| Normalized | 57.51% | 100% |
| Standard Deviation | 0% | 0.1% |
| **Minion - Graceful (sec)** | **41.961286** | **39.558481** |
| Normalized | 94.27% | 100% |

| | | |
|---|---|---|
| Standard Deviation | 0.1% | 0.5% |
| **Minion - Solitaire (sec)** | **55.284448** | **57.688167** |
| Normalized | 100% | 95.83% |
| Standard Deviation | 0.2% | 0.1% |
| **Minion - Quasigroup (sec)** | **93.440554** | **101.658951** |
| Normalized | 100% | 91.92% |
| Standard Deviation | 0.2% | 0.6% |
| **N-Queens - Elapsed Time (sec)** | **10.350** | **6.760** |
| Normalized | 65.31% | 100% |
| Standard Deviation | 0% | 0.2% |
| **Perl Benchmarks - Pod2html (sec)** | **0.09327881** | **0.11237626** |
| Normalized | 100% | 83.01% |
| Standard Deviation | 0.4% | 0.9% |
| **Perl Benchmarks - Interpreter (sec)** | **0.00066725** | **0.00069115** |
| Normalized | 100% | 96.54% |
| Standard Deviation | 1.4% | 1.9% |
| **Radiance Benchmark - Serial (sec)** | **577.884** | **538.599** |
| Normalized | 93.2% | 100% |
| **Radiance Benchmark - SMP Parallel (sec)** | **182.363** | **170.288** |
| Normalized | 93.38% | 100% |
| **Tachyon - Total Time (sec)** | **65.7816** | **46.0091** |
| Normalized | 69.94% | 100% |
| Standard Deviation | 0.1% | 0.3% |
| **OpenSSL - R.4.b.P (Signs/sec)** | **3756** | **4707** |
| Normalized | 79.79% | 100% |
| Standard Deviation | 0.1% | 0.1% |
| **Aircrack-ng (k/s)** | **45912** | **58218** |
| Normalized | 78.86% | 100% |
| Standard Deviation | 0% | 0.1% |
| **Cpuminer-Opt - m7m (kH/s - Hash Speed)** | **407.75** | **838.57** |
| Normalized | 48.62% | 100% |
| Standard Deviation | 0.1% | 0.3% |
| **Cpuminer-Opt - deep (kH/s - Hash Speed)** | **12397** | **15150** |
| Normalized | 81.83% | 100% |
| Standard Deviation | 0% | 0.1% |
| **Cpuminer-Opt - lbry (kH/s - Hash Speed)** | **38917** | **46910** |
| Normalized | 82.96% | 100% |
| Standard Deviation | 0.1% | 0.7% |
| **Cpuminer-Opt - skein (kH/s - Hash Speed)** | **45343** | **54471** |
| Normalized | 83.24% | 100% |
| Standard Deviation | 0.5% | 2.9% |
| **Cpuminer-Opt - myr-gr (kH/s - Hash Speed)** | **17627** | **9899** |
| Normalized | 100% | 56.16% |
| Standard Deviation | 0.1% | 10.6% |
| **Cpuminer-Opt - sha256t (kH/s - Hash Speed)** | **102523** | **119460** |
| Normalized | 85.82% | 100% |
| Standard Deviation | 1.8% | 2.6% |
| **Core-Latency - A.L.B.C.C (ns)** | **97.21** | **152.54** |
| Normalized | 100% | 63.73% |
| **Multichase Pointer Chaser - 4.A.6.B.S (ns)** | **5.206** | **4.720** |
| Normalized | 90.66% | 100% |
| Standard Deviation | 0.1% | 0.3% |
| **Multichase Pointer Chaser - 1.A.2.B.S (ns)** | **44.604** | **67.366** |
| Normalized | 100% | 66.21% |
| Standard Deviation | 0.2% | 0.1% |

| | | |
|---|---|---|
| **Multichase Pointer Chaser - 2.A.2.B.S (ns)** | **41.813** | **67.194** |
| **Normalized** | 100% | 62.23% |
| **Standard Deviation** | 0.1% | 0.3% |
| **Multichase Pointer Chaser - 1.A.2.B.S.2.T (ns)** | **46.168** | **67.811** |
| **Normalized** | 100% | 68.08% |
| **Standard Deviation** | 0.2% | 0% |
| **Multichase Pointer Chaser - 1.A.2.B.S.4.T (ns)** | **50.128** | **70.200** |
| **Normalized** | 100% | 71.41% |
| **Standard Deviation** | 0% | 0.1% |
| **ASKAP - tConvolve MT - Gridding (Million Grid Points/sec)** | **1142** | **874.050** |
| **Normalized** | 100% | 76.52% |
| **Standard Deviation** | 0% | 0.3% |
| **ASKAP - tConvolve MT - Degridding (Million Grid Points/sec)** | **1946** | **1618** |
| **Normalized** | 100% | 83.12% |
| **Standard Deviation** | 0.1% | 0.2% |
| **ASKAP - tConvolve MPI - Gridding (Million Grid Points/sec)** | **1161** | **892.666** |
| **Normalized** | 100% | 76.88% |
| **Standard Deviation** | 0.2% | 0% |
| **ASKAP - tConvolve MPI - Degridding (Million Grid Points/sec)** | **1953** | **1657** |
| **Normalized** | 100% | 84.84% |
| **Standard Deviation** | 0.1% | 0.1% |
| **ASKAP - tConvolve OpenMP - Gridding (Million Grid Points/sec)** | **1307** | **1165** |
| **Normalized** | 100% | 89.09% |
| **Standard Deviation** | 0.8% | 2% |
| **ASKAP - tConvolve OpenMP - Degridding (Million Grid Points/sec)** | **2165** | **1925** |
| **Normalized** | 100% | 88.91% |
| **Standard Deviation** | 0.8% | 0.4% |
| **libjpeg-turbo tjbench - D.T (Megapixels/sec)** | **237.108141** | **221.087385** |
| **Normalized** | 100% | 93.24% |
| **Standard Deviation** | 0.2% | 0.2% |
| **GROMACS - Water Benchmark (Ns/Day)** | **0.978** | **1.236** |
| **Normalized** | 79.13% | 100% |
| **Standard Deviation** | 0.1% | 0.2% |
| **G'MIC - P.I.O.A.3.V.1.T (sec)** | **16.006** | **18.735** |
| **Normalized** | 100% | 85.43% |
| **Standard Deviation** | 1.3% | 3% |
| **Basis Universal - ETC1S (sec)** | **42.177** | **42.788** |
| **Normalized** | 100% | 98.57% |
| **Standard Deviation** | 0.5% | 0.7% |
| **Basis Universal - UASTC Level 0 (sec)** | **6.514** | **7.197** |
| **Normalized** | 100% | 90.51% |
| **Standard Deviation** | 1.1% | 1% |
| **Basis Universal - UASTC Level 2 (sec)** | **25.170** | **19.048** |
| **Normalized** | 75.68% | 100% |
| **Standard Deviation** | 0.4% | 0.4% |
| **Basis Universal - UASTC Level 3 (sec)** | **46.509** | **32.607** |
| **Normalized** | 70.11% | 100% |
| **Standard Deviation** | 0% | 0.3% |

| | | |
|---|---|---|
| **Basis Universal - U.L.2.R.P.P (sec)** | **573.950** | **587.383** |
| Normalized | 100% | 97.71% |
| Standard Deviation | 0.1% | 0.2% |
| **SQLite Speedtest - Timed Time - Size 1,000 (sec)** | **44.924** | **58.132** |
| Normalized | 100% | 77.28% |
| Standard Deviation | 0.1% | 1.1% |
| **GEGL - Crop (sec)** | **6.764** | **7.538** |
| Normalized | 100% | 89.73% |
| Standard Deviation | 1.4% | 1.7% |
| **GEGL - Scale (sec)** | **4.822** | **5.042** |
| Normalized | 100% | 95.64% |
| Standard Deviation | 2% | 0.5% |
| **GEGL - Cartoon (sec)** | **78.938** | **89.855** |
| Normalized | 100% | 87.85% |
| Standard Deviation | 1.1% | 1.1% |
| **GEGL - Reflect (sec)** | **25.416** | **29.718** |
| Normalized | 100% | 85.52% |
| Standard Deviation | 0.2% | 1.8% |
| **GEGL - Antialias (sec)** | **32.111** | **37.298** |
| Normalized | 100% | 86.09% |
| Standard Deviation | 0.8% | 0.6% |
| **GEGL - Tile Glass (sec)** | **24.658** | **29.061** |
| Normalized | 100% | 84.85% |
| Standard Deviation | 0.1% | 0.5% |
| **GEGL - Wavelet Blur (sec)** | **52.123** | **61.585** |
| Normalized | 100% | 84.64% |
| Standard Deviation | 0.3% | 1.2% |
| **GEGL - Color Enhance (sec)** | **50.055** | **54.906** |
| Normalized | 100% | 91.16% |
| Standard Deviation | 1.2% | 0.4% |
| **GEGL - Rotate 90 Degrees (sec)** | **32.369** | **37.640** |
| Normalized | 100% | 86% |
| Standard Deviation | 1.2% | 0.6% |
| **GIMP - resize (sec)** | **6.135** | **6.689** |
| Normalized | 100% | 91.72% |
| Standard Deviation | 1% | 1.7% |
| **GIMP - rotate (sec)** | **9.573** | **10.542** |
| Normalized | 100% | 90.81% |
| Standard Deviation | 0.5% | 0.7% |
| **GIMP - auto-levels (sec)** | **9.693** | **11.692** |
| Normalized | 100% | 82.9% |
| Standard Deviation | 0.3% | 0.4% |
| **GIMP - unsharp-mask (sec)** | **11.946** | **14.776** |
| Normalized | 100% | 80.85% |
| Standard Deviation | 0.1% | 0.5% |
| **LibreOffice - 2.D.T.P (sec)** | **6.403** | **6.605** |
| Normalized | 100% | 96.94% |
| Standard Deviation | 2.7% | 2.7% |
| **RawTherapee - T.B.T (sec)** | **53.309** | **52.809** |
| Normalized | 99.06% | 100% |
| Standard Deviation | 0.2% | 0.1% |
| **Redis - LPOP (Reqs/sec)** | **3942561** | **2716045** |
| Normalized | 100% | 68.89% |
| Standard Deviation | 1.2% | 2.5% |
| **Redis - SADD (Reqs/sec)** | **3071108** | **2357410** |

| | | |
|---|---|---|
| Normalized | 100% | 76.76% |
| Standard Deviation | 6.3% | 2.2% |
| **Redis - LPUSH (Reqs/sec)** | **2289561** | **1666745** |
| Normalized | 100% | 72.8% |
| Standard Deviation | 2.8% | 4.5% |
| **Redis - GET (Reqs/sec)** | **3788205** | **2609128** |
| Normalized | 100% | 68.88% |
| Standard Deviation | 1.1% | 2.8% |
| **Redis - SET (Reqs/sec)** | **2770463** | **1992291** |
| Normalized | 100% | 71.91% |
| Standard Deviation | 1.4% | 5.4% |
| **Stress-NG - Atomic (Bogo Ops/s)** | **230445** | **747139** |
| Normalized | 30.84% | 100% |
| Standard Deviation | 13.5% | 0.3% |
| **Stress-NG - Crypto (Bogo Ops/s)** | **2678** | **4744** |
| Normalized | 56.45% | 100% |
| Standard Deviation | 0.1% | 0.3% |
| **Stress-NG - CPU Cache (Bogo Ops/s)** | **22.76** | **37.15** |
| Normalized | 61.27% | 100% |
| Standard Deviation | 0.6% | 4.7% |
| **Stress-NG - CPU Stress (Bogo Ops/s)** | **4731** | **6621** |
| Normalized | 71.46% | 100% |
| Standard Deviation | 0.3% | 0.2% |
| **Stress-NG - Matrix Math (Bogo Ops/s)** | **62671** | **77934** |
| Normalized | 80.42% | 100% |
| Standard Deviation | 2.8% | 0.8% |
| **Stress-NG - Vector Math (Bogo Ops/s)** | **94531** | **148737** |
| Normalized | 63.56% | 100% |
| Standard Deviation | 0% | 0.1% |
| **Stress-NG - Socket Activity (Bogo Ops/s)** | **8782** | **11945** |
| Normalized | 73.52% | 100% |
| Standard Deviation | 1.5% | 0.8% |
| **Stress-NG - Context Switching (Bogo Ops/s)** | **5661608** | **7734524** |
| Normalized | 73.2% | 100% |
| Standard Deviation | 0.8% | 2.7% |
| **PlaidML - No - Inference - VGG16 - CPU (FPS)** | **19.28** | **23.31** |
| Normalized | 82.71% | 100% |
| Standard Deviation | 0.9% | 1.4% |
| **PlaidML - No - Inference - VGG19 - CPU (FPS)** | **16.09** | **19.19** |
| Normalized | 83.85% | 100% |
| Standard Deviation | 0.7% | 1% |
| **PlaidML - No - Inference - Mobilenet - CPU (FPS)** | **17.18** | **17.28** |
| Normalized | 99.42% | 100% |
| Standard Deviation | 1.1% | 1% |
| **PlaidML - No - Inference - ResNet 50 - CPU (FPS)** | **7.38** | **7.34** |
| Normalized | 100% | 99.46% |
| Standard Deviation | 0.6% | 1.1% |
| **PlaidML - No - Inference - DenseNet 201 - CPU (FPS)** | **3.35** | **3.87** |
| Normalized | 86.56% | 100% |
| Standard Deviation | 0.5% | 1.1% |
| **PlaidML - No - Inference - Inception V3 - CPU (FPS)** | **9.23** | **11.21** |
| Normalized | 82.34% | 100% |
| Standard Deviation | 0.4% | 0.4% |
| **ctx_clock - C.S.T (Clocks)** | **144** | **140** |
| Normalized | 97.22% | 100% |

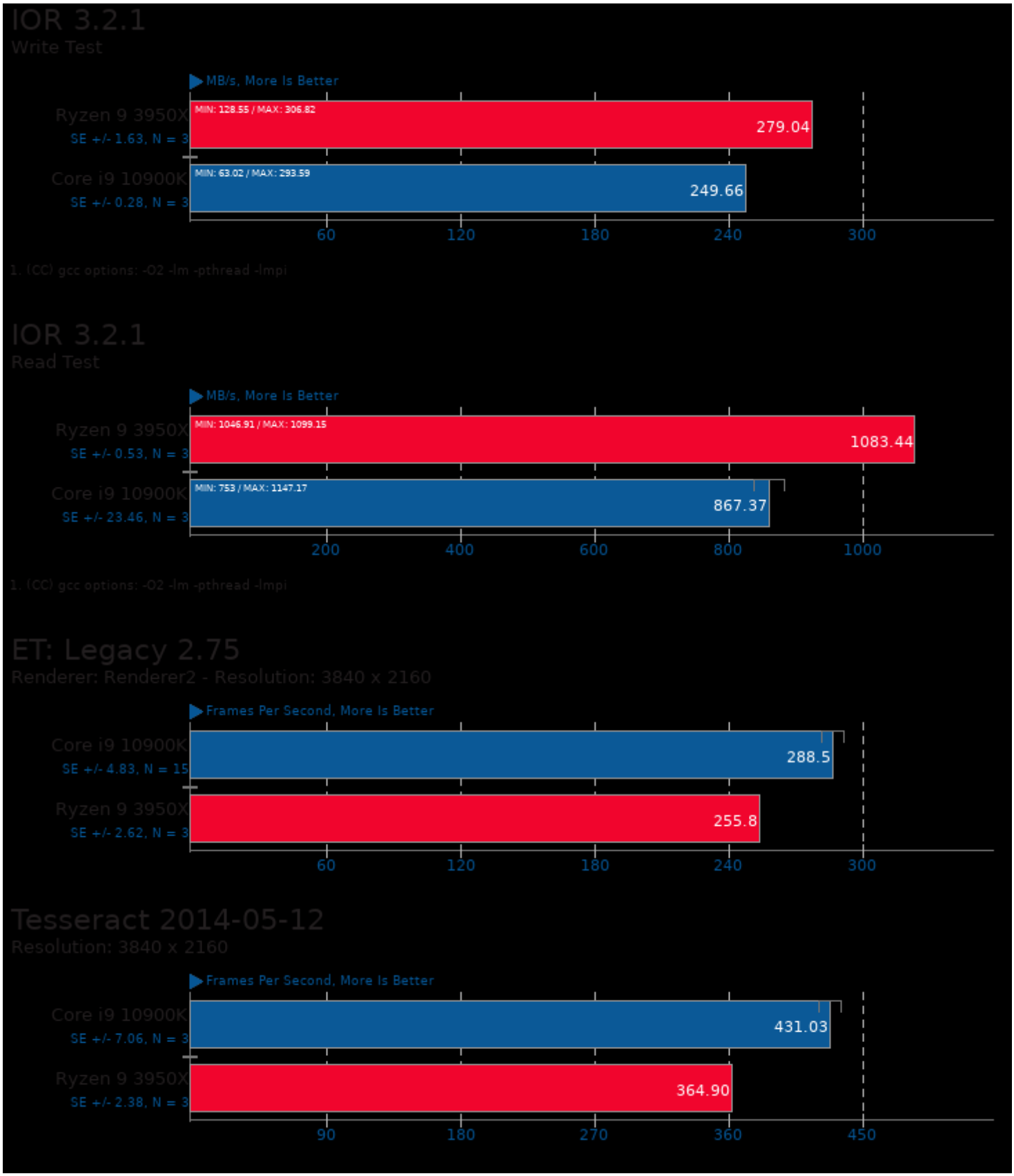
| | | |
|---|---|---|
| **Sysbench - CPU (Events/sec)** | **27066** | **34951** |
| Normalized | 77.44% | 100% |
| Standard Deviation | 0% | 0.1% |
| **Basemark GPU - OpenGL - 3840 x 2160 - High (FPS)** | **59.64** | **73.68** |
| Normalized | 80.94% | 100% |
| Standard Deviation | 0.9% | 0.4% |
| **Basemark GPU - Vulkan - 3840 x 2160 - High (FPS)** | **81.93** | **80.95** |
| Normalized | 100% | 98.8% |
| Standard Deviation | 0.2% | 0.1% |
| **Basemark GPU - OpenGL - 3840 x 2160 - Medium** | **304.94** | **187.04** |
| Normalized | 100% | 61.34% |
| Standard Deviation | 1.4% | 2.6% |
| **Basemark GPU - Vulkan - 3840 x 2160 - Medium (FPS)** | **404.07** | **415.32** |
| Normalized | 97.29% | 100% |
| Standard Deviation | 0.1% | 0.3% |
| **Optcarrot - O.B (FPS)** | **180.40** | **141.62** |
| Normalized | 100% | 78.5% |
| Standard Deviation | 0.3% | 1.3% |
| **IndigoBench - Bedroom (M samples/s)** | **1.894** | **2.669** |
| Normalized | 70.96% | 100% |
| Standard Deviation | 0.2% | 0.3% |
| **IndigoBench - Supercar (M samples/s)** | **4.435** | **5.660** |
| Normalized | 78.36% | 100% |
| Standard Deviation | 0.1% | 0.1% |
| **Facebook RocksDB - Rand Fill (Op/s)** | **656303** | **680458** |
| Normalized | 96.45% | 100% |
| Standard Deviation | 16.3% | 15.2% |
| **Facebook RocksDB - Rand Read (Op/s)** | **68514144** | **95962407** |
| Normalized | 71.4% | 100% |
| Standard Deviation | 0.2% | 1.1% |
| **Facebook RocksDB - Seq Fill (Op/s)** | **1431900** | **1292441** |
| Normalized | 100% | 90.26% |
| Standard Deviation | 0.4% | 0.5% |
| **Facebook RocksDB - Rand Fill Sync (Op/s)** | **2875** | **5148** |
| Normalized | 55.85% | 100% |
| Standard Deviation | 1.5% | 3.4% |
| **Facebook RocksDB - Read While Writing (Op/s)** | **2911882** | **3615702** |
| Normalized | 80.53% | 100% |
| Standard Deviation | 3.1% | 2.1% |
| **Blender - BMW27 - CPU-Only (sec)** | **114.39** | **84.77** |
| Normalized | 74.11% | 100% |
| Standard Deviation | 0.3% | 0.2% |
| **Blender - Classroom - CPU-Only (sec)** | **338.66** | **226.13** |
| Normalized | 66.77% | 100% |
| Standard Deviation | 0.2% | 0.1% |
| **Blender - Fishy Cat - CPU-Only (sec)** | **179.55** | **123.52** |
| Normalized | 68.79% | 100% |
| Standard Deviation | 0.2% | 0.1% |
| **Blender - Barbershop - CPU-Only (sec)** | **473.60** | **342.25** |
| Normalized | 72.27% | 100% |
| Standard Deviation | 0.1% | 0.1% |
| **Blender - Pabellon Barcelona - CPU-Only (sec)** | **426.20** | **285.86** |
| Normalized | 67.07% | 100% |
| Standard Deviation | 0.2% | 0.1% |
| **Xsbench (Lookups/s)** | **2639580** | **2653413** |

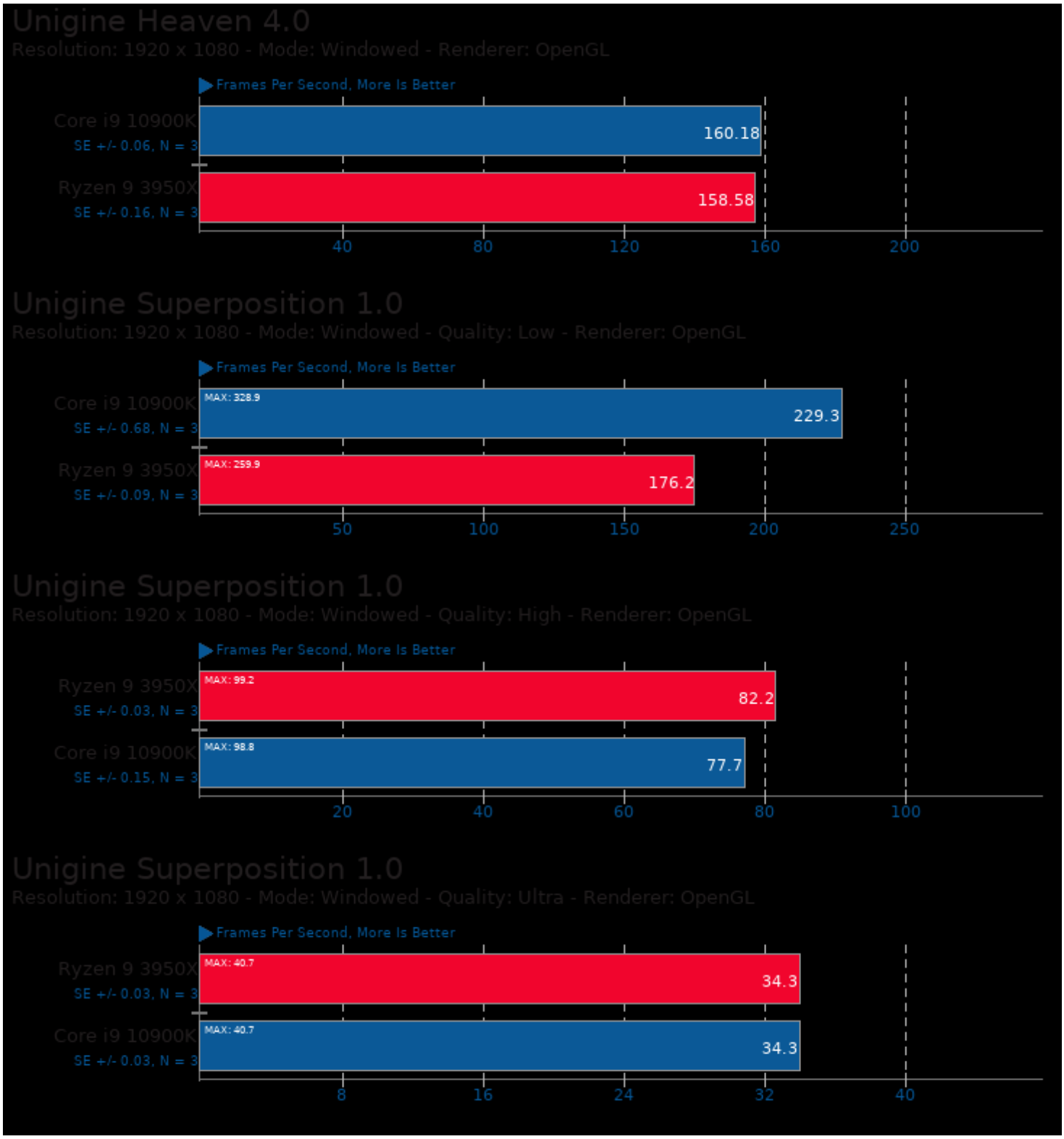
| | | |
|---|---|---|
| Normalized | 99.48% | 100% |
| Standard Deviation | 0% | 0.1% |
| **PyBench - T.F.A.T.T (Milliseconds)** | **760** | **894** |
| Normalized | 100% | 85.01% |
| Standard Deviation | 0.5% | 2.1% |
| **PyPerformance - go (Milliseconds)** | **187** | **228** |
| Normalized | 100% | 82.02% |
| **PyPerformance - 2to3 (Milliseconds)** | **241** | **283** |
| Normalized | 100% | 85.16% |
| Standard Deviation | | 0.2% |
| **PyPerformance - chaos (Milliseconds)** | **79.8** | **100** |
| Normalized | 100% | 79.8% |
| Standard Deviation | 1.2% | |
| **PyPerformance - float (Milliseconds)** | **82.5** | **102** |
| Normalized | 100% | 80.88% |
| Standard Deviation | 0.2% | |
| **PyPerformance - nbody (Milliseconds)** | **89.9** | **101** |
| Normalized | 100% | 89.01% |
| Standard Deviation | 0.2% | 0.6% |
| **PyPerformance - pathlib (Milliseconds)** | **14.4** | **15.5** |
| Normalized | 100% | 92.9% |
| Standard Deviation | 0.4% | 0.4% |
| **PyPerformance - raytrace (Milliseconds)** | **352** | **427** |
| Normalized | 100% | 82.44% |
| Standard Deviation | 0.3% | |
| **PyPerformance - json_loads (Milliseconds)** | **18.3** | **22.0** |
| Normalized | 100% | 83.18% |
| Standard Deviation | 0% | 0.3% |
| **PyPerformance - crypto_pyaes (Milliseconds)** | **83.2** | **97.2** |
| Normalized | 100% | 85.6% |
| Standard Deviation | 0% | 0.3% |
| **PyPerformance - regex_compile (Milliseconds)** | **133** | **155** |
| Normalized | 100% | 85.81% |
| Standard Deviation | 2.6% | |
| **PyPerformance - python_startup (Milliseconds)** | **6.04** | **6.46** |
| Normalized | 100% | 93.5% |
| Standard Deviation | 0.1% | 2.4% |
| **PyPerformance - django_template (Milliseconds)** | **38.3** | **45.5** |
| Normalized | 100% | 84.18% |
| Standard Deviation | 0.5% | 0.4% |
| **PyPerformance - pickle_pure_python (Milliseconds)** | **331** | **424** |
| Normalized | 100% | 78.07% |
| Standard Deviation | 0.3% | |
| **Numenta Anomaly Benchmark - EXPoSE (sec)** | **624.538** | **644.836** |
| Normalized | 100% | 96.85% |
| Standard Deviation | 0.4% | 1% |
| **Numenta Anomaly Benchmark - Relative Entropy** | **16.561** | **14.391** |
| Normalized | 86.9% | 100% |
| Standard Deviation | 1.5% | 1% |
| **Numenta Anomaly Benchmark - Windowed Gaussian (sec)** | **7.665** | **6.695** |
| Normalized | 87.35% | 100% |
| Standard Deviation | 0.7% | 0.5% |
| **Numenta Anomaly Benchmark - Earthgecko Skyline** | **90.165** | **77.869** |
| Normalized | 86.36% | 100% |

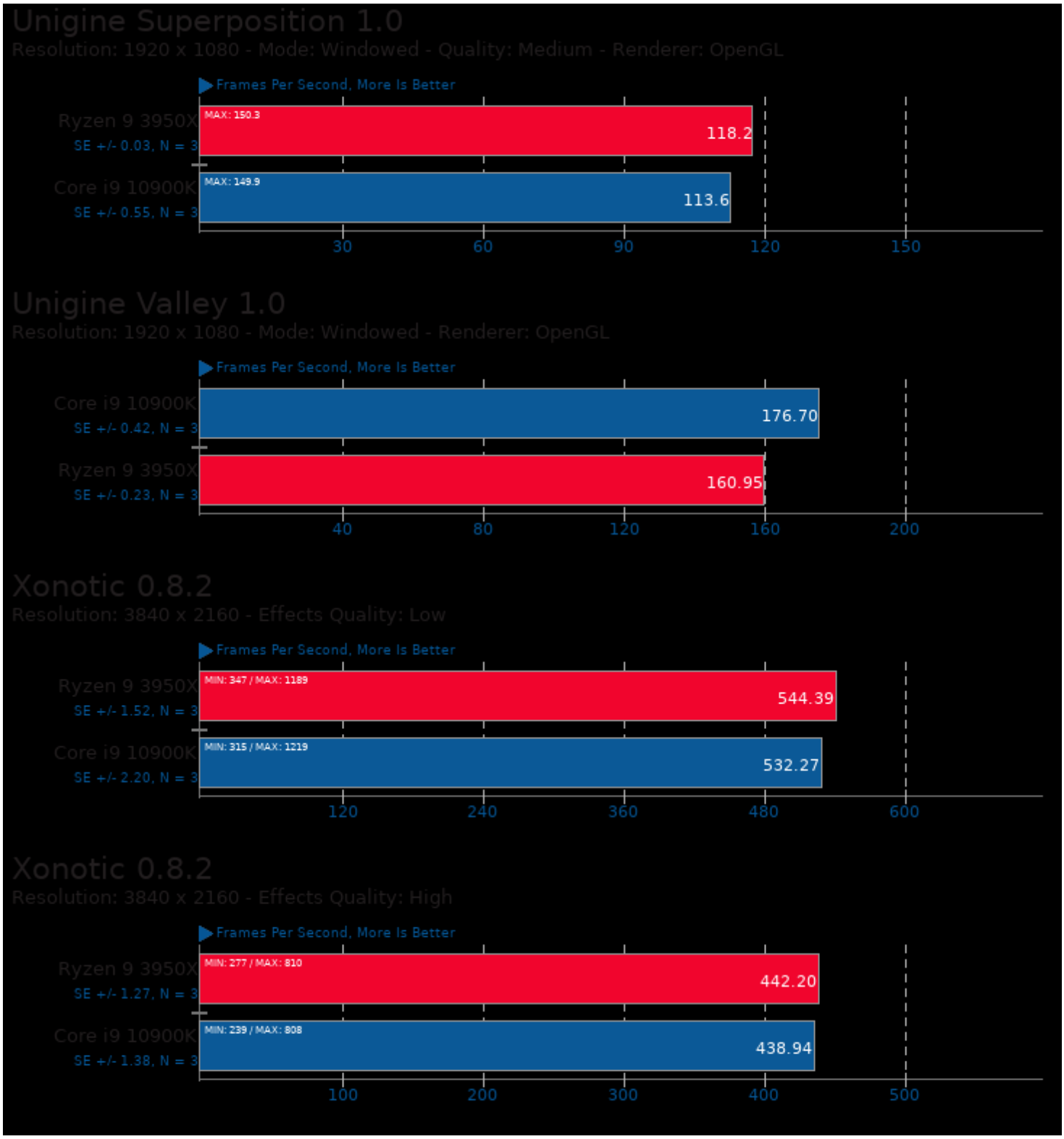
| | | |
|---|---|---|
| Standard Deviation | 2.9% | 0.4% |
| **Numenta Anomaly Benchmark - B.C (sec)** | **36.066** | **26.176** |
| Normalized | 72.58% | 100% |
| Standard Deviation | 0.7% | 2.9% |
| **Hierarchical INTegration - FLOAT (QUIPs)** | **510613895** | **380487205** |
| Normalized | 100% | 74.52% |
| Standard Deviation | 0.3% | 0.3% |
| **NeatBench - CPU (FPS)** | **18.3** | **26.2** |
| Normalized | 69.85% | 100% |
| Standard Deviation | 0.3% | 2.4% |
| **Appleseed - Emily (sec)** | **299.753452** | **213.491346** |
| Normalized | 71.22% | 100% |
| **Appleseed - Disney Material (sec)** | **174.867928** | **121.874074** |
| Normalized | 69.69% | 100% |
| **Appleseed - Material Tester (sec)** | **164.002915** | **128.457773** |
| Normalized | 78.33% | 100% |
| **Selenium - ARES-6 - Firefox (ms)** | **36.73** | **42.85** |
| Normalized | 100% | 85.72% |
| Standard Deviation | 0.9% | 0.1% |
| **Selenium - Kraken - Firefox (ms)** | **715.7** | **725.2** |
| Normalized | 100% | 98.69% |
| Standard Deviation | 2.3% | 0.4% |
| **Selenium - Octane - Firefox (Geometric Mean)** | **38776** | **34528** |
| Normalized | 100% | 89.04% |
| Standard Deviation | 1.1% | 1.3% |
| **Selenium - WebXPRT - Firefox (Score)** | **294** | **252** |
| Normalized | 100% | 85.71% |
| Standard Deviation | | 0.8% |
| **Selenium - Basemark - Firefox (Overall Score)** | **759.91** | **757.95** |
| Normalized | 100% | 99.74% |
| Standard Deviation | 7.3% | 4.8% |
| **Selenium - Jetstream - Firefox (Score)** | **237.52** | **218.55** |
| Normalized | 100% | 92.01% |
| Standard Deviation | 0.3% | 0.1% |
| **Selenium - CanvasMark - Firefox (Score)** | **14181** | **13796** |
| Normalized | 100% | 97.29% |
| Standard Deviation | 1.7% | 4.2% |
| **Selenium - MotionMark - Firefox (Score)** | **231.54** | **161.79** |
| Normalized | 100% | 69.88% |
| Standard Deviation | 28.2% | 24.1% |
| **Selenium - StyleBench - Firefox (Runs / Minute)** | **104** | **84.4** |
| Normalized | 100% | 81.15% |
| Standard Deviation | | 0.2% |
| **Selenium - Jetstream 2 - Firefox (Score)** | **102.083** | **95.645** |
| Normalized | 100% | 93.69% |
| Standard Deviation | 0.6% | 0.8% |
| **Selenium - Maze Solver - Firefox (sec)** | **5.4** | **4.5** |
| Normalized | 83.33% | 100% |
| Standard Deviation | 1.1% | 1.3% |
| **Selenium - Speedometer - Firefox (Runs/min)** | **104** | **99.34** |
| Normalized | 100% | 95.52% |
| Standard Deviation | 0.6% | 0.4% |
| **Selenium - ARES-6 - Google Chrome (ms)** | **17.47** | **20.20** |
| Normalized | 100% | 86.49% |
| Standard Deviation | 0.5% | 1.1% |

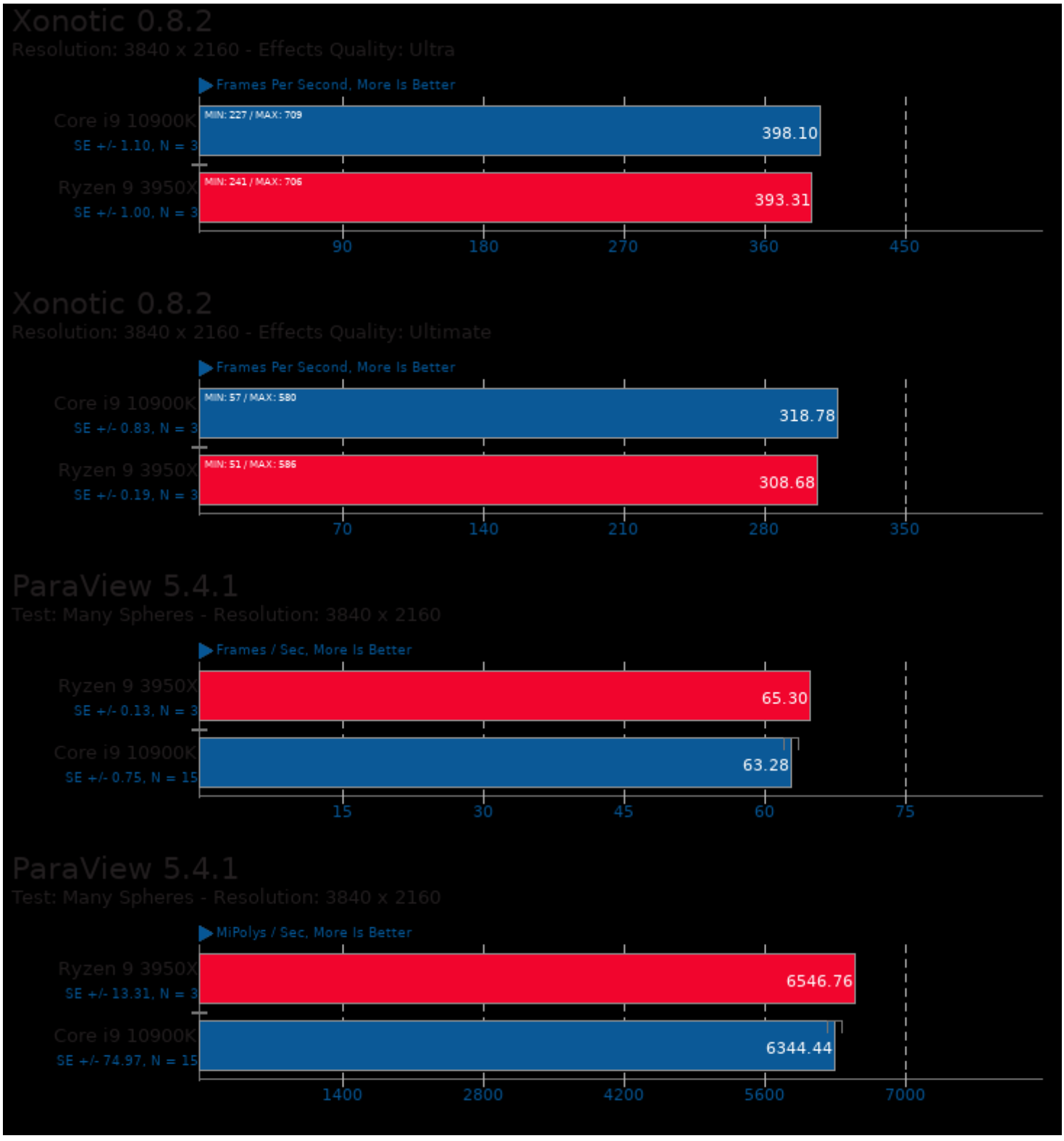
| | | |
|---|---|---|
| **Selenium - Kraken - Google Chrome (ms)** | **779.3** | **743.1** |
| **Normalized** | 95.35% | 100% |
| **Standard Deviation** | 2.7% | 1% |
| **Selenium - Octane - Google Chrome (Geometric** | **54153** | **49230** |
| **Normalized** | 100% | 90.91% |
| **Standard Deviation** | 0.2% | 0.7% |
| **Selenium - PSPDFKit WASM - Firefox (Score)** | **1148** | **1304** |
| **Normalized** | 100% | 88.04% |
| **Standard Deviation** | 0.6% | 0.1% |
| **Selenium - WebXPRT - Google Chrome (Score)** | **264** | **258** |
| **Normalized** | 100% | 97.73% |
| **Standard Deviation** | 0.8% | |
| **Selenium - Basemark - Google Chrome (Overall** | **1075** | **1387** |
| **Normalized** | 77.47% | 100% |
| **Standard Deviation** | 9.4% | 7.8% |
| **Selenium - Jetstream - Google Chrome (Score)** | **258.92** | **227.80** |
| **Normalized** | 100% | 87.98% |
| **Standard Deviation** | 0.3% | 0% |
| **Selenium - CanvasMark - Google Chrome (Score)** | **5033** | **5050** |
| **Normalized** | 99.66% | 100% |
| **Standard Deviation** | 0.5% | 0.3% |
| **Selenium - MotionMark - Google Chrome (Score)** | 1 | 1 |
| **Selenium - StyleBench - Google Chrome (Runs /** | **37.6** | **37.7** |
| **Normalized** | 99.73% | 100% |
| **Standard Deviation** | 0.7% | 0.7% |
| **Selenium - Jetstream 2 - Google Chrome (Score)** | **149.132** | **138.227** |
| **Normalized** | 100% | 92.69% |
| **Standard Deviation** | 2.1% | 1.1% |
| **Selenium - Maze Solver - Google Chrome (sec)** | **5.4** | **4.1** |
| **Normalized** | 75.93% | 100% |
| **Standard Deviation** | 0% | 1.4% |
| **Selenium - Speedometer - Google Chrome (Runs/min)** | **130** | **133** |
| **Normalized** | 97.74% | 100% |
| **Standard Deviation** | 0.4% | |
| **Selenium - PSPDFKit WASM - Google Chrome (Score)** | **1387** | **1509** |
| **Normalized** | 100% | 91.92% |
| **Standard Deviation** | 0.7% | 1.1% |
| **Selenium - W.i - Firefox (ms)** | **27.1** | **26.2** |
| **Normalized** | 96.68% | 100% |
| **Standard Deviation** | 0.7% | 2.3% |
| **Selenium - W.c - Firefox (ms)** | **414.4** | **351.9** |
| **Normalized** | 84.92% | 100% |
| **Standard Deviation** | 0.3% | 0.7% |
| **Selenium - W.i - Google Chrome (ms)** | **35.7272** | **35.8952** |
| **Normalized** | 100% | 99.53% |
| **Standard Deviation** | 0.5% | 0.9% |
| **Selenium - W.c - Google Chrome (ms)** | **343.4547** | **278.3210** |
| **Normalized** | 81.04% | 100% |
| **Standard Deviation** | 1.7% | 1.8% |
| **Git - T.T.C.C.G.C (sec)** | **41.515** | **45.230** |
| **Normalized** | 100% | 91.79% |
| **Standard Deviation** | 0.1% | 2.8% |
| **Mlpack Benchmark - scikit_ica (sec)** | **53.21** | **53.76** |
| **Normalized** | 100% | 98.98% |
| **Standard Deviation** | 1.7% | 0.9% |

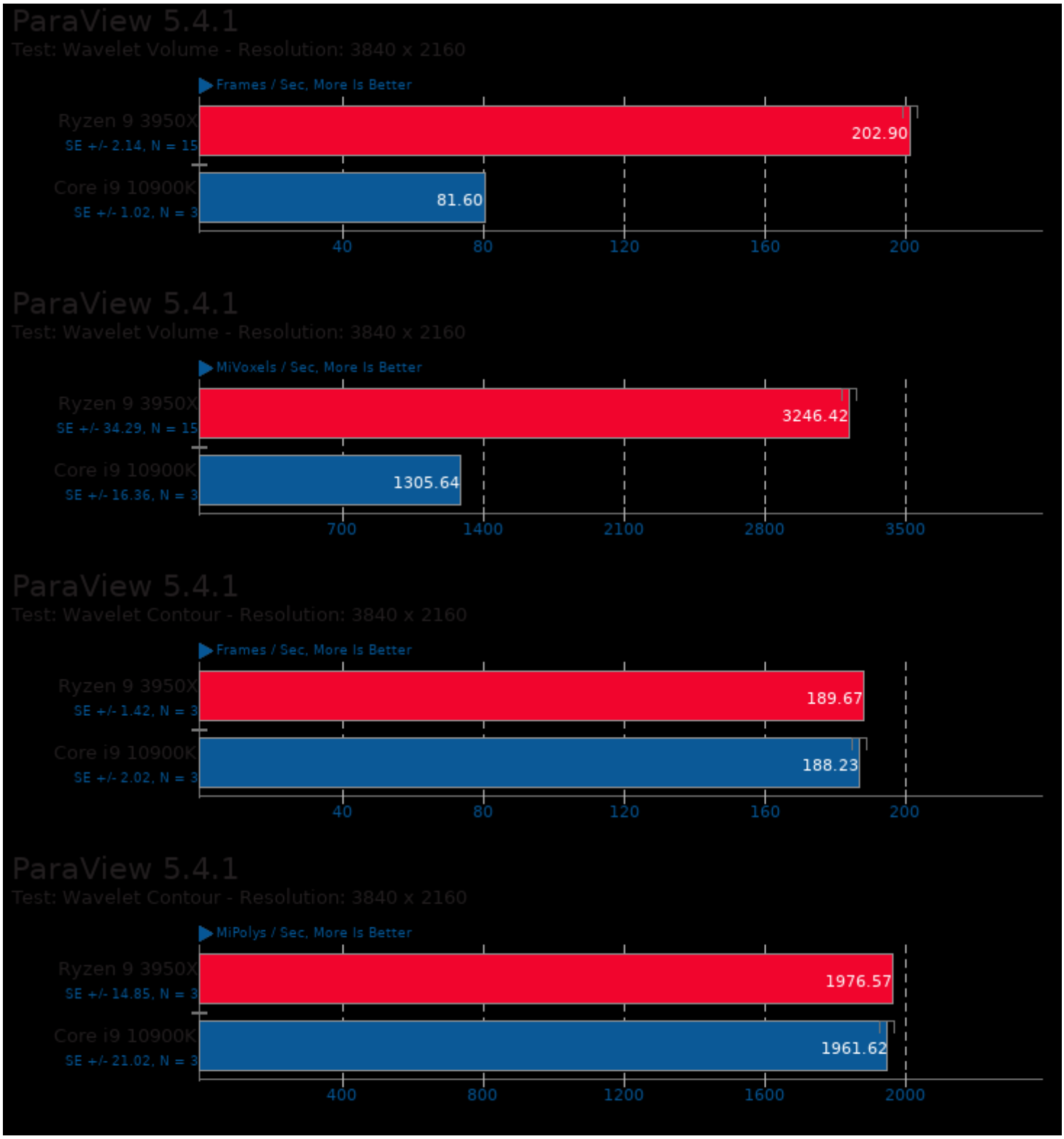
| | | |
|---|---|---|
| **Mlpack Benchmark - scikit_qda (sec)** | **62.50** | **68.93** |
| Normalized | 100% | 90.67% |
| Standard Deviation | 0.4% | 1.3% |
| **Mlpack Benchmark - scikit_svm (sec)** | **20.91** | **19.21** |
| Normalized | 91.87% | 100% |
| Standard Deviation | 0.1% | 0.6% |
| **Mlpack Benchmark - scikit_linearridgeregression** | **4.05** | **2.04** |
| Normalized | 50.37% | 100% |
| Standard Deviation | 0.7% | 0.5% |
| **Scikit-Learn (sec)** | **8.782** | **8.273** |
| Normalized | 94.2% | 100% |
| Standard Deviation | 2.5% | 2.4% |
| **BRL-CAD - V.P.M (VGR Performance Metric)** | **192500** | **251130** |
| Normalized | 76.65% | 100% |
| **OSBench - Create Files (us/Event)** | **10.474451** | **11.633563** |
| Normalized | 100% | 90.04% |
| Standard Deviation | 0.8% | 0.4% |
| **OSBench - Create Threads (us/Event)** | **8.883476** | **12.243907** |
| Normalized | 100% | 72.55% |
| Standard Deviation | 0.6% | 11.5% |
| **OSBench - Launch Programs (us/Event)** | **26.023388** | **35.923322** |
| Normalized | 100% | 72.44% |
| Standard Deviation | 0.3% | 1.2% |
| **OSBench - Create Processes (us/Event)** | **16.390483** | **27.797222** |
| Normalized | 100% | 58.96% |
| Standard Deviation | 1.7% | 2.4% |
| **OSBench - Memory Allocations (Ns/Event)** | **56.163311** | **69.227616** |
| Normalized | 100% | 81.13% |
| Standard Deviation | 0.2% | 0.3% |
| **Zstd Compression - 3 (MB/s)** | **2867** | **4014** |
| Normalized | 71.42% | 100% |
| Standard Deviation | 0.5% | 1.6% |
| **Zstd Compression - 19 (MB/s)** | **30.3** | **39.6** |
| Normalized | 76.52% | 100% |
| Standard Deviation | 0.3% | 0.1% |
| **dav1d - Chimera 1080p (FPS)** | **782.60** | **626.95** |
| Normalized | 100% | 80.11% |
| Standard Deviation | 0.3% | 0.3% |
| **dav1d - Summer Nature 4K (FPS)** | **185.20** | **204.01** |
| Normalized | 90.78% | 100% |
| Standard Deviation | 0.1% | 0.1% |
| **dav1d - S.N.1 (FPS)** | **735.61** | **587.62** |
| Normalized | 100% | 79.88% |
| Standard Deviation | 0.2% | 0.3% |
| **dav1d - C.1.1.b (FPS)** | **132.44** | **114.24** |
| Normalized | 100% | 86.26% |
| Standard Deviation | 0.1% | 0.2% |


IOR 3.2.1
Write Test
MB/s, More Is Better
Ryzen 9 3950X
SE +/- 1.63, N = 3
MIN: 128.55 / MAX: 306.82
279.04
Core i9 10900K
SE +/- 0.28, N = 3
MIN: 63.02 / MAX: 293.59
249.66
60
120
180
240
300
1. (CC) gcc options: -O2 -lm -pthread -lmpi
IOR 3.2.1
Read Test
MB/s, More Is Better
Ryzen 9 3950X
SE +/- 0.53, N = 3
MIN: 1046.91 / MAX: 1099.15
1083.44
Core i9 10900K
SE +/- 23.46, N = 3
MIN: 753 / MAX: 1147.17
867.37
200
400
600
800
1000
1. (CC) gcc options: -O2 -lm -pthread -lmpi
ET: Legacy 2.75
Renderer: Renderer2 - Resolution: 3840 x 2160
Frames Per Second, More Is Better
Core i9 10900K
SE +/- 4.83, N = 15
288.5
Ryzen 9 3950X
SE +/- 2.62, N = 3
255.8
60
120
180
240
300
Tesseract 2014-05-12
Resolution: 3840 x 2160
Frames Per Second, More Is Better
Core i9 10900K
SE +/- 7.06, N = 3
431.03
Ryzen 9 3950X
SE +/- 2.38, N = 3
364.90
90
180
270
360
450


Unigine Heaven 4.0
Resolution: 1920 x 1080 - Mode: Windowed - Renderer: OpenGL
Frames Per Second, More Is Better
Core i9 10900K
SE +/- 0.06, N = 3
160.18
Ryzen 9 3950X
SE +/- 0.16, N = 3
158.58
40
80
120
160
200
Unigine Superposition 1.0
Resolution: 1920 x 1080 - Mode: Windowed - Quality: Low - Renderer: OpenGL
Frames Per Second, More Is Better
Core i9 10900K
SE +/- 0.68, N = 3
MAX: 328.9
229.3
Ryzen 9 3950X
SE +/- 0.09, N = 3
MAX: 259.9
176.2
50
100
150
200
250
Unigine Superposition 1.0
Resolution: 1920 x 1080 - Mode: Windowed - Quality: High - Renderer: OpenGL
Frames Per Second, More Is Better
Ryzen 9 3950X
SE +/- 0.03, N = 3
MAX: 99.2
82.2
Core i9 10900K
SE +/- 0.15, N = 3
MAX: 98.8
77.7
20
40
60
80
100
Unigine Superposition 1.0
Resolution: 1920 x 1080 - Mode: Windowed - Quality: Ultra - Renderer: OpenGL
Frames Per Second, More Is Better
Ryzen 9 3950X
SE +/- 0.03, N = 3
MAX: 40.7
34.3
Core i9 10900K
SE +/- 0.03, N = 3
MAX: 40.7
34.3
8
16
24
32
40

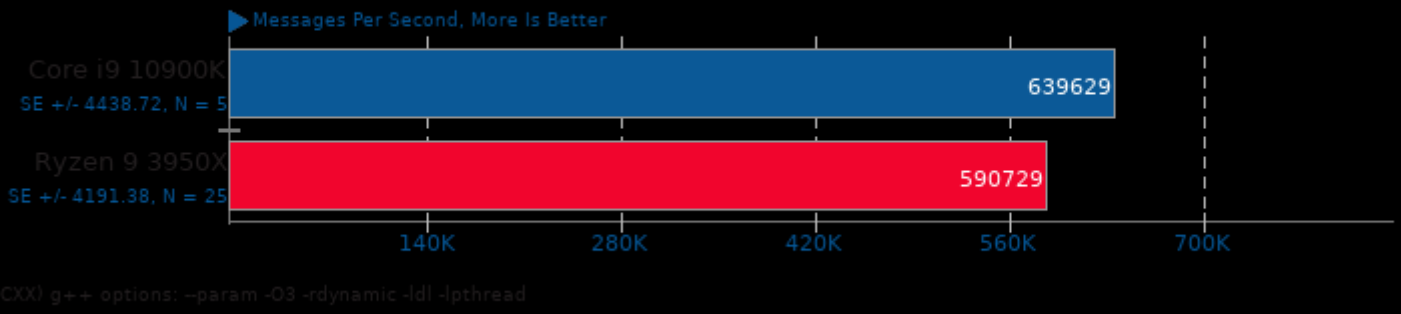

Unigine Superposition 1.0
Resolution: 1920 x 1080 - Mode: Windowed - Quality: Medium - Renderer: OpenGL
Frames Per Second, More Is Better
Ryzen 9 3950X
SE +/- 0.03, N = 3
MAX: 150.3
118.2
Core i9 10900K
SE +/- 0.55, N = 3
MAX: 149.9
113.6
30
60
90
120
150
Unigine Valley 1.0
Resolution: 1920 x 1080 - Mode: Windowed - Renderer: OpenGL
Frames Per Second, More Is Better
Core i9 10900K
SE +/- 0.42, N = 3
176.70
Ryzen 9 3950X
SE +/- 0.23, N = 3
160.95
40
80
120
160
200
Xonotic 0.8.2
Resolution: 3840 x 2160 - Effects Quality: Low
Frames Per Second, More Is Better
Ryzen 9 3950X
SE +/- 1.52, N = 3
MIN: 347 / MAX: 1189
544.39
Core i9 10900K
SE +/- 2.20, N = 3
MIN: 315 / MAX: 1219
532.27
120
240
360
480
600
Xonotic 0.8.2
Resolution: 3840 x 2160 - Effects Quality: High
Frames Per Second, More Is Better
Ryzen 9 3950X
SE +/- 1.27, N = 3
MIN: 277 / MAX: 810
442.20
Core i9 10900K
SE +/- 1.38, N = 3
MIN: 239 / MAX: 808
438.94
100
200
300
400
500


Xonotic 0.8.2
Resolution: 3840 x 2160 - Effects Quality: Ultra
Frames Per Second, More Is Better
Core i9 10900K
SE +/- 1.10, N = 3
MIN: 227 / MAX: 709
398.10
Ryzen 9 3950X
SE +/- 1.00, N = 3
MIN: 241 / MAX: 706
393.31
90
180
270
360
450
Xonotic 0.8.2
Resolution: 3840 x 2160 - Effects Quality: Ultimate
Frames Per Second, More Is Better
Core i9 10900K
SE +/- 0.83, N = 3
MIN: 57 / MAX: 580
318.78
Ryzen 9 3950X
SE +/- 0.19, N = 3
MIN: 51 / MAX: 586
308.68
70
140
210
280
350
ParaView 5.4.1
Test: Many Spheres - Resolution: 3840 x 2160
Frames / Sec, More Is Better
Ryzen 9 3950X
SE +/- 0.13, N = 3
65.30
Core i9 10900K
SE +/- 0.75, N = 15
63.28
15
30
45
60
75
ParaView 5.4.1
Test: Many Spheres - Resolution: 3840 x 2160
MiPolys / Sec, More Is Better
Ryzen 9 3950X
SE +/- 13.31, N = 3
6546.76
Core i9 10900K
SE +/- 74.97, N = 15
6344.44
1400
2800
4200
5600
7000


ParaView 5.4.1
Test: Wavelet Volume - Resolution: 3840 x 2160
Frames / Sec, More Is Better
Ryzen 9 3950X
SE +/- 2.14, N = 15
202.90
Core i9 10900K
SE +/- 1.02, N = 3
81.60
40
80
120
160
200
ParaView 5.4.1
Test: Wavelet Volume - Resolution: 3840 x 2160
MiVoxels / Sec, More Is Better
Ryzen 9 3950X
SE +/- 34.29, N = 15
3246.42
Core i9 10900K
SE +/- 16.36, N = 3
1305.64
700
1400
2100
2800
3500
ParaView 5.4.1
Test: Wavelet Contour - Resolution: 3840 x 2160
Frames / Sec, More Is Better
Ryzen 9 3950X
SE +/- 1.42, N = 3
189.67
Core i9 10900K
SE +/- 2.02, N = 3
188.23
40
80
120
160
200
ParaView 5.4.1
Test: Wavelet Contour - Resolution: 3840 x 2160
MiPolys / Sec, More Is Better
Ryzen 9 3950X
SE +/- 14.85, N = 3
1976.57
Core i9 10900K
SE +/- 21.02, N = 3
1961.62
400
800
1200
1600
2000

## Sockperf 3.4

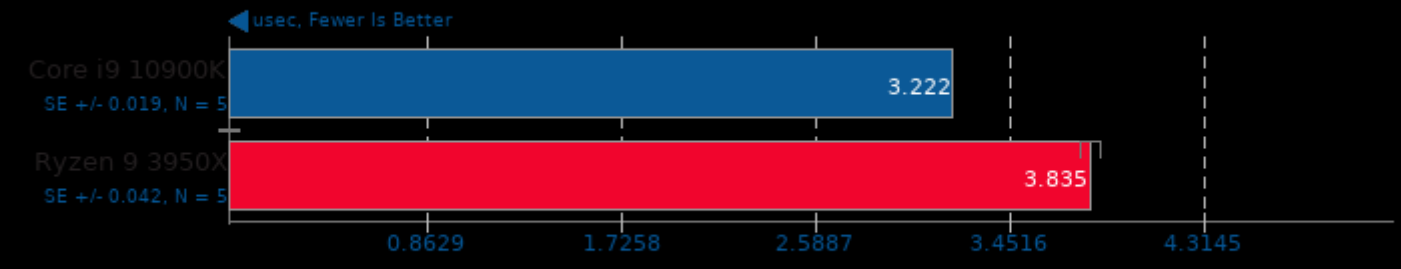
Test: Throughput




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

## Sockperf 3.4

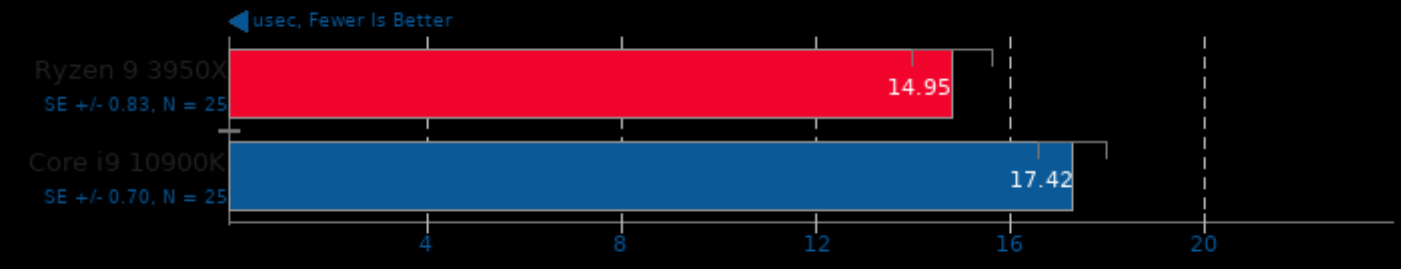
Test: Latency Ping Pong




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

## Sockperf 3.4

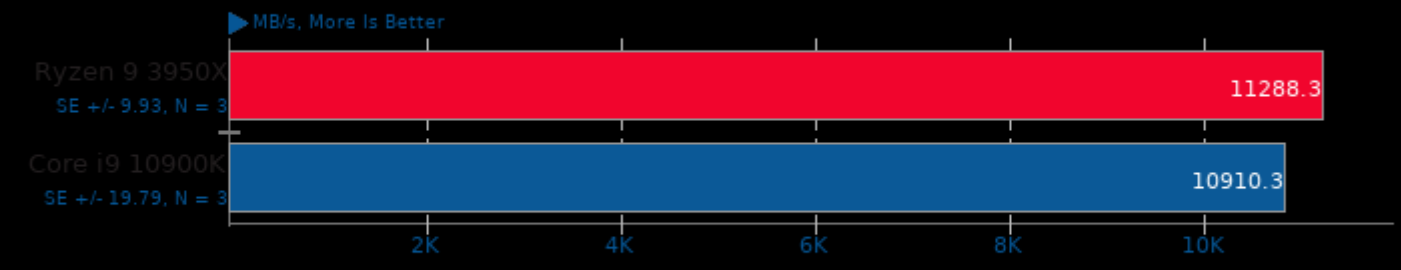
Test: Latency Under Load



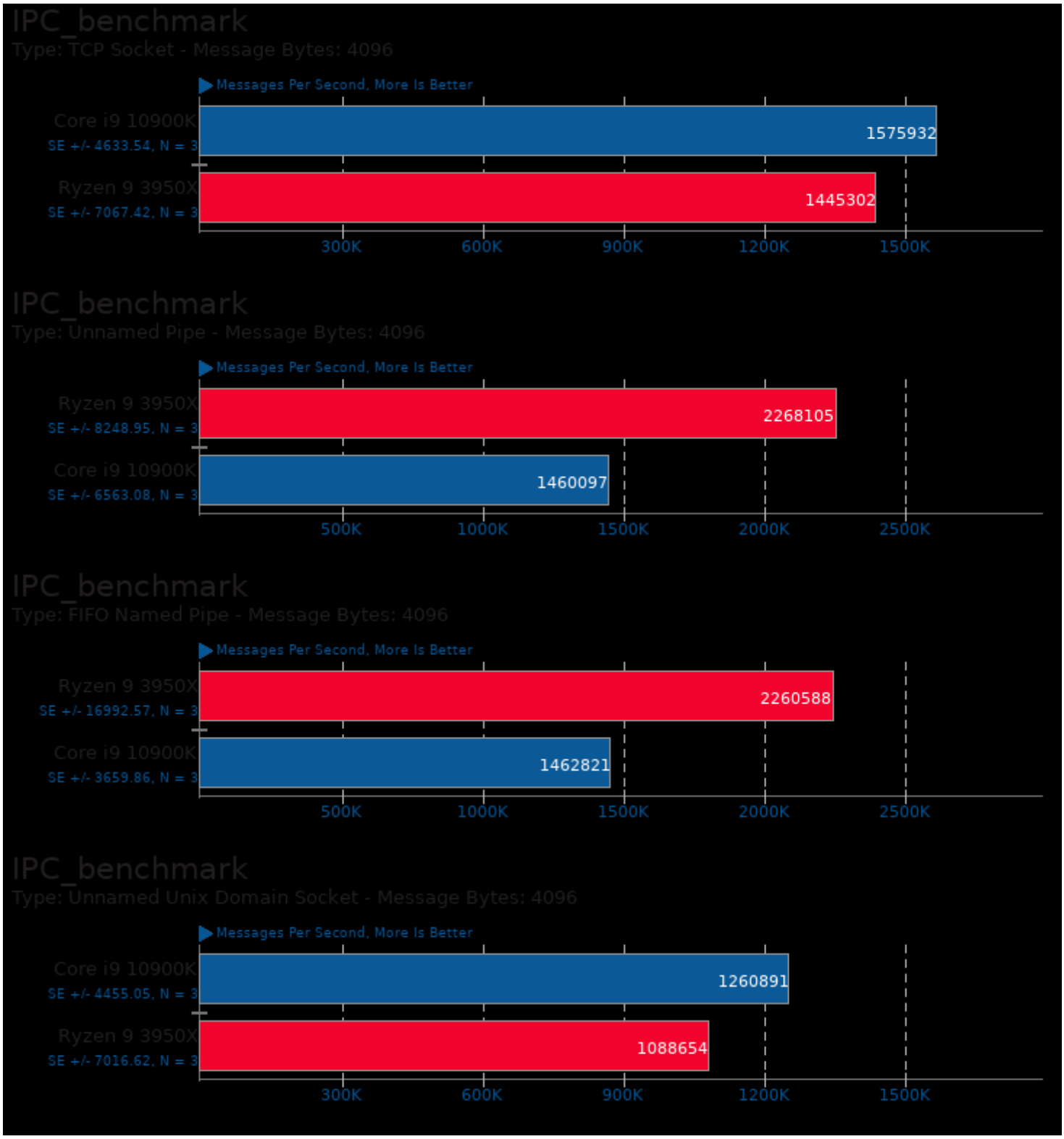

1. (CXX) g++ options: -param -O3 -rdynamic -ldl -lpthread

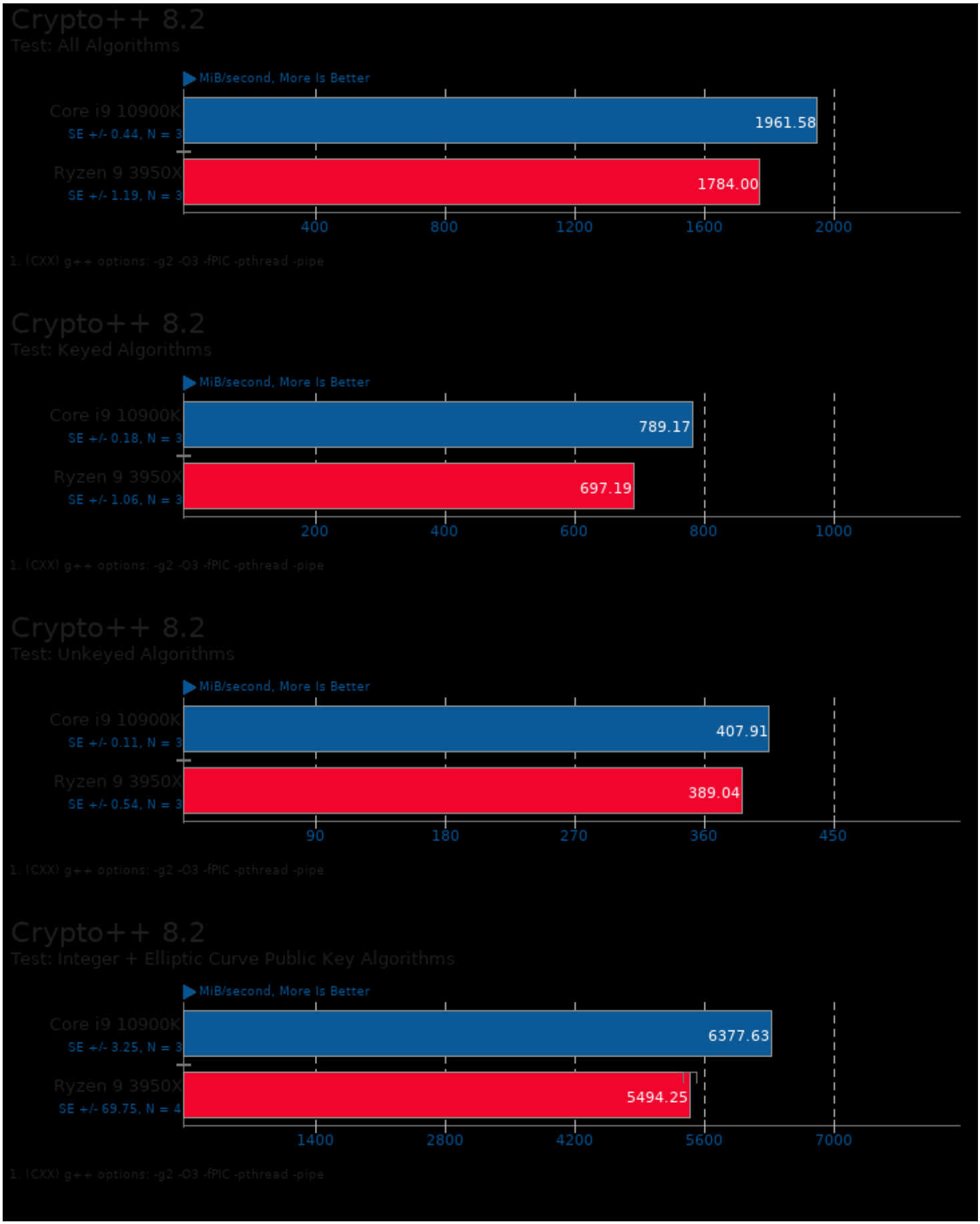
## C-Blosc 2.0 Beta 5

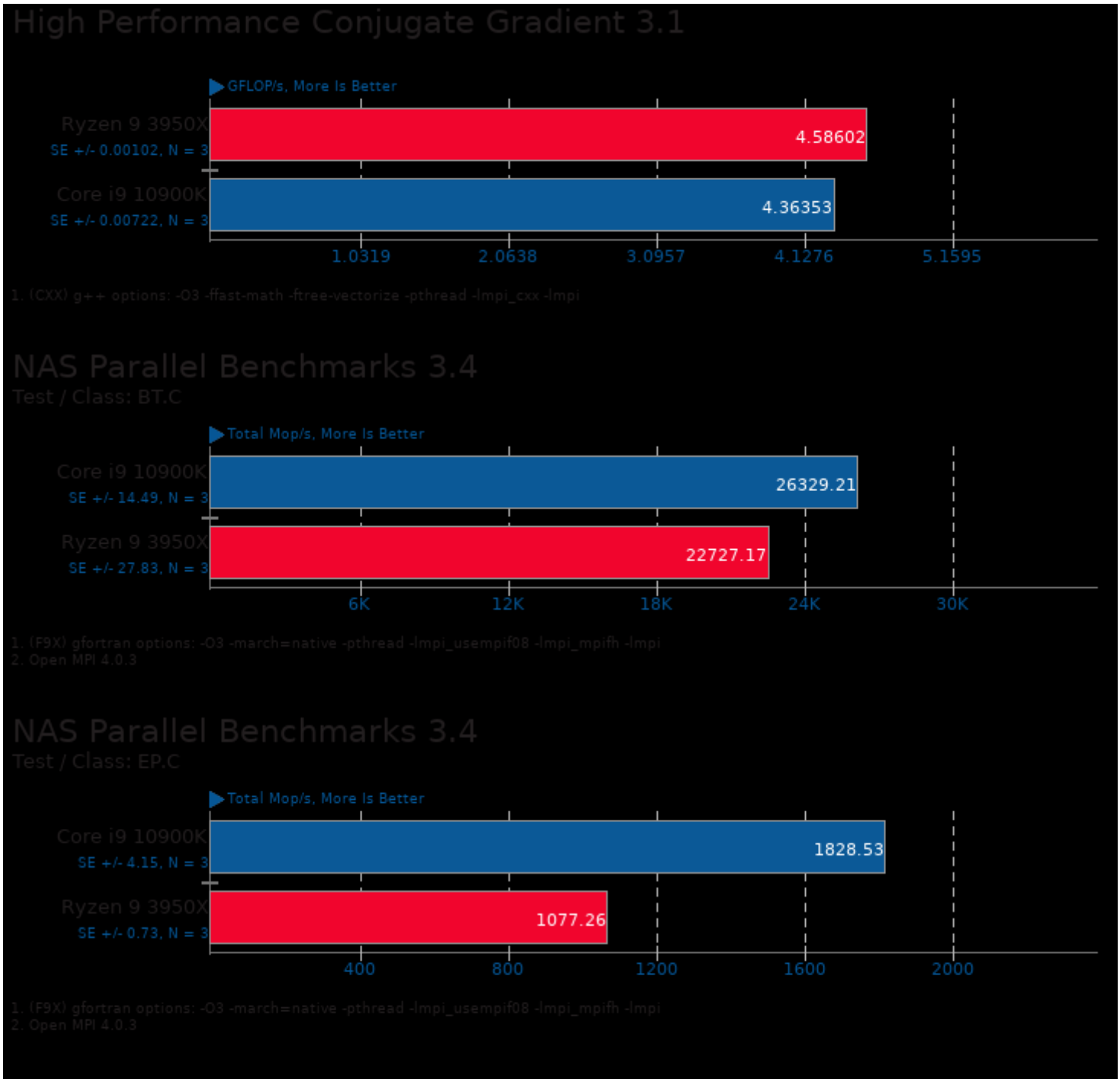
Compressor: blosclz

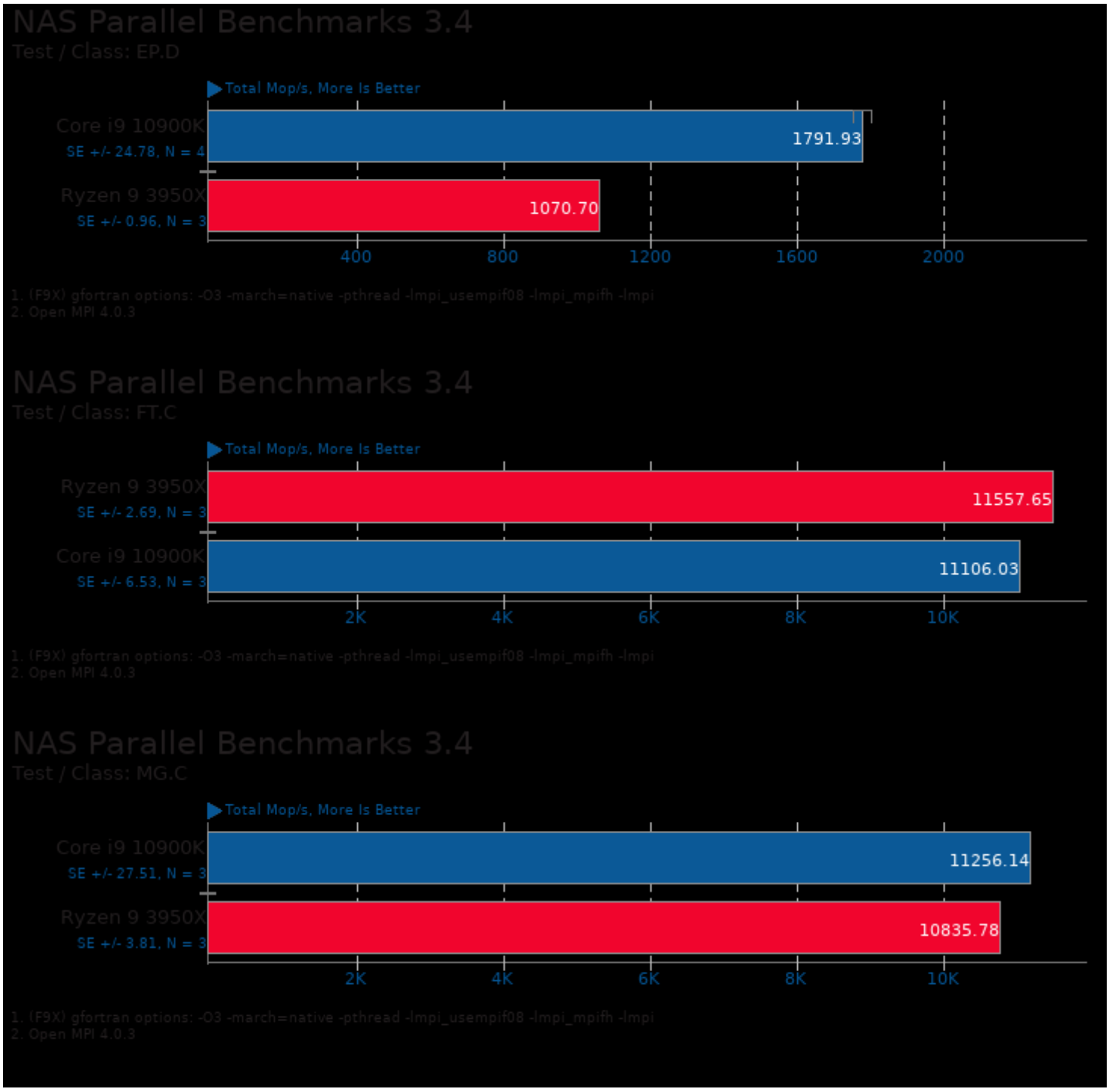



1. (CXX) g++ options: -rdynamic


IPC_benchmark
Type: TCP Socket - Message Bytes: 4096
Messages Per Second, More Is Better
Core i9 10900K
SE +/- 4633.54, N = 3
1575932
Ryzen 9 3950X
SE +/- 7067.42, N = 3
1445302
300K
600K
900K
1200K
1500K
IPC_benchmark
Type: Unnamed Pipe - Message Bytes: 4096
Messages Per Second, More Is Better
Ryzen 9 3950X
SE +/- 8248.95, N = 3
2268105
Core i9 10900K
SE +/- 6563.08, N = 3
1460097
500K
1000K
1500K
2000K
2500K
IPC_benchmark
Type: FIFO Named Pipe - Message Bytes: 4096
Messages Per Second, More Is Better
Ryzen 9 3950X
SE +/- 16992.57, N = 3
2260588
Core i9 10900K
SE +/- 3659.86, N = 3
1462821
500K
1000K
1500K
2000K
2500K
IPC_benchmark
Type: Unnamed Unix Domain Socket - Message Bytes: 4096
Messages Per Second, More Is Better
Core i9 10900K
SE +/- 4455.05, N = 3
1260891
Ryzen 9 3950X
SE +/- 7016.62, N = 3
1088654
300K
600K
900K
1200K
1500K

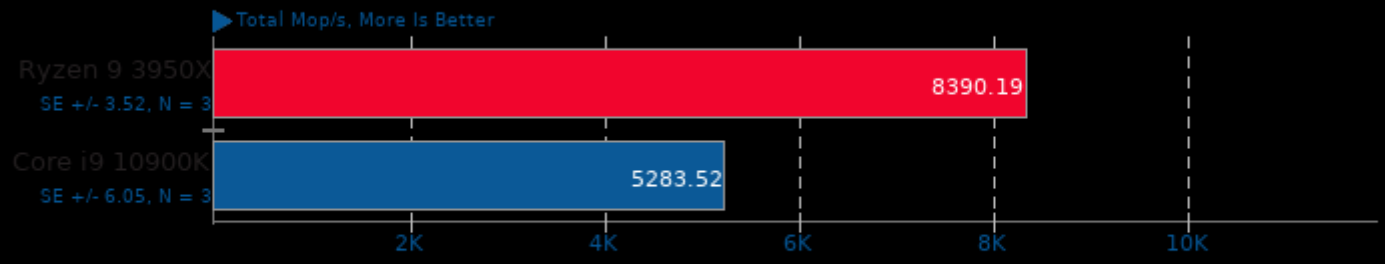

Crypto++ 8.2
Test: All Algorithms
MiB/second, More Is Better
Core i9 10900K
SE +/- 0.44, N = 3
1961.58
Ryzen 9 3950X
SE +/- 1.19, N = 3
1784.00
400
800
1200
1600
2000
1. (CXX) g++ options: -g2 -O3 -fPIC -pthread -pipe
Crypto++ 8.2
Test: Keyed Algorithms
MiB/second, More Is Better
Core i9 10900K
SE +/- 0.18, N = 3
789.17
Ryzen 9 3950X
SE +/- 1.06, N = 3
697.19
200
400
600
800
1000
1. (CXX) g++ options: -g2 -O3 -fPIC -pthread -pipe
Crypto++ 8.2
Test: Unkeyed Algorithms
MiB/second, More Is Better
Core i9 10900K
SE +/- 0.11, N = 3
407.91
Ryzen 9 3950X
SE +/- 0.54, N = 3
389.04
90
180
270
360
450
1. (CXX) g++ options: -g2 -O3 -fPIC -pthread -pipe
Crypto++ 8.2
Test: Integer + Elliptic Curve Public Key Algorithms
MiB/second, More Is Better
Core i9 10900K
SE +/- 3.25, N = 3
6377.63
Ryzen 9 3950X
SE +/- 69.75, N = 4
5494.25
1400
2800
4200
5600
7000
1. (CXX) g++ options: -g2 -O3 -fPIC -pthread -pipe


High Performance Conjugate Gradient 3.1
GFLOP/s, More Is Better
Ryzen 9 3950X
SE +/- 0.00102, N = 3
4.58602
Core i9 10900K
SE +/- 0.00722, N = 3
4.36353
1.0319
2.0638
3.0957
4.1276
5.1595
1. (CXX) g++ options: -O3 -ffast-math -ftree-vectorize -pthread -lmpi_cxx -lmpi
NAS Parallel Benchmarks 3.4
Test / Class: BT.C
Total Mop/s, More Is Better
Core i9 10900K
SE +/- 14.49, N = 3
26329.21
Ryzen 9 3950X
SE +/- 27.83, N = 3
22727.17
6K
12K
18K
24K
30K
1. (F9X) gfortran options: -O3 -march=native -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi
2. Open MPI 4.0.3
NAS Parallel Benchmarks 3.4
Test / Class: EP.C
Total Mop/s, More Is Better
Core i9 10900K
SE +/- 4.15, N = 3
1828.53
Ryzen 9 3950X
SE +/- 0.73, N = 3
1077.26
400
800
1200
1600
2000
1. (F9X) gfortran options: -O3 -march=native -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi
2. Open MPI 4.0.3


NAS Parallel Benchmarks 3.4
Test / Class: EP.D
Total Mop/s, More Is Better
Core i9 10900K
SE +/- 24.78, N = 4
1791.93
Ryzen 9 3950X
SE +/- 0.96, N = 3
1070.70
400
800
1200
1600
2000
1. (F9X) gfortran options: -O3 -march=native -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi
2. Open MPI 4.0.3
NAS Parallel Benchmarks 3.4
Test / Class: FT.C
Total Mop/s, More Is Better
Ryzen 9 3950X
SE +/- 2.69, N = 3
11557.65
Core i9 10900K
SE +/- 6.53, N = 3
11106.03
2K
4K
6K
8K
10K
1. (F9X) gfortran options: -O3 -march=native -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi
2. Open MPI 4.0.3
NAS Parallel Benchmarks 3.4
Test / Class: MG.C
Total Mop/s, More Is Better
Core i9 10900K
SE +/- 27.51, N = 3
11256.14
Ryzen 9 3950X
SE +/- 3.81, N = 3
10835.78
2K
4K
6K
8K
10K
1. (F9X) gfortran options: -O3 -march=native -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi
2. Open MPI 4.0.3

## NAS Parallel Benchmarks 3.4

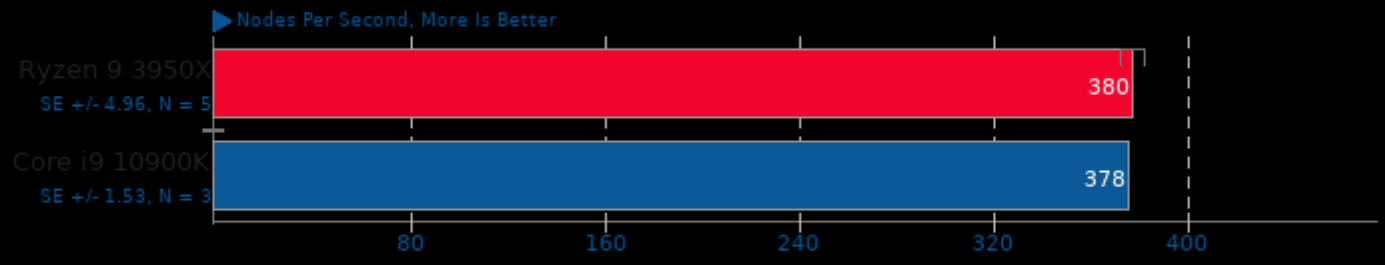
Test / Class: SP.B




1. (F9X) gfortran options: -O3 -march=native -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi
2. Open MPI 4.0.3

## LeelaChessZero 0.25

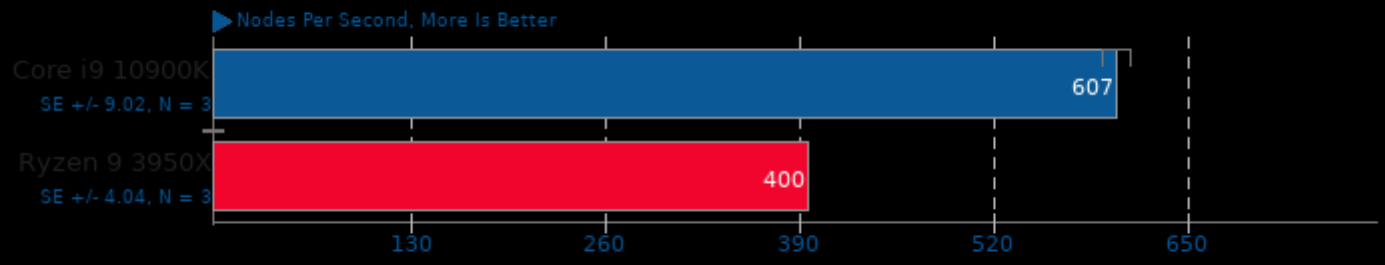
Backend: BLAS




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

## LeelaChessZero 0.25

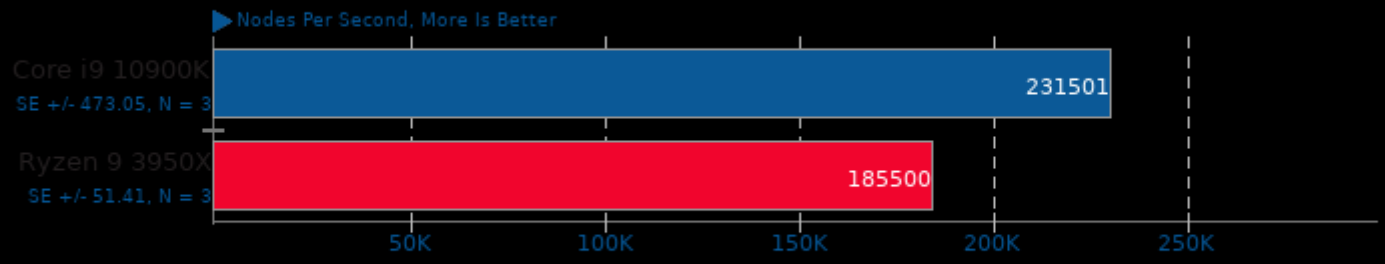
Backend: Eigen




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

## LeelaChessZero 0.25

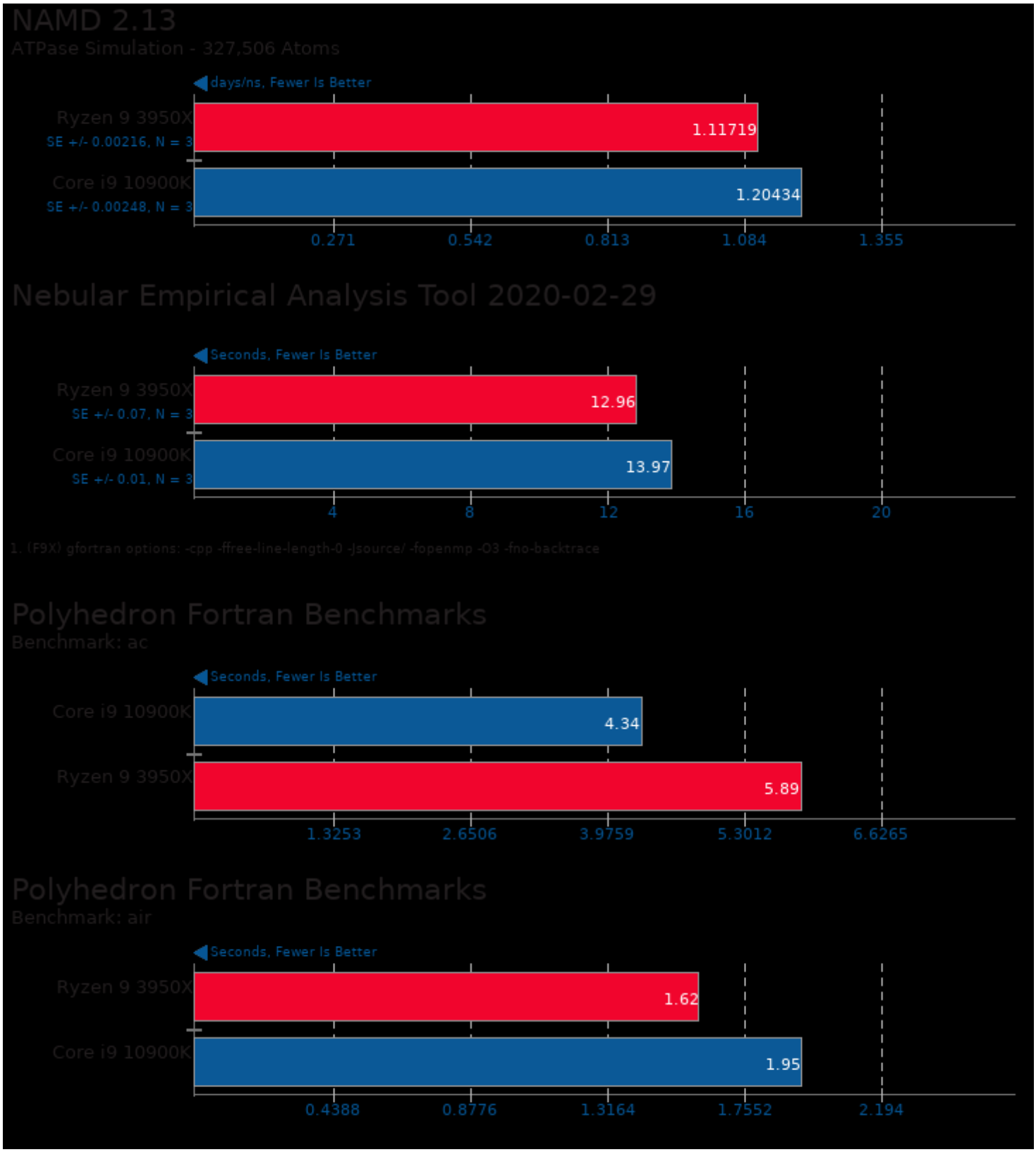
Backend: Random




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


Parboil 2.5
Test: OpenMP LBM
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.05, N = 3
160.96
Core i9 10900K
SE +/- 0.03, N = 3
165.15
40
80
120
160
200
1. (CXX) g++ options: -lm -lpthread -lgomp -O3 -ffast-math -fopenmp
Parboil 2.5
Test: OpenMP CUTCP
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.004000, N = 3
1.324664
Core i9 10900K
SE +/- 0.001089, N = 3
2.718560
0.6117
1.2234
1.8351
2.4468
3.0585
1. (CXX) g++ options: -lm -lpthread -lgomp -O3 -ffast-math -fopenmp
Parboil 2.5
Test: OpenMP Stencil
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.07, N = 3
15.11
Core i9 10900K
SE +/- 0.11, N = 3
16.40
4
8
12
16
20
1. (CXX) g++ options: -lm -lpthread -lgomp -O3 -ffast-math -fopenmp
Parboil 2.5
Test: OpenMP MRI Gridding
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.12, N = 3
31.27
Core i9 10900K
SE +/- 0.92, N = 15
54.94
12
24
36
48
60
1. (CXX) g++ options: -lm -lpthread -lgomp -O3 -ffast-math -fopenmp


CP2K Molecular Dynamics 6.1
Fayalite-FIST Data
Seconds, Fewer Is Better
Ryzen 9 3950X
324.19
Core i9 10900K
855.40
200
400
600
800
1000
Rodinia 2.4
Test: OpenMP LavaMD
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.02, N = 3
14.97
Core i9 10900K
SE +/- 0.10, N = 3
21.05
5
10
15
20
25
1. (CXX) g++ options: -O2 -lOpenCL
Rodinia 2.4
Test: OpenMP CFD Solver
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.02, N = 3
10.91
Core i9 10900K
SE +/- 0.02, N = 3
18.28
4
8
12
16
20
1. (CXX) g++ options: -O2 -lOpenCL
Rodinia 2.4
Test: OpenMP Streamcluster
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.01, N = 3
17.31
Ryzen 9 3950X
SE +/- 0.04, N = 3
25.52
6
12
18
24
30
1. (CXX) g++ options: -O2 -lOpenCL

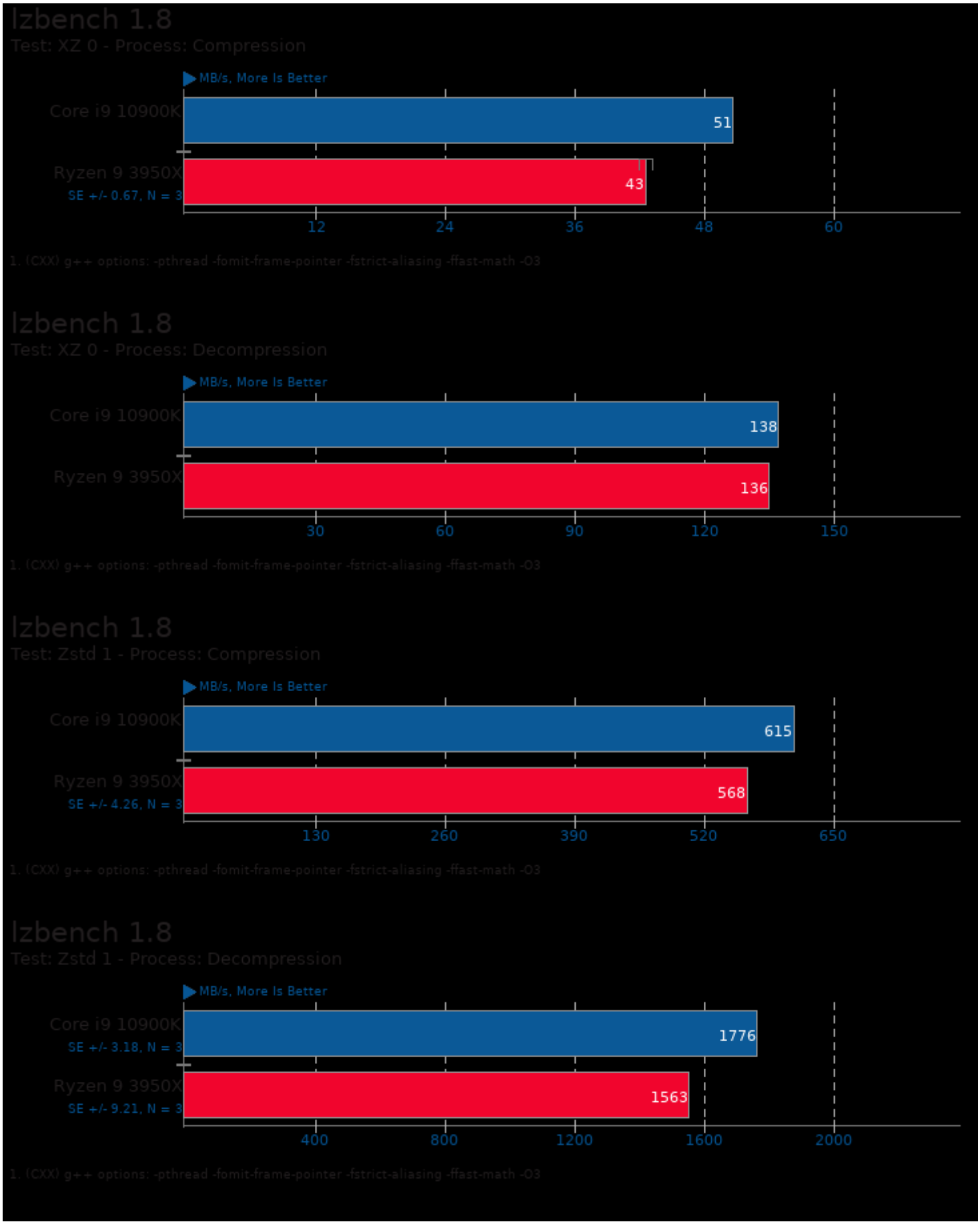

NAMD 2.13
ATPase Simulation - 327,506 Atoms
days/ns, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.00216, N = 3
1.11719
Core i9 10900K
SE +/- 0.00248, N = 3
1.20434
0.271
0.542
0.813
1.084
1.355
Nebular Empirical Analysis Tool 2020-02-29
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.07, N = 3
12.96
Core i9 10900K
SE +/- 0.01, N = 3
13.97
4
8
12
16
20
1. (F9X) gfortran options: -cpp -ffree-line-length-0 -Jsource/ -fopenmp -O3 -fno-backtrace
Polyhedron Fortran Benchmarks
Benchmark: ac
Seconds, Fewer Is Better
Core i9 10900K
4.34
Ryzen 9 3950X
5.89
1.3253
2.6506
3.9759
5.3012
6.6265
Polyhedron Fortran Benchmarks
Benchmark: air
Seconds, Fewer Is Better
Ryzen 9 3950X
1.62
Core i9 10900K
1.95
0.4388
0.8776
1.3164
1.7552
2.194

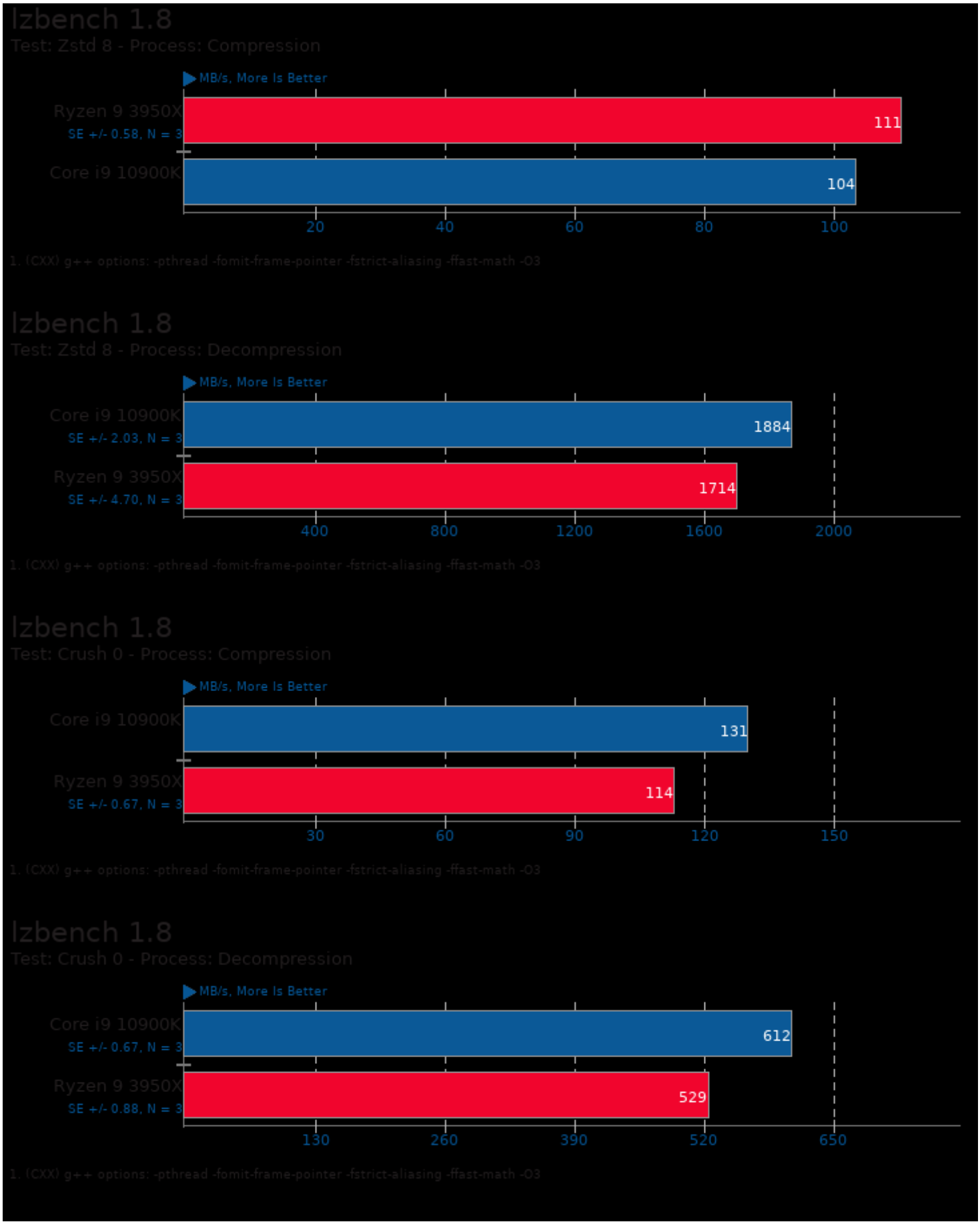

Polyhedron Fortran Benchmarks
Benchmark: mdbx
Seconds, Fewer Is Better
Core i9 10900K
3.87
Ryzen 9 3950X
4.27
0.9608
1.9216
2.8824
3.8432
4.804
Polyhedron Fortran Benchmarks
Benchmark: doduc
Seconds, Fewer Is Better
Core i9 10900K
6.13
Ryzen 9 3950X
6.56
2
4
6
8
10
Polyhedron Fortran Benchmarks
Benchmark: linpk
Seconds, Fewer Is Better
Core i9 10900K
2.31
Ryzen 9 3950X
3.05
0.6863
1.3726
2.0589
2.7452
3.4315
Polyhedron Fortran Benchmarks
Benchmark: aermod
Seconds, Fewer Is Better
Core i9 10900K
4.57
Ryzen 9 3950X
5.49
1.2353
2.4706
3.7059
4.9412
6.1765

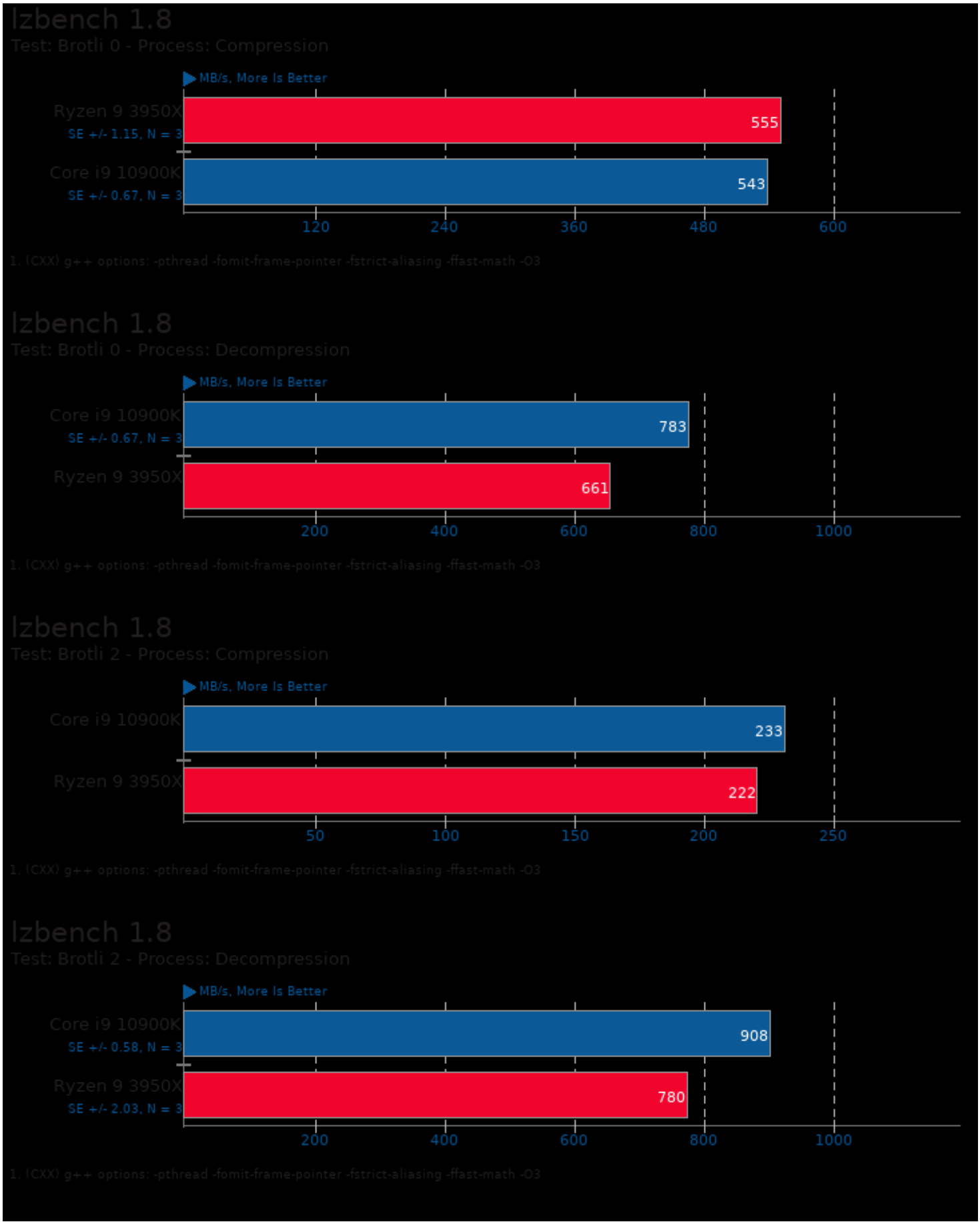

Polyhedron Fortran Benchmarks
Benchmark: rnflow
Seconds, Fewer Is Better
Core i9 10900K
12.58
Ryzen 9 3950X
15.00
4
8
12
16
20
Polyhedron Fortran Benchmarks
Benchmark: induct2
Seconds, Fewer Is Better
Core i9 10900K
14.45
Ryzen 9 3950X
21.35
5
10
15
20
25
Polyhedron Fortran Benchmarks
Benchmark: protein
Seconds, Fewer Is Better
Core i9 10900K
11.62
Ryzen 9 3950X
12.37
3
6
9
12
15
Polyhedron Fortran Benchmarks
Benchmark: channel2
Seconds, Fewer Is Better
Ryzen 9 3950X
42.71
Core i9 10900K
43.45
10
20
30
40
50

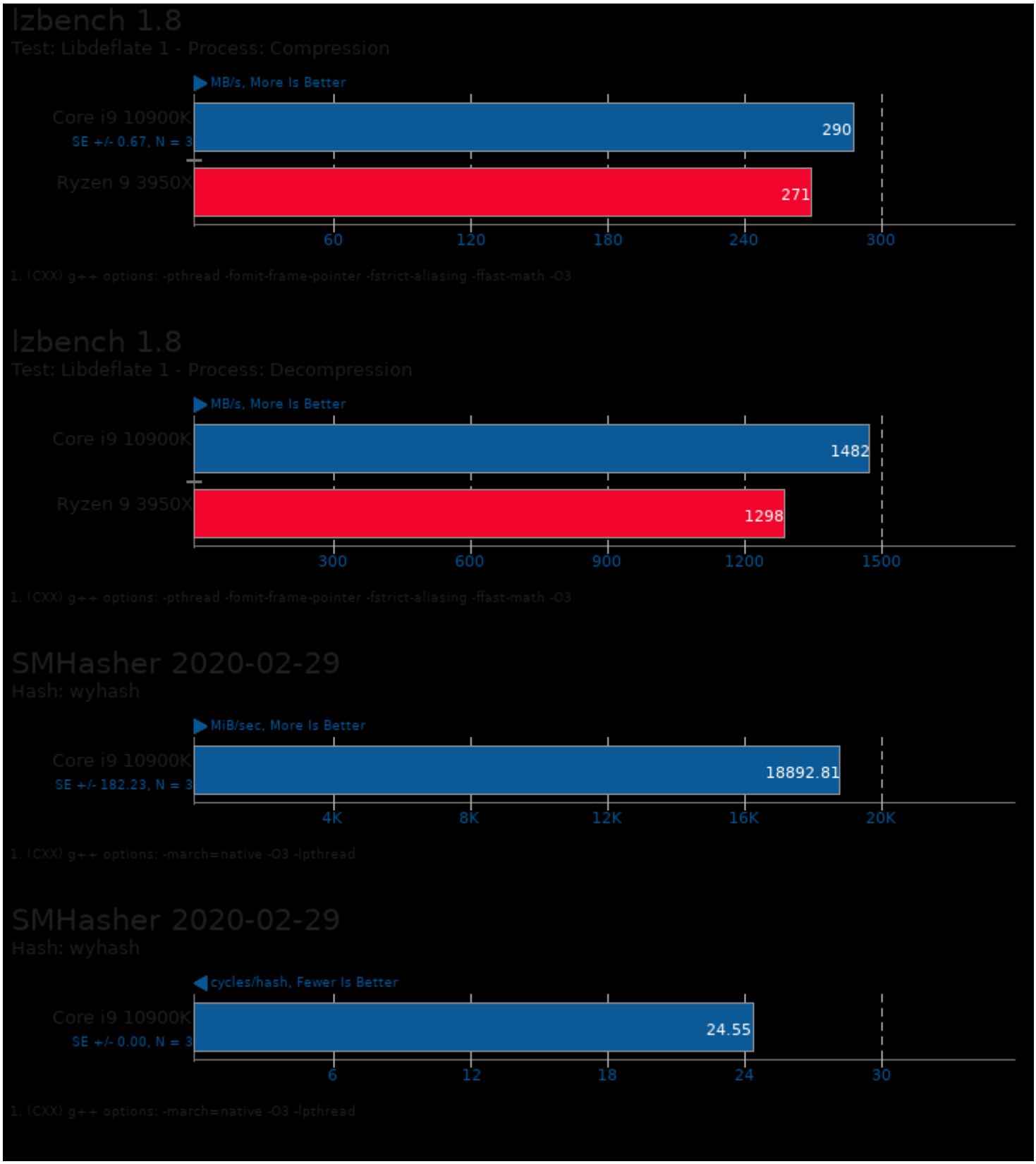

Polyhedron Fortran Benchmarks
Benchmark: fatigue2
Seconds, Fewer Is Better
Core i9 10900K
36.69
Ryzen 9 3950X
46.89
11
22
33
44
55
Polyhedron Fortran Benchmarks
Benchmark: gas_dyn2
Seconds, Fewer Is Better
Core i9 10900K
39.99
Ryzen 9 3950X
41.78
10
20
30
40
50
Polyhedron Fortran Benchmarks
Benchmark: test_fpu2
Seconds, Fewer Is Better
Ryzen 9 3950X
26.44
Core i9 10900K
28.67
7
14
21
28
35
Polyhedron Fortran Benchmarks
Benchmark: mp_prop_design
Seconds, Fewer Is Better
Core i9 10900K
49.13
Ryzen 9 3950X
53.27
12
24
36
48
60

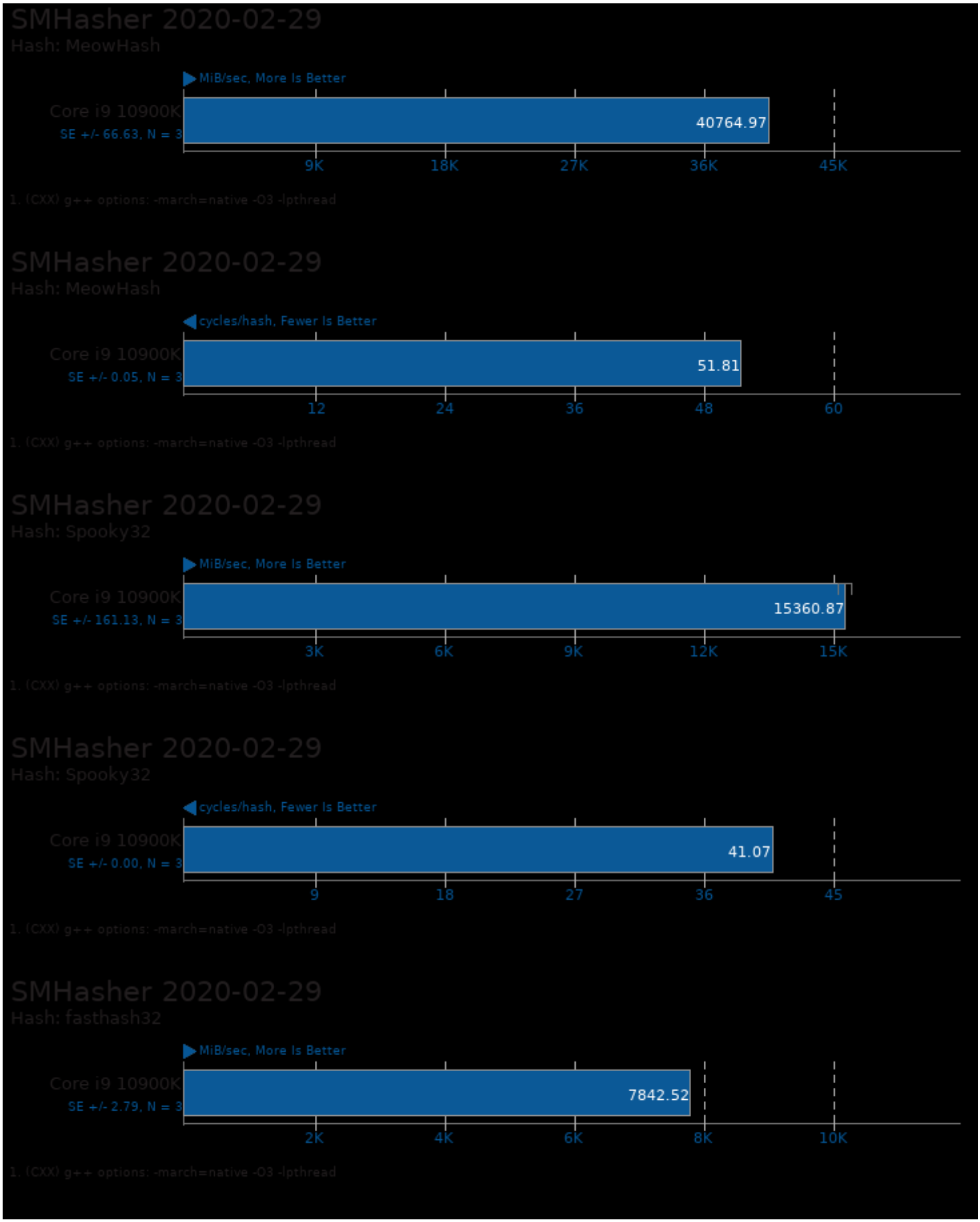

toyBrot Fractal Generator
Implementation: TBB
ms, Fewer Is Better
Ryzen 9 3950X
SE +/- 300.85, N = 3
46547
Core i9 10900K
SE +/- 672.45, N = 3
79924
20K
40K
60K
80K
100K
1. (CXX) g++ options: -lpthread -isystem -fopenmp -std=c++14
toyBrot Fractal Generator
Implementation: OpenMP
ms, Fewer Is Better
Ryzen 9 3950X
SE +/- 198.34, N = 3
47670
Core i9 10900K
SE +/- 8.39, N = 3
80088
20K
40K
60K
80K
100K
1. (CXX) g++ options: -lpthread -isystem -fopenmp -std=c++14
toyBrot Fractal Generator
Implementation: C++ Tasks
ms, Fewer Is Better
Ryzen 9 3950X
SE +/- 74.90, N = 3
46370
Core i9 10900K
SE +/- 23.54, N = 3
79172
20K
40K
60K
80K
100K
1. (CXX) g++ options: -lpthread -isystem -fopenmp -std=c++14
toyBrot Fractal Generator
Implementation: C++ Threads
ms, Fewer Is Better
Ryzen 9 3950X
SE +/- 72.70, N = 3
46331
Core i9 10900K
SE +/- 57.07, N = 3
79413
20K
40K
60K
80K
100K
1. (CXX) g++ options: -lpthread -isystem -fopenmp -std=c++14

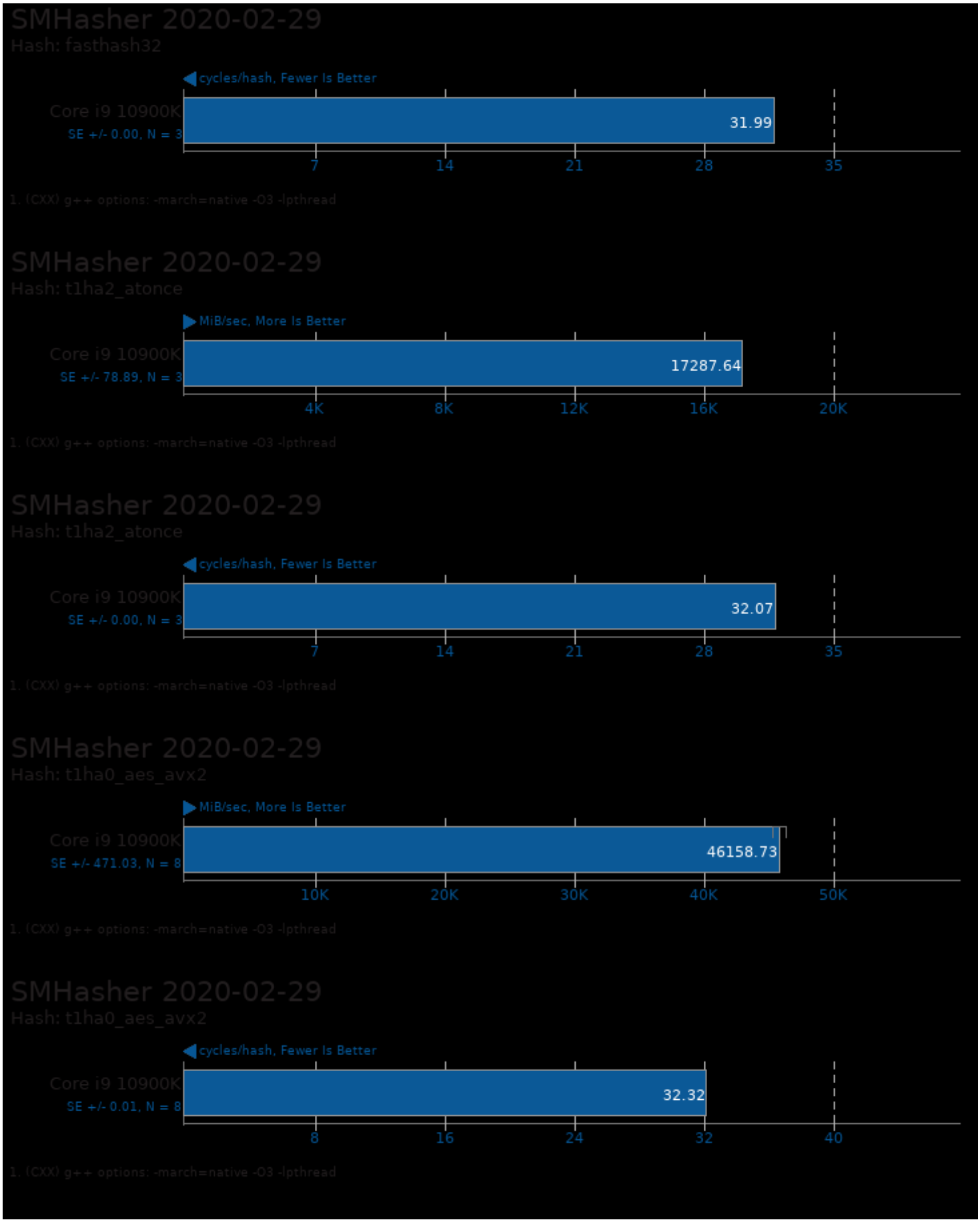

lzbench 1.8
Test: XZ 0 - Process: Compression
MB/s, More Is Better
Core i9 10900K
51
Ryzen 9 3950X
SE +/- 0.67, N = 3
43
12
24
36
48
60
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3
lzbench 1.8
Test: XZ 0 - Process: Decompression
MB/s, More Is Better
Core i9 10900K
138
Ryzen 9 3950X
136
30
60
90
120
150
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3
lzbench 1.8
Test: Zstd 1 - Process: Compression
MB/s, More Is Better
Core i9 10900K
615
Ryzen 9 3950X
SE +/- 4.26, N = 3
568
130
260
390
520
650
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3
lzbench 1.8
Test: Zstd 1 - Process: Decompression
MB/s, More Is Better
Core i9 10900K
SE +/- 3.18, N = 3
1776
Ryzen 9 3950X
SE +/- 9.21, N = 3
1563
400
800
1200
1600
2000
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3


lzbench 1.8
Test: Zstd 8 - Process: Compression
MB/s, More Is Better
Ryzen 9 3950X
SE +/- 0.58, N = 3
111
Core i9 10900K
104
20
40
60
80
100
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3
lzbench 1.8
Test: Zstd 8 - Process: Decompression
MB/s, More Is Better
Core i9 10900K
SE +/- 2.03, N = 3
1884
Ryzen 9 3950X
SE +/- 4.70, N = 3
1714
400
800
1200
1600
2000
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3
lzbench 1.8
Test: Crush 0 - Process: Compression
MB/s, More Is Better
Core i9 10900K
131
Ryzen 9 3950X
SE +/- 0.67, N = 3
114
30
60
90
120
150
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3
lzbench 1.8
Test: Crush 0 - Process: Decompression
MB/s, More Is Better
Core i9 10900K
SE +/- 0.67, N = 3
612
Ryzen 9 3950X
SE +/- 0.88, N = 3
529
130
260
390
520
650
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3

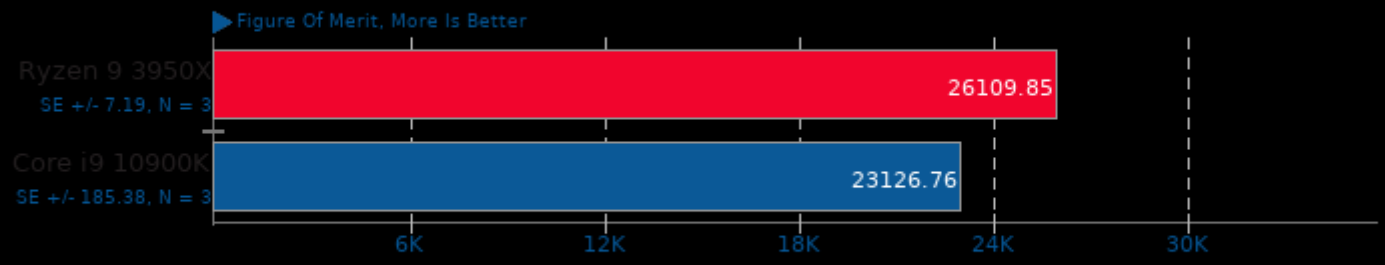

lzbench 1.8
Test: Brotli 0 - Process: Compression
MB/s, More Is Better
Ryzen 9 3950X
SE +/- 1.15, N = 3
555
Core i9 10900K
SE +/- 0.67, N = 3
543
120
240
360
480
600
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3
lzbench 1.8
Test: Brotli 0 - Process: Decompression
MB/s, More Is Better
Core i9 10900K
SE +/- 0.67, N = 3
783
Ryzen 9 3950X
661
200
400
600
800
1000
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3
lzbench 1.8
Test: Brotli 2 - Process: Compression
MB/s, More Is Better
Core i9 10900K
233
Ryzen 9 3950X
222
50
100
150
200
250
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3
lzbench 1.8
Test: Brotli 2 - Process: Decompression
MB/s, More Is Better
Core i9 10900K
SE +/- 0.58, N = 3
908
Ryzen 9 3950X
SE +/- 2.03, N = 3
780
200
400
600
800
1000
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3


lzbench 1.8
Test: Libdeflate 1 - Process: Compression
MB/s, More Is Better
Core i9 10900K
SE +/- 0.67, N = 3
290
Ryzen 9 3950X
271
60
120
180
240
300
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3
lzbench 1.8
Test: Libdeflate 1 - Process: Decompression
MB/s, More Is Better
Core i9 10900K
1482
Ryzen 9 3950X
1298
300
600
900
1200
1500
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3
SMHasher 2020-02-29
Hash: wyhash
MiB/sec, More Is Better
Core i9 10900K
SE +/- 182.23, N = 3
18892.81
4K
8K
12K
16K
20K
1. (CXX) g++ options: -march=native -O3 -lpthread
SMHasher 2020-02-29
Hash: wyhash
cycles/hash, Fewer Is Better
Core i9 10900K
SE +/- 0.00, N = 3
24.55
6
12
18
24
30
1. (CXX) g++ options: -march=native -O3 -lpthread


SMHasher 2020-02-29
Hash: MeowHash
MiB/sec, More Is Better
Core i9 10900K
SE +/- 66.63, N = 3
40764.97
9K
18K
27K
36K
45K
1. (CXX) g++ options: -march=native -O3 -lpthread
SMHasher 2020-02-29
Hash: MeowHash
cycles/hash, Fewer Is Better
Core i9 10900K
SE +/- 0.05, N = 3
51.81
12
24
36
48
60
1. (CXX) g++ options: -march=native -O3 -lpthread
SMHasher 2020-02-29
Hash: Spooky32
MiB/sec, More Is Better
Core i9 10900K
SE +/- 161.13, N = 3
15360.87
3K
6K
9K
12K
15K
1. (CXX) g++ options: -march=native -O3 -lpthread
SMHasher 2020-02-29
Hash: Spooky32
cycles/hash, Fewer Is Better
Core i9 10900K
SE +/- 0.00, N = 3
41.07
9
18
27
36
45
1. (CXX) g++ options: -march=native -O3 -lpthread
SMHasher 2020-02-29
Hash: fasthash32
MiB/sec, More Is Better
Core i9 10900K
SE +/- 2.79, N = 3
7842.52
2K
4K
6K
8K
10K
1. (CXX) g++ options: -march=native -O3 -lpthread


SMHasher 2020-02-29
Hash: fasthash32
cycles/hash, Fewer Is Better
Core i9 10900K
SE +/- 0.00, N = 3
31.99
7
14
21
28
35
1. (CXX) g++ options: -march=native -O3 -lpthread
SMHasher 2020-02-29
Hash: t1ha2_atonce
MiB/sec, More Is Better
Core i9 10900K
SE +/- 78.89, N = 3
17287.64
4K
8K
12K
16K
20K
1. (CXX) g++ options: -march=native -O3 -lpthread
SMHasher 2020-02-29
Hash: t1ha2_atonce
cycles/hash, Fewer Is Better
Core i9 10900K
SE +/- 0.00, N = 3
32.07
7
14
21
28
35
1. (CXX) g++ options: -march=native -O3 -lpthread
SMHasher 2020-02-29
Hash: t1ha0_aes_avx2
MiB/sec, More Is Better
Core i9 10900K
SE +/- 471.03, N = 8
46158.73
10K
20K
30K
40K
50K
1. (CXX) g++ options: -march=native -O3 -lpthread
SMHasher 2020-02-29
Hash: t1ha0_aes_avx2
cycles/hash, Fewer Is Better
Core i9 10900K
SE +/- 0.01, N = 8
32.32
8
16
24
32
40
1. (CXX) g++ options: -march=native -O3 -lpthread

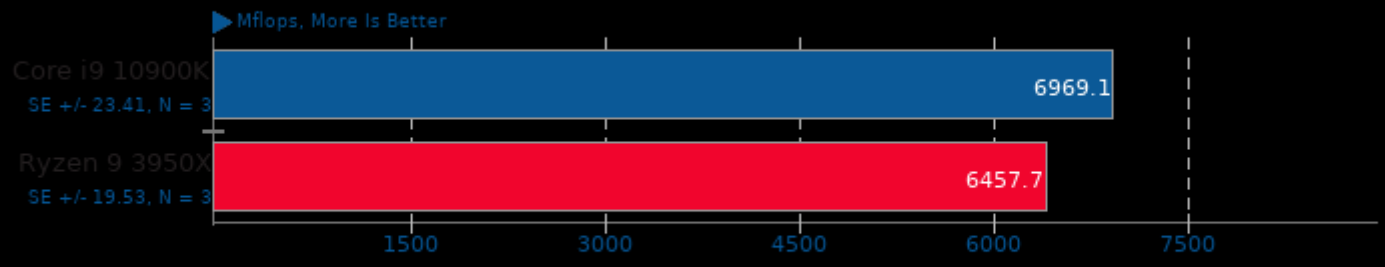
## Algebraic Multi-Grid Benchmark




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

## FFTW 3.3.6

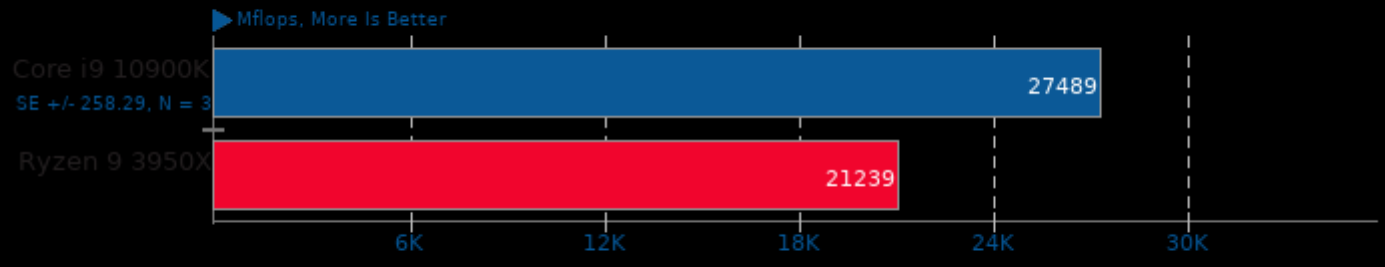
Build: Stock - Size: 2D FFT Size 4096




1. (CC) gcc options: -pthread -O3 -fomit-frame-pointer -mtune=native -malign-double -fstrict-aliasing -fno-schedule-insns -ffast-math -lm

## FFTW 3.3.6

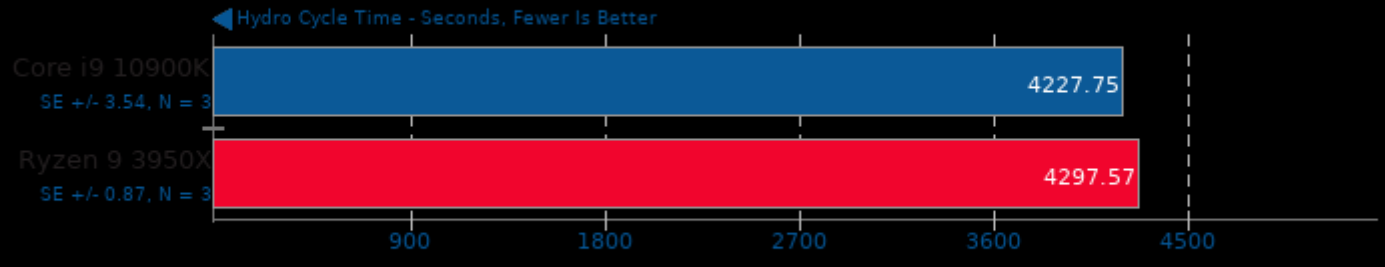
Build: Float + SSE - Size: 2D FFT Size 4096



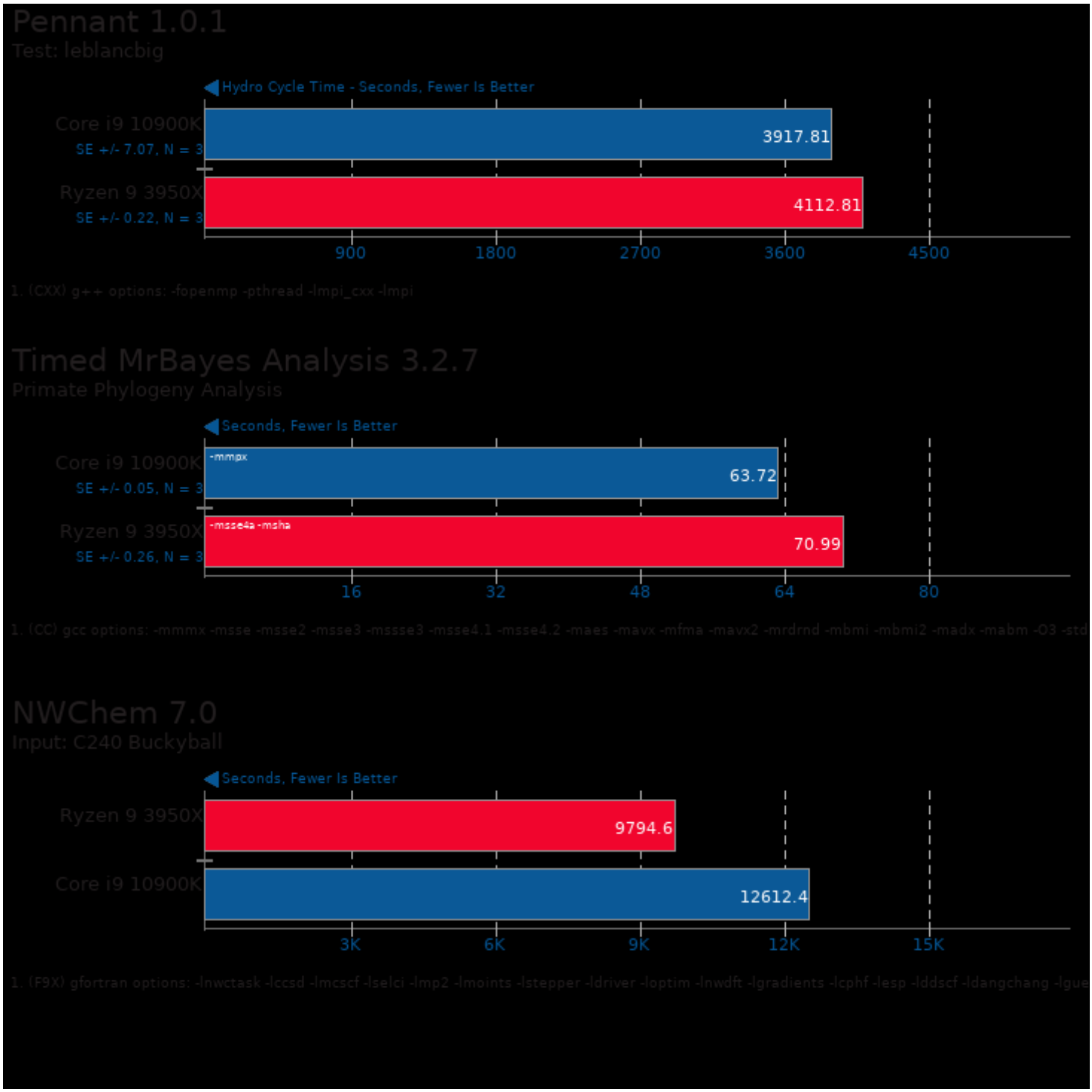

1. (CC) gcc options: -pthread -O3 -fomit-frame-pointer -mtune=native -malign-double -fstrict-aliasing -fno-schedule-insns -ffast-math -lm

## Pennant 1.0.1

Test: sedovbig

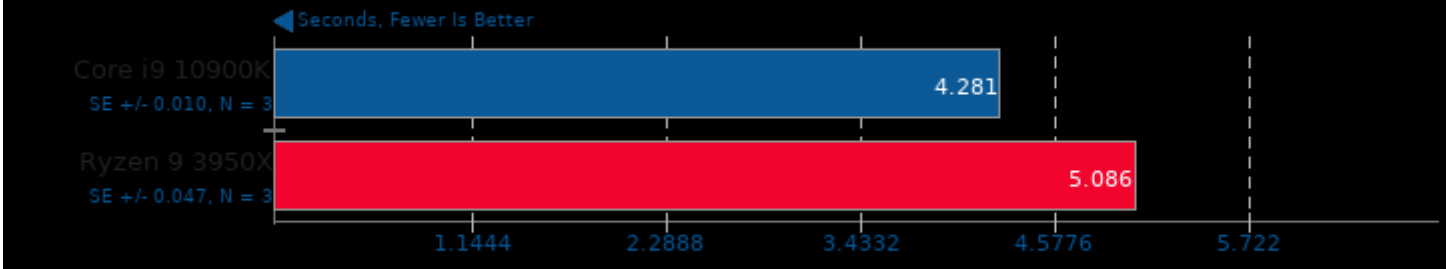



1. (CXX) g++ options: -fopenmp -pthread -lmpi_cxx -lmpi


Pennant 1.0.1
Test: leblancbig
Hydro Cycle Time - Seconds, Fewer Is Better
Core i9 10900K
SE +/- 7.07, N = 3
3917.81
Ryzen 9 3950X
SE +/- 0.22, N = 3
4112.81
900
1800
2700
3600
4500
1. (CXX) g++ options: -fopenmp -pthread -lmpi_cxx -lmpi
Timed MrBayes Analysis 3.2.7
Primate Phylogeny Analysis
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.05, N = 3
-mmmx
63.72
Ryzen 9 3950X
SE +/- 0.26, N = 3
-msse4a -msha
70.99
16
32
48
64
80
1. (CC) gcc options: -mmmx -msse -msse2 -msse3 -mssse3 -msse4.1 -msse4.2 -maes -mavx -mfma -mavx2 -mrdrnd -mbmi -mbmi2 -madx -mabm -O3 -std
NWChem 7.0
Input: C240 Buckyball
Seconds, Fewer Is Better
Ryzen 9 3950X
9794.6
Core i9 10900K
12612.4
3K
6K
9K
12K
15K
1. (F9X) gfortran options: -lnwctask -lccsd -lmcscf -lselci -lmp2 -lmoints -lstepper -ldriver -loptim -lnwdft -lgradients -lcphf -lesp -lddscf -ldangchang -lgue

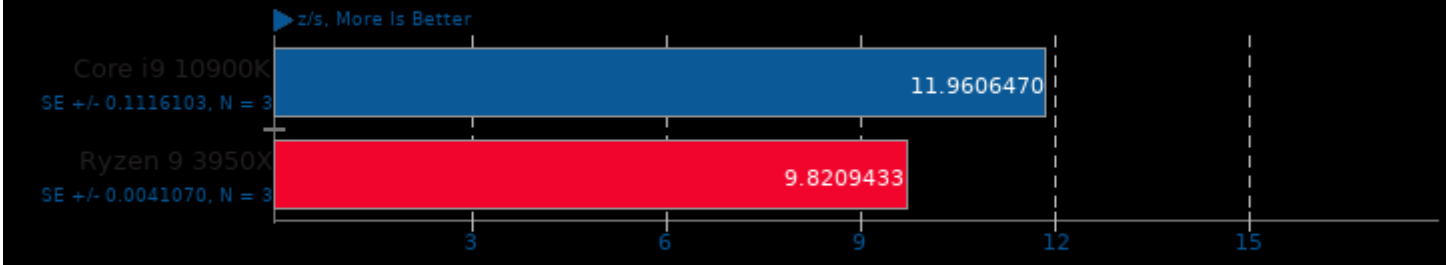
## Timed HMMer Search 2.3.2

Pfam Database Search



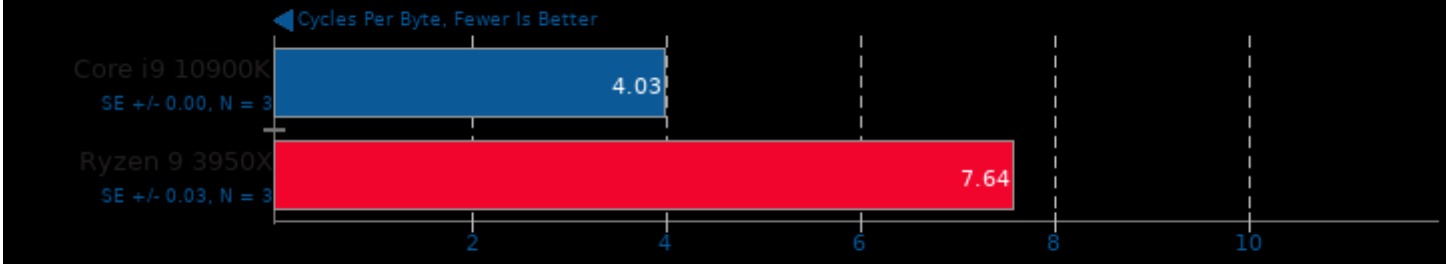

1. (CC) gcc options: -O2 -pthread -lhmmer -lsquid -lm

## LULESH 2.0.3




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

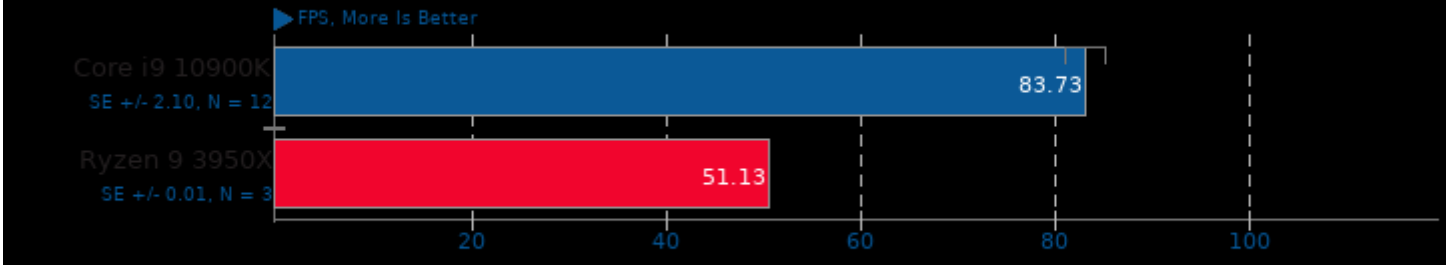
## BLAKE2 20170307



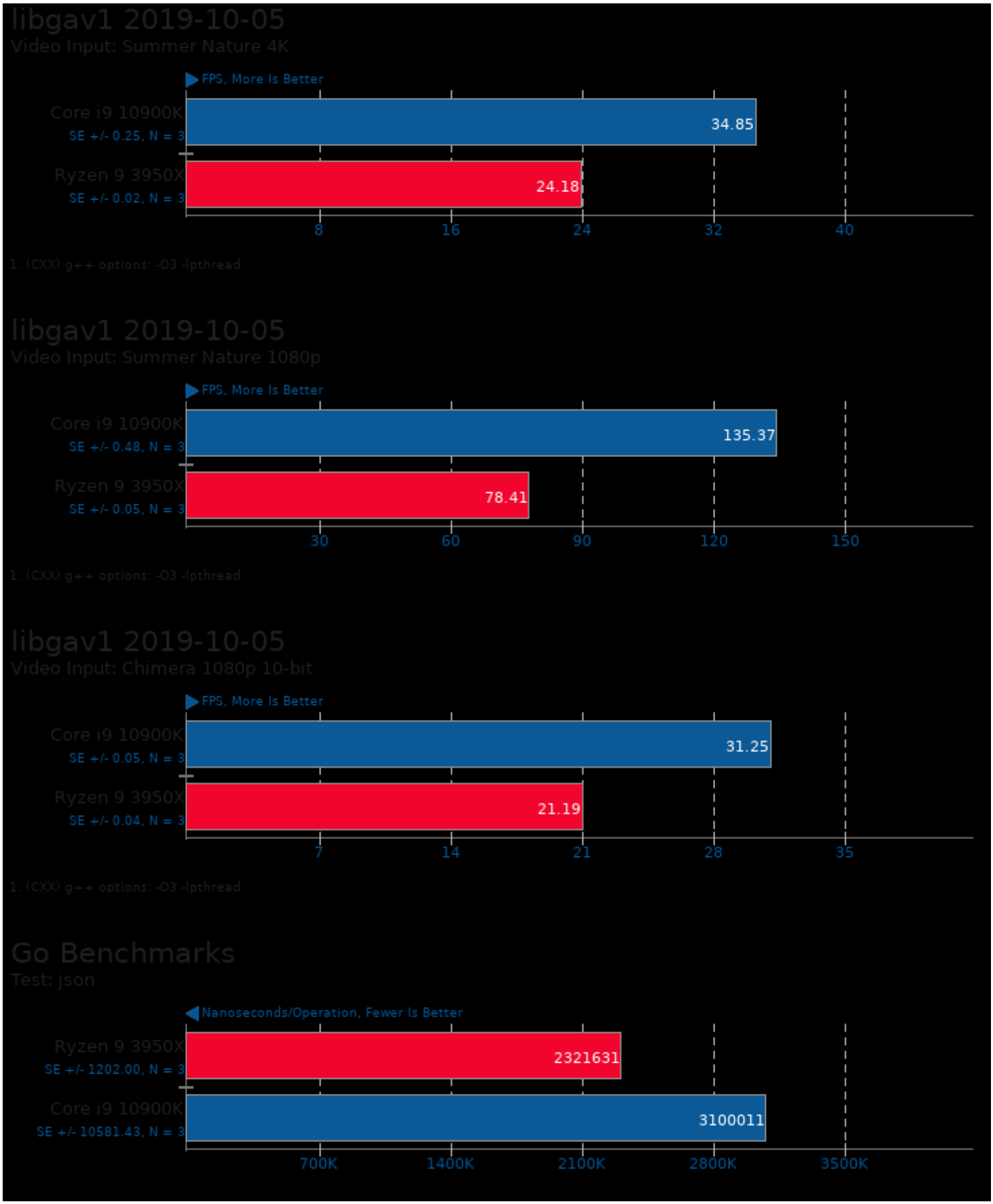

1. (CC) gcc options: -O3 -march=native -lcrypto -lz

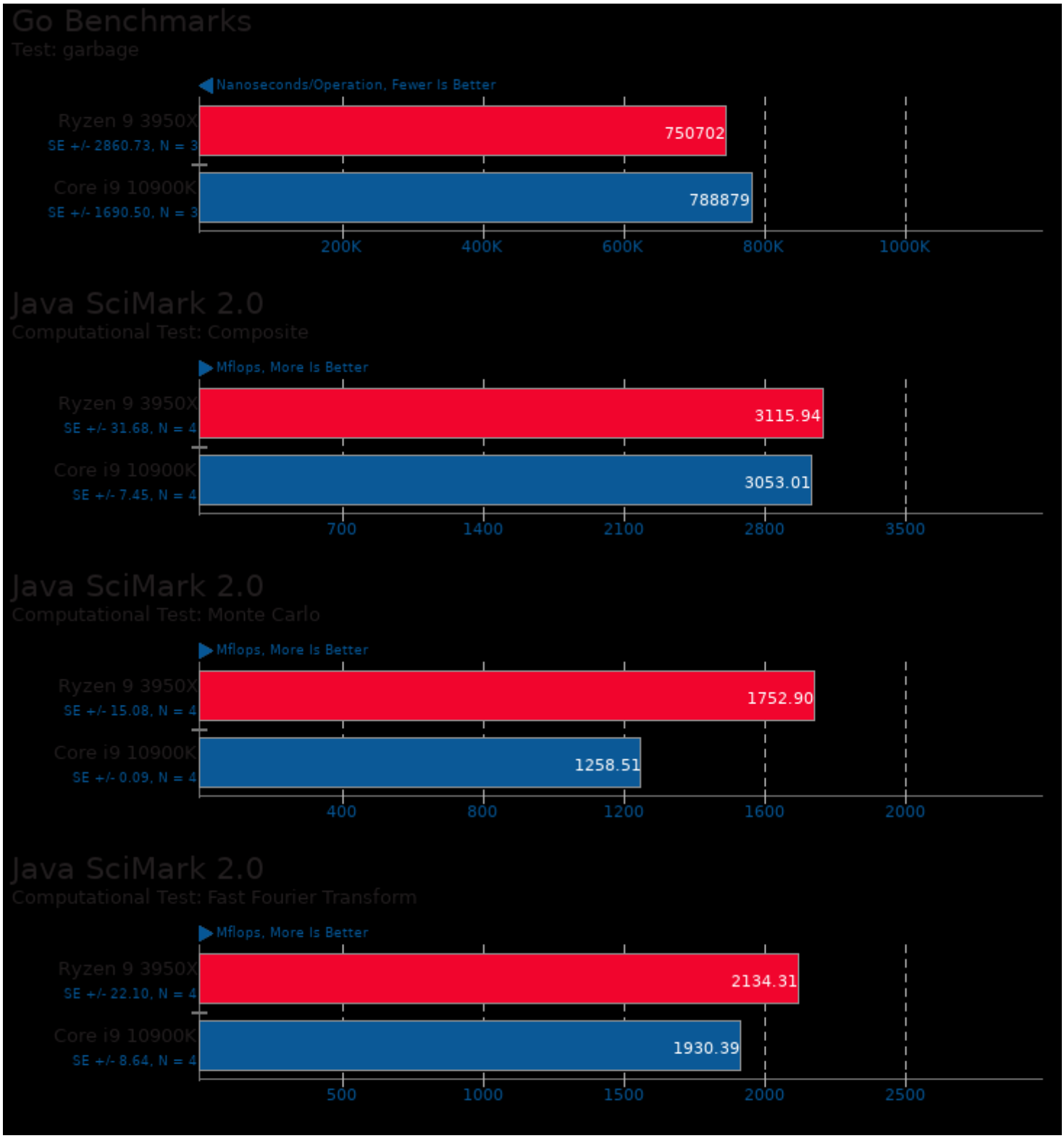
## libgav1 2019-10-05

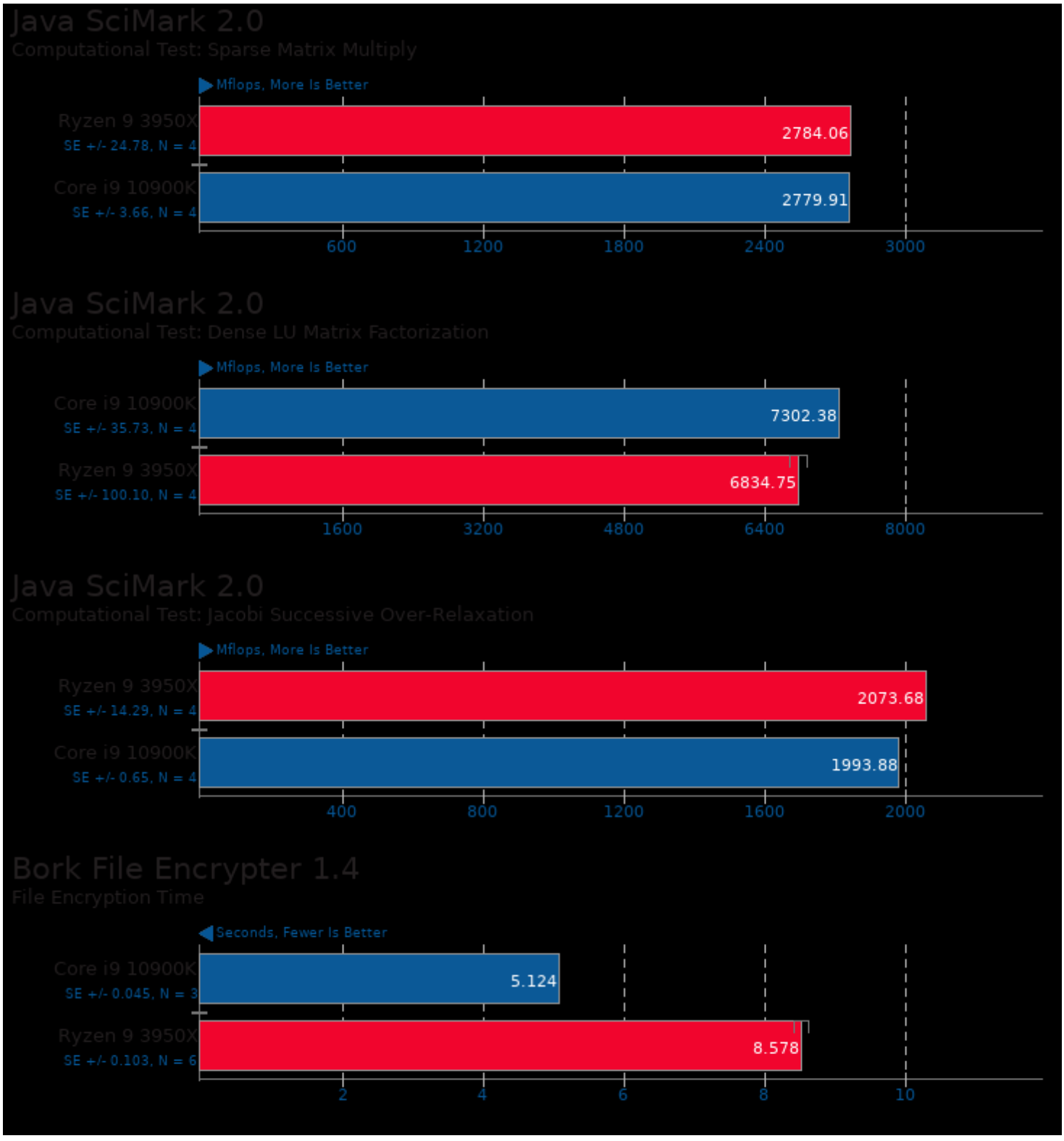
Video Input: Chimera 1080p

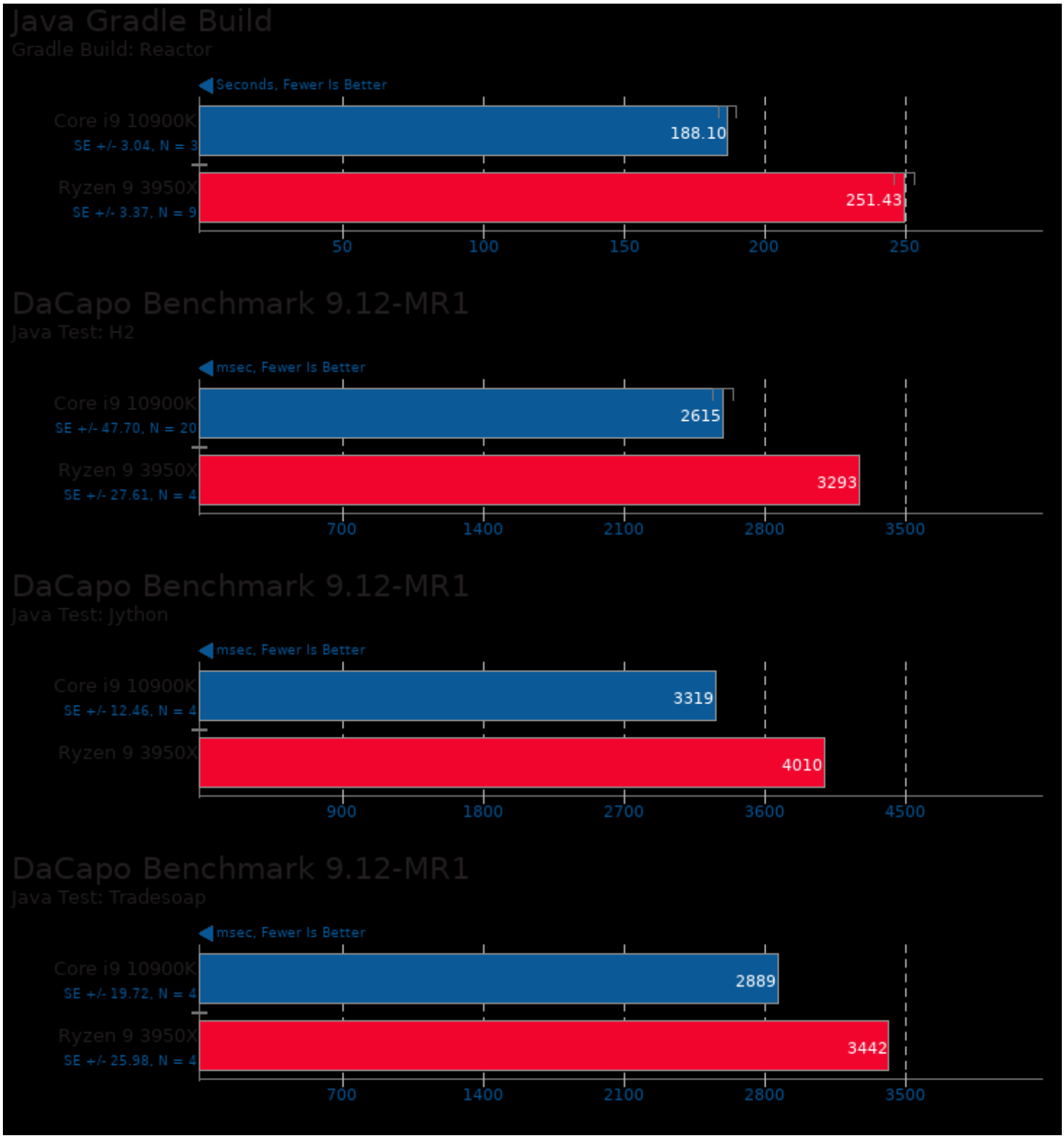


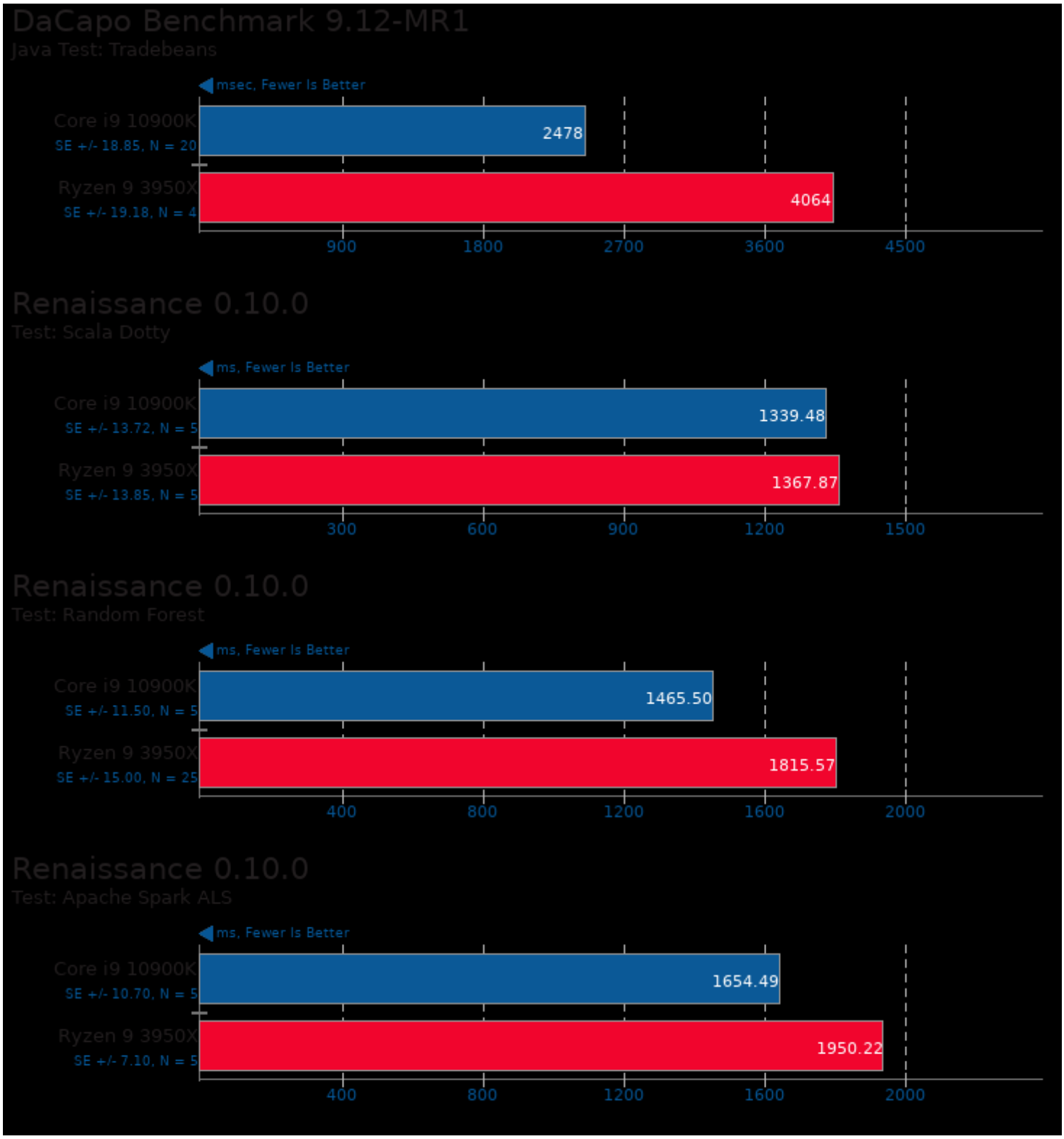

1. (CXX) g++ options: -O3 -lpthread

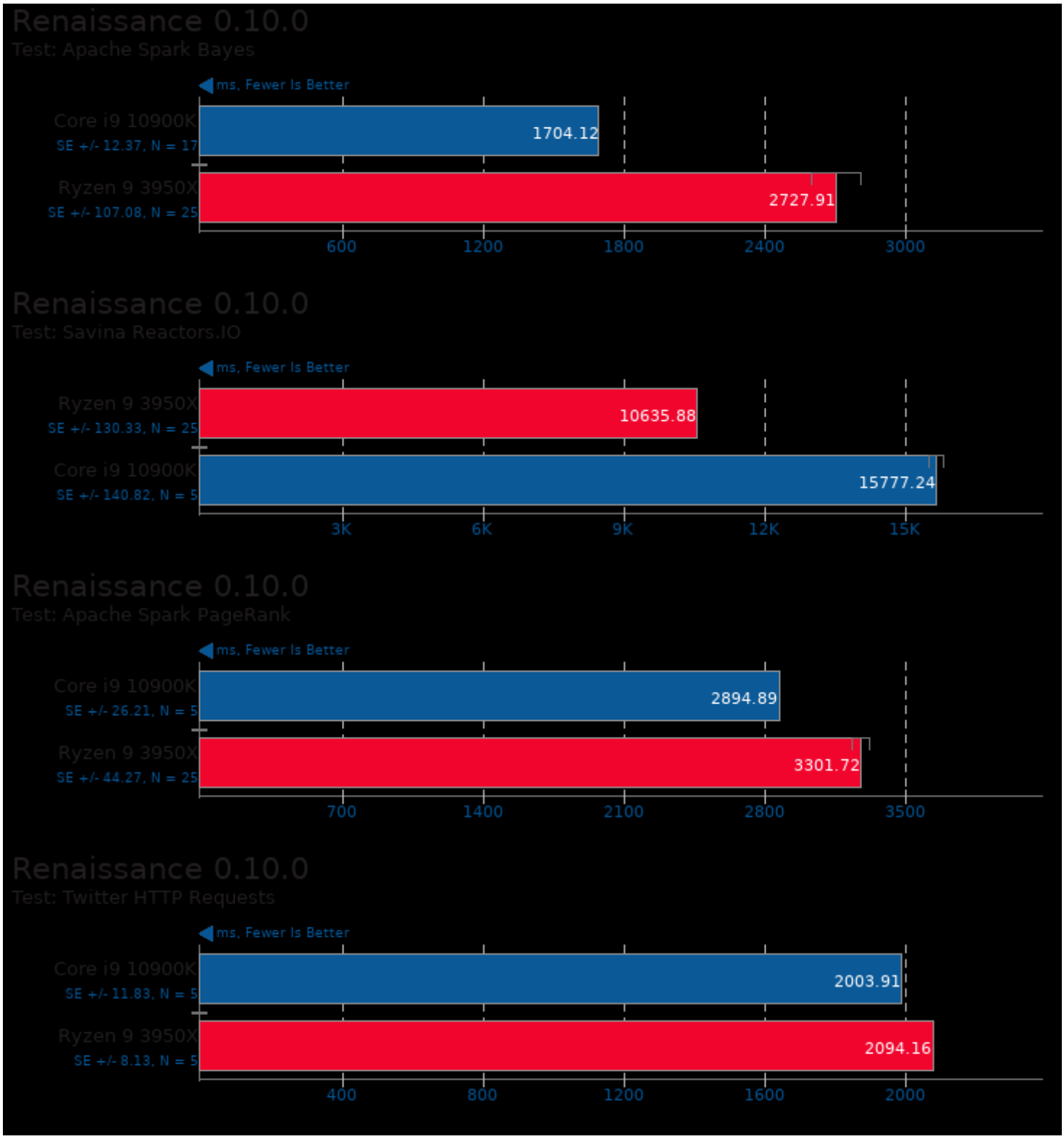

libgav1 2019-10-05
Video Input: Summer Nature 4K
FPS, More Is Better
Core i9 10900K
SE +/- 0.25, N = 3
34.85
Ryzen 9 3950X
SE +/- 0.02, N = 3
24.18
8
16
24
32
40
1. (CXX) g++ options: -O3 -lpthread
libgav1 2019-10-05
Video Input: Summer Nature 1080p
FPS, More Is Better
Core i9 10900K
SE +/- 0.48, N = 3
135.37
Ryzen 9 3950X
SE +/- 0.05, N = 3
78.41
30
60
90
120
150
1. (CXX) g++ options: -O3 -lpthread
libgav1 2019-10-05
Video Input: Chimera 1080p 10-bit
FPS, More Is Better
Core i9 10900K
SE +/- 0.05, N = 3
31.25
Ryzen 9 3950X
SE +/- 0.04, N = 3
21.19
7
14
21
28
35
1. (CXX) g++ options: -O3 -lpthread
Go Benchmarks
Test: json
Nanoseconds/Operation, Fewer Is Better
Ryzen 9 3950X
SE +/- 1202.00, N = 3
2321631
Core i9 10900K
SE +/- 10581.43, N = 3
3100011
700K
1400K
2100K
2800K
3500K

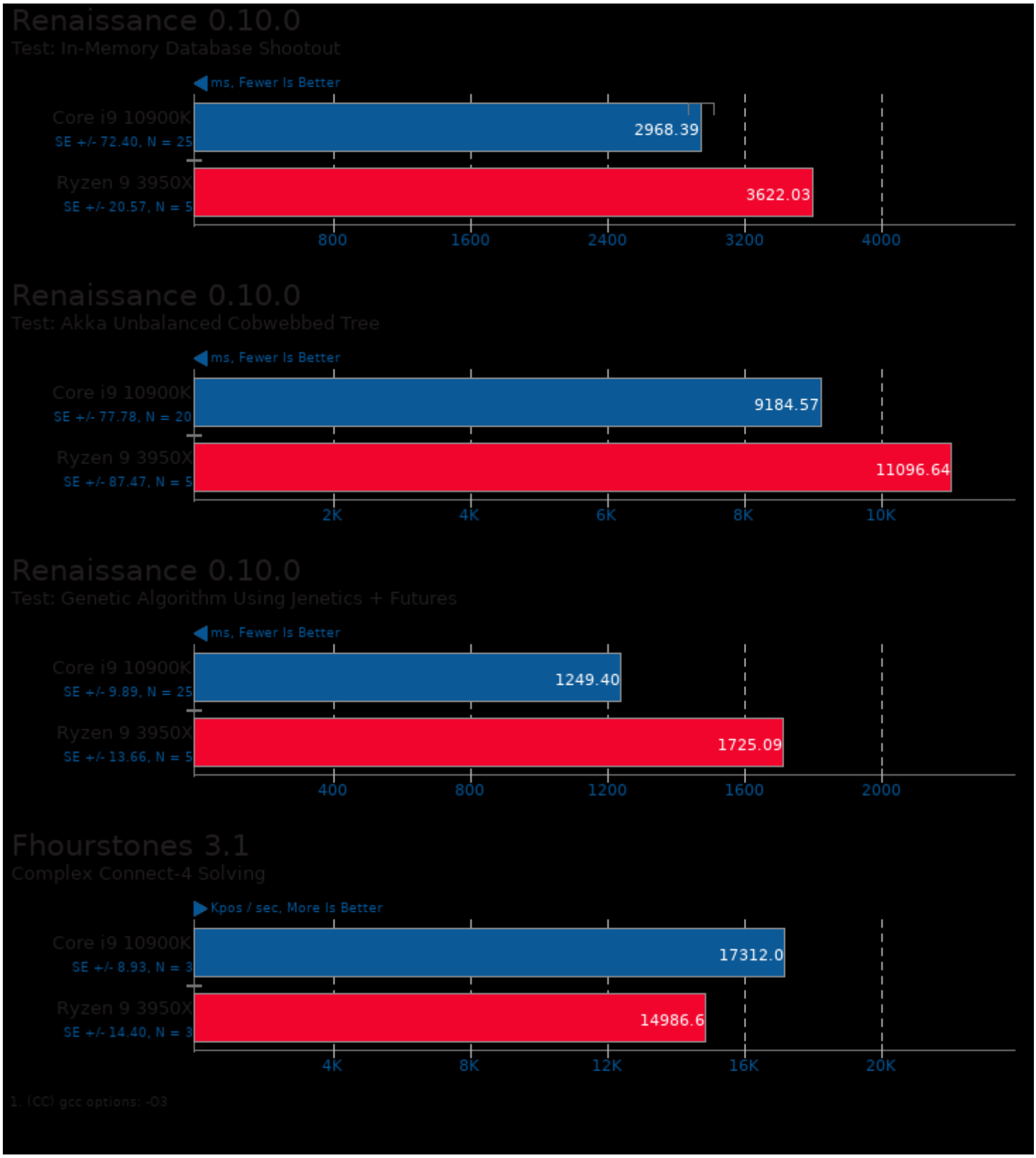

Go Benchmarks
Test: garbage
Nanoseconds/Operation, Fewer Is Better
Ryzen 9 3950X
SE +/- 2860.73, N = 3
750702
Core i9 10900K
SE +/- 1690.50, N = 3
788879
200K
400K
600K
800K
1000K
Java SciMark 2.0
Computational Test: Composite
Mflops, More Is Better
Ryzen 9 3950X
SE +/- 31.68, N = 4
3115.94
Core i9 10900K
SE +/- 7.45, N = 4
3053.01
700
1400
2100
2800
3500
Java SciMark 2.0
Computational Test: Monte Carlo
Mflops, More Is Better
Ryzen 9 3950X
SE +/- 15.08, N = 4
1752.90
Core i9 10900K
SE +/- 0.09, N = 4
1258.51
400
800
1200
1600
2000
Java SciMark 2.0
Computational Test: Fast Fourier Transform
Mflops, More Is Better
Ryzen 9 3950X
SE +/- 22.10, N = 4
2134.31
Core i9 10900K
SE +/- 8.64, N = 4
1930.39
500
1000
1500
2000
2500

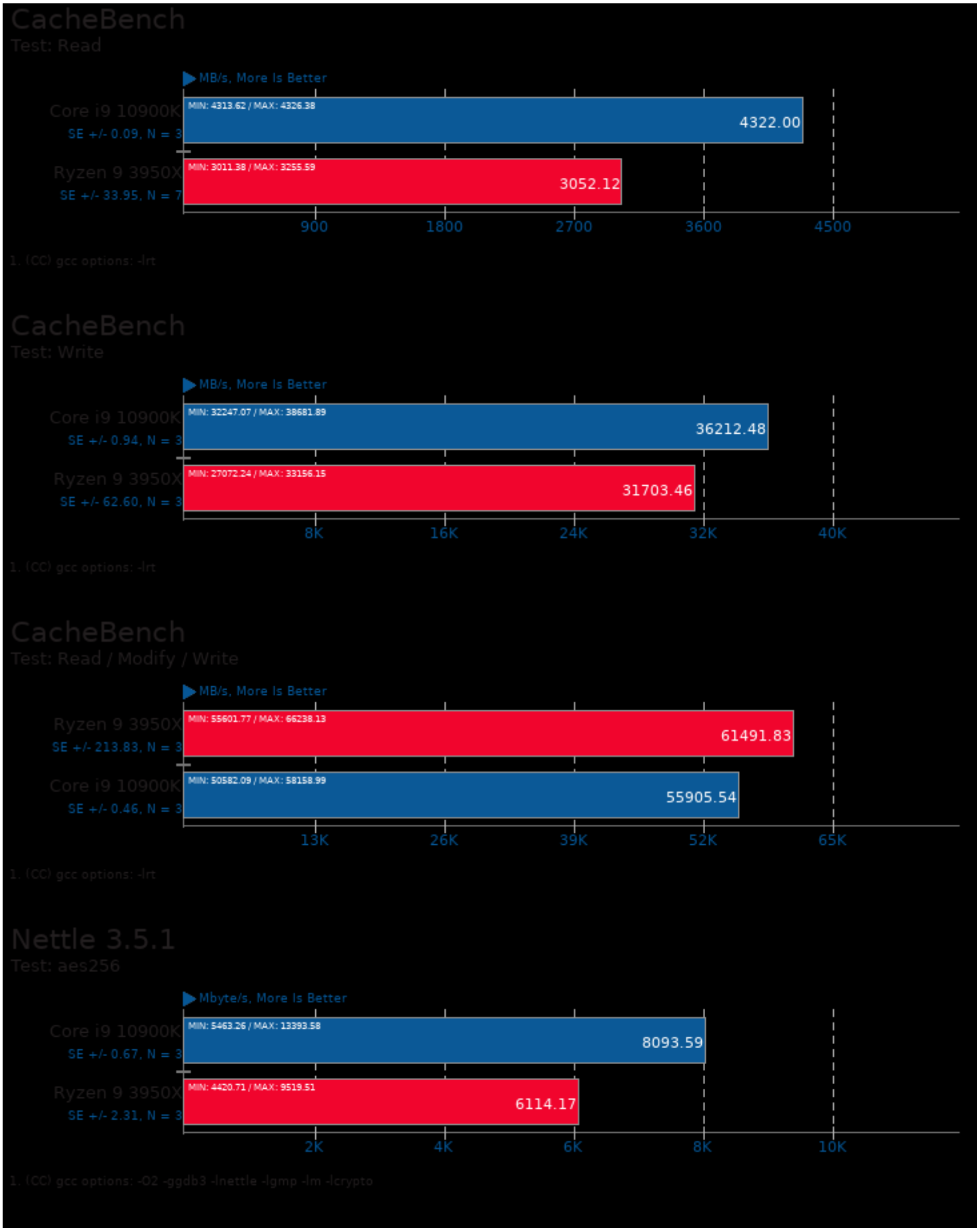

Java SciMark 2.0
Computational Test: Sparse Matrix Multiply
Mflops, More Is Better
Ryzen 9 3950X
SE +/- 24.78, N = 4
2784.06
Core i9 10900K
SE +/- 3.66, N = 4
2779.91
600
1200
1800
2400
3000
Java SciMark 2.0
Computational Test: Dense LU Matrix Factorization
Mflops, More Is Better
Core i9 10900K
SE +/- 35.73, N = 4
7302.38
Ryzen 9 3950X
SE +/- 100.10, N = 4
6834.75
1600
3200
4800
6400
8000
Java SciMark 2.0
Computational Test: Jacobi Successive Over-Relaxation
Mflops, More Is Better
Ryzen 9 3950X
SE +/- 14.29, N = 4
2073.68
Core i9 10900K
SE +/- 0.65, N = 4
1993.88
400
800
1200
1600
2000
Bork File Encrypter 1.4
File Encryption Time
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.045, N = 3
5.124
Ryzen 9 3950X
SE +/- 0.103, N = 6
8.578
2
4
6
8
10


Java Gradle Build
Gradle Build: Reactor
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 3.04, N = 3
188.10
Ryzen 9 3950X
SE +/- 3.37, N = 9
251.43
50
100
150
200
250
DaCapo Benchmark 9.12-MR1
Java Test: H2
msec, Fewer Is Better
Core i9 10900K
SE +/- 47.70, N = 20
2615
Ryzen 9 3950X
SE +/- 27.61, N = 4
3293
700
1400
2100
2800
3500
DaCapo Benchmark 9.12-MR1
Java Test: Jython
msec, Fewer Is Better
Core i9 10900K
SE +/- 12.46, N = 4
3319
Ryzen 9 3950X
4010
900
1800
2700
3600
4500
DaCapo Benchmark 9.12-MR1
Java Test: Tradesoap
msec, Fewer Is Better
Core i9 10900K
SE +/- 19.72, N = 4
2889
Ryzen 9 3950X
SE +/- 25.98, N = 4
3442
700
1400
2100
2800
3500

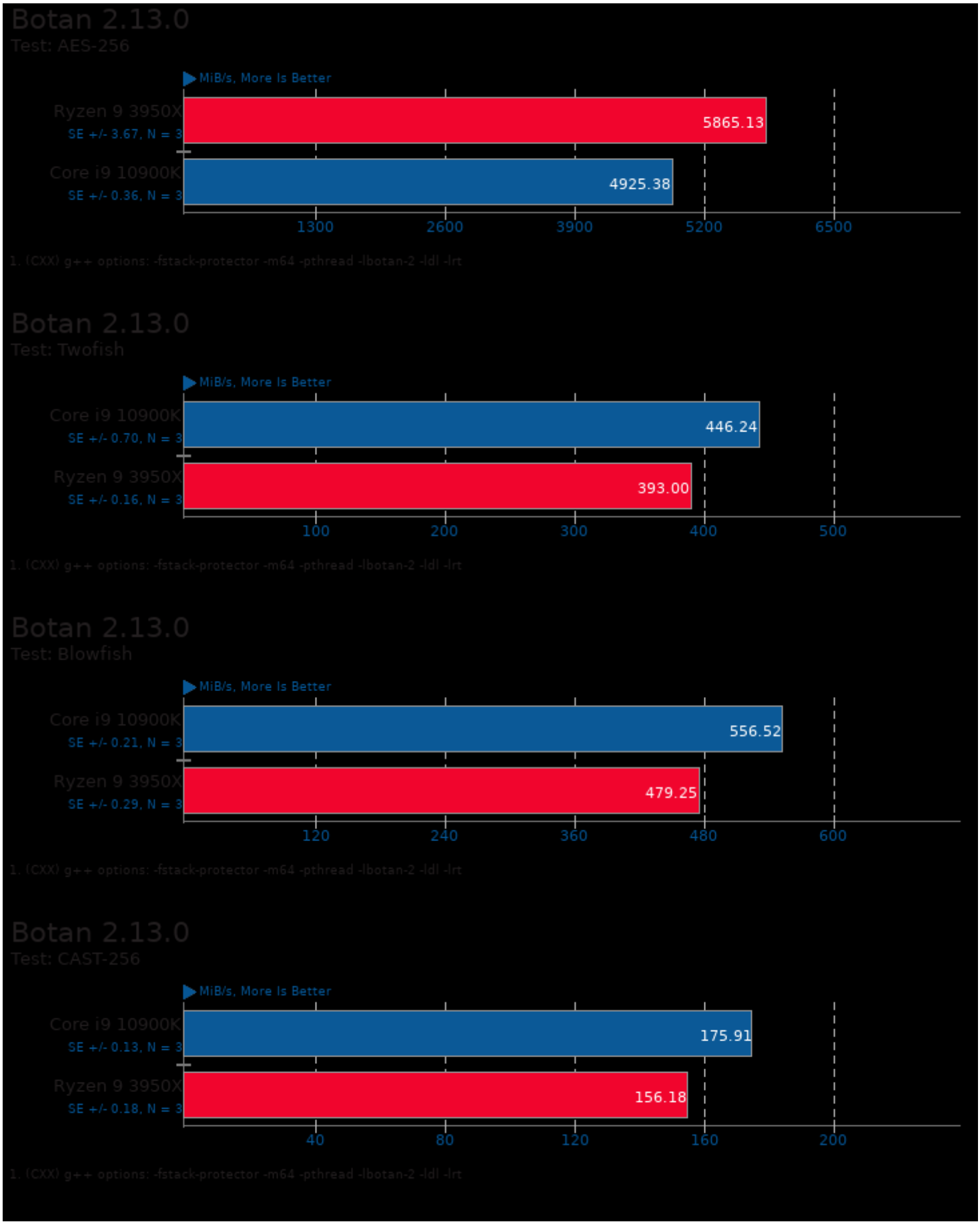

DaCapo Benchmark 9.12-MR1
Java Test: Tradebeans
msec, Fewer Is Better
Core i9 10900K
SE +/- 18.85, N = 20
2478
Ryzen 9 3950X
SE +/- 19.18, N = 4
4064
900
1800
2700
3600
4500
Renaissance 0.10.0
Test: Scala Dotty
ms, Fewer Is Better
Core i9 10900K
SE +/- 13.72, N = 5
1339.48
Ryzen 9 3950X
SE +/- 13.85, N = 5
1367.87
300
600
900
1200
1500
Renaissance 0.10.0
Test: Random Forest
ms, Fewer Is Better
Core i9 10900K
SE +/- 11.50, N = 5
1465.50
Ryzen 9 3950X
SE +/- 15.00, N = 25
1815.57
400
800
1200
1600
2000
Renaissance 0.10.0
Test: Apache Spark ALS
ms, Fewer Is Better
Core i9 10900K
SE +/- 10.70, N = 5
1654.49
Ryzen 9 3950X
SE +/- 7.10, N = 5
1950.22
400
800
1200
1600
2000


Renaissance 0.10.0
Test: Apache Spark Bayes
ms, Fewer Is Better
Core i9 10900K
SE +/- 12.37, N = 17
1704.12
Ryzen 9 3950X
SE +/- 107.08, N = 25
2727.91
600
1200
1800
2400
3000
Renaissance 0.10.0
Test: Savina Reactors.IO
ms, Fewer Is Better
Ryzen 9 3950X
SE +/- 130.33, N = 25
10635.88
Core i9 10900K
SE +/- 140.82, N = 5
15777.24
3K
6K
9K
12K
15K
Renaissance 0.10.0
Test: Apache Spark PageRank
ms, Fewer Is Better
Core i9 10900K
SE +/- 26.21, N = 5
2894.89
Ryzen 9 3950X
SE +/- 44.27, N = 25
3301.72
700
1400
2100
2800
3500
Renaissance 0.10.0
Test: Twitter HTTP Requests
ms, Fewer Is Better
Core i9 10900K
SE +/- 11.83, N = 5
2003.91
Ryzen 9 3950X
SE +/- 8.13, N = 5
2094.16
400
800
1200
1600
2000


Renaissance 0.10.0
Test: In-Memory Database Shootout
ms, Fewer Is Better
Core i9 10900K
SE +/- 72.40, N = 25
2968.39
Ryzen 9 3950X
SE +/- 20.57, N = 5
3622.03
800
1600
2400
3200
4000
Renaissance 0.10.0
Test: Akka Unbalanced Cobwebbed Tree
ms, Fewer Is Better
Core i9 10900K
SE +/- 77.78, N = 20
9184.57
Ryzen 9 3950X
SE +/- 87.47, N = 5
11096.64
2K
4K
6K
8K
10K
Renaissance 0.10.0
Test: Genetic Algorithm Using Jenetics + Futures
ms, Fewer Is Better
Core i9 10900K
SE +/- 9.89, N = 25
1249.40
Ryzen 9 3950X
SE +/- 13.66, N = 5
1725.09
400
800
1200
1600
2000
Fhourstones 3.1
Complex Connect-4 Solving
Kpos / sec, More Is Better
Core i9 10900K
SE +/- 8.93, N = 3
17312.0
Ryzen 9 3950X
SE +/- 14.40, N = 3
14986.6
4K
8K
12K
16K
20K
1. (CC) gcc options: -O3

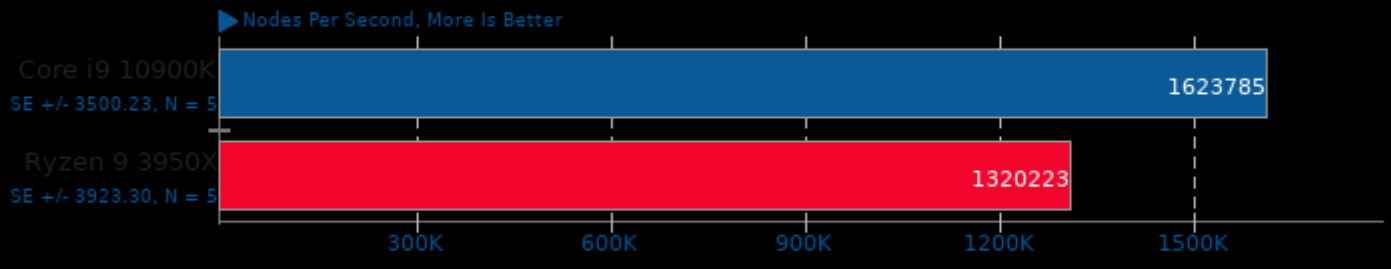

CacheBench
Test: Read
MB/s, More Is Better
Core i9 10900K
SE +/- 0.09, N = 3
MIN: 4313.62 / MAX: 4326.38
4322.00
Ryzen 9 3950X
SE +/- 33.95, N = 7
MIN: 3011.38 / MAX: 3255.59
3052.12
900
1800
2700
3600
4500
1. (CC) gcc options: -lrt
CacheBench
Test: Write
MB/s, More Is Better
Core i9 10900K
SE +/- 0.94, N = 3
MIN: 32247.07 / MAX: 38681.89
36212.48
Ryzen 9 3950X
SE +/- 62.60, N = 3
MIN: 27072.24 / MAX: 33156.15
31703.46
8K
16K
24K
32K
40K
1. (CC) gcc options: -lrt
CacheBench
Test: Read / Modify / Write
MB/s, More Is Better
Ryzen 9 3950X
SE +/- 213.83, N = 3
MIN: 55601.77 / MAX: 66238.13
61491.83
Core i9 10900K
SE +/- 0.46, N = 3
MIN: 50582.09 / MAX: 58158.99
55905.54
13K
26K
39K
52K
65K
1. (CC) gcc options: -lrt
Nettle 3.5.1
Test: aes256
Mbyte/s, More Is Better
Core i9 10900K
SE +/- 0.67, N = 3
MIN: 5463.26 / MAX: 13393.58
8093.59
Ryzen 9 3950X
SE +/- 2.31, N = 3
MIN: 4420.71 / MAX: 9519.51
6114.17
2K
4K
6K
8K
10K
1. (CC) gcc options: -O2 -ggdb3 -lnettle -lgmp -lm -lcrypto


Nettle 3.5.1
Test: chacha
Mbyte/s, More Is Better
Core i9 10900K
SE +/- 0.19, N = 3
MIN: 688.61 / MAX: 3733.83
1359.76
Ryzen 9 3950X
SE +/- 0.36, N = 3
MIN: 504.81 / MAX: 2706.97
992.02
300
600
900
1200
1500
1. (CC) gcc options: -O2 -ggdb3 -lnettle -lgmp -lm -lcrypto
Nettle 3.5.1
Test: sha512
Mbyte/s, More Is Better
Ryzen 9 3950X
SE +/- 8.34, N = 5
640.16
Core i9 10900K
SE +/- 1.64, N = 3
639.74
140
280
420
560
700
1. (CC) gcc options: -O2 -ggdb3 -lnettle -lgmp -lm -lcrypto
Nettle 3.5.1
Test: poly1305-aes
Mbyte/s, More Is Better
Core i9 10900K
SE +/- 6.96, N = 3
3725.66
Ryzen 9 3950X
SE +/- 3.39, N = 3
2711.19
800
1600
2400
3200
4000
1. (CC) gcc options: -O2 -ggdb3 -lnettle -lgmp -lm -lcrypto
Botan 2.13.0
Test: KASUMI
MiB/s, More Is Better
Core i9 10900K
SE +/- 0.18, N = 3
115.38
Ryzen 9 3950X
SE +/- 0.18, N = 3
101.03
30
60
90
120
150
1. (CXX) g++ options: -fstack-protector -m64 -pthread -lbotan-2 -ldl -lrt


Botan 2.13.0
Test: AES-256
MiB/s, More Is Better
Ryzen 9 3950X
SE +/- 3.67, N = 3
5865.13
Core i9 10900K
SE +/- 0.36, N = 3
4925.38
1300
2600
3900
5200
6500
1. (CXX) g++ options: -fstack-protector -m64 -pthread -lbotan-2 -ldl -lrt
Botan 2.13.0
Test: Twofish
MiB/s, More Is Better
Core i9 10900K
SE +/- 0.70, N = 3
446.24
Ryzen 9 3950X
SE +/- 0.16, N = 3
393.00
100
200
300
400
500
1. (CXX) g++ options: -fstack-protector -m64 -pthread -lbotan-2 -ldl -lrt
Botan 2.13.0
Test: Blowfish
MiB/s, More Is Better
Core i9 10900K
SE +/- 0.21, N = 3
556.52
Ryzen 9 3950X
SE +/- 0.29, N = 3
479.25
120
240
360
480
600
1. (CXX) g++ options: -fstack-protector -m64 -pthread -lbotan-2 -ldl -lrt
Botan 2.13.0
Test: CAST-256
MiB/s, More Is Better
Core i9 10900K
SE +/- 0.13, N = 3
175.91
Ryzen 9 3950X
SE +/- 0.18, N = 3
156.18
40
80
120
160
200
1. (CXX) g++ options: -fstack-protector -m64 -pthread -lbotan-2 -ldl -lrt

## TSCP 1.81

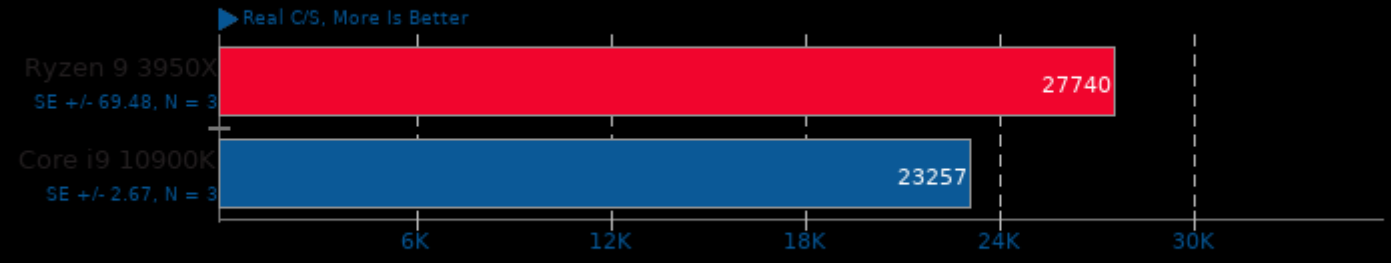
AI Chess Performance




1. (CC) gcc options: -O3 -march=native

## John The Ripper 1.9.0-jumbo-1

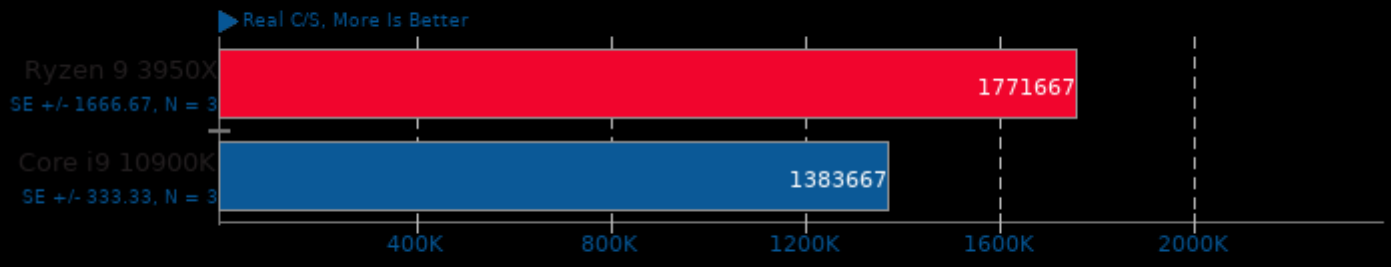
Test: Blowfish




1. (CC) gcc options: -m64 -lssl -lcrypto -fopenmp -lgmp -pthread -lm -lz -ldl -lcrypt -lbz2

## John The Ripper 1.9.0-jumbo-1

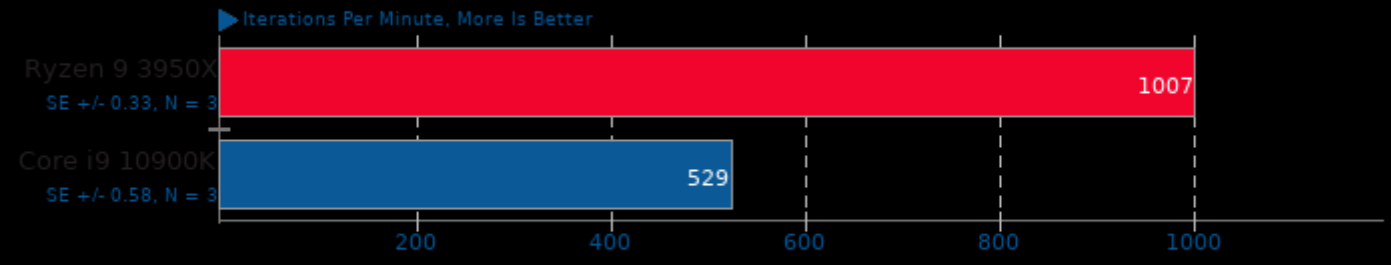
Test: MD5



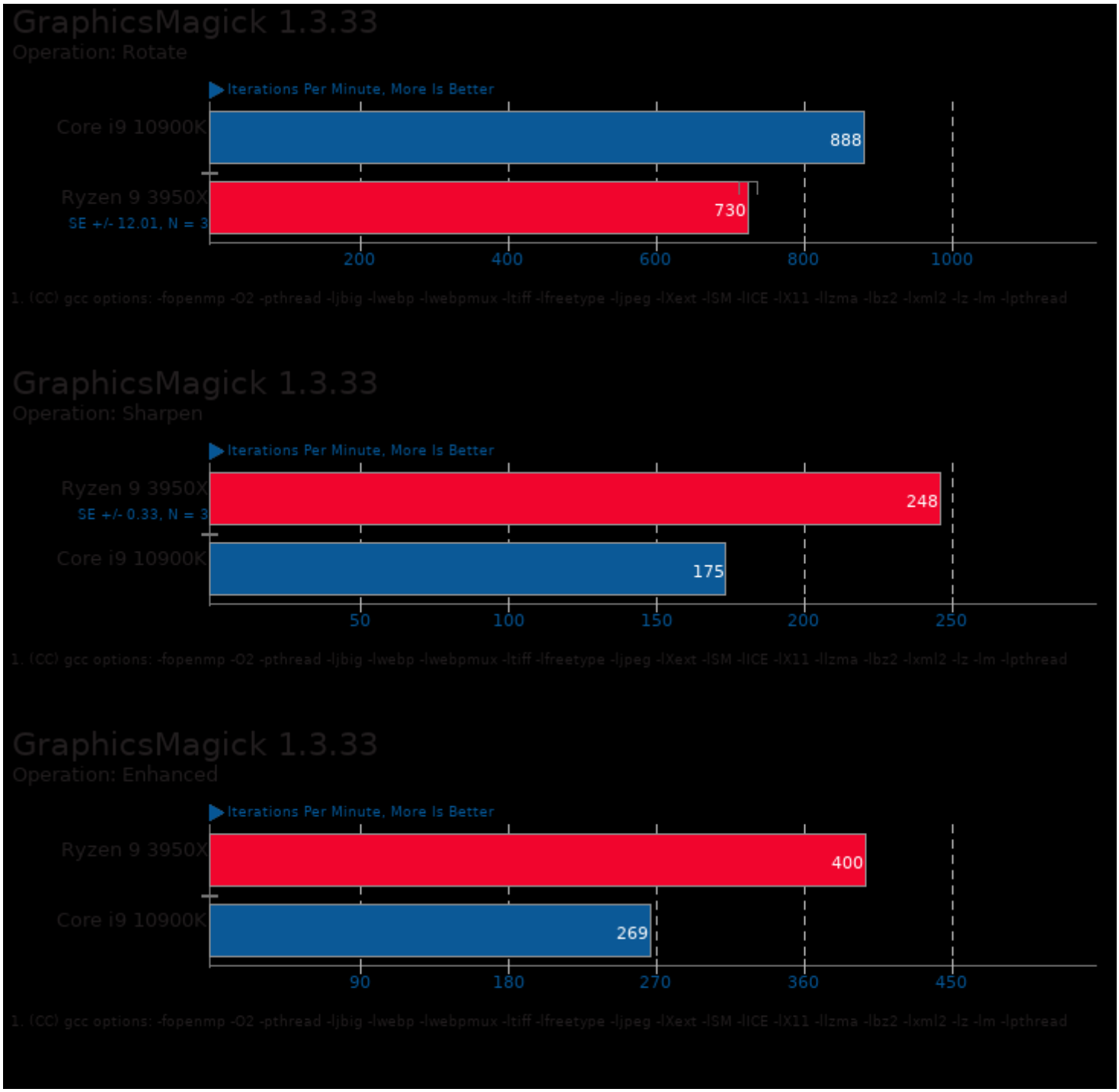

1. (CC) gcc options: -m64 -lssl -lcrypto -fopenmp -lgmp -pthread -lm -lz -ldl -lcrypt -lbz2

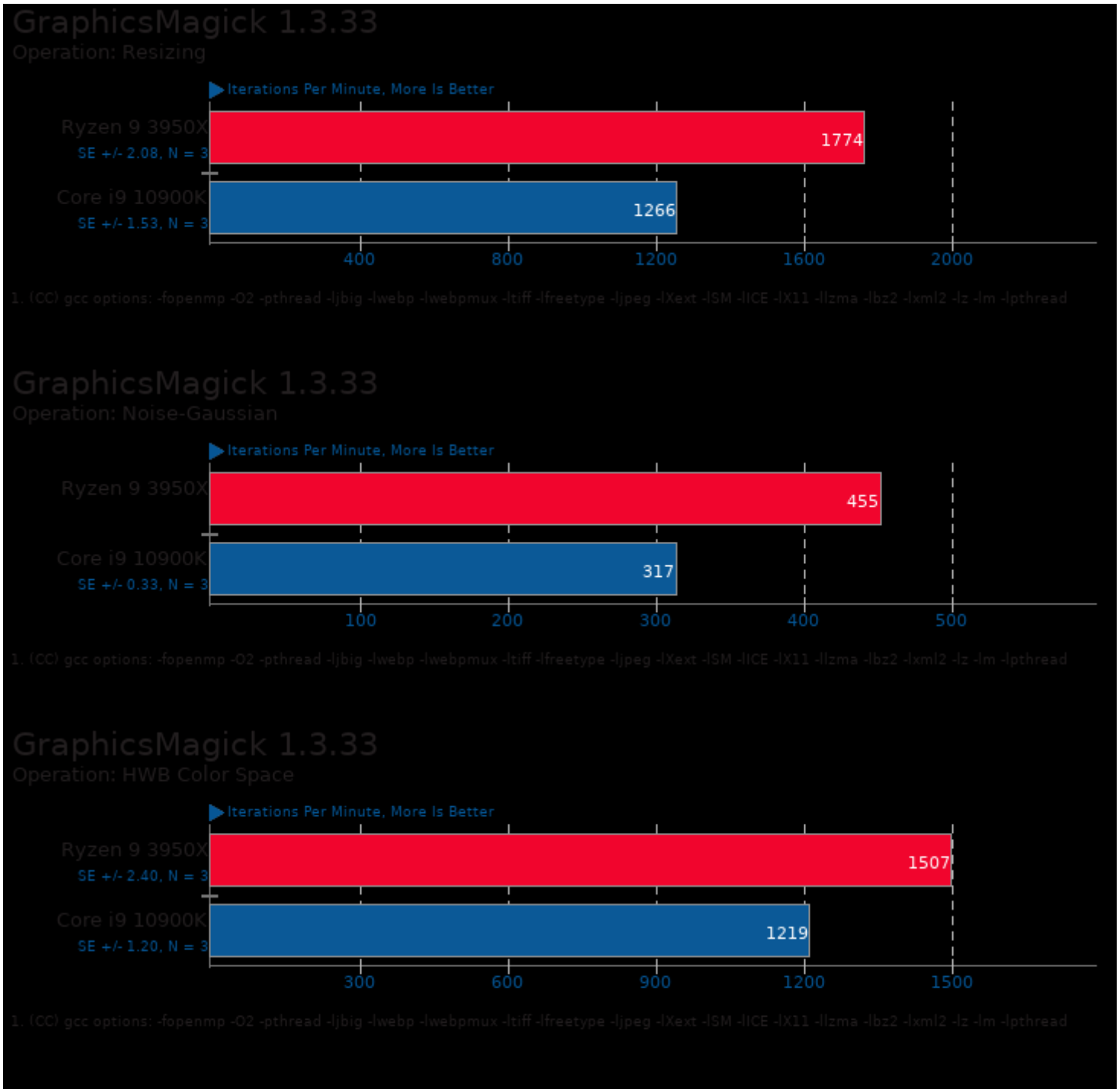
## GraphicsMagick 1.3.33

Operation: Swirl

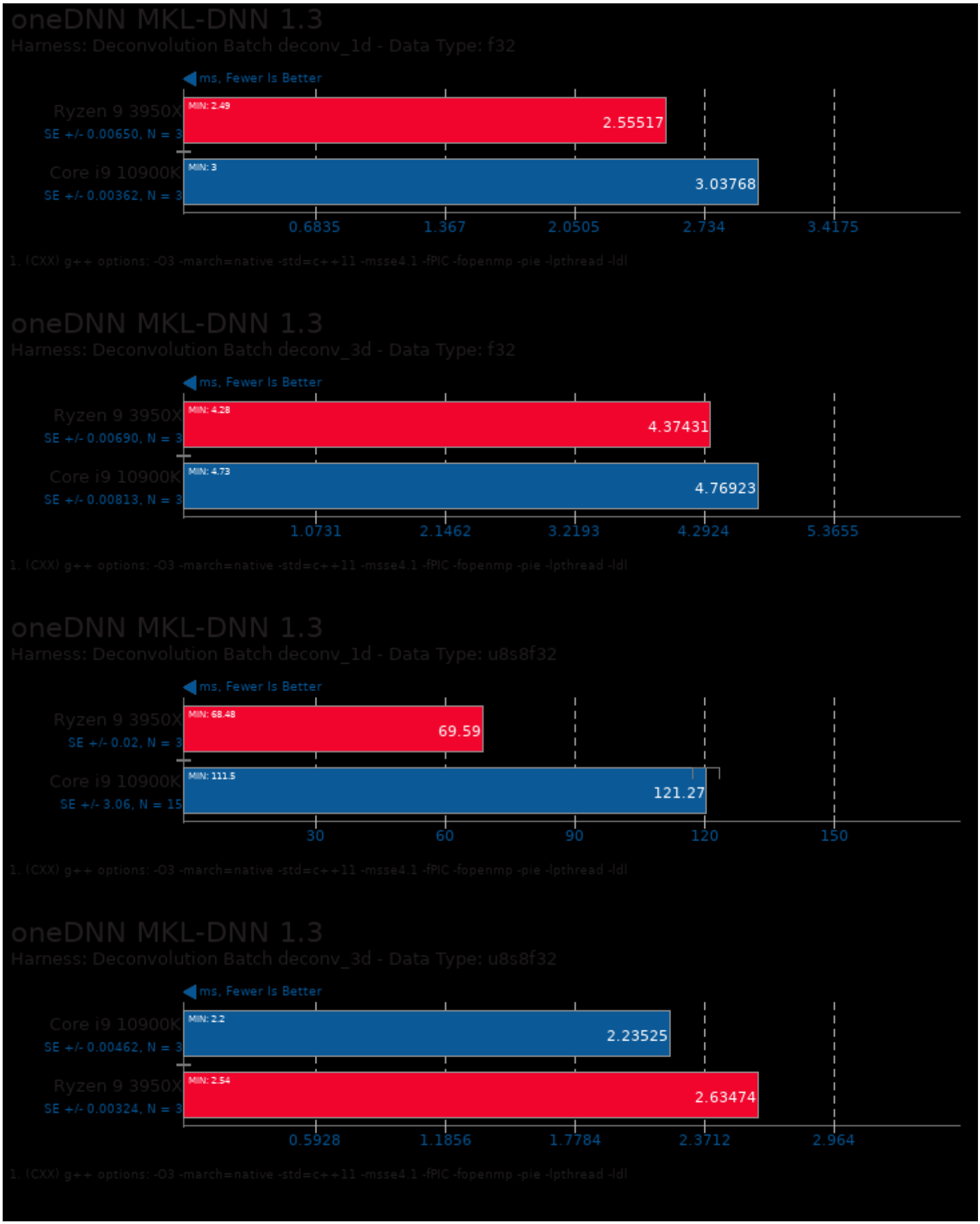


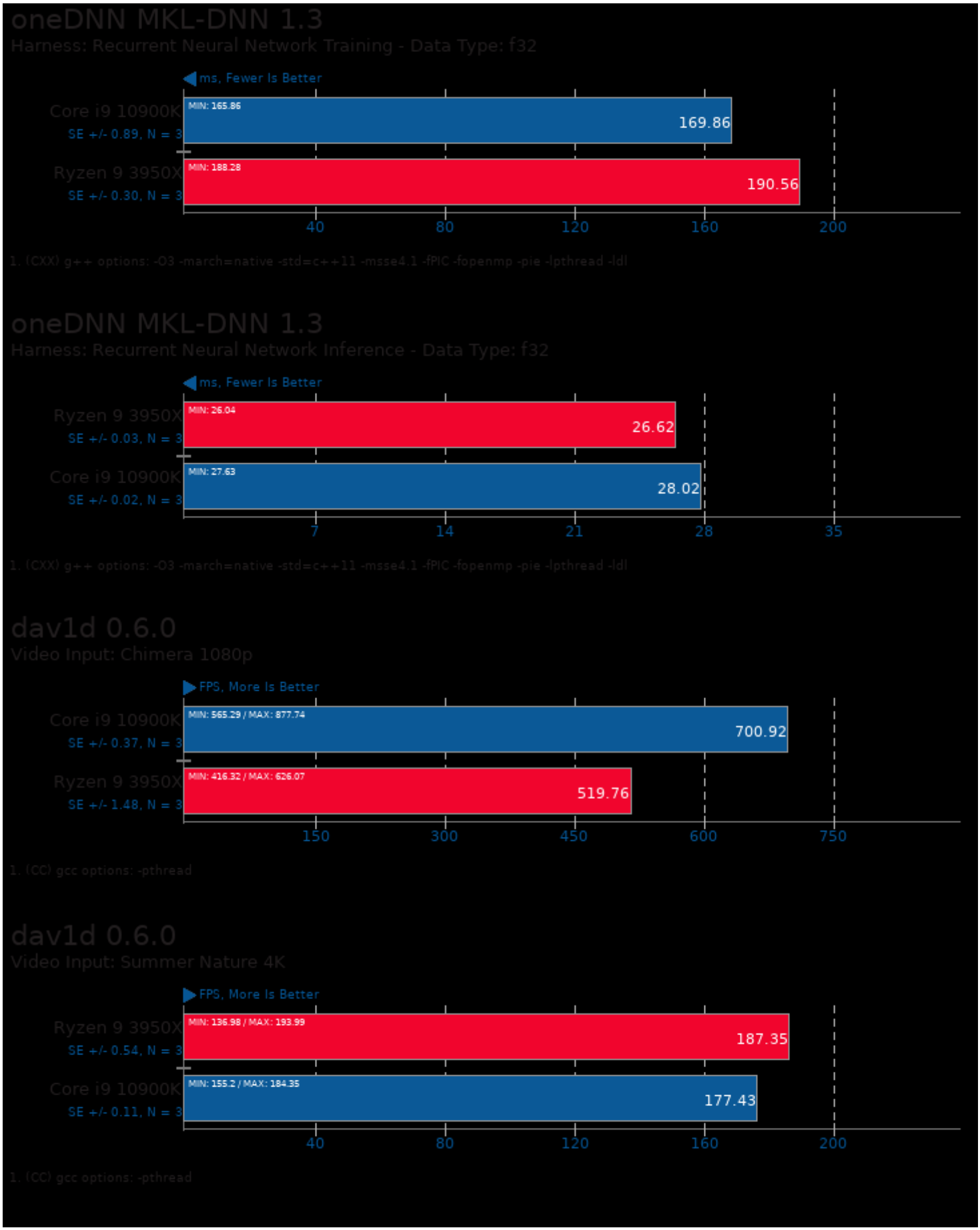

1. (CC) gcc options: -fopenmp -O2 -pthread -ljbig -lwebp -lwebpmux -ltiff -lfreetype -ljpeg -lXext -lSM -lICE -lX11 -llzma -lbz2 -lxml2 -lz -lm -lpthread


GraphicsMagick 1.3.33
Operation: Rotate
Iterations Per Minute, More Is Better
Core i9 10900K
888
Ryzen 9 3950X
730
SE +/- 12.01, N = 3
200
400
600
800
1000
1. (CC) gcc options: -fopenmp -O2 -pthread -ljbig -lwebp -lwebpmux -ltiff -lfreetype -ljpeg -lXext -lSM -lICE -lX11 -llzma -lbz2 -lxml2 -lz -lm -lpthread
GraphicsMagick 1.3.33
Operation: Sharpen
Iterations Per Minute, More Is Better
Ryzen 9 3950X
248
SE +/- 0.33, N = 3
Core i9 10900K
175
50
100
150
200
250
1. (CC) gcc options: -fopenmp -O2 -pthread -ljbig -lwebp -lwebpmux -ltiff -lfreetype -ljpeg -lXext -lSM -lICE -lX11 -llzma -lbz2 -lxml2 -lz -lm -lpthread
GraphicsMagick 1.3.33
Operation: Enhanced
Iterations Per Minute, More Is Better
Ryzen 9 3950X
400
Core i9 10900K
269
90
180
270
360
450
1. (CC) gcc options: -fopenmp -O2 -pthread -ljbig -lwebp -lwebpmux -ltiff -lfreetype -ljpeg -lXext -lSM -lICE -lX11 -llzma -lbz2 -lxml2 -lz -lm -lpthread


GraphicsMagick 1.3.33
Operation: Resizing
Iterations Per Minute, More Is Better
Ryzen 9 3950X
SE +/- 2.08, N = 3
1774
Core i9 10900K
SE +/- 1.53, N = 3
1266
400
800
1200
1600
2000
1. (CC) gcc options: -fopenmp -O2 -pthread -ljbig -lwebp -lwebpmux -ltiff -lfreetype -ljpeg -lXext -lSM -lICE -lX11 -llzma -lbz2 -lxml2 -lz -lm -lpthread
GraphicsMagick 1.3.33
Operation: Noise-Gaussian
Iterations Per Minute, More Is Better
Ryzen 9 3950X
455
Core i9 10900K
SE +/- 0.33, N = 3
317
100
200
300
400
500
1. (CC) gcc options: -fopenmp -O2 -pthread -ljbig -lwebp -lwebpmux -ltiff -lfreetype -ljpeg -lXext -lSM -lICE -lX11 -llzma -lbz2 -lxml2 -lz -lm -lpthread
GraphicsMagick 1.3.33
Operation: HWB Color Space
Iterations Per Minute, More Is Better
Ryzen 9 3950X
SE +/- 2.40, N = 3
1507
Core i9 10900K
SE +/- 1.20, N = 3
1219
300
600
900
1200
1500
1. (CC) gcc options: -fopenmp -O2 -pthread -ljbig -lwebp -lwebpmux -ltiff -lfreetype -ljpeg -lXext -lSM -lICE -lX11 -llzma -lbz2 -lxml2 -lz -lm -lpthread

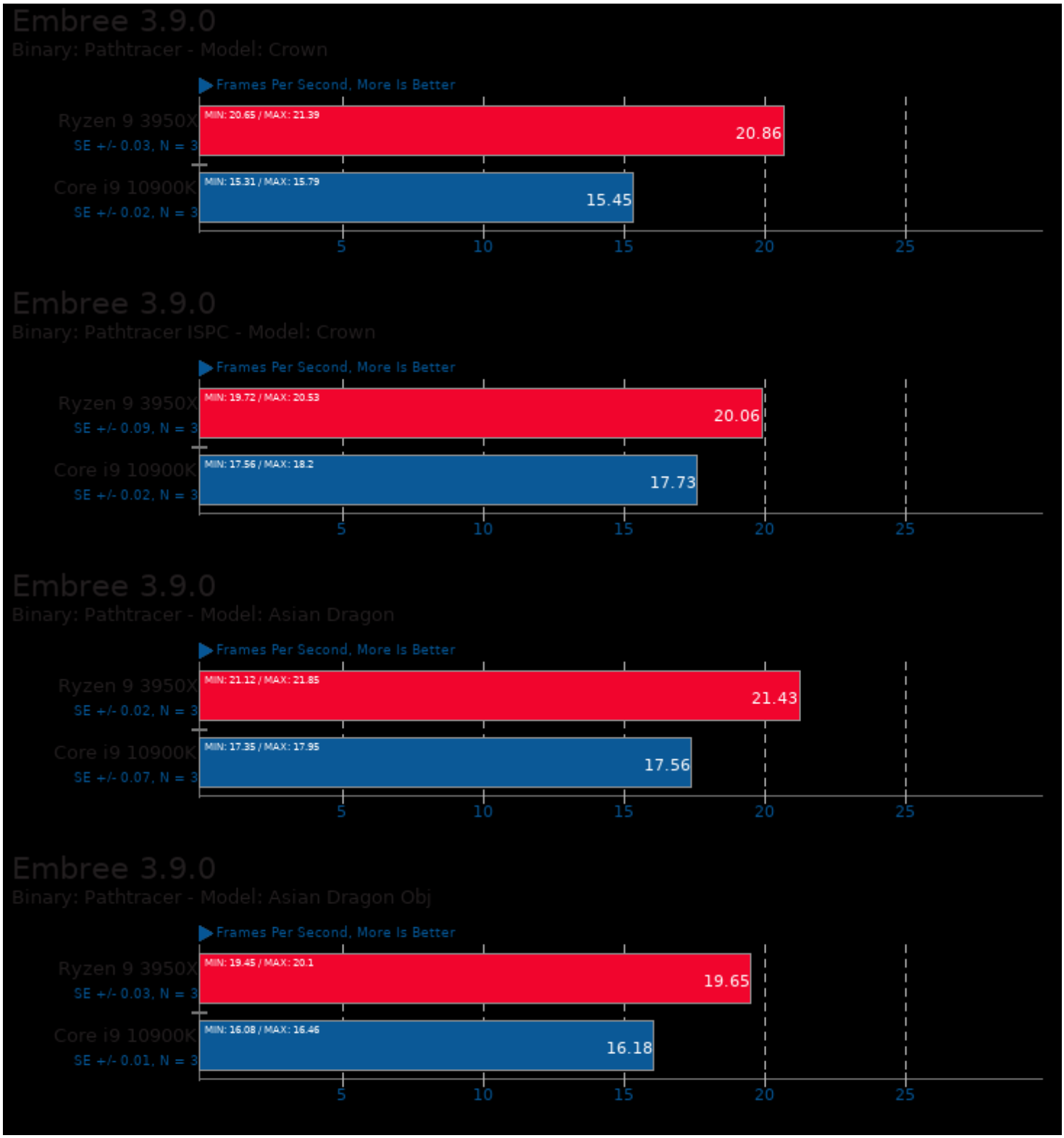

oneDNN MKL-DNN 1.3
Harness: IP Batch 1D - Data Type: f32
ms, Fewer Is Better
Core i9 10900K
SE +/- 0.01183, N = 3
MIN: 3.03
3.30905
Ryzen 9 3950X
SE +/- 0.00333, N = 3
MIN: 4.38
4.58909
1.0325
2.065
3.0975
4.13
5.1625
1. (CXX) g++ options: -O3 -march=native -std=c++11 -msse4.1 -fPIC -fopenmp -pie -lpthread -ldl
oneDNN MKL-DNN 1.3
Harness: IP Batch All - Data Type: f32
ms, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.10, N = 3
MIN: 49.23
50.17
Core i9 10900K
SE +/- 0.05, N = 3
MIN: 56.17
56.91
13
26
39
52
65
1. (CXX) g++ options: -O3 -march=native -std=c++11 -msse4.1 -fPIC -fopenmp -pie -lpthread -ldl
oneDNN MKL-DNN 1.3
Harness: IP Batch 1D - Data Type: u8s8f32
ms, Fewer Is Better
Core i9 10900K
SE +/- 0.00032, N = 3
MIN: 1.16
1.17466
Ryzen 9 3950X
SE +/- 0.00126, N = 3
MIN: 1.31
1.34228
0.302
0.604
0.906
1.208
1.51
1. (CXX) g++ options: -O3 -march=native -std=c++11 -msse4.1 -fPIC -fopenmp -pie -lpthread -ldl
oneDNN MKL-DNN 1.3
Harness: IP Batch All - Data Type: u8s8f32
ms, Fewer Is Better
Core i9 10900K
SE +/- 0.01, N = 3
MIN: 18.81
19.02
Ryzen 9 3950X
SE +/- 0.02, N = 3
MIN: 19.43
19.89
5
10
15
20
25
1. (CXX) g++ options: -O3 -march=native -std=c++11 -msse4.1 -fPIC -fopenmp -pie -lpthread -ldl

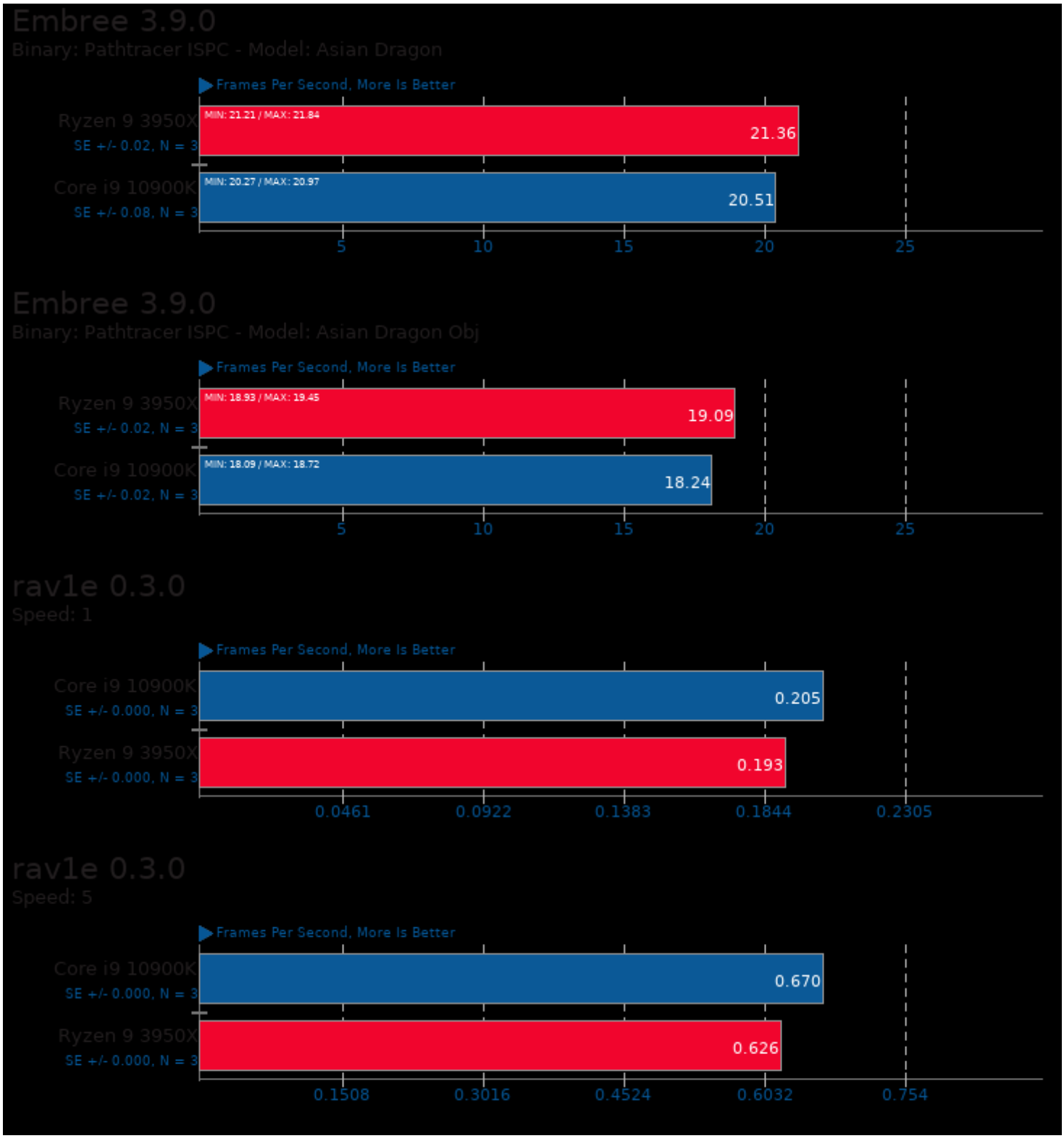

oneDNN MKL-DNN 1.3
Harness: Deconvolution Batch deconv_1d - Data Type: f32
ms, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.00650, N = 3
MIN: 2.49
2.55517
Core i9 10900K
SE +/- 0.00362, N = 3
MIN: 3
3.03768
0.6835
1.367
2.0505
2.734
3.4175
1. (CXX) g++ options: -O3 -march=native -std=c++11 -msse4.1 -fPIC -fopenmp -pie -lpthread -ldl
oneDNN MKL-DNN 1.3
Harness: Deconvolution Batch deconv_3d - Data Type: f32
ms, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.00690, N = 3
MIN: 4.28
4.37431
Core i9 10900K
SE +/- 0.00813, N = 3
MIN: 4.73
4.76923
1.0731
2.1462
3.2193
4.2924
5.3655
1. (CXX) g++ options: -O3 -march=native -std=c++11 -msse4.1 -fPIC -fopenmp -pie -lpthread -ldl
oneDNN MKL-DNN 1.3
Harness: Deconvolution Batch deconv_1d - Data Type: u8s8f32
ms, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.02, N = 3
MIN: 68.48
69.59
Core i9 10900K
SE +/- 3.06, N = 15
MIN: 111.5
121.27
30
60
90
120
150
1. (CXX) g++ options: -O3 -march=native -std=c++11 -msse4.1 -fPIC -fopenmp -pie -lpthread -ldl
oneDNN MKL-DNN 1.3
Harness: Deconvolution Batch deconv_3d - Data Type: u8s8f32
ms, Fewer Is Better
Core i9 10900K
SE +/- 0.00462, N = 3
MIN: 2.2
2.23525
Ryzen 9 3950X
SE +/- 0.00324, N = 3
MIN: 2.54
2.63474
0.5928
1.1856
1.7784
2.3712
2.964
1. (CXX) g++ options: -O3 -march=native -std=c++11 -msse4.1 -fPIC -fopenmp -pie -lpthread -ldl

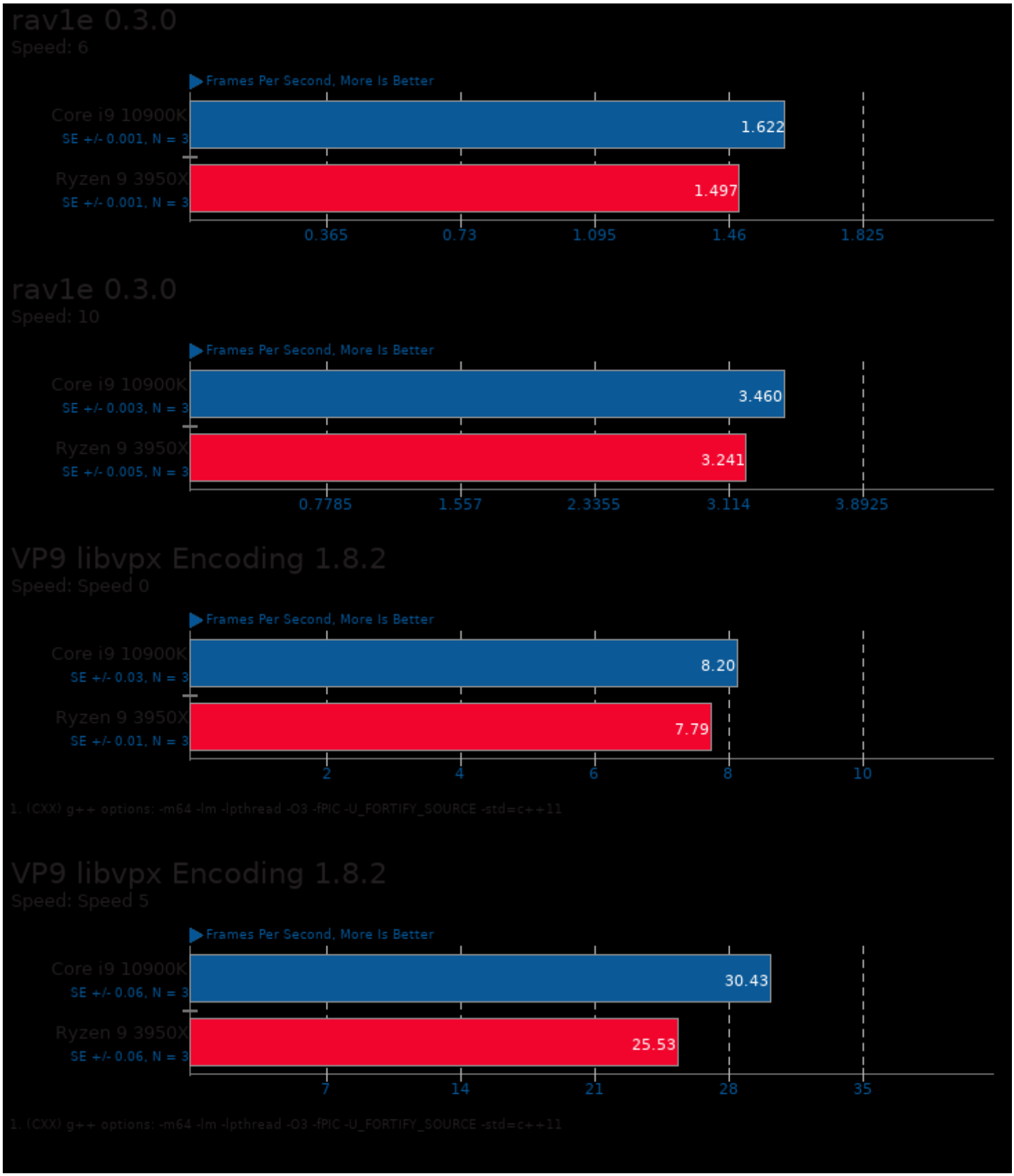

oneDNN MKL-DNN 1.3
Harness: Recurrent Neural Network Training - Data Type: f32
ms, Fewer Is Better
Core i9 10900K
SE +/- 0.89, N = 3
MIN: 165.86
169.86
Ryzen 9 3950X
SE +/- 0.30, N = 3
MIN: 188.28
190.56
40
80
120
160
200
1. (CXX) g++ options: -O3 -march=native -std=c++11 -msse4.1 -fPIC -fopenmp -pie -lpthread -ldl
oneDNN MKL-DNN 1.3
Harness: Recurrent Neural Network Inference - Data Type: f32
ms, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.03, N = 3
MIN: 26.04
26.62
Core i9 10900K
SE +/- 0.02, N = 3
MIN: 27.63
28.02
7
14
21
28
35
1. (CXX) g++ options: -O3 -march=native -std=c++11 -msse4.1 -fPIC -fopenmp -pie -lpthread -ldl
dav1d 0.6.0
Video Input: Chimera 1080p
FPS, More Is Better
Core i9 10900K
SE +/- 0.37, N = 3
MIN: 565.29 / MAX: 877.74
700.92
Ryzen 9 3950X
SE +/- 1.48, N = 3
MIN: 416.32 / MAX: 626.07
519.76
150
300
450
600
750
1. (CC) gcc options: -pthread
dav1d 0.6.0
Video Input: Summer Nature 4K
FPS, More Is Better
Ryzen 9 3950X
SE +/- 0.54, N = 3
MIN: 136.98 / MAX: 193.99
187.35
Core i9 10900K
SE +/- 0.11, N = 3
MIN: 155.2 / MAX: 184.35
177.43
40
80
120
160
200
1. (CC) gcc options: -pthread

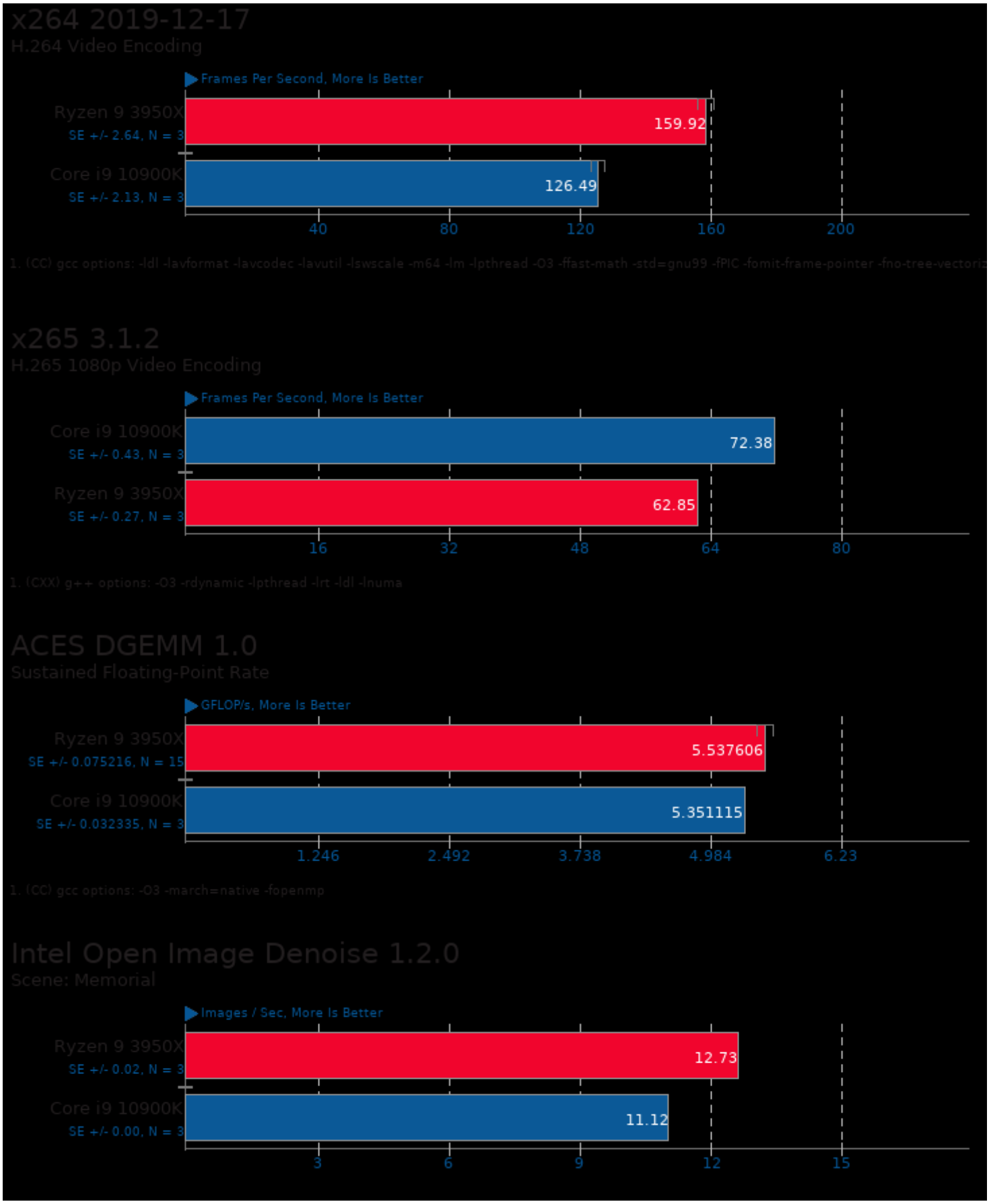

dav1d 0.6.0
Video Input: Summer Nature 1080p
FPS, More Is Better
Core i9 10900K
SE +/- 0.71, N = 3
MIN: 554.73 / MAX: 730.74
671.39
Ryzen 9 3950X
SE +/- 0.82, N = 3
MIN: 394.31 / MAX: 589.7
547.69
140
280
420
560
700
1. (CC) gcc options: -pthread
dav1d 0.6.0
Video Input: Chimera 1080p 10-bit
FPS, More Is Better
Core i9 10900K
SE +/- 0.10, N = 3
MIN: 84.61 / MAX: 295.01
131.44
Ryzen 9 3950X
SE +/- 0.26, N = 3
MIN: 77.55 / MAX: 224.73
113.65
30
60
90
120
150
1. (CC) gcc options: -pthread
TTSIOD 3D Renderer 2.3b
Phong Rendering With Soft-Shadow Mapping
FPS, More Is Better
Ryzen 9 3950X
SE +/- 1.07, N = 3
834.38
Core i9 10900K
SE +/- 0.81, N = 3
706.62
200
400
600
800
1000
1. (CXX) g++ options: -O3 -fomit-frame-pointer -ffast-math -mtune=native -flto -msse -mrecip -mfpmath=sse -msse2 -mssse3 -lSDL -fopenmp -fwhole-pr
AOM AV1 2.0
Encoder Mode: Speed 0 Two-Pass
Frames Per Second, More Is Better
Core i9 10900K
SE +/- 0.00, N = 3
0.35
Ryzen 9 3950X
SE +/- 0.00, N = 3
0.34
0.0788
0.1576
0.2364
0.3152
0.394
1. (CXX) g++ options: -O3 -std=c++11 -U_FORTIFY_SOURCE -lm -lpthread

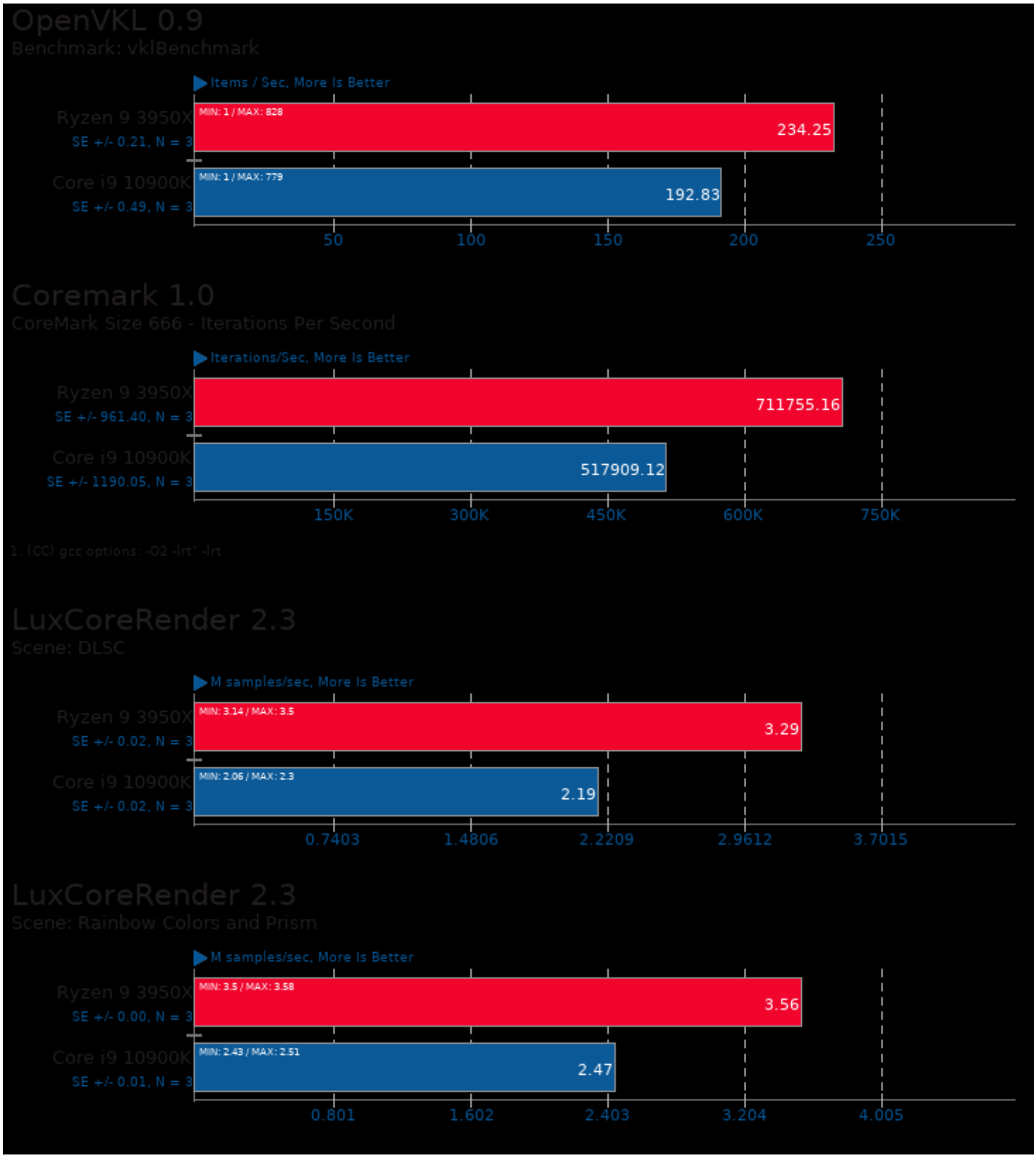

AOM AV1 2.0
Encoder Mode: Speed 4 Two-Pass
Frames Per Second, More Is Better
Core i9 10900K
SE +/- 0.01, N = 3
2.93
Ryzen 9 3950X
SE +/- 0.00, N = 3
2.71
0.6593
1.3186
1.9779
2.6372
3.2965
1. (CXX) g++ options: -O3 -std=c++11 -U_FORTIFY_SOURCE -lm -lpthread
AOM AV1 2.0
Encoder Mode: Speed 6 Realtime
Frames Per Second, More Is Better
Core i9 10900K
SE +/- 0.11, N = 3
25.31
Ryzen 9 3950X
SE +/- 0.08, N = 3
19.22
6
12
18
24
30
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
Core i9 10900K
SE +/- 0.01, N = 3
4.66
Ryzen 9 3950X
SE +/- 0.02, N = 3
4.16
1.0485
2.097
3.1455
4.194
5.2425
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
Core i9 10900K
SE +/- 0.14, N = 3
49.01
Ryzen 9 3950X
SE +/- 0.35, N = 3
38.24
11
22
33
44
55
1. (CXX) g++ options: -O3 -std=c++11 -U_FORTIFY_SOURCE -lm -lpthread

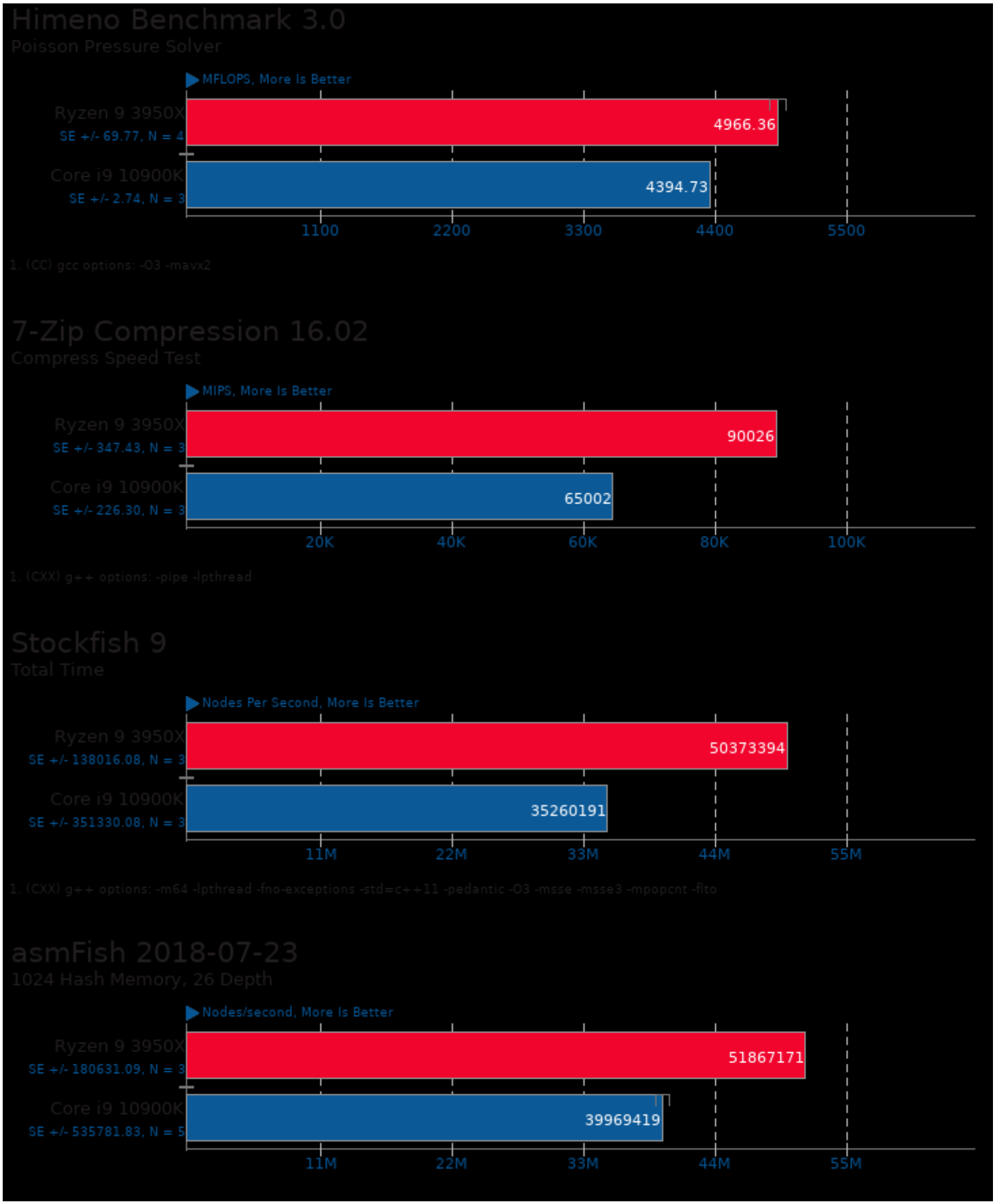

Embree 3.9.0
Binary: Pathtracer - Model: Crown
Frames Per Second, More Is Better
Ryzen 9 3950X
SE +/- 0.03, N = 3
MIN: 20.65 / MAX: 21.39
20.86
Core i9 10900K
SE +/- 0.02, N = 3
MIN: 15.31 / MAX: 15.79
15.45
5
10
15
20
25
Embree 3.9.0
Binary: Pathtracer ISPC - Model: Crown
Frames Per Second, More Is Better
Ryzen 9 3950X
SE +/- 0.09, N = 3
MIN: 19.72 / MAX: 20.53
20.06
Core i9 10900K
SE +/- 0.02, N = 3
MIN: 17.56 / MAX: 18.2
17.73
5
10
15
20
25
Embree 3.9.0
Binary: Pathtracer - Model: Asian Dragon
Frames Per Second, More Is Better
Ryzen 9 3950X
SE +/- 0.02, N = 3
MIN: 21.12 / MAX: 21.85
21.43
Core i9 10900K
SE +/- 0.07, N = 3
MIN: 17.35 / MAX: 17.95
17.56
5
10
15
20
25
Embree 3.9.0
Binary: Pathtracer - Model: Asian Dragon Obj
Frames Per Second, More Is Better
Ryzen 9 3950X
SE +/- 0.03, N = 3
MIN: 19.45 / MAX: 20.1
19.65
Core i9 10900K
SE +/- 0.01, N = 3
MIN: 16.08 / MAX: 16.46
16.18
5
10
15
20
25

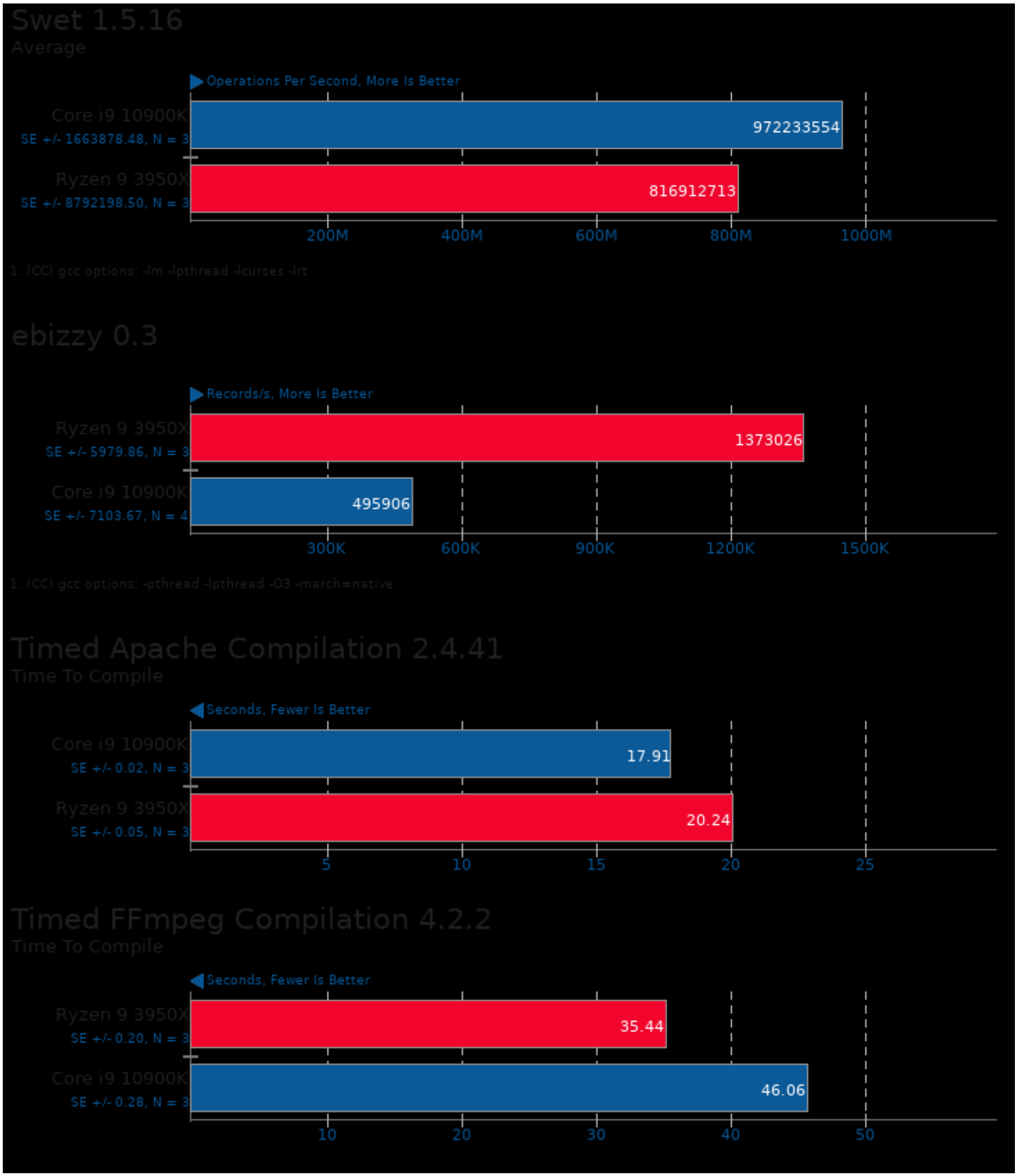

Embree 3.9.0
Binary: Pathtracer ISPC - Model: Asian Dragon
Frames Per Second, More Is Better
Ryzen 9 3950X
SE +/- 0.02, N = 3
MIN: 21.21 / MAX: 21.84
21.36
Core i9 10900K
SE +/- 0.08, N = 3
MIN: 20.27 / MAX: 20.97
20.51
5
10
15
20
25
Embree 3.9.0
Binary: Pathtracer ISPC - Model: Asian Dragon Obj
Frames Per Second, More Is Better
Ryzen 9 3950X
SE +/- 0.02, N = 3
MIN: 18.93 / MAX: 19.45
19.09
Core i9 10900K
SE +/- 0.02, N = 3
MIN: 18.09 / MAX: 18.72
18.24
5
10
15
20
25
rav1e 0.3.0
Speed: 1
Frames Per Second, More Is Better
Core i9 10900K
SE +/- 0.000, N = 3
0.205
Ryzen 9 3950X
SE +/- 0.000, N = 3
0.193
0.0461
0.0922
0.1383
0.1844
0.2305
rav1e 0.3.0
Speed: 5
Frames Per Second, More Is Better
Core i9 10900K
SE +/- 0.000, N = 3
0.670
Ryzen 9 3950X
SE +/- 0.000, N = 3
0.626
0.1508
0.3016
0.4524
0.6032
0.754


rav1e 0.3.0
Speed: 6
Frames Per Second, More Is Better
Core i9 10900K
SE +/- 0.001, N = 3
1.622
Ryzen 9 3950X
SE +/- 0.001, N = 3
1.497
0.365
0.73
1.095
1.46
1.825
rav1e 0.3.0
Speed: 10
Frames Per Second, More Is Better
Core i9 10900K
SE +/- 0.003, N = 3
3.460
Ryzen 9 3950X
SE +/- 0.005, N = 3
3.241
0.7785
1.557
2.3355
3.114
3.8925
VP9 libvpx Encoding 1.8.2
Speed: Speed 0
Frames Per Second, More Is Better
Core i9 10900K
SE +/- 0.03, N = 3
8.20
Ryzen 9 3950X
SE +/- 0.01, N = 3
7.79
2
4
6
8
10
1. (CXX) g++ options: -m64 -lm -lpthread -O3 -fPIC -U_FORTIFY_SOURCE -std=c++11
VP9 libvpx Encoding 1.8.2
Speed: Speed 5
Frames Per Second, More Is Better
Core i9 10900K
SE +/- 0.06, N = 3
30.43
Ryzen 9 3950X
SE +/- 0.06, N = 3
25.53
7
14
21
28
35
1. (CXX) g++ options: -m64 -lm -lpthread -O3 -fPIC -U_FORTIFY_SOURCE -std=c++11

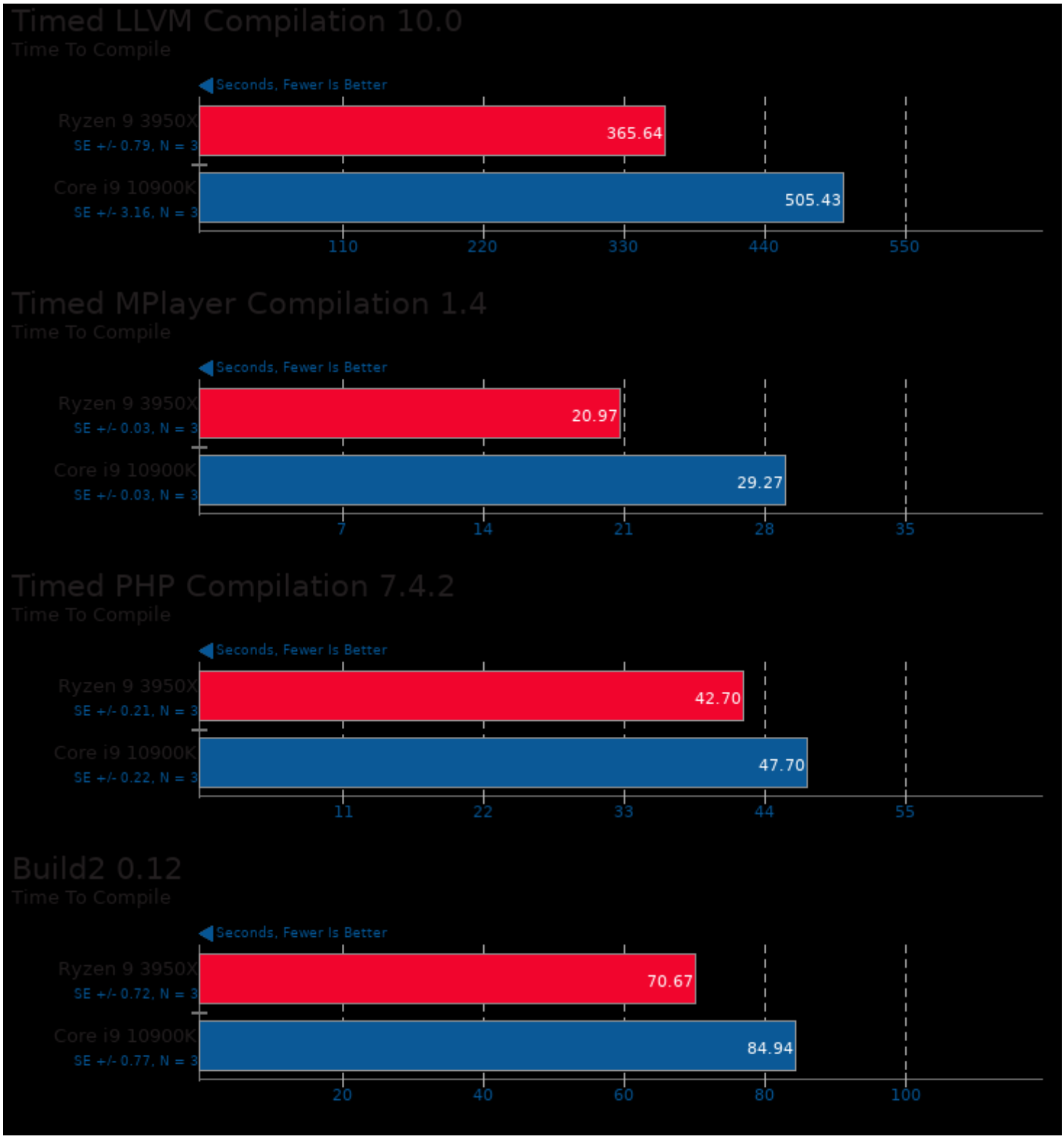

x264 2019-12-17
H.264 Video Encoding
Frames Per Second, More Is Better
Ryzen 9 3950X
SE +/- 2.64, N = 3
159.92
Core i9 10900K
SE +/- 2.13, N = 3
126.49
40
80
120
160
200
1. (CC) gcc options: -ldl -lavformat -lavcodec -lavutil -lswscale -m64 -lm -lpthread -O3 -ffast-math -std=gnu99 -fPIC -fomit-frame-pointer -fno-tree-vectori
x265 3.1.2
H.265 1080p Video Encoding
Frames Per Second, More Is Better
Core i9 10900K
SE +/- 0.43, N = 3
72.38
Ryzen 9 3950X
SE +/- 0.27, N = 3
62.85
16
32
48
64
80
1. (CXX) g++ options: -O3 -rdynamic -lpthread -lrt -ldl -lnuma
ACES DGEMM 1.0
Sustained Floating-Point Rate
GFLOP/s, More Is Better
Ryzen 9 3950X
SE +/- 0.075216, N = 15
5.537606
Core i9 10900K
SE +/- 0.032335, N = 3
5.351115
1.246
2.492
3.738
4.984
6.23
1. (CC) gcc options: -O3 -march=native -fopenmp
Intel Open Image Denoise 1.2.0
Scene: Memorial
Images / Sec, More Is Better
Ryzen 9 3950X
SE +/- 0.02, N = 3
12.73
Core i9 10900K
SE +/- 0.00, N = 3
11.12
3
6
9
12
15

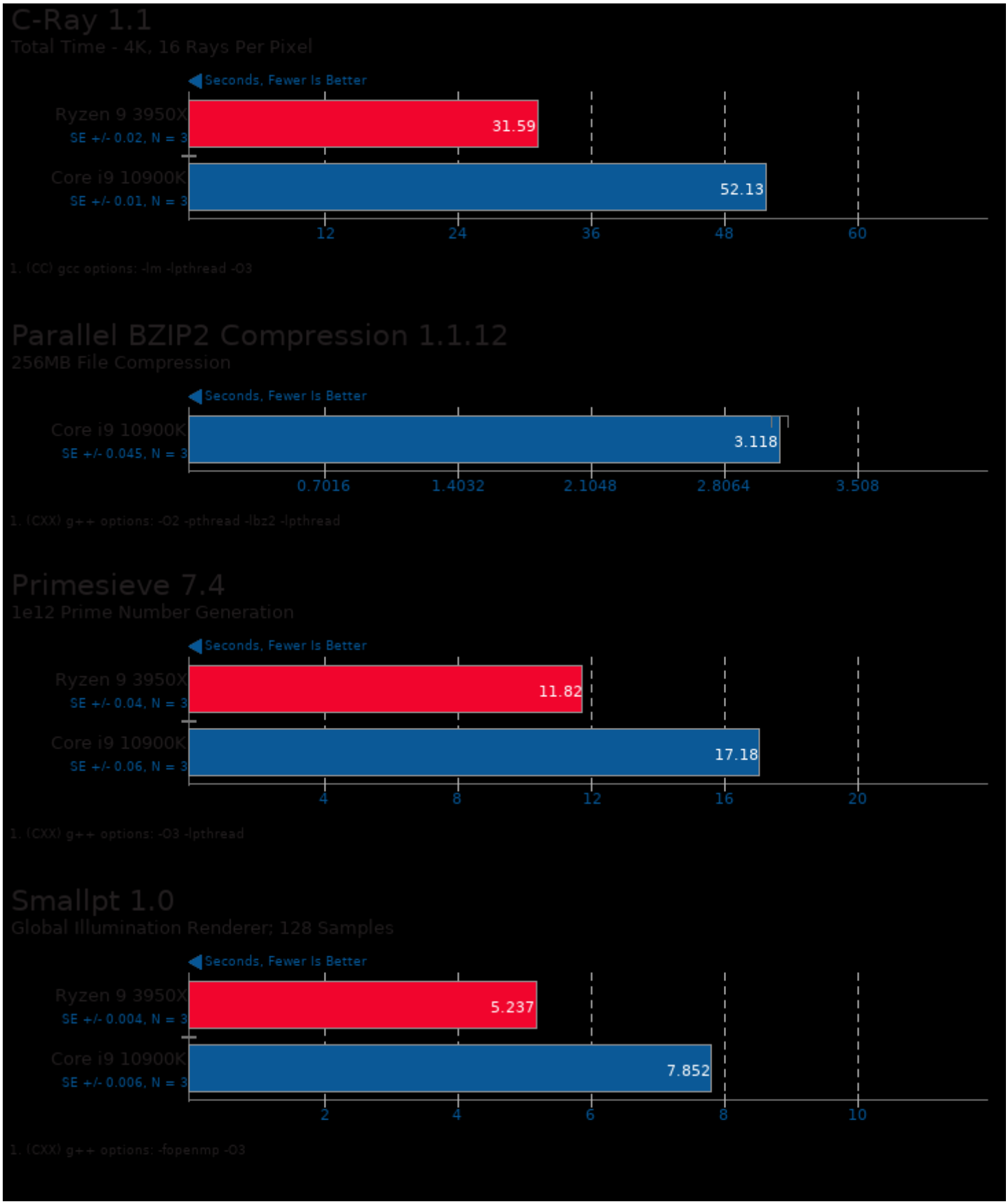

OpenVKL 0.9
Benchmark: vklBenchmark
Items / Sec, More Is Better
Ryzen 9 3950X
SE +/- 0.21, N = 3
MIN: 1 / MAX: 828
234.25
Core i9 10900K
SE +/- 0.49, N = 3
MIN: 1 / MAX: 779
192.83
50
100
150
200
250
Coremark 1.0
CoreMark Size 666 - Iterations Per Second
Iterations/Sec, More Is Better
Ryzen 9 3950X
SE +/- 961.40, N = 3
711755.16
Core i9 10900K
SE +/- 1190.05, N = 3
517909.12
150K
300K
450K
600K
750K
1. (CC) gcc options: -O2 -lrt" -lrt
LuxCoreRender 2.3
Scene: DLSC
M samples/sec, More Is Better
Ryzen 9 3950X
SE +/- 0.02, N = 3
MIN: 3.14 / MAX: 3.5
3.29
Core i9 10900K
SE +/- 0.02, N = 3
MIN: 2.06 / MAX: 2.3
2.19
0.7403
1.4806
2.2209
2.9612
3.7015
LuxCoreRender 2.3
Scene: Rainbow Colors and Prism
M samples/sec, More Is Better
Ryzen 9 3950X
SE +/- 0.00, N = 3
MIN: 3.5 / MAX: 3.58
3.56
Core i9 10900K
SE +/- 0.01, N = 3
MIN: 2.43 / MAX: 2.51
2.47
0.801
1.602
2.403
3.204
4.005

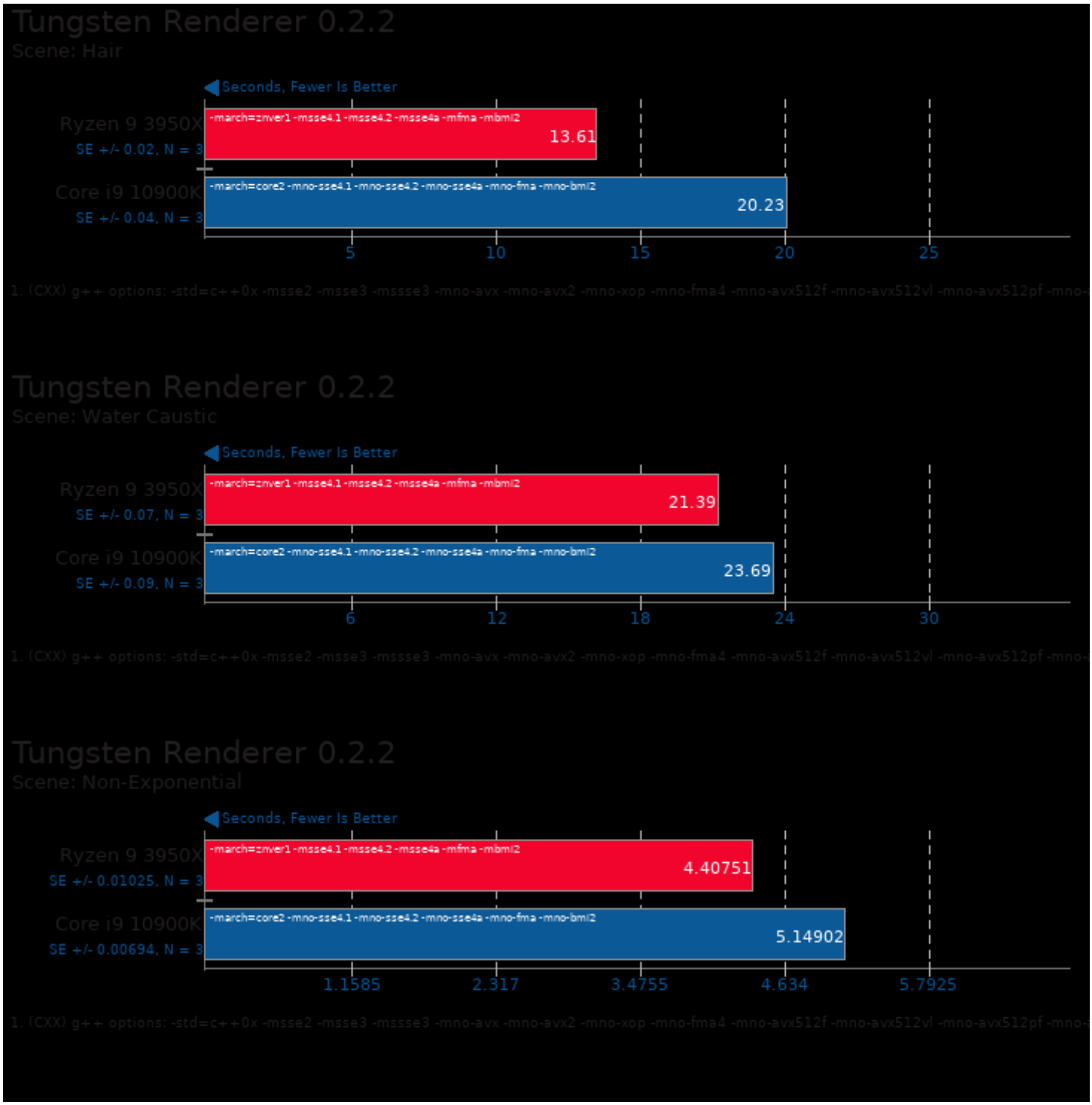

Himeno Benchmark 3.0
Poisson Pressure Solver
MFLOPS, More Is Better
Ryzen 9 3950X
SE +/- 69.77, N = 4
4966.36
Core i9 10900K
SE +/- 2.74, N = 3
4394.73
1100
2200
3300
4400
5500
1. (CC) gcc options: -O3 -mavx2
7-Zip Compression 16.02
Compress Speed Test
MIPS, More Is Better
Ryzen 9 3950X
SE +/- 347.43, N = 3
90026
Core i9 10900K
SE +/- 226.30, N = 3
65002
20K
40K
60K
80K
100K
1. (CXX) g++ options: -pipe -lpthread
Stockfish 9
Total Time
Nodes Per Second, More Is Better
Ryzen 9 3950X
SE +/- 138016.08, N = 3
50373394
Core i9 10900K
SE +/- 351330.08, N = 3
35260191
11M
22M
33M
44M
55M
1. (CXX) g++ options: -m64 -lpthread -fno-exceptions -std=c++11 -pedantic -O3 -msse -msse3 -mpopcnt -flto
asmFish 2018-07-23
1024 Hash Memory, 26 Depth
Nodes/second, More Is Better
Ryzen 9 3950X
SE +/- 180631.09, N = 3
51867171
Core i9 10900K
SE +/- 535781.83, N = 5
39969419
11M
22M
33M
44M
55M

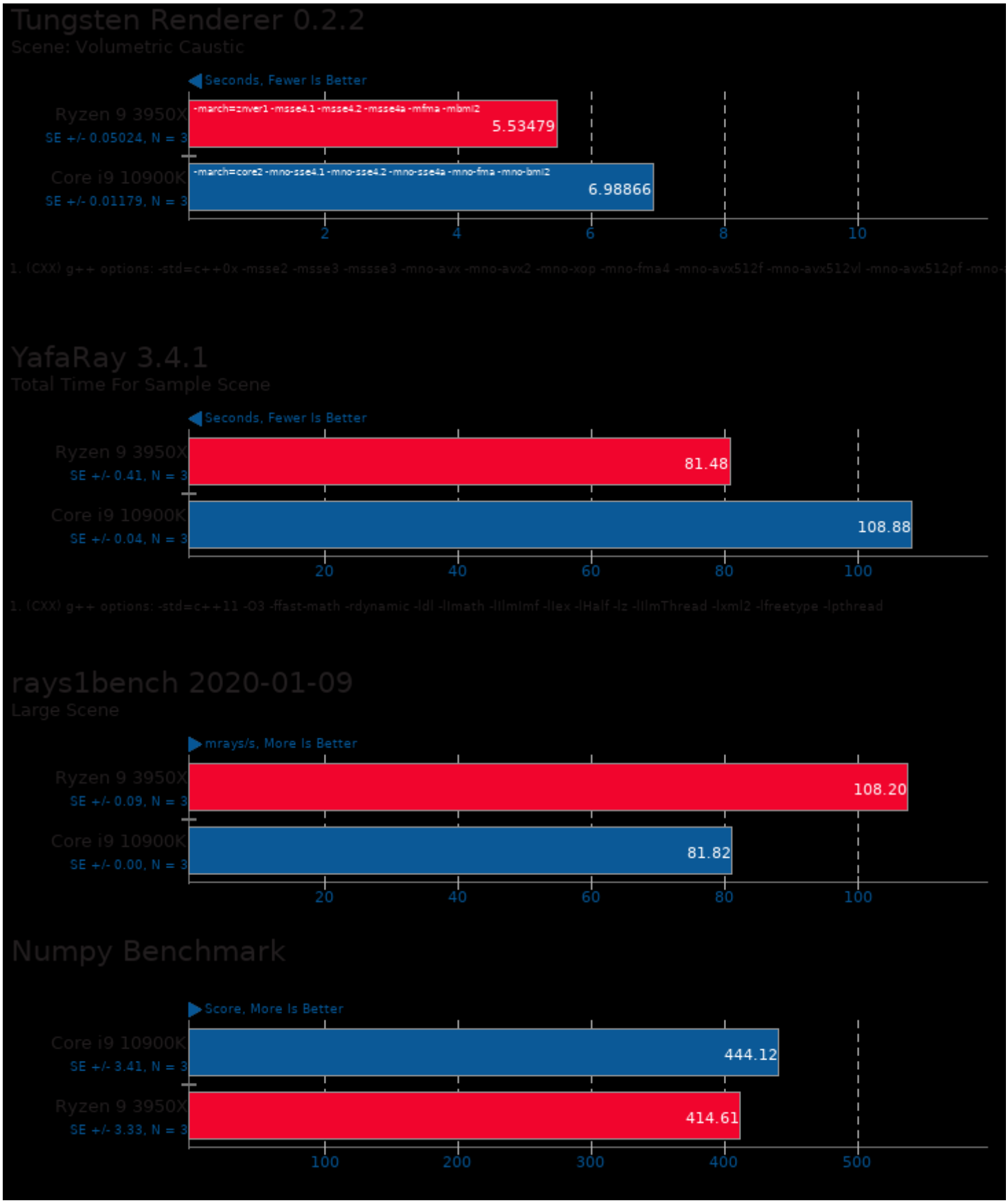

Swet 1.5.16
Average
Operations Per Second, More Is Better
Core i9 10900K
SE +/- 1663878.48, N = 3
972233554
Ryzen 9 3950X
SE +/- 8792198.50, N = 3
816912713
200M
400M
600M
800M
1000M
1. (CC) gcc options: -lm -lpthread -lcurses -lrt
ebizzy 0.3
Records/s, More Is Better
Ryzen 9 3950X
SE +/- 5979.86, N = 3
1373026
Core i9 10900K
SE +/- 7103.67, N = 4
495906
300K
600K
900K
1200K
1500K
1. (CC) gcc options: -pthread -lpthread -O3 -march=native
Timed Apache Compilation 2.4.41
Time To Compile
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.02, N = 3
17.91
Ryzen 9 3950X
SE +/- 0.05, N = 3
20.24
5
10
15
20
25
Timed FFmpeg Compilation 4.2.2
Time To Compile
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.20, N = 3
35.44
Core i9 10900K
SE +/- 0.28, N = 3
46.06
10
20
30
40
50

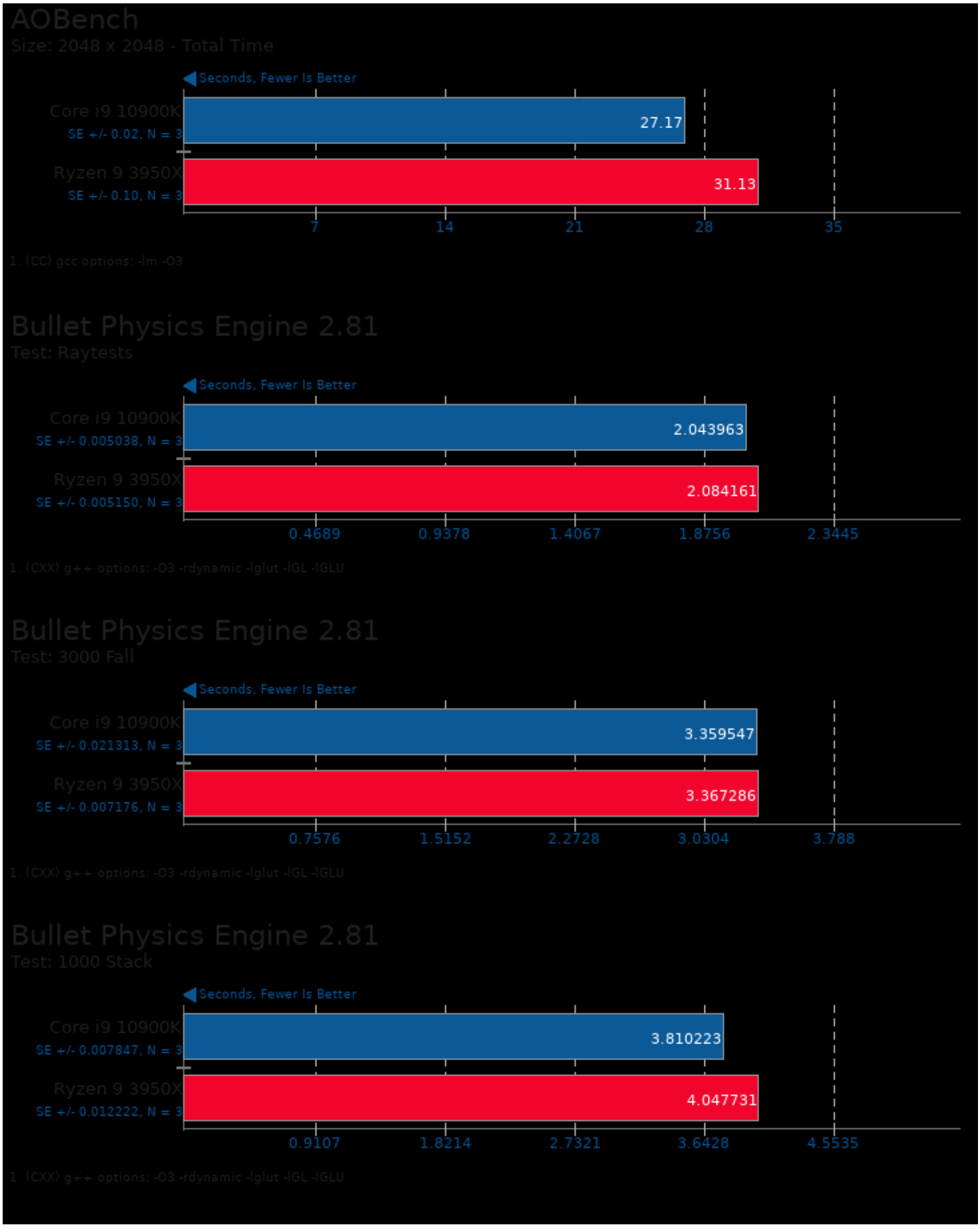

Timed GCC Compilation 9.3.0
Time To Compile
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 1.03, N = 3
716.26
Ryzen 9 3950X
SE +/- 1.36, N = 3
731.03
160
320
480
640
800
Timed GDB GNU Debugger Compilation 9.1
Time To Compile
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.09, N = 3
77.06
Ryzen 9 3950X
SE +/- 0.07, N = 3
88.76
20
40
60
80
100
Timed ImageMagick Compilation 6.9.0
Time To Compile
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.02, N = 3
20.86
Core i9 10900K
SE +/- 0.11, N = 3
25.03
6
12
18
24
30
Timed Linux Kernel Compilation 5.4
Time To Compile
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.43, N = 9
45.11
Core i9 10900K
SE +/- 0.31, N = 3
61.71
14
28
42
56
70

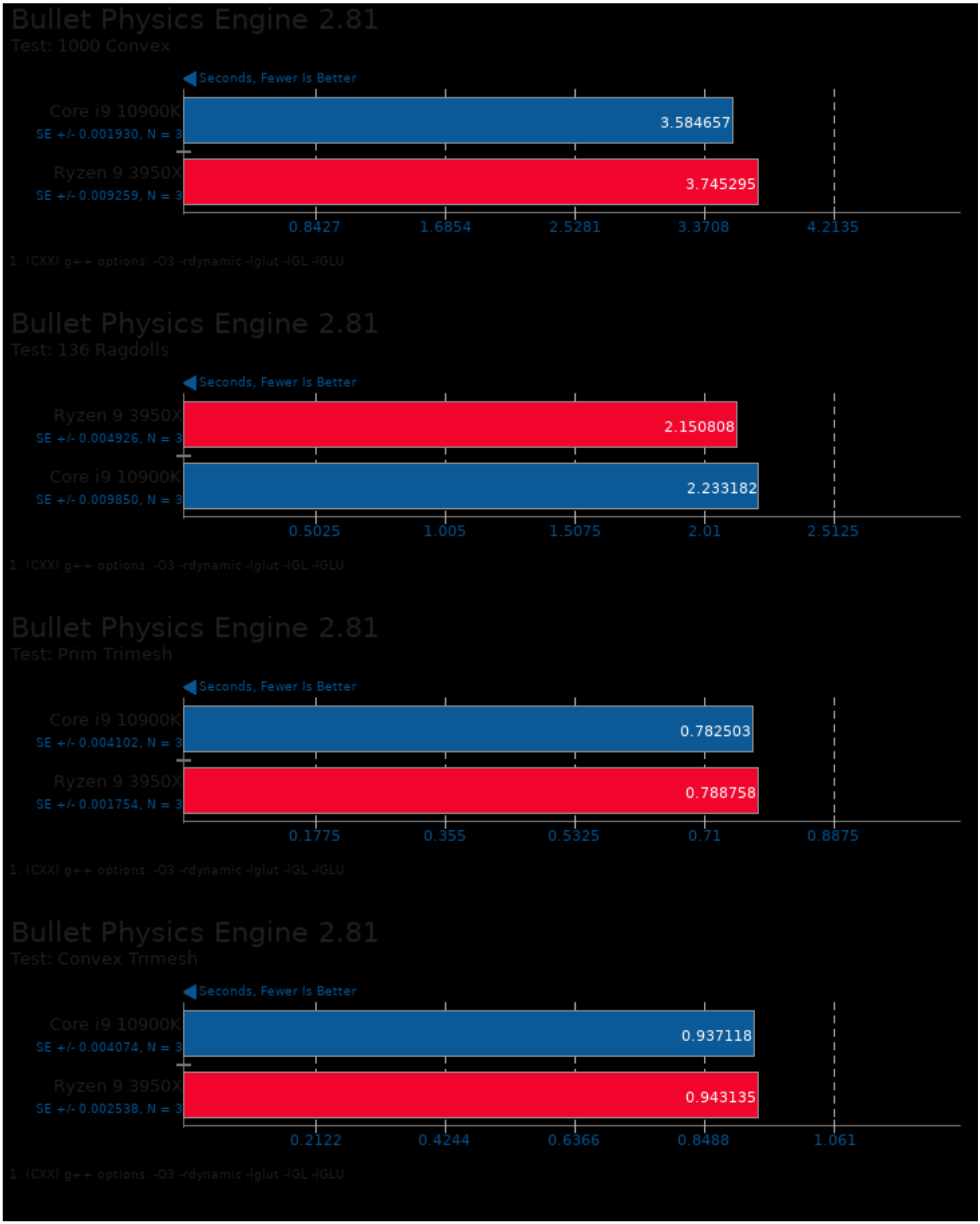

Timed LLVM Compilation 10.0
Time To Compile
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.79, N = 3
365.64
Core i9 10900K
SE +/- 3.16, N = 3
505.43
110
220
330
440
550
Timed MPlayer Compilation 1.4
Time To Compile
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.03, N = 3
20.97
Core i9 10900K
SE +/- 0.03, N = 3
29.27
7
14
21
28
35
Timed PHP Compilation 7.4.2
Time To Compile
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.21, N = 3
42.70
Core i9 10900K
SE +/- 0.22, N = 3
47.70
11
22
33
44
55
Build2 0.12
Time To Compile
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.72, N = 3
70.67
Core i9 10900K
SE +/- 0.77, N = 3
84.94
20
40
60
80
100

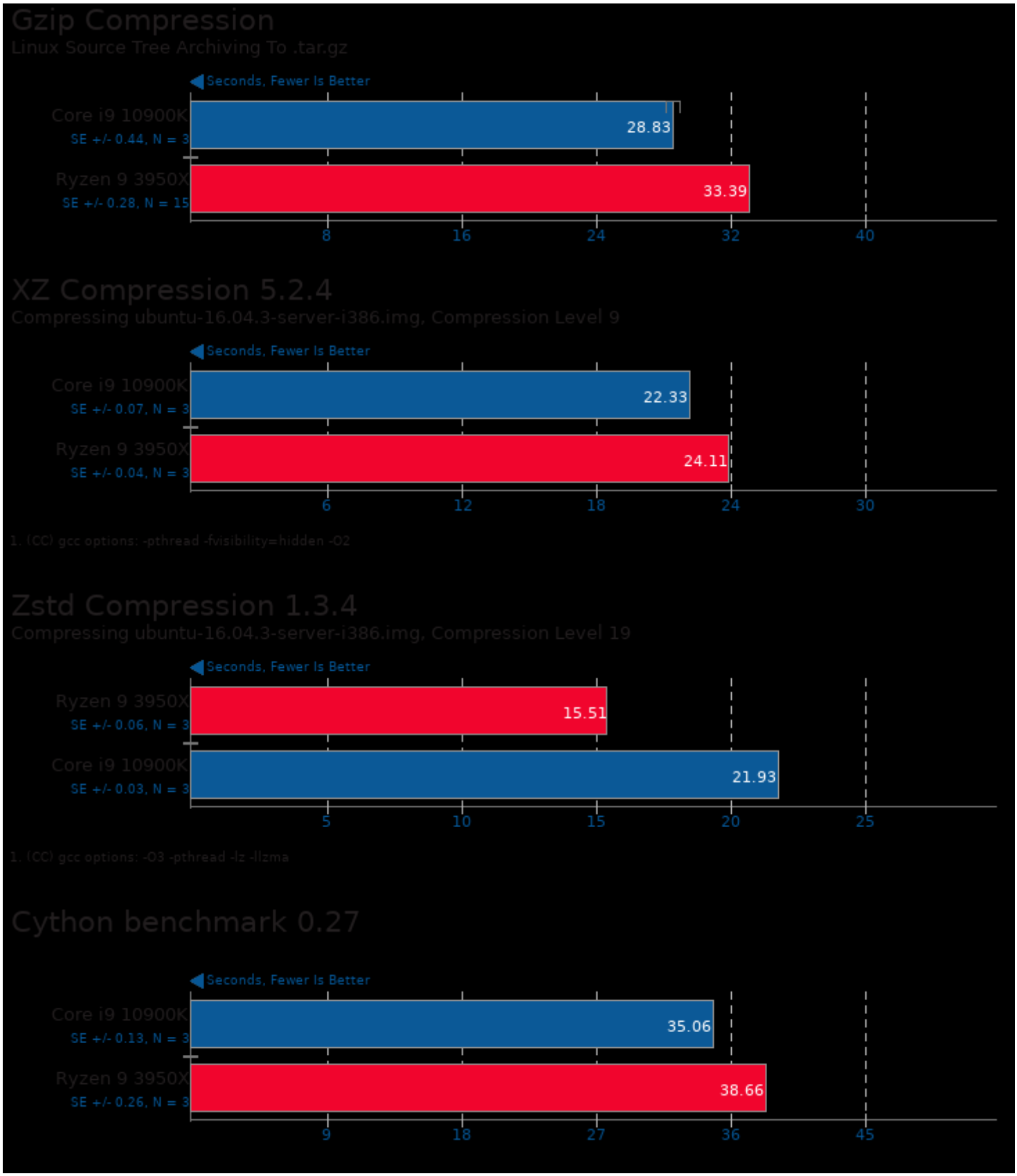

C-Ray 1.1
Total Time - 4K, 16 Rays Per Pixel
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.02, N = 3
31.59
Core i9 10900K
SE +/- 0.01, N = 3
52.13
12
24
36
48
60
1. (CC) gcc options: -lm -lpthread -O3
Parallel BZIP2 Compression 1.1.12
256MB File Compression
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.045, N = 3
3.118
0.7016
1.4032
2.1048
2.8064
3.508
1. (CXX) g++ options: -O2 -pthread -lbz2 -lpthread
Primesieve 7.4
1e12 Prime Number Generation
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.04, N = 3
11.82
Core i9 10900K
SE +/- 0.06, N = 3
17.18
4
8
12
16
20
1. (CXX) g++ options: -O3 -lpthread
Smallpt 1.0
Global Illumination Renderer; 128 Samples
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.004, N = 3
5.237
Core i9 10900K
SE +/- 0.006, N = 3
7.852
2
4
6
8
10
1. (CXX) g++ options: -fopenmp -O3


Tungsten Renderer 0.2.2
Scene: Hair
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.02, N = 3
-march=znver1 -msse4.1 -msse4.2 -msse4a -mfma -mbmi2
13.61
Core i9 10900K
SE +/- 0.04, N = 3
-march=core2 -mno-sse4.1 -mno-sse4.2 -mno-sse4a -mno-fma -mno-bmi2
20.23
5
10
15
20
25
1. (CXX) g++ options: -std=c++0x -msse2 -msse3 -mssse3 -mno-avx -mno-avx2 -mno-xop -mno-fma4 -mno-avx512f -mno-avx512vl -mno-avx512pf -mno-
Tungsten Renderer 0.2.2
Scene: Water Caustic
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.07, N = 3
-march=znver1 -msse4.1 -msse4.2 -msse4a -mfma -mbmi2
21.39
Core i9 10900K
SE +/- 0.09, N = 3
-march=core2 -mno-sse4.1 -mno-sse4.2 -mno-sse4a -mno-fma -mno-bmi2
23.69
6
12
18
24
30
1. (CXX) g++ options: -std=c++0x -msse2 -msse3 -mssse3 -mno-avx -mno-avx2 -mno-xop -mno-fma4 -mno-avx512f -mno-avx512vl -mno-avx512pf -mno-
Tungsten Renderer 0.2.2
Scene: Non-Exponential
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.01025, N = 3
-march=znver1 -msse4.1 -msse4.2 -msse4a -mfma -mbmi2
4.40751
Core i9 10900K
SE +/- 0.00694, N = 3
-march=core2 -mno-sse4.1 -mno-sse4.2 -mno-sse4a -mno-fma -mno-bmi2
5.14902
1.1585
2.317
3.4755
4.634
5.7925
1. (CXX) g++ options: -std=c++0x -msse2 -msse3 -mssse3 -mno-avx -mno-avx2 -mno-xop -mno-fma4 -mno-avx512f -mno-avx512vl -mno-avx512pf -mno-


Tungsten Renderer 0.2.2
Scene: Volumetric Caustic
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.05024, N = 3
-march=znver1 -msse4.1 -msse4.2 -msse4a -mfma -mbmi2
5.53479
Core i9 10900K
SE +/- 0.01179, N = 3
-march=core2 -mno-sse4.1 -mno-sse4.2 -mno-sse4a -mno-fma -mno-bmi2
6.98866
2
4
6
8
10
1. (CXX) g++ options: -std=c++0x -msse2 -msse3 -mssse3 -mno-avx -mno-avx2 -mno-xop -mno-fma4 -mno-avx512f -mno-avx512vl -mno-avx512pf -mno-
YafaRay 3.4.1
Total Time For Sample Scene
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.41, N = 3
81.48
Core i9 10900K
SE +/- 0.04, N = 3
108.88
20
40
60
80
100
1. (CXX) g++ options: -std=c++11 -O3 -ffast-math -rdynamic -ldl -lImath -lIlmImf -lIex -lHalf -lz -lIlmThread -lxml2 -lfreetype -lpthread
rays1bench 2020-01-09
Large Scene
mrays/s, More Is Better
Ryzen 9 3950X
SE +/- 0.09, N = 3
108.20
Core i9 10900K
SE +/- 0.00, N = 3
81.82
20
40
60
80
100
Numpy Benchmark
Score, More Is Better
Core i9 10900K
SE +/- 3.41, N = 3
444.12
Ryzen 9 3950X
SE +/- 3.33, N = 3
414.61
100
200
300
400
500

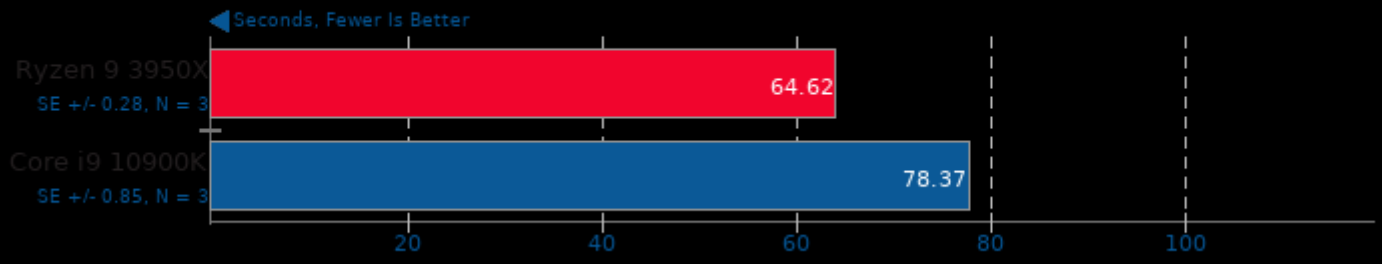

AOBench
Size: 2048 x 2048 - Total Time
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.02, N = 3
27.17
Ryzen 9 3950X
SE +/- 0.10, N = 3
31.13
7
14
21
28
35
1. (CC) gcc options: -lm -O3
Bullet Physics Engine 2.81
Test: Raytests
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.005038, N = 3
2.043963
Ryzen 9 3950X
SE +/- 0.005150, N = 3
2.084161
0.4689
0.9378
1.4067
1.8756
2.3445
1. (CXX) g++ options: -O3 -rdynamic -lglut -lGL -lGLU
Bullet Physics Engine 2.81
Test: 3000 Fall
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.021313, N = 3
3.359547
Ryzen 9 3950X
SE +/- 0.007176, N = 3
3.367286
0.7576
1.5152
2.2728
3.0304
3.788
1. (CXX) g++ options: -O3 -rdynamic -lglut -lGL -lGLU
Bullet Physics Engine 2.81
Test: 1000 Stack
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.007847, N = 3
3.810223
Ryzen 9 3950X
SE +/- 0.012222, N = 3
4.047731
0.9107
1.8214
2.7321
3.6428
4.5535
1. (CXX) g++ options: -O3 -rdynamic -lglut -lGL -lGLU


Bullet Physics Engine 2.81
Test: 1000 Convex
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.001930, N = 3
3.584657
Ryzen 9 3950X
SE +/- 0.009259, N = 3
3.745295
0.8427
1.6854
2.5281
3.3708
4.2135
1. (CXX) g++ options: -O3 -rdynamic -lglut -lGL -lGLU
Bullet Physics Engine 2.81
Test: 136 Ragdolls
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.004926, N = 3
2.150808
Core i9 10900K
SE +/- 0.009850, N = 3
2.233182
0.5025
1.005
1.5075
2.01
2.5125
1. (CXX) g++ options: -O3 -rdynamic -lglut -lGL -lGLU
Bullet Physics Engine 2.81
Test: Prim Trimesh
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.004102, N = 3
0.782503
Ryzen 9 3950X
SE +/- 0.001754, N = 3
0.788758
0.1775
0.355
0.5325
0.71
0.8875
1. (CXX) g++ options: -O3 -rdynamic -lglut -lGL -lGLU
Bullet Physics Engine 2.81
Test: Convex Trimesh
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.004074, N = 3
0.937118
Ryzen 9 3950X
SE +/- 0.002538, N = 3
0.943135
0.2122
0.4244
0.6366
0.8488
1.061
1. (CXX) g++ options: -O3 -rdynamic -lglut -lGL -lGLU


Gzip Compression
Linux Source Tree Archiving To .tar.gz
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.44, N = 3
28.83
Ryzen 9 3950X
SE +/- 0.28, N = 15
33.39
8
16
24
32
40
XZ Compression 5.2.4
Compressing ubuntu-16.04.3-server-i386.img, Compression Level 9
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.07, N = 3
22.33
Ryzen 9 3950X
SE +/- 0.04, N = 3
24.11
6
12
18
24
30
1. (CC) gcc options: -pthread -fvisibility=hidden -O2
Zstd Compression 1.3.4
Compressing ubuntu-16.04.3-server-i386.img, Compression Level 19
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.06, N = 3
15.51
Core i9 10900K
SE +/- 0.03, N = 3
21.93
5
10
15
20
25
1. (CC) gcc options: -O3 -pthread -lz -llzma
Cython benchmark 0.27
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.13, N = 3
35.06
Ryzen 9 3950X
SE +/- 0.26, N = 3
38.66
9
18
27
36
45

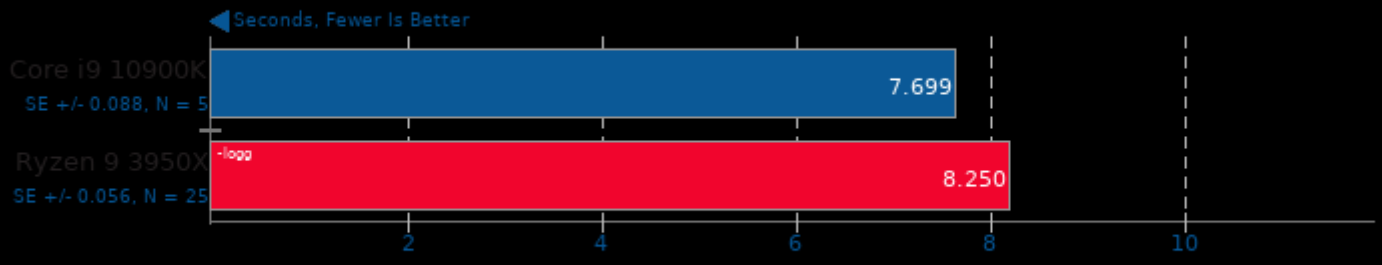
## DeepSpeech 0.6

Acceleration: CPU




## FLAC Audio Encoding 1.3.2

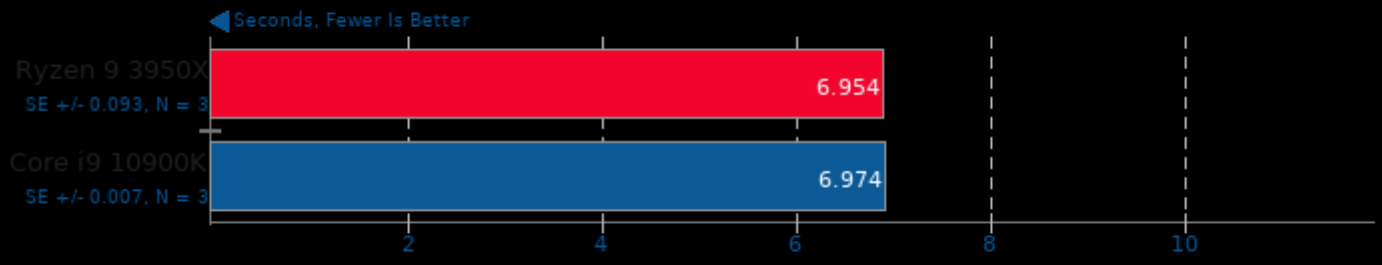
WAV To FLAC




1. (CXX) g++ options: -O2 -fvisibility=hidden -lm

## LAME MP3 Encoding 3.100

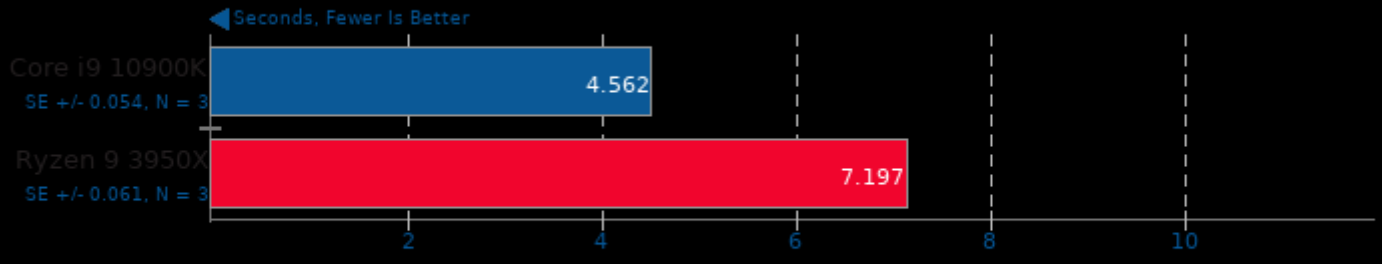
WAV To MP3




1. (CC) gcc options: -O3 -ffast-math -funroll-loops -fschedule-insns2 -fbranch-count-reg -fforce-addr -pipe -lncurses -lm

## FFmpeg 4.0.2

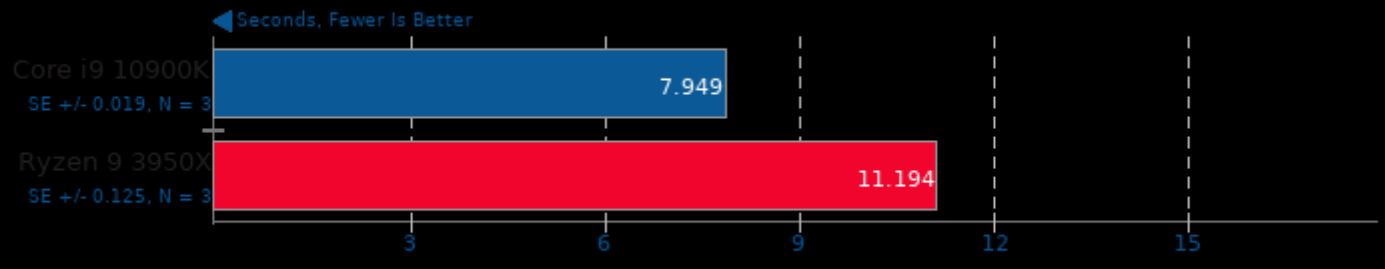
H.264 HD To NTSC DV




1. (CC) gcc options: -lavdevice -lavfilter -lavformat -lavcodec -lswresample -lswscale -lavutil -lXv -lX11 -lXext -lm -lxcb -lxcb-shm -lasound -lSDL2 -lsndio -p

## GnuPG 1.4.22

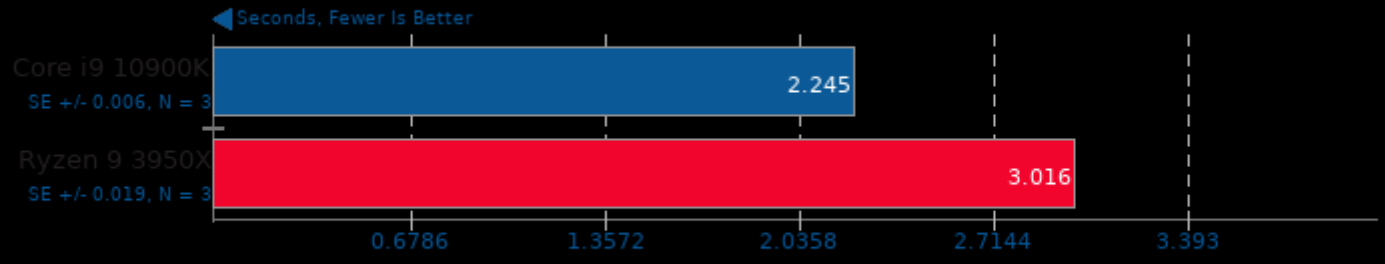
2GB File Encryption




1. (CC) gcc options: -O2 -MT -MD -MP -MF

## Hackbench

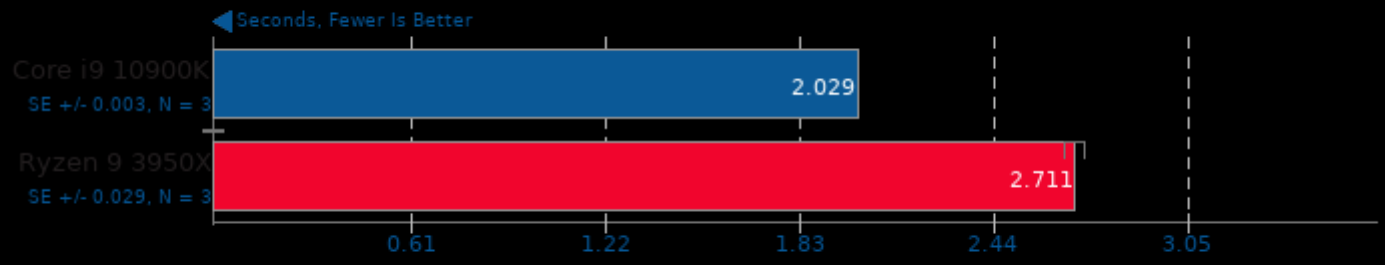
Count: 1 - Type: Thread




1. (CC) gcc options: -lpthread

## Hackbench

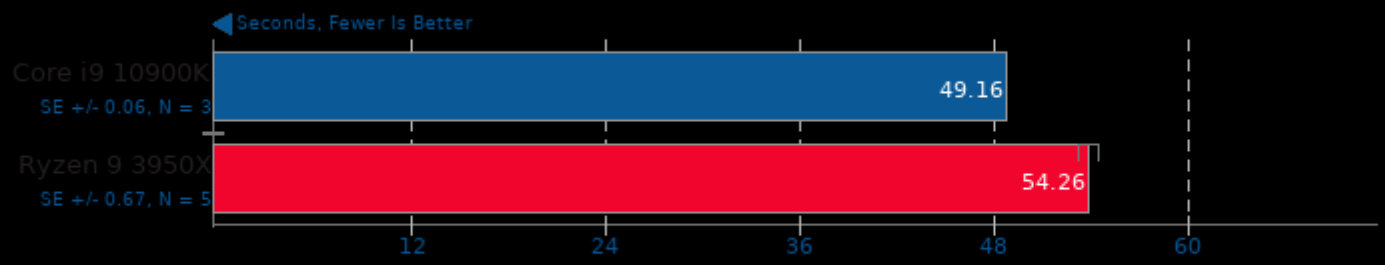
Count: 1 - Type: Process




1. (CC) gcc options: -lpthread

## Hackbench

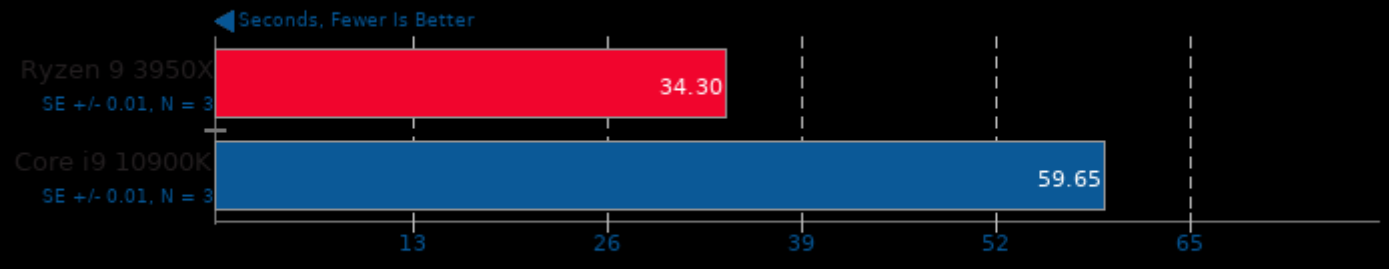
Count: 32 - Type: Process




1. (CC) gcc options: -lpthread

## m-queens 1.2

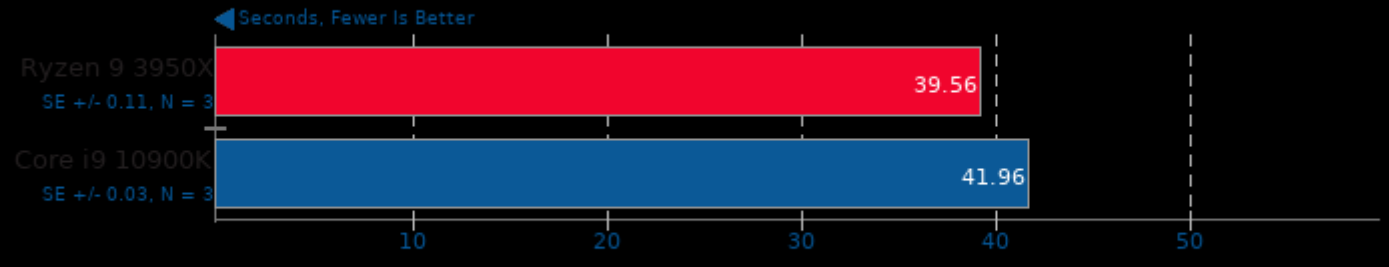
Time To Solve




1. (CXX) g++ options: -fopenmp -O2 -march=native

## Minion 1.8

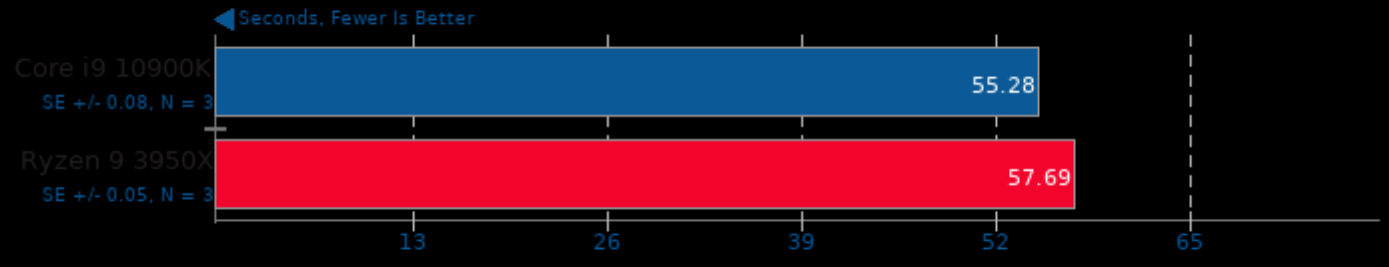
Benchmark: Graceful




1. (CXX) g++ options: -std=gnu++11 -O3 -fomit-frame-pointer -rdynamic

## Minion 1.8

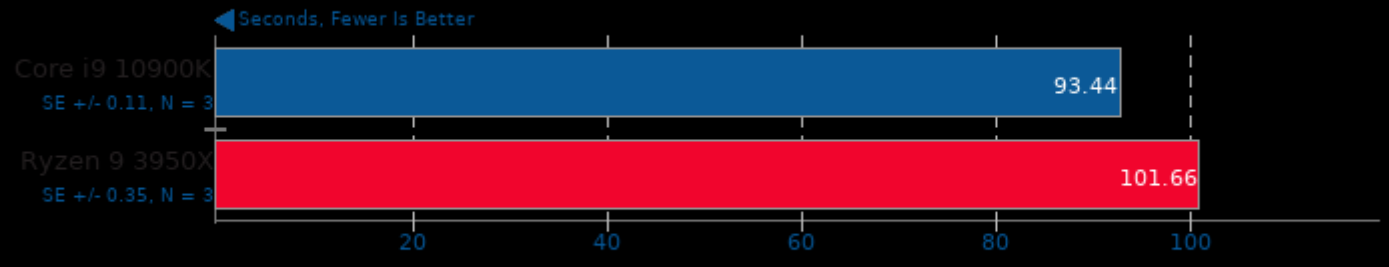
Benchmark: Solitaire



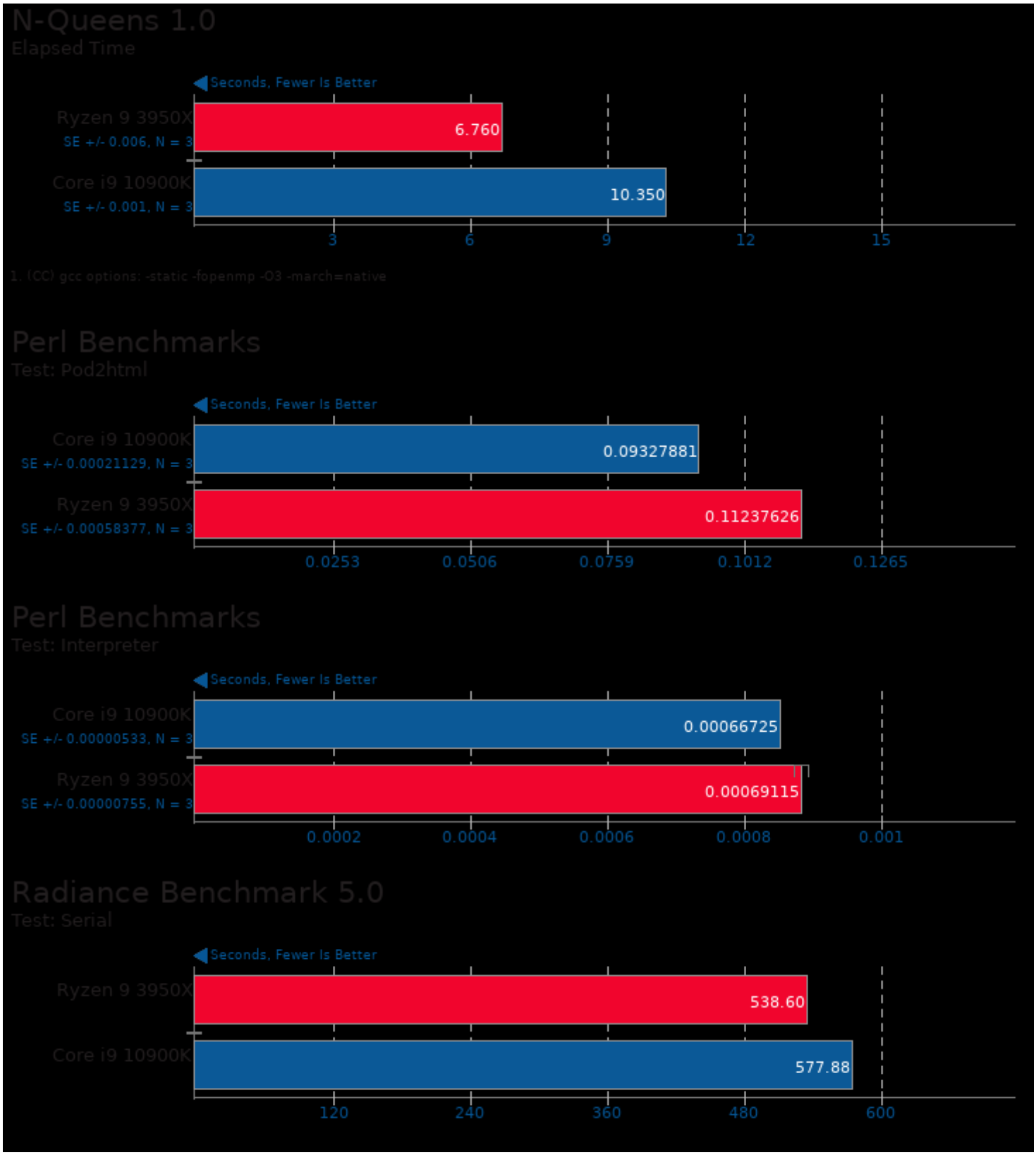

1. (CXX) g++ options: -std=gnu++11 -O3 -fomit-frame-pointer -rdynamic

## Minion 1.8

Benchmark: Quasigroup

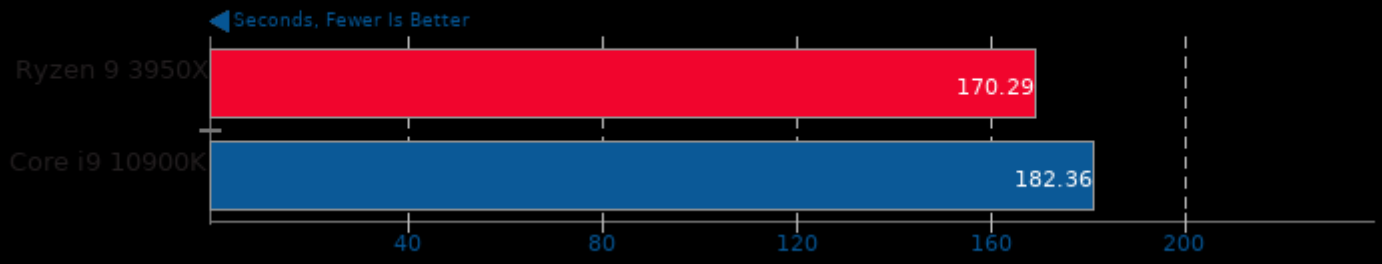



1. (CXX) g++ options: -std=gnu++11 -O3 -fomit-frame-pointer -rdynamic


N-Queens 1.0
Elapsed Time
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.006, N = 3
6.760
Core i9 10900K
SE +/- 0.001, N = 3
10.350
3
6
9
12
15
1. (CC) gcc options: -static -fopenmp -O3 -march=native
Perl Benchmarks
Test: Pod2html
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.00021129, N = 3
0.09327881
Ryzen 9 3950X
SE +/- 0.00058377, N = 3
0.11237626
0.0253
0.0506
0.0759
0.1012
0.1265
Perl Benchmarks
Test: Interpreter
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.00000533, N = 3
0.00066725
Ryzen 9 3950X
SE +/- 0.00000755, N = 3
0.00069115
0.0002
0.0004
0.0006
0.0008
0.001
Radiance Benchmark 5.0
Test: Serial
Seconds, Fewer Is Better
Ryzen 9 3950X
538.60
Core i9 10900K
577.88
120
240
360
480
600

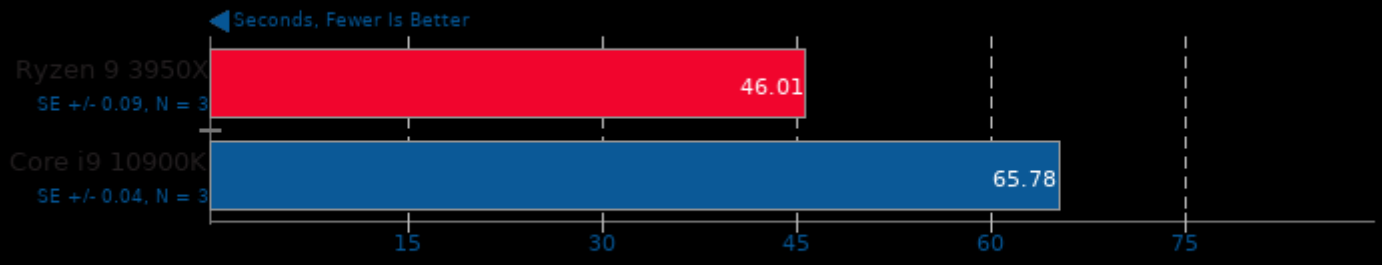
## Radiance Benchmark 5.0

Test: SMP Parallel




## Tachyon 0.99b6

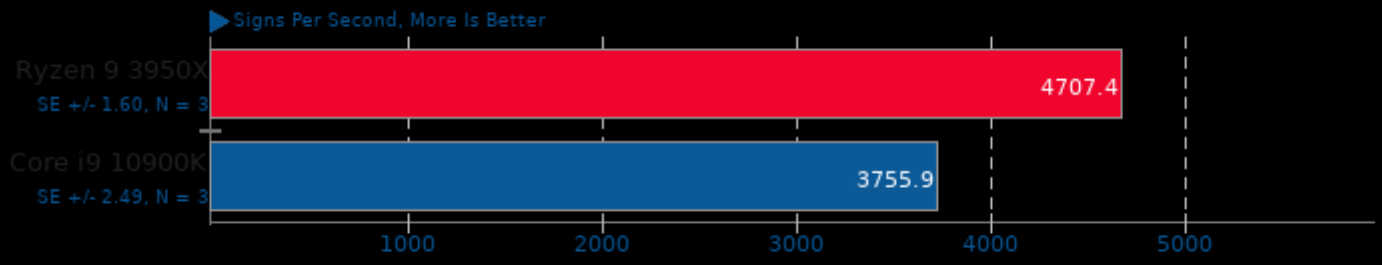
Total Time




1. (CC) gcc options: -m64 -O3 -fomit-frame-pointer -ffast-math -ltachyon -lm -lpthread

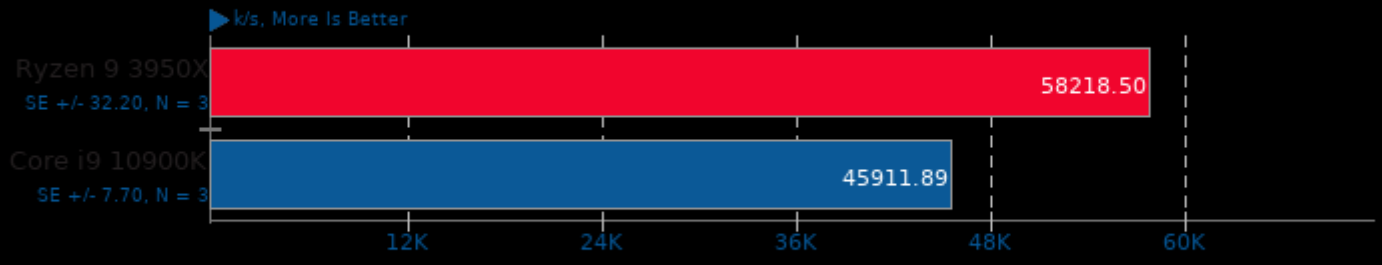
## OpenSSL 1.1.1

RSA 4096-bit Performance



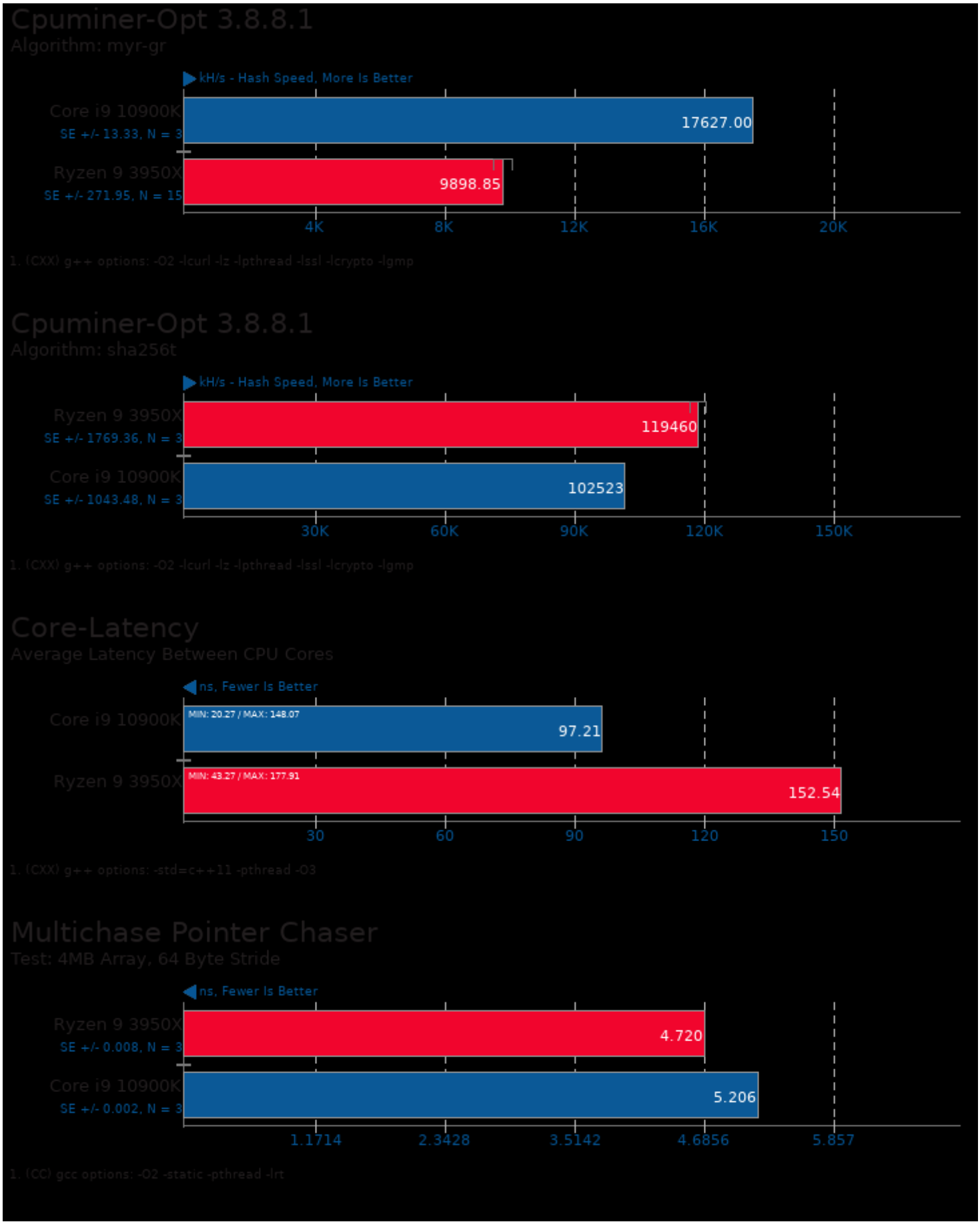

1. (CC) gcc options: -pthread -m64 -O3 -lssl -lcrypto -ldl

## Aircrack-ng 1.5.2



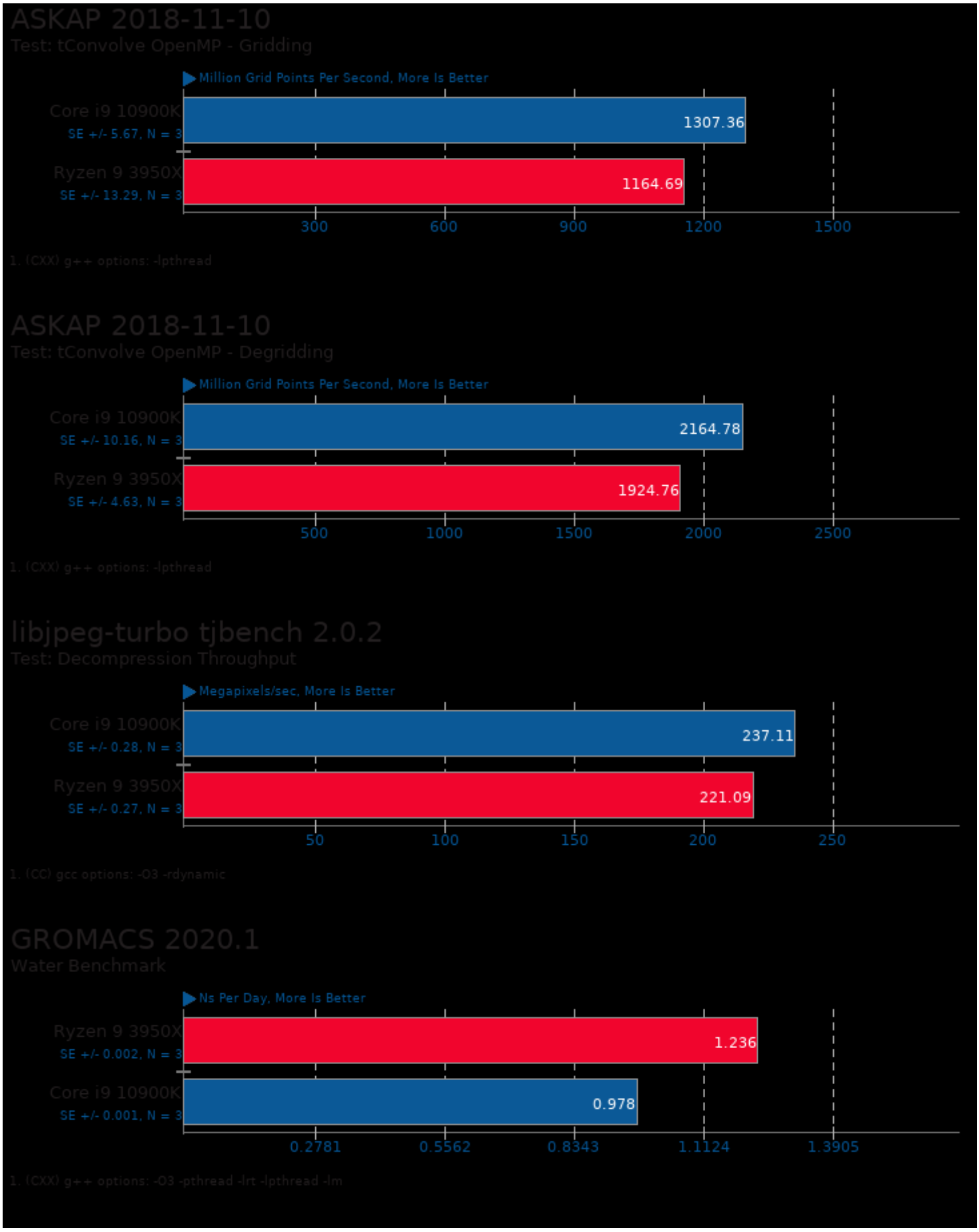

1. (CXX) g++ options: -O3 -fvisibility=hidden -masm=intel -fcommon -rdynamic -lpthread -lz -lcrypto -lhwloc -ldl -lm -pthread


Cpuminer-Opt 3.8.8.1
Algorithm: m7m
kH/s - Hash Speed, More Is Better
Ryzen 9 3950X
SE +/- 1.61, N = 3
838.57
Core i9 10900K
SE +/- 0.18, N = 3
407.75
200
400
600
800
1000
1. (CXX) g++ options: -O2 -lcurl -lz -lpthread -lssl -lcrypto -lgmp
Cpuminer-Opt 3.8.8.1
Algorithm: deep
kH/s - Hash Speed, More Is Better
Ryzen 9 3950X
SE +/- 5.77, N = 3
15150
Core i9 10900K
SE +/- 3.33, N = 3
12397
3K
6K
9K
12K
15K
1. (CXX) g++ options: -O2 -lcurl -lz -lpthread -lssl -lcrypto -lgmp
Cpuminer-Opt 3.8.8.1
Algorithm: lbry
kH/s - Hash Speed, More Is Better
Ryzen 9 3950X
SE +/- 186.10, N = 3
46910
Core i9 10900K
SE +/- 21.86, N = 3
38917
10K
20K
30K
40K
50K
1. (CXX) g++ options: -O2 -lcurl -lz -lpthread -lssl -lcrypto -lgmp
Cpuminer-Opt 3.8.8.1
Algorithm: skein
kH/s - Hash Speed, More Is Better
Ryzen 9 3950X
SE +/- 592.34, N = 7
54471
Core i9 10900K
SE +/- 138.36, N = 3
45343
12K
24K
36K
48K
60K
1. (CXX) g++ options: -O2 -lcurl -lz -lpthread -lssl -lcrypto -lgmp


Cpuminer-Opt 3.8.8.1
Algorithm: myr-gr
kH/s - Hash Speed, More Is Better
Core i9 10900K
SE +/- 13.33, N = 3
17627.00
Ryzen 9 3950X
SE +/- 271.95, N = 15
9898.85
4K
8K
12K
16K
20K
1. (CXX) g++ options: -O2 -lcurl -lz -lpthread -lssl -lcrypto -lgmp
Cpuminer-Opt 3.8.8.1
Algorithm: sha256t
kH/s - Hash Speed, More Is Better
Ryzen 9 3950X
SE +/- 1769.36, N = 3
119460
Core i9 10900K
SE +/- 1043.48, N = 3
102523
30K
60K
90K
120K
150K
1. (CXX) g++ options: -O2 -lcurl -lz -lpthread -lssl -lcrypto -lgmp
Core-Latency
Average Latency Between CPU Cores
ns, Fewer Is Better
Core i9 10900K
MIN: 20.27 / MAX: 148.07
97.21
Ryzen 9 3950X
MIN: 43.27 / MAX: 177.91
152.54
30
60
90
120
150
1. (CXX) g++ options: -std=c++11 -pthread -O3
Multichase Pointer Chaser
Test: 4MB Array, 64 Byte Stride
ns, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.008, N = 3
4.720
Core i9 10900K
SE +/- 0.002, N = 3
5.206
1.1714
2.3428
3.5142
4.6856
5.857
1. (CC) gcc options: -O2 -static -pthread -lrt

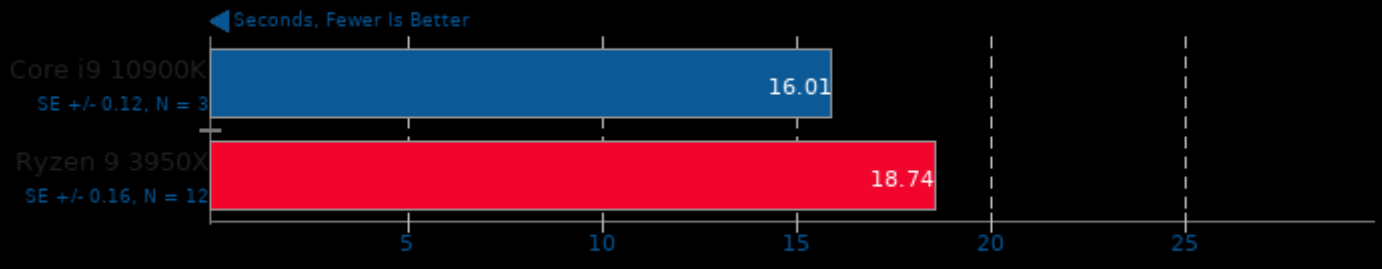

Multichase Pointer Chaser
Test: 1GB Array, 256 Byte Stride
ns, Fewer Is Better
Core i9 10900K
SE +/- 0.05, N = 3
44.60
Ryzen 9 3950X
SE +/- 0.05, N = 3
67.37
15
30
45
60
75
1. (CC) gcc options: -O2 -static -pthread -lrt
Multichase Pointer Chaser
Test: 256MB Array, 256 Byte Stride
ns, Fewer Is Better
Core i9 10900K
SE +/- 0.03, N = 3
41.81
Ryzen 9 3950X
SE +/- 0.10, N = 3
67.19
15
30
45
60
75
1. (CC) gcc options: -O2 -static -pthread -lrt
Multichase Pointer Chaser
Test: 1GB Array, 256 Byte Stride, 2 Threads
ns, Fewer Is Better
Core i9 10900K
SE +/- 0.06, N = 3
46.17
Ryzen 9 3950X
SE +/- 0.01, N = 3
67.81
15
30
45
60
75
1. (CC) gcc options: -O2 -static -pthread -lrt
Multichase Pointer Chaser
Test: 1GB Array, 256 Byte Stride, 4 Threads
ns, Fewer Is Better
Core i9 10900K
SE +/- 0.01, N = 3
50.13
Ryzen 9 3950X
SE +/- 0.02, N = 3
70.20
16
32
48
64
80
1. (CC) gcc options: -O2 -static -pthread -lrt


ASKAP 2018-11-10
Test: tConvolve MT - Gridding
Million Grid Points Per Second, More Is Better
Core i9 10900K
SE +/- 0.00, N = 3
1142.24
Ryzen 9 3950X
SE +/- 1.50, N = 3
874.05
200
400
600
800
1000
1. (CXX) g++ options: -lpthread
ASKAP 2018-11-10
Test: tConvolve MT - Degridding
Million Grid Points Per Second, More Is Better
Core i9 10900K
SE +/- 1.65, N = 3
1946.32
Ryzen 9 3950X
SE +/- 1.60, N = 3
1617.76
400
800
1200
1600
2000
1. (CXX) g++ options: -lpthread
ASKAP 2018-11-10
Test: tConvolve MPI - Gridding
Million Grid Points Per Second, More Is Better
Core i9 10900K
SE +/- 1.63, N = 3
1161.18
Ryzen 9 3950X
SE +/- 0.12, N = 3
892.67
200
400
600
800
1000
1. (CXX) g++ options: -lpthread
ASKAP 2018-11-10
Test: tConvolve MPI - Degridding
Million Grid Points Per Second, More Is Better
Core i9 10900K
SE +/- 0.83, N = 3
1953.46
Ryzen 9 3950X
SE +/- 0.57, N = 3
1657.41
400
800
1200
1600
2000
1. (CXX) g++ options: -lpthread


ASKAP 2018-11-10
Test: tConvolve OpenMP - Gridding
Million Grid Points Per Second, More Is Better
Core i9 10900K
SE +/- 5.67, N = 3
1307.36
Ryzen 9 3950X
SE +/- 13.29, N = 3
1164.69
300
600
900
1200
1500
1. (CXX) g++ options: -lpthread
ASKAP 2018-11-10
Test: tConvolve OpenMP - Degridding
Million Grid Points Per Second, More Is Better
Core i9 10900K
SE +/- 10.16, N = 3
2164.78
Ryzen 9 3950X
SE +/- 4.63, N = 3
1924.76
500
1000
1500
2000
2500
1. (CXX) g++ options: -lpthread
libjpeg-turbo tjbench 2.0.2
Test: Decompression Throughput
Megapixels/sec, More Is Better
Core i9 10900K
SE +/- 0.28, N = 3
237.11
Ryzen 9 3950X
SE +/- 0.27, N = 3
221.09
50
100
150
200
250
1. (CC) gcc options: -O3 -rdynamic
GROMACS 2020.1
Water Benchmark
Ns Per Day, More Is Better
Ryzen 9 3950X
SE +/- 0.002, N = 3
1.236
Core i9 10900K
SE +/- 0.001, N = 3
0.978
0.2781
0.5562
0.8343
1.1124
1.3905
1. (CXX) g++ options: -O3 -pthread -lrt -lpthread -lm

## G'MIC

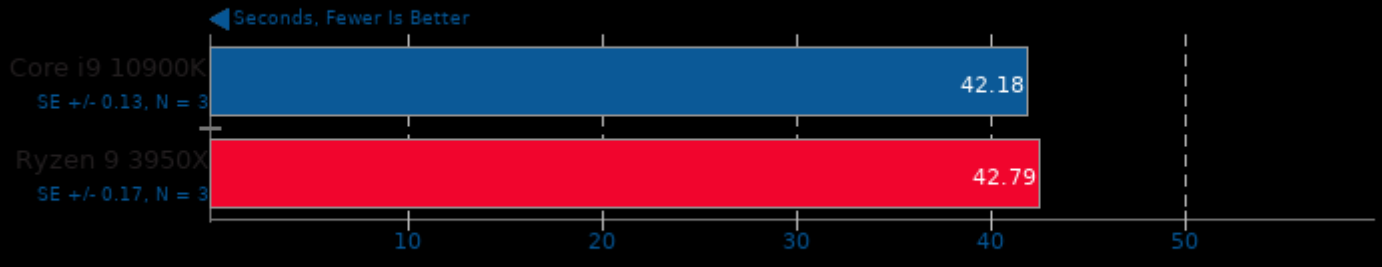
Test: Plotting Isosurface Of A 3D Volume, 1000 Times




1. Version 2.4.5, Copyright (c) 2008-2019, David Tschumperle.

## Basis Universal 1.12

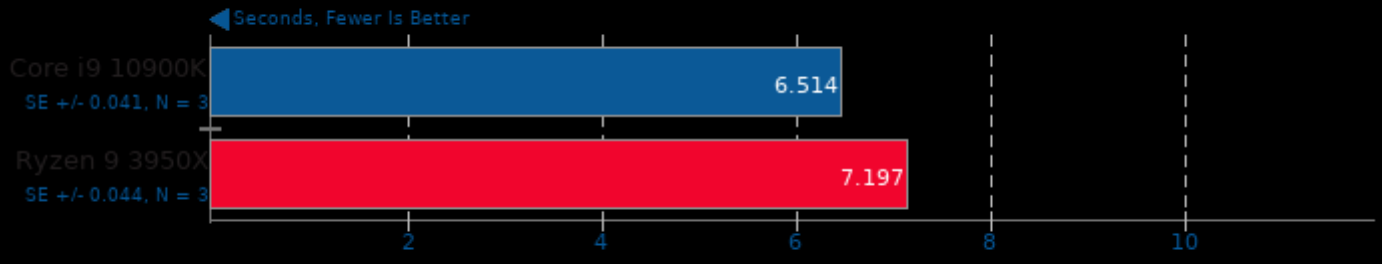
Settings: ETC1S




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

## Basis Universal 1.12

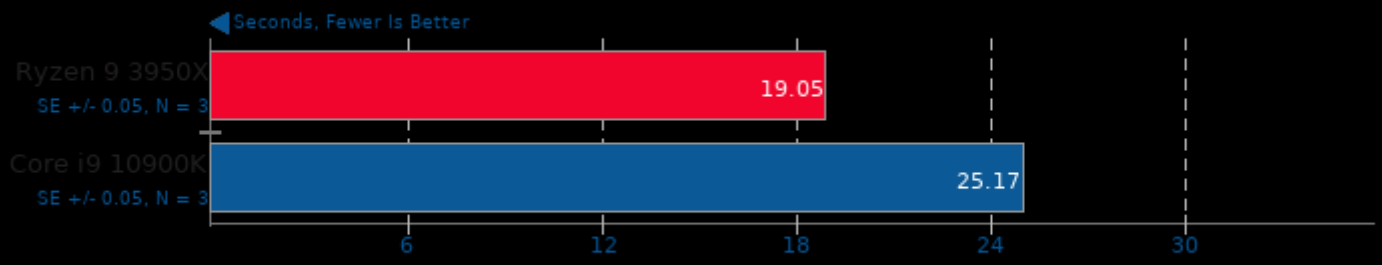
Settings: UASTC Level 0




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

## Basis Universal 1.12

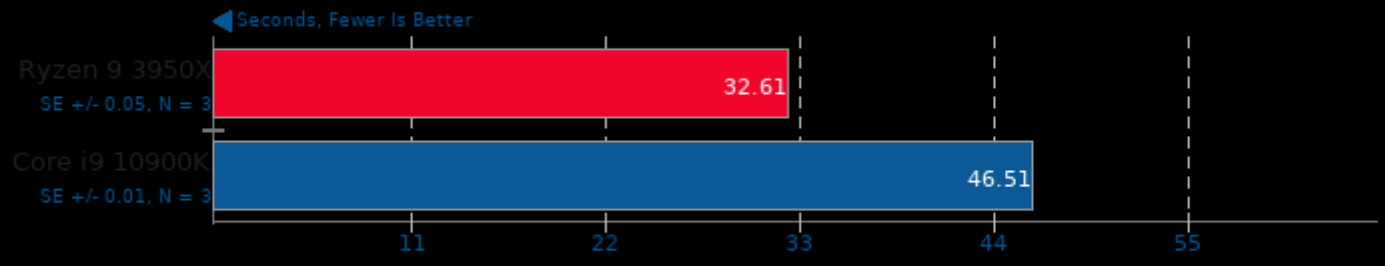
Settings: UASTC Level 2




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

## Basis Universal 1.12

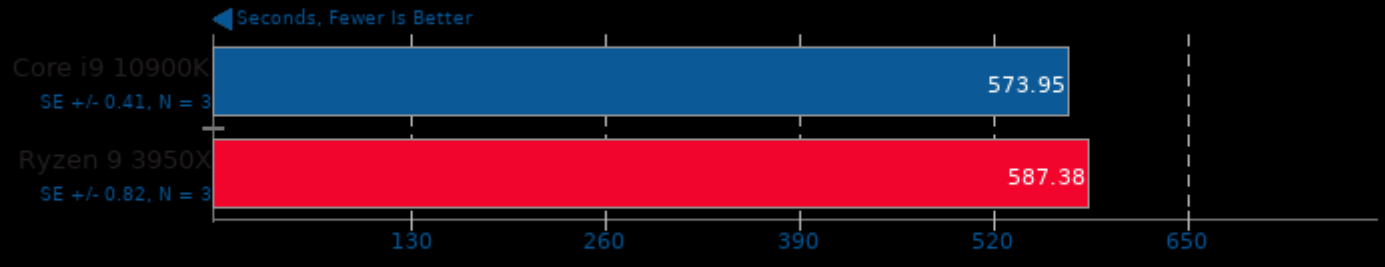
Settings: UASTC Level 3




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

## Basis Universal 1.12

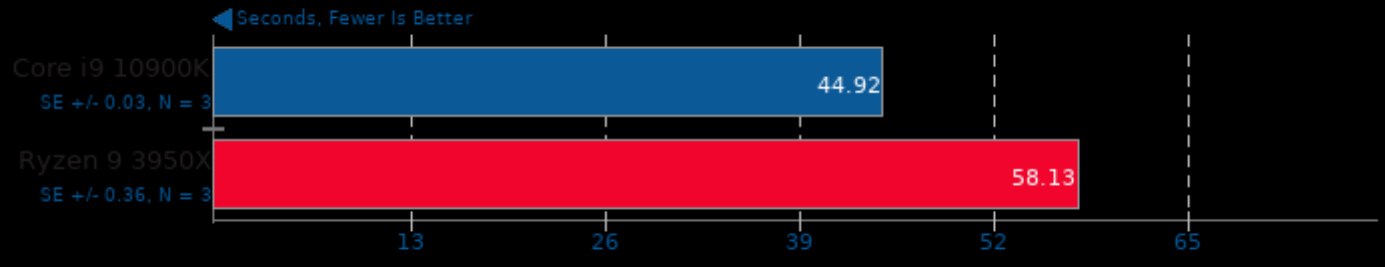
Settings: UASTC Level 2 + RDO Post-Processing




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

## SQLite Speedtest 3.30

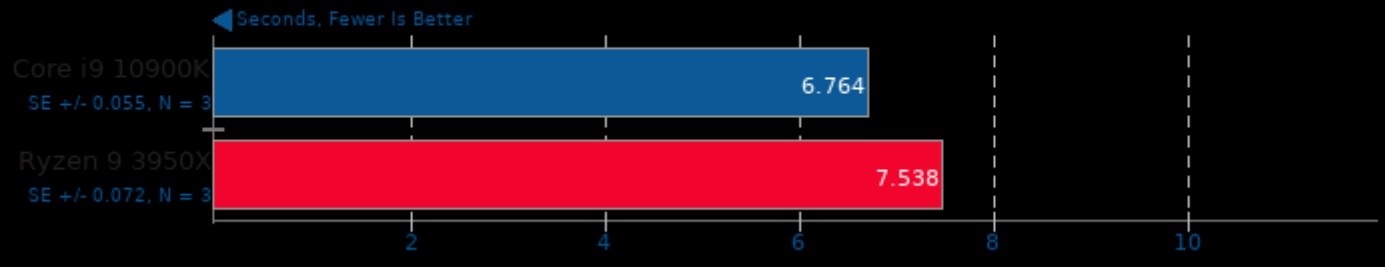
Timed Time - Size 1,000



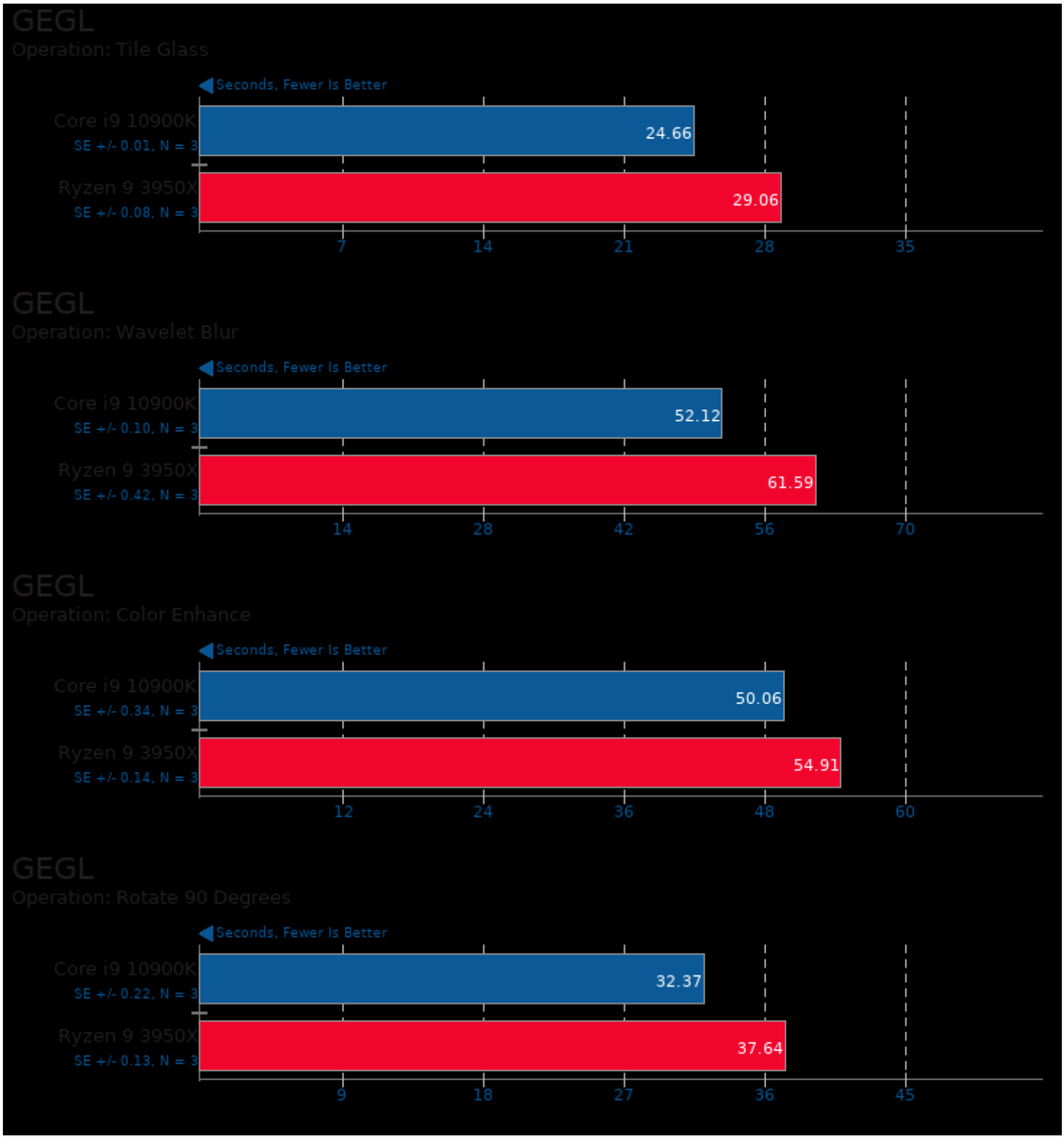

1. (CC) gcc options: -O2 -ldl -lz -lpthread

## GEGL

Operation: Crop



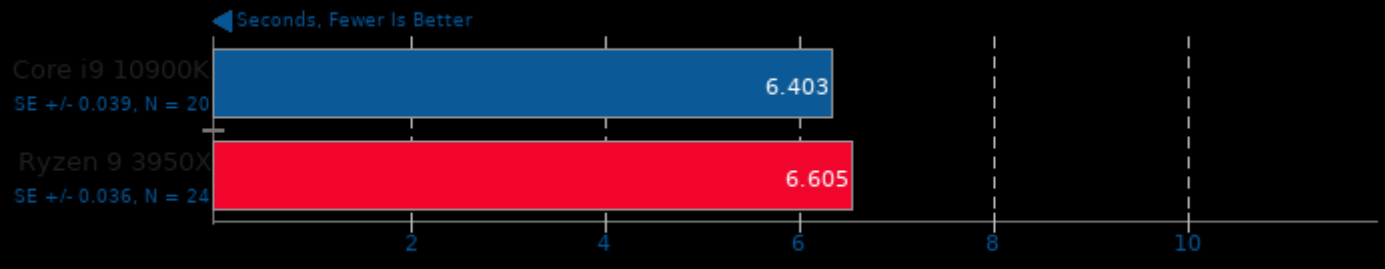

GEGL
Operation: Scale
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.055, N = 3
4.822
Ryzen 9 3950X
SE +/- 0.016, N = 3
5.042
1.1345
2.269
3.4035
4.538
5.6725
GEGL
Operation: Cartoon
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.50, N = 3
78.94
Ryzen 9 3950X
SE +/- 0.59, N = 3
89.86
20
40
60
80
100
GEGL
Operation: Reflect
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.03, N = 3
25.42
Ryzen 9 3950X
SE +/- 0.32, N = 3
29.72
7
14
21
28
35
GEGL
Operation: Antialias
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.15, N = 3
32.11
Ryzen 9 3950X
SE +/- 0.14, N = 3
37.30
9
18
27
36
45


GEGL
Operation: Tile Glass
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.01, N = 3
24.66
Ryzen 9 3950X
SE +/- 0.08, N = 3
29.06
7
14
21
28
35
GEGL
Operation: Wavelet Blur
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.10, N = 3
52.12
Ryzen 9 3950X
SE +/- 0.42, N = 3
61.59
14
28
42
56
70
GEGL
Operation: Color Enhance
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.34, N = 3
50.06
Ryzen 9 3950X
SE +/- 0.14, N = 3
54.91
12
24
36
48
60
GEGL
Operation: Rotate 90 Degrees
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.22, N = 3
32.37
Ryzen 9 3950X
SE +/- 0.13, N = 3
37.64
9
18
27
36
45


GIMP 2.10.18
Test: resize
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.035, N = 3
6.135
Ryzen 9 3950X
SE +/- 0.064, N = 3
6.689
2
4
6
8
10
GIMP 2.10.18
Test: rotate
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.028, N = 3
9.573
Ryzen 9 3950X
SE +/- 0.042, N = 3
10.542
3
6
9
12
15
GIMP 2.10.18
Test: auto-levels
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.018, N = 3
9.693
Ryzen 9 3950X
SE +/- 0.026, N = 3
11.692
3
6
9
12
15
GIMP 2.10.18
Test: unsharp-mask
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.01, N = 3
11.95
Ryzen 9 3950X
SE +/- 0.04, N = 3
14.78
4
8
12
16
20

## LibreOffice

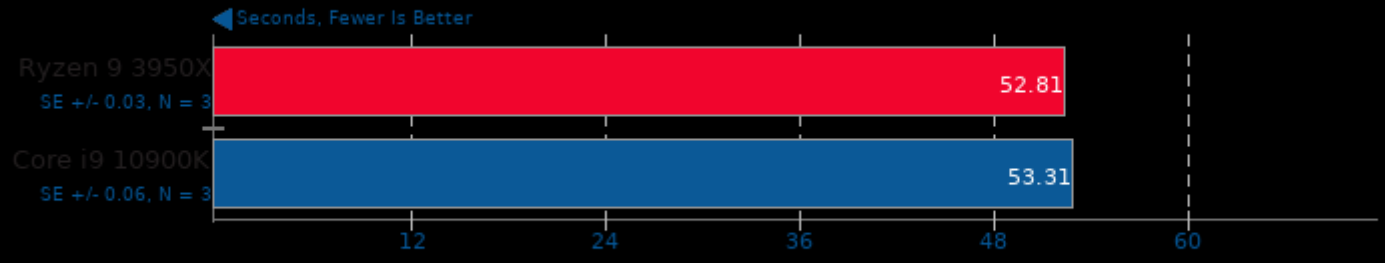
Test: 20 Documents To PDF




1. LibreOffice 6.4.3.2 40(Build:2)

## RawTherapee

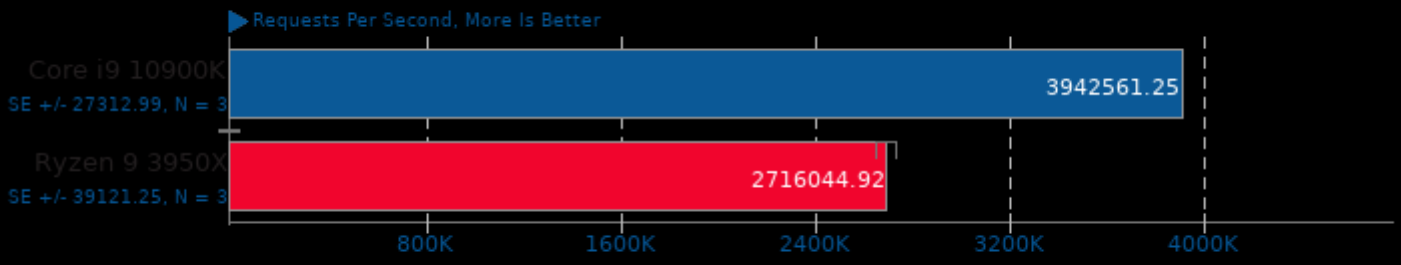
Total Benchmark Time




1. RawTherapee, version 5.8, command line.

## Redis 5.0.5

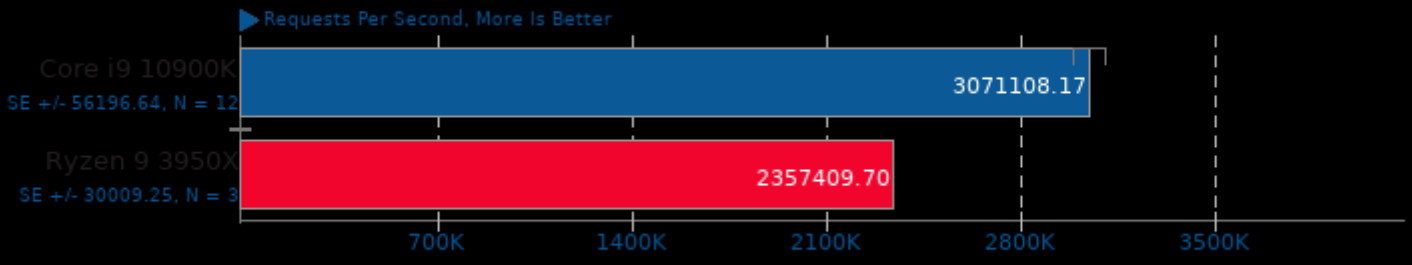
Test: LPOP




1. (CXX) g++ options: -MM -MT -g3 -fvisibility=hidden -O3

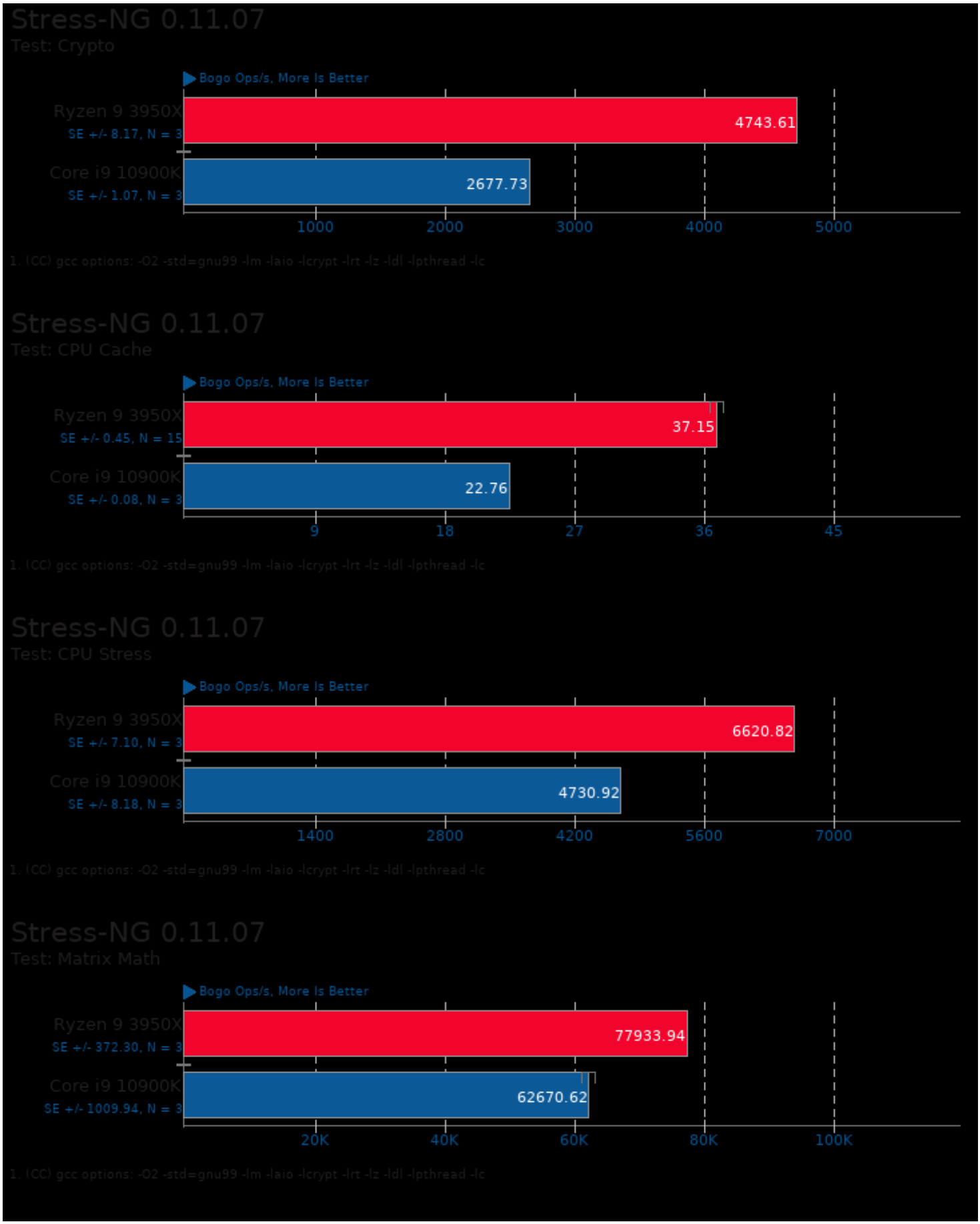
## Redis 5.0.5

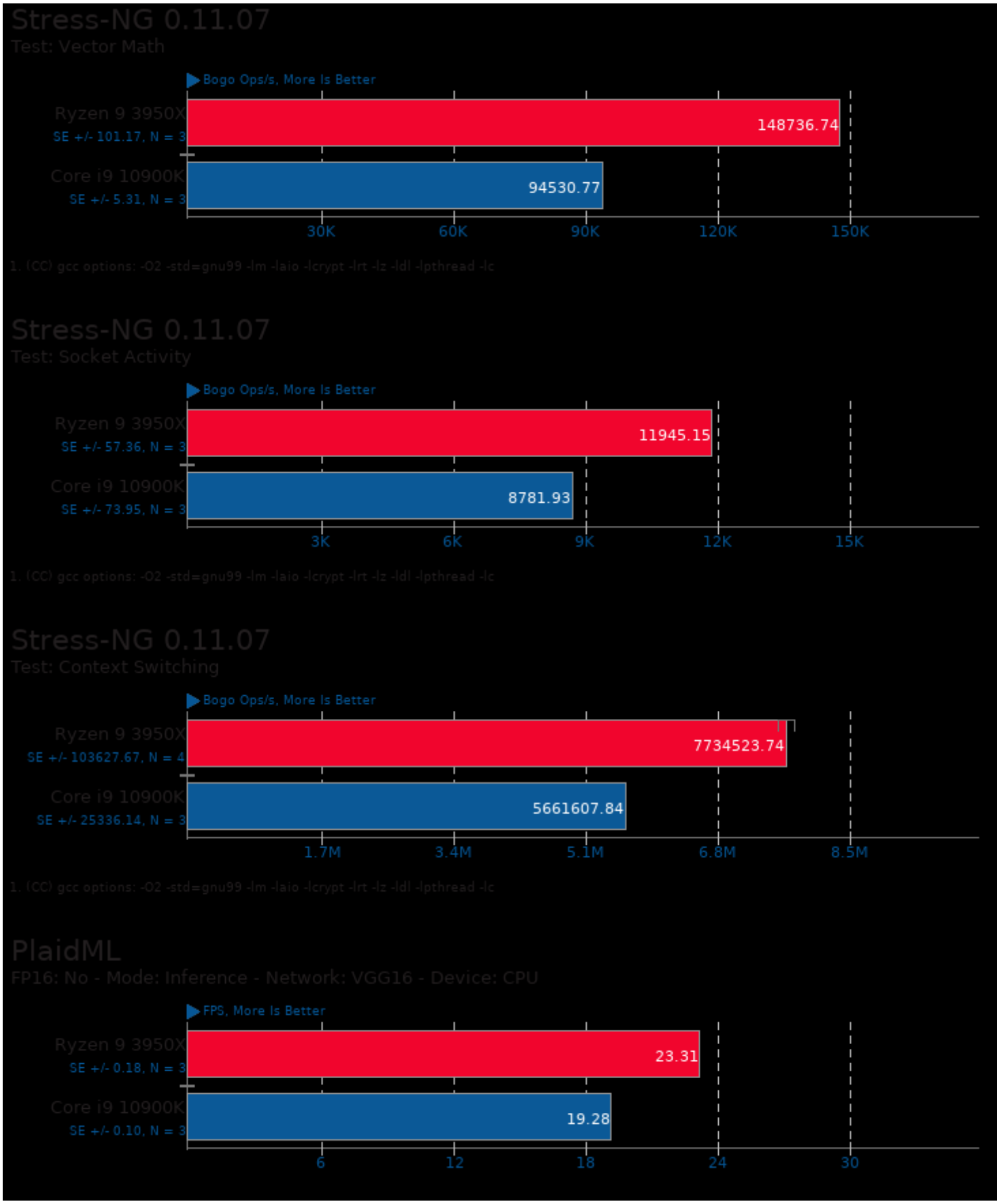
Test: SADD

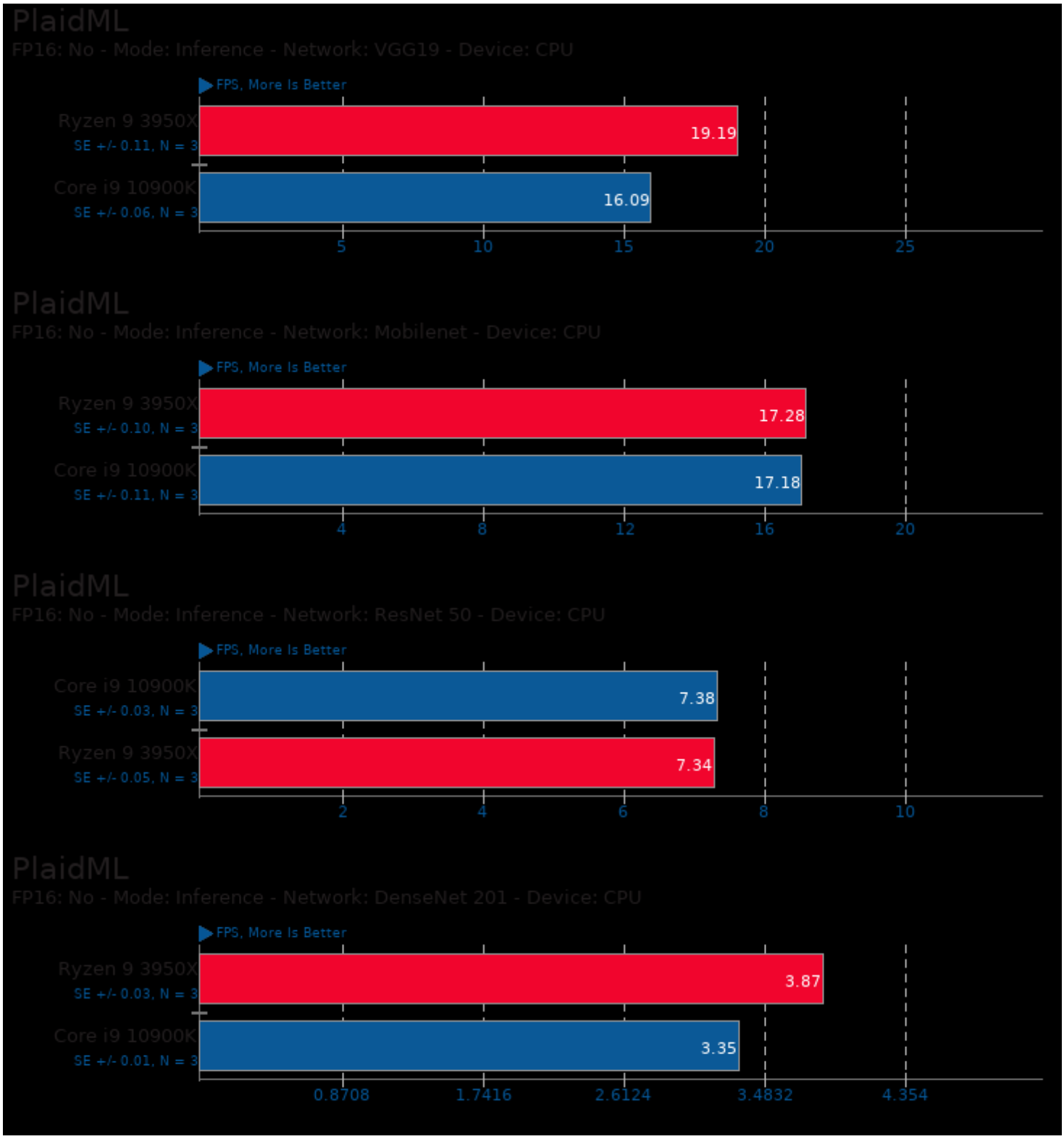


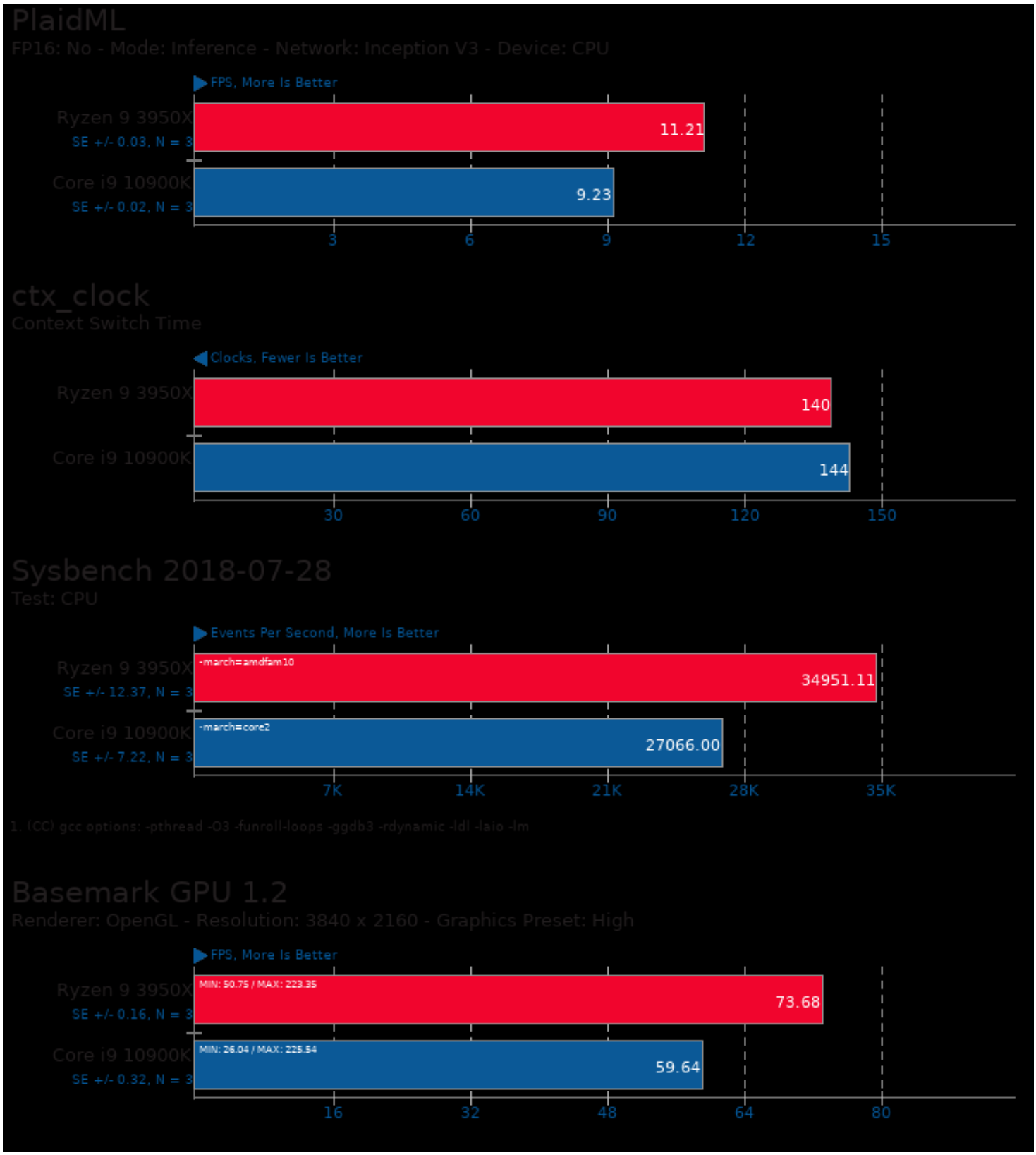

1. (CXX) g++ options: -MM -MT -g3 -fvisibility=hidden -O3


Redis 5.0.5
Test: LPUSH
Requests Per Second, More Is Better
Core i9 10900K
SE +/- 37327.85, N = 3
2289561.42
Ryzen 9 3950X
SE +/- 19234.29, N = 15
1666744.78
500K
1000K
1500K
2000K
2500K
1. (CXX) g++ options: -MM -MT -g3 -fvisibility=hidden -O3
Redis 5.0.5
Test: GET
Requests Per Second, More Is Better
Core i9 10900K
SE +/- 24855.18, N = 3
3788204.92
Ryzen 9 3950X
SE +/- 37136.44, N = 4
2609128.25
800K
1600K
2400K
3200K
4000K
1. (CXX) g++ options: -MM -MT -g3 -fvisibility=hidden -O3
Redis 5.0.5
Test: SET
Requests Per Second, More Is Better
Core i9 10900K
SE +/- 22833.50, N = 3
2770462.50
Ryzen 9 3950X
SE +/- 27814.04, N = 15
1992290.86
600K
1200K
1800K
2400K
3000K
1. (CXX) g++ options: -MM -MT -g3 -fvisibility=hidden -O3
Stress-NG 0.11.07
Test: Atomic
Bogo Ops/s, More Is Better
Ryzen 9 3950X
SE +/- 1341.32, N = 3
747139.32
Core i9 10900K
SE +/- 8010.27, N = 15
230445.25
160K
320K
480K
640K
800K
1. (CC) gcc options: -O2 -std=gnu99 -lm -laio -lcrypt -lrt -lz -ldl -lpthread -lc


Stress-NG 0.11.07
Test: Crypto
Bogo Ops/s, More Is Better
Ryzen 9 3950X
SE +/- 8.17, N = 3
4743.61
Core i9 10900K
SE +/- 1.07, N = 3
2677.73
1000
2000
3000
4000
5000
1. (CC) gcc options: -O2 -std=gnu99 -lm -laio -lcrypt -lrt -lz -ldl -lpthread -lc
Stress-NG 0.11.07
Test: CPU Cache
Bogo Ops/s, More Is Better
Ryzen 9 3950X
SE +/- 0.45, N = 15
37.15
Core i9 10900K
SE +/- 0.08, N = 3
22.76
9
18
27
36
45
1. (CC) gcc options: -O2 -std=gnu99 -lm -laio -lcrypt -lrt -lz -ldl -lpthread -lc
Stress-NG 0.11.07
Test: CPU Stress
Bogo Ops/s, More Is Better
Ryzen 9 3950X
SE +/- 7.10, N = 3
6620.82
Core i9 10900K
SE +/- 8.18, N = 3
4730.92
1400
2800
4200
5600
7000
1. (CC) gcc options: -O2 -std=gnu99 -lm -laio -lcrypt -lrt -lz -ldl -lpthread -lc
Stress-NG 0.11.07
Test: Matrix Math
Bogo Ops/s, More Is Better
Ryzen 9 3950X
SE +/- 372.30, N = 3
77933.94
Core i9 10900K
SE +/- 1009.94, N = 3
62670.62
20K
40K
60K
80K
100K
1. (CC) gcc options: -O2 -std=gnu99 -lm -laio -lcrypt -lrt -lz -ldl -lpthread -lc

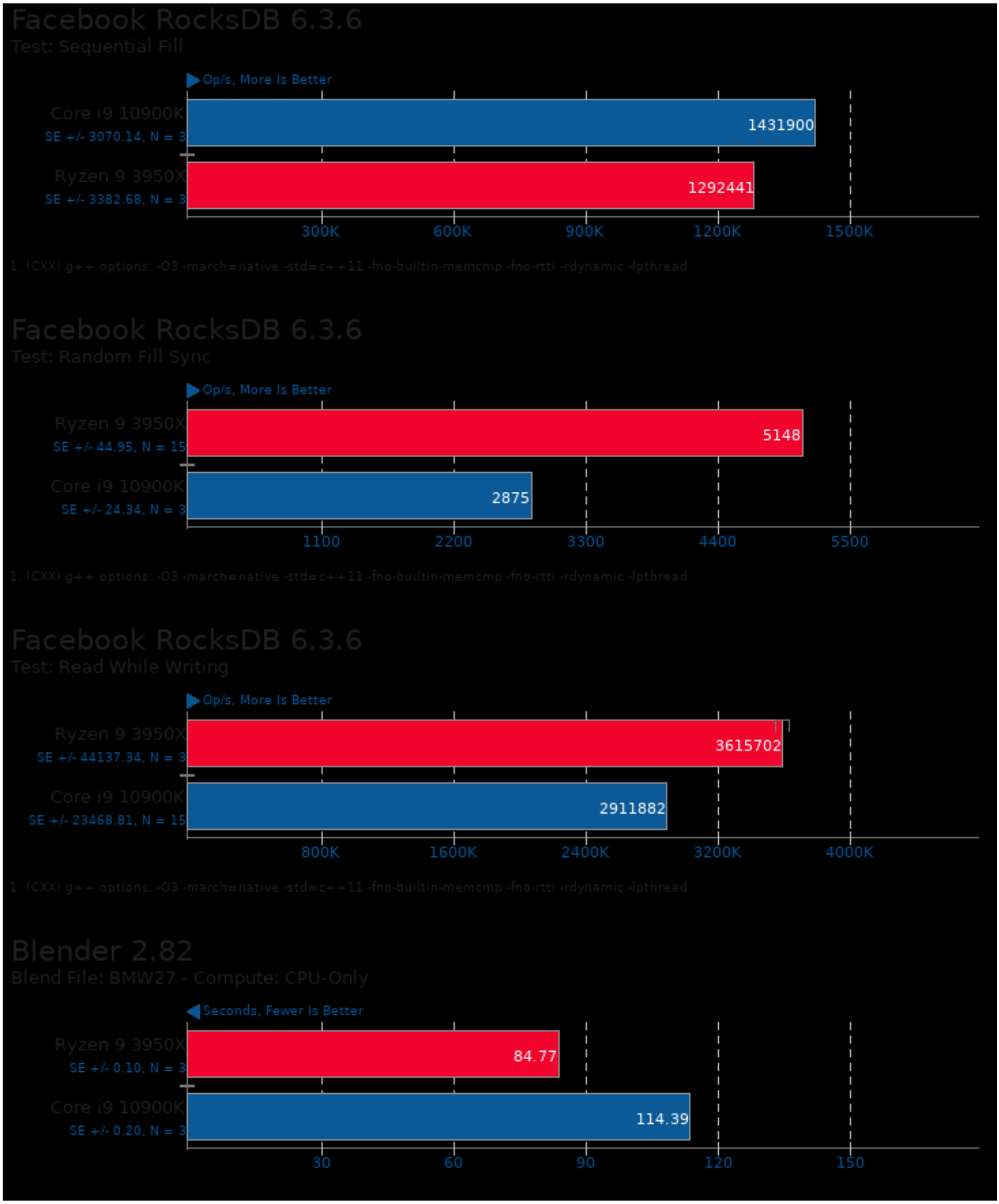

Stress-NG 0.11.07
Test: Vector Math
Bogo Ops/s, More Is Better
Ryzen 9 3950X
SE +/- 101.17, N = 3
148736.74
Core i9 10900K
SE +/- 5.31, N = 3
94530.77
30K
60K
90K
120K
150K
1. (CC) gcc options: -O2 -std=gnu99 -lm -laio -lcrypt -lrt -lz -ldl -lpthread -lc
Stress-NG 0.11.07
Test: Socket Activity
Bogo Ops/s, More Is Better
Ryzen 9 3950X
SE +/- 57.36, N = 3
11945.15
Core i9 10900K
SE +/- 73.95, N = 3
8781.93
3K
6K
9K
12K
15K
1. (CC) gcc options: -O2 -std=gnu99 -lm -laio -lcrypt -lrt -lz -ldl -lpthread -lc
Stress-NG 0.11.07
Test: Context Switching
Bogo Ops/s, More Is Better
Ryzen 9 3950X
SE +/- 103627.67, N = 4
7734523.74
Core i9 10900K
SE +/- 25336.14, N = 3
5661607.84
1.7M
3.4M
5.1M
6.8M
8.5M
1. (CC) gcc options: -O2 -std=gnu99 -lm -laio -lcrypt -lrt -lz -ldl -lpthread -lc
PlaidML
FP16: No - Mode: Inference - Network: VGG16 - Device: CPU
FPS, More Is Better
Ryzen 9 3950X
SE +/- 0.18, N = 3
23.31
Core i9 10900K
SE +/- 0.10, N = 3
19.28
6
12
18
24
30

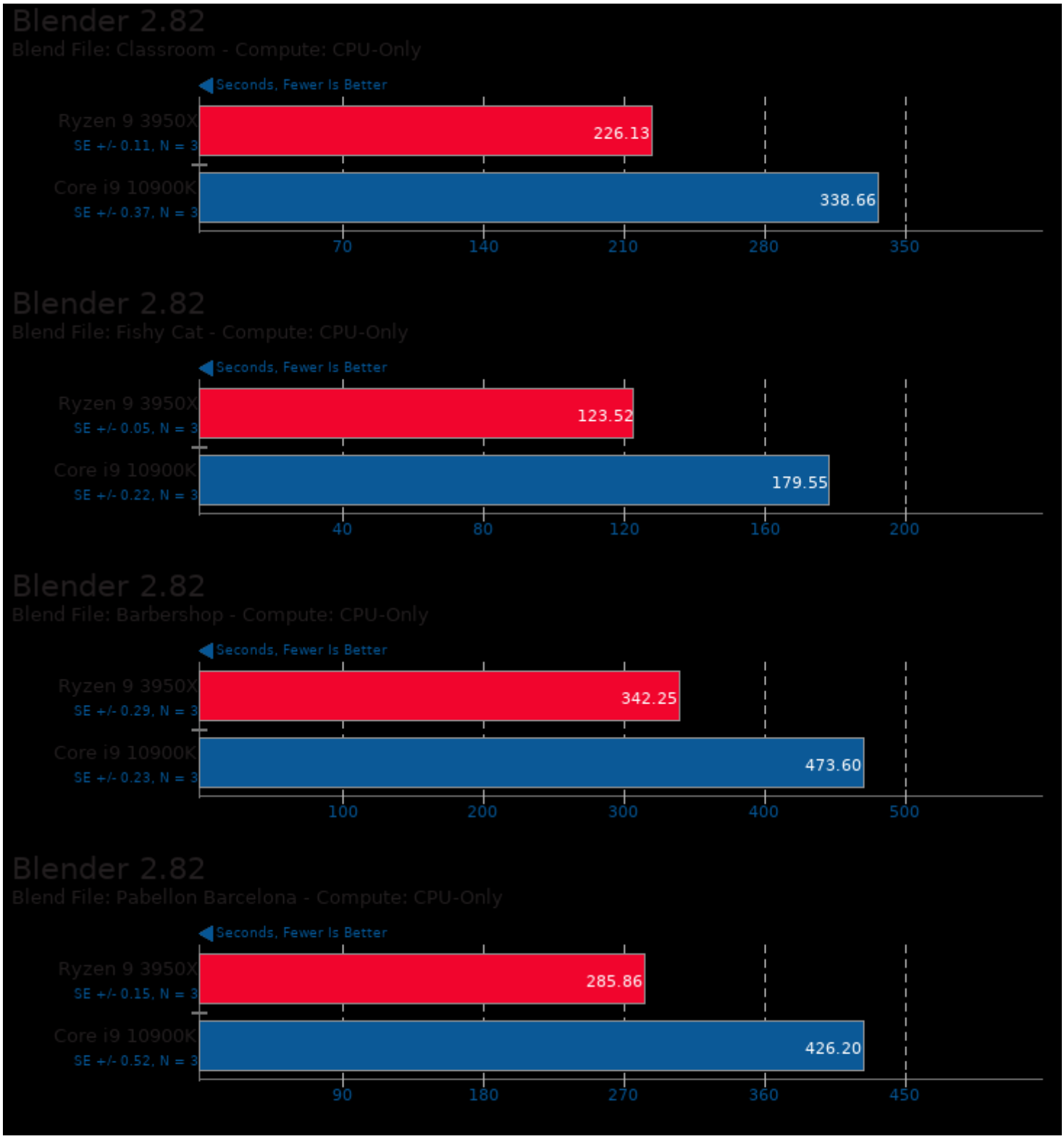

PlaidML
FP16: No - Mode: Inference - Network: VGG19 - Device: CPU
FPS, More Is Better
Ryzen 9 3950X
SE +/- 0.11, N = 3
19.19
Core i9 10900K
SE +/- 0.06, N = 3
16.09
5
10
15
20
25
PlaidML
FP16: No - Mode: Inference - Network: Mobilenet - Device: CPU
FPS, More Is Better
Ryzen 9 3950X
SE +/- 0.10, N = 3
17.28
Core i9 10900K
SE +/- 0.11, N = 3
17.18
4
8
12
16
20
PlaidML
FP16: No - Mode: Inference - Network: ResNet 50 - Device: CPU
FPS, More Is Better
Core i9 10900K
SE +/- 0.03, N = 3
7.38
Ryzen 9 3950X
SE +/- 0.05, N = 3
7.34
2
4
6
8
10
PlaidML
FP16: No - Mode: Inference - Network: DenseNet 201 - Device: CPU
FPS, More Is Better
Ryzen 9 3950X
SE +/- 0.03, N = 3
3.87
Core i9 10900K
SE +/- 0.01, N = 3
3.35
0.8708
1.7416
2.6124
3.4832
4.354

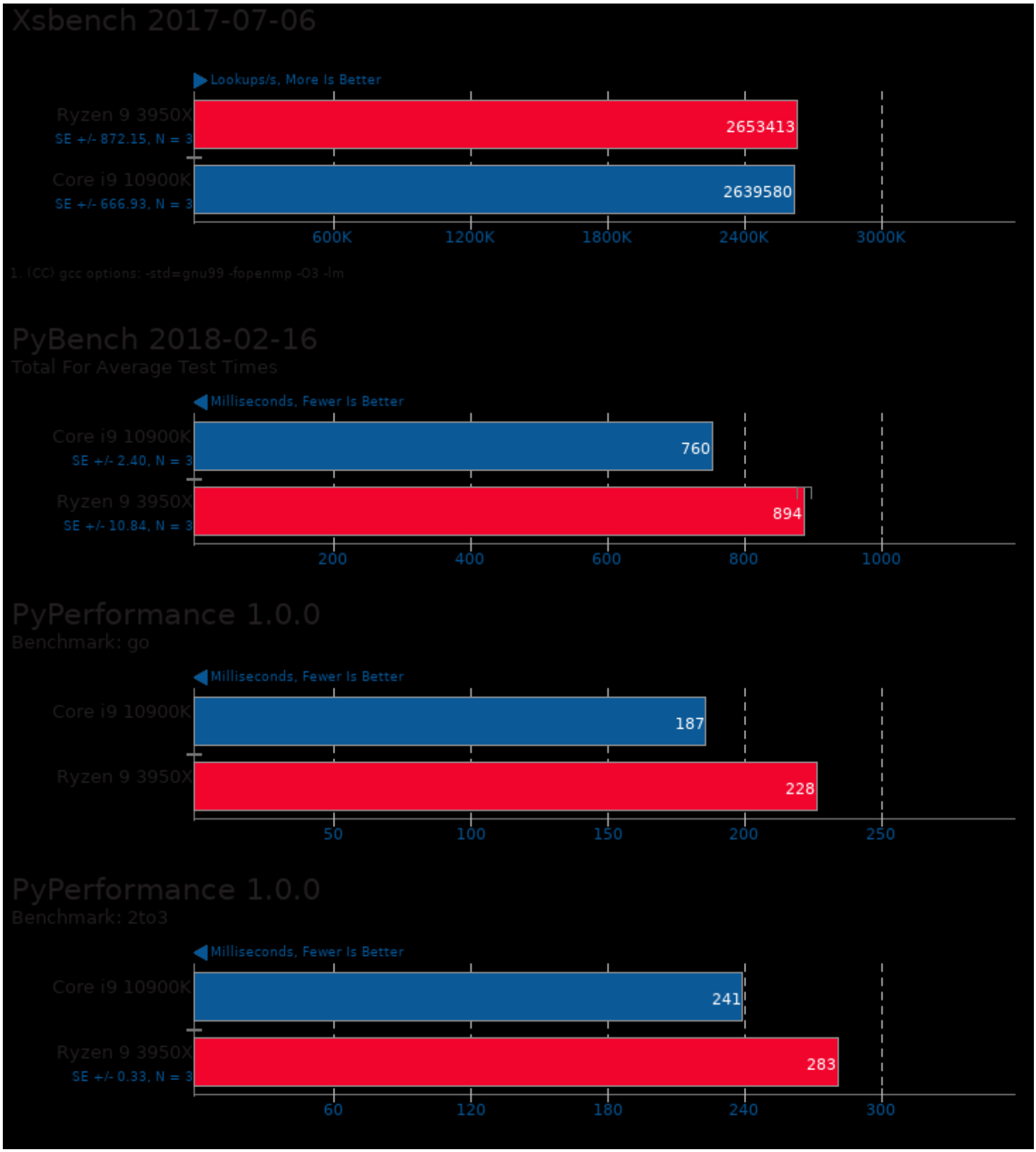

PlaidML
FP16: No - Mode: Inference - Network: Inception V3 - Device: CPU
FPS, More Is Better
Ryzen 9 3950X
SE +/- 0.03, N = 3
11.21
Core i9 10900K
SE +/- 0.02, N = 3
9.23
3
6
9
12
15
ctx_clock
Context Switch Time
Clocks, Fewer Is Better
Ryzen 9 3950X
140
Core i9 10900K
144
30
60
90
120
150
Sysbench 2018-07-28
Test: CPU
Events Per Second, More Is Better
Ryzen 9 3950X
SE +/- 12.37, N = 3
-march=amdfam10
34951.11
Core i9 10900K
SE +/- 7.22, N = 3
-march=core2
27066.00
7K
14K
21K
28K
35K
1. (CC) gcc options: -pthread -O3 -funroll-loops -ggdb3 -rdynamic -ldl -laio -lm
Basemark GPU 1.2
Renderer: OpenGL - Resolution: 3840 x 2160 - Graphics Preset: High
FPS, More Is Better
Ryzen 9 3950X
SE +/- 0.16, N = 3
MIN: 50.75 / MAX: 223.35
73.68
Core i9 10900K
SE +/- 0.32, N = 3
MIN: 26.04 / MAX: 225.54
59.64
16
32
48
64
80

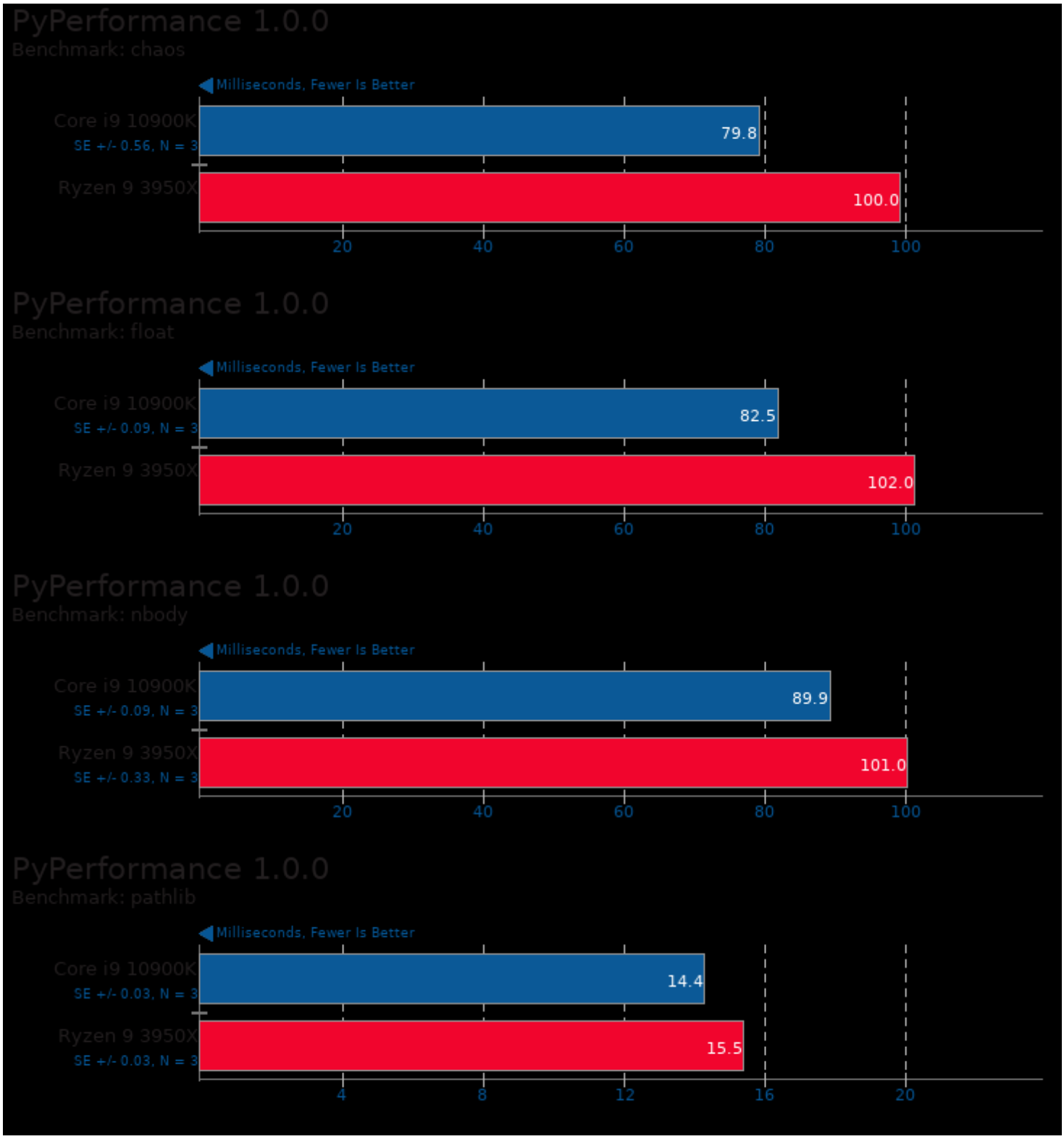

Basemark GPU 1.2
Renderer: Vulkan - Resolution: 3840 x 2160 - Graphics Preset: High
FPS, More Is Better
Core i9 10900K
SE +/- 0.08, N = 3
MIN: 64.4 / MAX: 112.07
81.93
Ryzen 9 3950X
SE +/- 0.06, N = 3
MIN: 66.95 / MAX: 108.2
80.95
20
40
60
80
100
Basemark GPU 1.2
Renderer: OpenGL - Resolution: 3840 x 2160 - Graphics Preset: Medium
FPS, More Is Better
Core i9 10900K
SE +/- 2.43, N = 3
MIN: 127.99 / MAX: 1207.51
304.94
Ryzen 9 3950X
SE +/- 2.80, N = 3
MIN: 81.01 / MAX: 784.38
187.04
70
140
210
280
350
Basemark GPU 1.2
Renderer: Vulkan - Resolution: 3840 x 2160 - Graphics Preset: Medium
FPS, More Is Better
Ryzen 9 3950X
SE +/- 0.66, N = 3
MIN: 267.26 / MAX: 672.55
415.32
Core i9 10900K
SE +/- 0.25, N = 3
MIN: 198.76 / MAX: 1403.78
404.07
90
180
270
360
450
Optcarrot
Optimized Benchmark
FPS, More Is Better
Core i9 10900K
SE +/- 0.27, N = 4
180.40
Ryzen 9 3950X
SE +/- 0.94, N = 4
141.62
40
80
120
160
200
1. ruby 2.7.0p0 (2019-12-25 revision 647ee6f091) [x86_64-linux-gnu]

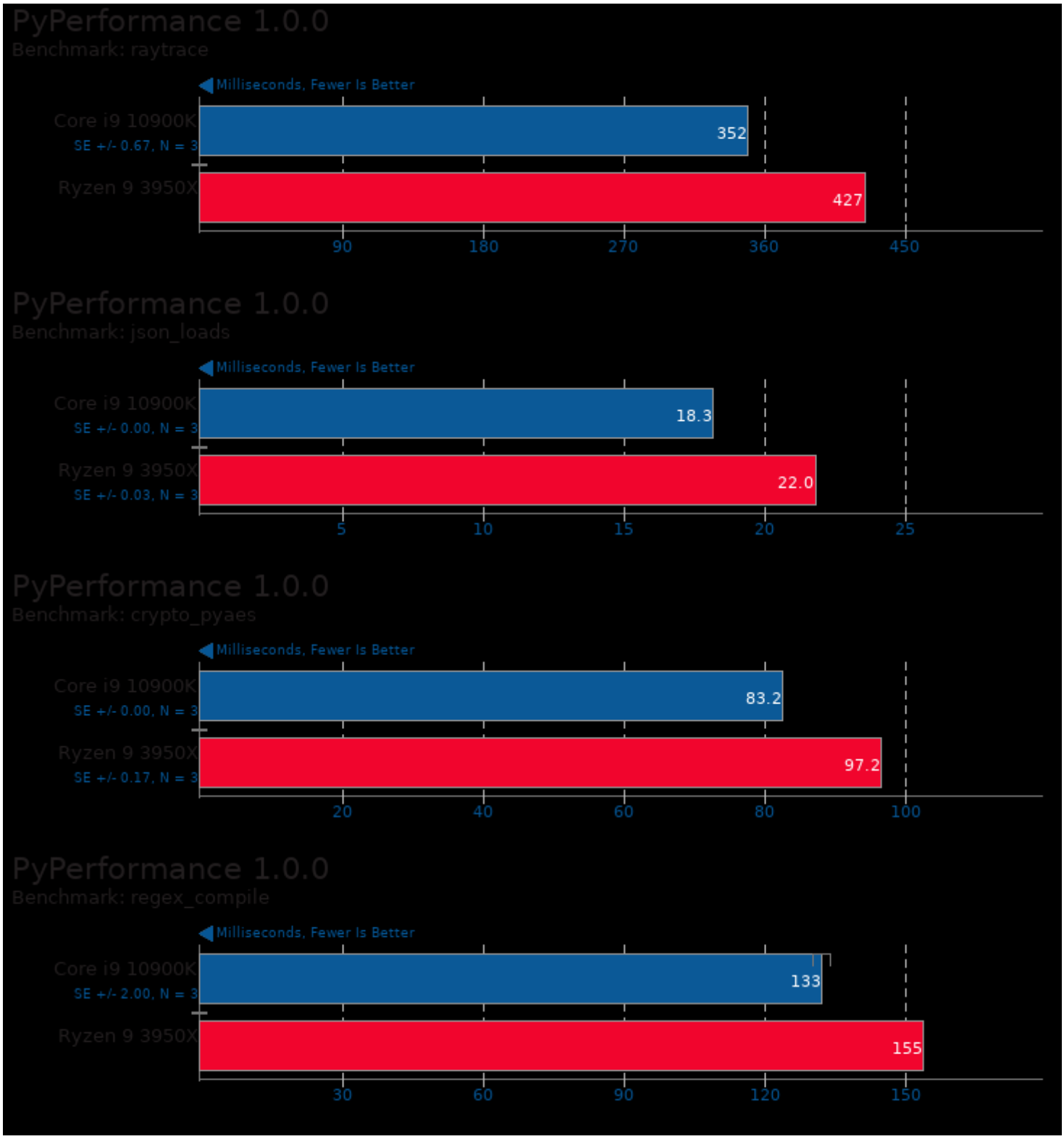

IndigoBench 4.0.64
Scene: Bedroom
M samples/s, More Is Better
Ryzen 9 3950X
SE +/- 0.004, N = 3
2.669
Core i9 10900K
SE +/- 0.003, N = 3
1.894
0.6005
1.201
1.8015
2.402
3.0025
IndigoBench 4.0.64
Scene: Supercar
M samples/s, More Is Better
Ryzen 9 3950X
SE +/- 0.003, N = 3
5.660
Core i9 10900K
SE +/- 0.003, N = 3
4.435
1.2735
2.547
3.8205
5.094
6.3675
Facebook RocksDB 6.3.6
Test: Random Fill
Op/s, More Is Better
Ryzen 9 3950X
SE +/- 26686.09, N = 15
680458
Core i9 10900K
SE +/- 27594.22, N = 15
656303
150K
300K
450K
600K
750K
1. (CXX) g++ options: -O3 -march=native -std=c++11 -fno-builtin-memcmp -fno-rtti -rdynamic -lpthread
Facebook RocksDB 6.3.6
Test: Random Read
Op/s, More Is Better
Ryzen 9 3950X
SE +/- 629940.78, N = 3
95962407
Core i9 10900K
SE +/- 63192.21, N = 3
68514144
20M
40M
60M
80M
100M
1. (CXX) g++ options: -O3 -march=native -std=c++11 -fno-builtin-memcmp -fno-rtti -rdynamic -lpthread

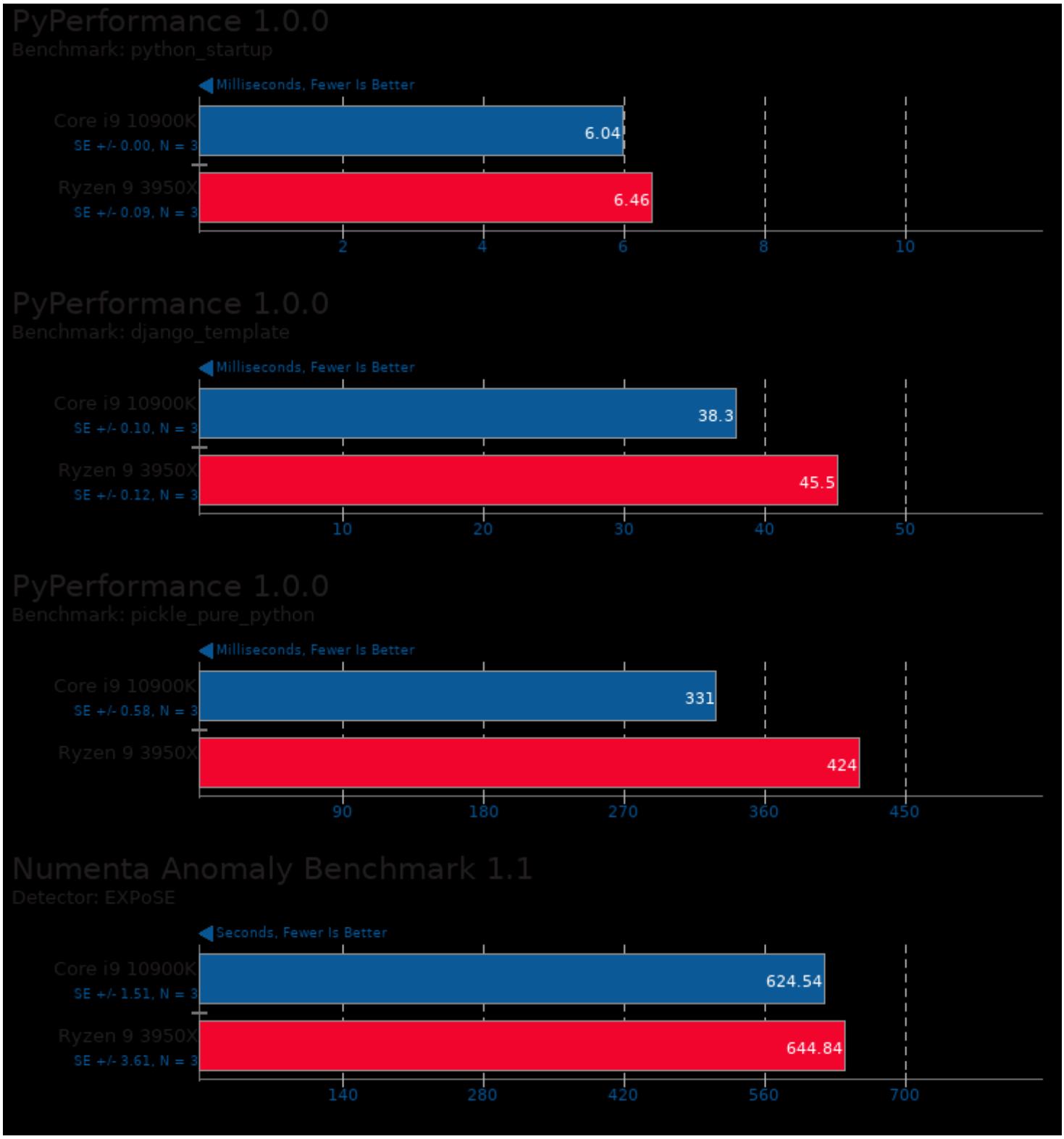

Facebook RocksDB 6.3.6
Test: Sequential Fill
Op/s, More Is Better
Core i9 10900K
SE +/- 3070.14, N = 3
1431900
Ryzen 9 3950X
SE +/- 3382.68, N = 3
1292441
300K
600K
900K
1200K
1500K
1. (CXX) g++ options: -O3 -march=native -std=c++11 -fno-builtin-memcmp -fno-rtti -rdynamic -lpthread
Facebook RocksDB 6.3.6
Test: Random Fill Sync
Op/s, More Is Better
Ryzen 9 3950X
SE +/- 44.95, N = 15
5148
Core i9 10900K
SE +/- 24.34, N = 3
2875
1100
2200
3300
4400
5500
1. (CXX) g++ options: -O3 -march=native -std=c++11 -fno-builtin-memcmp -fno-rtti -rdynamic -lpthread
Facebook RocksDB 6.3.6
Test: Read While Writing
Op/s, More Is Better
Ryzen 9 3950X
SE +/- 44137.34, N = 3
3615702
Core i9 10900K
SE +/- 23468.81, N = 15
2911882
800K
1600K
2400K
3200K
4000K
1. (CXX) g++ options: -O3 -march=native -std=c++11 -fno-builtin-memcmp -fno-rtti -rdynamic -lpthread
Blender 2.82
Blend File: BMW27 - Compute: CPU-Only
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.10, N = 3
84.77
Core i9 10900K
SE +/- 0.20, N = 3
114.39
30
60
90
120
150

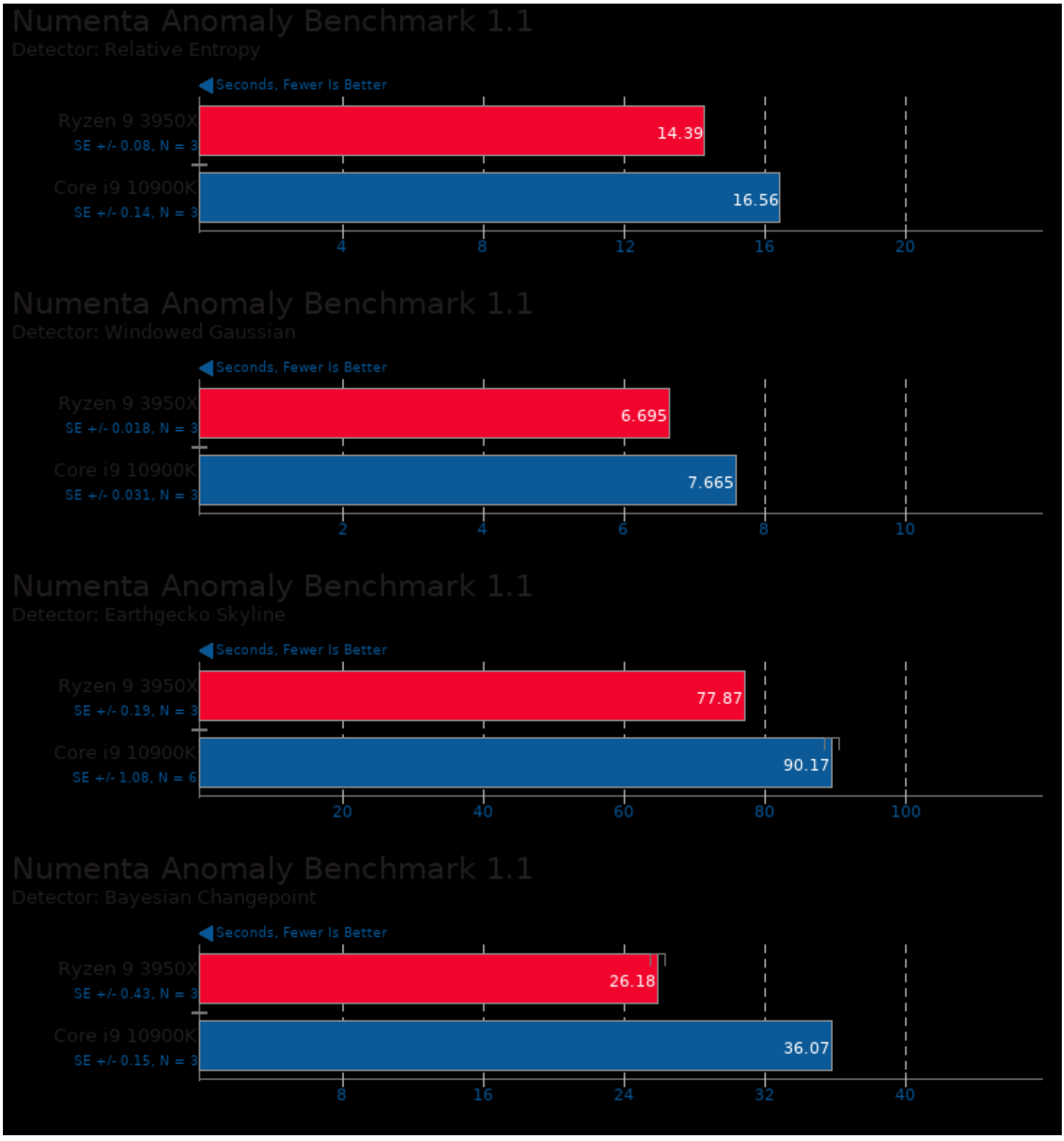

Blender 2.82
Blend File: Classroom - Compute: CPU-Only
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.11, N = 3
226.13
Core i9 10900K
SE +/- 0.37, N = 3
338.66
70
140
210
280
350
Blender 2.82
Blend File: Fishy Cat - Compute: CPU-Only
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.05, N = 3
123.52
Core i9 10900K
SE +/- 0.22, N = 3
179.55
40
80
120
160
200
Blender 2.82
Blend File: Barbershop - Compute: CPU-Only
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.29, N = 3
342.25
Core i9 10900K
SE +/- 0.23, N = 3
473.60
100
200
300
400
500
Blender 2.82
Blend File: Pabellon Barcelona - Compute: CPU-Only
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.15, N = 3
285.86
Core i9 10900K
SE +/- 0.52, N = 3
426.20
90
180
270
360
450

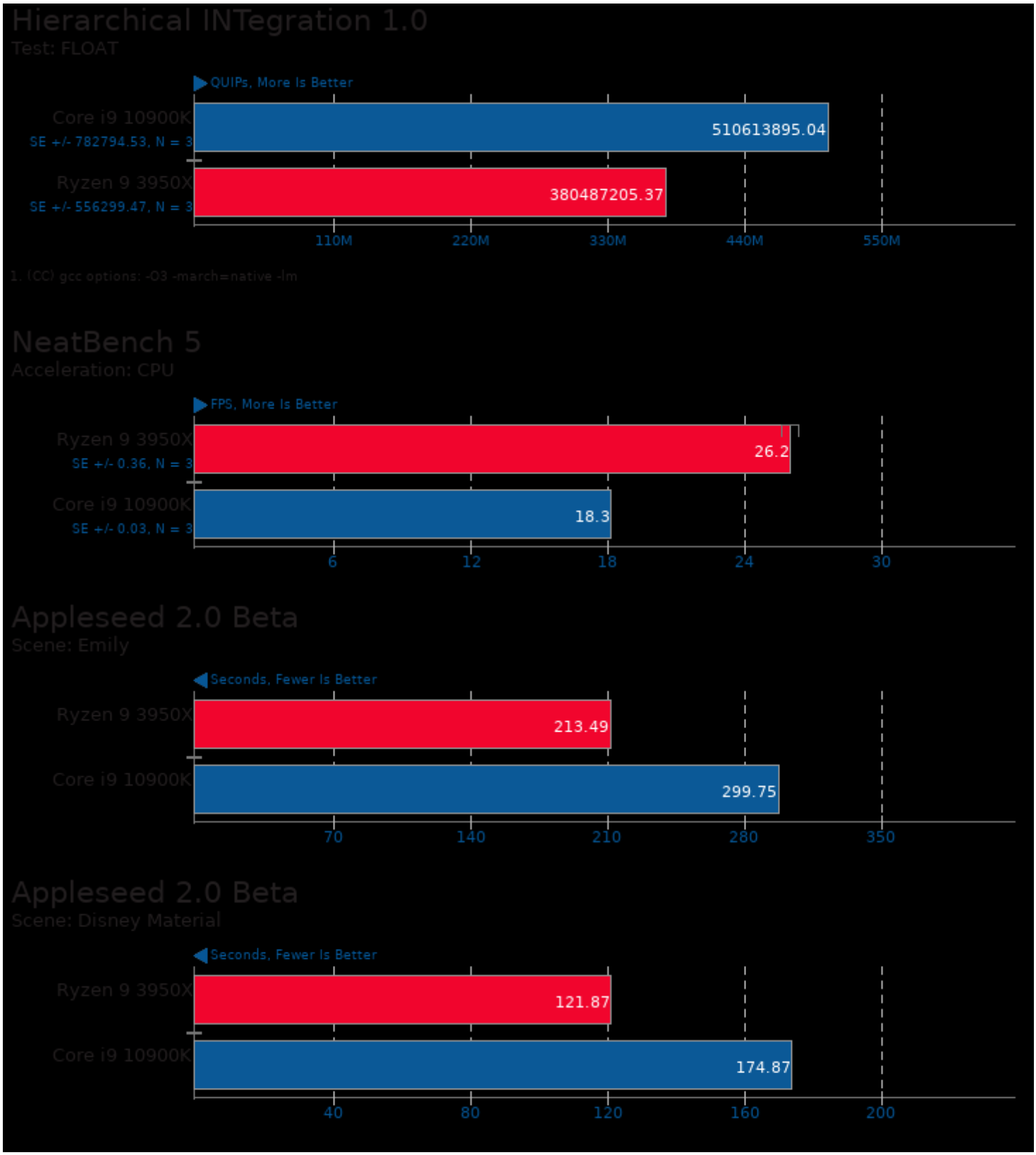

Xsbench 2017-07-06
Lookups/s, More Is Better
Ryzen 9 3950X
SE +/- 872.15, N = 3
2653413
Core i9 10900K
SE +/- 666.93, N = 3
2639580
600K
1200K
1800K
2400K
3000K
1. (CC) gcc options: -std=gnu99 -fopenmp -O3 -lm
PyBench 2018-02-16
Total For Average Test Times
Milliseconds, Fewer Is Better
Core i9 10900K
SE +/- 2.40, N = 3
760
Ryzen 9 3950X
SE +/- 10.84, N = 3
894
200
400
600
800
1000
PyPerformance 1.0.0
Benchmark: go
Milliseconds, Fewer Is Better
Core i9 10900K
187
Ryzen 9 3950X
228
50
100
150
200
250
PyPerformance 1.0.0
Benchmark: 2to3
Milliseconds, Fewer Is Better
Core i9 10900K
241
Ryzen 9 3950X
SE +/- 0.33, N = 3
283
60
120
180
240
300

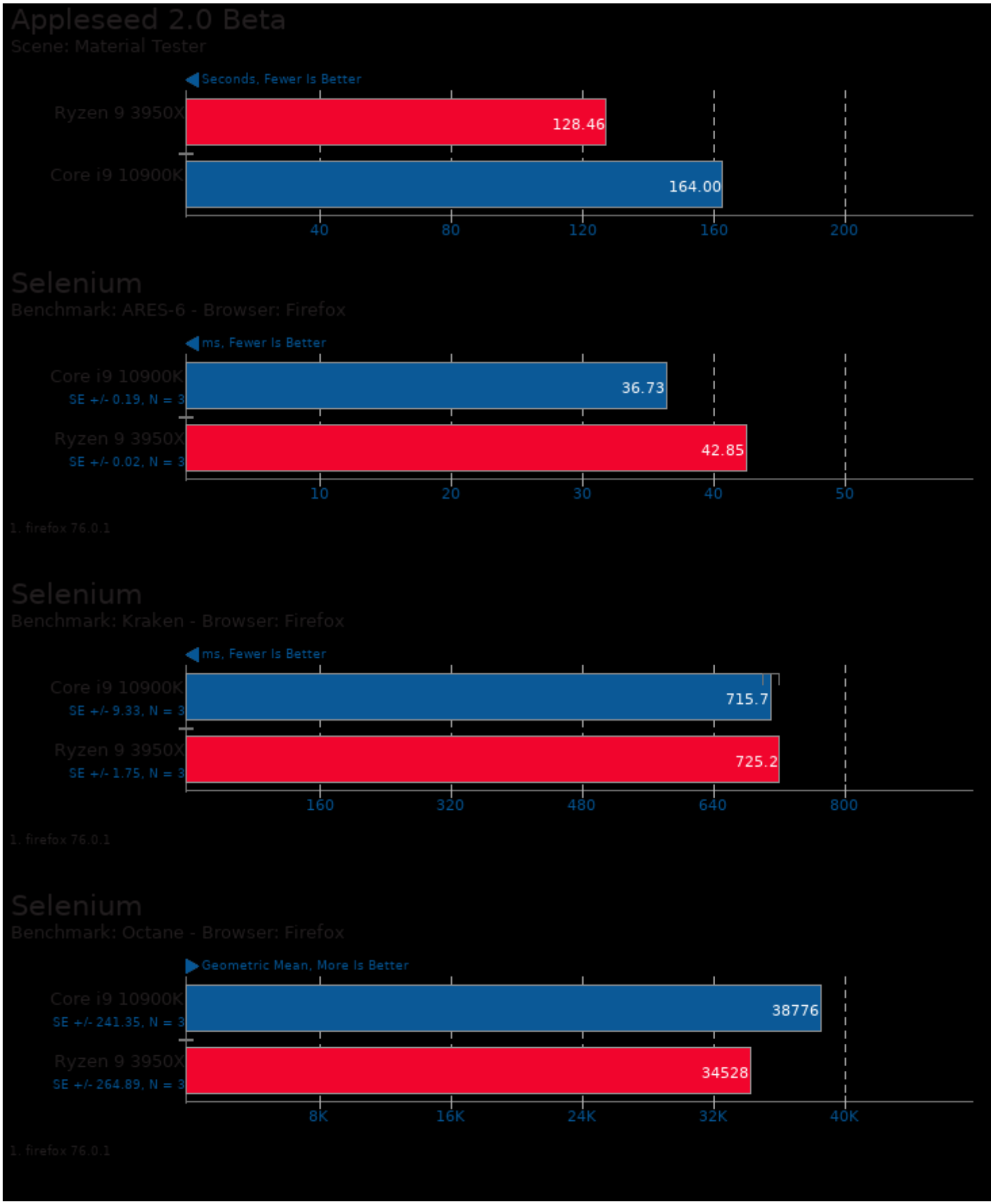

PyPerformance 1.0.0
Benchmark: chaos
Milliseconds, Fewer Is Better
Core i9 10900K
SE +/- 0.56, N = 3
79.8
Ryzen 9 3950X
100.0
20
40
60
80
100
PyPerformance 1.0.0
Benchmark: float
Milliseconds, Fewer Is Better
Core i9 10900K
SE +/- 0.09, N = 3
82.5
Ryzen 9 3950X
102.0
20
40
60
80
100
PyPerformance 1.0.0
Benchmark: nbody
Milliseconds, Fewer Is Better
Core i9 10900K
SE +/- 0.09, N = 3
89.9
Ryzen 9 3950X
SE +/- 0.33, N = 3
101.0
20
40
60
80
100
PyPerformance 1.0.0
Benchmark: pathlib
Milliseconds, Fewer Is Better
Core i9 10900K
SE +/- 0.03, N = 3
14.4
Ryzen 9 3950X
SE +/- 0.03, N = 3
15.5
4
8
12
16
20

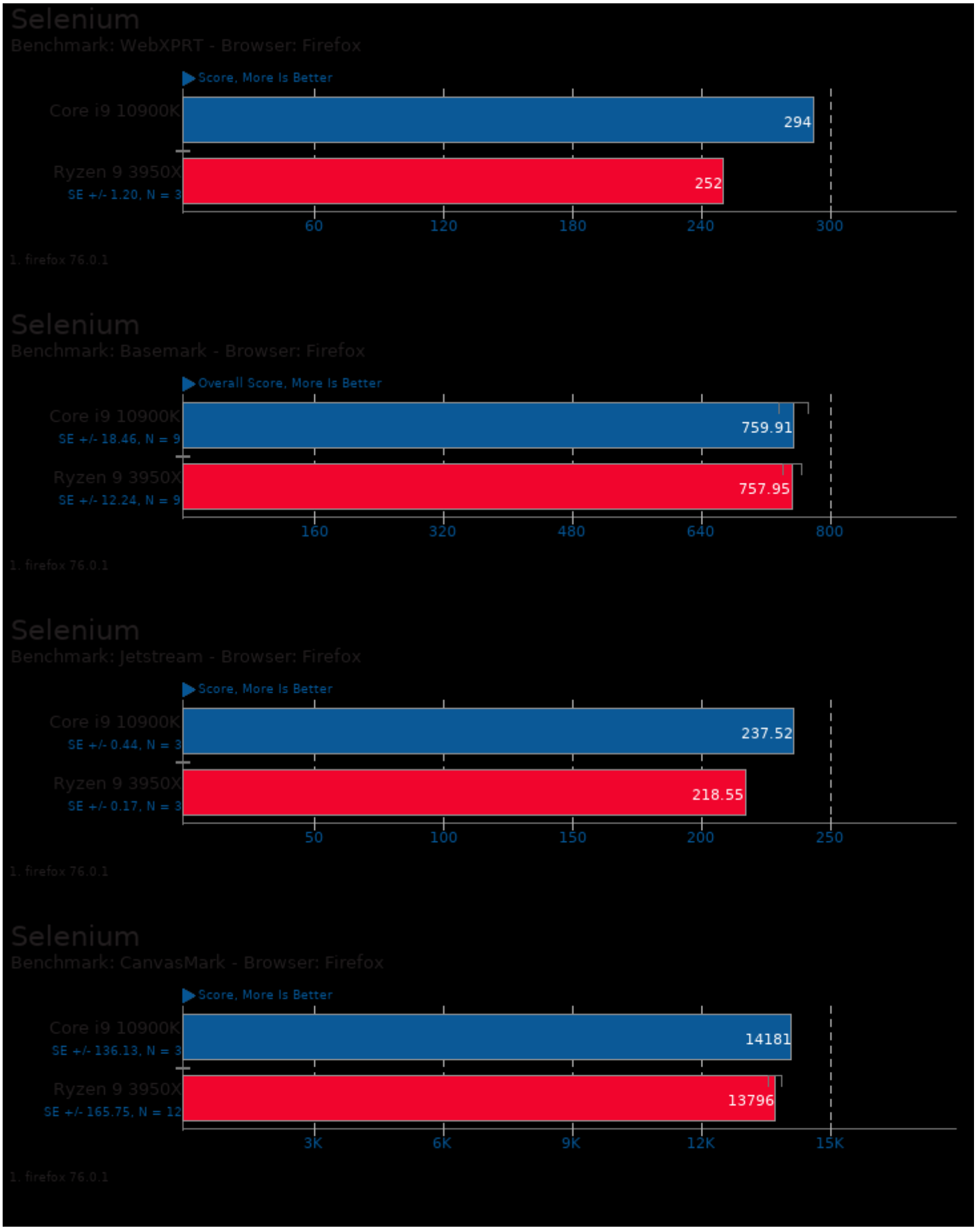

PyPerformance 1.0.0
Benchmark: raytrace
Milliseconds, Fewer Is Better
Core i9 10900K
SE +/- 0.67, N = 3
352
Ryzen 9 3950X
427
90
180
270
360
450
PyPerformance 1.0.0
Benchmark: json_loads
Milliseconds, Fewer Is Better
Core i9 10900K
SE +/- 0.00, N = 3
18.3
Ryzen 9 3950X
SE +/- 0.03, N = 3
22.0
5
10
15
20
25
PyPerformance 1.0.0
Benchmark: crypto_pyaes
Milliseconds, Fewer Is Better
Core i9 10900K
SE +/- 0.00, N = 3
83.2
Ryzen 9 3950X
SE +/- 0.17, N = 3
97.2
20
40
60
80
100
PyPerformance 1.0.0
Benchmark: regex_compile
Milliseconds, Fewer Is Better
Core i9 10900K
SE +/- 2.00, N = 3
133
Ryzen 9 3950X
155
30
60
90
120
150

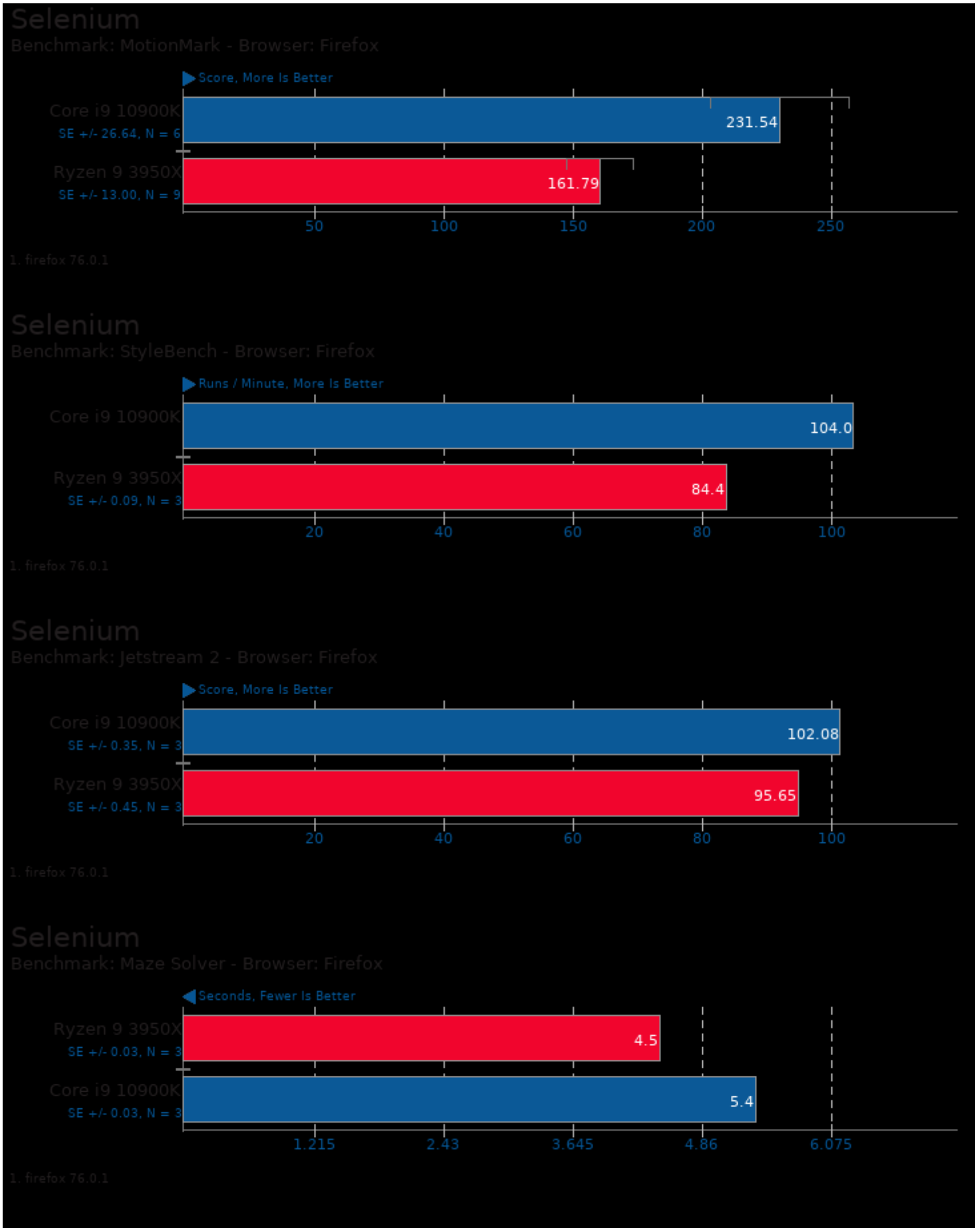

PyPerformance 1.0.0
Benchmark: python_startup
Milliseconds, Fewer Is Better
Core i9 10900K
SE +/- 0.00, N = 3
6.04
Ryzen 9 3950X
SE +/- 0.09, N = 3
6.46
2
4
6
8
10
PyPerformance 1.0.0
Benchmark: django_template
Milliseconds, Fewer Is Better
Core i9 10900K
SE +/- 0.10, N = 3
38.3
Ryzen 9 3950X
SE +/- 0.12, N = 3
45.5
10
20
30
40
50
PyPerformance 1.0.0
Benchmark: pickle_pure_python
Milliseconds, Fewer Is Better
Core i9 10900K
SE +/- 0.58, N = 3
331
Ryzen 9 3950X
424
90
180
270
360
450
Numenta Anomaly Benchmark 1.1
Detector: EXPoSE
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 1.51, N = 3
624.54
Ryzen 9 3950X
SE +/- 3.61, N = 3
644.84
140
280
420
560
700

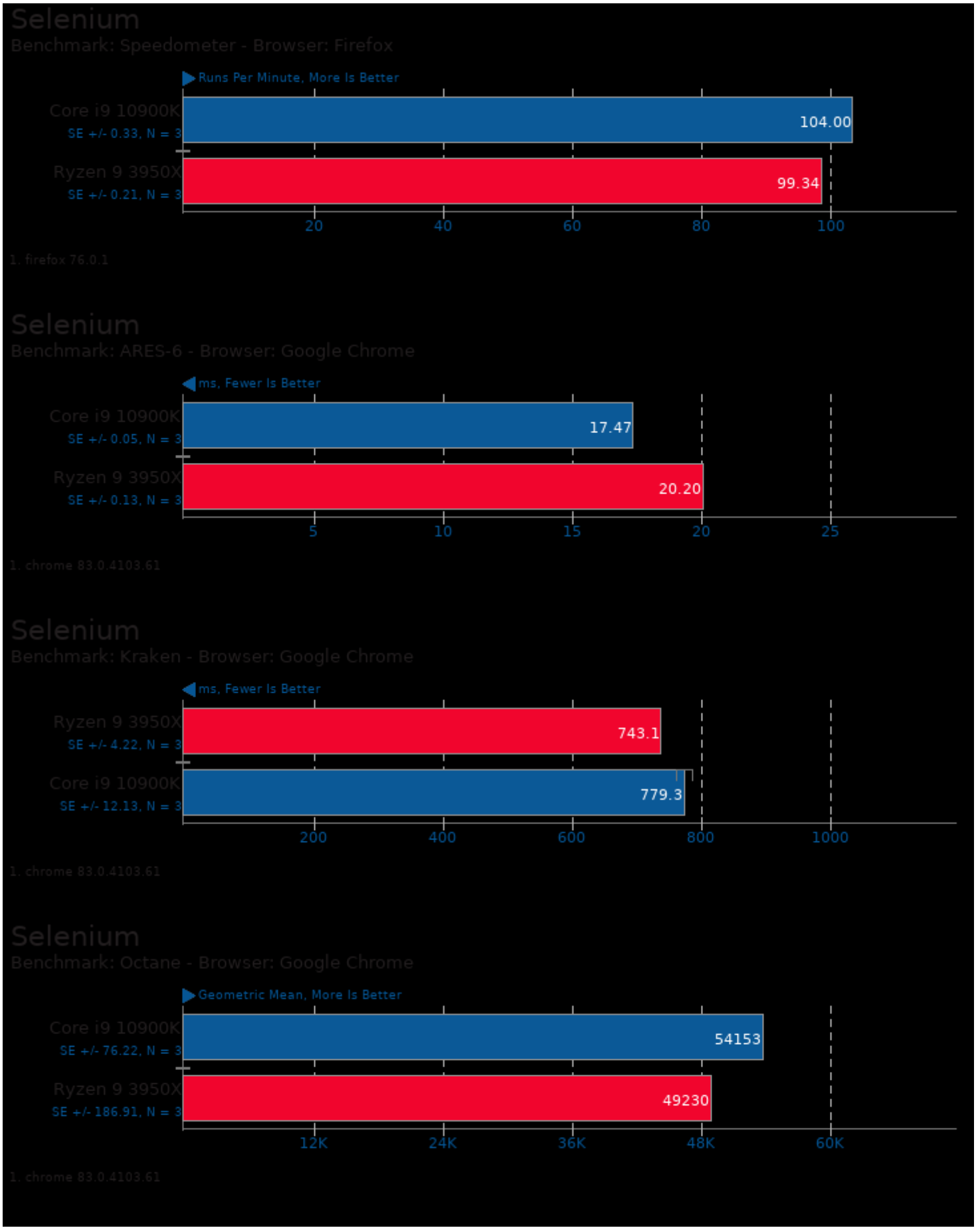

Numenta Anomaly Benchmark 1.1
Detector: Relative Entropy
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.08, N = 3
14.39
Core i9 10900K
SE +/- 0.14, N = 3
16.56
4
8
12
16
20
Numenta Anomaly Benchmark 1.1
Detector: Windowed Gaussian
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.018, N = 3
6.695
Core i9 10900K
SE +/- 0.031, N = 3
7.665
2
4
6
8
10
Numenta Anomaly Benchmark 1.1
Detector: Earthgecko Skyline
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.19, N = 3
77.87
Core i9 10900K
SE +/- 1.08, N = 6
90.17
20
40
60
80
100
Numenta Anomaly Benchmark 1.1
Detector: Bayesian Changepoint
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.43, N = 3
26.18
Core i9 10900K
SE +/- 0.15, N = 3
36.07
8
16
24
32
40

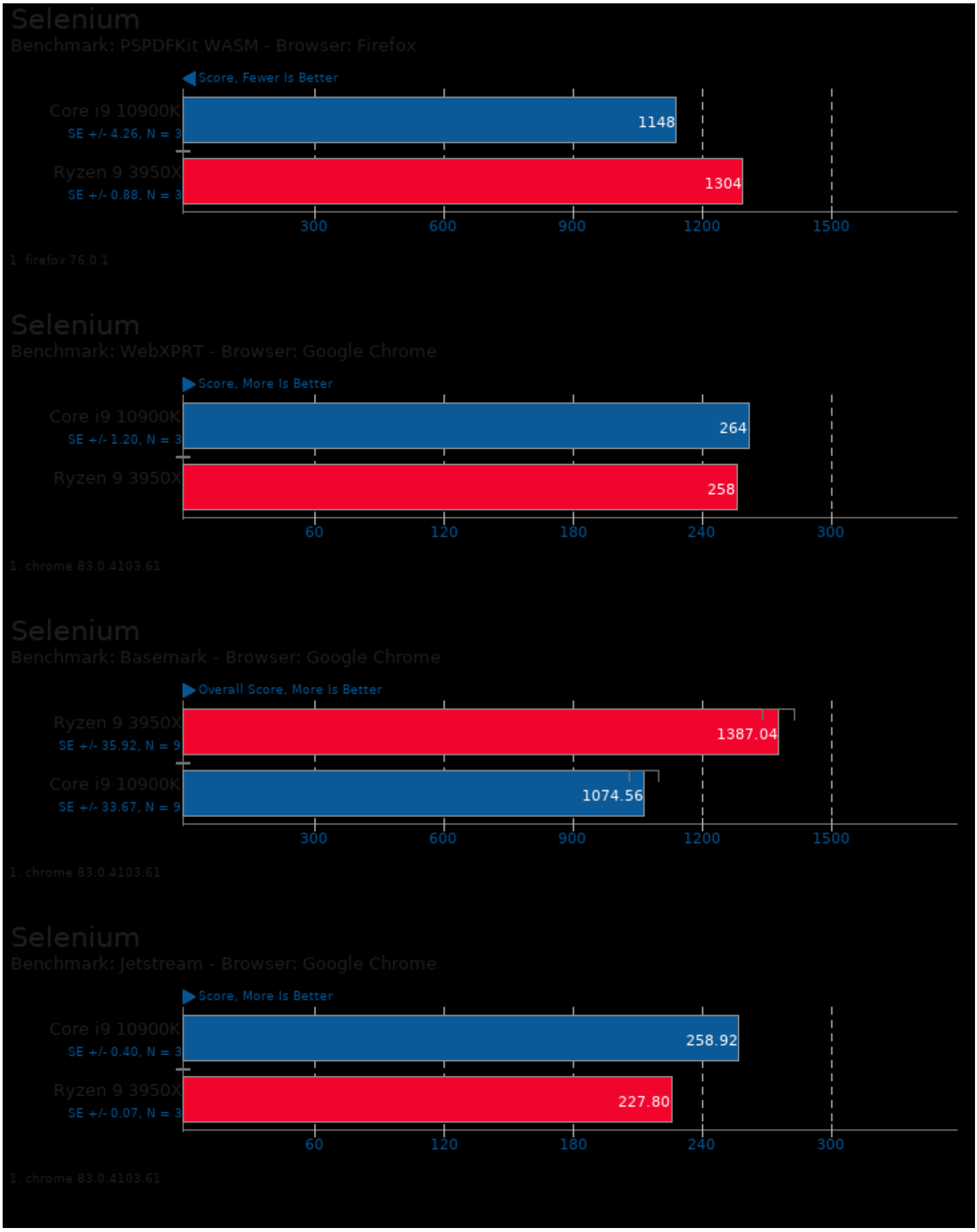

Hierarchical INTegration 1.0
Test: FLOAT
QUIPs, More Is Better
Core i9 10900K
SE +/- 782794.53, N = 3
510613895.04
Ryzen 9 3950X
SE +/- 556299.47, N = 3
380487205.37
110M
220M
330M
440M
550M
1. (CC) gcc options: -O3 -march=native -lm
NeatBench 5
Acceleration: CPU
FPS, More Is Better
Ryzen 9 3950X
SE +/- 0.36, N = 3
26.2
Core i9 10900K
SE +/- 0.03, N = 3
18.3
6
12
18
24
30
Appleseed 2.0 Beta
Scene: Emily
Seconds, Fewer Is Better
Ryzen 9 3950X
213.49
Core i9 10900K
299.75
70
140
210
280
350
Appleseed 2.0 Beta
Scene: Disney Material
Seconds, Fewer Is Better
Ryzen 9 3950X
121.87
Core i9 10900K
174.87
40
80
120
160
200

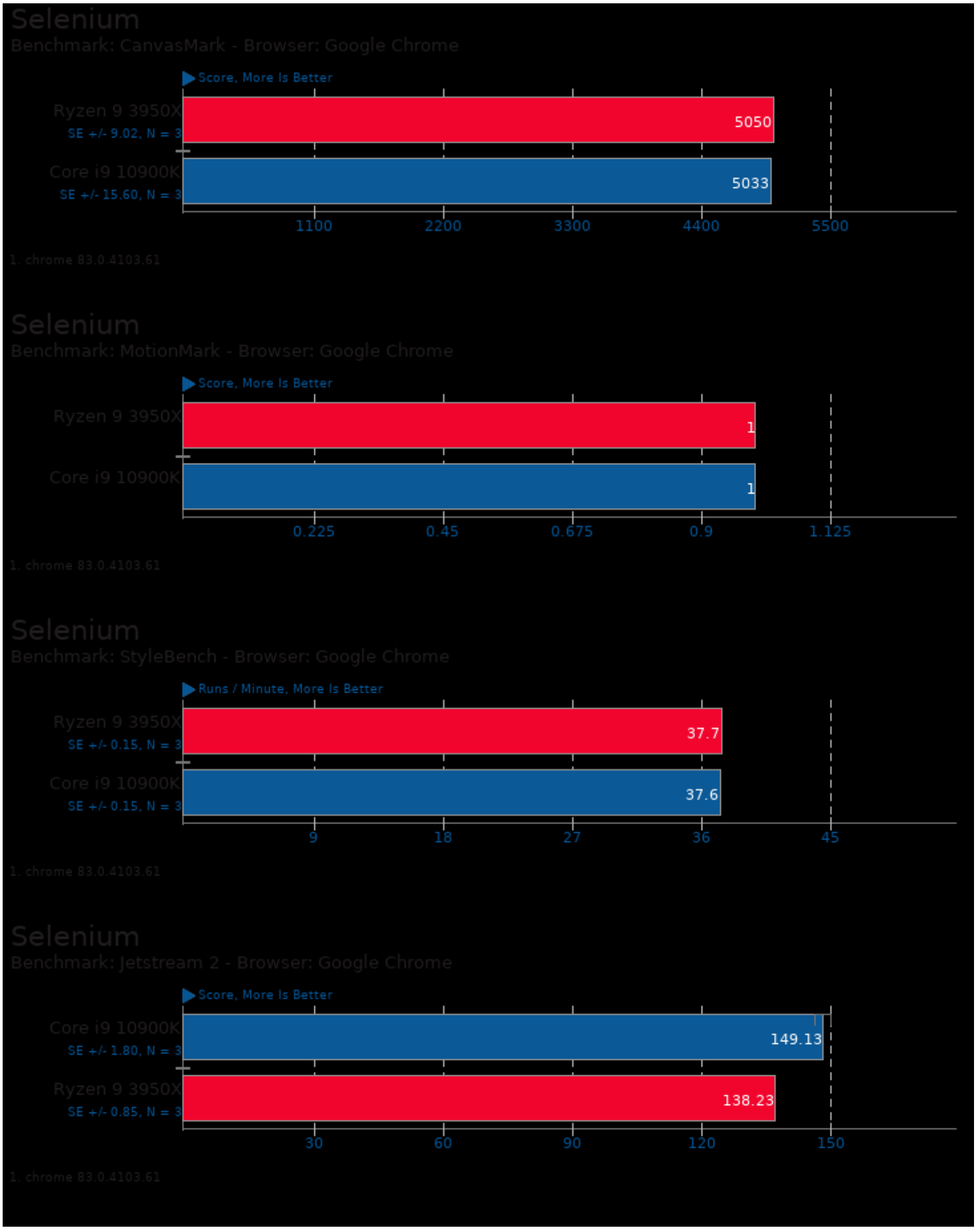

Appleseed 2.0 Beta
Scene: Material Tester
Seconds, Fewer Is Better
Ryzen 9 3950X
128.46
Core i9 10900K
164.00
40
80
120
160
200
Selenium
Benchmark: ARES-6 - Browser: Firefox
ms, Fewer Is Better
Core i9 10900K
SE +/- 0.19, N = 3
36.73
Ryzen 9 3950X
SE +/- 0.02, N = 3
42.85
10
20
30
40
50
1. firefox 76.0.1
Selenium
Benchmark: Kraken - Browser: Firefox
ms, Fewer Is Better
Core i9 10900K
SE +/- 9.33, N = 3
715.7
Ryzen 9 3950X
SE +/- 1.75, N = 3
725.2
160
320
480
640
800
1. firefox 76.0.1
Selenium
Benchmark: Octane - Browser: Firefox
Geometric Mean, More Is Better
Core i9 10900K
SE +/- 241.35, N = 3
38776
Ryzen 9 3950X
SE +/- 264.89, N = 3
34528
8K
16K
24K
32K
40K
1. firefox 76.0.1

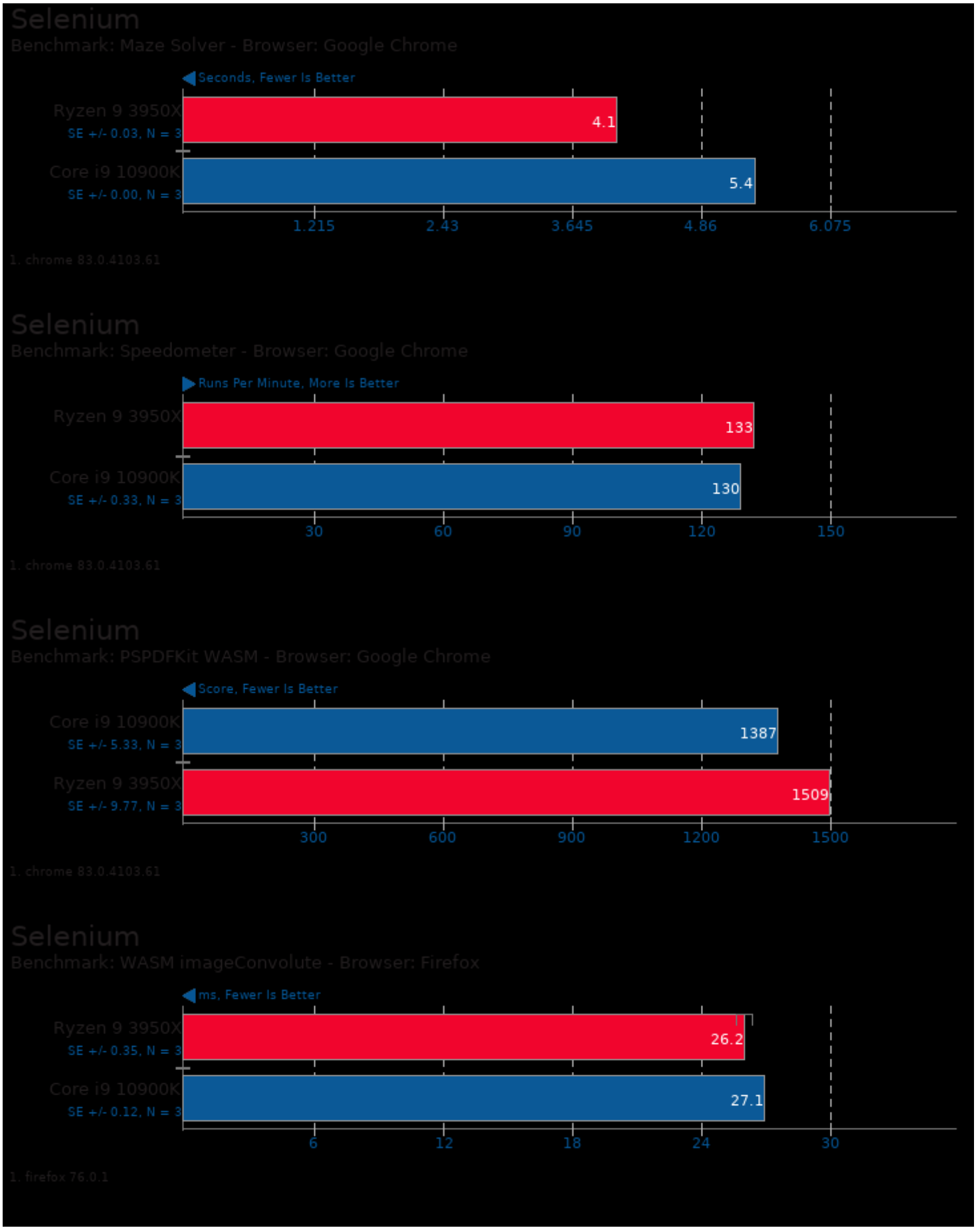

Selenium
Benchmark: WebXPRT - Browser: Firefox
Score, More Is Better
Core i9 10900K
294
Ryzen 9 3950X
SE +/- 1.20, N = 3
252
60
120
180
240
300
1. firefox 76.0.1
Selenium
Benchmark: Basemark - Browser: Firefox
Overall Score, More Is Better
Core i9 10900K
SE +/- 18.46, N = 9
759.91
Ryzen 9 3950X
SE +/- 12.24, N = 9
757.95
160
320
480
640
800
1. firefox 76.0.1
Selenium
Benchmark: Jetstream - Browser: Firefox
Score, More Is Better
Core i9 10900K
SE +/- 0.44, N = 3
237.52
Ryzen 9 3950X
SE +/- 0.17, N = 3
218.55
50
100
150
200
250
1. firefox 76.0.1
Selenium
Benchmark: CanvasMark - Browser: Firefox
Score, More Is Better
Core i9 10900K
SE +/- 136.13, N = 3
14181
Ryzen 9 3950X
SE +/- 165.75, N = 12
13796
3K
6K
9K
12K
15K
1. firefox 76.0.1


Selenium
Benchmark: MotionMark - Browser: Firefox
Score, More Is Better
Core i9 10900K
SE +/- 26.64, N = 6
231.54
Ryzen 9 3950X
SE +/- 13.00, N = 9
161.79
50
100
150
200
250
1. firefox 76.0.1
Selenium
Benchmark: StyleBench - Browser: Firefox
Runs / Minute, More Is Better
Core i9 10900K
104.0
Ryzen 9 3950X
SE +/- 0.09, N = 3
84.4
20
40
60
80
100
1. firefox 76.0.1
Selenium
Benchmark: Jetstream 2 - Browser: Firefox
Score, More Is Better
Core i9 10900K
SE +/- 0.35, N = 3
102.08
Ryzen 9 3950X
SE +/- 0.45, N = 3
95.65
20
40
60
80
100
1. firefox 76.0.1
Selenium
Benchmark: Maze Solver - Browser: Firefox
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.03, N = 3
4.5
Core i9 10900K
SE +/- 0.03, N = 3
5.4
1.215
2.43
3.645
4.86
6.075
1. firefox 76.0.1


Selenium
Benchmark: Speedometer - Browser: Firefox
Runs Per Minute, More Is Better
Core i9 10900K
SE +/- 0.33, N = 3
104.00
Ryzen 9 3950X
SE +/- 0.21, N = 3
99.34
20
40
60
80
100
1. firefox 76.0.1
Selenium
Benchmark: ARES-6 - Browser: Google Chrome
ms, Fewer Is Better
Core i9 10900K
SE +/- 0.05, N = 3
17.47
Ryzen 9 3950X
SE +/- 0.13, N = 3
20.20
5
10
15
20
25
1. chrome 83.0.4103.61
Selenium
Benchmark: Kraken - Browser: Google Chrome
ms, Fewer Is Better
Ryzen 9 3950X
SE +/- 4.22, N = 3
743.1
Core i9 10900K
SE +/- 12.13, N = 3
779.3
200
400
600
800
1000
1. chrome 83.0.4103.61
Selenium
Benchmark: Octane - Browser: Google Chrome
Geometric Mean, More Is Better
Core i9 10900K
SE +/- 76.22, N = 3
54153
Ryzen 9 3950X
SE +/- 186.91, N = 3
49230
12K
24K
36K
48K
60K
1. chrome 83.0.4103.61

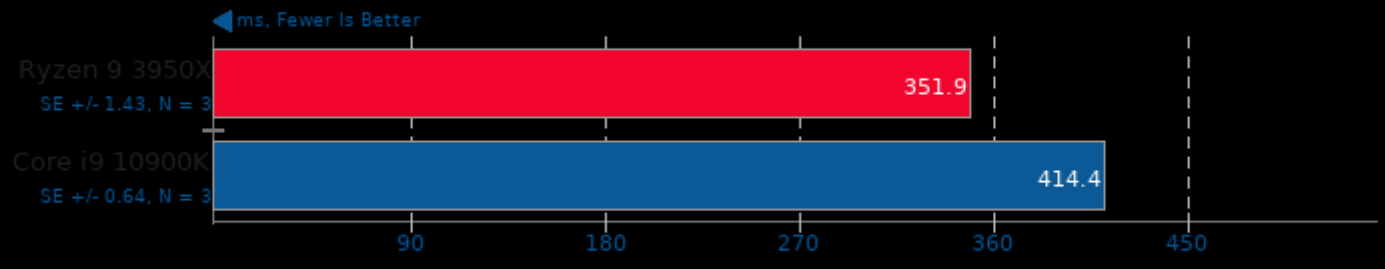

Selenium
Benchmark: PSPDFKit WASM - Browser: Firefox
Score, Fewer Is Better
Core i9 10900K
SE +/- 4.26, N = 3
1148
Ryzen 9 3950X
SE +/- 0.88, N = 3
1304
300
600
900
1200
1500
1. firefox 76.0.1
Selenium
Benchmark: WebXPRT - Browser: Google Chrome
Score, More Is Better
Core i9 10900K
SE +/- 1.20, N = 3
264
Ryzen 9 3950X
258
60
120
180
240
300
1. chrome 83.0.4103.61
Selenium
Benchmark: Basemark - Browser: Google Chrome
Overall Score, More Is Better
Ryzen 9 3950X
SE +/- 35.92, N = 9
1387.04
Core i9 10900K
SE +/- 33.67, N = 9
1074.56
300
600
900
1200
1500
1. chrome 83.0.4103.61
Selenium
Benchmark: Jetstream - Browser: Google Chrome
Score, More Is Better
Core i9 10900K
SE +/- 0.40, N = 3
258.92
Ryzen 9 3950X
SE +/- 0.07, N = 3
227.80
60
120
180
240
300
1. chrome 83.0.4103.61


Selenium
Benchmark: CanvasMark - Browser: Google Chrome
Score, More Is Better
Ryzen 9 3950X
SE +/- 9.02, N = 3
5050
Core i9 10900K
SE +/- 15.60, N = 3
5033
1100
2200
3300
4400
5500
1. chrome 83.0.4103.61
Selenium
Benchmark: MotionMark - Browser: Google Chrome
Score, More Is Better
Ryzen 9 3950X
1
Core i9 10900K
1
0.225
0.45
0.675
0.9
1.125
1. chrome 83.0.4103.61
Selenium
Benchmark: StyleBench - Browser: Google Chrome
Runs / Minute, More Is Better
Ryzen 9 3950X
SE +/- 0.15, N = 3
37.7
Core i9 10900K
SE +/- 0.15, N = 3
37.6
9
18
27
36
45
1. chrome 83.0.4103.61
Selenium
Benchmark: Jetstream 2 - Browser: Google Chrome
Score, More Is Better
Core i9 10900K
SE +/- 1.80, N = 3
149.13
Ryzen 9 3950X
SE +/- 0.85, N = 3
138.23
30
60
90
120
150
1. chrome 83.0.4103.61


Selenium
Benchmark: Maze Solver - Browser: Google Chrome
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.03, N = 3
4.1
Core i9 10900K
SE +/- 0.00, N = 3
5.4
1.215
2.43
3.645
4.86
6.075
1. chrome 83.0.4103.61
Selenium
Benchmark: Speedometer - Browser: Google Chrome
Runs Per Minute, More Is Better
Ryzen 9 3950X
133
Core i9 10900K
SE +/- 0.33, N = 3
130
30
60
90
120
150
1. chrome 83.0.4103.61
Selenium
Benchmark: PSPDFKit WASM - Browser: Google Chrome
Score, Fewer Is Better
Core i9 10900K
SE +/- 5.33, N = 3
1387
Ryzen 9 3950X
SE +/- 9.77, N = 3
1509
300
600
900
1200
1500
1. chrome 83.0.4103.61
Selenium
Benchmark: WASM imageConvolute - Browser: Firefox
ms, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.35, N = 3
26.2
Core i9 10900K
SE +/- 0.12, N = 3
27.1
6
12
18
24
30
1. firefox 76.0.1

## Selenium

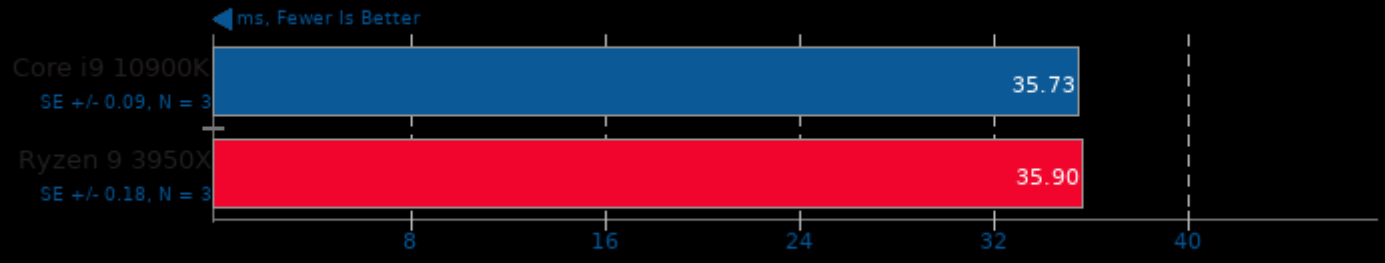
Benchmark: WASM collisionDetection - Browser: Firefox




1. firefox 76.0.1

## Selenium

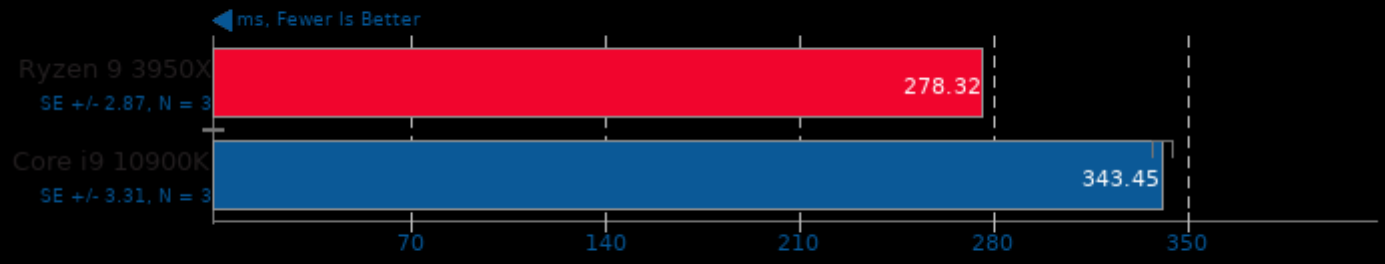
Benchmark: WASM imageConvolute - Browser: Google Chrome




1. chrome 83.0.4103.61

## Selenium

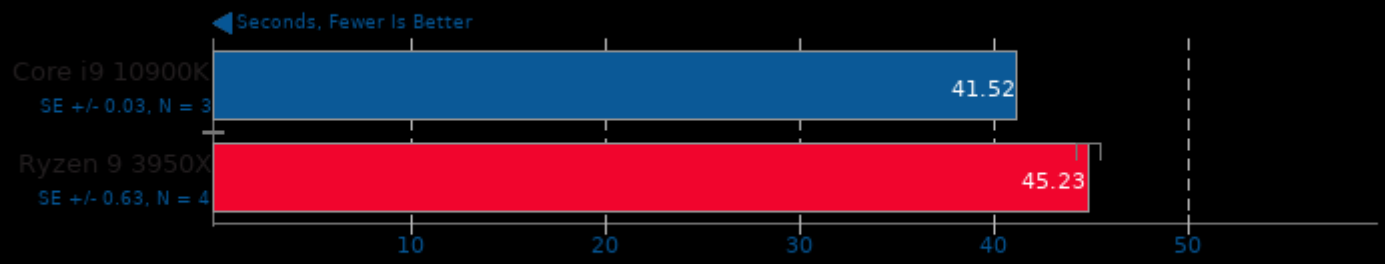
Benchmark: WASM collisionDetection - Browser: Google Chrome



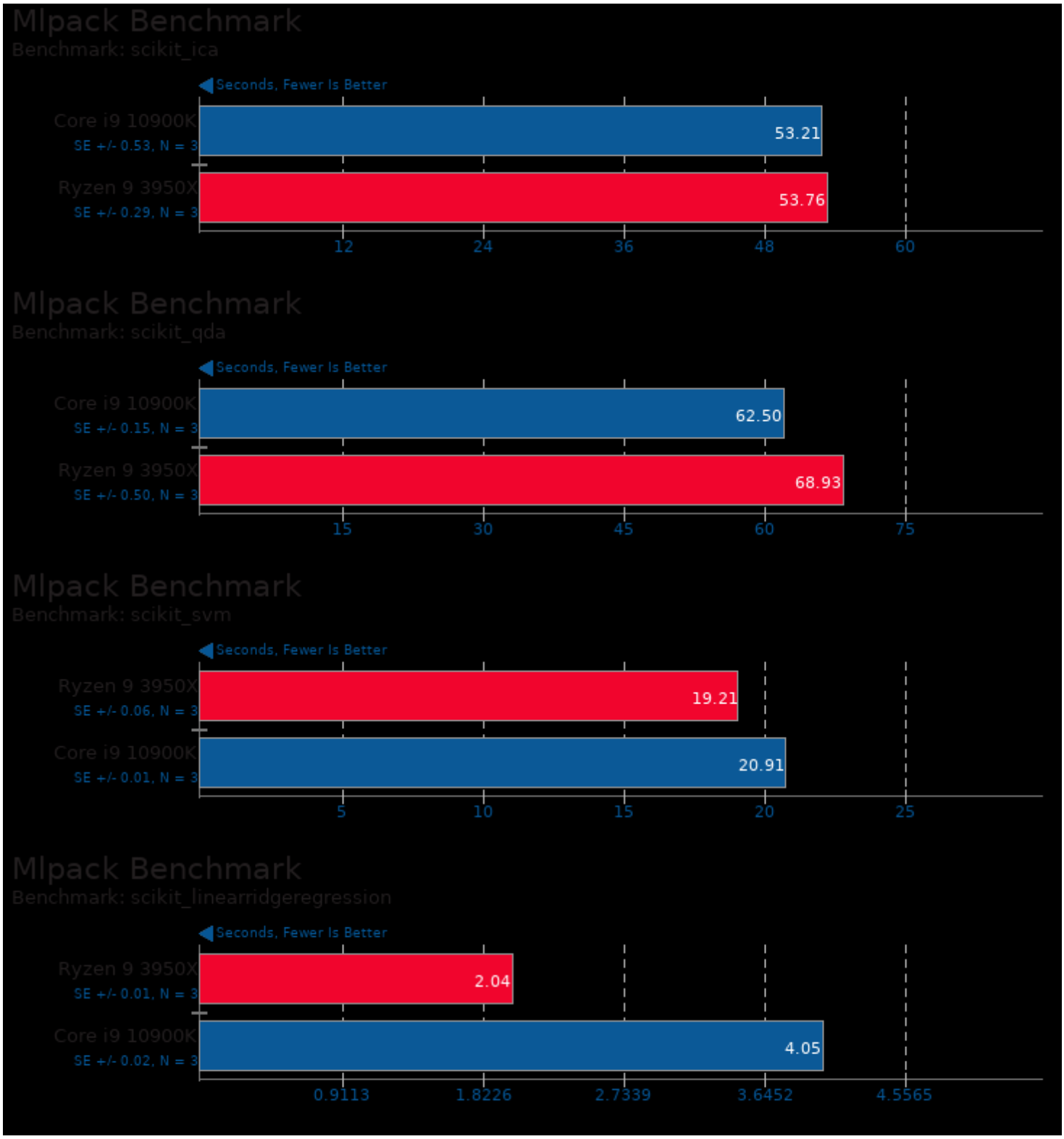

1. chrome 83.0.4103.61

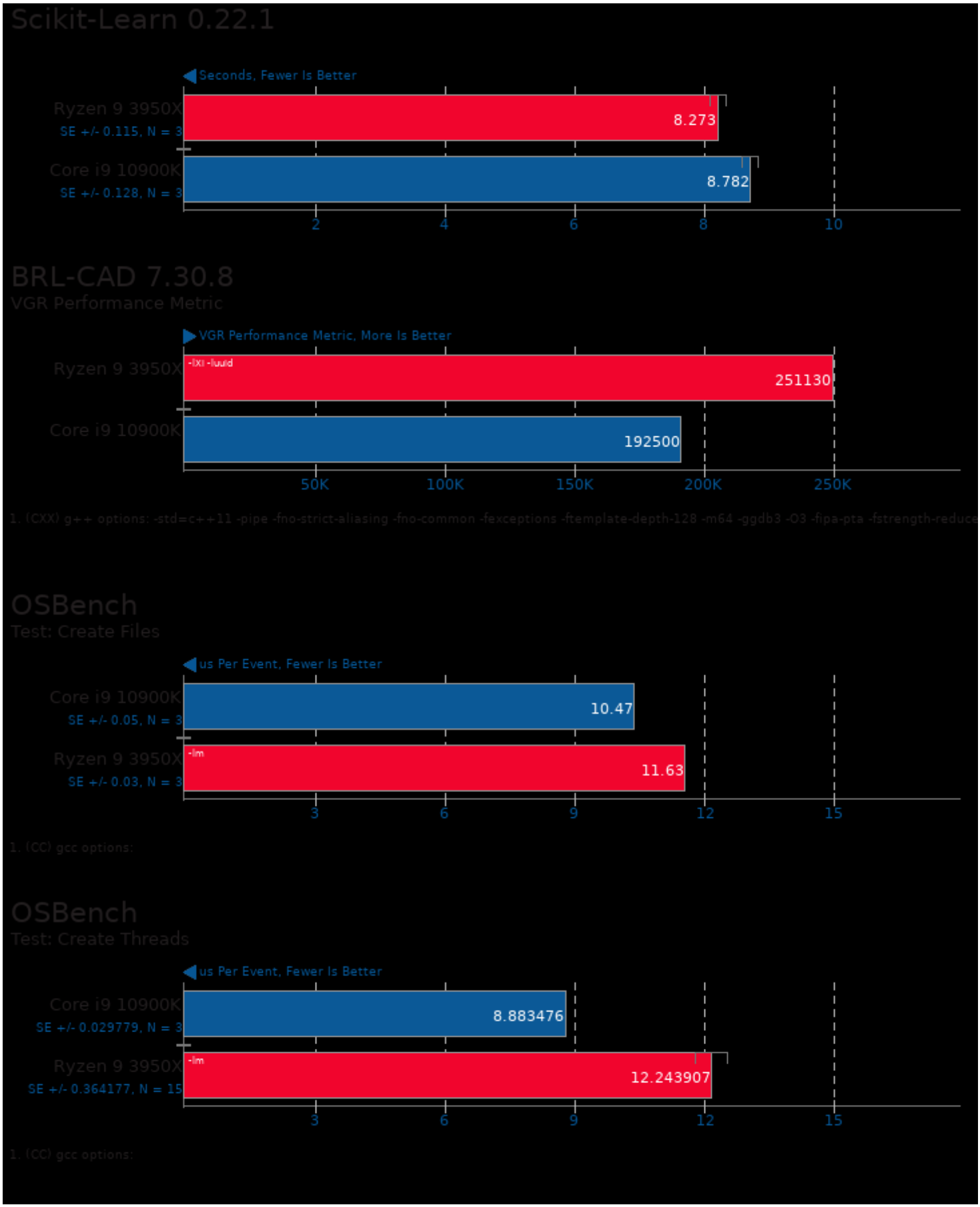
## Git

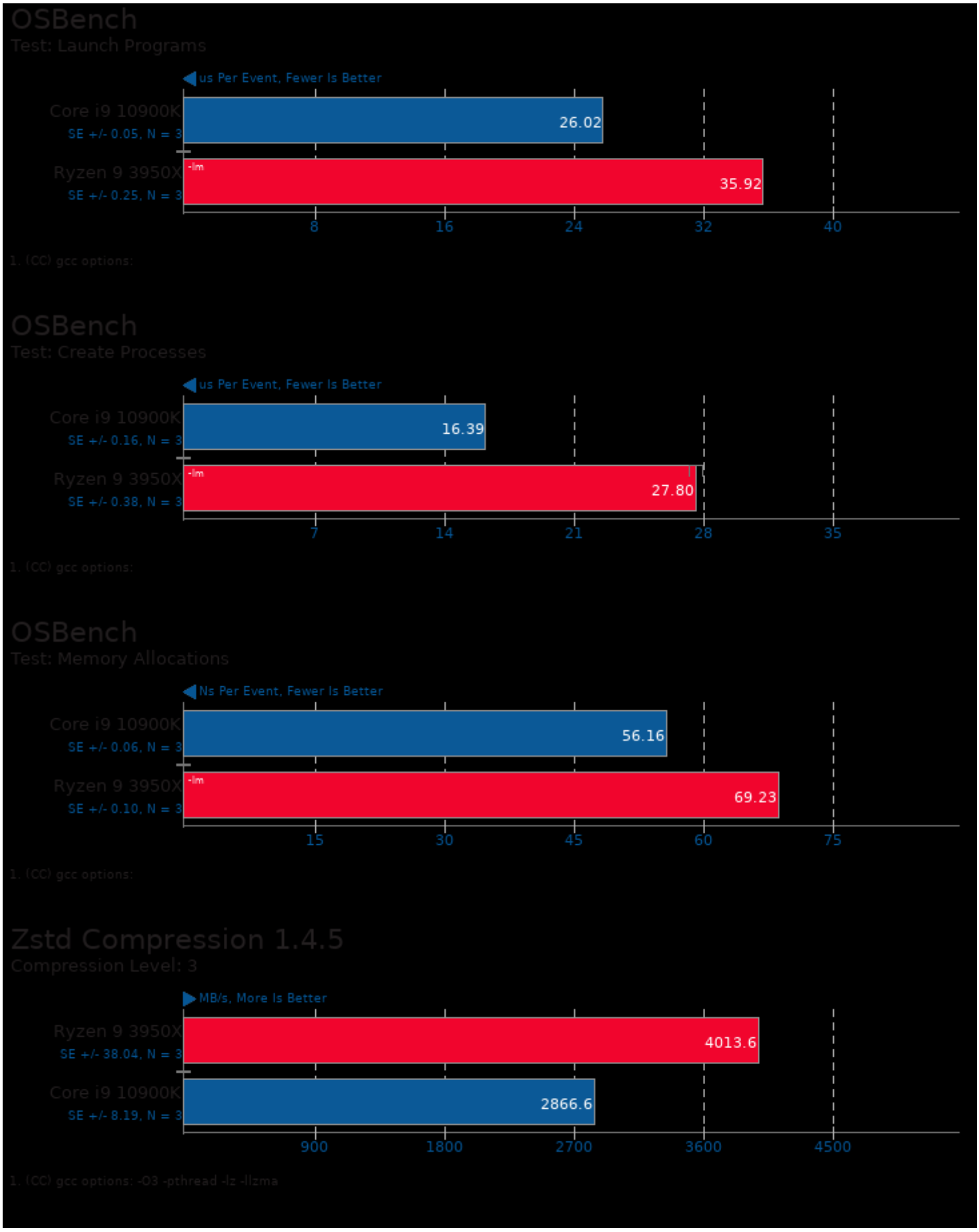
Time To Complete Common Git Commands




1. git version 2.25.1

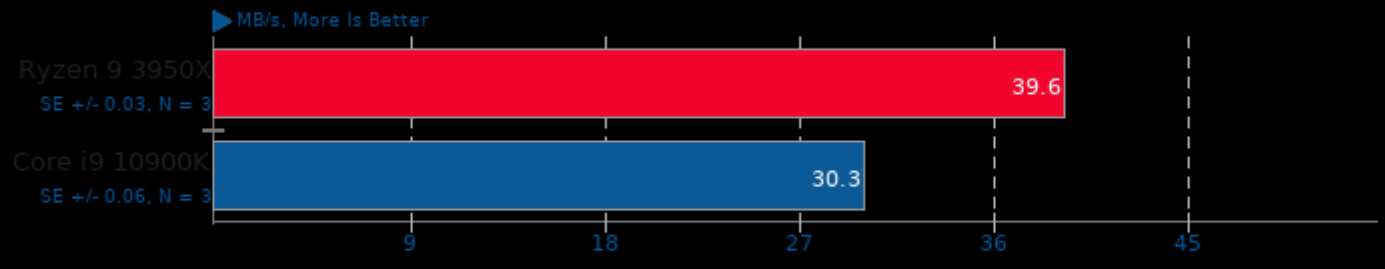

Mlpack Benchmark
Benchmark: scikit_ica
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.53, N = 3
53.21
Ryzen 9 3950X
SE +/- 0.29, N = 3
53.76
12
24
36
48
60
Mlpack Benchmark
Benchmark: scikit_qda
Seconds, Fewer Is Better
Core i9 10900K
SE +/- 0.15, N = 3
62.50
Ryzen 9 3950X
SE +/- 0.50, N = 3
68.93
15
30
45
60
75
Mlpack Benchmark
Benchmark: scikit_svm
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.06, N = 3
19.21
Core i9 10900K
SE +/- 0.01, N = 3
20.91
5
10
15
20
25
Mlpack Benchmark
Benchmark: scikit_linearridgeregression
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.01, N = 3
2.04
Core i9 10900K
SE +/- 0.02, N = 3
4.05
0.9113
1.8226
2.7339
3.6452
4.5565


Scikit-Learn 0.22.1
Seconds, Fewer Is Better
Ryzen 9 3950X
SE +/- 0.115, N = 3
8.273
Core i9 10900K
SE +/- 0.128, N = 3
8.782
2
4
6
8
10
BRL-CAD 7.30.8
VGR Performance Metric
VGR Performance Metric, More Is Better
Ryzen 9 3950X
-lXi -luuid
251130
Core i9 10900K
192500
50K
100K
150K
200K
250K
1. (CXX) g++ options: -std=c++11 -pipe -fno-strict-aliasing -fno-common -fexceptions -ftemplate-depth-128 -m64 -ggdb3 -O3 -fipa-pta -fstrength-reduce
OSBench
Test: Create Files
us Per Event, Fewer Is Better
Core i9 10900K
SE +/- 0.05, N = 3
10.47
Ryzen 9 3950X
-lm
SE +/- 0.03, N = 3
11.63
3
6
9
12
15
1. (CC) gcc options:
OSBench
Test: Create Threads
us Per Event, Fewer Is Better
Core i9 10900K
SE +/- 0.029779, N = 3
8.883476
Ryzen 9 3950X
-lm
SE +/- 0.364177, N = 15
12.243907
3
6
9
12
15
1. (CC) gcc options:


OSBench
Test: Launch Programs
us Per Event, Fewer Is Better
Core i9 10900K
SE +/- 0.05, N = 3
26.02
Ryzen 9 3950X
SE +/- 0.25, N = 3
-lm
35.92
8
16
24
32
40
1. (CC) gcc options:
OSBench
Test: Create Processes
us Per Event, Fewer Is Better
Core i9 10900K
SE +/- 0.16, N = 3
16.39
Ryzen 9 3950X
SE +/- 0.38, N = 3
-lm
27.80
7
14
21
28
35
1. (CC) gcc options:
OSBench
Test: Memory Allocations
Ns Per Event, Fewer Is Better
Core i9 10900K
SE +/- 0.06, N = 3
56.16
Ryzen 9 3950X
SE +/- 0.10, N = 3
-lm
69.23
15
30
45
60
75
1. (CC) gcc options:
Zstd Compression 1.4.5
Compression Level: 3
MB/s, More Is Better
Ryzen 9 3950X
SE +/- 38.04, N = 3
4013.6
Core i9 10900K
SE +/- 8.19, N = 3
2866.6
900
1800
2700
3600
4500
1. (CC) gcc options: -O3 -pthread -lz -llzma

## Zstd Compression 1.4.5

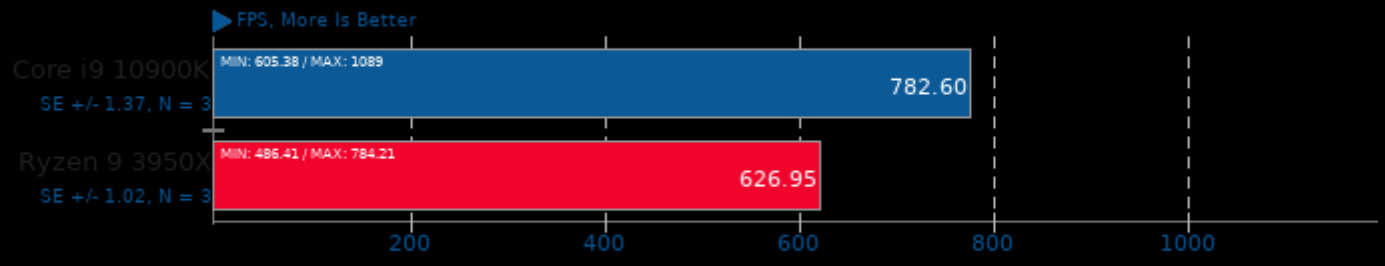
Compression Level: 19




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

## dav1d 0.7.0

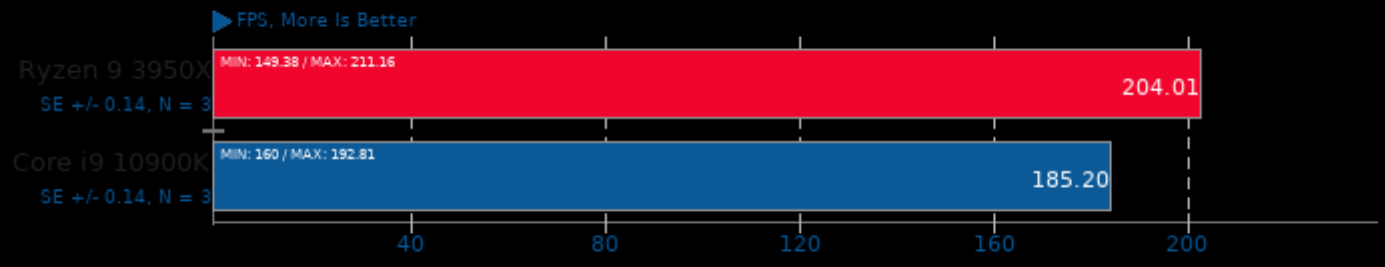
Video Input: Chimera 1080p




1. (CC) gcc options: -pthread

## dav1d 0.7.0

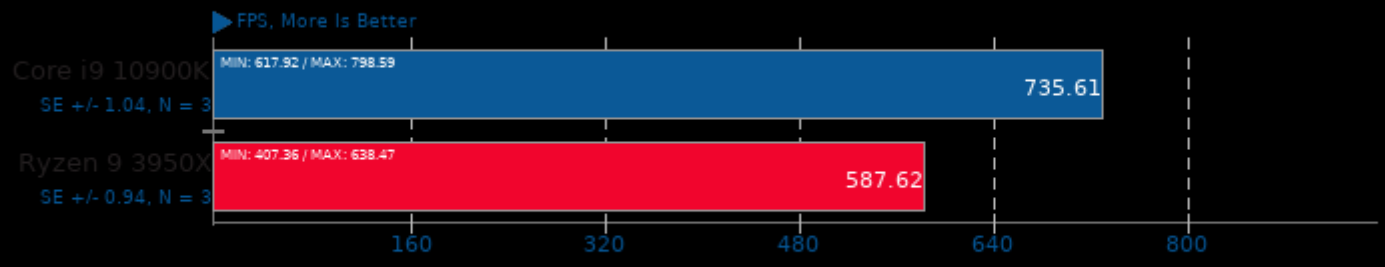
Video Input: Summer Nature 4K



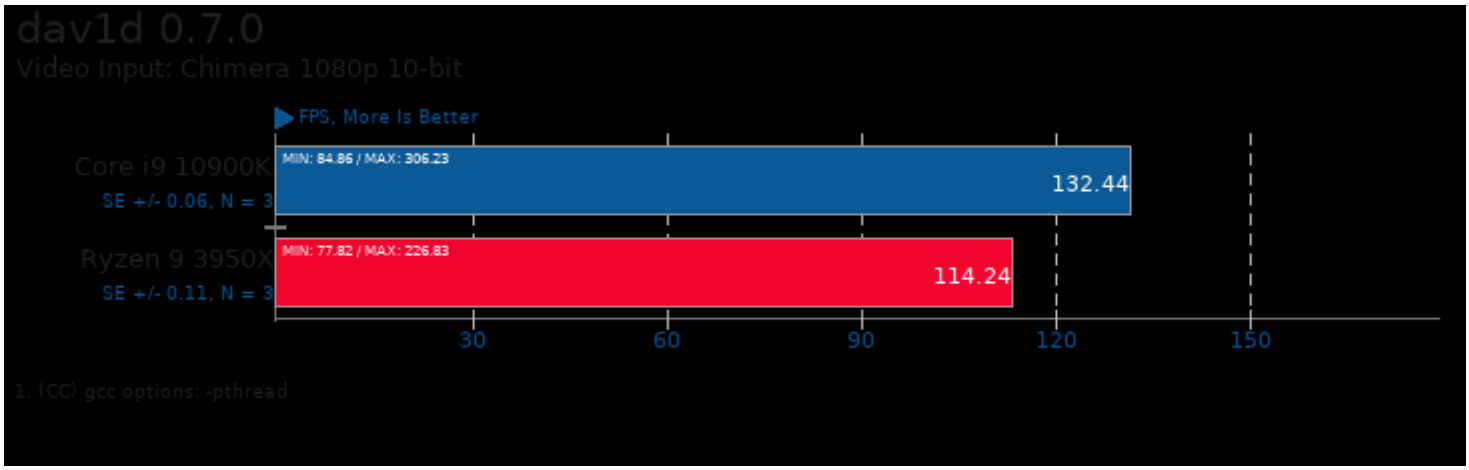

1. (CC) gcc options: -pthread

## dav1d 0.7.0

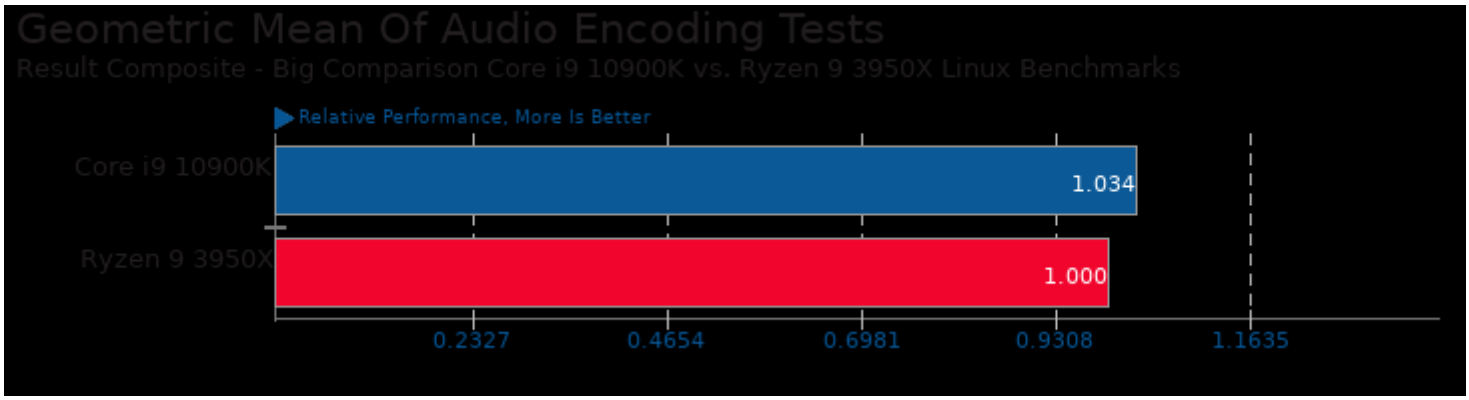
Video Input: Summer Nature 1080p



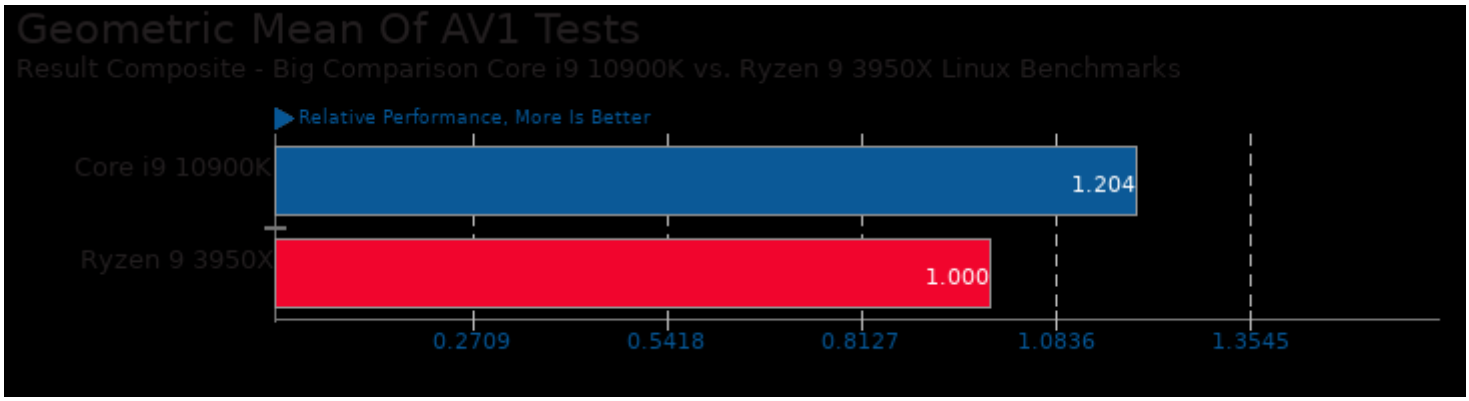

1. (CC) gcc options: -pthread


dav1d 0.7.0
Video Input: Chimera 1080p 10-bit
FPS, More Is Better
Core i9 10900K
SE +/- 0.06, N = 3
MIN: 84.86 / MAX: 306.23
132.44
Ryzen 9 3950X
SE +/- 0.11, N = 3
MIN: 77.82 / MAX: 226.83
114.24
30
60
90
120
150
1. (CC) gcc options: -pthread

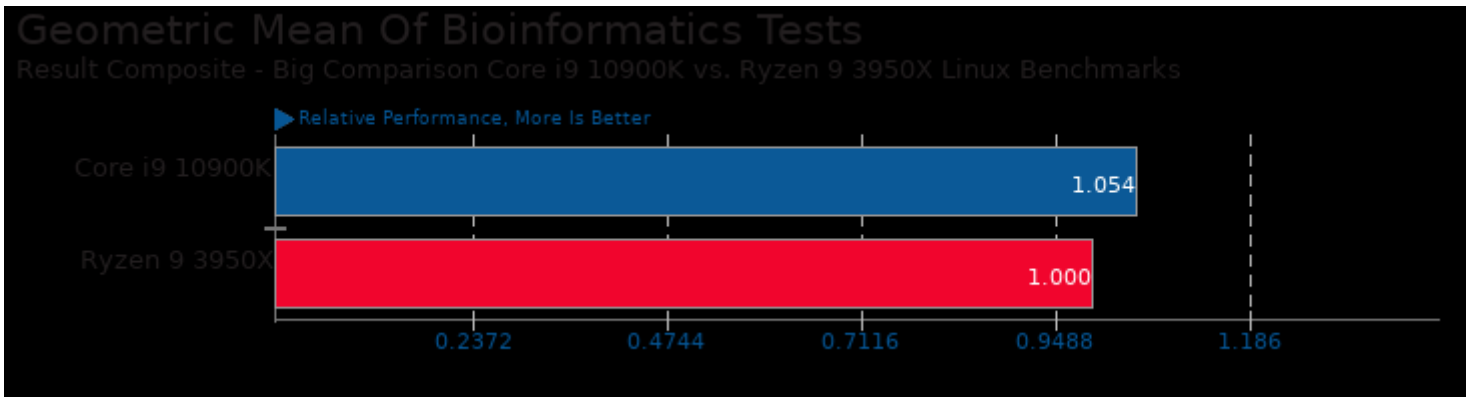
These geometric means are based upon test groupings / test suites for this result file.



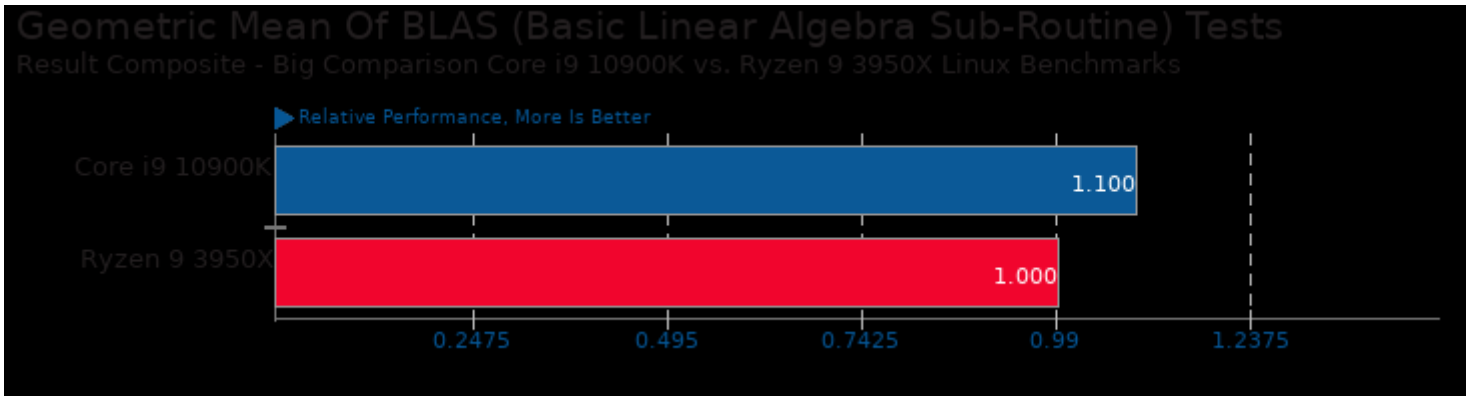

Geometric mean based upon tests: pts/encode-mp3 and pts/encode-flac



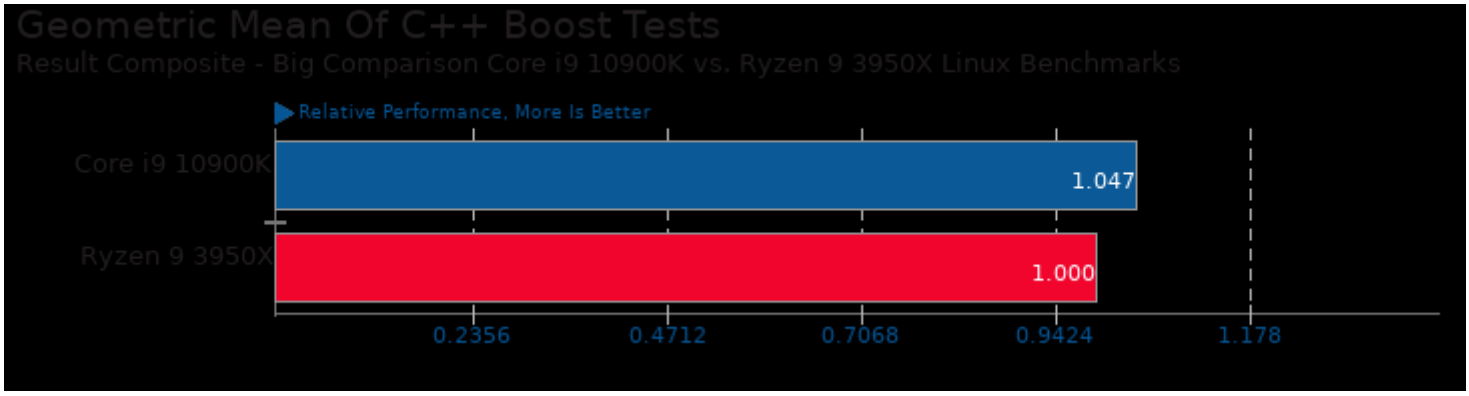

Geometric mean based upon tests: pts/dav1d, pts/aom-av1, pts/libgav1 and pts/rav1e



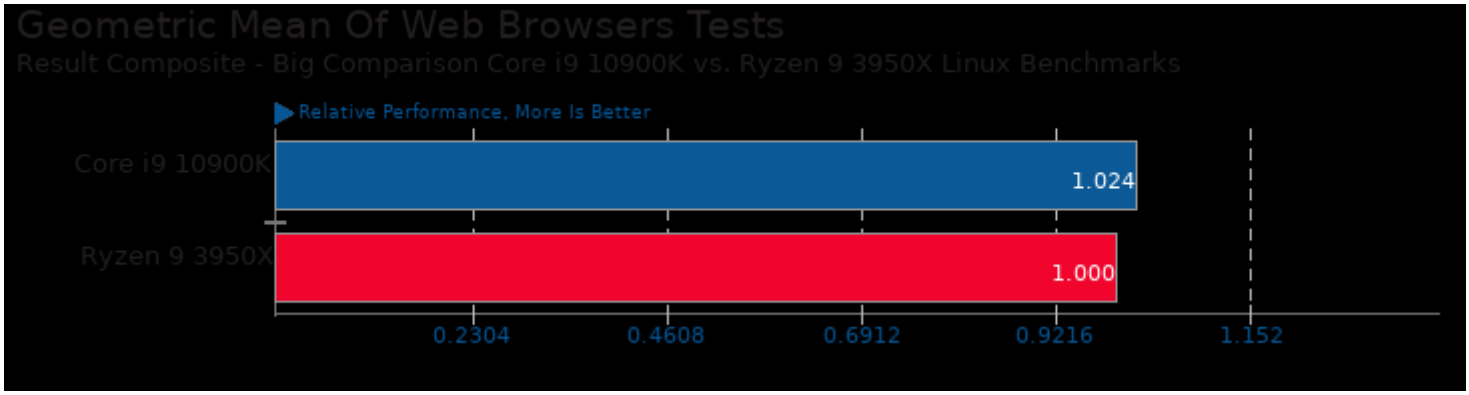

Geometric mean based upon tests: pts/himeno, pts/mrbayes and pts/hmmer



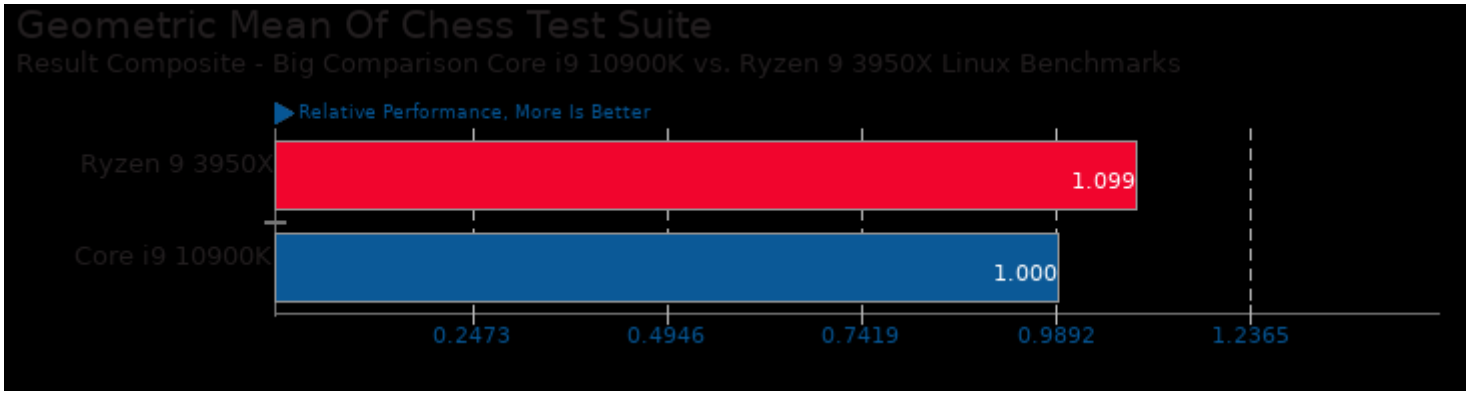

Geometric mean based upon tests: pts/lczero and pts/nwchem



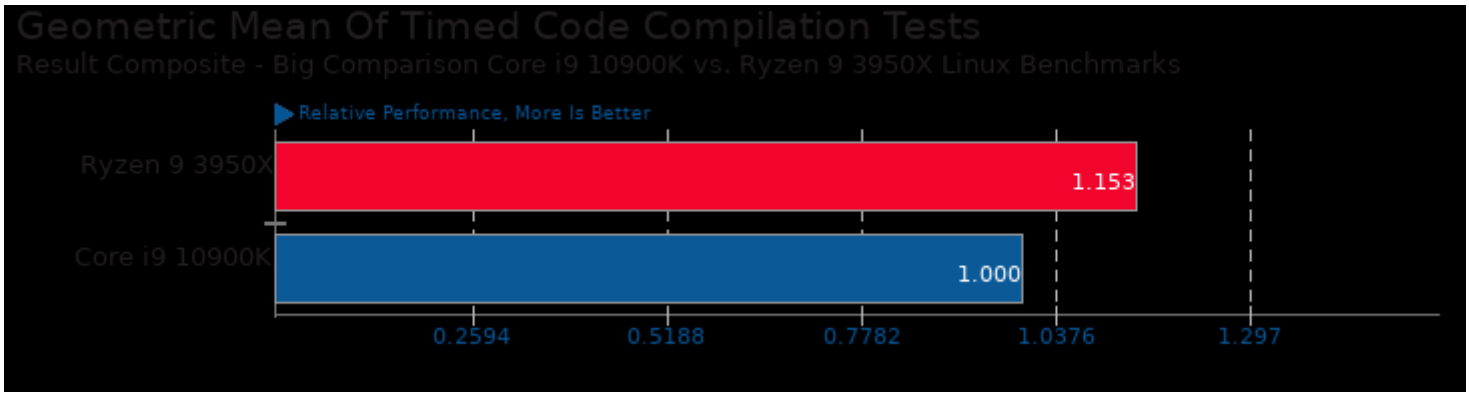

Geometric mean based upon tests: pts/yafaray, pts/minion and pts/core-latency



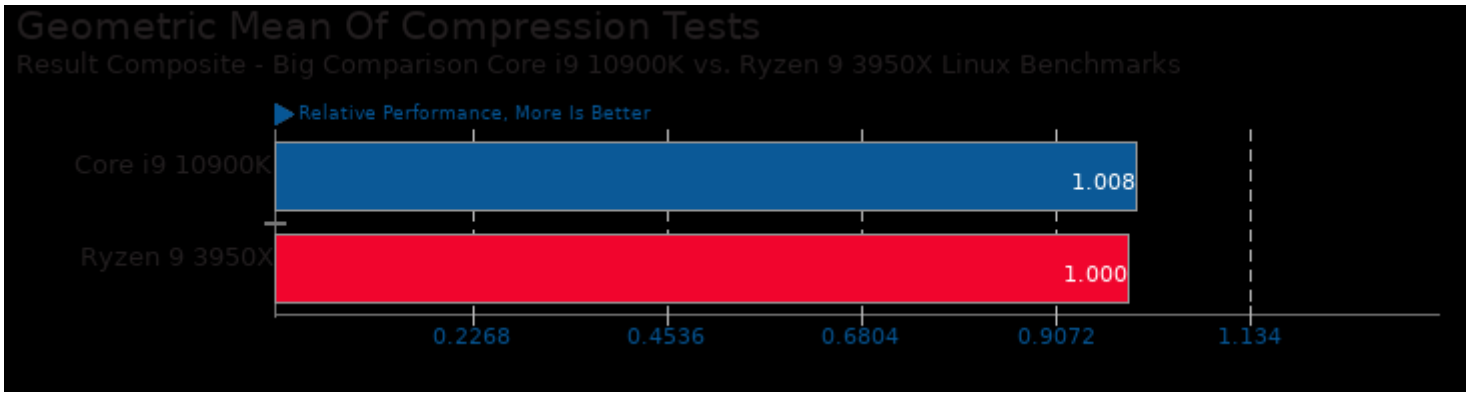

Geometric mean based upon tests: system/selenium



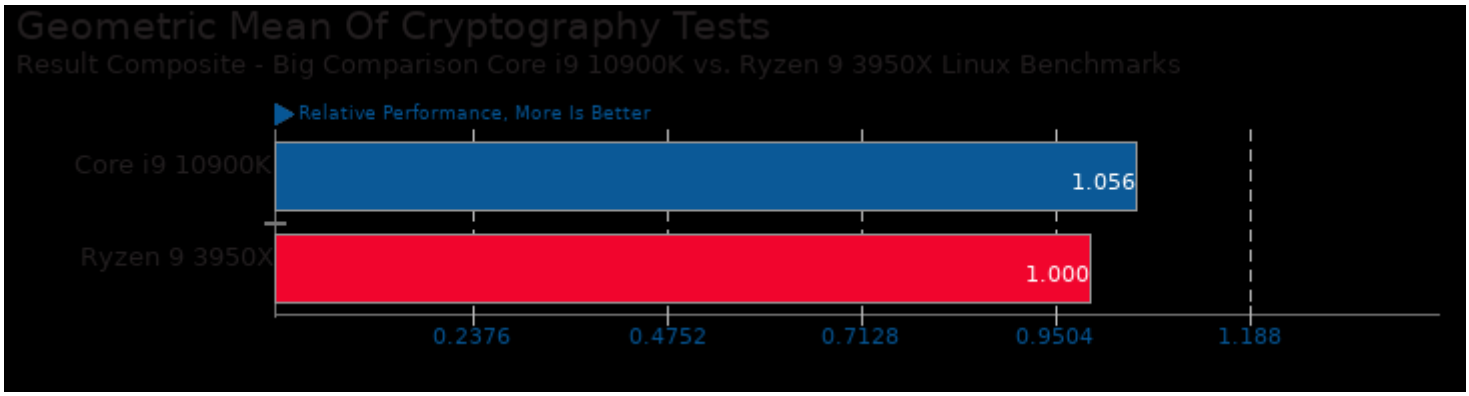

Geometric mean based upon tests: pts/tscp, pts/lczero, pts/stockfish, pts/asmfish, pts/n-queens and pts/m-queens



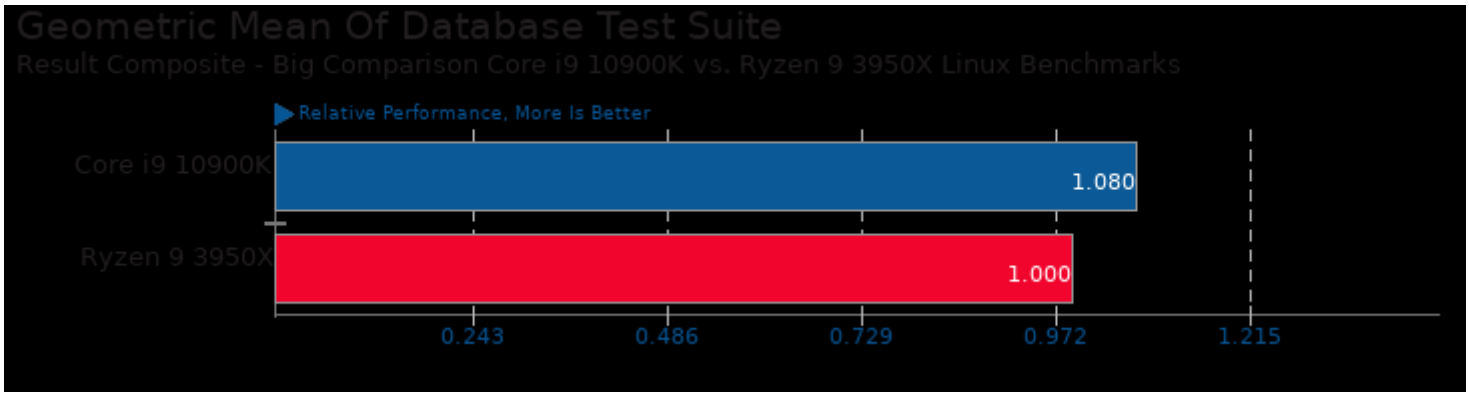

Geometric mean based upon tests: pts/build-apache, pts/build-php, pts/build-linux-kernel, pts/build-imagemagick, pts/build-gcc, pts/build-gdb, pts/build-llvm, pts/build-ffmpeg, pts/build-mplayer and pts/build2



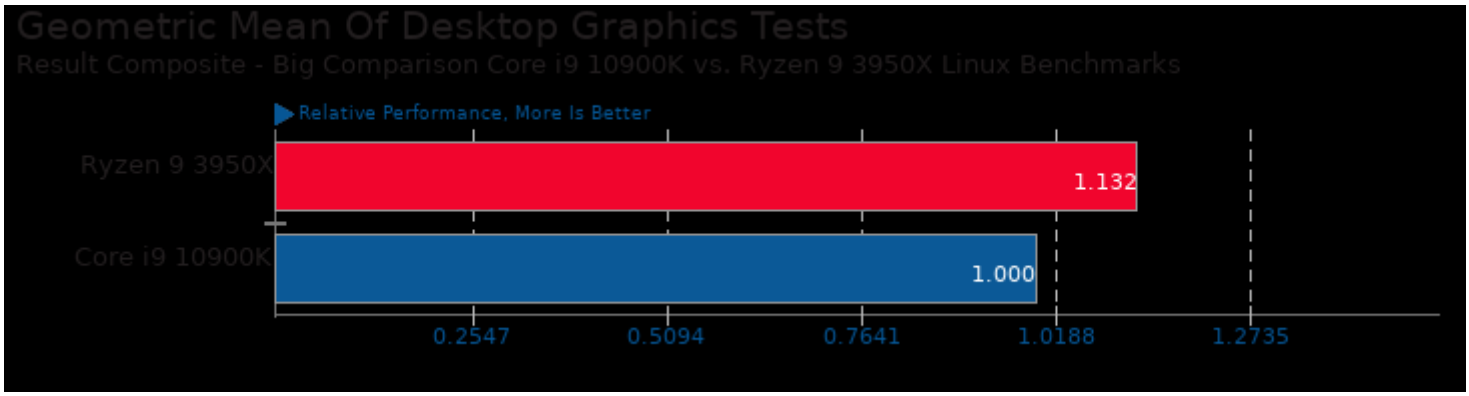

Geometric mean based upon tests: pts/compress-7zip, pts/compress-gzip, pts/compress-pbzip2, pts/compress-zstd, pts/compress-xz, pts/lzbench and pts/blosc



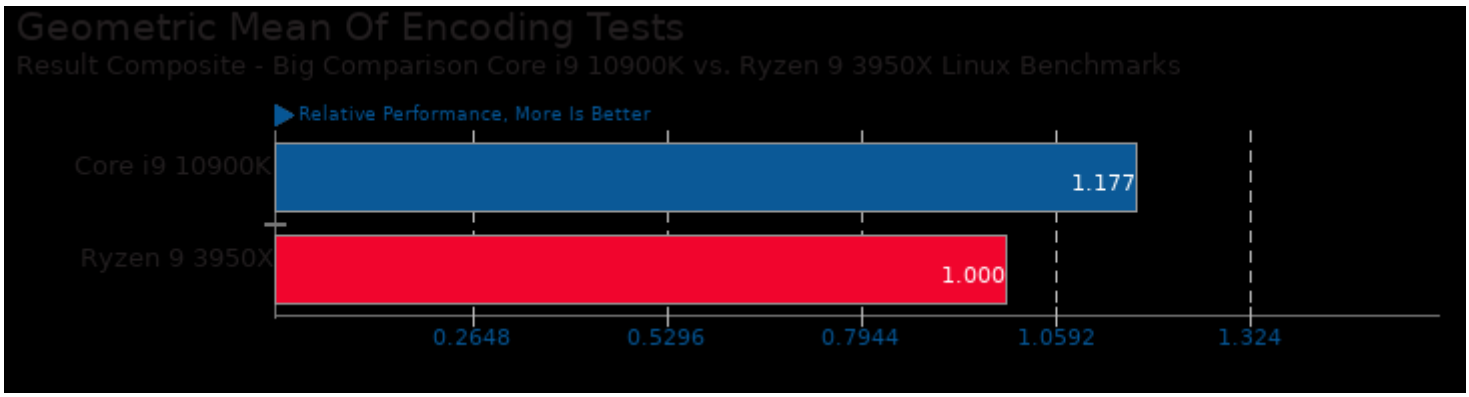

Geometric mean based upon tests: pts/gnupg, pts/openssl, pts/blake2, pts/john-the-ripper, pts/smhasher, pts/botan, pts/cryptopp, pts/bork, pts/nettle, pts/aircrack-ng and pts/cpuminer-opt



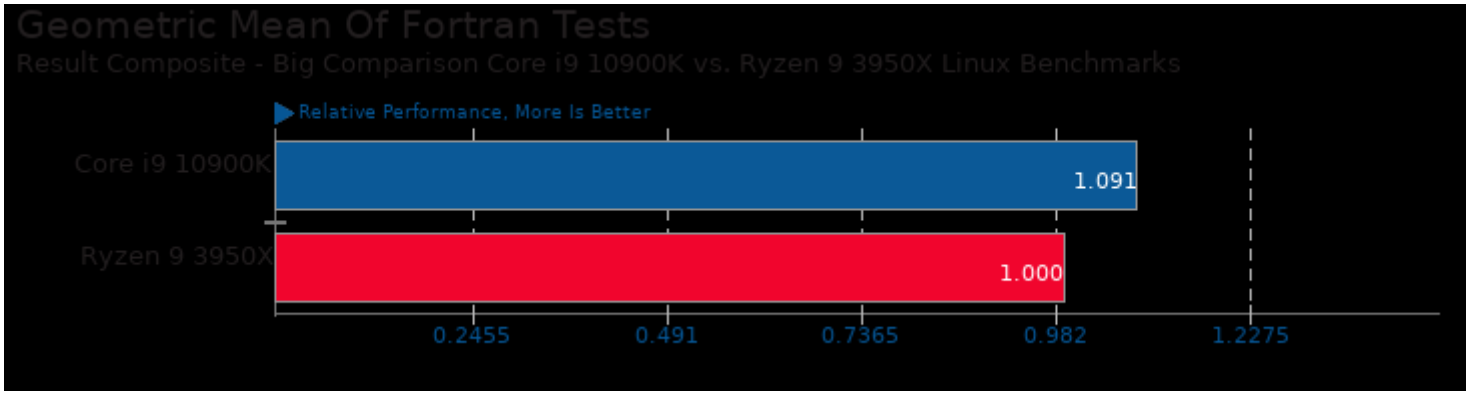

Geometric mean based upon tests: pts/sqlite-speedtest, pts/redis and pts/rocksdb



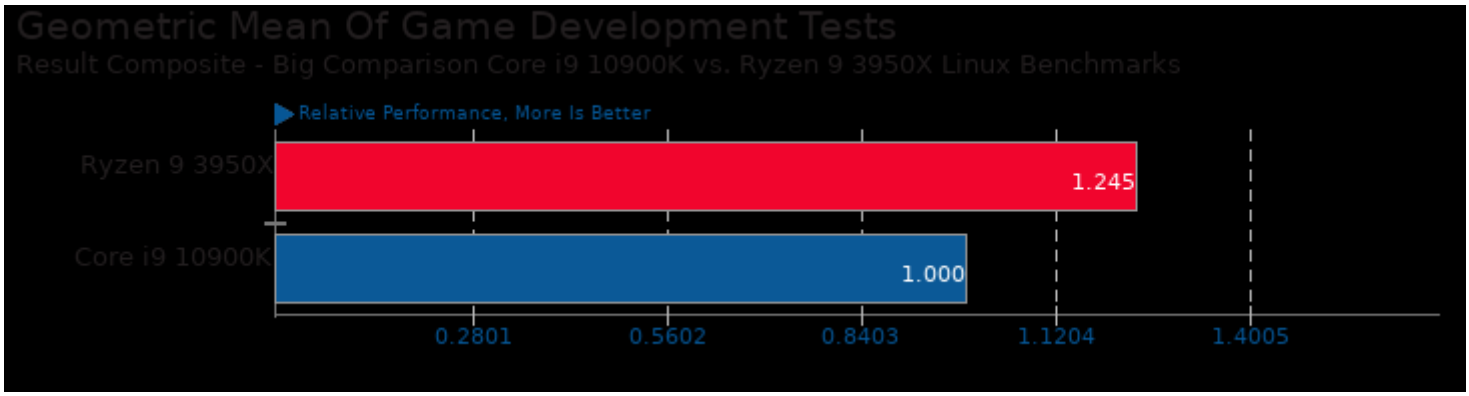

Geometric mean based upon tests: pts/xonotic, pts/tesseract, pts/paraview, pts/unigine-valley and pts/unigine-heaven



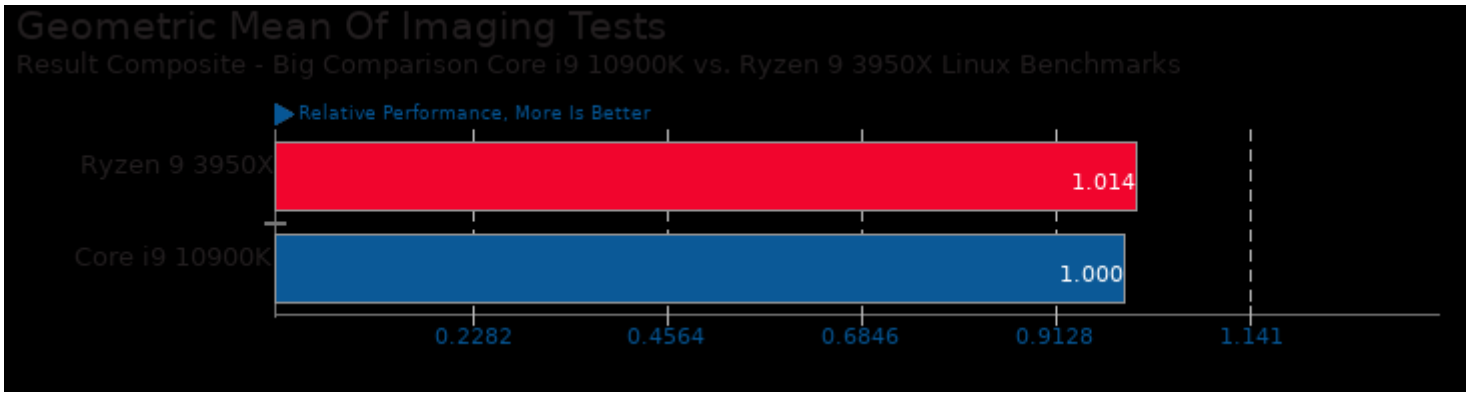

Geometric mean based upon tests: pts/encode-mp3, pts/encode-flac, pts/x264, pts/x265, pts/ffmpeg, pts/vpxenc, pts/dav1d, pts/aom-av1, pts/libgav1 and pts/rav1e



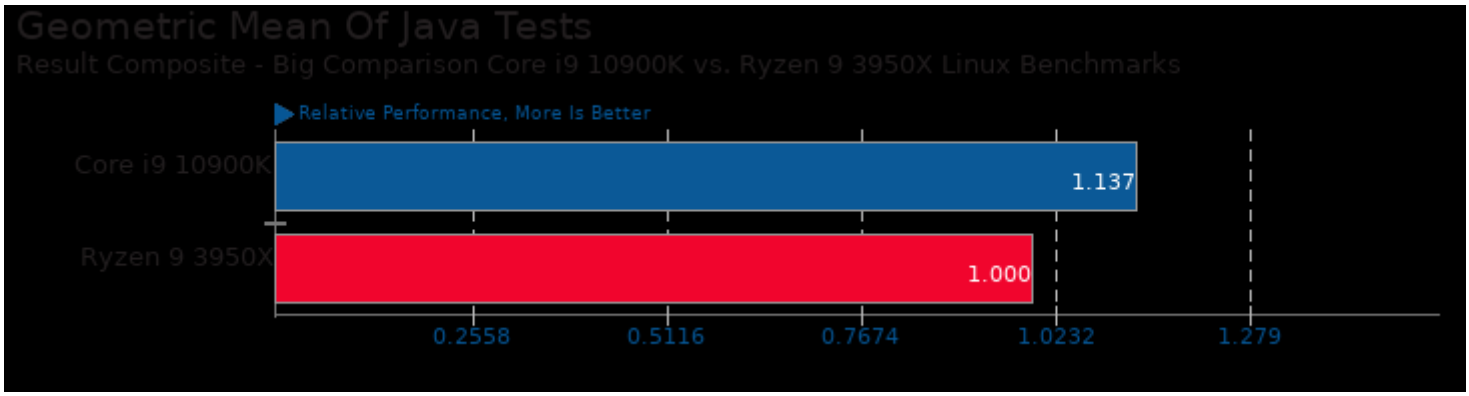

Geometric mean based upon tests: pts/hpcg, pts/npb, pts/neat, pts/polyhedron and pts/nwchem



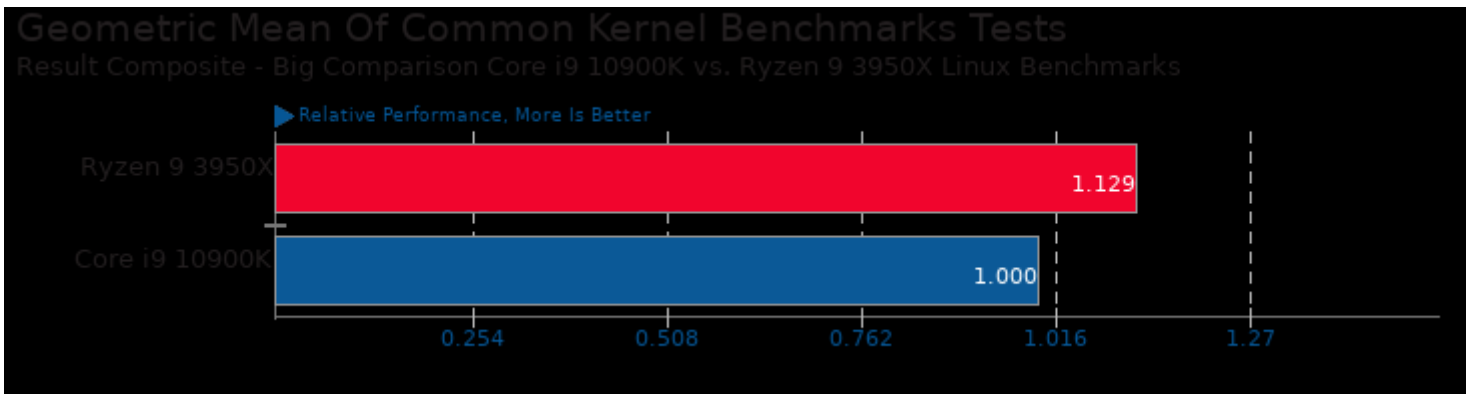

Geometric mean based upon tests: pts/basis, pts/blender, pts/oidn and pts/openvkl



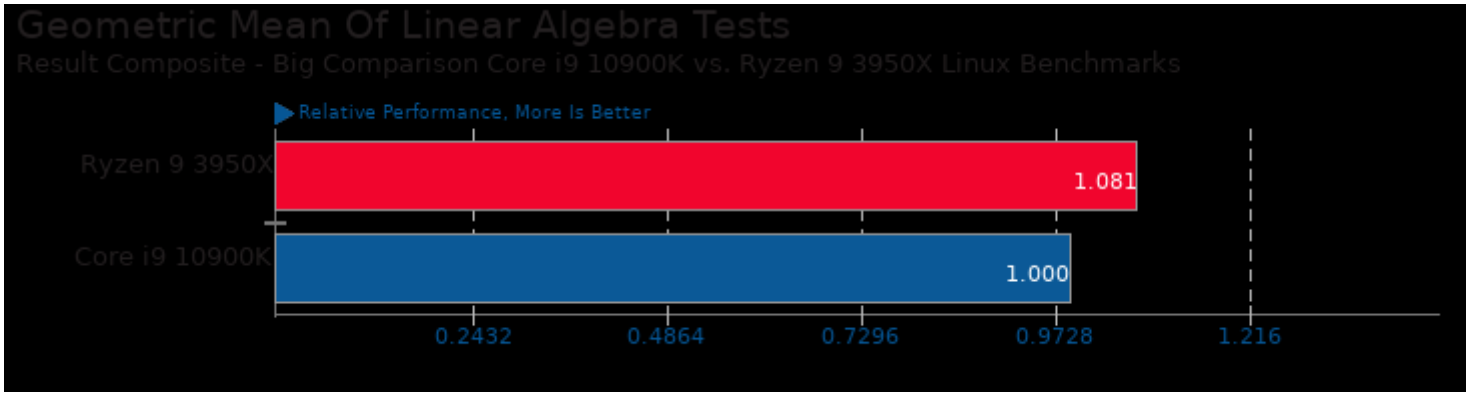

Geometric mean based upon tests: pts/graphics-magick, system/rawtherapee, pts/tjbench, system/gimp and system/gegl



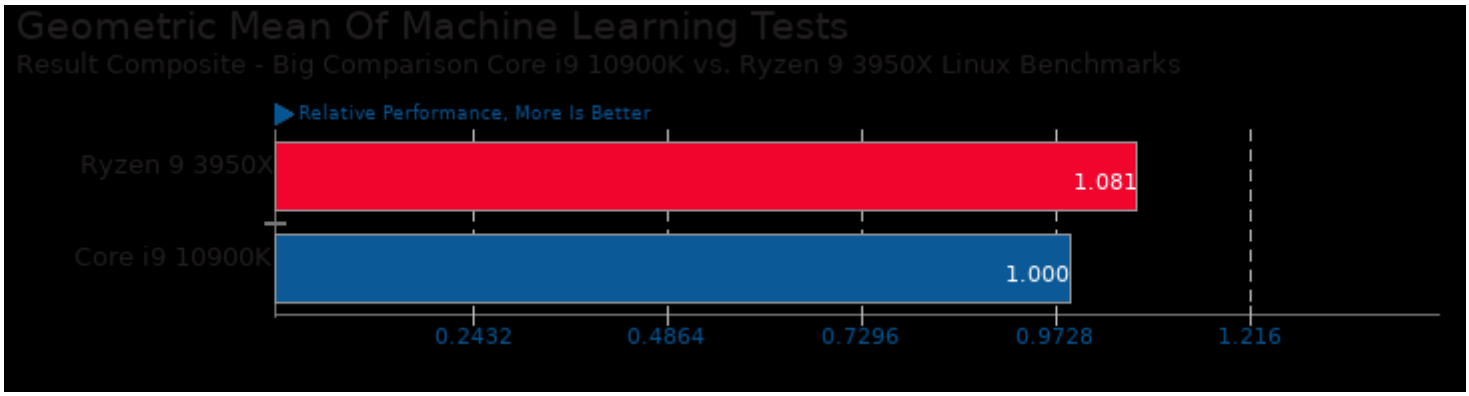

Geometric mean based upon tests: pts/bork, pts/java-scimark2, pts/dacapobench, pts/java-gradle-perf and pts/renaissance



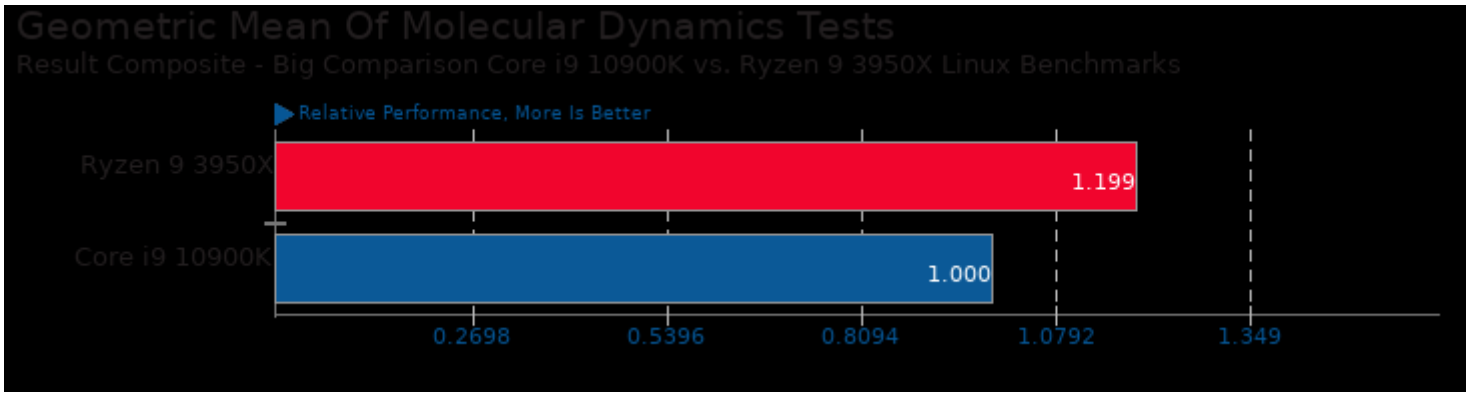
Geometric mean based upon tests: pts/sqlite-speedtest, pts/openssl, pts/ctx-clock, pts/hackbench, pts/ipc-benchmark, pts/stress-ng, pts/osbench and pts/rocksdb



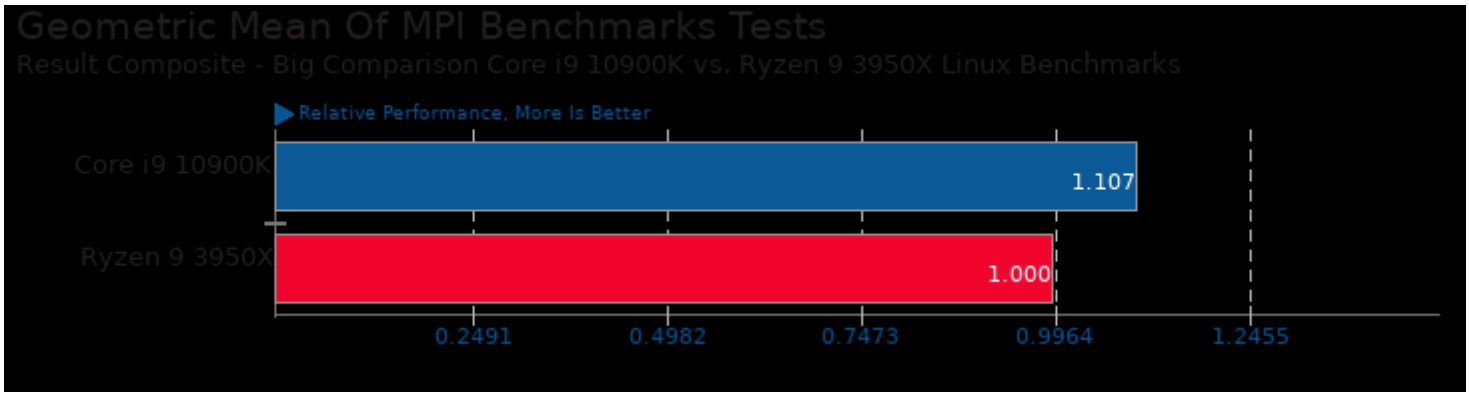

Geometric mean based upon tests: pts/mt-dgemm and pts/amg



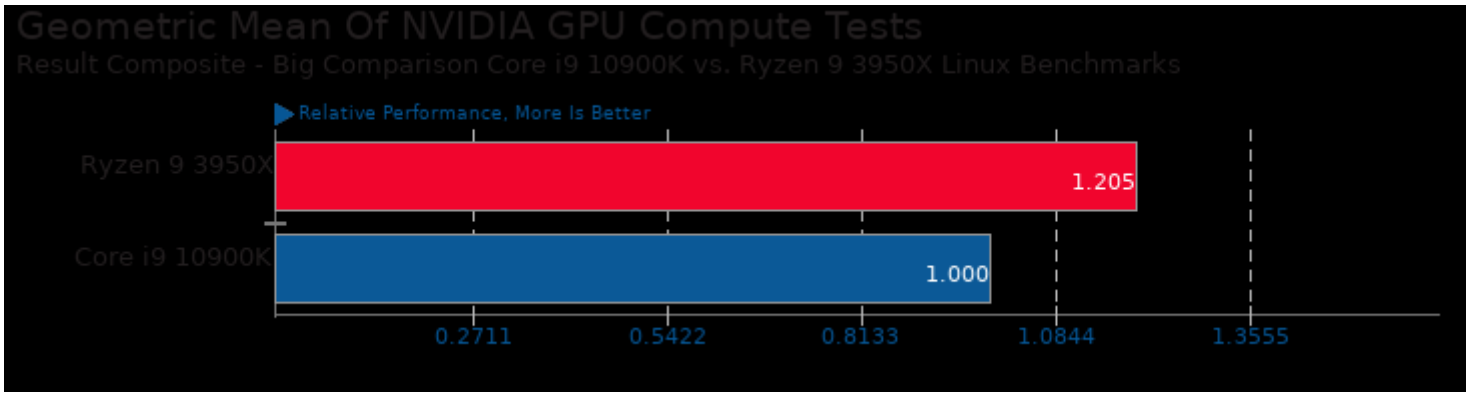

Geometric mean based upon tests: pts/numpy, pts/deepspeech, pts/scikit-learn, pts/mlpack, pts/numenta-nab, pts/plaidml and pts/lczero



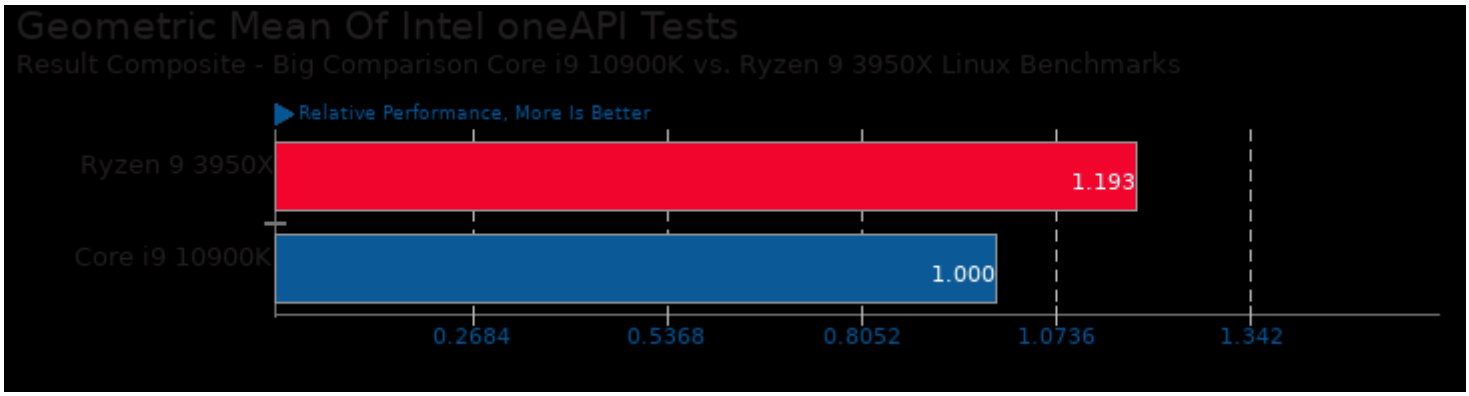

Geometric mean based upon tests: pts/namd, pts/gromacs, pts/cp2k, pts/nwchem, pts/lulesh and pts/pennant



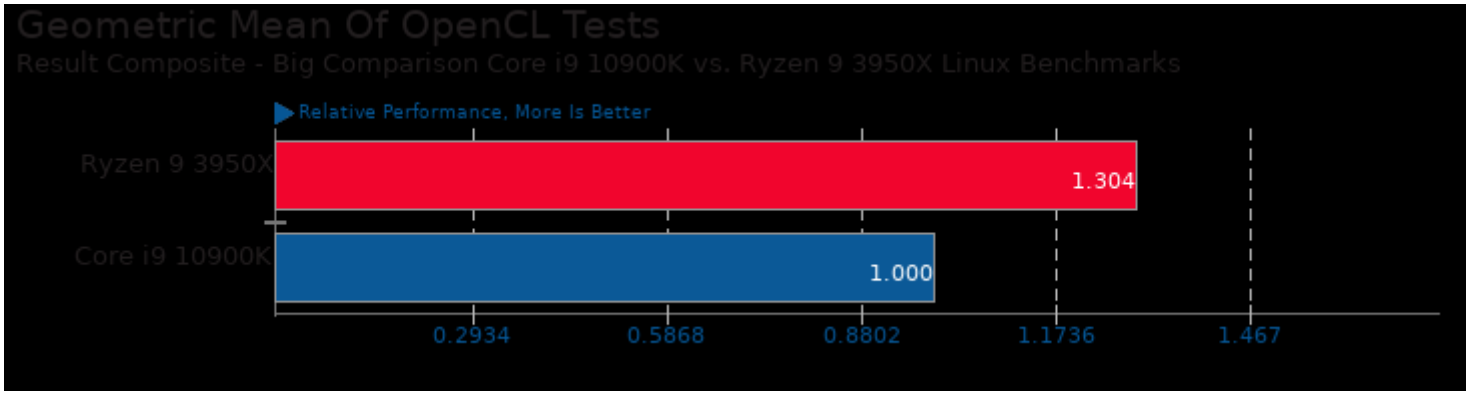

Geometric mean based upon tests: pts/askap, pts/gromacs, pts/pennant, pts/hpcg, pts/mrbayes and pts/npb



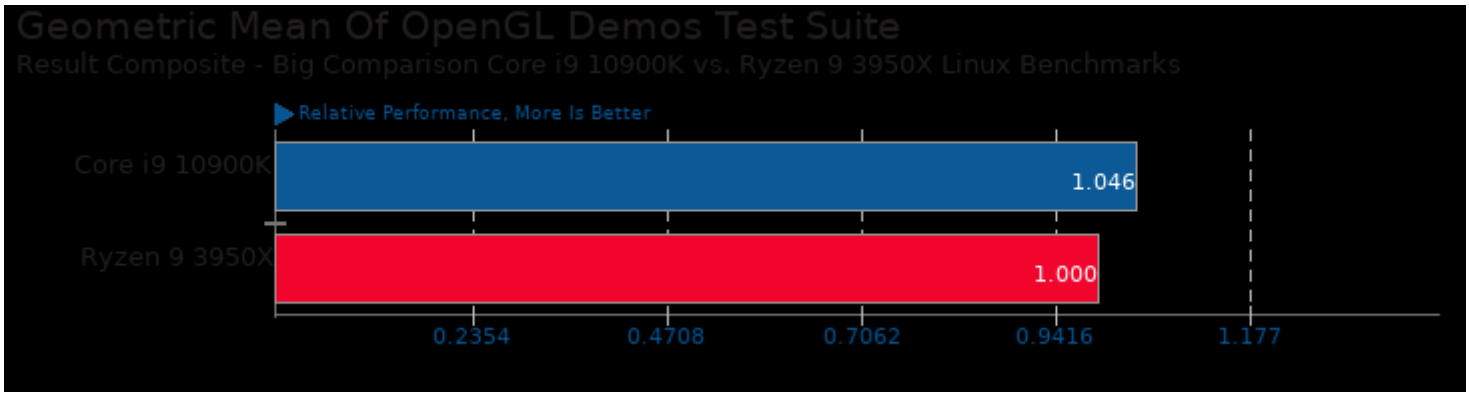

Geometric mean based upon tests: pts/gromacs, pts/luxcorerender, pts/rodinia, pts/neatbench, pts/plaidml, pts/lczero, pts/indigobench and pts/blender



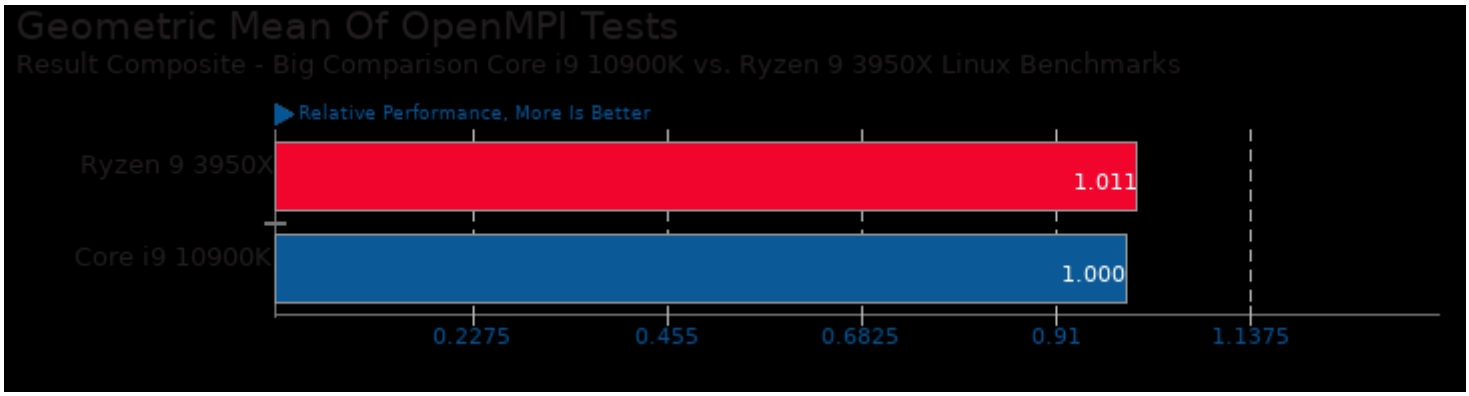

Geometric mean based upon tests: pts/embree, pts/oidn, pts/tungsten and pts/openvkl



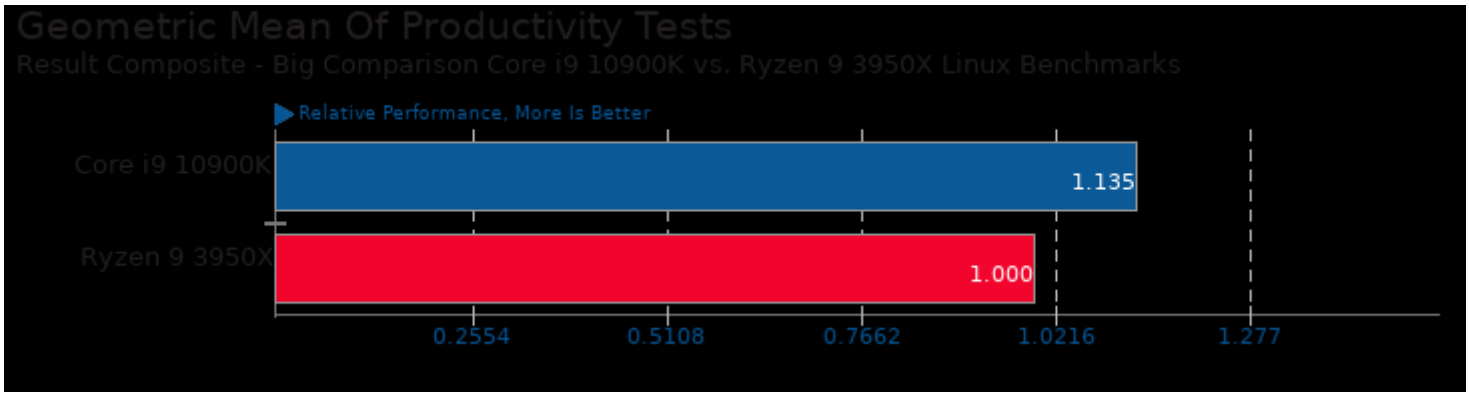

Geometric mean based upon tests: pts/rodinia and pts/parboil



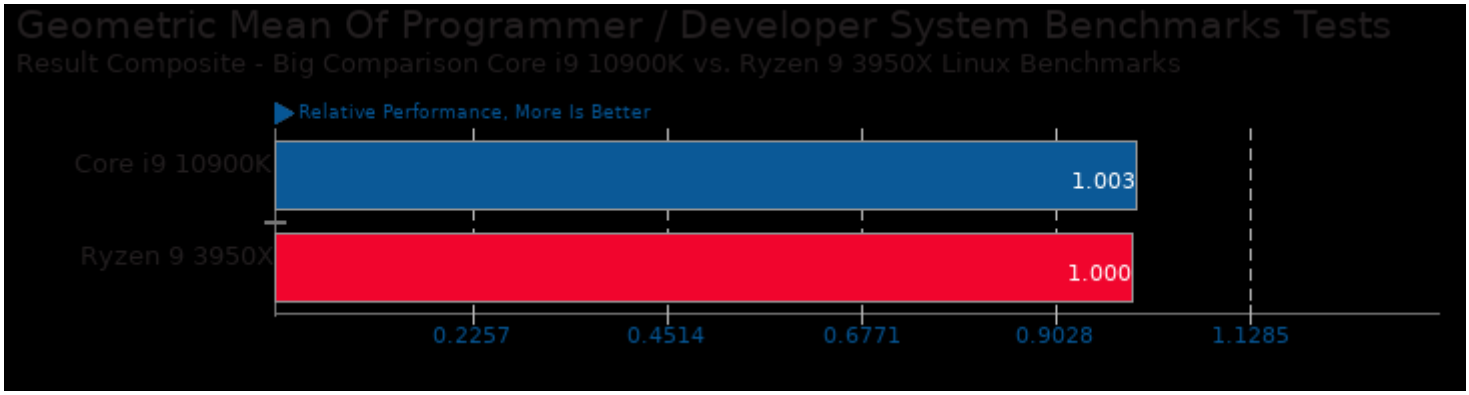

Geometric mean based upon tests: pts/unigine-valley, pts/unigine-heaven and pts/unigine-super




Geometric mean based upon tests: pts/hpcg, pts/npb, pts/parboil, pts/rodinia, pts/amg, pts/pennant, pts/mrbayes, pts/nwchem, pts/lulesh, pts/askap and pts/gromacs

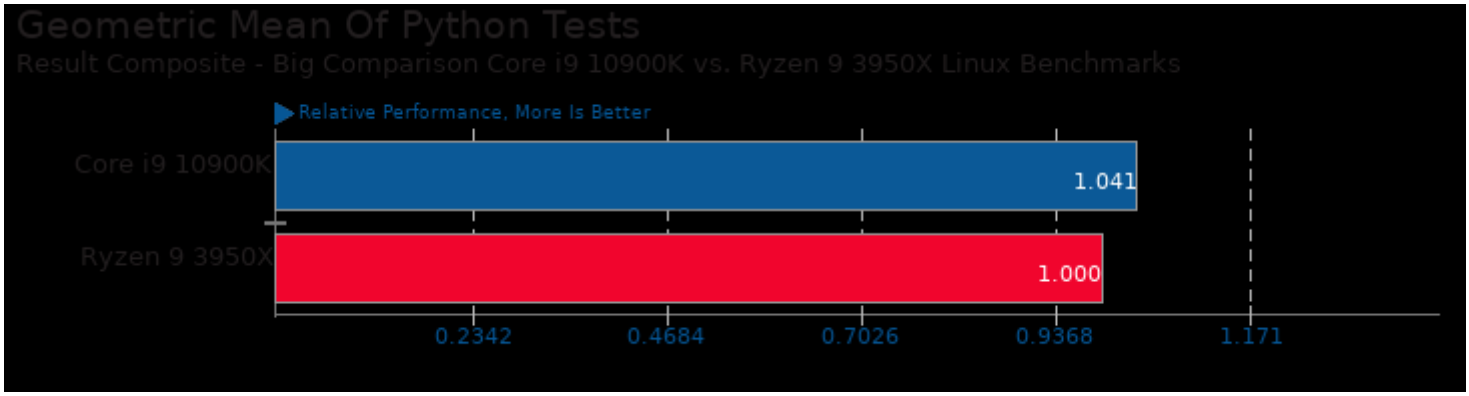



Geometric mean based upon tests: system/libreoffice, system/gimp and system/gegl

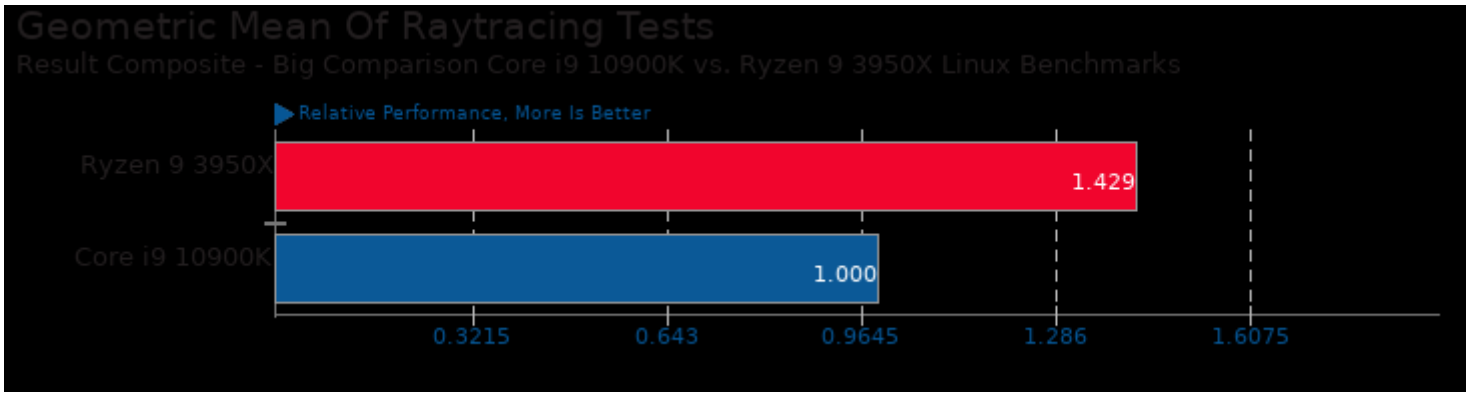



Geometric mean based upon tests: pts/sqlite-speedtest, pts/git, pts/blosc, pts/compress-zstd, pts/pyperformance,

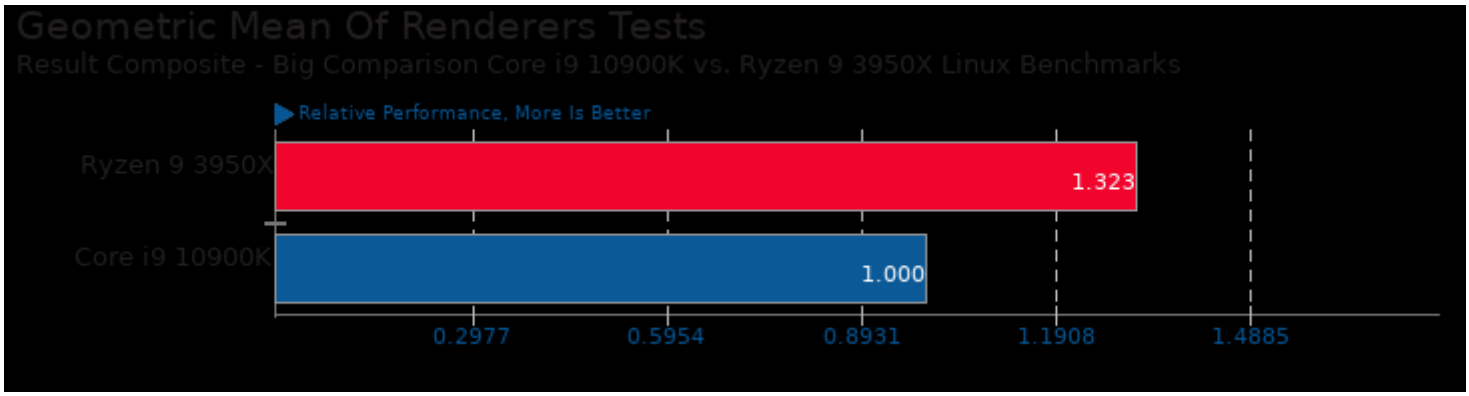
pts/pybench, pts/build-apache, pts/build-php, pts/build-linux-kernel, pts/build-imagemagick, pts/build-gcc, pts/build-gdb, pts/build-llvm, pts/build-ffmpeg, pts/build-mplayer, pts/build2, pts/mt-dgemm and pts/amg



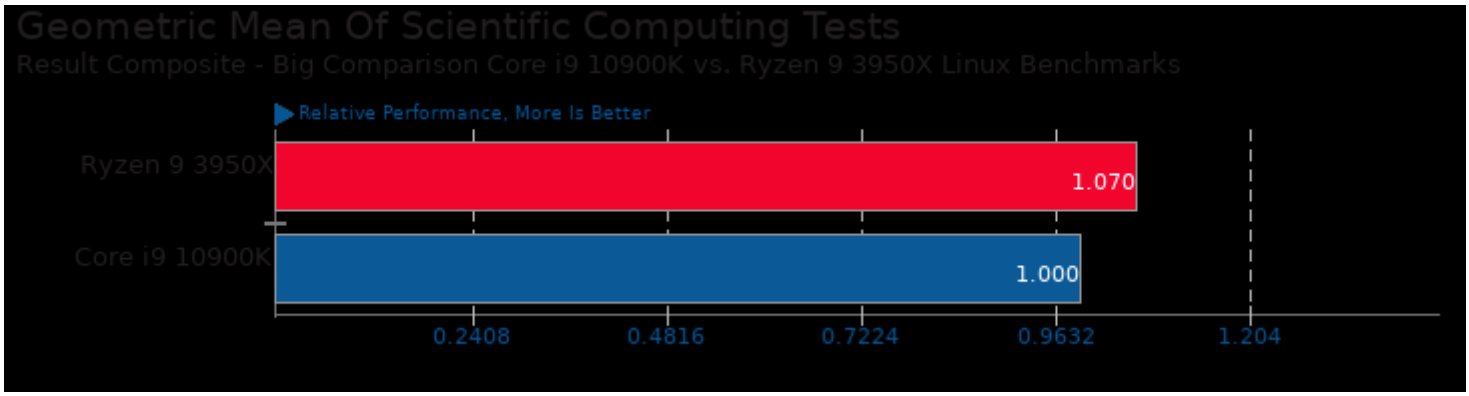

Geometric mean based upon tests: pts/pybench, pts/numenta-nab, pts/cython-bench, pts/numpy, pts/mlpack, pts/scikit-learn and pts/pyperformance



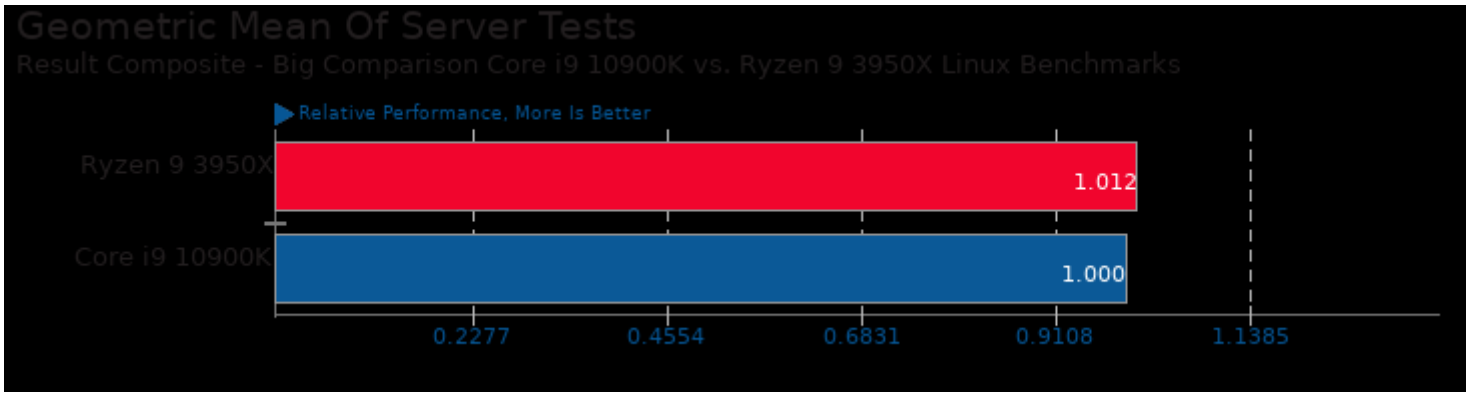

Geometric mean based upon tests: pts/c-ray, pts/tachyon, pts/rays1bench and pts/yafaray



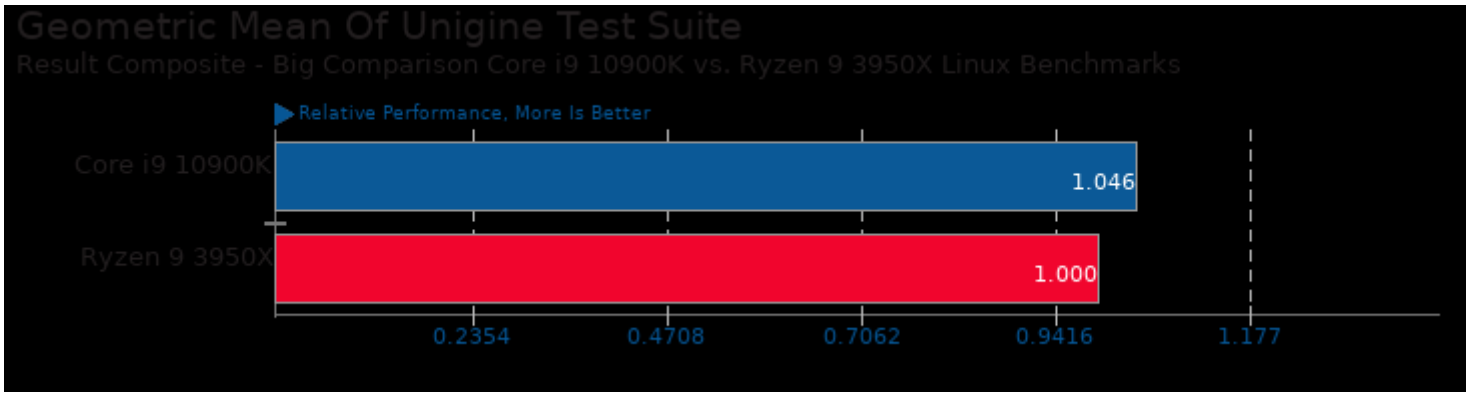

Geometric mean based upon tests: pts/c-ray, pts/tachyon, pts/rays1bench, pts/yafaray, pts/blender, pts/tungsten, pts/appleseed, pts/radiance, pts/aobench, pts/luxcorerender, pts/smallpt, pts/ttsiod-renderer and pts/indigobench



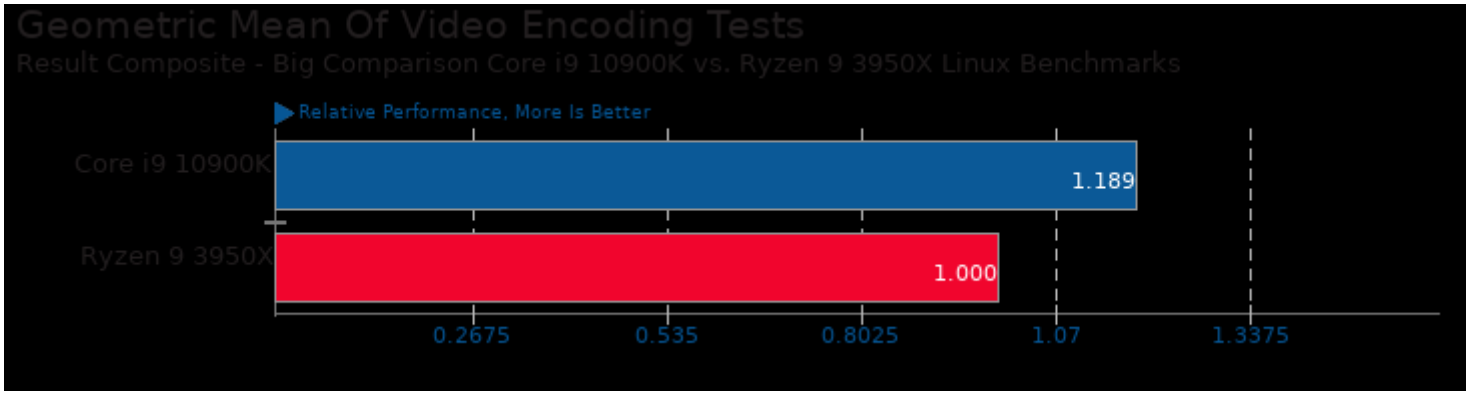

Geometric mean based upon tests: pts/fftw, pts/neat, pts/mt-dgemm, pts/amg, pts/namd, pts/gromacs, pts/cp2k, pts/nwchem, pts/lulesh, pts/pennant, pts/himeno, pts/mrbayes and pts/hmmer



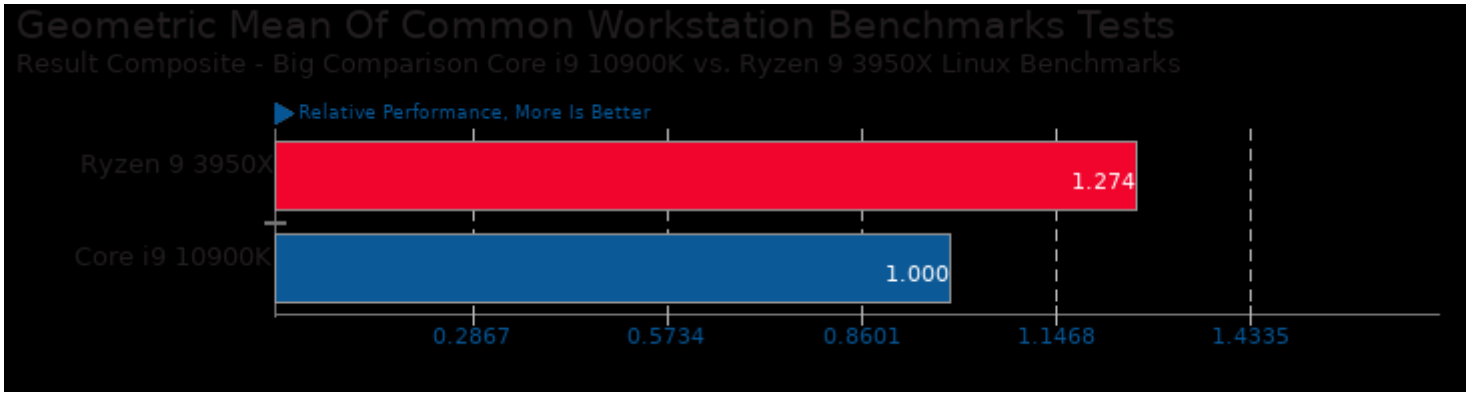

Geometric mean based upon tests: pts/ebizzy, pts/redis, pts/rocksdb, pts/openssl, pts/perl-benchmark and pts/sqlite-speedtest




Geometric mean based upon tests: pts/unigine-valley, pts/unigine-heaven and pts/unigine-super



Geometric mean based upon tests: pts/x264, pts/x265, pts/ffmpeg, pts/vpxenc, pts/dav1d, pts/aom-av1, pts/libgav1 and pts/rav1e




Geometric mean based upon tests: pts/blender, pts/rodinia, pts/parboil, pts/himeno, pts/brl-cad, pts/x265, pts/paraview, pts/swet, pts/sysbench and pts/git

*This file was automatically generated via the Phoronix Test Suite benchmarking software on Friday, 29 March 2024 11:14.*