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Raspberry Pi vs Orange Pi vs Banana Pi 2016-03 Showdown by LoveRPi

Debian 9 with Linux 4.4 on VS-RD-RK3399

Automated Executive Summary

ARMv8 Cortex-A72 had the most wins, coming in first place for 57% of the tests.

Test Systems:

Orange Pi One on Armbian

Processor: ARMv7 rev 5 @ 1.20GHz (4 Cores), Motherboard: sun8i, Memory: 494MB, Disk: 32GB 00000

OS: Debian 8.3, Kernel: 3.4.110-sun8i (armv7l), Compiler: GCC 4.9.2, File-System: ext4, Screen Resolution: 1280x1440

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 interactive

Orange Pi PC on Armbian

Processor: ARMv7 rev 5 @ 1.30GHz (4 Cores), Motherboard: sun8i, Memory: 1024MB, Disk: 32GB 00000

OS: Debian 8.3, Kernel: 3.4.110-sun8i (armv7l), Compiler: GCC 4.9.2, File-System: ext4, Screen Resolution: 1280x1440

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 interactive

Orange Pi Plus on Armbian

Processor: ARMv7 rev 5 @ 1.30GHz (4 Cores), Motherboard: sun8i, Memory: 1024MB, Disk: 32GB 00000 + 8GB M8G1GC

OS: Debian 8.3, Kernel: 3.4.110-sun8i (armv7l), Compiler: GCC 4.9.2, File-System: ext4, Screen Resolution: 1280x1440

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 interactive

Raspberry Pi 2 on Raspbian

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 3 on Raspbian

Processor: ARMv7 rev 4 @ 1.20GHz (4 Cores), Motherboard: BCM2709 Raspberry Pi 3 Model B Rev 1.2, Memory: 925MB, Disk: 63GB 00000

OS: Raspbian GNU/Linux 8, Kernel: 4.1.20-v7+ (armv7l), 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

Banana Pi M2 by LoveRPi

Processor: ARMv7 rev 3 @ 1.01GHz (4 Cores), Motherboard: Allwinner sun6i (A31) Family Sinovoip BPI-M2, Memory: 1024MB, Disk: 129GB 00000

OS: Ubuntu 14.04, Kernel: 4.4.1-sunxi (armv7l), Compiler: GCC 4.8.4, File-System: ext4

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: cpufreq-dt ondemand

Banana Pi M3 by LoveRPi

Processor: ARMv7 rev 5 @ 1.80GHz (8 Cores), Motherboard: sun8i, Memory: 2048MB, Disk: 8GB M8G1GC + 129GB TO

OS: Ubuntu 15.10, Kernel: 3.4.39-BPI-M3-aufs (armv7l), Compiler: GCC 5.2.1 20151010, File-System: aufs, Screen Resolution: 1920x2160

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,ada,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-default-libstdcxx-abi=new --with-float=hard --with-fpu=vfpv3-d16 --with-mode=thumb -v
Processor Notes: Scaling Governor: sunxi-iks interactive

Banana Pi M2+ SinoVoip

Processor: ARMv7 rev 5 @ 1.20GHz (1 Core), Motherboard: sun8i, Memory: 745MB, Disk: 64GB 00000 + 8GB 8WMB3R

OS: Debian 8.4, Kernel: 3.4.111-sun8i (armv7l), Desktop: Xfce, Display Driver: modesetting 0.9.0, Compiler: GCC 4.9.2, File-System: ext4, Screen Resolution: 1280x720

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 interactive

Banana Pi M2+ on Armbian

Processor: ARMv7 rev 5 @ 1.20GHz (4 Cores), Motherboard: sun8i, Memory: 745MB, Disk: 64GB 00000 + 8GB 8WMB3R

OS: Debian 8.4, Kernel: 3.4.111-sun8i (armv7l), Desktop: Xfce, Display Driver: modesetting 0.9.0, 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-sunxi interactive

Banana Pi M2+ Raspbian 8.0

Processor: ARMv7 rev 5 @ 1.20GHz (3 Cores), Motherboard: sun8i, Memory: 1024MB, Disk: 8GB SU08G + 8GB 8WMB3R

OS: Raspbian 8.0, Kernel: 3.4.39-02-lobo (armv7l), Desktop: LXDE, Compiler: GCC 4.9.2, File-System: ext4, Screen Resolution: 1280x720

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: cpufreq-sunxi ondemand

MiQi on Lubuntu 14.04

Processor: ARMv7 rev 1 @ 1.80GHz (4 Cores), Motherboard: Rockchip RK3288 (Flattened Device Tree), Memory: 2048MB, Disk: 31GB BIWIN

OS: Ubuntu 14.04, Kernel: 3.10.0 (armv7l), Desktop: LXDE, Compiler: GCC 4.8.4, 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: rockchip interactive

DragonBoard 410c on Debian RPB 16.03

Processor: Unknown @ 1.21GHz (4 Cores), Memory: 833MB, Disk: 8GB DS2008, Monitor: TX-NR636

OS: Debian 8.3, Kernel: 4.4.0-104-arm64 (aarch64), Desktop: LXDE, Compiler: GCC 4.9.2, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=aarch64-linux-gnu --disable-browser-plugin --disable-libquadmath --disable-libsanitizer --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-plugin --enable-shared --enable-threads=posix --host=aarch64-linux-gnu --target=aarch64-linux-gnu --with-arch-directory=arm64 -v
Processor Notes: Scaling Governor: cpufreq-dt ondemand

MeUbuntu 14.04.3

Processor: Intel Atom Z3735F @ 1.83GHz (4 Cores), Motherboard: Mini PC v2.80, Chipset: Intel ValleyView SSA-CUnit, Memory: 2048MB, Disk: 31GB NCard, Graphics: Intel ValleyView Gen7 (646MHz), Monitor: TX-NR636

OS: Ubuntu 14.04, Kernel: 3.16.0-45-generic (x86_64), Desktop: Unity 7.2.6, Display Driver: intel 2.99.914, Compiler: GCC 4.8.4, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-browser-plugin --disable-libmudflap --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-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-arch-directory=amd64 --with-multilib-list=m32,m64,mx32 --with-tune=generic -v
Processor Notes: Scaling Governor: intel_pstate powersave

NanoPi NEO 512MB No Heatsink

Processor: ARMv7 rev 5 @ 0.82GHz (4 Cores), Motherboard: sun8i, Memory: 495MB, Disk: 8GB SL08G

OS: Ubuntu 15.10, Kernel: 3.4.39-h3 (armv7l), Compiler: GCC 5.2.1 20151010, File-System: ext4, Screen Resolution: 1280x1440

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,ada,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-default-libstdcxx-abi=new --with-float=hard --with-fpu=vfpv3-d16 --with-mode=thumb -v
Processor Notes: Scaling Governor: cpufreq-sunxi interactive

NanoPi NEO 512MB Heatsink

NanoPi NEO 512MB Heatsink 2

NanoPi NEO 512MB Heatsink2

Processor: ARMv7 rev 5 @ 1.20GHz (4 Cores), Motherboard: sun8i, Memory: 495MB, Disk: 8GB SL08G

OS: Ubuntu 15.10, Kernel: 3.4.39-h3 (armv7l), Compiler: GCC 5.2.1 20151010, File-System: ext4, Screen Resolution: 1280x1440

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,ada,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-default-libstdcxx-abi=new --with-float=hard --with-fpu=vfpv3-d16 --with-mode=thumb -v
Processor Notes: Scaling Governor: cpufreq-sunxi interactive

NanoPi NEO 2 FA Ubuntu 16.04.2

Processor: AArch64 rev 4 @ 0.82GHz (4 Cores), Motherboard: sun50iw2, Memory: 468MB, Disk: 8GB SL08G

OS: Ubuntu 16.04, Kernel: 3.10.65 (aarch64), Compiler: GCC 5.4.0 20160609, File-System: ext4, Screen Resolution: 1280x1440

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

NanoPi NEO 2 Armbian Ubuntu 16.04.2

Processor: AArch64 rev 4 (4 Cores), Motherboard: Xunlong Orange Pi PC 2, Memory: 483MB, Disk: 8GB SL08G

OS: Ubuntu 16.04, Kernel: 4.10.0-sun50iw2 (aarch64), Compiler: GCC 5.4.0 20160609, File-System: ext4

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

VS-RK3399 Board - Debian 9

Processor: ARMv8 rev 4 @ 1.42GHz (6 Cores), Motherboard: Rockchip RK3399 VideoStrong Board MID (Android), Memory: 4096MB, Disk: 31GB BWBD3R, Monitor: TX-NR636

OS: Debian 9.1, Kernel: 4.4.55 (aarch64), Desktop: LXDE, Compiler: GCC 6.3.0 20170516, File-System: ext4, Screen Resolution: 1024x600p86

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

ARMv8 Cortex-A72

Processor: ARMv8 Cortex-A72 @ 2.00GHz (4 Cores), Motherboard: BCM2835 Raspberry Pi 4 Model B Rev 1.4,

Raspberry Pi vs Orange Pi vs Banana Pi 2016-03 Showdown by LoveRPi

Memory: 8192MB, Disk: 32GB SP32G, Graphics: vc4drmfb, Monitor: DELL P2418D

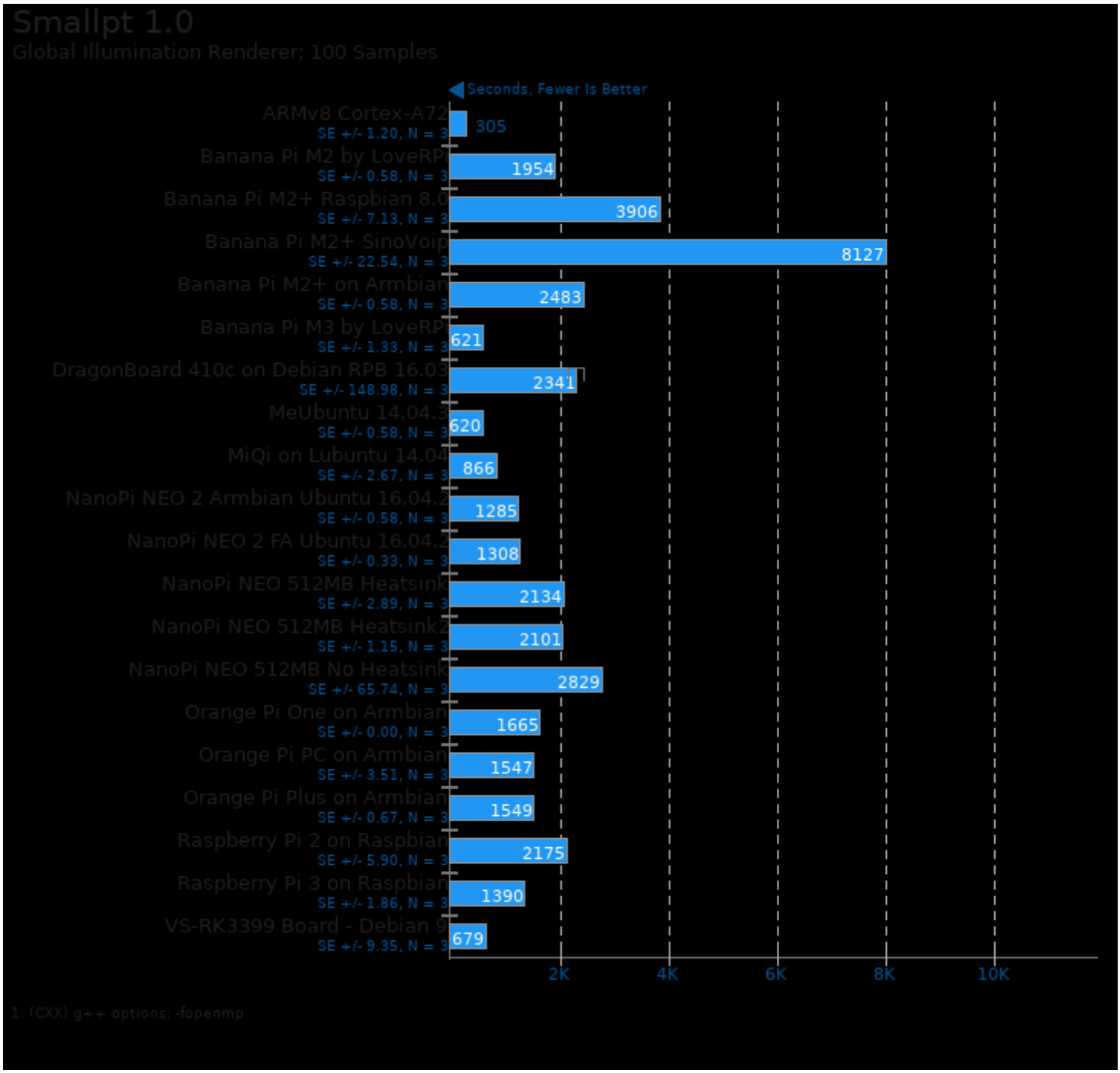
OS: Debian 10, Kernel: 5.4.72-v8+ (aarch64), Desktop: LXDE 0.10.0, Display Server: X Server 1.20.4, Display Driver: modesetting 1.20.4, Compiler: GCC 8.3.0, File-System: ext4, Screen Resolution: 2560x1440

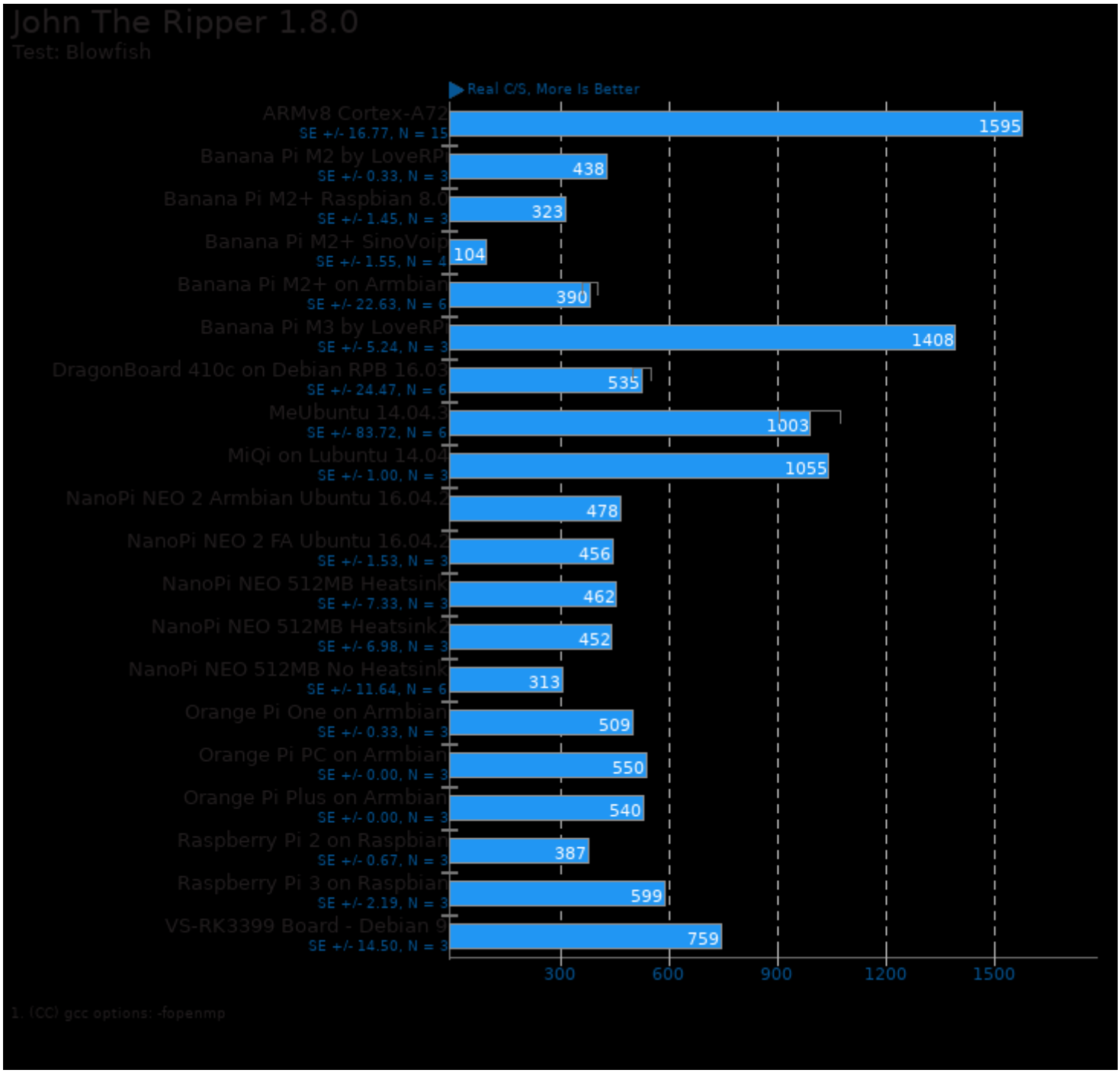
Kernel Notes: snd_bcm2835.enable_compat_alsa=0 snd_bcm2835.enable_hdmi=1 snd_bcm2835.enable_headphones=1
Compiler Notes: --build=aarch64-linux-gnu --disable-libphobos --disable-libquadmath --disable-libquadmath-support --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-fix-cortex-a53-843419 --enable-gnu-unique-object --enable-languages=c,ada,c++,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-plugin --enable-shared --enable-threads=posix --host=aarch64-linux-gnu --program-prefix=aarch64-linux-gnu- --target=aarch64-linux-gnu --with-default-libstdcxx-abi=new --with-gcc-major-version-only -v
Processor Notes: Scaling Governor: cpufreq-dt ondemand
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Vulnerable + spectre_v1: Mitigation of __user pointer sanitization + spectre_v2: Vulnerable + srbds: Not affected + tsx_async_abort: Not affected

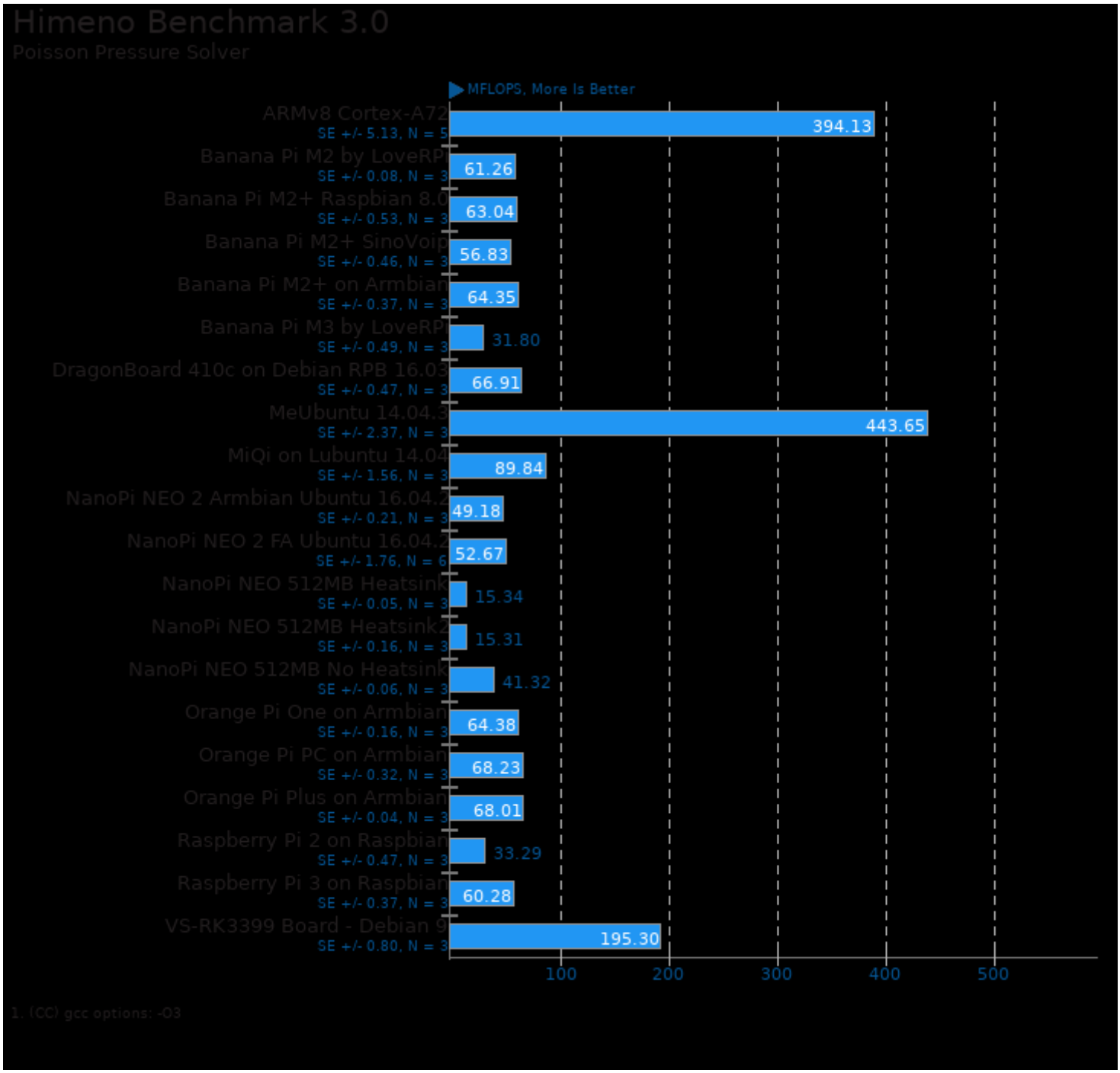
	Orange Pi One on Armbian	Orange Pi PC on Armbian	Orange Pi Plus on Armbian	Raspberry Pi 2 on Raspbian	Raspberry Pi 3 on Raspbian	Banana Pi M2 by LoveRPi	Banana Pi M3 by LoveRPi	Banana Pi M2+ SinoVoip	Banana Pi M2+ on Armbian	Banana Pi M2+ Raspbian 8.0	MiQi on Lubuntu 14.04	Dragon Board 410c on Debian RPB 16.03	Me Ubuntu 14.04.3	NanoPi NEO 512MB NoHeatsink	NanoPi NEO 512MB Heatsink	NanoPi NEO 512MB Heatsink 2	NanoPi NEO 512MB Heatsink2	NanoPi NEO 2 FA Ubuntu 16.04.2	NanoPi NEO 2 Armbian Ubuntu 16.04.2	VS-RK3399 Board - Debian 9	ARMv8 Cortex-A72
Smallpt - G.I.R.1.S (sec)	1665	1547	1549	2175	1390	1954	6217	8127	2483	3906	8662	2341	6201	2829	2134		2101	1308	1285	6791	3055
Normalized	18.32%	19.72%	19.69%	14.02%	21.94%	15.61%	49.13%	3.75%	12.28%	7.81%	35.23%	13.03%	49.19%	10.78%	14.29%		14.52%	23.32%	23.74%	44.99%	100%
Standard Deviation	0%	0.4%	0.1%	0.5%	0.2%	0.1%	0.4%	0.5%	0%	0.3%	0.5%	11%	0.2%	4%	0.2%		0.1%	0%	0.1%	2.4%	0.7%
John The Ripper - Blowfish (Real	509	550	540	387	599	438	1408	1047	390	323	1055	535	1003	313	462		452	456	478	759	1595
Normalized	31.91%	34.48%	33.86%	24.26%	37.55%	27.46%	88.26%	6.52%	24.45%	20.25%	66.14%	33.54%	62.86%	19.62%	28.96%		28.34%	28.59%	29.99%	47.59%	100%
Standard Deviation	0.1%	0%	0%	0.3%	0.6%	0.1%	0.6%	3%	14.2%	0.8%	0.2%	11.2%	20.4%	9.1%	2.7%		2.7%	0.6%		3.3%	4.1%

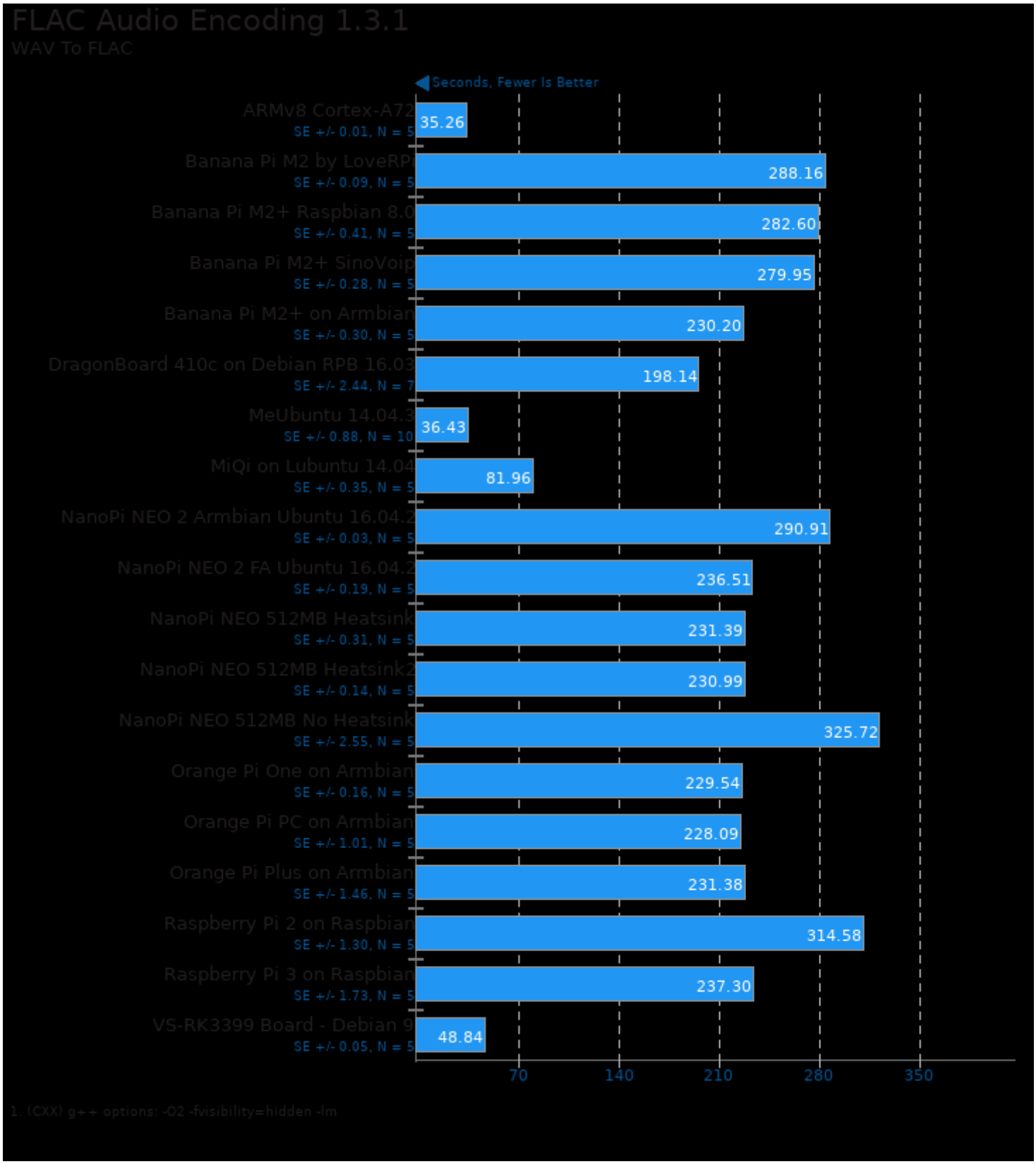
Himeno Benchmark - P.P.S (MFLOP	64.38	68.23	68.01	33.29	60.28	61.26	31.80	56.83	64.35	63.04	89.84	66.91	**443.65**	41.32	15.34	**15.31**	52.67	49.18	195.30	394.13
Normalized	14.51%	15.38%	15.33%	7.5%	13.59%	13.81%	7.17%	12.81%	14.54%	14.21%	20.15%	15.08%	100%	9.31%	3.46%	3.45%	11.87%	11.09%	44.02%	88.84%
Standard Deviation	0.4%	0.8%	0.1%	2.4%	1.1%	0.2%	2.7%	1.4%	1%	1.5%	3%	1.2%	0.9%	0.2%	0.5%	1.8%	8.2%	0.7%	0.7%	2.9%
FLAC Audio Encoding - WAV To FLAC (sec)	229.54	228.09	231.38	314.58	237.30	288.16		279.95	230.20	282.60	81.96	198.14	36.43	**325.72**	231.39	230.99	236.51	290.91	48.84	**35.26**
Normalized	15.36%	15.46%	15.24%	11.2%	14.86%	12.21%		12.66%	15.32%	12.42%	43.02%	17.82%	96.79%	10.83%	15.24%	15.26%	14.96%	12.16%	72.19%	100%
Standard Deviation	0.2%	1%	1.4%	0.9%	1.6%	0.1%		0.2%	0.3%	0.3%	0.9%	3.3%	7.7%	1.8%	0.3%	0.1%	0.2%	0%	0.2%	0.1%
C-Ray - Total Time (sec)	365.94	344.52	350.07	505.44	250.79	431.10	136.14	**177.8**	581.37	893.24	136.96	341.80	200.29	848.52	461.70	466.89	350.48	344.91	98.08	**52.20**
Normalized	14.26%	15.15%	14.91%	10.3%	20.81%	12.11%	38.31%	2.94%	8.98%	5.84%	38.11%	15.27%	26.06%	6.15%	11.31%	11.18%	14.89%	15.13%	53.29%	100%
Standard Deviation	0.2%	1.5%	0.5%	0.3%	0.1%	0%	0.3%	0.4%	3.6%	2.3%	4.3%	3.8%	0%	7.8%	3%	1.8%	0%	0.1%	3.1%	2.1%
OpenSSL - R.4.b.P (Signs/s	16	17.20	17.13	11.93	20.60	13.40	43.30	**3.30**	10.48	6.67	29.70	10.90	**66.53**	7.68	12.35	12.40				48.93
Normalized	24.05%	25.85%	25.75%	17.9%	30.96%	20.15%	65.08%	4.96%	15.75%	10.03%	44.64%	16.38%	100%	11.54%	18.56%	18.64%				73.55%
Standard Deviation	0%	0%	0.3%	0.5%	8.9%	0%	2%	0%	14.2%	0.9%	0%	9%	1.4%	18.6%	3.4%	4.4%				0.3%
Timed MAFFT Alignment - M.S.A		62.45	63.17	75.46	61.06	70.58	**29.72**	**210.62**	81.13	121.86	42.84	73.91	33.12	132.29	77.66	75.34	63.73	64.47		
Normalized		47.59%	47.05%	39.3%	48.67%	42.11%	100%	14.1%	36.63%	24.39%	69.3%	40.21%	89.73%	22.47%	38.27%	39.45%	46.61%	46.1%		
Standard Deviation		8.2%	2.1%	2.3%	10.4%	2%	0.8%	0%	8.4%	9.5%	4.6%	8.1%	1.2%	9.4%	2.5%	1.6%	8.2%	0.4%		

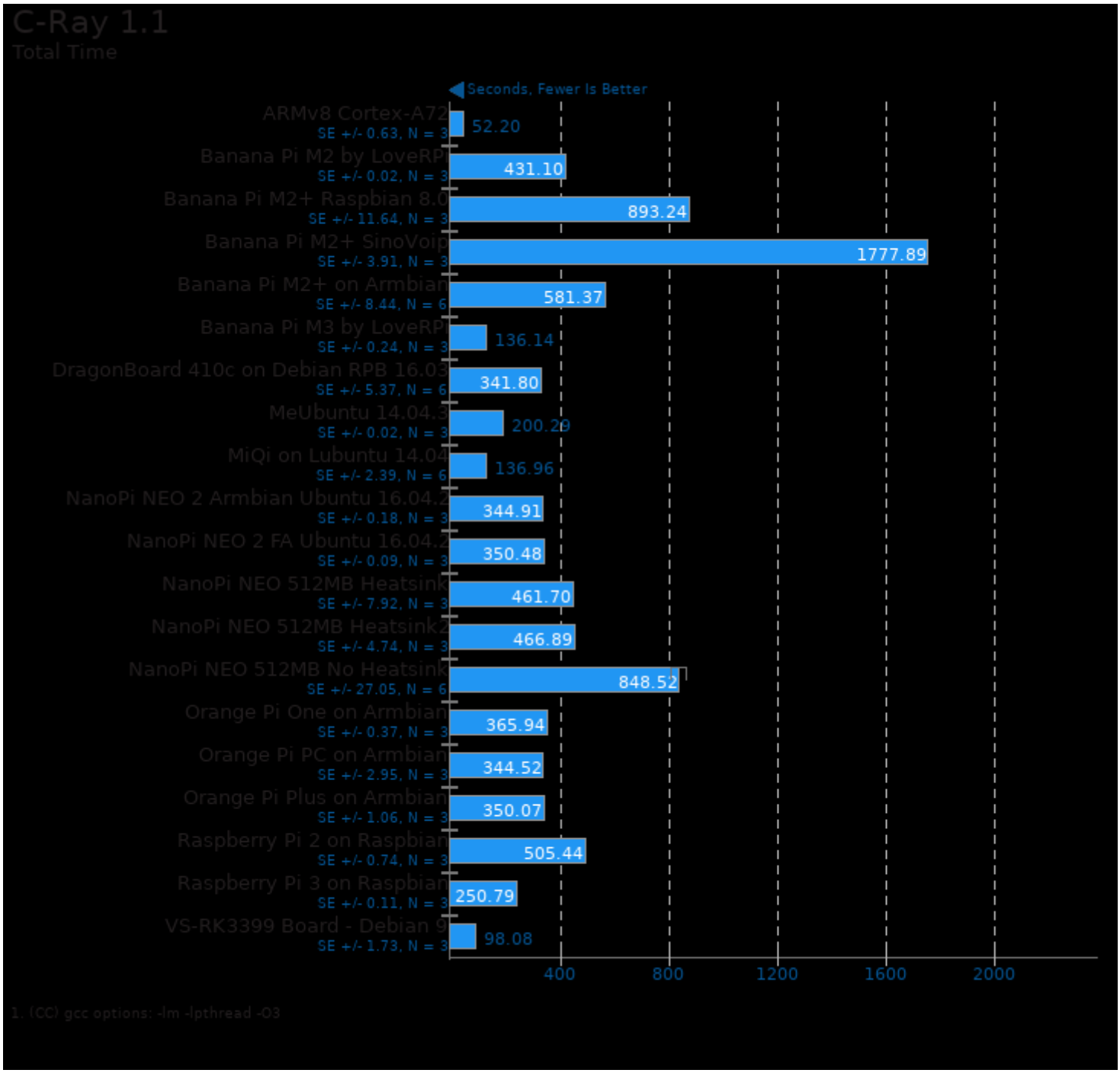
Meta Performance Per Dollar - P.P.D (Performance/Dollar)	**19.65**	14.12	5.34	6.48	**3.80**	6.18
Normalized	100%	71.86%	27.18%	32.98%	19.34%	31.45%
OpenSSL - Performance / Cost - R.4.b.P (Signs/sec/Dollar	**1.60**	1.15	0.44	0.59	**0.30**	0.54
Normalized	100%	71.88%	27.54%	36.87%	18.75%	33.75%
Himeno Benchmark - Performance / Cost - P.P.S (MFLOPS/Dollar)	**6.44**	4.55	1.74	1.72	1.36	**0.40**
Normalized	100%	70.65%	27.02%	26.71%	21.12%	6.21%
John The Ripper - Performance / Cost - Blowfish (Real C/S/Dolla	**50.90**	36.67	13.85	17.11	**9.73**	17.60
Normalized	100%	72.04%	27.21%	33.61%	19.12%	34.58%

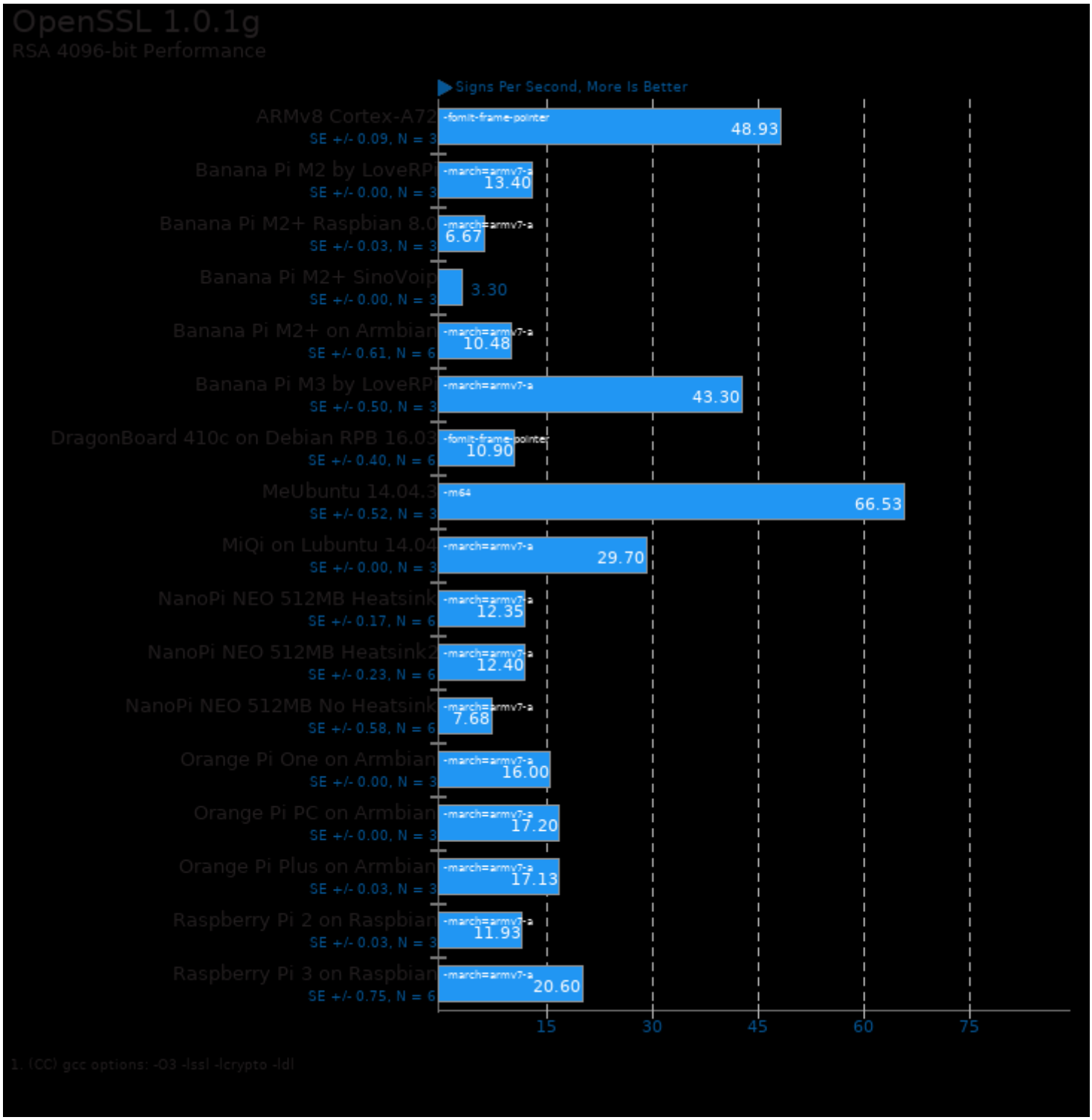

Smallpt 1.0
Global Illumination Renderer; 100 Samples
Seconds, Fewer Is Better
ARMv8 Cortex-A72
SE +/- 1.20, N = 3
305
Banana Pi M2 by LoveRPi
SE +/- 0.58, N = 3
1954
Banana Pi M2+ Raspbian 8.0
SE +/- 7.13, N = 3
3906
Banana Pi M2+ SinoVoip
SE +/- 22.54, N = 3
8127
Banana Pi M2+ on Armbian
SE +/- 0.58, N = 3
2483
Banana Pi M3 by LoveRPi
SE +/- 1.33, N = 3
621
DragonBoard 410c on Debian RPB 16.03
SE +/- 148.98, N = 3
2341
MeUbuntu 14.04.3
SE +/- 0.58, N = 3
620
MiQi on Lubuntu 14.04
SE +/- 2.67, N = 3
866
NanoPi NEO 2 Armbian Ubuntu 16.04.2
SE +/- 0.58, N = 3
1285
NanoPi NEO 2 FA Ubuntu 16.04.2
SE +/- 0.33, N = 3
1308
NanoPi NEO 512MB Heatsink
SE +/- 2.89, N = 3
2134
NanoPi NEO 512MB Heatsink2
SE +/- 1.15, N = 3
2101
NanoPi NEO 512MB No Heatsink
SE +/- 65.74, N = 3
2829
Orange Pi One on Armbian
SE +/- 0.00, N = 3
1665
Orange Pi PC on Armbian
SE +/- 3.51, N = 3
1547
Orange Pi Plus on Armbian
SE +/- 0.67, N = 3
1549
Raspberry Pi 2 on Raspbian
SE +/- 5.90, N = 3
2175
Raspberry Pi 3 on Raspbian
SE +/- 1.86, N = 3
1390
VS-RK3399 Board - Debian 9
SE +/- 9.35, N = 3
679
2K
4K
6K
8K
10K
1. (CXX) g++ options: -fopenmp

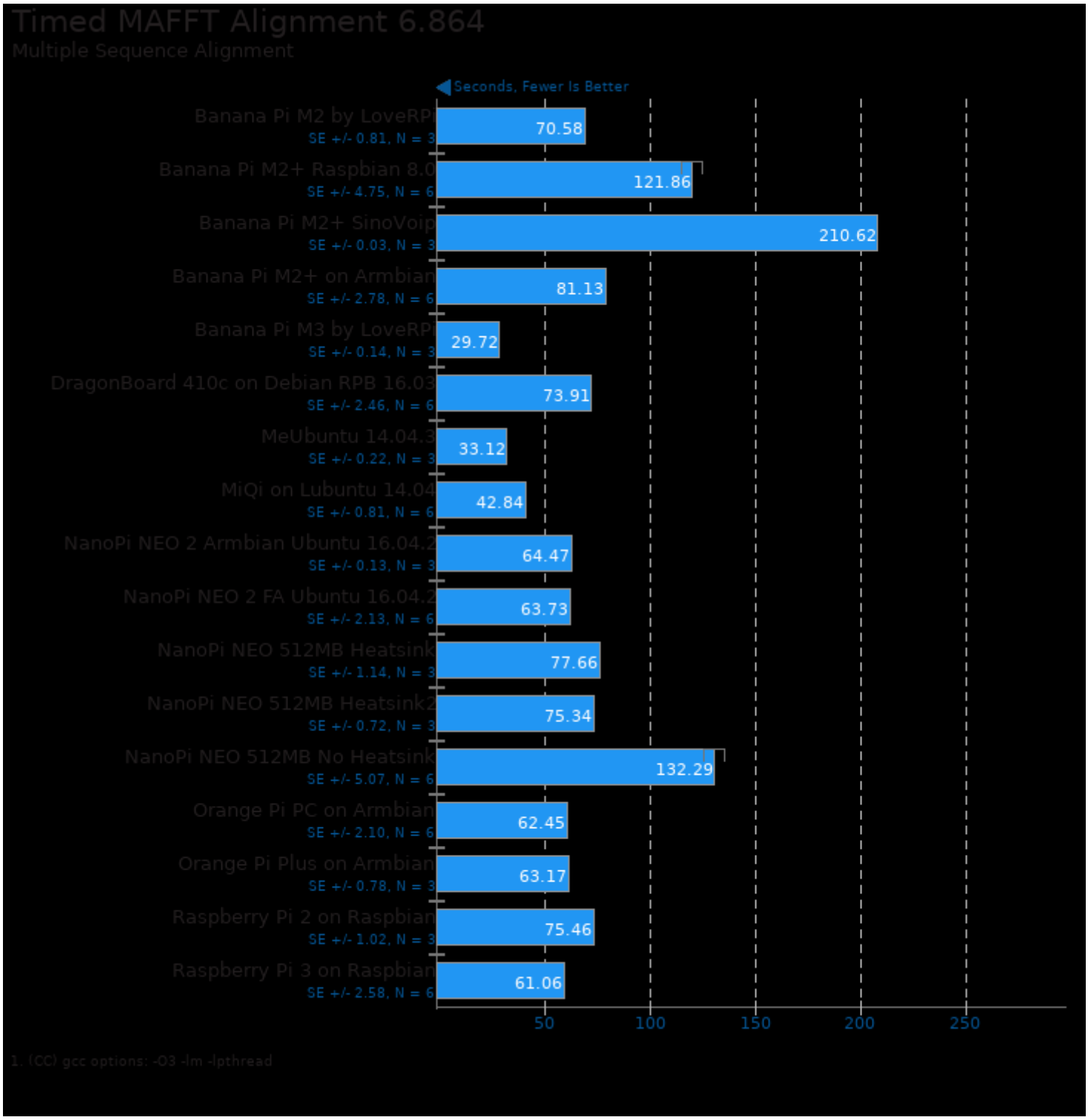

John The Ripper 1.8.0
Test: Blowfish
Real C/S, More Is Better
ARMv8 Cortex-A72
SE +/- 16.77, N = 15
1595
Banana Pi M2 by LoveRPi
SE +/- 0.33, N = 3
438
Banana Pi M2+ Raspbian 8.0
SE +/- 1.45, N = 3
323
Banana Pi M2+ SinoVoip
SE +/- 1.55, N = 4
104
Banana Pi M2+ on Armbian
SE +/- 22.63, N = 6
390
Banana Pi M3 by LoveRPi
SE +/- 5.24, N = 3
1408
DragonBoard 410c on Debian RPB 16.03
SE +/- 24.47, N = 6
535
MeUbuntu 14.04.3
SE +/- 83.72, N = 6
1003
MiQi on Lubuntu 14.04
SE +/- 1.00, N = 3
1055
NanoPi NEO 2 Armbian Ubuntu 16.04.2
478
NanoPi NEO 2 FA Ubuntu 16.04.2
SE +/- 1.53, N = 3
456
NanoPi NEO 512MB Heatsink
SE +/- 7.33, N = 3
462
NanoPi NEO 512MB Heatsink2
SE +/- 6.98, N = 3
452
NanoPi NEO 512MB No Heatsink
SE +/- 11.64, N = 6
313
Orange Pi One on Armbian
SE +/- 0.33, N = 3
509
Orange Pi PC on Armbian
SE +/- 0.00, N = 3
550
Orange Pi Plus on Armbian
SE +/- 0.00, N = 3
540
Raspberry Pi 2 on Raspbian
SE +/- 0.67, N = 3
387
Raspberry Pi 3 on Raspbian
SE +/- 2.19, N = 3
599
VS-RK3399 Board - Debian 9
SE +/- 14.50, N = 3
759
300
600
900
1200
1500
1. (CC) gcc options: -fopenmp


Himeno Benchmark 3.0
Poisson Pressure Solver
MFLOPS, More Is Better
ARMv8 Cortex-A72
SE +/- 5.13, N = 5
394.13
Banana Pi M2 by LoveRPi
SE +/- 0.08, N = 3
61.26
Banana Pi M2+ Raspbian 8.0
SE +/- 0.53, N = 3
63.04
Banana Pi M2+ SinoVoip
SE +/- 0.46, N = 3
56.83
Banana Pi M2+ on Armbian
SE +/- 0.37, N = 3
64.35
Banana Pi M3 by LoveRPi
SE +/- 0.49, N = 3
31.80
DragonBoard 410c on Debian RPB 16.03
SE +/- 0.47, N = 3
66.91
MeUbuntu 14.04.3
SE +/- 2.37, N = 3
443.65
MiQi on Lubuntu 14.04
SE +/- 1.56, N = 3
89.84
NanoPi NEO 2 Armbian Ubuntu 16.04.2
SE +/- 0.21, N = 3
49.18
NanoPi NEO 2 FA Ubuntu 16.04.2
SE +/- 1.76, N = 6
52.67
NanoPi NEO 512MB Heatsink
SE +/- 0.05, N = 3
15.34
NanoPi NEO 512MB Heatsink2
SE +/- 0.16, N = 3
15.31
NanoPi NEO 512MB No Heatsink
SE +/- 0.06, N = 3
41.32
Orange Pi One on Armbian
SE +/- 0.16, N = 3
64.38
Orange Pi PC on Armbian
SE +/- 0.32, N = 3
68.23
Orange Pi Plus on Armbian
SE +/- 0.04, N = 3
68.01
Raspberry Pi 2 on Raspbian
SE +/- 0.47, N = 3
33.29
Raspberry Pi 3 on Raspbian
SE +/- 0.37, N = 3
60.28
VS-RK3399 Board - Debian 9
SE +/- 0.80, N = 3
195.30
100
200
300
400
500
1. (CC) gcc options: -O3


FLAC Audio Encoding 1.3.1
WAV To FLAC
Seconds, Fewer Is Better
ARMv8 Cortex-A72
SE +/- 0.01, N = 5
35.26
Banana Pi M2 by LoveRPi
SE +/- 0.09, N = 5
288.16
Banana Pi M2+ Raspbian 8.0
SE +/- 0.41, N = 5
282.60
Banana Pi M2+ SinoVoip
SE +/- 0.28, N = 5
279.95
Banana Pi M2+ on Armbian
SE +/- 0.30, N = 5
230.20
DragonBoard 410c on Debian RPB 16.03
SE +/- 2.44, N = 7
198.14
MeUbuntu 14.04.3
SE +/- 0.88, N = 10
36.43
MiQi on Lubuntu 14.04
SE +/- 0.35, N = 5
81.96
NanoPi NEO 2 Armbian Ubuntu 16.04.2
SE +/- 0.03, N = 5
290.91
NanoPi NEO 2 FA Ubuntu 16.04.2
SE +/- 0.19, N = 5
236.51
NanoPi NEO 512MB Heatsink
SE +/- 0.31, N = 5
231.39
NanoPi NEO 512MB Heatsink2
SE +/- 0.14, N = 5
230.99
NanoPi NEO 512MB No Heatsink
SE +/- 2.55, N = 5
325.72
Orange Pi One on Armbian
SE +/- 0.16, N = 5
229.54
Orange Pi PC on Armbian
SE +/- 1.01, N = 5
228.09
Orange Pi Plus on Armbian
SE +/- 1.46, N = 5
231.38
Raspberry Pi 2 on Raspbian
SE +/- 1.30, N = 5
314.58
Raspberry Pi 3 on Raspbian
SE +/- 1.73, N = 5
237.30
VS-RK3399 Board - Debian 9
SE +/- 0.05, N = 5
48.84
70
140
210
280
350
1. (CXX) g++ options: -O2 -fvisibility=hidden -lm

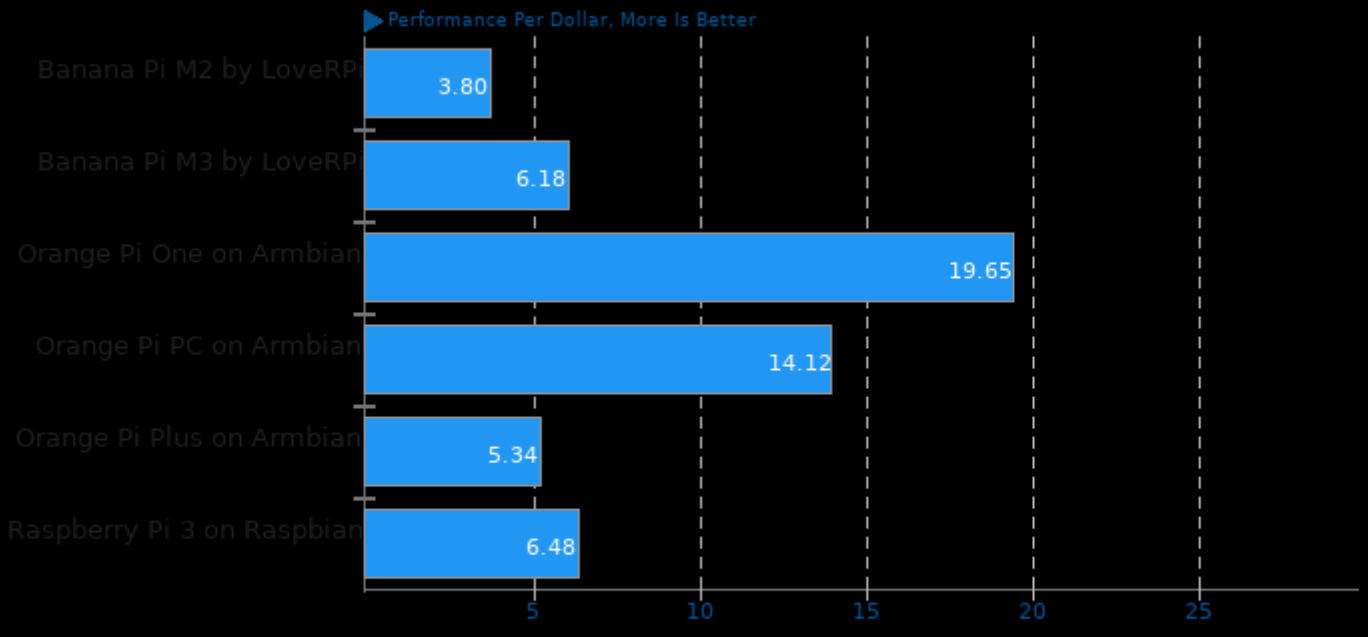

C-Ray 1.1
Total Time
Seconds, Fewer Is Better
ARMv8 Cortex-A72
SE +/- 0.63, N = 3
52.20
Banana Pi M2 by LoveRPi
SE +/- 0.02, N = 3
431.10
Banana Pi M2+ Raspbian 8.0
SE +/- 11.64, N = 3
893.24
Banana Pi M2+ SinoVoip
SE +/- 3.91, N = 3
1777.89
Banana Pi M2+ on Armbian
SE +/- 8.44, N = 6
581.37
Banana Pi M3 by LoveRPi
SE +/- 0.24, N = 3
136.14
DragonBoard 410c on Debian RPB 16.03
SE +/- 5.37, N = 6
341.80
MeUbuntu 14.04.3
SE +/- 0.02, N = 3
200.20
MiQi on Lubuntu 14.04
SE +/- 2.39, N = 6
136.96
NanoPi NEO 2 Armbian Ubuntu 16.04.2
SE +/- 0.18, N = 3
344.91
NanoPi NEO 2 FA Ubuntu 16.04.2
SE +/- 0.09, N = 3
350.48
NanoPi NEO 512MB Heatsink
SE +/- 7.92, N = 3
461.70
NanoPi NEO 512MB Heatsink2
SE +/- 4.74, N = 3
466.89
NanoPi NEO 512MB No Heatsink
SE +/- 27.05, N = 6
848.52
Orange Pi One on Armbian
SE +/- 0.37, N = 3
365.94
Orange Pi PC on Armbian
SE +/- 2.95, N = 3
344.52
Orange Pi Plus on Armbian
SE +/- 1.06, N = 3
350.07
Raspberry Pi 2 on Raspbian
SE +/- 0.74, N = 3
505.44
Raspberry Pi 3 on Raspbian
SE +/- 0.11, N = 3
250.79
VS-RK3399 Board - Debian 9
SE +/- 1.73, N = 3
98.08
400
800
1200
1600
2000
1. (CC) gcc options: -lm -lpthread -O3


OpenSSL 1.0.1g
RSA 4096-bit Performance
Signs Per Second, More Is Better
ARMv8 Cortex-A72
SE +/- 0.09, N = 3
-fomit-frame-pointer
48.93
Banana Pi M2 by LoveRPi
SE +/- 0.00, N = 3
-march=armv7-a
13.40
Banana Pi M2+ Raspbian 8.0
SE +/- 0.03, N = 3
-march=armv7-a
6.67
Banana Pi M2+ SinoVoip
SE +/- 0.00, N = 3
3.30
Banana Pi M2+ on Armbian
SE +/- 0.61, N = 6
-march=armv7-a
10.48
Banana Pi M3 by LoveRPi
SE +/- 0.50, N = 3
-march=armv7-a
43.30
DragonBoard 410c on Debian RPB 16.03
SE +/- 0.40, N = 6
-fomit-frame-pointer
10.90
MeUbuntu 14.04.3
SE +/- 0.52, N = 3
-m64
66.53
MiQi on Lubuntu 14.04
SE +/- 0.00, N = 3
-march=armv7-a
29.70
NanoPi NEO 512MB Heatsink
SE +/- 0.17, N = 6
-march=armv7-a
12.35
NanoPi NEO 512MB Heatsink2
SE +/- 0.23, N = 6
-march=armv7-a
12.40
NanoPi NEO 512MB No Heatsink
SE +/- 0.58, N = 6
-march=armv7-a
7.68
Orange Pi One on Armbian
SE +/- 0.00, N = 3
-march=armv7-a
16.00
Orange Pi PC on Armbian
SE +/- 0.00, N = 3
-march=armv7-a
17.20
Orange Pi Plus on Armbian
SE +/- 0.03, N = 3
-march=armv7-a
17.13
Raspberry Pi 2 on Raspbian
SE +/- 0.03, N = 3
-march=armv7-a
11.93
Raspberry Pi 3 on Raspbian
SE +/- 0.75, N = 6
-march=armv7-a
20.60
15
30
45
60
75
1. (CC) gcc options: -O3 -lssl -lcrypto -ldl


Timed MAFFT Alignment 6.864
Multiple Sequence Alignment
Seconds, Fewer Is Better
Banana Pi M2 by LoveRPi
SE +/- 0.81, N = 3
70.58
Banana Pi M2+ Raspbian 8.0
SE +/- 4.75, N = 6
121.86
Banana Pi M2+ SinoVoip
SE +/- 0.03, N = 3
210.62
Banana Pi M2+ on Armbian
SE +/- 2.78, N = 6
81.13
Banana Pi M3 by LoveRPi
SE +/- 0.14, N = 3
29.72
DragonBoard 410c on Debian RPB 16.03
SE +/- 2.46, N = 6
73.91
MeUbuntu 14.04.3
SE +/- 0.22, N = 3
33.12
MiQi on Lubuntu 14.04
SE +/- 0.81, N = 6
42.84
NanoPi NEO 2 Armbian Ubuntu 16.04.2
SE +/- 0.13, N = 3
64.47
NanoPi NEO 2 FA Ubuntu 16.04.2
SE +/- 2.13, N = 6
63.73
NanoPi NEO 512MB Heatsink
SE +/- 1.14, N = 3
77.66
NanoPi NEO 512MB Heatsink2
SE +/- 0.72, N = 3
75.34
NanoPi NEO 512MB No Heatsink
SE +/- 5.07, N = 6
132.29
Orange Pi PC on Armbian
SE +/- 2.10, N = 6
62.45
Orange Pi Plus on Armbian
SE +/- 0.78, N = 3
63.17
Raspberry Pi 2 on Raspbian
SE +/- 1.02, N = 3
75.46
Raspberry Pi 3 on Raspbian
SE +/- 2.58, N = 6
61.06
50
100
150
200
250
1. (CC) gcc options: -O3 -lm -lpthread

Meta Performance Per Dollar

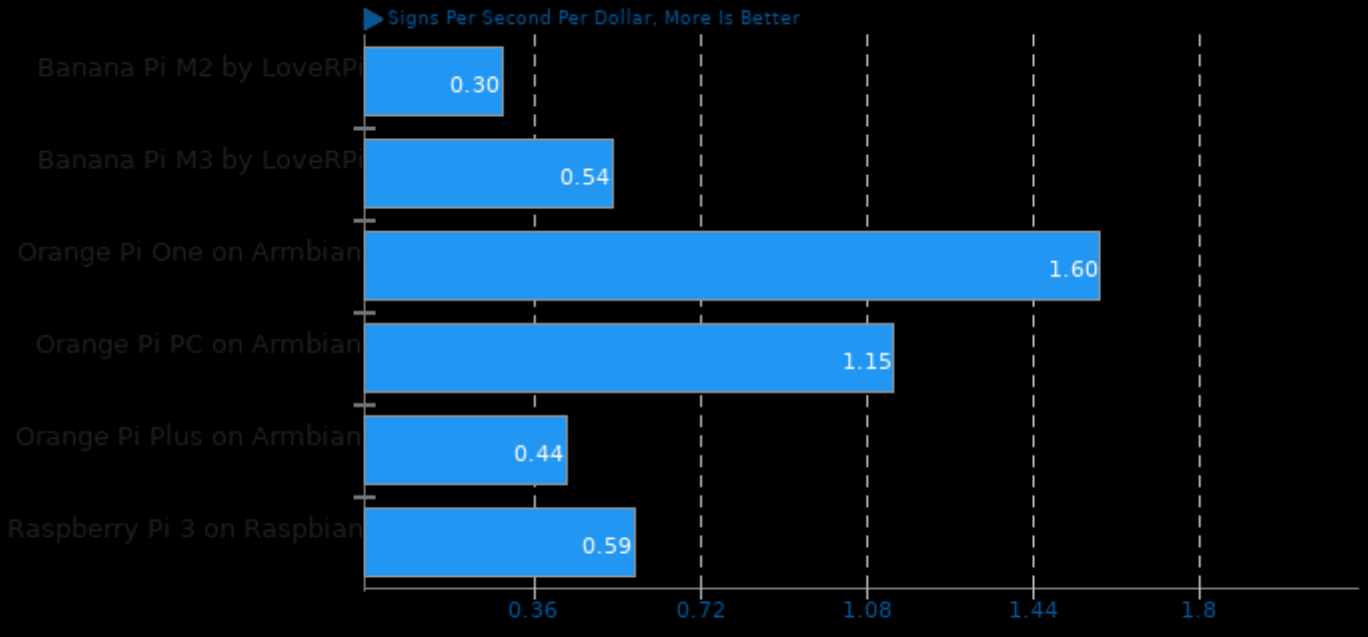
Performance Per Dollar



1. Banana Pi M2 by LoveRPi: $45 reported cost. Average result: 170.89.
2. Banana Pi M3 by LoveRPi: $80 reported cost. Average result: 494.37.
3. Orange Pi One on Armbian: $10 reported cost. Average result: 196.46.
4. Orange Pi PC on Armbian: $15 reported cost. Average result: 211.81.
5. Orange Pi Plus on Armbian: $39 reported cost. Average result: 208.38.
6. Raspberry Pi 3 on Raspbian: $35 reported cost. Average result: 226.63.

OpenSSL 1.0.1g

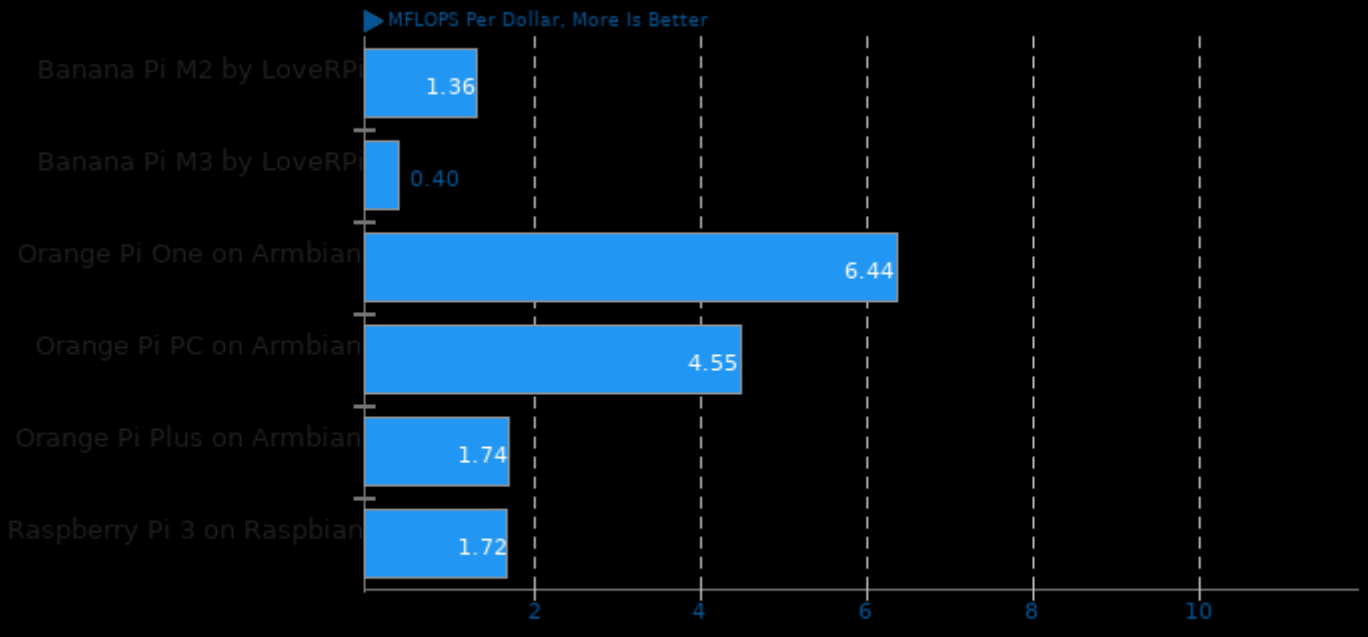
Performance / Cost - RSA 4096-bit Performance



1. Banana Pi M2 by LoveRPi: $45 reported cost.
2. Banana Pi M3 by LoveRPi: $80 reported cost.
3. Orange Pi One on Armbian: $10 reported cost.
4. Orange Pi PC on Armbian: $15 reported cost.
5. Orange Pi Plus on Armbian: $39 reported cost.
6. Raspberry Pi 3 on Raspbian: $35 reported cost.

Himeno Benchmark 3.0

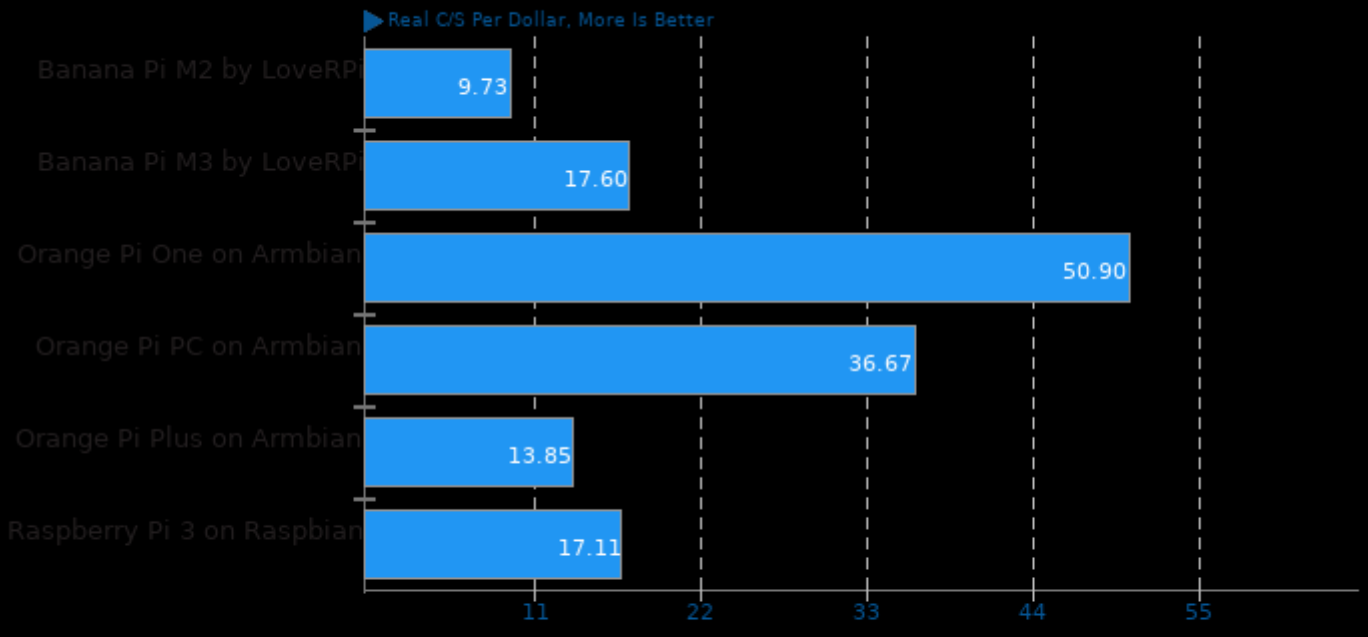
Performance / Cost - Poisson Pressure Solver



1. Banana Pi M2 by LoveRPi: $45 reported cost.
2. Banana Pi M3 by LoveRPi: $80 reported cost.
3. Orange Pi One on Armbian: $10 reported cost.
4. Orange Pi PC on Armbian: $15 reported cost.
5. Orange Pi Plus on Armbian: $39 reported cost.
6. Raspberry Pi 3 on Raspbian: $35 reported cost.

John The Ripper 1.8.0

Performance / Cost - Test: Blowfish



1. Banana Pi M2 by LoveRPi: $45 reported cost.
2. Banana Pi M3 by LoveRPi: $80 reported cost.
3. Orange Pi One on Armbian: $10 reported cost.
4. Orange Pi PC on Armbian: $15 reported cost.
5. Orange Pi Plus on Armbian: $39 reported cost.
6. Raspberry Pi 3 on Raspbian: $35 reported cost.

This file was automatically generated via the Phoronix Test Suite benchmarking software on Thursday, 28 March 2024 09:43.