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ODROID-H2 Intel Ubuntu Linux Benchmarks

Intel Atom N2800 testing with a ASUS 1025C (1025C.1301 BIOS) and llvmpipe 2GB on Ubuntu 18.04 via the Phoronix Test Suite.

Automated Executive Summary

ASUS U36JC v1.0 had the most wins, coming in first place for 58% of the tests.

Based on the geometric mean of all complete results, the fastest (ASUS U36JC v1.0) was 8.256x the speed of the slowest (Raspberry Pi 2 Model B).

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

PyBench (Total For Average Test Times) at 17.328x
PHPBench (PHP Benchmark Suite) at 15.035x
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 9.458x
Perl Benchmarks (Test: Pod2html) at 8.926x
LAME MP3 Encoding (WAV To MP3) at 8.519x
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

Odroid-XU4 + Cloudshell 2

Processor: ARMv7 rev 3 @ 1.50GHz (8 Cores), Motherboard: ODROID-XU4 Hardkernel Odroid XU4, Memory: 2048MB, Disk: 2 x 4001GB 004-2CV104 + 31GB BJNB4R, Graphics: fb_ili9340

OS: Debian 9.6, Kernel: 4.14.69-odroidxu4 (armv7l), Compiler: GCC 6.3.0 20170516, File-System: ext4, Screen Resolution: 320x240

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 ondemand
Python Notes: Python 2.7.13 + Python 3.5.3

ASUS U36JC v1.0

Processor: Intel Core i5 480M @ 2.67GHz (2 Cores / 4 Threads), Motherboard: ASUS U36JC v1.0 (U36JC.206 BIOS), Chipset: Intel Core DRAM, Memory: 4096MB, Disk: 128GB M4-CT128M4SSD2, Graphics: ASUS NVIDIA GeForce 310M 1GB (606/667MHz), Audio: Realtek ALC269VB, Network: Realtek RTL8111/8168/8411 + Qualcomm Atheros AR9285 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: NVIDIA 340.107, OpenGL: 3.3.0, Compiler: GCC 7.3.0, File-System: ext4 (ecryptfs), Screen Resolution: 1366x768

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 IBPB IBRS_FW + SSB disabled via prctl and seccomp + PTE Inversion; VMX: conditional cache flushes SMT vulnerable

AMD Turion II Neo N40L

Processor: AMD Turion II Neo N40L @ 1.50GHz (2 Cores), Motherboard: HP ProLiant MicroServer (O41 BIOS), Chipset: AMD RS880, Memory: 2048MB, Disk: 250GB VB0250EAVER + 3 x 2000GB Seagate ST2000DL004 HD20, Graphics: AMD Mobility Radeon HD 4225/4250 128MB (500/400MHz), Network: Broadcom Limited NetXtreme

BCM5723 Gigabit PCIe

OS: Debian 9.6, Kernel: 4.9.0-8-amd64 (x86_64), Compiler: GCC 6.3.0 20170516, File-System: ext4, Screen Resolution: 1024x768

Compiler Notes: --build=x86_64-linux-gnu --disable-browser-plugin --disable-vtable-verify --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-libmpx --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --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-arch-directory=amd64 --with-default-libstdcxx-abi=new --with-multilib-list=m32,m64,mx32 --with-target-system-zlib --with-tune=generic -v
Processor Notes: Scaling Governor: acpi-cpufreq conservative
Python Notes: Python 2.7.13 + Python 3.5.3
Security Notes: __user pointer sanitization + Full AMD retpoline

Intel Atom N2800

Processor: Intel Atom N2800 @ 1.86GHz (2 Cores / 4 Threads), Motherboard: ASUS 1025C (1025C.1301 BIOS), Chipset: Intel Atom D2xxx/N2xxx, Memory: 2048MB, Disk: 256GB SanDisk SDSSDHP2, Graphics: llvmpipe 2GB, Audio: Realtek ALC269VB, Network: Qualcomm Atheros AR8152 v2.0 Fast + Qualcomm Atheros AR9285 Wireless

OS: Ubuntu 18.04, Kernel: 4.15.0-33-generic (i686), Desktop: Xfce 4.12, Display Server: X Server 1.19.6, Display Driver: modesetting 1.19.6, OpenGL: 3.3 Mesa 18.0.5 (LLVM 6.0 128 bits), Compiler: GCC 7.3.0, File-System: ext4 (ecryptfs), Screen Resolution: 1024x600

Compiler Notes: --build=i686-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-plugin --enable-shared --enable-targets=all --enable-threads=posix --host=i686-linux-gnu --program-prefix=i686-linux-gnu- --target=i686-linux-gnu --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 -v
Processor Notes: Scaling Governor: acpi-cpufreq ondemand
Python Notes: Python 2.7.15rc1 + Python 3.6.7

	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	Odroid-XU4 + Cloudshell 2	ASUS U36JC v1.0	AMD Turion II Neo N40L	Intel Atom N2800
Tinymembench - Standard Memcpy (MB/s)	1000	1302	1285	1300	1532	1240	1718	5577	2294	3273	2174	2079
Normalized	17.93%	23.35%	23.04%	23.31%	27.47%	22.23%	30.81%	100%	41.13%	58.69%	38.98%	37.28%
Standard Deviation	2.5%	0.3%	1.2%	1.3%	0.3%	3.4%	0.4%	0.3%	3.4%	0.3%	0.2%	3.1%
Tinymembench - Standard Memset (MB/s)	1188	1773	1826	1833	4199	5628	3737	7590	4843	3488	2201	4670
Normalized	15.65%	23.36%	24.06%	24.15%	55.32%	74.15%	49.24%	100%	63.81%	45.96%	29%	61.53%
Standard Deviation	0.5%	1.6%	2.4%	3.4%	0%	5.3%	0.1%	0.1%	0.2%	0.1%	1.9%	1.8%

ODROID-H2 Intel Ubuntu Linux Benchmarks

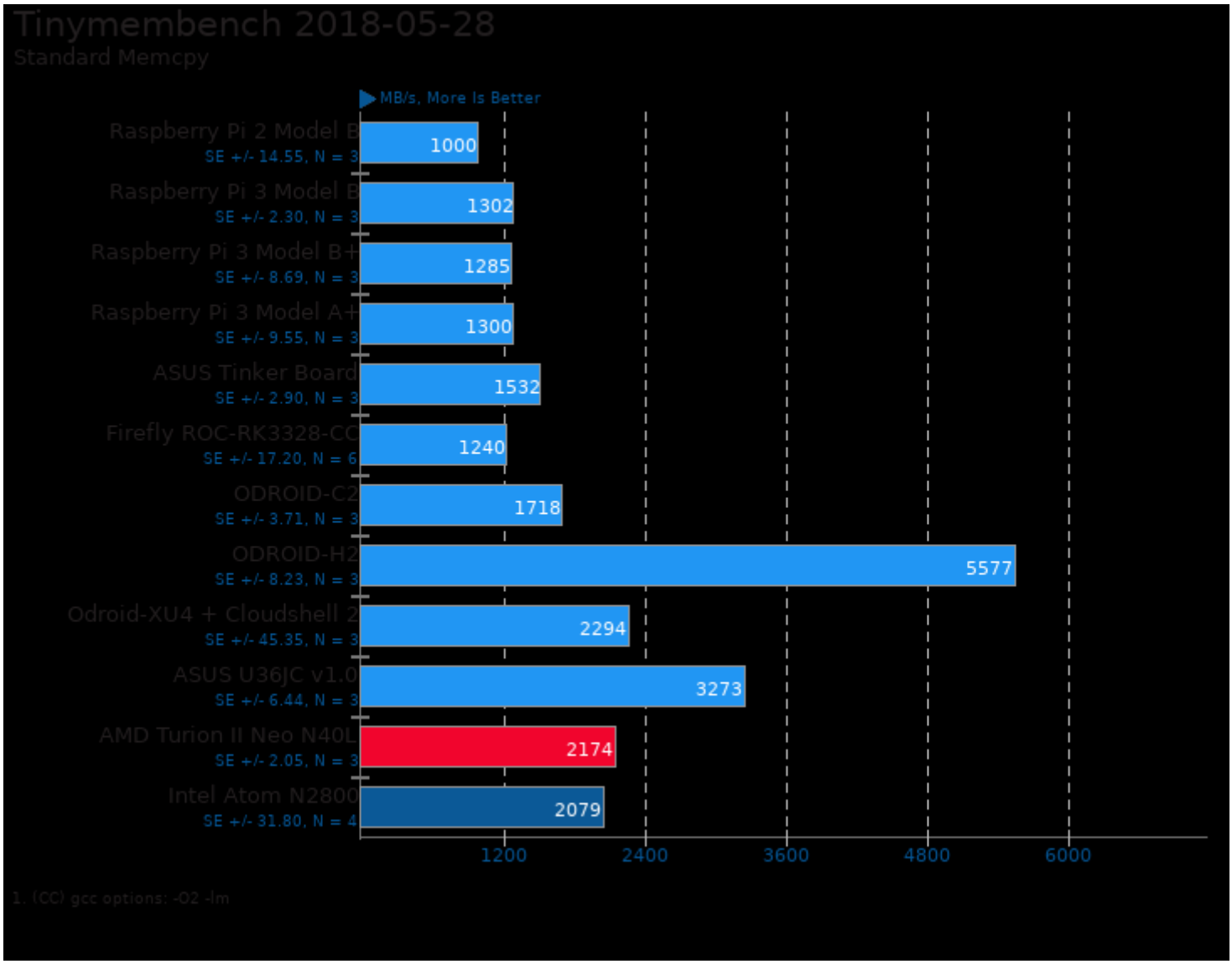
TTSIOD 3D Renderer - P.R.W.S.S.M (FPS)	**11.20**	15.99	16.51	17.25	22.38		22.51	**77.58**	51.18	55.56	18.79	13.40
Normalized	14.44%	20.61%	21.28%	22.24%	28.85%		29.02%	100%	65.97%	71.62%	24.22%	17.27%
Standard Deviation	0.4%	3.3%	0.3%	1.6%	2.6%		2.2%	0.3%	1.7%	2.5%	0.9%	0.6%
x264 - H.2.V.E (FPS)	**1.13**	2.03	2.08		3.36	1.65	2.88	**12.03**	5.22	8.16	3.63	1.67
Normalized	9.39%	16.87%	17.29%		27.93%	13.72%	23.94%	100%	43.39%	67.83%	30.17%	13.88%
Standard Deviation	0.5%	0%	0.6%		0.5%	0.6%	0.2%	0.3%	3.3%	0.2%	0.3%	0.3%
7-Zip Compression - C.S.T (MIPS)	**1168**	1858	1803	1993	2946	1536	2165	**7244**		6248	2504	2026
Normalized	16.12%	25.65%	24.89%	27.51%	40.67%	21.2%	29.89%	100%		86.25%	34.57%	27.97%
Standard Deviation	0.4%	0.3%	3%	0.7%	4%	0.5%	0.4%	0.9%		2.5%	2.7%	1%
C-Ray - Total Time - 4.1.R.P.P (sec)	**4364**	2317	2111	2068	1579	2604	1559	**454**	816	822	1584	4216
Normalized	10.4%	19.59%	21.51%	21.95%	28.75%	17.43%	29.12%	100%	55.64%	55.23%	28.66%	10.77%
Standard Deviation	1.6%	0.9%	0.2%	0.4%	0.3%	0.8%	1.9%	0%	8.6%	2.6%	0.2%	0.7%
AOBench - 2048 x 2048 - Total Time (sec)	**668**	334	298	286	214	298	262	88.80	150.53	**70.63**	217.38	543.20
Normalized	10.57%	21.15%	23.7%	24.7%	33%	23.7%	26.96%	79.54%	46.92%	100%	32.49%	13%
Standard Deviation	0.4%	0.1%	4.7%	0.4%	3.4%	0.4%	0.9%	0.5%	0.9%	0.1%	0.3%	1%
LAME MP3 Encoding - WAV To MP3 (sec)	**515**	352	302	304	158	315	265	73.22	122.87	**60.45**	145.08	250.17
Normalized	11.74%	17.17%	20.02%	19.88%	38.26%	19.19%	22.81%	82.56%	49.2%	100%	41.67%	24.16%
Standard Deviation	0.3%	0.2%	0.3%	0.6%	0.6%	0.2%	0.1%	0%	0.2%	0.7%	0.4%	1.2%
Perl Benchmarks - Pod2html (sec)	**2.39198**	1.29932	1.21061	1.15952	0.74372	1.70325	1.08893	0.32890	0.65061	**0.26799**	0.52462	1.36661
Normalized	11.2%	20.63%	22.14%	23.11%	36.03%	15.73%	24.61%	81.48%	41.19%	100%	51.08%	19.61%
Standard Deviation	1.9%	1.7%	0.8%	0.1%	1.1%	2.3%	4.7%	0.1%	3.9%	0.9%	0.9%	1%
Perl Benchmarks - Interpreter	**0.01409**	0.00843	0.00807	0.00971	0.00427	0.00598	0.00548	0.00333	0.00590	**0.00210**	0.00467	0.00760
Normalized	14.92%	24.96%	26.04%	21.65%	49.22%	35.14%	38.39%	63.13%	35.65%	100%	44.99%	27.66%
Standard Deviation	5.7%	3.3%	7%	14.5%	7.2%	0.2%	0.9%	0.6%	0.7%	1.7%	7.3%	1.1%
PyBench - T.F.A.T.T (Milliseconds)	**38087**	24328	21206	20874	9318	14242	12619	3031	8277	**2198**	6679	10427
Normalized	5.77%	9.03%	10.36%	10.53%	23.59%	15.43%	17.42%	72.52%	26.56%	100%	32.91%	21.08%
Standard Deviation	0.4%	0.4%	0.4%	0.2%	0.8%	0.4%	0.1%	0.1%		0.5%	0.2%	0.1%
PHPBench - P.B.S (Score)	**20920**	34426	38087	40338	61415	52852	59664	257186	82714	**314540**	116077	52753
Normalized	6.65%	10.94%	12.11%	12.82%	19.53%	16.8%	18.97%	81.77%	26.3%	100%	36.9%	16.77%
Standard Deviation	0.5%	0.2%	0.7%	0.2%	0.7%	0.5%	0.2%	0.1%	0.8%	0.2%	0.2%	0.4%
Git - T.T.C.C.G.C (sec)	**96.99**	59.52	49.17	58.67	25.72	41.47	42.08	12.99	26.98	**11.87**	26.53	49.69
Normalized	12.24%	19.94%	24.14%	20.23%	46.15%	28.62%	28.21%	91.38%	44%	100%	44.74%	23.89%
Standard Deviation	5.5%	10.2%	10.4%	1.7%	3.5%	2.5%	13.9%	2%	6.9%	4.1%	16.2%	1.1%

ODROID-H2 Intel Ubuntu Linux Benchmarks

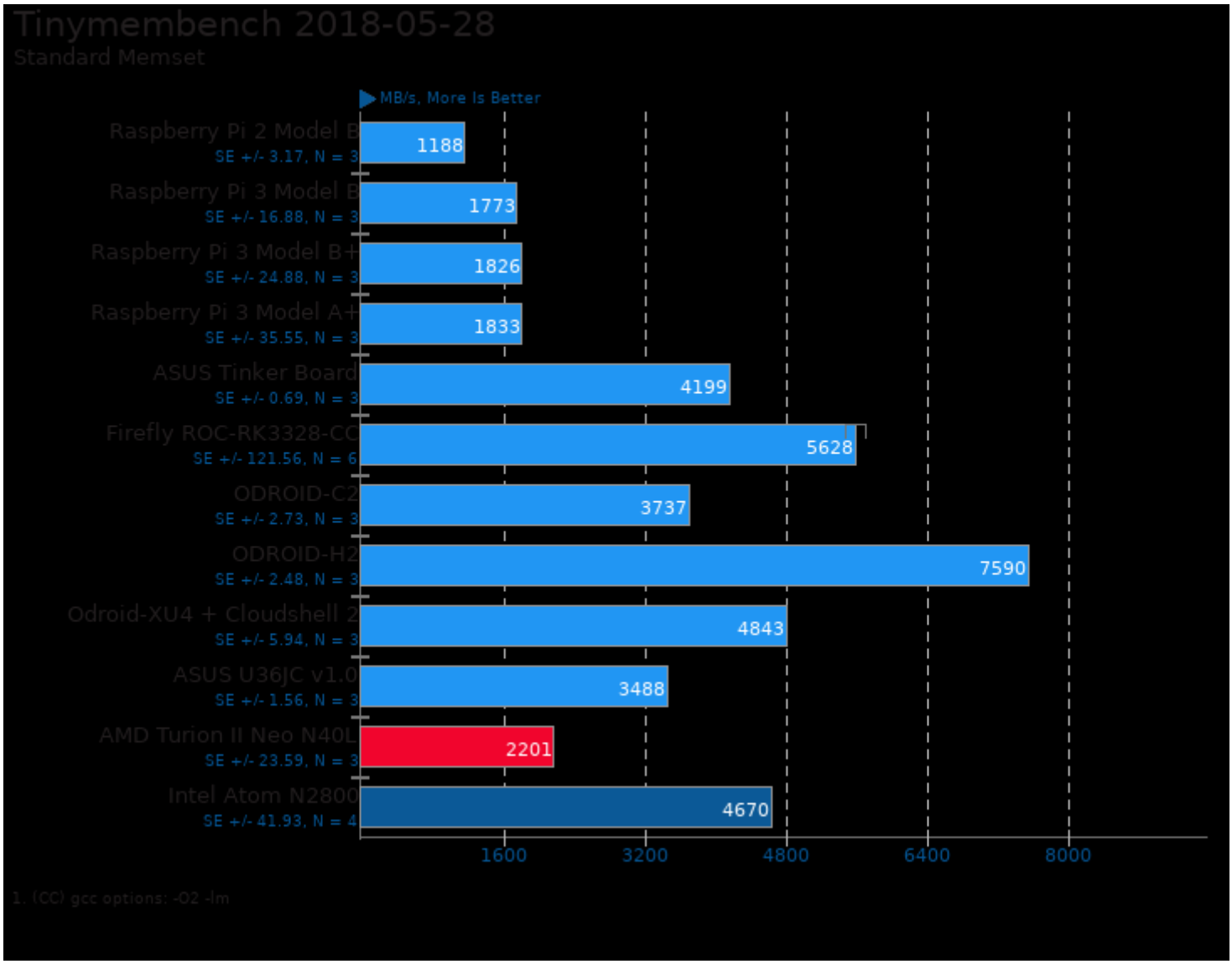
Tinymembench - Performance / Cost - Standard Memcpy (MB/s/Dollar)	36.71	**52.00**	**23.57**	35.43	28.63	
Normalized	70.6%	100%	45.33%	68.13%	55.06%	
TTSIOD 3D Renderer - Performance / Cost - P.R.W.S.S.M (FPS/Dollar)	0.47	0.69	**0.34**		0.38	**0.70**
Normalized	67.14%	98.57%	48.57%		54.29%	100%
x264 - 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%

ODROID-H2 Intel Ubuntu Linux Benchmarks

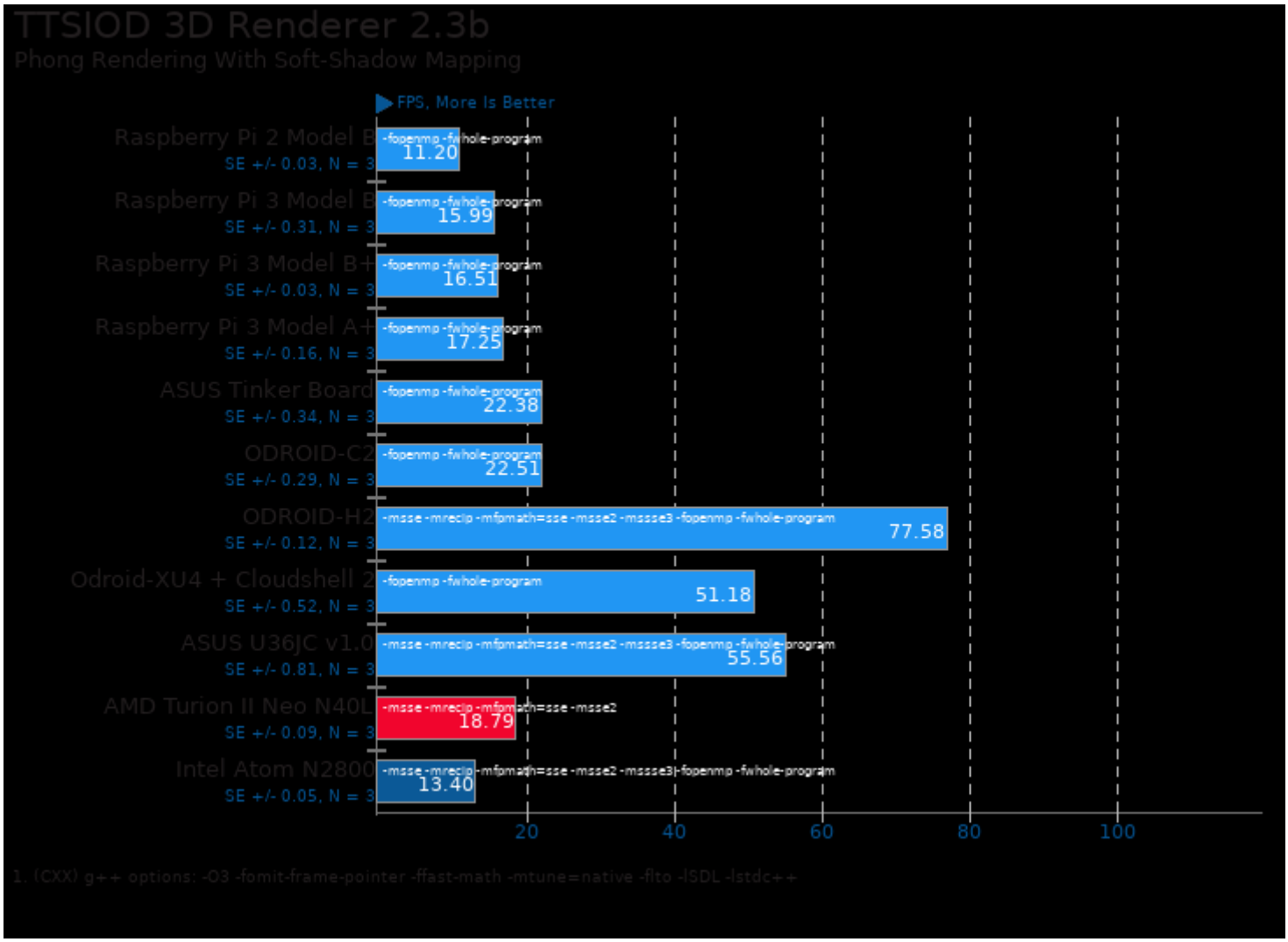
Perl Benchmarks - Performance / Cost - Pod2html (sec x Dollar)	42.37	**28.99**	48.34	59.61	**65.34**	36.51
Normalized	68.42%	100%	59.97%	48.63%	44.37%	79.4%
Perl Benchmarks - Performance / Cost - Interpreter (sec x Dollar)	0.28	0.24	0.28	**0.21**	0.33	**0.37**
Normalized	75%	87.5%	75%	100%	63.64%	56.76%
PyBench - Performance / Cost - T.F.A.T.T (Milliseconds x Dollar)	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%
Git - Performance / Cost - T.T.C.C.G.C (sec	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

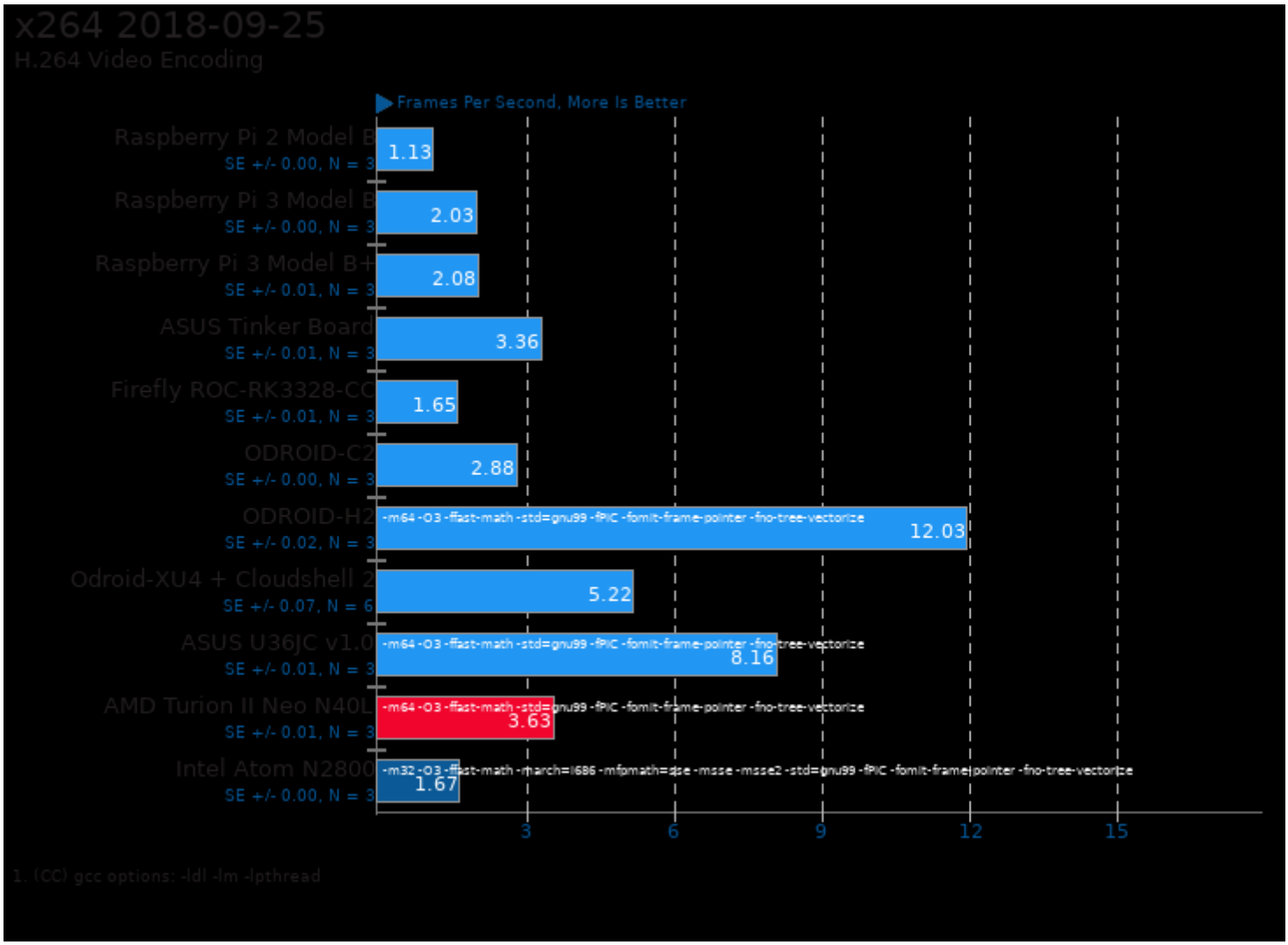

Tinymembench 2018-05-28
Standard Memcpy
MB/s, More Is Better
Raspberry Pi 2 Model B
SE +/- 14.55, N = 3
1000
Raspberry Pi 3 Model B
SE +/- 2.30, N = 3
1302
Raspberry Pi 3 Model B+
SE +/- 8.69, N = 3
1285
Raspberry Pi 3 Model A+
SE +/- 9.55, N = 3
1300
ASUS Tinker Board
SE +/- 2.90, N = 3
1532
Firefly 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
Odroid-XU4 + Cloudshell 2
SE +/- 45.35, N = 3
2294
ASUS U36JC v1.0
SE +/- 6.44, N = 3
3273
AMD Turion II Neo N40L
SE +/- 2.05, N = 3
2174
Intel Atom N2800
SE +/- 31.80, N = 4
2079
1200
2400
3600
4800
6000
1. (CC) gcc options: -O2 -lm

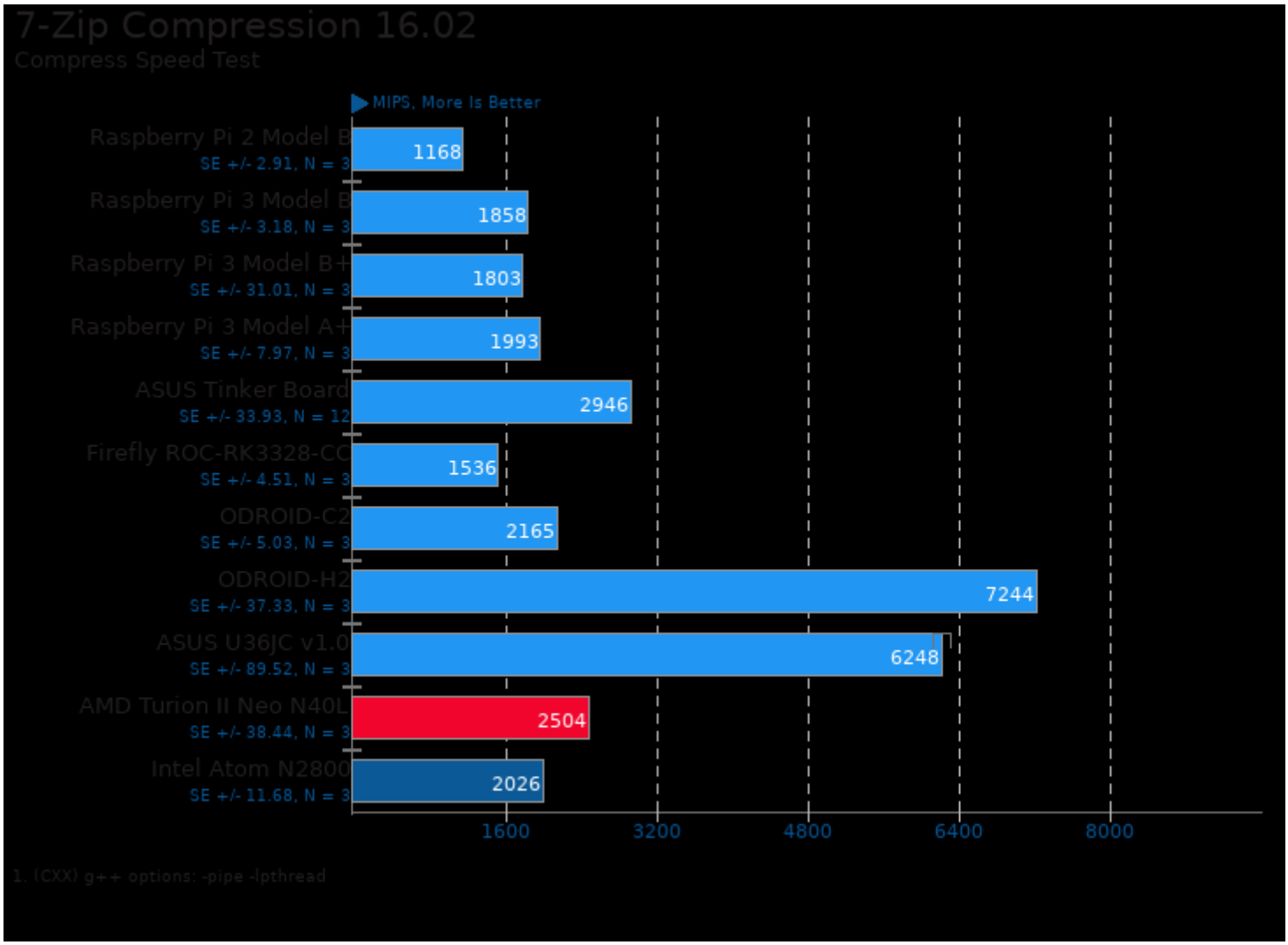
ODROID-H2 Intel Ubuntu Linux Benchmarks

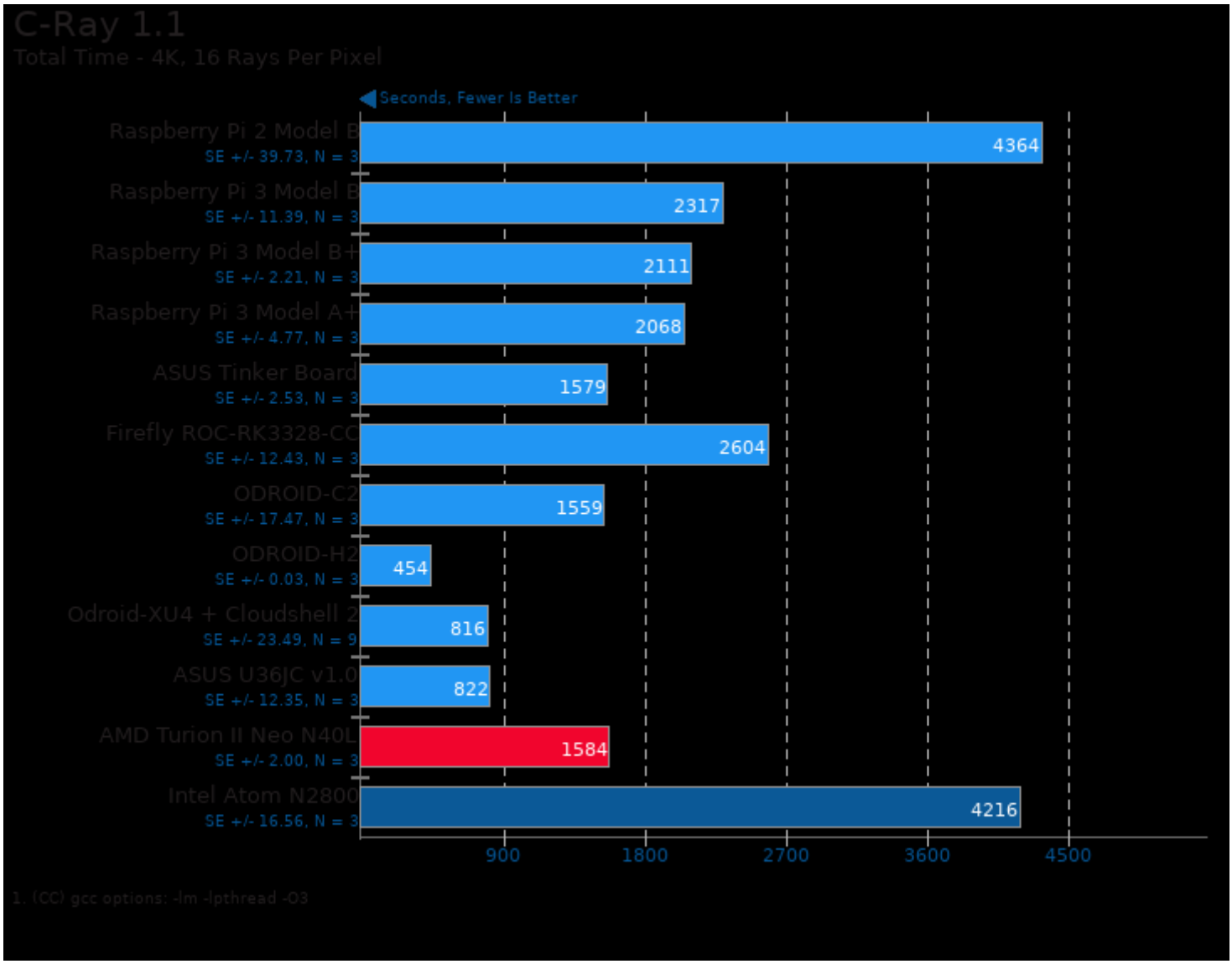


ODROID-H2 Intel Ubuntu Linux Benchmarks

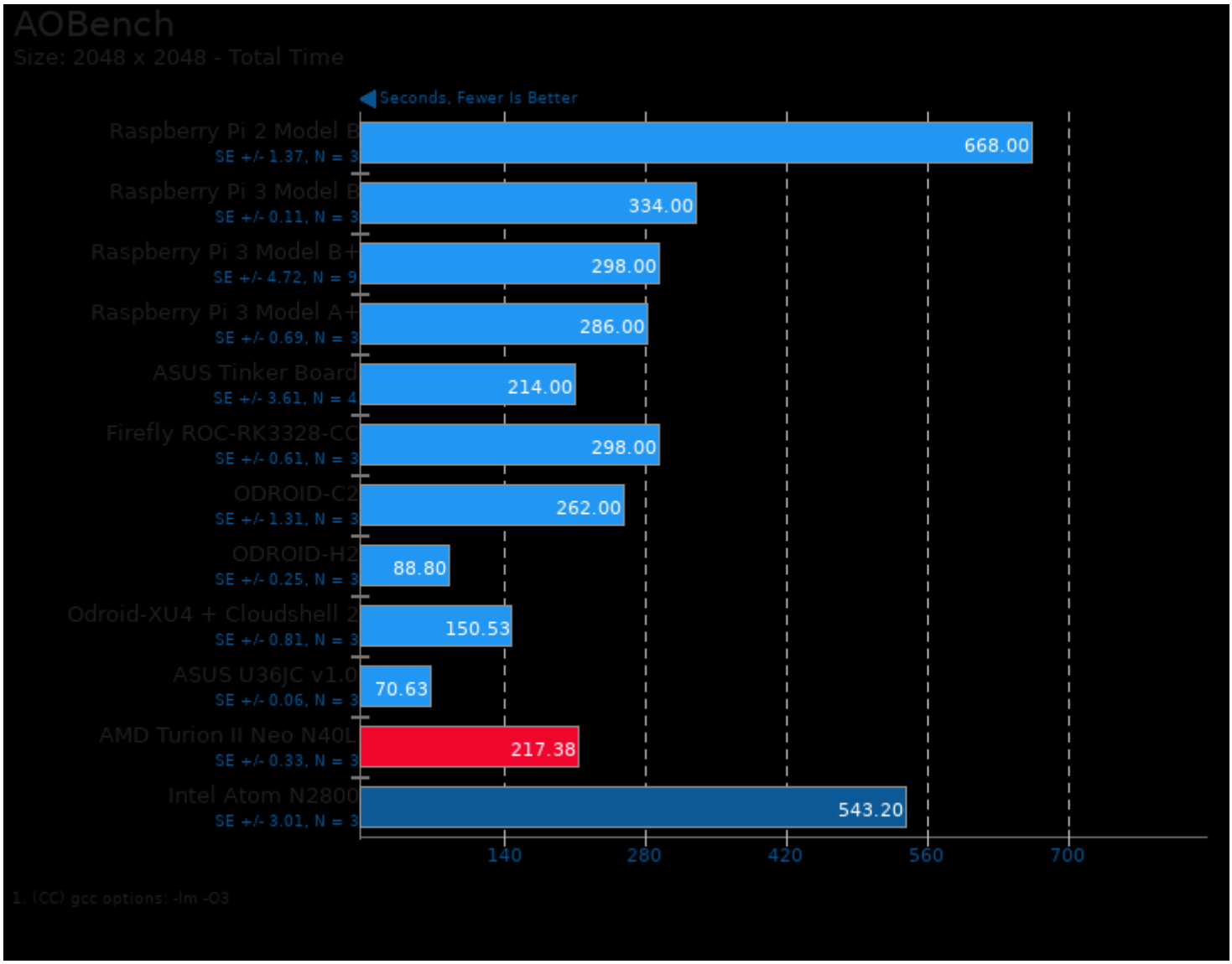



x264 2018-09-25
H.264 Video Encoding
Frames Per Second, More Is Better
Raspberry Pi 2 Model B
SE +/- 0.00, N = 3
1.13
Raspberry Pi 3 Model B
SE +/- 0.00, N = 3
2.03
Raspberry Pi 3 Model B+
SE +/- 0.01, N = 3
2.08
ASUS Tinker Board
SE +/- 0.01, N = 3
3.36
Firefly ROC-RK3328-CC
SE +/- 0.01, N = 3
1.65
ODROID-C2
SE +/- 0.00, N = 3
2.88
ODROID-H2
SE +/- 0.02, N = 3
-m64 -O3 -ffast-math -std=gnu99 -fPIC -fomit-frame-pointer -fno-tree-vectorize
12.03
Odroid-XU4 + Cloudshell 2
SE +/- 0.07, N = 6
5.22
ASUS U36JC v1.0
SE +/- 0.01, N = 3
-m64 -O3 -ffast-math -std=gnu99 -fPIC -fomit-frame-pointer -fno-tree-vectorize
8.16
AMD Turion II Neo N40L
SE +/- 0.01, N = 3
-m64 -O3 -ffast-math -std=gnu99 -fPIC -fomit-frame-pointer -fno-tree-vectorize
3.63
Intel Atom N2800
SE +/- 0.00, N = 3
-m32 -O3 -ffast-math -march=i686 -mfpmath=sse -msse -msse2 -std=gnu99 -fPIC -fomit-frame-pointer -fno-tree-vectorize
1.67
3
6
9
12
15
1. (CC) gcc options: -ldl -lm -lpthread

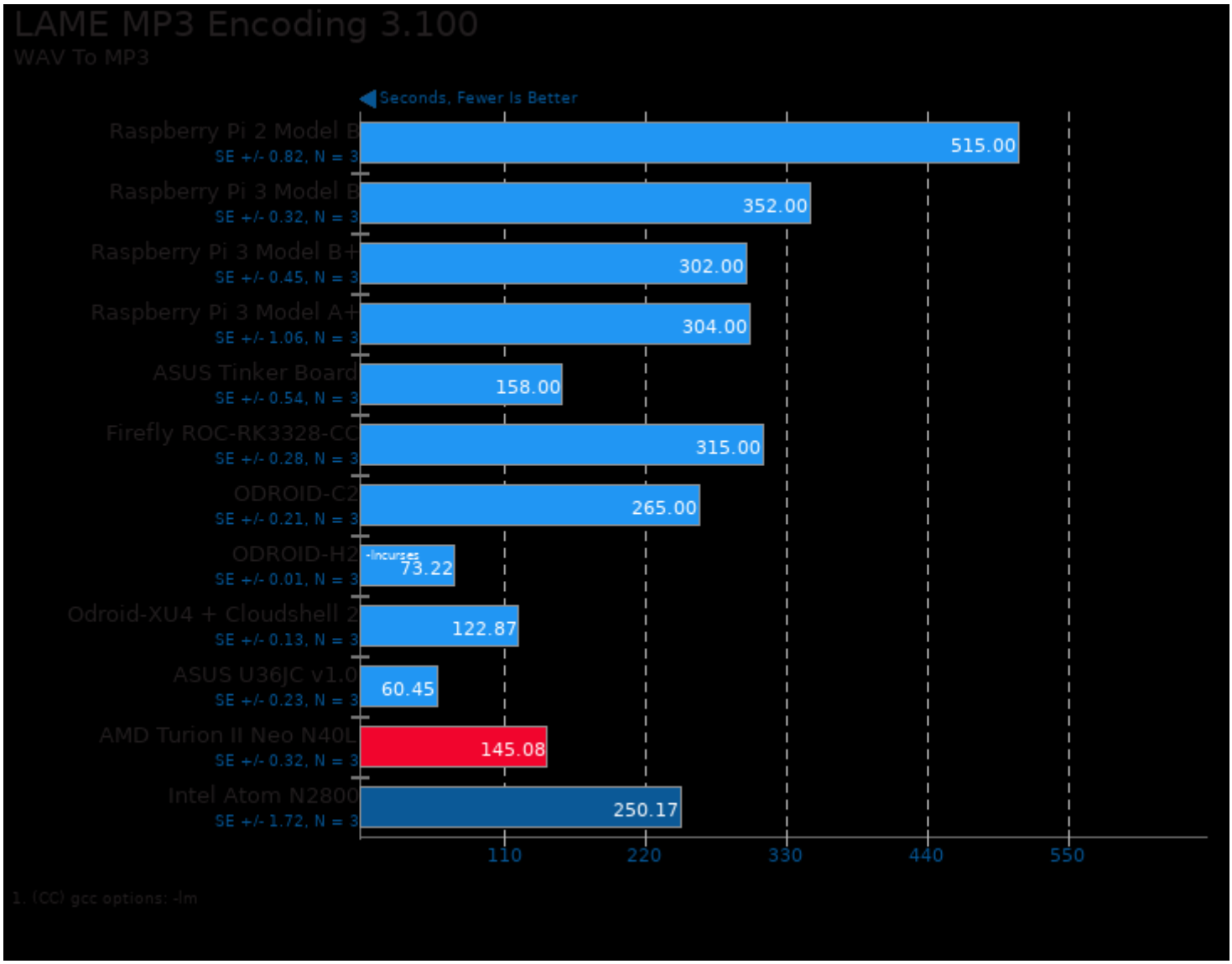

7-Zip Compression 16.02
Compress Speed Test
MIPS, More Is Better
Raspberry Pi 2 Model B
SE +/- 2.91, N = 3
1168
Raspberry Pi 3 Model B
SE +/- 3.18, N = 3
1858
Raspberry Pi 3 Model B+
SE +/- 31.01, N = 3
1803
Raspberry Pi 3 Model A+
SE +/- 7.97, N = 3
1993
ASUS Tinker Board
SE +/- 33.93, N = 12
2946
Firefly ROC-RK3328-CC
SE +/- 4.51, N = 3
1536
ODROID-C2
SE +/- 5.03, N = 3
2165
ODROID-H2
SE +/- 37.33, N = 3
7244
ASUS U36JC v1.0
SE +/- 89.52, N = 3
6248
AMD Turion II Neo N40L
SE +/- 38.44, N = 3
2504
Intel Atom N2800
SE +/- 11.68, N = 3
2026
1600
3200
4800
6400
8000
1. (CXX) g++ options: -pipe -lpthread


C-Ray 1.1
Total Time - 4K, 16 Rays Per Pixel
Seconds, Fewer Is Better
Raspberry Pi 2 Model B
SE +/- 39.73, N = 3
4364
Raspberry Pi 3 Model B
SE +/- 11.39, N = 3
2317
Raspberry Pi 3 Model B+
SE +/- 2.21, N = 3
2111
Raspberry Pi 3 Model A+
SE +/- 4.77, N = 3
2068
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
Odroid-XU4 + Cloudshell 2
SE +/- 23.49, N = 9
816
ASUS U36JC v1.0
SE +/- 12.35, N = 3
822
AMD Turion II Neo N40L
SE +/- 2.00, N = 3
1584
Intel Atom N2800
SE +/- 16.56, N = 3
4216
900
1800
2700
3600
4500
1. (CC) gcc options: -lm -lpthread -O3

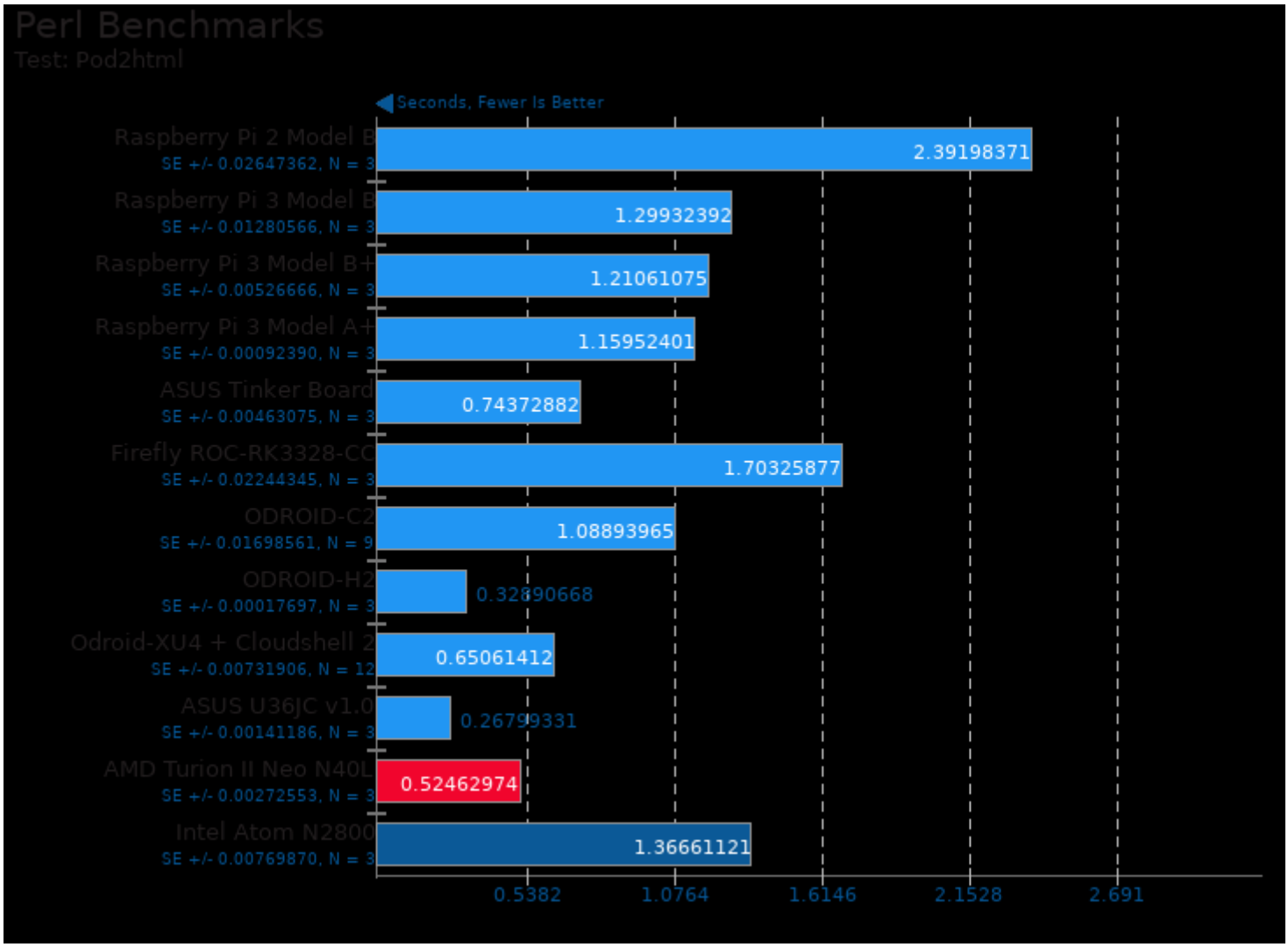
ODROID-H2 Intel Ubuntu Linux Benchmarks

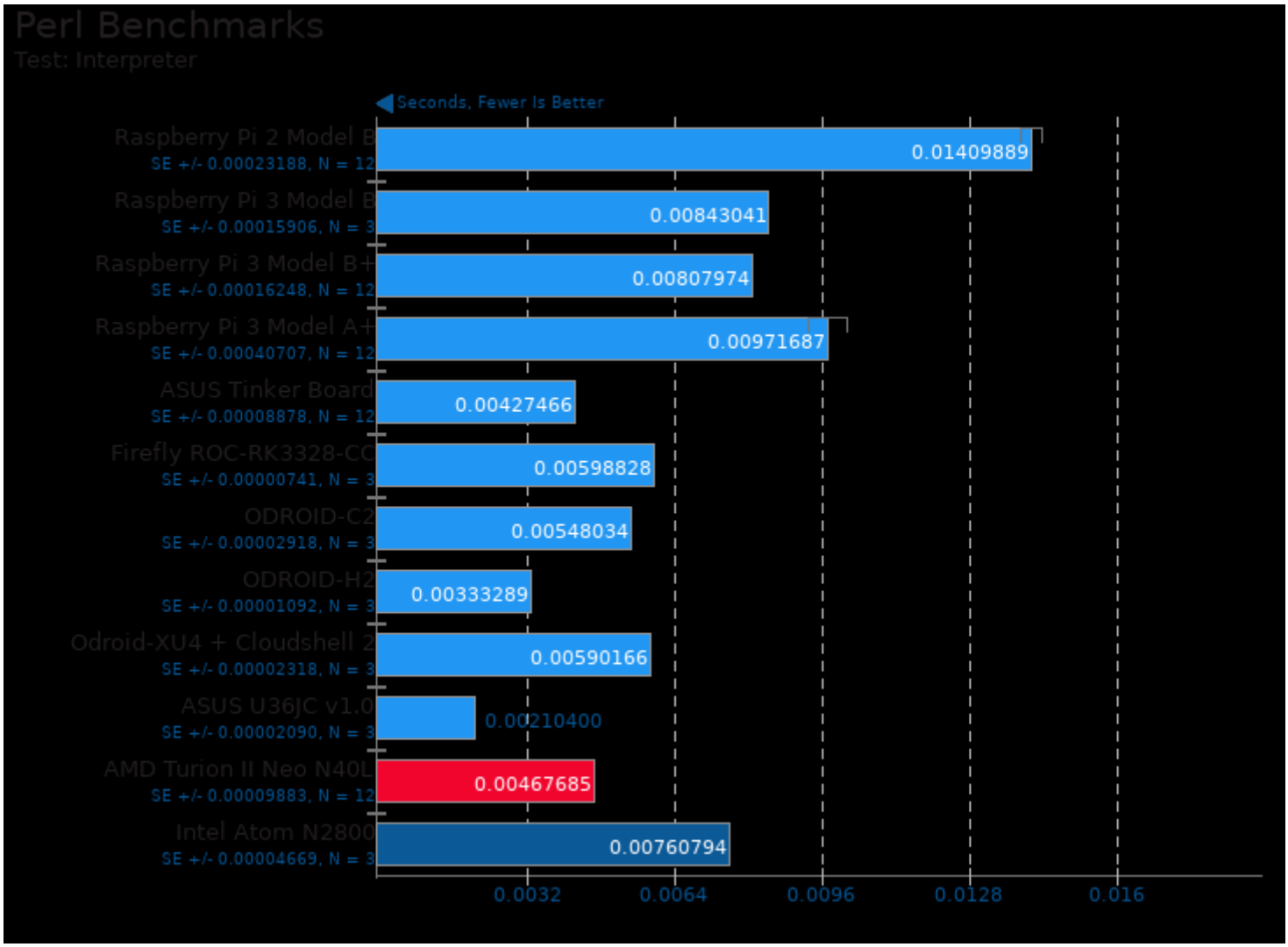


ODROID-H2 Intel Ubuntu Linux Benchmarks

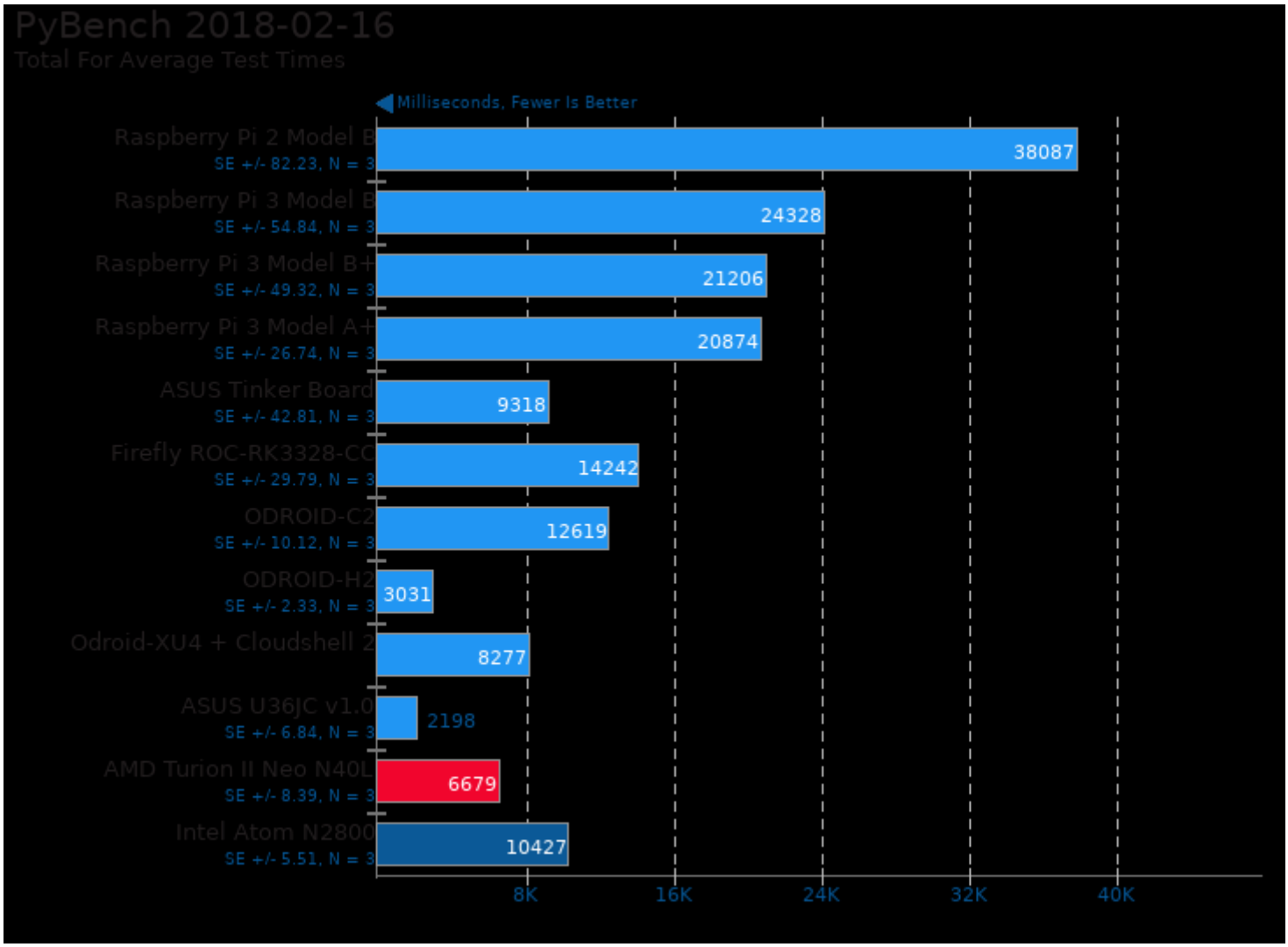


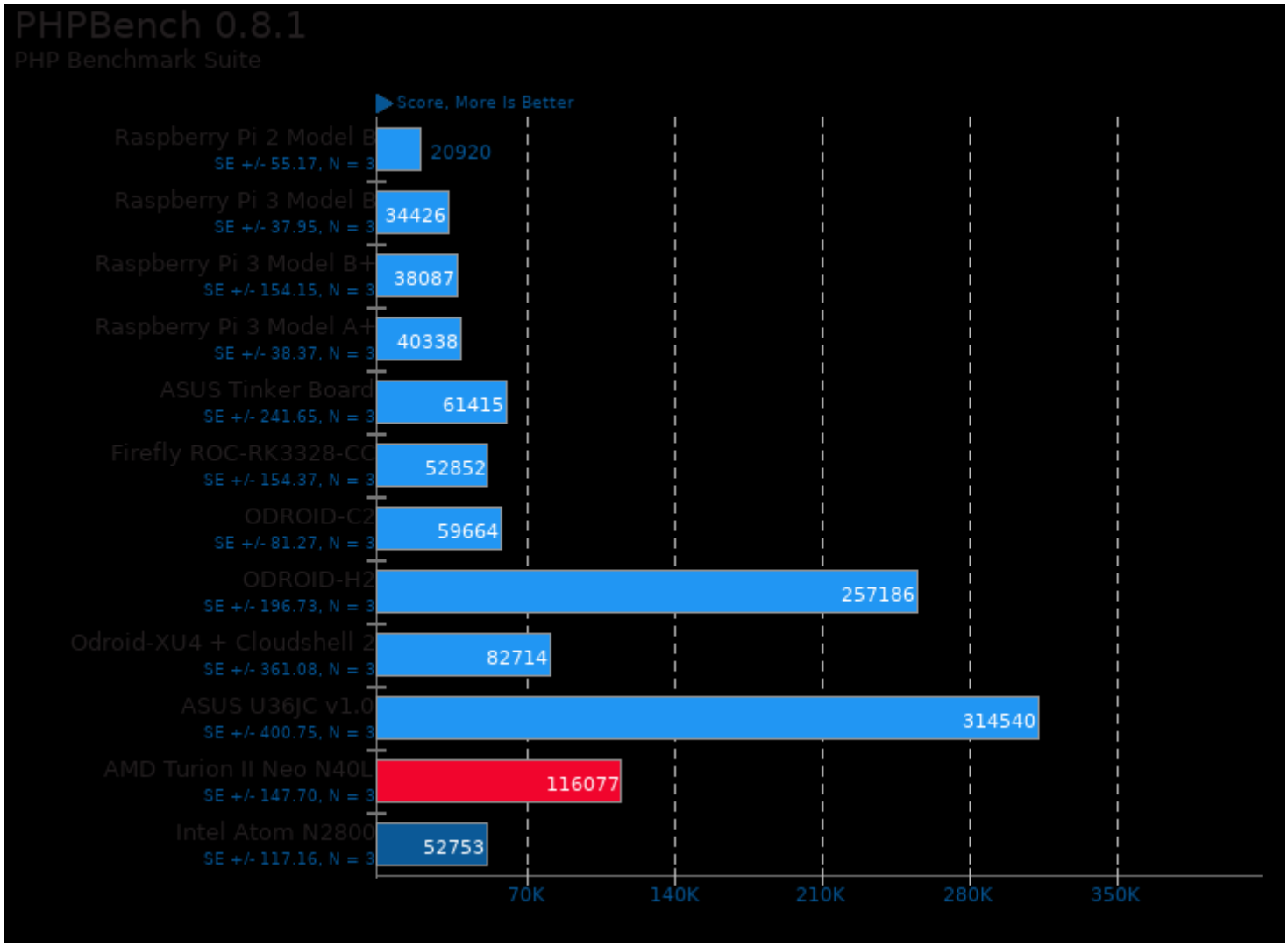
ODROID-H2 Intel Ubuntu Linux Benchmarks



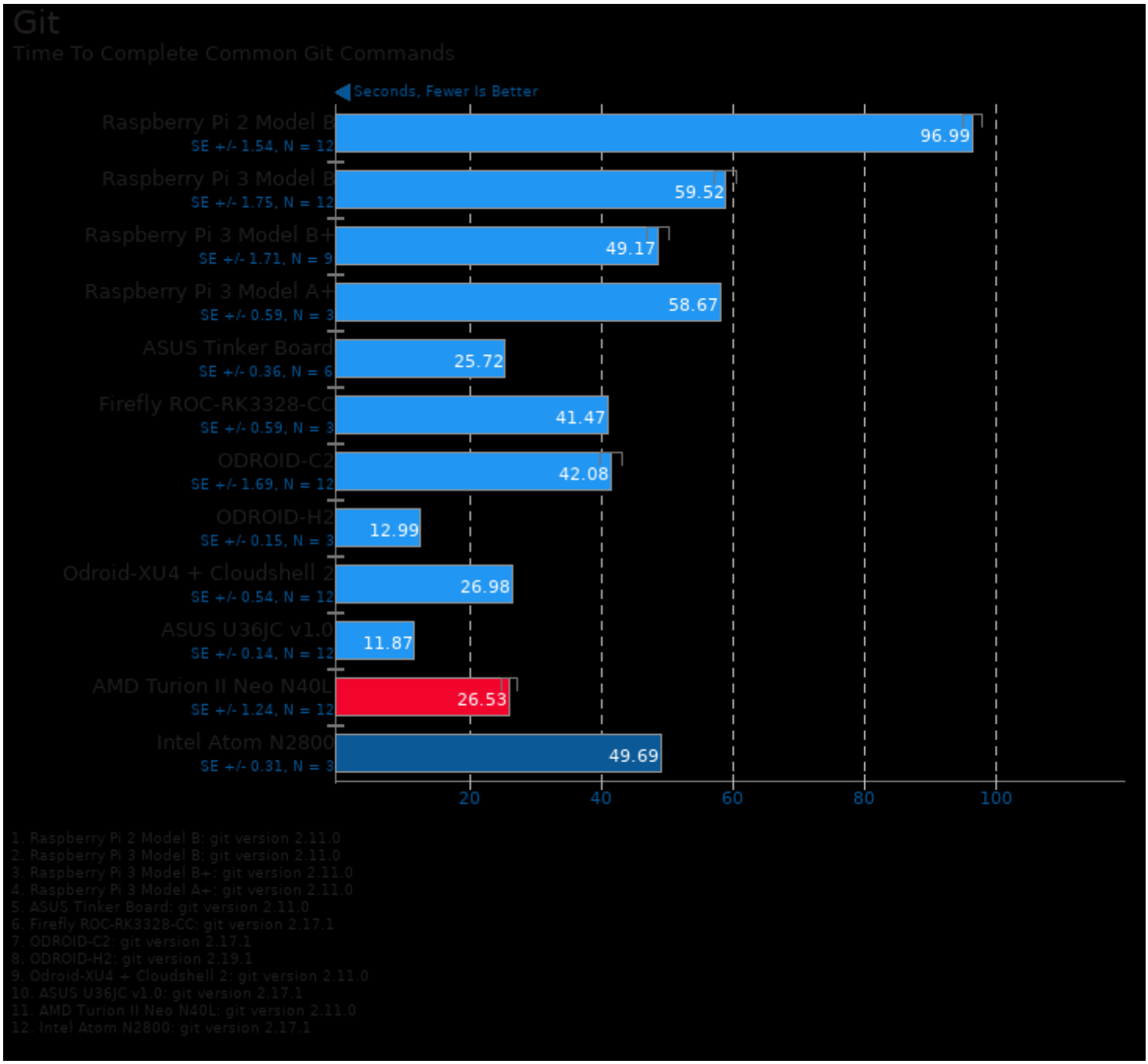

Perl Benchmarks
Test: Interpreter
Seconds, Fewer Is Better
Raspberry Pi 2 Model B
SE +/- 0.00023188, N = 12
0.01409889
Raspberry Pi 3 Model B
SE +/- 0.00015906, N = 3
0.00843041
Raspberry Pi 3 Model B+
SE +/- 0.00016248, N = 12
0.00807974
Raspberry Pi 3 Model A+
SE +/- 0.00040707, N = 12
0.00971687
ASUS 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
Odroid-XU4 + Cloudshell 2
SE +/- 0.00002318, N = 3
0.00590166
ASUS U36JC v1.0
SE +/- 0.00002090, N = 3
0.00210400
AMD Turion II Neo N40L
SE +/- 0.00009883, N = 12
0.00467685
Intel Atom N2800
SE +/- 0.00004669, N = 3
0.00760794
0.0032
0.0064
0.0096
0.0128
0.016

ODROID-H2 Intel Ubuntu Linux Benchmarks

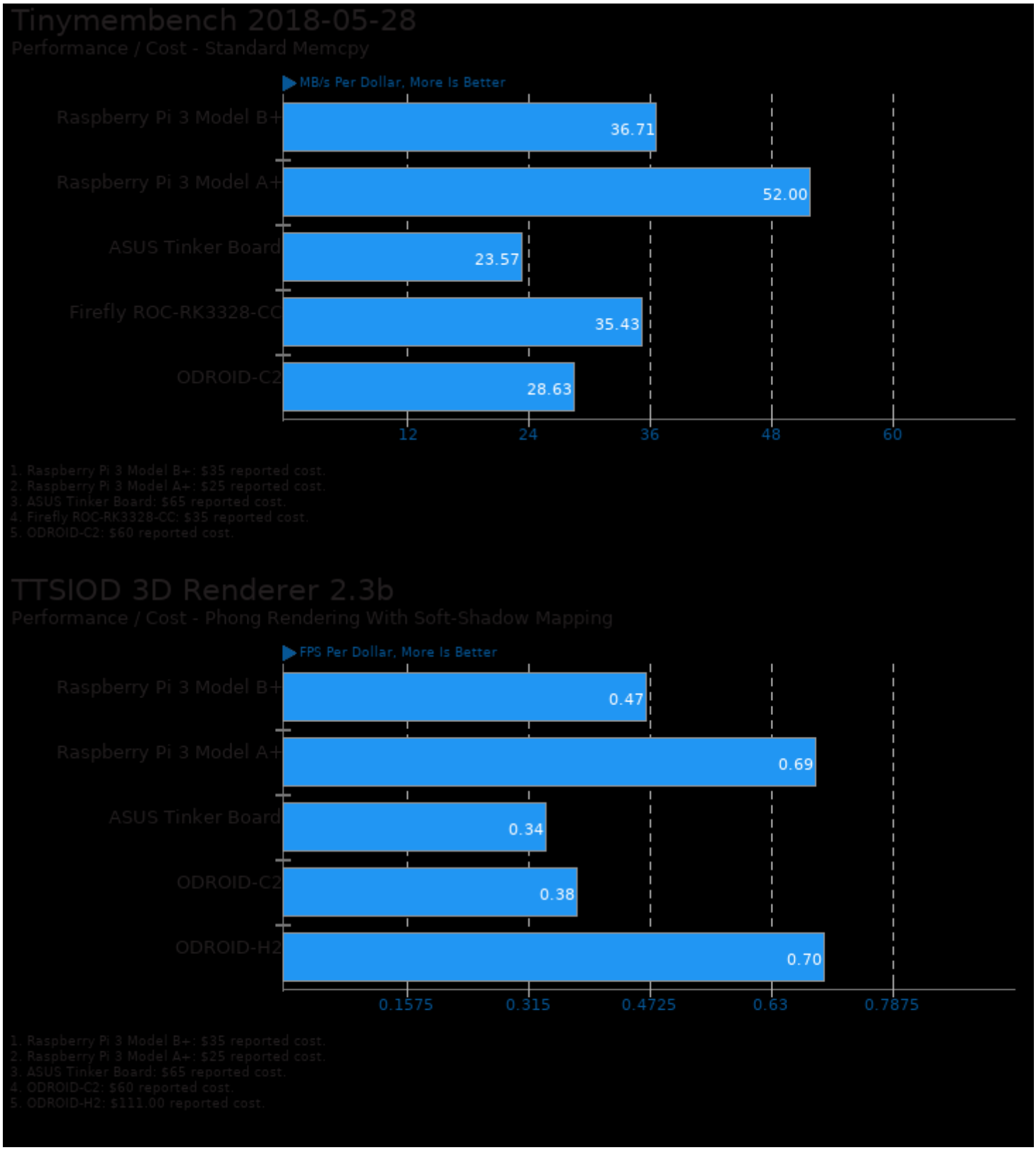



PHPBench 0.8.1
PHP Benchmark Suite
Score, More Is Better
Raspberry Pi 2 Model B
SE +/- 55.17, N = 3
20920
Raspberry Pi 3 Model B
SE +/- 37.95, N = 3
34426
Raspberry Pi 3 Model B+
SE +/- 154.15, N = 3
38087
Raspberry Pi 3 Model A+
SE +/- 38.37, N = 3
40338
ASUS Tinker Board
SE +/- 241.65, N = 3
61415
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
Odroid-XU4 + Cloudshell 2
SE +/- 361.08, N = 3
82714
ASUS U36JC v1.0
SE +/- 400.75, N = 3
314540
AMD Turion II Neo N40L
SE +/- 147.70, N = 3
116077
Intel Atom N2800
SE +/- 117.16, N = 3
52753
70K
140K
210K
280K
350K

ODROID-H2 Intel Ubuntu Linux Benchmarks



ODROID-H2 Intel Ubuntu Linux Benchmarks



x264 2018-09-25

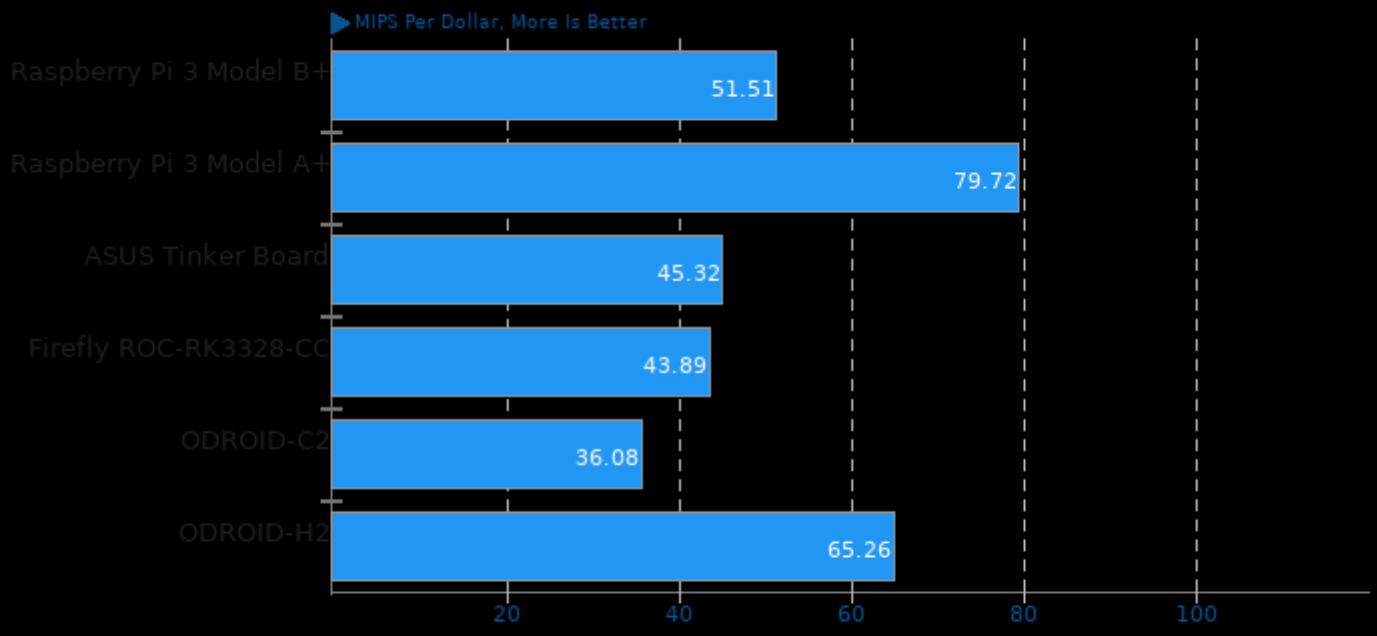
Performance / Cost - H.264 Video Encoding



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

7-Zip Compression 16.02

Performance / Cost - Compress Speed Test

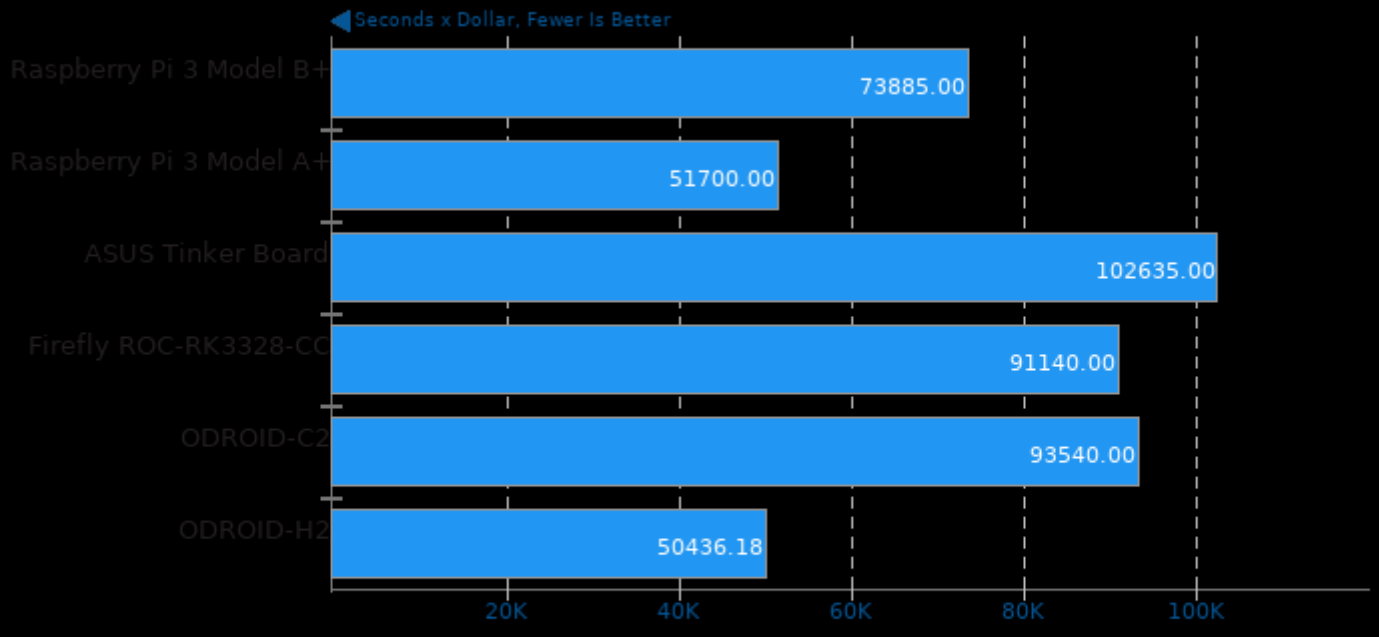


1. Raspberry Pi 3 Model B+: $35 reported cost.
2. Raspberry Pi 3 Model A+: $25 reported cost.
3. ASUS Tinker Board: $65 reported cost.
4. Firefly ROC-RK3328-CC: $35 reported cost.
5. ODROID-C2: $60 reported cost.
6. ODROID-H2: $111.00 reported cost.

ODROID-H2 Intel Ubuntu Linux Benchmarks

C-Ray 1.1

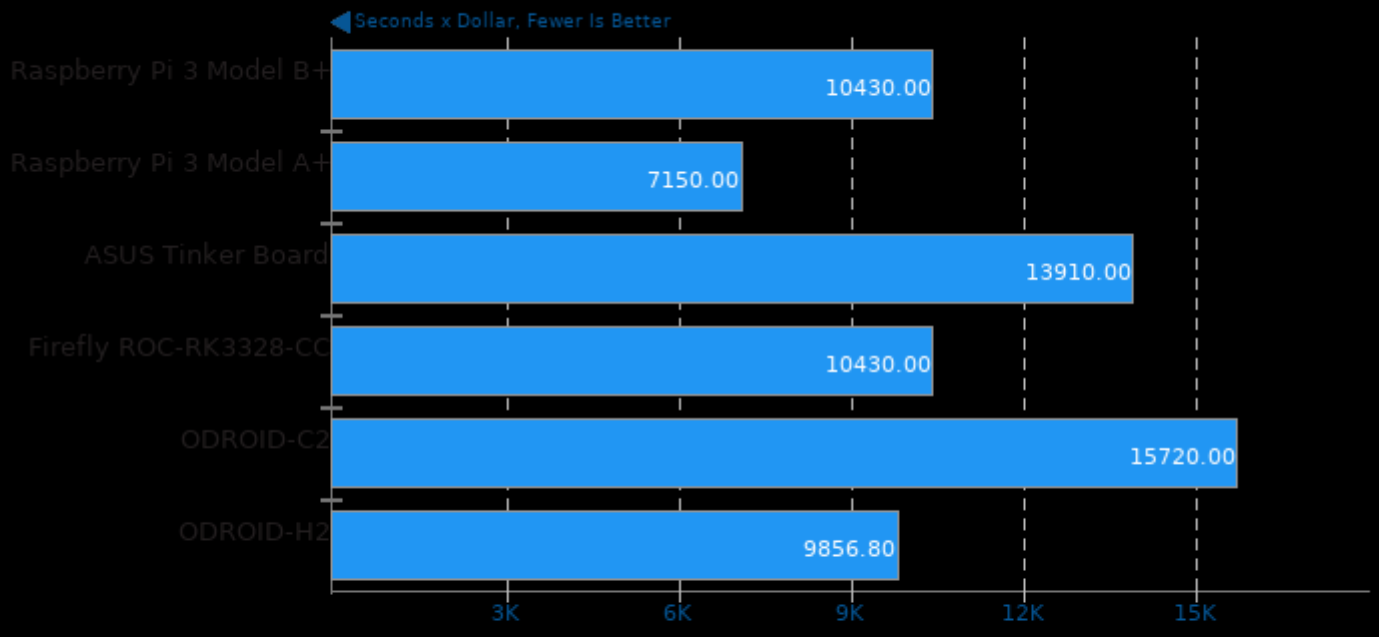
Performance / Cost - Total Time - 4K, 16 Rays Per Pixel



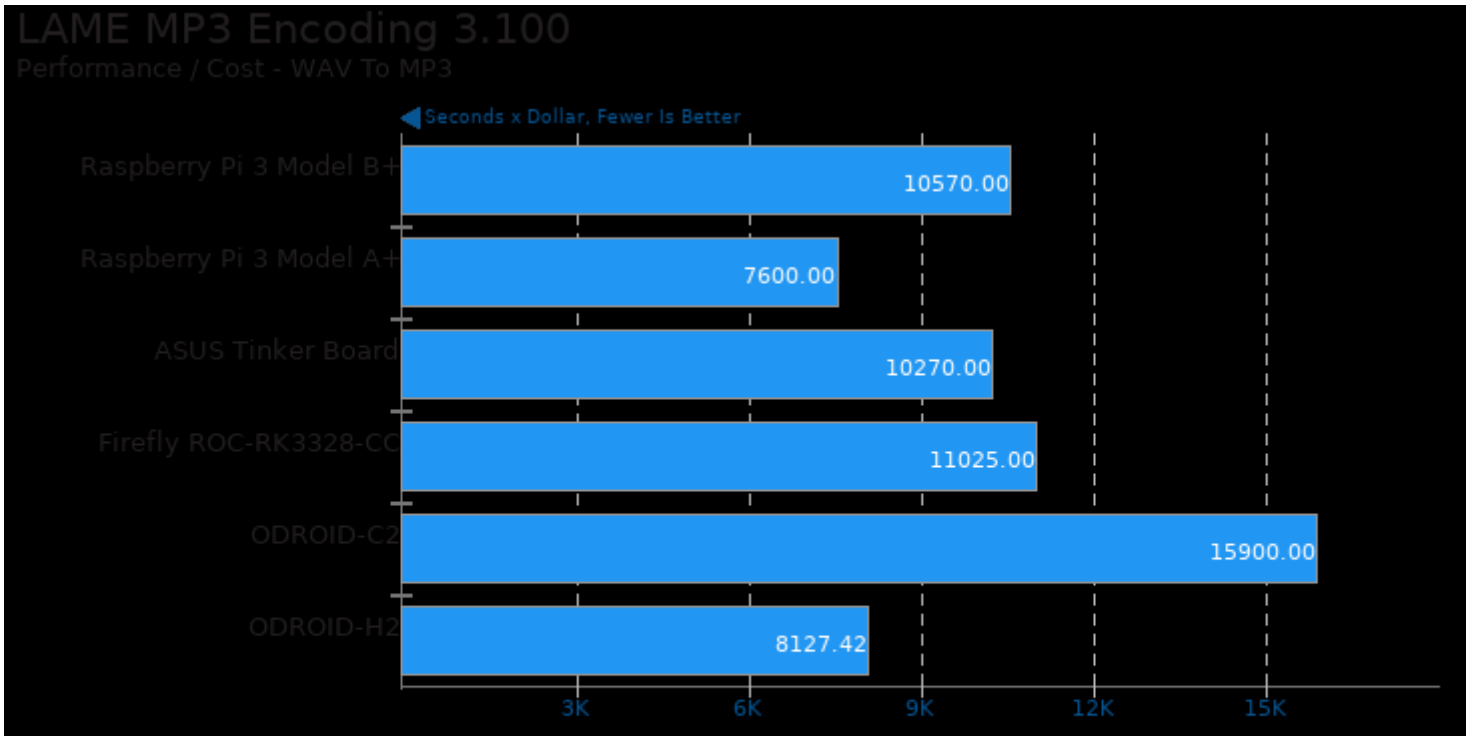
1. Raspberry Pi 3 Model B+: $35 reported cost.
2. Raspberry Pi 3 Model A+: $25 reported cost.
3. ASUS Tinker Board: $65 reported cost.
4. Firefly ROC-RK3328-CC: $35 reported cost.
5. ODROID-C2: $60 reported cost.
6. ODROID-H2: $111.00 reported cost.

AOBench

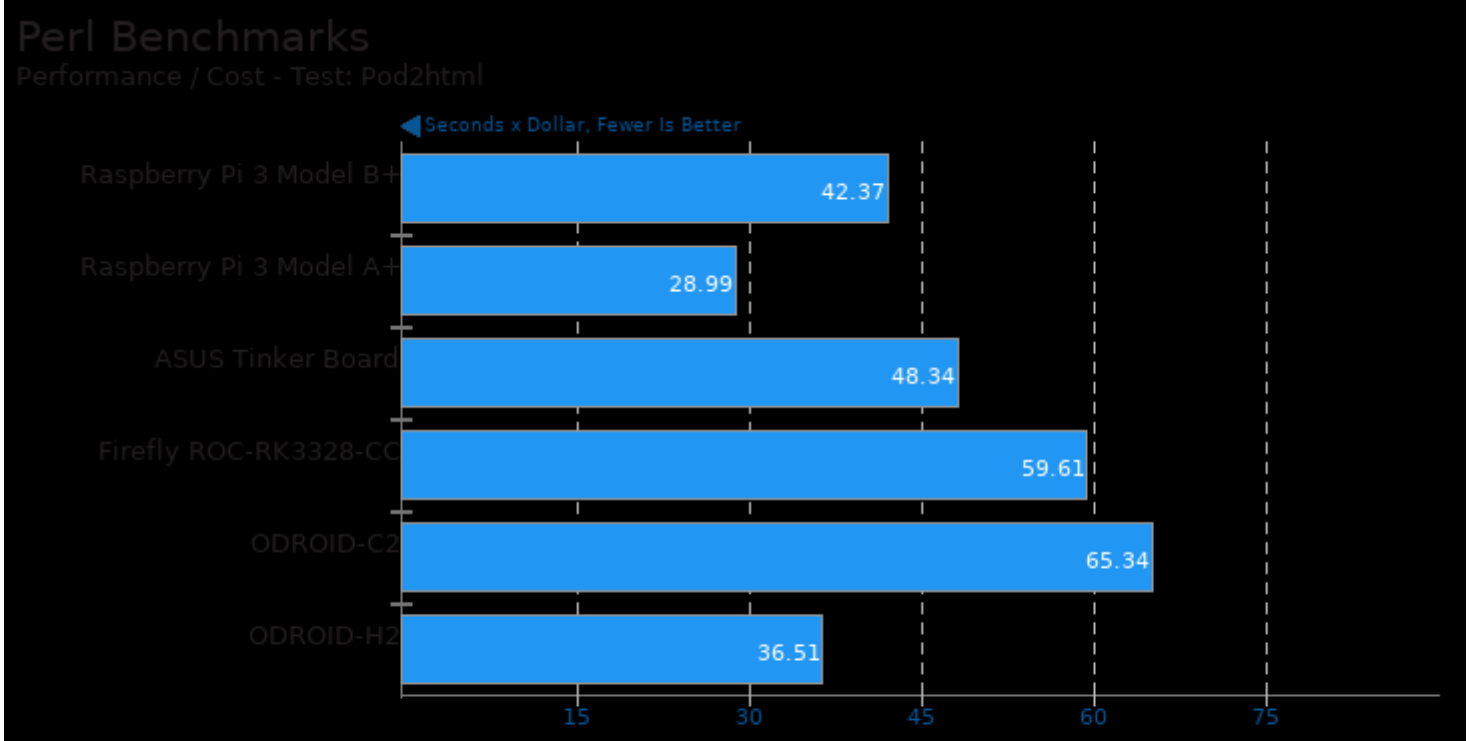
Performance / Cost - Size: 2048 x 2048 - Total Time



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



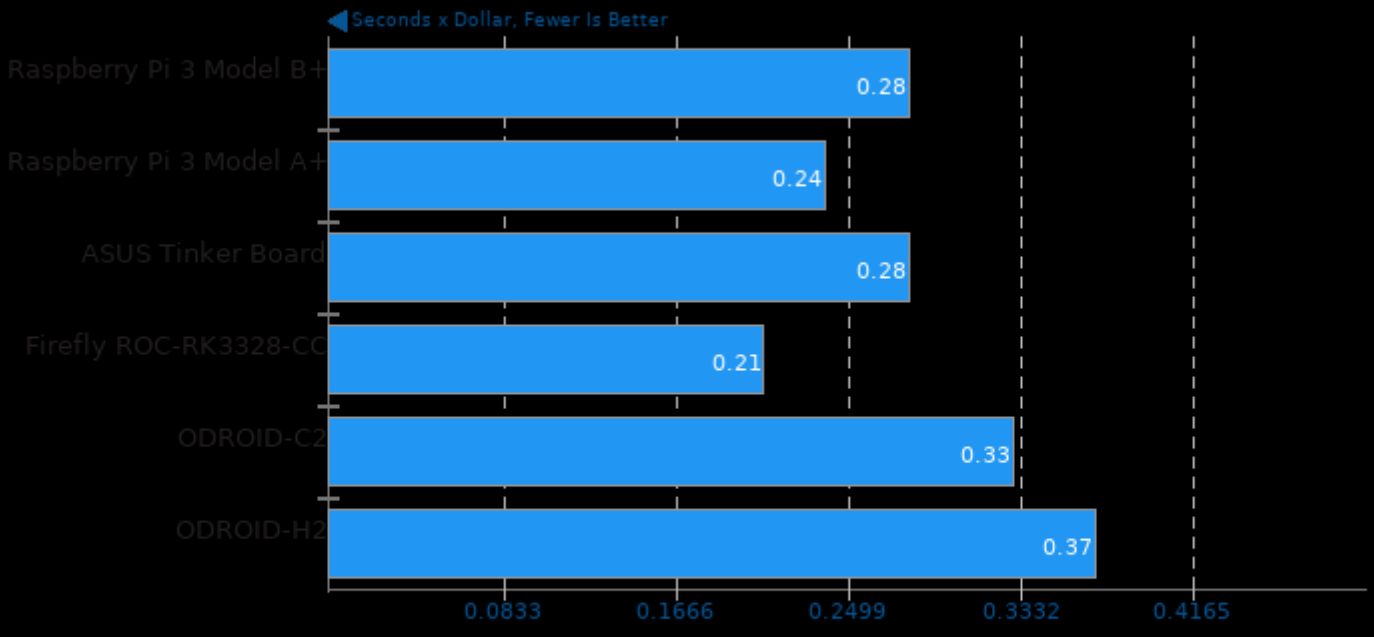
1. Raspberry Pi 3 Model B+: $35 reported cost.
2. Raspberry Pi 3 Model A+: $25 reported cost.
3. ASUS Tinker Board: $65 reported cost.
4. Firefly ROC-RK3328-CC: $35 reported cost.
5. ODROID-C2: $60 reported cost.
6. ODROID-H2: $111.00 reported cost.



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

Perl Benchmarks

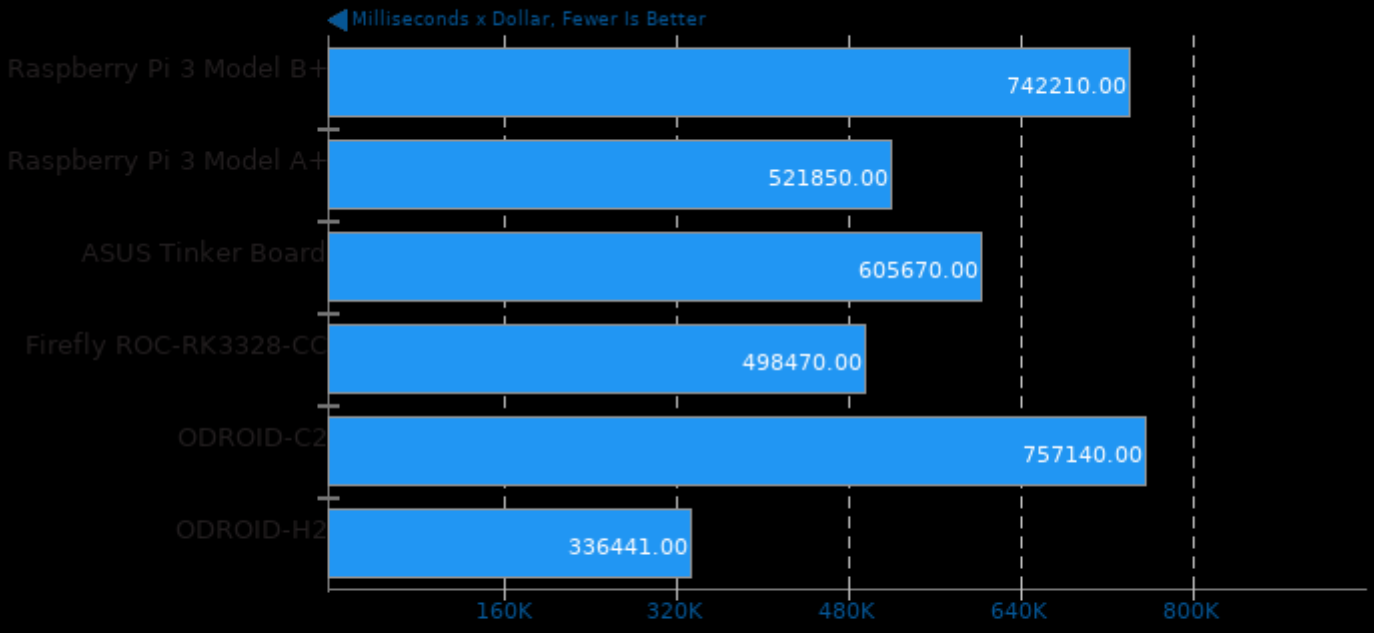
Performance / Cost - Test: Interpreter



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

PyBench 2018-02-16

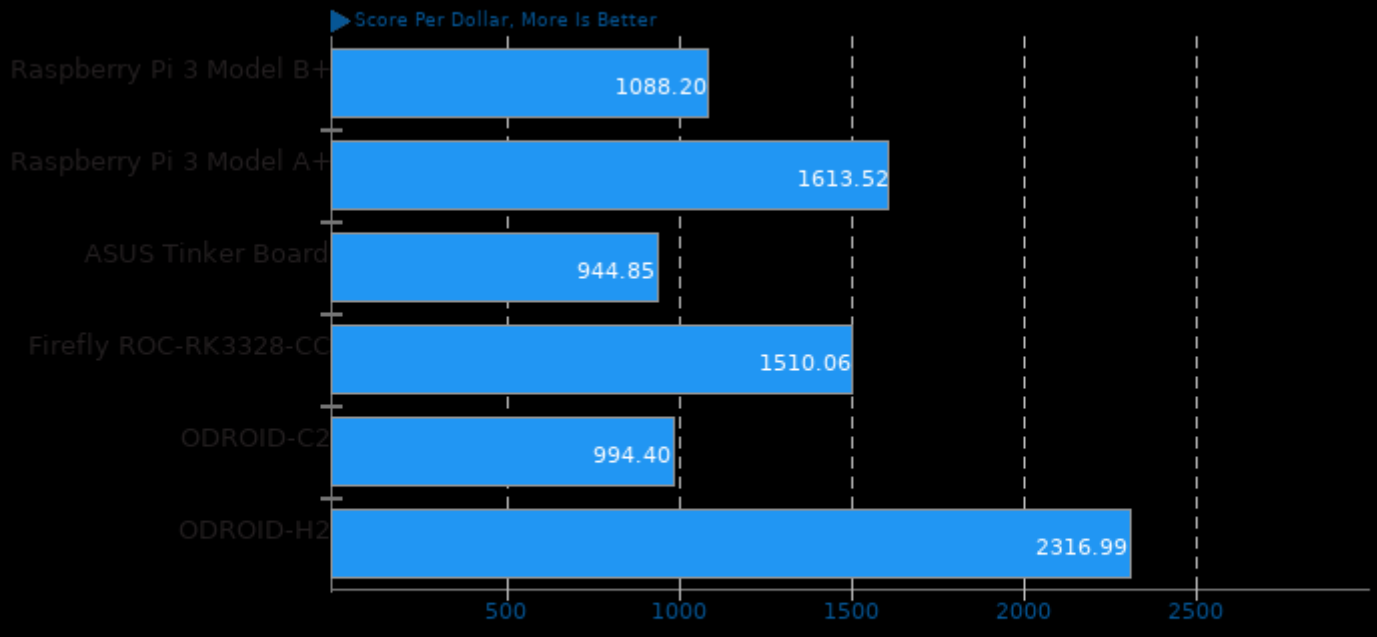
Performance / Cost - Total For Average Test Times



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

PHPBench 0.8.1

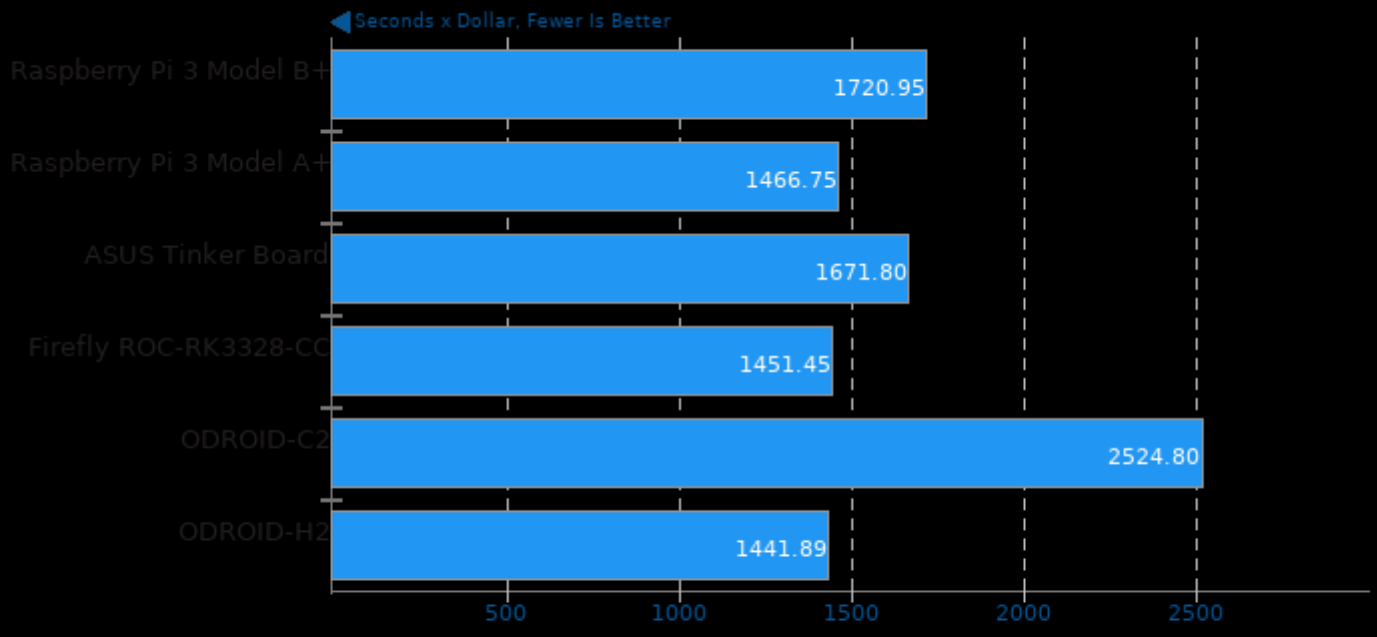
Performance / Cost - PHP Benchmark Suite



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

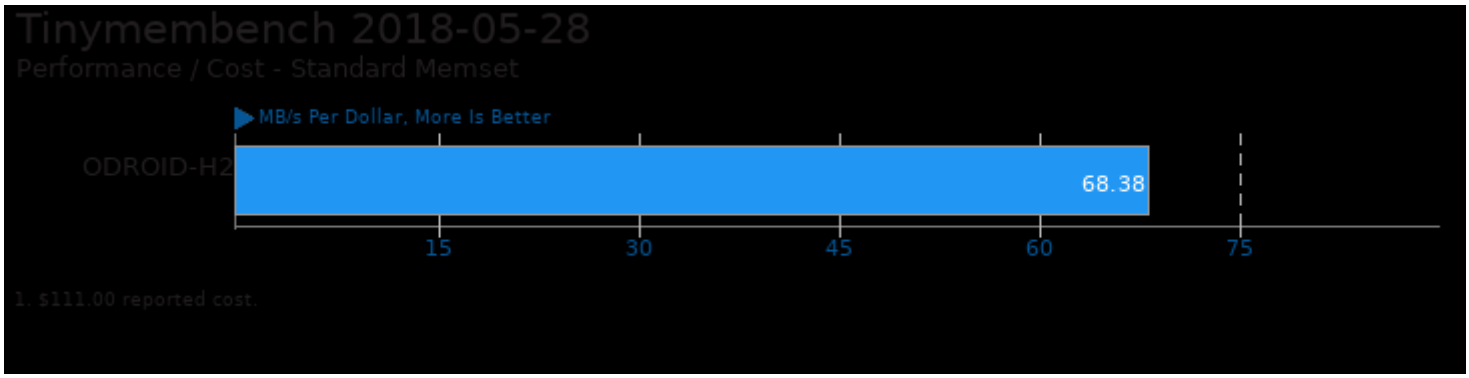
Git

Performance / Cost - Time To Complete Common Git Commands

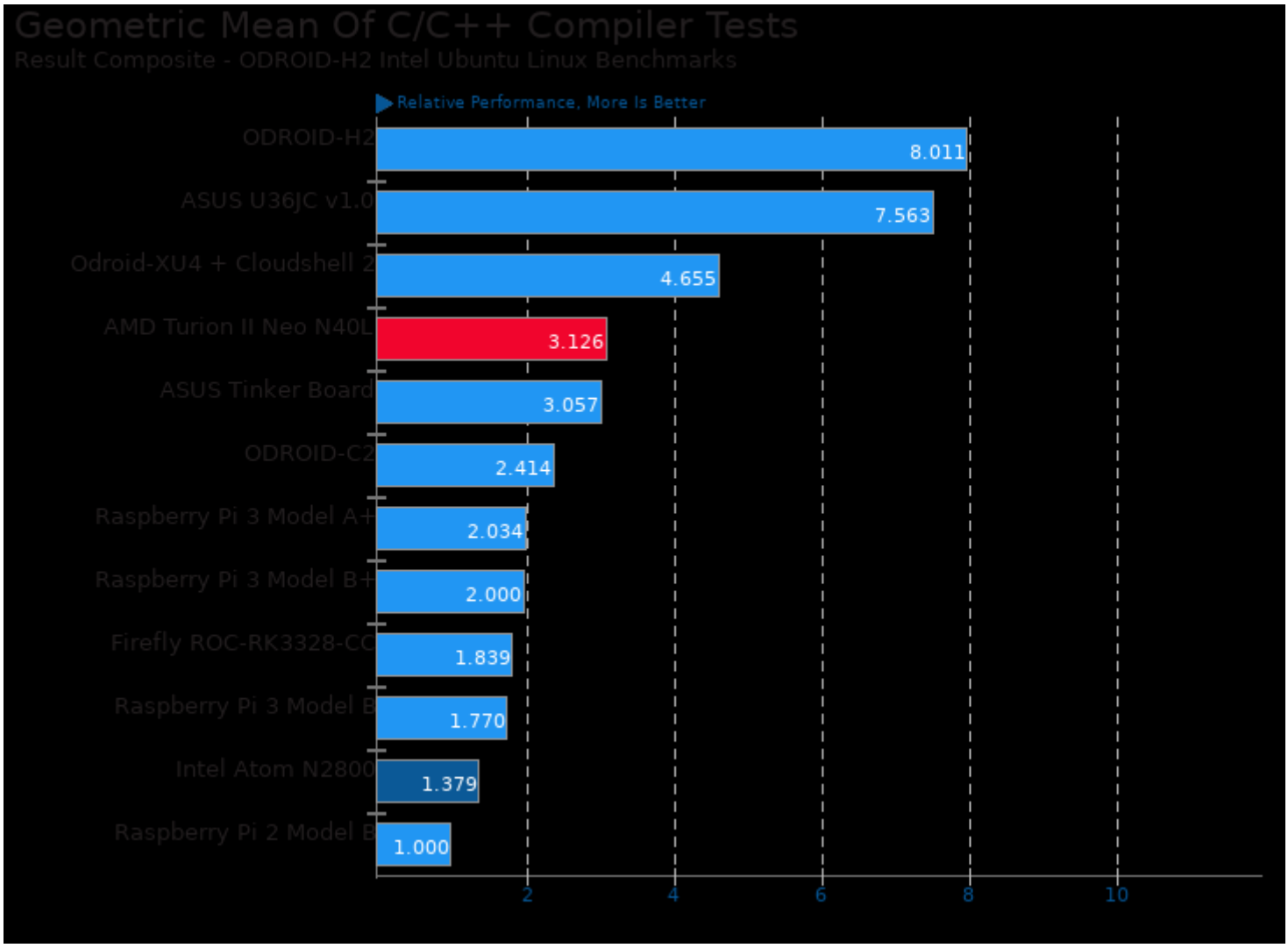


1. Raspberry Pi 3 Model B+: $35 reported cost.
2. Raspberry Pi 3 Model A+: $25 reported cost.
3. ASUS Tinker Board: $65 reported cost.
4. Firefly ROC-RK3328-CC: $35 reported cost.
5. ODROID-C2: $60 reported cost.
6. ODROID-H2: $111.00 reported cost.

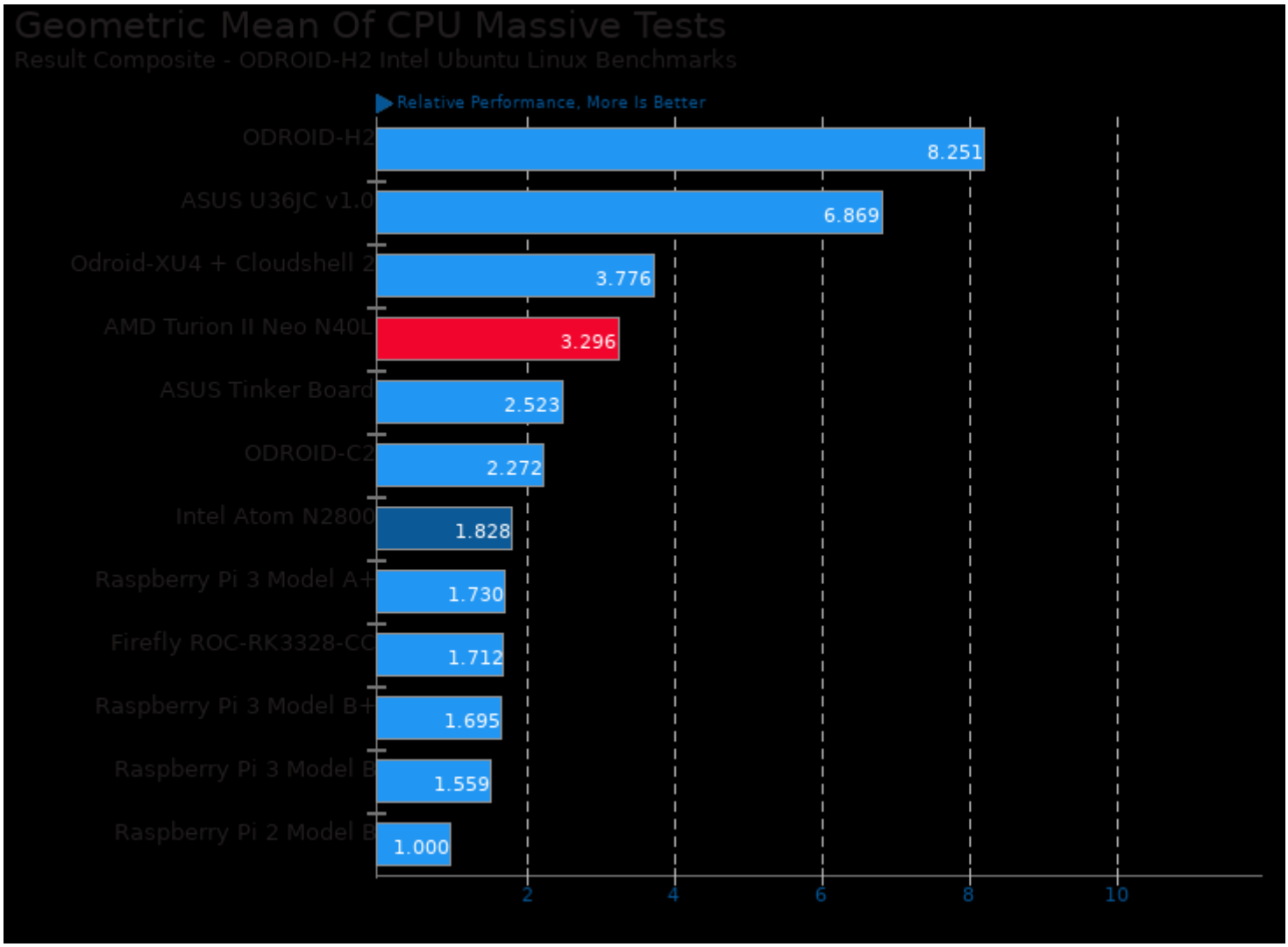
ODROID-H2 Intel Ubuntu Linux Benchmarks



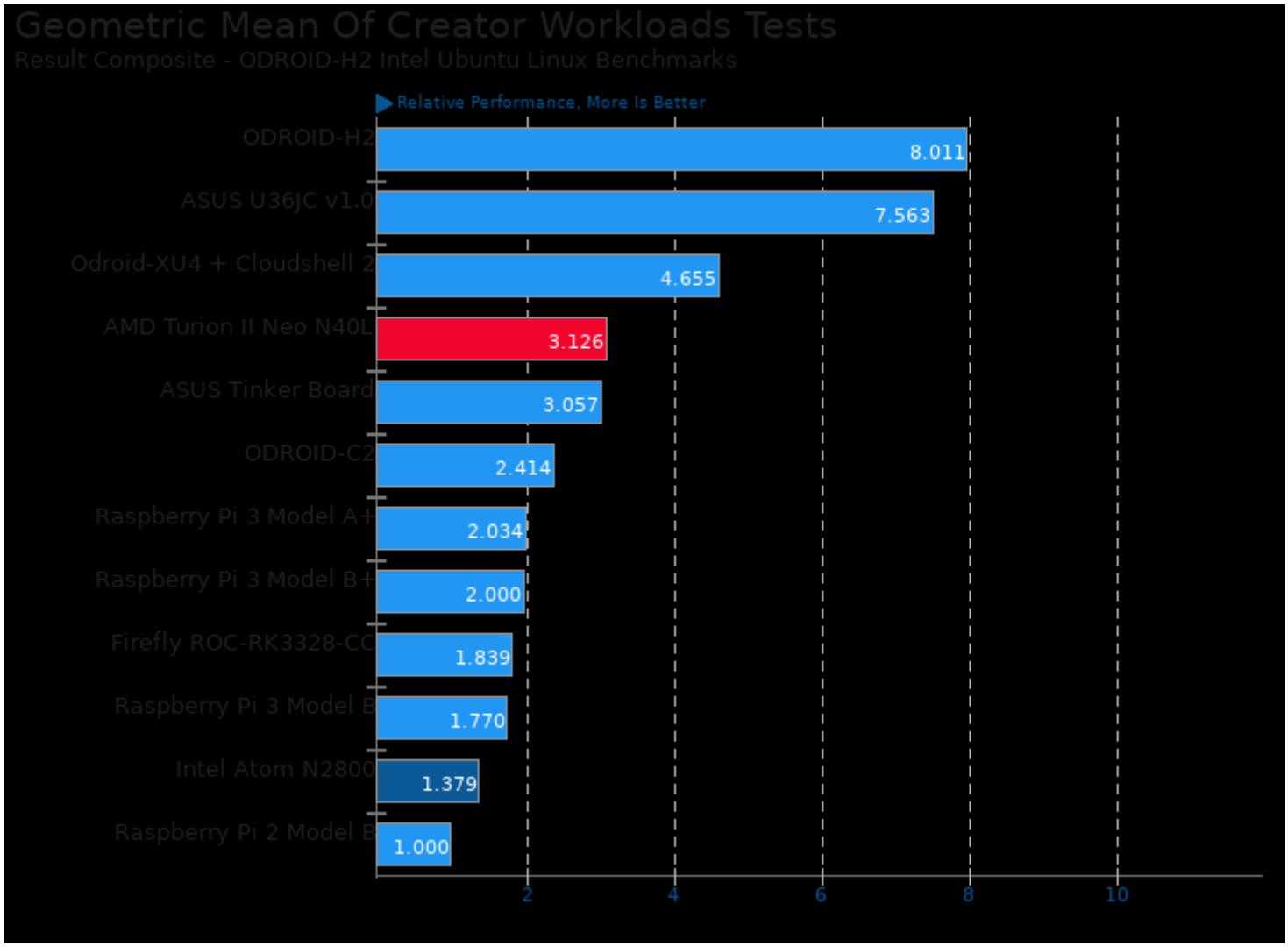
These geometric means are based upon test groupings / test suites for this result file.



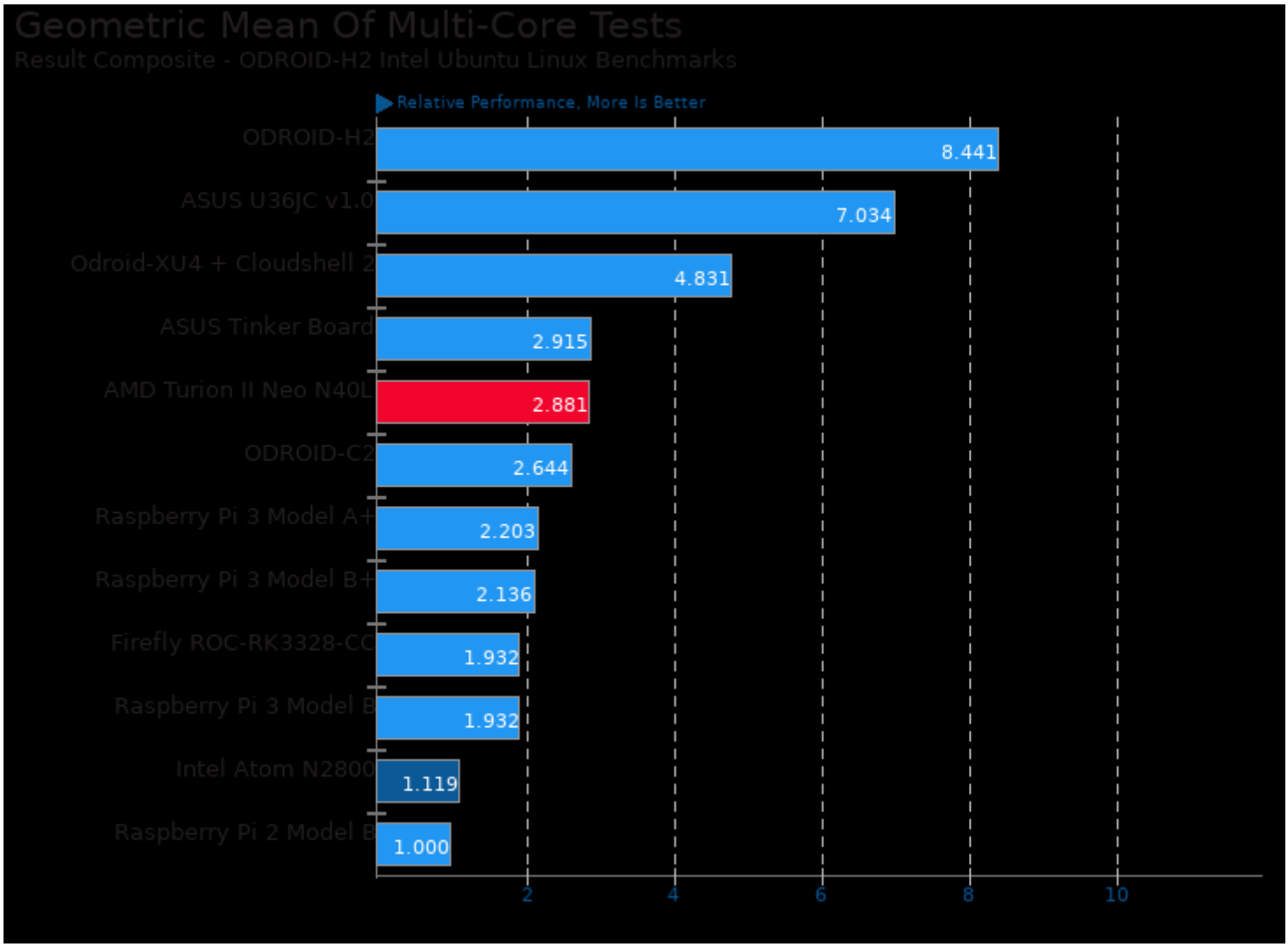
Geometric mean based upon tests: pts/aobench, pts/c-ray, pts/compress-7zip, pts/encode-mp3 and pts/x264



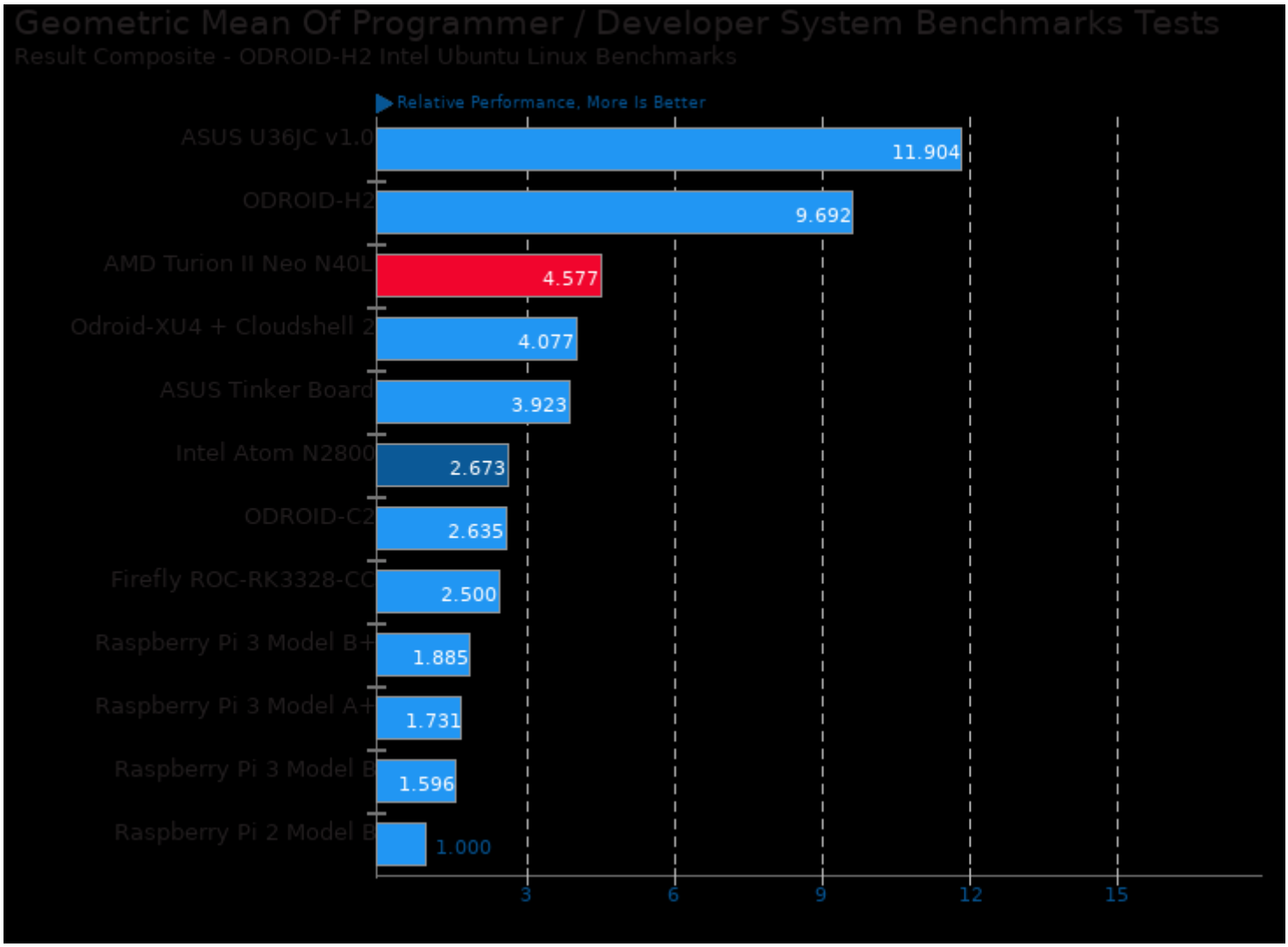
Geometric mean based upon tests: pts/c-ray, pts/compress-7zip, pts/x264, pts/encode-mp3, pts/phpbench, pts/tinymembench and pts/ttsiod-renderer



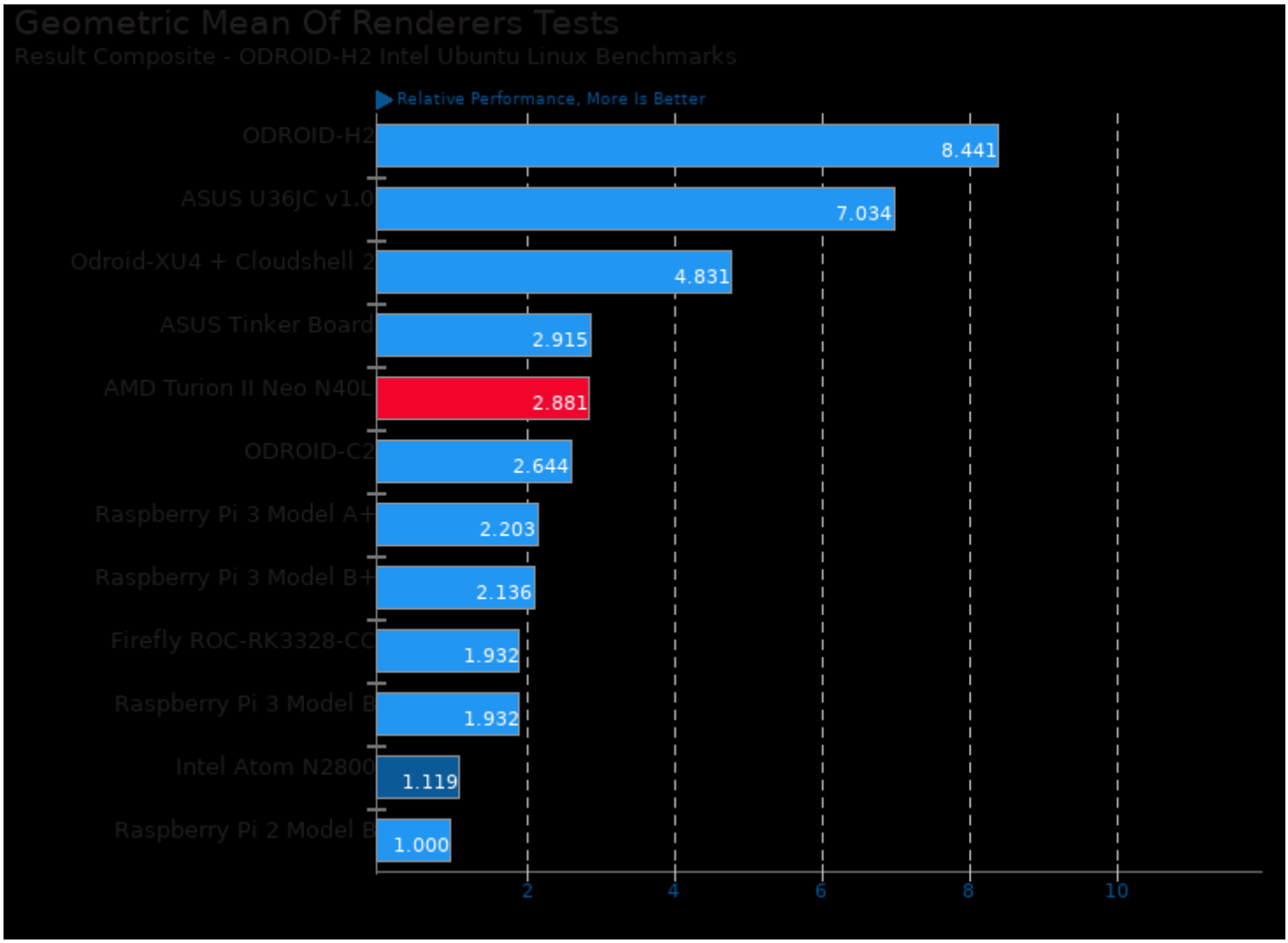
Geometric mean based upon tests: pts/c-ray, pts/aobench, pts/ttsiod-renderer, pts/x264 and pts/encode-mp3



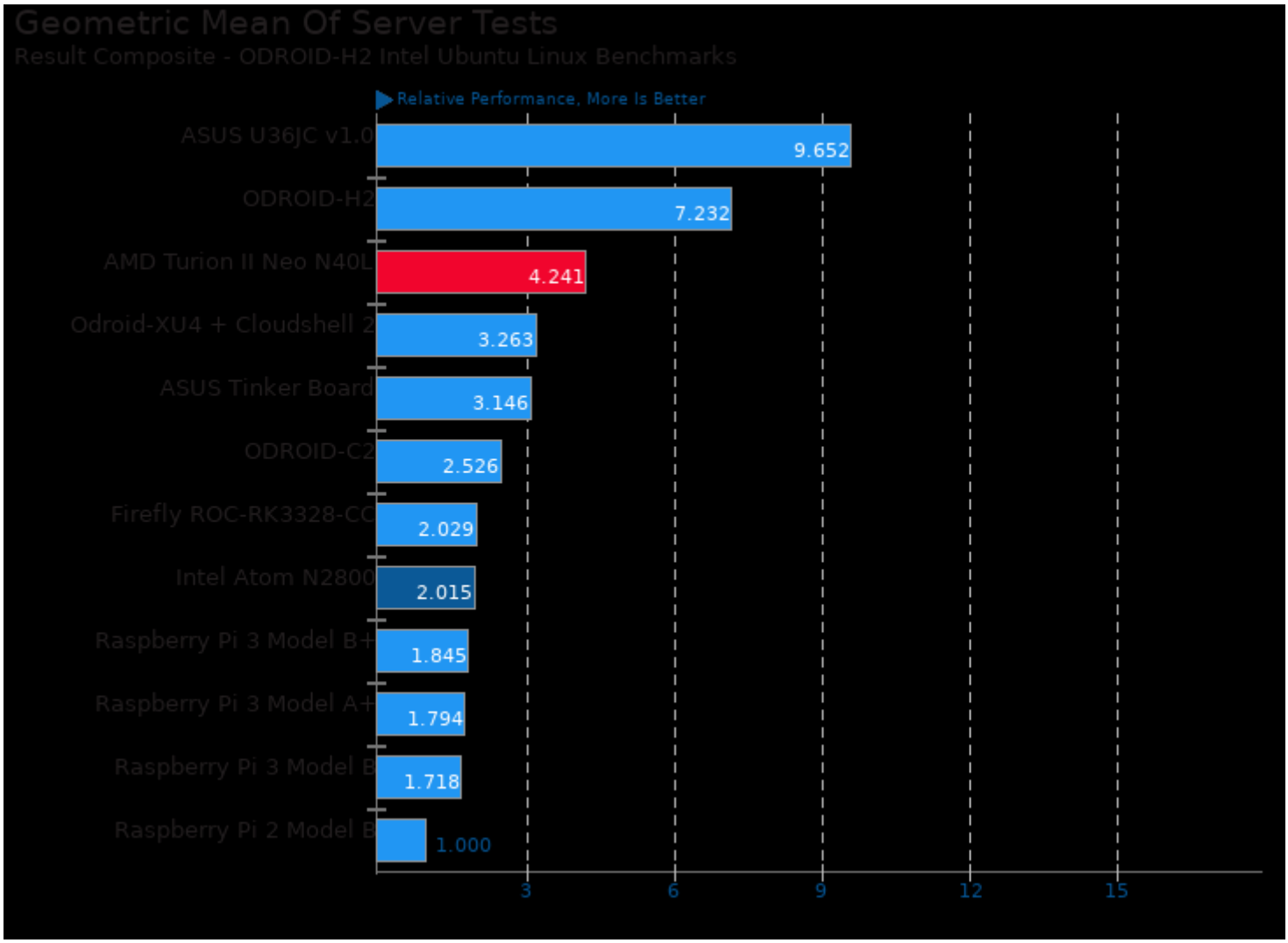
Geometric mean based upon tests: pts/c-ray, pts/x264, pts/compress-7zip, pts/aobench and pts/ttsiod-renderer



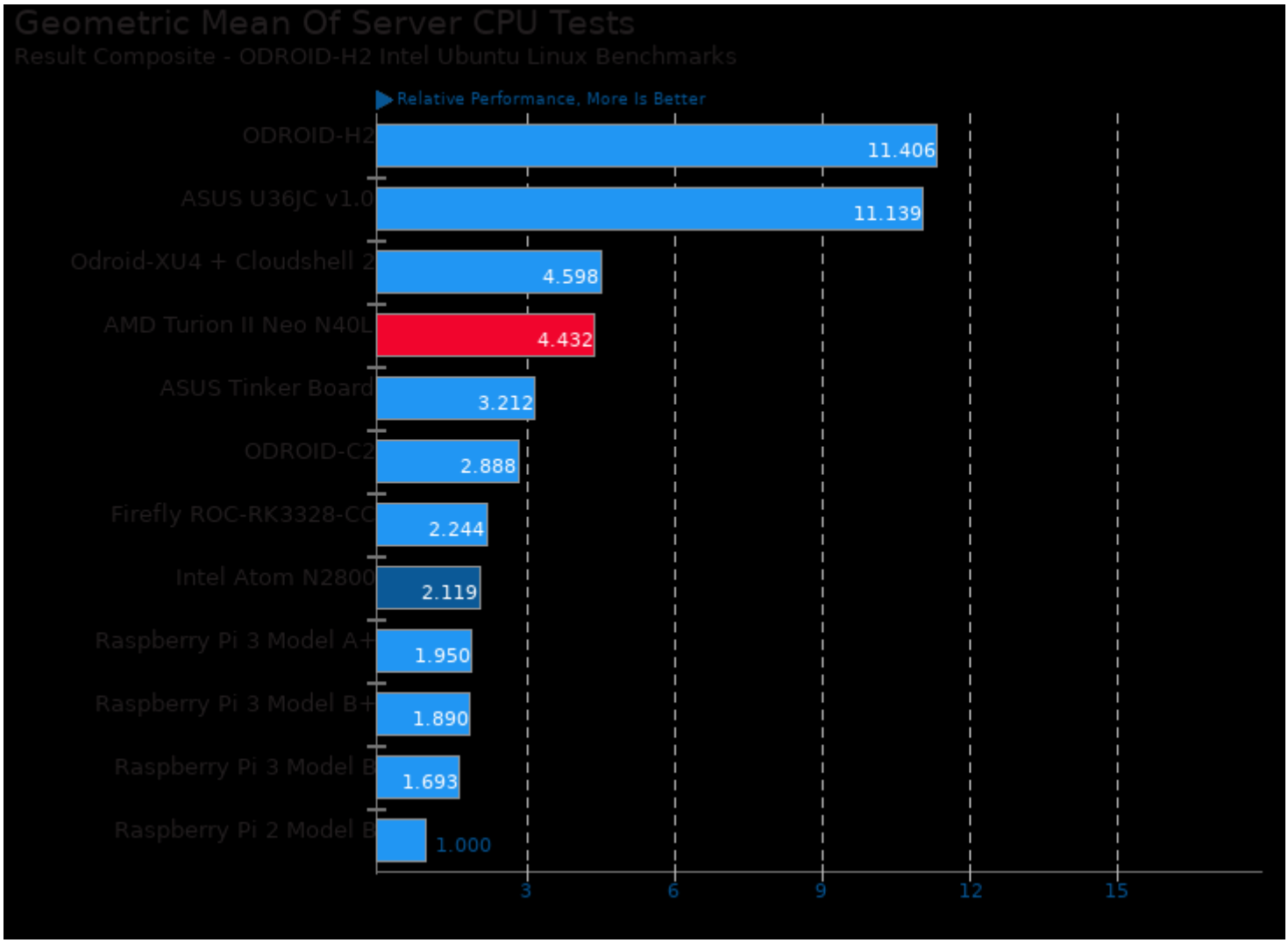
Geometric mean based upon tests: pts/git and pts/pybench



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

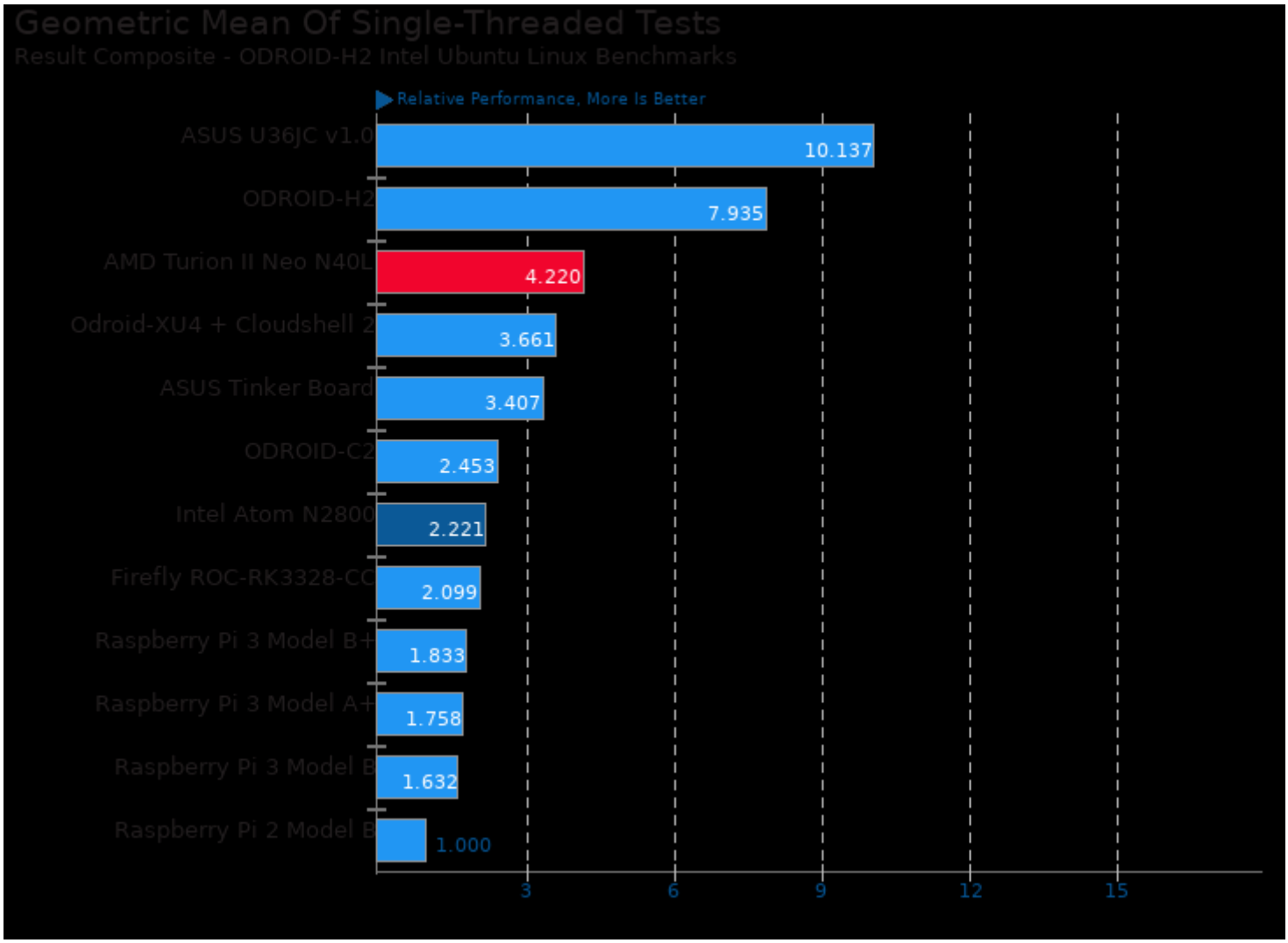


Geometric mean based upon tests: pts/phpbench and pts/perl-benchmark



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

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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 Friday, 29 March 2024 03:20.