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ODROID-H2 Intel Ubuntu Linux Benchmarks

ODROID H2 Intel Linux benchmarks by Michael Larabel for a future article.

Automated Executive Summary

ODROID-H2 had the most wins, coming in first place for 91% of the tests.

Based on the geometric mean of all complete results, the fastest (ODROID-H2) was 7.578x the speed of the slowest (Raspberry Pi 2 Model B). A9 T7100 was 0.597x the speed of ODROID-H2, ASUS Tinker Board was 0.655x the speed of A9 T7100, ODROID-C2 was 0.79x the speed of ASUS Tinker Board, Firefly ROC-RK3328-CC was 0.799x the speed of ODROID-C2, Raspberry Pi 3 Model B+ was 0.96x the speed of Firefly ROC-RK3328-CC, Raspberry Pi 3 Model A+ was 0.992x the speed of Raspberry Pi 3 Model B+, Raspberry Pi 3 Model B was 0.925x the speed of Raspberry Pi 3 Model A+, Raspberry Pi 2 Model B was 0.607x the speed of Raspberry Pi 3 Model B.

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

PyBench (Total For Average Test Times) at 12.566x
PHPBench (PHP Benchmark Suite) at 12.294x
x264 (H.264 Video Encoding) at 10.646x
C-Ray (Total Time - 4K, 16 Rays Per Pixel) at 9.612x
AOBench (Size: 2048 x 2048 - Total Time) at 7.523x
Perl Benchmarks (Test: Pod2html) at 7.273x

LAME MP3 Encoding (WAV To MP3) at 7.034x
TTSIOD 3D Renderer (Phong Rendering With Soft-Shadow Mapping) at 6.927x
Tinymembench (Standard Memset) at 6.389x
7-Zip Compression (Compress Speed Test) at 6.202x.

Test Systems:

Raspberry Pi 2 Model B

Processor: ARMv7 rev 5 @ 0.90GHz (4 Cores), Motherboard: BCM2835 Raspberry Pi 2 Model B Rev 1.1, Memory: 927MB, Disk: 32GB GB2MW, Graphics: BCM2708

OS: Raspbian 9.6, Kernel: 4.14.79-v7+ (armv7l), Desktop: LXDE, Display Server: X Server 1.19.2, Compiler: GCC 6.3.0 20170516, File-System: ext4, Screen Resolution: 656x416

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
Processor Notes: Scaling Governor: BCM2835 Freq ondemand
Python Notes: Python 2.7.13 + Python 3.5.3

Raspberry Pi 3 Model B

Processor: ARMv7 rev 4 @ 1.20GHz (4 Cores), Motherboard: BCM2835 Raspberry Pi 3 Model B Rev 1.2, Memory: 927MB, Disk: 32GB GB1QT, Graphics: BCM2708

OS: Raspbian 9.6, Kernel: 4.14.79-v7+ (armv7l), Desktop: LXDE, Display Server: X Server 1.19.2, Compiler: GCC 6.3.0 20170516, File-System: ext4, Screen Resolution: 656x416

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
Processor Notes: Scaling Governor: BCM2835 Freq ondemand
Python Notes: Python 2.7.13 + Python 3.5.3

Raspberry Pi 3 Model B+

Processor: ARMv7 rev 4 @ 1.40GHz (4 Cores), Motherboard: BCM2835 Raspberry Pi 3 Model B Plus Rev 1.3, Memory: 927MB, Disk: 32GB GB2MW, Graphics: BCM2708

OS: Raspbian 9.6, Kernel: 4.14.79-v7+ (armv7l), Desktop: LXDE, Display Server: X Server 1.19.2, Compiler: GCC 6.3.0 20170516, File-System: ext4, Screen Resolution: 1824x984

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
Processor Notes: Scaling Governor: BCM2835 Freq ondemand
Python Notes: Python 2.7.13 + Python 3.5.3

Raspberry Pi 3 Model A+

Processor: ARMv7 rev 4 @ 1.40GHz (4 Cores), Motherboard: BCM2835 Raspberry Pi 3 Model A Plus Rev 1.0, Memory: 431MB, Disk: 32GB SC32G, Graphics: BCM2708

OS: Raspbian 9.6, Kernel: 4.14.79-v7+ (armv7l), Desktop: LXDE, Display Server: X Server 1.19.2, Compiler: GCC 6.3.0 20170516, File-System: ext4, Screen Resolution: 1824x984

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
Processor Notes: Scaling Governor: BCM2835 Freq ondemand
Python Notes: Python 2.7.13 + Python 3.5.3

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

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 7.3.0, 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-as=/usr/bin/aarch64-linux-gnu-as --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-ld=/usr/bin/aarch64-linux-gnu-ld -v
Processor Notes: Scaling Governor: cpufreq-dt performance
Python Notes: Python 2.7.15rc1 + Python 3.6.5

ODROID-C2

Processor: Amlogic ARMv8 Cortex-A53 @ 1.54GHz (4 Cores), Motherboard: ODROID-C2, Memory: 2048MB, Disk: 32GB GB1QT, Graphics: OSD

OS: Ubuntu 18.04, Kernel: 3.16.57-20 (aarch64), Display Server: X Server 1.19.6, Compiler: GCC 7.3.0, File-System: ext4, Screen Resolution: 1920x1080

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-as=/usr/bin/aarch64-linux-gnu-as --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-ld=/usr/bin/aarch64-linux-gnu-ld -v
Processor Notes: Scaling Governor: meson_cpufreq performance

Python Notes: Python 2.7.15rc1 + Python 3.6.5

ODROID-H2

Processor: Intel Celeron J4105 @ 2.50GHz (4 Cores), Motherboard: HARDKERNEL ODROID-H2 v1.0 (5.13 BIOS), Chipset: Intel Device 31f0, Memory: 32768MB, Disk: 500GB Western Digital WDS500G2X0C-00L350, Graphics: inteldrmfb (750MHz), Audio: Realtek ALC662 rev1, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 18.10, Kernel: 4.15.0-38-generic (x86_64), Display Server: X Server, Compiler: GCC 8.2.0, File-System: overlayfs, Screen Resolution: 1920x1080, System Layer: docker

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 3.6.7
Security Notes: KPTI + __user pointer sanitization + Full generic retpoline IBPB IBRS_FW + SSB disabled via prctl and seccomp

A9 T7100

Processor: Intel Core 2 Duo T7100 @ 1.80GHz (2 Cores), Motherboard: TOSHIBA Portable PC (Version 1.40 BIOS), Chipset: Intel Mobile PM965/GM965/GL960 + ICH8M, Memory: 2048MB, Disk: 120GB FUJITSU MHW2120B, Graphics: Intel 965GM 384MB, Audio: Realtek ALC262, Network: Intel 82566MC Gigabit Connection + Intel PRO/Wireless

OS: Ubuntu 18.04, Kernel: 4.15.0-39-generic (x86_64), Desktop: GNOME Shell 3.28.3, Display Server: X Server 1.19.6, Display Driver: modesetting 1.19.6, OpenGL: 2.1 Mesa 18.0.5, Compiler: GCC 7.3.0, File-System: ext4, Screen Resolution: 1280x800

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: acpi-cpufreq ondemand
Python Notes: Python 2.7.15rc1 + Python 3.6.7
Security Notes: KPTI + __user pointer sanitization + Full generic retpoline + PTE Inversion; VMX: EPT disabled

	Raspberry Pi 2 Model B	Raspberry Pi 3 Model B	Raspberry Pi 3 Model B+	Raspberry Pi 3 Model A+	ASUS Tinker Board	Firefly ROC-RK3328-CC	ODROID-C2	ODROID-H2	A9 T7100
Tinymembench - Standard Memcpy (MB/s)	1000	1302	1285	1300	1532	1240	1718	5577	1949
Normalized	17.93%	23.35%	23.04%	23.31%	27.47%	22.23%	30.81%	100%	34.95%
Standard Deviation	2.5%	0.3%	1.2%	1.3%	0.3%	3.4%	0.4%	0.3%	0.4%
Tinymembench - Standard Memset (MB/s)	1188	1773	1826	1833	4199	5628	3737	7590	2086
Normalized	15.65%	23.36%	24.06%	24.15%	55.32%	74.15%	49.24%	100%	27.48%
Standard Deviation	0.5%	1.6%	2.4%	3.4%	0%	5.3%	0.1%	0.1%	0.1%

ODROID-H2 Intel Ubuntu Linux Benchmarks

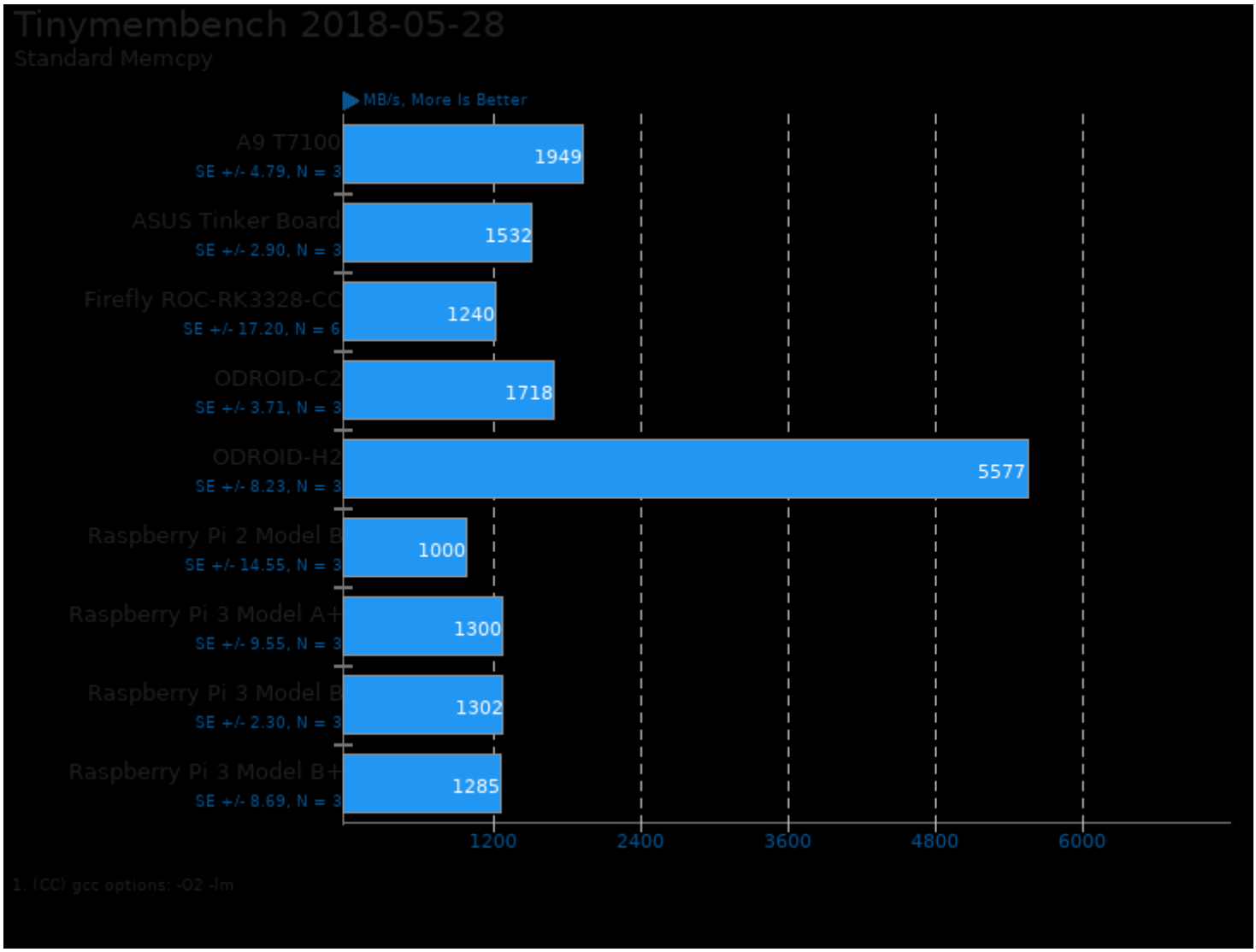
TTSIOD 3D Renderer - P.R.W.S.S.M (FPS)	**11.20**	15.99	16.51	17.25	22.38		22.51	**77.58**	28.75
Normalized	14.44%	20.61%	21.28%	22.24%	28.85%		29.02%	100%	37.06%
Standard Deviation	0.4%	3.3%	0.3%	1.6%	2.6%		2.2%	0.3%	0.4%
x264 - H.2.V.E (FPS)	**1.13**	2.03	2.08		3.36	1.65	2.88	**12.03**	4.03
Normalized	9.39%	16.87%	17.29%		27.93%	13.72%	23.94%	100%	33.5%
Standard Deviation	0.5%	0%	0.6%		0.5%	0.6%	0.2%	0.3%	0.5%
7-Zip Compression - C.S.T (MIPS)	**1168**	1858	1803	1993	2946	1536	2165	**7244**	3023
Normalized	16.12%	25.65%	24.89%	27.51%	40.67%	21.2%	29.89%	100%	41.73%
Standard Deviation	0.4%	0.3%	3%	0.7%	4%	0.5%	0.4%	0.9%	0.6%
C-Ray - Total Time - 4.1.R.P.P (sec)	**4364**	2317	2111	2068	1579	2604	1559	**454**	1472
Normalized	10.4%	19.59%	21.51%	21.95%	28.75%	17.43%	29.12%	100%	30.84%
Standard Deviation	1.6%	0.9%	0.2%	0.4%	0.3%	0.8%	1.9%	0%	0.2%
AOBench - 2048 x 2048 - Total Time (sec)	**668**	334	298	286	214	298	262	**88.80**	145.46
Normalized	13.29%	26.59%	29.8%	31.05%	41.5%	29.8%	33.89%	100%	61.05%
Standard Deviation	0.4%	0.1%	4.7%	0.4%	3.4%	0.4%	0.9%	0.5%	0.1%
LAME MP3 Encoding - WAV To MP3 (sec)	**515**	352	302	304	158	315	265	**73.22**	90.85
Normalized	14.22%	20.8%	24.25%	24.09%	46.34%	23.24%	27.63%	100%	80.59%
Standard Deviation	0.3%	0.2%	0.3%	0.6%	0.6%	0.2%	0.1%	0%	0.1%
Perl Benchmarks - Pod2html (sec)	**2.391983 71**	1.299323 92	1.210610 75	1.159524 01	0.743728 82	1.703258 77	1.088939 65	**0.328906 68**	0.403089 35
Normalized	13.75%	25.31%	27.17%	28.37%	44.22%	19.31%	30.2%	100%	81.6%
Standard Deviation	1.9%	1.7%	0.8%	0.1%	1.1%	2.3%	4.7%	0.1%	0.5%
Perl Benchmarks - Interpreter (sec)	**0.014098 89**	0.008430 41	0.008079 74	0.009716 87	0.004274 66	0.005988 28	0.005480 34	0.003332 89	**0.003093 49**
Normalized	21.94%	36.69%	38.29%	31.84%	72.37%	51.66%	56.45%	92.82%	100%
Standard Deviation	5.7%	3.3%	7%	14.5%	7.2%	0.2%	0.9%	0.6%	0.2%
PyBench - T.F.A.T.T (Milliseconds)	**38087**	24328	21206	20874	9318	14242	12619	**3031**	3542
Normalized	7.96%	12.46%	14.29%	14.52%	32.53%	21.28%	24.02%	100%	85.57%
Standard Deviation	0.4%	0.4%	0.4%	0.2%	0.8%	0.4%	0.1%	0.1%	0.5%
PHPBench - P.B.S (Score)	**20920**	34426	38087	40338	61415	52852	59664	**257186**	190928
Normalized	8.13%	13.39%	14.81%	15.68%	23.88%	20.55%	23.2%	100%	74.24%
Standard Deviation	0.5%	0.2%	0.7%	0.2%	0.7%	0.5%	0.2%	0.1%	1.4%
Git - T.T.C.C.G.C (sec)	**96.99**	59.52	49.17	58.67	25.72	41.47	42.08	**12.99**	27.95
Normalized	13.39%	21.82%	26.42%	22.14%	50.51%	31.32%	30.87%	100%	46.48%
Standard Deviation	5.5%	10.2%	10.4%	1.7%	3.5%	2.5%	13.9%	2%	0.3%
Tinymembench - Performance / Cost - Standard Memcpy (MB/s/Dollar)			36.71	**52.00**	**23.57**	35.43	28.63		
Normalized			70.6%	100%	45.33%	68.13%	55.06%		

ODROID-H2 Intel Ubuntu Linux Benchmarks

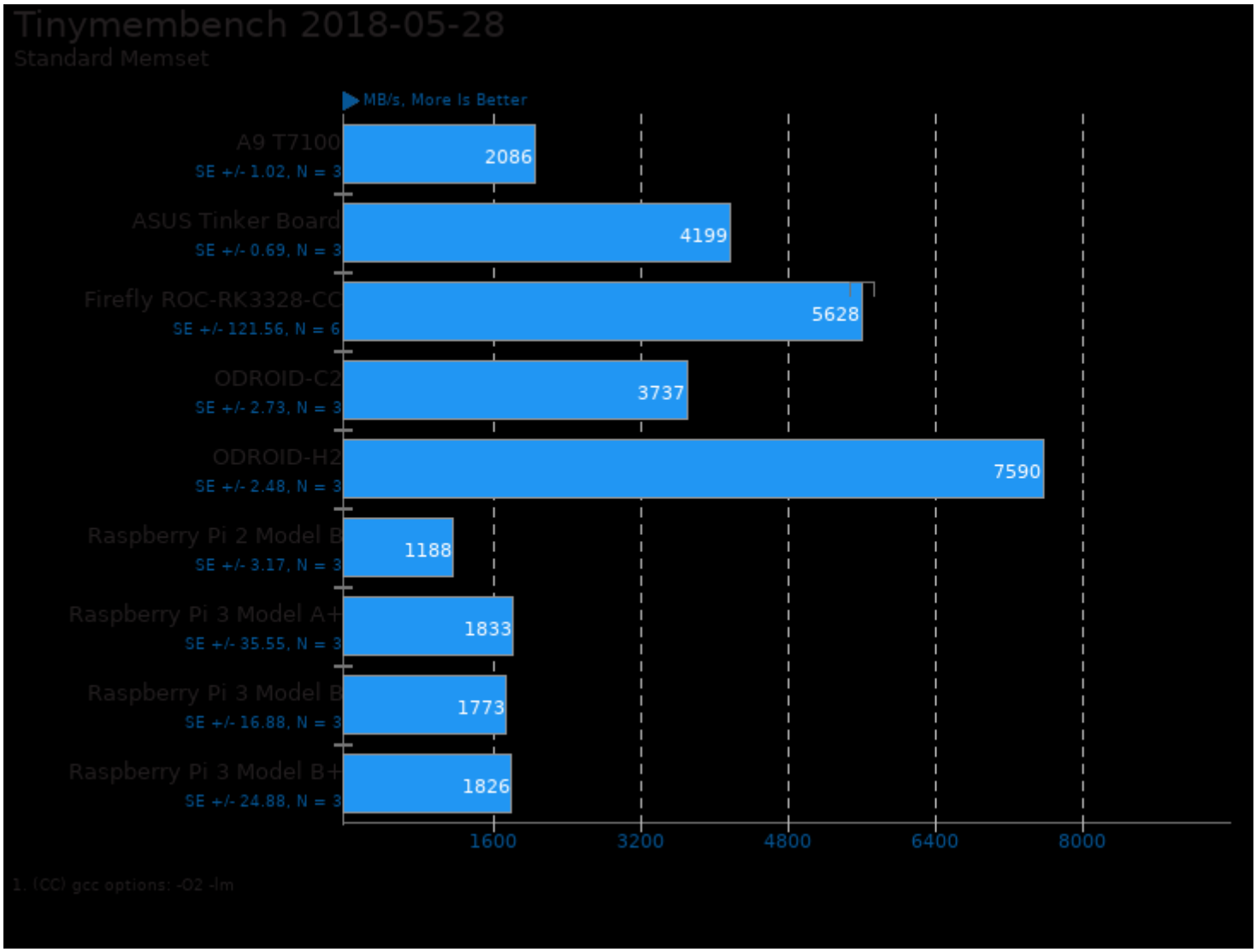
TTSIOD 3D Renderer - Performance / Cost - P.R.W.S.S.M (FPS/Dollar)	0.47	0.69	**0.34**		0.38	**0.70**
Normalized	67.14%	98.57%	48.57%		54.29%	100%
x264 - Performance / Cost - H.2.V.E (FPS/Dollar)	0.06		**0.05**	**0.05**	**0.05**	**0.11**
Normalized	54.55%		45.45%	45.45%	45.45%	100%
7-Zip Compression - Performance / Cost - C.S.T (MIPS/Dollar)	51.51	**79.72**	45.32	43.89	**36.08**	65.26
Normalized	64.61%	100%	56.85%	55.06%	45.26%	81.86%
C-Ray - Performance / Cost - Total Time - 4.1.R.P.P (sec x Dollar)	73885	51700	**102635**	91140	93540	**50436**
Normalized	68.26%	97.56%	49.14%	55.34%	53.92%	100%
AOBench - Performance / Cost - 2048 x 2048 - Total Time (sec x Dollar)	10430	**7150**	13910	10430	**15720**	9857
Normalized	68.55%	100%	51.4%	68.55%	45.48%	72.54%
LAME MP3 Encoding - Performance / Cost - WAV To MP3 (sec x Dollar)	10570	**7600**	10270	11025	**15900**	8127
Normalized	71.9%	100%	74%	68.93%	47.8%	93.51%
Perl Benchmarks - Performance / Cost - Pod2html (sec x Dollar)	42.37	**28.99**	48.34	59.61	**65.34**	36.51
Normalized	68.42%	100%	59.97%	48.63%	44.37%	79.4%
Perl Benchmarks - Performance / Cost - Interpreter (sec x Dollar)	0.28	0.24	0.28	**0.21**	0.33	**0.37**
Normalized	75%	87.5%	75%	100%	63.64%	56.76%
PyBench - Performance / Cost - T.F.A.T.T (Milliseconds x	742210	521850	605670	498470	**757140**	**336441**
Normalized	45.33%	64.47%	55.55%	67.49%	44.44%	100%
PHPBench - Performance / Cost - P.B.S (Score/Dollar)	1088	1614	**944.85**	1510	994.40	**2317**
Normalized	46.97%	69.64%	40.78%	65.17%	42.92%	100%

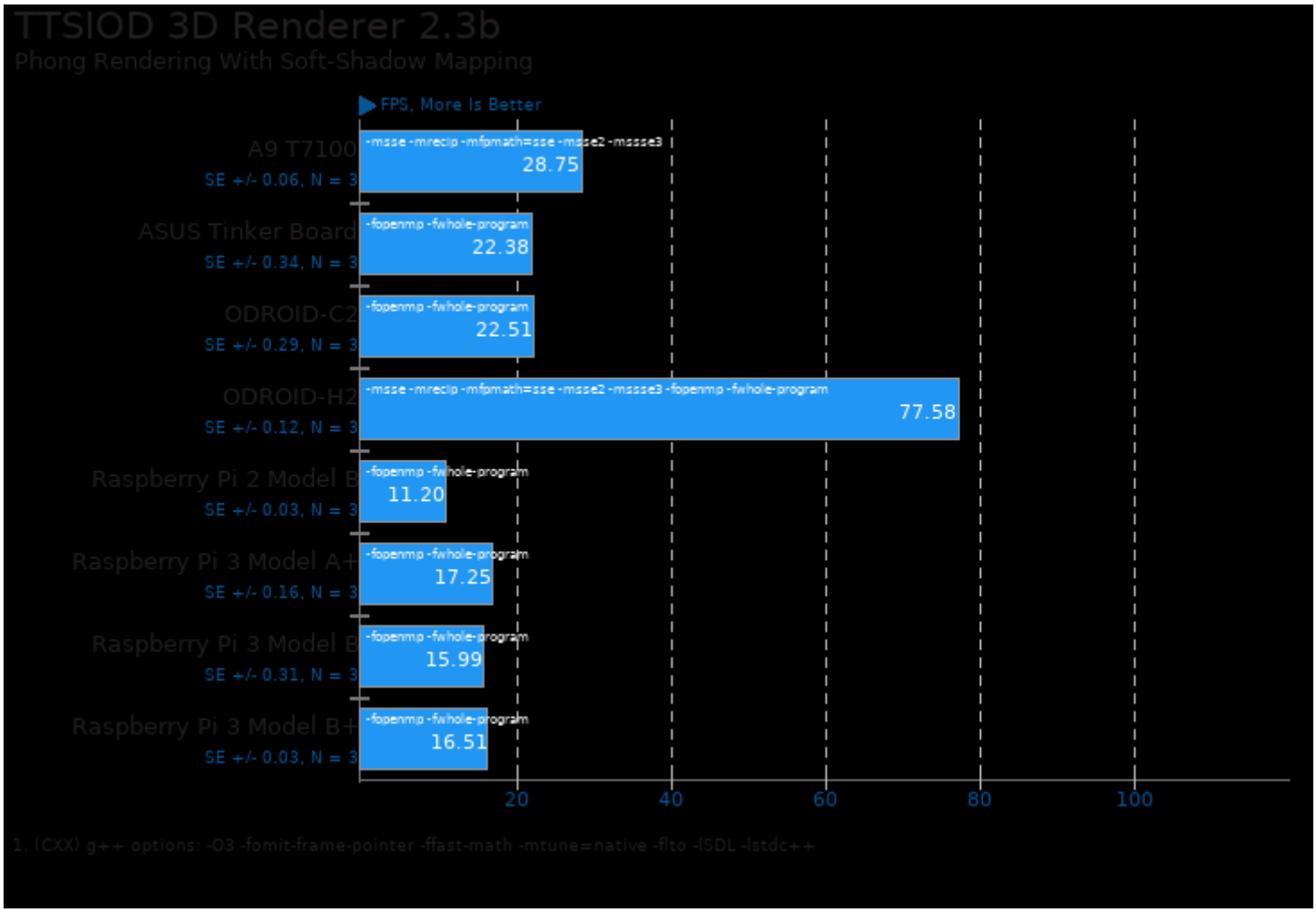
ODROID-H2 Intel Ubuntu Linux Benchmarks

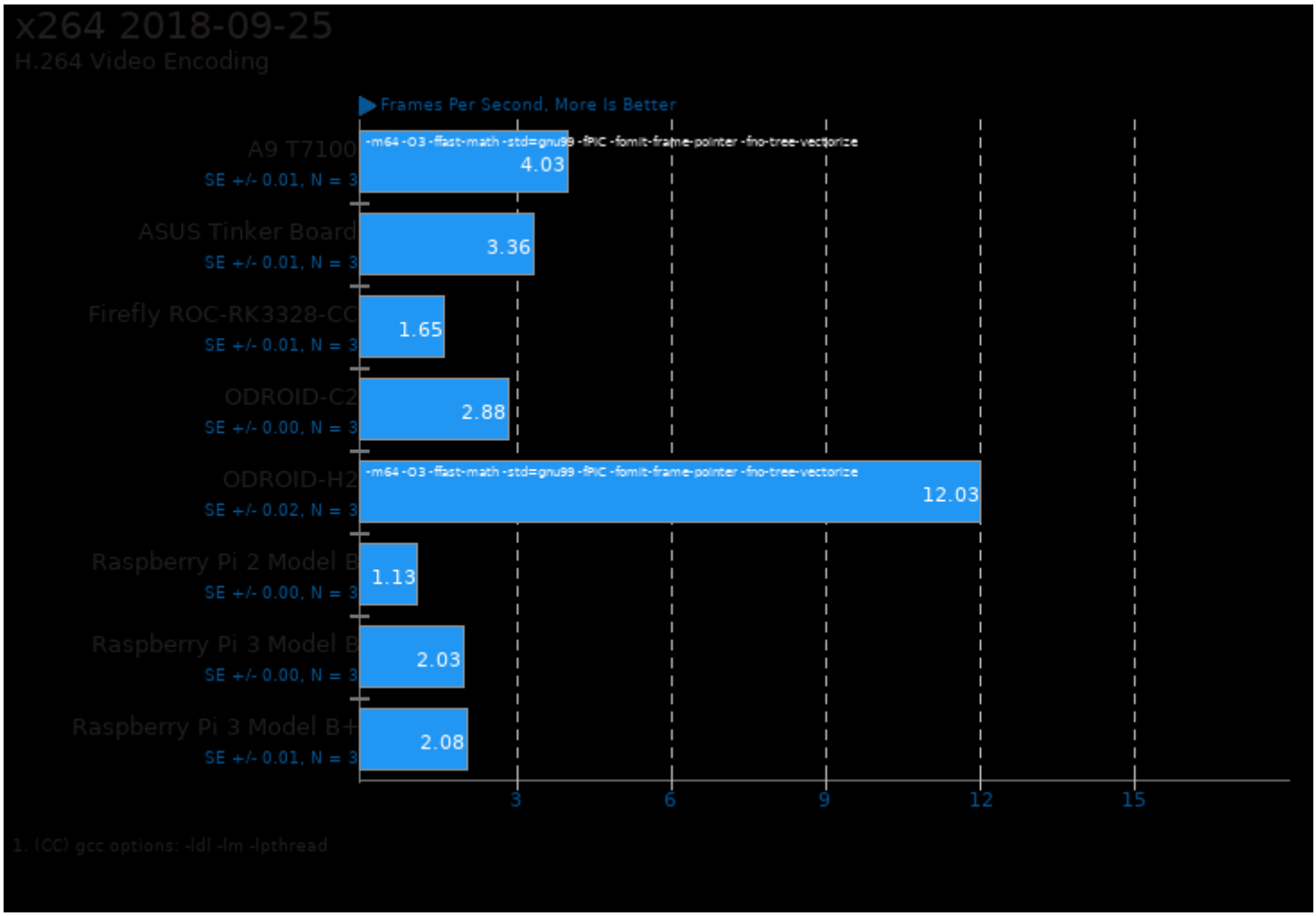
Git - Performance / Cost - T.T.C.C.G.C (sec x Dollar)	1721	1467	1672	1451	**2525**	**1442**
Normalized	83.78%	98.31%	86.25%	99.34%	57.11%	100%
Tinymembench - Performance / Cost - Standard Memset (MB/s/Dollar)						68.38


Tinymembench 2018-05-28
Standard Memcpy
MB/s, More Is Better
A9 T7100
SE +/- 4.79, N = 3
1949
ASUS Tinker Board
SE +/- 2.90, N = 3
1532
Firefly ROC-RK3328-CC
SE +/- 17.20, N = 6
1240
ODROID-C2
SE +/- 3.71, N = 3
1718
ODROID-H2
SE +/- 8.23, N = 3
5577
Raspberry Pi 2 Model B
SE +/- 14.55, N = 3
1000
Raspberry Pi 3 Model A+
SE +/- 9.55, N = 3
1300
Raspberry Pi 3 Model B
SE +/- 2.30, N = 3
1302
Raspberry Pi 3 Model B+
SE +/- 8.69, N = 3
1285
1200
2400
3600
4800
6000
1. (CC) gcc options: -O2 -lm

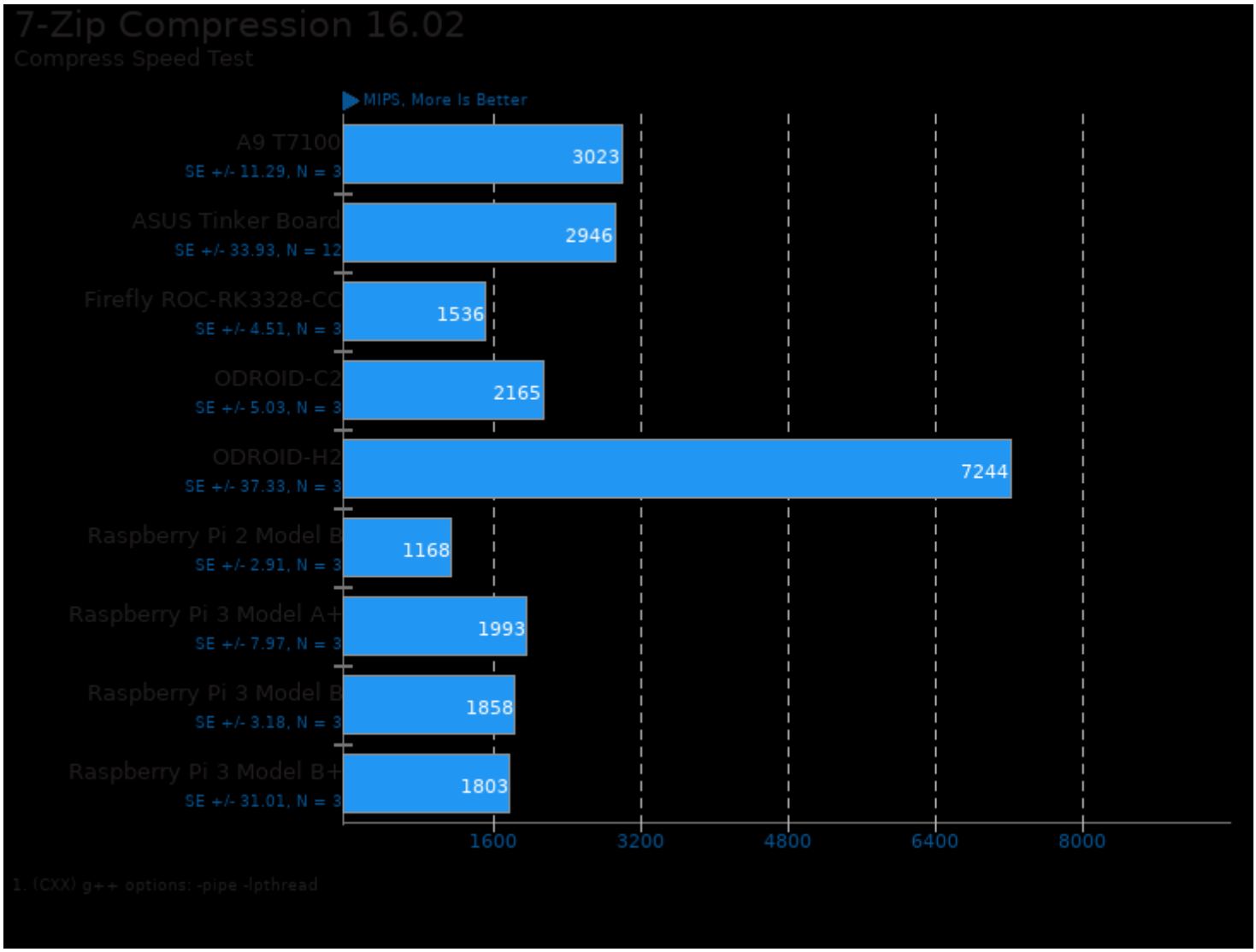
ODROID-H2 Intel Ubuntu Linux Benchmarks

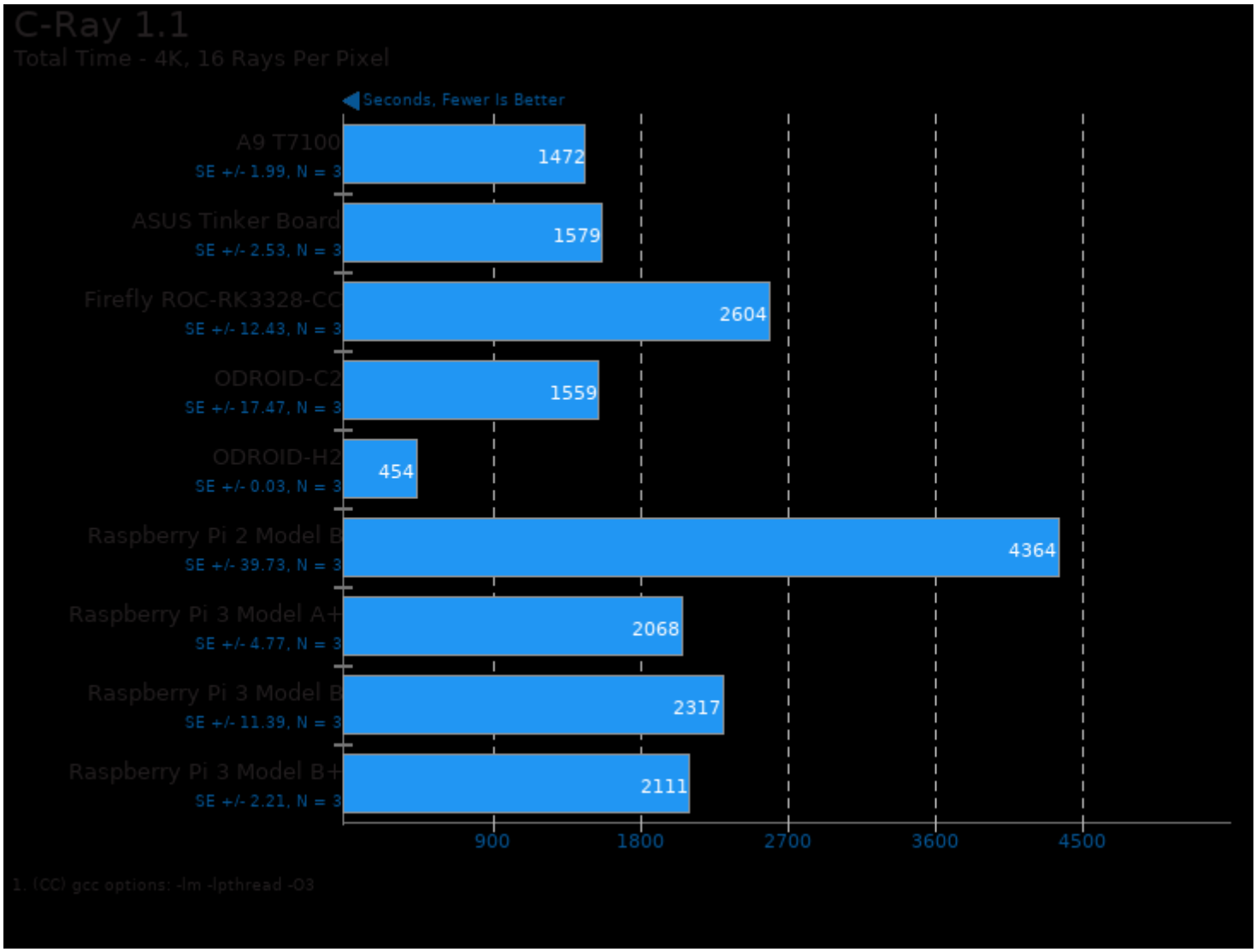



TTSIOD 3D Renderer 2.3b
Phong Rendering With Soft-Shadow Mapping
FPS, More Is Better
A9 T7100
SE +/- 0.06, N = 3
-msse -mrecip -mfpmath=sse -msse2 -mssse3
28.75
ASUS Tinker Board
SE +/- 0.34, N = 3
-fopenmp -fwhole-program
22.38
ODROID-C2
SE +/- 0.29, N = 3
-fopenmp -fwhole-program
22.51
ODROID-H2
SE +/- 0.12, N = 3
-msse -mrecip -mfpmath=sse -msse2 -mssse3 -fopenmp -fwhole-program
77.58
Raspberry Pi 2 Model B
SE +/- 0.03, N = 3
-fopenmp -fwhole-program
11.20
Raspberry Pi 3 Model A+
SE +/- 0.16, N = 3
-fopenmp -fwhole-program
17.25
Raspberry Pi 3 Model B
SE +/- 0.31, N = 3
-fopenmp -fwhole-program
15.99
Raspberry Pi 3 Model B+
SE +/- 0.03, N = 3
-fopenmp -fwhole-program
16.51
20
40
60
80
100
1. (CXX) g++ options: -O3 -fomit-frame-pointer -ffast-math -mtune=native -flto -lSDL -lstdc++

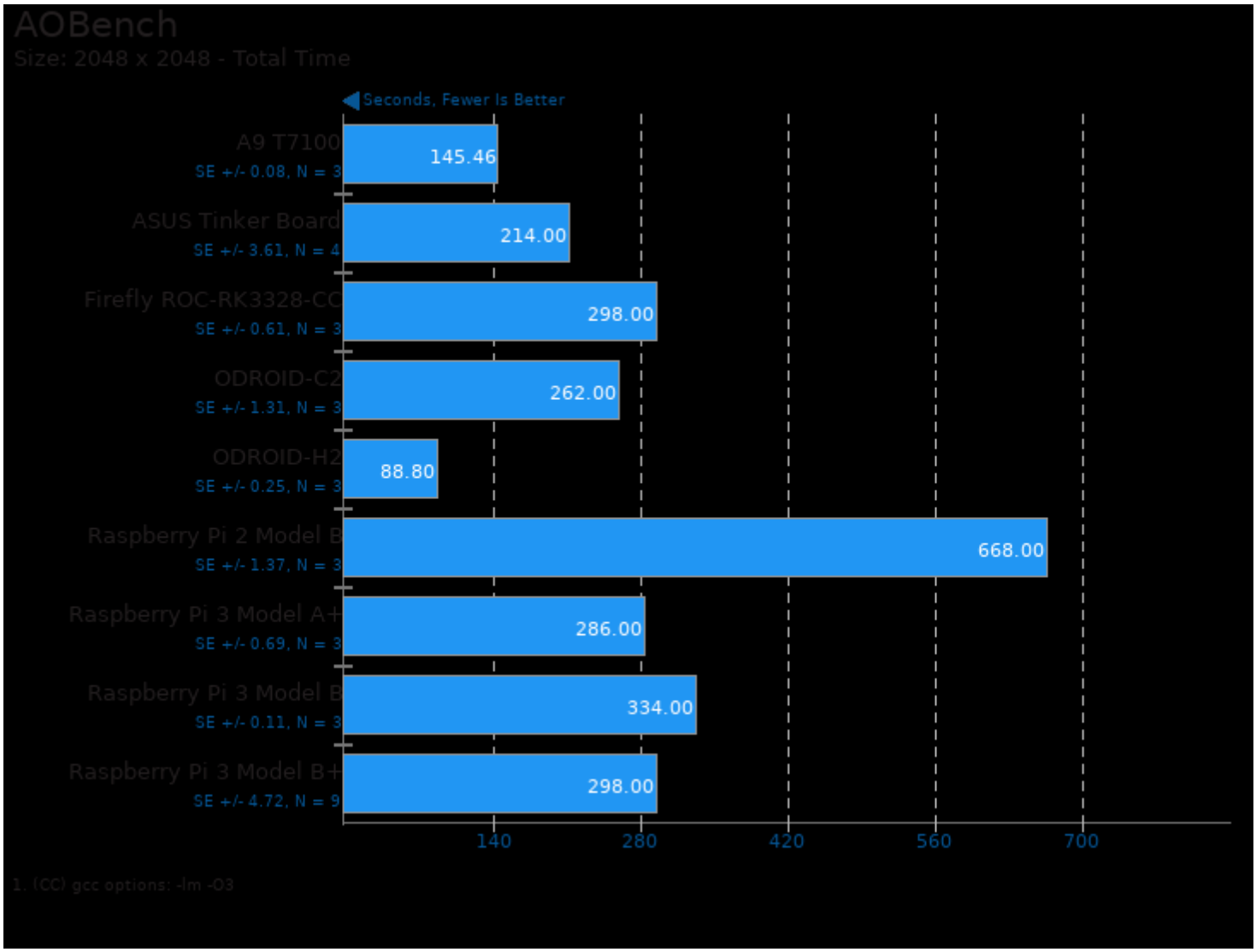

x264 2018-09-25
H.264 Video Encoding
Frames Per Second, More Is Better
A9 T7100
SE +/- 0.01, N = 3
4.03
-m64 -O3 -ffast-math -std=gnu99 -fPIC -fomit-frame-pointer -fno-tree-vectorize
ASUS Tinker Board
SE +/- 0.01, N = 3
3.36
Firefly ROC-RK3328-CC
SE +/- 0.01, N = 3
1.65
ODROID-C2
SE +/- 0.00, N = 3
2.88
ODROID-H2
SE +/- 0.02, N = 3
12.03
-m64 -O3 -ffast-math -std=gnu99 -fPIC -fomit-frame-pointer -fno-tree-vectorize
Raspberry Pi 2 Model B
SE +/- 0.00, N = 3
1.13
Raspberry Pi 3 Model B
SE +/- 0.00, N = 3
2.03
Raspberry Pi 3 Model B+
SE +/- 0.01, N = 3
2.08
3
6
9
12
15
1. (CC) gcc options: -ldl -lm -lpthread

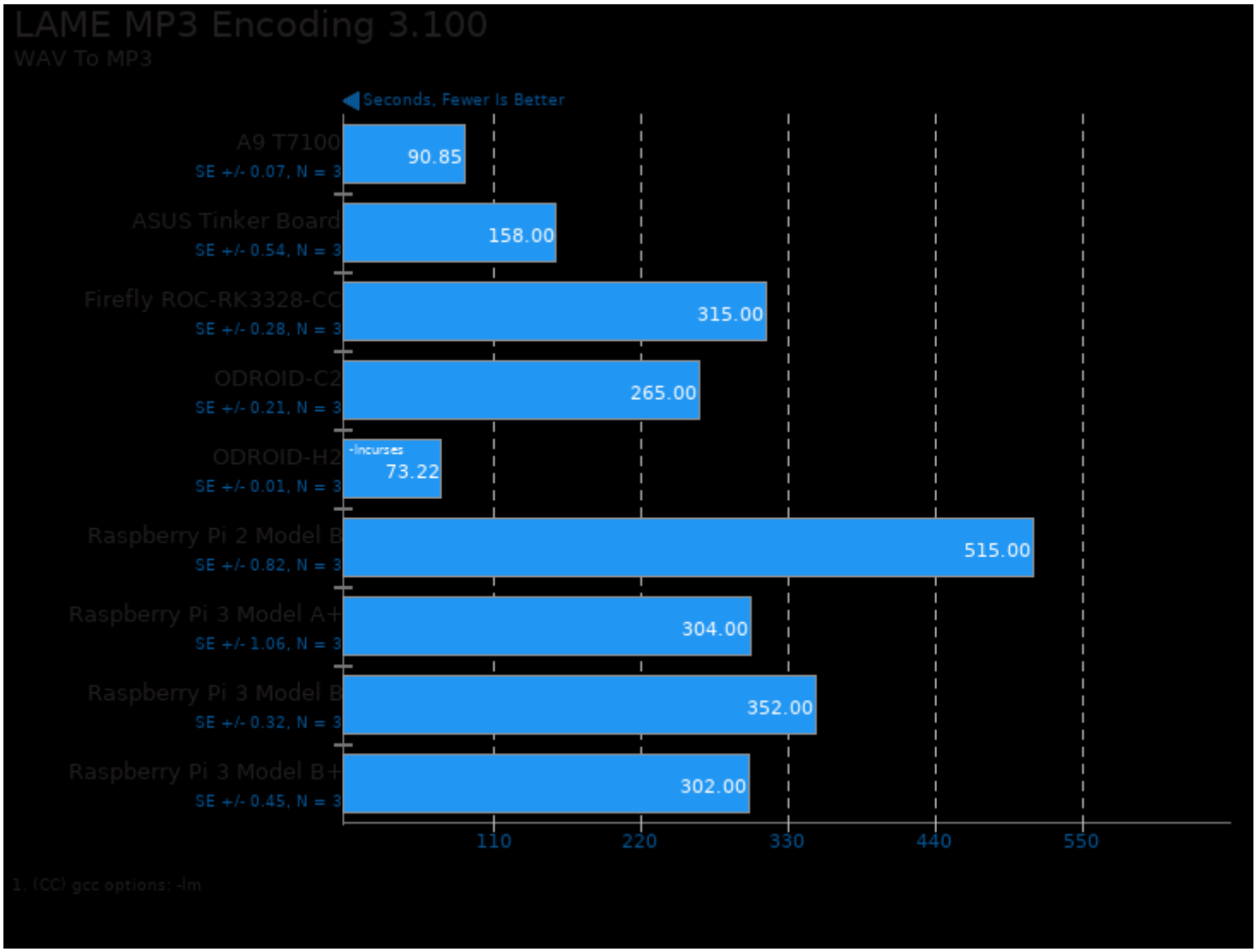
ODROID-H2 Intel Ubuntu Linux Benchmarks



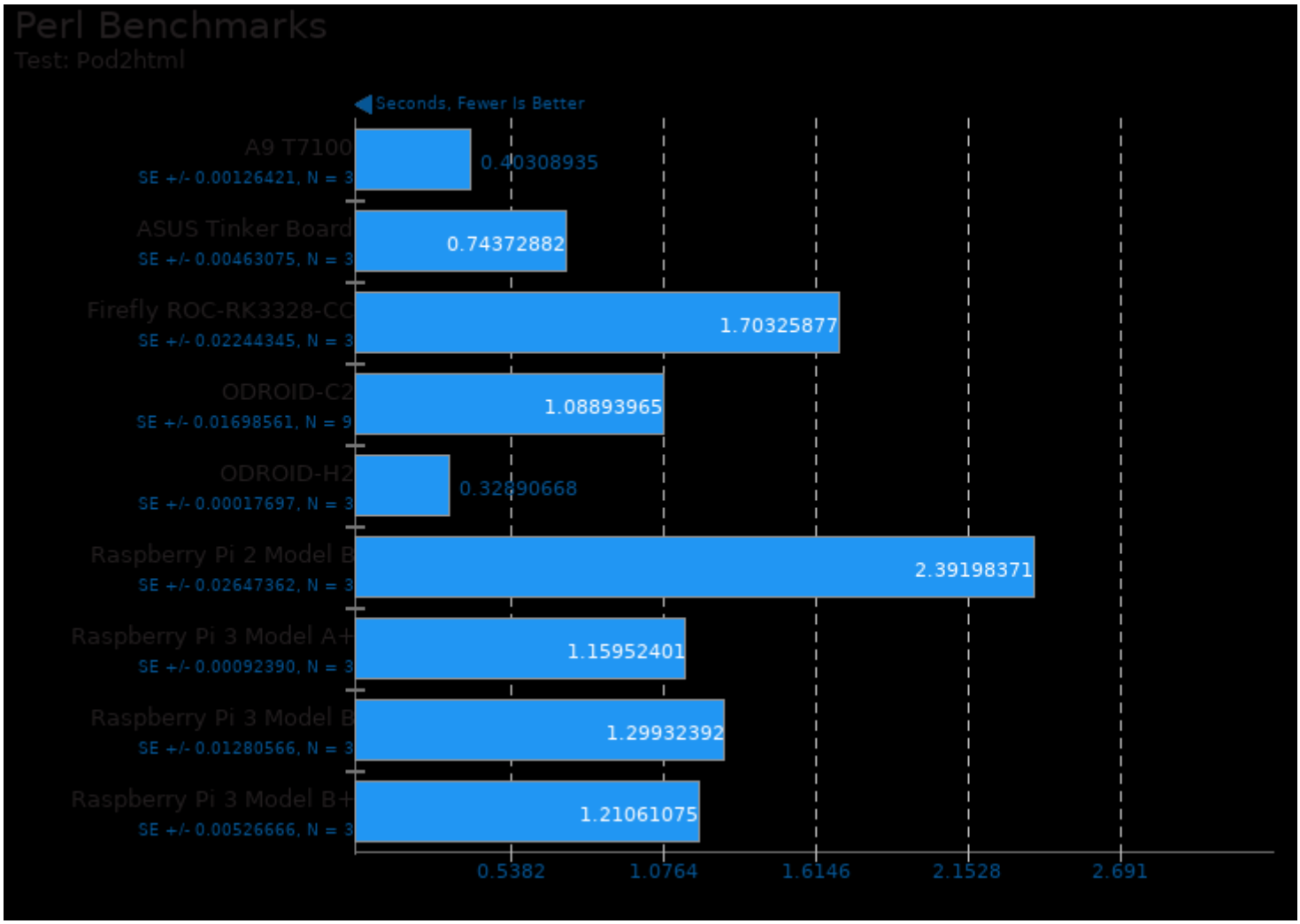

C-Ray 1.1
Total Time - 4K, 16 Rays Per Pixel
Seconds, Fewer Is Better
A9 T7100
SE +/- 1.99, N = 3
1472
ASUS Tinker Board
SE +/- 2.53, N = 3
1579
Firefly ROC-RK3328-CC
SE +/- 12.43, N = 3
2604
ODROID-C2
SE +/- 17.47, N = 3
1559
ODROID-H2
SE +/- 0.03, N = 3
454
Raspberry Pi 2 Model B
SE +/- 39.73, N = 3
4364
Raspberry Pi 3 Model A+
SE +/- 4.77, N = 3
2068
Raspberry Pi 3 Model B
SE +/- 11.39, N = 3
2317
Raspberry Pi 3 Model B+
SE +/- 2.21, N = 3
2111
900
1800
2700
3600
4500
1. (CC) gcc options: -lm -lpthread -O3

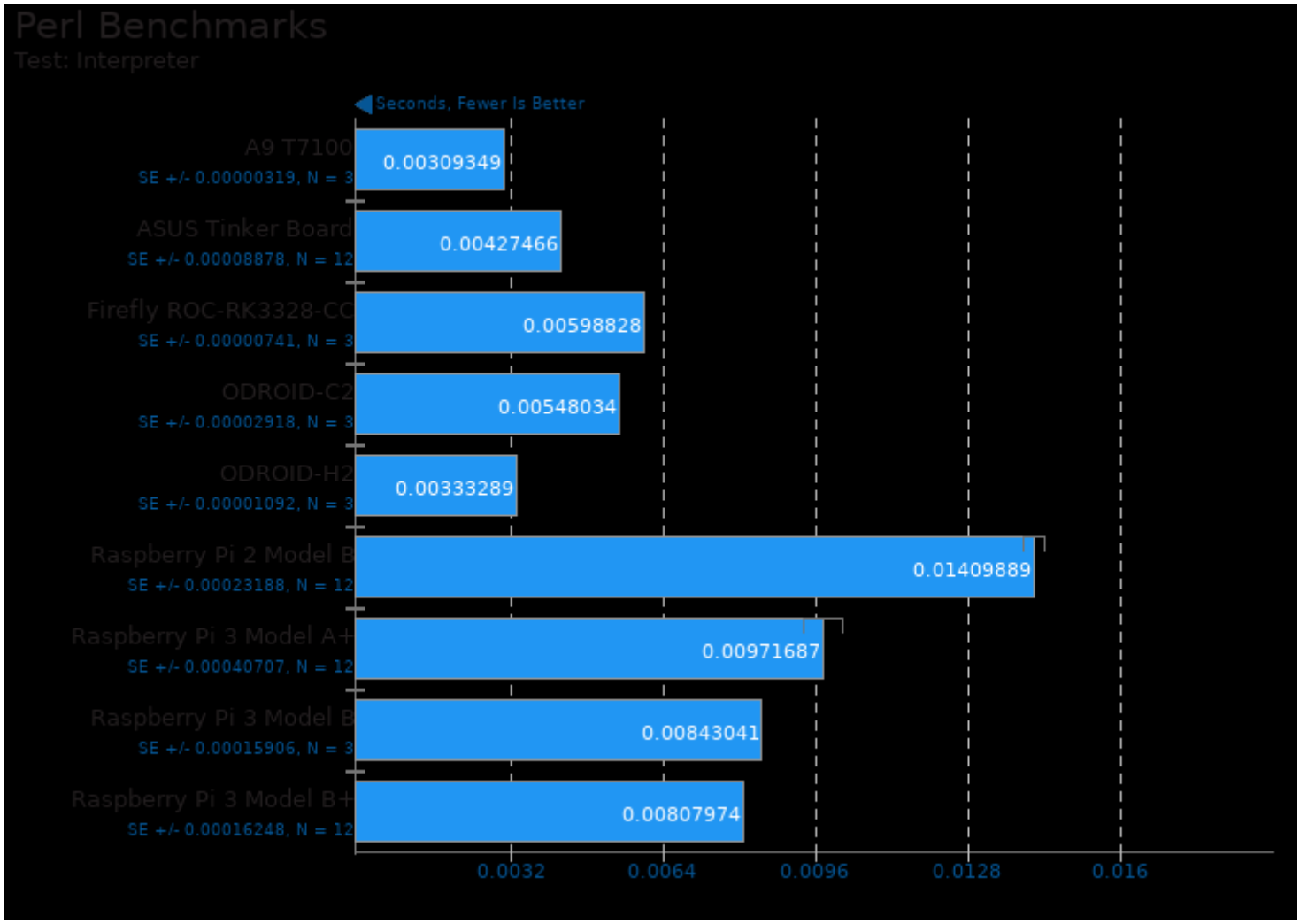
ODROID-H2 Intel Ubuntu Linux Benchmarks



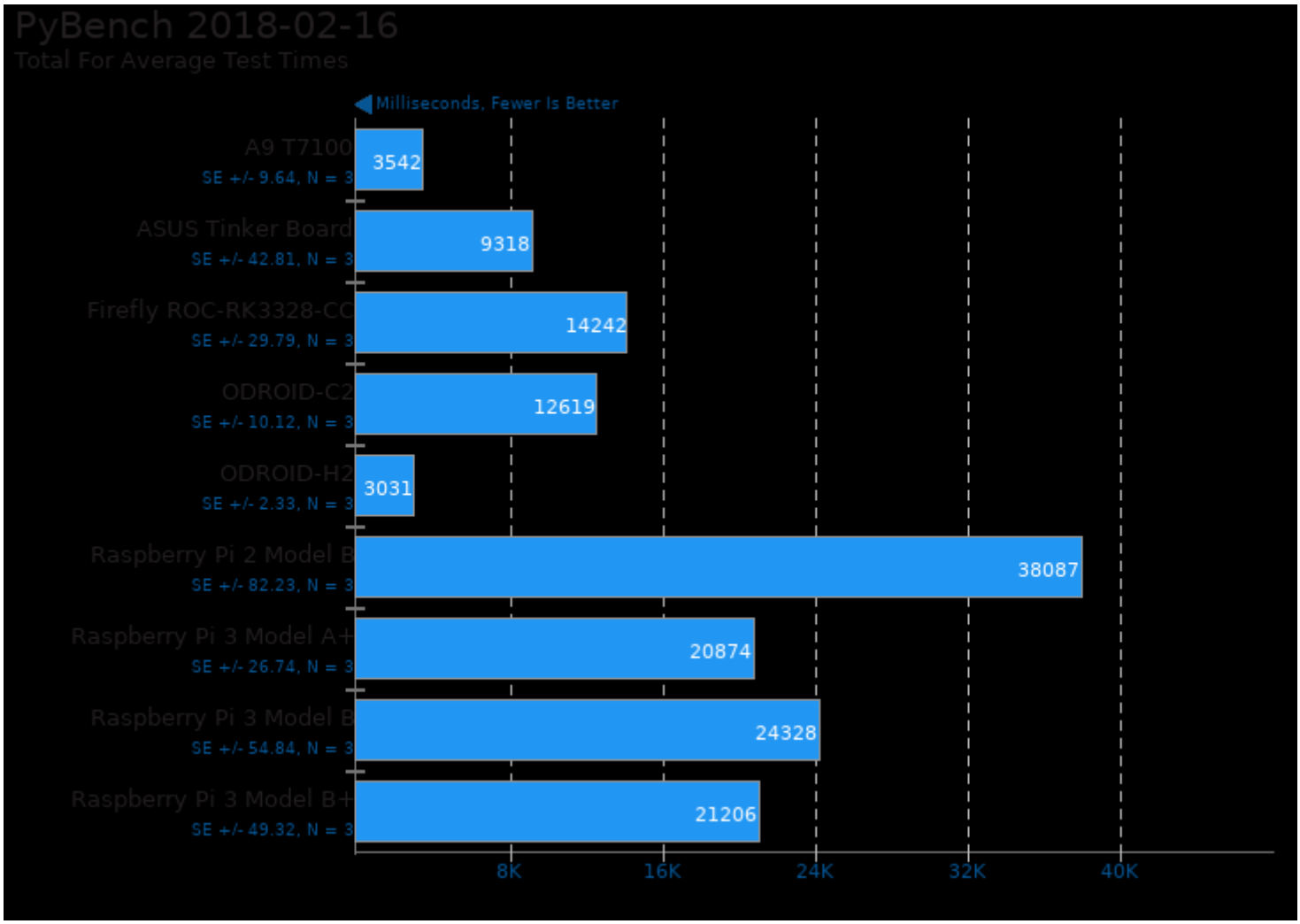

LAME MP3 Encoding 3.100
WAV To MP3
Seconds, Fewer Is Better
A9 T7100
SE +/- 0.07, N = 3
90.85
ASUS Tinker Board
SE +/- 0.54, N = 3
158.00
Firefly ROC-RK3328-CC
SE +/- 0.28, N = 3
315.00
ODROID-C2
SE +/- 0.21, N = 3
265.00
ODROID-H2
SE +/- 0.01, N = 3
-lncurses
73.22
Raspberry Pi 2 Model B
SE +/- 0.82, N = 3
515.00
Raspberry Pi 3 Model A+
SE +/- 1.06, N = 3
304.00
Raspberry Pi 3 Model B
SE +/- 0.32, N = 3
352.00
Raspberry Pi 3 Model B+
SE +/- 0.45, N = 3
302.00
110
220
330
440
550
1. (CC) gcc options: -lm

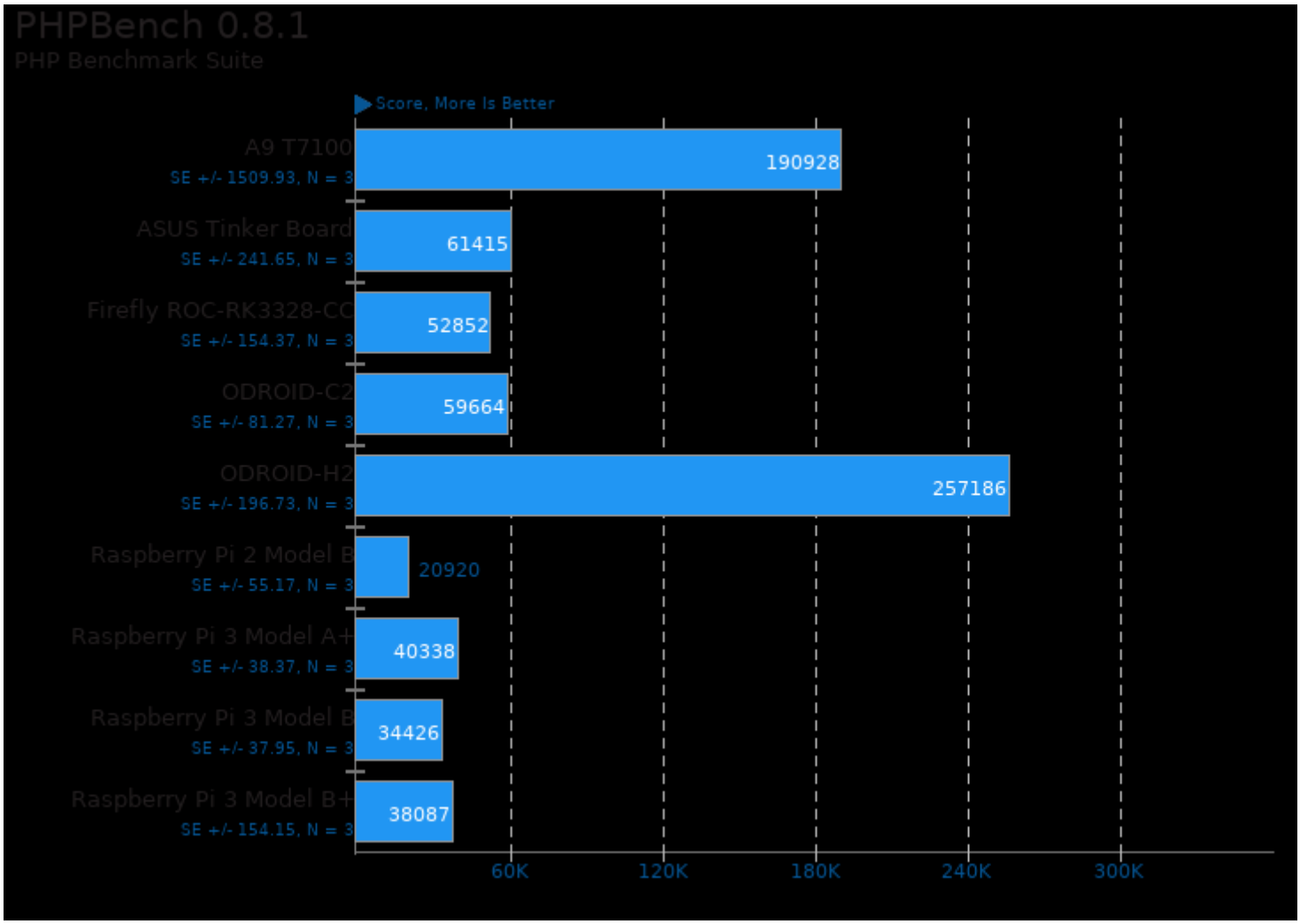
ODROID-H2 Intel Ubuntu Linux Benchmarks



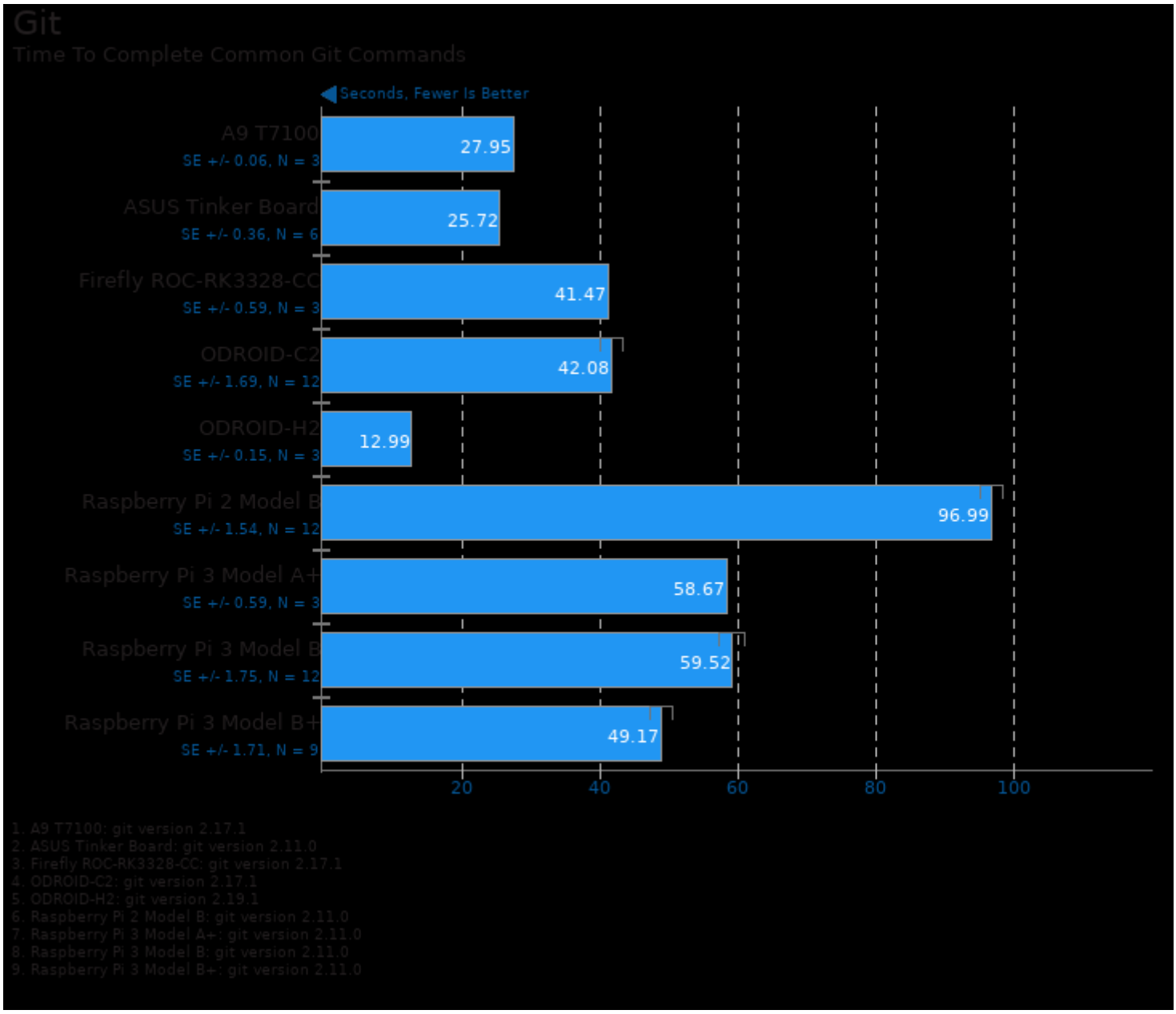

Perl Benchmarks
Test: Interpreter
Seconds, Fewer Is Better
A9 T7100
SE +/- 0.00000319, N = 3
0.00309349
ASUS Tinker Board
SE +/- 0.00008878, N = 12
0.00427466
Firefly ROC-RK3328-CC
SE +/- 0.00000741, N = 3
0.00598828
ODROID-C2
SE +/- 0.00002918, N = 3
0.00548034
ODROID-H2
SE +/- 0.00001092, N = 3
0.00333289
Raspberry Pi 2 Model B
SE +/- 0.00023188, N = 12
0.01409889
Raspberry Pi 3 Model A+
SE +/- 0.00040707, N = 12
0.00971687
Raspberry Pi 3 Model B
SE +/- 0.00015906, N = 3
0.00843041
Raspberry Pi 3 Model B+
SE +/- 0.00016248, N = 12
0.00807974
0.0032
0.0064
0.0096
0.0128
0.016

ODROID-H2 Intel Ubuntu Linux Benchmarks




PHPBench 0.8.1
PHP Benchmark Suite
Score, More Is Better
A9 T7100
SE +/- 1509.93, N = 3
190928
ASUS Tinker Board
SE +/- 241.65, N = 3
61415
Firefly ROC-RK3328-CC
SE +/- 154.37, N = 3
52852
ODROID-C2
SE +/- 81.27, N = 3
59664
ODROID-H2
SE +/- 196.73, N = 3
257186
Raspberry Pi 2 Model B
SE +/- 55.17, N = 3
20920
Raspberry Pi 3 Model A+
SE +/- 38.37, N = 3
40338
Raspberry Pi 3 Model B
SE +/- 37.95, N = 3
34426
Raspberry Pi 3 Model B+
SE +/- 154.15, N = 3
38087
60K
120K
180K
240K
300K

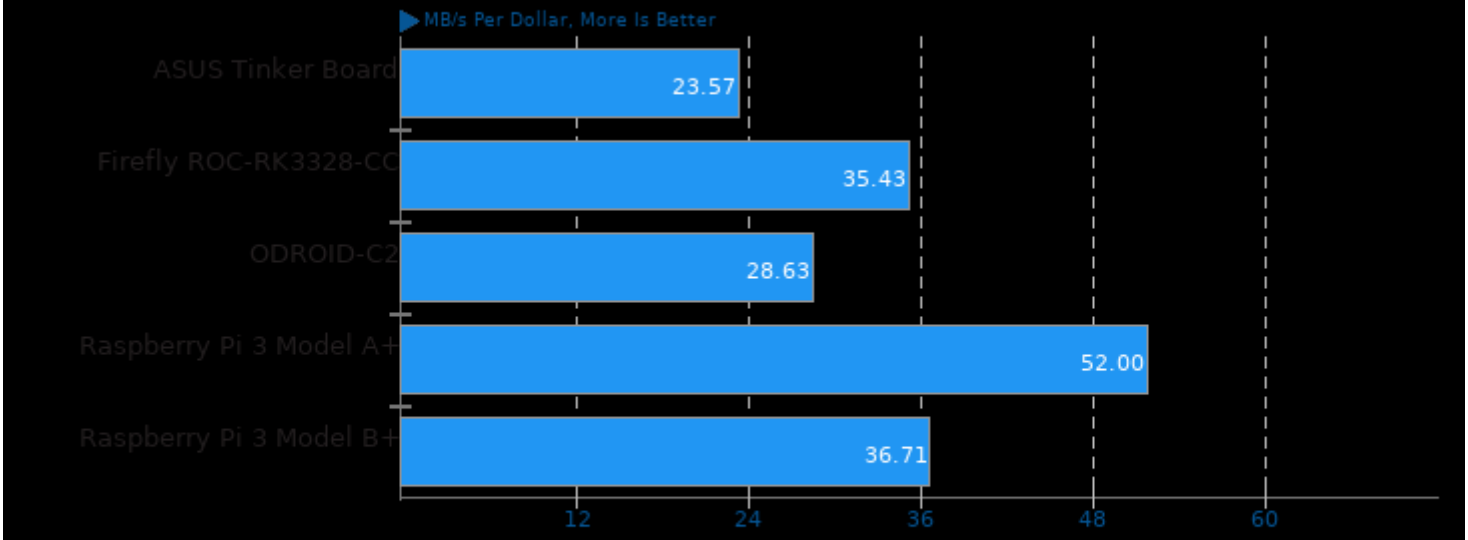
ODROID-H2 Intel Ubuntu Linux Benchmarks



ODROID-H2 Intel Ubuntu Linux Benchmarks

Tinymembench 2018-05-28

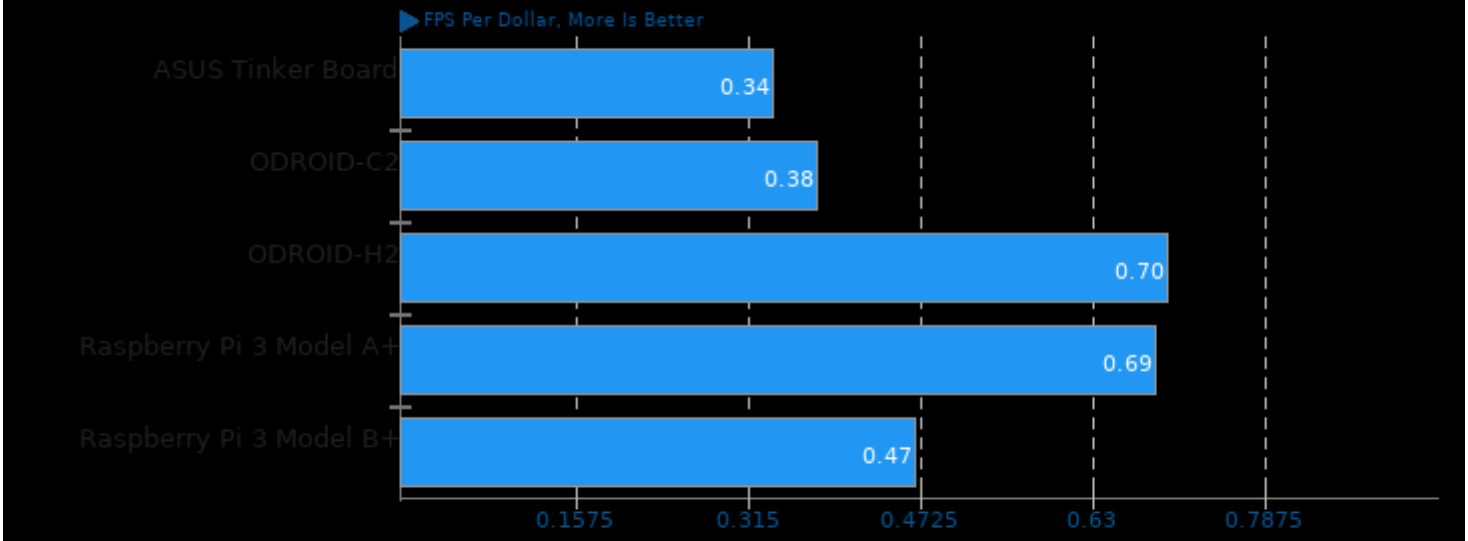
Performance / Cost - Standard Memcpy



1. ASUS Tinker Board: $65 reported cost.
2. Firefly ROC-RK3328-CC: $35 reported cost.
3. ODROID-C2: $60 reported cost.
4. Raspberry Pi 3 Model A+: $25 reported cost.
5. Raspberry Pi 3 Model B+: $35 reported cost.

TTSIOD 3D Renderer 2.3b

Performance / Cost - Phong Rendering With Soft-Shadow Mapping



1. ASUS Tinker Board: $65 reported cost.
2. ODROID-C2: $60 reported cost.
3. ODROID-H2: $111.00 reported cost.
4. Raspberry Pi 3 Model A+: $25 reported cost.
5. Raspberry Pi 3 Model B+: $35 reported cost.

ODROID-H2 Intel Ubuntu Linux Benchmarks

x264 2018-09-25

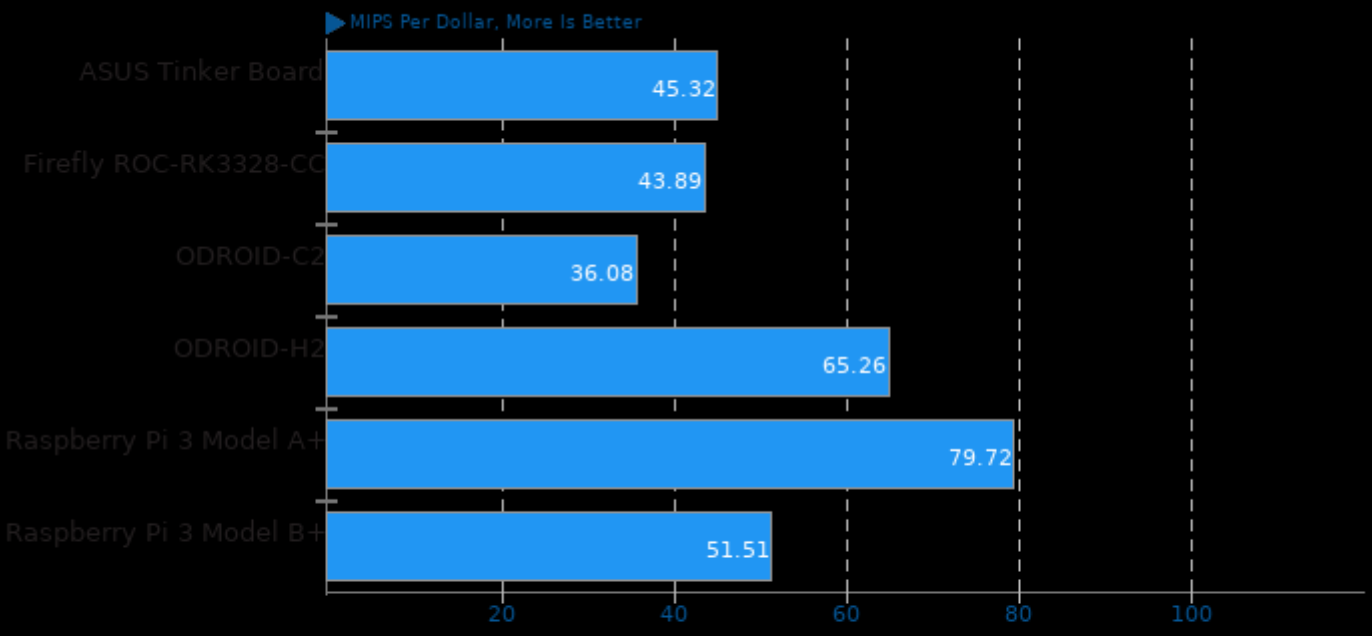
Performance / Cost - H.264 Video Encoding



1. ASUS Tinker Board: $65 reported cost.
2. Firefly ROC-RK3328-CC: $35 reported cost.
3. ODROID-C2: $60 reported cost.
4. ODROID-H2: $111.00 reported cost.
5. Raspberry Pi 3 Model B+: $35 reported cost.

7-Zip Compression 16.02

Performance / Cost - Compress Speed Test

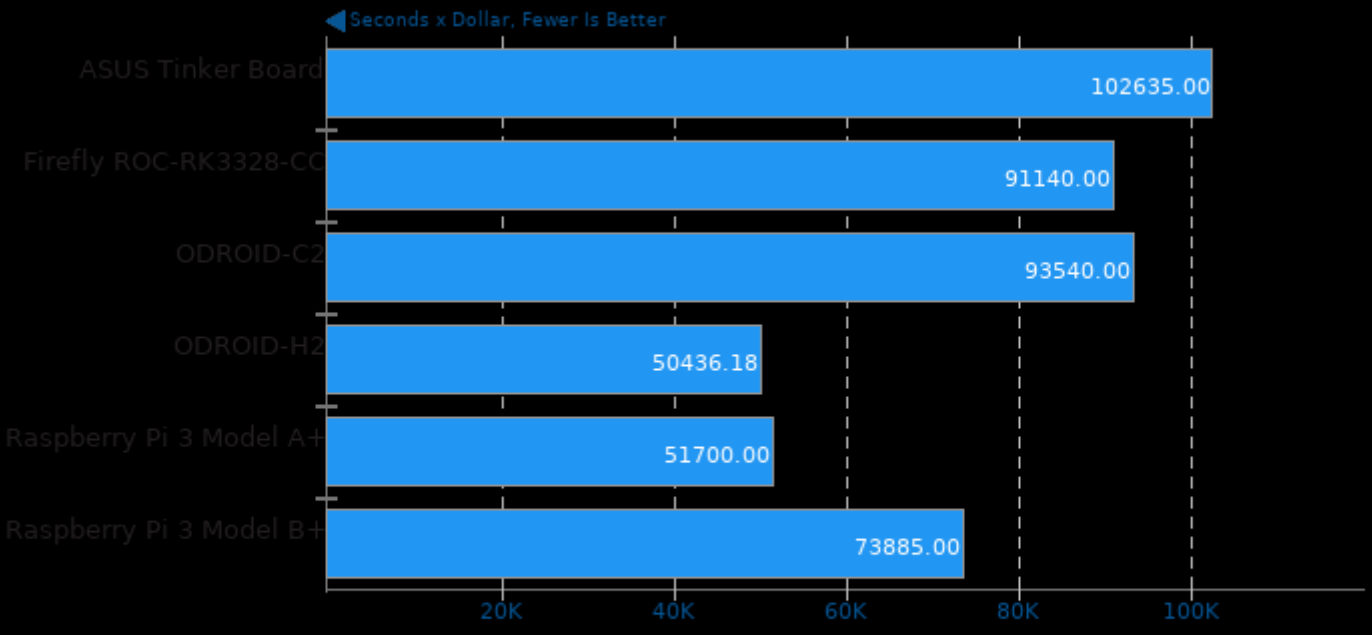


1. ASUS Tinker Board: $65 reported cost.
2. Firefly ROC-RK3328-CC: $35 reported cost.
3. ODROID-C2: $60 reported cost.
4. ODROID-H2: $111.00 reported cost.
5. Raspberry Pi 3 Model A+: $25 reported cost.
6. Raspberry Pi 3 Model B+: $35 reported cost.

ODROID-H2 Intel Ubuntu Linux Benchmarks

C-Ray 1.1

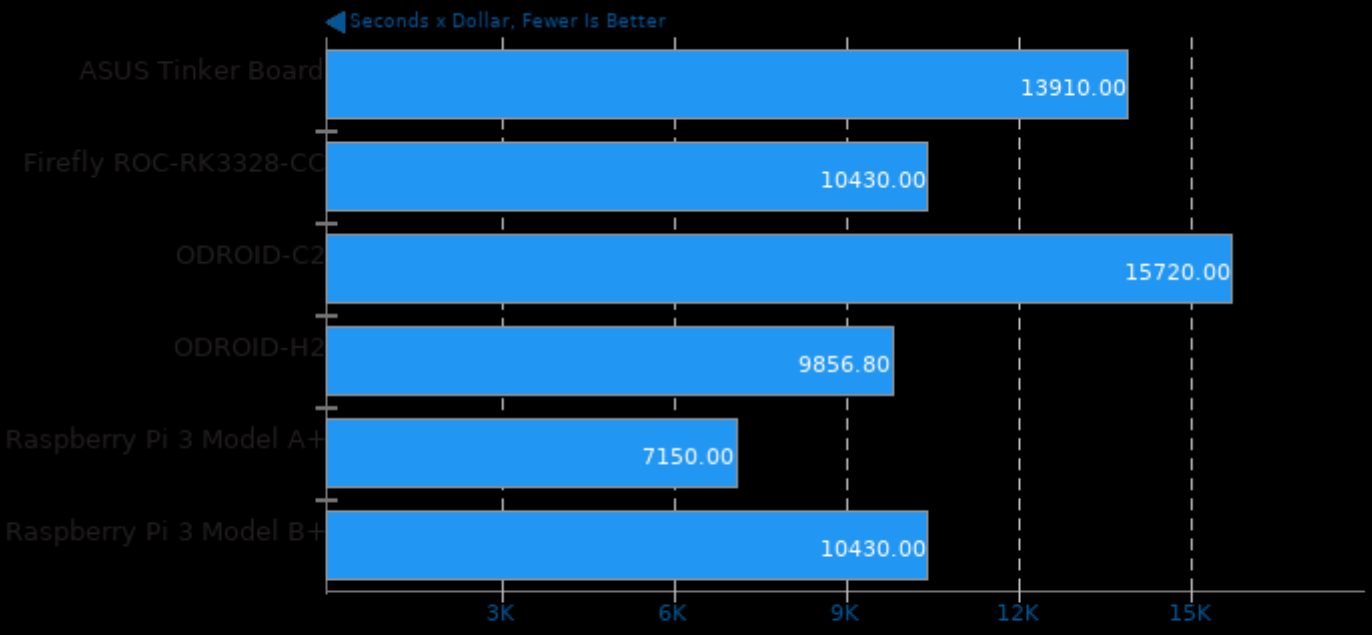
Performance / Cost - Total Time - 4K, 16 Rays Per Pixel



1. ASUS Tinker Board: $65 reported cost.
2. Firefly ROC-RK3328-CC: $35 reported cost.
3. ODROID-C2: $60 reported cost.
4. ODROID-H2: $111.00 reported cost.
5. Raspberry Pi 3 Model A+: $25 reported cost.
6. Raspberry Pi 3 Model B+: $35 reported cost.

AOBench

Performance / Cost - Size: 2048 x 2048 - Total Time

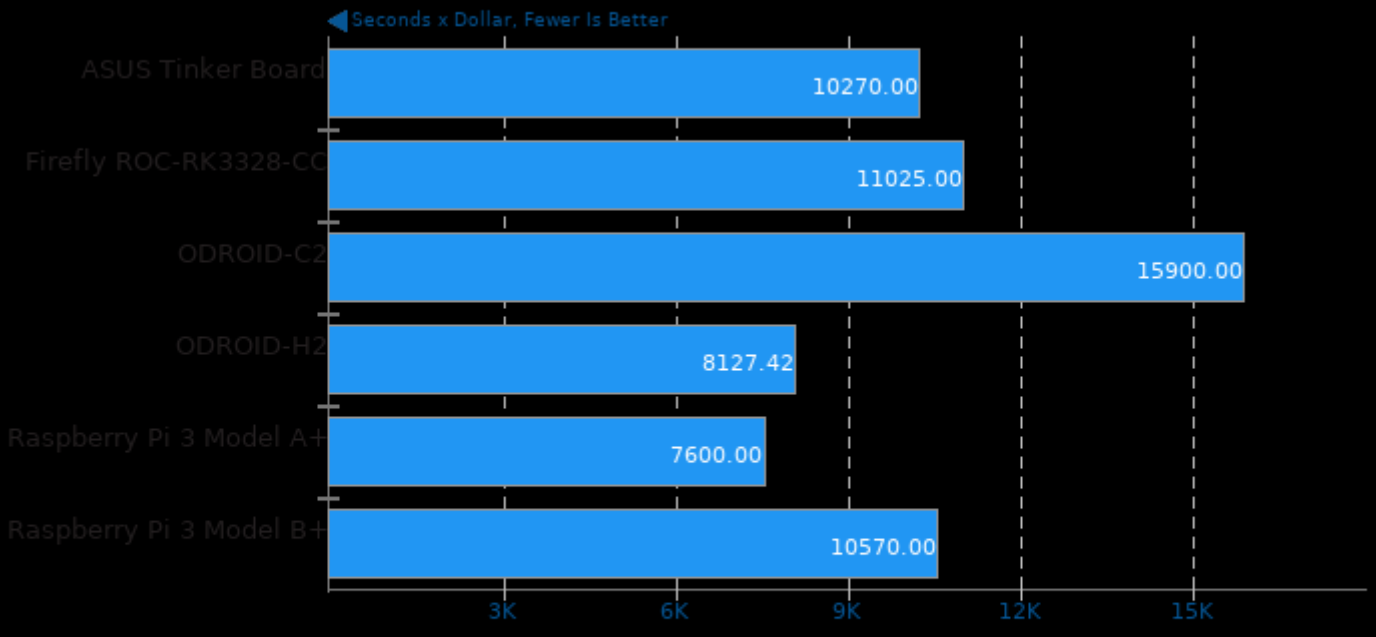


1. ASUS Tinker Board: $65 reported cost.
2. Firefly ROC-RK3328-CC: $35 reported cost.
3. ODROID-C2: $60 reported cost.
4. ODROID-H2: $111.00 reported cost.
5. Raspberry Pi 3 Model A+: $25 reported cost.
6. Raspberry Pi 3 Model B+: $35 reported cost.

ODROID-H2 Intel Ubuntu Linux Benchmarks

LAME MP3 Encoding 3.100

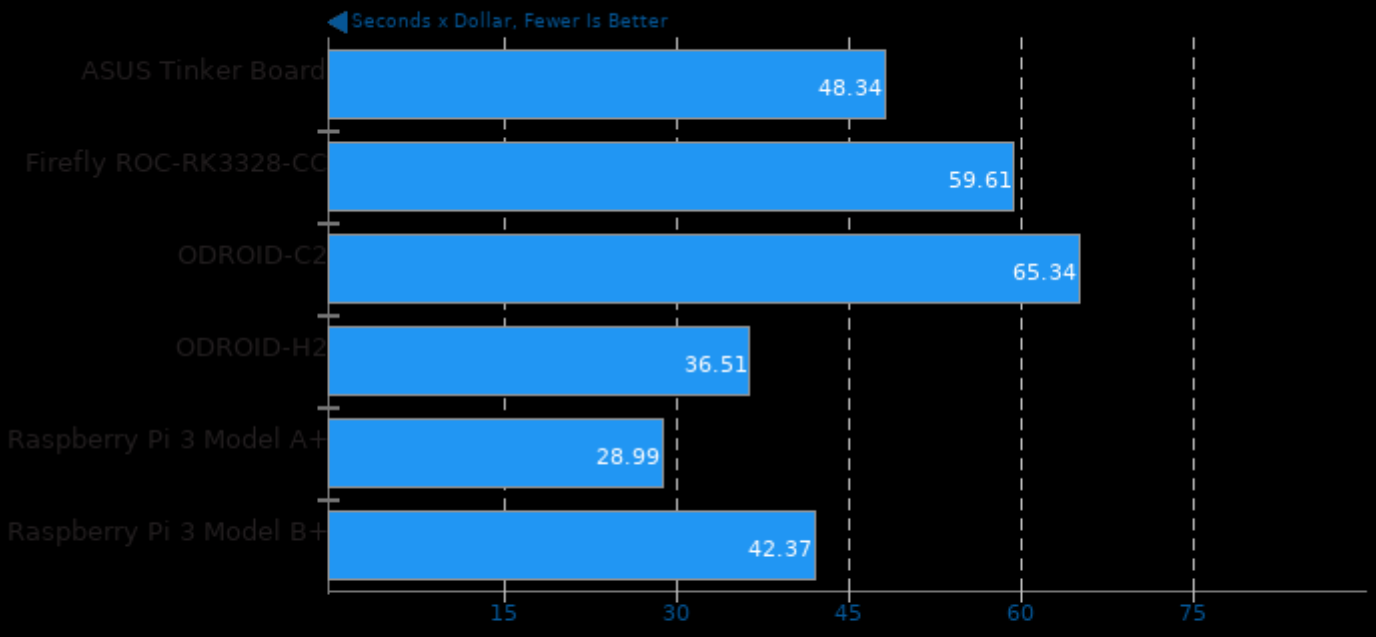
Performance / Cost - WAV To MP3



1. ASUS Tinker Board: $65 reported cost.
2. Firefly ROC-RK3328-CC: $35 reported cost.
3. ODROID-C2: $60 reported cost.
4. ODROID-H2: $111.00 reported cost.
5. Raspberry Pi 3 Model A+: $25 reported cost.
6. Raspberry Pi 3 Model B+: $35 reported cost.

Perl Benchmarks

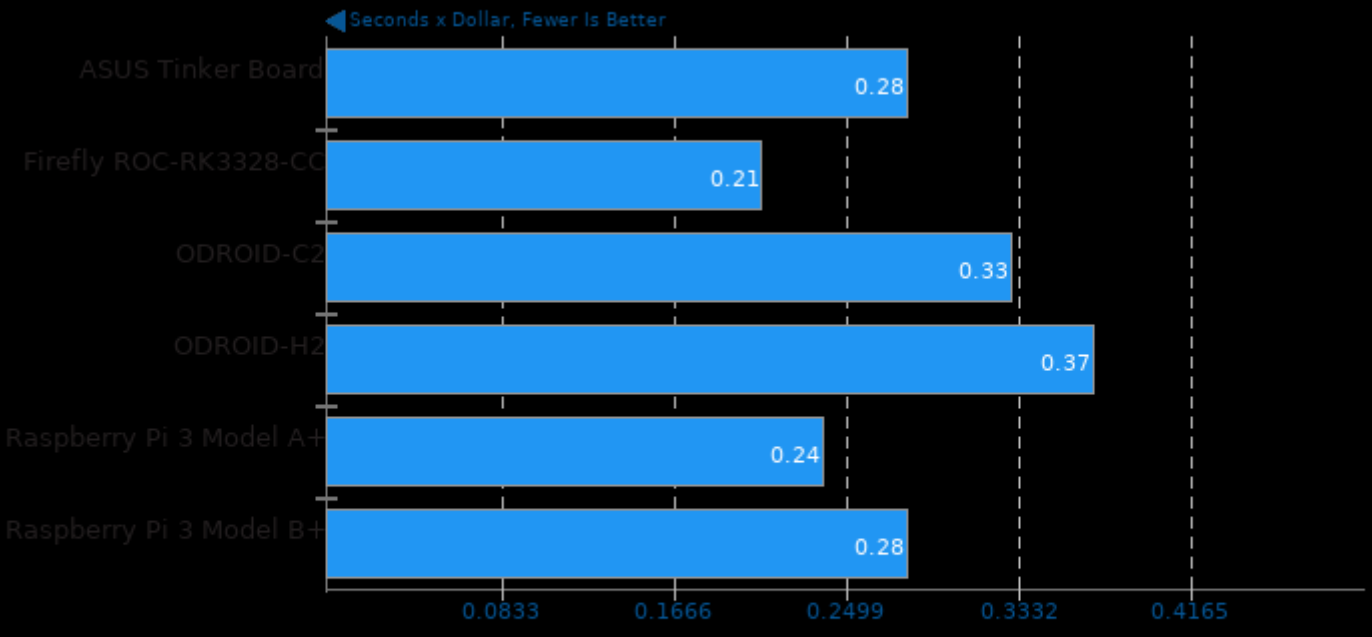
Performance / Cost - Test: Pod2html



1. ASUS Tinker Board: $65 reported cost.
2. Firefly ROC-RK3328-CC: $35 reported cost.
3. ODROID-C2: $60 reported cost.
4. ODROID-H2: $111.00 reported cost.
5. Raspberry Pi 3 Model A+: $25 reported cost.
6. Raspberry Pi 3 Model B+: $35 reported cost.

Perl Benchmarks

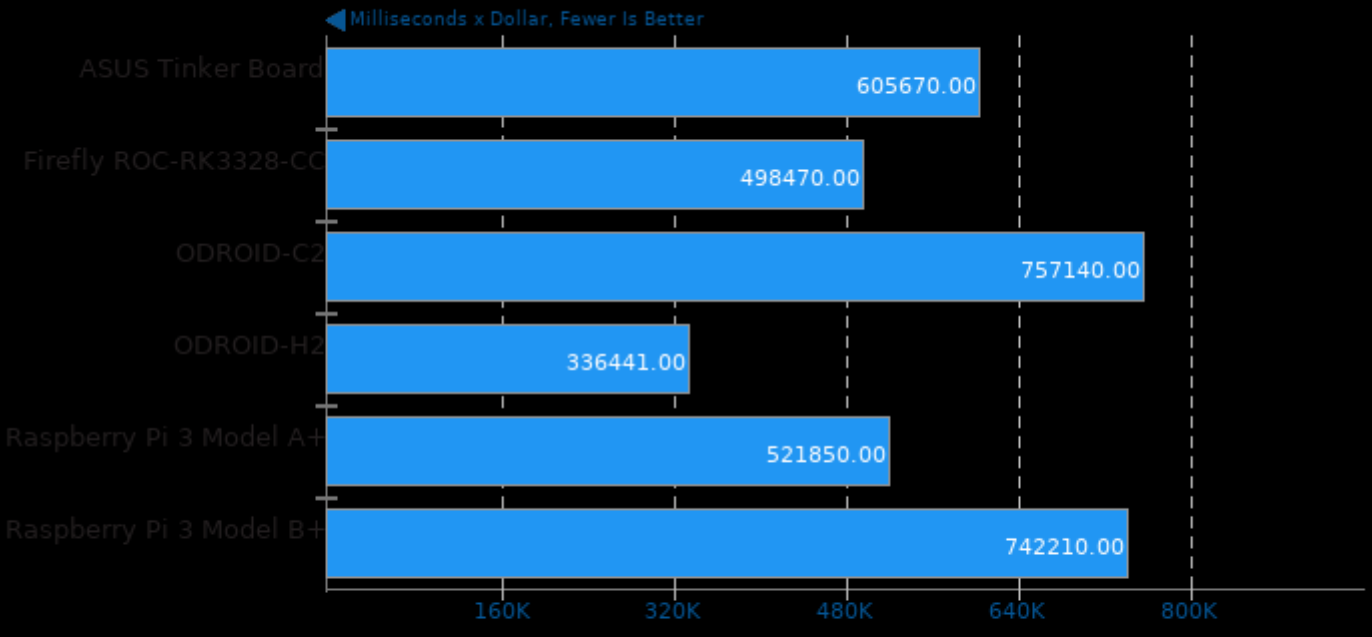
Performance / Cost - Test: Interpreter



1. ASUS Tinker Board: $65 reported cost.
2. Firefly ROC-RK3328-CC: $35 reported cost.
3. ODROID-C2: $60 reported cost.
4. ODROID-H2: $111.00 reported cost.
5. Raspberry Pi 3 Model A+: $25 reported cost.
6. Raspberry Pi 3 Model B+: $35 reported cost.

PyBench 2018-02-16

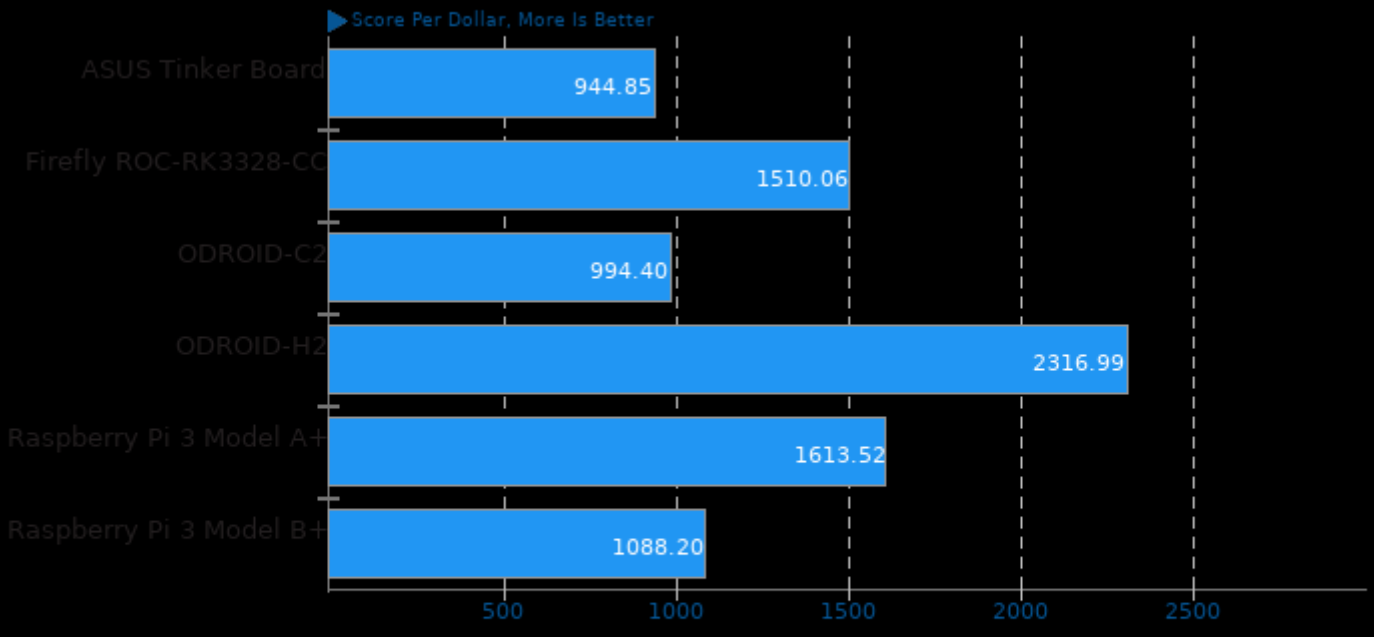
Performance / Cost - Total For Average Test Times



1. ASUS Tinker Board: $65 reported cost.
2. Firefly ROC-RK3328-CC: $35 reported cost.
3. ODROID-C2: $60 reported cost.
4. ODROID-H2: $111.00 reported cost.
5. Raspberry Pi 3 Model A+: $25 reported cost.
6. Raspberry Pi 3 Model B+: $35 reported cost.

PHPBench 0.8.1

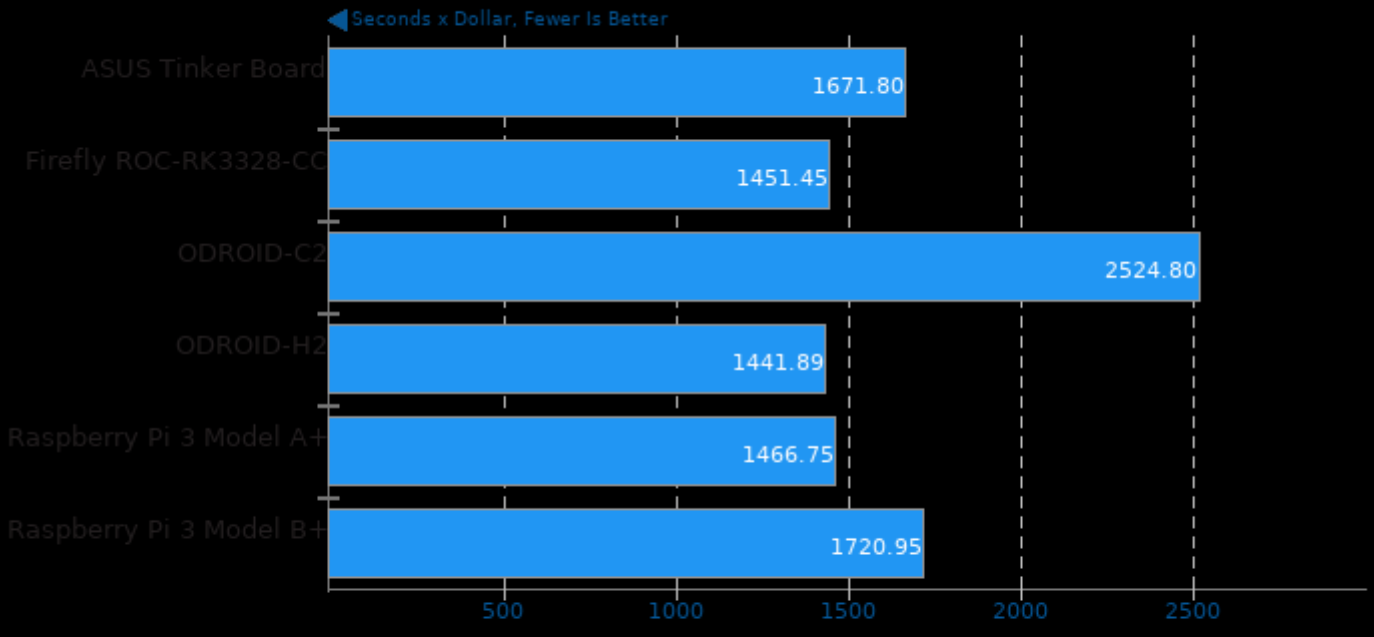
Performance / Cost - PHP Benchmark Suite



1. ASUS Tinker Board: $65 reported cost.
2. Firefly ROC-RK3328-CC: $35 reported cost.
3. ODROID-C2: $60 reported cost.
4. ODROID-H2: $111.00 reported cost.
5. Raspberry Pi 3 Model A+: $25 reported cost.
6. Raspberry Pi 3 Model B+: $35 reported cost.

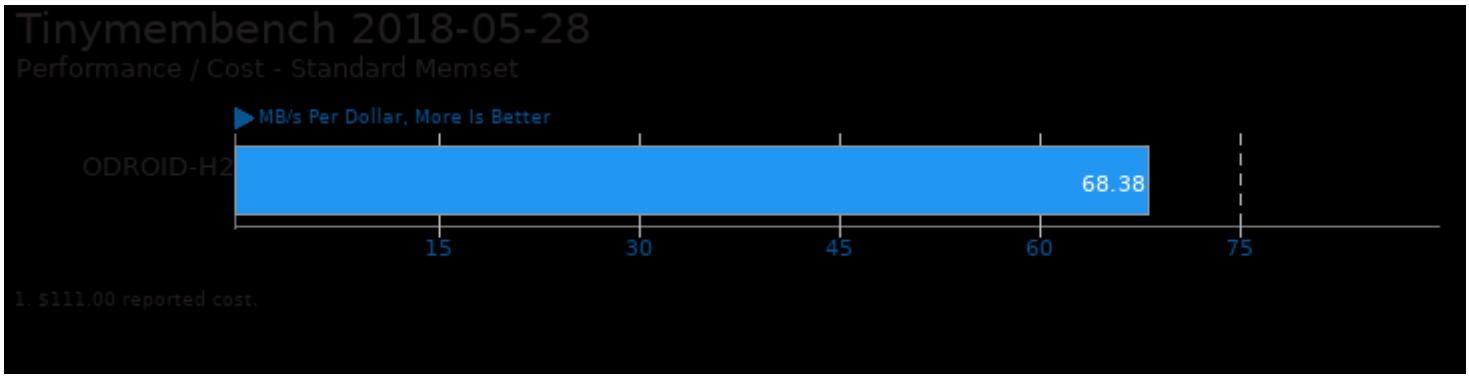
Git

Performance / Cost - Time To Complete Common Git Commands

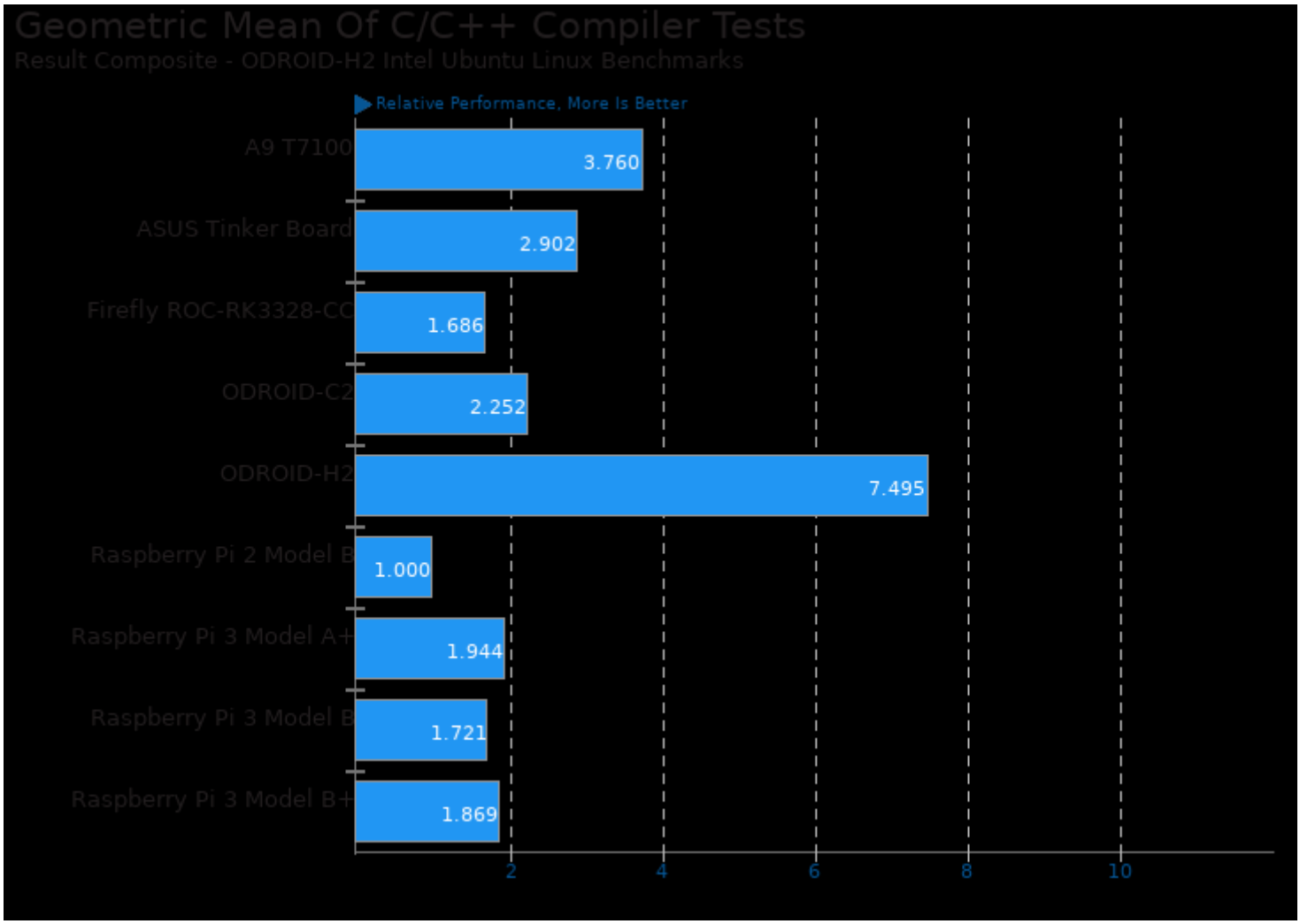


1. ASUS Tinker Board: $65 reported cost.
2. Firefly ROC-RK3328-CC: $35 reported cost.
3. ODROID-C2: $60 reported cost.
4. ODROID-H2: $111.00 reported cost.
5. Raspberry Pi 3 Model A+: $25 reported cost.
6. Raspberry Pi 3 Model B+: $35 reported cost.

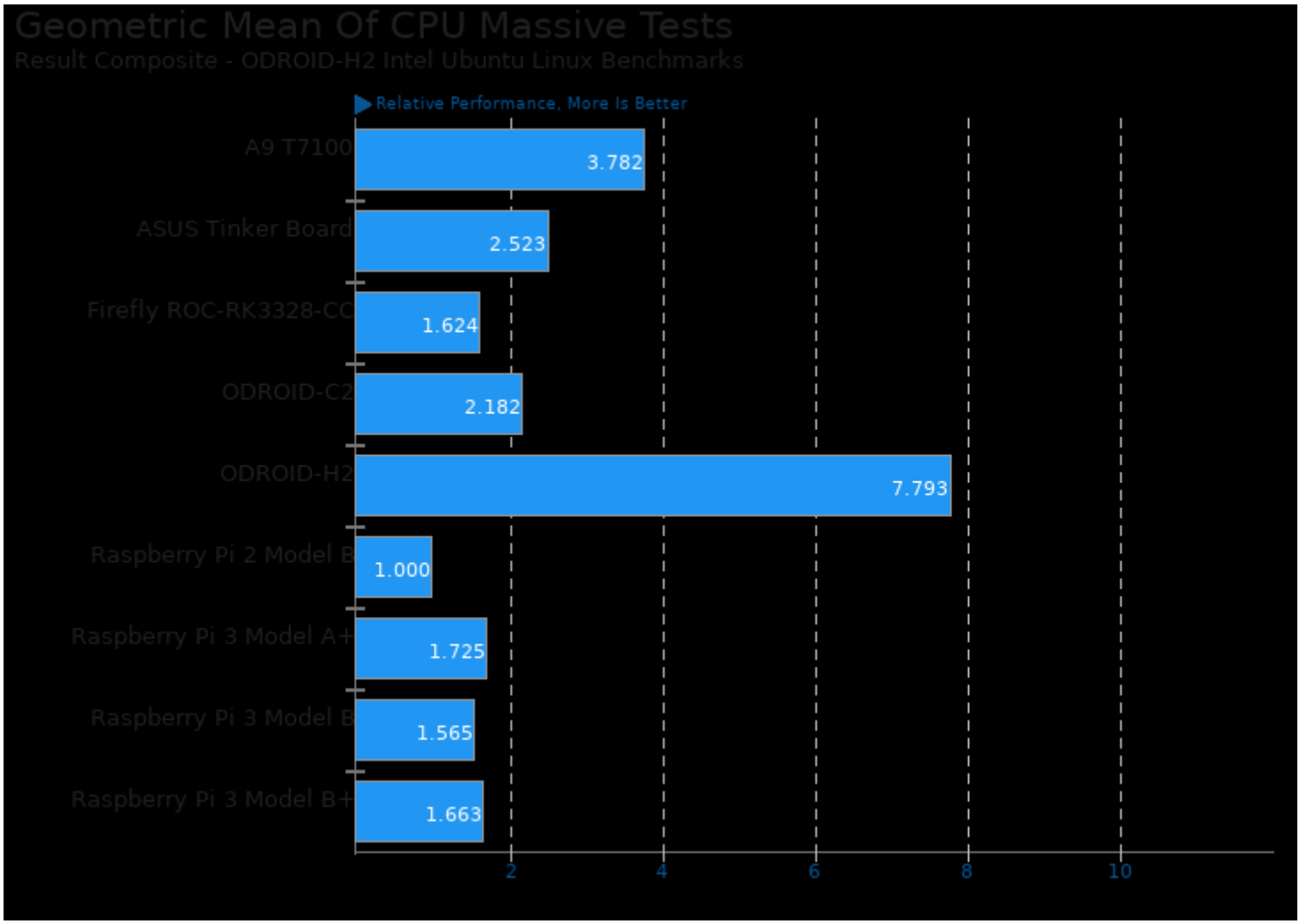
ODROID-H2 Intel Ubuntu Linux Benchmarks



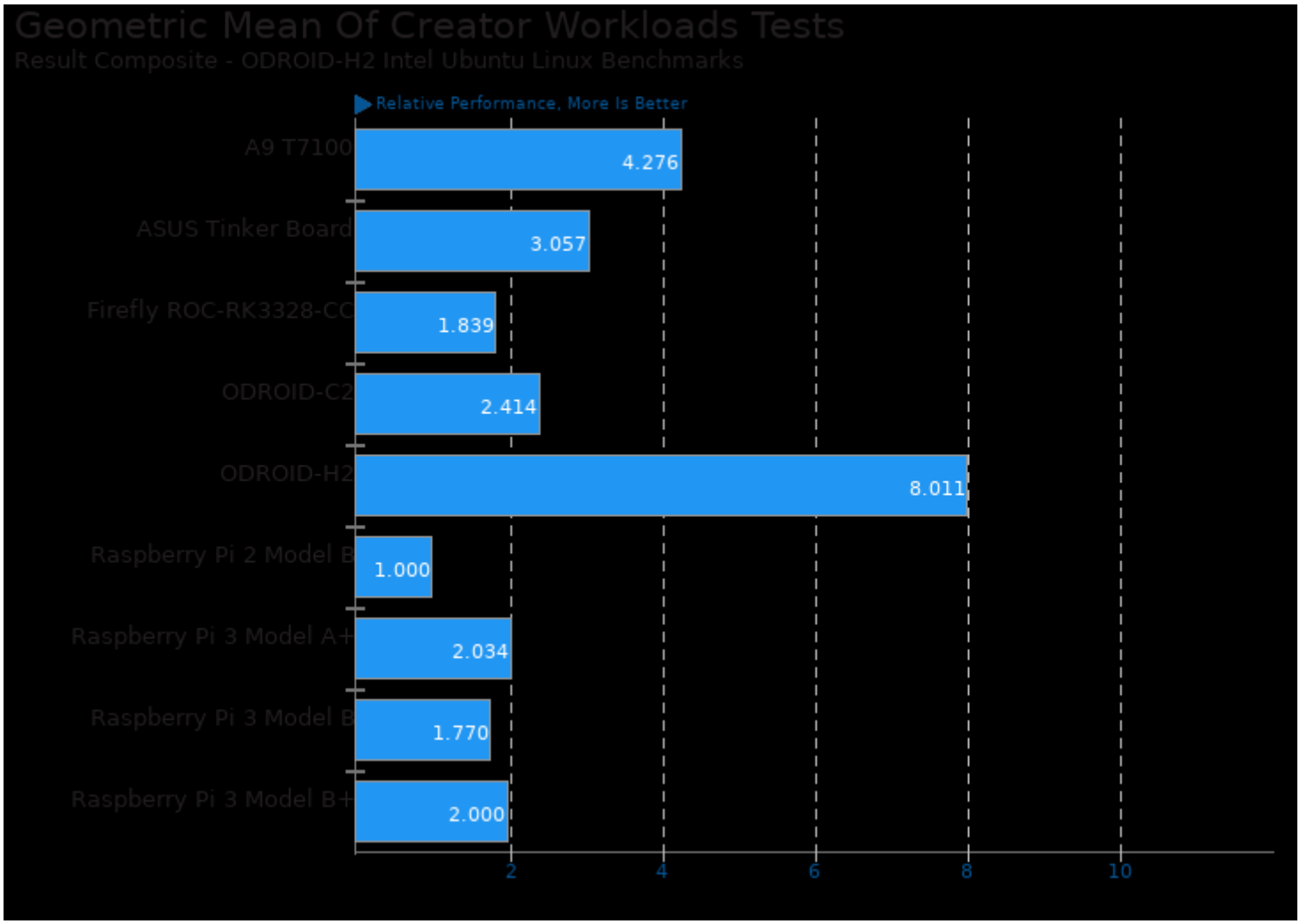
These geometric means are based upon test groupings / test suites for this result file.



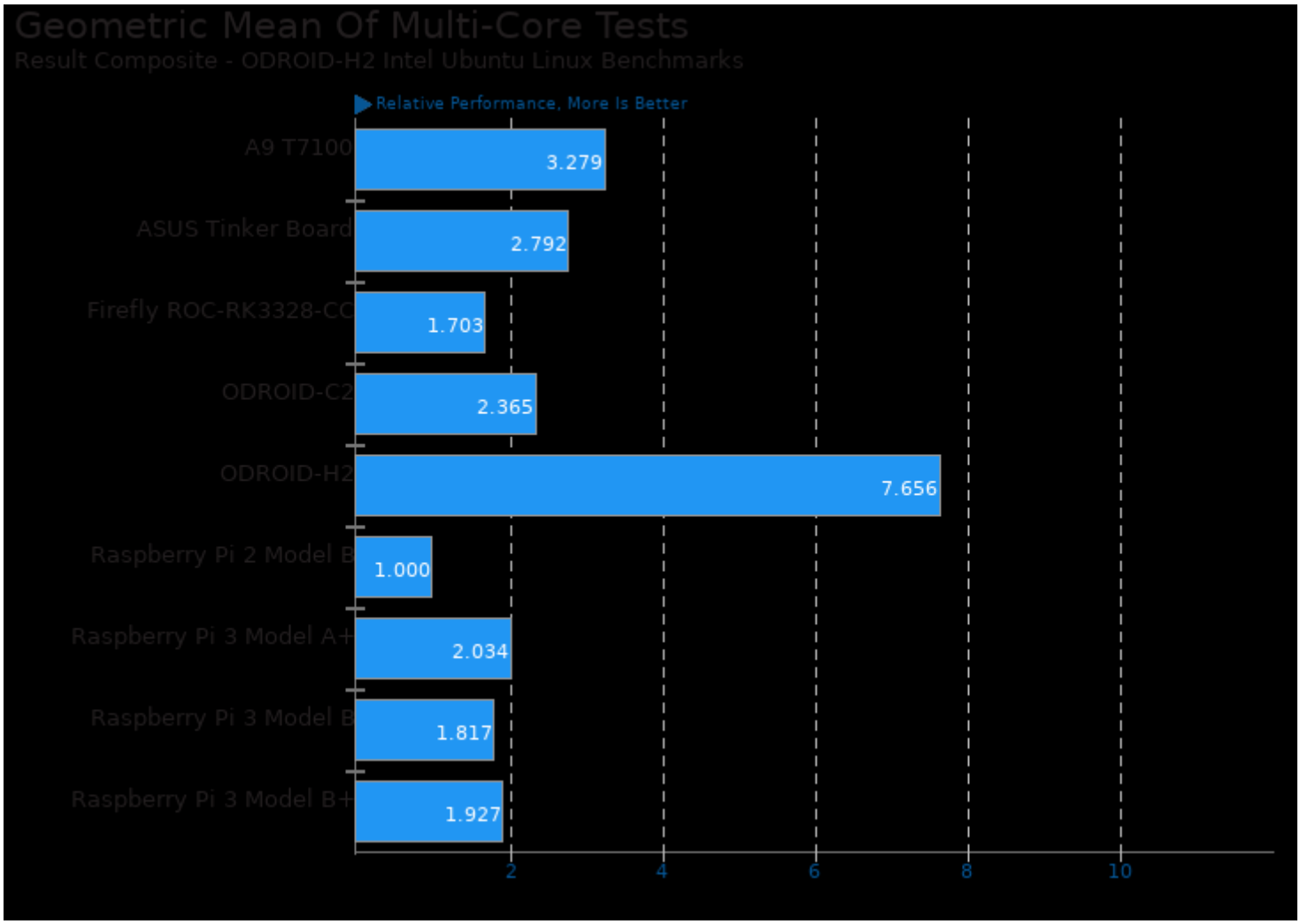
Geometric mean based upon tests: pts/aobench, pts/c-ray, pts/compress-7zip, pts/encode-mp3 and pts/x264



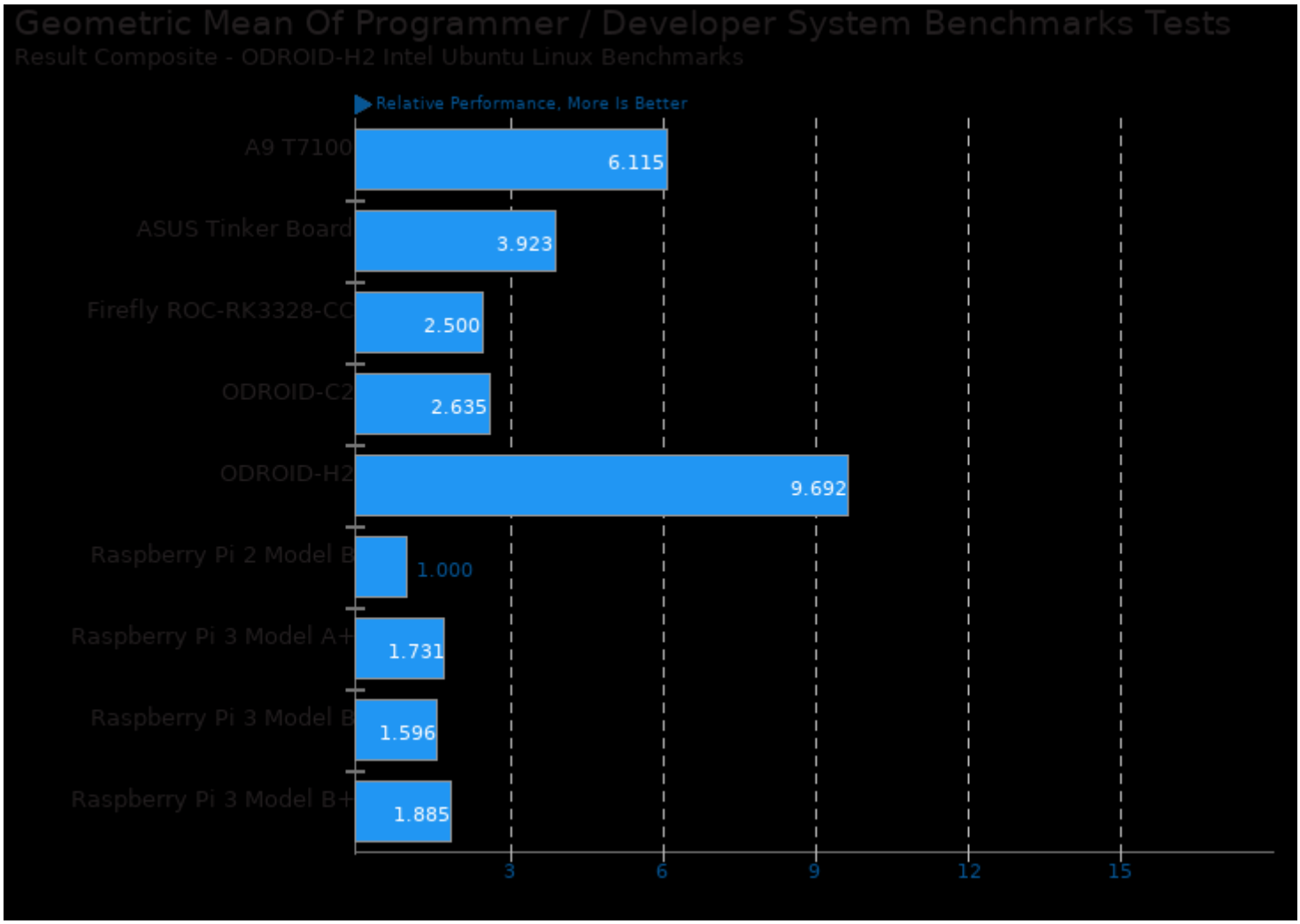
Geometric mean based upon tests: pts/c-ray, pts/compress-7zip, pts/x264, pts/encode-mp3, pts/phpbench, pts/tinymembench and pts/ttsiod-renderer



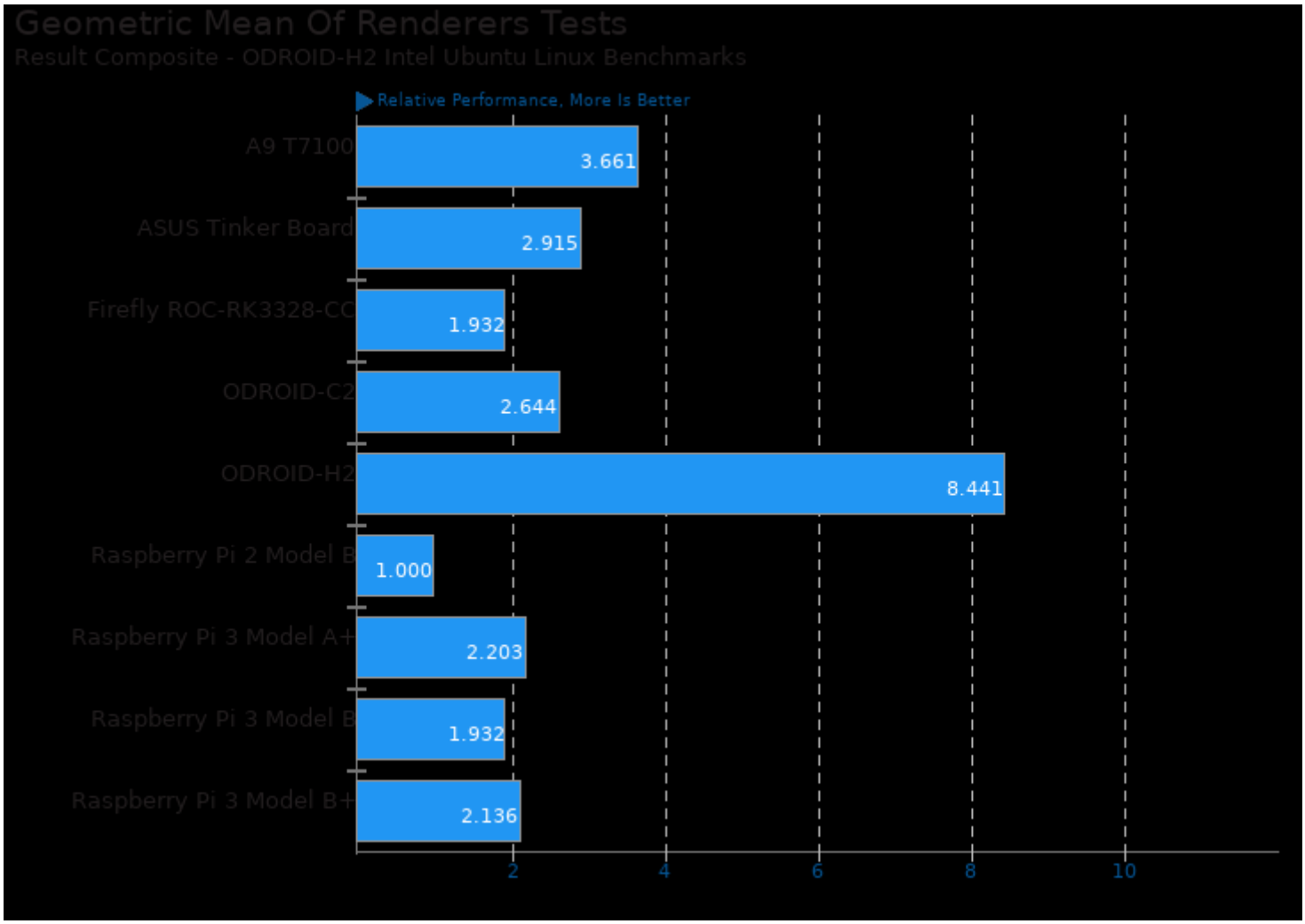
Geometric mean based upon tests: pts/c-ray, pts/aobench, pts/ttsiod-renderer, pts/x264 and pts/encode-mp3



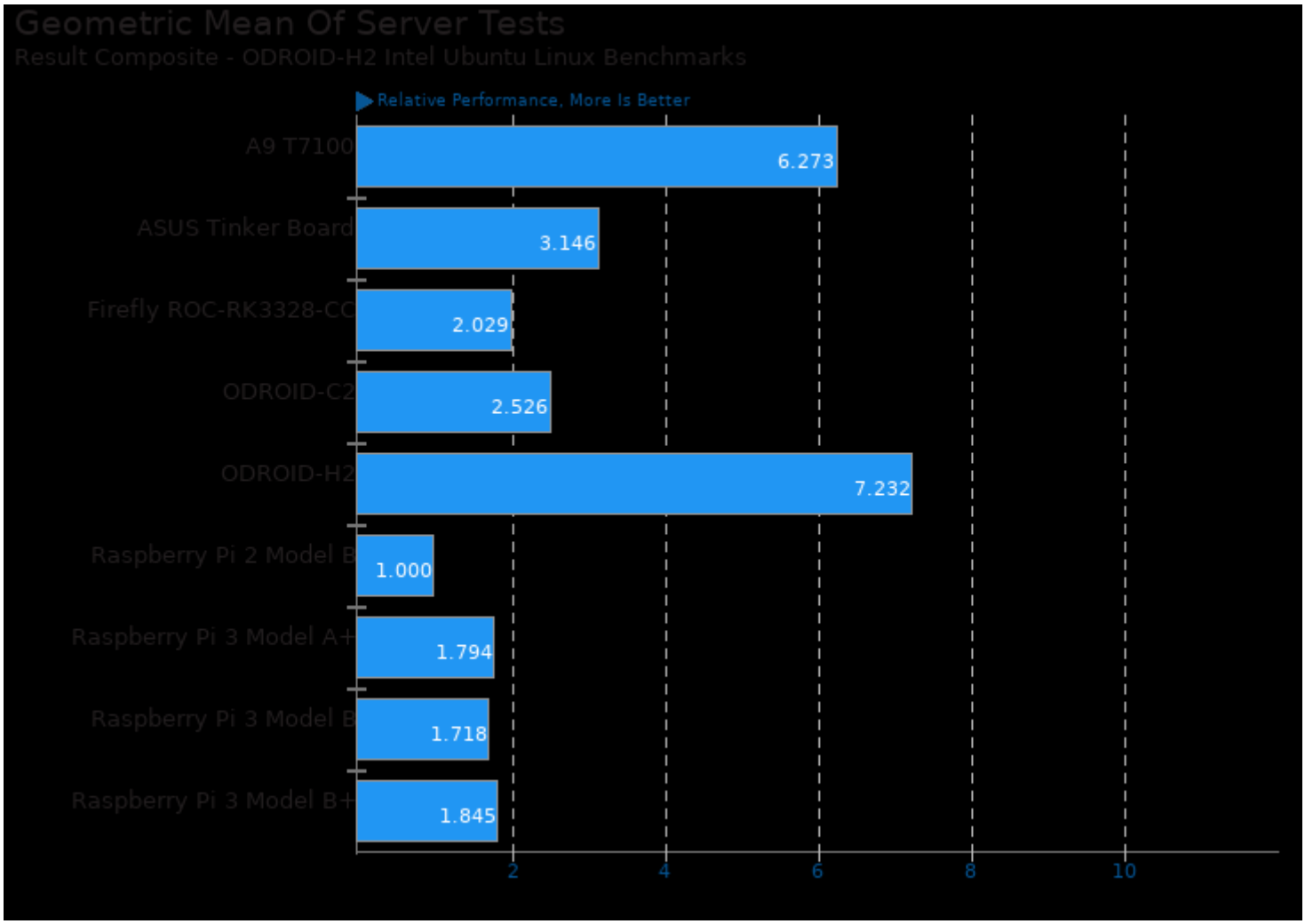
Geometric mean based upon tests: pts/c-ray, pts/x264, pts/compress-7zip, pts/aobench and pts/ttsiod-renderer



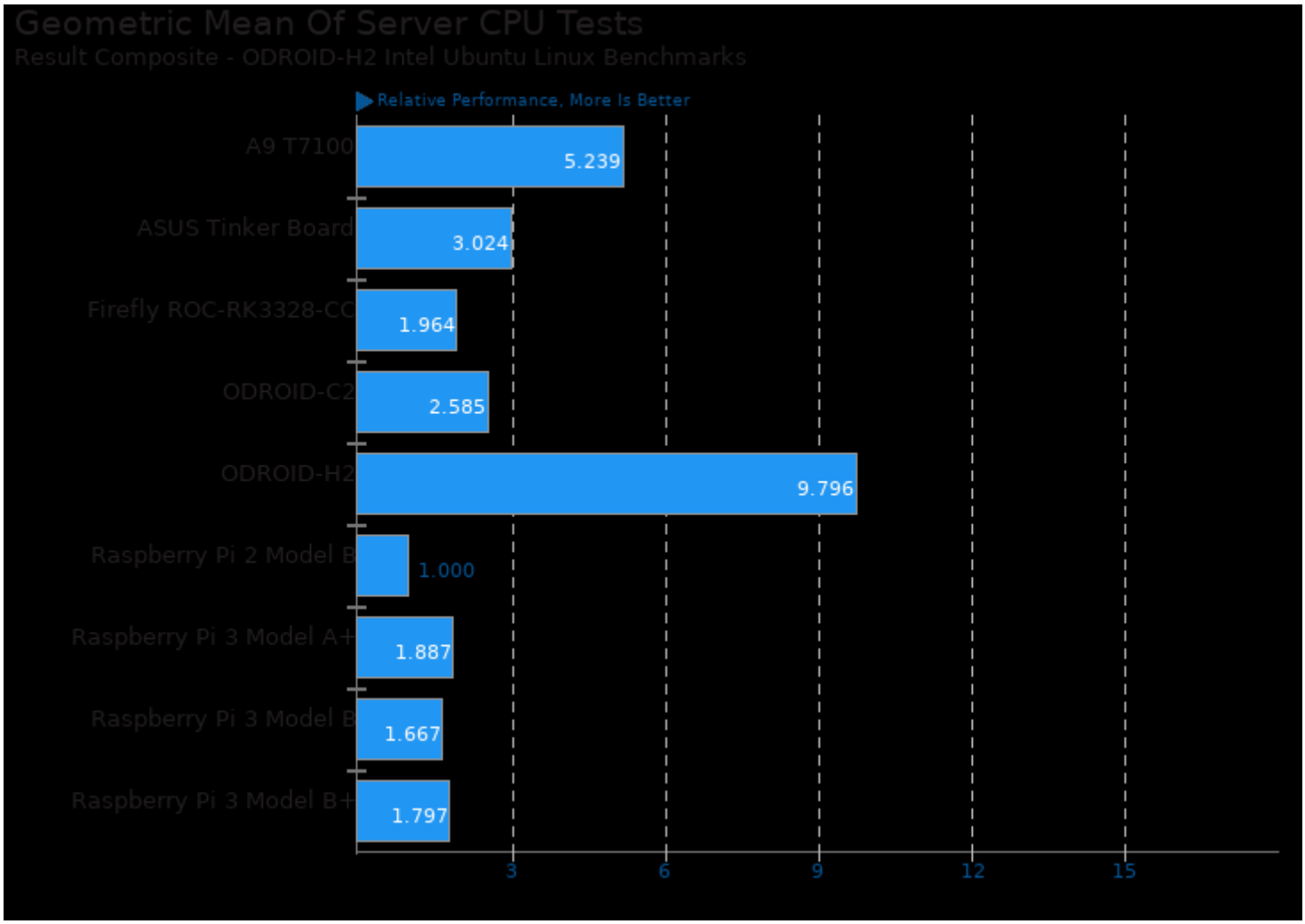
Geometric mean based upon tests: pts/git and pts/pybench



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

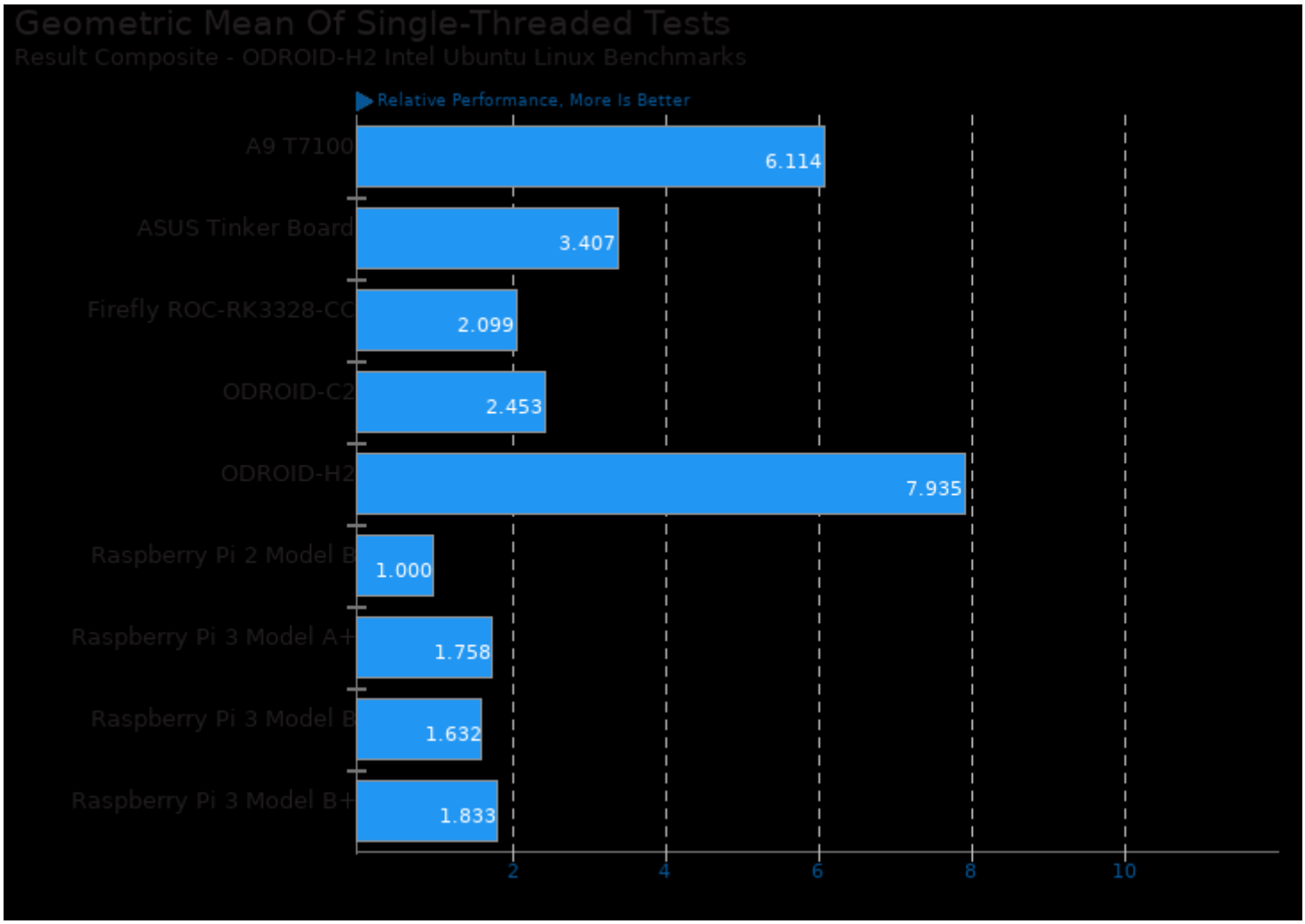


Geometric mean based upon tests: pts/phpbench and pts/perl-benchmark



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

ODROID-H2 Intel Ubuntu Linux Benchmarks



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

This file was automatically generated via the Phoronix Test Suite benchmarking software on Thursday, 28 March 2024 16:18.