www.phoronix-test-suite.com

Raspberry Pi 3 Linux Benchmark Comparison

Testing allowing more cpufreq steps to see whether thermal throttling improves

Automated Executive Summary

Jetson TX1 had the most wins, coming in first place for 42% of the tests.

Test Systems:

Raspberry Pi 3

Processor: ARMv7 rev 4 @ 1.20GHz (4 Cores), Motherboard: BCM2709 Raspberry Pi 3 Model B Rev 1.2, Memory: 925MB, Disk: 16GB SD16G, Graphics: LLVMpipe

OS: Raspbian 8.0, Kernel: 4.1.18-v7+ (armv7l), Desktop: LXDE 0.7.2, Display Server: X Server 1.17.2, OpenGL: 3.0 Mesa 11.1.0 Gallium 0.4, Compiler: GCC 4.9.2, 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,c++,java,go,d,fortran,objc,obj-c++

--enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=arm-linux-gnueabihf --target=arm-linux-gnueabihf --with-arch-directory=arm --with-arch=armv6 --with-float=hard --with-fpu=vfp -v
Processor Notes: Scaling Governor: BCM2835 Freq ondemand

Raspberry Pi 2

Processor: ARMv7 rev 5 @ 0.90GHz (4 Cores), Motherboard: BCM2709 Raspberry Pi 2 Model B Rev 1.1, Memory: 925MB, Disk: 8GB SD

OS: Raspbian 8.0, Kernel: 4.1.13-v7+ (armv7l), Desktop: LXDE 0.7.2, Display Server: X Server 1.16.4, Compiler: GCC 4.9.2, 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,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=arm-linux-gnueabihf --target=arm-linux-gnueabihf --with-arch-directory=arm --with-arch=armv6 --with-float=hard --with-fpu=vfp -v
Processor Notes: Scaling Governor: BCM2835 Freq ondemand

Raspberry Pi Zero

Processor: ARMv6-compatible rev 7 @ 1.00GHz (1 Core), Motherboard: BCM2708 Raspberry Pi ? Rev 1.2, Memory: 434MB, Disk: 8GB SL08G

OS: Raspbian 8.0, Kernel: 4.1.13+ (armv6l), Desktop: LXDE 0.7.2, Display Server: X Server 1.16.4, Compiler: GCC 4.9.2, File-System: ext4, Screen Resolution: 1776x952

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,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=arm-linux-gnueabihf --target=arm-linux-gnueabihf --with-arch-directory=arm --with-arch=armv6 --with-float=hard --with-fpu=vfp -v
Processor Notes: Scaling Governor: BCM2835 Freq ondemand

Banana Pi M2

Processor: ARMv7 rev 3 @ 1.01GHz (4 Cores), Motherboard: Allwinner sun6i (A31) Family Banana Pi BPI-M2, Memory: 1024MB, Disk: 8GB SD

OS: Debian 8.1, Kernel: 4.2.0-BPI-kernel+ (armv7l), Compiler: GCC 4.9.2, File-System: ext4, Screen Resolution: 1920x1080

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,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=arm-linux-gnueabihf --target=arm-linux-gnueabihf --with-arch-directory=arm --with-arch=armv7-a --with-float=hard --with-fpu=vfpv3-d16 --with-mode=thumb -v
Processor Notes: Scaling Governor: cpufreq-dt ondemand

ODROID C1 Plus

Processor: ARMv7 rev 1 @ 1.54GHz (4 Cores), Motherboard: ODROIDC, Memory: 836MB, Disk: 8GB SD

OS: Ubuntu 14.04, Kernel: 3.10.80-135 (armv7l), Desktop: LXDE 0.6.1, Display Server: X Server 1.15.1, OpenGL: 2.1 Mesa 10.1.3, Compiler: GCC 4.9.3, File-System: ext4, Screen Resolution: 1920x1080

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

Orange Pi PC

Processor: ARMv7 rev 5 @ 1.20GHz (4 Cores), Motherboard: sun8i, Memory: 1024MB, Disk: 16GB SL16G

OS: Raspbian GNU/Linux 7, Kernel: 3.4.39 (armv7l), Desktop: LXDE 0.7.1, Display Server: X Server 1.12.4, Compiler: GCC 4.6.3, File-System: ext4, Screen Resolution: 1280x720

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

Orange Pi Plus

Processor: ARMv7 rev 5 @ 1.20GHz (3 Cores), Motherboard: sun8i, Memory: 1024MB, Disk: 16GB SL16G

OS: Raspbian GNU/Linux 7, Kernel: 3.4.39 (armv7l), Desktop: LXDE 0.7.1, Display Server: X Server 1.12.4, Compiler: GCC 4.6.3, File-System: ext4, Screen Resolution: 1280x720

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

Jetson TK1

Processor: ARMv7 rev 3 @ 2.32GHz (4 Cores), Motherboard: jetson-tk1, Memory: 2048MB, Disk: 16GB SEM16G, Graphics: GK20A/NullRM/AXI, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 14.04, Kernel: 3.10.40-gdacac96 (armv7l), Desktop: Unity 7.2.2, Display Server: X Server 1.15.1, Display Driver: NVIDIA 21.4, OpenGL: 4.3.0, Compiler: GCC 4.8.4 + CUDA 6.5, File-System: ext4, Screen Resolution: 1920x1080

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

Jetson TX1

Processor: Cortex A57 rev 1 @ 1.91GHz (4 Cores), Motherboard: jetson_tx1, Memory: 4096MB, Disk: 16GB 016G32, Graphics: NVIDIA Tegra X1 (nvgpu)/, Monitor: Acer G237HL

OS: Ubuntu 14.04, Kernel: 3.10.67-g3a5c467 (aarch64), Desktop: Unity 7.2.2, Display Server: X Server 1.15.1, Display Driver: NVIDIA 23.1.1, OpenGL: 4.3.0, Compiler: GCC 4.8.4 + Clang 3.4-1ubuntu3 + CUDA 7.0, File-System: ext4, Screen Resolution: 1920x1080

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

Pine64+

Processor: AArch64 rev 4 @ 1.15GHz (4 Cores), Motherboard: sun50iw1p1, Memory: 1024MB, Disk: 32GB SE32G,

Graphics: NVIDIA GeForce GT 650M

OS: Ubuntu 16.04, Kernel: 3.10.65+ (aarch64), Desktop: Xfce 4.12, Display Server: X Server 1.17.3, Display Driver: modesetting 1.17.3, OpenGL: 1.4, Compiler: GCC 5.3.1 20160225, File-System: ext4, Screen Resolution: 2560x1578

Compiler Notes: --build=aarch64-linux-gnu --disable-browser-plugin --disable-libquadmath --disable-werror --enable-checking=release --enable-clocale=gnu --enable-fix-cortex-a53-843419 --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-plugin --enable-shared --enable-threads=posix --host=aarch64-linux-gnu --target=aarch64-linux-gnu --with-arch-directory=aarch64 --with-default-libstdcxx-abi=new -v
Processor Notes: Scaling Governor: cpufreq-sunxi interactive

Pine64+ take 2

Processor: AArch64 rev 4 @ 1.15GHz (4 Cores), Motherboard: sun50iw1p1, Memory: 1024MB, Disk: 32GB SE32G, Graphics: NVIDIA GeForce GT 650M

OS: Ubuntu 16.04, Kernel: 3.10.65+ (aarch64), Display Server: X Server 1.17.3, Display Driver: modesetting 1.17.3, OpenGL: 1.4, Compiler: GCC 5.3.1 20160225, File-System: ext4, Screen Resolution: 2560x1578

Compiler Notes: --build=aarch64-linux-gnu --disable-browser-plugin --disable-libquadmath --disable-werror --enable-checking=release --enable-clocale=gnu --enable-fix-cortex-a53-843419 --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-plugin --enable-shared --enable-threads=posix --host=aarch64-linux-gnu --target=aarch64-linux-gnu --with-arch-directory=aarch64 --with-default-libstdcxx-abi=new -v
Processor Notes: Scaling Governor: cpufreq-sunxi interactive

Pine64+ take 3

Pine64+ take4

Processor: AArch64 rev 4 @ 1.15GHz (4 Cores), Motherboard: sun50iw1p1, Memory: 1024MB, Disk: 32GB SE32G, Graphics: NVIDIA GeForce GT 650M

OS: Ubuntu 16.04, Kernel: 3.10.65+ (aarch64), Display Server: X Server 1.17.3, Display Driver: modesetting 1.17.3, OpenGL: 1.4, Compiler: GCC 5.3.1 20160225, File-System: ext4, Screen Resolution: 1440x878

Compiler Notes: --build=aarch64-linux-gnu --disable-browser-plugin --disable-libquadmath --disable-werror --enable-checking=release --enable-clocale=gnu --enable-fix-cortex-a53-843419 --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-plugin --enable-shared --enable-threads=posix --host=aarch64-linux-gnu --target=aarch64-linux-gnu --with-arch-directory=aarch64 --with-default-libstdcxx-abi=new -v
Processor Notes: Scaling Governor: cpufreq-sunxi interactive

Pine64+ ARMv8

Processor: AArch64 rev 4 @ 1.34GHz (4 Cores), Motherboard: sun50iw1p1, Memory: 1024MB, Disk: 16GB SD16G

OS: Ubuntu 16.04, Kernel: 3.10.65-2-pine64-longsleep (aarch64), Compiler: GCC 5.3.1 20160225, File-System: ext4, Screen Resolution: 1920x2160

Compiler Notes: --build=aarch64-linux-gnu --disable-browser-plugin --disable-libquadmath --disable-werror --enable-checking=release --enable-clocale=gnu --enable-fix-cortex-a53-843419 --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-plugin --enable-shared --enable-threads=posix --host=aarch64-linux-gnu --target=aarch64-linux-gnu --with-arch-directory=aarch64 --with-default-libstdcxx-abi=new -v
Processor Notes: Scaling Governor: cpufreq-sunxi performance

Orange Pi PC Armbian

Processor: ARMv7 rev 5 @ 1.30GHz (4 Cores), Motherboard: sun8i, Memory: 1024MB, Disk: 8GB SU08G

OS: Debian 8.3, Kernel: 3.4.110-sun8i (armv7l), Compiler: GCC 4.9.2, File-System: ext4, Screen Resolution: 1920x2160

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,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=arm-linux-gnueabihf --target=arm-linux-gnueabihf --with-arch-directory=arm --with-arch=armv7-a --with-float=hard --with-fpu=vfpv3-d16 --with-mode=thumb -v
Processor Notes: Scaling Governor: cpufreq-sunxi performance

Pine64+ ARMv8 -O3

Processor: AArch64 rev 4 @ 1.34GHz (4 Cores), Motherboard: sun50iw1p1, Memory: 1024MB, Disk: 16GB SD16G

OS: Ubuntu 16.04, Kernel: 3.10.65-2-pine64-longsleep (aarch64), Compiler: GCC 5.3.1 20160225, File-System: ext4, Screen Resolution: 1920x2160

Compiler Notes: --build=aarch64-linux-gnu --disable-browser-plugin --disable-libquadmath --disable-werror --enable-checking=release --enable-clocale=gnu --enable-fix-cortex-a53-843419 --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-plugin --enable-shared --enable-threads=posix --host=aarch64-linux-gnu --target=aarch64-linux-gnu --with-arch-directory=aarch64 --with-default-libstdcxx-abi=new -v
Processor Notes: Scaling Governor: cpufreq-sunxi performance

Pine64+ in enclosure

Processor: AArch64 rev 4 @ 1.10GHz (4 Cores), Motherboard: sun50iw1p1, Memory: 1024MB, Disk: 16GB SD16G

OS: Ubuntu 16.04, Kernel: 3.10.65-2-pine64-longsleep (aarch64), Compiler: GCC 5.3.1 20160225, File-System: ext4, Screen Resolution: 1920x2160

Compiler Notes: --build=aarch64-linux-gnu --disable-browser-plugin --disable-libquadmath --disable-werror --enable-checking=release --enable-clocale=gnu --enable-fix-cortex-a53-843419 --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-plugin --enable-shared --enable-threads=posix --host=aarch64-linux-gnu --target=aarch64-linux-gnu --with-arch-directory=aarch64 --with-default-libstdcxx-abi=new -v
Processor Notes: Scaling Governor: cpufreq-sunxi interactive

Pine64+ enclosure+heatsink

Pine64+ encl/heatsink/cpufreq

Processor: AArch64 rev 4 @ 1.15GHz (4 Cores), Motherboard: sun50iw1p1, Memory: 1024MB, Disk: 16GB SD16G

OS: Ubuntu 16.04, Kernel: 3.10.65-2-pine64-longsleep (aarch64), Compiler: GCC 5.3.1 20160225, File-System: ext4, Screen Resolution: 1920x2160

Compiler Notes: --build=aarch64-linux-gnu --disable-browser-plugin --disable-libquadmath --disable-werror --enable-checking=release --enable-clocale=gnu --enable-fix-cortex-a53-843419 --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-plugin --enable-shared --enable-threads=posix --host=aarch64-linux-gnu --target=aarch64-linux-gnu --with-arch-directory=aarch64 --with-default-libstdcxx-abi=new -v
Processor Notes: Scaling Governor: cpufreq-sunxi interactive

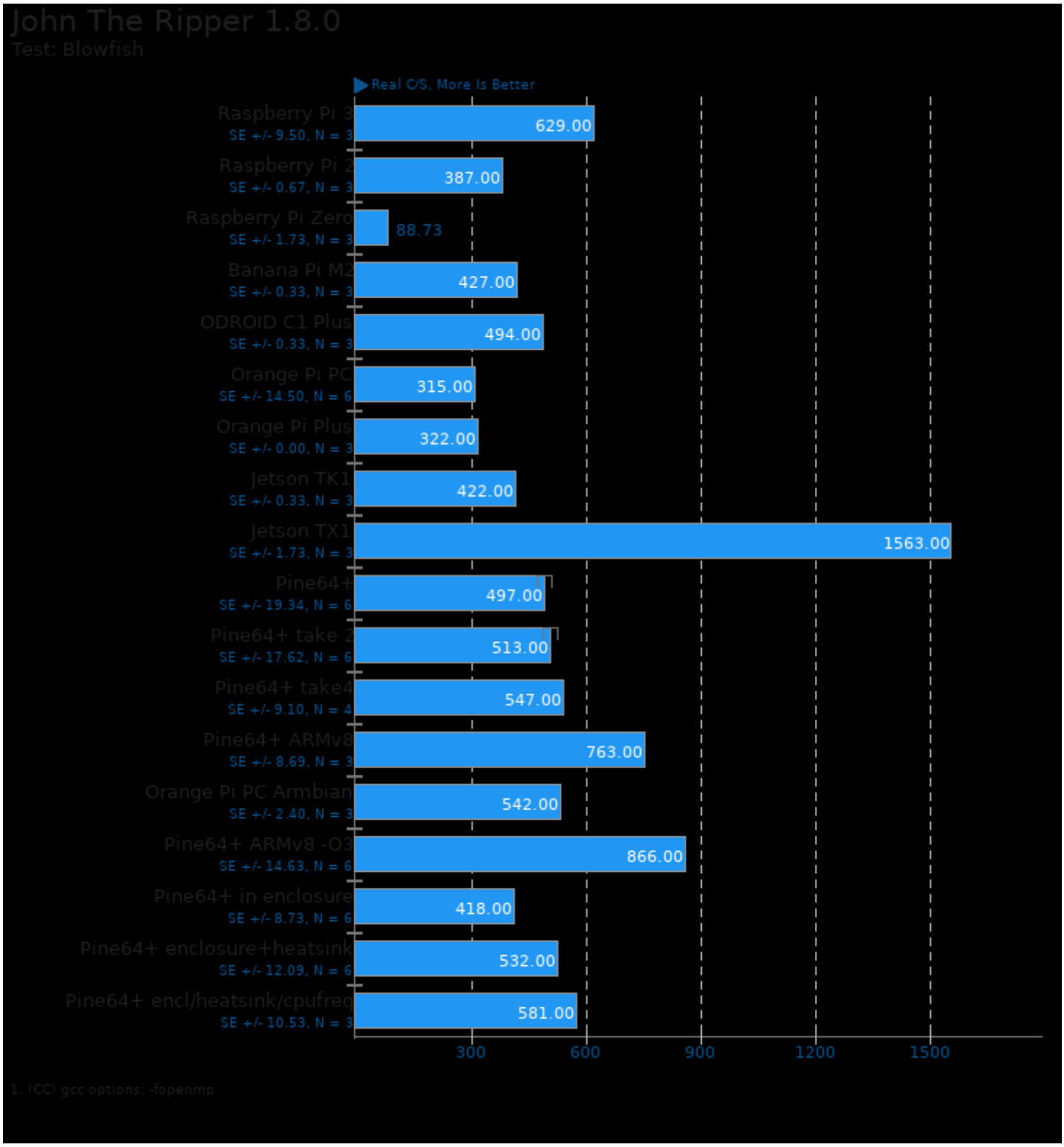
Raspberry Pi 3 Linux Benchmark Comparison

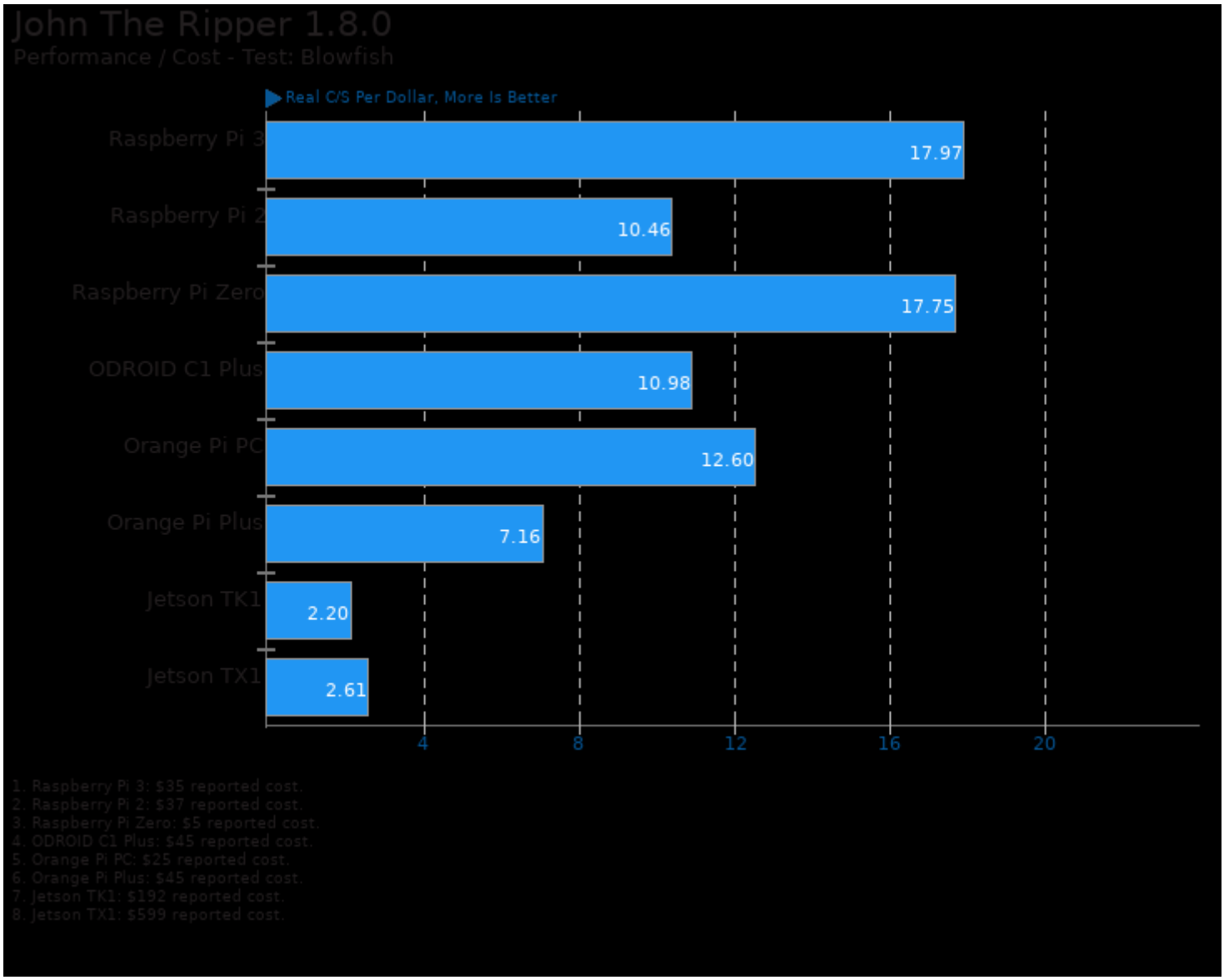
	Raspberry Pi 3	Raspberry Pi 2	Raspberry Pi Zero	Banana Pi M2	ODROID C1 Plus	Orange Pi PC	Orange Pi Plus	Jetson TK1	Jetson TX1	Pine64+	Pine64+ take 2	Pine64+ take 3	Pine64+ take 4	Pine64+ AR Mv8	Orange Pi PC Armbian	Pine64+ AR Mv8 -O3	Pine64+ in enclosure	Pine64+ enclosure+heatsink	Pine64+ encl/heatsink/cpufre
John The Ripper - Blowfish (Real C/S)	629	387	**88.73**	427	494	315	322	422	**1563**	497	513		547	763	542	866	418	532	581
Normalized	40.24%	24.76%	5.68%	27.32%	31.61%	20.15%	20.6%	27%	100%	31.8%	32.82%		35%	48.82%	34.68%	55.41%	26.74%	34.04%	37.17%
Standard Deviation	2.6%	0.3%	3.4%	0.1%	0.1%	11.3%	0%	0.1%	0.2%	9.5%	8.4%		3.3%	2%	0.8%	4.1%	5.1%	5.6%	3.1%
John The Ripper - Performance / Cost - Blowfish (Real C/S/Dollar	**17.97**	10.46	17.75		10.98	12.60	7.16	**2.20**	2.61										
Normalized	100%	58.21%	98.78%		61.1%	70.12%	39.84%	12.24%	14.52%										
C-Ray - Total Time (sec)	247.37	505.44	**3038**	436.18	323.08	951.10	1425	95.01	**85.30**	290.58	289.96		281.87	210.23	346.72	208.71	354.50	303.39	283.69
Normalized	34.48%	16.88%	2.81%	19.56%	26.4%	8.97%	5.99%	89.78%	100%	29.36%	29.42%		30.26%	40.57%	24.6%	40.87%	24.06%	28.12%	30.07%
Standard Deviation	0.4%	0.3%	0.9%	0.2%	0.9%	0.9%	2%	13.4%	3.5%	0.9%	0.3%		0.7%	1.3%	1%	0.2%	0.2%	1.4%	1.6%
Smallpt - G.I.R.1.S (sec)	1388	2175	**12029**	1984	1590	1982	3042	2888	613		1489		1470	1045	1550	**2150**	1920	1574	1488
Normalized	15.49%	9.89%	1.79%	10.84%	13.52%	10.85%	7.07%	7.44%	35.07%		14.44%		14.63%	20.57%	13.87%	100%	11.2%	13.66%	14.45%
Standard Deviation	0.4%	0.5%	0.5%	0.1%	0.2%	0.1%	0.1%	0.1%	0.1%		0.8%		0.5%	0.1%	0%	0.8%	3%	0.6%	0.8%
Timed MAFFT Alignment - M.S.A (sec)	53.62	75.46	**501.11**	71.58	51.54	77.16	103.05	**15.10**	16.56		57.61		57.91	42.03	63.58	43.74	80.65	60.82	62.18
Normalized	28.16%	20.01%	3.01%	21.17%	29.3%	19.57%	14.65%	100%	91.18%		26.21%		26.07%	35.93%	23.75%	34.52%	18.72%	24.83%	24.28%
Standard Deviation	3.3%	2.3%	1.8%		0.8%	0.9%	5.5%	5.6%	0.7%		1.5%		6.5%	3.4%	0.2%	3.1%	4%	7.2%	1.8%

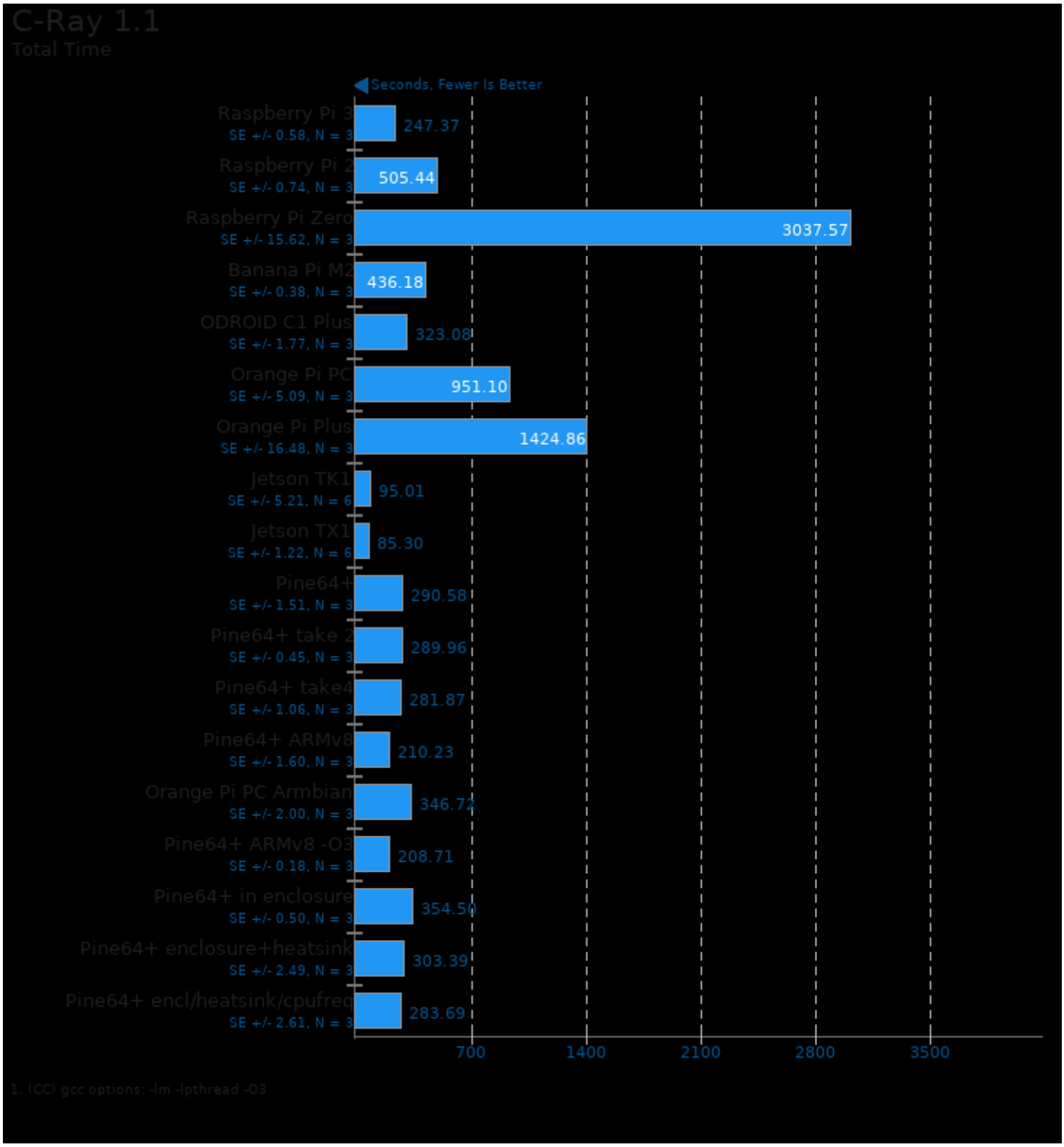
Raspberry Pi 3 Linux Benchmark Comparison

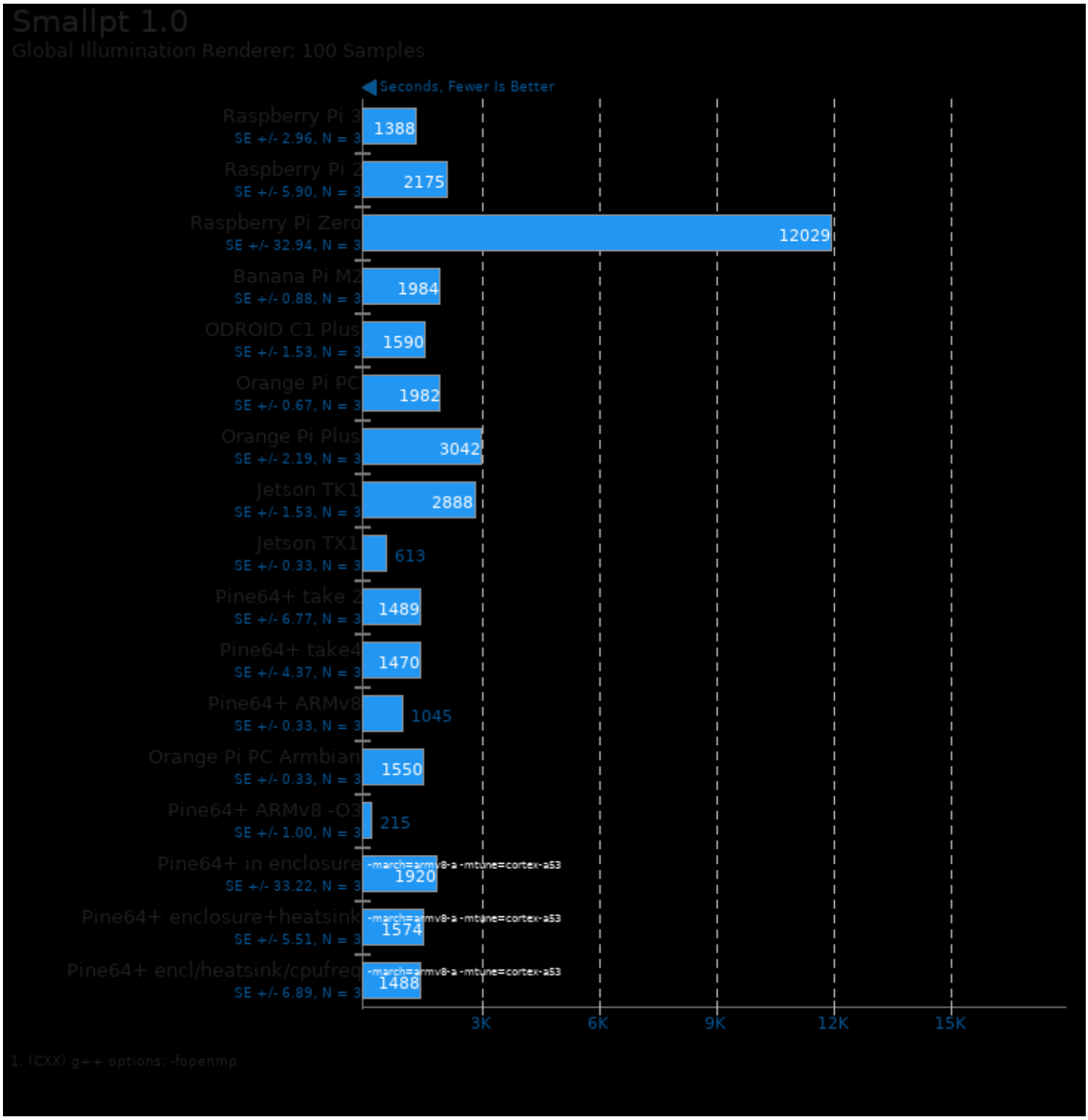
Himeno Benchmark - P.P.S (MFLOPS)	62.54	33.29	**10.00**	60.08	81.97	59.24	64.38	**141.30**	83.40	58.94	62.62	72.00	66.29	66.37	60.16	62.42	64.44
Normalized	44.26%	23.56%	7.08%	42.52%	58.01%	41.92%	45.56%	100%	59.02%	41.71%	44.32%	50.96%	46.91%	46.97%	42.58%	44.18%	45.61%
Standard Deviation	5.9%	2.4%	1.2%	2.3%	3%	1.2%	0.1%	1.8%	1.8%	3.5%	2.4%	3.5%	1.2%	2%	0.7%	0.9%	0.8%
Himeno Benchmark - Performance / Cost - P.P.S (MFLOPS/Dollar)	1.79	0.90	2.00		1.82	**2.37**	1.43	0.74	**0.14**								
Normalized	75.53%	37.97%	84.39%		76.79%	100%	60.34%	31.22%	5.91%								
OpenSSL - R.4.b.P (Signs/sec	20.25	11.93	**2.60**	13.40	18.80	11.93	7.83	**54.40**	24.67	13.83	13.97	18.47	17.17	18.50	9.40	12.70	13.50
Normalized	37.22%	21.93%	4.78%	24.63%	34.56%	21.93%	14.39%	100%	45.35%	25.42%	25.68%	33.95%	31.56%	34.01%	17.28%	23.35%	24.82%
Standard Deviation	8.6%	0.5%	0%	0%	0%	0.5%	0.7%	0.2%	0.2%	2.2%	1.5%	0.3%	0.3%	0%	12.9%	4.5%	2.2%
OpenSSL - Performance / Cost - R.4.b.P (Signs/sec	**0.58**	0.32	0.52		0.42	0.48	0.17	0.28	**0.04**								
Normalized	100%	55.17%	89.66%		72.41%	82.76%	29.31%	48.28%	6.9%								
FLAC Audio Encoding - WAV To FLAC (sec)	228.37	314.58	**606.76**	269.63	200.50	261.83	257.87	50.29	**47.64**	215.92	215.24	177.58	223.11	177.35	234.33	217.02	216.50
Normalized	20.86%	15.14%	7.85%	17.67%	23.76%	18.2%	18.47%	94.73%	100%	22.06%	22.13%	26.83%	21.35%	26.86%	20.33%	21.95%	22%
Standard Deviation	0.3%	0.9%	1.5%	0.1%	2.7%	2.2%	1.1%	0.1%	0.2%	0.3%	0.3%	0.2%	0.6%	0.2%	0.7%	1.1%	0.7%

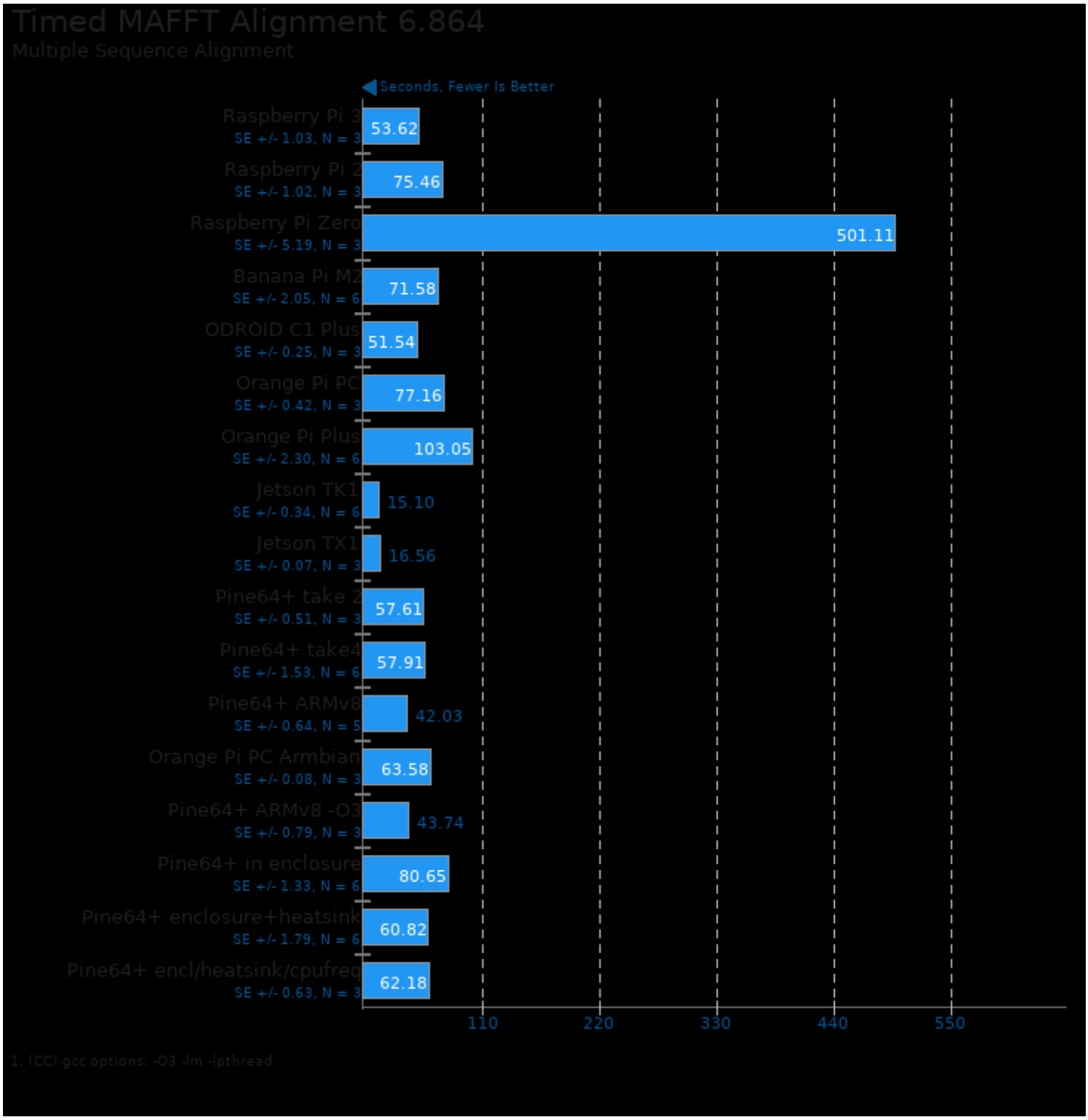
Meta Performance Per Dollar - P.P.D (Performance/Dollar	6.78	3.58	**8.08**	4.07	5.07	2.92	1.03	**0.79**
Normalized	83.91 %	44.31 %	100%	50.37 %	62.75 %	36.14 %	12.75 %	9.78 %

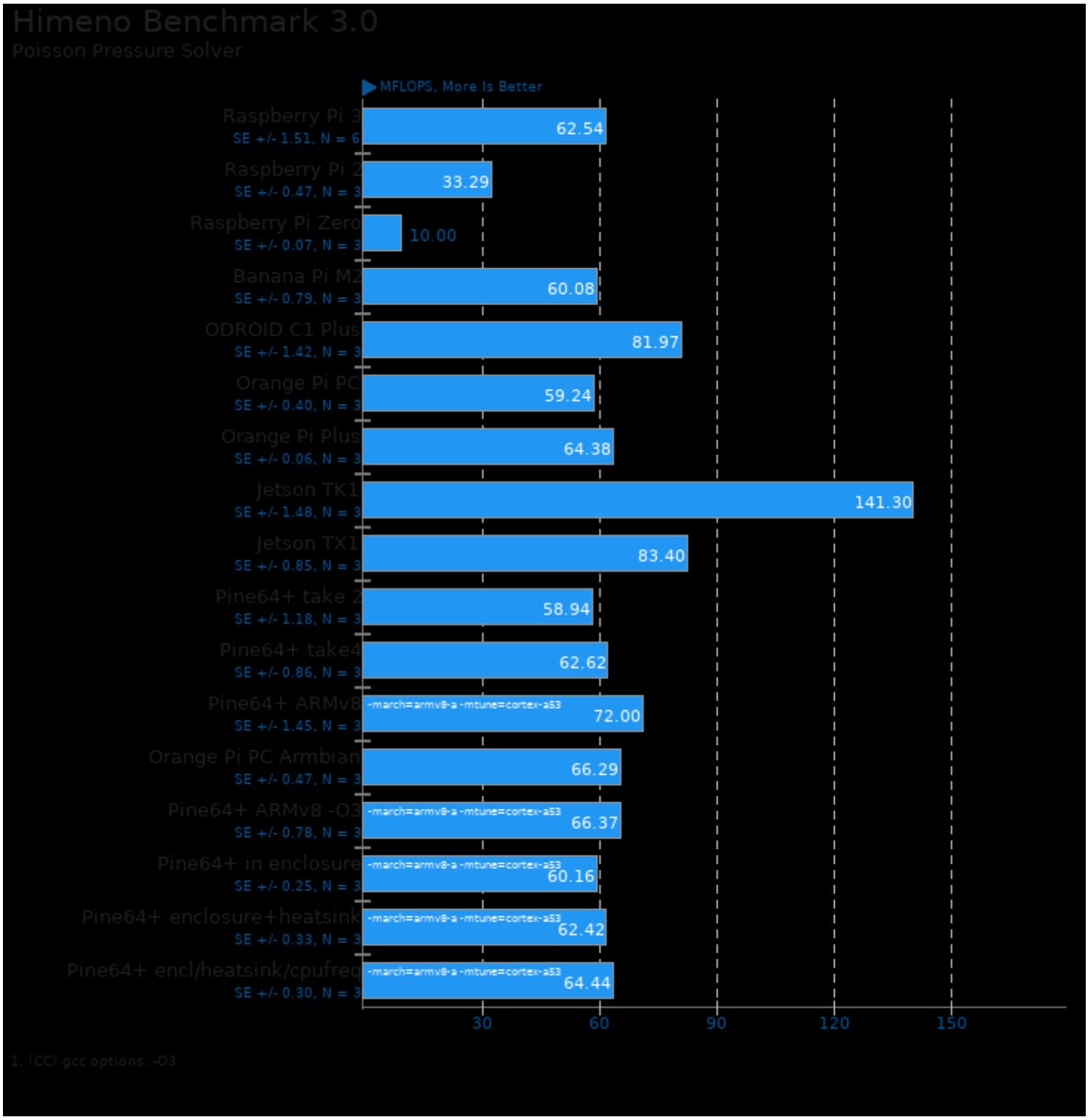

John The Ripper 1.8.0
Test: Blowfish
Real C/S, More Is Better
Raspberry Pi 3
SE +/- 9.50, N = 3
629.00
Raspberry Pi 2
SE +/- 0.67, N = 3
387.00
Raspberry Pi Zero
SE +/- 1.73, N = 3
88.73
Banana Pi M2
SE +/- 0.33, N = 3
427.00
ODROID C1 Plus
SE +/- 0.33, N = 3
494.00
Orange Pi PC
SE +/- 14.50, N = 6
315.00
Orange Pi Plus
SE +/- 0.00, N = 3
322.00
Jetson TK1
SE +/- 0.33, N = 3
422.00
Jetson TX1
SE +/- 1.73, N = 3
1563.00
Pine64+
SE +/- 19.34, N = 6
497.00
Pine64+ take 2
SE +/- 17.62, N = 6
513.00
Pine64+ take4
SE +/- 9.10, N = 4
547.00
Pine64+ ARMv8
SE +/- 8.69, N = 3
763.00
Orange Pi PC Armbian
SE +/- 2.40, N = 3
542.00
Pine64+ ARMv8 -O3
SE +/- 14.63, N = 6
866.00
Pine64+ in enclosure
SE +/- 8.73, N = 6
418.00
Pine64+ enclosure+heatsink
SE +/- 12.09, N = 6
532.00
Pine64+ encl/heatsink/cpufreq
SE +/- 10.53, N = 3
581.00
300
600
900
1200
1500
1. (CC) gcc options: -fopenmp

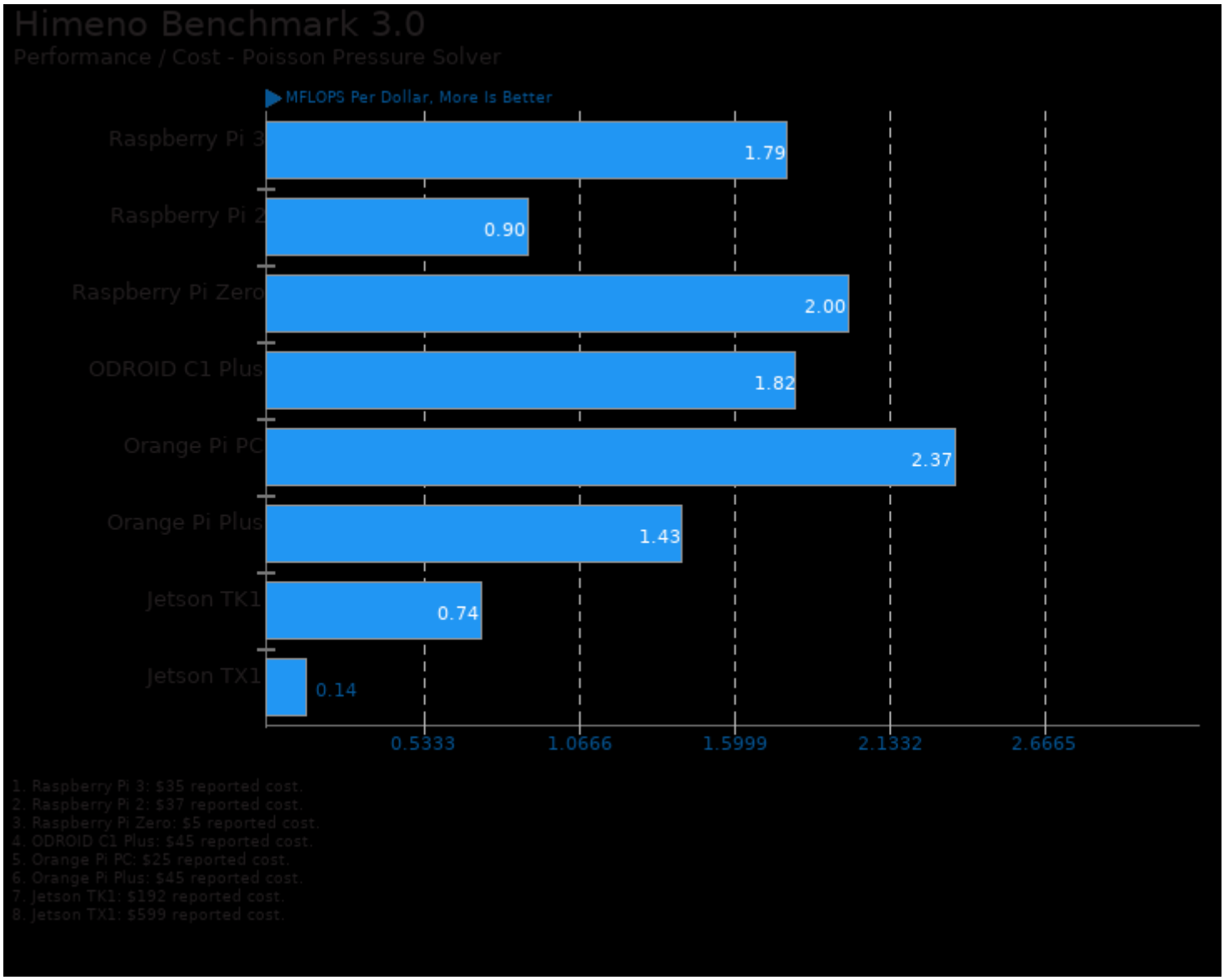

John The Ripper 1.8.0
Performance / Cost - Test: Blowfish
Real C/S Per Dollar, More Is Better
Raspberry Pi 3
17.97
Raspberry Pi 2
10.46
Raspberry Pi Zero
17.75
ODROID C1 Plus
10.98
Orange Pi PC
12.60
Orange Pi Plus
7.16
Jetson TK1
2.20
Jetson TX1
2.61
4
8
12
16
20
1. Raspberry Pi 3: $35 reported cost.
2. Raspberry Pi 2: $37 reported cost.
3. Raspberry Pi Zero: $5 reported cost.
4. ODROID C1 Plus: $45 reported cost.
5. Orange Pi PC: $25 reported cost.
6. Orange Pi Plus: $45 reported cost.
7. Jetson TK1: $192 reported cost.
8. Jetson TX1: $599 reported cost.

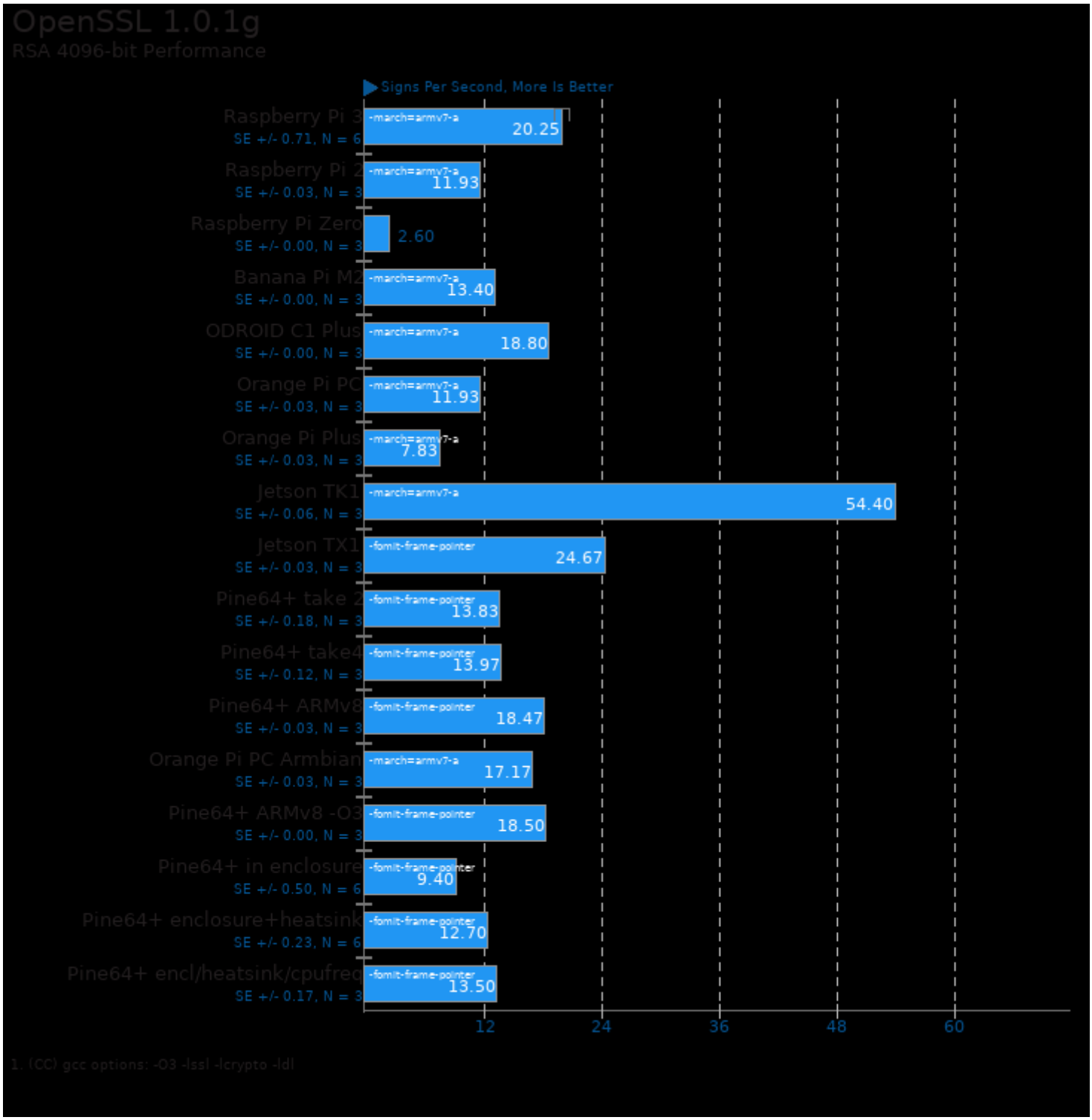

C-Ray 1.1
Total Time
Seconds, Fewer Is Better
Raspberry Pi 3
SE +/- 0.58, N = 3
247.37
Raspberry Pi 2
SE +/- 0.74, N = 3
505.44
Raspberry Pi Zero
SE +/- 15.62, N = 3
3037.57
Banana Pi M2
SE +/- 0.38, N = 3
436.18
ODROID C1 Plus
SE +/- 1.77, N = 3
323.08
Orange Pi PC
SE +/- 5.09, N = 3
951.10
Orange Pi Plus
SE +/- 16.48, N = 3
1424.86
Jetson TK1
SE +/- 5.21, N = 6
95.01
Jetson TX1
SE +/- 1.22, N = 6
85.30
Pine64+
SE +/- 1.51, N = 3
290.58
Pine64+ take 2
SE +/- 0.45, N = 3
289.96
Pine64+ take4
SE +/- 1.06, N = 3
281.87
Pine64+ ARMv8
SE +/- 1.60, N = 3
210.23
Orange Pi PC Armbian
SE +/- 2.00, N = 3
346.72
Pine64+ ARMv8 -O3
SE +/- 0.18, N = 3
208.71
Pine64+ in enclosure
SE +/- 0.50, N = 3
354.50
Pine64+ enclosure+heatsink
SE +/- 2.49, N = 3
303.39
Pine64+ encl/heatsink/cpufreq
SE +/- 2.61, N = 3
283.69
700
1400
2100
2800
3500
1. (CC) gcc options: -lm -lpthread -O3

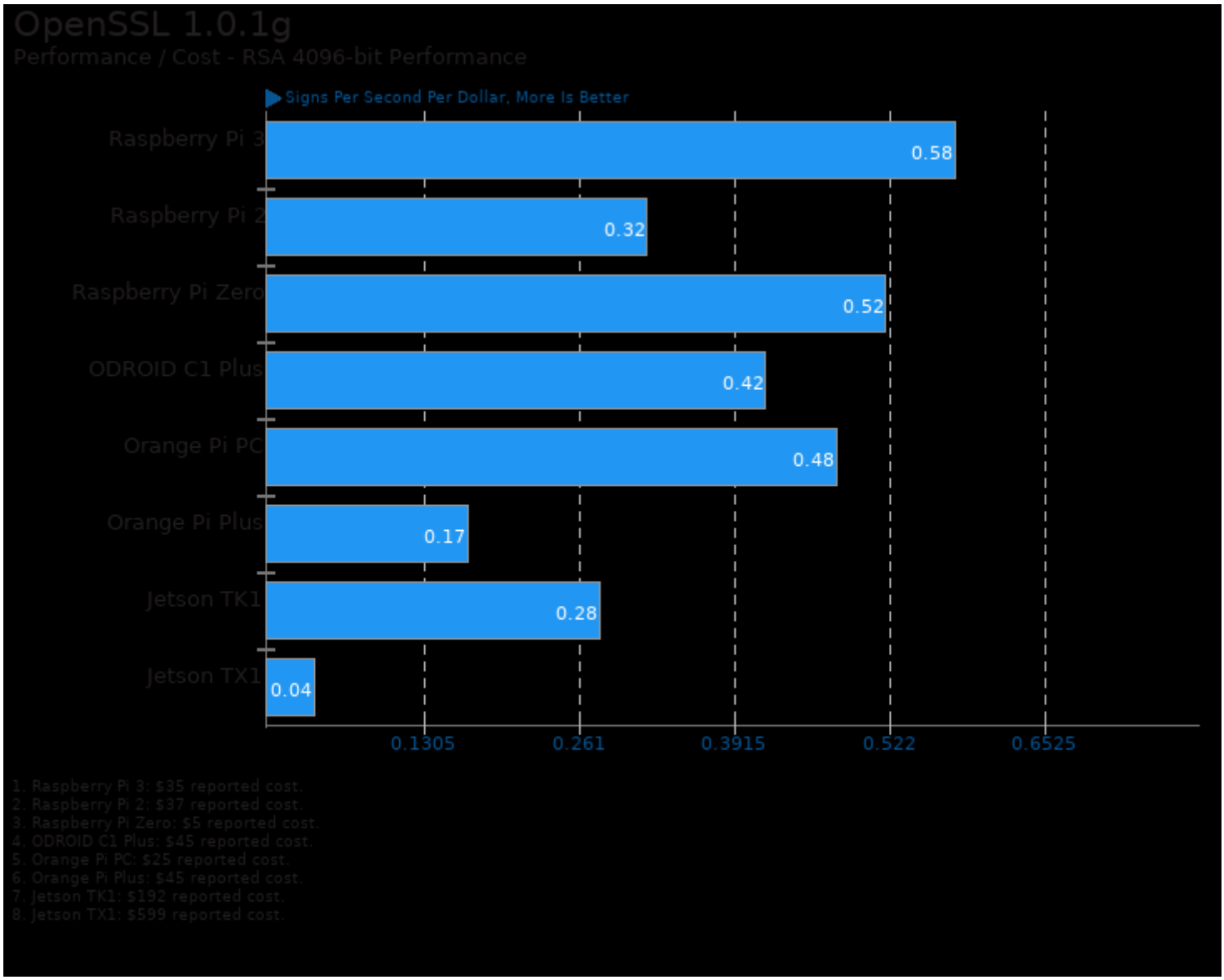

Smallpt 1.0
Global Illumination Renderer; 100 Samples
Seconds, Fewer Is Better
Raspberry Pi 3
SE +/- 2.96, N = 3
1388
Raspberry Pi 2
SE +/- 5.90, N = 3
2175
Raspberry Pi Zero
SE +/- 32.94, N = 3
12029
Banana Pi M2
SE +/- 0.88, N = 3
1984
ODROID C1 Plus
SE +/- 1.53, N = 3
1590
Orange Pi PC
SE +/- 0.67, N = 3
1982
Orange Pi Plus
SE +/- 2.19, N = 3
3042
Jetson TK1
SE +/- 1.53, N = 3
2888
Jetson TX1
SE +/- 0.33, N = 3
613
Pine64+ take 2
SE +/- 6.77, N = 3
1489
Pine64+ take4
SE +/- 4.37, N = 3
1470
Pine64+ ARMv8
SE +/- 0.33, N = 3
1045
Orange Pi PC Armbian
SE +/- 0.33, N = 3
1550
Pine64+ ARMv8 -O3
SE +/- 1.00, N = 3
215
Pine64+ in enclosure
SE +/- 33.22, N = 3
-march=armv8-a -mtune=cortex-a53
1920
Pine64+ enclosure+heatsink
SE +/- 5.51, N = 3
-march=armv8-a -mtune=cortex-a53
1574
Pine64+ encl/heatsink/cpufreq
SE +/- 6.89, N = 3
-march=armv8-a -mtune=cortex-a53
1488
3K
6K
9K
12K
15K
1. (CXX) g++ options: -fopenmp

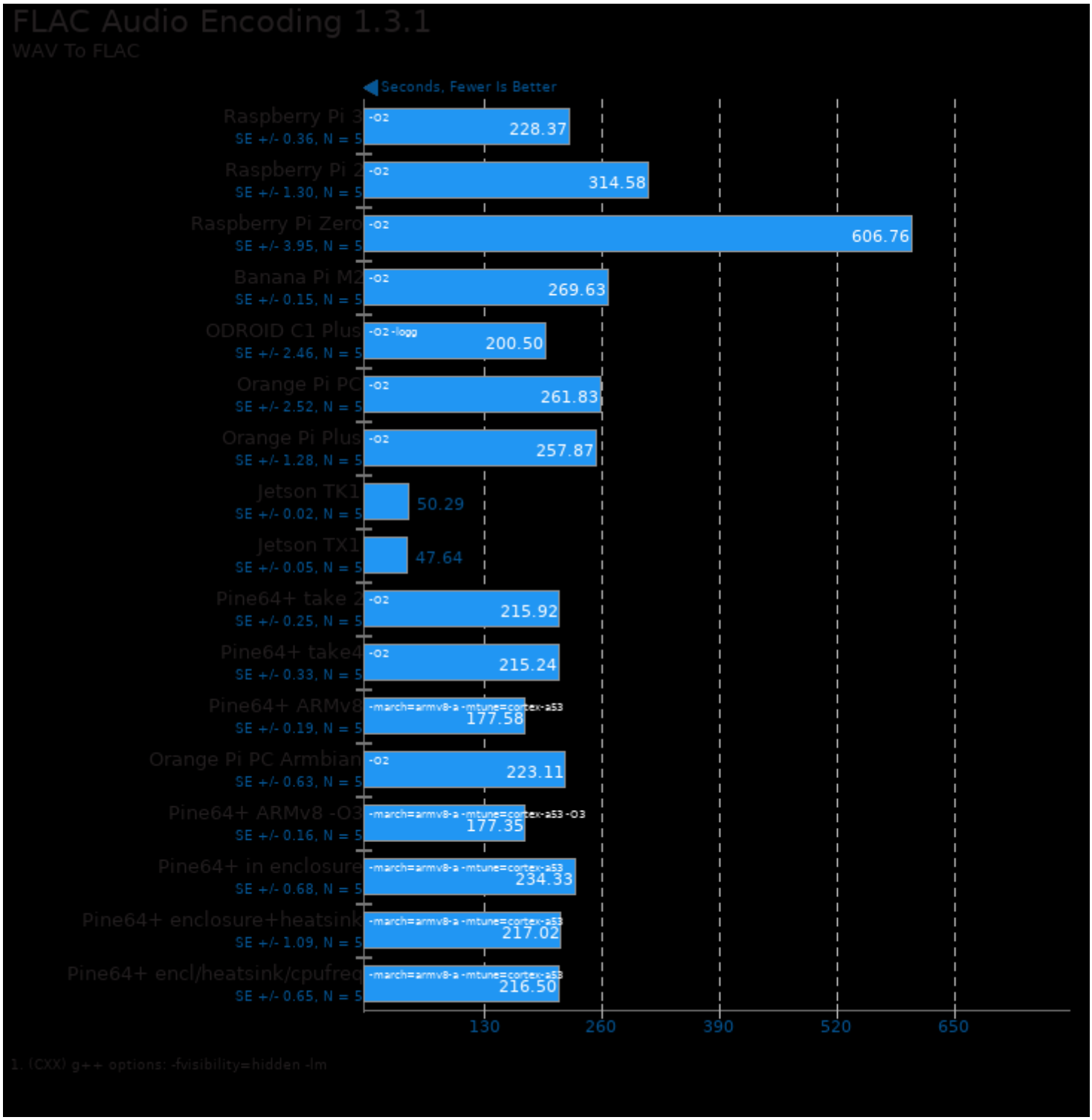

Timed MAFFT Alignment 6.864
Multiple Sequence Alignment
Seconds, Fewer Is Better
Raspberry Pi 3
SE +/- 1.03, N = 3
53.62
Raspberry Pi 2
SE +/- 1.02, N = 3
75.46
Raspberry Pi Zero
SE +/- 5.19, N = 3
501.11
Banana Pi M2
SE +/- 2.05, N = 6
71.58
ODROID C1 Plus
SE +/- 0.25, N = 3
51.54
Orange Pi PC
SE +/- 0.42, N = 3
77.16
Orange Pi Plus
SE +/- 2.30, N = 6
103.05
Jetson TK1
SE +/- 0.34, N = 6
15.10
Jetson TX1
SE +/- 0.07, N = 3
16.56
Pine64+ take 2
SE +/- 0.51, N = 3
57.61
Pine64+ take4
SE +/- 1.53, N = 6
57.91
Pine64+ ARMv8
SE +/- 0.64, N = 5
42.03
Orange Pi PC Armbian
SE +/- 0.08, N = 3
63.58
Pine64+ ARMv8 -O3
SE +/- 0.79, N = 3
43.74
Pine64+ in enclosure
SE +/- 1.33, N = 6
80.65
Pine64+ enclosure+heatsink
SE +/- 1.79, N = 6
60.82
Pine64+ encl/heatsink/cpufreq
SE +/- 0.63, N = 3
62.18
110
220
330
440
550
1. (CC) gcc options: -O3 -lm -lpthread

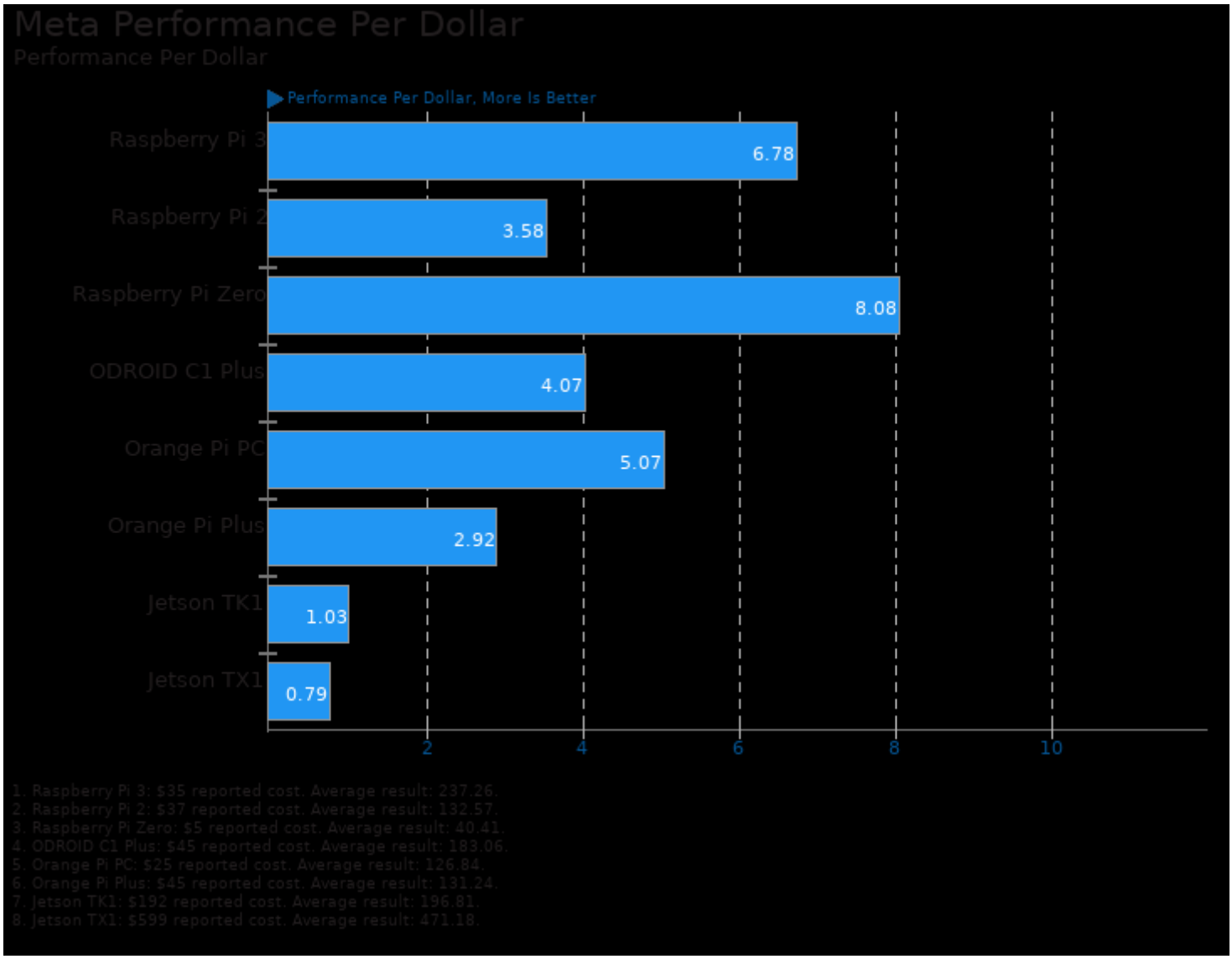

Himeno Benchmark 3.0
Poisson Pressure Solver
MFLOPS, More Is Better
Raspberry Pi 3
SE +/- 1.51, N = 6
62.54
Raspberry Pi 2
SE +/- 0.47, N = 3
33.29
Raspberry Pi Zero
SE +/- 0.07, N = 3
10.00
Banana Pi M2
SE +/- 0.79, N = 3
60.08
ODROID C1 Plus
SE +/- 1.42, N = 3
81.97
Orange Pi PC
SE +/- 0.40, N = 3
59.24
Orange Pi Plus
SE +/- 0.06, N = 3
64.38
Jetson TK1
SE +/- 1.48, N = 3
141.30
Jetson TX1
SE +/- 0.85, N = 3
83.40
Pine64+ take 2
SE +/- 1.18, N = 3
58.94
Pine64+ take4
SE +/- 0.86, N = 3
62.62
Pine64+ ARMv8
SE +/- 1.45, N = 3
-march=armv8-a -mtune=cortex-a53
72.00
Orange Pi PC Armbian
SE +/- 0.47, N = 3
66.29
Pine64+ ARMv8 -O3
SE +/- 0.78, N = 3
-march=armv8-a -mtune=cortex-a53
66.37
Pine64+ in enclosure
SE +/- 0.25, N = 3
-march=armv8-a -mtune=cortex-a53
60.16
Pine64+ enclosure+heatsink
SE +/- 0.33, N = 3
-march=armv8-a -mtune=cortex-a53
62.42
Pine64+ encl/heatsink/cpufreq
SE +/- 0.30, N = 3
-march=armv8-a -mtune=cortex-a53
64.44
30
60
90
120
150
1. (CC) gcc options: -O3


Himeno Benchmark 3.0
Performance / Cost - Poisson Pressure Solver
MFLOPS Per Dollar, More Is Better
Raspberry Pi 3
1.79
Raspberry Pi 2
0.90
Raspberry Pi Zero
2.00
ODROID C1 Plus
1.82
Orange Pi PC
2.37
Orange Pi Plus
1.43
Jetson TK1
0.74
Jetson TX1
0.14
0.5333
1.0666
1.5999
2.1332
2.6665
1. Raspberry Pi 3: $35 reported cost.
2. Raspberry Pi 2: $37 reported cost.
3. Raspberry Pi Zero: $5 reported cost.
4. ODROID C1 Plus: $45 reported cost.
5. Orange Pi PC: $25 reported cost.
6. Orange Pi Plus: $45 reported cost.
7. Jetson TK1: $192 reported cost.
8. Jetson TX1: $599 reported cost.


OpenSSL 1.0.1g
RSA 4096-bit Performance
Signs Per Second, More Is Better
Raspberry Pi 3
SE +/- 0.71, N = 6
-march=armv7-a
20.25
Raspberry Pi 2
SE +/- 0.03, N = 3
-march=armv7-a
11.93
Raspberry Pi Zero
SE +/- 0.00, N = 3
2.60
Banana Pi M2
SE +/- 0.00, N = 3
-march=armv7-a
13.40
ODROID C1 Plus
SE +/- 0.00, N = 3
-march=armv7-a
18.80
Orange Pi PC
SE +/- 0.03, N = 3
-march=armv7-a
11.93
Orange Pi Plus
SE +/- 0.03, N = 3
-march=armv7-a
7.83
Jetson TK1
SE +/- 0.06, N = 3
-march=armv7-a
54.40
Jetson TX1
SE +/- 0.03, N = 3
-fomit-frame-pointer
24.67
Pine64+ take 2
SE +/- 0.18, N = 3
-fomit-frame-pointer
13.83
Pine64+ take4
SE +/- 0.12, N = 3
-fomit-frame-pointer
13.97
Pine64+ ARMv8
SE +/- 0.03, N = 3
-fomit-frame-pointer
18.47
Orange Pi PC Armbian
SE +/- 0.03, N = 3
-march=armv7-a
17.17
Pine64+ ARMv8 -O3
SE +/- 0.00, N = 3
-fomit-frame-pointer
18.50
Pine64+ in enclosure
SE +/- 0.50, N = 6
-fomit-frame-pointer
9.40
Pine64+ enclosure+heatsink
SE +/- 0.23, N = 6
-fomit-frame-pointer
12.70
Pine64+ encl/heatsink/cpufreq
SE +/- 0.17, N = 3
-fomit-frame-pointer
13.50
12
24
36
48
60
1. (CC) gcc options: -O3 -lssl -lcrypto -ldl


OpenSSL 1.0.1g
Performance / Cost - RSA 4096-bit Performance
Signs Per Second Per Dollar, More Is Better
Raspberry Pi 3
Raspberry Pi 2
Raspberry Pi Zero
ODROID C1 Plus
Orange Pi PC
Orange Pi Plus
Jetson TK1
Jetson TX1
0.58
0.32
0.52
0.42
0.48
0.17
0.28
0.04
0.1305
0.261
0.3915
0.522
0.6525
1. Raspberry Pi 3: $35 reported cost.
2. Raspberry Pi 2: $37 reported cost.
3. Raspberry Pi Zero: $5 reported cost.
4. ODROID C1 Plus: $45 reported cost.
5. Orange Pi PC: $25 reported cost.
6. Orange Pi Plus: $45 reported cost.
7. Jetson TK1: $192 reported cost.
8. Jetson TX1: $599 reported cost.


FLAC Audio Encoding 1.3.1
WAV To FLAC
Seconds, Fewer Is Better
Raspberry Pi 3
SE +/- 0.36, N = 5
-O2
228.37
Raspberry Pi 2
SE +/- 1.30, N = 5
-O2
314.58
Raspberry Pi Zero
SE +/- 3.95, N = 5
-O2
606.76
Banana Pi M2
SE +/- 0.15, N = 5
-O2
269.63
ODROID C1 Plus
SE +/- 2.46, N = 5
-O2 -logg
200.50
Orange Pi PC
SE +/- 2.52, N = 5
-O2
261.83
Orange Pi Plus
SE +/- 1.28, N = 5
-O2
257.87
Jetson TK1
SE +/- 0.02, N = 5
50.29
Jetson TX1
SE +/- 0.05, N = 5
47.64
Pine64+ take 2
SE +/- 0.25, N = 5
-O2
215.92
Pine64+ take4
SE +/- 0.33, N = 5
-O2
215.24
Pine64+ ARMv8
SE +/- 0.19, N = 5
-march=armv8-a -mtune=cortex-a53
177.58
Orange Pi PC Armbian
SE +/- 0.63, N = 5
-O2
223.11
Pine64+ ARMv8 -O3
SE +/- 0.16, N = 5
-march=armv8-a -mtune=cortex-a53 -O3
177.35
Pine64+ in enclosure
SE +/- 0.68, N = 5
-march=armv8-a -mtune=cortex-a53
234.33
Pine64+ enclosure+heatsink
SE +/- 1.09, N = 5
-march=armv8-a -mtune=cortex-a53
217.02
Pine64+ encl/heatsink/cpufreq
SE +/- 0.65, N = 5
-march=armv8-a -mtune=cortex-a53
216.50
130
260
390
520
650
1. (CXX) g++ options: -fvisibility=hidden -lm



This file was automatically generated via the Phoronix Test Suite benchmarking software on Monday, 23 December 2024 06:13.