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ARM-SBC-Benchmark

ARMv8 Cortex-A72 testing with a SolidRun CEX7 (EDK II BIOS) and AMD Radeon PRO WX 3200 4GB on Debian testing via the Phoronix Test Suite.

Automated Executive Summary

LX2160A Arm Cortex A72 had the most wins, coming in first place for 61% of the tests.

Based on the geometric mean of all complete results, the fastest (LX2160A Arm Cortex A72) was 21.088x the speed of the slowest (Raspberry Pi). Honycomb LX2K was 0.949x the speed of LX2160A Arm Cortex A72, HummingBoard_i2ex was 0.171x the speed of Honycomb LX2K, HummingBoard_i2ex_SSD was 0.972x the speed of HummingBoard_i2ex, HummingBoard_i1 was 0.96x the speed of HummingBoard_i2ex_SSD, Banana Pi was 0.687x the speed of HummingBoard_i1, Raspberry Pi was 0.457x the speed of Banana Pi.

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

Parallel BZIP2 Compression (256MB File Compression) at 123.253x

OpenSSL (RSA 4096-bit Performance) at 91.708x

SciMark (Computational Test: Dense LU Matrix Factorization) at 49.229x

SciMark (Computational Test: Sparse Matrix Multiply) at 29.38x

SciMark (Computational Test: Composite) at 21.924x

x264 (H.264 Video Encoding) at 20.652x

Stream (Type: Triad) at 19.86x

Stream (Type: Add) at 17.38x

Stream (Type: Scale) at 14.347x

PyBench (Total For Average Test Times) at 13.989x.

Test Systems:

Banana Pi

Processor: ARMv7 rev 4 @ 0.91GHz (2 Cores), Motherboard: sun7i, Memory: 873MB, Disk: 8GB SU08G

OS: Ubuntu 14.04, Kernel: 3.4.90 (armv7l), Compiler: GCC 4.8, File-System: ext4, Screen Resolution: 1280x1440

Compiler Notes: --build=arm-linux-gnueabihf --disable-browser-plugin --disable-libitm --disable-libmudflap --disable-libquadmath --disable-sjlj-exceptions --disable-werror --enable-checking=release --enable-clocale-gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=arm-linux-gnueabihf --target=arm-linux-gnueabihf --with-arch-directory=arm --with-arch=armv7-a --with-ecj-jar=/usr/share/java/eclipse-ecj.jar --with-float=hard --with-fpu=vfpv3-d16 --with-java-home=/usr/lib/jvm/java-1.5.0-gcj-4.8-armhf/jre --with-jvm-jar-dir=/usr/lib/vm-exports/java-1.5.0-gcj-4.8-armhf --with-jvm-root-dir=/usr/lib/jvm/java-1.5.0-gcj-4.8-armhf --with-mode=thumb -v

Processor Notes: Scaling Governor: sunxi interactive

System Notes: Python 2.7.6.

Raspberry Pi

Processor: ARMv6-compatible rev 7 @ 0.90GHz (1 Core), Motherboard: BCM2708, Memory: 469MB, Disk: 8GB SL08G

OS: Debian Linux 7.5, Kernel: 3.12.22+ (armv6l), Compiler: GCC 4.6, File-System: ext4, Screen Resolution: 656x416

Compiler Notes: --build=arm-linux-gnueabihf --disable-sjlj-exceptions --enable-checking=release --enable-clocale-gnu --enable-gnu-unique-object --enable-languages=c,c++,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=arm-linux-gnueabihf --target=arm-linux-gnueabihf --with-arch=armv6 --with-float=hard --with-fpu=vfp -v

System Notes: Python 2.7.3.

HummingBoard_i2ex

Processor: ARMv7 rev 10 @ 1.00GHz (2 Cores), Motherboard: SolidRun i.MX6 Quad/Dual/DualLite/Solo HummingBoard, Memory: 745MB, Disk: 8GB SU08G

OS: Debian testing, Kernel: 3.0.35-g01c6ae1 (armv7l), Compiler: GCC 4.8.2, File-System: ext4, Screen Resolution: 1280x720

Compiler Notes: --build=arm-linux-gnueabihf --disable-browser-plugin --disable-libitm --disable-libmudflap --disable-libquadmath --disable-sjlj-exceptions --enable-checking=release --enable-clocale-gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=arm-linux-gnueabihf --target=arm-linux-gnueabihf --with-arch-directory=arm --with-arch=armv7-a --with-float=hard --with-fpu=vfpv3-d16 --with-mode=thumb -v

Processor Notes: Scaling Governor: imx performance

System Notes: Python 2.7.6.

HummingBoard_i2ex_SSD

Processor: ARMv7 rev 10 @ 1.00GHz (2 Cores), Motherboard: SolidRun i.MX6 Quad/Dual/DualLite/Solo HummingBoard, Memory: 745MB, Disk: 30GB KINGSTON SMS200S + 8GB SU08G

OS: Debian testing, Kernel: 3.0.35-g01c6ae1 (armv7l), Compiler: GCC 4.8.2, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=arm-linux-gnueabihf --disable-browser-plugin --disable-libitm --disable-libmudflap --disable-libquadmath --disable-sjlj-exceptions --enable-checking=release --enable-clocale-gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=arm-linux-gnueabihf --target=arm-linux-gnueabihf --with-arch-directory=arm --with-arch=armv7-a --with-float=hard --with-fpu=vfpv3-d16 --with-mode=thumb -v

Processor Notes: Scaling Governor: imx performance

System Notes: Python 2.7.6.

HummingBoard_i1

Processor: ARMv7 rev 10 @ 1.00GHz (1 Core), Motherboard: Freescale i.MX6 Quad/DualLite (Device Tree), Memory: 494MB, Disk: 8GB SU08G

OS: Debian Linux 7.6, Kernel: 3.14.14-cubox (armv7l), File-System: ext4, Screen Resolution: 1920x1080

System Notes: Python 2.7.3.

Honeycomb LX2K

Processor: ARMv8 Cortex-A72 (16 Cores), Motherboard: SolidRun CEX7 (EDK II BIOS), Memory: 64GB, Disk: 1000GB Samsung SSD 970 EVO Plus 1TB + 120GB OCZ VERTEX3, Graphics: AMD Radeon PRO WX 3200 (1295/1500MHz), Audio: AMD Baffin HDMI/DP, Monitor: PHL BDM4350

OS: Debian testing, Kernel: 5.9.0-4-arm64 (aarch64), Desktop: KDE Plasma 5.19.5, Display Server: X Server 1.20.10, Display Driver: amdgpu 19.1.0, Compiler: GCC 10.2.0, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: amdgpu.pcie_gen_cap=0x00040004

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-mutex --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

Python Notes: Python 2.7.18 + Python 3.9.1

Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Not affected + spectre_v1: Mitigation of __user pointer sanitization + spectre_v2: Mitigation of Branch predictor hardening + srbds: Not affected + tsx_async_abort: Not affected

LX2160A Arm Cortex A72

Processor: ARMv8 Cortex-A72 (16 Cores), Motherboard: SolidRun CEX7 (EDK II BIOS), Memory: 64GB, Disk: 1000GB Samsung SSD 970 EVO Plus 1TB + 120GB OCZ VERTEX3, Graphics: AMD Radeon PRO WX 3200 4GB (1295/1500MHz), Audio: AMD Baffin HDMI/DP, Monitor: PHL BDM4350

OS: Debian testing, Kernel: 5.9.0-4-arm64 (aarch64), Desktop: KDE Plasma 5.19.5, Display Server: X Server 1.20.10, Display Driver: amdgpu 19.1.0, OpenGL: 4.6 Mesa 20.2.4 (LLVM 11.0.0), Compiler: GCC 10.2.0, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: amdgpu.pcie_gen_cap=0x00040004

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-mutex --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

Python Notes: Python 2.7.18 + Python 3.9.1

Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Not affected + spectre_v1: Mitigation of __user pointer sanitization + spectre_v2: Mitigation of Branch predictor hardening + srbds: Not affected + tsx_async_abort: Not affected

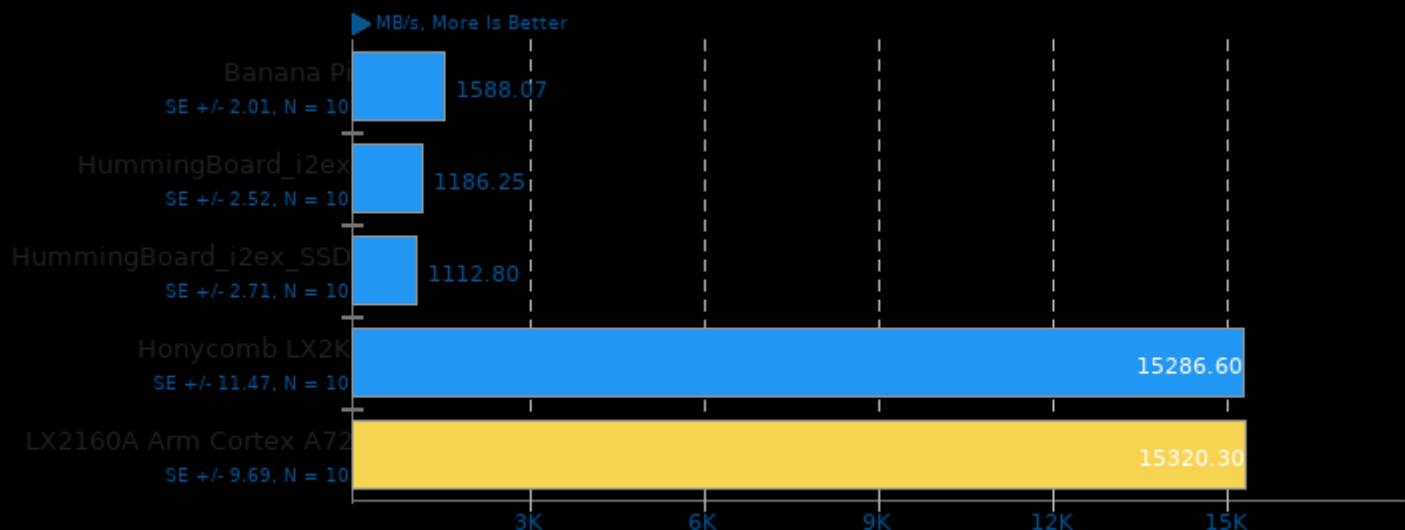
	Banana Pi	Raspberry Pi	HummingBoard_i2ex	HummingBoard_i2ex_SS	HummingBoard_i1	Honeycomb LX2K	LX2160A
			D			Arm Cortex A72	
Stream - Copy (MB/s)	1588		1186	1113		15287	15320
Normalized	10.37%		7.74%	7.26%		99.78%	100%
Standard Deviation	0.4%		0.7%	0.8%		0.2%	0.2%
Stream - Scale (MB/s)	1315		1143	1076		15435	15437
Normalized	8.52%		7.4%	6.97%		99.99%	100%
Standard Deviation	0.2%		0.8%	1.1%		0.1%	0.3%
Stream - Triad (MB/s)	925.85		1031	1017		18360	18388
Normalized	5.04%		5.61%	5.53%		99.85%	100%
Standard Deviation	0.1%		0.2%	0.3%		0.2%	0.5%
Stream - Add (MB/s)	1088		1080	1057		18379	18302
Normalized	5.92%		5.88%	5.75%		100%	99.58%
Standard Deviation	0.1%		0.3%	0.3%		0.4%	0.5%
SciMark - Composite (Mflops)	57.88	24.40	87.18	86.61	91.95	514.36	534.94
Normalized	10.82%	4.56%	16.3%	16.19%	17.19%	96.15%	100%
Standard Deviation	0.1%	0.1%	0.1%	0.2%	0.1%	14.6%	0.2%
SciMark - Monte Carlo (Mflops)	37.74	25.71	65.23	65.31	66.28	227.74	226.14
Normalized	16.57%	11.29%	28.64%	28.68%	29.1%	100%	99.3%
Standard Deviation	0.1%	0%	0.2%	0.3%	0.5%	1.4%	1.3%
SciMark - F.F.T (Mflops)	13.03	7.12	21.61	17.36	17.38	59.24	60.53
Normalized	21.53%	11.76%	35.7%	28.68%	28.71%	97.87%	100%
Standard Deviation	0.7%	0.1%	0.9%	1.4%	0.3%	8%	0.2%
SciMark - S.M.M (Mflops)	34.03	18.49	91.02	90.70	105.14	452.35	543.23
Normalized	6.26%	3.4%	16.76%	16.7%	19.35%	83.27%	100%
Standard Deviation	0%	0.4%	0.3%	0.2%	0.2%	42.2%	0.7%
SciMark - D.L.M.F (Mflops)	74.90	25.72	84.42	83.68	105.41	1104	1266
Normalized	5.92%	2.03%	6.67%	6.61%	8.33%	87.19%	100%
Standard Deviation	0%	0%	0.1%	0.1%	0.1%	30.8%	0.4%
SciMark - J.S.O.R (Mflops)	129.71	44.93	173.61	175.99	165.55	552.58	578.60
Normalized	22.42%	7.77%	30.01%	30.42%	28.61%	95.5%	100%
Standard Deviation	0.2%	0.2%	0.2%	0.2%	0.2%	9.7%	0%
x264 - H.2.V.E (FPS)	3.26		5.12	5.14	2.44		50.39
Normalized	6.47%		10.16%	10.2%	4.84%		100%
Standard Deviation	0.6%		0.9%	2.1%	0.3%		0.2%
7-Zip Compression - C.S.T (MIPS)	569	226	746	766			
Normalized	74.28%	29.5%	97.39%	100%			
Standard Deviation	0.3%	1.2%	2.5%	0.9%			
Parallel BZIP2	276.09	824.44	194.11	193.86	12.91		6.689
Compression - 2.F.C (sec)							
Normalized	2.42%	0.81%	3.45%	3.45%	51.81%		100%
Standard Deviation	2.7%	1.5%	2.3%	1.5%	3%		0.8%
LAME MP3 Encoding - WAV To MP3 (sec)	165.20	303.79	125.58	125.81	131.96		
Normalized	76.02%	41.34%	100%	99.82%	95.17%		
Standard Deviation	0.1%	1.9%	0.4%	0.1%	0.9%		
OpenSSL - R.4.b.P (Signs/sec)	6.07	2.40	8.27	8.30	4.10	220.1	219.8
Normalized	2.76%	1.09%	3.76%	3.77%	1.86%	100%	99.86%
Standard Deviation	1%	0%	0.7%	0%	0%	0%	0%

ARM-SBC-Benchmark

PyBench - T.F.A.T.T	29417 (Milliseconds)	62448	19887	20091	20446	4473	4464
Normalized	15.17%	7.15%	22.45%	22.22%	21.83%	99.8%	100%
Standard Deviation	0.1%	3%	0.1%	0%	0.1%	0.6%	0.5%
NGINX Benchmark -	1922	394.29	3848	4185			
S.W.P.S (Req/sec)							
Normalized	45.94%	9.42%	91.95%	100%			
Standard Deviation	0.3%	0%	1.5%	1.3%			
PHPBench - P.B.S (Score)	8017	3916	11389	11426	10871		
Normalized	70.16%	34.27%	99.68%	100%	95.14%		
Standard Deviation	0.4%	8%	0%	0.2%	0.1%		

Stream 2013-01-17

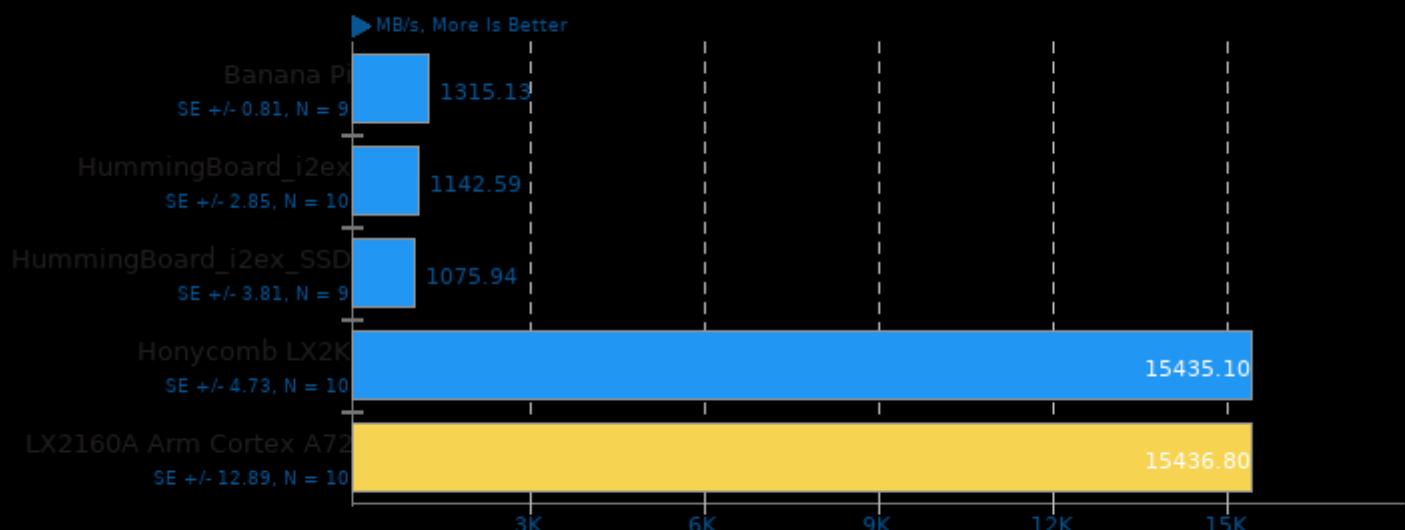
Type: Copy



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

Stream 2013-01-17

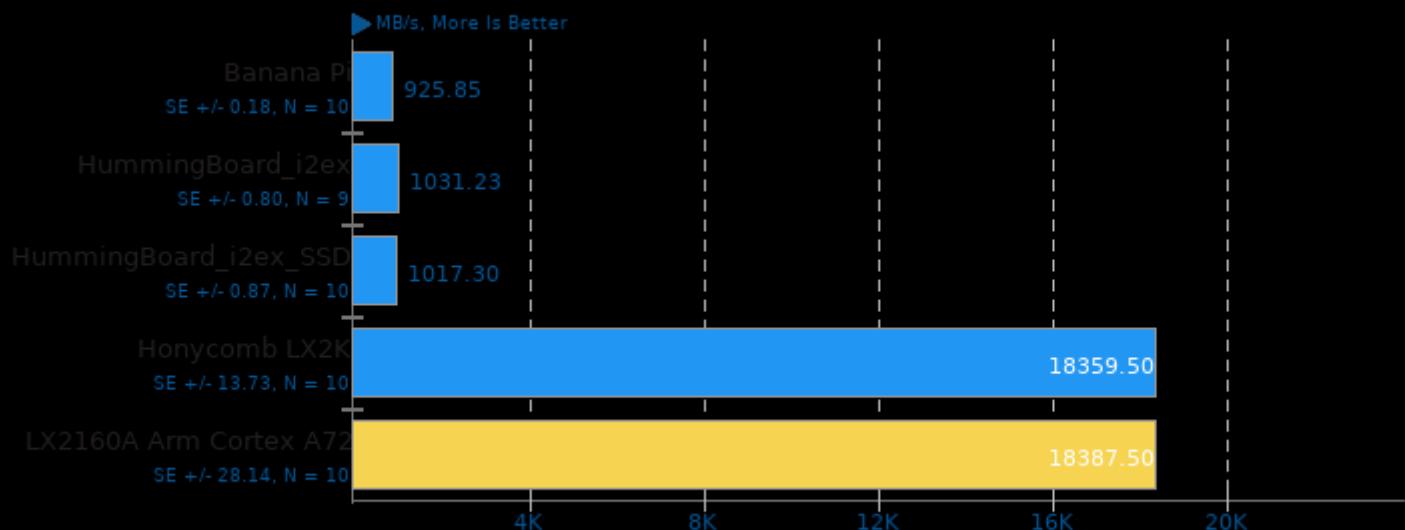
Type: Scale



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

Stream 2013-01-17

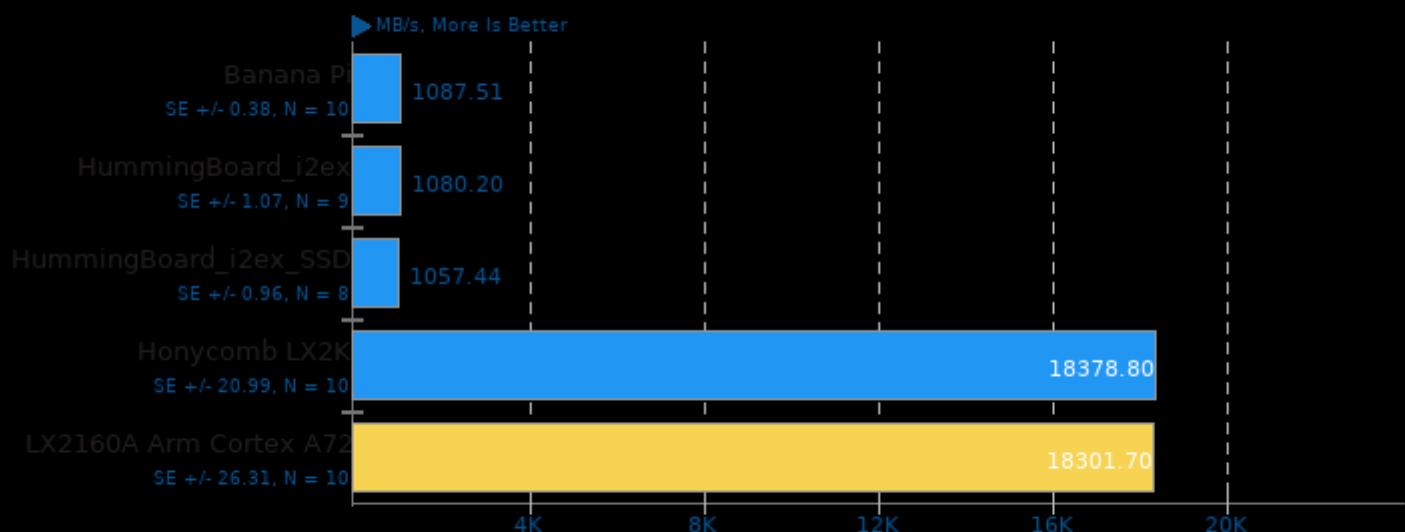
Type: Triad



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

Stream 2013-01-17

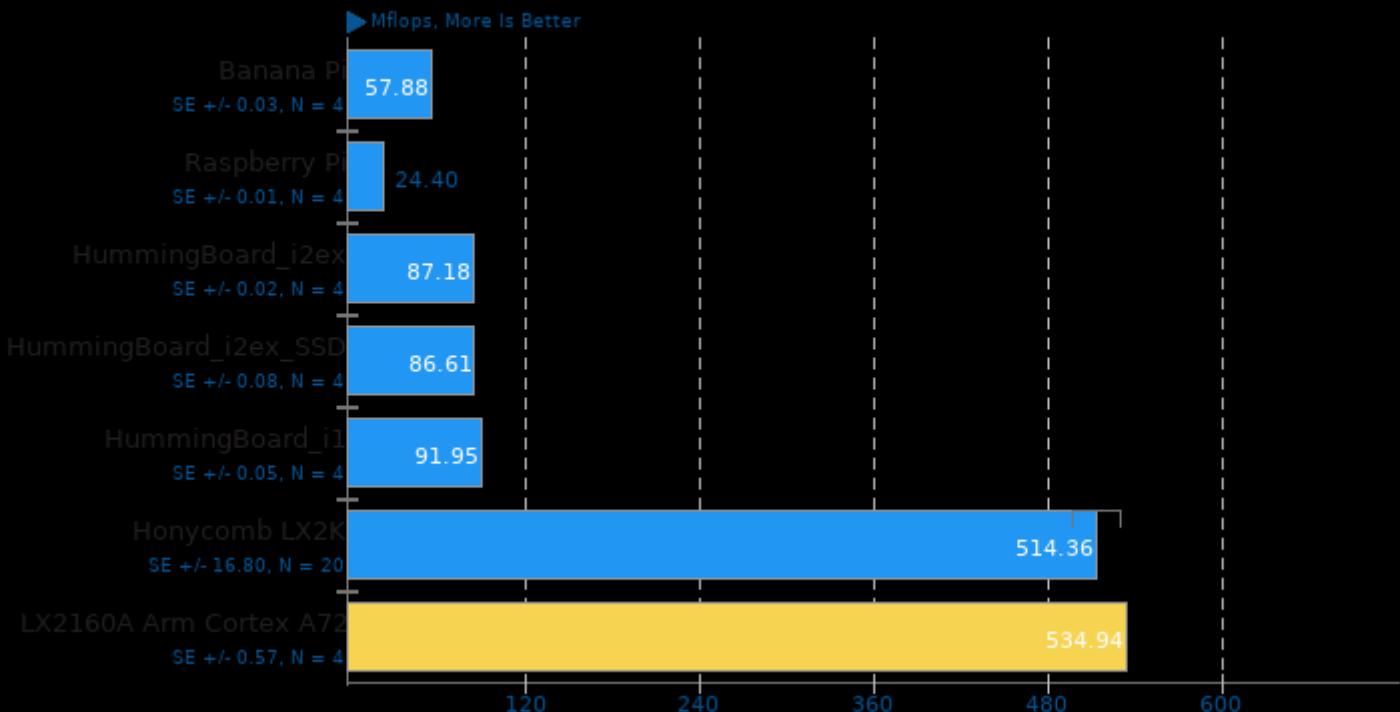
Type: Add



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

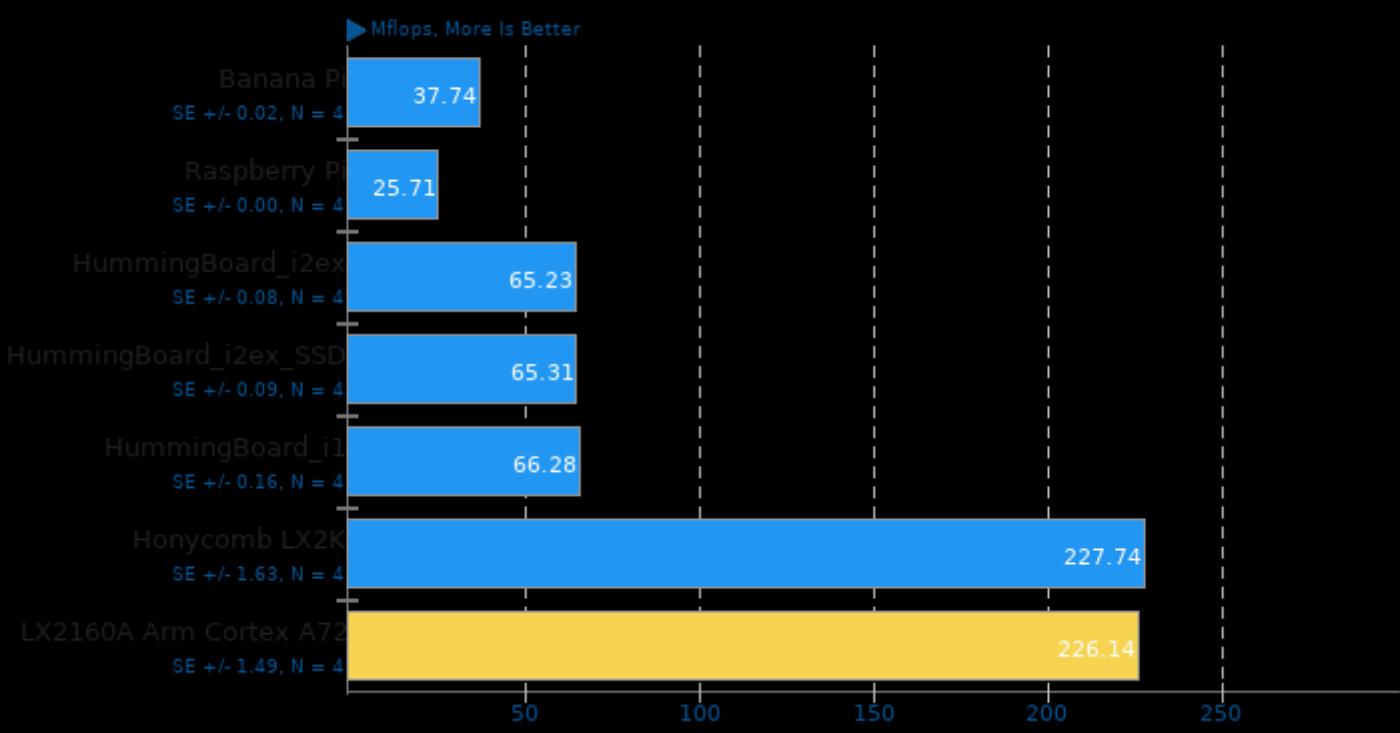
SciMark 2.0

Computational Test: Composite



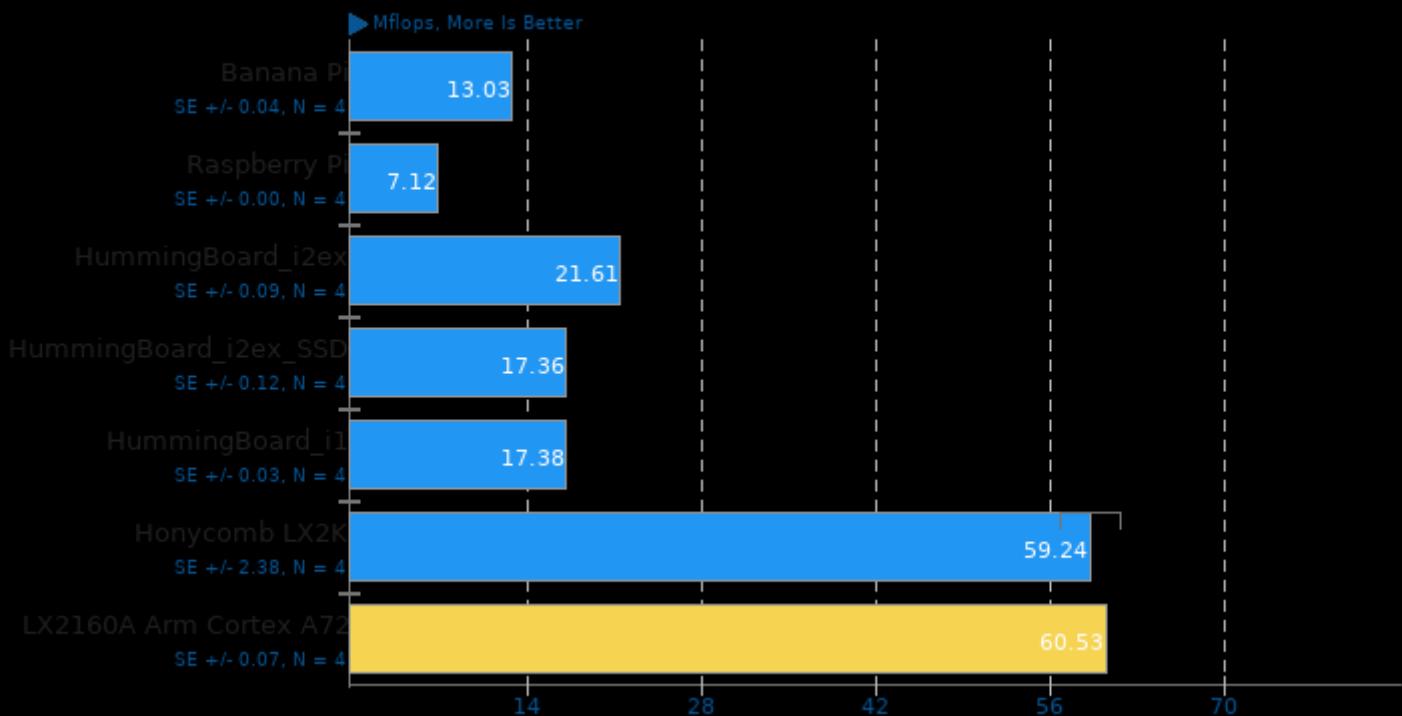
SciMark 2.0

Computational Test: Monte Carlo



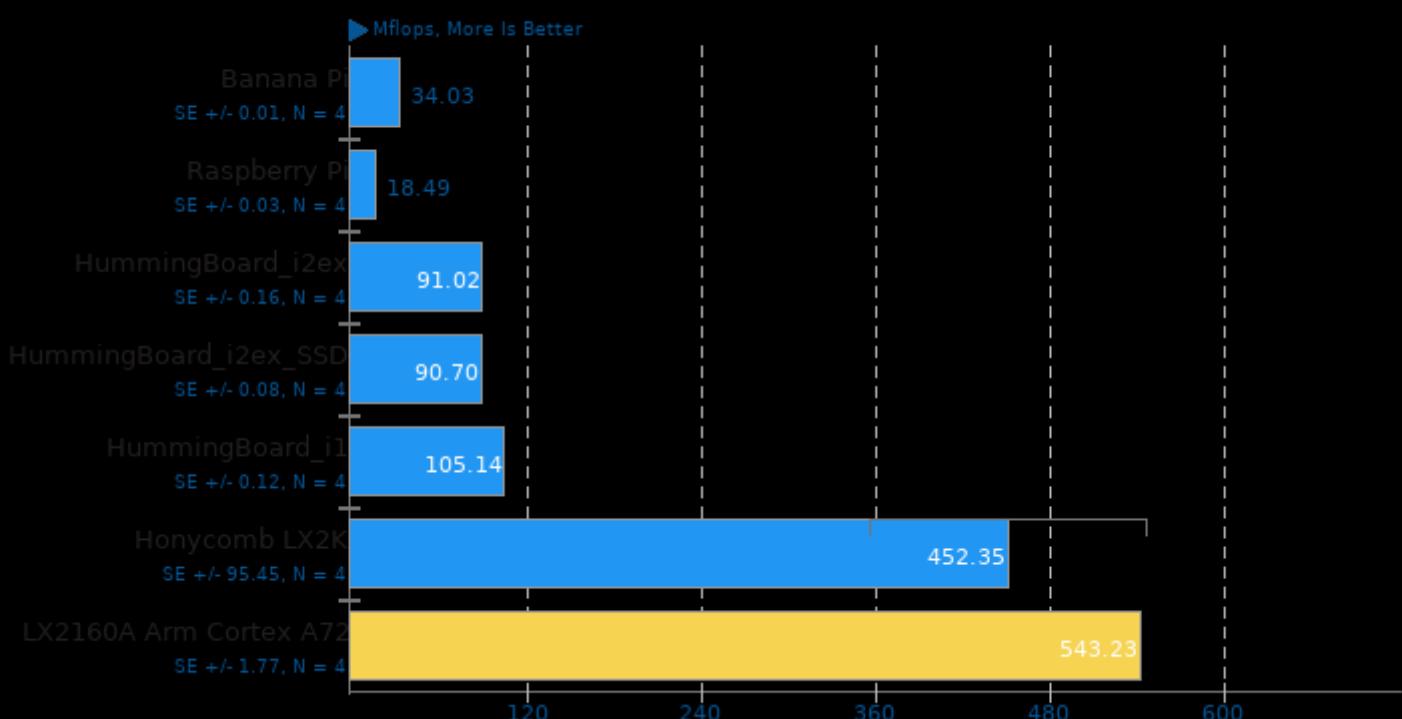
SciMark 2.0

Computational Test: Fast Fourier Transform



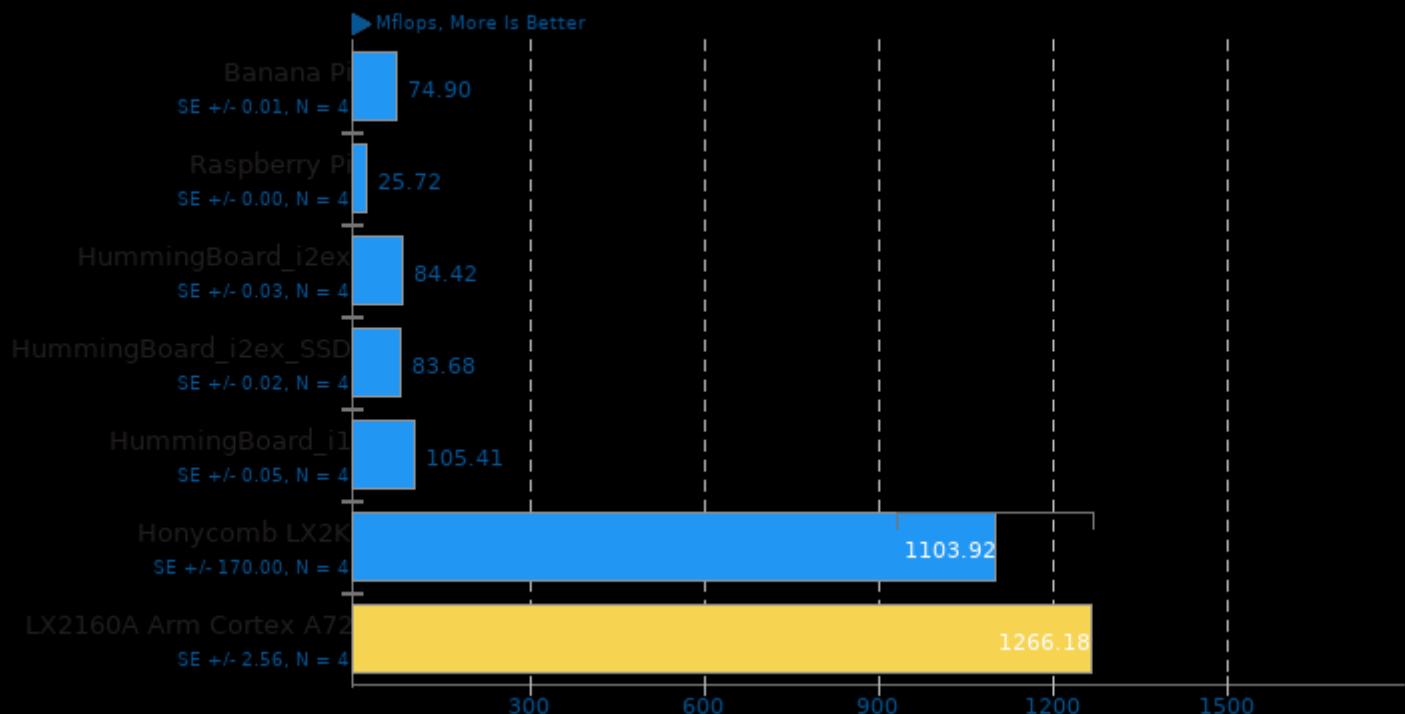
SciMark 2.0

Computational Test: Sparse Matrix Multiply



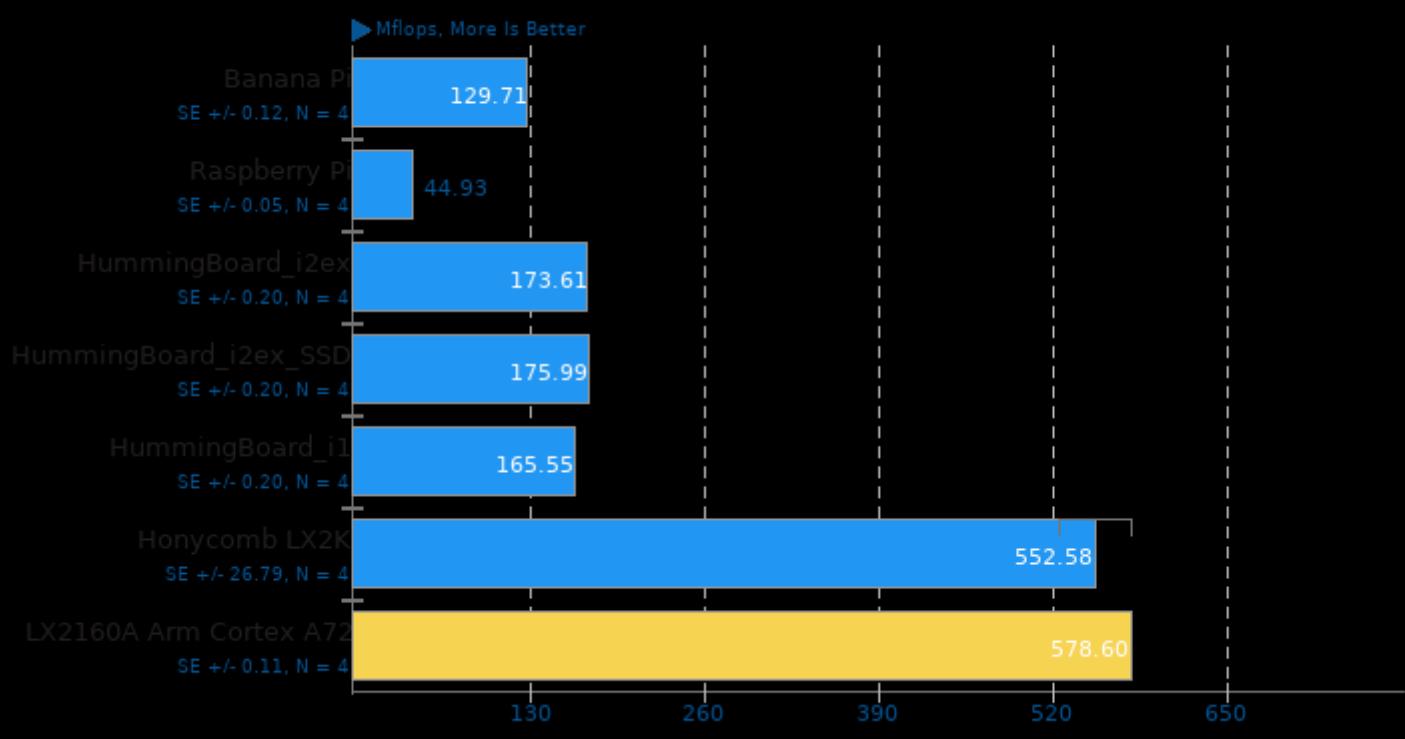
SciMark 2.0

Computational Test: Dense LU Matrix Factorization



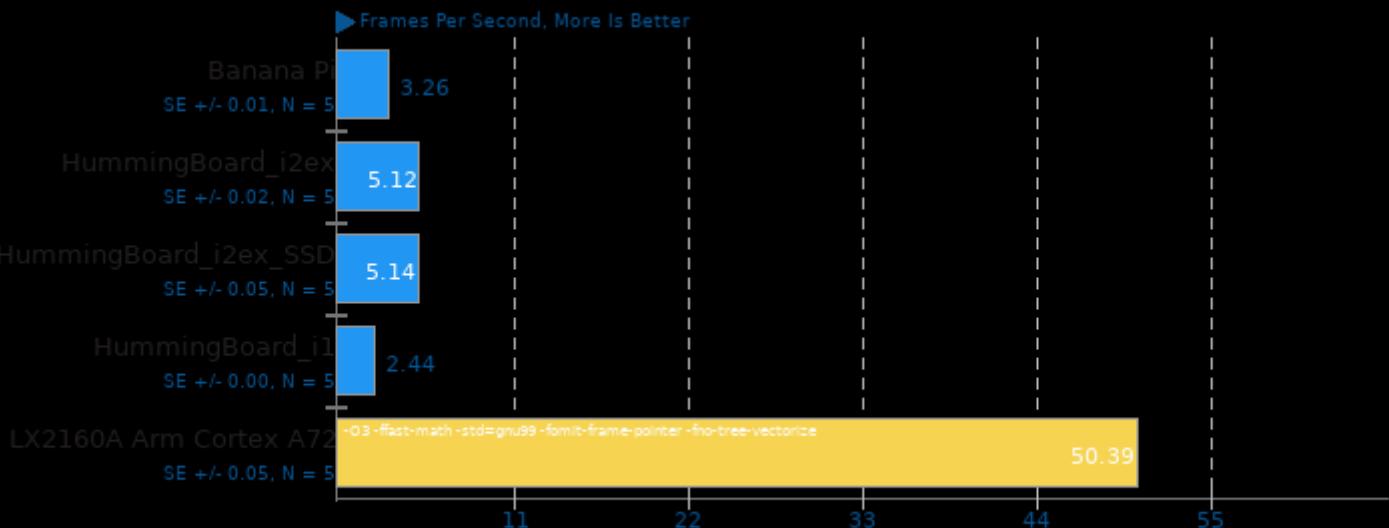
SciMark 2.0

Computational Test: Jacobi Successive Over-Relaxation



x264 2014-01-09

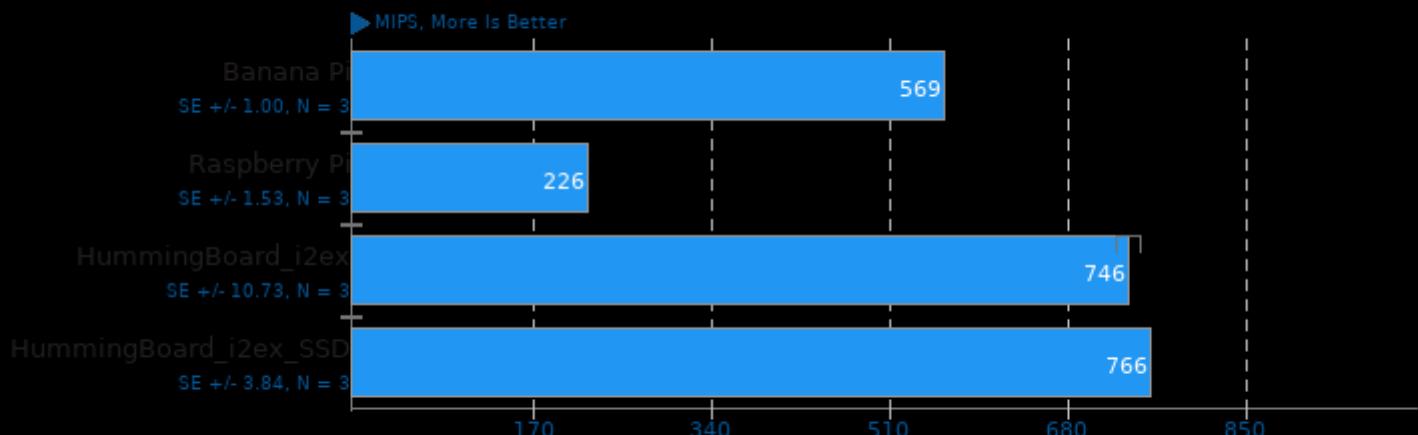
H.264 Video Encoding



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

7-Zip Compression 9.20.1

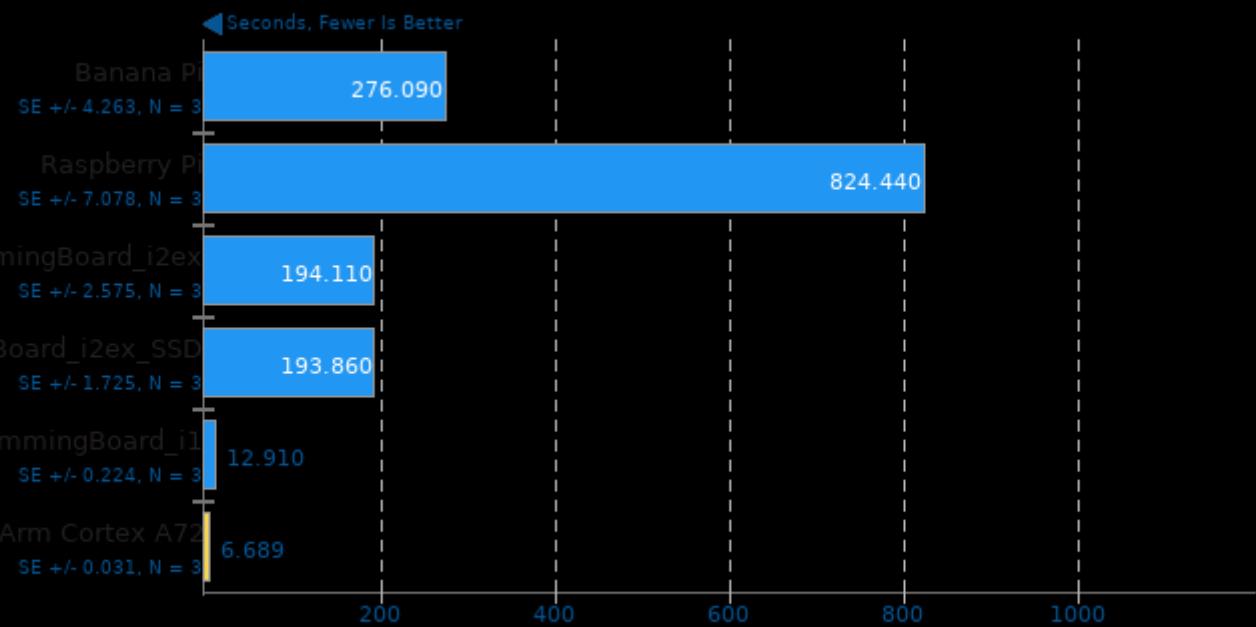
Compress Speed Test



1. (CXX) g++ options: -pipe -lpthread

Parallel BZIP2 Compression 1.1.6

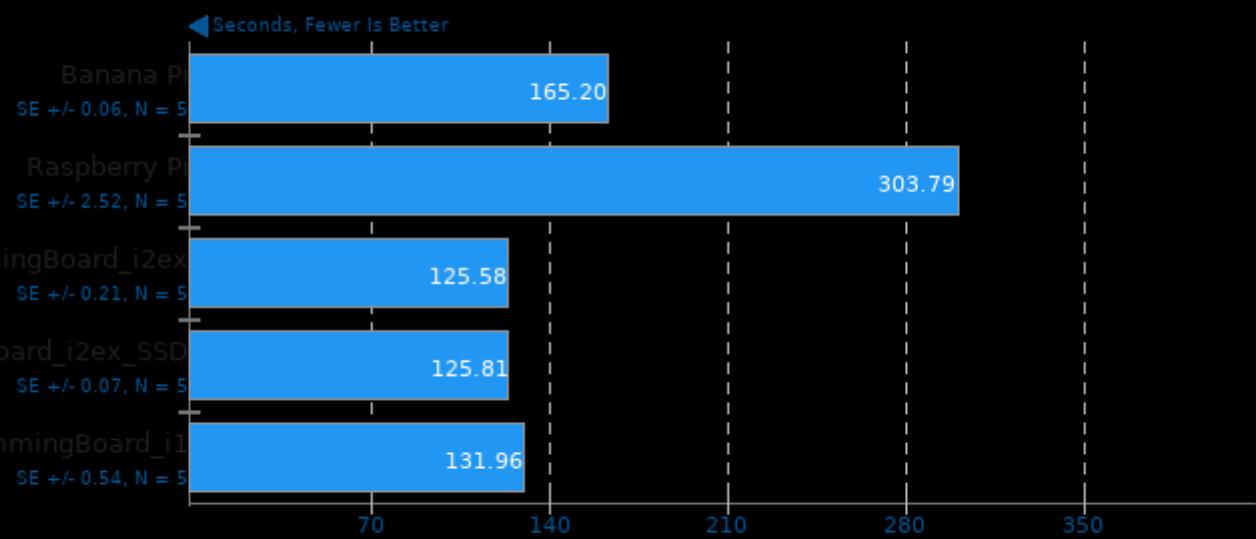
256MB File Compression



1. (CXX) g++ options: -O2 -pthread -lbz2 -lpthread

LAME MP3 Encoding 3.99.3

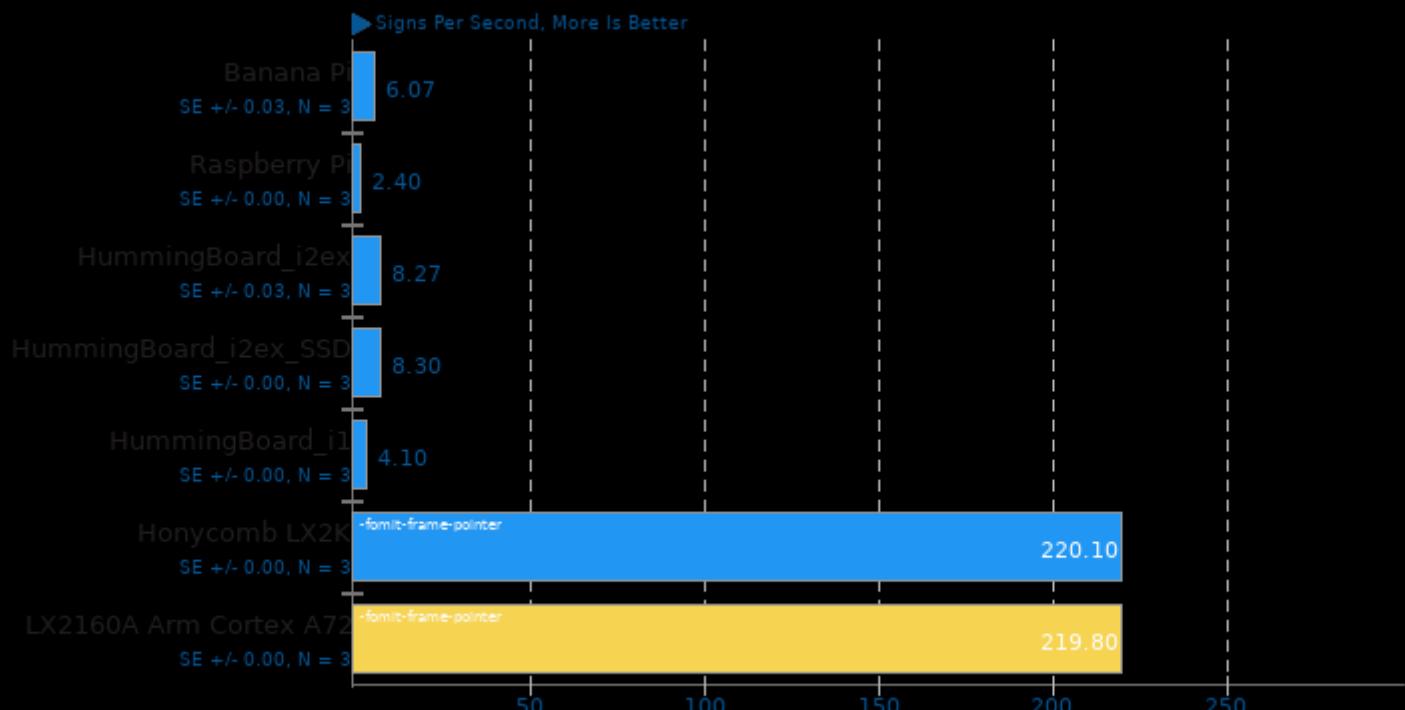
WAV To MP3



1. (CC) gcc options: -O3 -fomit-frame-pointer -ffast-math -pipe -lm

OpenSSL 1.0.1g

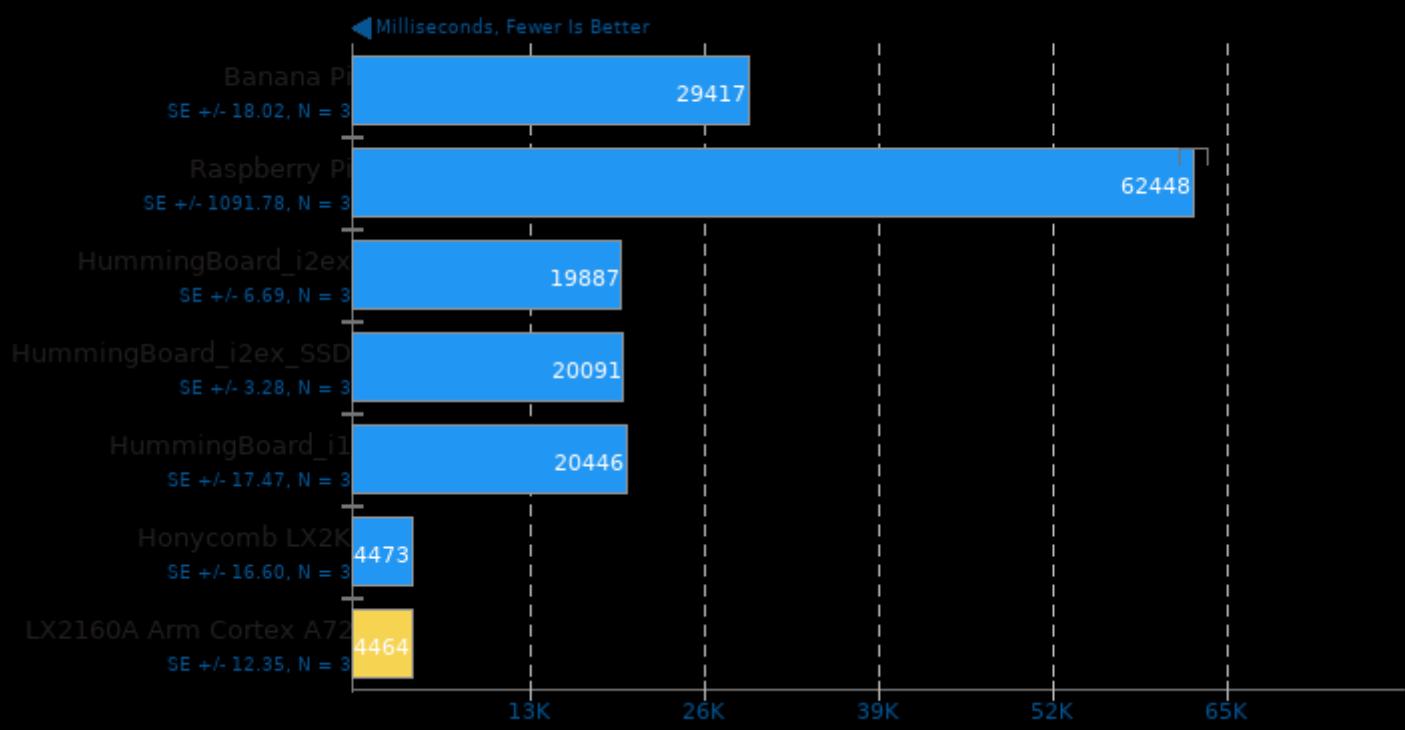
RSA 4096-bit Performance



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

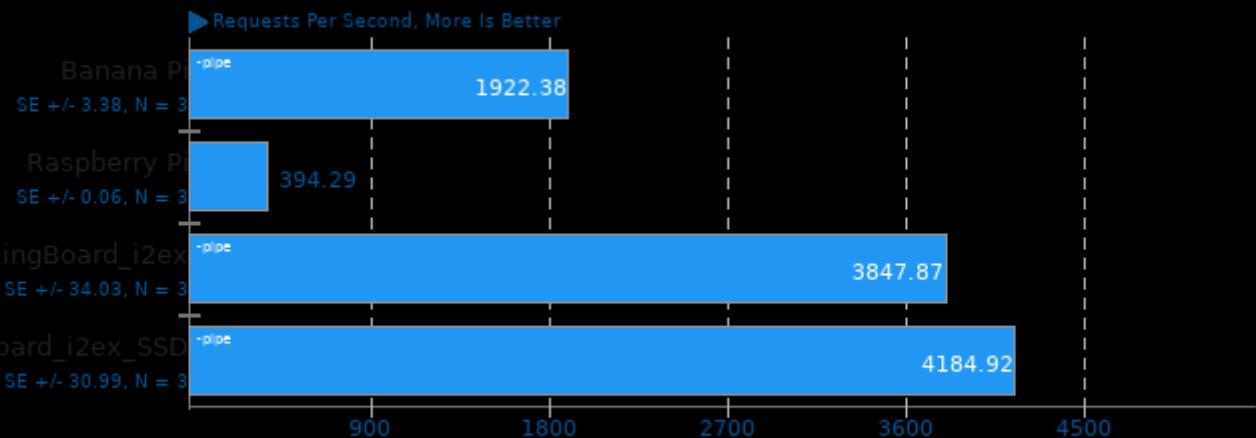
PyBench 2008-08-14

Total For Average Test Times



NGINX Benchmark 1.0.11

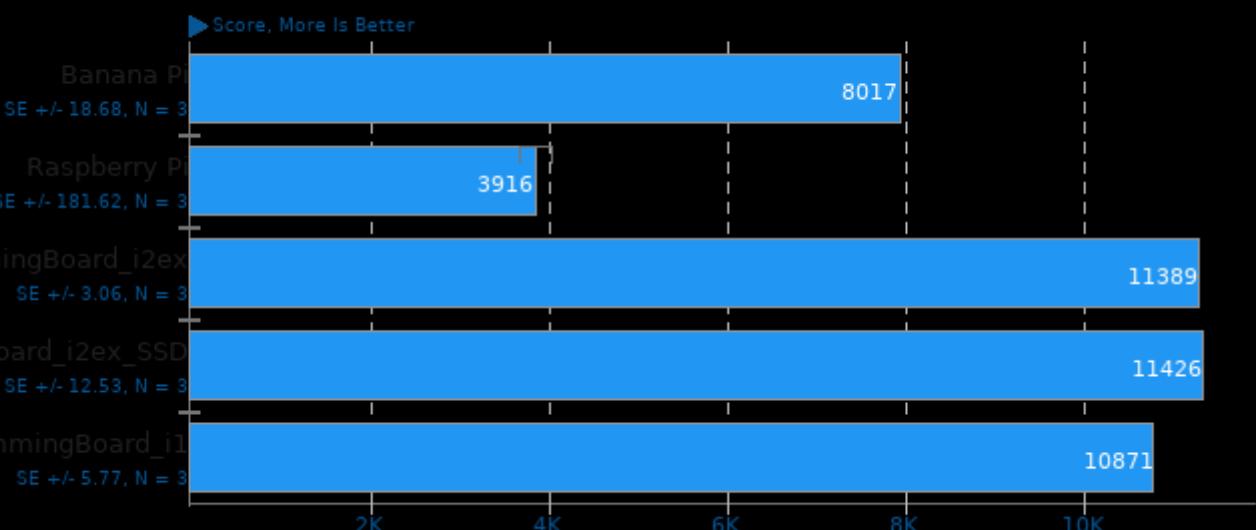
Static Web Page Serving



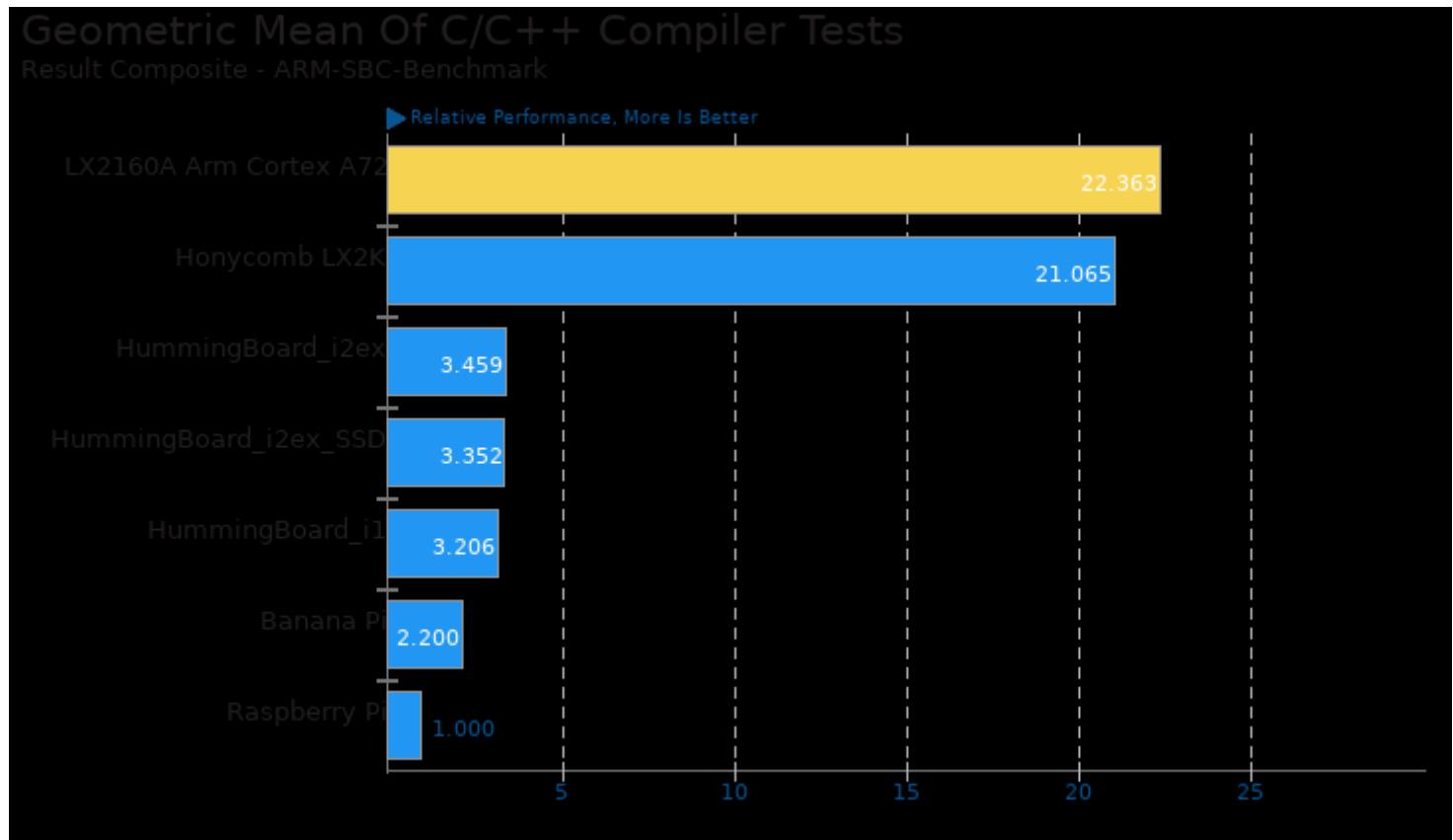
1. (CC) gcc options: -lpthread -lcrypt -lz

PHPBench 0.8.1

PHP Benchmark Suite



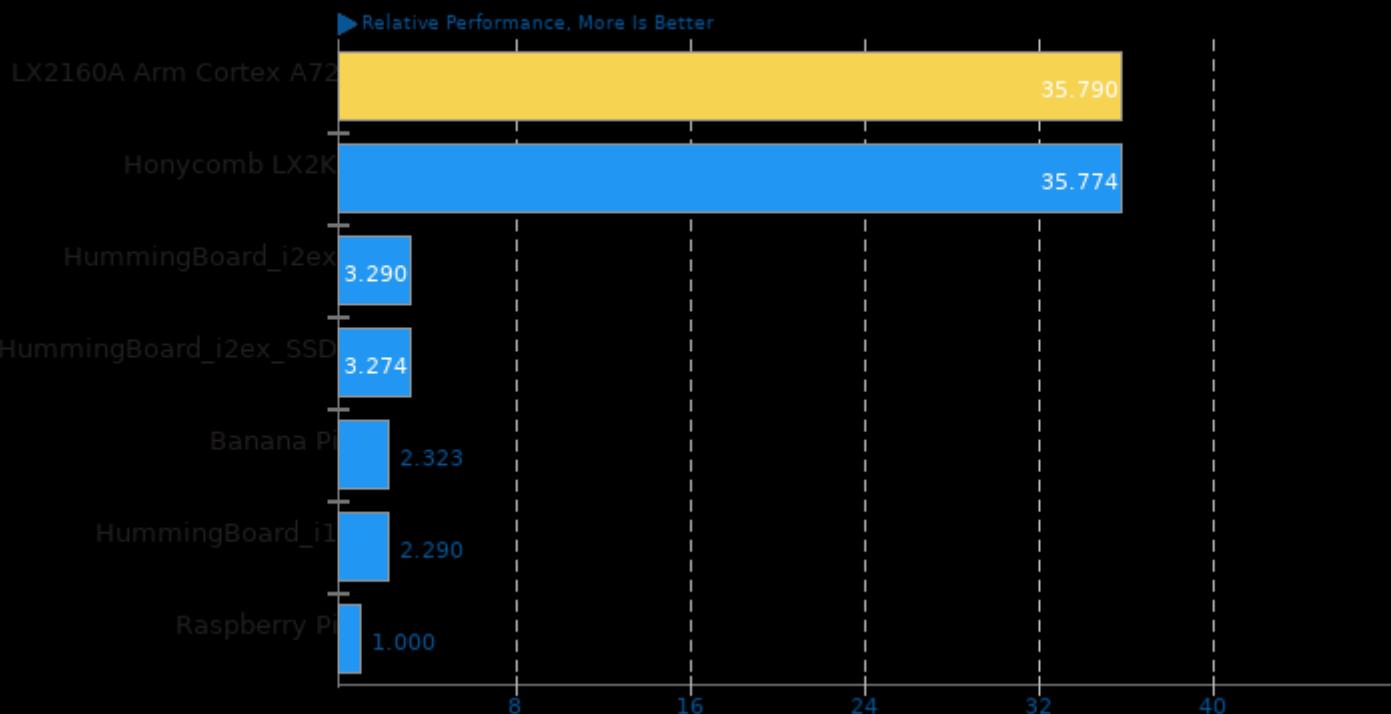
These geometric means are based upon test groupings / test suites for this result file.



Geometric mean based upon tests: pts/scimark2, pts/compress-7zip, pts/encode-mp3, pts/x264, pts/openssl and pts/nginx

Geometric Mean Of Server CPU Tests

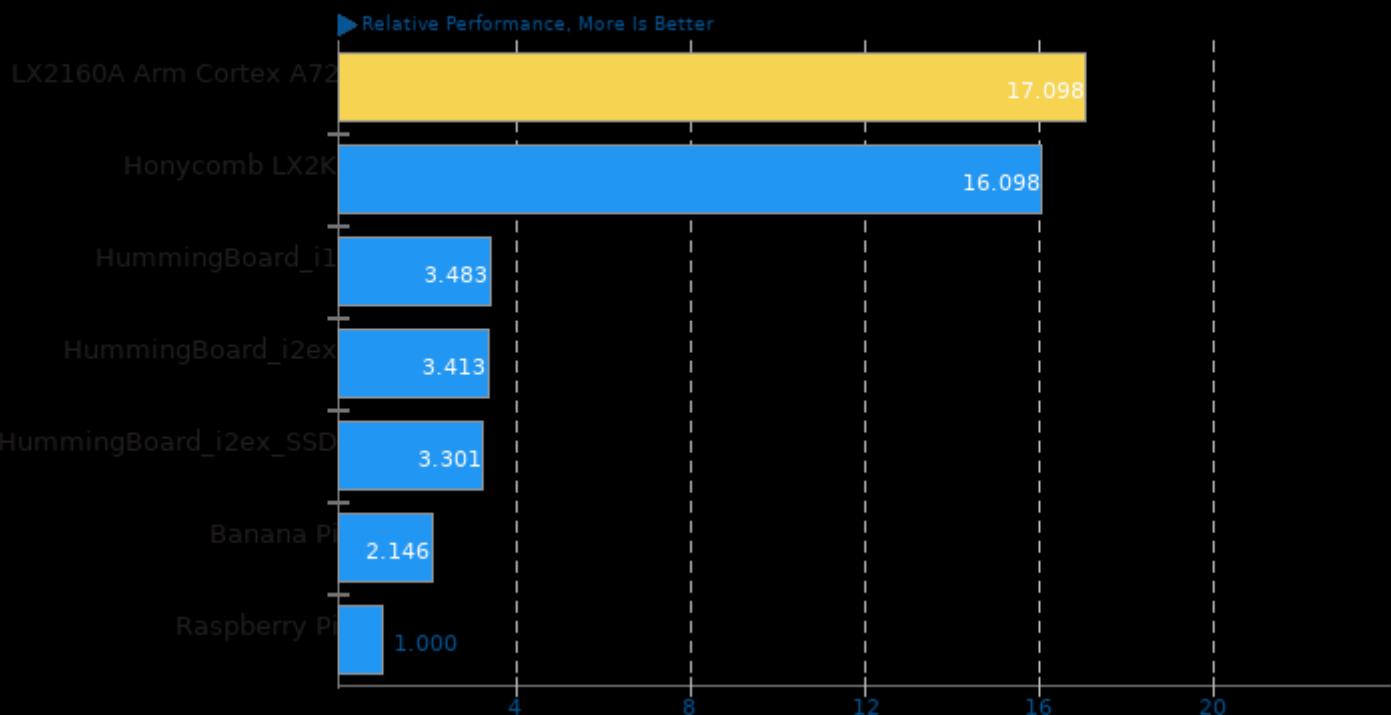
Result Composite - ARM-SBC-Benchmark



Geometric mean based upon tests: pts/x264, pts/compress-7zip, pts/openssl, pts/pybench, pts/phpbench and pts/stream

Geometric Mean Of Single-Threaded Tests

Result Composite - ARM-SBC-Benchmark



Geometric mean based upon tests: pts/scimark2, pts/encode-mp3, pts/pybench, pts/phpbench and pts/nginx

This file was automatically generated via the Phoronix Test Suite benchmarking software on Friday, 29 March 2024 02:38.