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Ryzen 7 2700X BIOS Testing

Benchmarks by Michael Larabel for a future article.

Automated Executive Summary

BIOS 0509 had the most wins, coming in first place for 94% of the tests.

Based on the geometric mean of all complete results, the fastest (BIOS 0509) was 1.097x the speed of the slowest (Ondemand - Default).

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

LuaJIT (Test: Dense LU Matrix Factorization) at 1.211x
Minion (Benchmark: Solitaire) at 1.186x
NGINX Benchmark (Static Web Page Serving) at 1.179x
LuaJIT (Test: Jacobi Successive Over-Relaxation) at 1.172x
LuaJIT (Test: Composite) at 1.17x
CacheBench (Test: Read) at 1.168x
LAME MP3 Encoding (WAV To MP3) at 1.162x
Minion (Benchmark: Graceful) at 1.161x
CacheBench (Test: Write) at 1.159x
PHPBench (PHP Benchmark Suite) at 1.159x.

Test Systems:

Ondemand - Default

Processor: AMD Ryzen 7 2700X Eight-Core (8 Cores / 16 Threads), Motherboard: ASUS ROG CROSSHAIR VII HERO (WI-FI) (0505 BIOS), Chipset: AMD Device 1450, Memory: 16384MB, Disk: 525GB Crucial_CT525MX3 + Samsung SSD 950 PRO 256GB, Monitor: Acer B286HK, Network: Intel I211 Gigabit Connection + Realtek Device b822

OS: Ubuntu 17.10, Kernel: 4.16.2-041602-generic (x86_64), Desktop: GNOME Shell 3.26.2, Vulkan: 1.0.61, Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 3840x2160

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --enable-libmpx --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none --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 --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq ondemand
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: __user pointer sanitization + Full AMD retpoline IBPB Protection

BIOS 0509

Processor: AMD Ryzen 7 2700X Eight-Core (8 Cores / 16 Threads), Motherboard: ASUS ROG CROSSHAIR VII HERO (WI-FI) (0509 BIOS), Chipset: AMD Device 1450, Memory: 16384MB, Disk: 525GB Crucial_CT525MX3 + Samsung SSD 950 PRO 256GB, Monitor: Acer B286HK, Network: Intel I211 Gigabit Connection + Realtek Device b822

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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++ --enable-libmpx --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none --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 --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq ondemand
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: __user pointer sanitization + Full AMD retpoline IBPB Protection

	Ondemand - Default	BIOS 0509
Apache Benchmark - S.W.P.S (Reqs/sec)	**30146**	**31133**
Normalized	96.83%	100%
Standard Deviation	1.1%	0.7%
CacheBench - Read (MB/s)	**2571**	**3003**
Normalized	85.63%	100%
Standard Deviation	0%	0.3%
CacheBench - Write (MB/s)	**25364**	**29404**
Normalized	86.26%	100%
Standard Deviation	0.1%	0.8%
CacheBench - R.M.W (MB/s)	**26641**	**30829**
Normalized	86.42%	100%
Standard Deviation	0%	0.1%
Darktable - Boat - CPU-only (sec)	**12.81**	**13.57**
Normalized	100%	94.4%

Ryzen 7 2700X BIOS Testing

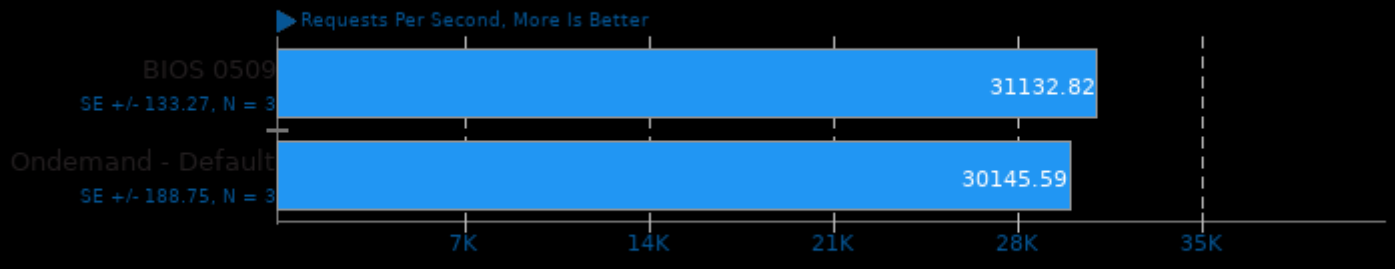
Standard Deviation	0.2%	0.3%
Darktable - Masskrug - CPU-only (sec)	**6.81**	**6.77**
Normalized	99.41%	100%
Standard Deviation	0.1%	0.3%
Darktable - Server Room - CPU-only (sec)	**5.27**	**5.20**
Normalized	98.67%	100%
Standard Deviation	0.7%	0.5%
FLAC Audio Encoding - WAV To FLAC (sec)	**10.29**	**8.97**
Normalized	87.17%	100%
Standard Deviation	0.2%	0.3%
GIMP - resize (sec)	**3.34**	**3.03**
Normalized	90.72%	100%
Standard Deviation	1.2%	2.4%
GIMP - auto-levels (sec)	**5.71**	**5.12**
Normalized	89.67%	100%
Standard Deviation	0.4%	1.4%
GIMP - unsharp-mask (sec)	**12.53**	**11.15**
Normalized	88.99%	100%
Standard Deviation	0.9%	1.5%
Go Benchmarks - http (ns/op)	**6908**	**6886**
Normalized	99.68%	100%
Standard Deviation	0.2%	0.3%
Go Benchmarks - json (ns/op)	**7686694**	**7186669**
Normalized	93.49%	100%
Standard Deviation	0.1%	0.2%
Go Benchmarks - build (ns/op)	**15020982158**	**13860580939**
Normalized	92.27%	100%
Standard Deviation	0.3%	1.1%
Go Benchmarks - garbage (ns/op)	**1544348**	**1450493**
Normalized	93.92%	100%
Standard Deviation	0.1%	0.3%
John The Ripper - Blowfish (Real C/S)	**12912**	**13975**
Normalized	92.39%	100%
Standard Deviation	0%	0.5%
John The Ripper - Traditional DES (Real C/S)	**57326000**	**61115000**
Normalized	93.8%	100%
Standard Deviation	0%	0%
John The Ripper - MD5 (Real C/S)	**430072**	**460480**
Normalized	93.4%	100%
Standard Deviation	0.3%	0.2%
LAME MP3 Encoding - WAV To MP3 (sec)	**36.96**	**31.80**
Normalized	86.04%	100%
Standard Deviation	0.1%	0.2%
LuaJIT - Composite (Mflops)	**1312**	**1536**
Normalized	85.45%	100%
Standard Deviation	0.5%	1.3%
LuaJIT - Monte Carlo (Mflops)	**440.75**	**509.84**
Normalized	86.45%	100%
Standard Deviation	0%	0.2%
LuaJIT - F.F.T (Mflops)	**286.09**	**306.00**
Normalized	93.49%	100%
Standard Deviation	0.2%	0.3%
LuaJIT - S.M.M (Mflops)	**1072**	**1160**
Normalized	92.42%	100%
Standard Deviation	0.1%	9.3%

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LuaJIT - D.L.M.F (Mflops)	**3113**	**3770**
Normalized	82.57%	100%
Standard Deviation	0.9%	0.2%
LuaJIT - J.S.O.R (Mflops)	**1651**	**1935**
Normalized	85.33%	100%
Standard Deviation	0%	0%
Minion - Graceful (sec)	**49.53**	**42.65**
Normalized	86.11%	100%
Standard Deviation	0.2%	0.1%
Minion - Solitaire (sec)	**76.75**	**64.72**
Normalized	84.33%	100%
Standard Deviation	0.2%	0.7%
Minion - Quasigroup (sec)	**127.01**	**109.96**
Normalized	86.58%	100%
Standard Deviation	0.2%	0.7%
NGINX Benchmark - S.W.P.S (Reqs/sec)	**30914**	**36457**
Normalized	84.8%	100%
Standard Deviation	0.4%	0.7%
PHPBench - P.B.S (Score)	**398195**	**461582**
Normalized	86.27%	100%
Standard Deviation	0.7%	0.8%
PostgreSQL pgbench - Buffer Test - Normal Load - Read Only (TPS)	**186964**	**206319**
Normalized	90.62%	100%
Standard Deviation	0.3%	0.2%
PyBench - T.F.A.T.T (Milliseconds)	**1766**	**1524**
Normalized	86.3%	100%
Standard Deviation	0.1%	0.4%
Smallpt - G.I.R.1.S (sec)	**37**	**35**
Normalized	94.59%	100%
Stockfish - Total Time (ms)	**3807**	**3344**
Normalized	87.84%	100%
Standard Deviation	0.1%	0.2%
Timed Linux Kernel Compilation - Time To Compile	**77.81**	**73.97**
Normalized	95.06%	100%
Standard Deviation	2%	2%
TTSIOD 3D Renderer - P.R.W.S.S.M (FPS)	**400.90**	**349.04**
Normalized	100%	87.06%
Standard Deviation	0.1%	0%
x264 - H.2.V.E (FPS)	**76.07**	**78.76**
Normalized	96.58%	100%
Standard Deviation	0.8%	0.5%

Apache Benchmark 2.4.29

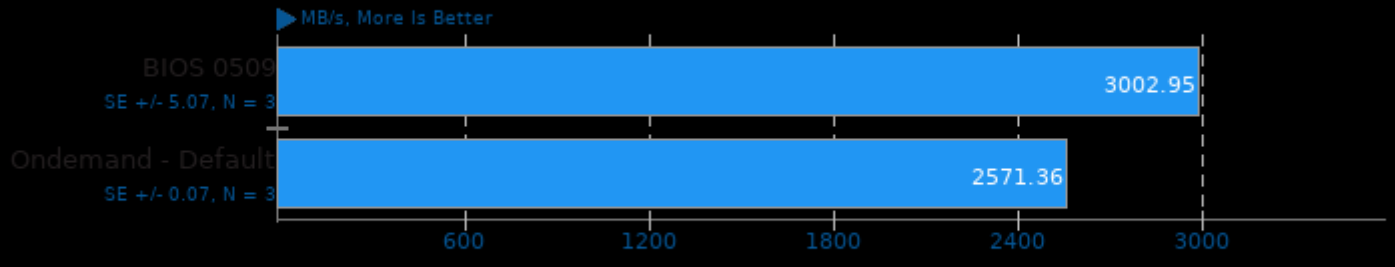
Static Web Page Serving



1. (CC) gcc options: -shared -fPIC -O2 -pthread

CacheBench

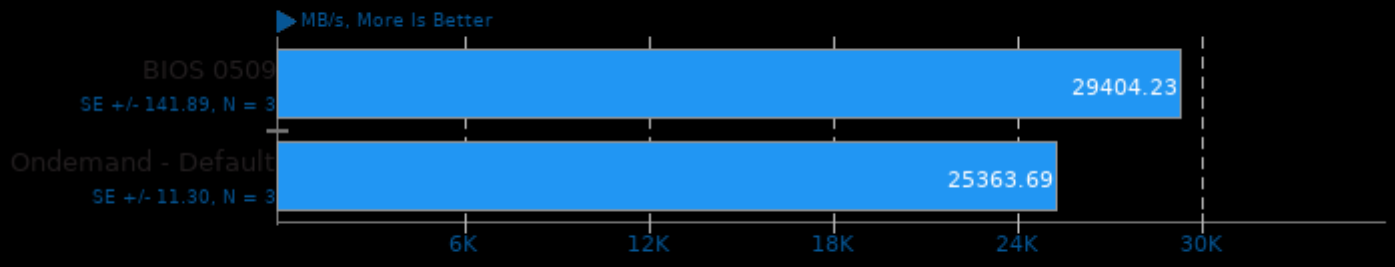
Test: Read



1. (CC) gcc options: -lrt

CacheBench

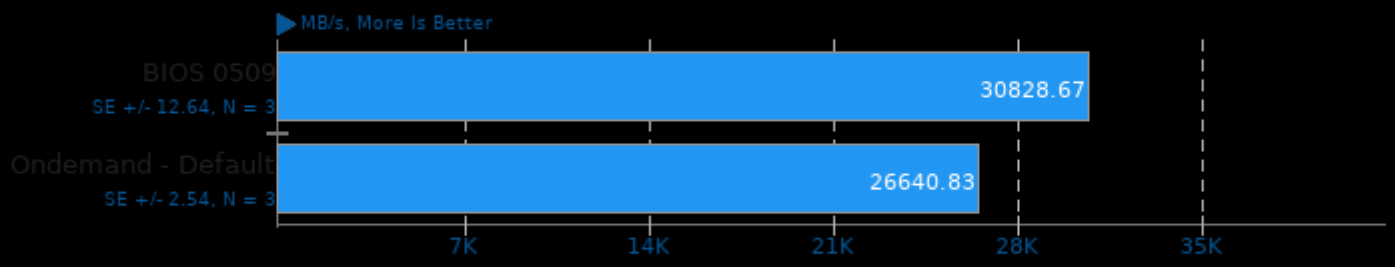
Test: Write



1. (CC) gcc options: -lrt

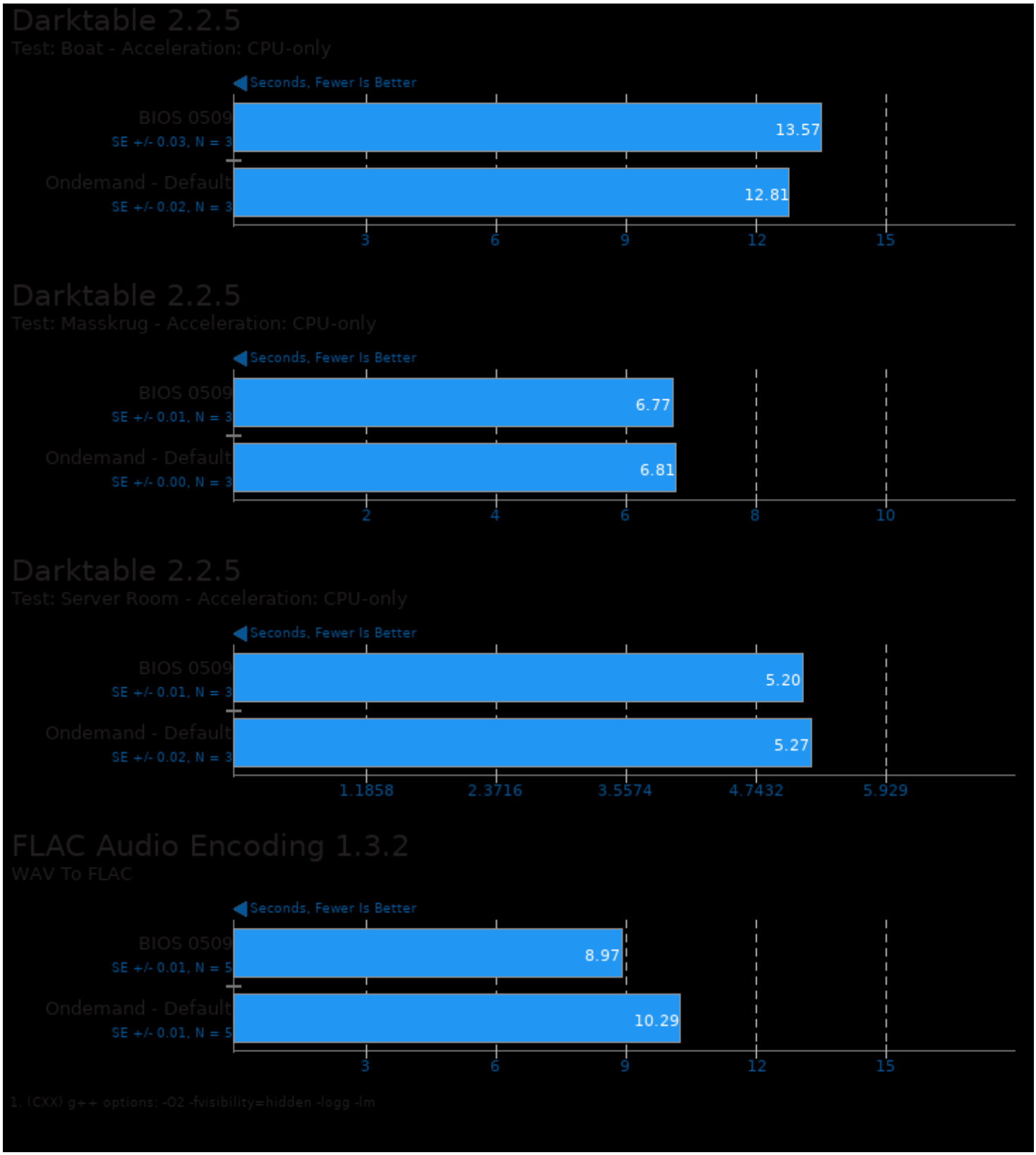
CacheBench

Test: Read / Modify / Write

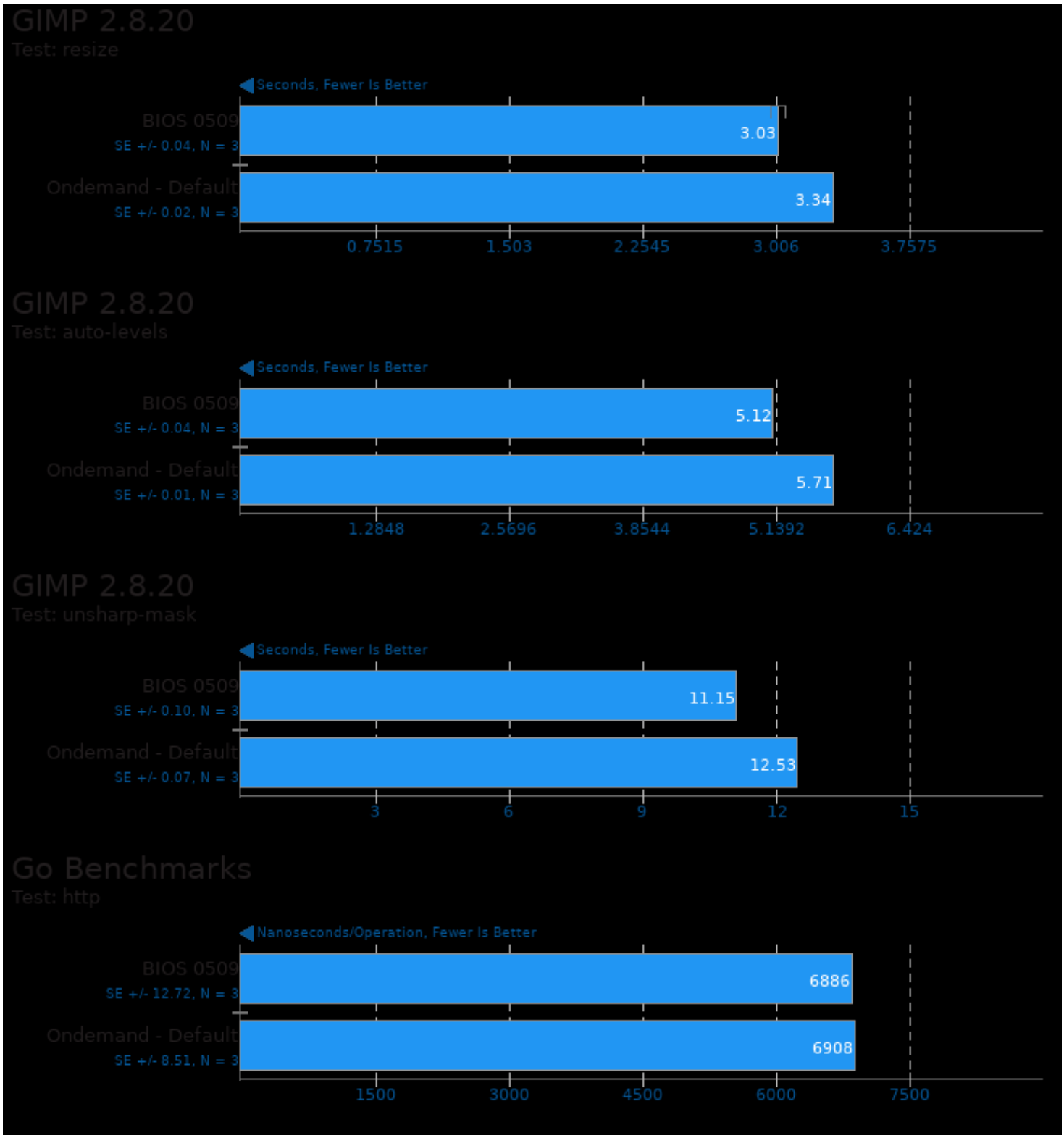


1. (CC) gcc options: -lrt

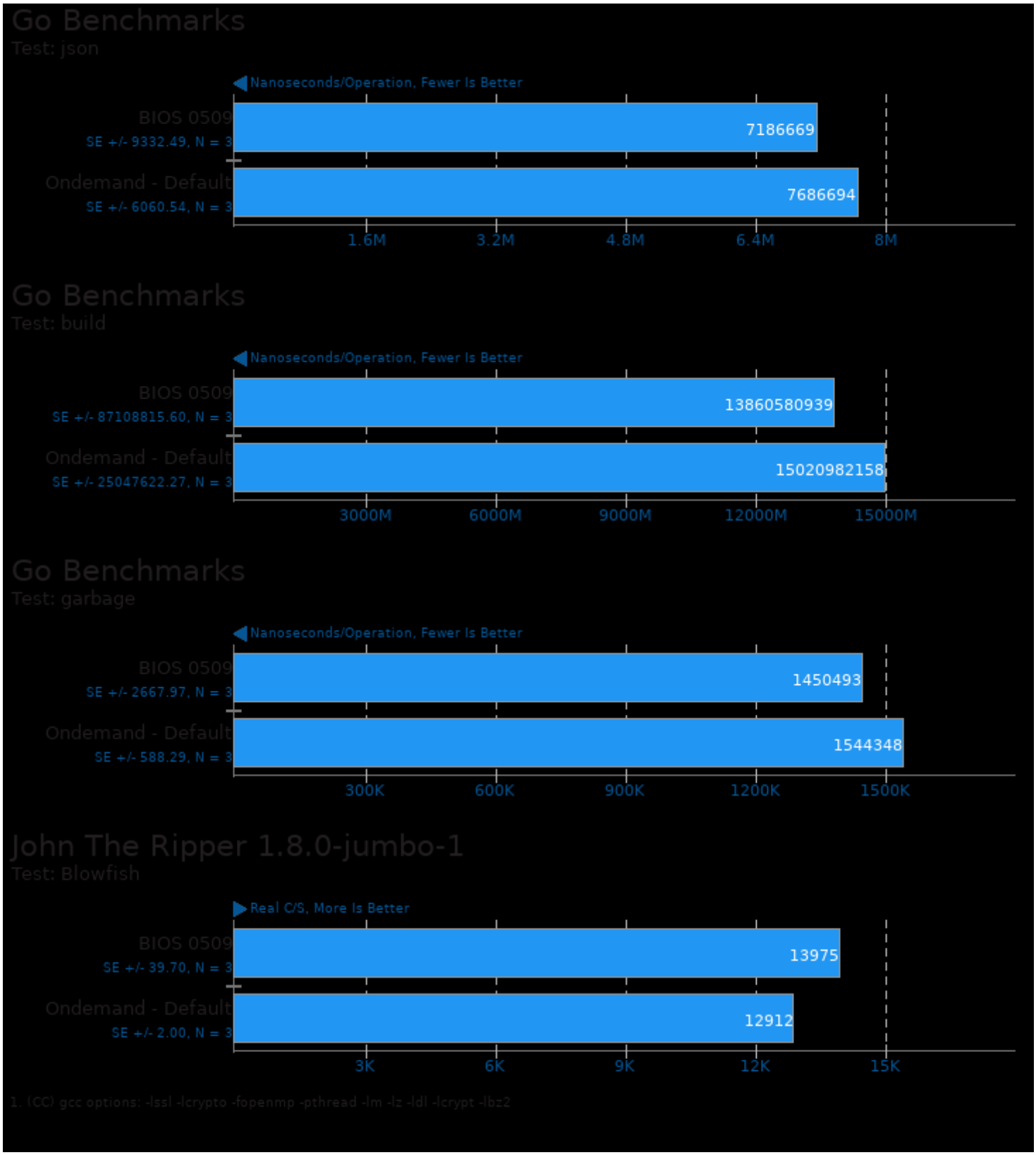
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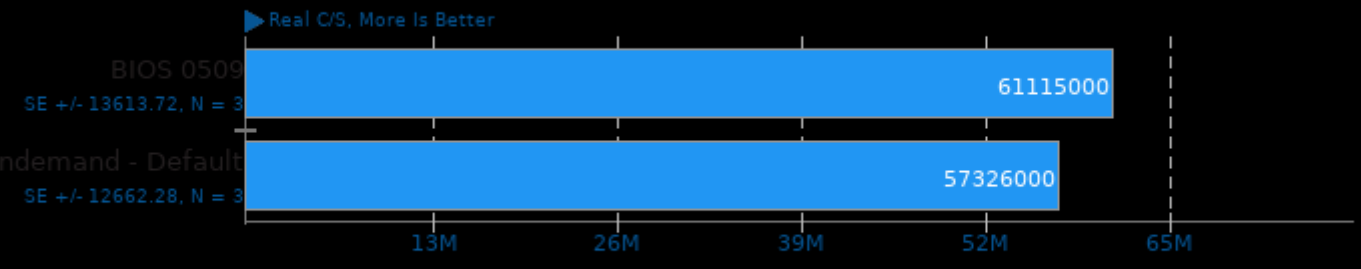
Ryzen 7 2700X BIOS Testing



Ryzen 7 2700X BIOS Testing

John The Ripper 1.8.0-jumbo-1

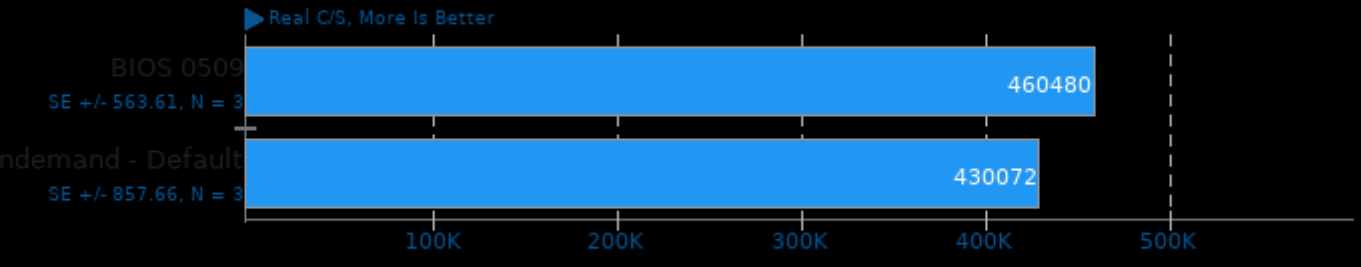
Test: Traditional DES



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

John The Ripper 1.8.0-jumbo-1

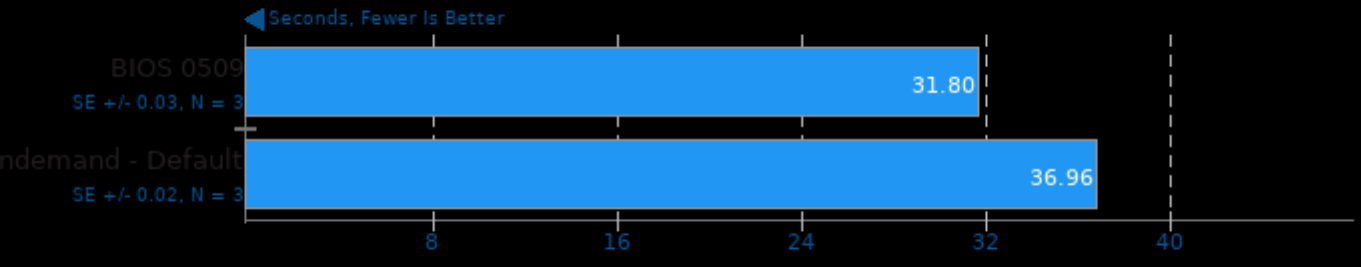
Test: MD5



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

LAME MP3 Encoding 3.100

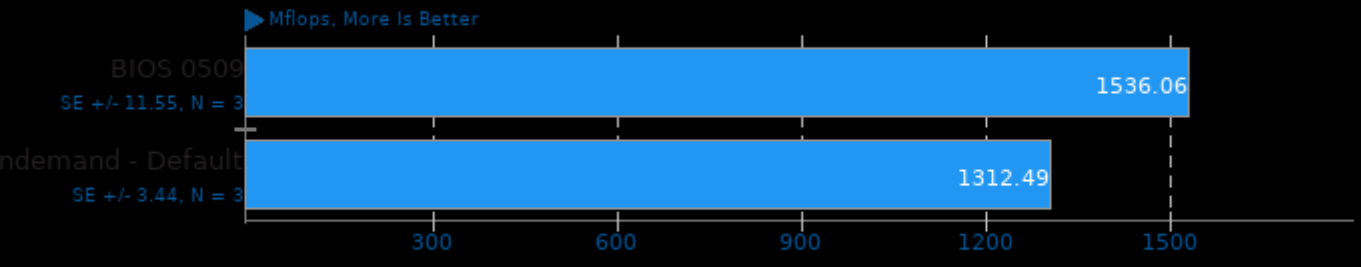
WAV To MP3



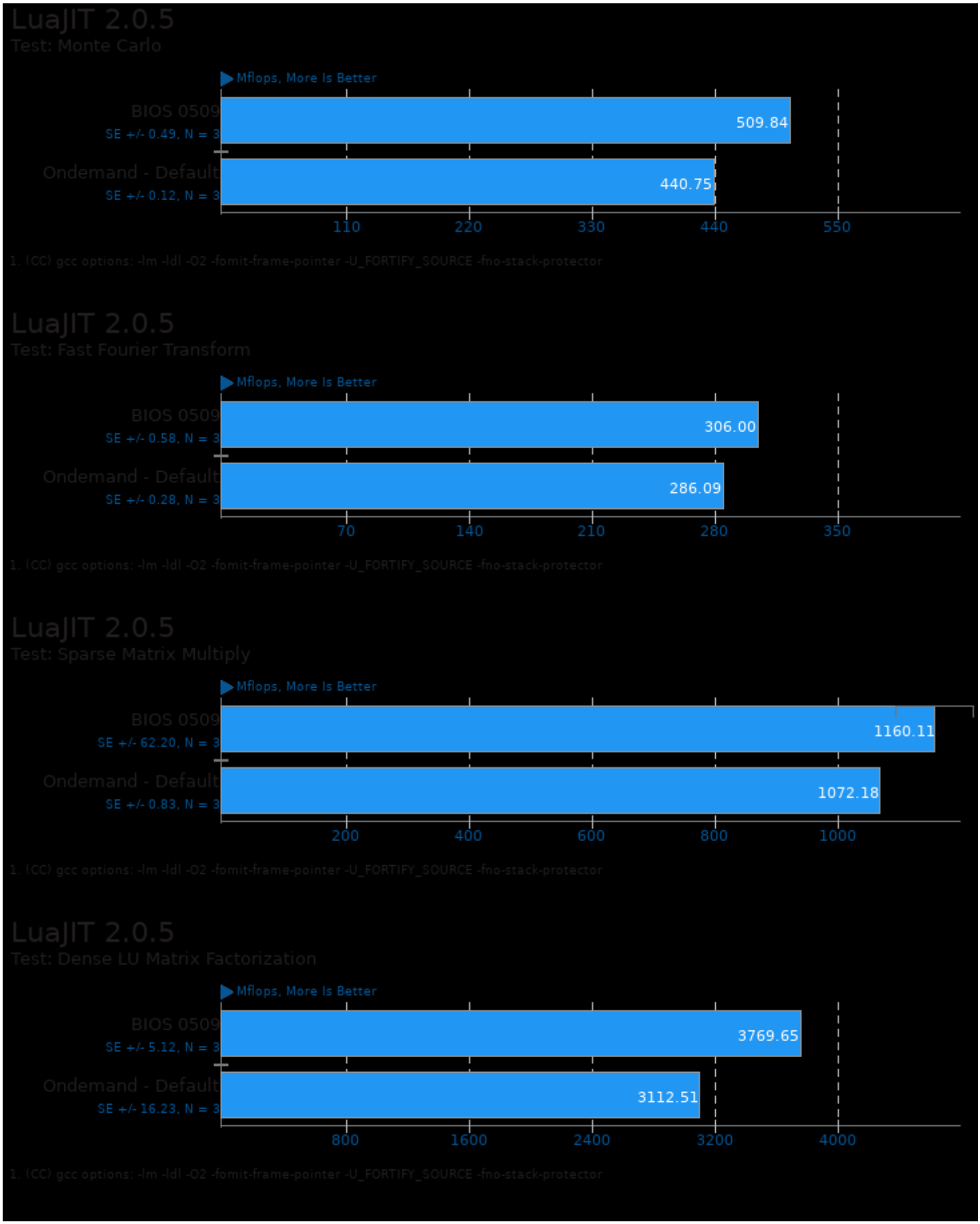
1. (CC) gcc options: -lm

LuaJIT 2.0.5

Test: Composite

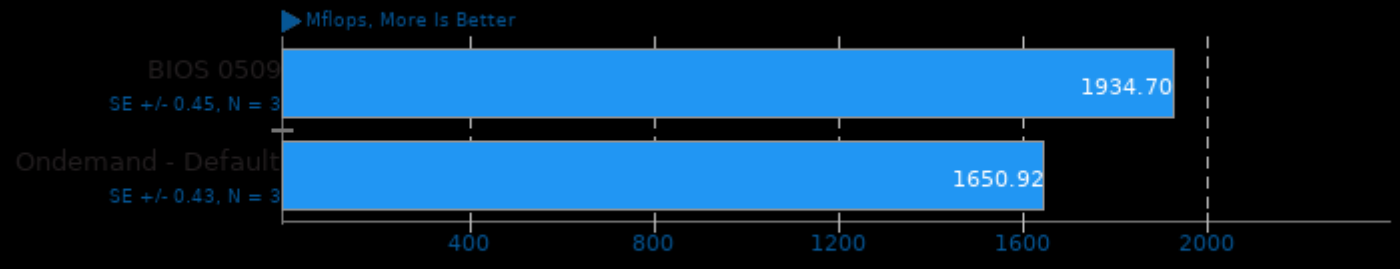


1. (CC) gcc options: -lm -ldl -O2 -fomit-frame-pointer -U_FORTIFY_SOURCE -fno-stack-protector


LuaJIT 2.0.5
Test: Monte Carlo
Mflops, More Is Better
BIOS 0509
SE +/- 0.49, N = 3
509.84
Ondemand - Default
SE +/- 0.12, N = 3
440.75
110
220
330
440
550
1. (CC) gcc options: -lm -ldl -O2 -fomit-frame-pointer -U_FORTIFY_SOURCE -fno-stack-protector
LuaJIT 2.0.5
Test: Fast Fourier Transform
Mflops, More Is Better
BIOS 0509
SE +/- 0.58, N = 3
306.00
Ondemand - Default
SE +/- 0.28, N = 3
286.09
70
140
210
280
350
1. (CC) gcc options: -lm -ldl -O2 -fomit-frame-pointer -U_FORTIFY_SOURCE -fno-stack-protector
LuaJIT 2.0.5
Test: Sparse Matrix Multiply
Mflops, More Is Better
BIOS 0509
SE +/- 62.20, N = 3
1160.11
Ondemand - Default
SE +/- 0.83, N = 3
1072.18
200
400
600
800
1000
1. (CC) gcc options: -lm -ldl -O2 -fomit-frame-pointer -U_FORTIFY_SOURCE -fno-stack-protector
LuaJIT 2.0.5
Test: Dense LU Matrix Factorization
Mflops, More Is Better
BIOS 0509
SE +/- 5.12, N = 3
3769.65
Ondemand - Default
SE +/- 16.23, N = 3
3112.51
800
1600
2400
3200
4000
1. (CC) gcc options: -lm -ldl -O2 -fomit-frame-pointer -U_FORTIFY_SOURCE -fno-stack-protector

LuaJIT 2.0.5

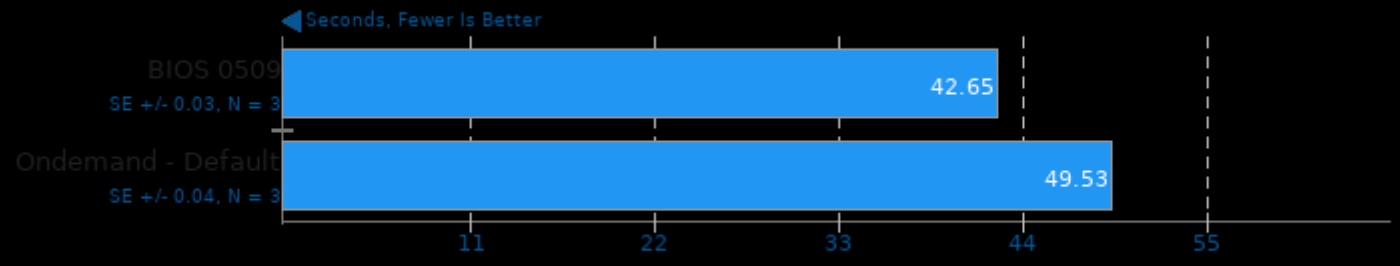
Test: Jacobi Successive Over-Relaxation



1. (CC) gcc options: -lm -ldl -O2 -fomit-frame-pointer -U_FORTIFY_SOURCE -fno-stack-protector

Minion 1.8

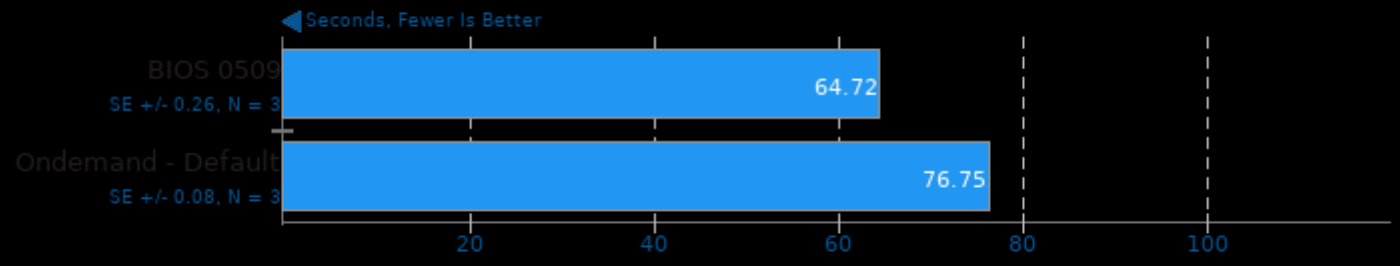
Benchmark: Graceful



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

Minion 1.8

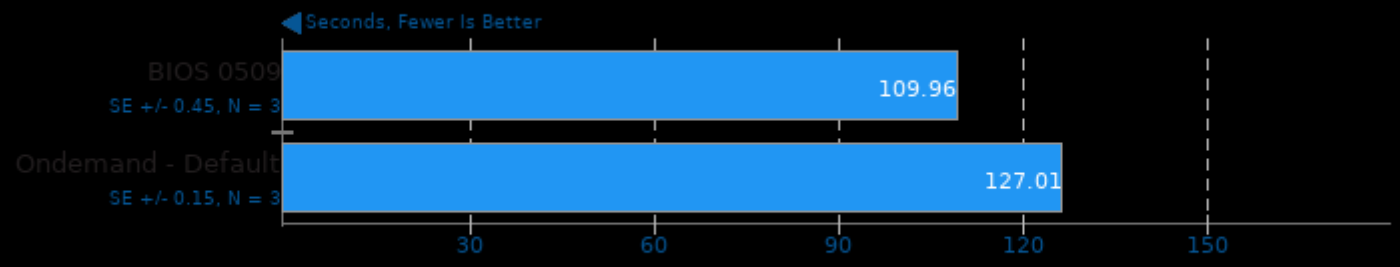
Benchmark: Solitaire



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

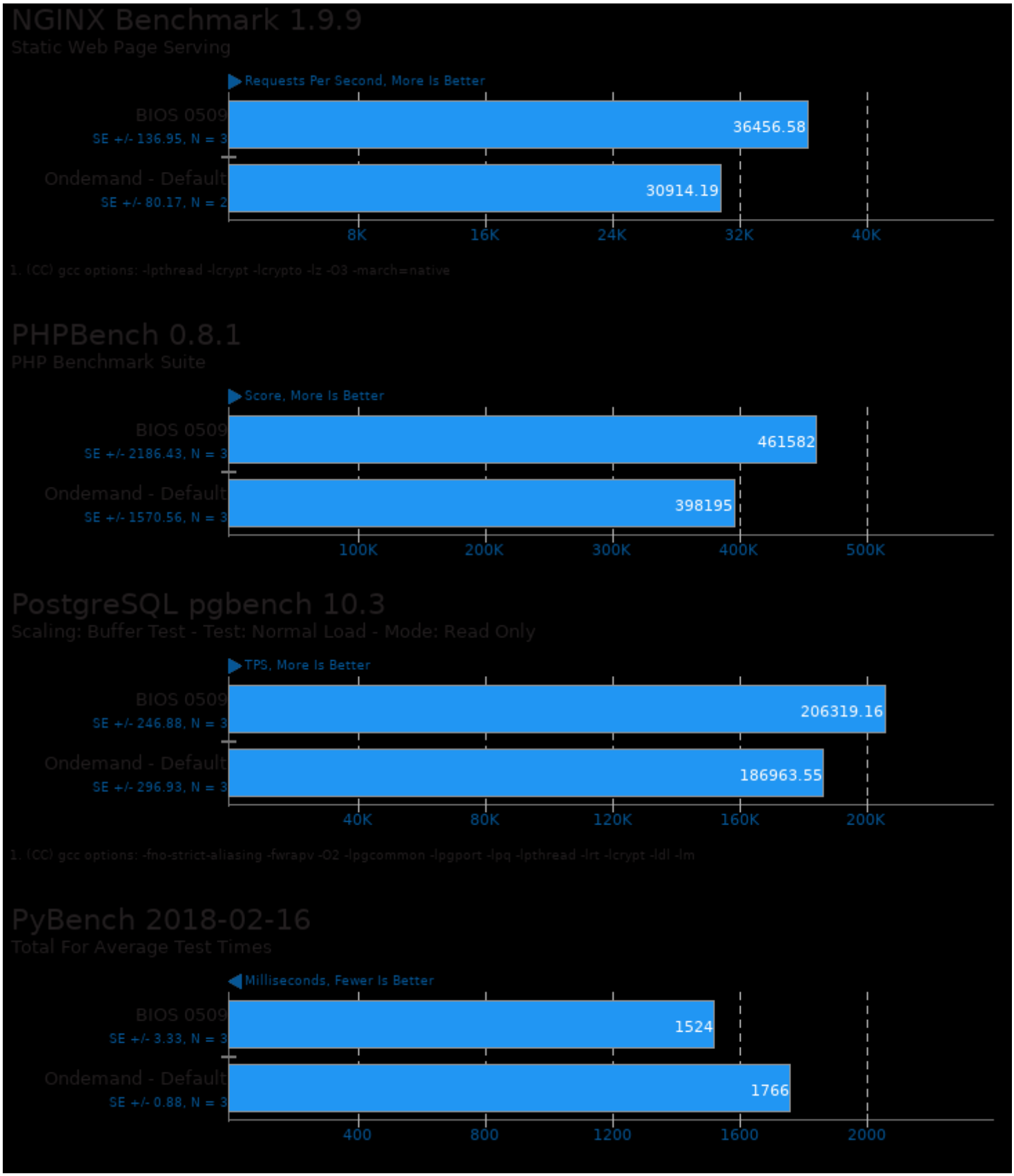
Minion 1.8

Benchmark: Quasigroup



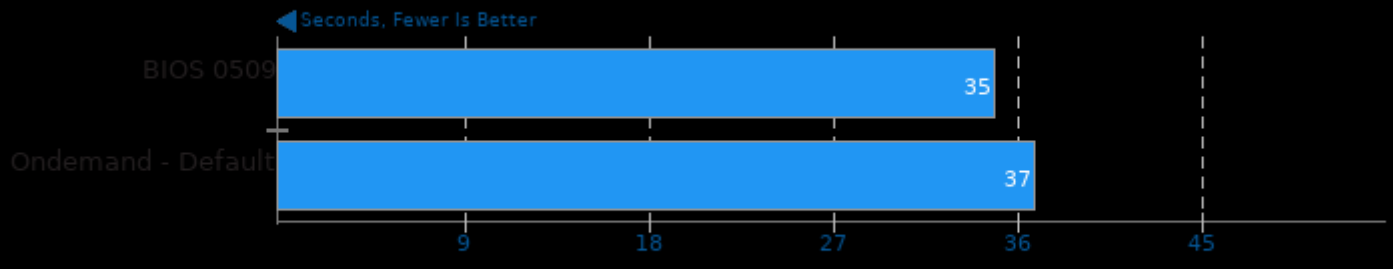
1. (CXX) g++ options: -std=gnu++11 -O3 -fomit-frame-pointer -rdynamic

Ryzen 7 2700X BIOS Testing



Smallpt 1.0

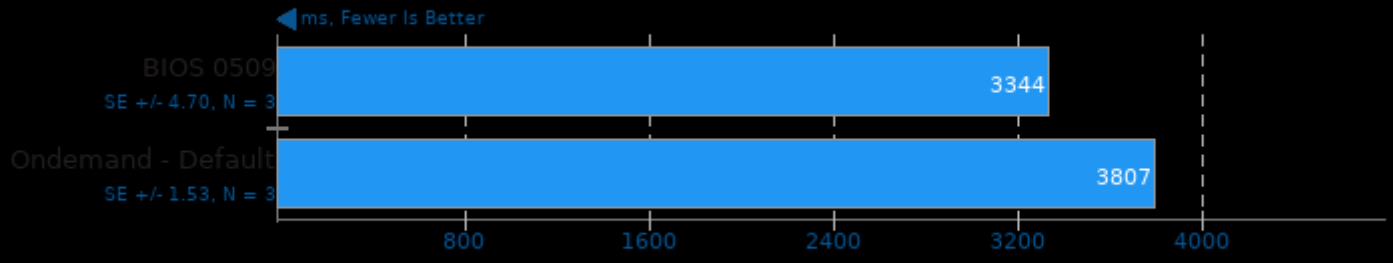
Global Illumination Renderer; 100 Samples



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

Stockfish 2014-11-26

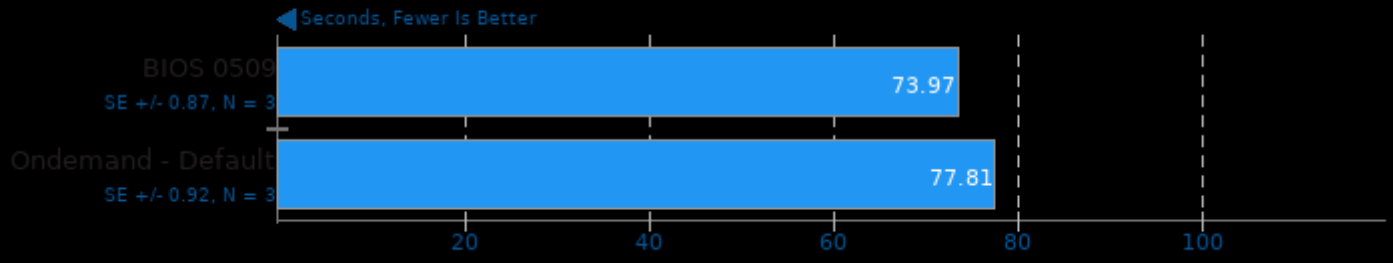
Total Time



1. (CXX) g++ options: -lpthread -fno-exceptions -fno-rtti -ansi -pedantic -O3 -msse -msse3 -mpopcnt -flto

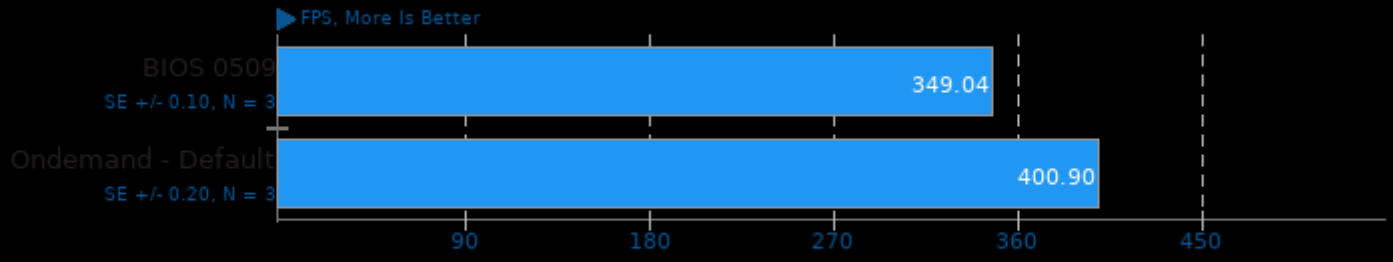
Timed Linux Kernel Compilation 4.13

Time To Compile



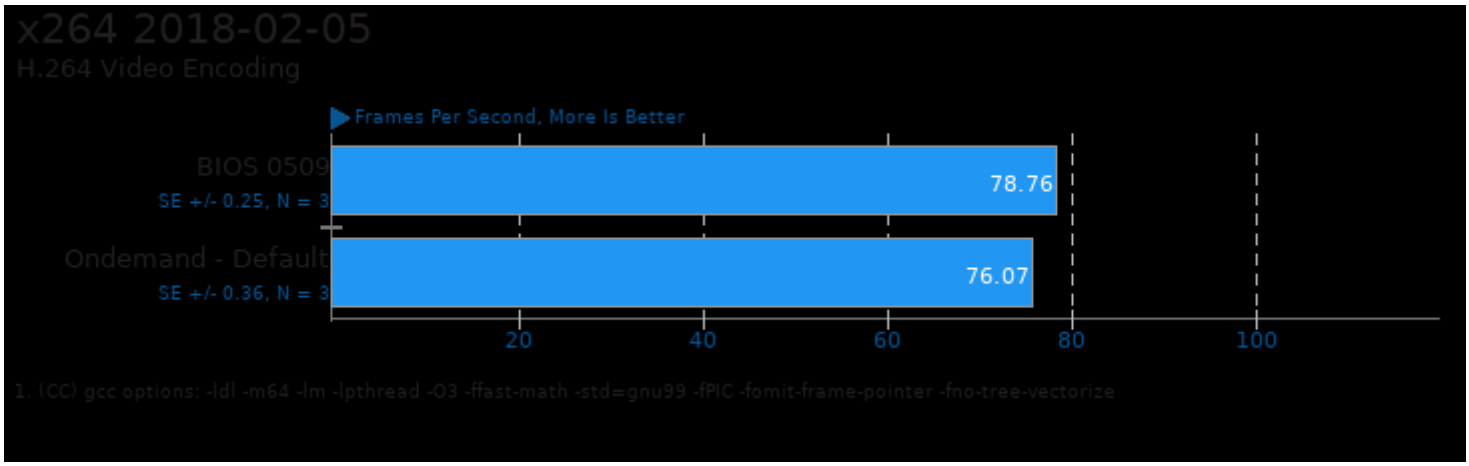
TTSIOD 3D Renderer 2.3a

Phong Rendering With Soft-Shadow Mapping



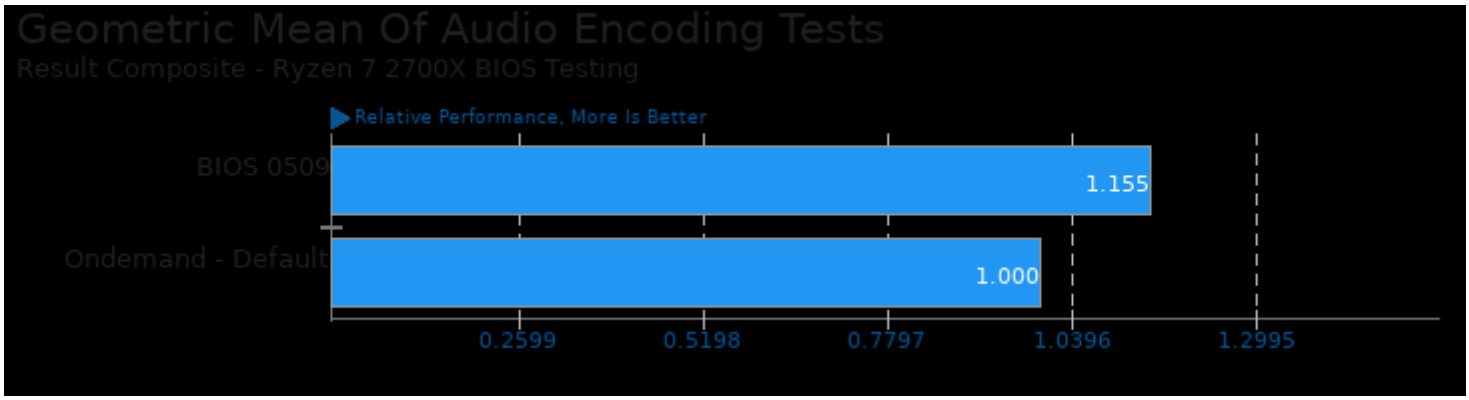
1. (CXX) g++ options: -O3 -fomit-frame-pointer -ffast-math -mtune=native -flto -msse -mrecip -mfpmath=sse -msse2 -mssse3 -lSDL -lstdc++

Ryzen 7 2700X BIOS Testing

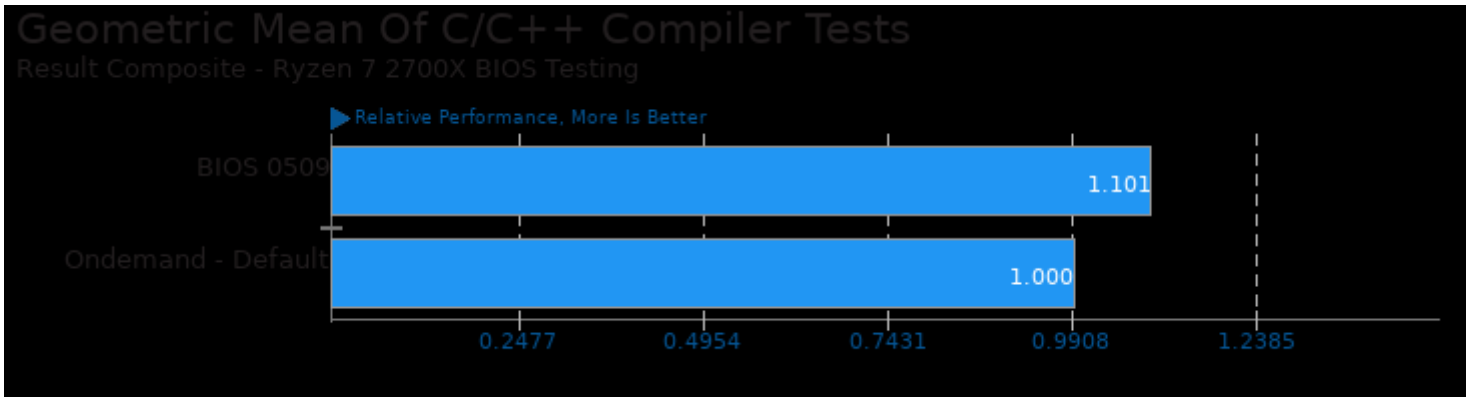


Ryzen 7 2700X BIOS Testing

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



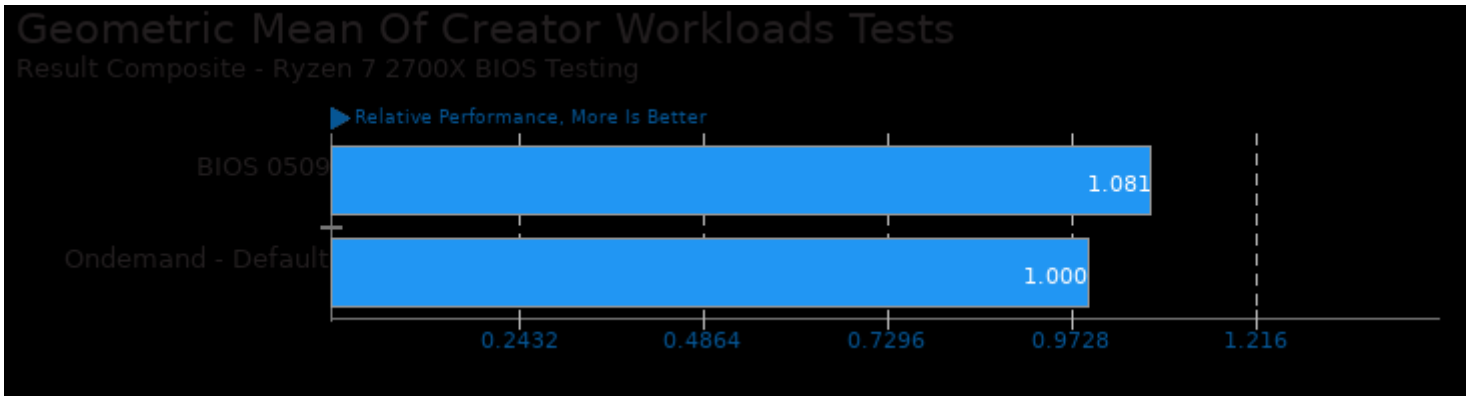
Geometric mean based upon tests: pts/encode-mp3 and pts/encode-flac



Geometric mean based upon tests: pts/stockfish, pts/encode-mp3, pts/encode-flac, pts/pgbench, pts/apache, pts/john-the-ripper, pts/x264 and pts/nginx



Geometric mean based upon tests: pts/apache, pts/build-linux-kernel, pts/cachebench, pts/x264, pts/encode-flac, pts/encode-mp3, pts/go-benchmark, pts/john-the-ripper, pts/minion, pts/nginx, pts/pgbench, pts/phpbench, pts/stockfish, pts/ttsiod-renderer and system/darktable



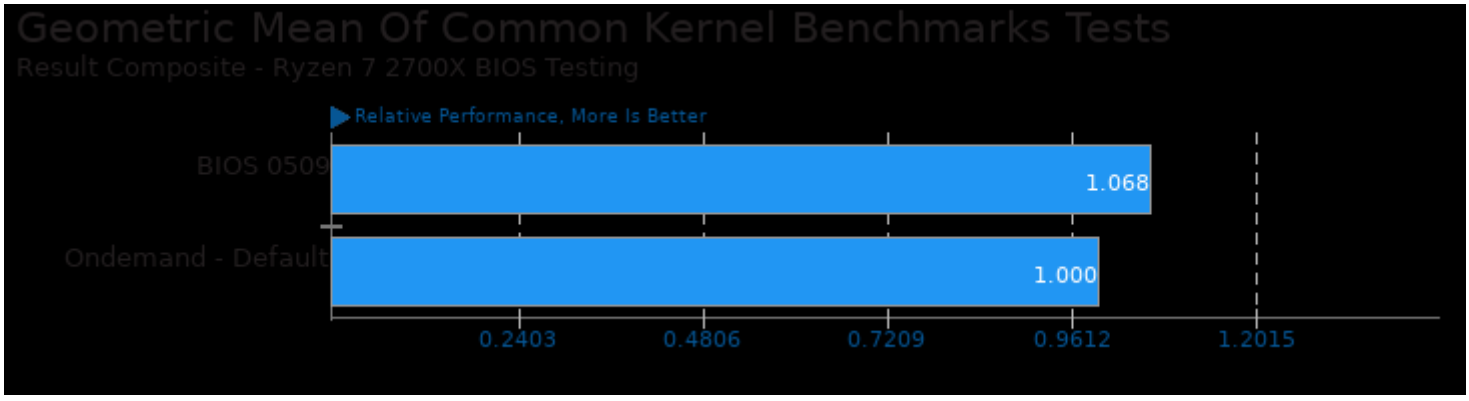
Geometric mean based upon tests: pts/smallpt, pts/ttsiod-renderer, pts/x264, pts/encode-mp3, pts/encode-flac, system/gimp, system/darktable and pts/luajit



Geometric mean based upon tests: pts/encode-mp3, pts/encode-flac and pts/x264



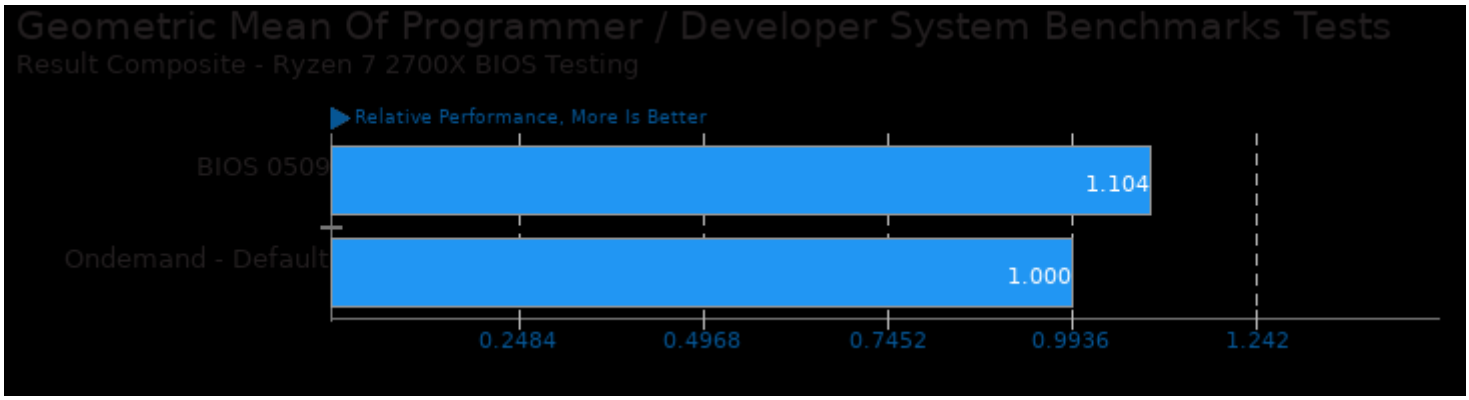
Geometric mean based upon tests: system/gimp and system/darktable



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



Geometric mean based upon tests: pts/stockfish, pts/x264, pts/john-the-ripper, pts/smallpt, pts/build-linux-kernel, pts/ttsiod-renderer and pts/pgbench

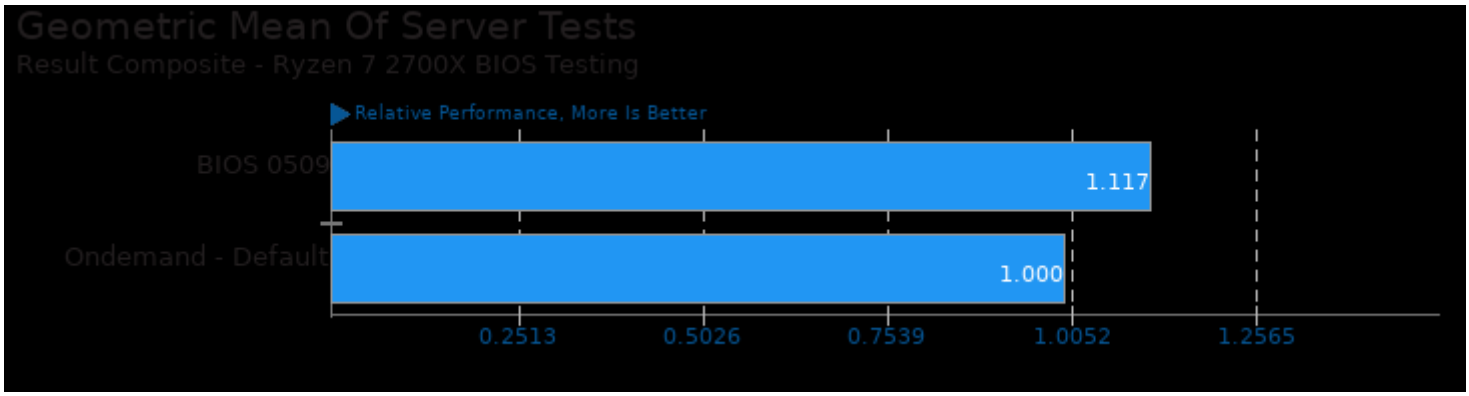


Geometric mean based upon tests: pts/pybench and pts/build-linux-kernel

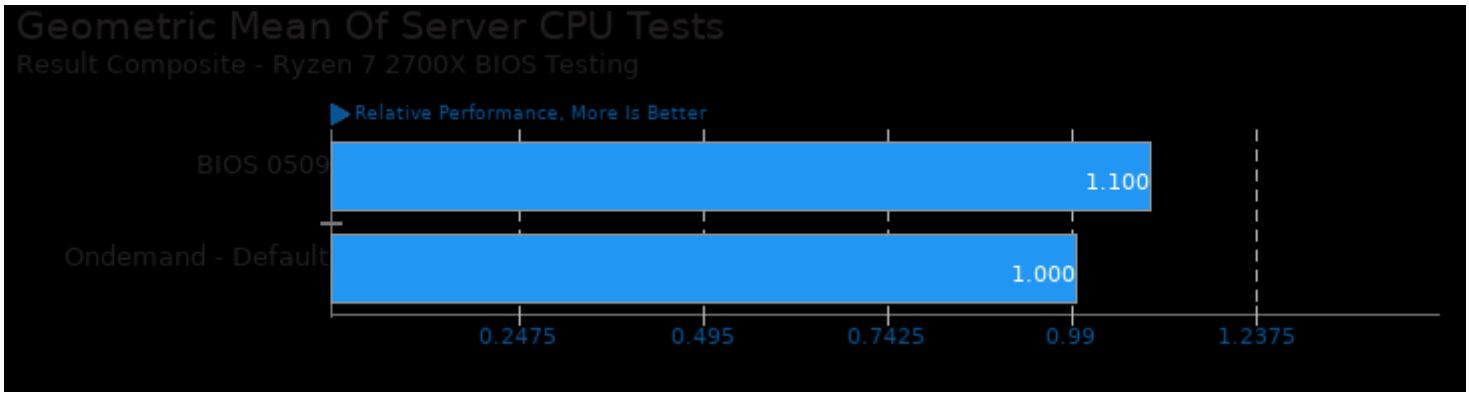


Geometric mean based upon tests: pts/smallpt and pts/ttsiod-renderer

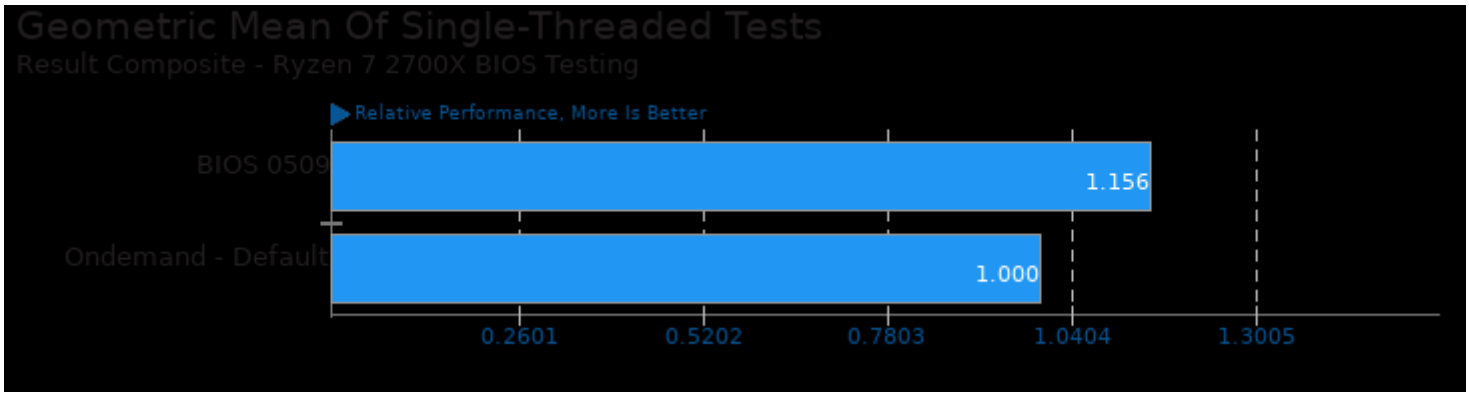
Ryzen 7 2700X BIOS Testing



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



Geometric mean based upon tests: pts/john-the-ripper, pts/x264, pts/stockfish, pts/build-linux-kernel, system/gimp, pts/pybench and pts/phpbench



Geometric mean based upon tests: pts/cachebench, pts/luajit, pts/encode-flac, pts/encode-mp3, pts/minion, pts/pybench, pts/phpbench and pts/nginx

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