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GCC 9.1 Compiler Tuning Threadripper AMD znver1

AMD Ryzen Threadripper 2990WX compiler benchmarks on GCC 9.1 with Ubuntu Linux by Michael Larabel.

Automated Executive Summary

-O3 -march=native -fno had the most wins, coming in first place for 30% of the tests.

Based on the geometric mean of all complete results, the fastest (-O3 -march=native -fno) was 2.325x the speed of the slowest (AMD Ryzen Threadripper 2990WX 32-Core). -O3 -march=native was 0.998x the speed of -O3 -march=native -fno, PGO was 0.997x the speed of -O3 -march=native, -O3 -march=athlon64-sse3 was 0.947x the speed of PGO, -O3 -march=athlon64 was 0.986x the speed of -O3 -march=athlon64-sse3, -O2 -march=native was 0.996x the speed of -O3 -march=athlon64, -O2 -march=athlon64 was 0.974x the speed of -O2 -march=native, AMD Ryzen Threadripper 2990WX 32-Core was 0.477x the speed of -O2 -march=athlon64.

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

C-Ray (Total Time - 4K, 16 Rays Per Pixel) at 225.469x

Smallpt (Global Illumination Renderer; 128 Samples) at 147.277x

GraphicsMagick (Operation: Sharpen) at 55.25x

GraphicsMagick (Operation: Enhanced) at 29.25x

XZ Compression (Compressing ubuntu-16.04.3-server-i386.img, Compression Level 9) at 27.641x

SVT-VP9 (1080p 8-bit YUV To VP9 Video Encode) at 20.596x

GraphicsMagick (Operation: Swirl) at 9.615x

GraphicsMagick (Operation: Resizing) at 7.839x

SciMark (Computational Test: Monte Carlo) at 7.467x

Timed ImageMagick Compilation (Time To Compile) at 5.106x.

Test Systems:

-O2 -march=athlon64

-O3 -march=athlon64

-O3 -march=athlon64-sse3

-O2 -march=native

-O3 -march=native

-O3 -march=native -fIto

PGO

AMD Ryzen Threadripper 2990WX 32-Core

Processor: AMD Ryzen Threadripper 2990WX 32-Core @ 3.00GHz (32 Cores / 64 Threads), Motherboard: ASUS ROG ZENITH EXTREME (1701 BIOS), Chipset: AMD 17h, Memory: 32768MB, Disk: Samsung SSD 970 EVO 500GB, Graphics: AMD Radeon RX 64 8GB (1590/800MHz), Audio: Realtek ALC1220, Monitor: ASUS VP28U, Network: Intel I211 + Qualcomm Atheros QCA6174 802.11ac + Wilocity Wil6200 802.11ad

OS: Ubuntu 18.04, Kernel: 4.18.0-18-generic (x86_64), Desktop: GNOME Shell 3.28.3, Display Server: X Server 1.20.1, Display Driver: amdgpu 18.1.0, OpenGL: 4.5 Mesa 18.2.8 (LLVM 7.0.0), Compiler: GCC 9.1.0, File-System: ext4, Screen Resolution: 3840x2160

Environment Notes: CXXFLAGS=-O3-march=native CFLAGS=-O3-march=native

Compiler Notes: --disable-multilib --enable-cheching=release

Processor Notes: Scaling Governor: acpi-cpufreq ondemand

Python Notes: Python 2.7.15rc1 + Python 3.6.7

Security Notes: __user pointer sanitization + Full AMD retpoline IBPB: conditional STIBP: disabled RSB filling + SSB disabled via prctl and seccomp

	-O2 -march=at hlon64	-O3 -march=at hlon64	-O3 -march=at hlon64-sse	-O2 -march=na tive	-O3 -march=na tive	-O3 -march=na tive -flto	PGO	AMD Ryzen Threadripp er 2990WX
				3				
MBW - Memory Copy - 8192 MiB (MiB/s)	12632	12930	12699	12795	12851	13176	12406	12618
Normalized	95.87%	98.13%	96.38%	97.11%	97.53%	100%	94.16%	95.77%
Standard Deviation	2.7%	2.8%	3%	2.9%	2.3%	2%	0.9%	
MBW - M.C.F.B.S - 8192 MiB (MiB/s)	6526	6755	6681	6778	6685	6721	6753	6596
Normalized	96.28%	99.66%	98.57%	100%	98.63%	99.16%	99.63%	97.31%
Standard Deviation	1.6%	0.2%	0.3%	1%	0.7%	2.5%	0.7%	
t-test1 - 1 (sec)	25.60	29.66	27.12	26.07	26.23	26.31	28.74	27.83
Normalized	100%	86.31%	94.4%	98.2%	97.6%	97.3%	89.07%	91.99%
Standard Deviation	0.7%	3%	4.8%	2.2%	0.5%	1%	2.3%	
t-test1 - 2 (sec)	8.68	9.59	8.82	9.40	9.01	8.89	9.41	14.05
Normalized	100%	90.51%	98.41%	92.34%	96.34%	97.64%	92.24%	61.78%
Standard Deviation	2.1%	4.1%	2%	2.1%	3.9%	2.9%	2.3%	
High Performance	0.89	0.92	0.85	0.81	0.83	0.98	0.91	0.90
Conjugate Gradient (GFLOP/s)								
Normalized	90.82%	93.88%	86.73%	82.65%	84.69%	100%	92.86%	91.84%
Standard Deviation	8.9%	9.2%	1.1%	9.7%	11.9%	2.9%	9.9%	
FFTW - Stock - 2D FFT Size 4096 (Mflops)	4342	4361	4463	6335	6600	7019	6717	6411
Normalized	61.86%	62.13%	63.58%	90.26%	94.03%	100%	95.7%	91.34%
Standard Deviation	1.1%	2.5%	0.1%	0.9%	1.4%	0.2%	0.4%	
FFTW - Float + SSE - 2D FFT Size 4096				16263	14927	14864	15287	15098
Normalized				100%	91.79%	91.4%	94%	92.84%
Standard Deviation				0.1%	0.8%	0.9%	1.7%	
Timed MAFFT	2.60	2.58	2.55	2.58	2.69	2.65	2.63	2.74
Alignment - M.S.A (sec)								
Normalized	98.08%	98.84%	100%	98.84%	94.8%	96.23%	96.96%	93.07%
Standard Deviation	6.9%	3.7%	5.1%	8.7%	0.4%	4.2%	0.3%	
LuaJIT - Composite (Mflops)	1491	1489	1496	1467	1495	1497	1499	
Normalized	99.47%	99.33%	99.8%	97.87%	99.73%	99.87%	100%	
Standard Deviation	0.5%	0.5%	0.2%	1.3%	0.1%	0.1%	0.2%	
LuaJIT - Monte Carlo (Mflops)	498	498	499	490	499	500	499	
Normalized	99.6%	99.6%	99.8%	98%	99.8%	100%	99.8%	
Standard Deviation	0%	0.2%	0%	1%	0.1%	0.6%	0.2%	
LuaJIT - F.F.T (Mflops)	286	287	287	281	286	287	286	
Normalized	99.65%	100%	100%	97.91%	99.65%	100%	99.65%	
Standard Deviation	0.2%	0.4%	0.5%	1.7%	0%	0.1%	0.2%	
LuaJIT - S.M.M (Mflops)	1183	1200	1207	1182	1208	1204	1203	
Normalized	97.93%	99.34%	99.92%	97.85%	100%	99.67%	99.59%	
Standard Deviation	2.1%	0.3%	0.2%	1.1%	0.2%	0.2%	0.1%	
LuaJIT - D.L.M.F (Mflops)	3623	3590	3619	3550	3611	3624	3636	
Normalized	99.64%	98.73%	99.53%	97.63%	99.31%	99.67%	100%	
Standard Deviation	0.4%	1.1%	0.3%	1.5%	0.1%	0.1%	0.4%	

LuaJIT - J.S.O.R	1865	1867	1868	1830	1868	1868	1870	
Normalized	99.73%	99.84%	99.89%	97.86%	99.89%	99.89%	100%	
Standard Deviation	0%	0%	0%	1.1%	0%	0%	0%	
SciMark - Composite (Mflops)	1782	2021	2039	1981	2514	2543	2555	2257
Normalized	69.75%	79.1%	79.8%	77.53%	98.4%	99.53%	100%	88.34%
Standard Deviation	0.4%	2.8%	0%	1.5%	2.9%	2.2%	0.2%	
SciMark - Monte Carlo (Mflops)	723	736	737	721	732	1904	728	255
Normalized	37.97%	38.66%	38.71%	37.87%	38.45%	100%	38.24%	13.39%
Standard Deviation	0.8%	0.2%	0%	0.9%	0%	0%	0.1%	
SciMark - F.F.T (Mflops)	291	294	294	265	270	270	261	260
Normalized	98.98%	100%	100%	90.14%	91.84%	91.84%	88.78%	88.44%
Standard Deviation	0.6%	0.1%	0.4%	0.8%	0.1%	0.1%	0.1%	
SciMark - S.M.M	3119	2874	3082	3105	3174	2951	3220	3153
Normalized	96.86%	89.25%	95.71%	96.43%	98.57%	91.65%	100%	97.92%
Standard Deviation	0.4%	12.5%	0.2%	2.9%	2%	1.2%	0.5%	
SciMark - D.L.M.F (Mflops)	3593	4274	4239	4507	5989	5388	6356	5429
Normalized	56.53%	67.24%	66.69%	70.91%	94.23%	84.77%	100%	85.42%
Standard Deviation	0.8%	0%	0.2%	1.4%	10.2%	4.5%	0.3%	
SciMark - J.S.O.R (Mflops)	1186	1842	1842	1306	2218	2202	2208	2190
Normalized	53.47%	83.05%	83.05%	58.88%	100%	99.28%	99.55%	98.74%
Standard Deviation	0.8%	0%	0%	1%	0%	0%	0%	
TSCP - A.C.P (Nodes/s)	1094211	1115390	1115841	1102013	1116747	1135626	1109114	981778
Normalized	96.35%	98.22%	98.26%	97.04%	98.34%	100%	97.67%	86.45%
Standard Deviation	1%	0.2%	0.2%	0.4%	0.2%	0.1%	0.4%	
MKL-DNN - IP Batch 1D - f32 (ms)	71.98	70.94	71.02	72.08	71.26		70.94	71.00
Normalized	98.56%	100%	99.89%	98.42%	99.55%		100%	99.92%
Standard Deviation	0.2%	0.3%	0.1%	0.6%	1%		0.2%	
AOM AV1 - AV1 Video Encoding (FPS)	0.20	0.20	0.21	0.21	0.22	0.22	0.22	0.08
Normalized	90.91%	90.91%	95.45%	95.45%	100%	100%	100%	36.36%
Standard Deviation	0%	2.8%	0%	0%	0%	0%	0%	
SVT-AV1 - 18.51	18.84	18.66	18.63	20.27	20.41	19.57	18.77	
1.8.b.Y.T.A.V.E (FPS)								
Normalized	90.69%	92.31%	91.43%	91.28%	99.31%	100%	95.88%	91.96%
Standard Deviation	1.6%	1.1%	0.8%	0.8%	0.4%	0.7%	0.9%	
SVT-HEVC - 172	168	166	163	165	165	185	23.01	
1.8.b.Y.T.H.V.E (FPS)								
Normalized	92.97%	90.81%	89.73%	88.11%	89.19%	89.19%	100%	12.44%
Standard Deviation	10.8%	2.5%	0.7%	6.4%	2.1%	2.1%	13.5%	
SVT-VP9 - 101.13	103.45	97.81	100.82	102.91	104.42	103.97	5.07	
1.8.b.Y.T.V.V.E (FPS)								
Normalized	96.85%	99.07%	93.67%	96.55%	98.55%	100%	99.57%	4.86%
Standard Deviation	3.7%	4.7%	1.4%	1.4%	4.3%	4.4%	3.6%	
VP9 libvpx Encoding - 25.44	26.12	25.58	26.02	26.37			26.36	
v.V.1.V.E (FPS)								
Normalized	96.47%	99.05%	97%	98.67%	100%			99.96%
Standard Deviation	3%	0%	2.7%	1.5%	0.9%			0.2%
x264 - H.2.V.E (FPS)	146	146	146	143	147		145	
Normalized	99.32%	99.32%	99.32%	97.28%	100%			98.64%

	Standard Deviation	3%	1%	3%	2.4%	3%	1.1%	
x265 - H.2.1.V.E (FPS)	33.53	33.89	33.88	33.44	33.76	33.68	33.79	9.95
Normalized	98.94%	100%	99.97%	98.67%	99.62%	99.38%	99.7%	29.36%
Standard Deviation	0.3%	0.2%	0.3%	0.5%	0.5%	0.2%	0.3%	
GraphicsMagick - Swirl	244	237	237	245	247	250	250	26
(Iterations/min)								
Normalized	97.6%	94.8%	94.8%	98%	98.8%	100%	100%	10.4%
Standard Deviation	0.2%		0.4%	0.7%				
GraphicsMagick -	243	238	240	249	249	248	251	175
Rotate (Iterations/min)								
Normalized	96.81%	94.82%	95.62%	99.2%	99.2%	98.8%	100%	69.72%
Standard Deviation						0.5%	0.2%	
GraphicsMagick -	192	190	191	217	219	221	220	4
Sharpen								
Normalized	86.88%	85.97%	86.43%	98.19%	99.1%	100%	99.55%	1.81%
Standard Deviation		0.6%	0.6%	0.3%		0.7%	0.7%	
GraphicsMagick -	198	195	194	231	232	233	234	8
Enhanced								
(Iterations/min)								
Normalized	84.62%	83.33%	82.91%	98.72%	99.15%	99.57%	100%	3.42%
Standard Deviation	0.5%	0.5%					0.7%	
GraphicsMagick -	235	233	231	238	243	240	243	31
Resizing								
Normalized	96.71%	95.88%	95.06%	97.94%	100%	98.77%	100%	12.76%
Standard Deviation	0.9%				0.7%	0.6%	0.5%	
GraphicsMagick -	202	199	198	200	204	203	203	40
Noise-Gaussian								
(Iterations/min)								
Normalized	99.02%	97.55%	97.06%	98.04%	100%	99.51%	99.51%	19.61%
Standard Deviation	1.3%	0.8%		0.6%	0.6%		0.6%	
GraphicsMagick - HWB	272	261	263	271	272	274	274	59
Color Space								
(Iterations/min)								
Normalized	99.27%	95.26%	95.99%	98.91%	99.27%	100%	100%	21.53%
Standard Deviation	0.2%	0.9%						
Himeno Benchmark -	1328	1316	1316	1319	1313	1304	1321	1322
P.P.S (MFLOPS)								
Normalized	100%	99.1%	99.1%	99.32%	98.87%	98.19%	99.47%	99.55%
Standard Deviation	0.5%	0.5%	0.5%	0.5%	0.2%	0.2%	0.5%	
Stockfish - Total Time	66890687	67513602	67571150	66697487	68200164	67450689	67841877	
(Nodes/s)								
Normalized	98.08%	98.99%	99.08%	97.8%	100%	98.9%	99.47%	
Standard Deviation	0.6%	2%	1.1%	1.4%	2.4%	1%	1.2%	
Timed ImageMagick	17.41	19.77	19.73	17.58	19.15	88.89	19.09	19.69
Compilation - Time To								
Compile (sec)								
Normalized	100%	88.06%	88.24%	99.03%	90.91%	19.59%	91.2%	88.42%
Standard Deviation	2.1%	2.6%	0.3%	2.4%	2.3%	2.7%	0.7%	
Timed LLVM	229	225	224	221	221	951		290
Compilation - Time To								
Normalized	96.51%	98.22%	98.66%	100%	100%	23.24%		76.21%

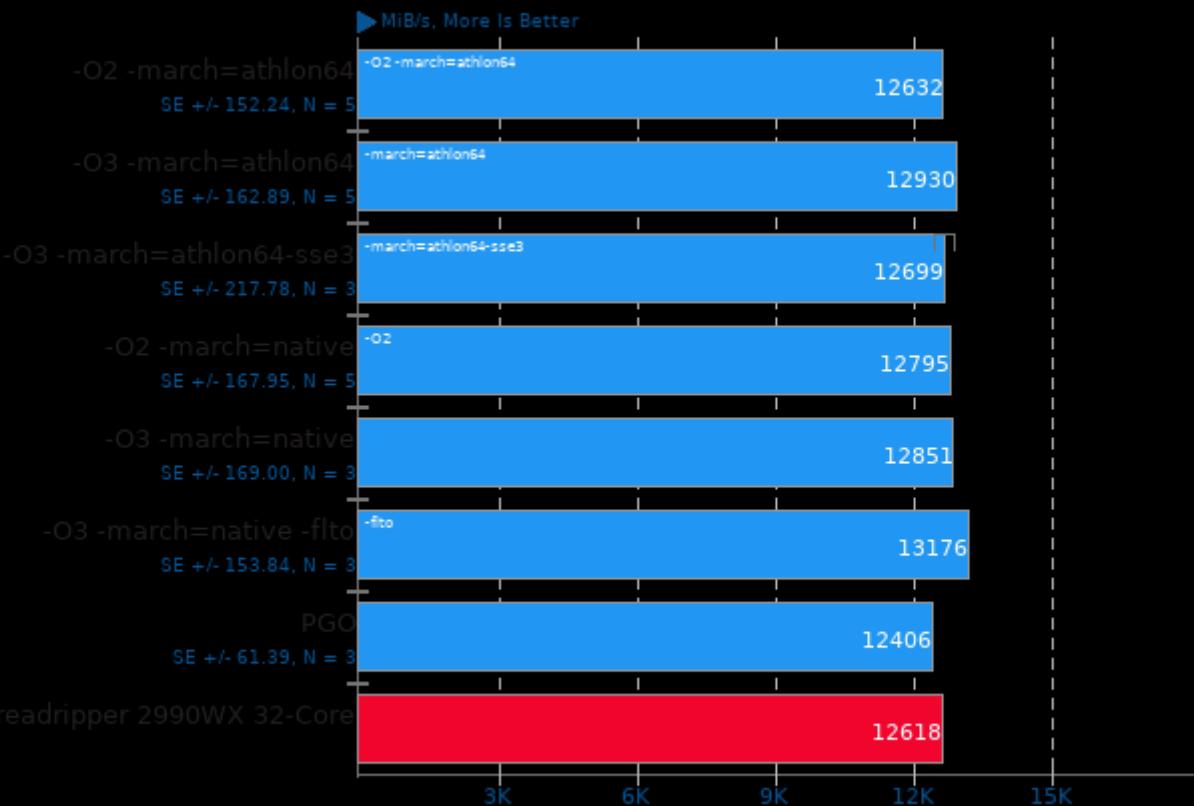
Timed PHP Compilation	43.86	63.19	62.93	44.44	63.25		63.01	85.40
- Time To Compile (sec)								
Normalized	100%	69.41%	69.7%	98.69%	69.34%		69.61%	51.36%
Standard Deviation	0.8%	0.9%	0.5%	0.3%	0.2%		0.3%	
C-Ray - Total Time -	45.43	29.39	29.53	34.22	18.00	17.85	17.96	4025
4.1.R.P.P (sec)								
Normalized	39.29%	60.73%	60.45%	52.16%	99.17%	100%	99.39%	0.44%
Standard Deviation	0.5%	0.3%	0.3%	0.6%	0.3%	0.5%	0.2%	
Smallpt - G.I.R.1.S (sec)	4.57	4.51	4.54	3.89	3.87	3.85	3.83	564.07
Normalized	83.81%	84.92%	84.36%	98.46%	98.97%	99.48%	100%	0.68%
Standard Deviation	1%	1%	0.6%	0.5%	1.4%	0.3%	1.8%	
AOBench - 2048 x 2048	47.28	45.20	44.98	42.34	39.11	39.92	39.10	43.36
- Total Time (sec)								
Normalized	82.7%	86.5%	86.93%	92.35%	99.97%	97.95%	100%	90.18%
Standard Deviation	0%	0.1%	0%	0.1%	0%	0.1%	0.1%	
Bullet Physics Engine -	2.49	2.46	2.46	2.38	2.35	2.30	2.34	
Raytests (sec)								
Normalized	92.37%	93.5%	93.5%	96.64%	97.87%	100%	98.29%	
Standard Deviation	1.7%	0.1%	0.1%	0.1%	0.1%	0%	0%	
Bullet Physics Engine -	3.96	3.92	3.91	3.95	3.84	3.97	3.83	
3000 Fall (sec)								
Normalized	96.72%	97.7%	97.95%	96.96%	99.74%	96.47%	100%	
Standard Deviation	1.4%	0.1%	0%	0.9%	0.2%	0.4%	0.1%	
Bullet Physics Engine -	4.68	4.65	4.62	4.57	4.42	4.82	4.41	
1000 Stack (sec)								
Normalized	94.23%	94.84%	95.45%	96.5%	99.77%	91.49%	100%	
Standard Deviation	1.3%	0.3%	0.2%	1.2%	0.2%	0.3%	0.2%	
Bullet Physics Engine -	4.50	4.45	4.45	4.06	3.97	3.90	3.97	
1000 Convex (sec)								
Normalized	86.67%	87.64%	87.64%	96.06%	98.24%	100%	98.24%	
Standard Deviation	1.6%	0.1%	0.2%	0.5%	0.2%	0.1%	0.1%	
Bullet Physics Engine -	2.42	2.36	2.35	2.39	2.30	2.44	2.32	
136 Ragdolls (sec)								
Normalized	95.04%	97.46%	97.87%	96.23%	100%	94.26%	99.14%	
Standard Deviation	2.5%	0.2%	0.2%	1.8%	0.2%	0.2%	0.6%	
Bullet Physics Engine -	0.87	0.86	0.86	0.84	0.84	0.82	0.83	
Prim Trimesh (sec)								
Normalized	94.25%	95.35%	95.35%	97.62%	97.62%	100%	98.8%	
Standard Deviation	1.1%	0.2%	0.3%	0.2%	0.1%	0.4%	0.1%	
Bullet Physics Engine -	1.07	1.06	1.06	1.02	1.00	0.97	1.00	
Convex Trimesh (sec)								
Normalized	90.65%	91.51%	91.51%	95.1%	97%	100%	97%	
Standard Deviation	1.6%	0.1%	0.1%	0.7%	0.2%	0.1%	0%	
XZ Compression -	26.75	26.50	25.93	26.78	25.70	25.62	26.09	708.15
C.u.1.0.3.s.i.i.C.L.9								
Normalized	95.78%	96.68%	98.8%	95.67%	99.69%	100%	98.2%	3.62%
Standard Deviation	3%	1.7%	2.9%	0.7%	3.9%	3.5%	0.5%	
Zstd Compression -	18.02	17.74	18.38	19.31	19.09	17.94	17.36	265.79
C.u.1.0.3.s.i.i.C.L.1								
Normalized	96.34%	97.86%	94.45%	89.9%	90.94%	96.77%	100%	6.53%
Standard Deviation	12.9%	13.4%	13.9%	12.3%	13.2%	14.3%	10.1%	

FLAC Audio Encoding - WAV To FLAC (sec)	15.58	15.48	15.43	9.78	9.53	9.48	9.44	9.81
Normalized	60.59%	60.98%	61.18%	96.52%	99.06%	99.58%	100%	96.23%
Standard Deviation	0.2%	0.6%	0.1%	1.2%	0.2%	1.5%	0.1%	
LAME MP3 Encoding - WAV To MP3 (sec)	11.41	9.43	9.36	10.80	8.00	7.98	7.98	11.09
Normalized	69.94%	84.62%	85.26%	73.89%	99.75%	100%	100%	71.96%
Standard Deviation	0.7%	0.2%	0.1%	1%	0.2%	0%	0.1%	
OpenSSL - R.4.b.P (Signs/sec)	5832	5837	5838	5831	5825	5833	5830	5791
Normalized	99.9%	99.98%	100%	99.88%	99.78%	99.91%	99.86%	99.19%
Standard Deviation	0%	0%	0%	0%	0.1%	0.1%	0.1%	
PostgreSQL pgbench - Buffer Test - Normal	453605	463840	459596	458551	466723	473620	460414	259058
Load - Read Only (TPS)								
Normalized	95.77%	97.94%	97.04%	96.82%	98.54%	100%	97.21%	54.7%
Standard Deviation	1.1%	2.6%	2.6%	1.3%	0.4%	0.6%	2.8%	
PostgreSQL pgbench - Buffer Test - Normal	5098	15616	16252	13558	16339	14989	6281	6472
Load - Read Write								
Normalized	31.2%	95.58%	99.47%	82.98%	100%	91.74%	38.44%	39.61%
Standard Deviation	2.6%	2.7%	0.5%	8%	1%	2.9%	3%	
CppPerformanceBench - Atol (sec)	69.08	68.37	68.42	69.80	69.03	69.25	69.31	69.25
Normalized	98.97%	100%	99.93%	97.95%	99.04%	98.73%	98.64%	98.73%
Standard Deviation	0.1%	1%	1%	0.3%	0.1%	0.2%	0.4%	
CppPerformanceBench - Ctype (sec)	33.37	33.28	33.31	34.50	33.88	32.32	34.02	37.67
Normalized	96.85%	97.12%	97.03%	93.68%	95.4%	100%	95%	85.8%
Standard Deviation	0%	0.1%	0.1%	0.4%	0%	0%	0%	
CppPerformanceBench - Math Library	399	398	399	356	351	352	353	355
Normalized	87.97%	88.19%	87.97%	98.6%	100%	99.72%	99.43%	98.87%
Standard Deviation	0.4%	0.3%	0.4%	0.9%	0.1%	0.4%	0.5%	
CppPerformanceBench - Rand Numbers	1072	1070	1055	1041	1023	1011	1027	1154
(sec)								
Normalized	94.31%	94.49%	95.83%	97.12%	98.83%	100%	98.44%	87.61%
Standard Deviation	0%	0.1%	0%	0.8%	0%	0%	0%	
CppPerformanceBench - Stepanov	75.79	75.53	75.56	75.99	74.93	74.92	75.27	78.14
Vector (sec)								
Normalized	98.85%	99.19%	99.15%	98.59%	99.99%	100%	99.54%	95.88%
Standard Deviation	0.1%	0%	0%	0.2%	0%	0%	0.1%	
CppPerformanceBench - Function	16.20	16.17	16.14	15.61	15.40	15.50	15.46	22.07
Objects (sec)								
Normalized	95.06%	95.24%	95.42%	98.65%	100%	99.35%	99.61%	69.78%
Standard Deviation	0.1%	0.2%	0.1%	0.1%	0.1%	0%	0%	
CppPerformanceBench - S.A (sec)	28.33	28.26	28.28	28.69	28.22	28.25	28.36	29.08
Normalized	99.61%	99.86%	99.79%	98.36%	100%	99.89%	99.51%	97.04%
Standard Deviation	0.1%	0%	0.1%	0.8%	0%	0%	0.1%	

Redis - LPOP	2654025	2544762	2506276	2340595	2573823	2616703	2648345
Normalized	100%	95.88%	94.43%	88.19%	96.98%	98.59%	99.79%
Standard Deviation	6%	2.9%	0.3%	1.8%	2.3%	2.8%	1.7%
Redis - SADD	1975322	2051129	2032921	2000709	2046557	2084089	2083430
Normalized	94.78%	98.42%	97.54%	96%	98.2%	100%	99.97%
Standard Deviation	1.6%	2%	2.7%	4.5%	1.1%	2.3%	0.8%
Redis - LPUSH	1548556	1520276	1522952	1463388	1540257	1549647	1532038
(Req/sec)							
Normalized	99.93%	98.1%	98.28%	94.43%	99.39%	100%	98.86%
Standard Deviation	3%	2.3%	1%	2.7%	1.4%	0.8%	2.5%
Redis - GET (Req/sec)	2384143	2540398	2461725	2275019	2502182	2509433	2533027
Normalized	93.85%	100%	96.9%	89.55%	98.5%	98.78%	99.71%
Standard Deviation	2.9%	1%	2%	1.9%	0.8%	2.5%	3.6%
Redis - SET (Req/sec)	1730702	1840806	1755590	1744979	1807270	1755472	1798800
Normalized	94.02%	100%	95.37%	94.79%	98.18%	95.36%	97.72%
Standard Deviation	2.3%	1.6%	1.2%	6.4%	0.6%	0.7%	1.4%
ctx_clock - C.S.T	150	150	150	150	150	150	150
(Clocks)							
Memcached mcperf - Add (Operations/sec)	54600	53106	34822	34138	44903	50055	47774
Normalized	100%	97.26%	63.78%	62.52%	82.24%	91.68%	87.5%
Standard Deviation	18.2%	16.4%	0.6%	0.6%	9.1%	16.9%	17.7%
Memcached mcperf - Get (Operations/sec)	55647	56837	69004	55791	57652	68644	68426
Normalized	80.64%	82.37%	100%	80.85%	83.55%	99.48%	99.16%
Standard Deviation	1.1%	0.1%	0.7%	0.4%	2.4%	0.2%	1.9%
Memcached mcperf - Set (Operations/sec)	59924	34880	48548	34446	38646	43570	46396
Normalized	100%	58.21%	81.02%	57.48%	64.49%	72.71%	77.42%
Standard Deviation	14.2%	0.2%	19%	0.3%	8.8%	0.8%	11%
Memcached mcperf - Append	61219	56172	45716	35058	42455	45339	46106
Normalized	100%	91.76%	74.68%	57.27%	69.35%	74.06%	75.31%
Standard Deviation	16.8%	21%	0.8%	0.8%	1%	0.8%	0.5%
Memcached mcperf - Delete (Operations/sec)	55747	56822	69509	56141	58969	68696	68980
Normalized	100%	80.2%	100%	80.77%	84.84%	98.83%	99.24%
Standard Deviation	0.9%	0.9%	2.6%	0.9%	2.6%	0.6%	0.9%
Memcached mcperf - Prepend (Operations/sec)	35467	35968	45691	35552	43824	45587	47085
Normalized	75.33%	76.39%	97.04%	75.51%	93.07%	96.82%	100%
Standard Deviation	0.5%	0.3%	0.4%	0.9%	20.3%	0.7%	6.4%
Memcached mcperf - Replace	35829	36231	45707	35486	53865	45591	45956
Normalized	66.52%	67.26%	84.85%	65.88%	100%	84.64%	85.32%
Standard Deviation	0.6%	1.7%	0.3%	0.8%	11.2%	0.7%	0.6%
NGINX Benchmark - S.W.P.S (Req/sec)	29704	29726	29281	27834	29274	27352	
Normalized	99.93%	100%	98.5%	93.64%	98.48%	92.01%	
Standard Deviation	1.3%	1%	2.5%	1%	2.7%	0.3%	

MBW 2018-09-08

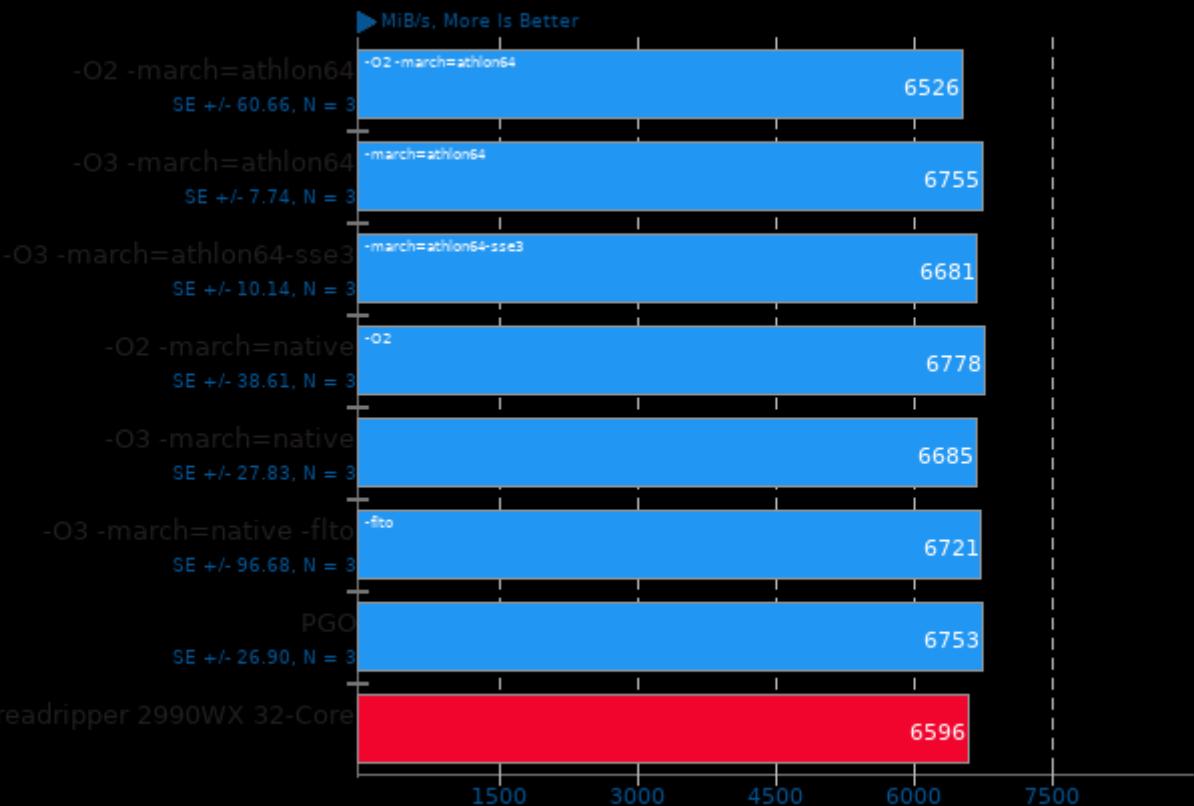
Test: Memory Copy - Array Size: 8192 MiB



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

MBW 2018-09-08

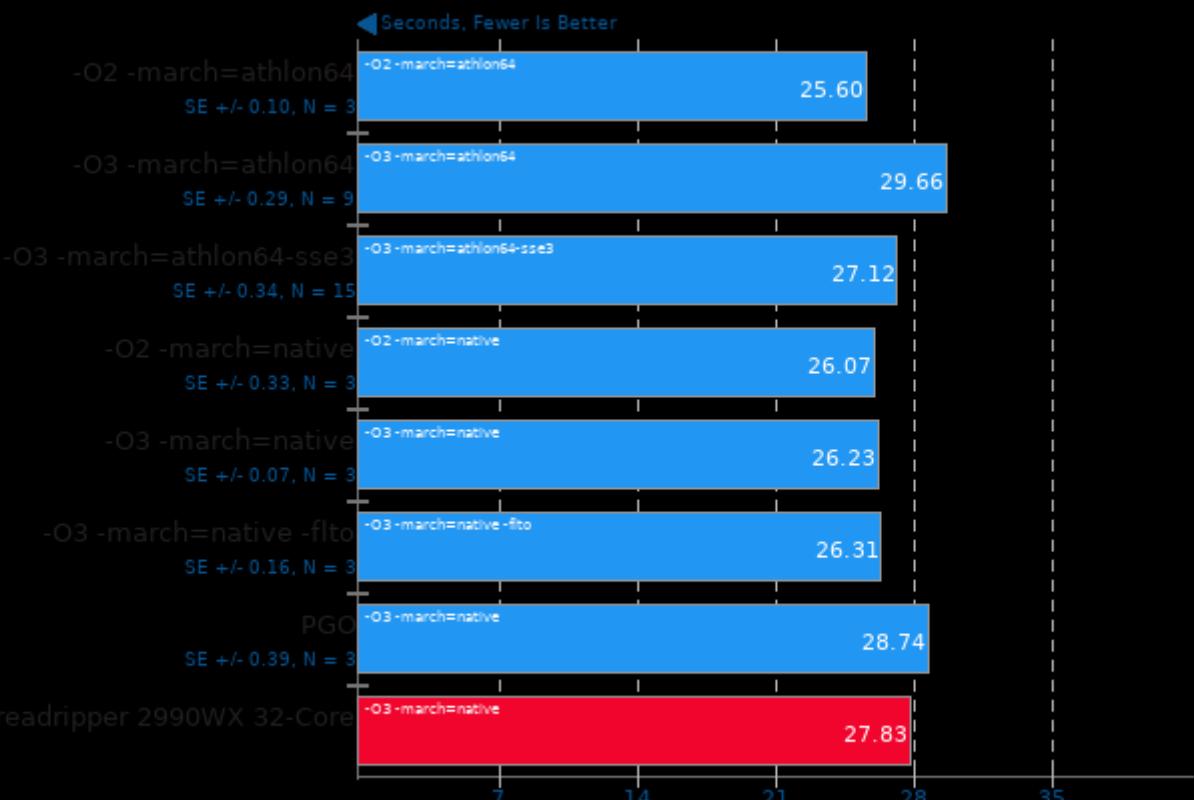
Test: Memory Copy, Fixed Block Size - Array Size: 8192 MiB



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

t-test1 2017-01-13

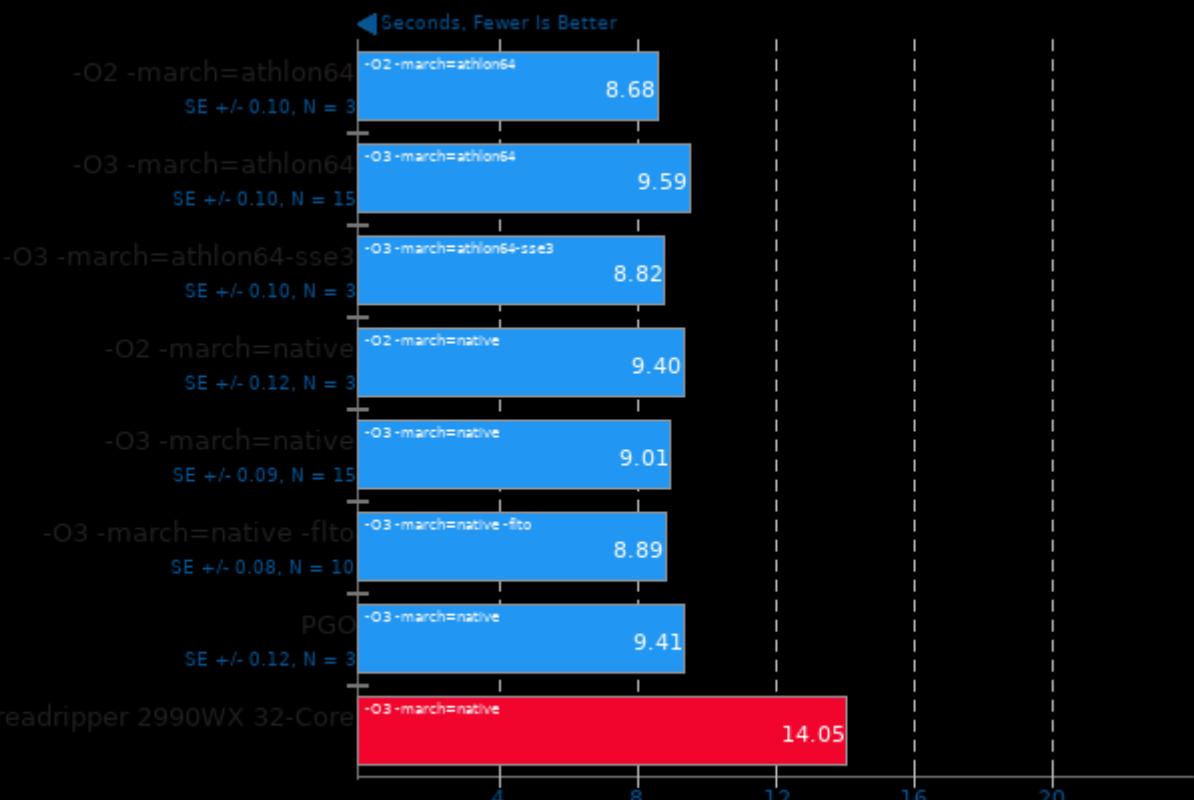
Threads: 1



1. (CC) gcc options: -pthread

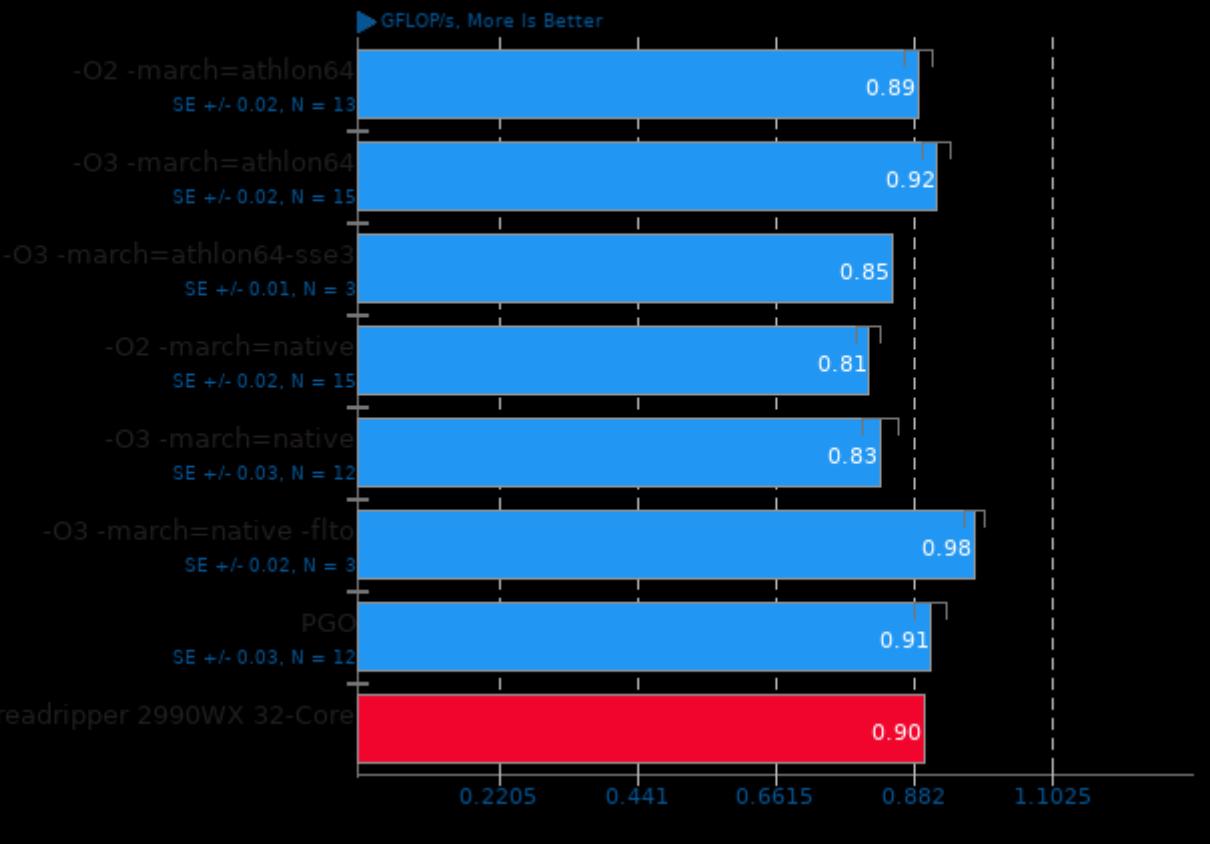
t-test1 2017-01-13

Threads: 2



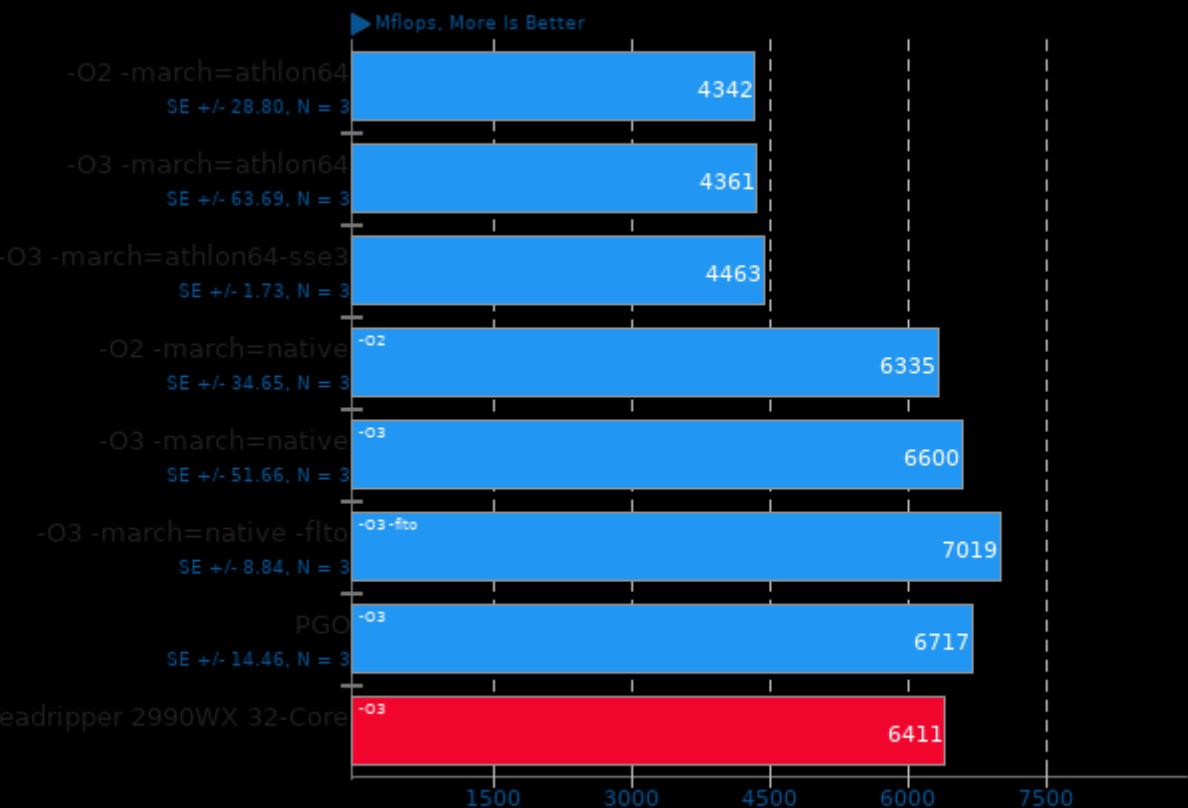
1. (CC) gcc options: -pthread

High Performance Conjugate Gradient 3.0



FFTW 3.3.6

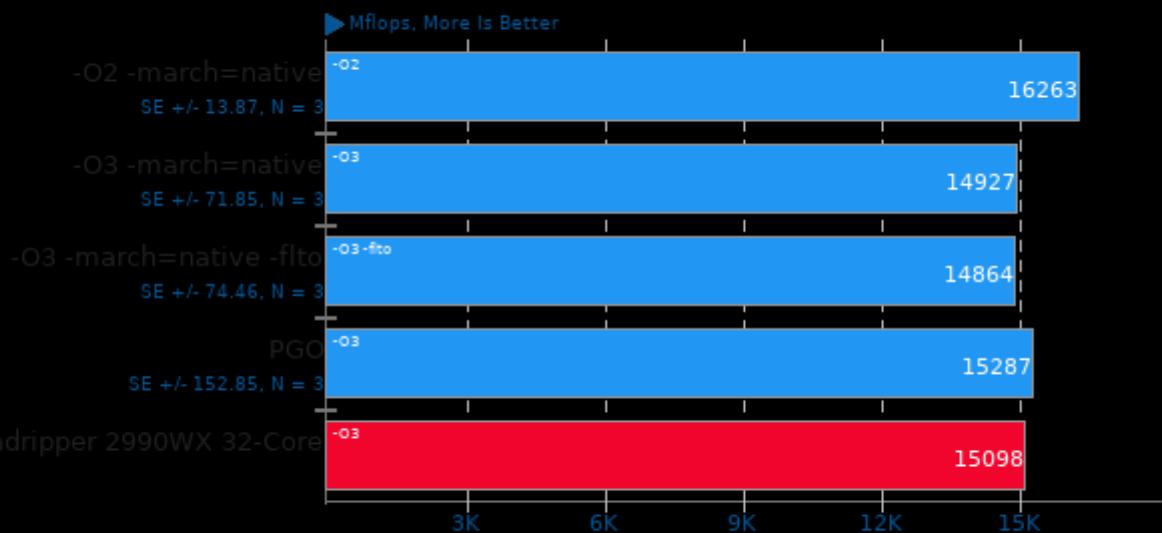
Build: Stock - Size: 2D FFT Size 4096



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

FFTW 3.3.6

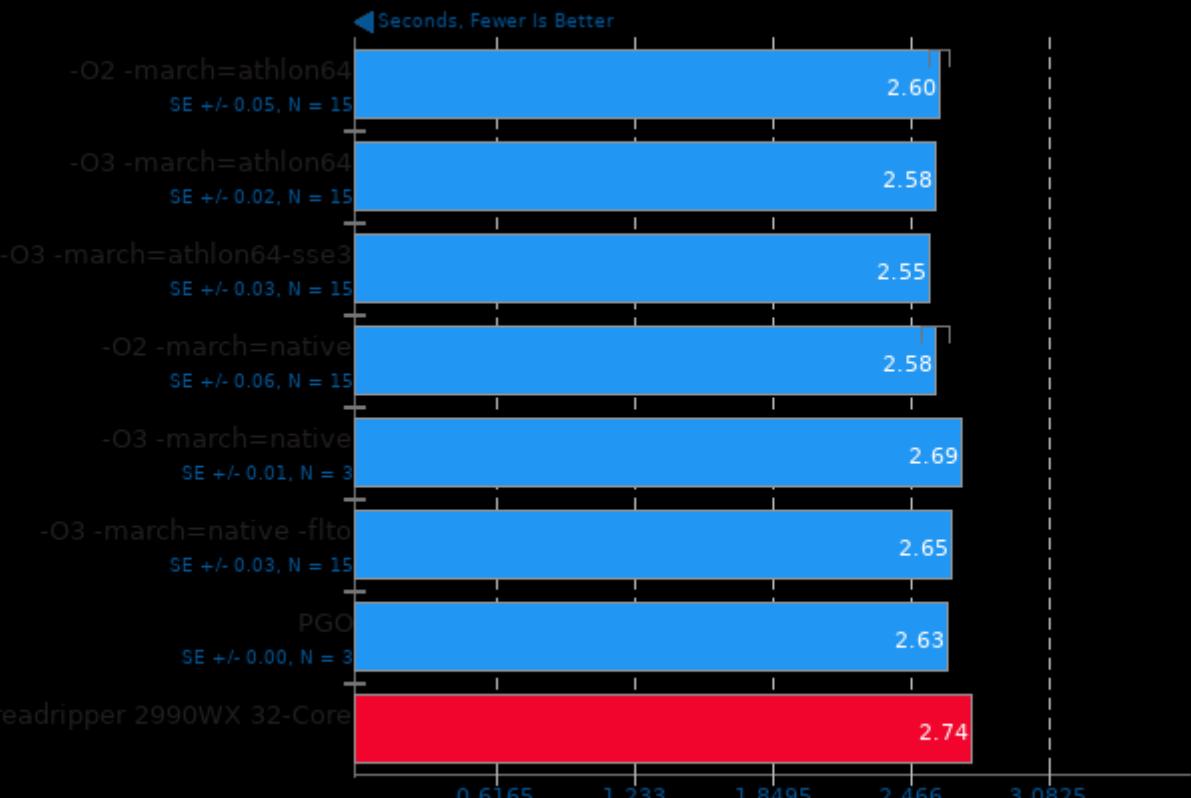
Build: Float + SSE - Size: 2D FFT Size 4096



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

Timed MAFFT Alignment 7.392

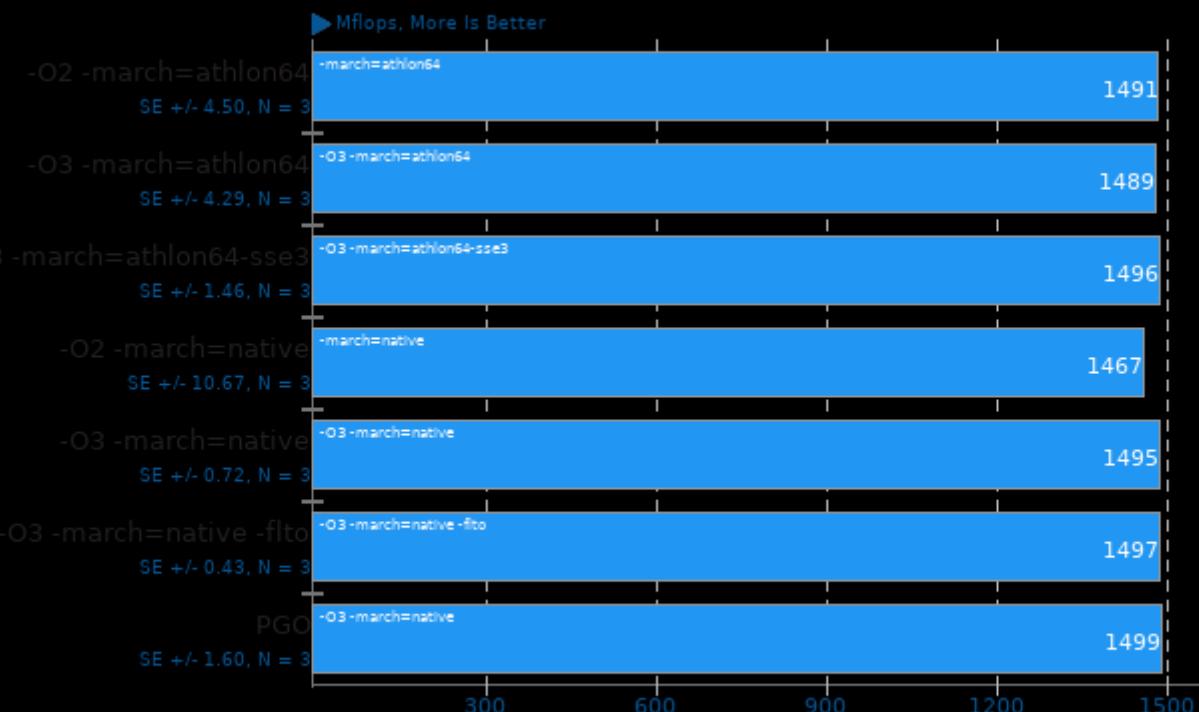
Multiple Sequence Alignment



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

LuaJIT 2.1-git

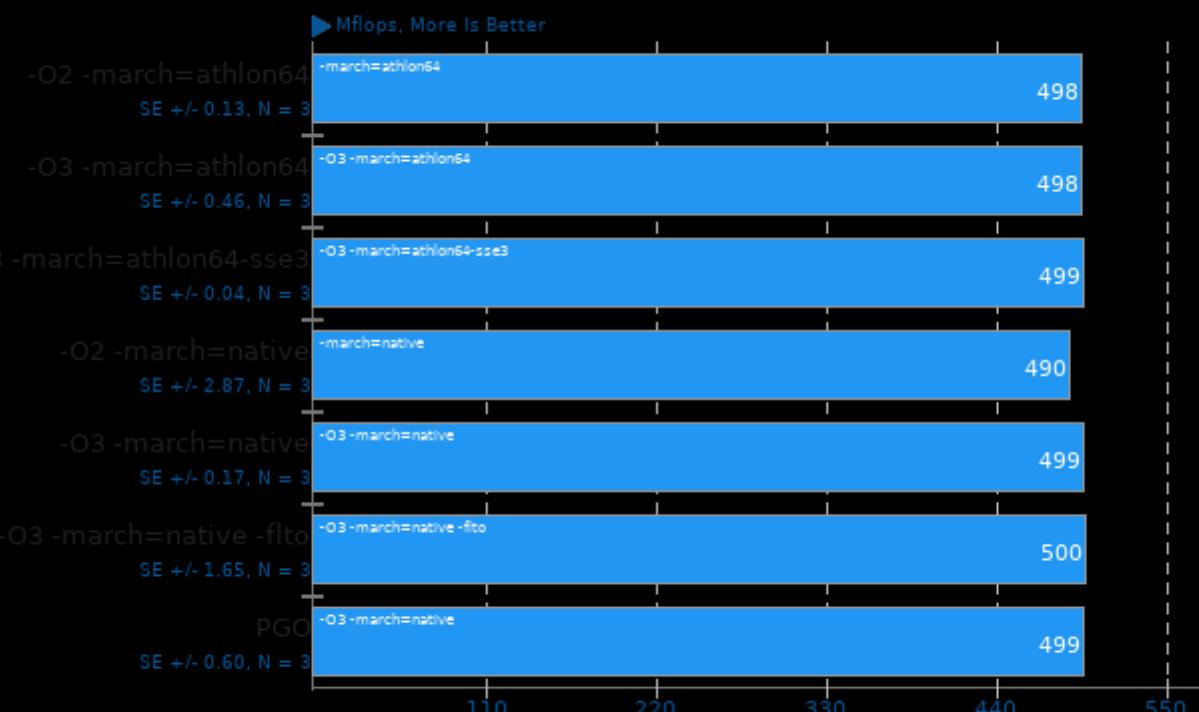
Test: Composite



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

LuaJIT 2.1-git

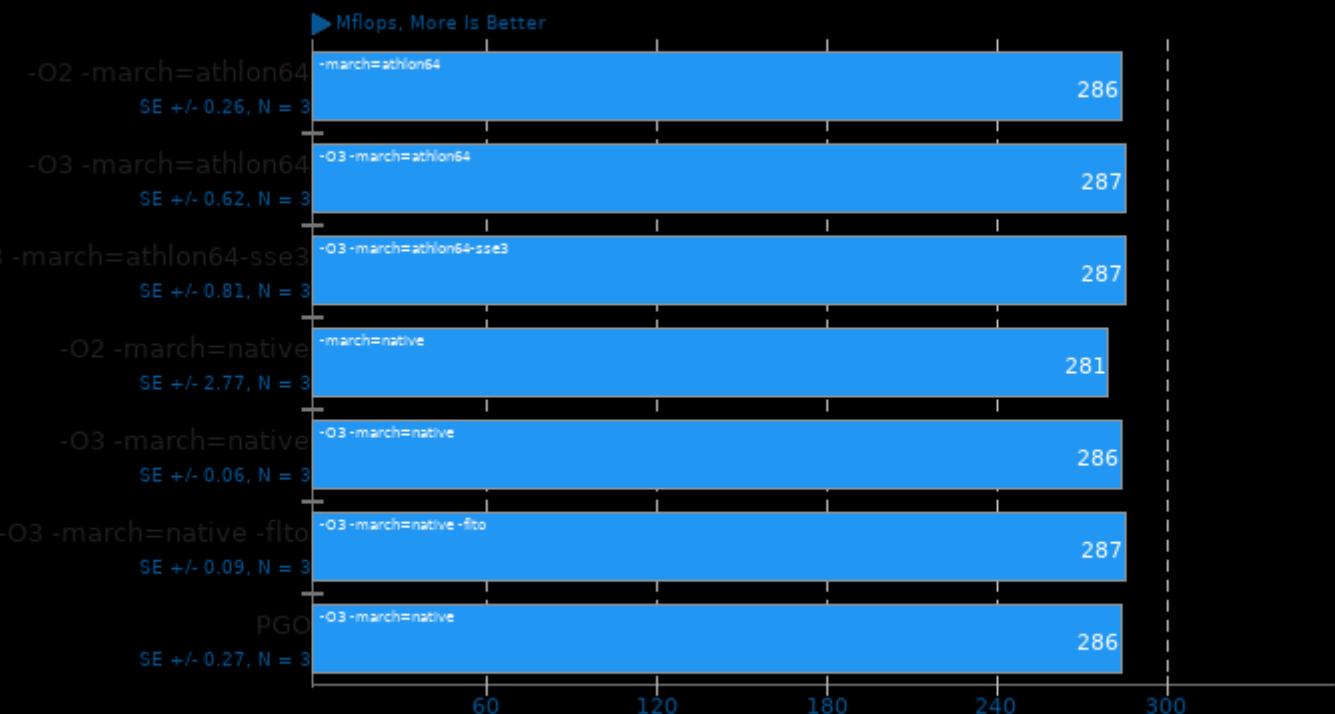
Test: Monte Carlo



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

LuaJIT 2.1-git

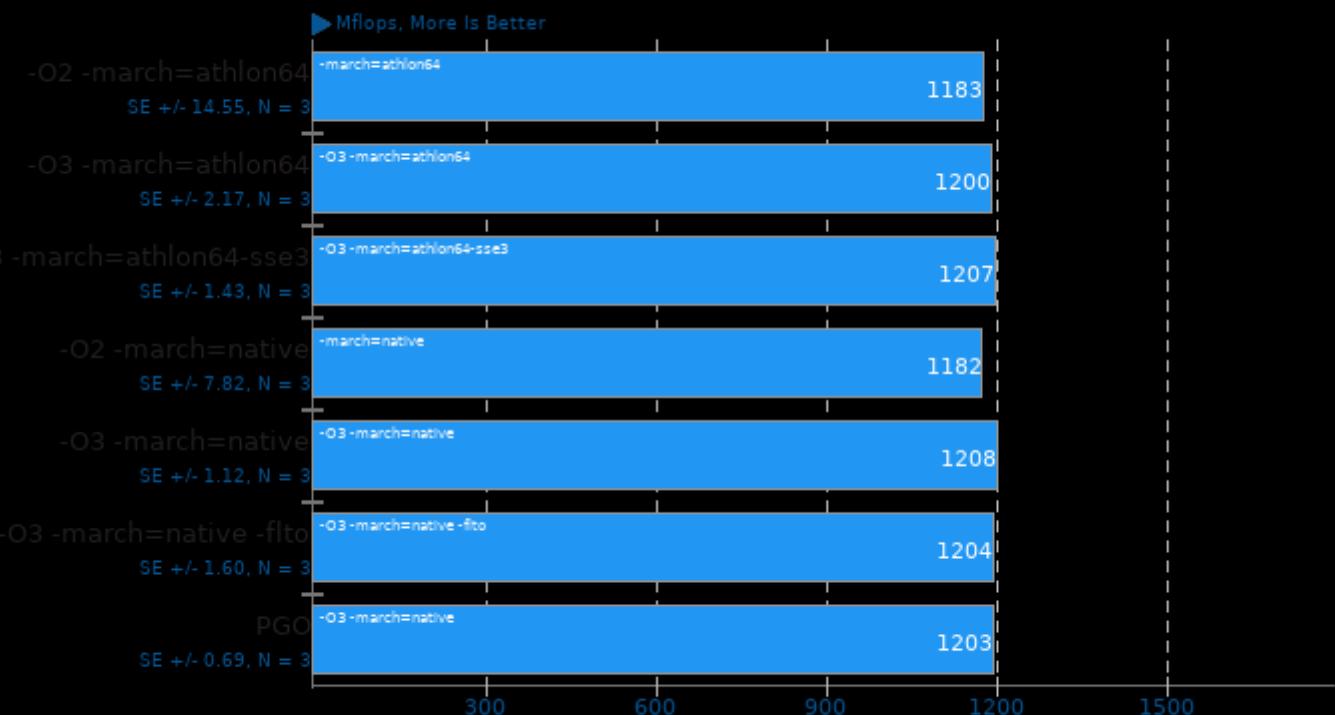
Test: Fast Fourier Transform



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

LuaJIT 2.1-git

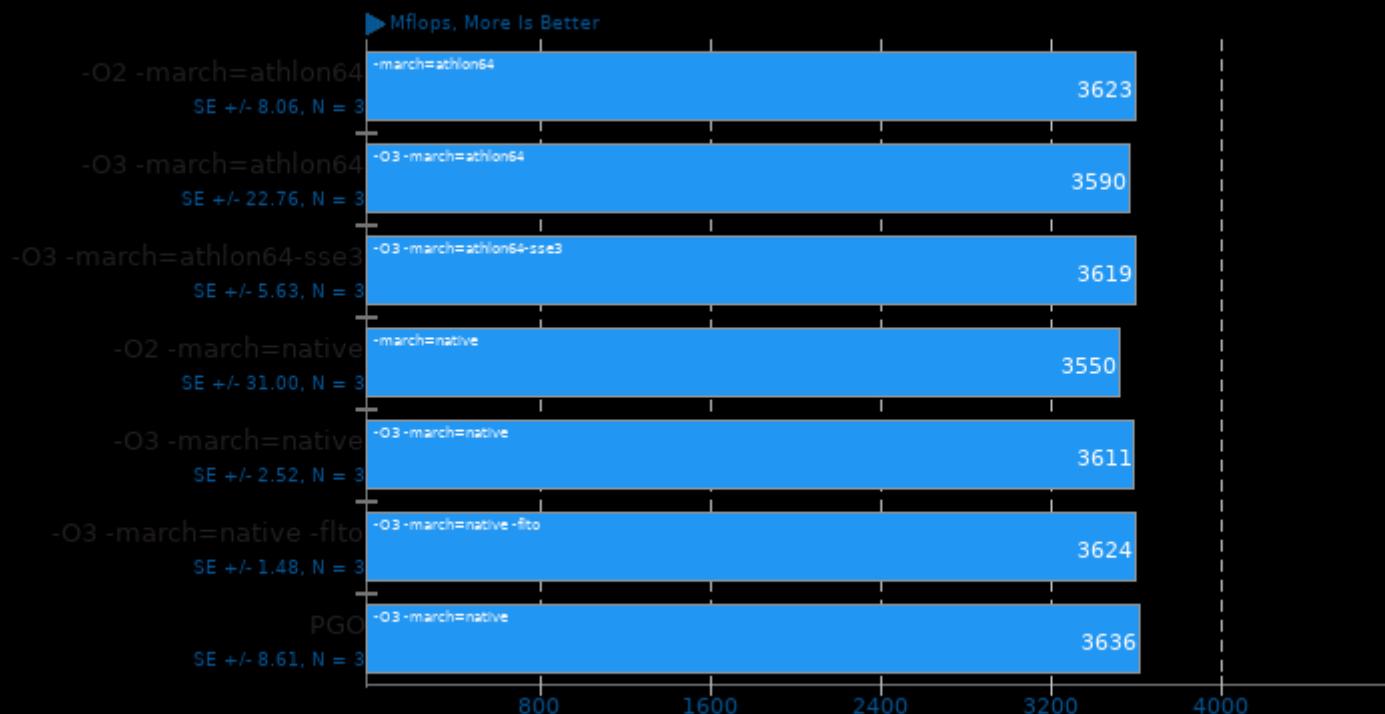
Test: Sparse Matrix Multiply



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

LuaJIT 2.1-git

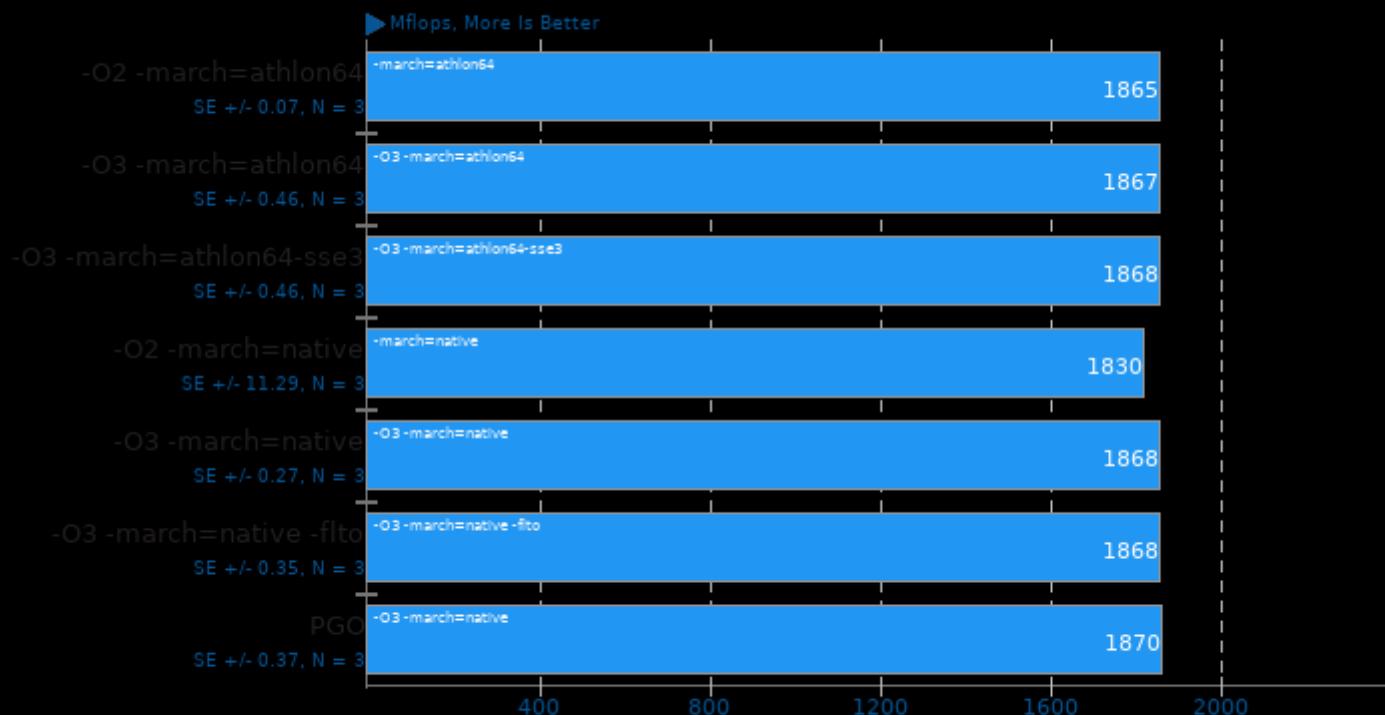
Test: Dense LU Matrix Factorization



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

LuaJIT 2.1-git

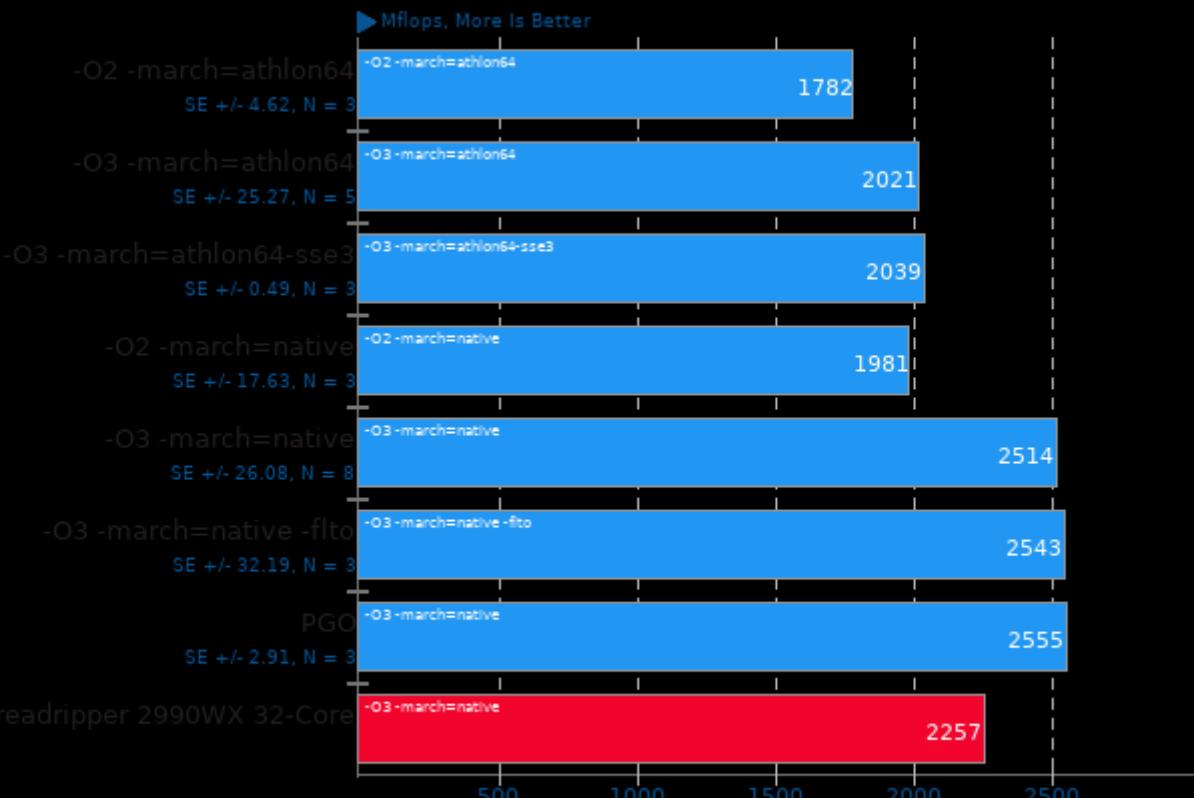
Test: Jacobi Successive Over-Relaxation



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

SciMark 2.0

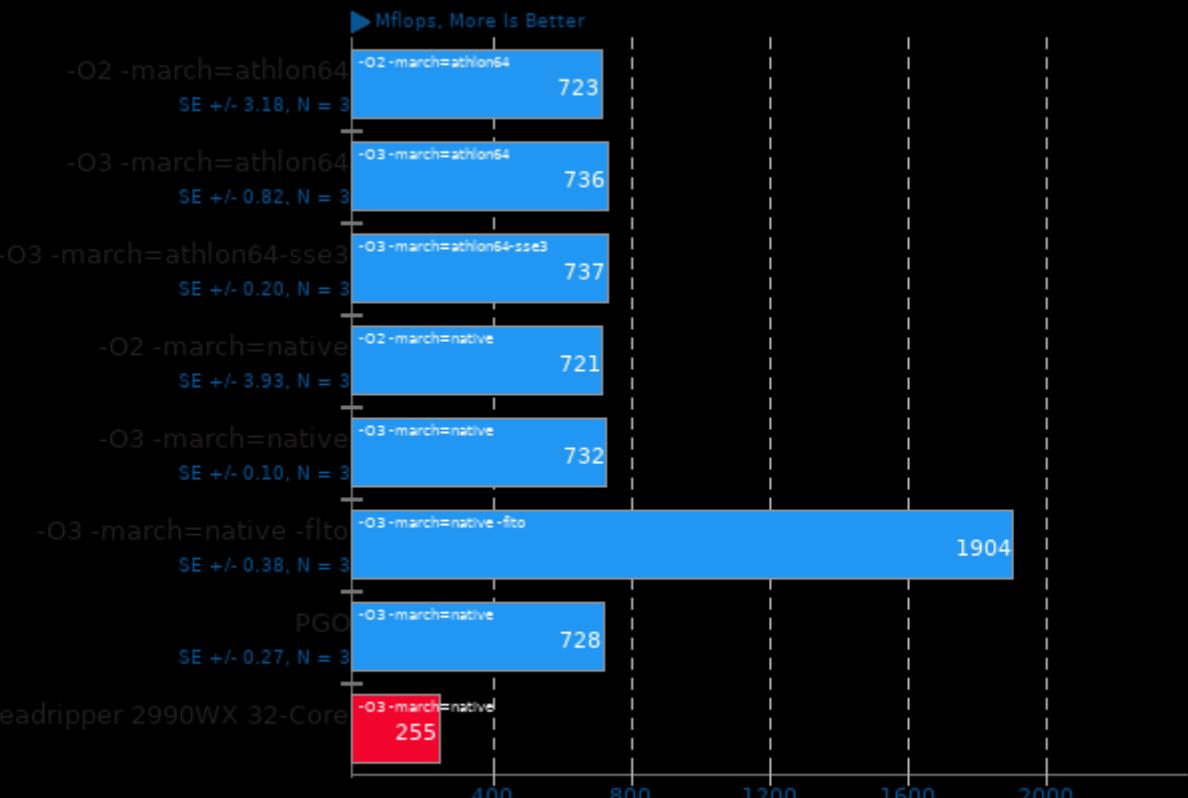
Computational Test: Composite



1. (CC) gcc options: -lm

SciMark 2.0

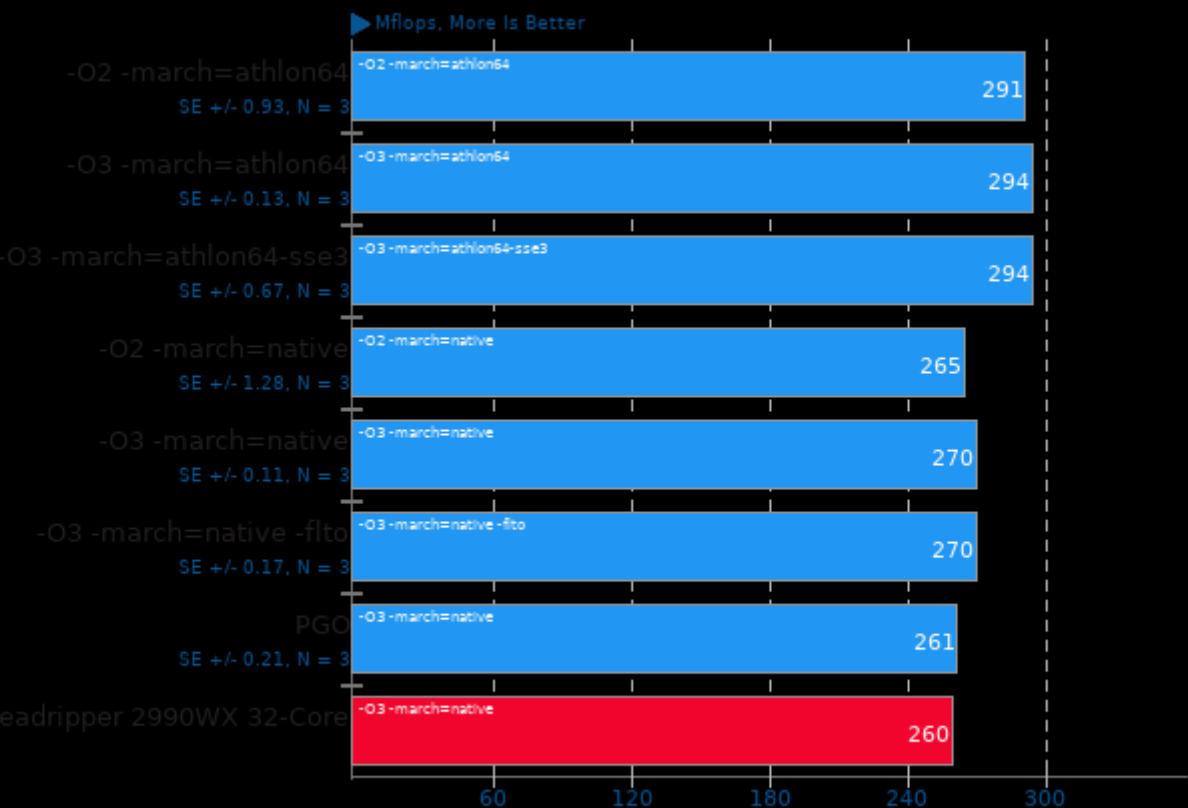
Computational Test: Monte Carlo



1. (CC) gcc options: -lm

SciMark 2.0

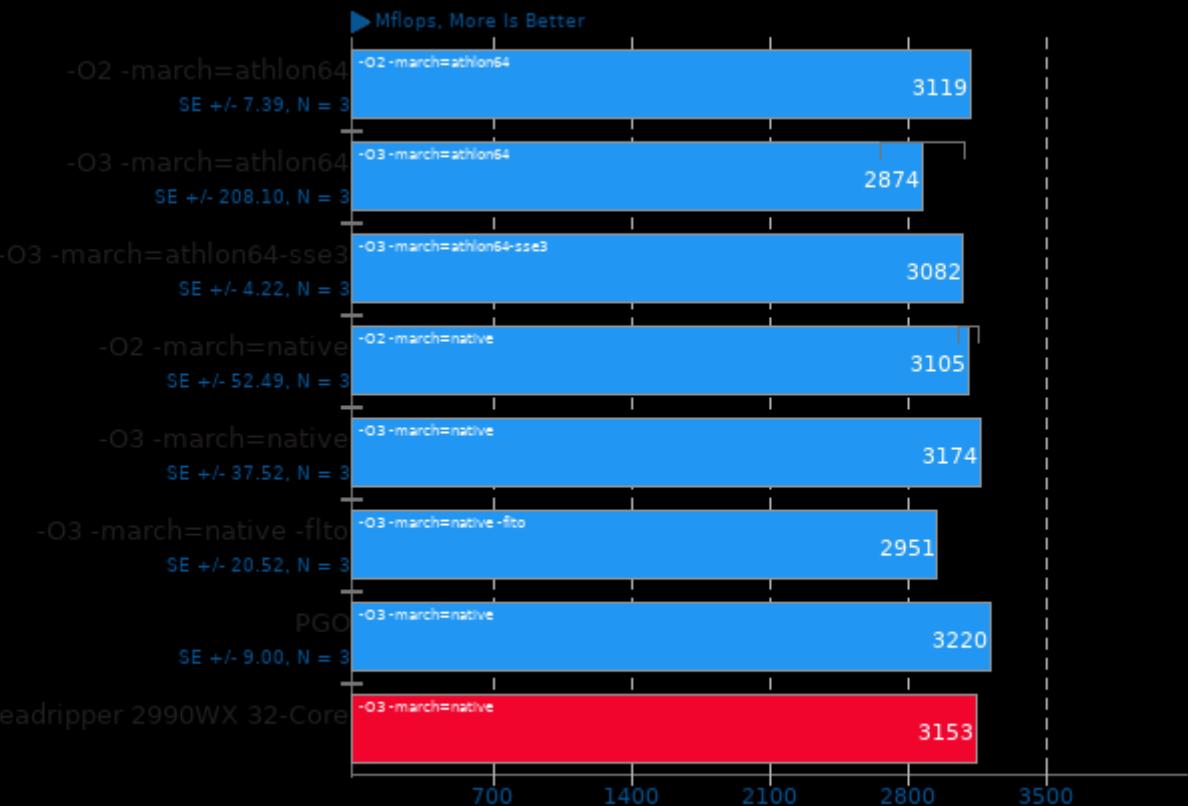
Computational Test: Fast Fourier Transform



1. (CC) gcc options: -lm

SciMark 2.0

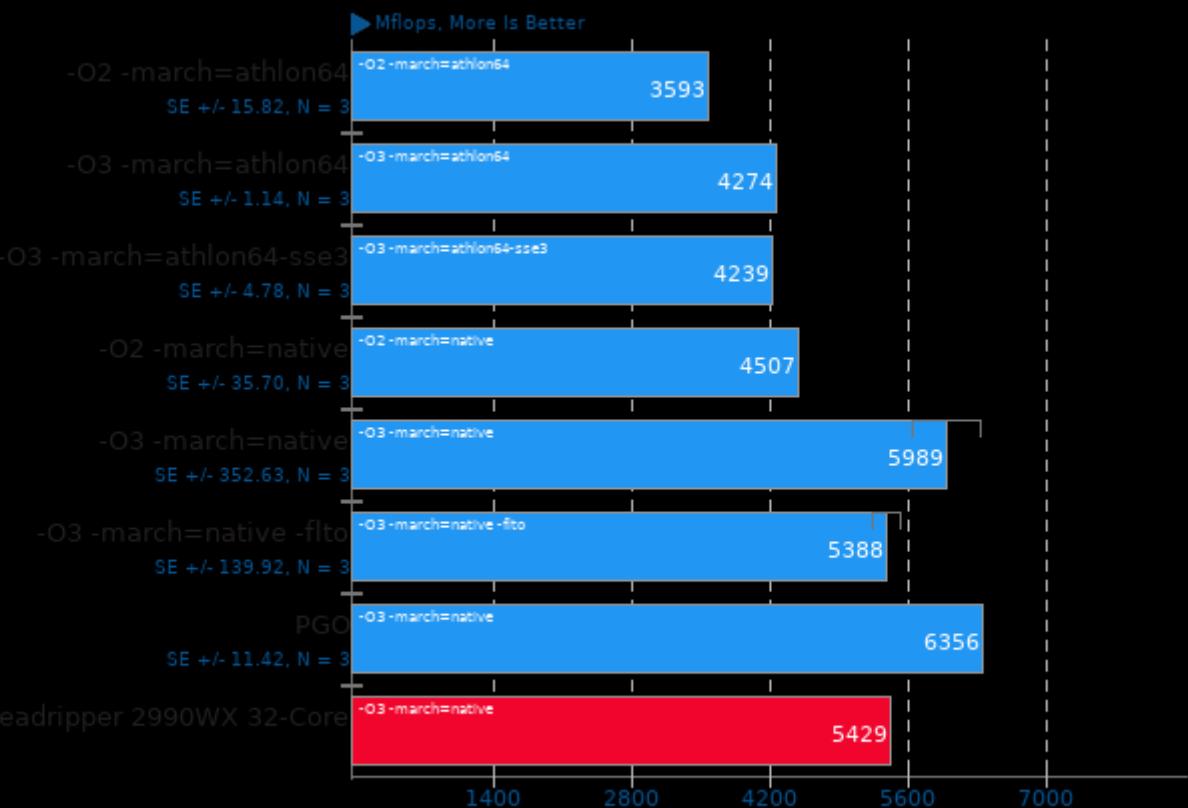
Computational Test: Sparse Matrix Multiply



1. (CC) gcc options: -lm

SciMark 2.0

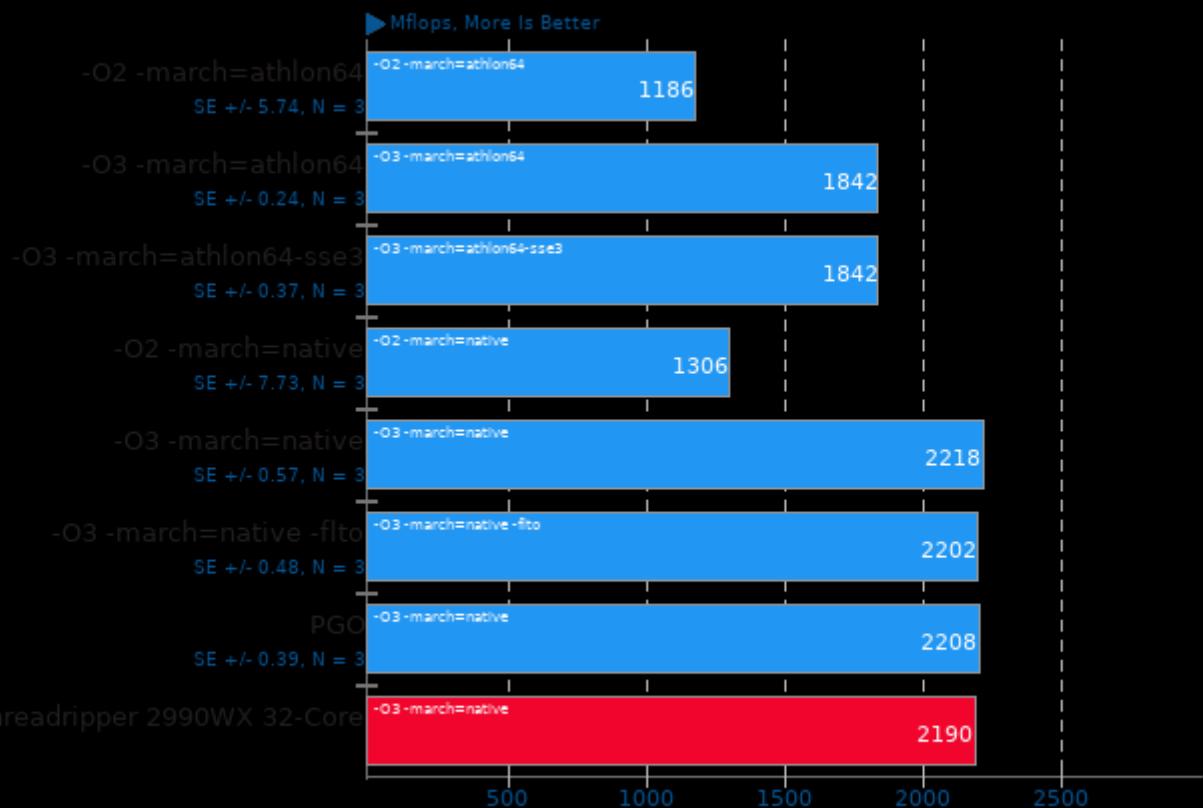
Computational Test: Dense LU Matrix Factorization



1. (CC) gcc options: -lm

SciMark 2.0

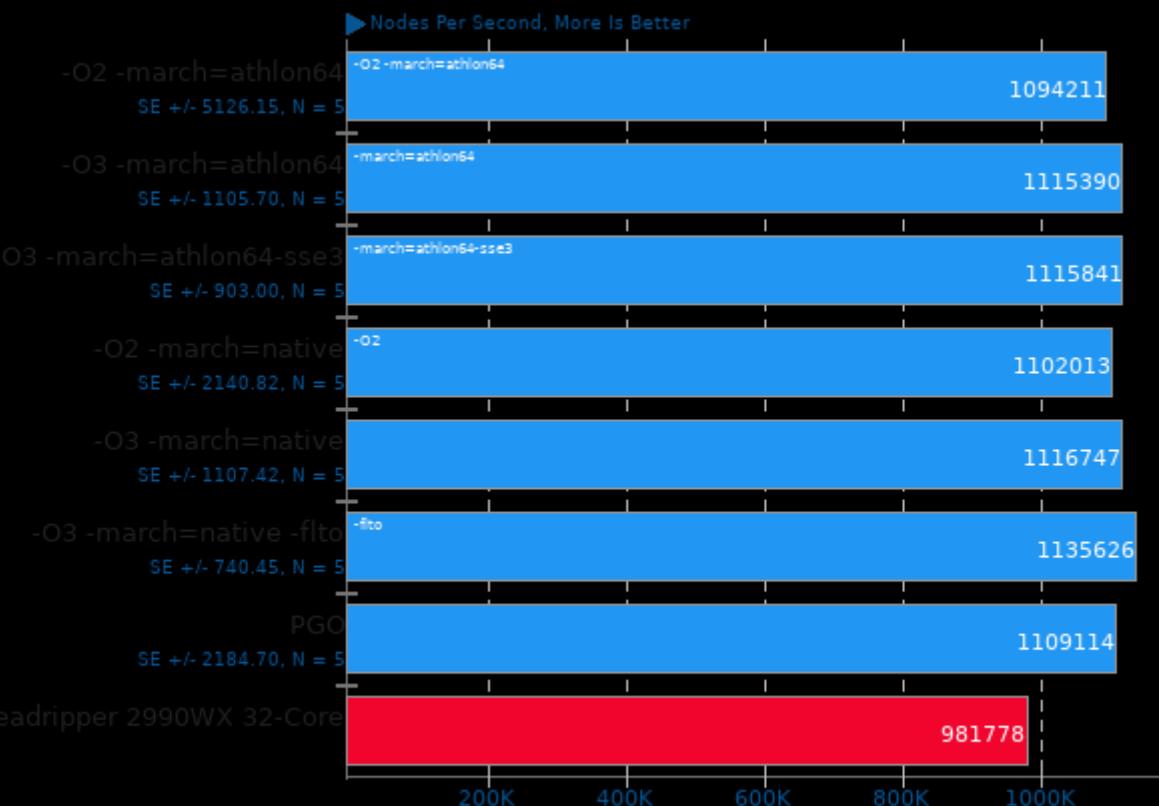
Computational Test: Jacobi Successive Over-Relaxation



1. (CC) gcc options: -lm

TSCP 1.81

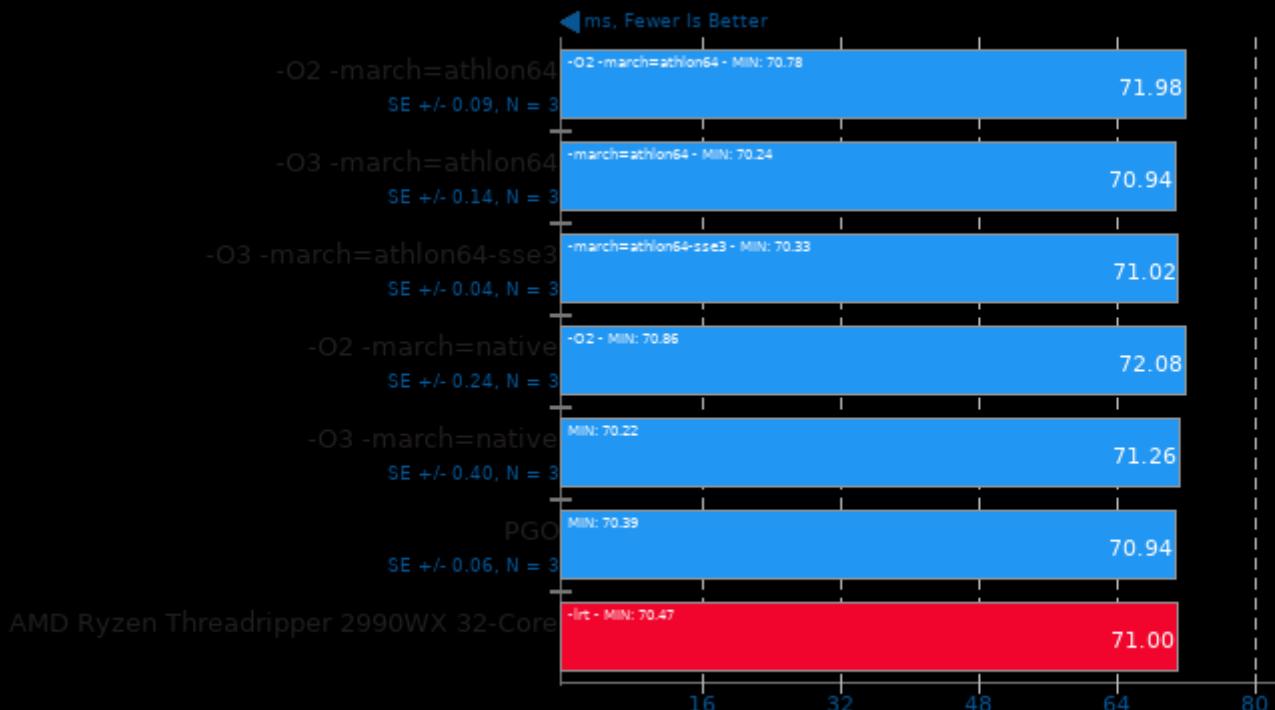
AI Chess Performance



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

MKL-DNN 2019-04-16

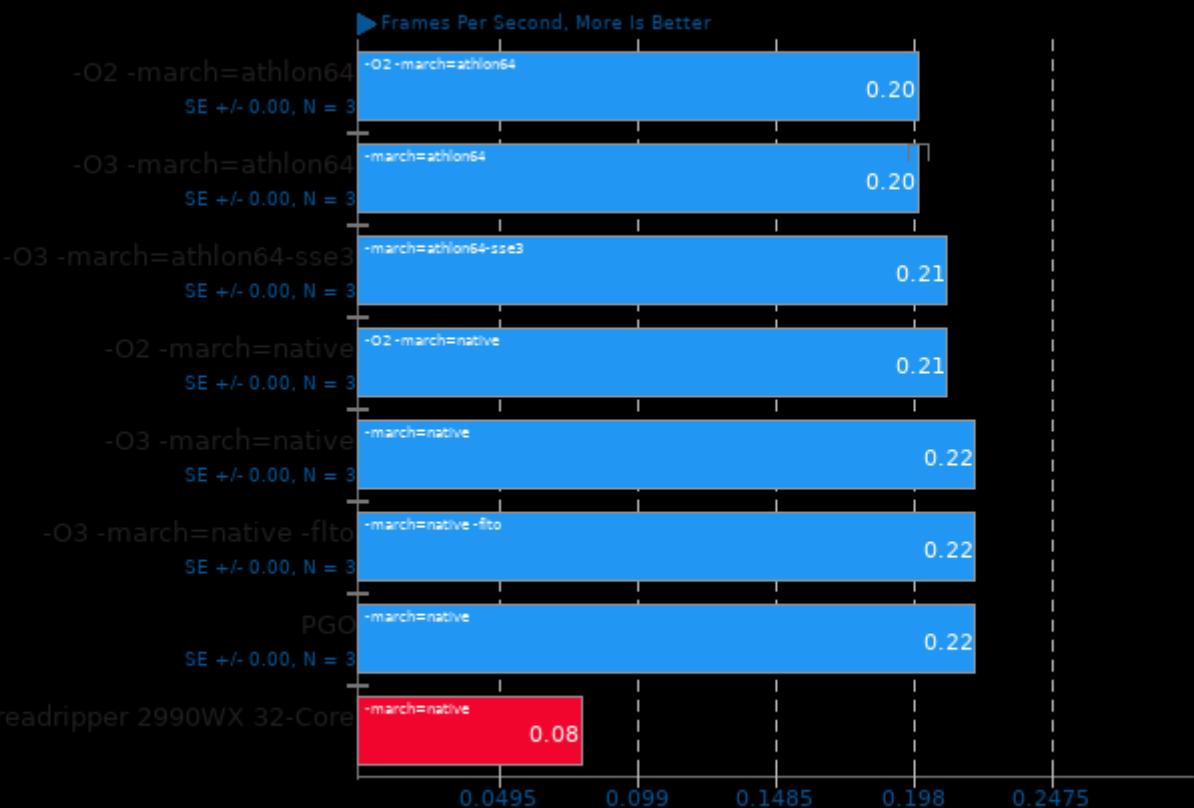
Harness: IP Batch 1D - Data Type: f32



1. (CXX) g++ options: -std=c++11 -march=native -mtune=native -fPIC -fopenmp -O3 -pie -lmklml_intel -ldl

AOM AV1 2019-02-11

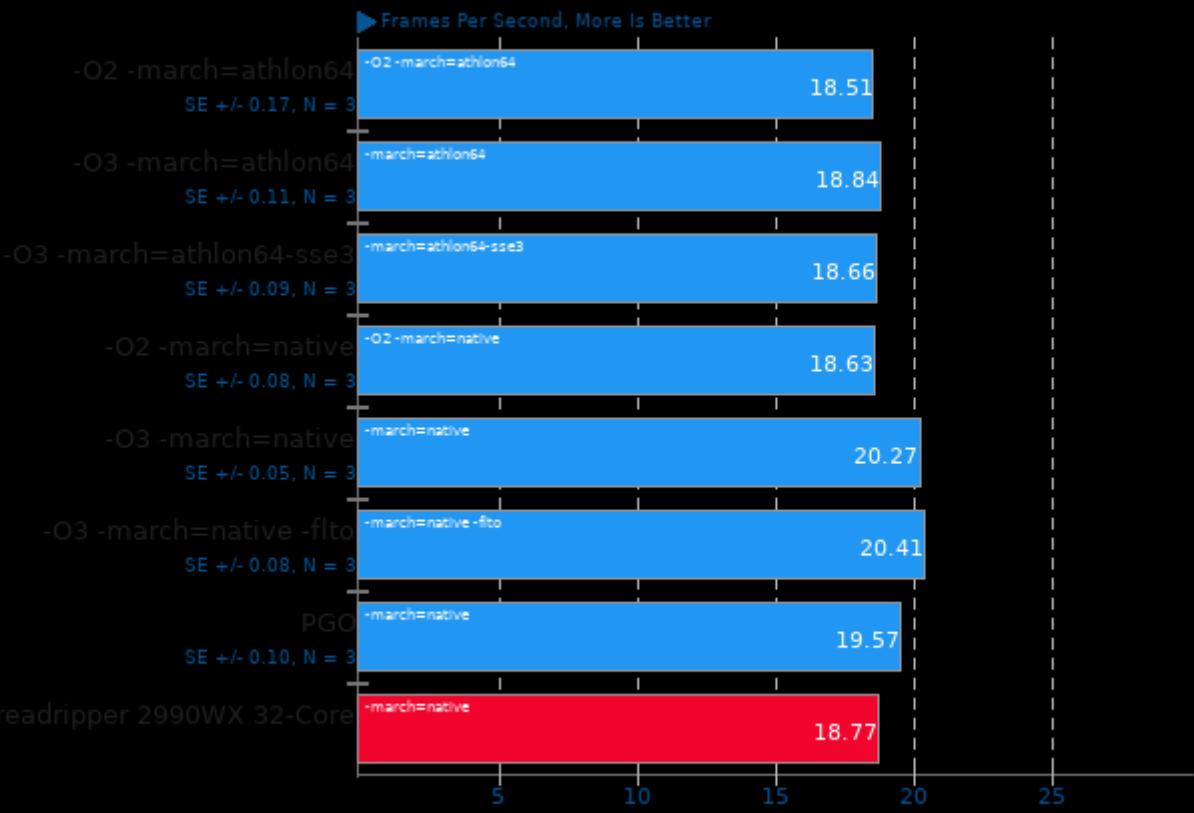
AV1 Video Encoding



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

SVT-AV1 2019-03-07

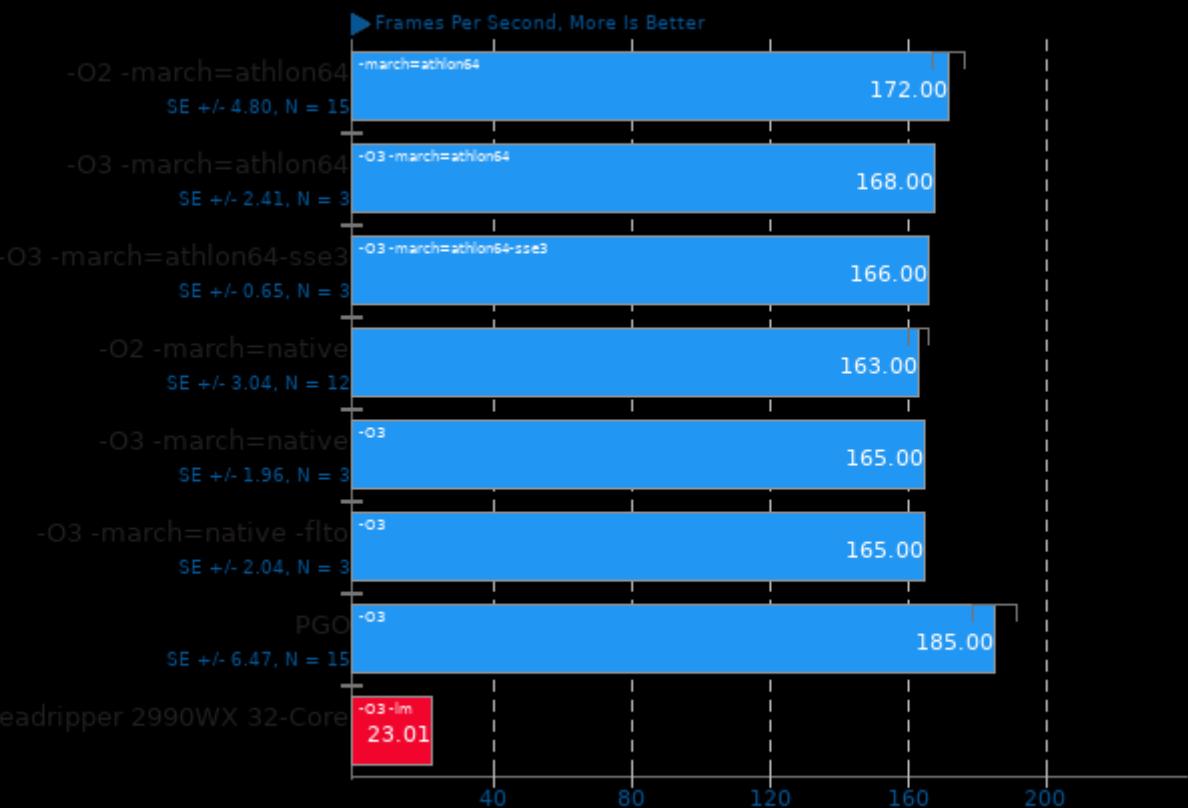
1080p 8-bit YUV To AV1 Video Encode



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

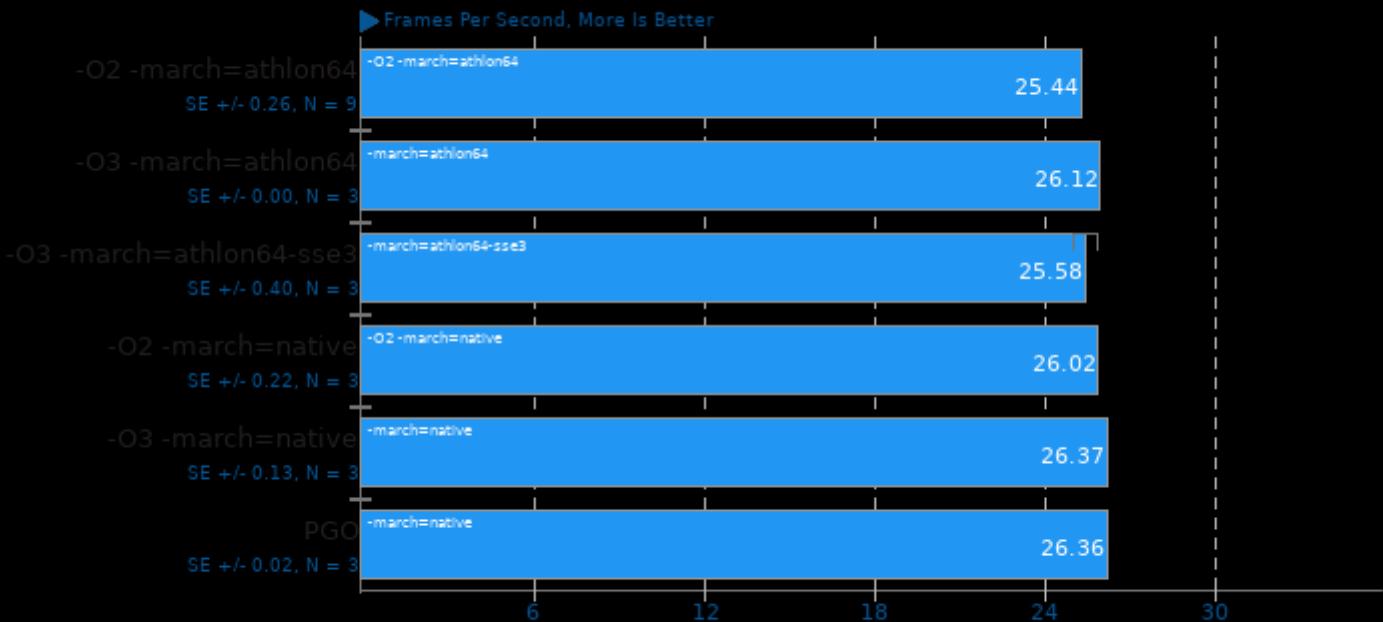
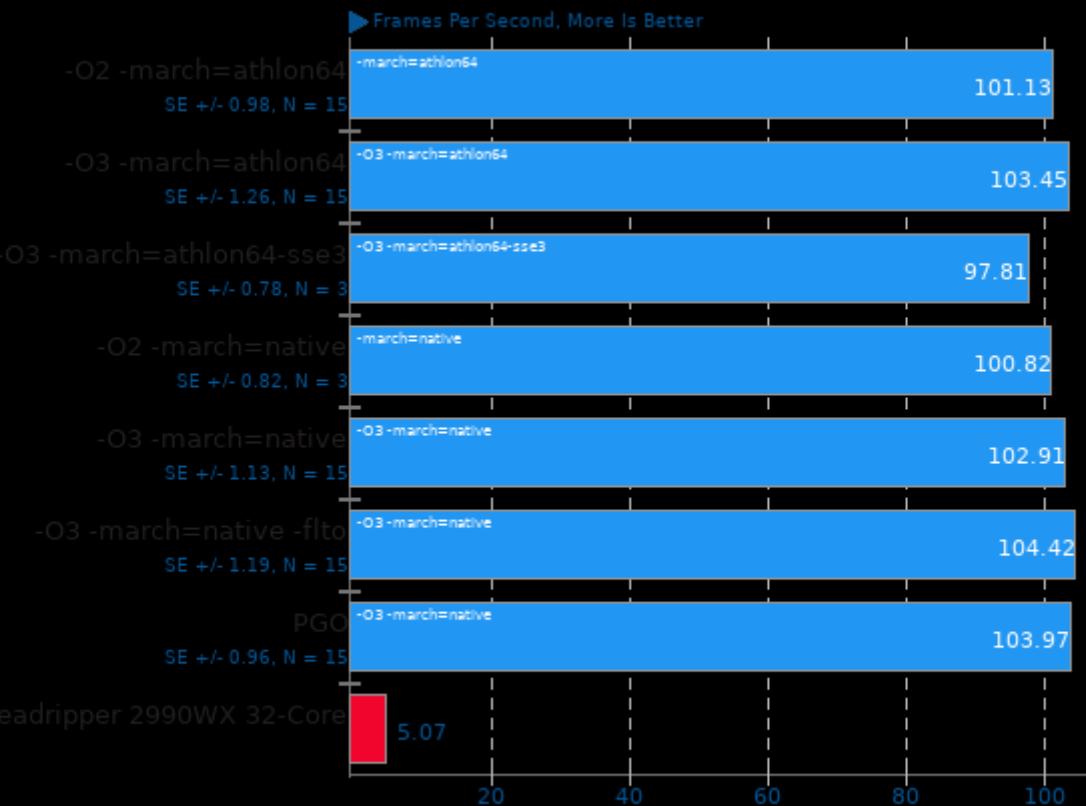
SVT-HEVC 2019-02-03

1080p 8-bit YUV To HEVC Video Encode



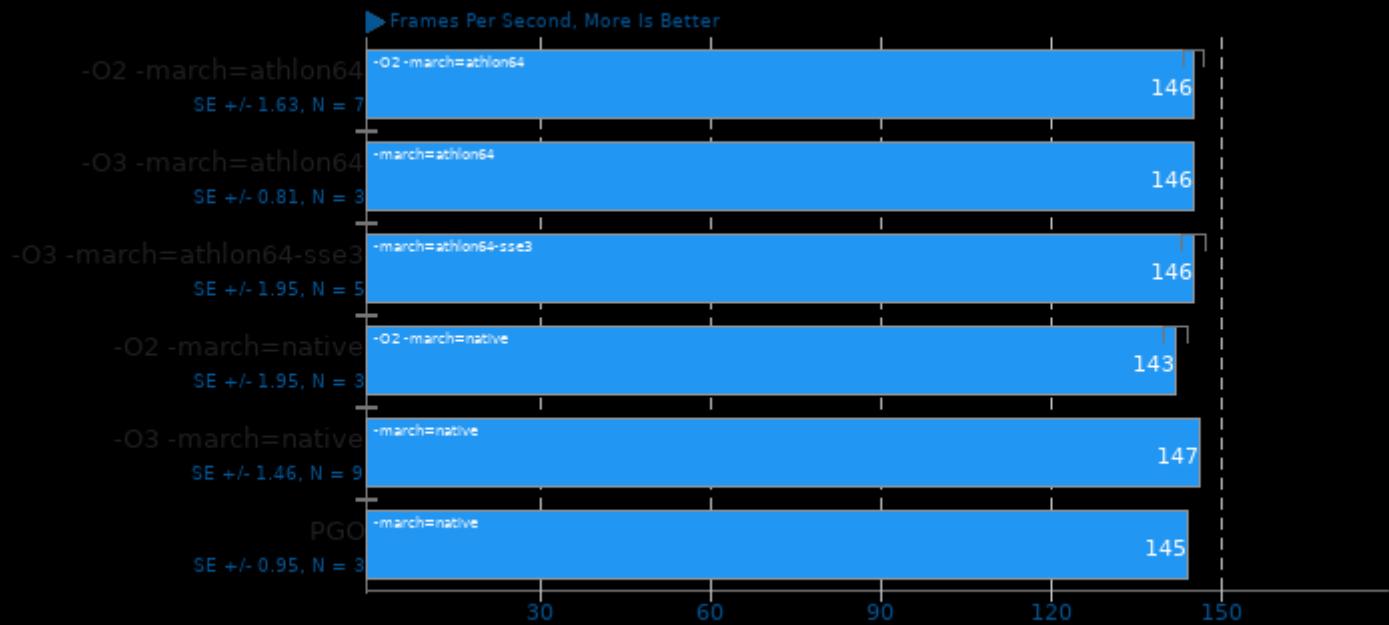
1. (CC) gcc options: -O2 -fPIE -fPIC -fno-strict-aliasing -fvisibility=hidden -march=native -pie -rdynamic -lpthread -lrt

SVT-VP9 2019-02-17



x264 2018-09-25

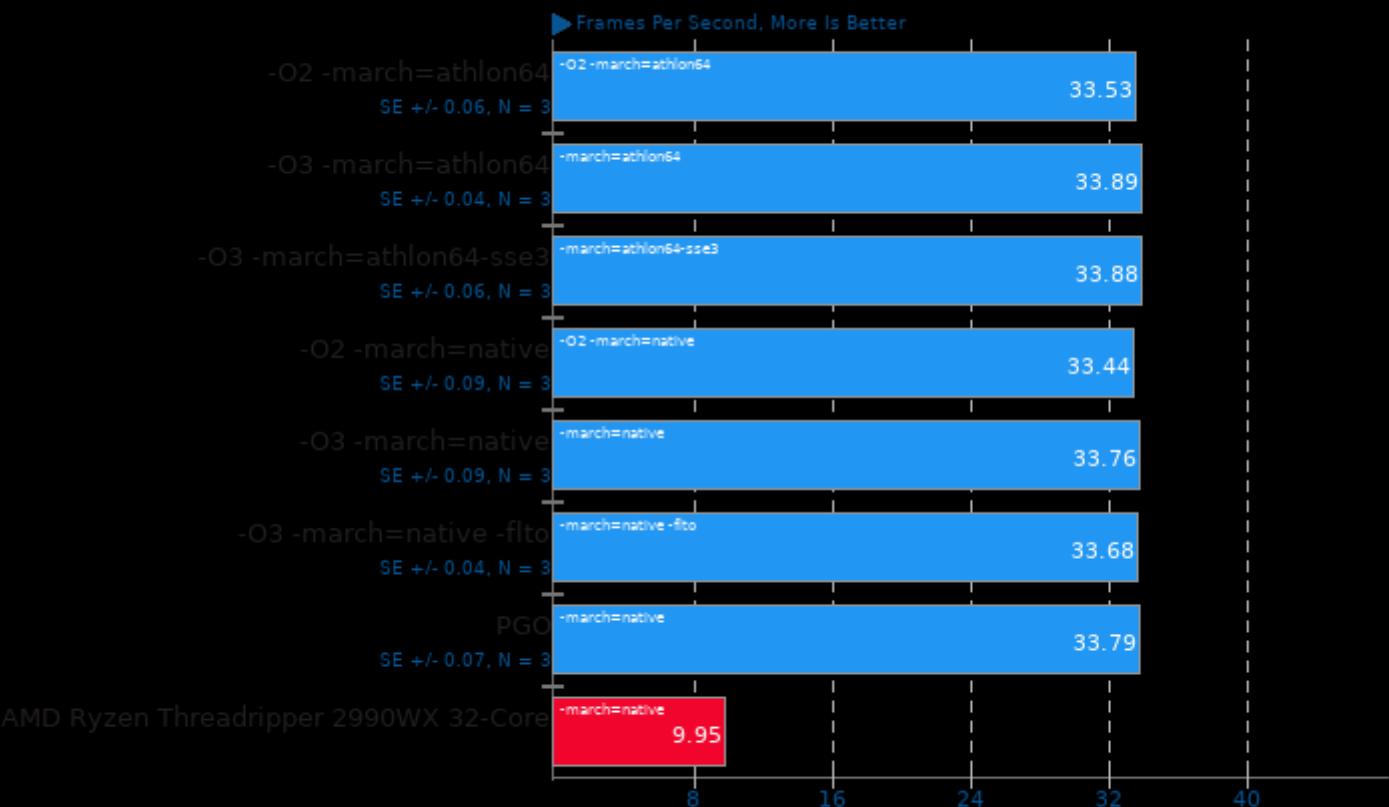
H.264 Video Encoding



1. (CC) gcc options: -ldl -m64 -lm -lpthread -O3 -ffast-math -std=gnu99 -fPIC -fomit-frame-pointer -fno-tree-vectorize

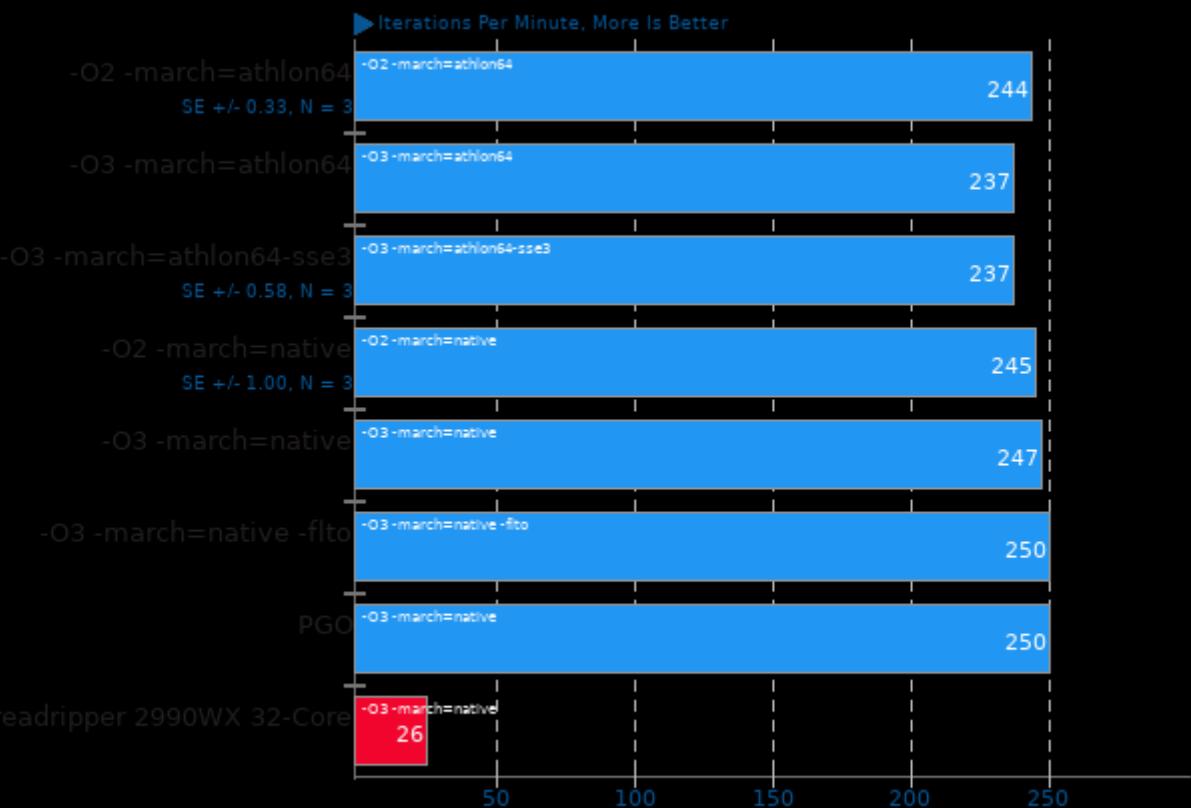
x265 3.0

H.265 1080p Video Encoding



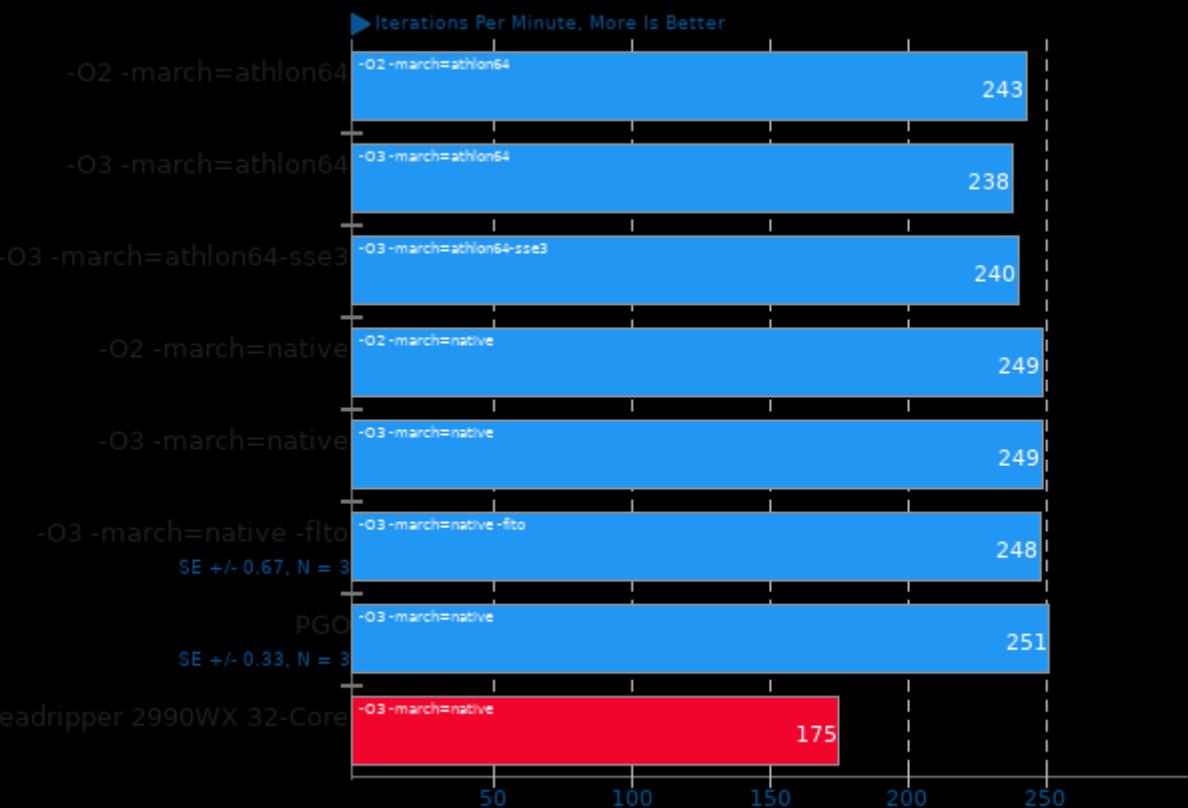
1. (CXX) g++ options: -O3 -rdynamic -lpthread -lrt -ldl -lnuma

GraphicsMagick 1.3.30



GraphicsMagick 1.3.30

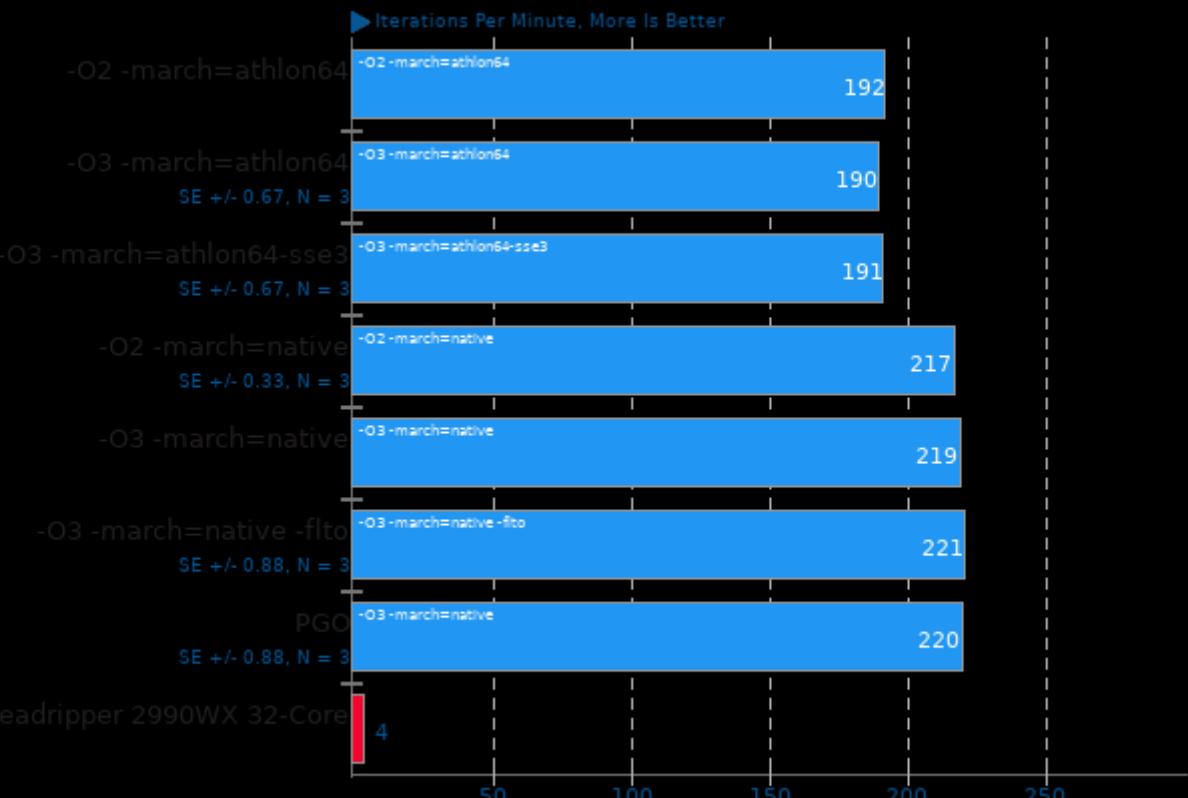
Operation: Rotate



1. (CC) gcc options: -fopenmp -pthread -ljbig -ltiff -ljpeg -lXext -lSM -lICE -lX11 -lIzma -lz -lm -ldl -lpthread

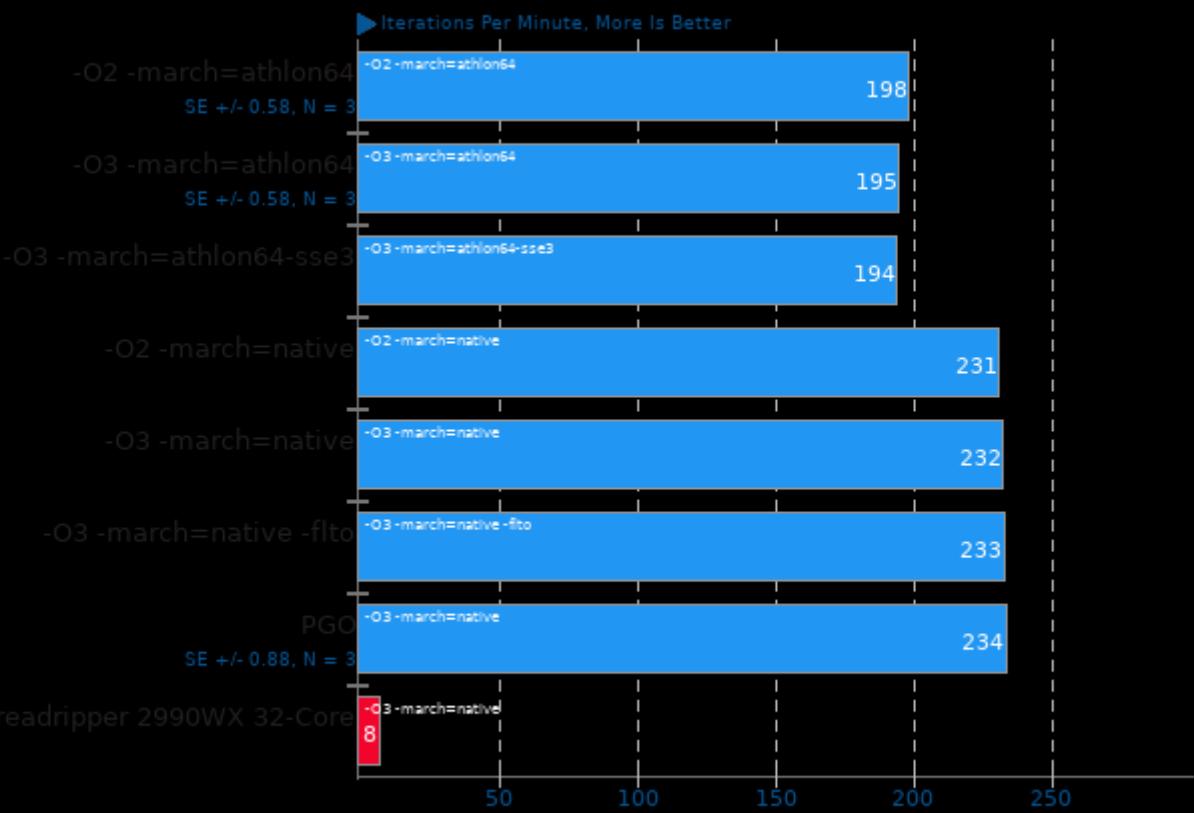
GraphicsMagick 1.3.30

Operation: Sharpen

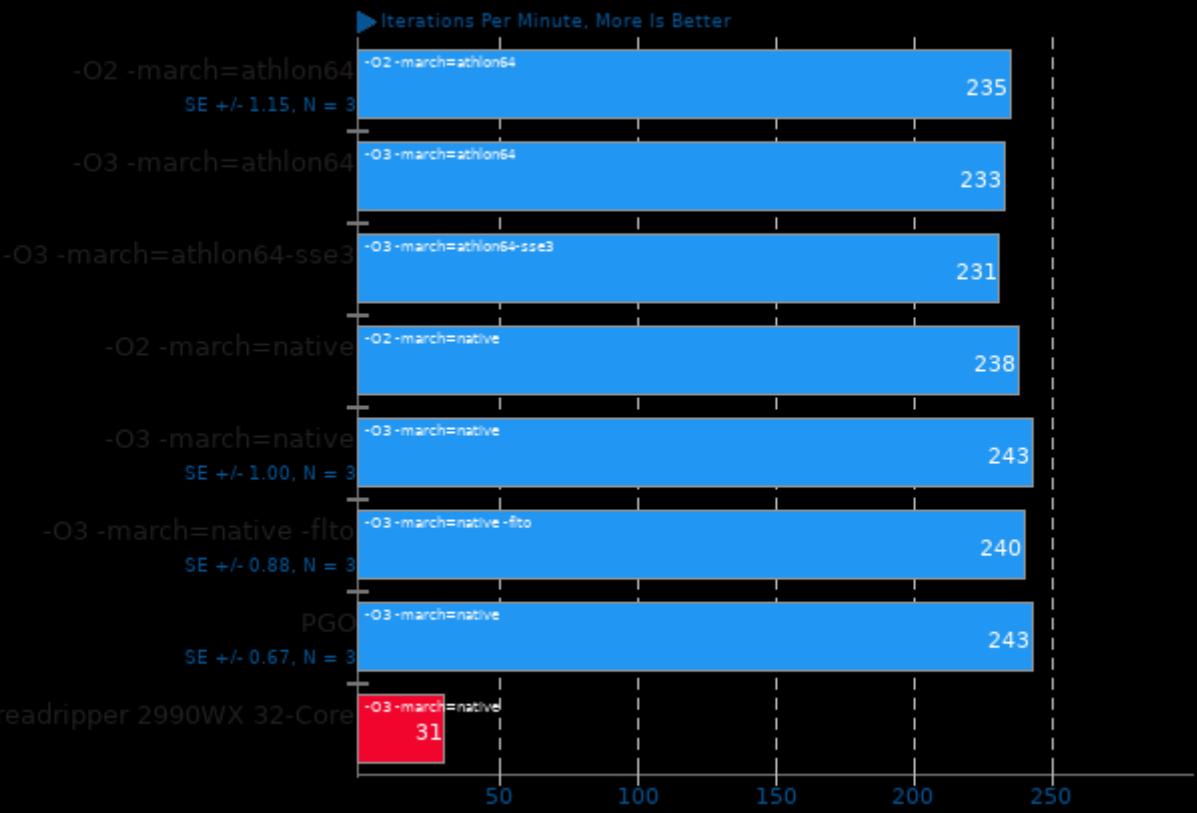


1. (CC) gcc options: -fopenmp -pthread -ljbig -ltiff -ljpeg -lXext -lSM -ICE -lX11 -lIzma -lz -lm -ldl -lpthread

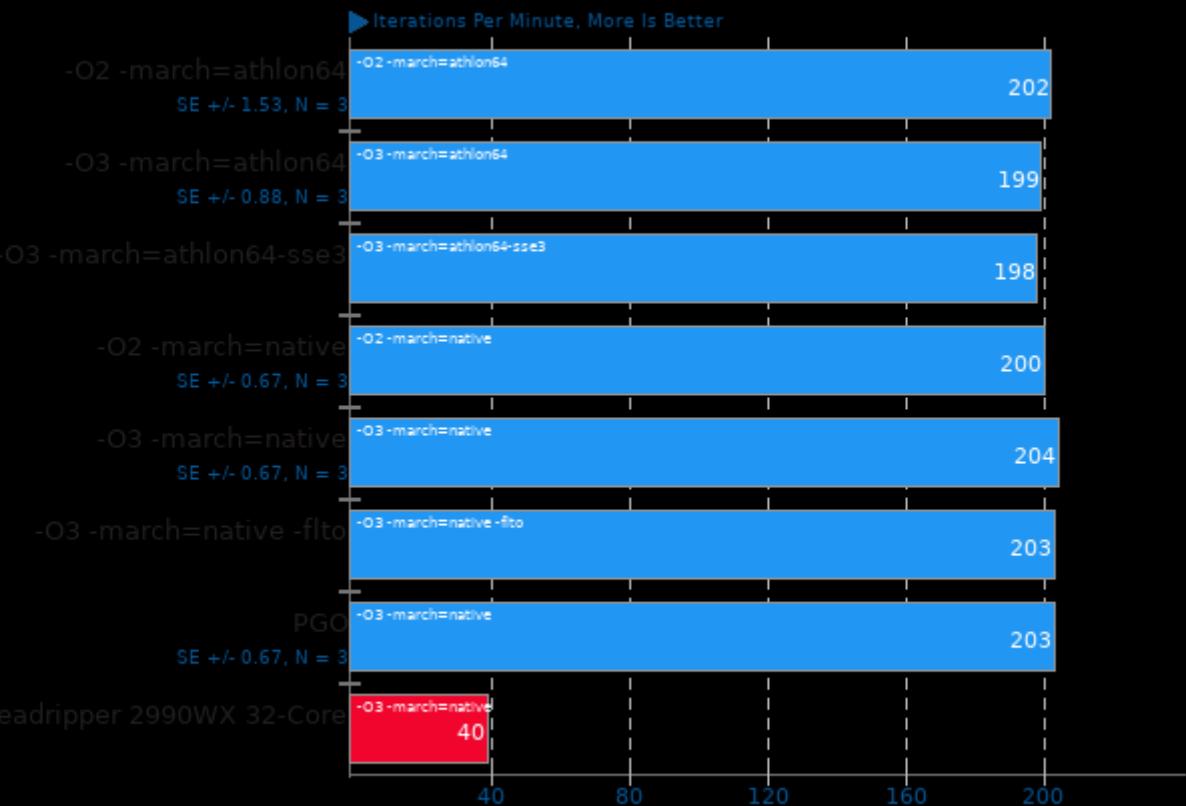
GraphicsMagick 1.3.30



GraphicsMagick 1.3.30

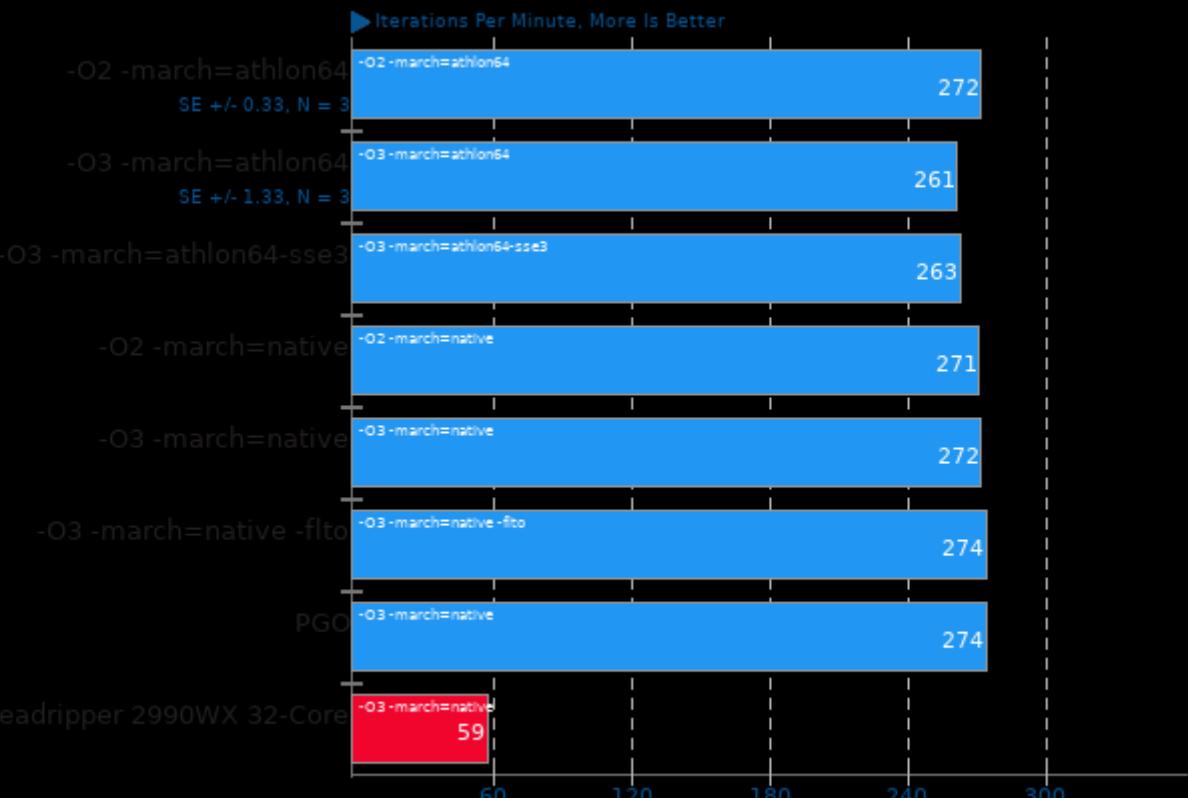


GraphicsMagick 1.3.30



GraphicsMagick 1.3.30

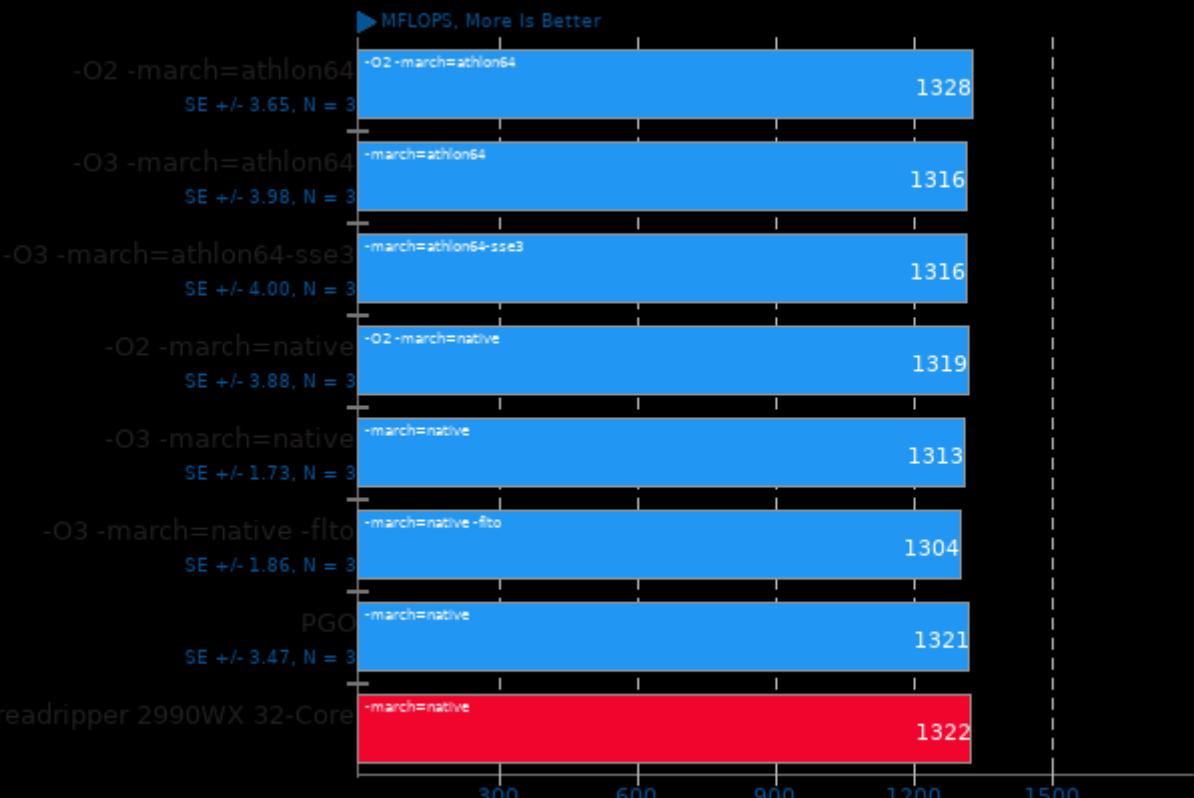
Operation: HWB Color Space



1. (CC) gcc options: -fopenmp -pthread -ljpeg -ltiff -ljpeg -lXext -lSM -lICE -lX11 -lX11 -lzma -lz -lm -ldl -lpthread

Himeno Benchmark 3.0

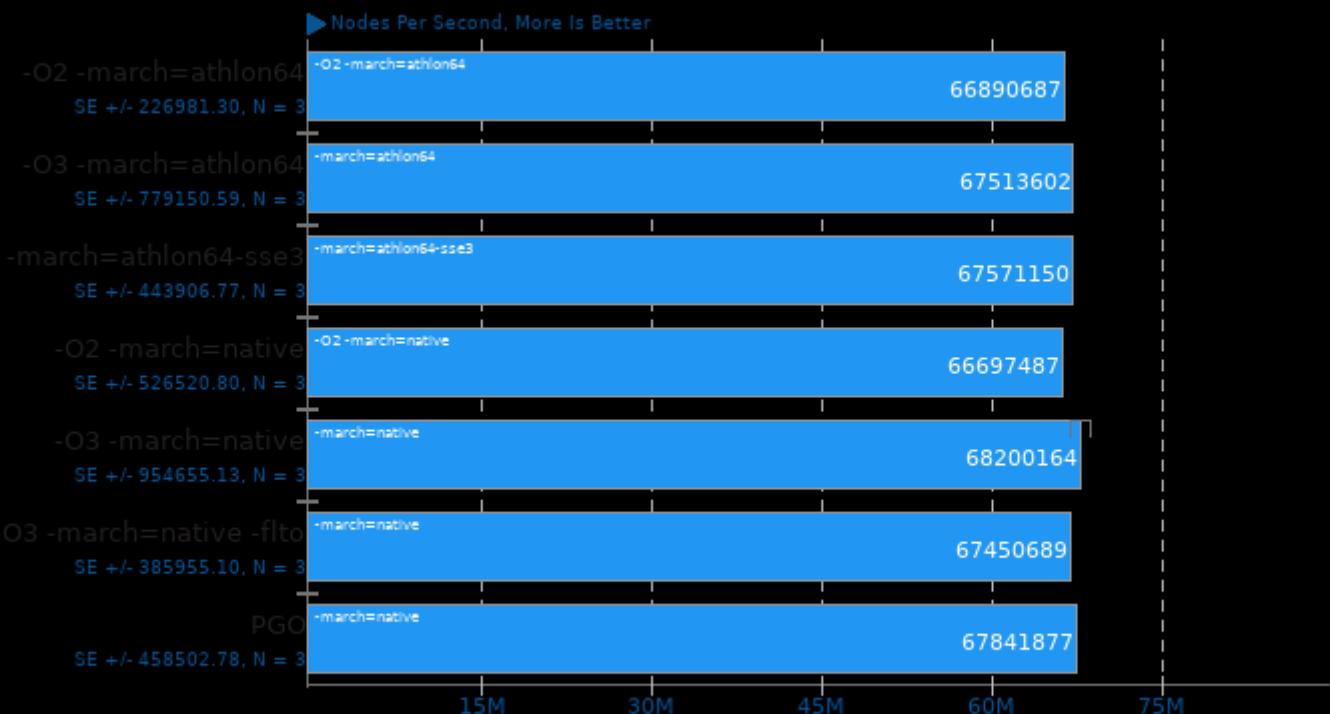
Poisson Pressure Solver



1. (CC) gcc options: -O3 -mavx2

Stockfish 9

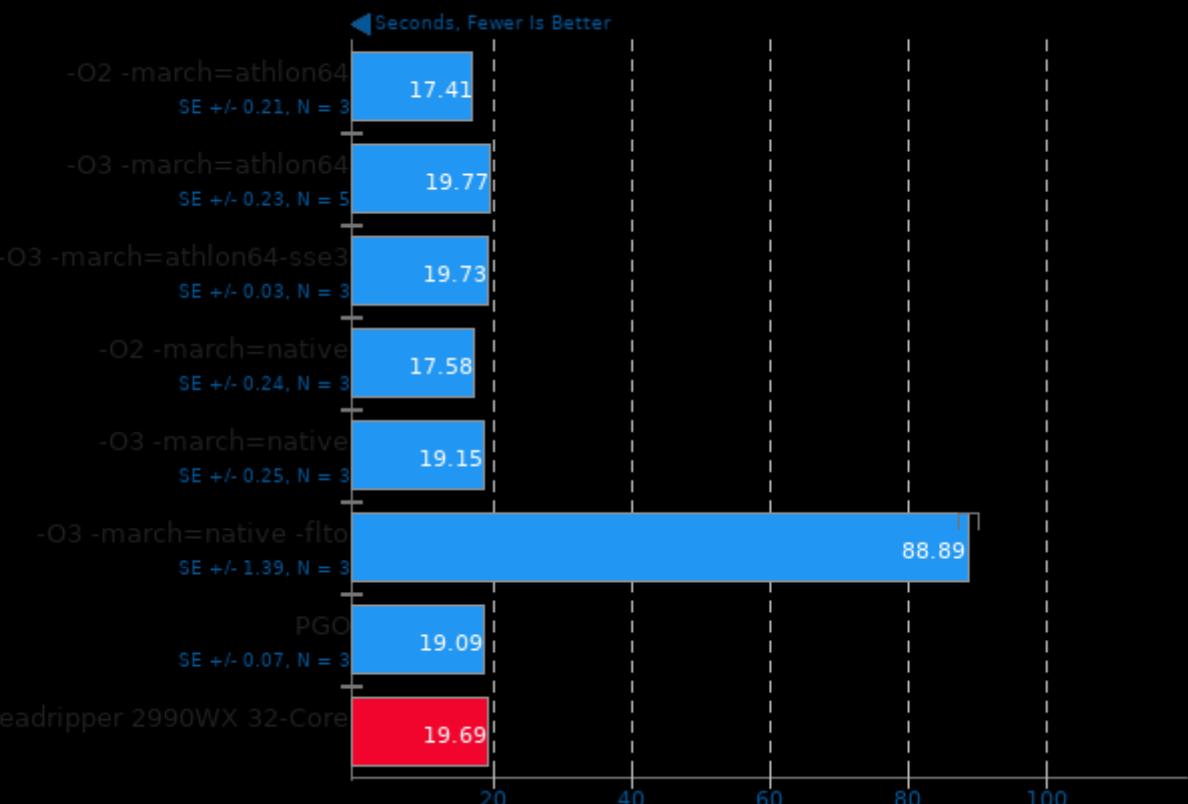
Total Time



1. (CXX) g++ options: -m64 -lpthread -fno-exceptions -std=c++11 -pedantic -O3 -msse -msse3 -mpopcnt -flio

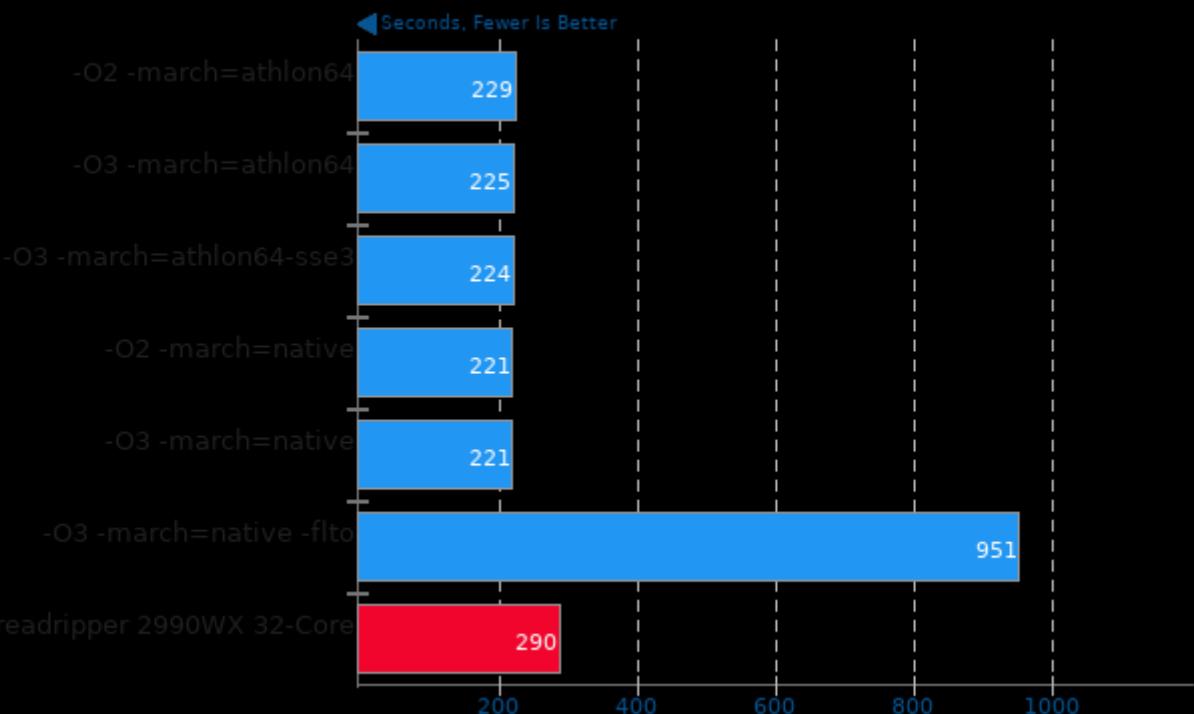
Timed ImageMagick Compilation 6.9.0

Time To Compile



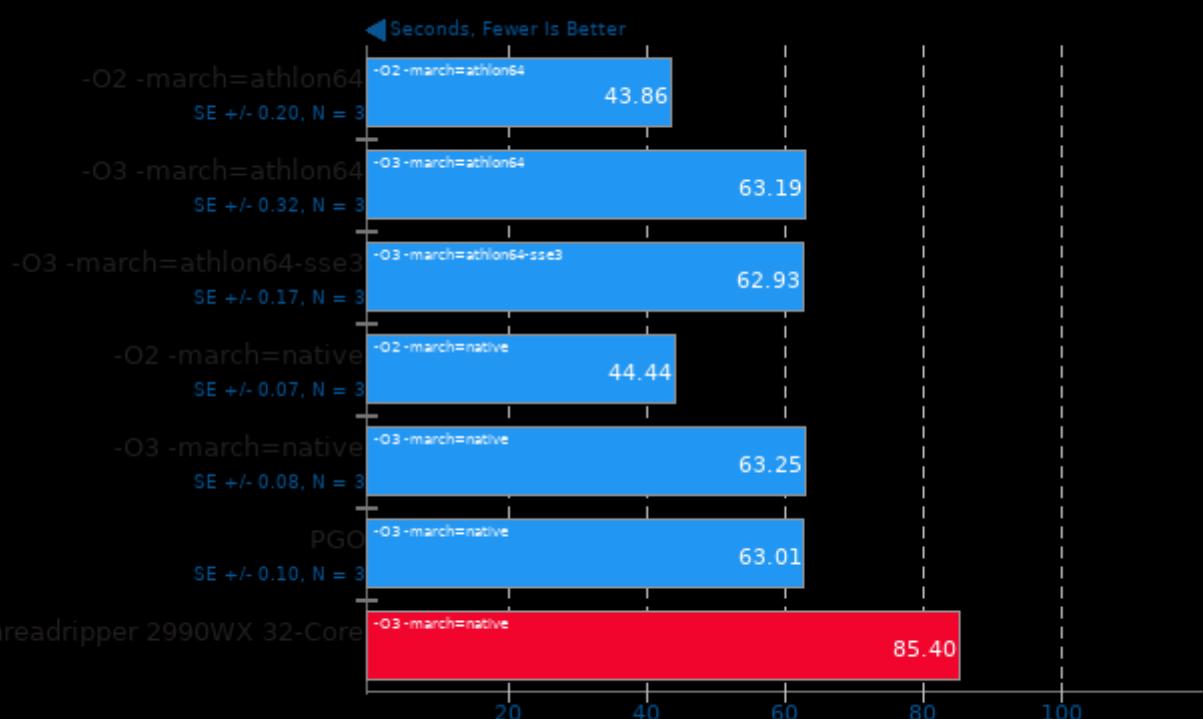
Timed LLVM Compilation 6.0.1

Time To Compile



Timed PHP Compilation 7.1.9

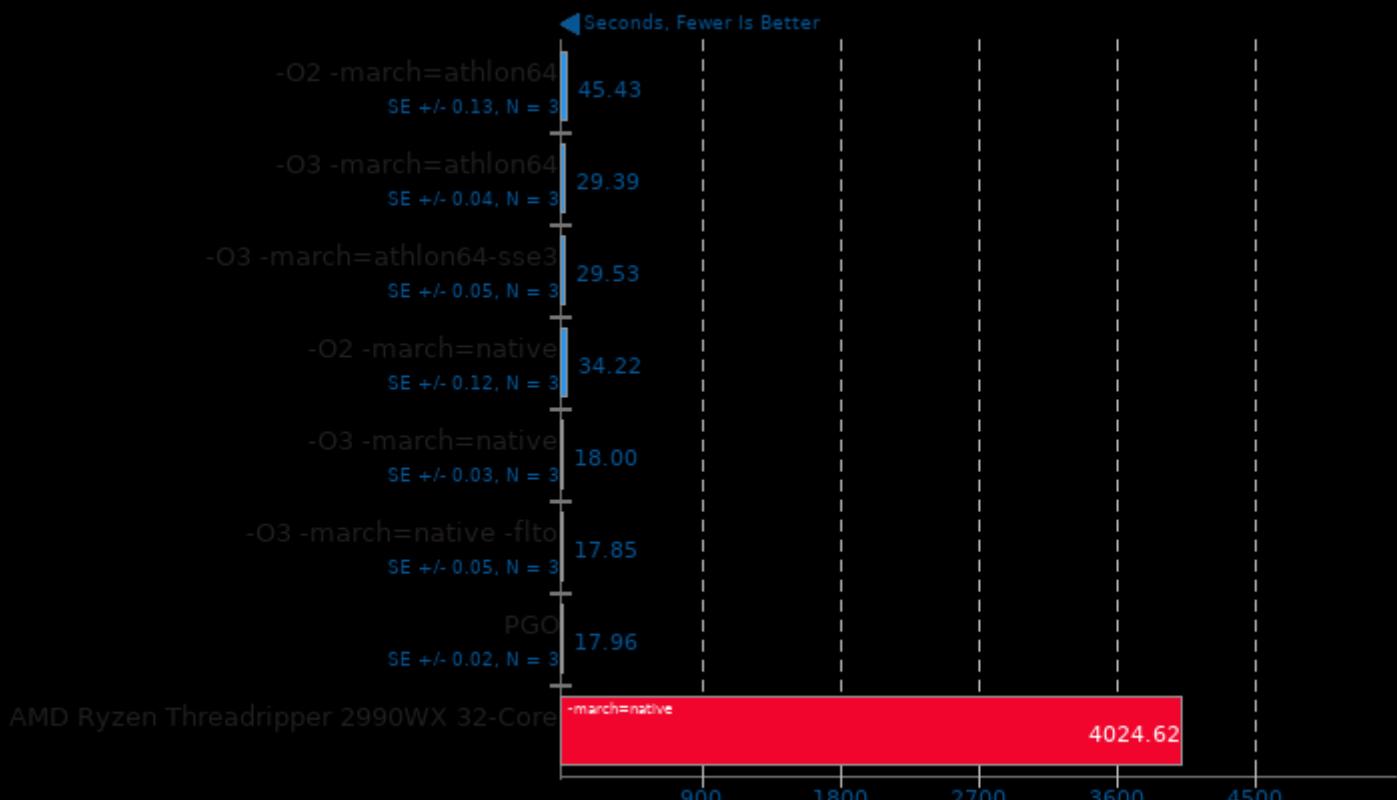
Time To Compile



1. (CC) gcc options: -pedantic -ldl -lz -lm

C-Ray 1.1

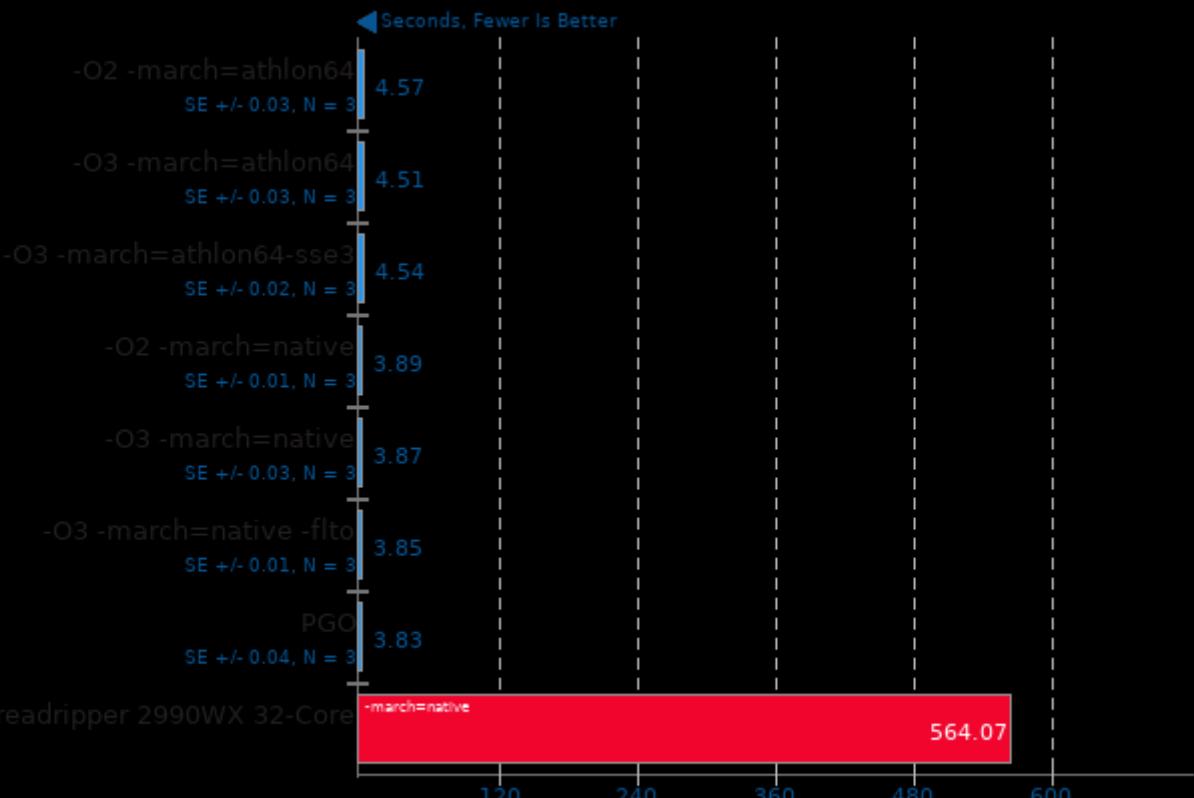
Total Time - 4K, 16 Rays Per Pixel



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

Smallpt 1.0

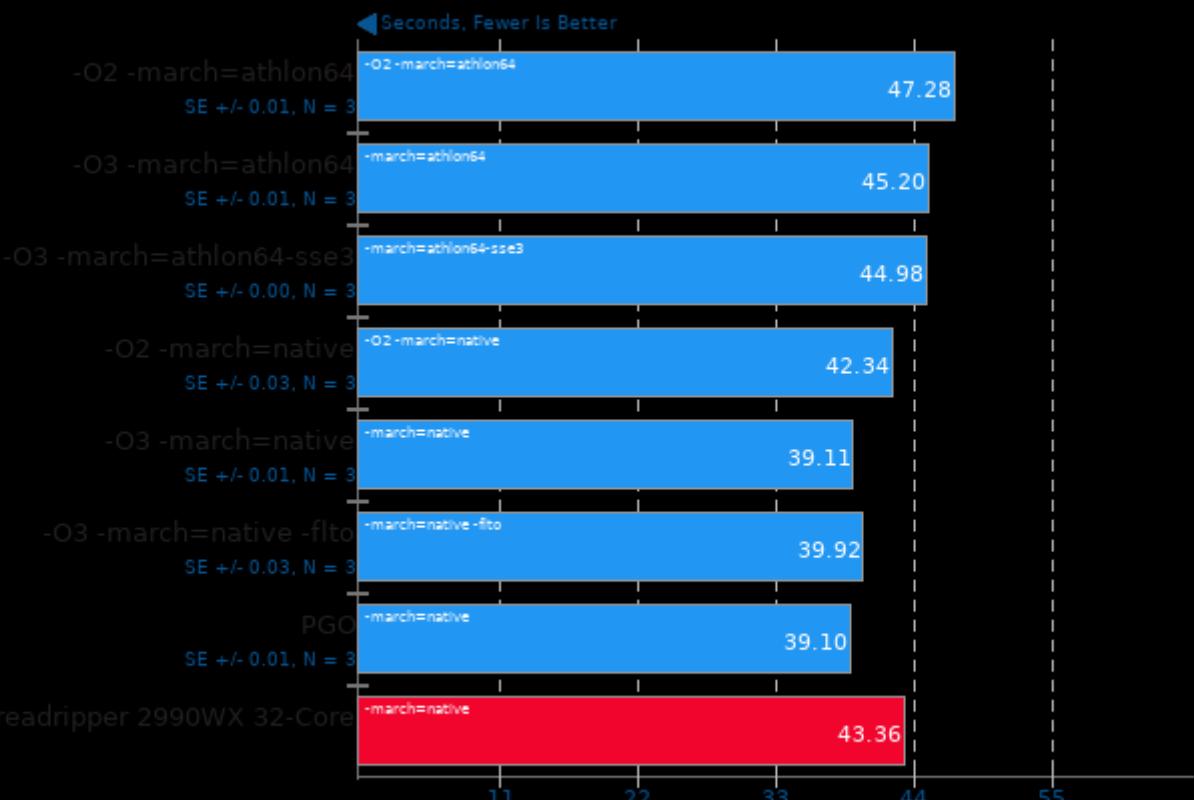
Global Illumination Renderer; 128 Samples



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

AOBench

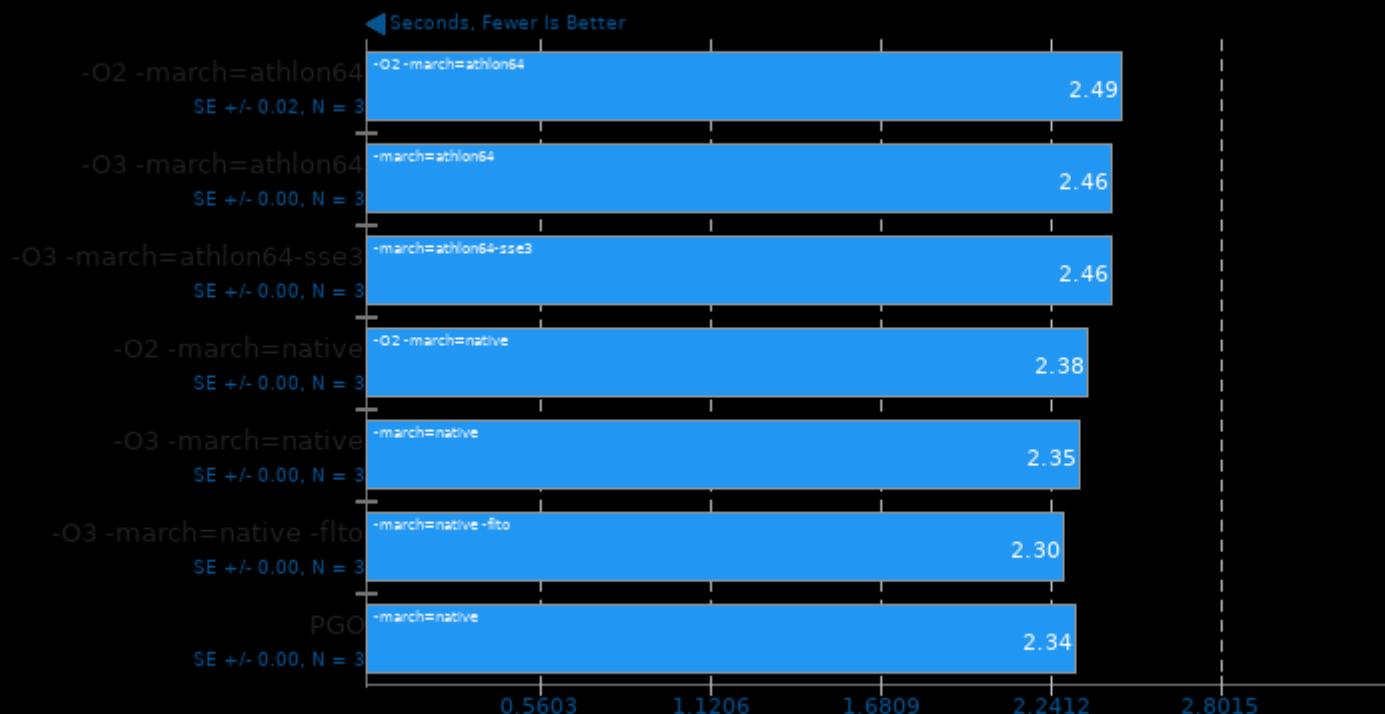
Size: 2048 x 2048 - Total Time



1. (CC) gcc options: -lm -O3

Bullet Physics Engine 2.81

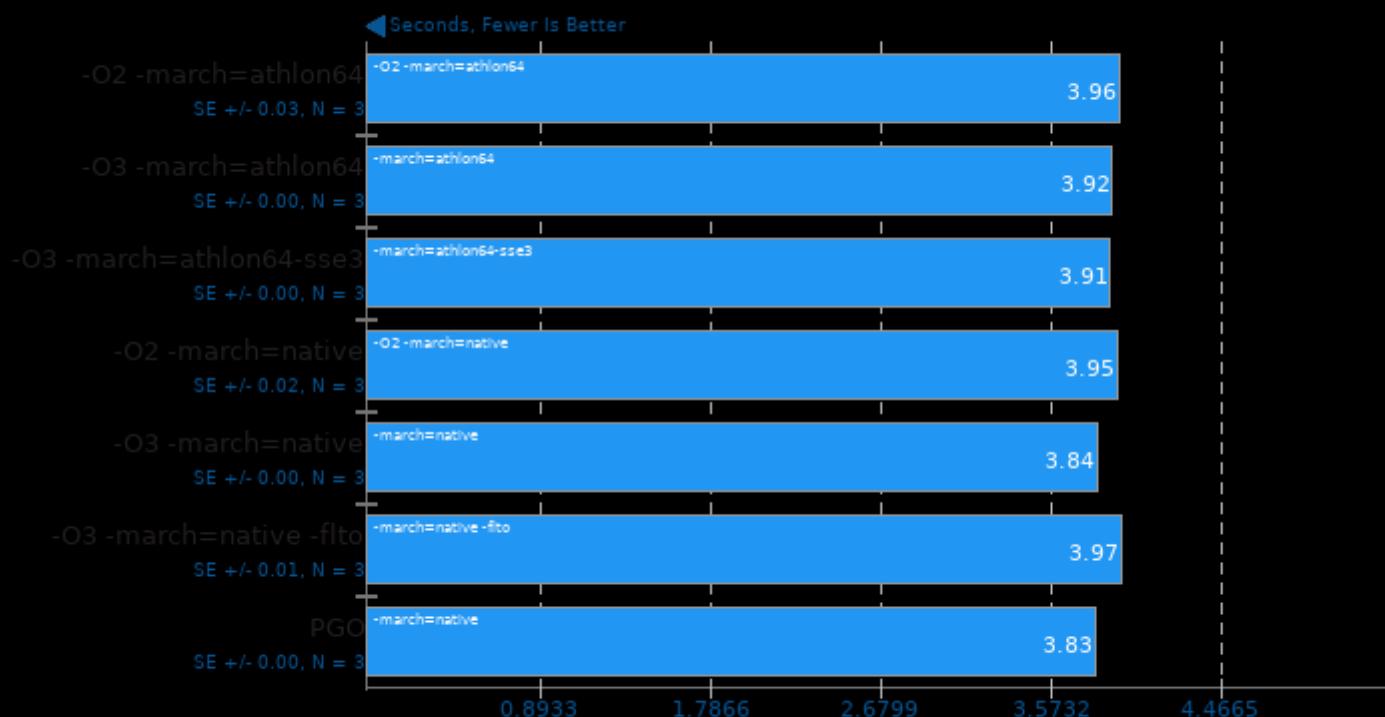
Test: Raytests



1. (CXX) g++ options: -O3 -rdynamic -lglut -IGL -IGLU

Bullet Physics Engine 2.81

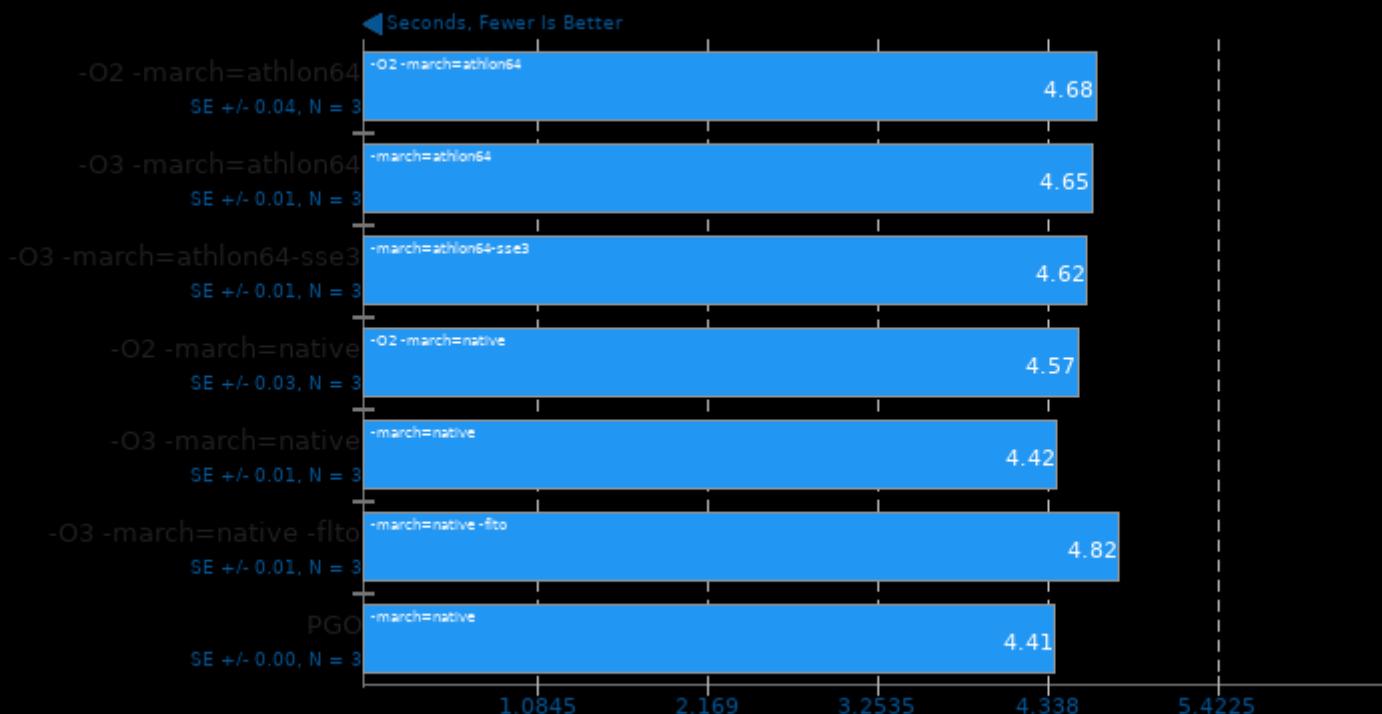
Test: 3000 Fall



1. (CXX) g++ options: -O3 -rdynamic -lglut -IGL -IGLU

Bullet Physics Engine 2.81

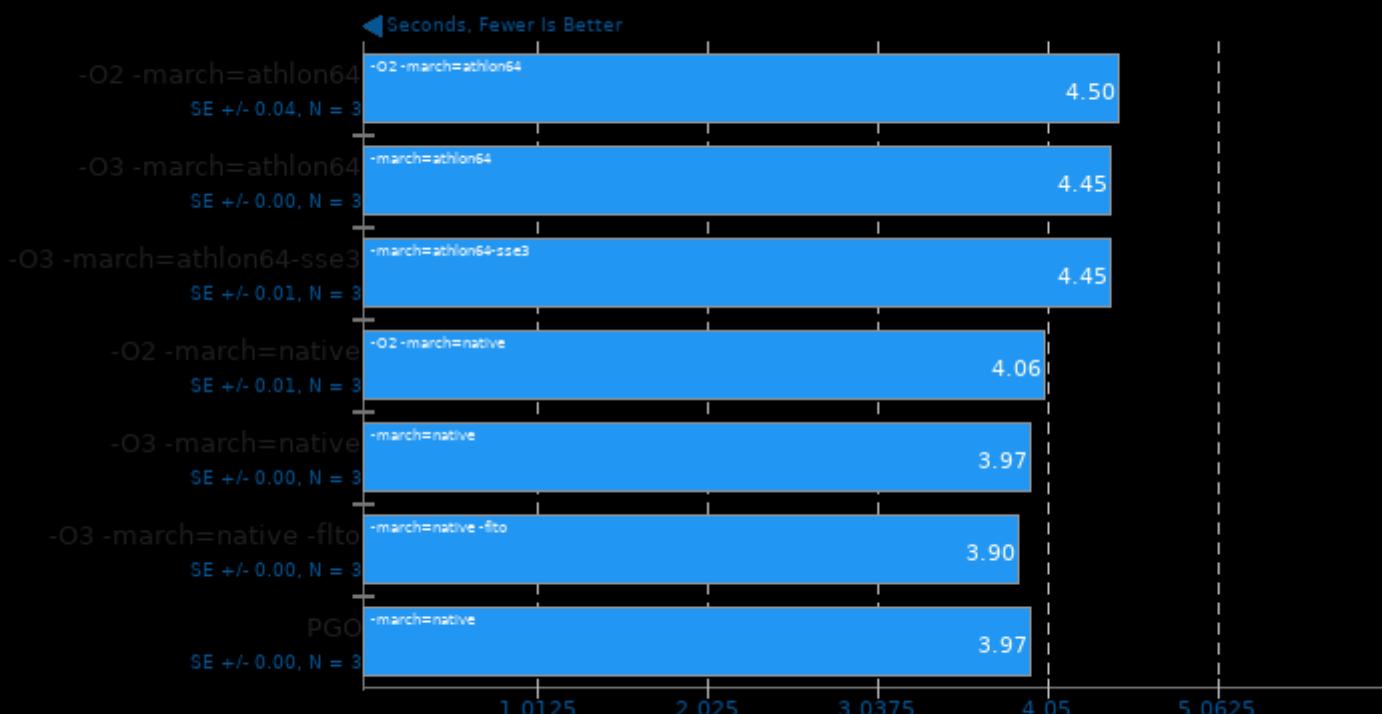
Test: 1000 Stack



1. (CXX) g++ options: -O3 -rdynamic -lglut -IGL -IGLU

Bullet Physics Engine 2.81

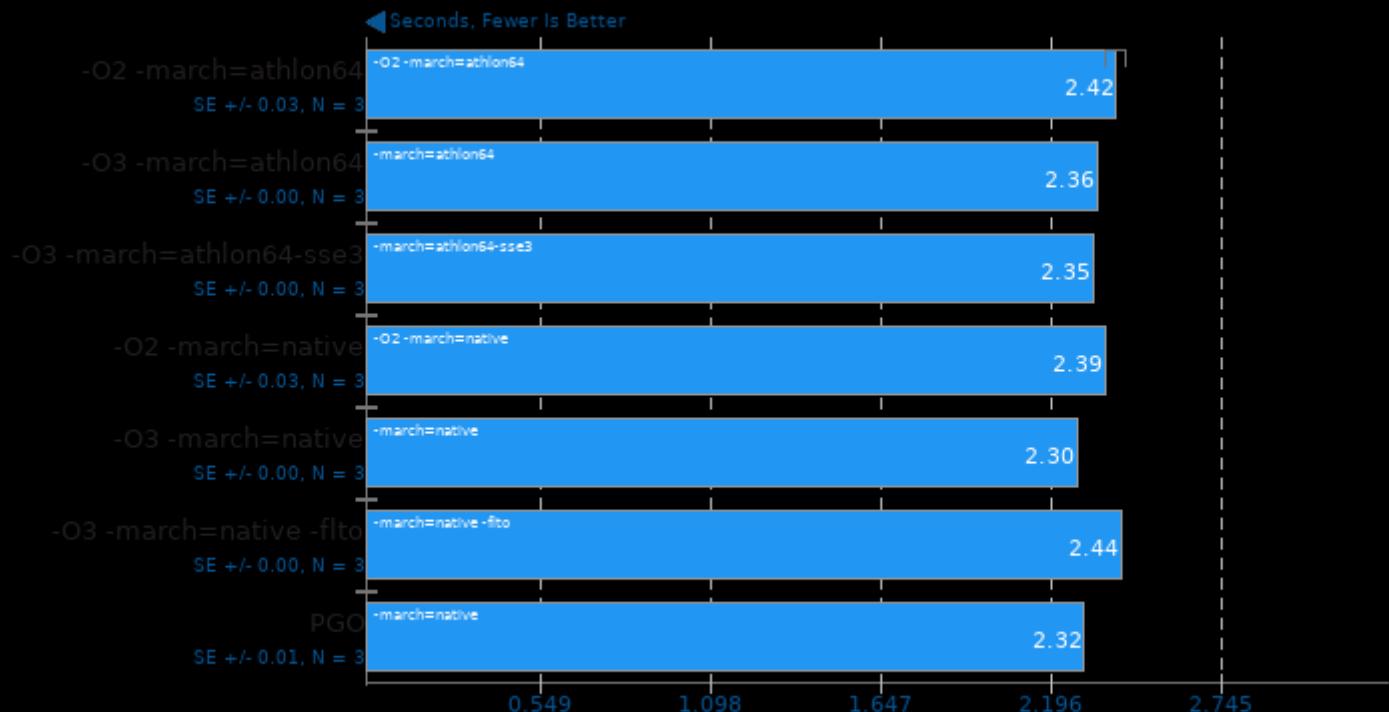
Test: 1000 Convex



1. (CXX) g++ options: -O3 -rdynamic -lglut -IGL -IGLU

Bullet Physics Engine 2.81

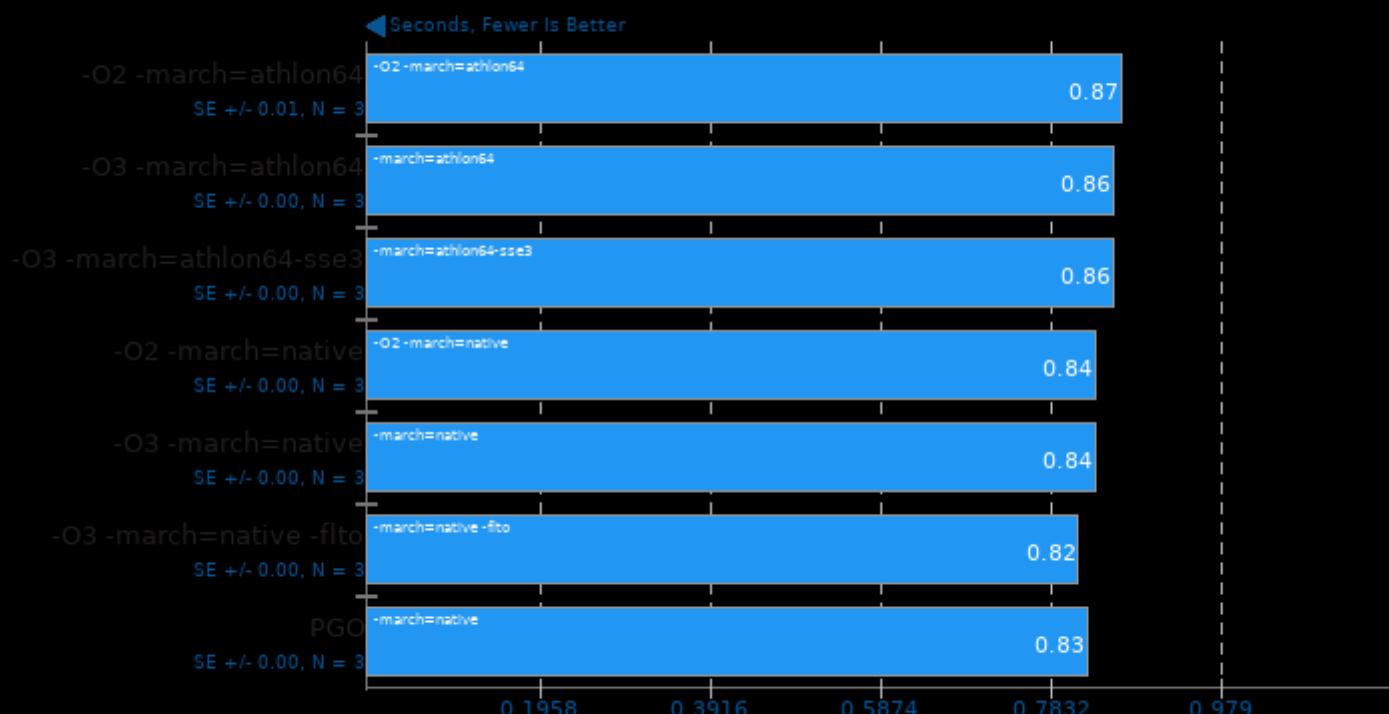
Test: 136 Ragdolls



1. (CXX) g++ options: -O3 -rdynamic -lglut -IGL -IGLU

Bullet Physics Engine 2.81

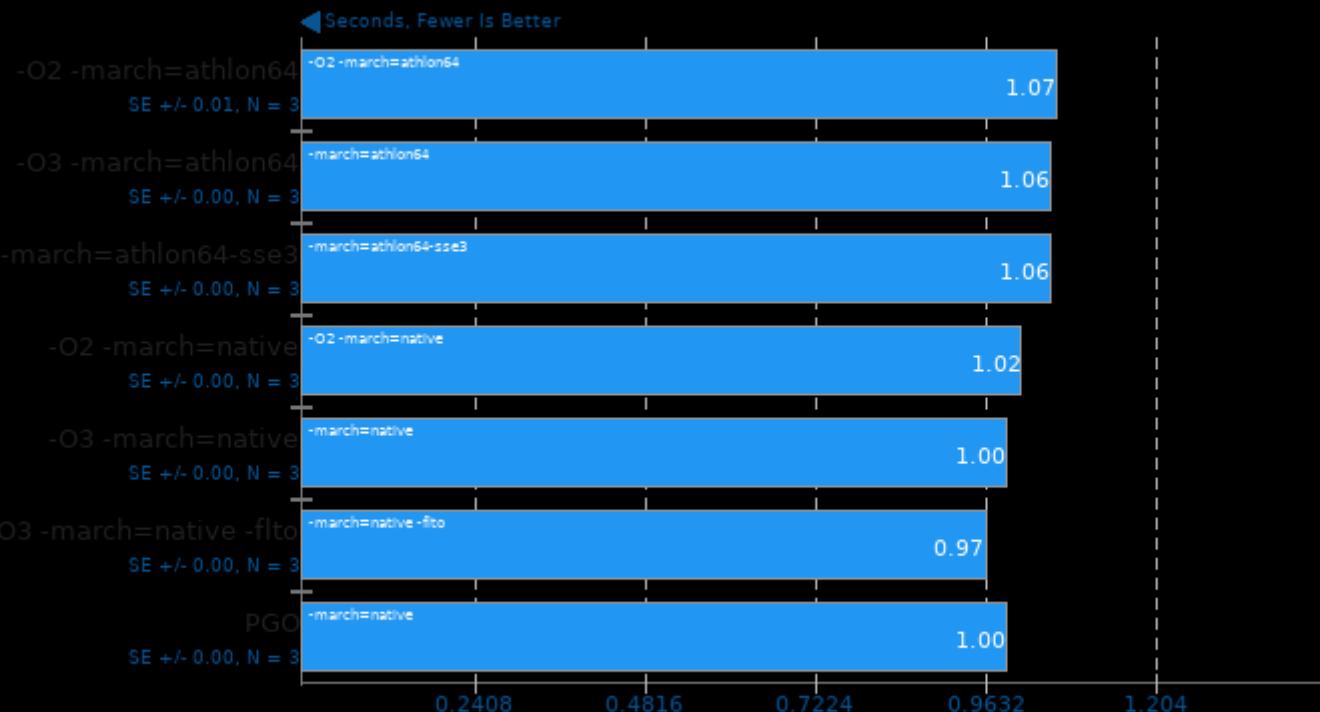
Test: Prim Trimesh



1. (CXX) g++ options: -O3 -rdynamic -lglut -IGL -IGLU

Bullet Physics Engine 2.81

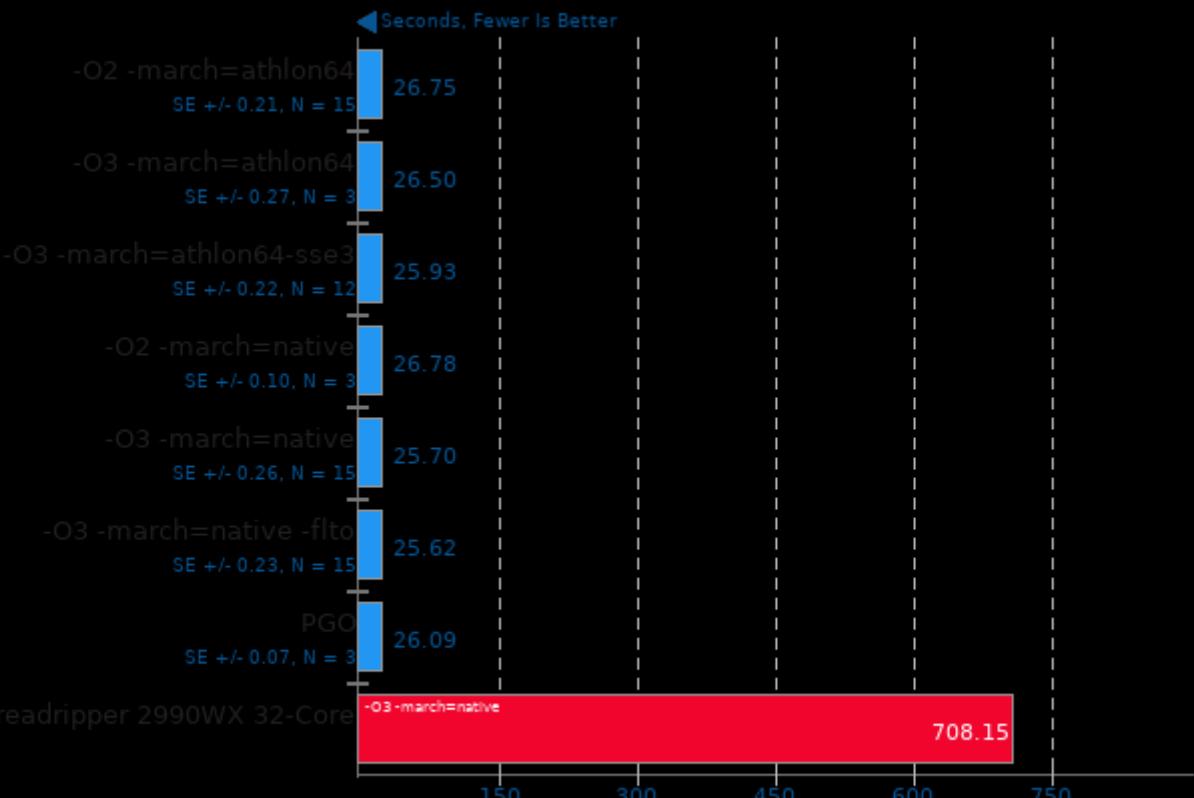
Test: Convex Trimesh



1. (CXX) g++ options: -O3 -rdynamic -lglut -IGL -IGLU

XZ Compression 5.2.4

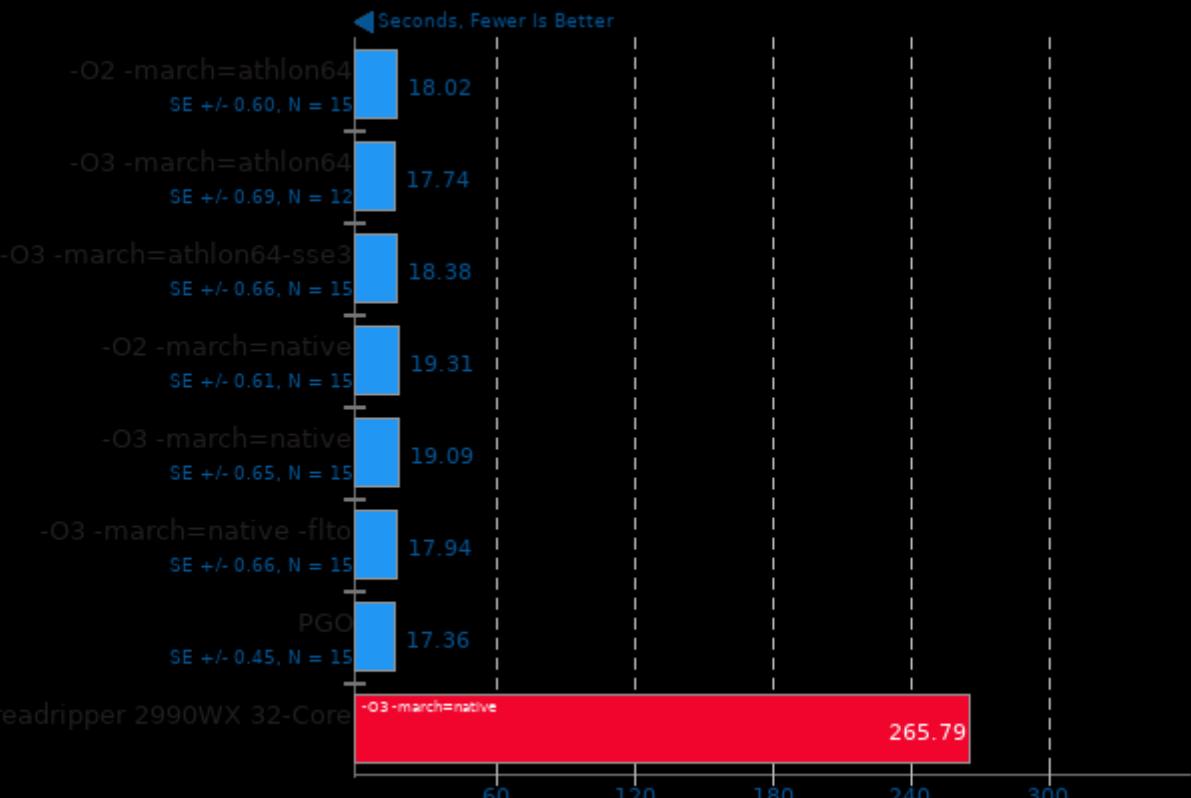
Compressing ubuntu-16.04.3-server-i386.img, Compression Level 9



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

Zstd Compression 1.3.4

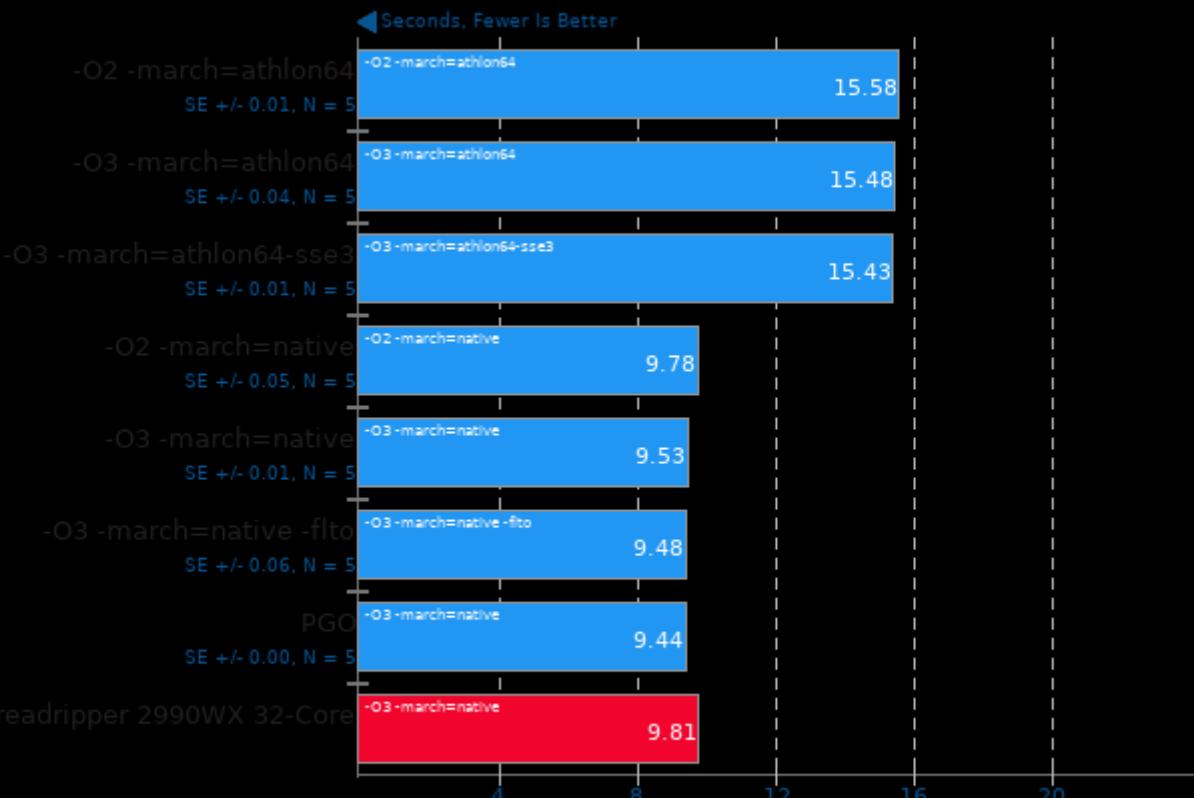
Compressing ubuntu-16.04.3-server-i386.img, Compression Level 19



1. (CC) gcc options: -pthread -lz -lzma

FLAC Audio Encoding 1.3.2

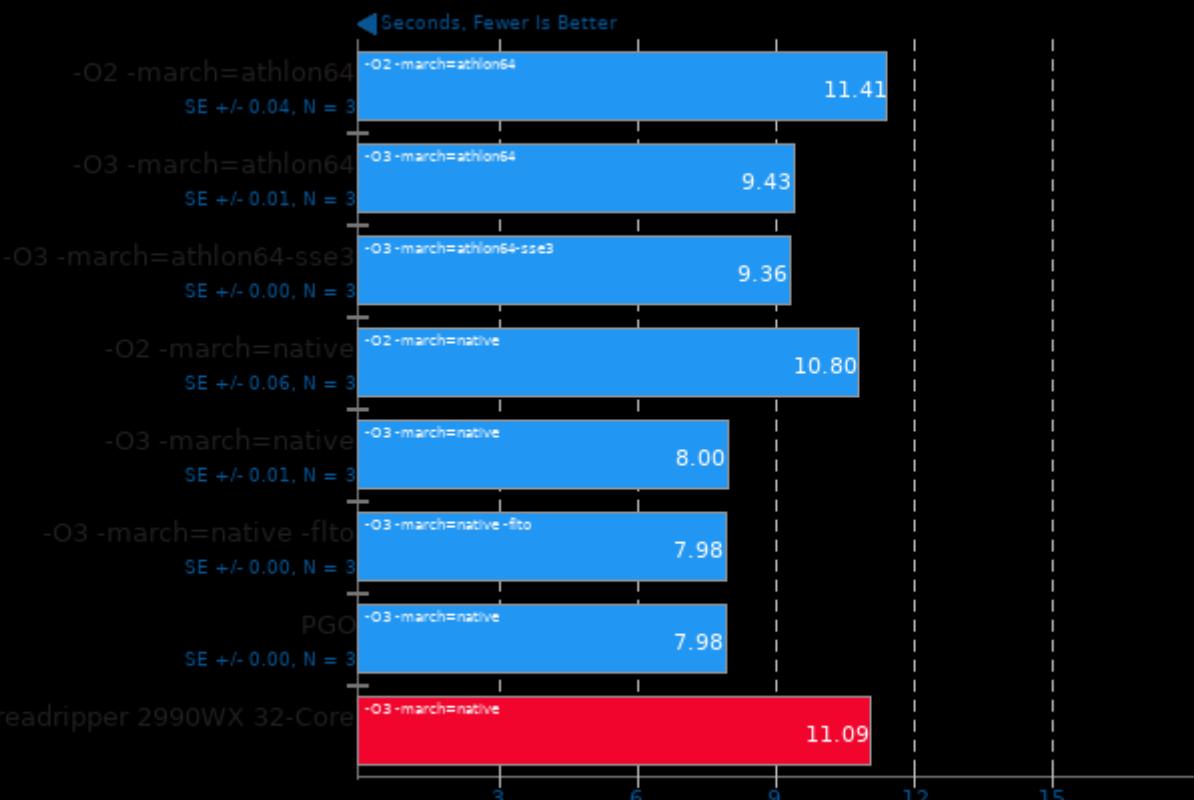
WAV To FLAC



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

LAME MP3 Encoding 3.100

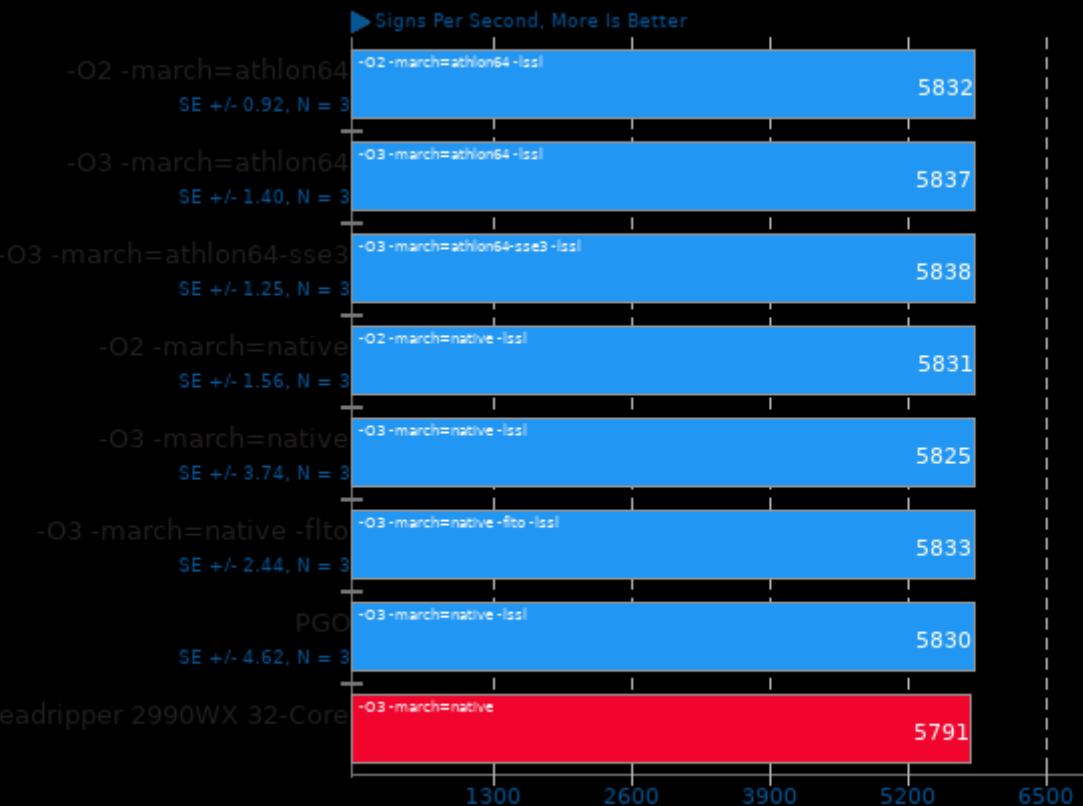
WAV To MP3



1. (CC) gcc options: -lm

OpenSSL 1.1.1

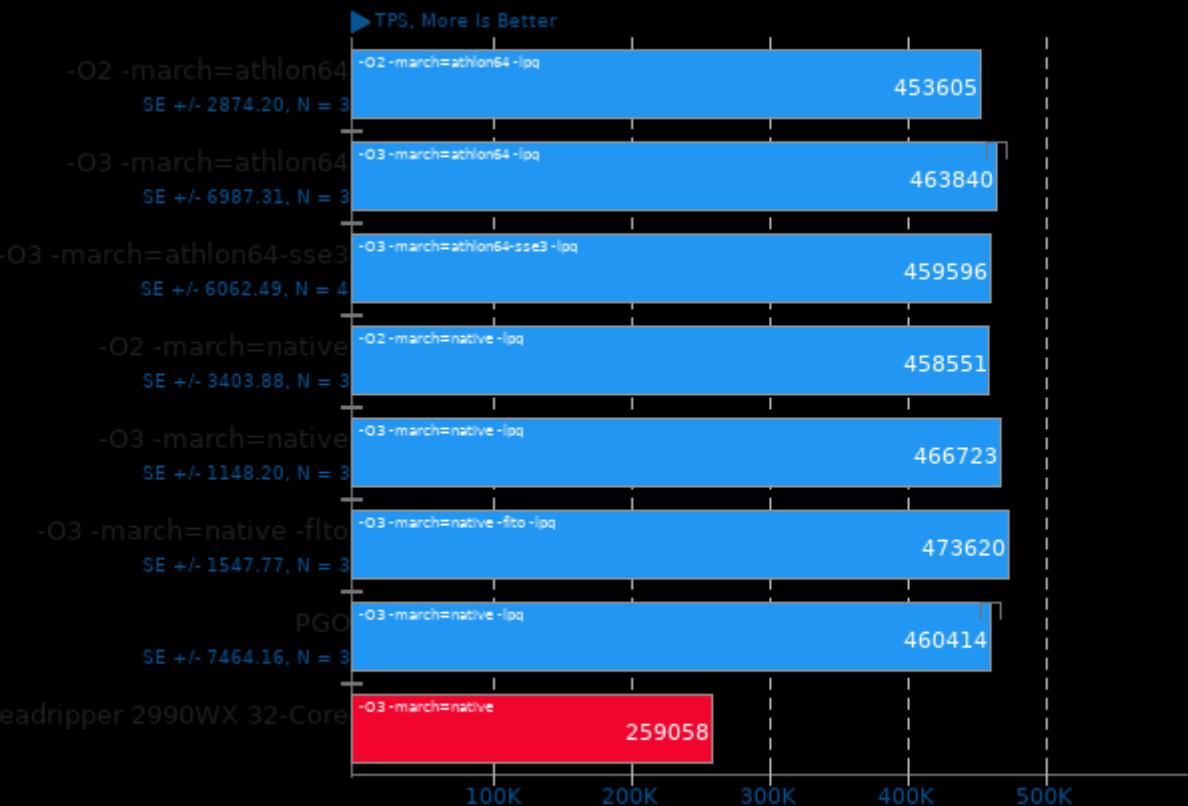
RSA 4096-bit Performance



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

PostgreSQL pgbench 10.3

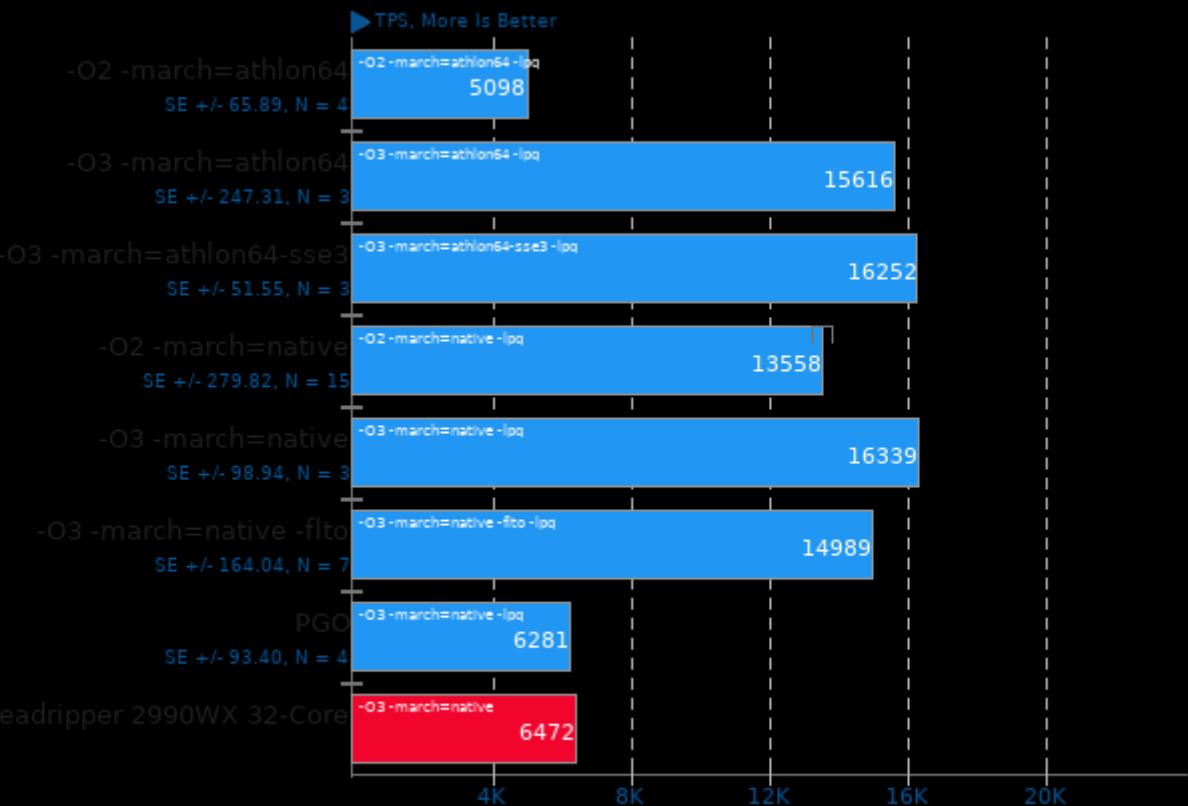
Scaling: Buffer Test - Test: Normal Load - Mode: Read Only



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -lpgcommon -lpgport -lpthread -lrt -lcrypt -ldl -lm

PostgreSQL pgbench 10.3

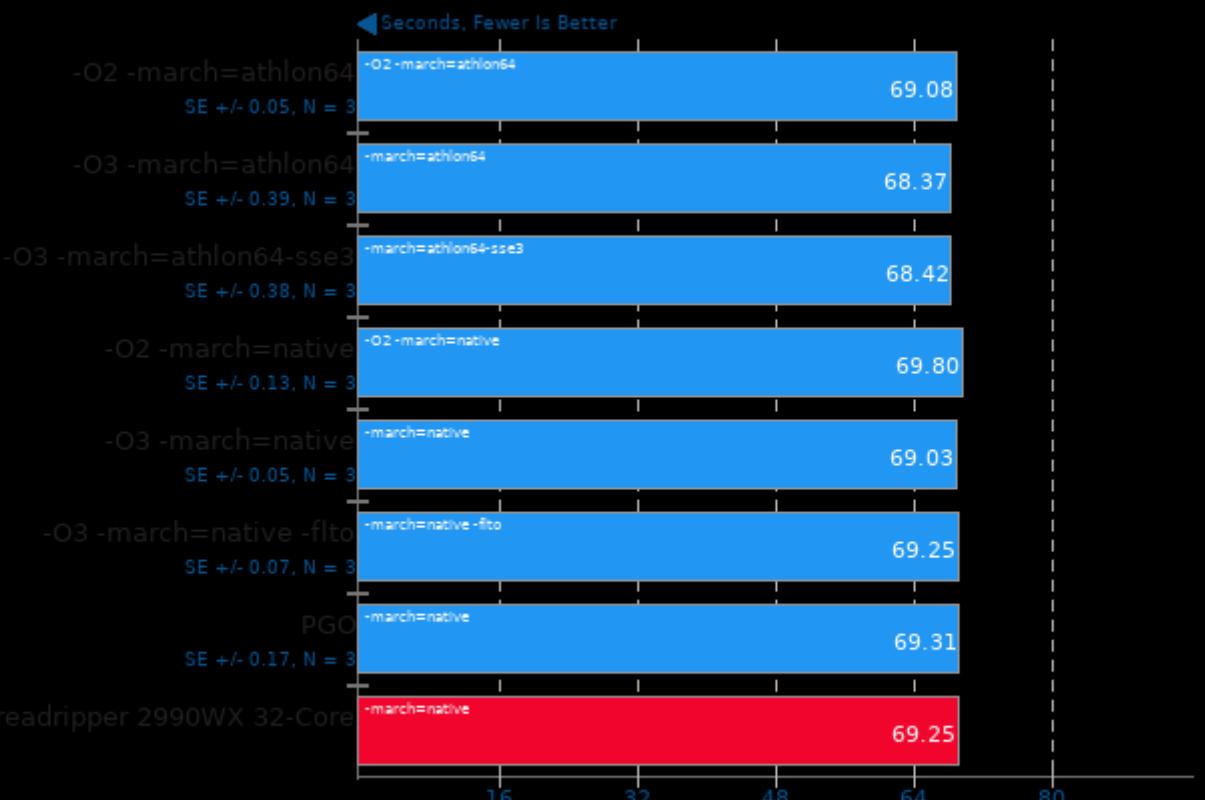
Scaling: Buffer Test - Test: Normal Load - Mode: Read Write



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -lpgcommon -lpgport -lpthread -lrt -lcrypt -ldl -lm

CppPerformanceBenchmarks 9

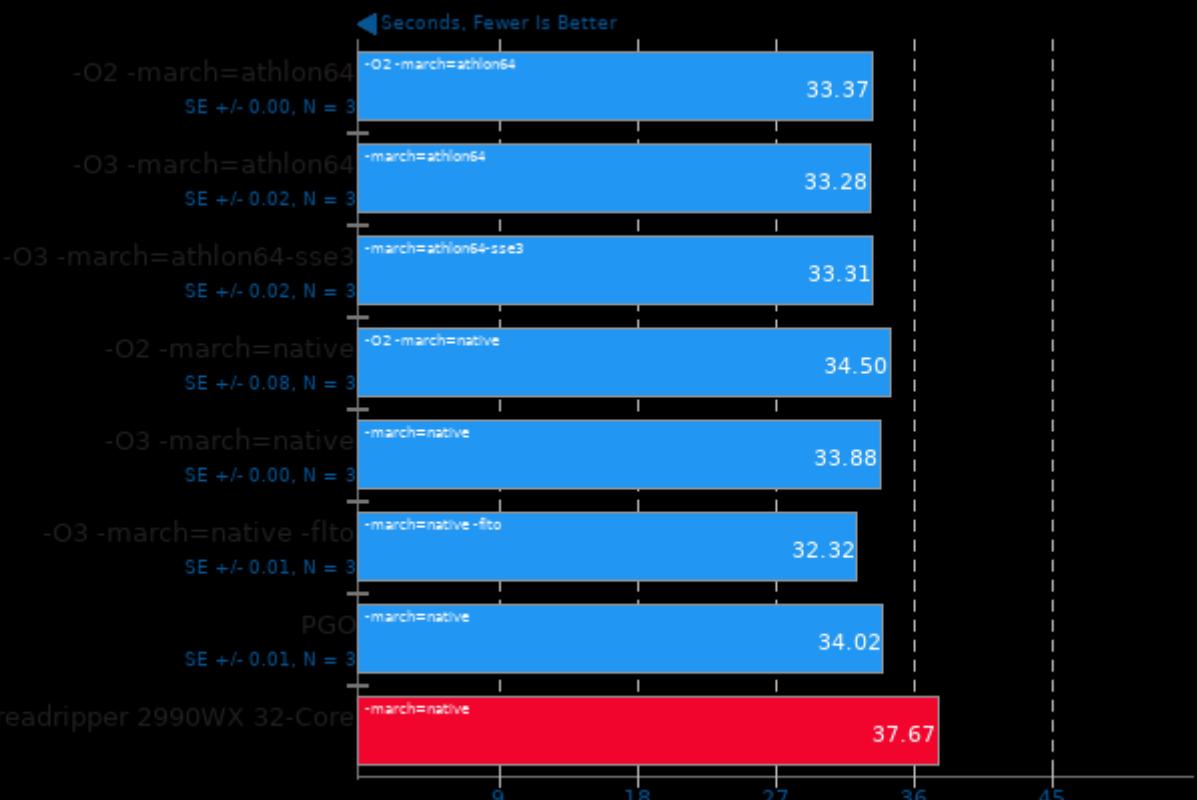
Test: Atol



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

CppPerformanceBenchmarks 9

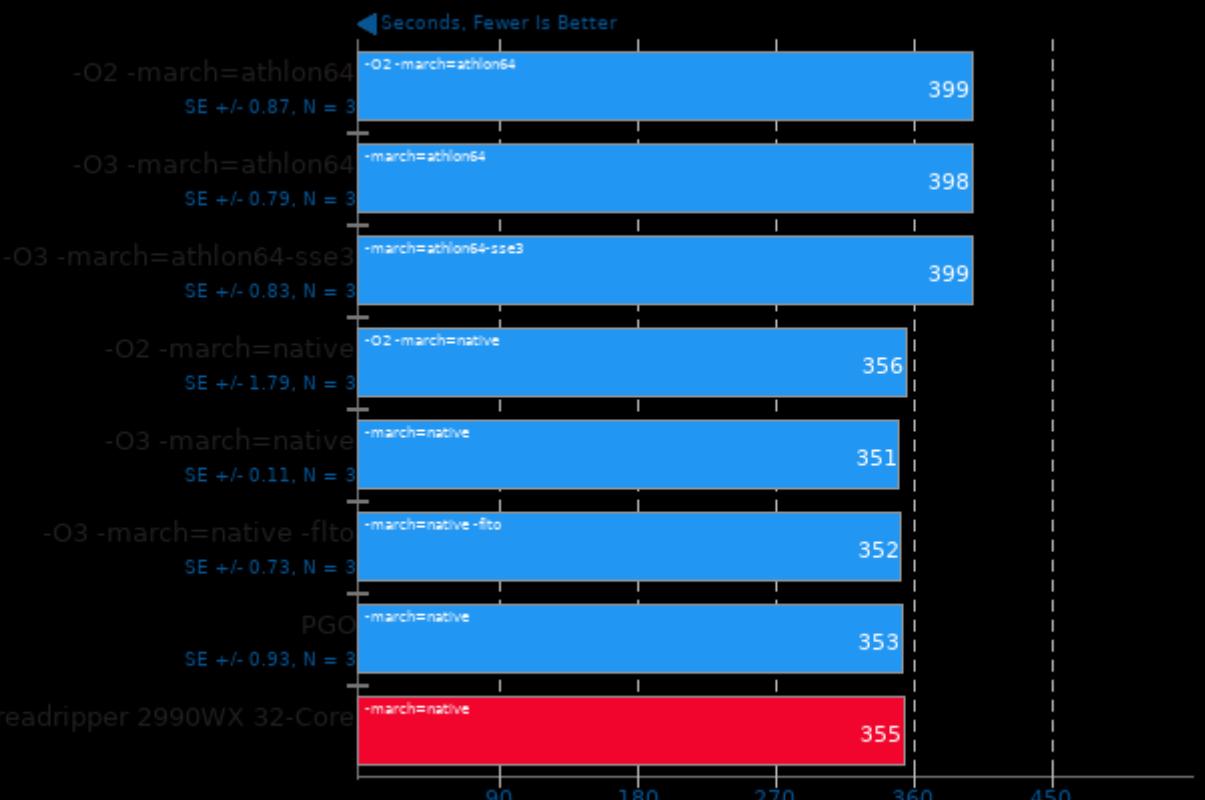
Test: Ctype



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

CppPerformanceBenchmarks 9

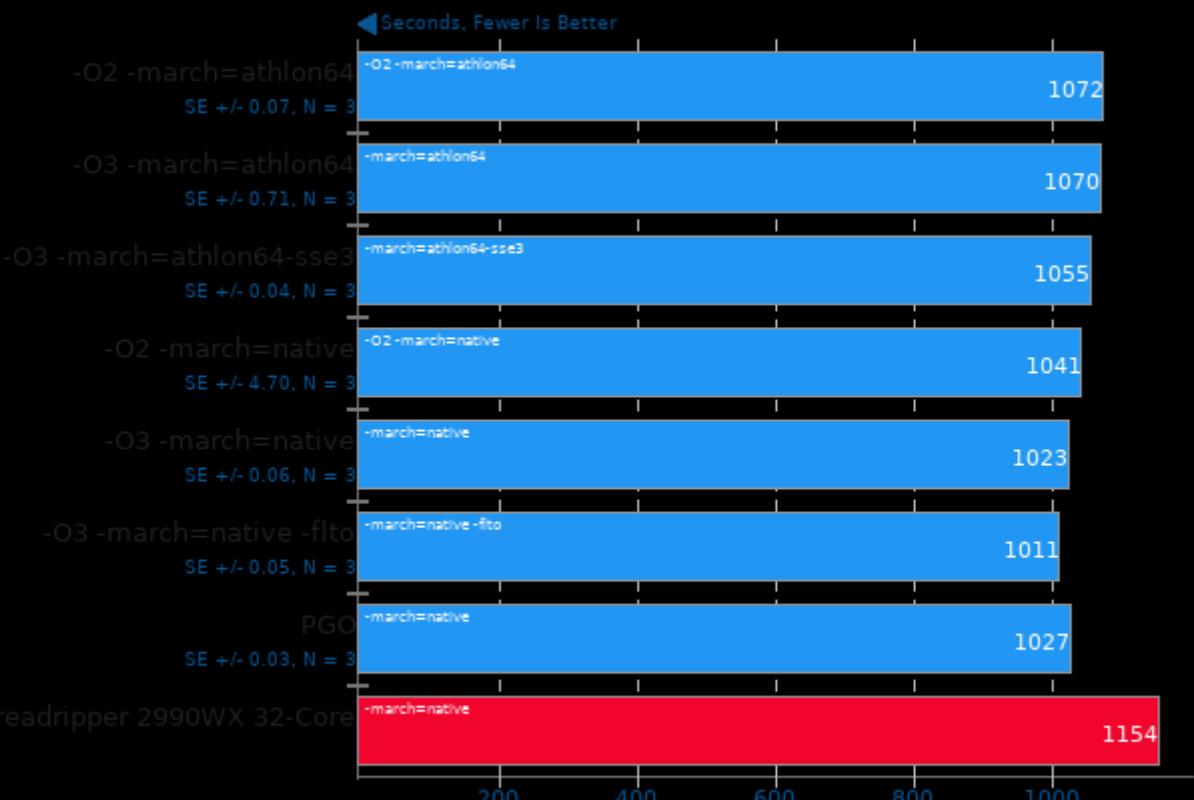
Test: Math Library



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

CppPerformanceBenchmarks 9

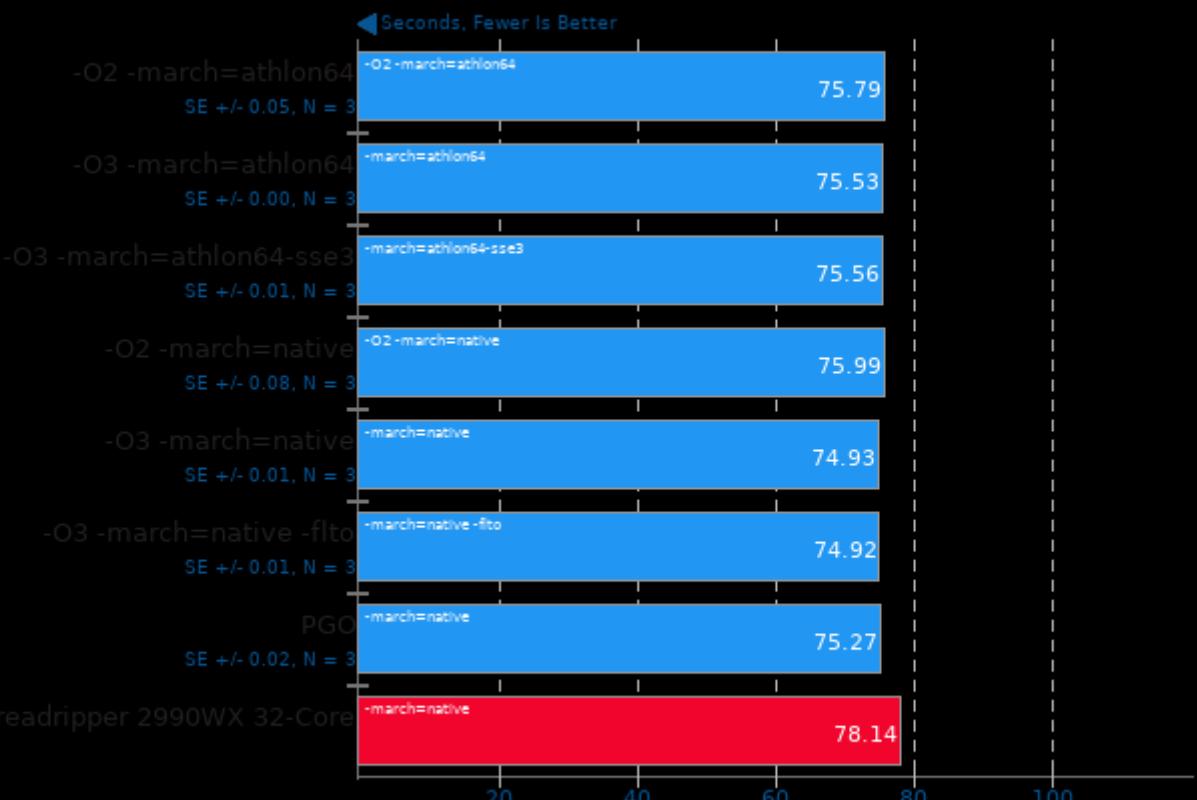
Test: Random Numbers



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

CppPerformanceBenchmarks 9

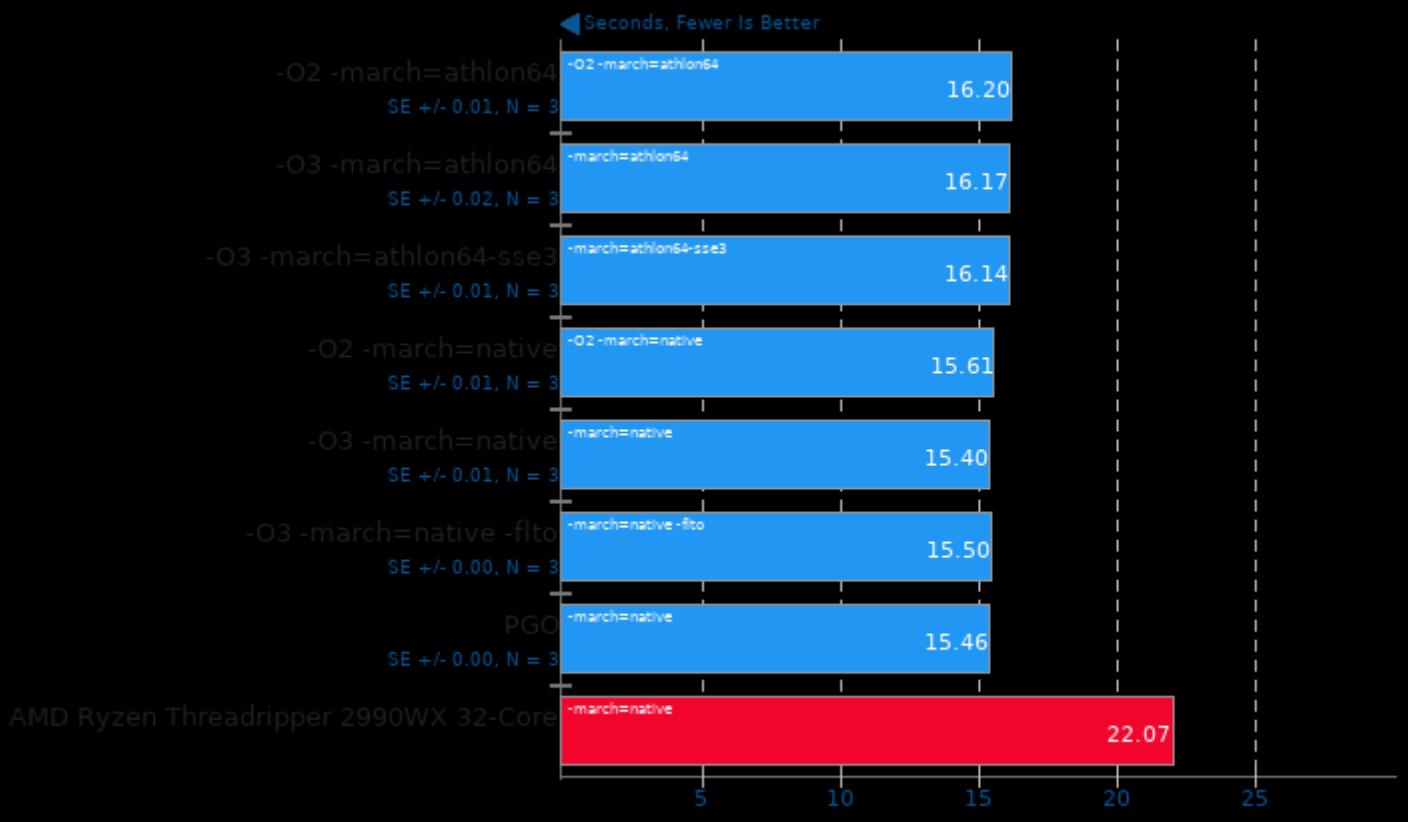
Test: Stepanov Vector



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

CppPerformanceBenchmarks 9

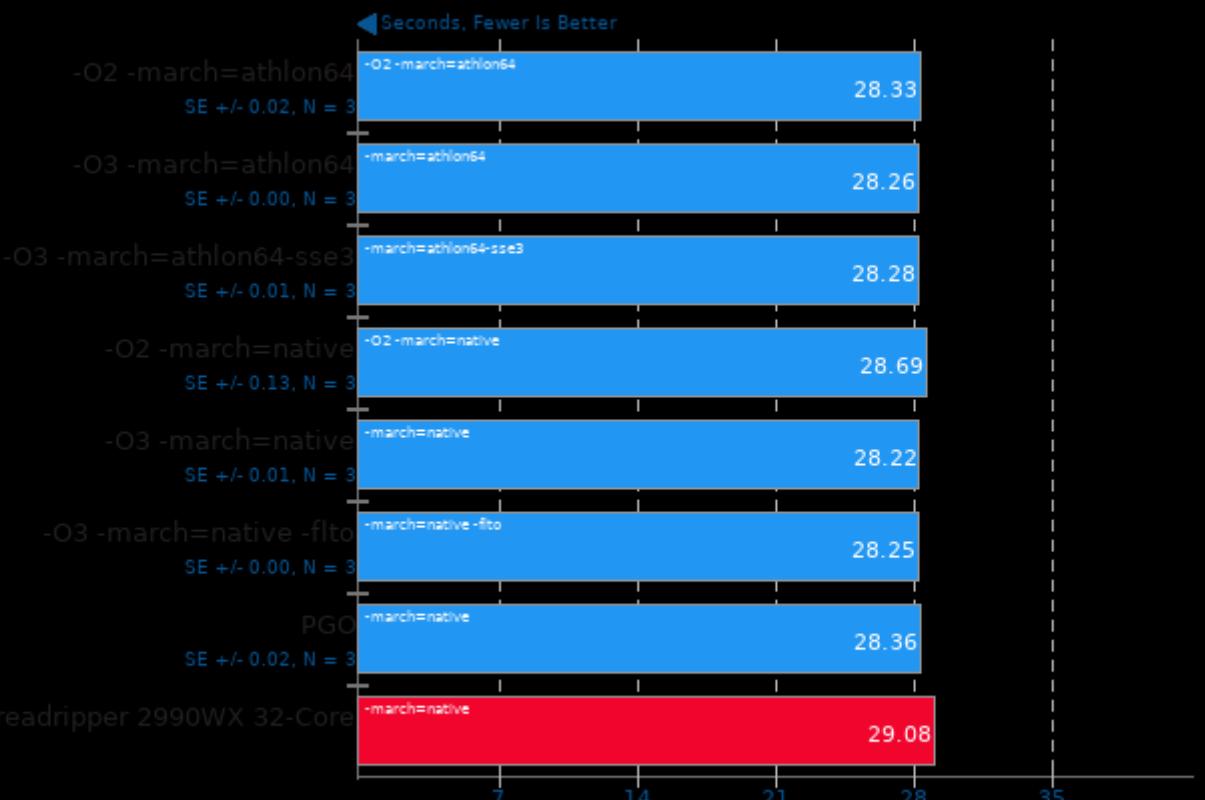
Test: Function Objects



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

CppPerformanceBenchmarks 9

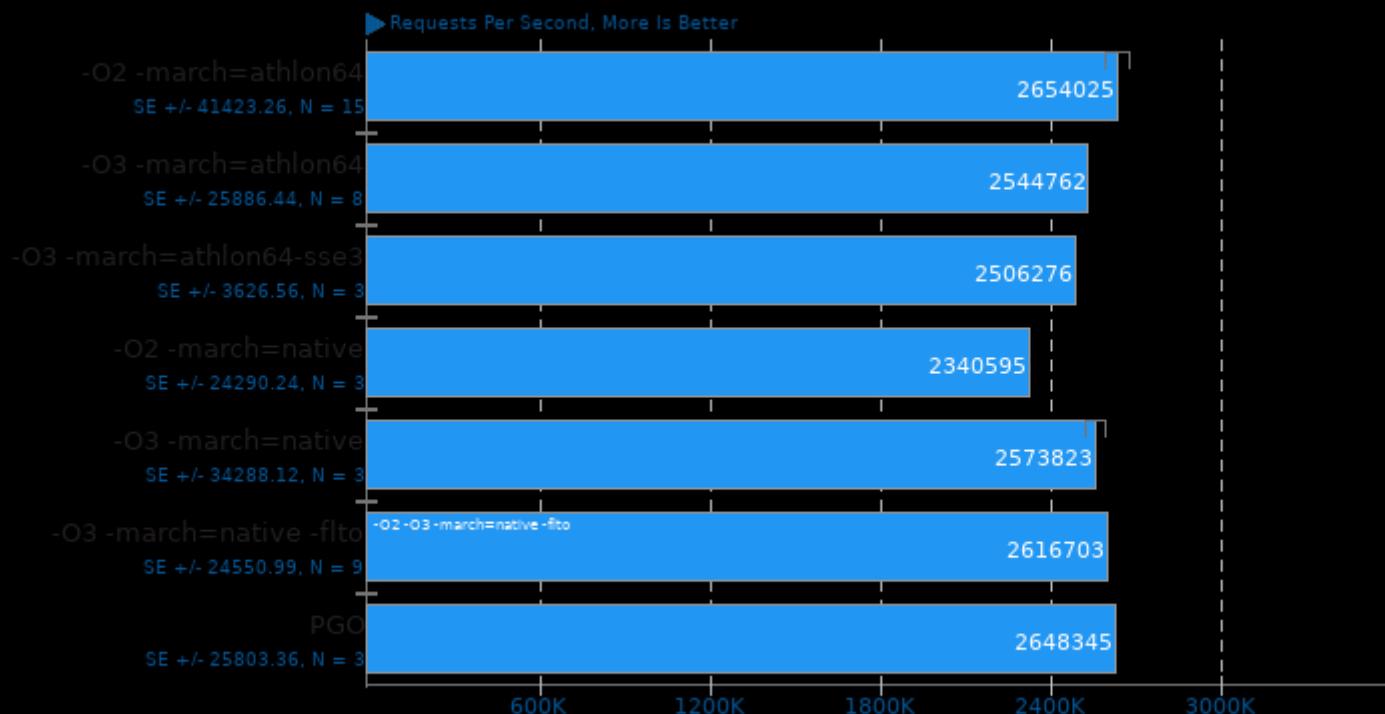
Test: Stepanov Abstraction



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

Redis 4.0.8

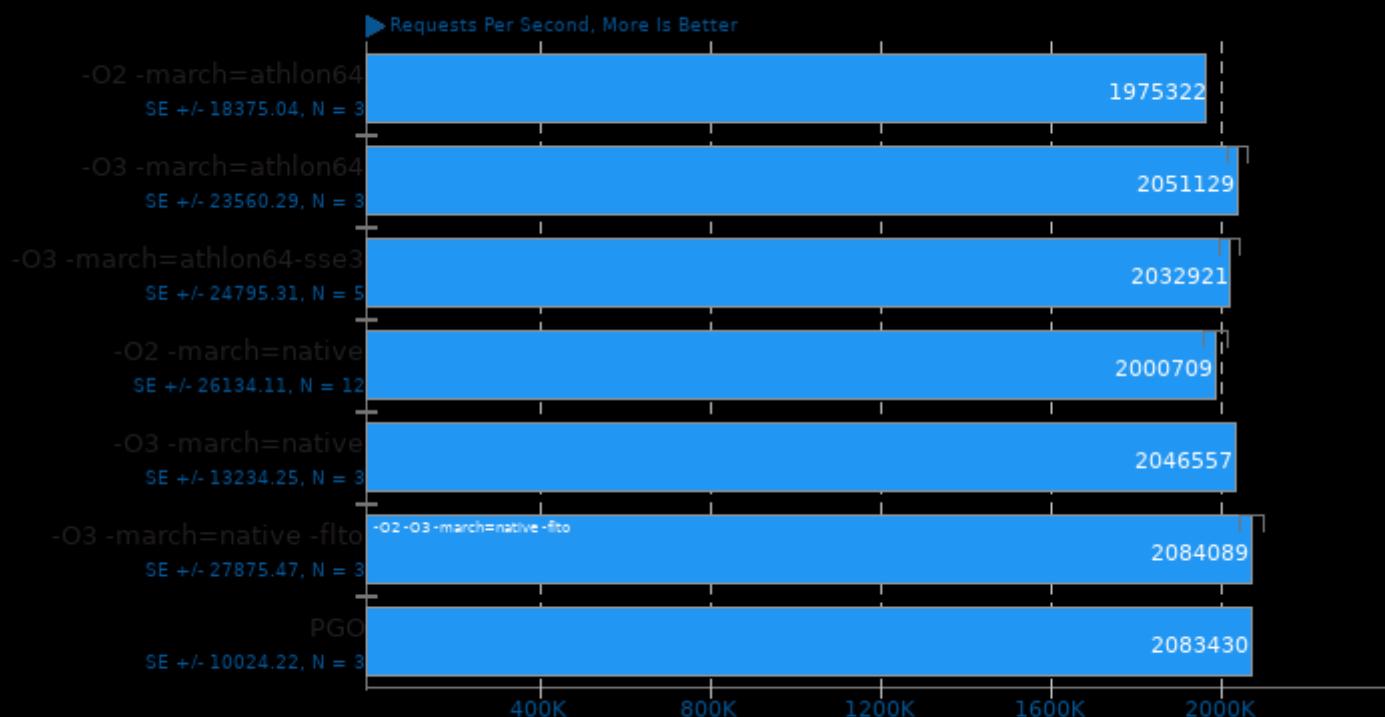
Test: LPOP



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

Redis 4.0.8

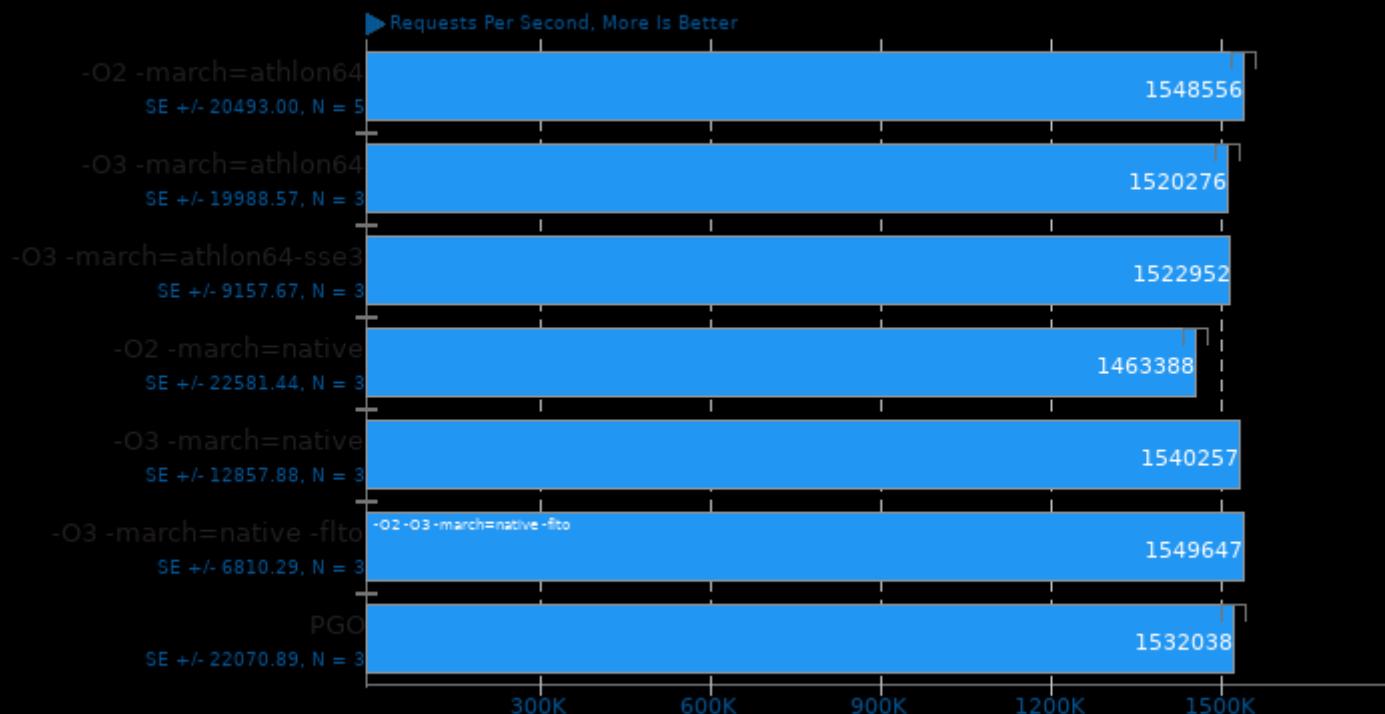
Test: SADD



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

Redis 4.0.8

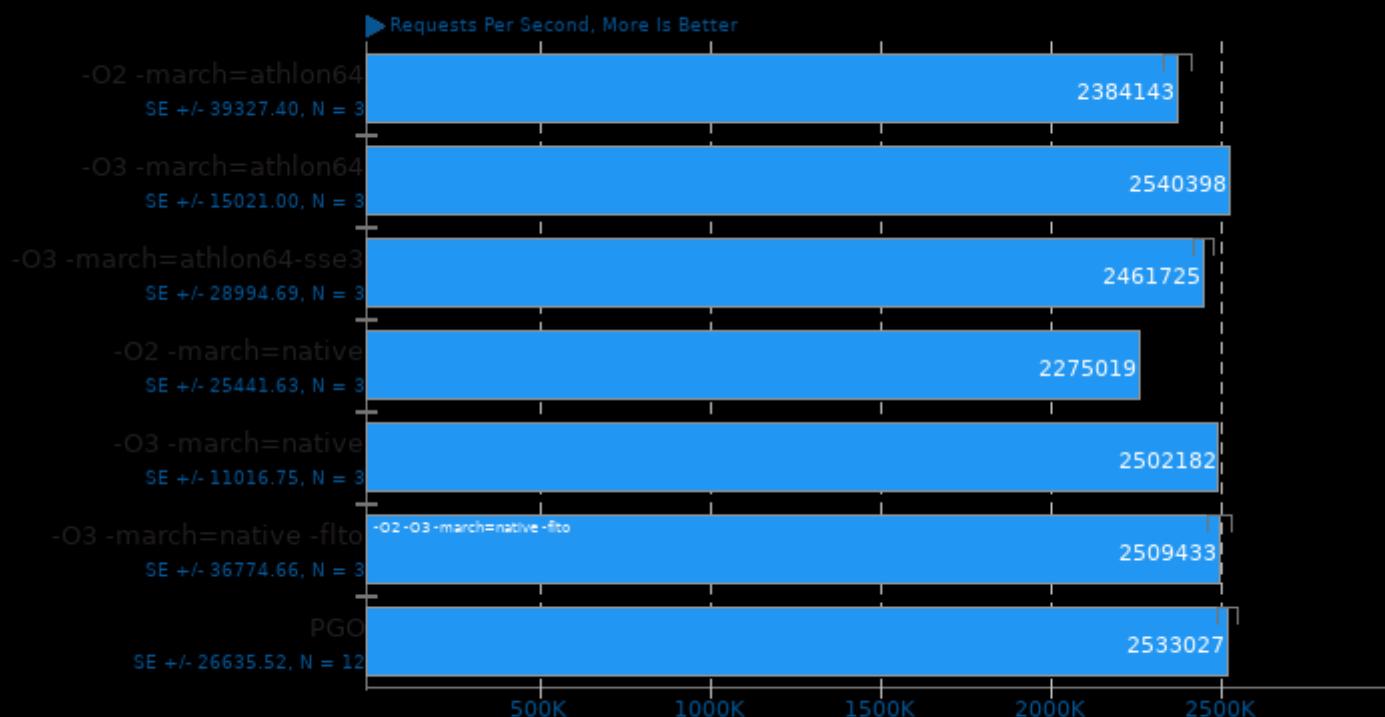
Test: LPUSH



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

Redis 4.0.8

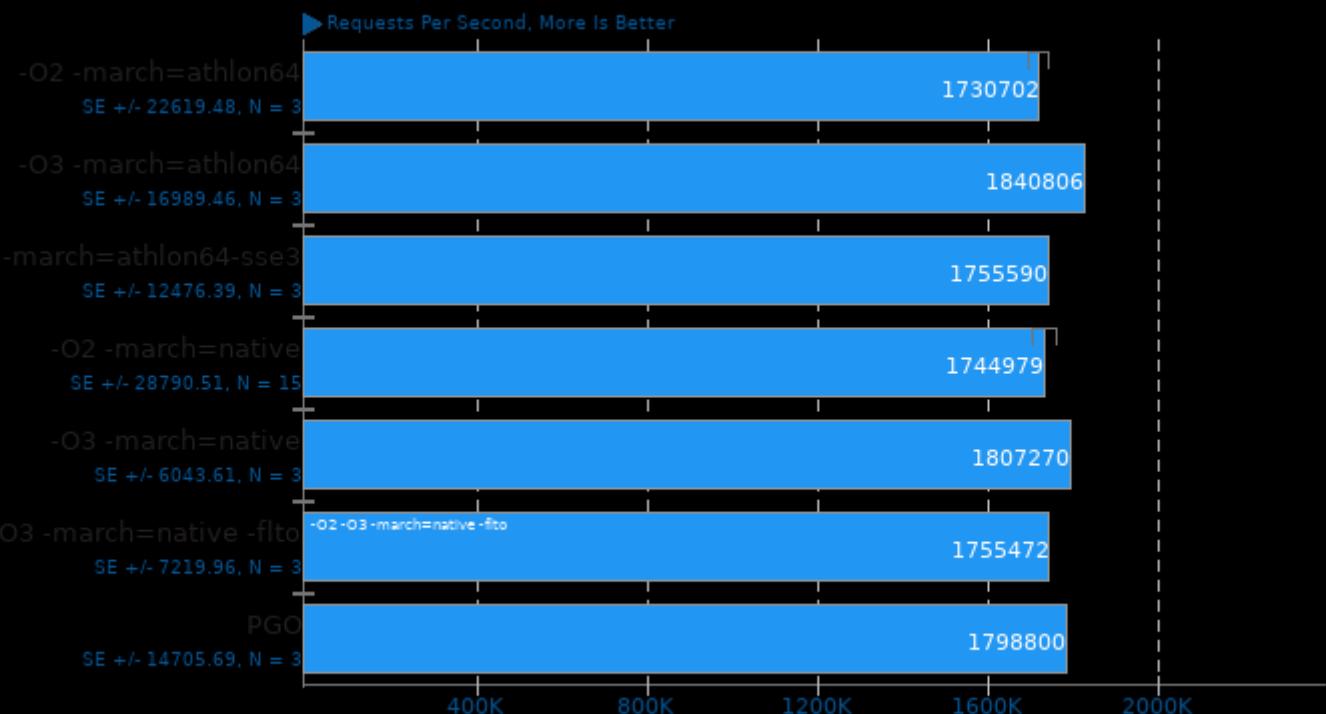
Test: GET



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

Redis 4.0.8

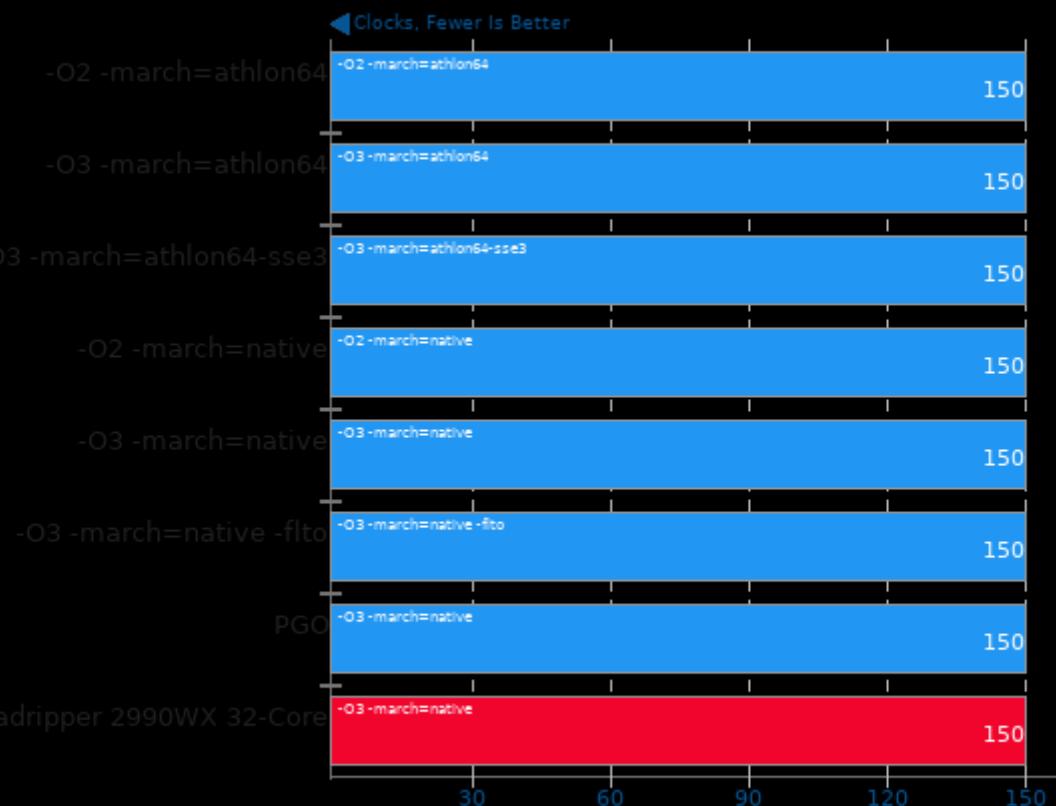
Test: SET



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

ctx_clock

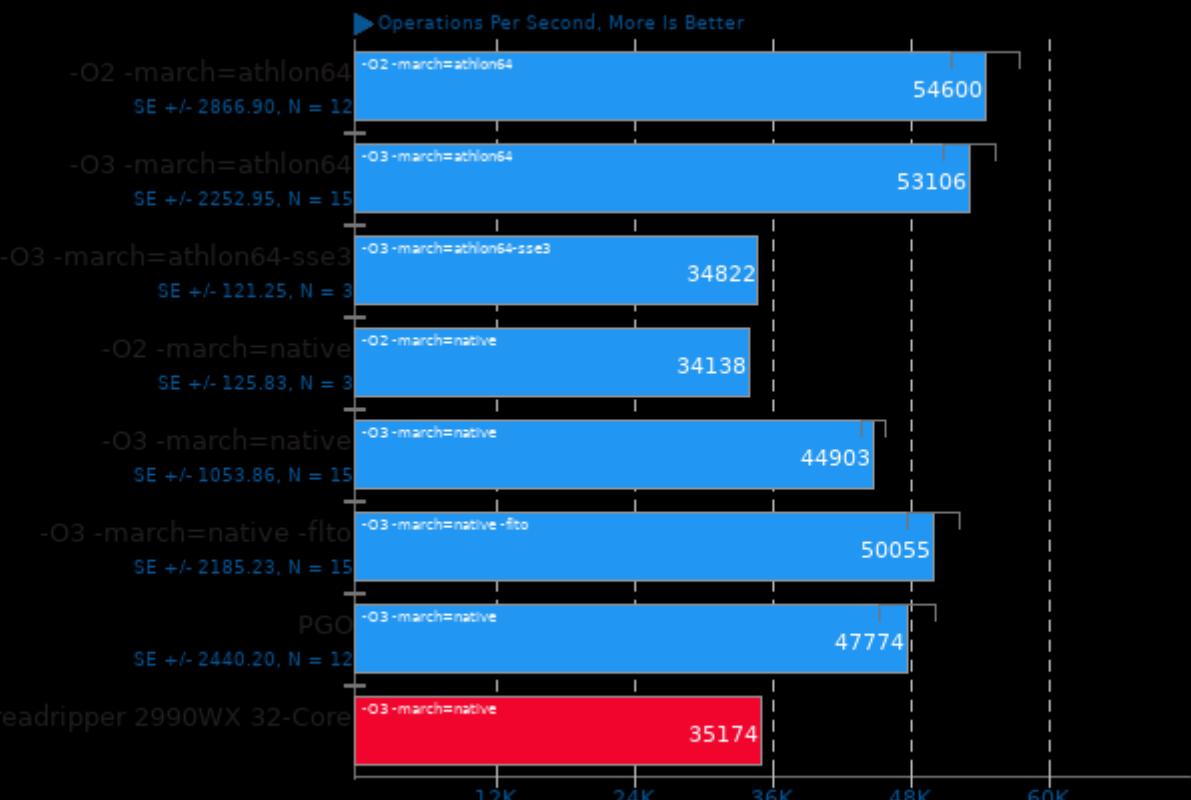
Context Switch Time



1. (CC) gcc options:

Memcached mcperf 1.5.10

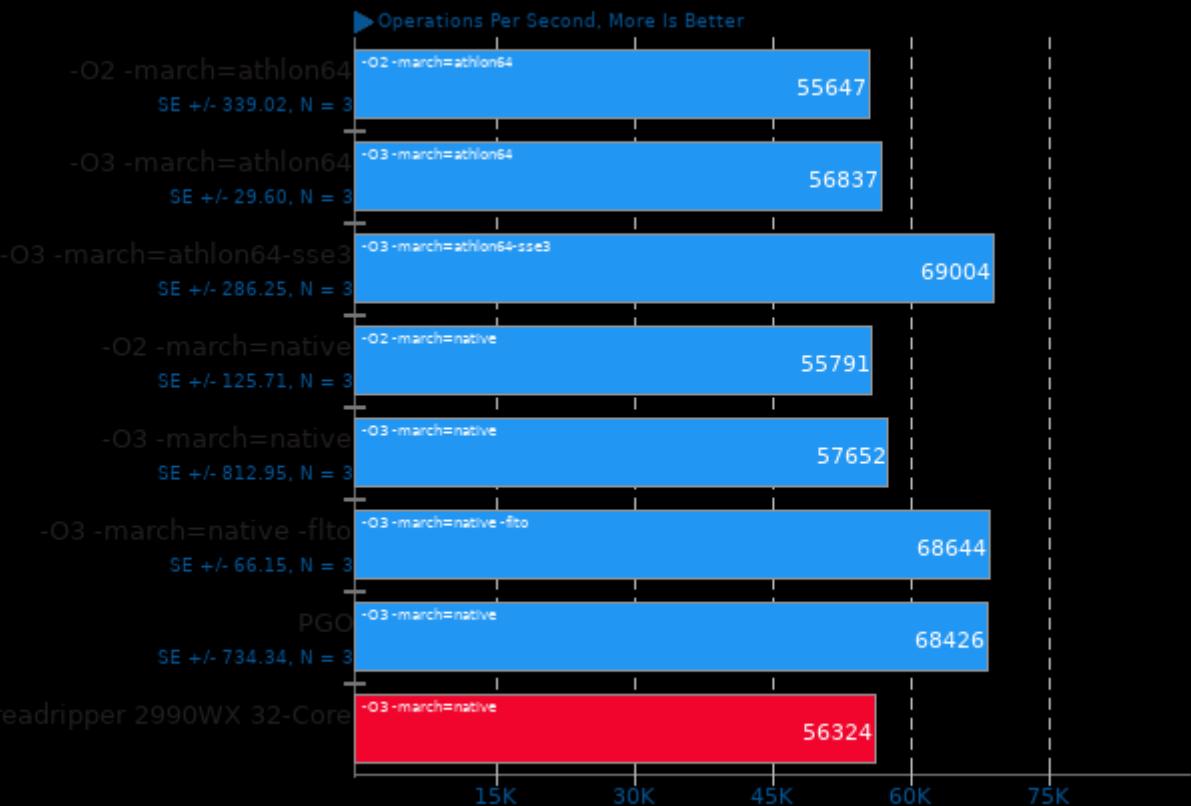
Method: Add



1. (CC) gcc options: -lm -rdynamic

Memcached mcperf 1.5.10

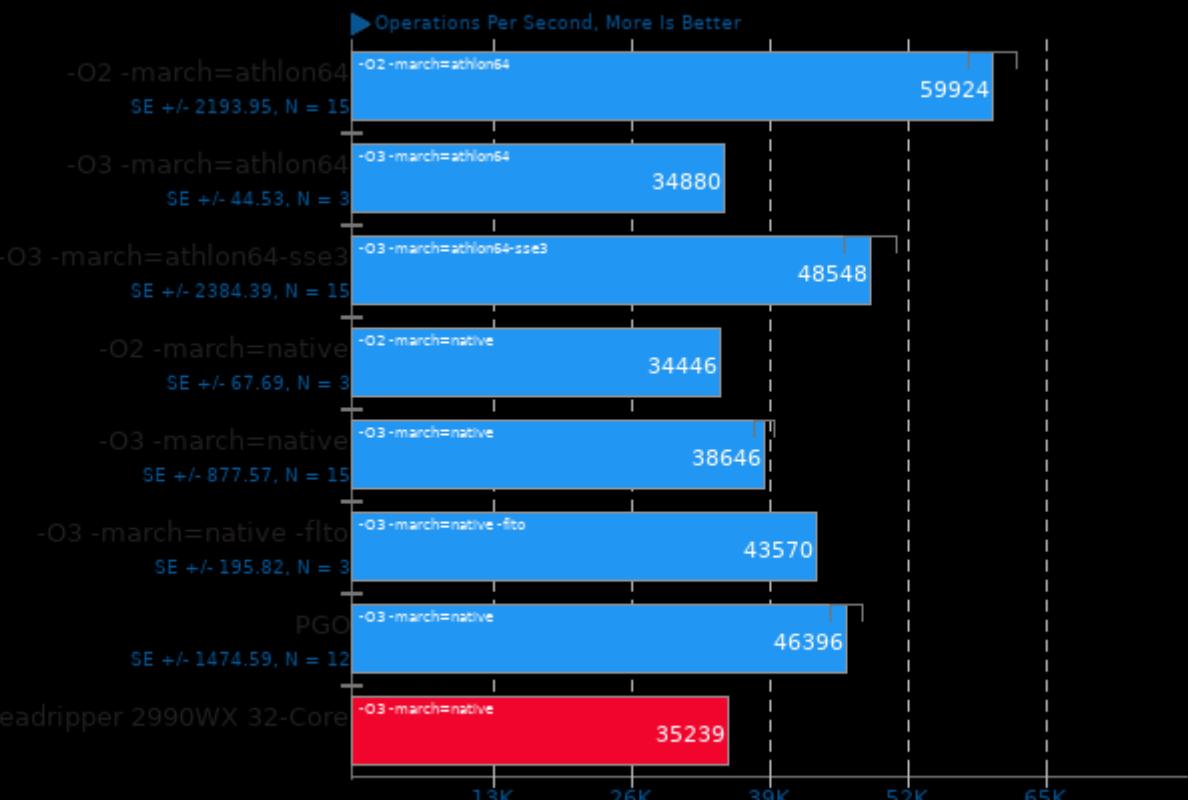
Method: Get



1. (CC) gcc options: -lm -rdynamic

Memcached mcperf 1.5.10

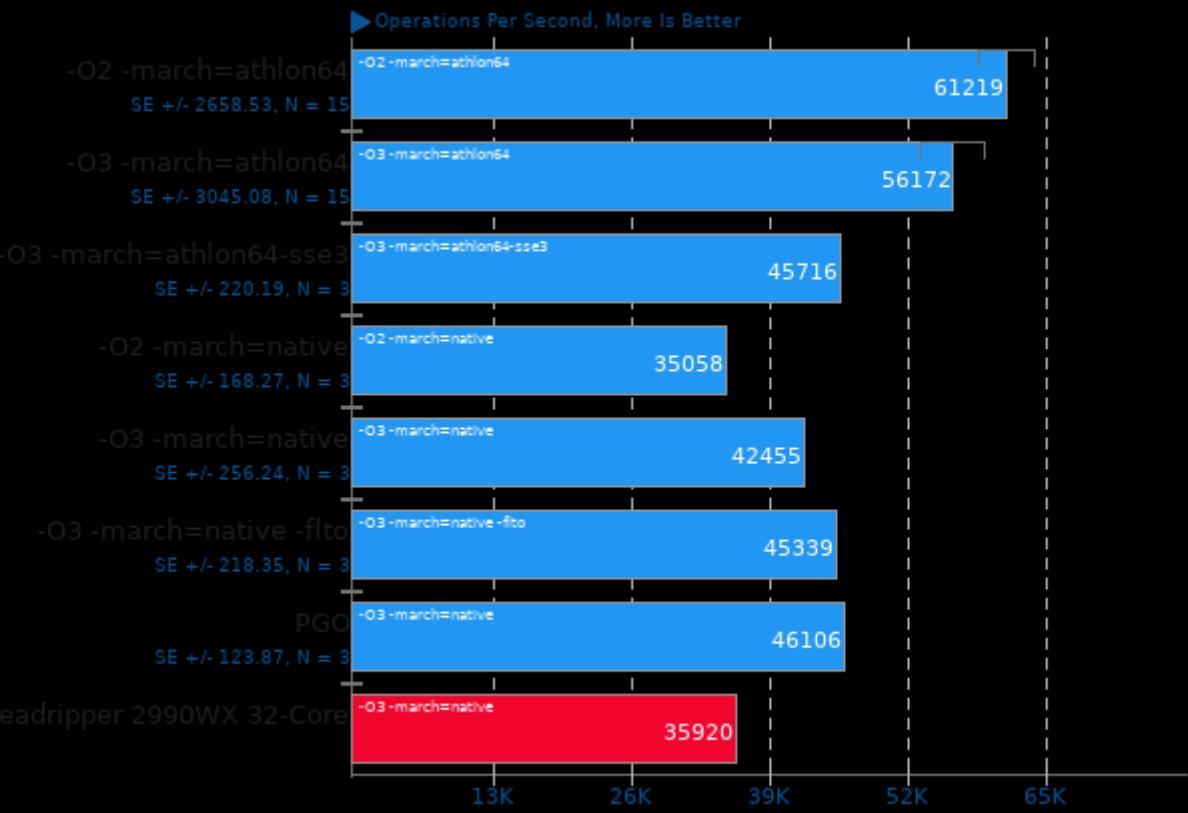
Method: Set



1. (CC) gcc options: -lm -rdynamic

Memcached mcperf 1.5.10

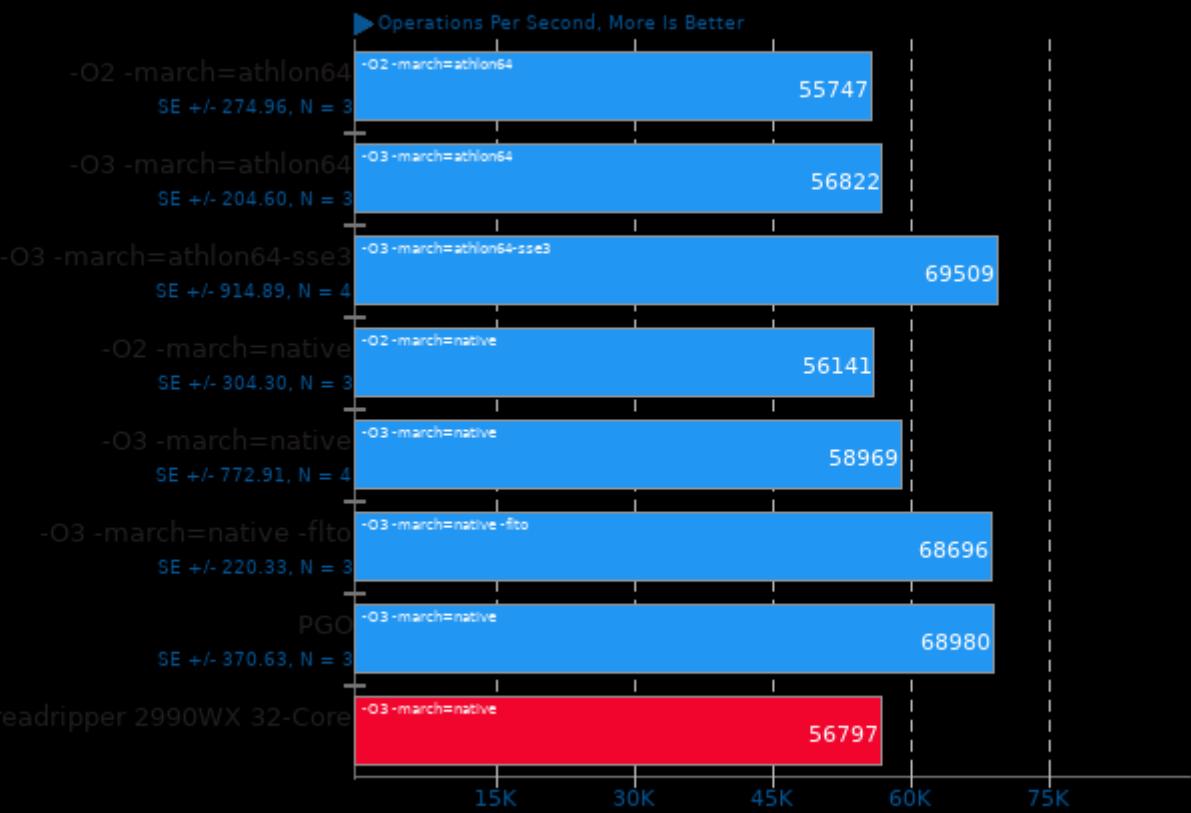
Method: Append



1. (CC) gcc options: -lm -rdynamic

Memcached mcperf 1.5.10

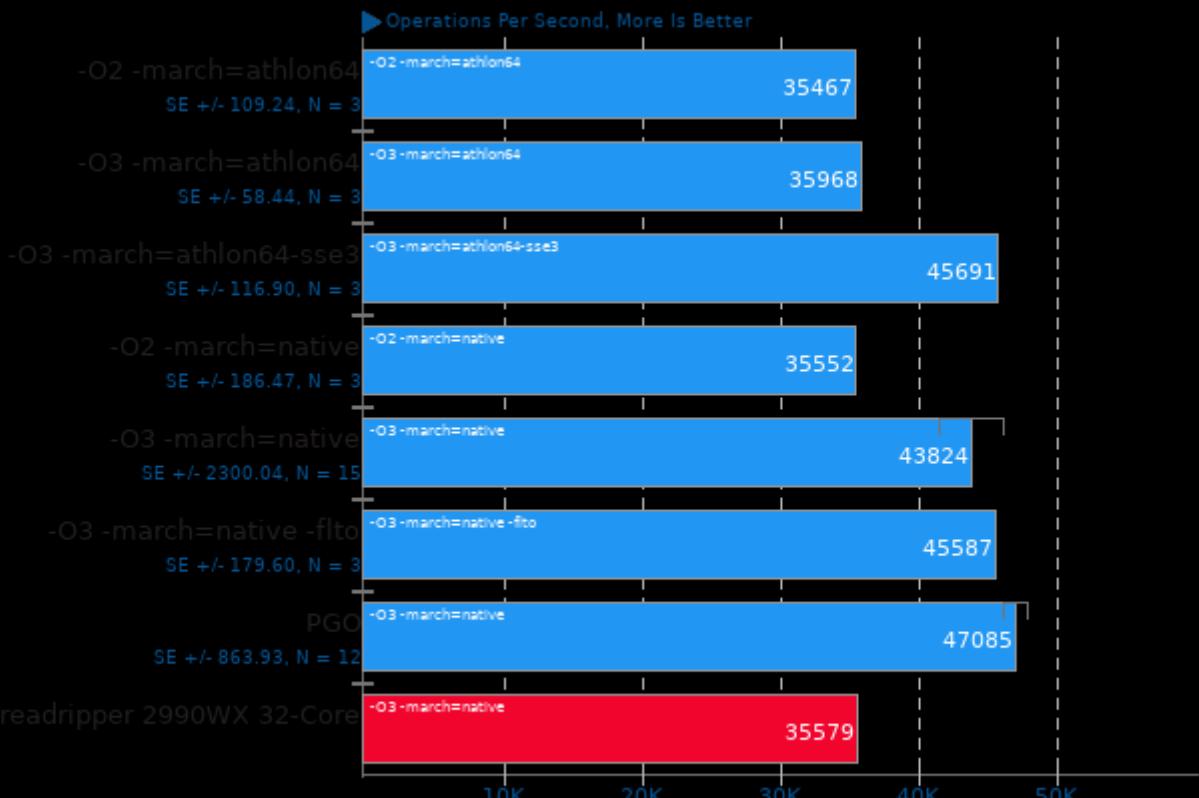
Method: Delete



1. (CC) gcc options: -lm -rdynamic

Memcached mcperf 1.5.10

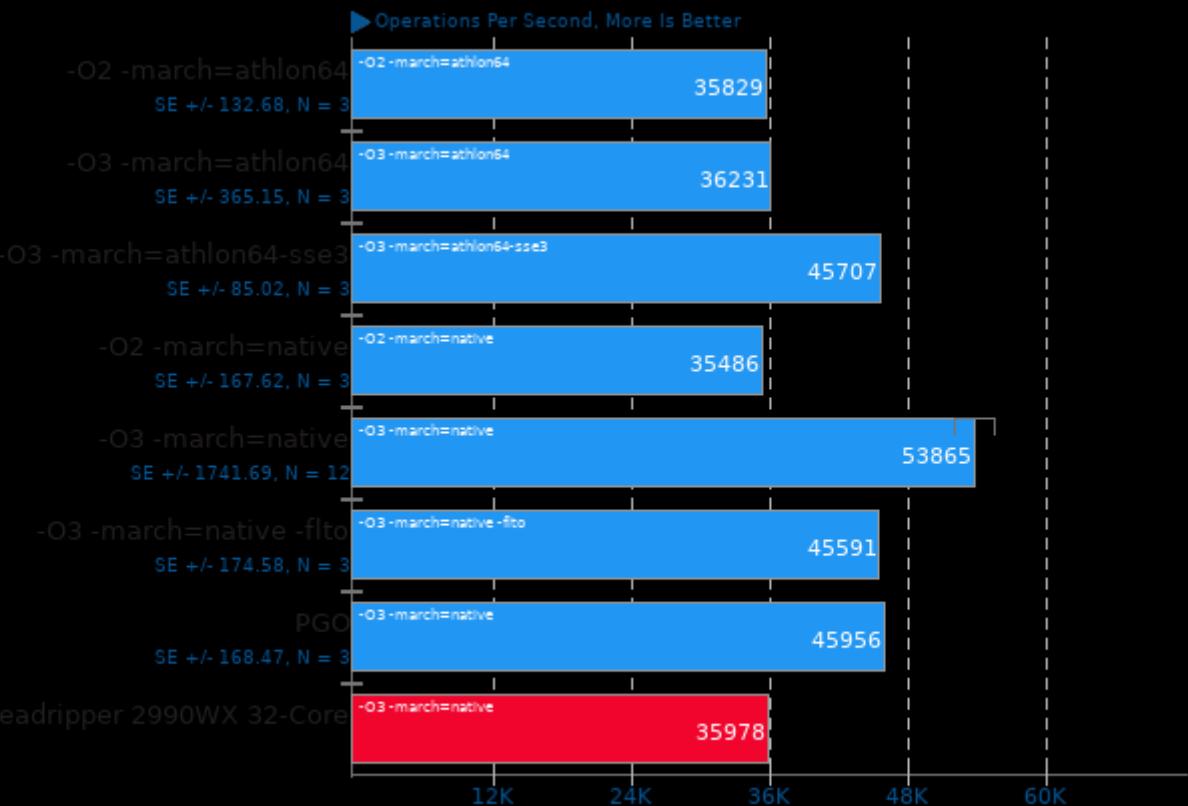
Method: Prepend



1. (CC) gcc options: -lm -rdynamic

Memcached mcperf 1.5.10

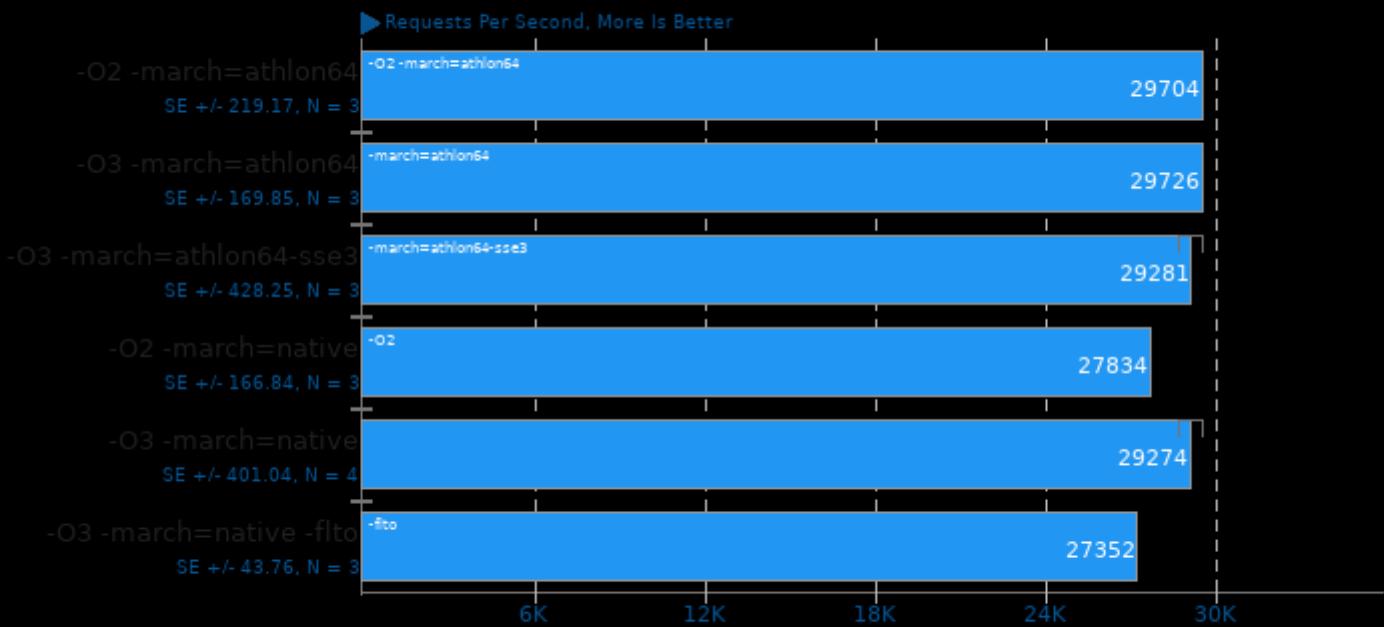
Method: Replace



1. (CC) gcc options: -lm -rdynamic

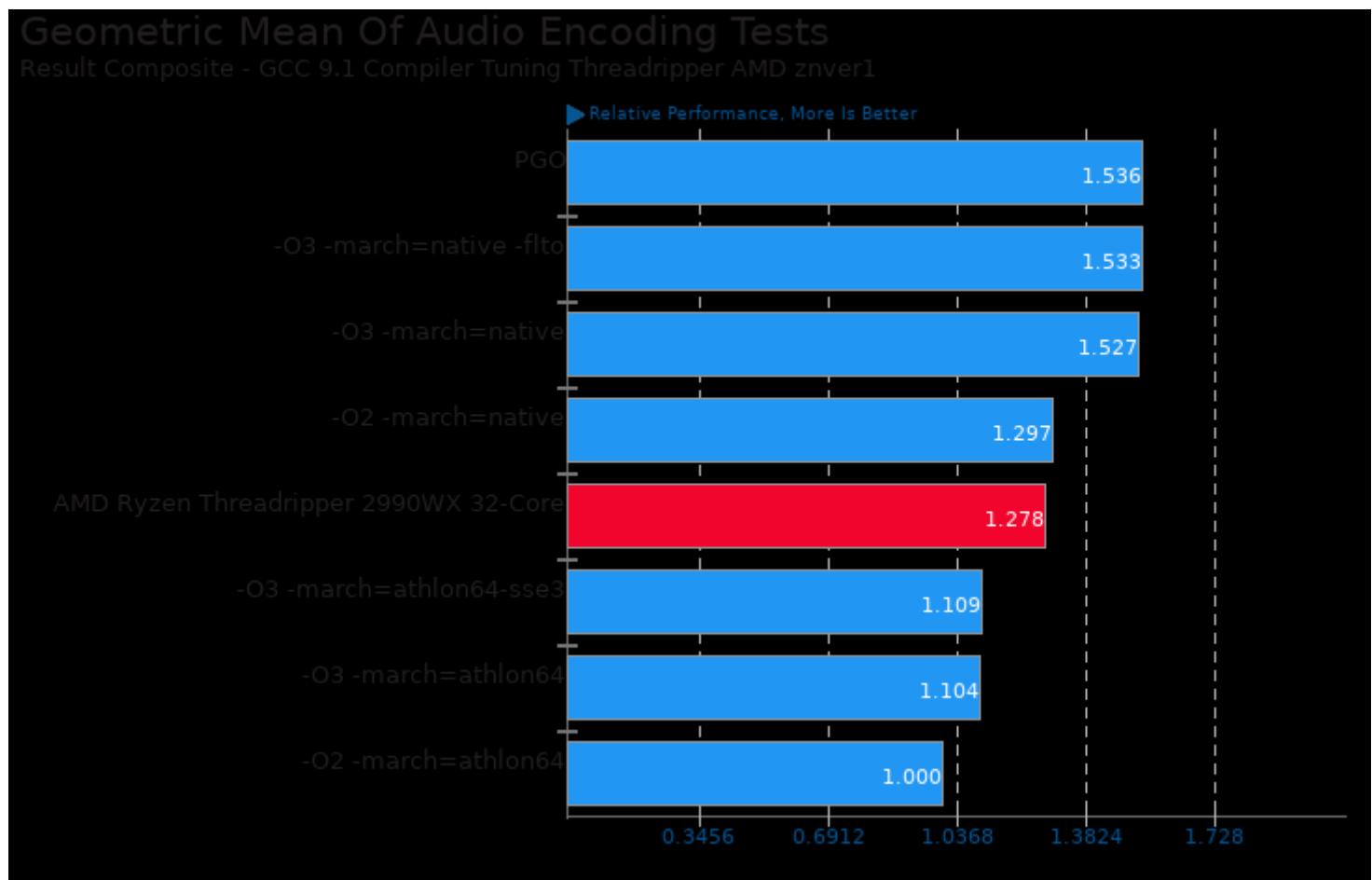
NGINX Benchmark 1.9.9

Static Web Page Serving



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

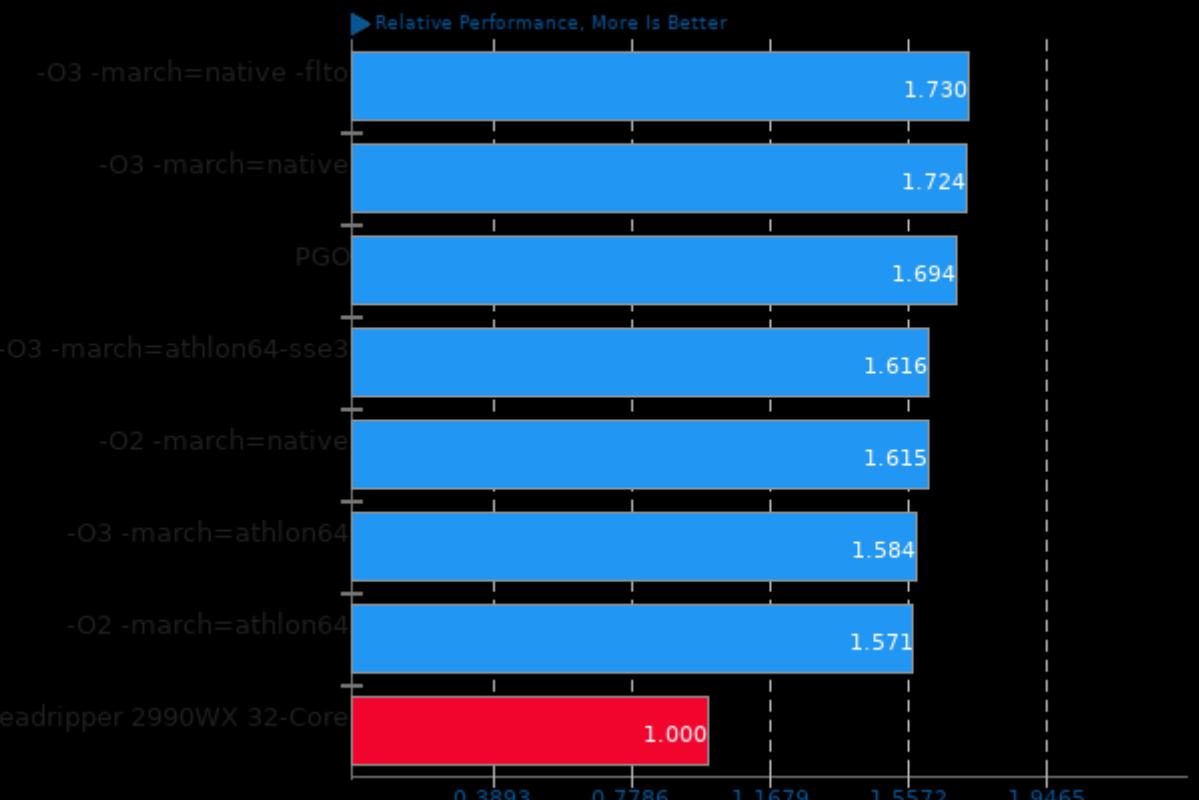
These geometric means are based upon test groupings / test suites for this result file.



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

Geometric Mean Of AV1 Tests

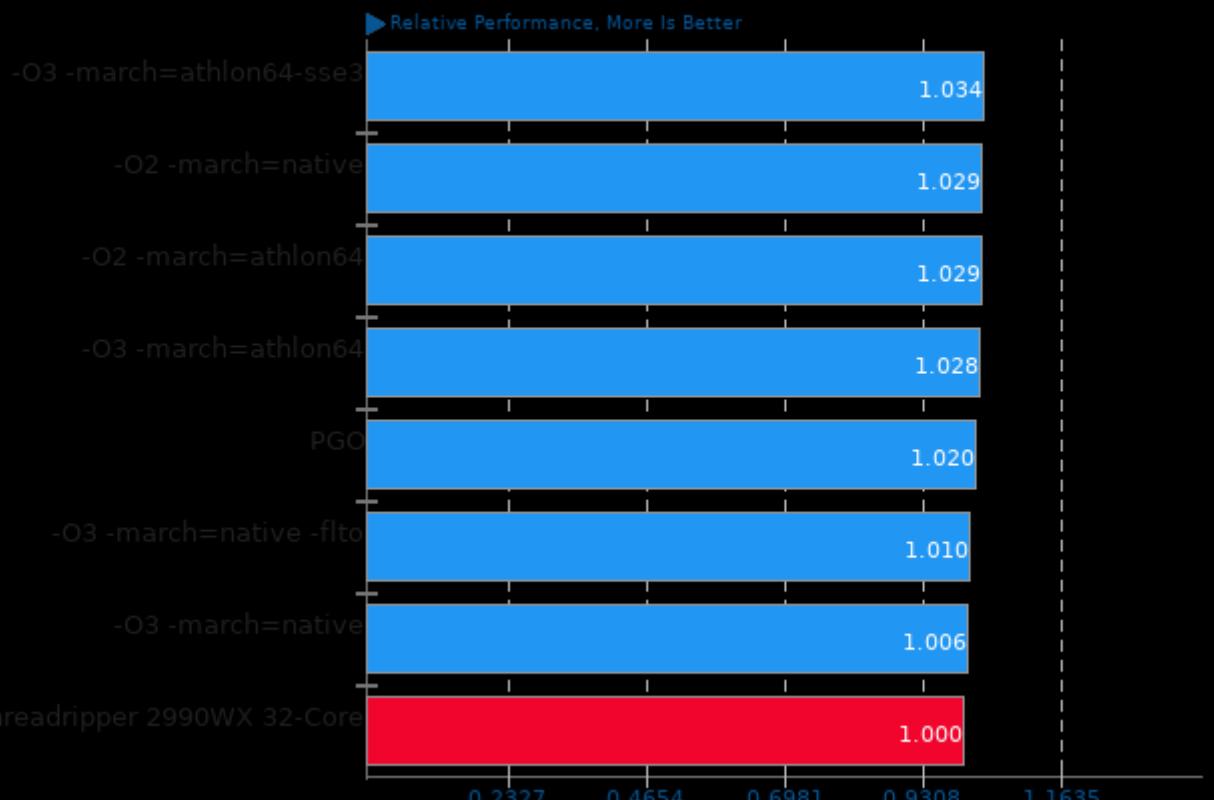
Result Composite - GCC 9.1 Compiler Tuning Threadripper AMD znver1



Geometric mean based upon tests: pts/aom-av1 and pts/svt-av1

Geometric Mean Of Bioinformatics Tests

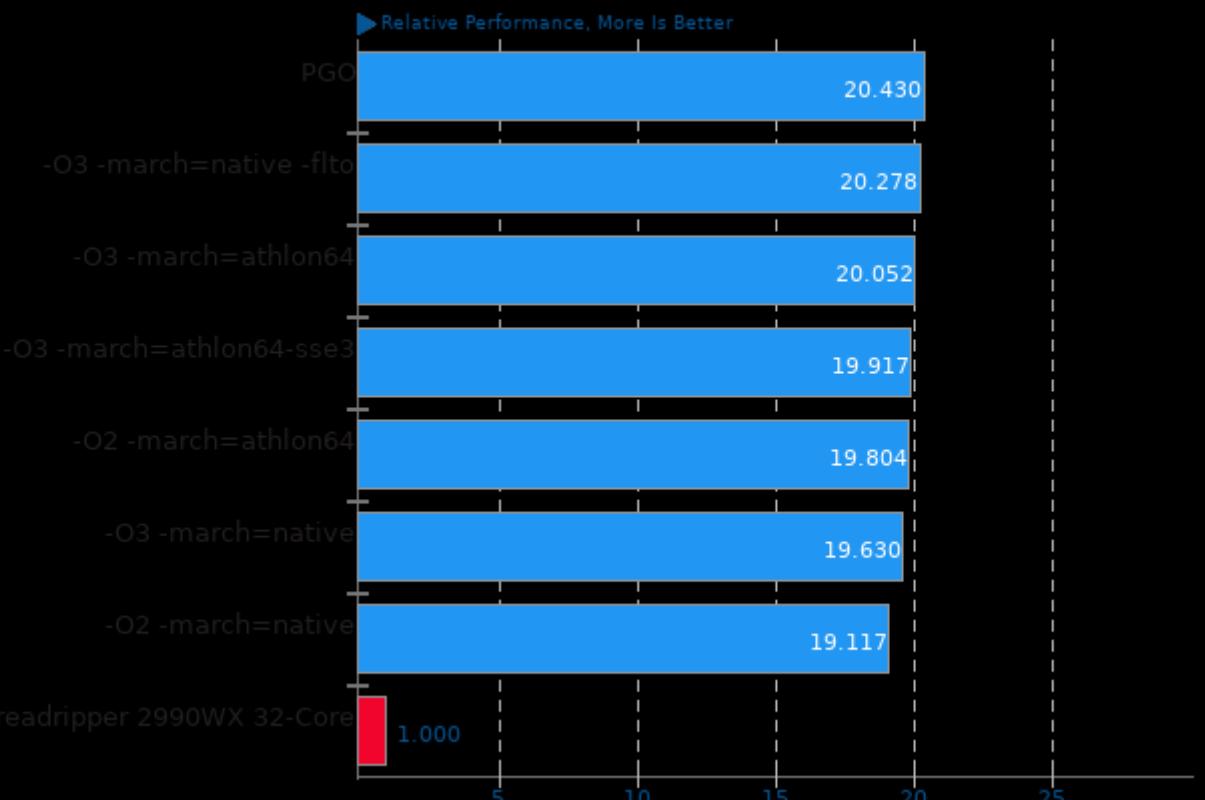
Result Composite - GCC 9.1 Compiler Tuning Threadripper AMD znver1



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

Geometric Mean Of Compression Tests

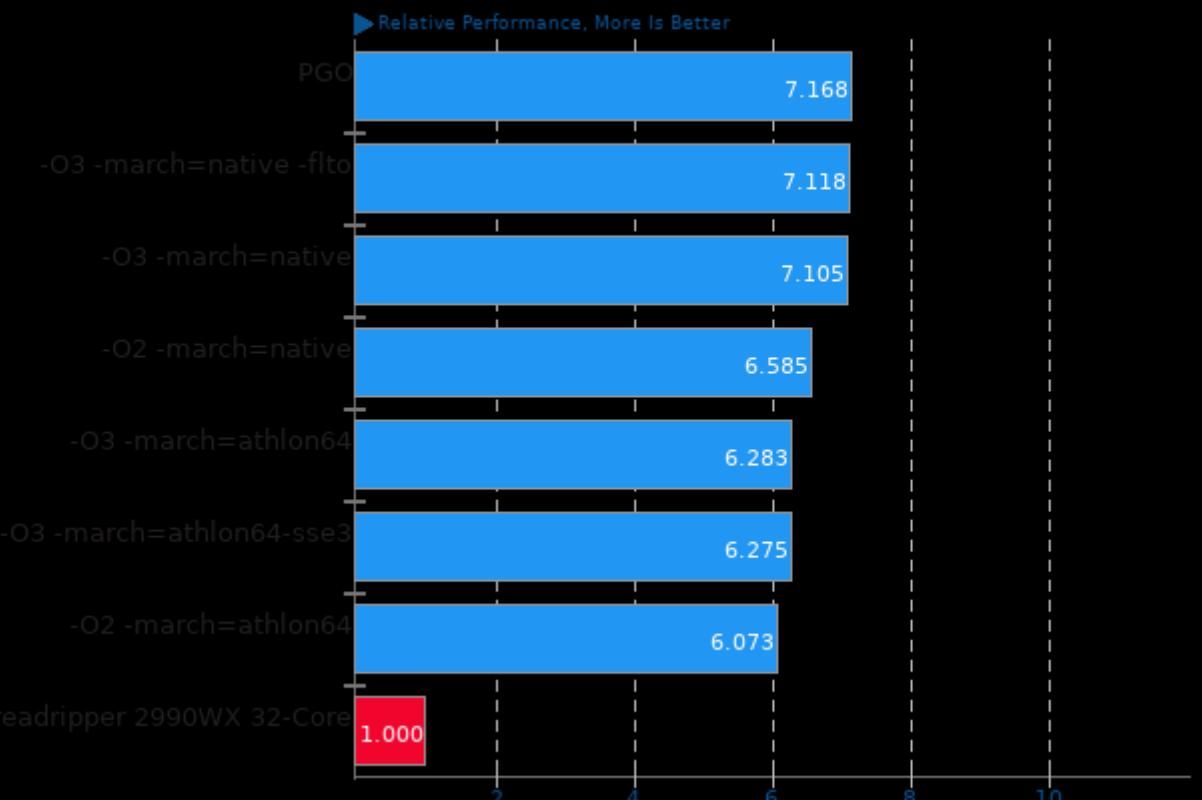
Result Composite - GCC 9.1 Compiler Tuning Threadripper AMD znver1



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

Geometric Mean Of Creator Workloads Tests

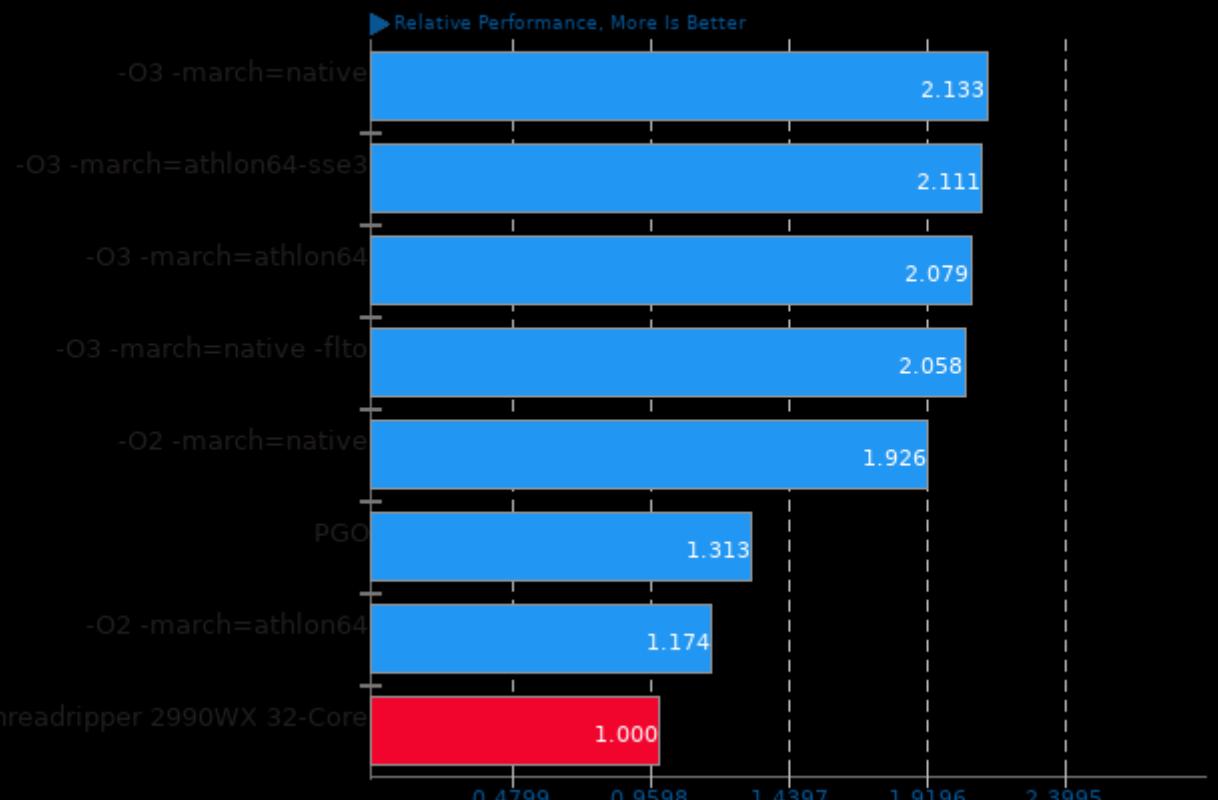
Result Composite - GCC 9.1 Compiler Tuning Threadripper AMD znver1



Geometric mean based upon tests: pts/c-ray, pts/aobench, pts/smallpt, pts/svt-vp9, pts/svt-hevc, pts/x264, pts/x265, pts/vpxenc, pts/aom-av1, pts/svt-av1, pts/encode-mp3, pts/encode-flac, pts/graphics-magick and pts/luajit

Geometric Mean Of Database Test Suite

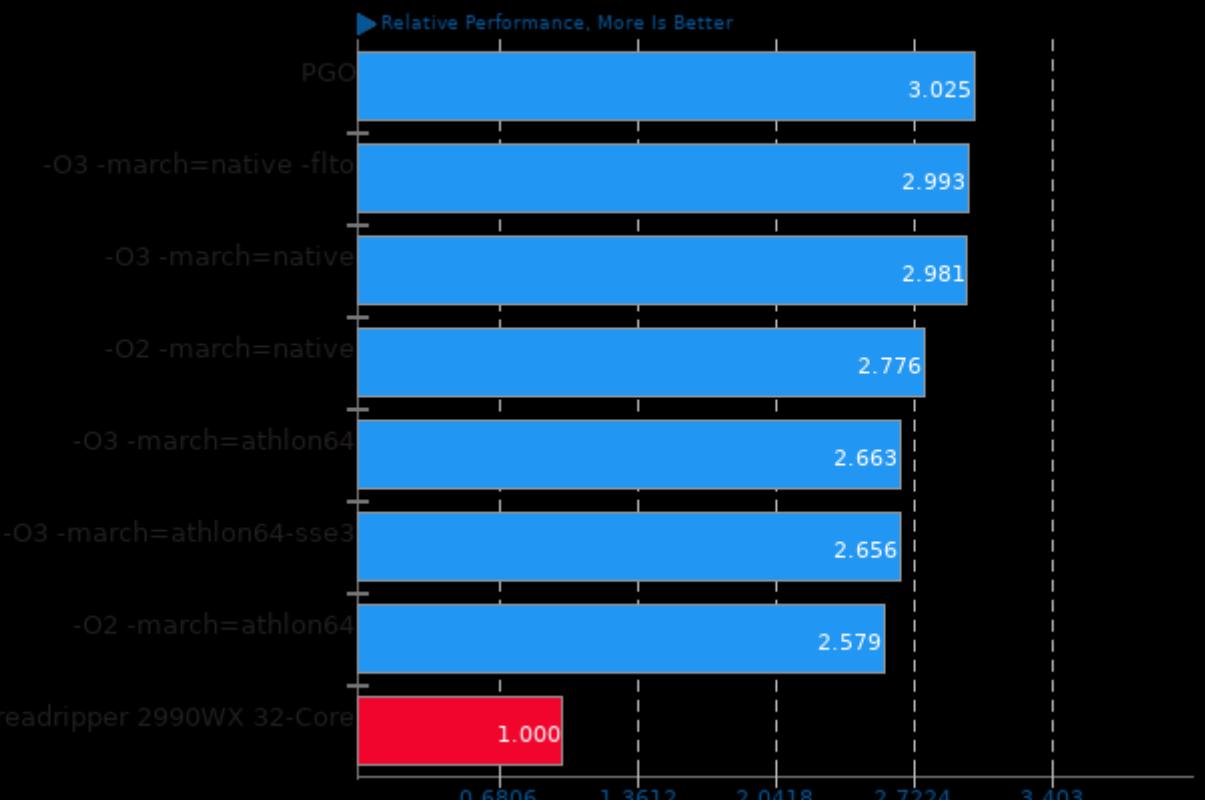
Result Composite - GCC 9.1 Compiler Tuning Threadripper AMD znver1



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

Geometric Mean Of Encoding Tests

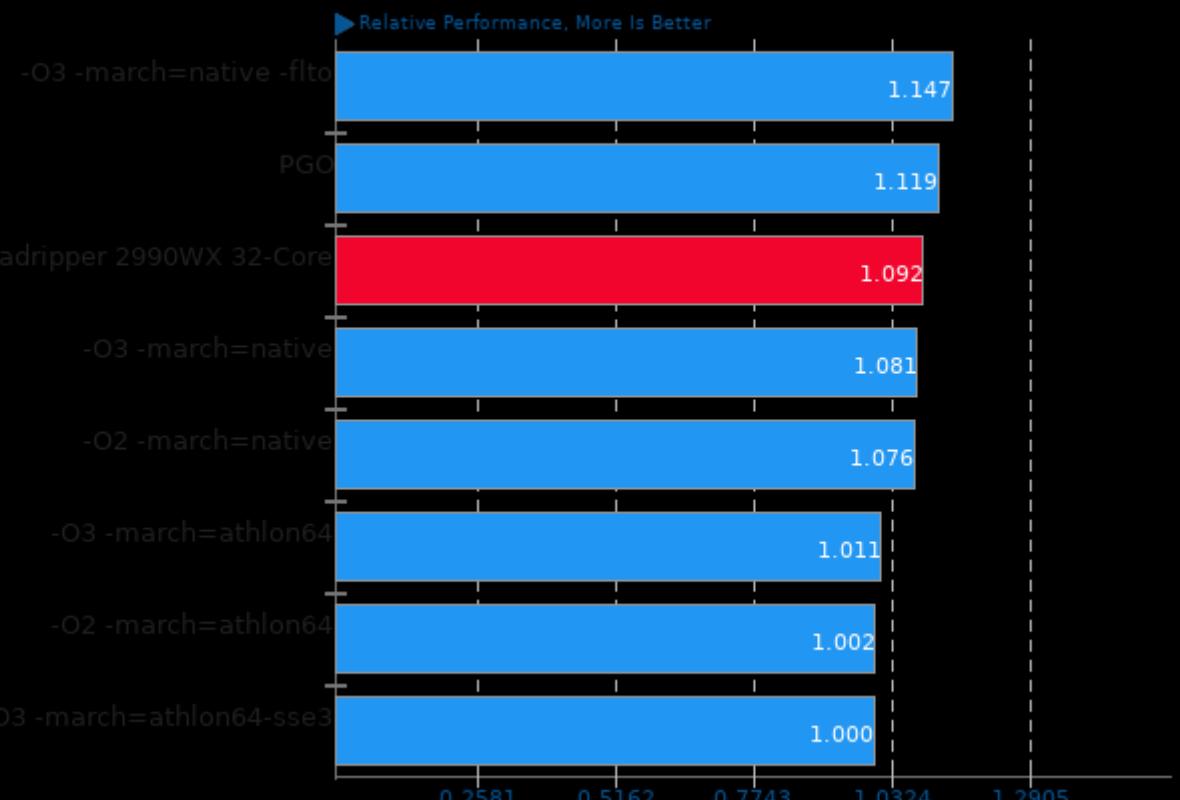
Result Composite - GCC 9.1 Compiler Tuning Threadripper AMD znver1



Geometric mean based upon tests: pts/encode-mp3, pts/encode-flac, pts/svt-vp9, pts/svt-hevc, pts/x264, pts/x265, pts/vpxenc, pts/aom-av1 and pts/svt-av1

Geometric Mean Of HPC - High Performance Computing Tests

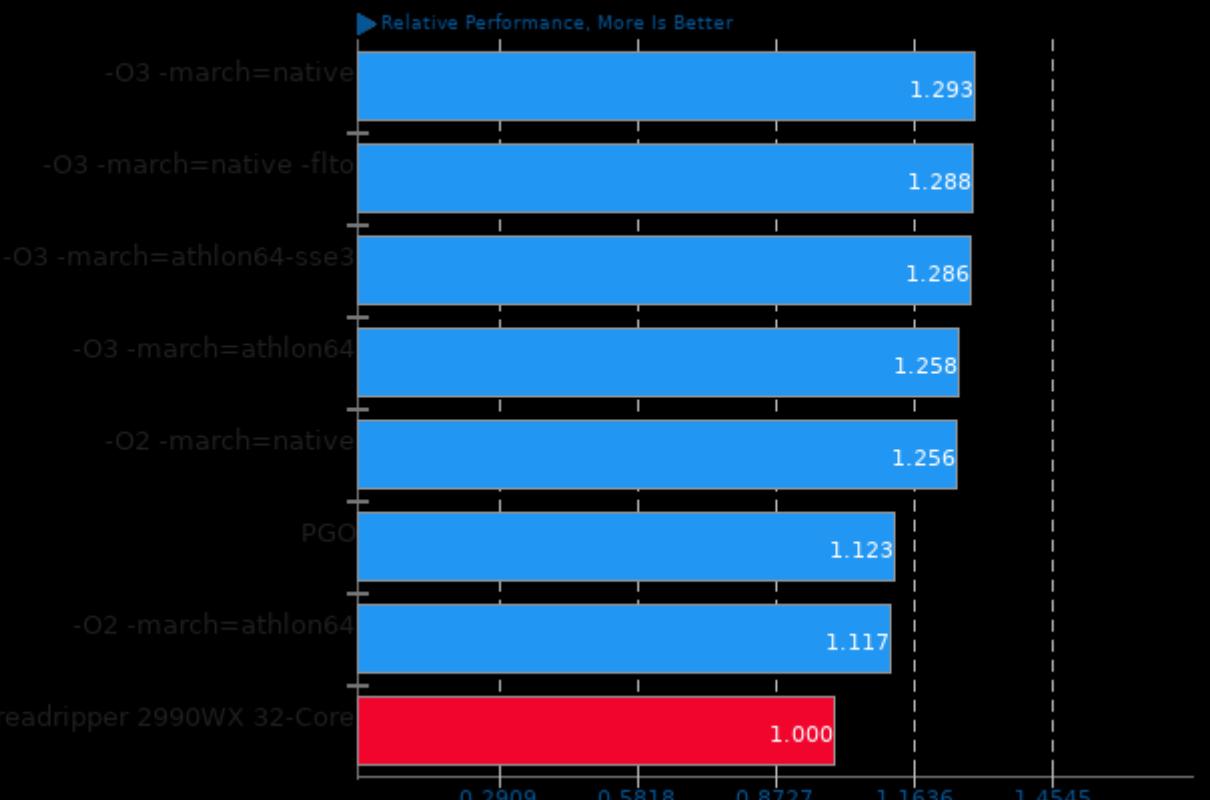
Result Composite - GCC 9.1 Compiler Tuning Threadripper AMD znver1



Geometric mean based upon tests: pts/hpcg, pts/fftw, pts/himeno and pts/mafft

Geometric Mean Of Common Kernel Benchmarks Tests

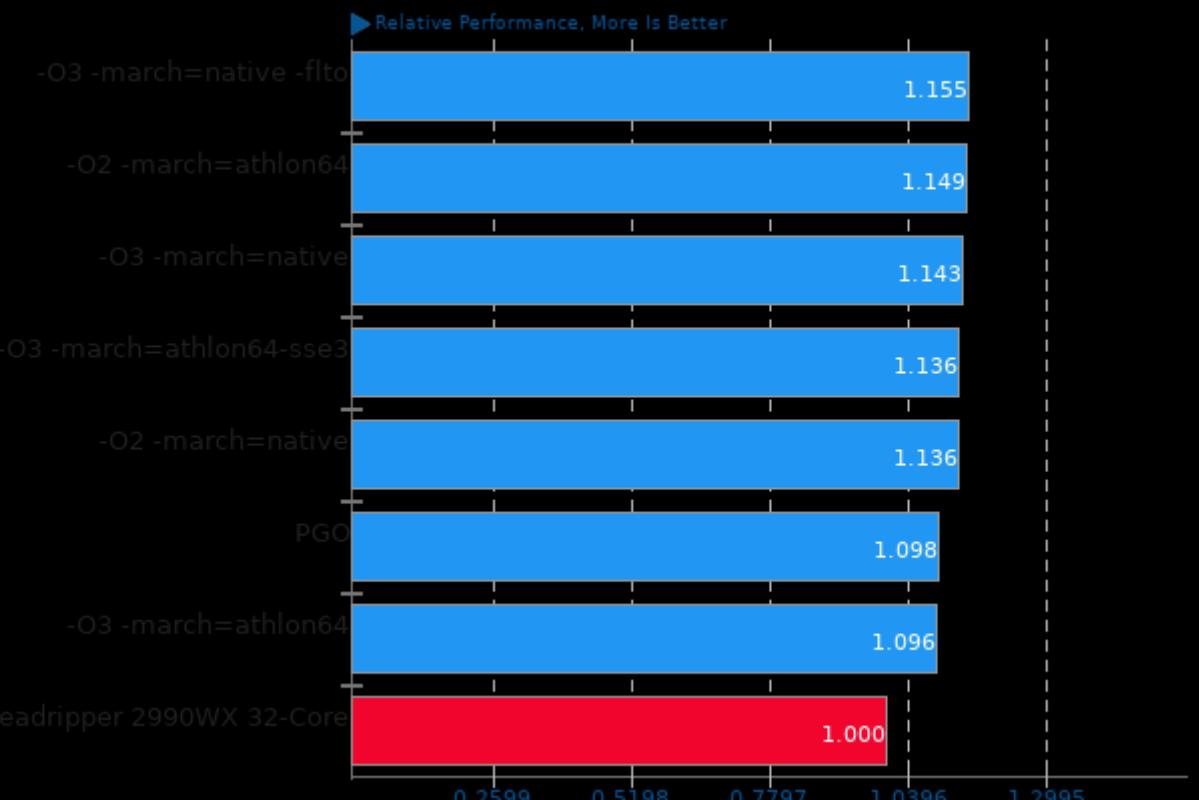
Result Composite - GCC 9.1 Compiler Tuning Threadripper AMD znver1



Geometric mean based upon tests: pts/pgbench, pts/mbw, pts/t-test1, pts/openssl and pts/ctx-clock

Geometric Mean Of Memory Test Suite

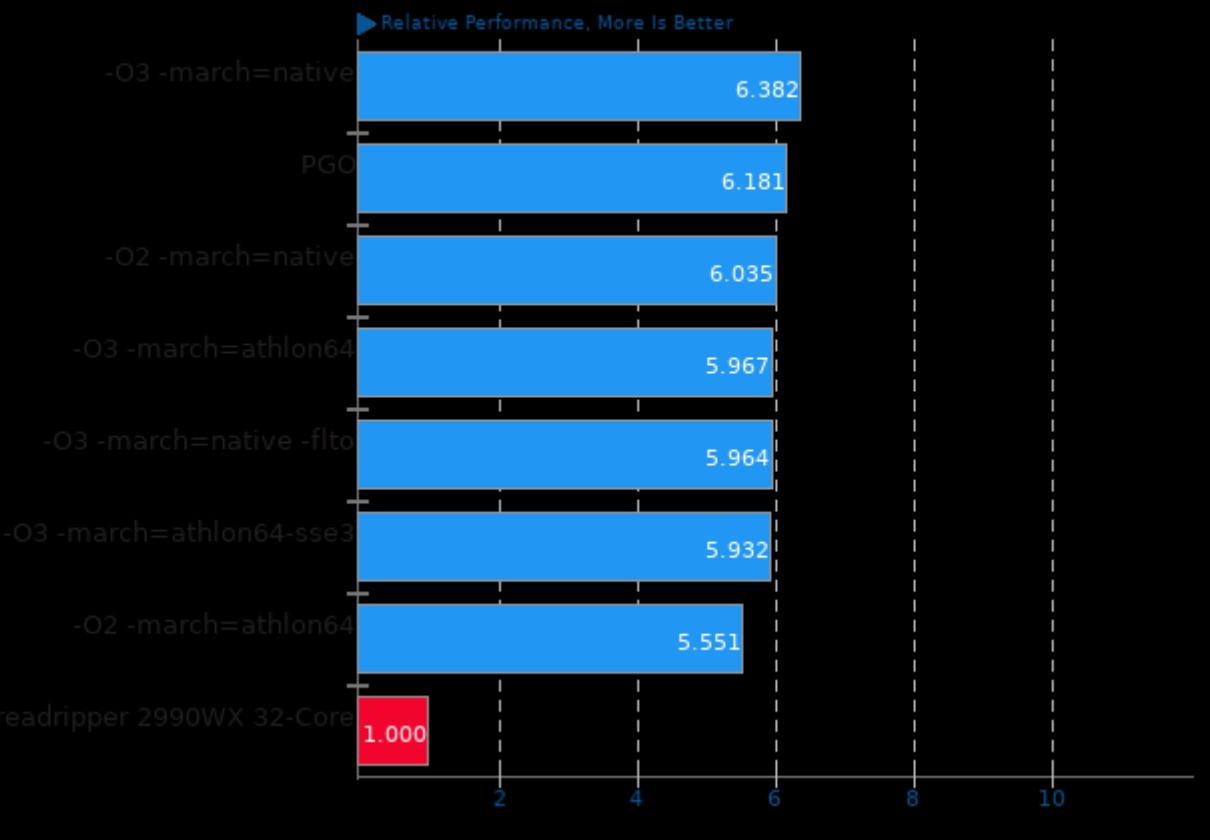
Result Composite - GCC 9.1 Compiler Tuning Threadripper AMD znver1



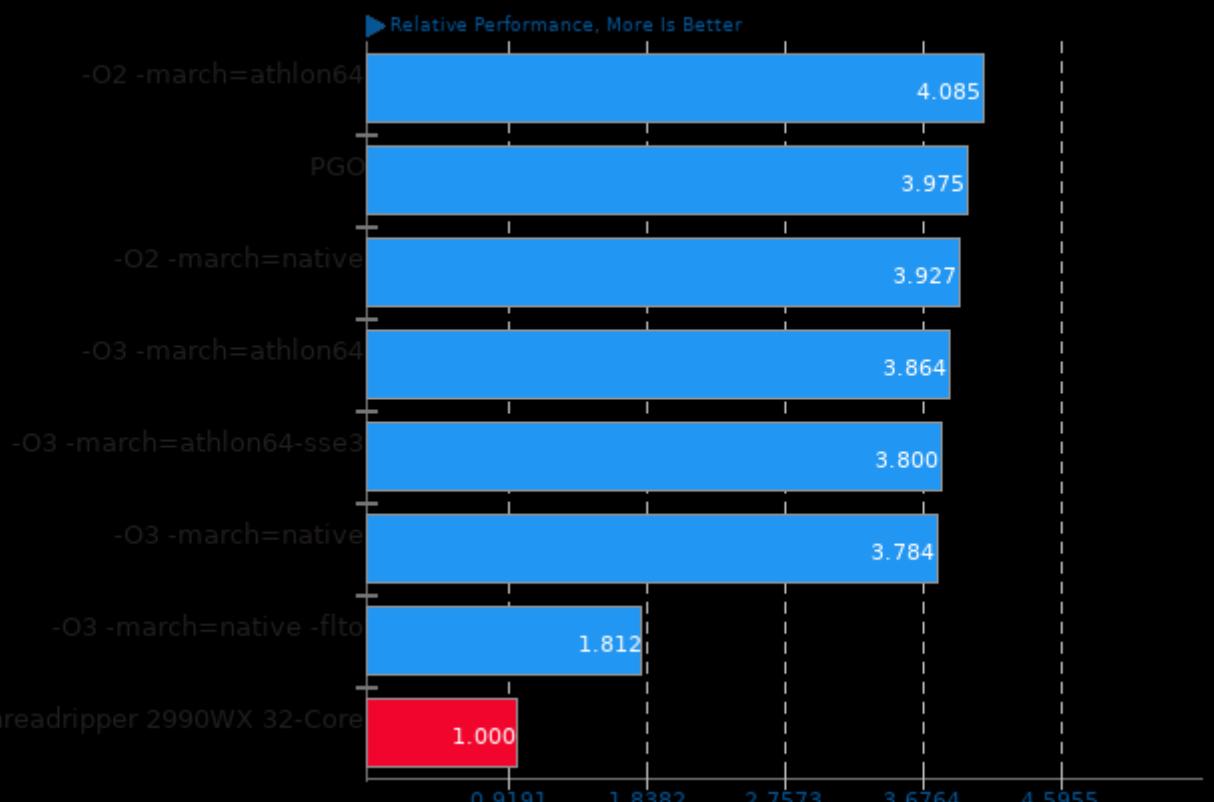
Geometric mean based upon tests: pts/t-test1 and pts/mbw

Geometric Mean Of Multi-Core Tests

Result Composite - GCC 9.1 Compiler Tuning Threadripper AMD znver1



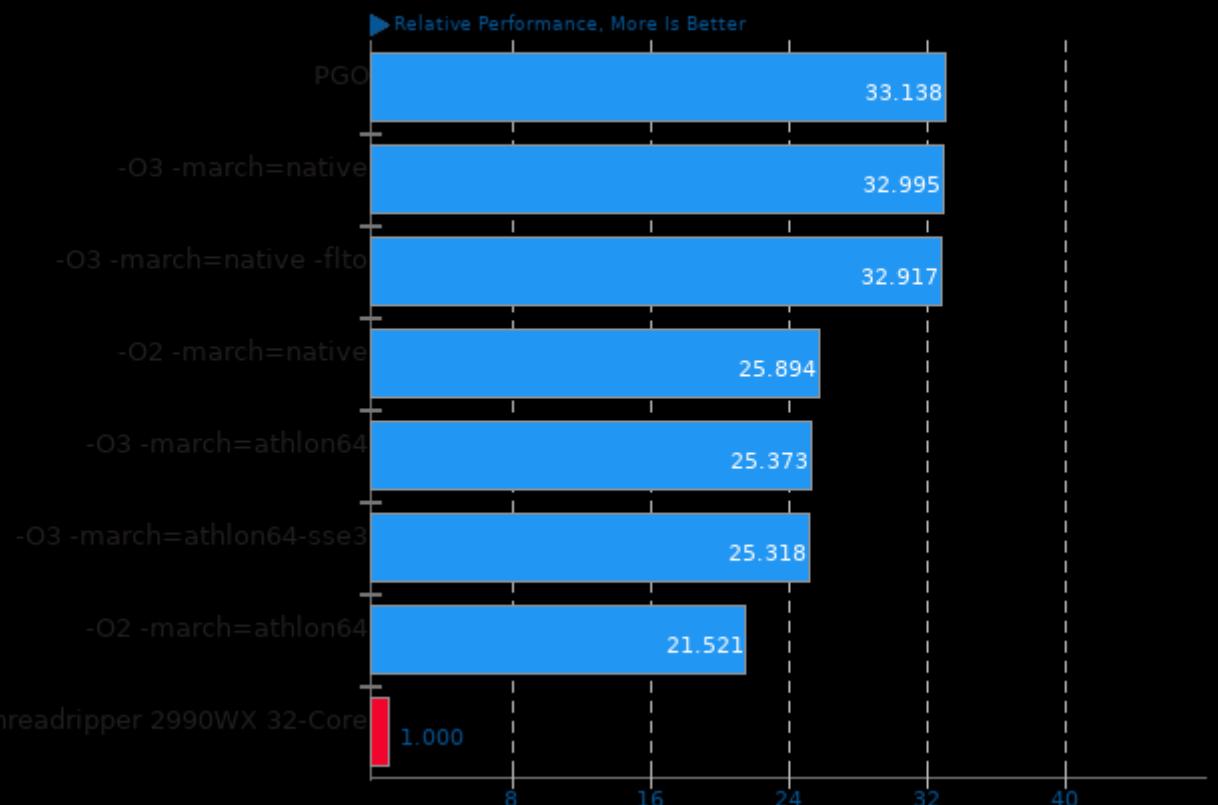
Geometric mean based upon tests: pts/c-ray, pts/stockfish, pts/svt-vp9, pts/svt-hevc, pts/x264, pts/x265, pts/vpxenc, pts/aom-av1, pts/svt-av1, pts/smallpt, pts/graphics-magick, pts/compress-zstd, pts/build-php, pts/build-imagemagick, pts/build-llvm, pts/aobench, pts/hpcg and pts/pgbench

Geometric Mean Of Programmer / Developer System Benchmarks Tests
Result Composite - GCC 9.1 Compiler Tuning Threadripper AMD znver1

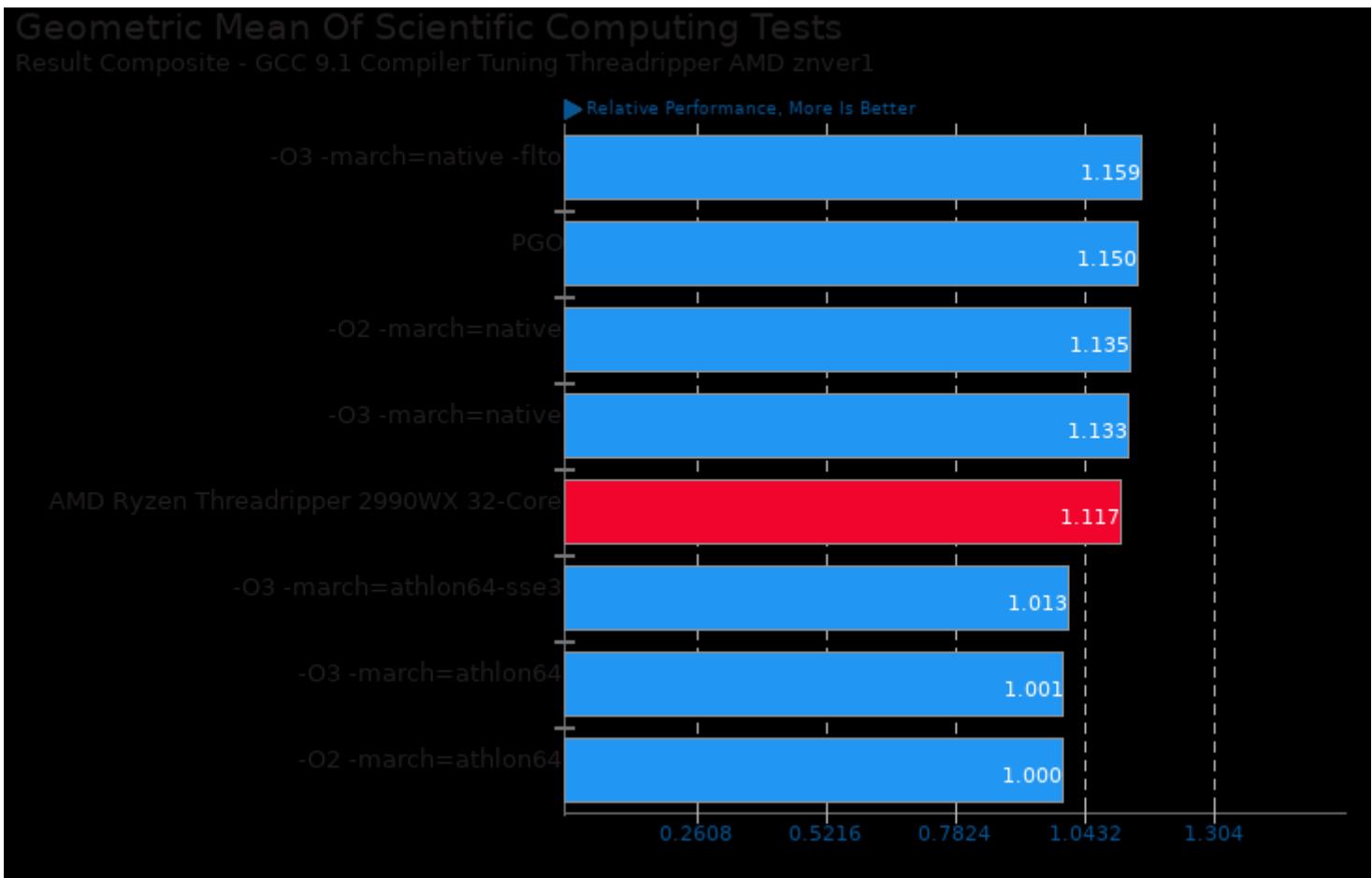
Geometric mean based upon tests: pts/compress-zstd, pts/build-php, pts/build-imagemagick and pts/build-llvm

Geometric Mean Of Renderers Tests

Result Composite - GCC 9.1 Compiler Tuning Threadripper AMD znver1



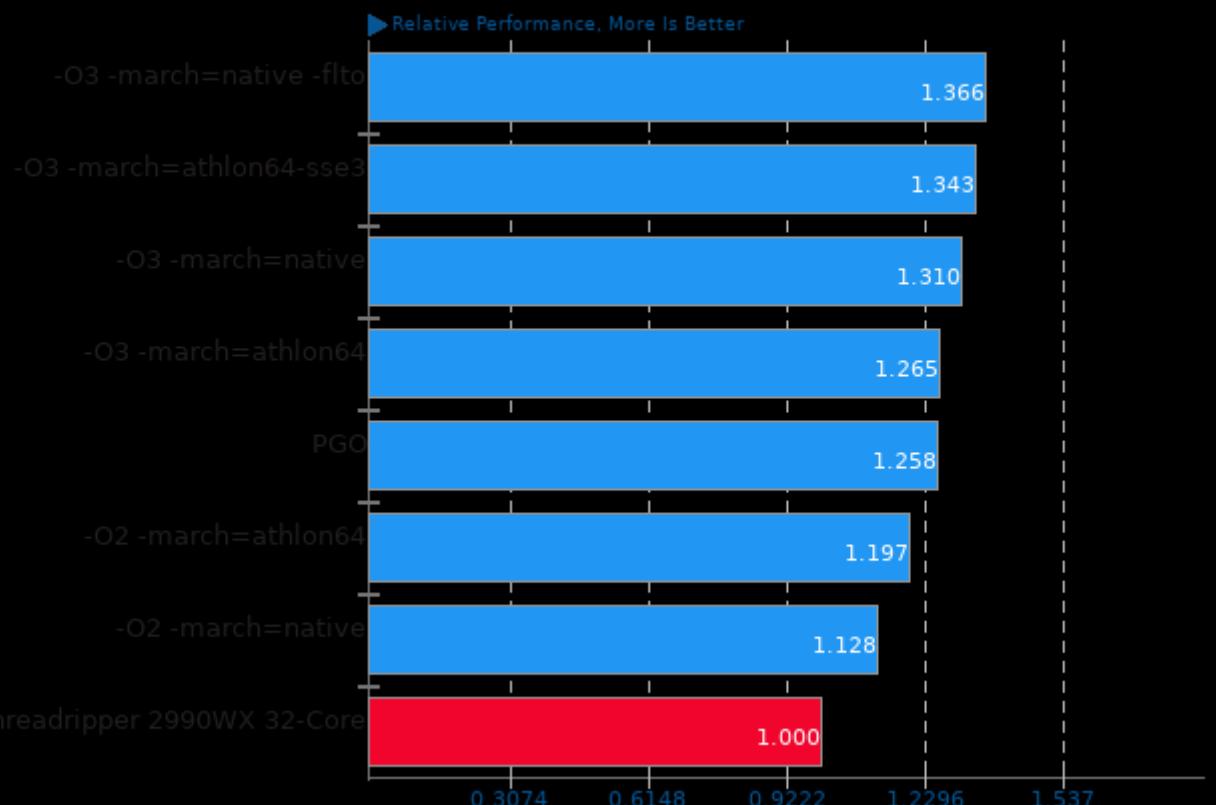
Geometric mean based upon tests: pts/c-ray, pts/aobench and pts/smallpt



Geometric mean based upon tests: pts/fftw, pts/himeno and pts/mafft

Geometric Mean Of Server Tests

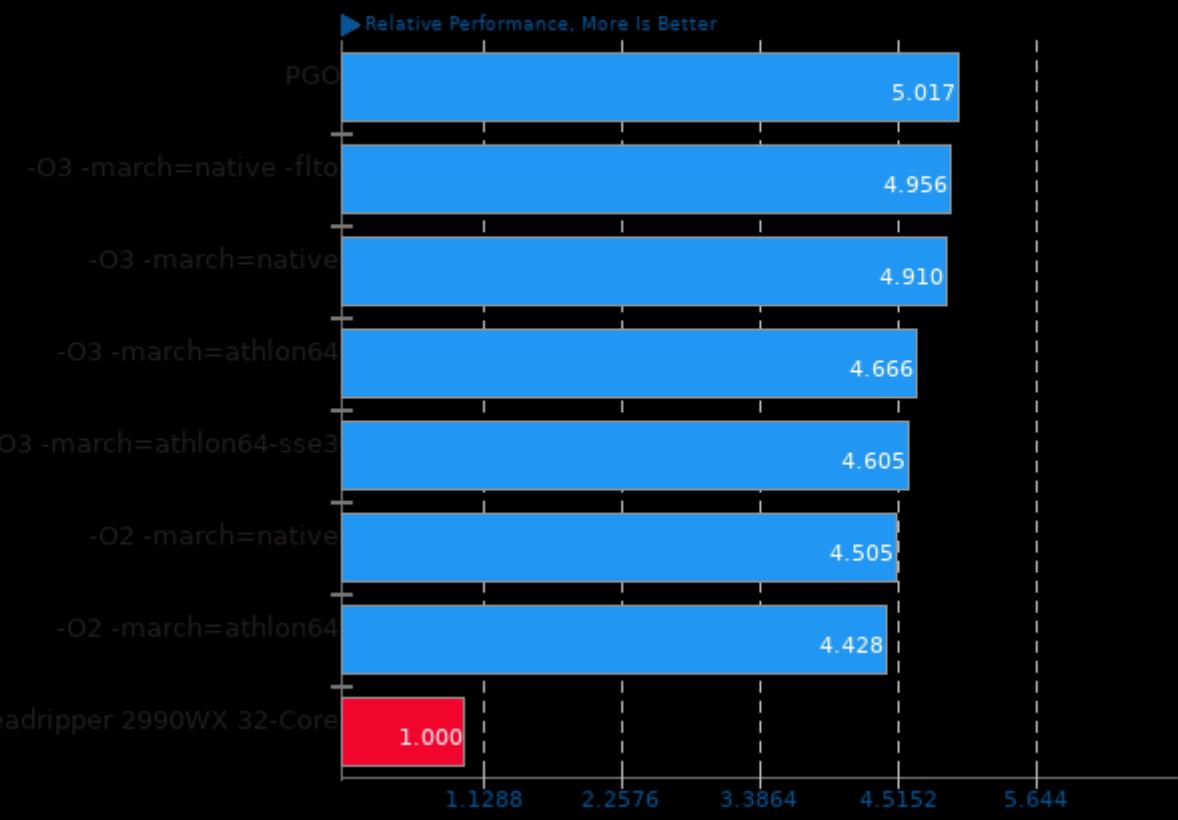
Result Composite - GCC 9.1 Compiler Tuning Threadripper AMD znver1



Geometric mean based upon tests: pts/nginx, pts/pgbench, pts/mcperf, pts/redis and pts/openssl

Geometric Mean Of Server CPU Tests

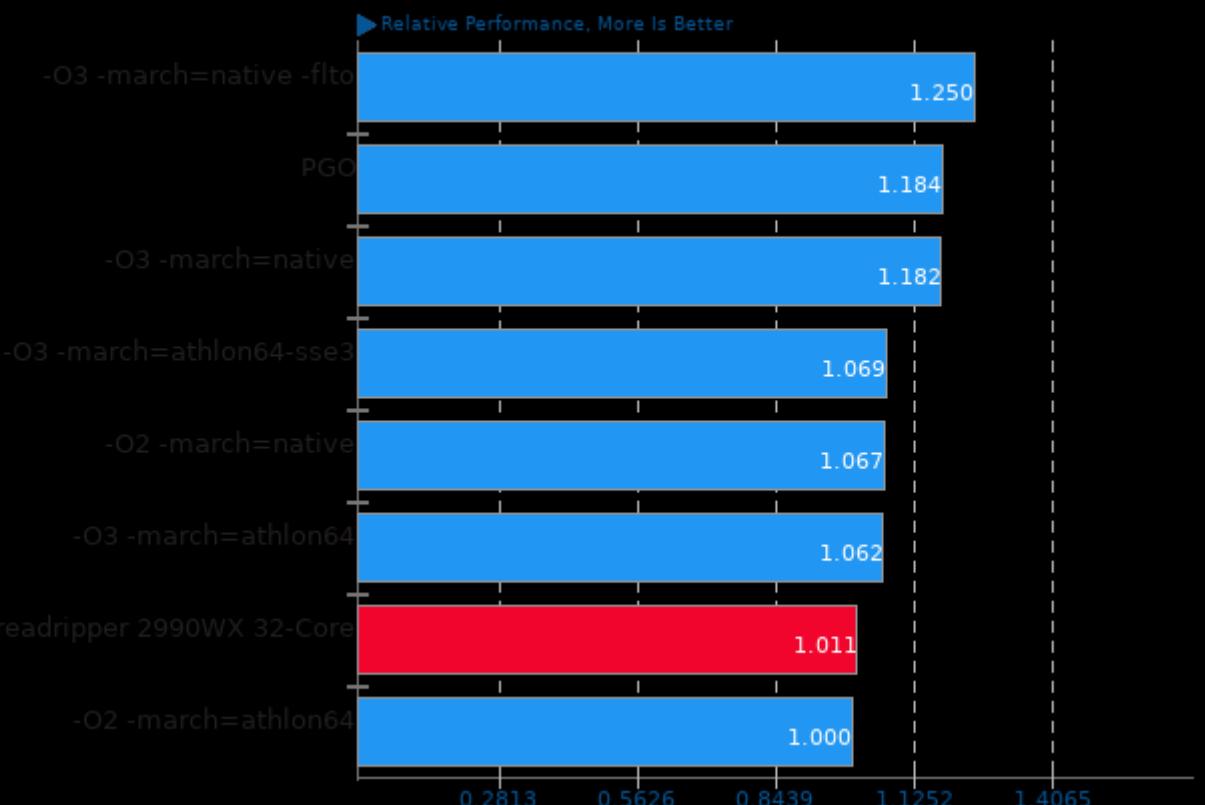
Result Composite - GCC 9.1 Compiler Tuning Threadripper AMD znver1



Geometric mean based upon tests: pts/svt-av1, pts/svt-hevc, pts/svt-vp9, pts/x264, pts/x265, pts/himeno, pts/stockfish, pts/build-php, pts/build-llvm, pts/c-ray, pts/compress-zstd, pts/openssl, pts/redis and pts/ctx-clock

Geometric Mean Of Single-Threaded Tests

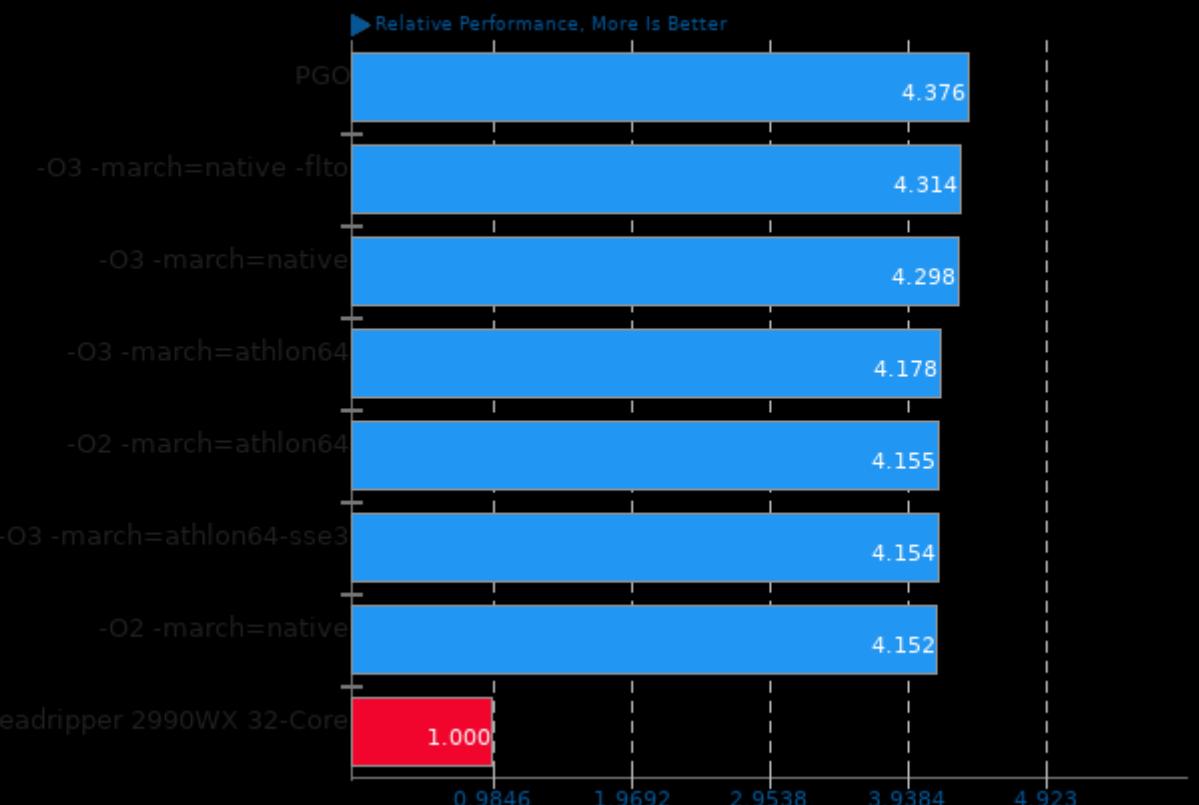
Result Composite - GCC 9.1 Compiler Tuning Threadripper AMD znver1



Geometric mean based upon tests: pts/luajit, pts/scimark2, pts/encode-flac, pts/encode-mp3, pts/cpp-perf-bench, pts/redis and pts/nginx

Geometric Mean Of Video Encoding Tests

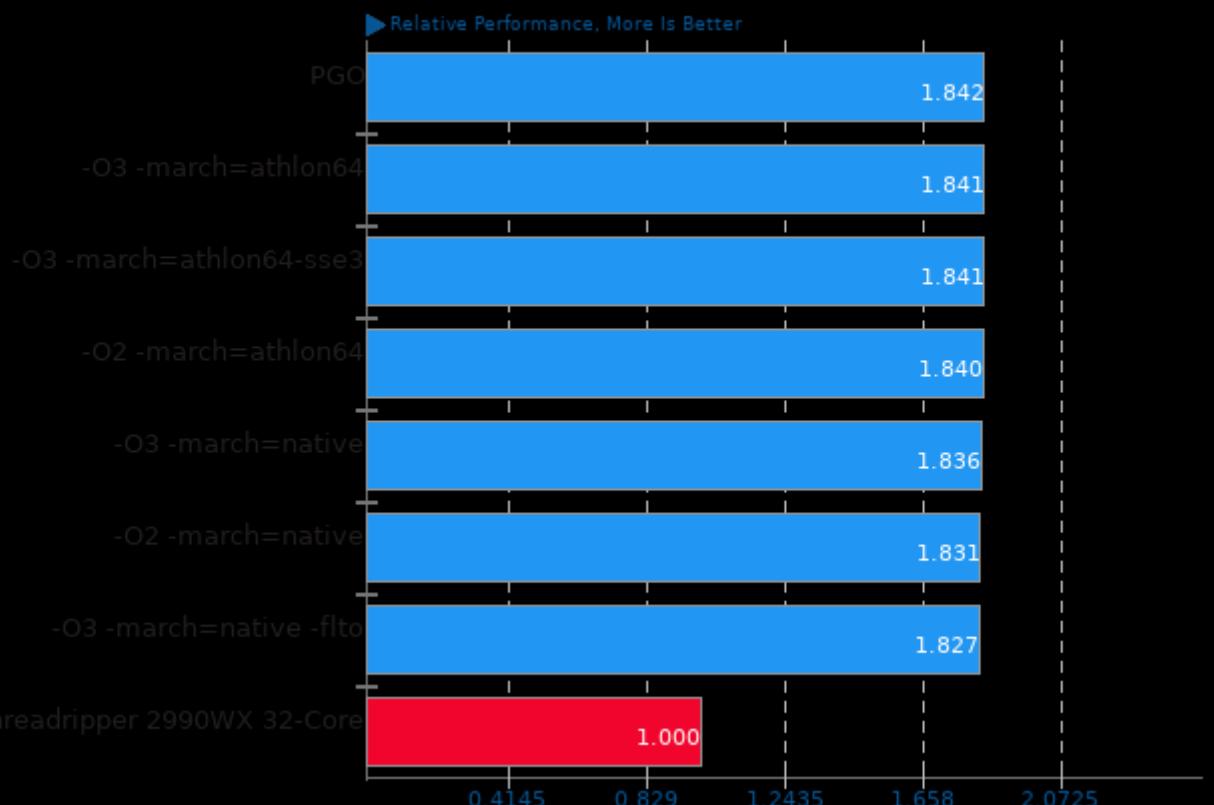
Result Composite - GCC 9.1 Compiler Tuning Threadripper AMD znver1



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

Geometric Mean Of Common Workstation Benchmarks Tests

Result Composite - GCC 9.1 Compiler Tuning Threadripper AMD znver1



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

This file was automatically generated via the Phoronix Test Suite benchmarking software on Friday, 29 March 2024 02:29.