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AMD Ryzen 3000 vs. Intel On Linux Ubuntu 19.04

SparePartsServer

Automated Executive Summary

AMD Ryzen 9 3900X had the most wins, coming in first place for 63% of the tests.

Based on the geometric mean of all complete results, the fastest (AMD Ryzen 9 3900X) was 1.997x the speed of the slowest (Intel Core i5 9400F). Intel Core i9 9900K was 0.794x the speed of AMD Ryzen 9 3900X, AMD Ryzen 7 3700X was 0.992x the speed of Intel Core i9 9900K, AMD Ryzen 7 2700X was 0.837x the speed of AMD Ryzen 7 3700X, AMD Ryzen 5 3600X was 0.99x the speed of AMD Ryzen 7 2700X, SparePartsServer was 0.915x the speed of AMD Ryzen 5 3600X, Intel Core i5 9400F was 0.839x the speed of SparePartsServer.

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

*Tesseract (System Power Consumption Monitor) at 8.667x
SuperTuxKart (System Power Consumption Monitor) at 8.337x
Xonotic (System Power Consumption Monitor) at 8.263x
Xonotic (System Power Consumption Monitor) at 7.676x
GROMACS (Water Benchmark) at 6.049x
NAMD (System Power Consumption Monitor) at 5.428x
Stockfish (System Power Consumption Monitor) at 5.392x*

Timed Linux Kernel Compilation (System Power Consumption Monitor) at 5.386x

Timed LLVM Compilation (System Power Consumption Monitor) at 5.377x

Blender (System Power Consumption Monitor) at 5.37x.

Test Systems:

AMD Ryzen 7 2700X

Processor: AMD Ryzen 7 2700X Eight-Core @ 3.70GHz (8 Cores / 16 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (0803 BIOS), Chipset: AMD 17h, Memory: 16384MB, Disk: 2000GB Force MP600, Graphics: AMD Vega 20 16GB (1802/1001MHz), Audio: AMD Device ab20, Monitor: ASUS VP28U, Network: Realtek Device 8125 + Intel I211 + Intel Device 2723

OS: Ubuntu 19.04, Kernel: 5.3.0-999-generic (x86_64) 20190811, Desktop: GNOME Shell 3.32.2, Display Server: X Server 1.20.4, Display Driver: amdgpu 19.0.1, OpenGL: 4.5 Mesa 19.0.2 (LLVM 8.0.0), Compiler: GCC 8.3.0, File-System: ext4, Screen Resolution: 3840x2160

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --enable-libmpx --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq ondemand

Graphics Notes: GLAMOR

Python Notes: Python 2.7.16 + Python 3.7.3

Security Notes: 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/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional STIBP: disabled RSB filling

AMD Ryzen 5 3600X

Processor: AMD Ryzen 5 3600X 6-Core @ 3.80GHz (6 Cores / 12 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (0803 BIOS), Chipset: AMD Device 1480, Memory: 16384MB, Disk: 2000GB Force MP600, Graphics: AMD Vega 20 16GB (1802/1001MHz), Audio: AMD Device ab20, Monitor: ASUS VP28U, Network: Realtek Device 8125 + Intel I211 + Intel Device 2723

OS: Ubuntu 19.04, Kernel: 5.3.0-999-generic (x86_64) 20190811, Desktop: GNOME Shell 3.32.2, Display Server: X Server 1.20.4, Display Driver: amdgpu 19.0.1, OpenGL: 4.5 Mesa 19.0.2 (LLVM 8.0.0), Compiler: GCC 8.3.0, File-System: ext4, Screen Resolution: 3840x2160

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --enable-libmpx --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq ondemand

Graphics Notes: GLAMOR

Python Notes: Python 2.7.16 + Python 3.7.3

Security Notes: 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/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional STIBP: always-on RSB filling

AMD Ryzen 7 3700X

Processor: AMD Ryzen 7 3700X 8-Core @ 3.60GHz (8 Cores / 16 Threads), Motherboard: ASUS ROG CROSSHAIR

VIII HERO (WI-FI) (0803 BIOS), Chipset: AMD Device 1480, Memory: 16384MB, Disk: 2000GB Force MP600, Graphics: AMD Vega 20 16GB (1802/1001MHz), Audio: AMD Device ab20, Monitor: ASUS VP28U, Network: Realtek Device 8125 + Intel I211 + Intel Device 2723

OS: Ubuntu 19.04, Kernel: 5.3.0-999-generic (x86_64) 20190811, Desktop: GNOME Shell 3.32.2, Display Server: X Server 1.20.4, Display Driver: amdgpu 19.0.1, OpenGL: 4.5 Mesa 19.0.2 (LLVM 8.0.0), Compiler: GCC 8.3.0, File-System: ext4, Screen Resolution: 3840x2160

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --enable-libmpx --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq ondemand

Graphics Notes: GLAMOR

Python Notes: Python 2.7.16 + Python 3.7.3

Security Notes: I1tf: Not affected + mds: 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 retrpoline IBPB: conditional STIBP: always-on RSB filling

AMD Ryzen 9 3900X

Processor: AMD Ryzen 9 3900X 12-Core @ 3.80GHz (12 Cores / 24 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (0803 BIOS), Chipset: AMD Device 1480, Memory: 16384MB, Disk: 2000GB Force MP600, Graphics: AMD Vega 20 16GB (1802/1001MHz), Audio: AMD Device ab20, Monitor: ASUS VP28U, Network: Realtek Device 8125 + Intel I211 + Intel Device 2723

OS: Ubuntu 19.04, Kernel: 5.3.0-999-generic (x86_64) 20190811, Desktop: GNOME Shell 3.32.2, Display Server: X Server 1.20.4, Display Driver: amdgpu 19.0.1, OpenGL: 4.5 Mesa 19.0.2 (LLVM 8.0.0), Compiler: GCC 8.3.0, File-System: ext4, Screen Resolution: 3840x2160

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --enable-libmpx --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq ondemand

Graphics Notes: GLAMOR

Python Notes: Python 2.7.16 + Python 3.7.3

Security Notes: I1tf: Not affected + mds: 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 retrpoline IBPB: conditional STIBP: always-on RSB filling

Intel Core i5 9400F

Processor: Intel Core i5-9400F @ 4.10GHz (6 Cores), Motherboard: ASUS PRIME Z390-A (0802 BIOS), Chipset: Intel Cannon Lake PCH, Memory: 16384MB, Disk: 2000GB Force MP600, Graphics: AMD Vega 20 16GB (1802/1001MHz), Audio: Realtek ALC1220, Monitor: Acer B286HK, Network: Intel I219-V

OS: Ubuntu 19.04, Kernel: 5.3.0-999-generic (x86_64) 20190811, Desktop: GNOME Shell 3.32.2, Display Server: X Server 1.20.4, Display Driver: amdgpu 19.0.1, OpenGL: 4.5 Mesa 19.0.2 (LLVM 8.0.0), Compiler: GCC 8.3.0, File-System: ext4, Screen Resolution: 3840x2160

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --enable-libmpx --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: intel_pstate powersave

Graphics Notes: GLAMOR

Python Notes: Python 2.7.16 + Python 3.7.3

Security Notes: I1tf: Mitigation of PTE Inversion + mds: Mitigation of Clear buffers; SMT disabled + meltdown: Mitigation of PTI + 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 generic retrpoline IBPB: conditional IBRS_FW STIBP: disabled RSB filling

Intel Core i9 9900K

Processor: Intel Core i9-9900K @ 5.00GHz (8 Cores / 16 Threads), Motherboard: ASUS PRIME Z390-A (0802 BIOS), Chipset: Intel Cannon Lake PCH, Memory: 16384MB, Disk: 2000GB Force MP600, Graphics: AMD Vega 20 16GB (1802/1001MHz), Audio: Realtek ALC1220, Monitor: Acer B286HK, Network: Intel I219-V

OS: Ubuntu 19.04, Kernel: 5.3.0-999-generic (x86_64) 20190811, Desktop: GNOME Shell 3.32.2, Display Server: X Server 1.20.4, Display Driver: amdgpu 19.0.1, OpenGL: 4.5 Mesa 19.0.2 (LLVM 8.0.0), Compiler: GCC 8.3.0, File-System: ext4, Screen Resolution: 3840x2160

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --enable-libmpx --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: intel_pstate powersave

Graphics Notes: GLAMOR

Python Notes: Python 2.7.16 + Python 3.7.3

Security Notes: i1tf: Not affected + mds: Mitigation of Clear buffers; SMT vulnerable + 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 generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling

SparePartsServer

Processor: AMD Ryzen 5 3600 6-Core @ 3.60GHz (6 Cores / 12 Threads), Motherboard: ASRock X370 Taichi (P6.40 BIOS), Chipset: AMD Starship/Matisse, Memory: 48GB, Disk: 4001GB Seagate ST4000VN000-1H41, Graphics: ASUS NVIDIA GeForce GTX 760, Audio: NVIDIA GK104 HDMI Audio, Network: Intel I211 + Intel Dual Band-AC 3168NGW

OS: Ubuntu 20.04, Kernel: 5.11.0-46-generic (x86_64), Desktop: GNOME Shell 3.36.9, Display Server: X Server 1.20.13, Vulkan: 1.0.2, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 1920x1200

Kernel Notes: Transparent Huge Pages: madvise

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEA/gcc-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq ondemand (Boost: Enabled) - CPU Microcode: 0x8701021

Python Notes: Python 3.8.10

Security Notes: itlb_multihit: Not affected + i1tf: 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 + srbs: Not affected + tsx_async_abort: Not affected

	AMD Ryzen 7 2700X	AMD Ryzen 5 3600X	AMD Ryzen 7 3700X	AMD Ryzen 9 3900X	Intel Core i5 9400F	Intel Core i9 9900K	SparePartsS erver
SVT-HEVC - 1.8.b.Y.T.H.V.E (FPS/Watt)	1.24	1.58	1.73	2.14	1.65	1.86	
Normalized	57.94%	73.83%	80.84%	100%	77.1%	86.92%	
Tesseract - 3840 x 2160 (FPS)	342.96	371.37	368.77	376.19	279.04	353.51	
Normalized	91.17%	98.72%	98.03%	100%	74.18%	93.97%	
Standard Deviation	1.8%	0.9%	2.2%	1.1%	2.2%	11.9%	
Xonotic - 3840 x 2160 - Ultra (FPS)	294.21	368.93	377.14	373.33	288.28	353.85	
Normalized	78.01%	97.82%	100%	98.99%	76.44%	93.82%	

	Standard Deviation	1.1%	0.5%	0.6%	1.1%	1.9%	0.5%
Xonotic - 3840 x 2160 - Ultimate (FPS)	Normalized	79.91%	98.68%	100%	99.61%	81.81%	98.4%
	Standard Deviation	0.7%	0.3%	0.5%	1%	0.6%	0.5%
VP9 libvpx Encoding - v.V.1.V.E (FPS/Watt)	Normalized	0.80	1.05	1.00	1.05	1.45	1.56
	Standard Deviation	51.28%	67.31%	64.1%	67.31%	92.95%	100%
SuperTuxKart - 3840 x 2160 - Fullscreen - Ultimate - 6 - Candela City	Normalized	72.99	73.38	73.60	73.54	73.72	74.38
	Standard Deviation	1.35	1.49	1.12	0.75	1.87	0.72
Cost - 3840 x 2160 (FPS/Dollar)	Normalized	98.13%	98.66%	98.95%	98.87%	99.11%	100%
	Standard Deviation	0.1%	0.3%	0.4%	0.7%	0.3%	0.8%
Tesseract - Performance / Cost - 3840 x 2160 - Ultra (FPS/Dollar)	Normalized	1.16	1.48	1.15	0.75	1.93	0.72
	Standard Deviation	0.92	1.16	0.89	0.59	1.61	0.58
Cost - 3840 x 2160 - Ultimate (FPS/Dollar)	Normalized	60.1%	76.68%	59.59%	38.86%	100%	37.31%
	Standard Deviation	0.29	0.29	0.22	0.15	0.49	0.15
Performance / Cost - 3840 x 2160 - Fullscreen - Ultimate - 6 - Candela City (FPS/Dollar)	Normalized	59.18%	59.18%	44.9%	30.61%	100%	30.61%
	Standard Deviation	0.12	0.16	0.13	0.10	0.23	0.09
- H.2.1.V.E (FPS/Dollar)	Normalized	52.17%	69.57%	56.52%	43.48%	100%	39.13%
Xonotic - 3840 x 2160 - Ultra (FPS/Watt)	Normalized	1.74	1.79	2.01	1.76	2.29	2.44
	Standard Deviation	1.21	1.21	1.35	1.25	1.81	1.53
Xonotic - 3840 x 2160 - Ultimate (FPS/Watt)	Normalized	66.85%	66.85%	74.59%	69.06%	100%	84.53%
	Standard Deviation	25.98	26.09	35.40	46.04	22.46	35.21
SVT-AV1 - 1.8.b.Y.T.A.V.E (FPS)	Normalized	56.43%	56.67%	76.89%	100%	48.78%	76.48%
	Standard Deviation	0.7%	0.3%	0.2%	0.7%	0.3%	0.5%
SVT-HEVC - 1.8.b.Y.T.H.V.E (FPS)	Normalized	148.76	155.74	192.69	247.63	120.25	192.33
	Standard Deviation	1.28	1.30	1.30	1.20	1.60	1.52
Tesseract - 3840 x 2160 (FPS/Watt)	Normalized	80%	81.25%	81.25%	75%	100%	95%

SuperTuxKart - 3840 x 2160 - Fullscreen - Ultimate - 6 - Candela City	0.21	0.21	0.21	0.21	0.25	0.24
Normalized	84%	84%	84%	84%	100%	96%
SVT-AV1 - 1.8.b.Y.T.A.V.E	0.19	0.21	0.31	0.29	0.27	0.35
(FPS/Watt)						
Normalized	54.29%	60%	88.57%	82.86%	77.14%	100%
x265 - H.2.1.V.E	0.17	0.27	0.30	0.29	0.35	0.40
Normalized	42.5%	67.5%	75%	72.5%	87.5%	100%
VP9 libvpx Encoding - v.V.1.V.E (FPS)	134.67	140.95	135.73	178.62	127.51	191.33
Normalized	70.39%	73.67%	70.94%	93.36%	66.64%	100%
Standard Deviation	2.4%	7.3%	2.8%	1%	0.7%	0.8%
x264 - H.2.V.E (FPS)	78.61	76.90	92.94	139.25	58.29	94.53
Normalized	56.45%	55.22%	66.74%	100%	41.86%	67.89%
Standard Deviation	1.5%	1.7%	1.7%	2.4%	2.7%	1.5%
SVT-AV1 - Performance / Cost - 1.8.b.Y.T.A.V.E (FPS/Dollar)	0.10	0.10	0.11	0.09	0.15	0.07
Normalized	66.67%	66.67%	73.33%	60%	100%	46.67%
x265 - H.2.1.V.E (FPS)	30.27	38.88	43.48	52.24	33.58	44.94
Normalized	57.94%	74.43%	83.23%	100%	64.28%	86.03%
Standard Deviation	0.1%	0.6%	0.5%	0.6%	0.3%	0.5%
SVT-HEVC - Performance / Cost - 1.8.b.Y.T.H.V.E (FPS/Dollar)	0.59	0.63	0.59	0.50	0.81	0.39
Normalized	72.84%	77.78%	72.84%	61.73%	100%	48.15%
VP9 libvpx Encoding - Performance / Cost - v.V.1.V.E (FPS/Dollar)	0.53	0.57	0.41	0.36	0.86	0.39
Normalized	61.63%	66.28%	47.67%	41.86%	100%	45.35%
x264 - Performance / Cost - H.2.V.E (FPS/Dollar)	0.31	0.31	0.28	0.28	0.39	0.19
Normalized	79.49%	79.49%	71.79%	71.79%	100%	48.72%
x264 - H.2.V.E (FPS/Watt)	0.45	0.66	0.67	0.88	0.71	0.93
Normalized	48.39%	70.97%	72.04%	94.62%	76.34%	100%
Selenium - Performance / Cost - Octane - Firefox (Geometric Mean/Dollar)	129.43	149.03	112.40	75.88	235.13	80.54
Normalized	55.05%	63.38%	47.8%	32.27%	100%	34.25%
Selenium - Performance / Cost - Octane - Google Chrome (Geometric Mean/Dollar)	167.99	197.67	150.45	100.39	305.33	92.07
Normalized	55.02%	64.74%	49.27%	32.88%	100%	30.15%
Selenium - Octane - Firefox (Geometric Mean)	32874	37108	36980	37862	35034	39786
Normalized	82.63%	93.27%	92.95%	95.16%	88.06%	100%
Standard Deviation	1.3%	0.6%	0.7%	1.8%	0.7%	0.6%

Selenium - Octane - Google Chrome	42670	49221	49499	50093	45494	45482	
Normalized	85.18%	98.26%	98.81%	100%	90.82%	90.8%	
Standard Deviation	0.4%	0.8%	0.2%	0.7%	0.4%	0.2%	
Selenium - Octane - Firefox (Geometric)	328.59	383.73	384.79	334.27	599.20	613.10	
Normalized	53.59%	62.59%	62.76%	54.52%	97.73%	100%	
Selenium - Octane - Google Chrome (Geometric Mean/Watt)	422.18	507.02	504.48	452.48	777.39	680.15	
Normalized	54.31%	65.22%	64.89%	58.21%	100%	87.49%	
Coremark - CoreMark Size 666 - I.P.S (Iterations/Sec)	269063	279739	371430	531933	186484	394681	261302
Normalized	50.58%	52.59%	69.83%	100%	35.06%	74.2%	49.12%
Standard Deviation	1.7%	0.4%	1%	1.8%	0.6%	2.3%	0.3%
Coremark - Performance /	1059	1123	1129	1066	1252	798.95	
Cost - CoreMark Size 666 - I.P.S							
Normalized	84.64%	89.76%	90.2%	85.17%	100%	63.84%	
Coremark - CoreMark Size 666 - I.P.S (Iterations/Sec/Watt)	1896	2151	2509	2847	2306	3386	
Normalized	55.99%	63.53%	74.09%	84.08%	68.11%	100%	
libjpeg-turbo tjbench - D.T (Megapixels/sec)	181.01	218.61	220.41	226.84	200.32	240.07	209.803188
Normalized	75.4%	91.06%	91.81%	94.49%	83.44%	100%	87.39%
Standard Deviation	0.3%	0.3%	0.5%	0.3%	0.8%	0.1%	0.7%
libjpeg-turbo tjbench -	0.71	0.88	0.67	0.45	1.34	0.49	
Performance / Cost - D.T (Megapixels/sec/Dollar)							
Normalized	52.99%	65.67%	50%	33.58%	100%	36.57%	
libjpeg-turbo tjbench - D.T (Megapixels/sec/Watt)	1.96	2.59	2.51	2.31	3.74	3.92	
Normalized	50%	66.07%	64.03%	58.93%	95.41%	100%	
Stockfish - Performance /	91847	82142	80017	75285	94439	50957	
Cost - Total Time (Nodes/s/Dollar)							
Normalized	97.25%	86.98%	84.73%	79.72%	100%	53.96%	
Stockfish - Total Time (Nodes/s/Watt)	111706	127375	155686	160646	139653	181677	
Normalized	61.49%	70.11%	85.69%	88.42%	76.87%	100%	
Stockfish - Total Time (Nodes/s)	23329057	20453316	26325499	37567127	14071430	25172823	19068344
Normalized	62.1%	54.44%	70.08%	100%	37.46%	67.01%	50.76%
Standard Deviation	0.4%	1.4%	1%	0.1%	1%	1.1%	1.8%
asmFish - Performance /	95297	86605	85775	78848	102580	56775	
Cost - 1.H.M.2.D (Nodes/s/Dollar)							
Normalized	92.9%	84.43%	83.62%	76.87%	100%	55.35%	

AMD Ryzen 3000 vs. Intel On Linux Ubuntu 19.04

asmFish - 1.H.M.2.D	117199	139128	165344	166631	152151	198397
(Nodes/s/Watt)						
Normalized	59.07%	70.13%	83.34%	83.99%	76.69%	100%
asmFish - 1.H.M.2.D	24205430	21564595	28219892	39345381	15284406	28046739
(Nodes/s)						
Normalized	61.52%	54.81%	71.72%	100%	38.85%	71.28%
Standard Deviation	0.4%	2.1%	1.5%	1.6%	2.8%	1.5%
GROMACS - Water	0.72	0.66	0.76	0.98	0.74	0.84
Benchmark (Ns/Day)						
Normalized	73.47%	67.35%	77.55%	100%	75.51%	85.71%
Standard Deviation	0.2%	0.3%	0.1%	0.3%	0.5%	0.5%
GROMACS - Water	0.00	0.00	0.00	0.00	0.01	0.01
Benchmark (Ns/Day/Watt)						
Meta Performance Per Watt - P.P.W	1593	1285	1434	1690	1695	1453
Normalized	94%	75.8%	84.57%	99.67%	100%	85.69%
John The Ripper - Blowfish (Real C/S)	17919	14599	19595	28291	9772	16678
Normalized	63.34%	51.6%	69.26%	100%	34.54%	58.95%
Standard Deviation	0.2%	0.1%	0.2%	0.3%	0%	0.3%
John The Ripper - Performance / Cost - Blowfish (Real C/S/Dollar)	70.55	58.63	59.56	56.70	65.58	33.76
Normalized	100%	83.1%	84.42%	80.37%	92.96%	47.85%
John The Ripper - Blowfish (Real C/S/Watt)	98.66	108.41	131.82	140.94	110.61	125.73
Normalized	70%	76.92%	93.53%	100%	78.48%	89.21%
Selenium - Performance / Cost - Jetstream - Firefox (Score/Dollar)	0.78	0.90	0.68	0.45	1.38	0.47
Normalized	56.52%	65.22%	49.28%	32.61%	100%	34.06%
Selenium - Jetstream - Firefox (Score)	197.27	223.00	225.14	226.48	205.48	231.14
Normalized	85.35%	96.48%	97.4%	97.98%	88.9%	100%
Standard Deviation	0.4%	0.5%	0.6%	0.3%	0.3%	0.5%
Selenium - Jetstream - Google Chrome (Score)	194.53	222.04	223.96	224.19	213.82	207.78
Normalized	86.77%	99.04%	99.9%	100%	95.37%	92.68%
Standard Deviation	0.1%	1.3%	0.9%	1.9%	1.6%	1.4%
Selenium - Performance / Cost - Jetstream - Google Chrome (Score/Dollar)	0.77	0.89	0.68	0.45	1.44	0.42
Normalized	53.47%	61.81%	47.22%	31.25%	100%	29.17%
Selenium - Jetstream - Firefox (Score/Watt)	1.90	2.26	2.26	1.99	3.49	3.46
Normalized	54.44%	64.76%	64.76%	57.02%	100%	99.14%
Selenium - Jetstream - Google Chrome (Score/Watt)	1.78	2.21	2.21	1.94	3.56	3.04
Normalized	50%	62.08%	62.08%	54.49%	100%	85.39%

NAMD - ATPase Simulation - 327,506	2.29880	2.70469	2.06935	1.45296	2.71364	1.75577	2.92715
Normalized	63.21%	53.72%	70.21%	100%	53.54%	82.75%	49.64%
Standard Deviation	0.1%	0.2%	0.1%	0.6%	0.5%	0.4%	0.5%
NAMD - Performance /	583.90	673.47	680.82	725.03	404.33	867.35	
Cost - ATPase Simulation - 327,506 Atoms (days/ns x Dollar)							
Normalized	69.25%	60.04%	59.39%	55.77%	100%	46.62%	
PyBench - T.F.A.T.T (Milliseconds)	1105	959	941	919	954	801	944
Normalized	72.49%	83.52%	85.12%	87.16%	83.96%	100%	84.85%
Standard Deviation	0.5%	1%	0.7%	0.9%	0.2%	0.1%	1%
PyBench - Performance /	280670	238791	309589	458581	142146	395694	
Cost - T.F.A.T.T (Milliseconds x Dollar)							
Normalized	50.65%	59.53%	45.91%	31%	100%	35.92%	
Selenium - ARES-6 - Firefox (ms)	59.73	51.57	50.94	51.50	51.79	51.21	
Normalized	85.28%	98.78%	100%	98.91%	98.36%	99.47%	
Standard Deviation	0.5%	0.3%	0.5%	0.9%	0.3%	1.5%	
Selenium - ARES-6 - Google Chrome (ms)	23.27	19.46	19.21	19.25	19.95	23.29	
Normalized	82.55%	98.72%	100%	99.79%	96.29%	82.48%	
Standard Deviation	0.4%	0.5%	0.3%	0.3%	0.3%	0.6%	
Selenium - Performance /	15171	12841	16759	25699	7717	25298	
Cost - ARES-6 - Firefox (ms x Dollar)							
Normalized	50.86%	60.09%	46.04%	30.03%	100%	30.5%	
Selenium - Performance /	5911	4846	6320	9606	2973	11505	
Cost - ARES-6 - Google Chrome (ms x Dollar)							
Normalized	50.29%	61.35%	47.03%	30.95%	100%	25.84%	
Go Benchmarks - build (ns/op)	1600118962	1359043924	1375033899	1378688634	1282585645	1101544574	2035000344
Normalized	68.84%	81.05%	80.11%	79.9%	85.88%	100%	54.13%
Standard Deviation	2.3%	2.1%	1.9%	1.9%	1.6%	2.8%	2.4%
Go Benchmarks - http (ns/op)	5797	6568	5216	4911	7916	4353	4966
Normalized	75.09%	66.28%	83.45%	88.64%	54.99%	100%	87.66%
Standard Deviation	0.1%	0%	0.7%	1.1%	0.1%	0.1%	0.1%
Go Benchmarks - json (ns/op)	6529598	7583507	5816657	4064232	8114011	5738127	5846391
Normalized	62.24%	53.59%	69.87%	100%	50.09%	70.83%	69.52%
Standard Deviation	0.4%	0.4%	0.6%	0.4%	0.2%	0.3%	0.4%
Go Benchmarks - garbage (ns/op)	1376986	1563993	1173265	859808	2056607	1151564	1466336
Normalized	62.44%	54.98%	73.28%	100%	41.81%	74.66%	58.64%
Standard Deviation	0.2%	0.3%	0.4%	0.2%	0.5%	0.1%	0.3%

Go Benchmarks -	4064302165	3384019372	4523861530	6879656285	1911052611	5441630199
Performance / Cost - build	512	005	013	157	348	018
(ns/op x Dollar)						
Normalized	47.02%	56.47%	42.24%	27.78%	100%	35.12%
Go Benchmarks -	1472438	1635432	1716064	2450589	1179484	2150382
Performance / Cost - http						
(ns/op x Dollar)						
Normalized	80.1%	72.12%	68.73%	48.13%	100%	54.85%
Go Benchmarks -	1658517892	1888293243	1913680153	2028051768	1208987639	2834634738
Performance / Cost - json						
(ns/op x Dollar)						
Normalized	72.9%	64.03%	63.18%	59.61%	100%	42.65%
Go Benchmarks -	349754444	389434257	386004185	429044192	306434443	568872616
Performance / Cost - garbage (ns/op x Dollar)						
Normalized	87.61%	78.69%	79.39%	71.42%	100%	53.87%
Blender - BMW27 -	194.72	212.24	162.93	113.74	306.52	171.62
CPU-Only (sec)						
Normalized	58.41%	53.59%	69.81%	100%	37.11%	66.27%
Standard Deviation	0.5%	0.4%	0.6%	0.1%	0.3%	0.3%
Blender - Barbershop -	774.72	848.76	655.41	460.09	1283	675.06
CPU-Only (sec)						
Normalized	59.39%	54.21%	70.2%	100%	35.86%	68.16%
Standard Deviation	0.3%	0.1%	0.1%	0.4%	0.3%	0.2%
Darktable - Boat -	12.49	11.10	11.41	11.17	13.19	13.78
CPU-only (sec)						
Normalized	88.87%	100%	97.28%	99.37%	84.15%	80.55%
Standard Deviation	0.2%	0.3%	0.4%	0%	0.1%	0.1%
Darktable - Masskrug -	6.23	6.09	5.34	4.54	7.66	5.39
CPU-only (sec)						
Normalized	72.87%	74.55%	85.02%	100%	59.27%	84.23%
Standard Deviation	0.4%	0.7%	0.6%	0.7%	0.2%	0.3%
Darktable - Server Room -	4.12	4.37	3.87	3.57	5.35	4.20
CPU-only (sec)						
Normalized	86.65%	81.69%	92.25%	100%	66.73%	85%
Standard Deviation	0.3%	0.2%	0%	0.1%	0.3%	0.1%
GIMP - unsharp-mask	17.64	15.25	15.81	17.16	15.62	15.02
Normalized	85.15%	98.49%	95%	87.53%	96.16%	100%
Standard Deviation	0.7%	0.8%	0.3%	0.7%	0.8%	1.3%
GIMP - resize (sec)	8.66	7.82	7.52	7.49	8.24	6.77
Normalized	78.18%	86.57%	90.03%	90.39%	82.16%	100%
Standard Deviation	1.5%	0.2%	1.3%	0.7%	0.2%	1.7%
GIMP - rotate (sec)	13.26	11.88	11.80	11.80	13.13	11.14
Normalized	84.01%	93.77%	94.41%	94.41%	84.84%	100%
Standard Deviation	0.1%	3.2%	0.2%	0.6%	0.2%	0.3%
GIMP - auto-levels (sec)	15.36	13.43	13.61	14.34	14.07	12.67
Normalized	82.49%	94.34%	93.09%	88.35%	90.05%	100%
Standard Deviation	0.5%	0.9%	0.5%	0.8%	1%	0.3%
Appleseed - Emily (sec)	422.69	481.78	378.97	271.99	774.80	421.19
Normalized	64.35%	56.46%	71.77%	100%	35.1%	64.58%
						53.35%

Appleseed - Disney Material (sec)	242.13	309.83	238.12	168.73	406.82	245.34	318.459435
Normalized	69.69%	54.46%	70.86%	100%	41.48%	68.77%	52.98%
Appleseed - Material Tester (sec)	225.60	272.97	213.66	162.52	421.10	232.07	289.478053
Normalized	72.04%	59.54%	76.06%	100%	38.59%	70.03%	56.14%
Timed LLVM Compilation - Time To Compile (sec)	473.30	412.00	333.56	243.59	629.47	370.37	537.544
Normalized	51.47%	59.12%	73.03%	100%	38.7%	65.77%	45.32%
Timed Linux Kernel	76.09	72.04	58.16	41.87	112.17	65.98	92.766
Compilation - Time To Compile (sec)							
Normalized	55.03%	58.12%	71.99%	100%	37.33%	63.46%	45.14%
Standard Deviation	1.9%	1.6%	2.1%	2.9%	1.4%	2.1%	1.8%
CP2K Molecular	530.33	321.56	318.34	325.73	780.32	638.04	336.787
Dynamics - Fayalite-FIST							
Normalized	60.03%	99%	100%	97.73%	40.8%	49.89%	94.52%
dav1d - S.N.1 (sec)	11.78	10.58	9.79	8.04	12.68	7.68	10.287
Normalized	65.2%	72.59%	78.45%	95.52%	60.57%	100%	74.66%
Standard Deviation	0.8%	0.9%	0.9%	0.7%	0.3%	0.8%	0.3%
dav1d - Summer Nature	34.28	30.71	26.08	21.87	42.61	26.56	31.577
4K (sec)							
Normalized	63.8%	71.21%	83.86%	100%	51.33%	82.34%	69.26%
Standard Deviation	0.6%	0.6%	0.7%	0.9%	0.2%	0.5%	0.4%
Zstd Compression	28.94	27.25	22.34	17.96	28.79	24.20	25.968
C.u.1.0.3.s.i.i.C.L.1 (sec)							
Normalized	62.06%	65.91%	80.39%	100%	62.38%	74.21%	69.16%
Standard Deviation	1.7%	0.2%	0.6%	0.6%	0.1%	0.3%	0.2%
XZ Compression	39.42	38.83	31.51	25.49	45.85	28.46	39.742
C.u.1.0.3.s.i.i.C.L.9 (sec)							
Normalized	64.66%	65.65%	80.89%	100%	55.59%	89.56%	64.14%
Standard Deviation	0.3%	0.1%	0.4%	0.6%	0.5%	0.1%	0.5%
Rust Mandelbrot	45.82	44.79	40.70	36.15	76.42	44.04	46.152
T.T.C.S.P.M (sec)							
Normalized	78.9%	80.71%	88.82%	100%	47.3%	82.08%	78.33%
Standard Deviation	0.3%	0.5%	0%	1.7%	0.9%	0.1%	0.3%
Tensorflow - Cifar10 (sec)	36.12	27.57	25.93	21.88	33.54	23.86	
Normalized	60.58%	79.36%	84.38%	100%	65.24%	91.7%	
Standard Deviation	0.1%	0.3%	0.2%	0.2%	0.3%	0.1%	
Tungsten Renderer - Hair	27.66	32.58	24.91	17.53	52.83	28.03	34.7268
(sec)							
Normalized	63.38%	53.81%	70.37%	100%	33.18%	62.54%	50.48%
Standard Deviation	0.2%	0.1%	0.2%	0.1%	0%	0.4%	1.1%
Tungsten Renderer	30.89	30.58	26.78	23.98	39.37	25.05	31.8377
Water Caustic (sec)							
Normalized	77.63%	78.42%	89.54%	100%	60.91%	95.73%	75.32%
Standard Deviation	0.3%	0.7%	0.9%	0.2%	0.3%	0.3%	0.3%
Tungsten Renderer	9.26	11.68	8.30	6.88	15.51	7.71	12.2682
Non-Exponential (sec)							
Normalized	74.3%	58.9%	82.89%	100%	44.36%	89.23%	56.08%
Standard Deviation	0.6%	0.2%	0.2%	6.7%	0.1%	0.3%	0.3%

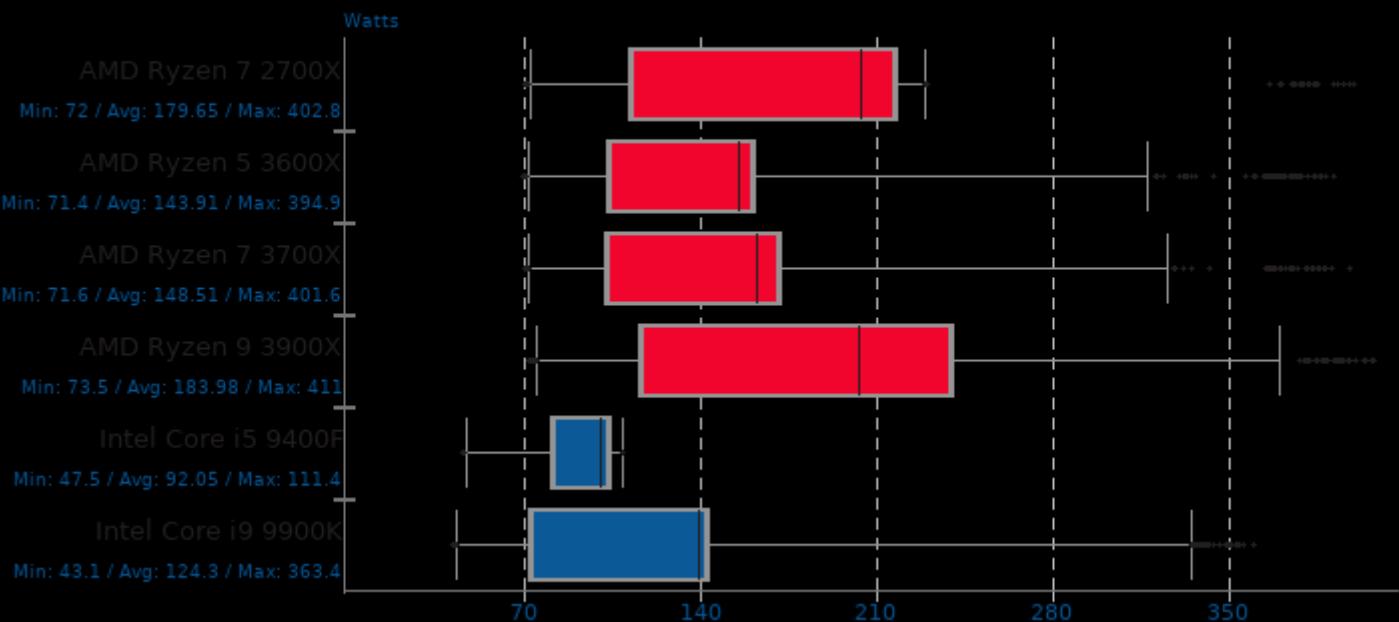
Tungsten Renderer - Volumetric Caustic (sec)	11.75	13.49	10.26	7.52	19.24	10.00	14.2293
Normalized	64%	55.74%	73.29%	100%	39.09%	75.2%	52.85%
Standard Deviation	0.2%	0.1%	0.2%	0.2%	0.2%	0.5%	0.3%
Darktable - Boat - CPU-only (sec)							10.617
Standard Deviation							0.3%
Darktable - Masskrug - CPU-only (sec)							6.979
Standard Deviation							0.2%
Darktable - Server Room - CPU-only (sec)							4.577
Standard Deviation							0.3%
GIMP - unsharp-mask Standard Deviation							13.814
Standard Deviation							0.4%
GIMP - resize (sec) Standard Deviation							7.893
Standard Deviation							0.2%
GIMP - rotate (sec) Standard Deviation							11.184
Standard Deviation							0.7%
GIMP - auto-levels (sec) Standard Deviation							11.776
Standard Deviation							0.4%
Blender - Performance / Cost - BMW27 - CPU-Only (sec x Dollar)	49459	52848	53604	56756	45671	84780	
Normalized	92.34%	86.42%	85.2%	80.47%	100%	53.87%	
Blender - Performance / Cost - Barbershop - CPU-Only (sec x Dollar)	196779	211341	215630	229585	191163	333480	
Normalized	97.15%	90.45%	88.65%	83.26%	100%	57.32%	
Darktable - Performance / Cost - Boat - CPU-only (sec x Dollar)	3172	2764	3754	5574	1965	6807	
Normalized	61.95%	71.11%	52.35%	35.26%	100%	28.87%	
Darktable - Performance / Cost - Masskrug - CPU-only (sec x Dollar)	1582	1516	1757	2265	1141	2663	
Normalized	72.13%	75.27%	64.96%	50.38%	100%	42.86%	
Darktable - Performance / Cost - Server Room - CPU-only (sec x Dollar)	1046	1088	1273	1781	797.15	2075	
Normalized	76.17%	73.26%	62.61%	44.75%	100%	38.42%	
GIMP - Performance / Cost - resize (sec x Dollar)	4481	3797	5201	8563	2327	7420	
Normalized	51.94%	61.29%	44.74%	27.18%	100%	31.37%	
GIMP - Performance / Cost - rotate (sec x Dollar)	2200	1947	2474	3738	1228	3344	
Normalized	55.82%	63.05%	49.62%	32.85%	100%	36.71%	
GIMP - Performance / Cost - unsharp-mask (sec x Dollar)	3368	2958	3882	5888	1956	5503	
Normalized	58.09%	66.14%	50.39%	33.23%	100%	35.55%	

GIMP - Performance / Cost - auto-levels (sec x)	3901	3344	4478	7156	2096	6259
Appleseed - Performance / Cost - Emily (sec x)	Normalized 53.73%	62.69%	46.82%	29.3%	100%	33.49%
Appleseed - Performance / Cost - Material Tester (sec x)	107363	119963	124681	135723	115445	208068
Appleseed - Performance / Cost - Disney Material (sec x Dollar)	Normalized 100%	89.5%	86.11%	79.1%	93%	51.6%
Appleseed - Performance / Cost - Material Tester (sec x Dollar)	61501	77148	78341	84196	60616	121198
Timed LLVM Compilation - Performance / Cost - Time To Compile (sec x)	Normalized 98.56%	78.57%	77.37%	71.99%	100%	50.01%
Timed LLVM Compilation - Performance / Cost - Time To Compile (sec x)	57302	67970	70294	81097	62744	114643
Timed Linux Kernel - Compilation - Performance / Cost - Time To Compile (sec x Dollar)	Normalized 100%	84.31%	81.52%	70.66%	91.33%	49.98%
Timed Linux Kernel - Compilation - Performance / Cost - Time To Compile (sec x Dollar)	120218	102588	109741	121551	93791	182963
CP2K Molecular Dynamics - Performance / Cost - Fayalite-FIST Data (sec x Dollar)	Normalized 78.02%	91.42%	85.47%	77.16%	100%	51.26%
CP2K Molecular Dynamics - Performance / Cost - Fayalite-FIST Data (sec x Dollar)	19327	17938	19135	20893	16713	32594
dav1d - Performance / Cost - S.N.1 (sec x Dollar)	Normalized 86.48%	93.17%	87.35%	79.99%	100%	51.28%
dav1d - Performance / Cost - S.N.1 (sec x Dollar)	80068	104734	162539	116268		315192
dav1d - Performance / Cost - Summer Nature 4K (sec x Dollar)	Normalized 59.44%	100%	76.45%	49.26%	68.87%	25.4%
dav1d - Performance / Cost - Summer Nature 4K (sec x Dollar)	2992	2634	3221	4012	1889	3794
dav1d - Performance / Cost - Zstd Compression -	Normalized 63.14%	71.72%	58.66%	47.09%	100%	49.8%
dav1d - Performance / Cost - Zstd Compression -	8707	7647	8580	10913	6349	13121
XZ Compression - Performance / Cost - C.u.1.0.3.s.i.i.C.L.1 (sec x Dollar)	Normalized 72.92%	83.03%	73.99%	58.18%	100%	48.39%
XZ Compression - Performance / Cost - C.u.1.0.3.s.i.i.C.L.1 (sec x Dollar)	7351	6785	7350	8962	4290	11955
Rust Mandelbrot - Performance / Cost - C.u.1.0.3.s.i.i.C.L.9 (sec x Dollar)	Normalized 58.36%	63.22%	58.36%	47.87%	100%	35.88%
Rust Mandelbrot - Performance / Cost - C.u.1.0.3.s.i.i.C.L.9 (sec x Dollar)	10013	9669	10367	12720	6832	14059
T.T.C.S.P.M - Performance / Cost - T.T.C.S.P.M (sec x Dollar)	Normalized 68.23%	70.66%	65.9%	53.71%	100%	48.59%
T.T.C.S.P.M - Performance / Cost - T.T.C.S.P.M (sec x Dollar)	11153	13390	18039	11387		21756
	Normalized 95.83%	100%	83.29%	61.83%	97.95%	51.26%

Tensorflow - Performance / Cost - Cifar10 (sec x	9174	6865	8531	10918	4997	11787
Normalized	54.47%	72.8%	58.58%	45.77%	100%	42.4%
Tungsten Renderer -	7026	8112	8195	8747	7872	13847
Performance / Cost - Hair (sec x Dollar)						
Normalized	100%	86.6%	85.73%	80.32%	89.25%	50.74%
Tungsten Renderer -	7846	7614	8811	11966	5866	12375
Performance / Cost - Water Caustic (sec x						
Normalized	74.77%	77.04%	66.58%	49.02%	100%	47.4%
Tungsten Renderer -	2352	2908	2731	3433	2311	3809
Performance / Cost - Non-Exponential (sec x Dollar)						
Normalized	98.25%	79.46%	84.63%	67.31%	100%	60.68%
Tungsten Renderer -	2985	3359	3376	3752	2867	4940
Performance / Cost - Volumetric Caustic (sec x Dollar)						
Normalized	96.05%	85.35%	84.93%	76.4%	100%	58.03%

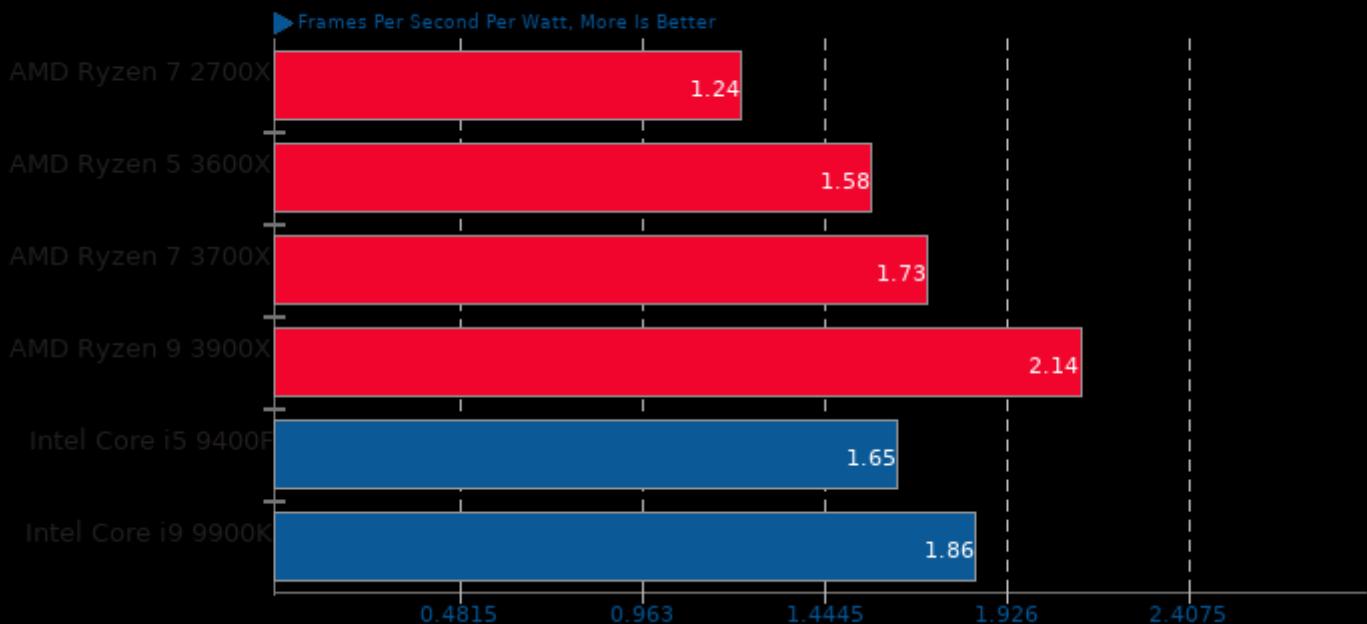
System Power Consumption Monitor

Phoronix Test Suite System Monitoring



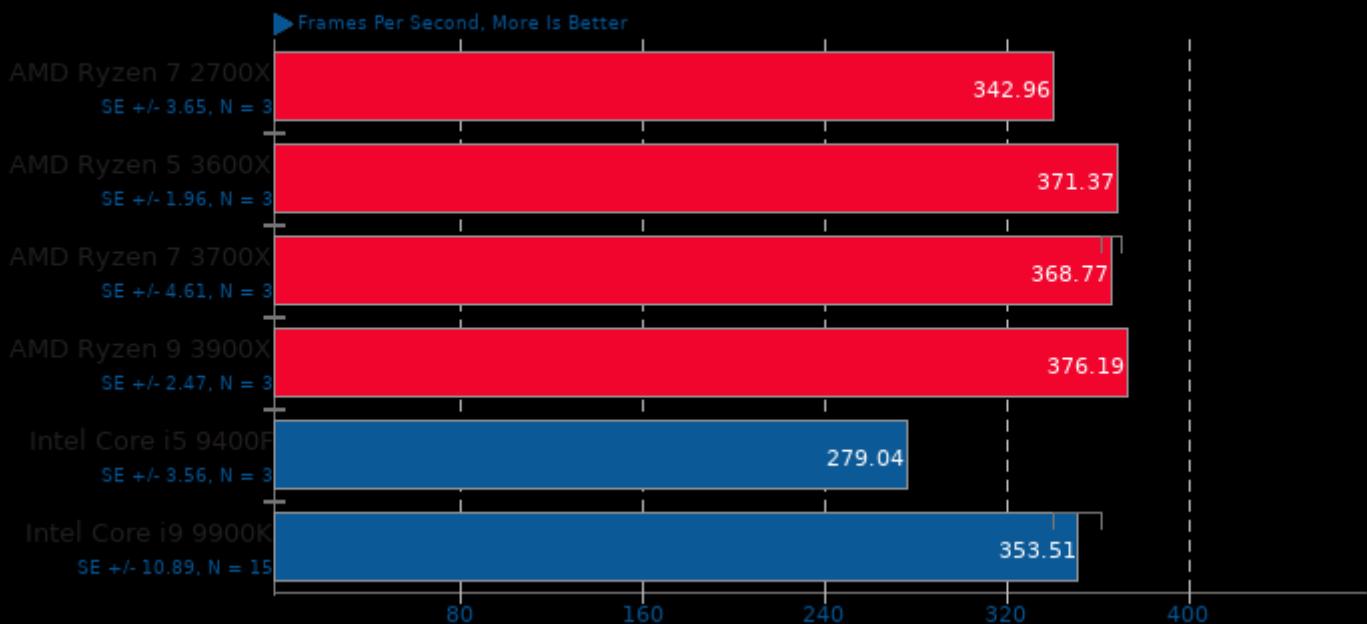
SVT-HEVC 2019-02-03

1080p 8-bit YUV To HEVC Video Encode



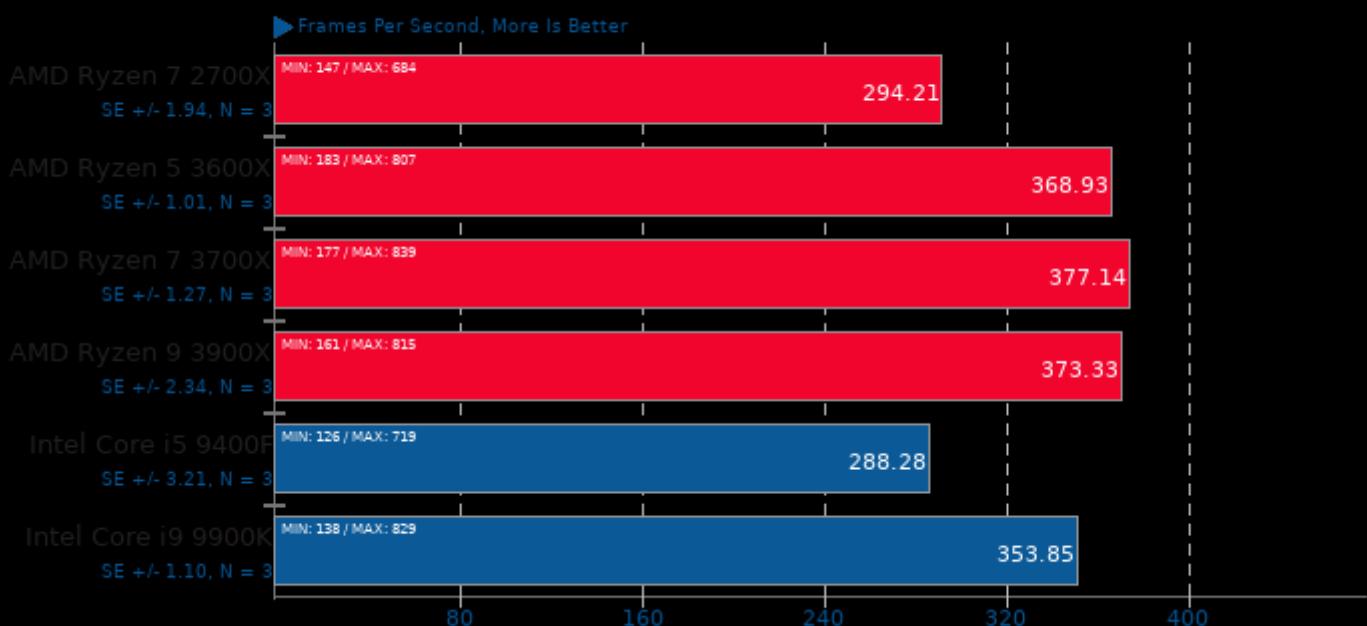
Tesseract 2014-05-12

Resolution: 3840 x 2160



Xonotic 0.8.2

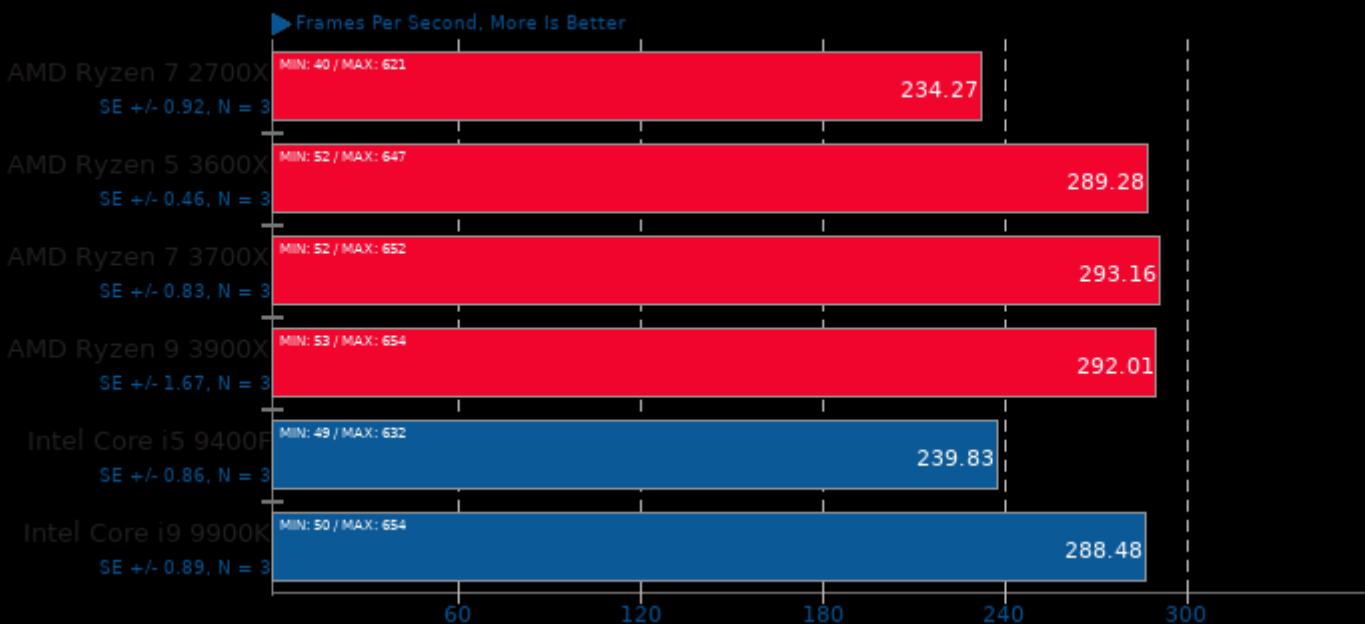
Resolution: 3840 x 2160 - Effects Quality: Ultra



AMD Ryzen 3000 vs. Intel On Linux Ubuntu 19.04

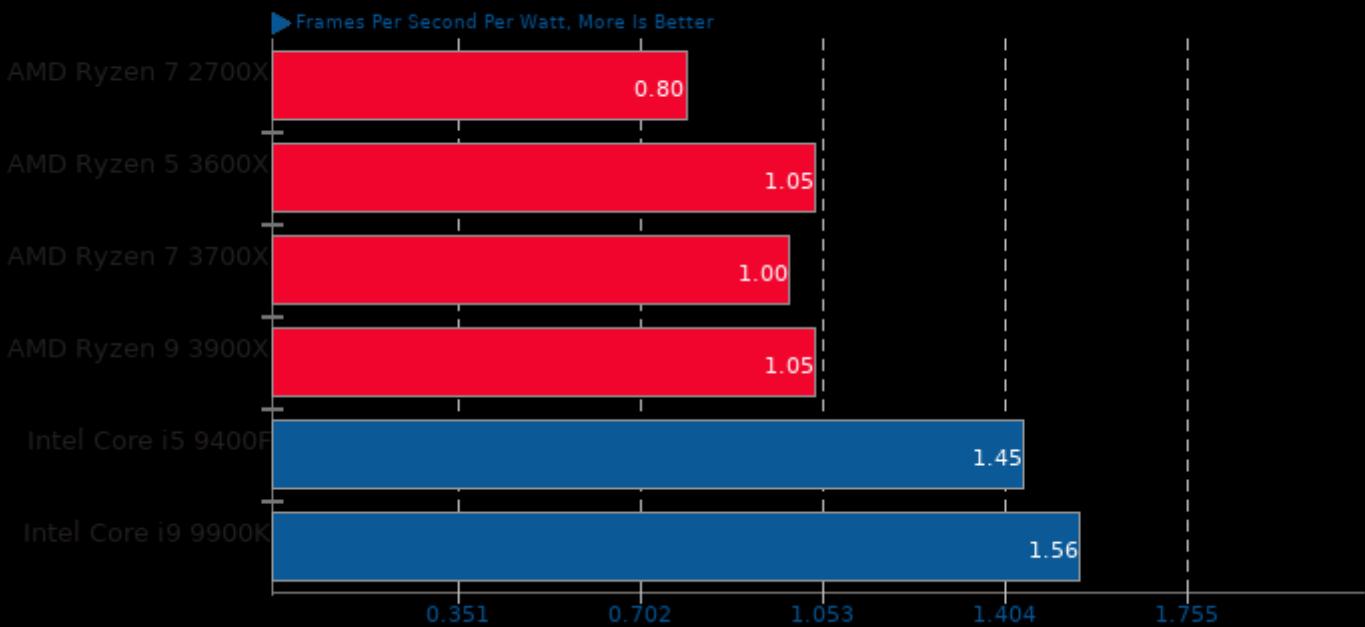
Xonotic 0.8.2

Resolution: 3840 x 2160 - Effects Quality: Ultimate



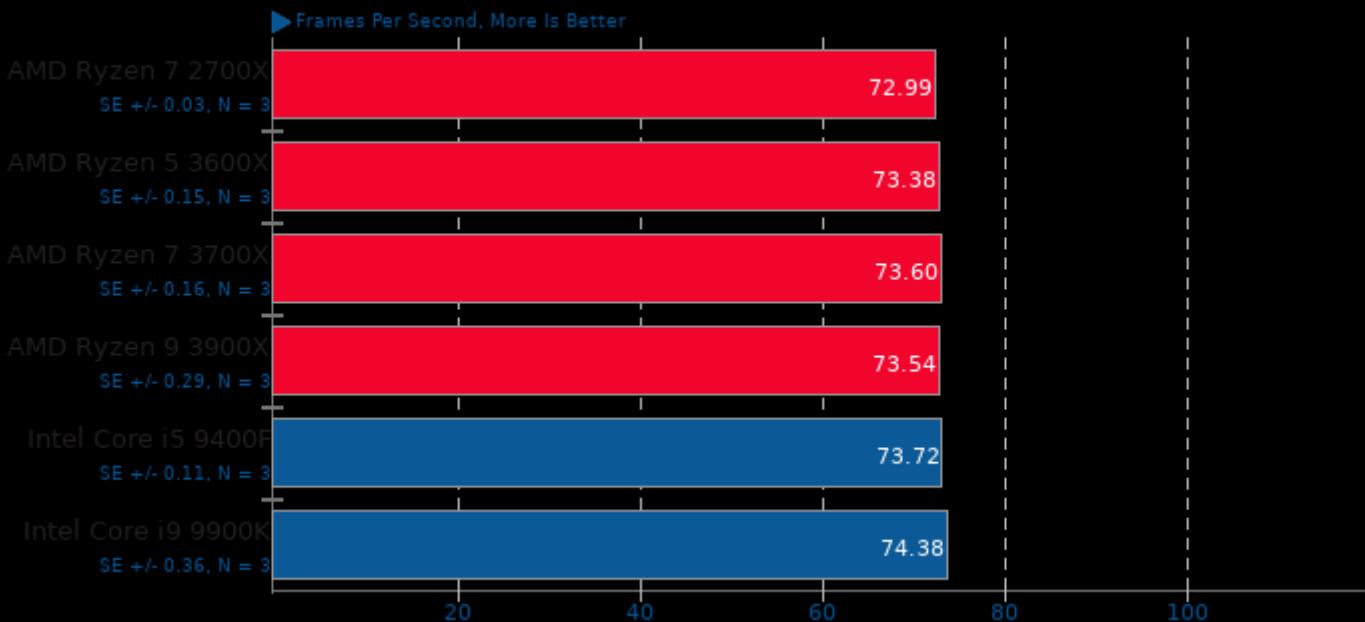
VP9 libvpx Encoding 1.8.0

vpxenc VP9 1080p Video Encode



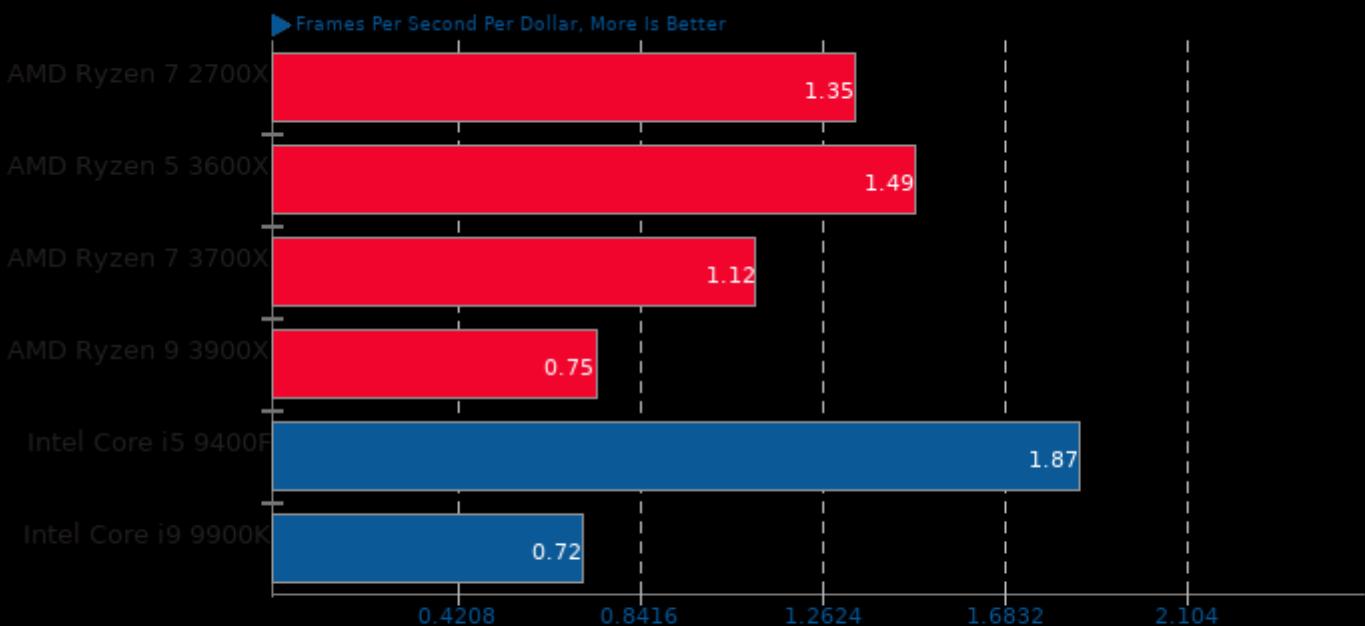
SuperTuxKart 0.9.3

Resolution: 3840 x 2160 - Mode: Fullscreen - Graphics Effects: Ultimate - Karts: 6 - Scene: Candela City



Tesseract 2014-05-12

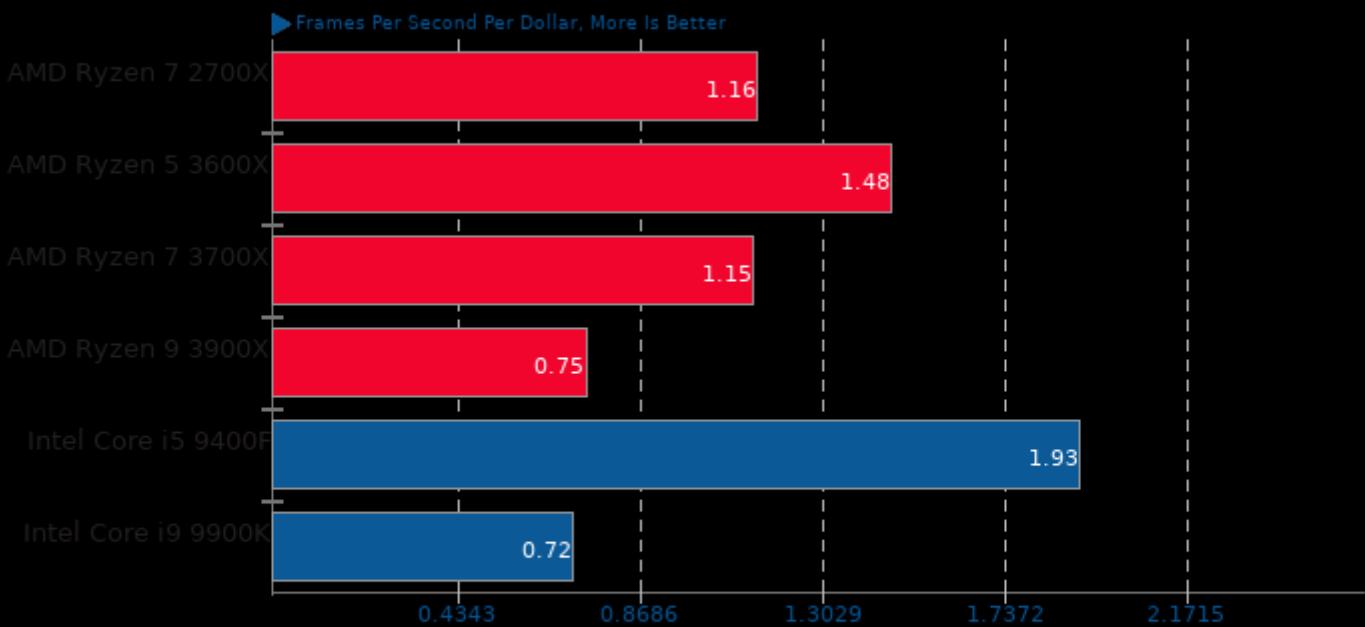
Performance / Cost - Resolution: 3840 x 2160



1. AMD Ryzen 7 2700X: \$254 reported cost.
2. AMD Ryzen 5 3600X: \$249 reported cost.
3. AMD Ryzen 7 3700X: \$329 reported cost.
4. AMD Ryzen 9 3900X: \$499 reported cost.
5. Intel Core i5 9400F: \$149 reported cost.
6. Intel Core i9 9900K: \$494 reported cost.

Xonotic 0.8.2

Performance / Cost - Resolution: 3840 x 2160 - Effects Quality: Ultra



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

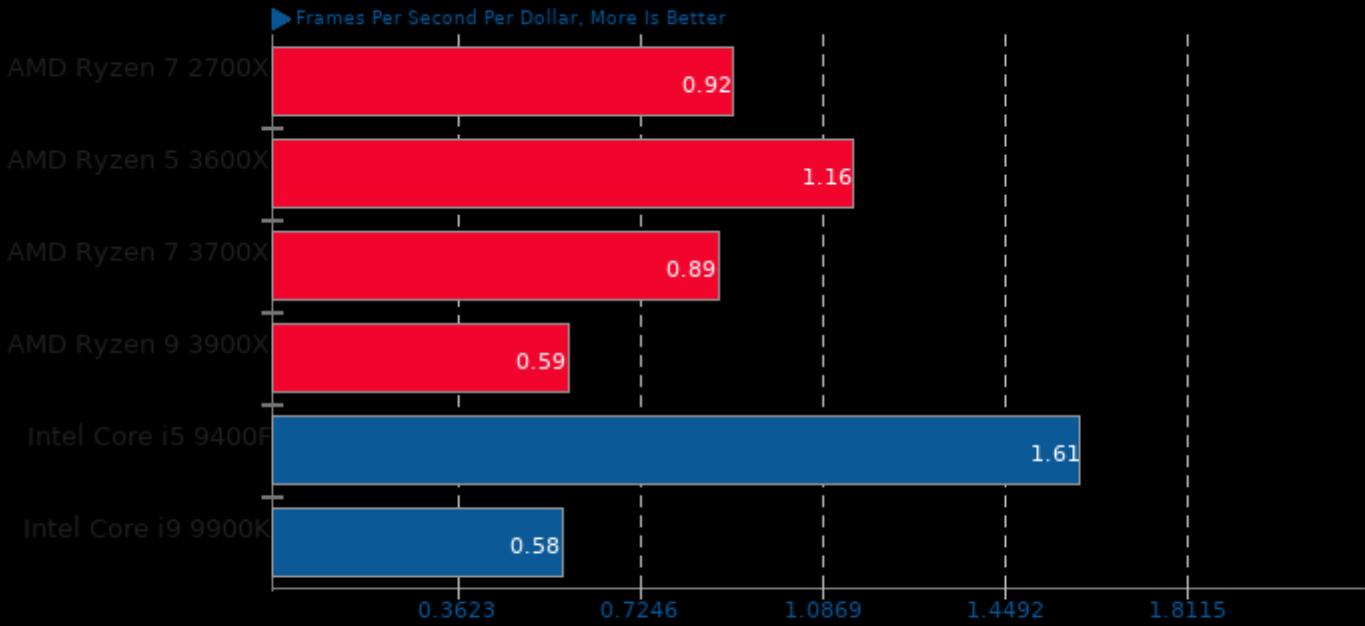
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

Xonotic 0.8.2

Performance / Cost - Resolution: 3840 x 2160 - Effects Quality: Ultimate



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

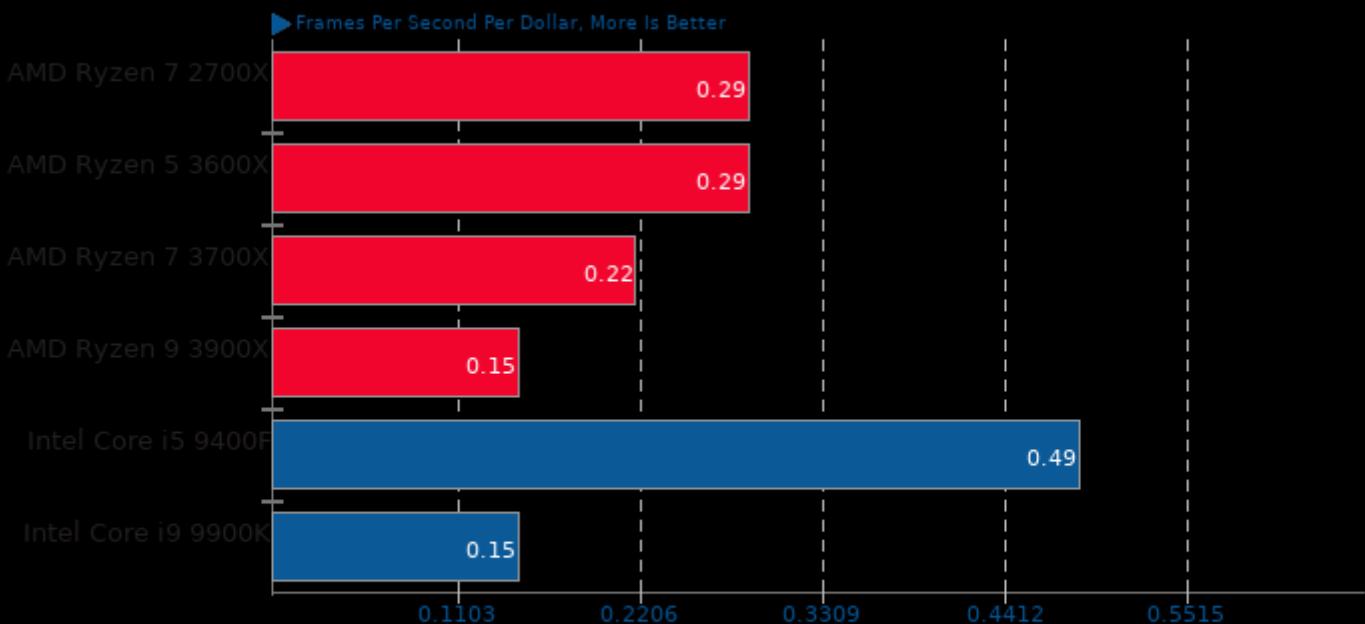
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

SuperTuxKart 0.9.3

Performance / Cost - Resolution: 3840 x 2160 - Mode: Fullscreen - Graphics Effects: Ultimate - Karts: 6 - Scene: Candela City



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

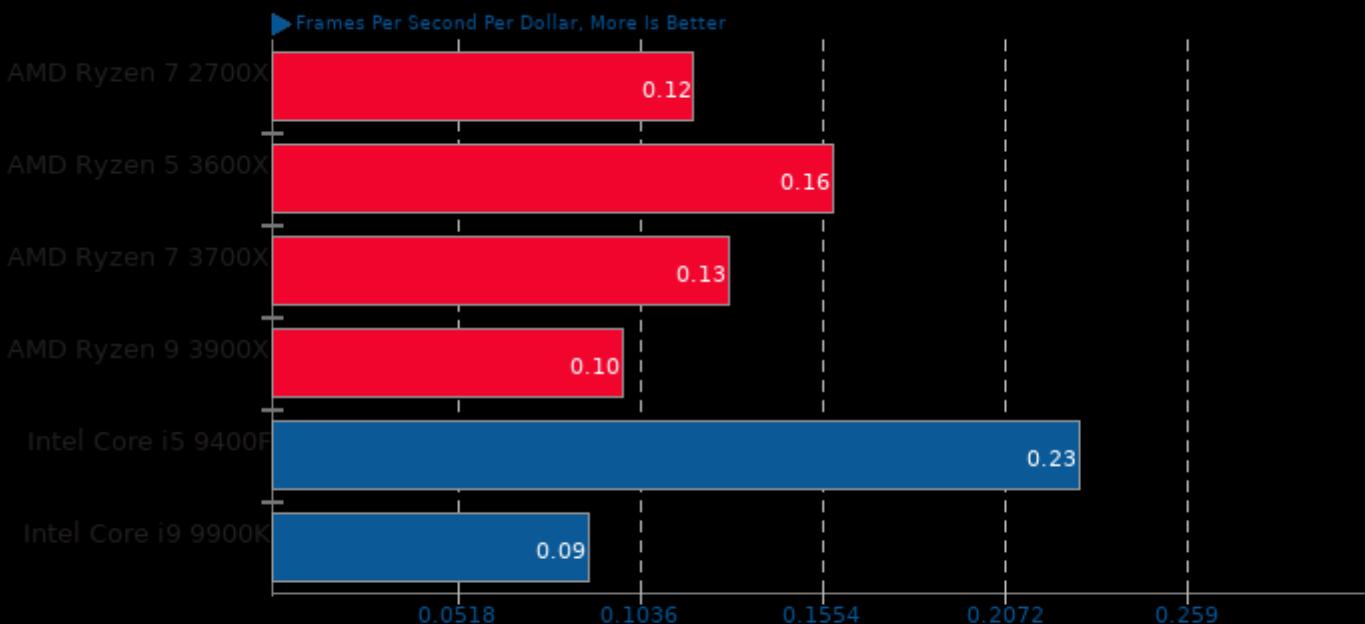
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

X265 3.0

Performance / Cost - H.265 1080p Video Encoding



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

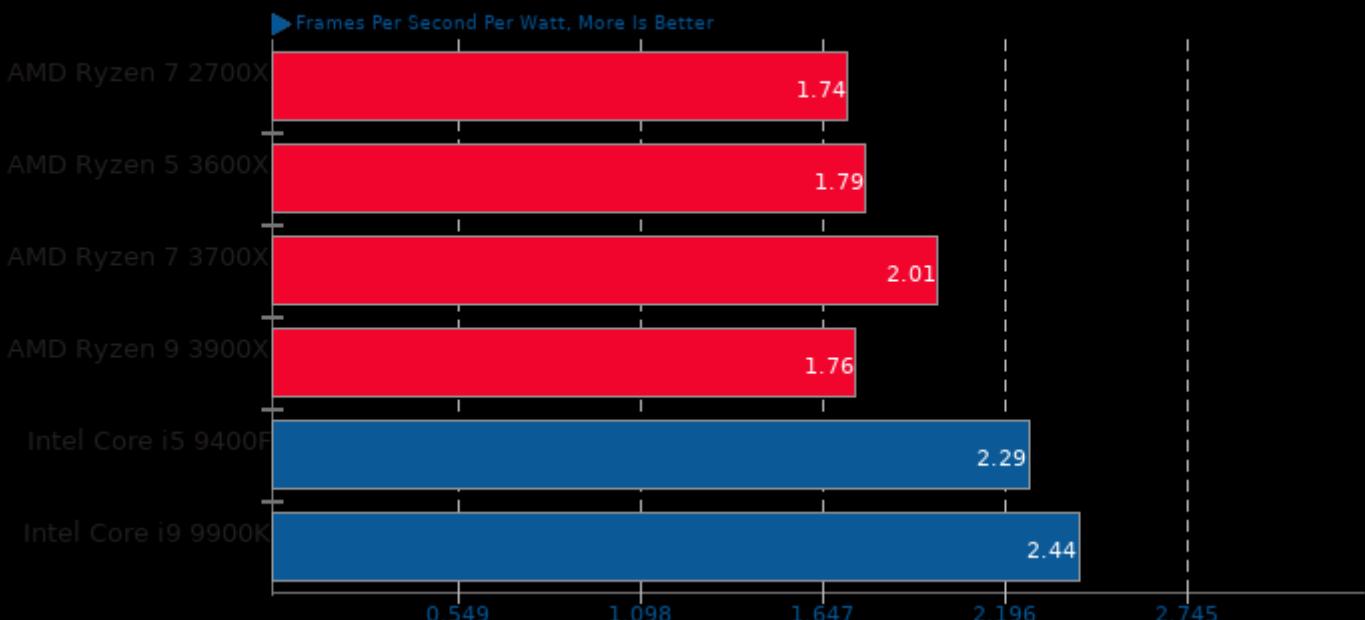
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

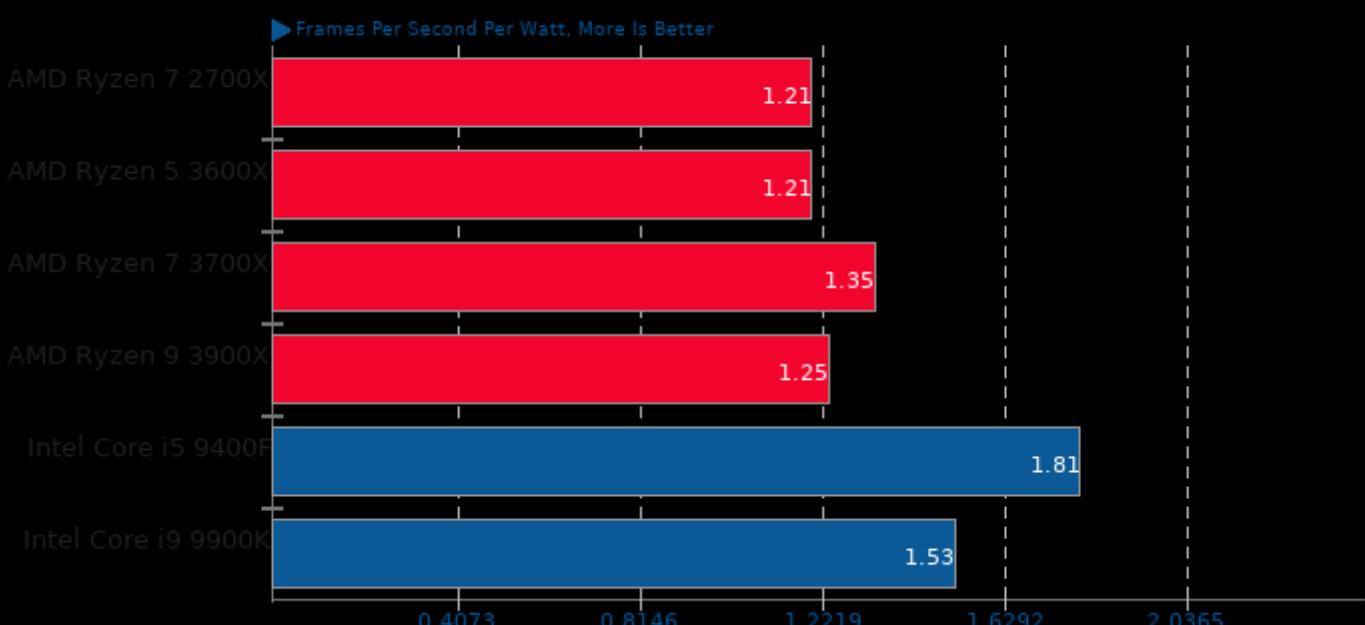
Xonotic 0.8.2

Resolution: 3840 x 2160 - Effects Quality: Ultra



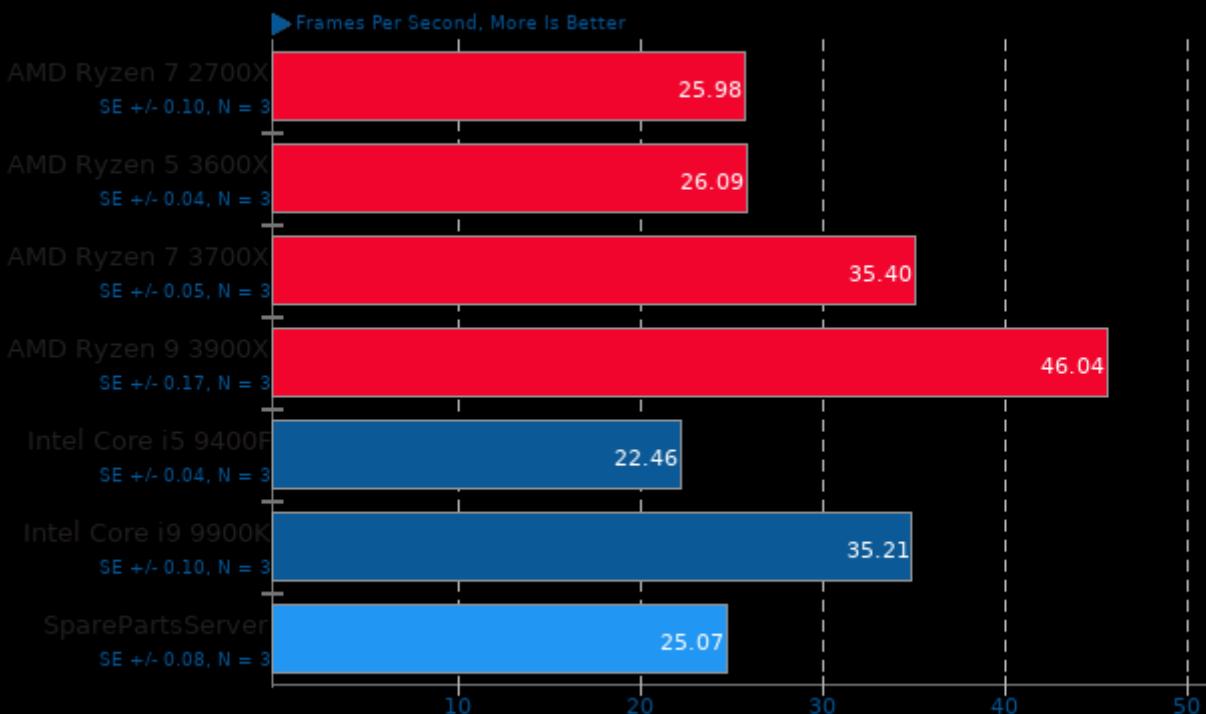
Xonotic 0.8.2

Resolution: 3840 x 2160 - Effects Quality: Ultimate



SVT-AV1 0.5

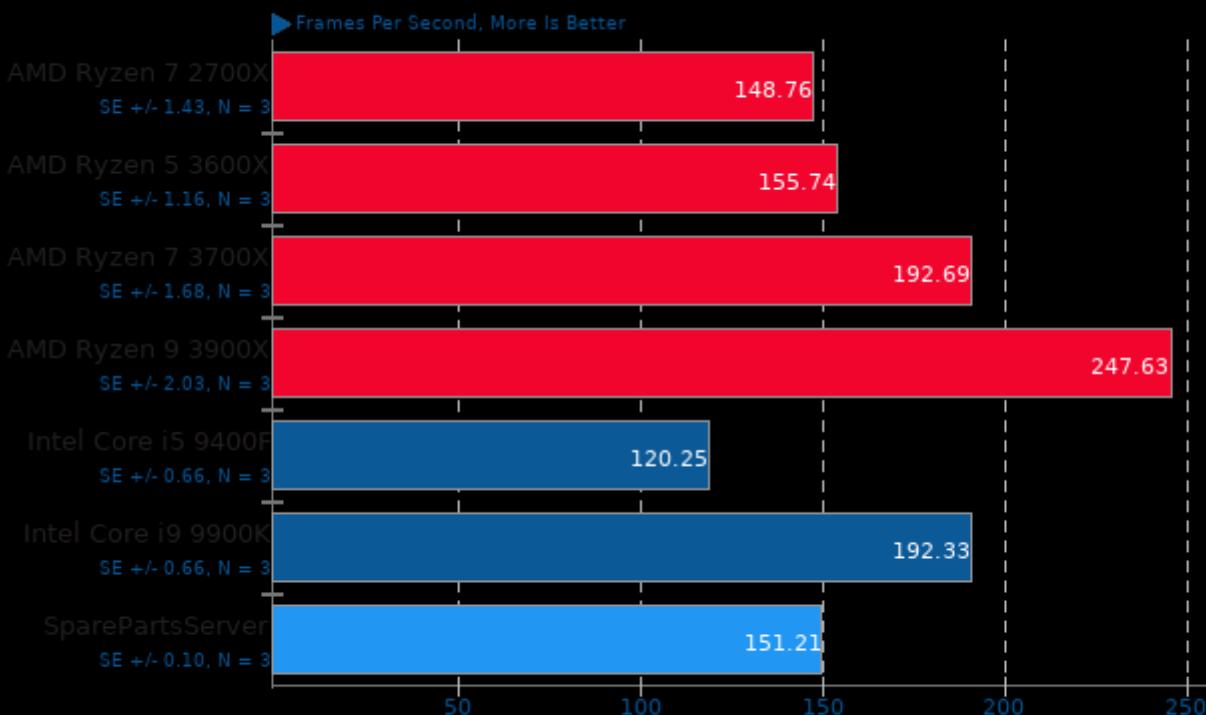
1080p 8-bit YUV To AV1 Video Encode



1. (CXX) g++ options: -O3 -pie -pthread -lm

SVT-HEVC 2019-02-03

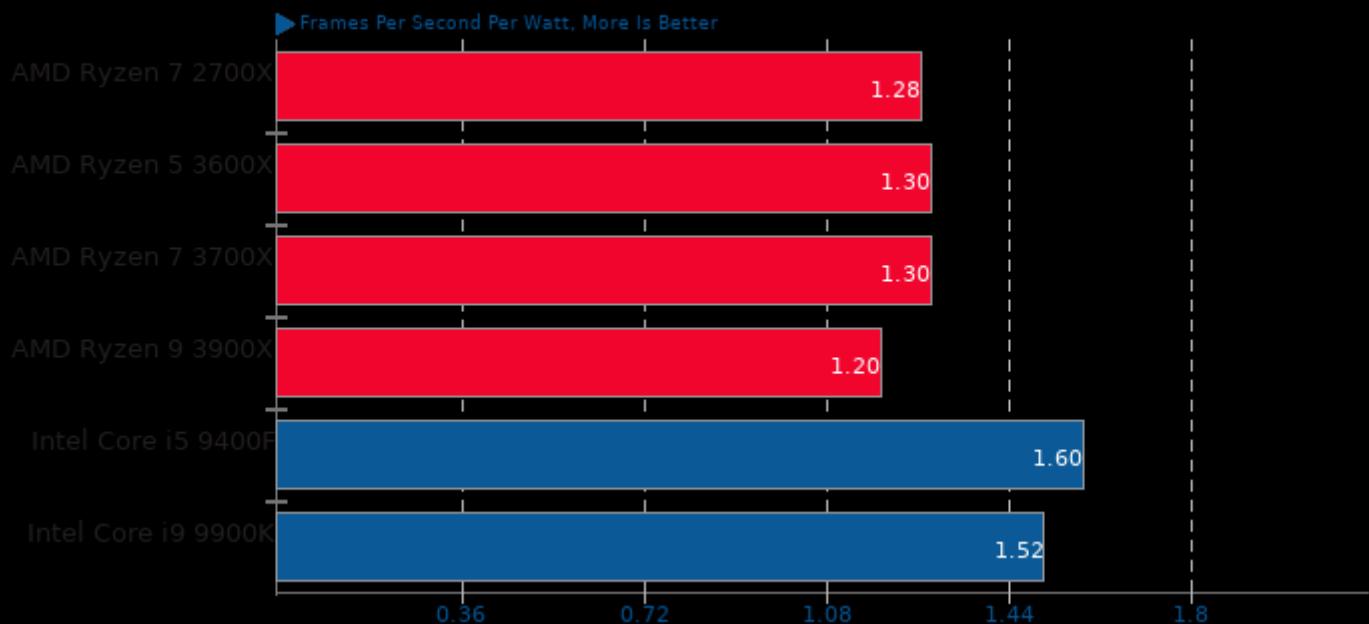
1080p 8-bit YUV To HEVC Video Encode



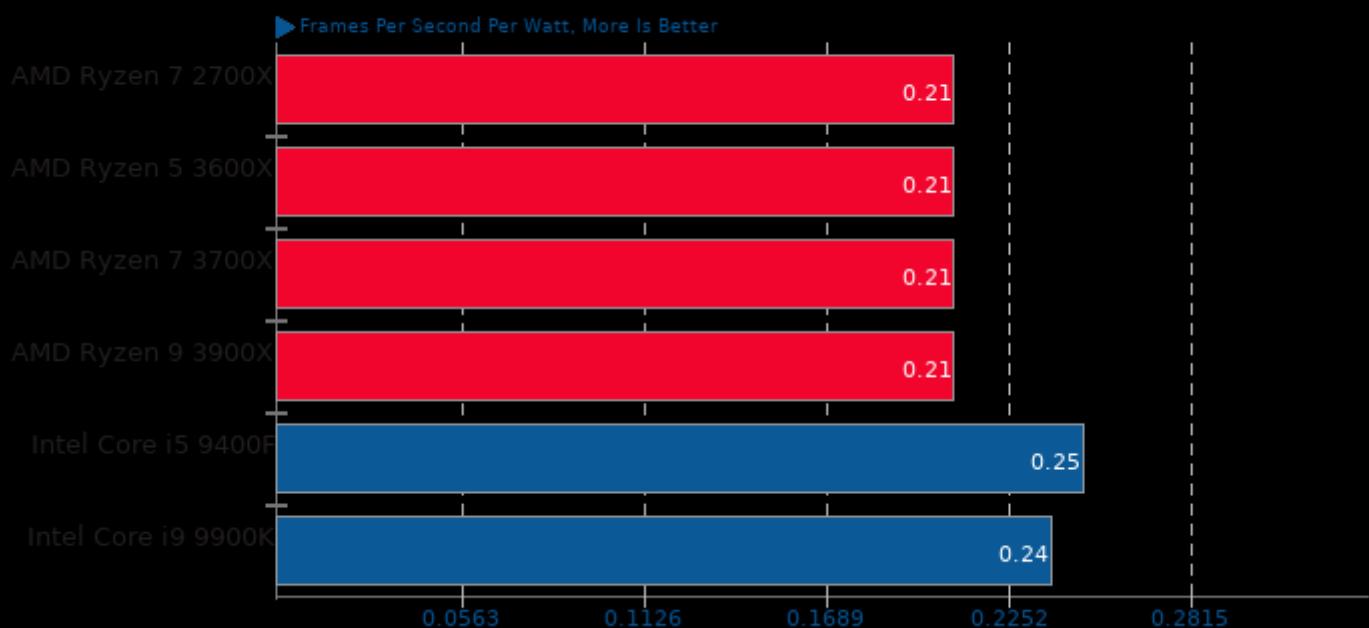
1. (CC) gcc options: -fPIE -fPIC -O2 -fno -fvisibility=hidden -march=native -pie -rdynamic -pthread -lrt

Tesseract 2014-05-12

Resolution: 3840 x 2160

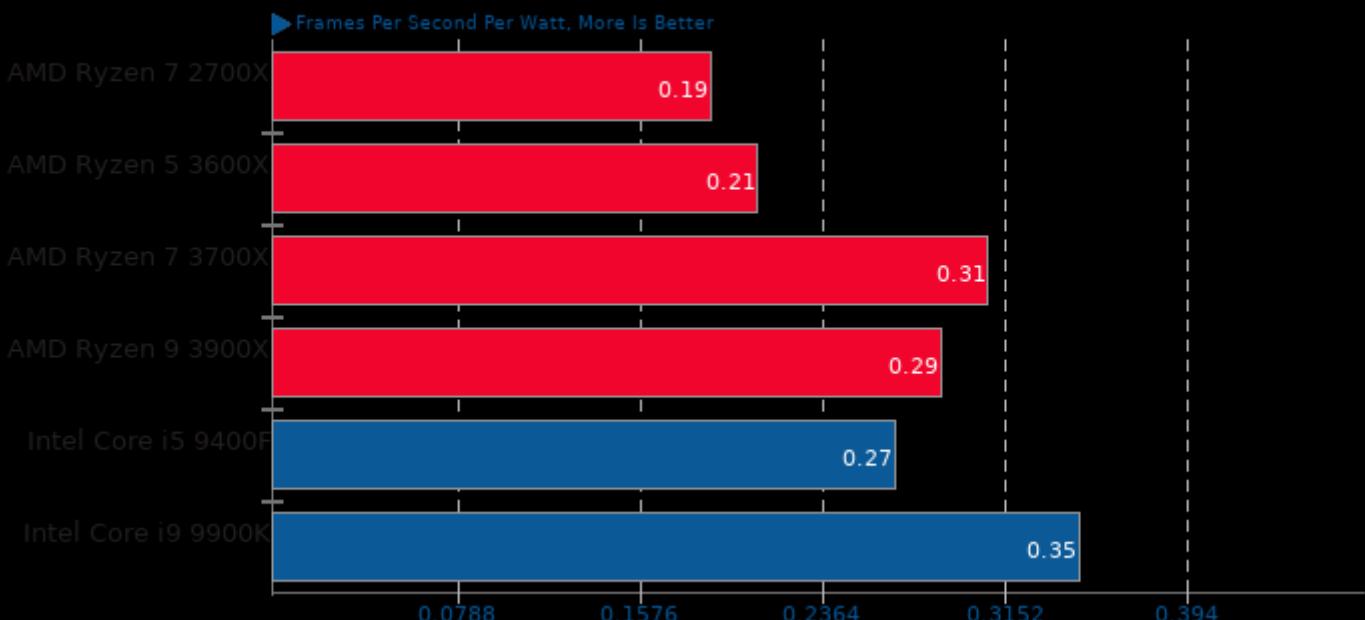
**SuperTuxKart 0.9.3**

Resolution: 3840 x 2160 - Mode: Fullscreen - Graphics Effects: Ultimate - Karts: 6 - Scene: Candela City

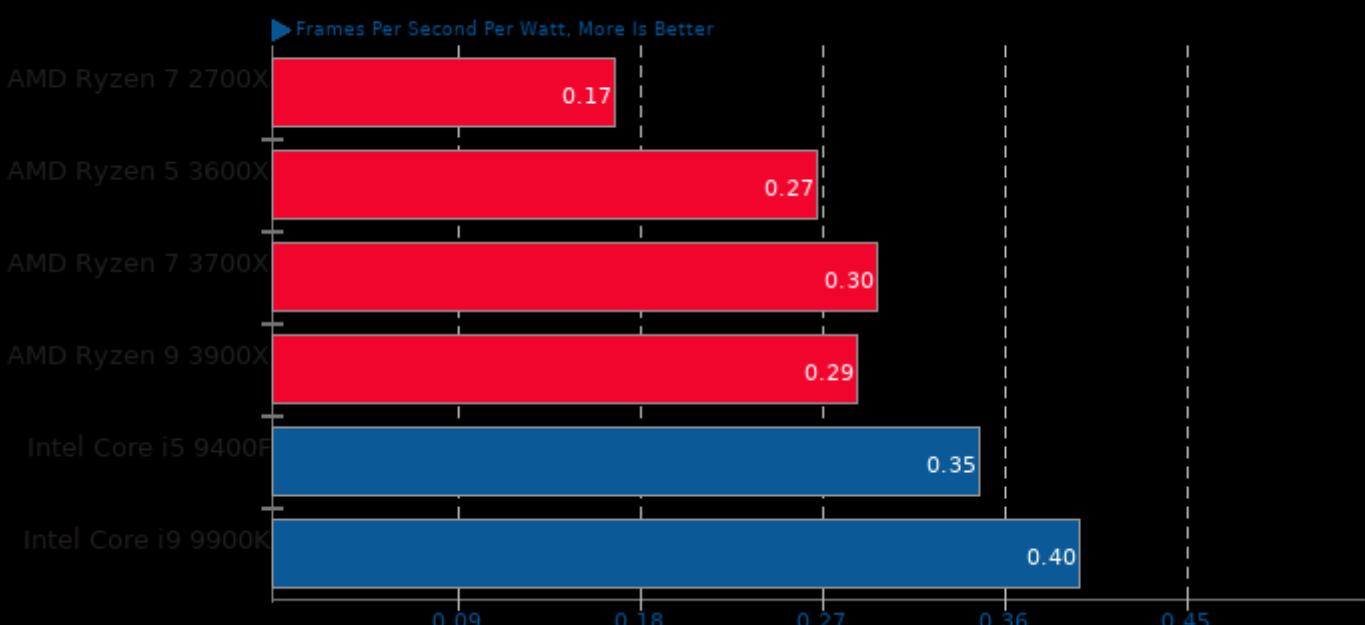


SVT-AV1 0.5

1080p 8-bit YUV To AV1 Video Encode

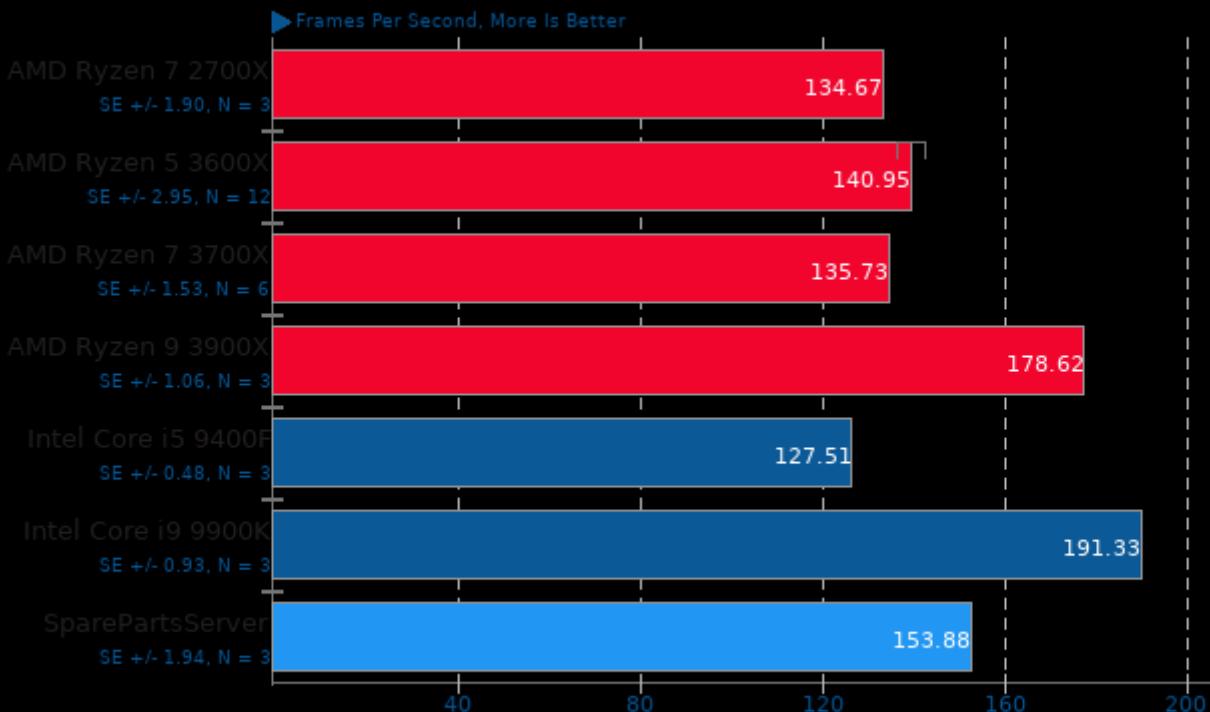
**X265 3.0**

H.265 1080p Video Encoding



VP9 libvpx Encoding 1.8.0

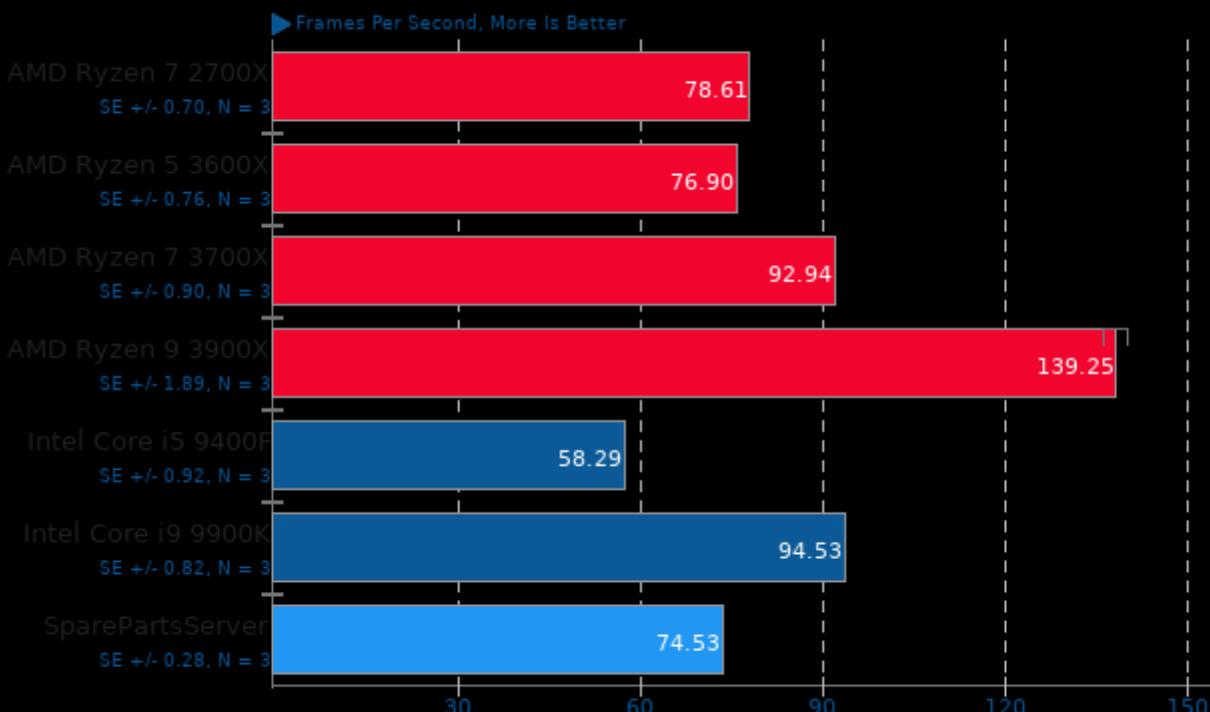
vpxenc VP9 1080p Video Encode



1. (CXX) g++ options: -m64 -lm -lpthread -O3 -fPIC -U_FORTIFY_SOURCE -std=c++11

x264 2018-09-25

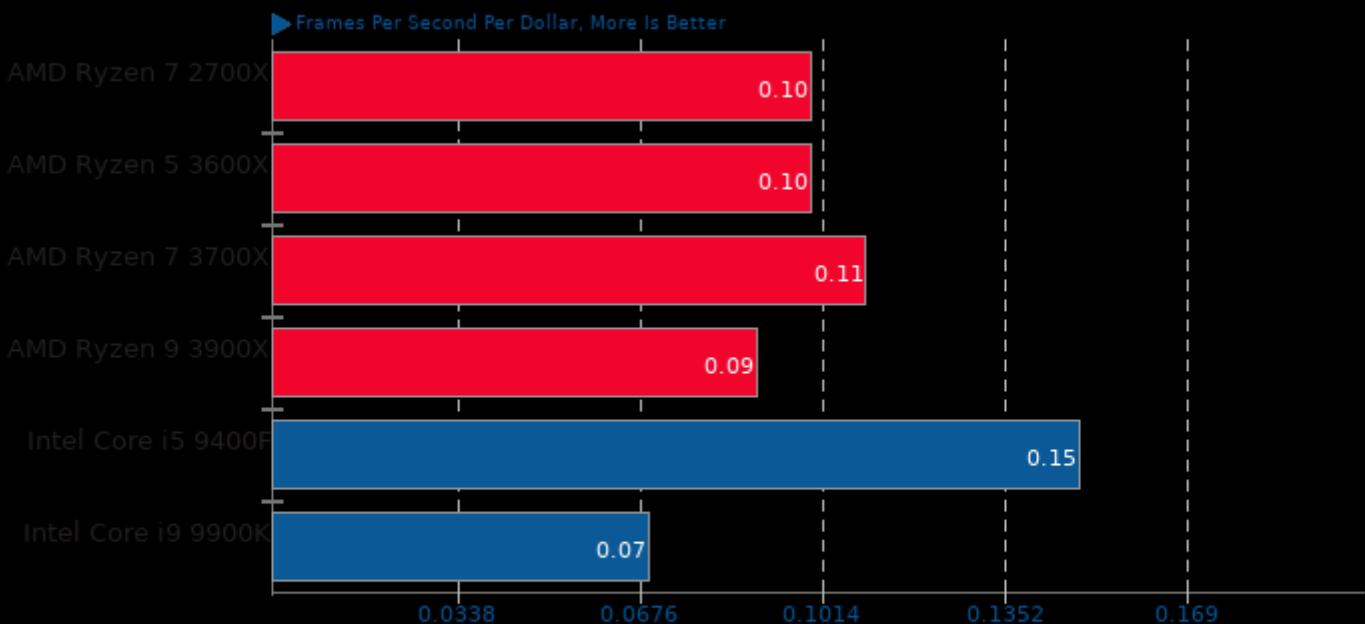
H.264 Video Encoding



1. (CC) gcc options: -ldl -m64 -lm -lpthread -O3 -ffast-math -std=gnu99 -fPIC -fomit-frame-pointer -fno-tree-vectorize

SVT-AV1 0.5

Performance / Cost - 1080p 8-bit YUV To AV1 Video Encode



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

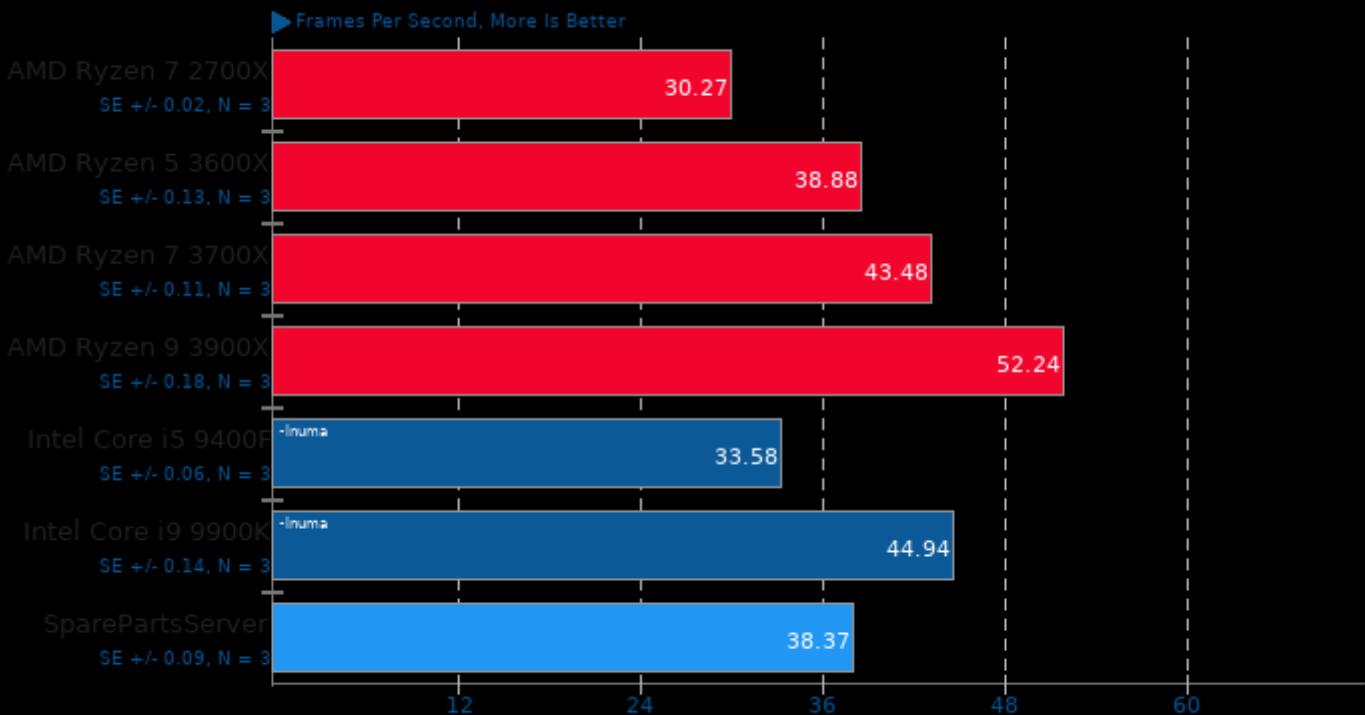
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

X265 3.0

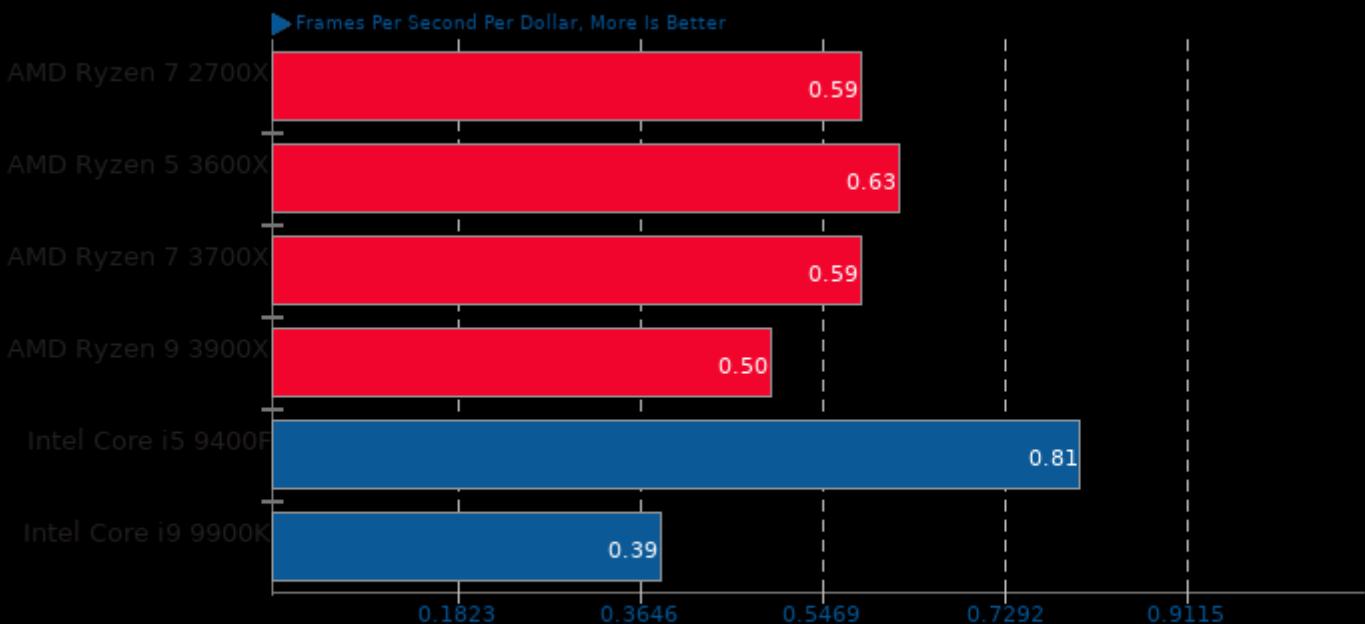
H.265 1080p Video Encoding



1. (CXX) g++ options: -O3 -rdynamic -lpthread -lrt -ldl

SVT-HEVC 2019-02-03

Performance / Cost - 1080p 8-bit YUV To HEVC Video Encode



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

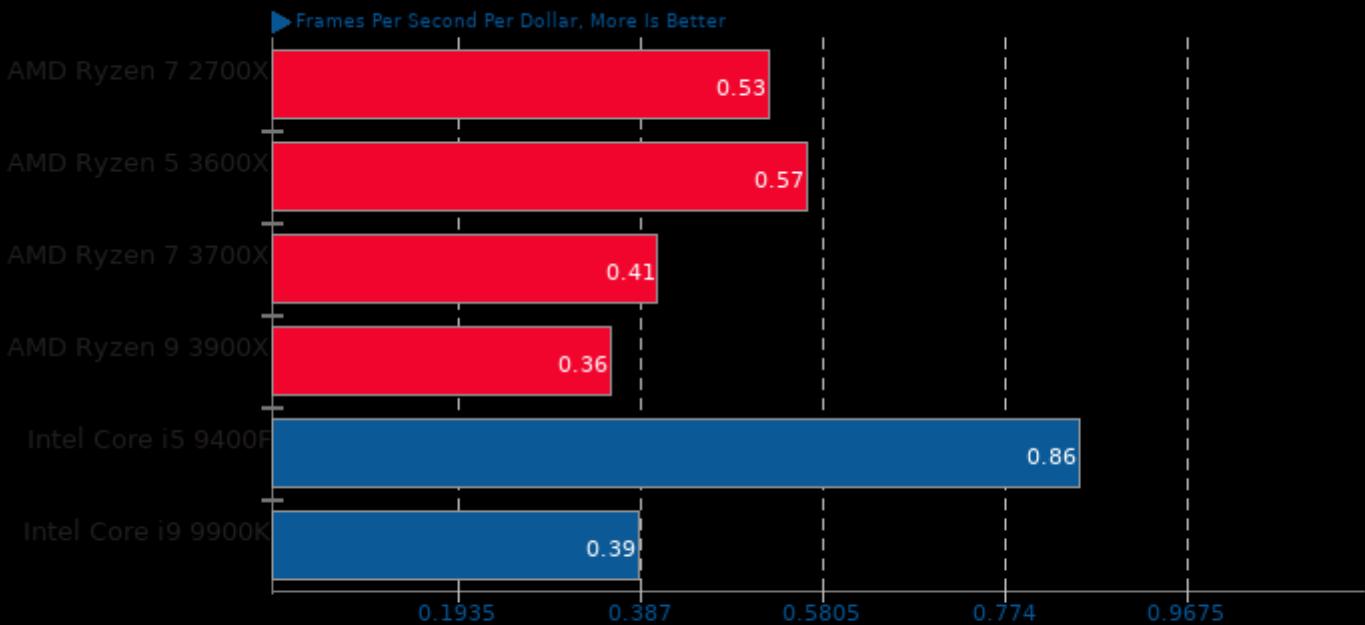
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

VP9 libvpx Encoding 1.8.0

Performance / Cost - vpxenc VP9 1080p Video Encode



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

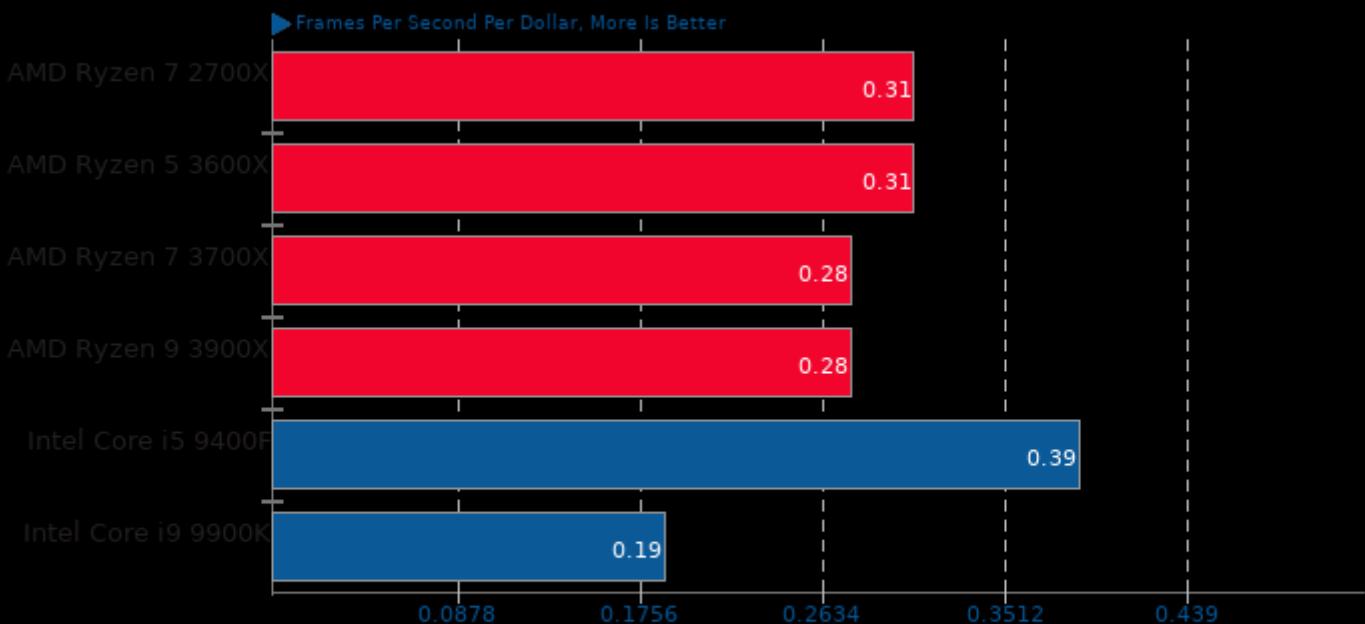
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

x264 2018-09-25

Performance / Cost - H.264 Video Encoding



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

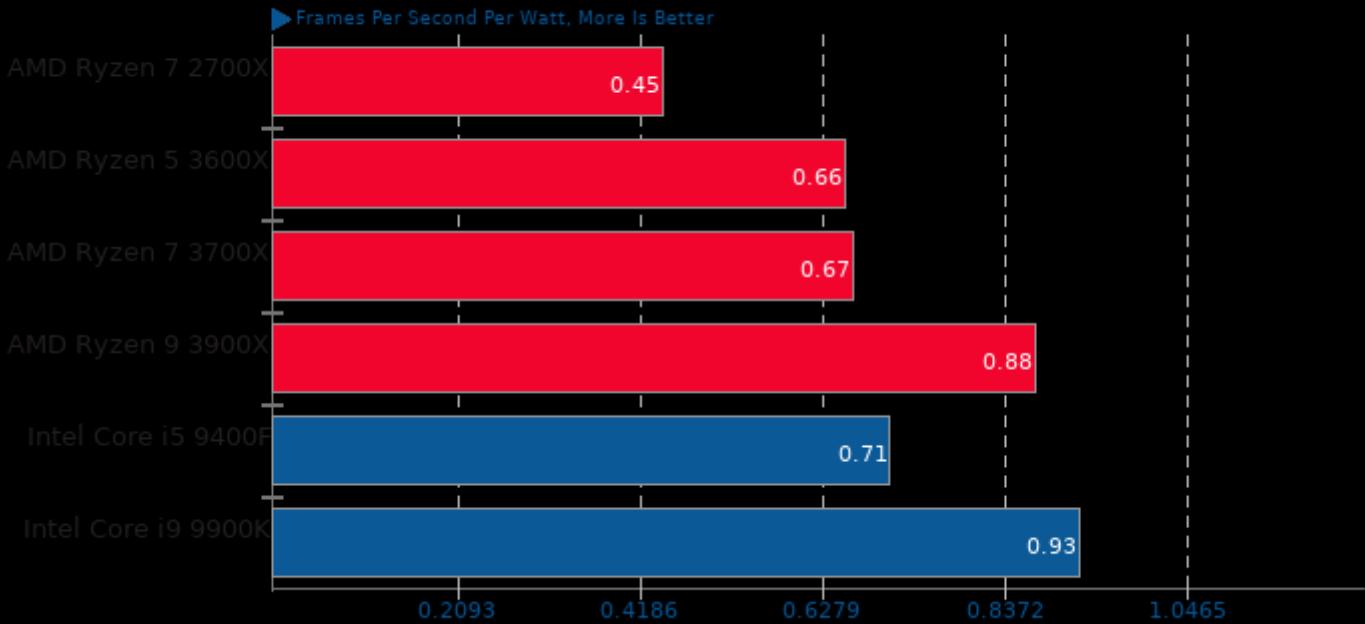
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

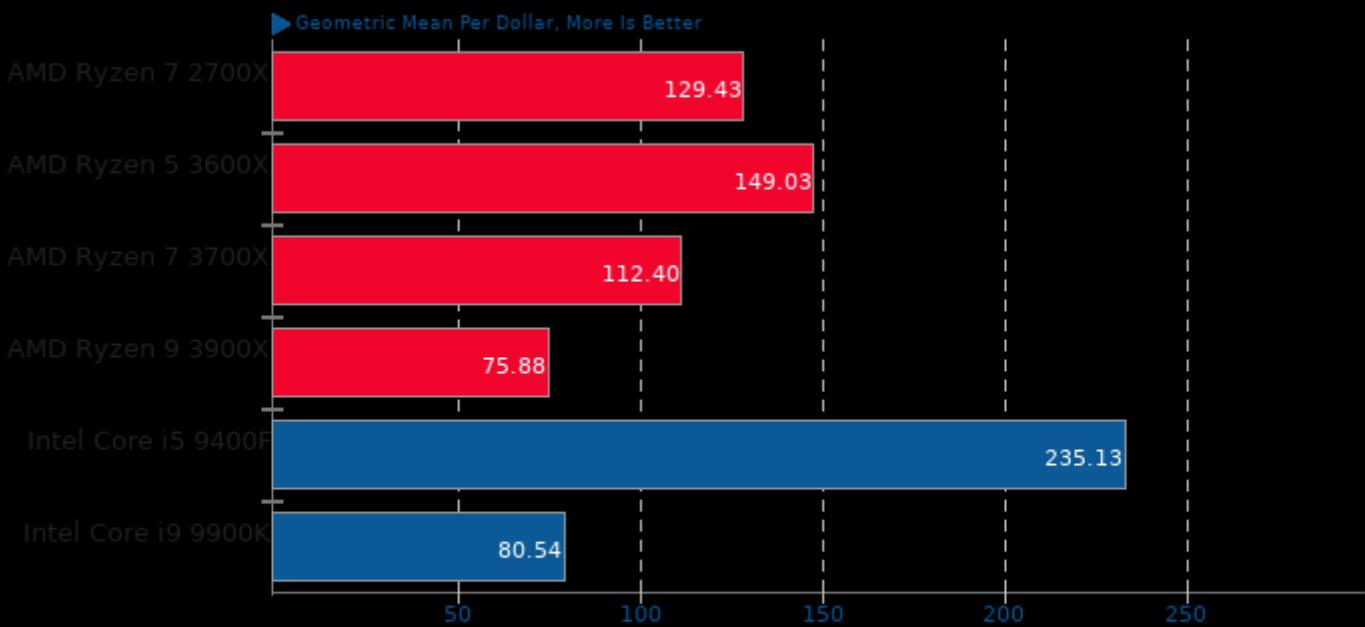
x264 2018-09-25

H.264 Video Encoding



Selenium

Performance / Cost - Benchmark: Octane - Browser: Firefox



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

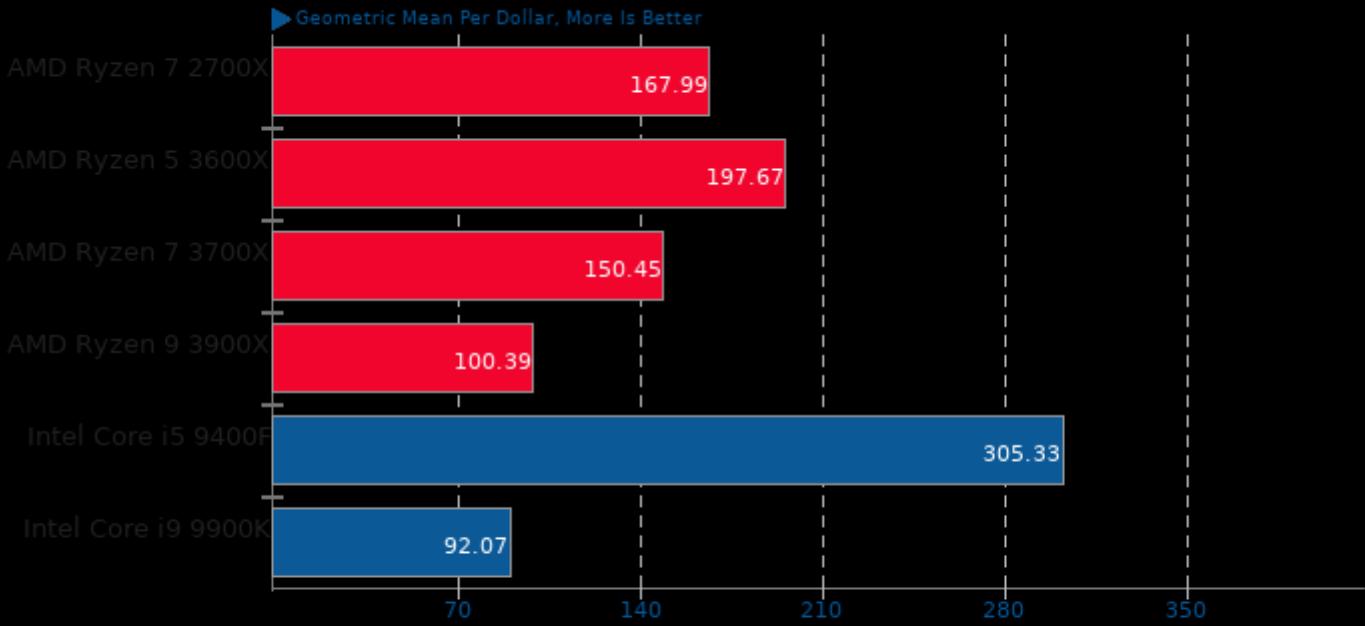
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

Selenium

Performance / Cost - Benchmark: Octane - Browser: Google Chrome



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

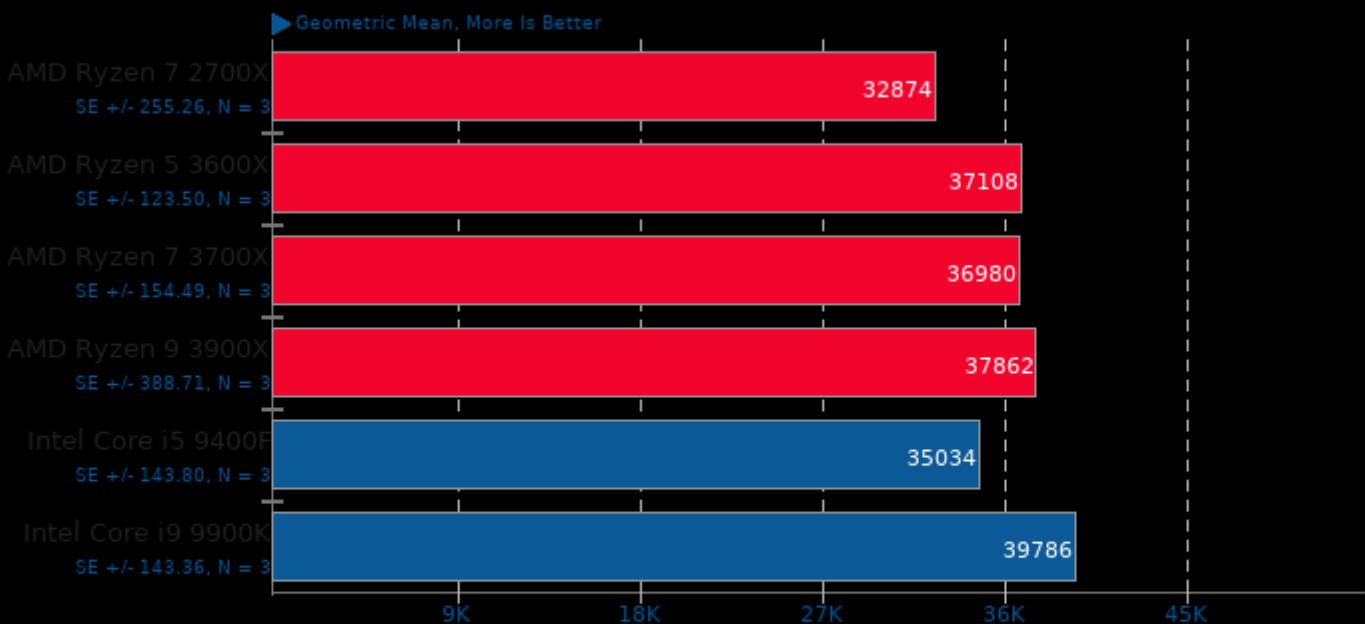
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

Selenium

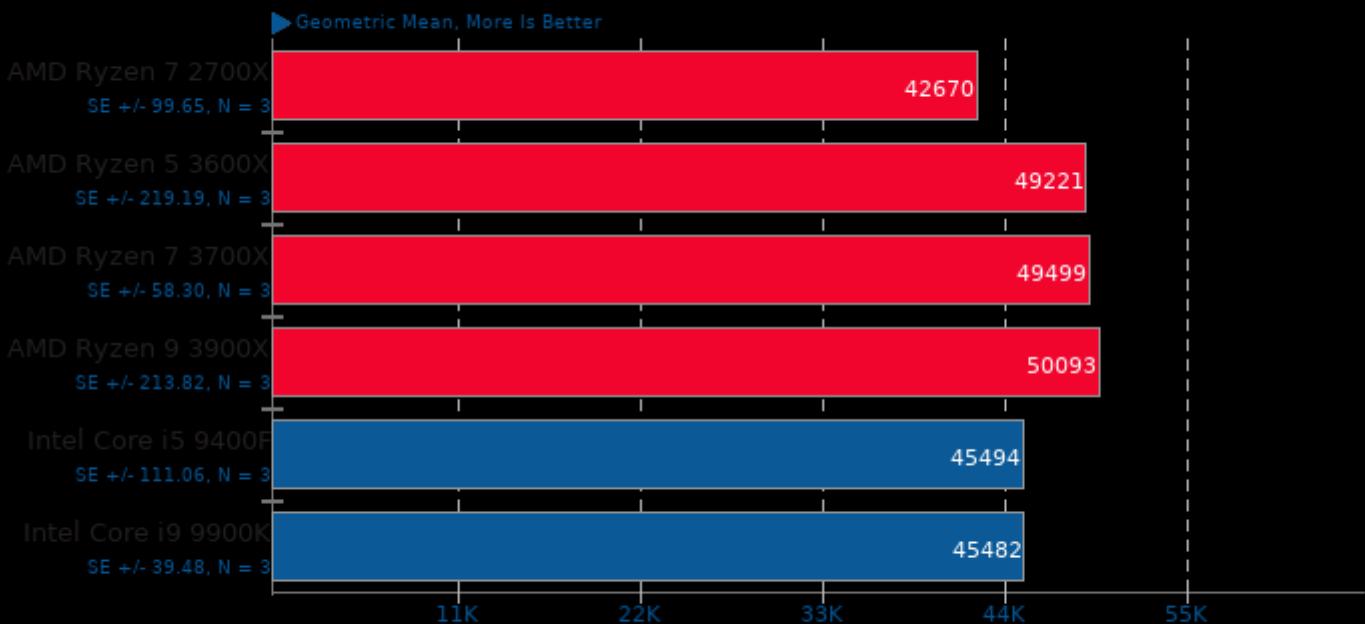
Benchmark: Octane - Browser: Firefox



1. AMD Ryzen 7 2700X: firefox 68.0.1
2. AMD Ryzen 5 3600X: firefox 68.0.1
3. AMD Ryzen 7 3700X: firefox 68.0.1
4. AMD Ryzen 9 3900X: firefox 68.0.1
5. Intel Core i5 9400F: firefox 68.0.2
6. Intel Core i9 9900K: firefox 68.0.2

Selenium

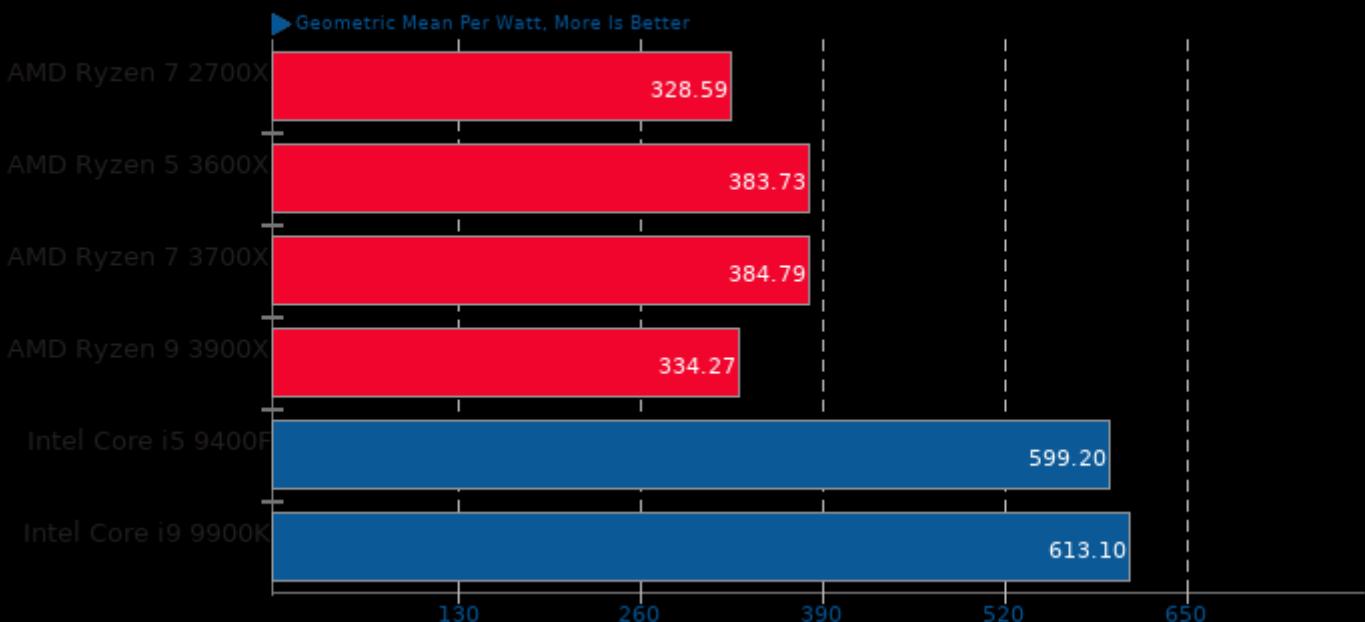
Benchmark: Octane - Browser: Google Chrome



1. chrome 76.0.3809.100

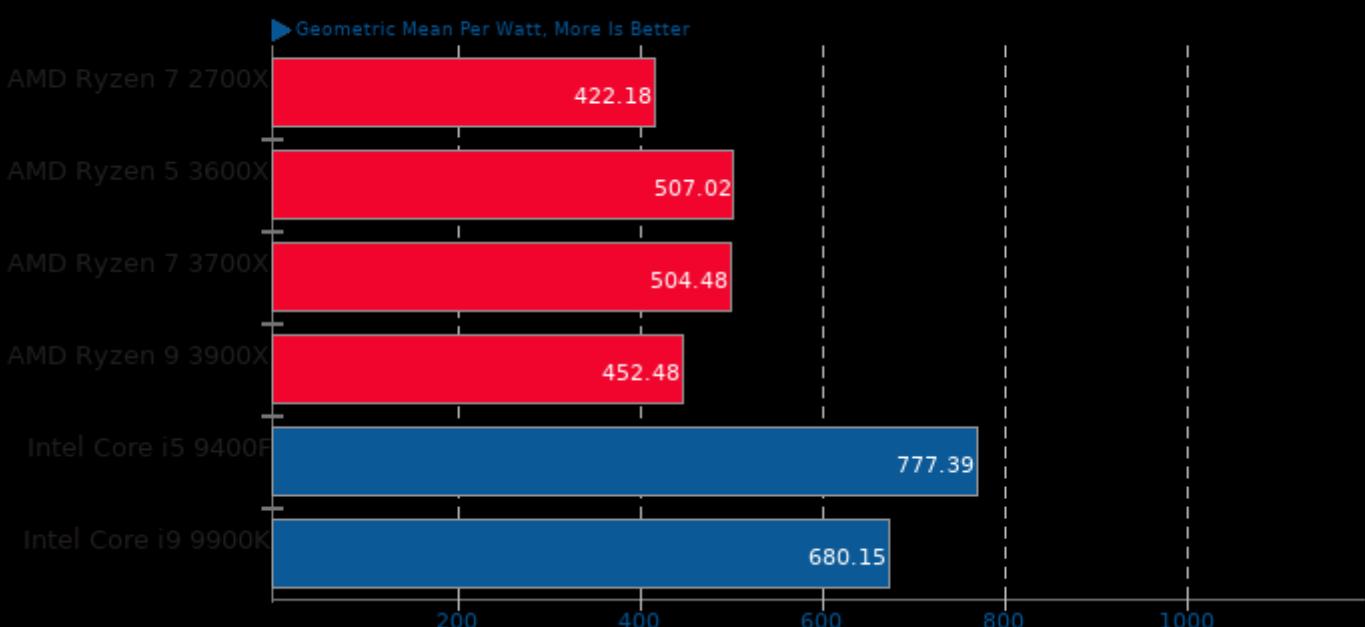
Selenium

Benchmark: Octane - Browser: Firefox



Selenium

Benchmark: Octane - Browser: Google Chrome



Coremark 1.0

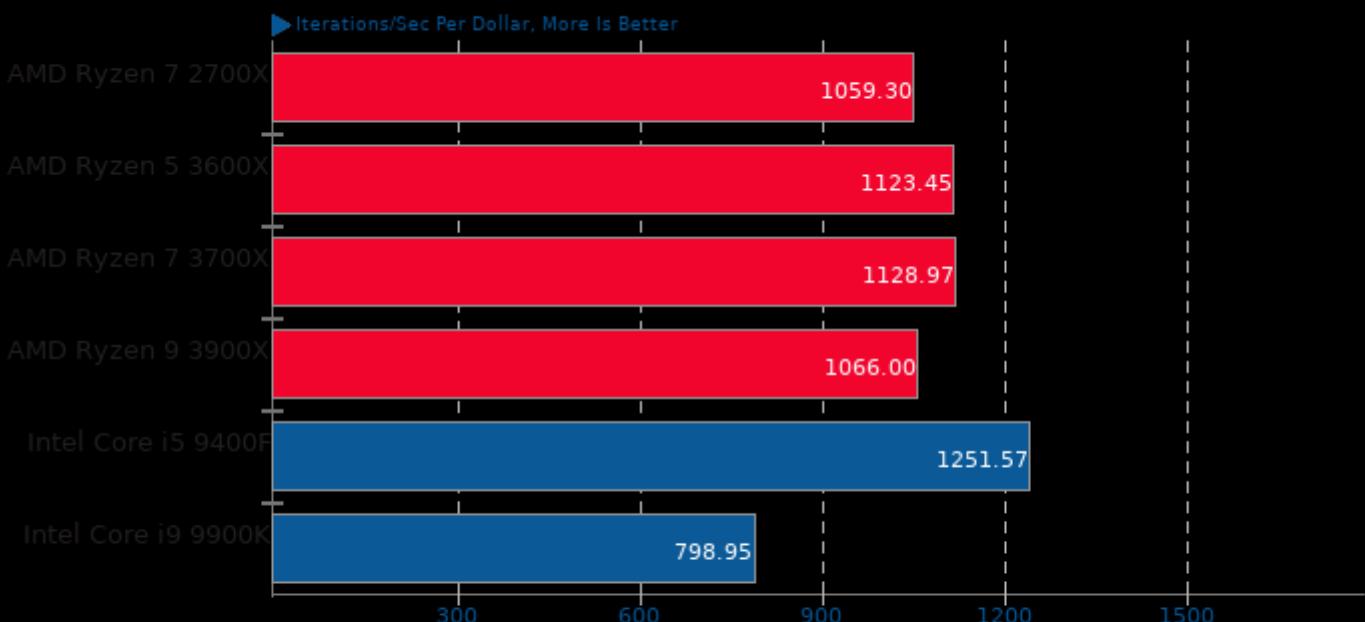
CoreMark Size 666 - Iterations Per Second



1. (CC) gcc options: -O2 -fomit-frame-pointer

Coremark 1.0

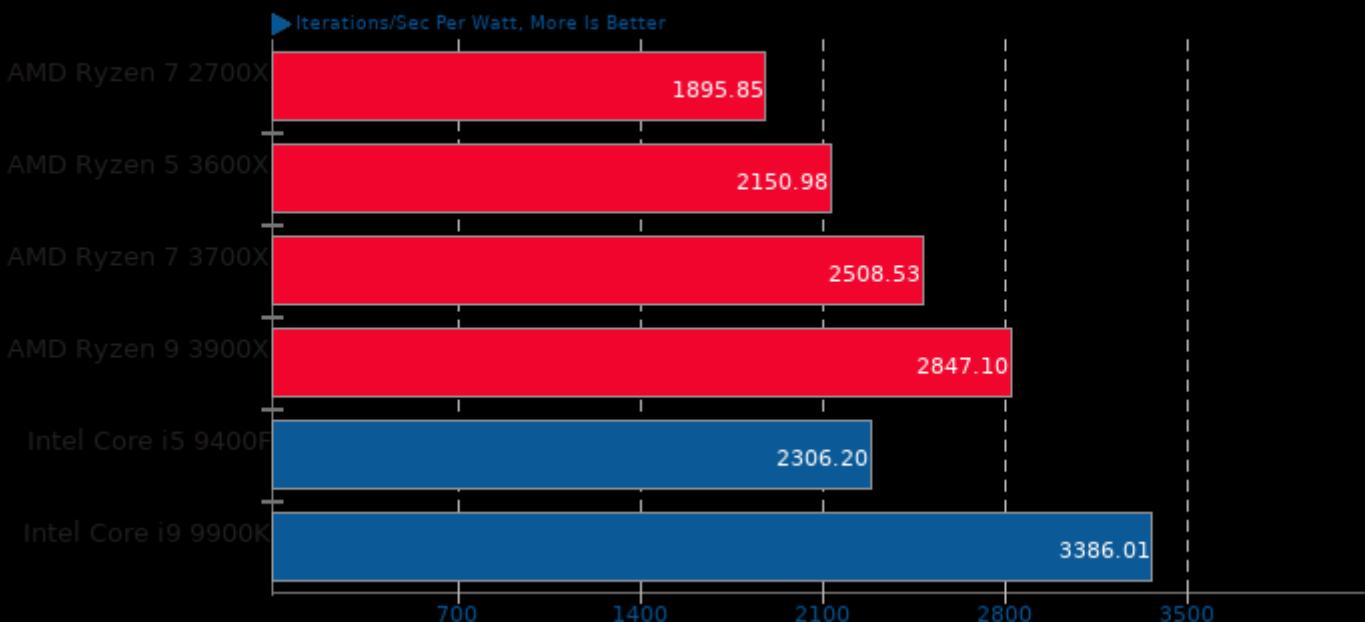
Performance / Cost - CoreMark Size 666 - Iterations Per Second



1. AMD Ryzen 7 2700X: \$254 reported cost.
2. AMD Ryzen 5 3600X: \$249 reported cost.
3. AMD Ryzen 7 3700X: \$329 reported cost.
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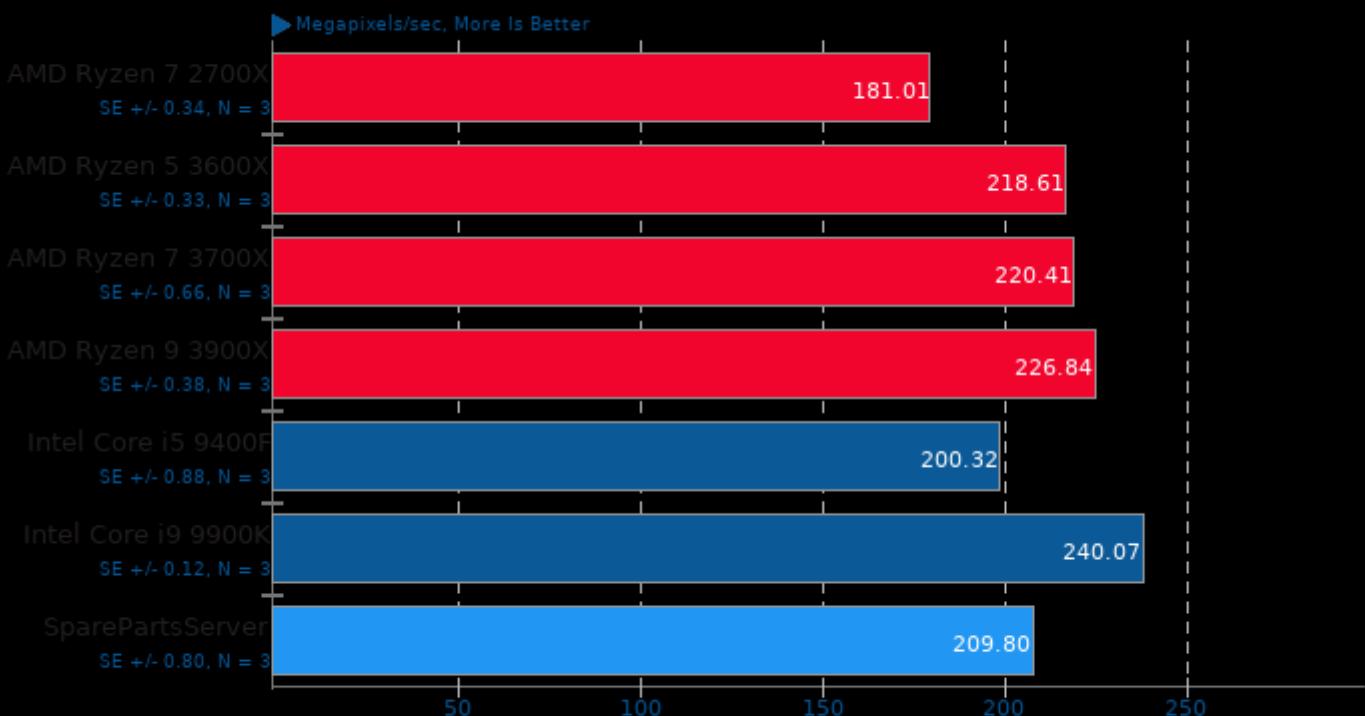
Coremark 1.0

CoreMark Size 666 - Iterations Per Second



libjpeg-turbo tjbench 2.0.2

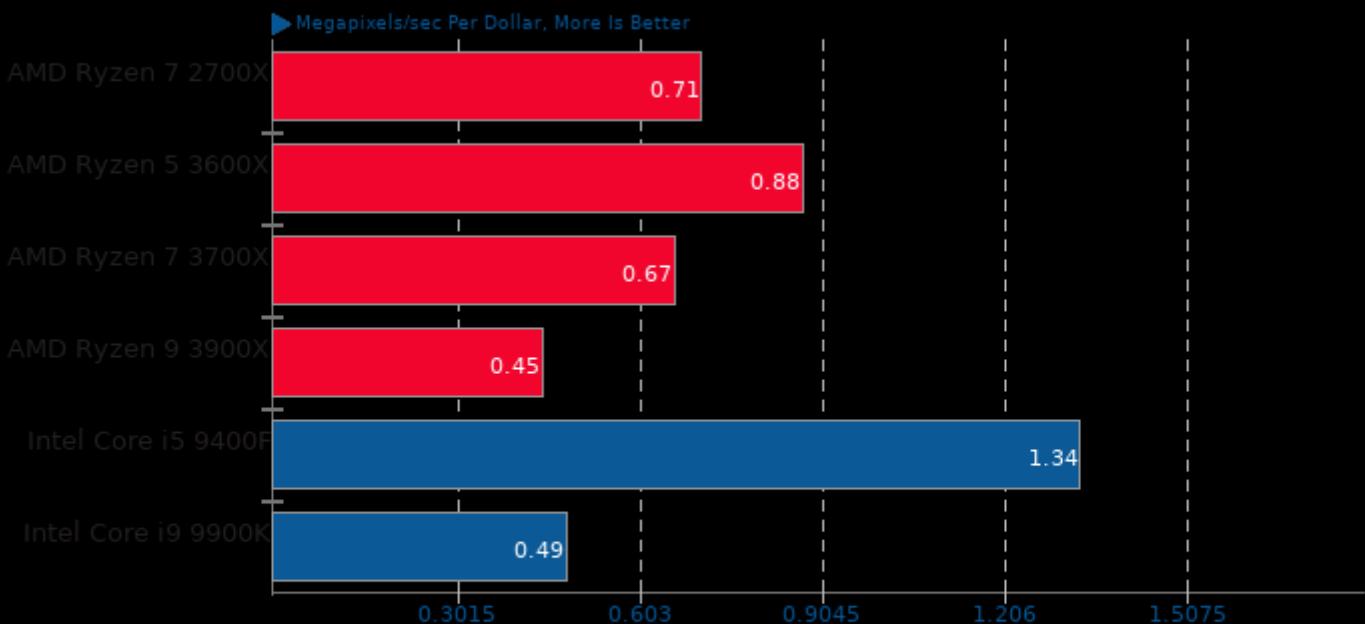
Test: Decompression Throughput



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

libjpeg-turbo tjbench 2.0.2

Performance / Cost - Test: Decompression Throughput



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

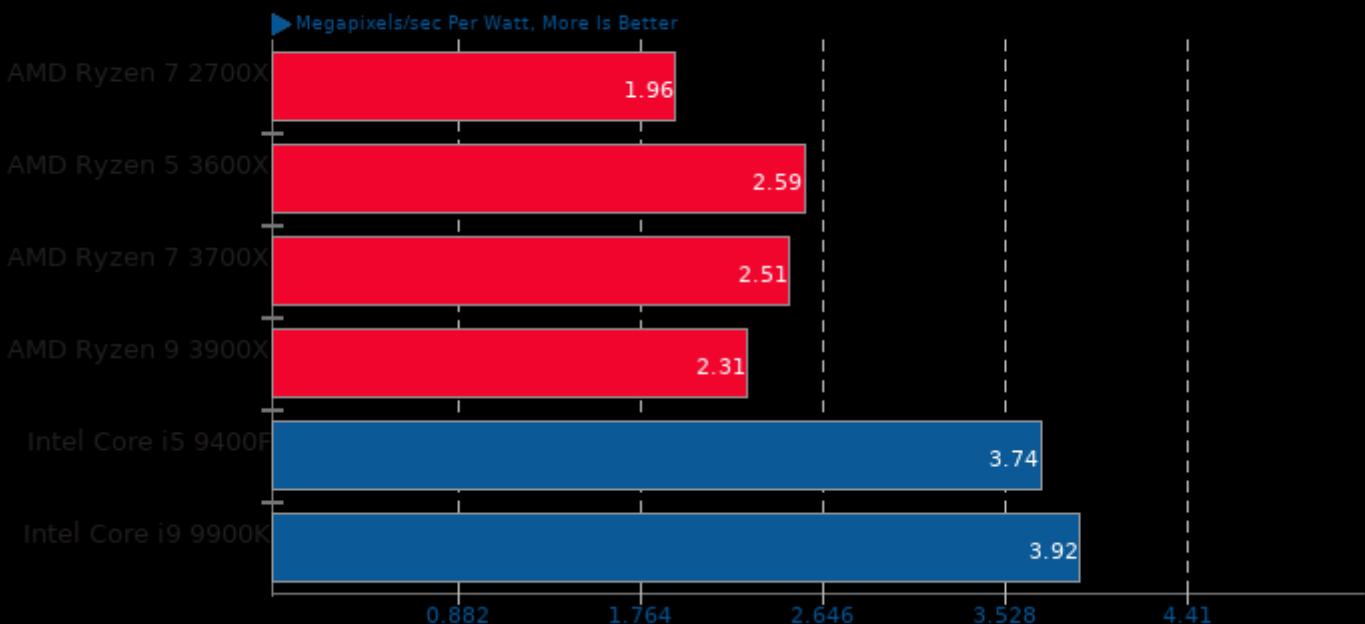
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

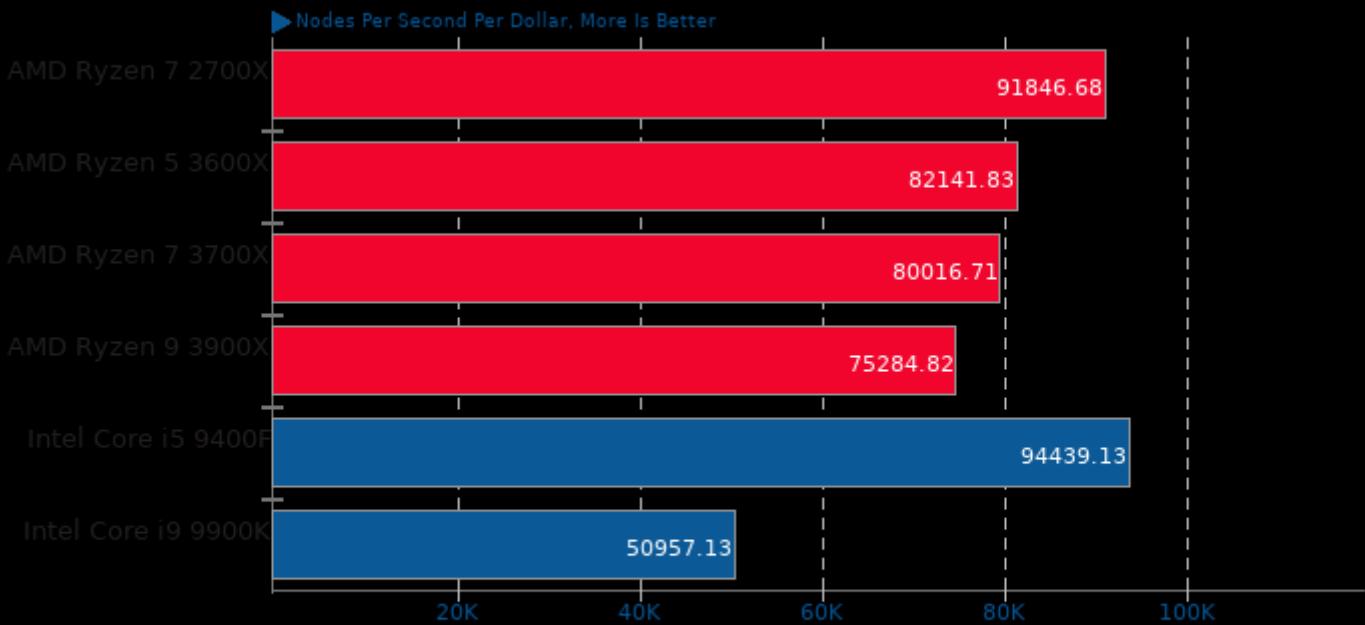
libjpeg-turbo tjbench 2.0.2

Test: Decompression Throughput



Stockfish 9

Performance / Cost - Total Time



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

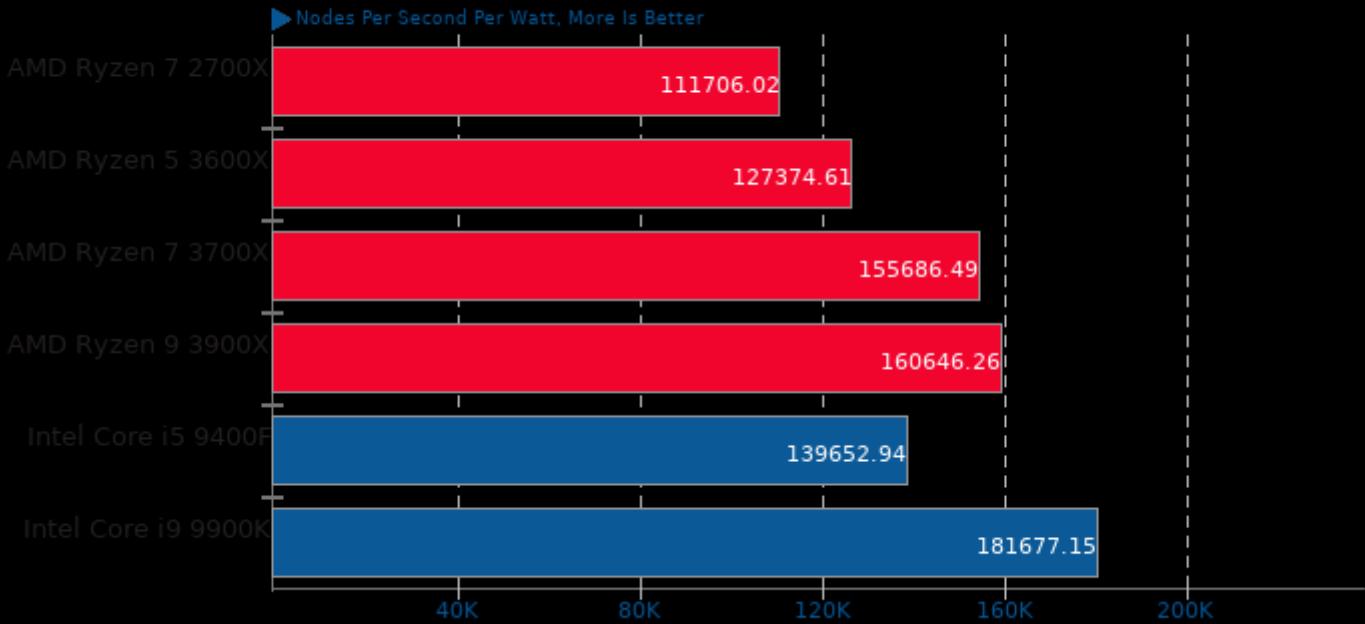
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

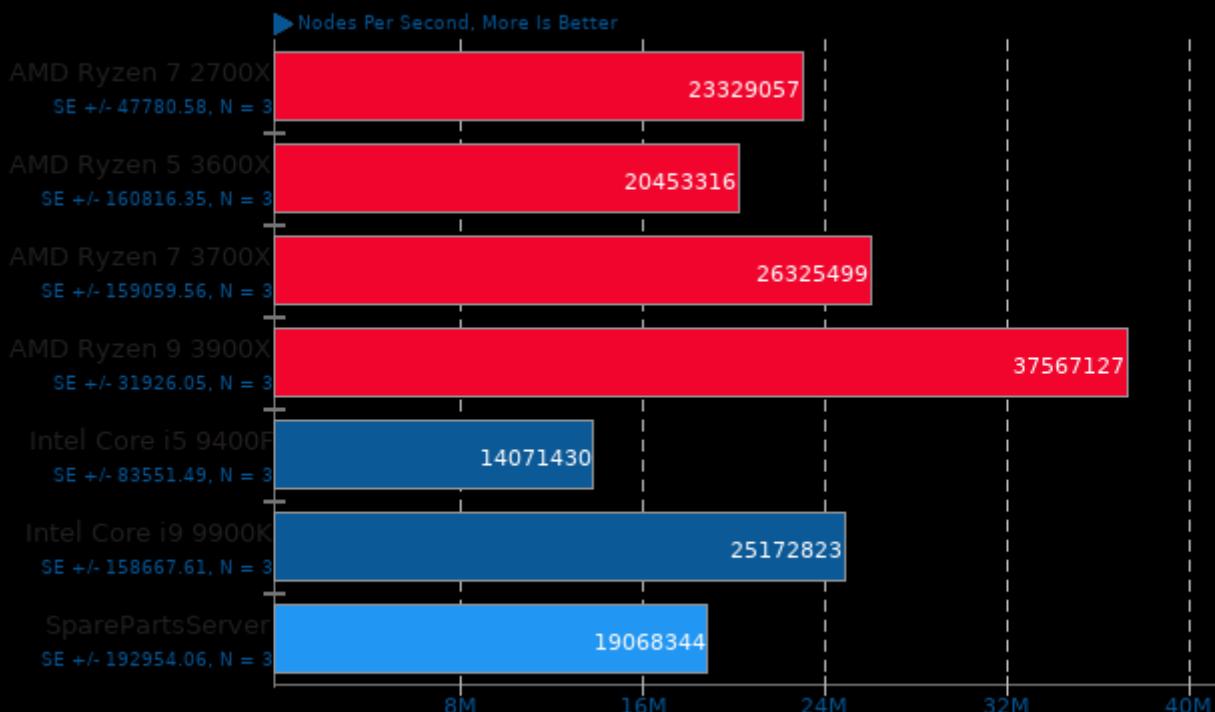
Stockfish 9

Total Time



Stockfish 9

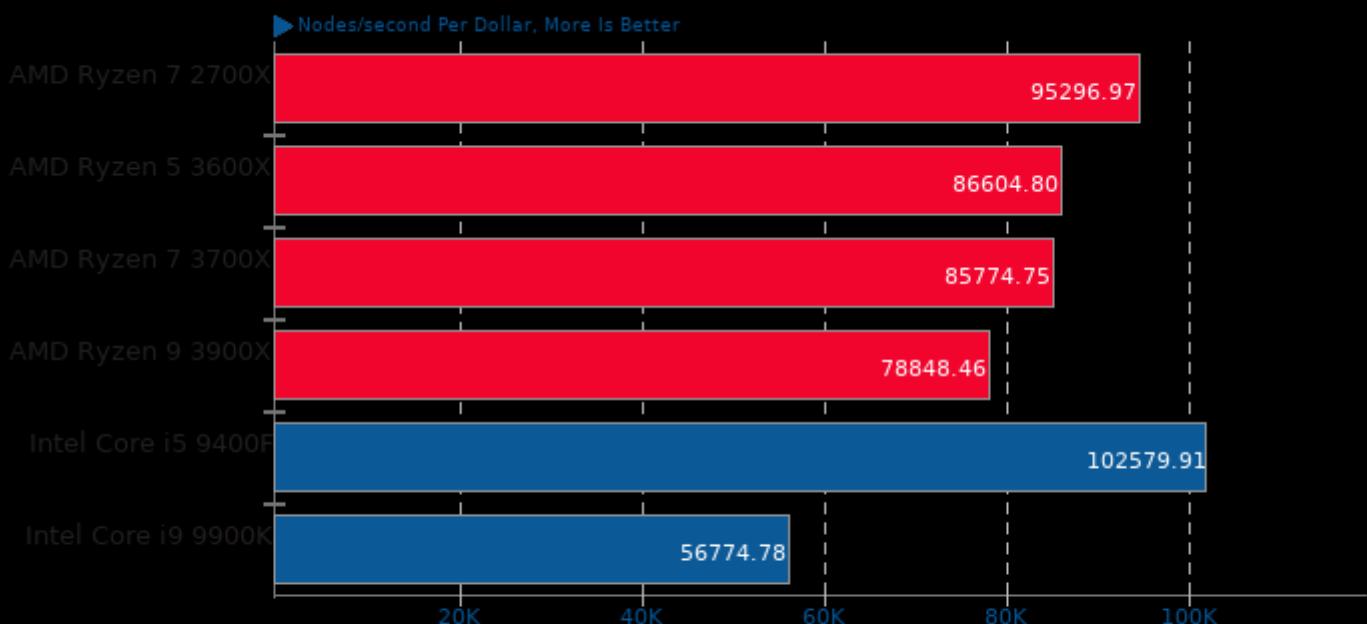
Total Time



1. (CXX) g++ options: -m64 -lpthread -fno-exceptions -std=c++11 -pedantic -O3 -msse -msse3 -mpopcnt -fno-

asmFish 2018-07-23

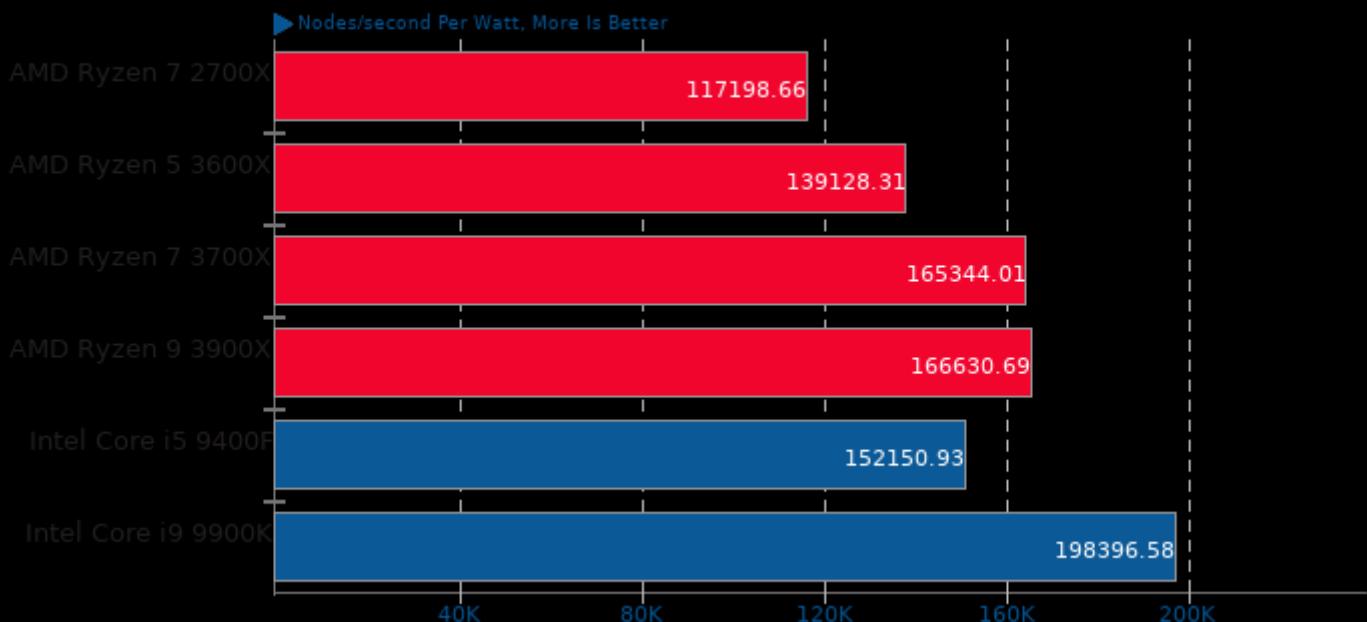
Performance / Cost - 1024 Hash Memory, 26 Depth



1. AMD Ryzen 7 2700X: \$254 reported cost.
2. AMD Ryzen 5 3600X: \$249 reported cost.
3. AMD Ryzen 7 3700X: \$329 reported cost.
4. AMD Ryzen 9 3900X: \$499 reported cost.
5. Intel Core i5 9400F: \$149 reported cost.
6. Intel Core i9 9900K: \$494 reported cost.

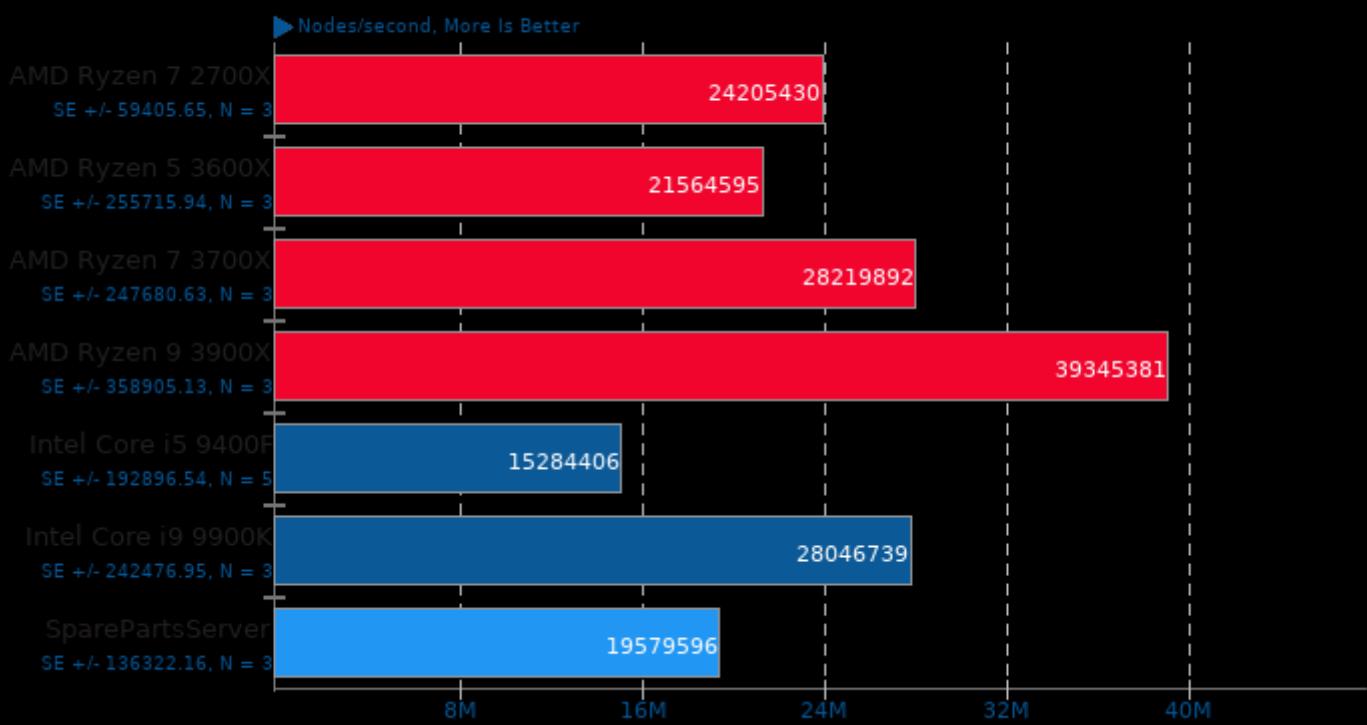
asmFish 2018-07-23

1024 Hash Memory, 26 Depth



asmFish 2018-07-23

1024 Hash Memory, 26 Depth



GROMACS 2018.3

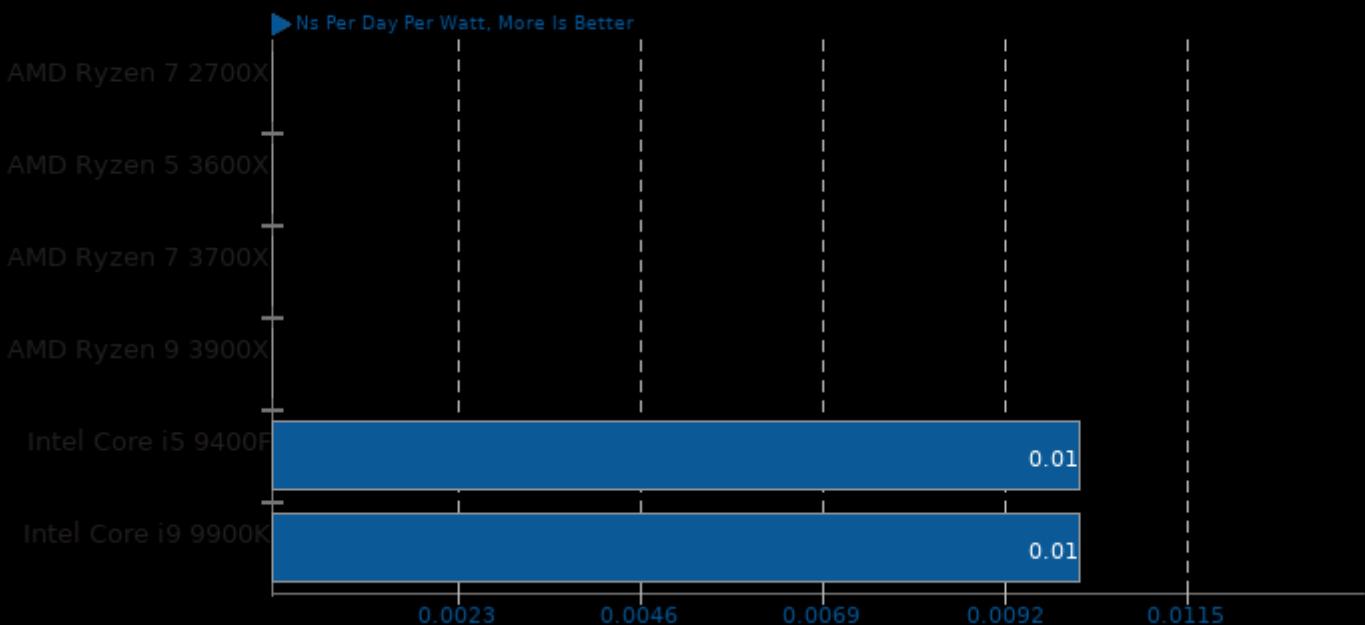
Water Benchmark



1. (CXX) g++ options: -std=c++11 -O3 -funroll-all-loops -fopenmp -lrt -lpthread -lm

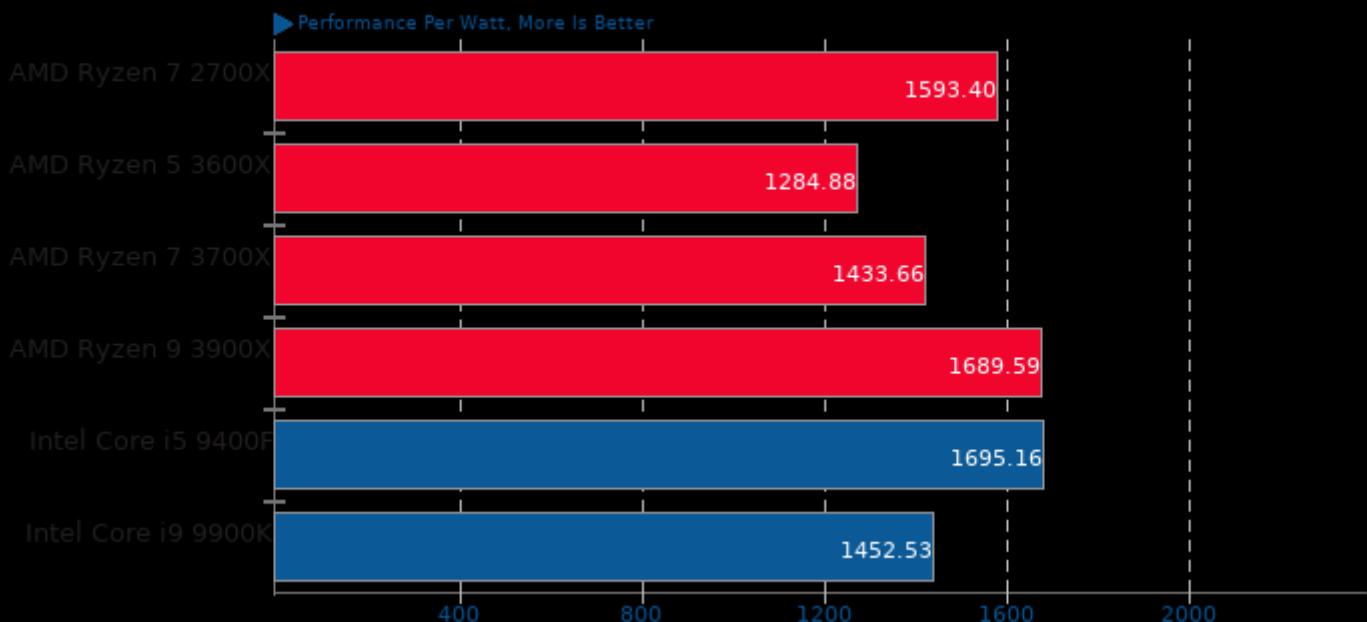
GROMACS 2018.3

Water Benchmark



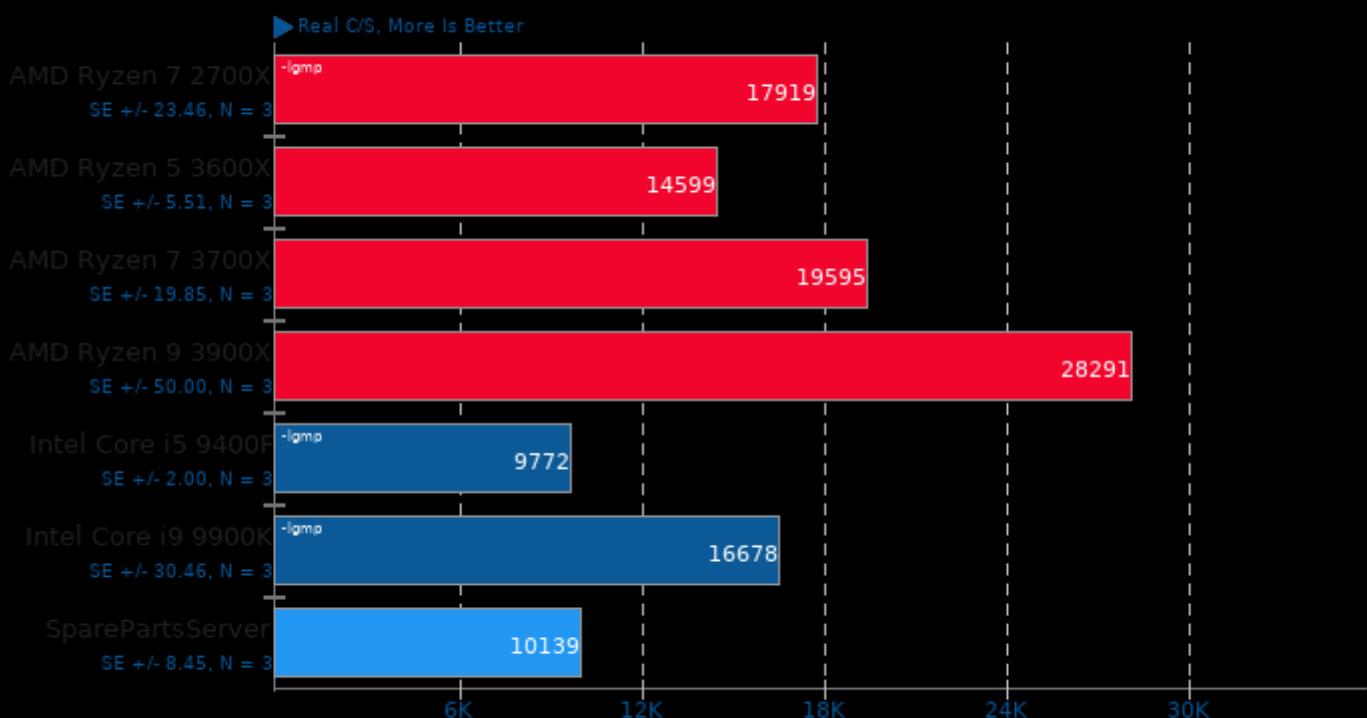
Meta Performance Per Watt

Performance Per Watt



John The Ripper 1.9.0-jumbo-1

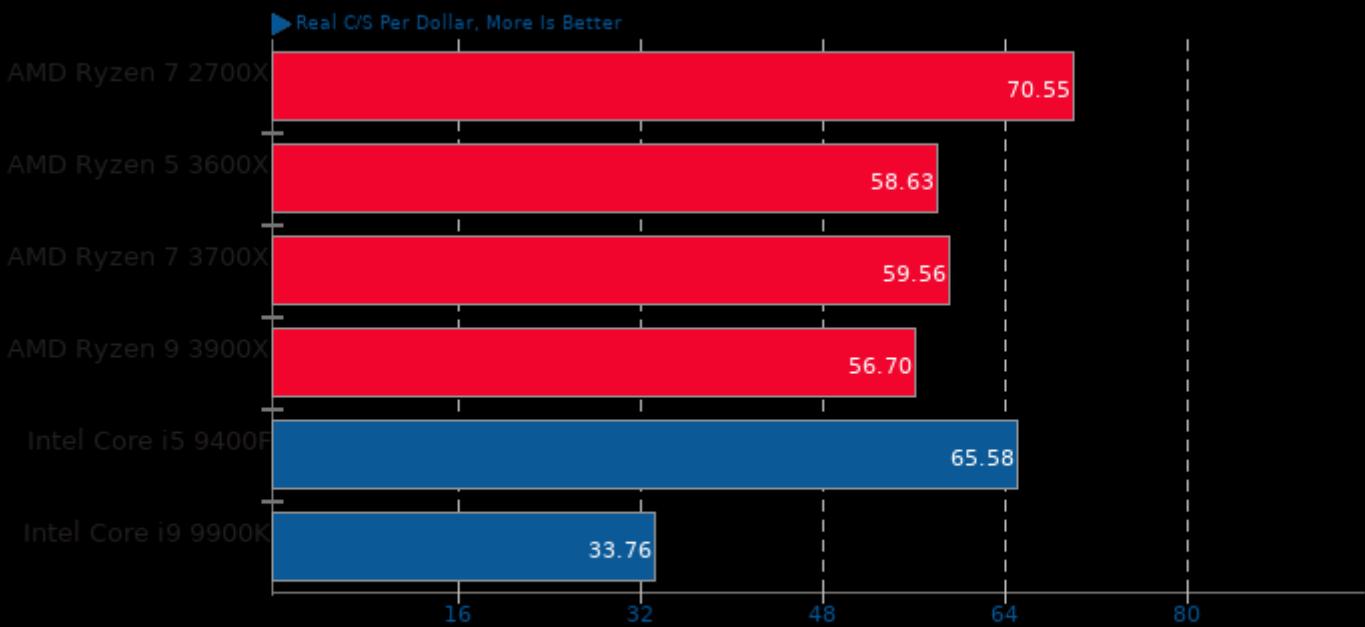
Test: Blowfish



1. (CC) gcc options: -m64 -lssl -lcrypto -fopenmp -pthread -lm -lz -ldl -lcrypt -bz2

John The Ripper 1.9.0-jumbo-1

Performance / Cost - Test: Blowfish



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

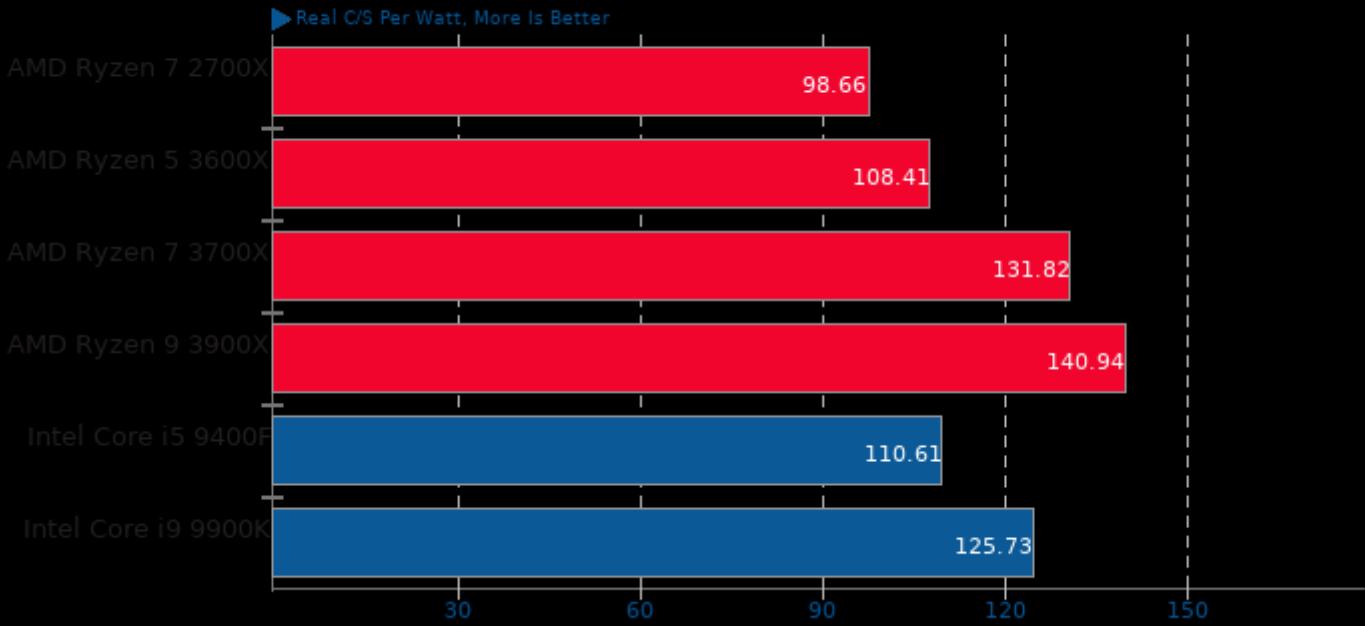
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

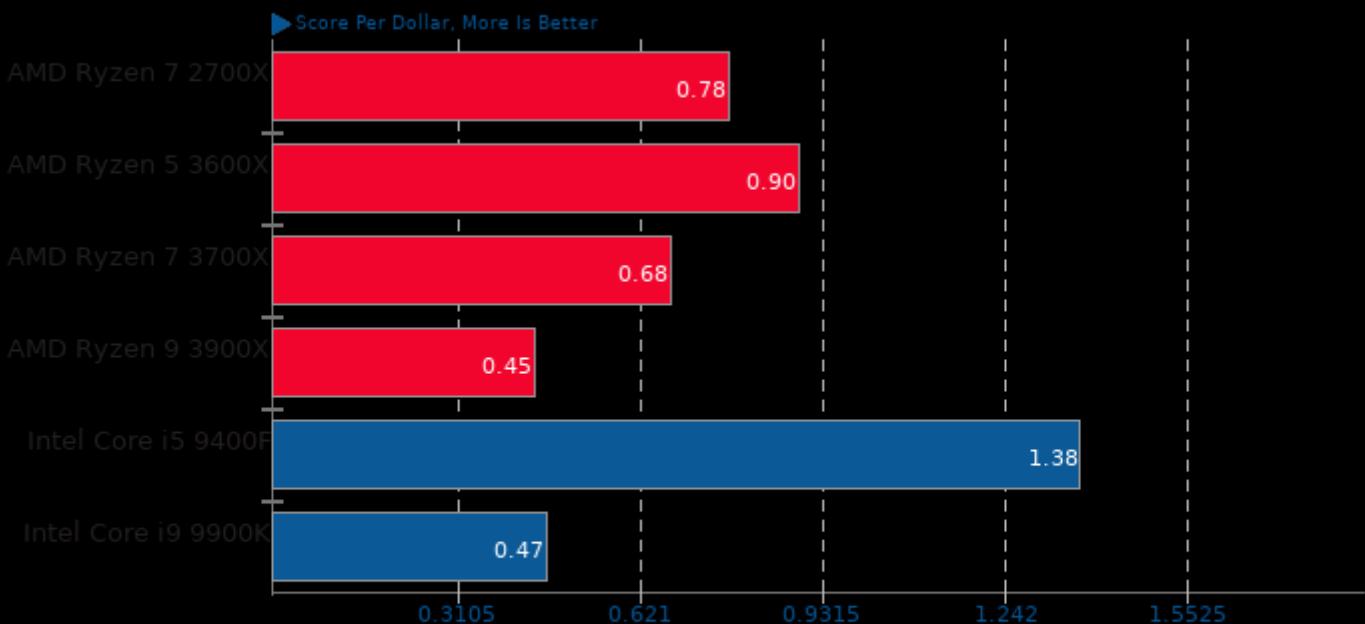
John The Ripper 1.9.0-jumbo-1

Test: Blowfish



Selenium

Performance / Cost - Benchmark: Jetstream - Browser: Firefox



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

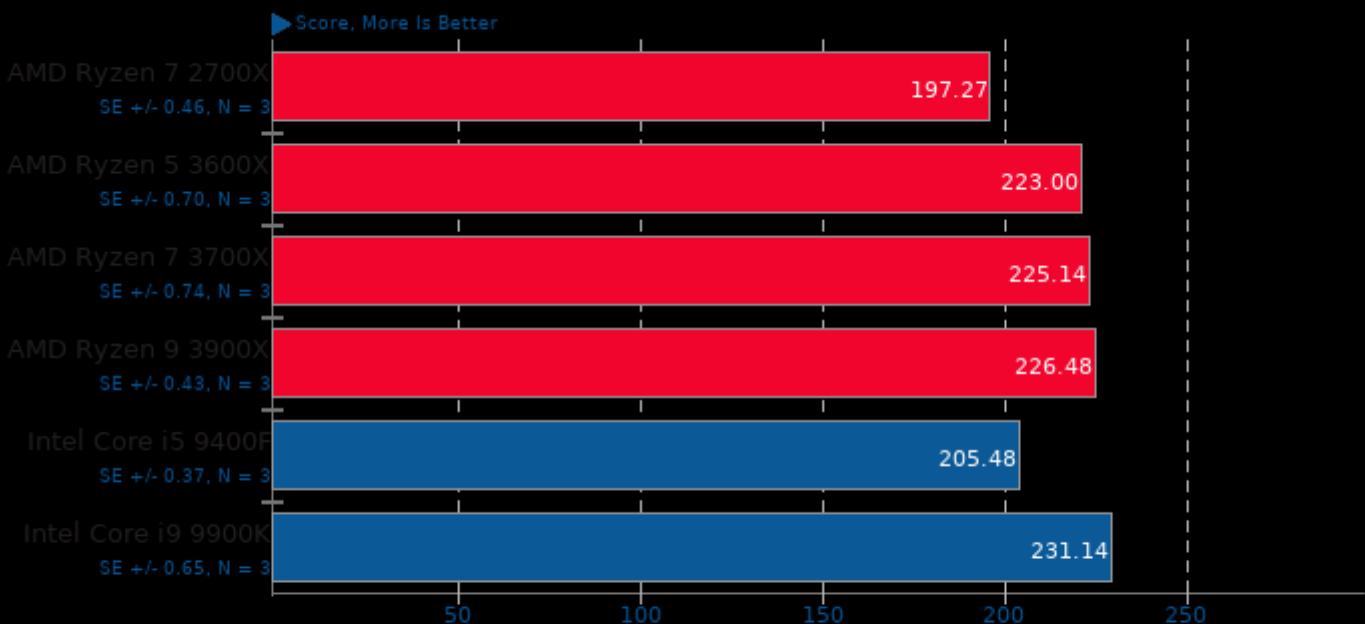
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

Selenium

Benchmark: Jetstream - Browser: Firefox



1. AMD Ryzen 7 2700X: firefox 68.0.1

2. AMD Ryzen 5 3600X: firefox 68.0.1

3. AMD Ryzen 7 3700X: firefox 68.0.1

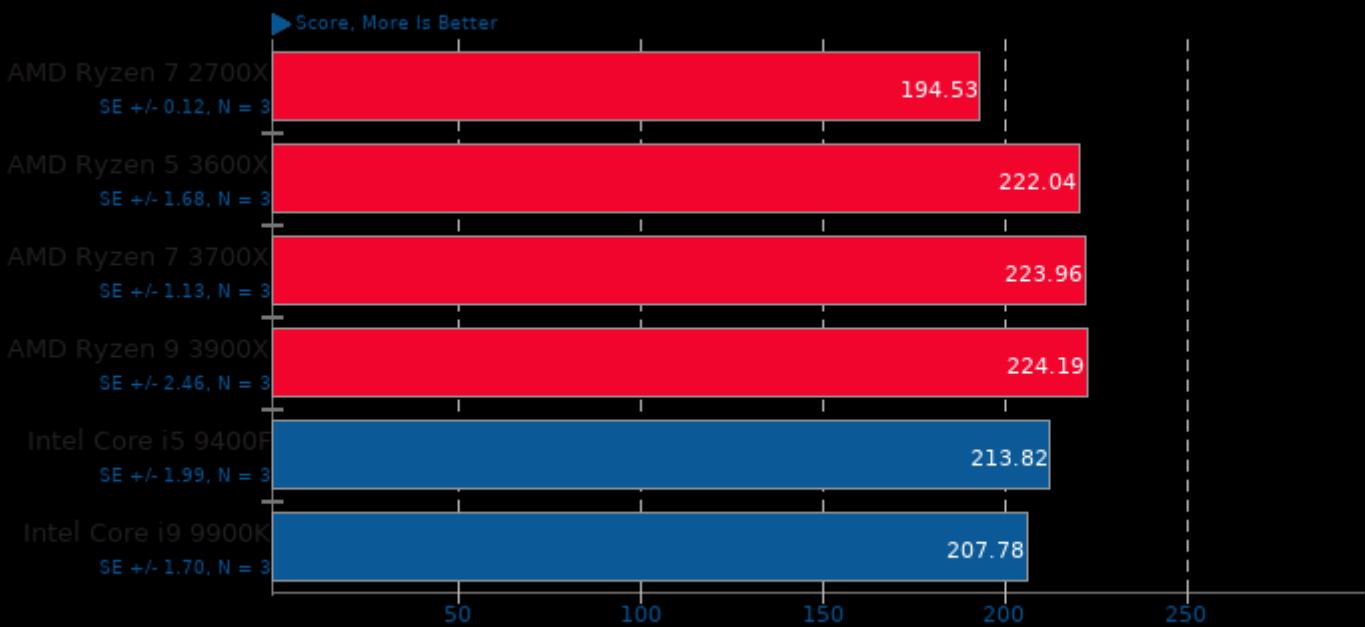
4. AMD Ryzen 9 3900X: firefox 68.0.1

5. Intel Core i5 9400F: firefox 68.0.2

6. Intel Core i9 9900K: firefox 68.0.2

Selenium

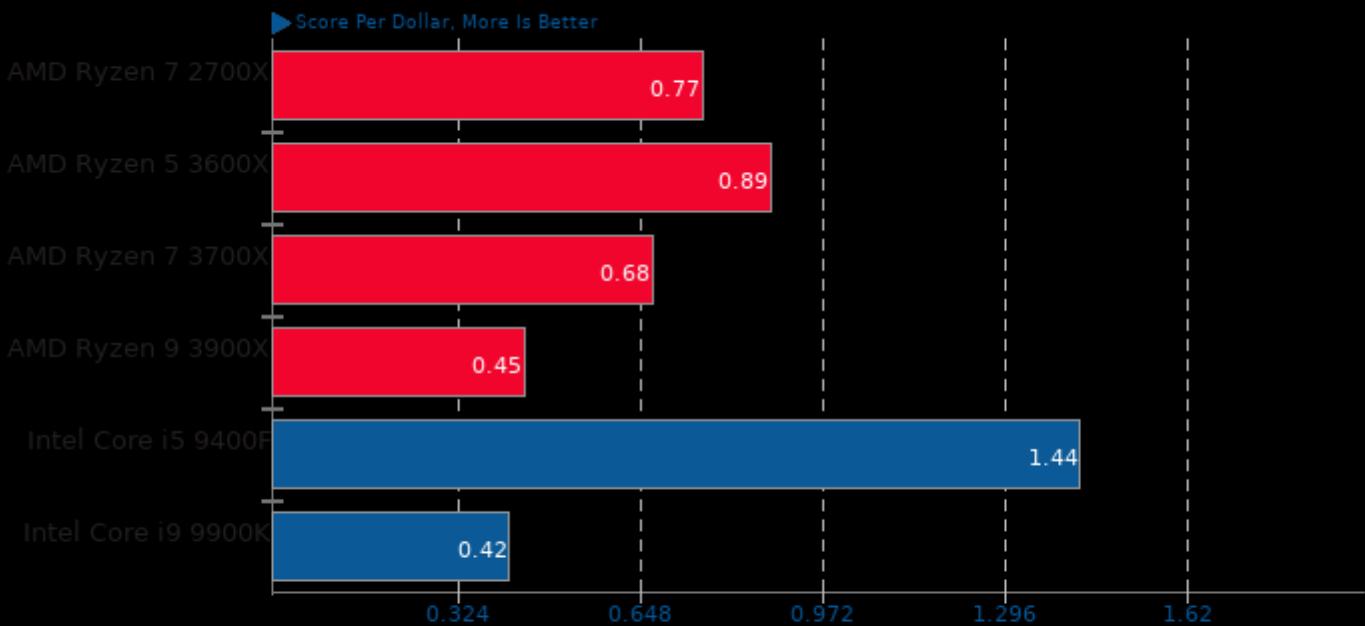
Benchmark: Jetstream - Browser: Google Chrome



1. chrome 76.0.3809.100

Selenium

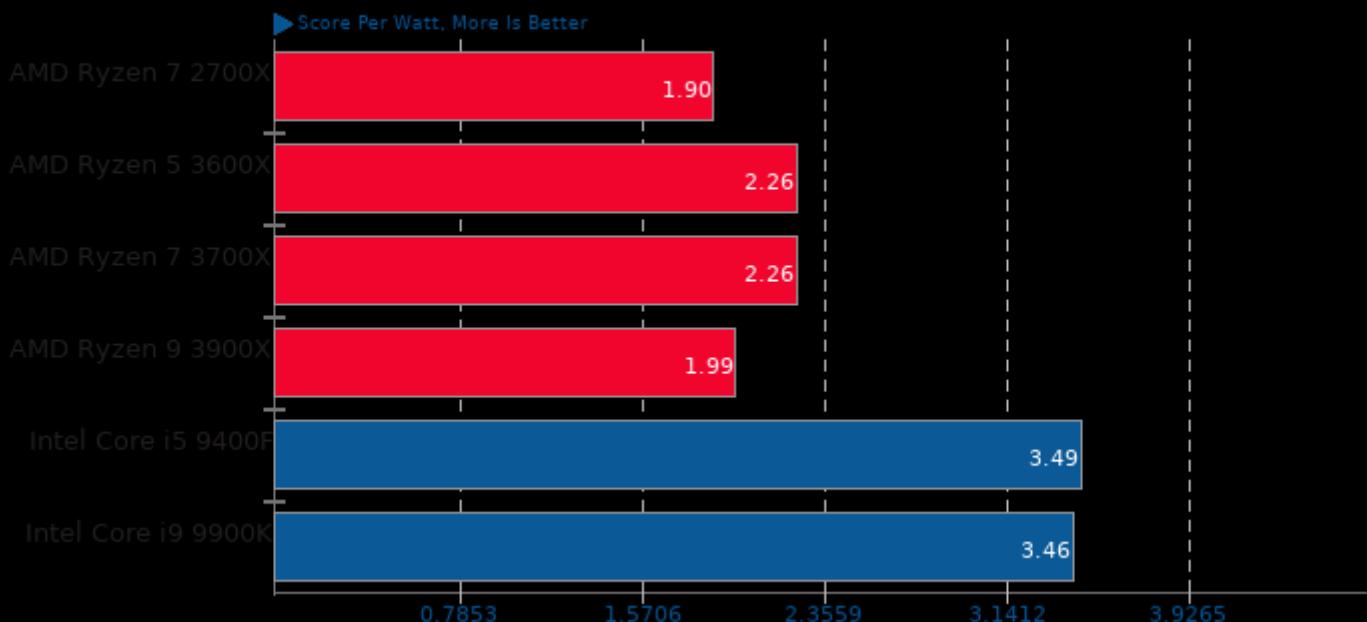
Performance / Cost - Benchmark: Jetstream - Browser: Google Chrome



1. AMD Ryzen 7 2700X: \$254 reported cost.
2. AMD Ryzen 5 3600X: \$249 reported cost.
3. AMD Ryzen 7 3700X: \$329 reported cost.
4. AMD Ryzen 9 3900X: \$499 reported cost.
5. Intel Core i5 9400F: \$149 reported cost.
6. Intel Core i9 9900K: \$494 reported cost.

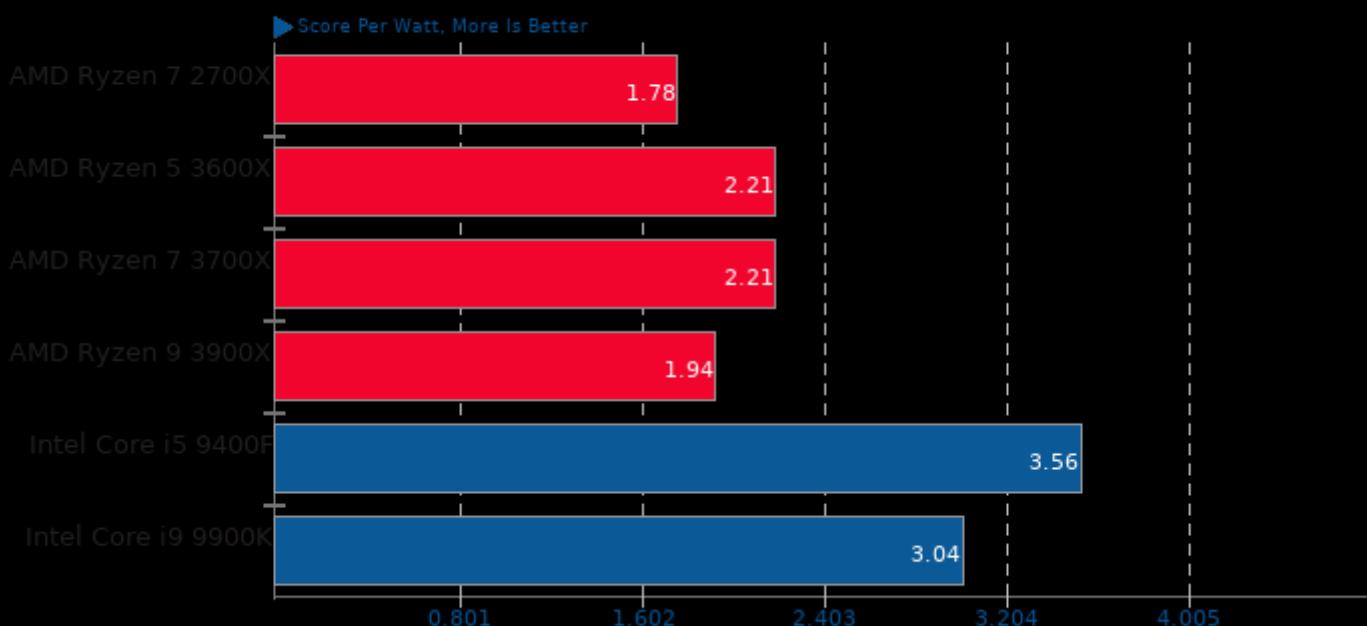
Selenium

Benchmark: Jetstream - Browser: Firefox



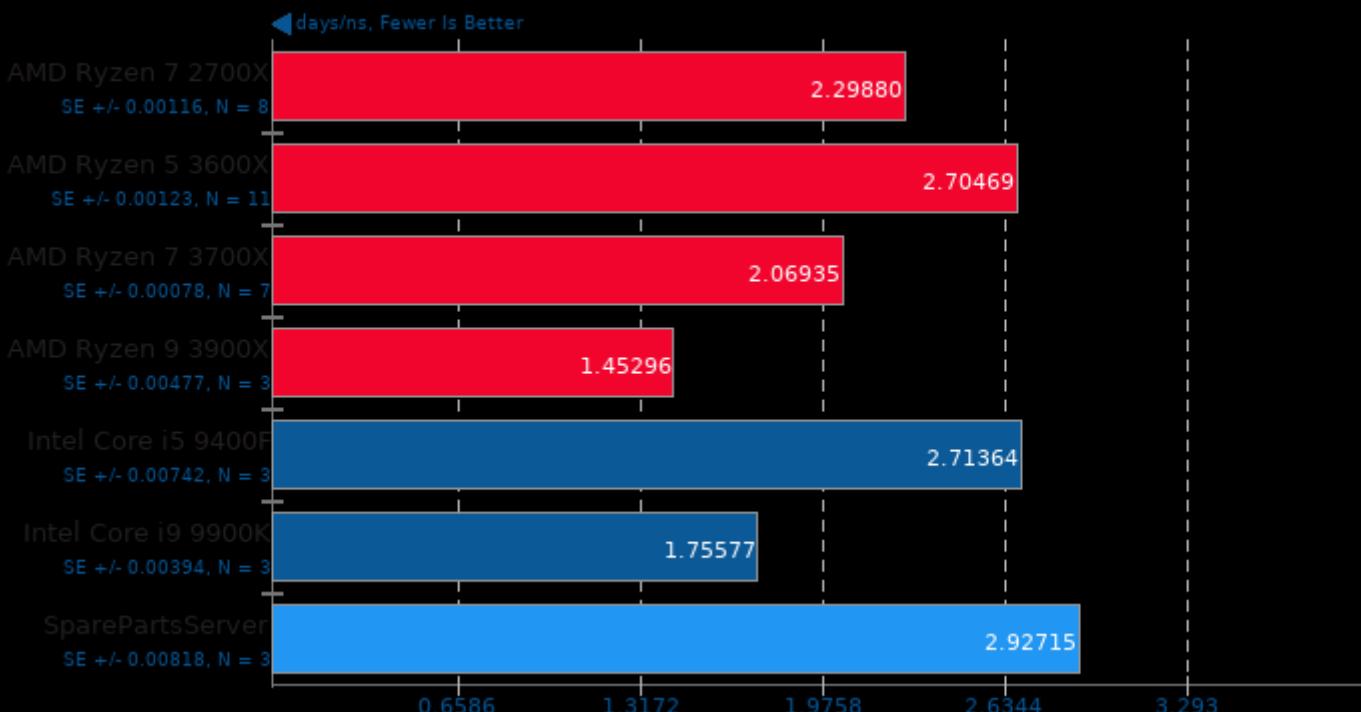
Selenium

Benchmark: Jetstream - Browser: Google Chrome



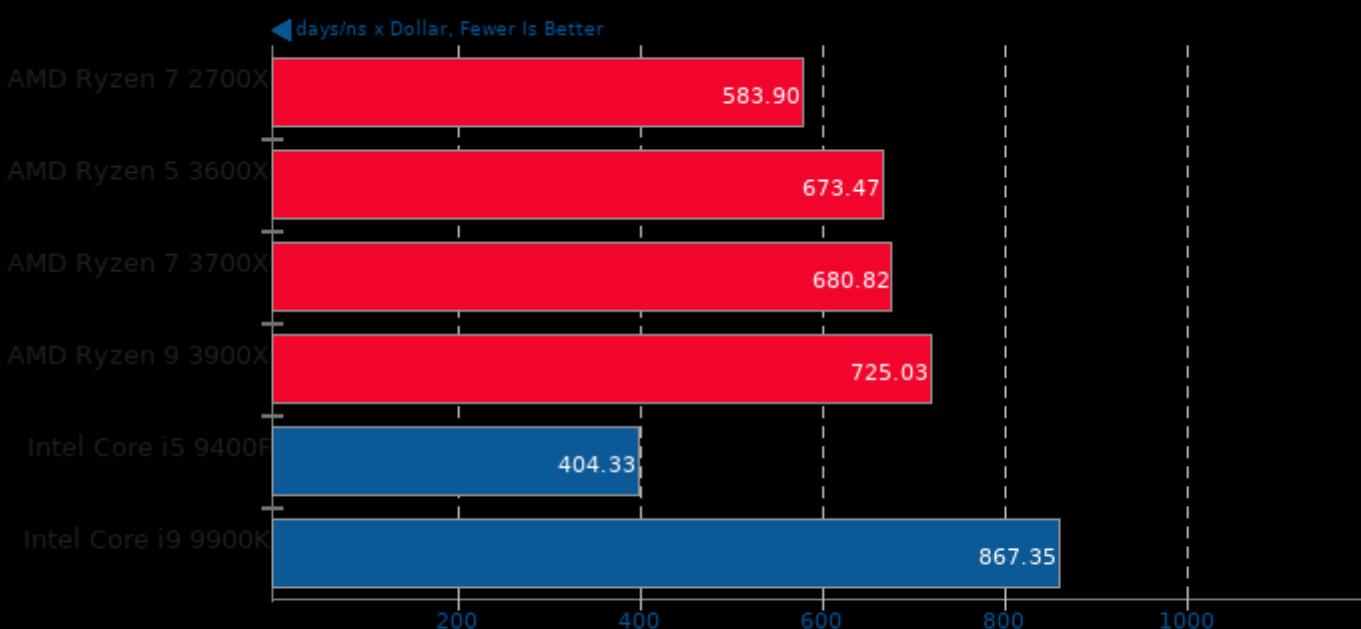
NAMD 2.13b1

ATPase Simulation - 327,506 Atoms



NAMD 2.13b1

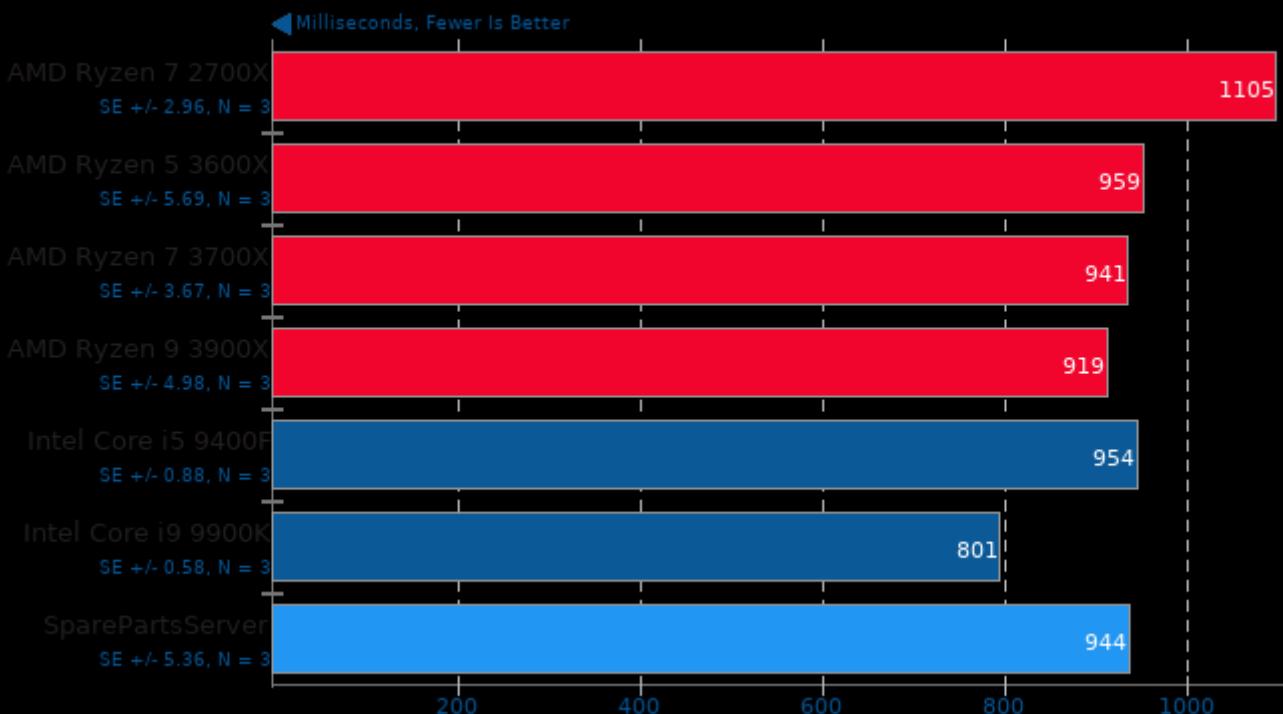
Performance / Cost - ATPase Simulation - 327,506 Atoms



1. AMD Ryzen 7 2700X: \$254 reported cost.
2. AMD Ryzen 5 3600X: \$249 reported cost.
3. AMD Ryzen 7 3700X: \$329 reported cost.
4. AMD Ryzen 9 3900X: \$499 reported cost.
5. Intel Core i5 9400F: \$149 reported cost.
6. Intel Core i9 9900K: \$494 reported cost.

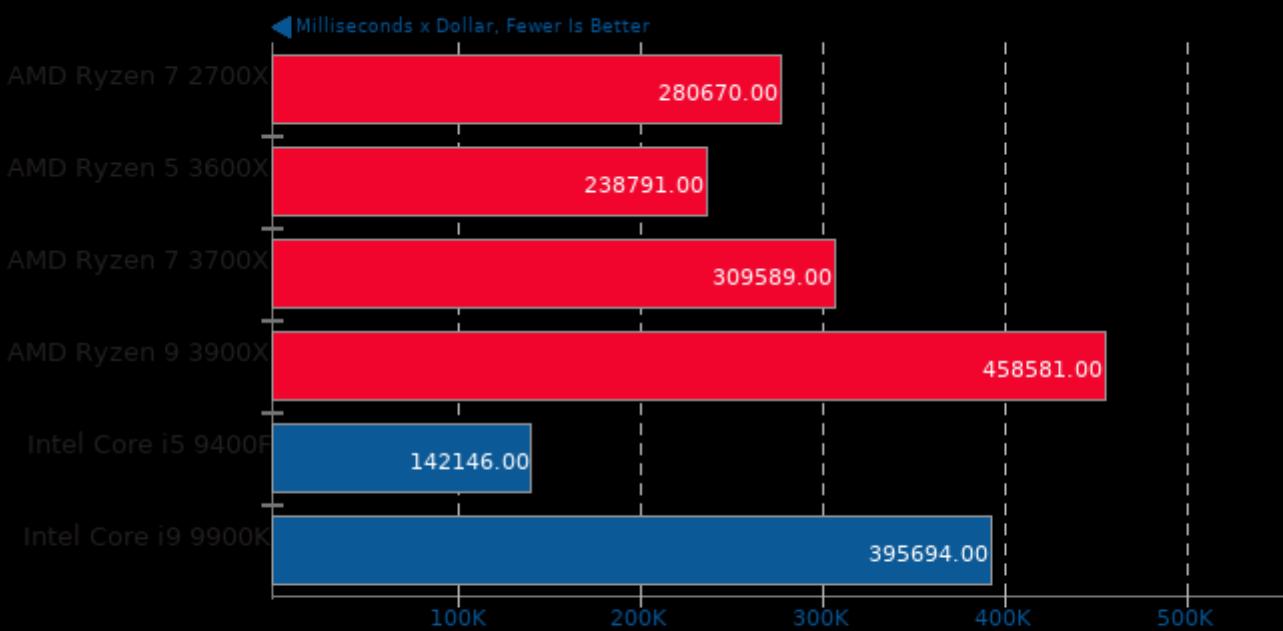
PyBench 2018-02-16

Total For Average Test Times



PyBench 2018-02-16

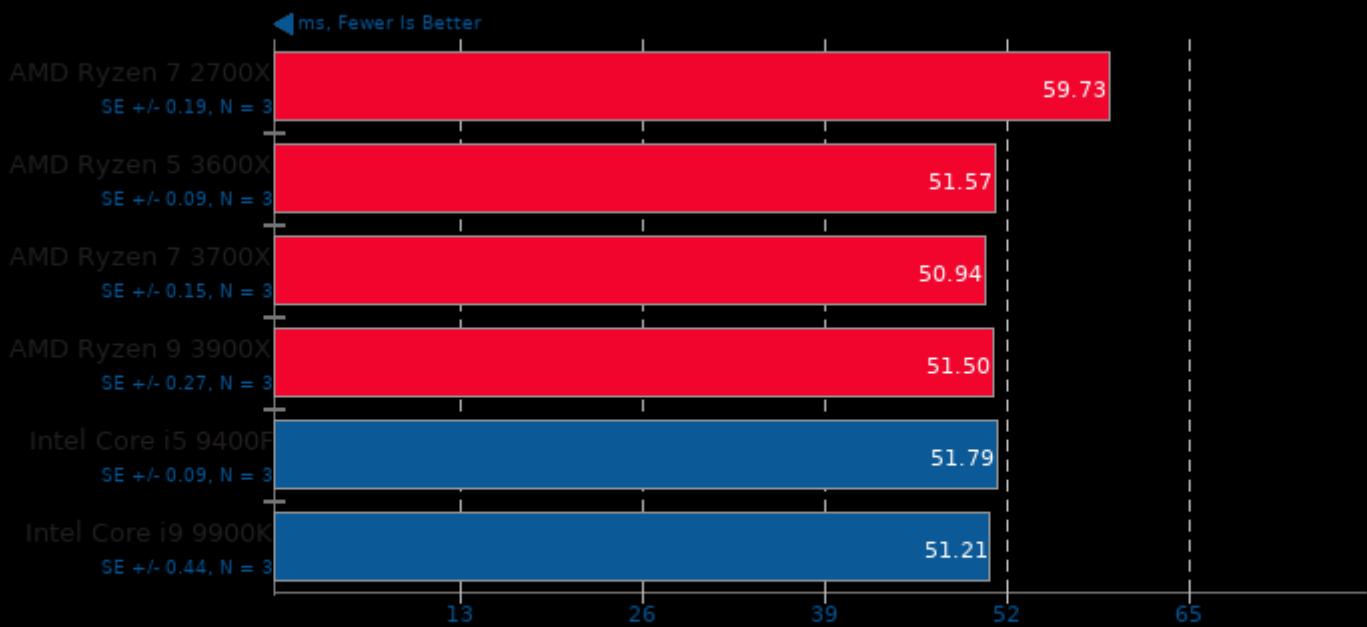
Performance / Cost - Total For Average Test Times



1. AMD Ryzen 7 2700X: \$254 reported cost.
2. AMD Ryzen 5 3600X: \$249 reported cost.
3. AMD Ryzen 7 3700X: \$329 reported cost.
4. AMD Ryzen 9 3900X: \$499 reported cost.
5. Intel Core i5 9400F: \$149 reported cost.
6. Intel Core i9 9900K: \$494 reported cost.

Selenium

Benchmark: ARES-6 - Browser: Firefox



1. AMD Ryzen 7 2700X: firefox 68.0.1

2. AMD Ryzen 5 3600X: firefox 68.0.1

3. AMD Ryzen 7 3700X: firefox 68.0.1

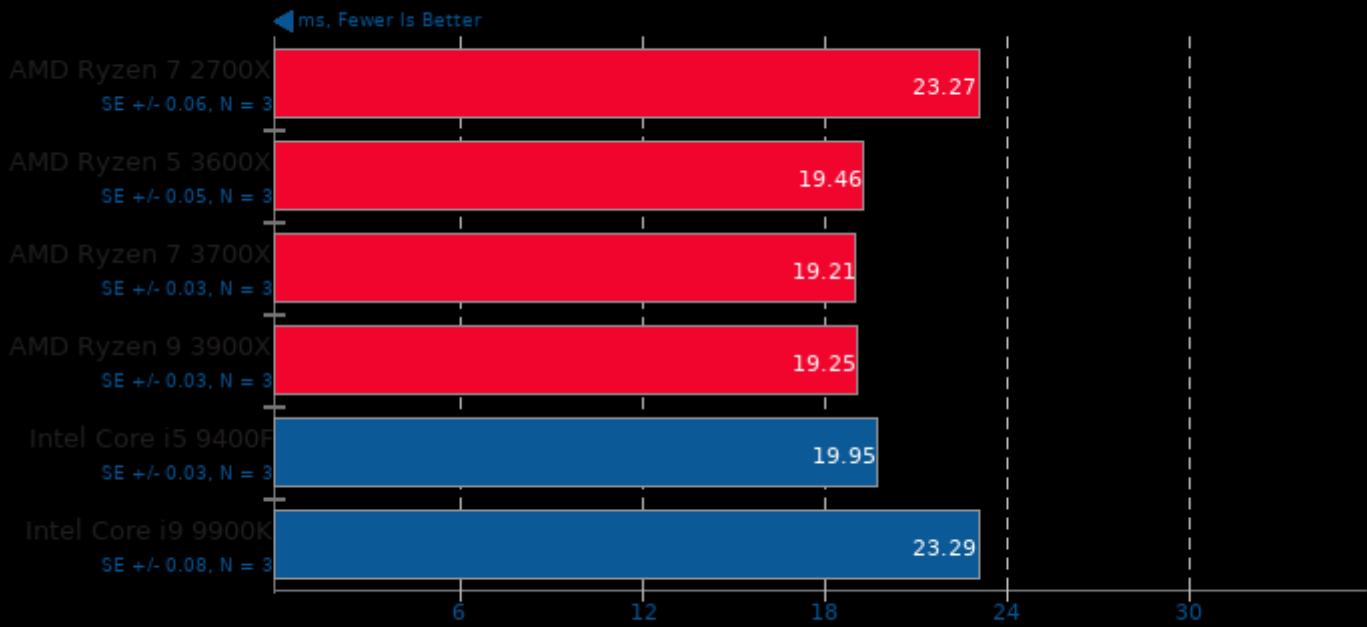
4. AMD Ryzen 9 3900X: firefox 68.0.1

5. Intel Core i5 9400F: firefox 68.0.2

6. Intel Core i9 9900K: firefox 68.0.2

Selenium

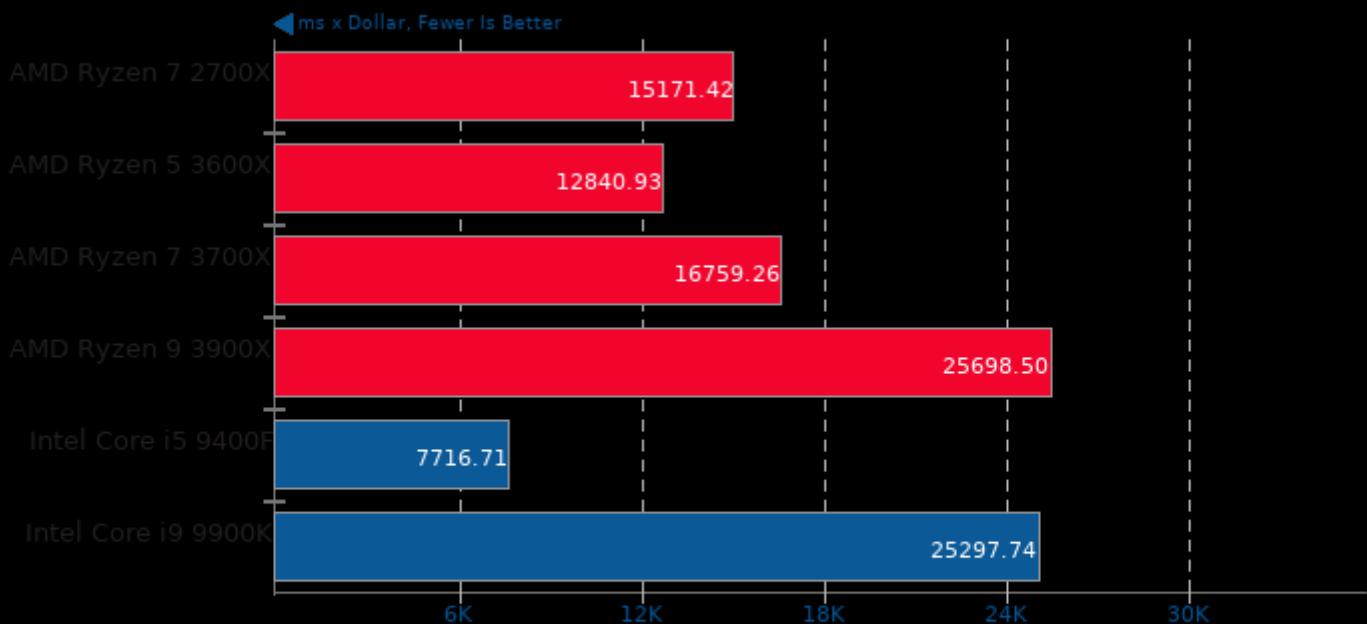
Benchmark: ARES-6 - Browser: Google Chrome



1. chrome 76.0.3809.100

Selenium

Performance / Cost - Benchmark: ARES-6 - Browser: Firefox



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

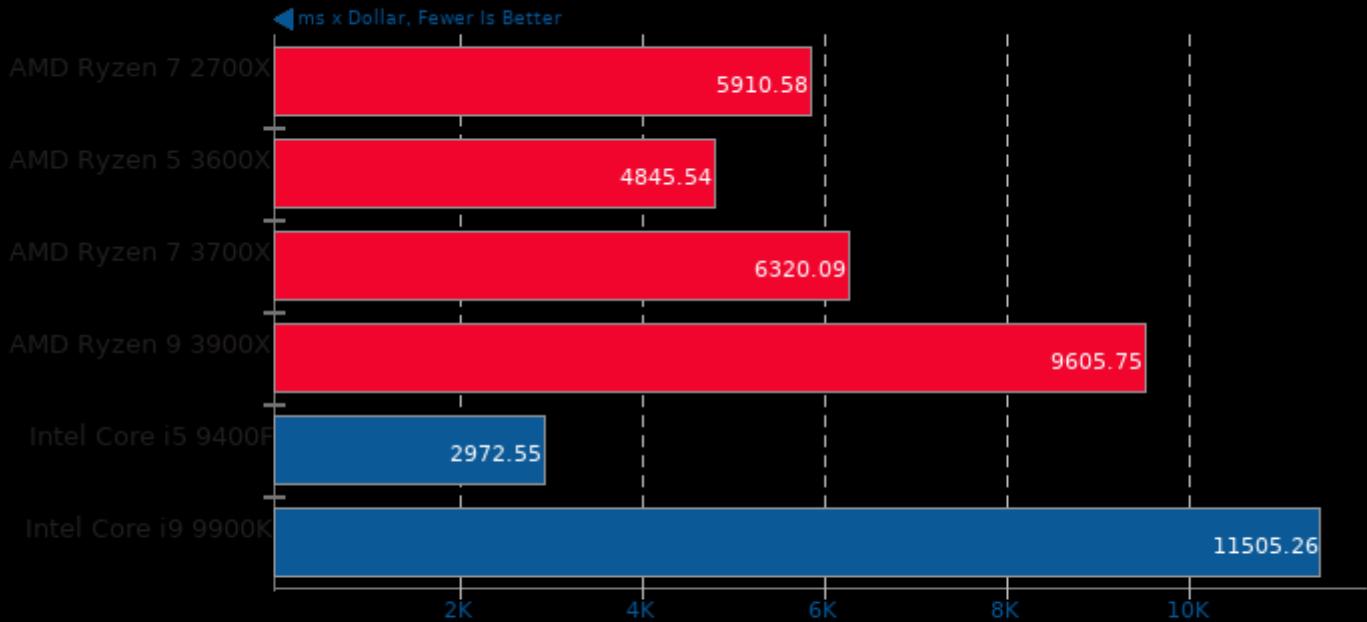
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

Selenium

Performance / Cost - Benchmark: ARES-6 - Browser: Google Chrome



1. AMD Ryzen 7 2700X: \$254 reported cost.

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3. AMD Ryzen 7 3700X: \$329 reported cost.

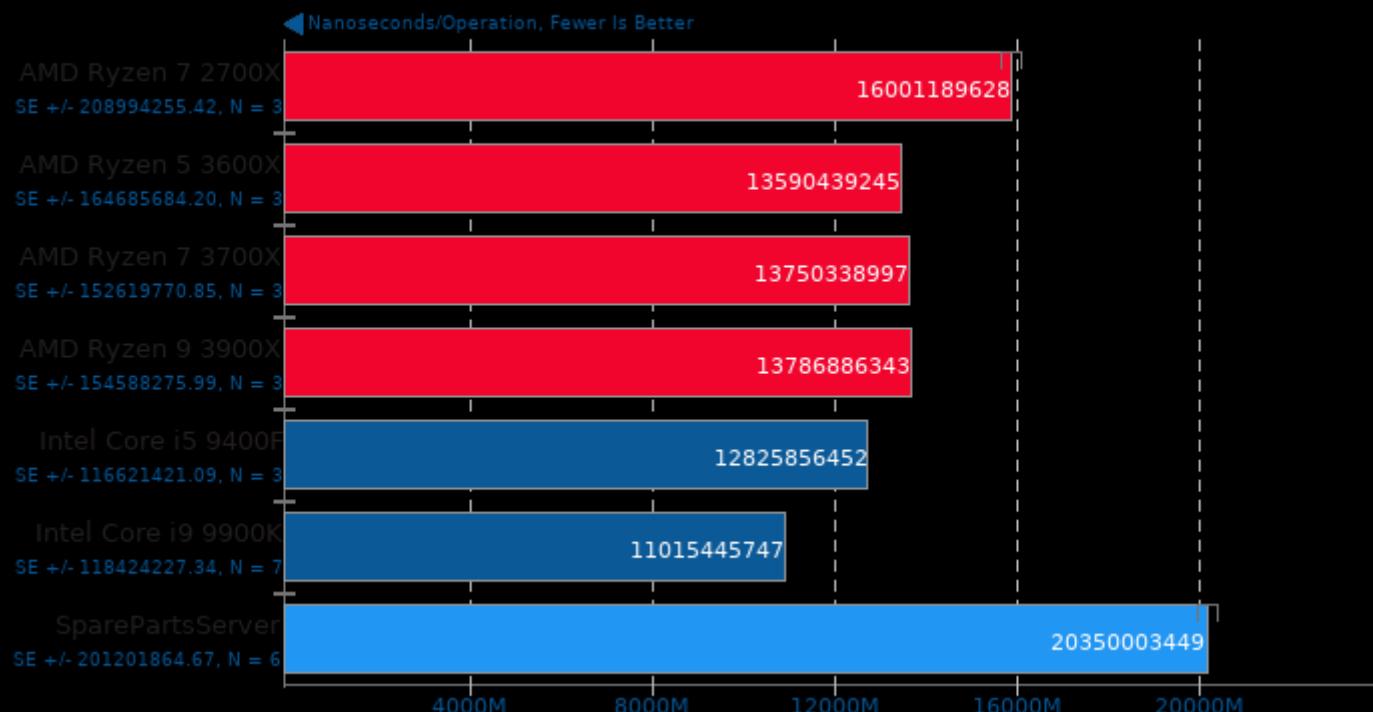
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

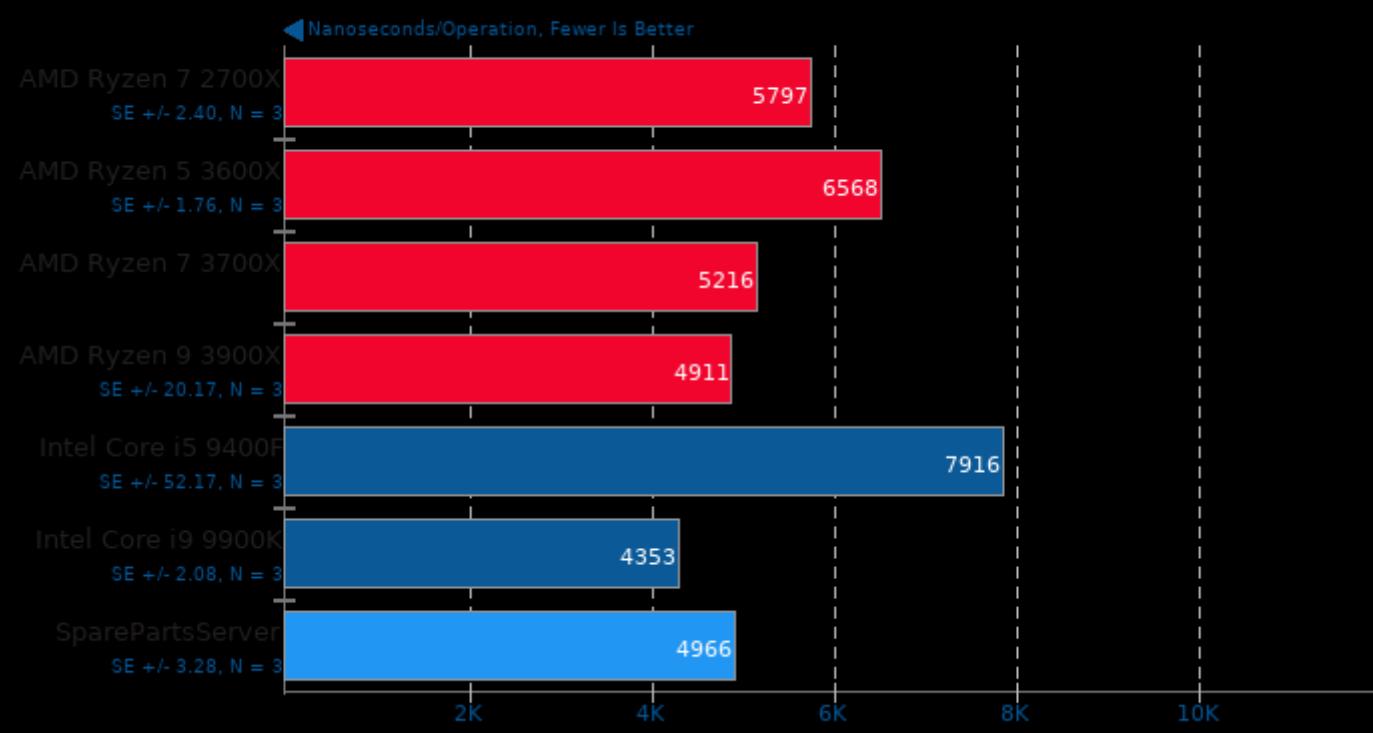
Go Benchmarks

Test: build



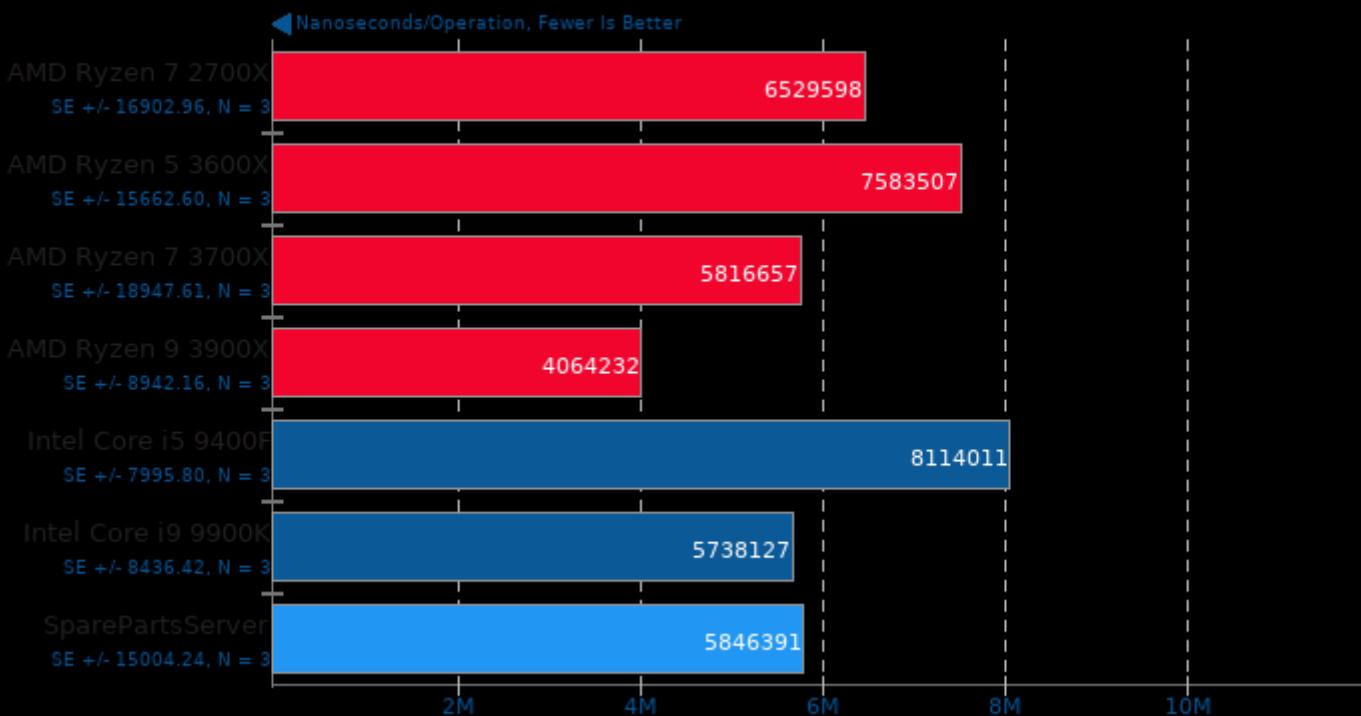
Go Benchmarks

Test: http



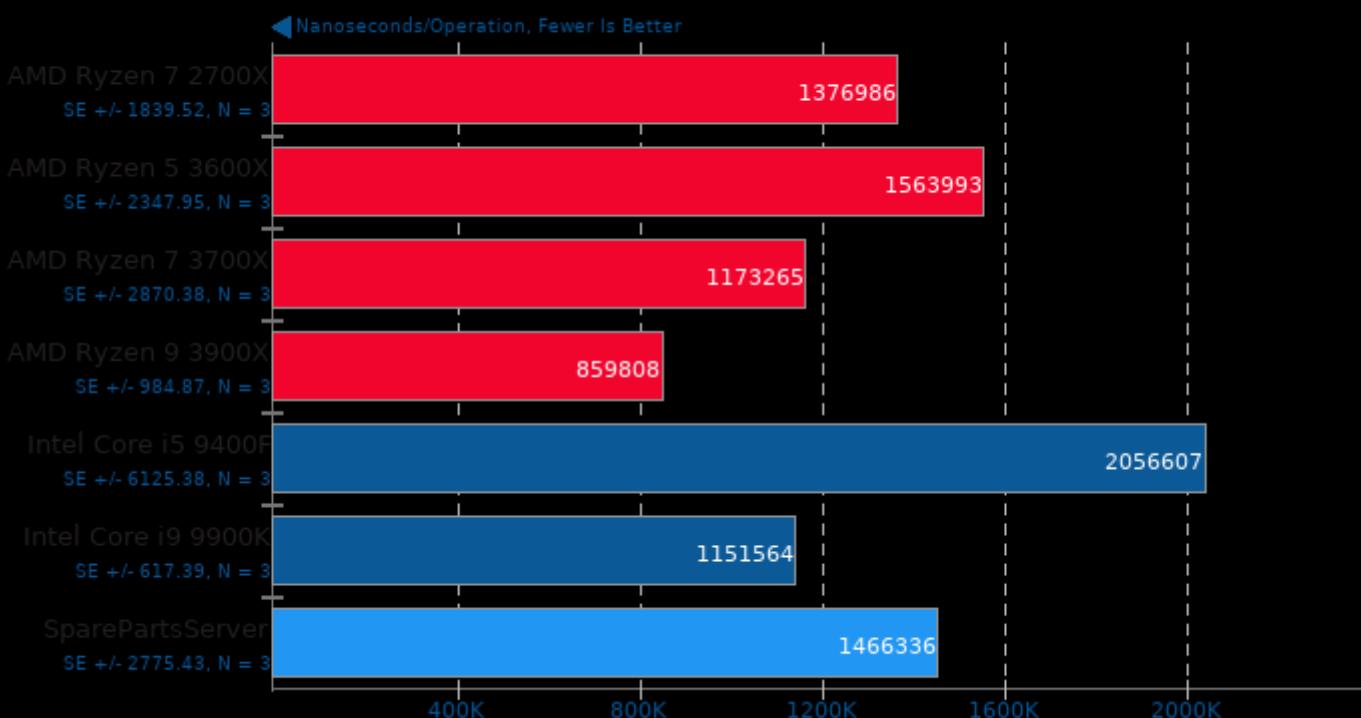
Go Benchmarks

Test: json



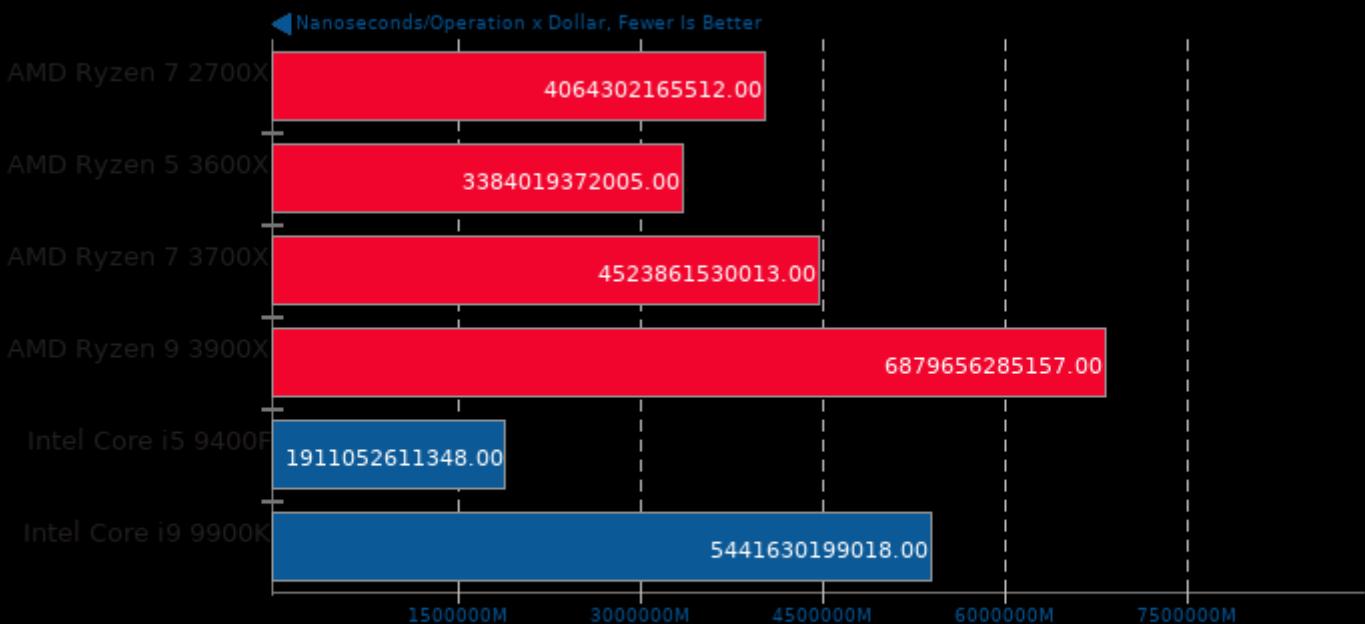
Go Benchmarks

Test: garbage



Go Benchmarks

Performance / Cost - Test: build



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

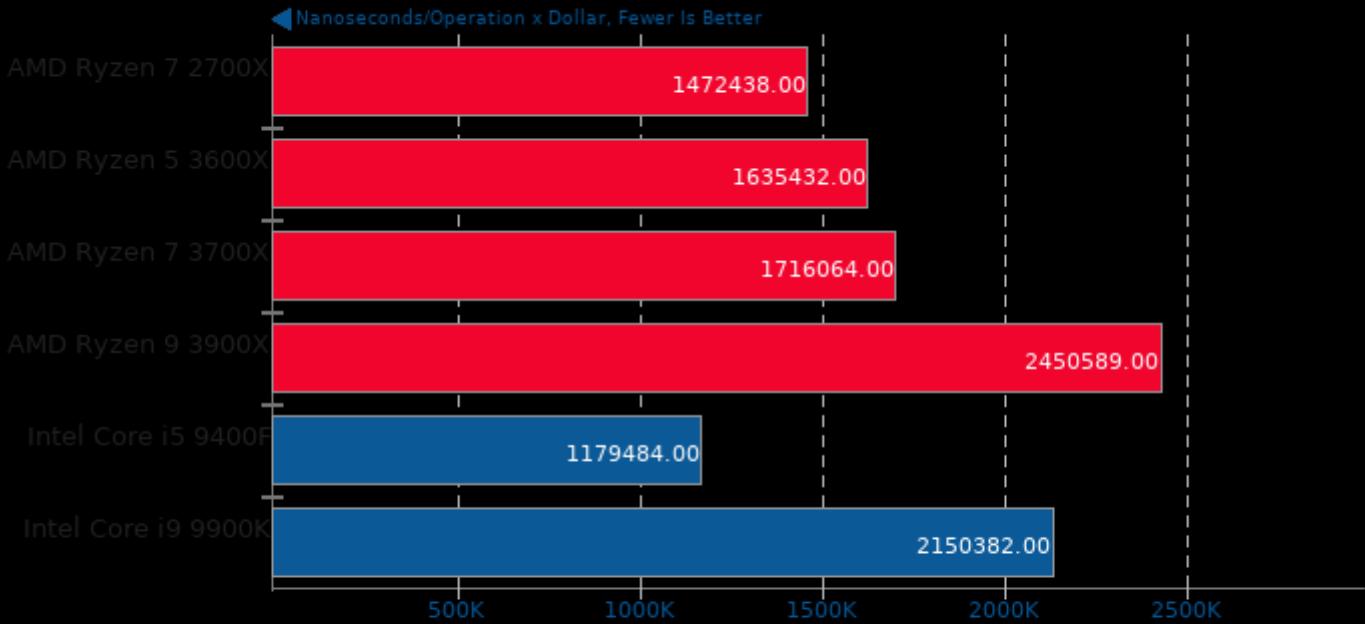
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

Go Benchmarks

Performance / Cost - Test: http



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

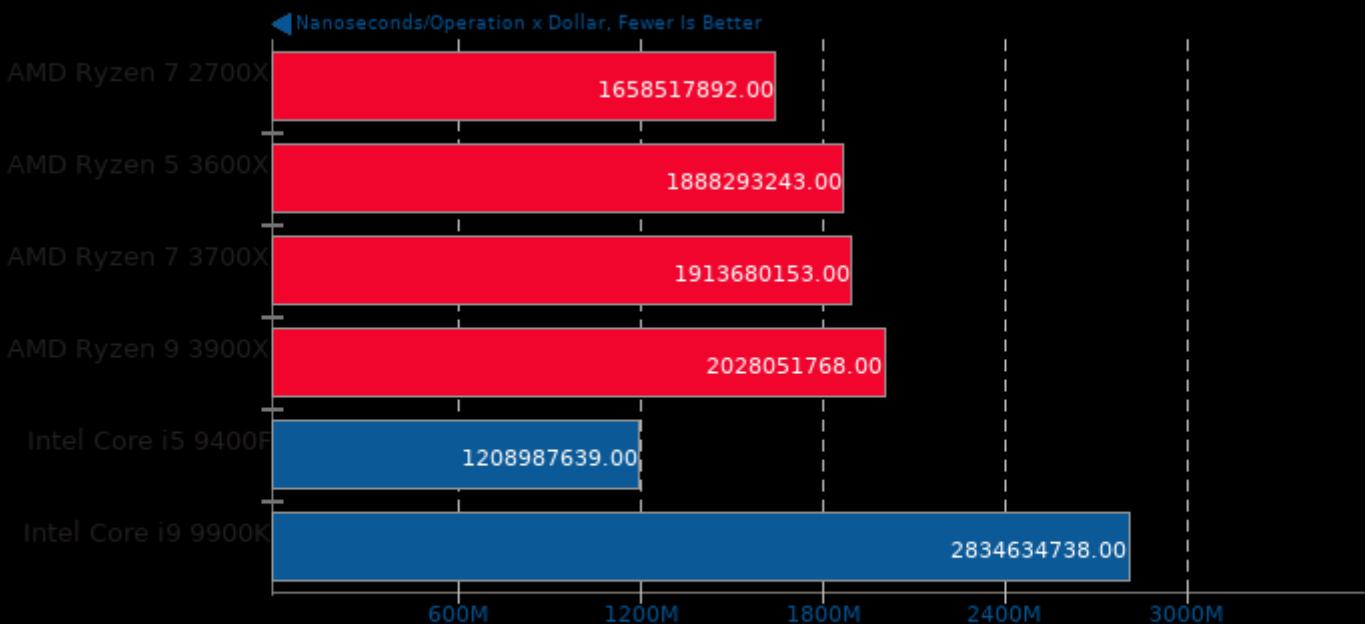
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

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Go Benchmarks

Performance / Cost - Test: json



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

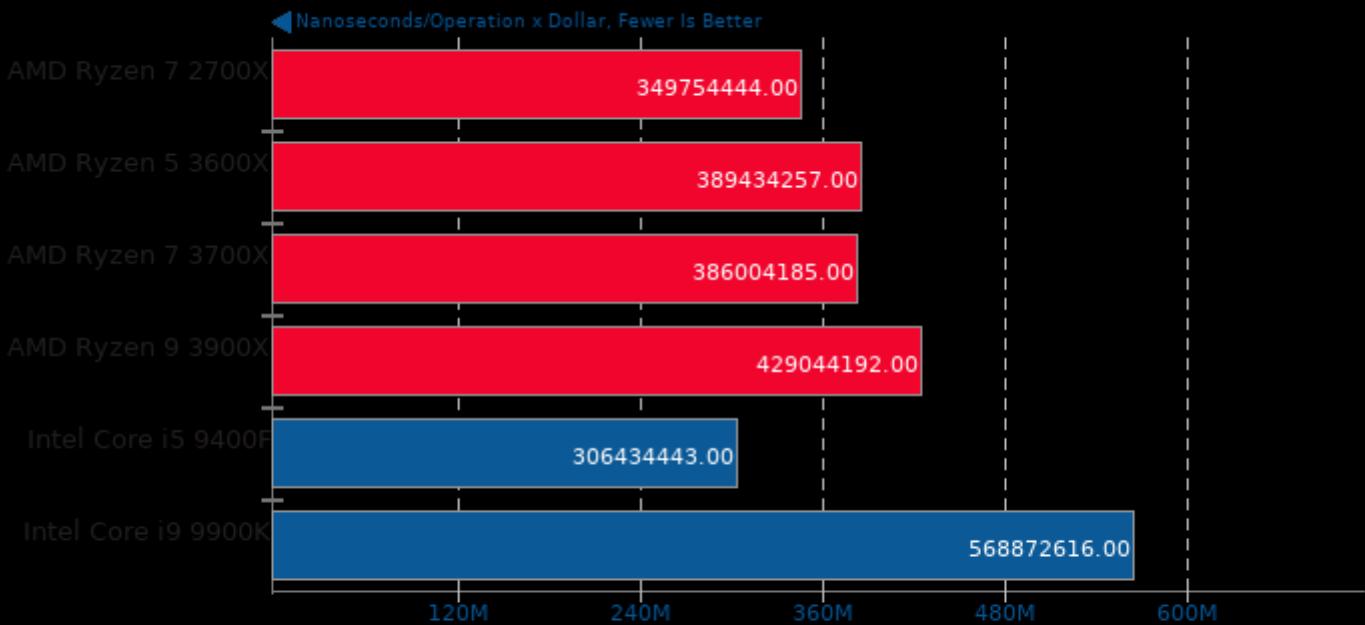
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

Go Benchmarks

Performance / Cost - Test: garbage



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

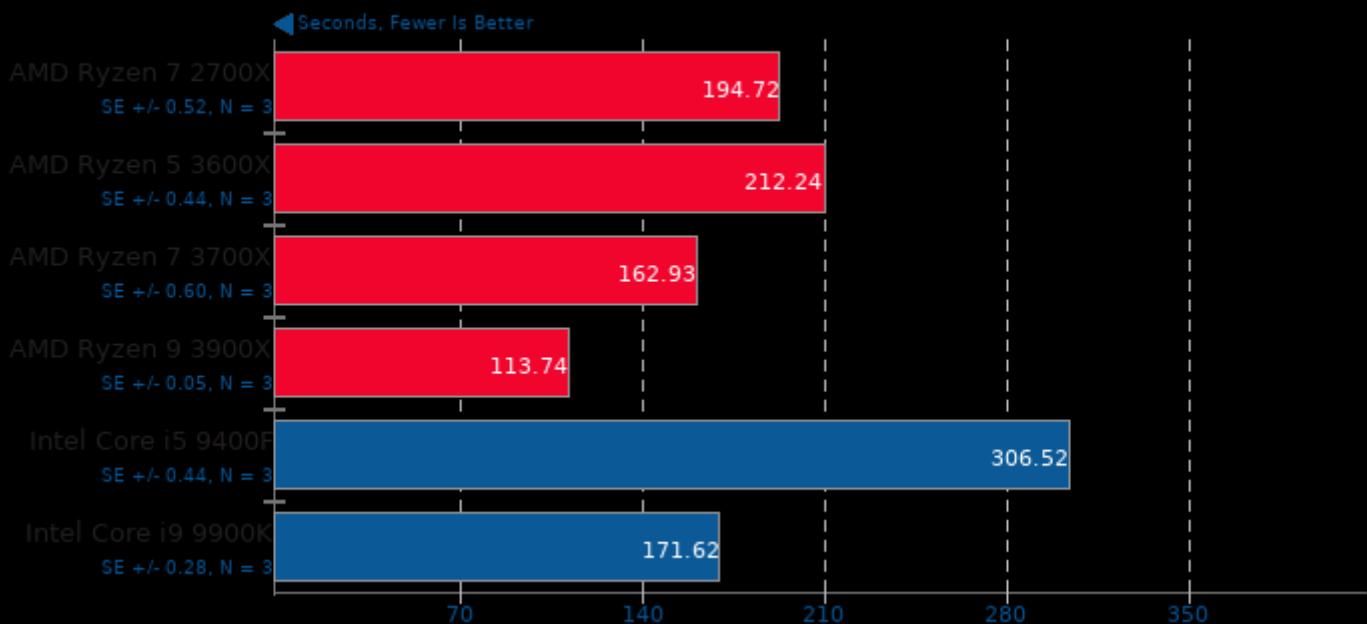
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

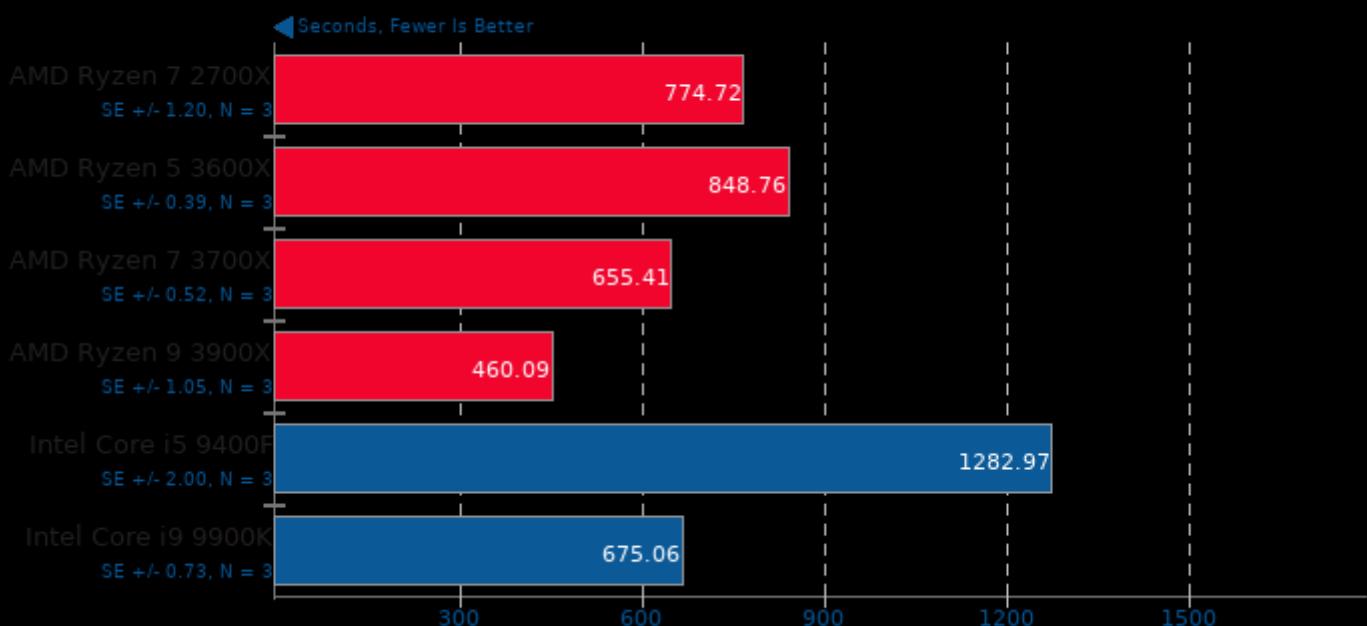
Blender 2.80

Blend File: BMW27 - Compute: CPU-Only



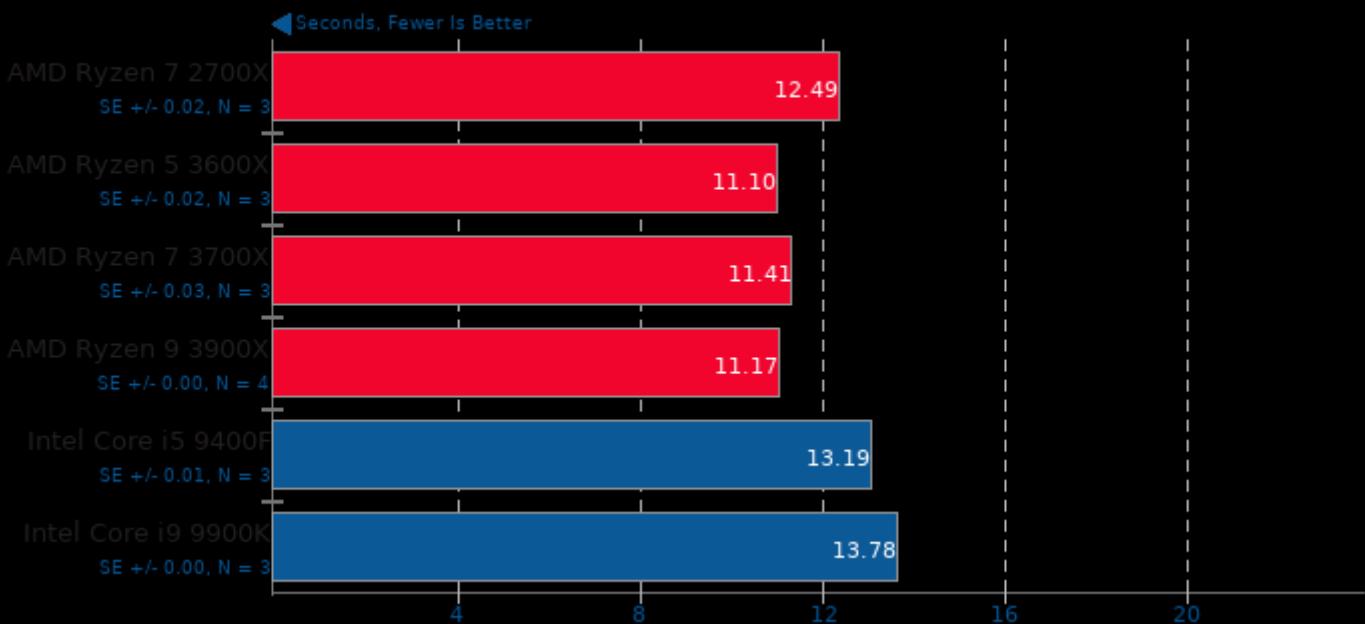
Blender 2.80

Blend File: Barbershop - Compute: CPU-Only



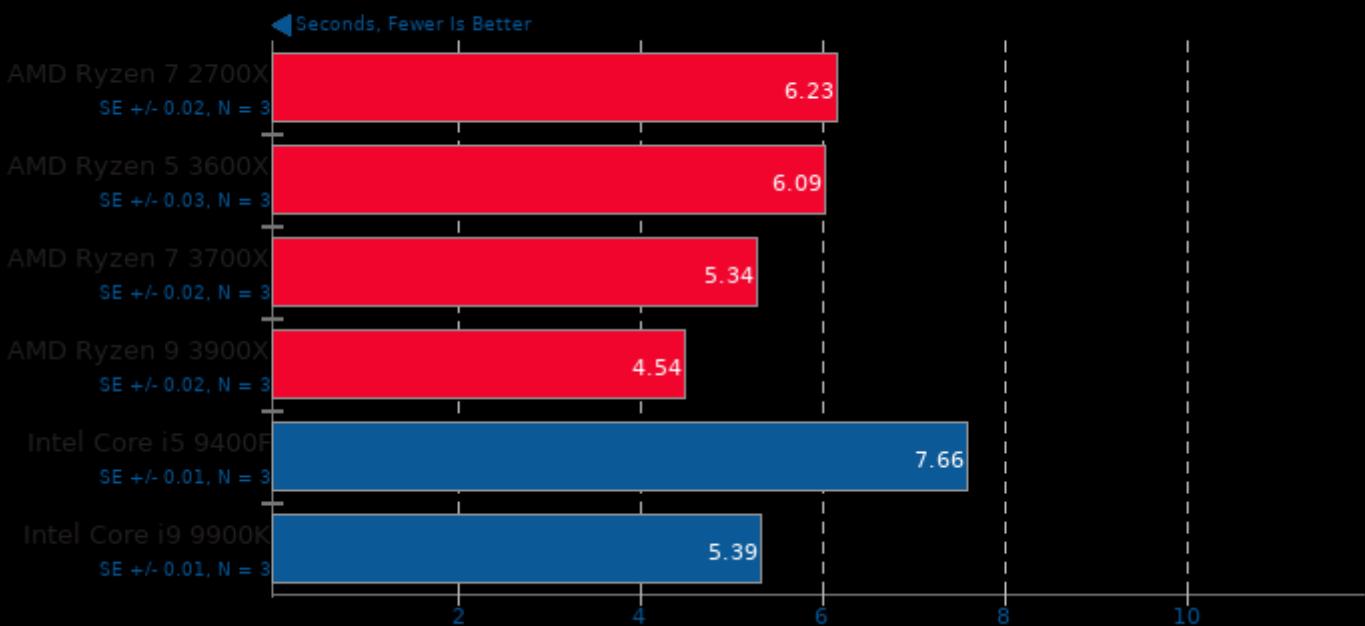
Darktable 2.6.0

Test: Boat - Acceleration: CPU-only



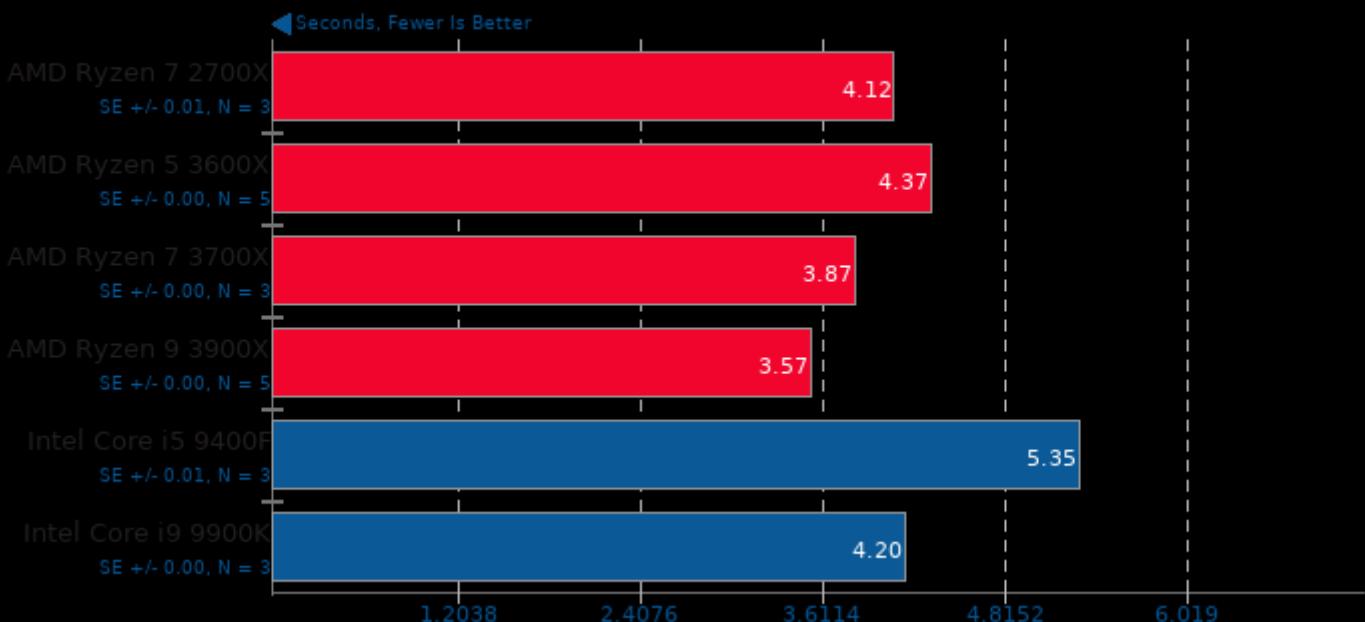
Darktable 2.6.0

Test: Masskrug - Acceleration: CPU-only



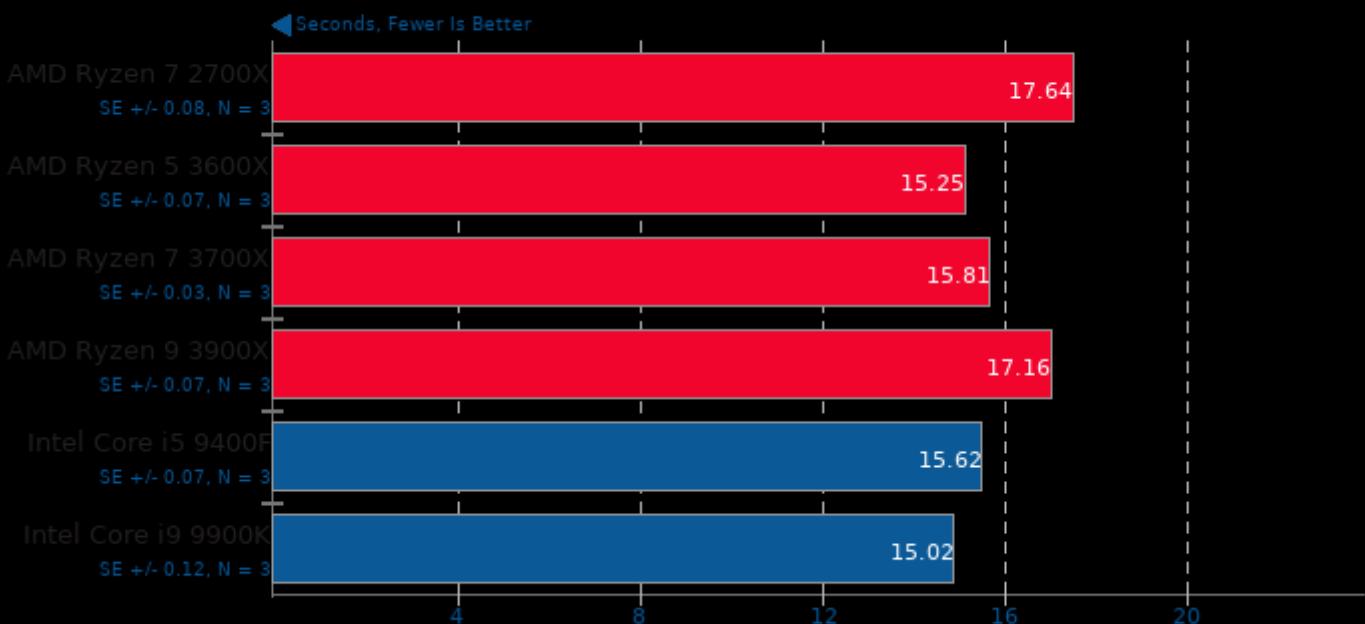
Darktable 2.6.0

Test: Server Room - Acceleration: CPU-only



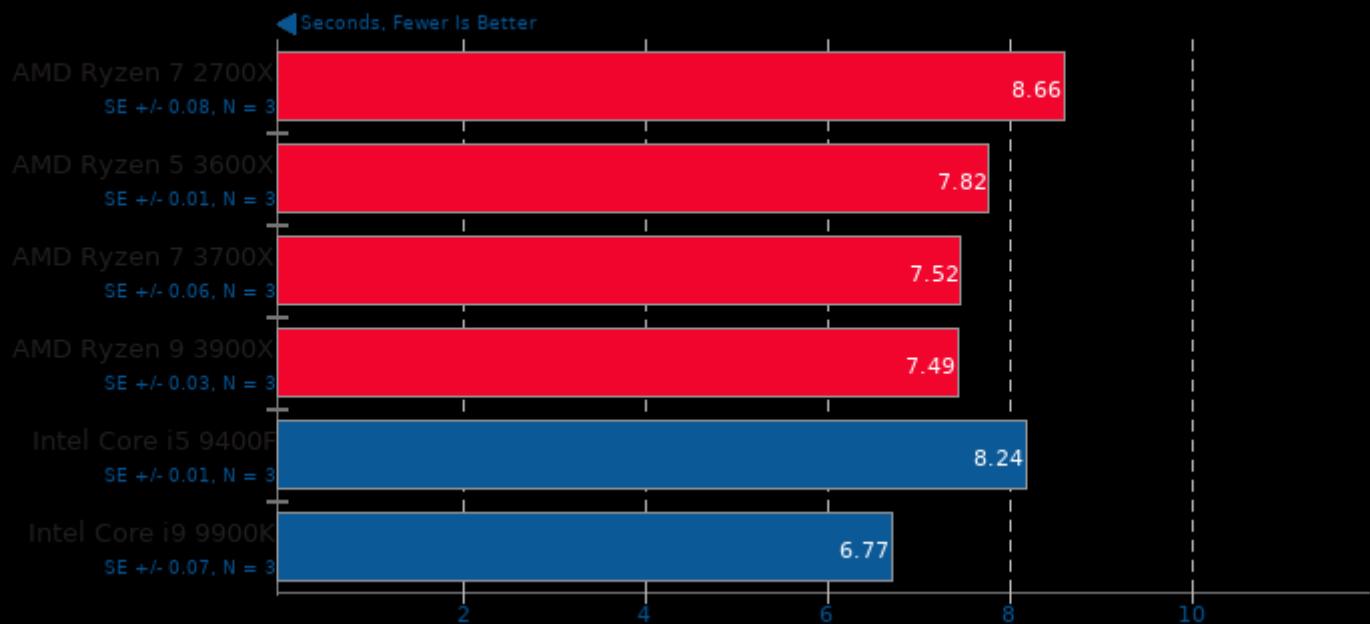
GIMP 2.10.8

Test: unsharp-mask



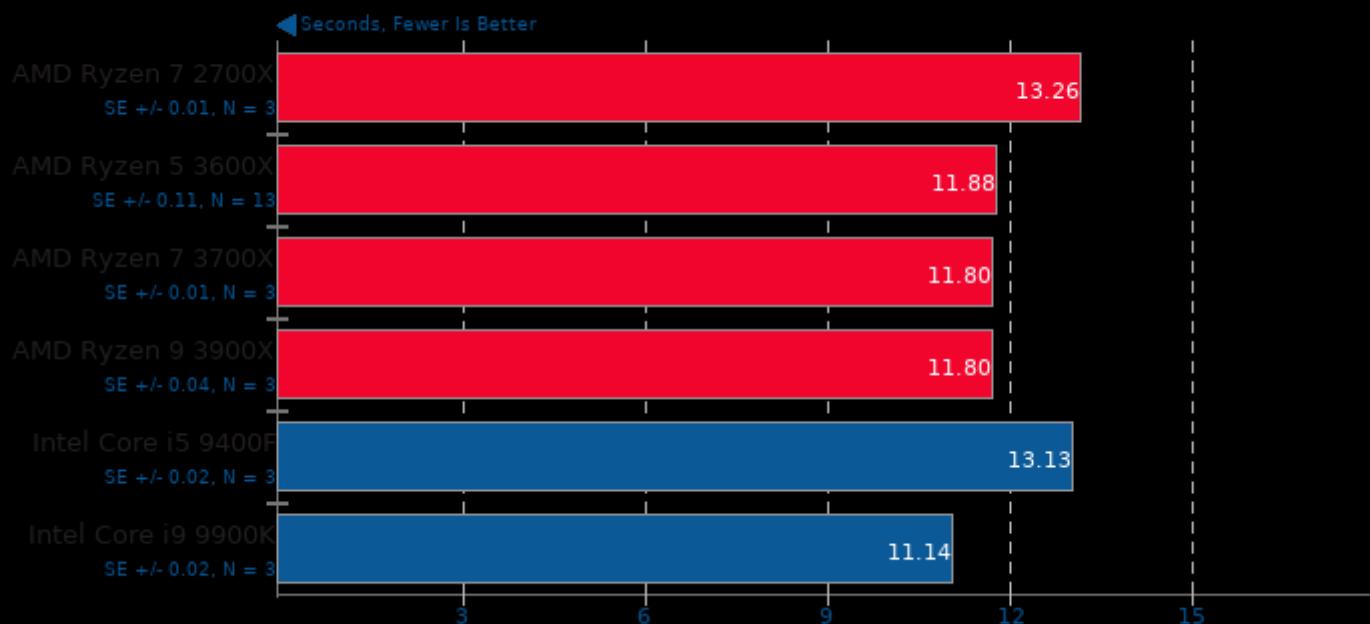
GIMP 2.10.8

Test: resize



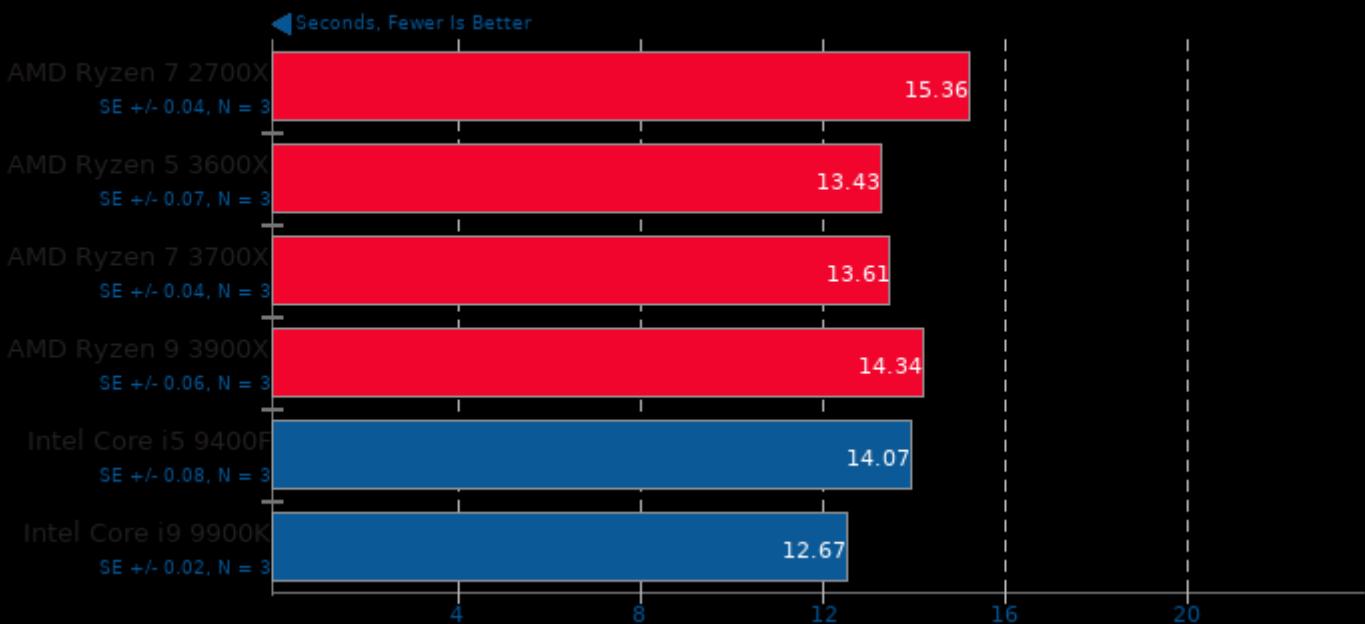
GIMP 2.10.8

Test: rotate



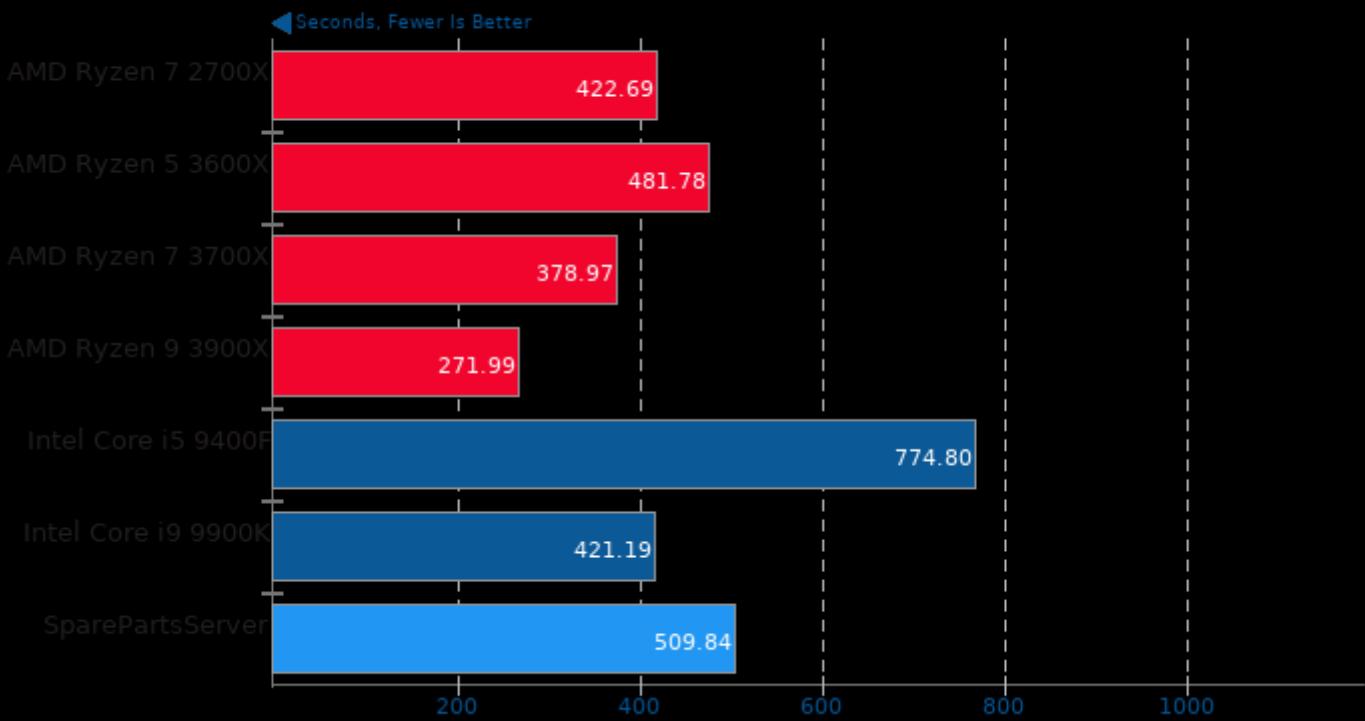
GIMP 2.10.8

Test: auto-levels



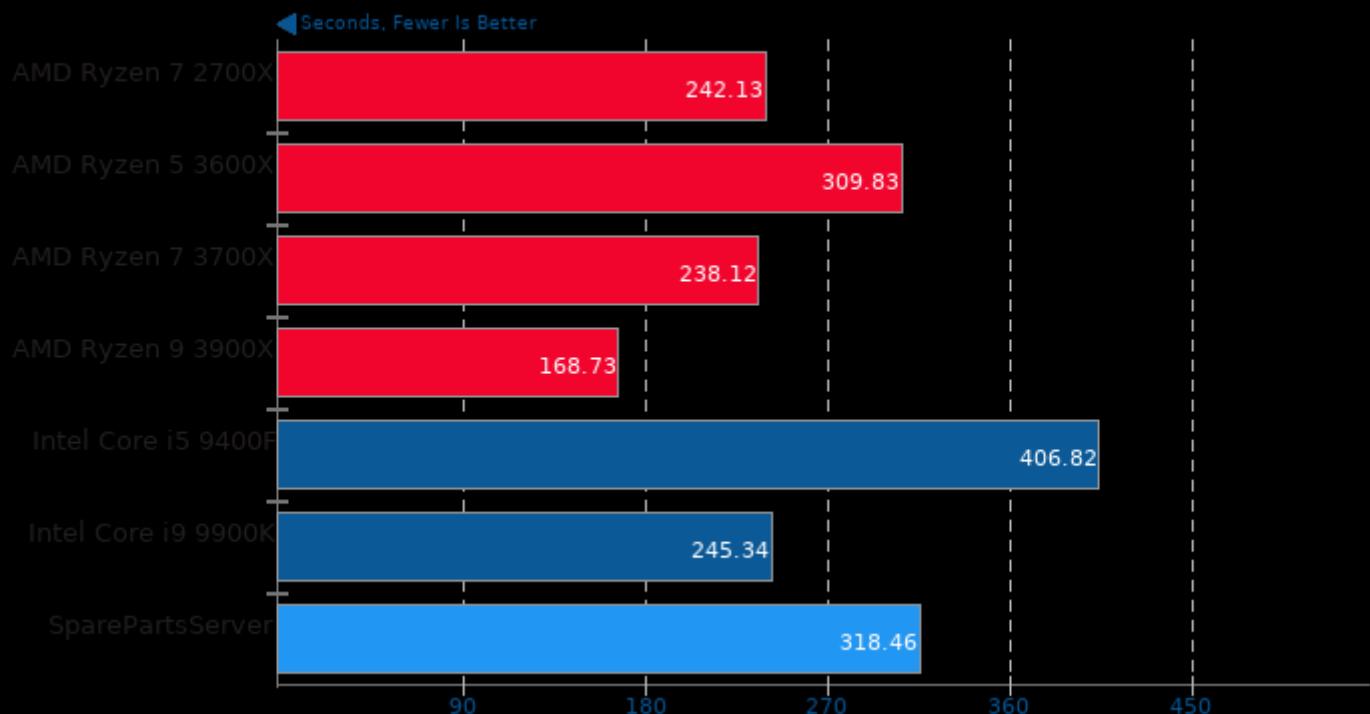
Appleseed 2.0 Beta

Scene: Emily



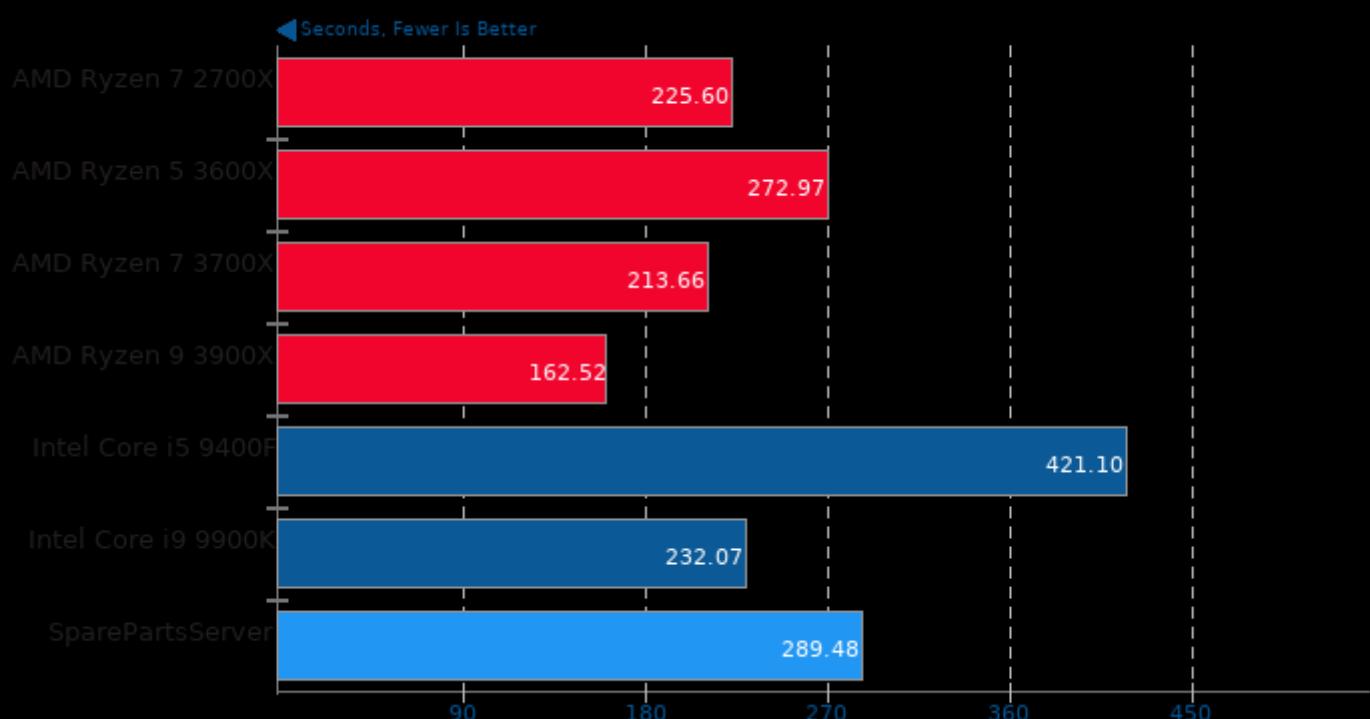
Appleseed 2.0 Beta

Scene: Disney Material



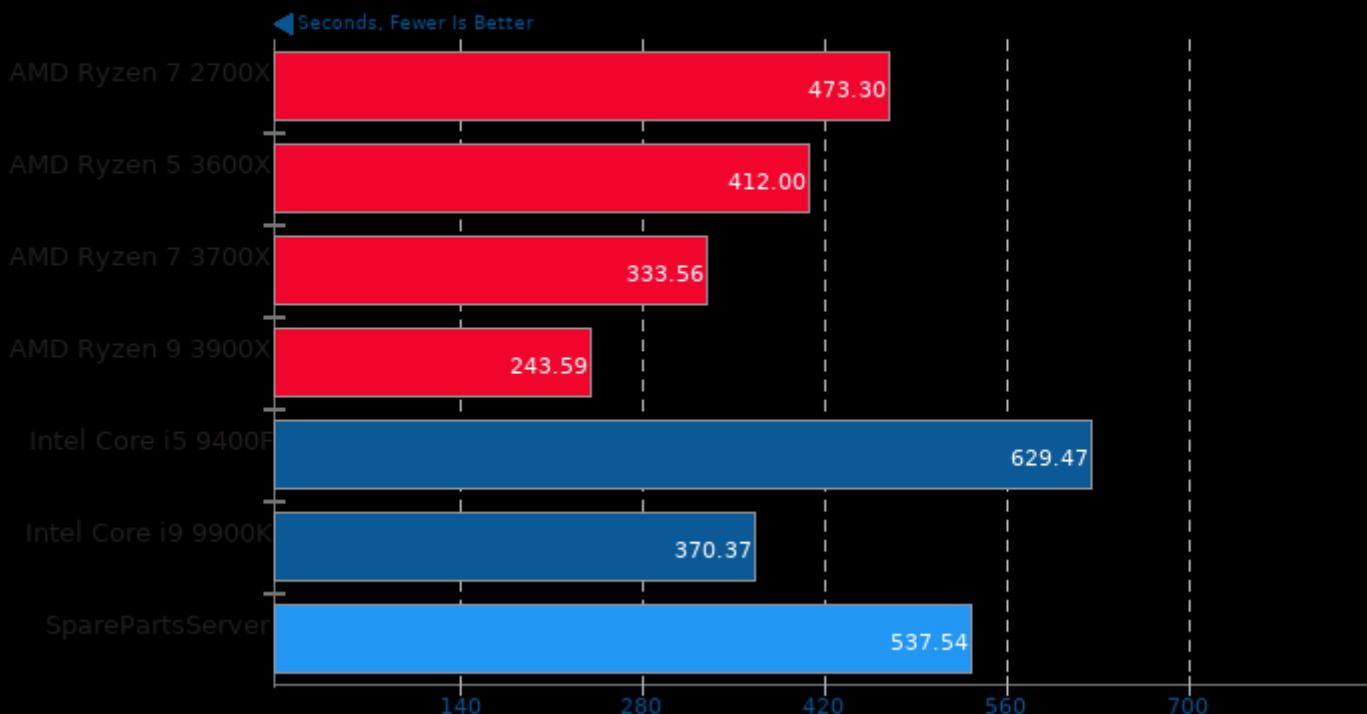
Appleseed 2.0 Beta

Scene: Material Tester



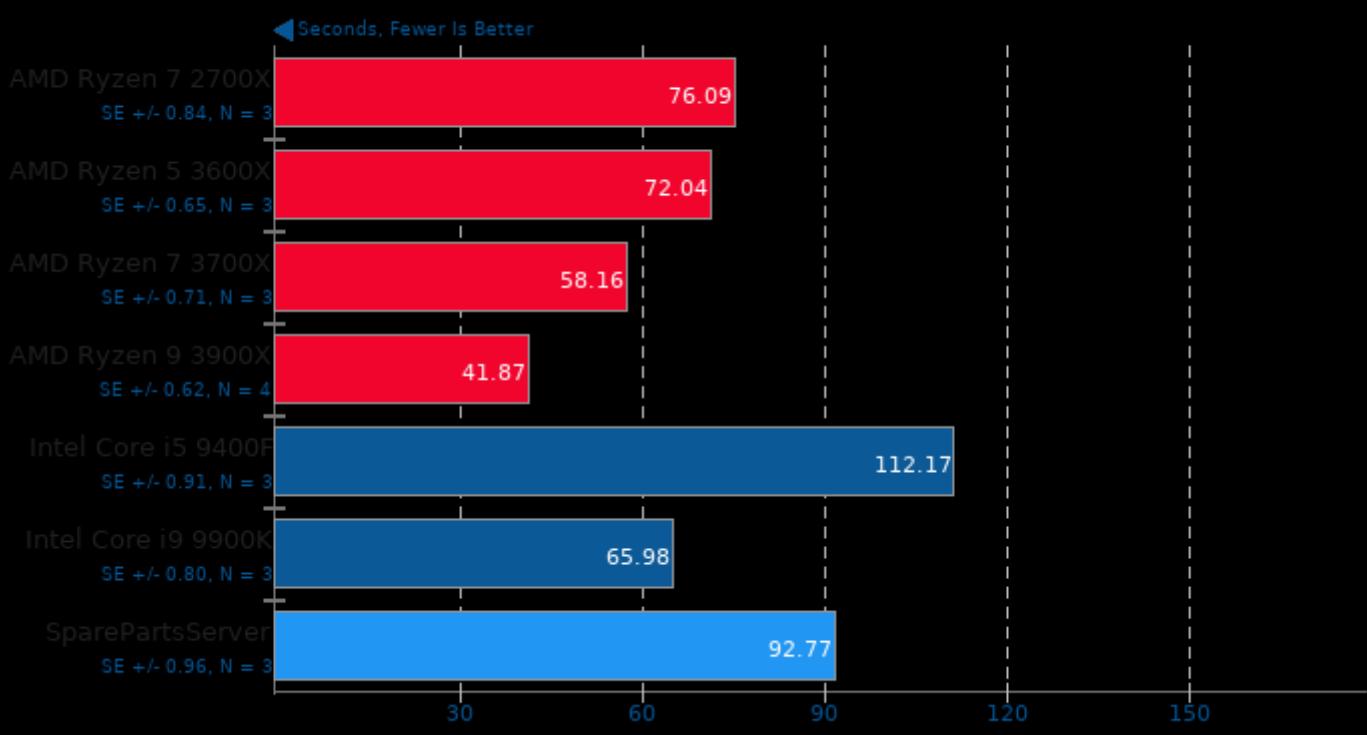
Timed LLVM Compilation 6.0.1

Time To Compile



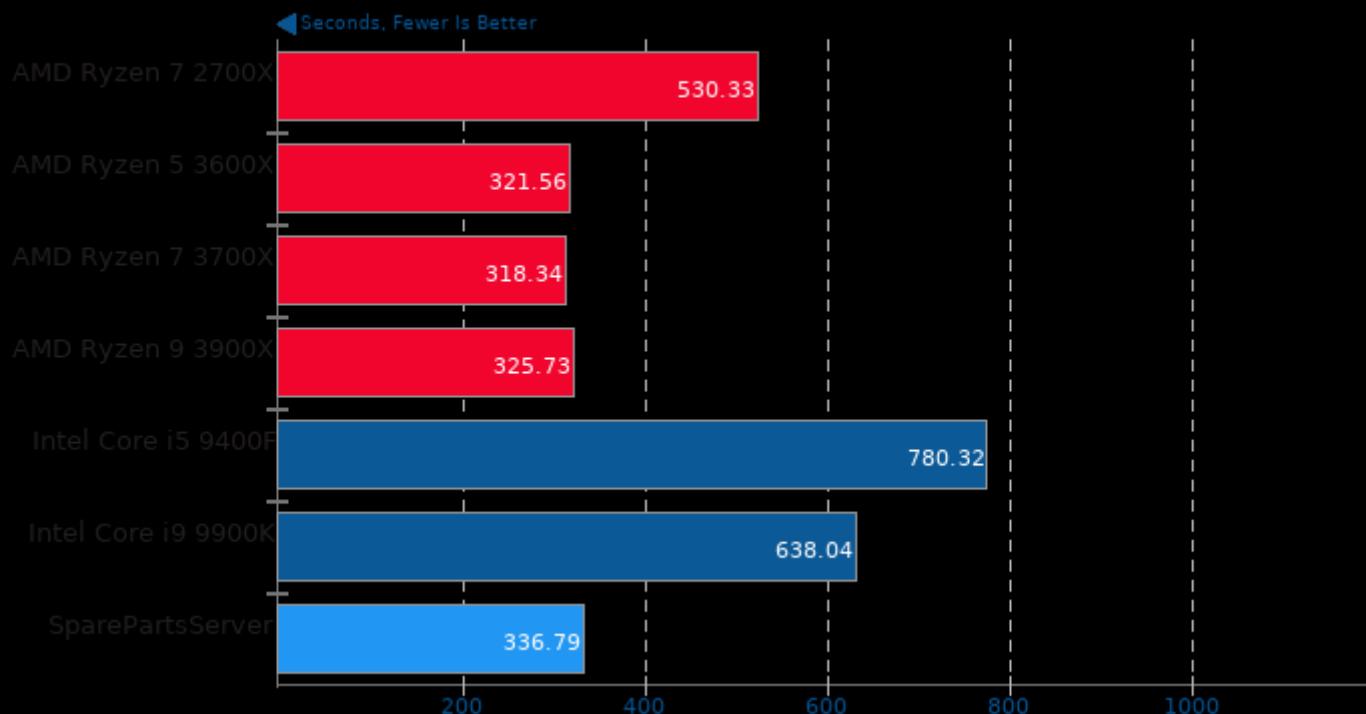
Timed Linux Kernel Compilation 4.18

Time To Compile



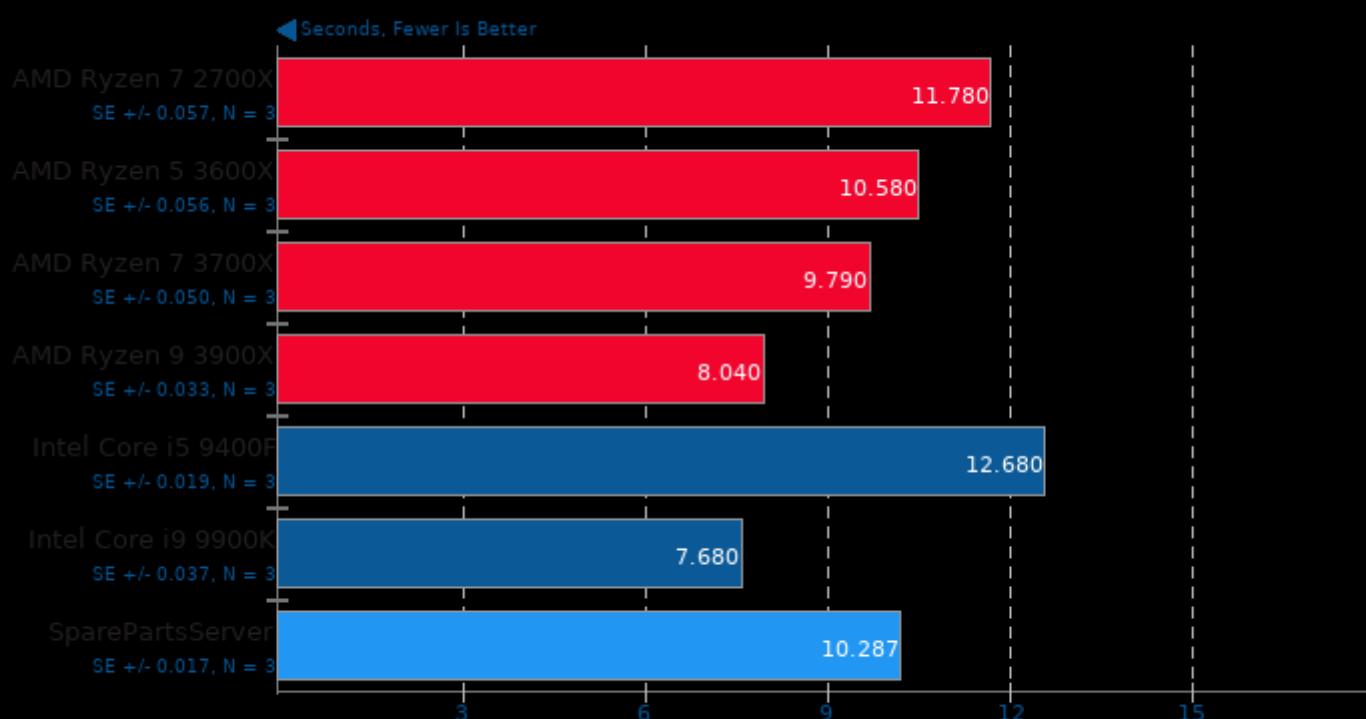
CP2K Molecular Dynamics 6.1

Fayalite-FIST Data



dav1d 0.3

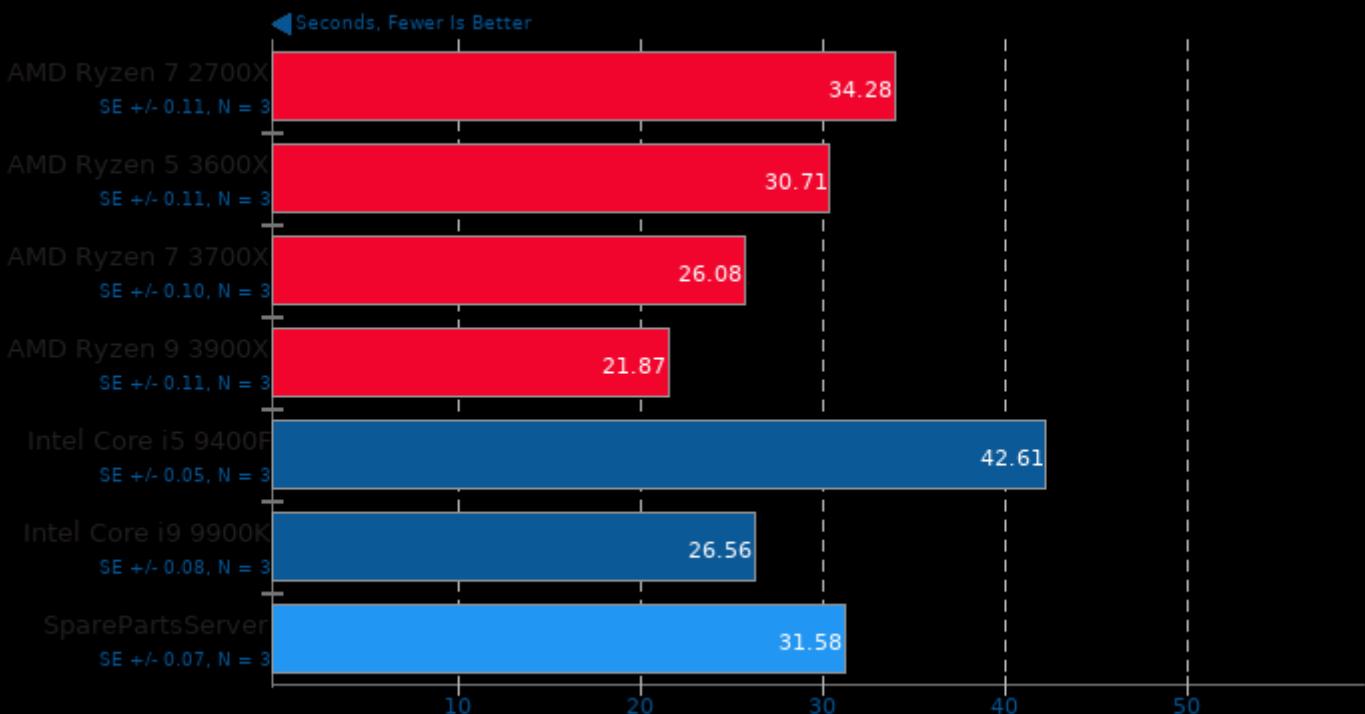
Video Input: Summer Nature 1080p



1. (CC) gcc options: -pthread

dav1d 0.3

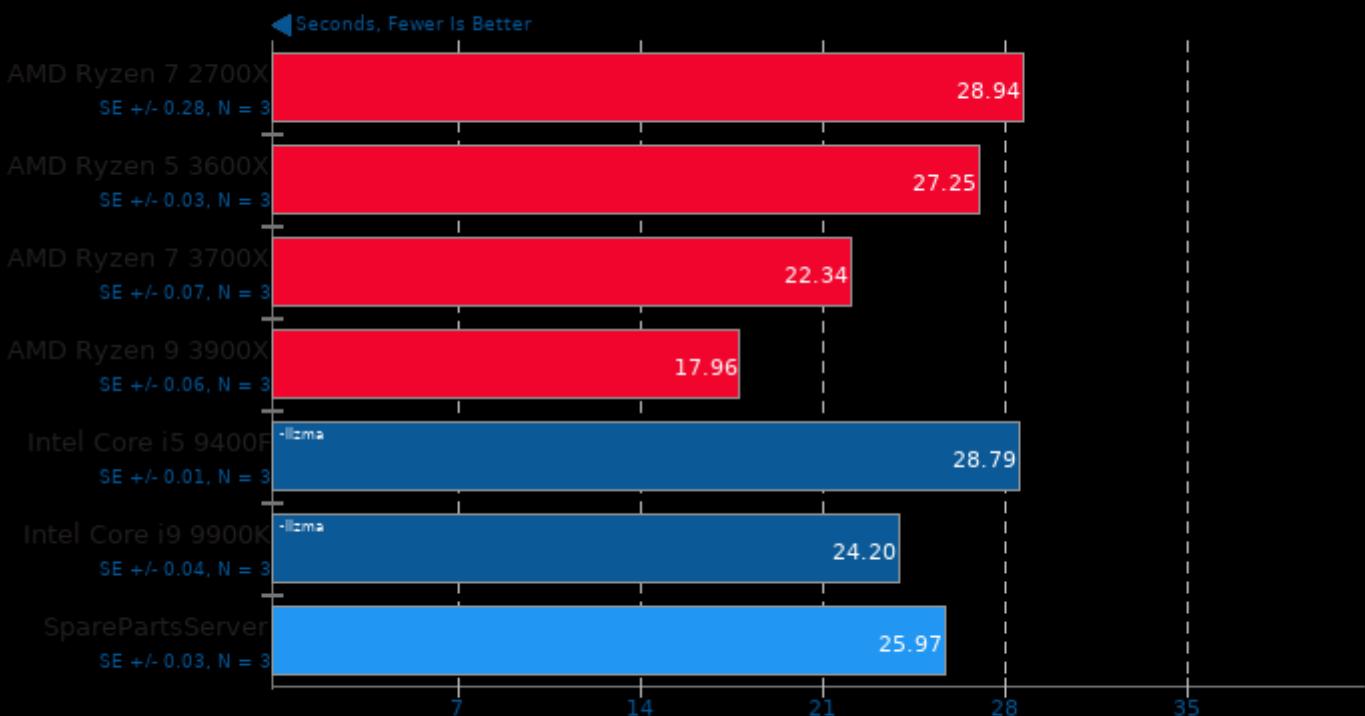
Video Input: Summer Nature 4K



1. (CC) gcc options: -pthread

Zstd Compression 1.3.4

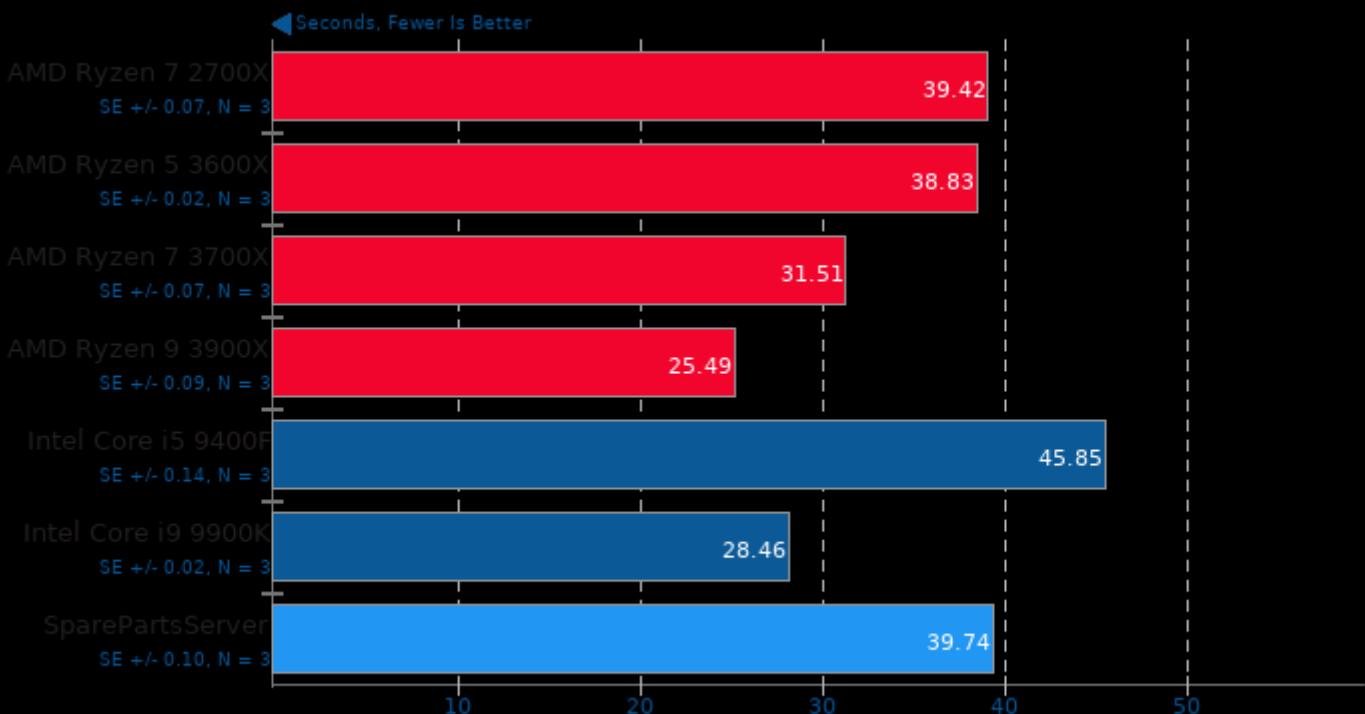
Compressing ubuntu-16.04.3-server-i386.img, Compression Level 19



1. (CC) gcc options: -O3 -pthread -lz

XZ Compression 5.2.4

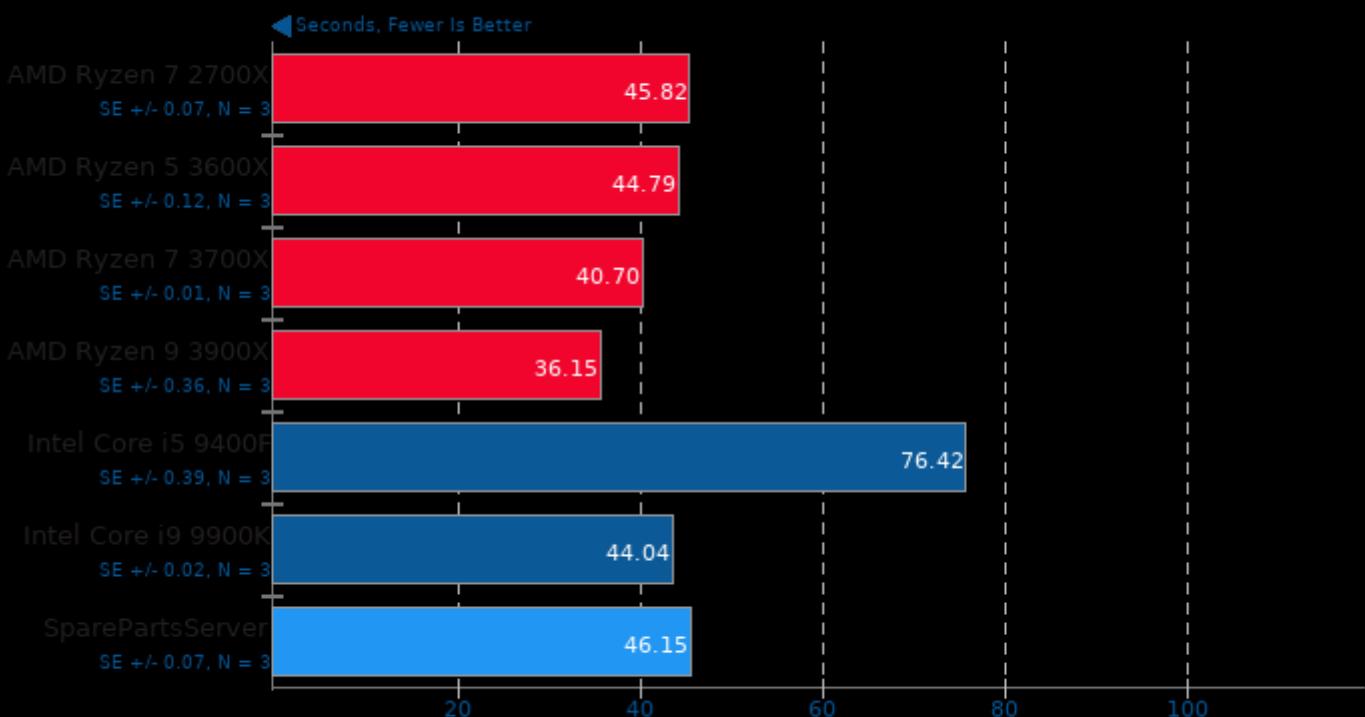
Compressing ubuntu-16.04.3-server-i386.img, Compression Level 9



1. (CC) gcc options: -pthread -fvisibility=hidden -O2

Rust Mandelbrot

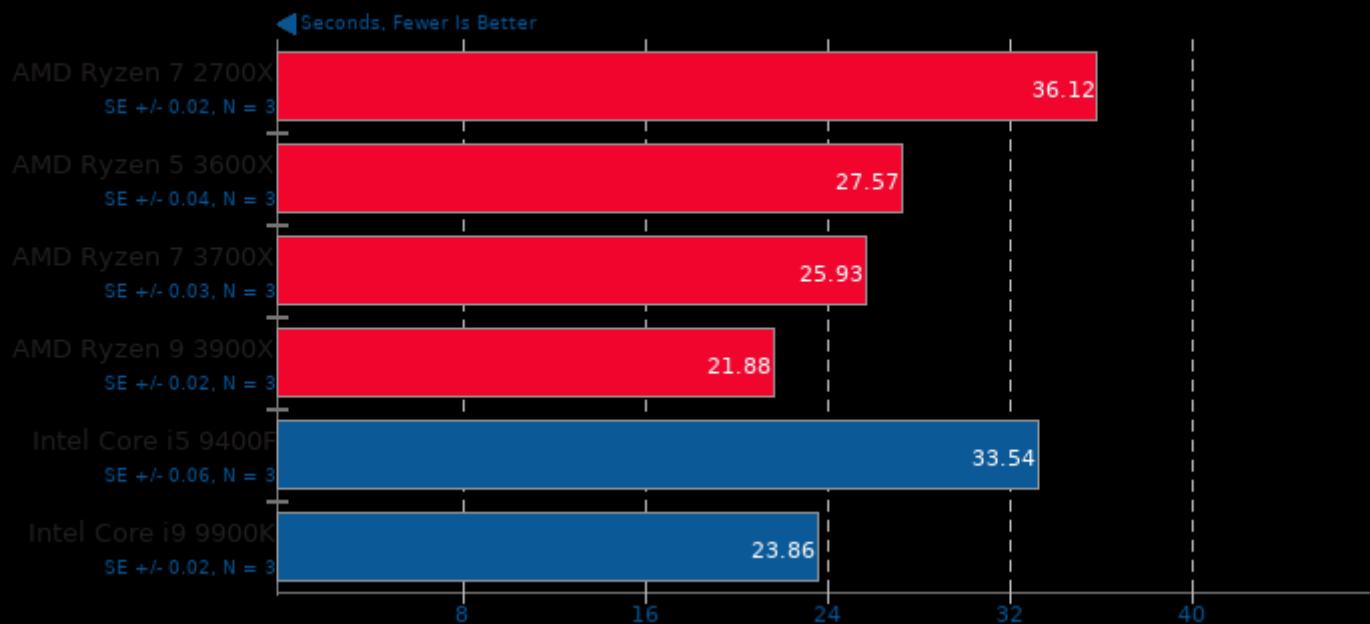
Time To Complete Serial/Parallel Mandelbrot



1. (CC) gcc options: -m64 -pie -nodefaultlibs -lutil -ldl -lrt -lpthread -lgcc_s -lc -lm

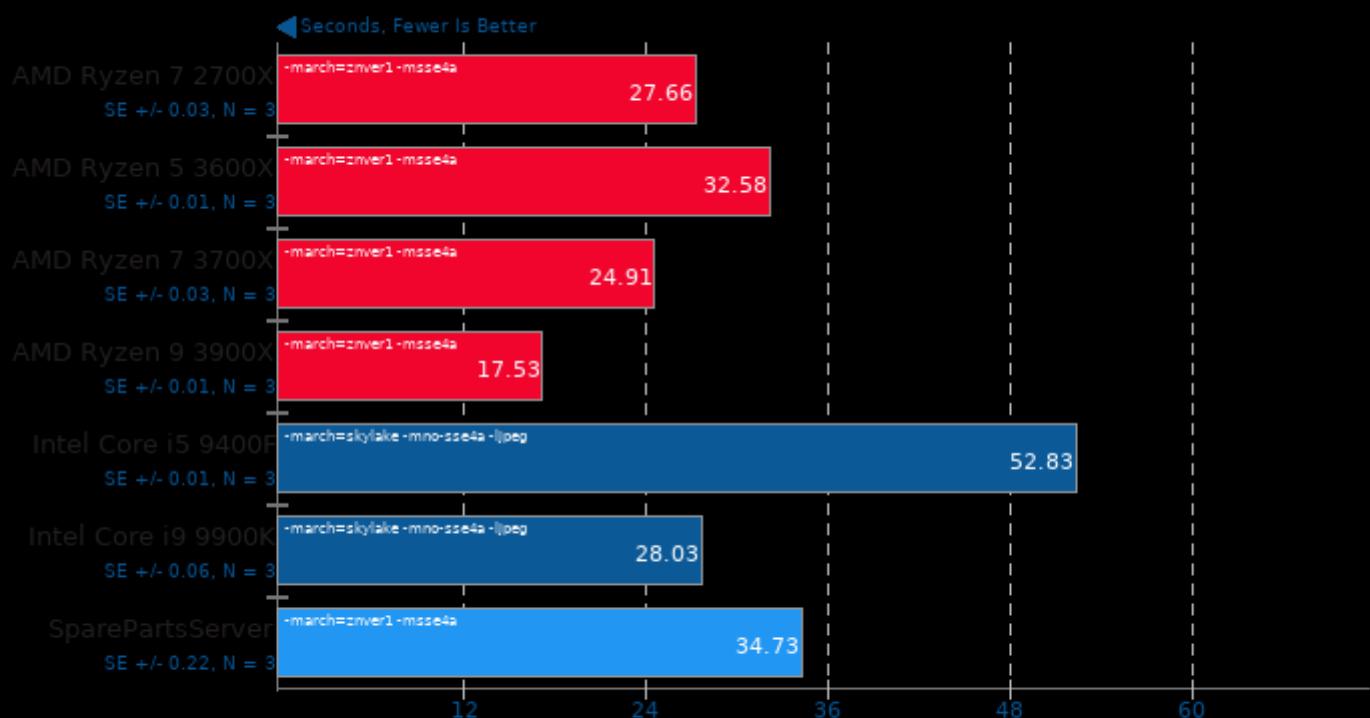
Tensorflow 2017-02-03

Build: Cifar10



Tungsten Renderer 0.2.2

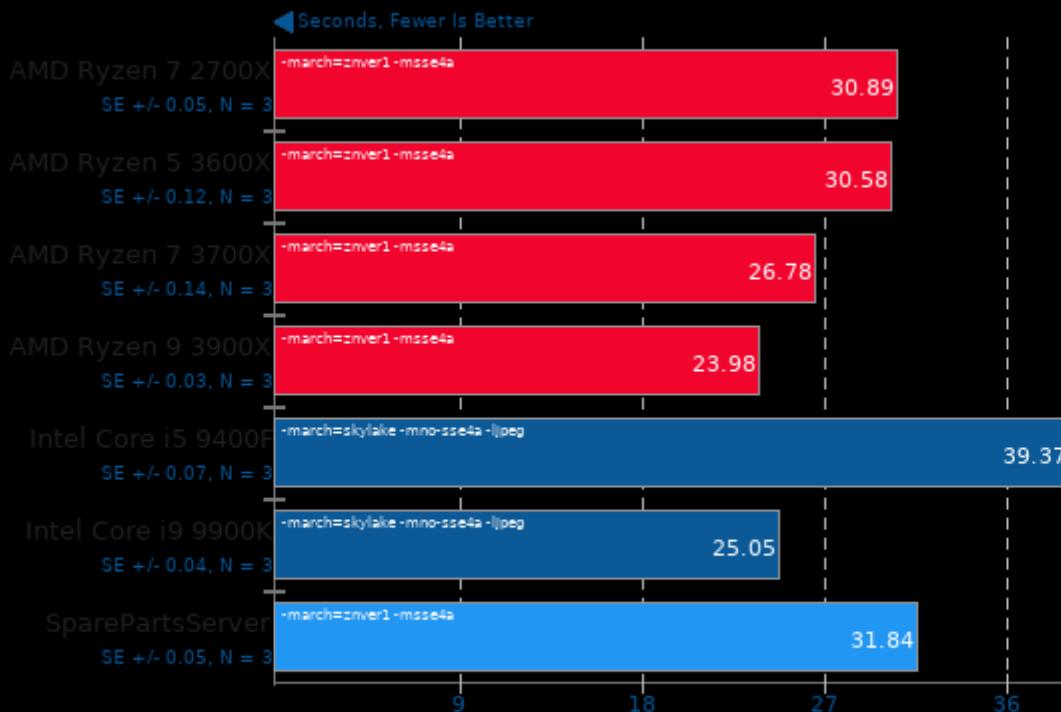
Scene: Hair



1. (CXX) g++ options: -std=c++0x -msse2 -msse3 -mssse3 -msse4.1 -msse4.2 -mfma -mbmi2 -mno-avx -mno-avx2 -mno-xop -mno-fma4 -mno-avx512f -n

Tungsten Renderer 0.2.2

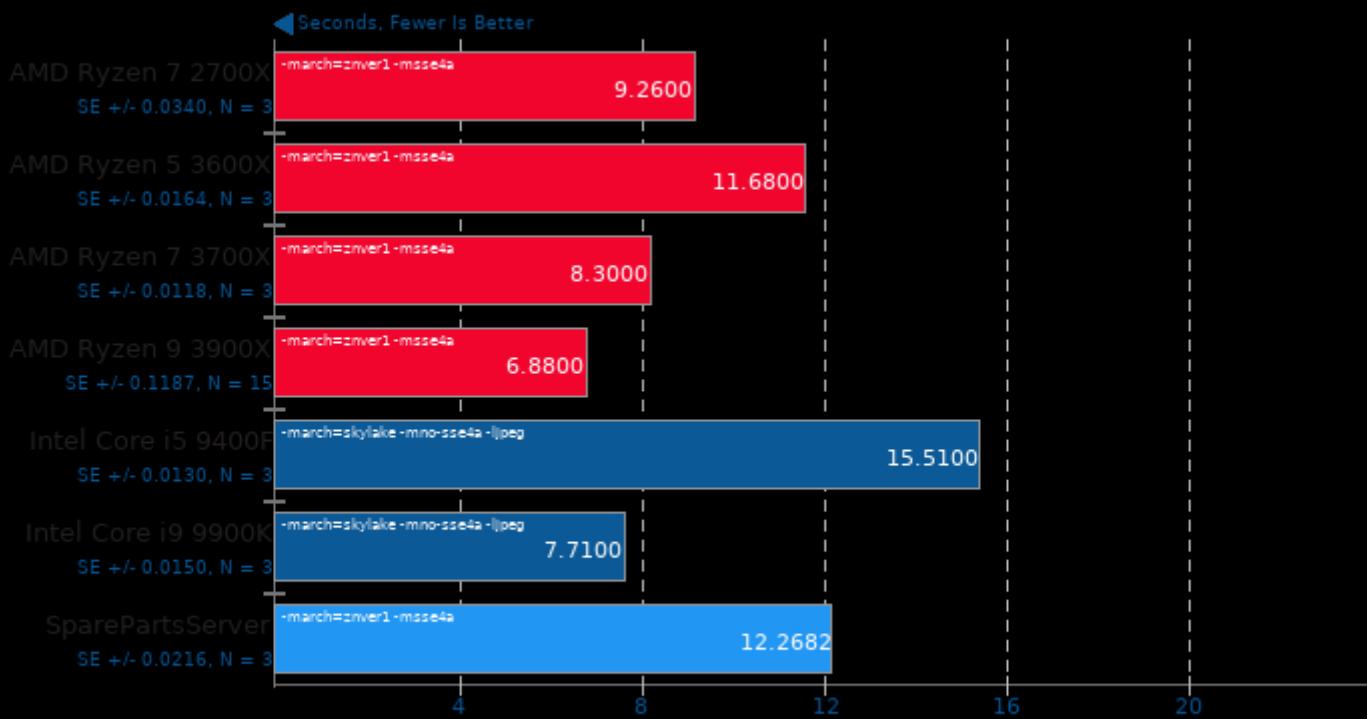
Scene: Water Caustic



1. (CXX) g++ options: -std=c++0x -msse2 -msse3 -mssse3 -msse4.1 -msse4.2 -mfma -mbmi2 -mno-avx -mno-avx2 -mno-xop -mno-fma4 -mno-avx512f -n

Tungsten Renderer 0.2.2

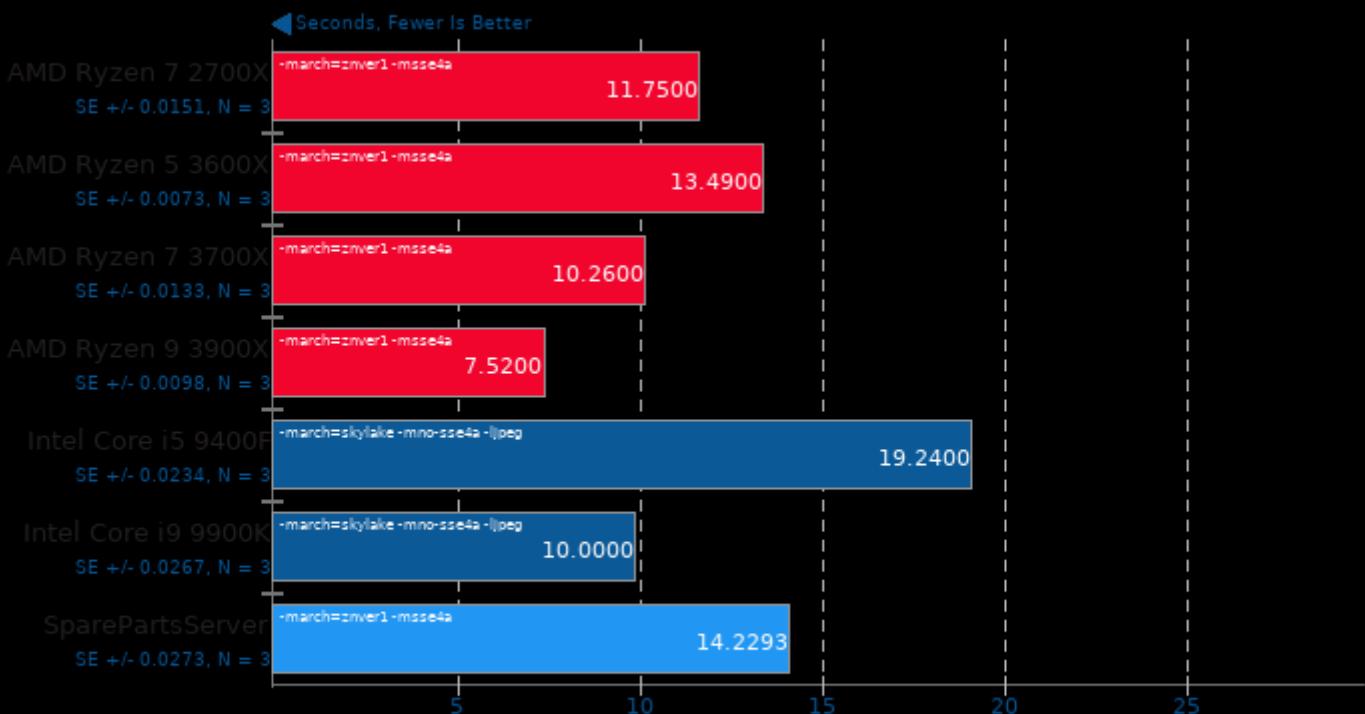
Scene: Non-Exponential



1. (CXX) g++ options: -std=c++0x -msse2 -msse3 -mssse3 -msse4.1 -msse4.2 -mfma -mbmi2 -mno-avx -mno-avx2 -mno-xop -mno-fma4 -mno-avx512f -n

Tungsten Renderer 0.2.2

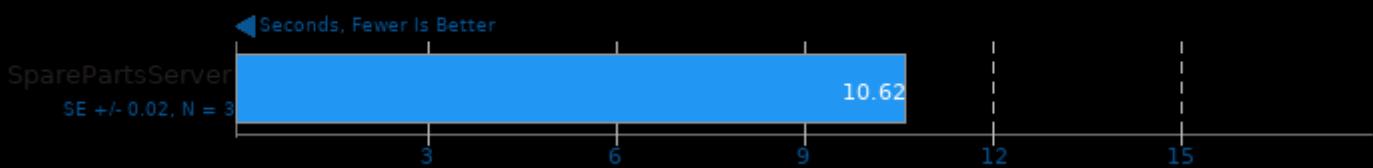
Scene: Volumetric Caustic



1. (CXX) g++ options: -std=c++0x -msse2 -msse3 -mssse3 -msse4.1 -msse4.2 -mfma -mbmi2 -mno-avx -mno-avx2 -mno-xop -mno-fma4 -mno-avx512f -n

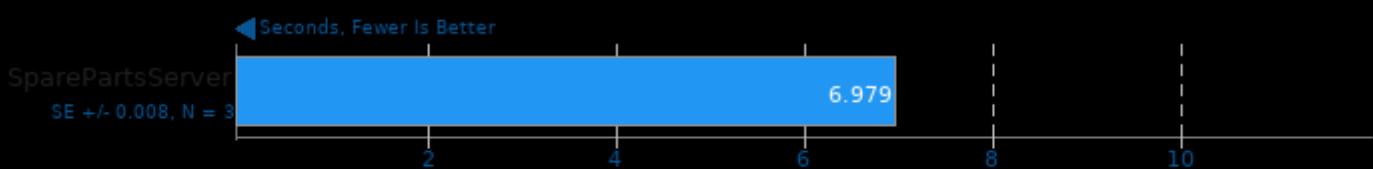
Darktable 3.0.1

Test: Boat - Acceleration: CPU-only



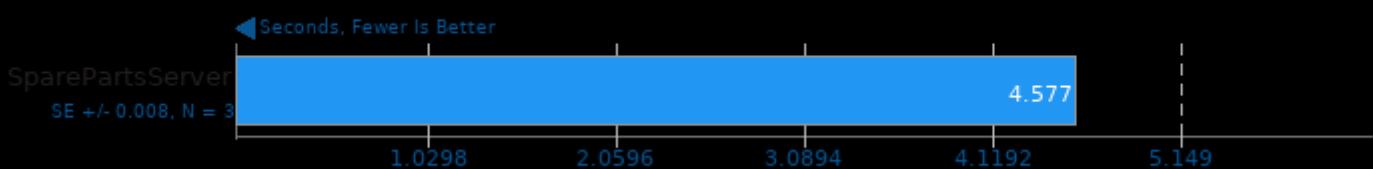
Darktable 3.0.1

Test: Masskrug - Acceleration: CPU-only



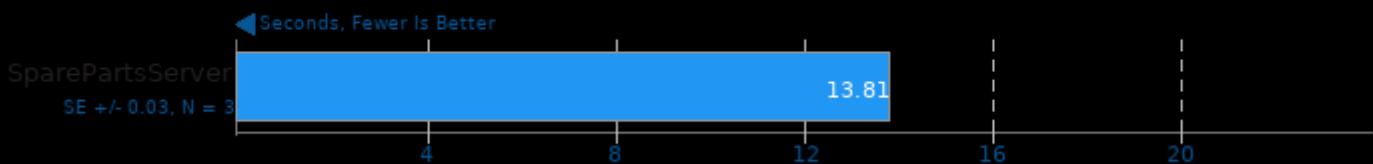
Darktable 3.0.1

Test: Server Room - Acceleration: CPU-only

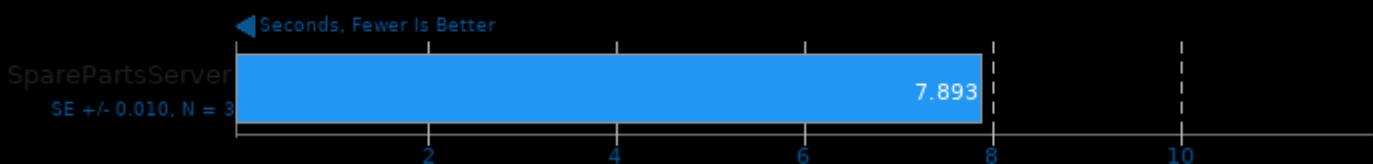


GIMP 2.10.18

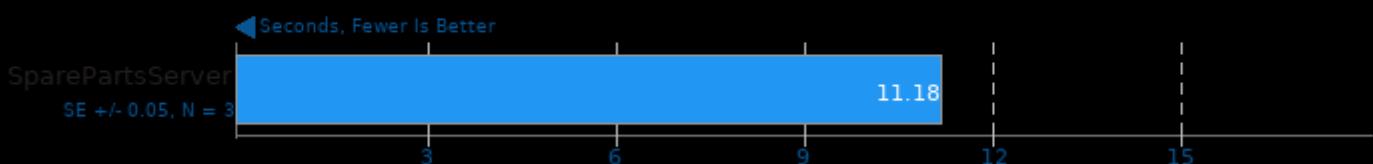
Test: unsharp-mask

**GIMP 2.10.18**

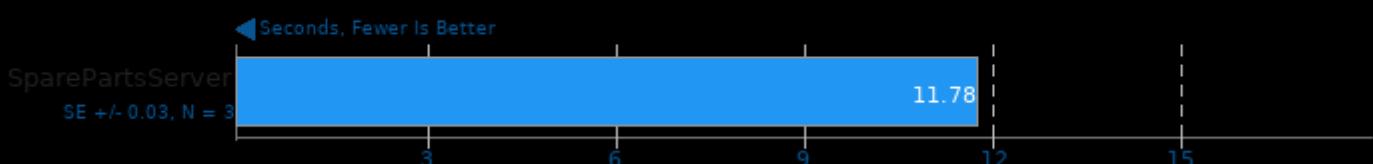
Test: resize

**GIMP 2.10.18**

Test: rotate

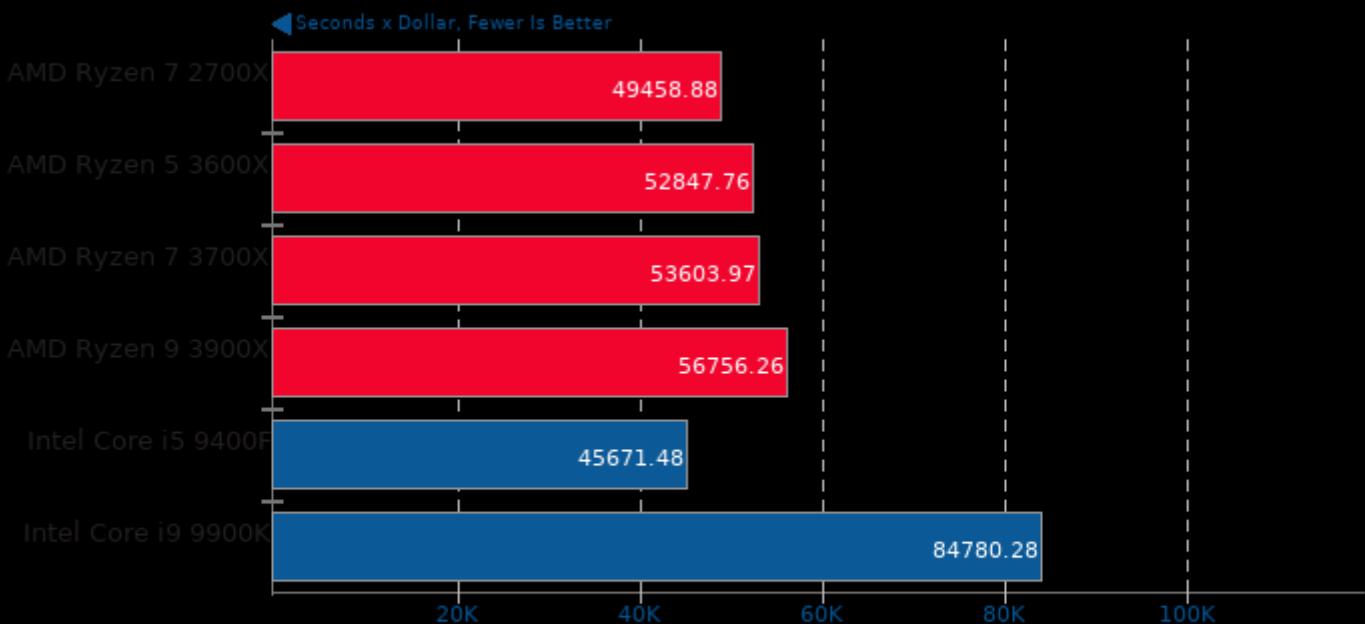
**GIMP 2.10.18**

Test: auto-levels



Blender 2.80

Performance / Cost - Blend File: BMW27 - Compute: CPU-Only



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

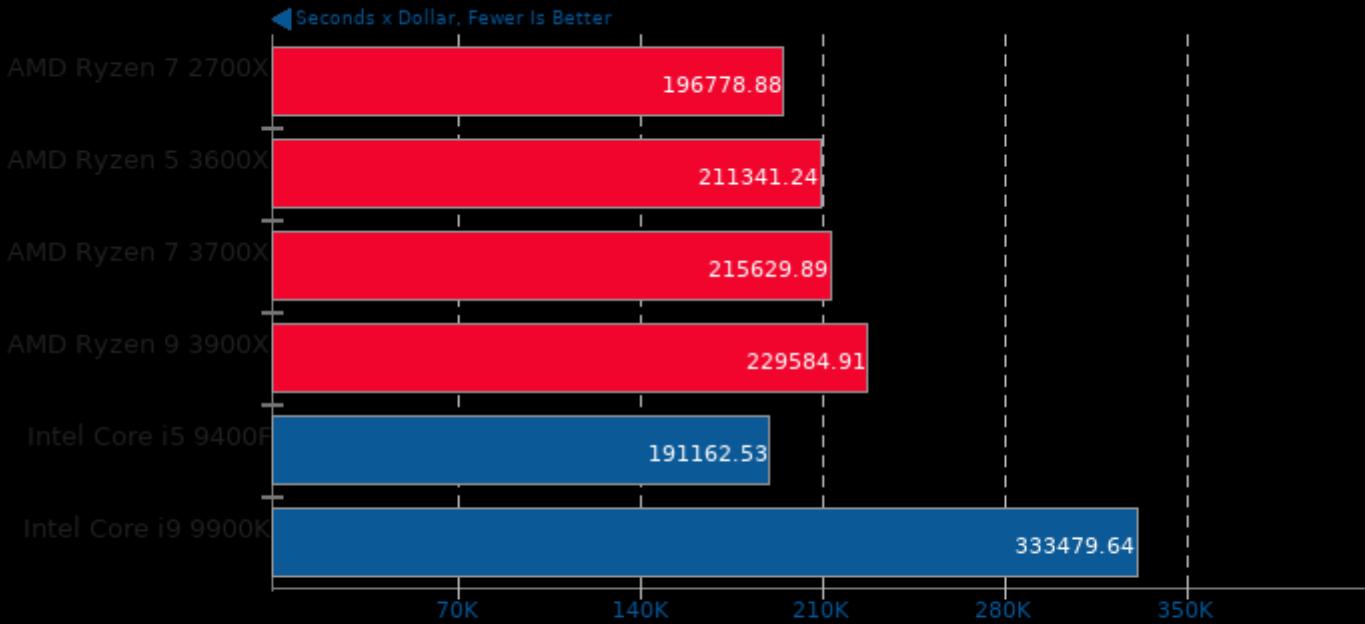
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

Blender 2.80

Performance / Cost - Blend File: Barbershop - Compute: CPU-Only



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

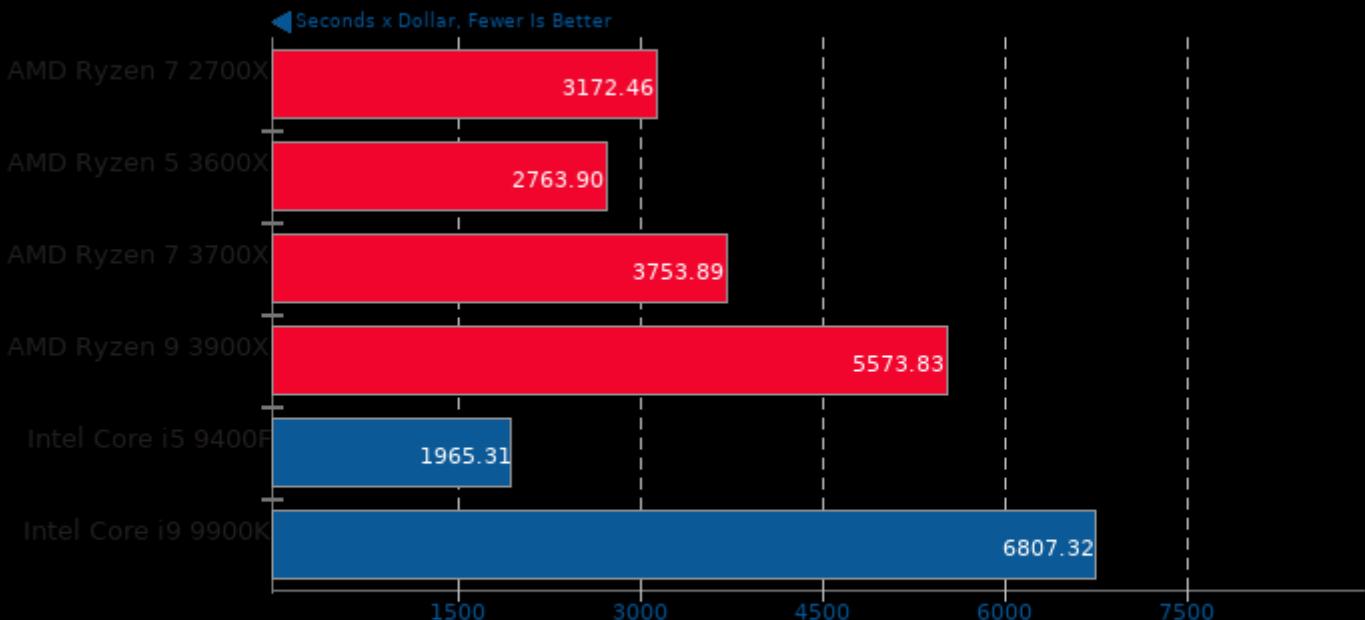
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

Darktable 2.6.0

Performance / Cost - Test: Boat - Acceleration: CPU-only



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

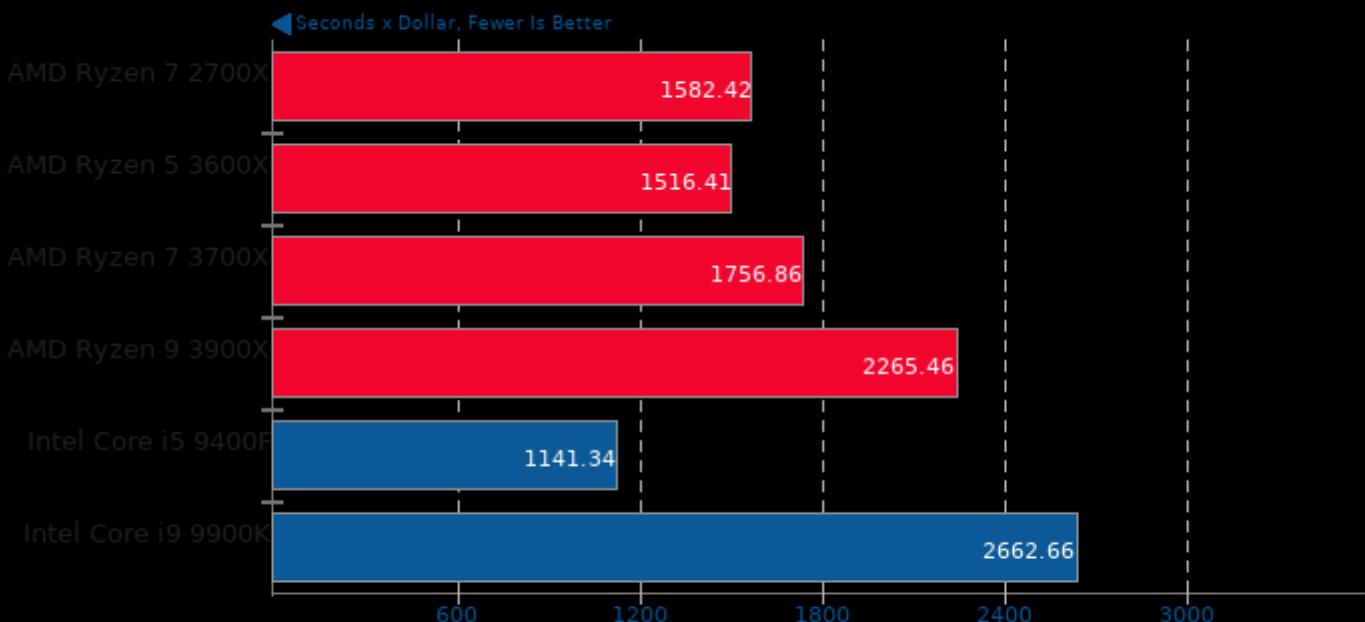
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

Darktable 2.6.0

Performance / Cost - Test: Masskrug - Acceleration: CPU-only



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

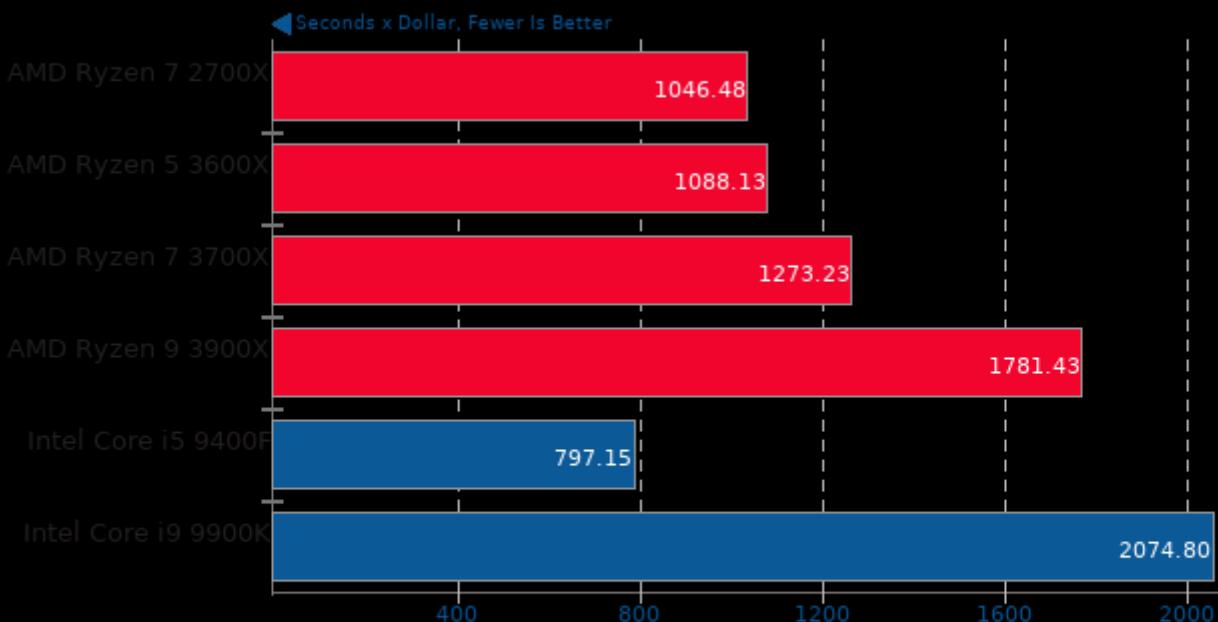
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

Darktable 2.6.0

Performance / Cost - Test: Server Room - Acceleration: CPU-only



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

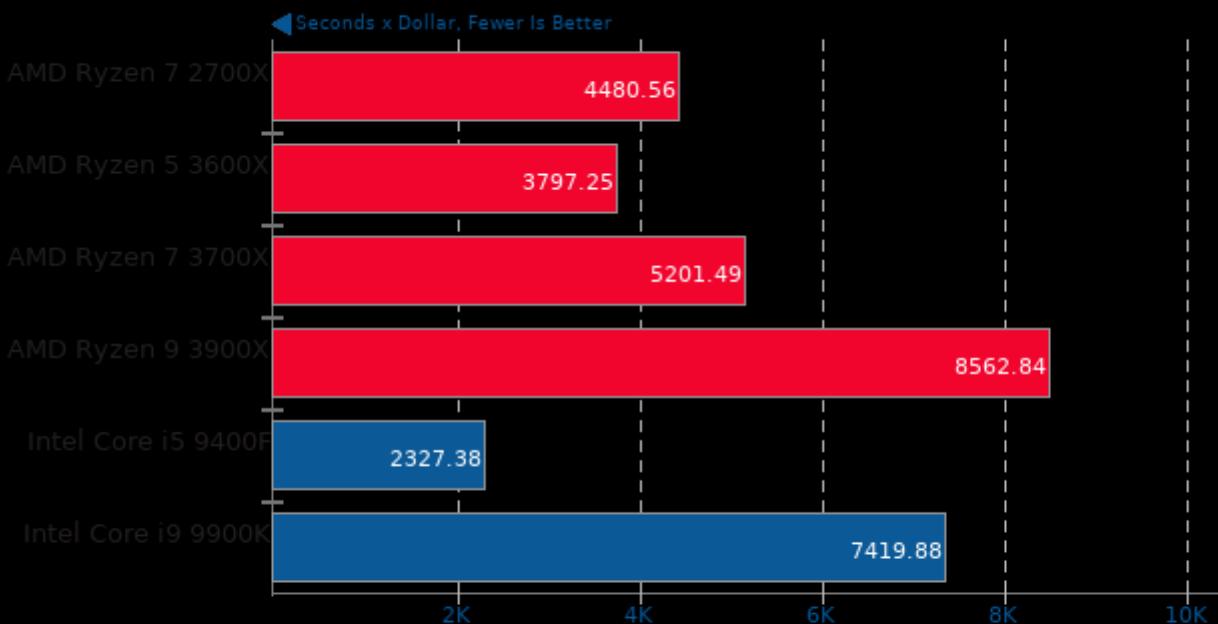
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

GIMP 2.10.8

Performance / Cost - Test: unsharp-mask



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

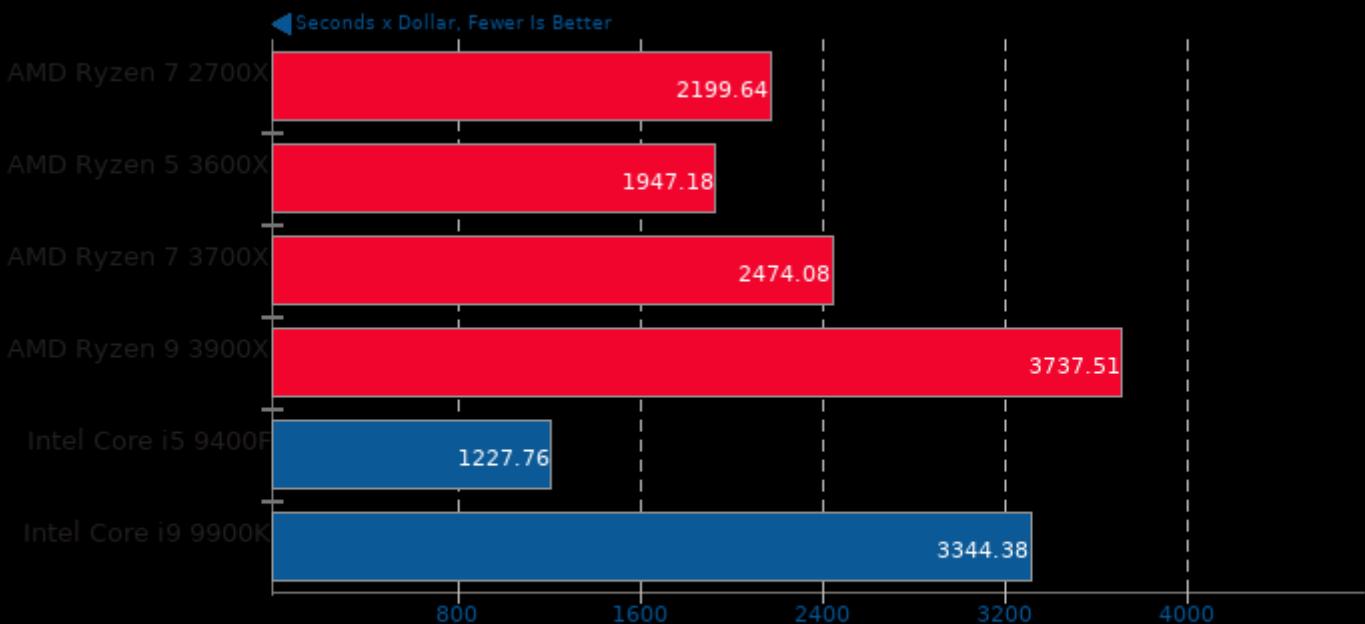
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

GIMP 2.10.8

Performance / Cost - Test: resize



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

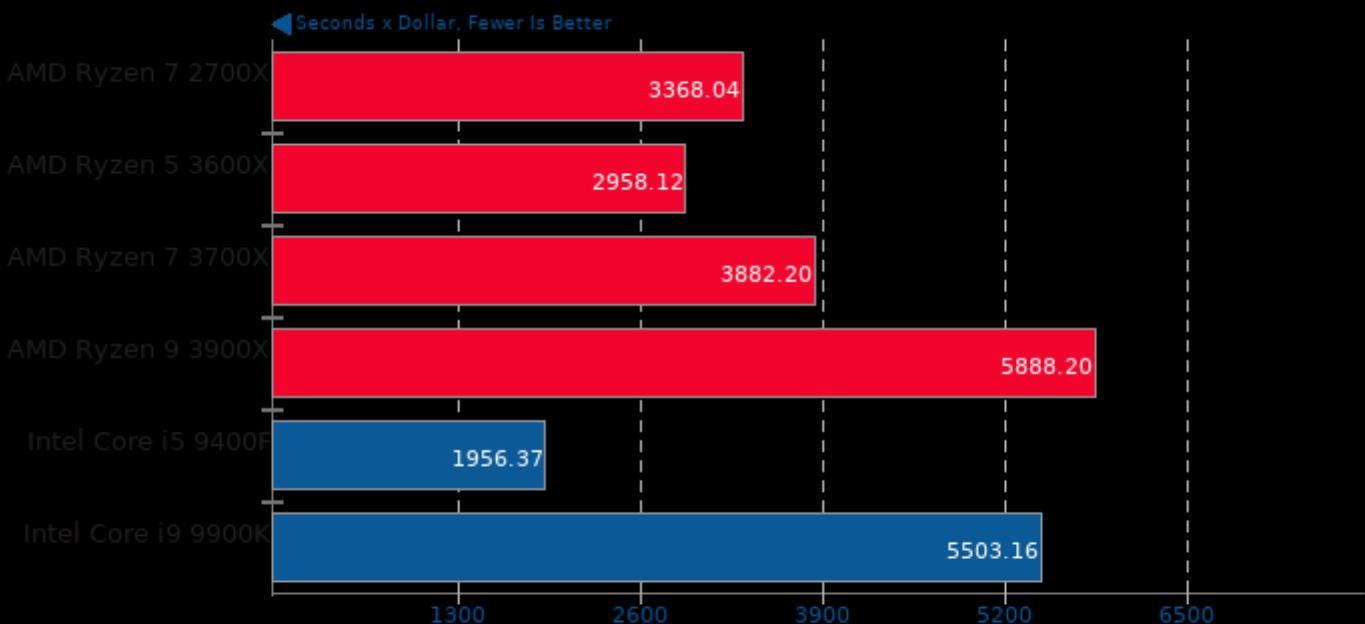
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

GIMP 2.10.8

Performance / Cost - Test: rotate



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

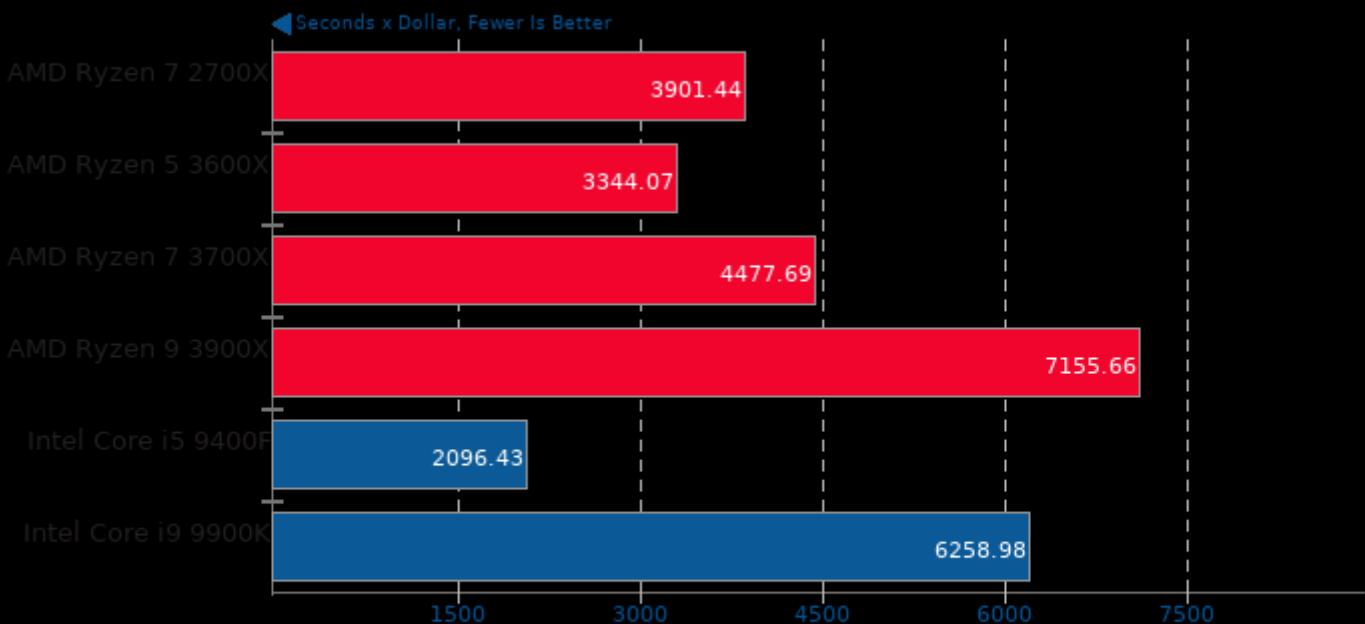
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

GIMP 2.10.8

Performance / Cost - Test: auto-levels



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

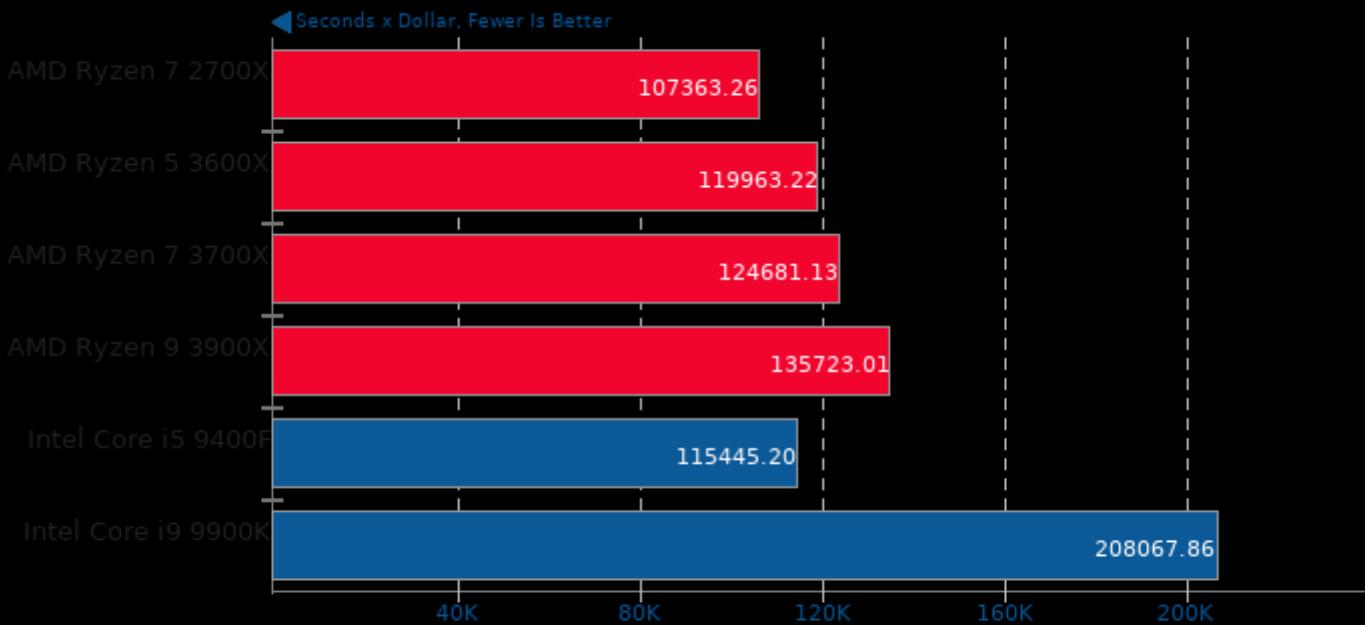
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

Appleseed 2.0 Beta

Performance / Cost - Scene: Emily



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

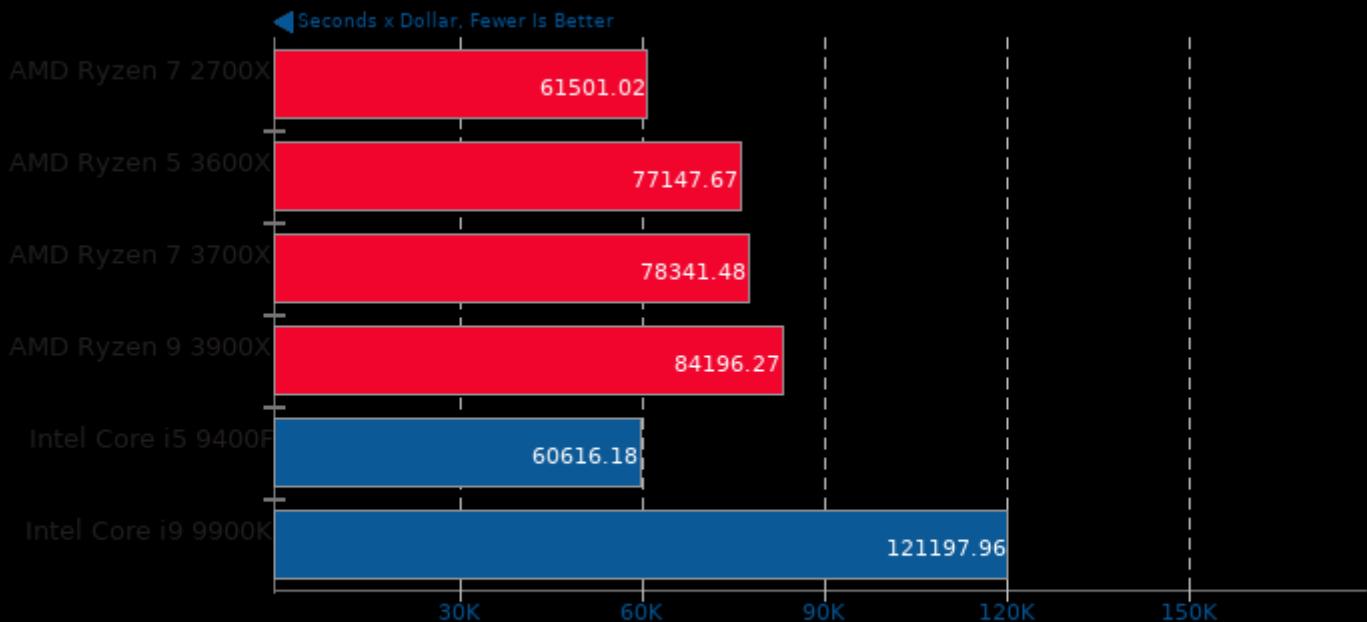
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

Appleseed 2.0 Beta

Performance / Cost - Scene: Disney Material



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

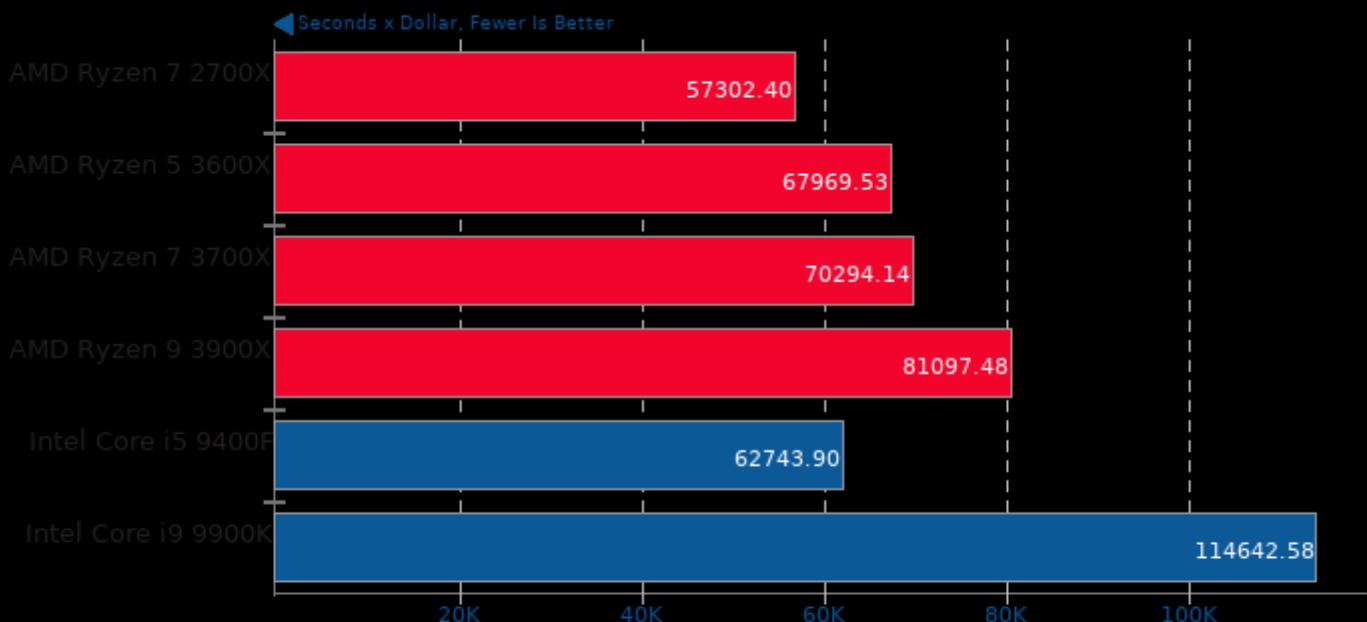
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

Appleseed 2.0 Beta

Performance / Cost - Scene: Material Tester



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

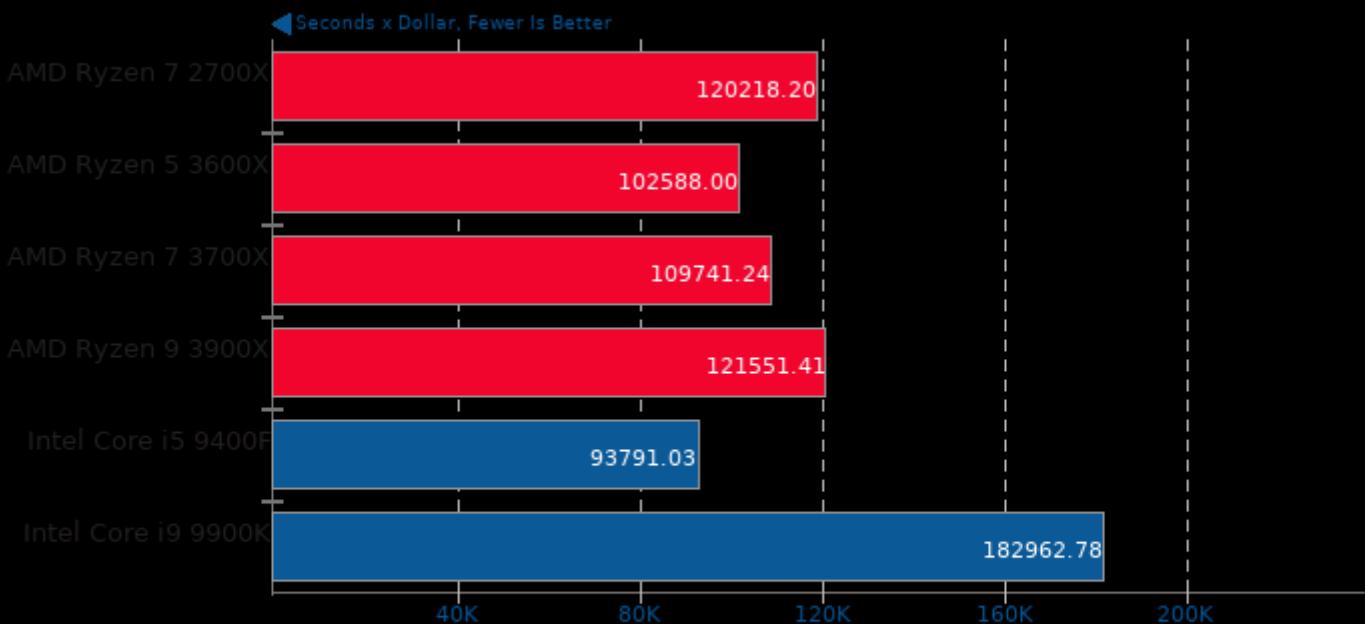
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

Timed LLVM Compilation 6.0.1

Performance / Cost - Time To Compile



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

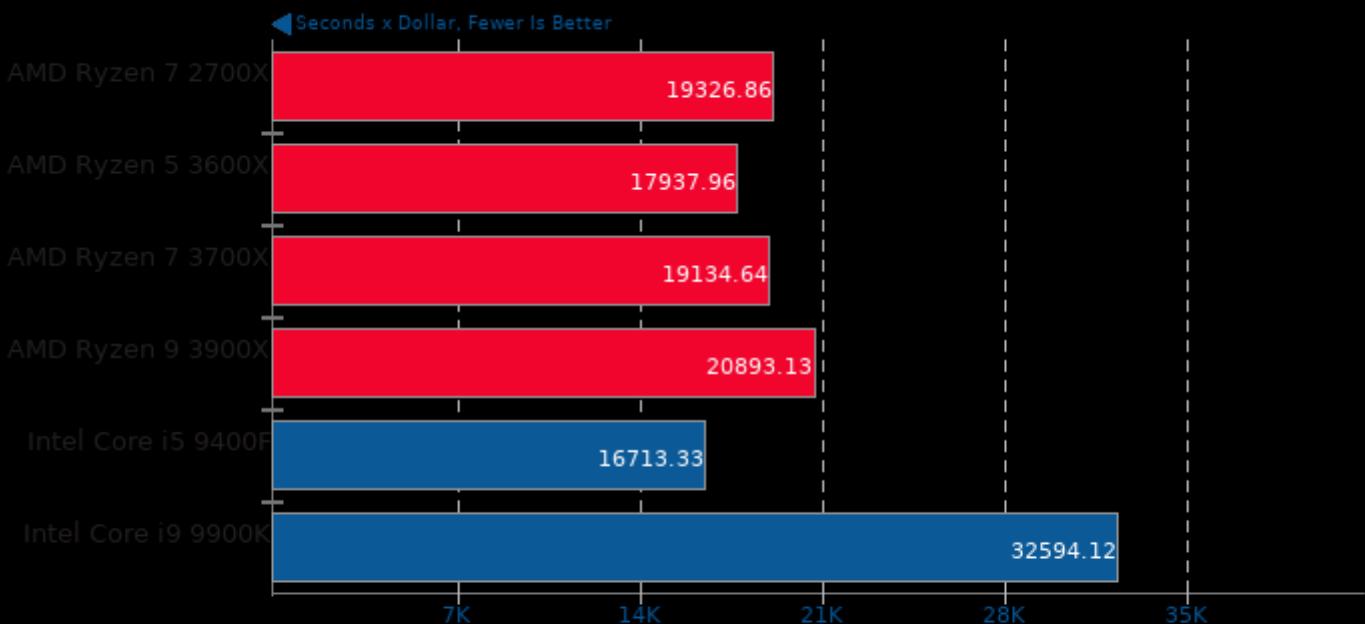
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

Timed Linux Kernel Compilation 4.18

Performance / Cost - Time To Compile



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

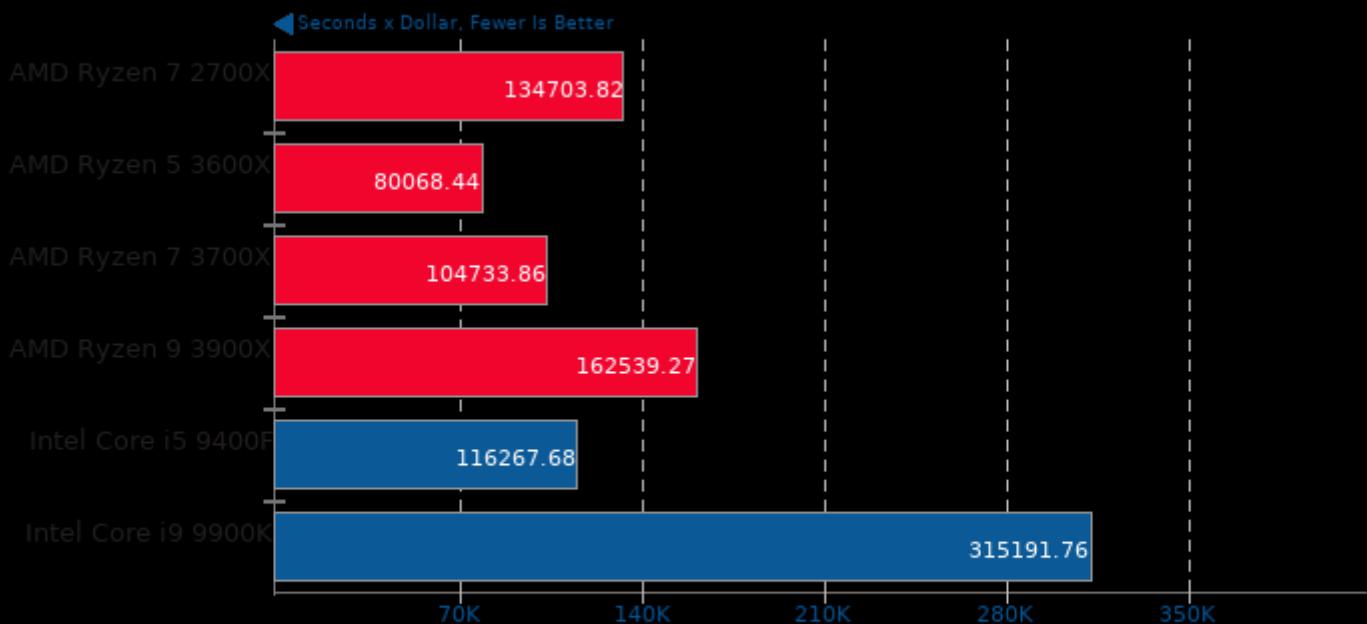
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

CP2K Molecular Dynamics 6.1

Performance / Cost - Fayalite-FIST Data



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

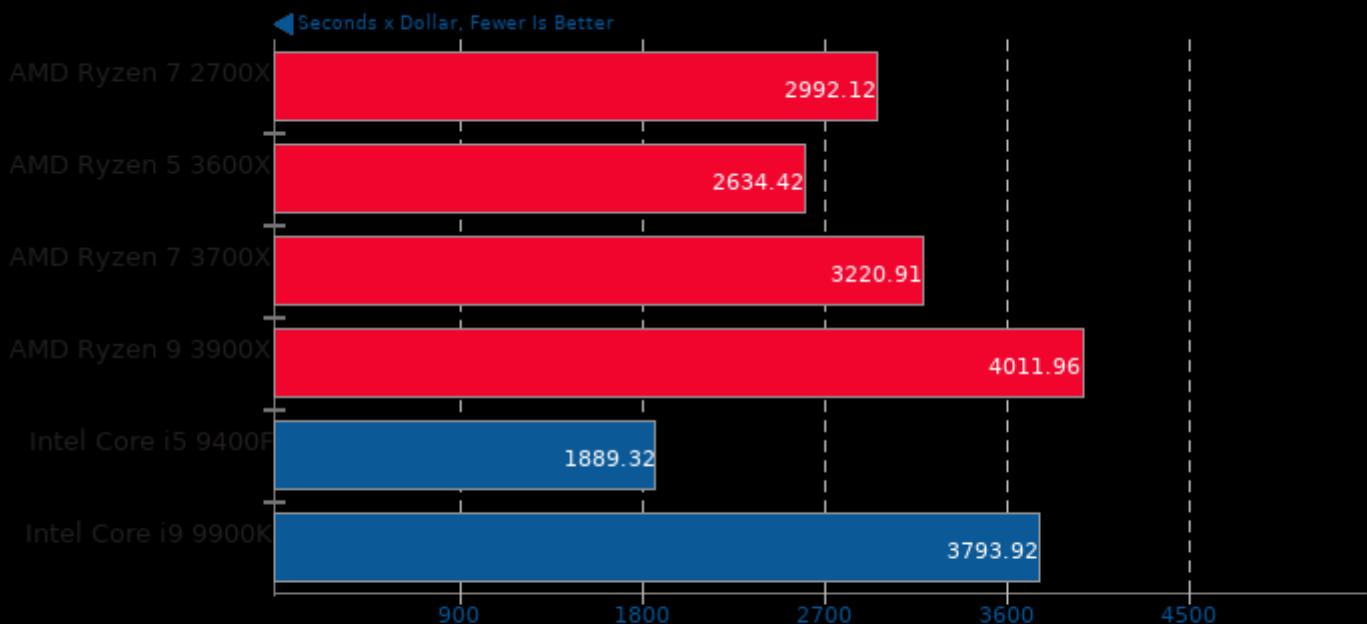
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

dav1d 0.3

Performance / Cost - Video Input: Summer Nature 1080p



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

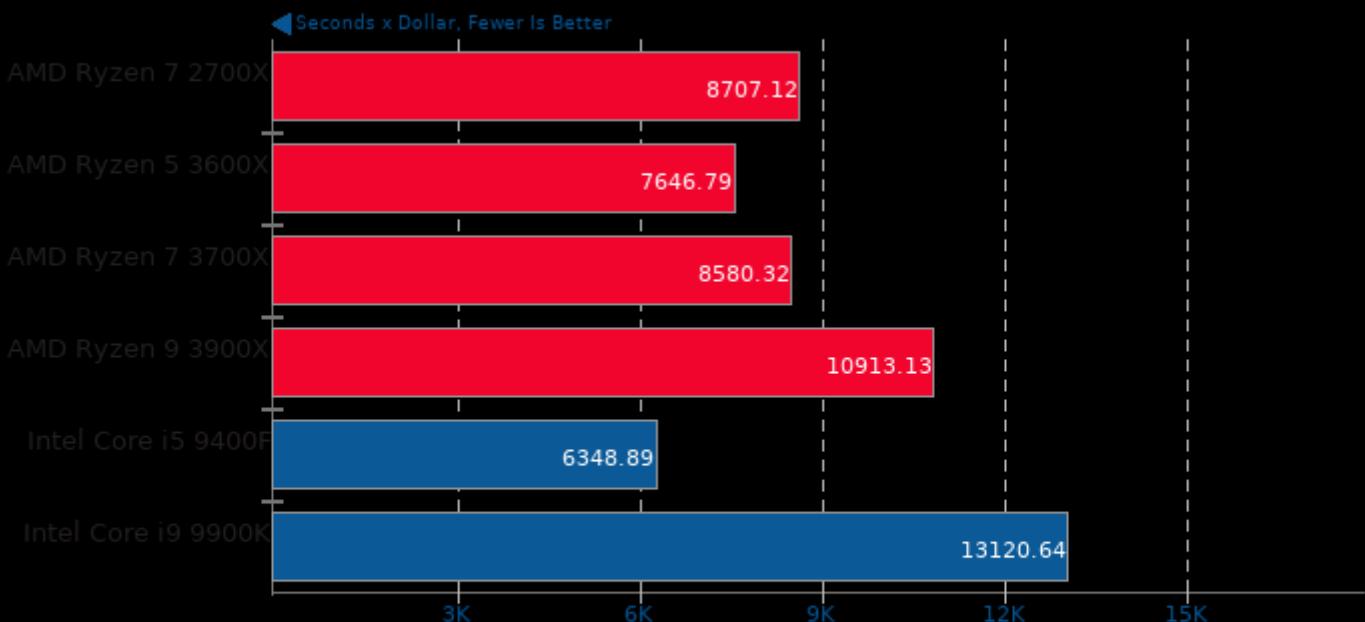
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

dav1d 0.3

Performance / Cost - Video Input: Summer Nature 4K



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

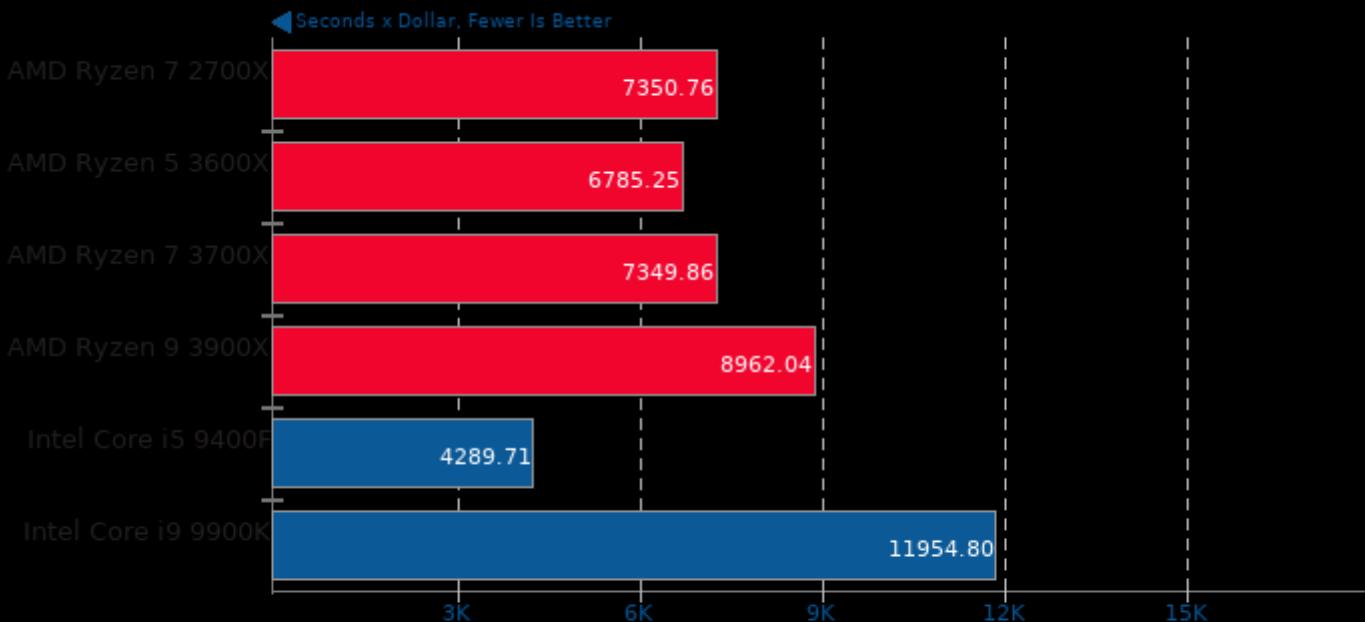
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

Zstd Compression 1.3.4

Performance / Cost - Compressing ubuntu-16.04.3-server-i386.img, Compression Level 19



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

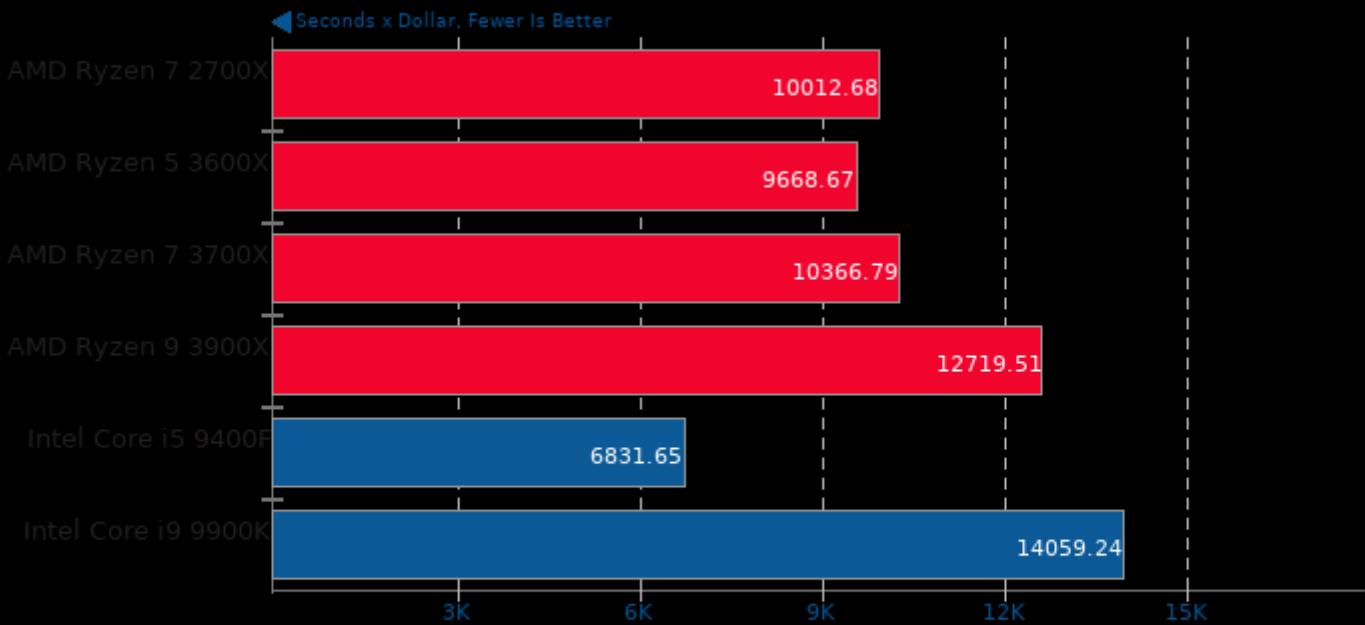
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

XZ Compression 5.2.4

Performance / Cost - Compressing ubuntu-16.04.3-server-i386.img, Compression Level 9



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

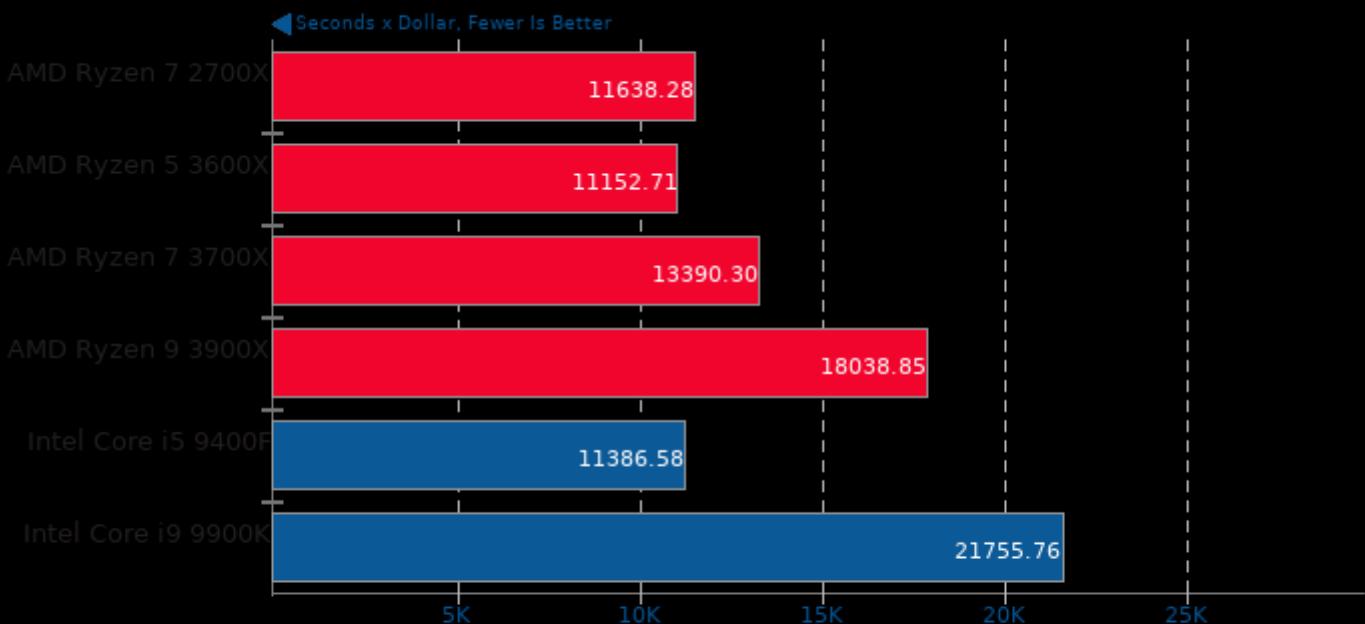
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

Rust Mandelbrot

Performance / Cost - Time To Complete Serial/Parallel Mandelbrot



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

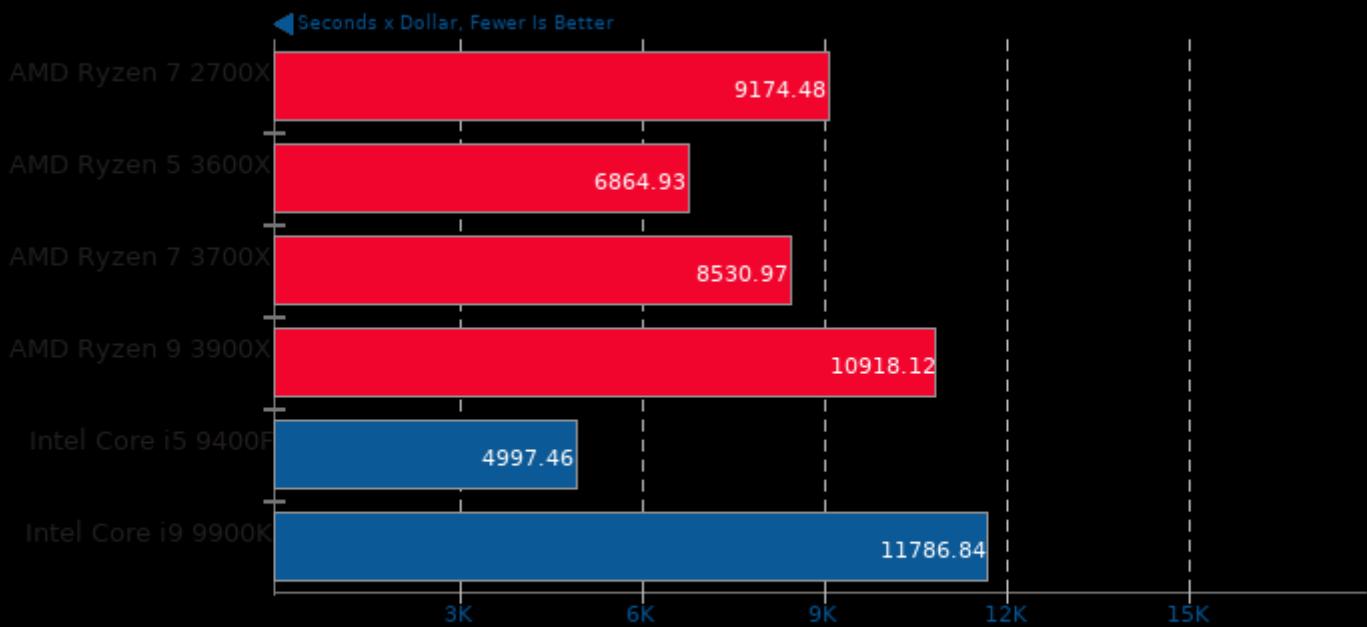
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

Tensorflow 2017-02-03

Performance / Cost - Build: Cifar10



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

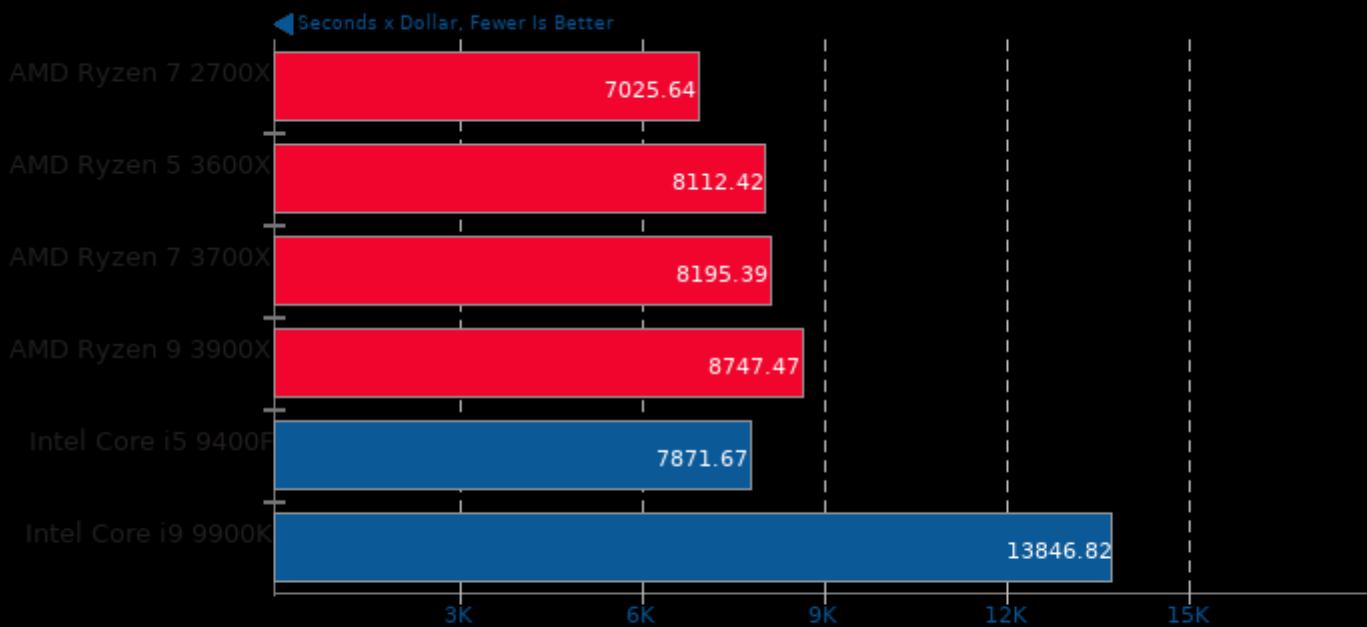
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

Tungsten Renderer 0.2.2

Performance / Cost - Scene: Hair



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

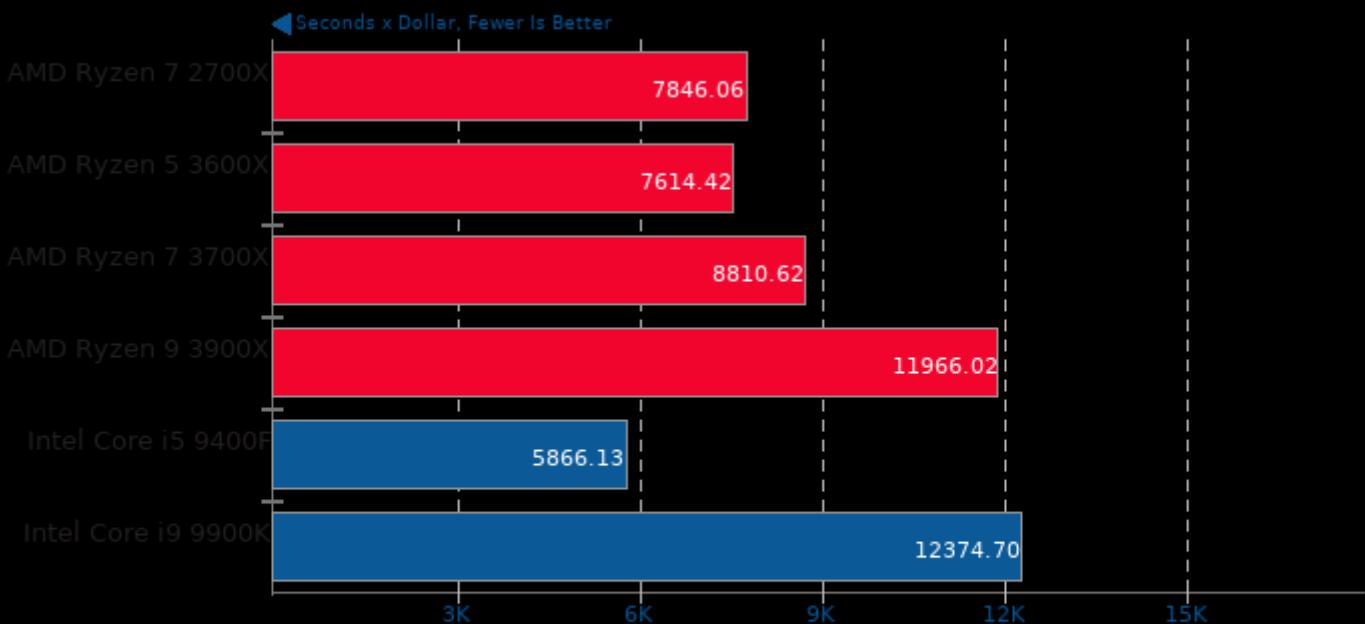
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

Tungsten Renderer 0.2.2

Performance / Cost - Scene: Water Caustic



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

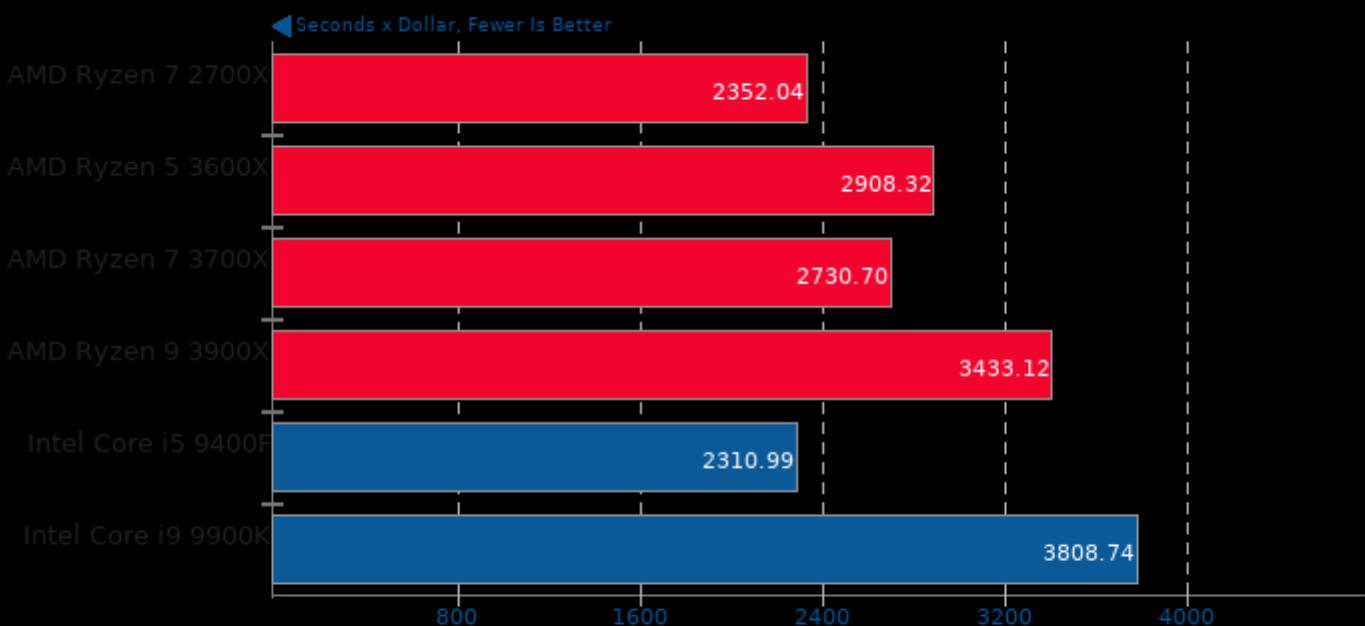
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

Tungsten Renderer 0.2.2

Performance / Cost - Scene: Non-Exponential



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

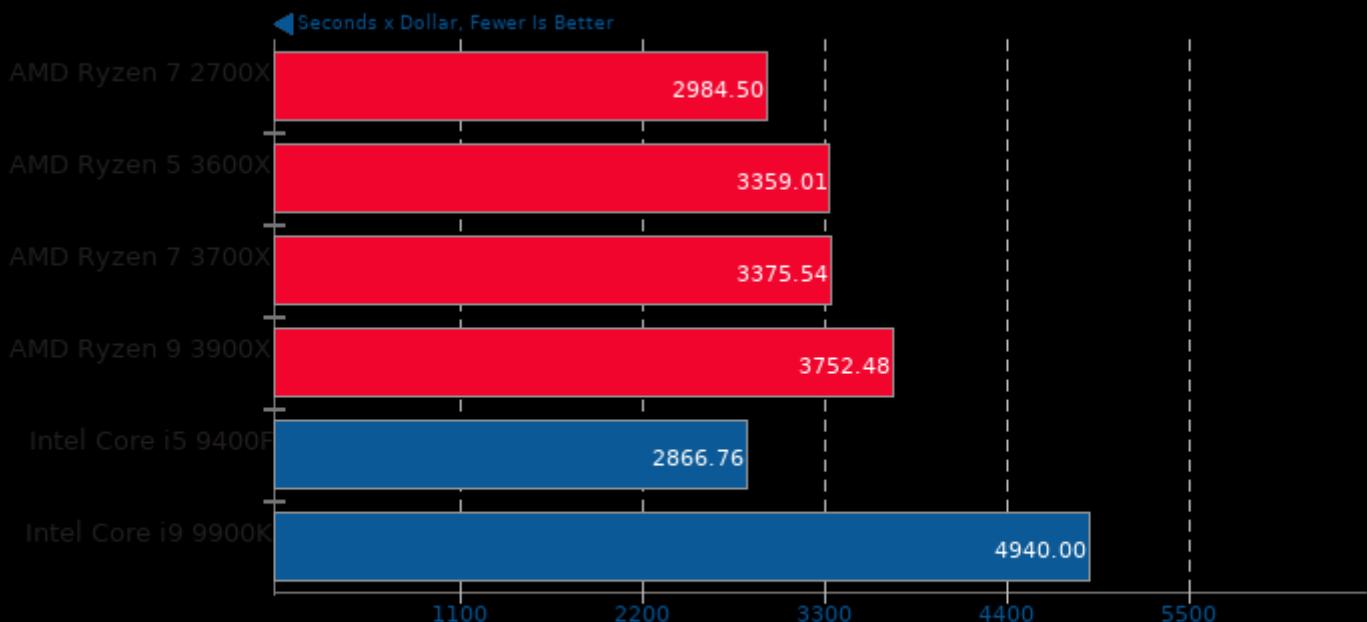
4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

6. Intel Core i9 9900K: \$494 reported cost.

Tungsten Renderer 0.2.2

Performance / Cost - Scene: Volumetric Caustic



1. AMD Ryzen 7 2700X: \$254 reported cost.

2. AMD Ryzen 5 3600X: \$249 reported cost.

3. AMD Ryzen 7 3700X: \$329 reported cost.

4. AMD Ryzen 9 3900X: \$499 reported cost.

5. Intel Core i5 9400F: \$149 reported cost.

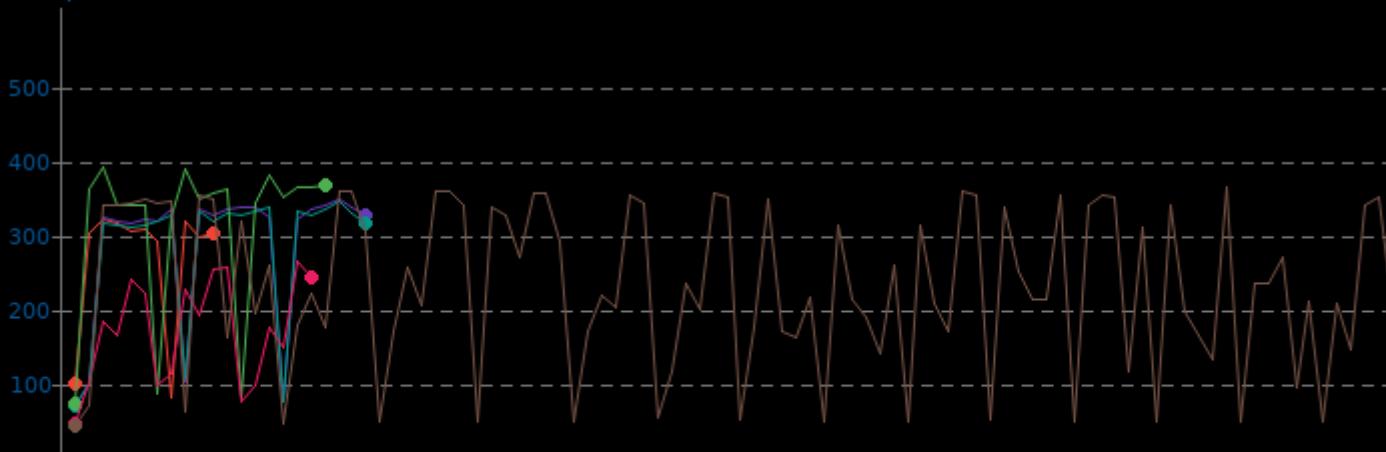
6. Intel Core i9 9900K: \$494 reported cost.

Tesseract 2014-05-12

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	82.7	267.8	320.6
AMD Ryzen 5 3600X	72.2	286.0	347.2
AMD Ryzen 7 3700X	72.7	282.9	345.6
AMD Ryzen 9 3900X	74.2	313.9	390.0
Intel Core i5 9400F	49.3	174.0	265.2
Intel Core i9 9900K	45.0	232.1	363.4

▼ Watts, Fewer Is Better

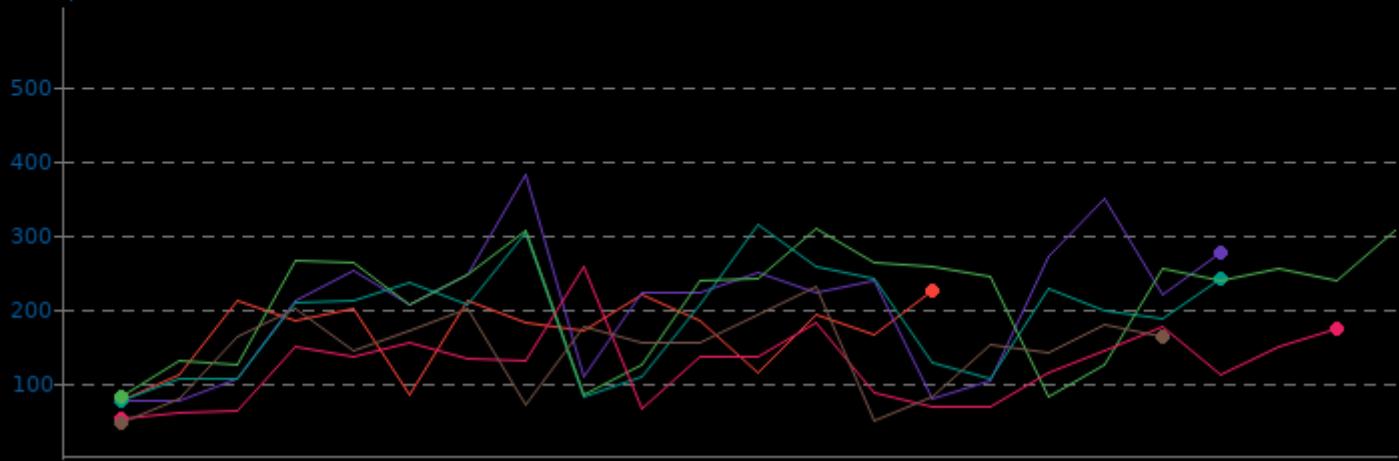


Xonotic 0.8.2

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	78.5	169.4	225.1
AMD Ryzen 5 3600X	77.1	206.1	379.2
AMD Ryzen 7 3700X	78.2	188.0	312.1
AMD Ryzen 9 3900X	82.0	212.6	308.0
Intel Core i5 9400F	53.5	125.8	258.3
Intel Core i9 9900K	49.4	145.1	229.5

▼ Watts, Fewer Is Better

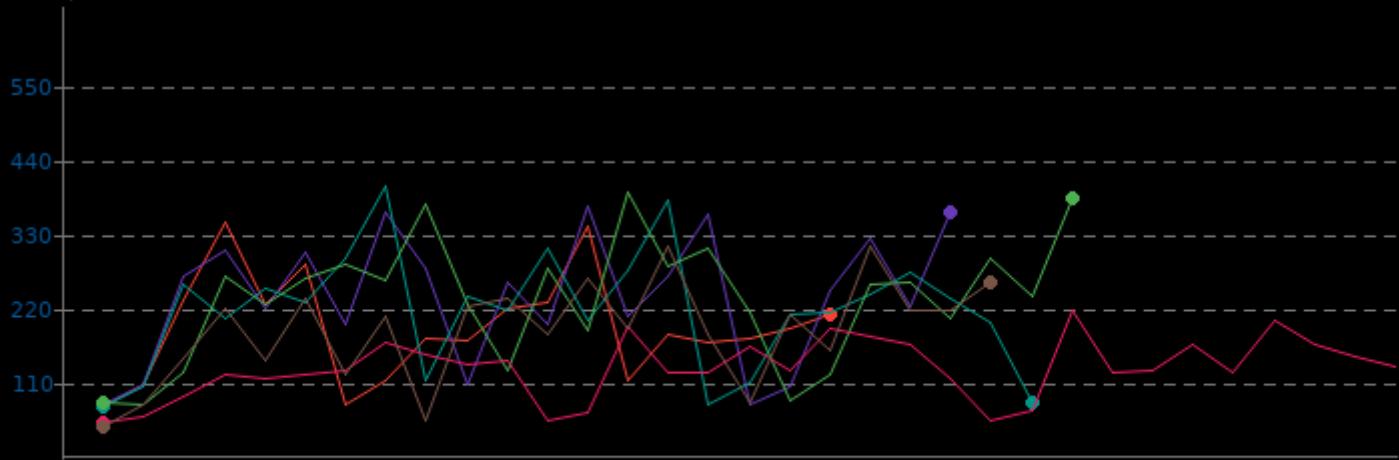


Xonotic 0.8.2

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	77.3	192.9	346.6
AMD Ryzen 5 3600X	78.6	238.6	370.3
AMD Ryzen 7 3700X	77.6	217.2	401.6
AMD Ryzen 9 3900X	80.8	233.7	392.0
Intel Core i5 9400F	53.4	132.6	216.6
Intel Core i9 9900K	48.6	188.2	313.5

▼ Watts, Fewer Is Better

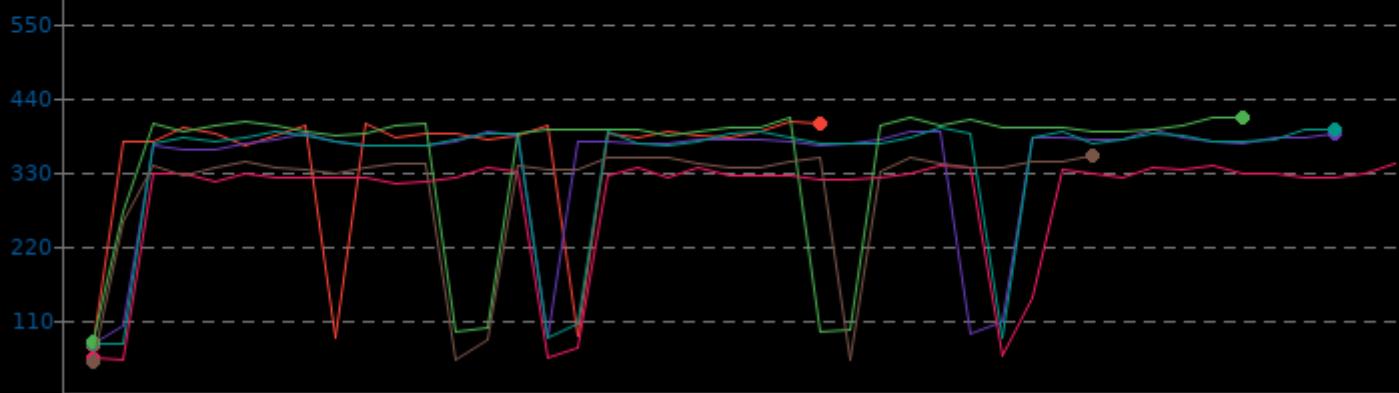


SuperTuxKart 0.9.3

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	74.6	350.0	402.8
AMD Ryzen 5 3600X	76.6	342.6	391.8
AMD Ryzen 7 3700X	75.6	344.4	394.0
AMD Ryzen 9 3900X	80.3	353.6	411.0
Intel Core i5 9400F	54.0	292.0	341.7
Intel Core i9 9900K	49.3	304.5	352.5

▼ Watts, Fewer Is Better

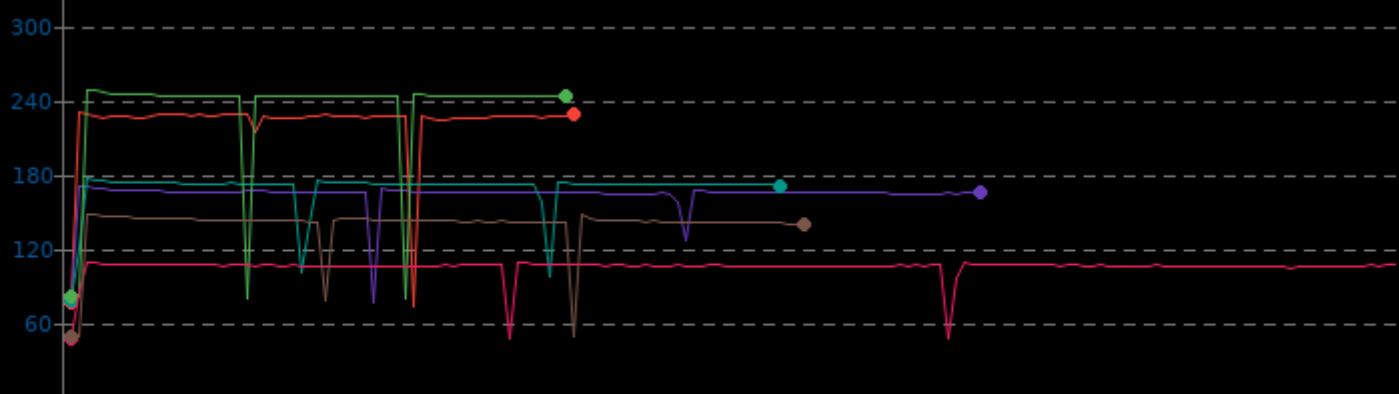


Blender 2.80

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	74.1	221.6	229.7
AMD Ryzen 5 3600X	76.5	163.8	170.9
AMD Ryzen 7 3700X	79.2	168.7	177.0
AMD Ryzen 9 3900X	79.6	232.9	247.7
Intel Core i5 9400F	48.6	105.5	109.7
Intel Core i9 9900K	49.7	139.2	148.5

▼ Watts, Fewer Is Better

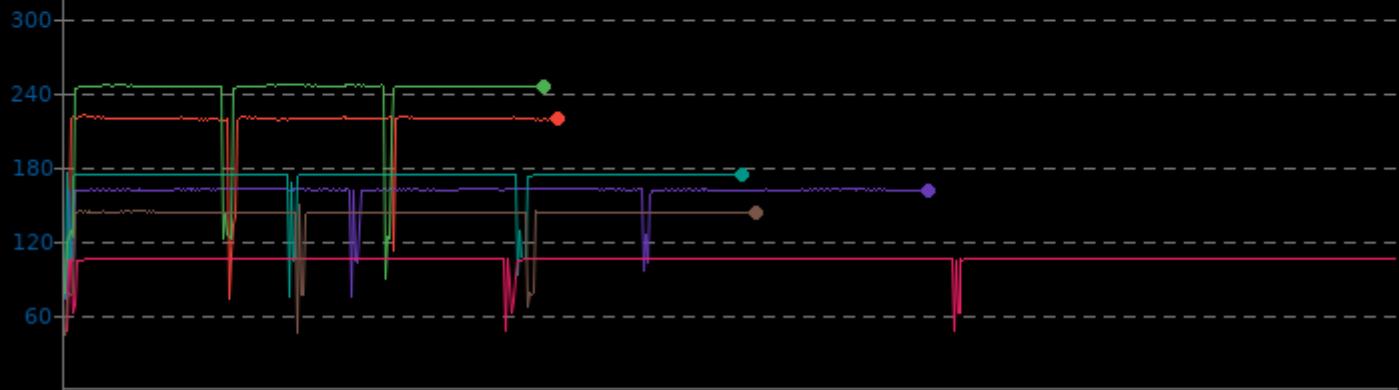


Blender 2.80

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	74.0	215.2	221.6
AMD Ryzen 5 3600X	74.3	160.0	162.8
AMD Ryzen 7 3700X	75.0	171.0	175.6
AMD Ryzen 9 3900X	78.9	238.0	245.4
Intel Core i5 9400F	48.6	105.1	106.6
Intel Core i9 9900K	45.7	140.7	150.2

▼ Watts, Fewer Is Better

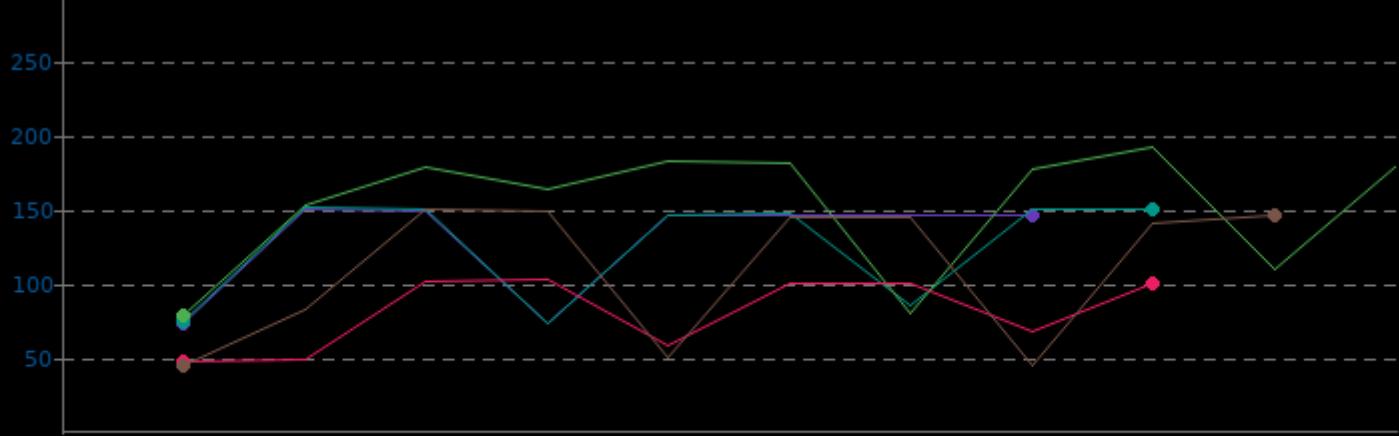


Darktable 2.6.0

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 5 3600X	73.4	128.8	150.4
AMD Ryzen 7 3700X	73.7	125.5	151.0
AMD Ryzen 9 3900X	78.9	152.0	191.0
Intel Core i5 9400F	48.4	81.4	102.6
Intel Core i9 9900K	45.5	109.8	149.4

▼ Watts, Fewer Is Better

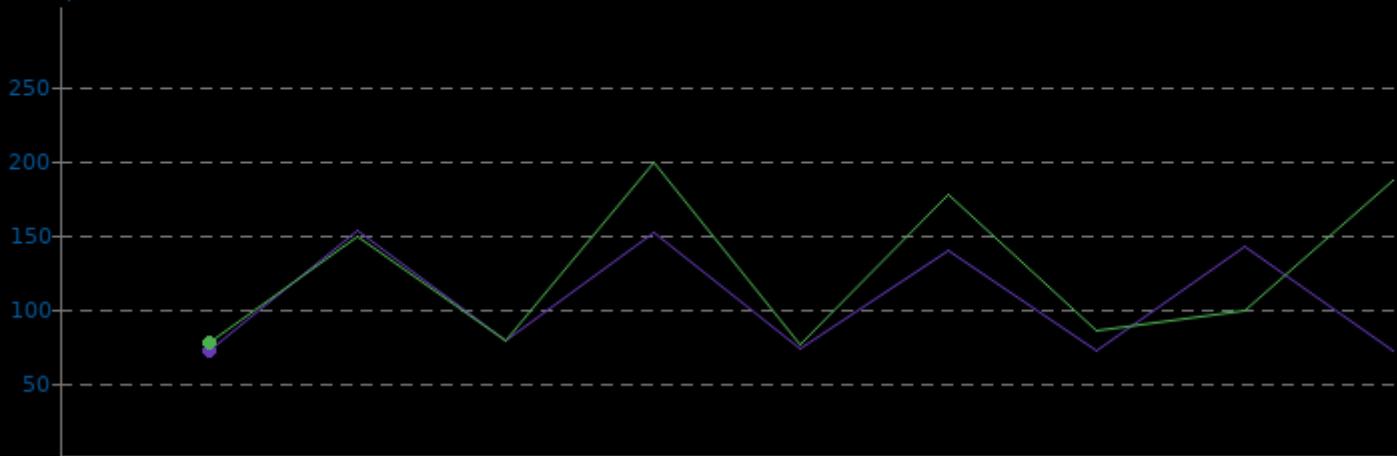


Darktable 2.6.0

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 5 3600X	72.1	106.1	152.3
AMD Ryzen 9 3900X	76.9	125.3	198.5

▼ Watts, Fewer Is Better

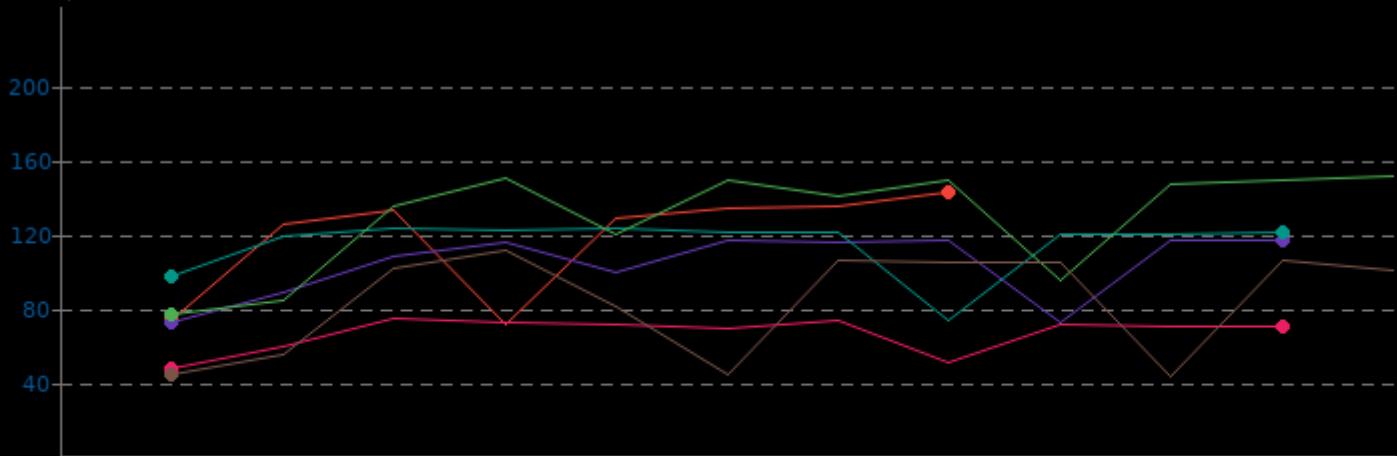


GIMP 2.10.8

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	72.0	118.0	142.5
AMD Ryzen 5 3600X	72.9	103.8	117.0
AMD Ryzen 7 3700X	74.1	114.8	123.3
AMD Ryzen 9 3900X	76.9	128.8	150.6
Intel Core i5 9400F	48.1	66.8	74.6
Intel Core i9 9900K	44.3	83.9	111.7

▼ Watts, Fewer Is Better

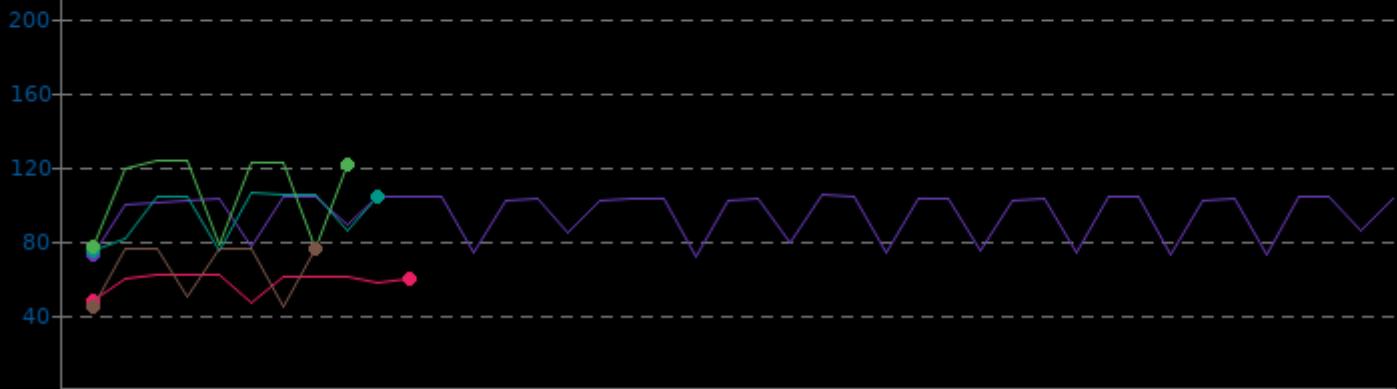


GIMP 2.10.8

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 5 3600X	71.8	94.9	104.8
AMD Ryzen 7 3700X	74.6	94.5	106.1
AMD Ryzen 9 3900X	76.0	106.9	123.4
Intel Core i5 9400F	47.5	58.5	61.8
Intel Core i9 9900K	45.0	65.1	76.4

▼ Watts, Fewer Is Better

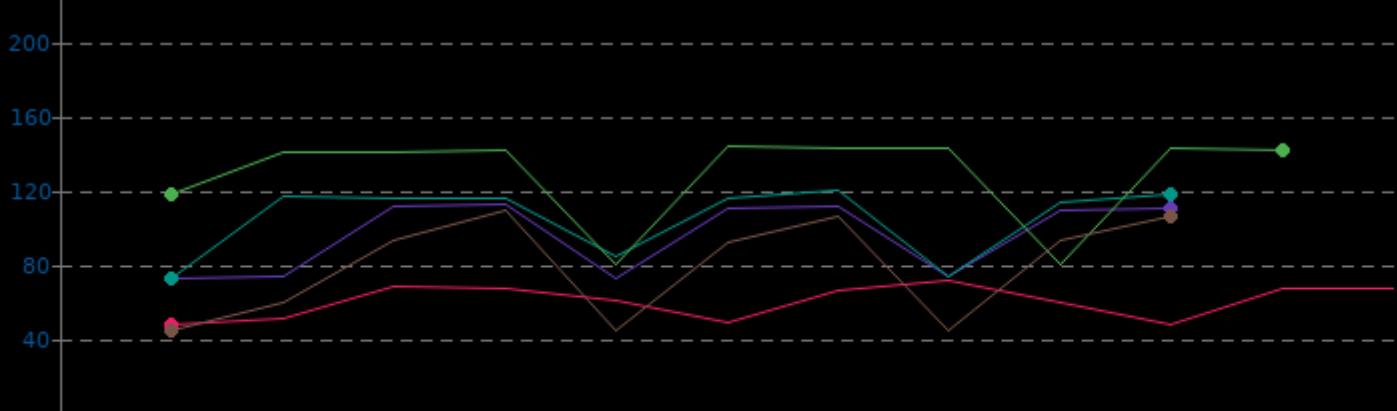


GIMP 2.10.8

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 5 3600X	73.2	96.0	112.5
AMD Ryzen 7 3700X	73.2	104.8	119.7
AMD Ryzen 9 3900X	80.4	128.4	143.1
Intel Core i5 9400F	48.1	60.4	71.7
Intel Core i9 9900K	44.5	79.4	109.2

▼ Watts, Fewer Is Better

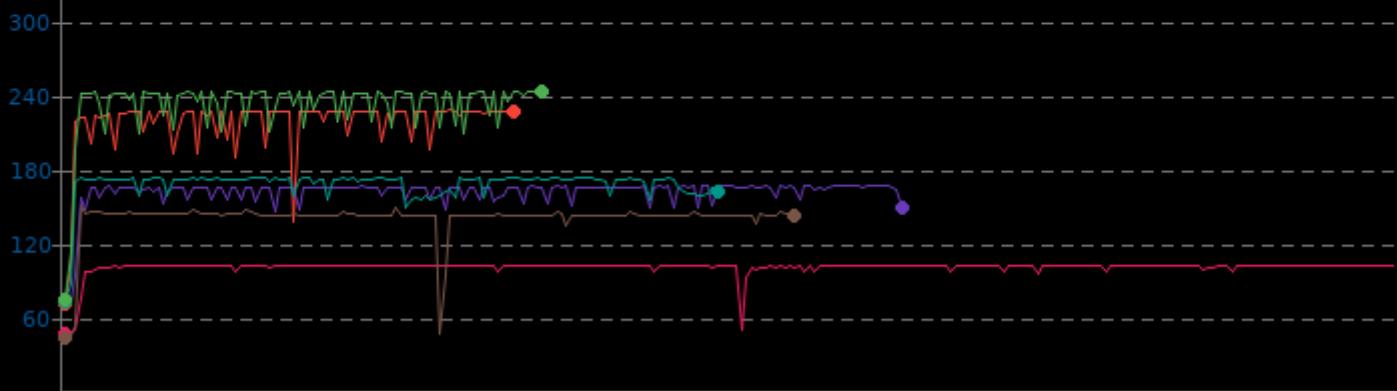


Appleseed 2.0 Beta

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	72.8	218.0	227.5
AMD Ryzen 5 3600X	73.3	162.2	167.3
AMD Ryzen 7 3700X	74.6	168.5	174.1
AMD Ryzen 9 3900X	75.6	232.2	242.7
Intel Core i5 9400F	48.1	101.5	103.6
Intel Core i9 9900K	45.5	140.9	151.2

▼ Watts, Fewer Is Better

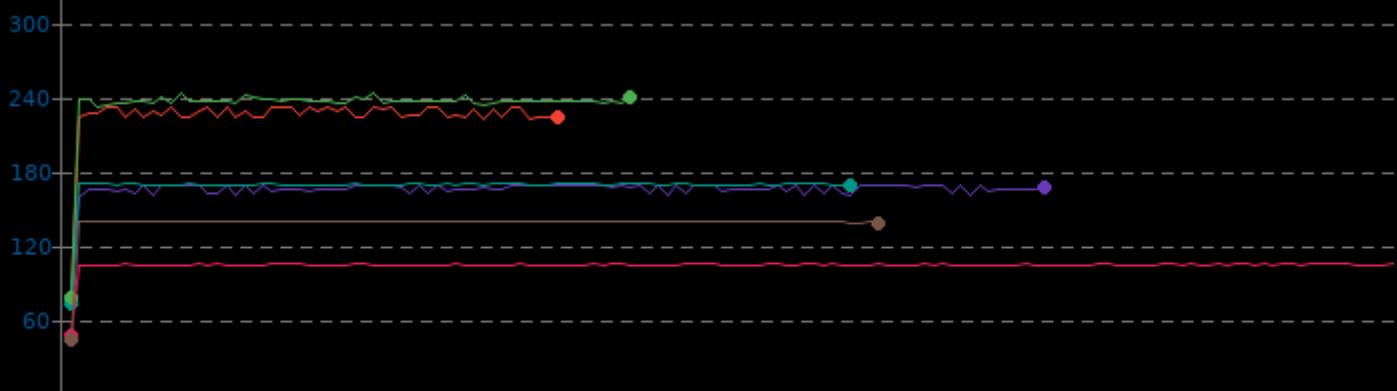


Appleseed 2.0 Beta

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	76.6	224.3	232.0
AMD Ryzen 5 3600X	74.2	165.4	169.1
AMD Ryzen 7 3700X	73.9	168.4	170.7
AMD Ryzen 9 3900X	78.3	234.0	241.9
Intel Core i5 9400F	48.4	104.8	105.6
Intel Core i9 9900K	45.6	138.4	140.3

▼ Watts, Fewer Is Better



Appleseed 2.0 Beta

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	75.4	224.5	231.2
AMD Ryzen 5 3600X	74.4	161.2	163.5
AMD Ryzen 7 3700X	74.5	169.0	171.0
AMD Ryzen 9 3900X	79.0	233.0	241.7
Intel Core i5 9400F	48.6	100.2	101.3
Intel Core i9 9900K	45.6	138.7	160.8

▼ Watts, Fewer Is Better

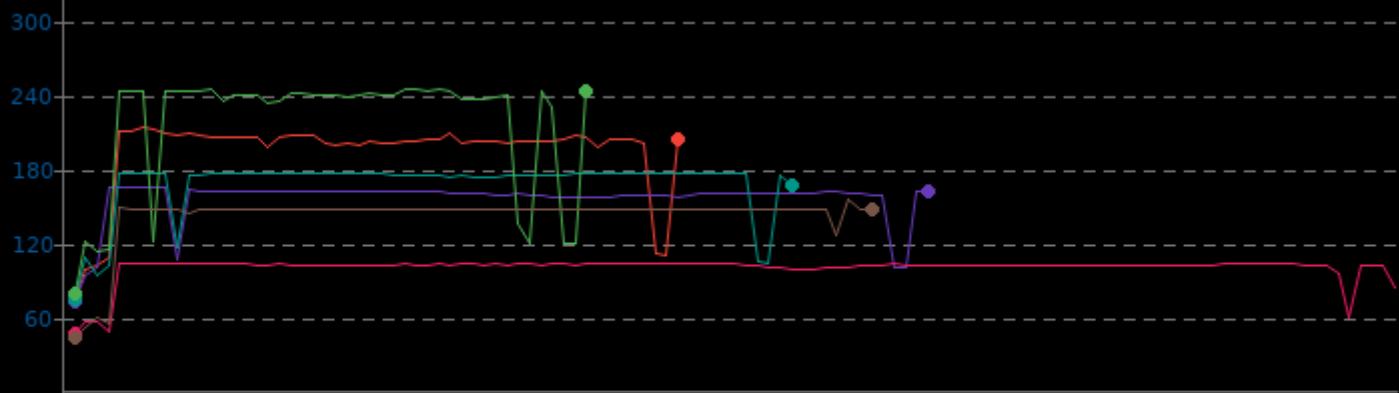


Timed LLVM Compilation 6.0.1

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	74.8	192.9	213.3
AMD Ryzen 5 3600X	74.1	156.2	165.8
AMD Ryzen 7 3700X	75.8	167.7	176.9
AMD Ryzen 9 3900X	79.9	215.9	244.1
Intel Core i5 9400F	48.7	101.1	104.7
Intel Core i9 9900K	45.4	142.3	156.3

▼ Watts, Fewer Is Better

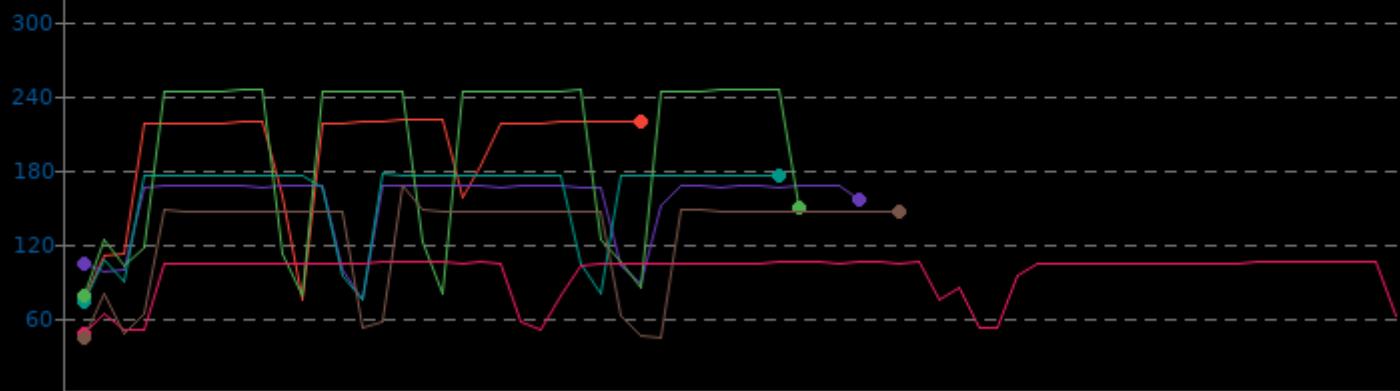


Timed Linux Kernel Compilation 4.18

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	76.0	195.5	219.8
AMD Ryzen 5 3600X	76.3	153.5	167.3
AMD Ryzen 7 3700X	74.7	158.6	176.4
AMD Ryzen 9 3900X	78.7	199.1	244.0
Intel Core i5 9400F	48.7	97.0	105.4
Intel Core i9 9900K	45.3	127.7	166.9

▼ Watts, Fewer Is Better

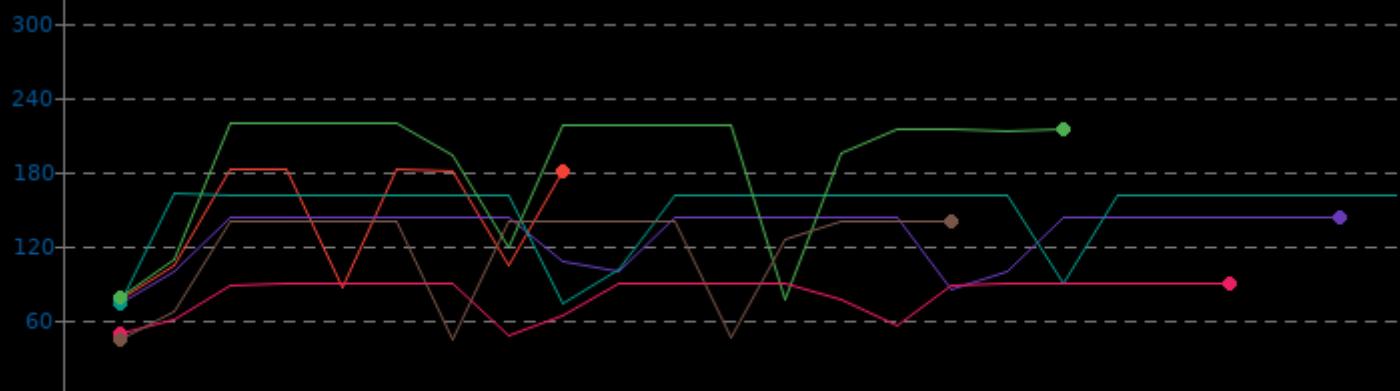


Coremark 1.0

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	76.6	141.9	182.1
AMD Ryzen 5 3600X	73.6	130.1	143.1
AMD Ryzen 7 3700X	74.2	148.1	162.2
AMD Ryzen 9 3900X	76.8	186.8	218.6
Intel Core i5 9400F	49.0	80.9	89.7
Intel Core i9 9900K	45.2	116.6	140.3

▼ Watts, Fewer Is Better

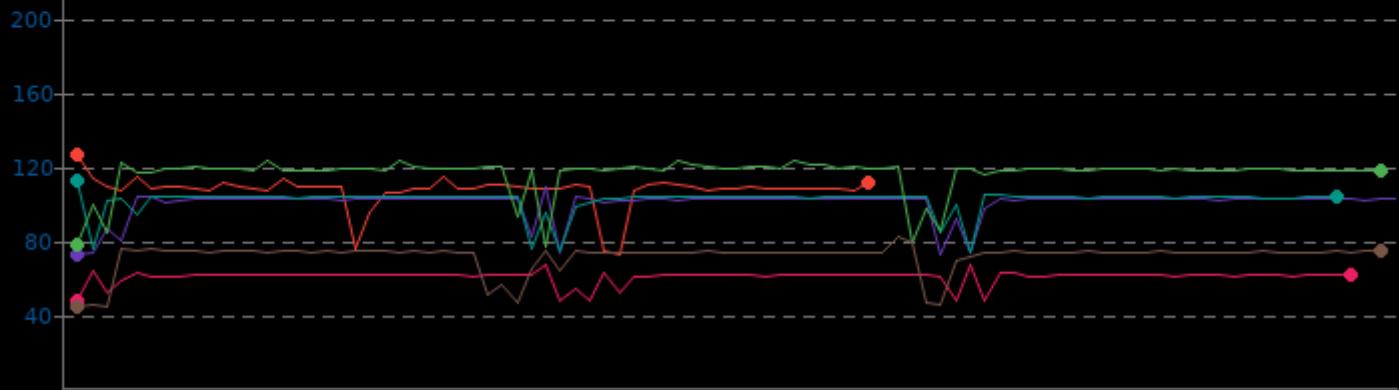


Selenium

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	72.7	107.4	126.7
AMD Ryzen 5 3600X	72.8	100.3	109.7
AMD Ryzen 7 3700X	73.8	101.9	112.5
AMD Ryzen 9 3900X	77.6	116.1	123.6
Intel Core i5 9400F	48.2	61.0	67.9
Intel Core i9 9900K	44.9	71.9	82.3

▼ Watts, Fewer Is Better

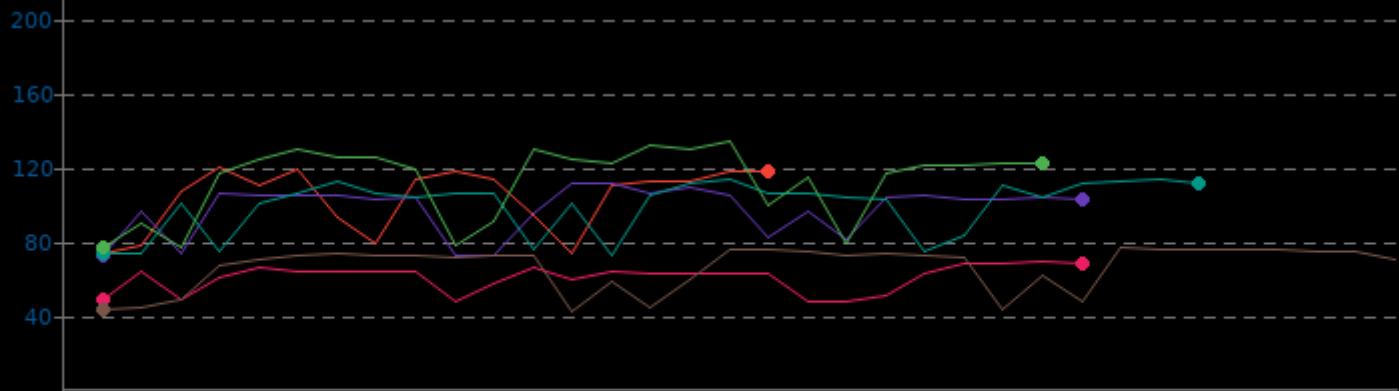


Selenium

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	73.5	103.5	119.8
AMD Ryzen 5 3600X	73.0	97.5	111.3
AMD Ryzen 7 3700X	72.6	99.5	113.3
AMD Ryzen 9 3900X	77.1	112.9	134.0
Intel Core i5 9400F	48.0	61.0	69.3
Intel Core i9 9900K	43.1	66.7	77.4

▼ Watts, Fewer Is Better

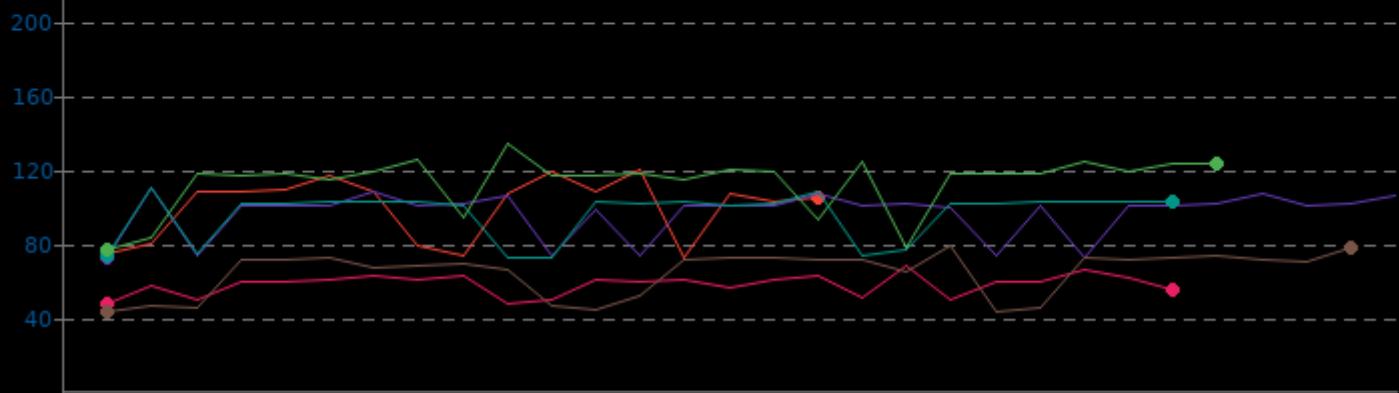


Selenium

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	73.2	100.0	120.4
AMD Ryzen 5 3600X	72.5	96.7	110.7
AMD Ryzen 7 3700X	73.0	96.1	110.5
AMD Ryzen 9 3900X	77.1	113.3	134.2
Intel Core i5 9400F	48.2	58.5	68.9
Intel Core i9 9900K	43.7	64.9	79.8

▼ Watts, Fewer Is Better

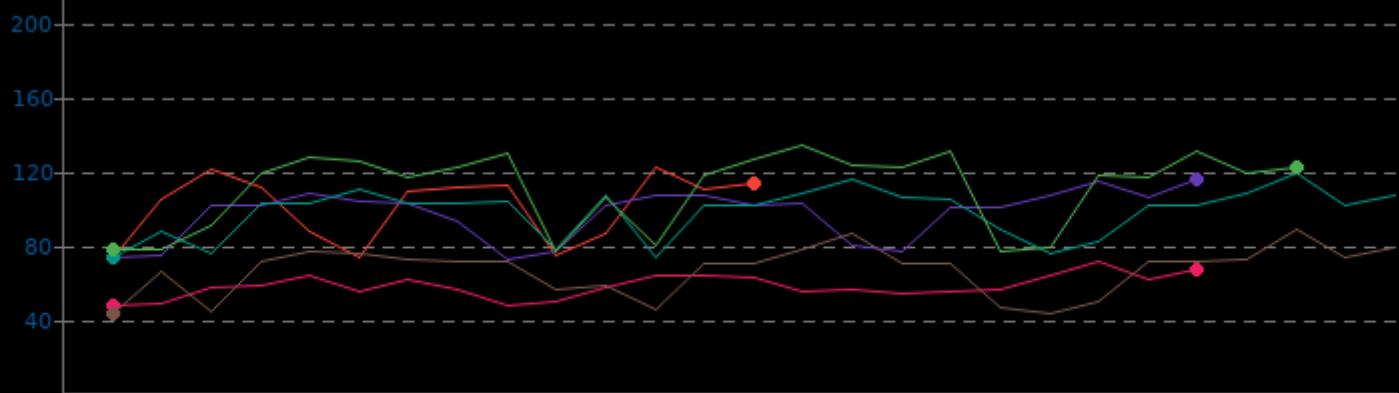


Selenium

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	73.4	101.1	121.8
AMD Ryzen 5 3600X	72.8	97.1	115.7
AMD Ryzen 7 3700X	73.7	98.1	118.4
AMD Ryzen 9 3900X	76.9	110.7	133.4
Intel Core i5 9400F	48.2	58.5	71.3
Intel Core i9 9900K	44.0	66.9	88.4

▼ Watts, Fewer Is Better

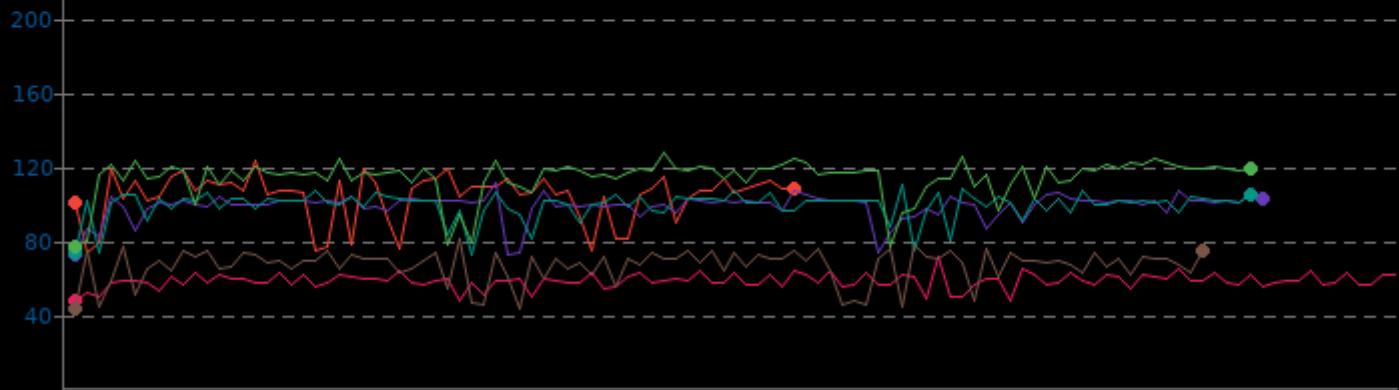


Selenium

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	73.5	103.9	122.8
AMD Ryzen 5 3600X	73.0	98.7	111.3
AMD Ryzen 7 3700X	72.5	99.4	110.3
AMD Ryzen 9 3900X	77.3	114.0	127.9
Intel Core i5 9400F	48.3	58.8	71.3
Intel Core i9 9900K	44.0	66.9	81.7

▼ Watts, Fewer Is Better

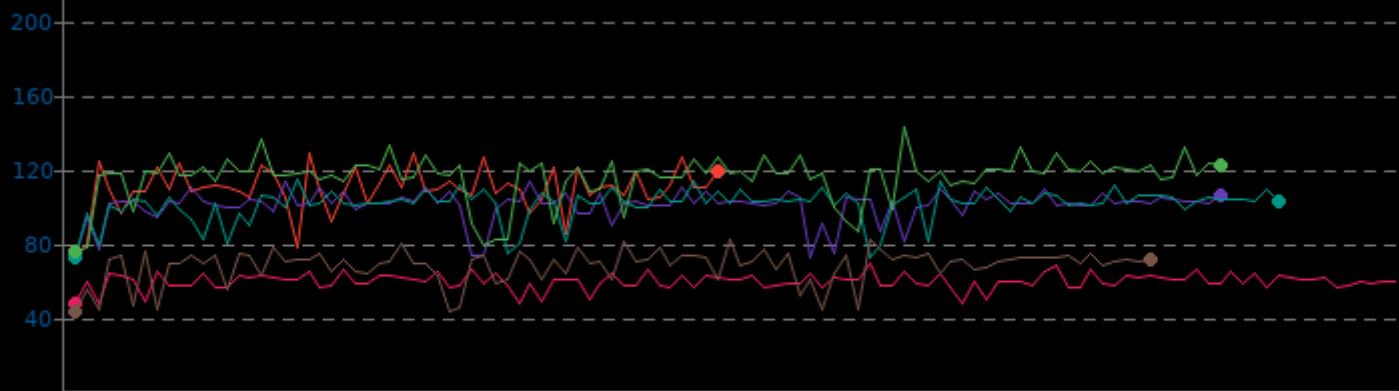


Selenium

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	72.7	109.6	129.1
AMD Ryzen 5 3600X	73.2	100.7	113.5
AMD Ryzen 7 3700X	72.5	101.2	114.8
AMD Ryzen 9 3900X	76.1	115.7	142.1
Intel Core i5 9400F	48.0	60.1	70.1
Intel Core i9 9900K	43.9	68.3	82.9

▼ Watts, Fewer Is Better

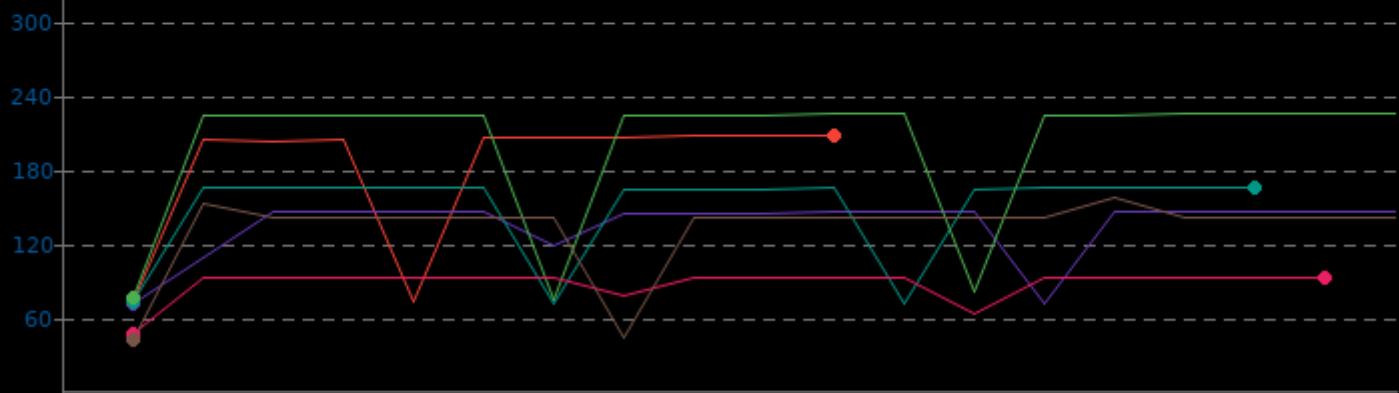


John The Ripper 1.9.0-jumbo-1

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	74.2	181.6	207.4
AMD Ryzen 5 3600X	72.6	134.7	146.1
AMD Ryzen 7 3700X	72.2	148.7	165.2
AMD Ryzen 9 3900X	76.0	200.7	224.5
Intel Core i5 9400F	48.7	88.3	93.4
Intel Core i9 9900K	44.1	132.7	156.7

▼ Watts, Fewer Is Better



GROMACS 2018.3

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	74.2	200.0	212.3
AMD Ryzen 5 3600X	74.4	150.0	154.7
AMD Ryzen 7 3700X	73.9	154.9	159.8
AMD Ryzen 9 3900X	75.8	198.8	211.7
Intel Core i5 9400F	48.6	108.1	111.3
Intel Core i9 9900K	45.1	143.9	151.2

▼ Watts, Fewer Is Better

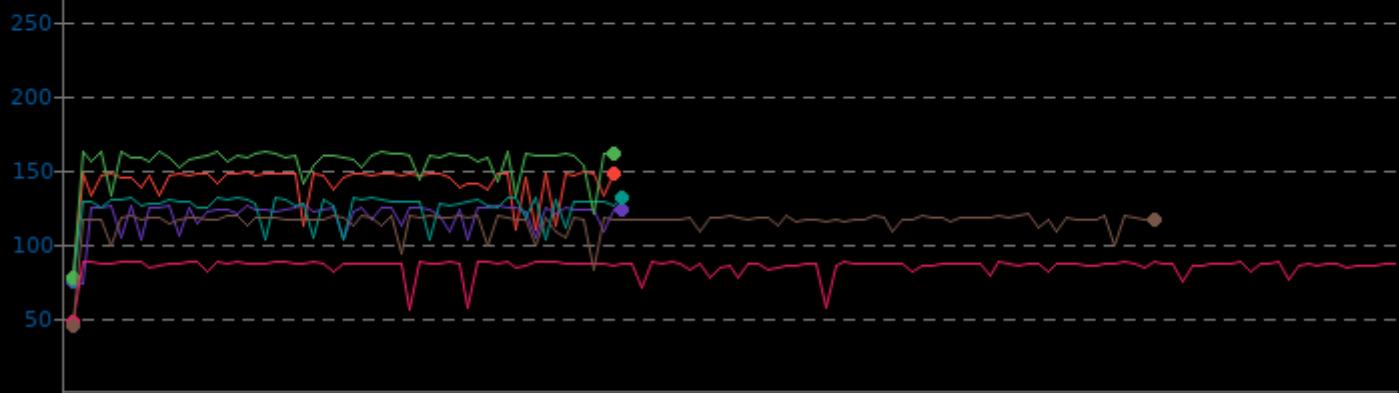


CP2K Molecular Dynamics 6.1

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	75.7	141.3	148.3
AMD Ryzen 5 3600X	74.2	119.0	126.8
AMD Ryzen 7 3700X	75.9	125.0	131.6
AMD Ryzen 9 3900X	78.1	155.0	162.6
Intel Core i5 9400F	48.6	85.4	88.9
Intel Core i9 9900K	45.2	115.0	120.4

▼ Watts, Fewer Is Better



SVT-HEVC 2019-02-03

System Power Consumption Monitor

Processor	Min	Avg	Max
AMD Ryzen 9 3900X	74.4	115.7	233.8

▼ Watts, Fewer Is Better



VP9 libvpx Encoding 1.8.0

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	110.1	168.4	200.9
AMD Ryzen 5 3600X	71.4	134.5	158.7
AMD Ryzen 7 3700X	72.0	135.4	158.5
AMD Ryzen 9 3900X	74.1	170.5	204.2
Intel Core i5 9400F	48.3	87.8	103.4
Intel Core i9 9900K	44.9	122.6	164.8

▼ Watts, Fewer Is Better

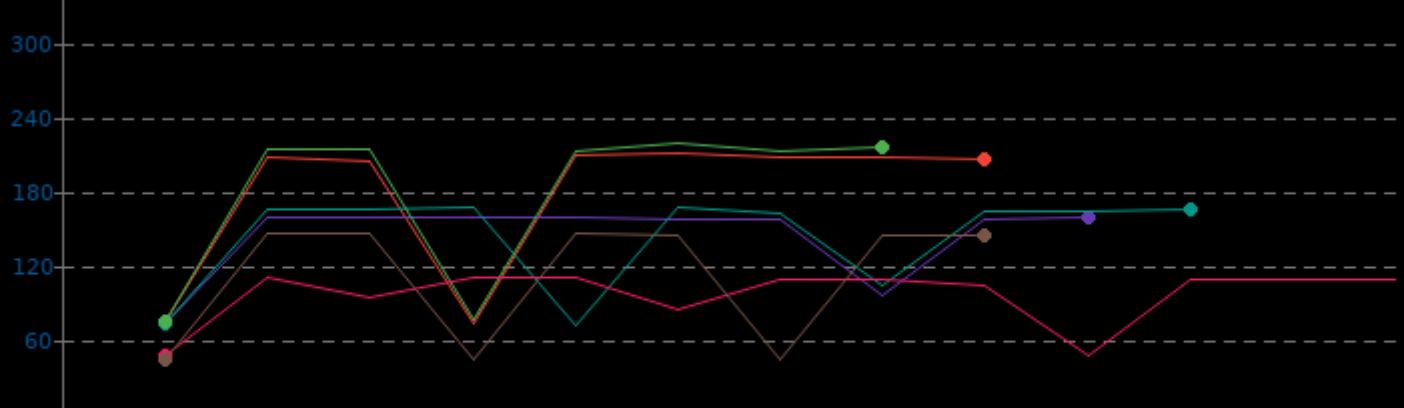


X265 3.0

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	74.2	178.1	211.3
AMD Ryzen 5 3600X	73.2	143.8	159.7
AMD Ryzen 7 3700X	72.5	143.1	167.6
AMD Ryzen 9 3900X	75.7	179.5	217.8
Intel Core i5 9400F	48.4	97.1	111.4
Intel Core i9 9900K	45.5	112.2	146.1

▼ Watts, Fewer Is Better

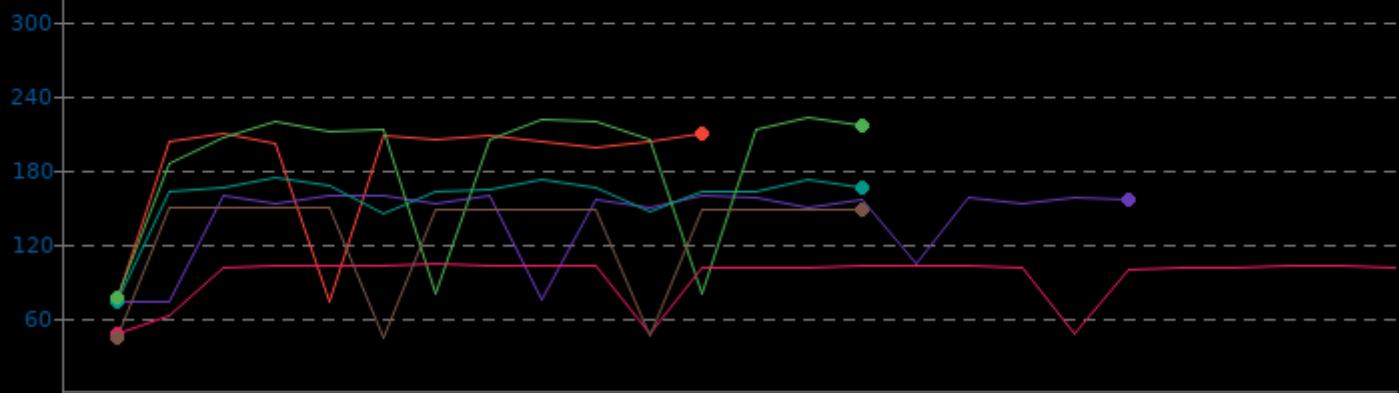


dav1d 0.3

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	73.5	182.8	209.7
AMD Ryzen 5 3600X	73.6	141.0	159.5
AMD Ryzen 7 3700X	74.0	157.4	173.7
AMD Ryzen 9 3900X	76.4	184.4	222.2
Intel Core i5 9400F	48.2	94.1	104.0
Intel Core i9 9900K	45.0	127.8	149.8

▼ Watts, Fewer Is Better

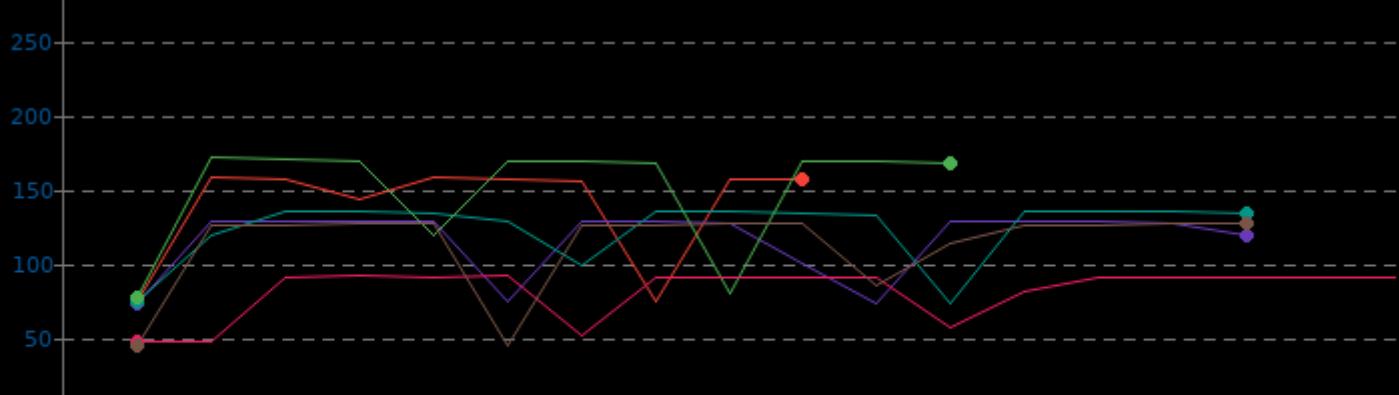


Zstd Compression 1.3.4

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	74.8	139.2	157.6
AMD Ryzen 5 3600X	73.9	115.9	128.9
AMD Ryzen 7 3700X	74.0	123.5	135.8
AMD Ryzen 9 3900X	77.2	149.7	171.3
Intel Core i5 9400F	48.5	82.3	91.8
Intel Core i9 9900K	45.1	113.1	127.6

▼ Watts, Fewer Is Better

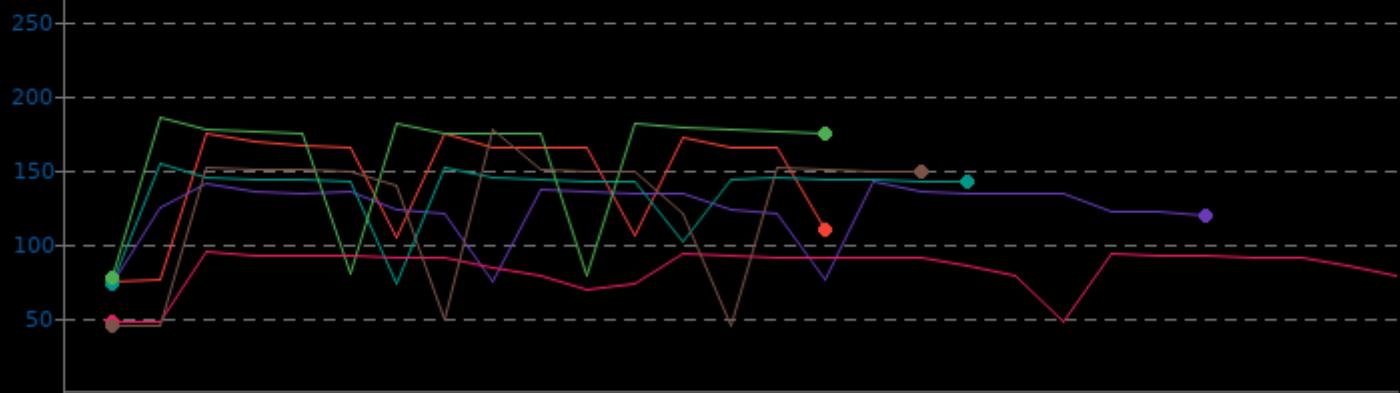


XZ Compression 5.2.4

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	75.1	144.6	174.5
AMD Ryzen 5 3600X	73.8	123.5	142.3
AMD Ryzen 7 3700X	73.3	134.8	153.6
AMD Ryzen 9 3900X	77.5	158.4	184.4
Intel Core i5 9400F	48.3	83.8	94.9
Intel Core i9 9900K	45.0	126.0	176.4

▼ Watts, Fewer Is Better

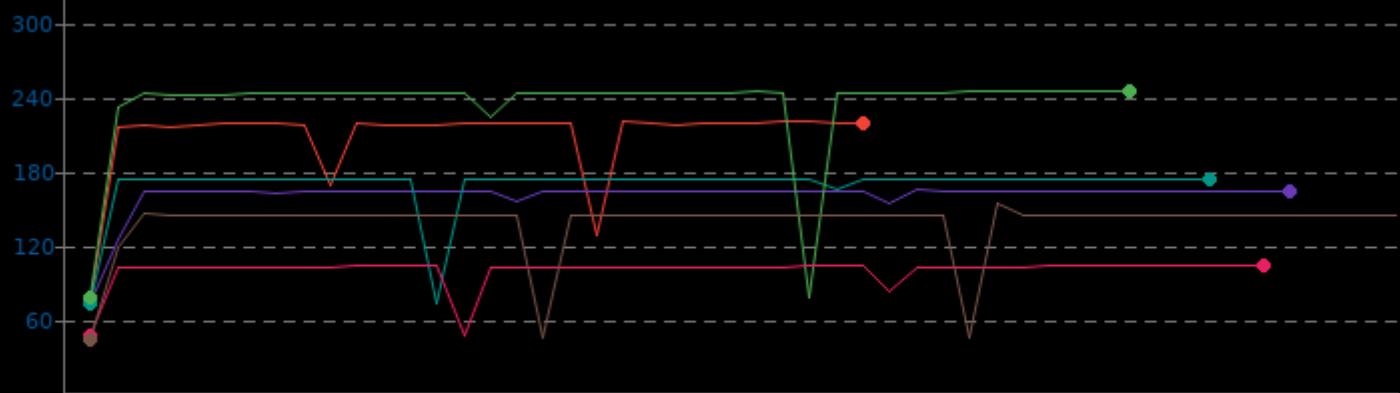


Stockfish 9

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	75.2	208.8	220.0
AMD Ryzen 5 3600X	74.1	160.6	164.8
AMD Ryzen 7 3700X	73.5	169.1	174.2
AMD Ryzen 9 3900X	78.2	233.9	243.7
Intel Core i5 9400F	48.8	100.8	104.6
Intel Core i9 9900K	45.2	138.6	153.5

▼ Watts, Fewer Is Better



asmFish 2018-07-23

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	75.8	206.5	213.1
AMD Ryzen 5 3600X	72.4	155.0	159.0
AMD Ryzen 7 3700X	74.3	170.7	174.8
AMD Ryzen 9 3900X	78.7	236.1	243.6
Intel Core i5 9400F	48.4	100.5	102.6
Intel Core i9 9900K	46.0	141.4	145.7

▼ Watts, Fewer Is Better

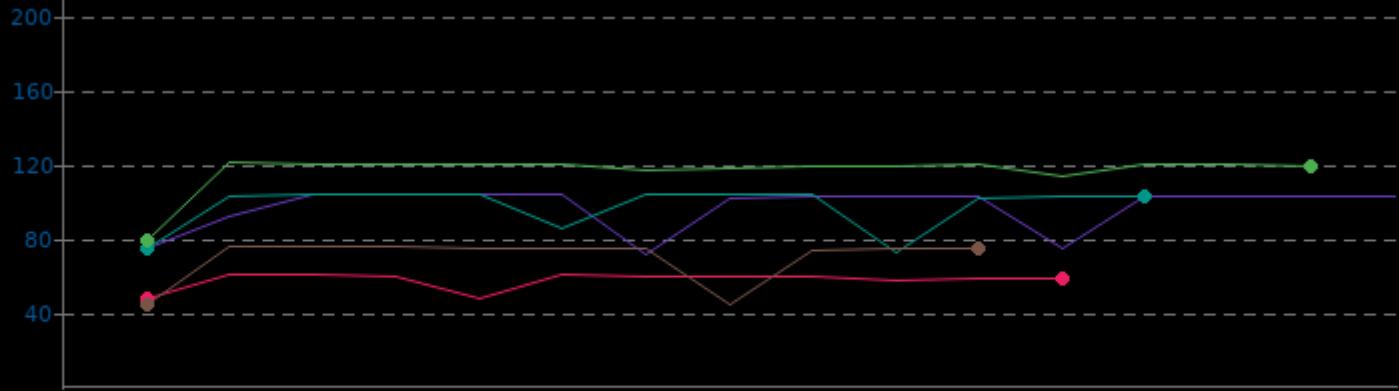


PyBench 2018-02-16

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 5 3600X	71.7	96.9	104.1
AMD Ryzen 7 3700X	72.7	97.2	103.5
AMD Ryzen 9 3900X	79.2	116.4	120.8
Intel Core i5 9400F	48.2	58.0	61.3
Intel Core i9 9900K	44.5	69.7	76.2

▼ Watts, Fewer Is Better



NAMD 2.13b1

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	74.6	221.6	232.8
AMD Ryzen 5 3600X	73.3	158.7	163.8
AMD Ryzen 7 3700X	72.5	168.7	173.7
AMD Ryzen 9 3900X	76.4	227.8	242.1
Intel Core i5 9400F	48.2	107.6	110.2
Intel Core i9 9900K	44.6	140.9	165.6

▼ Watts, Fewer Is Better

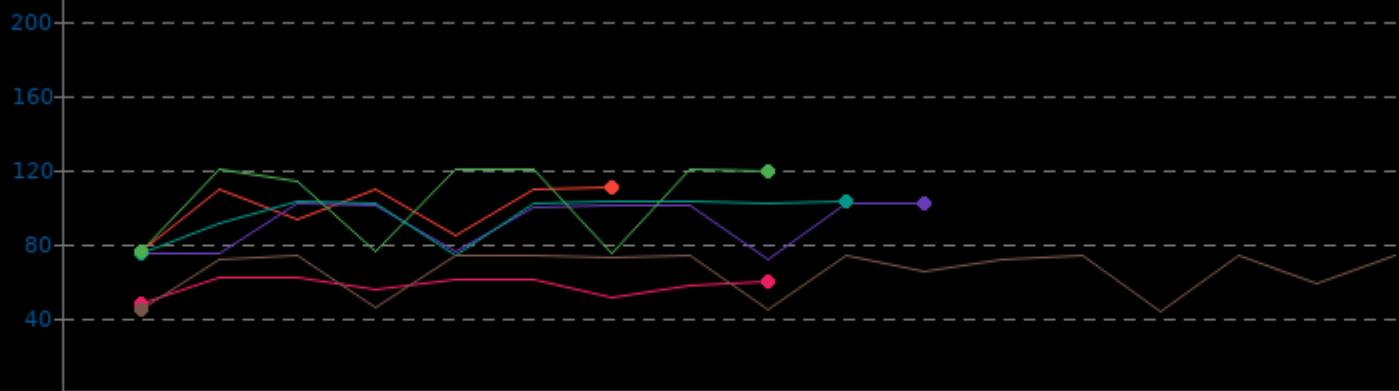


Go Benchmarks

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	75.8	99.0	110.1
AMD Ryzen 5 3600X	71.6	91.4	101.8
AMD Ryzen 7 3700X	73.7	95.8	103.2
AMD Ryzen 9 3900X	75.0	104.4	120.2
Intel Core i5 9400F	48.5	57.9	62.0
Intel Core i9 9900K	44.4	65.5	74.4

▼ Watts, Fewer Is Better

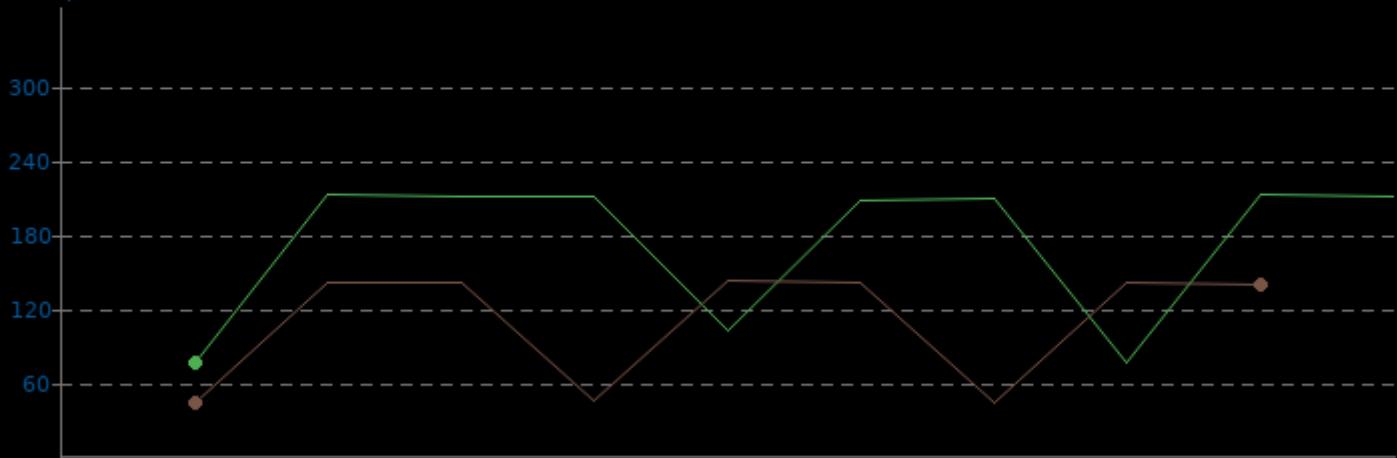


Go Benchmarks

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 9 3900X	77.5	173.2	212.8
Intel Core i9 9900K	44.5	109.4	143.8

▼ Watts, Fewer Is Better

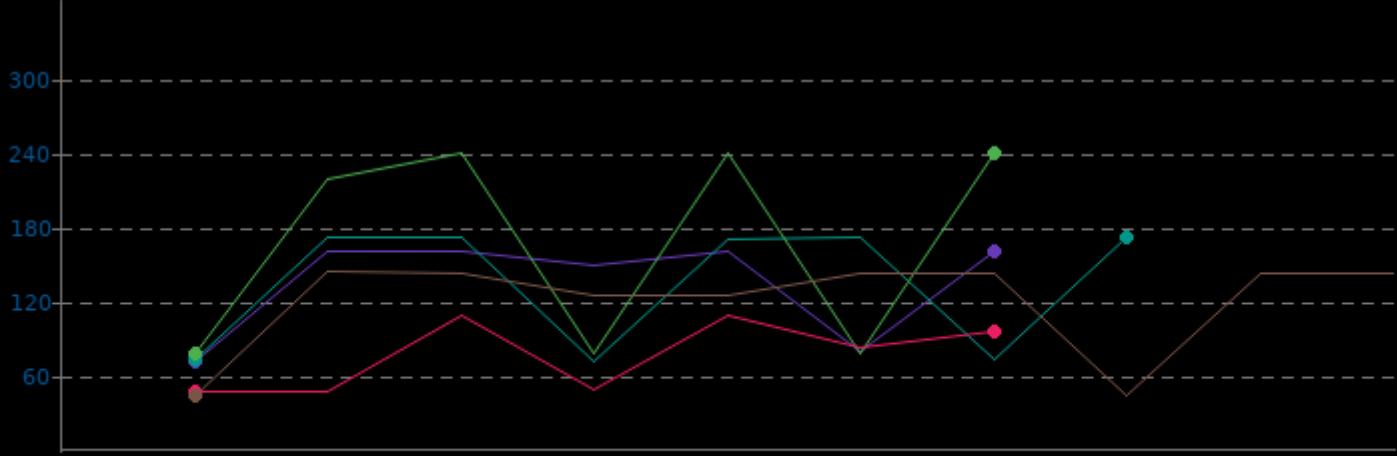


Go Benchmarks

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 5 3600X	72.6	134.9	161.0
AMD Ryzen 7 3700X	72.1	134.5	172.0
AMD Ryzen 9 3900X	78.2	167.4	239.3
Intel Core i5 9400F	48.6	77.8	109.2
Intel Core i9 9900K	45.5	120.1	144.3

▼ Watts, Fewer Is Better

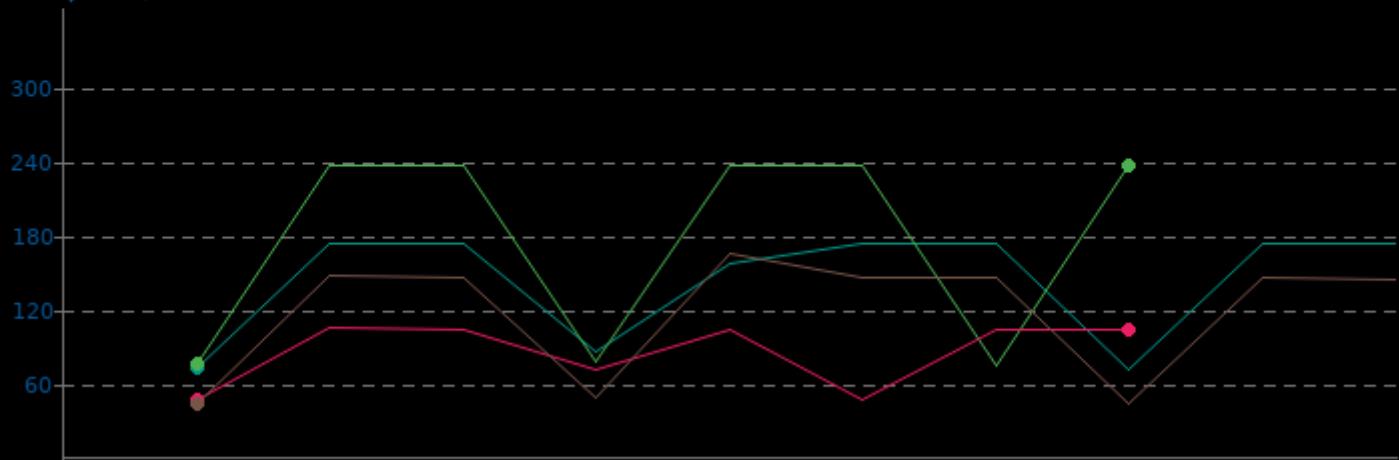


Go Benchmarks

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 3700X	72.5	143.1	173.6
AMD Ryzen 9 3900X	76.2	176.8	237.0
Intel Core i5 9400F	48.3	86.8	105.3
Intel Core i9 9900K	45.1	118.1	166.2

▼ Watts, Fewer Is Better

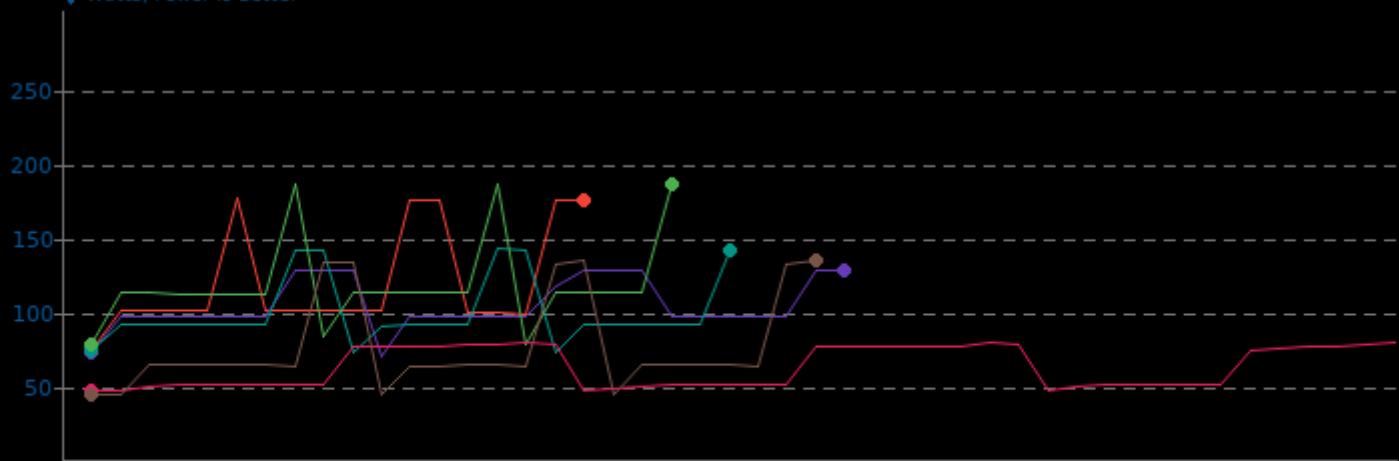


Rust Mandelbrot

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	74.5	120.6	176.2
AMD Ryzen 5 3600X	71.4	105.5	128.9
AMD Ryzen 7 3700X	73.0	100.9	143.1
AMD Ryzen 9 3900X	78.5	119.4	186.5
Intel Core i5 9400F	47.8	64.2	80.1
Intel Core i9 9900K	44.9	77.9	134.8

▼ Watts, Fewer Is Better

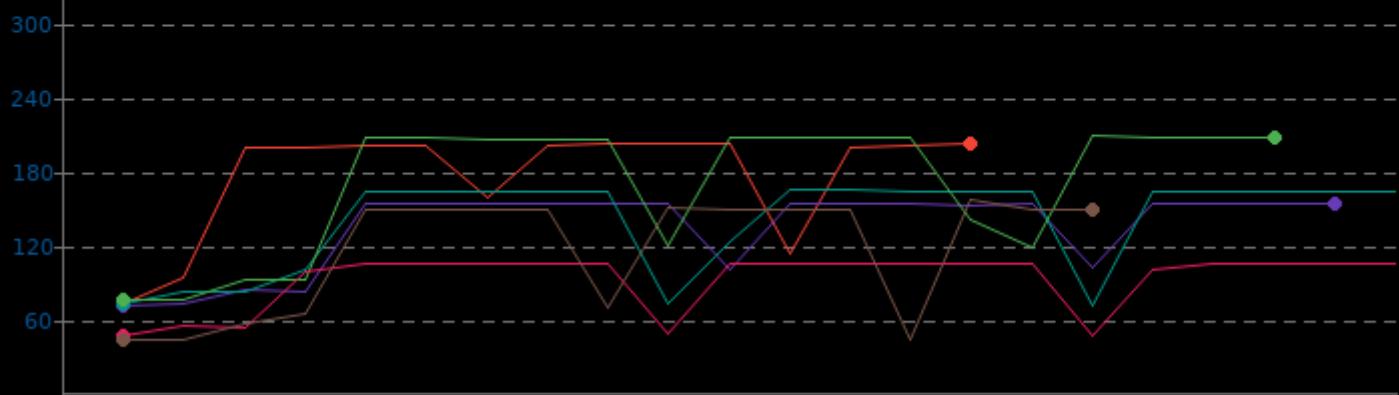


Tensorflow 2017-02-03

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	73.9	177.0	202.6
AMD Ryzen 5 3600X	72.9	134.7	154.7
AMD Ryzen 7 3700X	73.1	139.7	165.3
AMD Ryzen 9 3900X	77.6	170.7	208.4
Intel Core i5 9400F	48.2	93.0	106.4
Intel Core i9 9900K	44.9	116.3	157.1

▼ Watts, Fewer Is Better

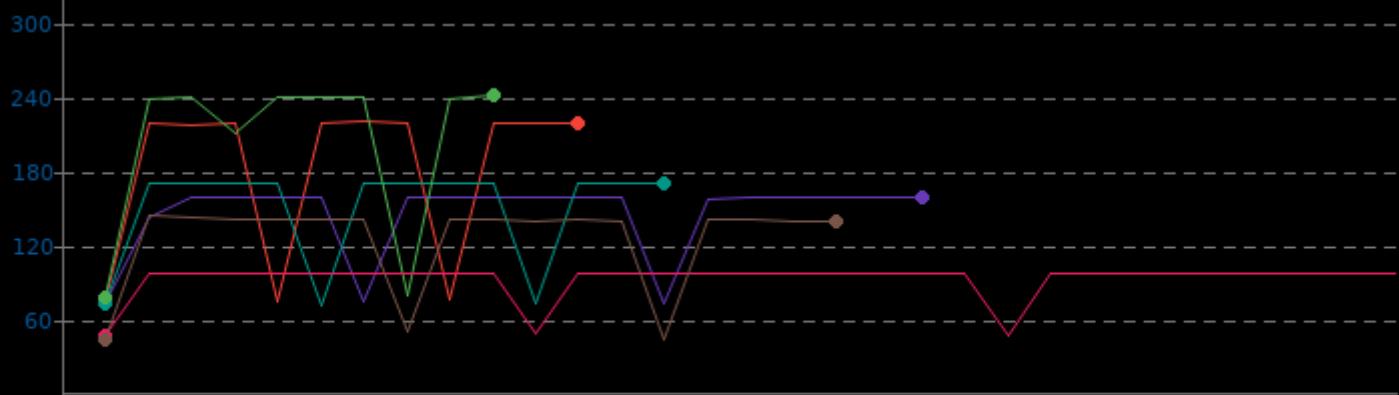


Tungsten Renderer 0.2.2

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	75.2	182.9	219.6
AMD Ryzen 5 3600X	73.8	145.6	159.6
AMD Ryzen 7 3700X	71.6	149.8	171.1
AMD Ryzen 9 3900X	78.1	204.4	240.9
Intel Core i5 9400F	48.4	93.4	98.5
Intel Core i9 9900K	45.2	125.7	145.4

▼ Watts, Fewer Is Better

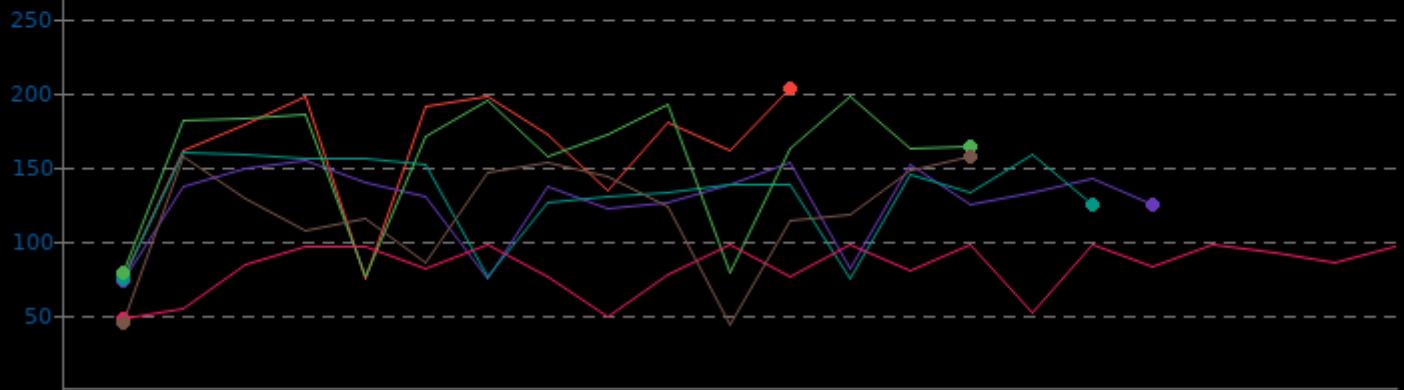


Tungsten Renderer 0.2.2

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	74.6	160.1	202.8
AMD Ryzen 5 3600X	73.8	127.1	153.9
AMD Ryzen 7 3700X	74.7	131.1	159.6
AMD Ryzen 9 3900X	76.2	156.5	196.7
Intel Core i5 9400F	48.4	82.6	97.9
Intel Core i9 9900K	44.7	119.2	157.3

▼ Watts, Fewer Is Better

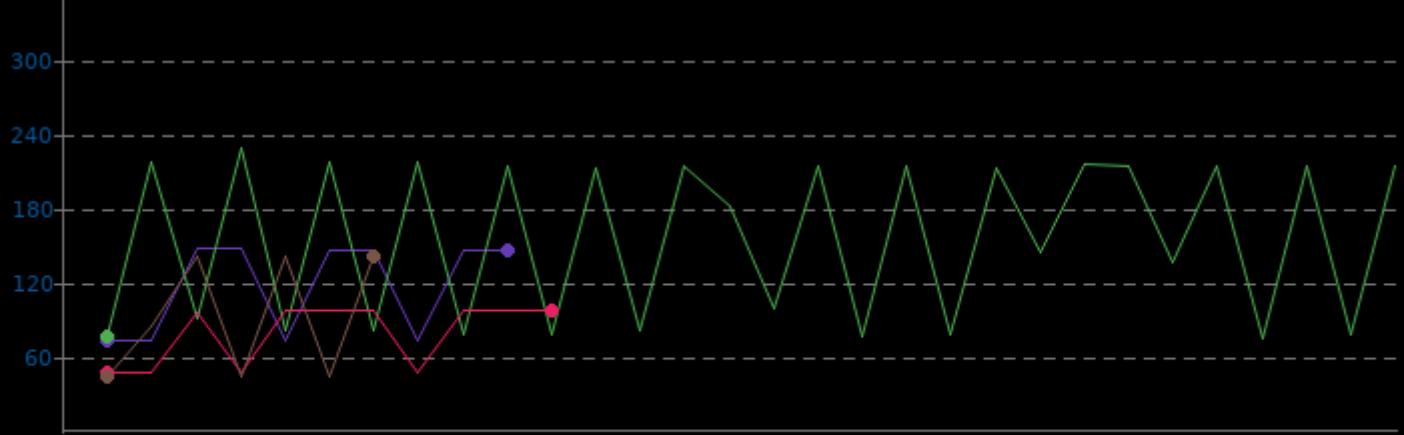


Tungsten Renderer 0.2.2

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 5 3600X	73.5	117.8	148.2
AMD Ryzen 9 3900X	76.3	155.7	228.1
Intel Core i5 9400F	48.4	80.0	98.4
Intel Core i9 9900K	44.9	91.9	141.5

▼ Watts, Fewer Is Better

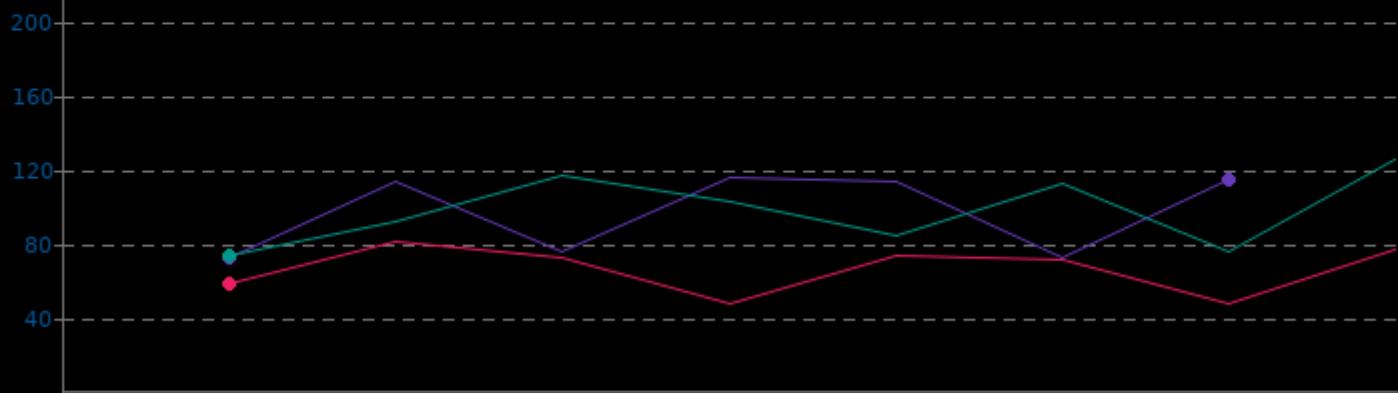


GIMP 2.10.8

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 5 3600X	72.4	97.0	115.8
AMD Ryzen 7 3700X	73.8	98.0	124.9
Intel Core i5 9400F	48.2	66.6	81.0

▼ Watts, Fewer Is Better

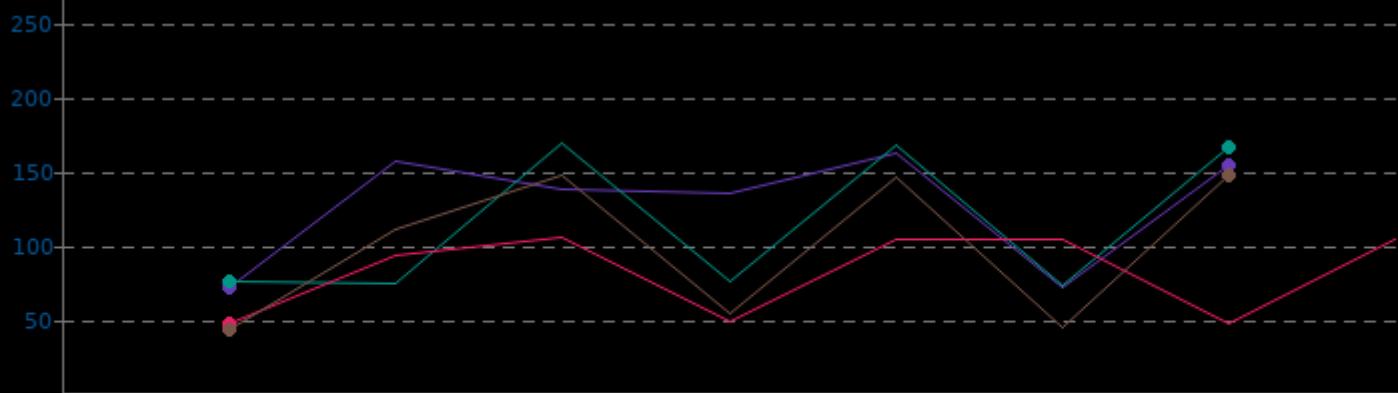


SVT-AV1 0.5

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 5 3600X	72.6	127.3	162.4
AMD Ryzen 7 3700X	73.6	114.7	169.3
Intel Core i5 9400F	48.3	82.4	105.9
Intel Core i9 9900K	44.7	99.5	147.5

▼ Watts, Fewer Is Better

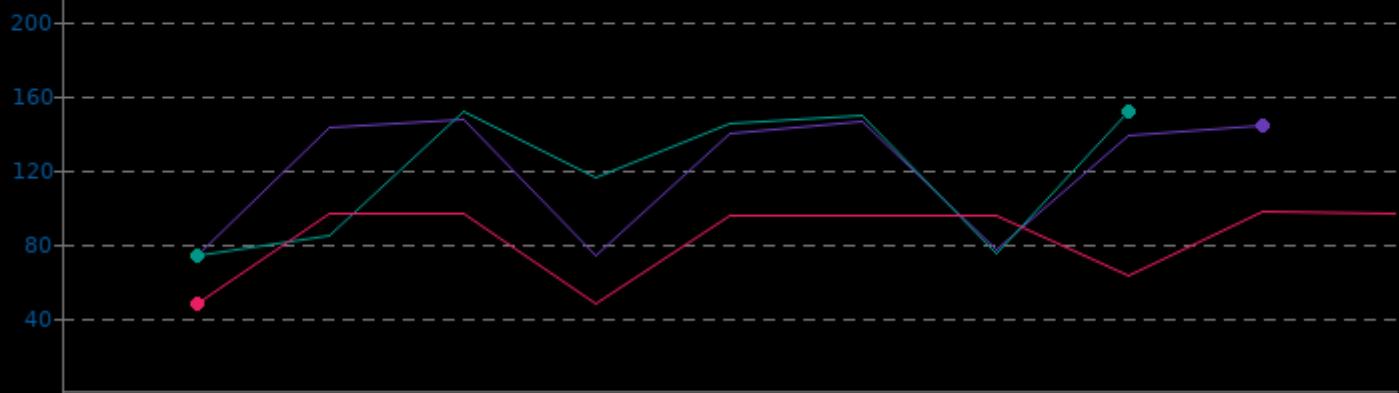


dav1d 0.3

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 5 3600X	73.9	120.1	146.8
AMD Ryzen 7 3700X	74.1	118.2	151.2
Intel Core i5 9400F	48.4	83.4	97.3

▼ Watts, Fewer Is Better

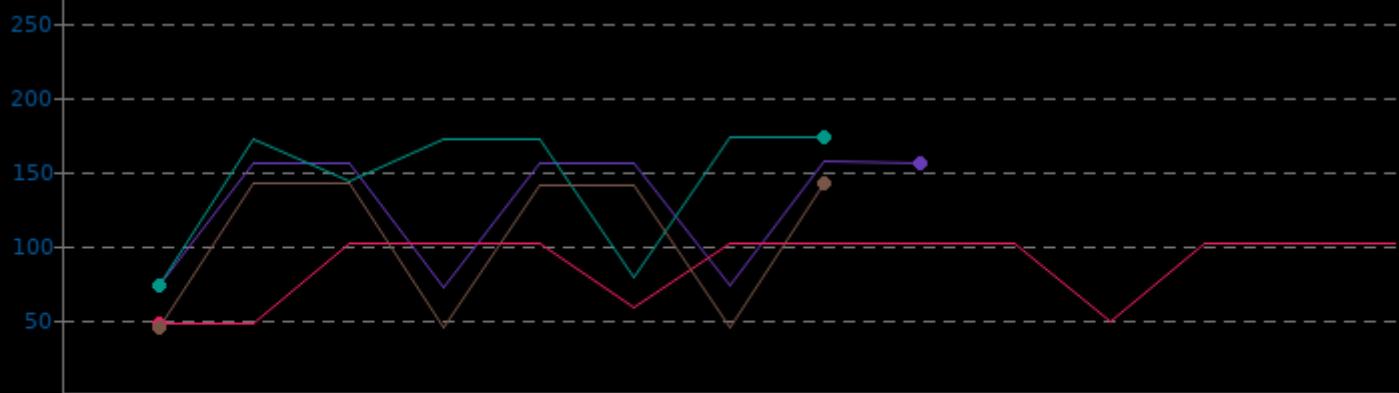


Tungsten Renderer 0.2.2

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 5 3600X	72.1	128.1	156.2
AMD Ryzen 7 3700X	73.5	144.4	172.3
Intel Core i5 9400F	48.3	87.4	102.1
Intel Core i9 9900K	45.0	105.4	141.9

▼ Watts, Fewer Is Better

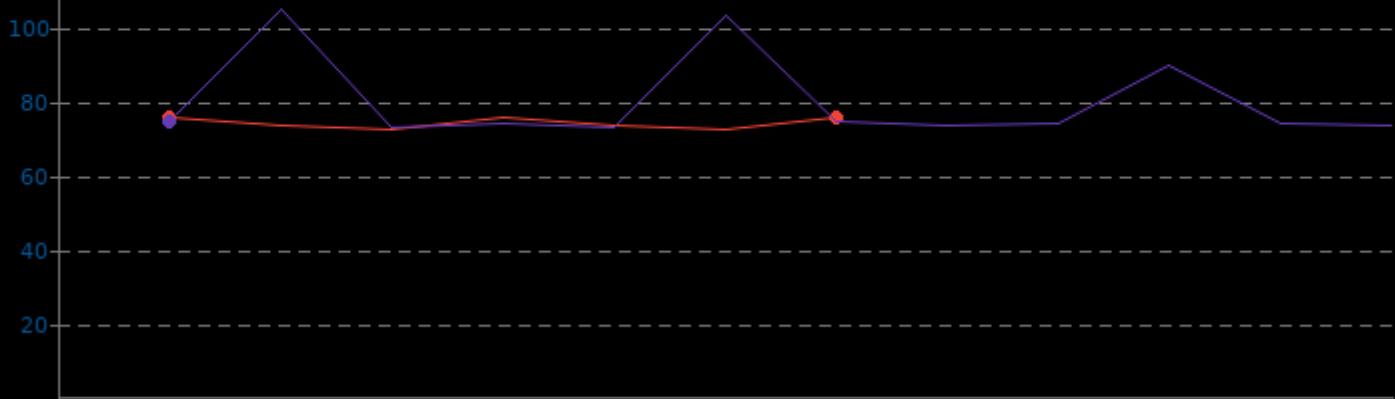


Darktable 2.6.0

System Power Consumption Monitor

	Min	Avg	Max
AMD Ryzen 7 2700X	72.5	74.1	75.8
AMD Ryzen 5 3600X	72.7	79.9	104.4

▼ Watts, Fewer Is Better

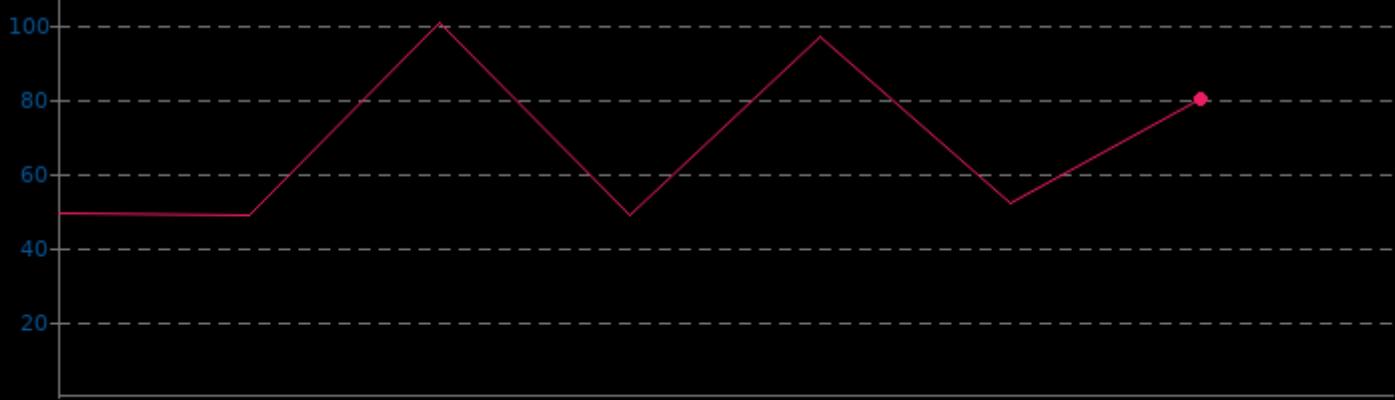


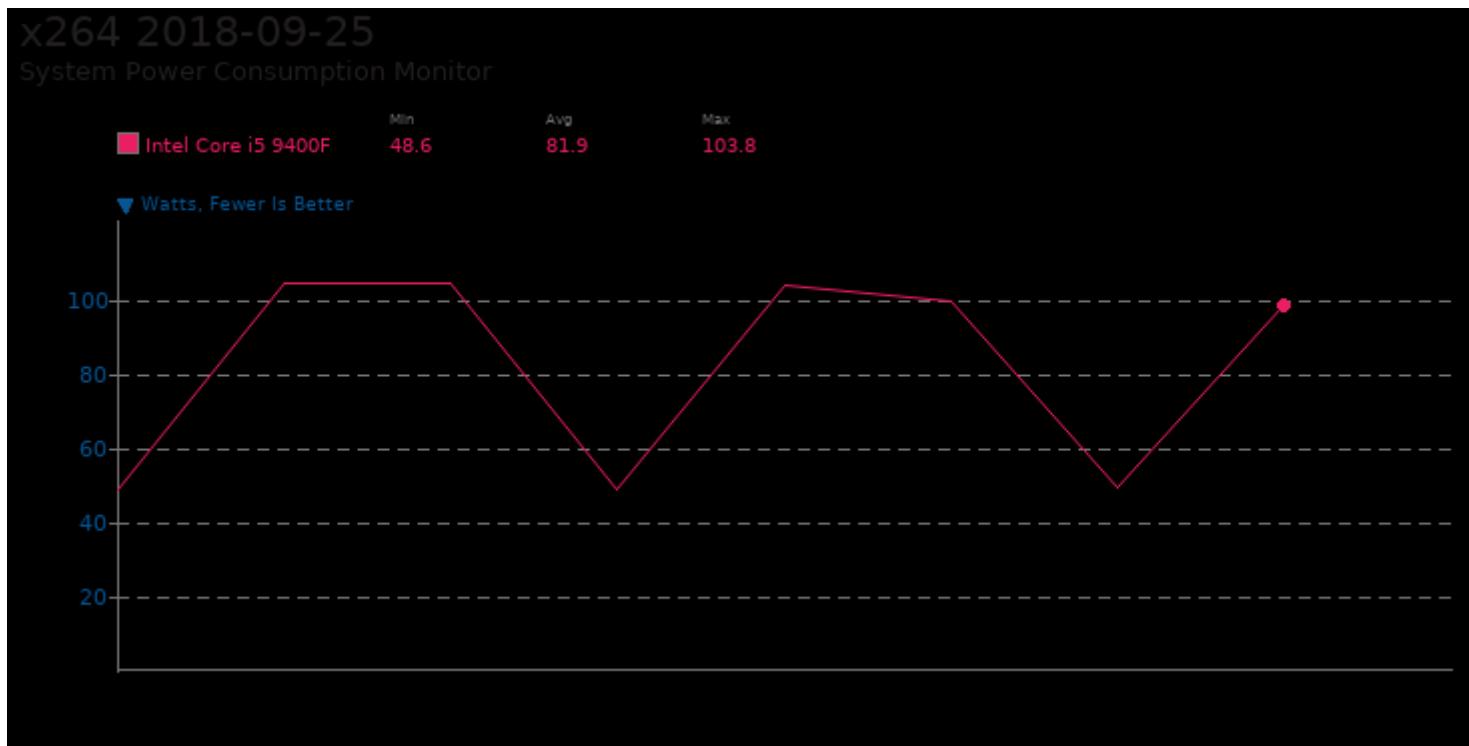
Darktable 2.6.0

System Power Consumption Monitor

	Min	Avg	Max
Intel Core i5 9400F	48.6	67.9	100.1

▼ Watts, Fewer Is Better



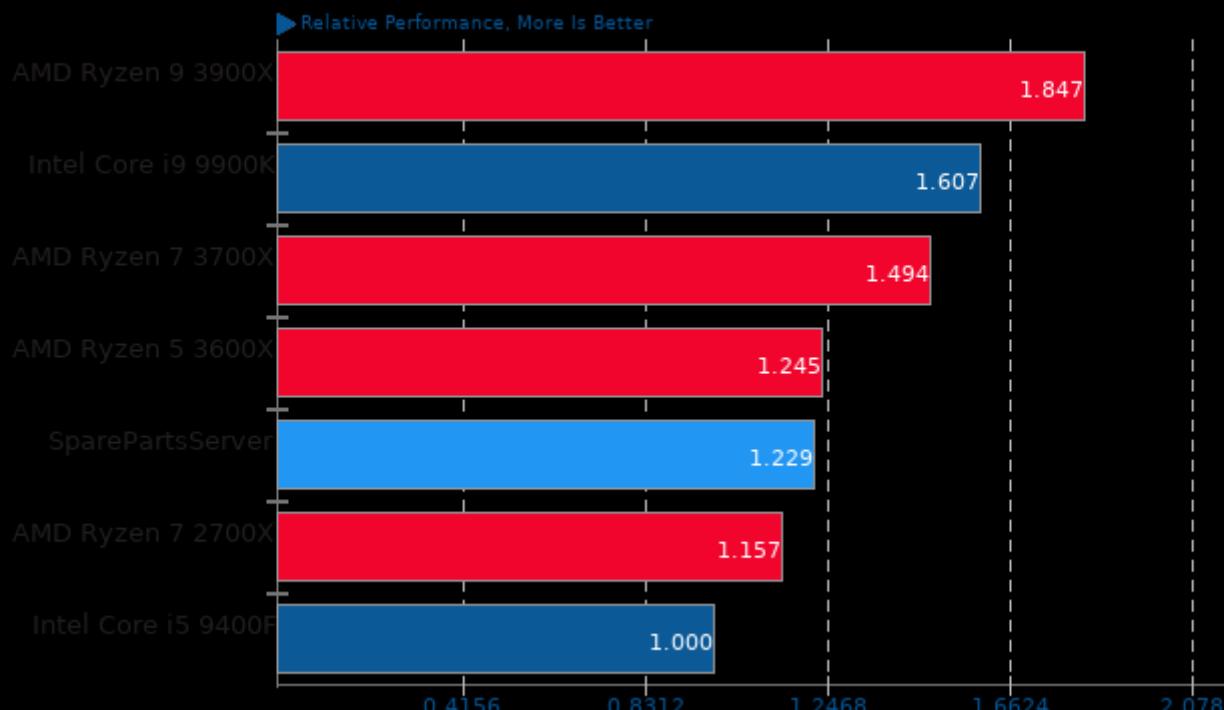


AMD Ryzen 3000 vs. Intel On Linux Ubuntu 19.04

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

Geometric Mean Of AV1 Tests

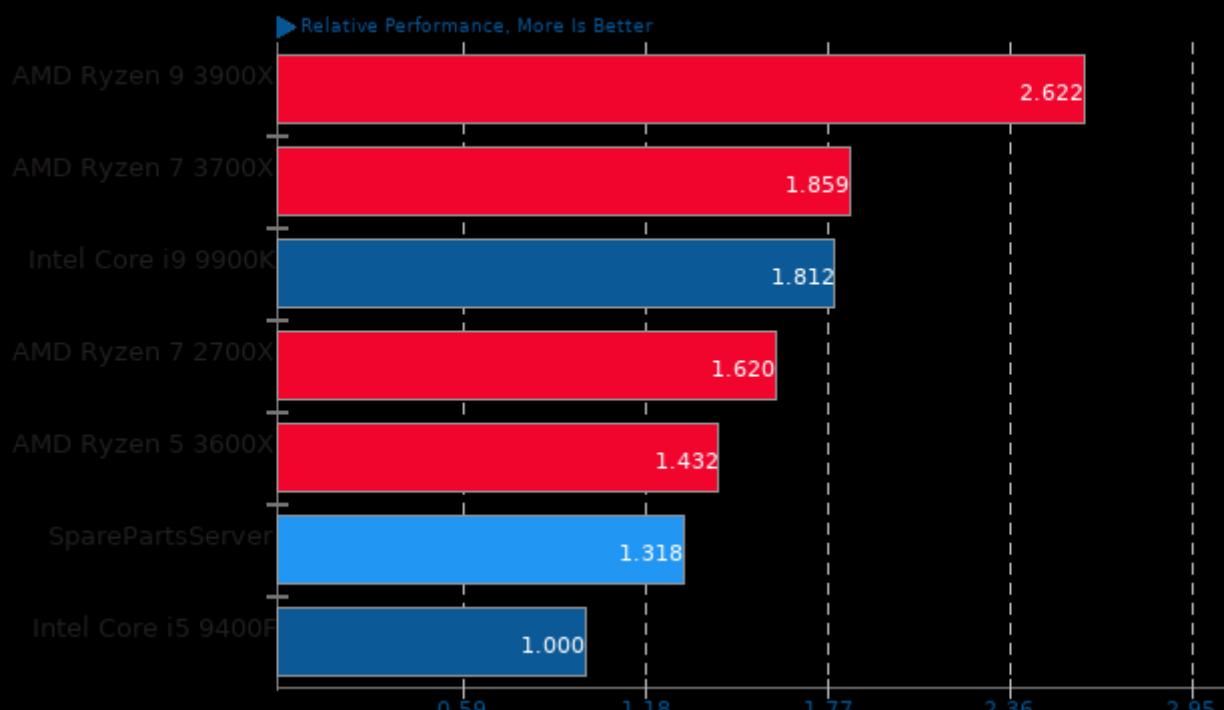
Result Composite - AMD Ryzen 3000 vs. Intel On Linux Ubuntu 19.04



Geometric mean based upon tests: pts/dav1d and pts/svt-av1

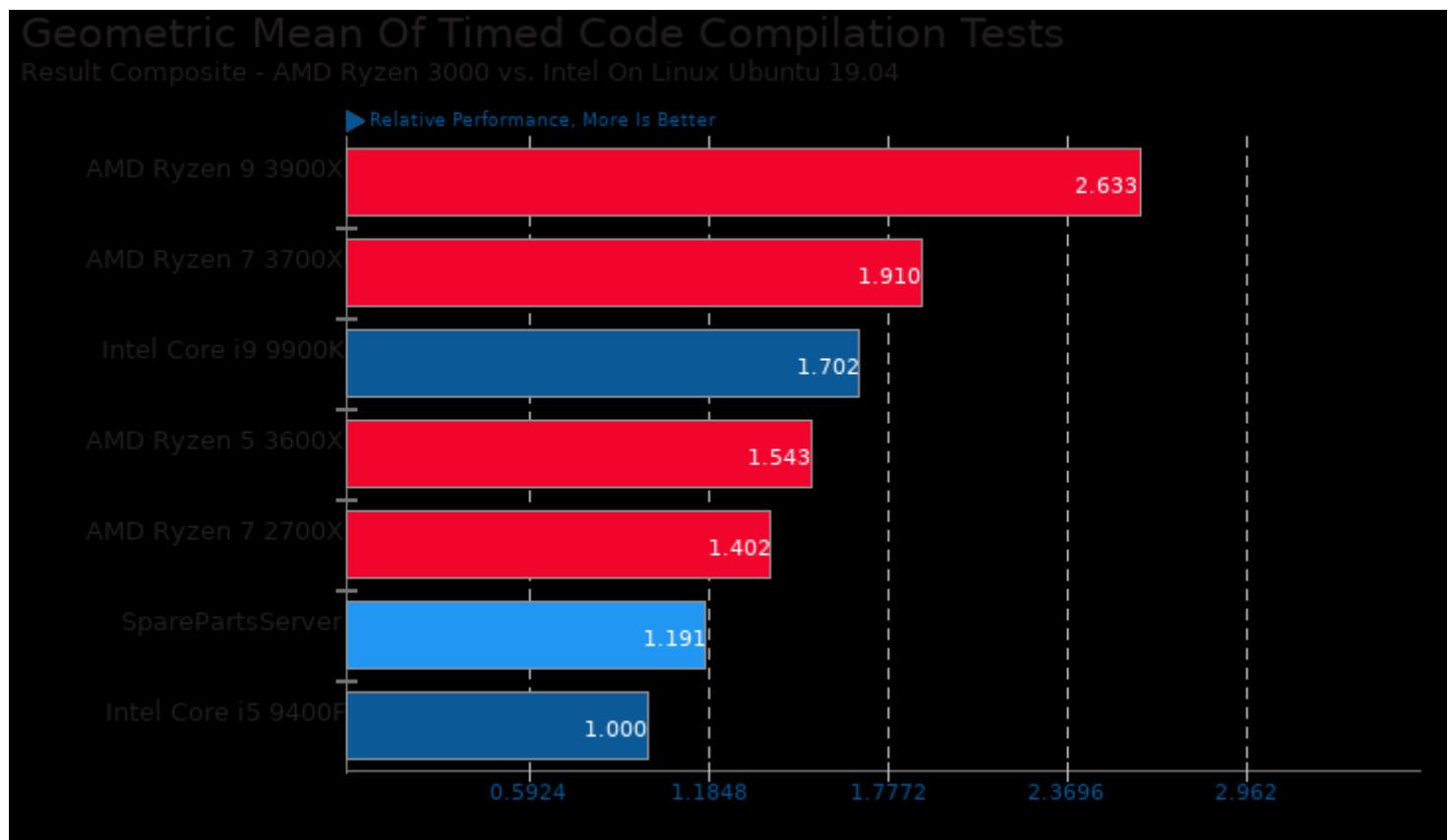
Geometric Mean Of Chess Test Suite

Result Composite - AMD Ryzen 3000 vs. Intel On Linux Ubuntu 19.04

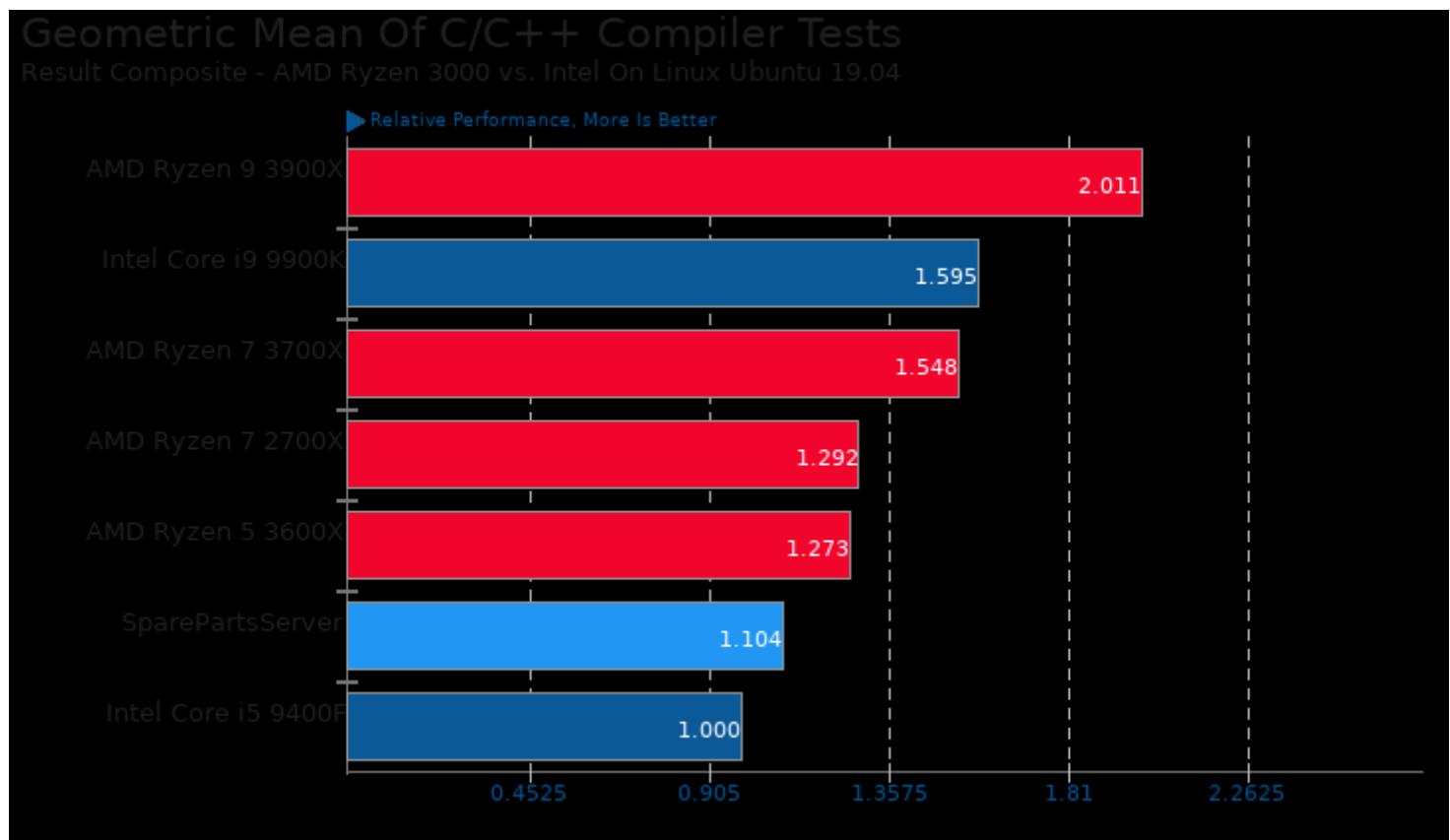


AMD Ryzen 3000 vs. Intel On Linux Ubuntu 19.04

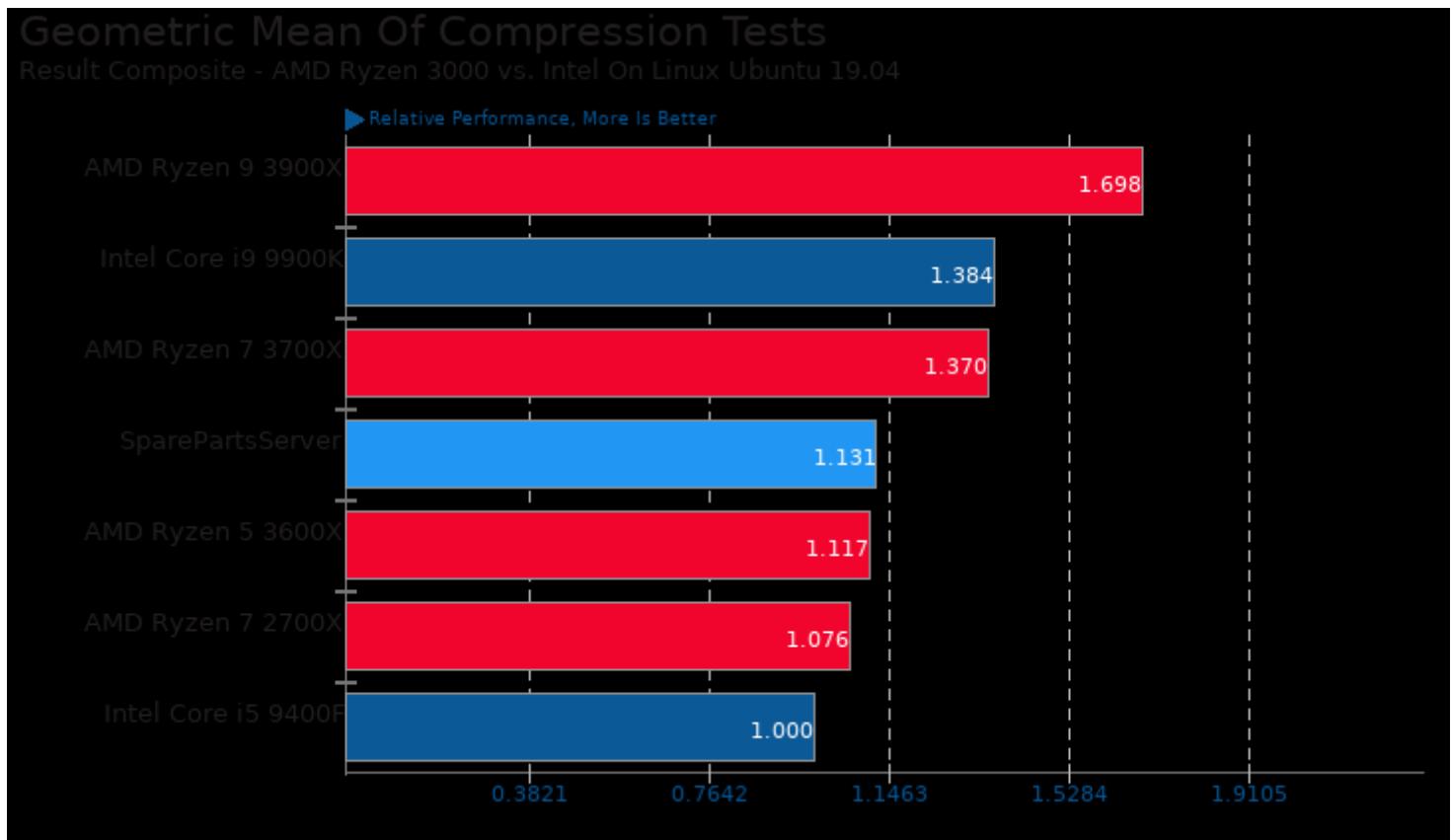
Geometric mean based upon tests: pts/stockfish and pts/asmfish



Geometric mean based upon tests: pts/build-linux-kernel and pts/build-llvm



Geometric mean based upon tests: pts/vpxenc, pts/stockfish, pts/build-llvm, pts/john-the-ripper, pts/dav1d, pts/x264, pts/x265, pts/tungsten, pts/compress-xz, pts/compress-zstd, pts/svt-av1 and pts/gromacs

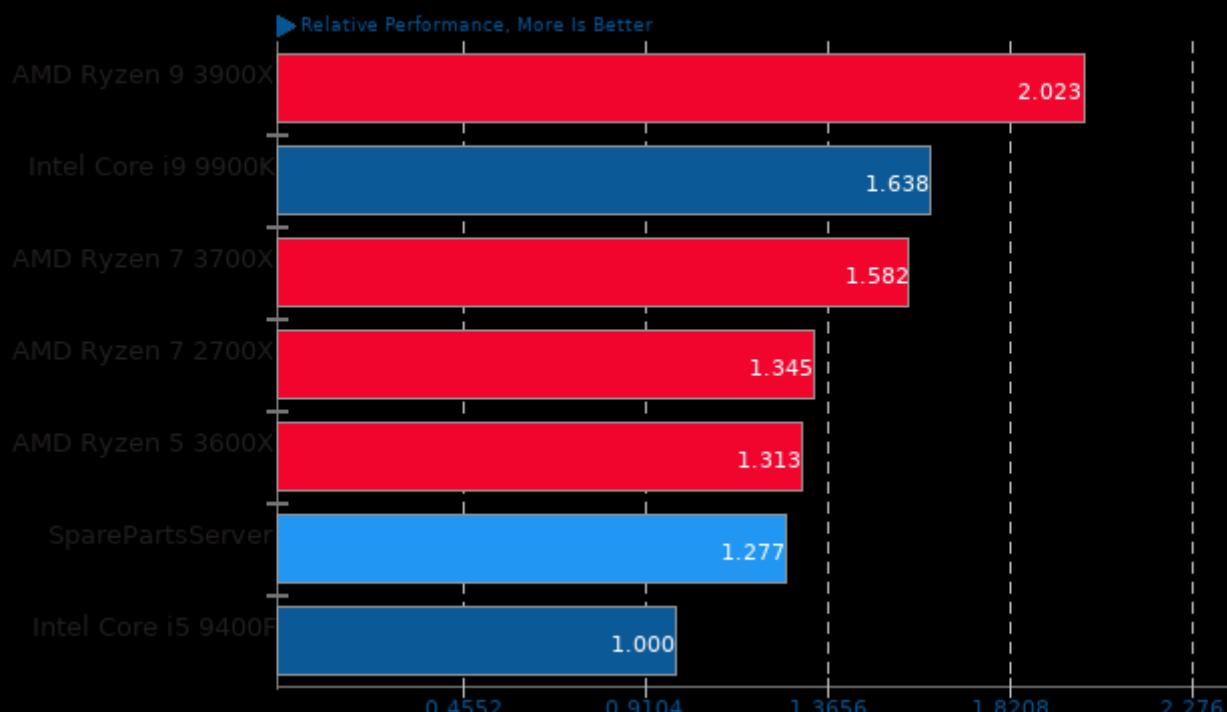


Geometric mean based upon tests: pts/compress-zstd and pts/compress-xz

AMD Ryzen 3000 vs. Intel On Linux Ubuntu 19.04

Geometric Mean Of Creator Workloads Tests

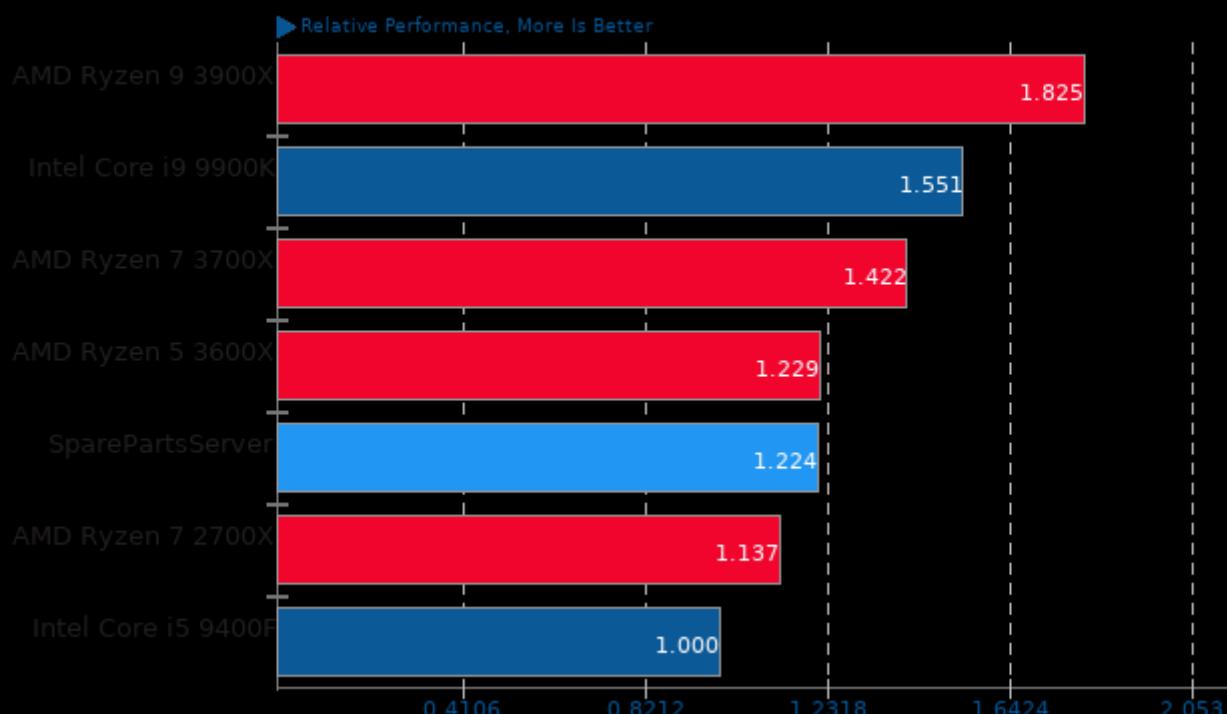
Result Composite - AMD Ryzen 3000 vs. Intel On Linux Ubuntu 19.04



Geometric mean based upon tests: pts/blender, pts/tungsten, pts/appleseed, pts/svt-hevc, pts/x264, pts/x265, pts/vpxenc, pts/dav1d, pts/svt-av1, pts/tjbench, system/gimp and system/darktable

Geometric Mean Of Encoding Tests

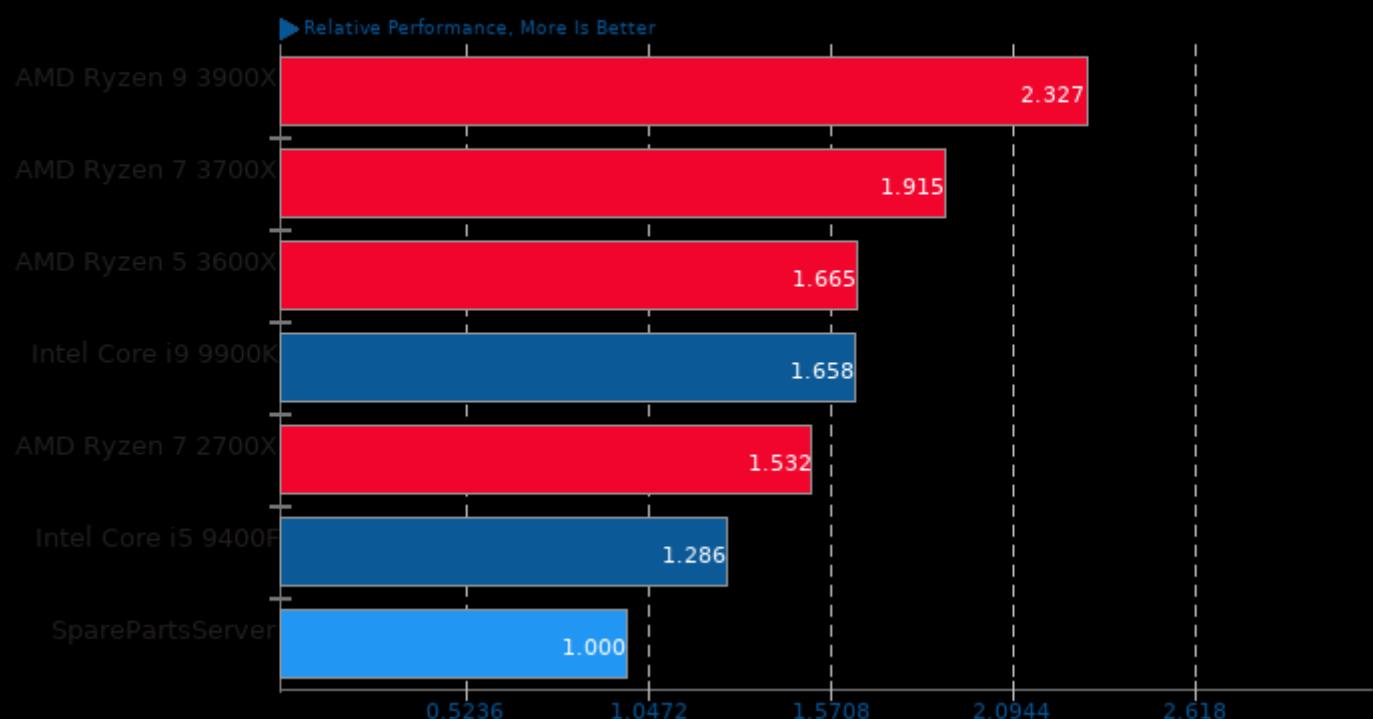
Result Composite - AMD Ryzen 3000 vs. Intel On Linux Ubuntu 19.04



Geometric mean based upon tests: pts/svt-hevc, pts/x264, pts/x265, pts/vpxenc, pts/dav1d and pts/svt-av1

Geometric Mean Of HPC - High Performance Computing Tests

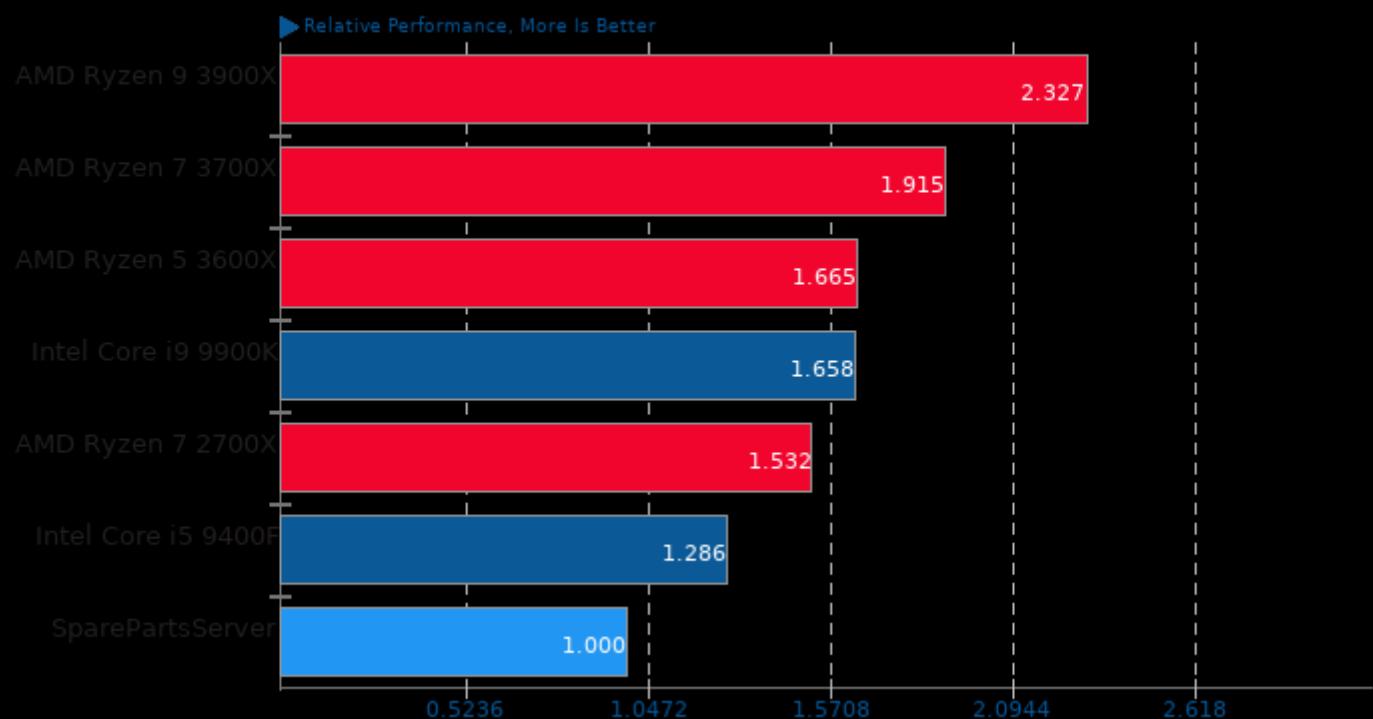
Result Composite - AMD Ryzen 3000 vs. Intel On Linux Ubuntu 19.04



Geometric mean based upon tests: pts/namd, pts/gromacs, pts/cp2k and pts/tensorflow

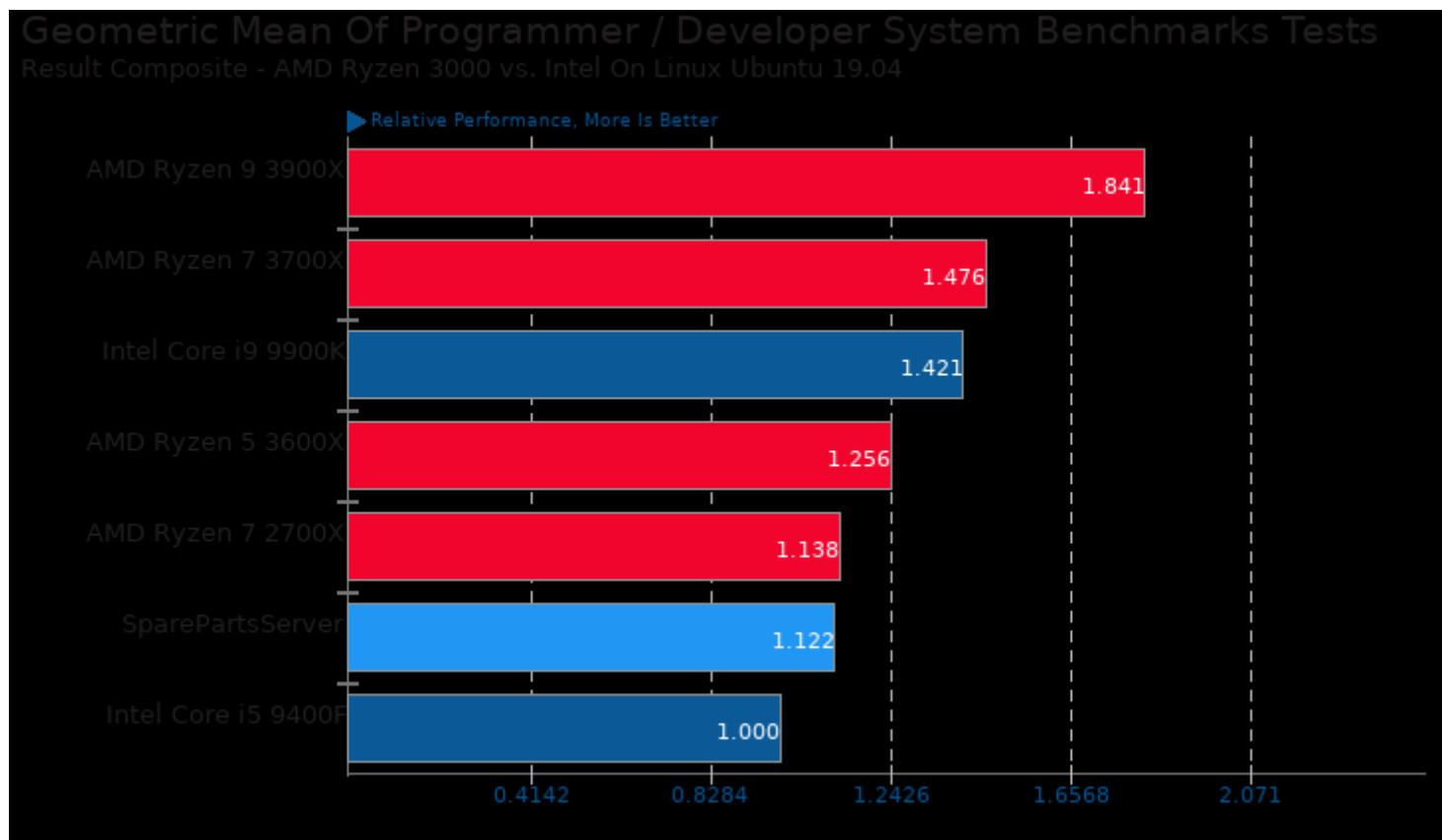
Geometric Mean Of Molecular Dynamics Tests

Result Composite - AMD Ryzen 3000 vs. Intel On Linux Ubuntu 19.04

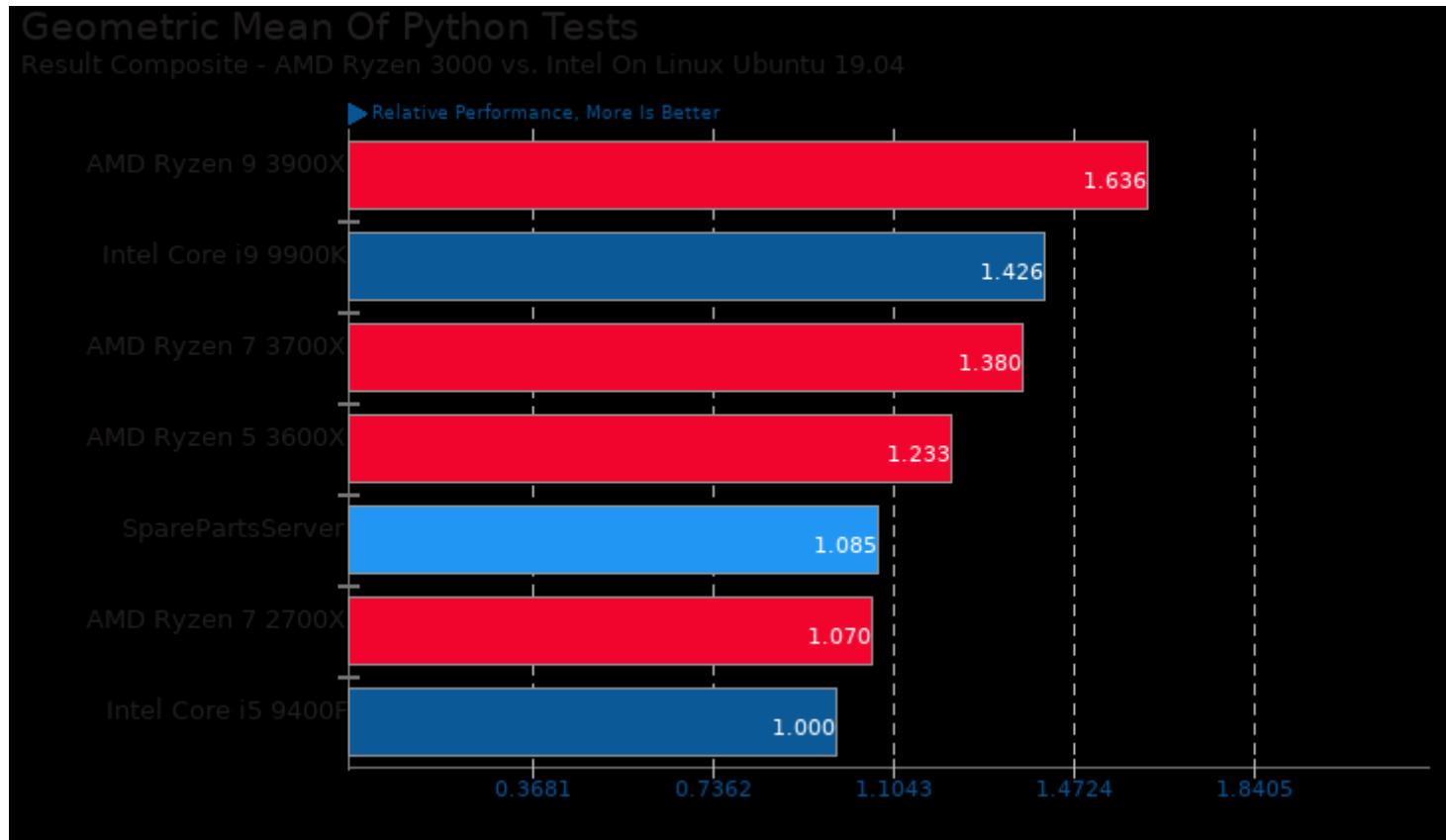


Geometric mean based upon tests: pts/namd, pts/gromacs and pts/cp2k

AMD Ryzen 3000 vs. Intel On Linux Ubuntu 19.04



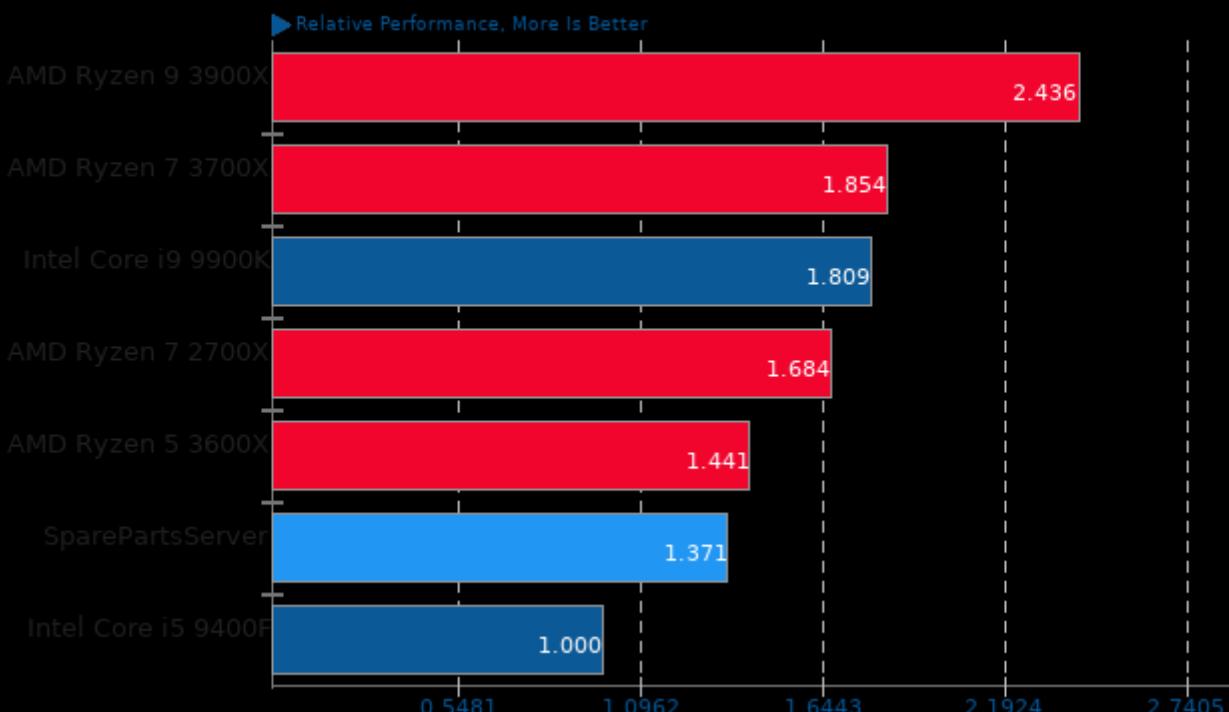
Geometric mean based upon tests: pts/compress-zstd, pts/pybench, pts/build-linux-kernel and pts/build-llvm



Geometric mean based upon tests: pts/pybench, pts/build-llvm and pts/tensorflow

Geometric Mean Of Renderers Tests

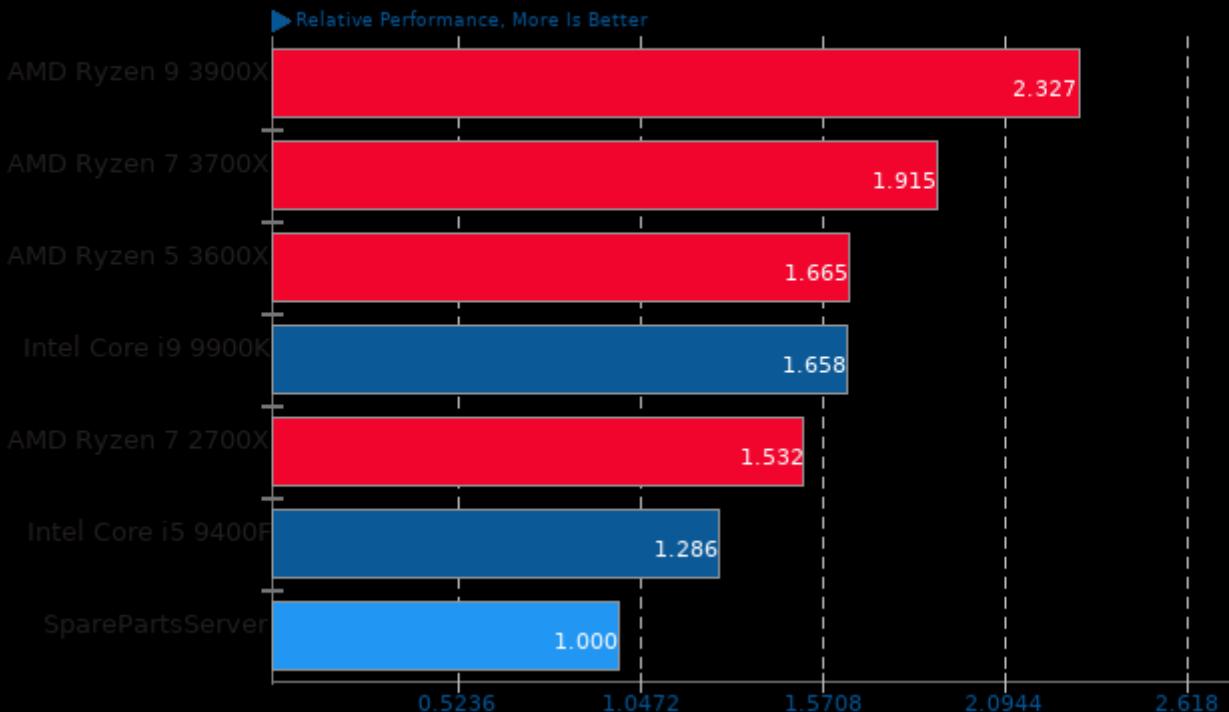
Result Composite - AMD Ryzen 3000 vs. Intel On Linux Ubuntu 19.04



Geometric mean based upon tests: pts/blender, pts/tungsten and pts/appleseed

Geometric Mean Of Scientific Computing Tests

Result Composite - AMD Ryzen 3000 vs. Intel On Linux Ubuntu 19.04

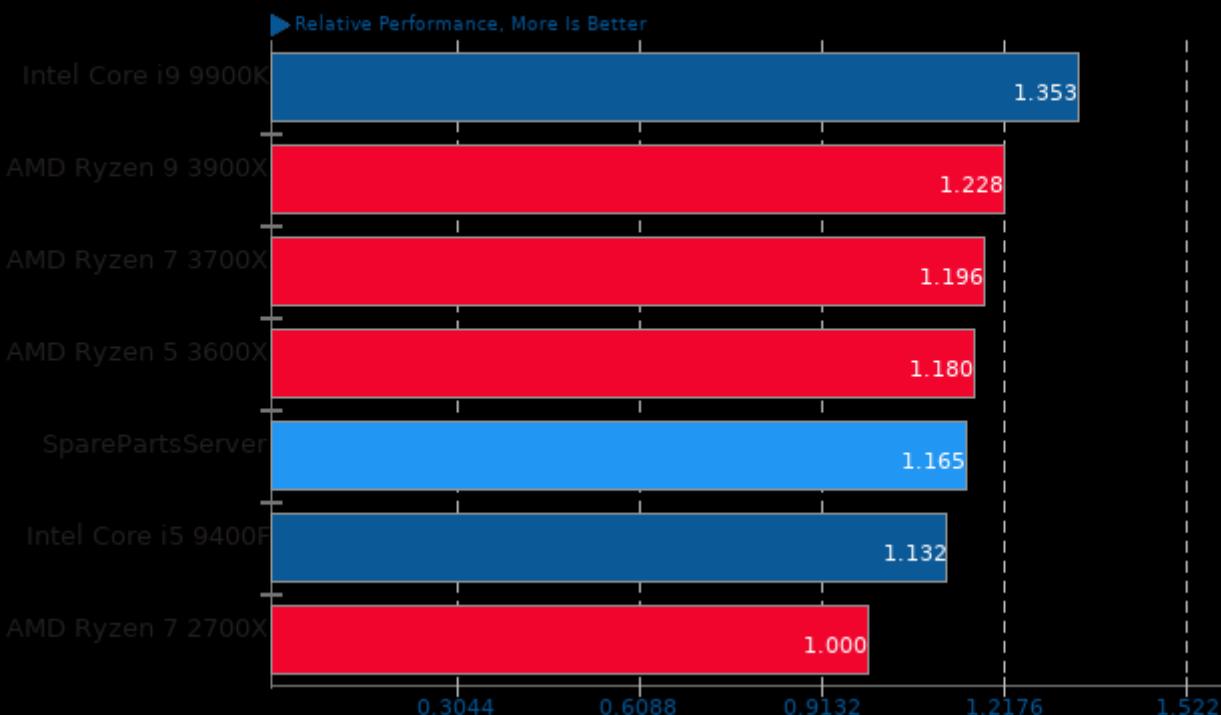


Geometric mean based upon tests: pts/namd, pts/gromacs and pts/cp2k

AMD Ryzen 3000 vs. Intel On Linux Ubuntu 19.04

Geometric Mean Of Single-Threaded Tests

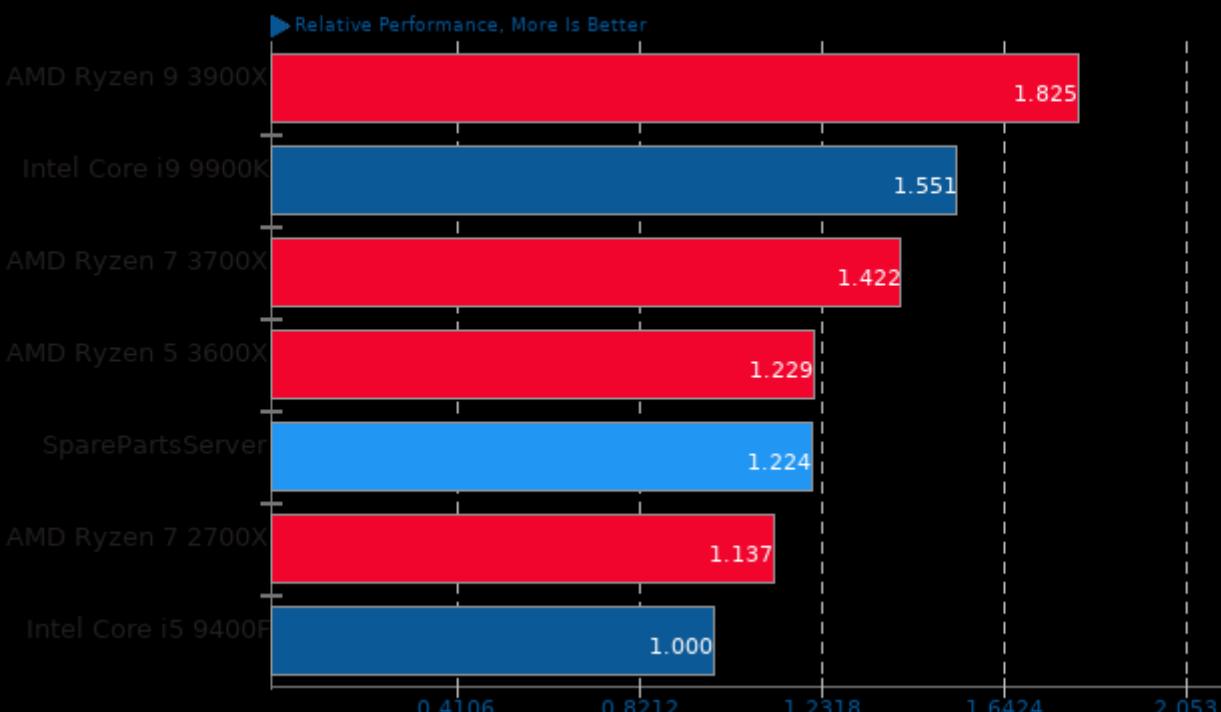
Result Composite - AMD Ryzen 3000 vs. Intel On Linux Ubuntu 19.04



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

Geometric Mean Of Video Encoding Tests

Result Composite - AMD Ryzen 3000 vs. Intel On Linux Ubuntu 19.04



Geometric mean based upon tests: pts/svt-hevc, pts/x264, pts/x265, pts/vpxenc, pts/dav1d and pts/svt-av1

This file was automatically generated via the Phoronix Test Suite benchmarking software on Thursday, 28 March 2024 19:39.