



Raspberry Pi 3 Linux Benchmark Comparison

Showing how terribly throttling affects PTS scores when putting an SBC in a small enclosure

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-gnueabi --target=arm-linux-gnueabi --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-gnueabi --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-gnueabi --target=arm-linux-gnueabi --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-gnueabi --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-gnueabi --target=arm-linux-gnueabi --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-gnueabi --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-gnueabi --target=arm-linux-gnueabi --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-gnueabi --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-gnueabi --target=arm-linux-gnueabi --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-gnueabi --disable-sjlj-exceptions --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-languages=c,c++,fortran,objc,obj-c++ --enable-libstdc++-debug --enable-libstdc++-time=yes --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=arm-linux-gnueabi --target=arm-linux-gnueabi --with-arch=armv7 --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-gnueabi --disable-sjlj-exceptions --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-languages=c,c++,fortran,objc,obj-c++ --enable-libstdc++-debug --enable-libstdc++-time=yes --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=arm-linux-gnueabi --target=arm-linux-gnueabi --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-gdacc96 (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-gnueabi --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-libstdc++-debug --enable-libstdc++-time=yes --enable-multilib --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=arm-linux-gnueabi --target=arm-linux-gnueabi --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-gnueabi --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-libstdc++-debug --enable-libstdc++-time=yes --enable-multilib --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=arm-linux-gnueabi --target=arm-linux-gnueabi --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-gnueabi --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-gnueabi --target=arm-linux-gnueabi --with-arch-directory=arm --with-arch=armv7-a --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

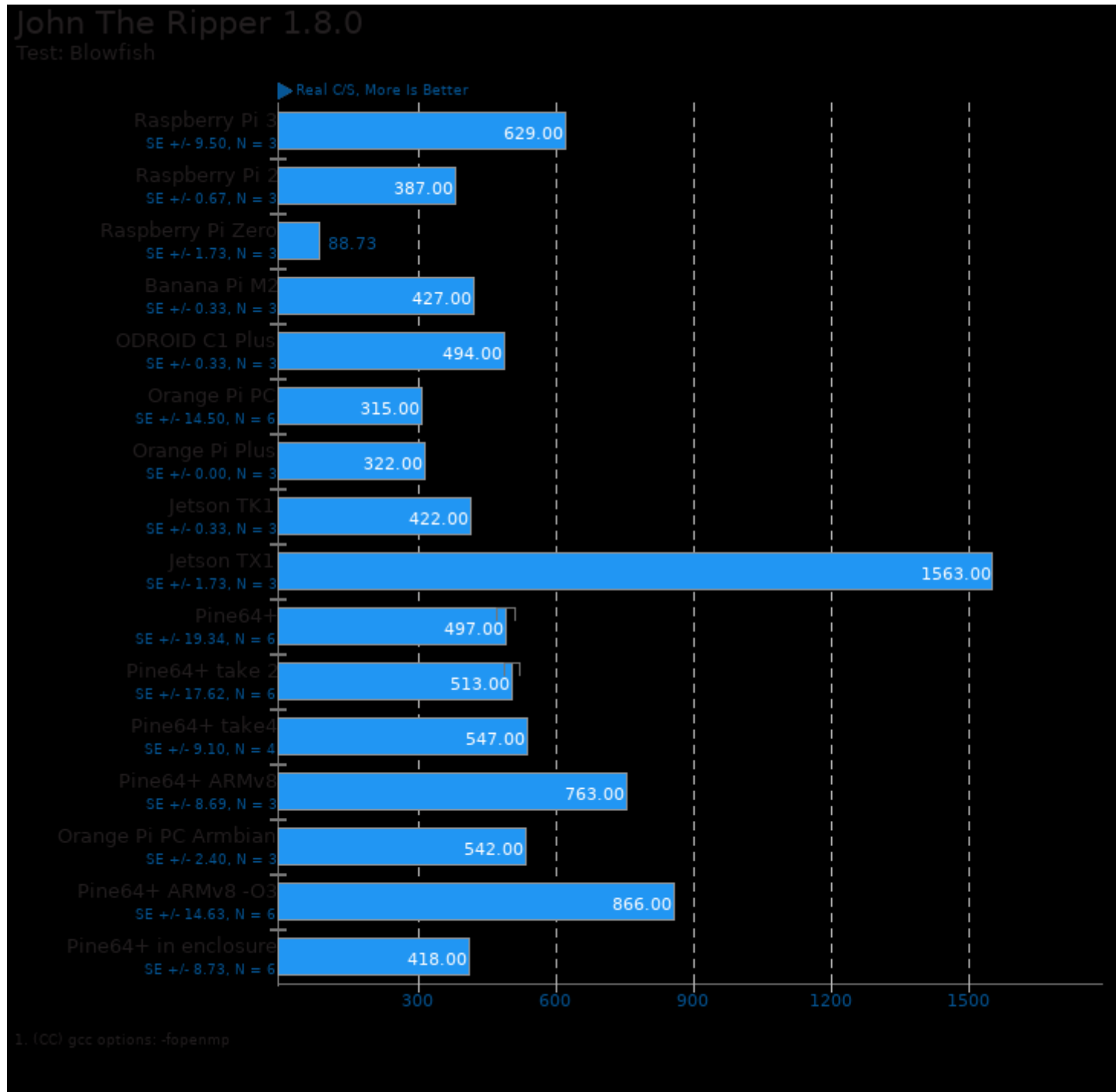
	Rasp berry Pi 3	Rasp berry Pi 2	Rasp berry Pi Zero	Bana na Pi M2	ODR OID C1 Plus	Oran ge Pi PC	Oran ge Pi Plus	Jets on TK1	Jets on TX1	Pine 64+	Pine 64+ take 2	Pine 64+ take 3	Pine 64+ take 4	Pine 64+ ARM v8	Oran ge Pi PC Arm bian	Pine 64+ ARM v8 -O3	Pine 64+ in encl osur
John The Ripper - Blowfish (Real C/S)	629	387	88.73	427	494	315	322	422	1563	497	513		547	763	542	866	418
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
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%

Raspberry Pi 3 Linux Benchmark Comparison

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)	247.3	505.4	3038	436.1	323.0	951.1	1425	95.01	85.30	290.5	289.9	281.8	210.2	346.7	208.7	354.5	
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	
Standard	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%	
Deviation																	
Smallpt - G.I.R.1.S (sec)	1388	2175	12029	1984	1590	1982	3042	2888	613	1489		1470	1045	1550	215	1920	
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%	
Standard	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%	
Deviation																	
Timed MAFFT	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	
Alignment - M.S.A (sec)	28.16	20.01	3.01%	21.1%	29.3%	19.57	14.65	100%	91.18	26.21		26.07	35.93	23.75	34.52	18.72	
Standard	3.3%	2.3%	1.8%	7%	0.8%	0.9%	5.5%	5.6%	0.7%	1.5%		6.5%	3.4%	0.2%	3.1%	4%	
Deviation																	
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	
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	
Standard	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%	
Deviation																	

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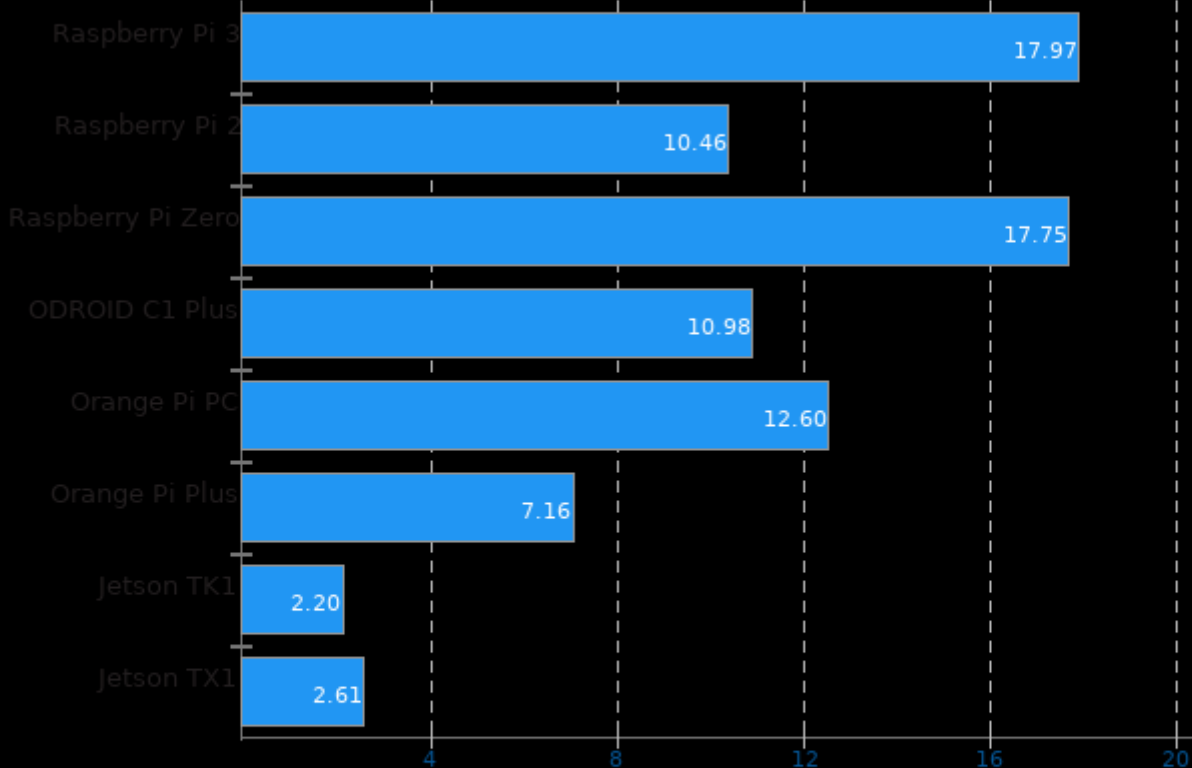
Himeno Benchmark	1.79	0.90	2.00	1.82	2.37	1.43	0.74	0.14							
Performance / Cost - P.P.S (MFLOPS/D)															
Normalized	75.53	37.97	84.39	76.79	100%	60.34	31.22	5.91%							
OpenSSL - R.4.b.P (Signs/sec)	20.25	11.93	2.60	13.40	18.80	11.93	7.83	54.40	24.67	13.83	13.97	18.47	17.17	18.50	9.40
Normalized	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
Standard	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%
Deviation															
OpenSSL - Performance / Cost - R.4.b.P (Signs/sec/Dollar)	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	228.3	314.5	606.7	269.6	200.5	261.8	257.8	50.29	47.64	215.9	215.2	177.5	223.1	177.3	234.3
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
Standard	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%
Deviation															
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%							
	%	%		%	%	%	%								



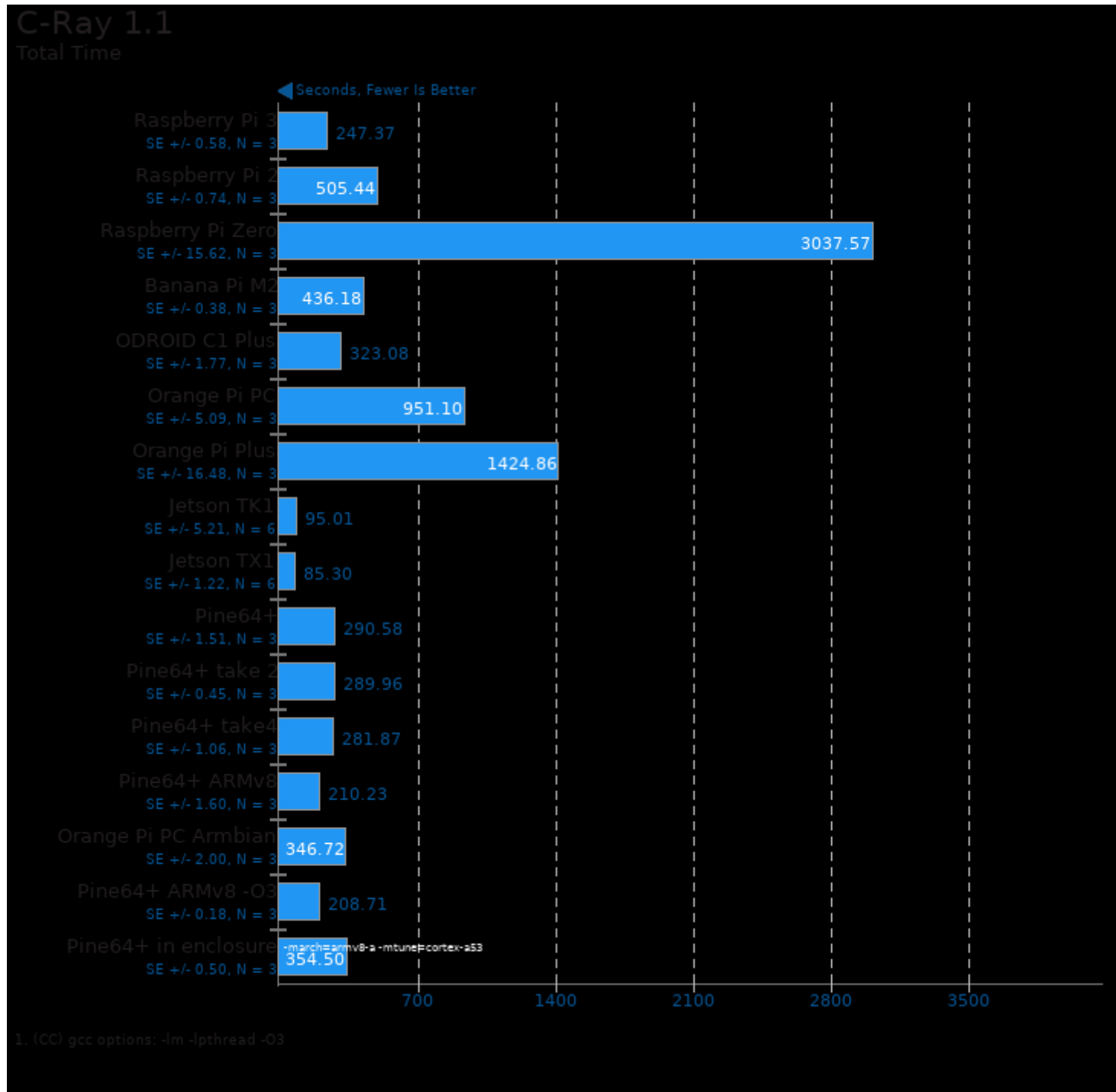
John The Ripper 1.8.0

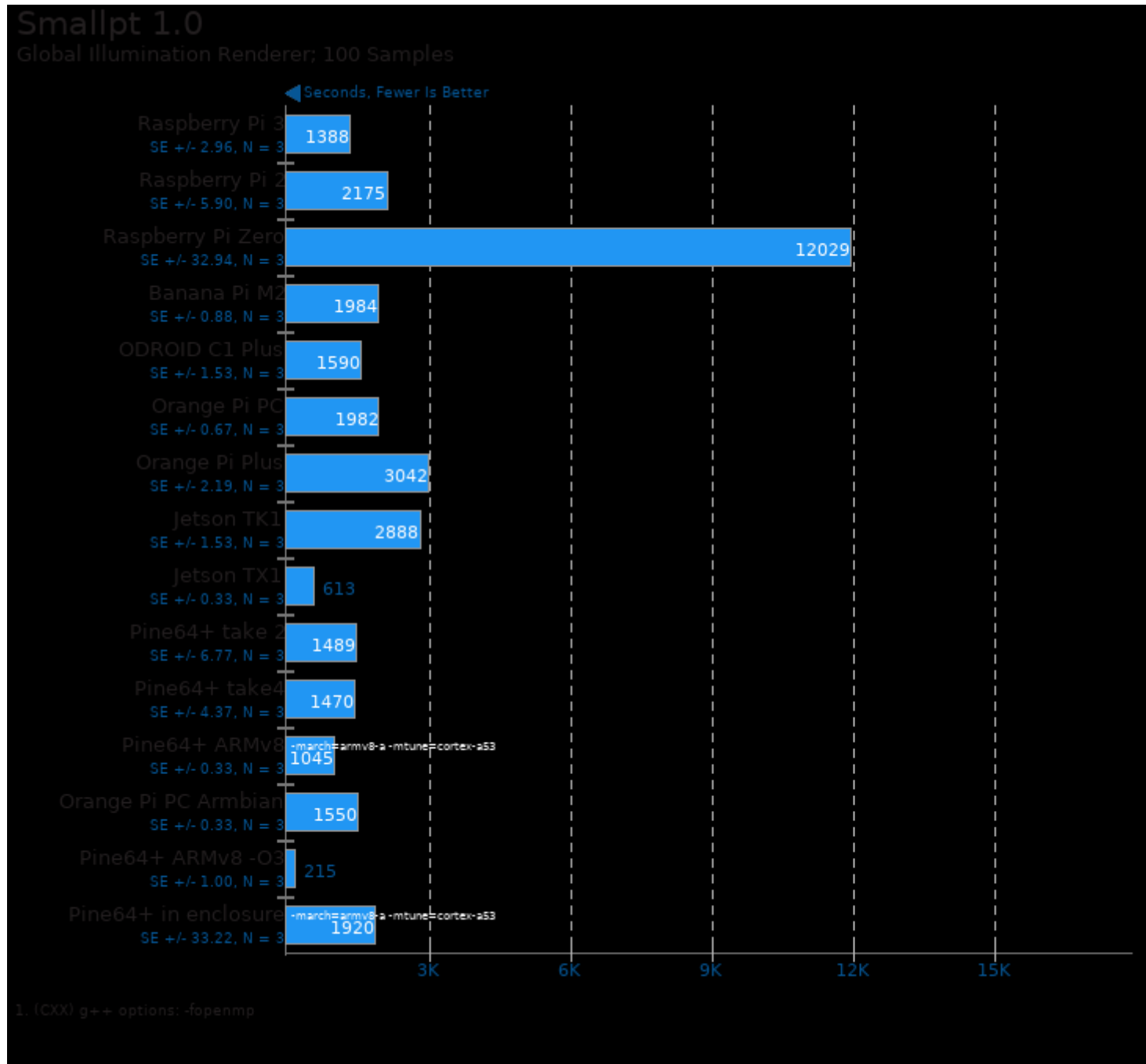
Performance / Cost - Test: Blowfish

► Real C/S Per Dollar, More Is Better



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.

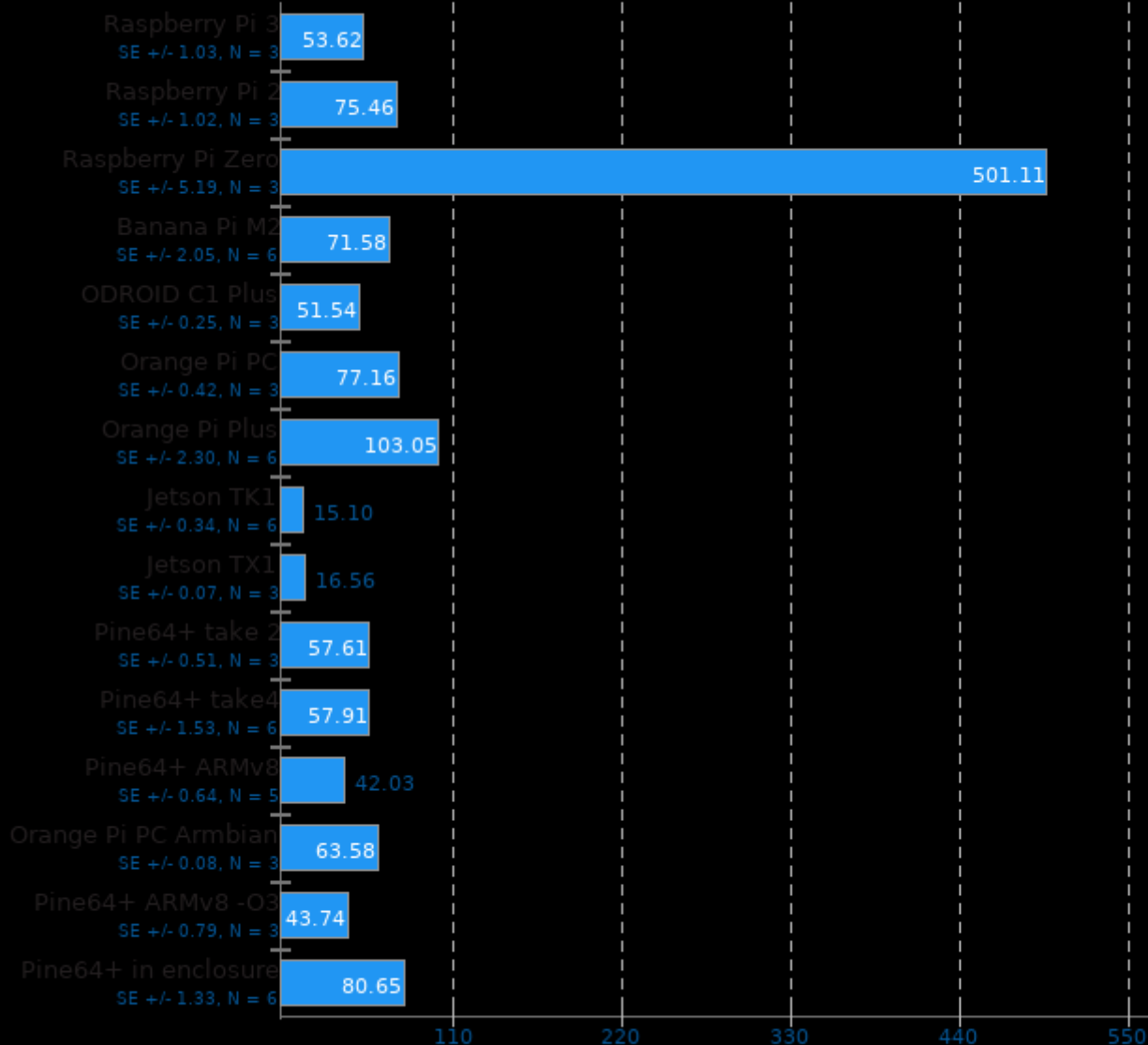




Timed MAFFT Alignment 6.864

Multiple Sequence Alignment

Seconds, Fewer Is Better

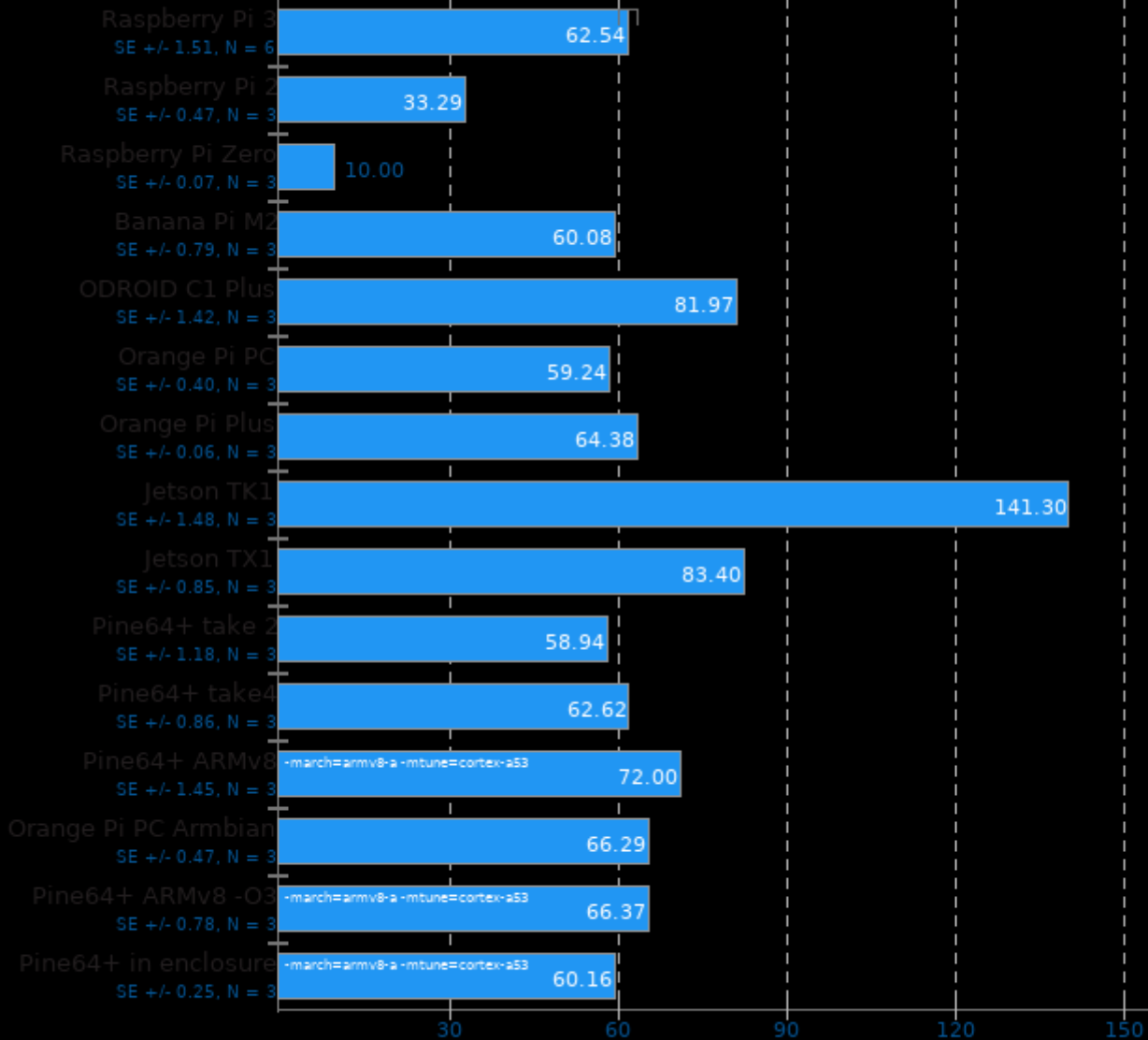


1. (CC) gcc options: -O3 -lm -lpthread

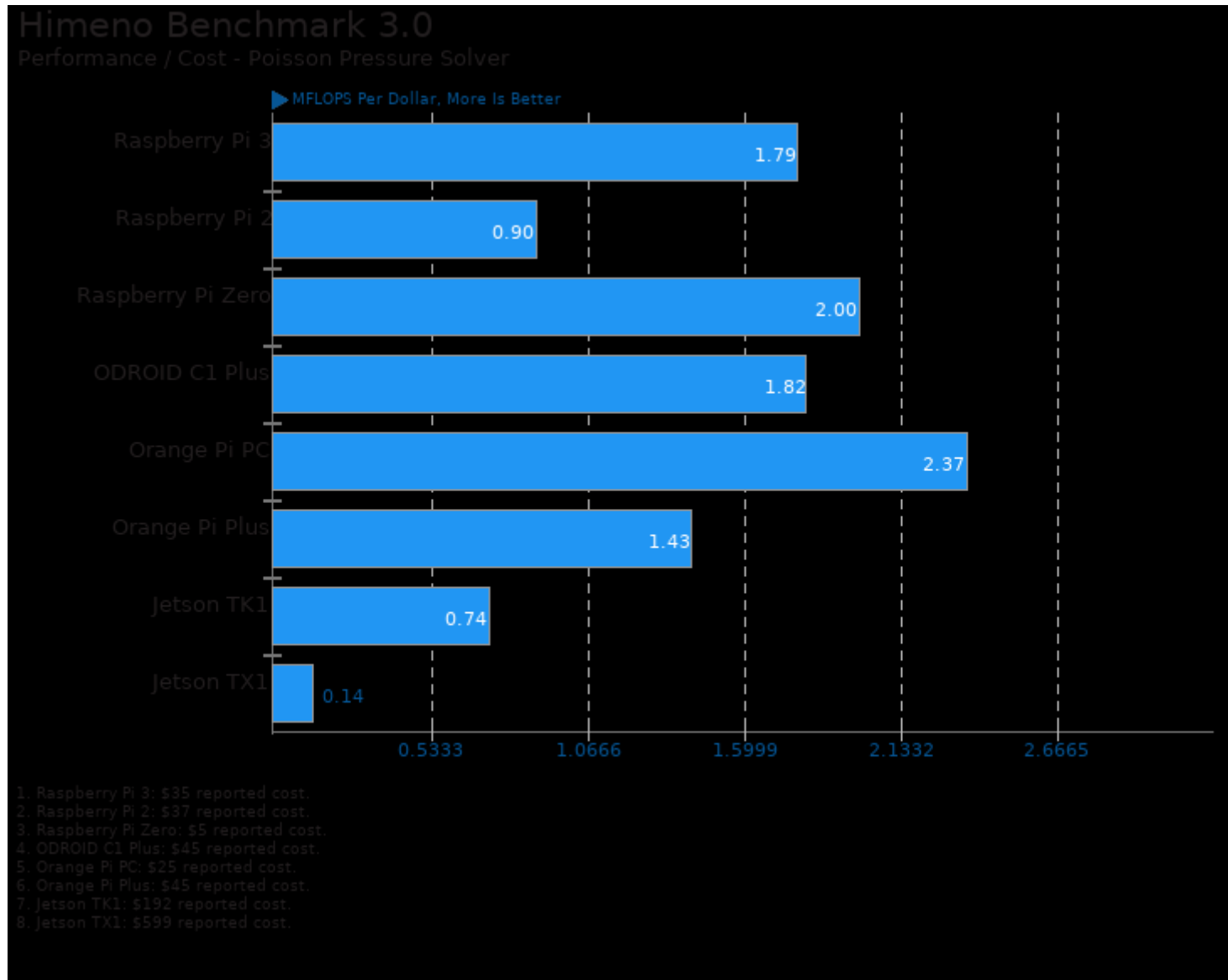
Himeno Benchmark 3.0

Poisson Pressure Solver

► MFLOPS, More Is Better

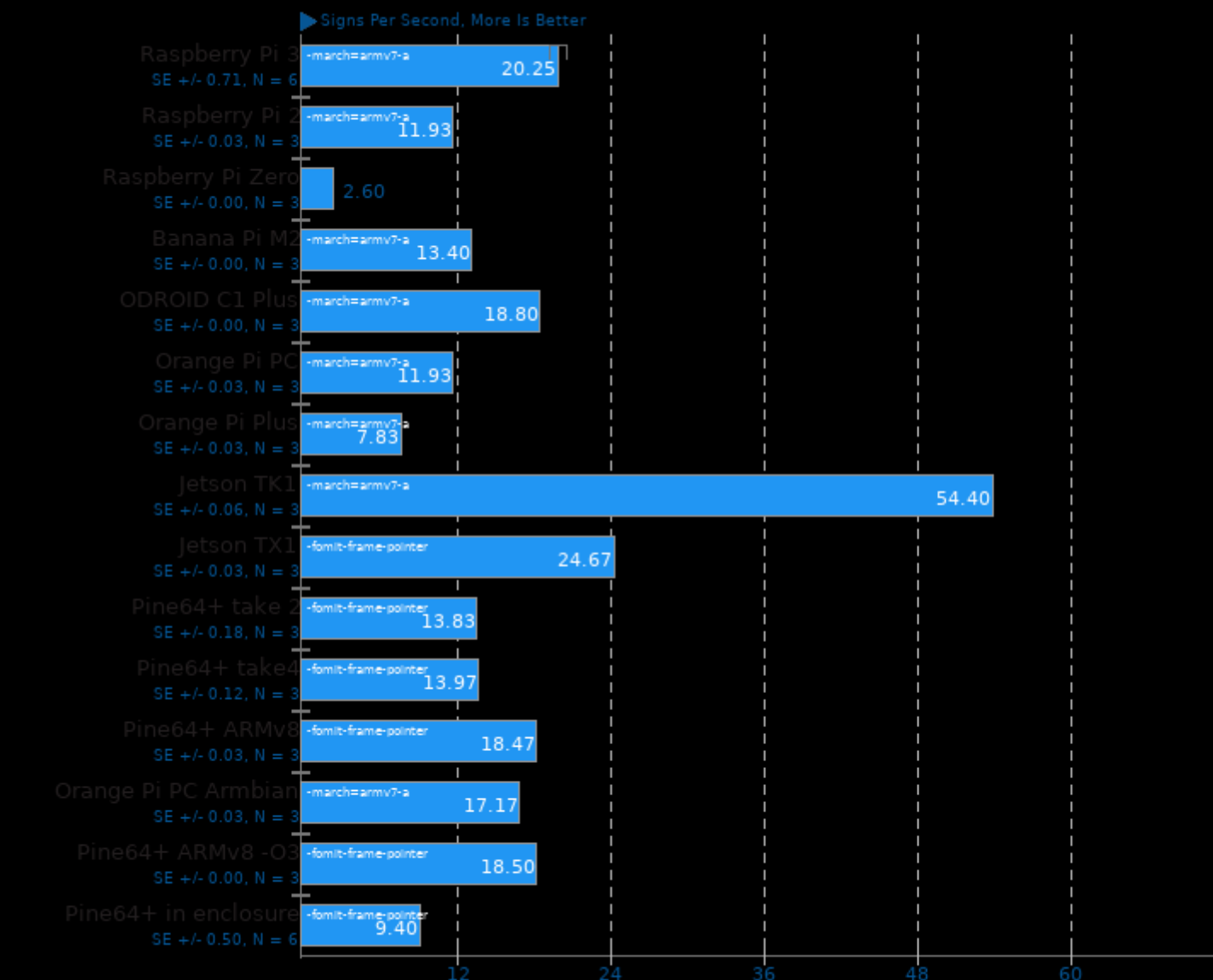


1. (CC) gcc options: -O3



OpenSSL 1.0.1g

RSA 4096-bit Performance

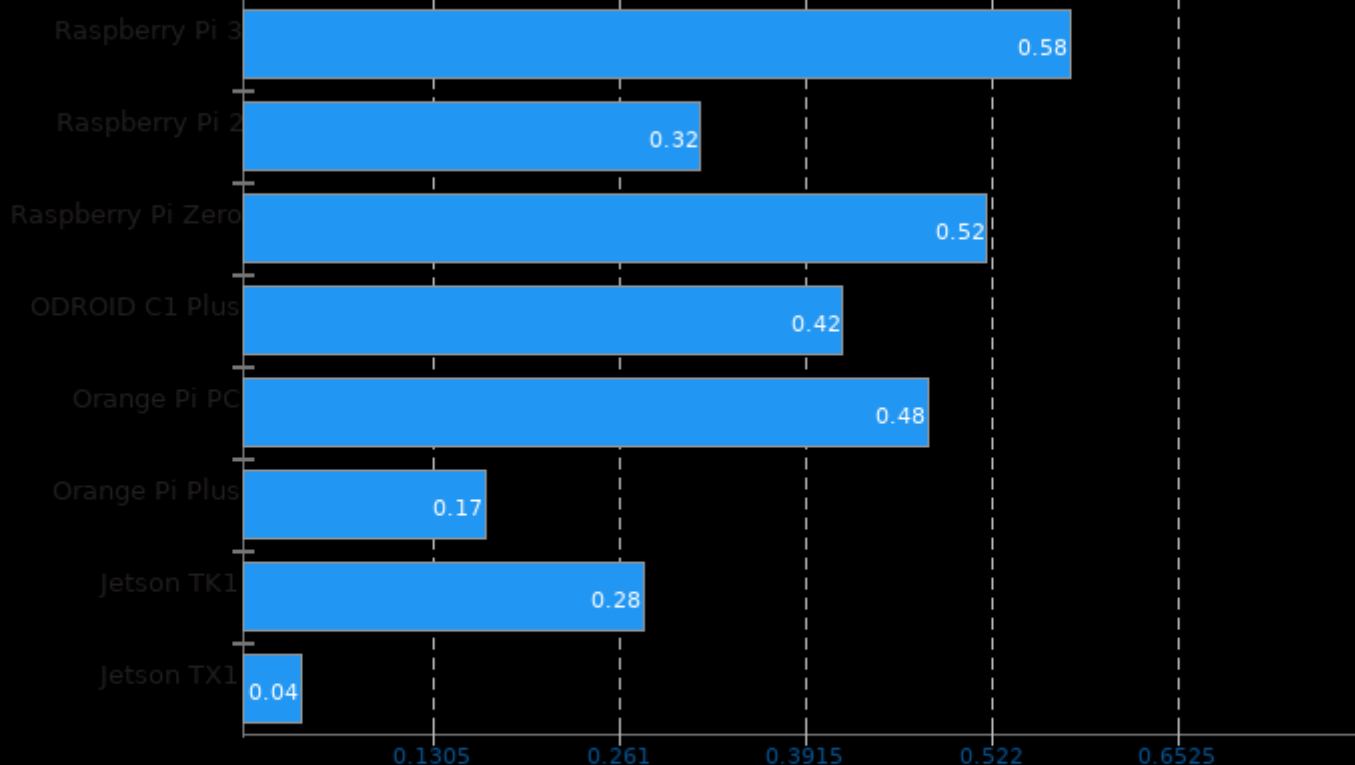


1. (CC) gcc options: -O3 -lssl -lcrypto -ldl

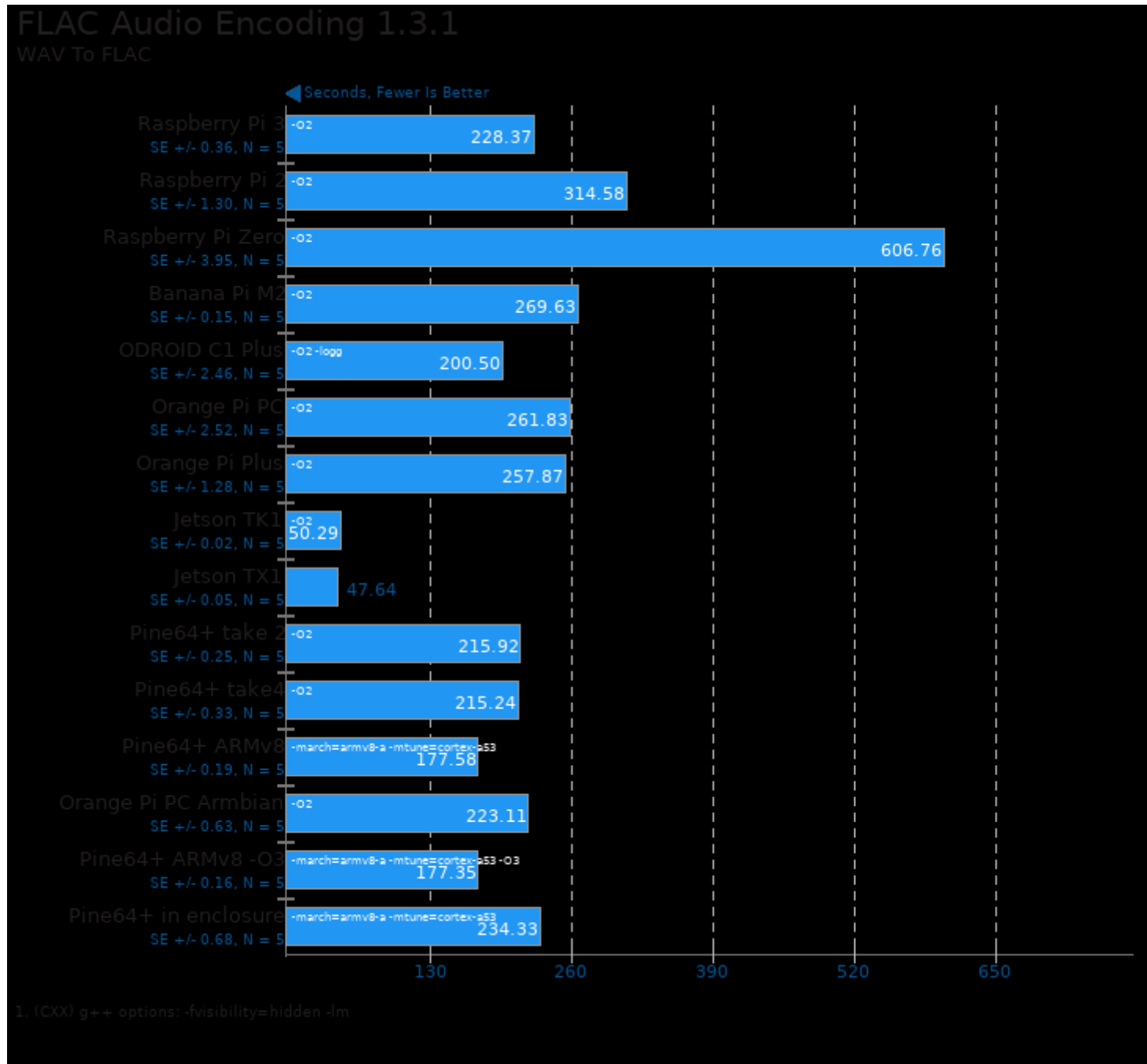
OpenSSL 1.0.1g

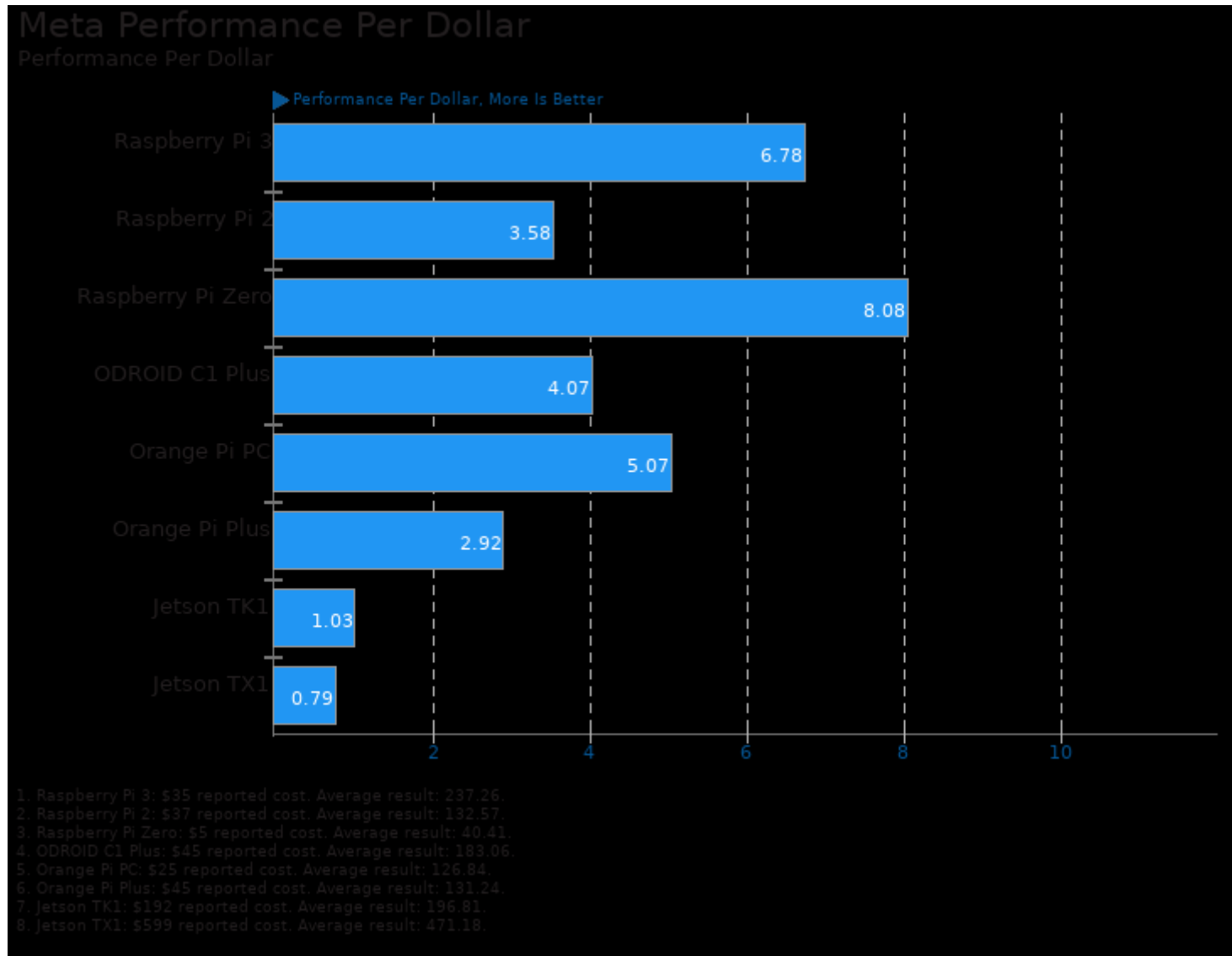
Performance / Cost - RSA 4096-bit Performance

► Signs Per Second Per Dollar, More Is Better



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.





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