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Raspberry Pi Model 4 Benchmarks

My server vs Raspberry Pi 4

Automated Executive Summary

RPi Model 4 B 2GB had the most wins, coming in first place for 35% of the tests.

Based on the geometric mean of all complete results, the fastest (RPi Model 4 B 2GB) was 4.302x the speed of the slowest (RPi Model 3 B+). Intel Celeron N3050 was 0.965x the speed of RPi Model 4 B 2GB, RPi Model 4 B 4GB was 0.974x the speed of Intel Celeron N3050, ASUS Tinker Board was 0.84x the speed of RPi Model 4 B 4GB, Firefly ROC-RK3328-CC was 0.727x the speed of ASUS Tinker Board, Libre Board ALL-H3-CC H5 was 0.525x the speed of Firefly ROC-RK3328-CC, RPi Model 3 B+ was 0.772x the speed of Libre Board ALL-H3-CC H5.

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

x264 (H.264 Video Encoding) at 35.071x
Rust Prime Benchmark (Prime Number Test To 200,000,000) at 22.186x
Rust Prime Benchmark (Performance / Cost - Prime Number Test To 200,000,000) at 22.155x
FLAC Audio Encoding (WAV To FLAC) at 15.344x
PyBench (Total For Average Test Times) at 7.774x
PHPBench (PHP Benchmark Suite) at 6.563x
Perl Benchmarks (Performance / Cost - Test: Interpreter) at 6.529x

Perl Benchmarks (Test: Interpreter) at 6.458x
PyBench (Performance / Cost - Total For Average Test Times) at 6.047x
FLAC Audio Encoding (Performance / Cost - WAV To FLAC) at 5.426x.

Test Systems:

RPi Model 3 B+

Processor: ARMv7 rev 4 @ 1.40GHz (4 Cores), Motherboard: BCM2835 Raspberry Pi 3 Model B Plus Rev 1.3, Memory: 926MB, Disk: 32GB GB2MW, Graphics: BCM2708

OS: Raspbian 10, Kernel: 4.19.42-v7+ (armv7l), Display Server: X Server 1.20.4, Compiler: GCC 8.3.0, File-System: ext4, Screen Resolution: 656x416

Compiler Notes: --build=arm-linux-gnueabihf --disable-libitm --disable-libquadmath --disable-libquadmath-support --disable-sjlj-exceptions --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-languages=c,ada,c++,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc=auto --enable-plugin --enable-shared --enable-threads=posix --host=arm-linux-gnueabihf --program-prefix=arm-linux-gnueabihf- --target=arm-linux-gnueabihf --with-arch=armv6 --with-default-libstdcxx-abi=new --with-float=hard --with-fpu=vfp --with-gcc-major-version-only --with-target-system-zlib -v
Processor Notes: Scaling Governor: BCM2835 Freq ondemand
Python Notes: Python 2.7.16 + Python 3.7.3

ASUS Tinker Board

Processor: ARMv7 rev 1 @ 1.80GHz (4 Cores), Motherboard: Rockchip (Device Tree), Memory: 2048MB, Disk: 32GB GB1QT

OS: Debian 9.0, Kernel: 4.4.16-00006-g4431f98-dirty (armv7l), Desktop: LXDE, Display Server: X Server 1.18.4, Compiler: GCC 6.3.0 20170516, File-System: ext4, Screen Resolution: 1024x768

Compiler Notes: --build=arm-linux-gnueabihf --disable-browser-plugin --disable-libitm --disable-libquadmath --disable-sjlj-exceptions --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,ada,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc=auto --enable-plugin --enable-shared --enable-threads=posix --host=arm-linux-gnueabihf --program-prefix=arm-linux-gnueabihf- --target=arm-linux-gnueabihf --with-arch-directory=arm --with-arch=armv7-a --with-default-libstdcxx-abi=new --with-float=hard --with-fpu=vfpv3-d16 --with-mode=thumb --with-target-system-zlib -v
Processor Notes: Scaling Governor: cpufreq-dt interactive
Python Notes: Python 2.7.13 + Python 3.5.3

Libre Board ALL-H3-CC H5

Processor: ARMv8 Cortex-A53 (4 Cores), Motherboard: Libre Board ALL-H3-CC H5, Memory: 2048MB, Disk: 32GB GB1QT

OS: Raspbian 9.6, Kernel: 4.18.0-rc3-gfc36def997cf-dirty (aarch64), Display Server: X Server 1.19.2, Compiler: GCC 6.3.0 20170516, File-System: ext4

Compiler Notes: --build=arm-linux-gnueabihf --disable-browser-plugin --disable-libitm --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,ada,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc=auto --enable-plugin --enable-shared --enable-threads=posix --host=arm-linux-gnueabihf --program-prefix=arm-linux-gnueabihf- --target=arm-linux-gnueabihf --with-arch-directory=arm --with-arch=armv6 --with-default-libstdcxx-abi=new --with-float=hard --with-fpu=vfp --with-target-system-zlib -v
Python Notes: Python 2.7.13 + Python 3.5.3

Firefly ROC-RK3328-CC

Processor: Rockchip ARMv8 Cortex-A53 @ 1.39GHz (4 Cores), Motherboard: Firefly ROC-RK3328-CC, Memory: 2048MB, Disk: 32GB GB1QT

OS: Ubuntu 18.04, Kernel: 4.4.114 (aarch64), Display Server: X Server 1.18.4, Compiler: GCC 7.4.0, File-System: ext4, Screen Resolution: 1024x768

Compiler Notes: --build=aarch64-linux-gnu --disable-libquadmath --disable-libquadmath-support --disable-werror --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++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-plugin --enable-shared --enable-threads=posix --host=aarch64-linux-gnu --program-prefix=aarch64-linux-gnu- --target=aarch64-linux-gnu --with-default-libstdcxx-abi=new --with-gcc-major-version-only -v
Processor Notes: Scaling Governor: cpufreq-dt performance
Python Notes: Python 2.7.15rc1 + Python 3.6.7

RPi Model 4 B 4GB

Processor: ARMv7 rev 3 @ 1.50GHz (4 Cores), Motherboard: BCM2835 Raspberry Pi 4 Model B Rev 1.1, Memory: 4096MB, Disk: 16GB SC16G, Graphics: V3D 4.2 4GB, Monitor: DELL P2415Q

OS: Raspbian 10, Kernel: 4.19.50-v7l+ (armv7l), Desktop: LXDE 0.10.0, Display Server: X Server 1.20.4, Display Driver: modesetting 1.20.4, OpenGL: 2.1 Mesa 19.1.0-devel, Compiler: GCC 8.3.0, File-System: ext4, Screen Resolution: 1024x768

Compiler Notes: --build=arm-linux-gnueabihf --disable-libitm --disable-libquadmath --disable-libquadmath-support --disable-sjlj-exceptions --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-languages=c,ada,c++,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc=auto --enable-plugin --enable-shared --enable-threads=posix --host=arm-linux-gnueabihf --program-prefix=arm-linux-gnueabihf- --target=arm-linux-gnueabihf --with-arch=armv6 --with-default-libstdcxx-abi=new --with-float=hard --with-fpu=vfp --with-gcc-major-version-only --with-target-system-zlib -v
Processor Notes: Scaling Governor: BCM2835 Freq ondemand
Python Notes: Python 2.7.16 + Python 3.7.3

RPi Model 4 B 2GB

Processor: ARMv7 rev 3 @ 1.50GHz (4 Cores), Motherboard: BCM2835 Raspberry Pi 4 Model B Rev 1.1, Memory: 2048MB, Disk: 16GB SC16G, Graphics: V3D 4.2 2GB, Monitor: DELL P2415Q

OS: Raspbian 10, Kernel: 4.19.50-v7l+ (armv7l), Desktop: LXDE 0.10.0, Display Server: X Server 1.20.4, Display Driver: modesetting 1.20.4, OpenGL: 2.1 Mesa 19.1.0-devel, Compiler: GCC 8.3.0, File-System: ext4, Screen Resolution: 1024x768

Compiler Notes: --build=arm-linux-gnueabihf --disable-libitm --disable-libquadmath --disable-libquadmath-support --disable-sjlj-exceptions --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-languages=c,ada,c++,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc=auto --enable-plugin --enable-shared --enable-threads=posix --host=arm-linux-gnueabihf --program-prefix=arm-linux-gnueabihf- --target=arm-linux-gnueabihf --with-arch=armv6 --with-default-libstdcxx-abi=new --with-float=hard --with-fpu=vfp --with-gcc-major-version-only --with-target-system-zlib -v
Processor Notes: Scaling Governor: BCM2835 Freq ondemand
Python Notes: Python 2.7.16 + Python 3.7.3

Intel Celeron N3050

Processor: Intel Celeron N3050 @ 2.16GHz (2 Cores), Motherboard: ASRock N3050M (P1.40 BIOS), Chipset: Intel Atom/Celeron/Pentium, Memory: 8192MB, Disk: 64GB ADATA SP900, Graphics: Intel Atom/Celeron/Pentium x5-E8000/J3xxx/N3xxx IGP (600MHz), Monitor: HDMI2K, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 18.04, Kernel: 4.15.0-58-generic (x86_64), Compiler: GCC 7.4.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --enable-libmpx --enable-libstdcxx-debug --enable-libstdcxx-time=yes

--enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: intel_pstate powersave
Python Notes: Python 2.7.15+ + Python 3.6.8
Security Notes: l1tf: Not affected + mds: Mitigation of Clear buffers; SMT disabled + meltdown: Mitigation of PTI + spec_store_bypass: Not affected + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW STIBP: disabled RSB filling

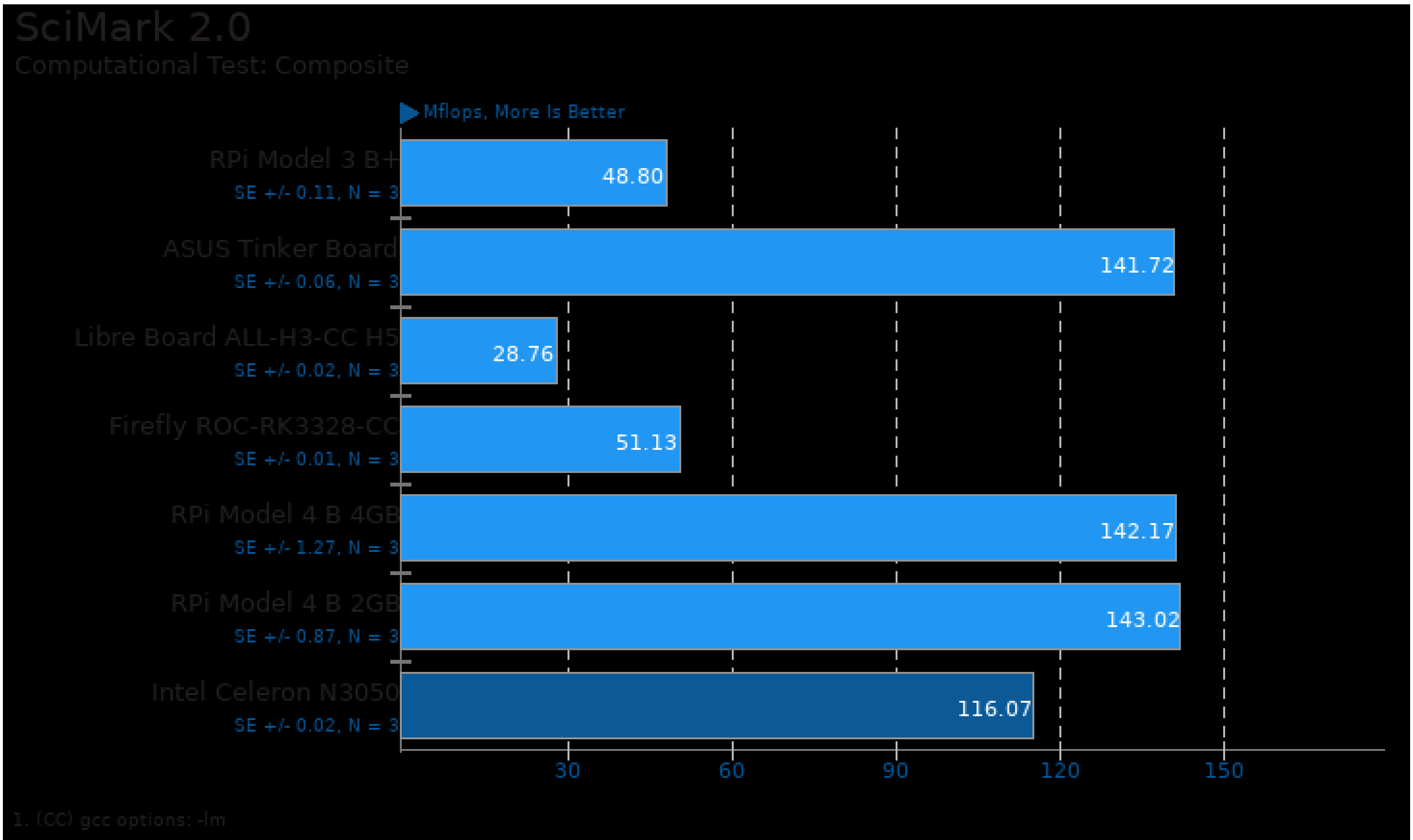
	RPi Model 3 B+	ASUS Tinker Board	Libre Board ALL-H3-CC H5	Firefly ROC-RK3328-CC	RPi Model 4 B 4GB	RPi Model 4 B 2GB	Intel Celeron N3050
SciMark - Composite (Mflops)	48.80	141.72	28.76	51.13	142.17	143.02	116.07
Normalized	34.12%	99.09%	20.11%	35.75%	99.41%	100%	81.16%
Standard Deviation	0.4%	0.1%	0.1%	0%	1.6%	1.1%	0%
x264 - H.2.V.E (FPS)	0.14	3.32		2.31	3.10	4.91	3.55
Normalized	2.85%	67.62%		47.05%	63.14%	100%	72.3%
Standard Deviation	0%	6.3%		0.2%	8.5%	2.1%	0.3%
GraphicsMagick - Rotate (Iterations/min)	16	66	24	44	63	64	66
Normalized	24.24%	100%	36.36%	66.67%	95.45%	96.97%	100%
Standard Deviation		3.4%			1.8%		
GraphicsMagick - Resizing (Iterations/min)	15	53	22	36	45	53	45
Normalized	28.3%	100%	41.51%	67.92%	84.91%	100%	84.91%
Standard Deviation		3.4%			2.9%		
Rust Prime Benchmark - P.N.T.T.2.0.0 (sec)	3106	1052		140	1104	658	384
Normalized	4.51%	13.31%		100%	12.68%	21.28%	36.46%
Standard Deviation	1.1%	1%		0.3%	0.6%	0%	0%
Smallpt - G.I.R.1.S (sec)	745	273	424	251	261	146	360
Normalized	19.6%	53.48%	34.43%	58.17%	55.94%	100%	40.56%
Standard Deviation	0.1%	0.9%	0.3%	1.1%	2.3%	2.9%	0.1%
Zstd Compression - C.u.1.0.3.s.i.i.C.L.1 (sec)	787	240	402	343	291	292	365
Normalized	30.5%	100%	59.7%	69.97%	82.47%	82.19%	65.75%
Standard Deviation	0.4%	0.3%	3.4%	0.1%	1.5%	1%	0.2%
FLAC Audio Encoding - WAV To FLAC (sec)	777.65	135.25	566.40	288.92	111.09	111.48	50.68
Normalized	6.52%	37.47%	8.95%	17.54%	45.62%	45.46%	100%
Standard Deviation	0.9%	3.4%	0.3%	0.7%	3.1%	0.7%	0.7%
LAME MP3 Encoding - WAV To MP3 (sec)	659	162	518	295	125	125	137
Normalized	18.97%	77.16%	24.13%	42.37%	100%	100%	91.24%
Standard Deviation	2.4%	0.6%	0%	0.2%	0.1%	0.1%	0%
Perl Benchmarks - Pod2html (sec)	2.56511278	0.78254268	2.57273250	1.31659761	0.61207402	0.62136299	0.67975162
Normalized	23.86%	78.22%	23.79%	46.49%	100%	98.51%	90.04%
Standard Deviation	5.2%	2%	0.6%	2%	0.8%	1.3%	0.2%

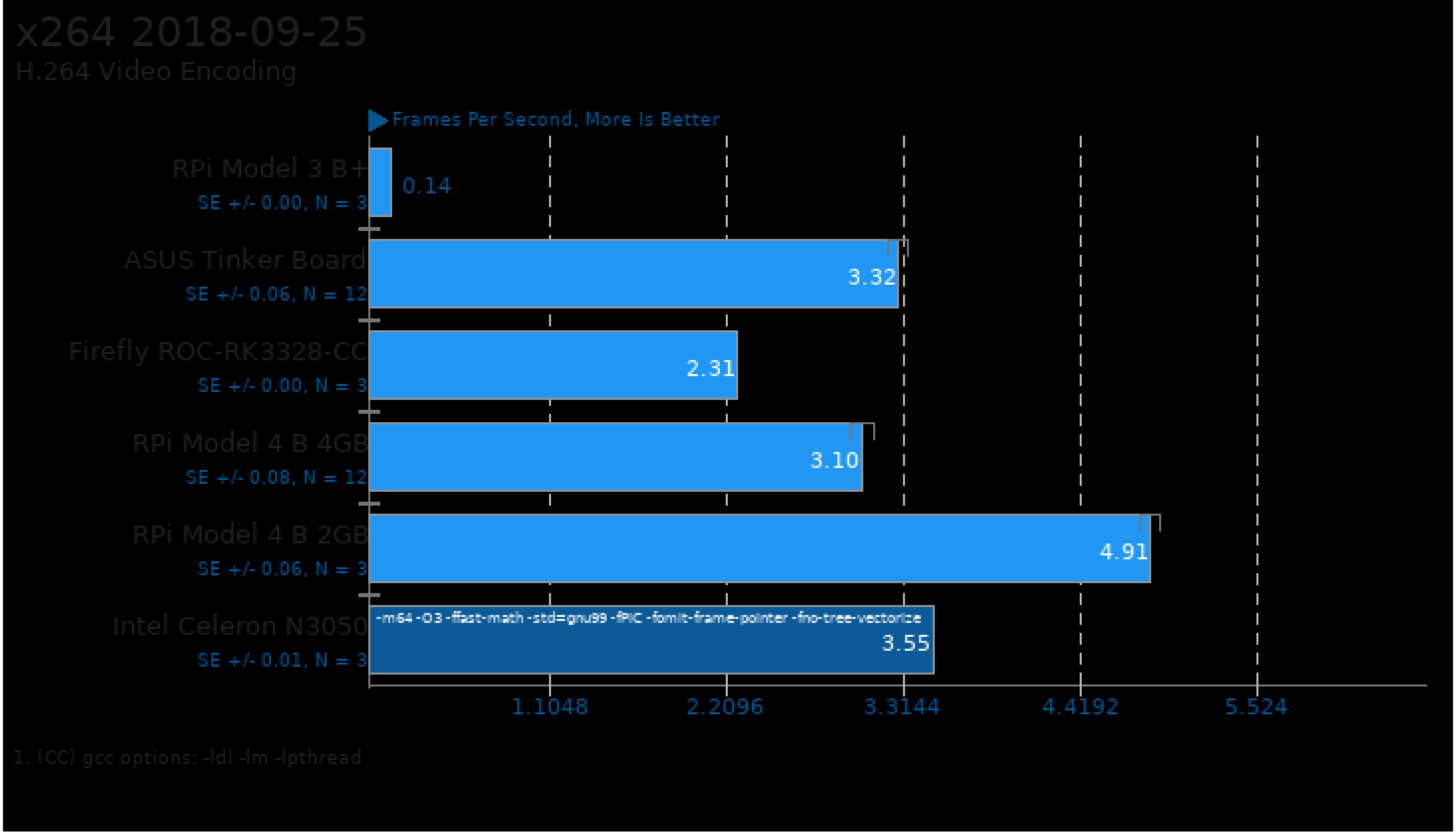
Raspberry Pi Model 4 Benchmarks

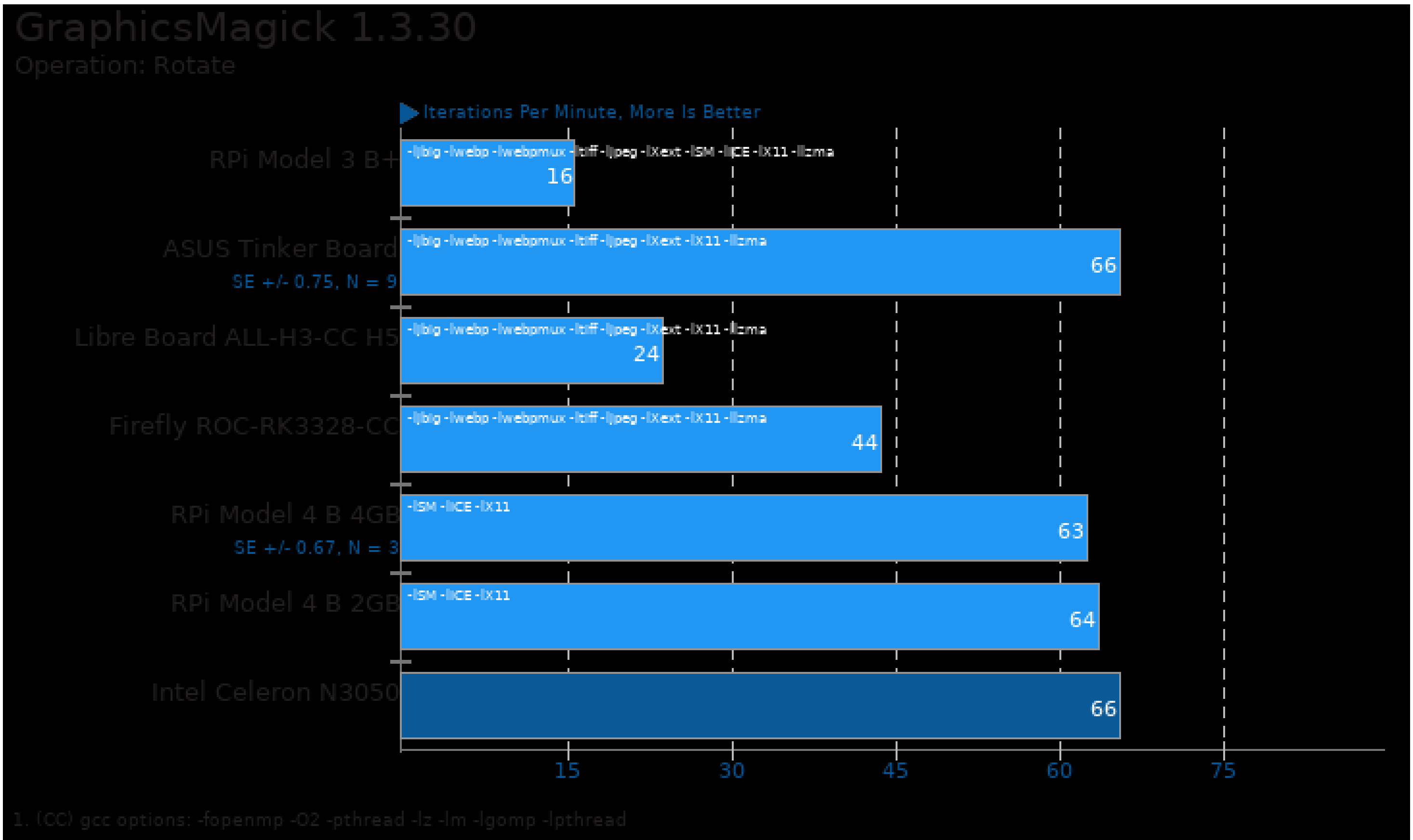
Perl Benchmarks - Interpreter (sec)	**0.03173653**	0.01229804	0.01091688	**0.00491447**	0.00778405	0.00826085	0.00636543
Normalized	15.49%	39.96%	45.02%	100%	63.14%	59.49%	77.21%
Standard Deviation	3.5%	0.4%	0.3%	0.5%	5.6%	6.9%	0.3%
PyBench - T.F.A.T.T (Milliseconds)	29609	9312	**40683**	13542	5249	**5233**	5587
Normalized	17.67%	56.2%	12.86%	38.64%	99.7%	100%	93.66%
Standard Deviation	0.5%	0.5%	0.8%	0.2%	0.2%	0.3%	0.3%
NGINX Benchmark - S.W.P.S (Reqs/sec)	**2012**	3880			4746	**5105**	4995
Normalized	39.41%	76%			92.97%	100%	97.85%
Standard Deviation	0.7%	1.6%			3.1%	0.1%	0.1%
PHPBench - P.B.S (Score)	**20275**	59450	21345	54131	101564	100678	**133062**
Normalized	15.24%	44.68%	16.04%	40.68%	76.33%	75.66%	100%
Standard Deviation	0.5%	3.3%	0.1%	0.2%	0.4%	0.9%	0.2%
SciMark - Performance / Cost - Composite (Mflops/Dollar)	1.39	2.00	**0.82**	1.46	2.58	**3.18**	
Normalized	43.71%	62.89%	25.79%	45.91%	81.13%	100%	
GraphicsMagick - Performance / Cost - Rotate	**0.46**	0.93	0.69	1.26	1.15	**1.42**	
Normalized	32.39%	65.49%	48.59%	88.73%	80.99%	100%	
GraphicsMagick - Performance / Cost - Resizing (Iterations/min/Dollar)	**0.43**	0.75	0.63	1.03	0.82	**1.18**	
Normalized	36.44%	63.56%	53.39%	87.29%	69.49%	100%	
Rust Prime Benchmark - Performance / Cost - P.N.T.T.2.0.0 (sec x Dollar)	**108715**	74726		**4907**	60738	29599	
Normalized	4.51%	6.57%		100%	8.08%	16.58%	
Smallpt - Performance / Cost - G.I.R.1.S (sec x Dollar)	**26059**	19404	14841	8798	14340	**6548**	
Normalized	25.13%	33.74%	44.12%	74.42%	45.66%	100%	
Zstd Compression - Performance / Cost - C.u.1.0.3.s.i.i.C.L.1 (sec x Dollar)	**27545**	17039	14075	**12016**	16031	13120	
Normalized	43.62%	70.52%	85.37%	100%	74.95%	91.59%	
FLAC Audio Encoding - Performance / Cost - WAV To FLAC (sec x Dollar)	**27218**	9603	19824	10112	6110	**5017**	
Normalized	18.43%	52.24%	25.31%	49.61%	82.11%	100%	
LAME MP3 Encoding - Performance / Cost - WAV To MP3 (sec x Dollar)	**23059**	11531	18147	10340	6894	**5635**	
Normalized	24.44%	48.87%	31.05%	54.49%	81.74%	100%	

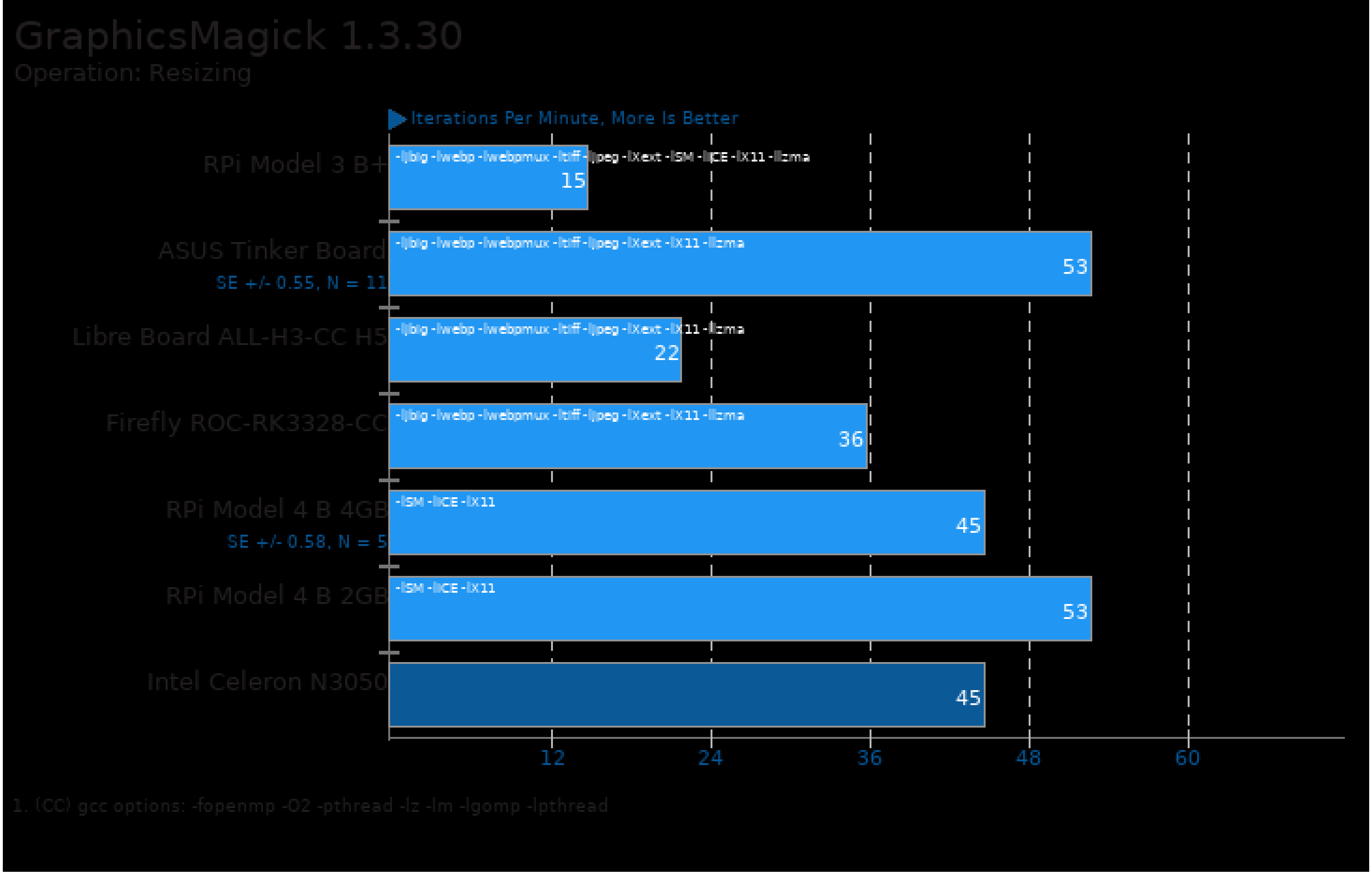
Raspberry Pi Model 4 Benchmarks

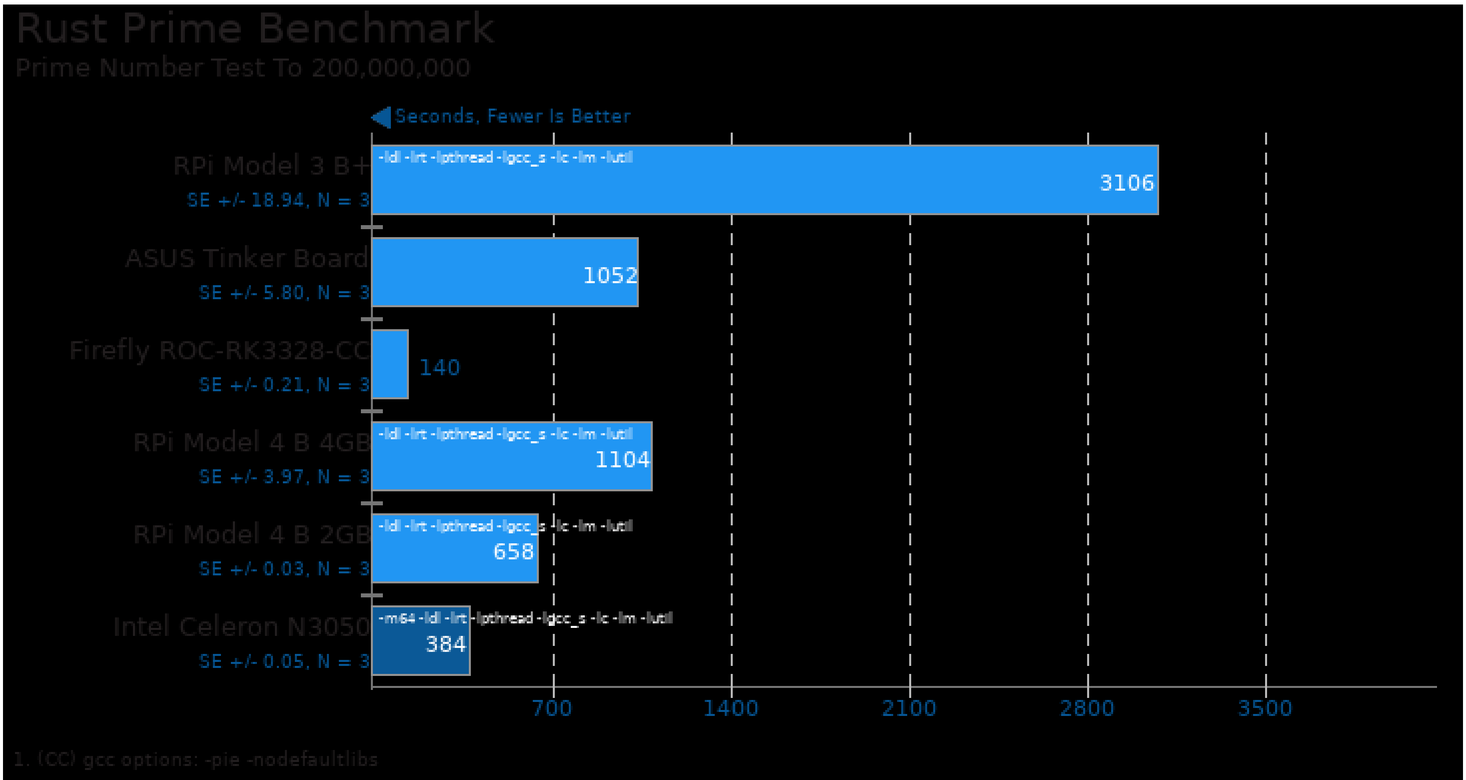
Perl Benchmarks - Performance / Cost - Pod2html (sec x Dollar)	89.78	55.56	**90.05**	46.08	33.66	**27.96**
Normalized	31.14%	50.32%	31.05%	60.68%	83.07%	100%
Perl Benchmarks - Performance / Cost - Interpreter (sec x Dollar)	**1.11**	0.87	0.38	**0.17**	0.43	0.37
Normalized	15.32%	19.54%	44.74%	100%	39.53%	45.95%
PyBench - Performance / Cost - T.F.A.T.T (Milliseconds x Dollar)	1036315	661152	**1423905**	473970	288695	**235485**
Normalized	22.72%	35.62%	16.54%	49.68%	81.57%	100%
NGINX Benchmark - Performance / Cost - S.W.P.S (Reqs/sec/Dollar)	57.49	**54.65**			86.29	**113.44**
Normalized	50.68%	48.18%			76.07%	100%
PHPBench - Performance / Cost - P.B.S	**579.29**	837.32	609.86	1547	1847	**2237**
Normalized	25.89%	37.43%	27.26%	69.13%	82.54%	100%
x264 - Performance / Cost - H.2.V.E (FPS/Dollar)		**0.05**		0.07	0.06	**0.11**
Normalized		45.45%		63.64%	54.55%	100%

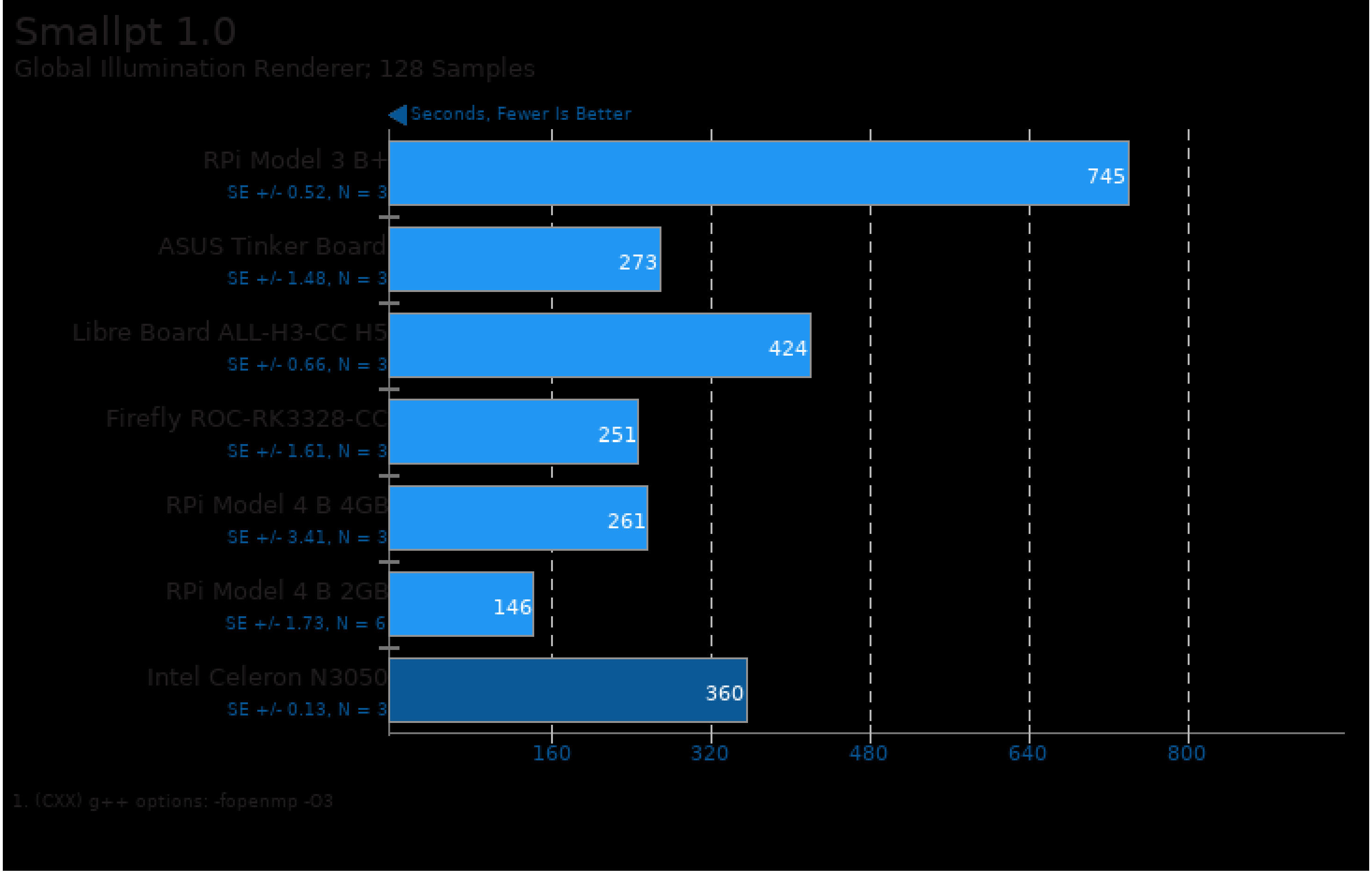

SciMark 2.0
Computational Test: Composite
Mflops, More Is Better
RPi Model 3 B+
SE +/- 0.11, N = 3
48.80
ASUS Tinker Board
SE +/- 0.06, N = 3
141.72
Libre Board ALL-H3-CC H5
SE +/- 0.02, N = 3
28.76
Firefly ROC-RK3328-CC
SE +/- 0.01, N = 3
51.13
RPi Model 4 B 4GB
SE +/- 1.27, N = 3
142.17
RPi Model 4 B 2GB
SE +/- 0.87, N = 3
143.02
Intel Celeron N3050
SE +/- 0.02, N = 3
116.07
30
60
90
120
150
1. (CC) gcc options: -lm

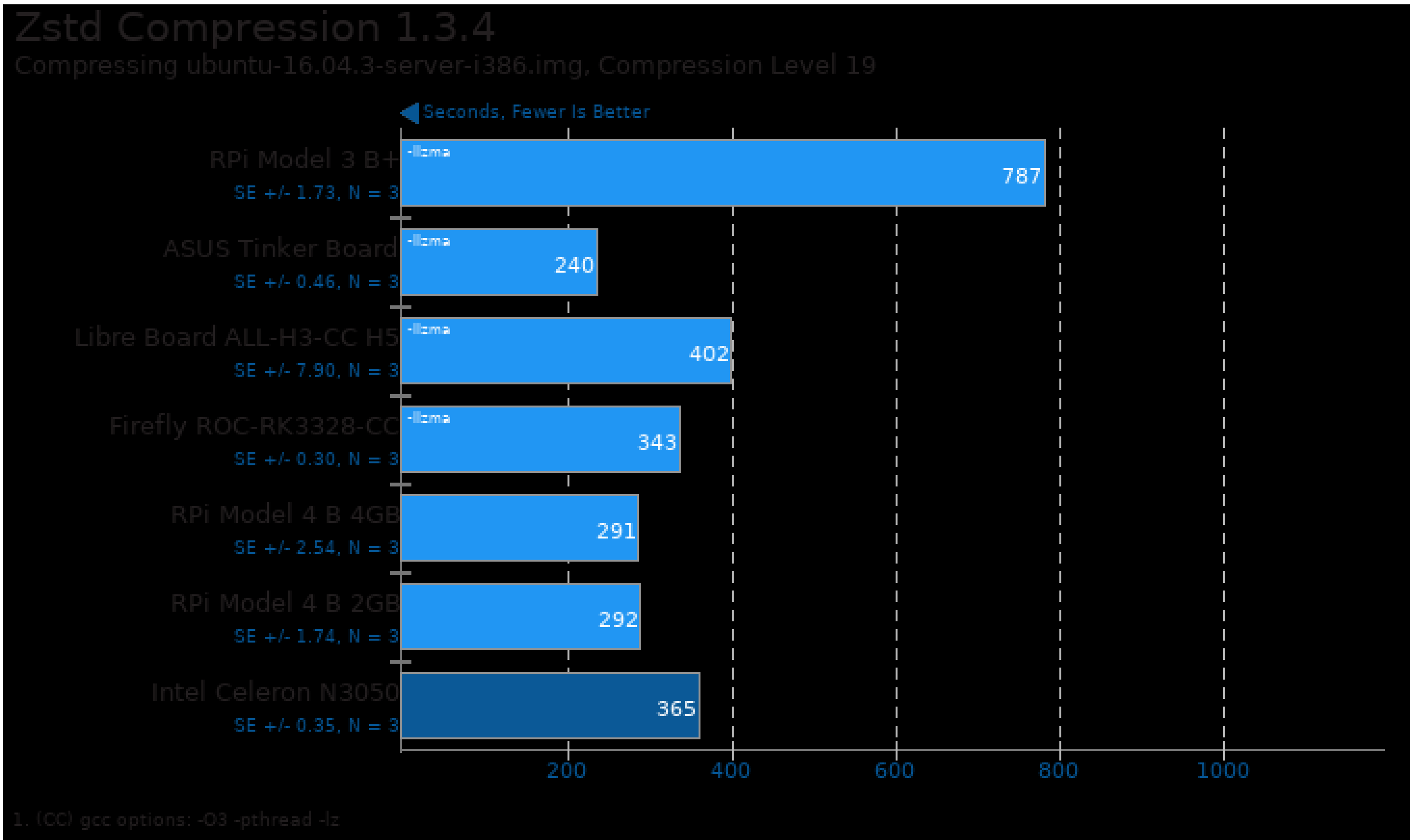

x264 2018-09-25
H.264 Video Encoding
Frames Per Second, More Is Better
RPi Model 3 B+
SE +/- 0.00, N = 3
0.14
ASUS Tinker Board
SE +/- 0.06, N = 12
3.32
Firefly ROC-RK3328-CC
SE +/- 0.00, N = 3
2.31
RPi Model 4 B 4GB
SE +/- 0.08, N = 12
3.10
RPi Model 4 B 2GB
SE +/- 0.06, N = 3
4.91
Intel Celeron N3050
SE +/- 0.01, N = 3
-m64 -O3 -ffast-math -std=gnu99 -fPIC -fomit-frame-pointer -fno-tree-vectorize
3.55
1.1048
2.2096
3.3144
4.4192
5.524
1. (CC) gcc options: -ldl -lm -lpthread

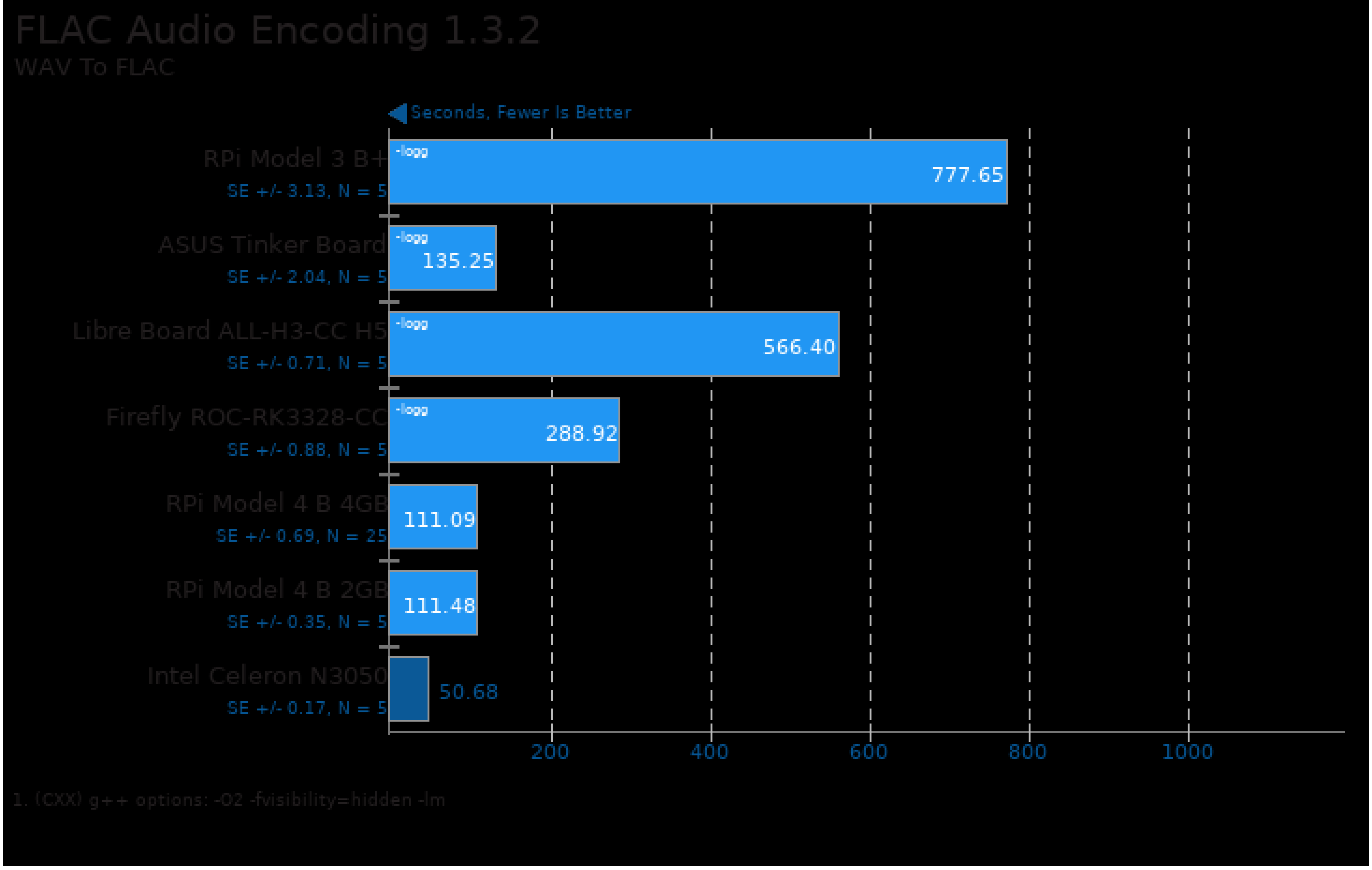

GraphicsMagick 1.3.30
Operation: Rotate
Iterations Per Minute, More Is Better
RPi Model 3 B+
-ljbig -lwebp -lwebpmux -ltiff -ljpeg -lXext -lSM -lICE -lX11 -llzma
16
ASUS Tinker Board
SE +/- 0.75, N = 9
-ljbig -lwebp -lwebpmux -ltiff -ljpeg -lXext -lX11 -llzma
66
Libre Board ALL-H3-CC H5
-ljbig -lwebp -lwebpmux -ltiff -ljpeg -lXext -lX11 -llzma
24
Firefly ROC-RK3328-CC
-ljbig -lwebp -lwebpmux -ltiff -ljpeg -lXext -lX11 -llzma
44
RPi Model 4 B 4GB
SE +/- 0.67, N = 3
-lSM -lICE -lX11
63
RPi Model 4 B 2GB
-lSM -lICE -lX11
64
Intel Celeron N3050
66
15
30
45
60
75
1. (CC) gcc options: -fopenmp -O2 -pthread -lz -lm -lgomp -lpthread

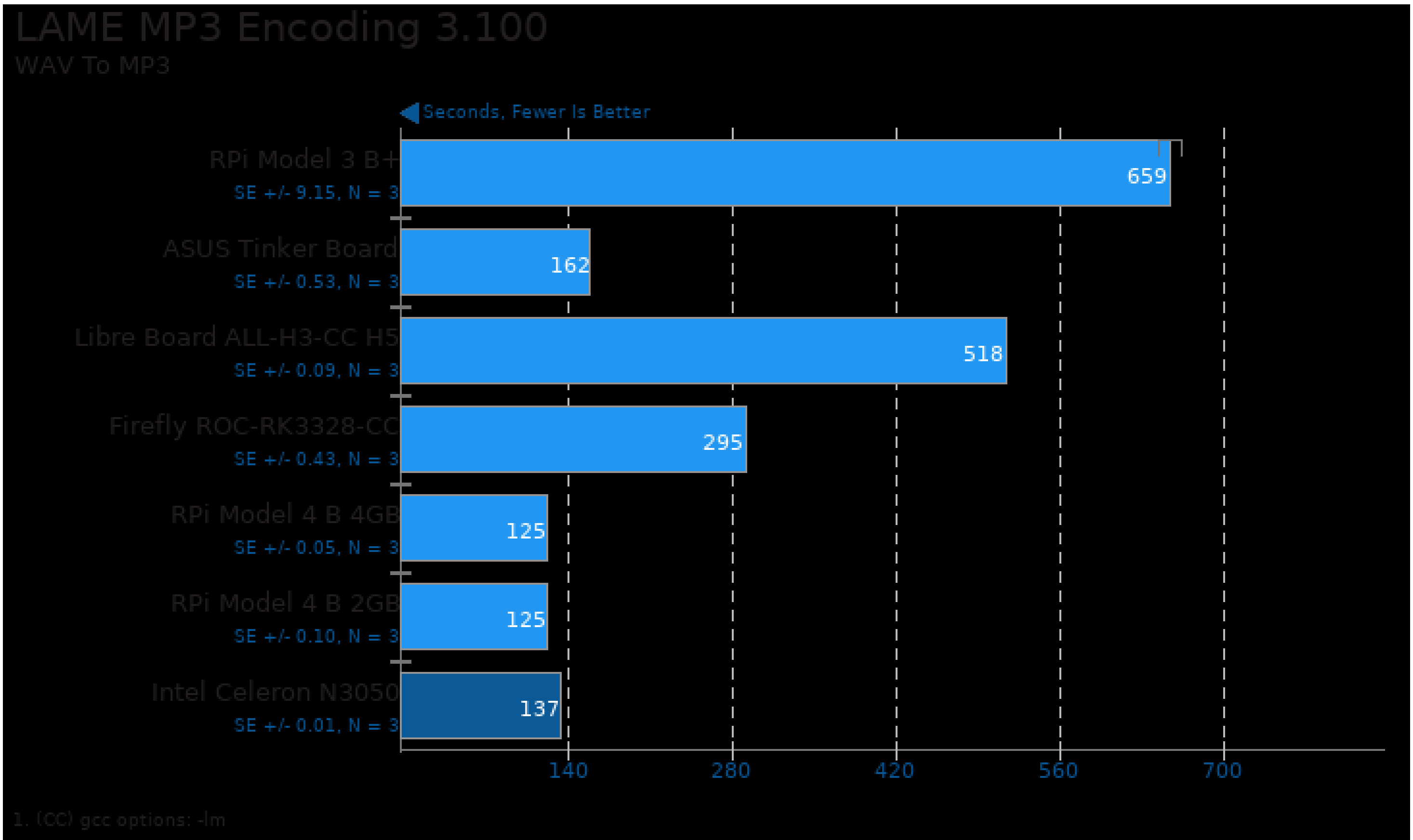

GraphicsMagick 1.3.30
Operation: Resizing
Iterations Per Minute, More Is Better
RPi Model 3 B+
-ljbig -lwebp -lwebpmux -ltiff -ljpeg -lXext -lSM -lICE -lX11 -llzma
15
ASUS Tinker Board
SE +/- 0.55, N = 11
-ljbig -lwebp -lwebpmux -ltiff -ljpeg -lXext -lX11 -llzma
53
Libre Board ALL-H3-CC H5
-ljbig -lwebp -lwebpmux -ltiff -ljpeg -lXext -lX11 -llzma
22
Firefly ROC-RK3328-CC
-ljbig -lwebp -lwebpmux -ltiff -ljpeg -lXext -lX11 -llzma
36
RPi Model 4 B 4GB
SE +/- 0.58, N = 5
-lSM -lICE -lX11
45
RPi Model 4 B 2GB
-lSM -lICE -lX11
53
Intel Celeron N3050
45
12
24
36
48
60
1. (CC) gcc options: -fopenmp -O2 -pthread -lz -lm -lgomp -lpthread


Rust Prime Benchmark
Prime Number Test To 200,000,000
Seconds, Fewer Is Better
RPi Model 3 B+
SE +/- 18.94, N = 3
-ldl -lrt -lpthread -lgcc_s -lc -lm -lutil
3106
ASUS Tinker Board
SE +/- 5.80, N = 3
1052
Firefly ROC-RK3328-CC
SE +/- 0.21, N = 3
140
RPi Model 4 B 4GB
SE +/- 3.97, N = 3
-ldl -lrt -lpthread -lgcc_s -lc -lm -lutil
1104
RPi Model 4 B 2GB
SE +/- 0.03, N = 3
-ldl -lrt -lpthread -lgcc_s -lc -lm -lutil
658
Intel Celeron N3050
SE +/- 0.05, N = 3
-m64 -ldl -lrt -lpthread -lgcc_s -lc -lm -lutil
384
700
1400
2100
2800
3500
1. (CC) gcc options: -pie -nodefaultlibs

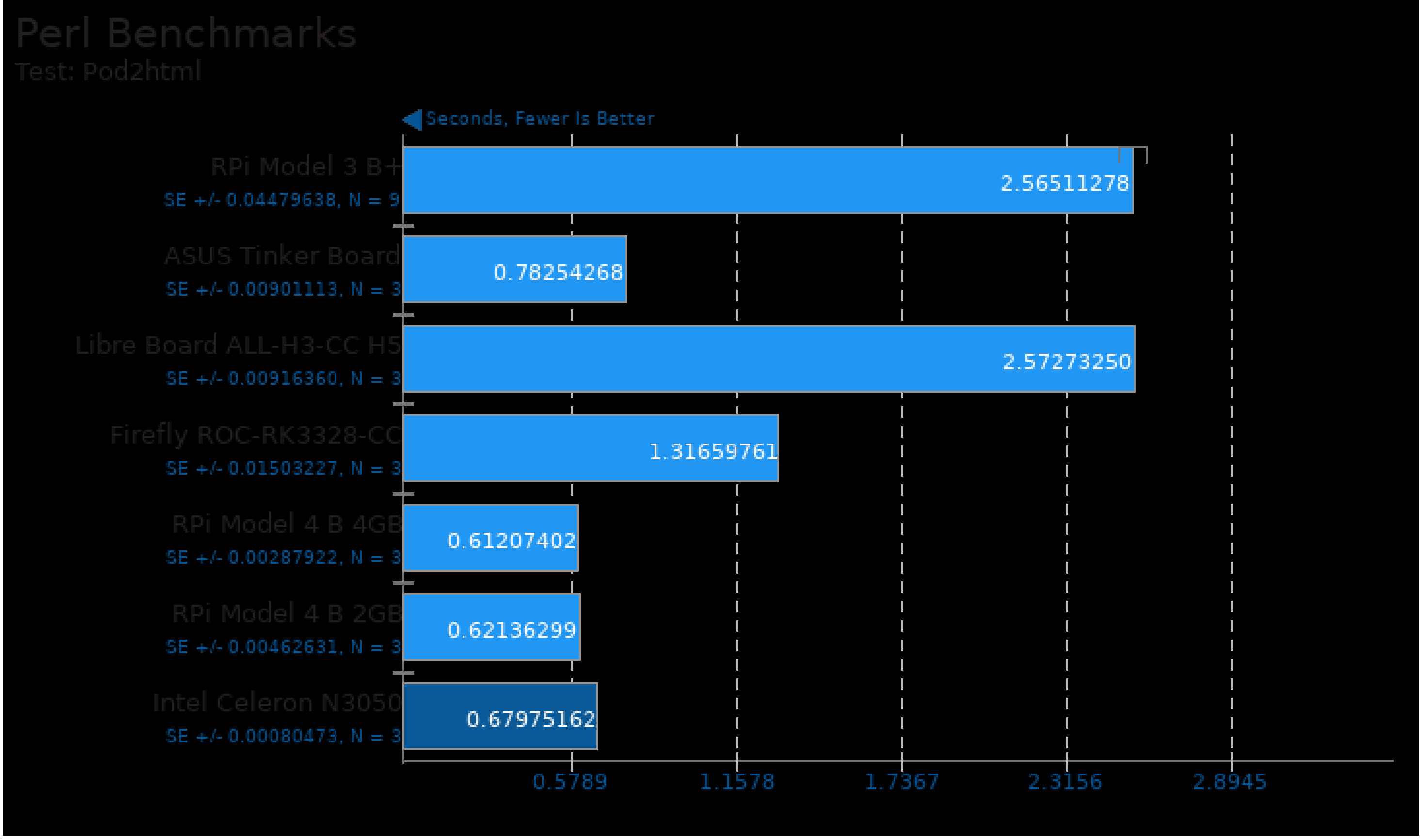

Smallpt 1.0
Global Illumination Renderer; 128 Samples
Seconds, Fewer Is Better
RPi Model 3 B+
SE +/- 0.52, N = 3
745
ASUS Tinker Board
SE +/- 1.48, N = 3
273
Libre Board ALL-H3-CC H5
SE +/- 0.66, N = 3
424
Firefly ROC-RK3328-CC
SE +/- 1.61, N = 3
251
RPi Model 4 B 4GB
SE +/- 3.41, N = 3
261
RPi Model 4 B 2GB
SE +/- 1.73, N = 6
146
Intel Celeron N3050
SE +/- 0.13, N = 3
360
160
320
480
640
800
1. (CXX) g++ options: -fopenmp -O3


Zstd Compression 1.3.4
Compressing ubuntu-16.04.3-server-i386.img, Compression Level 19
Seconds, Fewer Is Better
RPi Model 3 B+
SE +/- 1.73, N = 3
-llzma
787
ASUS Tinker Board
SE +/- 0.46, N = 3
-llzma
240
Libre Board ALL-H3-CC H5
SE +/- 7.90, N = 3
-llzma
402
Firefly ROC-RK3328-CC
SE +/- 0.30, N = 3
-llzma
343
RPi Model 4 B 4GB
SE +/- 2.54, N = 3
291
RPi Model 4 B 2GB
SE +/- 1.74, N = 3
292
Intel Celeron N3050
SE +/- 0.35, N = 3
365
200
400
600
800
1000
1. (CC) gcc options: -O3 -pthread -lz

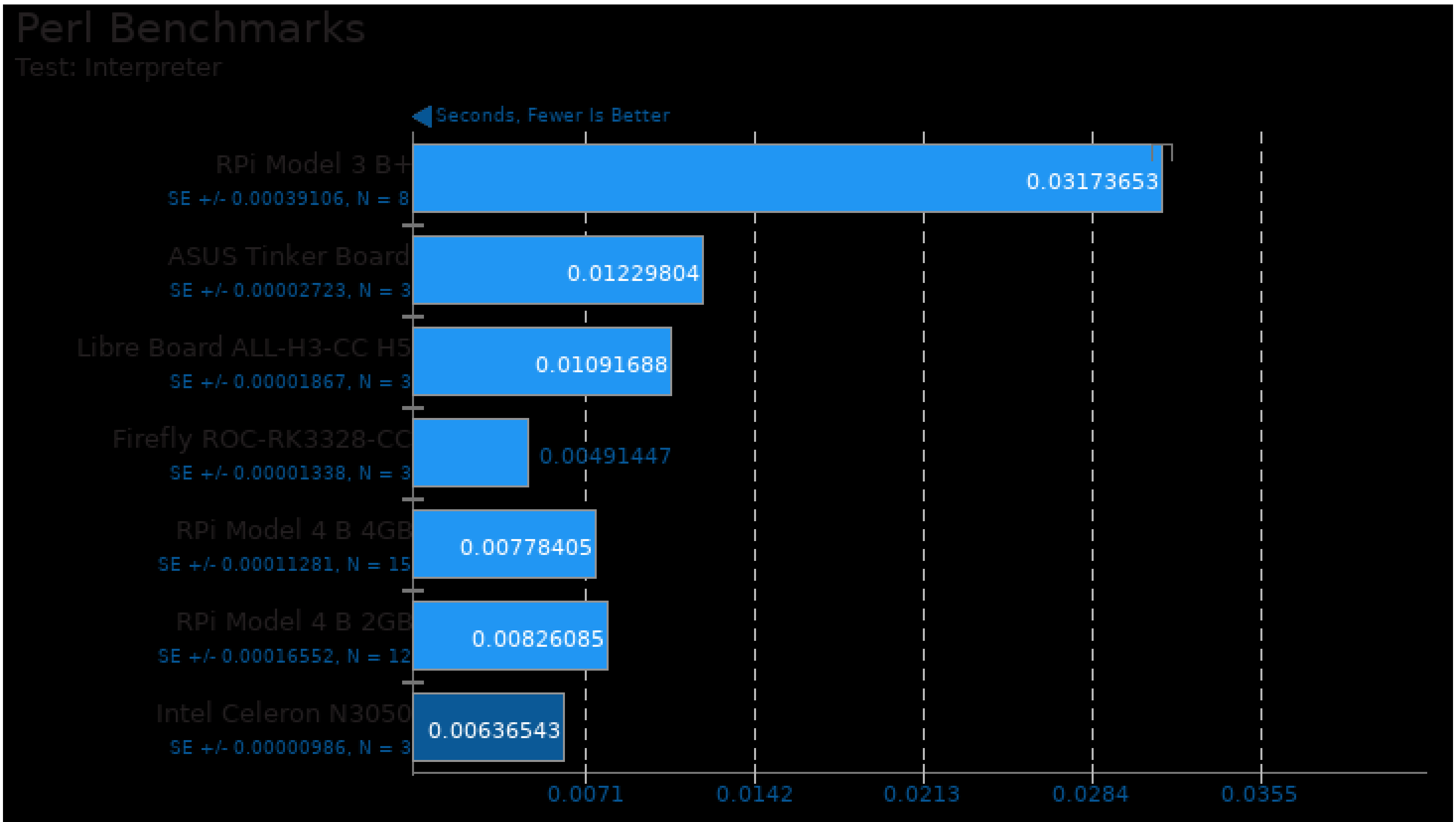

FLAC Audio Encoding 1.3.2
WAV To FLAC
Seconds, Fewer Is Better
RPi Model 3 B+
SE +/- 3.13, N = 5
-logg
777.65
ASUS Tinker Board
SE +/- 2.04, N = 5
-logg
135.25
Libre Board ALL-H3-CC H5
SE +/- 0.71, N = 5
-logg
566.40
Firefly ROC-RK3328-CC
SE +/- 0.88, N = 5
-logg
288.92
RPi Model 4 B 4GB
SE +/- 0.69, N = 25
111.09
RPi Model 4 B 2GB
SE +/- 0.35, N = 5
111.48
Intel Celeron N3050
SE +/- 0.17, N = 5
50.68
200
400
600
800
1000
1. (CXX) g++ options: -O2 -fvisibility=hidden -lm

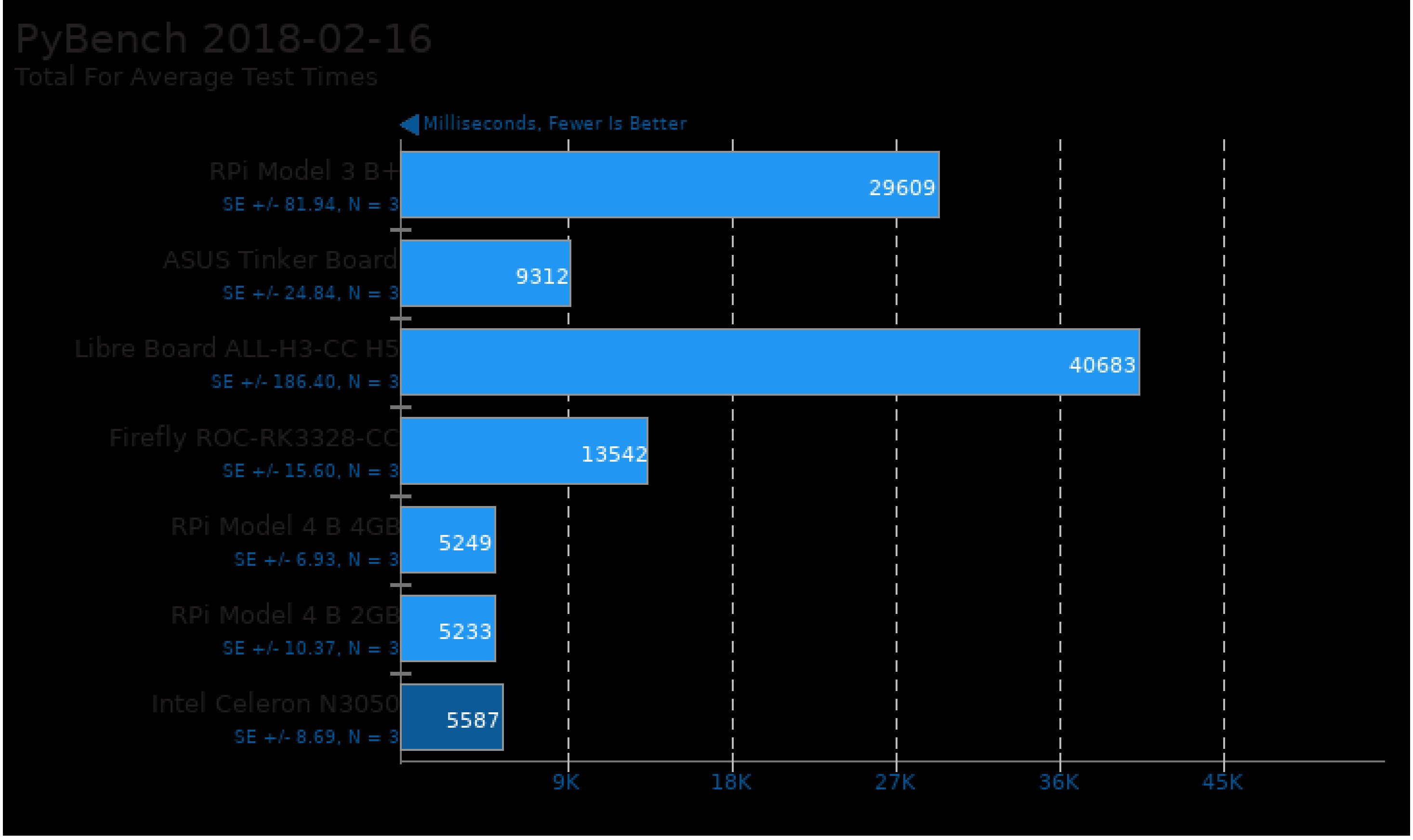


LAME MP3 Encoding 3.100
WAV To MP3
Seconds, Fewer Is Better
RPi Model 3 B+
SE +/- 9.15, N = 3
659
ASUS Tinker Board
SE +/- 0.53, N = 3
162
Libre Board ALL-H3-CC H5
SE +/- 0.09, N = 3
518
Firefly ROC-RK3328-CC
SE +/- 0.43, N = 3
295
RPi Model 4 B 4GB
SE +/- 0.05, N = 3
125
RPi Model 4 B 2GB
SE +/- 0.10, N = 3
125
Intel Celeron N3050
SE +/- 0.01, N = 3
137
140
280
420
560
700
1. (CC) gcc options: -lm

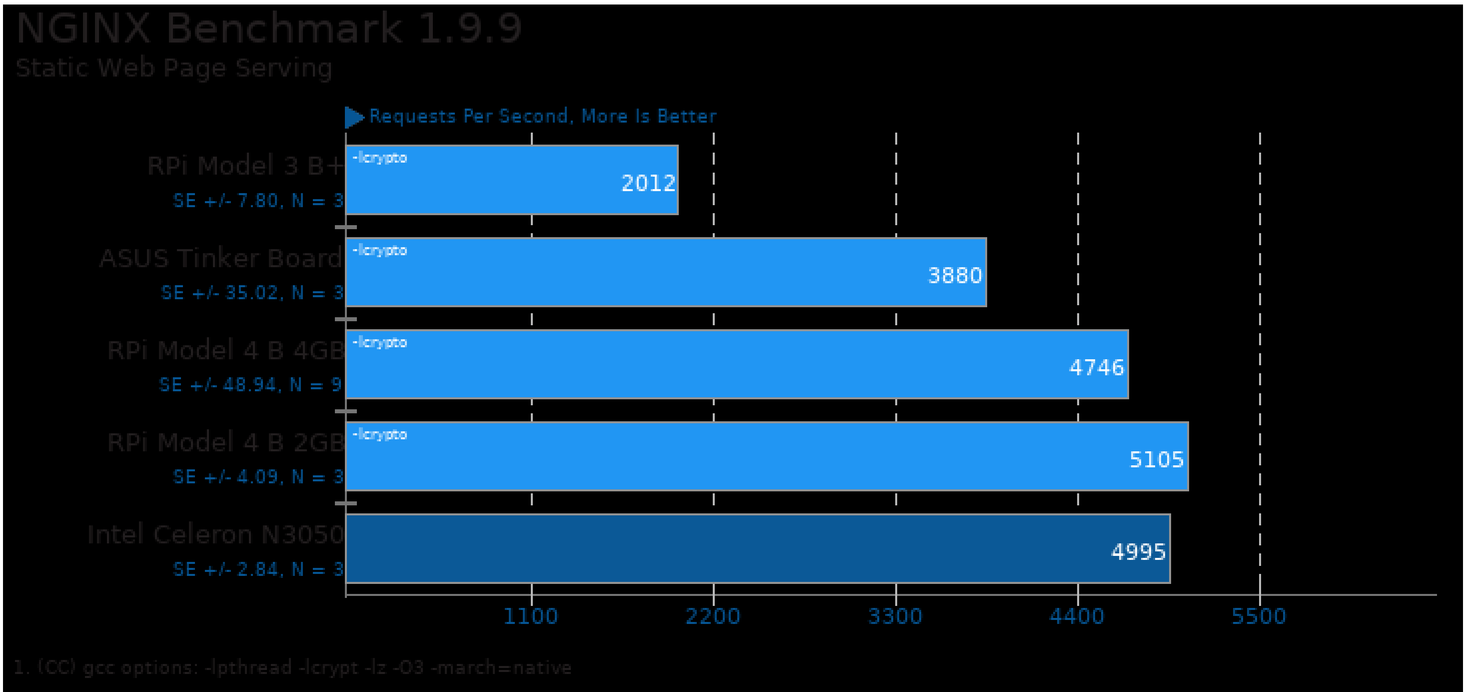


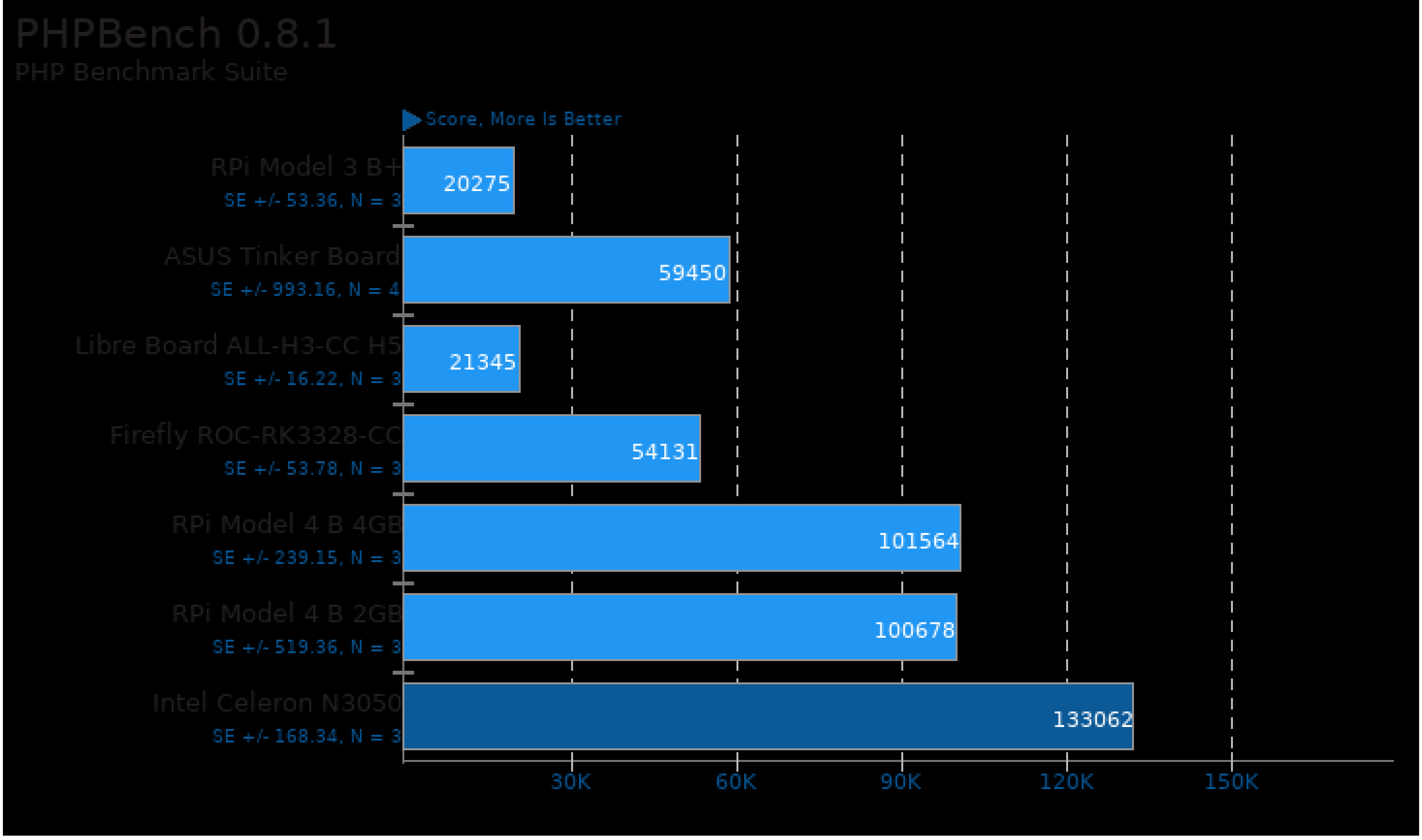
Perl Benchmarks
Test: Pod2html
Seconds, Fewer Is Better
RPi Model 3 B+
SE +/- 0.04479638, N = 9
2.56511278
ASUS Tinker Board
SE +/- 0.00901113, N = 3
0.78254268
Libre Board ALL-H3-CC H5
SE +/- 0.00916360, N = 3
2.57273250
Firefly ROC-RK3328-CC
SE +/- 0.01503227, N = 3
1.31659761
RPi Model 4 B 4GB
SE +/- 0.00287922, N = 3
0.61207402
RPi Model 4 B 2GB
SE +/- 0.00462631, N = 3
0.62136299
Intel Celeron N3050
SE +/- 0.00080473, N = 3
0.67975162
0.5789
1.1578
1.7367
2.3156
2.8945


Perl Benchmarks
Test: Interpreter
Seconds, Fewer Is Better
RPi Model 3 B+
SE +/- 0.00039106, N = 8
0.03173653
ASUS Tinker Board
SE +/- 0.00002723, N = 3
0.01229804
Libre Board ALL-H3-CC H5
SE +/- 0.00001867, N = 3
0.01091688
Firefly ROC-RK3328-CC
SE +/- 0.00001338, N = 3
0.00491447
RPi Model 4 B 4GB
SE +/- 0.00011281, N = 15
0.00778405
RPi Model 4 B 2GB
SE +/- 0.00016552, N = 12
0.00826085
Intel Celeron N3050
SE +/- 0.00000986, N = 3
0.00636543
0.0071
0.0142
0.0213
0.0284
0.0355

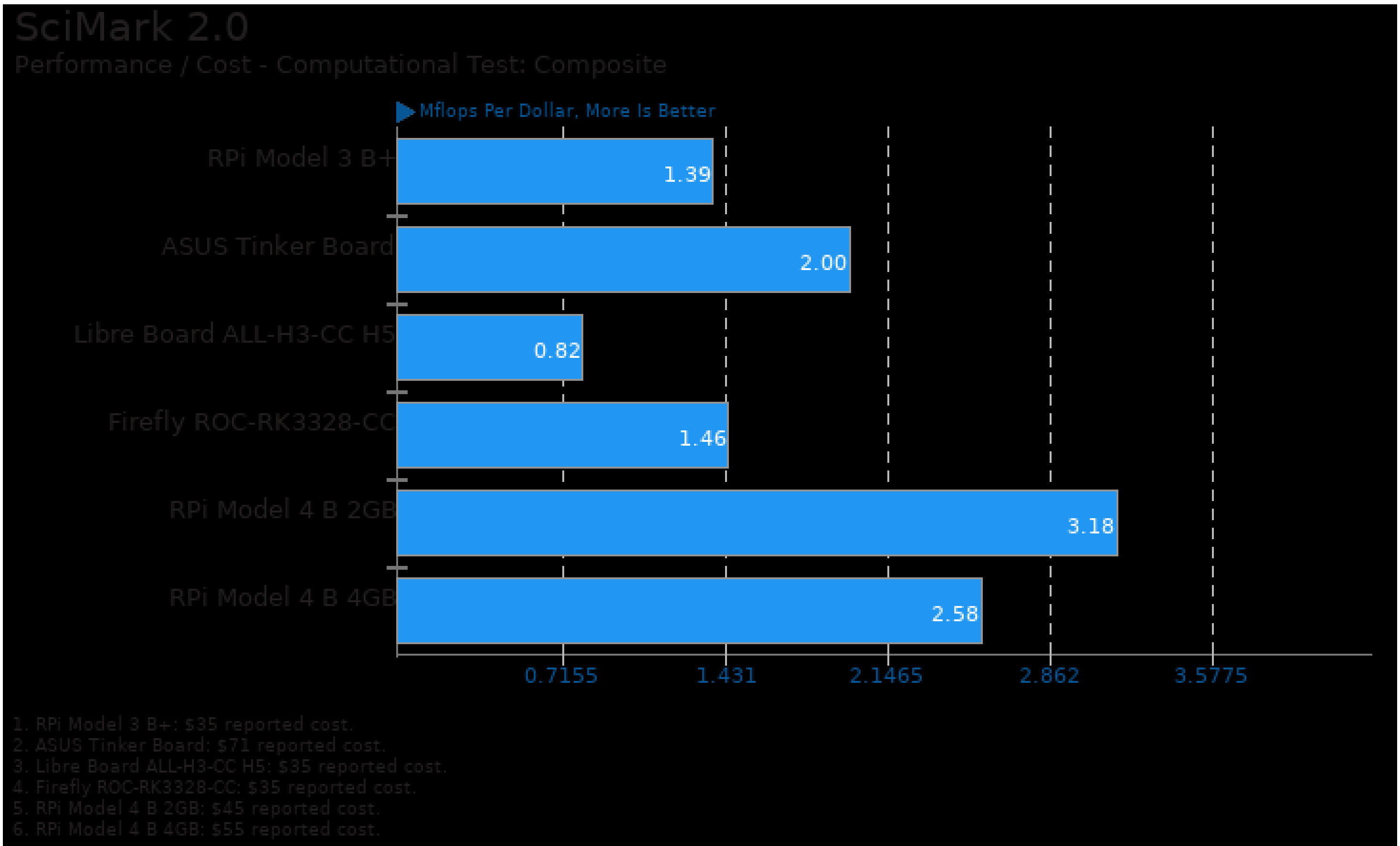

PyBench 2018-02-16
Total For Average Test Times
Milliseconds, Fewer Is Better
RPi Model 3 B+
SE +/- 81.94, N = 3
29609
ASUS Tinker Board
SE +/- 24.84, N = 3
9312
Libre Board ALL-H3-CC H5
SE +/- 186.40, N = 3
40683
Firefly ROC-RK3328-CC
SE +/- 15.60, N = 3
13542
RPi Model 4 B 4GB
SE +/- 6.93, N = 3
5249
RPi Model 4 B 2GB
SE +/- 10.37, N = 3
5233
Intel Celeron N3050
SE +/- 8.69, N = 3
5587
9K
18K
27K
36K
45K

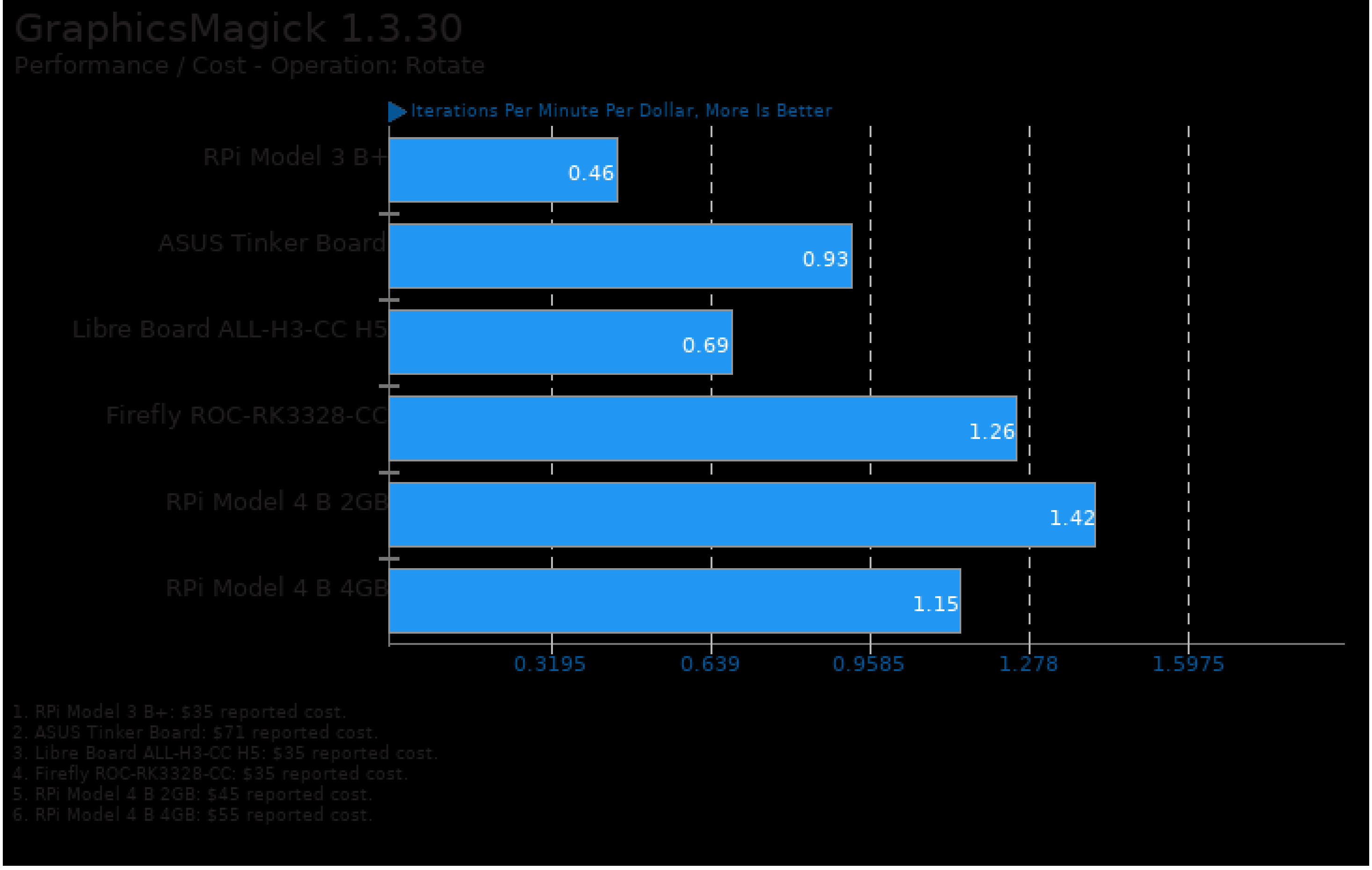
Raspberry Pi Model 4 Benchmarks

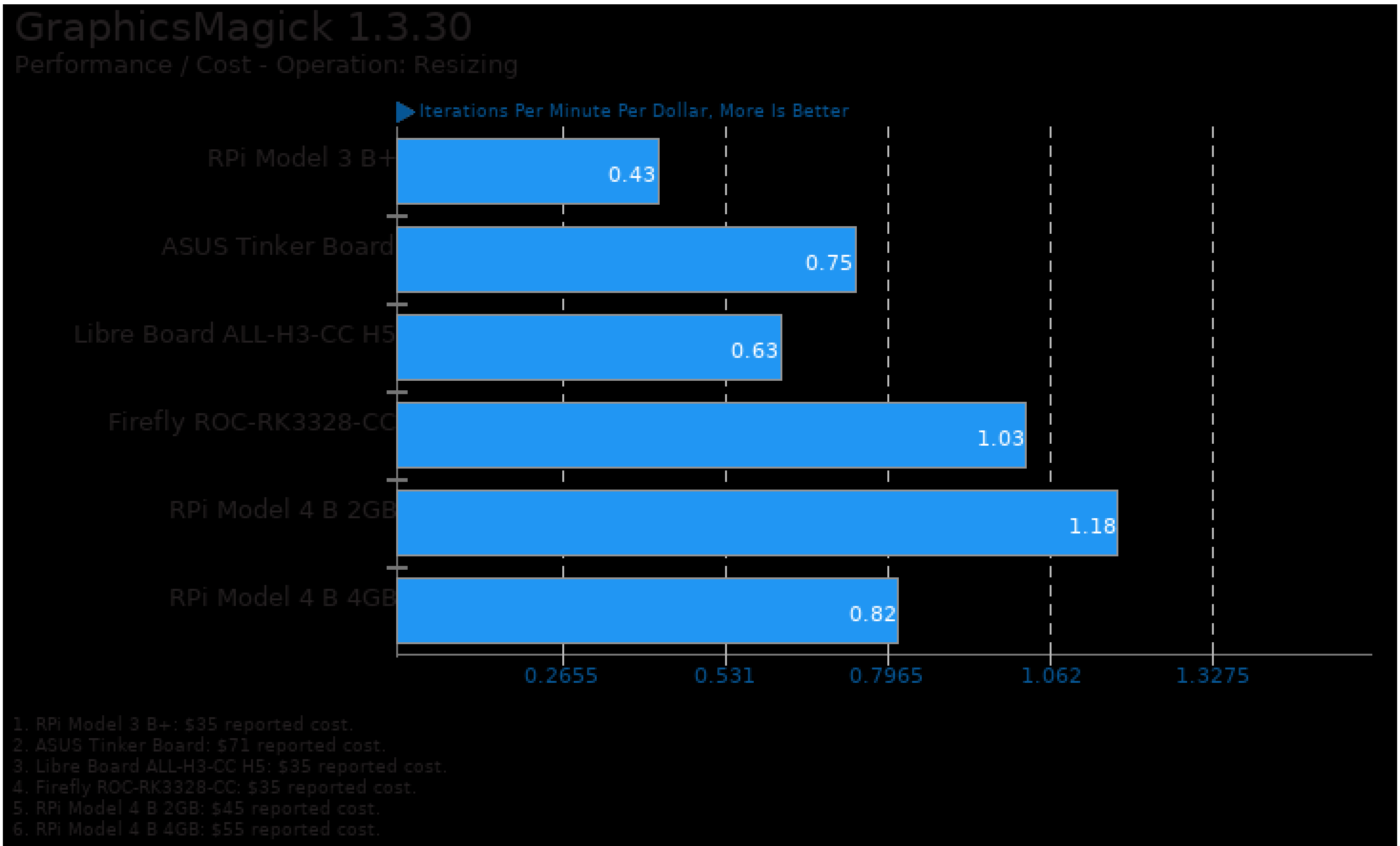


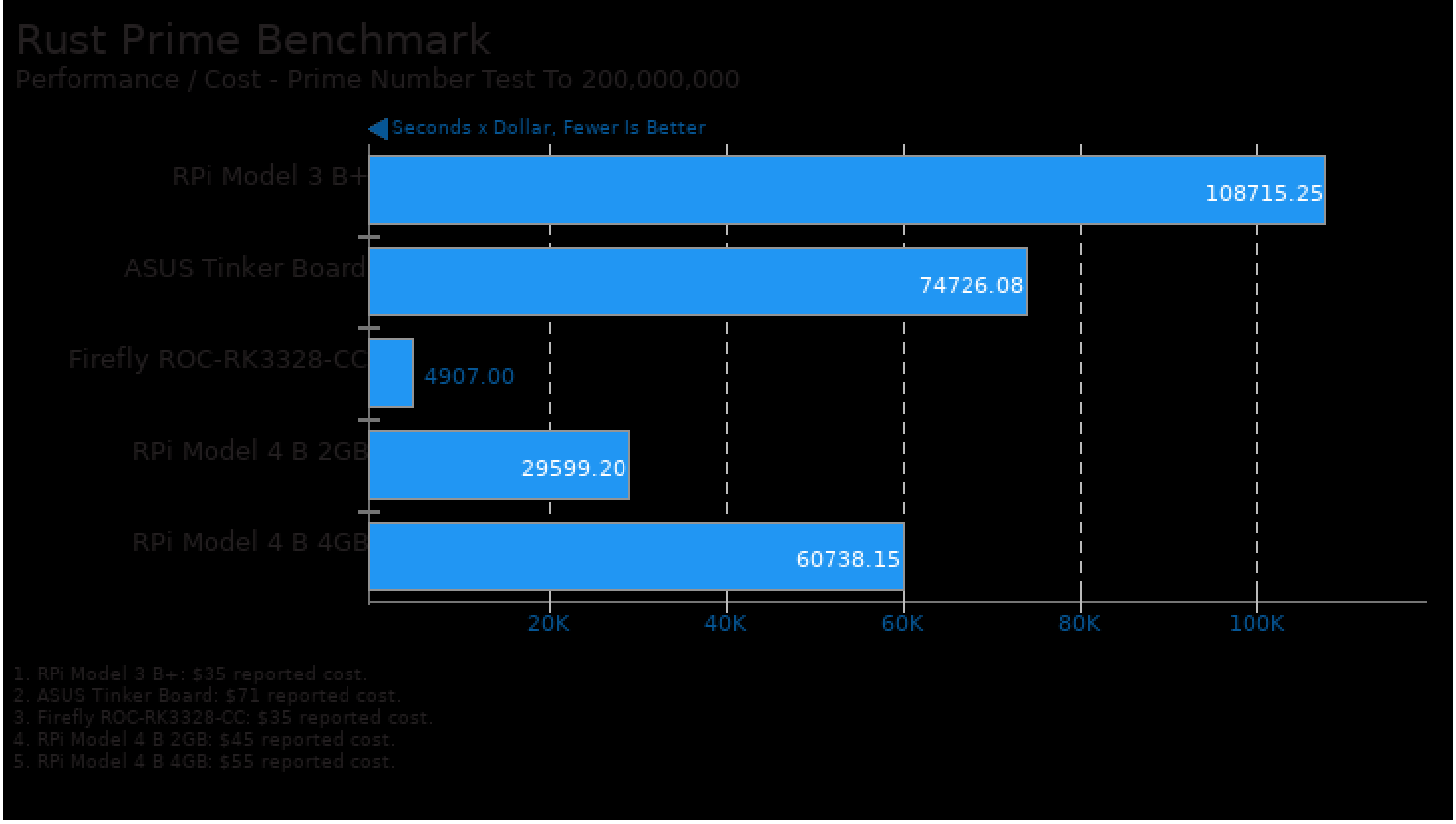


Raspberry Pi Model 4 Benchmarks



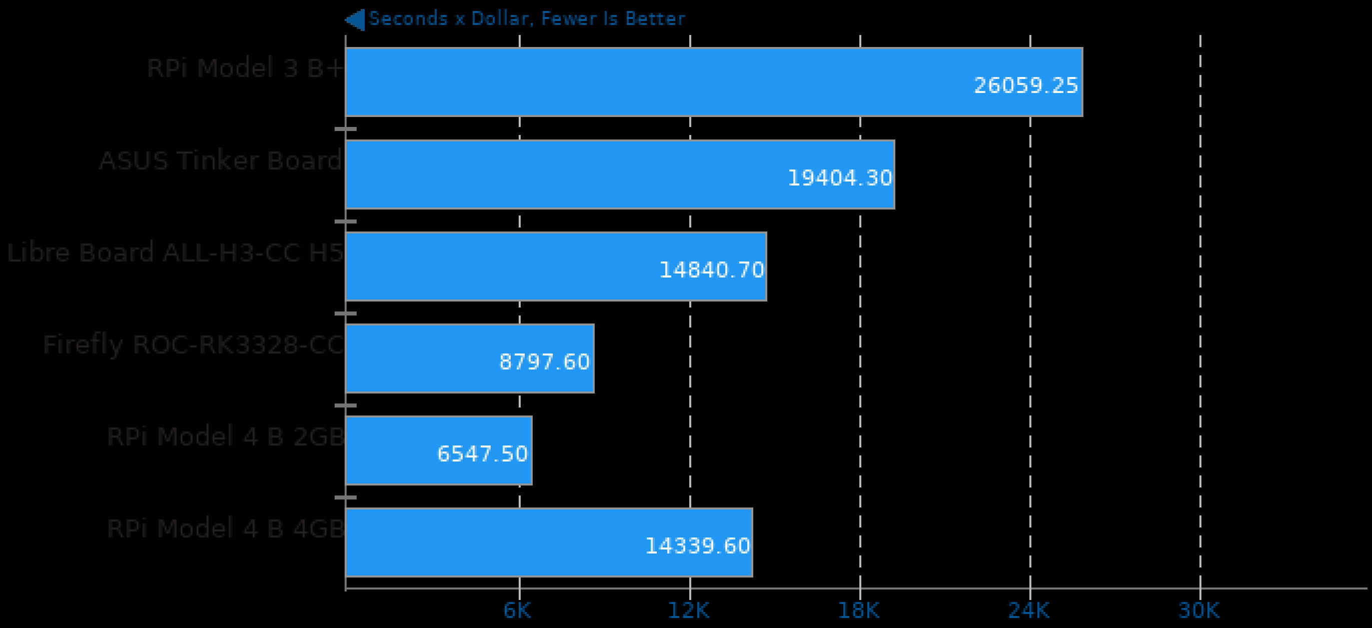



GraphicsMagick 1.3.30
Performance / Cost - Operation: Resizing
Iterations Per Minute Per Dollar, More Is Better
RPi Model 3 B+
0.43
ASUS Tinker Board
0.75
Libre Board ALL-H3-CC H5
0.63
Firefly ROC-RK3328-CC
1.03
RPi Model 4 B 2GB
1.18
RPi Model 4 B 4GB
0.82
0.2655
0.531
0.7965
1.062
1.3275
1. RPi Model 3 B+: $35 reported cost.
2. ASUS Tinker Board: $71 reported cost.
3. Libre Board ALL-H3-CC H5: $35 reported cost.
4. Firefly ROC-RK3328-CC: $35 reported cost.
5. RPi Model 4 B 2GB: $45 reported cost.
6. RPi Model 4 B 4GB: $55 reported cost.


Rust Prime Benchmark
Performance / Cost - Prime Number Test To 200,000,000
Seconds x Dollar, Fewer Is Better
RPi Model 3 B+
108715.25
ASUS Tinker Board
74726.08
Firefly ROC-RK3328-CC
4907.00
RPi Model 4 B 2GB
29599.20
RPi Model 4 B 4GB
60738.15
20K
40K
60K
80K
100K
1. RPi Model 3 B+: $35 reported cost.
2. ASUS Tinker Board: $71 reported cost.
3. Firefly ROC-RK3328-CC: $35 reported cost.
4. RPi Model 4 B 2GB: $45 reported cost.
5. RPi Model 4 B 4GB: $55 reported cost.

Smallpt 1.0

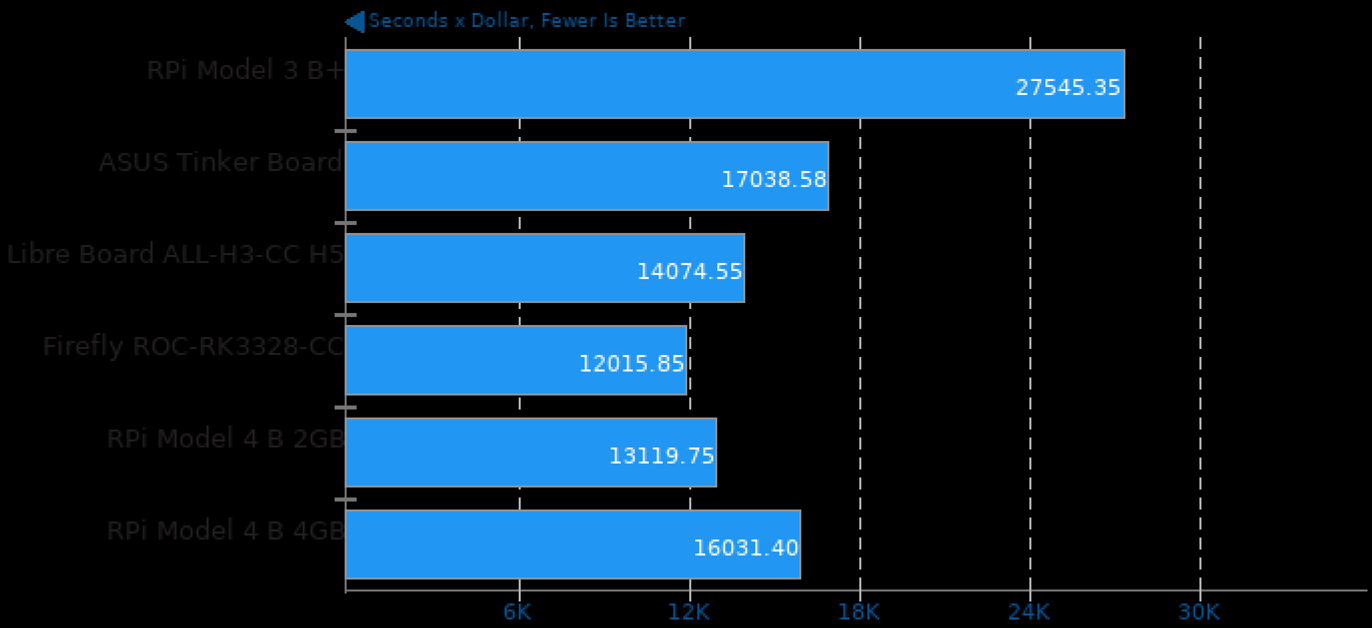
Performance / Cost - Global Illumination Renderer; 128 Samples



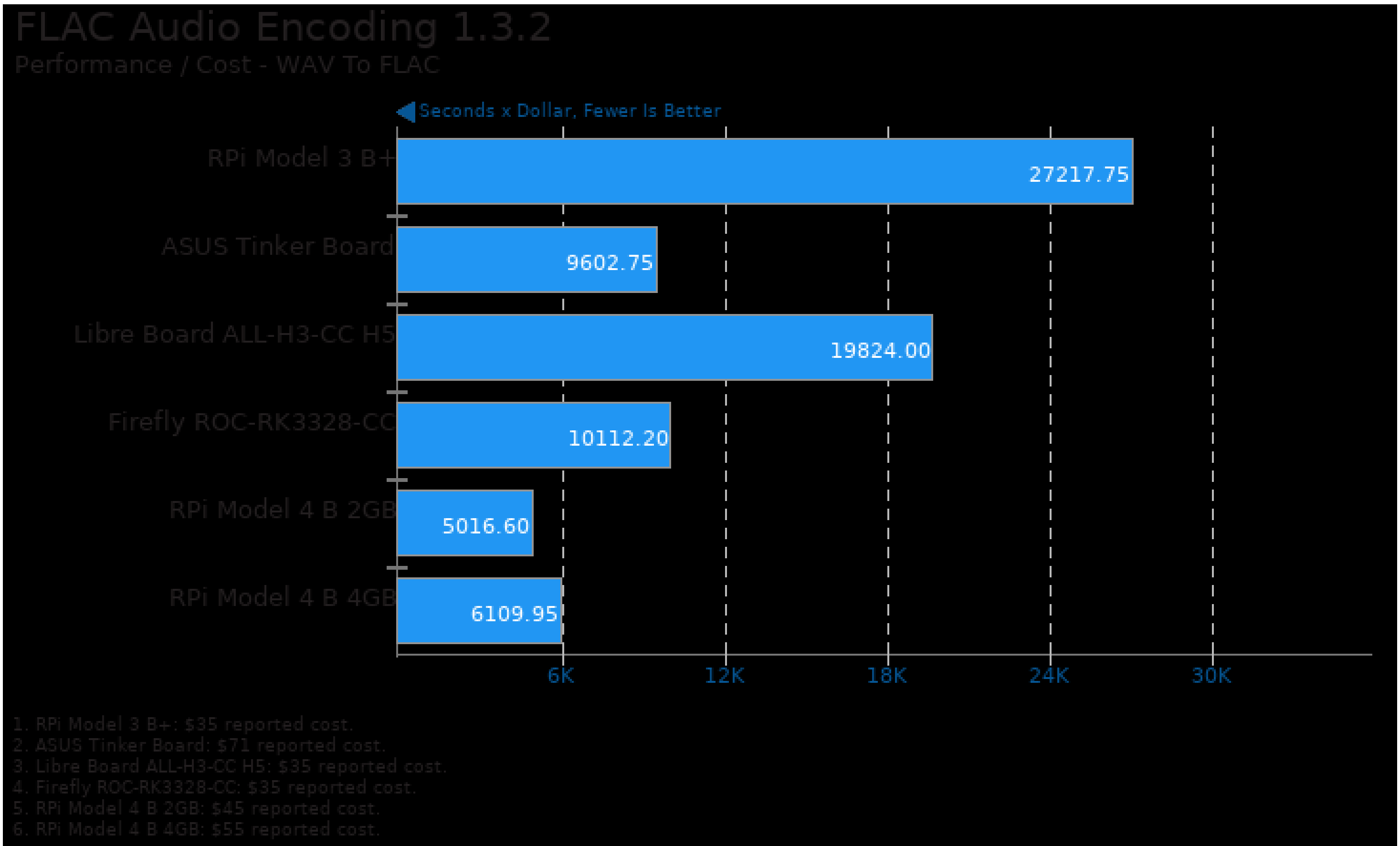
1. RPi Model 3 B+: $35 reported cost.
2. ASUS Tinker Board: $71 reported cost.
3. Libre Board ALL-H3-CC H5: $35 reported cost.
4. Firefly ROC-RK3328-CC: $35 reported cost.
5. RPi Model 4 B 2GB: $45 reported cost.
6. RPi Model 4 B 4GB: $55 reported cost.

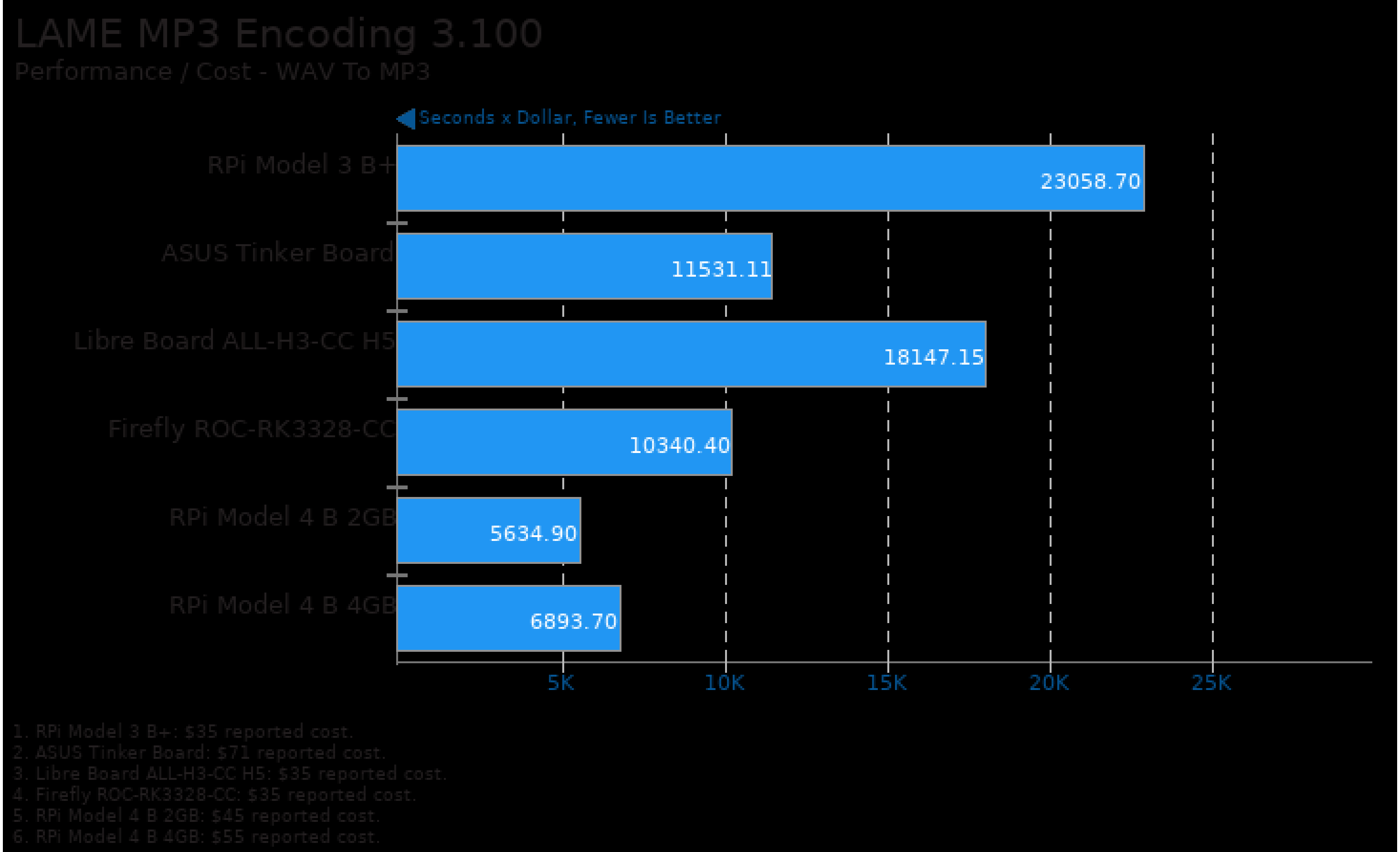
Zstd Compression 1.3.4

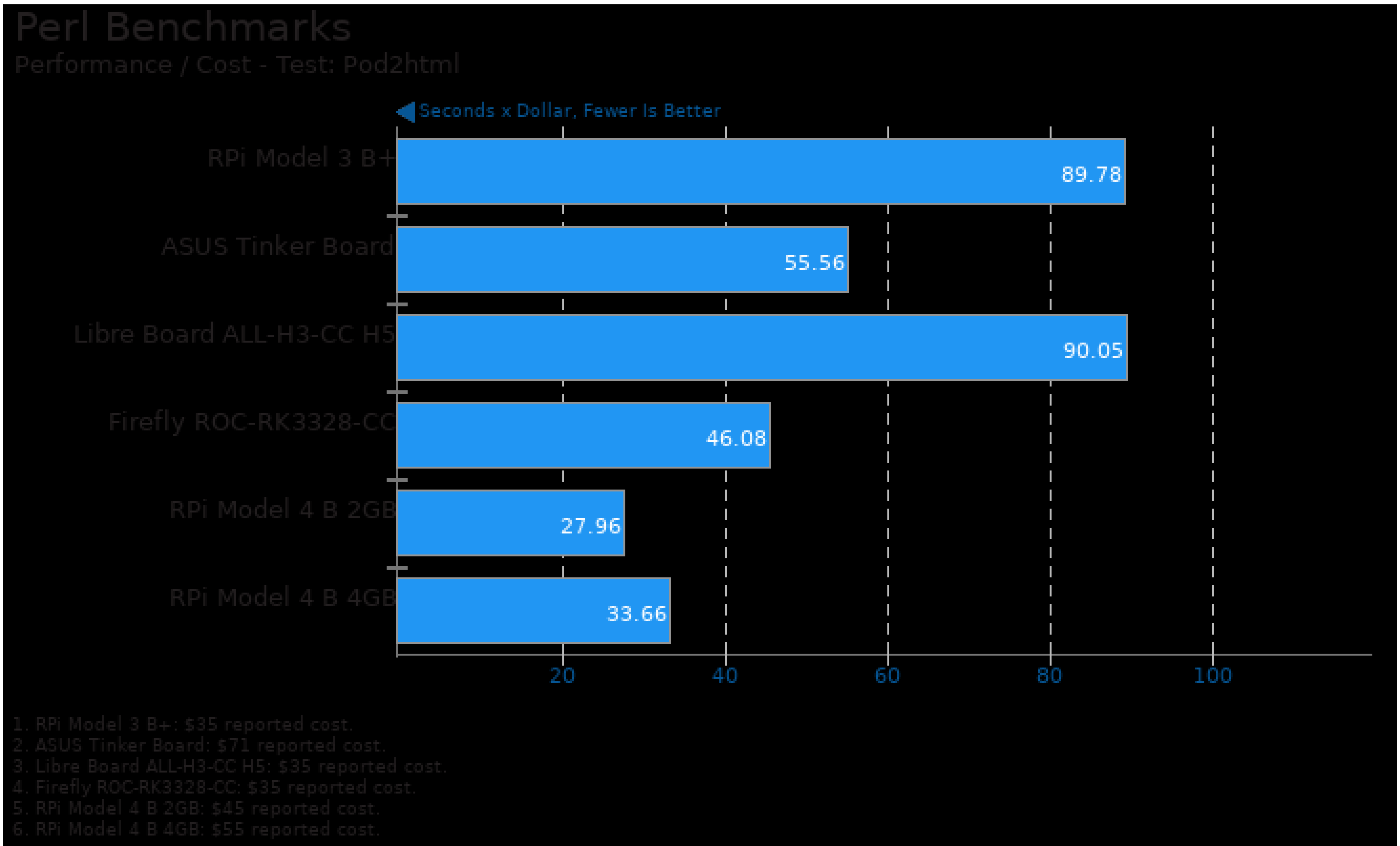
Performance / Cost - Compressing ubuntu-16.04.3-server-i386.img, Compression Level 19

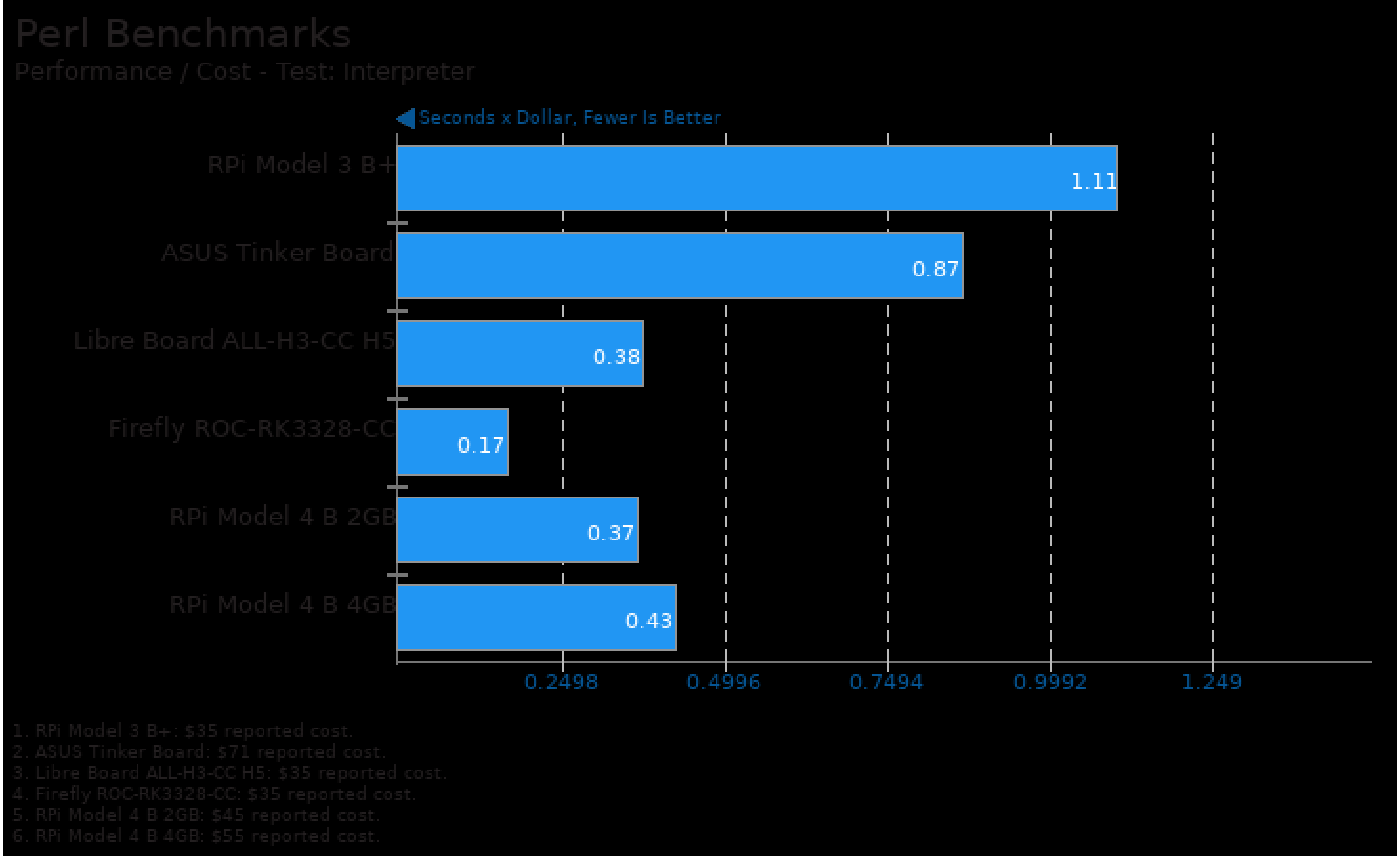


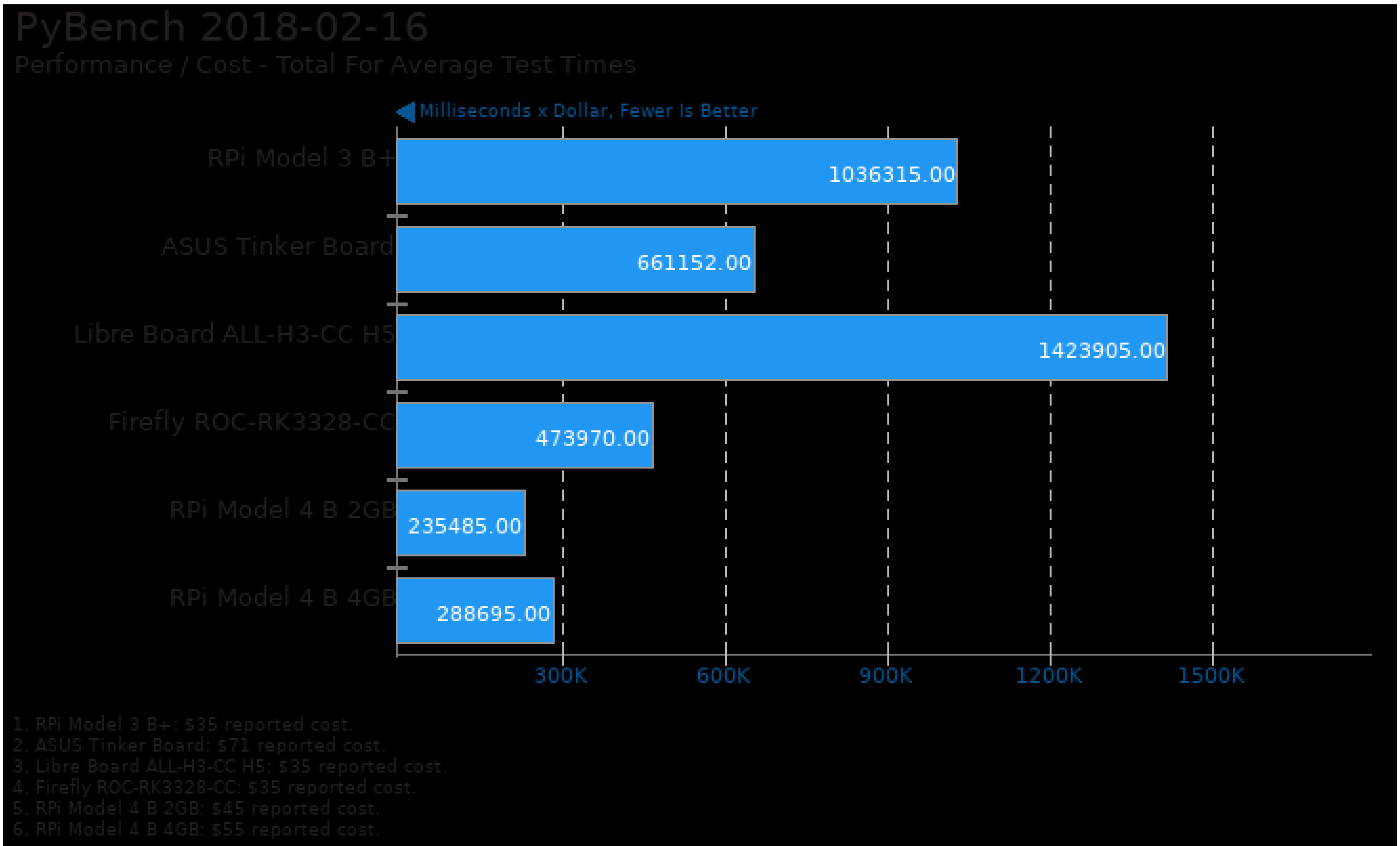
1. RPi Model 3 B+: $35 reported cost.
2. ASUS Tinker Board: $71 reported cost.
3. Libre Board ALL-H3-CC H5: $35 reported cost.
4. Firefly ROC-RK3328-CC: $35 reported cost.
5. RPi Model 4 B 2GB: $45 reported cost.
6. RPi Model 4 B 4GB: $55 reported cost.

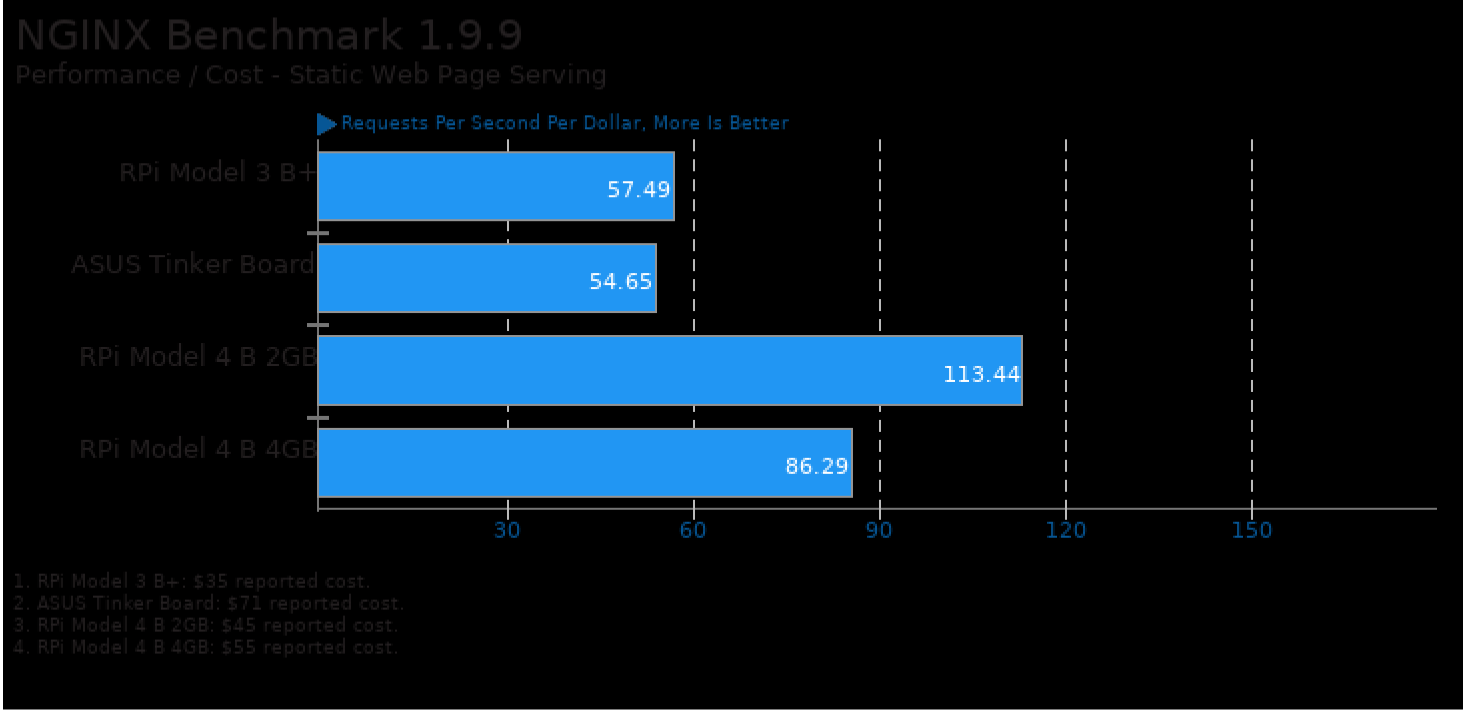

FLAC Audio Encoding 1.3.2
Performance / Cost - WAV To FLAC
Seconds x Dollar, Fewer Is Better
RPi Model 3 B+
27217.75
ASUS Tinker Board
9602.75
Libre Board ALL-H3-CC H5
19824.00
Firefly ROC-RK3328-CC
10112.20
RPi Model 4 B 2GB
5016.60
RPi Model 4 B 4GB
6109.95
6K
12K
18K
24K
30K
1. RPi Model 3 B+: $35 reported cost.
2. ASUS Tinker Board: $71 reported cost.
3. Libre Board ALL-H3-CC H5: $35 reported cost.
4. Firefly ROC-RK3328-CC: $35 reported cost.
5. RPi Model 4 B 2GB: $45 reported cost.
6. RPi Model 4 B 4GB: $55 reported cost.

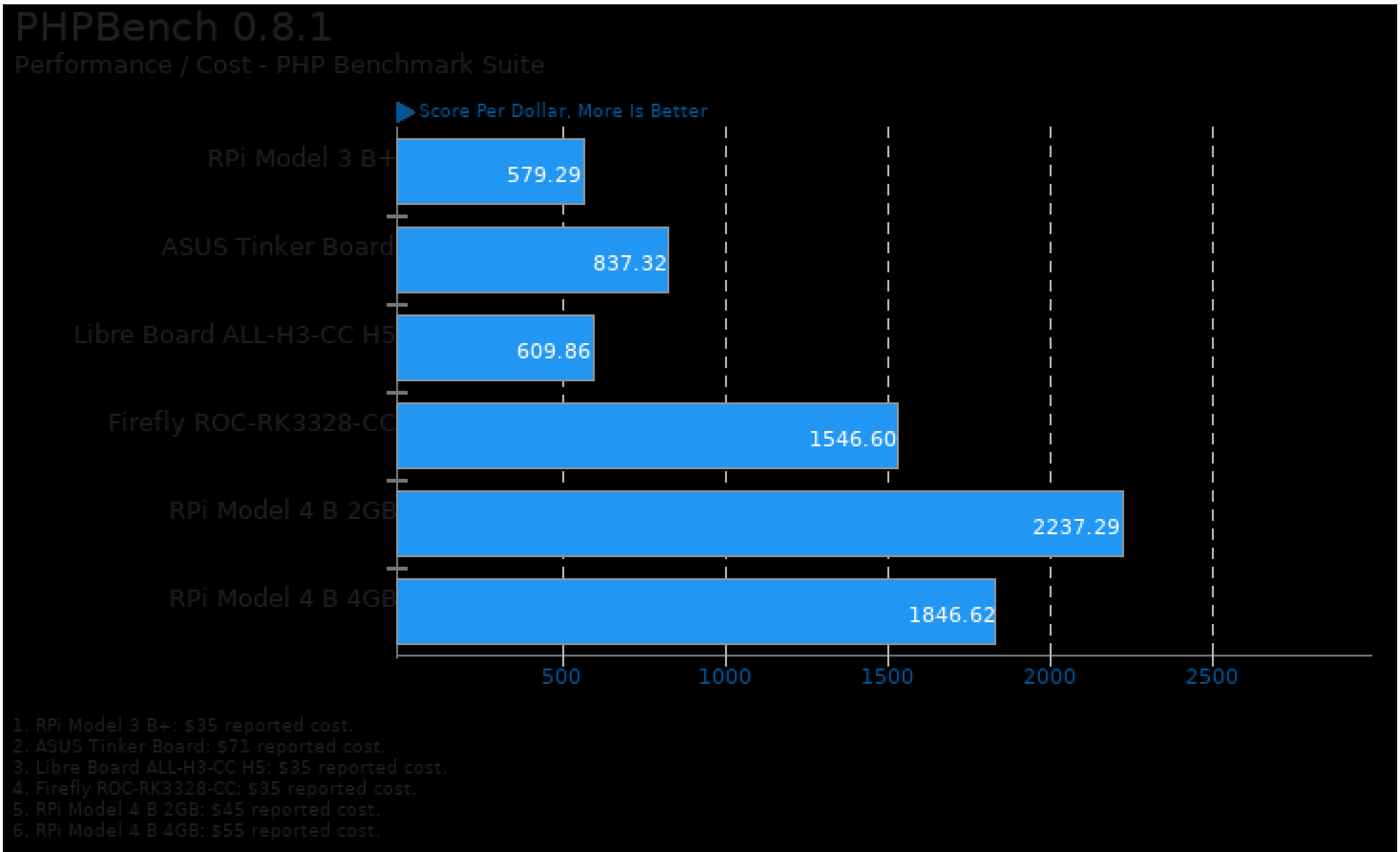

LAME MP3 Encoding 3.100
Performance / Cost - WAV To MP3
Seconds x Dollar, Fewer Is Better
RPi Model 3 B+
23058.70
ASUS Tinker Board
11531.11
Libre Board ALL-H3-CC H5
18147.15
Firefly ROC-RK3328-CC
10340.40
RPi Model 4 B 2GB
5634.90
RPi Model 4 B 4GB
6893.70
5K
10K
15K
20K
25K
1. RPi Model 3 B+: $35 reported cost.
2. ASUS Tinker Board: $71 reported cost.
3. Libre Board ALL-H3-CC H5: $35 reported cost.
4. Firefly ROC-RK3328-CC: $35 reported cost.
5. RPi Model 4 B 2GB: $45 reported cost.
6. RPi Model 4 B 4GB: $55 reported cost.

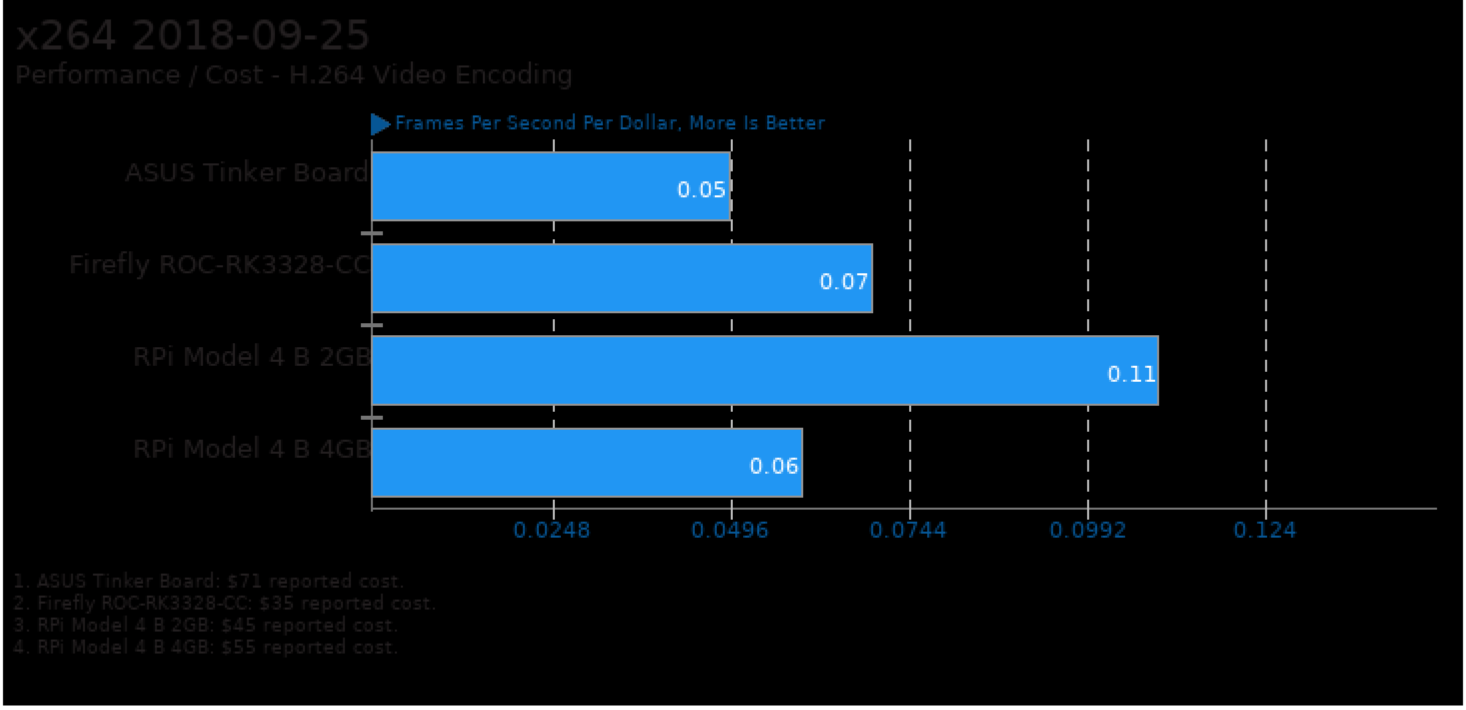

Perl Benchmarks
Performance / Cost - Test: Pod2html
Seconds x Dollar, Fewer Is Better
RPi Model 3 B+
89.78
ASUS Tinker Board
55.56
Libre Board ALL-H3-CC H5
90.05
Firefly ROC-RK3328-CC
46.08
RPi Model 4 B 2GB
27.96
RPi Model 4 B 4GB
33.66
20
40
60
80
100
1. RPi Model 3 B+: $35 reported cost.
2. ASUS Tinker Board: $71 reported cost.
3. Libre Board ALL-H3-CC H5: $35 reported cost.
4. Firefly ROC-RK3328-CC: $35 reported cost.
5. RPi Model 4 B 2GB: $45 reported cost.
6. RPi Model 4 B 4GB: $55 reported cost.


Perl Benchmarks
Performance / Cost - Test: Interpreter
Seconds x Dollar, Fewer Is Better
RPi Model 3 B+
1.11
ASUS Tinker Board
0.87
Libre Board ALL-H3-CC H5
0.38
Firefly ROC-RK3328-CC
0.17
RPi Model 4 B 2GB
0.37
RPi Model 4 B 4GB
0.43
0.2498
0.4996
0.7494
0.9992
1.249
1. RPi Model 3 B+: $35 reported cost.
2. ASUS Tinker Board: $71 reported cost.
3. Libre Board ALL-H3-CC H5: $35 reported cost.
4. Firefly ROC-RK3328-CC: $35 reported cost.
5. RPi Model 4 B 2GB: $45 reported cost.
6. RPi Model 4 B 4GB: $55 reported cost.


PyBench 2018-02-16
Performance / Cost - Total For Average Test Times
Milliseconds x Dollar, Fewer Is Better
RPi Model 3 B+
1036315.00
ASUS Tinker Board
661152.00
Libre Board ALL-H3-CC H5
1423905.00
Firefly ROC-RK3328-CC
473970.00
RPi Model 4 B 2GB
235485.00
RPi Model 4 B 4GB
288695.00
300K
600K
900K
1200K
1500K
1. RPi Model 3 B+: $35 reported cost.
2. ASUS Tinker Board: $71 reported cost.
3. Libre Board ALL-H3-CC H5: $35 reported cost.
4. Firefly ROC-RK3328-CC: $35 reported cost.
5. RPi Model 4 B 2GB: $45 reported cost.
6. RPi Model 4 B 4GB: $55 reported cost.

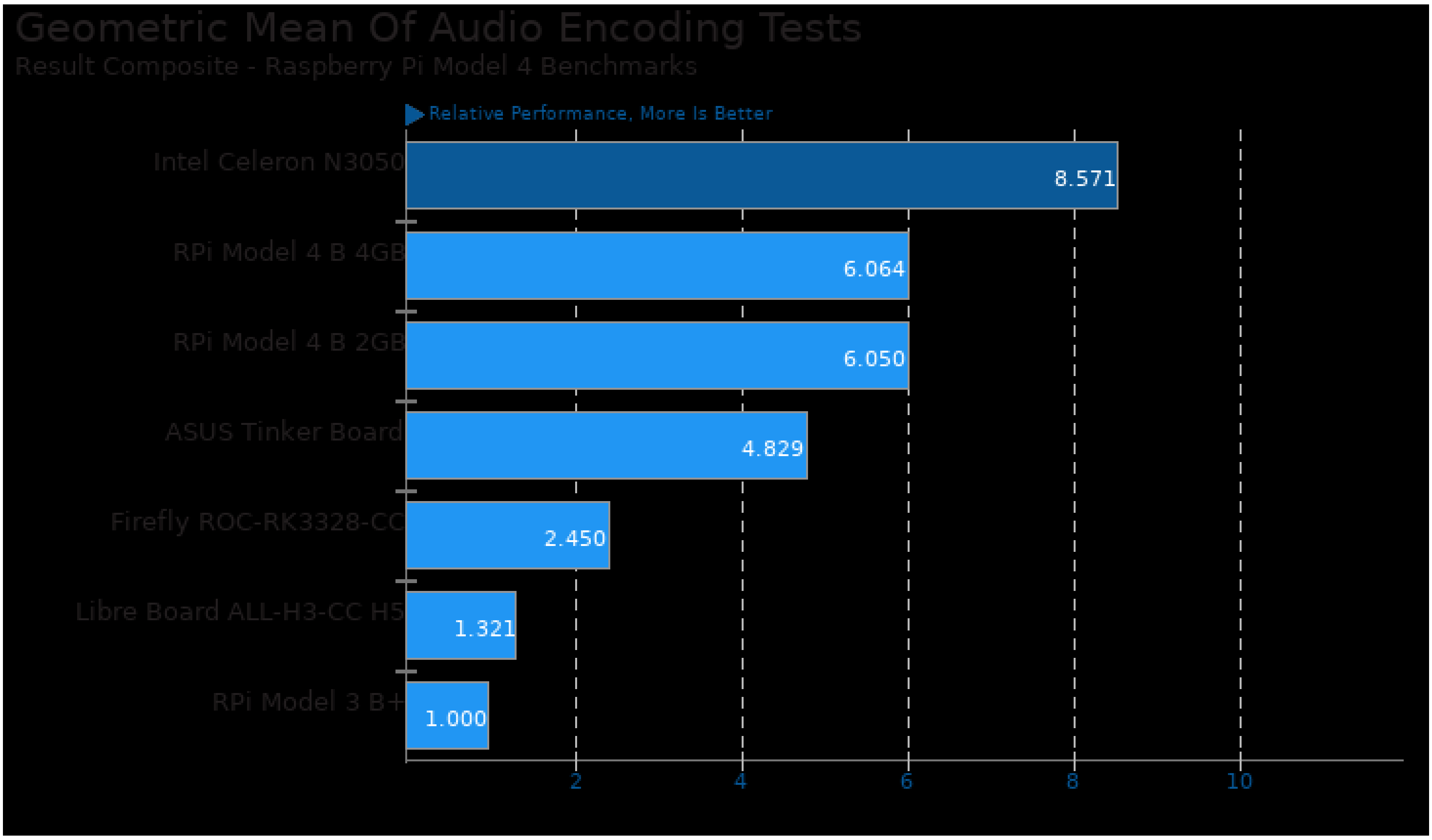

NGINX Benchmark 1.9.9
Performance / Cost - Static Web Page Serving
Requests Per Second Per Dollar, More Is Better
RPi Model 3 B+
57.49
ASUS Tinker Board
54.65
RPi Model 4 B 2GB
113.44
RPi Model 4 B 4GB
86.29
30
60
90
120
150
1. RPi Model 3 B+: $35 reported cost.
2. ASUS Tinker Board: $71 reported cost.
3. RPi Model 4 B 2GB: $45 reported cost.
4. RPi Model 4 B 4GB: $55 reported cost.


PHPBench 0.8.1
Performance / Cost - PHP Benchmark Suite
Score Per Dollar, More Is Better
RPi Model 3 B+
579.29
ASUS Tinker Board
837.32
Libre Board ALL-H3-CC H5
609.86
Firefly ROC-RK3328-CC
1546.60
RPi Model 4 B 2GB
2237.29
RPi Model 4 B 4GB
1846.62
500
1000
1500
2000
2500
1. RPi Model 3 B+: $35 reported cost.
2. ASUS Tinker Board: $71 reported cost.
3. Libre Board ALL-H3-CC H5: $35 reported cost.
4. Firefly ROC-RK3328-CC: $35 reported cost.
5. RPi Model 4 B 2GB: $45 reported cost.
6. RPi Model 4 B 4GB: $55 reported cost.

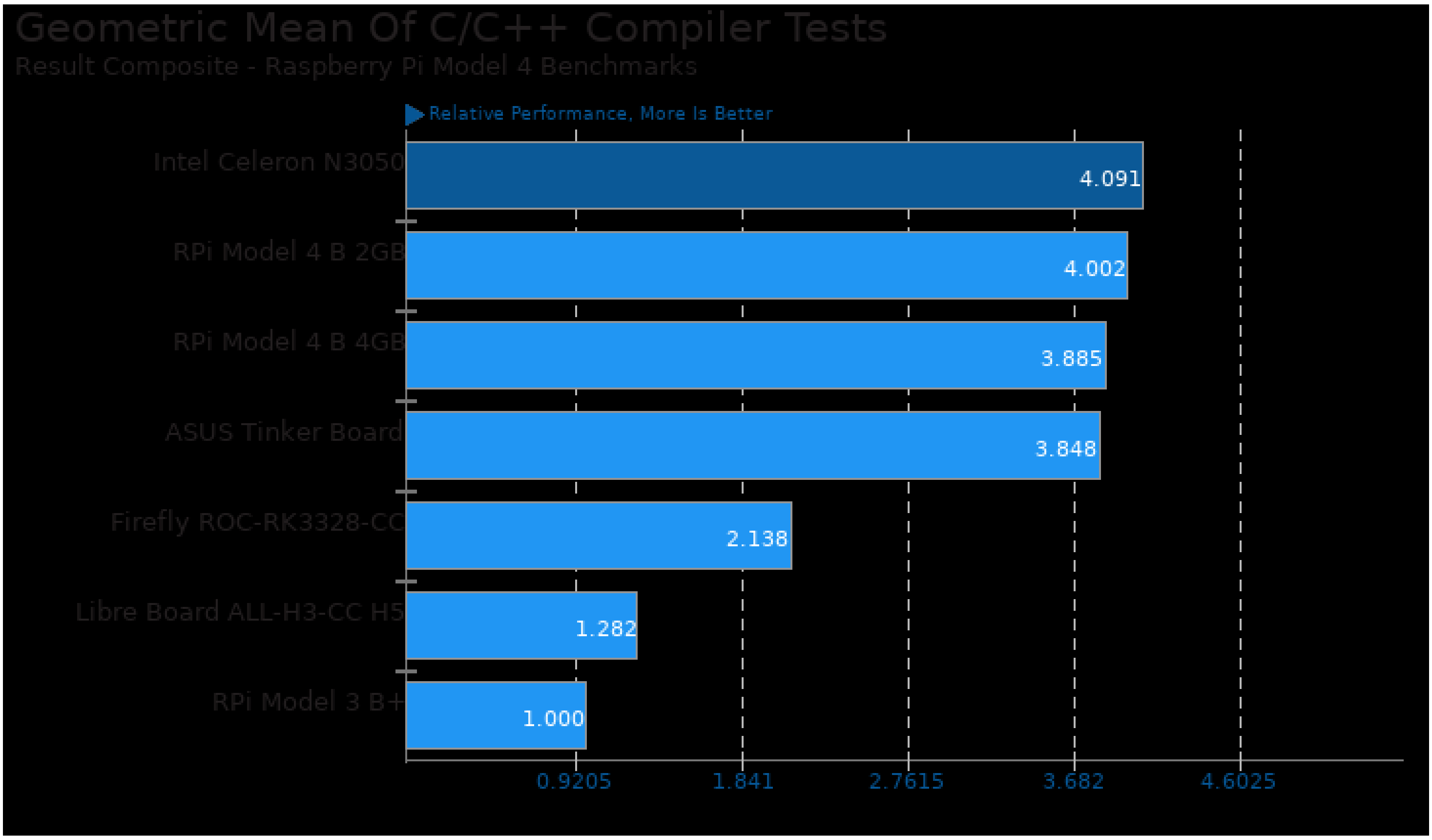

x264 2018-09-25
Performance / Cost - H.264 Video Encoding
Frames Per Second Per Dollar, More Is Better
ASUS Tinker Board
0.05
Firefly ROC-RK3328-CC
0.07
RPi Model 4 B 2GB
0.11
RPi Model 4 B 4GB
0.06
0.0248
0.0496
0.0744
0.0992
0.124
1. ASUS Tinker Board: $71 reported cost.
2. Firefly ROC-RK3328-CC: $35 reported cost.
3. RPi Model 4 B 2GB: $45 reported cost.
4. RPi Model 4 B 4GB: $55 reported cost.

Raspberry Pi Model 4 Benchmarks

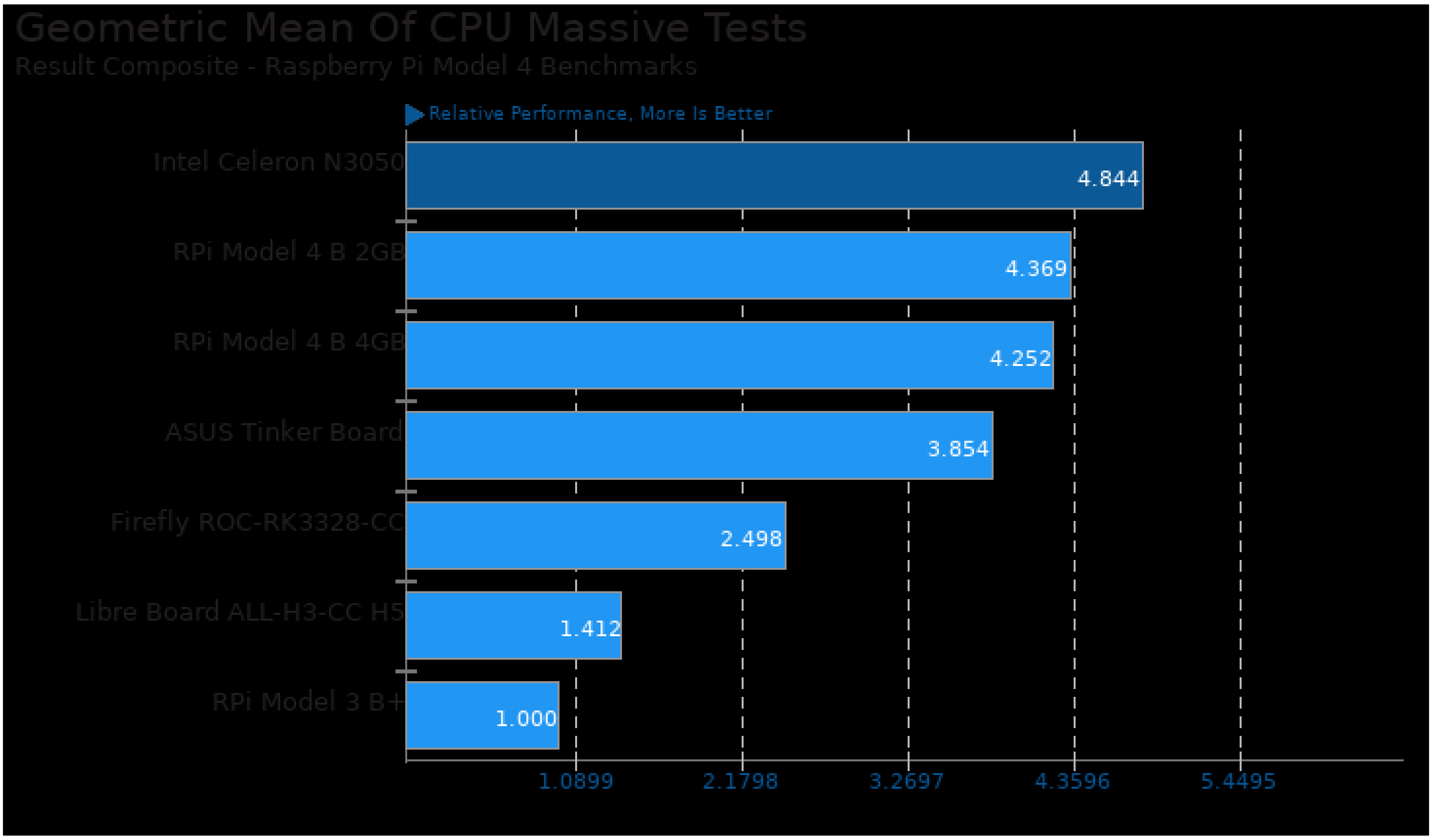
These geometric means are based upon test groupings / test suites for this result file.



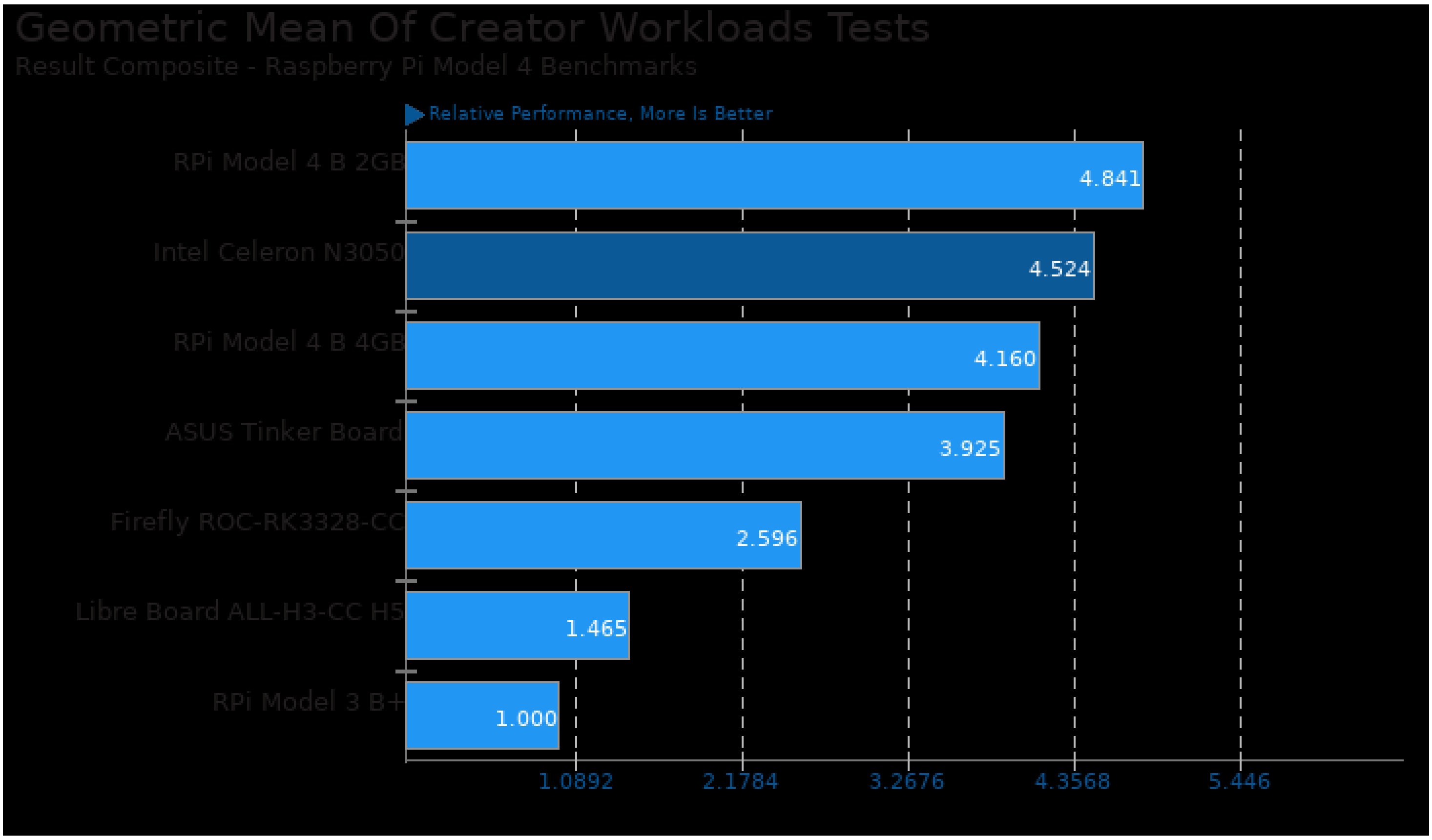
Geometric mean based upon tests: pts/encode-mp3 and pts/encode-flac



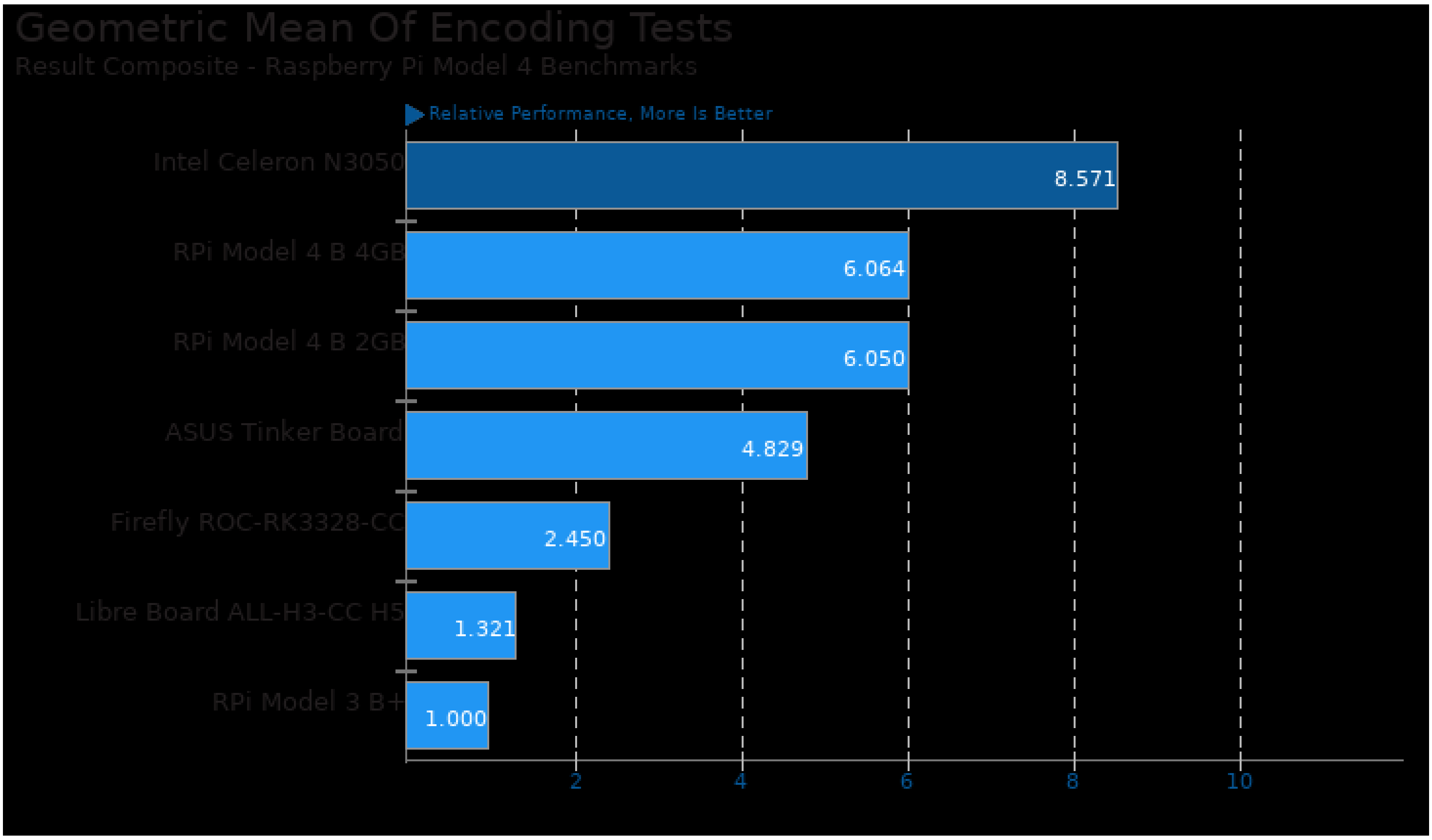
Geometric mean based upon tests: pts/scimark2, pts/graphics-magick, pts/encode-mp3, pts/encode-flac, pts/x264, pts/compress-zstd and pts/nginx



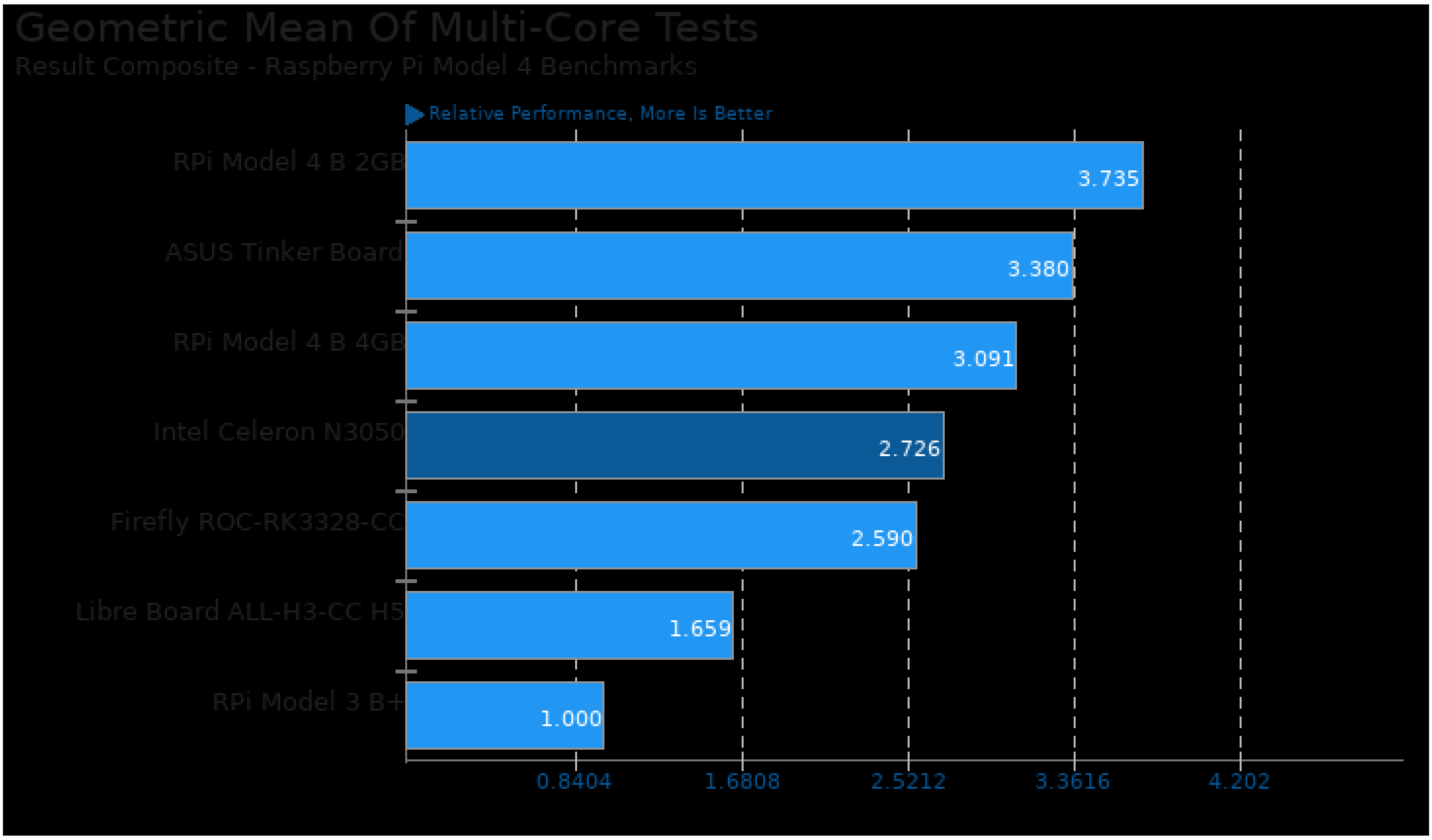
Geometric mean based upon tests: pts/compress-zstd, pts/x264, pts/encode-flac, pts/encode-mp3, pts/graphics-magick, pts/nginx, pts/phpbench and pts/rust-prime



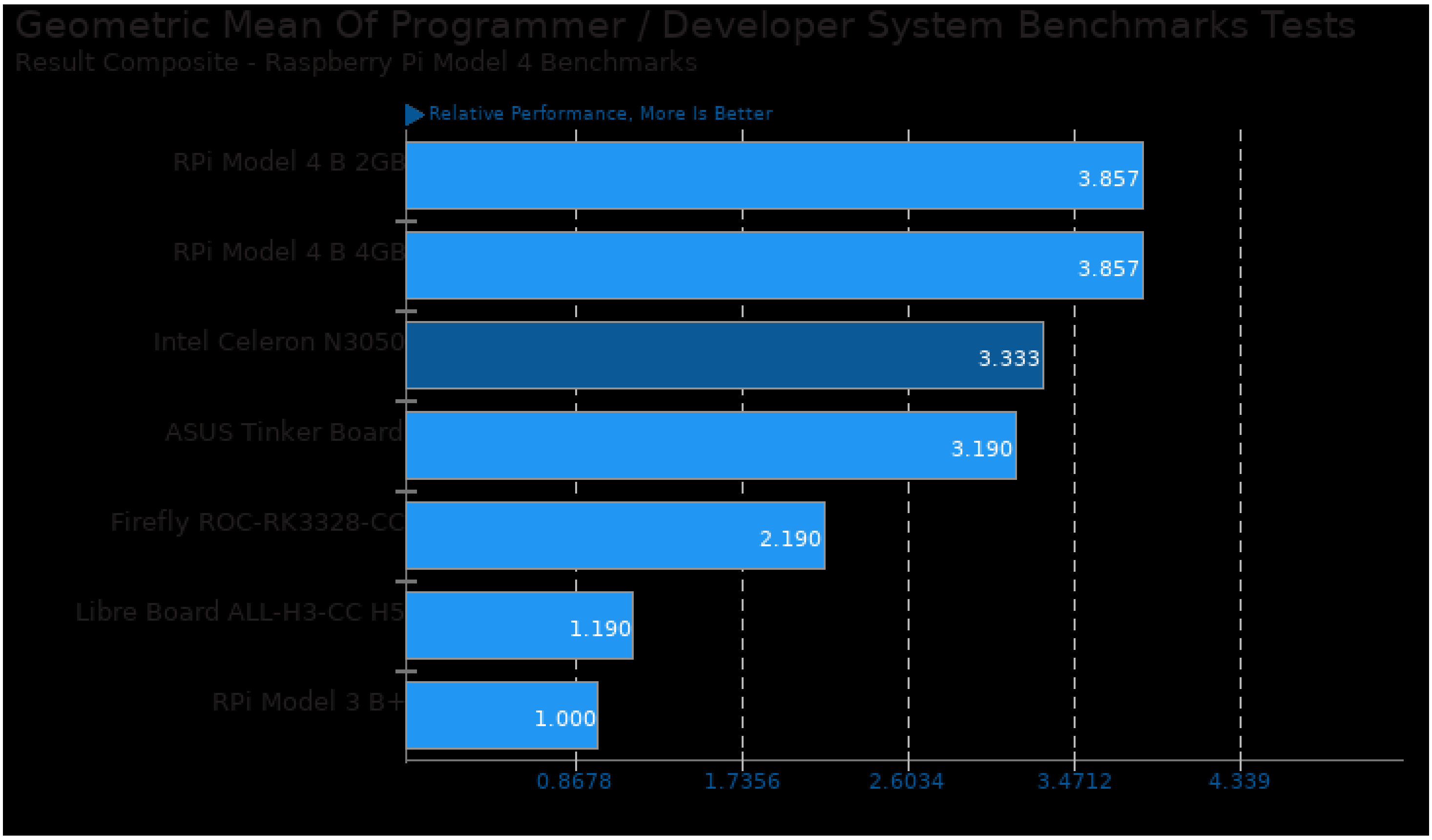
Geometric mean based upon tests: pts/smallpt, pts/x264, pts/encode-mp3, pts/encode-flac and pts/graphics-magick



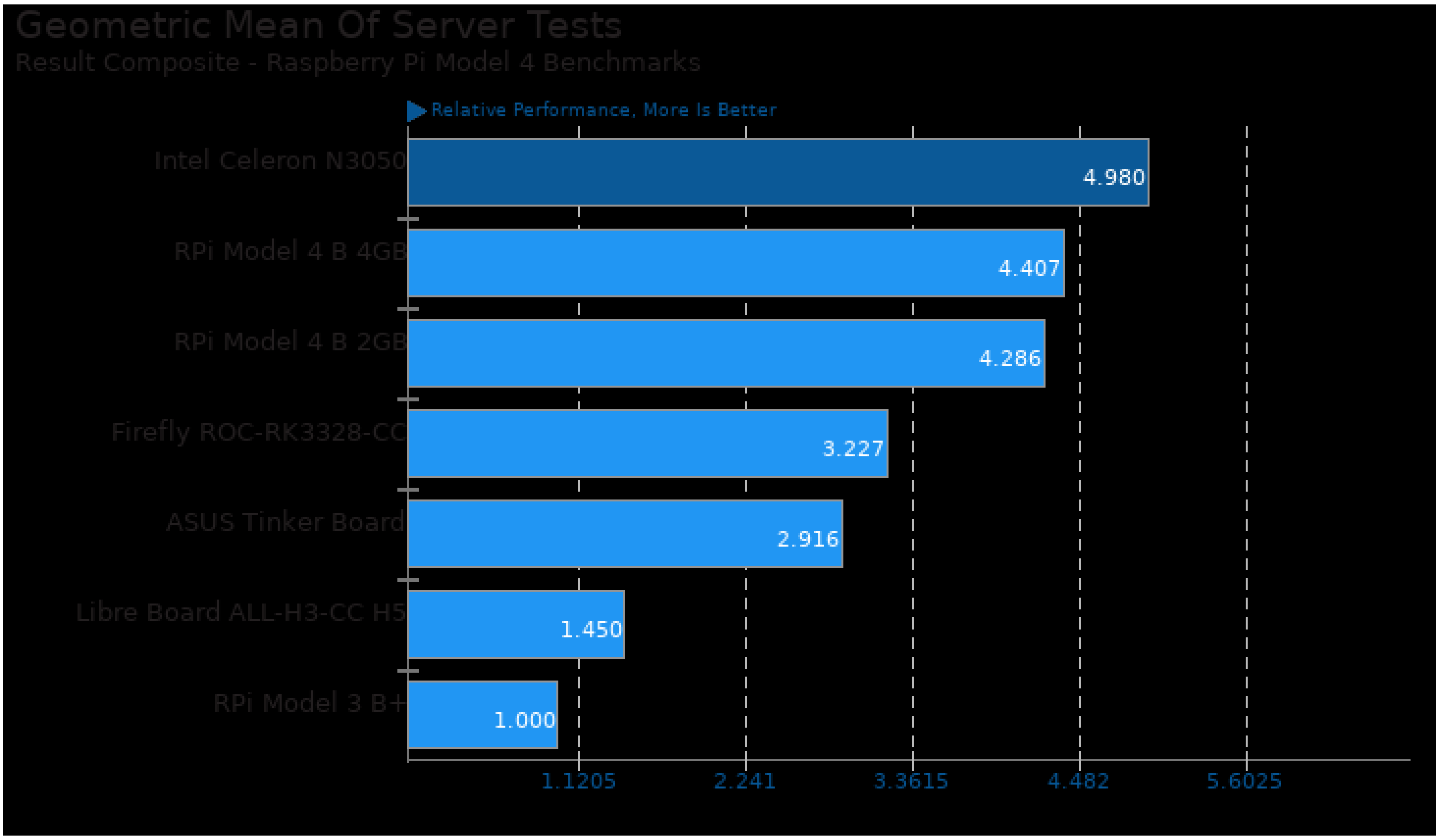
Geometric mean based upon tests: pts/encode-mp3, pts/encode-flac and pts/x264



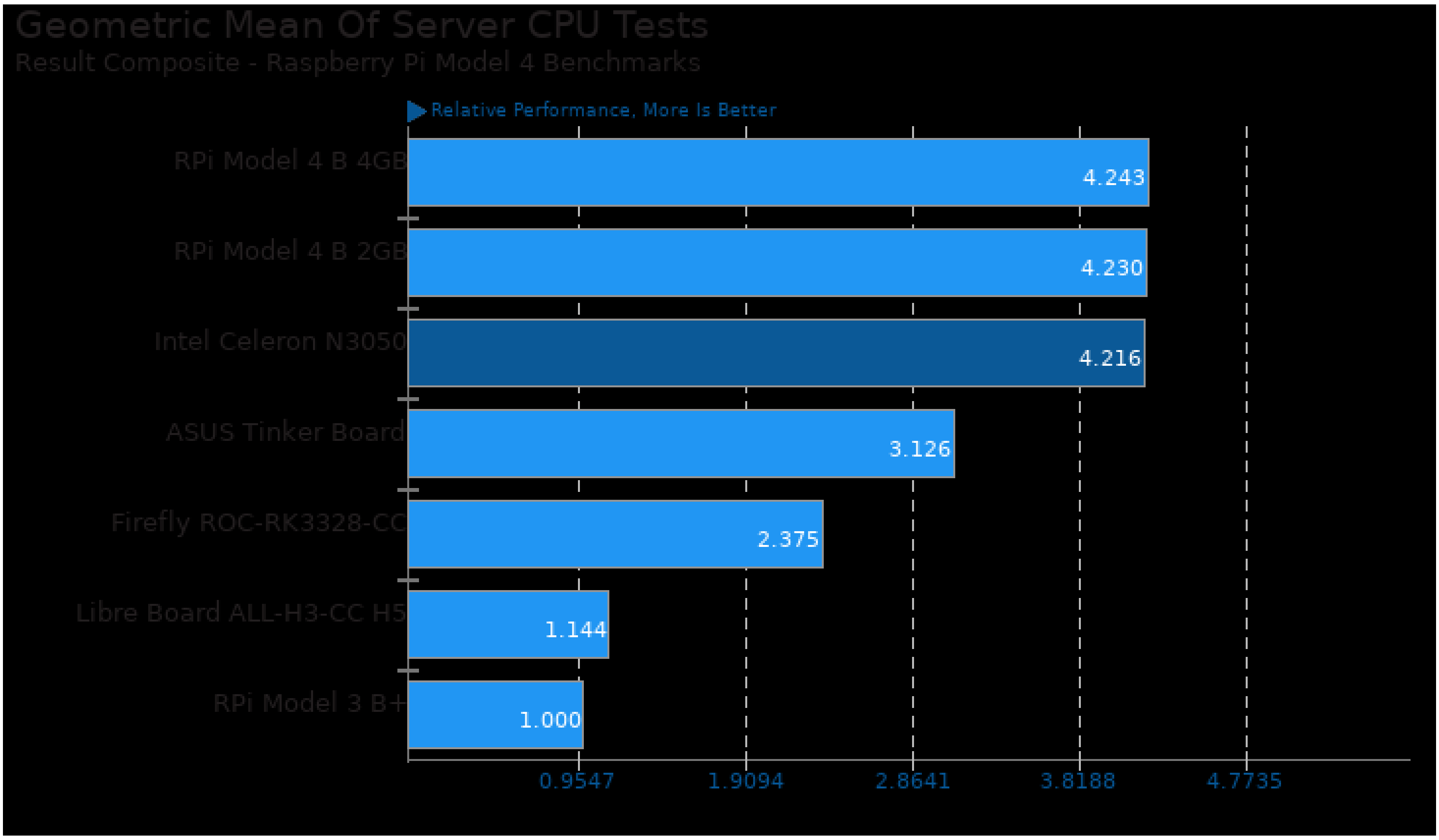
Geometric mean based upon tests: pts/x264, pts/smallpt, pts/graphics-magick, pts/compress-zstd and pts/rust-prime



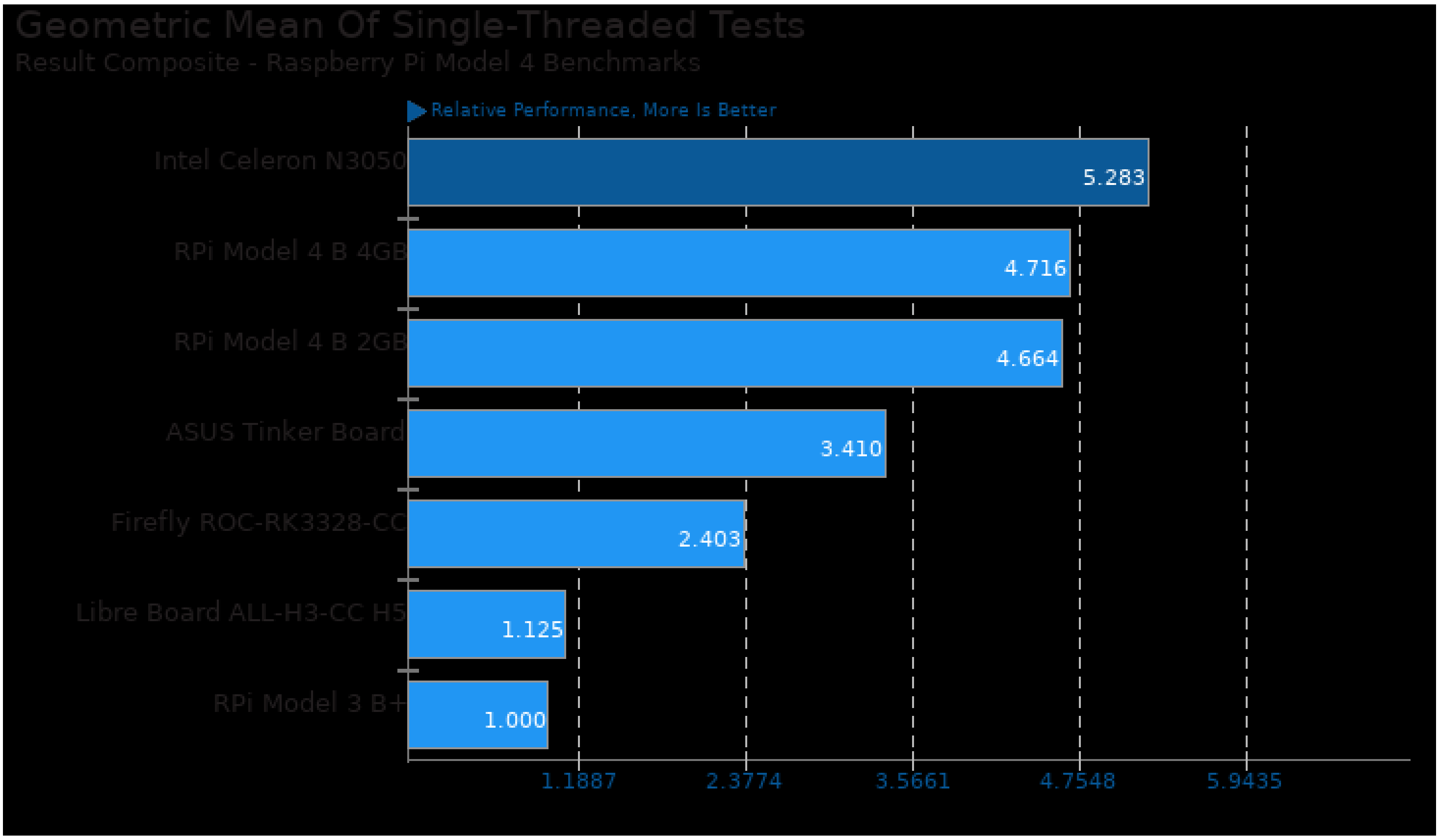
Geometric mean based upon tests: pts/compress-zstd and pts/pybench



Geometric mean based upon tests: pts/nginx, pts/phpbench and pts/perl-benchmark



Geometric mean based upon tests: pts/x264, pts/compress-zstd, pts/pybench and pts/phpbench



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

This file was automatically generated via the Phoronix Test Suite benchmarking software on Friday, 29 March 2024 11:53.