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## mark4-1

2 x Intel Xeon E5-2667 v3 testing with a HP 2129 v1.01 (M60 v02.48 BIOS) and NVIDIA Quadro K5200 8GB on openSUSE 15.1 via the Phoronix Test Suite.

### Automated Executive Summary

*AMD Ryzen 9 3900X had the most wins, coming in first place for 52% of the tests.*

*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  
CP2K Molecular Dynamics (Fayalite-FIST Data) at 7.899x  
Xonotic (System Power Consumption Monitor) at 7.676x  
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:

### Z840 2 x E5-2667v3, 512GB Z Drive #1

Processor: 2 x Intel Xeon E5-2667 v3 @ 3.60GHz (16 Cores), Motherboard: HP 2129 v1.01 (M60 v02.48 BIOS), Chipset: Intel Xeon E7 v3/Xeon, Memory: 32768MB, Disk: 512GB SAMSUNG MZHPV512 + 2 x 4001GB External USB 3.0 + 2 x 512GB MTFDDAK512MBF-1A + 2000GB Hitachi HDS5C302 + 750GB Seagate ST3750640AS, Graphics: NVIDIA Quadro K5200 8GB (324/324MHz), Audio: Intel C610/X99, Monitor: DELL U2410, Network: Intel I218-LM + Intel I210

OS: openSUSE 15.1, Kernel: 4.12.14-1p151.28.13-default (x86\_64), Desktop: KDE Plasma 5.12.8, Display Server: X Server 1.20.3, Display Driver: NVIDIA 390.116, Vulkan: 1.0.65, Compiler: GCC 7.4.0, File-System: ext4, Screen Resolution: 1920x1200

Compiler Notes: --build=x86\_64-suse-linux --disable-libcc1 --disable-libssp --disable-libstdcxx-pch --disable-libvtv --disable-plugin --disable-werror --enable-checking=release --enable-gnu-indirect-function --enable-languages=c,c++,objc,fortran,obj-c++,ada,go --enable-libstdcxx-allocator=new --enable-linux-futex --enable-multilib --enable-offload-targets=hsa,nvptx-none=/usr/nvptx-none, --enable-ssp --enable-version-specific-runtime-libs --host=x86\_64-suse-linux --mandir=/usr/share/man --with-arch-32=x86-64 --with-gcc-major-version-only --with-slibdir=/lib64 --with-tune=generic --without-cuda-driver --without-system-libunwind

Processor Notes: Scaling Governor: intel\_pstate powersave

OpenCL Notes: GPU Compute Cores: 2304

Security Notes: l1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT disabled + 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/swaps barriers and \_\_user pointer sanitization + spectre\_v2: Mitigation of Full generic retrpoline IBPB: conditional IBRS\_FW RSB filling

### Z840 2 x E5-2667v3, 512GB Z Drive #2

### Z840 2 x E5-2667v3, 512GB Z Drive #3

### Z840 2 x E5-2667v3, 512GB Z Drive #4

### Z840 2 x E5-2667v3, 512GB Z Drive #5

### Z840 2 x E5-2667v3, 512GB Z Drive #6

Processor: 2 x Intel Xeon E5-2667 v3 @ 3.60GHz (16 Cores), Motherboard: HP 2129 v1.01 (M60 v02.48 BIOS), Chipset: Intel Xeon E7 v3/Xeon, Memory: 32768MB, Disk: 512GB SAMSUNG MZHPV512 + 2 x 4001GB External USB 3.0 + 2 x 512GB MTFDDAK512MBF-1A + 2000GB Hitachi HDS5C302 + 750GB Seagate ST3750640AS, Graphics: NVIDIA Quadro K5200 8GB (666/3004MHz), Audio: Intel C610/X99, Monitor: DELL U2410, Network: Intel I218-LM + Intel I210

OS: openSUSE 15.1, Kernel: 4.12.14-1p151.28.13-default (x86\_64), Desktop: KDE Plasma 5.12.8, Display Server: X Server 1.20.3, Display Driver: NVIDIA 390.116, OpenGL: 4.5.0, Vulkan: 1.0.65, Compiler: GCC 7.4.0, File-System: ext4, Screen Resolution: 1920x1200

Processor Notes: Scaling Governor: intel\_pstate performance

OpenCL Notes: GPU Compute Cores: 2304

Security Notes: l1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT disabled + 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/swaps barriers and \_\_user pointer sanitization + spectre\_v2: Mitigation of Full generic retrpoline IBPB: conditional IBRS\_FW RSB filling

## 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: 11tf: 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: 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: 11tf: 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: 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: 11tf: 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: 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: 11tf: 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 retroline 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: 11tf: 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/swaps barriers and \_\_user pointer sanitization + spectre\_v2: Mitigation of Full generic retroline 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

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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

## 2 x Intel Xeon E5-3667v3

Processor: 2 x Intel Xeon E5-2667 v3 @ 3.60GHz (16 Cores), Motherboard: HP 2129 v1.01 (M60 v02.48 BIOS), Chipset: Intel Xeon E7 v3/Xeon, Memory: 32768MB, Disk: 512GB SAMSUNG MZHPV512 + 2 x 4001GB External USB 3.0 + 2 x 512GB MTFDDAK512MBF-1A + 2000GB Hitachi HDS5C302 + 750GB Seagate ST3750640AS, Graphics: NVIDIA Quadro K5200 8GB (324/324MHz), Audio: Intel C610/X99, Monitor: DELL U2410, Network: Intel I218-LM + Intel I210

OS: openSUSE 15.1, Kernel: 4.12.14-lp151.28.13-default (x86\_64), Desktop: KDE Plasma 5.12.8, Display Server: X Server 1.20.3, Display Driver: NVIDIA 390.116, Vulkan: 1.0.65, Compiler: GCC 7.4.0, File-System: ext4, Screen Resolution: 1920x1200

Compiler Notes: --build=x86\_64-suse-linux --disable-libcc1 --disable-libssp --disable-libstdcxx-pch --disable-libvtv --disable-plugin --disable-werror --enable-checking=release --enable-gnu-indirect-function --enable-languages=c,c++,objc,fortran,obj-c++,ada,go --enable-libstdcxx-allocator=new --enable-linux-futex --enable-multilib --enable-offload-targets=hsa,nvptx-none=/usr/nvptx-none, --enable-ssp --enable-version-specific-runtime-libs --host=x86\_64-suse-linux --mandir=/usr/share/man --with-arch-32=x86-64 --with-gcc-major-version-only --with-slibdir=/lib64 --with-tune=generic --without-cuda-driver --without-system-libunwind

Processor Notes: Scaling Governor: intel\_pstate performance

OpenCL Notes: GPU Compute Cores: 2304

Python Notes: Python 2.7.14 + Python 3.6.5

Security Notes: I1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT disabled + 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 retpoline IBPB: conditional IBRS\_FW RSB filling

## 2 x Intel Xeon E5-2667v3

Processor: 2 x Intel Xeon E5-2667 v3 @ 3.60GHz (16 Cores), Motherboard: HP 2129 v1.01 (M60 v02.48 BIOS), Chipset: Intel Xeon E7 v3/Xeon, Memory: 32768MB, Disk: 512GB SAMSUNG MZHPV512 + 2 x 4001GB External USB 3.0 + 2 x 512GB MTFDDAK512MBF-1A + 2000GB Hitachi HDS5C302 + 750GB Seagate ST3750640AS, Graphics: NVIDIA Quadro K5200 8GB (666/3004MHz), Audio: Intel C610/X99, Monitor: DELL U2410, Network: Intel I218-LM + Intel I210

OS: openSUSE 15.1, Kernel: 4.12.14-lp151.28.13-default (x86\_64), Desktop: KDE Plasma 5.12.8, Display Server: X Server 1.20.3, Display Driver: NVIDIA 390.129, OpenGL: 4.5.0, Vulkan: 1.0.65, Compiler: GCC 7.4.0, File-System: ext4, Screen Resolution: 1920x1200

Compiler Notes: --build=x86\_64-suse-linux --disable-libcc1 --disable-libssp --disable-libstdcxx-pch --disable-libvtv --disable-plugin --disable-werror --enable-checking=release --enable-gnu-indirect-function --enable-languages=c,c++,objc,fortran,obj-c++,ada,go --enable-libstdcxx-allocator=new --enable-linux-futex --enable-multilib --enable-offload-targets=hsa,nvptx-none=/usr/nvptx-none, --enable-ssp --enable-version-specific-runtime-libs --host=x86\_64-suse-linux --mandir=/usr/share/man --with-arch-32=x86-64 --with-gcc-major-version-only --with-slibdir=/lib64 --with-tune=generic --without-cuda-driver --without-system-libunwind

Processor Notes: Scaling Governor: intel\_pstate powersave

OpenCL Notes: GPU Compute Cores: 2304

Python Notes: Python 2.7.14 + Python 3.6.5

Security Notes: I1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT disabled + 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 retpoline IBPB: conditional IBRS\_FW RSB filling

	Z840 2	Z840 2	Z840 2	Z840 2	Z840 2	Z840 2	AMD	AMD	AMD	AMD	Intel	Intel	2 x	2 x
x	x	x	x	x	x	x	Ryzen 7	Ryzen 5	Ryzen 7	Ryzen 9	Core i5	Core i9	Intel Xeon	Intel Xeon
E5-26	E5-26	E5-26	E5-26	E5-26	E5-26	E5-26	2700X	3600X	3700X	3900X	9400F	9900K	E5-36	E5-26
67v3,	67v3,	67v3,	67v3,	67v3,	67v3,	67v3,							67v3	67v3
512G	512G	512G	512G	512G	512G	512G								
B Z	B Z	B Z	B Z	B Z	B Z	B Z								
Drive	Drive	Drive	Drive	Drive	Drive	Drive								
#1	#2	#3	#4	#5	#6									
<b>Rodinia - OpenMP</b>	<b>59.62</b>	<b>61.74</b>												
<b>LavaMD (sec)</b>														
Normalized	100%	96.57%												
Standard	0.8%	2.1%												
<b>Rodinia - OpenMP CFD</b>	<b>20.85</b>	<b>21.87</b>												
<b>Solver (sec)</b>														
Normalized	100%	95.34%												
Standard	2.2%	6.7%												
<b>NAMD - ATPase</b>	1.3985	1.4005					2.2988	2.7046	2.0693	1.4529	<b>2.7136</b>	1.7557		<b>1.3980</b>
	2	3					0	9	5	6	<b>4</b>	7		<b>7</b>
<b>Simulation - 327,506 Atoms</b>														
Normalized	99.97%	99.82%					60.82%	51.69%	67.56%	96.22%	51.52%	79.63%		100%
Standard	0.4%	0.2%					0.1%	0.2%	0.1%	0.6%	0.5%	0.4%		0.2%
<b>x264 - H.2.V.E</b>	91.10						78.61	76.90	92.94	<b>139.25</b>	<b>58.29</b>	94.53		90.55
<b>(FPS)</b>														
Normalized	65.42%						56.45%	55.22%	66.74%	100%	41.86%	67.89%		65.03%
Standard	0.3%						1.5%	1.7%	1.7%	2.4%	2.7%	1.5%		1.1%
<b>x265 - 7-Zip</b>	10.86	<b>10.81</b>					30.27	38.88	43.48	<b>52.24</b>	33.58	44.94		10.89
<b>H.2.1.V.E</b>														
<b>(FPS)</b>														
Normalized	20.79%	20.69%					57.94%	74.43%	83.23%	100%	64.28%	86.03%		20.85%
Standard	0.2%	0.3%					0.1%	0.6%	0.5%	0.6%	0.3%	0.5%		0.7%
<b>Compression - C.S.T (MIPS)</b>	<b>61109</b>	<b>60400</b>												
Normalized	100%	98.84%												
Standard	1.2%	0.8%												
<b>Stockfish - Total Time</b>	31382	31351					23329	20453	26325	<b>37567</b>	<b>14071</b>	25172		31564
<b>(Nodes/s)</b>							057	316	499	<b>127</b>	<b>430</b>	823		351
Normalized	83.54%	83.46%					62.1%	54.44%	70.08%	100%	37.46%	67.01%		84.02%
Standard	0.7%	2.7%					0.4%	1.4%	1%	0.1%	1%	1.1%		0.4%
<b>asmFish - 1.H.M.2.D</b>	33462	33654					24205	21564	28219	<b>39345</b>	<b>15284</b>	28046		34046
<b>(Nodes/s)</b>							430	595	892	<b>381</b>	<b>406</b>	739		861
Normalized	85.05%	85.54%					61.52%	54.81%	71.72%	100%	38.85%	71.28%		86.53%
Standard	1.4%	2.3%					0.4%	2.1%	1.5%	1.6%	2.8%	1.5%		2.6%
<b>Deviation</b>														

<b>Timed GCC</b>	836.17							
<b>Compilation -</b>								
<b>Time To</b>								
<b>Compile (sec)</b>								
<b>Timed Linux</b>	62.28	62.31		76.09	72.04	58.16	<b>41.87</b>	<b>112.17</b>
<b>Kernel</b>								
<b>Compilation -</b>								
<b>Time To</b>								
<b>Compile (sec)</b>								
<b>Normalized</b>	67.23%	67.2%		55.03%	58.12%	71.99%	100%	37.33%
<b>Standard</b>	2.4%	2.3%		1.9%	1.6%	2.1%	2.9%	1.4%
<b>Radiance</b>	936.89							
<b>Benchmark -</b>								
<b>Serial (sec)</b>								
<b>Radiance</b>	280.14							
<b>Benchmark -</b>								
<b>SMP Parallel</b>								
<b>(sec)</b>								
<b>OpenSSL -</b>	2426							
<b>R.4.b.P</b>								
<b>(Signs/sec)</b>								
<b>Standard</b>	0.2%							
<b>ctx_clock -</b>	1178							
<b>C.S.T (Clocks)</b>								
<b>Standard</b>	0.2%							
<b>Sysbench -</b>	<b>15609</b>	<b>15595</b>						
<b>CPU</b>								
<b>(Events/sec)</b>								
<b>Normalized</b>	100%	99.91%						
<b>Standard</b>	0.1%	0%						
<b>SQLite - T.S.I</b>	109.31							
<b>(sec)</b>								
<b>Standard</b>	0.3%							
<b>Flexible IO</b>	2157							
<b>Tester - Rand</b>								
<b>Read - Linux</b>								
<b>AIO - No - Yes</b>								
<b>- 2MB (MB/s)</b>								
<b>Flexible IO</b>	644							
<b>Tester - Rand</b>								
<b>Read - Linux</b>								
<b>AIO - No - Yes</b>								
<b>- 4KB (MB/s)</b>								
<b>Standard</b>	6.5%							
<b>Deviation</b>								

**Flexible IO** 16473**Tester - Rand** 3**Read - Linux****AIO - No - Yes****- 4KB (IOPS)**

Standard 6.5%

**Flexible IO** 1495**Tester - Rand****Write - Linux****AIO - No - Yes****- 2MB (MB/s)**

Standard 0.4%

**Flexible IO** 403**Tester - Rand****Write - Linux****AIO - No - Yes****- 4KB (MB/s)****Flexible IO** 10300**Tester - Rand** 0**Write - Linux****AIO - No - Yes****- 4KB (IOPS)****Flexible IO** 1696**Tester - Seq****Read - Linux****AIO - No - Yes****- 2MB (MB/s)**

Standard 0%

**Flexible IO** 843**Tester - Seq****Read - Linux****AIO - No - Yes****- 4KB (MB/s)**

Standard 18%

**Flexible IO** 21580**Tester - Seq** 0**Read - Linux****AIO - No - Yes****- 4KB (IOPS)**

Standard 18%

**Flexible IO** 1500**Tester - Seq****Write - Linux****AIO - No - Yes****- 2MB (MB/s)**

Standard 0.4%

**Deviation**

**Flexible IO** 769**Tester - Seq****Write - Linux****AIO - No - Yes****- 4KB (MB/s)**

Standard 10.8%

**Flexible IO** 19683**Tester - Seq** 3**Write - Linux****AIO - No - Yes****- 4KB (IOPS)**

Standard 10.8%

**FS-Mark** - 104.57**1.F.1.S****(Files/s)**

Standard 1.4%

**FS-Mark** - 207.88**5.F.1.S.4.T****(Files/s)**

Standard 12.6%

**FS-Mark** - 102.03**4.F.3.S.D.1.S****(Files/s)**

Standard 0.5%

**FS-Mark** - 1734**1.F.1.S.N.S.F****(Files/s)**

Standard 0.2%

**Dbench - 12** 292.62**Clients (MB/s)**

Standard 0.5%

**Dbench - 1** 57.53**Clients (MB/s)**

Standard 0.2%

**Compile** 1583**Bench -****Compile**

Standard 2.1%

**Compile** 402.19**Bench - Initial****Create (MB/s)**

Standard 2%

**Compile** 1976**Bench - Read****Compiled****Tree (MB/s)**

Standard 3.7%

**PostMark** - 4870**D.T.P (TPS)**

Standard 1.1%

**Deviation**

<b>Parboil -</b>	3.56							
<b>OpenMP</b>								
<b>CUTCP (sec)</b>								
<b>Standard</b>	0.6%							
<b>TTSIOD 3D</b>	402.20							
<b>Renderer -</b>								
<b>P.R.W.S.S.M</b>								
<b>(FPS)</b>								
<b>Standard</b>	1%							
<b>SVT-HEVC -</b>	148.83	149	156	193	<b>248</b>	<b>120</b>	192	156
<b>1.8.b.Y.T.H.V.</b>								
<b>E (FPS)</b>								
<b>Normalized</b>	60.01%	60.08%	62.9%	77.82%	100%	48.39%	77.42%	62.9%
<b>Standard</b>	0.3%	1.7%	1.3%	1.5%	1.4%	1%	0.6%	0.3%
<b>SVT-VP9 -</b>	52.72							
<b>1.8.b.Y.T.V.V.</b>								
<b>E (FPS)</b>								
<b>Standard</b>	0.2%							
<b>GraphicsMagi</b>	208							
<b>ck - Resizing</b>								
<b>(Iterations/min</b>								
<b>Standard</b>	0.5%							
<b>Swet -</b>	64206							
<b>Average</b>	6116							
<b>(Operations/s</b>								
<b>Standard</b>	0.7%							
<b>Timed LLVM</b>	333.98	473	412	334	<b>244</b>	<b>629</b>	370	349
<b>Compilation -</b>								
<b>Time To</b>								
<b>Compile (sec)</b>								
<b>Normalized</b>	73.06%	51.59%	59.22%	73.05%	100%	38.79%	65.95%	69.91%
<b>C-Ray - Total</b>	65.37							
<b>Time -</b>								
<b>4.1.R.P.P (sec)</b>								
<b>Standard</b>	0.1%							
<b>Parallel BZIP2</b>	3.70							
<b>Compression</b>								
<b>- 2.F.C (sec)</b>								
<b>Standard</b>	1.7%							
<b>Primesieve -</b>	17.90							
<b>1.P.N.G (sec)</b>								
<b>Standard</b>	0.2%							
<b>Smallpt -</b>	10.43							
<b>G.I.R.1.S (sec)</b>								
<b>Standard</b>	0.2%							
<b>Sysbench -</b>	40565							
<b>Memory</b>	83							
<b>(Events/sec)</b>								
<b>Standard</b>	0.4%							
<b>Deviation</b>								

**Unigine** 49.66

**Heaven** - 1920

**x 1200** -

**Fullscreen** -

**OpenGL (FPS)**

**Standard** 1.3%

**Unigine** 212.01

**Sanctuary** -

**1920 x 1200** -

**Fullscreen**

**(FPS)**

**Standard** 0.5%

**Unigine** 70.27

**Superposition**

**- 1920 x 1200** -

**Fullscreen** -

**Low** - **OpenGL**

**(FPS)**

**Standard** 0.1%

**Unigine** 24

**Superposition**

**- 1920 x 1200** -

**Fullscreen** -

**High** -

**OpenGL (FPS)**

**Unigine** 7.80

**Superposition**

**- 1920 x 1200** -

**Fullscreen** -

**Ultra** -

**OpenGL (FPS)**

**Standard** 0%

**Unigine** 32.93

**Superposition**

**- 1920 x 1200** -

**Fullscreen** -

**Medium** -

**OpenGL (FPS)**

**Standard** 0.2%

**Unigine** 168.43

**Tropics** - 1920

**x 1200** -

**Fullscreen**

**(FPS)**

**Standard** 0%

**Deviation**

**Unigine Valley** 58.04

- 1920 x 1200 -

Fullscreen -

**OpenGL (FPS)**

Standard 0.1%

**Blender** - 378.74

**BMW27** -

**CUDA (sec)**

Standard 1.6%

**Blender** - 382.81

**BMW27** -

**OpenCL (sec)**

Standard 0.4%

**Blender** - 149.24

195	212	163	<b>114</b>	<b>307</b>	172	146
58.46%	53.77%	69.94%	100%	37.13%	66.28%	78.08%

**BMW27** -

**CPU-Only (sec)**

Normalized 76.39%

Standard 0.3%

**Blender** - 453.84

0.5%	0.4%	0.6%	0.1%	0.3%	0.3%	0.3%
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**Classroom** -

**CUDA (sec)**

Standard 0.2%

**Blender** - 1042

**Fishy Cat** -

**CUDA (sec)**

Standard 0.8%

**Blender** - 778.78

**Barbershop** -

**CUDA (sec)**

Standard 0.7%

**Blender** - 451.60

**Classroom** -

**OpenCL (sec)**

Standard 0.4%

**Blender** - 1009

**Fishy Cat** -

**OpenCL (sec)**

Standard 1.2%

**Blender** - 772.95

**Barbershop** -

**OpenCL (sec)**

Standard 0.9%

**Blender** - 408.75

**Classroom** -

**CPU-Only (sec)**

Standard 0.2%

Deviation

<b>Blender -</b>	229.87							
<b>Fishy Cat -</b>								
<b>CPU-Only</b>								
<b>(sec)</b>								
Standard	0.1%							
<b>Blender -</b>	635.72			775	849	655	<b>460</b>	<b>1283</b>
<b>Barbershop -</b>								675
<b>CPU-Only</b>								
<b>(sec)</b>								
Normalized	72.36%			59.35%	54.18%	70.23%	100%	35.85%
Standard	0.2%			0.3%	0.1%	0.1%	0.4%	0.3%
<b>Blender -</b>	1100							68.15% 75.41%
<b>Pabellon</b>								
<b>Barcelona -</b>								
<b>CUDA (sec)</b>								
Standard	0.2%							
<b>Blender -</b>	1100							
<b>Pabellon</b>								
<b>Barcelona -</b>								
<b>OpenCL (sec)</b>								
Standard	0.1%							
<b>Blender -</b>	525.90							
<b>Pabellon</b>								
<b>Barcelona -</b>								
<b>CPU-Only</b>								
<b>(sec)</b>								
Standard	0.2%							
<b>Tesseract -</b>				342.96	371.37	368.77	<b>376.19</b>	<b>279.04</b>
<b>3840 x 2160</b>								353.51
<b>(FPS)</b>								
Normalized				91.17%	98.72%	98.03%	100%	74.18%
Standard				1.8%	0.9%	2.2%	1.1%	2.2%
<b>Xonotic - 3840</b>				294	369	<b>377</b>	373	<b>288</b>
<b>x 2160 - Ultra</b>								354
<b>(FPS)</b>								
Normalized				77.98%	97.88%	100%	98.94%	76.39%
Standard				1.1%	0.5%	0.6%	1.1%	1.9%
<b>Xonotic - 3840</b>				234	289	<b>293</b>	292	240
<b>x 2160 -</b>								288
<b>Ultimate (FPS)</b>								
Normalized				79.86%	98.63%	100%	99.66%	81.91%
Standard				0.7%	0.3%	0.5%	1%	0.6%
Deviation								0.5%
								0.1%

<b>SuperTuxKart</b>		72.99	73.38	73.60	73.54	73.72	<b>74.38</b>	<b>45.95</b>
- 3840 x 2160 -								
Fullscreen -								
Ultimate - 6 -								
<b>Candela City</b>								
(FPS)								
Normalized		98.13%	98.66%	98.95%	98.87%	99.11%	100%	61.78%
Standard		0.1%	0.3%	0.4%	0.7%	0.3%	0.8%	16.3%
<b>Darktable -</b>		<b>12.49</b>	<b>11.10</b>	11.41	11.17	13.19	<b>13.78</b>	
Boat -								
<b>CPU-only</b>								
Normalized		88.87%	100%	97.28%	99.37%	84.15%	80.55%	
Standard		0.2%	0.3%	0.4%	0%	0.1%	0.1%	
<b>Darktable -</b>		<b>6.23</b>	6.09	5.34	<b>4.54</b>	<b>7.66</b>	5.39	
Masskrug -								
<b>CPU-only</b>								
Normalized		72.87%	74.55%	85.02%	100%	59.27%	84.23%	
Standard		0.4%	0.7%	0.6%	0.7%	0.2%	0.3%	
<b>Darktable -</b>		<b>4.12</b>	4.37	3.87	<b>3.57</b>	<b>5.35</b>	4.20	
<b>Server Room -</b>								
<b>CPU-only</b>								
Normalized		86.65%	81.69%	92.25%	100%	66.73%	85%	
Standard		0.3%	0.2%	0%	0.1%	0.3%	0.1%	
<b>GIMP -</b>		<b>17.64</b>	15.25	15.81	17.16	15.62	<b>15.02</b>	
<b>unsharp-mask</b>								
(sec)								
Normalized		85.15%	98.49%	95%	87.53%	96.16%	100%	
Standard		0.7%	0.8%	0.3%	0.7%	0.8%	1.3%	
<b>GIMP - resize</b>		<b>8.66</b>	7.82	7.52	7.49	8.24	<b>6.77</b>	
(sec)								
Normalized		78.18%	86.57%	90.03%	90.39%	82.16%	100%	
Standard		1.5%	0.2%	1.3%	0.7%	0.2%	1.7%	
<b>GIMP - rotate</b>		<b>13.26</b>	11.88	11.80	11.80	13.13	<b>11.14</b>	
(sec)								
Normalized		84.01%	93.77%	94.41%	94.41%	84.84%	100%	
Standard		0.1%	3.2%	0.2%	0.6%	0.2%	0.3%	
<b>GIMP - auto-levels</b>		<b>15.36</b>	13.43	13.61	14.34	14.07	<b>12.67</b>	
(sec)								
Normalized		82.49%	94.34%	93.09%	88.35%	90.05%	100%	
Standard		0.5%	0.9%	0.5%	0.8%	1%	0.3%	
<b>Appleseed -</b>								
<b>Emily (sec)</b>								
Normalized		422.69	481.78	378.97	<b>271.99</b>	<b>774.80</b>	421.19	
Disney								
<b>Material (sec)</b>								
Normalized		64.35%	56.46%	71.77%	100%	35.1%	64.58%	
Appleseed -		242.13	309.83	238.12	<b>168.73</b>	<b>406.82</b>	245.34	
Disney								
Normalized		69.69%	54.46%	70.86%	100%	41.48%	68.77%	

<b>Appleseed - Material Tester (sec)</b>	225.60	272.97	213.66	<b>162.52</b>	<b>421.10</b>	232.07	
Normalized	72.04%	59.54%	76.06%	100%	38.59%	70.03%	
<b>Coremark - CoreMark Size</b>	26906	27973	37143	<b>53193</b>	<b>18648</b>	39468	38694
3	9	0	<b>3</b>	<b>4</b>	1		9
<b>666 - I.P.S (Iterations/Sec)</b>							
Normalized	50.58%	52.59%	69.83%	100%	35.06%	74.2%	72.74%
Standard	1.7%	0.4%	1%	1.8%	0.6%	2.3%	2%
<b>Selenium - ARES-6 - Firefox (ms)</b>	59.73	51.57	<b>50.94</b>	51.50	51.79	51.21	<b>70.11</b>
Normalized	85.28%	98.78%	100%	98.91%	98.36%	99.47%	72.66%
Standard	0.5%	0.3%	0.5%	0.9%	0.3%	1.5%	0.7%
<b>Selenium - ARES-6 - Google Chrome (ms)</b>	23.27	19.46	<b>19.21</b>	19.25	19.95	23.29	<b>25.08</b>
Normalized	82.55%	98.72%	100%	99.79%	96.29%	82.48%	76.59%
Standard	0.4%	0.5%	0.3%	0.3%	0.3%	0.6%	0.4%
<b>Selenium - Octane - Firefox (Geometric Mean)</b>	32874	37108	36980	37862	35034	<b>39786</b>	<b>25742</b>
Normalized	82.63%	93.27%	92.95%	95.16%	88.06%	100%	64.7%
Standard	1.3%	0.6%	0.7%	1.8%	0.7%	0.6%	0.4%
<b>Selenium - Octane - Google Chrome (Geometric Mean)</b>	42670	49221	49499	<b>50093</b>	45494	45482	<b>34657</b>
Normalized	85.18%	98.26%	98.81%	100%	90.82%	90.8%	69.19%
Standard	0.4%	0.8%	0.2%	0.7%	0.4%	0.2%	0.3%
<b>Selenium - Jetstream - Firefox (Score)</b>	197	223	225	226	205	<b>231</b>	<b>154</b>
Normalized	85.28%	96.54%	97.4%	97.84%	88.74%	100%	66.67%
Standard	0.4%	0.5%	0.6%	0.3%	0.3%	0.5%	0.9%
<b>Selenium - Jetstream - Google Chrome (Score)</b>	195	222	<b>224</b>	<b>224</b>	214	208	<b>169</b>
Normalized	87.05%	99.11%	100%	100%	95.54%	92.86%	75.45%
Standard	0.1%	1.3%	0.9%	1.9%	1.6%	1.4%	0.4%
<b>Deviation</b>							

	181	219	220	227	200	240	155
<b>libjpeg-turbo</b>							
<b>tjbench - D.T</b>							
<b>(Megapixels/s ec)</b>							
Normalized	75.42%	91.25%	91.67%	94.58%	83.33%	100%	64.58%
Standard	0.3%	0.3%	0.5%	0.3%	0.8%	0.1%	1.3%
<b>John The Ripper -</b>	17919	14599	19595	<b>28291</b>	<b>9772</b>	16678	20060
<b>Blowfish (Real C/S)</b>							
Normalized	63.34%	51.6%	69.26%	100%	34.54%	58.95%	70.91%
Standard	0.2%	0.1%	0.2%	0.3%	0%	0.3%	0.3%
<b>GROMACS - Water</b>	0.72	<b>0.66</b>	0.76	0.98	0.74	0.84	<b>1.25</b>
<b>Benchmark (Ns/Day)</b>							
Normalized	57.6%	52.8%	60.8%	78.4%	59.2%	67.2%	100%
Standard	0.2%	0.3%	0.1%	0.3%	0.5%	0.5%	1.2%
<b>CP2K</b>	530	322	<b>318</b>	326	780	638	<b>2512</b>
<b>Molecular Dynamics -</b>							
<b>Fayalite-FIST Data (sec)</b>							
Normalized	60%	98.76%	100%	97.55%	40.77%	49.84%	12.66%
<b>SVT-AV1 -</b>	25.98	26.09	35.40	<b>46.04</b>	<b>22.46</b>	35.21	31.34
<b>1.8.b.Y.T.A.V. E (FPS)</b>							
Normalized	56.43%	56.67%	76.89%	100%	48.78%	76.48%	68.07%
Standard	0.7%	0.3%	0.2%	0.7%	0.3%	0.5%	1.1%
<b>VP9 libvpx Encoding - v.V.1.V.E (FPS)</b>	135	141	136	179	<b>128</b>	<b>191</b>	175
<b>dav1d - S.N.1 (sec)</b>							
Normalized	70.68%	73.82%	71.2%	93.72%	67.02%	100%	91.62%
Standard	2.4%	7.3%	2.8%	1%	0.7%	0.8%	1%
<b>dav1d - Summer</b>	11.78	10.58	9.79	8.04	<b>12.68</b>	<b>7.68</b>	
<b>Nature 4K (sec)</b>							
Normalized	65.2%	72.59%	78.45%	95.52%	60.57%	100%	
Standard	0.8%	0.9%	0.9%	0.7%	0.3%	0.8%	
<b>dav1d -</b>	34.28	30.71	26.08	<b>21.87</b>	<b>42.61</b>	26.56	
<b>Deviation</b>							
	63.8%	71.21%	83.86%	100%	51.33%	82.34%	
	0.6%	0.6%	0.7%	0.9%	0.2%	0.5%	

Zstd Compression	<b>28.94</b>	27.25	22.34	17.96	28.79	24.20	<b>17.08</b>
C.u.1.0.3.s.i.i.							
Normalized	59.02%	62.68%	76.45%	95.1%	59.33%	70.58%	100%
Standard	1.7%	0.2%	0.6%	0.6%	0.1%	0.3%	7.4%
XZ	39.42	38.83	31.51	25.49	<b>45.85</b>	28.46	<b>24.13</b>
Compression							
C.u.1.0.3.s.i.i.							
Normalized	61.21%	62.14%	76.58%	94.66%	52.63%	84.79%	100%
Standard	0.3%	0.1%	0.4%	0.6%	0.5%	0.1%	0.1%
PyBench - T.F.A.T.T	1105	959	941	919	954	<b>801</b>	<b>1626</b>
(Milliseconds)							
Normalized	72.49%	83.52%	85.12%	87.16%	83.96%	100%	49.26%
Standard	0.5%	1%	0.7%	0.9%	0.2%	0.1%	0.3%
Go	16001	13590	13750	13786	12825	<b>11015</b>	<b>19929</b>
Benchmarks - build (ns/op)	18962	43924	33899	88634	85645	<b>44574</b>	<b>46253</b>
Normalized	8	5	7	3	2	<b>7</b>	<b>6</b>
Standard	68.84%	81.05%	80.11%	79.9%	85.88%	100%	55.27%
Go	2.3%	2.1%	1.9%	1.9%	1.6%	2.8%	0.5%
	5797	6568	5216	4911	<b>7916</b>	<b>4353</b>	6514
Benchmarks - http (ns/op)							
Normalized	75.09%	66.28%	83.45%	88.64%	54.99%	100%	66.83%
Standard	0.1%	0%	0.7%	1.1%	0.1%	0.2%	0.2%
Go	65295	75835	58166	<b>40642</b>	<b>81140</b>	57381	44475
Benchmarks - json (ns/op)	98	07	57	<b>32</b>	<b>11</b>	27	34
Normalized	62.24%	53.59%	69.87%	100%	50.09%	70.83%	91.38%
Standard	0.4%	0.4%	0.6%	0.4%	0.2%	0.3%	0.2%
Go	13769	15639	11732	<b>85980</b>	<b>20566</b>	11515	14469
Benchmarks - garbage (ns/op)	86	93	65	<b>8</b>	<b>07</b>	64	90
Normalized	62.44%	54.98%	73.28%	100%	41.81%	74.66%	59.42%
Standard	0.2%	0.3%	0.4%	0.2%	0.5%	0.1%	0.6%
Rust	45.82	44.79	40.70	<b>36.15</b>	<b>76.42</b>	44.04	58.78
Mandelbrot - T.T.C.S.P.M (sec)							
Normalized	78.9%	80.71%	88.82%	100%	47.3%	82.08%	61.5%
Standard	0.3%	0.5%	0%	1.7%	0.9%	0.1%	0.1%
Tensorflow - Cifar10 (sec)	<b>36.12</b>	27.57	25.93	<b>21.88</b>	33.54	23.86	
Normalized	60.58%	79.36%	84.38%	100%	65.24%	91.7%	
Standard	0.1%	0.3%	0.2%	0.2%	0.3%	0.1%	
Deviation							

<b>Tungsten</b>	27.66	32.58	24.91	<b>17.53</b>	<b>52.83</b>	28.03	24.01
<b>Renderer - Hair (sec)</b>							
Normalized	63.38%	53.81%	70.37%	100%	33.18%	62.54%	73.01%
Standard	0.2%	0.1%	0.2%	0.1%	0%	0.4%	0.1%
<b>Tungsten</b>	30.89	30.58	26.78	<b>23.98</b>	<b>39.37</b>	25.05	30.47
<b>Renderer - Water Caustic (sec)</b>							
Normalized	77.63%	78.42%	89.54%	100%	60.91%	95.73%	78.7%
Standard	0.3%	0.7%	0.9%	0.2%	0.3%	0.3%	1.2%
<b>Tungsten</b>	9.26	11.68	8.30	<b>6.88</b>	<b>15.51</b>	7.71	14.63
<b>Renderer - Non-Exponent ial (sec)</b>							
Normalized	74.3%	58.9%	82.89%	100%	44.36%	89.23%	47.03%
Standard	0.6%	0.2%	0.2%	6.7%	0.1%	0.3%	0.5%
<b>Tungsten</b>	11.75	13.49	10.26	<b>7.52</b>	<b>19.24</b>	10.00	11.78
<b>Renderer - Volumetric Caustic (sec)</b>							
Normalized	64%	55.74%	73.29%	100%	39.09%	75.2%	63.84%
Standard	0.2%	0.1%	0.2%	0.2%	0.2%	0.5%	0.5%
<b>Tesseract - 3840 x 2160 (FPS/Watt)</b>	1.28	1.30	1.30	<b>1.20</b>	<b>1.60</b>	1.52	
<b>Xonotic - 3840 x 2160 - Ultra (FPS/Watt)</b>	80%	81.25%	81.25%	75%	100%	95%	
	<b>1.74</b>	1.79	2.01	1.76	2.29	<b>2.44</b>	
<b>Xonotic - 3840 x 2160 - Ultimate (FPS/Watt)</b>	71.31%	73.36%	82.38%	72.13%	93.85%	100%	
	<b>1.21</b>	<b>1.21</b>	1.35	1.25	<b>1.81</b>	1.53	
<b>SuperTuxKart - 3840 x 2160 - Fullscreen - Ultimate - 6 - Candela City (FPS/Watt)</b>	66.85%	66.85%	74.59%	69.06%	100%	84.53%	
	<b>0.21</b>	<b>0.21</b>	<b>0.21</b>	<b>0.21</b>	<b>0.25</b>	0.24	
<b>Normalized</b>	84%	84%	84%	84%	100%	96%	

## mark4-1

	1896	2151	2509	2847	2306	3386
<b>Coremark - CoreMark Size 666 - I.P.S (Iterations/Sec /Watt)</b>	55.99%	63.53%	74.09%	84.08%	68.11%	100%
<b>Selenium - Octane - Firefox (Geometric Mean/Watt)</b>	328.59	383.73	384.79	334.27	599.20	613.10
<b>Normalized Selenium - Octane - Google Chrome (Geometric Mean/Watt)</b>	422.18	507.02	504.48	452.48	777.39	680.15
<b>Normalized Selenium - Jetstream - Firefox (Score/Watt)</b>	1.90	2.26	2.26	1.99	3.49	87.49%
<b>Normalized Selenium - Jetstream - Google Chrome (Score/Watt)</b>	1.78	2.21	2.21	1.94	3.56	99.14%
<b>Normalized libjpeg-turbo tjbench - D.T (Megapixels/sec/Watt)</b>	1.96	2.59	2.51	2.31	3.74	3.92
<b>Normalized John The Ripper - Blowfish (Real C/S/Watt)</b>	98.66	108.41	131.82	58.93%	95.41%	100%
<b>Normalized GROMACS - Water Benchmark (Ns/Day/Watt)</b>	0.00	0.00	0.00	0.00	0.01	0.01
<b>Normalized SVT-AV1 - 1.8.b.Y.T.A.V. E (FPS/Watt)</b>	0.19	0.21	0.31	0.29	0.27	0.35
<b>Normalized</b>	54.29%	60%	88.57%	82.86%	77.14%	100%

<b>SVT-HEVC - 1.8.b.Y.T.H.V. E (FPS/Watt)</b>	<b>Normalized</b>	<b>1.24</b>	1.58	1.73	<b>2.14</b>	1.65	1.86
		57.94%	73.83%	80.84%	100%	77.1%	86.92%
<b>VP9 libvpx Encoding - v.V.1.V.E (FPS/Watt)</b>	<b>Normalized</b>	<b>0.80</b>	1.05	1.00	1.05	1.45	<b>1.56</b>
		48.39%	70.97%	72.04%	94.62%	76.34%	100%
<b>x264 - H.2.V.E (FPS/Watt)</b>	<b>Normalized</b>	<b>0.45</b>	0.66	0.67	0.88	0.71	<b>0.93</b>
		51.28%	67.31%	64.1%	67.31%	92.95%	100%
<b>x265 - H.2.1.V.E (FPS/Watt)</b>	<b>Normalized</b>	<b>0.17</b>	0.27	0.30	0.29	0.35	<b>0.40</b>
		48.39%	70.97%	72.04%	94.62%	76.34%	100%
<b>Stockfish - Total Time (Nodes/s/Watt)</b>	<b>Normalized</b>	<b>11170</b>	12737	15568	16064	13965	<b>18167</b>
		42.5%	67.5%	75%	72.5%	87.5%	100%
<b>asmFish - 1.H.M.2.D (Nodes/s/Watt)</b>	<b>Normalized</b>	<b>11719</b>	13912	16534	16663	15215	<b>19839</b>
		61.49%	70.11%	85.69%	88.42%	76.87%	100%
<b>Meta Performance Per Watt - P.P.W (Performance/ Watt)</b>	<b>Normalized</b>	<b>9</b>	8	4	1	1	<b>7</b>
		59.07%	70.13%	83.34%	83.99%	76.69%	100%
<b>Tesseract - Performance / Cost - 3840 x 2160 (FPS/Dollar)</b>	<b>Normalized</b>	<b>1593</b>	<b>1285</b>	1434	1690	<b>1695</b>	1453
		94%	75.8%	84.57%	99.67%	100%	85.69%
<b>Xonotic - Performance / Cost - 3840 x 2160 - Ultra (FPS/Dollar)</b>	<b>Normalized</b>	<b>1.35</b>	1.49	1.12	0.75	<b>1.87</b>	<b>0.72</b>
		72.19%	79.68%	59.89%	40.11%	100%	38.5%
<b>Normalized</b>		<b>1.16</b>	1.48	1.15	0.75	<b>1.93</b>	<b>0.72</b>
		60.1%	76.68%	59.59%	38.86%	100%	37.31%

Xonotic - Performance / Cost - 3840 x 2160 - Ultimate Normalized SuperTuxKart - Performance / Cost - 3840 x 2160 - Fullscreen - Ultimate - 6 - Candela City (FPS/Dollar) Normalized Blender - Performance / Cost - BMW27 - CPU-Only (sec x Dollar) Normalized Blender - Performance / Cost - Barbershop - CPU-Only (sec x Dollar) Normalized Darktable - Performance / Cost - Boat - CPU-only (sec x Dollar) Normalized Darktable - Performance / Cost - Masskrug - CPU-only (sec x Dollar) Normalized	0.92 57.14% 0.29 59.18% 49459 9 19677 21134 21563 22958 3 1 3172 2764 3754 5574 61.95% 1582 1516 1757 2265 72.13%	1.16 72.05% 0.29 59.18% 52848 0 21134 21563 22958 0 0 3754 5574 71.11% 1757 2265 50.38%	0.89 55.28% 0.22 44.9% 53604 0 21563 22958 22958 5 5 5574 5574 88.65% 2265 2265 50.38%	0.59 36.65% 100% 30.61% 56756 100% 100% 100% 100% 5 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100%	<b>1.61</b> <b>0.58</b> <b>0.15</b> <b>0.49</b> <b>0.15</b>
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Darktable - Performance / Cost - Server Room - CPU-only (sec x Dollar)		1046	1088	1273	1781	<b>797.15</b> <span style="color:red">2075</span>	
Normalized GIMP - Performance / Cost - unsharp-mask (sec x Dollar)		76.17%	73.26%	62.61%	44.75%	100%	38.42%
		4481	3797	5201	<b>8563</b>	<span style="color:green">2327</span>	7420
Normalized GIMP - Performance / Cost - resize (sec x Dollar)		51.94%	61.29%	44.74%	27.18%	100%	31.37%
		2200	1947	2474	<b>3738</b>	<span style="color:green">1228</span>	3344
Normalized GIMP - Performance / Cost - rotate (sec x Dollar)		55.82%	63.05%	49.62%	32.85%	100%	36.71%
		3368	2958	3882	<b>5888</b>	<span style="color:green">1956</span>	5503
Normalized GIMP - Performance / Cost - auto-levels (sec x Dollar)		58.09%	66.14%	50.39%	33.23%	100%	35.55%
		3901	3344	4478	<b>7156</b>	<span style="color:green">2096</span>	6259
Normalized Appleseed - Performance / Cost - Emily (sec x Dollar)		53.73%	62.69%	46.82%	29.3%	100%	33.49%
		<b>10736</b>	11996	12468	13572	11544	<span style="color:red">20806</span>
		<b>3</b>	3	1	3	5	<span style="color:red">8</span>
Normalized Appleseed - Performance / Cost - Disney Material (sec x Dollar)		100%	89.5%	86.11%	79.1%	93%	51.6%
		61501	77148	78341	84196	<b>60616</b>	<span style="color:red">12119</span>
							<span style="color:red">8</span>
Normalized Appleseed - Performance / Cost - Material Tester (sec x Dollar)		98.56%	78.57%	77.37%	71.99%	100%	50.01%
		<b>57302</b>	67970	70294	81097	62744	<span style="color:red">11464</span>
							<span style="color:red">3</span>
Normalized		100%	84.31%	81.52%	70.66%	91.33%	49.98%

Timed LLVM	12021	10258	10974	12155	<b>93791</b>	<b>18296</b>	
Compilation -	8	8	1	1		<b>3</b>	
Performance /							
Cost - Time							
To Compile							
(sec x Dollar)							
Normalized	78.02%	91.42%	85.47%	77.16%	100%	51.26%	
Timed Linux	19327	17938	19135	20893	<b>16713</b>	<b>32594</b>	
Kernel							
Compilation -							
Performance /							
Cost - Time							
To Compile							
(sec x Dollar)							
Normalized	86.48%	93.17%	87.35%	79.99%	100%	51.28%	
Coremark -	1059	1123	1129	1066	<b>1252</b>	<b>798.95</b>	
Performance /							
Cost -							
CoreMark Size							
666 - I.P.S							
(Iterations/Sec							
/Dollar)							
Normalized	84.64%	89.76%	90.2%	85.17%	100%	63.84%	
Selenium -	15171	12841	16759	<b>25699</b>	<b>7717</b>	25298	
Performance /							
Cost - ARES-6							
- Firefox (ms x							
Dollar)							
Normalized	50.86%	60.09%	46.04%	30.03%	100%	30.5%	
Selenium -	5911	4846	6320	9606	<b>2973</b>	<b>11505</b>	
Performance /							
Cost - ARES-6							
- Google							
Chrome (ms x							
Dollar)							
Normalized	50.29%	61.35%	47.03%	30.95%	100%	25.84%	
Selenium -	129.43	149.03	112.40	<b>75.88</b>	<b>235.13</b>	80.54	
Performance /							
Cost - Octane							
- Firefox							
(Geometric							
Mean/Dollar)							
Normalized	55.05%	63.38%	47.8%	32.27%	100%	34.25%	

Selenium - Performance / Cost - Octane - Google Chrome (Geometric Mean/Dollar)	Normalized	167.99	197.67	150.45	100.39	<b>305.33</b>	<b>92.07</b>
		55.02%	64.74%	49.27%	32.88%	100%	30.15%
	Normalized Selenium - Performance / Cost - Jetstream - Firefox (Score/Dollar)	0.78	0.90	0.68	<b>0.45</b>	<b>1.38</b>	0.47
		56.52%	65.22%	49.28%	32.61%	100%	34.06%
	Normalized Selenium - Performance / Cost - Jetstream - Google Chrome (Score/Dollar)	0.77	0.89	0.68	0.45	<b>1.44</b>	<b>0.42</b>
		53.47%	61.81%	47.22%	31.25%	100%	29.17%
Normalized libjpeg-turbo tjbench - Performance / Cost - D.T (Megapixels/s ec/Dollar)	Normalized	0.71	0.88	0.67	<b>0.45</b>	<b>1.34</b>	0.49
		52.99%	65.67%	50%	33.58%	100%	36.57%
Normalized John The Ripper - Performance / Cost - Blowfish (Real C/S/Dollar)	Normalized	<b>70.55</b>	58.63	59.56	56.70	65.58	<b>33.76</b>
		100%	83.1%	84.42%	80.37%	92.96%	47.85%

<b>CP2K</b>	13470	<b>80068</b>	10473	16253	11626	<b>31519</b>
<b>Molecular</b>	4		4	9	8	<b>2</b>
<b>Dynamics -</b>						
<b>Performance /</b>						
<b>Cost -</b>						
<b>Fayalite-FIST</b>						
<b>Data (sec x</b>						
<b>Dollar)</b>						
<b>Normalized</b>	59.44%	100%	76.45%	49.26%	68.87%	25.4%
<b>SVT-AV1 -</b>	0.10	0.10	0.11	0.09	<b>0.15</b>	<b>0.07</b>
<b>Performance /</b>						
<b>Cost -</b>						
<b>1.8.b.Y.T.A.V.</b>						
<b>E (FPS/Dollar)</b>						
<b>Normalized</b>	66.67%	66.67%	73.33%	60%	100%	46.67%
<b>SVT-HEVC -</b>	0.59	0.63	0.59	0.50	<b>0.81</b>	<b>0.39</b>
<b>Performance /</b>						
<b>Cost -</b>						
<b>1.8.b.Y.T.H.V.</b>						
<b>E (FPS/Dollar)</b>						
<b>Normalized</b>	72.84%	77.78%	72.84%	61.73%	100%	48.15%
<b>VP9 libvpx</b>	0.53	0.57	0.41	<b>0.36</b>	<b>0.86</b>	0.39
<b>Encoding -</b>						
<b>Performance /</b>						
<b>Cost -</b>						
<b>v.V.1.V.E</b>						
<b>(FPS/Dollar)</b>						
<b>Normalized</b>	61.63%	66.28%	47.67%	41.86%	100%	45.35%
<b>x264 -</b>	0.31	0.31	0.28	0.28	<b>0.39</b>	<b>0.19</b>
<b>Performance /</b>						
<b>Cost - H.2.V.E</b>						
<b>(FPS/Dollar)</b>						
<b>Normalized</b>	79.49%	79.49%	71.79%	71.79%	100%	48.72%
<b>x265 -</b>	0.12	0.16	0.13	0.10	<b>0.23</b>	<b>0.09</b>
<b>Performance /</b>						
<b>Cost -</b>						
<b>H.2.1.V.E</b>						
<b>(FPS/Dollar)</b>						
<b>Normalized</b>	52.17%	69.57%	56.52%	43.48%	100%	39.13%
<b>dav1d -</b>	2992	2634	3221	<b>4012</b>	<b>1889</b>	3794
<b>Performance /</b>						
<b>Cost - S.N.1</b>						
<b>(sec x Dollar)</b>						
<b>Normalized</b>	63.14%	71.72%	58.66%	47.09%	100%	49.8%

dav1d -	8707	7647	8580	10913	6349	13121
Performance /						
Cost -						
Summer						
Nature 4K						
Normalized	72.92%	83.03%	73.99%	58.18%	100%	48.39%
Zstd	7351	6785	7350	8962	4290	11955
Compression						
- Performance						
/ Cost -						
C.u.1.0.3.s.i.i.						
C.L.1 (sec x						
Dollar)						
Normalized	58.36%	63.22%	58.36%	47.87%	100%	35.88%
XZ	10013	9669	10367	12720	6832	14059
Compression						
- Performance						
/ Cost -						
C.u.1.0.3.s.i.i.						
C.L.9 (sec x						
Dollar)						
Normalized	68.23%	70.66%	65.9%	53.71%	100%	48.59%
Stockfish -	91847	82142	80017	75285	94439	50957
Performance /						
Cost - Total						
Time						
(Nodes/s/Doll						
ar)						
Normalized	97.25%	86.98%	84.73%	79.72%	100%	53.96%
asmFish -	95297	86605	85775	78848	10258	56775
Performance /						
Cost -						
1.H.M.2.D						
(Nodes/s/Doll						
ar)						
Normalized	92.9%	84.43%	83.62%	76.87%	100%	55.35%
PyBench -	28067	23879	30958	45858	14214	39569
Performance /						
Cost -						
T.F.A.T.T						
(Milliseconds						
x Dollar)						
Normalized	0	1	9	1	6	4
	50.65%	59.53%	45.91%	31%	100%	35.92%

NAMD - Performance / Cost - ATPase Simulation -	327,506 Atoms (days/ns x	583.90	673.47	680.82	725.03	<b>404.33</b>	<b>867.35</b>
Normalized Go		69.25%	60.04%	59.39%	55.77%	100%	46.62%
Benchmarks -	40643	33840	45238	<b>68796</b>	<b>19110</b>	54416	
Performance /	02165	19372	61530	<b>56285</b>	<b>52611</b>	30199	
Cost - build (ns/op x	512	005	013	<b>157</b>	<b>348</b>	018	
Normalized Go		47.02%	56.47%	42.24%	27.78%	100%	35.12%
Benchmarks -	14724	16354	17160	<b>24505</b>	<b>11794</b>	21503	
Performance /	38	32	64	<b>89</b>	<b>84</b>	82	
Cost - http (ns/op x		80.1%	72.12%	68.73%	48.13%	100%	54.85%
Normalized Go	16585	18882	19136	20280	<b>12089</b>	<b>28346</b>	
Benchmarks -	17892	93243	80153	51768	<b>87639</b>	<b>34738</b>	
Performance /							
Cost - json (ns/op x		72.9%	64.03%	63.18%	59.61%	100%	42.65%
Normalized Go	34975	38943	38600	42904	<b>30643</b>	<b>56887</b>	
Benchmarks -	4444	4257	4185	4192	<b>4443</b>	<b>2616</b>	
Performance /							
Cost - garbage		87.61%	78.69%	79.39%	71.42%	100%	53.87%
Normalized Rust	11638	<b>11153</b>	13390	18039	11387	<b>21756</b>	
Mandelbrot -							
Performance /							
Cost - T.T.C.S.P.M							
(sec x Dollar)							
Normalized Tensorflow -		95.83%	100%	83.29%	61.83%	97.95%	51.26%
Performance /	9174	6865	8531	10918	<b>4997</b>	<b>11787</b>	
Cost - Cifar10 (sec x Dollar)							
Normalized		54.47%	72.8%	58.58%	45.77%	100%	42.4%

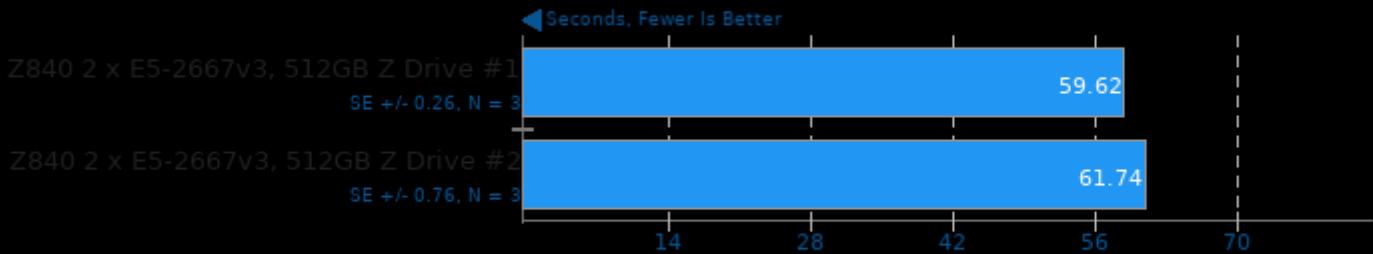
	7026	8112	8195	8747	7872	13847	
<b>Tungsten</b>							
<b>Renderer -</b>							
<b>Performance /</b>							
<b>Cost - Hair</b>							
<b>(sec x Dollar)</b>							
Normalized	100%	86.6%	85.73%	80.32%	89.25%	50.74%	
<b>Tungsten</b>	7846	7614	8811	11966	<b>5866</b>	<b>12375</b>	
<b>Renderer -</b>							
<b>Performance /</b>							
<b>Cost - Water</b>							
<b>Caustic (sec x</b>							
<b>Dollar)</b>							
Normalized	74.77%	77.04%	66.58%	49.02%	100%	47.4%	
<b>Tungsten</b>	2352	2908	2731	3433	<b>2311</b>	<b>3809</b>	
<b>Renderer -</b>							
<b>Performance /</b>							
<b>Cost -</b>							
<b>Non-Exponent</b>							
<b>ial (sec x</b>							
<b>Dollar)</b>							
Normalized	98.25%	79.46%	84.63%	67.31%	100%	60.68%	
<b>Tungsten</b>	2985	3359	3376	3752	<b>2867</b>	<b>4940</b>	
<b>Renderer -</b>							
<b>Performance /</b>							
<b>Cost -</b>							
<b>Volumetric</b>							
<b>Caustic (sec x</b>							
<b>Dollar)</b>							
Normalized	96.05%	85.35%	84.93%	76.4%	100%	58.03%	
<b>Darktable -</b>							8.04
<b>Boat -</b>							
<b>CPU-only</b>							
Standard							1.4%
<b>Darktable -</b>							
<b>Masskrug -</b>							6.09
<b>CPU-only</b>							
Standard							
<b>Darktable -</b>							
Standard							2.9%
<b>Server Room -</b>							
<b>CPU-only</b>							
Standard							
<b>GIMP -</b>							
Standard							5.7%
<b>unsharp-mask</b>							
<b>(sec)</b>							
Standard							
<b>GIMP - resize</b>							
<b>(sec)</b>							
Standard							
<b>Deviation</b>							0.5%

---

<b>GIMP - rotate</b>		23.38
(sec)		
Standard		0.3%
GIMP -		22.80
auto-levels		
(sec)		
Standard		0.4%
Deviation		

## Rodinia 2.4

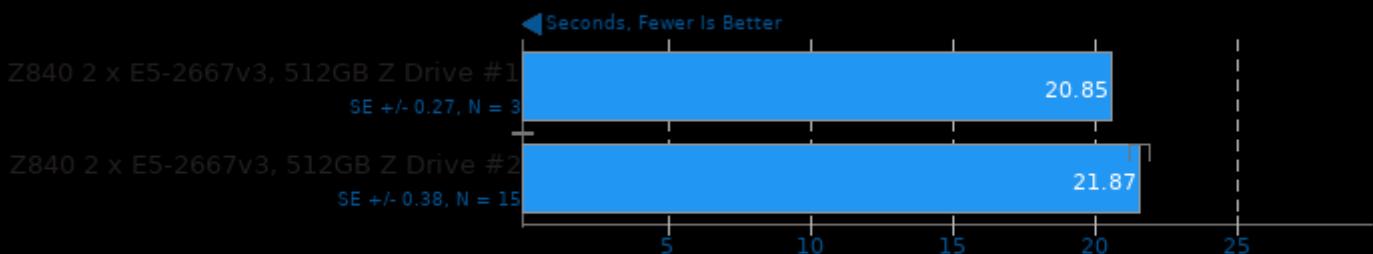
Test: OpenMP LavaMD



1. (CXX) g++ options: -O2 -fOpenCL

## Rodinia 2.4

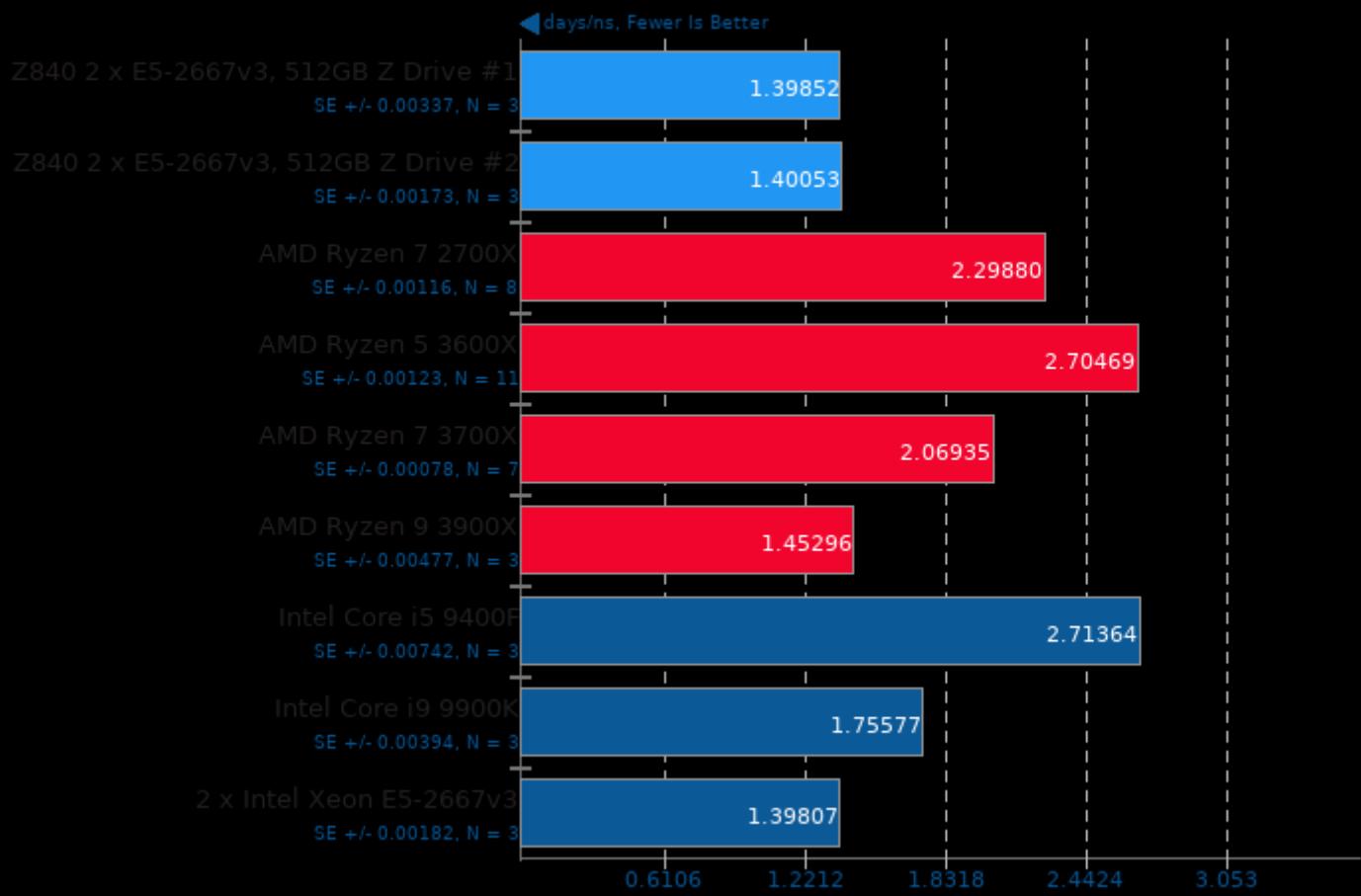
Test: OpenMP CFD Solver



1. (CXX) g++ options: -O2 -fOpenCL

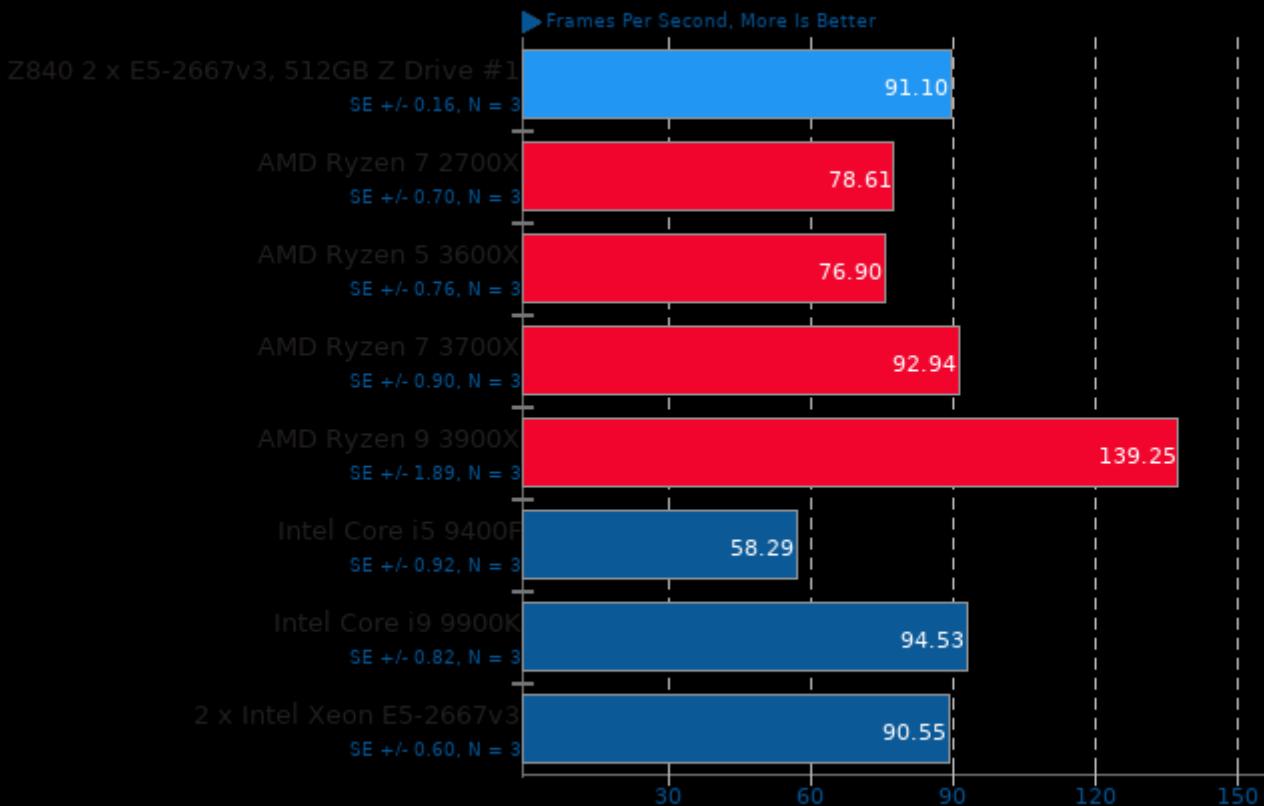
## NAMD 2.13b1

ATPase Simulation - 327,506 Atoms



**x264 2018-09-25**

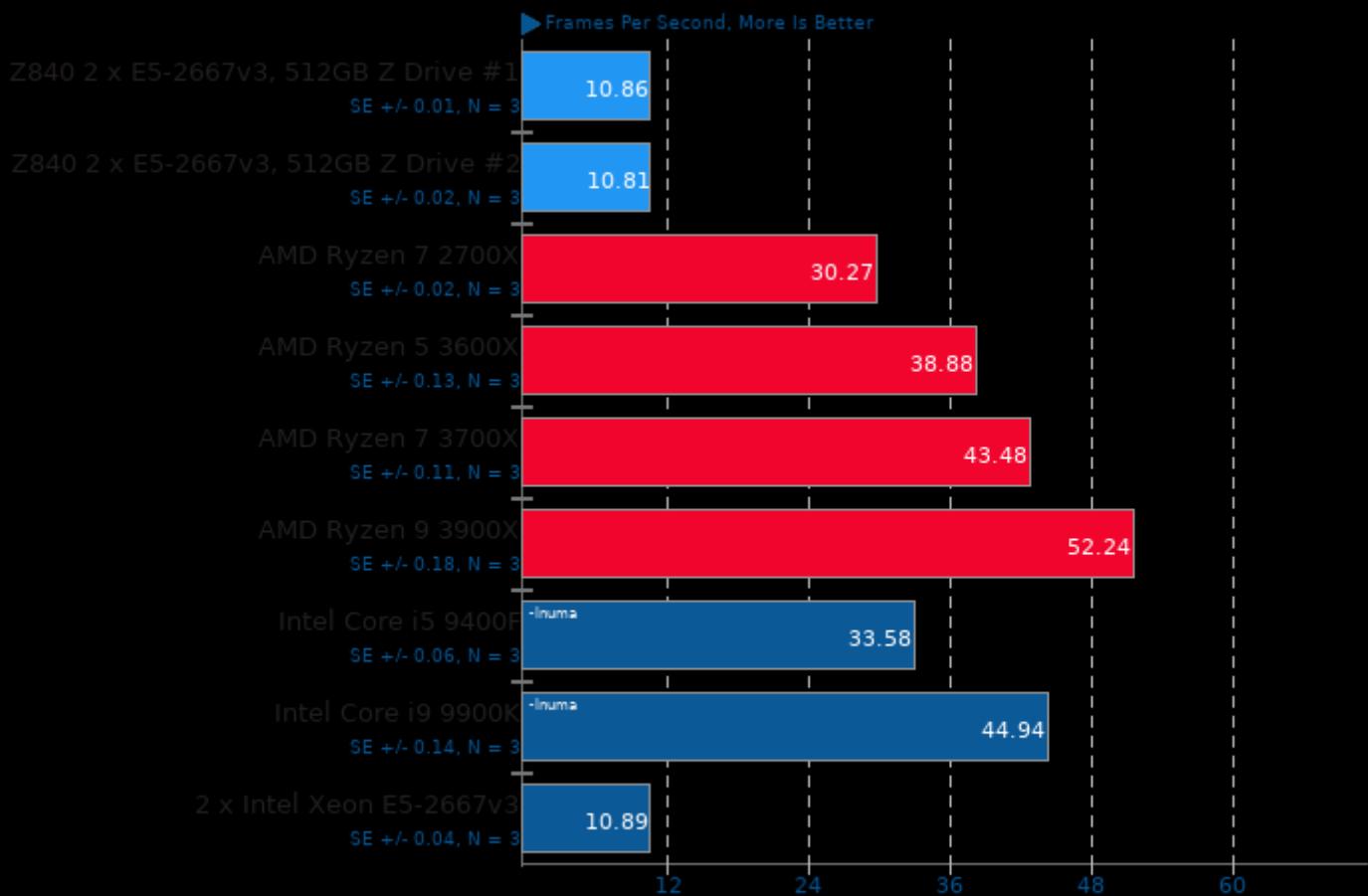
H.264 Video Encoding



1. (CC) gcc options: -fPIC -fno-tree-vectorize

## x265 3.0

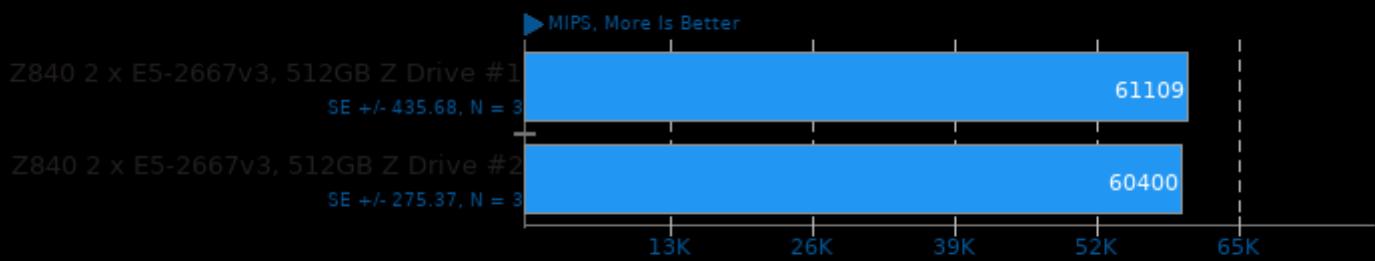
H.265 1080p Video Encoding



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

## 7-Zip Compression 16.02

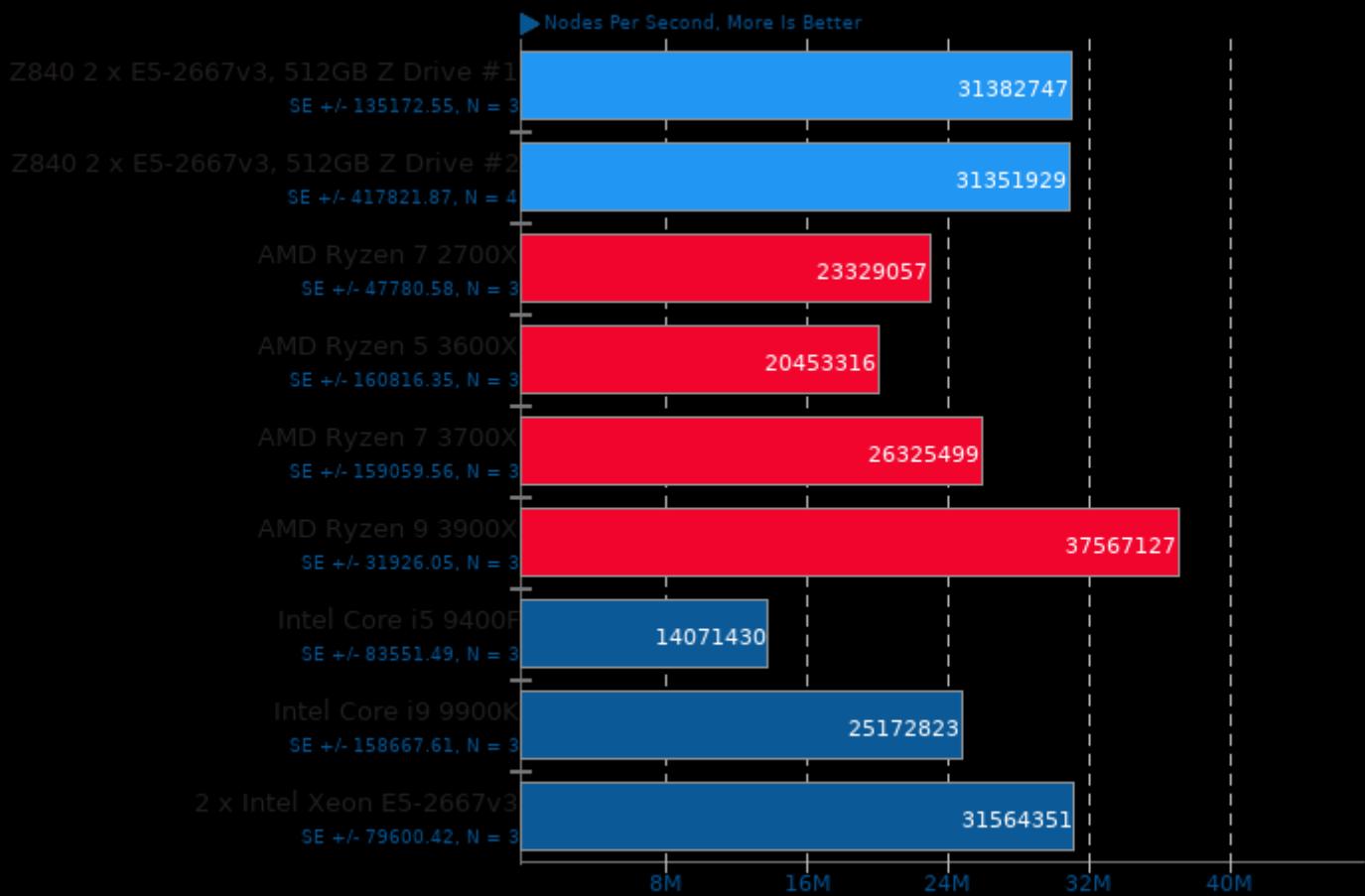
Compress Speed Test



1. (CXX) g++ options: -pipe -lpthread

## Stockfish 9

Total Time



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

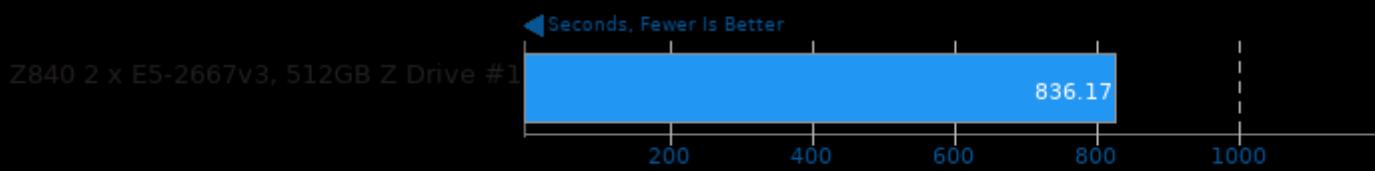
## asmFish 2018-07-23

1024 Hash Memory, 26 Depth



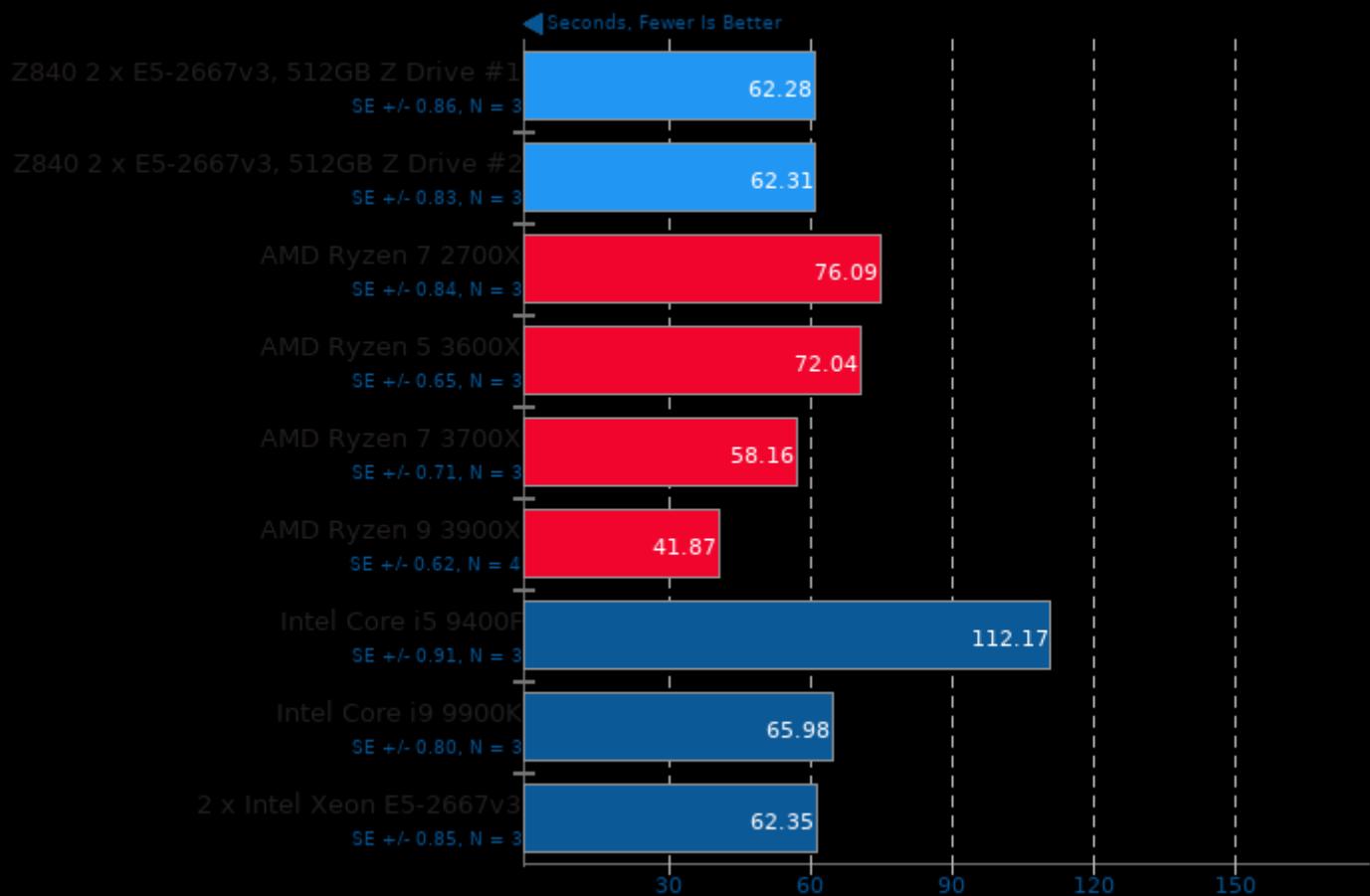
## Timed GCC Compilation 8.2

Time To Compile



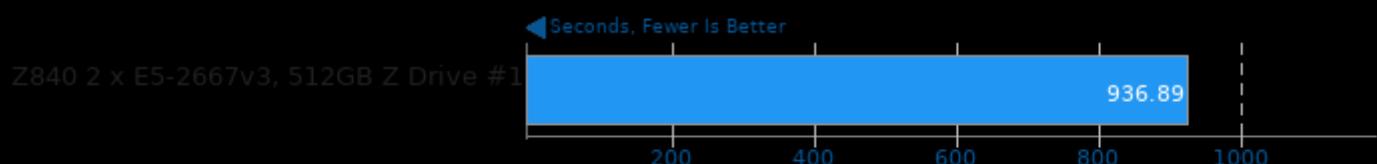
## Timed Linux Kernel Compilation 4.18

Time To Compile



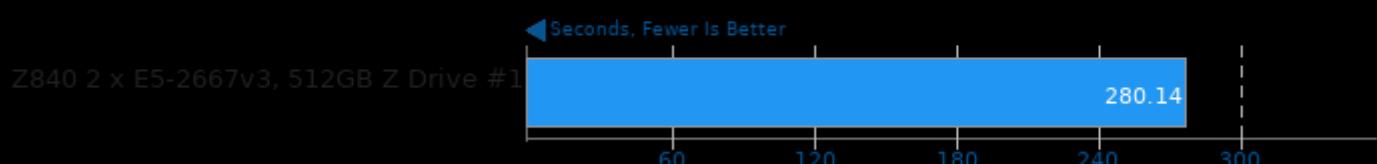
## Radiance Benchmark 5.0

Test: Serial



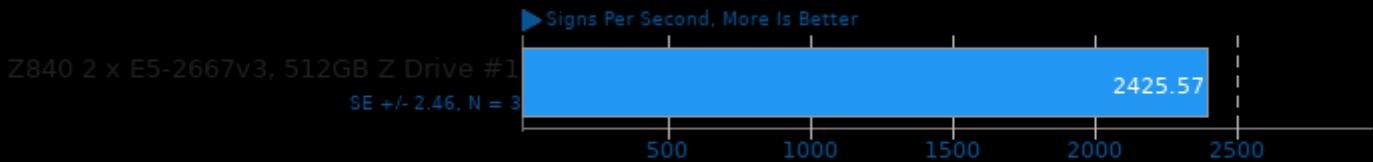
## Radiance Benchmark 5.0

Test: SMP Parallel



## OpenSSL 1.1.1

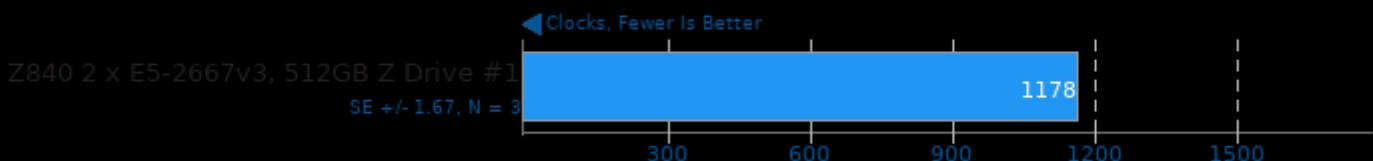
RSA 4096-bit Performance



1. (CC) gcc options: -pthread -m64 -O3 -lssl -lcrypto -ldl

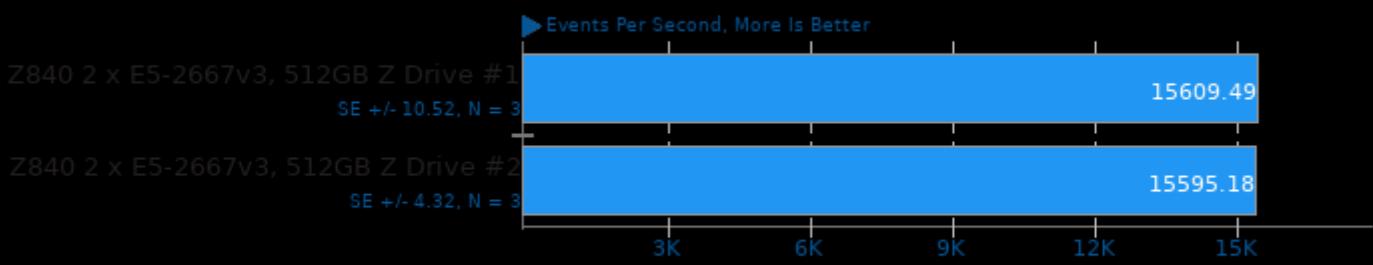
## ctx\_clock

Context Switch Time



## Sysbench 2018-07-28

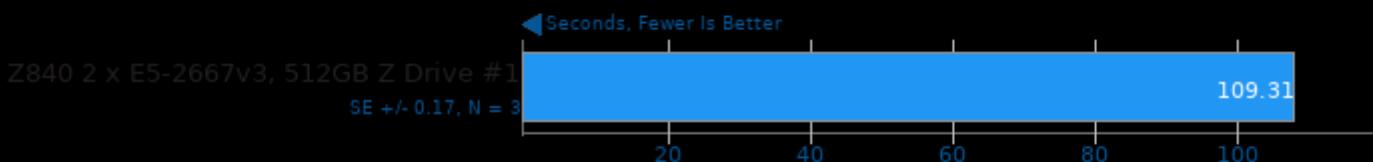
Test: CPU



1. (CC) gcc options: -pthread -O3 -funroll-loops -ggdb3 -march=haswell -rdynamic -ldl -laio -lm

## SQLite 3.22

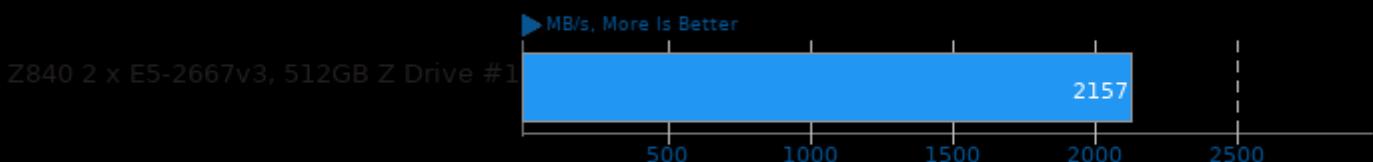
Timed SQLite Insertions



1. (CC) gcc options: -O2 -lz -ldl -pthread

## Flexible IO Tester 3.1

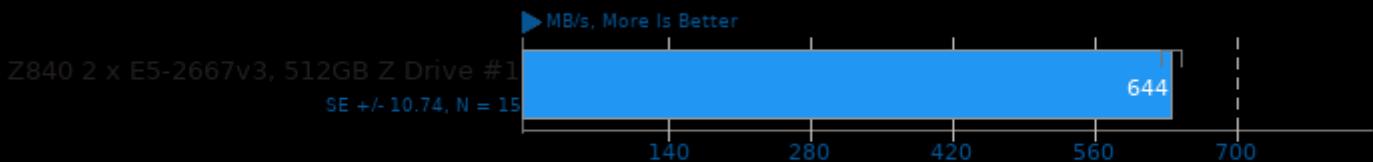
Type: Random Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory



1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U\_FORTIFY\_SOURCE -fPIE -laio -lz -lm -lpthread -ldl

## Flexible IO Tester 3.1

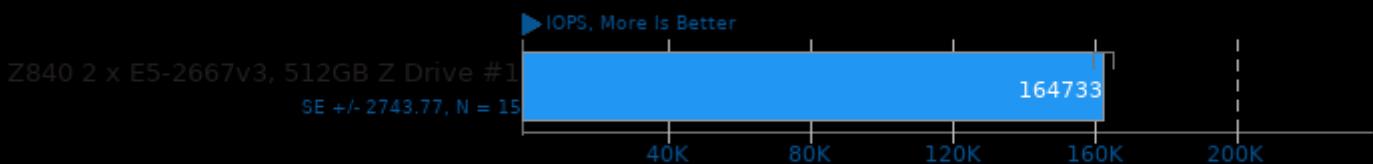
Type: Random Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory



1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U\_FORTIFY\_SOURCE -lrt -laio -lz -lm -lpthread -ldl

## Flexible IO Tester 3.1

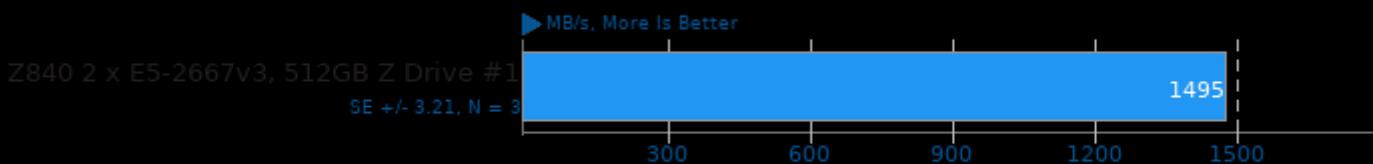
Type: Random Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory



1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U\_FORTIFY\_SOURCE -lrt -laio -lz -lm -lpthread -ldl

## Flexible IO Tester 3.1

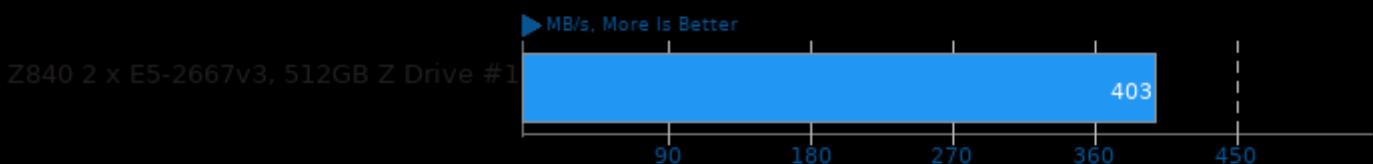
Type: Random Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory



1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U\_FORTIFY\_SOURCE -lrt -laio -lz -lm -lpthread -ldl

## Flexible IO Tester 3.1

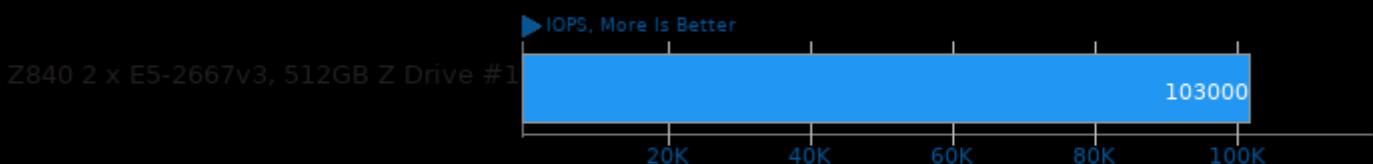
Type: Random Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory



1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U\_FORTIFY\_SOURCE -lrt -laio -lz -lm -lpthread -ldl

## Flexible IO Tester 3.1

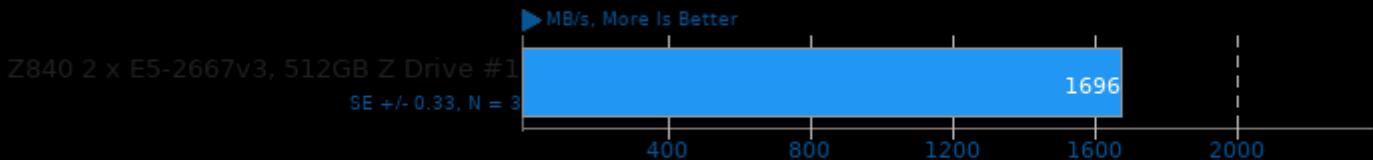
Type: Random Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory



1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U\_FORTIFY\_SOURCE -lrt -laio -lz -lm -lpthread -ldl

## Flexible IO Tester 3.1

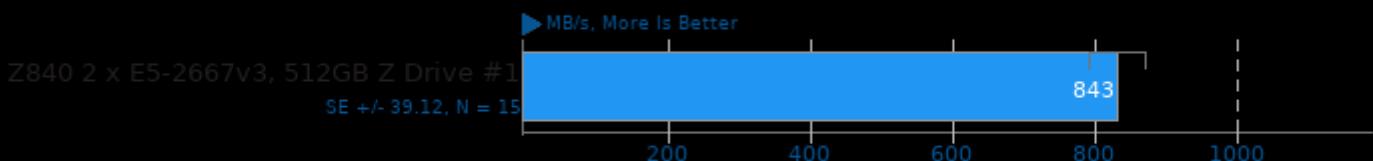
Type: Sequential Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory



1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U\_FORTIFY\_SOURCE -lrt -laio -lz -lm -lpthread -ldl

## Flexible IO Tester 3.1

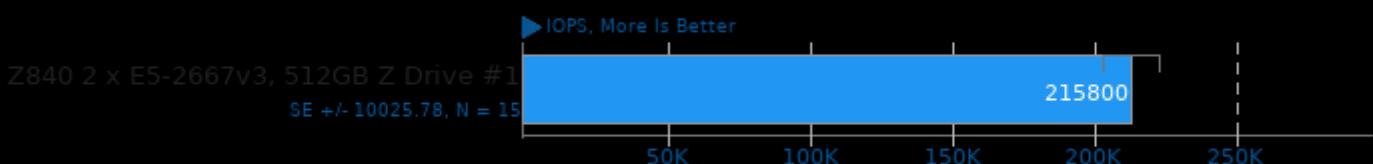
Type: Sequential Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory



1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U\_FORTIFY\_SOURCE -lrt -laio -lz -lm -lpthread -ldl

## Flexible IO Tester 3.1

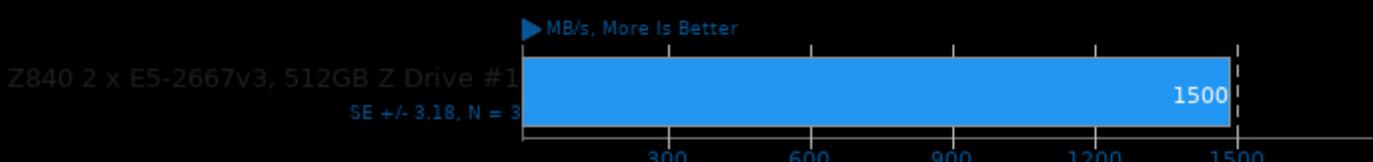
Type: Sequential Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory



1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U\_FORTIFY\_SOURCE -lrt -laio -lz -lm -lpthread -ldl

## Flexible IO Tester 3.1

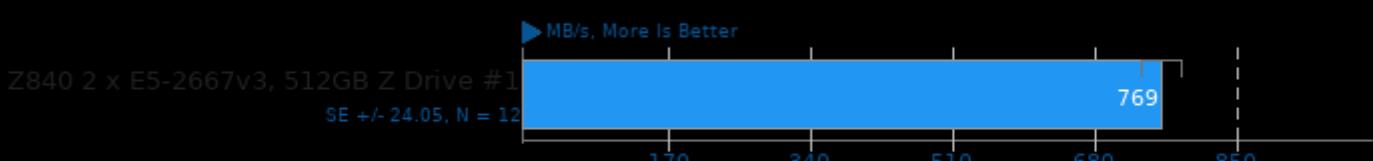
Type: Sequential Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory



1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U\_FORTIFY\_SOURCE -lrt -laio -lz -lm -lpthread -ldl

## Flexible IO Tester 3.1

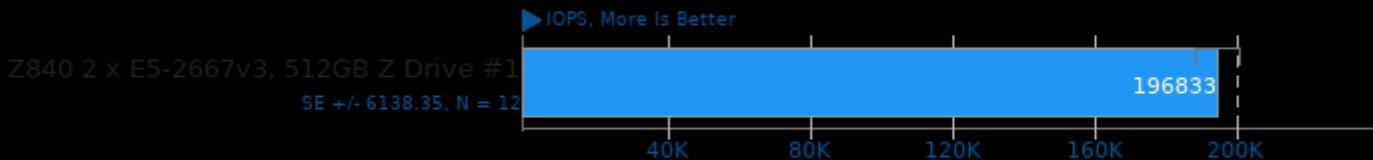
Type: Sequential Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory



1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U\_FORTIFY\_SOURCE -lrt -laio -lz -lm -lpthread -ldl

## Flexible IO Tester 3.1

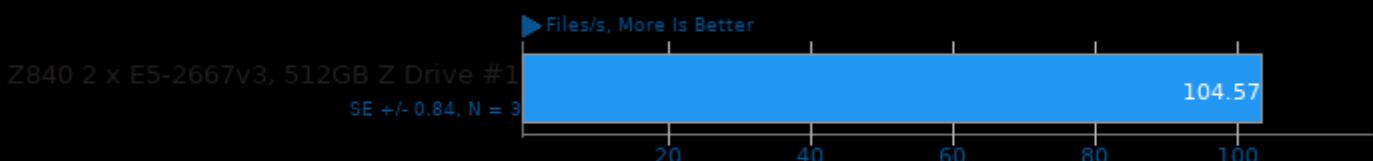
Type: Sequential Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory



1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U\_FORTIFY\_SOURCE -lrt -laio -lz -lm -lpthread -ldl

## FS-Mark 3.3

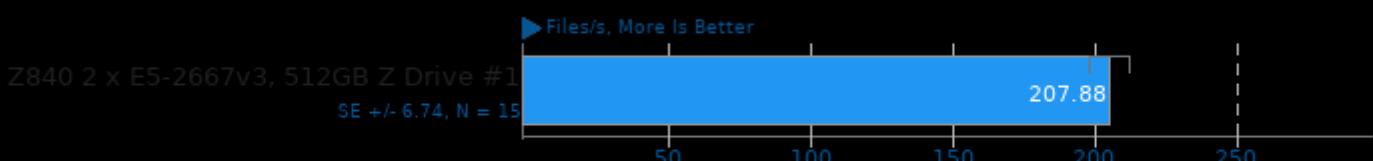
Test: 1000 Files, 1MB Size



1. (CC) gcc options: -static

## FS-Mark 3.3

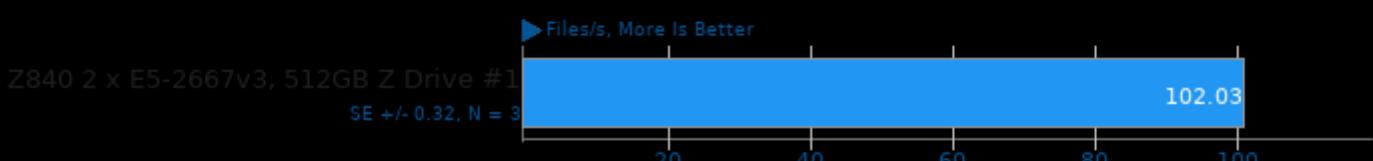
Test: 5000 Files, 1MB Size, 4 Threads



1. (CC) gcc options: -static

## FS-Mark 3.3

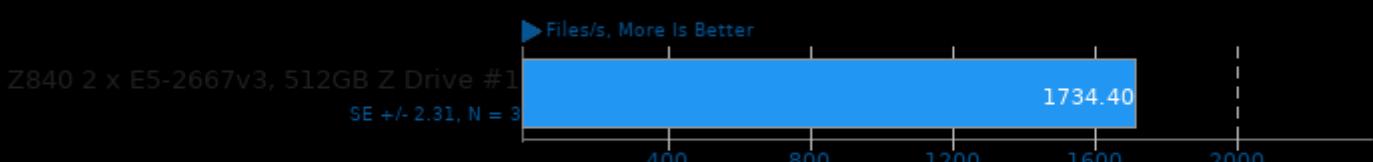
Test: 4000 Files, 32 Sub Dirs, 1MB Size



1. (CC) gcc options: -static

## FS-Mark 3.3

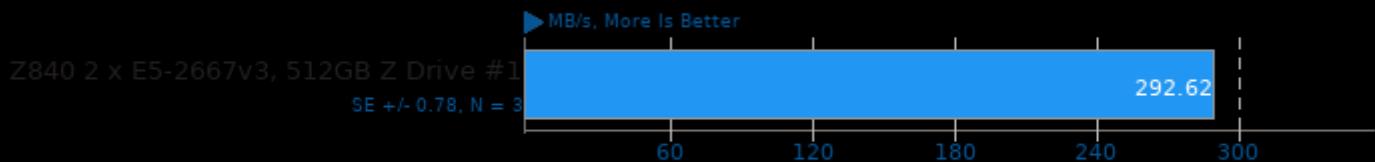
Test: 1000 Files, 1MB Size, No Sync/FSync



1. (CC) gcc options: -static

## Dbench 4.0

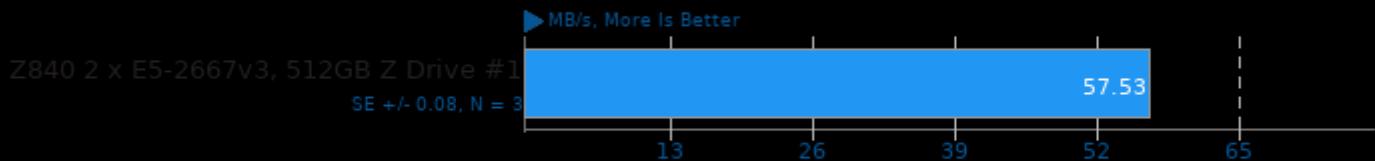
12 Clients



1. (CC) gcc options: -fipa-optim -O2

## Dbench 4.0

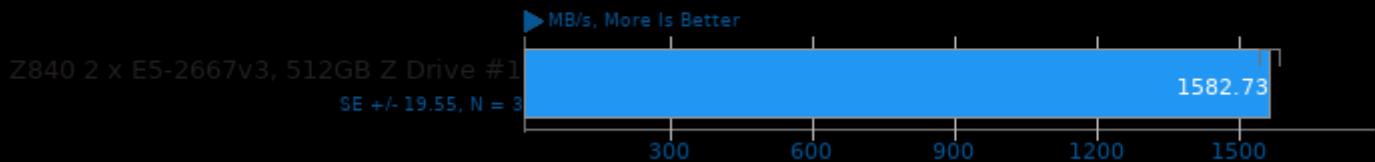
1 Clients



1. (CC) gcc options: -fipa-optim -O2

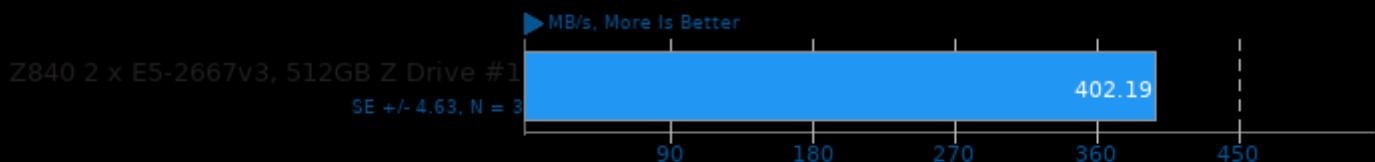
## Compile Bench 0.6

Test: Compile



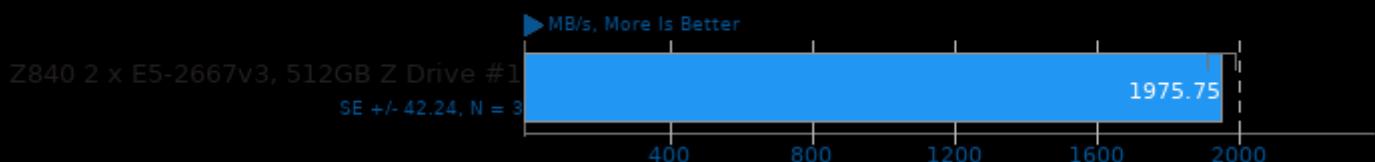
## Compile Bench 0.6

Test: Initial Create



## Compile Bench 0.6

Test: Read Compiled Tree



## PostMark 1.51

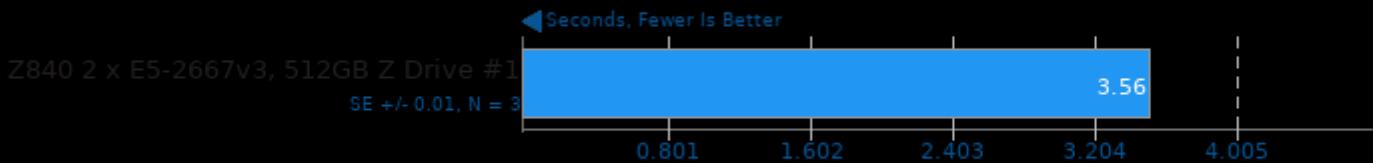
Disk Transaction Performance



1. (CC) gcc options: -O3

## Parboil 2.5

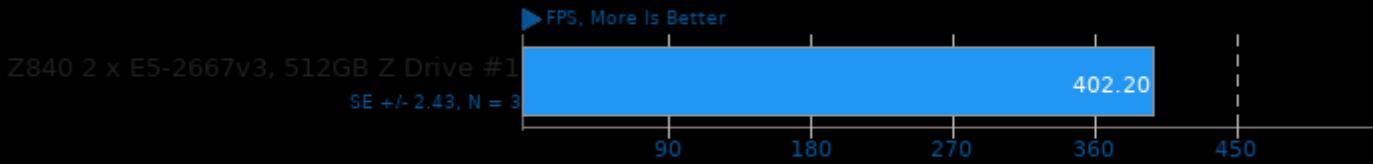
Test: OpenMP CUTCP



1. (CXX) g++ options: -lm -lpthread -lgomp -O3 -ffast-math -fopenmp

## TTSIOD 3D Renderer 2.3b

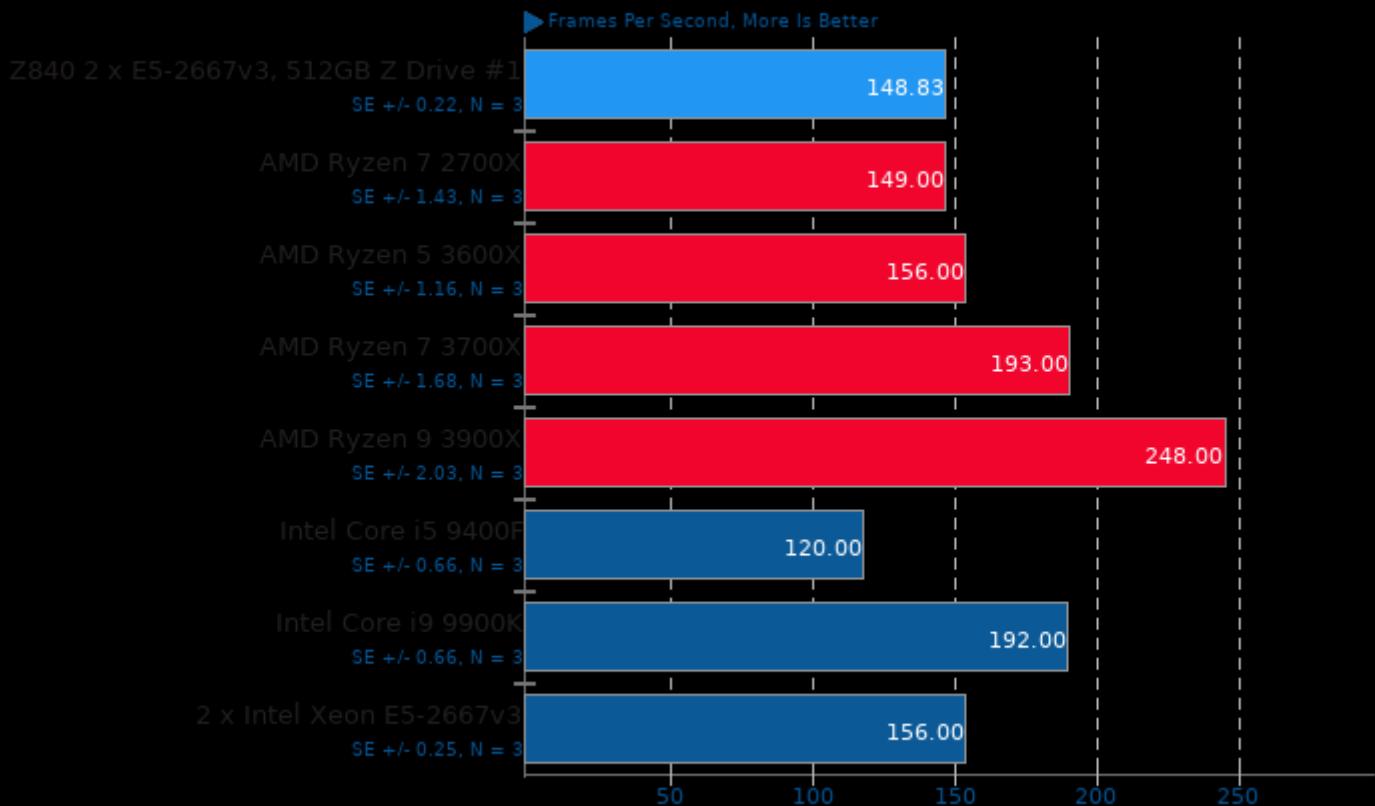
Phong Rendering With Soft-Shadow Mapping



1. (CXX) g++ options: -O3 -fomit-frame-pointer -ffast-math -mtune=native -fno -msse -mrecip -mfpmath=sse -msse2 -msse3 -fSDL -lpthread -fopenmp

## SVT-HEVC 2019-02-03

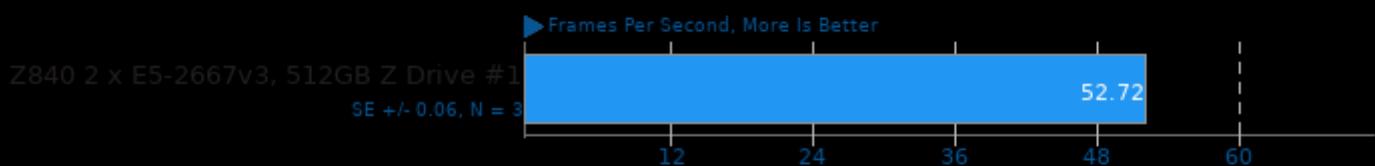
1080p 8-bit YUV To HEVC Video Encode



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

## SVT-VP9 2019-02-17

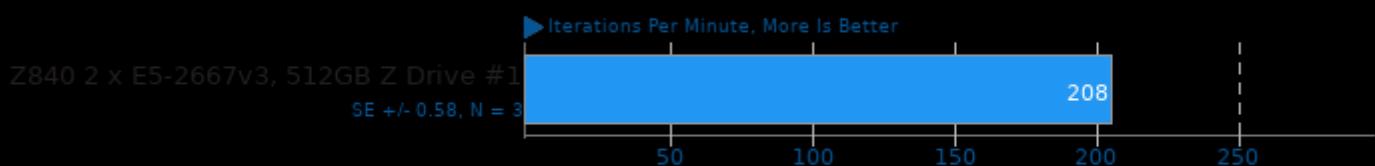
1080p 8-bit YUV To VP9 Video Encode



1. (CC) gcc options: -fPIE -fPIC -O2 -fno -fvisibility=hidden -mavx -pie -rdynamic -lpthread -lrt -lm

## GraphicsMagick 1.3.30

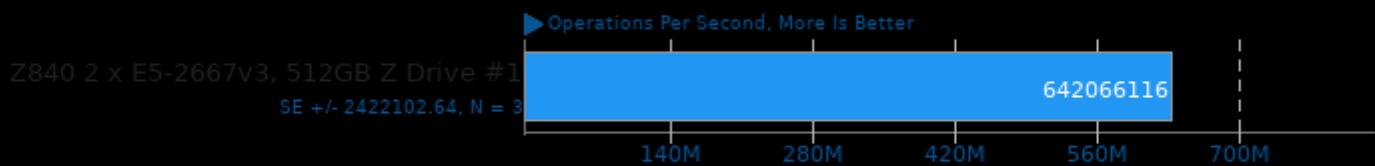
Operation: Resizing



1. (CC) gcc options: -fopenmp -O2 -pthread -ltiff -lfreetype -ljpeg -lpng16 -lXext -lSM -lICE -lX11 -lbz2 -lz -lm -lgomp -lpthread

## Swet 1.5.16

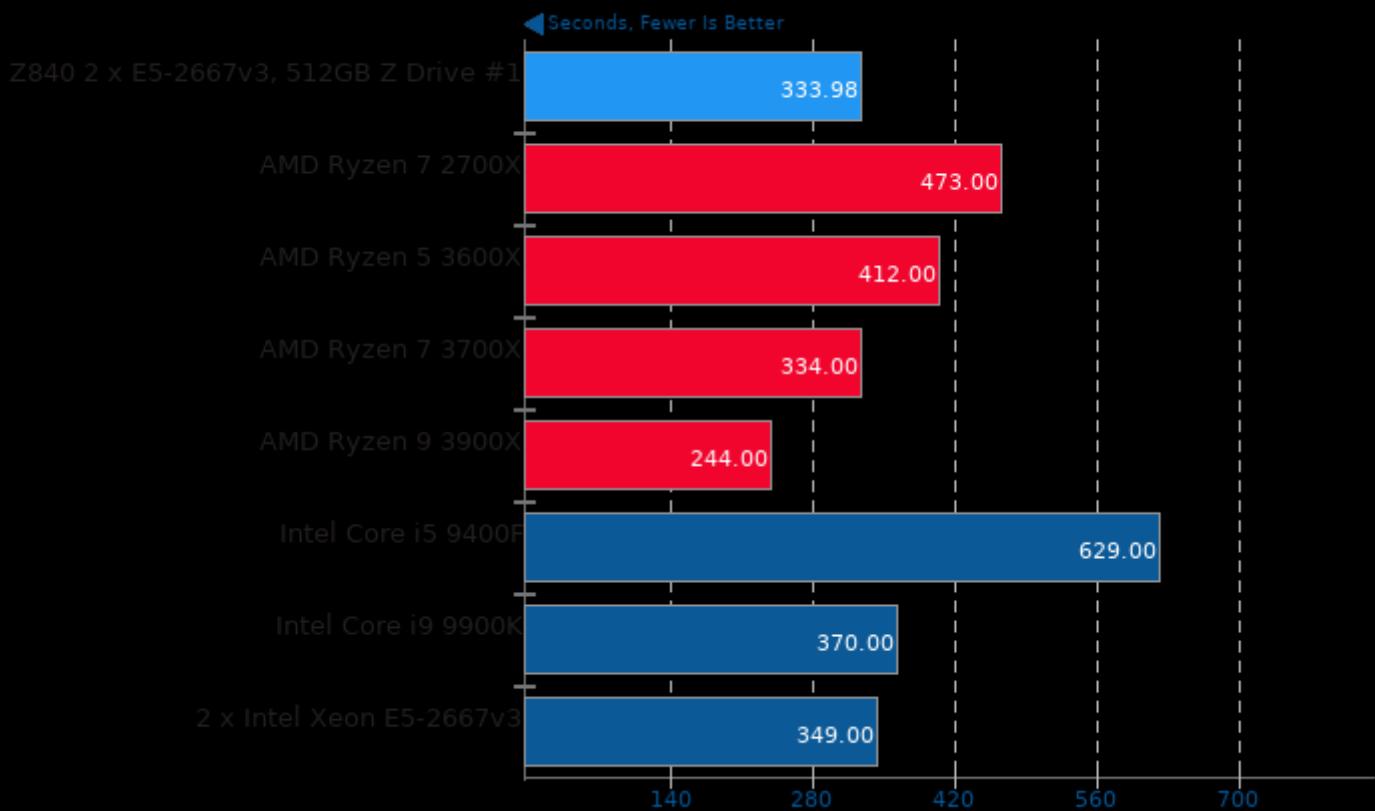
Average



1. (CC) gcc options: -lm -lpthread -lcurSES -lrt

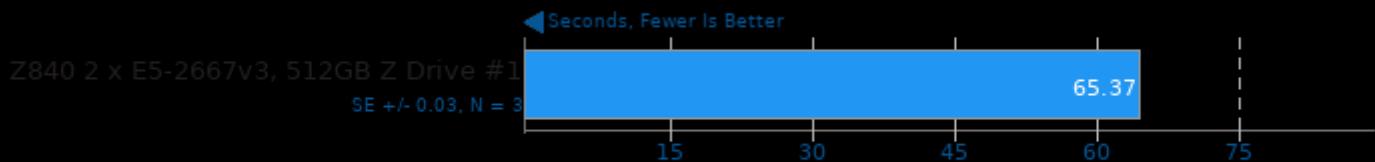
## Timed LLVM Compilation 6.0.1

Time To Compile



## C-Ray 1.1

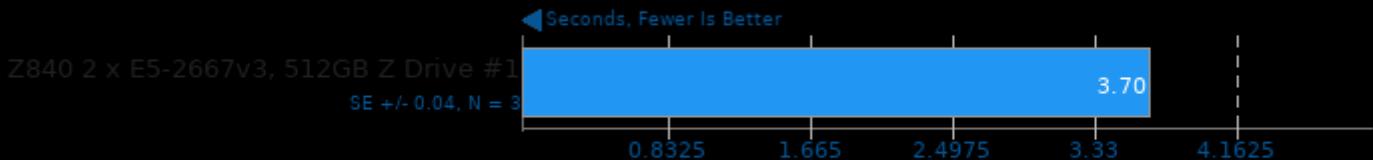
Total Time - 4K, 16 Rays Per Pixel



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

## Parallel BZIP2 Compression 1.1.12

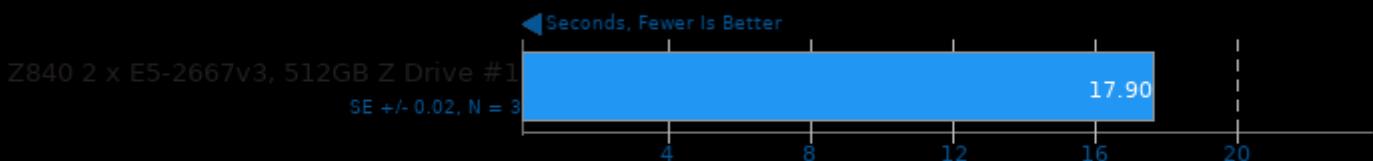
256MB File Compression



1. (CXX) g++ options: -O2 -pthread -lbz2 -pthread

## Primesieve 7.4

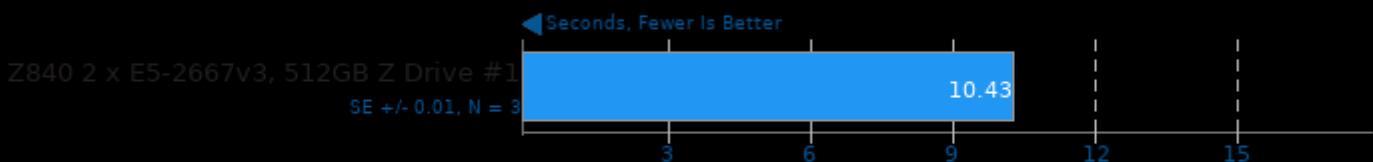
1e12 Prime Number Generation



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

## Smallpt 1.0

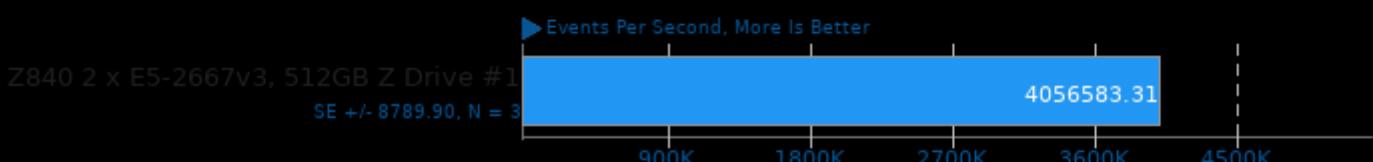
Global Illumination Renderer; 128 Samples



1. (CXX) g++ options: -fopenmp -O3

## Sysbench 2018-07-28

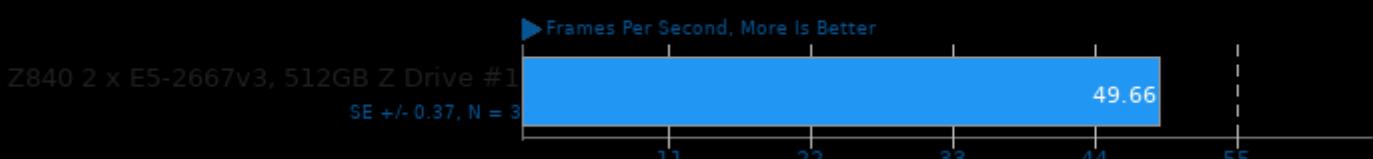
Test: Memory



1. (CC) gcc options: -pthread -O3 -funroll-loops -ggdb3 -march=haswell -rdynamic -ldl -lao -lm

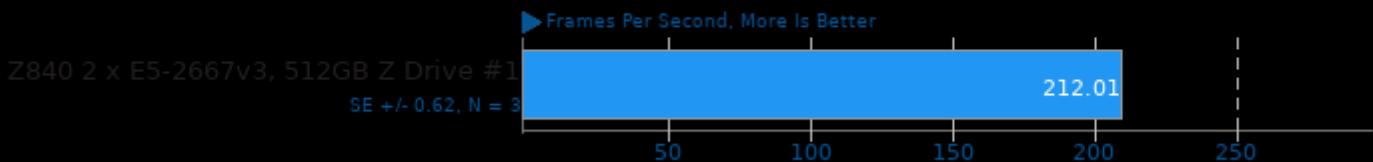
## Unigine Heaven 4.0

Resolution: 1920 x 1200 - Mode: Fullscreen - Renderer: OpenGL



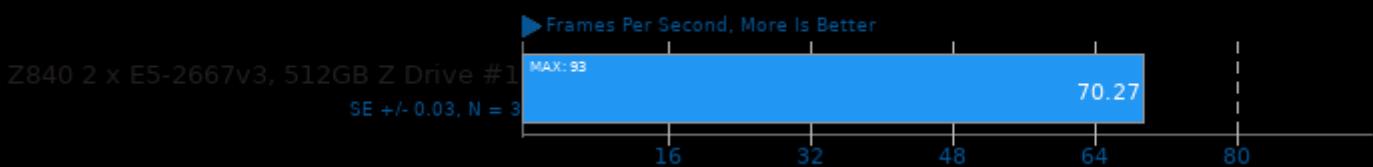
## Unigine Sanctuary 2.3

Resolution: 1920 x 1200 - Mode: Fullscreen



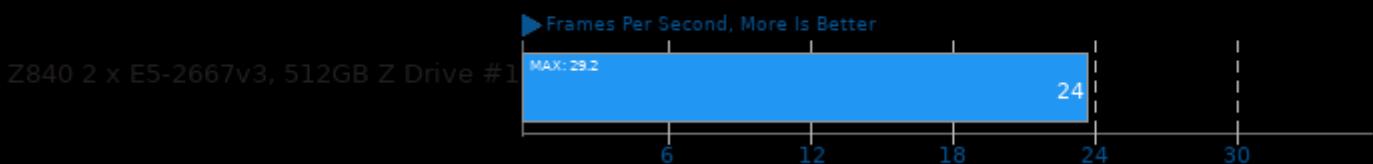
## Unigine Superposition 1.0

Resolution: 1920 x 1200 - Mode: Fullscreen - Quality: Low - Renderer: OpenGL



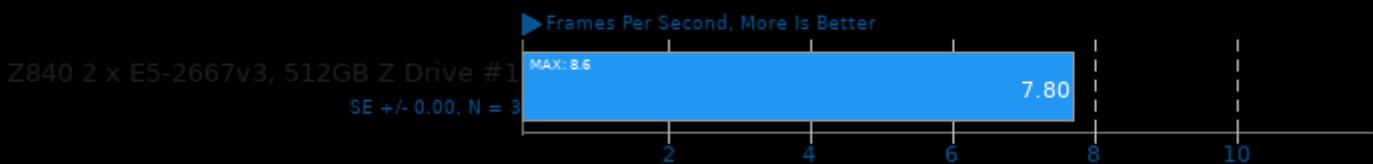
## Unigine Superposition 1.0

Resolution: 1920 x 1200 - Mode: Fullscreen - Quality: High - Renderer: OpenGL



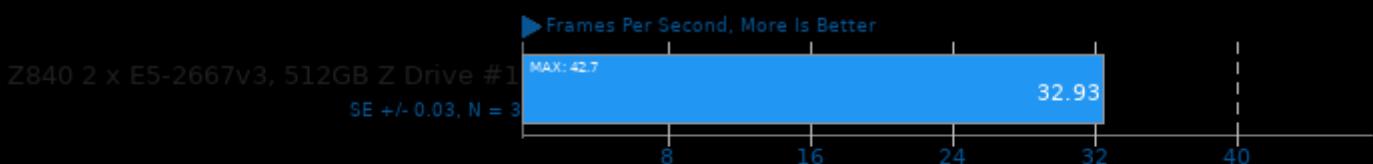
## Unigine Superposition 1.0

Resolution: 1920 x 1200 - Mode: Fullscreen - Quality: Ultra - Renderer: OpenGL



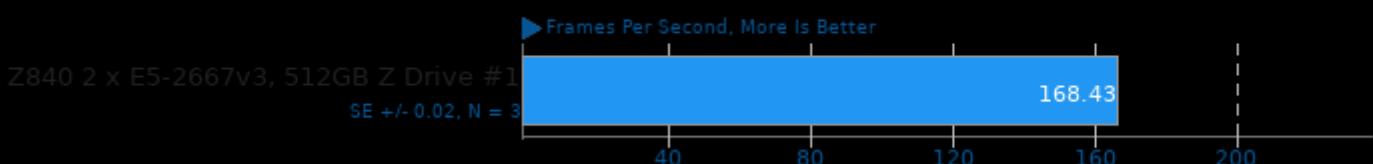
## Unigine Superposition 1.0

Resolution: 1920 x 1200 - Mode: Fullscreen - Quality: Medium - Renderer: OpenGL



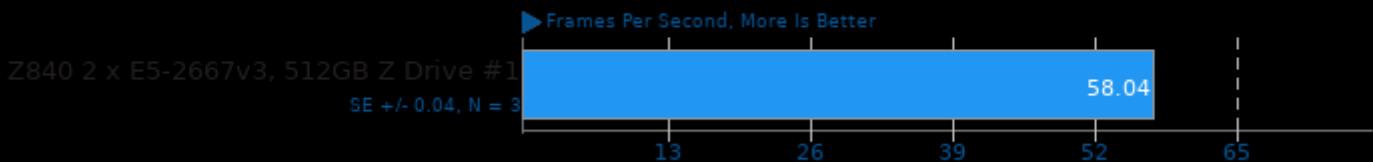
## Unigine Tropics 1.3

Resolution: 1920 x 1200 - Mode: Fullscreen



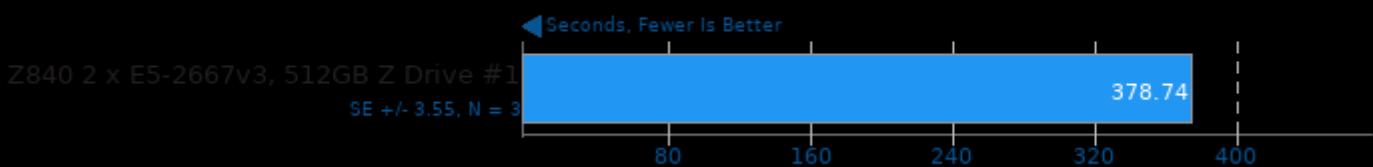
## Unigine Valley 1.0

Resolution: 1920 x 1200 - Mode: Fullscreen - Renderer: OpenGL



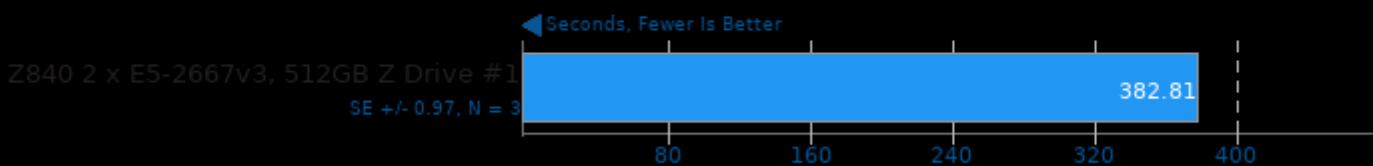
## Blender 2.80

Blend File: BMW27 - Compute: CUDA



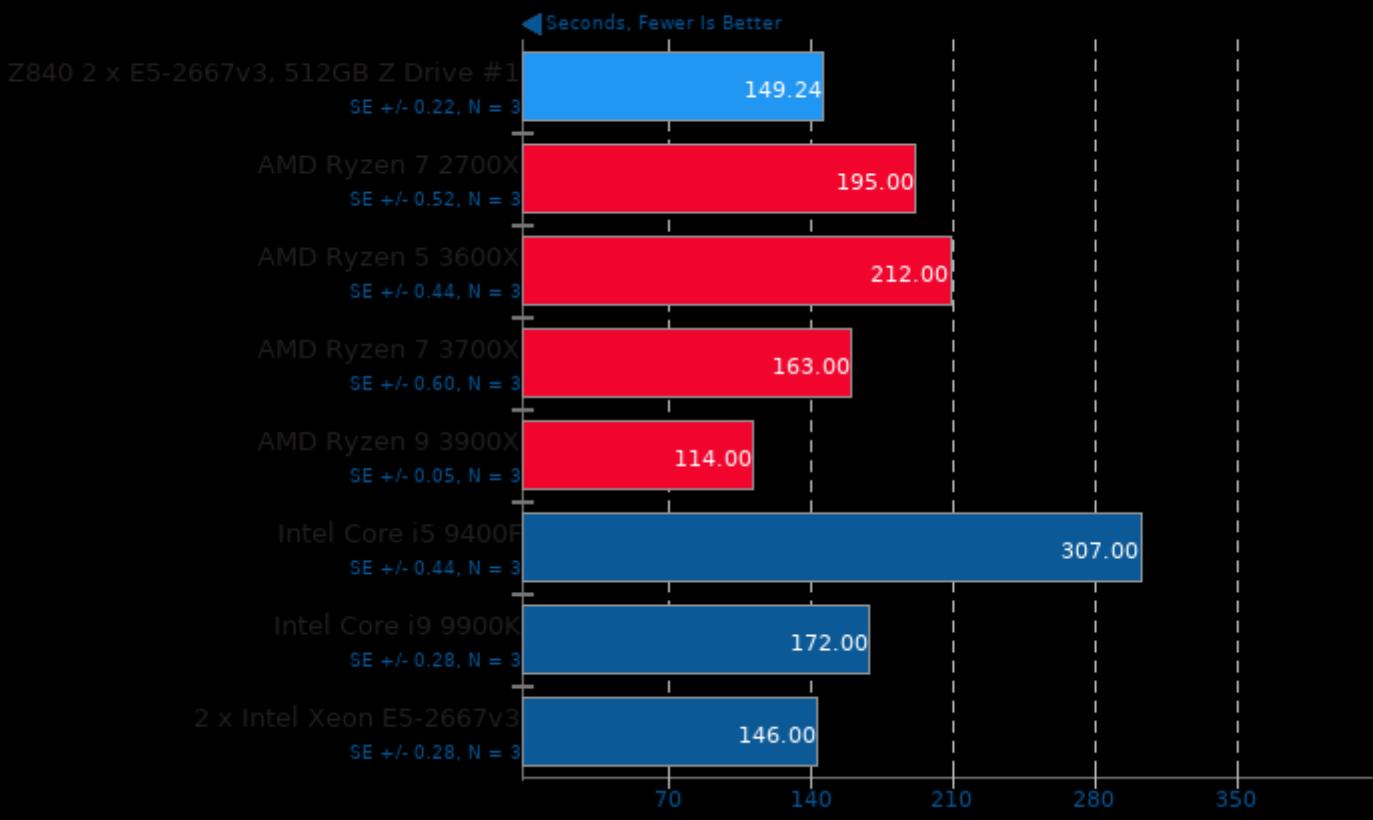
## Blender 2.80

Blend File: BMW27 - Compute: OpenCL



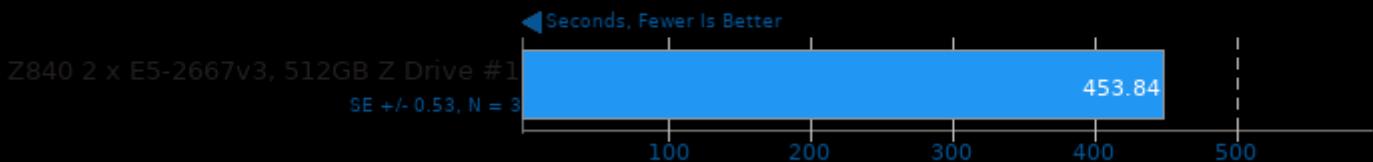
## Blender 2.80

Blend File: BMW27 - Compute: CPU-Only



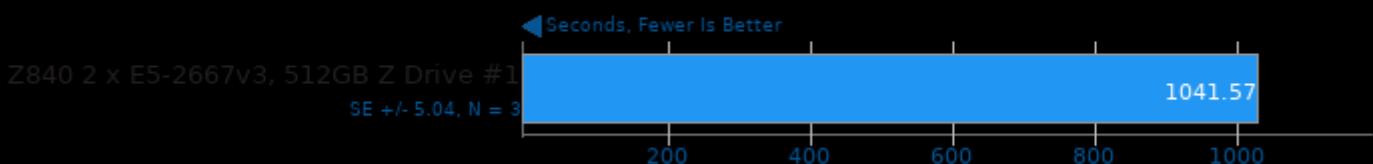
## Blender 2.80

Blend File: Classroom - Compute: CUDA



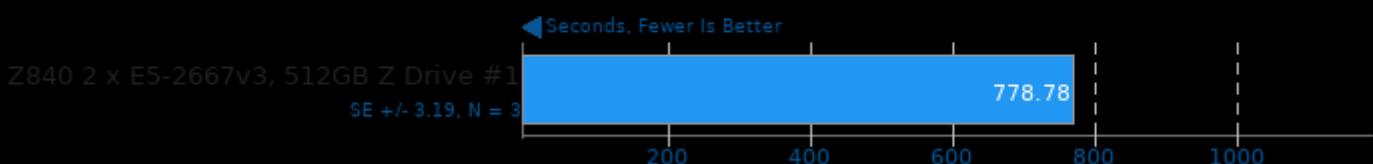
## Blender 2.80

Blend File: Fishy Cat - Compute: CUDA



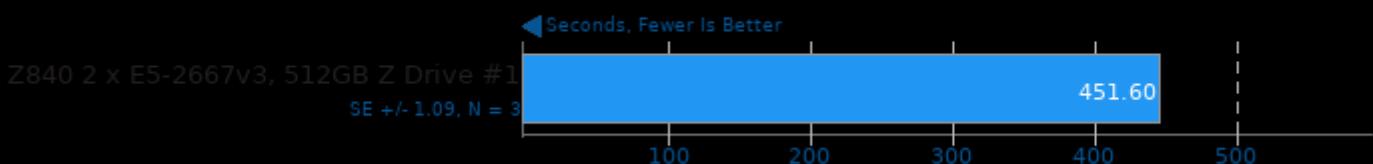
## Blender 2.80

Blend File: Barbershop - Compute: CUDA



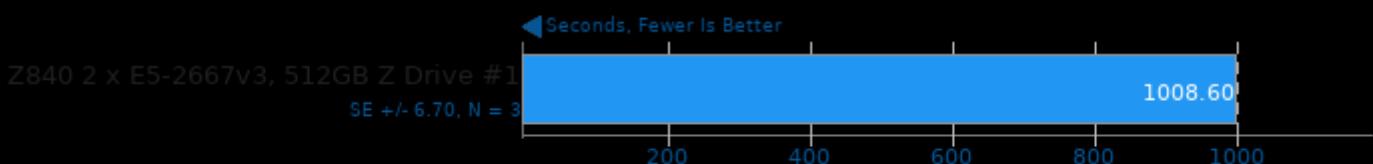
## Blender 2.80

Blend File: Classroom - Compute: OpenCL



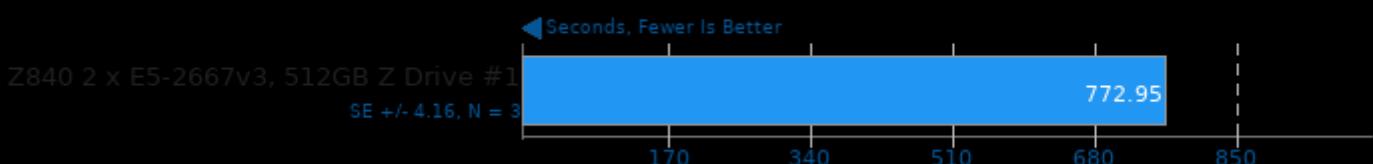
## Blender 2.80

Blend File: Fishy Cat - Compute: OpenCL



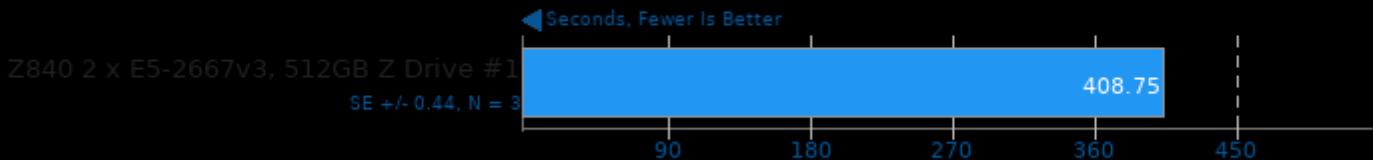
## Blender 2.80

Blend File: Barbershop - Compute: OpenCL



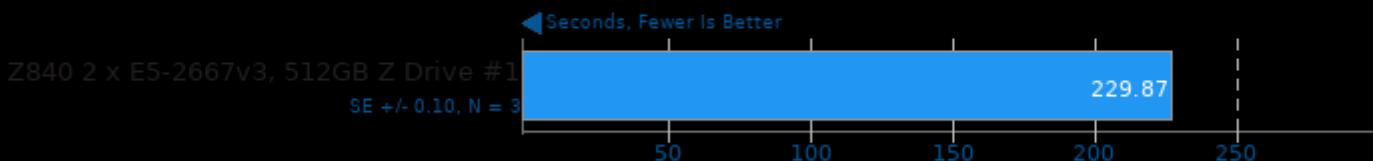
## Blender 2.80

Blend File: Classroom - Compute: CPU-Only



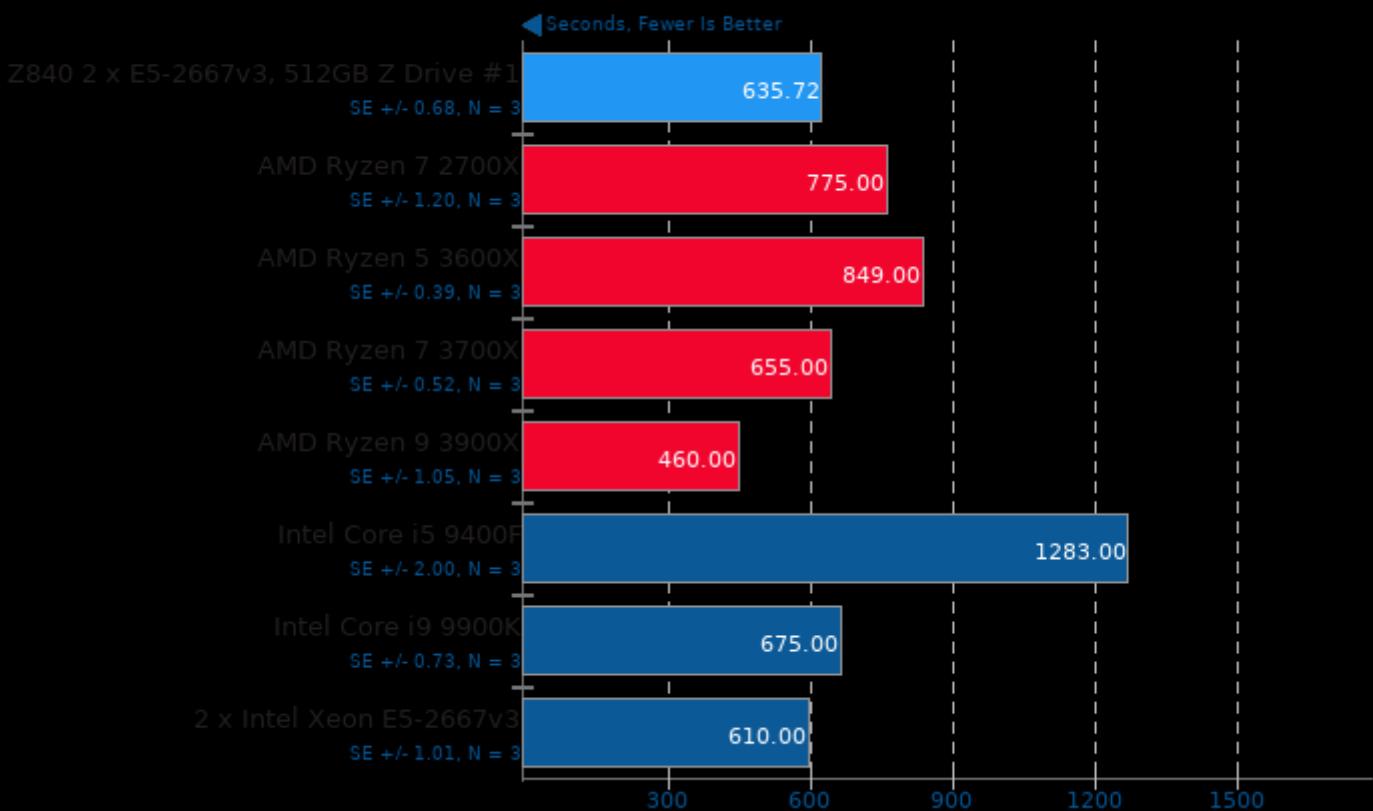
## Blender 2.80

Blend File: Fishy Cat - Compute: CPU-Only



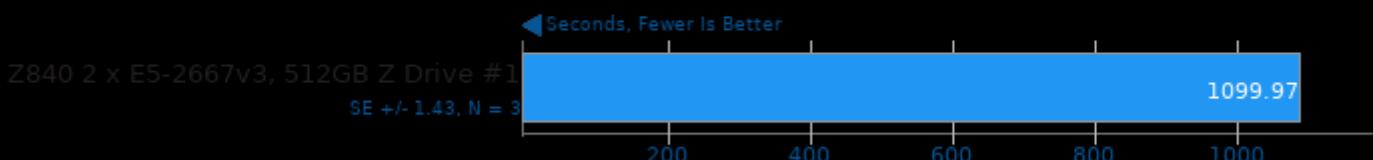
## Blender 2.80

Blend File: Barbershop - Compute: CPU-Only



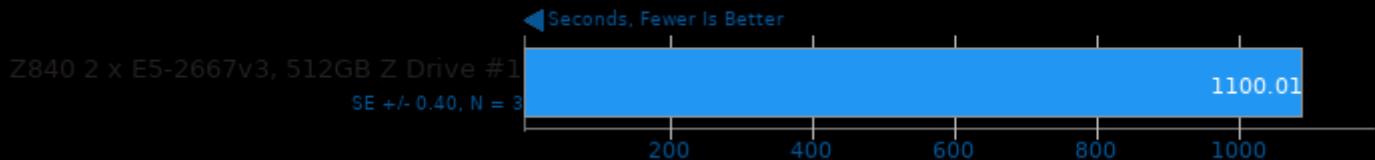
## Blender 2.80

Blend File: Pabellon Barcelona - Compute: CUDA



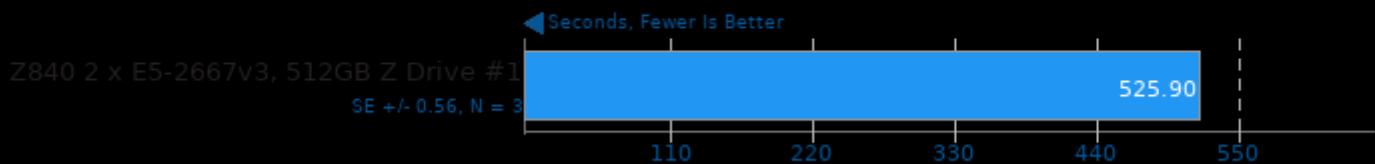
## Blender 2.80

Blend File: Pabellon Barcelona - Compute: OpenCL



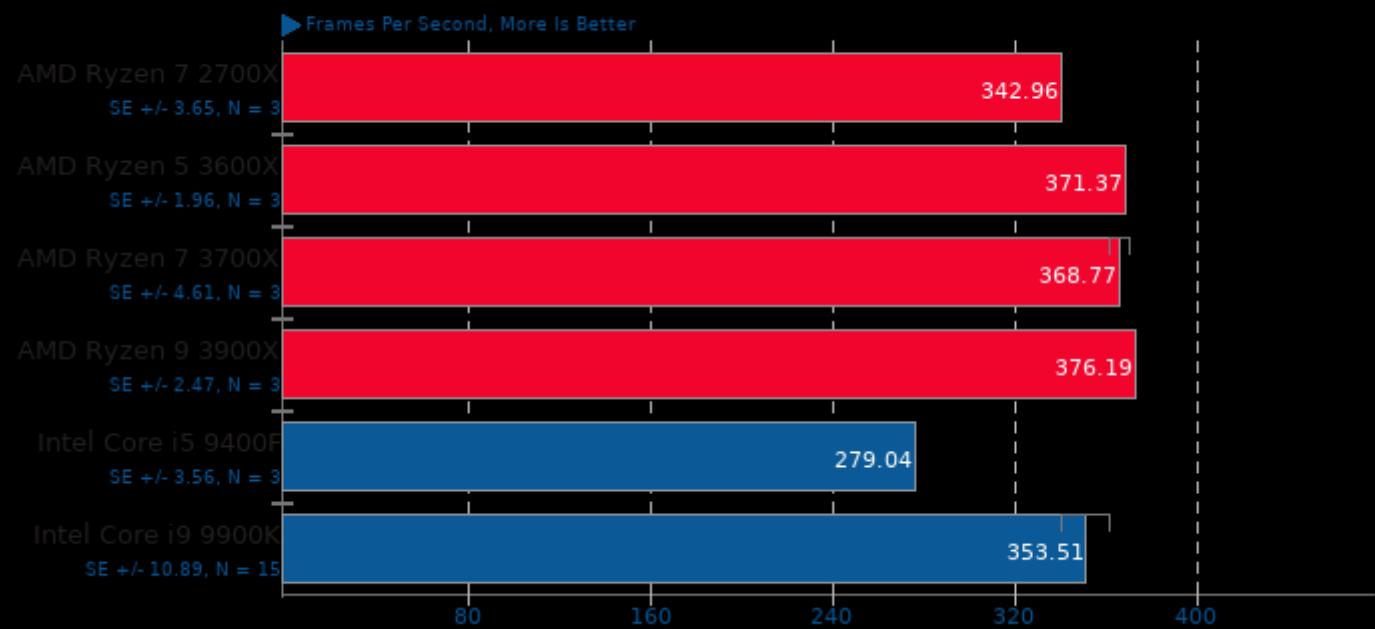
## Blender 2.80

Blend File: Pabellon Barcelona - Compute: CPU-Only



## Tesseract 2014-05-12

Resolution: 3840 x 2160



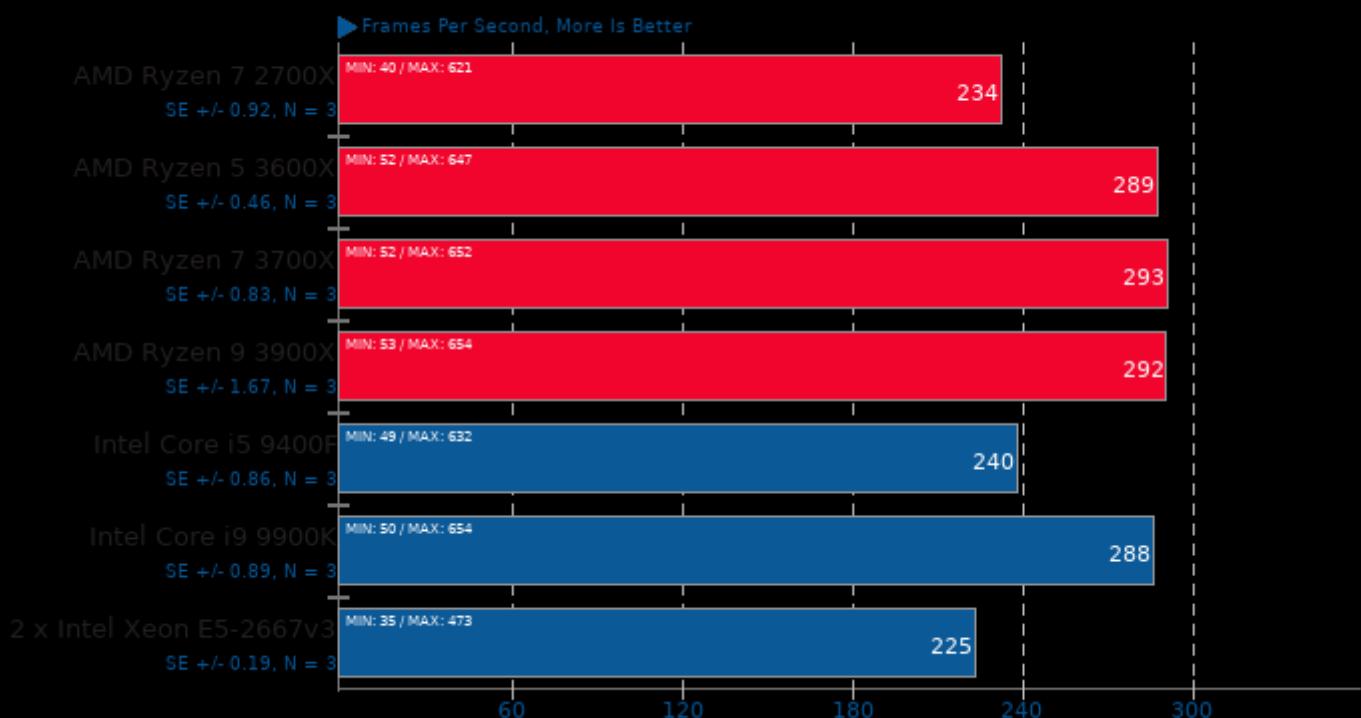
## Xonotic 0.8.2

Resolution: 3840 x 2160 - Effects Quality: Ultra



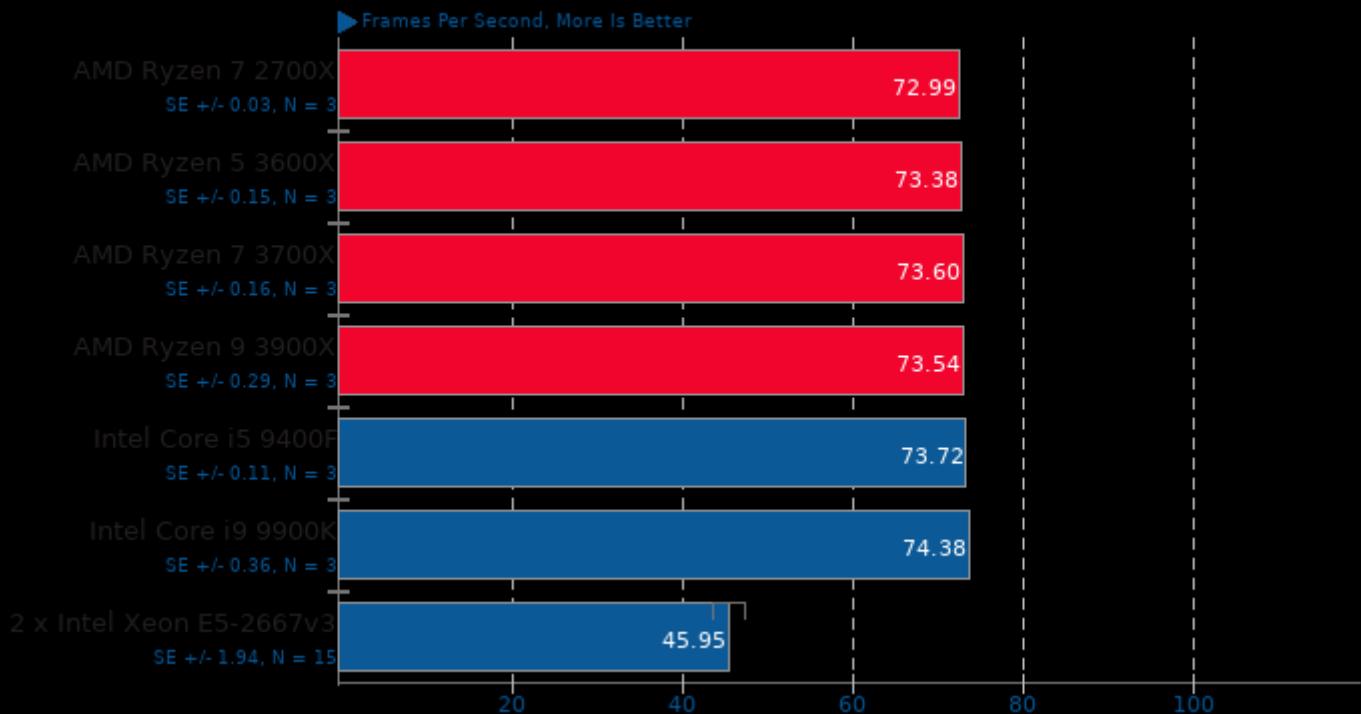
## Xonotic 0.8.2

Resolution: 3840 x 2160 - Effects Quality: Ultimate



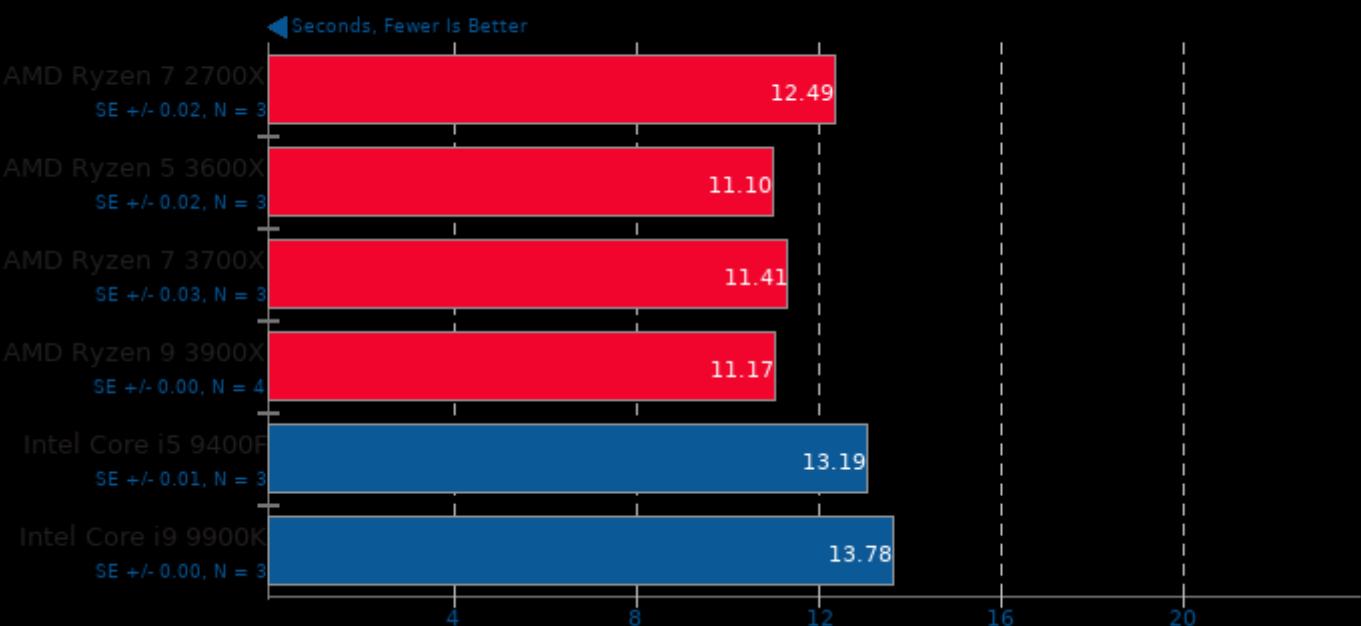
## SuperTuxKart 0.9.3

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



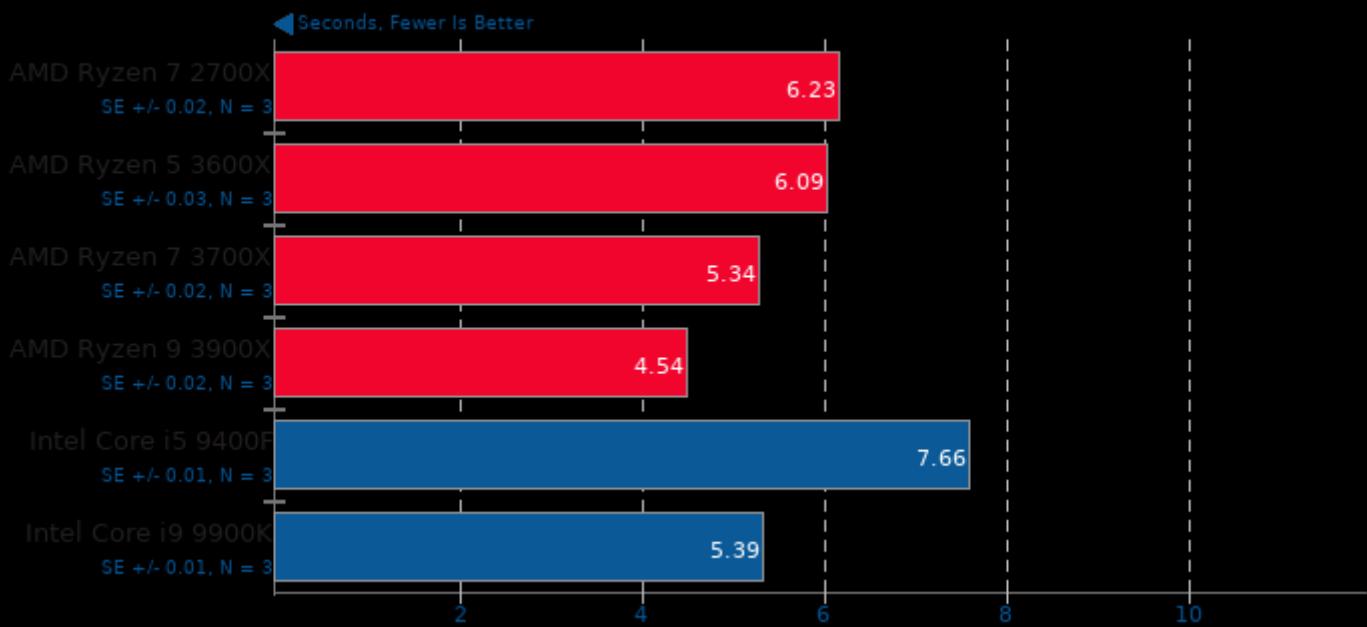
## Darktable 2.6.0

Test: Boat - Acceleration: CPU-only



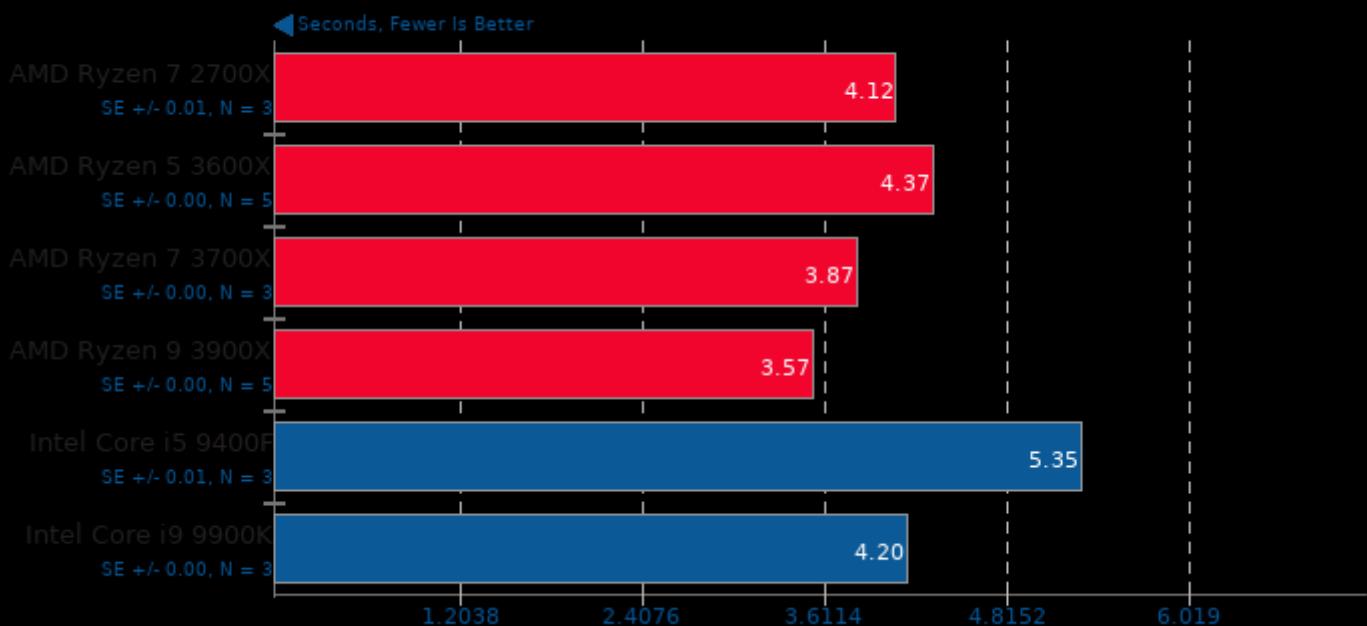
## Darktable 2.6.0

Test: Masskrug - Acceleration: CPU-only



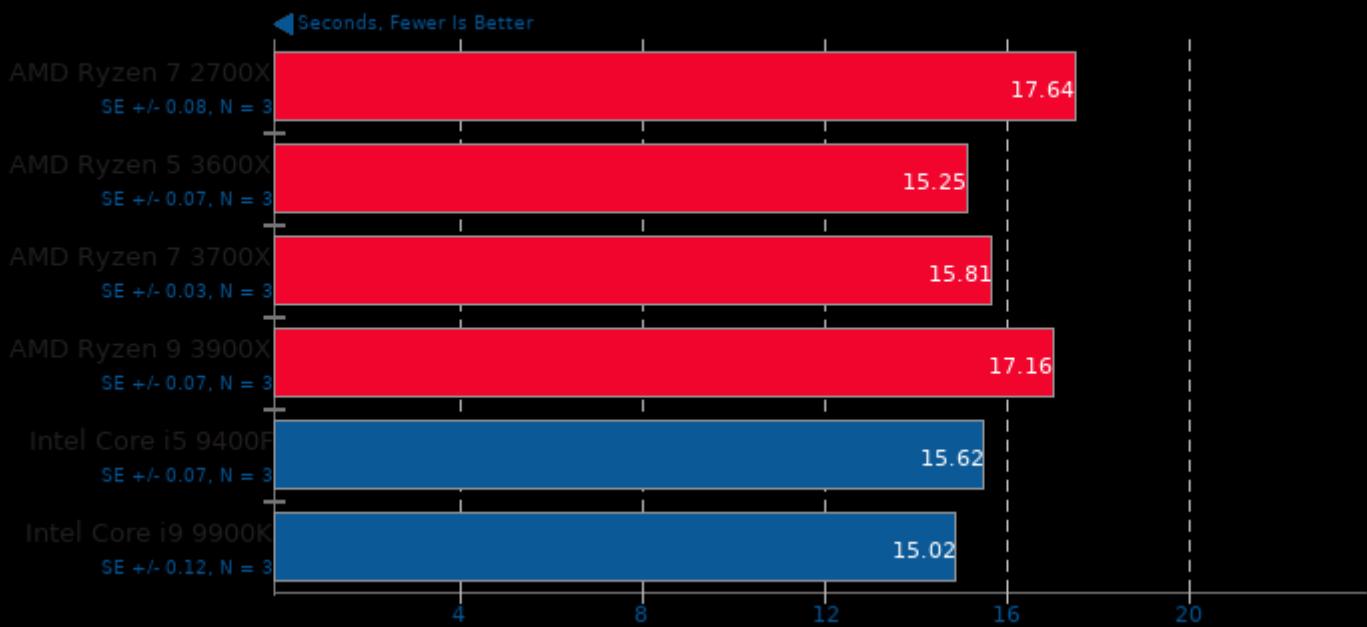
## Darktable 2.6.0

Test: Server Room - Acceleration: CPU-only

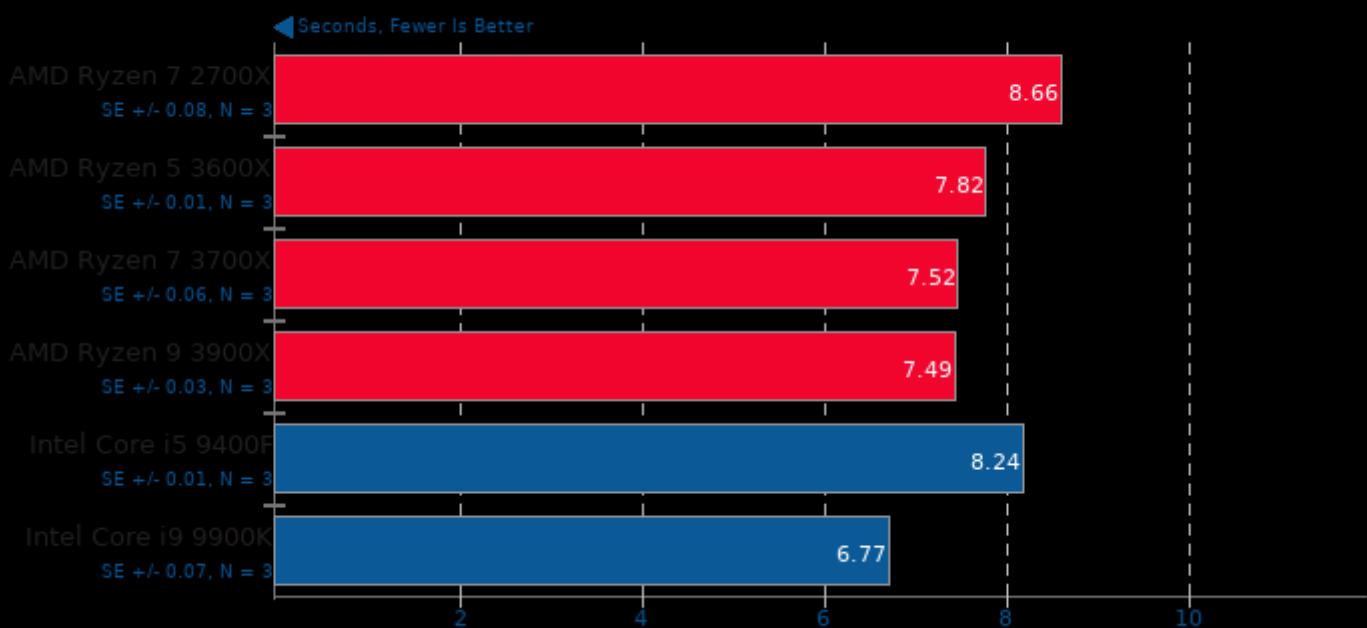


**GIMP 2.10.8**

Test: unsharp-mask

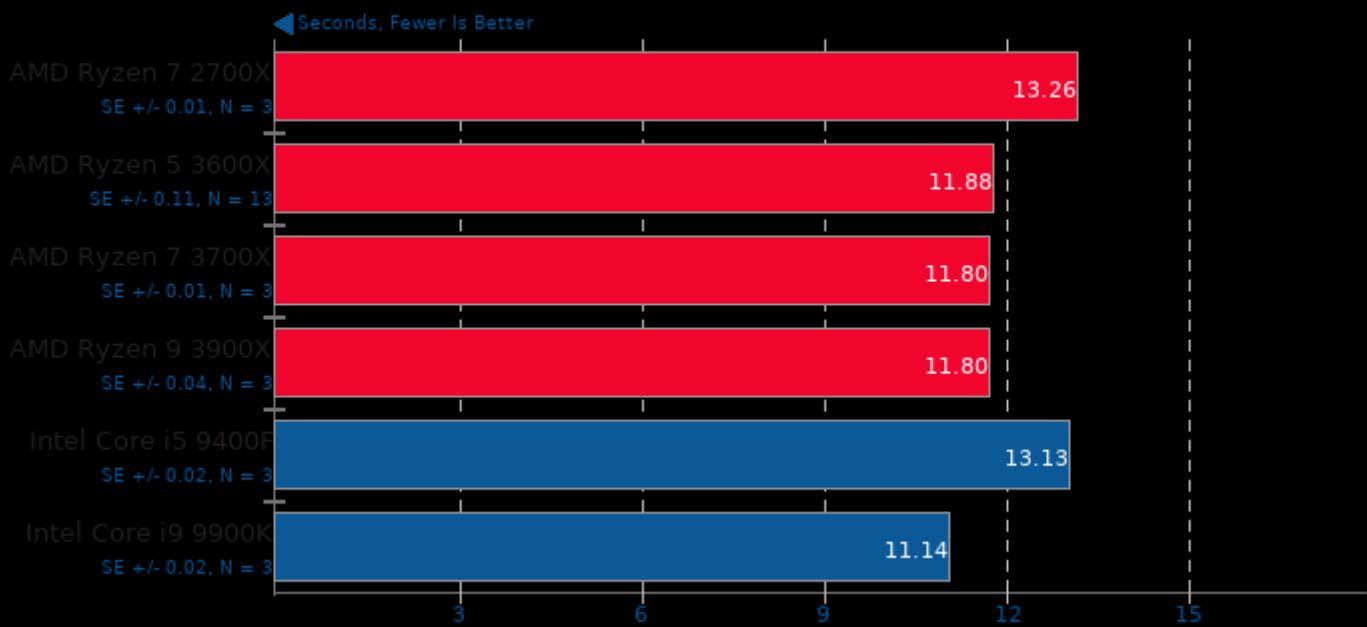
**GIMP 2.10.8**

Test: resize



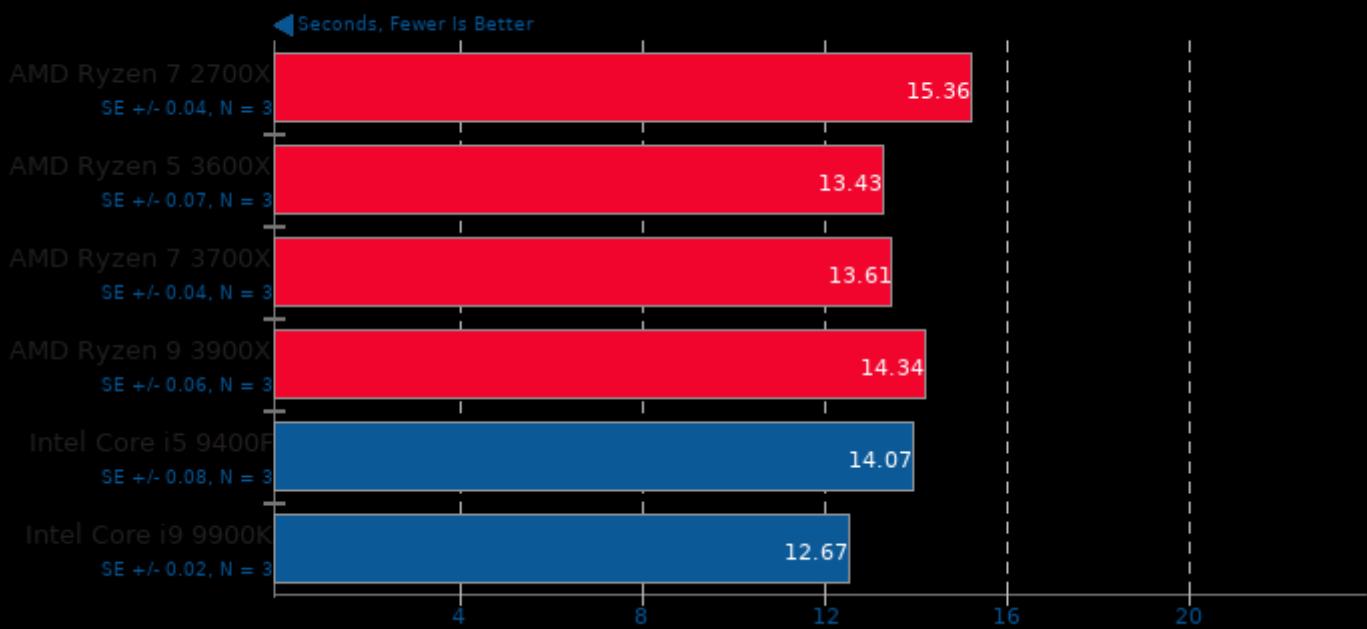
## GIMP 2.10.8

Test: rotate



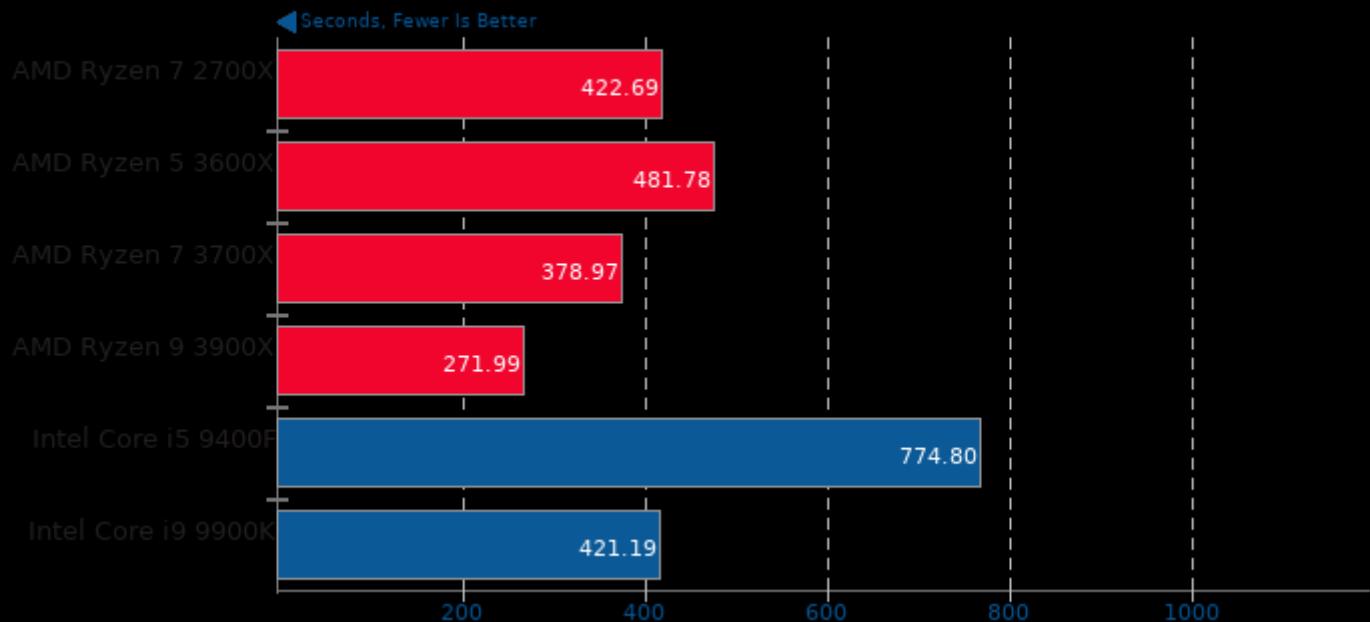
## GIMP 2.10.8

Test: auto-levels



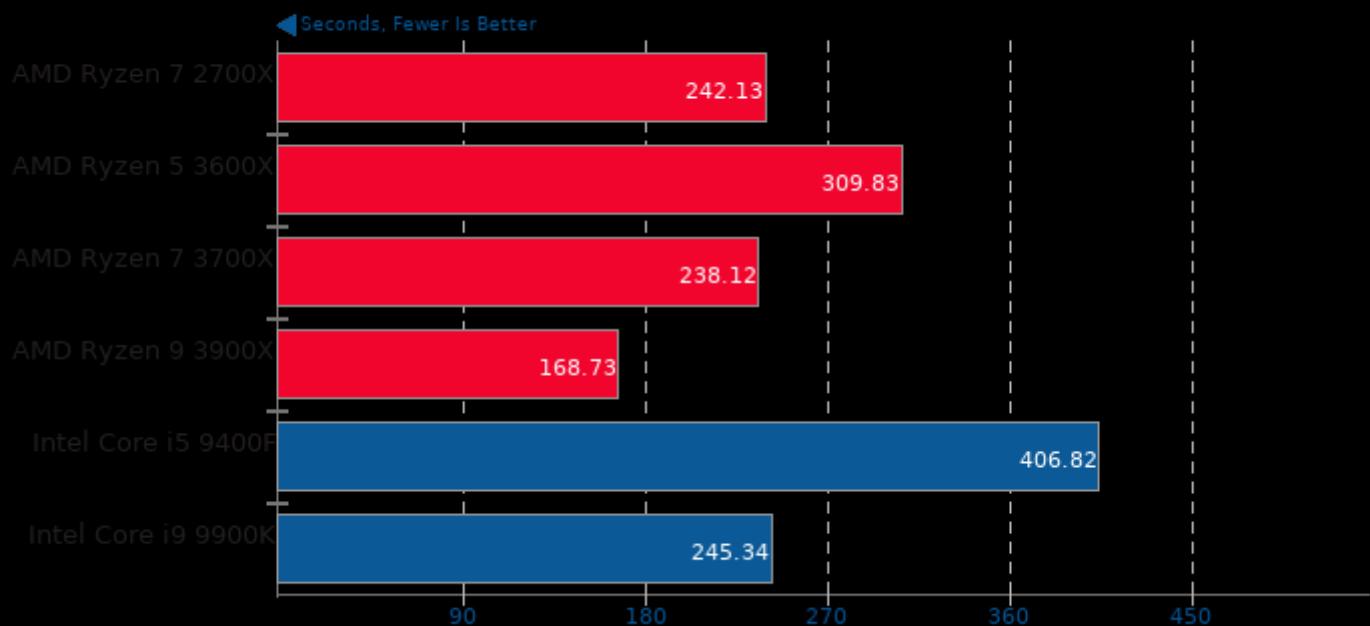
## Appleseed 2.0 Beta

Scene: Emily



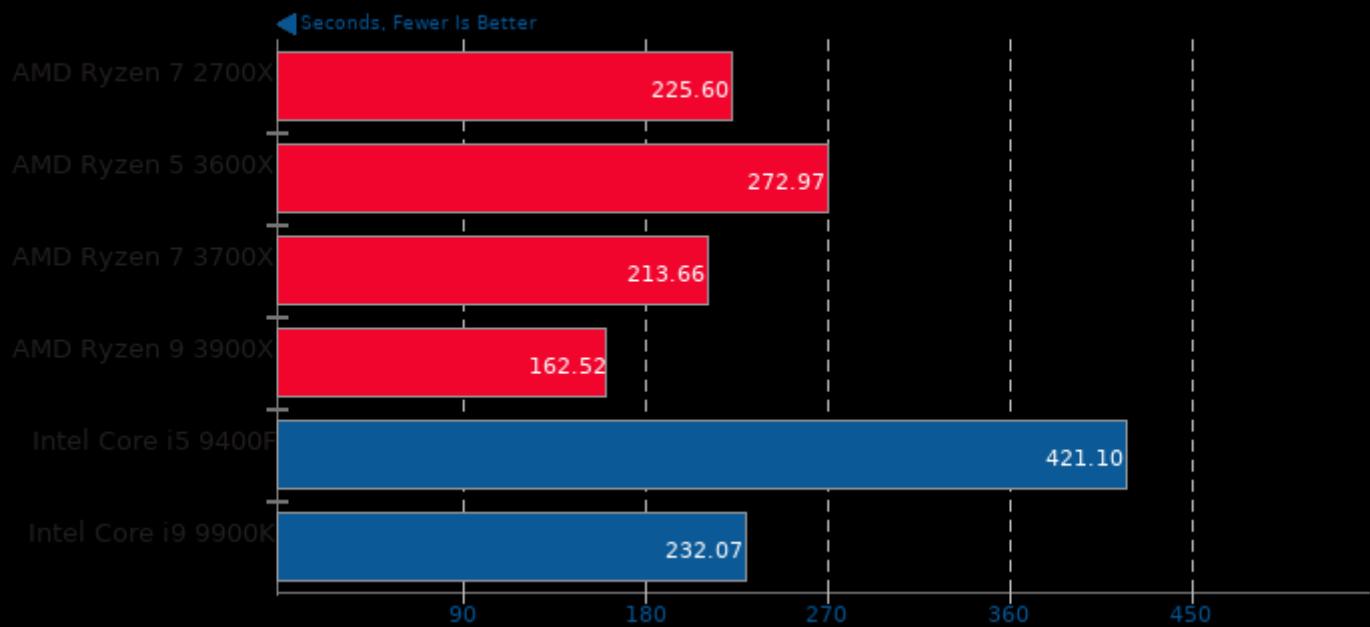
## Appleseed 2.0 Beta

Scene: Disney Material



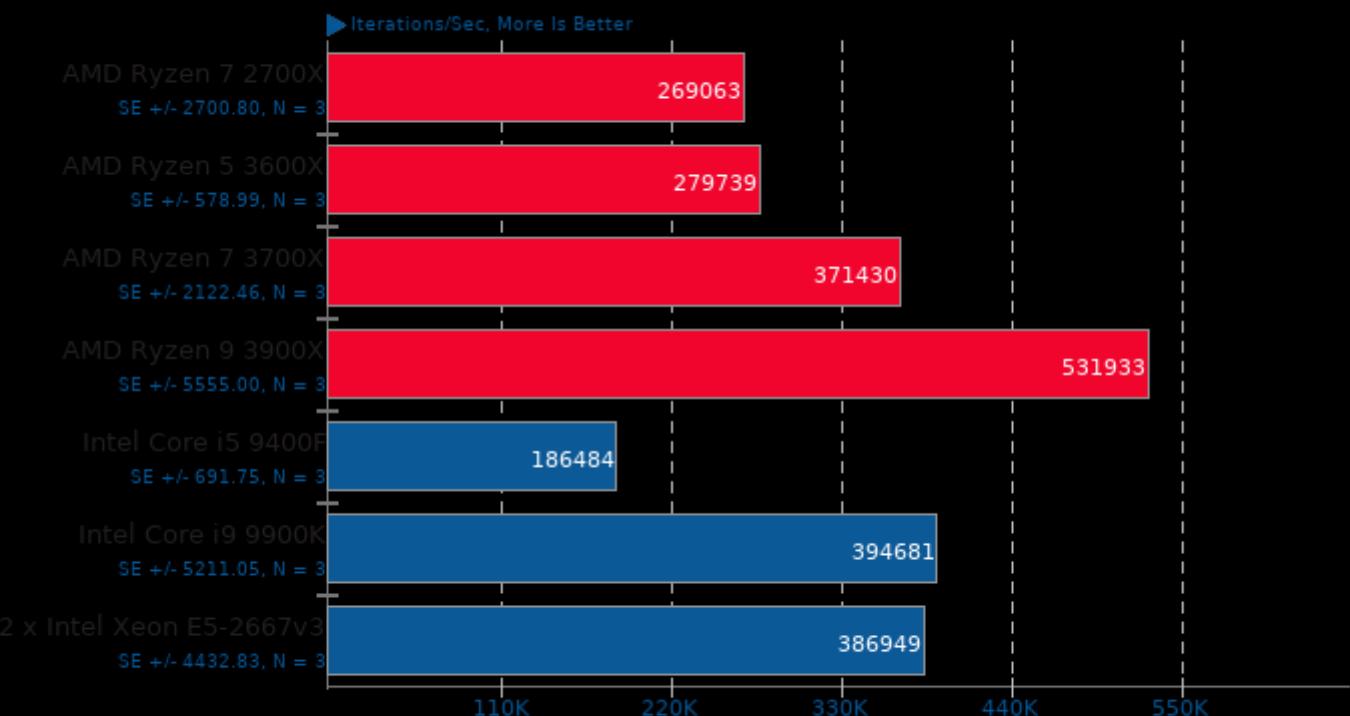
## Appleseed 2.0 Beta

Scene: Material Tester



## Coremark 1.0

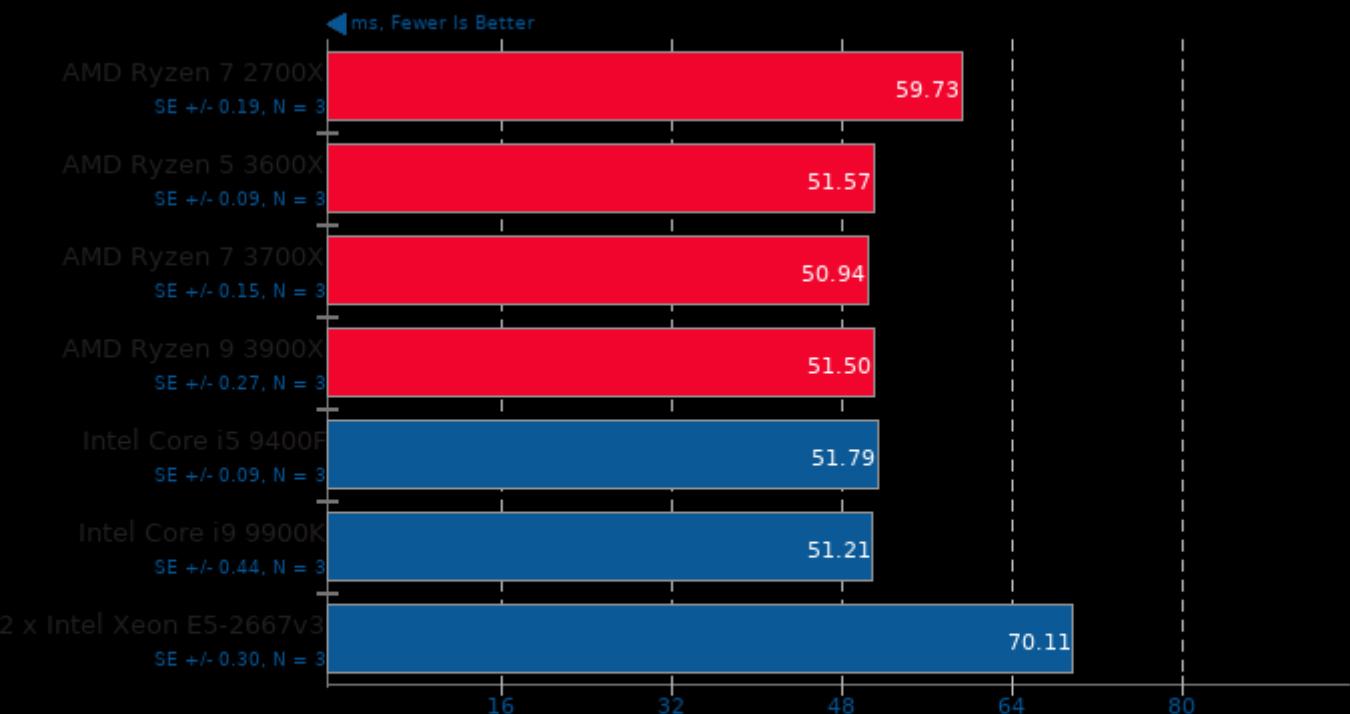
CoreMark Size 666 - Iterations Per Second



1. (CC) gcc options: -O2 -fintc -firt

## Selenium

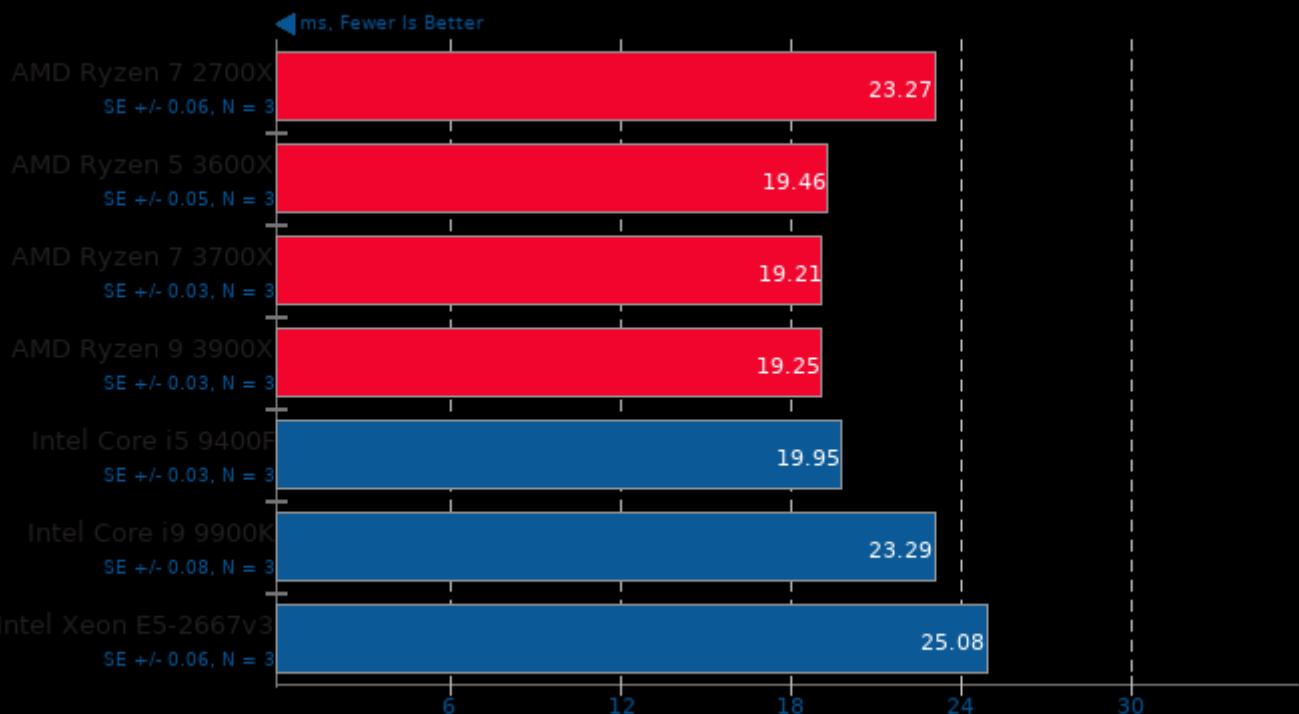
Benchmark: ARES-6 - Browser: Firefox



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
7. 2 x Intel Xeon E5-2667v3: firefox 68.0.1

## Selenium

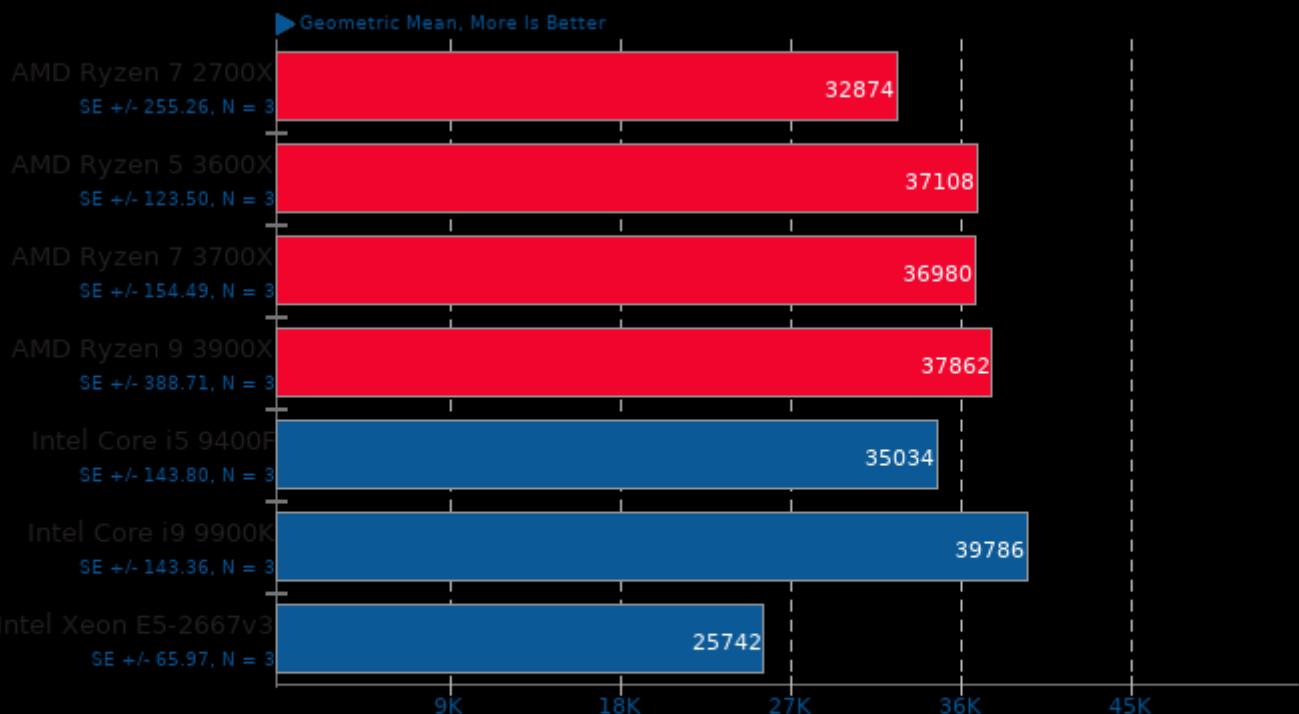
Benchmark: ARES-6 - Browser: Google Chrome



1. chrome 76.0.3809.100

## Selenium

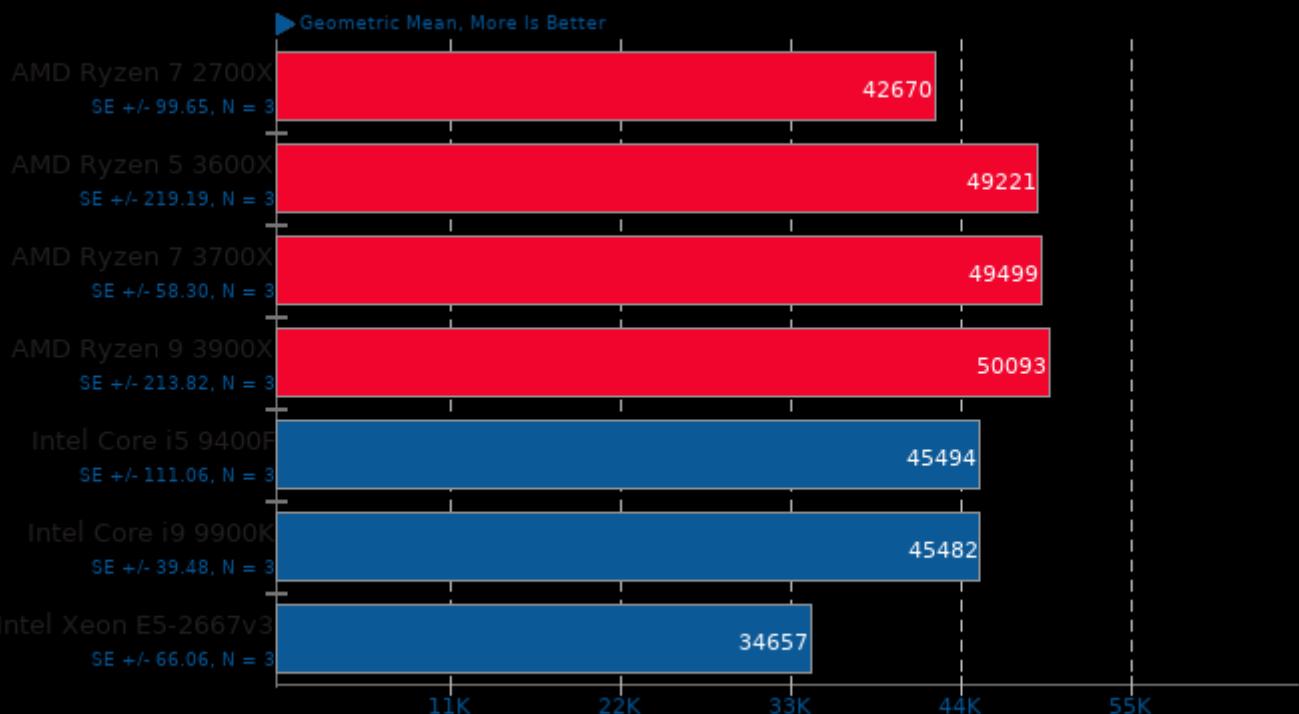
Benchmark: Octane - Browser: Firefox



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
7. 2 x Intel Xeon E5-2667v3: firefox 68.0.1

## Selenium

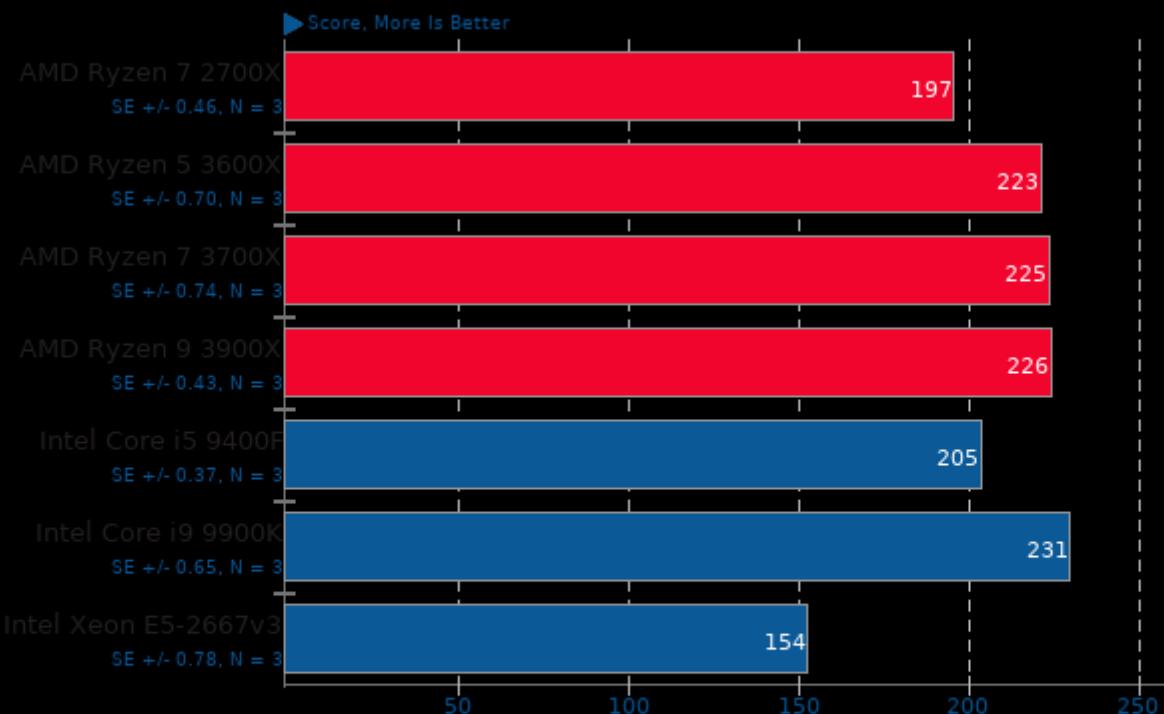
Benchmark: Octane - Browser: Google Chrome



1. chrome 76.0.3809.100

## Selenium

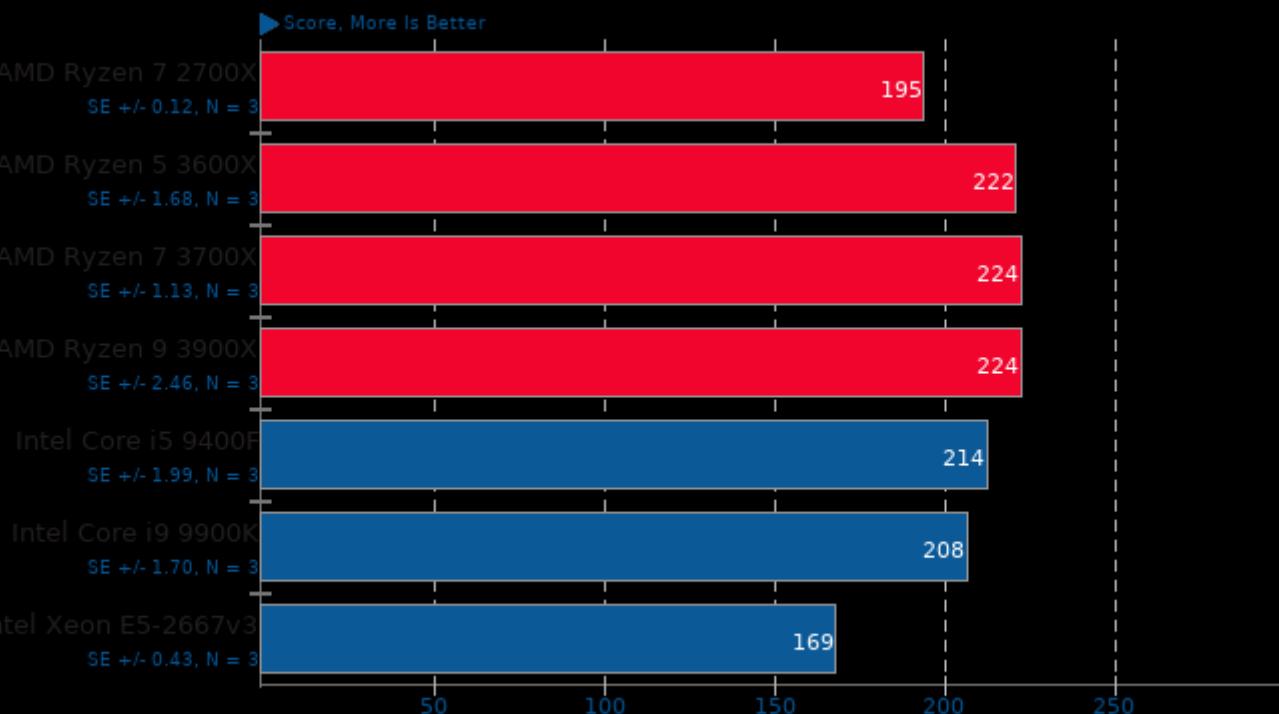
Benchmark: Jetstream - Browser: Firefox



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
7. 2 x Intel Xeon E5-2667v3: firefox 68.0.1

## Selenium

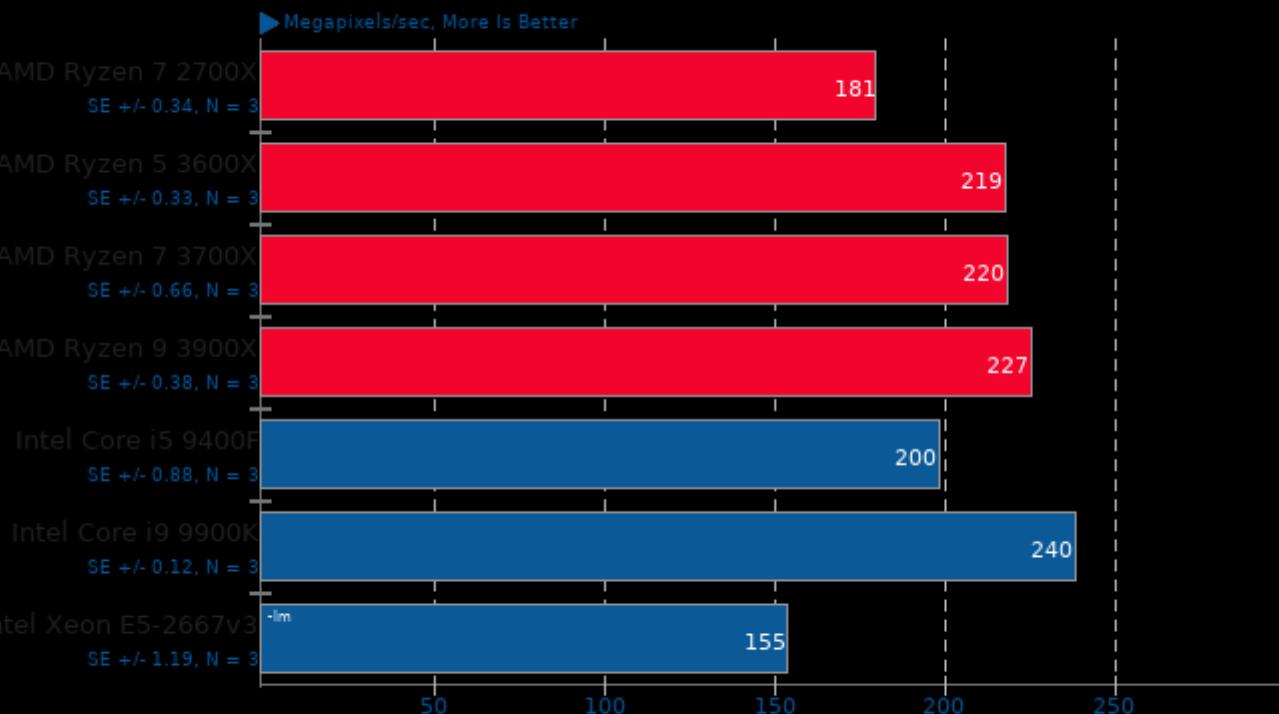
Benchmark: Jetstream - Browser: Google Chrome



1. chrome 76.0.3809.100

## libjpeg-turbo tjbench 2.0.2

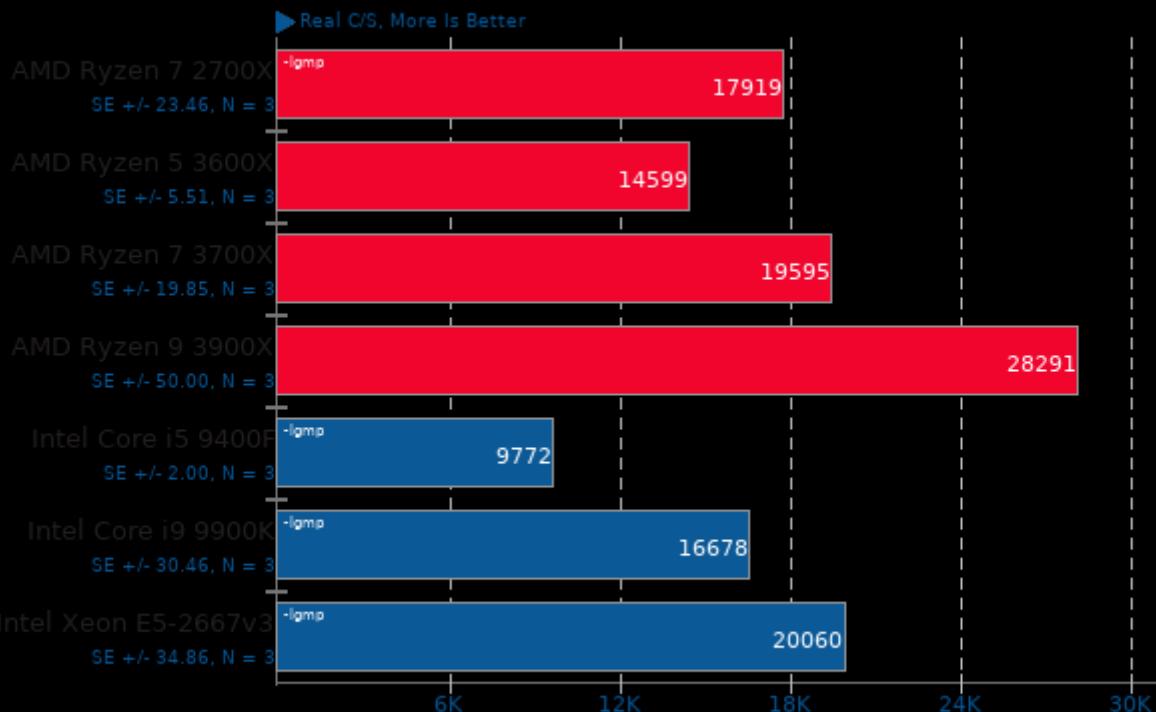
Test: Decompression Throughput



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

## John The Ripper 1.9.0-jumbo-1

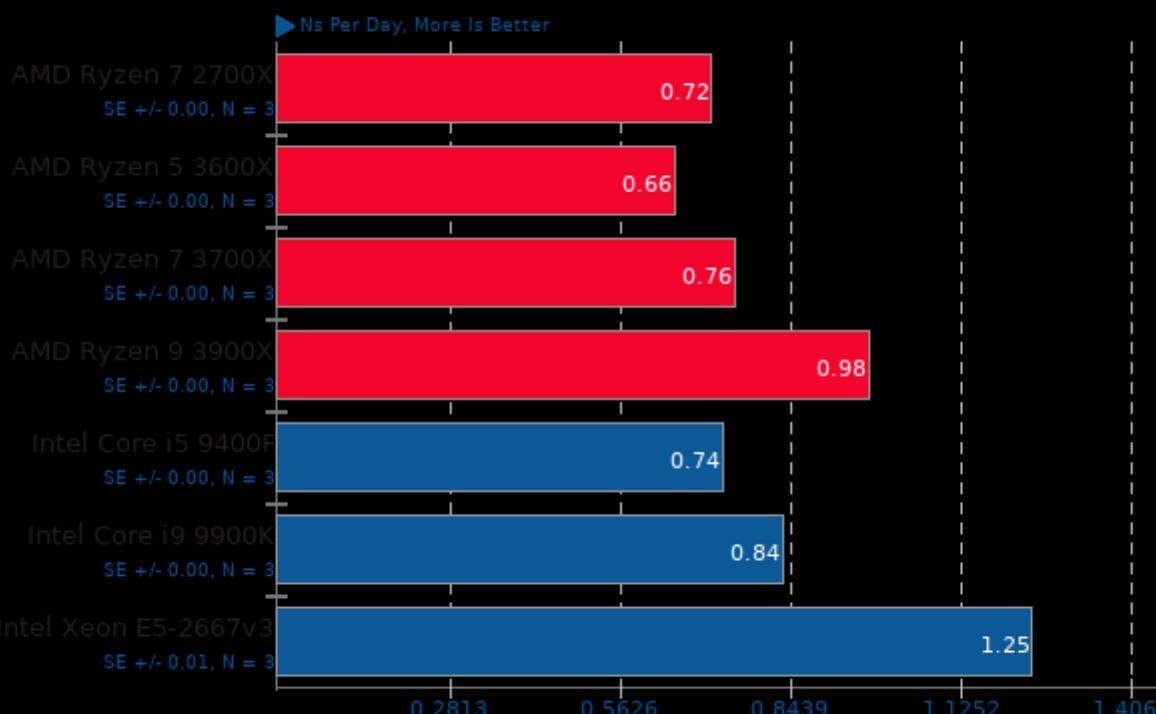
Test: Blowfish



1. (CC) gcc options: -m64 -lssl -lcrypto -fopenmp -pthread -lm -lz -ldl -lcrypt -lbz2

## GROMACS 2018.3

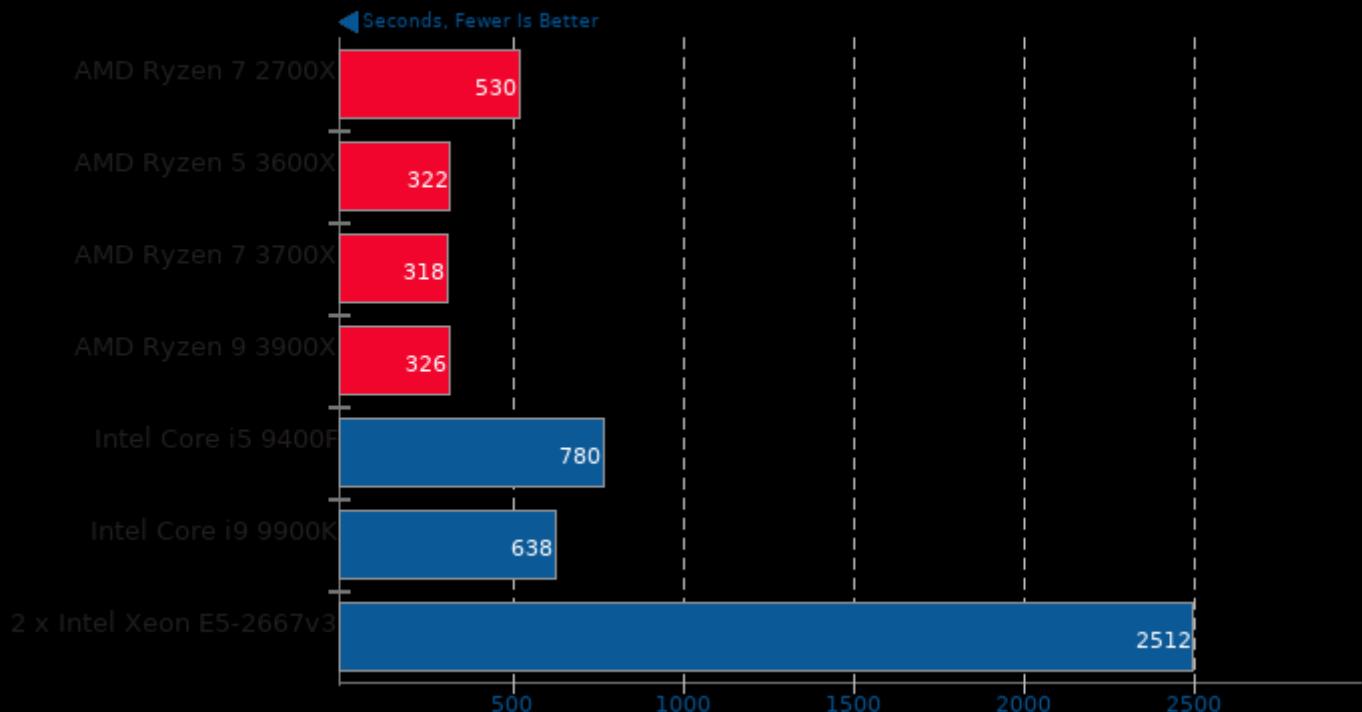
Water Benchmark



1. (CXX) g++ options: -march=core-avx2 -std=c++11 -O3 -funroll-all-loops -fopenmp -lrt -pthread -lm

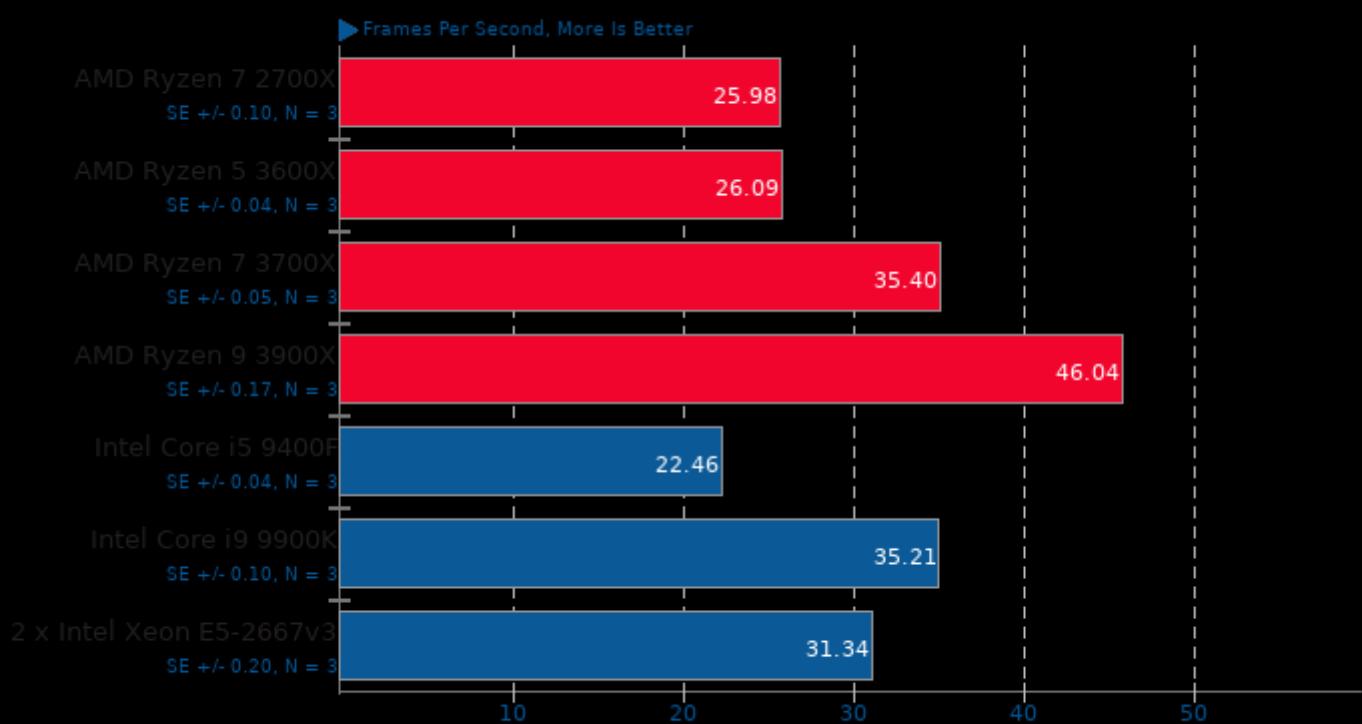
## CP2K Molecular Dynamics 6.1

Fayalite-FIST Data



## SVT-AV1 0.5

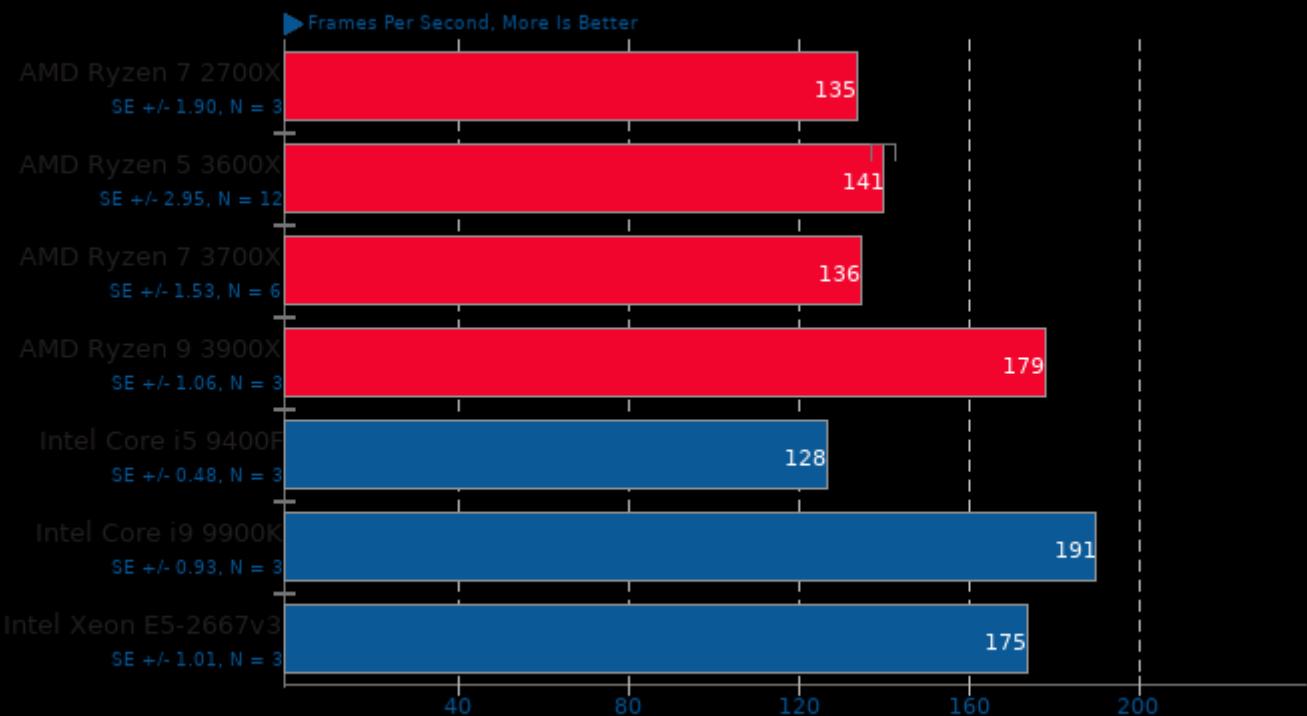
1080p 8-bit YUV To AV1 Video Encode



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

## VP9 libvpx Encoding 1.8.0

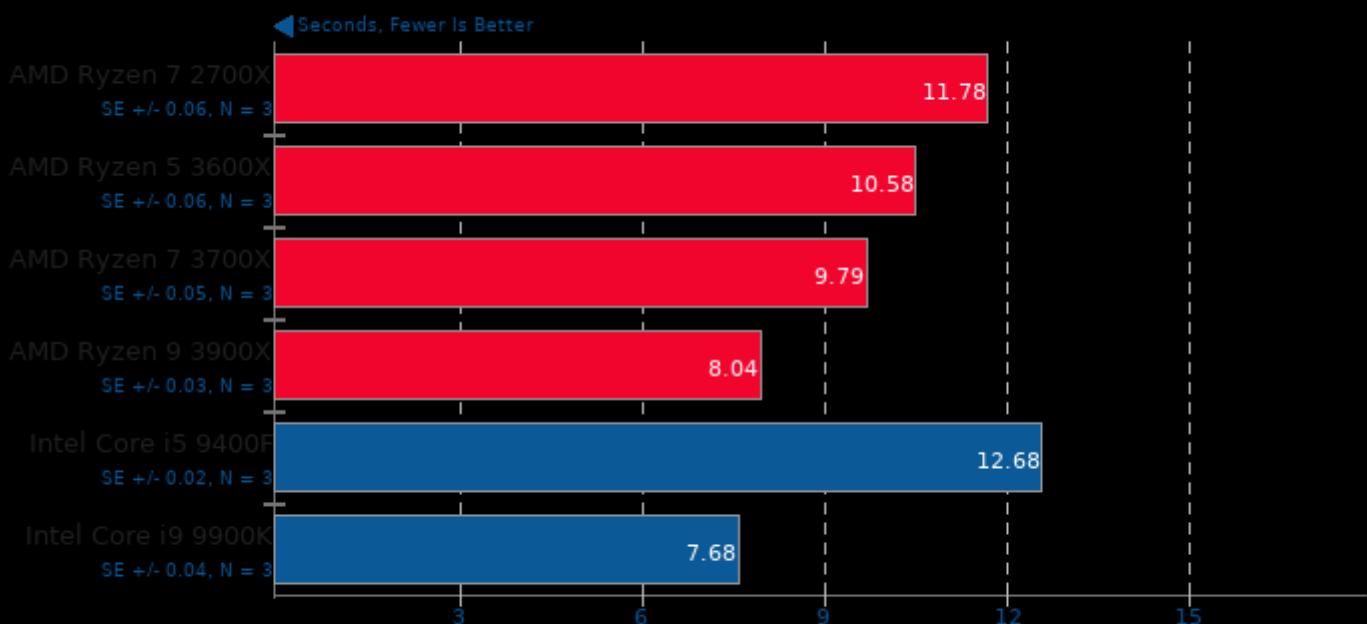
vpxenc VP9 1080p Video Encode



1. (CXX) g++ options: -m64 -lm -lpthread -O3 -fPIC -U\_FORTIFY\_SOURCE -std=c++11

## dav1d 0.3

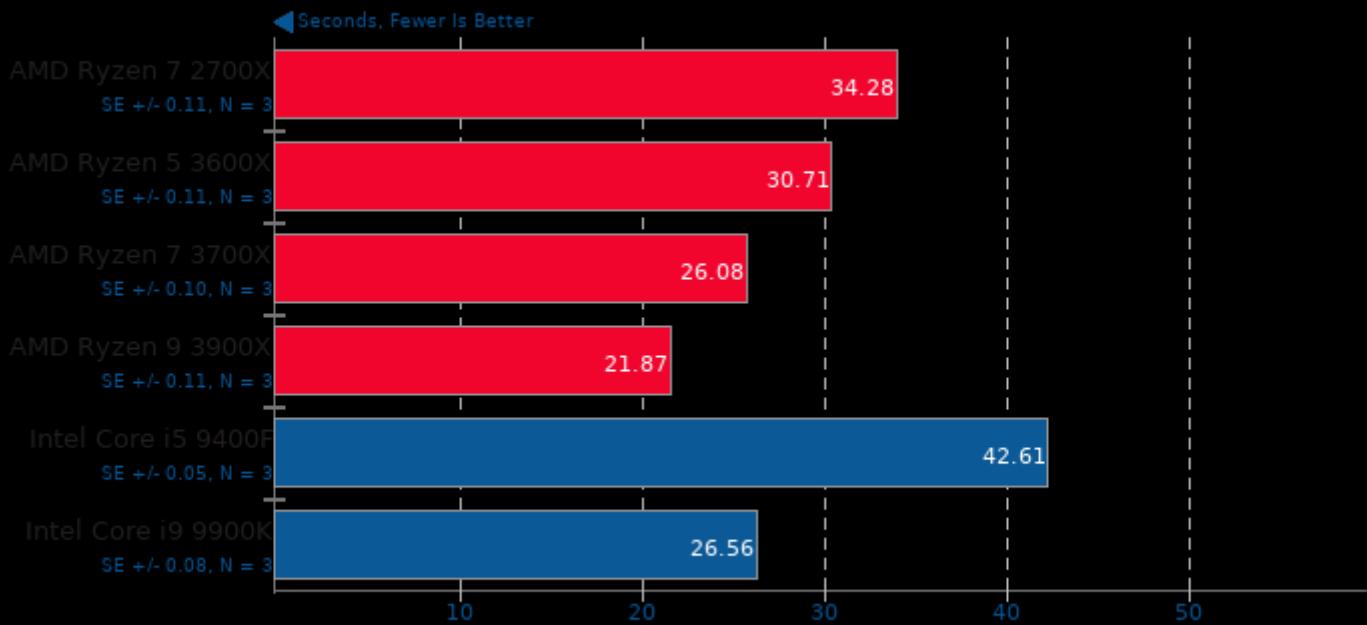
Video Input: Summer Nature 1080p



1. (CC) gcc options: -pthread

## dav1d 0.3

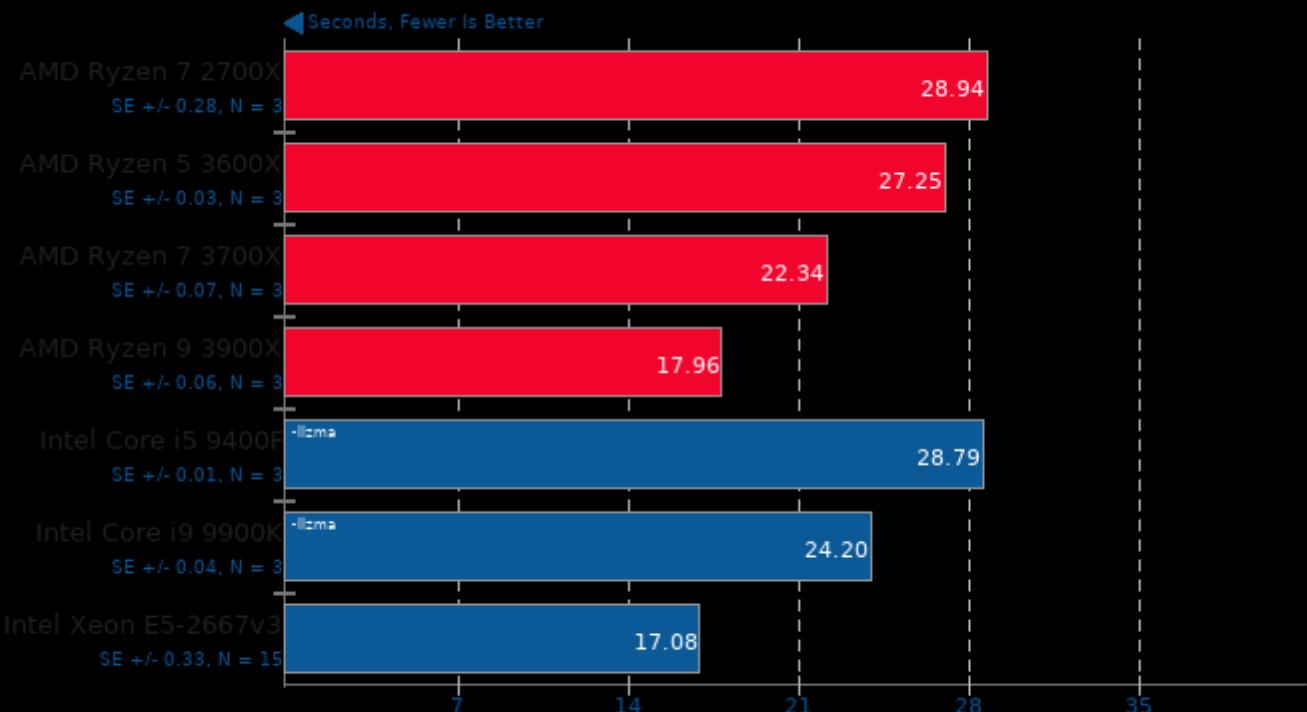
Video Input: Summer Nature 4K



1. (CC) gcc options: -pthread

## Zstd Compression 1.3.4

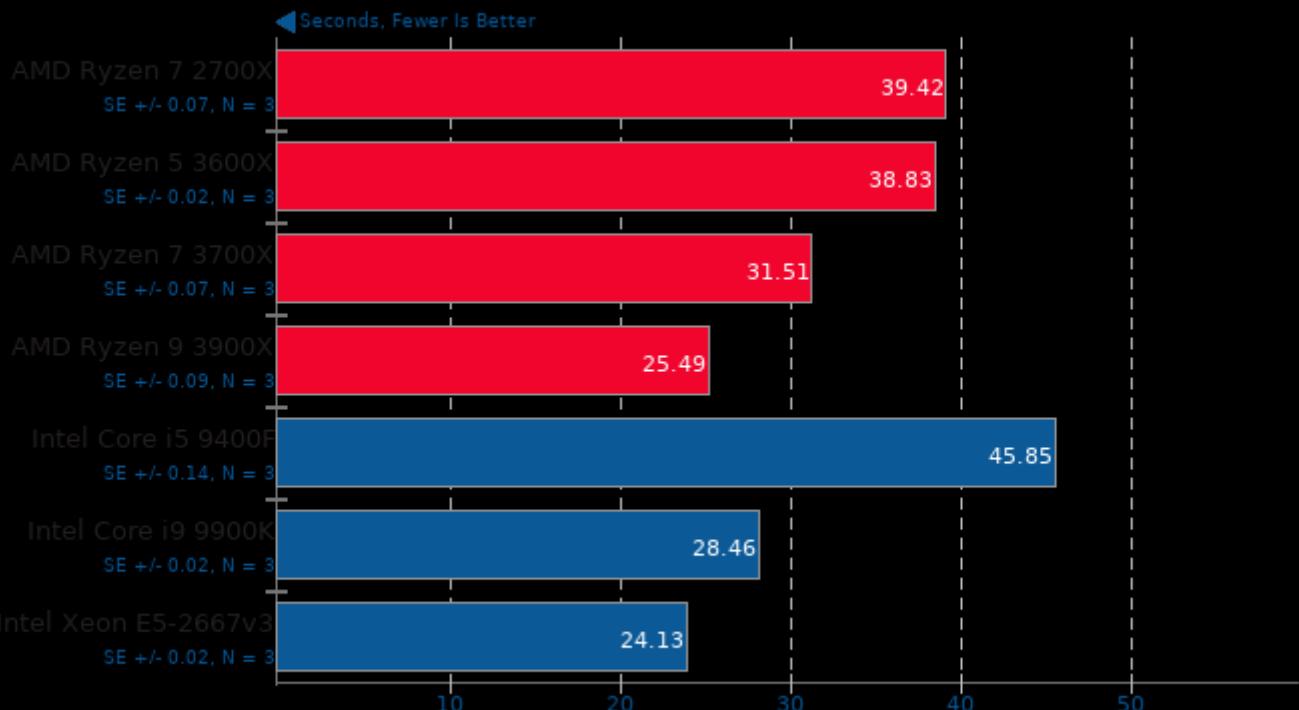
Compressing ubuntu-16.04.3-server-i386.img, Compression Level 19



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

## XZ Compression 5.2.4

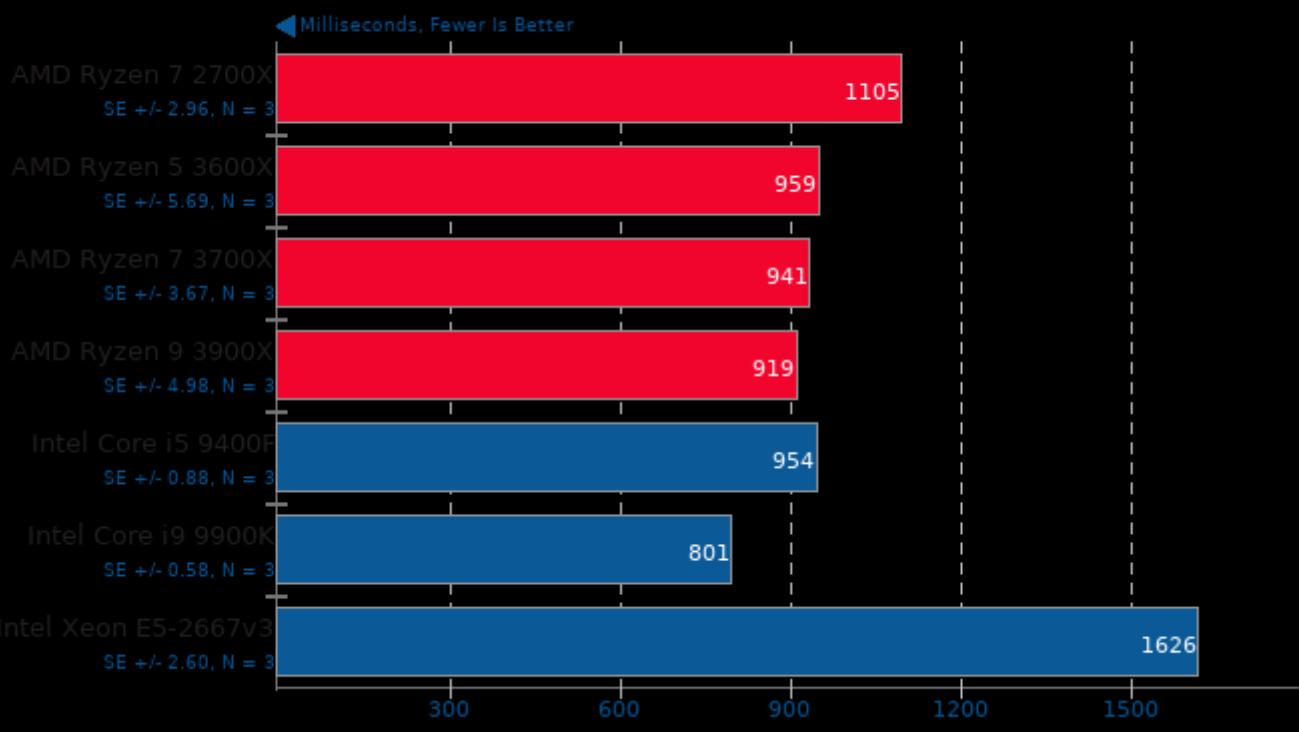
Compressing ubuntu-16.04.3-server-i386.img, Compression Level 9



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

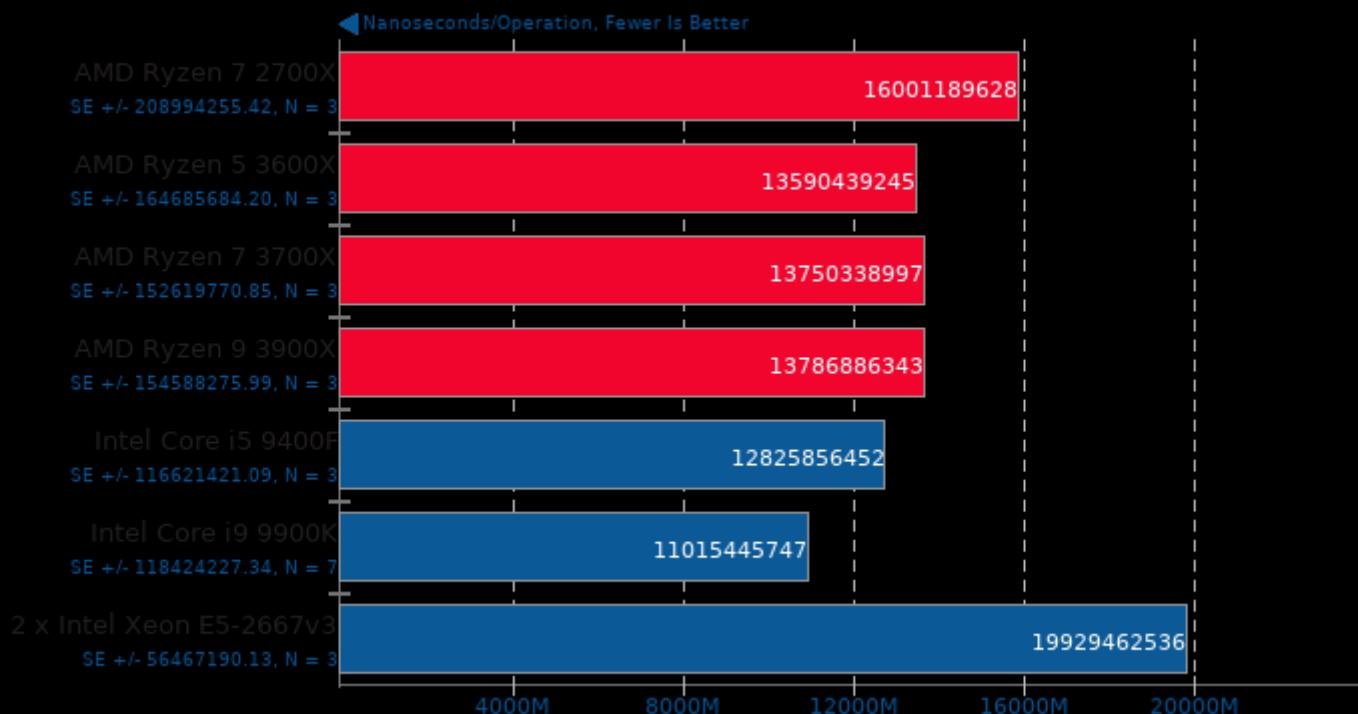
## PyBench 2018-02-16

Total For Average Test Times



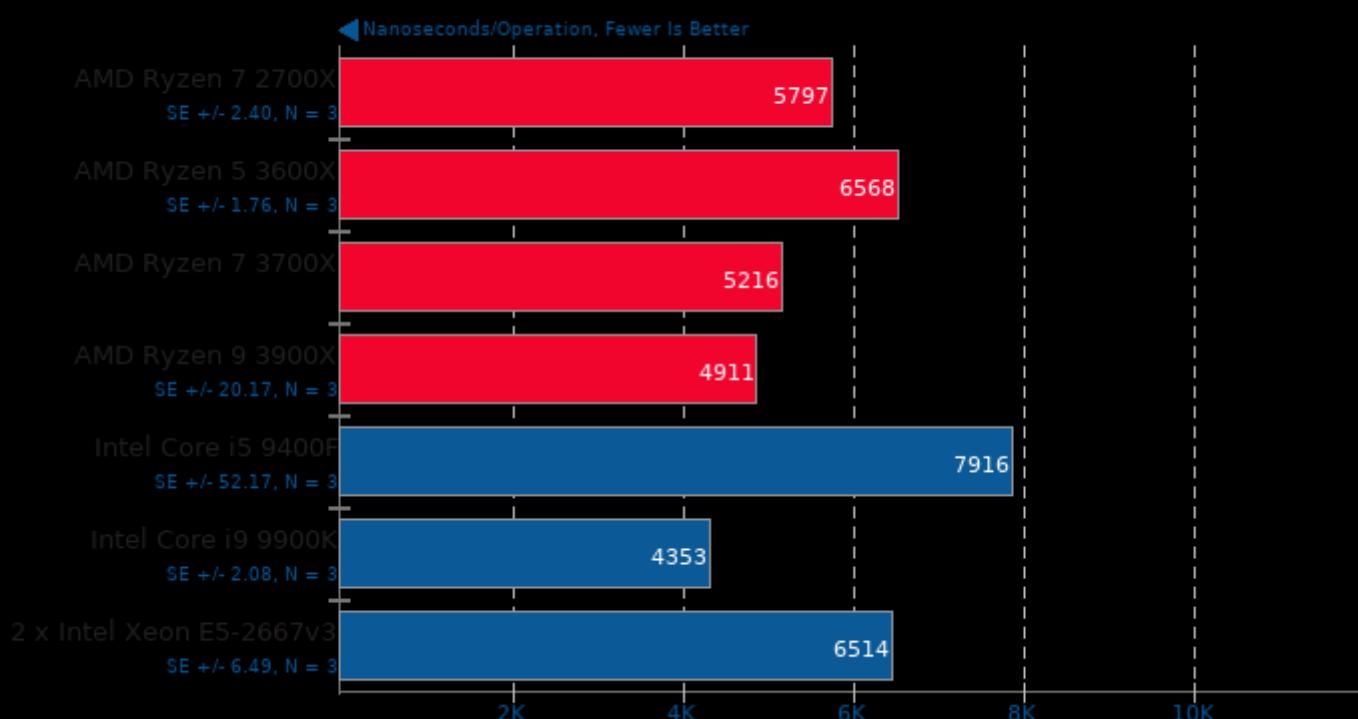
## Go Benchmarks

Test: build



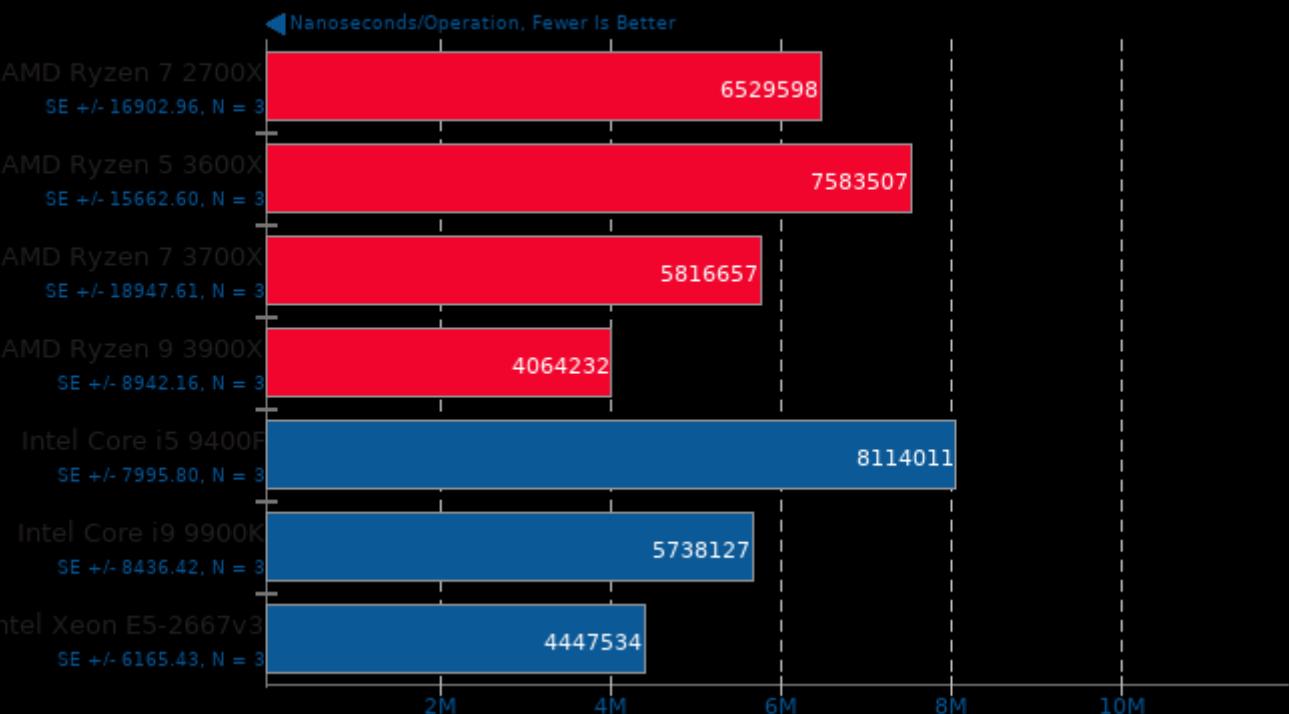
## Go Benchmarks

Test: http



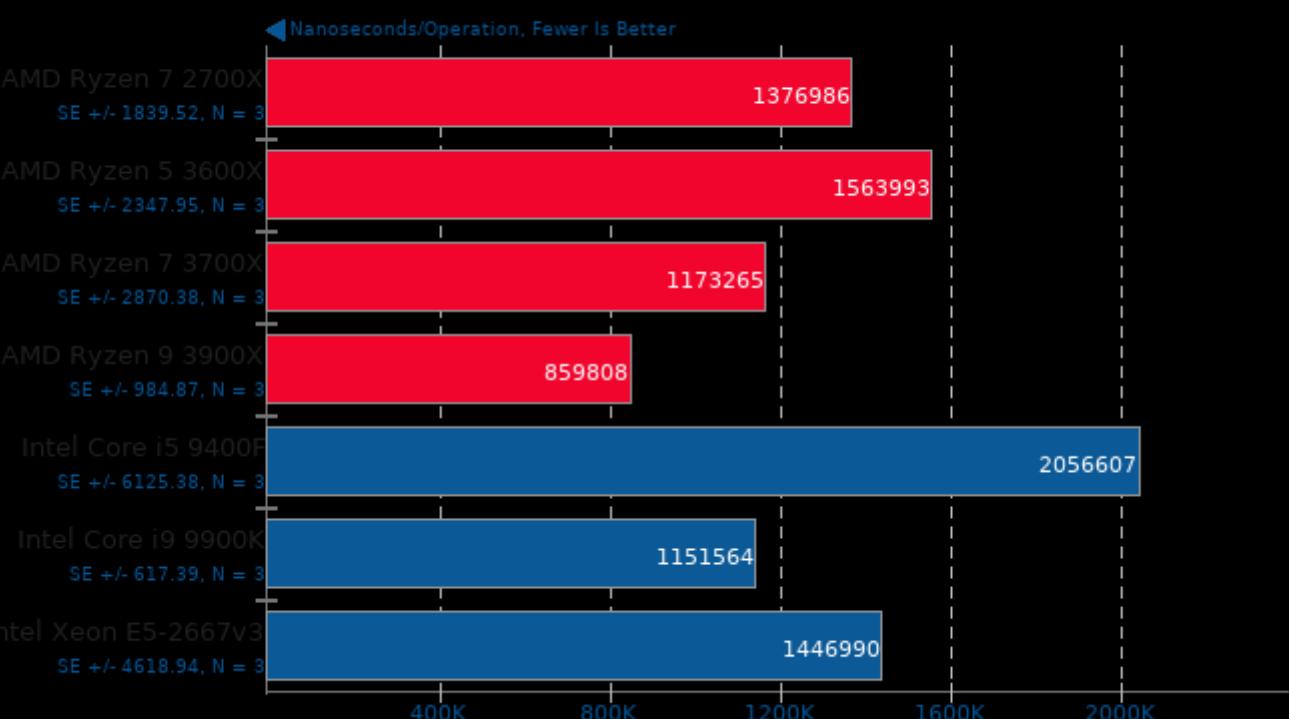
## Go Benchmarks

Test: json



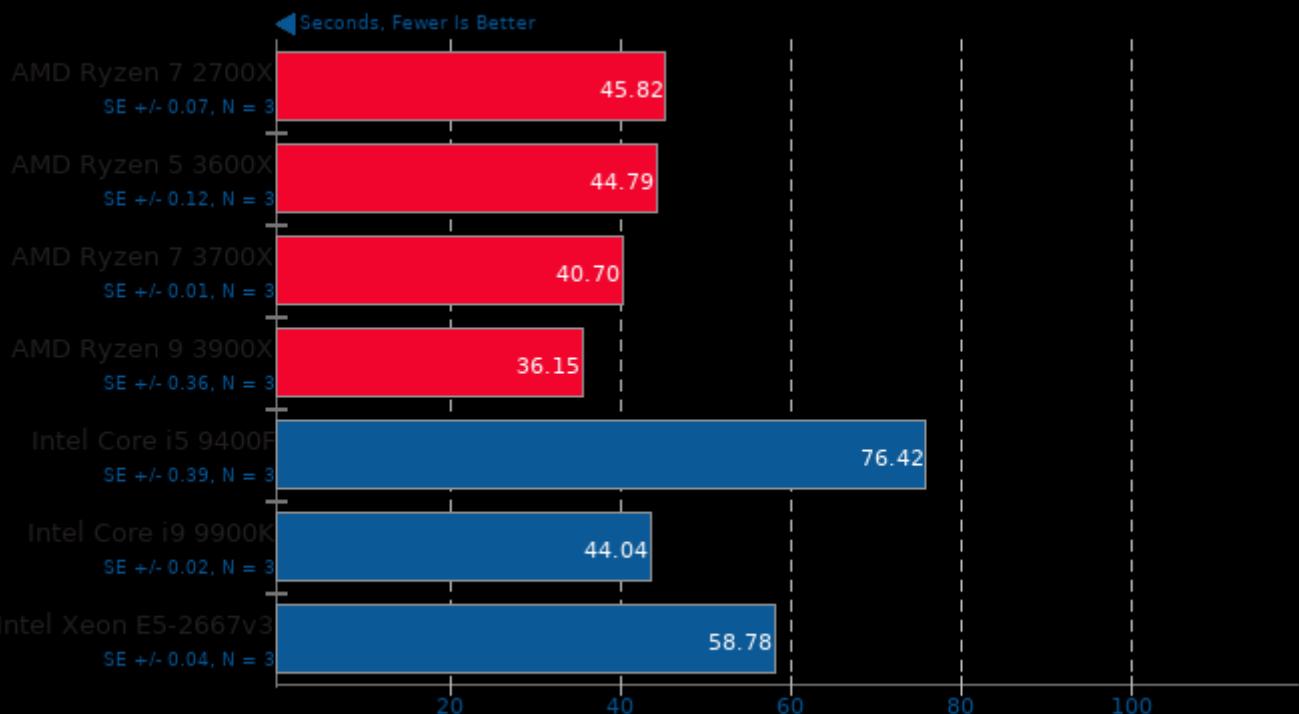
## Go Benchmarks

Test: garbage



## Rust Mandelbrot

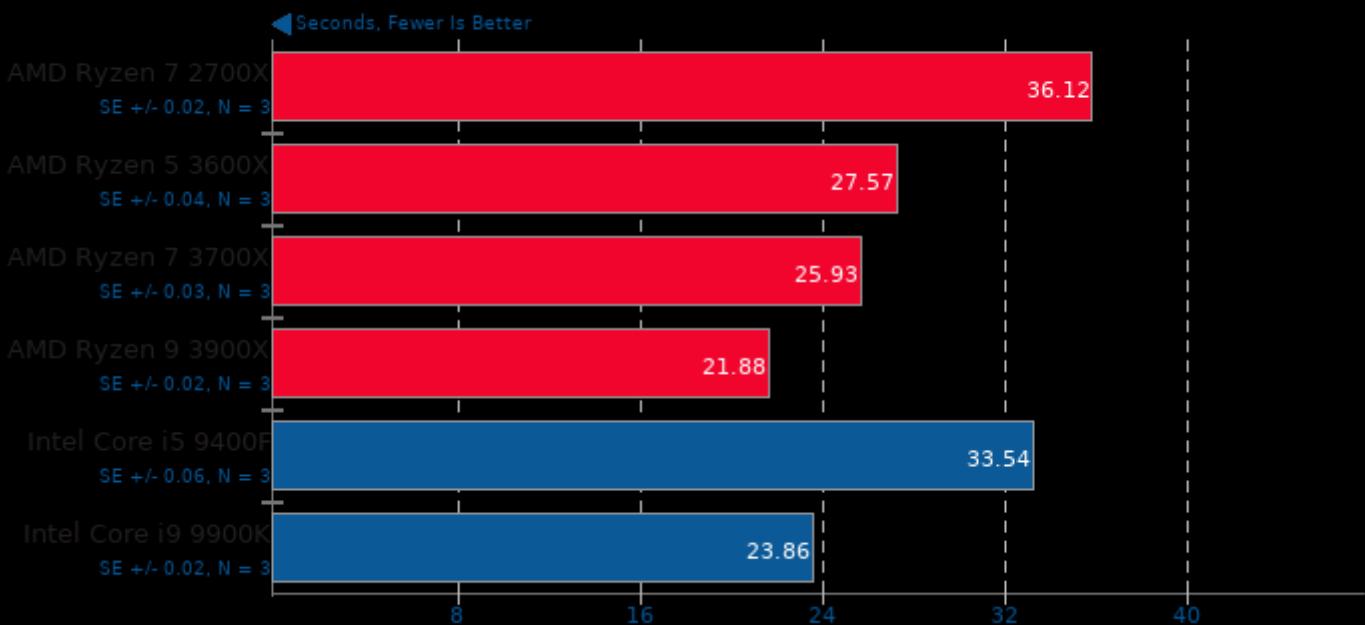
Time To Complete Serial/Parallel Mandelbrot



1. (CC) gcc options: -m64 -pie -nodefaultlibs -futil -ldl -lrt -lpthread -lgcc\_s -lc -lm

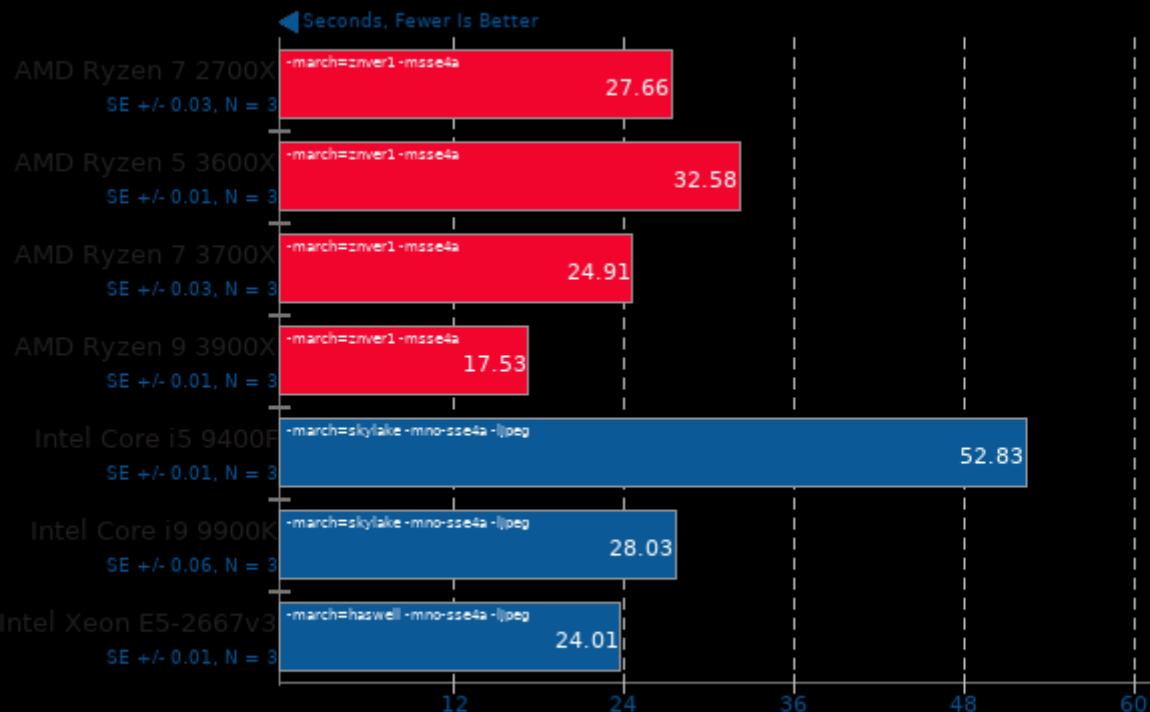
## Tensorflow 2017-02-03

Build: Cifar10



## Tungsten Renderer 0.2.2

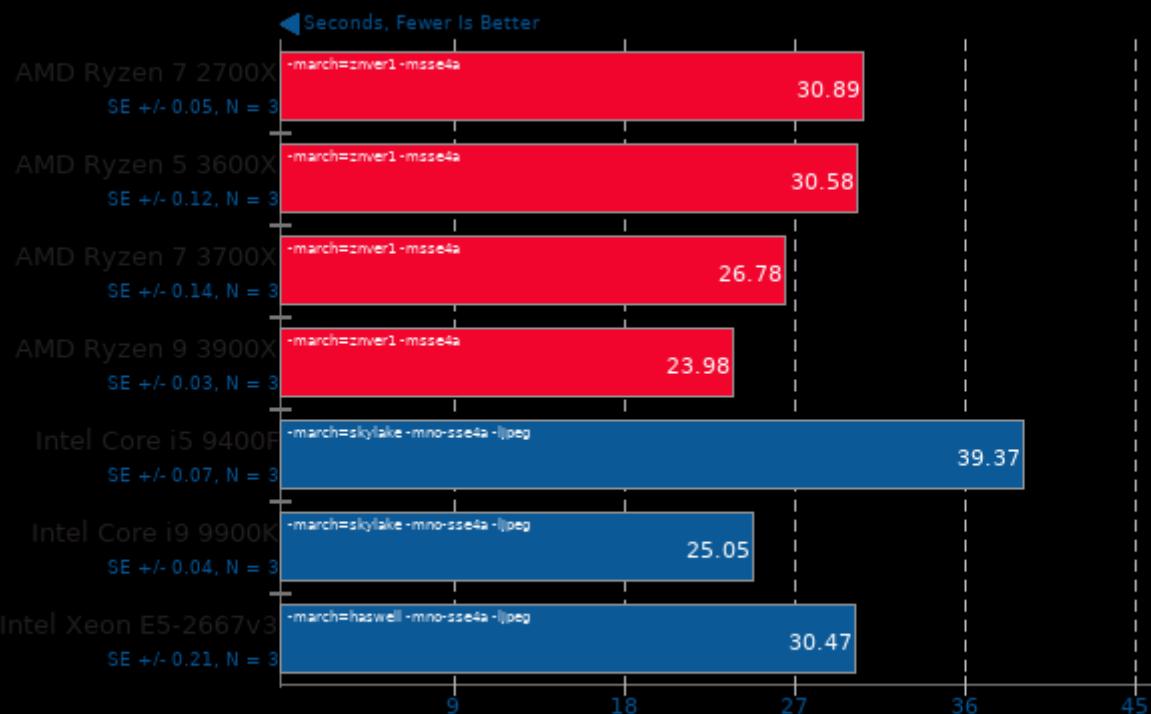
Scene: Hair



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

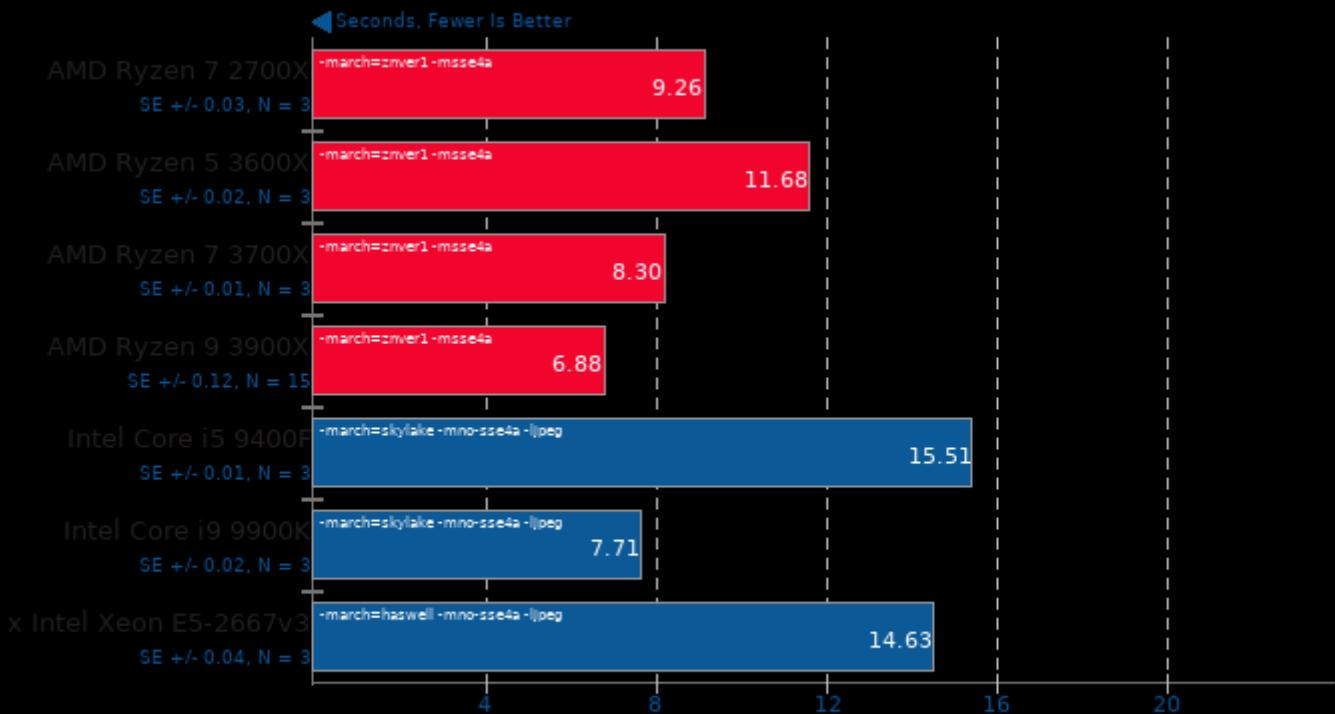
Scene: Water Caustic



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

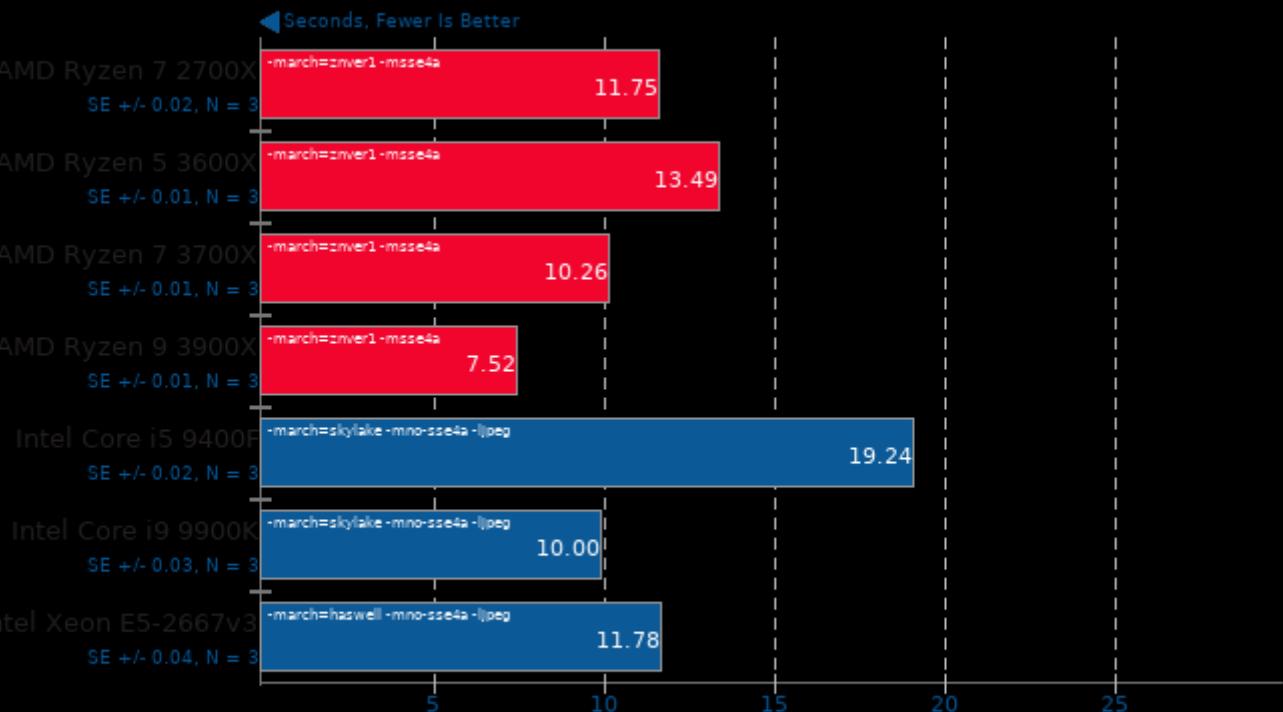
Scene: Non-Exponential



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

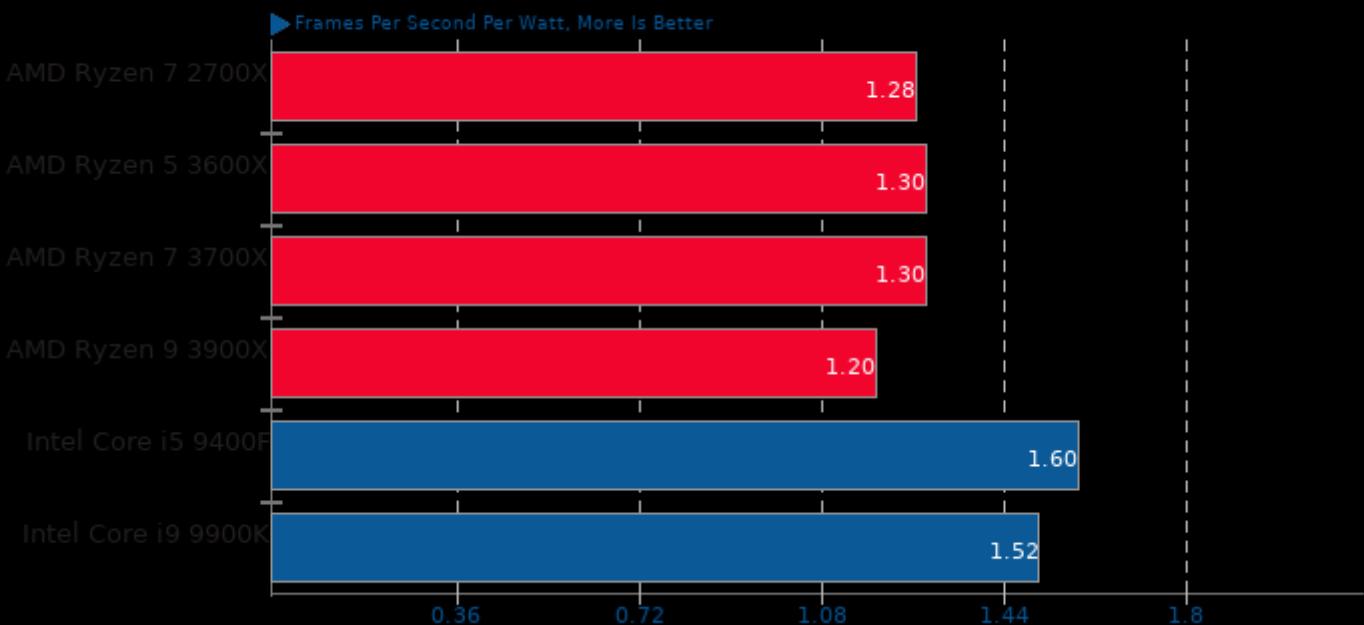
Scene: Volumetric Caustic



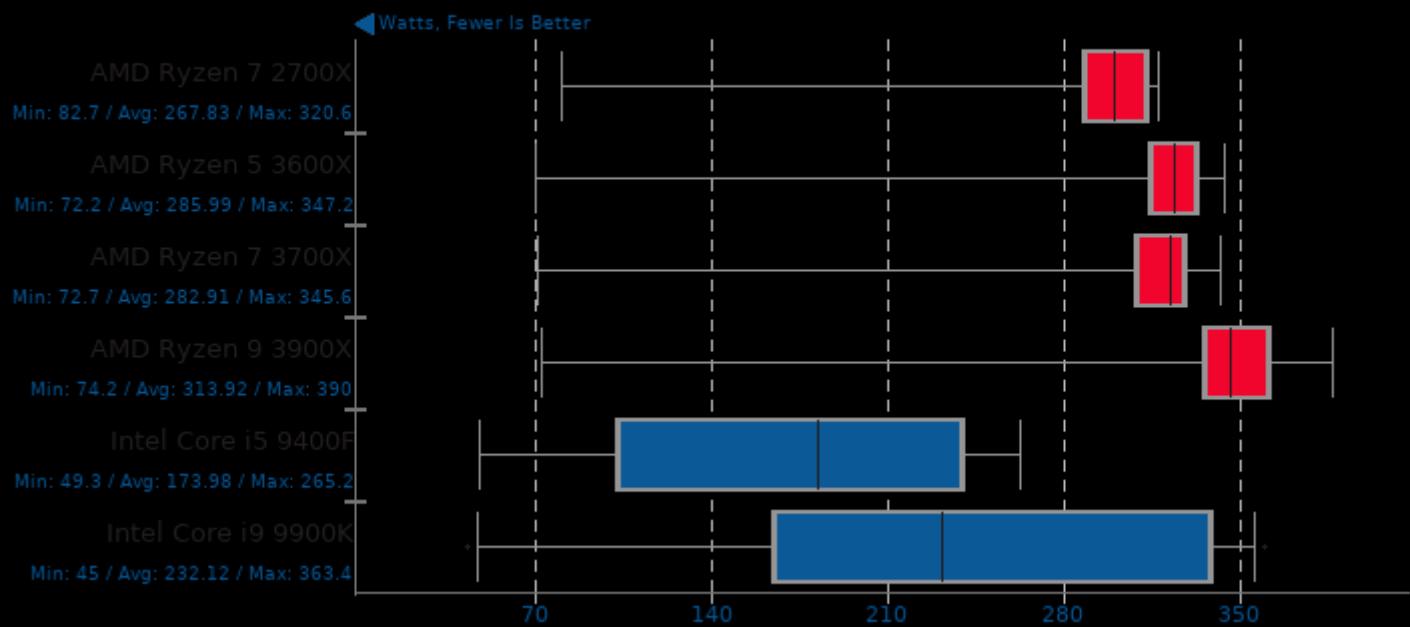
1. (CXX) g++ options: -std=c++0x -msse2 -msse3 -mssse3 -msse4.1 -msse4.2 -mfma -mbmi2 -mno-avx -mno-avx2 -mno-xop -mno-fma4 -mno-avx512f -n

## Tesseract 2014-05-12

Resolution: 3840 x 2160

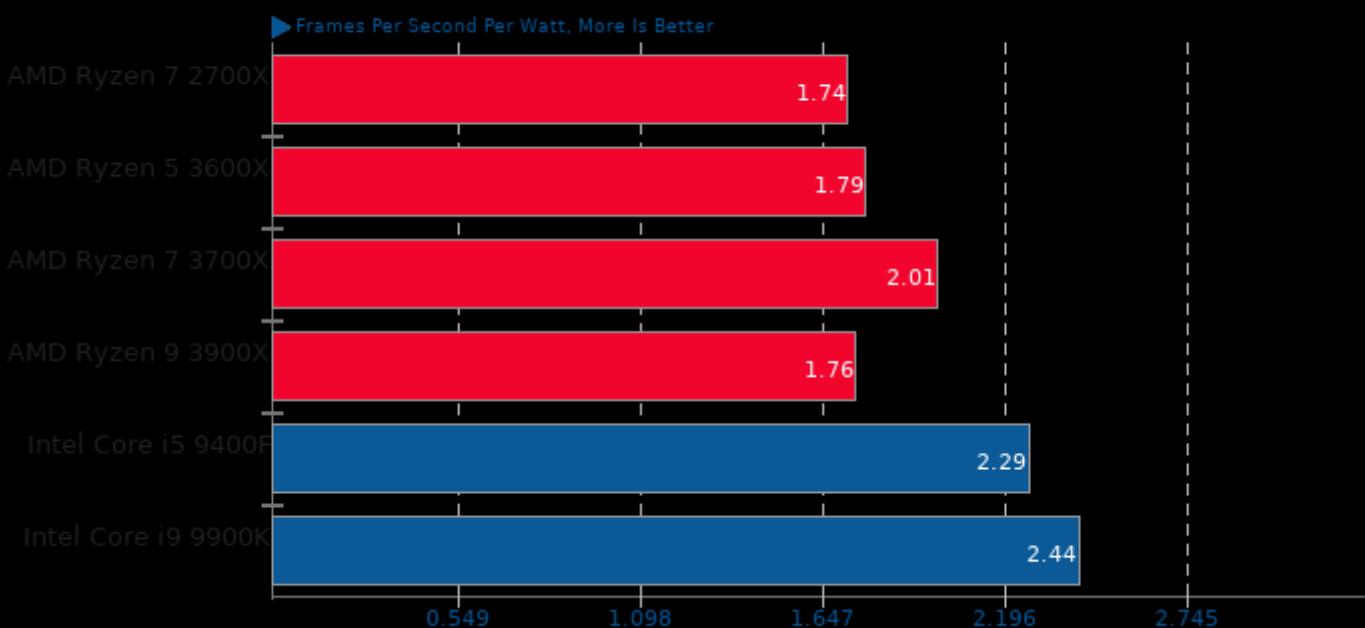


## Tesseract 2014-05-12 System Power Consumption Monitor



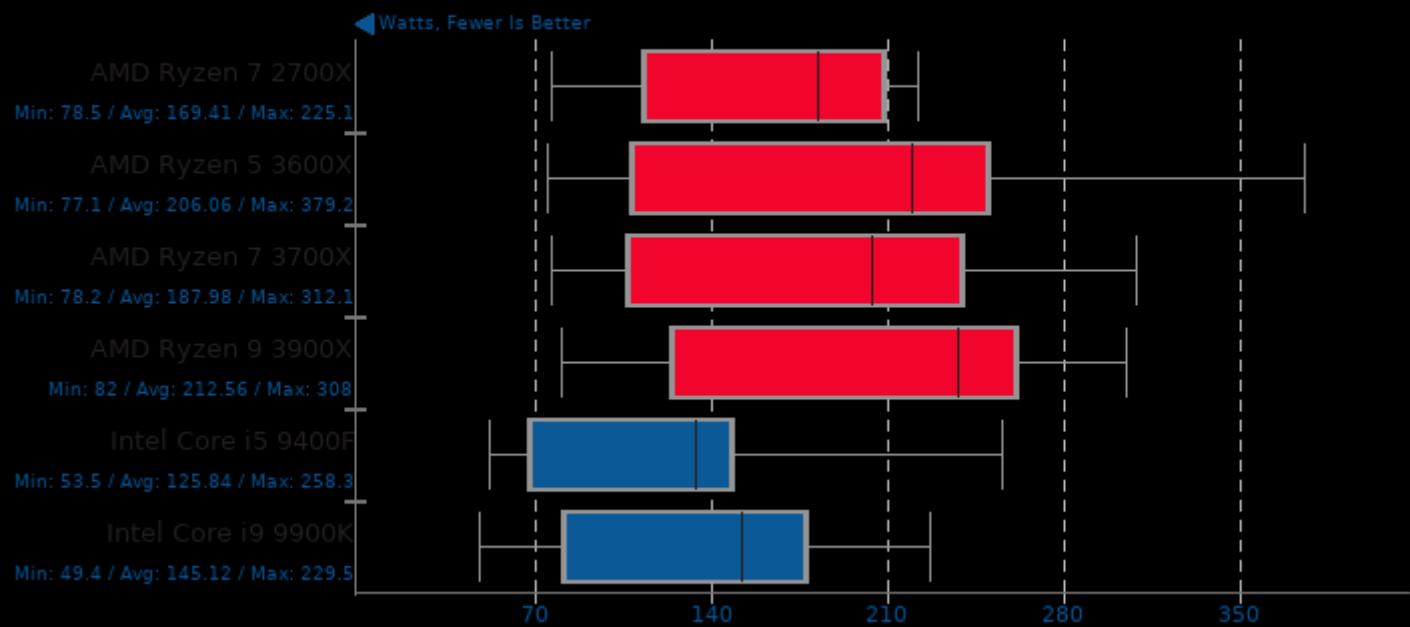
## Xonotic 0.8.2

Resolution: 3840 x 2160 - Effects Quality: Ultra



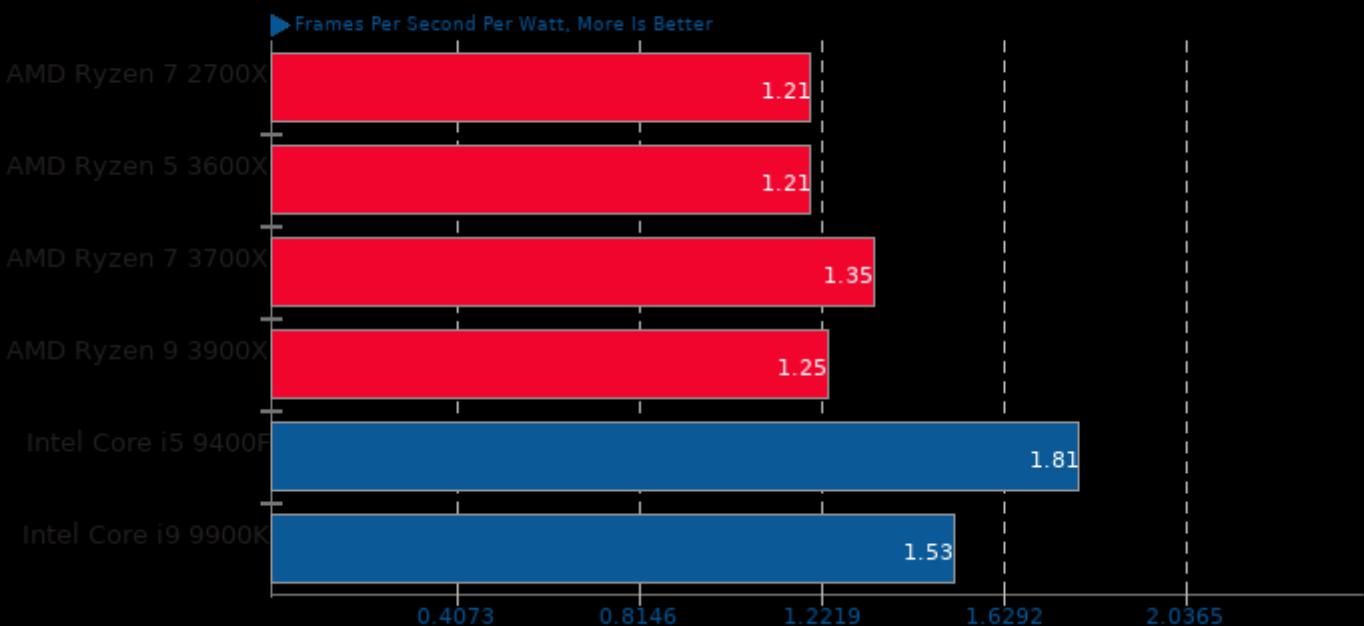
## Xonotic 0.8.2

System Power Consumption Monitor



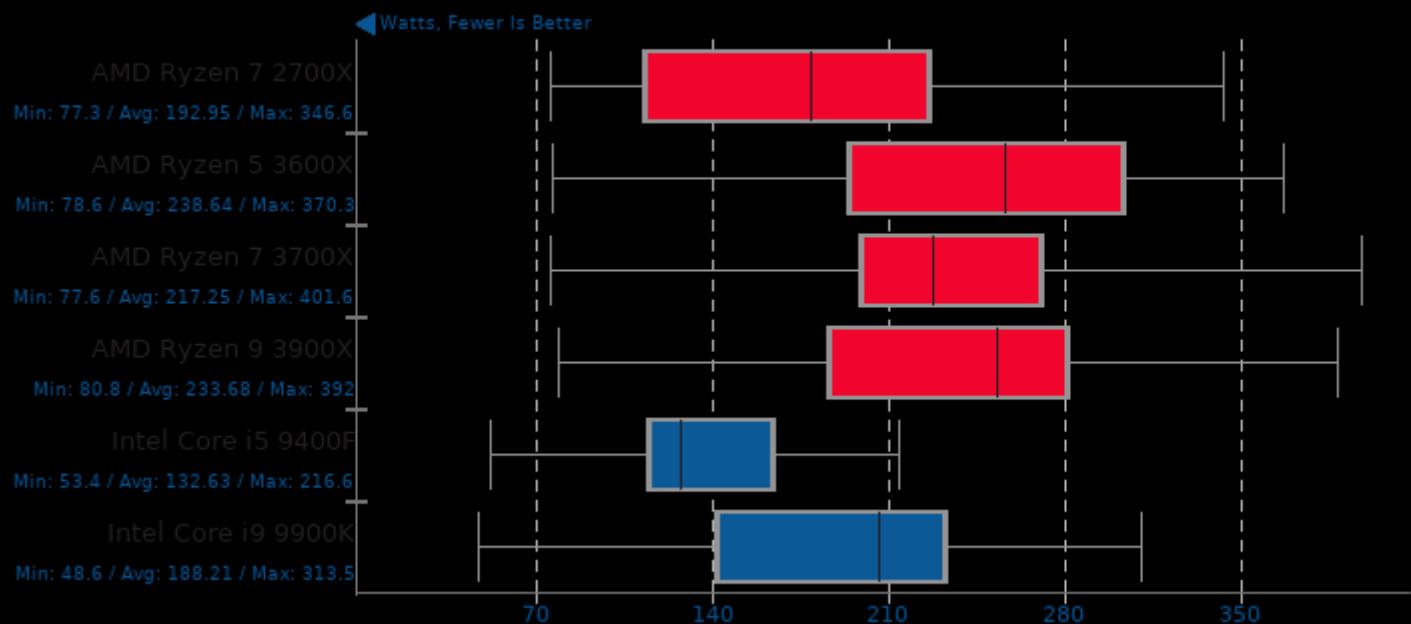
## Xonotic 0.8.2

Resolution: 3840 x 2160 - Effects Quality: Ultimate



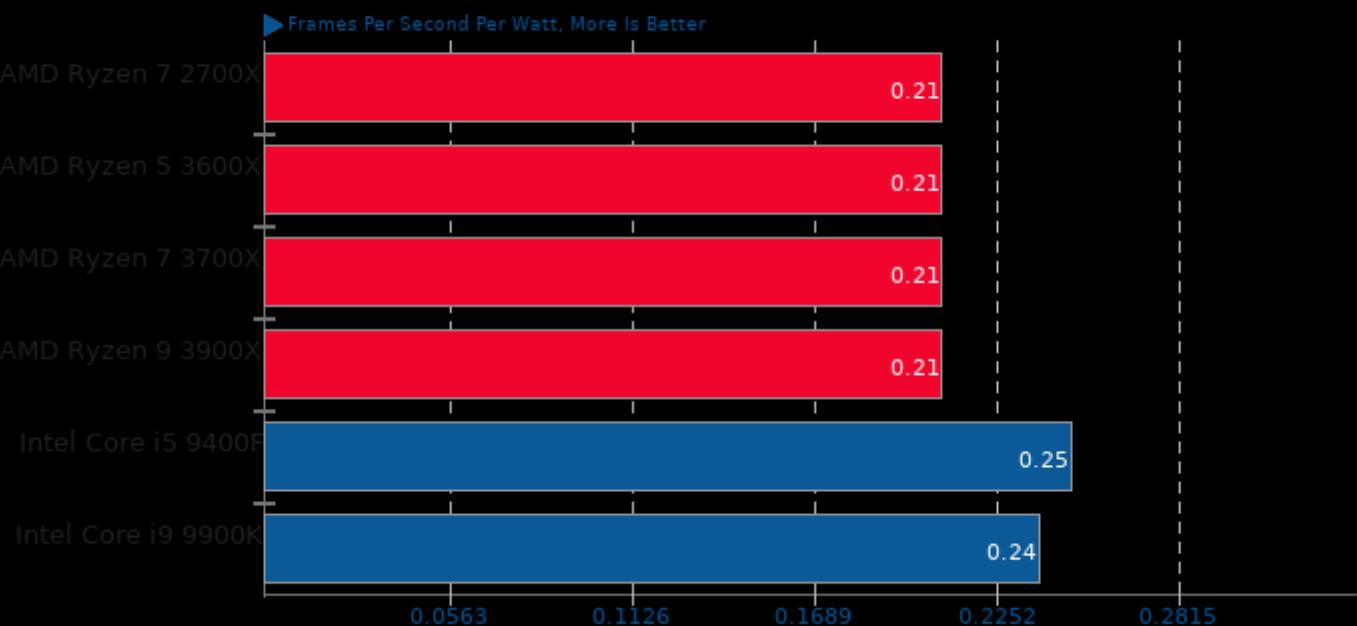
## Xonotic 0.8.2

System Power Consumption Monitor



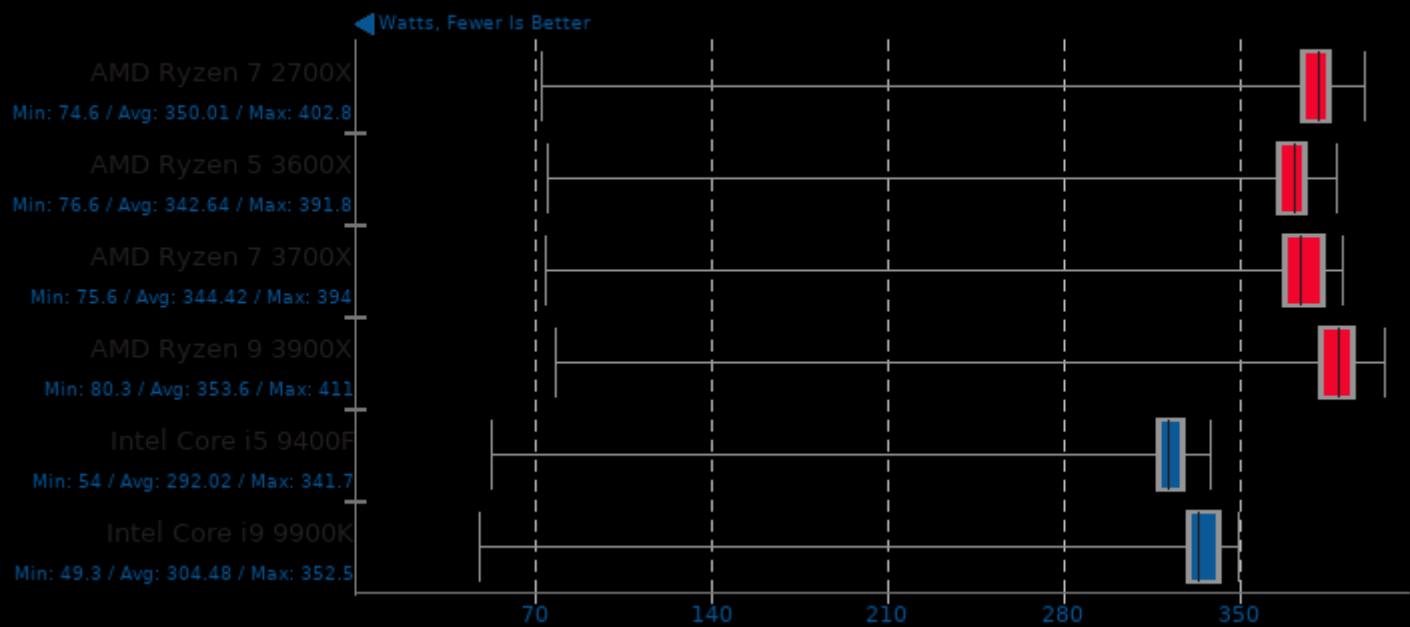
## SuperTuxKart 0.9.3

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



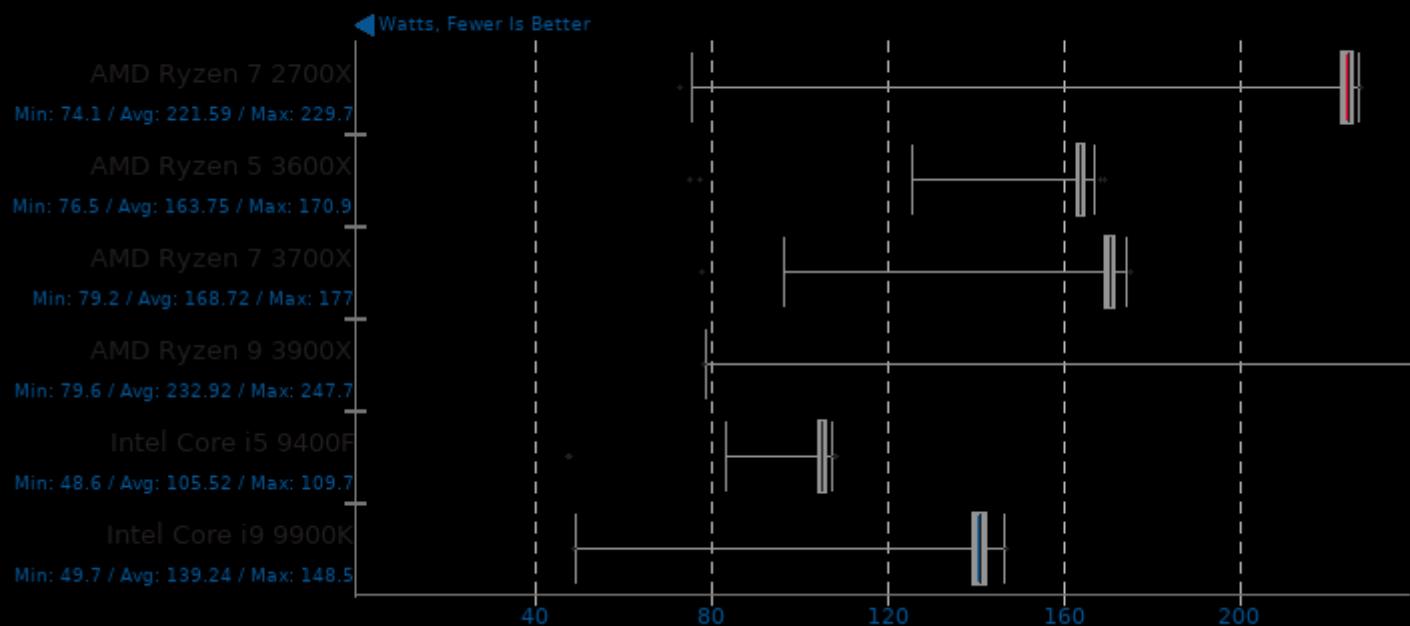
## SuperTuxKart 0.9.3

System Power Consumption Monitor



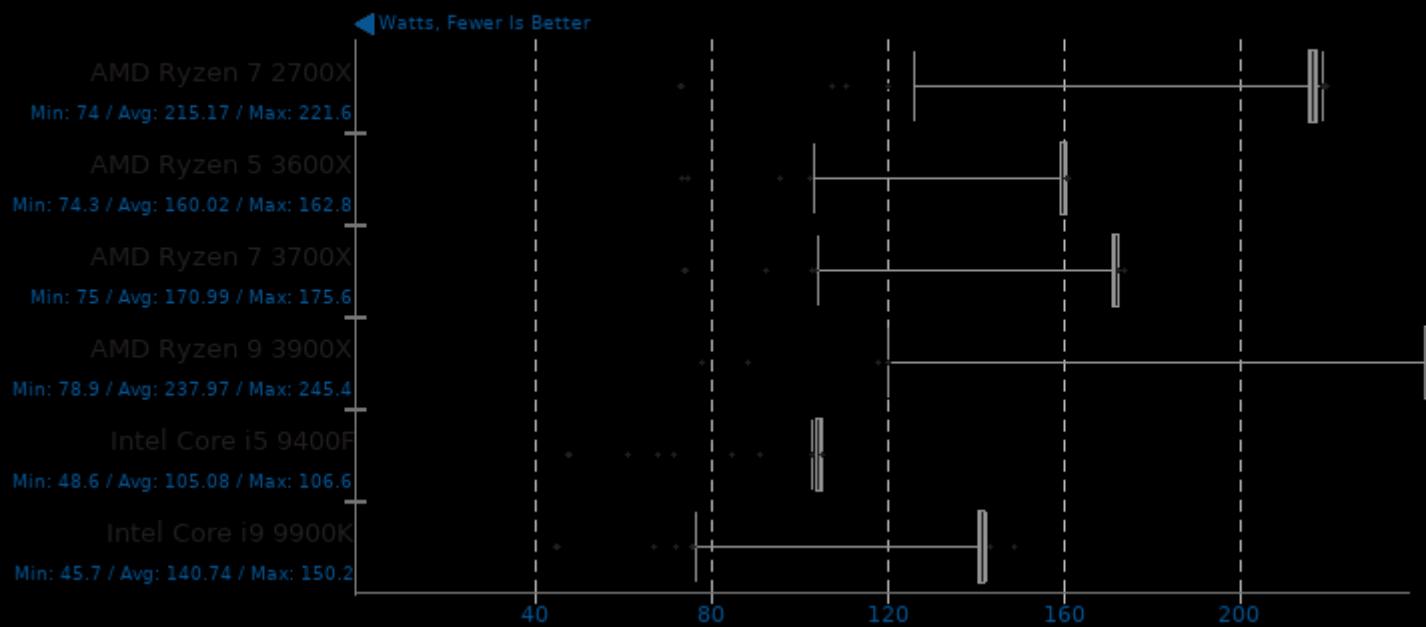
## Blender 2.80

System Power Consumption Monitor



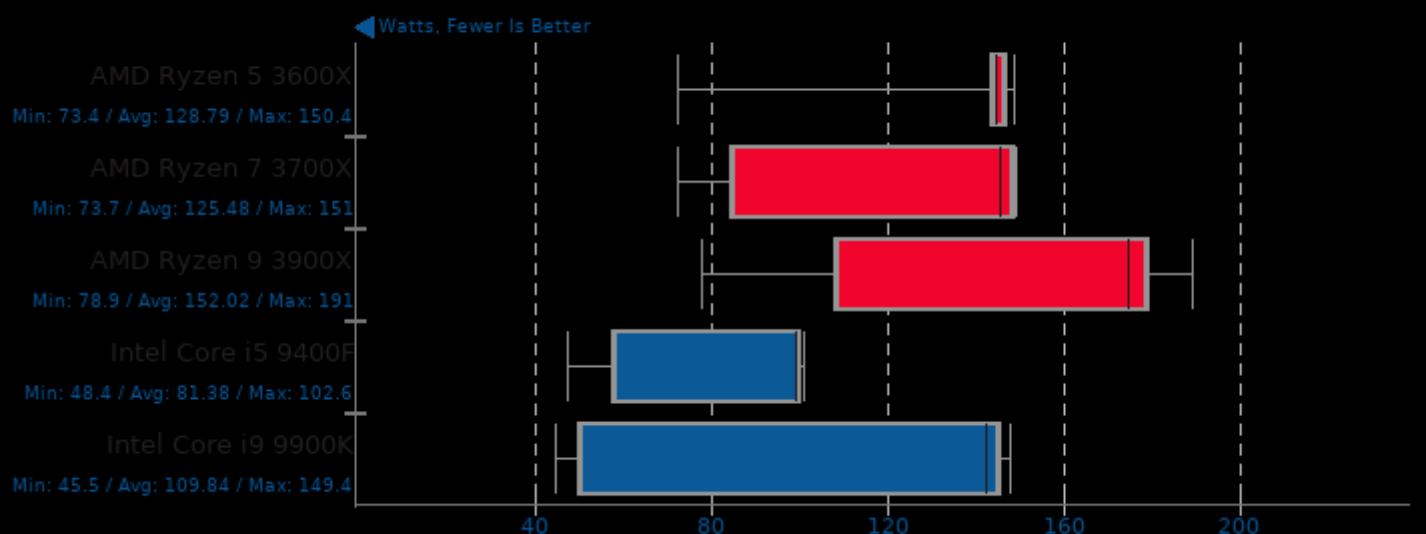
## Blender 2.80

System Power Consumption Monitor



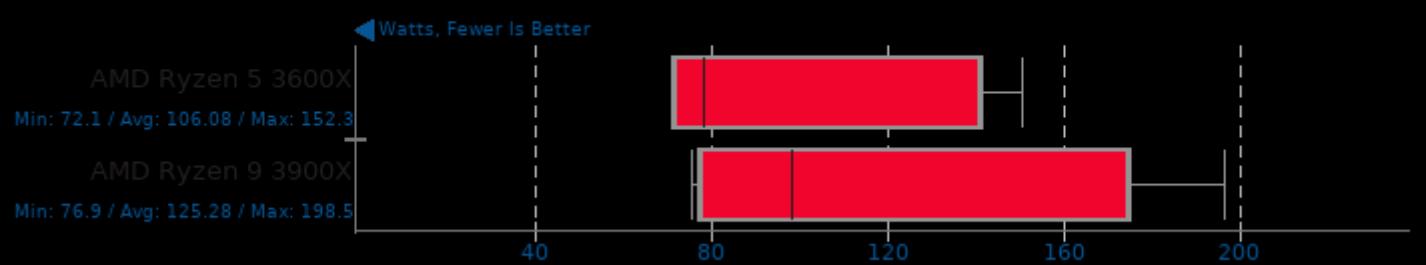
## Darktable 2.6.0

System Power Consumption Monitor



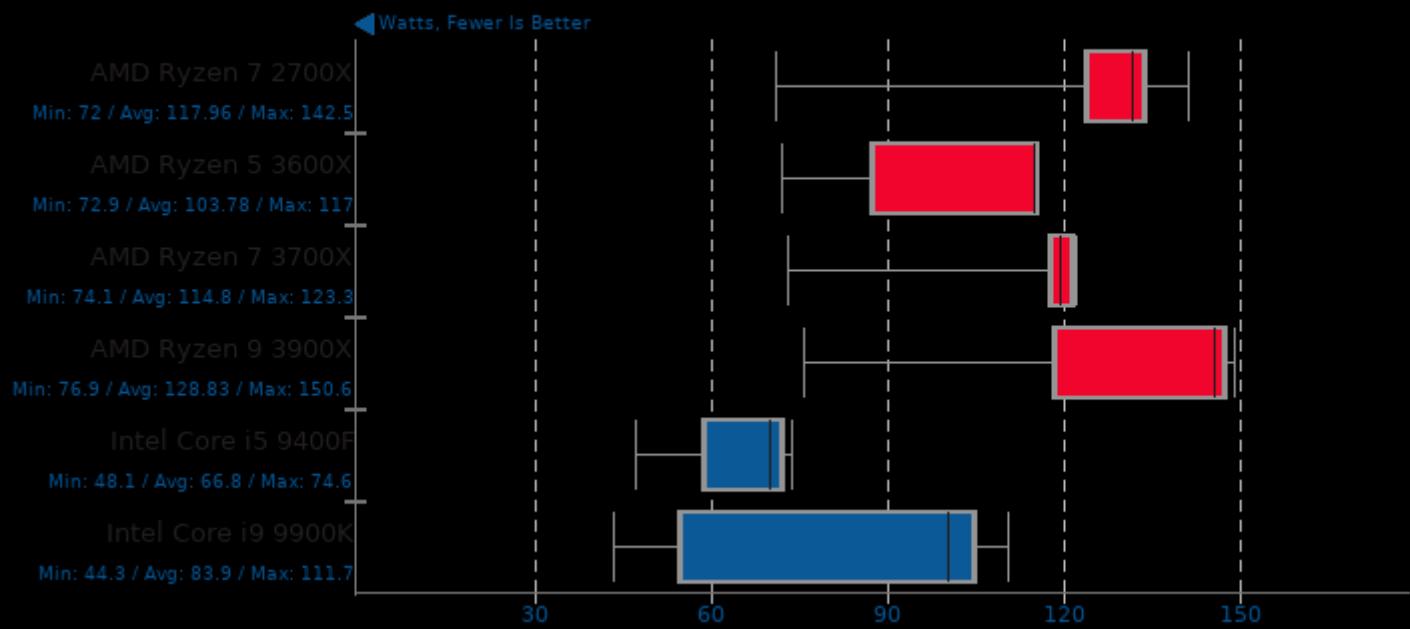
## Darktable 2.6.0

System Power Consumption Monitor



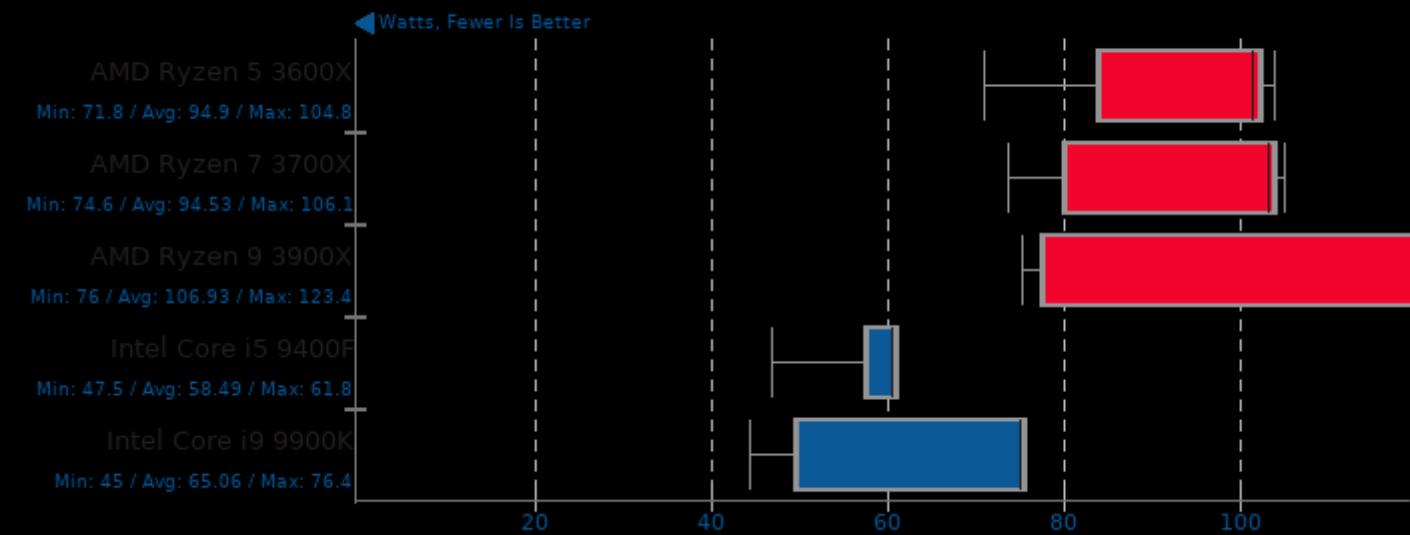
## GIMP 2.10.8

System Power Consumption Monitor



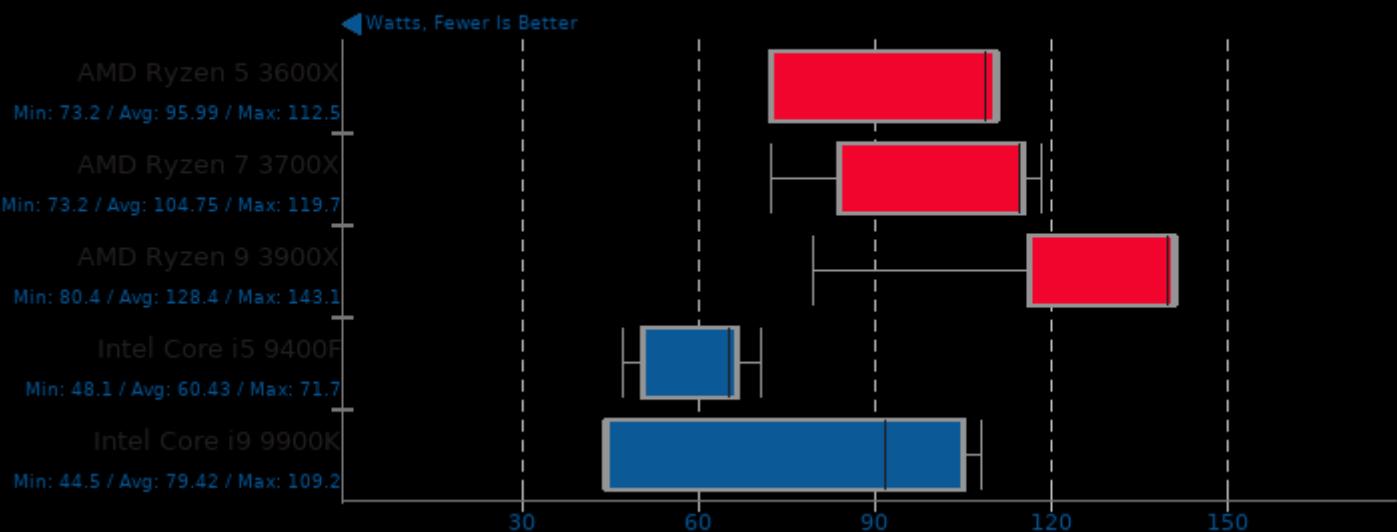
## GIMP 2.10.8

System Power Consumption Monitor



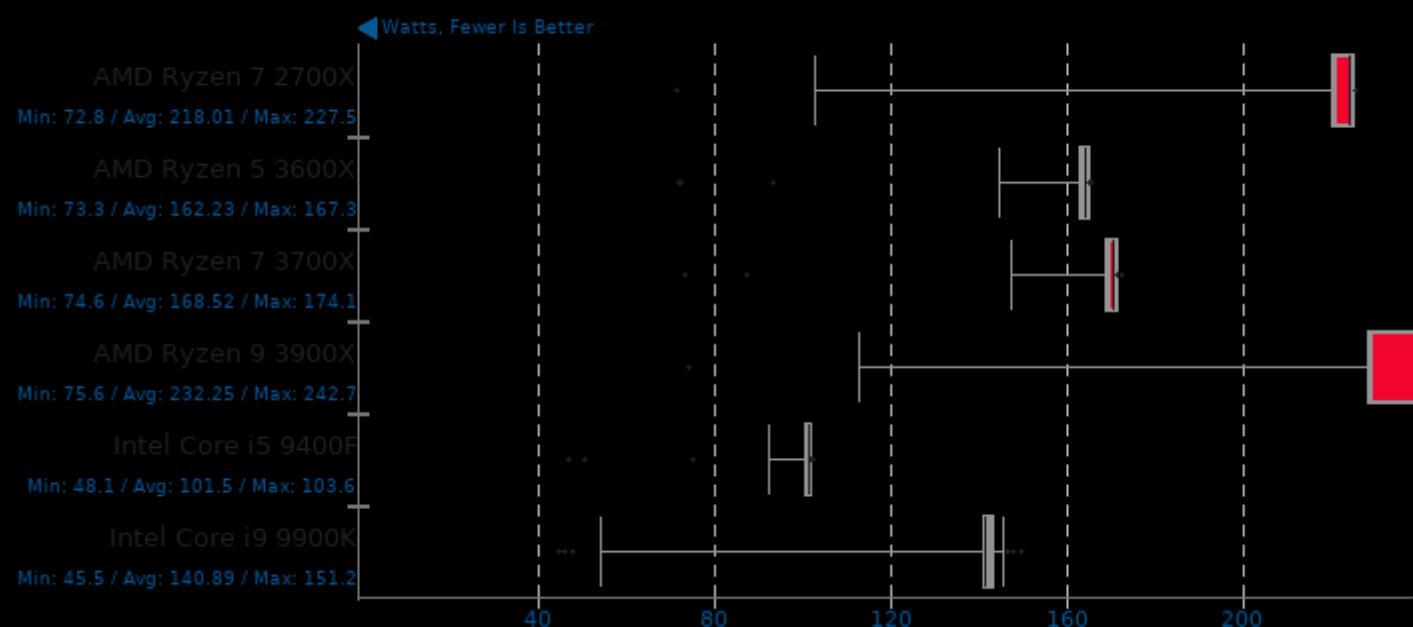
## GIMP 2.10.8

System Power Consumption Monitor



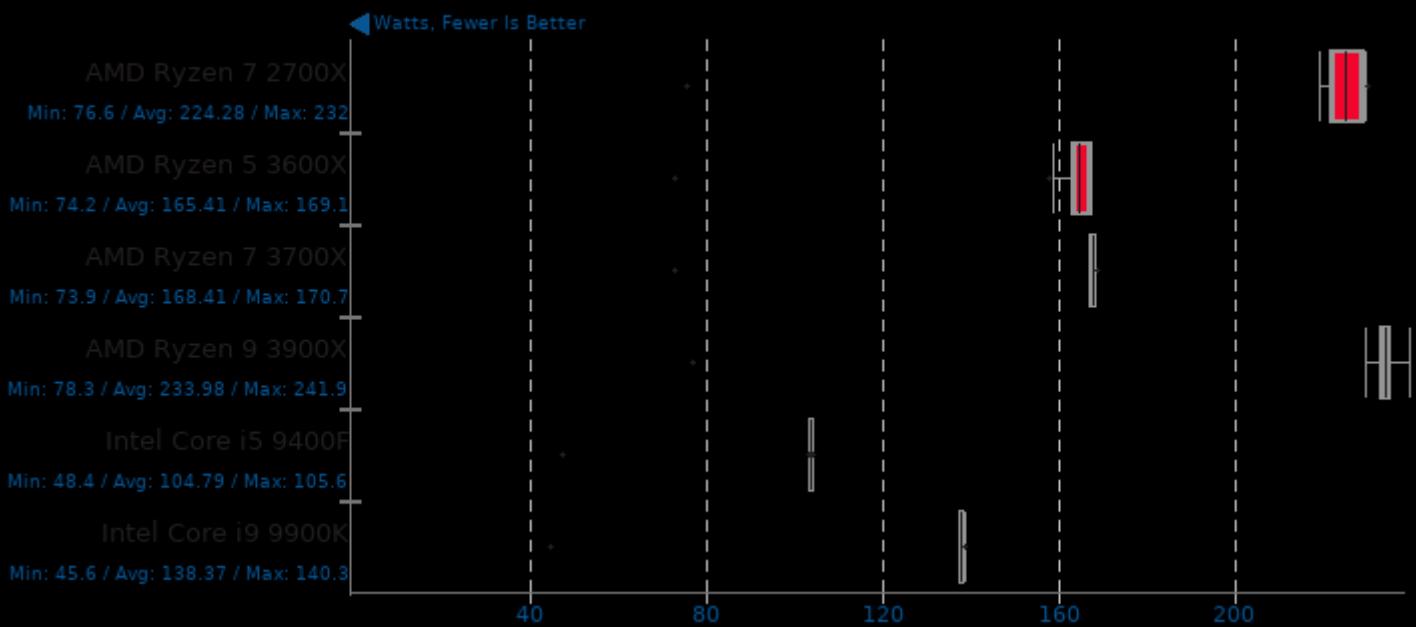
## Appleseed 2.0 Beta

System Power Consumption Monitor



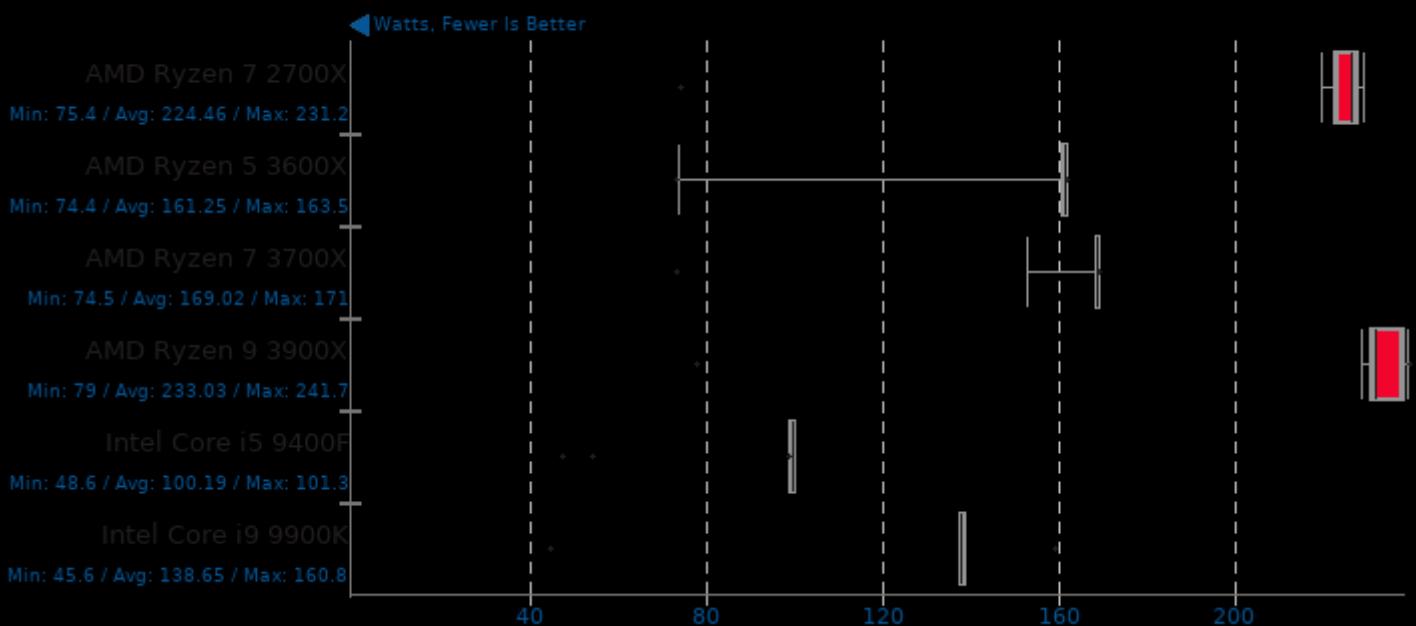
## Appleseed 2.0 Beta

System Power Consumption Monitor



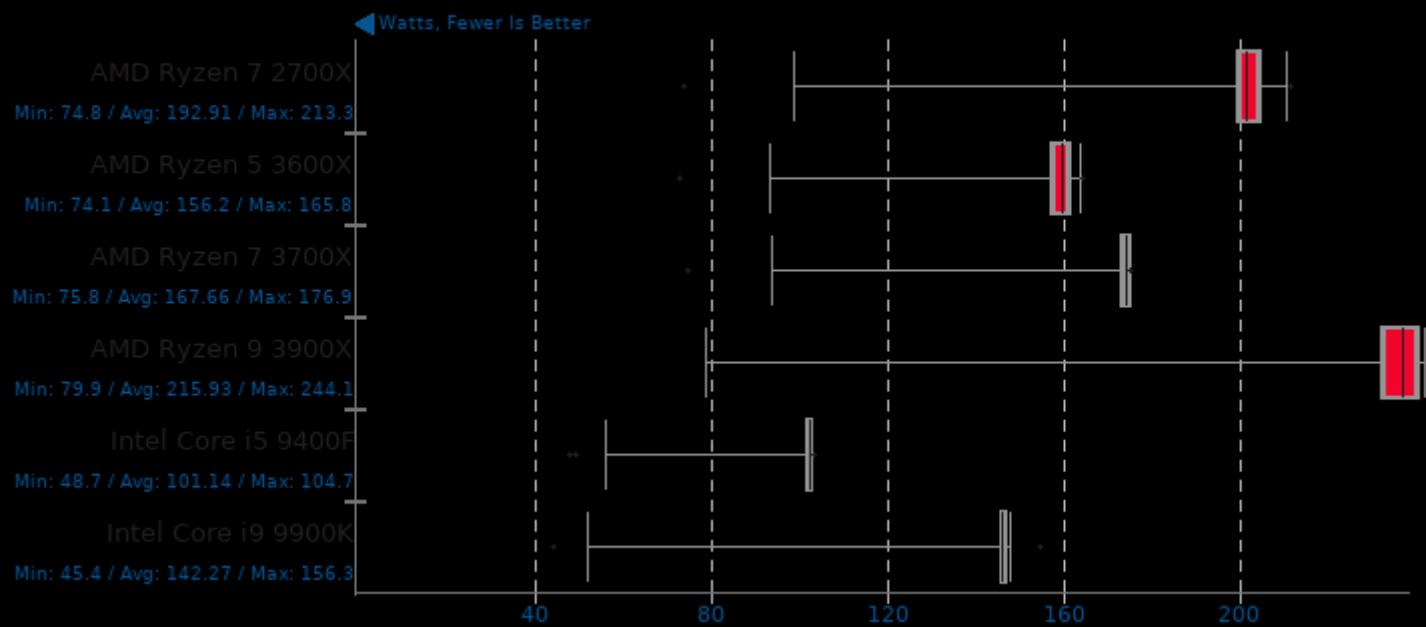
## Appleseed 2.0 Beta

System Power Consumption Monitor



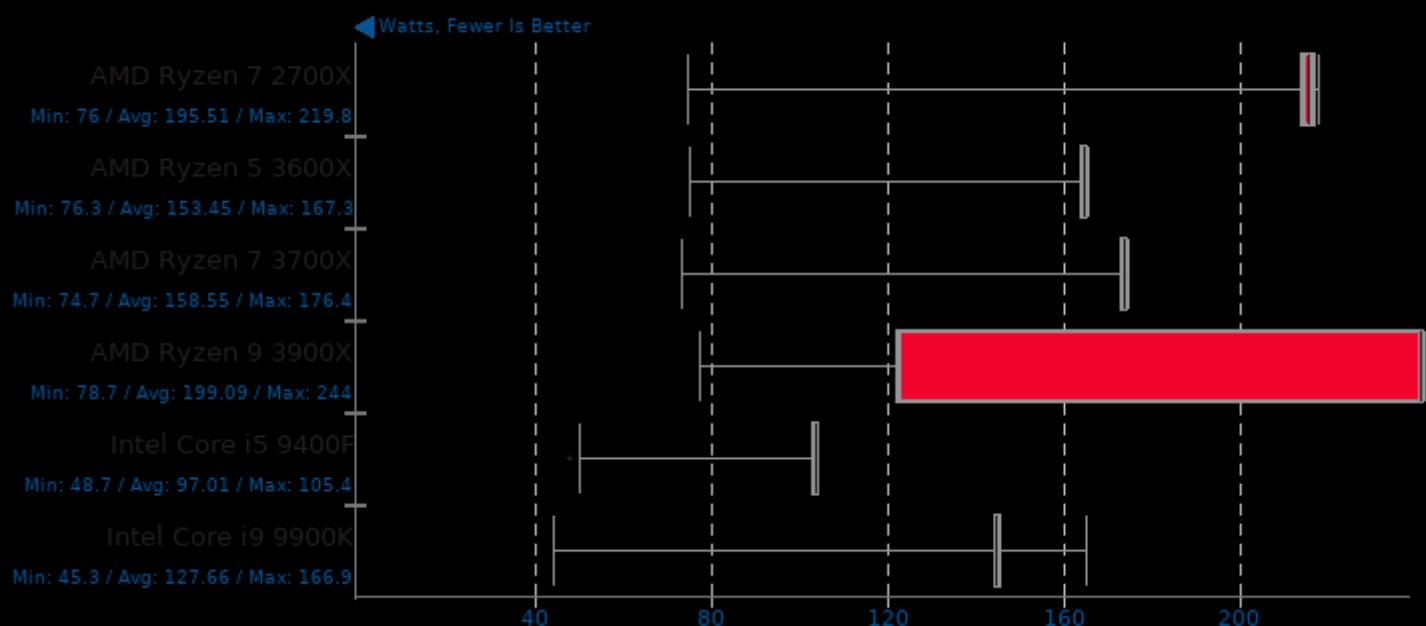
## Timed LLVM Compilation 6.0.1

System Power Consumption Monitor



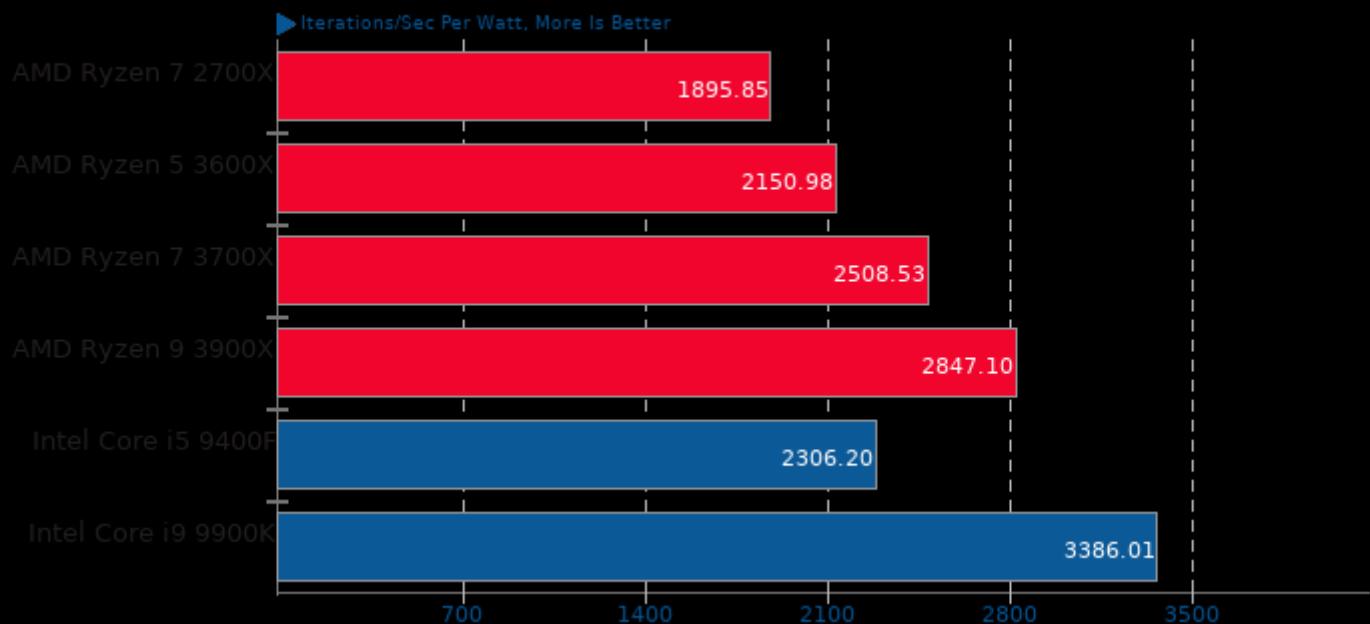
## Timed Linux Kernel Compilation 4.18

System Power Consumption Monitor



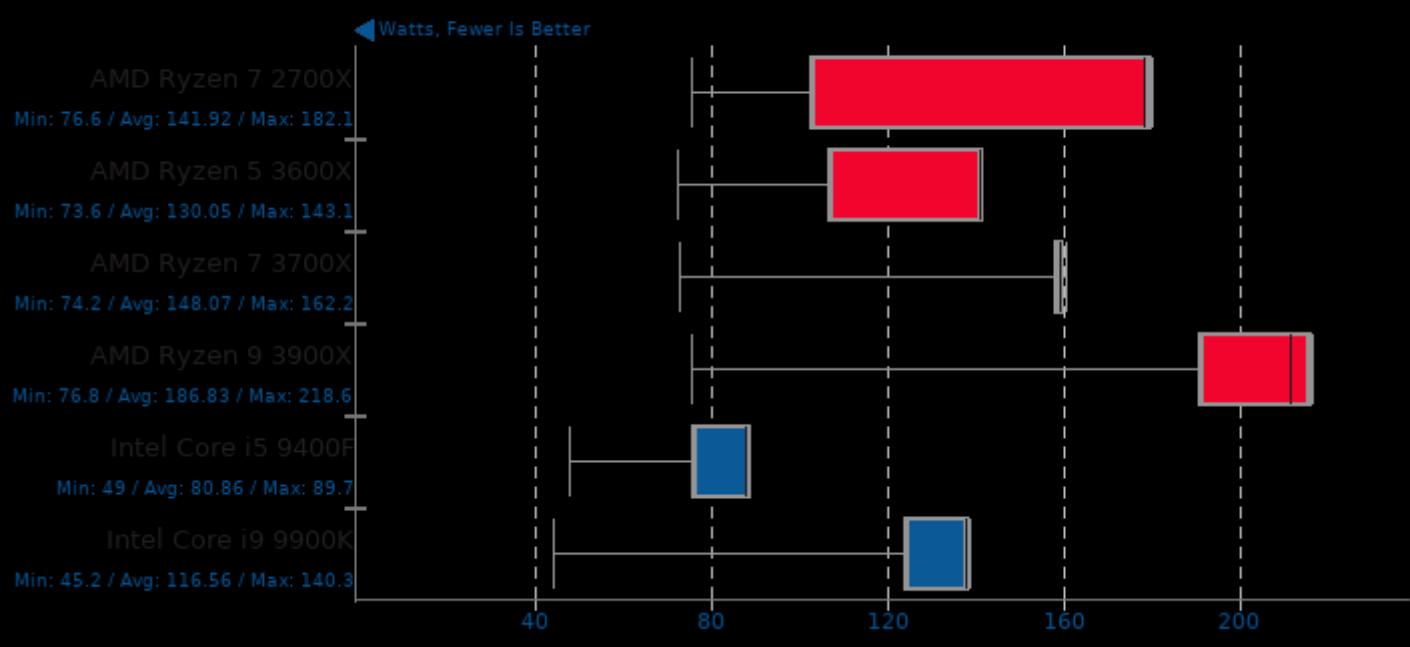
## Coremark 1.0

CoreMark Size 666 - Iterations Per Second



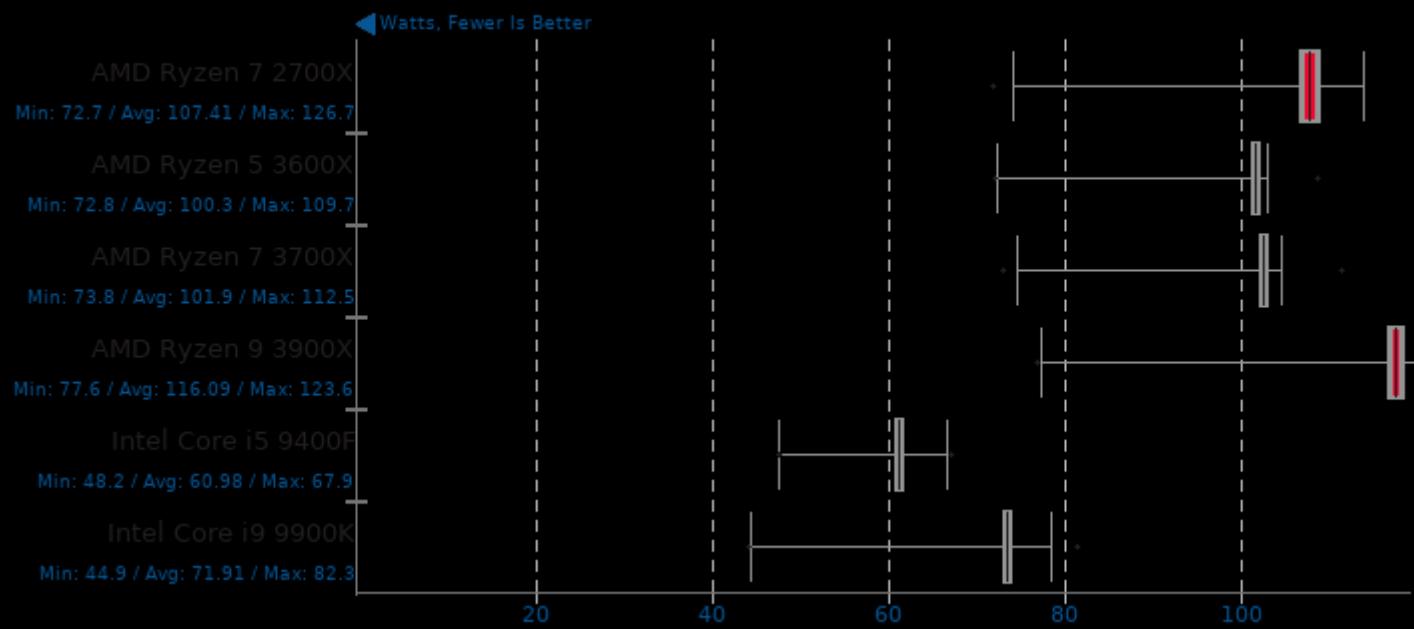
## Coremark 1.0

System Power Consumption Monitor



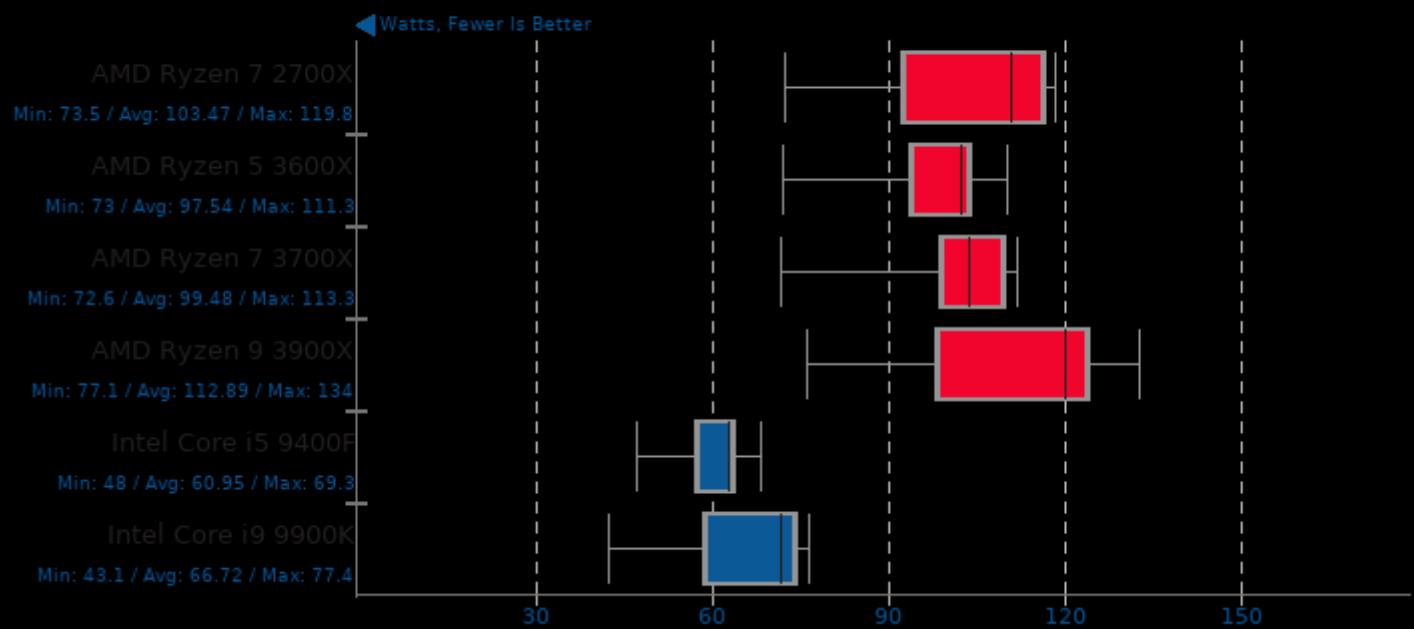
## Selenium

System Power Consumption Monitor



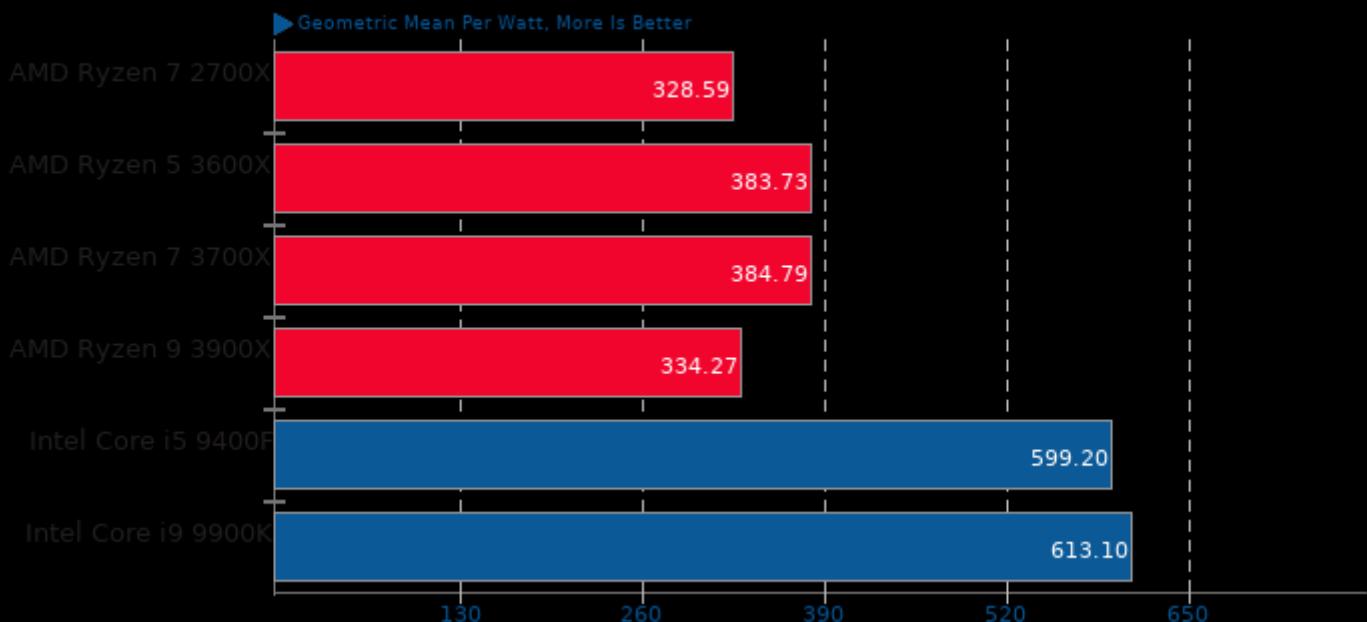
## Selenium

System Power Consumption Monitor



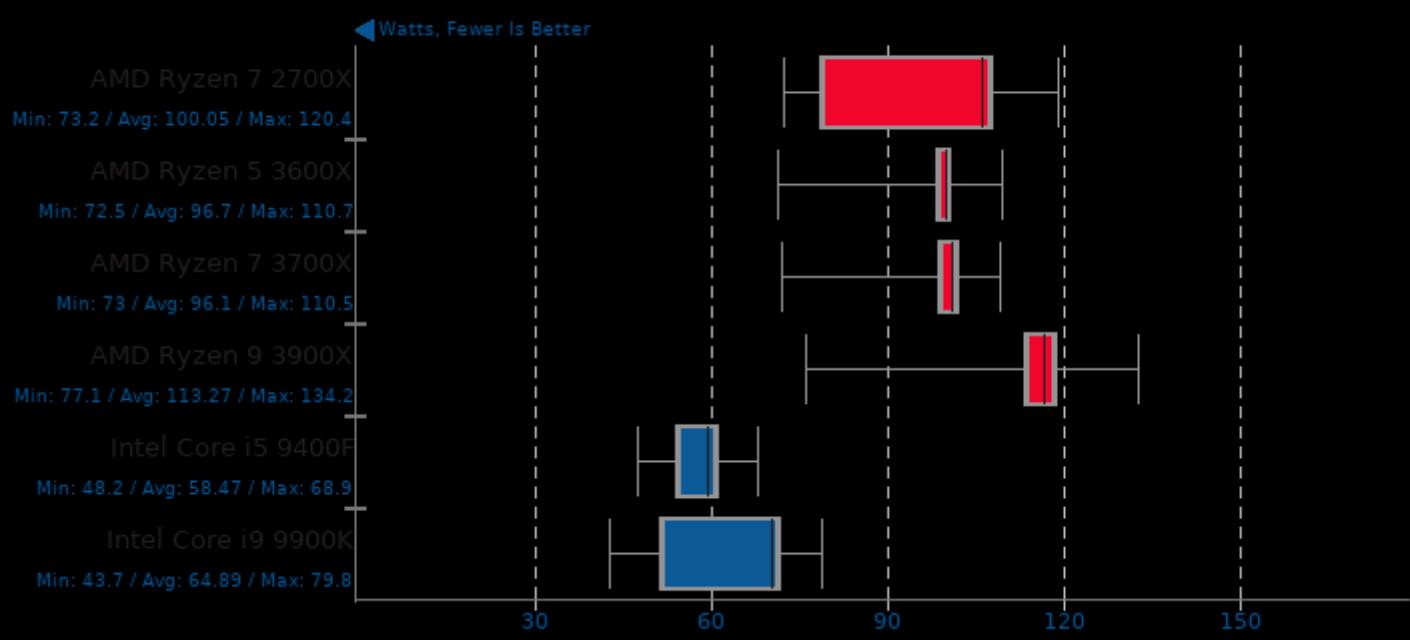
## Selenium

Benchmark: Octane - Browser: Firefox



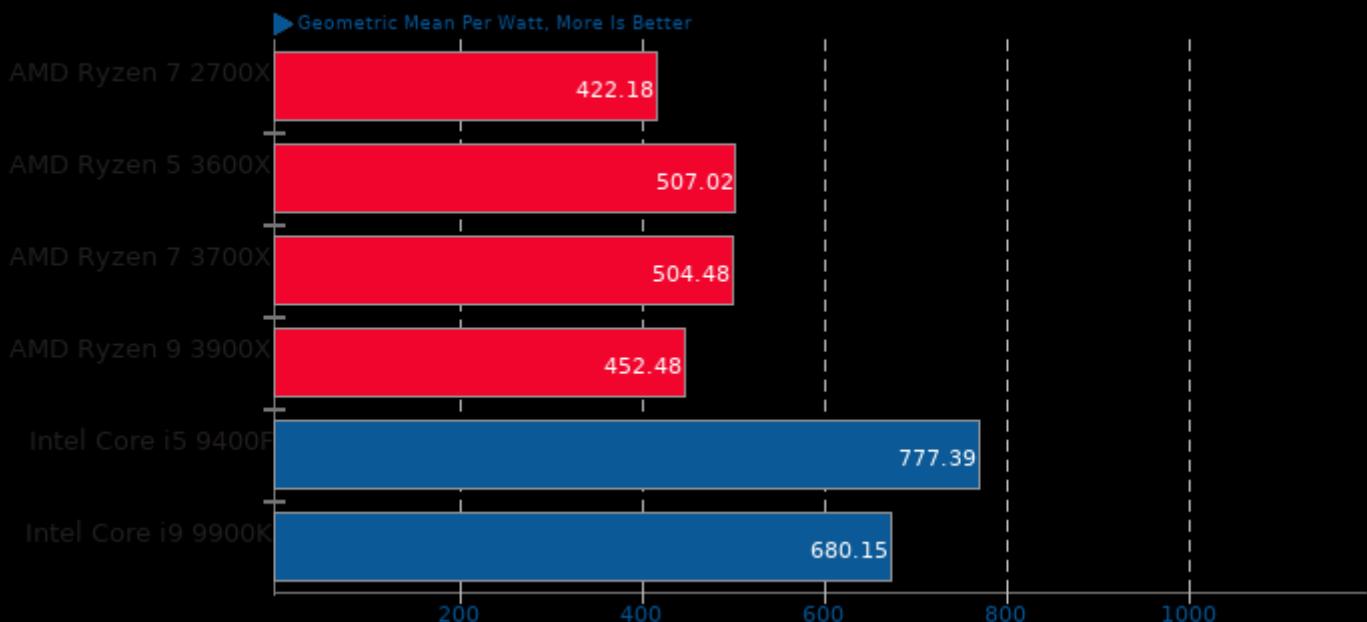
## Selenium

System Power Consumption Monitor



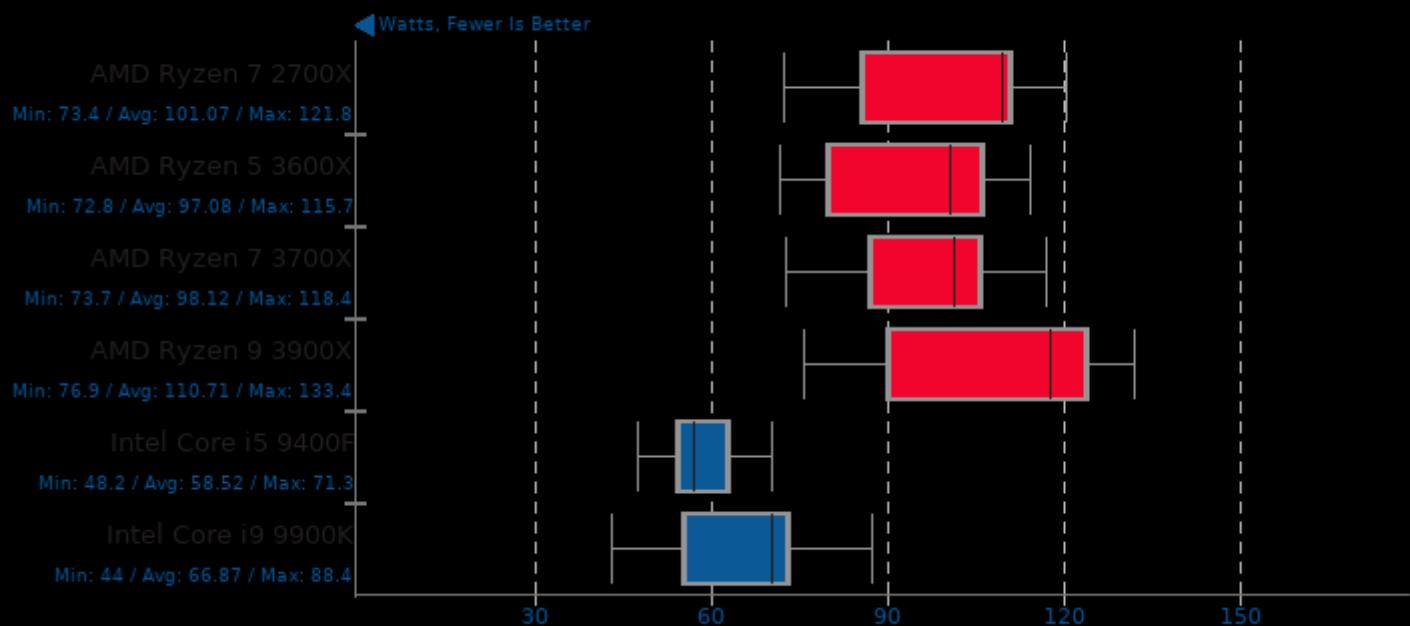
## Selenium

Benchmark: Octane - Browser: Google Chrome



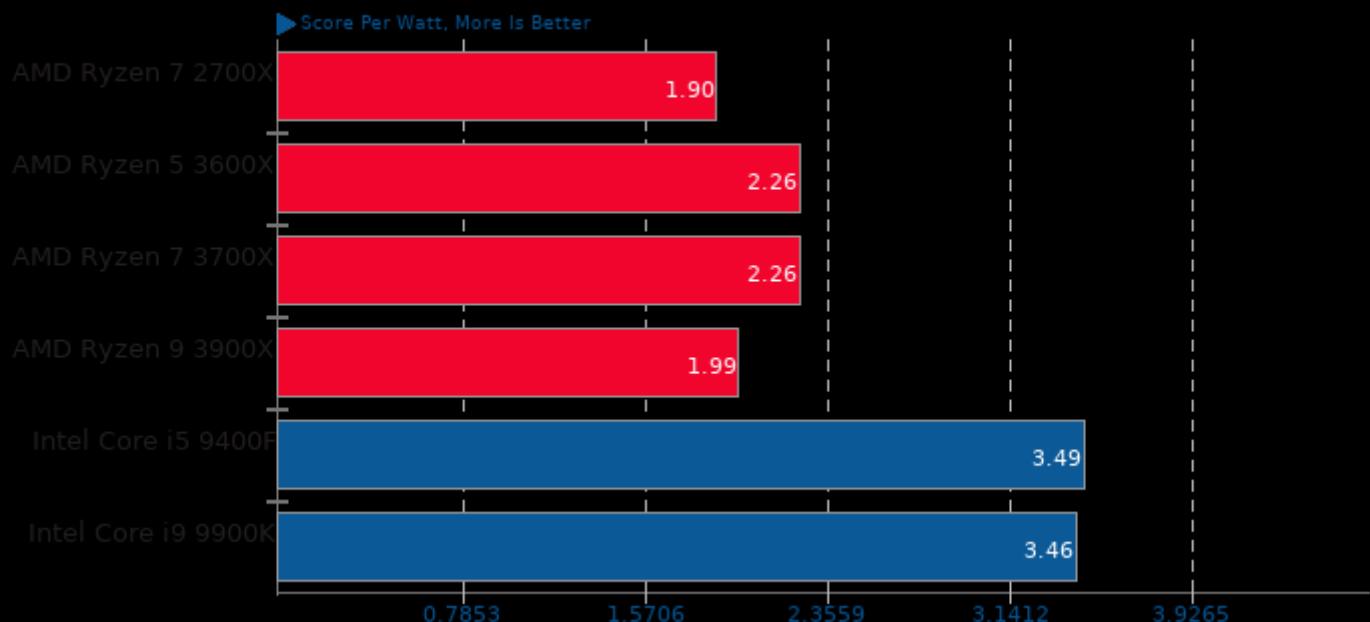
## Selenium

System Power Consumption Monitor



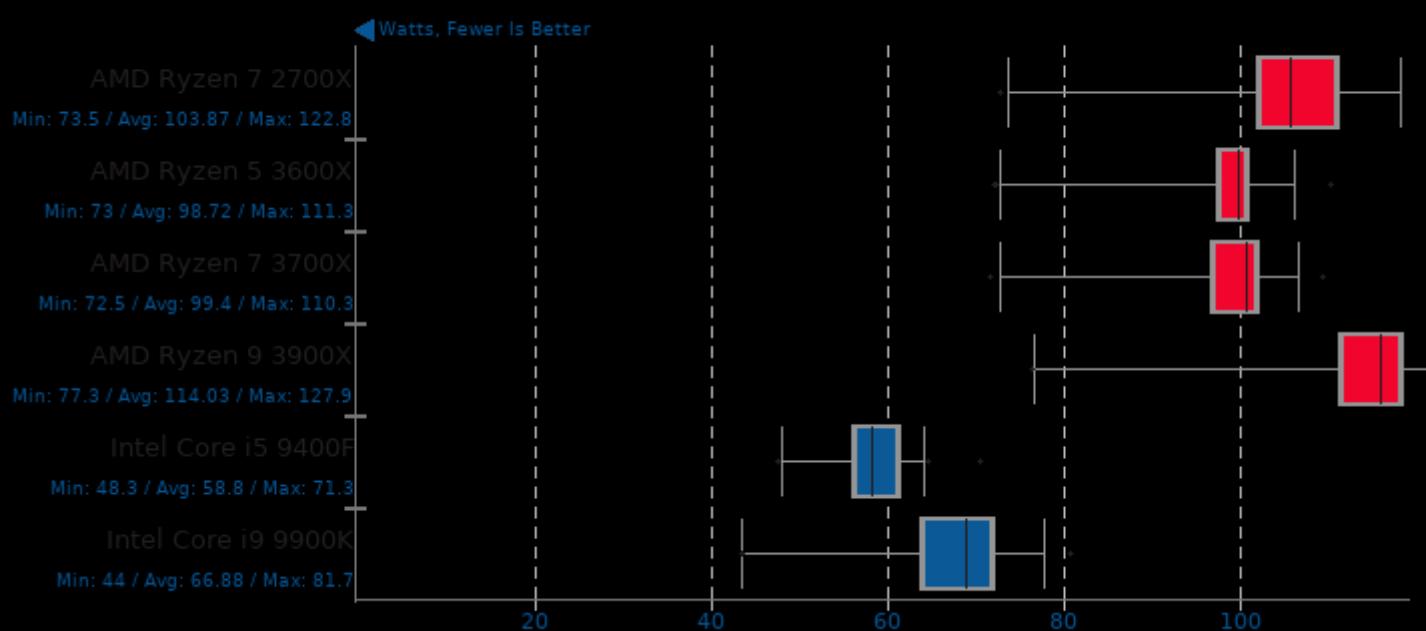
## Selenium

Benchmark: Jetstream - Browser: Firefox



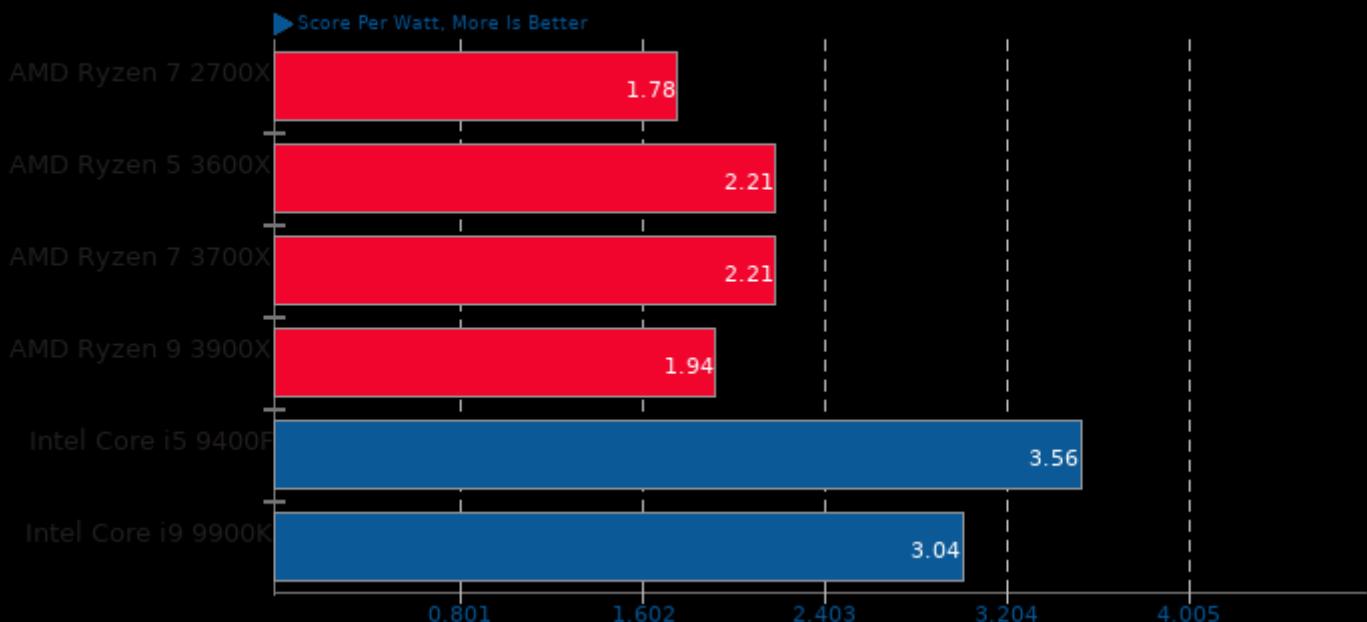
## Selenium

System Power Consumption Monitor



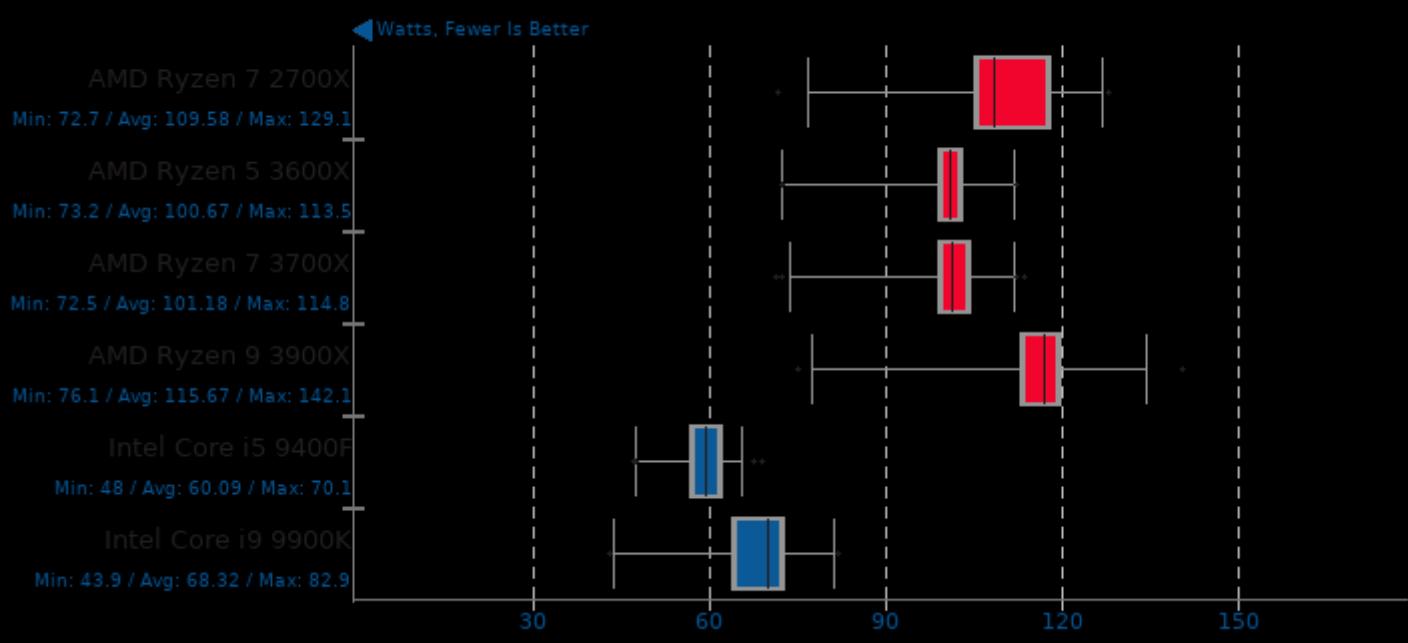
## Selenium

Benchmark: Jetstream - Browser: Google Chrome



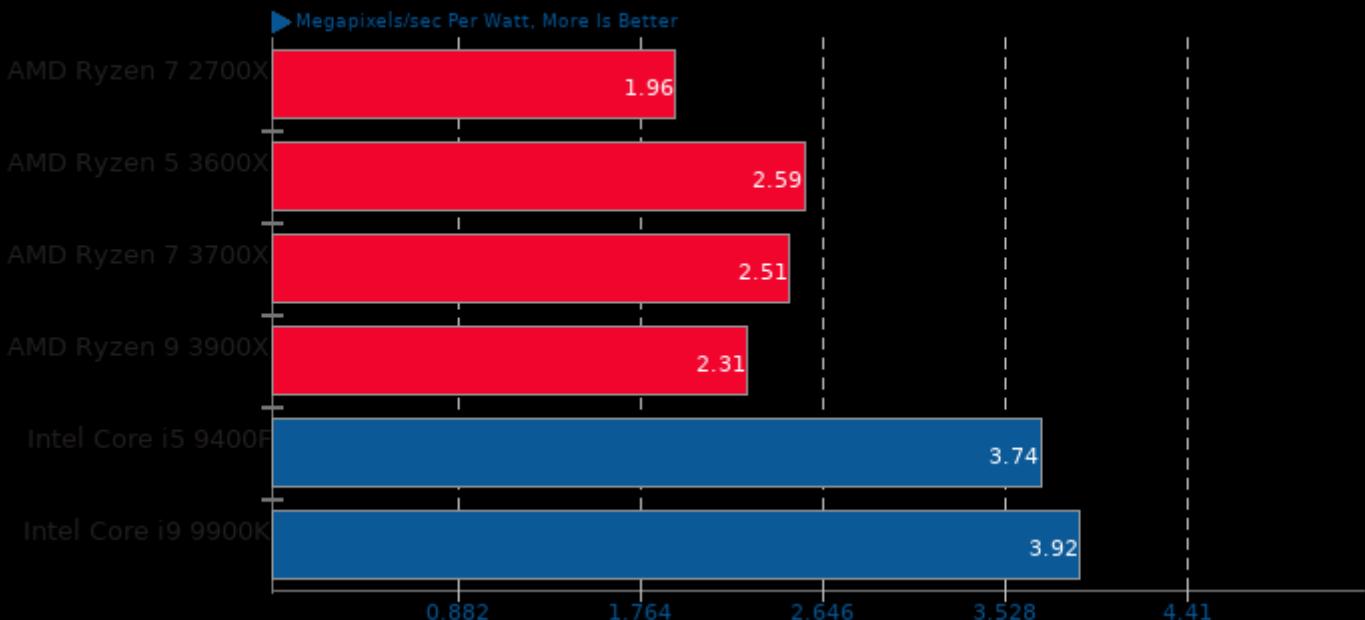
## Selenium

System Power Consumption Monitor



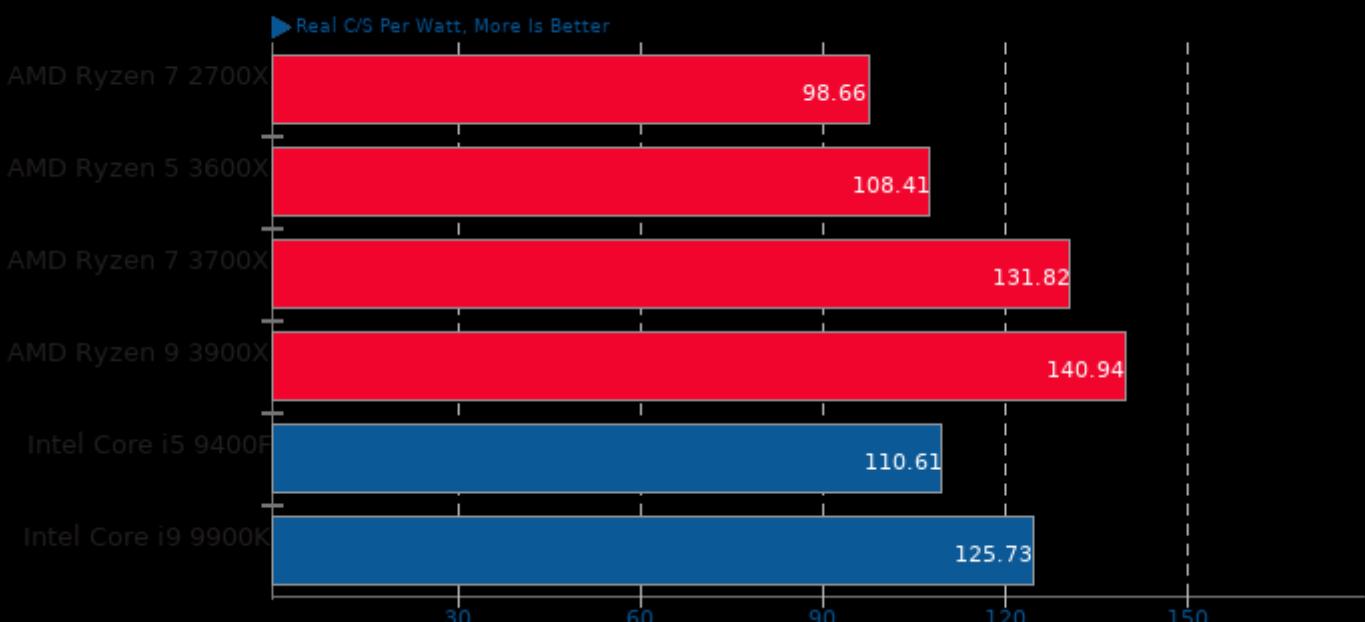
## libjpeg-turbo tjbench 2.0.2

Test: Decompression Throughput



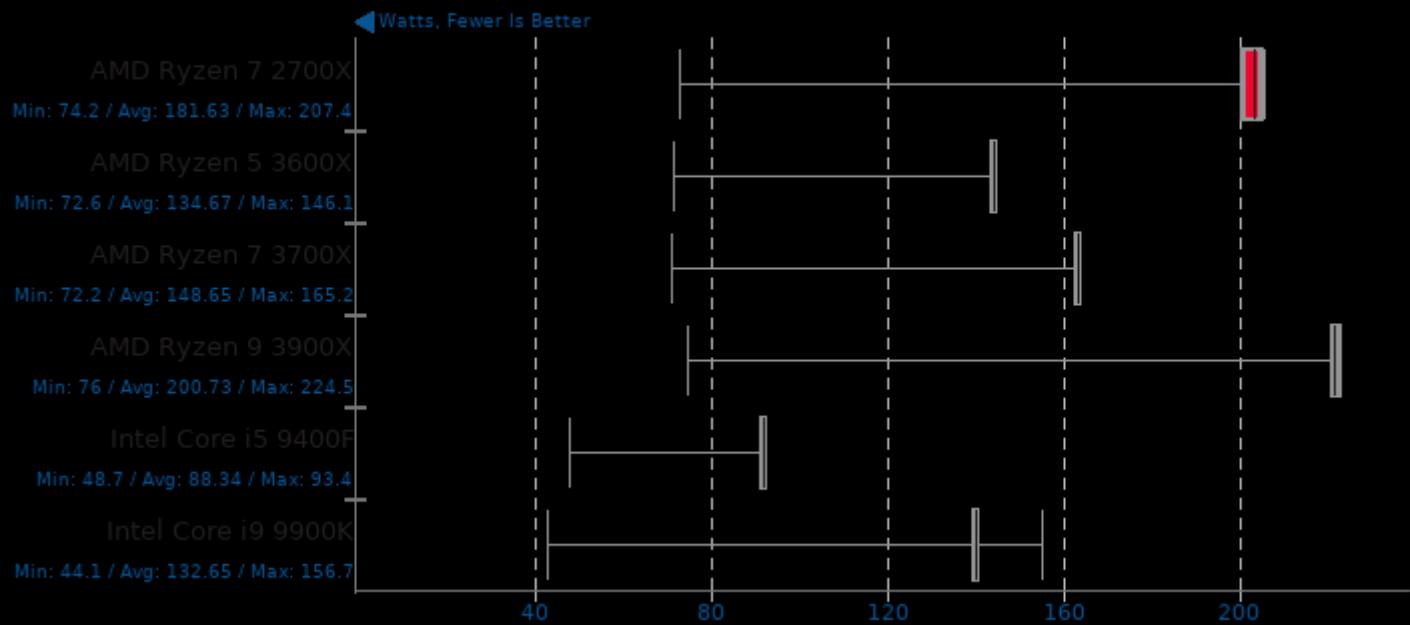
## John The Ripper 1.9.0-jumbo-1

Test: Blowfish



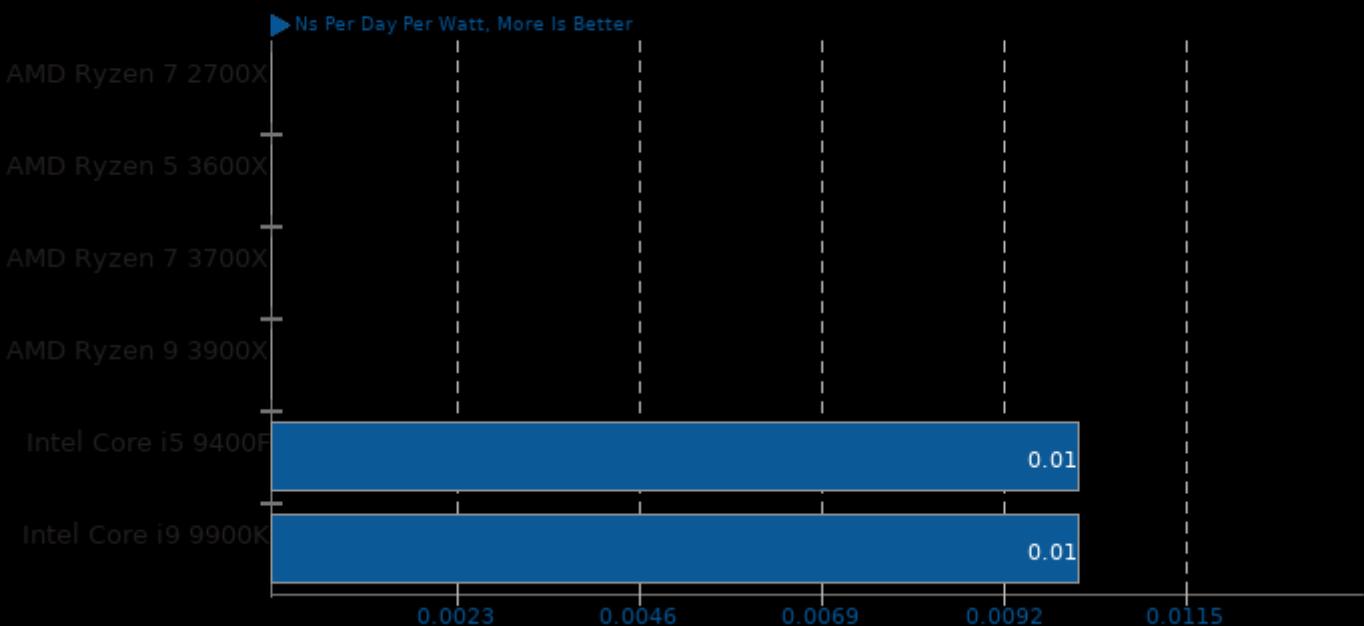
## John The Ripper 1.9.0-jumbo-1

System Power Consumption Monitor



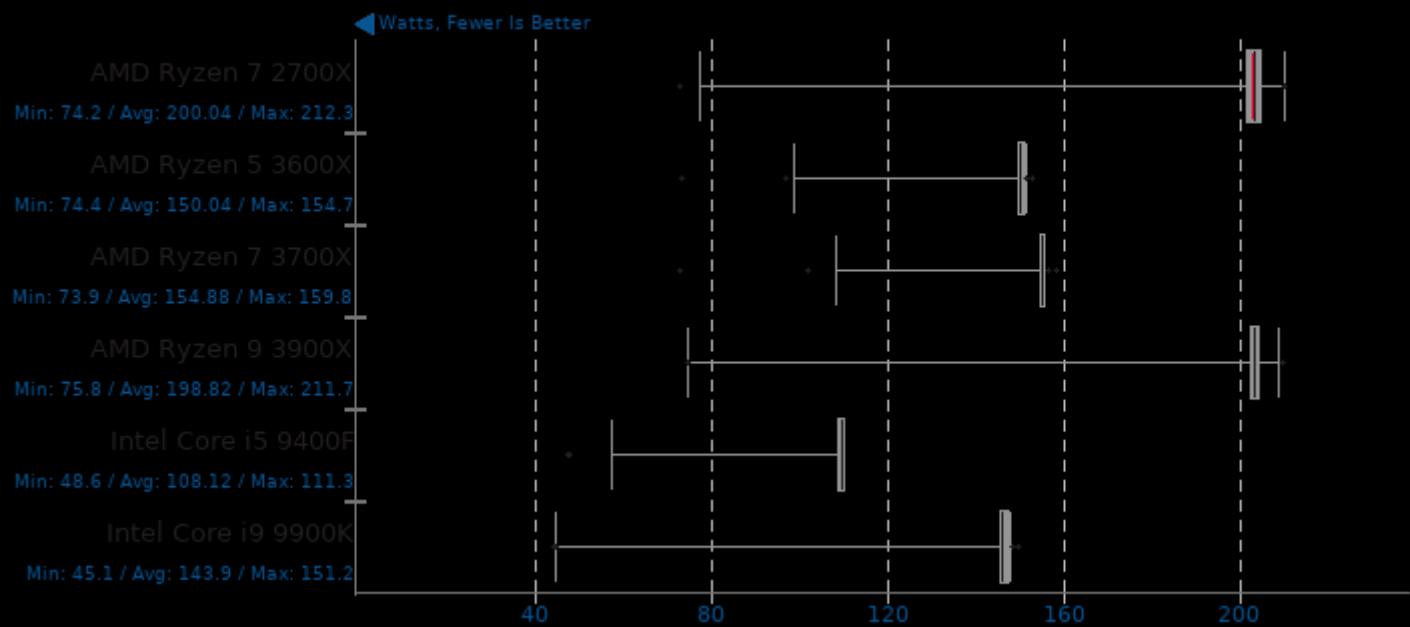
## GROMACS 2018.3

Water Benchmark



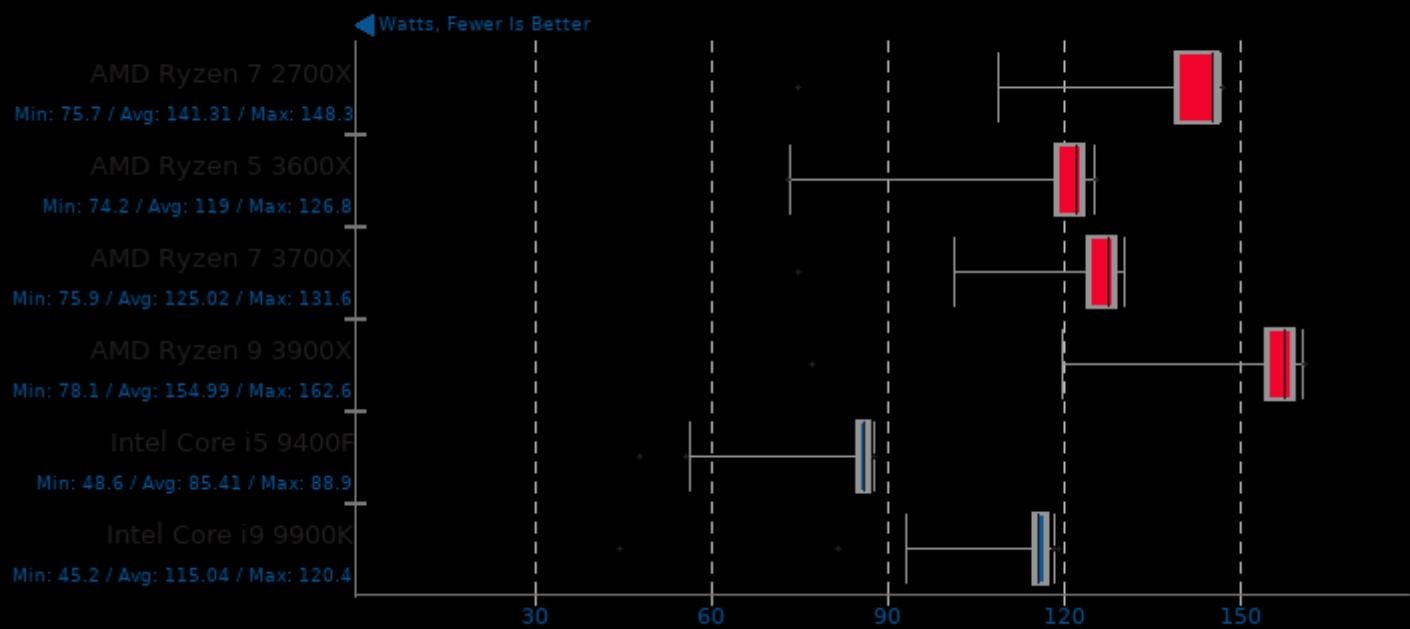
## GROMACS 2018.3

System Power Consumption Monitor



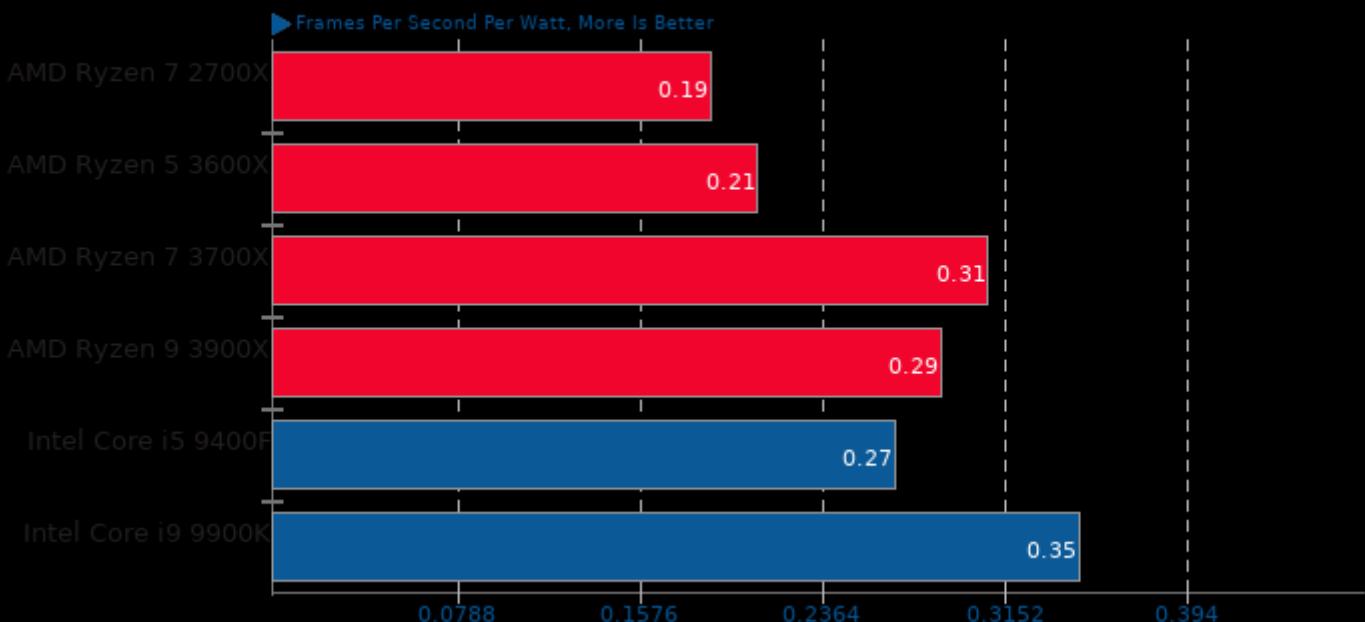
## CP2K Molecular Dynamics 6.1

System Power Consumption Monitor



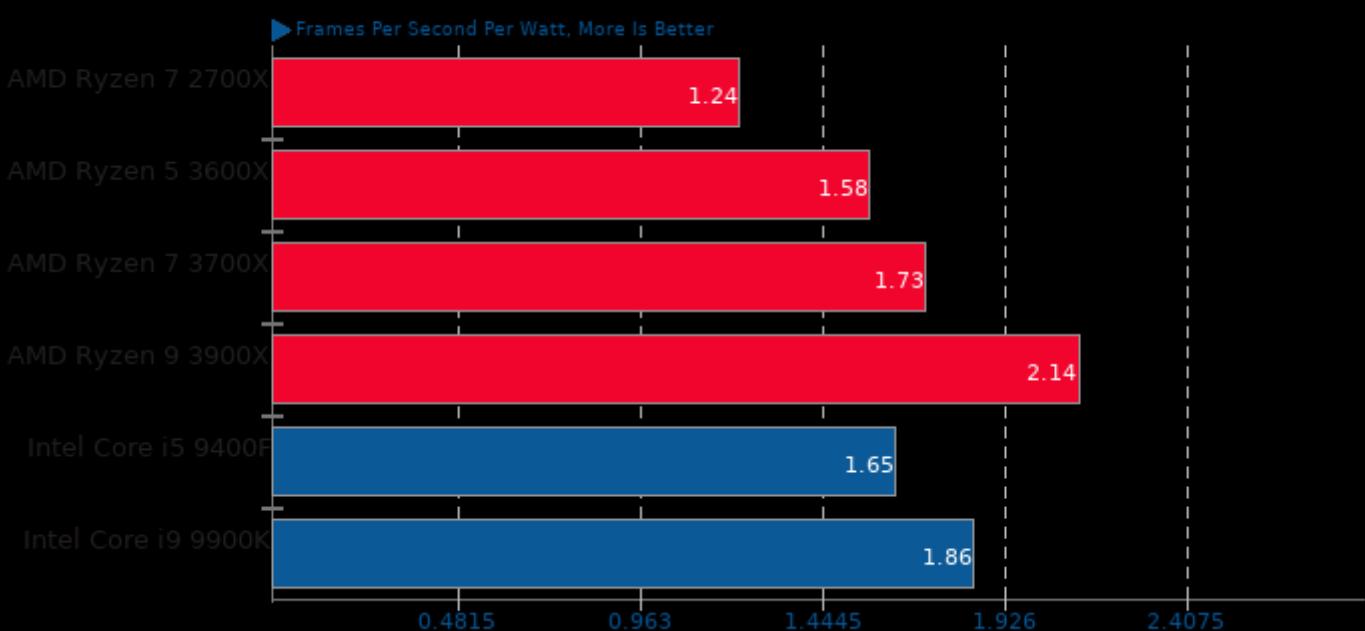
## SVT-AV1 0.5

1080p 8-bit YUV To AV1 Video Encode



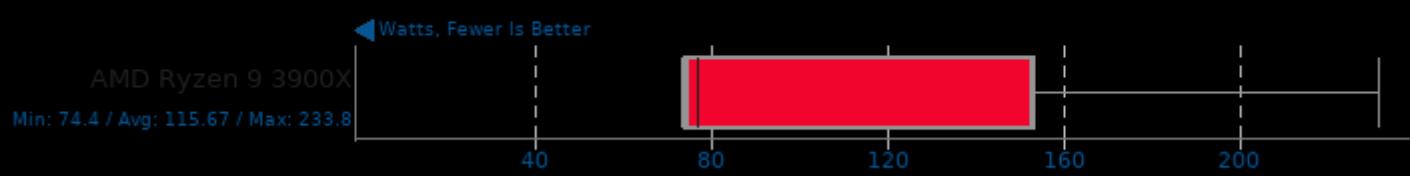
## SVT-HEVC 2019-02-03

1080p 8-bit YUV To HEVC Video Encode



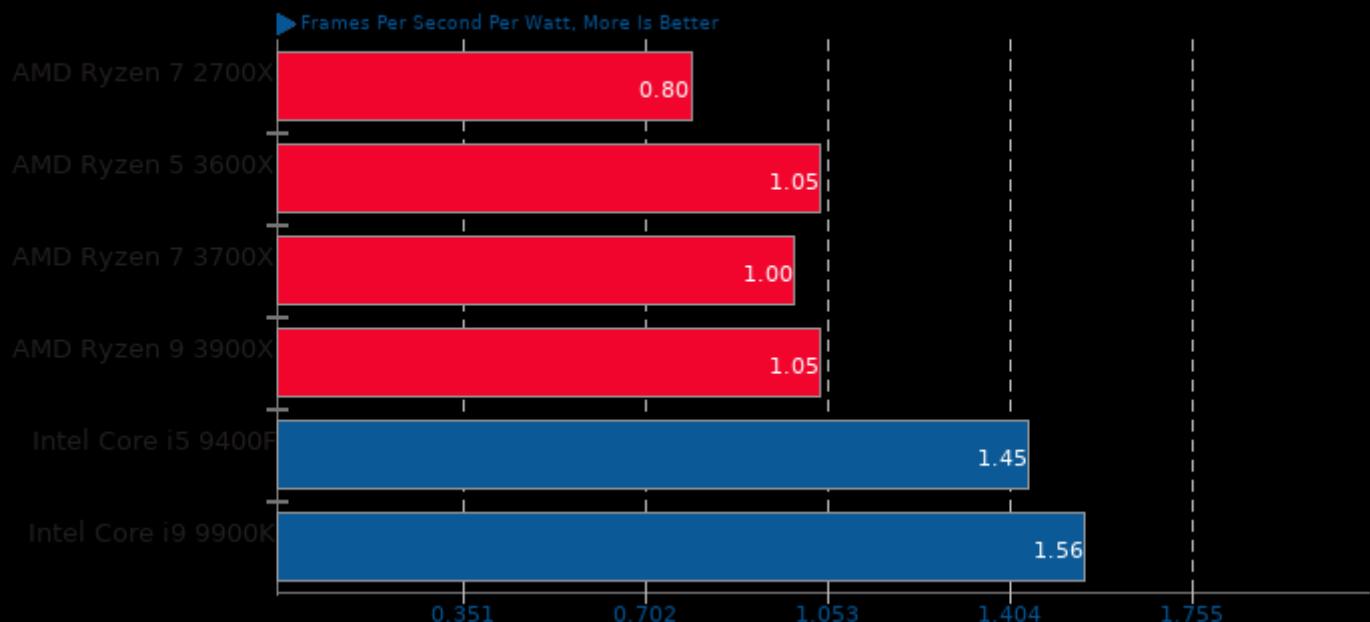
## SVT-HEVC 2019-02-03

System Power Consumption Monitor



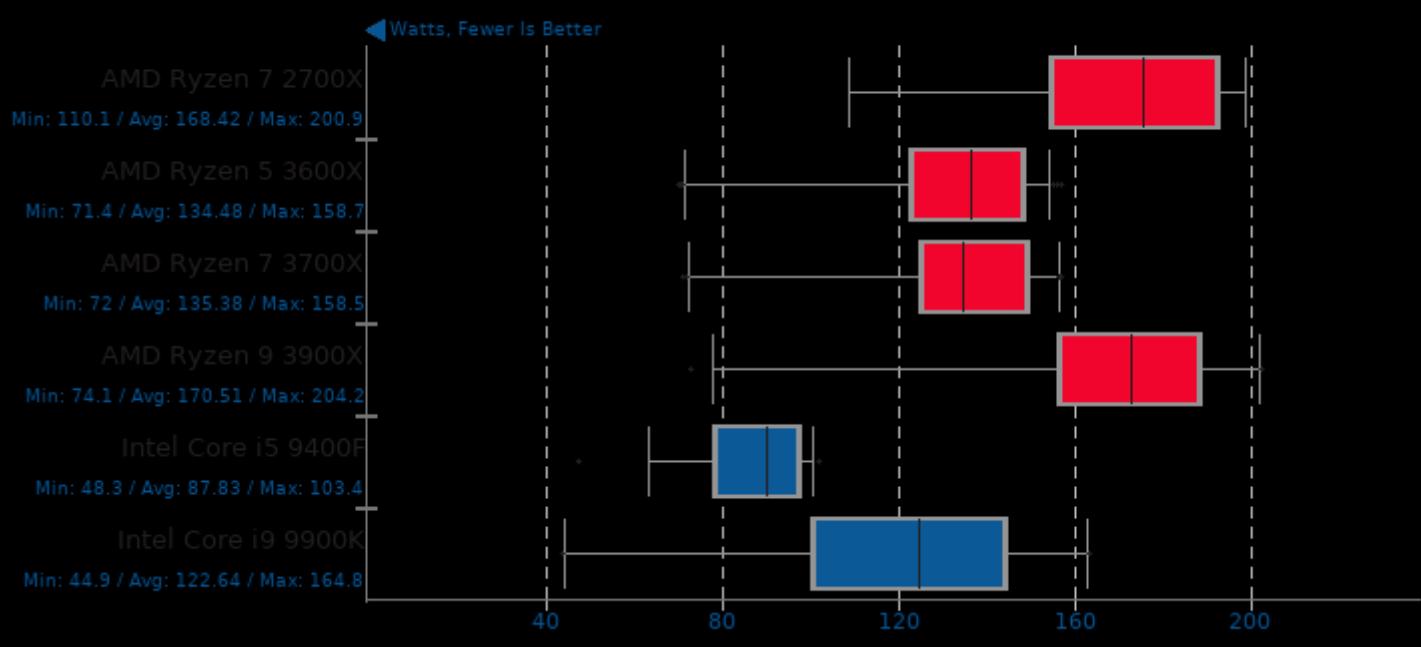
## VP9 libvpx Encoding 1.8.0

vpxenc VP9 1080p Video Encode



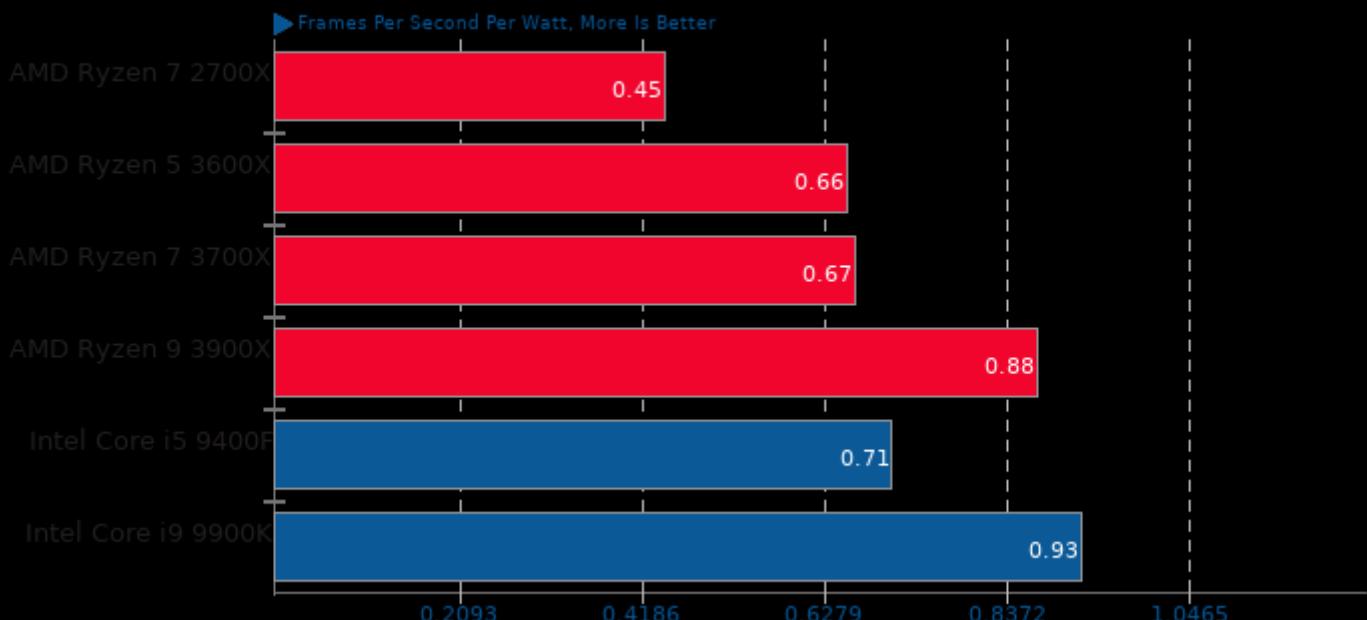
## VP9 libvpx Encoding 1.8.0

System Power Consumption Monitor

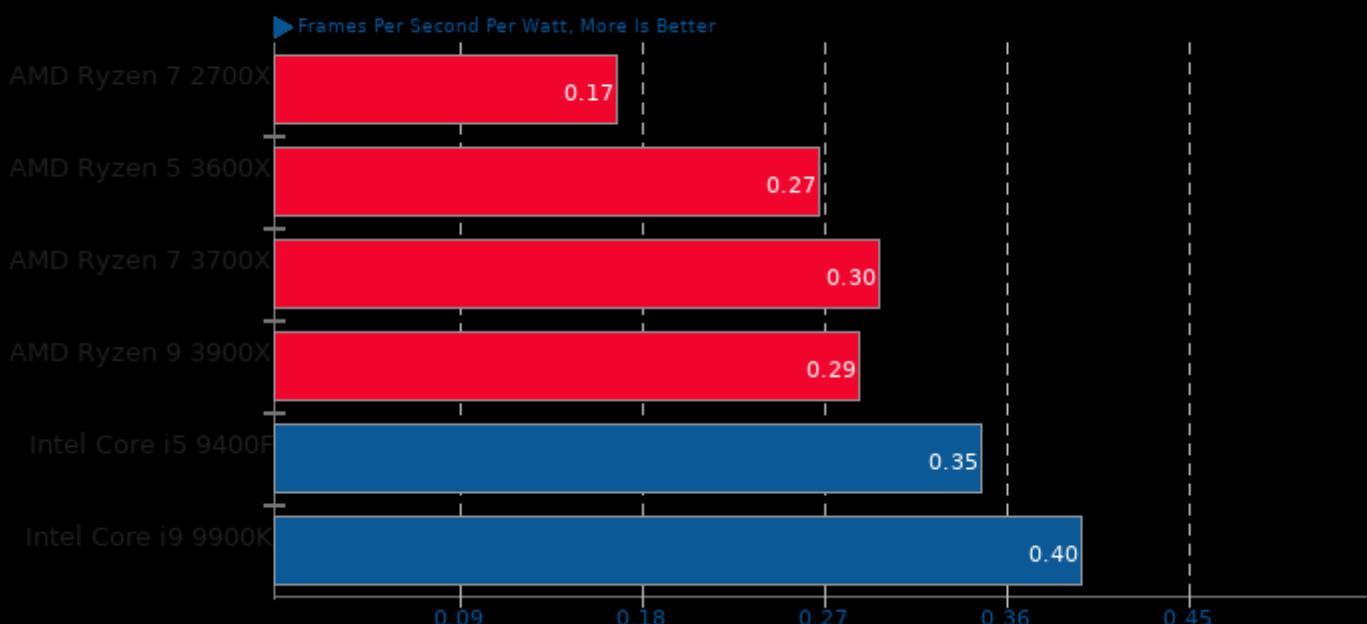


**x264 2018-09-25**

H.264 Video Encoding

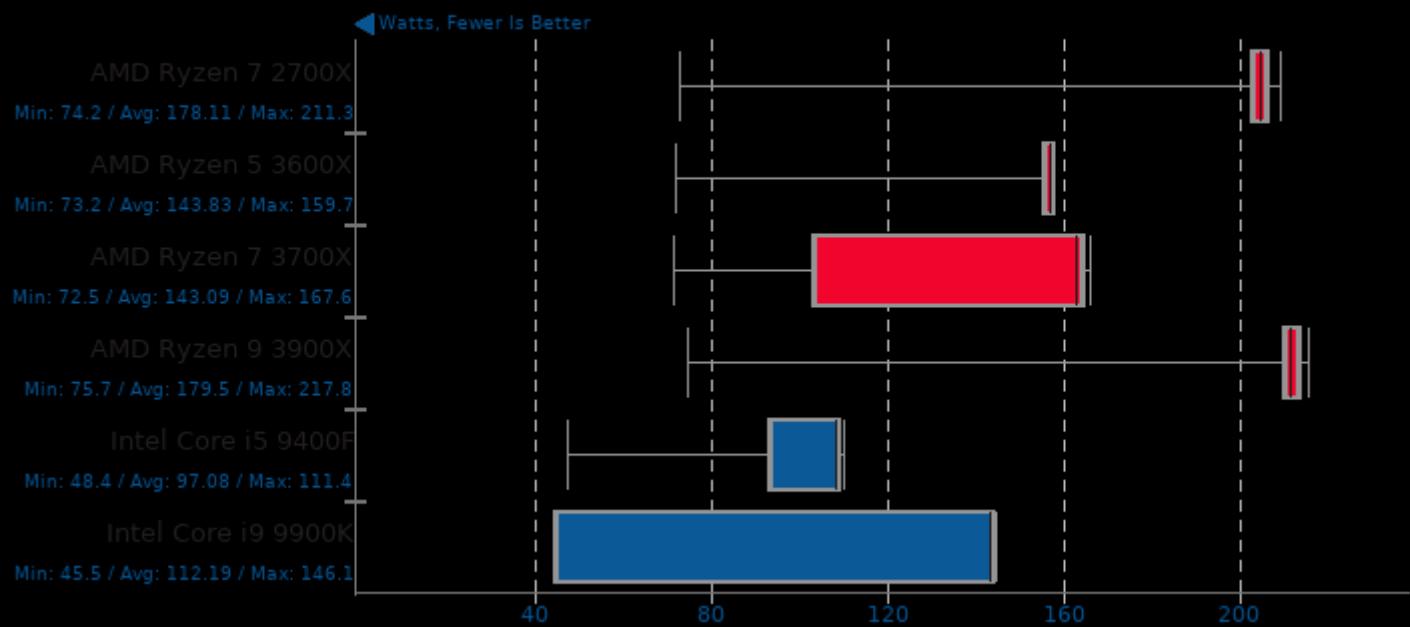
**x265 3.0**

H.265 1080p Video Encoding



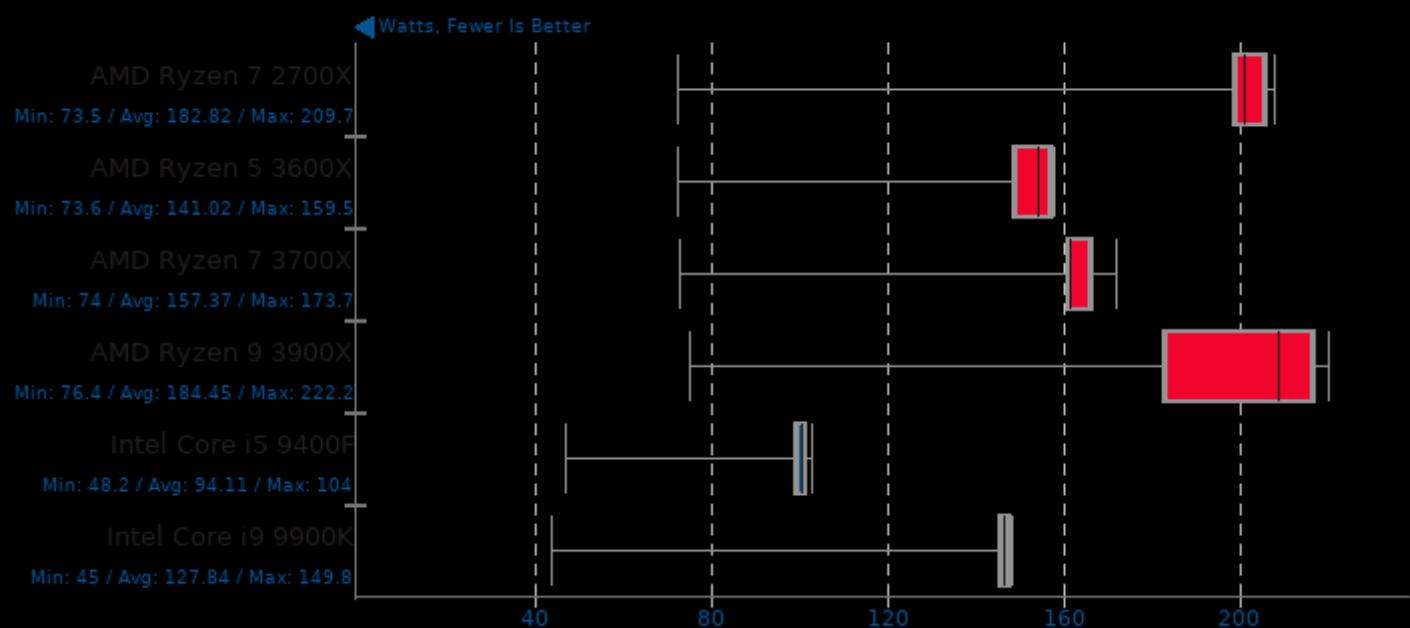
## x265 3.0

System Power Consumption Monitor



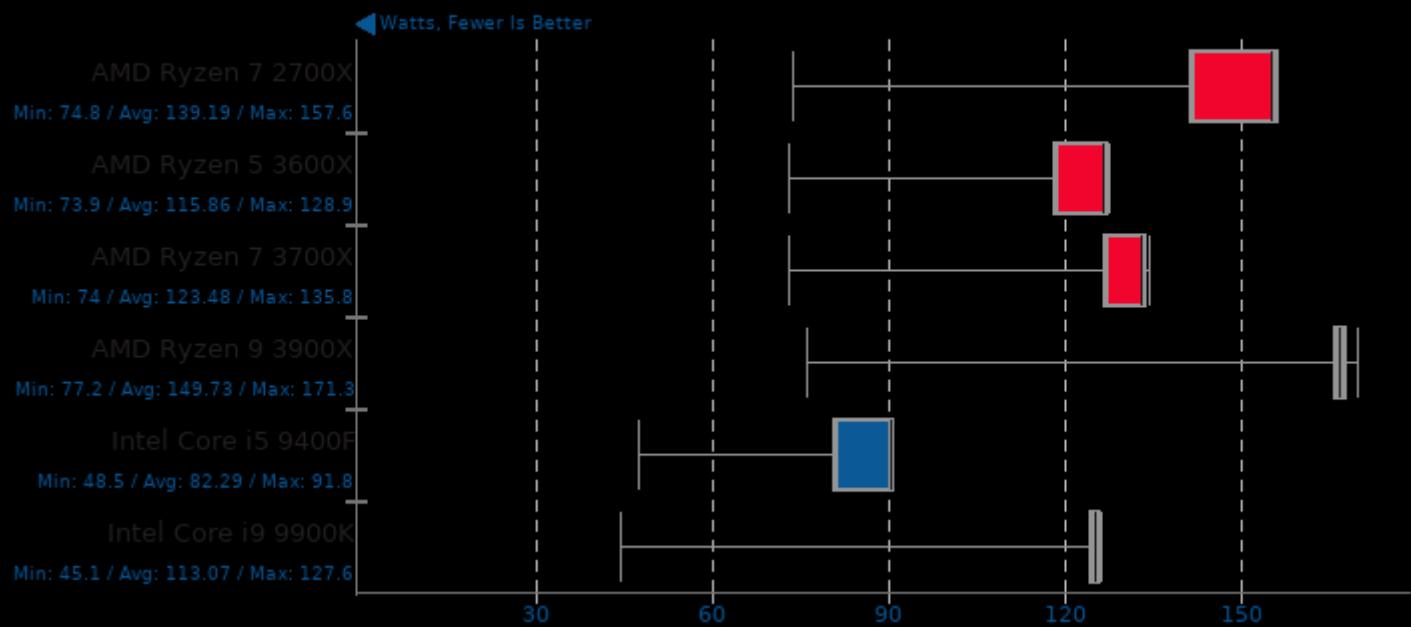
## dav1d 0.3

System Power Consumption Monitor



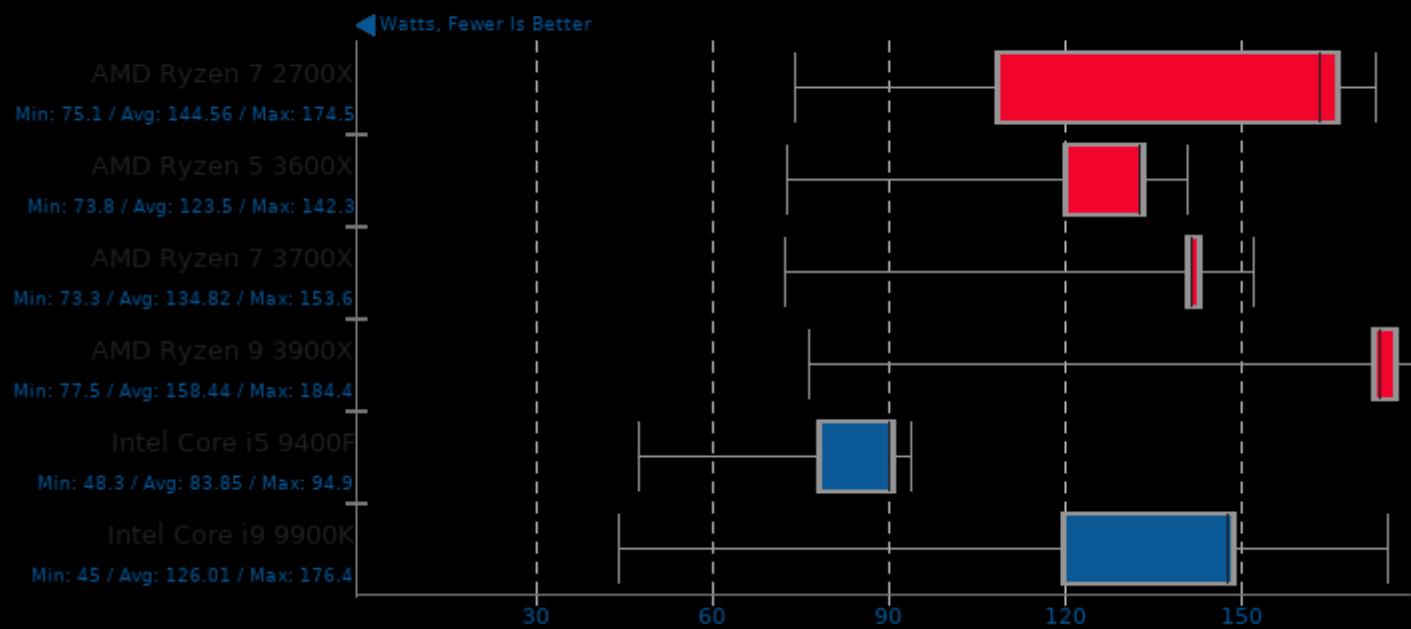
## Zstd Compression 1.3.4

System Power Consumption Monitor



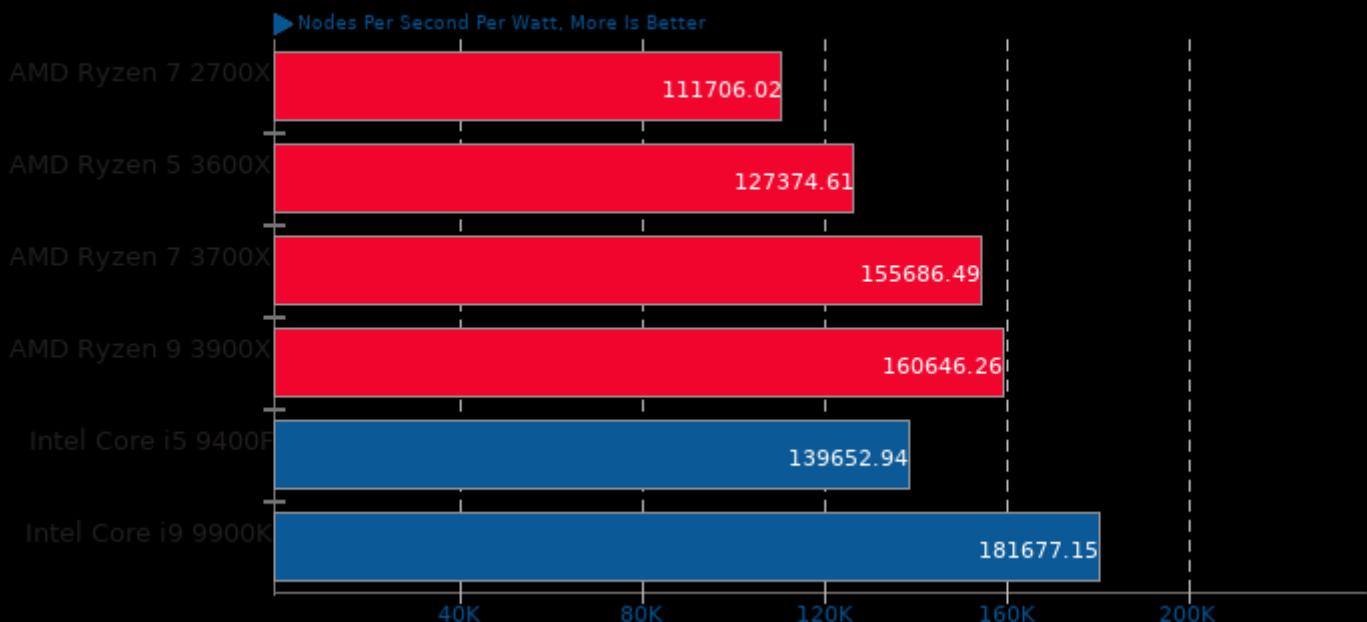
## XZ Compression 5.2.4

System Power Consumption Monitor



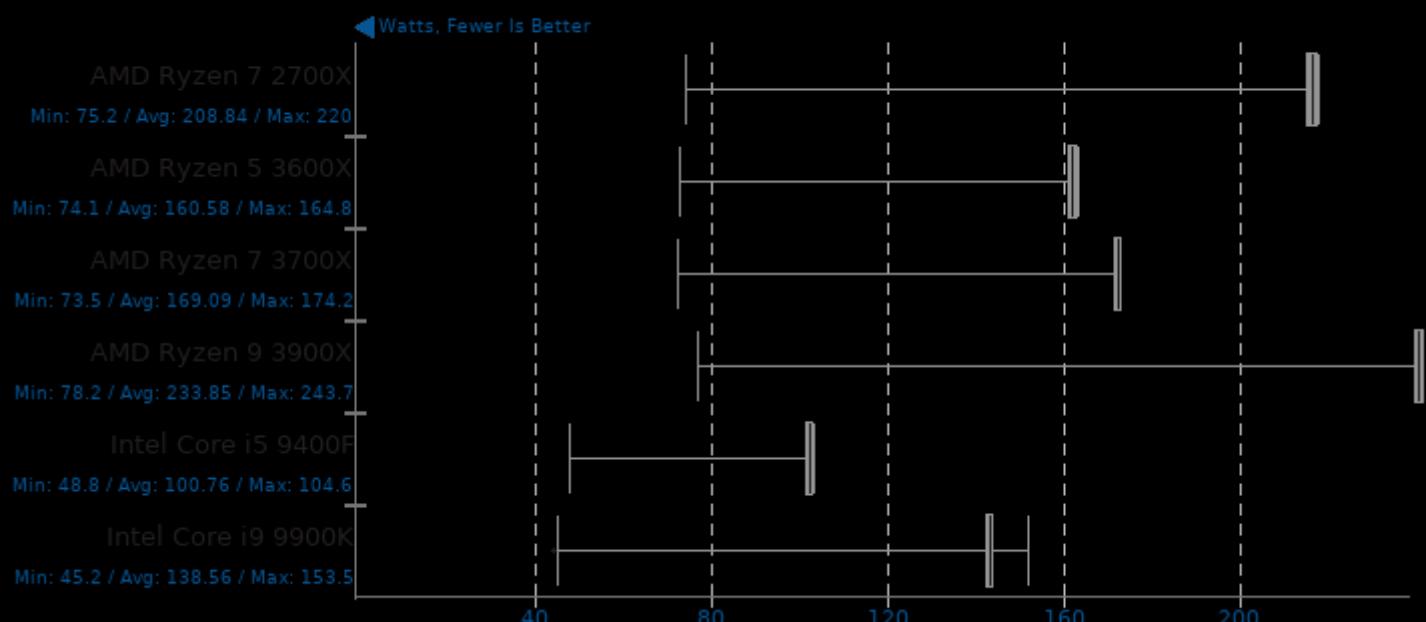
## Stockfish 9

Total Time



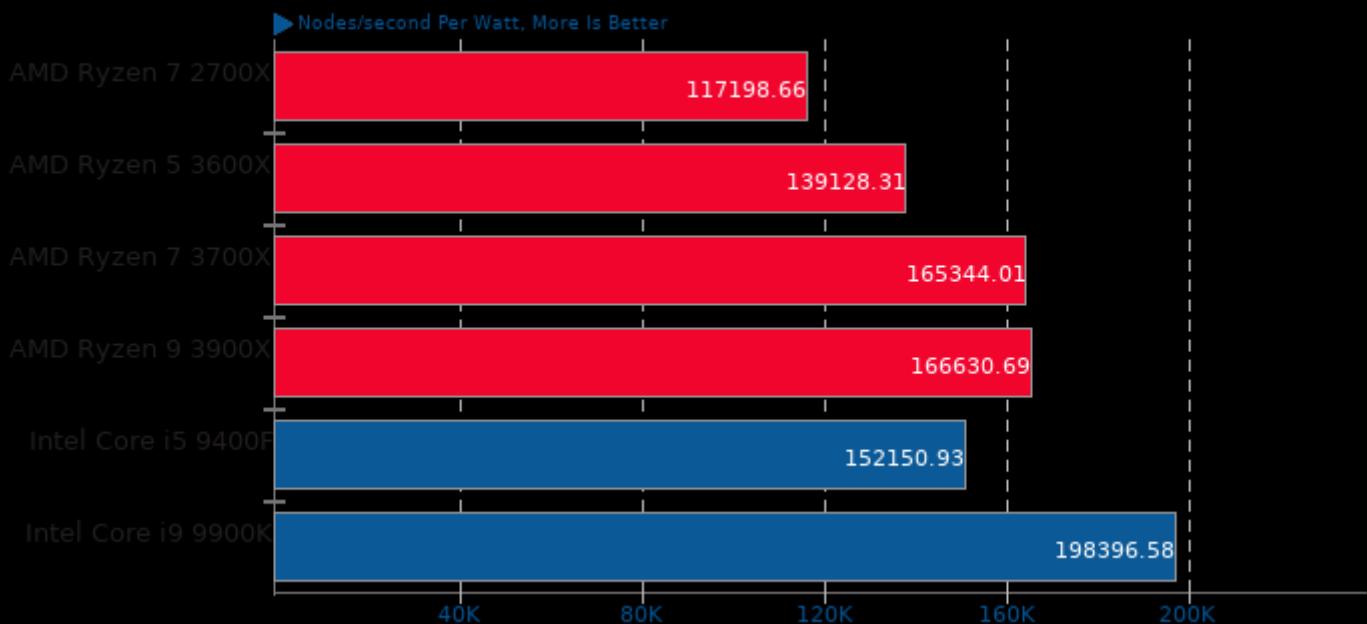
## Stockfish 9

System Power Consumption Monitor



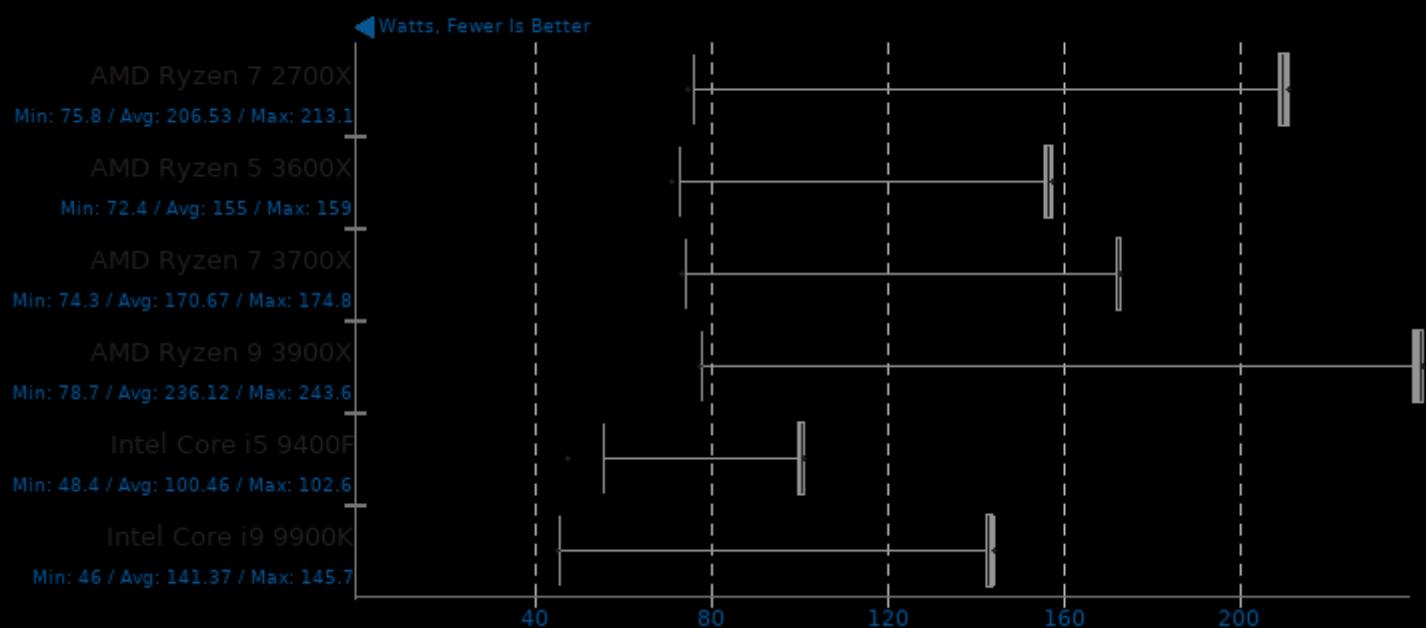
## asmFish 2018-07-23

1024 Hash Memory, 26 Depth



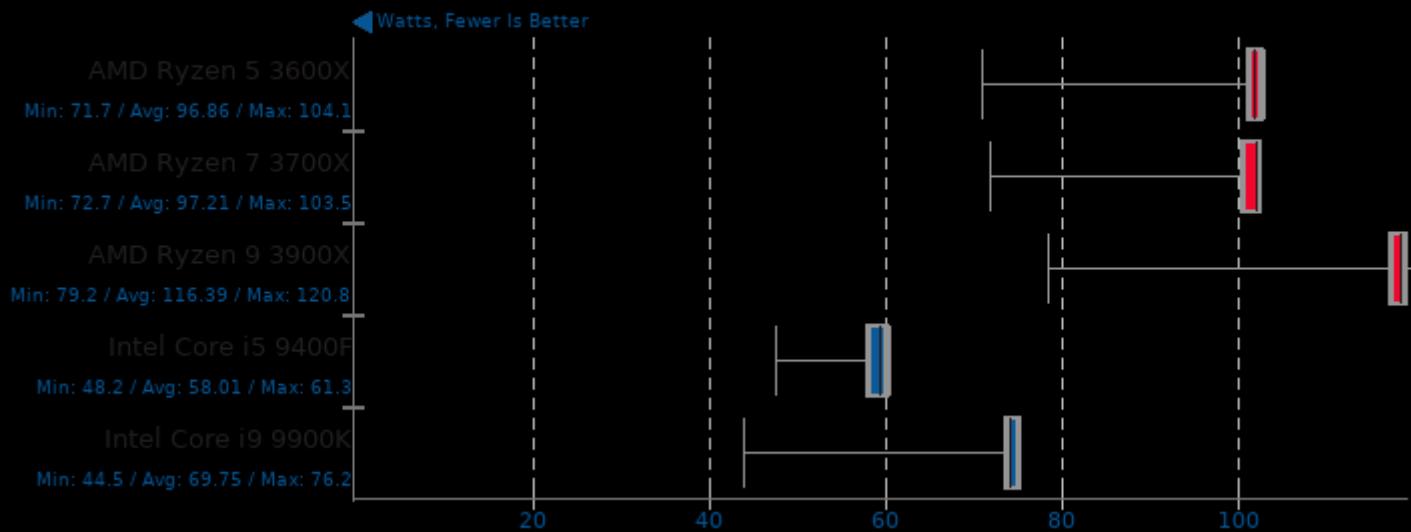
## asmFish 2018-07-23

System Power Consumption Monitor



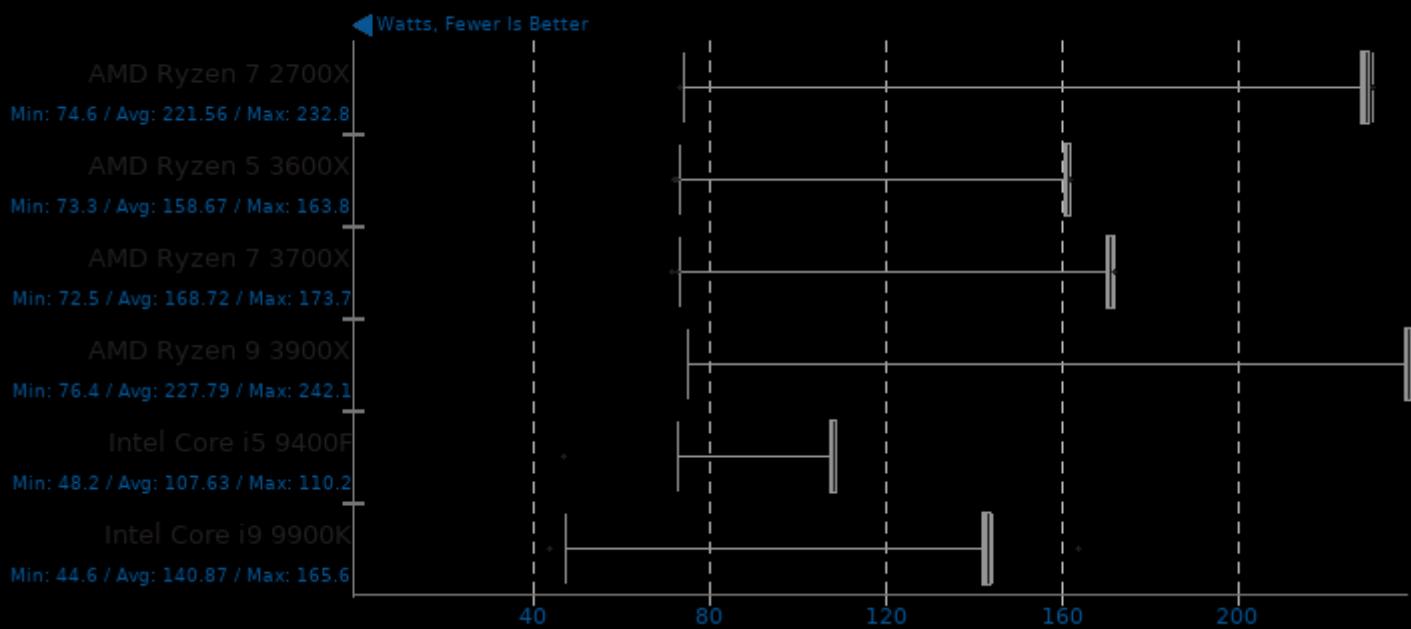
## PyBench 2018-02-16

System Power Consumption Monitor



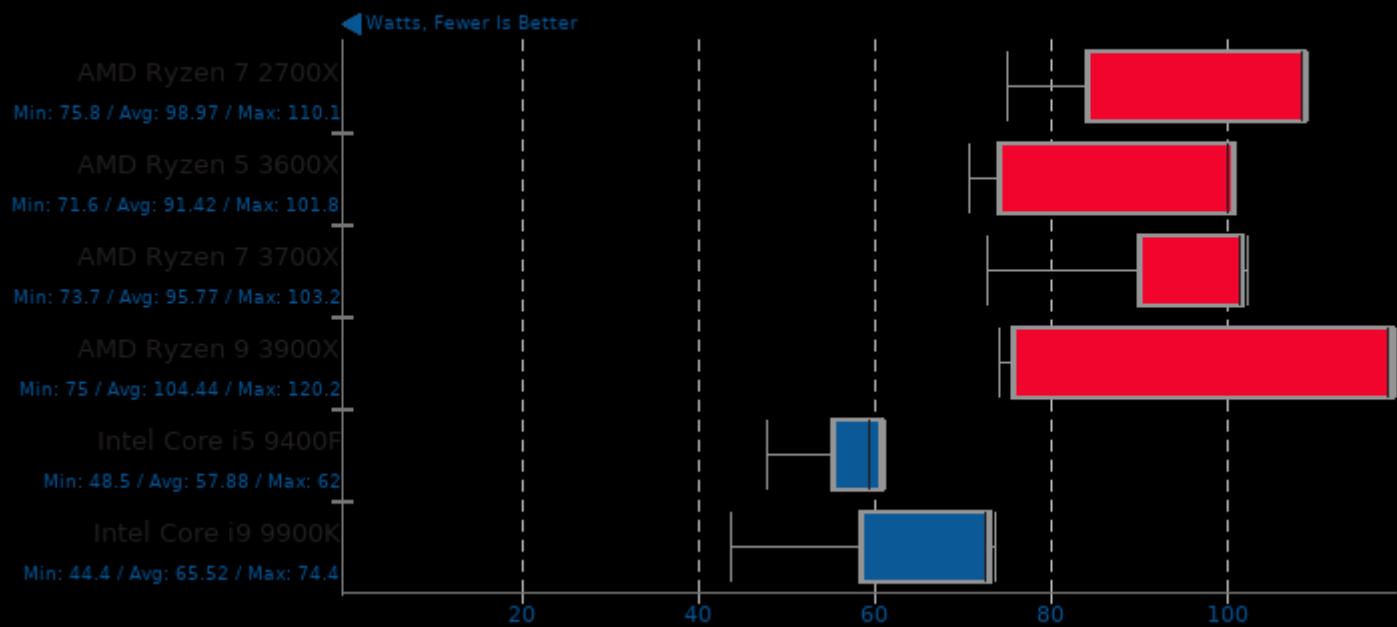
## NAMD 2.13b1

System Power Consumption Monitor



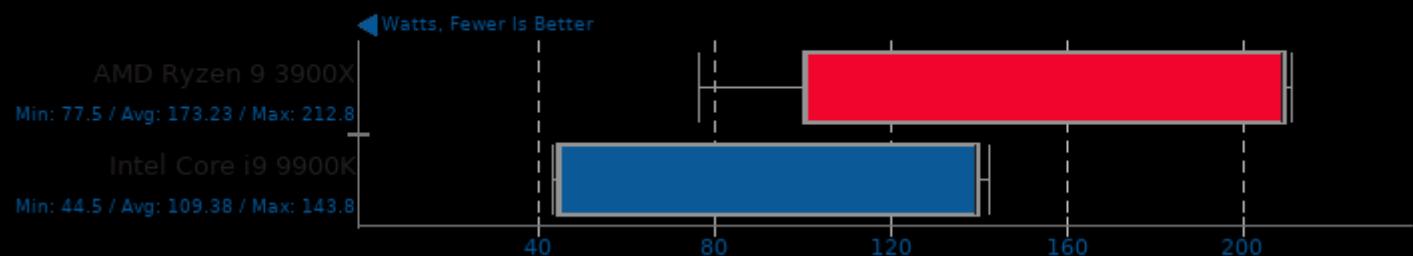
## Go Benchmarks

System Power Consumption Monitor



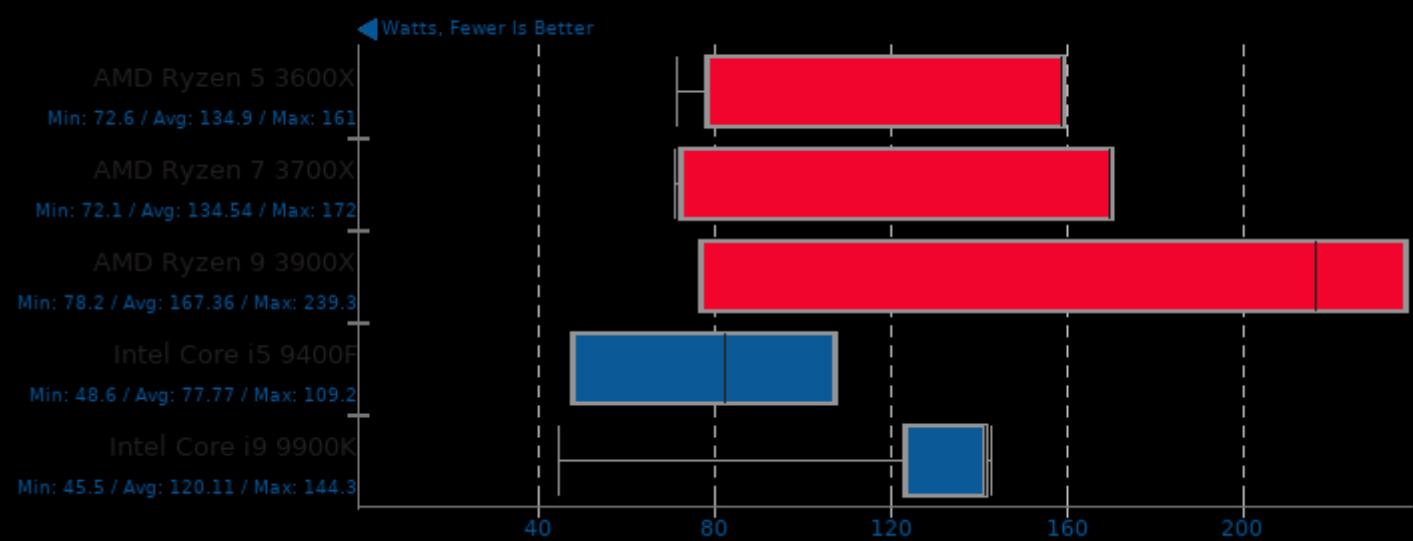
## Go Benchmarks

System Power Consumption Monitor



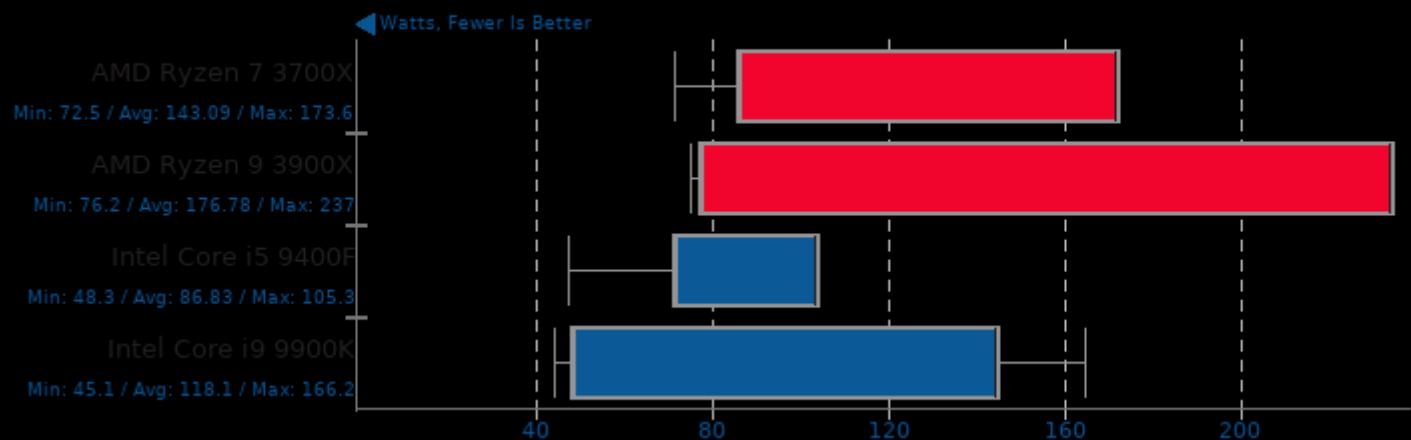
## Go Benchmarks

System Power Consumption Monitor



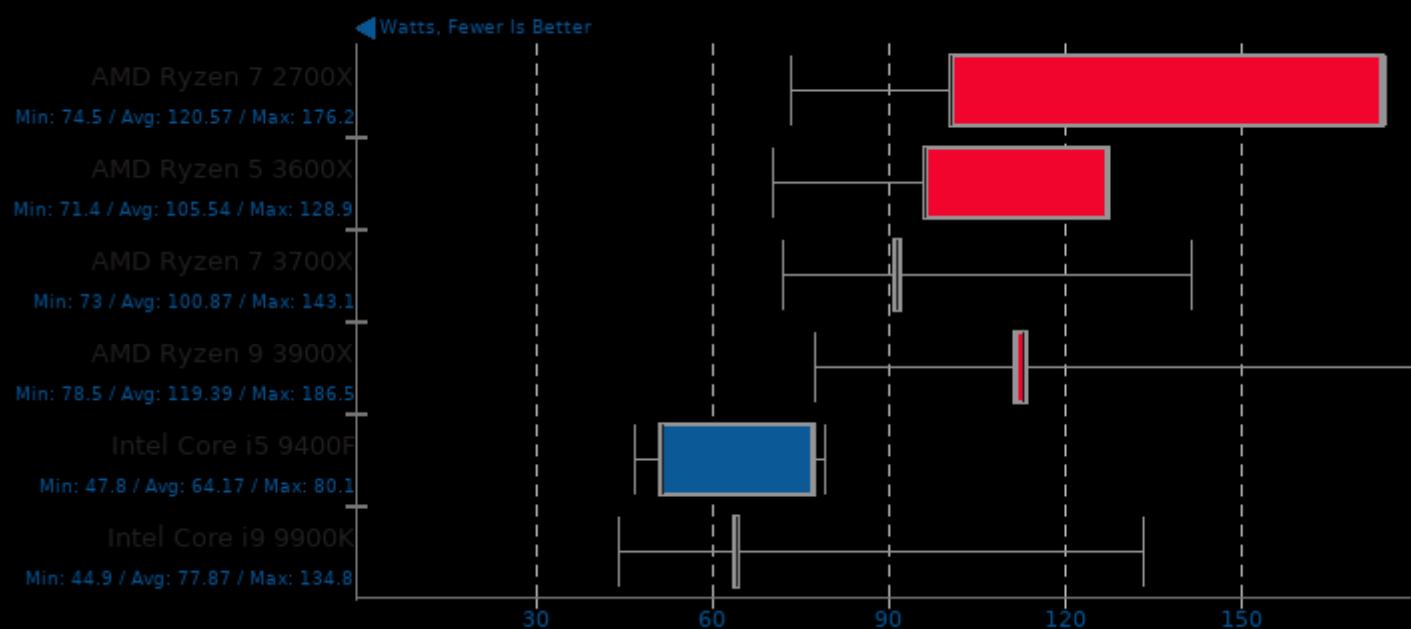
## Go Benchmarks

System Power Consumption Monitor



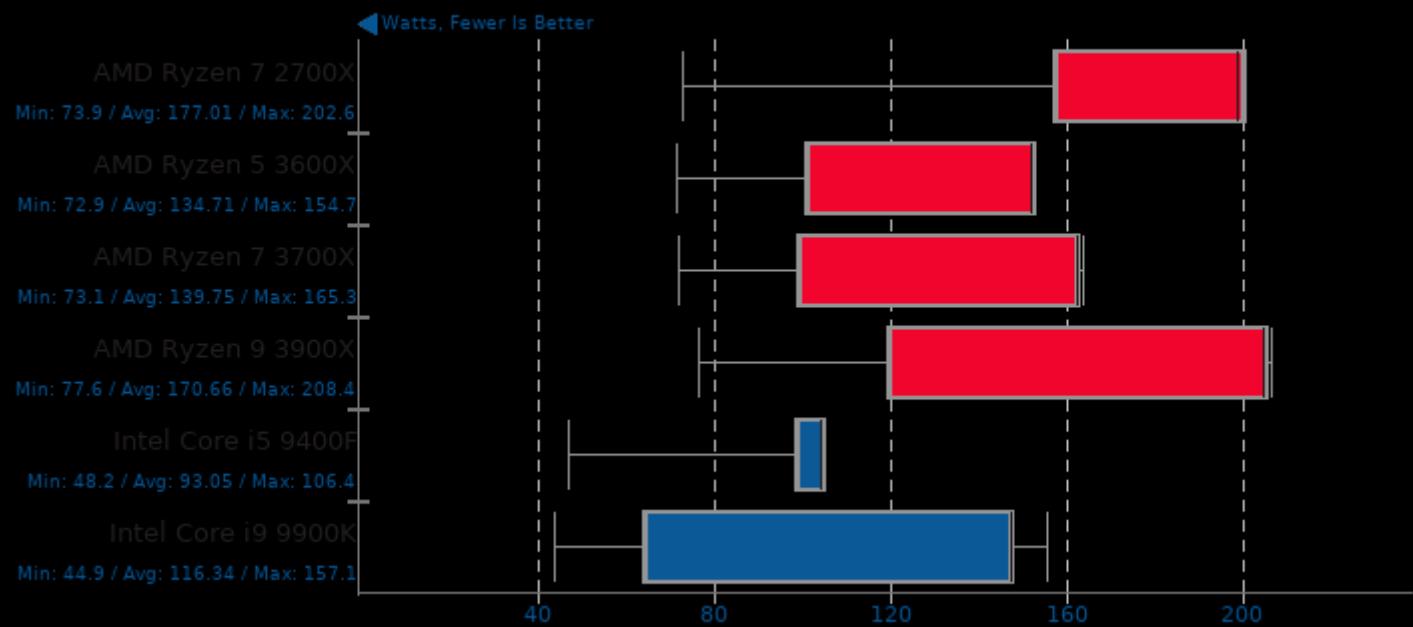
## Rust Mandelbrot

System Power Consumption Monitor



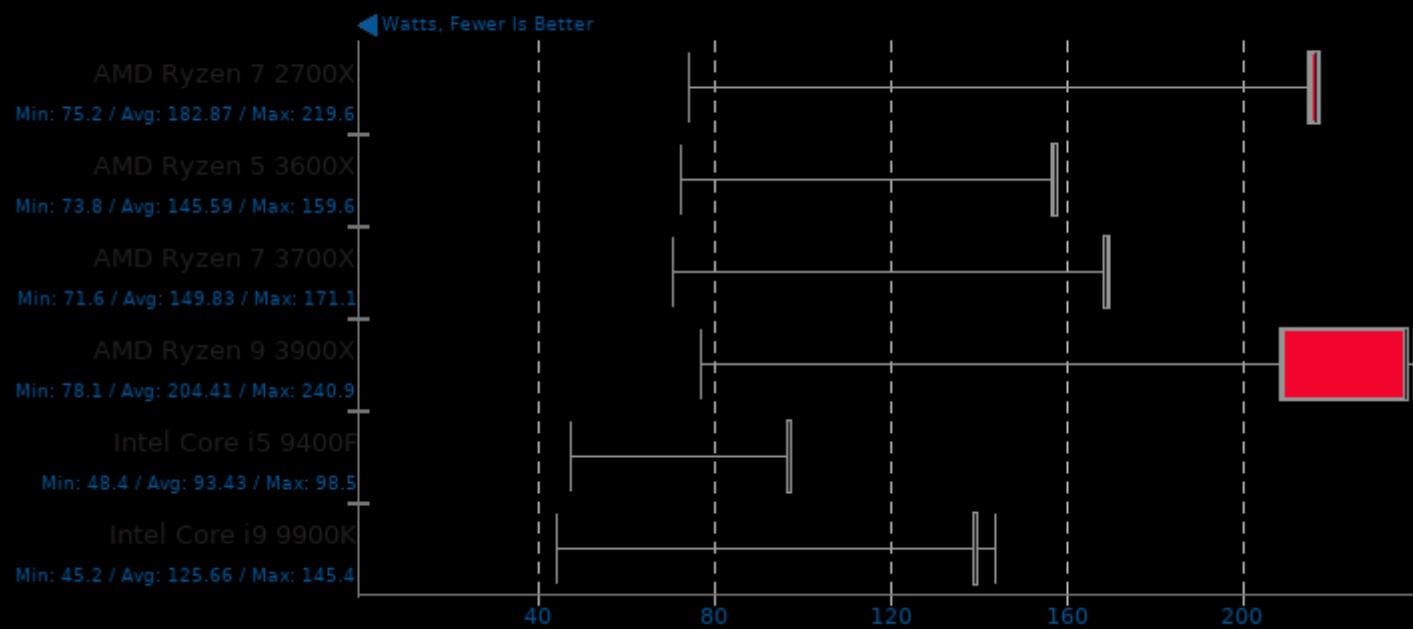
## Tensorflow 2017-02-03

System Power Consumption Monitor



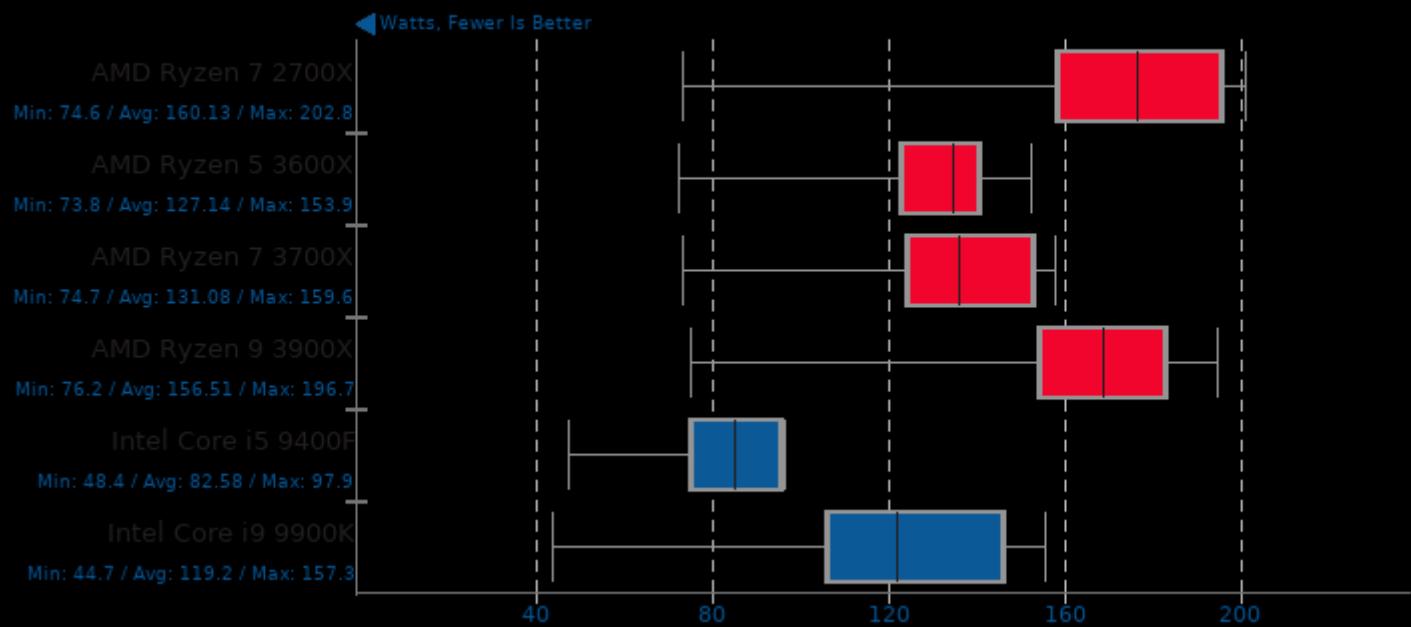
## Tungsten Renderer 0.2.2

System Power Consumption Monitor



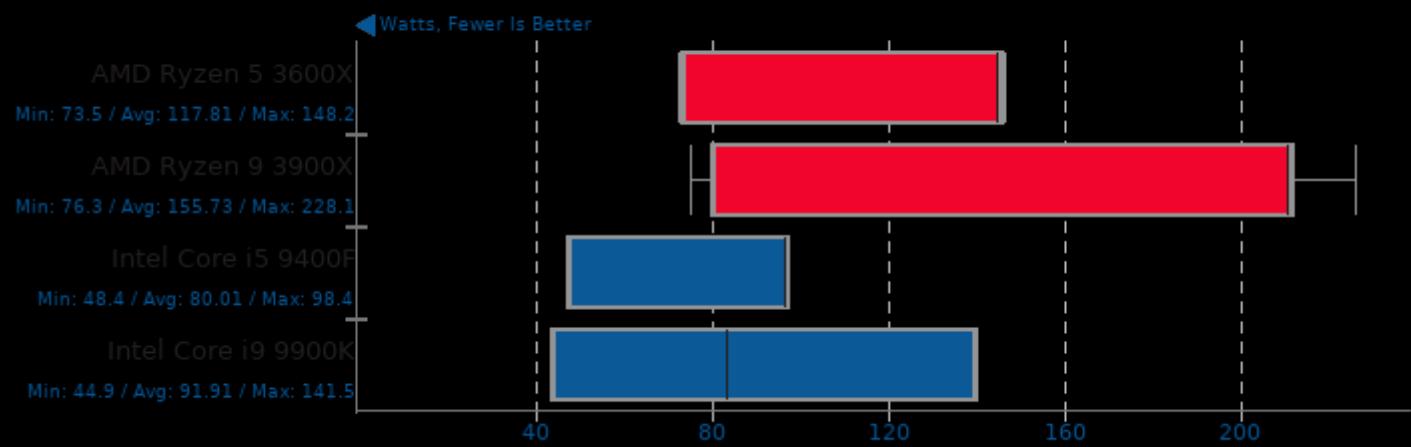
## Tungsten Renderer 0.2.2

System Power Consumption Monitor



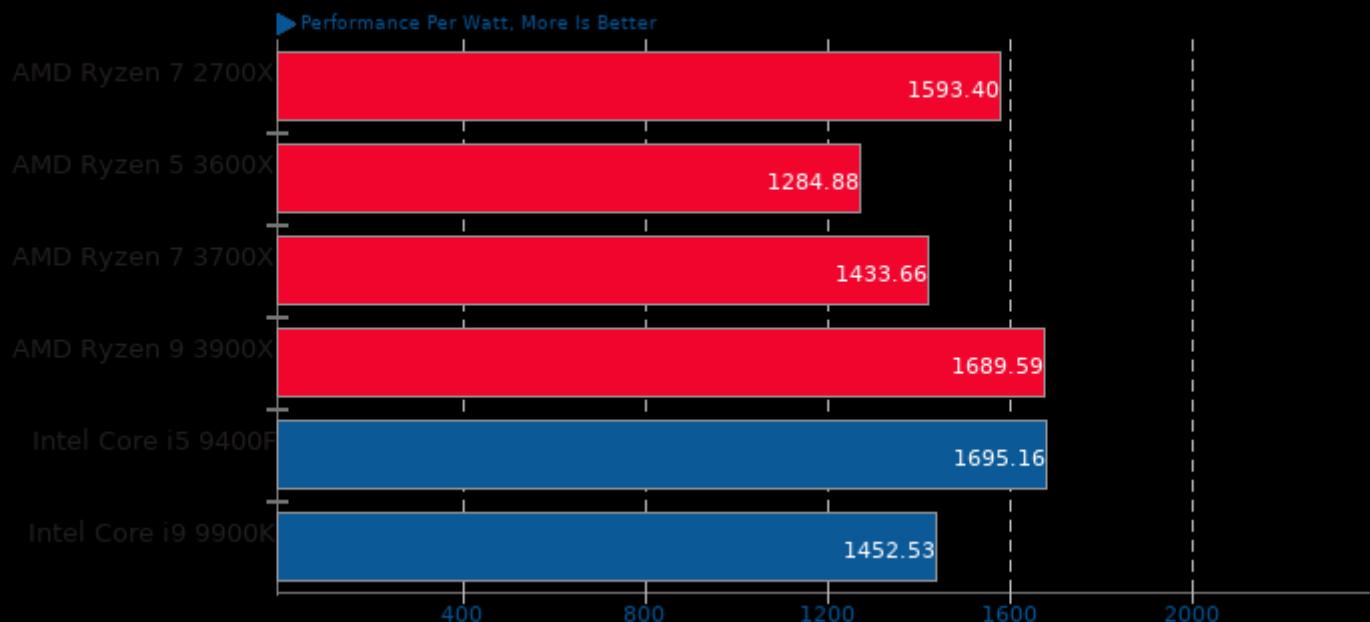
## Tungsten Renderer 0.2.2

System Power Consumption Monitor



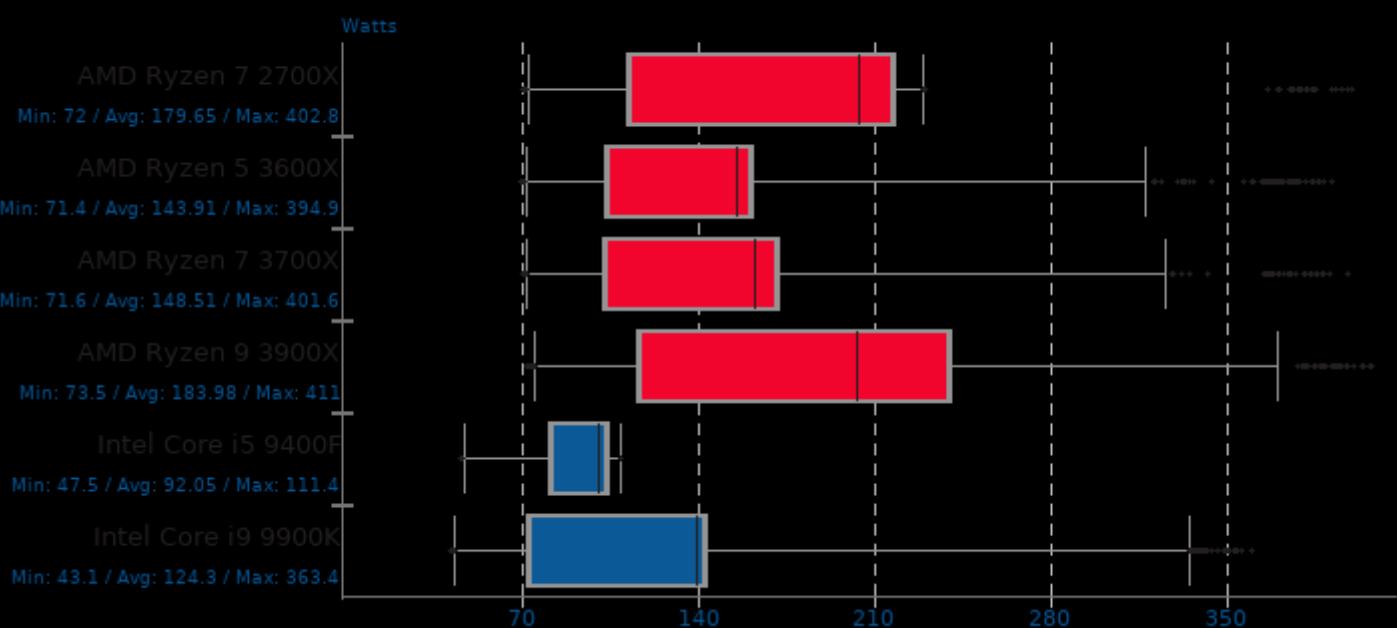
## Meta Performance Per Watt

Performance Per Watt



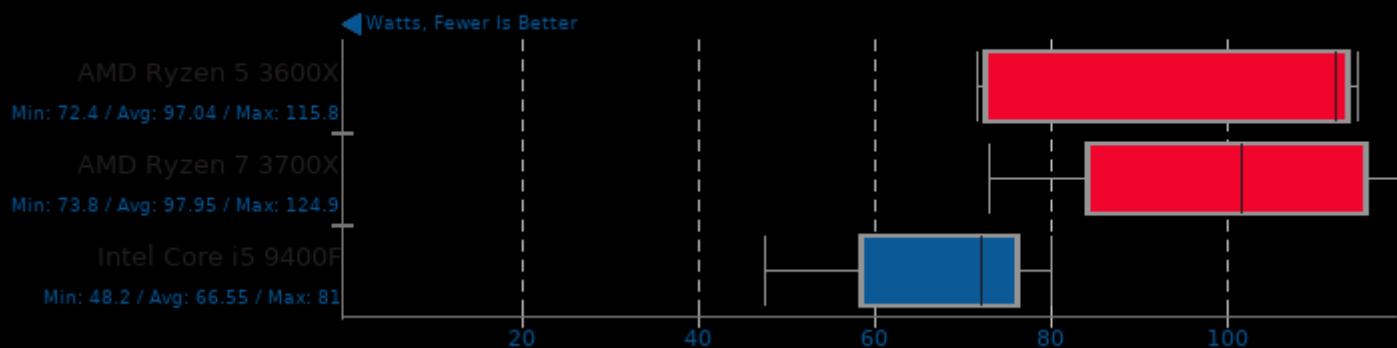
## System Power Consumption Monitor

Phoronix Test Suite System Monitoring



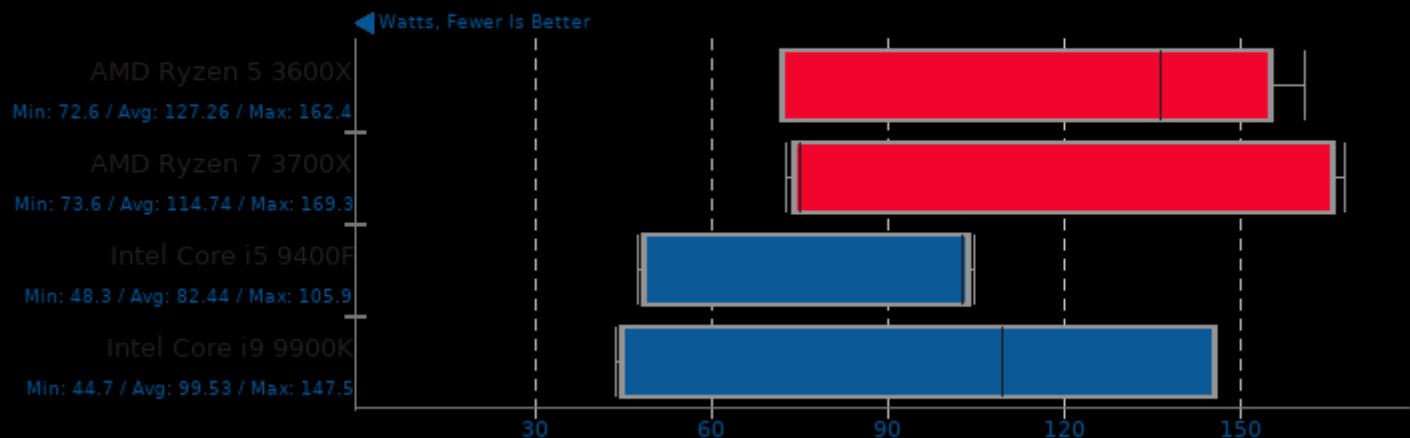
## GIMP 2.10.8

System Power Consumption Monitor



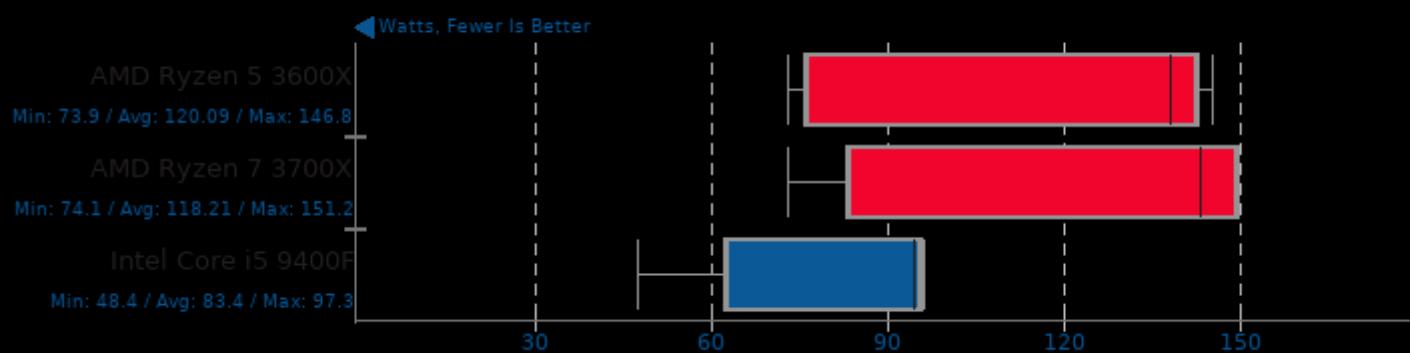
## SVT-AV1 0.5

System Power Consumption Monitor



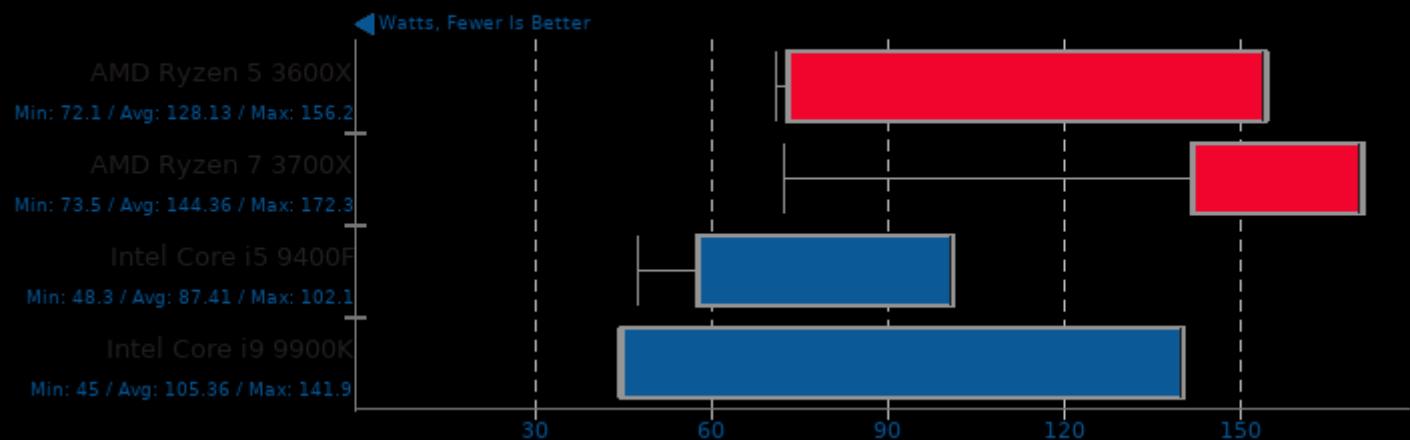
## dav1d 0.3

System Power Consumption Monitor



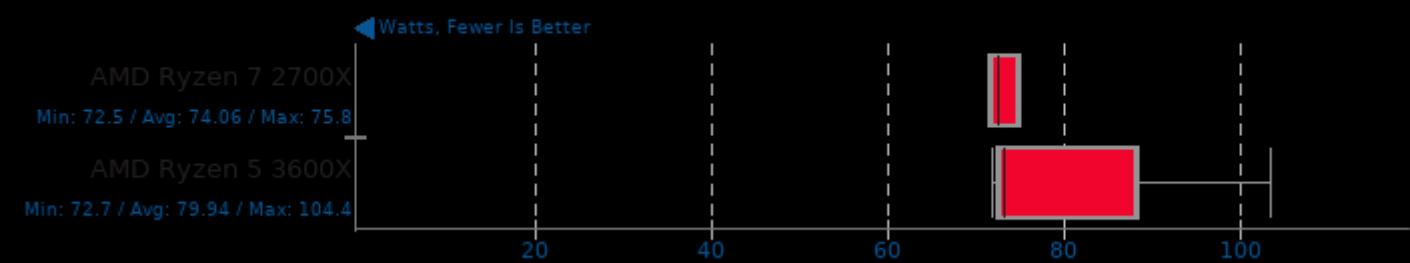
## Tungsten Renderer 0.2.2

System Power Consumption Monitor



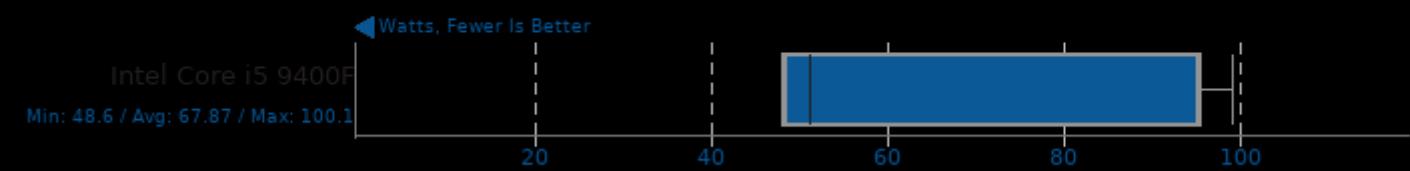
## Darktable 2.6.0

System Power Consumption Monitor



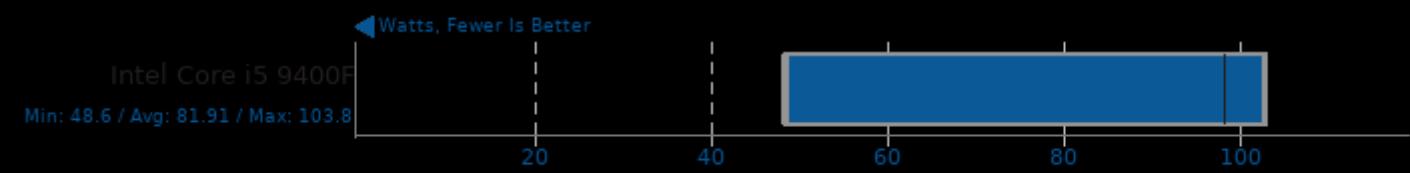
## Darktable 2.6.0

System Power Consumption Monitor



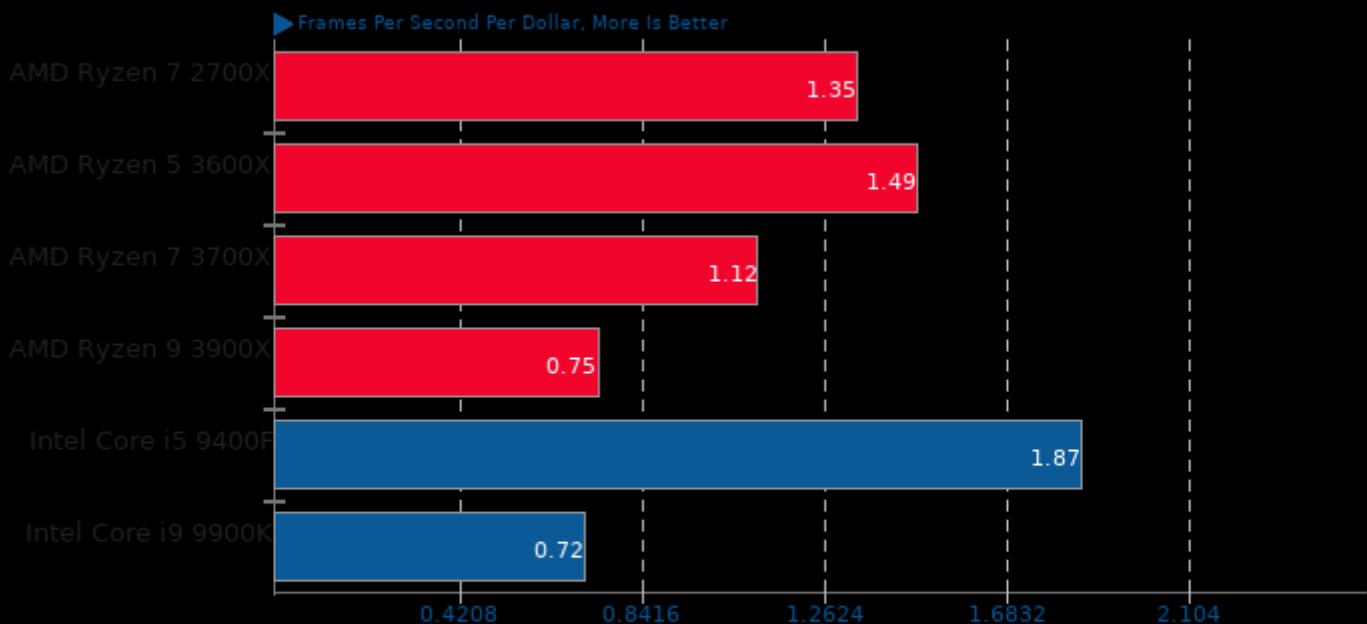
## x264 2018-09-25

System Power Consumption Monitor



## 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.

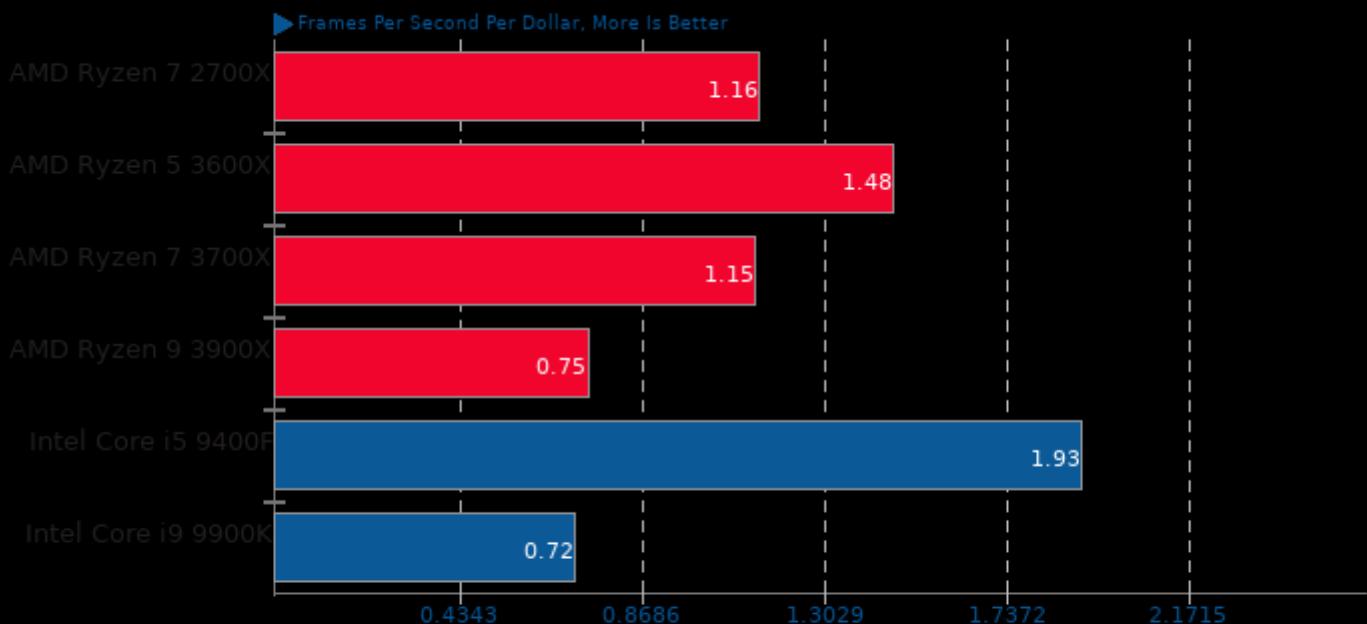
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

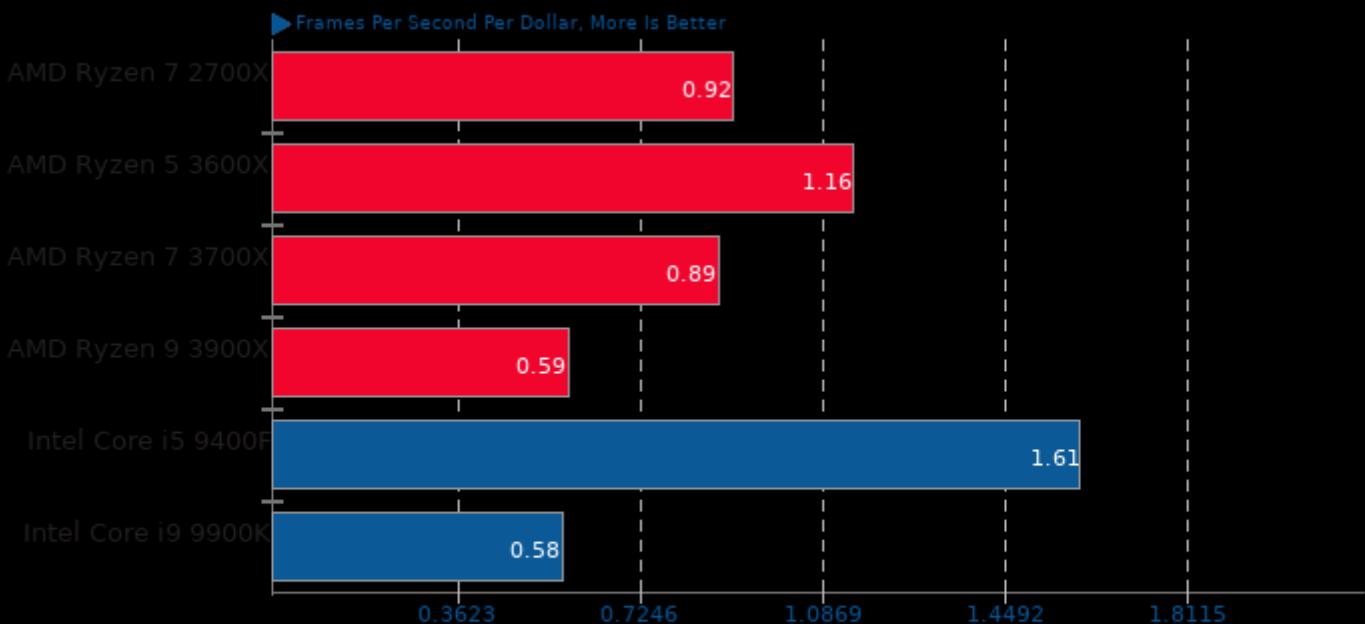
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

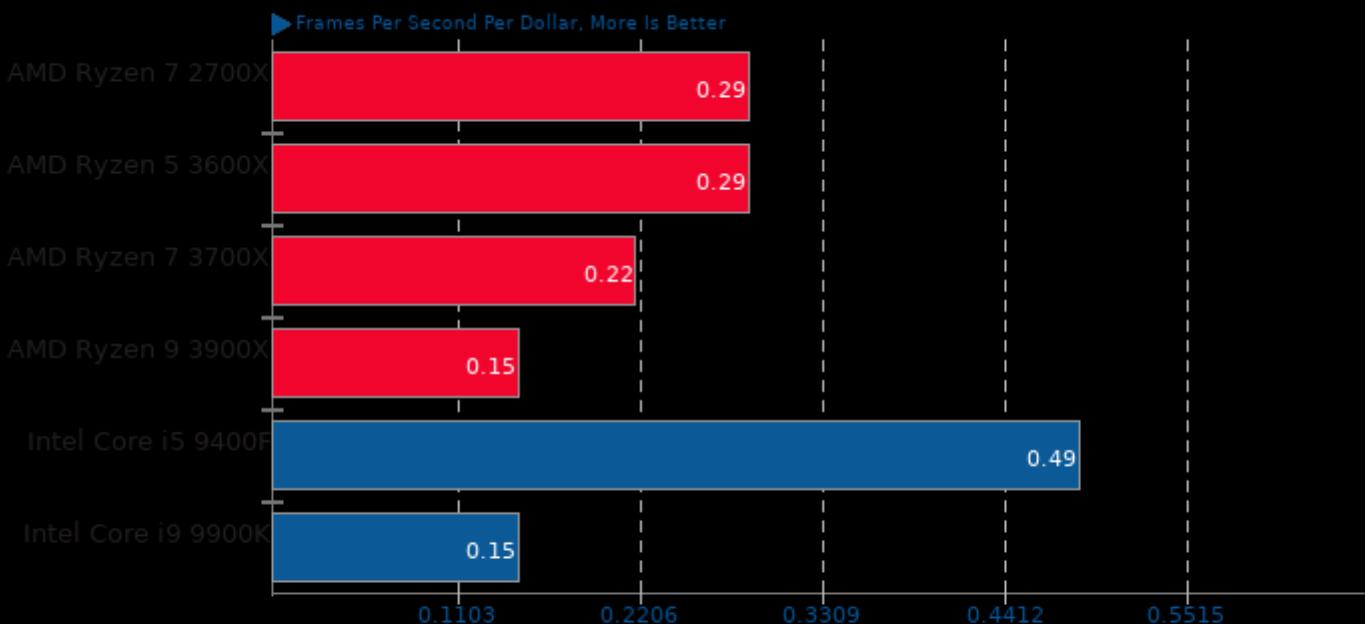
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

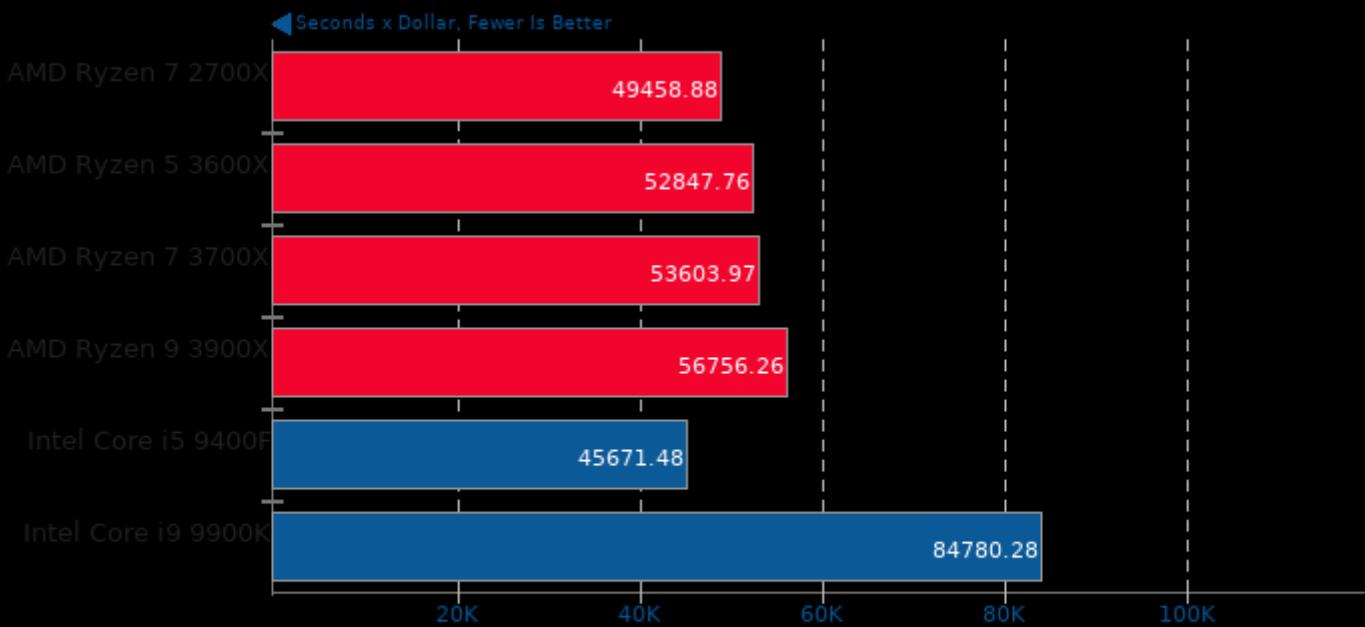
4. AMD Ryzen 9 3900X: \$499 reported cost.

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

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

## Blender 2.80

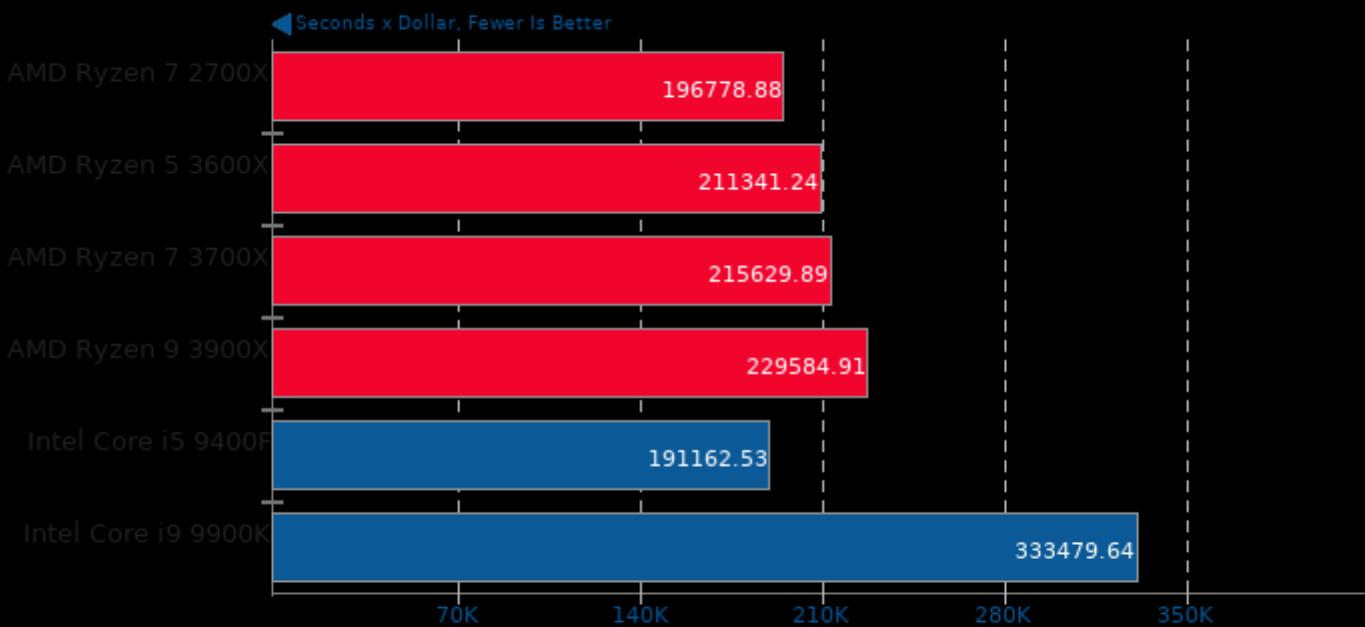
Performance / Cost - Blend File: BMW27 - Compute: CPU-Only



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

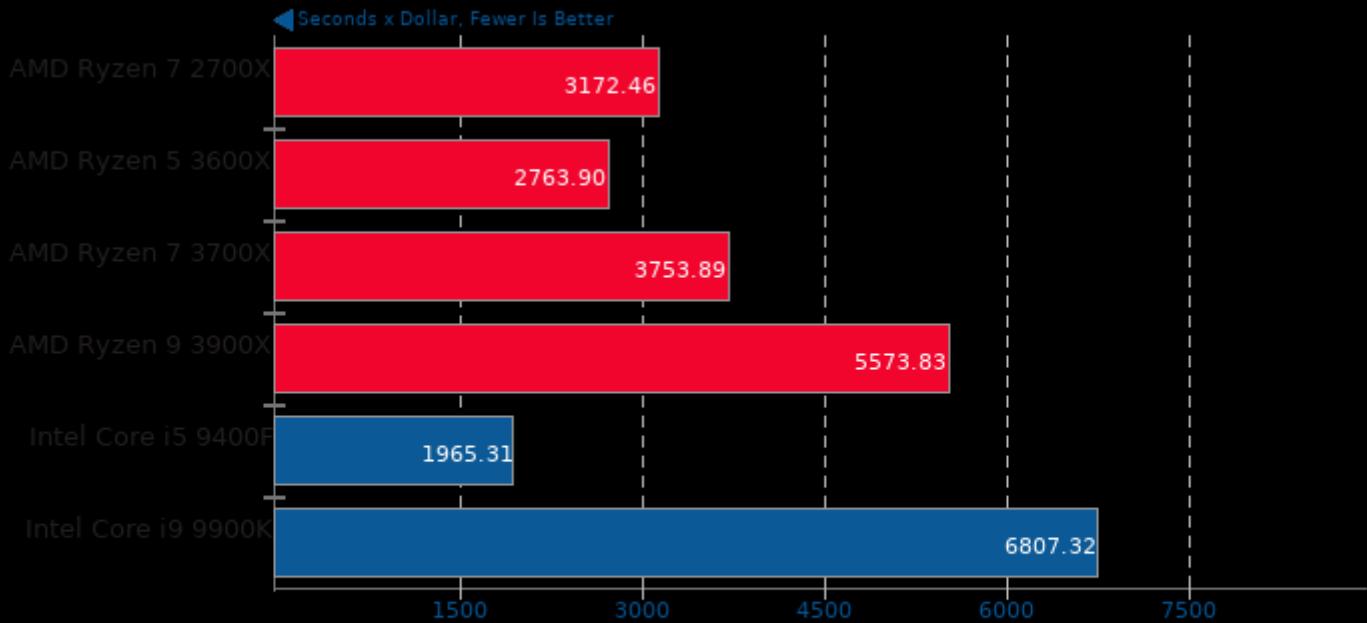
Performance / Cost - Blend File: Barbershop - Compute: CPU-Only



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.

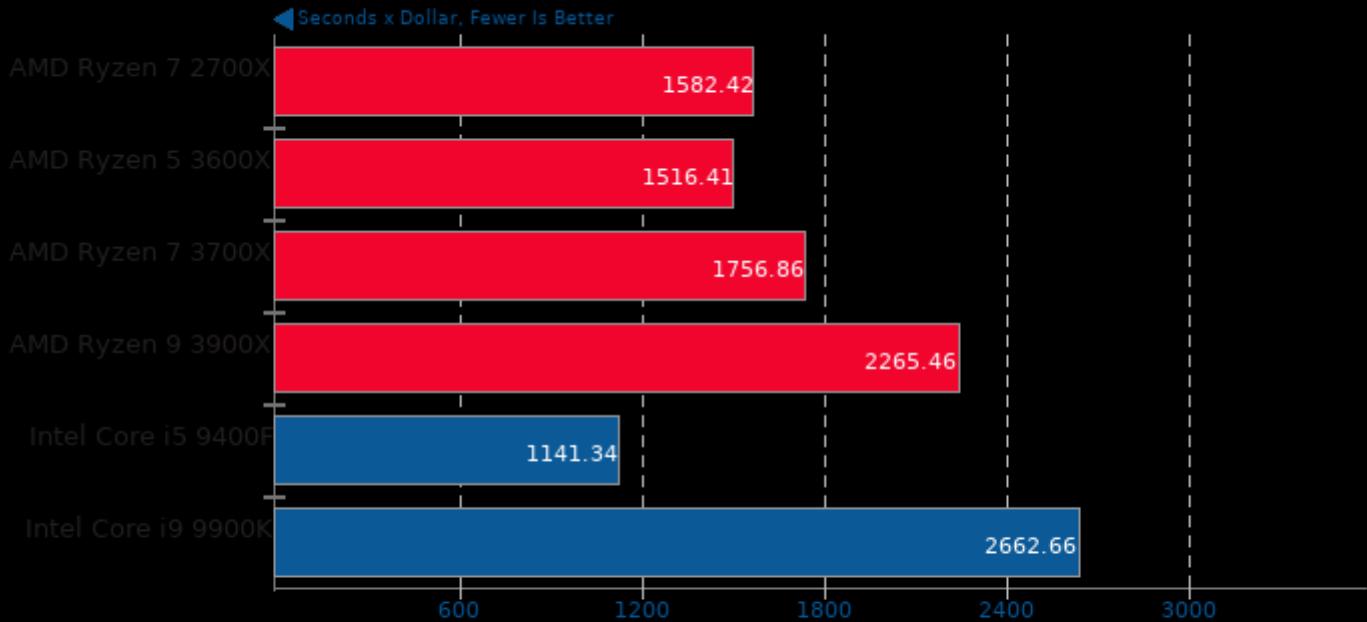
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

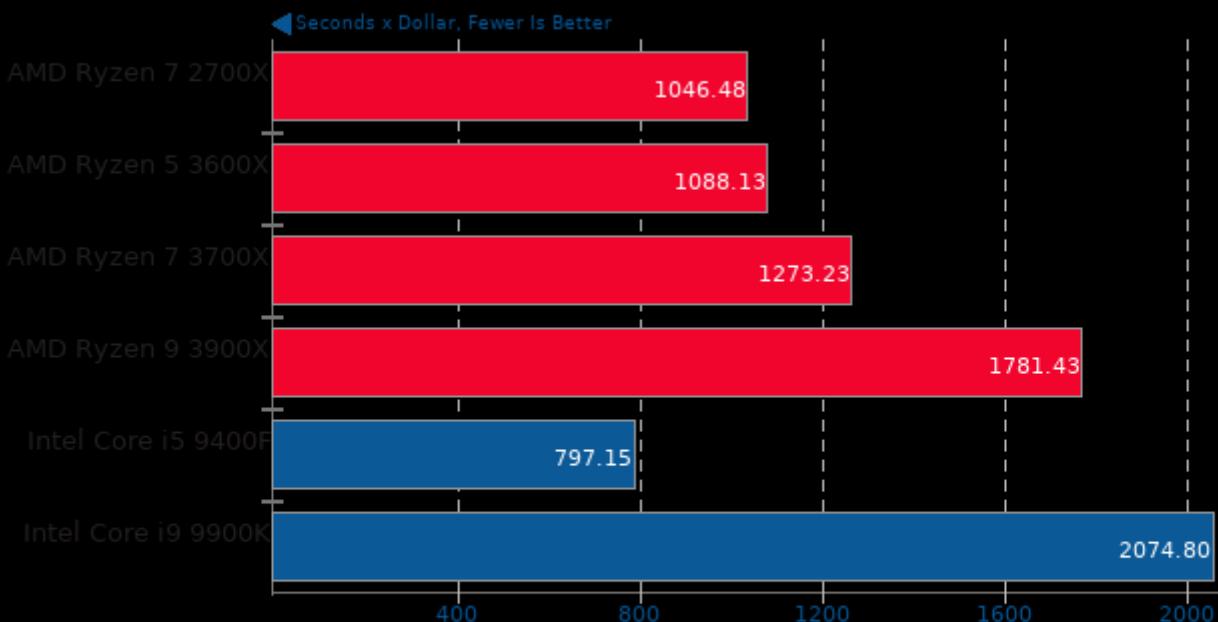
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

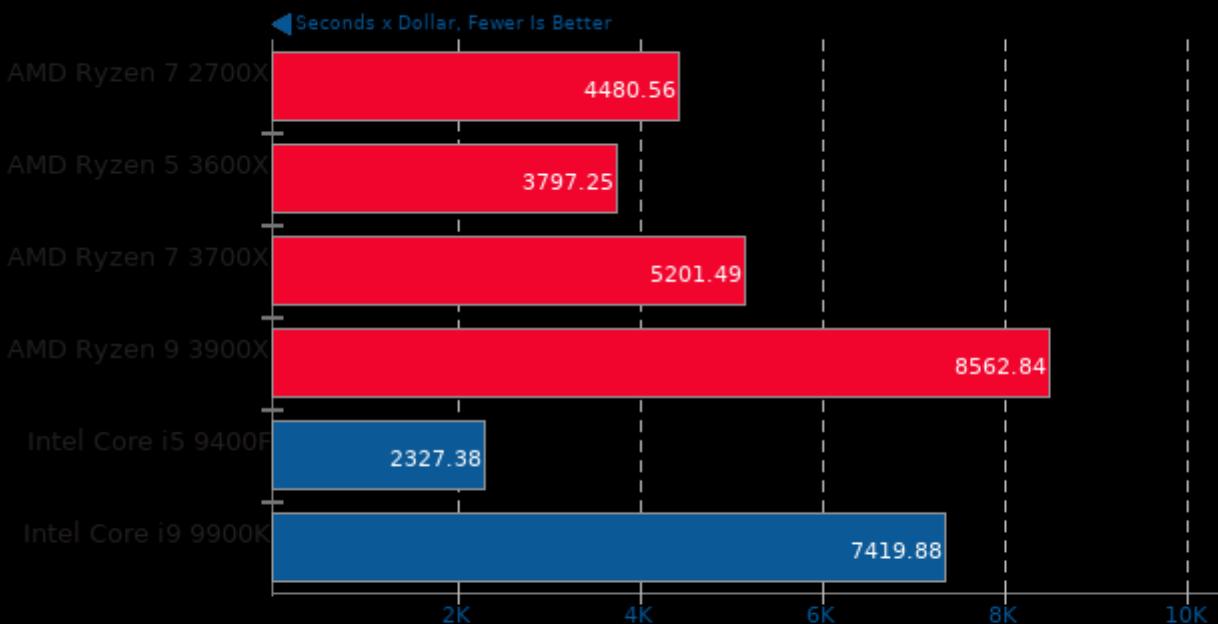
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

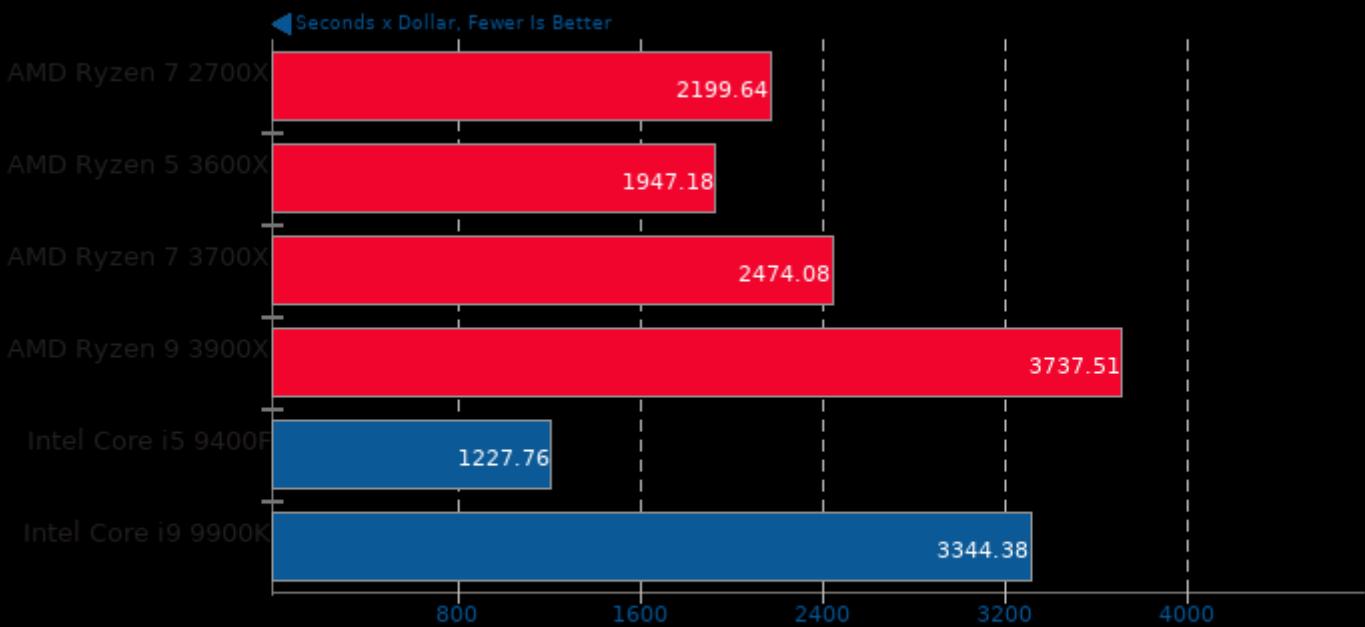
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

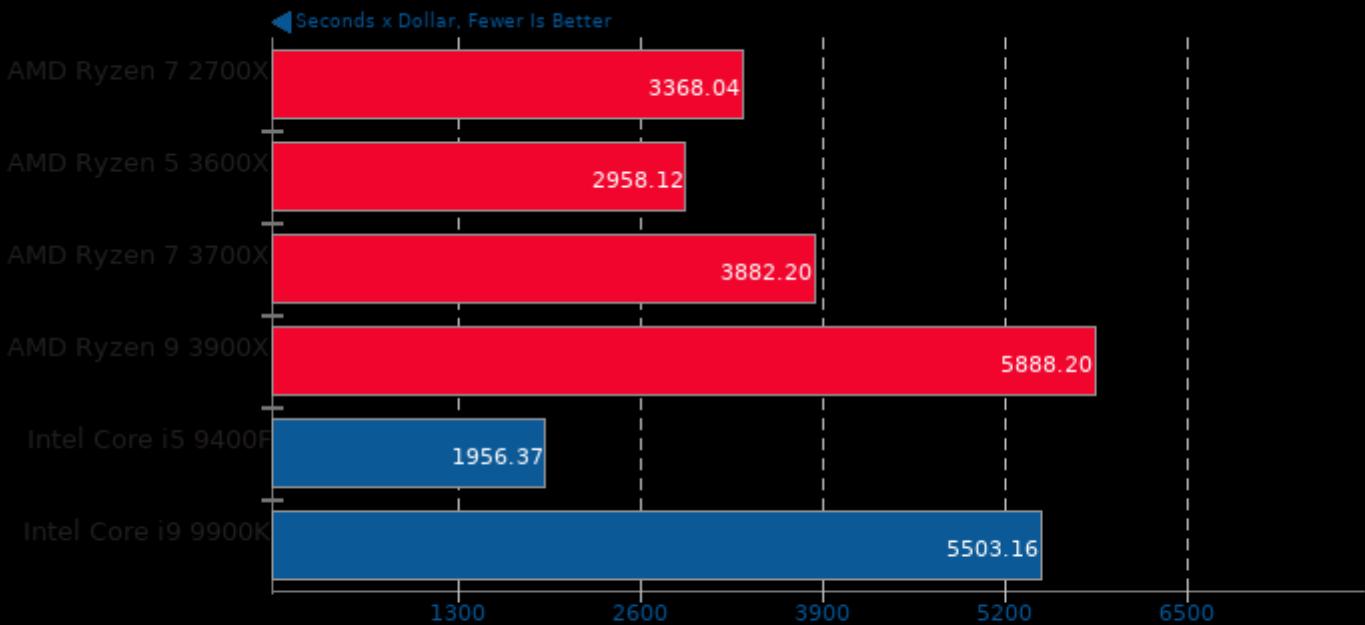
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

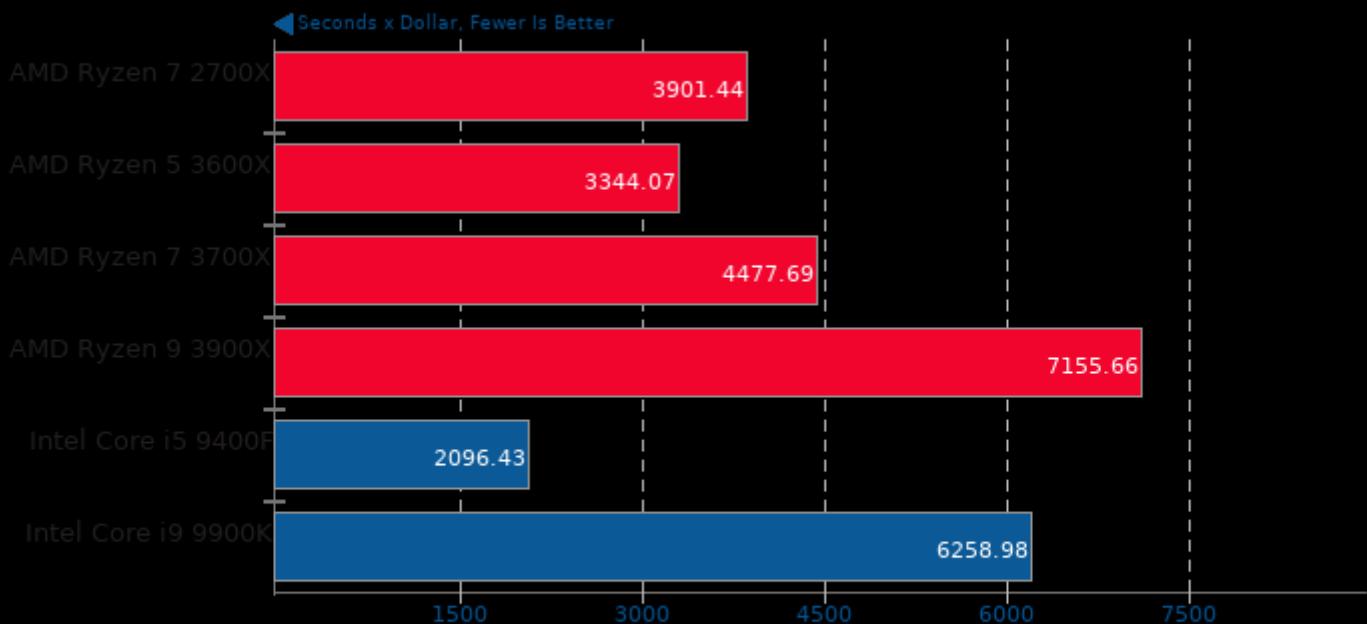
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

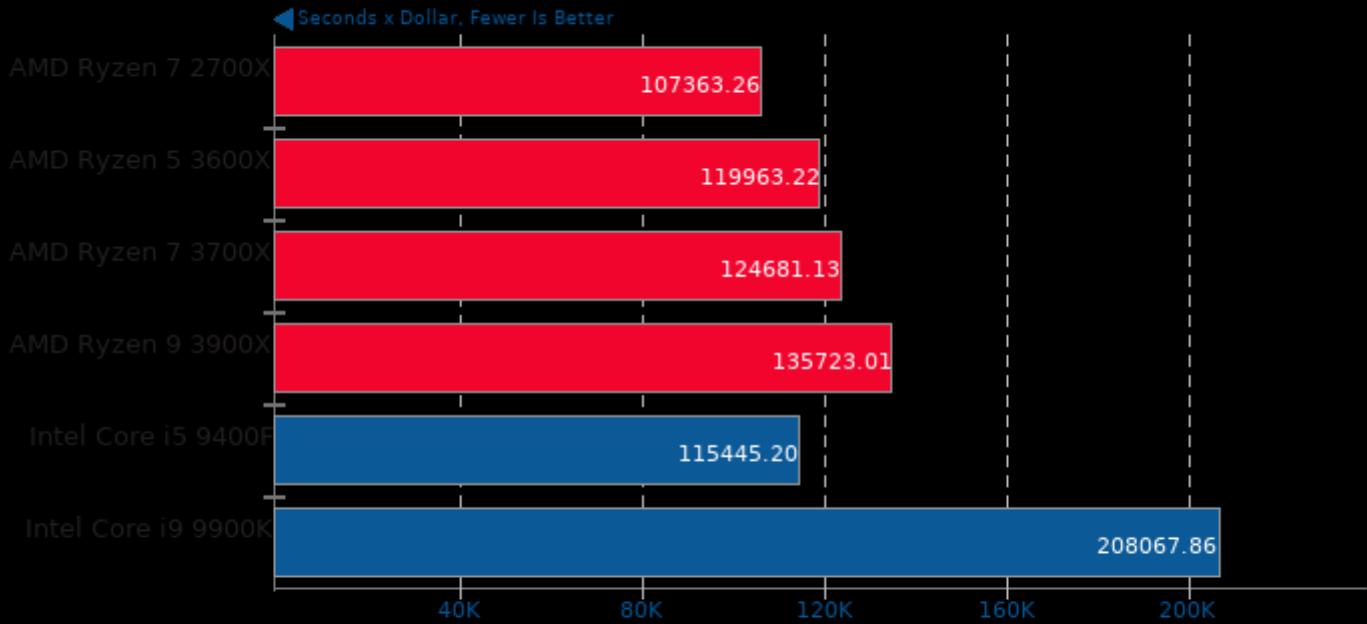
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

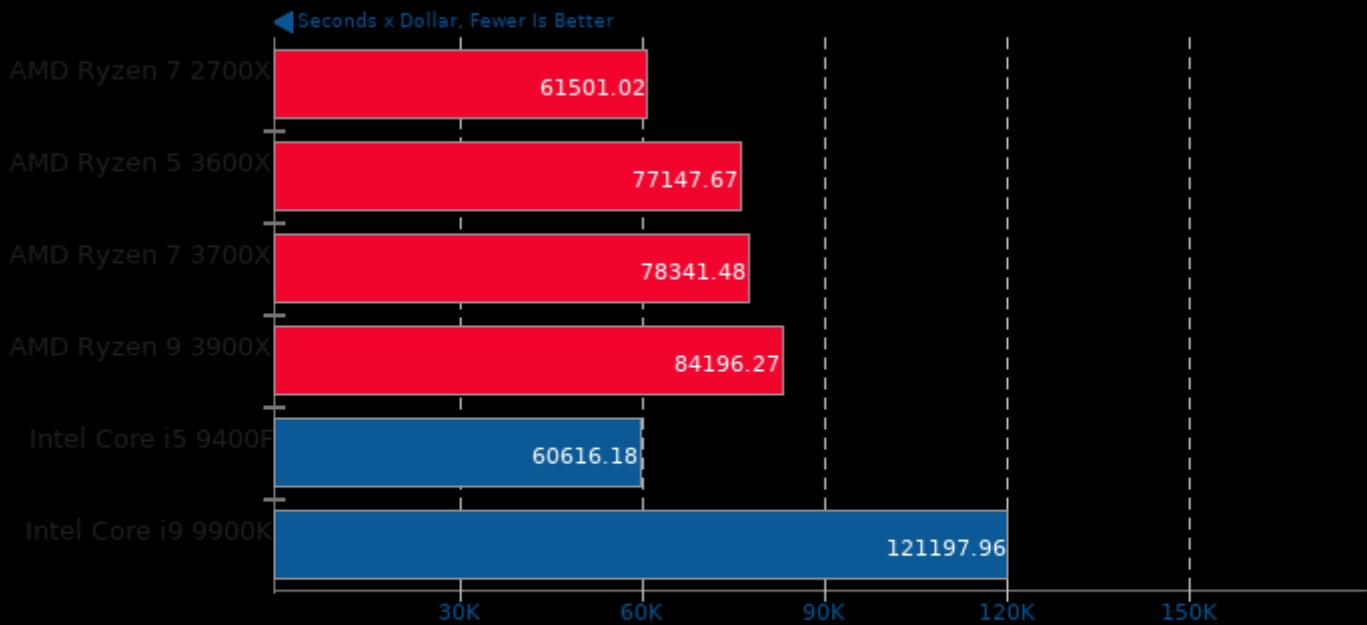
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

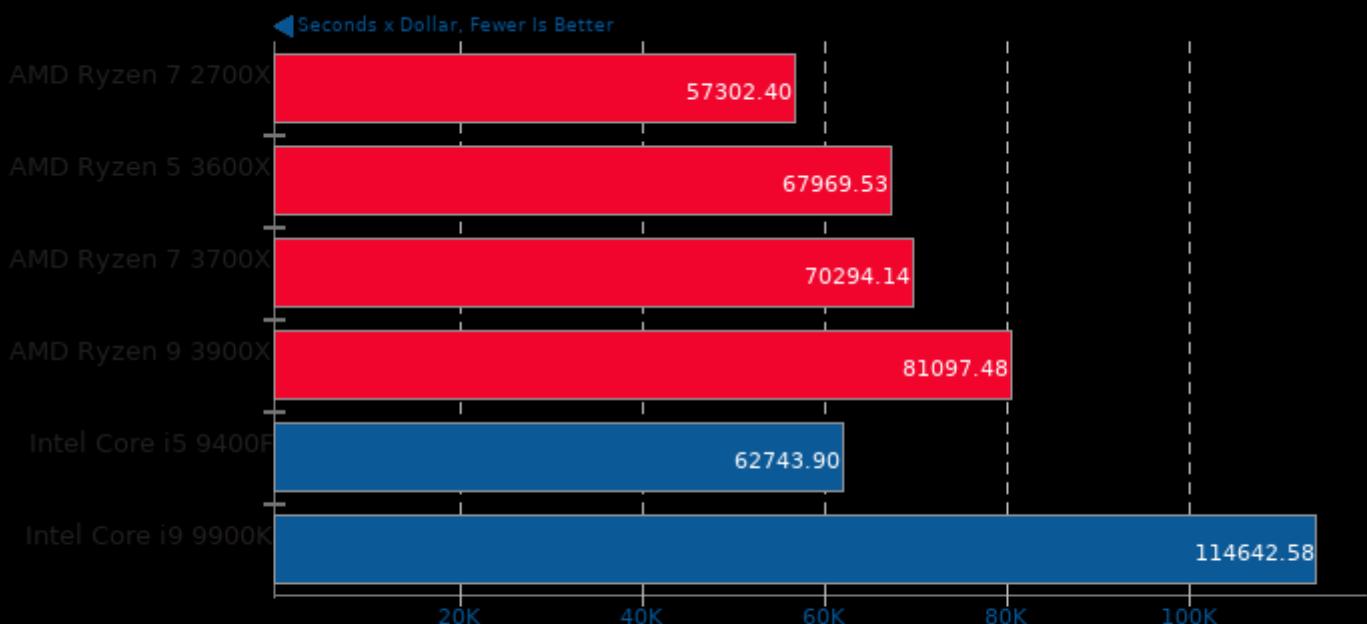
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

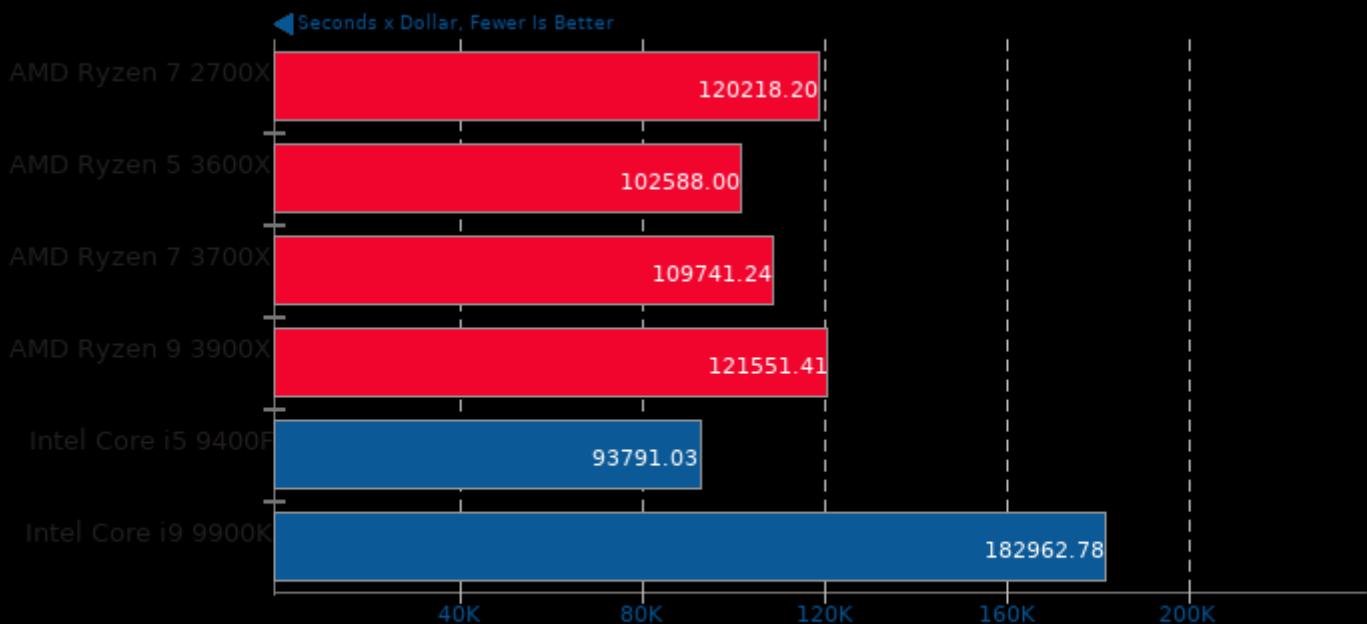
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

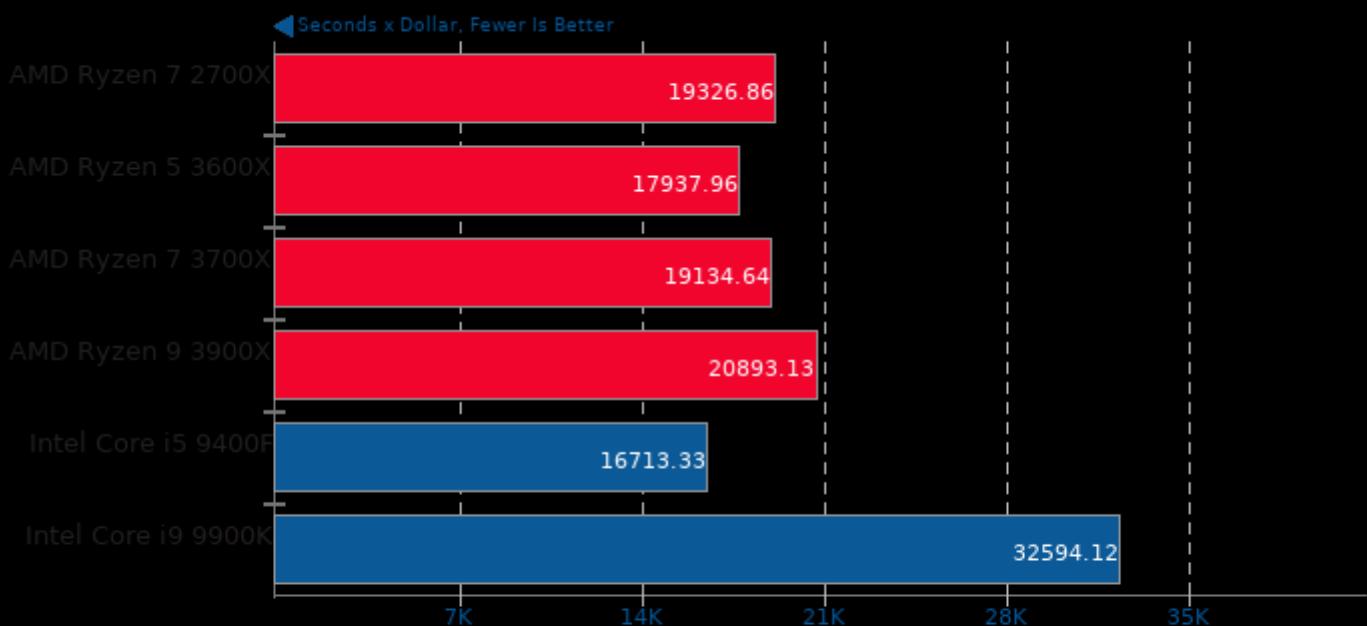
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

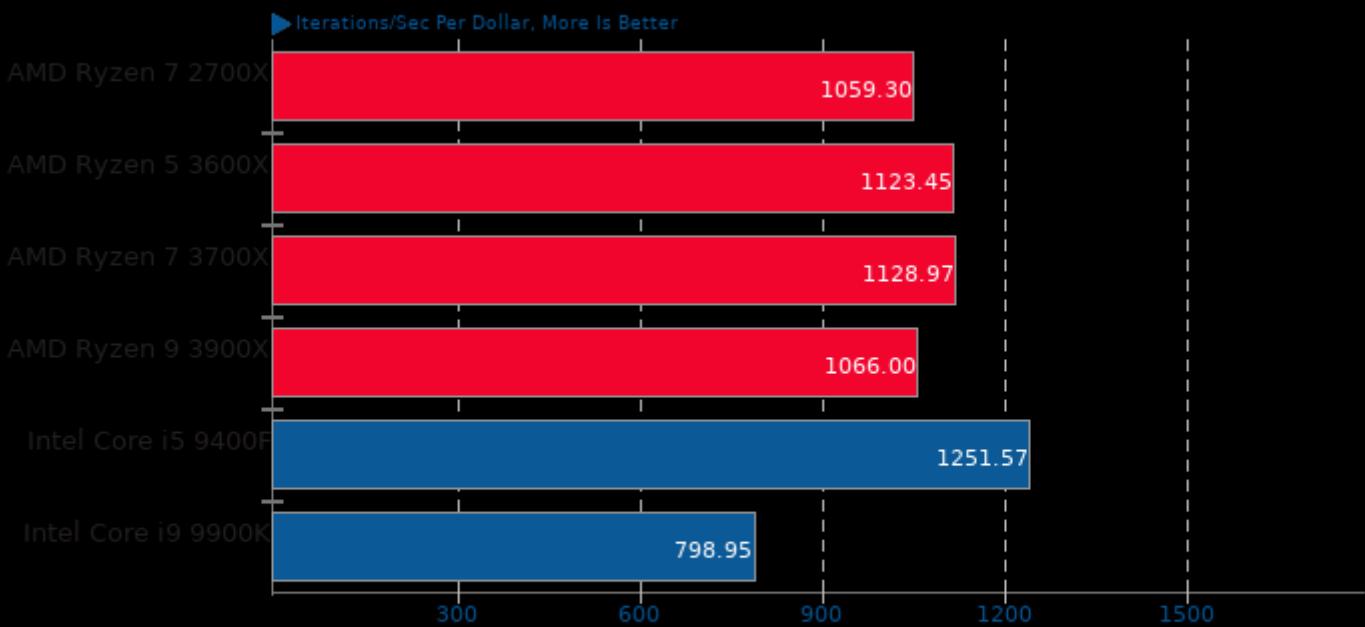
4. AMD Ryzen 9 3900X: \$499 reported cost.

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

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

## 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.

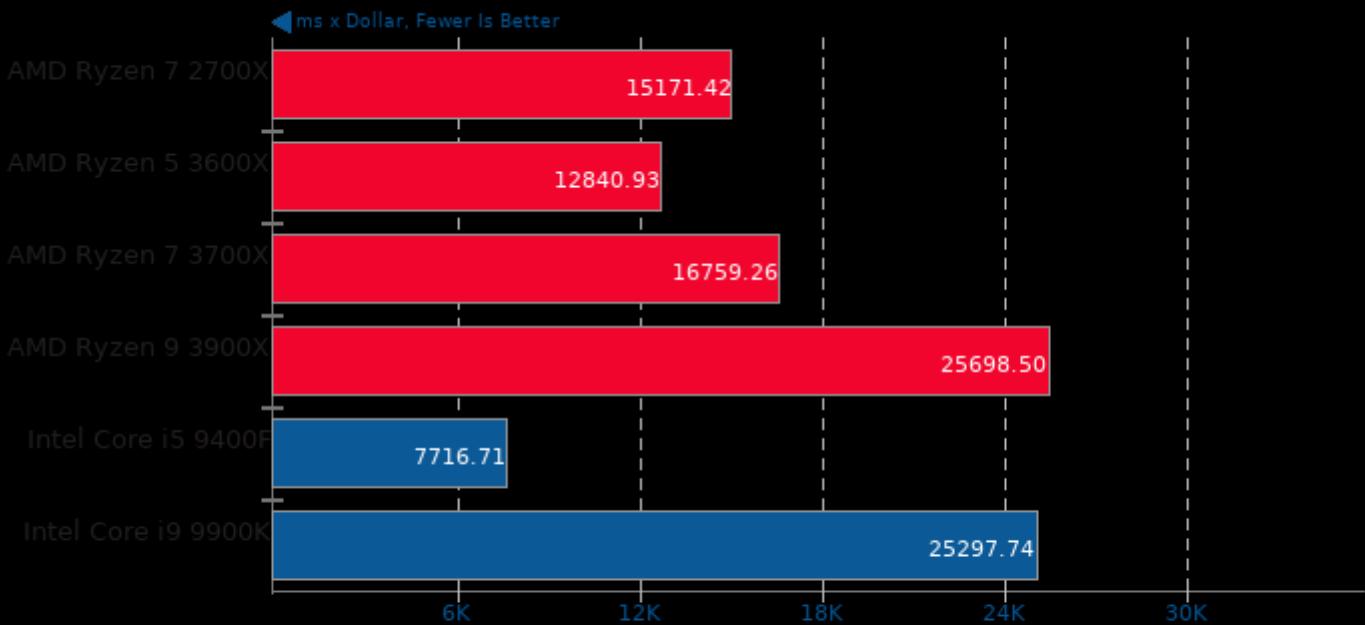
4. AMD Ryzen 9 3900X: \$499 reported cost.

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

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

## Selenium

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

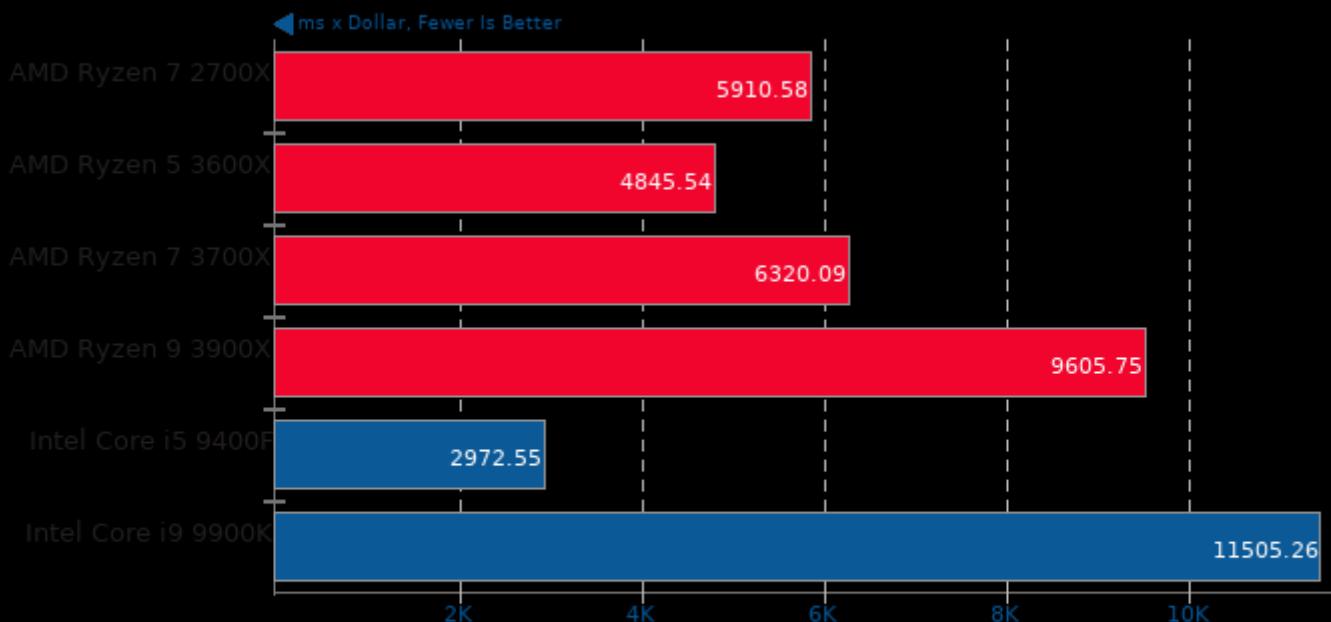
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

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

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

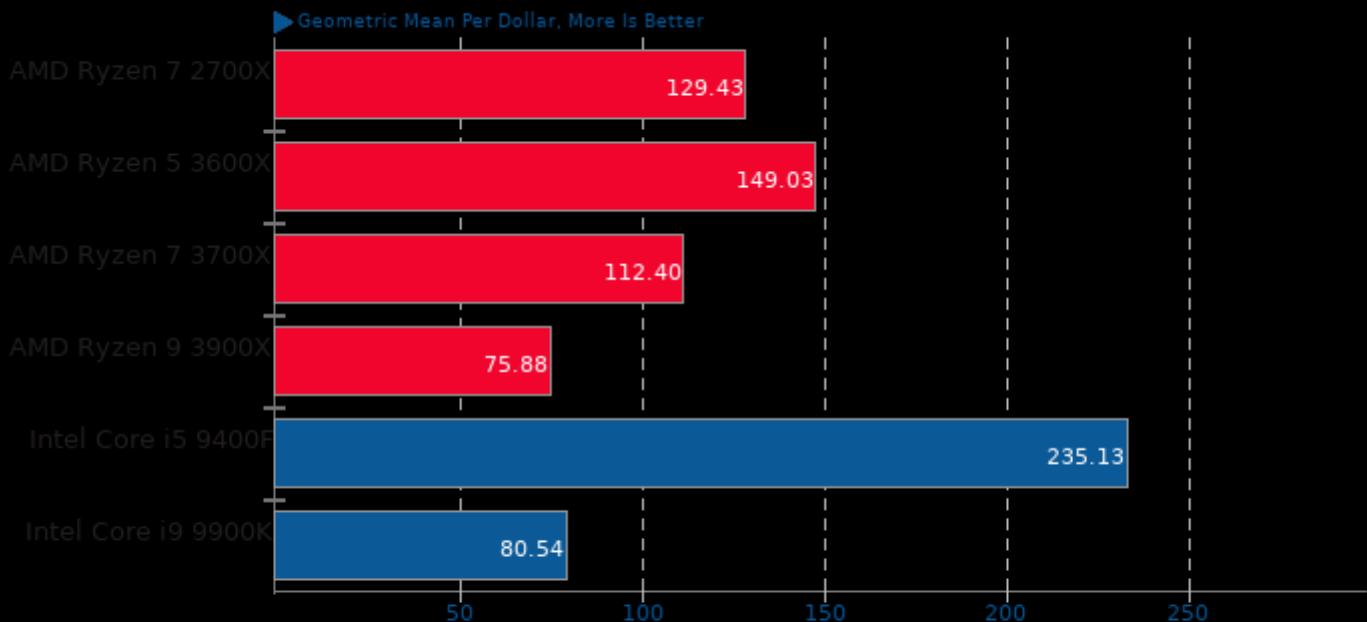
4. AMD Ryzen 9 3900X: \$499 reported cost.

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

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

## Selenium

Performance / Cost - Benchmark: Octane - Browser: 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.

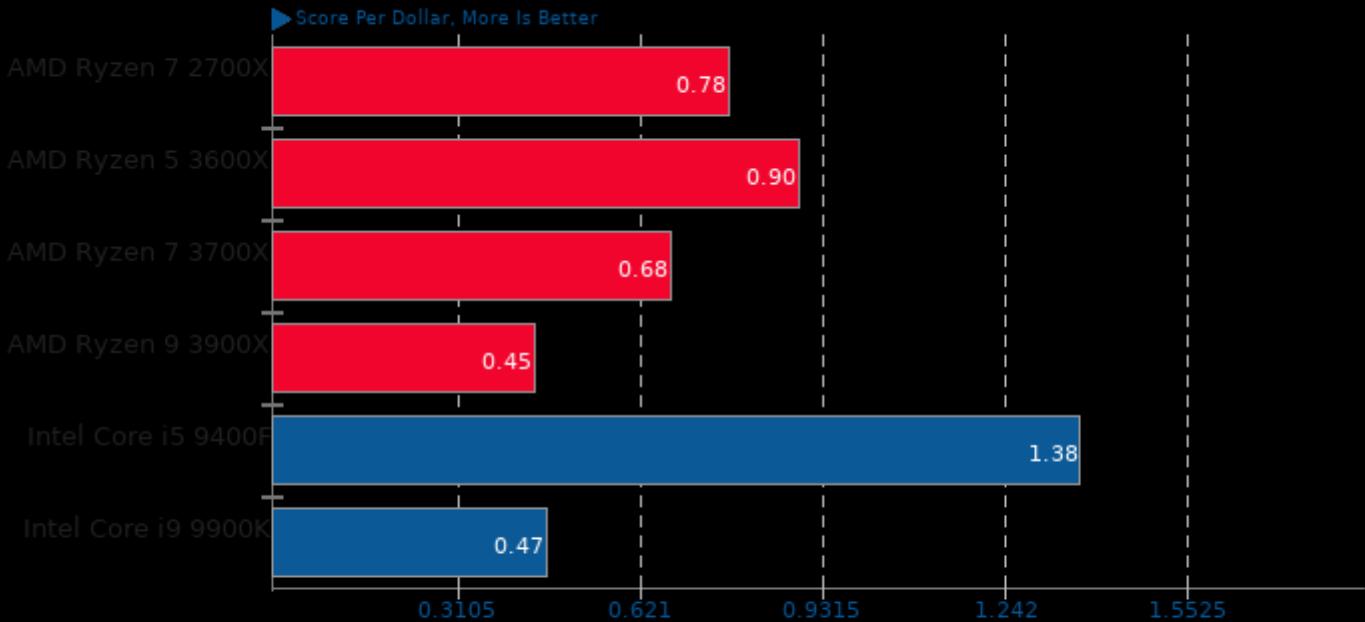
4. AMD Ryzen 9 3900X: \$499 reported cost.

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

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

## Selenium

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.

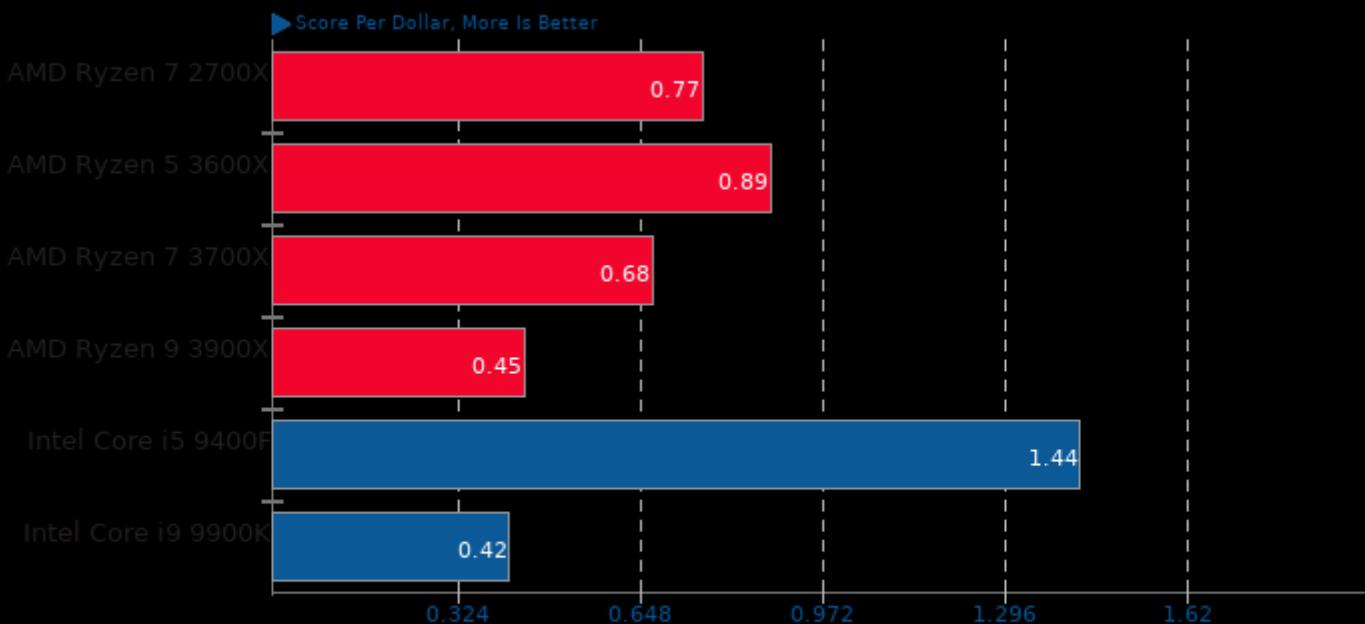
4. AMD Ryzen 9 3900X: \$499 reported cost.

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

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

## Selenium

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.

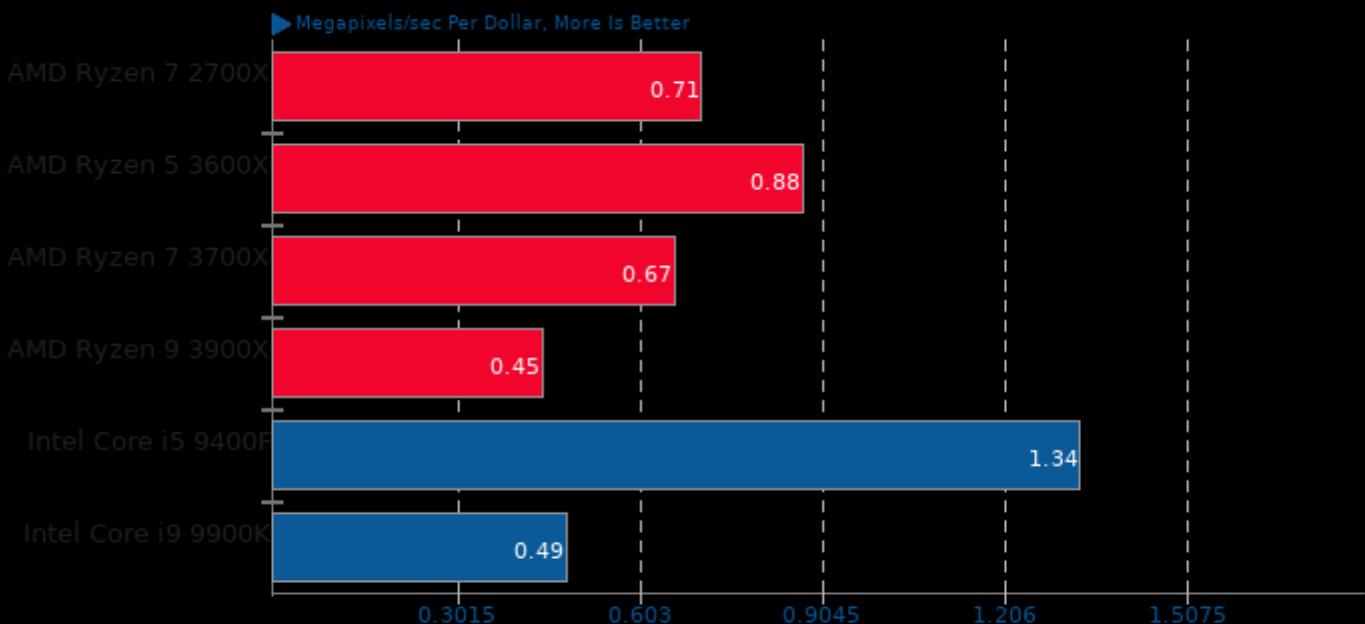
4. AMD Ryzen 9 3900X: \$499 reported cost.

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

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

## 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.

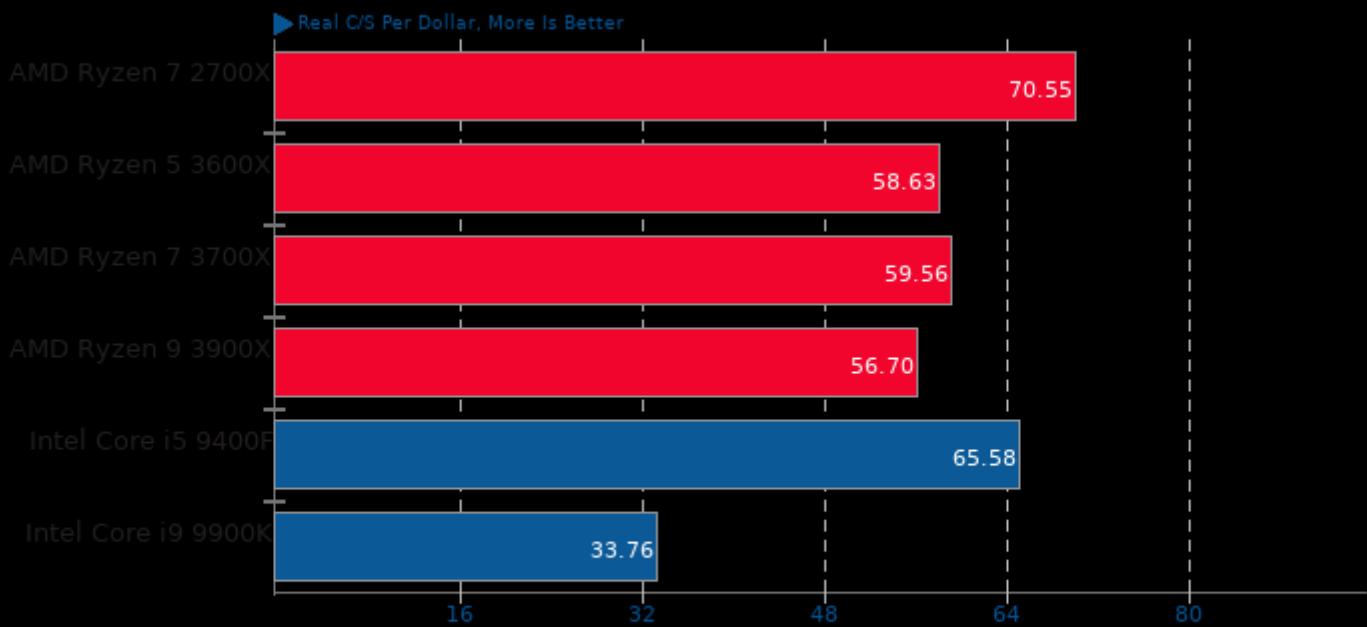
4. AMD Ryzen 9 3900X: \$499 reported cost.

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

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

## 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.

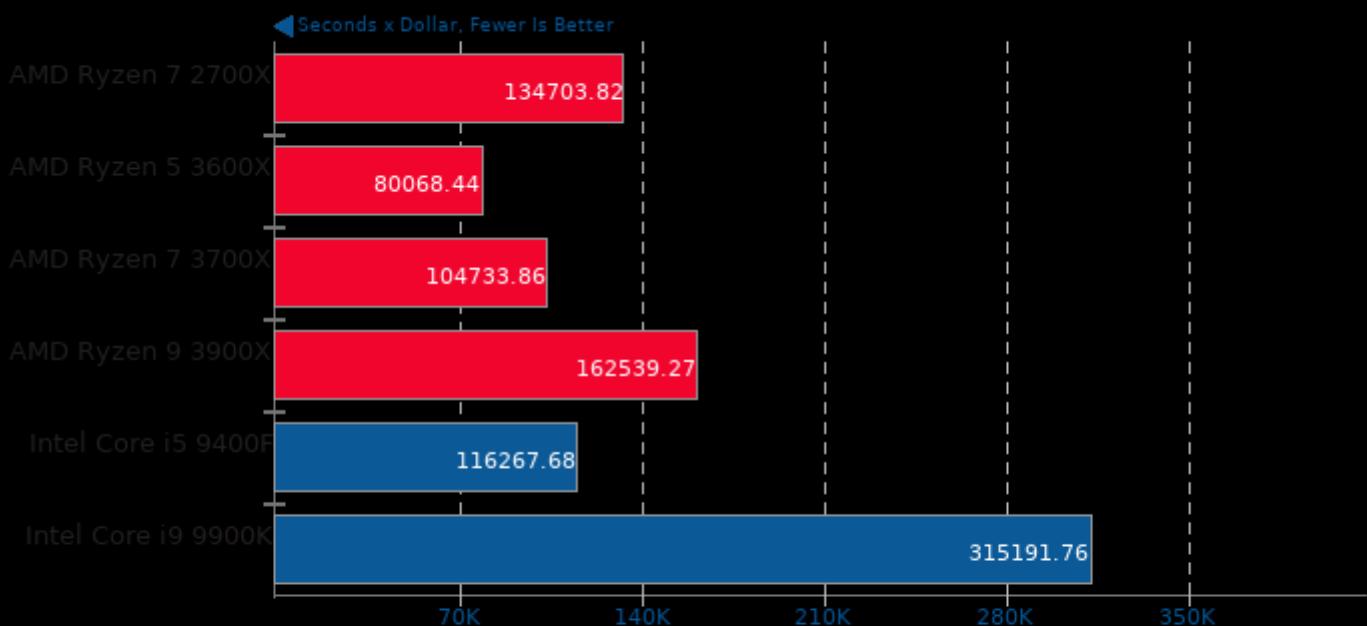
4. AMD Ryzen 9 3900X: \$499 reported cost.

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

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

## 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.

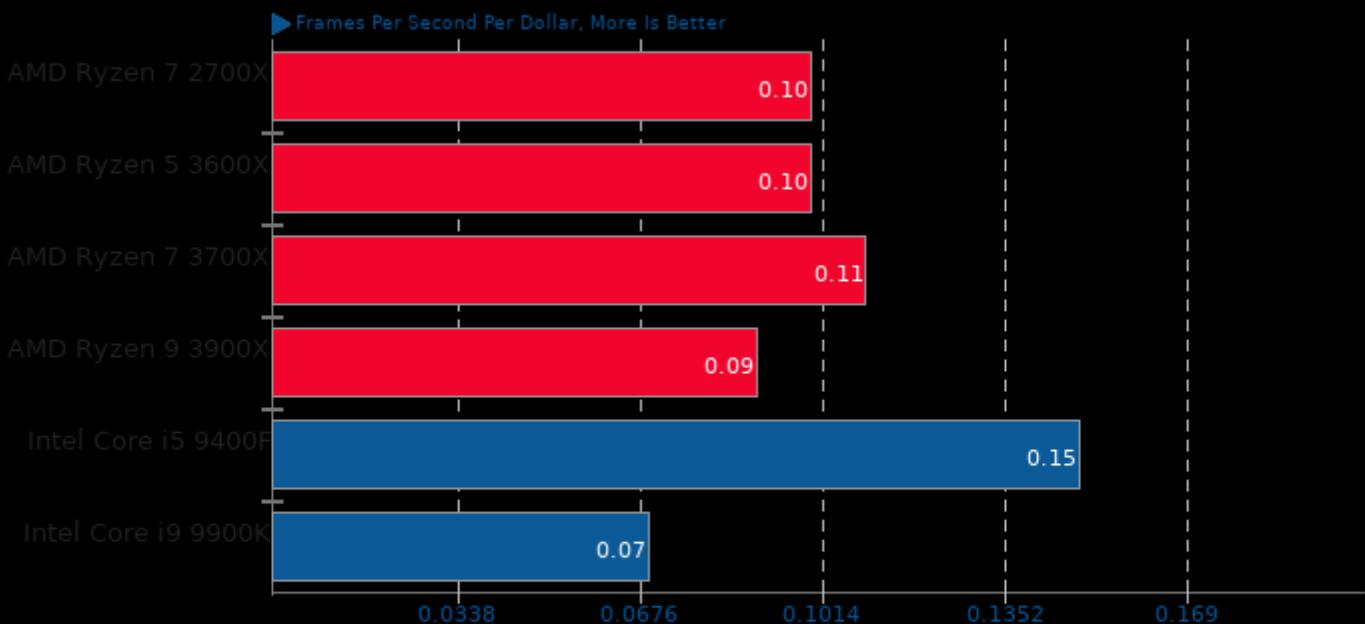
4. AMD Ryzen 9 3900X: \$499 reported cost.

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

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

## 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.

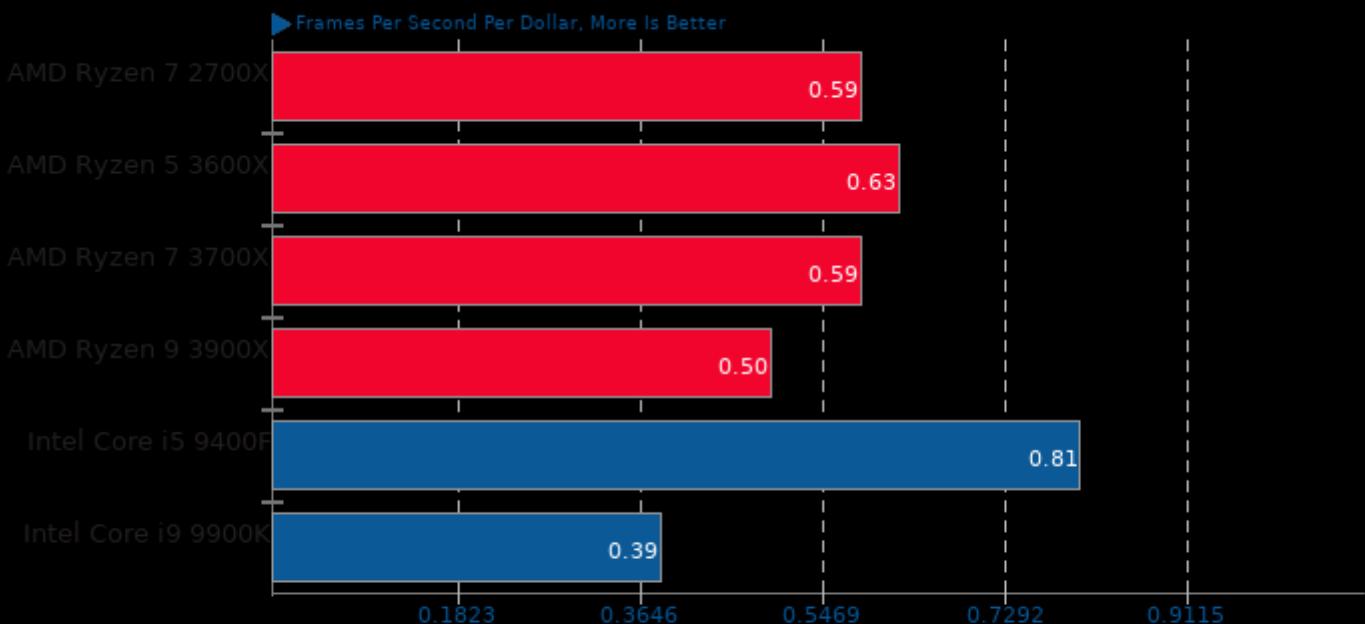
4. AMD Ryzen 9 3900X: \$499 reported cost.

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

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

## 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.

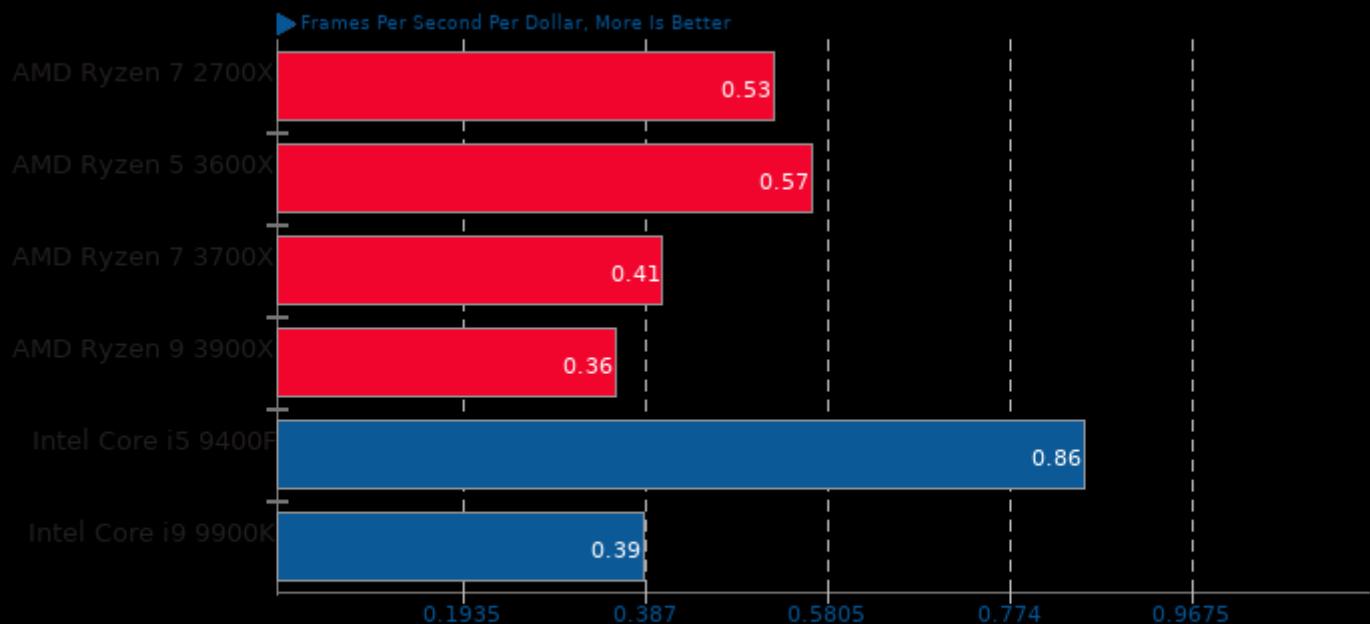
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

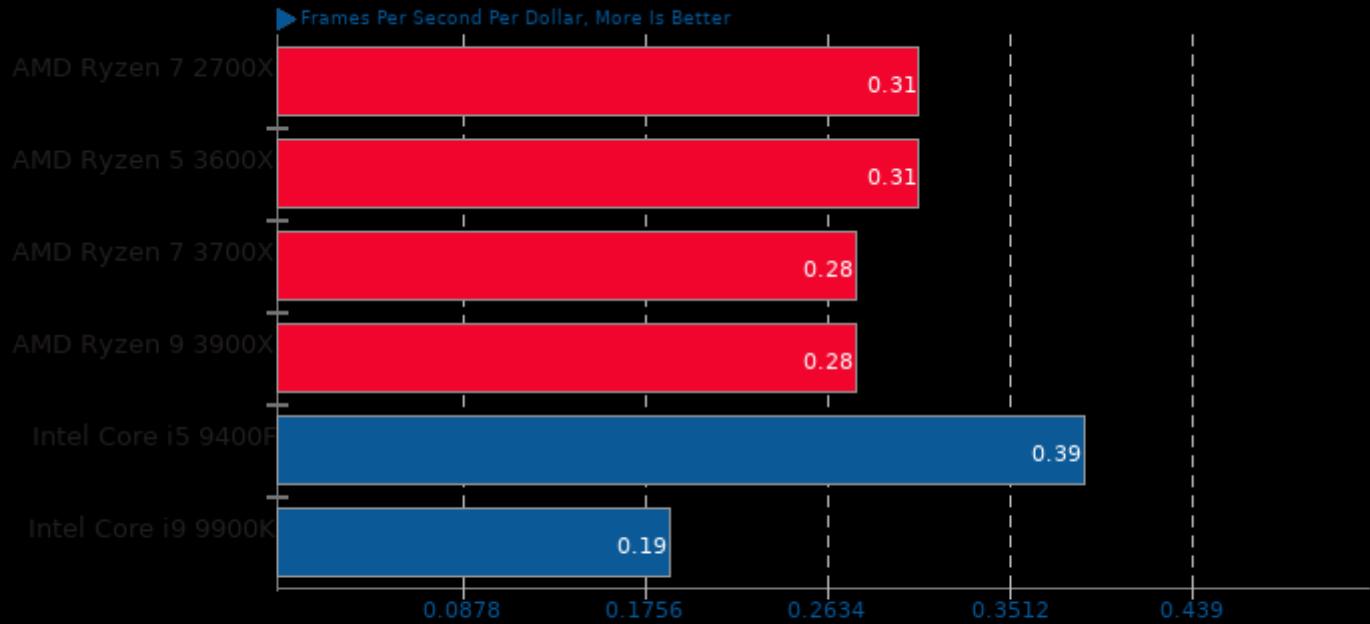
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

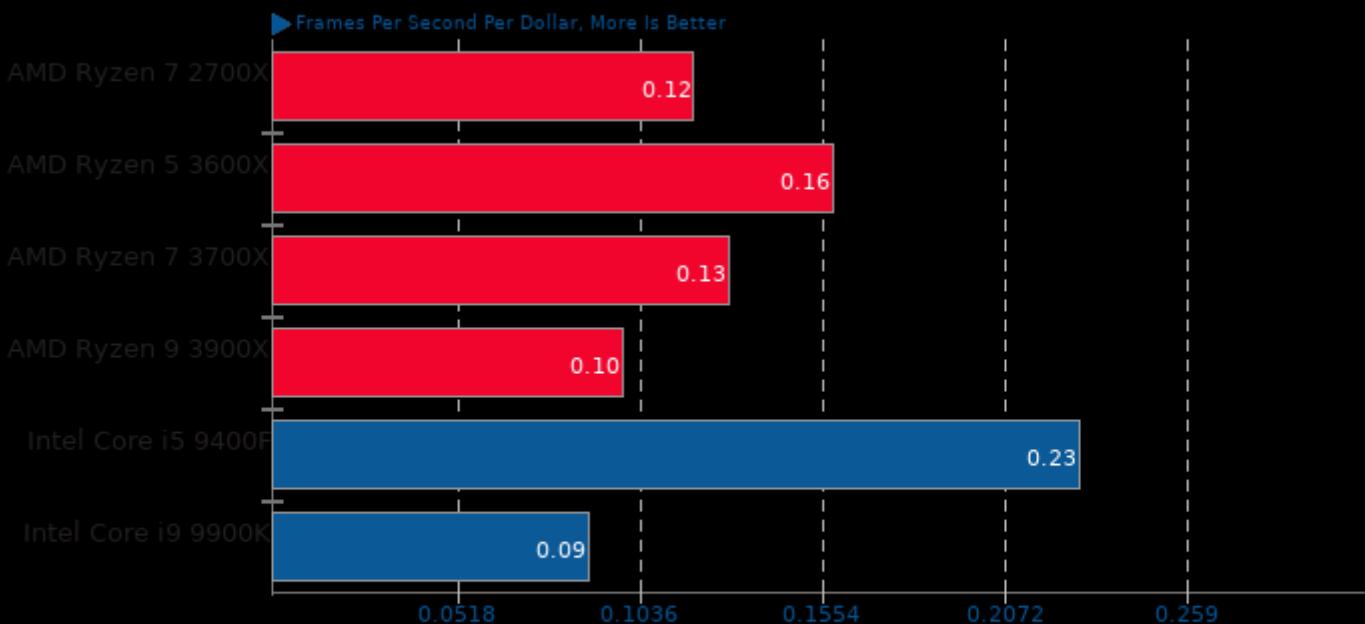
4. AMD Ryzen 9 3900X: \$499 reported cost.

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

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

## 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.

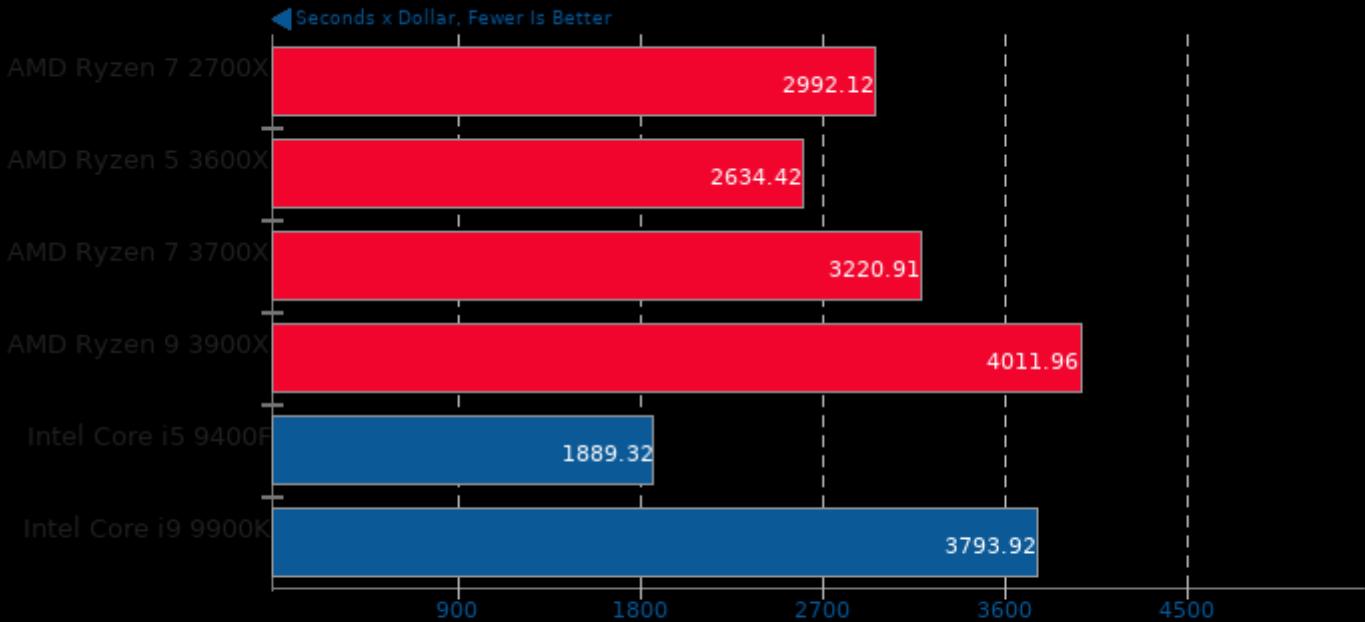
4. AMD Ryzen 9 3900X: \$499 reported cost.

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

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

## 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.

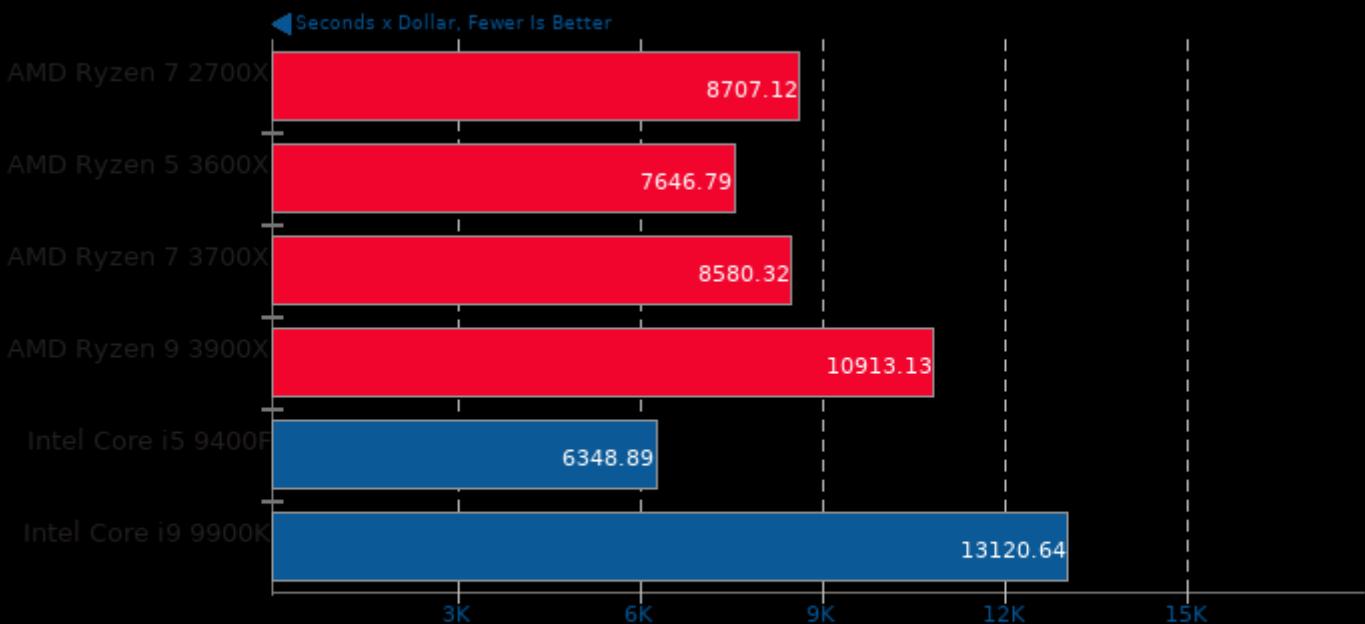
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

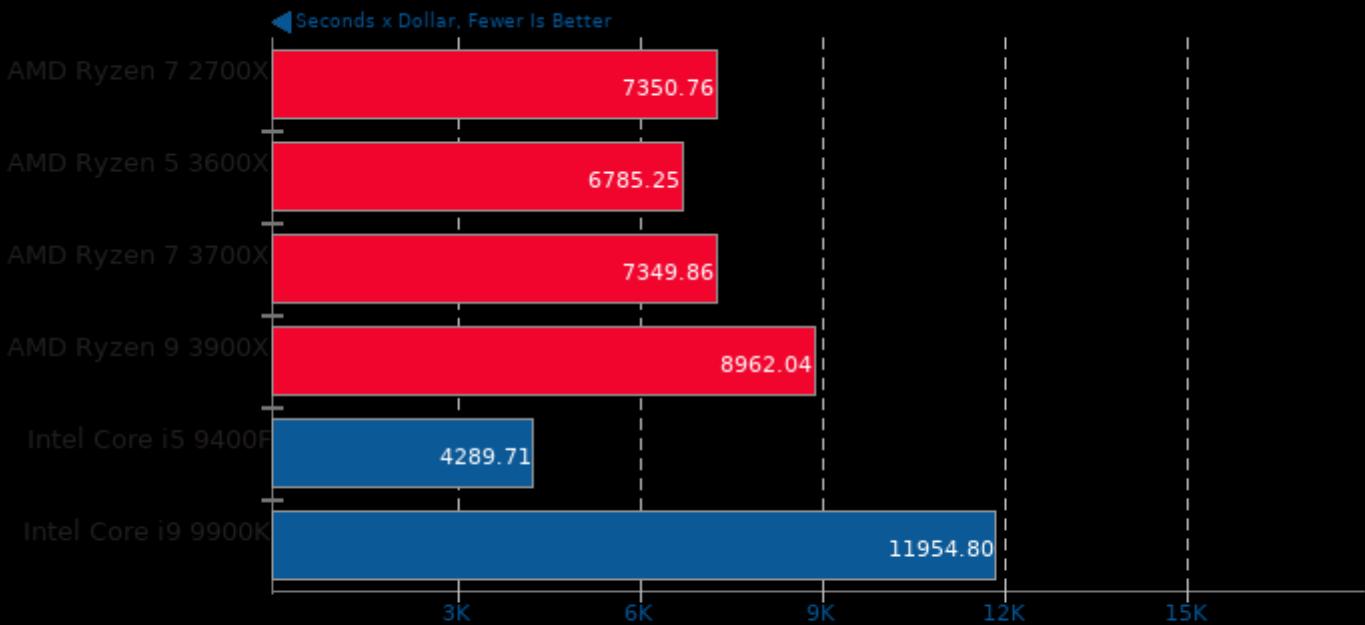
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

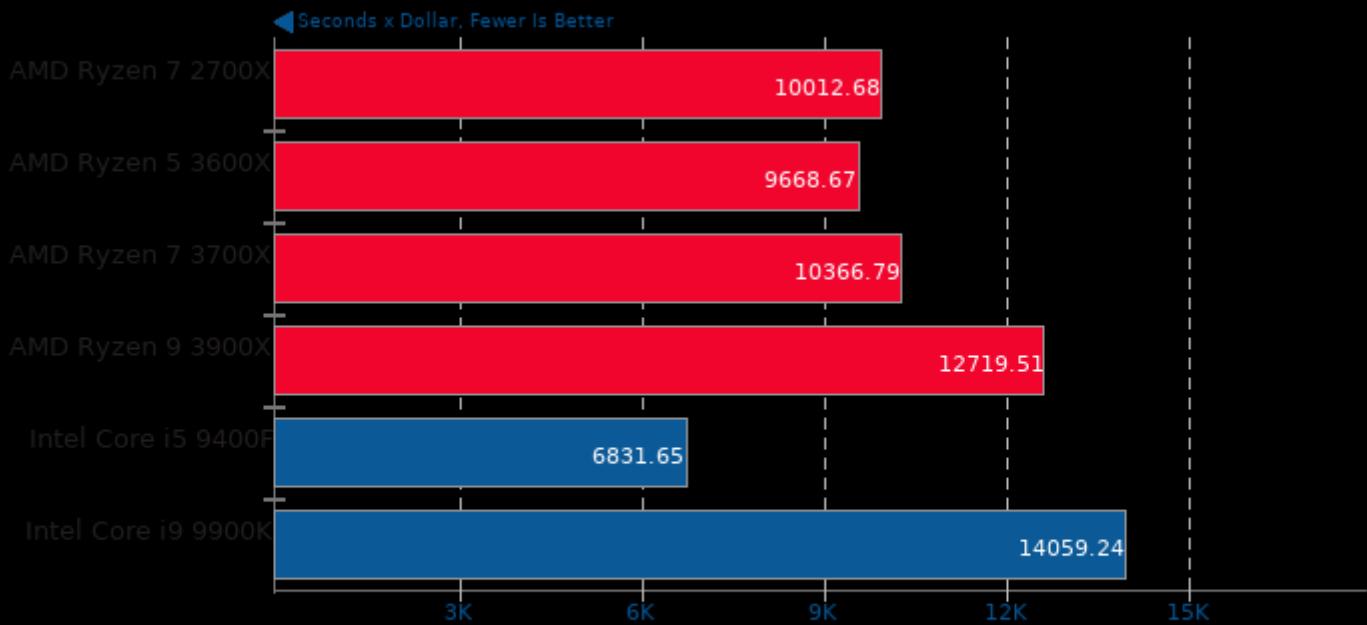
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

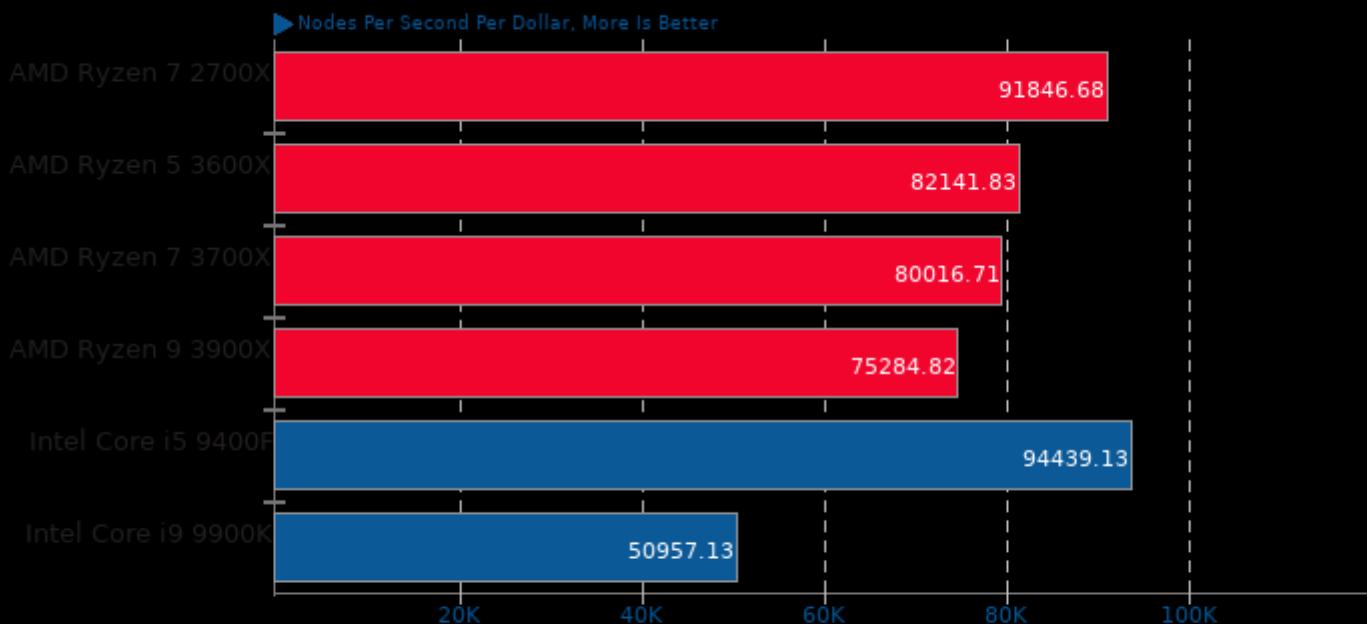
4. AMD Ryzen 9 3900X: \$499 reported cost.

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

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

## 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.

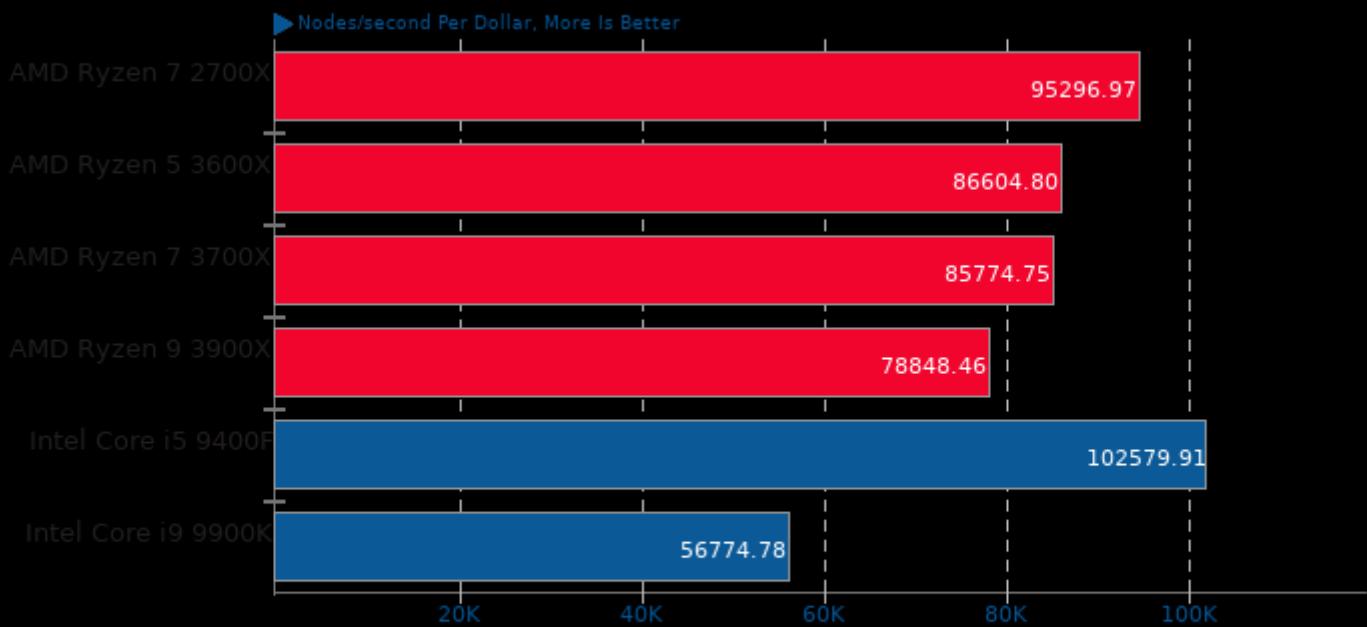
4. AMD Ryzen 9 3900X: \$499 reported cost.

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

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

## 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.

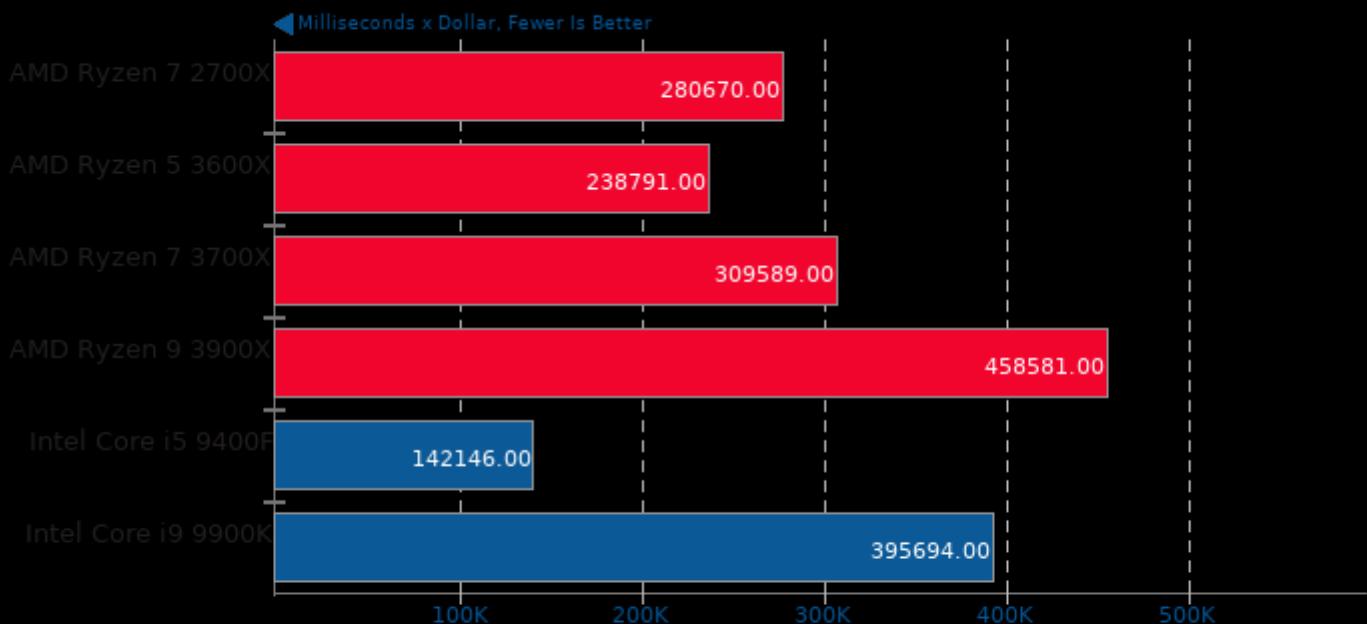
4. AMD Ryzen 9 3900X: \$499 reported cost.

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

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

## 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.

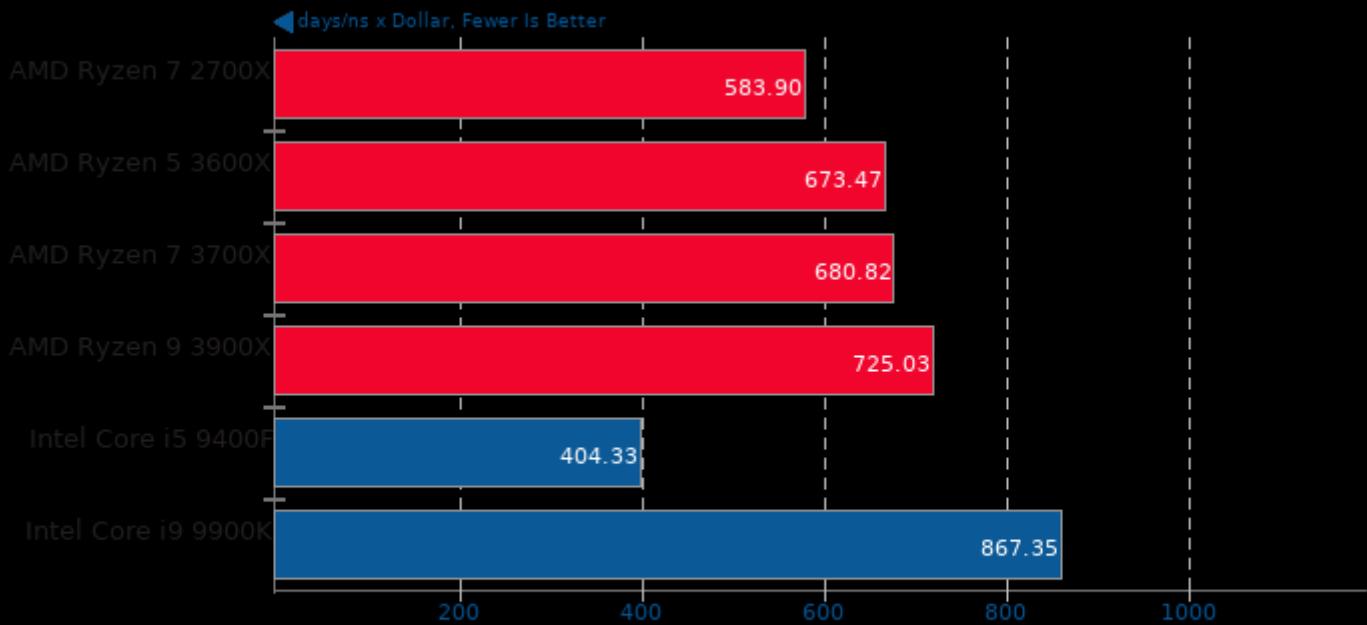
4. AMD Ryzen 9 3900X: \$499 reported cost.

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

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

## 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.

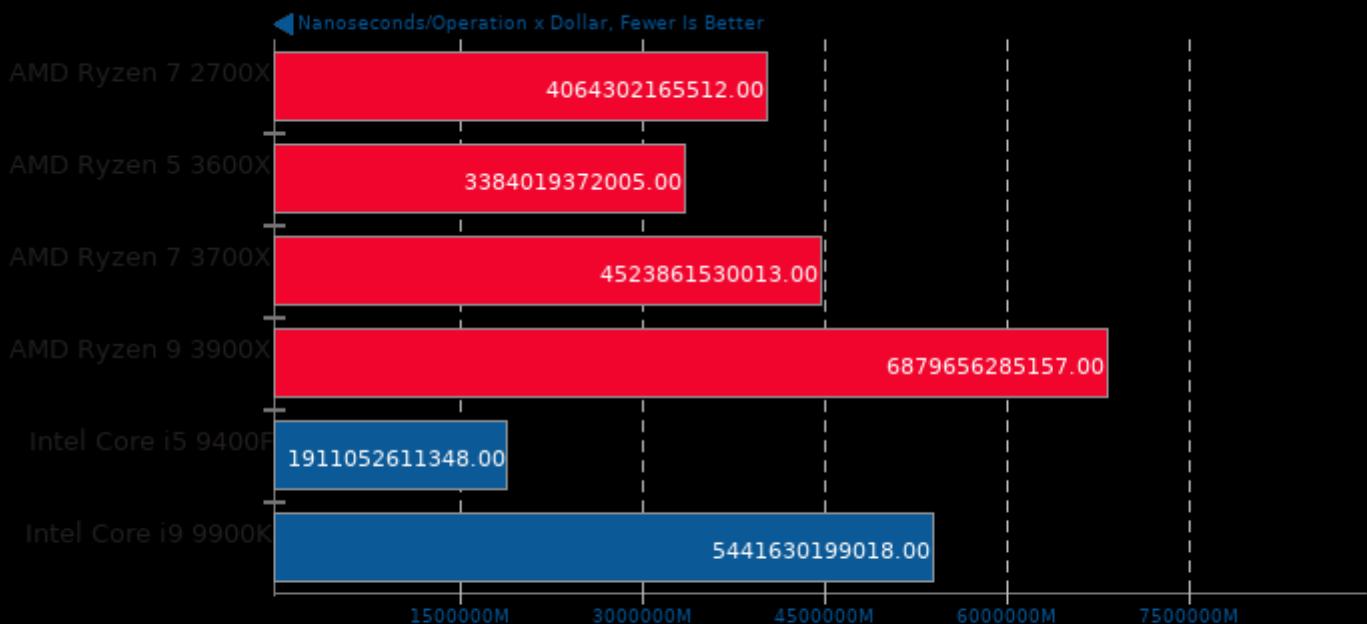
4. AMD Ryzen 9 3900X: \$499 reported cost.

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

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

## 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.

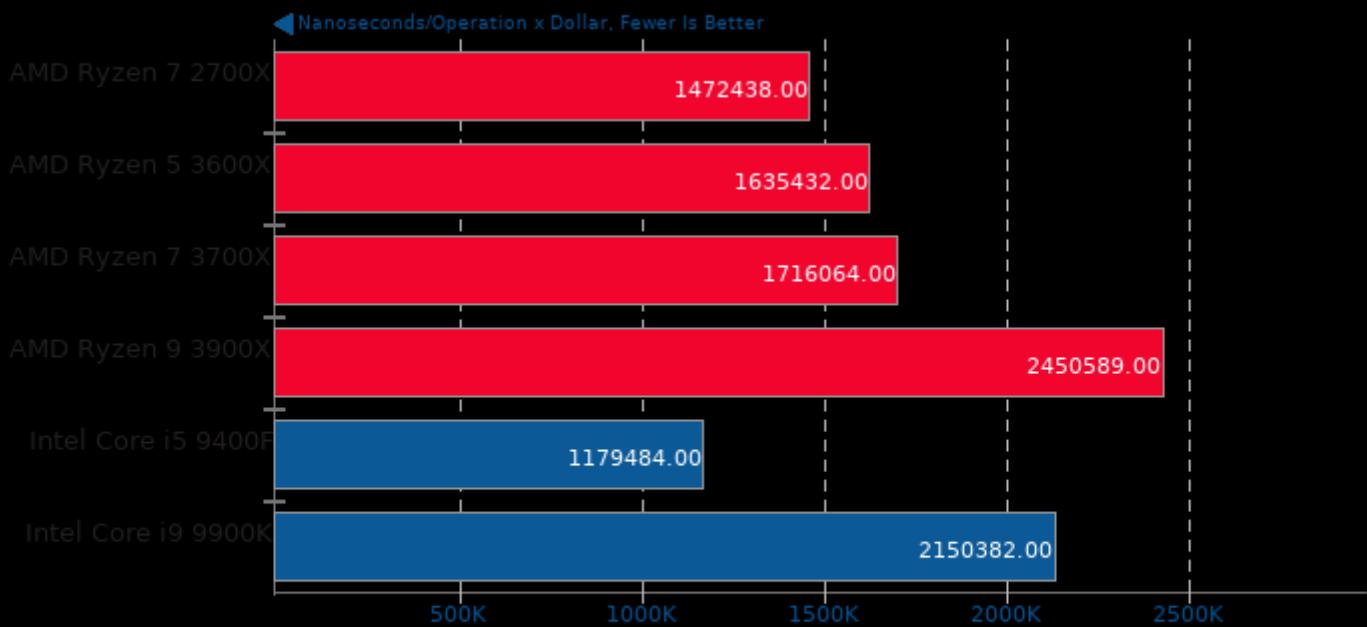
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

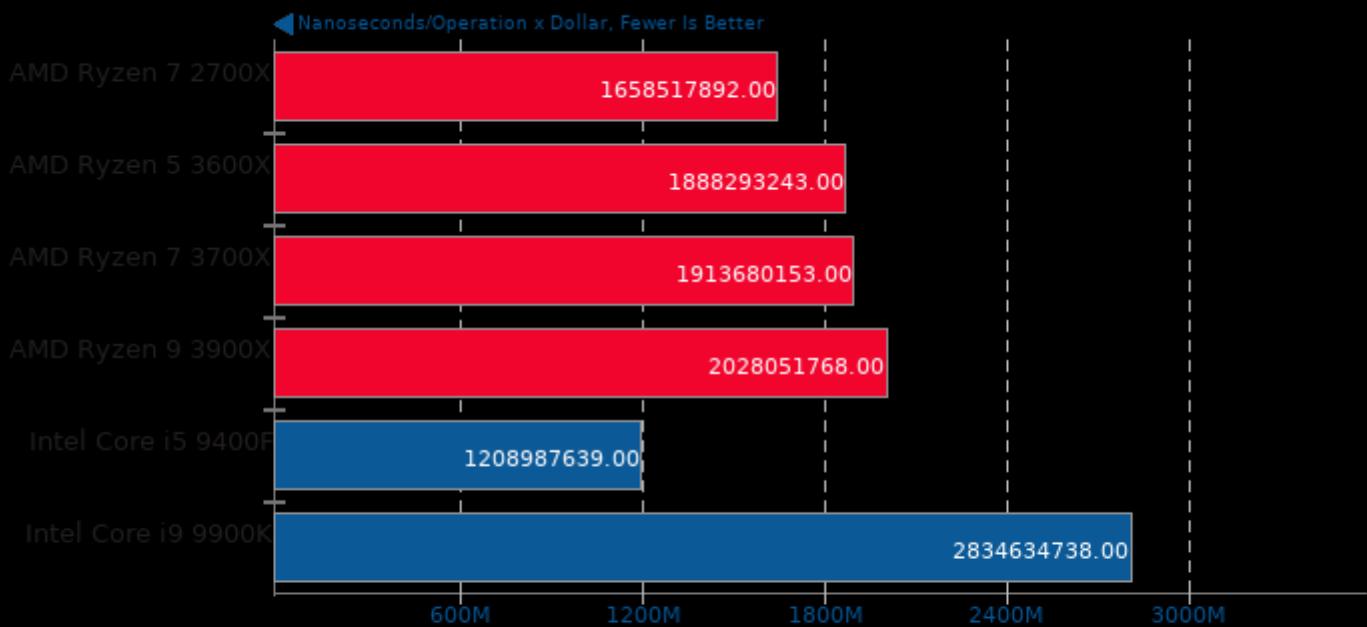
4. AMD Ryzen 9 3900X: \$499 reported cost.

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

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

## 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.

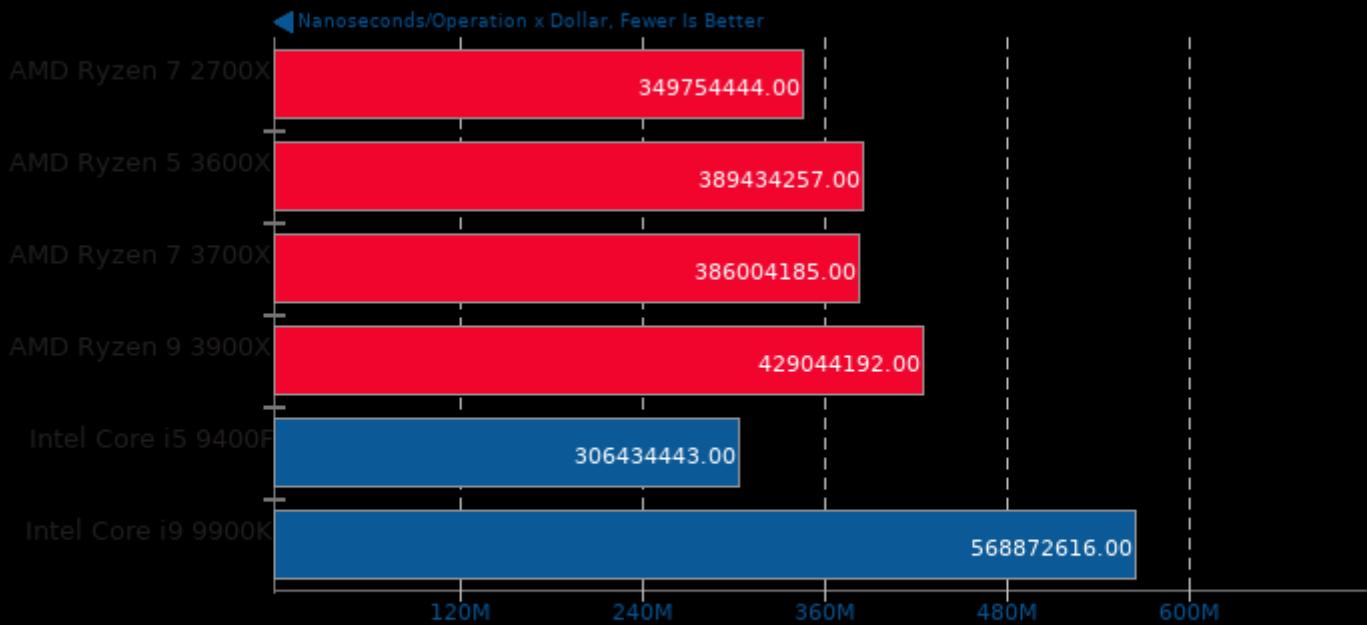
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

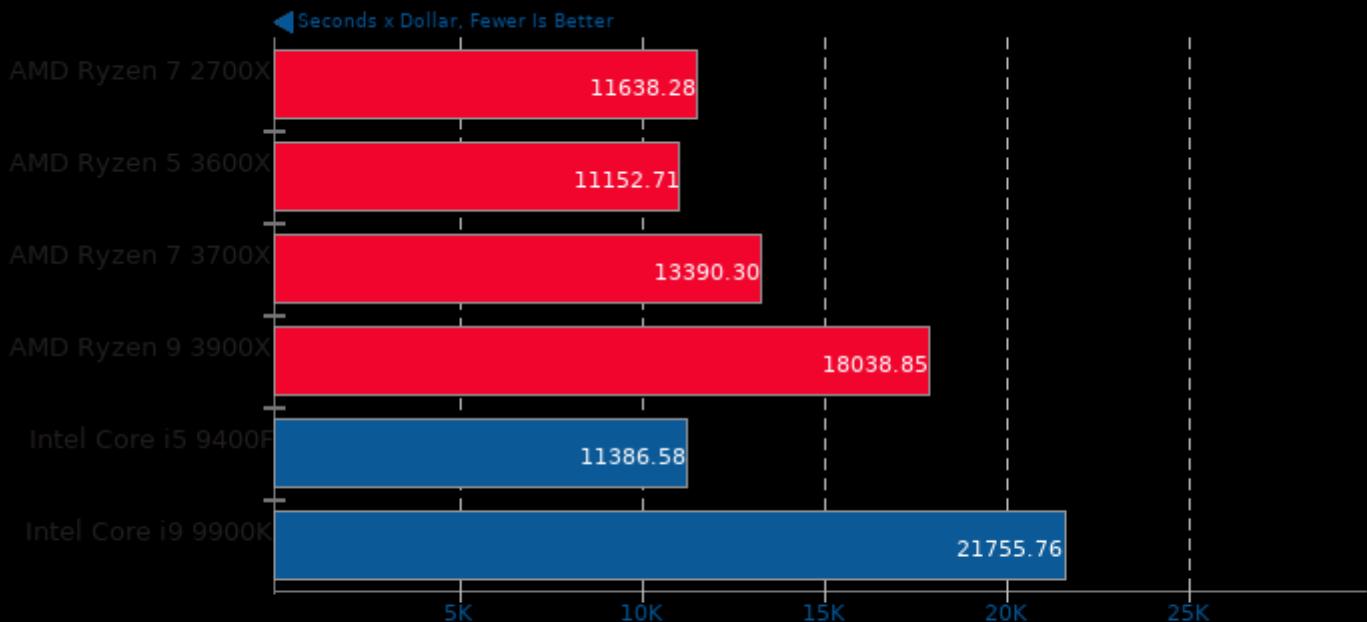
4. AMD Ryzen 9 3900X: \$499 reported cost.

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

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

## 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.

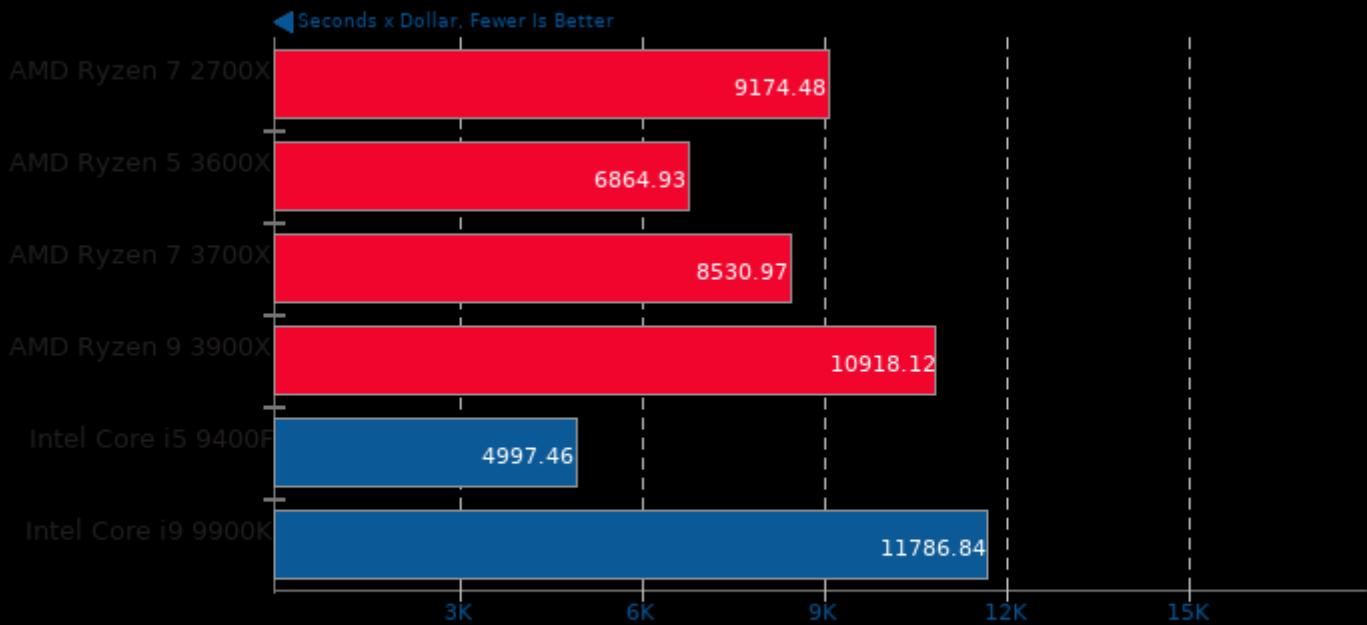
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

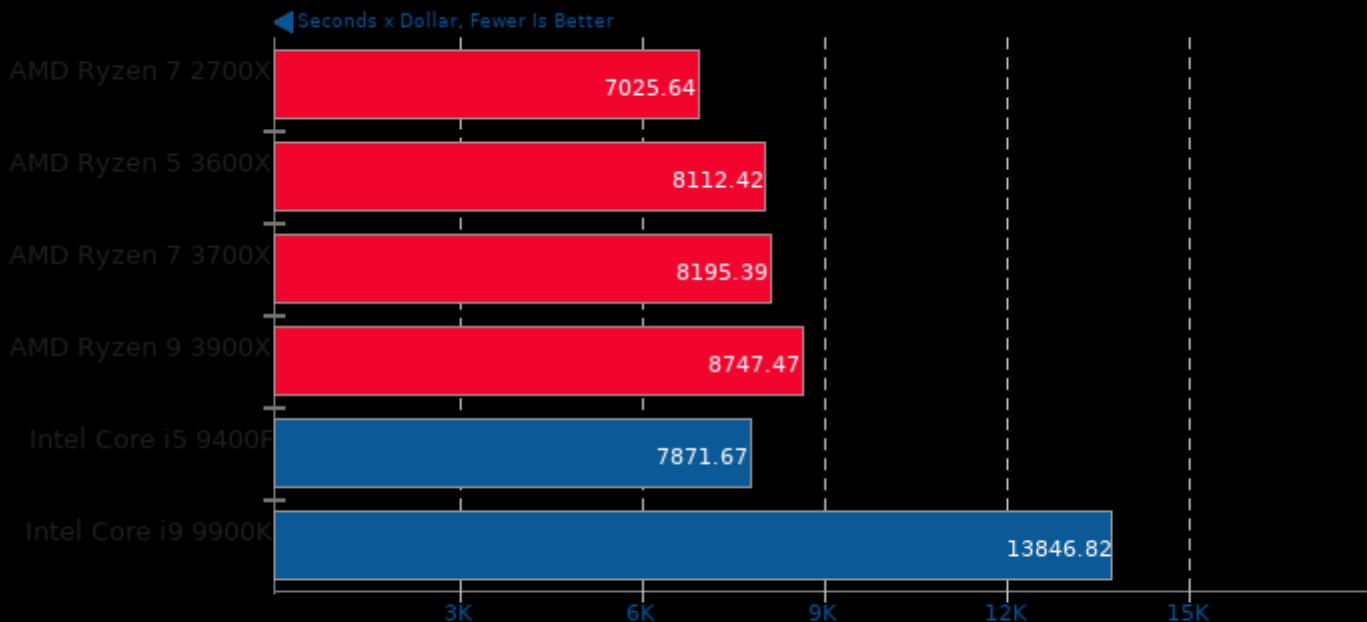
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

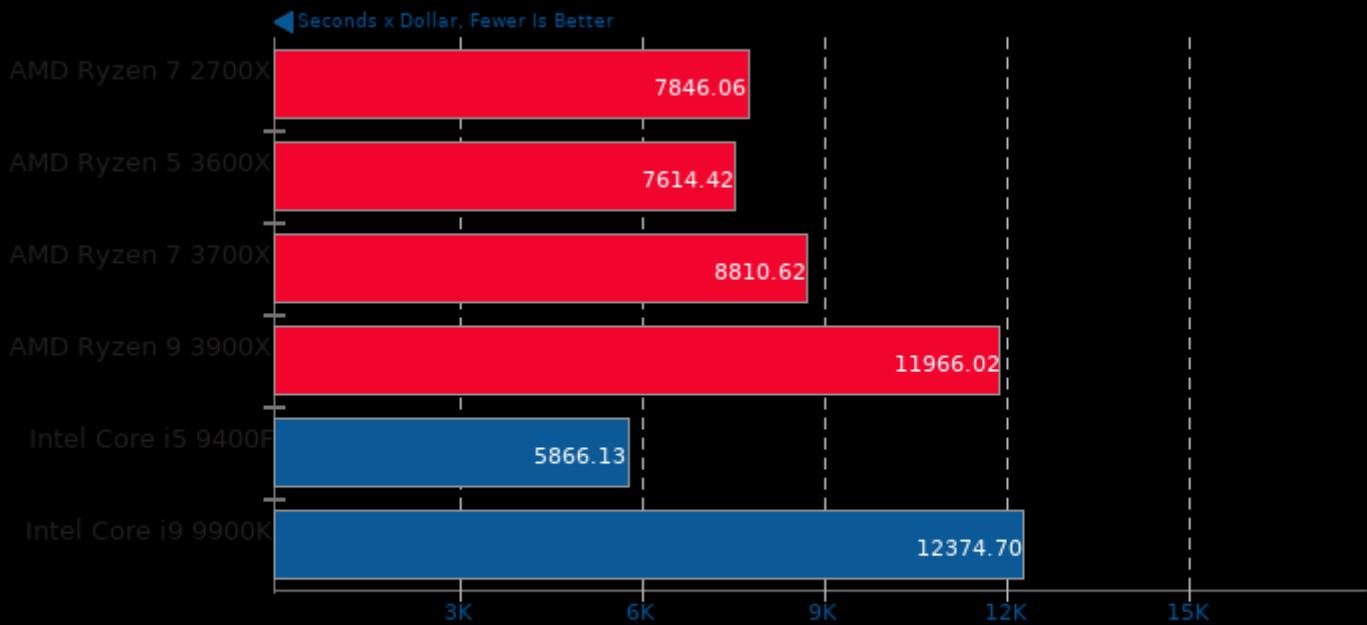
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

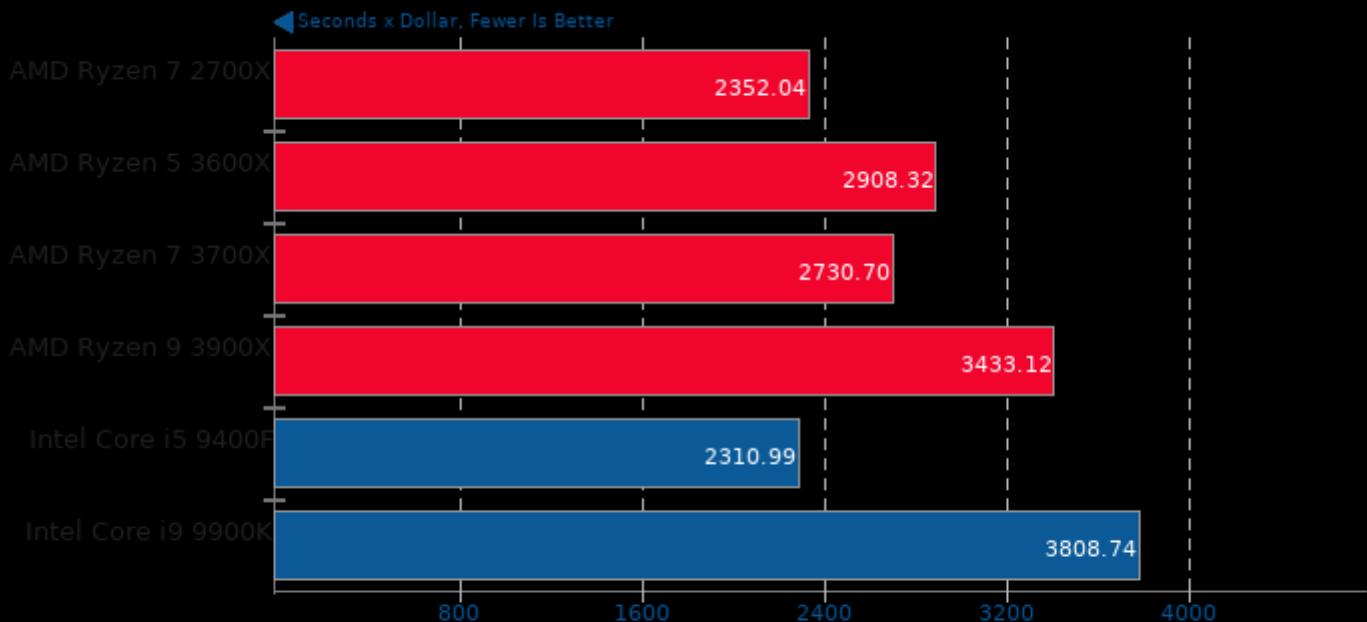
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

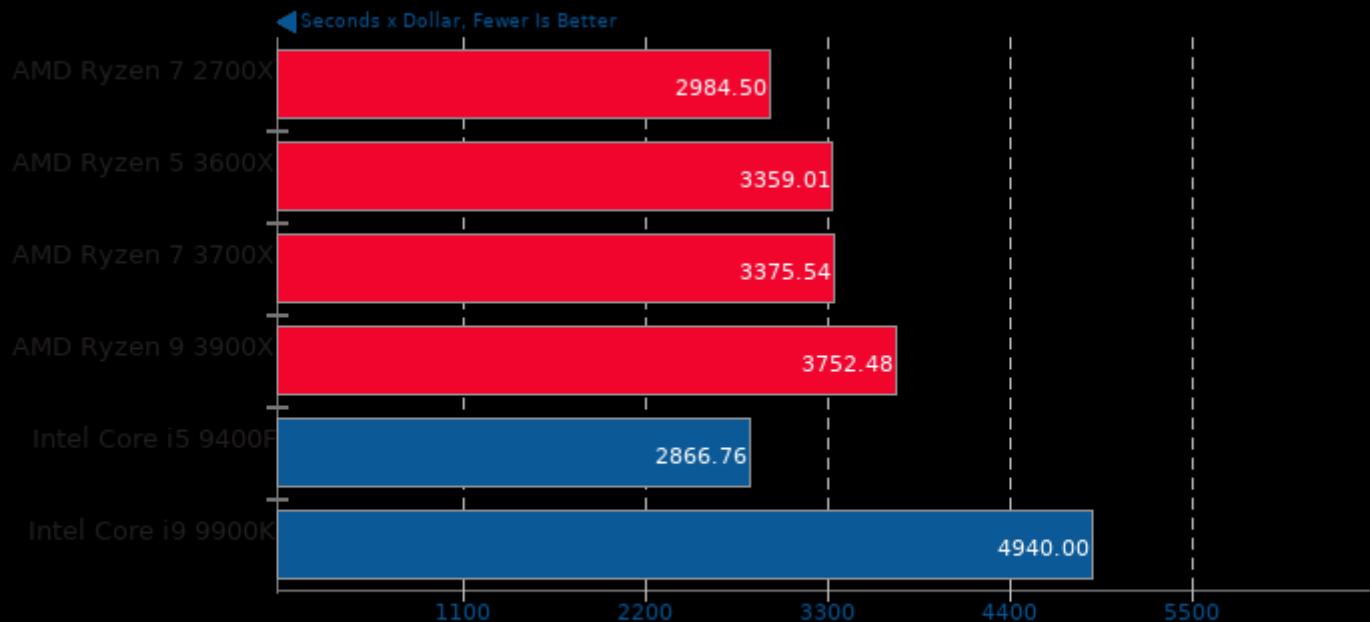
4. AMD Ryzen 9 3900X: \$499 reported cost.

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.

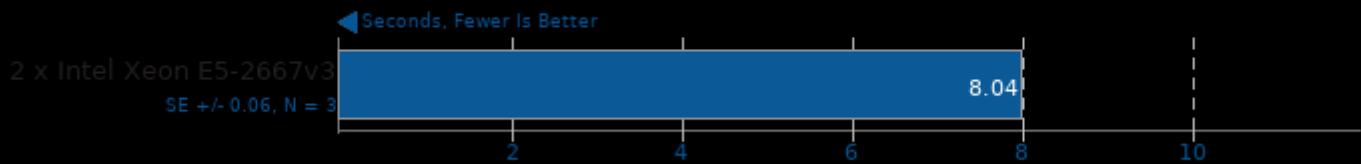
4. AMD Ryzen 9 3900X: \$499 reported cost.

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

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

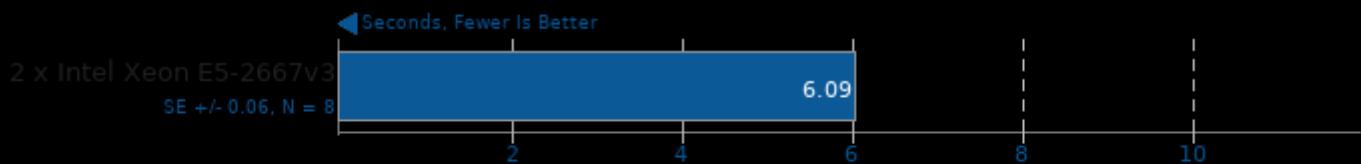
## Darktable 2.6.2

Test: Boat - Acceleration: CPU-only



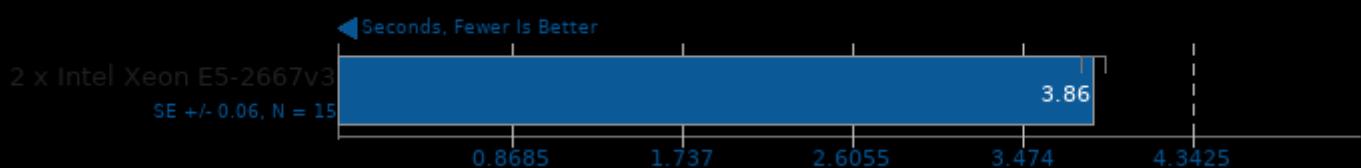
## Darktable 2.6.2

Test: Masskrug - Acceleration: CPU-only



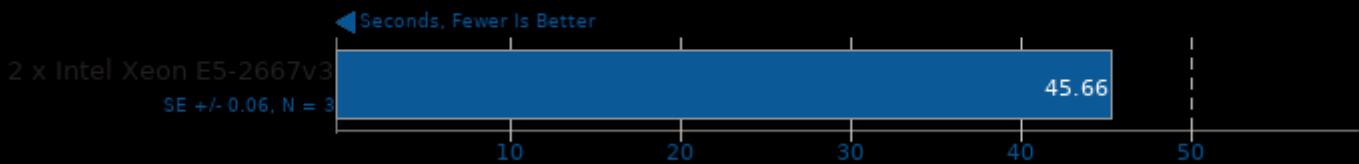
## Darktable 2.6.2

Test: Server Room - Acceleration: CPU-only

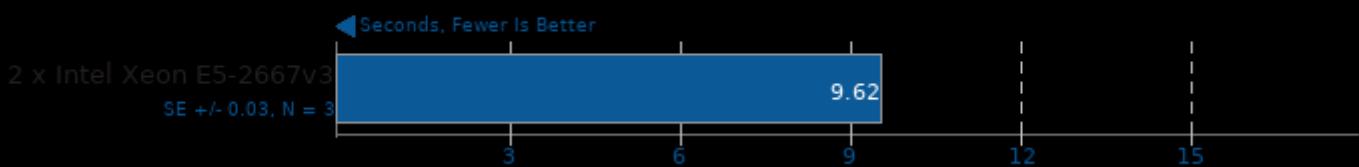


**GIMP 2.8.22**

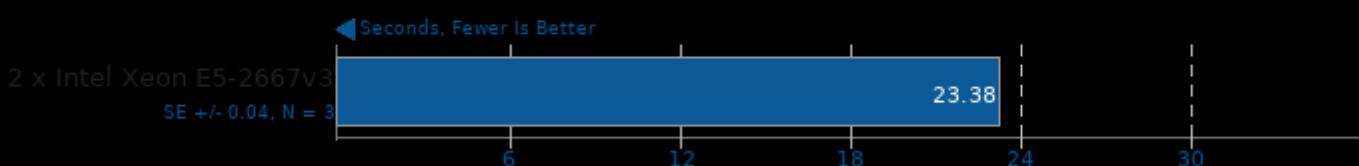
Test: unsharp-mask

**GIMP 2.8.22**

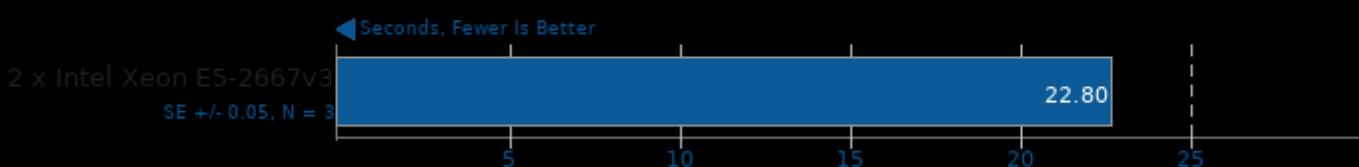
Test: resize

**GIMP 2.8.22**

Test: rotate

**GIMP 2.8.22**

Test: auto-levels



*This file was automatically generated via the Phoronix Test Suite benchmarking software on Friday, 29 March 2024 01:45.*