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AMD Ryzen 7 1800X Comparison

AMD Ryzen 9 3900X 12-Core testing with a MSI B450 TOMAHAWK MAX II (MS-7C02) v3.0 (H.40 BIOS) and Sapphire AMD Radeon RX 56/64 8GB on Arch rolling via the Phoronix Test Suite.

Automated Executive Summary

paju_3900x had the most wins, coming in first place for 57% of the tests.

Test Systems:

AMD Ryzen 7 1800X

Processor: AMD Ryzen 7 1800X Eight-Core @ 3.60GHz (16 Cores), Motherboard: MSI X370 XPOWER GAMING TITANIUM (MS-7A31) v1.0, Chipset: AMD Device 1450, Memory: 16384MB, Disk: 256GB INTEL SSDPEKKW256G7, Graphics: Sapphire AMD Radeon R9 FURY / NANO 4096MB, Audio: AMD Fiji HDMI/DP, Monitor: DELL P2415Q, Network: Intel I211 Gigabit Connection

OS: Ubuntu 17.04, Kernel: 4.10.0-9-generic (x86_64), Desktop: Unity 7.5.0, Display Server: X Server 1.18.4, Display

Driver: modesetting 1.18.4, OpenGL: 4.3 Mesa 13.0.4 Gallium 0.4 (LLVM 3.9.1), Compiler: GCC 6.3.0 20161229, File-System: ext4, Screen Resolution: 3840x2160

Compiler Notes: --build=x86_64-linux-gnu --disable-browser-plugin --disable-vtable-verify --disable-werror --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 ondemand

AMD FX-8320 @4.6Ghz sterky

Processor: AMD FX-8320 Eight-Core @ 4.60GHz (8 Cores), Motherboard: ASUS SABERTOOTH 990FX R2.0, Chipset: AMD RD9x0/RX980, Memory: 16384MB, Disk: 128GB Samsung SSD 840 + 4001GB Seagate ST4000DM000-1F21 + 256GB Crucial_CT256MX1 + 256GB SAMSUNG MZVPV256HDGL-00000, Graphics: eVGA NVIDIA GeForce GTX 1070 8192MB (1133/4006MHz), Audio: NVIDIA GP104 HD Audio, Monitor: ROG PG279Q, Network: Realtek RTL8111/8168/8411

OS: Arch rolling, Kernel: 4.10.1-1-ARCH (x86_64), Desktop: MATE 1.16.1, Display Driver: NVIDIA 378.13, OpenGL: 4.5.0, Vulkan: 1.0.39, Compiler: GCC 6.3.1 20170109 + Clang 3.9.1 + CUDA 8.0, File-System: ext4, Screen Resolution: 2560x1440

Compiler Notes: --disable-libssp --disable-libstdcxx-pch --disable-libunwind-exceptions --disable-werror --enable-__cxa_atexit --enable-checking=release --enable-clocale=gnu --enable-gnu-indirect-function --enable-gnu-unique-object --enable-install-libiberty --enable-languages=c,c++,ada,fortran,go,lto,objc,obj-c++ --enable-libmpx --enable-lto --enable-multilib --enable-plugin --enable-shared --enable-threads=posix --mandir=/usr/share/man --with-isl --with-linker-hash-style=gnu
Processor Notes: Scaling Governor: acpi-cpufreq performance

Intel i7-4790K @4.4Ghz Kallestofeles

Processor: Intel Core i7-4790K @ 4.40GHz (8 Cores), Motherboard: MSI Z97 GAMING 3 (MS-7918) v1.0, Chipset: Intel 4th Gen Core DRAM, Memory: 8192MB, Disk: 128GB Samsung SSD 840 + 250GB Seagate ST3250823AS + 250GB Samsung SSD 850, Graphics: MSI NVIDIA GeForce GTX 1070 8192MB (106/405MHz), Audio: Realtek ALC1150, Network: Qualcomm Atheros Killer E220x Gigabit

OS: Arch rolling, Kernel: 4.9.11-1-ARCH (x86_64), Desktop: Xfce 4.12, Display Driver: NVIDIA 378.13, OpenGL: 4.5.0, Vulkan: 1.0.37, Compiler: GCC 6.3.1 20170109 + Clang 3.9.1 + CUDA 8.0, File-System: ext4, Screen Resolution: 3840x1080

Compiler Notes: --disable-libssp --disable-libstdcxx-pch --disable-libunwind-exceptions --disable-multilib --disable-werror --enable-__cxa_atexit --enable-checking=release --enable-clocale=gnu --enable-gnu-indirect-function --enable-gnu-unique-object --enable-install-libiberty --enable-languages=c,c++,ada,fortran,go,lto,objc,obj-c++ --enable-libmpx --enable-lto --enable-plugin --enable-shared --enable-threads=posix --mandir=/usr/share/man --with-isl --with-linker-hash-style=gnu
Processor Notes: Scaling Governor: intel_pstate powersave

Intel i7-3770K @4.3Ghz paju

Processor: Intel Core i7-3770K @ 4.30GHz (8 Cores), Motherboard: Intel DZ77GA-70K, Chipset: Intel Xeon E3-1200 v2/3rd, Memory: 16384MB, Disk: 128GB Samsung SSD 840 + 256GB Crucial_CT256MX1 + 3001GB Western Digital WD30EFRX-68A, Graphics: AMD Radeon RX 470/480 8192MB, Audio: Realtek ALC898, Monitor: DELL U2412M + Philips FTV, Network: Intel 82579V Gigabit Connection

OS: Arch rolling, Kernel: 4.10.1-1-zen (x86_64), Desktop: MATE 1.16.1, Display Server: X Server 1.19.1, Display Driver: amdgpu 1.2.0, OpenGL: 4.5 Mesa 17.0.0 Gallium 0.4, Vulkan: 1.0.3, Compiler: GCC 6.3.1 20170109 + Clang 3.9.1 + LLVM 3.9.1, File-System: ext4, Screen Resolution: 1920x1200

Environment Notes: __GL_THREADED_OPTIMISATIONS=1
Compiler Notes: --disable-libssp --disable-libstdcxx-pch --disable-libunwind-exceptions --disable-werror --enable-__cxa_atexit --enable-checking=release --enable-clocale=gnu --enable-gnu-indirect-function --enable-gnu-unique-object --enable-install-libiberty --enable-languages=c,c++,ada,fortran,go,lto,objc,obj-c++

--enable-libmpx --enable-lto --enable-multilib --enable-plugin --enable-shared --enable-threads=posix --mandir=/usr/share/man --with-isl --with-linker-hash-style=gnu
Processor Notes: Scaling Governor: intel_pstate performance

AMD Ryzen 7 1800X sterky ddr4_3200

Processor: AMD Ryzen 7 1800X Eight-Core @ 3.60GHz (16 Cores), Motherboard: ASUS CROSSHAIR VI HERO, Chipset: AMD Device 1450, Memory: 16384MB, Disk: 256GB Crucial_CT256MX1 + 4001GB Seagate ST4000DM000-1F21 + 128GB Samsung SSD 840 + 256GB SAMSUNG MZVPV256HDGL-00000, Graphics: eVGA NVIDIA GeForce GTX 1070 8192MB (1596/4006MHz), Audio: NVIDIA GP104 HD Audio, Monitor: ROG PG279Q, Network: Intel I211 Gigabit Connection

OS: Arch rolling, Kernel: 4.10.1-1-ARCH (x86_64), Desktop: MATE 1.16.1, Display Driver: NVIDIA 378.13, OpenGL: 4.5.0, Vulkan: 1.0.39, Compiler: GCC 6.3.1 20170109 + Clang 3.9.1 + CUDA 8.0, File-System: ext4, Screen Resolution: 2560x1440

Compiler Notes: --disable-libssp --disable-libstdcxx-pch --disable-libunwind-exceptions --disable-werror --enable-__cxa_atexit --enable-checking=release --enable-clocale=gnu --enable-gnu-indirect-function --enable-gnu-unique-object --enable-install-libiberty --enable-languages=c,c++,ada,fortran,go,lto,objc,obj-c++ --enable-libmpx --enable-lto --enable-multilib --enable-plugin --enable-shared --enable-threads=posix --mandir=/usr/share/man --with-isl --with-linker-hash-style=gnu
Processor Notes: Scaling Governor: acpi-cpufreq performance

AMD Ryzen 7 1800X sterky 001_manual

Processor: AMD Ryzen 7 1800X Eight-Core @ 3.70GHz (16 Cores), Motherboard: ASUS CROSSHAIR VI HERO, Chipset: AMD Device 1450, Memory: 16384MB, Disk: 256GB Crucial_CT256MX1 + 4001GB Seagate ST4000DM000-1F21 + 128GB Samsung SSD 840 + 256GB SAMSUNG MZVPV256HDGL-00000, Graphics: eVGA NVIDIA GeForce GTX 1070 8192MB (202/405MHz), Audio: NVIDIA GP104 HD Audio, Monitor: ROG PG279Q, Network: Intel I211 Gigabit Connection

OS: Arch rolling, Kernel: 4.10.3-1-ARCH (x86_64), Desktop: MATE 1.16.1, Display Driver: NVIDIA 378.13, OpenGL: 4.5.0, Vulkan: 1.0.42, Compiler: GCC 6.3.1 20170306 + Clang 3.9.1 + CUDA 8.0, File-System: ext4, Screen Resolution: 2560x1440

Compiler Notes: --disable-libssp --disable-libstdcxx-pch --disable-libunwind-exceptions --disable-werror --enable-__cxa_atexit --enable-checking=release --enable-clocale=gnu --enable-gnu-indirect-function --enable-gnu-unique-object --enable-install-libiberty --enable-languages=c,c++,ada,fortran,go,lto,objc,obj-c++ --enable-libmpx --enable-lto --enable-multilib --enable-plugin --enable-shared --enable-threads=posix --mandir=/usr/share/man --with-isl --with-linker-hash-style=gnu
Processor Notes: Scaling Governor: acpi-cpufreq performance

AMD Ryzen 7 1800X sterky 002_manual

Processor: AMD Ryzen 7 1800X Eight-Core @ 3.70GHz (16 Cores), Motherboard: ASUS CROSSHAIR VI HERO, Chipset: AMD Device 1450, Memory: 16384MB, Disk: 256GB Crucial_CT256MX1 + 4001GB Seagate ST4000DM000-1F21 + 128GB Samsung SSD 840 + 256GB SAMSUNG MZVPV256HDGL-00000, Graphics: eVGA NVIDIA GeForce GTX 1070 8192MB (1597/4006MHz), Audio: NVIDIA GP104 HD Audio, Monitor: ROG PG279Q, Network: Intel I211 Gigabit Connection

OS: Arch rolling, Kernel: 4.10.3-1-ARCH (x86_64), Desktop: MATE 1.16.1, Display Driver: NVIDIA 378.13, OpenGL: 4.5.0, Vulkan: 1.0.42, Compiler: GCC 6.3.1 20170306 + Clang 3.9.1 + CUDA 8.0, File-System: ext4, Screen Resolution: 2560x1440

Compiler Notes: --disable-libssp --disable-libstdcxx-pch --disable-libunwind-exceptions --disable-werror --enable-__cxa_atexit --enable-checking=release --enable-clocale=gnu --enable-gnu-indirect-function --enable-gnu-unique-object --enable-install-libiberty --enable-languages=c,c++,ada,fortran,go,lto,objc,obj-c++ --enable-libmpx --enable-lto --enable-multilib --enable-plugin --enable-shared --enable-threads=posix --mandir=/usr/share/man --with-isl --with-linker-hash-style=gnu
Processor Notes: Scaling Governor: acpi-cpufreq performance

AMD Ryzen 7 1800X 003_manual

AMD Ryzen 7 1800X Comparison

Processor: AMD Ryzen 7 1800X Eight-Core @ 3.63GHz (16 Cores), Motherboard: ASUS CROSSHAIR VI HERO, Chipset: AMD Device 1450, Memory: 16384MB, Disk: 256GB Crucial_CT256MX1 + 4001GB Seagate ST4000DM000-1F21 + 128GB Samsung SSD 840 + 256GB SAMSUNG MZVPV256HDGL-00000, Graphics: eVGA NVIDIA GeForce GTX 1070 8192MB (1595/4006MHz), Audio: NVIDIA GP104 HD Audio, Monitor: ROG PG279Q, Network: Intel I211 Gigabit Connection

OS: Arch rolling, Kernel: 4.10.3-1-ARCH (x86_64), Desktop: MATE 1.16.1, Display Driver: NVIDIA 378.13, OpenGL: 4.5.0, Vulkan: 1.0.42, Compiler: GCC 6.3.1 20170306 + Clang 3.9.1 + CUDA 8.0, File-System: ext4, Screen Resolution: 2560x1440

Compiler Notes: --disable-libssp --disable-libstdcxx-pch --disable-libunwind-exceptions --disable-werror --enable-__cxa_atexit --enable-checking=release --enable-clocale=gnu --enable-gnu-indirect-function --enable-gnu-unique-object --enable-install-libiberty --enable-languages=c,c++,ada,fortran,go,lto,objc,obj-c++ --enable-libmpx --enable-lto --enable-multilib --enable-plugin --enable-shared --enable-threads=posix --mandir=/usr/share/man --with-isl --with-linker-hash-style=gnu
Processor Notes: Scaling Governor: acpi-cpufreq performance

paju_3900x

Processor: AMD Ryzen 9 3900X 12-Core @ 6.00GHz (12 Cores / 24 Threads), Motherboard: MSI B450 TOMAHAWK MAX II (MS-7C02) v3.0 (H.40 BIOS), Chipset: AMD Starship/Matisse, Memory: 32GB, Disk: Samsung SSD 970 PRO 512GB + 512GB ADATA SP900 + 2 x 256GB Crucial CT256MX1 + 3001GB Western Digital WD30EFRX-68A, Graphics: Sapphire AMD Radeon RX 56/64 8GB (1590/800MHz), Audio: AMD Vega 10 HDMI Audio, Monitor: XF270HU, Network: Realtek RTL8111/8168/8411

OS: Arch rolling, Kernel: 5.12.2-zen2-1-zen (x86_64), Desktop: Cinnamon 4.8.6, Display Server: X Server 1.20.11, OpenGL: 4.6 Mesa 21.1.0 (LLVM 11.1.0), Compiler: GCC 10.2.0 + Clang 11.1.0 + LLVM 11.1.0, File-System: ext4, Screen Resolution: 2560x1440

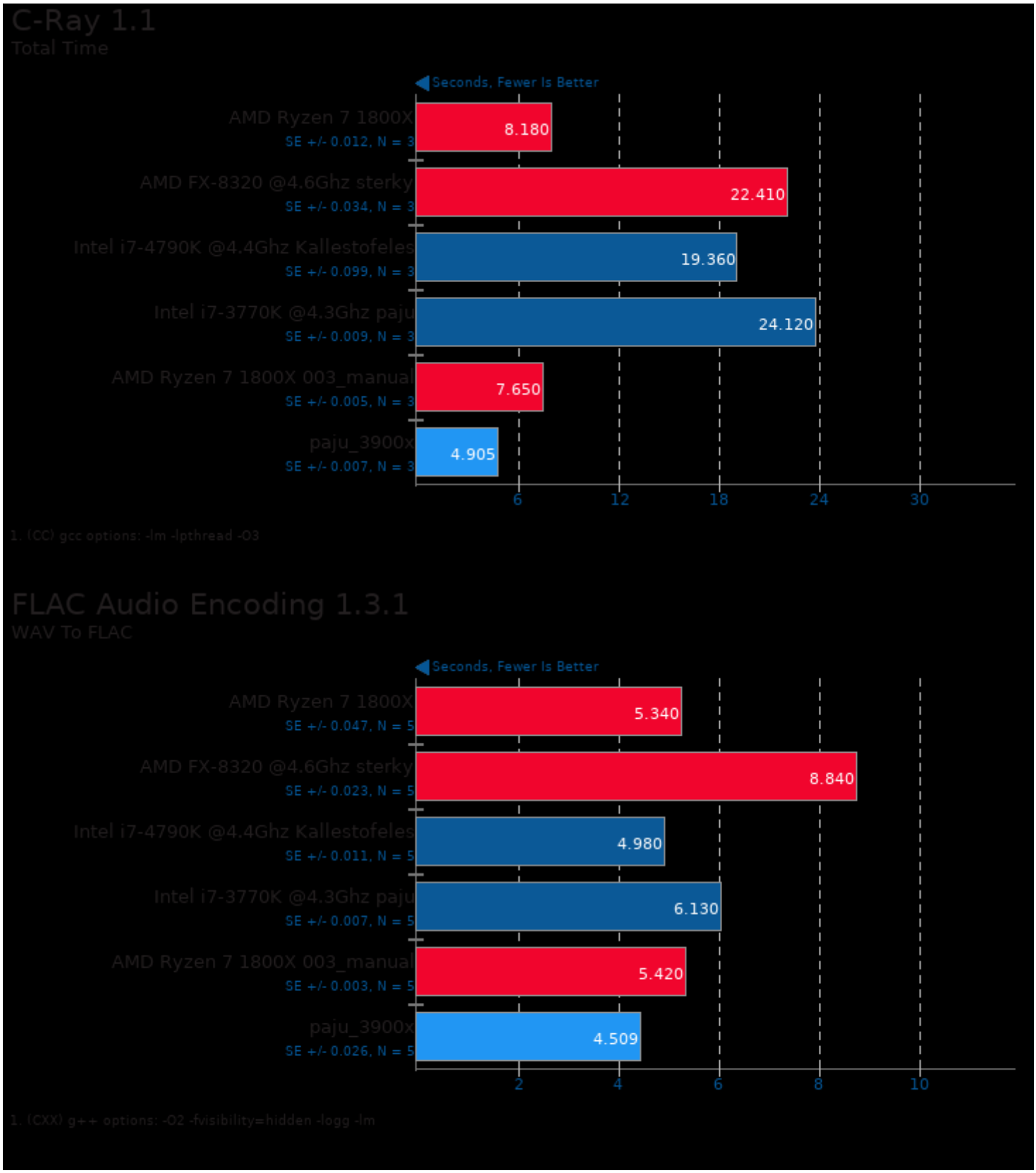
Kernel Notes: Transparent Huge Pages: always
Environment Notes: __GL_THREADED_OPTIMISATIONS=1
Compiler Notes: --disable-libssp --disable-libstdcxx-pch --disable-libunwind-exceptions --disable-werror --enable-__cxa_atexit --enable-cet=auto --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-default-ssp --enable-gnu-indirect-function --enable-gnu-unique-object --enable-install-libiberty --enable-languages=c,c++,ada,fortran,go,lto,objc,obj-c++,d --enable-lto --enable-multilib --enable-plugin --enable-shared --enable-threads=posix --mandir=/usr/share/man --with-isl --with-linker-hash-style=gnu
Processor Notes: Scaling Governor: acpi-cpufreq schedutil (Boost: Enabled) - CPU Microcode: 0x8701021
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional STIBP: conditional RSB filling + srbds: Not affected + tsx_async_abort: Not affected

	AMD Ryzen 7 1800X	AMD FX-8320 @4.6Ghz sterky	Intel i7-4790K @4.4Ghz Kallestofeles	Intel i7-3770K @4.3Ghz paju	AMD Ryzen 7 1800X sterky ddr4_3200	AMD Ryzen 7 1800X sterky 001_manual	AMD Ryzen 7 1800X sterky 002_manual	AMD Ryzen 7 1800X 003_manual	paju_3900x
C-Ray - Total Time (sec)	8.18	22.41	19.36	**24.12**				7.65	**4.905**
Normalized	59.96%	21.89%	25.34%	20.34%				64.12%	100%
Standard Deviation	0.2%	0.3%	0.9%	0.1%				0.1%	0.3%

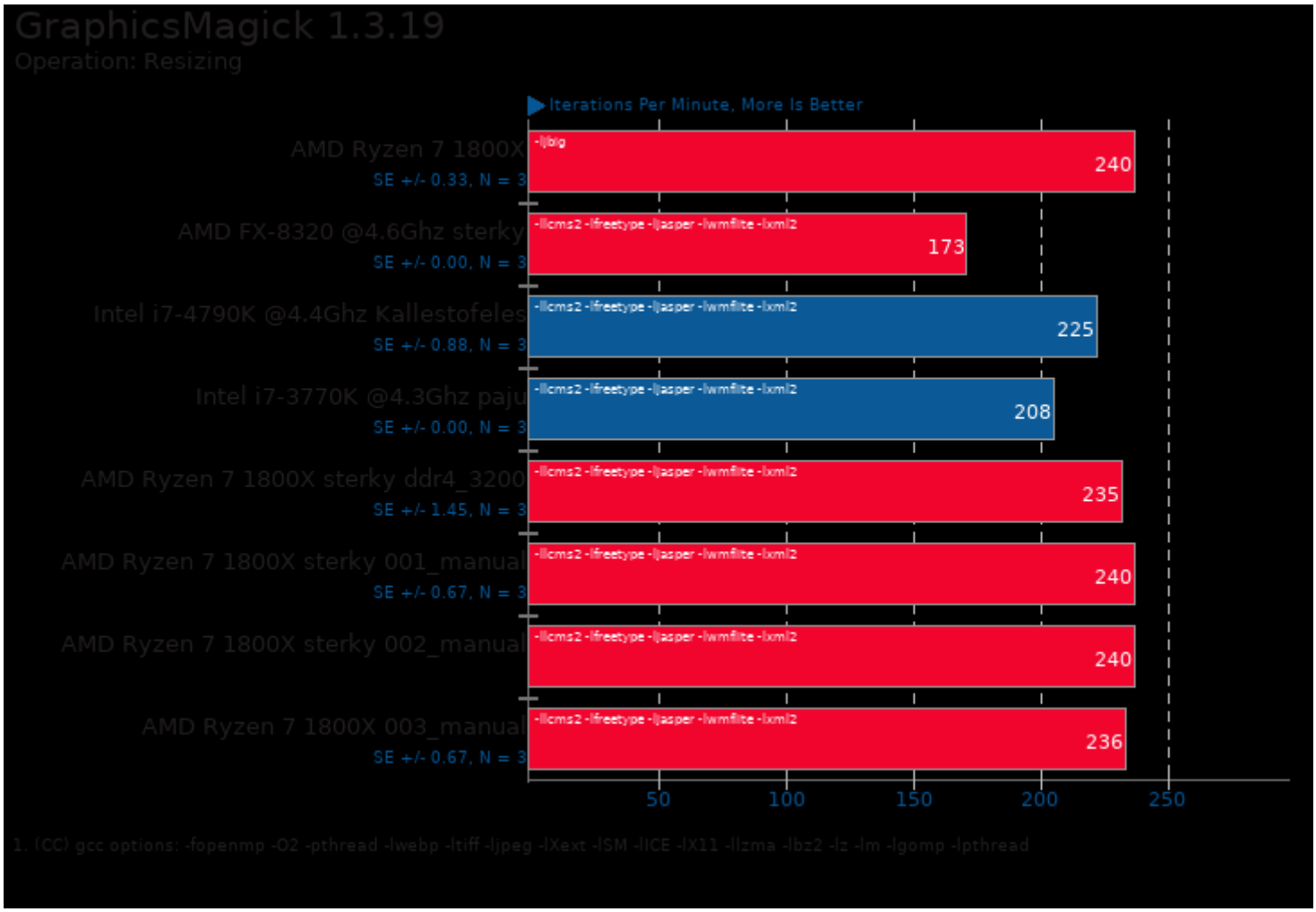
AMD Ryzen 7 1800X Comparison

FLAC Audio Encoding - WAV To	5.34	**8.84**	4.98	6.13				5.42	**4.509**
Normalized	84.44%	51.01%	90.54%	73.56%				83.19%	100%
Standard Deviation	2%	0.6%	0.5%	0.3%				0.1%	1.3%
GraphicsMagick - Resizing (Iterations/min)	**240**	**173**	225	208	235	**240**	**240**	236	
Normalized	100%	72.08%	93.75%	86.67%	97.92%	100%	100%	98.33%	
Standard Deviation	0.2%	0%	0.7%	0%	1.1%	0.5%		0.5%	
GraphicsMagick - HWB Color Space (Iterations/min)	248	**185**	245	227	246	**255**	**255**	250	
Normalized	97.25%	72.55%	96.08%	89.02%	96.47%	100%	100%	98.04%	
Standard Deviation	0.2%	0.3%	0.2%	0%	0.8%		0.4%		
libjpeg-turbo tjbench - D.T	177.16		180.40	**167.55**				173.74	**197.286908**
Normalized	89.8%		91.44%	84.93%				88.06%	100%
Standard Deviation	0.1%		0.6%	0.3%				0.1%	0.5%
OpenSSL - R.4.b.P (Signs/sec)	1139	786.13	729.43	**639.93**				1220	**2395**
Normalized	47.58%	32.83%	30.46%	26.72%				50.94%	100%
Standard Deviation	0.3%	0.2%	0%	0%				0%	0.1%
Timed Linux Kernel Compilation - Time To Compile (sec)	80.91	144.96	124.93	**148.08**				**71.06**	
Normalized	87.83%	49.02%	56.88%	47.99%				100%	
Standard Deviation	1.3%	1.1%	0.4%	0.9%				2%	

AMD Ryzen 7 1800X Comparison



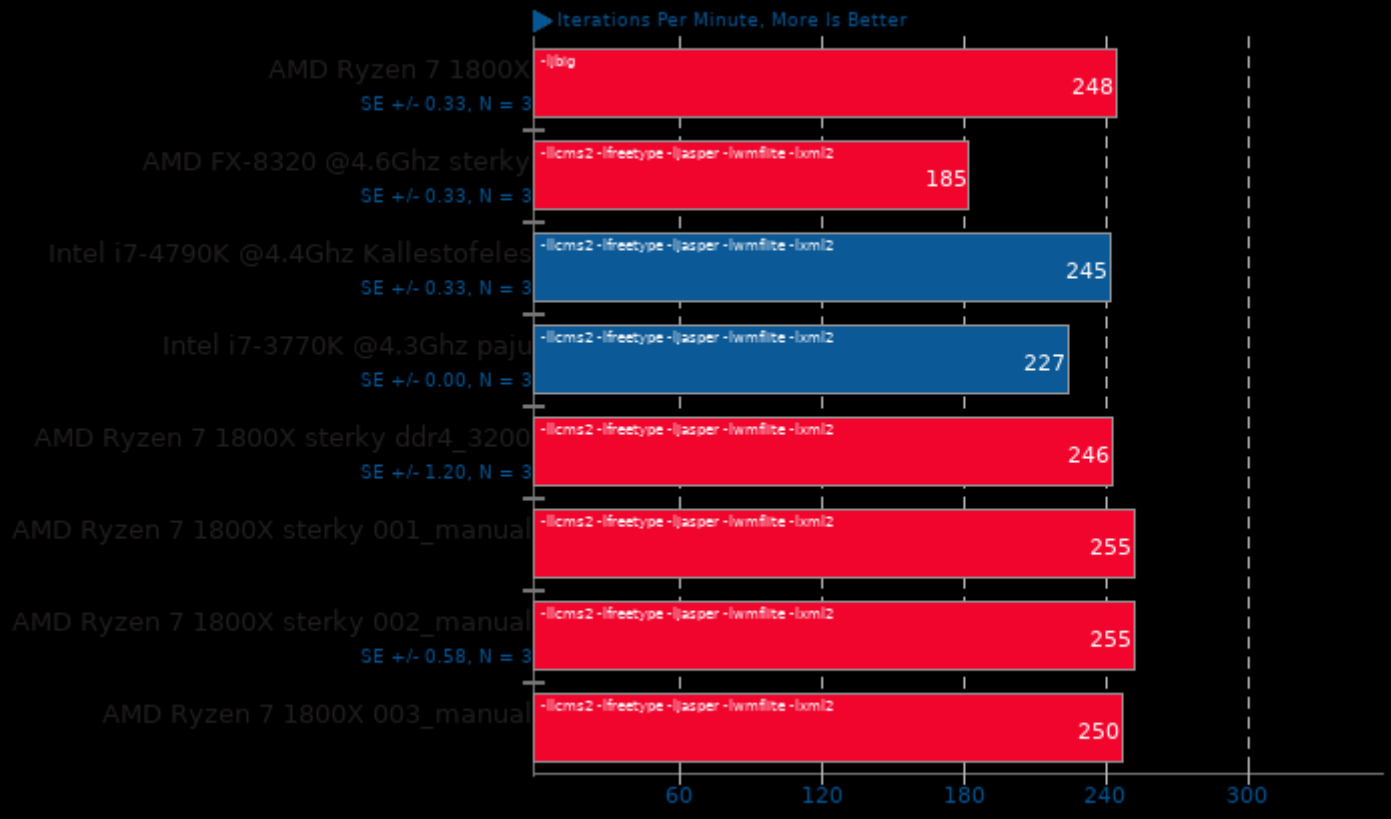
AMD Ryzen 7 1800X Comparison



AMD Ryzen 7 1800X Comparison

GraphicsMagick 1.3.19

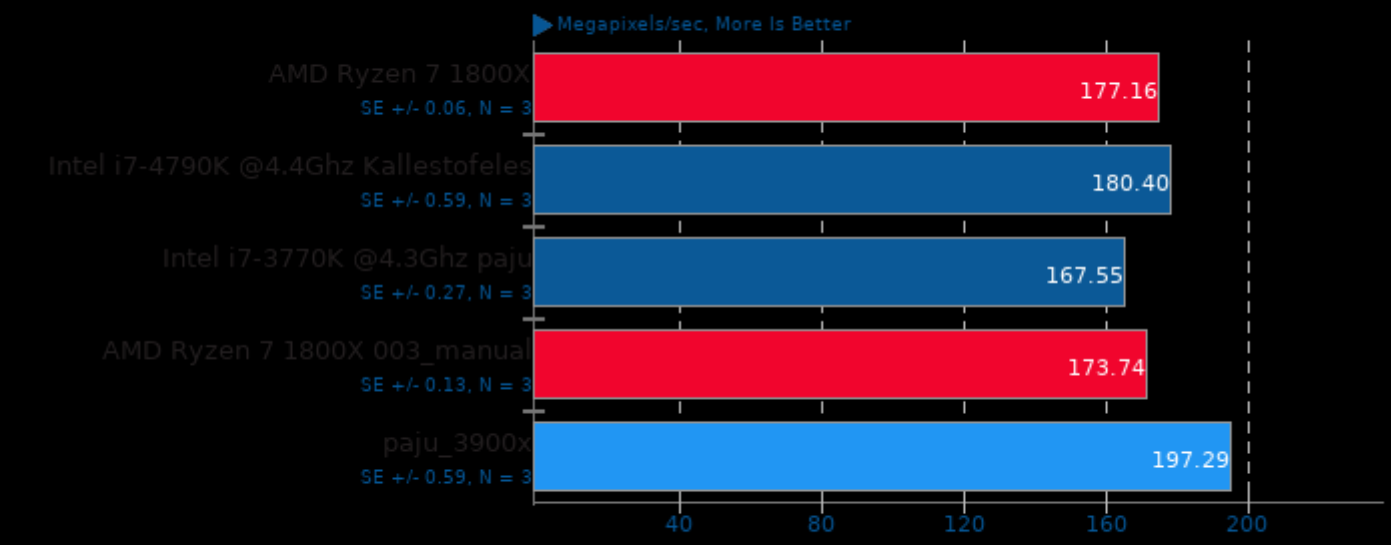
Operation: HWB Color Space



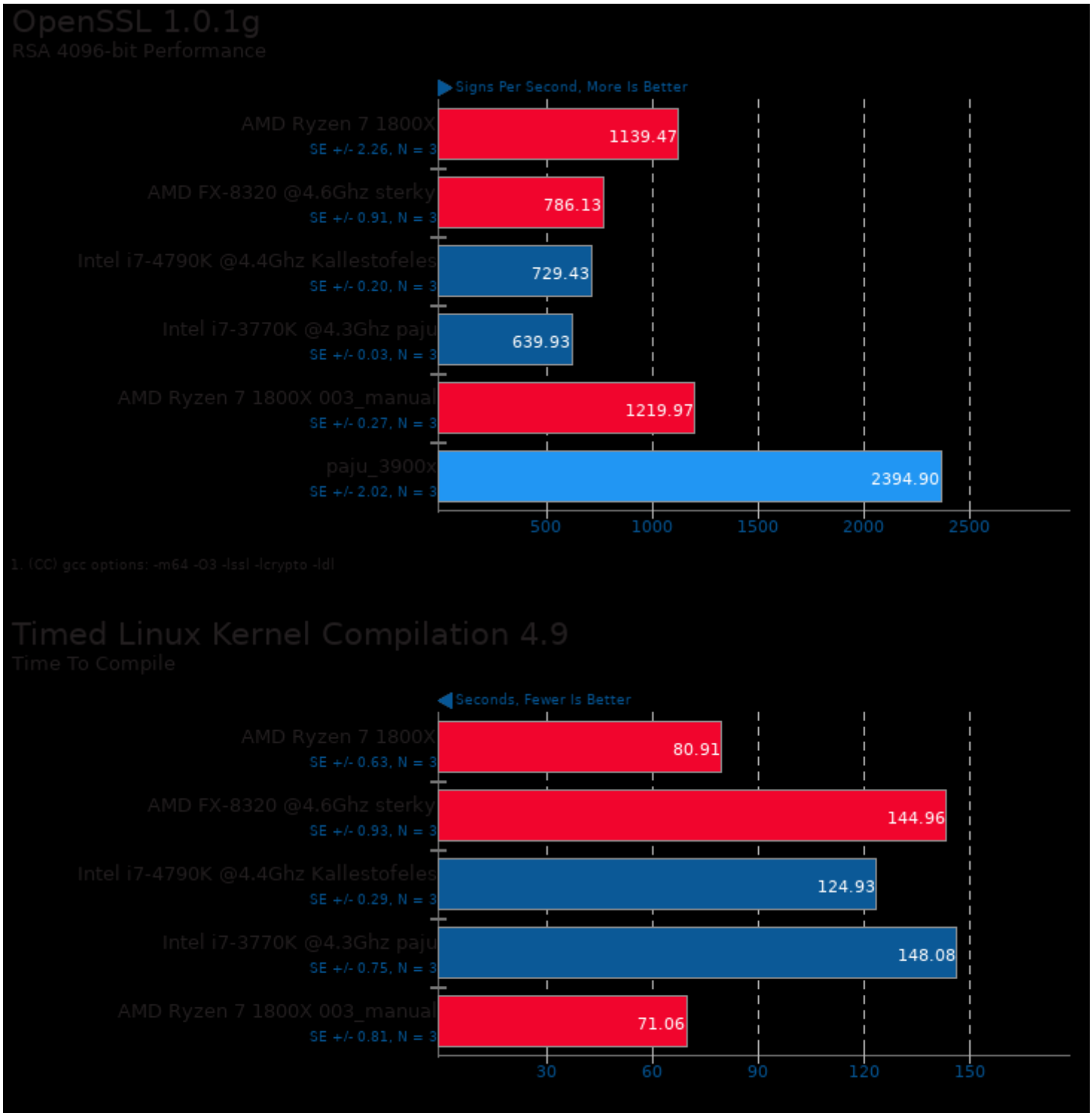
1. (CC) gcc options: -fopenmp -O2 -pthread -lwebp -ltiff -ljpeg -lXext -lSM -lICE -lX11 -llzma -lbz2 -lz -lm -lgomp -lpthread

libjpeg-turbo tjbench 1.5.1

Test: Decompression Throughput



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



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