



xeon-broadwell-2021

Intel Xeon E5-2609 v4 testing with a MSI X99A RAIDERS (MS-7885) v5.0 (P.50 BIOS) and llvmpipe on Ubuntu 20.04 via the Phoronix Test Suite.

Automated Executive Summary

3 had the most wins, coming in first place for 42% of the tests.

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

Mobile Neural Network (Model: mobilenet-v1-1.0) at 1.04x
CloverLeaf (Lagrangian-Eulerian Hydrodynamics) at 1.038x
Mobile Neural Network (Model: inception-v3) at 1.022x
Mobile Neural Network (Model: MobileNetV2_224) at 1.011x
LULESH at 1.01x
Kripke at 1.01x
Cryptsetup (AES-XTS 512b Decryption) at 1.009x
rav1e (Speed: 1) at 1.007x
Cryptsetup (AES-XTS 512b Encryption) at 1.006x
OpenFOAM (Input: Motorbike 30M) at 1.006x.

Test Systems:

Intel Xeon E5-2609 v4

- 1
- 2
- 3
- 4

Processor: Intel Xeon E5-2609 v4 @ 1.70GHz (8 Cores), Motherboard: MSI X99A RAIDER (MS-7885) v5.0 (P.50 BIOS), Chipset: Intel Xeon E7 v4/Xeon, Memory: 16GB, Disk: 256GB CORSAIR FORCE LX, Graphics: llvmpipe, Audio: Realtek ALC892, Network: Intel I218-V

OS: Ubuntu 20.04, Kernel: 5.9.0-050900rc6daily20200926-generic (x86_64) 20200925, Desktop: GNOME Shell 3.36.2, Display Server: X Server 1.20.8, Display Driver: modesetting 1.20.8, OpenGL: 3.3 Mesa 20.0.4 (LLVM 9.0.1 256 bits), Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 1024x768

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
 Processor Notes: Scaling Governor: intel_cpufreq ondemand - CPU Microcode: 0xb000038
 Python Notes: Python 2.7.18rc1 + Python 3.8.2
 Security Notes: itlb_multihit: KVM: Mitigation of VMX disabled + I1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT disabled + mds: Mitigation of Clear buffers; SMT disabled + meltdown: Mitigation of PTI + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW STIBP: disabled RSB filling + srbsds: Not affected + tsx_async_abort: Mitigation of Clear buffers; SMT disabled

	Intel Xeon	1	2	3	4
	E5-2609 v4				
Mobile Neural Network - mobilenet-v1-1.0 (ms)	5.226		5.276	5.073	
Normalized	97.07%		96.15%	100%	
Standard Deviation	2.3%		2.5%	0.1%	
CloverLeaf - L.E.H (sec)	143.82		145.05	149.26	146.49
Normalized	100%		99.15%	96.36%	98.18%
Standard Deviation	0.1%		0.2%	0.2%	0.1%
Mobile Neural Network - inception-v3 (ms)	60.130		60.010	58.861	
Normalized	97.89%		98.09%	100%	
Standard Deviation	0.3%		0.1%	0.4%	
Mobile Neural Network - MobileNetV2_224 (ms)	4.684		4.686	4.635	
Normalized	98.95%		98.91%	100%	
Standard Deviation	0.4%		0.2%	0.2%	
LULESH (z/s)	3396		3370	3403	

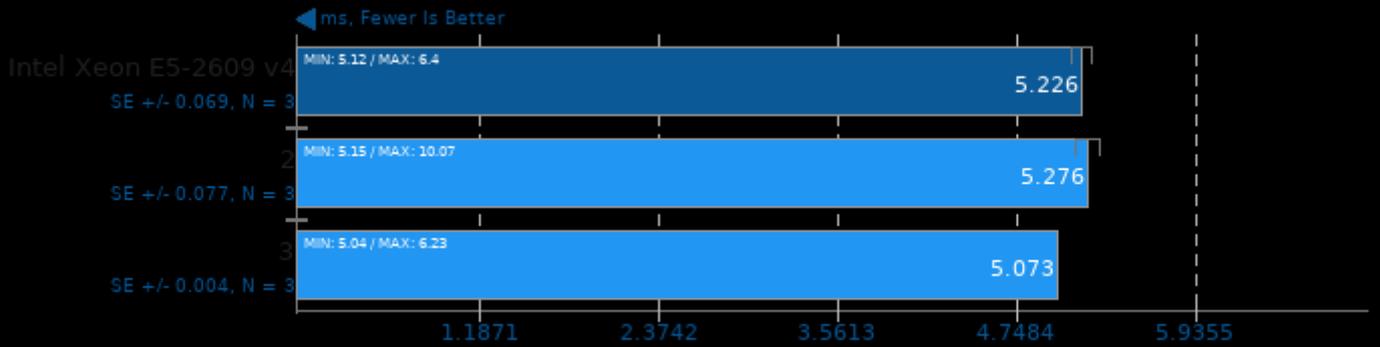
	Normalized	99.8%	99.03%	100%
	Standard Deviation	0.2%	1.9%	0.1%
Kripke (Throughput FoM)		44988007	45423017	45414067
	Normalized	99.04%	100%	99.98%
	Standard Deviation	0%	0%	0.2%
Cryptsetup - A.X.5.D (MiB/s)		708.0	712.2	714.6
	Normalized	99.08%	99.66%	100%
	Standard Deviation	0.8%	0.1%	0.1%
rav1e - 1 (FPS)		0.15	0.15	0.151
	Normalized	99.34%	99.34%	100%
	Standard Deviation	0%	0%	0.4%
Cryptsetup - A.X.5.E (MiB/s)		715.7	711.2	714.0
	Normalized	100%	99.37%	99.76%
	Standard Deviation	0.3%	0.2%	0.3%
OpenFOAM - Motorbike 30M		241.09	240.28	239.66
	Normalized	99.41%	99.74%	100%
	Standard Deviation	0.1%	0.3%	0.1%
Unpacking Firefox -		44.699	44.946	44.688
firefox-84.0.source.tar.xz (sec)				
	Normalized	99.98%	99.43%	100%
	Standard Deviation	0.8%	1%	0.6%
dav1d - Chimera 1080p (FPS)		207.70	207.32	208.45
	Normalized	99.64%	99.46%	100%
	Standard Deviation	0.5%	0.3%	0.2%
LAMMPS Molecular Dynamics		2.673	2.683	2.669
Simulator - Rhodopsin Protein				
	(ns/day)			
	Normalized	99.63%	100%	99.48%
	Standard Deviation	0.5%	0.8%	0.5%
Algebraic Multi-Grid Benchmark		265467500	264731000	266061767
	(Figure Of Merit)			
	Normalized	99.78%	99.5%	100%
	Standard Deviation	0.4%	1%	0.2%
TNN - CPU - MobileNet v2 (ms)		662.486	663.637	665.434
	Normalized	100%	99.83%	99.56%
	Standard Deviation	0%	0.2%	0.7%
Cryptsetup - S.X.5.E (MiB/s)		272.0	270.8	271.5
	Normalized	100%	99.56%	99.82%
	Standard Deviation	0%		0.2%
ONNX Runtime -		2313	2303	2312
super-resolution-10 - OpenMP				
CPU (Inferences/min)				
	Normalized	100%	99.57%	99.96%
	Standard Deviation	0.2%	0.3%	0.4%
CP2K Molecular Dynamics -		2584	2587	2576
Fayalite-FIST Data (sec)				
	Normalized	99.69%	99.6%	100%
dav1d - Summer Nature 4K (FPS)		62.37	62.24	62.13
	Normalized	100%	99.79%	99.62%
	Standard Deviation	0.1%	0.5%	0.1%
dav1d - S.N.1 (FPS)		191.69	192.34	192.22
	Normalized	99.66%	100%	99.94%
	Standard Deviation	0.5%	0.2%	0.2%
OpenFOAM - Motorbike 60M		1082	1082	1079
	(sec)			

	Normalized	99.68%		99.73%		100%
	Standard Deviation	0.1%		0.1%		0.1%
ONNX Runtime - bert squad-10 - OpenMP CPU (Inferences/min)			331	330		331
	Normalized	100%		99.7%		100%
Cryptsetup - T.X.5.E (MiB/s)		170.5		170.6		170.1
	Normalized	99.94%		100%		99.71%
	Standard Deviation	0.2%				0.7%
Cryptsetup - T.X.5.D (MiB/s)		170.9		170.4		170.9
	Normalized	100%		99.71%		100%
ONNX Runtime - shufflenet-v2-10 - OpenMP CPU (Inferences/min)			7981	8004		7987
	Standard Deviation	0%		0.2%		0.1%
	Normalized	99.71%		100%		99.79%
Quantum ESPRESSO - AUSURF112 (sec)		2801		2794		2798
	Standard Deviation	0.4%		0.3%		0.4%
	Normalized	99.73%		100%		99.83%
Cryptsetup - S.X.2.E (MiB/s)		271.5		271.3		272.0
	Standard Deviation	0.5%		0.1%		0.5%
	Normalized	99.82%		99.74%		100%
TNN - CPU - SqueezeNet v1.1 (ms)		640.568		642.092		640.565
	Standard Deviation	0.4%		0.4%		0%
	Normalized	100%		99.76%		100%
Cryptsetup - T.X.2.E (MiB/s)		170.5		170.7		170.9
	Standard Deviation	0.1%		0.2%		0.1%
	Normalized	99.77%		99.88%		100%
Cryptsetup - A.X.2.E (MiB/s)		873.5		874.0		875.2
	Standard Deviation	0.4%		0%		0%
	Normalized	99.81%		99.86%		100%
Cryptsetup - S.X.5.D (MiB/s)		264.1		263.6		264.1
	Standard Deviation	0.4%		0.2%		0.1%
	Normalized	100%		99.81%		100%
Cryptsetup - S.X.2.D (MiB/s)		263.6		263.8		264.1
	Standard Deviation	0%		0.4%		0.1%
	Normalized	99.81%		99.89%		100%
rav1e - 6 (FPS)		0.603		0.602		0.603
	Standard Deviation	0.3%		0.1%		0.1%
	Normalized	100%		99.83%		100%
Mobile Neural Network - resnet-v2-50 (ms)		43.351		43.325		43.387
	Standard Deviation	0.1%		0.1%		0%
	Normalized	99.94%		100%		99.86%
Mobile Neural Network - SqueezeNetV1.0 (ms)		8.109		8.114		8.103
	Standard Deviation	0.2%		0.3%		0.3%
	Normalized	99.93%		99.86%		100%
LAMMPS Molecular Dynamics Simulator - 20k Atoms (ns/day)		2.709		2.707		2.706
	Standard Deviation	0.2%		0.3%		0.1%
	Normalized	100%		99.93%		99.89%
	Standard Deviation	0.3%		1%		0.4%

Google SynthMark -	310.075	309.745	310.077
VoiceMark_100 (Voices)			
Normalized	100%	99.89%	100%
Standard Deviation	0%	0.2%	0%
Cryptsetup - PBKDF2-whirlpool	274114	274400	274305
(Iterations/sec)			
Normalized	99.9%	100%	99.97%
Standard Deviation	0.2%	0.1%	0.1%
dav1d - C.1.1.b (FPS)	40.81	40.80	40.78
Normalized	100%	99.98%	99.93%
Standard Deviation	0.2%	0.1%	0.1%
rav1e - 10 (FPS)	1.383	1.383	1.382
Normalized	100%	100%	99.93%
Standard Deviation	0.1%	0.2%	0.1%
Cryptsetup - T.X.2.D (MiB/s)	171	170.9	171.0
Normalized	100%	99.94%	100%
Standard Deviation		0.1%	0%
Cryptsetup - A.X.2.D (MiB/s)	874.5	874.7	875.0
Normalized	99.94%	99.97%	100%
Standard Deviation	0.2%	0.2%	0.1%
Cryptsetup - PBKDF2-sha512	663655	663655	663375
(Iterations/sec)			
Normalized	100%	100%	99.96%
Standard Deviation			0.1%
Timed Godot Game Engine	410.633	410.611	410.662
Compilation - Time To Compile			
(sec)			
Normalized	99.99%	100%	99.99%
Standard Deviation	0%	0%	0.1%
ONNX Runtime -	35	35	35
fcn-resnet101-11 - OpenMP CPU			
ONNX Runtime - yolov4 -	196	196	196
OpenMP CPU (Inferences/min)			
rav1e - 5 (FPS)	0.450	0.45	0.450
Standard Deviation	0.3%	0%	0.3%

Mobile Neural Network 1.1.1

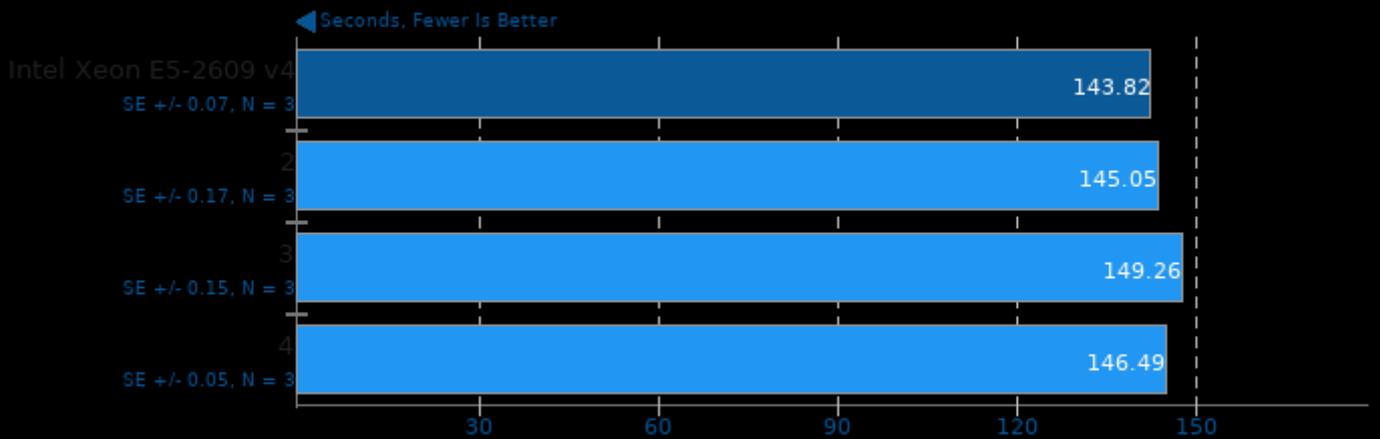
Model: mobilenet-v1-1.0



1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fno-

CloverLeaf

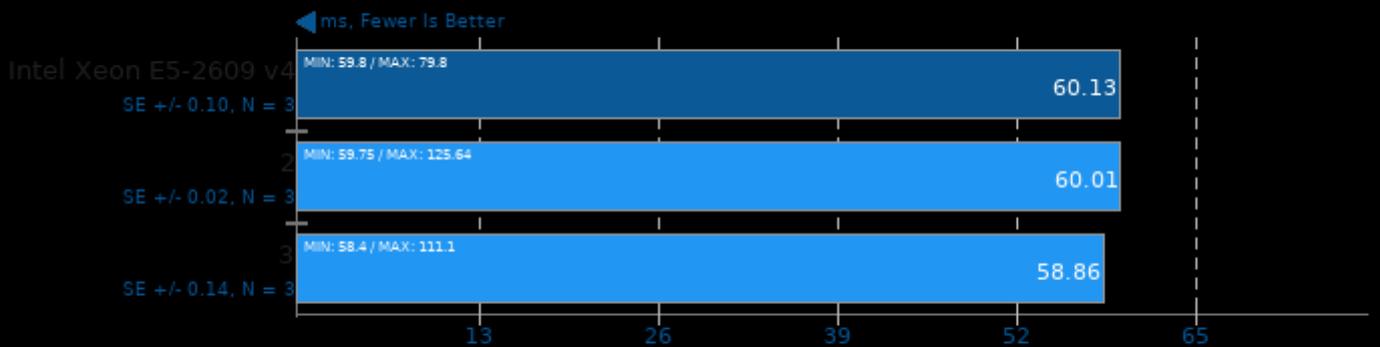
Lagrangian-Eulerian Hydrodynamics



1. (F9X) gfortran options: -O3 -march=native -funroll-loops -fopenmp

Mobile Neural Network 1.1.1

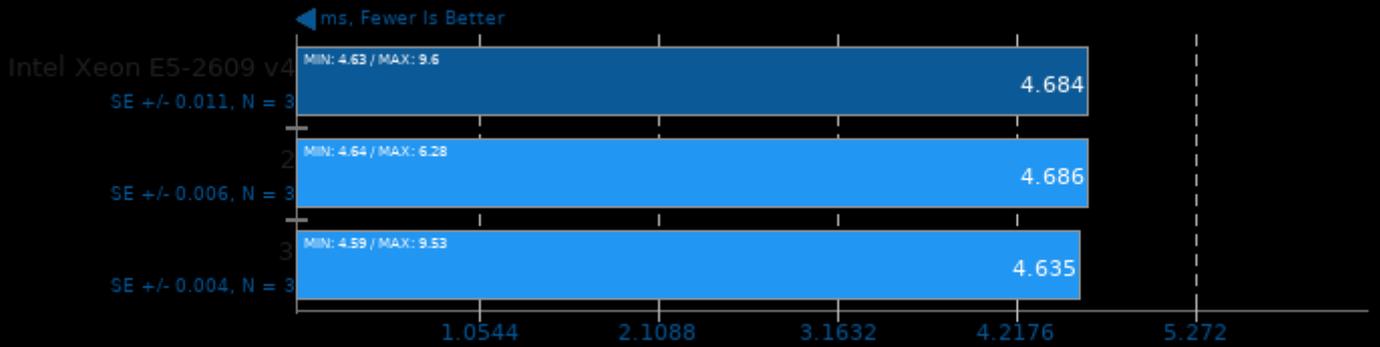
Model: inception-v3



1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fno-

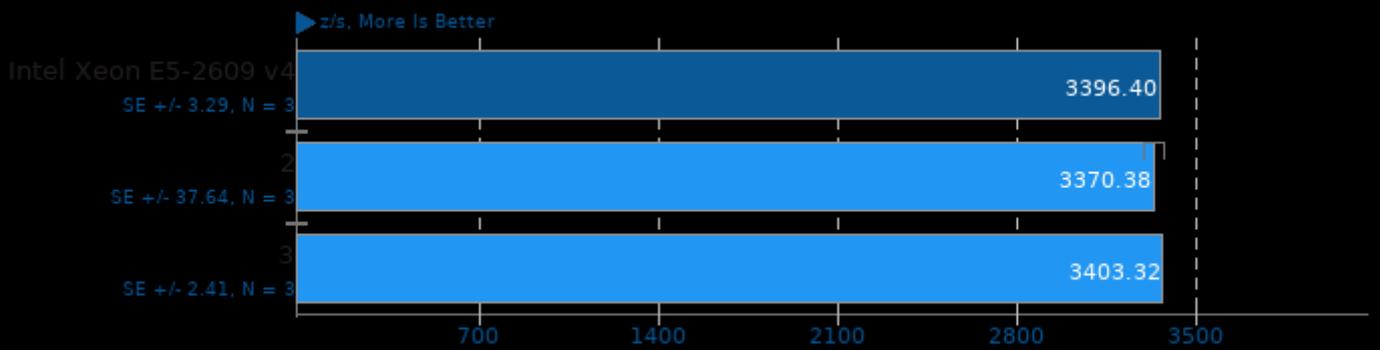
Mobile Neural Network 1.1.1

Model: MobileNetV2_224



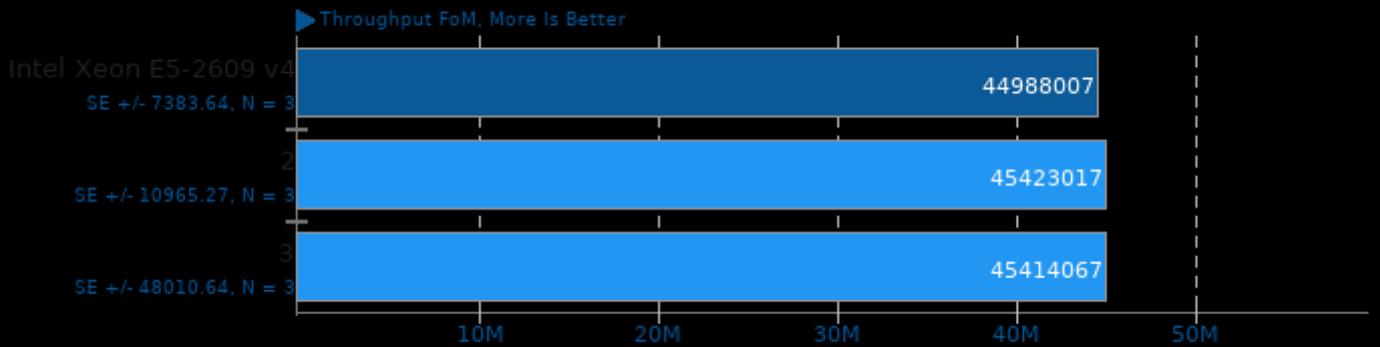
1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fno-

LULESH 2.0.3



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

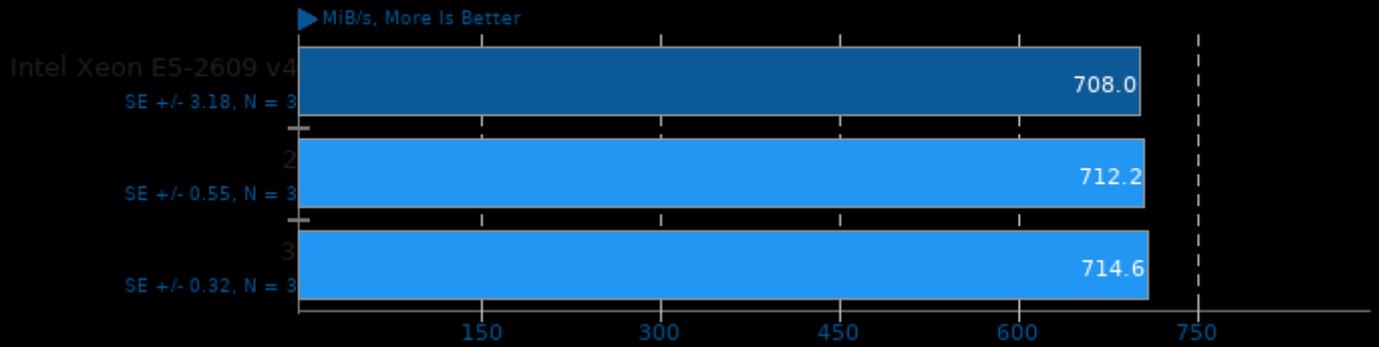
Kripke 1.2.4



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

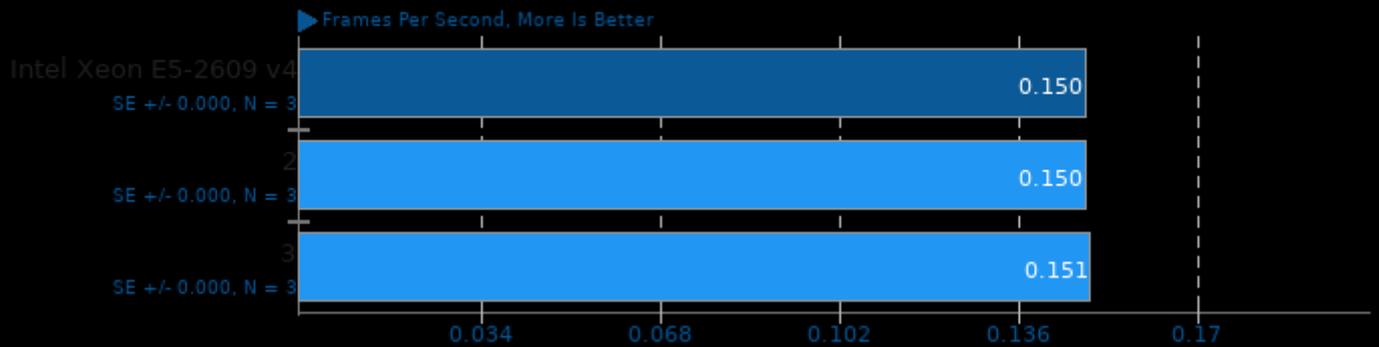
Cryptsetup

AES-XTS 512b Decryption



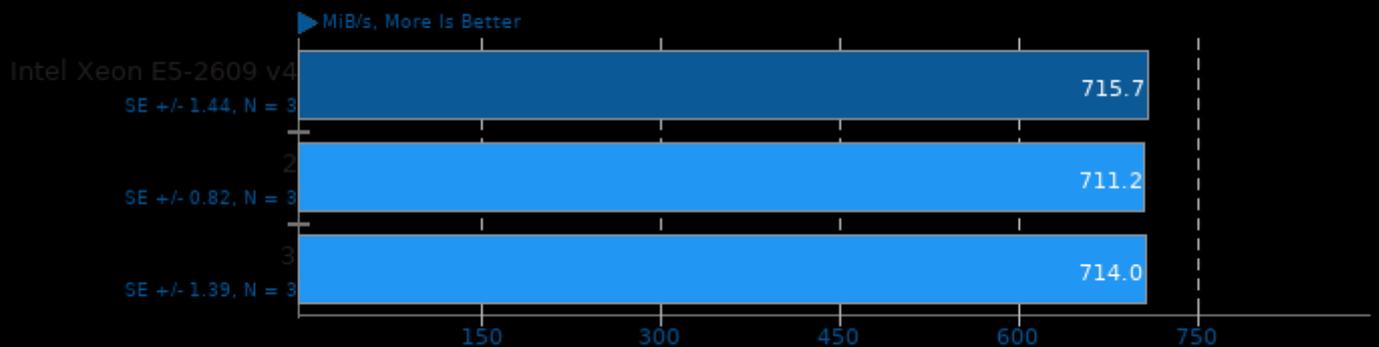
rav1e 0.4

Speed: 1



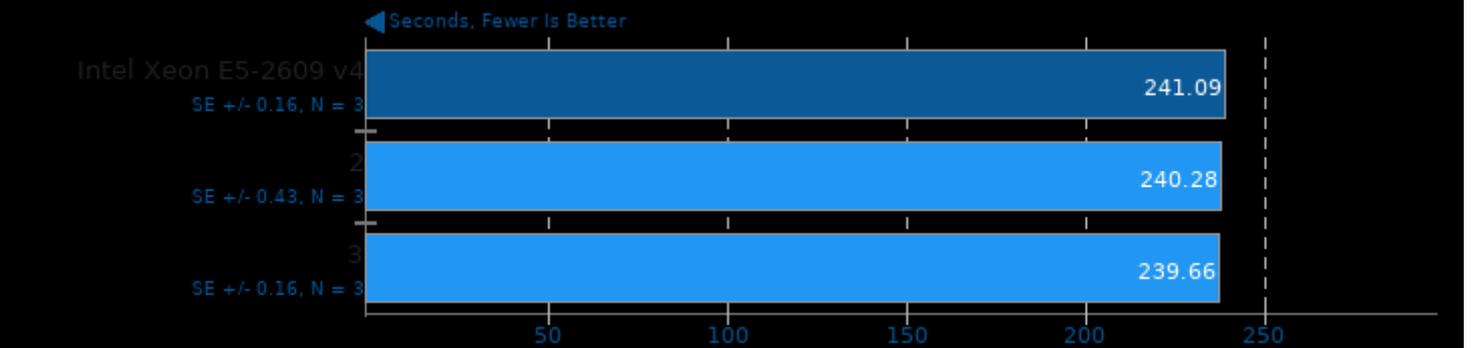
Cryptsetup

AES-XTS 512b Encryption



OpenFOAM 8

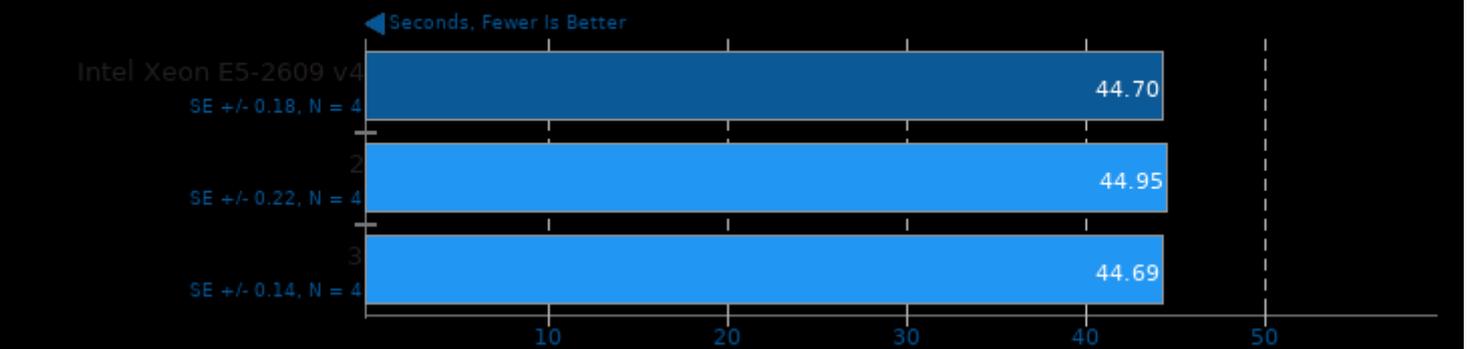
Input: Motorbike 30M



1. (CXX) g++ options: -std=c++11 -m64 -O3 -ftemplate-depth-100 -fPIC -fuse-id=bfd -Xlinker --add-needed --no-as-needed -ldynamicMesh -lgenericPatch

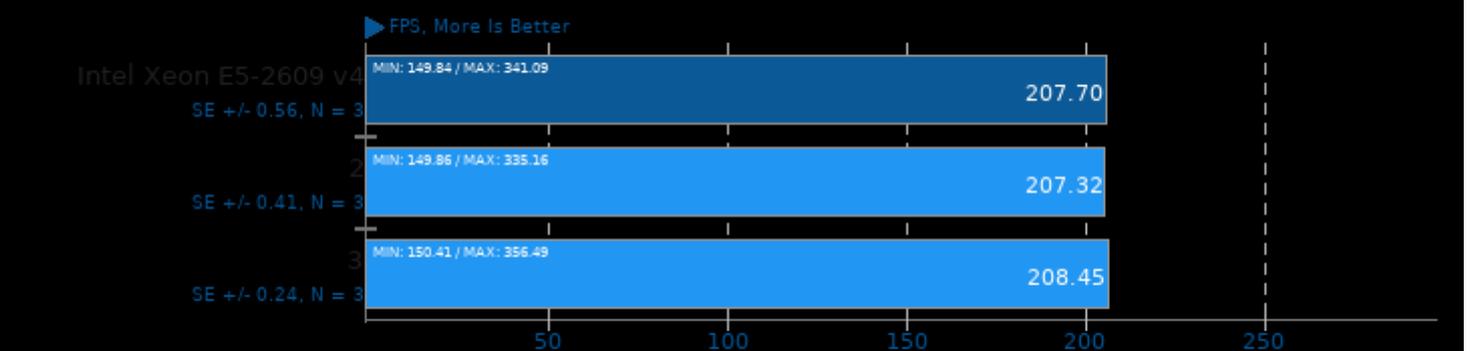
Unpacking Firefox 84.0

Extracting: firefox-84.0.source.tar.xz



dav1d 0.8.1

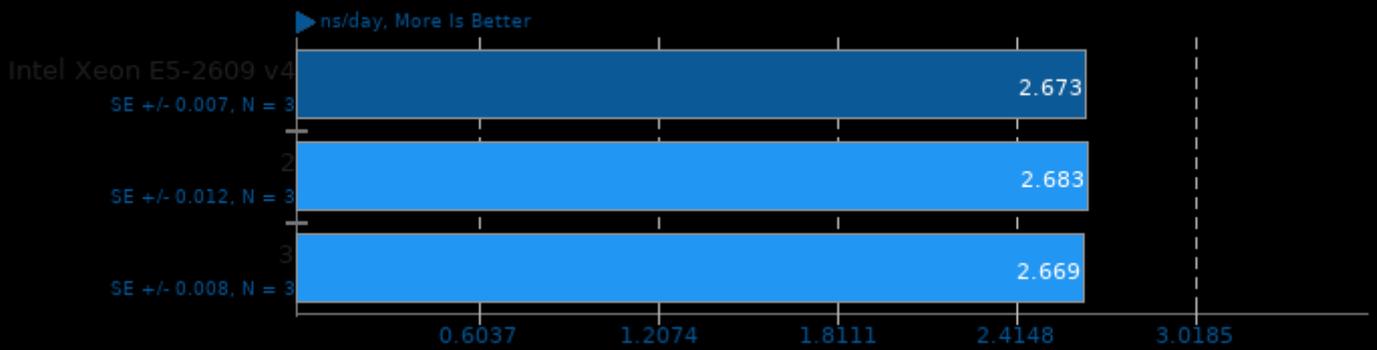
Video Input: Chimera 1080p



1. (C) gcc options: -pthread

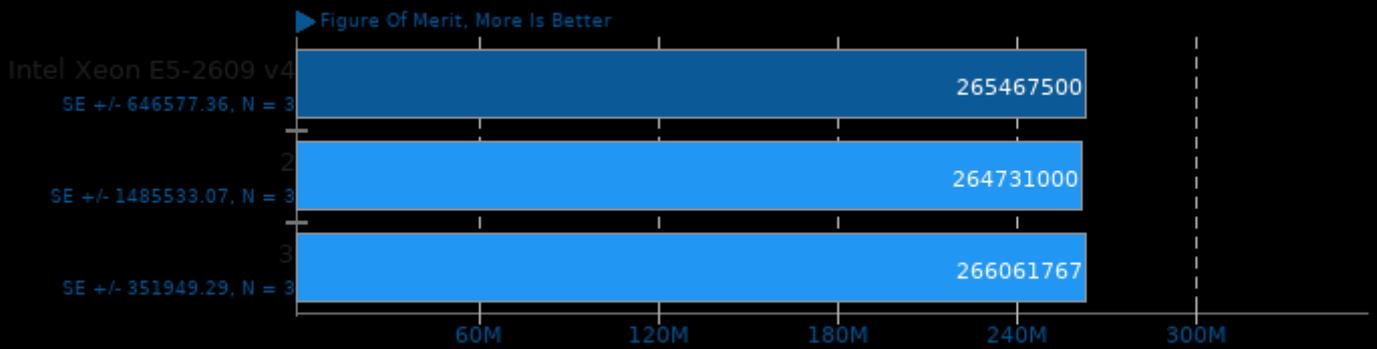
LAMMPS Molecular Dynamics Simulator 29Oct2020

Model: Rhodopsin Protein



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

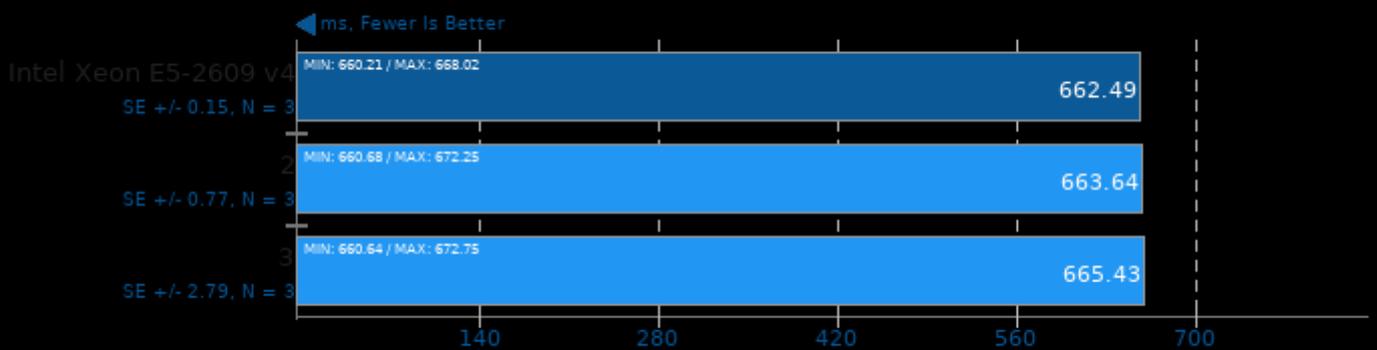
Algebraic Multi-Grid Benchmark 1.2



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

TNN 0.2.3

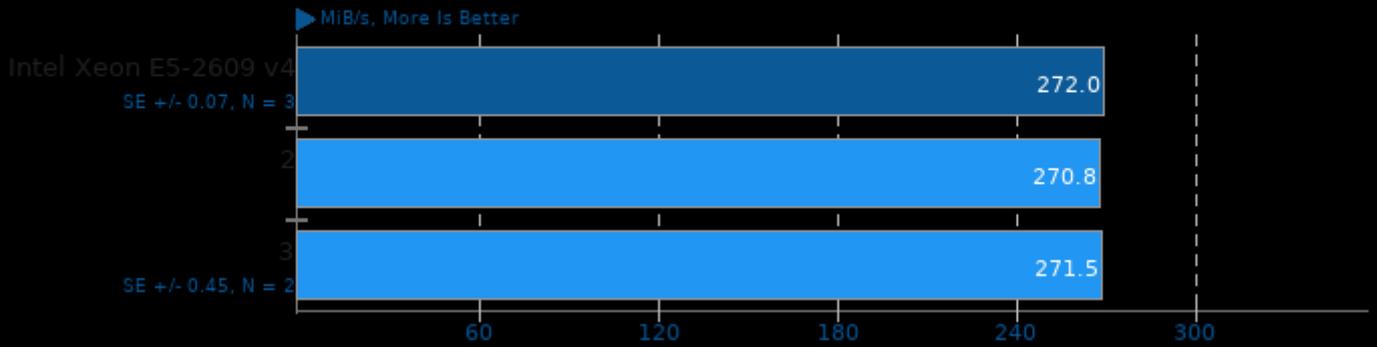
Target: CPU - Model: MobileNet v2



1. (CXX) g++ options: -fopenmp -pthread -fvisibility=hidden -O3 -rdynamic -ldl

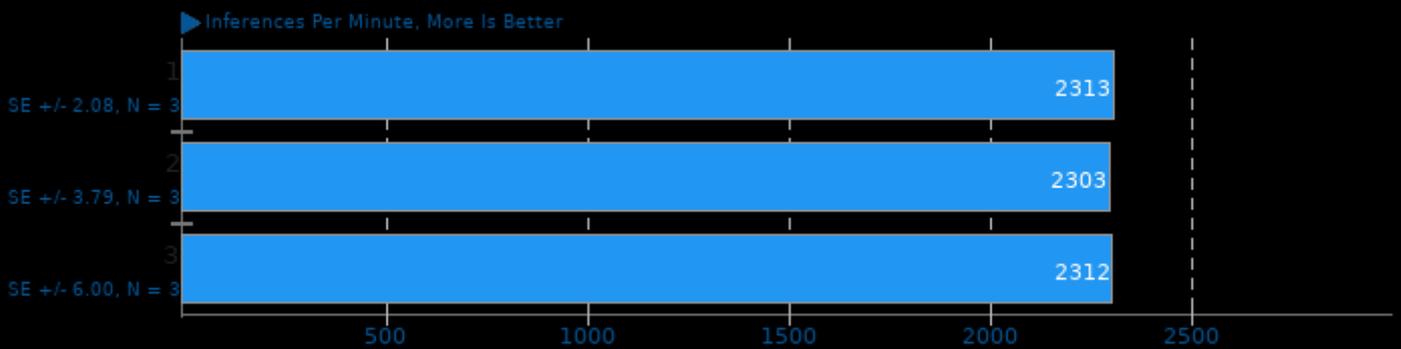
Cryptsetup

Serpent-XTS 512b Encryption



ONNX Runtime 1.6

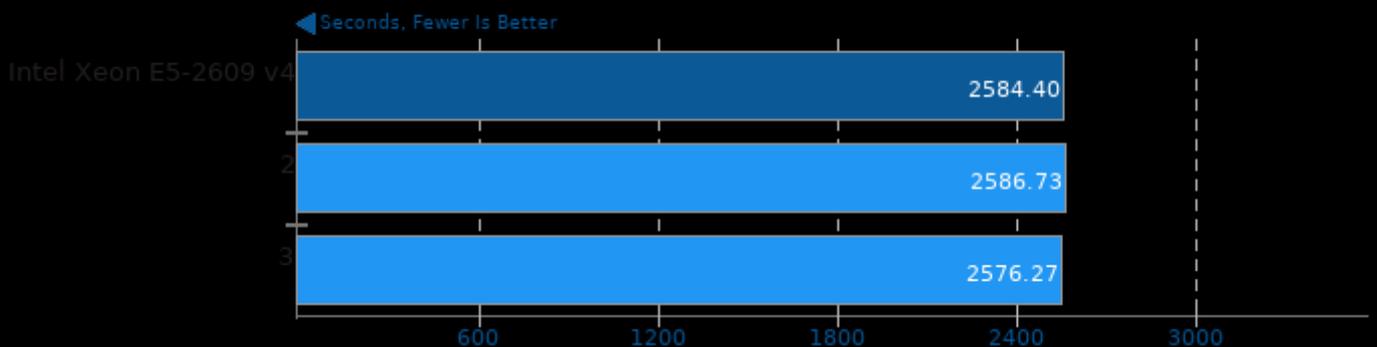
Model: super-resolution-10 - Device: OpenMP CPU



1. (CXX) g++ options: -fopenmp -function-sections -fdata-sections -O3 -ldl -lrt

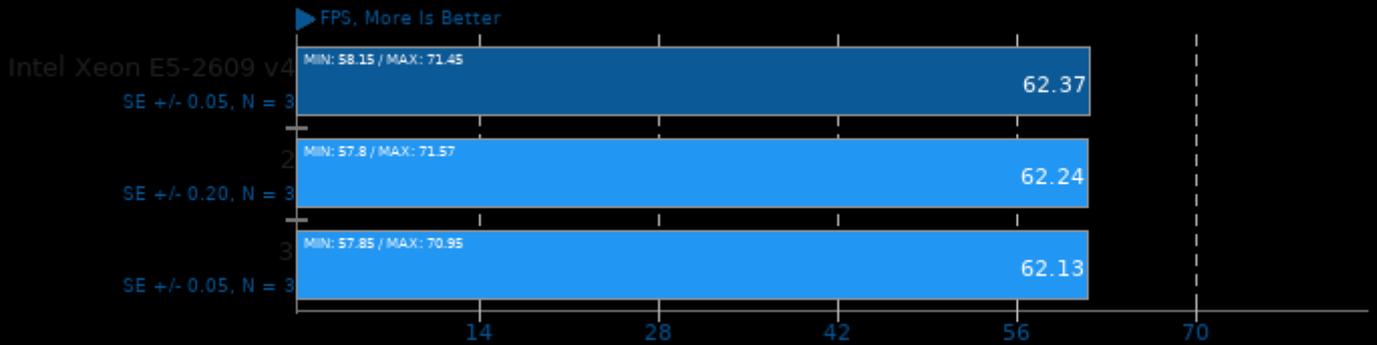
CP2K Molecular Dynamics 8.1

Fayalite-FIST Data



dav1d 0.8.1

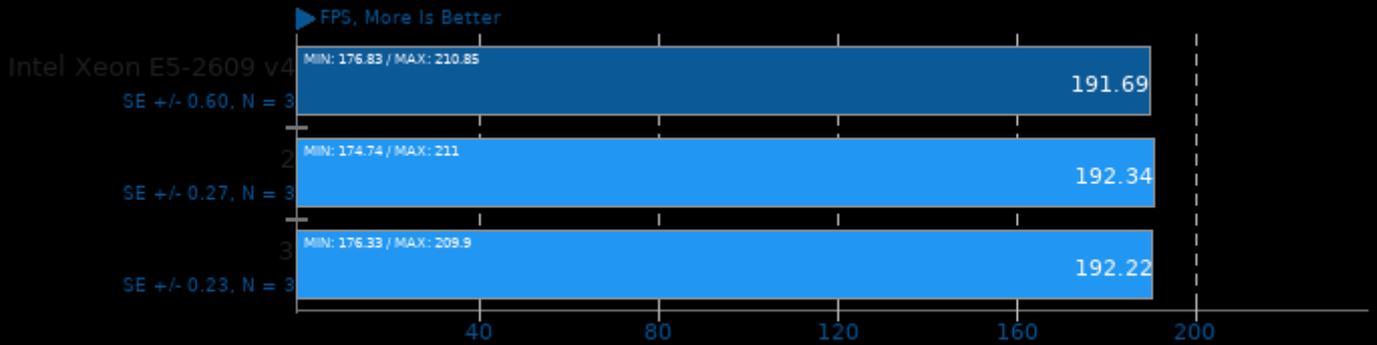
Video Input: Summer Nature 4K



1. (CC) gcc options: -pthread

dav1d 0.8.1

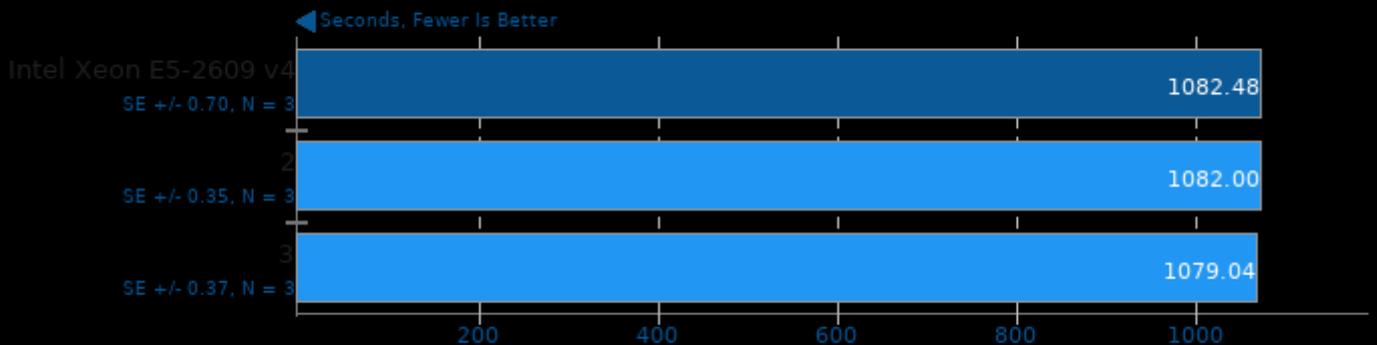
Video Input: Summer Nature 1080p



1. (CC) gcc options: -pthread

OpenFOAM 8

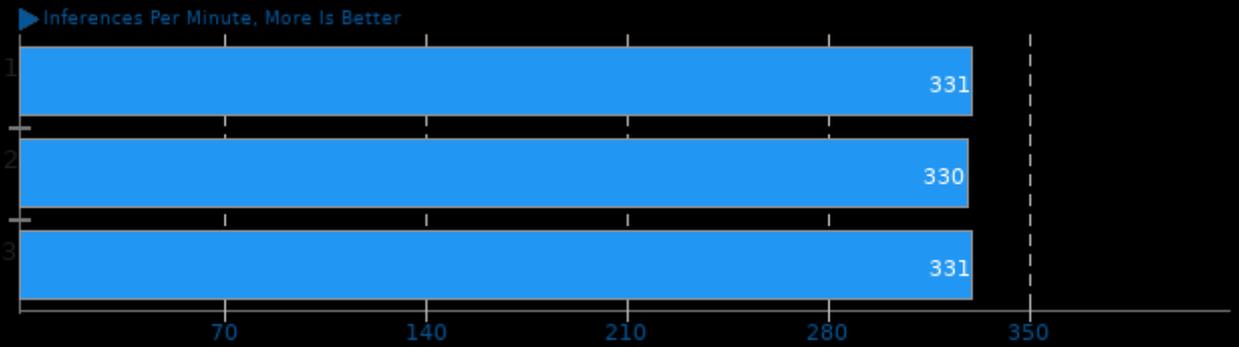
Input: Motorbike 60M



1. (CXX) g++ options: -std=c++11 -m64 -O3 -ftemplate-depth-100 -fPIC -fuse-ld=bfd -Xlinker --add-needed --no-as-needed -ldynamicMesh -lgenericPatch

ONNX Runtime 1.6

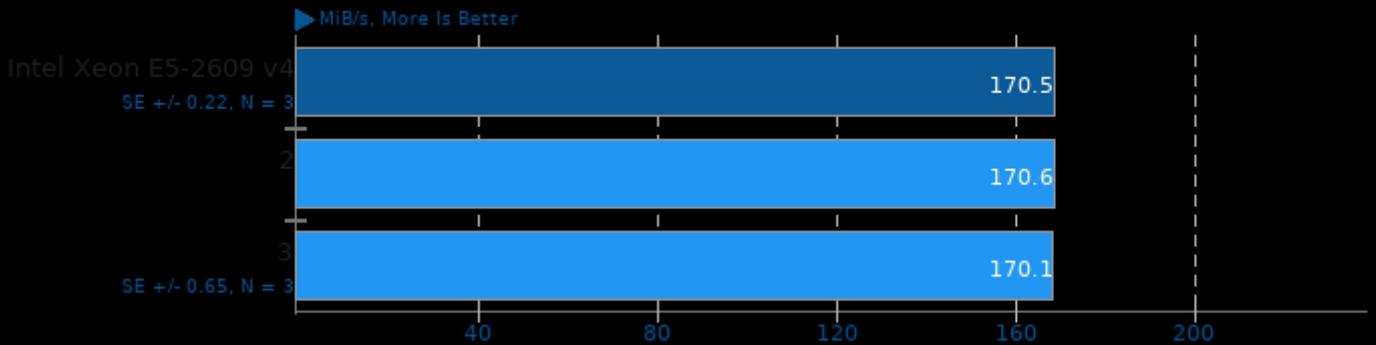
Model: bertsqad-10 - Device: OpenMP CPU



1. (CXX) g++ options: -fopenmp -function-sections -fdata-sections -O3 -ldl -lrt

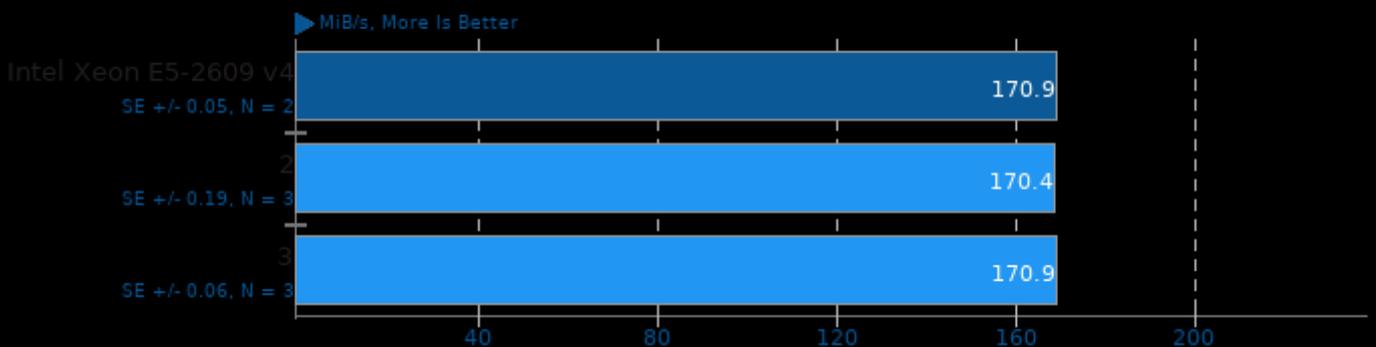
Cryptsetup

Twofish-XTS 512b Encryption



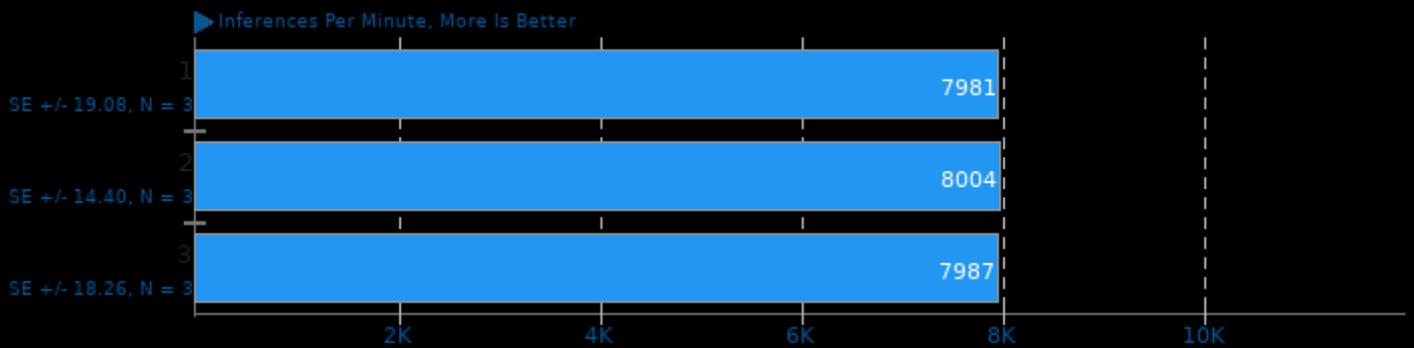
Cryptsetup

Twofish-XTS 512b Decryption



ONNX Runtime 1.6

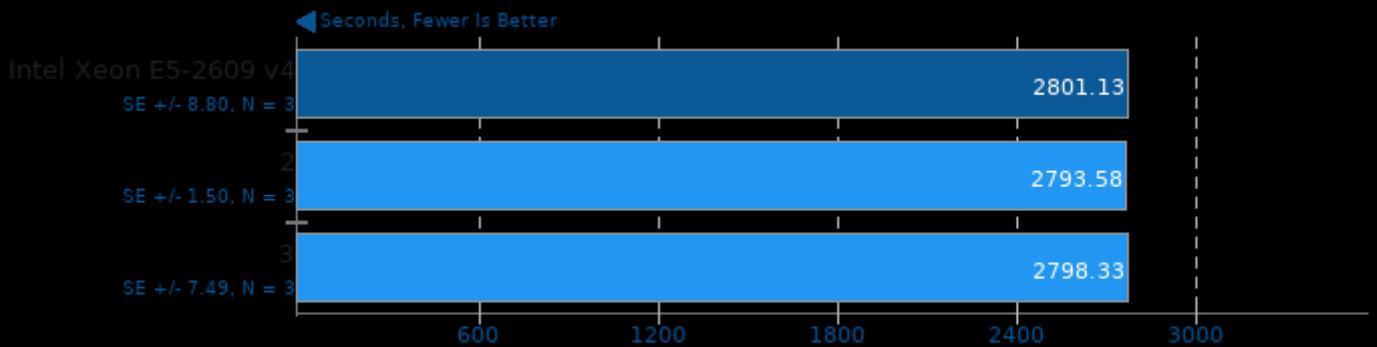
Model: shufflenet-v2-10 - Device: OpenMP CPU



1. (CXX) g++ options: -fopenmp -function-sections -fdata-sections -O3 -ldl -lrt

Quantum ESPRESSO 6.7

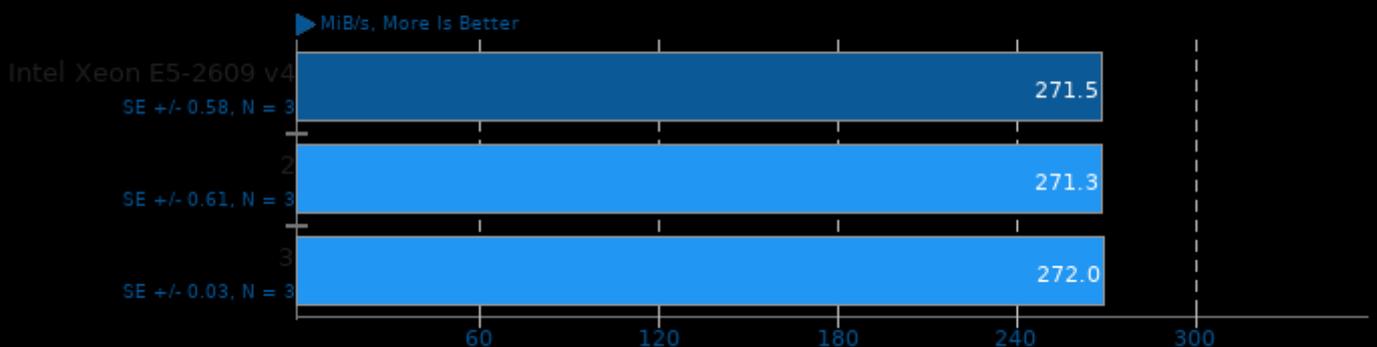
Input: AUSURF112



1. (F9X) gfortran options: -lopenblas -lFoX_dom -lFoX_sax -lFoX_wxml -lFoX_common -lFoX_utils -lFoX_fsys -lfftw3 -pthread -lmpi_usempif08 -lmpi_mpifh

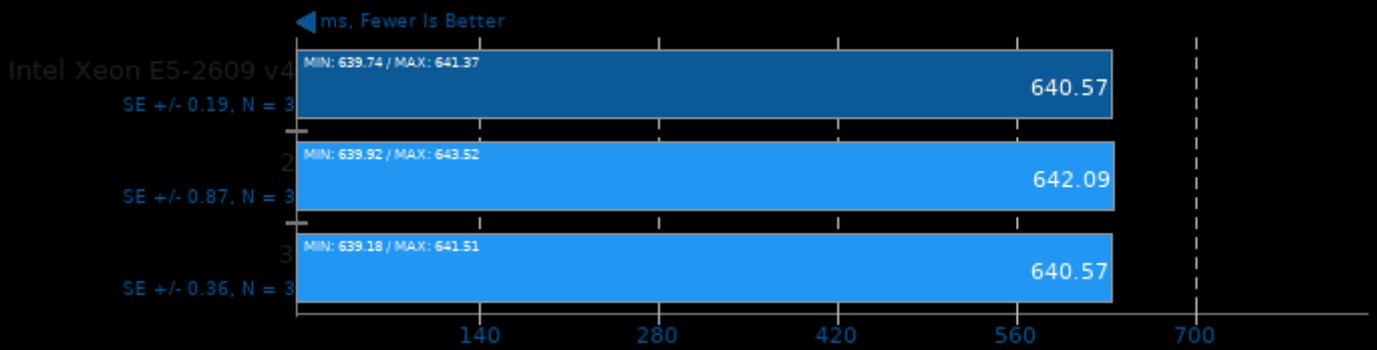
Cryptsetup

Serpent-XTS 256b Encryption



TNN 0.2.3

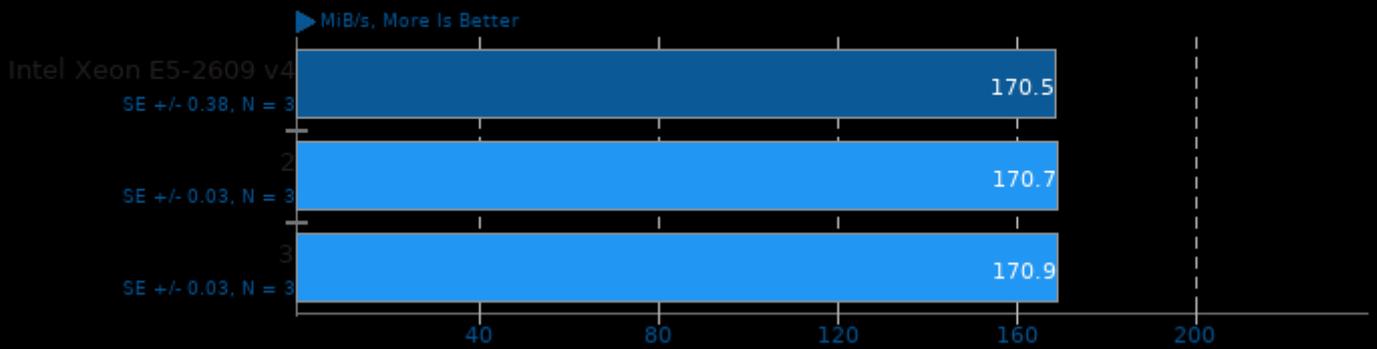
Target: CPU - Model: SqueezeNet v1.1



1. (CXX) g++ options: -fopenmp -pthread -fvisibility=hidden -O3 -rdynamic -ldl

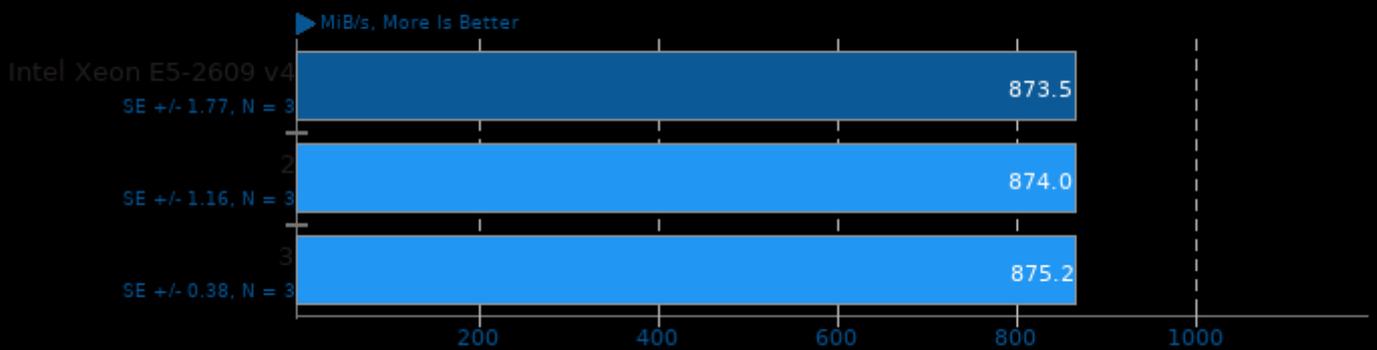
Cryptsetup

Twofish-XTS 256b Encryption



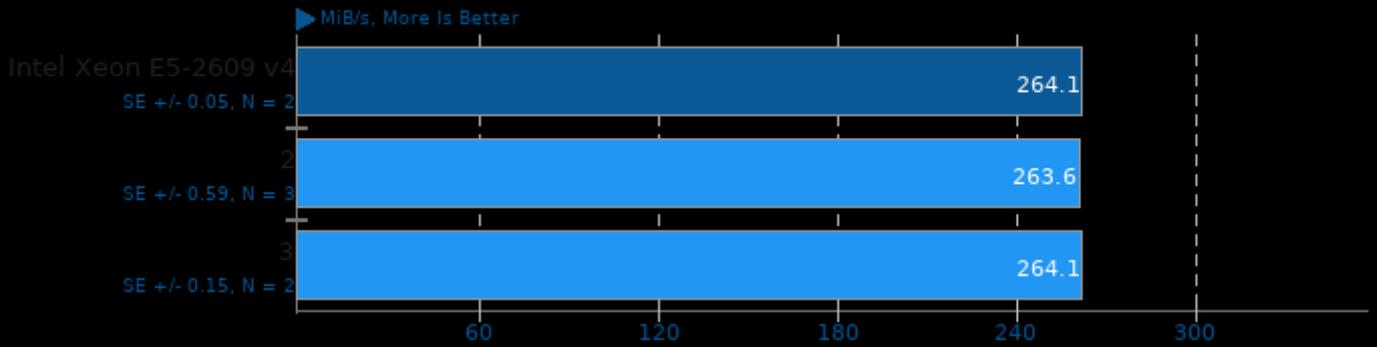
Cryptsetup

AES-XTS 256b Encryption



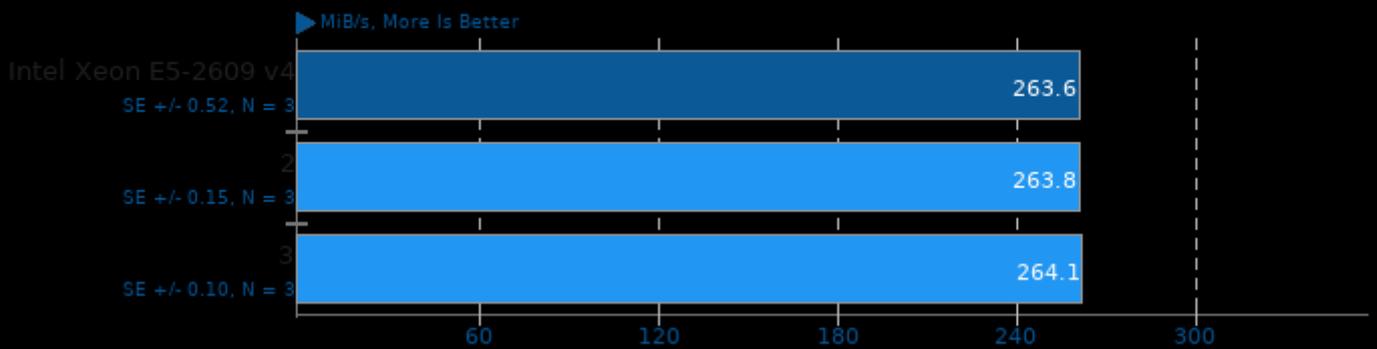
Cryptsetup

Serpent-XTS 512b Decryption



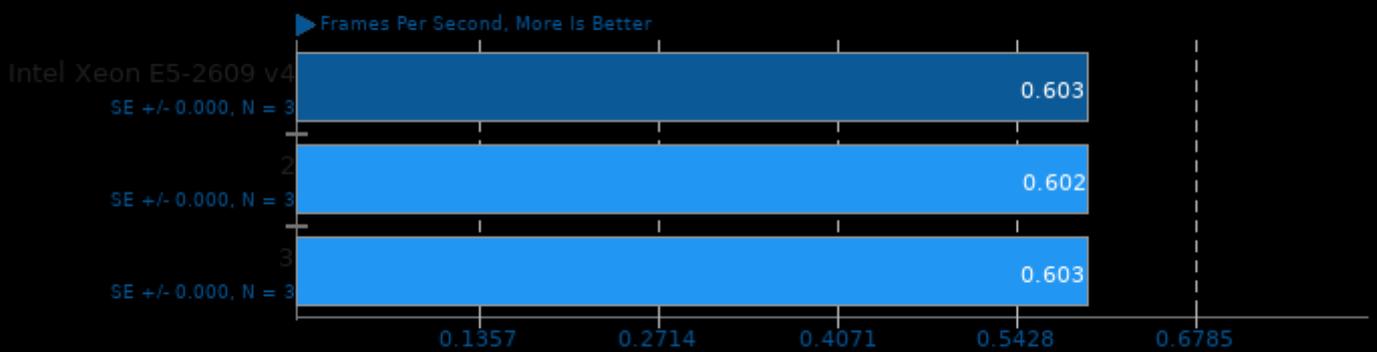
Cryptsetup

Serpent-XTS 256b Decryption



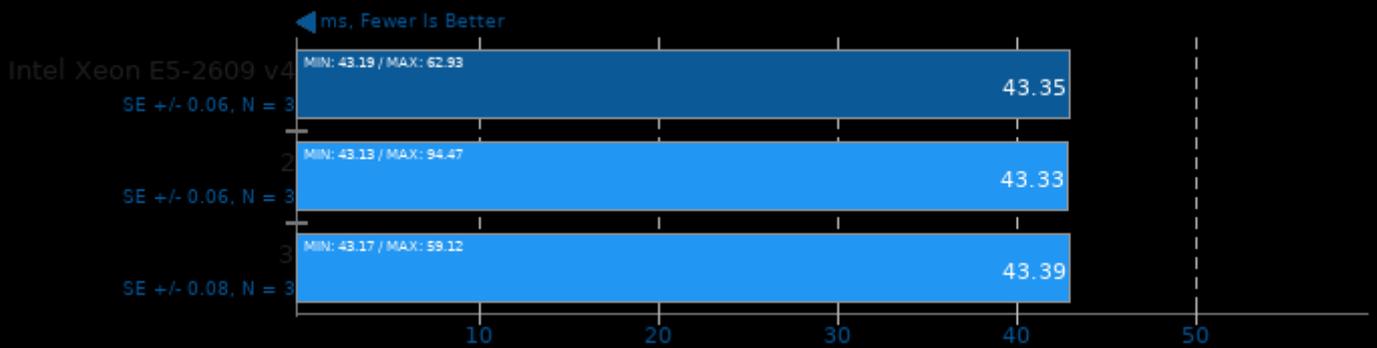
rav1e 0.4

Speed: 6



Mobile Neural Network 1.1.1

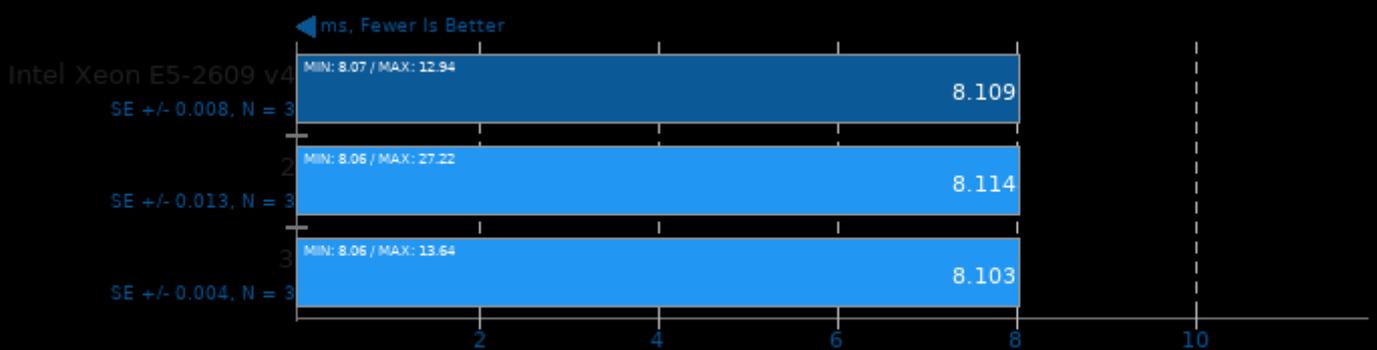
Model: resnet-v2-50



1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fno-

Mobile Neural Network 1.1.1

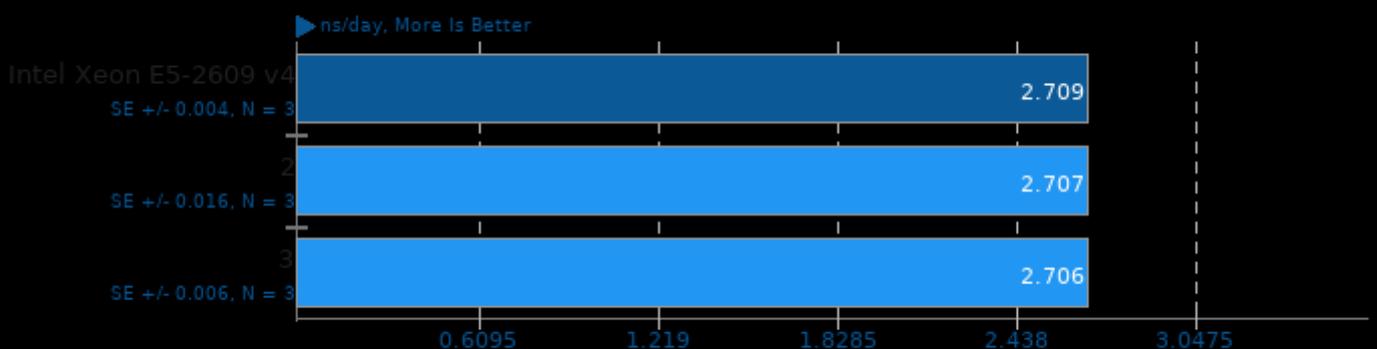
Model: SqueezeNetV1.0



1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fno-

LAMMPS Molecular Dynamics Simulator 29Oct2020

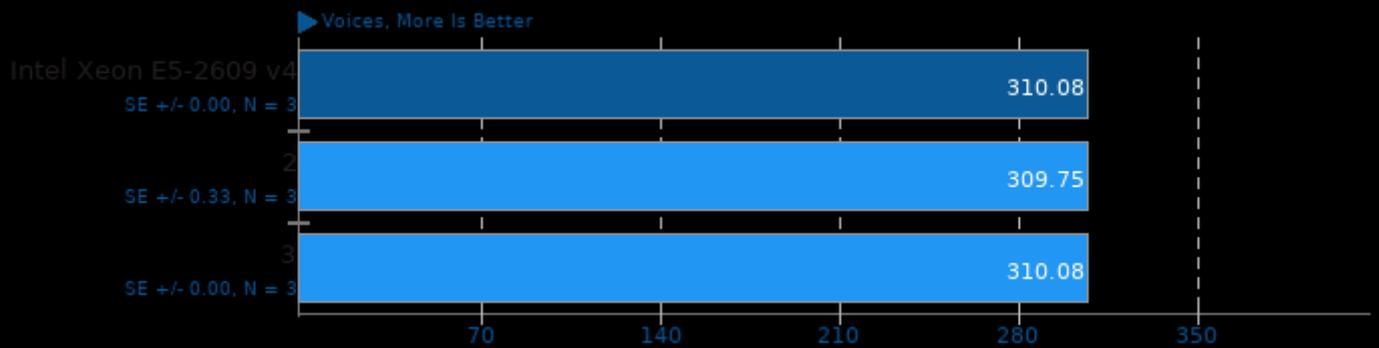
Model: 20k Atoms



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

Google SynthMark 20201109

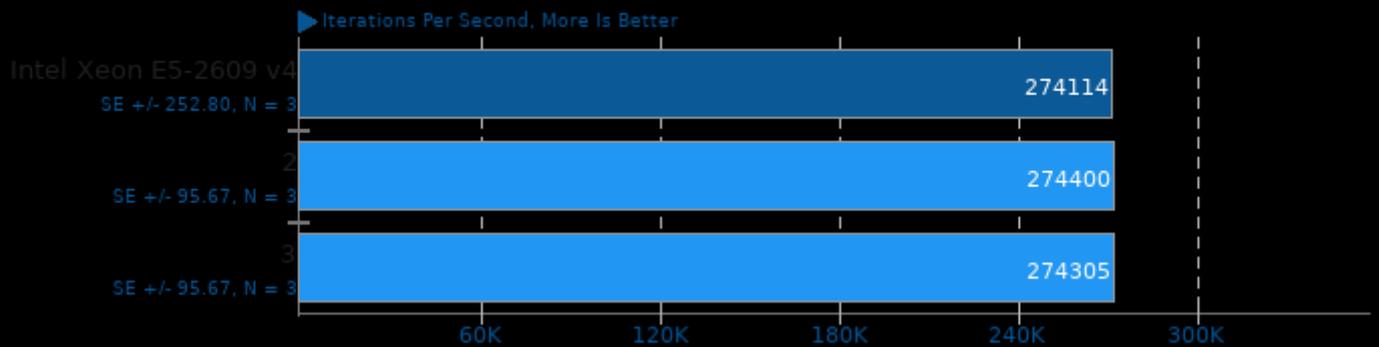
Test: VoiceMark_100



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

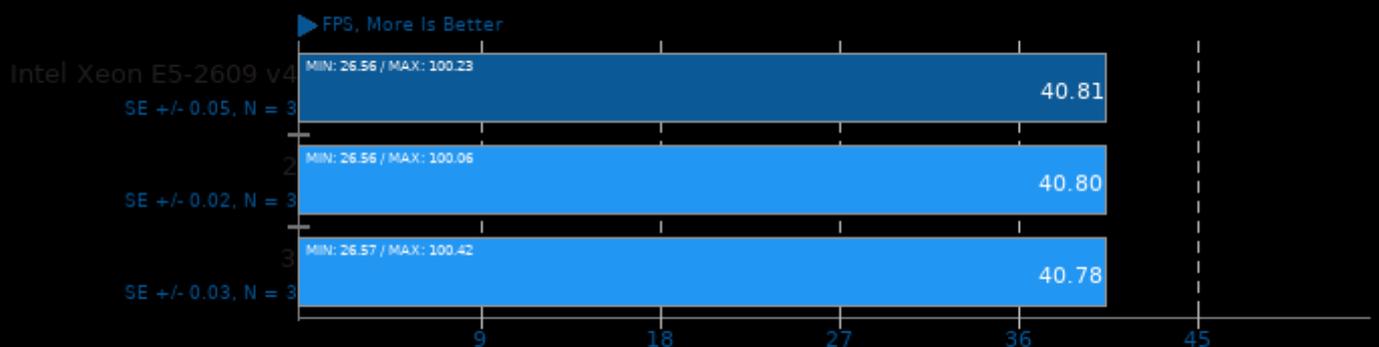
Cryptsetup

PBKDF2-whirlpool



dav1d 0.8.1

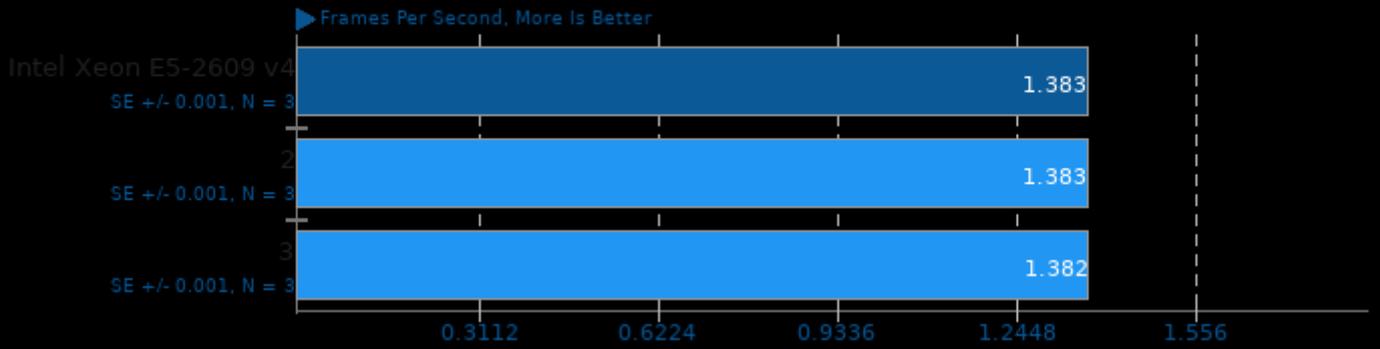
Video Input: Chimera 1080p 10-bit



1. (C) gcc options: -pthread

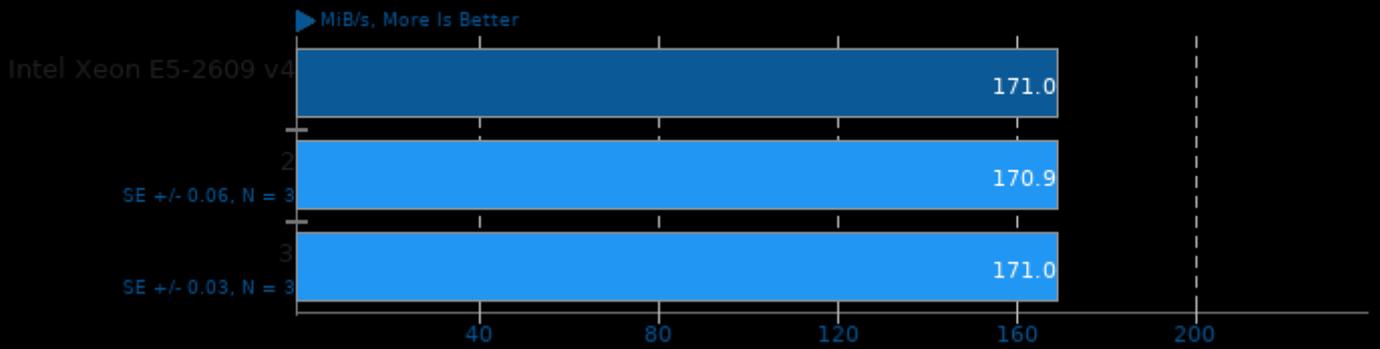
rav1e 0.4

Speed: 10



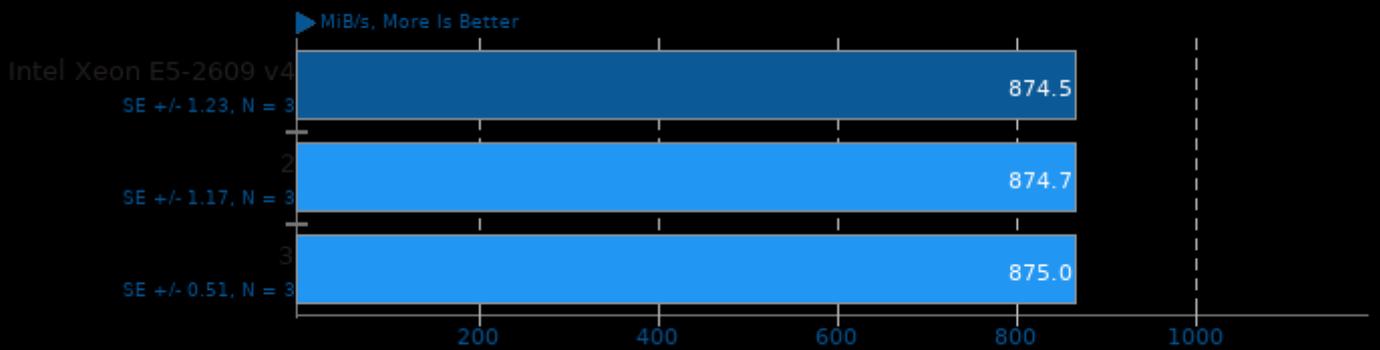
Cryptsetup

Twofish-XTS 256b Decryption



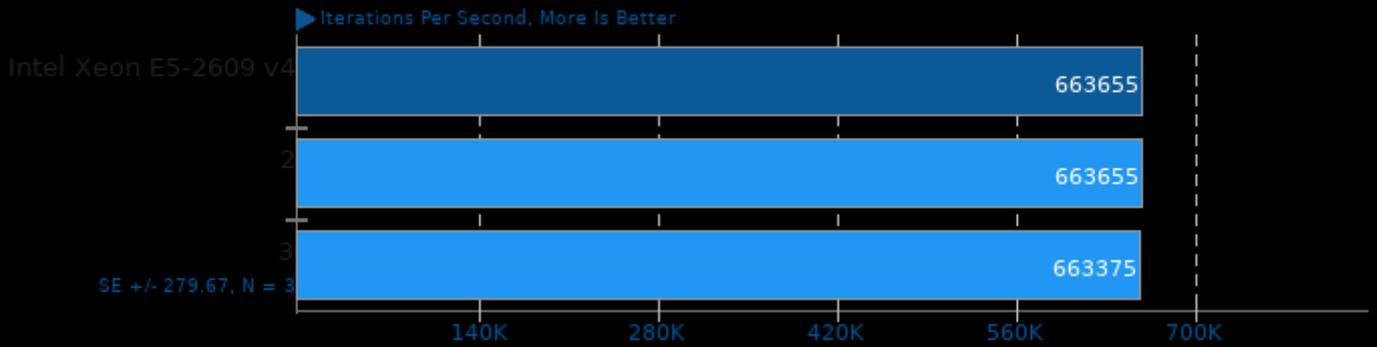
Cryptsetup

AES-XTS 256b Decryption



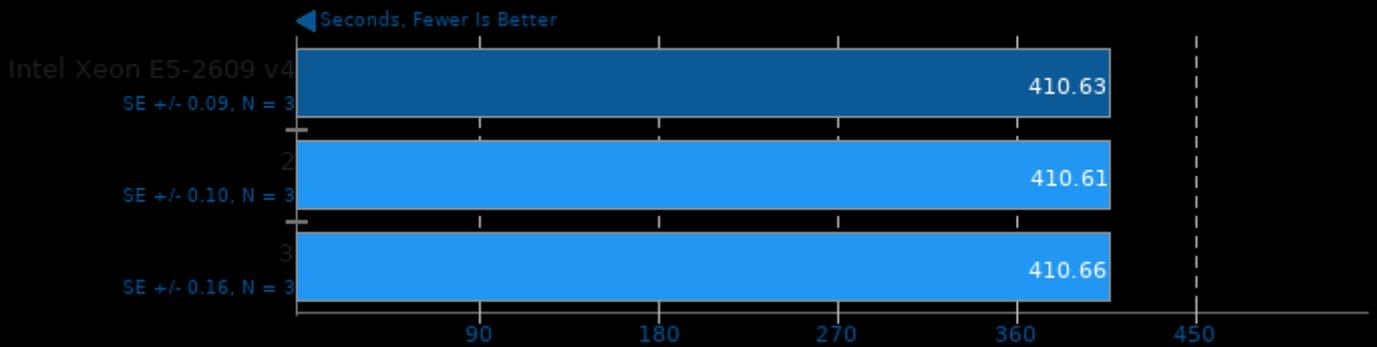
Cryptsetup

PBKDF2-sha512



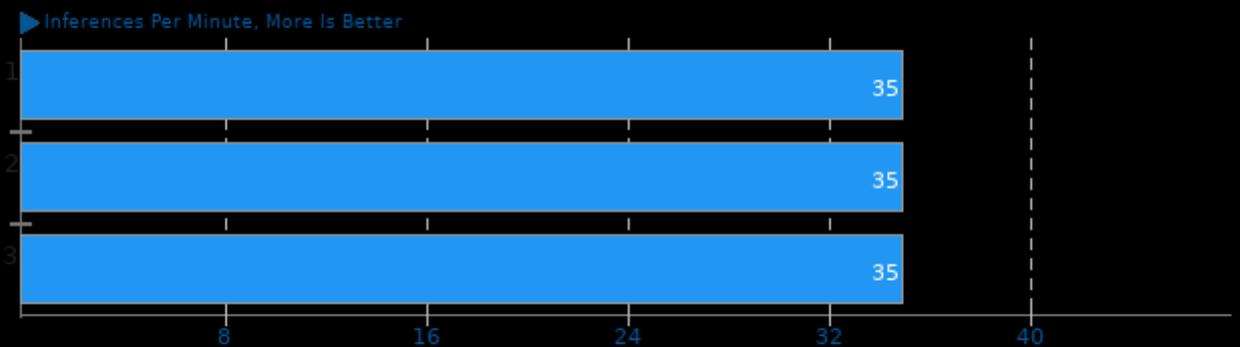
Timed Godot Game Engine Compilation 3.2.3

Time To Compile

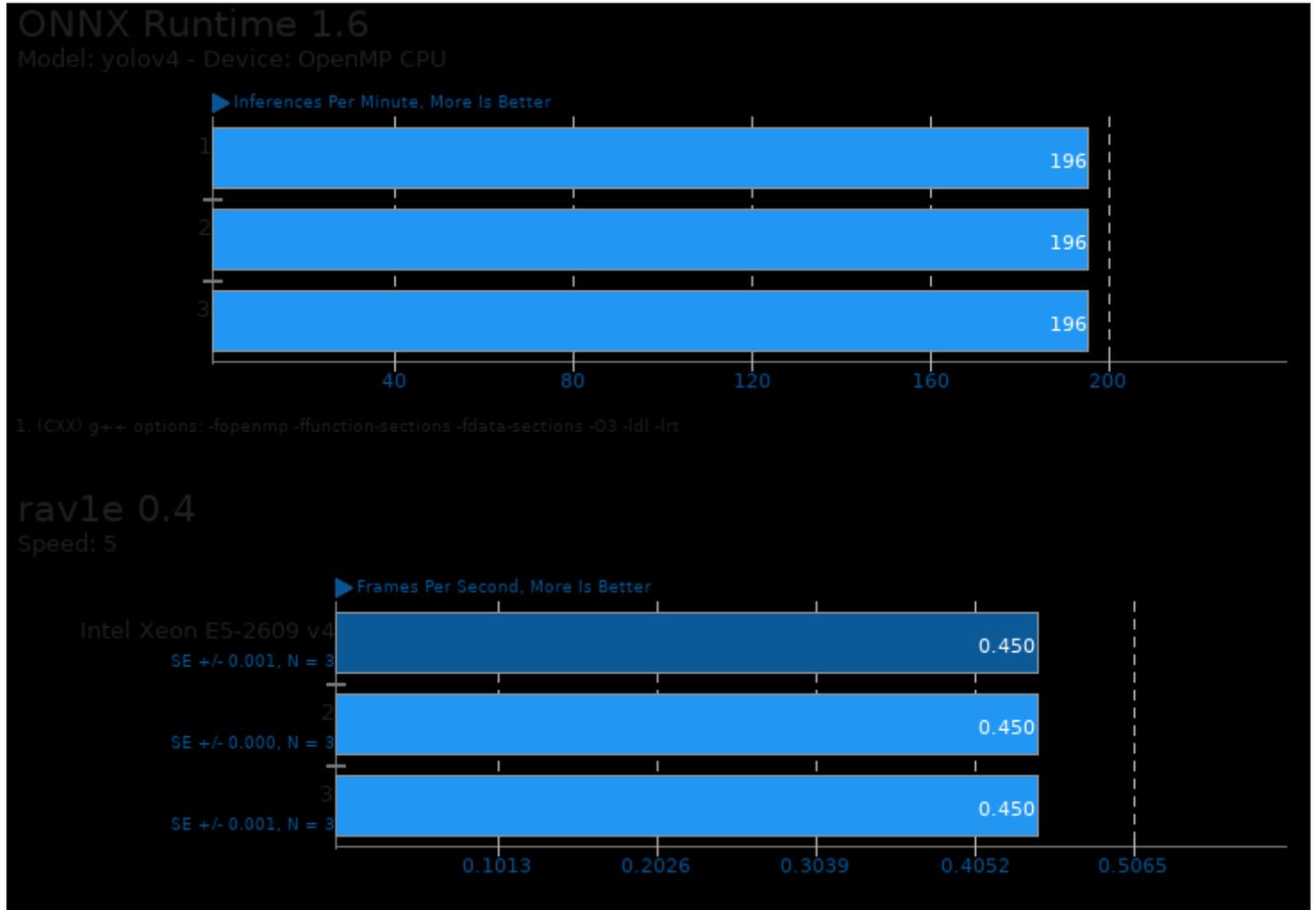


ONNX Runtime 1.6

Model: fcnn-resnet101-11 - Device: OpenMP CPU



1. (CXX) g++ options: -fopenmp -function-sections -fdata-sections -O3 -ldl -lrt



This file was automatically generated via the Phoronix Test Suite benchmarking software on Friday, 29 March 2024 04:42.