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# 2019 Intel LLVM Clang Compiler Comparison

Tests for a future article by Michael Larabel.

**Automated Executive Summary**

*LLVM Clang 9.0.1 had the most wins, coming in first place for 32% of the tests.*

*Based on the geometric mean of all complete results, the fastest (LLVM Clang 10 20191217) was 1.009x the speed of the slowest (LLVM Clang 6.0.1). LLVM Clang 8.0.1 was 0.997x the speed of LLVM Clang 10 20191217, LLVM Clang 9.0.1 was 1x the speed of LLVM Clang 8.0.1, LLVM Clang 7.1.0 was 0.997x the speed of LLVM Clang 9.0.1, LLVM Clang 6.0.1 was 0.997x the speed of LLVM Clang 7.1.0.*

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

*GraphicsMagick (Operation: HWB Color Space) at 1.294x*
*Timed PHP Compilation (Time To Compile) at 1.277x*
*CppPerformanceBenchmarks (Test: Ctype) at 1.148x*
*Apache Benchmark (Static Web Page Serving) at 1.11x*
*GraphicsMagick (Operation: Noise-Gaussian) at 1.1x*
*GraphicsMagick (Operation: Swirl) at 1.086x*
*Himeno Benchmark (Poisson Pressure Solver) at 1.08x*
*Coremark (CoreMark Size 666 - Iterations Per Second) at 1.076x*

*C-Ray (Total Time - 4K, 16 Rays Per Pixel) at 1.067x*
*Zstd Compression (Compressing ubuntu-16.04.3-server-i386.img, Compression Level 19) at 1.048x.*

# Test Systems:

## LLVM Clang 6.0.1

Processor: Intel Core i7-5960X @ 3.50GHz (8 Cores / 16 Threads), Motherboard: ASRock X99 Extreme3 (P3.70 BIOS), Chipset: Intel Xeon E7 v3/Xeon, Memory: 16384MB, Disk: 120GB INTEL SSDSC2BW12, Graphics: AMD FirePro V7900 2GB, Audio: Realtek ALC1150, Monitor: VA2431, Network: Intel I218-V

OS: Ubuntu 19.10, Kernel: 5.3.0-24-generic (x86_64), Desktop: GNOME Shell 3.34.1, Display Server: X Server 1.20.5, Display Driver: modesetting 1.20.5, Compiler: Clang 6.0.1 + LLVM 6.0.1, File-System: ext4, Screen Resolution: 1920x1080

Environment Notes: CXXFLAGS="-O3 -march=native" CFLAGS="-O3 -march=native"
Compiler Notes: Optimized build; Default target: x86_64-unknown-linux-gnu; Host CPU: haswell
Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0x43
Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + l1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT vulnerable + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Mitigation of PTI + 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 generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + tsx_async_abort: Not affected

## LLVM Clang 7.1.0

Processor: Intel Core i7-5960X @ 3.50GHz (8 Cores / 16 Threads), Motherboard: ASRock X99 Extreme3 (P3.70 BIOS), Chipset: Intel Xeon E7 v3/Xeon, Memory: 16384MB, Disk: 120GB INTEL SSDSC2BW12, Graphics: AMD FirePro V7900 2GB, Audio: Realtek ALC1150, Monitor: VA2431, Network: Intel I218-V

OS: Ubuntu 19.10, Kernel: 5.3.0-24-generic (x86_64), Desktop: GNOME Shell 3.34.1, Display Server: X Server 1.20.5, Display Driver: modesetting 1.20.5, Compiler: Clang 7.1.0 + LLVM 7.1.0, File-System: ext4, Screen Resolution: 1920x1080

Environment Notes: CXXFLAGS="-O3 -march=native" CFLAGS="-O3 -march=native"
Compiler Notes: Optimized build; Default target: x86_64-unknown-linux-gnu; Host CPU: haswell
Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0x43
Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + l1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT vulnerable + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Mitigation of PTI + 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 generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + tsx_async_abort: Not affected

## LLVM Clang 8.0.1

Processor: Intel Core i7-5960X @ 3.50GHz (8 Cores / 16 Threads), Motherboard: ASRock X99 Extreme3 (P3.70 BIOS), Chipset: Intel Xeon E7 v3/Xeon, Memory: 16384MB, Disk: 120GB INTEL SSDSC2BW12, Graphics: AMD FirePro V7900 2GB, Audio: Realtek ALC1150, Monitor: VA2431, Network: Intel I218-V

OS: Ubuntu 19.10, Kernel: 5.3.0-24-generic (x86_64), Desktop: GNOME Shell 3.34.1, Display Server: X Server 1.20.5, Display Driver: modesetting 1.20.5, Compiler: Clang 8.0.1 + LLVM 8.0.1, File-System: ext4, Screen Resolution: 1920x1080

Environment Notes: CXXFLAGS="-O3 -march=native" CFLAGS="-O3 -march=native"
Compiler Notes: Optimized build; Default target: x86_64-unknown-linux-gnu; Host CPU: haswell
Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0x43
Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + l1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT vulnerable + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Mitigation of PTI + 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 generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + tsx_async_abort: Not affected

## LLVM Clang 9.0.1

Processor: Intel Core i7-5960X @ 3.50GHz (8 Cores / 16 Threads), Motherboard: ASRock X99 Extreme3 (P3.70 BIOS), Chipset: Intel Xeon E7 v3/Xeon, Memory: 16384MB, Disk: 120GB INTEL SSDSC2BW12, Graphics: AMD FirePro V7900 2GB, Audio: Realtek ALC1150, Monitor: VA2431, Network: Intel I218-V

OS: Ubuntu 19.10, Kernel: 5.3.0-24-generic (x86_64), Desktop: GNOME Shell 3.34.1, Display Server: X Server 1.20.5, Display Driver: modesetting 1.20.5, Compiler: Clang 9.0.1 + LLVM 9.0.1, File-System: ext4, Screen Resolution: 1920x1080

Environment Notes: CXXFLAGS="-O3 -march=native" CFLAGS="-O3 -march=native"
Compiler Notes: Optimized build; Default target: x86_64-unknown-linux-gnu; Host CPU: haswell
Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0x43
Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + l1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT vulnerable + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Mitigation of PTI + 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 generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + tsx_async_abort: Not affected

## LLVM Clang 10 20191217

Processor: Intel Core i7-5960X @ 3.50GHz (8 Cores / 16 Threads), Motherboard: ASRock X99 Extreme3 (P3.70 BIOS), Chipset: Intel Xeon E7 v3/Xeon, Memory: 16384MB, Disk: 120GB INTEL SSDSC2BW12, Graphics: AMD FirePro V7900 2GB, Audio: Realtek ALC1150, Monitor: VA2431, Network: Intel I218-V

OS: Ubuntu 19.10, Kernel: 5.3.0-24-generic (x86_64), Desktop: GNOME Shell 3.34.1, Display Server: X Server 1.20.5, Display Driver: modesetting 1.20.5, Compiler: Clang 10.0.0, File-System: ext4, Screen Resolution: 1920x1080

Environment Notes: CXXFLAGS="-O3 -march=native" CFLAGS="-O3 -march=native"
Compiler Notes: Optimized build; Default target: x86_64-unknown-linux-gnu; Host CPU: haswell
Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0x43
Python Notes: Python 2.7.17rc1 + Python 3.7.5
Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + l1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT vulnerable + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Mitigation of PTI + 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 generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + tsx_async_abort: Not affected

| | LLVM Clang 6.0.1 | LLVM Clang 7.1.0 | LLVM Clang 8.0.1 | LLVM Clang 9.0.1 | LLVM Clang 10 20191217 |
|---|---|---|---|---|---|
| **Timed MrBayes Analysis - P.P.A (sec)** | **109.252** | 108.759 | 108.616 | 109.030 | **108.448** |
| **Normalized** | 99.26% | 99.71% | 99.85% | 99.47% | 100% |
| **Standard Deviation** | 0.3% | 0.2% | 0.5% | 0.3% | 0.4% |
| **Timed HMMer Search - P.D.S (sec)** | 7.307 | **7.181** | 7.302 | **7.311** | 7.201 |
| **Normalized** | 98.28% | 100% | 98.34% | 98.22% | 99.72% |
| **Standard Deviation** | 2% | 1.3% | 2.6% | 2.1% | 1.8% |

# 2019 Intel LLVM Clang Compiler Comparison

| | | | | | |
|---|---|---|---|---|---|
| **libgav1 - Chimera 1080p (FPS)** | 36.32 | **36.21** | 36.25 | 36.23 | **36.38** |
| **Normalized** | 99.84% | 99.53% | 99.64% | 99.59% | 100% |
| **Standard Deviation** | 0.1% | 0% | 0.1% | 0.1% | 0.1% |
| **libgav1 - Summer Nature 4K** | 15.83 | **15.72** | 15.76 | 15.74 | **15.89** |
| **Normalized** | 99.62% | 98.93% | 99.18% | 99.06% | 100% |
| **Standard Deviation** | 0% | 0.1% | 0.1% | 0.2% | 0.1% |
| **libgav1 - S.N.1 (FPS)** | 51.30 | 50.94 | **50.88** | 51.18 | **51.73** |
| **Normalized** | 99.17% | 98.47% | 98.36% | 98.94% | 100% |
| **Standard Deviation** | 0.3% | 0.1% | 0.3% | 0.3% | 0.2% |
| **SciMark - Composite (Mflops)** | 2100 | 2104 | **2100** | **2115** | 2114 |
| **Normalized** | 99.32% | 99.48% | 99.31% | 100% | 99.97% |
| **Standard Deviation** | 0.2% | 0% | 0.3% | 0.2% | 0.2% |
| **SciMark - Monte Carlo (Mflops)** | **557.24** | 557.10 | 557.09 | 555.78 | **555.76** |
| **Normalized** | 100% | 99.97% | 99.97% | 99.74% | 99.73% |
| **Standard Deviation** | 0% | 0% | 0% | 0% | 0% |
| **SciMark - F.F.T (Mflops)** | **453.81** | **459.85** | 455.34 | 455.31 | 455.49 |
| **Normalized** | 98.69% | 100% | 99.02% | 99.01% | 99.05% |
| **Standard Deviation** | 0.1% | 0.4% | 0.3% | 0.7% | 0.2% |
| **SciMark - S.M.M (Mflops)** | **2739** | 2772 | 2754 | 2808 | **2829** |
| **Normalized** | 96.84% | 97.99% | 97.38% | 99.27% | 100% |
| **Standard Deviation** | 0.4% | 0.2% | 0.1% | 0.4% | 0.6% |
| **SciMark - D.L.M.F (Mflops)** | 5240 | **5218** | 5222 | **5243** | 5220 |
| **Normalized** | 99.93% | 99.52% | 99.59% | 100% | 99.54% |
| **Standard Deviation** | 0.4% | 0.1% | 0.6% | 0.5% | 0% |
| **TSCP - A.C.P (Nodes/s)** | 1305161 | 1312628 | **1295948** | **1351272** | 1345331 |
| **Normalized** | 96.59% | 97.14% | 95.91% | 100% | 99.56% |
| **Standard Deviation** | | 0.1% | | 0.1% | 0.1% |
| **John The Ripper - Blowfish (Real C/S)** | 1337 | **1343** | **1293** | **1293** | **1293** |
| **Normalized** | 99.55% | 100% | 96.28% | 96.28% | 96.28% |
| **Standard Deviation** | | | | 0% | |
| **John The Ripper - MD5 (Real** | **76421** | 76487 | 76623 | 76627 | **77384** |
| **Normalized** | 98.76% | 98.84% | 99.02% | 99.02% | 100% |
| **Standard Deviation** | 0.2% | 0.4% | 0.1% | 0.1% | 0.2% |
| **GraphicsMagick - Swirl (Iterations/min)** | **35** | **35** | 36 | **35** | **38** |
| **Normalized** | 92.11% | 92.11% | 94.74% | 92.11% | 100% |
| **Standard Deviation** | | | 1.6% | | |
| **GraphicsMagick - Rotate (Iterations/min)** | **577** | 578 | 578 | 584 | **591** |
| **Normalized** | 97.63% | 97.8% | 97.8% | 98.82% | 100% |
| **GraphicsMagick - Sharpen (Iterations/min)** | 12 | 12 | 12 | 12 | 12 |
| **GraphicsMagick - Resizing (Iterations/min)** | **79** | **79** | 80 | **81** | 80 |
| **Normalized** | 97.53% | 97.53% | 98.77% | 100% | 98.77% |
| **Standard Deviation** | 1.5% | | | 0.7% | |
| **GraphicsMagick - Noise-Gaussian (Iterations/min)** | **20** | 21 | **22** | **22** | **22** |
| **Normalized** | 90.91% | 95.45% | 100% | 100% | 100% |
| **GraphicsMagick - HWB Color Space (Iterations/min)** | **109** | **109** | 111 | 112 | **141** |
| **Normalized** | 77.3% | 77.3% | 78.72% | 79.43% | 100% |
| **Standard Deviation** | 0.5% | | | 2.4% | |

# 2019 Intel LLVM Clang Compiler Comparison

| | | | | | |
|---|---|---|---|---|---|
| **dav1d - Chimera 1080p (FPS)** | 352.92 | 354.12 | 353.14 | **354.96** | **351.63** |
| **Normalized** | 99.43% | 99.76% | 99.49% | 100% | 99.06% |
| **Standard Deviation** | 0.4% | 0.2% | 1.2% | 0.9% | 1.3% |
| **dav1d - Summer Nature 4K (FPS)** | **105.51** | **107.13** | 106.57 | 106.53 | 106.56 |
| **Normalized** | 98.49% | 100% | 99.48% | 99.44% | 99.47% |
| **Standard Deviation** | 0.8% | 0.3% | 0.3% | 0.2% | 0.2% |
| **dav1d - S.N.1 (FPS)** | **300.97** | 303.93 | **305.15** | 304.73 | 305.08 |
| **Normalized** | 98.63% | 99.6% | 100% | 99.86% | 99.98% |
| **Standard Deviation** | 0.4% | 0.4% | 0.3% | 0.3% | 0.2% |
| **SVT-AV1 - Enc Mode 8 - 1080p (FPS)** | 23.283 | **23.208** | 23.419 | **23.451** | 23.395 |
| **Normalized** | 99.28% | 98.96% | 99.86% | 100% | 99.76% |
| **Standard Deviation** | 0.6% | 0.4% | 0.6% | 0.6% | 0.2% |
| **SVT-HEVC - 1.8.b.Y.T.H.V.E (FPS)** | **35.06** | 35.11 | 35.48 | 35.88 | **35.90** |
| **Normalized** | 97.66% | 97.8% | 98.83% | 99.94% | 100% |
| **Standard Deviation** | 0.8% | 0.9% | 0.8% | 0.9% | 0.9% |
| **SVT-VP9 - VMAF Optimized - Bosphorus 1080p (FPS)** | 102.84 | 102.26 | **101.77** | **102.90** | 102.66 |
| **Normalized** | 99.94% | 99.38% | 98.9% | 100% | 99.77% |
| **Standard Deviation** | 2.8% | 2.8% | 3% | 3% | 2.9% |
| **SVT-VP9 - P.S.O - Bosphorus 1080p (FPS)** | **110.61** | 110.17 | 110.09 | **109.56** | 110.25 |
| **Normalized** | 100% | 99.6% | 99.53% | 99.05% | 99.67% |
| **Standard Deviation** | 1.3% | 1.7% | 1.1% | 1% | 1.1% |
| **SVT-VP9 - V.Q.O - Bosphorus 1080p (FPS)** | 81.14 | **80.23** | **81.50** | 80.82 | 81.14 |
| **Normalized** | 99.56% | 98.44% | 100% | 99.17% | 99.56% |
| **Standard Deviation** | 0.2% | 0.4% | 0.7% | 0.7% | 0.6% |
| **VP9 libvpx Encoding - v.V.1.V.E (FPS)** | **110.24** | 110.78 | **111.71** | 111.05 | 110.98 |
| **Normalized** | 98.68% | 99.17% | 100% | 99.41% | 99.35% |
| **Standard Deviation** | 8.9% | 8.9% | 8.7% | 8.9% | 8.9% |
| **x264 - H.2.V.E (FPS)** | **56.26** | 56.95 | 57.60 | 57.37 | **57.84** |
| **Normalized** | 97.27% | 98.46% | 99.59% | 99.19% | 100% |
| **Standard Deviation** | 3% | 2.7% | 2.9% | 2.4% | 2.7% |
| **x265 - H.2.1.V.E (FPS)** | **34.45** | 34.59 | 34.52 | **35.10** | 34.52 |
| **Normalized** | 98.15% | 98.55% | 98.35% | 100% | 98.35% |
| **Standard Deviation** | 0.7% | 1.5% | 0.5% | 1.6% | 0.6% |
| **Coremark - CoreMark Size 666 - I.P.S (Iterations/Sec)** | 222703 | **228736** | 222924 | 215757 | **212568** |
| **Normalized** | 97.36% | 100% | 97.46% | 94.33% | 92.93% |
| **Standard Deviation** | 0% | 0.3% | 0.1% | 0.2% | 0.1% |
| **Himeno Benchmark - P.P.S (MFLOPS)** | **2915** | 3099 | 3086 | **3148** | 3145 |
| **Normalized** | 92.6% | 98.44% | 98.02% | 100% | 99.91% |
| **Standard Deviation** | 0.2% | 0.2% | 0.3% | 0.2% | 0.1% |
| **asmFish - 1.H.M.2.D (Nodes/s)** | 21773169 | 22113202 | **21716998** | **22125493** | 21917065 |
| **Normalized** | 98.41% | 99.94% | 98.15% | 100% | 99.06% |
| **Standard Deviation** | 1.1% | 0.8% | 1.2% | 1.1% | 1.9% |
| **ebizzy (Records/s)** | 284282 | 278134 | **285846** | 278849 | **272998** |
| **Normalized** | 99.45% | 97.3% | 100% | 97.55% | 95.51% |
| **Standard Deviation** | 2.9% | 3% | 2.9% | 2% | 3% |

# 2019 Intel LLVM Clang Compiler Comparison

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|---|---|---|---|---|---|
| **Timed PHP Compilation - Time To Compile (sec)** | **99.443** | 110.278 | 112.170 | 115.967 | **127.013** |
| **Normalized** | 100% | 90.17% | 88.65% | 85.75% | 78.29% |
| **Standard Deviation** | 0.1% | 0% | 0.4% | 0.1% | 0.2% |
| **C-Ray - Total Time - 4.1.R.P.P (sec)** | **133.539** | 127.178 | 127.086 | **125.180** | 127.246 |
| **Normalized** | 93.74% | 98.43% | 98.5% | 100% | 98.38% |
| **Standard Deviation** | 0.1% | 0% | 0.1% | 0% | 0.1% |
| **Tungsten Renderer - Hair (sec)** | 35.2842 | 35.2485 | **35.6346** | 34.9660 | **34.9000** |
| **Normalized** | 98.91% | 99.01% | 97.94% | 99.81% | 100% |
| **Standard Deviation** | 0.2% | 0.1% | 0.1% | 0% | 0% |
| **Tungsten Renderer - Water Caustic (sec)** | 31.1509 | **31.4654** | 31.1359 | **31.0105** | 31.1667 |
| **Normalized** | 99.55% | 98.55% | 99.6% | 100% | 99.5% |
| **Standard Deviation** | 0.2% | 0.2% | 0.4% | 0.2% | 0.2% |
| **Tungsten Renderer - Non-Exponential (sec)** | 9.97024 | 9.93175 | 9.95480 | **10.00685** | **9.83032** |
| **Normalized** | 98.6% | 98.98% | 98.75% | 98.24% | 100% |
| **Standard Deviation** | 0.7% | 0.2% | 0.1% | 0.7% | 0.7% |
| **Tungsten Renderer - Volumetric Caustic (sec)** | **12.3110** | 12.1987 | 12.2350 | 12.2433 | **12.1656** |
| **Normalized** | 98.82% | 99.73% | 99.43% | 99.37% | 100% |
| **Standard Deviation** | 0.8% | 0.2% | 0.3% | 0.9% | 0.8% |
| **AOBench - 2048 x 2048 - Total Time (sec)** | **41.549** | **42.200** | 41.604 | 42.109 | 41.799 |
| **Normalized** | 100% | 98.46% | 99.87% | 98.67% | 99.4% |
| **Standard Deviation** | 0.2% | 2.4% | 0.3% | 2.9% | 1.2% |
| **XZ Compression - C.u.1.0.3.s.i.i.C.L.9 (sec)** | 32.170 | 32.111 | **32.191** | **31.595** | 32.128 |
| **Normalized** | 98.21% | 98.39% | 98.15% | 100% | 98.34% |
| **Standard Deviation** | 0.3% | 0.3% | 0.3% | 0.8% | 0.6% |
| **Zstd Compression - C.u.1.0.3.s.i.i.C.L.1 (sec)** | 20.938 | 20.953 | **21.339** | 20.829 | **20.364** |
| **Normalized** | 97.26% | 97.19% | 95.43% | 97.77% | 100% |
| **Standard Deviation** | 0.6% | 0.3% | 0.5% | 0.9% | 1.3% |
| **Minion - Graceful (sec)** | 64.306260 | **64.366640** | 63.472231 | **63.040103** | 63.623649 |
| **Normalized** | 98.03% | 97.94% | 99.32% | 100% | 99.08% |
| **Standard Deviation** | 0.2% | 0.1% | 0.1% | 0.1% | 0.4% |
| **Minion - Solitaire (sec)** | **86.677773** | 86.975667 | 86.960693 | **87.056188** | 86.850014 |
| **Normalized** | 100% | 99.66% | 99.67% | 99.57% | 99.8% |
| **Standard Deviation** | 0.1% | 0.3% | 0.3% | 0.3% | 0.3% |
| **Minion - Quasigroup (sec)** | 140.385022 | 141.394096 | **139.842752** | 141.484902 | **144.574132** |
| **Normalized** | 99.61% | 98.9% | 100% | 98.84% | 96.73% |
| **Standard Deviation** | 0.1% | 0.2% | 0.2% | 0.2% | 2.7% |
| **libjpeg-turbo tjbench - D.T (Megapixels/sec)** | **172.995715** | 169.256304 | 167.204583 | **166.392078** | 168.245614 |
| **Normalized** | 100% | 97.84% | 96.65% | 96.18% | 97.25% |
| **Standard Deviation** | 0.3% | 0.5% | 0.7% | 0.7% | 0.2% |
| **PostgreSQL pgbench - Buffer Test - Normal Load - Read Only** | **147464** | 147812 | 148727 | **149135** | 148891 |
| **Normalized** | 98.88% | 99.11% | 99.73% | 100% | 99.84% |
| **Standard Deviation** | 0% | 0.1% | 0.2% | 0.1% | 0.4% |

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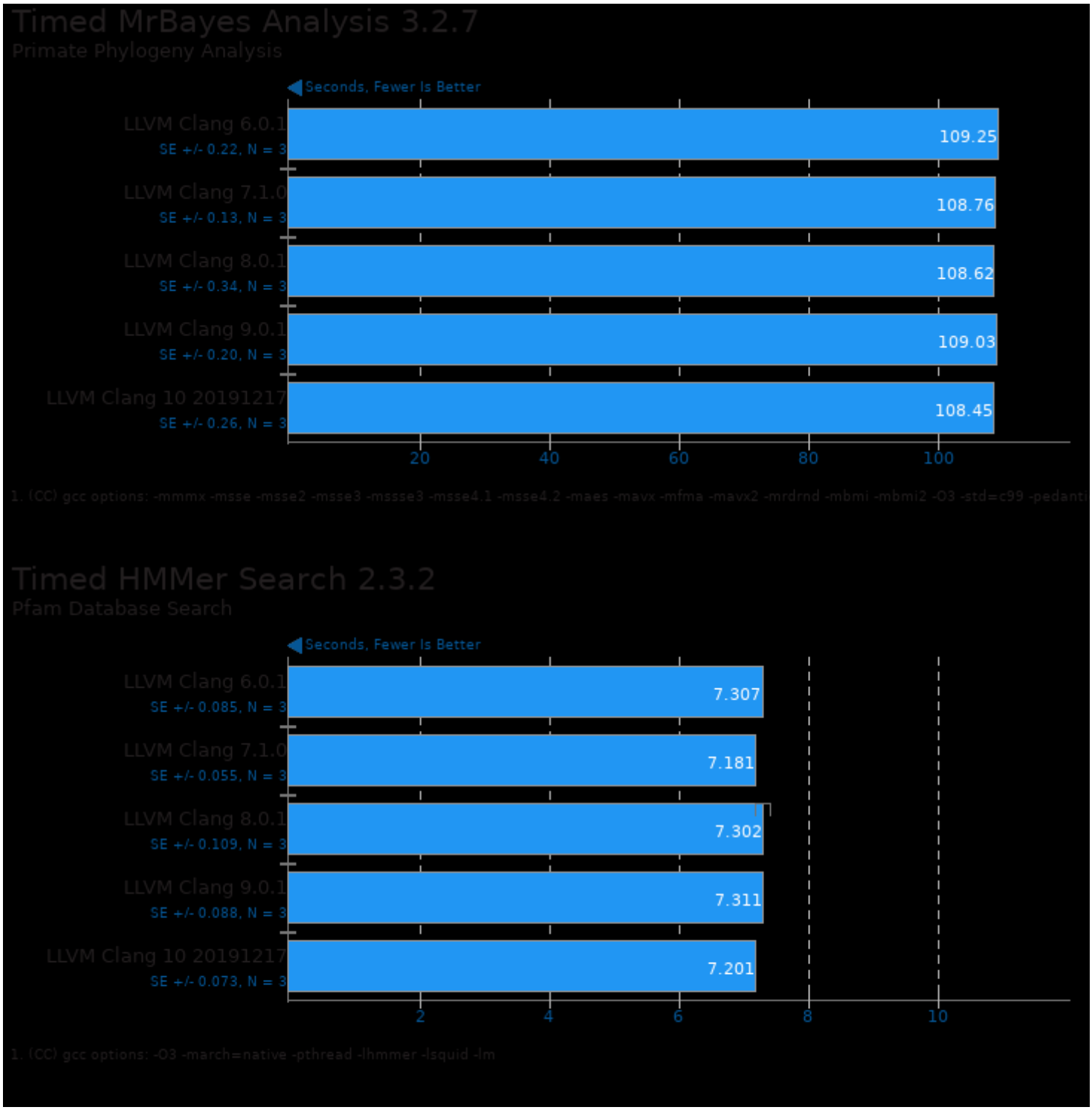
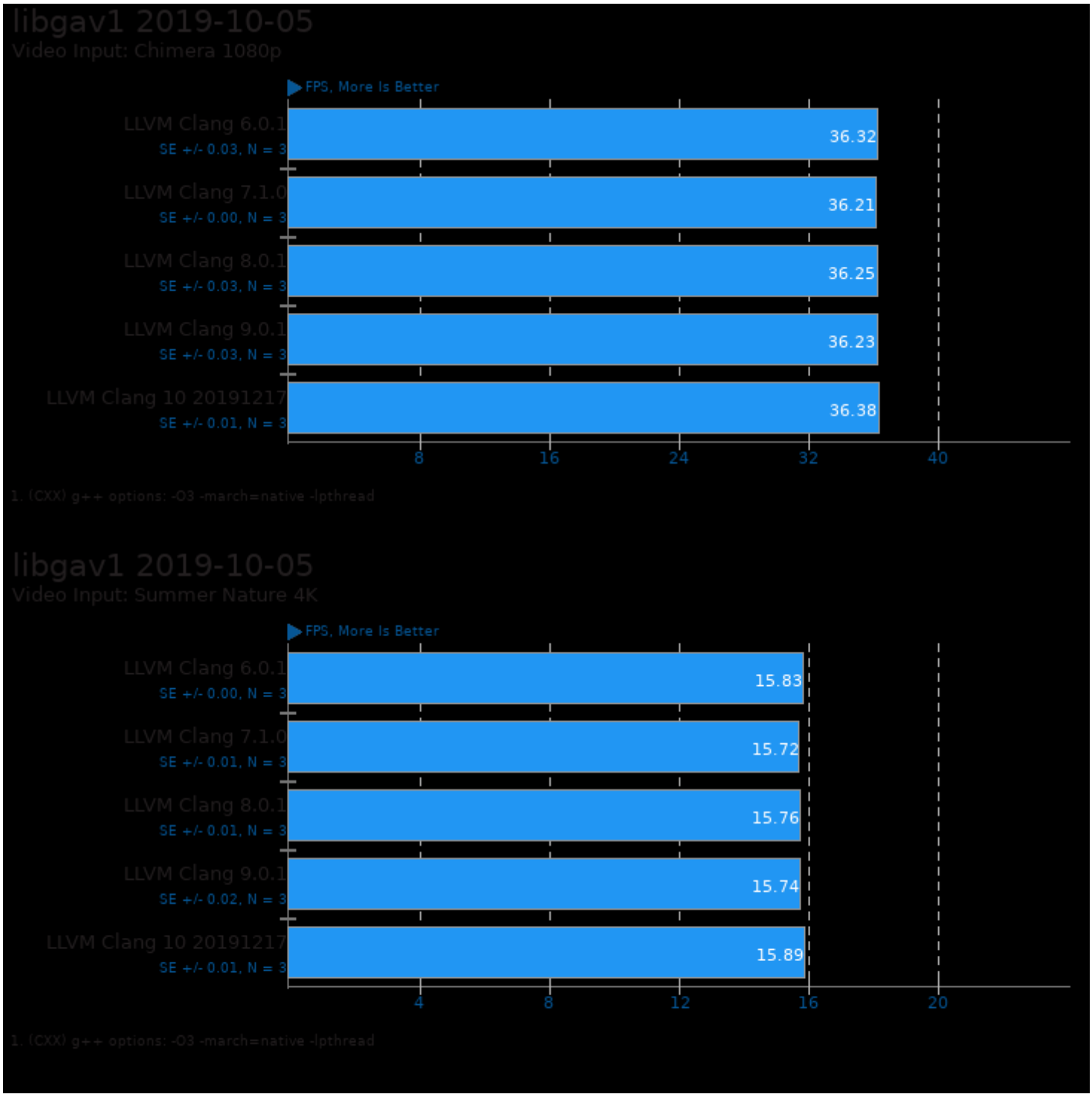
|---|---|---|---|---|---|
| **CppPerformanceBenchmarks - Ctype (sec)** | 35.312 | **35.698** | **31.093** | 34.939 | 32.959 |
| **Normalized** | 88.05% | 87.1% | 100% | 88.99% | 94.34% |
| **Standard Deviation** | 0% | 0% | 0% | 0% | 0.1% |
| **CppPerformanceBenchmarks - Math Library (sec)** | 407.300 | **406.432** | 406.927 | 408.076 | **408.082** |
| **Normalized** | 99.79% | 100% | 99.88% | 99.6% | 99.6% |
| **Standard Deviation** | 0.5% | 0.1% | 0.1% | 0.6% | 0.5% |
| **CppPerformanceBenchmarks - Function Objects (sec)** | 16.134 | **16.139** | 15.998 | 16.135 | **15.939** |
| **Normalized** | 98.79% | 98.76% | 99.63% | 98.79% | 100% |
| **Standard Deviation** | 0.6% | 0.6% | 0.6% | 0.6% | 0.6% |
| **NGINX Benchmark - S.W.P.S (Reqs/sec)** | **25228** | 25579 | 25504 | **25695** | 25528 |
| **Normalized** | 98.18% | 99.55% | 99.25% | 100% | 99.35% |
| **Standard Deviation** | 1.3% | 0.5% | 1.1% | 0.3% | 2% |
| **Apache Benchmark - S.W.P.S (Reqs/sec)** | 19278 | 19825 | 20225 | **20345** | **18326** |
| **Normalized** | 94.76% | 97.44% | 99.41% | 100% | 90.08% |
| **Standard Deviation** | 2.2% | 2.5% | 1.9% | 0.9% | 3.2% |

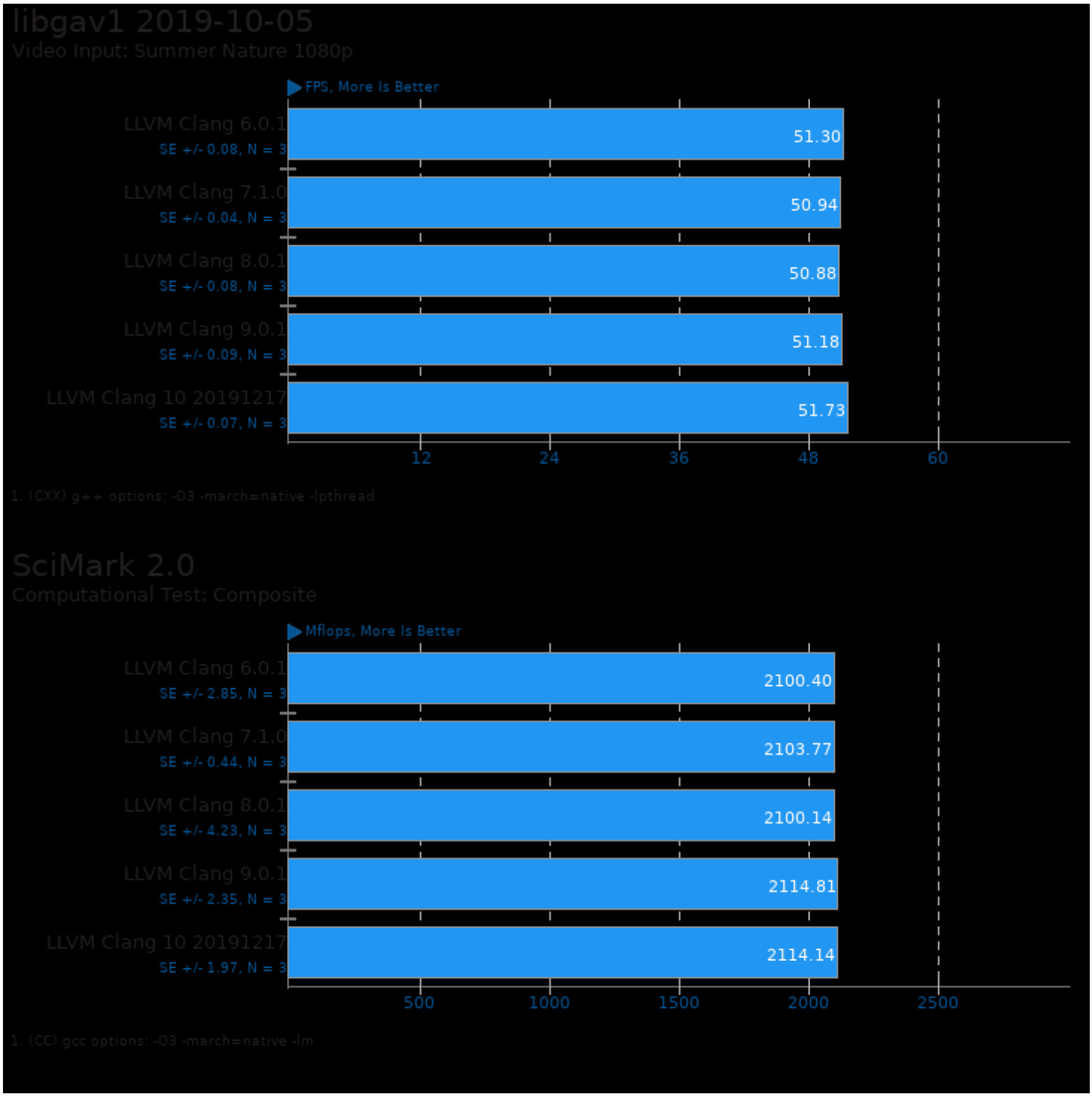
# 2019 Intel LLVM Clang Compiler Comparison



# 2019 Intel LLVM Clang Compiler Comparison



# 2019 Intel LLVM Clang Compiler Comparison



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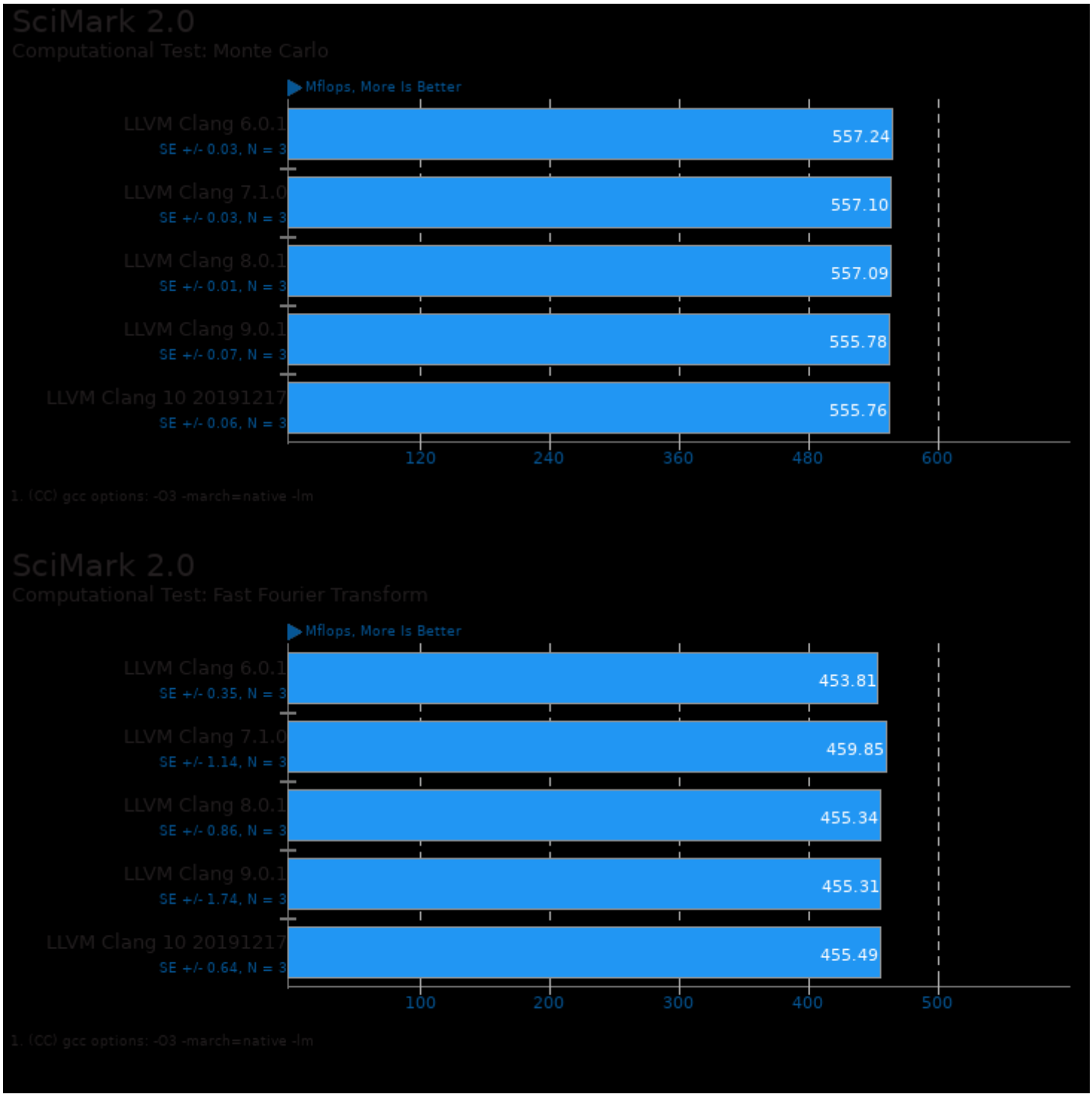

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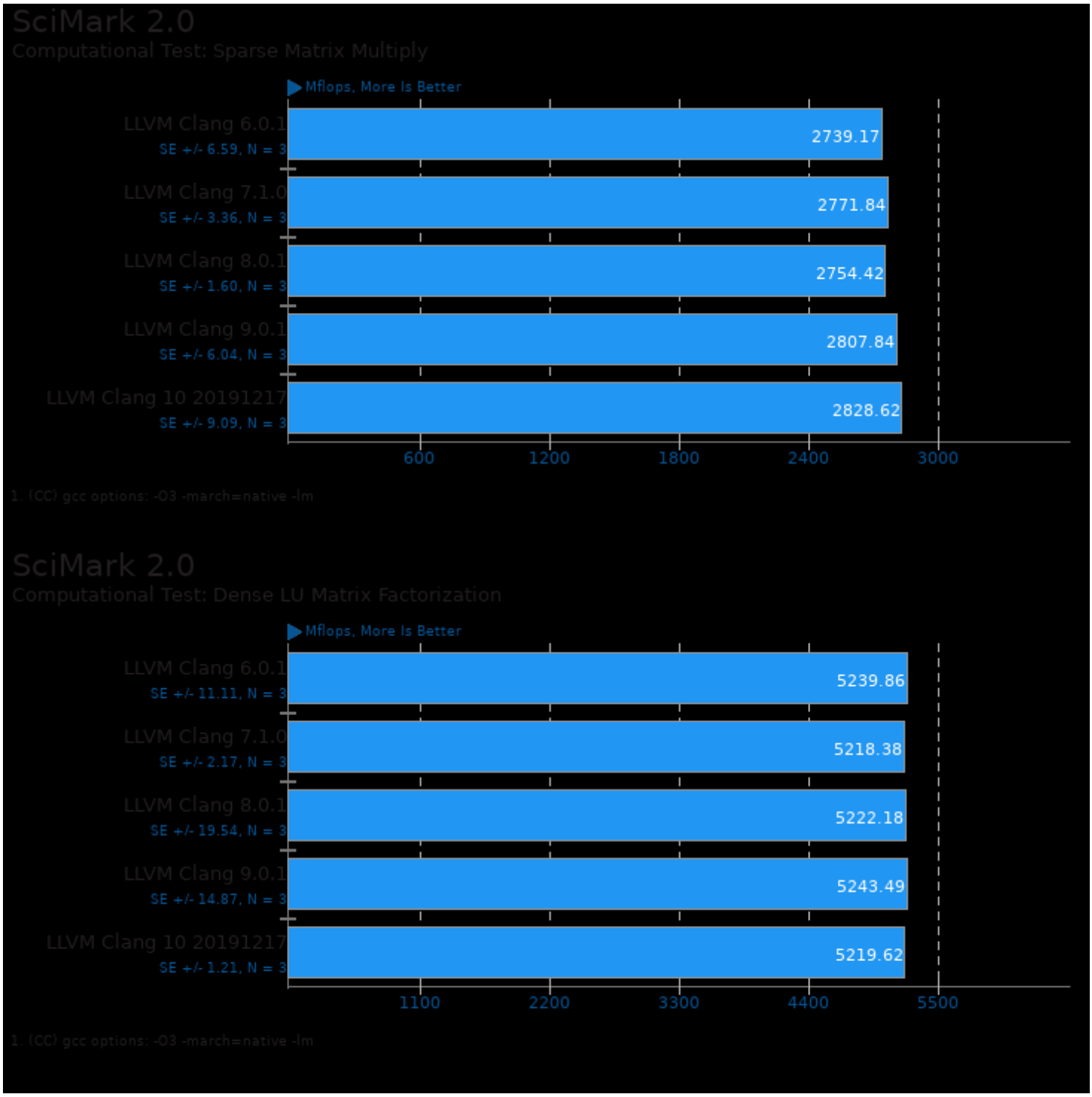
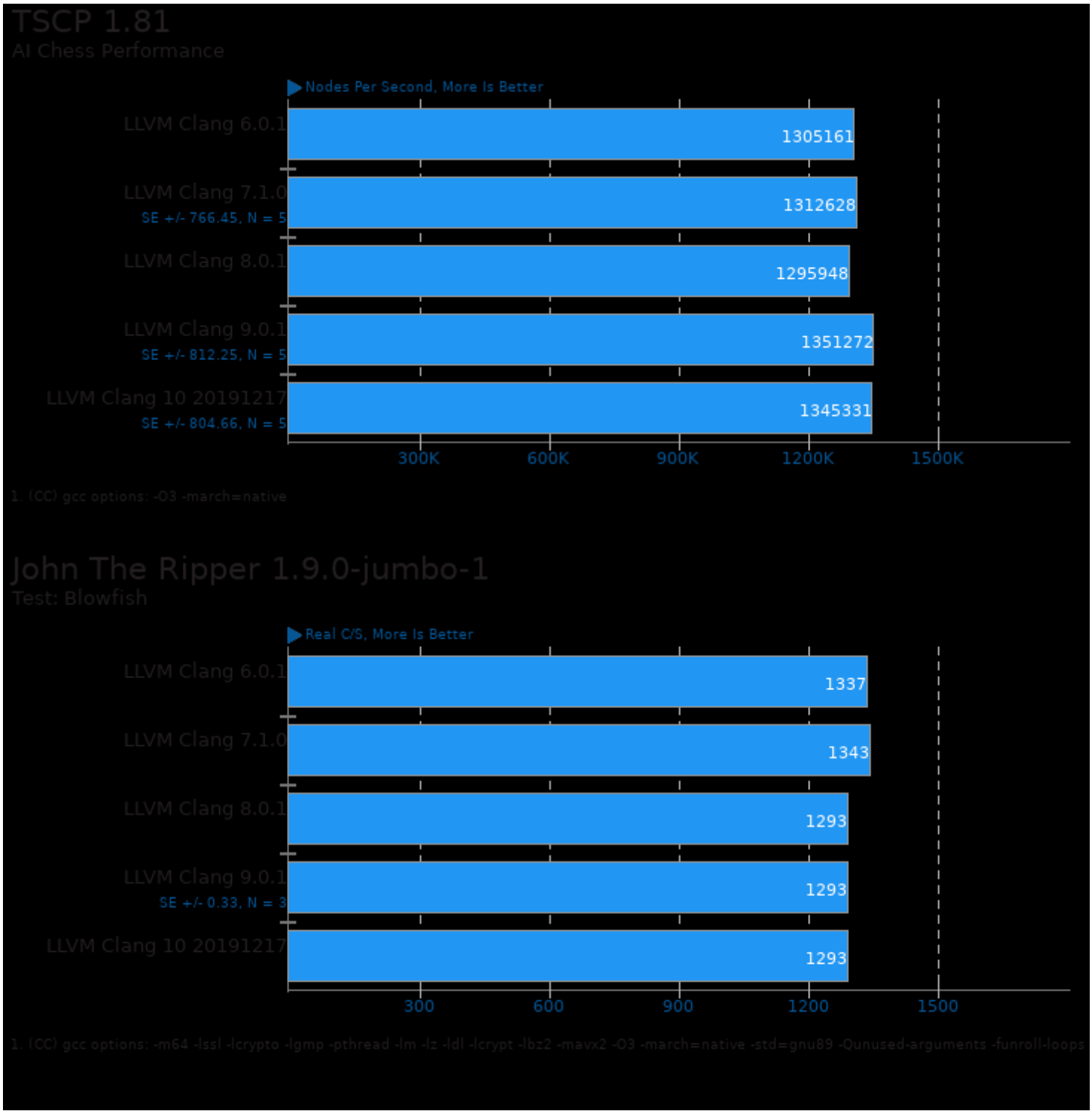


# 2019 Intel LLVM Clang Compiler Comparison



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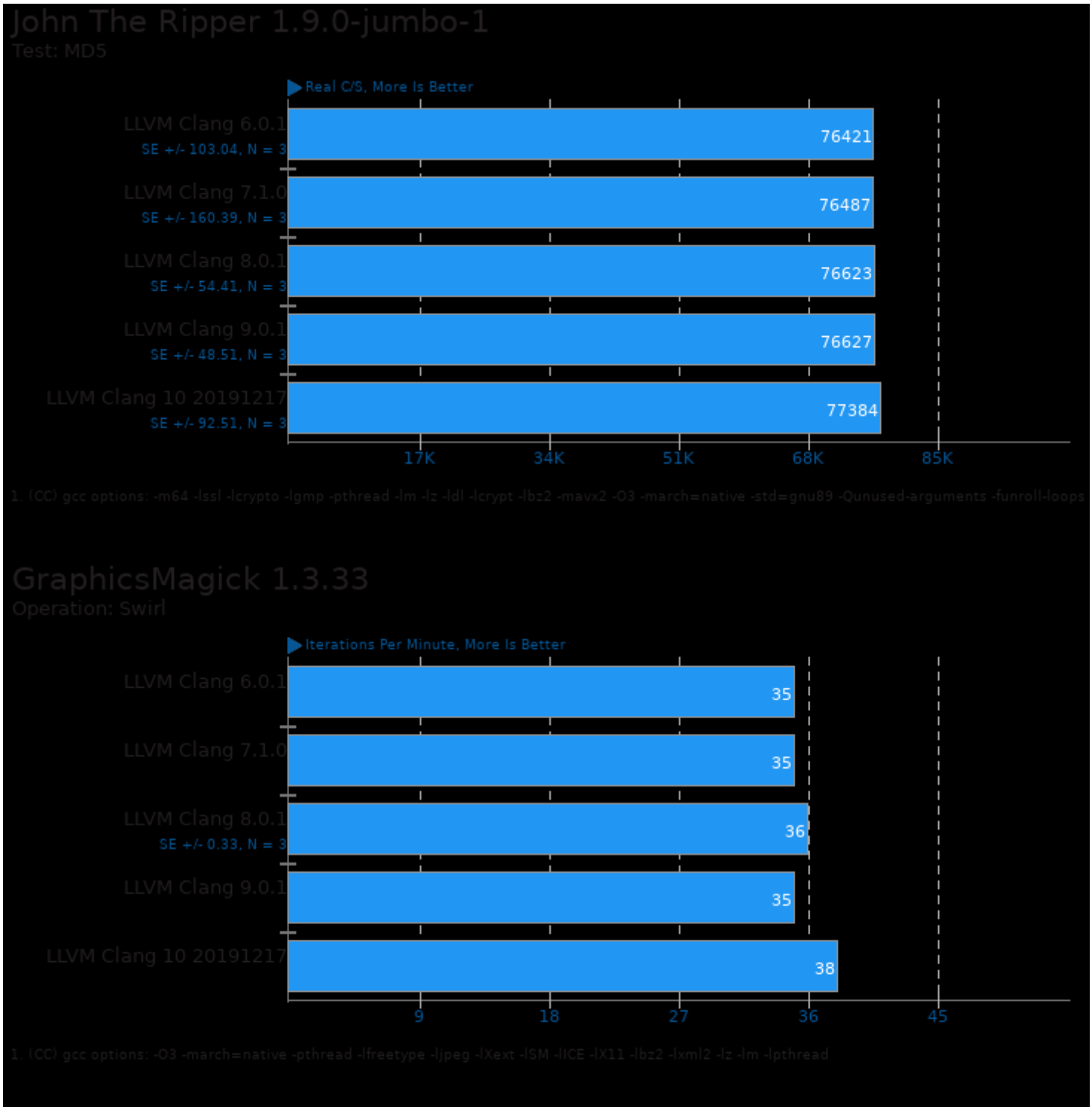

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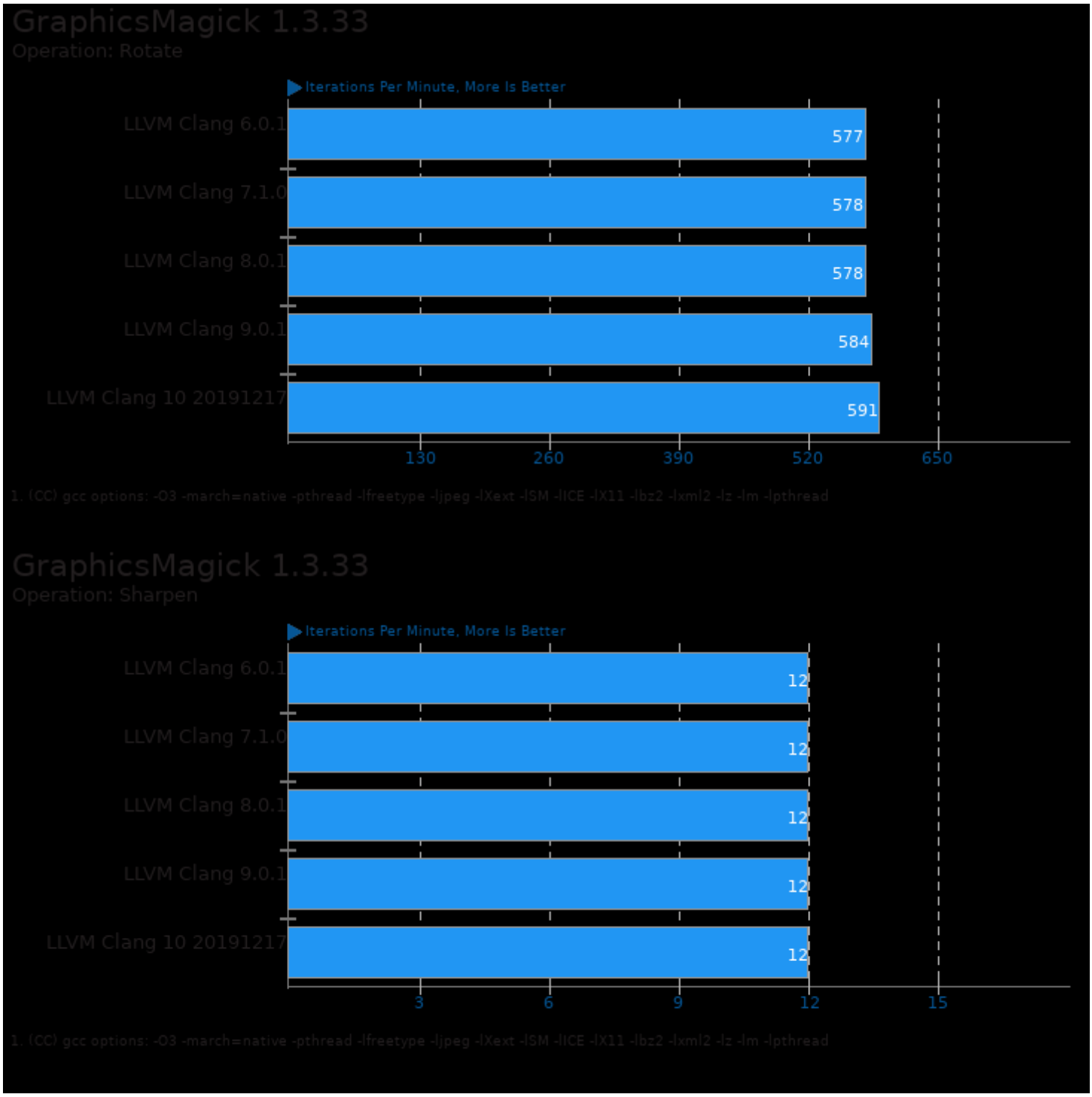

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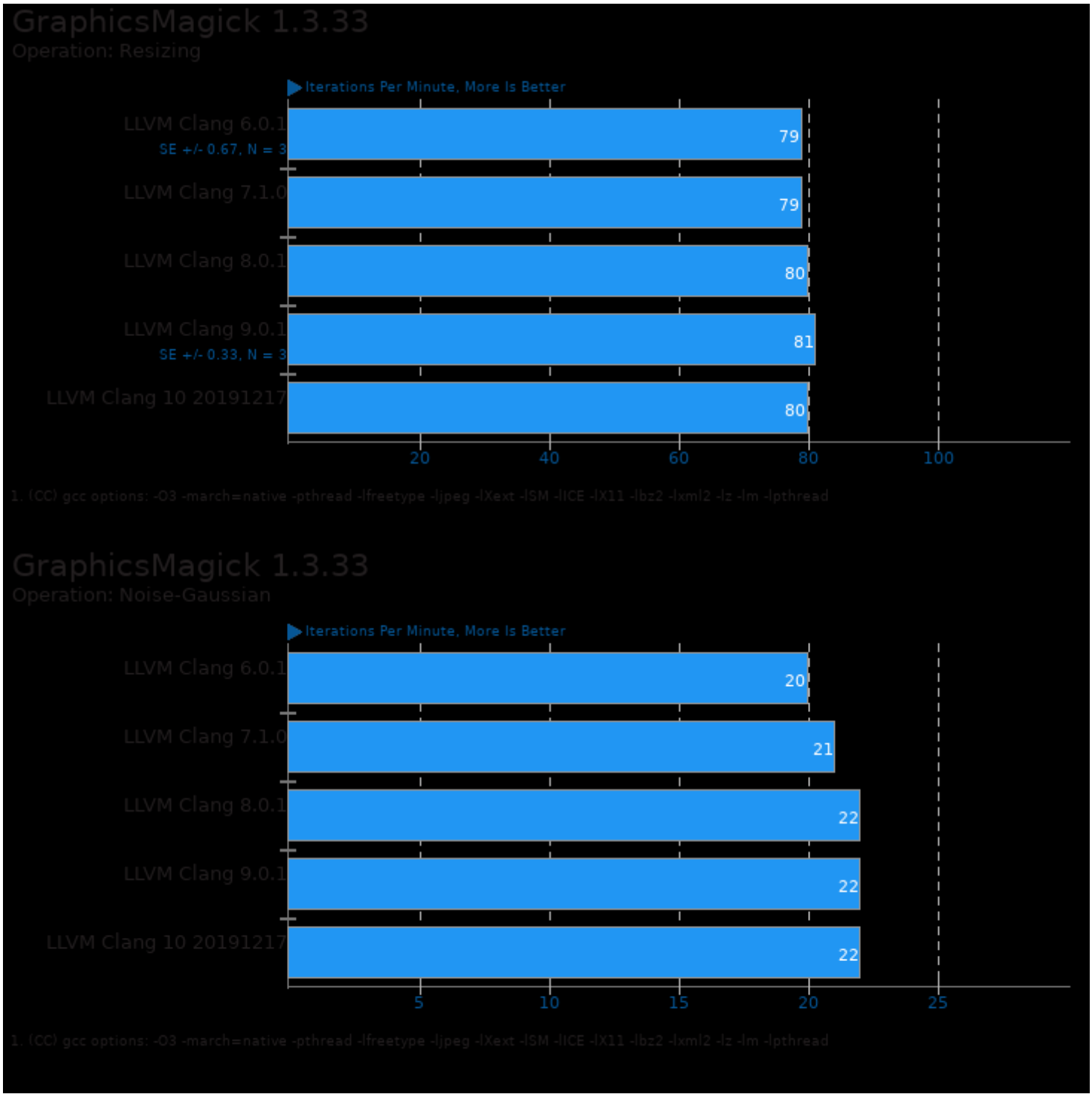

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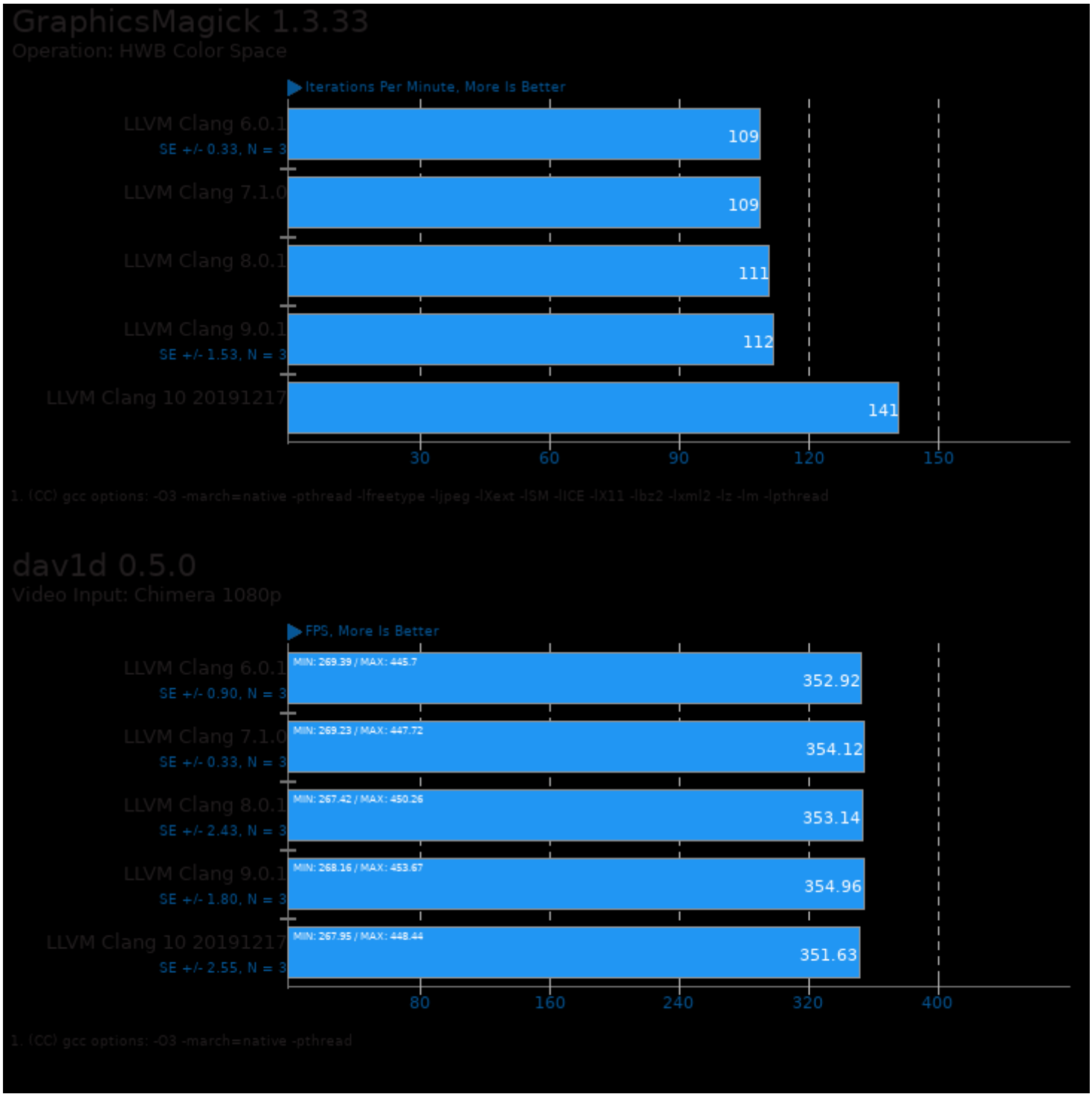

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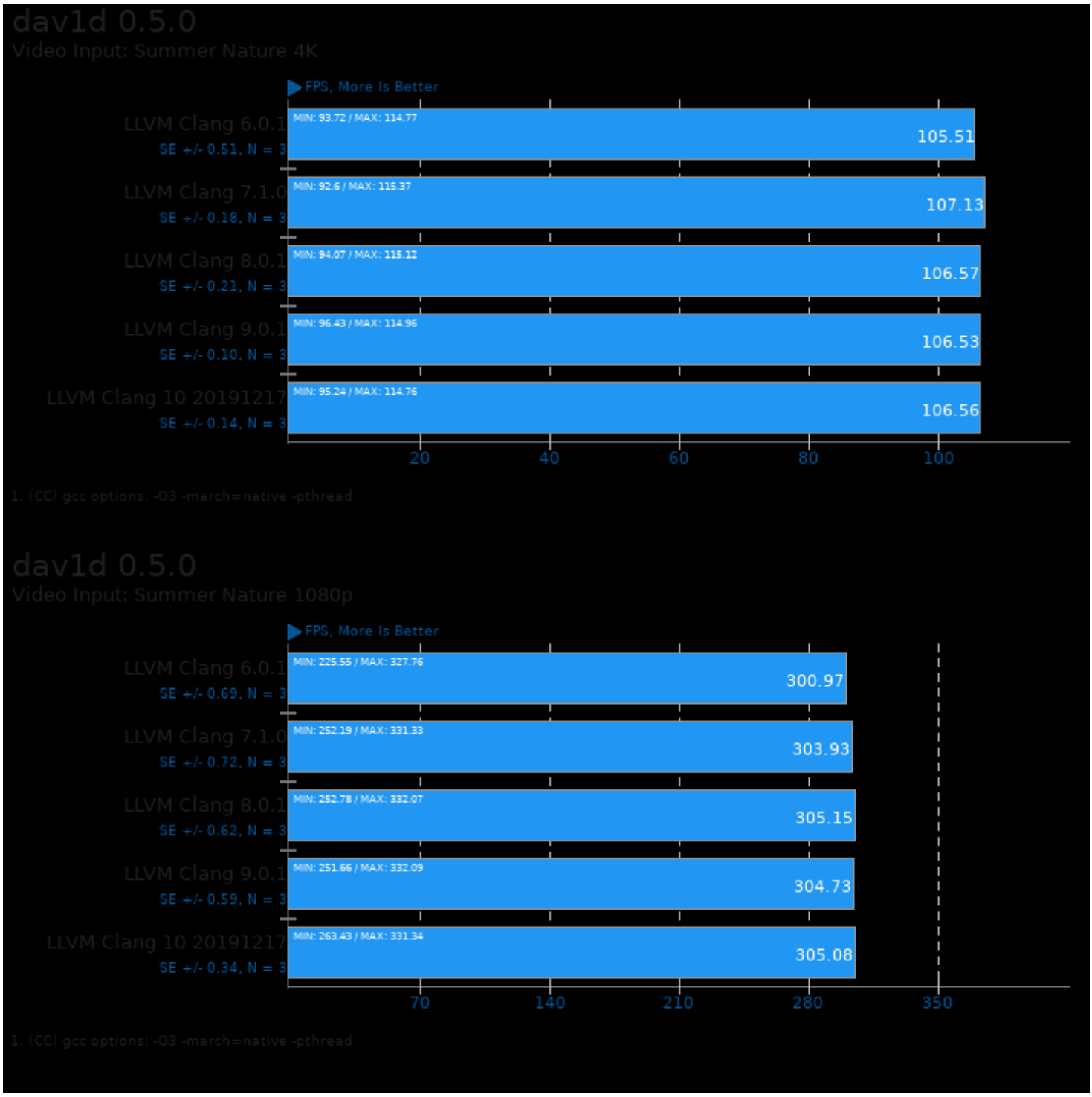

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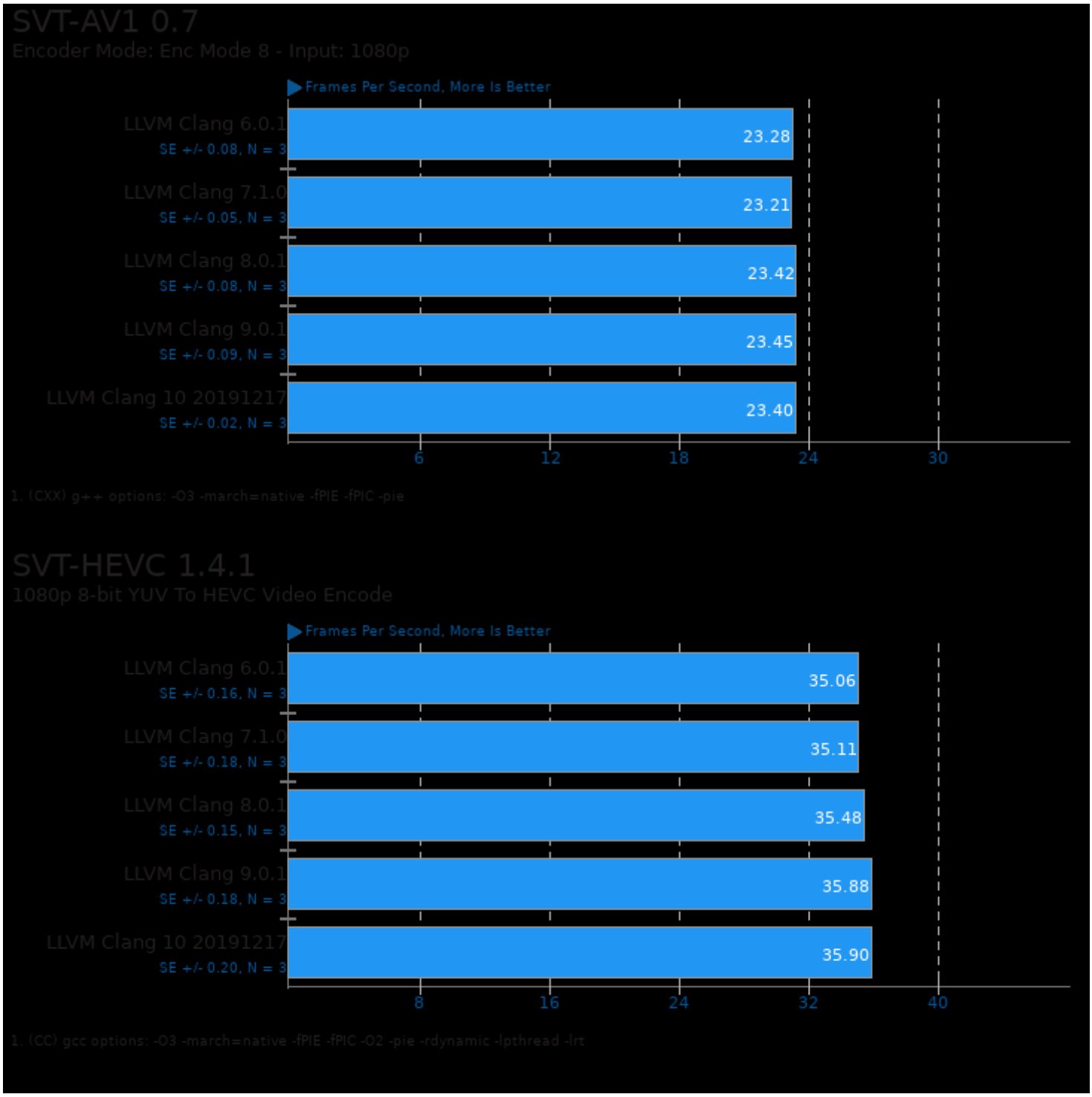

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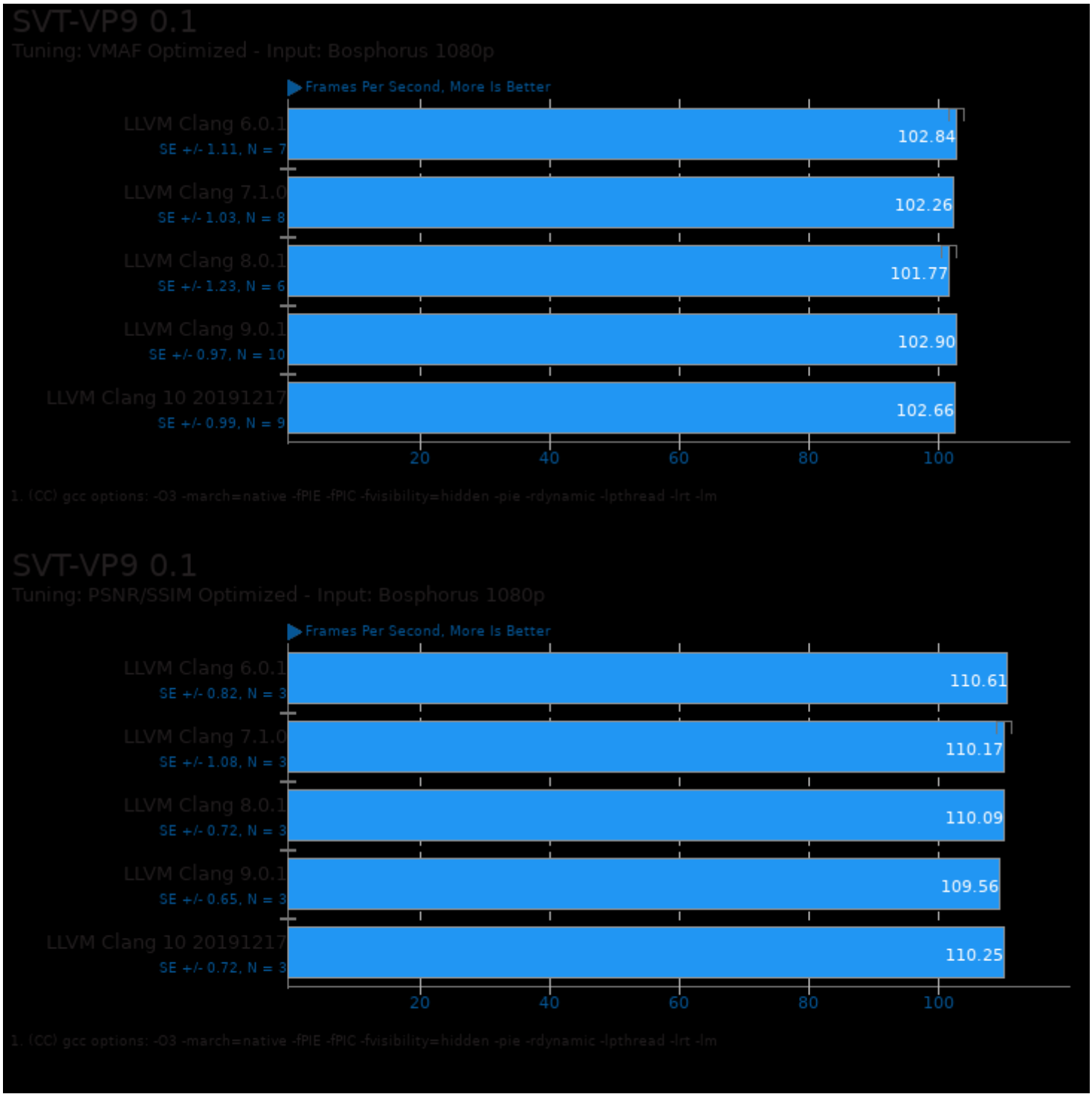

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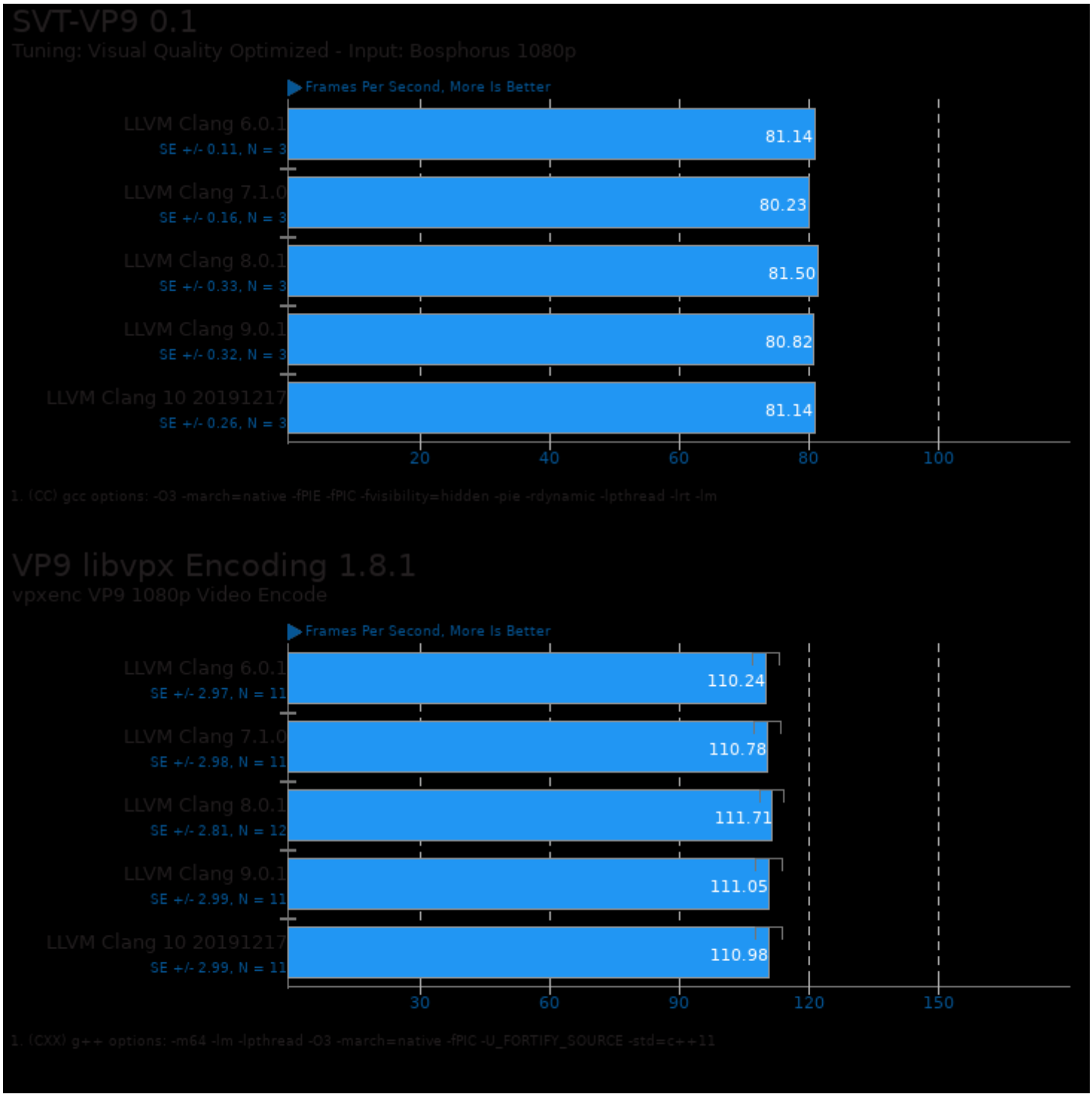

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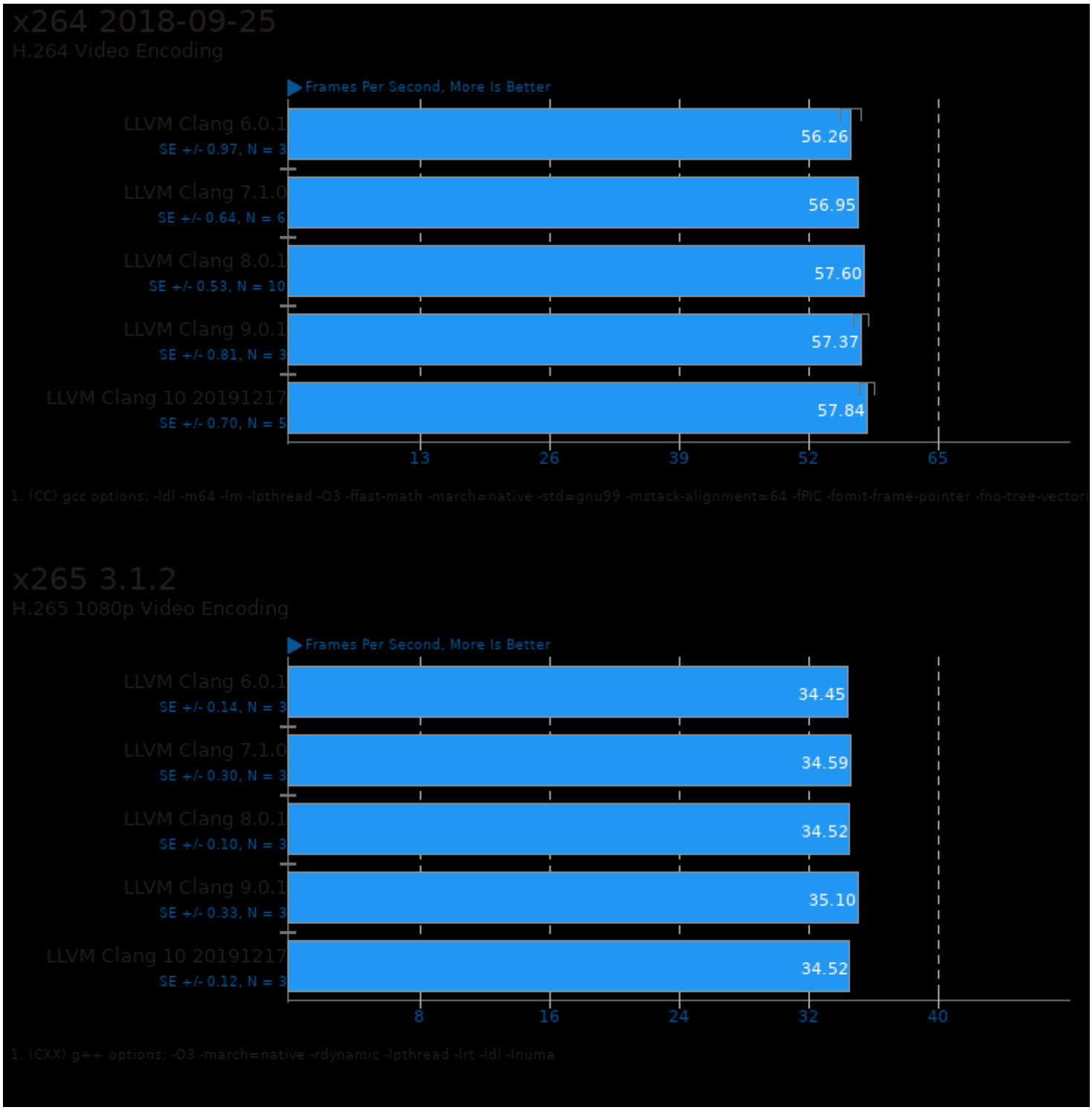

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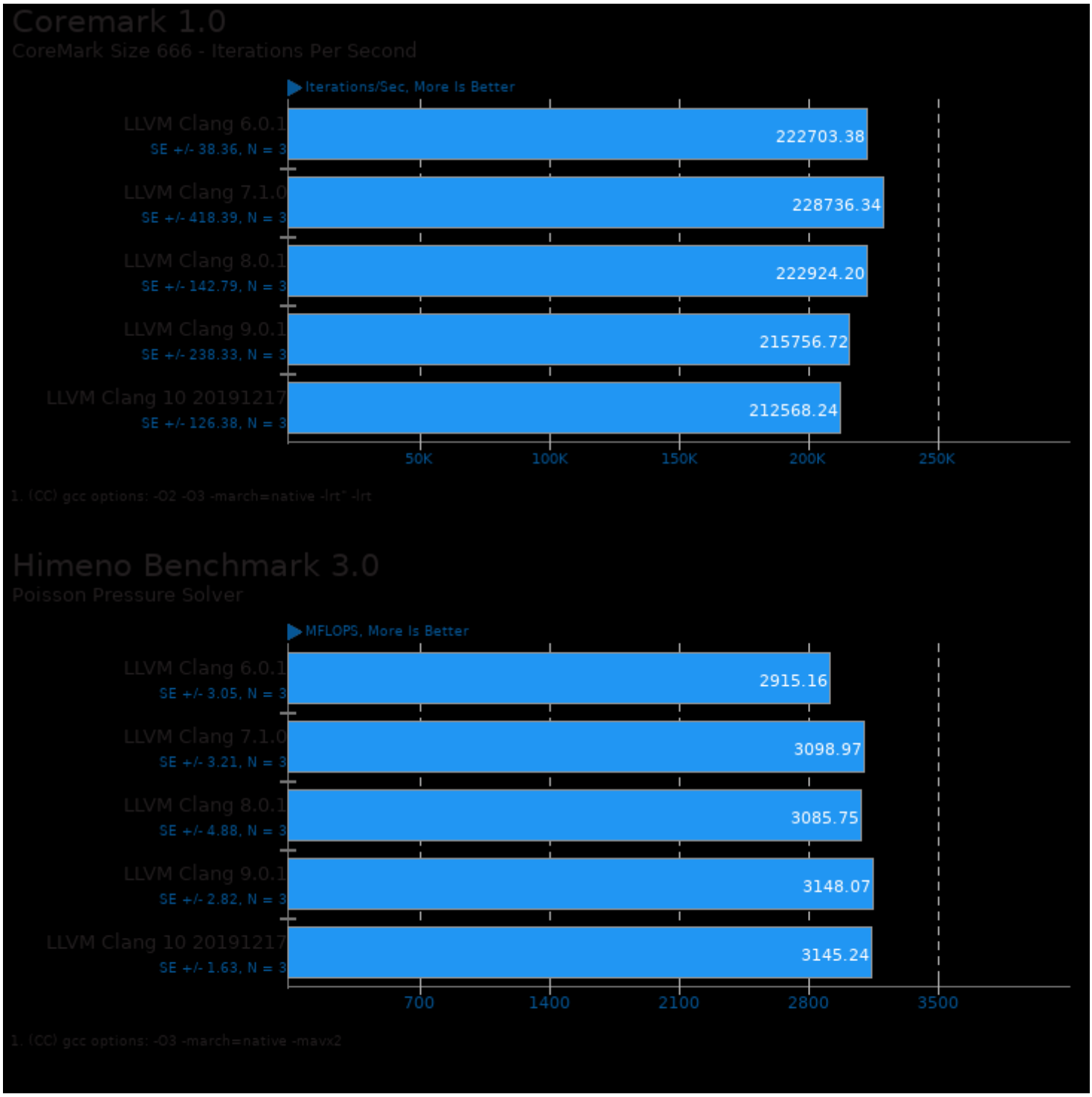

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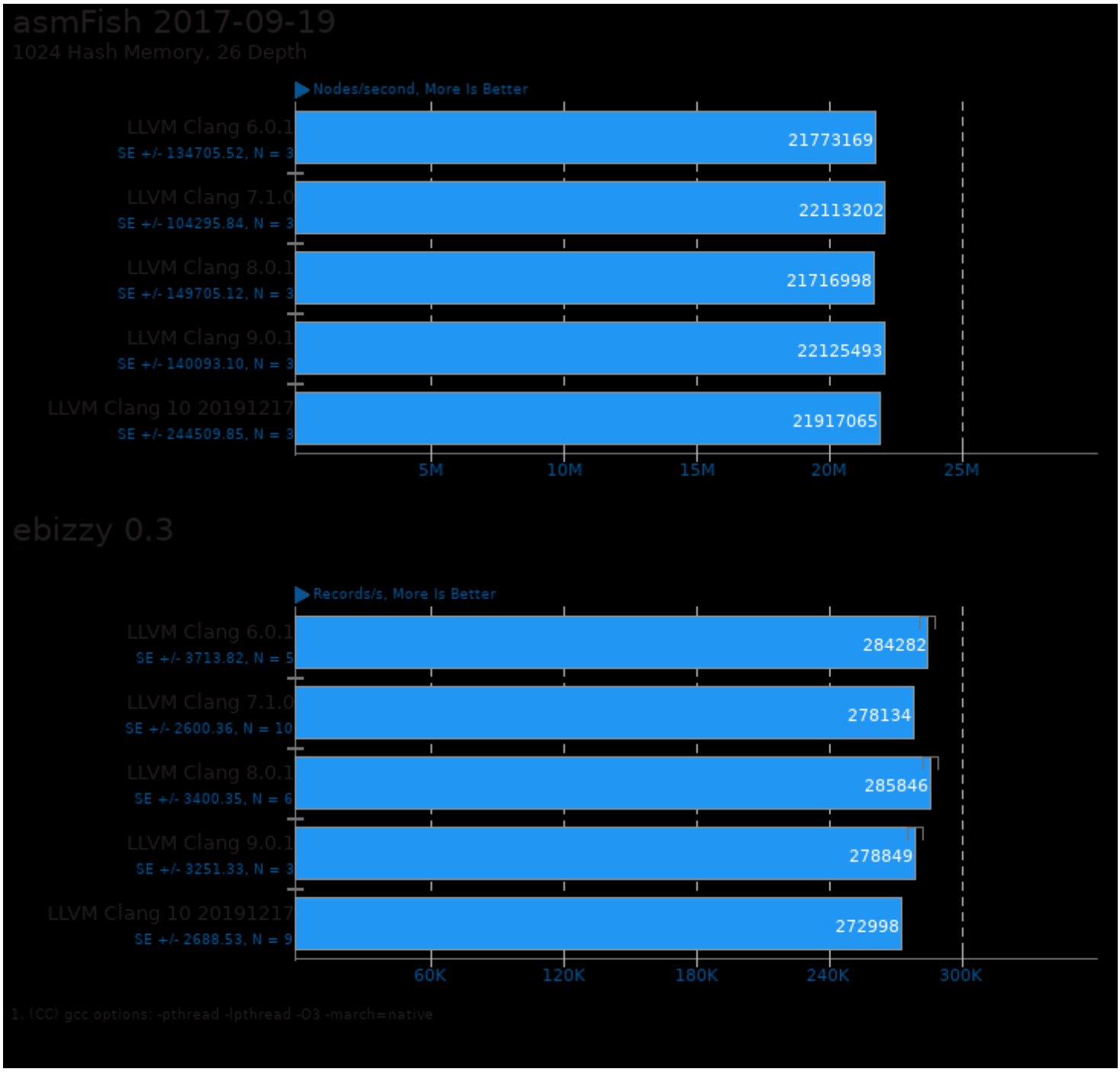

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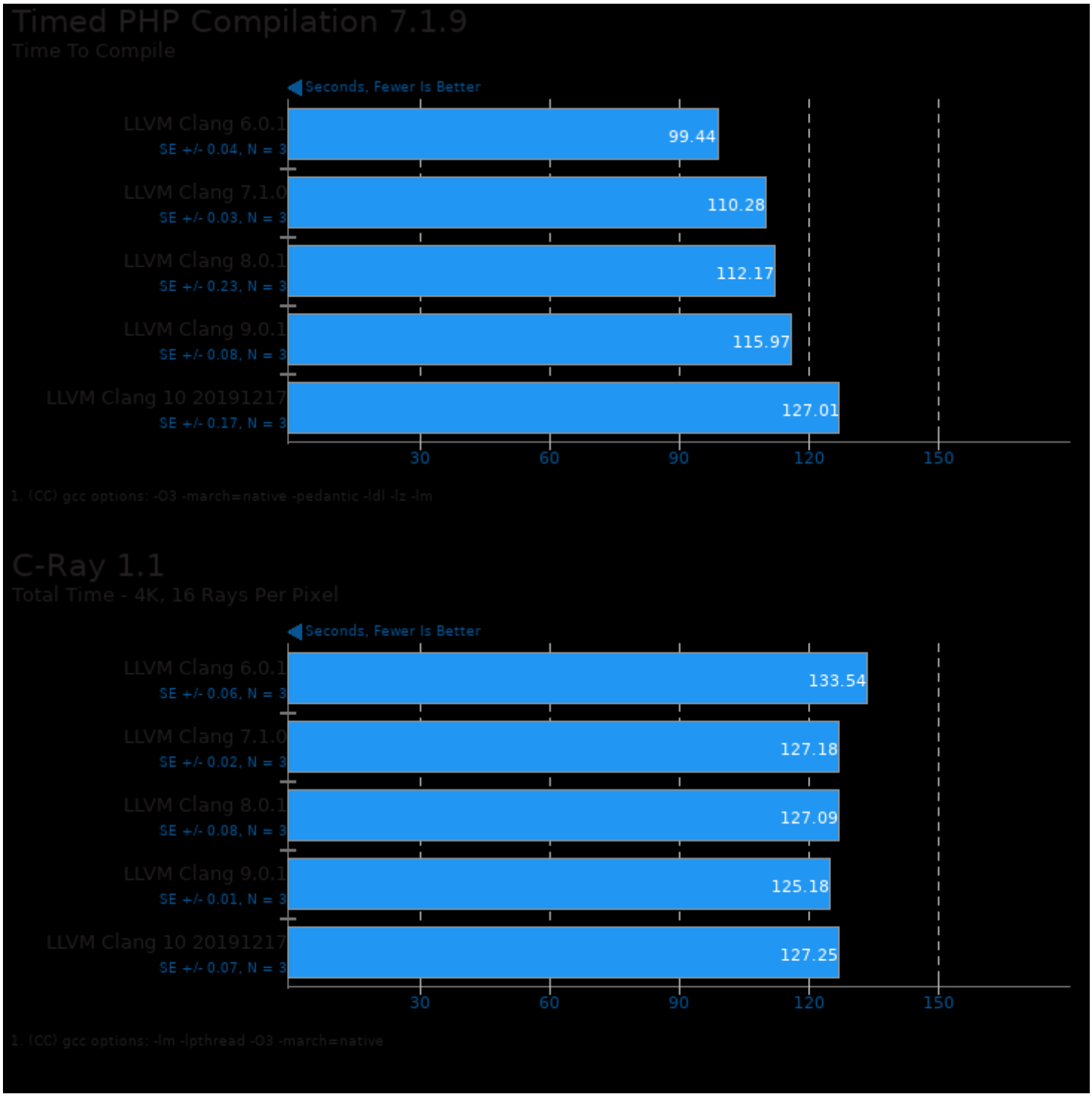

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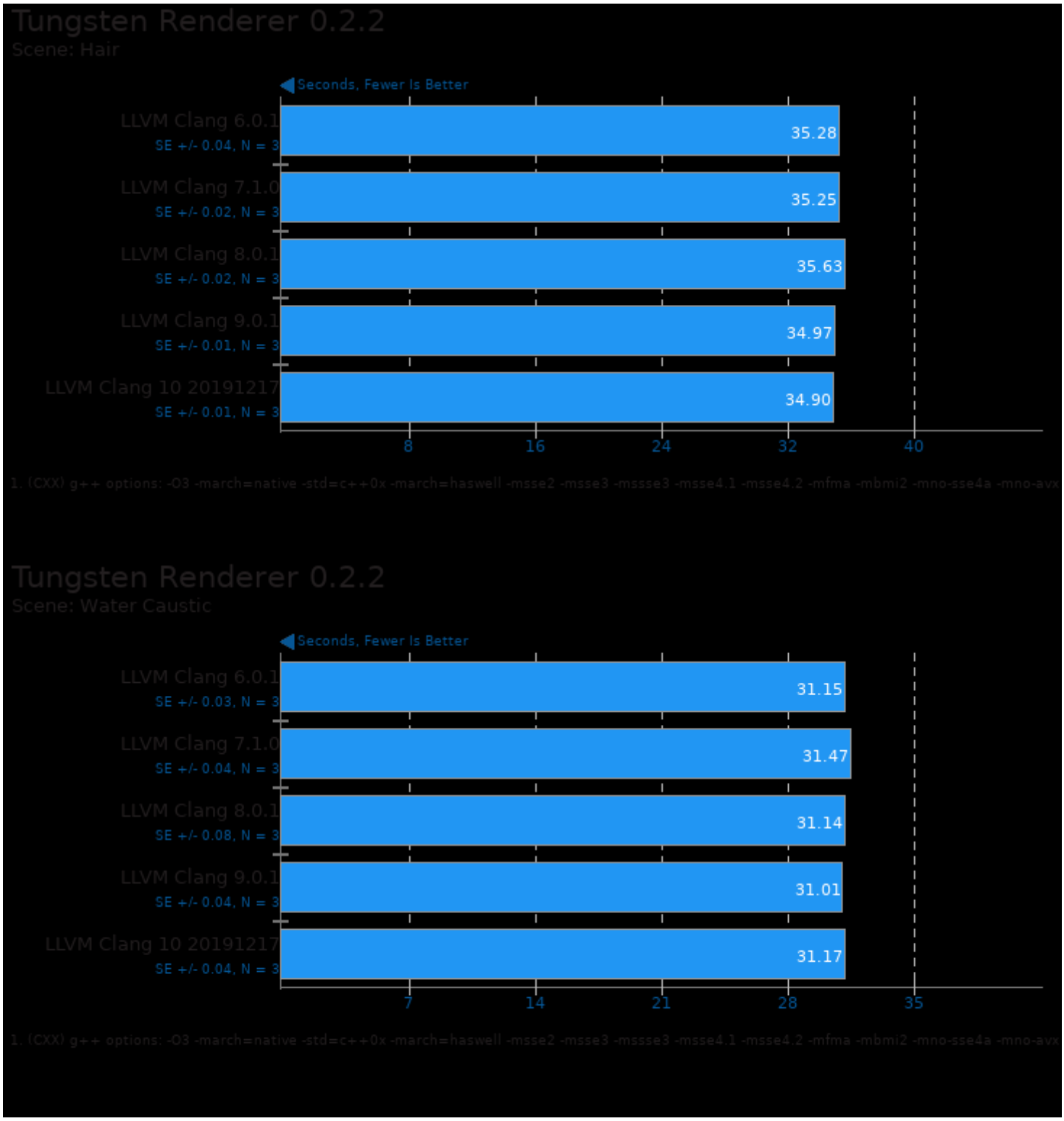

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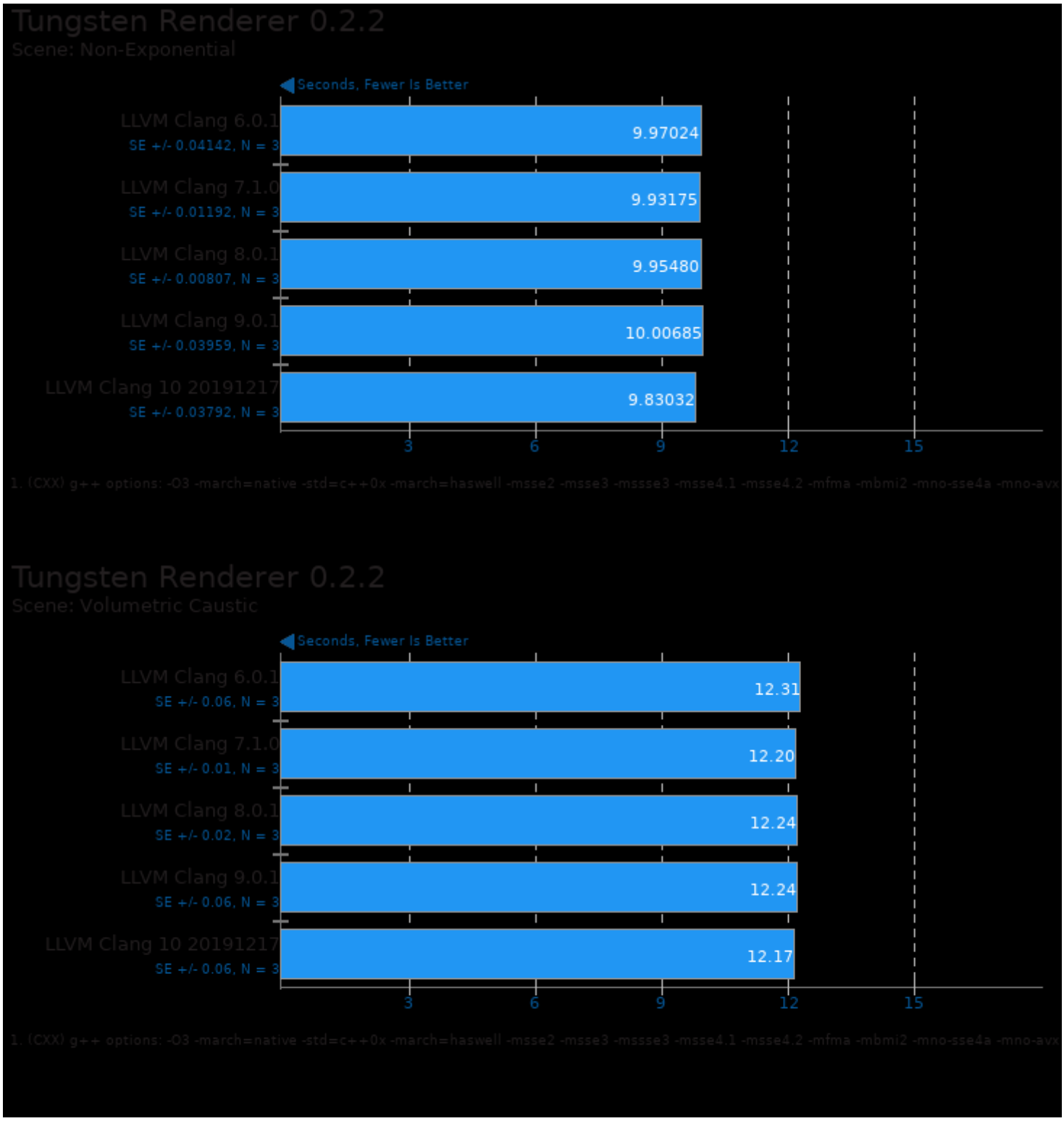

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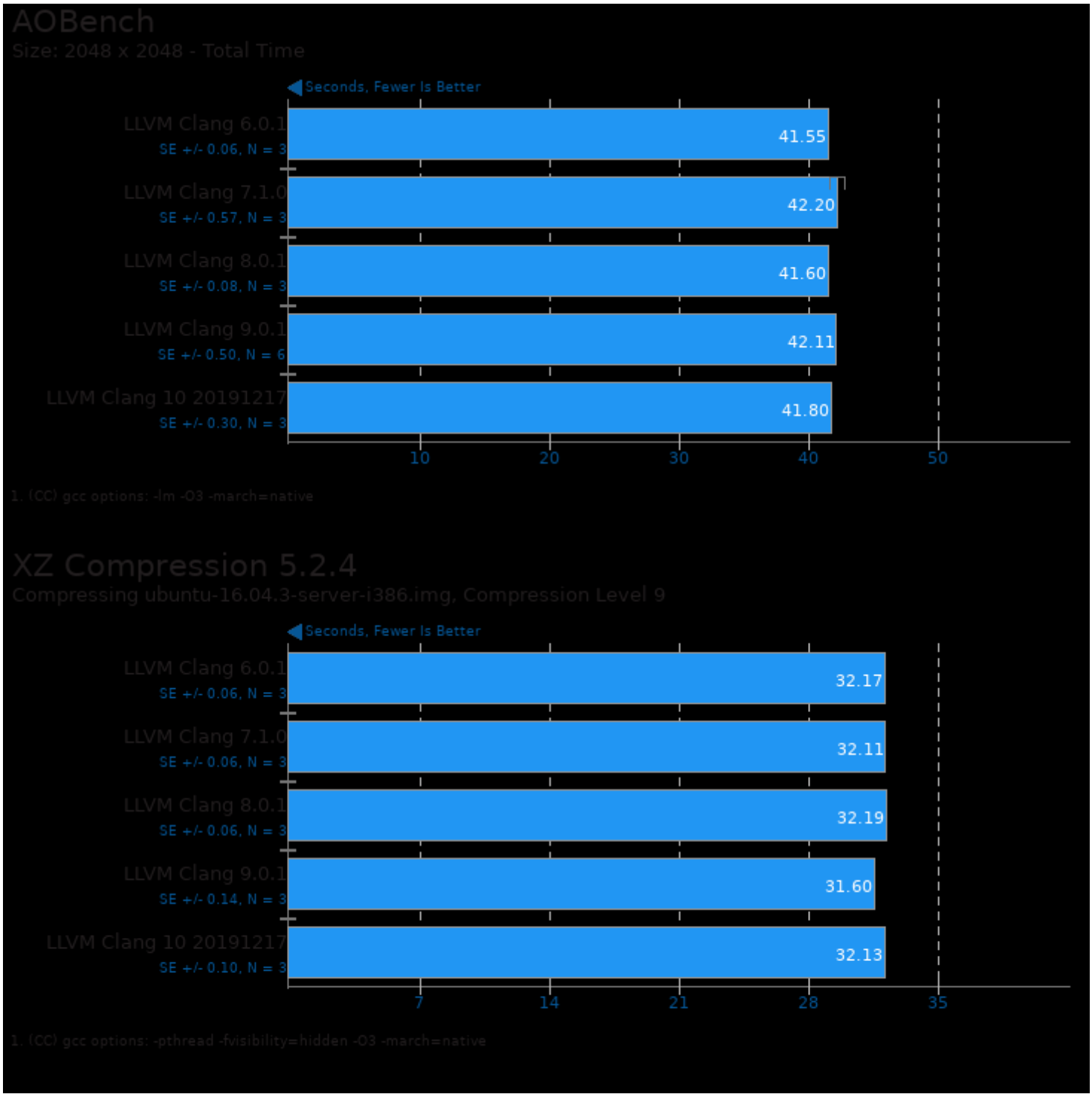

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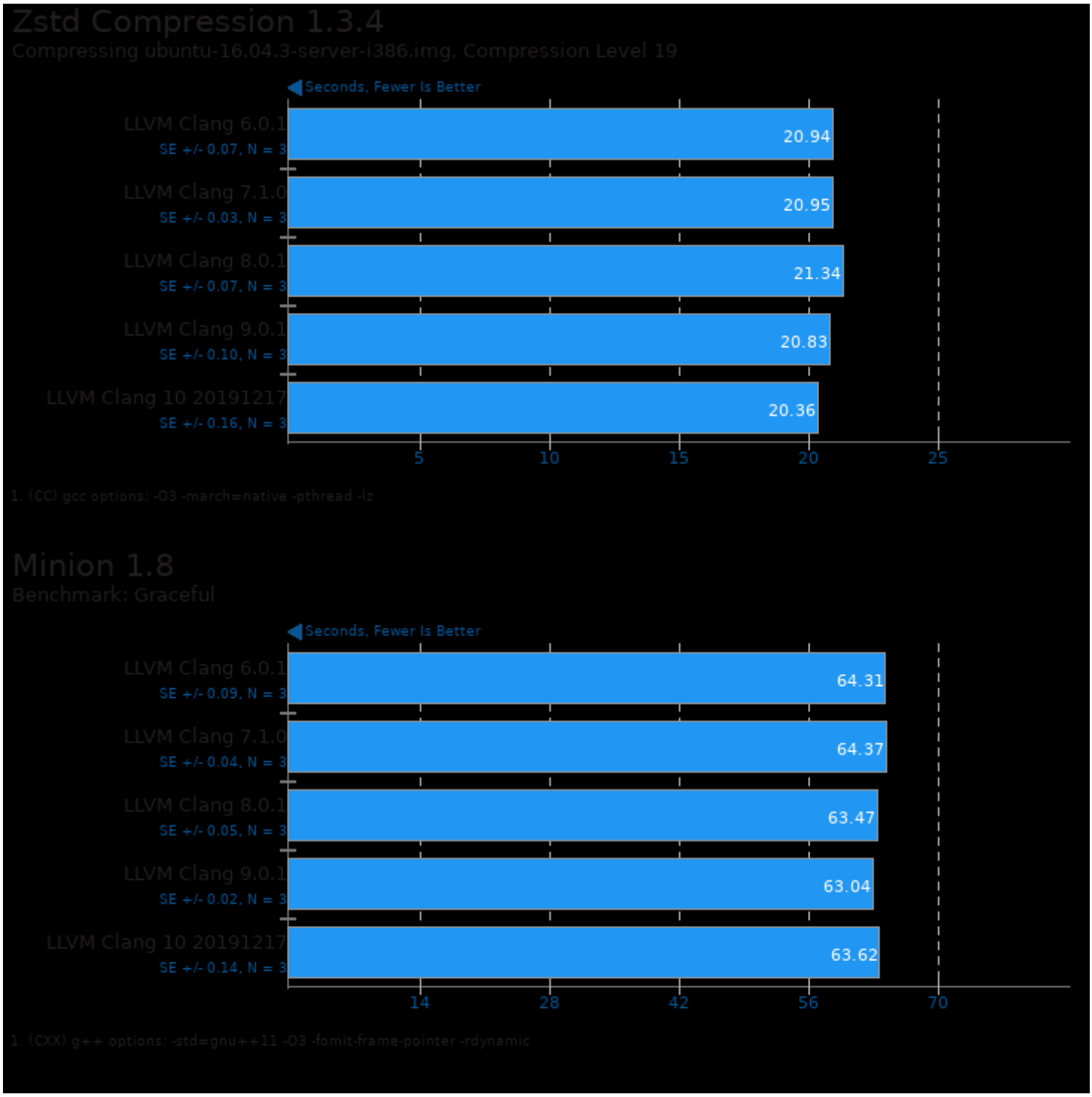

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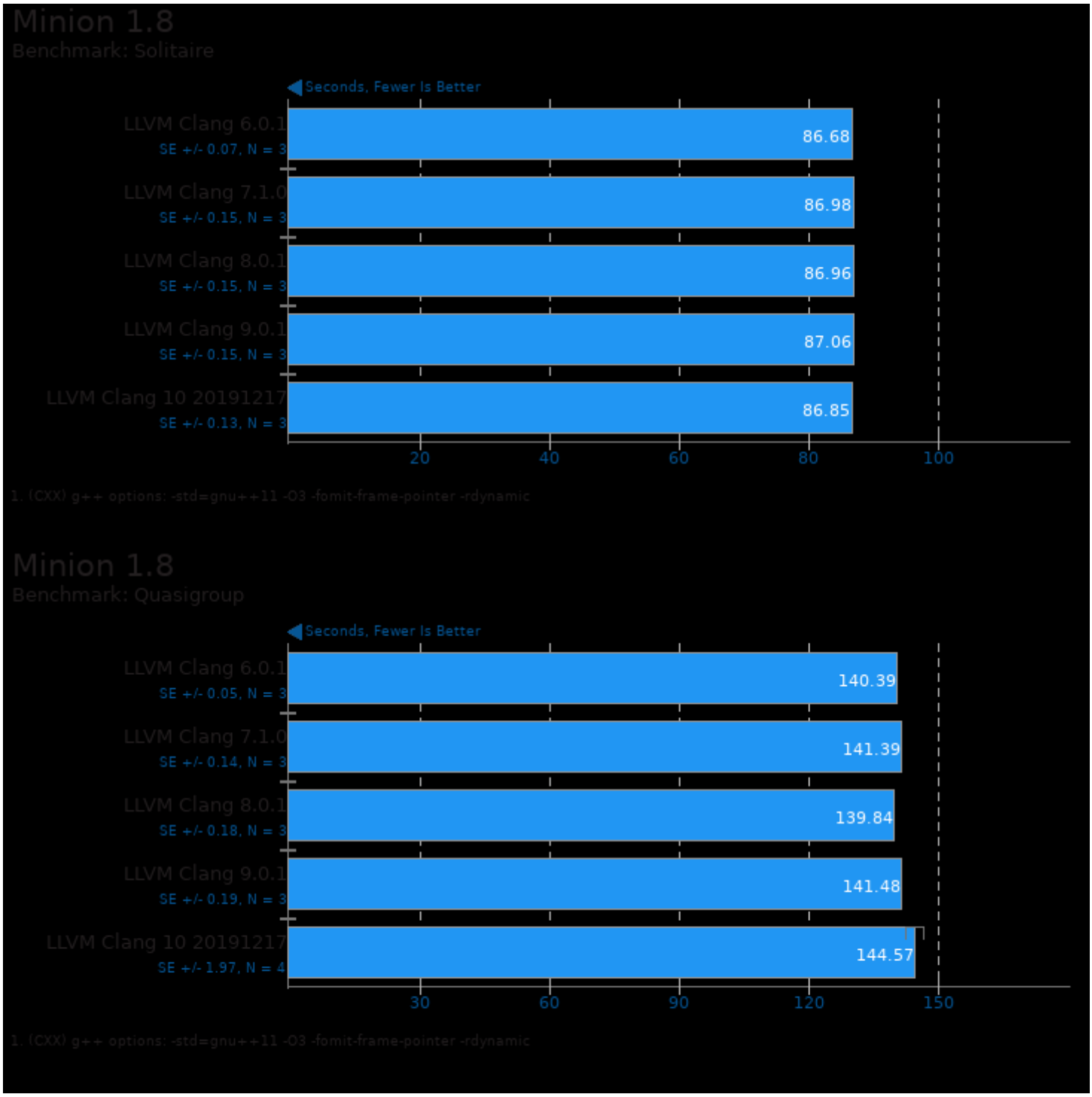

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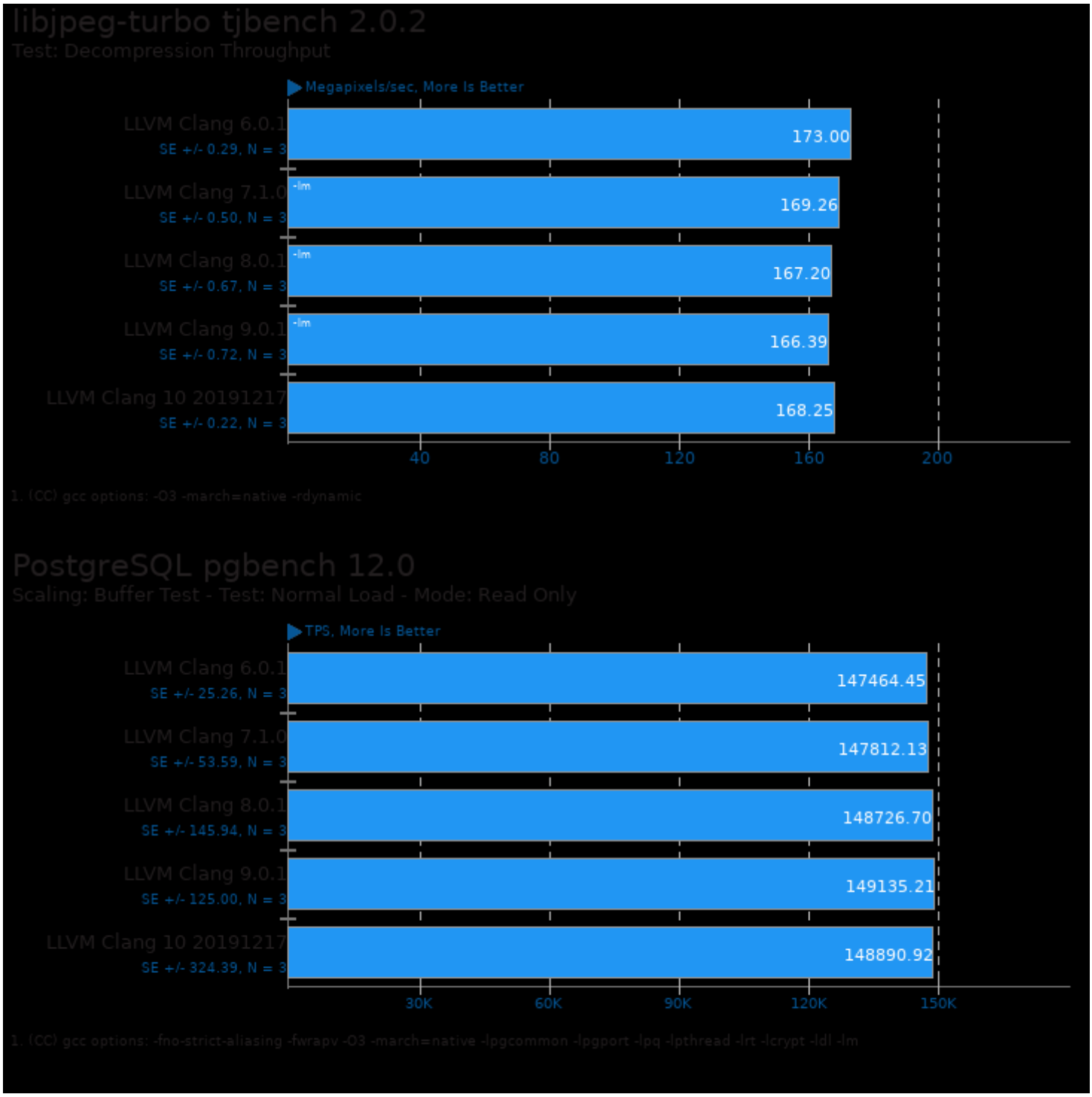

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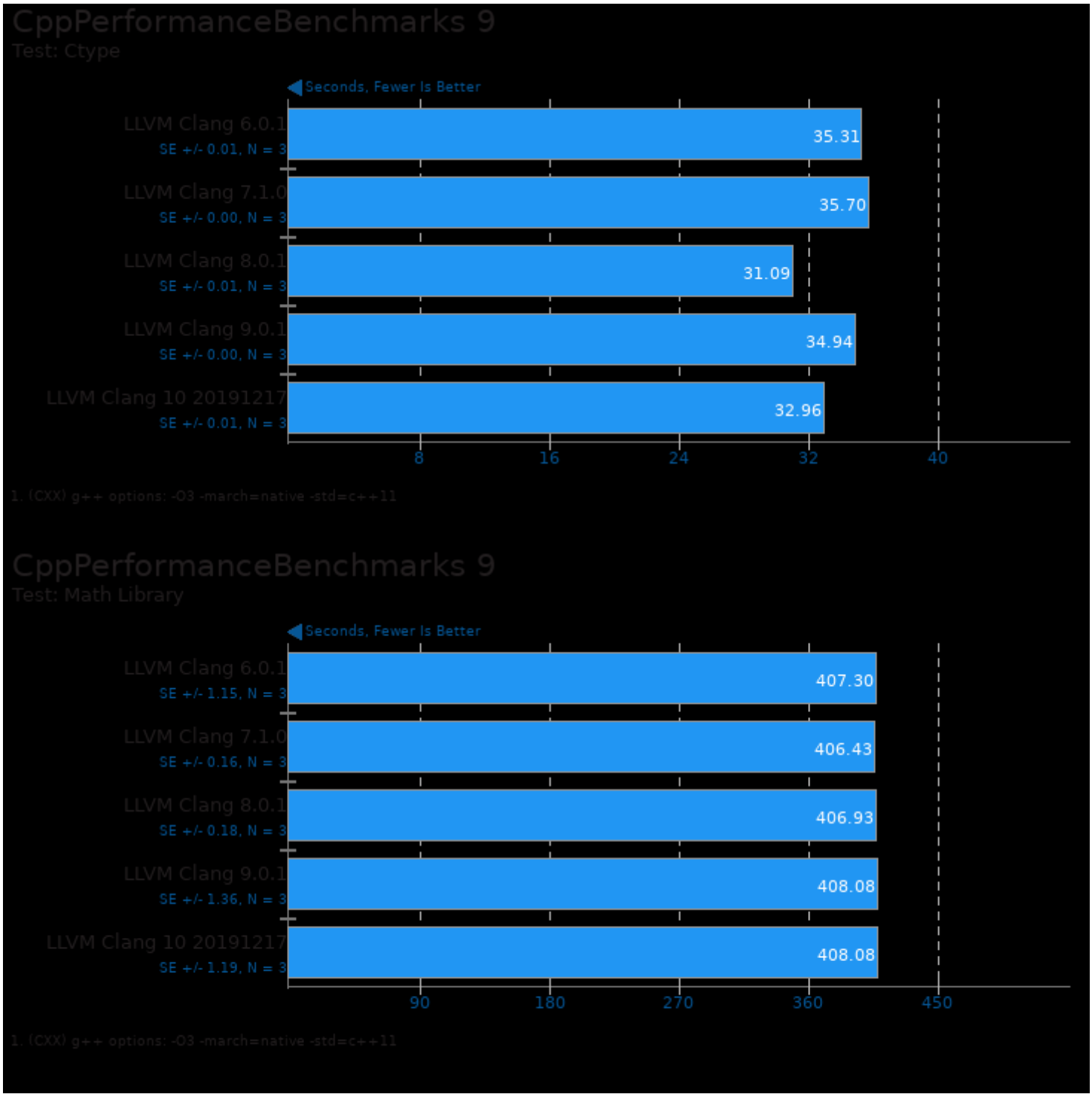

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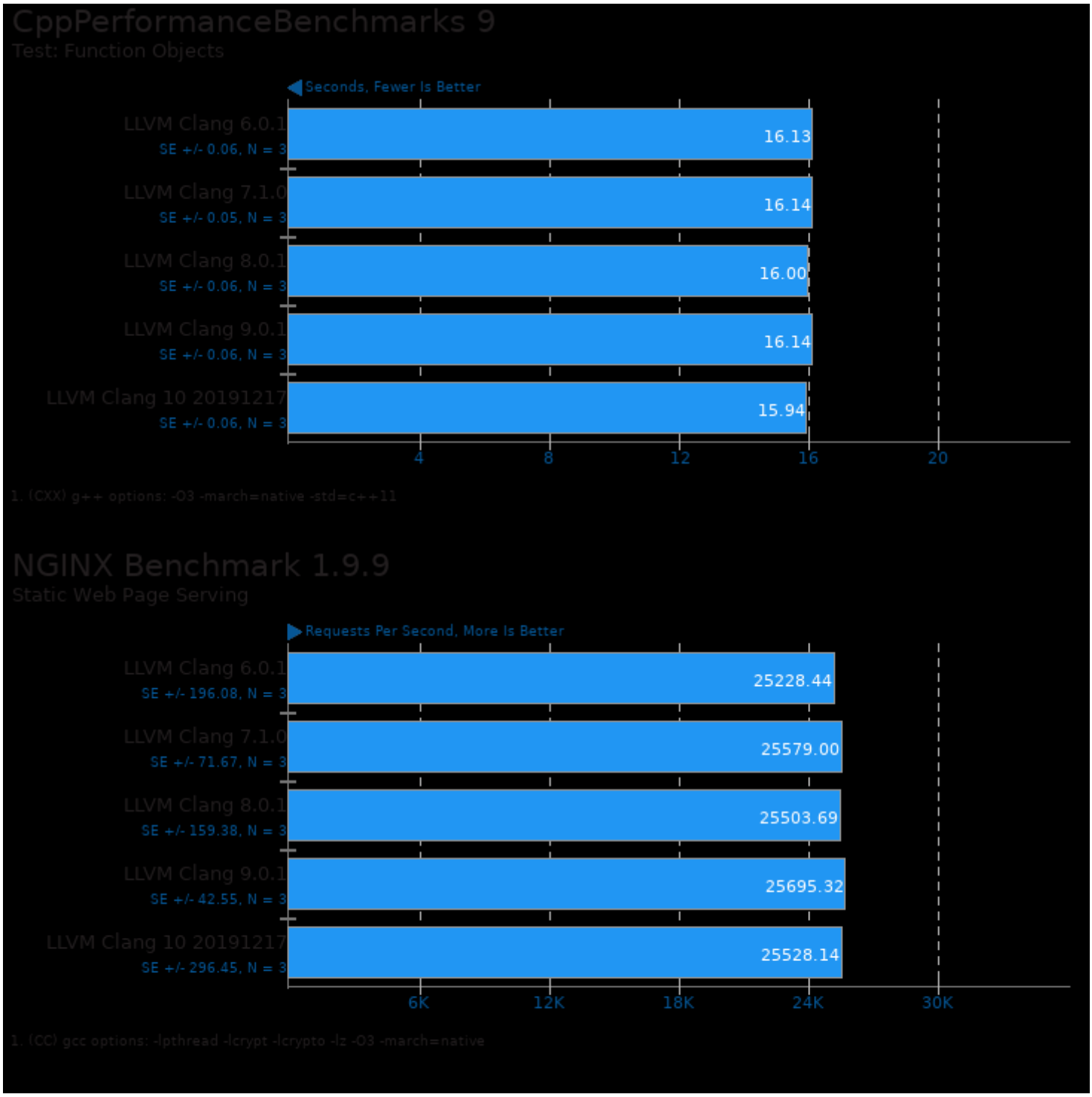

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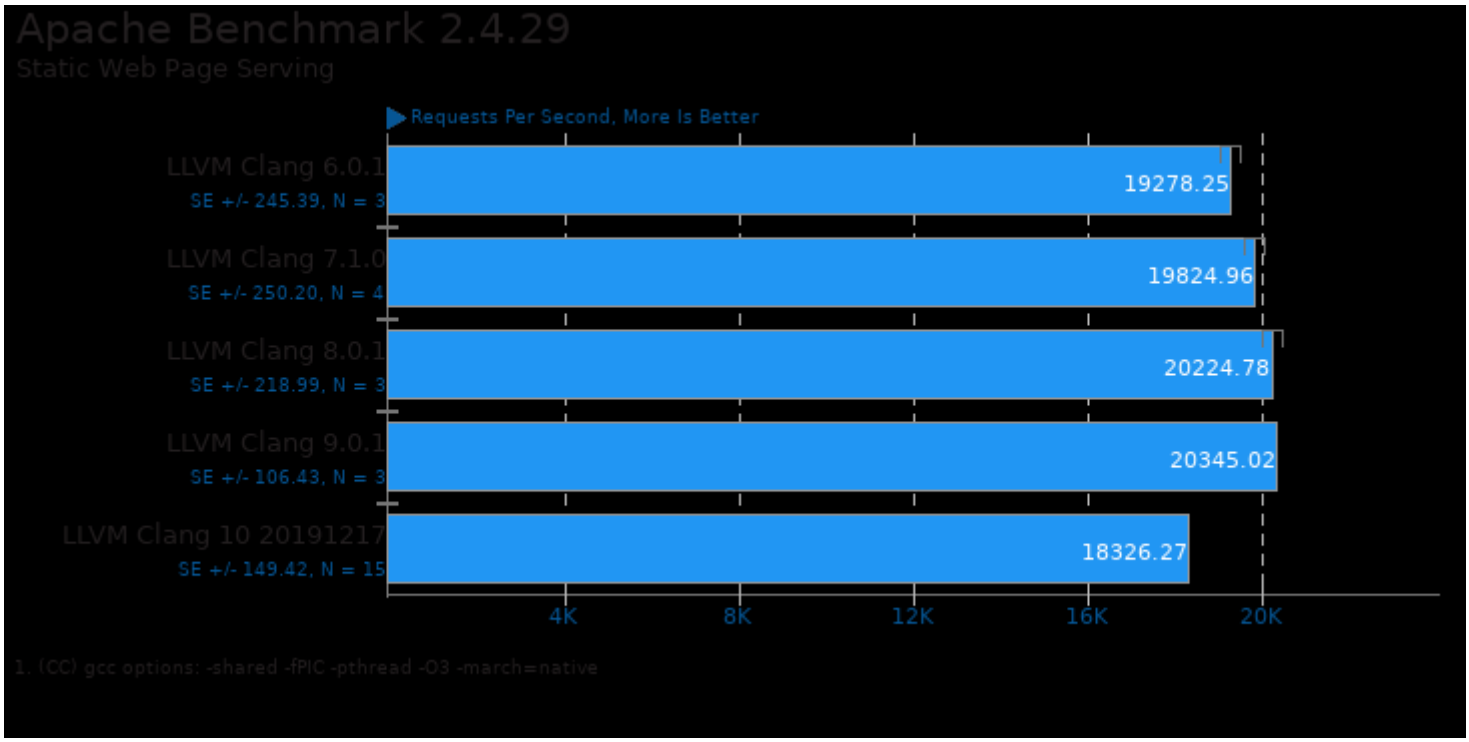
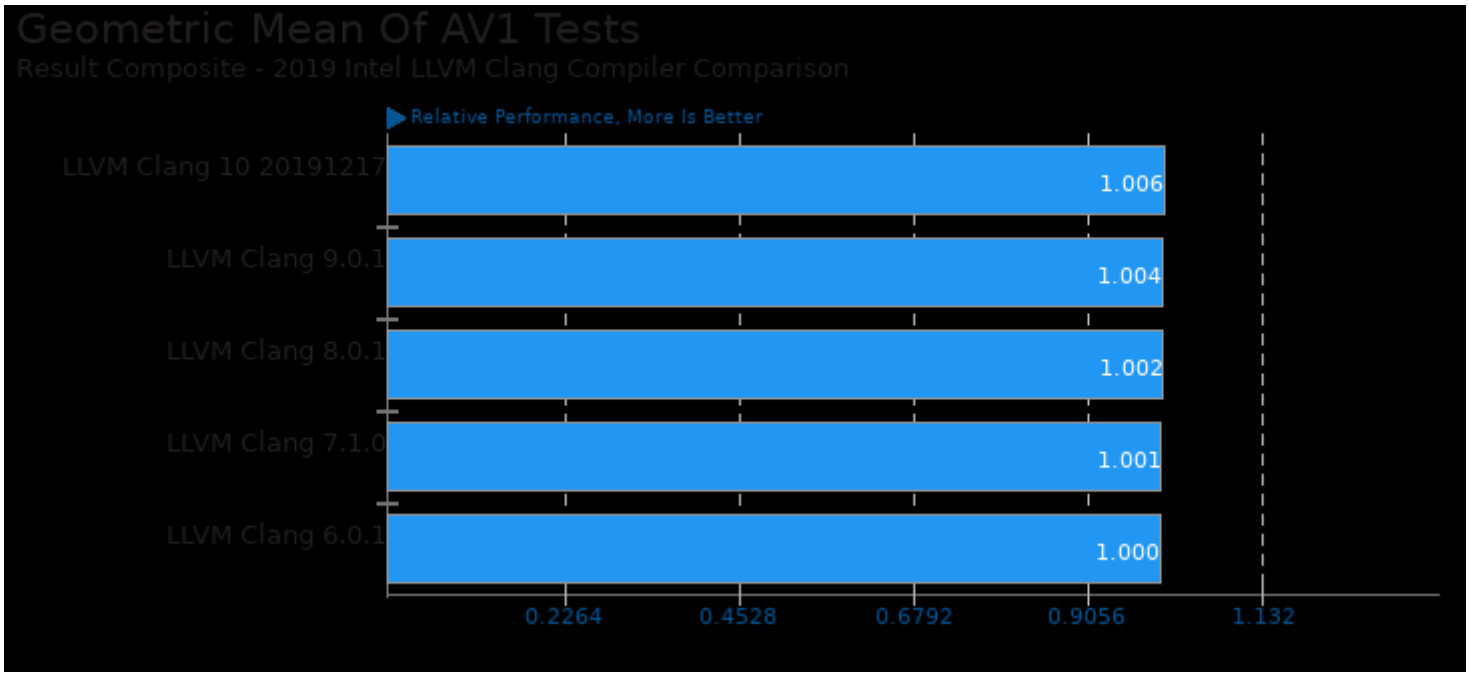
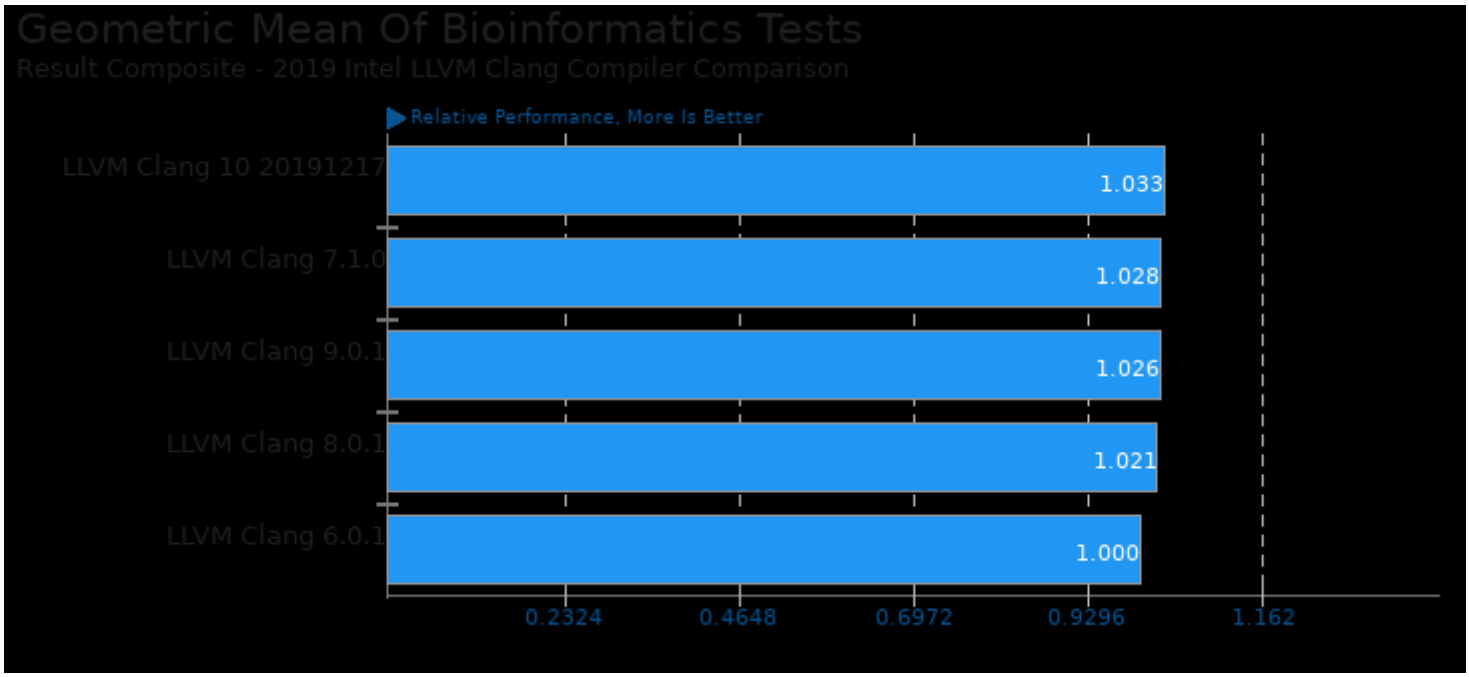


# 2019 Intel LLVM Clang Compiler Comparison

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

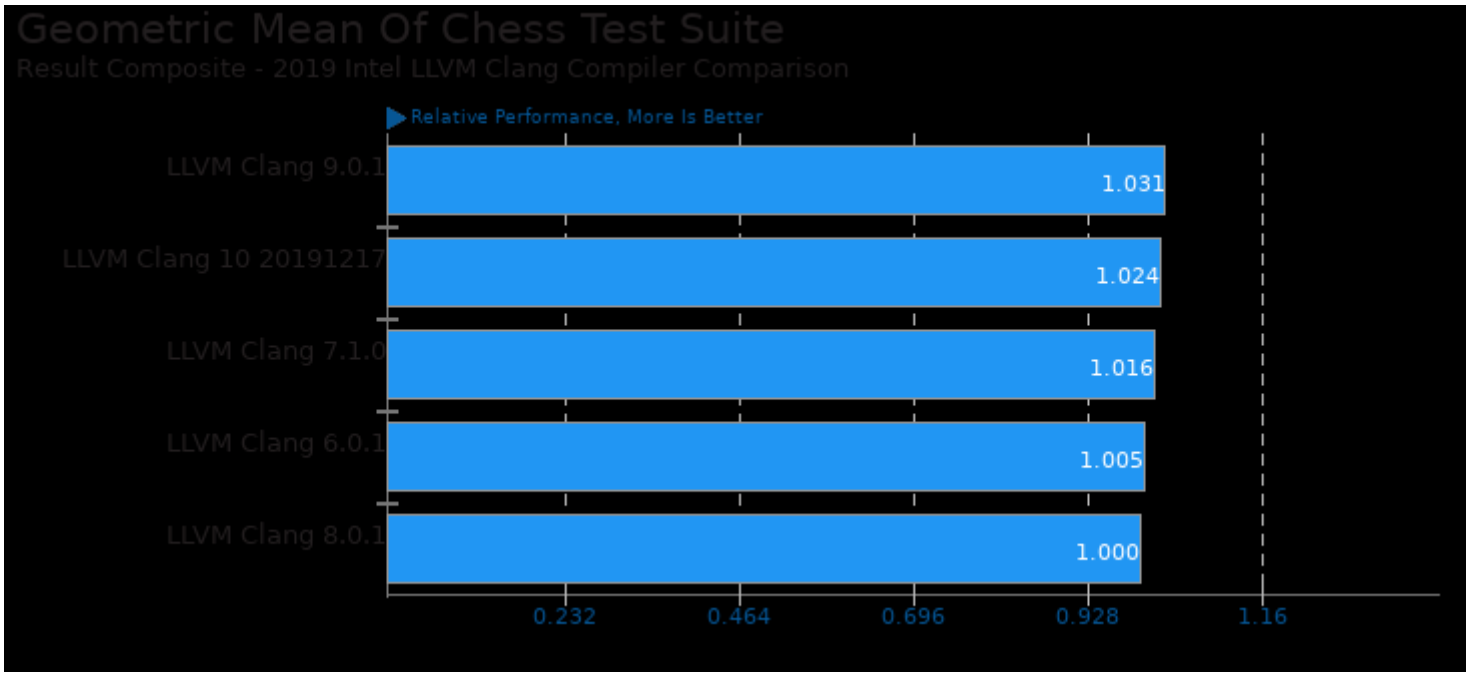



Geometric mean based upon tests: pts/dav1d, pts/svt-av1 and pts/libgav1

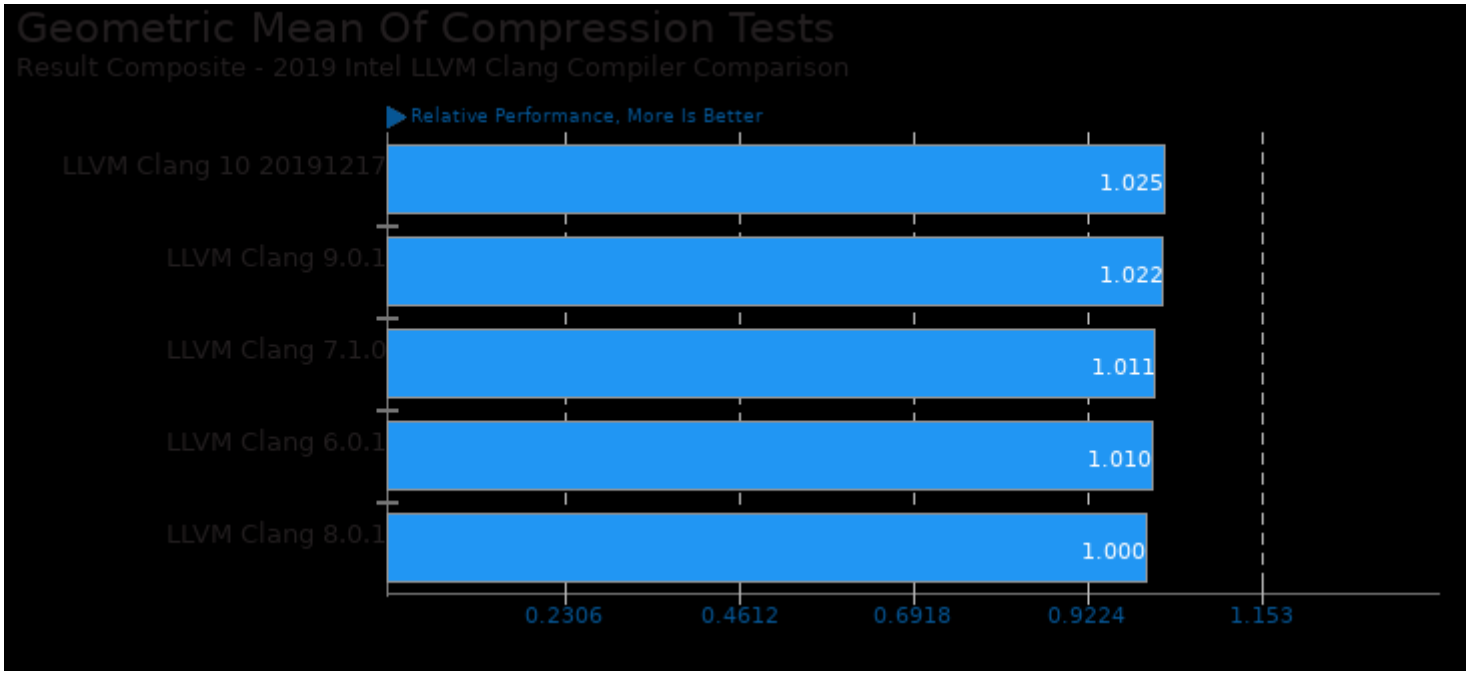



Geometric mean based upon tests: pts/himeno, pts/mrbayes and pts/hmmer

# 2019 Intel LLVM Clang Compiler Comparison

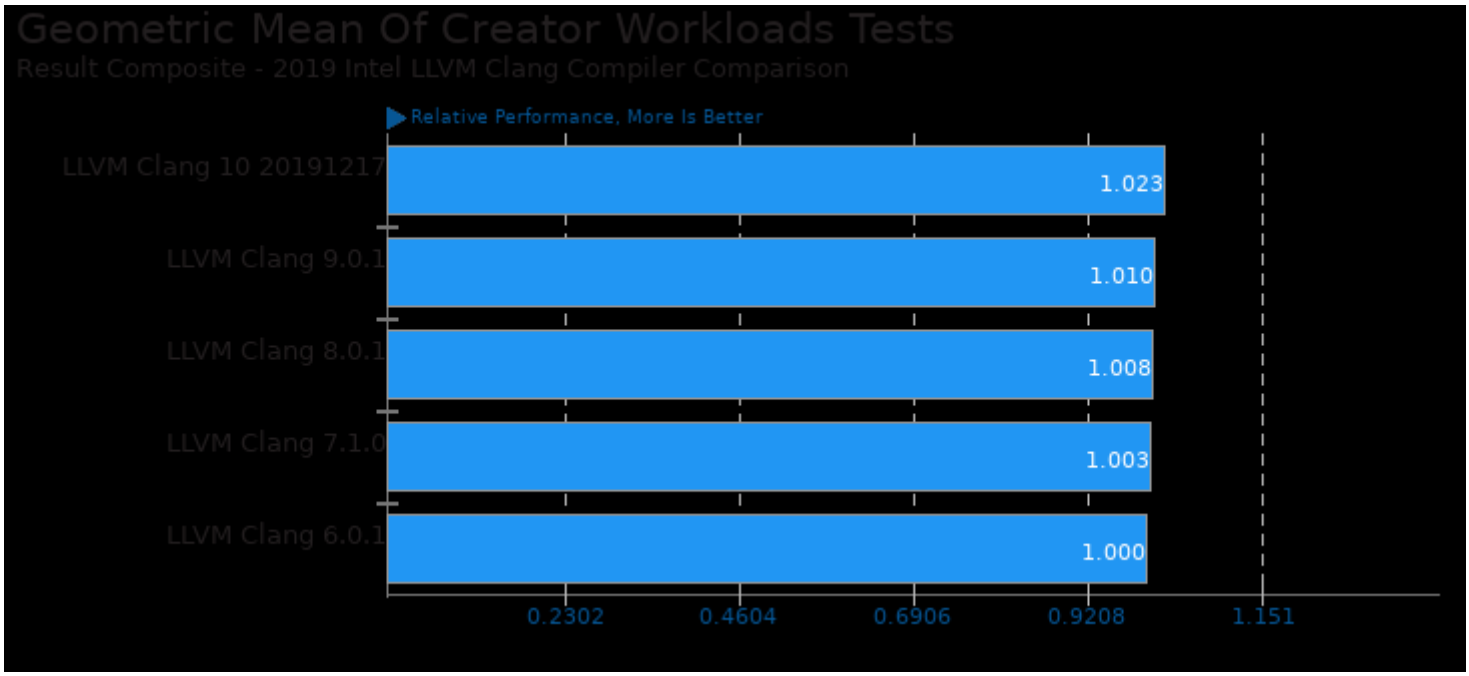



Geometric mean based upon tests: pts/tscp and pts/asmfish

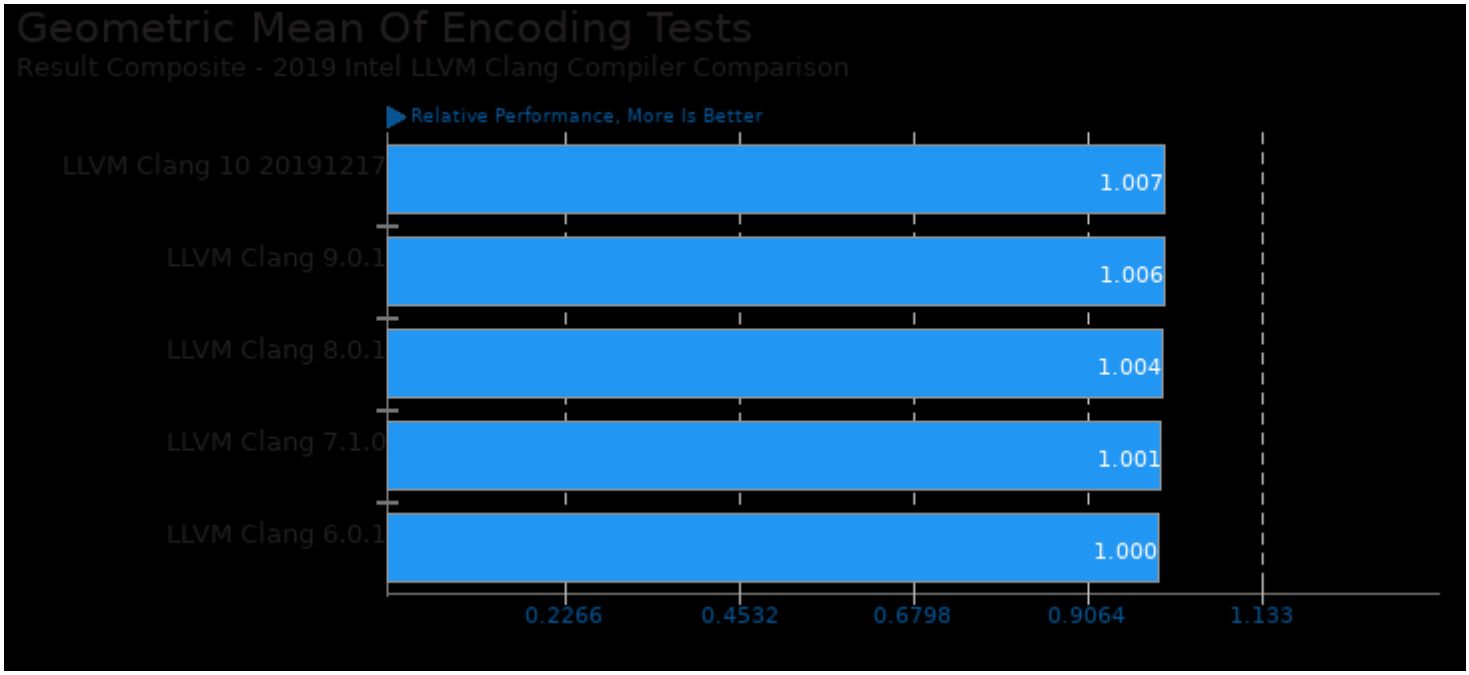



Geometric mean based upon tests: pts/compress-zstd and pts/compress-xz

# 2019 Intel LLVM Clang Compiler Comparison

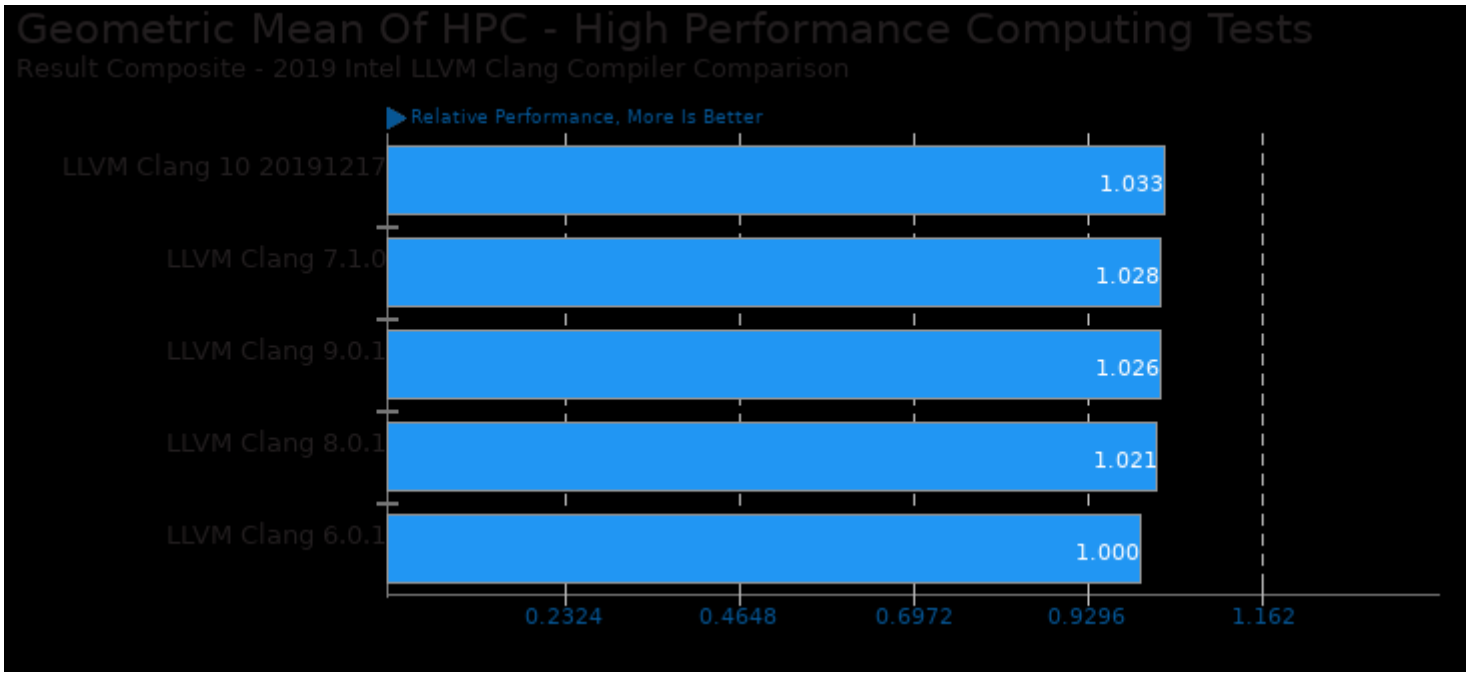



Geometric mean based upon tests: pts/c-ray, pts/tungsten, pts/aobench, pts/svt-vp9, pts/svt-hevc, pts/x264, pts/x265, pts/vpxenc, pts/dav1d, pts/svt-av1, pts/libgav1, pts/graphics-magick and pts/tjbench

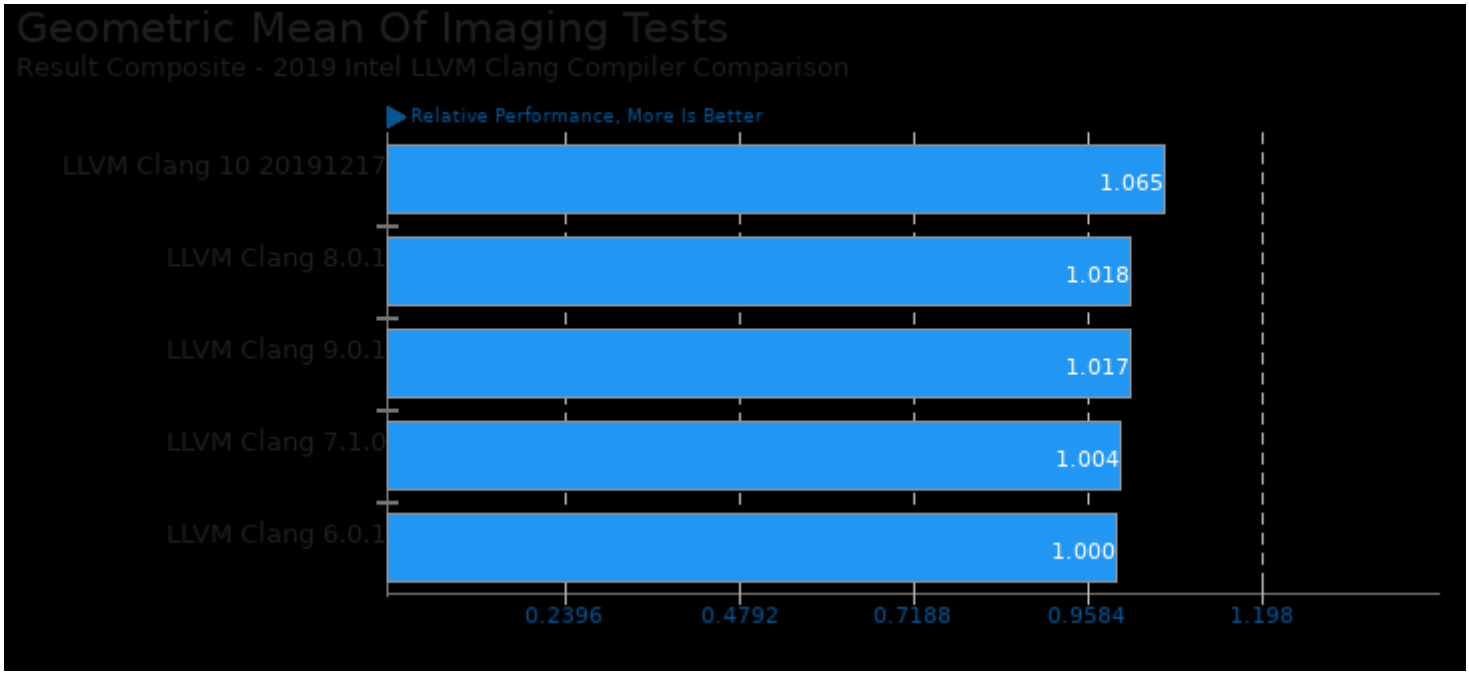



Geometric mean based upon tests: pts/svt-vp9, pts/svt-hevc, pts/x264, pts/x265, pts/vpxenc, pts/dav1d, pts/svt-av1 and pts/libgav1

# 2019 Intel LLVM Clang Compiler Comparison

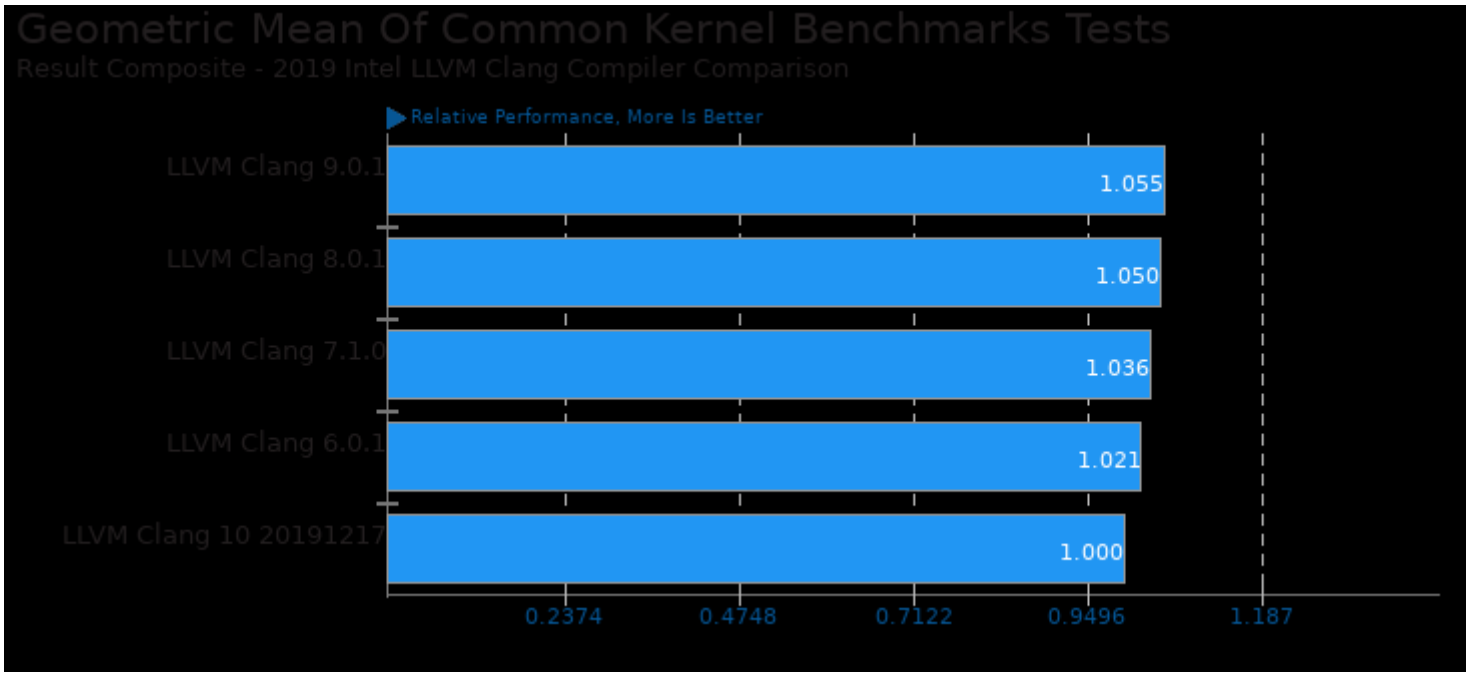



Geometric mean based upon tests: pts/himeno, pts/mrbayes and pts/hmmer

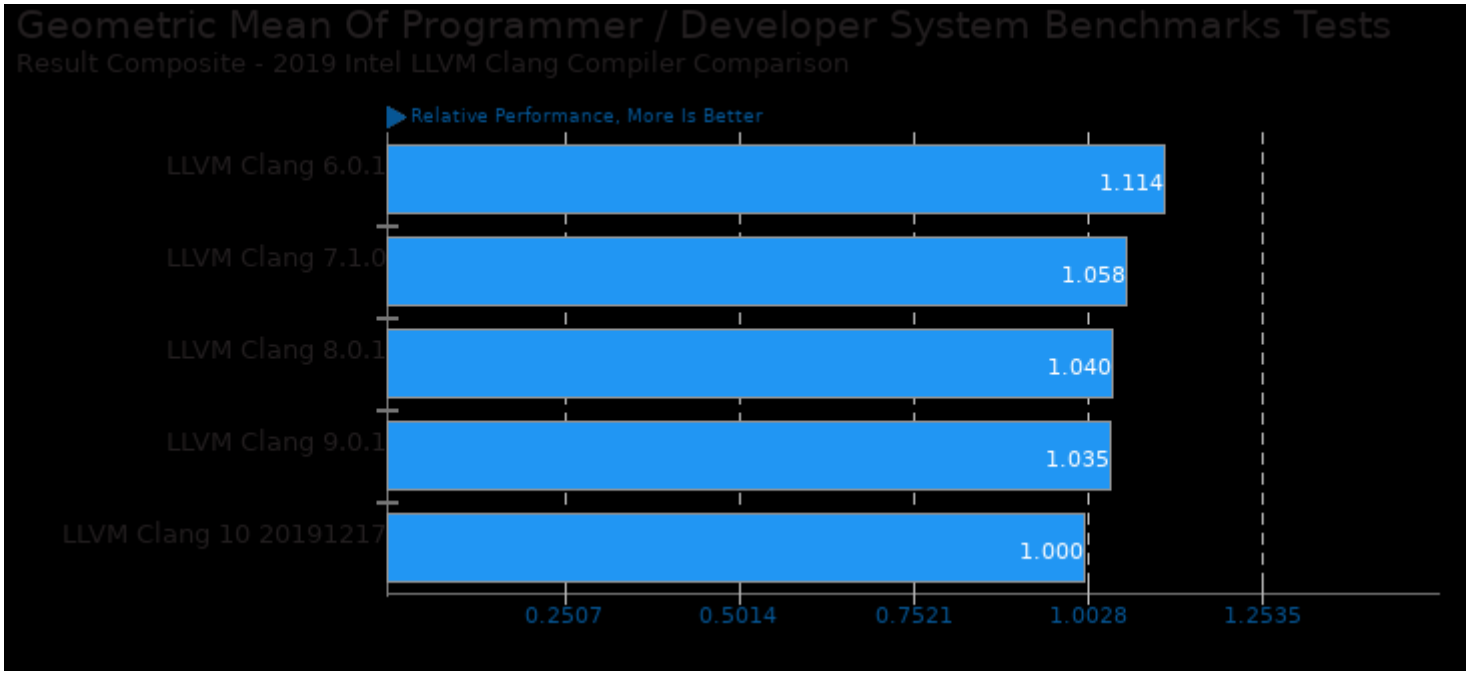



Geometric mean based upon tests: pts/graphics-magick and pts/tjbench

# 2019 Intel LLVM Clang Compiler Comparison

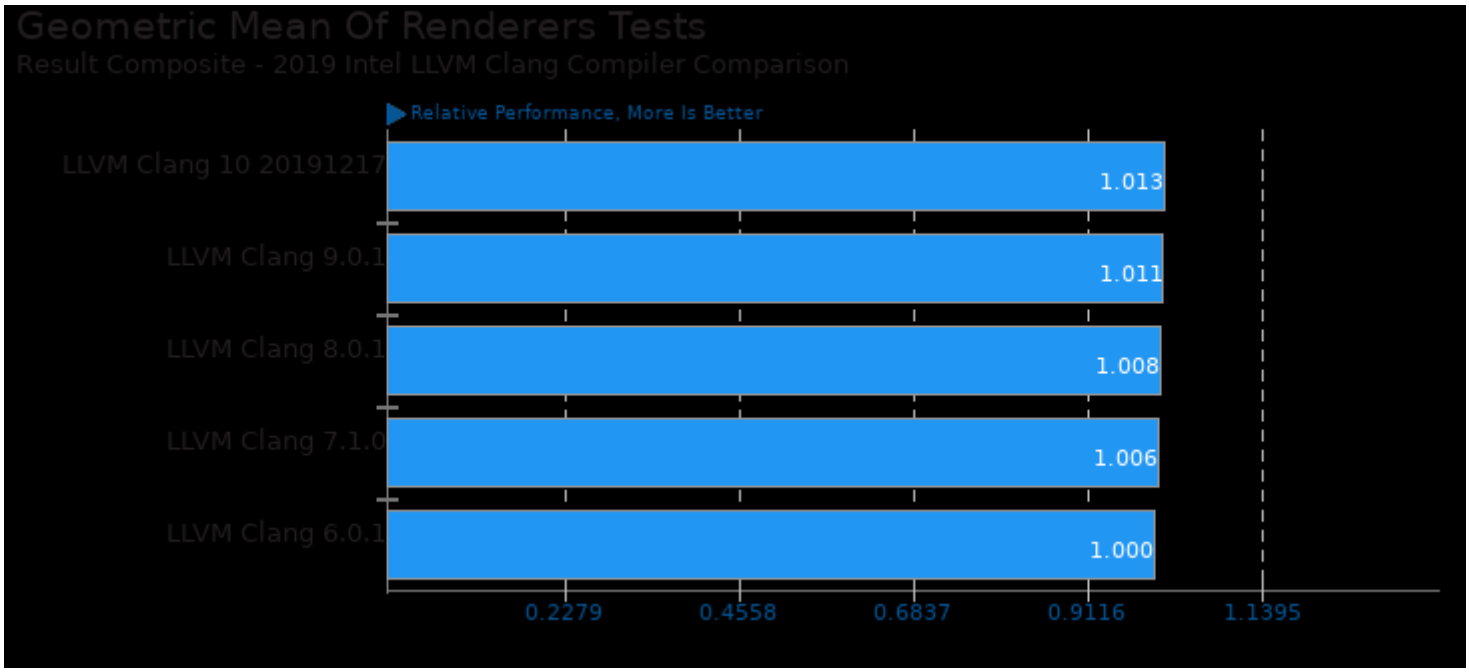



Geometric mean based upon tests: pts/apache and pts/pgbench

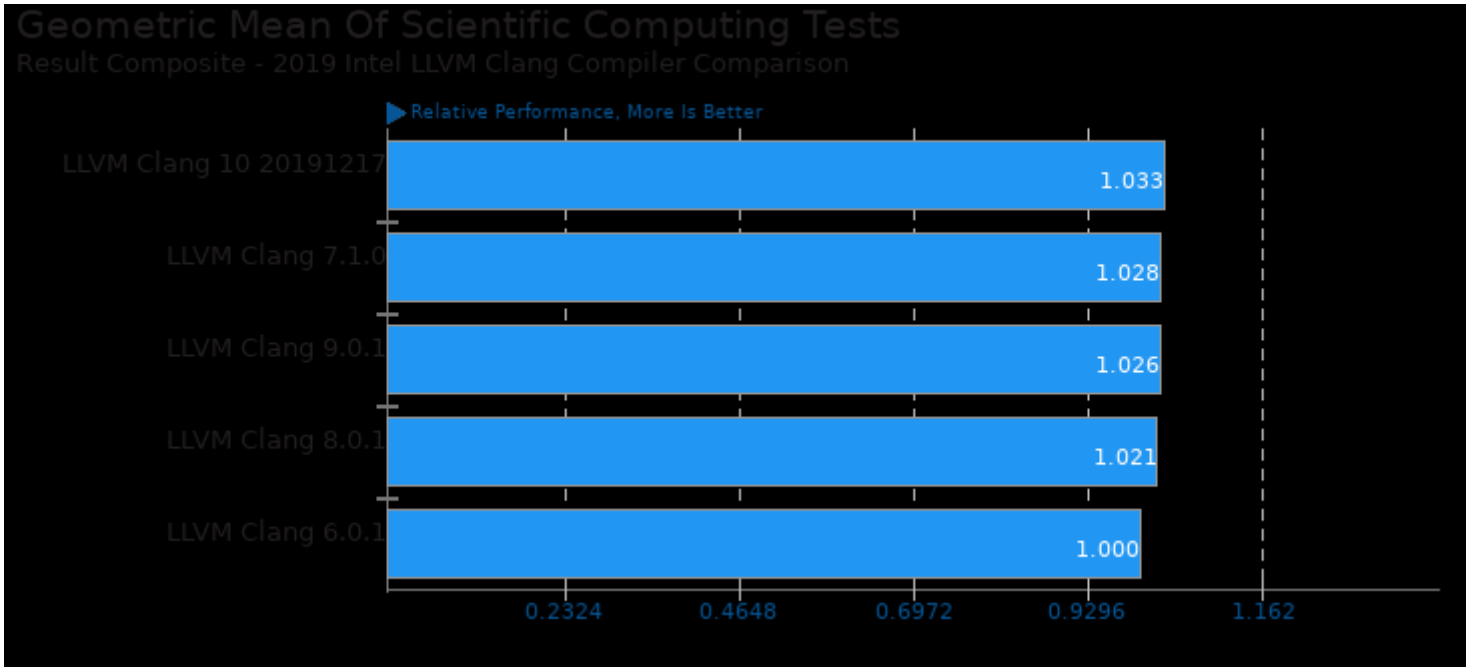



Geometric mean based upon tests: pts/compress-zstd and pts/build-php

# 2019 Intel LLVM Clang Compiler Comparison

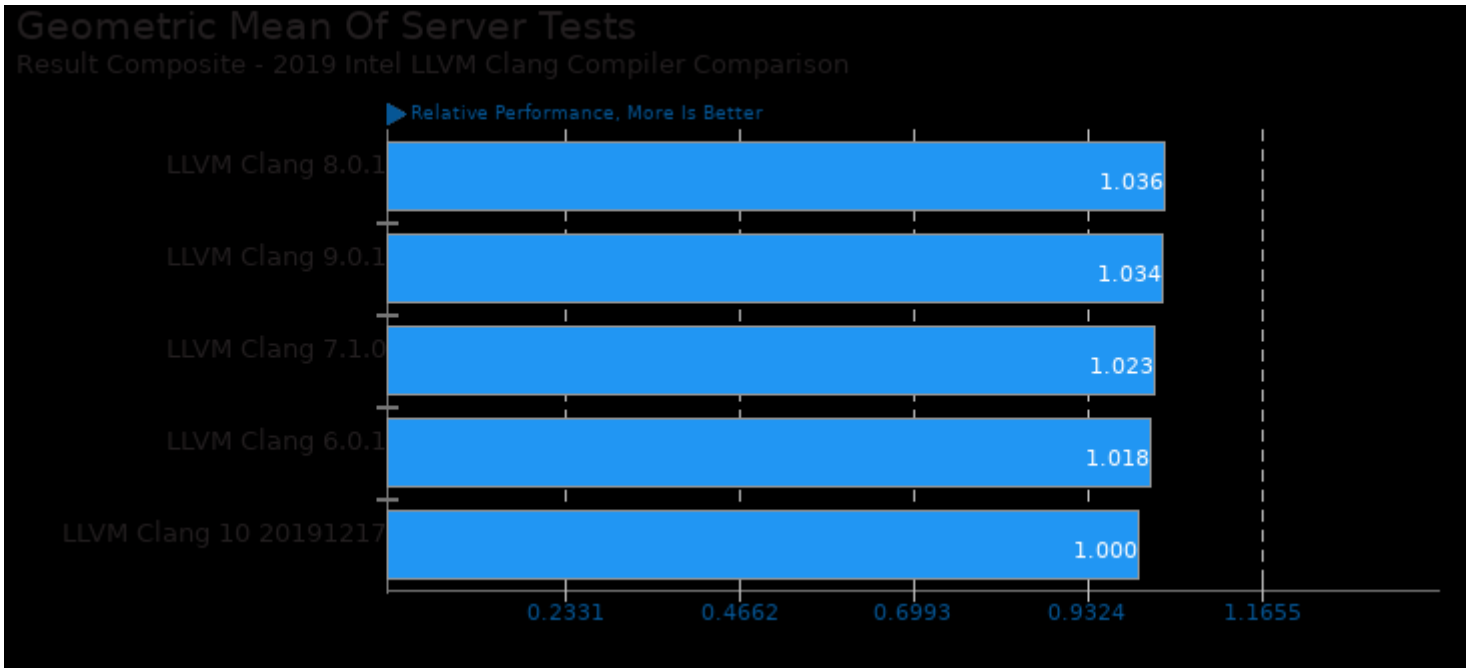



Geometric mean based upon tests: pts/c-ray, pts/tungsten and pts/aobench

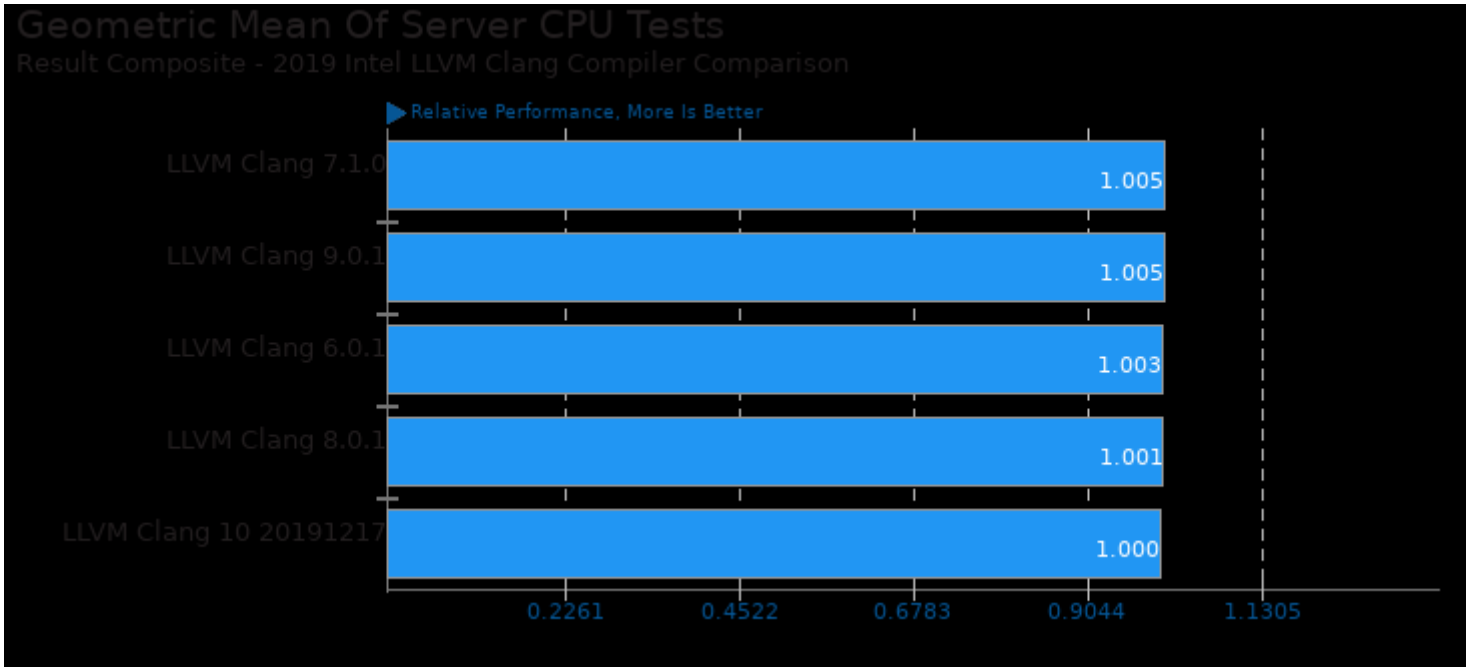



Geometric mean based upon tests: pts/himeno, pts/mrbayes and pts/hmmer

# 2019 Intel LLVM Clang Compiler Comparison

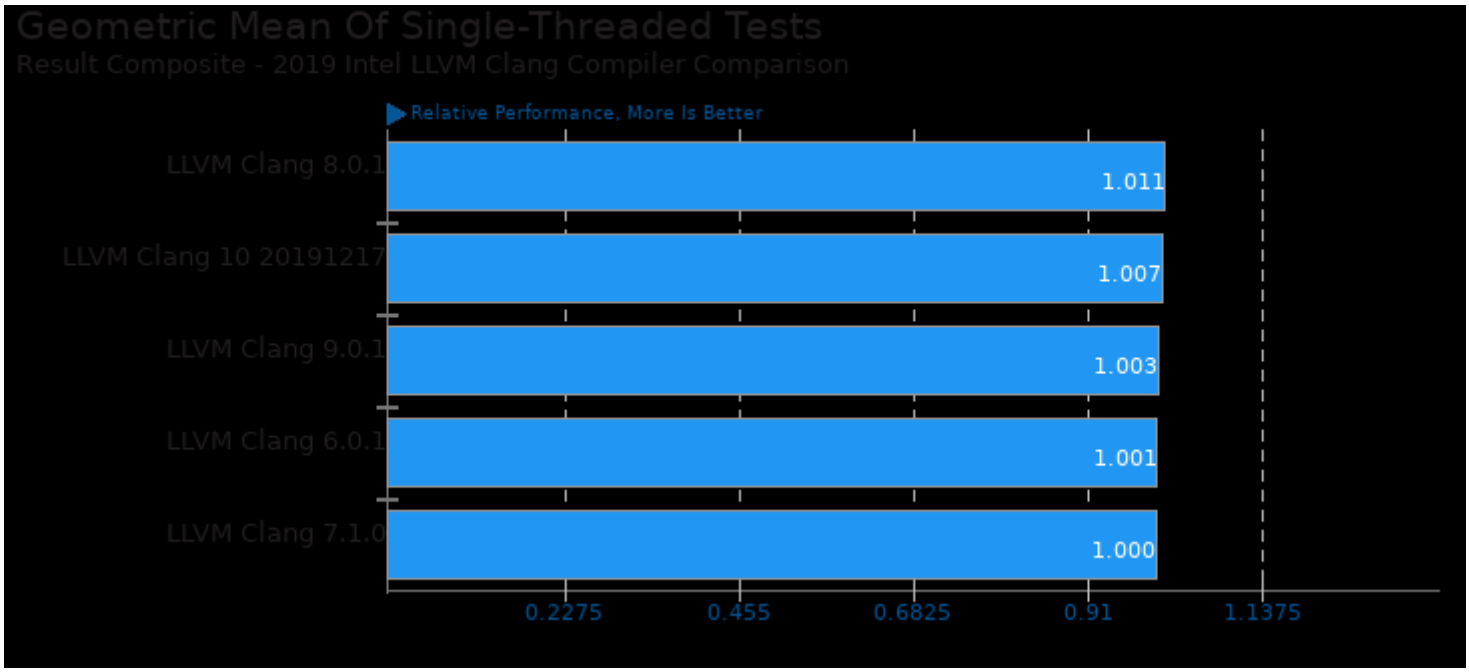



Geometric mean based upon tests: pts/apache, pts/nginx, pts/ebizzy and pts/pgbench

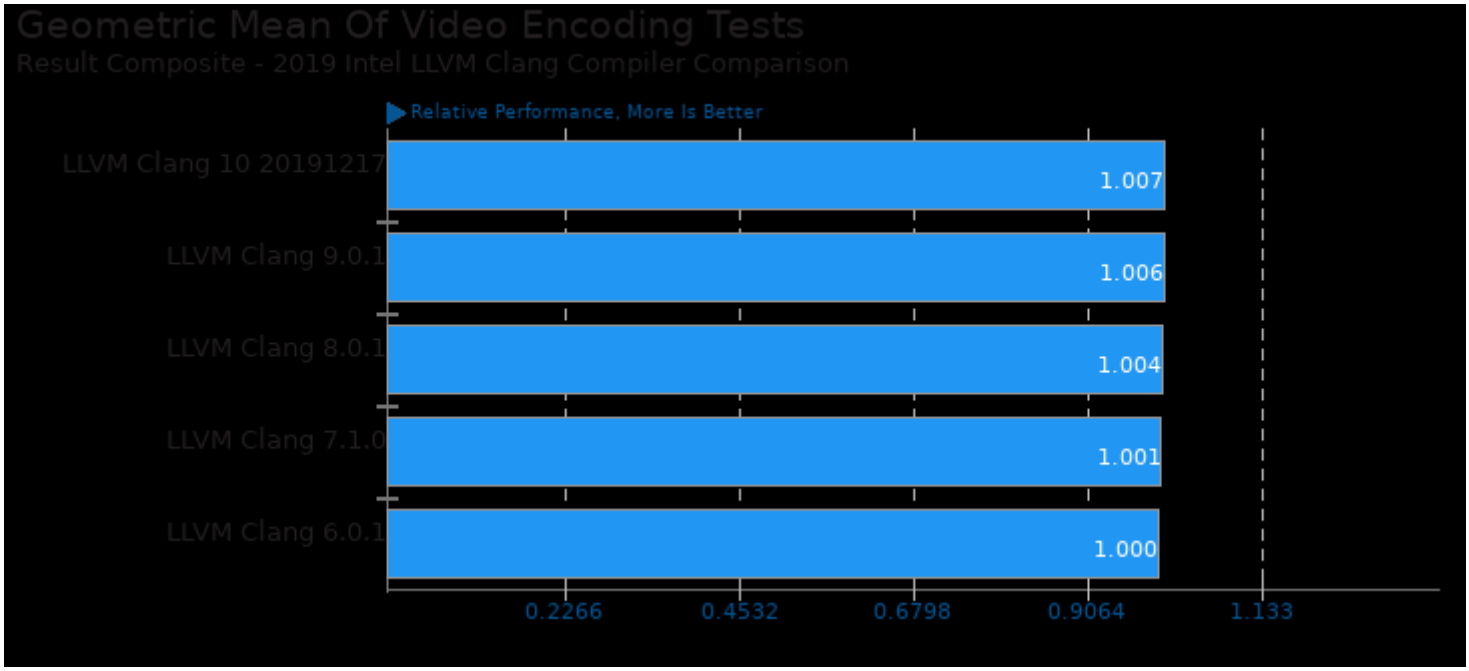



Geometric mean based upon tests: pts/john-the-ripper, pts/svt-av1, pts/svt-hevc, pts/svt-vp9, pts/x264, pts/x265, pts/dav1d, pts/himeno, pts/asmfish, pts/build-php, pts/c-ray, pts/compress-zstd and pts/tjbench

# 2019 Intel LLVM Clang Compiler Comparison

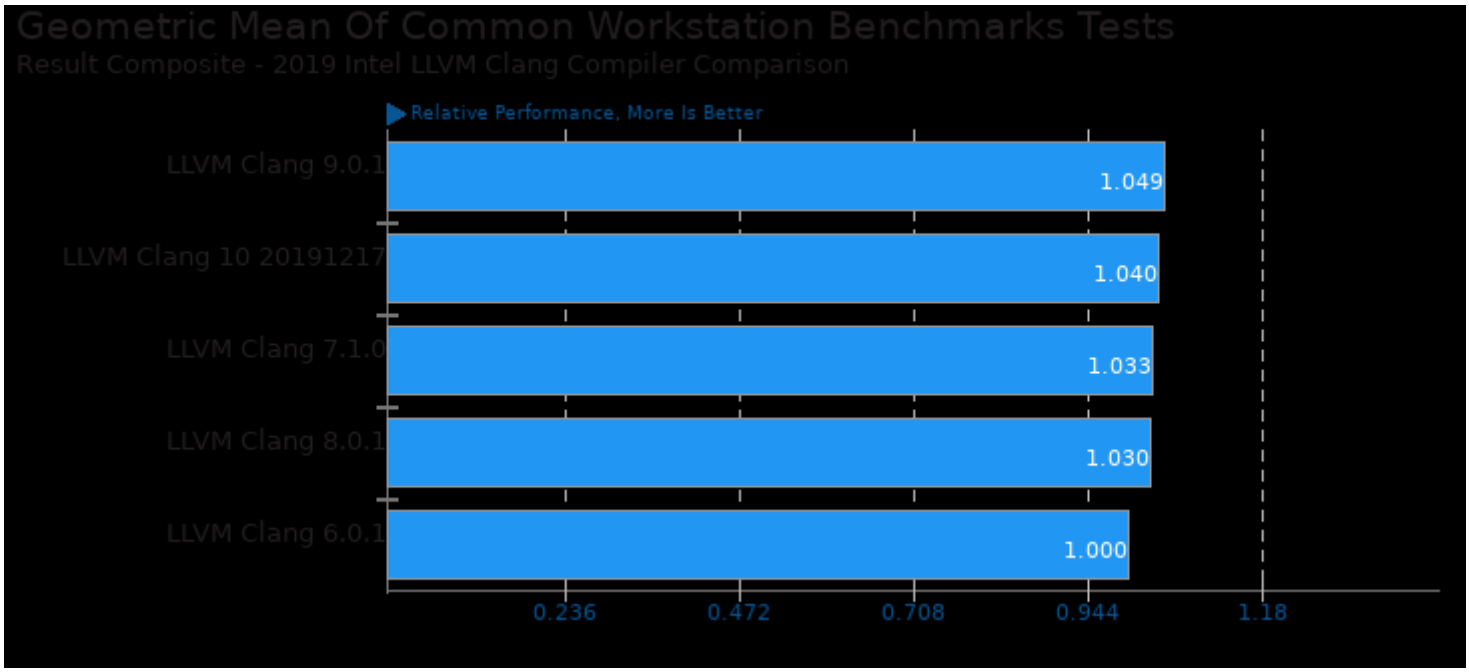



Geometric mean based upon tests: pts/scimark2, pts/minion, pts/tjbench, pts/cpp-perf-bench and pts/nginx




Geometric mean based upon tests: pts/svt-vp9, pts/svt-hevc, pts/x264, pts/x265, pts/vpxenc, pts/dav1d, pts/svt-av1 and pts/libgav1

# 2019 Intel LLVM Clang Compiler Comparison




Geometric mean based upon tests: pts/himeno and pts/x265

*This file was automatically generated via the Phoronix Test Suite benchmarking software on Thursday, 28 March 2024 16:31.*