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## Amazon EC2 c7g.4xlarge AWS Graviton3

Graviton3 benchmarks by Michael Larabel.

### Test Systems:

#### c7g.4xlarge

Processor: ARMv8 Neoverse-V1 (16 Cores), Motherboard: Amazon EC2 c7g.4xlarge (1.0 BIOS), Chipset: Amazon Device 0200, Memory: 32GB, Disk: 193GB Amazon Elastic Block Store, Network: Amazon Elastic

OS: Ubuntu 22.04, Kernel: 5.15.0-1004-aws (aarch64), Compiler: GCC 11.2.0, File-System: ext4, System Layer: amazon

Kernel Notes: Transparent Huge Pages: madvise  
Compiler Notes: --build=aarch64-linux-gnu --disable-libquadmath --disable-libquadmath-support --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale-gnu --enable-default-pie --enable-fix-cortex-a53-843419 --enable-gnu-unique-object --enable-languages=c,ada,c++,go,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-link-serialization=2 --enable-multiarch --enable-nls --enable-objc-gc=auto --enable-plugin --enable-shared --enable-threads=posix --host=aarch64-linux-gnu --program-prefix=aarch64-linux-gnu- --target=aarch64-linux-gnu --with-build-config=bootstrap-lto-lean --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-target-system-zlib=auto -v  
Java Notes: OpenJDK Runtime Environment (build 11.0.15+10-Ubuntu-0ubuntu0.22.04.1)  
Python Notes: Python 3.10.4

Security Notes: itlb\_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec\_store\_bypass: Mitigation of SSB disabled via prctl + spectre\_v1: Mitigation of \_\_user pointer sanitization + spectre\_v2: Mitigation of CSV2 BHB + srbds: Not affected + tsx\_async\_abort: Not affected

## c6g.4xlarge Graviton2

Processor: ARMv8 Neoverse-N1 (16 Cores), Motherboard: Amazon EC2 c6g.4xlarge (1.0 BIOS), Chipset: Amazon Device 0200, Memory: 32GB, Disk: 193GB Amazon Elastic Block Store, Network: Amazon Elastic

OS: Ubuntu 22.04, Kernel: 5.15.0-1004-aws (aarch64), Compiler: GCC 11.2.0, File-System: ext4, System Layer: amazon

Kernel Notes: Transparent Huge Pages: madvise

Compiler Notes: --build=aarch64-linux-gnu --disable-libquadmath --disable-libquadmath-support --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-fix-cortex-a53-843419 --enable-gnu-unique-object --enable-languages=c,ada,c++,go,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-link-serialization=2 --enable-multiarch --enable-nls --enable-objc-gc=auto --enable-plugin --enable-shared --enable-threads=posix --host=aarch64-linux-gnu --program-prefix=aarch64-linux-gnu- --target=aarch64-linux-gnu --with-build-config=bootstrap-lto-lean --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-target-system-zlib=auto -v

Java Notes: OpenJDK Runtime Environment (build 11.0.15+10-Ubuntu-0ubuntu0.22.04.1)

Python Notes: Python 3.10.4

Security Notes: itlb\_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec\_store\_bypass: Mitigation of SSB disabled via prctl + spectre\_v1: Mitigation of \_\_user pointer sanitization + spectre\_v2: Mitigation of CSV2 BHB + srbds: Not affected + tsx\_async\_abort: Not affected

	c7g.4xlarge	c6g.4xlarge Graviton2
<b>Stress-NG - Crypto (Bogo Ops/s)</b>	<b>23182</b>	<b>17924</b>
Normalized	100%	77.32%
Standard Deviation	0.2%	0.9%
<b>Stress-NG - IO_uring (Bogo Ops/s)</b>	<b>843016</b>	<b>770522</b>
Normalized	100%	91.4%
Standard Deviation	0.1%	0.5%
<b>Stress-NG - CPU Cache (Bogo Ops/s)</b>	<b>64.31</b>	<b>37.19</b>
Normalized	100%	57.83%
Standard Deviation	19.6%	10.1%
<b>Stress-NG - CPU Stress (Bogo Ops/s)</b>	<b>5030</b>	<b>3405</b>
Normalized	100%	67.7%
Standard Deviation	0%	0%
<b>Stress-NG - Matrix Math (Bogo Ops/s)</b>	<b>80089</b>	<b>64084</b>
Normalized	100%	80.02%
Standard Deviation	0%	0%
<b>Stress-NG - Vector Math (Bogo Ops/s)</b>	<b>55258</b>	<b>37754</b>
Normalized	100%	68.32%
Standard Deviation	0.1%	0.1%
<b>Stress-NG - Memory Copying (Bogo Ops/s)</b>	<b>6693</b>	<b>2903</b>
Normalized	100%	43.37%
Standard Deviation	0.1%	0.2%
<b>OpenSSL - SHA256 (byte/s)</b>	<b>13722045973</b>	<b>10723184083</b>
Normalized	100%	78.15%
Standard Deviation	0.1%	0.8%
<b>Algebraic Multi-Grid Benchmark (Figure Of Merit)</b>	<b>1258807333</b>	<b>932652900</b>
Normalized	100%	74.09%
Standard Deviation	0.1%	0.6%
<b>simdjson - Kostya (GB/s)</b>	<b>1.94</b>	<b>1.19</b>
Normalized	100%	61.34%
Standard Deviation	0%	0%

<b>simdjson - LargeRand (GB/s)</b>	<b>0.7</b>	<b>0.49</b>
Normalized	100%	70%
Standard Deviation	0%	1.2%
<b>simdjson - PartialTweets (GB/s)</b>	<b>2.62</b>	<b>1.51</b>
Normalized	100%	57.63%
Standard Deviation	0%	0%
<b>simdjson - DistinctUserID (GB/s)</b>	<b>2.69</b>	<b>1.53</b>
Normalized	100%	56.88%
Standard Deviation	0%	0%
<b>High Performance Conjugate Gradient (GFLOP/s)</b>	<b>26.3058</b>	<b>19.7218</b>
Normalized	100%	74.97%
Standard Deviation	0.2%	0.1%
<b>ACES DGEMM - S.F.P.R (GFLOP/s)</b>	<b>5.853864</b>	<b>4.785123</b>
Normalized	100%	81.74%
Standard Deviation	0.5%	0.3%
<b>ONNX Runtime - GPT-2 - CPU - Standard</b>	<b>7990</b>	<b>6948</b>
(Inferences/min)		
Normalized	100%	86.96%
Standard Deviation	0.1%	0.1%
<b>ONNX Runtime - bertsquad-12 - CPU - Standard</b>	<b>407</b>	<b>322</b>
(Inferences/min)		
Normalized	100%	79.12%
Standard Deviation	0.1%	0.1%
<b>ONNX Runtime - fcn-resnet101-11 - CPU - Standard</b>	<b>38</b>	<b>28</b>
(Inferences/min)		
Normalized	100%	73.68%
Standard Deviation	0%	0%
<b>ONNX Runtime - ArcFace ResNet-100 - CPU - Standard</b>	<b>609</b>	<b>334</b>
(Inferences/min)		
Normalized	100%	54.84%
Standard Deviation	0%	0.1%
<b>ONNX Runtime - super-resolution-10 - CPU - Standard</b>	<b>2817</b>	<b>2072</b>
(Inferences/min)		
Normalized	100%	73.55%
Standard Deviation	0.1%	0.1%
<b>Coremark - CoreMark Size 666 - I.P.S (Iterations/Sec)</b>	<b>405414</b>	<b>315464</b>
Normalized	100%	77.81%
Standard Deviation	1.4%	0%
<b>SecureMark - SecureMark-TLS (marks)</b>	<b>183708</b>	<b>120301</b>
Normalized	100%	65.48%
Standard Deviation	0.7%	0%
<b>Zstd Compression - 3 - Compression Speed (MB/s)</b>	<b>4639</b>	<b>2879</b>
Normalized	100%	62.06%
Standard Deviation	0.4%	0.2%
<b>Zstd Compression - 3 - D.S (MB/s)</b>	<b>3509</b>	
Standard Deviation	0.1%	
<b>Zstd Compression - 19 - Compression Speed (MB/s)</b>	<b>41.2</b>	<b>34.6</b>
Normalized	100%	83.98%
Standard Deviation	0%	0.3%
<b>Zstd Compression - 19 - D.S (MB/s)</b>	<b>3050</b>	<b>2052</b>
Normalized	100%	67.26%
Standard Deviation	0.4%	1%

Zstd Compression - 19, Long Mode - Compression Speed (MB/s)	<b>39.5</b>	<b>31.0</b>
Normalized	100%	78.48%
Standard Deviation	1%	0.2%
Zstd Compression - 19, Long Mode - D.S (MB/s)	<b>3241</b>	<b>2196</b>
Normalized	100%	67.77%
Standard Deviation	0.4%	0.2%
QuantLib (MFLOPS)	<b>2513</b>	<b>1742</b>
Normalized	100%	69.34%
Standard Deviation	0%	0.5%
7-Zip Compression - Compression Rating (MIPS)	<b>97824</b>	<b>71285</b>
Normalized	100%	72.87%
Standard Deviation	0.3%	0.1%
7-Zip Compression - D.R (MIPS)	<b>73054</b>	<b>59445</b>
Normalized	100%	81.37%
Standard Deviation	0%	0.7%
LeelaChessZero - BLAS (Nodes/s)	<b>1103</b>	<b>864</b>
Normalized	100%	78.33%
Standard Deviation	1%	2.4%
LeelaChessZero - Eigen (Nodes/s)	<b>1189</b>	<b>834</b>
Normalized	100%	70.14%
Standard Deviation	1.4%	2.5%
TSCP - A.C.P (Nodes/s)	<b>1370094</b>	<b>872313</b>
Normalized	100%	63.67%
Standard Deviation	0%	0.1%
Stockfish - Total Time (Nodes/s)	<b>27608891</b>	<b>21679245</b>
Normalized	100%	78.52%
Standard Deviation	1%	2.3%
asmFish - 1.H.M.2.D (Nodes/s)	<b>32134123</b>	<b>26540482</b>
Normalized	100%	82.59%
Standard Deviation	0.6%	2.3%
GROMACS - MPI CPU - water_GMX50_bare (Ns/Day)	<b>1.128</b>	<b>0.781</b>
Normalized	100%	69.24%
Standard Deviation	0.3%	0.1%
LAMMPS Molecular Dynamics Simulator - Rhodopsin Protein (ns/day)	<b>11.291</b>	<b>7.935</b>
Normalized	100%	70.28%
Standard Deviation	0.9%	0.3%
nginx - 100 (Req/sec)	<b>345711</b>	<b>307349</b>
Normalized	100%	88.9%
Standard Deviation	1%	2.2%
nginx - 200 (Req/sec)	<b>352381</b>	<b>308939</b>
Normalized	100%	87.67%
Standard Deviation	2%	0.8%
nginx - 500 (Req/sec)	<b>346613</b>	<b>310597</b>
Normalized	100%	89.61%
Standard Deviation	0.5%	2.1%
nginx - 1000 (Req/sec)	<b>346815</b>	<b>308213</b>
Normalized	100%	88.87%
Standard Deviation	0.7%	0.9%
Apache HTTP Server - 100 (Req/sec)	<b>67232</b>	<b>46995</b>
Normalized	100%	69.9%
Standard Deviation	0.1%	0.3%
Apache HTTP Server - 200 (Req/sec)	<b>73677</b>	<b>50060</b>
Normalized	100%	67.95%

	Standard Deviation	1.5%	0.4%
Apache HTTP Server - 500 (Reqs/sec)	73546	50078	
	Normalized	100%	68.09%
	Standard Deviation	0.2%	2%
Apache HTTP Server - 1000 (Reqs/sec)	72719	46629	
	Normalized	100%	64.12%
	Standard Deviation	0.2%	1%
Liquid-DSP - 16 - 256 - 57 (samples/s)	383606667	262890000	
	Normalized	100%	68.53%
	Standard Deviation	0.2%	0%
PHPBench - P.B.S (Score)	666484	449855	
	Normalized	100%	67.5%
	Standard Deviation	0.1%	0.3%
OpenSSL - RSA4096 (sign/s)	2546	660.6	
	Normalized	100%	25.94%
	Standard Deviation	0%	0%
NAS Parallel Benchmarks - BT.C (Mop/s)	10340	6449	
	Normalized	100%	62.37%
	Standard Deviation	0.1%	0.1%
NAS Parallel Benchmarks - CG.C (Mop/s)	6572	3521	
	Normalized	100%	53.57%
	Standard Deviation	0.5%	0.5%
NAS Parallel Benchmarks - EP.D (Mop/s)	934.72	558.88	
	Normalized	100%	59.79%
	Standard Deviation	0.1%	0.1%
NAS Parallel Benchmarks - FT.C (Mop/s)	11792	6244	
	Normalized	100%	52.96%
	Standard Deviation	0%	0%
NAS Parallel Benchmarks - IS.D (Mop/s)	1042	372.76	
	Normalized	100%	35.78%
	Standard Deviation	0.4%	0.1%
NAS Parallel Benchmarks - LU.C (Mop/s)	7730	5134	
	Normalized	100%	66.41%
	Standard Deviation	0%	0%
NAS Parallel Benchmarks - MG.C (Mop/s)	13482	6721	
	Normalized	100%	49.85%
	Standard Deviation	0.1%	0%
NAS Parallel Benchmarks - SP.C (Mop/s)	4467	2356	
	Normalized	100%	52.74%
	Standard Deviation	0.4%	0%
OpenSSL - RSA4096 (verify/s)	178460	53952	
	Normalized	100%	30.23%
	Standard Deviation	0.1%	0%
Google SynthMark - VoiceMark_100 (Voices)	675.635	470.389	
	Normalized	100%	69.62%
	Standard Deviation	0.1%	0.1%
LULESH (z/s)	10941	6016	
	Normalized	100%	54.99%
	Standard Deviation	1.2%	0.1%
WebP Image Encode - Q.1.L (Encode Time - sec)	22.769	31.082	
	Normalized	100%	73.25%
	Standard Deviation	0.7%	0.1%
WebP Image Encode - Q.1.H.C (Encode Time - sec)	9.346	12.248	
	Normalized	100%	76.31%
	Standard Deviation	0.1%	0.6%

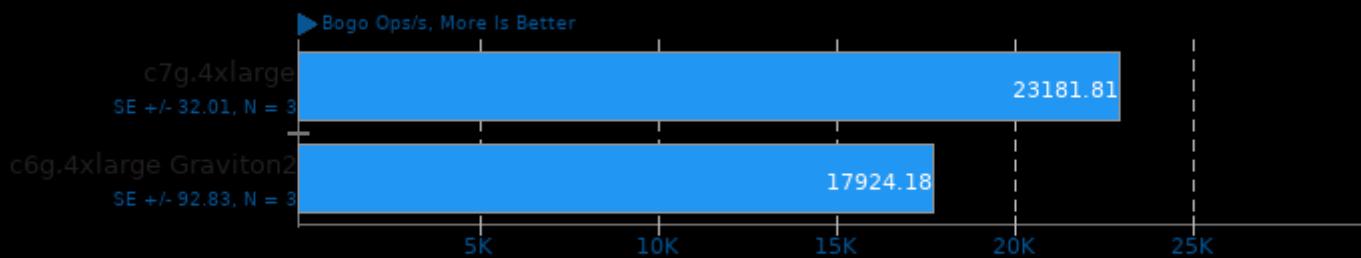
WebP Image Encode - Q.1.L.H.C (Encode Time - sec)	<b>48.208</b>	<b>66.147</b>
Normalized	100%	72.88%
Standard Deviation	0%	0%
TensorFlow Lite - SqueezeNet (us)	<b>3258</b>	<b>3969</b>
Normalized	100%	82.08%
Standard Deviation	1.2%	1.6%
TensorFlow Lite - Inception V4 (us)	<b>41855</b>	<b>46794</b>
Normalized	100%	89.45%
Standard Deviation	0.9%	0.7%
TensorFlow Lite - NASNet Mobile (us)	<b>11592</b>	<b>14985</b>
Normalized	100%	77.35%
Standard Deviation	4.1%	5.3%
TensorFlow Lite - Mobilenet Float (us)	<b>2157</b>	<b>2501</b>
Normalized	100%	86.23%
Standard Deviation	1.6%	2%
TensorFlow Lite - Mobilenet Quant (us)	<b>1503</b>	<b>1980</b>
Normalized	100%	75.9%
Standard Deviation	2%	1.3%
TensorFlow Lite - I.R.V (us)	<b>40051</b>	<b>45956</b>
Normalized	100%	87.15%
Standard Deviation	1.3%	1.3%
PyBench - T.F.A.T.T (Milliseconds)	<b>1185</b>	<b>1741</b>
Normalized	100%	68.06%
Standard Deviation	0%	0.2%
DaCapo Benchmark - H2 (msec)	<b>2951</b>	<b>3964</b>
Normalized	100%	74.45%
Standard Deviation	2.5%	2.3%
DaCapo Benchmark - Jython (msec)	<b>3940</b>	<b>5626</b>
Normalized	100%	70.03%
Standard Deviation	0.4%	0.8%
DaCapo Benchmark - Tradesoap (msec)	<b>3524</b>	<b>4506</b>
Normalized	100%	78.21%
Standard Deviation	0.8%	1.2%
DaCapo Benchmark - Tradebeans (msec)	<b>3203</b>	<b>4344</b>
Normalized	100%	73.73%
Standard Deviation	1.7%	1.8%
Rodinia - OpenMP LavaMD (sec)	<b>143.334</b>	<b>215.666</b>
Normalized	100%	66.46%
Standard Deviation	0.2%	0%
Rodinia - OpenMP CFD Solver (sec)	<b>10.478</b>	<b>17.035</b>
Normalized	100%	61.51%
Standard Deviation	0.4%	0.5%
Rodinia - O.S (sec)	<b>13.296</b>	<b>15.484</b>
Normalized	100%	85.87%
Standard Deviation	8.6%	6.6%
Timed MrBayes Analysis - P.P.A (sec)	<b>251.397</b>	<b>384.753</b>
Normalized	100%	65.34%
Standard Deviation	0.2%	0.1%
Xcompact3d Incompact3d - i.i.1.C.P.D (sec)	<b>8.01671425</b>	<b>11.5733547</b>
Normalized	100%	69.27%
Standard Deviation	0.3%	0.2%
Xcompact3d Incompact3d - i.i.1.C.P.D (sec)	<b>29.1258570</b>	<b>41.0240835</b>
Normalized	100%	71%
Standard Deviation	0.2%	0.1%
libavif avifenc - 0 (sec)	<b>256.841</b>	<b>406.937</b>

Normalized	100%	63.12%
Standard Deviation	0.1%	0.1%
<b>libavif avifenc - 2 (sec)</b>	<b>141.698</b>	<b>238.205</b>
Normalized	100%	59.49%
Standard Deviation	0.1%	0.1%
<b>libavif avifenc - 6 (sec)</b>	<b>9.385</b>	<b>13.046</b>
Normalized	100%	71.94%
Standard Deviation	0.5%	0.1%
<b>libavif avifenc - 6, Lossless (sec)</b>	<b>11.908</b>	<b>16.518</b>
Normalized	100%	72.09%
Standard Deviation	0.2%	1.8%
<b>libavif avifenc - 10, Lossless (sec)</b>	<b>5.765</b>	<b>8.311</b>
Normalized	100%	69.37%
Standard Deviation	0.6%	0.5%
<b>Timed Apache Compilation - Time To Compile (sec)</b>	<b>26.940</b>	<b>34.201</b>
Normalized	100%	78.77%
Standard Deviation	0.3%	0.1%
<b>Timed Gem5 Compilation - Time To Compile (sec)</b>	<b>391.171</b>	<b>488.805</b>
Normalized	100%	80.03%
Standard Deviation	0.6%	0.2%
<b>Timed ImageMagick Compilation - Time To Compile</b>	<b>27.904</b>	<b>40.333</b>
Normalized	100%	69.18%
Standard Deviation	0.8%	0.9%
<b>Timed LLVM Compilation - Ninja (sec)</b>	<b>544.929</b>	<b>682.981</b>
Normalized	100%	79.79%
Standard Deviation	1.7%	0.1%
<b>Timed Node.js Compilation - Time To Compile (sec)</b>	<b>497.579</b>	<b>628.401</b>
Normalized	100%	79.18%
Standard Deviation	0.7%	0.1%
<b>Timed PHP Compilation - Time To Compile (sec)</b>	<b>69.483</b>	<b>88.897</b>
Normalized	100%	78.16%
Standard Deviation	0.3%	0.6%
<b>Build2 - Time To Compile (sec)</b>	<b>115.020</b>	<b>142.277</b>
Normalized	100%	80.84%
Standard Deviation	1%	0.9%
<b>C-Ray - Total Time - 4.1.R.P.P (sec)</b>	<b>38.517</b>	<b>62.323</b>
Normalized	100%	61.8%
Standard Deviation	0.1%	0.1%
<b>POV-Ray - Trace Time (sec)</b>	<b>37.863</b>	<b>51.047</b>
Normalized	100%	74.17%
Standard Deviation	0.1%	0%
<b>m-queens - Time To Solve (sec)</b>	<b>66.822</b>	<b>75.224</b>
Normalized	100%	88.83%
Standard Deviation	0%	0%
<b>N-Queens - Elapsed Time (sec)</b>	<b>21.536</b>	<b>23.136</b>
Normalized	100%	93.08%
Standard Deviation	0%	0%
<b>Ngspice - C2670 (sec)</b>	<b>198.224</b>	<b>263.724</b>
Normalized	100%	75.16%
Standard Deviation	0.8%	0.6%
<b>Ngspice - C7552 (sec)</b>	<b>191.286</b>	<b>255.205</b>
Normalized	100%	74.95%
Standard Deviation	1.8%	2.5%
<b>ASTC Encoder - Thorough (sec)</b>	<b>13.9248</b>	<b>16.5222</b>
Normalized	100%	84.28%

	Standard Deviation	0%	0.1%
<b>ASTC Encoder - Exhaustive (sec)</b>	<b>139.3797</b>	<b>159.2039</b>	
	Normalized	100%	87.55%
	Standard Deviation	0%	0%
<b>GPAW - Carbon Nanotube (sec)</b>	<b>155.180</b>	<b>215.528</b>	
	Normalized	100%	72%
	Standard Deviation	0.1%	0.1%

## Stress-NG 0.14

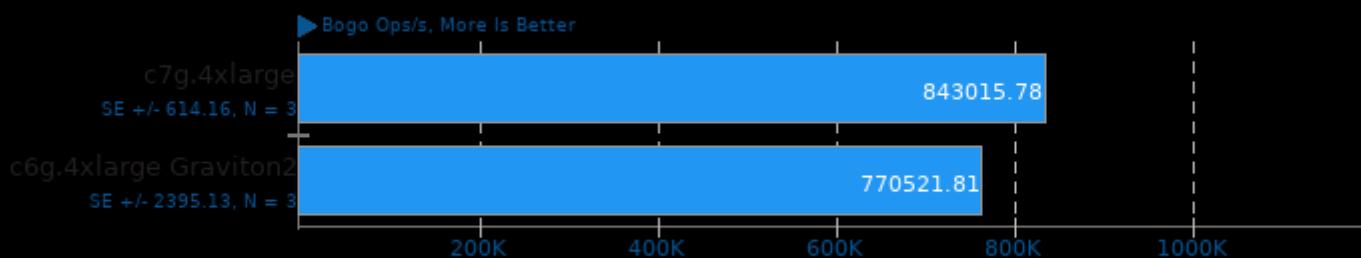
Test: Crypto



1. (CC) gcc options: -O2 -std=gnu99 -lm -lapparmor -latomic -lc -lcrypt -ldl -ljpeg -lrt -lz -pthread

## Stress-NG 0.14

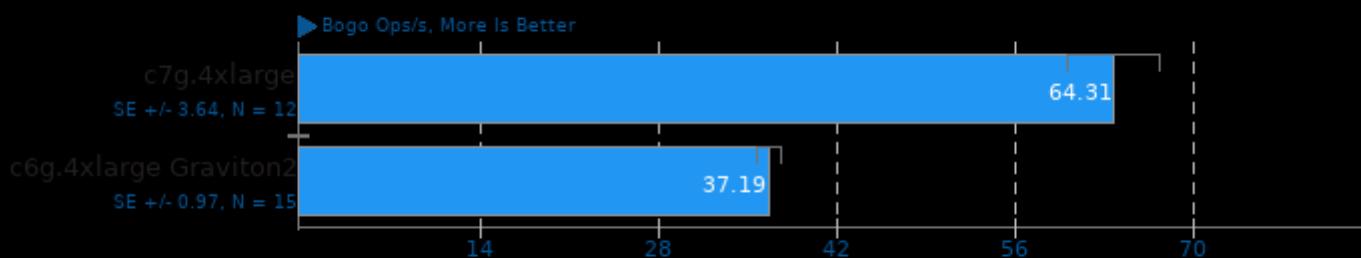
Test: IO\_uring



1. (CC) gcc options: -O2 -std=gnu99 -lm -lapparmor -latomic -lc -lcrypt -ldl -ljpeg -lrt -lz -pthread

## Stress-NG 0.14

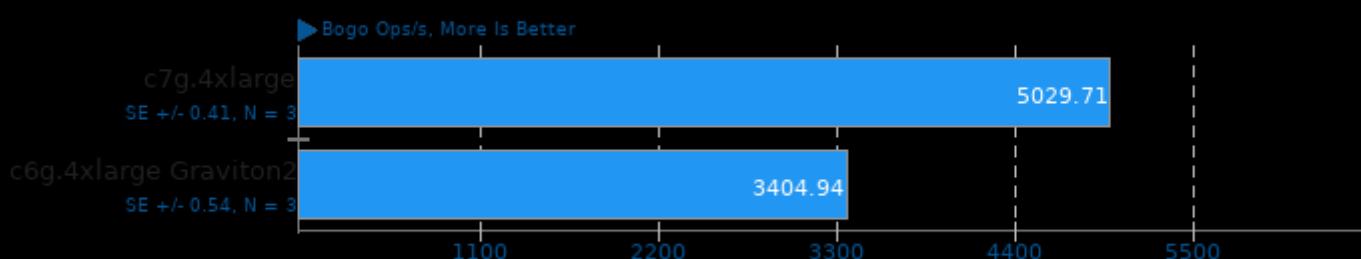
Test: CPU Cache



1. (CC) gcc options: -O2 -std=gnu99 -lm -lapparmor -latomic -lc -lcrypt -ldl -ljpeg -lrt -lz -pthread

## Stress-NG 0.14

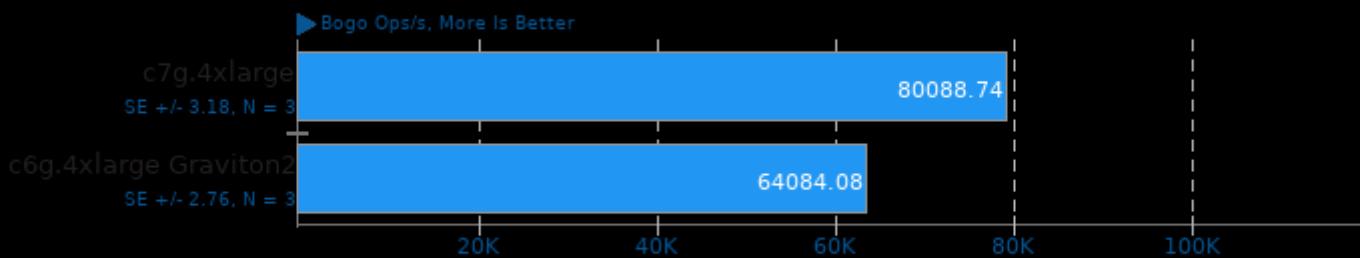
Test: CPU Stress



1. (CC) gcc options: -O2 -std=gnu99 -lm -lapparmor -latomic -lc -lcrypt -ldl -ljpeg -lrt -lz -pthread

## Stress-NG 0.14

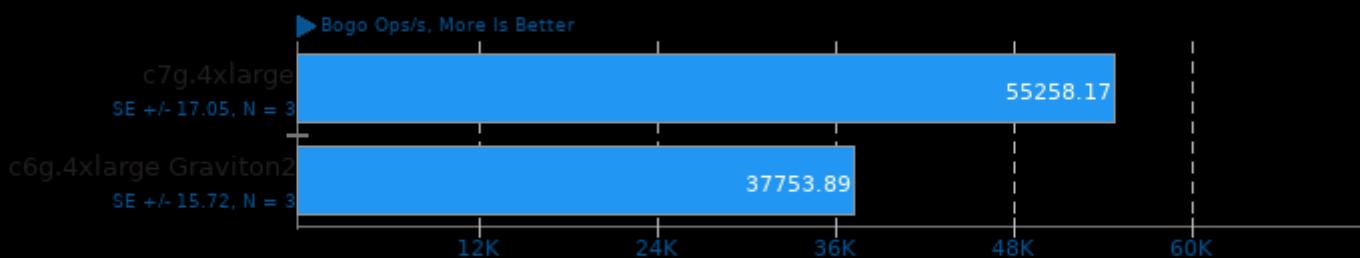
Test: Matrix Math



1. (CC) gcc options: -O2 -std=gnu99 -lm -lapparmor -latomic -lc -lcrypt -ldl -ljpeg -lrt -lz -pthread

## Stress-NG 0.14

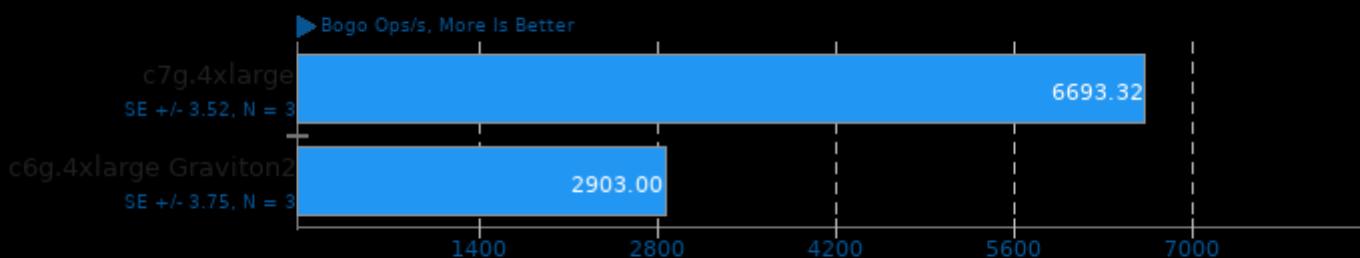
Test: Vector Math



1. (CC) gcc options: -O2 -std=gnu99 -lm -lapparmor -latomic -lc -lcrypt -ldl -ljpeg -lrt -lz -pthread

## Stress-NG 0.14

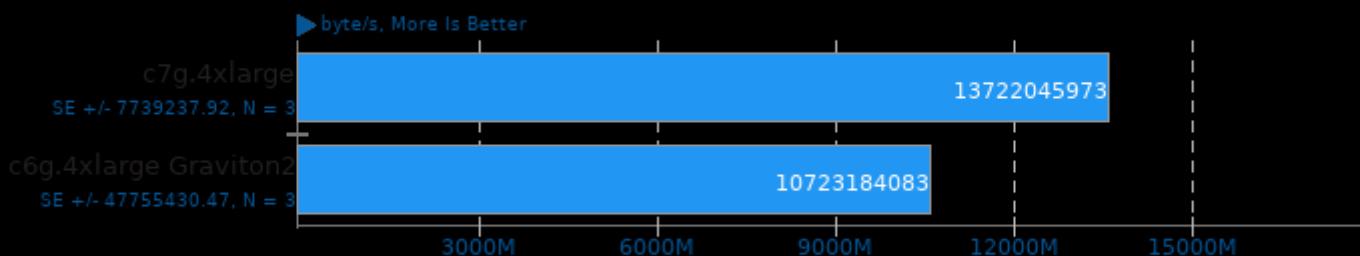
Test: Memory Copying



1. (CC) gcc options: -O2 -std=gnu99 -lm -lapparmor -latomic -lc -lcrypt -ldl -ljpeg -lrt -lz -pthread

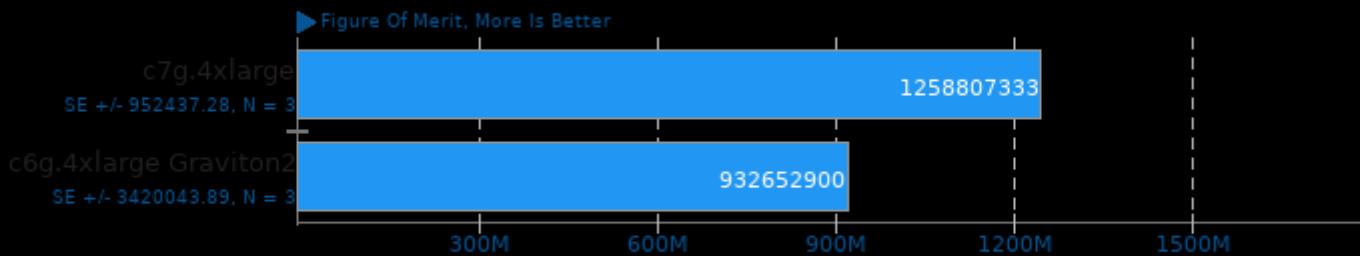
## OpenSSL 3.0

Algorithm: SHA256



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

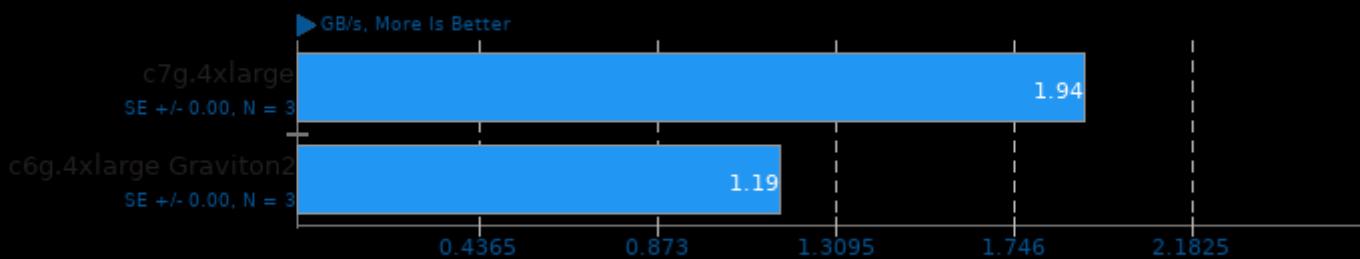
## Algebraic Multi-Grid Benchmark 1.2



1. (CC) gcc options: -lparcsr\_ls -lparcsr\_mv -lseq\_mv -lIJ\_mv -lkrylov -lHYPRE\_utilities -lm -fopenmp -lmpi

## simdjson 1.0

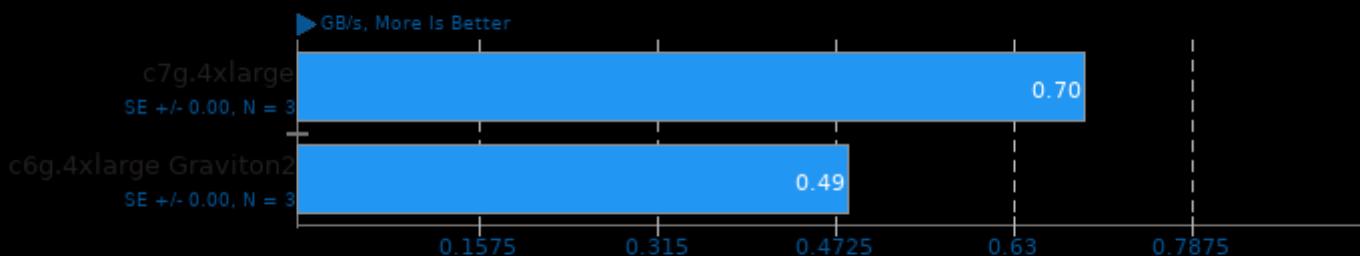
Throughput Test: Kostya



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

## simdjson 1.0

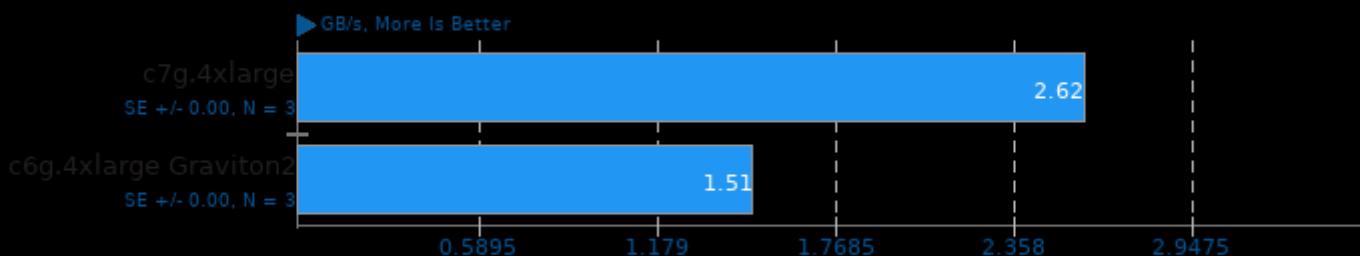
Throughput Test: LargeRandom



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

## simdjson 1.0

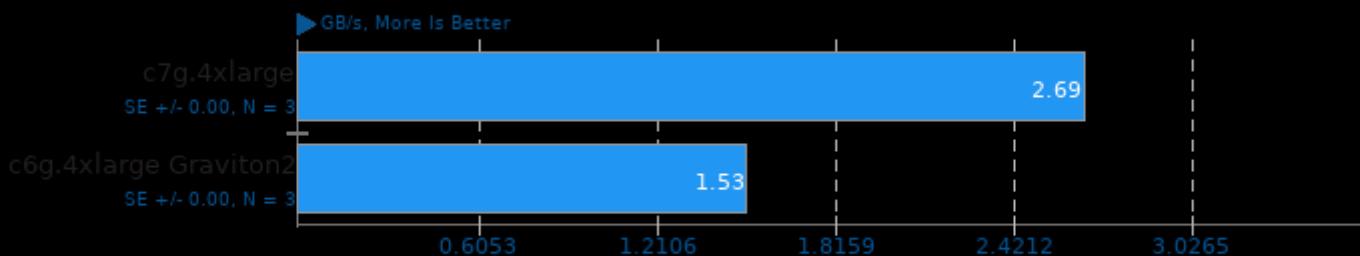
Throughput Test: PartialTweets



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

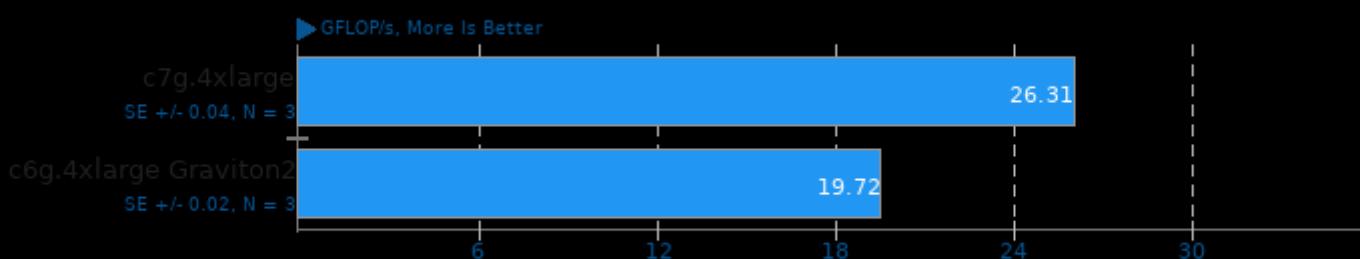
## simdjson 1.0

Throughput Test: DistinctUserID



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

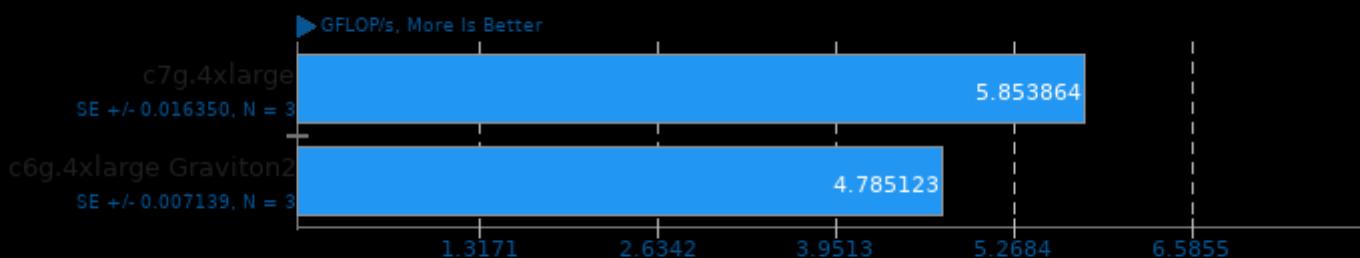
## High Performance Conjugate Gradient 3.1



1. (CXX) g++ options: -O3 -ffast-math -fno-tree-vectorize -fmpi\_cxx -fmpi

## ACES DGEMM 1.0

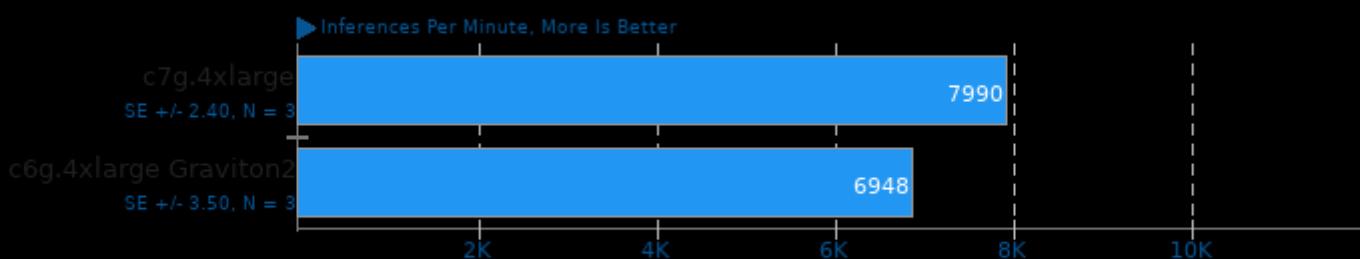
Sustained Floating-Point Rate



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

## ONNX Runtime 1.11

Model: GPT-2 - Device: CPU - Executor: Standard

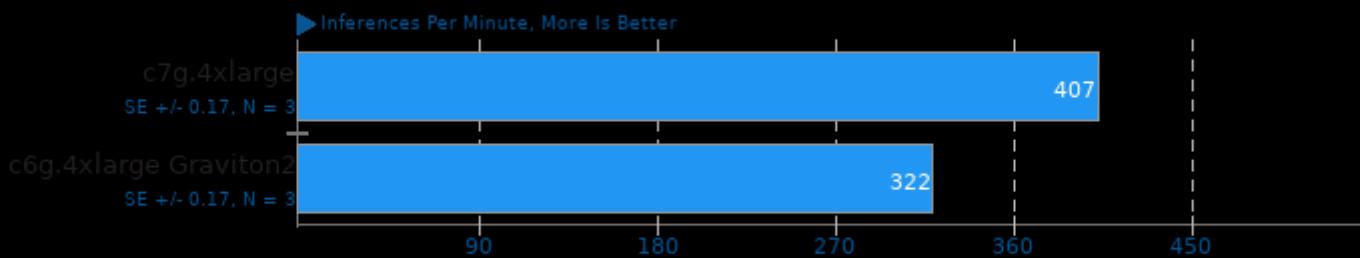


1. (CXX) g++ options: -ffunction-sections -fdata-sections -march=native -mtune=native -O3 -fipa -fno-fat-lto-objects -ldl -lir

## Amazon EC2 c7g.4xlarge AWS Graviton3

### ONNX Runtime 1.11

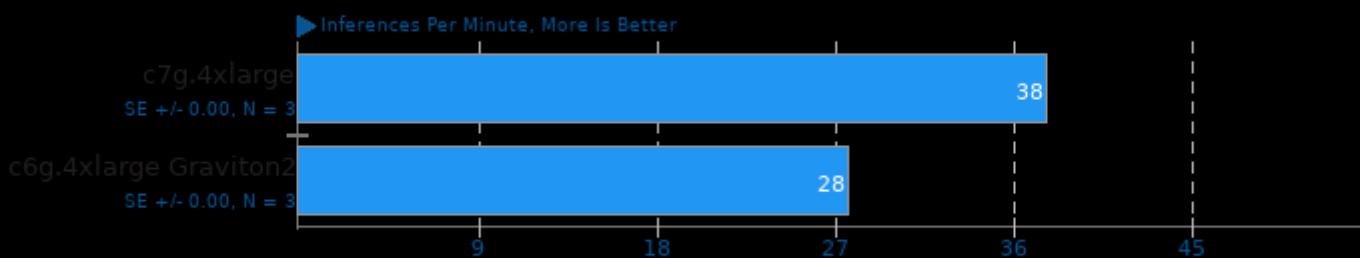
Model: bertsquad-12 - Device: CPU - Executor: Standard



1. (CXX) g++ options: -ffunction-sections -fdata-sections -march=native -mtune=native -O3 -fipa -fno-fat-lto-objects -ldl -lrt

### ONNX Runtime 1.11

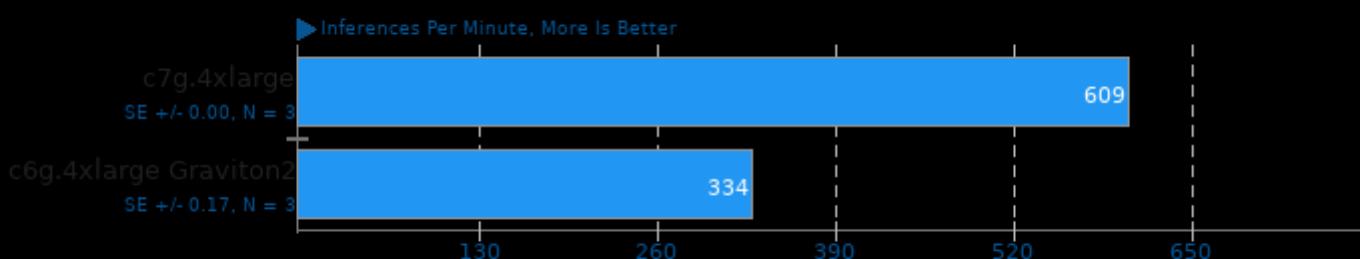
Model: fcn-resnet101-11 - Device: CPU - Executor: Standard



1. (CXX) g++ options: -ffunction-sections -fdata-sections -march=native -mtune=native -O3 -fipa -fno-fat-lto-objects -ldl -lrt

### ONNX Runtime 1.11

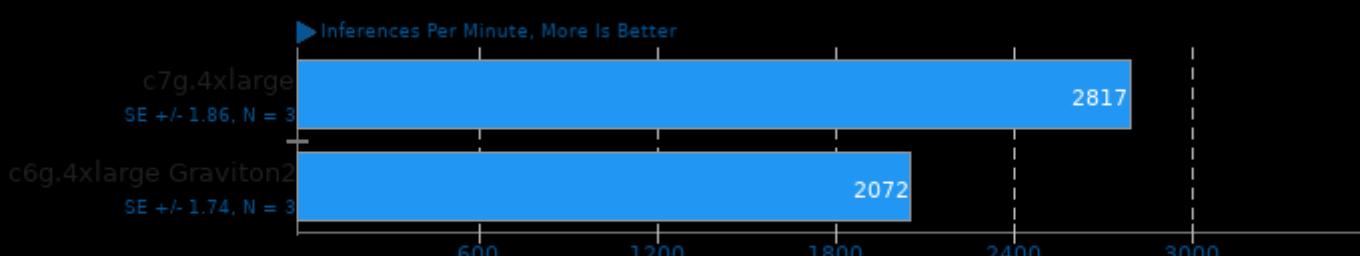
Model: ArcFace ResNet-100 - Device: CPU - Executor: Standard



1. (CXX) g++ options: -ffunction-sections -fdata-sections -march=native -mtune=native -O3 -fipa -fno-fat-lto-objects -ldl -lrt

### ONNX Runtime 1.11

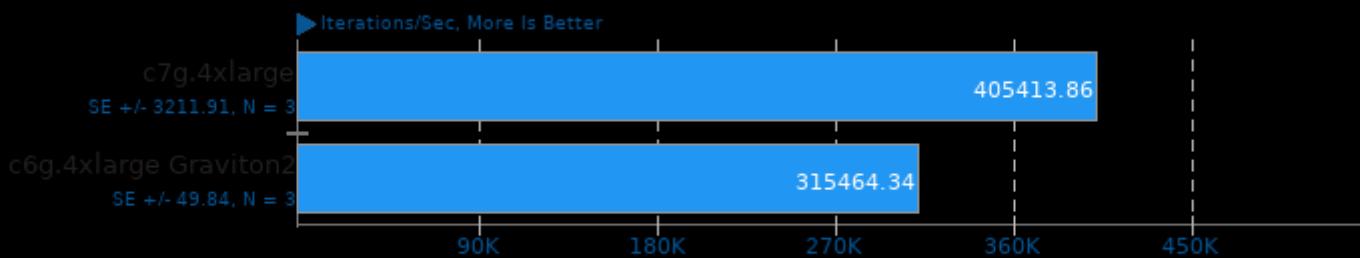
Model: super-resolution-10 - Device: CPU - Executor: Standard



1. (CXX) g++ options: -ffunction-sections -fdata-sections -march=native -mtune=native -O3 -fipa -fno-fat-lto-objects -ldl -lrt

## Coremark 1.0

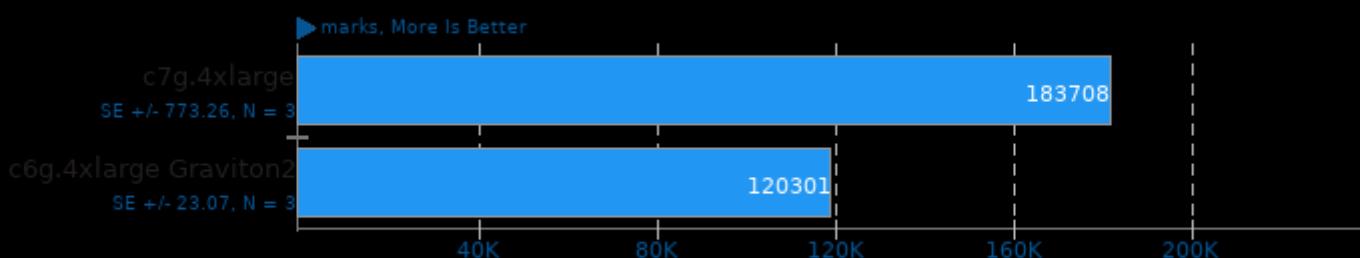
CoreMark Size 666 - Iterations Per Second



1. (CC) gcc options: -O2 -fintc -fintt

## SecureMark 1.0.4

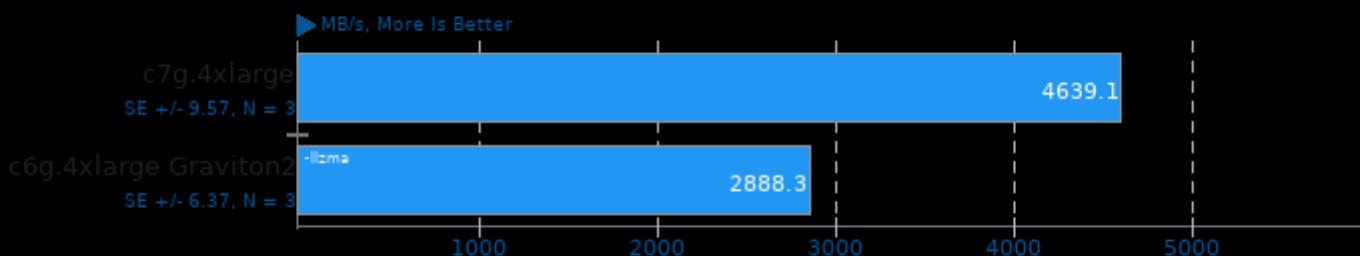
Benchmark: SecureMark-TLS



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

## Zstd Compression 1.5.0

Compression Level: 3 - Compression Speed



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

## Zstd Compression 1.5.0

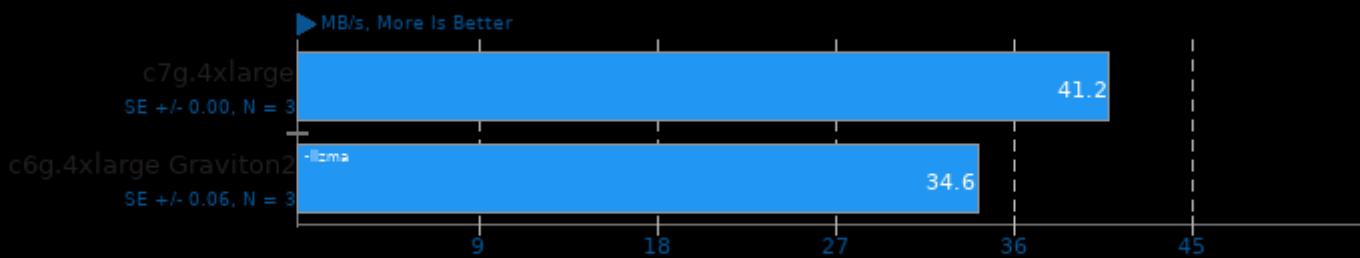
Compression Level: 3 - Decompression Speed



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

## Zstd Compression 1.5.0

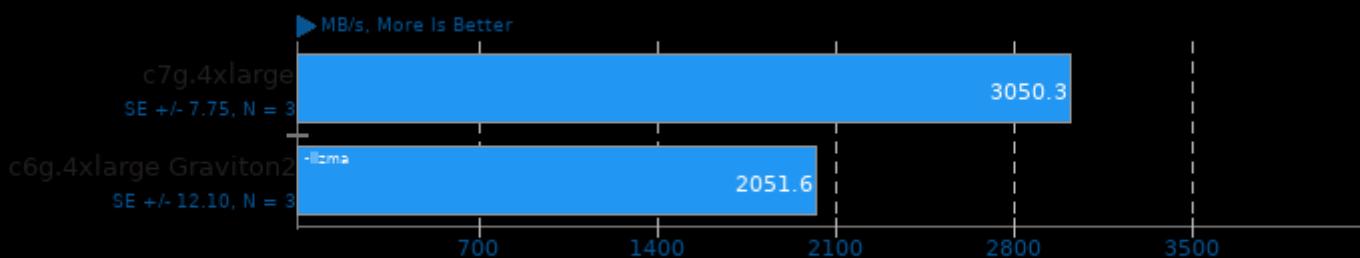
Compression Level: 19 - Compression Speed



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

## Zstd Compression 1.5.0

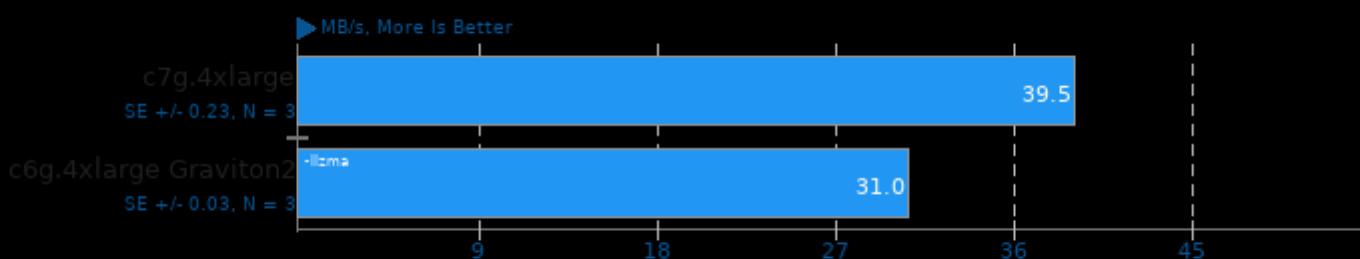
Compression Level: 19 - Decompression Speed



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

## Zstd Compression 1.5.0

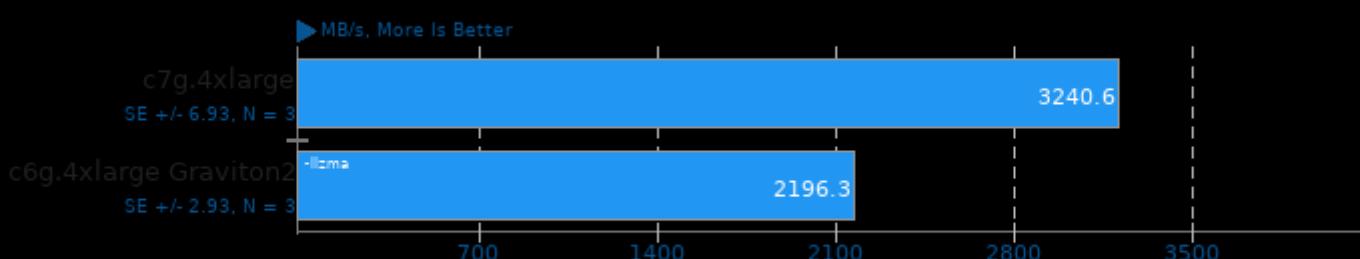
Compression Level: 19, Long Mode - Compression Speed



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

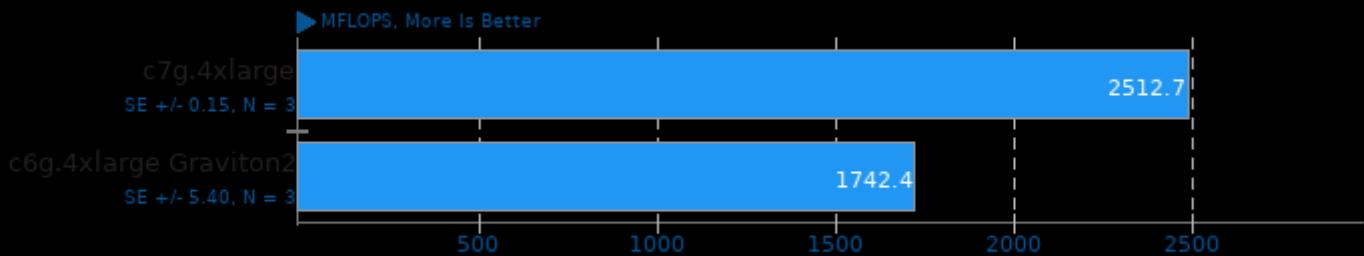
## Zstd Compression 1.5.0

Compression Level: 19, Long Mode - Decompression Speed



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

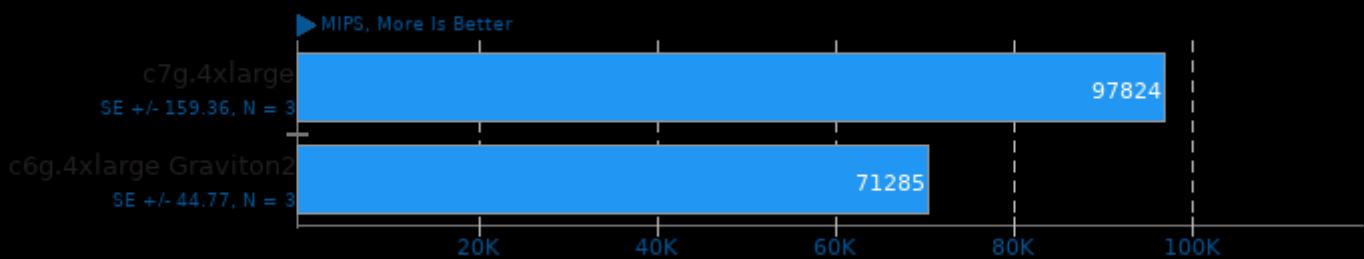
## QuantLib 1.21



1. (CXX) g++ options: -O3 -march=native -rdynamic

## 7-Zip Compression 21.06

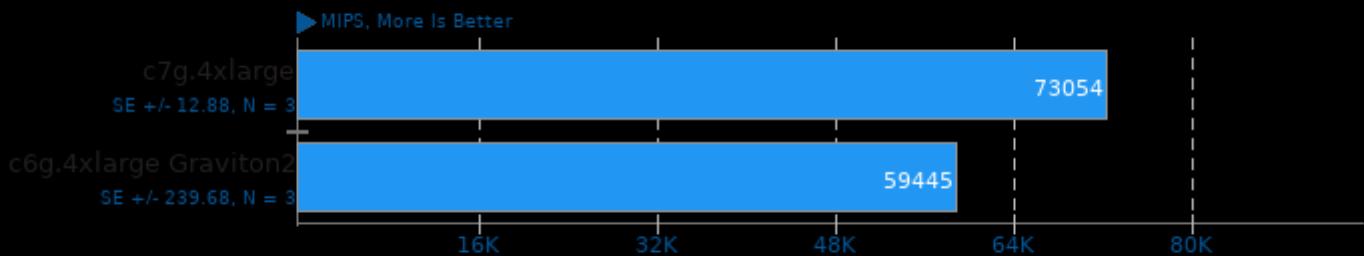
Test: Compression Rating



1. (CXX) g++ options: -lpthread -ldl -O2 -fPIC

## 7-Zip Compression 21.06

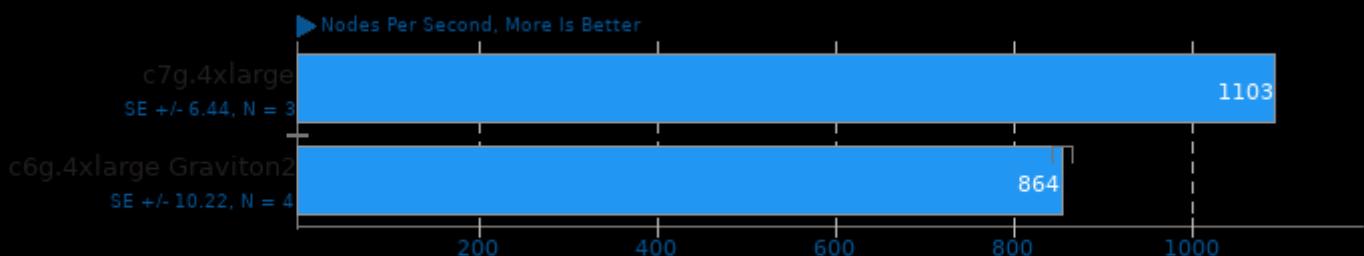
Test: Decompression Rating



1. (CXX) g++ options: -lpthread -ldl -O2 -fPIC

## LeelaChessZero 0.28

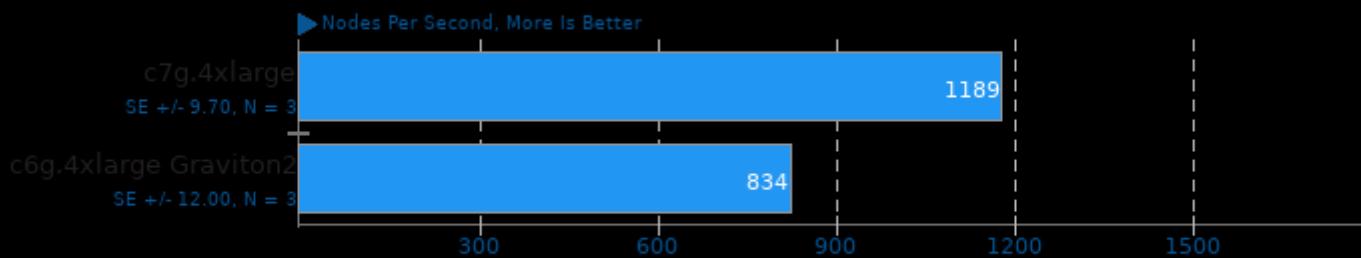
Backend: BLAS



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

## LeelaChessZero 0.28

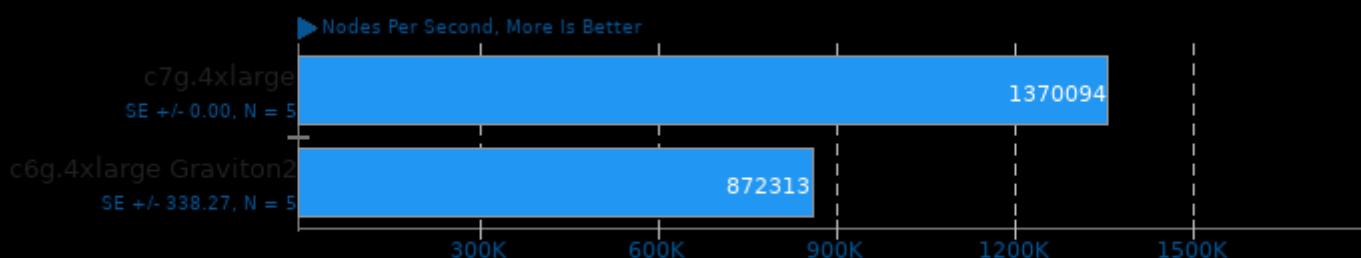
Backend: Eigen



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

## TSCP 1.81

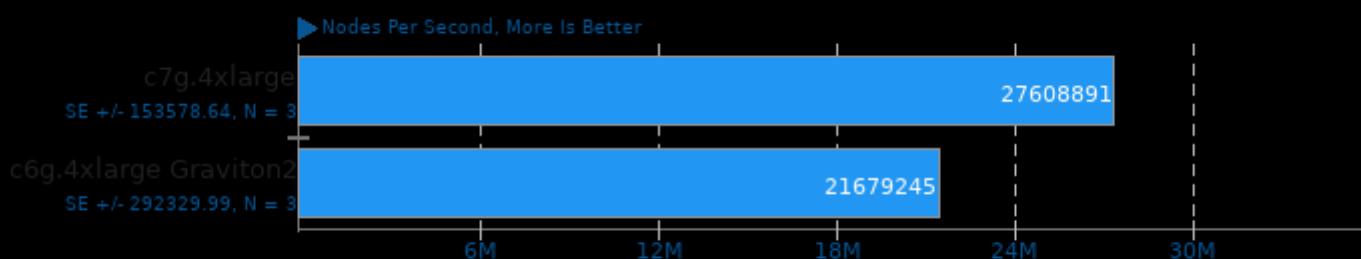
AI Chess Performance



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

## Stockfish 13

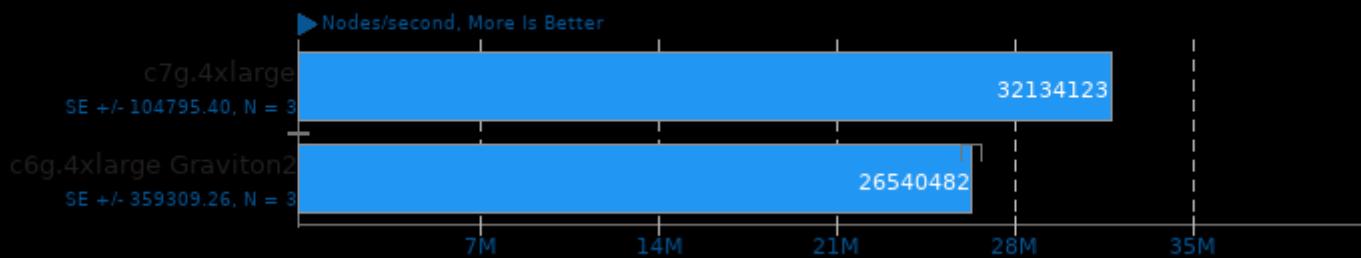
Total Time



1. (CXX) g++ options: -lgcov -lpthread -fno-exceptions -std=c++17 -fprofile-use -fno-peel-loops -fno-tracer -pedantic -O3 -fno -fno=jobserver

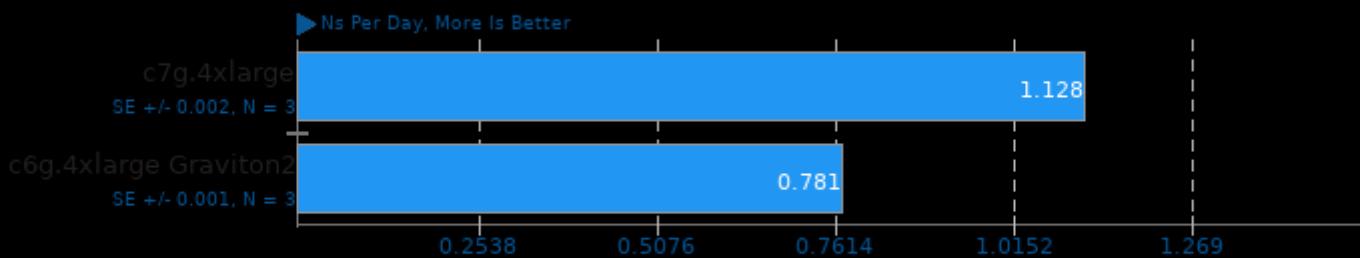
## asmFish 2018-07-23

1024 Hash Memory, 26 Depth



## GROMACS 2022.1

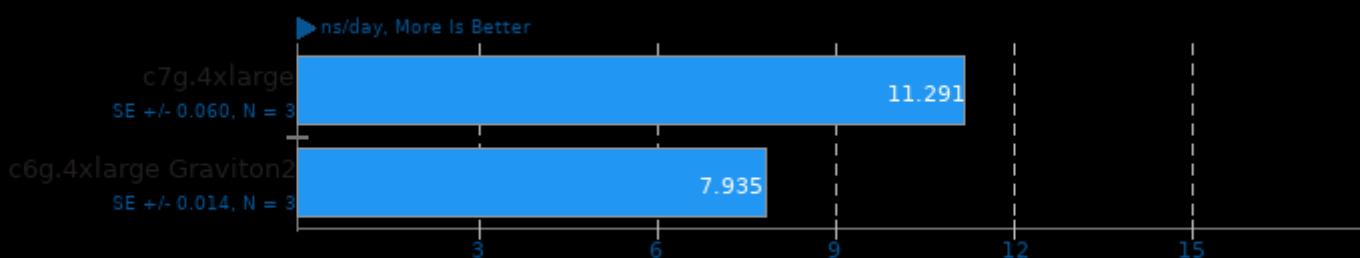
Implementation: MPI CPU - Input: water\_GMX50\_bare



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

## LAMMPS Molecular Dynamics Simulator 29Oct2020

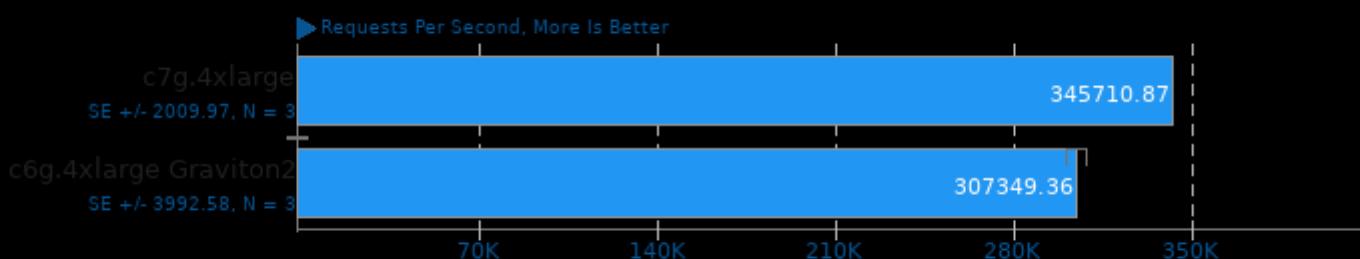
Model: Rhodopsin Protein



1. (CXX) g++ options: -O3 -fipa=none

## nginx 1.21.1

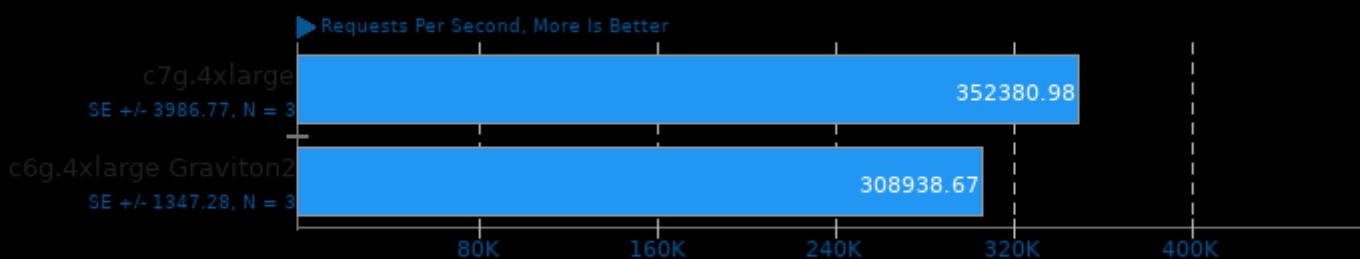
Concurrent Requests: 100



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

## nginx 1.21.1

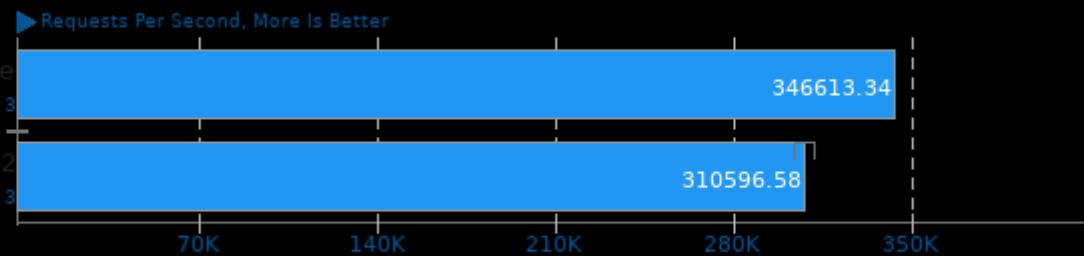
Concurrent Requests: 200



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

## nginx 1.21.1

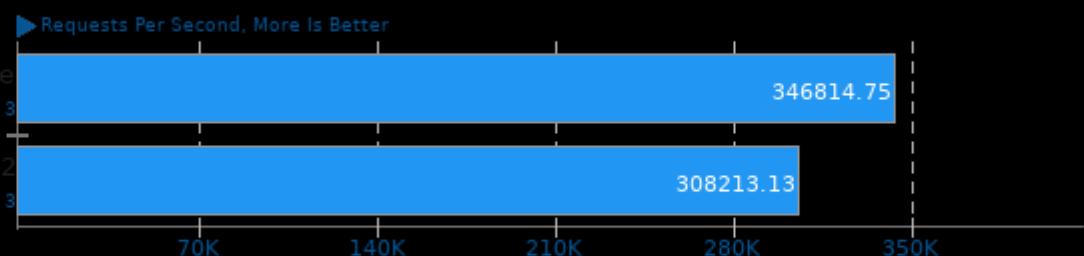
Concurrent Requests: 500



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

## nginx 1.21.1

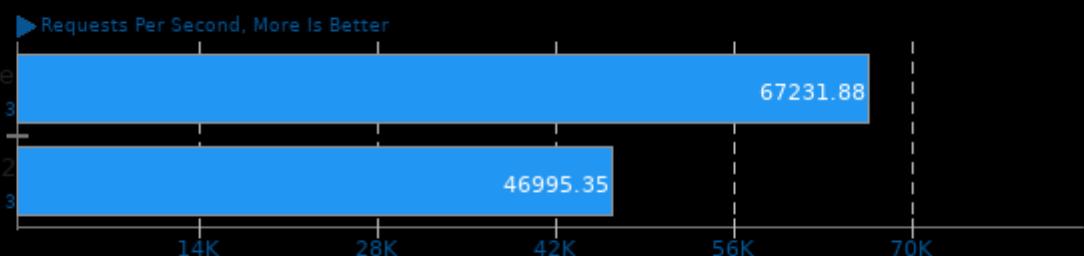
Concurrent Requests: 1000



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

## Apache HTTP Server 2.4.48

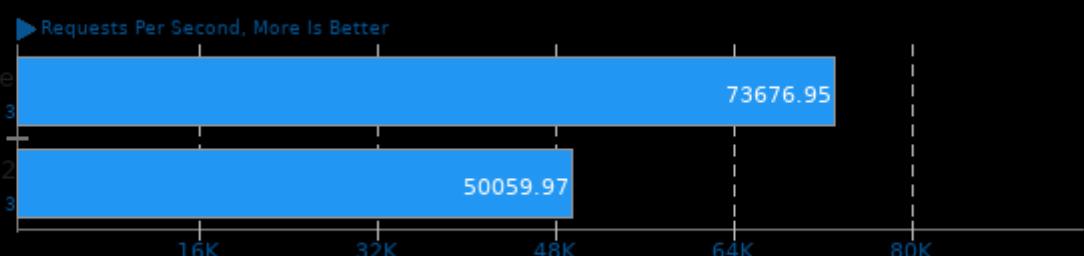
Concurrent Requests: 100



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

## Apache HTTP Server 2.4.48

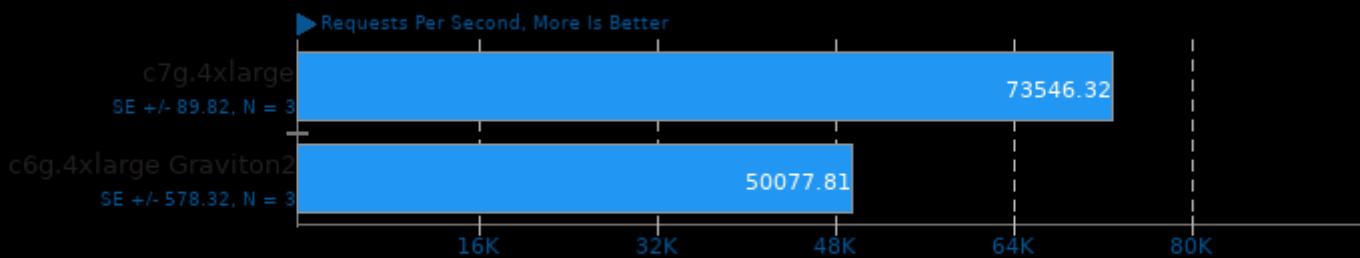
Concurrent Requests: 200



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

## Apache HTTP Server 2.4.48

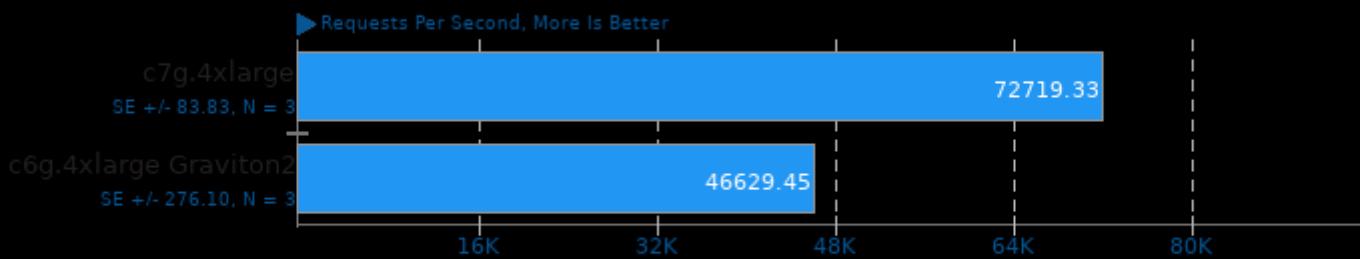
Concurrent Requests: 500



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

## Apache HTTP Server 2.4.48

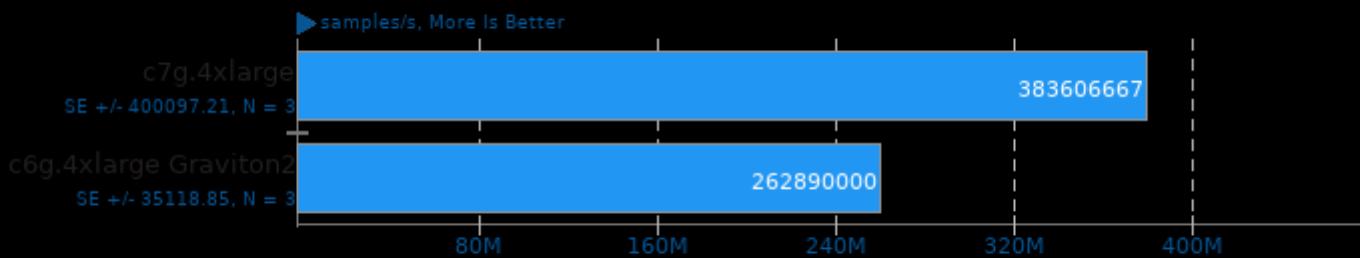
Concurrent Requests: 1000



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

## Liquid-DSP 2021.01.31

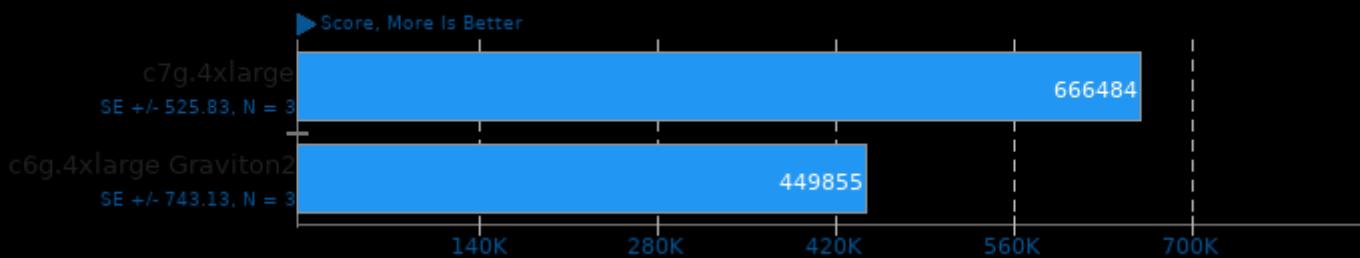
Threads: 16 - Buffer Length: 256 - Filter Length: 57



1. (CC) gcc options: -O3 -pthread -lm -lc -lliquid

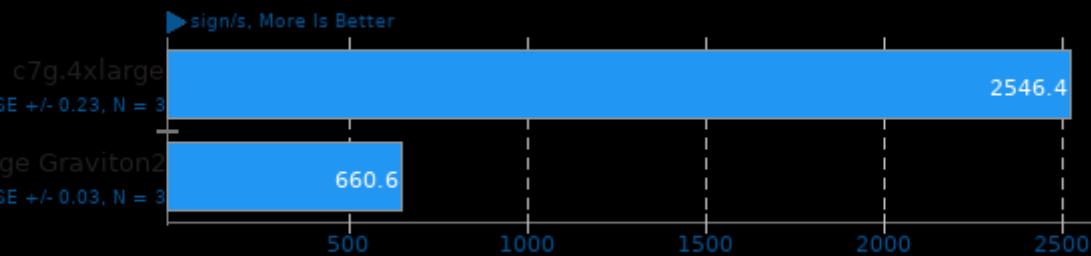
## PHPBench 0.8.1

PHP Benchmark Suite



## OpenSSL 3.0

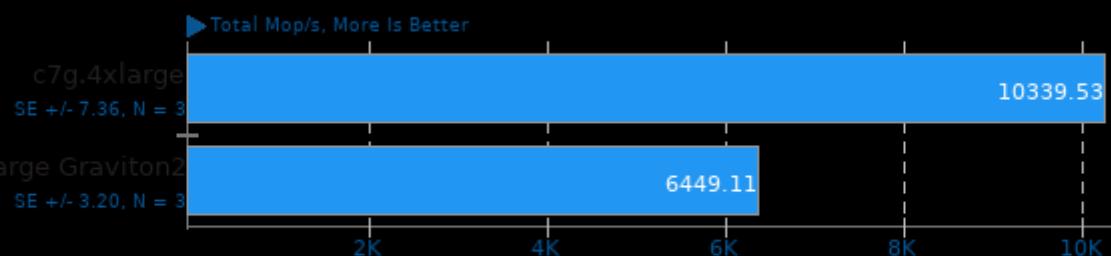
Algorithm: RSA4096



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

## NAS Parallel Benchmarks 3.4

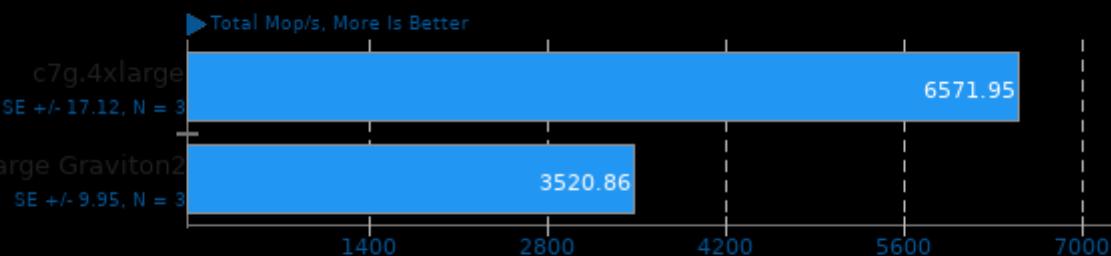
Test / Class: BT.C



1. (F9X) gfortran options: -O3 -march=native -lmpi\_usempif08 -lmpi\_mpifh -lmpi -lopen-rte -lopen-pal -lhwloc -levent\_core -levent\_pthreads -lm -lz

## NAS Parallel Benchmarks 3.4

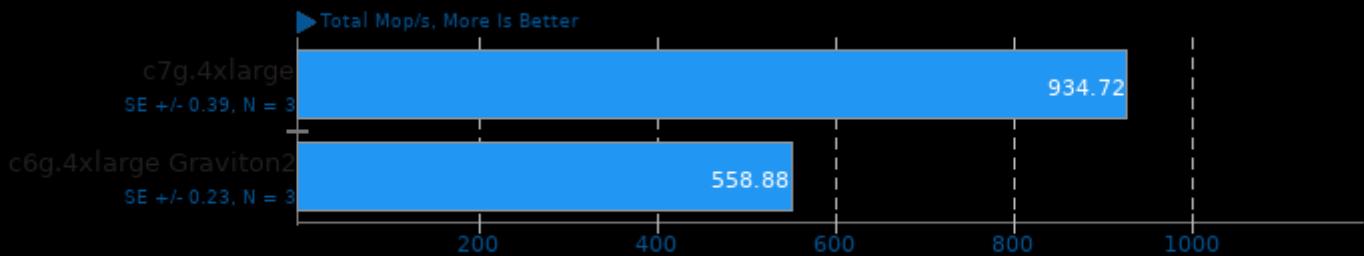
Test / Class: CG.C



1. (F9X) gfortran options: -O3 -march=native -lmpi\_usempif08 -lmpi\_mpifh -lmpi -lopen-rte -lopen-pal -lhwloc -levent\_core -levent\_pthreads -lm -lz

## NAS Parallel Benchmarks 3.4

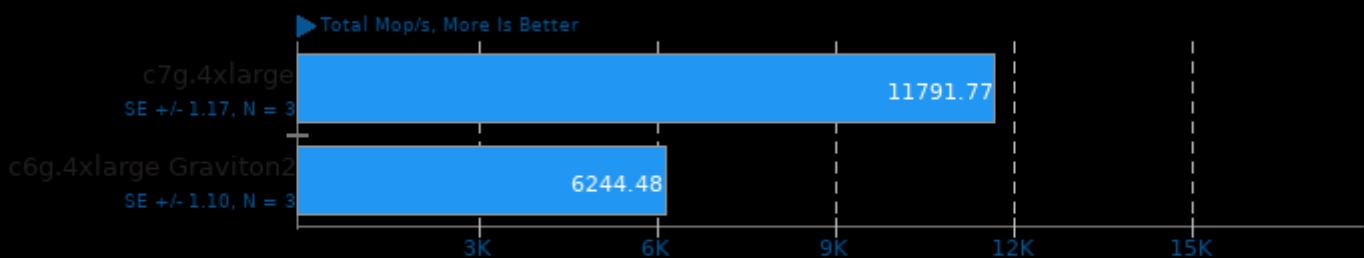
Test / Class: EP.D



1. (F9X) gfortran options: -O3 -march=native -lmpi\_usempif08 -lmpi\_mpifh -lmpi -lopen-rte -lopen-pal -lhwloc -levent\_core -levent\_pthreads -lm -lz

## NAS Parallel Benchmarks 3.4

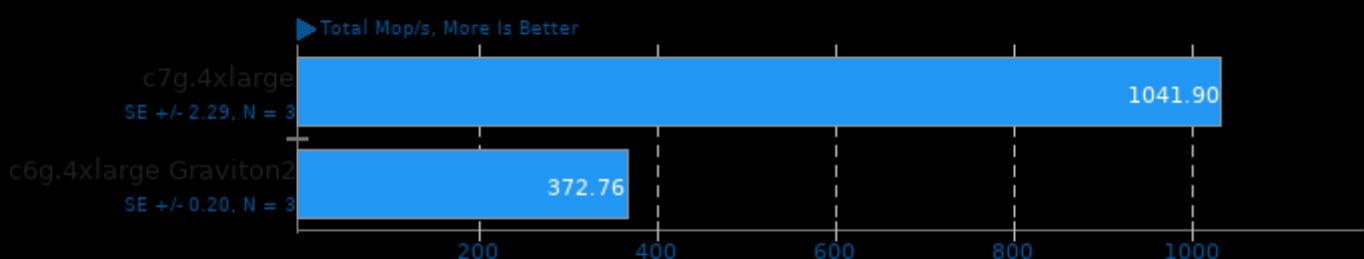
Test / Class: FT.C



1. (F9X) gfortran options: -O3 -march=native -lmpi\_usempif08 -lmpi\_mpifh -lmpi -lopen-rte -lopen-pal -lhwloc -levent\_core -levent\_pthreads -lm -lz

## NAS Parallel Benchmarks 3.4

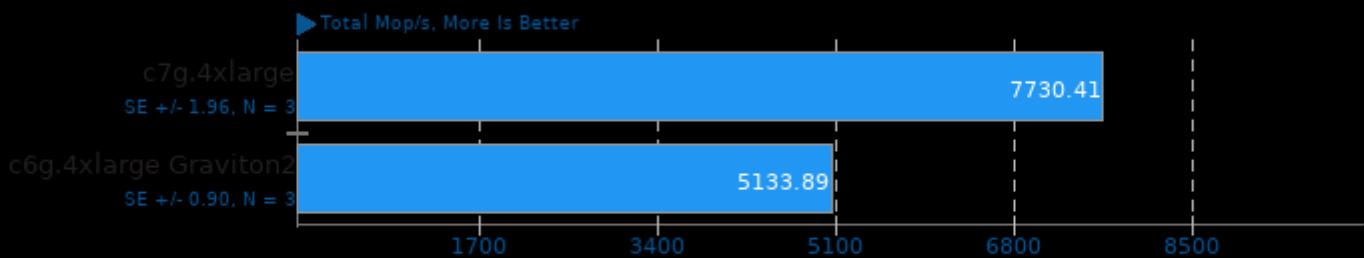
Test / Class: IS.D



1. (F9X) gfortran options: -O3 -march=native -lmpi\_usempif08 -lmpi\_mpifh -lmpi -lopen-rte -lopen-pal -lhwloc -levent\_core -levent\_pthreads -lm -lz

## NAS Parallel Benchmarks 3.4

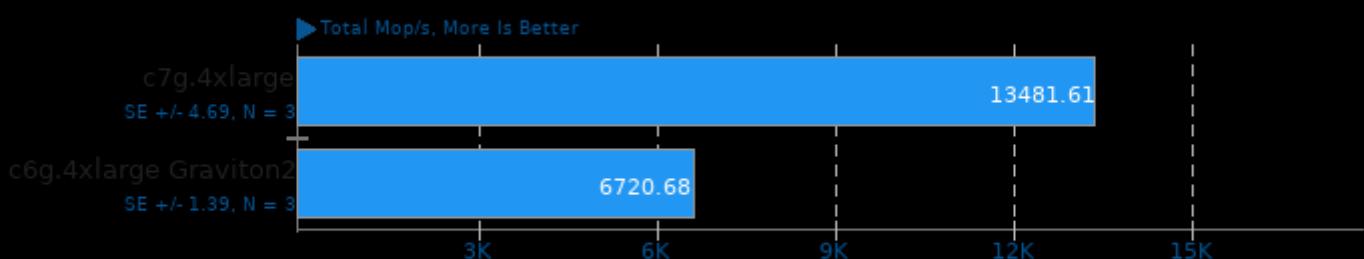
Test / Class: LU.C



1. (F9X) gfortran options: -O3 -march=native -lmpi\_usempif08 -lmpi\_mpih -lmpi -lopen-rte -lopen-pal -lhwloc -levent\_core -levent\_pthreads -lm -lz

## NAS Parallel Benchmarks 3.4

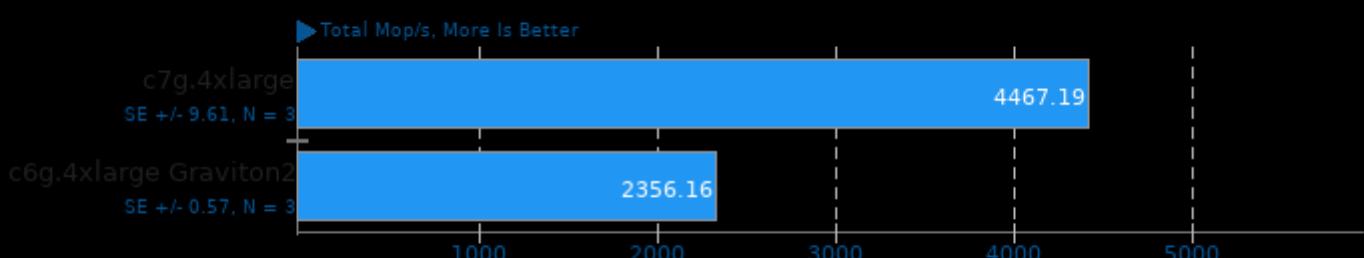
Test / Class: MG.C



1. (F9X) gfortran options: -O3 -march=native -lmpi\_usempif08 -lmpi\_mpih -lmpi -lopen-rte -lopen-pal -lhwloc -levent\_core -levent\_pthreads -lm -lz

## NAS Parallel Benchmarks 3.4

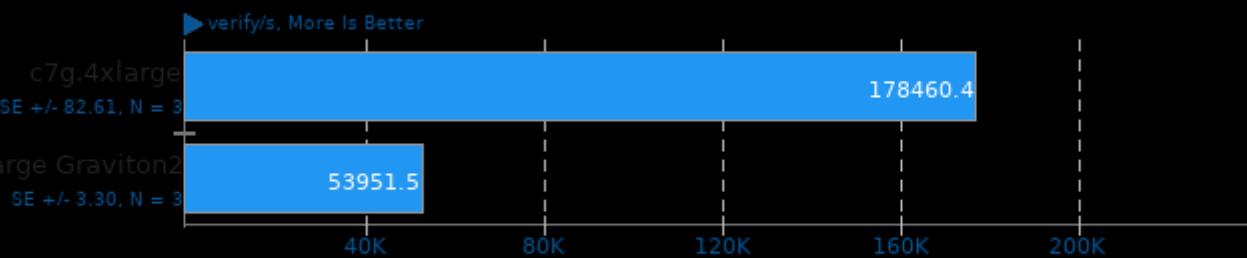
Test / Class: SP.C



1. (F9X) gfortran options: -O3 -march=native -lmpi\_usempif08 -lmpi\_mpih -lmpi -lopen-rte -lopen-pal -lhwloc -levent\_core -levent\_pthreads -lm -lz

## OpenSSL 3.0

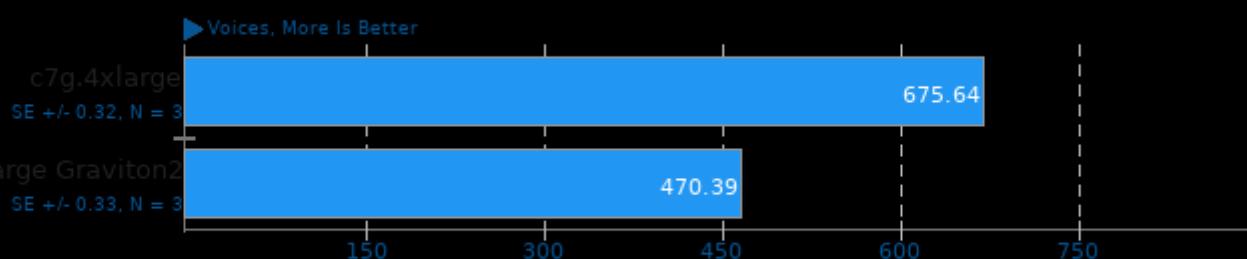
Algorithm: RSA4096



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

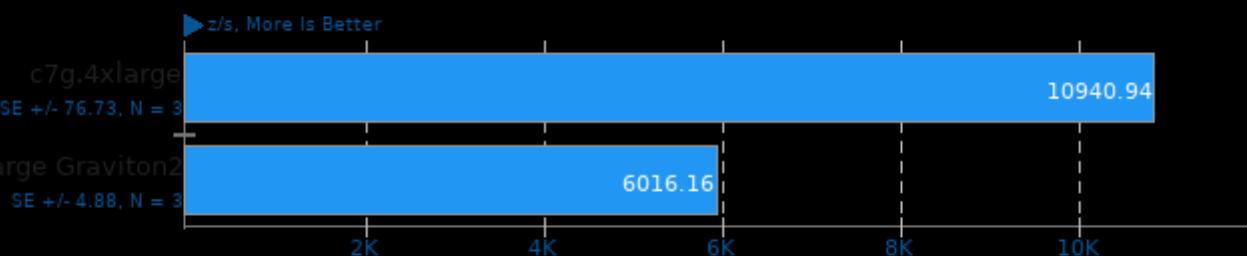
## Google SynthMark 20201109

Test: VoiceMark\_100



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

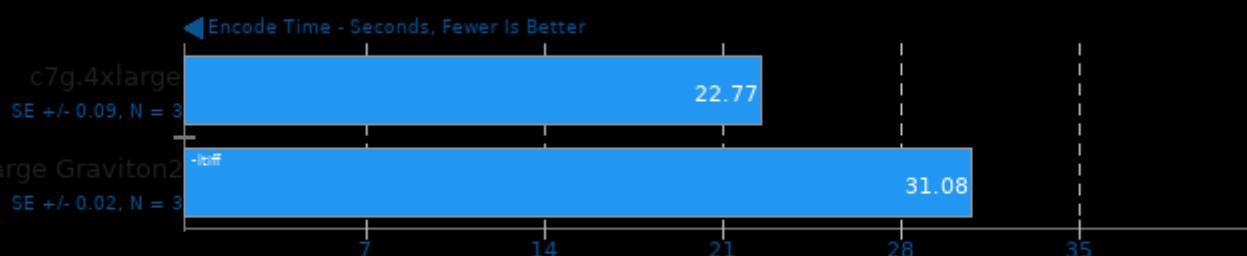
## LULESH 2.0.3



1. (CXX) g++ options: -O3 -fopenmp -lm -lmpi\_cxx -lmpi

## WebP Image Encode 1.1

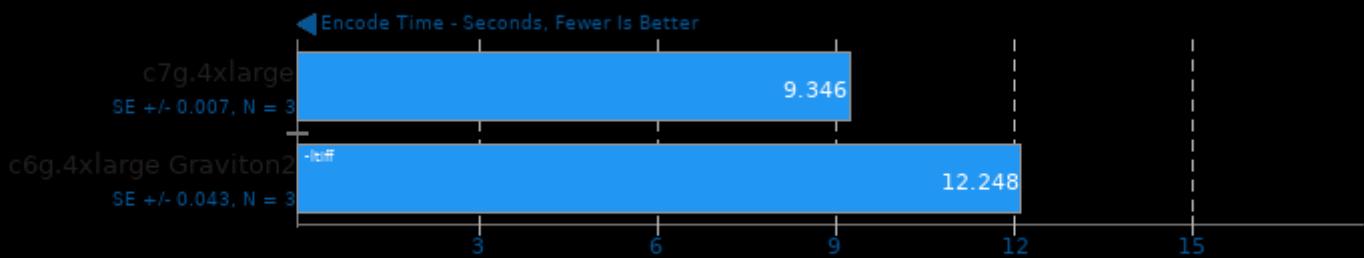
Encode Settings: Quality 100, Lossless



1. (CC) gcc options: -fvisibility=hidden -O2 -lm -ljpeg -lpng16

## WebP Image Encode 1.1

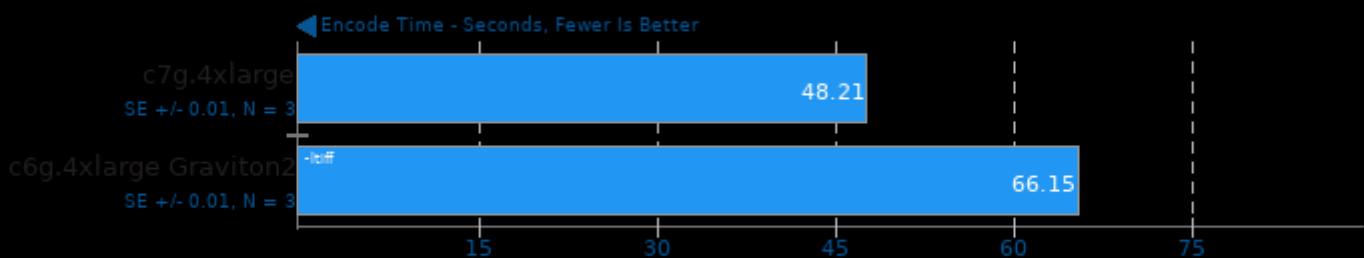
Encode Settings: Quality 100, Highest Compression



1. (CC) gcc options: -fvisibility=hidden -O2 -lm -ljpeg -lpng16

## WebP Image Encode 1.1

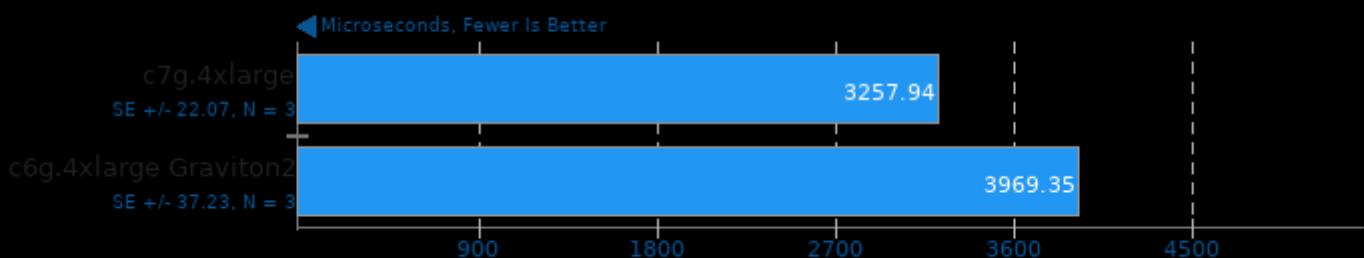
Encode Settings: Quality 100, Lossless, Highest Compression



1. (CC) gcc options: -fvisibility=hidden -O2 -lm -ljpeg -lpng16

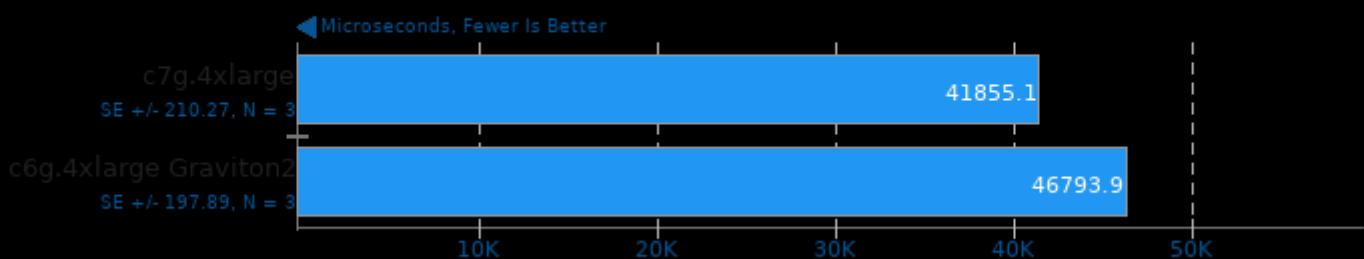
## TensorFlow Lite 2022-05-18

Model: SqueezeNet



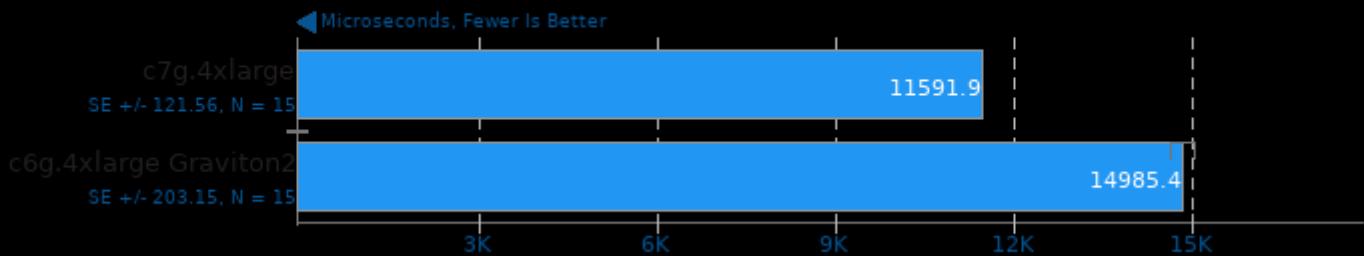
## TensorFlow Lite 2022-05-18

Model: Inception V4



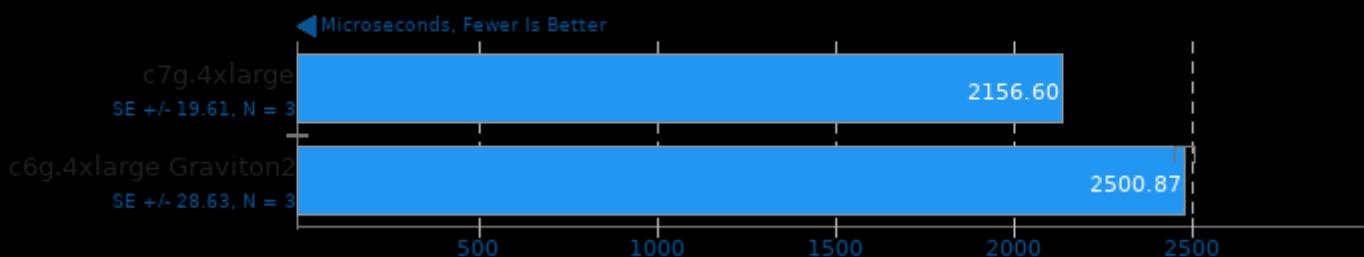
## TensorFlow Lite 2022-05-18

Model: NASNet Mobile



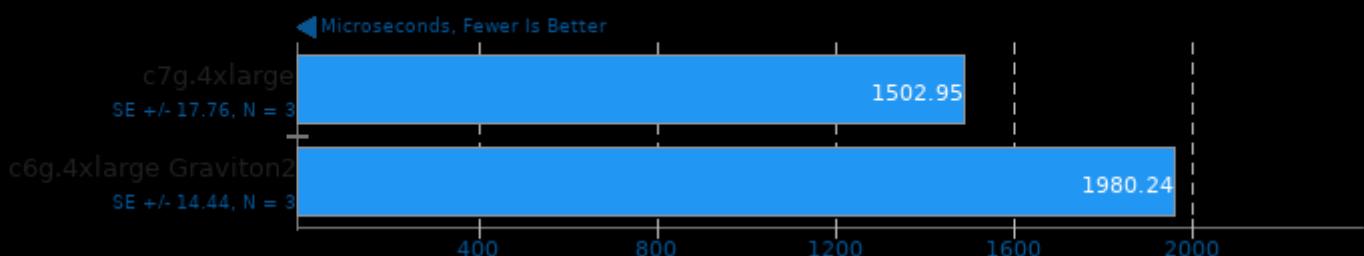
## TensorFlow Lite 2022-05-18

Model: Mobilenet Float



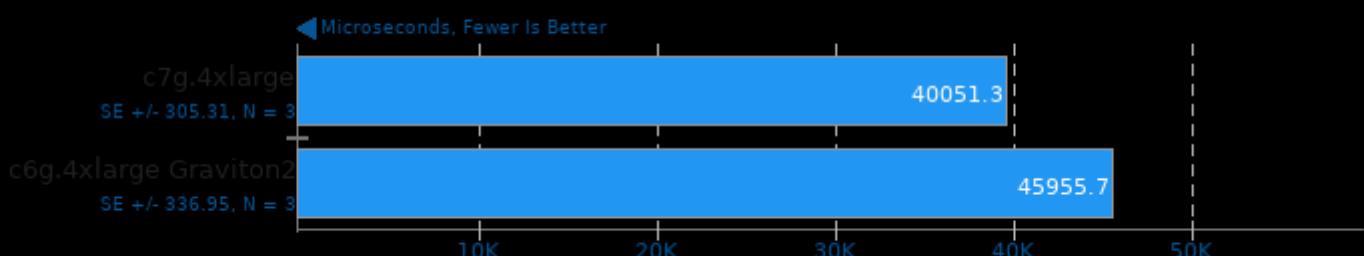
## TensorFlow Lite 2022-05-18

Model: Mobilenet Quant



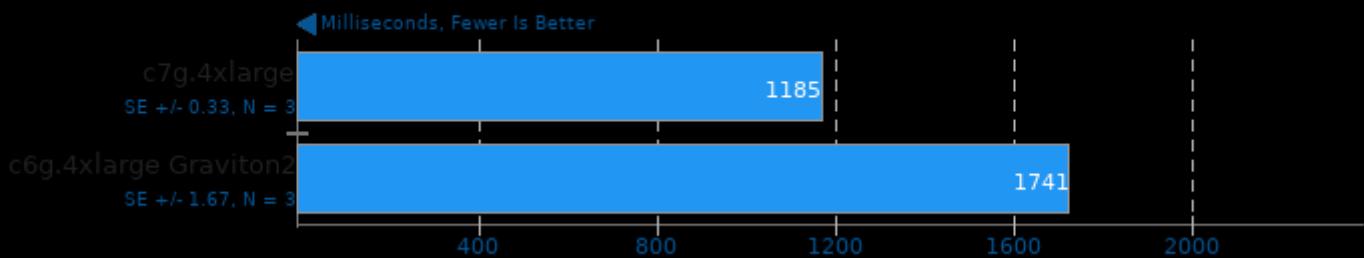
## TensorFlow Lite 2022-05-18

Model: Inception ResNet V2



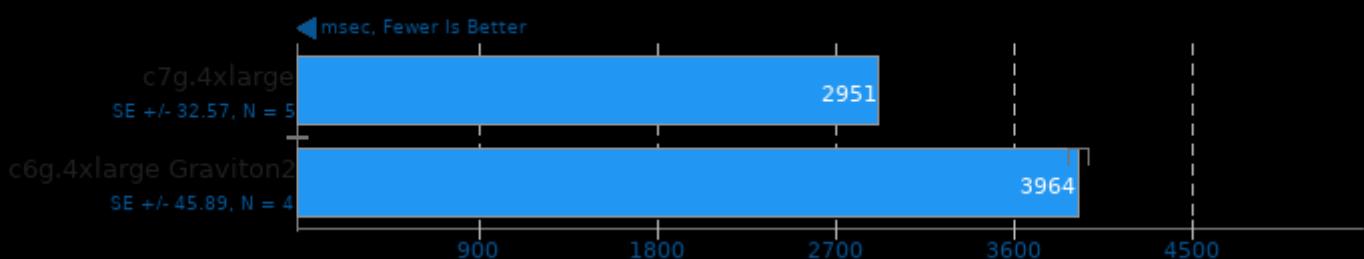
## PyBench 2018-02-16

Total For Average Test Times



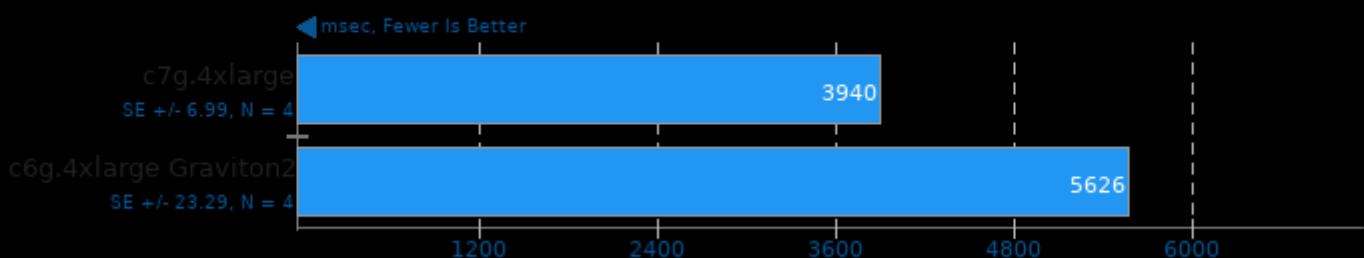
## DaCapo Benchmark 9.12-MR1

Java Test: H2



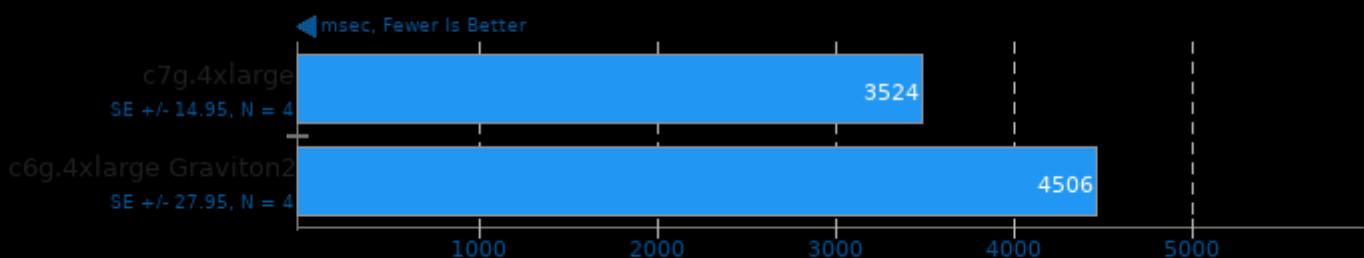
## DaCapo Benchmark 9.12-MR1

Java Test: Jython



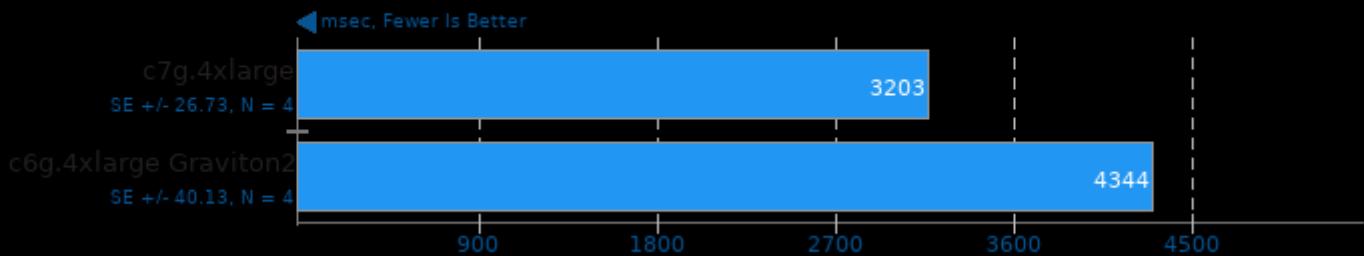
## DaCapo Benchmark 9.12-MR1

Java Test: Tradesoap



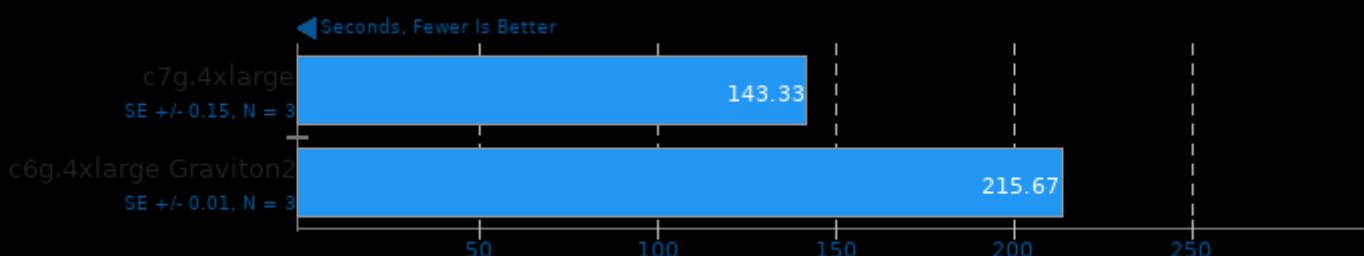
## DaCapo Benchmark 9.12-MR1

Java Test: Tradebeans



## Rodinia 3.1

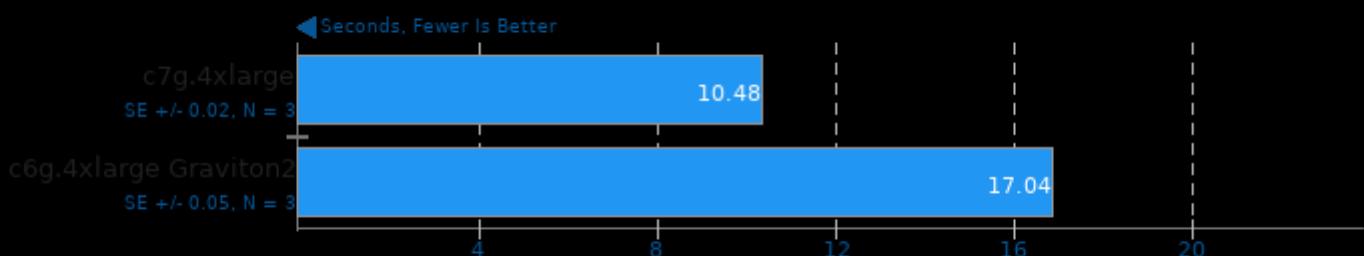
Test: OpenMP LavaMD



1. (CXX) g++ options: -O2 -fOpenCL

## Rodinia 3.1

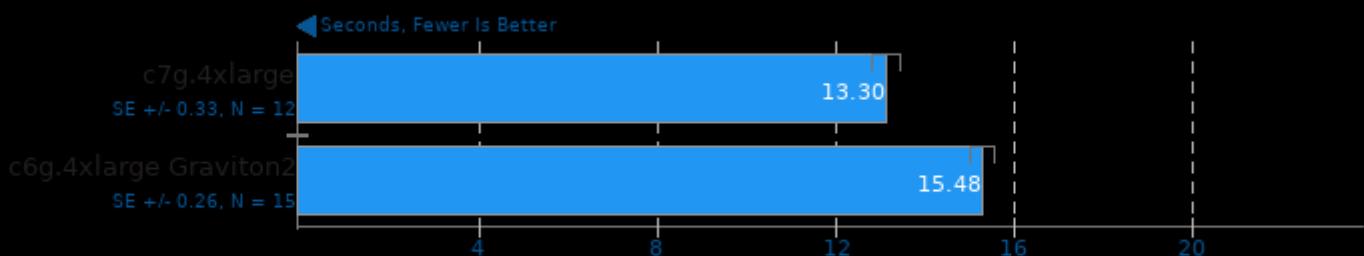
Test: OpenMP CFD Solver



1. (CXX) g++ options: -O2 -fOpenCL

## Rodinia 3.1

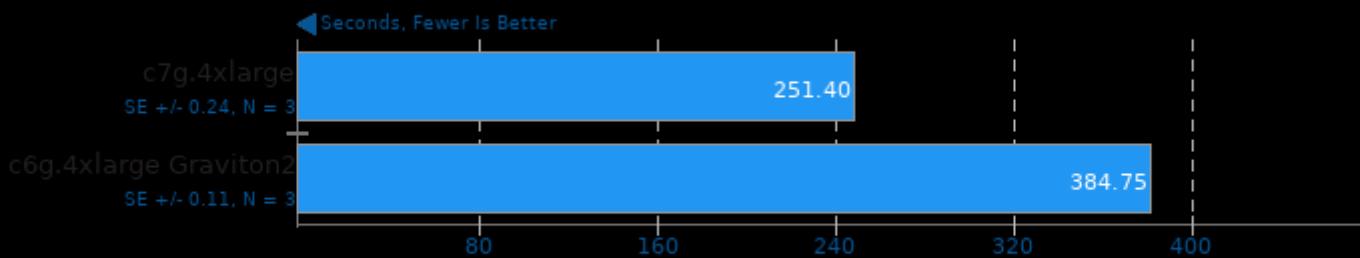
Test: OpenMP Streamcluster



1. (CXX) g++ options: -O2 -fOpenCL

## Timed MrBayes Analysis 3.2.7

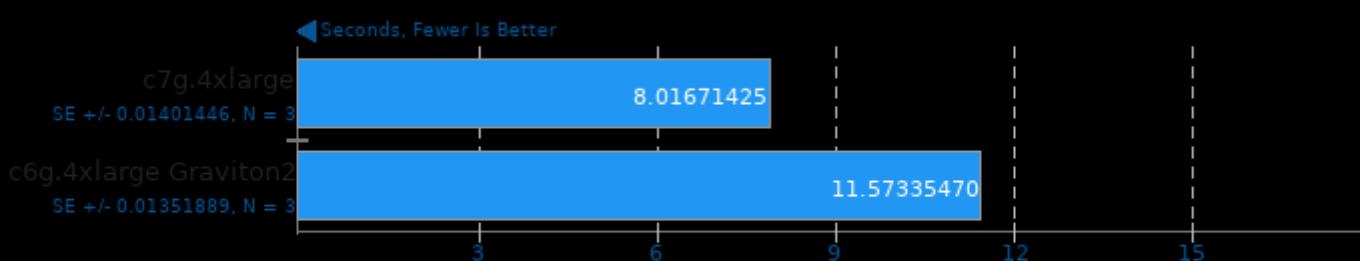
Primate Phylogeny Analysis



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

## Xcompact3d Incompact3d 2021-03-11

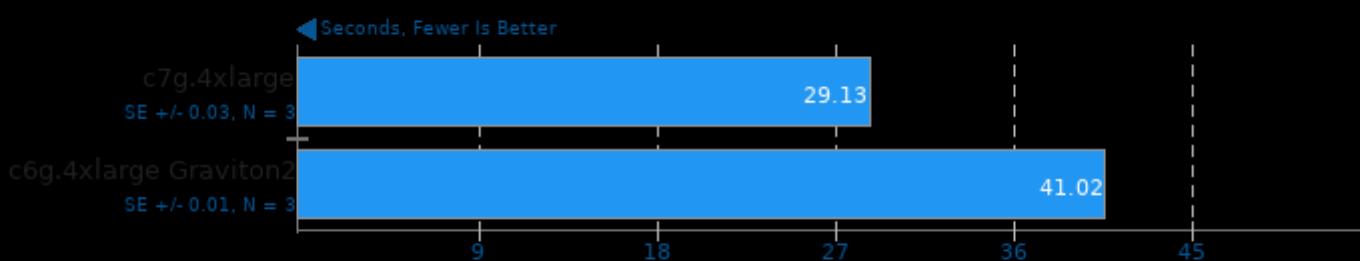
Input: input.i3d 129 Cells Per Direction



1. (F9X) gfortran options: -cpp -O2 -funroll-loops -floop-optimize -fcray-pointer -fbacktrace -lmpi\_usempif08 -lmpi\_mpifh -lmpi -lopen-rte -lopen-pal -lhwloc

## Xcompact3d Incompact3d 2021-03-11

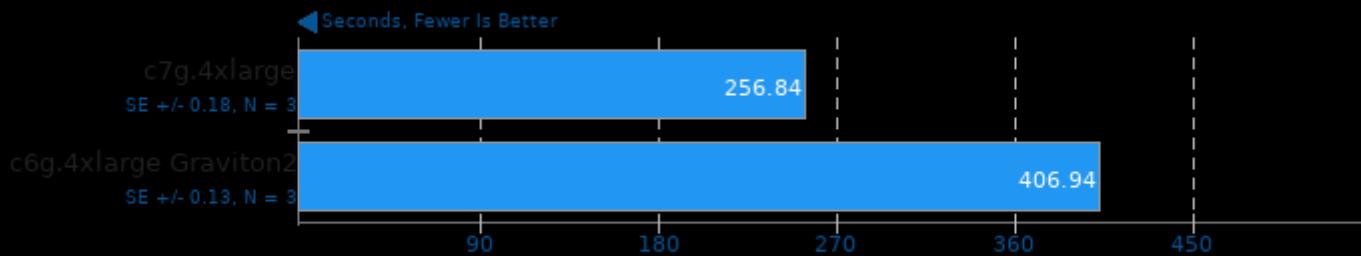
Input: input.i3d 193 Cells Per Direction



1. (F9X) gfortran options: -cpp -O2 -funroll-loops -floop-optimize -fcray-pointer -fbacktrace -lmpi\_usempif08 -lmpi\_mpifh -lmpi -lopen-rte -lopen-pal -lhwloc

**libavif avifenc 0.10**

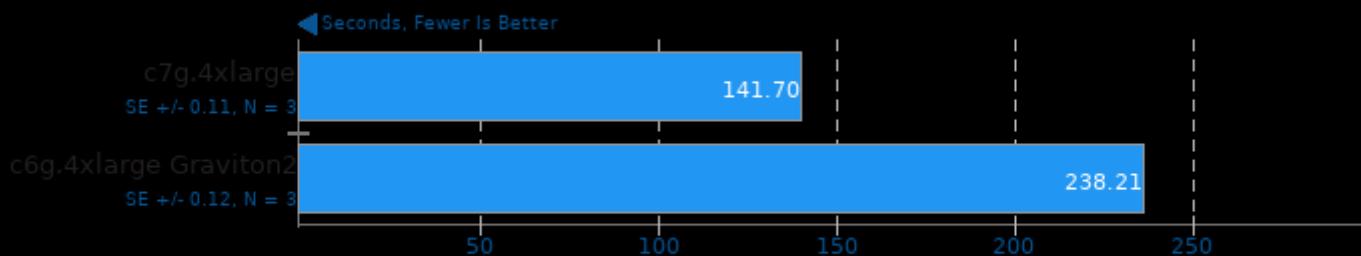
Encoder Speed: 0



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

**libavif avifenc 0.10**

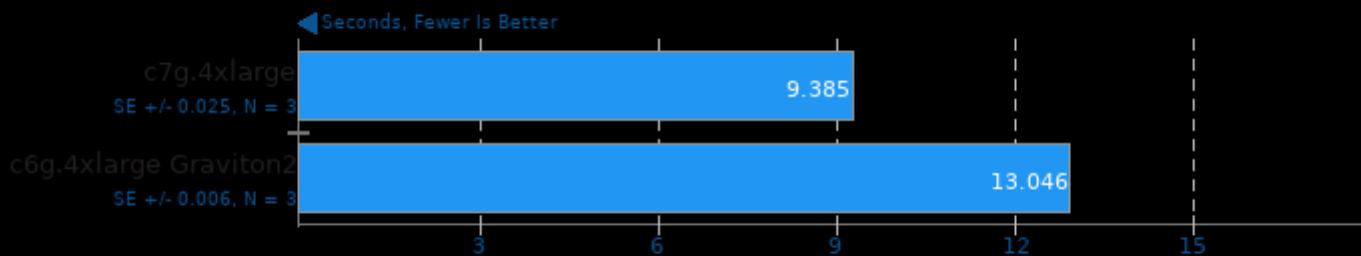
Encoder Speed: 2



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

**libavif avifenc 0.10**

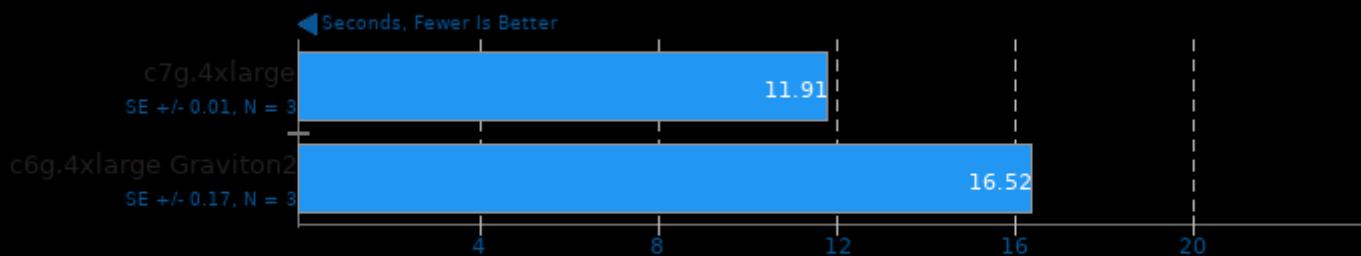
Encoder Speed: 6



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

**libavif avifenc 0.10**

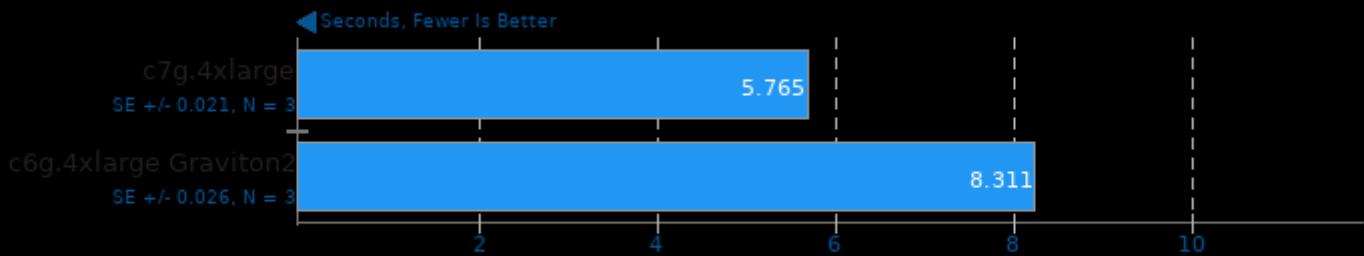
Encoder Speed: 6, Lossless



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

**libavif avifenc 0.10**

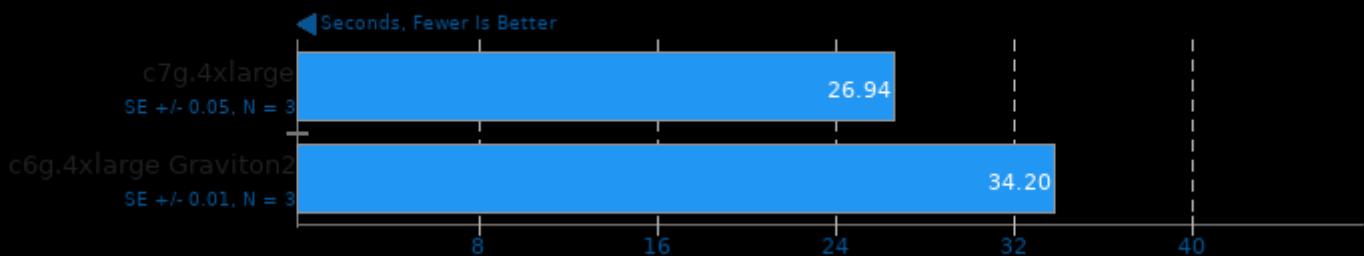
Encoder Speed: 10, Lossless



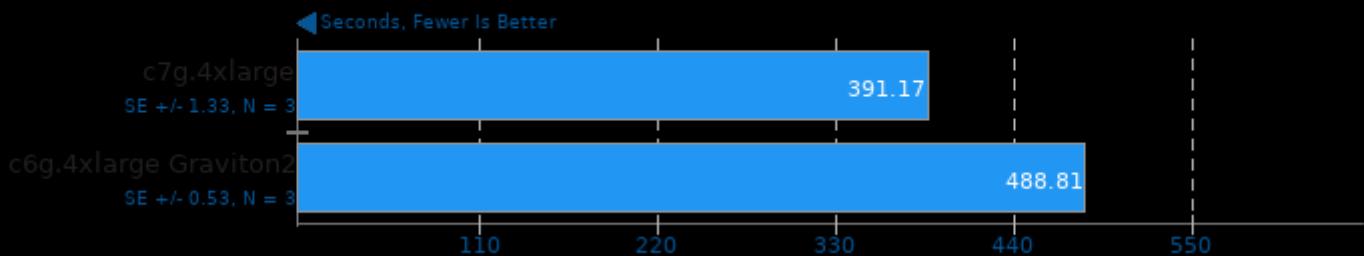
1. (CXX) g++ options: -O3 -fPIC -lm

**Timed Apache Compilation 2.4.41**

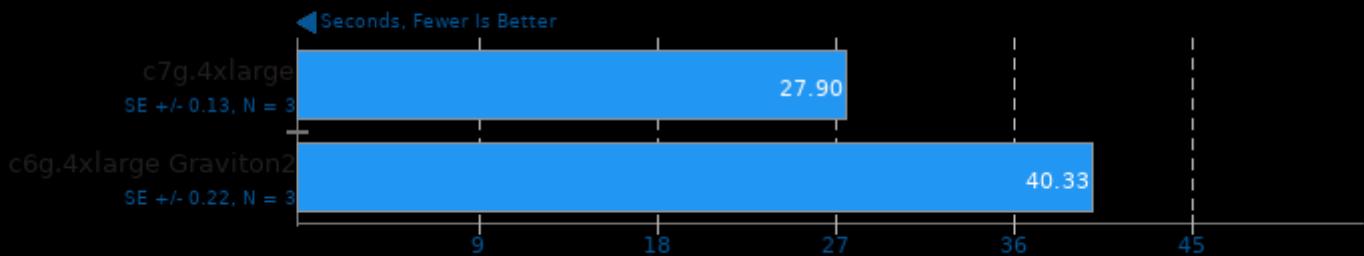
Time To Compile

**Timed Gem5 Compilation 21.2**

Time To Compile

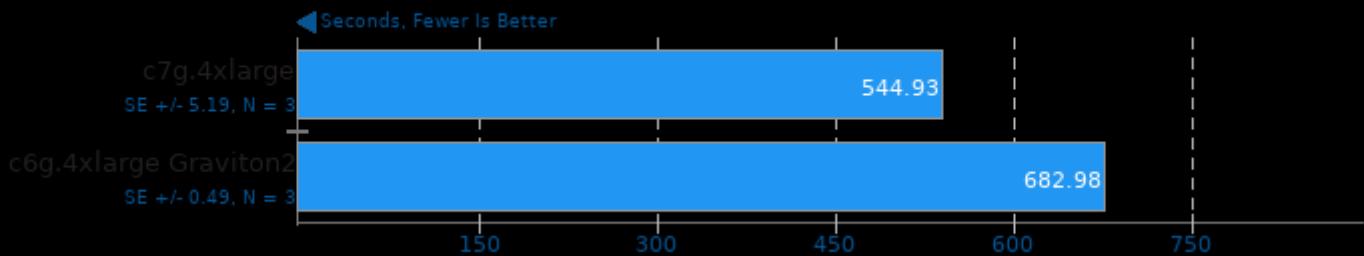
**Timed ImageMagick Compilation 6.9.0**

Time To Compile



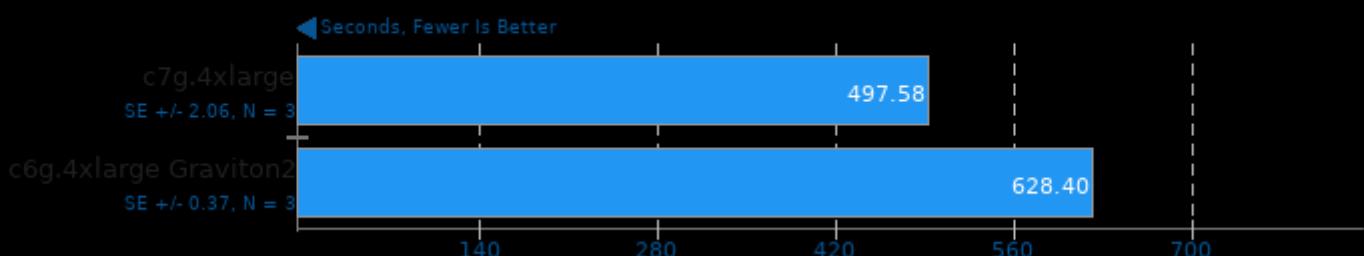
## Timed LLVM Compilation 13.0

Build System: Ninja



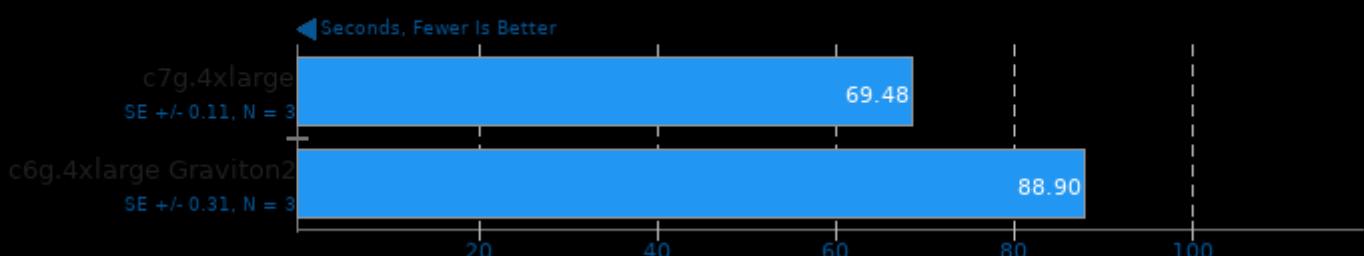
## Timed Node.js Compilation 17.3

Time To Compile



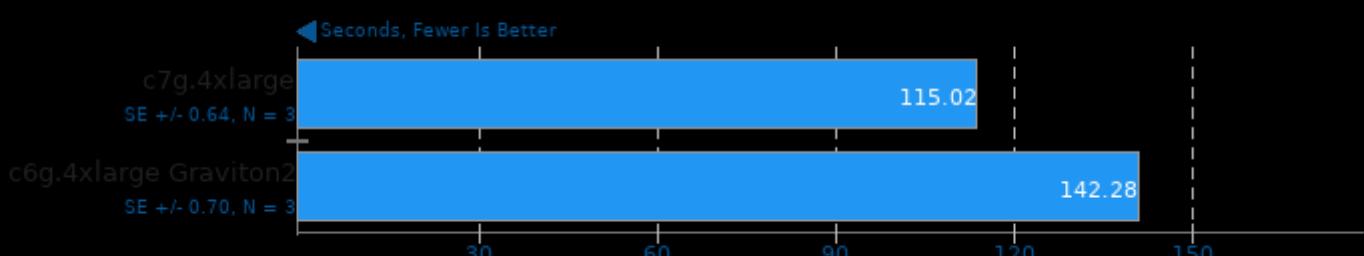
## Timed PHP Compilation 7.4.2

Time To Compile



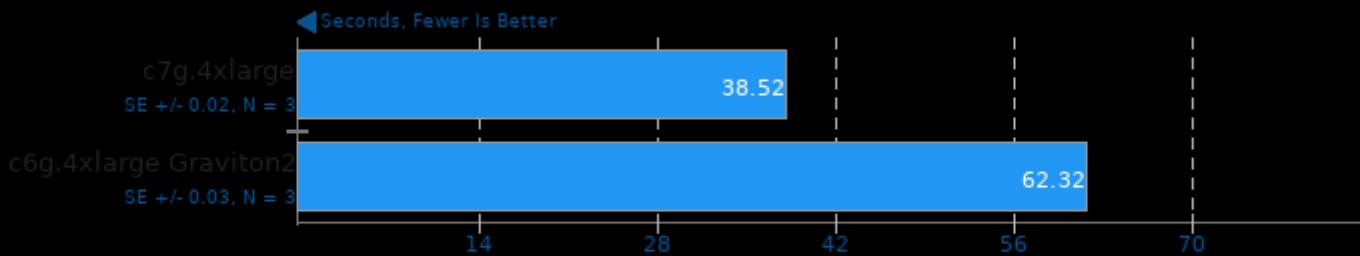
## Build2 0.13

Time To Compile



## C-Ray 1.1

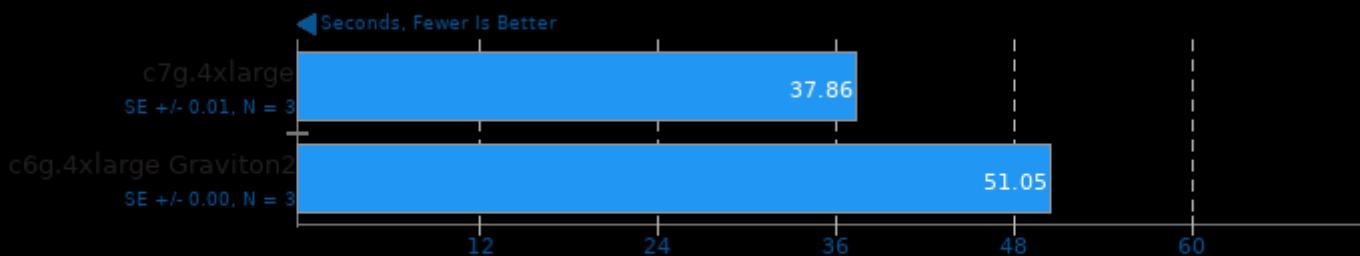
Total Time - 4K, 16 Rays Per Pixel



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

## POV-Ray 3.7.0.7

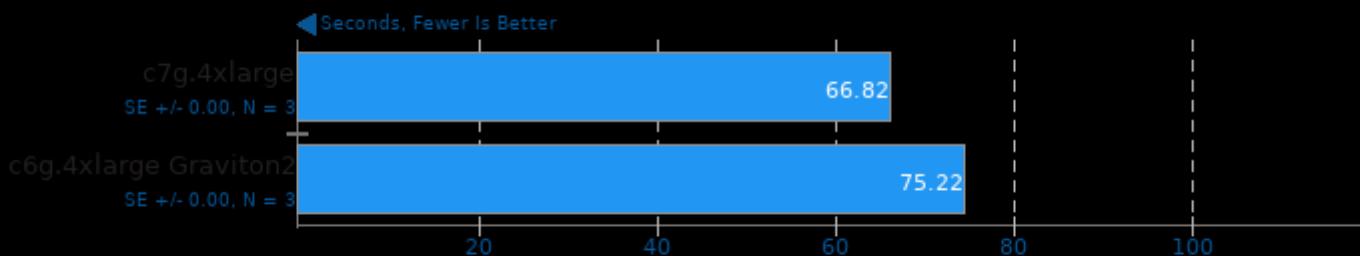
Trace Time



1. (CXX) g++ options: -pipe -O3 -ffast-math -R/usr/lib -lXpm -lSM -lICE -lXi11 -ltiff -ljpeg -lpng -lz -lrt -lm -lboost\_thread -lboost\_system

## m-queens 1.2

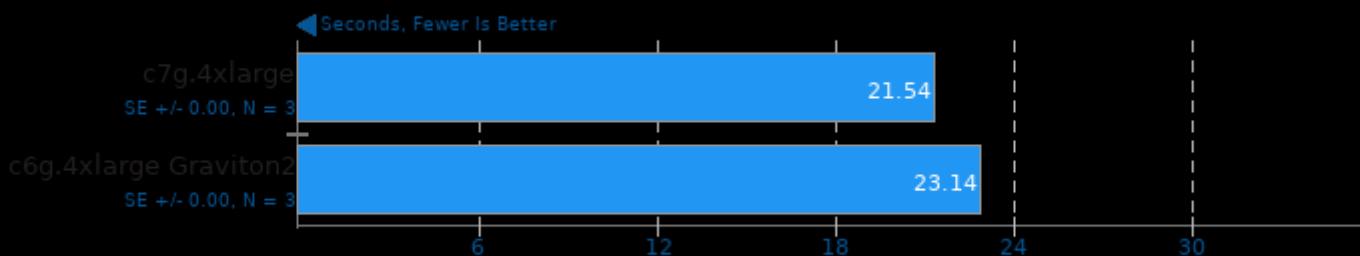
Time To Solve



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

## N-Queens 1.0

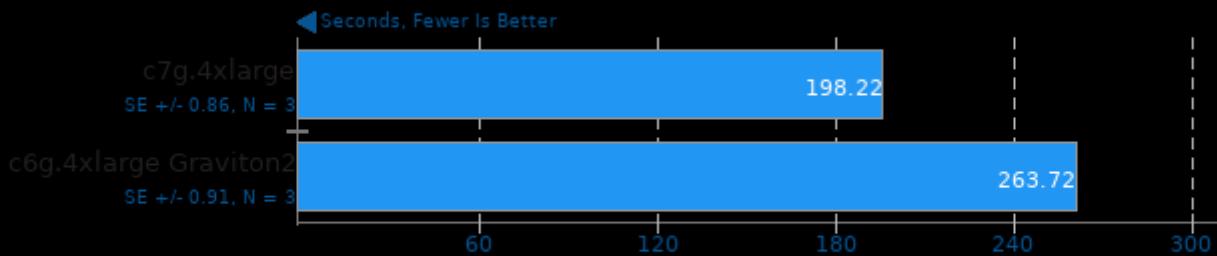
Elapsed Time



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

## Ngspice 34

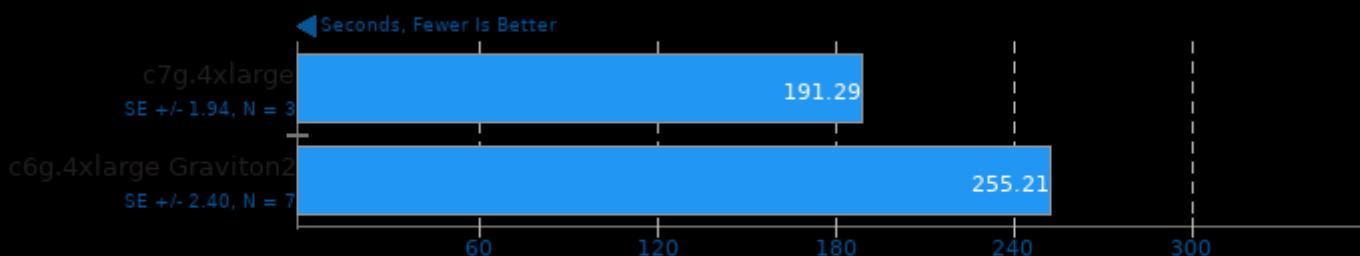
Circuit: C2670



1. (CC) gcc options: -O0 -fopenmp -lm -lstdc++ -lfftw3 -lXaw -lXmu -lXt -lXext -lX11 -lXft -lfontconfig -lXrender -lfreetype -lSM -lICE

## Ngspice 34

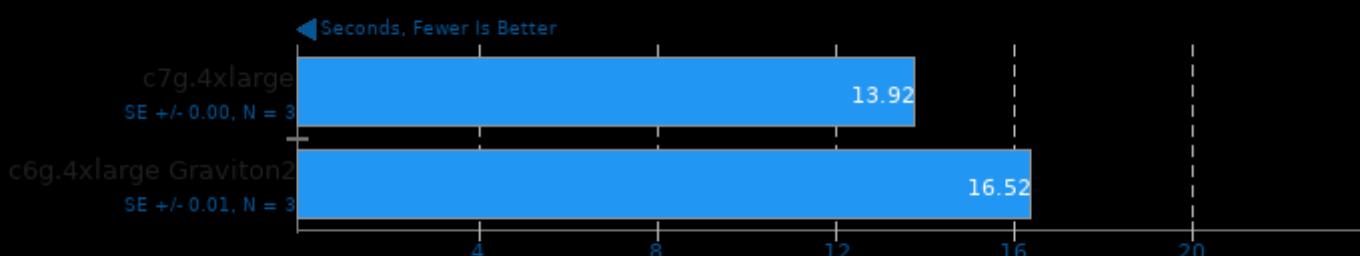
Circuit: C7552



1. (CC) gcc options: -O0 -fopenmp -lm -lstdc++ -lfftw3 -lXaw -lXmu -lXt -lXext -lX11 -lXft -lfontconfig -lXrender -lfreetype -lSM -lICE

## ASTC Encoder 3.2

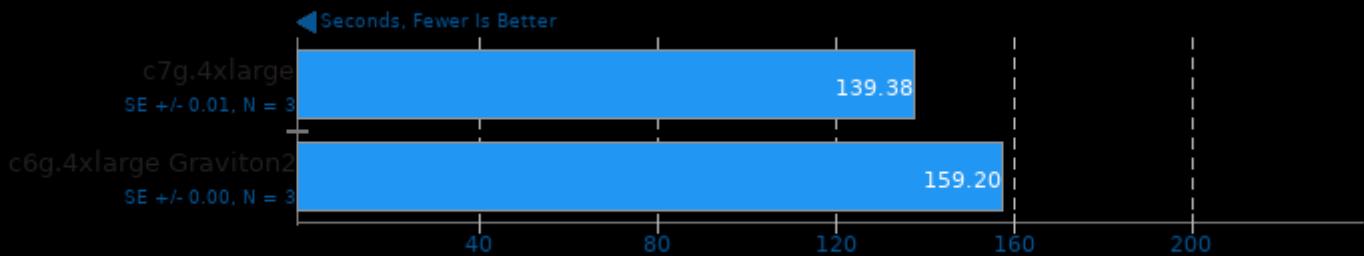
Preset: Thorough



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

## ASTC Encoder 3.2

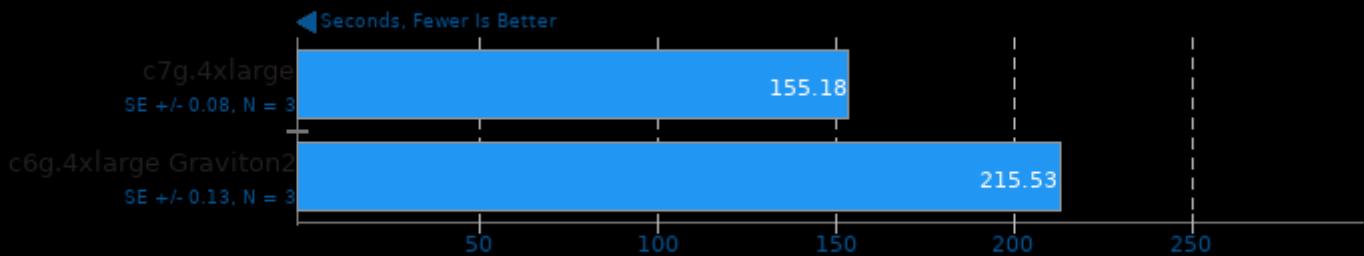
Preset: Exhaustive



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

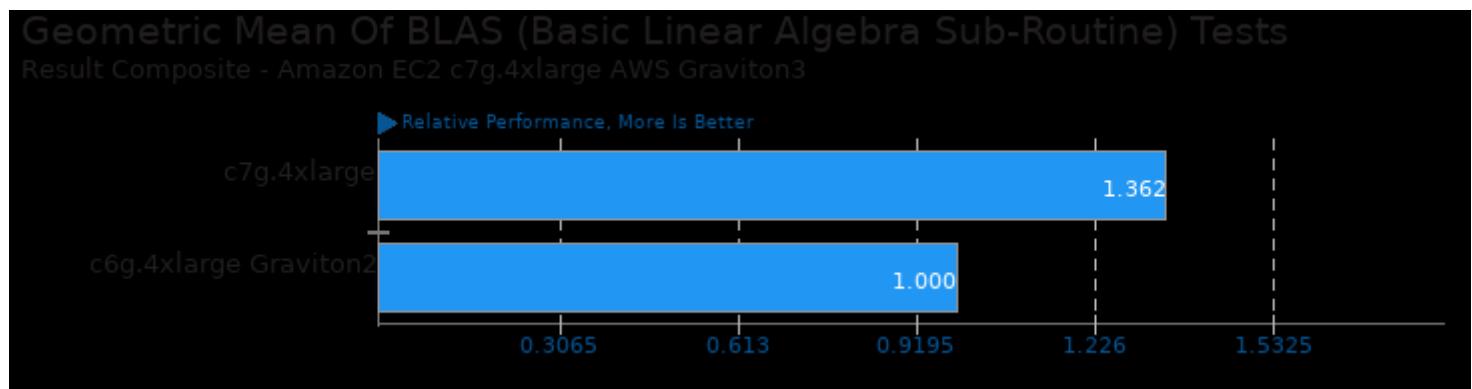
## GPAW 22.1

Input: Carbon Nanotube

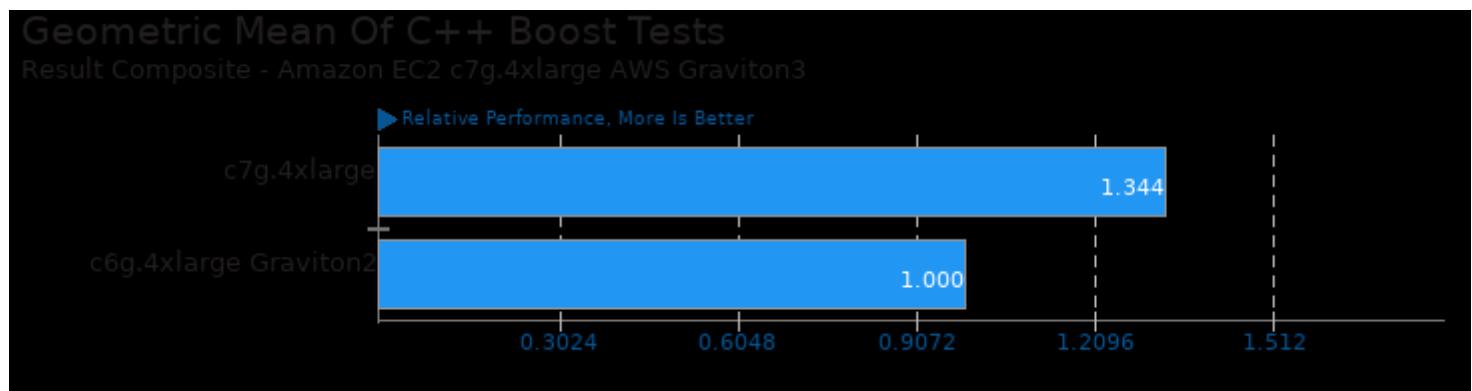


1. (CC) gcc options: -shared -fwrapv -O2 -lxc -lblas -lmpi

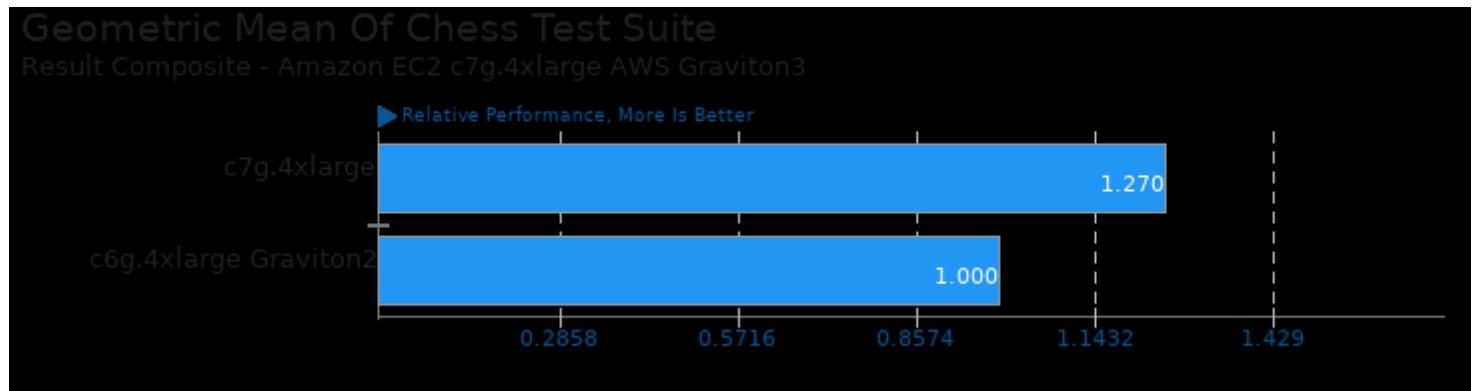
These geometric means are based upon test groupings / test suites for this result file.



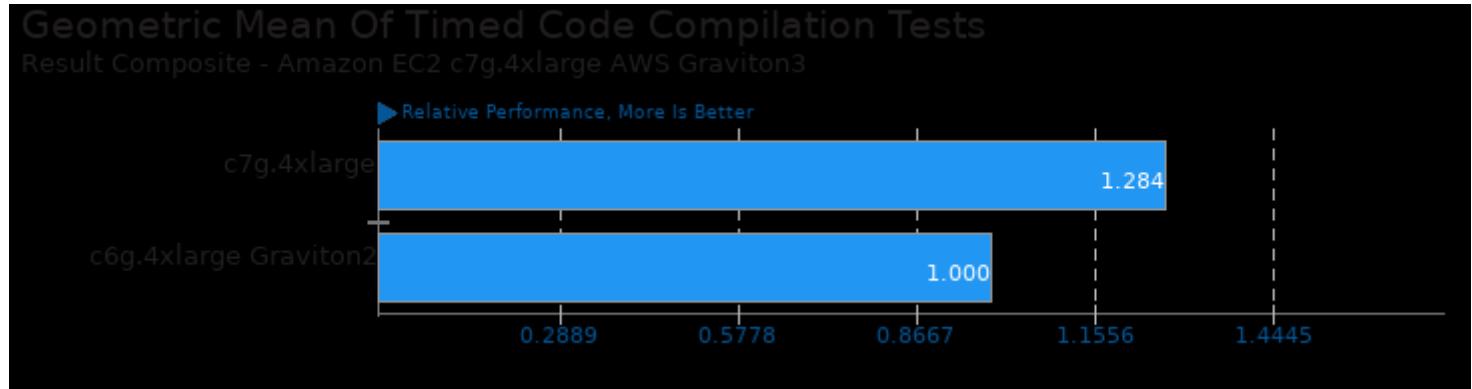
Geometric mean based upon tests: pts/lczero and pts/gpaw



Geometric mean based upon tests: pts/quantlib, pts/build-gem5 and pts/povray



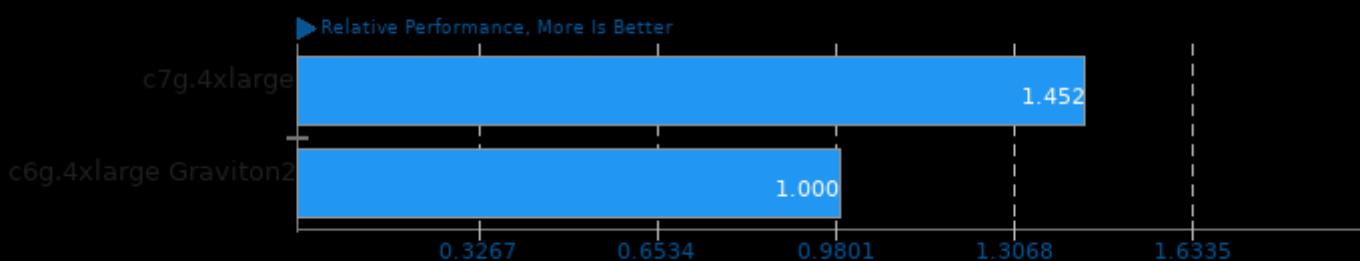
Geometric mean based upon tests: pts/tscp, pts/lczero, pts/stockfish, pts/asmfish, pts/n-queens and pts/m-queens



Geometric mean based upon tests: pts/build-apache, pts/build-php, pts/build-imagemagick, pts/build-llvm, pts/build2, pts/build-nodejs and pts/build-gem5

### Geometric Mean Of C/C++ Compiler Tests

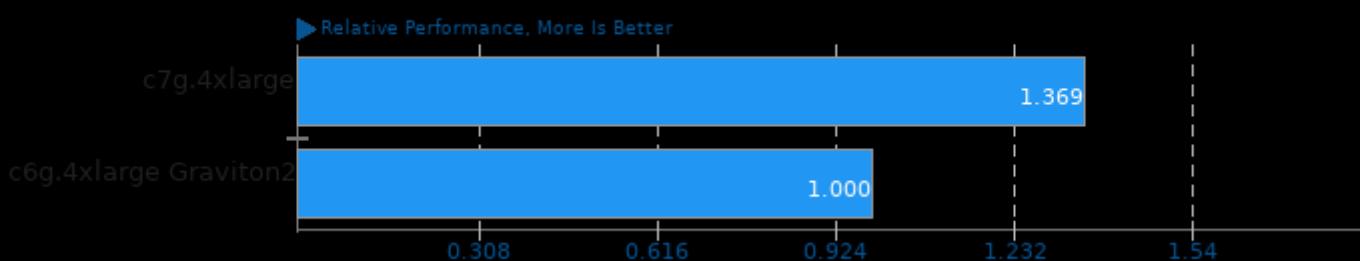
Result Composite - Amazon EC2 c7g.4xlarge AWS Graviton3



Geometric mean based upon tests: pts/tscp, pts/stockfish, pts/build-php, pts/build-imagemagick, pts/build-llvm, pts/c-ray, pts/compress-7zip, pts/apache, pts/mrbayes, pts/compress-zstd, pts/openssl, pts/nginx, pts/lammps, pts/gromacs and pts/build-apache

### Geometric Mean Of Compression Tests

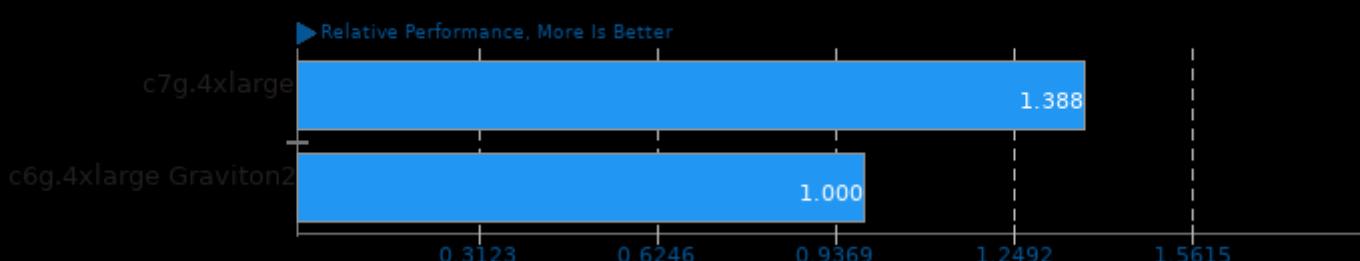
Result Composite - Amazon EC2 c7g.4xlarge AWS Graviton3



Geometric mean based upon tests: pts/compress-7zip and pts/compress-zstd

### Geometric Mean Of Creator Workloads Tests

Result Composite - Amazon EC2 c7g.4xlarge AWS Graviton3

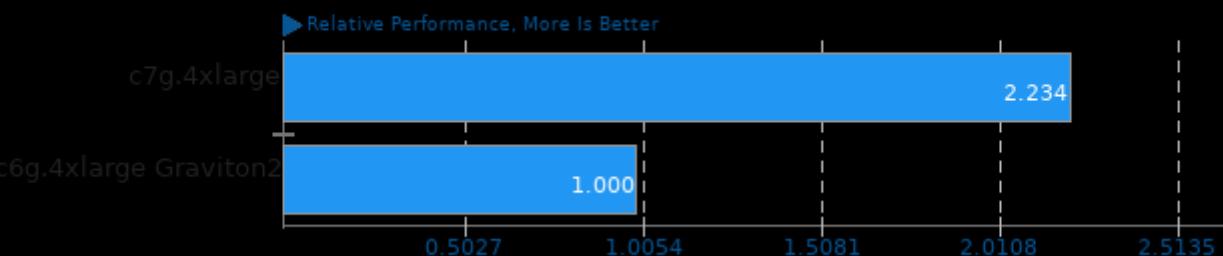


Geometric mean based upon tests: pts/c-ray, pts/povray, pts/avifenc, pts/webp, pts/astcenc, pts/synthmark and pts/ngspice

## Amazon EC2 c7g.4xlarge AWS Graviton3

### Geometric Mean Of Cryptography Tests

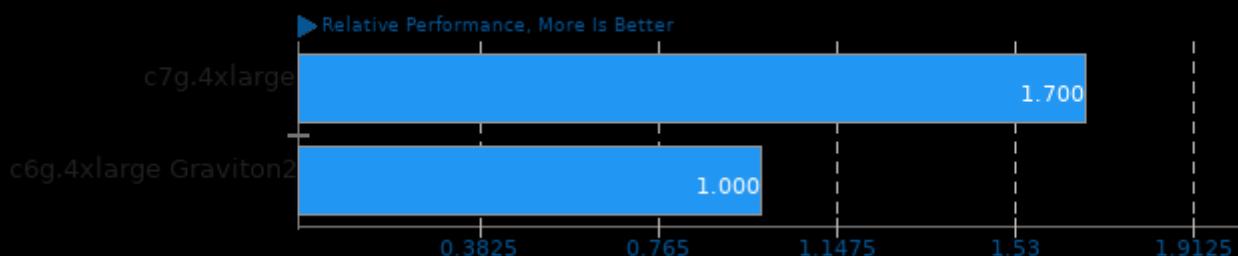
Result Composite - Amazon EC2 c7g.4xlarge AWS Graviton3



Geometric mean based upon tests: pts/openssl and pts/securemark

### Geometric Mean Of Fortran Tests

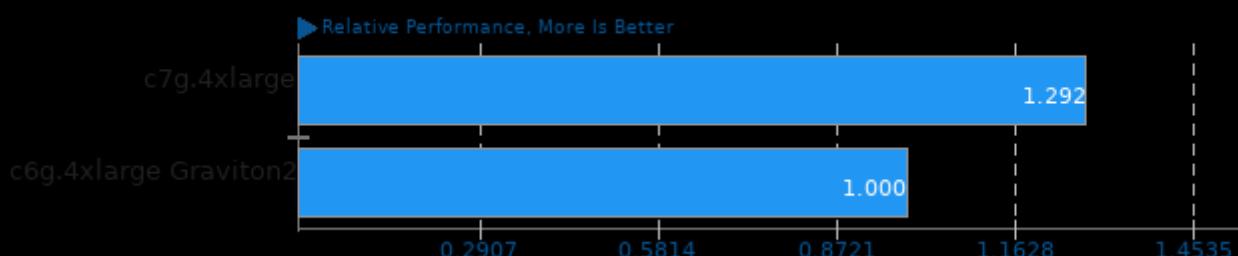
Result Composite - Amazon EC2 c7g.4xlarge AWS Graviton3



Geometric mean based upon tests: pts/hpcg, pts/lammps, pts/npb and pts/incompact3d

### Geometric Mean Of Go Language Tests

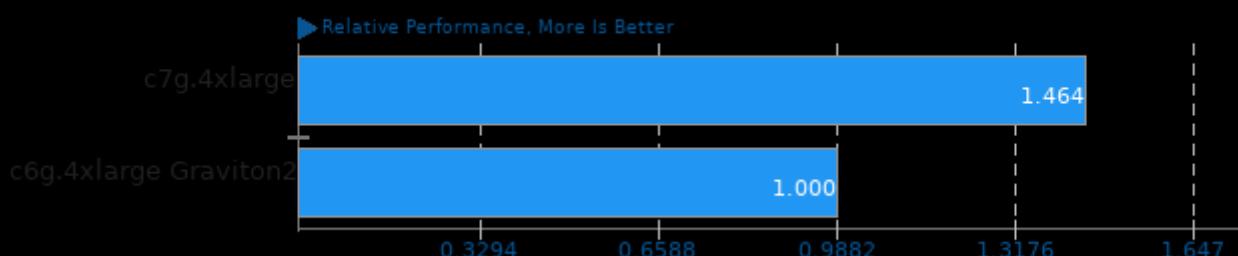
Result Composite - Amazon EC2 c7g.4xlarge AWS Graviton3



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

### Geometric Mean Of HPC - High Performance Computing Tests

Result Composite - Amazon EC2 c7g.4xlarge AWS Graviton3

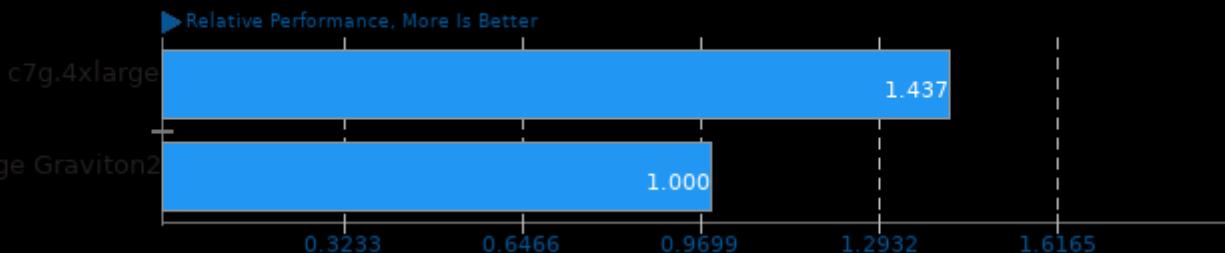


Geometric mean based upon tests: pts/npb, pts/rodinia, pts/hpcg, pts/mt-dgemm, pts/amg, pts/gromacs, pts/lammps, pts/lulesh, pts/incompact3d, pts/mrbayes, pts/gpaw, pts/tensorflow-lite, pts/onnx and pts/lczero

## Amazon EC2 c7g.4xlarge AWS Graviton3

### Geometric Mean Of Imaging Tests

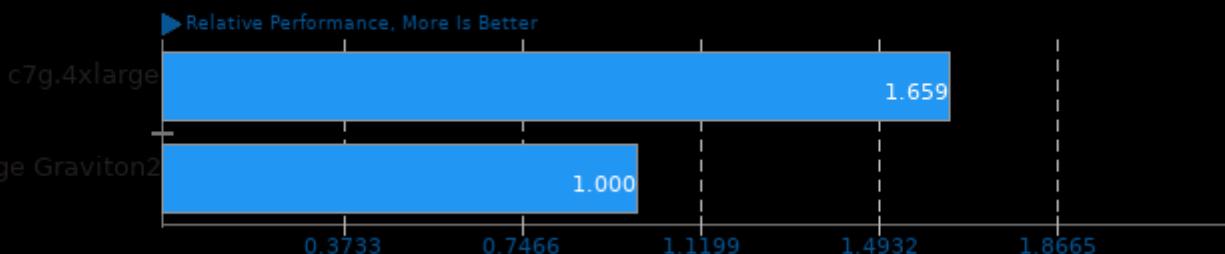
Result Composite - Amazon EC2 c7g.4xlarge AWS Graviton3



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

### Geometric Mean Of Common Kernel Benchmarks Tests

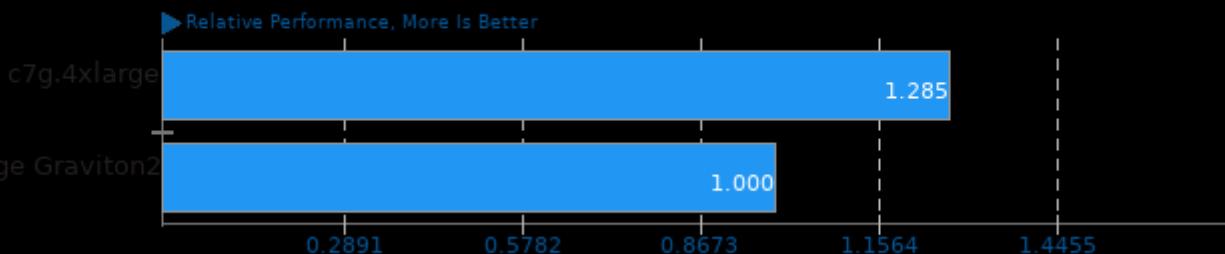
Result Composite - Amazon EC2 c7g.4xlarge AWS Graviton3



Geometric mean based upon tests: pts/apache, pts/openssl and pts/stress-ng

### Geometric Mean Of Linear Algebra Tests

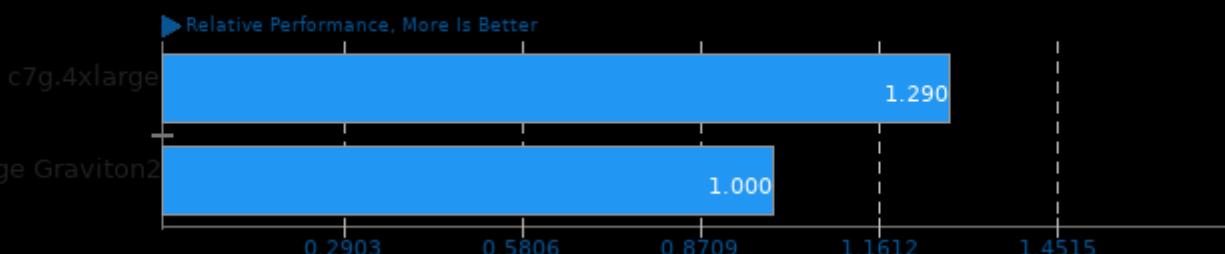
Result Composite - Amazon EC2 c7g.4xlarge AWS Graviton3



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

### Geometric Mean Of Machine Learning Tests

Result Composite - Amazon EC2 c7g.4xlarge AWS Graviton3

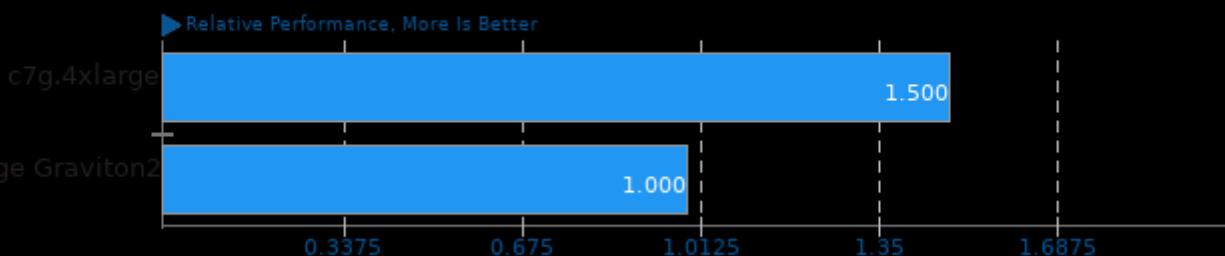


Geometric mean based upon tests: pts/tensorflow-lite, pts/onnx and pts/lczero

## Amazon EC2 c7g.4xlarge AWS Graviton3

### Geometric Mean Of Molecular Dynamics Tests

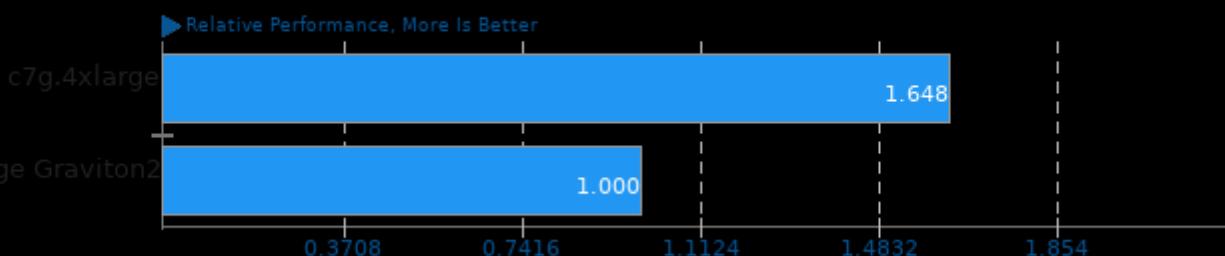
Result Composite - Amazon EC2 c7g.4xlarge AWS Graviton3



Geometric mean based upon tests: pts/gromacs, pts/lammps, pts/lulesh and pts/incompact3d

### Geometric Mean Of MPI Benchmarks Tests

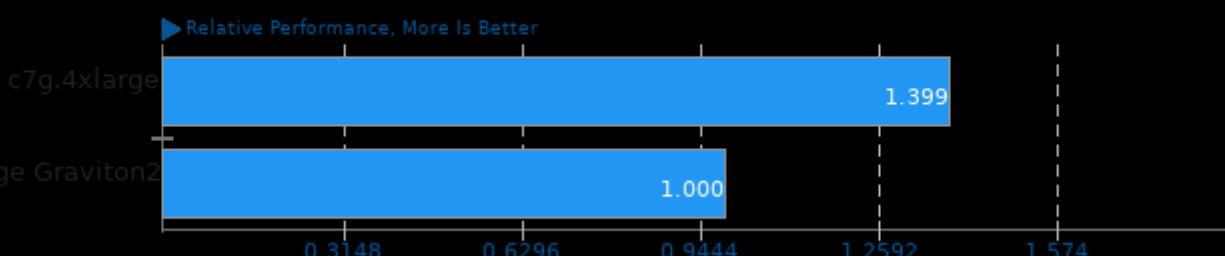
Result Composite - Amazon EC2 c7g.4xlarge AWS Graviton3



Geometric mean based upon tests: pts/lammps, pts/incompact3d, pts/gpaw, pts/gromacs, pts/hpcg, pts/mrbayes and pts/npb

### Geometric Mean Of NVIDIA GPU Compute Tests

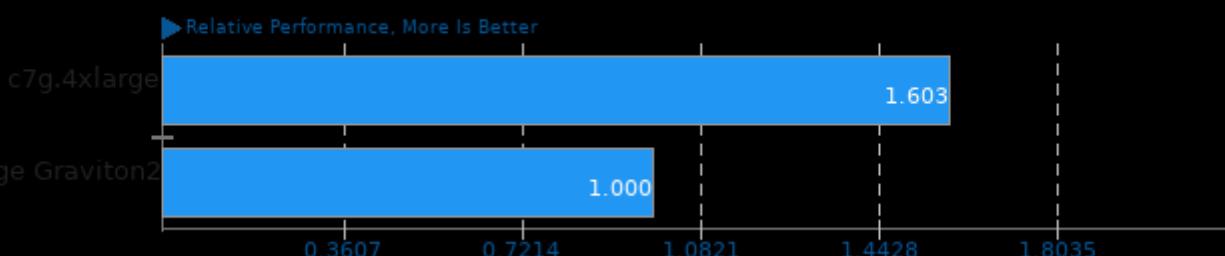
Result Composite - Amazon EC2 c7g.4xlarge AWS Graviton3



Geometric mean based upon tests: pts/gromacs, pts/rodinia and pts/lczero

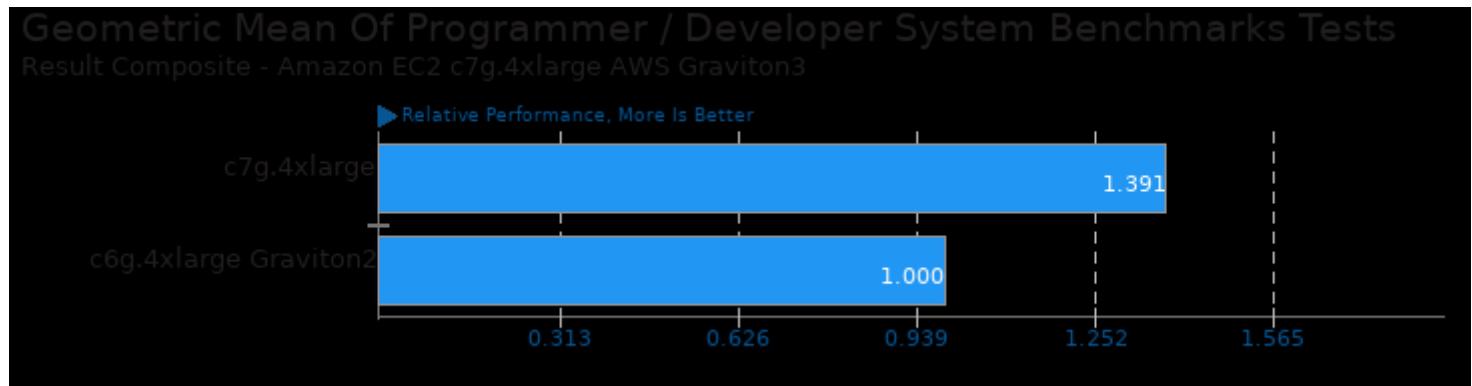
### Geometric Mean Of OpenMPI Tests

Result Composite - Amazon EC2 c7g.4xlarge AWS Graviton3

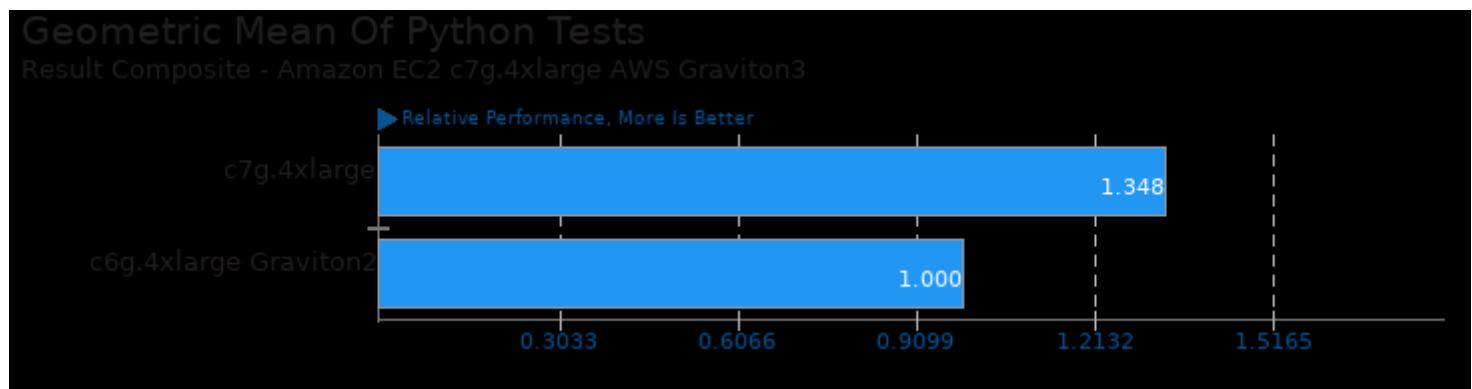


Geometric mean based upon tests: pts/amg, pts/hpcg, pts/gromacs, pts/lammps, pts/npb, pts/lulesh, pts/rodinia,

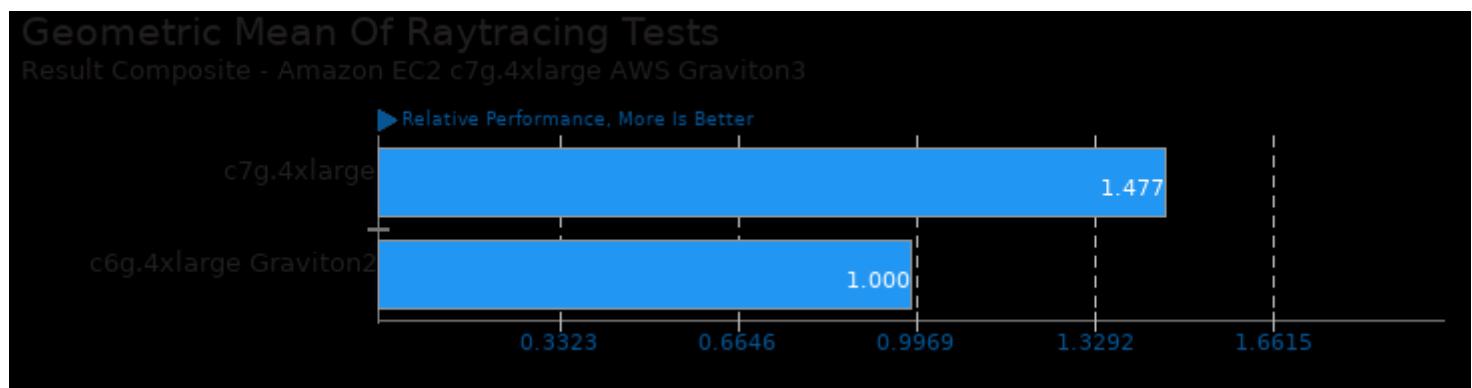
pts/mrbayes, pts/incompact3d and pts/gpaw



Geometric mean based upon tests: pts/simdjson, pts/compress-zstd, pts/pybench, pts/build-apache, pts/build-php, pts/build-imagemagick, pts/build-llvm, pts/build2, pts/build-nodejs, pts/build-gem5, pts/mt-dgemm and pts/amg



Geometric mean based upon tests: pts/onnx, pts/pybench, pts/build-gem5, pts/build-llvm, pts/build-nodejs and pts/gpaw

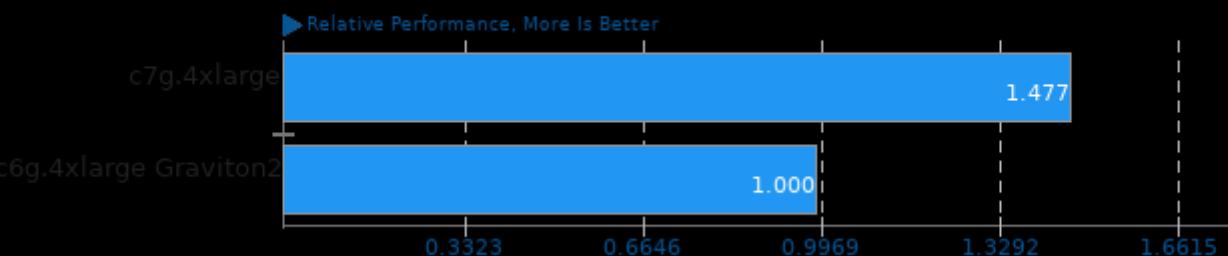


Geometric mean based upon tests: pts/c-ray and pts/povray

## Amazon EC2 c7g.4xlarge AWS Graviton3

### Geometric Mean Of Renderers Tests

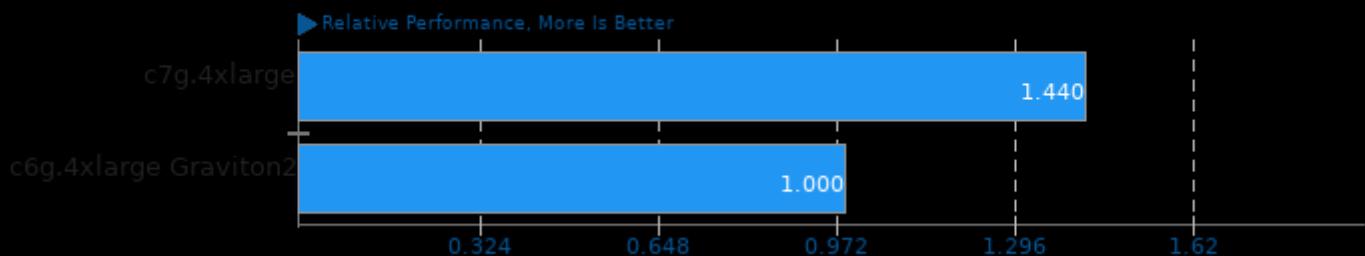
Result Composite - Amazon EC2 c7g.4xlarge AWS Graviton3



Geometric mean based upon tests: pts/c-ray and pts/povray

### Geometric Mean Of Scientific Computing Tests

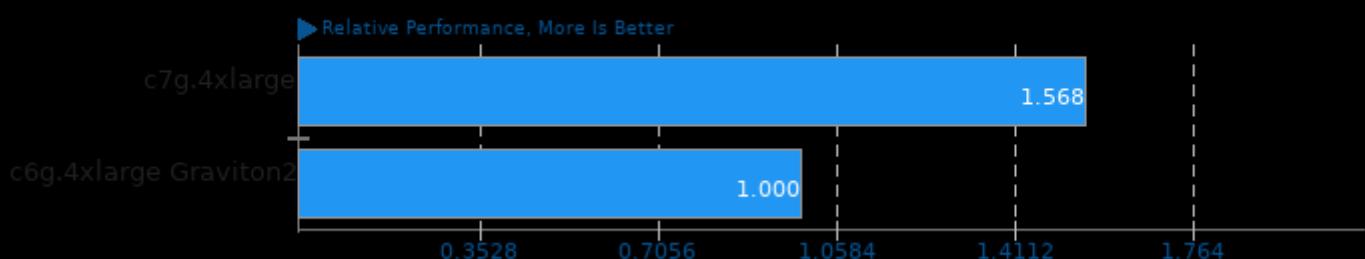
Result Composite - Amazon EC2 c7g.4xlarge AWS Graviton3



Geometric mean based upon tests: pts/mt-dgemm, pts/amg, pts/gromacs, pts/lammps, pts/lulesh, pts/incompact3d, pts/mrbayes and pts/gpaw

### Geometric Mean Of Server Tests

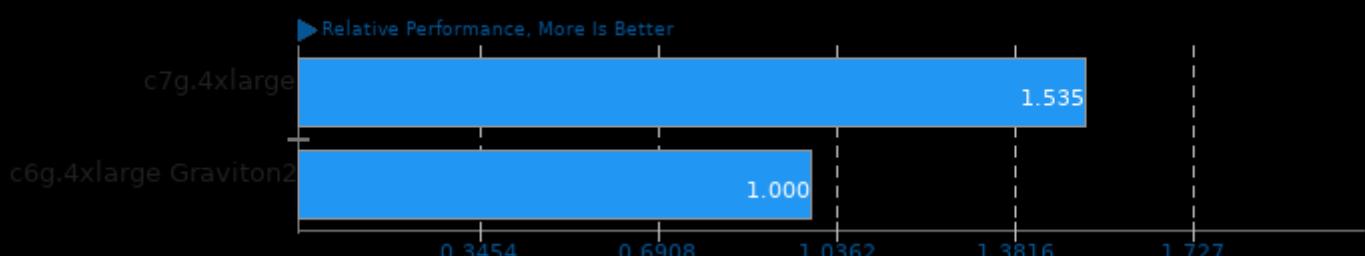
Result Composite - Amazon EC2 c7g.4xlarge AWS Graviton3



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

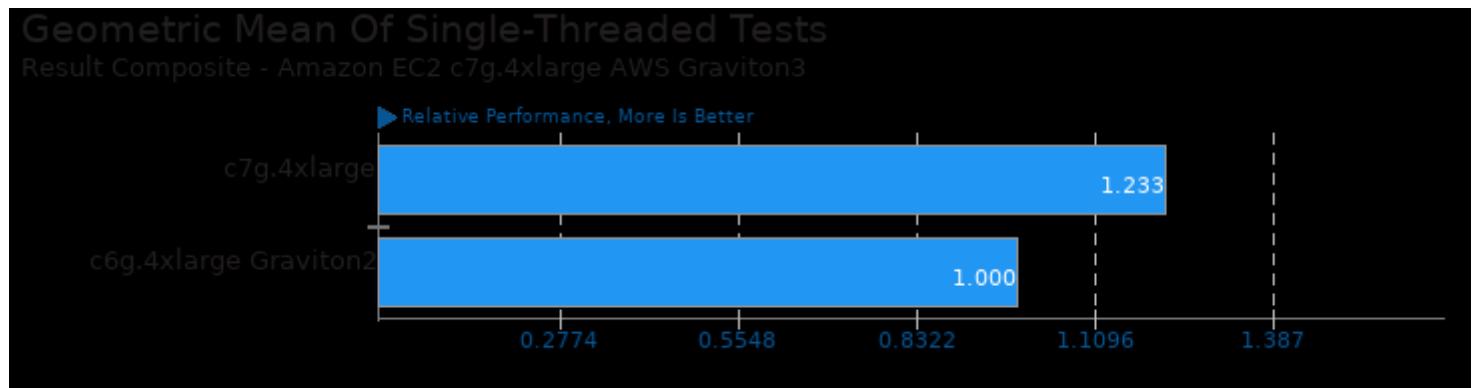
### Geometric Mean Of Server CPU Tests

Result Composite - Amazon EC2 c7g.4xlarge AWS Graviton3



Geometric mean based upon tests: pts/npb, pts/rodinia, pts/dacapobench, pts/compress-7zip, pts/stockfish, pts/asmfish,

pts/build-php, pts/build-llvm, pts/c-ray, pts/povray, pts/compress-zstd, pts/m-queens, pts/openssl, pts/stress-ng, pts/pybench and pts/phpbench



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

*This file was automatically generated via the Phoronix Test Suite benchmarking software on Friday, 29 March 2024 09:12.*