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# Large Intel AMD Linux CPU Benchmark Comparison

Large CPU comparison. Tests being worked on by Michael Larabel.

**Automated Executive Summary**

*2 x Xeon Gold 6138 had the most wins, coming in first place for 64% of the tests.*

*Based on the geometric mean of all complete results, the fastest (2 x Xeon Gold 6138) was 9.39x the speed of the slowest (A10-7800).*

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

*OpenSSL (RSA 4096-bit Performance) at 44.947x*
*Java JMH (Throughput) at 30.177x*
*POV-Ray (Trace Time) at 25.641x*
*NAS Parallel Benchmarks (Test / Class: EP.C) at 24.051x*
*C-Ray (Total Time) at 19.666x*
*John The Ripper (Test: Blowfish) at 16.794x*
*Timed Linux Kernel Compilation (Time To Compile) at 15.935x*
*Rodinia (Test: OpenMP LavaMD) at 15.653x*
*7-Zip Compression (Compress Speed Test) at 15.537x*
*Parboil (Test: OpenMP CUTCP) at 15.204x.*

# Test Systems:

## A10-7800

Processor: AMD A10-7800 Radeon R7 12 Compute Cores 4C+8G @ 3.50GHz (2 Cores / 4 Threads), Motherboard: MSI A78M-E35 (MS-7721) v6.0 (V30.1 BIOS), Chipset: AMD Family 15h, Memory: 7168MB, Disk: 500GB Western Digital WD5000AZRX-0 + 525GB SABRENT, Graphics: MSI AMD Radeon R7 1024MB, Audio: AMD Kaveri HDMI/DP, Monitor: DELL S2409W, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Server: Wayland, Display Driver: modesetting 1.19.5, OpenGL: 4.5 Mesa 17.2.4 (LLVM 5.0.0), Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: __user pointer sanitization + Full AMD retpoline Protection

## A10-7870K

Processor: AMD A10-7870K Radeon R7 12 Compute Cores 4C+8G @ 3.90GHz (2 Cores / 4 Threads), Motherboard: ASUS A88XM-E (2001 BIOS), Chipset: AMD Family 15h, Memory: 15360MB, Disk: 250GB Samsung SSD 850 + 525GB SABRENT, Graphics: ASUS AMD Radeon R7 1024MB, Audio: AMD Kaveri HDMI/DP, Monitor: VE228, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Server: Wayland, Display Driver: modesetting 1.19.5, OpenGL: 4.5 Mesa 17.2.4 (LLVM 5.0.0), Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: __user pointer sanitization + Full AMD retpoline Protection

## FX-8350

Processor: AMD FX-8350 Eight-Core @ 4.00GHz (4 Cores / 8 Threads), Motherboard: Gigabyte 970A-D3P (FB BIOS), Chipset: AMD RD9x0/RX980, Memory: 16384MB, Disk: 250GB Samsung SSD 850 + 525GB SABRENT, Graphics: HIS AMD Radeon HD 6450/7450/8450 / R5 230 OEM 1024MB, Audio: Realtek ALC892, Monitor: DELL S2409W, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Server: Wayland, Display Driver: modesetting 1.19.5, OpenGL: 3.3 Mesa 17.2.4 (LLVM 5.0.0), Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: __user pointer sanitization + Full AMD retpoline Protection

## Ryzen 3 1200

Processor: AMD Ryzen 3 1200 @ 3.10GHz (4 Cores), Motherboard: MSI B350M GAMING PRO (MS-7A39) v1.0 (2.90 BIOS), Chipset: AMD Device 1450, Memory: 8192MB, Disk: 525GB SABRENT + 120GB ADATA SU700, Graphics: AMD FirePro V3800 512MB, Audio: AMD Redwood HDMI Audio, Monitor: DELL S2409W, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Server: Wayland, Display Driver: modesetting 1.19.5, OpenGL: 3.3 Mesa 17.2.4 (LLVM 5.0.0), Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: __user pointer sanitization + Full AMD retpoline Protection

## Ryzen 3 1300X

Processor: AMD Ryzen 3 1300X @ 3.50GHz (4 Cores), Motherboard: ASRock AB350 Pro4 (P3.20 BIOS), Chipset: AMD Device 1450, Memory: 8192MB, Disk: 525GB SABRENT + 128GB ADATA SU800, Graphics: Sapphire AMD Radeon R7 260X/360 2048MB, Audio: AMD Tobago HDMI Audio, Monitor: VE228, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Server: Wayland, Display Driver: modesetting 1.19.5, OpenGL: 4.5 Mesa 17.2.4 (LLVM 5.0.0), Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: __user pointer sanitization + Full AMD retpoline Protection

## Ryzen 3 2200G

Processor: AMD Ryzen 3 2200G @ 3.50GHz (4 Cores), Motherboard: MSI X370 XPOWER GAMING TITANIUM (MS-7A31) v1.0 (1.C0 BIOS), Chipset: AMD Device 15d0, Memory: 14336MB, Disk: 525GB SABRENT + 525GB Crucial_CT525MX3 + 120GB Force MP500, Graphics: llvmpipe 14080MB, Audio: AMD Device 15de, Network: Intel I211 Gigabit Connection

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Driver: modesetting 1.19.5, OpenGL: 3.3 Mesa 18.1.0-devel- padoka PPA (LLVM 7.0 128 bits), Vulkan: 1.0.61, Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 3840x2160

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: __user pointer sanitization + Full AMD retpoline IBPB Protection

## Ryzen 5 2400G

Processor: AMD Ryzen 5 2400G @ 3.60GHz (4 Cores / 8 Threads), Motherboard: MSI X370 XPOWER GAMING TITANIUM (MS-7A31) v1.0 (1.C0 BIOS), Chipset: AMD Device 15d0, Memory: 14336MB, Disk: 525GB SABRENT + 525GB Crucial_CT525MX3 + 120GB Force MP500, Graphics: llvmpipe 14080MB, Audio: AMD Device 15de, Network: Intel I211 Gigabit Connection

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Driver: modesetting 1.19.5, OpenGL: 3.3 Mesa 18.1.0-devel- padoka PPA (LLVM 7.0 128 bits), Vulkan: 1.0.61, Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 3840x2160

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: __user pointer sanitization + Full AMD retpoline IBPB Protection

## Ryzen 7 1700

Processor: AMD Ryzen 7 1700 Eight-Core @ 3.00GHz (8 Cores / 16 Threads), Motherboard: MSI B350 TOMAHAWK (MS-7A34) v1.0 (1.90 BIOS), Chipset: AMD Device 1450, Memory: 16384MB, Disk: 525GB SABRENT + 120GB Samsung SSD 840, Graphics: llvmpipe 16128MB, Audio: AMD Cape Verde/Pitcairn, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Driver: modesetting 1.19.5, OpenGL: 3.3 Mesa 17.2.4 (LLVM 5.0 128 bits), Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 1280x1024

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: __user pointer sanitization + Full AMD retpoline Protection

## Ryzen 7 1800X

Processor: AMD Ryzen 7 1800X Eight-Core @ 3.60GHz (8 Cores / 16 Threads), Motherboard: MSI X370 XPOWER GAMING TITANIUM (MS-7A31) v1.0 (1.90 BIOS), Chipset: AMD Device 1450, Memory: 16384MB, Disk: 525GB SABRENT, Graphics: NV134 8192MB, Audio: NVIDIA GP104 HD Audio, Monitor: DELL P2415Q, Network: Intel I211 Gigabit Connection

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Server: Wayland, Display Driver: modesetting 1.19.5, OpenGL: 4.3 Mesa 17.2.4, Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 3840x2160

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: __user pointer sanitization + Full AMD retpoline Protection

## Threadripper 1950X

Processor: AMD Ryzen Threadripper 1950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: Gigabyte X399 AORUS Gaming 7 (F3g BIOS), Chipset: AMD Device 1450, Memory: 16384MB, Disk: 525GB SABRENT + 120GB Force MP500, Graphics: MSI AMD Radeon R7 370 / R9 270/370 OEM 4096MB, Audio: Realtek ALC1220, Monitor: VE228, Network: Qualcomm Atheros Device e0b1 + Intel Wireless 8265 / 8275

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Server: Wayland, Display Driver: modesetting 1.19.5, OpenGL: 4.5 Mesa 17.2.4 (LLVM 5.0.0), Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: __user pointer sanitization + Full AMD retpoline Protection

## EPYC 7601

Processor: AMD EPYC 7601 32-Core @ 2.20GHz (32 Cores / 64 Threads), Motherboard: TYAN B8026T70AE24HR (V0.05.B10 BIOS), Chipset: AMD Device 1450, Memory: 129024MB, Disk: 525GB SABRENT + 280GB INTEL SSDPE21D280GA, Graphics: ASPEED ASPEED Family, Monitor: VE228, Network: Broadcom Limited NetXtreme BCM5720 Gigabit PCIe

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Driver: modesetting 1.19.5, Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: __user pointer sanitization + Full AMD retpoline Protection

## Core i3 4130

Processor: Intel Core i3-4130 @ 3.40GHz (2 Cores / 4 Threads), Motherboard: Intel DH87RL (RLH8710H.86A.0317.2013.0426.1724 BIOS), Chipset: Intel 4th Gen Core DRAM, Memory: 1536MB, Disk: 128GB TOSHIBA THNSNH12 + 525GB SABRENT, Graphics: Intel Haswell 1536MB (1150MHz), Audio: Intel Xeon E3-1200 v3/4th, Monitor: DELL S2409W, Network: Intel Connection I217-V

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Server: Wayland, Display Driver: modesetting 1.19.5, OpenGL: 4.5 Mesa 17.2.4, Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: KPTI + __user pointer sanitization + Full generic retpoline Protection

## Core i3 7100

Processor: Intel Core i3-7100 @ 3.90GHz (2 Cores / 4 Threads), Motherboard: Gigabyte B250M-DS3H-CF (F1 BIOS), Chipset: Intel Xeon E3-1200 v6/7th + B250, Memory: 8192MB, Disk: 250GB Western Digital WDS250G1B0A- + 525GB SABRENT, Graphics: Intel HD 630 3072MB (1100MHz), Audio: Realtek ALC887-VD, Monitor: DELL S2409W, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Server: Wayland, Display Driver: modesetting 1.19.5, OpenGL: 4.5 Mesa 17.2.4, Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: KPTI + __user pointer sanitization + Full generic retpoline Protection

## Core i3 8100

Processor: Intel Core i3-8100 @ 3.60GHz (4 Cores), Motherboard: ASRock Z370M-ITX/ac (P1.20 BIOS), Chipset: Intel Device 3e1f, Memory: 8192MB, Disk: 525GB SABRENT + 60GB DREVO X1 SSD, Graphics: Intel HD 3072MB (1100MHz), Audio: Realtek ALC892, Monitor: DELL S2409W, Network: Intel Connection + Intel Device 24fb

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Server: Wayland, Display Driver: modesetting 1.19.5, OpenGL: 4.5 Mesa 17.2.4, Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: KPTI + __user pointer sanitization + Full generic retpoline Protection

## Core i5 3470

Processor: Intel Core i5-3470 @ 3.60GHz (4 Cores), Motherboard: ECS H61H2-I3 v1.0 (4.6.5 BIOS), Chipset: Intel Xeon E3-1200 v2/3rd, Memory: 4096MB, Disk: 120GB Samsung SSD 850 + 525GB SABRENT, Graphics: Intel Ivybridge Desktop 1536MB (1100MHz), Audio: VIA VT1705, Monitor: DELL S2409W, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Server: Wayland, Display Driver: modesetting 1.19.5, OpenGL: 4.2 Mesa 17.2.4, Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: KPTI + __user pointer sanitization + Full generic retpoline Protection

## Core i5 4670

Processor: Intel Core i5-4670 @ 3.80GHz (4 Cores), Motherboard: MSI B85M-P33 (MS-7817) v1.0 (V4.5 BIOS), Chipset: Intel 4th Gen Core DRAM, Memory: 8192MB, Disk: 63GB SanDisk SDSSDP06 + 525GB SABRENT, Graphics: Intel Haswell Desktop 1536MB (1200MHz), Audio: Intel Xeon E3-1200 v3/4th, Monitor: DELL S2409W, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Server: Wayland, Display Driver: modesetting 1.19.5, OpenGL: 4.5 Mesa 17.2.4, Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: KPTI + __user pointer sanitization + Full generic retpoline Protection

## Core i5 6500

Processor: Intel Core i5-6500 @ 3.60GHz (4 Cores), Motherboard: Gigabyte Z170M-D3H-CF (F3 BIOS), Chipset: Intel Skylake, Memory: 8192MB, Disk: 250GB Samsung SSD 850 + 525GB SABRENT, Graphics: Intel HD 530 3072MB (1050MHz), Audio: Realtek ALC892, Monitor: DELL S2409W, Network: Intel Connection

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Server: Wayland, Display Driver: modesetting 1.19.5, OpenGL: 4.5 Mesa 17.2.4, Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: KPTI + __user pointer sanitization + Full generic retpoline Protection

## Core i5 6600K

Processor: Intel Core i5-6600K @ 3.90GHz (4 Cores), Motherboard: MSI Z170A GAMING PRO (MS-7984) v1.0 (1.00 BIOS), Chipset: Intel Skylake, Memory: 15360MB, Disk: 525GB SABRENT + 256GB TS256GSSD370S, Graphics: Intel HD 530 3072MB (1150MHz), Audio: Realtek ALC1150, Monitor: Acer B286HK, Network: Intel Connection

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Driver: modesetting 1.19.5, OpenGL: 4.5 Mesa 18.1.0-devel- padoka PPA, Vulkan: 1.0.61, Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: KPTI + __user pointer sanitization + Full generic retpoline Protection

# Large Intel AMD Linux CPU Benchmark Comparison

## Core i5 7600K

Processor: Intel Core i5-7600K @ 4.20GHz (4 Cores), Motherboard: Gigabyte Z270M-D3H-CF (F1 BIOS), Chipset: Intel Device 591f + Z270, Memory: 8192MB, Disk: 250GB Samsung SSD 850 + 525GB SABRENT, Graphics: Intel HD 630 3072MB (1150MHz), Audio: Realtek ALC892, Monitor: DELL S2409W, Network: Intel Connection

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Server: Wayland, Display Driver: modesetting 1.19.5, OpenGL: 4.5 Mesa 17.2.4, Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: KPTI + __user pointer sanitization + Full generic retpoline Protection

## Core i5 8400

Processor: Intel Core i5-8400 @ 4.00GHz (6 Cores), Motherboard: MSI Z370M MORTAR (MS-7B54) v1.0 (1.10 BIOS), Chipset: Intel Device 3ec2, Memory: 8192MB, Disk: 525GB SABRENT + 128GB ADATA SX6000NP, Graphics: Intel HD 3072MB (1050MHz), Audio: Realtek ALC892, Monitor: DELL S2409W, Network: Intel Connection

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Server: Wayland, Display Driver: modesetting 1.19.5, OpenGL: 4.5 Mesa 17.2.4, Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: KPTI + __user pointer sanitization + Full generic retpoline Protection

## Core i7 4770K

Processor: Intel Core i7-4770K @ 3.90GHz (4 Cores / 8 Threads), Motherboard: Gigabyte Z97-HD3 (F10c BIOS), Chipset: Intel 4th Gen Core DRAM, Memory: 8192MB, Disk: 128GB Crucial_CT128MX1 + 525GB SABRENT, Graphics: Intel Haswell Desktop 1536MB (1250MHz), Audio: Intel Xeon E3-1200 v3/4th, Monitor: DELL S2409W, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Server: Wayland, Display Driver: modesetting 1.19.5, OpenGL: 4.5 Mesa 17.2.4, Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: KPTI + __user pointer sanitization + Full generic retpoline Protection

## Core i7 5960X

Processor: Intel Core i7-5960X @ 3.50GHz (8 Cores / 16 Threads), Motherboard: ASRock X99 Extreme3 (P3.50 BIOS), Chipset: Intel Xeon E7 v3/Xeon, Memory: 16384MB, Disk: 120GB INTEL SSDSC2BW12 + 525GB SABRENT, Graphics: AMD FirePro V7900 2048MB, Audio: Realtek ALC1150, Monitor: DELL S2409W, Network: Intel Connection

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Server: Wayland, Display Driver: modesetting 1.19.5, OpenGL: 4.1 Mesa 17.2.4 (LLVM 5.0.0), Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: KPTI + __user pointer sanitization + Full generic retpoline Protection

## Core i7 7740X

Processor: Intel Core i7-7740K @ 4.50GHz (4 Cores / 8 Threads), Motherboard: Gigabyte X299 AORUS Gaming-CF (F2d BIOS), Chipset: Intel Device 591f, Memory: 8192MB, Disk: 525GB SABRENT + 120GB Force MP500, Graphics: llvmpipe 7936MB, Audio: Realtek ALC1220, Monitor: VE228, Network: Intel Connection

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Server: Wayland, Display Driver: modesetting 1.19.5, OpenGL: 3.3 Mesa 17.2.4 (LLVM 5.0 256 bits), Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: KPTI + __user pointer sanitization + Full generic retpoline Protection

## Core i7 8700K

Processor: Intel Core i7-8700K @ 4.70GHz (6 Cores / 12 Threads), Motherboard: ASUS PRIME Z370-A (0606 BIOS), Chipset: Intel Device 3ec2, Memory: 16384MB, Disk: 525GB SABRENT + 525GB Crucial_CT525MX3 + Samsung SSD 950 PRO 256GB, Graphics: MSI AMD Radeon RX 580 8192MB, Audio: Realtek ALC1220, Monitor: DELL P2415Q, Network: Intel Connection

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Server: Wayland, OpenGL: 4.5 Mesa 17.2.4 (LLVM 5.0.0), Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 3840x2160

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: KPTI + __user pointer sanitization + Full generic retpoline Protection

## Core i9 7980XE

Processor: Intel Core i9-7980XE @ 4.40GHz (18 Cores / 36 Threads), Motherboard: ASUS PRIME X299-A (1004 BIOS), Chipset: Intel Device 2020, Memory: 16384MB, Disk: 525GB SABRENT + 256GB INTEL SSDPEKKW256G8,

Graphics: NV117 1024MB, Audio: Realtek ALC1220, Monitor: Acer B286HK, Network: Intel Connection

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Server: Wayland, OpenGL: 4.3 Mesa 17.2.4, Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 3840x2160

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: KPTI + __user pointer sanitization + Full generic retpoline Protection

## Xeon Silver 4108

Processor: Intel Xeon Silver 4108 @ 3.00GHz (8 Cores / 16 Threads), Motherboard: TYAN S7100AG2NR (V3.00 BIOS), Chipset: Intel Device 2020, Memory: 23552MB, Disk: 525GB SABRENT + 240GB Force MP500, Graphics: ASPEED ASPEED Family, Audio: Realtek ALC892, Monitor: VE228, Network: Intel I350 Gigabit Connection

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Driver: modesetting 1.19.5, Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: KPTI + __user pointer sanitization + Full generic retpoline Protection

## 2 x Xeon Gold 6138

Processor: 2 x Intel Xeon Gold 6138 @ 3.70GHz (40 Cores / 80 Threads), Motherboard: TYAN S7106 (V1.00 BIOS), Chipset: Intel Device 2020, Memory: 96256MB, Disk: 525GB SABRENT + 256GB Samsung SSD 850 + 2000GB Seagate ST2000DM006-2DM1 + 2 x 120GB TOSHIBA-TR150, Graphics: ASPEED ASPEED Family, Monitor: VE228, Network: Intel I210 Gigabit Connection

OS: Ubuntu 17.10, Kernel: 4.15.2-041502-generic (x86_64), Desktop: GNOME Shell 3.26.2, Display Driver: modesetting 1.19.5, Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: KPTI + __user pointer sanitization + Full generic retpoline Protection

## t2.2xlarge

Processor: Intel Xeon E5-2676 v3 @ 2.39GHz (8 Cores), Motherboard: Xen HVM domU (4.2.amazon BIOS), Chipset: Intel 440FX- 82441FX PMC, Memory: 32768MB, Disk: 28GB, Graphics: Cirrus Logic GD 5446

OS: Ubuntu 16.04, Kernel: 4.4.0-1050-aws (x86_64), Compiler: GCC 5.4.0 20160609, File-System: ext4, System Layer: Xen HVM domU 4.2.amazon

Compiler Notes: --build=x86_64-linux-gnu --disable-browser-plugin --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu

# Large Intel AMD Linux CPU Benchmark Comparison

--enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,ada,c++,java,go,d,fortran,objc,obj-c++ --enable-libmpx --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-arch-directory=amd64 --with-default-libstdcxx-abi=new --with-multilib-list=m32,m64,mx32 --with-tune=generic -v
Python Notes: Python 2.7.12 + Python 3.5.2
Security Notes: KPTI Protection

| | A10-7800 | A10-7870K | FX-8350 | Ryzen 3 1200 | Ryzen 3 1300X | Ryzen 3 2200G | Ryzen 5 2400G | Ryzen 7 1700 | Ryzen 7 1800X | Threadripper 1950X | EPYC 7601 | Core i3 4130 | Core i3 7100 | Core i3 8100 | Core i5 3470 | Core i5 4670 | Core i5 6500 | Core i5 6600K | Core i5 7600K | Core i5 8400 | Core i7 4770K | Core i7 5960X | Core i7 7740X | Core i7 8700K | Core i9 7980XE | Xeon Silver 4108 | 2 x Xeon Gold 6138 | t2.2xlarge |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| x264 - H.2.V.E (FPS) | 15.61 | 17.58 | 30.58 | 23.47 | 27.33 | 27.60 | 34.75 | 60.90 | 71.46 | 127.00 | 108.07 | 15.47 | 23.89 | 30.52 | 19.83 | 28.16 | 28.67 | 33.11 | 33.69 | 56.11 | 37.64 | 58.01 | 49.95 | 72.96 | 12.28 | 32.75 | 10.89 | 38.43 |
| Normalized | 12.29% | 13.84% | 24.08% | 18.48% | 21.52% | 21.73% | 27.36% | 47.95% | 56.27% | 100% | 85.09% | 12.18% | 18.81% | 23.95% | 15.61% | 22.17% | 22.42% | 26.07% | 26.37% | 44.18% | 29.64% | 45.68% | 39.33% | 57.45% | 98.65% | 25.79% | 84.95% | 30.26% |
| Standard Deviation | 0.1% | 0% | 0.2% | 3.4% | 0.2% | 0.1% | 3.3% | 3.3% | 0.5% | 0.6% | 0.7% | 0.3% | 0.2% | 3.3% | 18.4% | 3.4% | 0.4% | 0.2% | 0.1% | 0.2% | 0.1% | 0.6% | 0.6% | 0.5% | 0.4% | 0.7% | 2.5% | 0.1% |
| OpenSSL - R.4.b.P (Signs/sec) | 29.73 | 33.70 | 70.20 | | 71.53 | 73.20 | 79.80 | 13.80 | 15.93 | 30.21 | 45.67 | 30.97 | 59.13 | 10.43 | 49.23 | 64.10 | 94.73 | 11.43 | 11.48 | 16.71 | 68.30 | 12.03 | 13.13 | 19.80 | 46.95 | 12.85 | 78.58 | 17.83 |
| Normalized | 3.8% | 4.3% | 8.9% | | 9.0% | 9.3% | 10.1% | 17.56% | 20.27% | 38.45% | 58.12% | 3.9% | 7.6% | 13.27% | 6.3% | 8.2% | 12% | 14.55% | 14.61% | 21.27% | 8.7% | 15.3% | 16.71% | 25.19% | 59.75% | 16.36% | 10% | 2.2% |
| Standard Deviation | 1% | 0.5% | 0.1% | | 6.4% | 1.1% | 2.1% | 0.1% | 0.1% | 0.2% | 0.9% | 0% | 0.3% | 2.2% | 4% | 0.2% | 2.3% | 0% | 2.8% | 0% | 0.1% | 0% | 2.7% | 0.1% | 0.2% | 0.3% | 0.6% | 1.4% |

# Large Intel AMD Linux CPU Benchmark Comparison

Phoronix Test Suite

| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Java JMH - Throughput (Ops/s)** | **34 87 05 99 08** | 38 94 12 39 75 | 80 56 29 69 46 | 61 74 07 80 43 | 71 69 11 09 74 | 73 85 10 71 72 | 74 05 45 34 45 | 12 78 36 88 16 7 | 14 78 08 54 84 1 | 27 82 59 81 93 1 | 41 83 06 58 06 4 | 67 39 70 82 81 | 77 90 12 93 36 | 14 38 23 33 76 5 | 12 39 11 66 25 2 | 14 33 72 75 79 5 | 13 18 76 79 15 0 | 15 58 20 92 81 1 | 15 98 35 91 76 4 | 22 77 54 63 20 1 | 15 49 91 95 57 9 | 26 23 08 88 03 5 | 17 92 08 02 34 4 | 25 75 62 00 60 8 | 61 04 24 10 55 6 | 16 74 16 24 53 1 | **10 52 30 02 79 22** | 42 17 43 10 39 |
| **Normalized** | 3.3 1% | 3.7 % | 7.6 6% | 5.8 7% | 6.8 1% | 7.0 2% | 7.0 4% | 12. 15 % | 14. 05 % | 26. 44 % | 39. 75 % | 6.4 % | 7.4 % | 13. 67 % | 11. 78 % | 13. 62 % | 12. 53 % | 14. 81 % | 15. 19 % | 21. 64 % | 14. 73 % | 24. 93 % | 17. 03 % | 24. 48 % | 58. 01 % | 15. 91 % | 10 0% | 4.0 1% |
| **Timed MAFFT Alignment - M.S.A (sec)** | **11 .9 6** | 10 .4 0 | 5. 92 | 7. 25 | 5. 99 | 6. 27 | 5. 73 | 4. 26 | 3. 65 | 3. 13 | 4. 69 | 10 .4 5 | 7. 85 | 5. 71 | 6. 93 | 5. 85 | 6. 32 | 5. 36 | 5. 42 | 3. 68 | 4. 88 | 3. 54 | 3. 97 | | **3. 04** | 5. 46 | 10 .1 5 | 4. 26 |
| **Normalized** | 25. 42 % | 29. 23 % | 51. 35 % | 41. 93 % | 50. 75 % | 48. 48 % | 53. 05 % | 71. 36 % | 83. 29 % | 97. 12 % | 64. 82 % | 29. 09 % | 38. 73 % | 53. 24 % | 43. 87 % | 51. 97 % | 48. 1% % | 56. 72 % | 56. 09 % | 82. 61 % | 62. 3% % | 85. 88 % | 76. 57 % | | 10 0% | 55. 68 % | 29. 95 % | 71. 36 % |
| **Standard Deviation** | 2% | 7.5 % | 1.3 % | 0.4 % | 4.8 % | 5% | 4.3 % | 3.1 % | 0.9 % | 4% | 4.1 % | 3.7 % | 0.2 % | 6.4 % | 0.8 % | 6.8 % | 3.4 % | 3.9 % | 1% | 4.7 % | 4.4 % | 3.1 % | 8.7 % | | | 3.8 % | 3.3 % | 0.6 % |
| **POV-Ray - Trace Time (sec)** | 27 0. 86 | 24 2. 07 | 13 4. 01 | 18 1. 19 | 15 6. 29 | 15 3. 63 | 10 7. 39 | 64 .4 0 | 56 .2 1 | 30 .3 0 | **21 .9 7** | 26 7. 70 | 20 0. 73 | 13 9. 02 | 22 8. 83 | 14 7. 13 | 14 9. 84 | 12 6. 84 | 12 5. 90 | 87 .9 4 | 13 1. 09 | 70 .2 7 | 87 .9 4 | 60 .9 6 | 32 .7 5 | 19 5. 83 | 25 .7 0 | **56 3. 33** |
| **Normalized** | 8.1 1% | 9.0 8% | 16. 39 % | 12. 13 % | 14. 06 % | 14. 3% % | 20. 46 % | 34. 11 % | 39. 09 % | 72. 51 % | 10 0% | 8.2 1% | 10. 95 % | 15. 8% % | 9.6 % | 14. 93 % | 14. 66 % | 17. 32 % | 17. 45 % | 24. 98 % | 16. 76 % | 31. 27 % | 24. 98 % | 36. 04 % | 67. 08 % | 11. 22 % | 85. 49 % | 3.9 % |
| **Standard Deviation** | 0.2 % | 0.1 % | 0.3 % | 0.1 % | 0.2 % | 0.4 % | 0.3 % | 0% | 0.1 % | 0.3 % | 0.6 % | 0.2 % | 0.1 % | 0.1 % | 2.5 % | 0.1 % | 0.1 % | 0.1 % | 0.9 % | 0.1 % | 0.2 % | 0.2 % | 0.1 % | 0.2 % | 0.6 % | 0.4 % | 17. 3% | 9% |
| **NAS Parallel Benchmarks - EP.C (Mop/s)** | **83 .1 1** | 92 .0 5 | 22 1. 13 | 12 2. 00 | 14 1. 62 | 14 4. 02 | 29 3. 90 | 48 9. 65 | 57 1. 10 | 10 90 | 16 23 | 14 3. 51 | 17 5. 07 | 20 2. 48 | 18 0. 13 | 19 8. 48 | 18 5. 67 | 21 9. 61 | 22 5. 62 | 32 1. 50 | 33 1. 54 | 56 4. 87 | 39 4. 63 | 57 7. 05 | 12 68 | 31 9. 97 | **19 99** | 14 6. 20 |
| **Normalized** | 4.1 6% | 4.6 1% | 11. 06 % | 6.1 % | 7.0 9% | 7.2 1% | 14. 7% % | 24. 5% % | 28. 57 % | 54. 55 % | 81. 18 % | 7.1 8% | 8.7 6% | 10. 13 % | 9.0 1% | 9.9 3% | 9.2 9% | 10. 99 % | 11. 29 % | 16. 08 % | 16. 59 % | 28. 26 % | 19. 74 % | 28. 87 % | 63. 42 % | 16. 01 % | 10 0% | 7.3 1% |
| **Standard Deviation** | 1.8 % | 0.3 % | 1.6 % | 0.5 % | 0.1 % | 0.3 % | 1% | 2.5 % | 0.4 % | 0.5 % | 0.6 % | 1.1 % | 0.8 % | 0.3 % | 0.4 % | 0.2 % | 0.1 % | 0.1 % | 0.2 % | 0.1 % | 1% | 0.2 % | 1.1 % | 0.6 % | 0.9 % | 0.4 % | 1.1 % | 0.1 % |

# Large Intel AMD Linux CPU Benchmark Comparison

Phoronix Test Suite

| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NGINX Benchmark - S.W.P.S (Reqs/sec)** | 19113963 | 21359095 | 19628045 | 29145082 | 32633496 | 33621900 | 33450804 | 29820078 | 32960519 | 31190220 | 24026575 | 20657531 | 36751276 | 36311767 | 20762244 | 35672200 | 34800423 | 39234033 | 40485353 | 40537445 | 36374547 | 28457606 | 45476091 | 44918421 | 42841067 | 31670995 | 30957609 | 18175 |
| **Normalized** | 42.03% | 46.97% | 43.16% | 64.09% | 71.76% | 73.93% | 73.55% | 65.57% | 72.49% | 68.6% | 52.82% | 45.42% | 80.83% | 79.85% | 45.65% | 78.44% | 76.52% | 86.27% | 89.02% | 89.13% | 79.98% | 62.58% | 100% | 98.77% | 94.21% | 69.64% | 68.08% | 39.97% |
| **Standard Deviation** | 0.7% | 1.1% | 0.5% | 1.7% | 0.2% | | | 1.2% | 0.1% | 0.5% | 0.8% | 3% | 0.4% | 0.6% | 0.2% | 0.2% | 0.5% | 0.8% | 1.6% | 0.5% | 0.4% | 2.4% | 1.1% | 3.3% | 2% | 0.3% | 0.9% | 7.6% |
| **PyBench - T.F.A.T.T (Milliseconds)** | 22642 | 20284 | 20486 | 16558 | 14983 | 15471 | 14589 | 15181 | 13955 | 14208 | 17817 | 15657 | 12373 | 13407 | 17232 | 13904 | 13423 | 12394 | 11090 | 12569 | 13761 | 15145 | 10753 | 10310 | 11508 | 16150 | 13078 | 18737 |
| **Normalized** | 45.54% | 50.84% | 50.34% | 62.3% | 68.83% | 66.65% | 70.71% | 67.92% | 73.91% | 72.61% | 57.89% | 65.88% | 83.35% | 76.94% | 59.84% | 74.17% | 76.83% | 83.21% | 89.73% | 85.28% | 76.03% | 68.14% | 95.91% | 100% | 89.65% | 63.84% | 78.88% | 56.12% |
| **Standard Deviation** | 0.3% | 0.4% | 0.1% | 0.1% | 0.3% | 0.9% | 0.2% | 0.2% | 0.4% | 1.3% | | 0.3% | 0.2% | 0.1% | 0.4% | | 0.1% | 0.1% | | 0.4% | 0.2% | 0.2% | 0.1% | 0.2% | 0.1% | | 0.3% | 0.5% |
| **LAME MP3 Encoding - WAV To MP3 (sec)** | 54.17 | 48.37 | 47.03 | 39.68 | 35.78 | 37.13 | 35.19 | 36.55 | 33.55 | 33.75 | 42.77 | 38.94 | 31.03 | 33.30 | 37.36 | 33.25 | 33.55 | 30.94 | 28.70 | 30.01 | 32.54 | 36.10 | 27.58 | 26.07 | 28.50 | 39.90 | 32.33 | 42.12 |
| **Normalized** | 48.13% | 53.9% | 55.43% | 65.7% | 72.86% | 70.21% | 74.08% | 71.25% | 77.82% | 77.24% | 60.95% | 66.95% | 83.88% | 78.29% | 69.78% | 78.41% | 77.8% | 84.23% | 90.62% | 86.87% | 80.12% | 72.06% | 94.8% | 100% | 91.47% | 65.34% | 80.64% | 61.89% |
| **Standard Deviation** | 0.2% | 0.1% | 0.2% | 0.1% | 0.3% | 0.2% | 0.1% | 0% | 0.8% | 0.9% | 0% | 3% | 0.1% | 0% | 0.2% | 0% | 0% | 0% | 0.1% | 0% | 0.4% | 0.2% | 0.8% | 1.3% | 0.1% | 0.1% | 0.1% | 0.1% |
| **C-Ray - Total Time (sec)** | 61.75 | 55.09 | 28.01 | 24.95 | 21.50 | 21.07 | 19.48 | 11.23 | 9.70 | 5.16 | 3.47 | 54.28 | 41.97 | 24.65 | 39.00 | 27.40 | 26.97 | 22.83 | 22.25 | 15.57 | 24.51 | 13.71 | 18.79 | 12.78 | 5.46 | 19.69 | 3.14 | 16.52 |
| **Normalized** | 5.09% | 5.7% | 11.21% | 12.59% | 14.6% | 14.9% | 16.12% | 27.96% | 32.37% | 60.85% | 90.49% | 5.7% | 7.48% | 12.74% | 8.05% | 11.46% | 11.64% | 13.75% | 14.11% | 20.17% | 12.81% | 22.48% | 16.8% | 24.57% | 57.51% | 15.95% | 100% | 19.01% |

# Large Intel AMD Linux CPU Benchmark Comparison

| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Standard Deviation | 0% | 0.1% | 0% | 0.1% | 0% | 0.7% | 1.4% | 0% | 0.1% | 0.1% | 0.7% | 0.2% | 0.1% | 0.1% | 1.4% | 0.1% | 0.1% | 0.2% | 0.1% | 0.1% | 0.1% | 0.2% | 1.5% | 0.1% | 0.3% | 0.1% | 0.2% | 0% |
| John The Ripper - Blowfish (Real C/S) | 33 | 37 | 68 | 37 | 43 | 45 | 60 | 10 | 12 | 23 | 23 | 30 | 38 | 44 | 29 | 40 | 40 | 47 | 49 | 69 | 68 | 11 | 88 | 12 | 30 | 82 | 50 | 60 |
| | 73 | 75 | 26 | 11 | 93 | 40 | 22 | 43 | 44 | 00 | 55 | 08 | 59 | 11 | 92 | 80 | 46 | 85 | 10 | 98 | 00 | 71 | 80 | 75 | 10 | 75 | 24 | 67 |
| | | | | | | | | 1 | 5 | 1 | 2 | | | | | | | | | | | 0 | | 8 | 4 | | 8 | |
| Normalized | 6.7 | 7.5 | 13.58% | 7.3 | 8.7 | 9.0 | 11.98% | 20.76% | 24.77% | 45.77% | 46.87% | 5.9 | 7.6 | 8.7 | 5.9 | 8.1 | 8.0 | 9.5 | 9.7 | 13.93% | 13.53% | 23.3% | 17.67% | 25.39% | 59.91% | 16.47% | 10 | 12.07% |
| Standard Deviation | 0.3% | 0.1% | 0.6% | 0.8% | 0.3% | 0.2% | 3.9% | 0.8% | 0.1% | 2% | 0.5% | | | 0.2% | 2.7% | 0.2% | 0.1% | 0.1% | | | 3.2% | 0% | | | 0% | | 1.9% | |
| Timed Linux Kernel Compilation - Time To Compile | 34 | 30 | 16 | 48 | 45 | 20 | 15 | 95 | 85 | 48 | 38 | 42 | 24 | 16 | 26 | 18 | 18 | 15 | 15 | 10 | 15 | 89 | 10 | 79 | 39 | 12 | 30 | 10 |
| | 2.81 | 0.92 | 7.85 | 4.57 | 8.00 | 1.48 | 3.49 | .17 | .22 | .48 | .39 | 6.59 | 6.44 | 7.81 | 4.97 | 0.98 | 1.66 | 8.43 | 7.58 | 8.02 | 0.12 | .15 | 6.97 | .10 | .70 | 7.47 | .41 | 6.83 |
| Normalized | 8.8% | 10.11% | 18.12% | 6.2% | 6.6% | 15.09% | 19.81% | 31.95% | 35.68% | 62.73% | 79.21% | 7.1% | 12.34% | 18.12% | 11.48% | 16.8% | 16.74% | 19.19% | 19.3% | 28.15% | 20.26% | 34.11% | 28.43% | 38.45% | 76.6% | 23.86% | 10 | 28.47% |
| Standard Deviation | 0.8% | 1.1% | 1.5% | 0.2% | 0.3% | 1% | 1.2% | 2.2% | 2% | 3.2% | 4.5% | 0.5% | 0.8% | 1% | 1.1% | 1.2% | 1.1% | 1% | 1% | 1.7% | 1% | 2.3% | 1% | 7% | 6.9% | 2.3% | 6.2% | 1.3% |
| Rodinia - OpenMP LavaMD (sec) | 44 | 39 | 21 | 25 | 22 | 21 | 16 | 95 | 82 | 45 | 31 | 44 | 35 | 22 | 40 | 32 | 24 | 20 | 20 | 14 | 19 | 11 | 15 | 10 | 46 | 17 | 28 | 21 |
| | 6.42 | 7.52 | 1.52 | 8.67 | 3.34 | 7.13 | 0.28 | .15 | .29 | .95 | .58 | 0.27 | 4.52 | 6.21 | 0.13 | 2.61 | 6.20 | 8.84 | 3.35 | 3.15 | 9.36 | 4.38 | 4.42 | 7.19 | .64 | 0.83 | .52 | 3.70 |
| Normalized | 6.39% | 7.17% | 13.48% | 11.03% | 12.77% | 13.13% | 17.79% | 29.97% | 34.62% | 62.07% | 90.31% | 6.4% | 8.0% | 12.61% | 7.13% | 8.84% | 11.58% | 13.66% | 14.03% | 19.92% | 14.31% | 24.93% | 18.47% | 26.61% | 61.15% | 16.69% | 10 | 13.35% |
| Standard Deviation | 0.1% | 0.4% | 0.1% | 0.2% | 0.2% | 0.2% | 0.1% | 0.1% | 0.1% | 2.1% | 1.5% | 0.1% | 0.3% | 0% | 0.8% | 0.1% | 0.1% | 0% | 0.1% | 0.1% | 0% | 0.4% | 0.9% | 0.1% | 0.3% | 0.6% | 1.9% | 0% |

# Large Intel AMD Linux CPU Benchmark Comparison

| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **7-Zip Compression - C.S.T (MIPS)** | 99 | 11 | 22 | 12 | 15 | 15 | 17 | 30 | 33 | 71 | 95 | **89** | 12 | 17 | 14 | 16 | 15 | 18 | 17 | 27 | 21 | 37 | 28 | 39 | 91 | 27 | **13** | 23 |
| | 83 | 43 | 09 | 60 | 88 | 74 | 72 | 62 | 02 | 59 | 06 | **92** | 89 | 22 | 10 | 59 | 11 | 07 | 72 | 02 | 66 | 23 | 95 | 03 | 13 | 88 | **97** | 91 |
| | | 1 | 7 | 1 | 0 | 4 | 9 | 7 | 2 | 2 | 2 | | 6 | 1 | 0 | 5 | 6 | 9 | 7 | 8 | 7 | 6 | 2 | 9 | 8 | 8 | **07** | 7 |
| **Normalized** | 7.15% | 8.18% | 15.82% | 9.02% | 11.37% | 11.27% | 12.69% | 21.92% | 23.64% | 51.24% | 68.04% | 6.44% | 9.23% | 12.33% | 10.09% | 11.88% | 10.82% | 12.94% | 12.69% | 19.35% | 15.51% | 26.65% | 20.72% | 27.94% | 65.24% | 19.96% | 10.00% | 17.12% |
| **Standard Deviation** | 1.5% | 1.4% | 0.3% | | 1.8% | 0.5% | 3.3% | 0.6% | 1.5% | 0.2% | 0.6% | 1.2% | 0.1% | 0.2% | 3.1% | 0.9% | 0.1% | 0.1% | 0.3% | 0.2% | 1.3% | 1.4% | 2.9% | 1% | 0.5% | 1.5% | 2.6% | 0.6% |
| **Parboil - OpenMP CUTCP (sec)** | **35.73** | 31.60 | 16.90 | 17.36 | 15.03 | 15.64 | 11.34 | 6.49 | 5.58 | 3.24 | 2.63 | 30.51 | 22.87 | 14.95 | 17.82 | 15.80 | 16.21 | 13.86 | 13.44 | 9.47 | 12.99 | 7.83 | 10.13 | 7.08 | 3.28 | 10.99 | **2.35** | 11.46 |
| **Normalized** | 6.58% | 7.44% | 13.91% | 13.54% | 15.64% | 15.03% | 20.72% | 36.21% | 42.11% | 72.53% | 89.35% | 7.74% | 10.28% | 15.72% | 13.19% | 14.87% | 14.5% | 17% | 17.46% | 24.82% | 18.09% | 30.01% | 23.2% | 33.19% | 71.65% | 21.38% | 10.00% | 20.51% |
| **Standard Deviation** | 0.1% | 0.3% | 0.4% | 0.4% | 0.1% | 0.7% | 0.6% | 0.7% | 0.4% | 0.4% | 1% | 0.4% | 1.1% | 0% | 0.2% | 0.2% | 0.1% | 0.1% | 0.2% | 0.1% | 1% | 0.3% | 1.7% | 0.3% | 0.4% | 0.3% | 1.1% | 0% |
| **Open FMM Nero2D - Total Time (sec)** | **28.43** | 25.40 | 11.89 | 10.59 | 94.9 | 92.9 | 90.6 | 57.8 | 50.5 | 30.6 | 26.5 | 20.51 | 16.73 | 92.1 | 14.12 | 10.83 | 10.83 | 85.1 | 83.8 | 61.4 | 98.1 | 60.3 | 76.6 | 54.8 | 27.9 | 86.4 | **21.4** | 87.4 |
| **Normalized** | 7.65% | 8.53% | 17.88% | 19.56% | 22.71% | 23.28% | 23.67% | 37.3% | 42.75% | 71.09% | 81.99% | 10.23% | 12.94% | 23.15% | 15.19% | 20.85% | 21.26% | 25.01% | 25.53% | 35.12% | 21.83% | 35.66% | 28.08% | 39% | 76.6% | 24.69% | 10.00% | 24.63% |
| **Standard Deviation** | 0.5% | 0.5% | 1.8% | 0.3% | 0.1% | 0.3% | 1% | 0.5% | 1.1% | 3.3% | 3% | 0.9% | 0.4% | 0.7% | 2.2% | 1.1% | 0.2% | 0.4% | 0.7% | 1.2% | 0.6% | 0.7% | 0.5% | 1% | 0.6% | 0.4% | 4.1% | 0.8% |

# Large Intel AMD Linux CPU Benchmark Comparison

| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TTSIOD 3D Renderer - P.R.W.S.S.M (FPS) | 67.42 | 82.93 | 14.275 | 12.295 | 13.497 | 17.178 | 21.601 | 27.064 | 31.222 | 46.136 | 44.713 | 73.5 | 12.169 | 16.827 | 12.909 | 15.775 | 15.228 | 18.472 | 18.907 | 26.363 | 20.431 | 32.551 | 27.437 | 39.167 | 69.006 | 21.084 | 73.358 | 23.107 |
| Normalized | 9.19% | 11.3% | 19.46% | 16.76% | 18.4% | 24.29% | 28.84% | 37.44% | 42.56% | 63.54% | 61.03% | 10.03% | 16.59% | 22.94% | 17.71% | 21.23% | 21.57% | 25.18% | 25.61% | 35.94% | 27.85% | 44.37% | 37.82% | 53.39% | 94.06% | 28.74% | 10% | 31.5% |
| Standard Deviation | 0.3% | 0.2% | 1% | 0.7% | 0.2% | 0.8% | 1.4% | 0.1% | 0.2% | 0.2% | 0.2% | 0.9% | 0.3% | 0.6% | 2% | 0.4% | 0.1% | 1.2% | 0.2% | 0.1% | 1.7% | 0.2% | 1.8% | 0.3% | 0.8% | 0.4% | 3.2% | 0.3% |
| Cost To Run Tests - C.P.P.H (Cost / Price/ Crafty - Performance / Cost - Elapsed Time (Nodes/s/Do Crafty - Elapsed Time (Node | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.95 | |
| Standard Deviation | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.1% | |

| | |
|---|---|
| AOBench - Performance / Cost - 2048 x 2048 - Total Time (sec x | 1.24 |
| AOBench - 2048 x 2048 - Total Time (sec) | 62.18 |
| Standard Deviation | 0.1% |
| Scikit-Learn - Performance / Cost - (sec x Dollar | 10.74 |
| Scikit-Learn (sec) | 17 9.03 |
| Standard Deviation | 0.1% |

| | |
|---|---|
| Numpy Benchmark - Performance / Cost - (Nanoseconds x Dollar | 24 47 66 9 |
| Numpy Benchmark (Nanoseconds) | 71 99 02 6 |
| PyBench - Performance / Cost - T.F.A.T.T (Milliseconds x Dollar | 20 .4 4 |
| PyBench - T.F.A.T.T (Millisecond | 20 44 |
| Standard Deviation | 0% |

| | | |

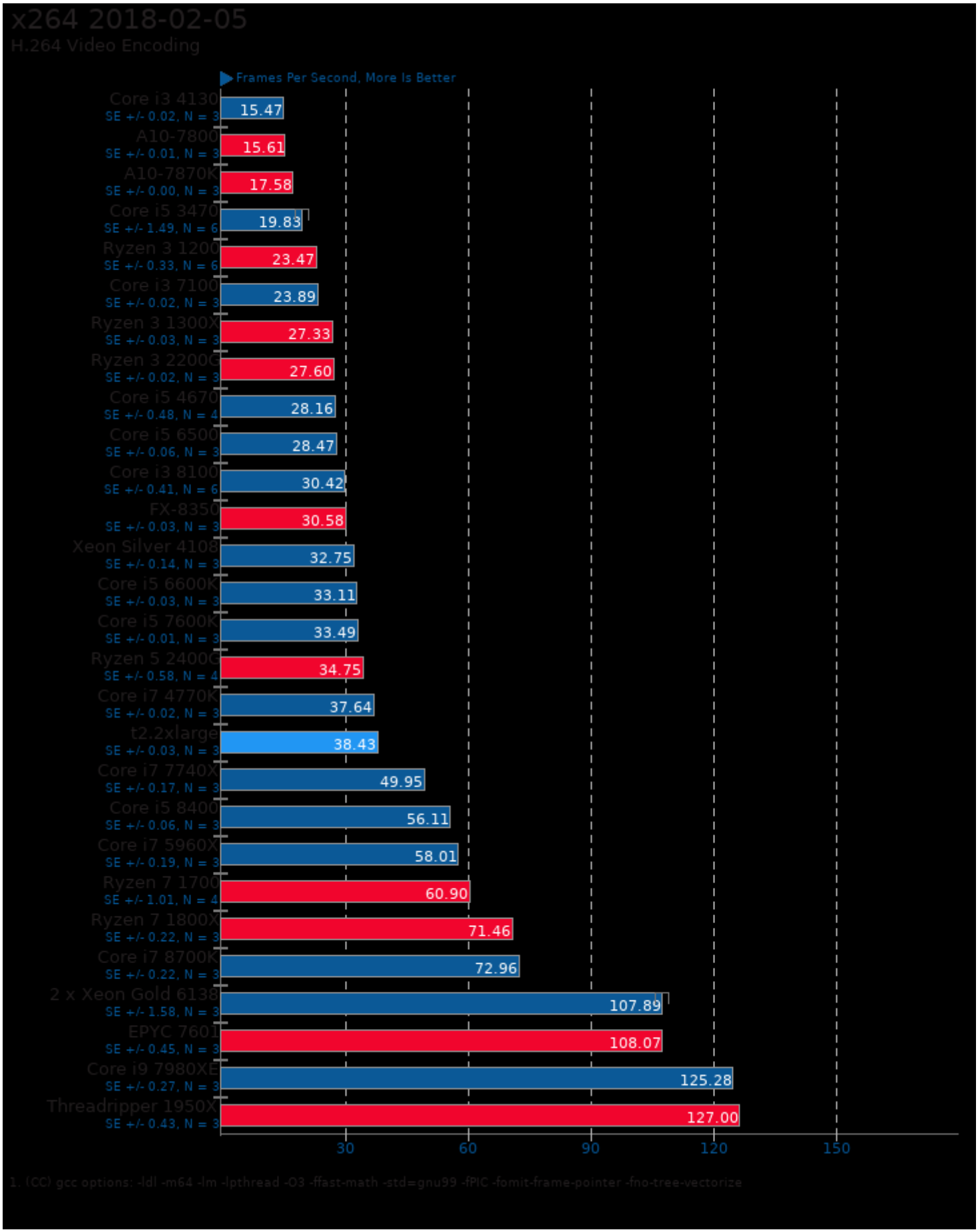
| | |
|---|---|
| OpenSSL - Performance / Cost - R.4.b.P (Signs/sec/Dollar) | 17<br>48<br>3 |
| LAME MP3 Encoding - Performance / Cost - WAV To MP3 (sec x Dollar) | 0.<br>42 |
| POV-Ray - Performance / Cost - Trace Time (sec x Dollar) | 10<br>1.<br>40 |

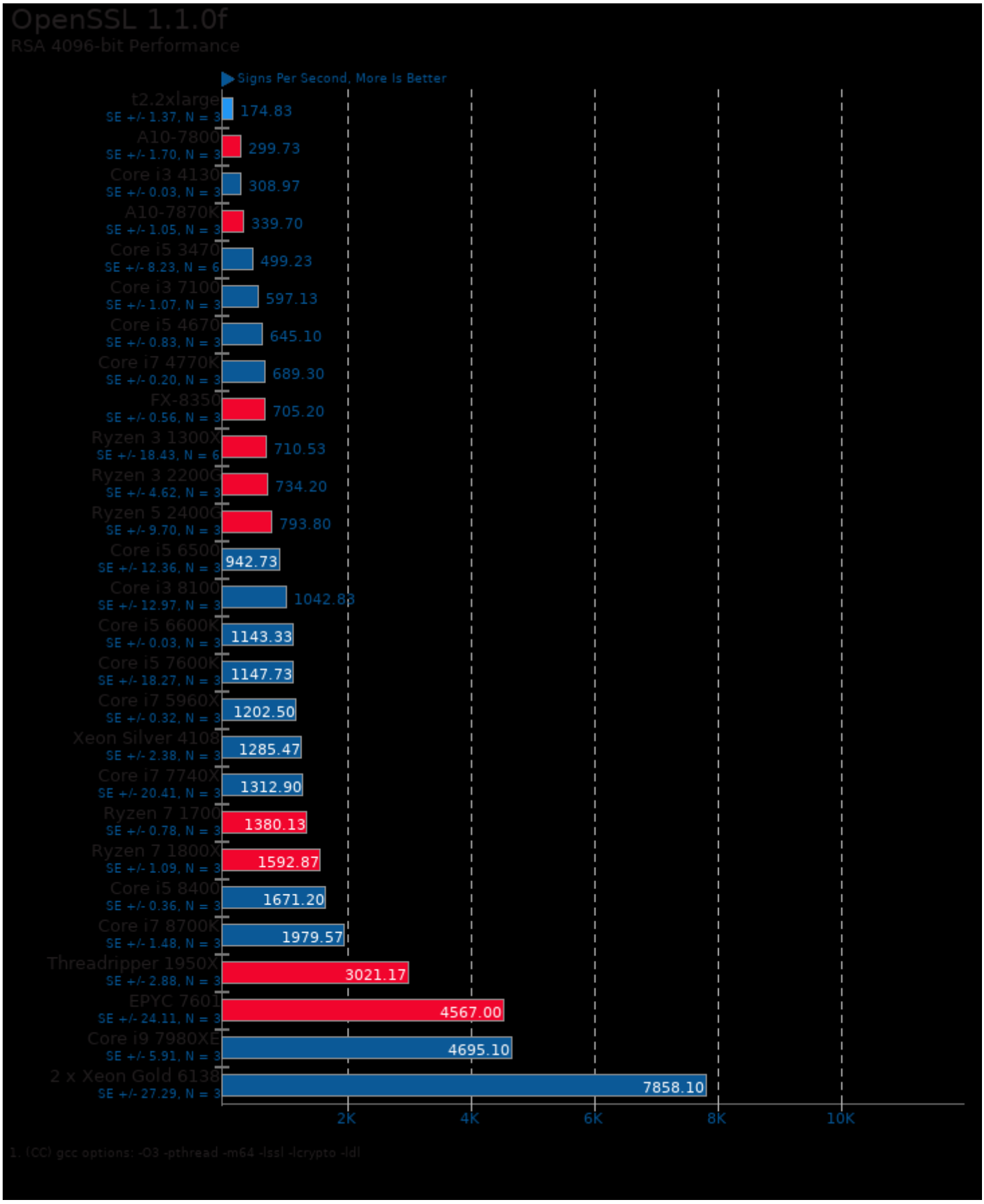
| | |
|---|---|
| C-Ray - Performance / Cost - Total Time (sec x | 0.17 |
| Timed Linux Kernel Compilation - Performance / Cost - Time To Compile (sec | 4.27 |
| 7-Zip Compression - Performance / Cost - C.S.T (MIPS/ Dollar) | 23917700 |

| | |
|---|---|
| x264 - Performance / Cost - H.2.V.E (FPS/Dollar | 38<br>43 |
| TTSIOD 3D Renderer - Performance / Cost - P.R.W.S.S.M (FPS/Dollar | 23<br>10<br>7 |
| Open FMM Nero2D - Performance / Cost - Total Time (sec x Dollar) | 2.<br>61 |

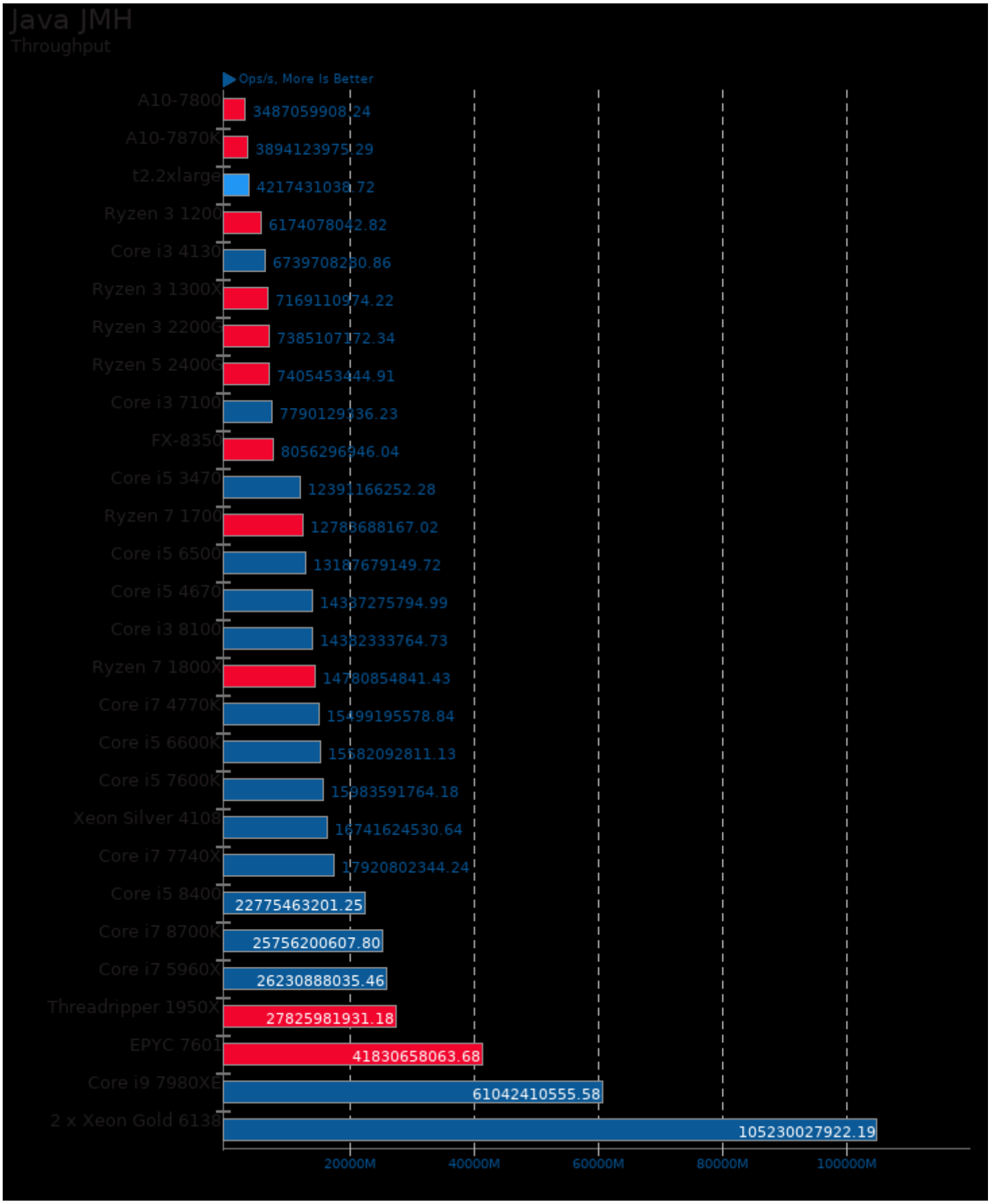
| | |
|---|---|
| John The Ripper - Performance / Cost - Blowfish (Real C/S/Dollar) | 30<br>33<br>50 |
| Rodinia - Performance / Cost - OpenMP LavaMD (sec x Dollar) | 14<br>.9<br>6 |

| | |
|---|---|
| **NAS Parallel Benchmarks - Performance / Cost - EP.C (Mop/s/Dollar)** | 73<br>10 |

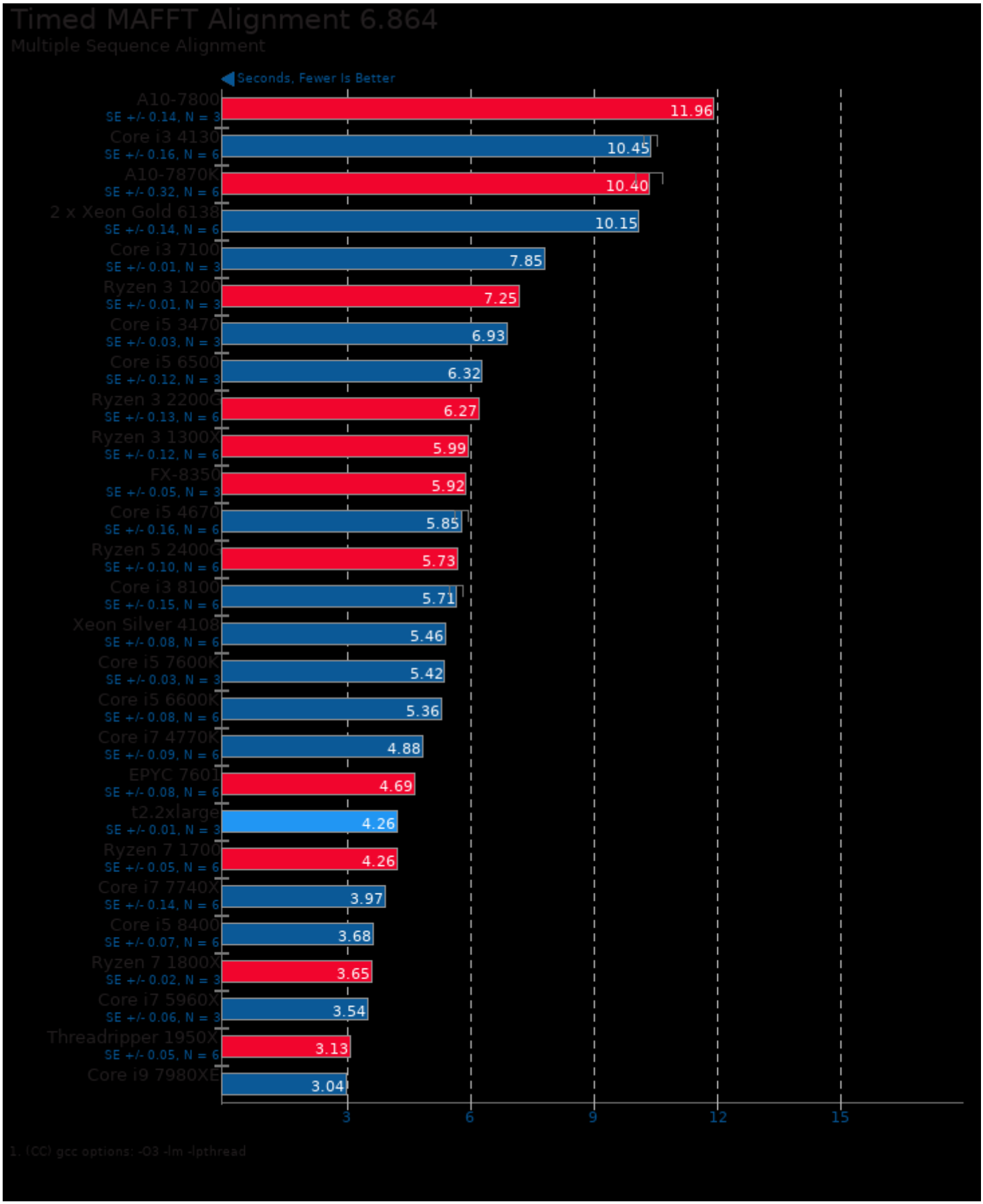

x264 2018-02-05
H.264 Video Encoding
Frames Per Second, More Is Better
Core i3 4130
SE +/- 0.02, N = 3
15.47
A10-7800
SE +/- 0.01, N = 3
15.61
A10-7870K
SE +/- 0.00, N = 3
17.58
Core i5 3470
SE +/- 1.49, N = 6
19.83
Ryzen 3 1200
SE +/- 0.33, N = 6
23.47
Core i3 7100
SE +/- 0.02, N = 3
23.89
Ryzen 3 1300X
SE +/- 0.03, N = 3
27.33
Ryzen 3 2200G
SE +/- 0.02, N = 3
27.60
Core i5 4670
SE +/- 0.48, N = 4
28.16
Core i5 6500
SE +/- 0.06, N = 3
28.47
Core i3 8100
SE +/- 0.41, N = 6
30.42
FX-8350
SE +/- 0.03, N = 3
30.58
Xeon Silver 4108
SE +/- 0.14, N = 3
32.75
Core i5 6600K
SE +/- 0.03, N = 3
33.11
Core i5 7600K
SE +/- 0.01, N = 3
33.49
Ryzen 5 2400G
SE +/- 0.58, N = 4
34.75
Core i7 4770K
SE +/- 0.02, N = 3
37.64
t2.2xlarge
SE +/- 0.03, N = 3
38.43
Core i7 7740X
SE +/- 0.17, N = 3
49.95
Core i5 8400
SE +/- 0.06, N = 3
56.11
Core i7 5960X
SE +/- 0.19, N = 3
58.01
Ryzen 7 1700
SE +/- 1.01, N = 4
60.90
Ryzen 7 1800X
SE +/- 0.22, N = 3
71.46
Core i7 8700K
SE +/- 0.22, N = 3
72.96
2 x Xeon Gold 6138
SE +/- 1.58, N = 3
107.89
EPYC 7601
SE +/- 0.45, N = 3
108.07
Core i9 7980XE
SE +/- 0.27, N = 3
125.28
Threadripper 1950X
SE +/- 0.43, N = 3
127.00
30
60
90
120
150
1. (CC) gcc options: -ldl -m64 -lm -lpthread -O3 -ffast-math -std=gnu99 -fPIC -fomit-frame-pointer -fno-tree-vectorize

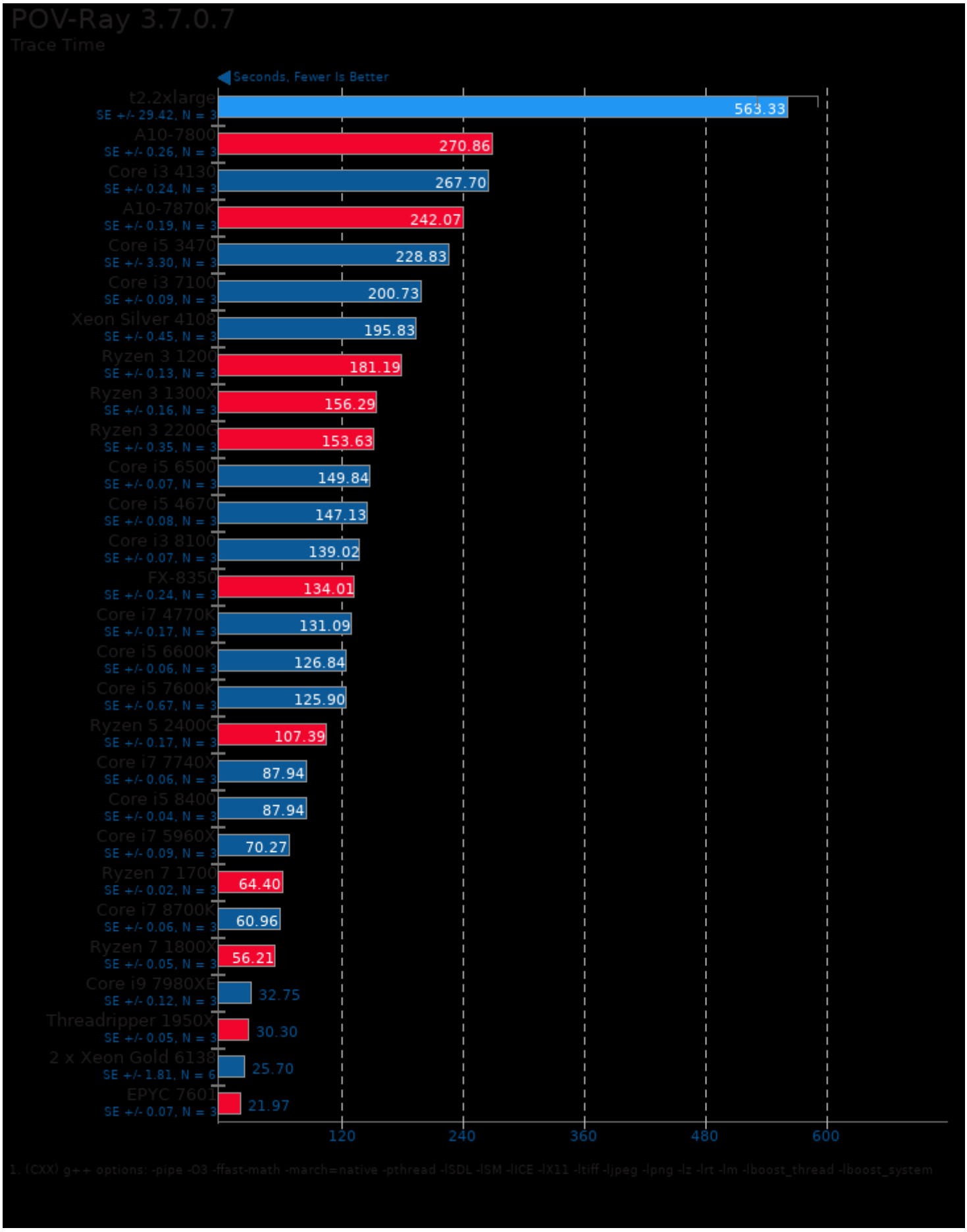

OpenSSL 1.1.0f
RSA 4096-bit Performance
Signs Per Second, More Is Better
t2.2xlarge
SE +/- 1.37, N = 3
174.83
A10-7800
SE +/- 1.70, N = 3
299.73
Core i3 4130
SE +/- 0.03, N = 3
308.97
A10-7870K
SE +/- 1.05, N = 3
339.70
Core i5 3470
SE +/- 8.23, N = 6
499.23
Core i3 7100
SE +/- 1.07, N = 3
597.13
Core i5 4670
SE +/- 0.83, N = 3
645.10
Core i7 4770K
SE +/- 0.20, N = 3
689.30
FX-8350
SE +/- 0.56, N = 3
705.20
Ryzen 3 1300X
SE +/- 18.43, N = 6
710.53
Ryzen 3 2200G
SE +/- 4.62, N = 3
734.20
Ryzen 5 2400G
SE +/- 9.70, N = 3
793.80
Core i5 6500
SE +/- 12.36, N = 3
942.73
Core i3 8100
SE +/- 12.97, N = 3
1042.83
Core i5 6600K
SE +/- 0.03, N = 3
1143.33
Core i5 7600K
SE +/- 18.27, N = 3
1147.73
Core i7 5960X
SE +/- 0.32, N = 3
1202.50
Xeon Silver 4108
SE +/- 2.38, N = 3
1285.47
Core i7 7740X
SE +/- 20.41, N = 3
1312.90
Ryzen 7 1700
SE +/- 0.78, N = 3
1380.13
Ryzen 7 1800X
SE +/- 1.09, N = 3
1592.87
Core i5 8400
SE +/- 0.36, N = 3
1671.20
Core i7 8700K
SE +/- 1.48, N = 3
1979.57
Threadripper 1950X
SE +/- 2.88, N = 3
3021.17
EPYC 7601
SE +/- 24.11, N = 3
4567.00
Core i9 7980XE
SE +/- 5.91, N = 3
4695.10
2 x Xeon Gold 6138
SE +/- 27.29, N = 3
7858.10
2K
4K
6K
8K
10K
1. (CC) gcc options: -O3 -pthread -m64 -lssl -lcrypto -ldl

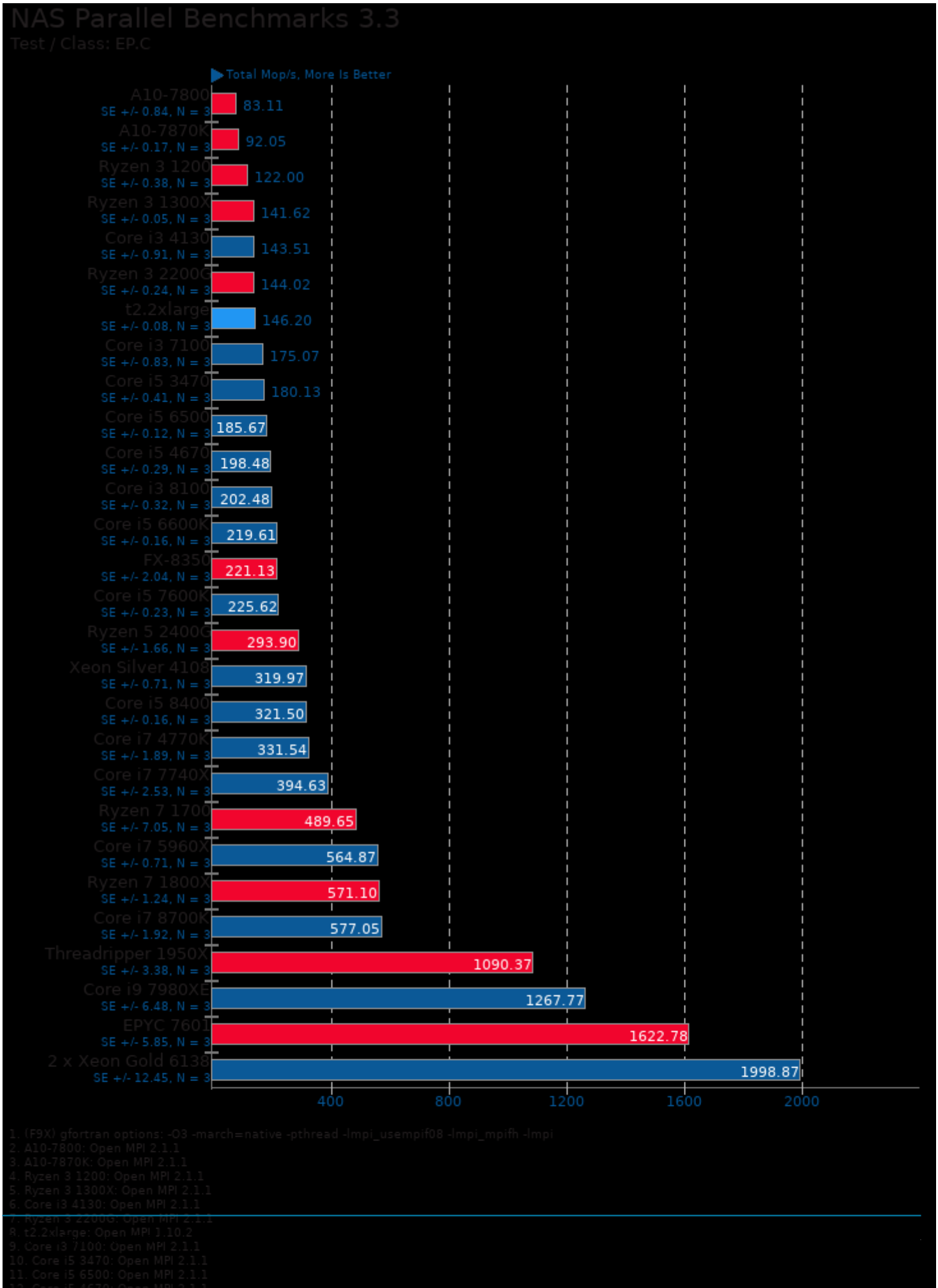
# Large Intel AMD Linux CPU Benchmark Comparison

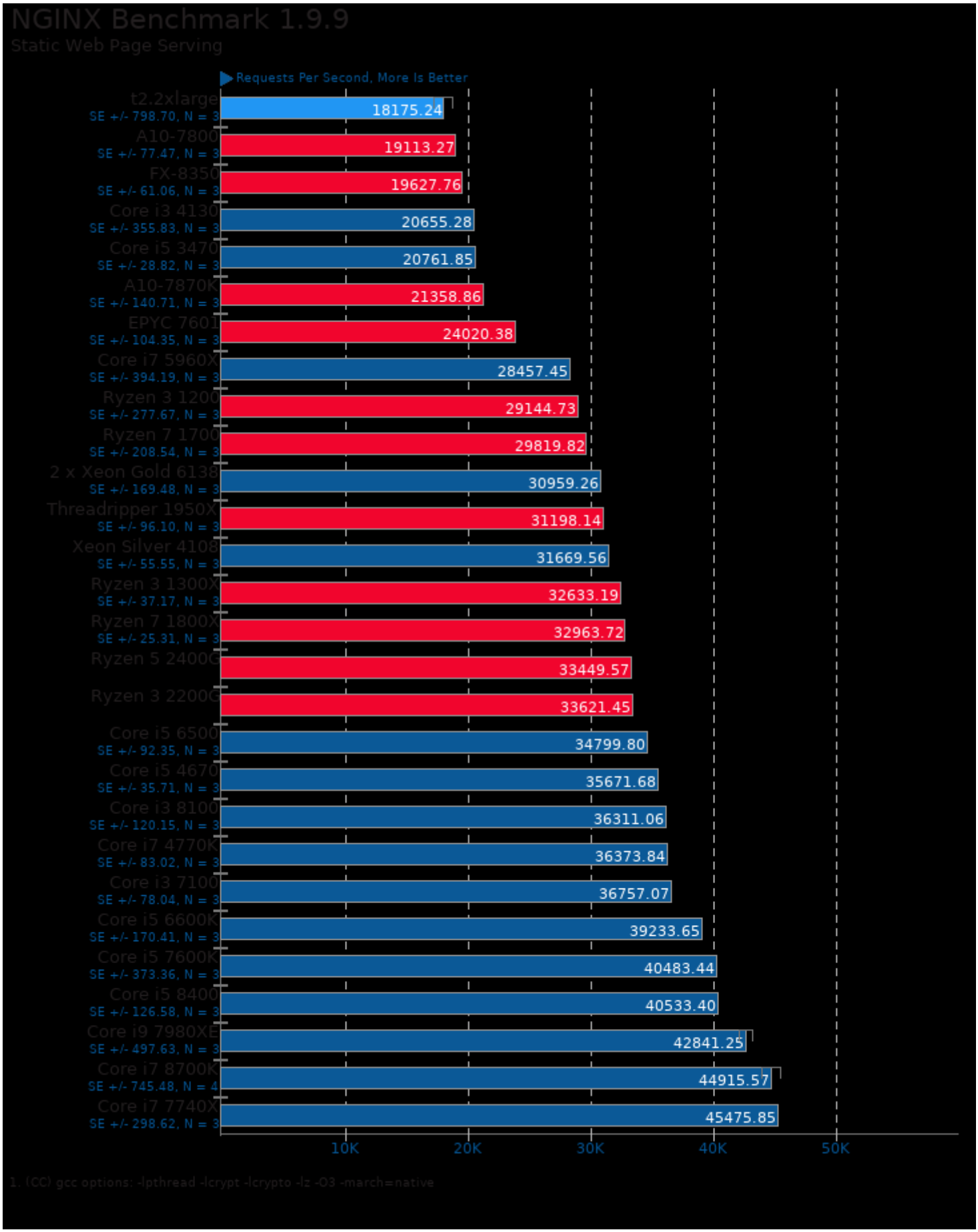


# Large Intel AMD Linux CPU Benchmark Comparison

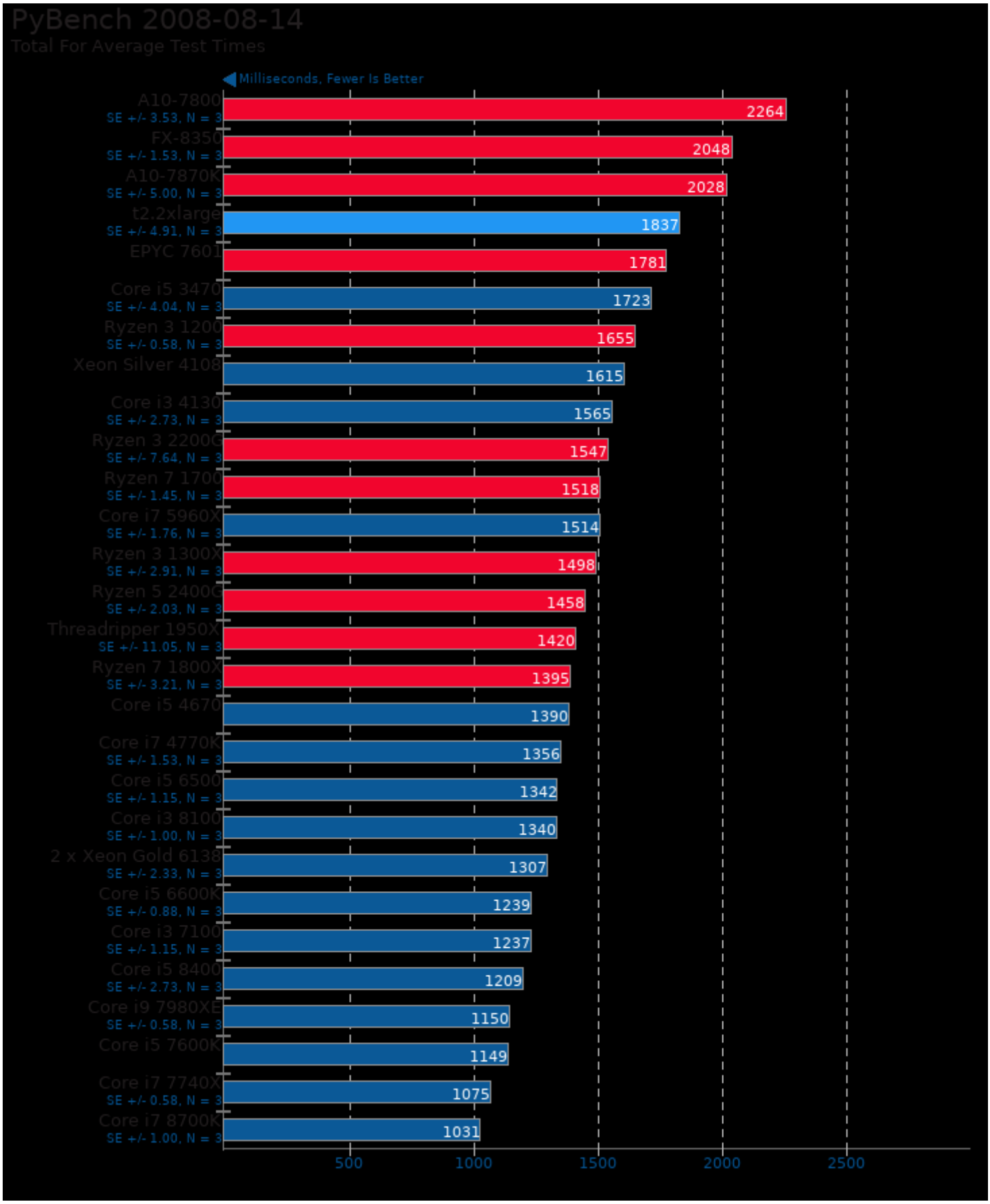



POV-Ray 3.7.0.7
Trace Time
Seconds, Fewer Is Better
t2.2xlarge
SE +/- 29.42, N = 3
563.33
A10-7800
SE +/- 0.26, N = 3
270.86
Core i3 4130
SE +/- 0.24, N = 3
267.70
A10-7870K
SE +/- 0.19, N = 3
242.07
Core i5 3470
SE +/- 3.30, N = 3
228.83
Core i3 7100
SE +/- 0.09, N = 3
200.73
Xeon Silver 4108
SE +/- 0.45, N = 3
195.83
Ryzen 3 1200
SE +/- 0.13, N = 3
181.19
Ryzen 3 1300X
SE +/- 0.16, N = 3
156.29
Ryzen 3 2200G
SE +/- 0.35, N = 3
153.63
Core i5 6500
SE +/- 0.07, N = 3
149.84
Core i5 4670
SE +/- 0.08, N = 3
147.13
Core i3 8100
SE +/- 0.07, N = 3
139.02
FX-8350
SE +/- 0.24, N = 3
134.01
Core i7 4770K
SE +/- 0.17, N = 3
131.09
Core i5 6600K
SE +/- 0.06, N = 3
126.84
Core i5 7600K
SE +/- 0.67, N = 3
125.90
Ryzen 5 2400G
SE +/- 0.17, N = 3
107.39
Core i7 7740X
SE +/- 0.06, N = 3
87.94
Core i5 8400
SE +/- 0.04, N = 3
87.94
Core i7 5960X
SE +/- 0.09, N = 3
70.27
Ryzen 7 1700
SE +/- 0.02, N = 3
64.40
Core i7 8700K
SE +/- 0.06, N = 3
60.96
Ryzen 7 1800X
SE +/- 0.05, N = 3
56.21
Core i9 7980XE
SE +/- 0.12, N = 3
32.75
Threadripper 1950X
SE +/- 0.05, N = 3
30.30
2 x Xeon Gold 6138
SE +/- 1.81, N = 6
25.70
EPYC 7601
SE +/- 0.07, N = 3
21.97
120
240
360
480
600
1. (CXX) g++ options: -pipe -O3 -ffast-math -march=native -pthread -lSDL -lSM -lICE -lX11 -ltiff -ljpeg -lpng -lz -lrt -lm -lboost_thread -lboost_system

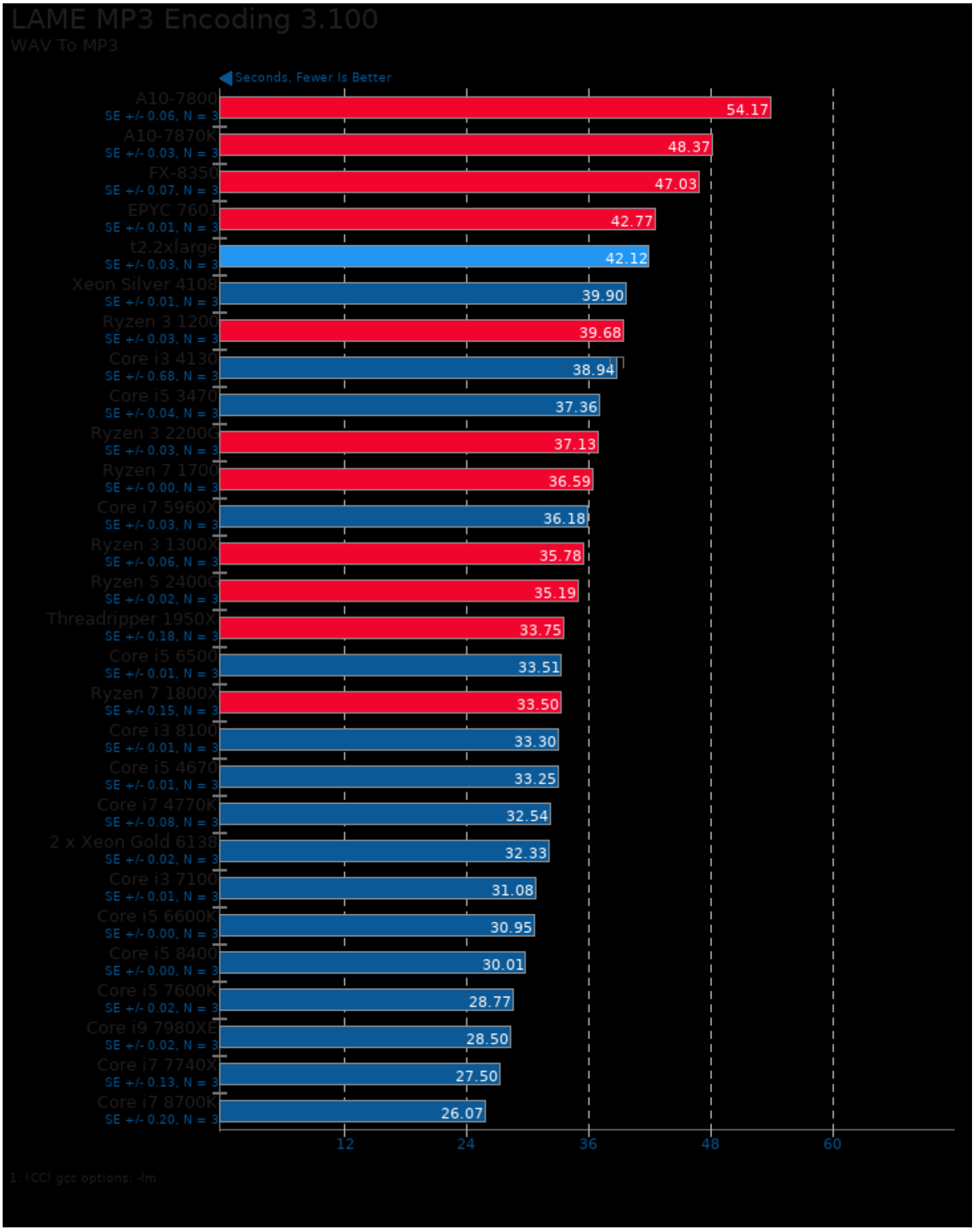

NAS Parallel Benchmarks 3.3
Test / Class: EP.C
Total Mop/s, More Is Better
A10-7800
SE +/- 0.84, N = 3
83.11
A10-7870K
SE +/- 0.17, N = 3
92.05
Ryzen 3 1200
SE +/- 0.38, N = 3
122.00
Ryzen 3 1300X
SE +/- 0.05, N = 3
141.62
Core i3 4130
SE +/- 0.91, N = 3
143.51
Ryzen 3 2200G
SE +/- 0.24, N = 3
144.02
t2.2xlarge
SE +/- 0.08, N = 3
146.20
Core i3 7100
SE +/- 0.83, N = 3
175.07
Core i5 3470
SE +/- 0.41, N = 3
180.13
Core i5 6500
SE +/- 0.12, N = 3
185.67
Core i5 4670
SE +/- 0.29, N = 3
198.48
Core i3 8100
SE +/- 0.32, N = 3
202.48
Core i5 6600K
SE +/- 0.16, N = 3
219.61
FX-8350
SE +/- 2.04, N = 3
221.13
Core i5 7600K
SE +/- 0.23, N = 3
225.62
Ryzen 5 2400G
SE +/- 1.66, N = 3
293.90
Xeon Silver 4108
SE +/- 0.71, N = 3
319.97
Core i5 8400
SE +/- 0.16, N = 3
321.50
Core i7 4770K
SE +/- 1.89, N = 3
331.54
Core i7 7740X
SE +/- 2.53, N = 3
394.63
Ryzen 7 1700
SE +/- 7.05, N = 3
489.65
Core i7 5960X
SE +/- 0.71, N = 3
564.87
Ryzen 7 1800X
SE +/- 1.24, N = 3
571.10
Core i7 8700K
SE +/- 1.92, N = 3
577.05
Threadripper 1950X
SE +/- 3.38, N = 3
1090.37
Core i9 7980XE
SE +/- 6.48, N = 3
1267.77
EPYC 7601
SE +/- 5.85, N = 3
1622.78
2 x Xeon Gold 6138
SE +/- 12.45, N = 3
1998.87
400
800
1200
1600
2000
1. (F9X) gfortran options: -O3 -march=native -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi
2. A10-7800: Open MPI 2.1.1
3. A10-7870K: Open MPI 2.1.1
4. Ryzen 3 1200: Open MPI 2.1.1
5. Ryzen 3 1300X: Open MPI 2.1.1
6. Core i3 4130: Open MPI 2.1.1
7. Ryzen 3 2200G: Open MPI 2.1.1
8. t2.2xlarge: Open MPI 1.10.2
9. Core i3 7100: Open MPI 2.1.1
10. Core i5 3470: Open MPI 2.1.1
11. Core i5 6500: Open MPI 2.1.1

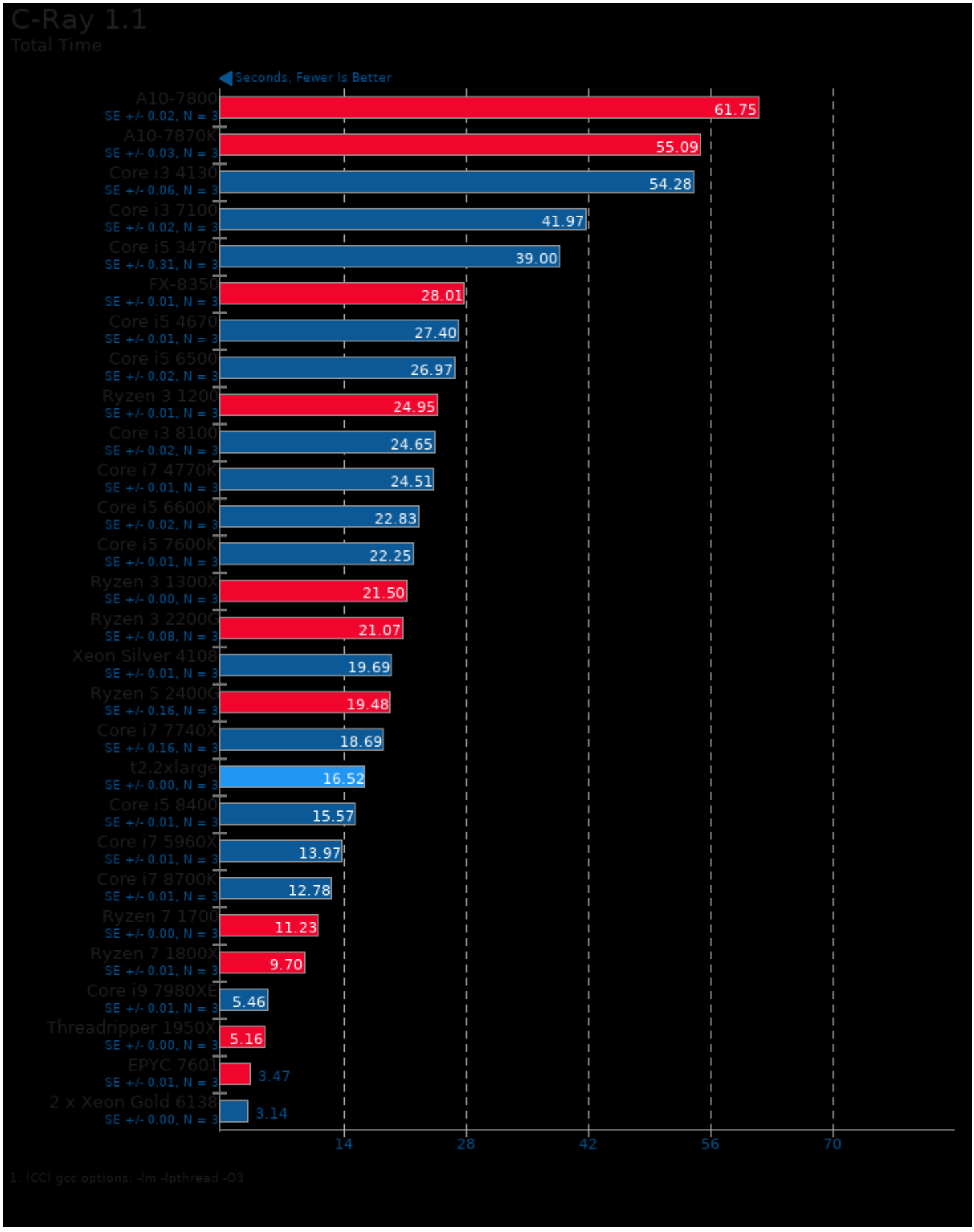

NGINX Benchmark 1.9.9
Static Web Page Serving
Requests Per Second, More Is Better
t2.2xlarge
SE +/- 798.70, N = 3
18175.24
A10-7800
SE +/- 77.47, N = 3
19113.27
FX-8350
SE +/- 61.06, N = 3
19627.76
Core i3 4130
SE +/- 355.83, N = 3
20655.28
Core i5 3470
SE +/- 28.82, N = 3
20761.85
A10-7870K
SE +/- 140.71, N = 3
21358.86
EPYC 7601
SE +/- 104.35, N = 3
24020.38
Core i7 5960X
SE +/- 394.19, N = 3
28457.45
Ryzen 3 1200
SE +/- 277.67, N = 3
29144.73
Ryzen 7 1700
SE +/- 208.54, N = 3
29819.82
2 x Xeon Gold 6138
SE +/- 169.48, N = 3
30959.26
Threadripper 1950X
SE +/- 96.10, N = 3
31198.14
Xeon Silver 4108
SE +/- 55.55, N = 3
31669.56
Ryzen 3 1300X
SE +/- 37.17, N = 3
32633.19
Ryzen 7 1800X
SE +/- 25.31, N = 3
32963.72
Ryzen 5 2400G
33449.57
Ryzen 3 2200G
33621.45
Core i5 6500
SE +/- 92.35, N = 3
34799.80
Core i5 4670
SE +/- 35.71, N = 3
35671.68
Core i3 8100
SE +/- 120.15, N = 3
36311.06
Core i7 4770K
SE +/- 83.02, N = 3
36373.84
Core i3 7100
SE +/- 78.04, N = 3
36757.07
Core i5 6600K
SE +/- 170.41, N = 3
39233.65
Core i5 7600K
SE +/- 373.36, N = 3
40483.44
Core i5 8400
SE +/- 126.58, N = 3
40533.40
Core i9 7980XE
SE +/- 497.63, N = 3
42841.25
Core i7 8700K
SE +/- 745.48, N = 4
44915.57
Core i7 7740X
SE +/- 298.62, N = 3
45475.85
10K
20K
30K
40K
50K
1. (CC) gcc options: -lpthread -lcrypt -lcrypto -lz -O3 -march=native

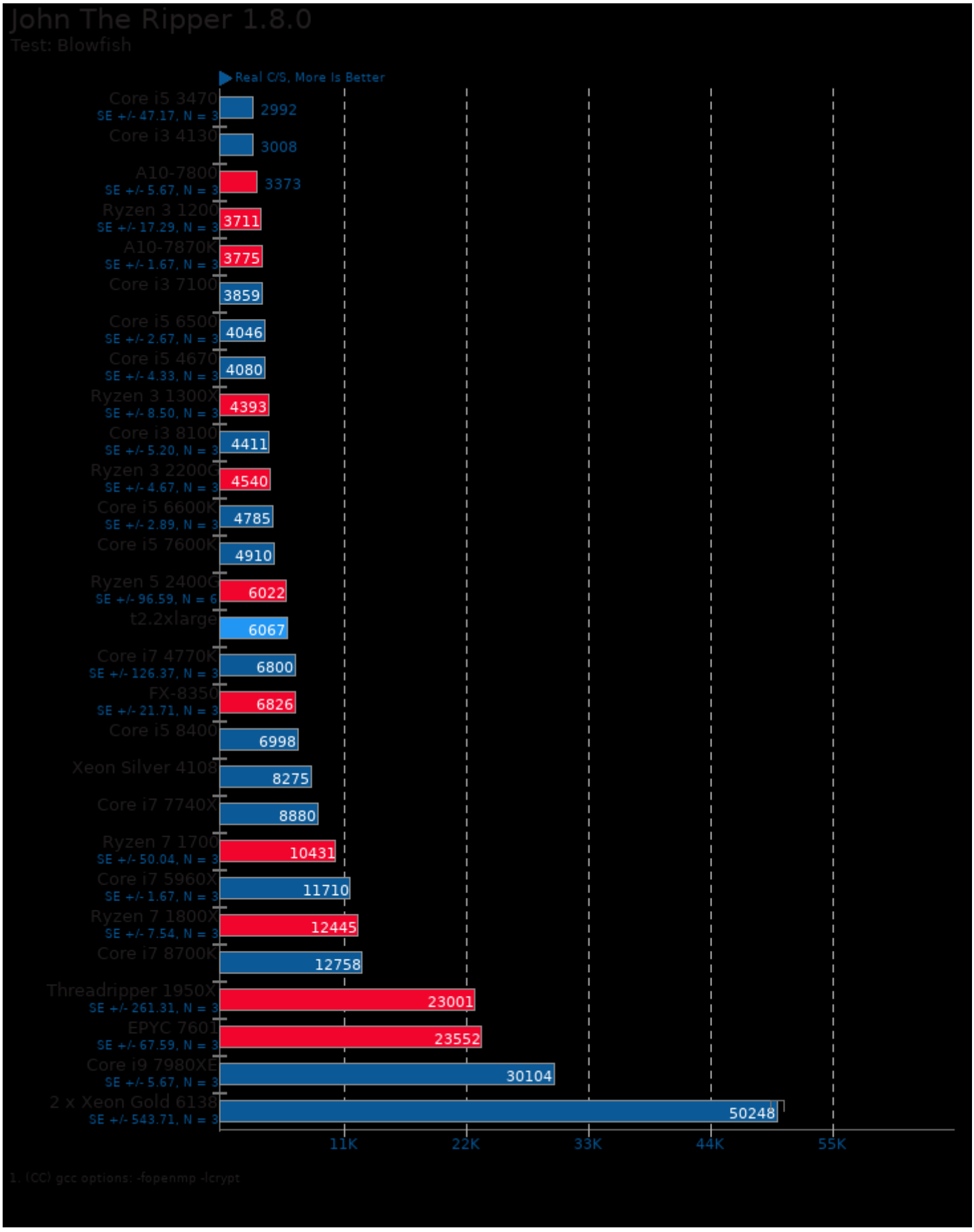
# Large Intel AMD Linux CPU Benchmark Comparison



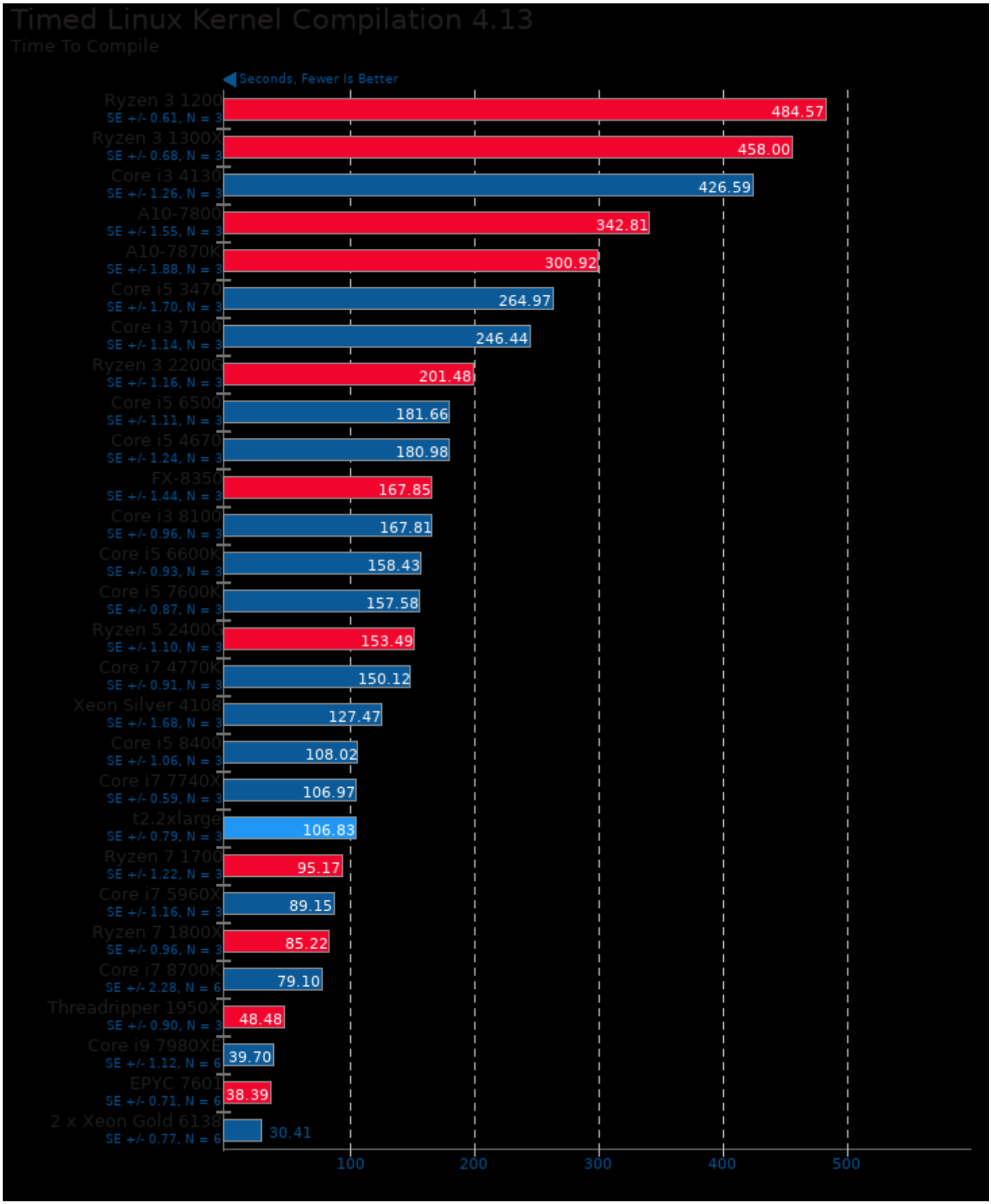
# Large Intel AMD Linux CPU Benchmark Comparison



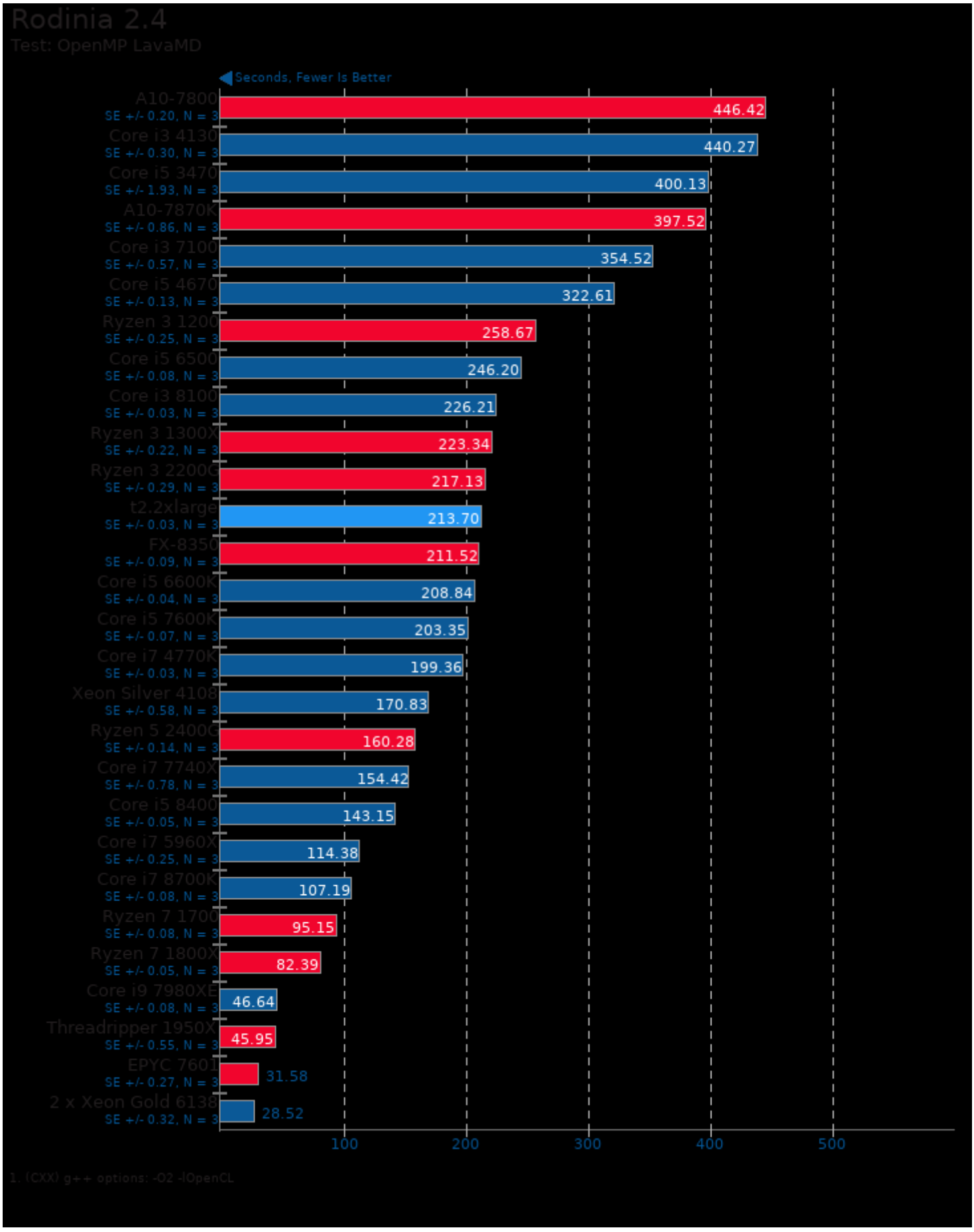

C-Ray 1.1
Total Time
Seconds, Fewer Is Better
A10-7800
SE +/- 0.02, N = 3
61.75
A10-7870K
SE +/- 0.03, N = 3
55.09
Core i3 4130
SE +/- 0.06, N = 3
54.28
Core i3 7100
SE +/- 0.02, N = 3
41.97
Core i5 3470
SE +/- 0.31, N = 3
39.00
FX-8350
SE +/- 0.01, N = 3
28.01
Core i5 4670
SE +/- 0.01, N = 3
27.40
Core i5 6500
SE +/- 0.02, N = 3
26.97
Ryzen 3 1200
SE +/- 0.01, N = 3
24.95
Core i3 8100
SE +/- 0.02, N = 3
24.65
Core i7 4770K
SE +/- 0.01, N = 3
24.51
Core i5 6600K
SE +/- 0.02, N = 3
22.83
Core i5 7600K
SE +/- 0.01, N = 3
22.25
Ryzen 3 1300X
SE +/- 0.00, N = 3
21.50
Ryzen 3 2200G
SE +/- 0.08, N = 3
21.07
Xeon Silver 4108
SE +/- 0.01, N = 3
19.69
Ryzen 5 2400G
SE +/- 0.16, N = 3
19.48
Core i7 7740X
SE +/- 0.16, N = 3
18.69
t2.2xlarge
SE +/- 0.00, N = 3
16.52
Core i5 8400
SE +/- 0.01, N = 3
15.57
Core i7 5960X
SE +/- 0.01, N = 3
13.97
Core i7 8700K
SE +/- 0.01, N = 3
12.78
Ryzen 7 1700
SE +/- 0.00, N = 3
11.23
Ryzen 7 1800X
SE +/- 0.01, N = 3
9.70
Core i9 7980XE
SE +/- 0.01, N = 3
5.46
Threadripper 1950X
SE +/- 0.00, N = 3
5.16
EPYC 7601
SE +/- 0.01, N = 3
3.47
2 x Xeon Gold 6138
SE +/- 0.00, N = 3
3.14
14
28
42
56
70
1. (CC) gcc options: -lm -lpthread -O3

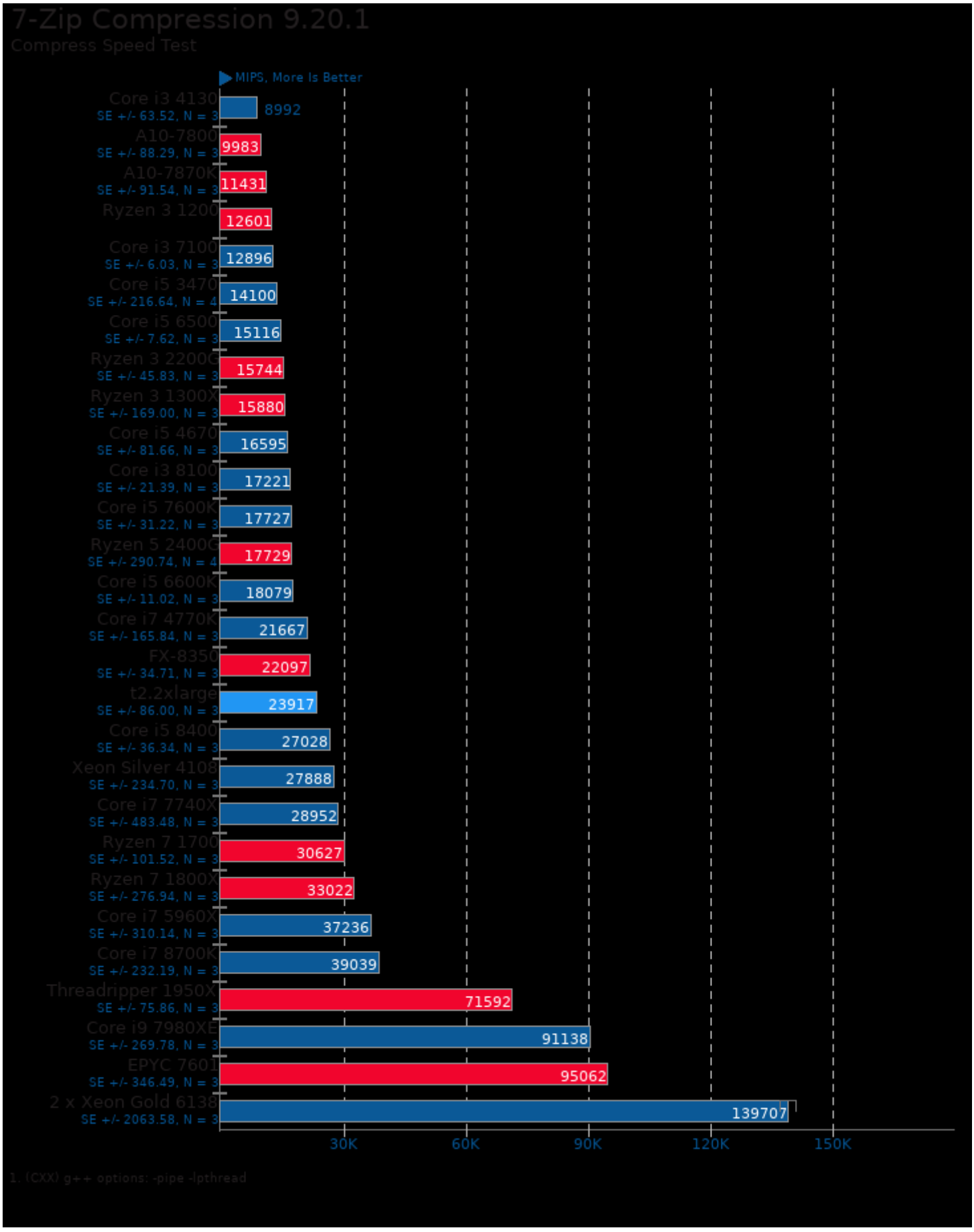

John The Ripper 1.8.0
Test: Blowfish
Real C/S, More Is Better
Core i5 3470
SE +/- 47.17, N = 3
2992
Core i3 4130
3008
A10-7800
SE +/- 5.67, N = 3
3373
Ryzen 3 1200
SE +/- 17.29, N = 3
3711
A10-7870K
SE +/- 1.67, N = 3
3775
Core i3 7100
3859
Core i5 6500
SE +/- 2.67, N = 3
4046
Core i5 4670
SE +/- 4.33, N = 3
4080
Ryzen 3 1300X
SE +/- 8.50, N = 3
4393
Core i3 8100
SE +/- 5.20, N = 3
4411
Ryzen 3 2200G
SE +/- 4.67, N = 3
4540
Core i5 6600K
SE +/- 2.89, N = 3
4785
Core i5 7600K
4910
Ryzen 5 2400G
SE +/- 96.59, N = 6
6022
t2.2xlarge
6067
Core i7 4770K
SE +/- 126.37, N = 3
6800
FX-8350
SE +/- 21.71, N = 3
6826
Core i5 8400
6998
Xeon Silver 4108
8275
Core i7 7740X
8880
Ryzen 7 1700
SE +/- 50.04, N = 3
10431
Core i7 5960X
SE +/- 1.67, N = 3
11710
Ryzen 7 1800X
SE +/- 7.54, N = 3
12445
Core i7 8700K
12758
Threadripper 1950X
SE +/- 261.31, N = 3
23001
EPYC 7601
SE +/- 67.59, N = 3
23552
Core i9 7980XE
SE +/- 5.67, N = 3
30104
2 x Xeon Gold 6138
SE +/- 543.71, N = 3
50248
11K
22K
33K
44K
55K
1. (CC) gcc options: -fopenmp -lcrypt

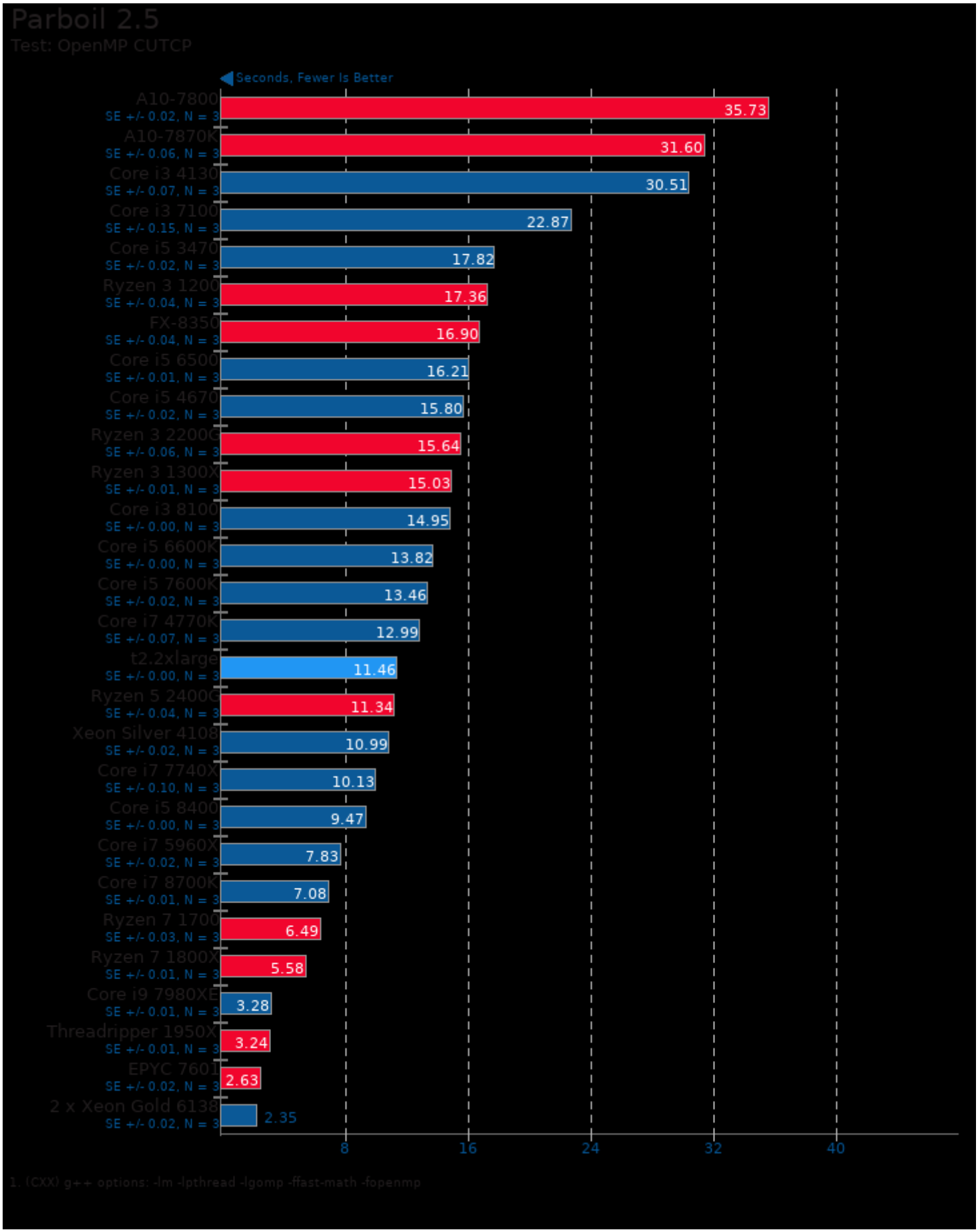
# Large Intel AMD Linux CPU Benchmark Comparison

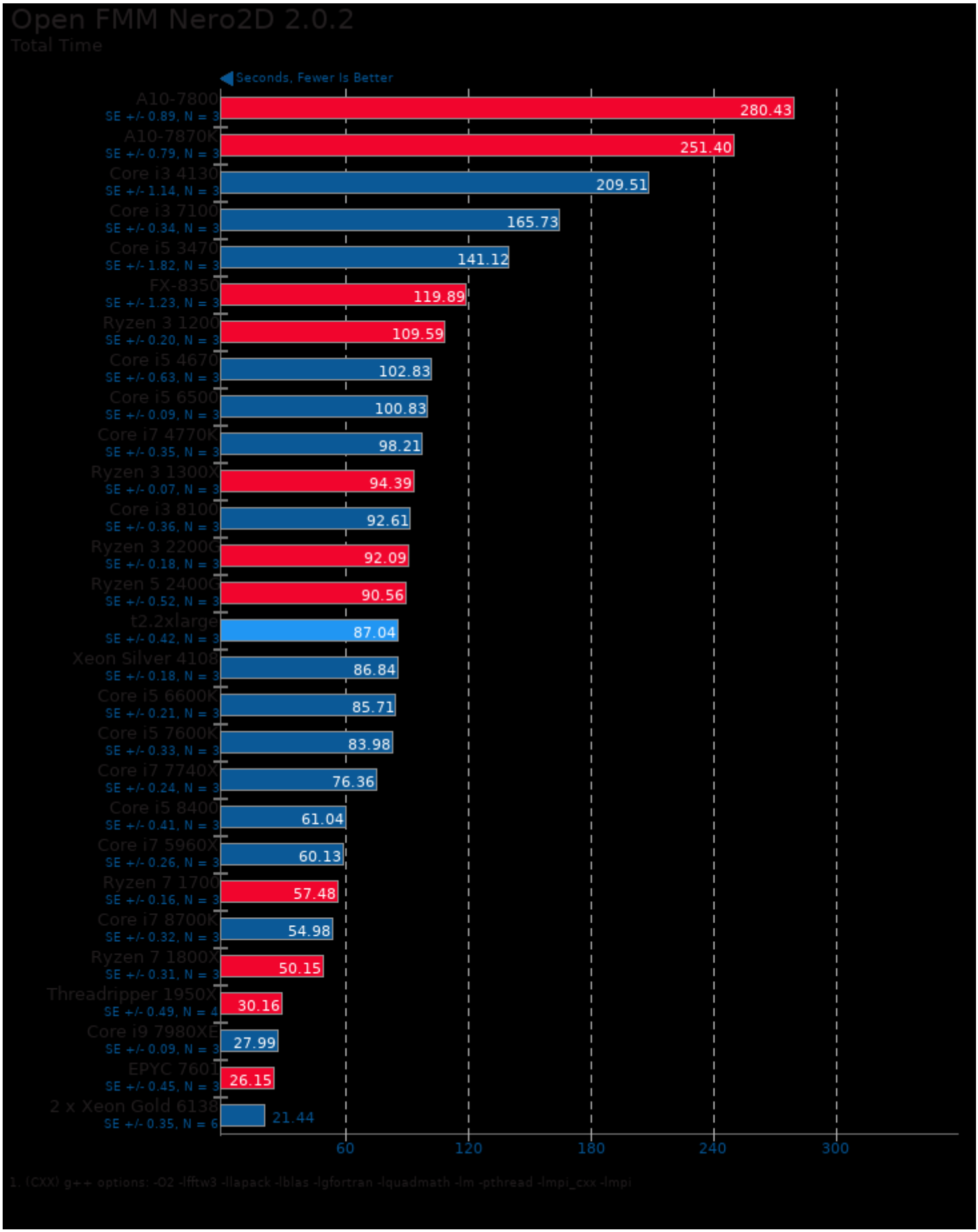


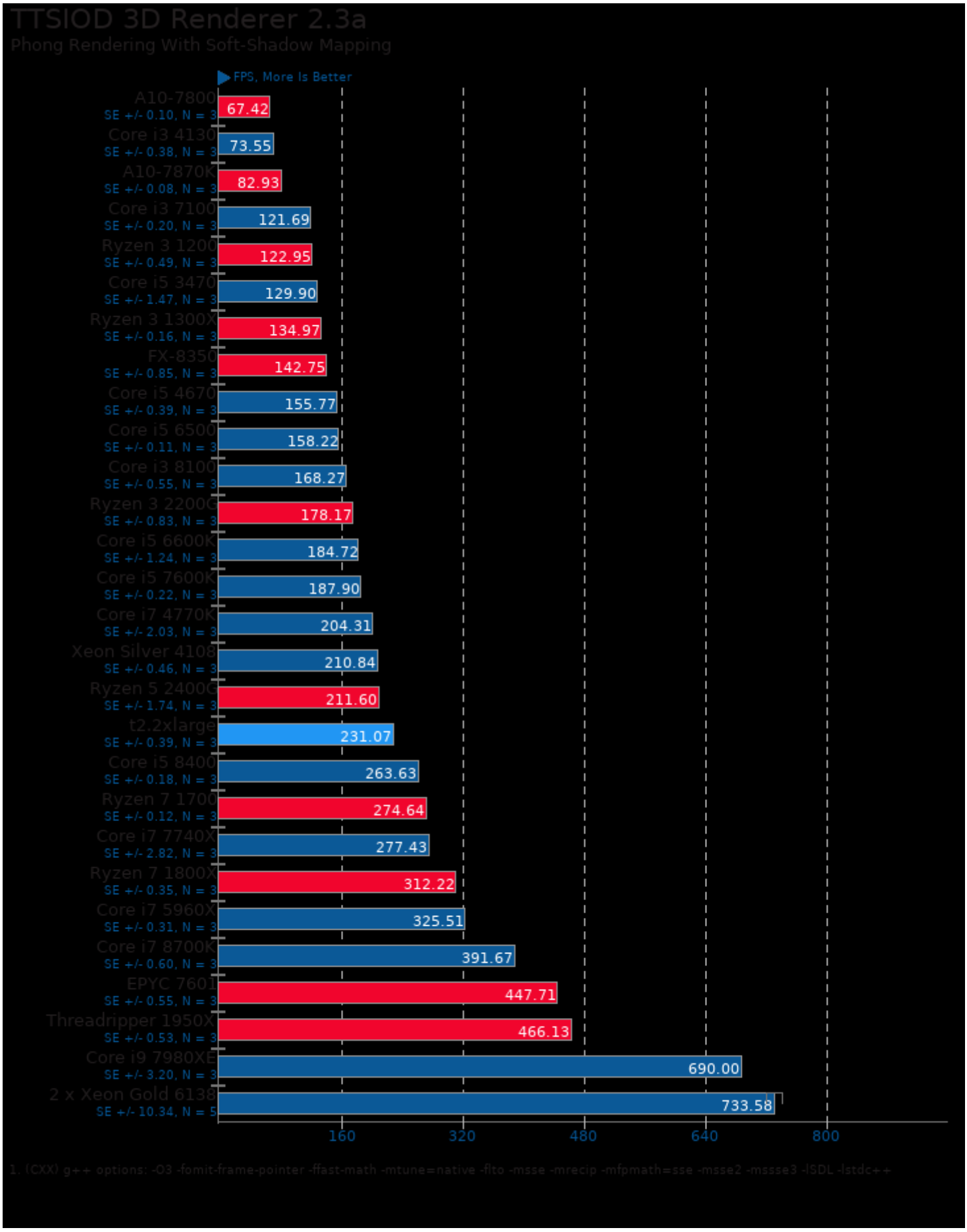
# Large Intel AMD Linux CPU Benchmark Comparison




7-Zip Compression 9.20.1
Compress Speed Test
MIPS, More Is Better
Core i3 4130
SE +/- 63.52, N = 3
8992
A10-7800
SE +/- 88.29, N = 3
9983
A10-7870K
SE +/- 91.54, N = 3
11431
Ryzen 3 1200
12601
Core i3 7100
SE +/- 6.03, N = 3
12896
Core i5 3470
SE +/- 216.64, N = 4
14100
Core i5 6500
SE +/- 7.62, N = 3
15116
Ryzen 3 2200G
SE +/- 45.83, N = 3
15744
Ryzen 3 1300X
SE +/- 169.00, N = 3
15880
Core i5 4670
SE +/- 81.66, N = 3
16595
Core i3 8100
SE +/- 21.39, N = 3
17221
Core i5 7600K
SE +/- 31.22, N = 3
17727
Ryzen 5 2400G
SE +/- 290.74, N = 4
17729
Core i5 6600K
SE +/- 11.02, N = 3
18079
Core i7 4770K
SE +/- 165.84, N = 3
21667
FX-8350
SE +/- 34.71, N = 3
22097
t2.2xlarge
SE +/- 86.00, N = 3
23917
Core i5 8400
SE +/- 36.34, N = 3
27028
Xeon Silver 4108
SE +/- 234.70, N = 3
27888
Core i7 7740X
SE +/- 483.48, N = 3
28952
Ryzen 7 1700
SE +/- 101.52, N = 3
30627
Ryzen 7 1800X
SE +/- 276.94, N = 3
33022
Core i7 5960X
SE +/- 310.14, N = 3
37236
Core i7 8700K
SE +/- 232.19, N = 3
39039
Threadripper 1950X
SE +/- 75.86, N = 3
71592
Core i9 7980XE
SE +/- 269.78, N = 3
91138
EPYC 7601
SE +/- 346.49, N = 3
95062
2 x Xeon Gold 6138
SE +/- 2063.58, N = 3
139707
30K
60K
90K
120K
150K
1. (CXX) g++ options: -pipe -lpthread


Parboil 2.5
Test: OpenMP CUTCP
Seconds, Fewer Is Better
A10-7800
SE +/- 0.02, N = 3
35.73
A10-7870K
SE +/- 0.06, N = 3
31.60
Core i3 4130
SE +/- 0.07, N = 3
30.51
Core i3 7100
SE +/- 0.15, N = 3
22.87
Core i5 3470
SE +/- 0.02, N = 3
17.82
Ryzen 3 1200
SE +/- 0.04, N = 3
17.36
FX-8350
SE +/- 0.04, N = 3
16.90
Core i5 6500
SE +/- 0.01, N = 3
16.21
Core i5 4670
SE +/- 0.02, N = 3
15.80
Ryzen 3 2200G
SE +/- 0.06, N = 3
15.64
Ryzen 3 1300X
SE +/- 0.01, N = 3
15.03
Core i3 8100
SE +/- 0.00, N = 3
14.95
Core i5 6600K
SE +/- 0.00, N = 3
13.82
Core i5 7600K
SE +/- 0.02, N = 3
13.46
Core i7 4770K
SE +/- 0.07, N = 3
12.99
t2.2xlarge
SE +/- 0.00, N = 3
11.46
Ryzen 5 2400G
SE +/- 0.04, N = 3
11.34
Xeon Silver 4108
SE +/- 0.02, N = 3
10.99
Core i7 7740X
SE +/- 0.10, N = 3
10.13
Core i5 8400
SE +/- 0.00, N = 3
9.47
Core i7 5960X
SE +/- 0.02, N = 3
7.83
Core i7 8700K
SE +/- 0.01, N = 3
7.08
Ryzen 7 1700
SE +/- 0.03, N = 3
6.49
Ryzen 7 1800X
SE +/- 0.01, N = 3
5.58
Core i9 7980XE
SE +/- 0.01, N = 3
3.28
Threadripper 1950X
SE +/- 0.01, N = 3
3.24
EPYC 7601
SE +/- 0.02, N = 3
2.63
2 x Xeon Gold 6138
SE +/- 0.02, N = 3
2.35
8
16
24
32
40
1. (CXX) g++ options: -lm -lpthread -lgomp -ffast-math -fopenmp

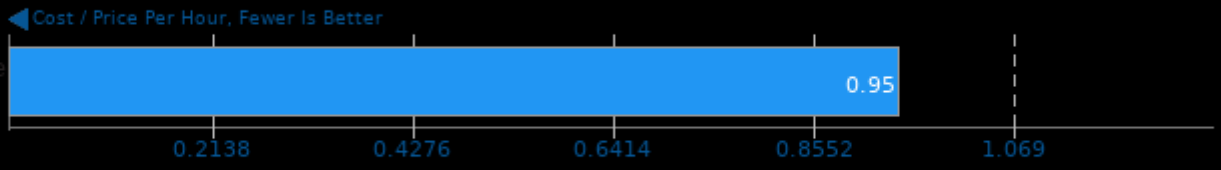

Open FMM Nero2D 2.0.2
Total Time
Seconds, Fewer Is Better
A10-7800
SE +/- 0.89, N = 3
280.43
A10-7870K
SE +/- 0.79, N = 3
251.40
Core i3 4130
SE +/- 1.14, N = 3
209.51
Core i3 7100
SE +/- 0.34, N = 3
165.73
Core i5 3470
SE +/- 1.82, N = 3
141.12
FX-8350
SE +/- 1.23, N = 3
119.89
Ryzen 3 1200
SE +/- 0.20, N = 3
109.59
Core i5 4670
SE +/- 0.63, N = 3
102.83
Core i5 6500
SE +/- 0.09, N = 3
100.83
Core i7 4770K
SE +/- 0.35, N = 3
98.21
Ryzen 3 1300X
SE +/- 0.07, N = 3
94.39
Core i3 8100
SE +/- 0.36, N = 3
92.61
Ryzen 3 2200G
SE +/- 0.18, N = 3
92.09
Ryzen 5 2400G
SE +/- 0.52, N = 3
90.56
t2.2xlarge
SE +/- 0.42, N = 3
87.04
Xeon Silver 4108
SE +/- 0.18, N = 3
86.84
Core i5 6600K
SE +/- 0.21, N = 3
85.71
Core i5 7600K
SE +/- 0.33, N = 3
83.98
Core i7 7740X
SE +/- 0.24, N = 3
76.36
Core i5 8400
SE +/- 0.41, N = 3
61.04
Core i7 5960X
SE +/- 0.26, N = 3
60.13
Ryzen 7 1700
SE +/- 0.16, N = 3
57.48
Core i7 8700K
SE +/- 0.32, N = 3
54.98
Ryzen 7 1800X
SE +/- 0.31, N = 3
50.15
Threadripper 1950X
SE +/- 0.49, N = 4
30.16
Core i9 7980XE
SE +/- 0.09, N = 3
27.99
EPYC 7601
SE +/- 0.45, N = 3
26.15
2 x Xeon Gold 6138
SE +/- 0.35, N = 6
21.44
60
120
180
240
300
1. (CXX) g++ options: -O2 -lfftw3 -llapack -lblas -lgfortran -lquadmath -lm -pthread -lmpi_cxx -lmpi


TTSIOD 3D Renderer 2.3a
Phong Rendering With Soft-Shadow Mapping
FPS, More Is Better
A10-7800
SE +/- 0.10, N = 3
67.42
Core i3 4130
SE +/- 0.38, N = 3
73.55
A10-7870K
SE +/- 0.08, N = 3
82.93
Core i3 7100
SE +/- 0.20, N = 3
121.69
Ryzen 3 1200
SE +/- 0.49, N = 3
122.95
Core i5 3470
SE +/- 1.47, N = 3
129.90
Ryzen 3 1300X
SE +/- 0.16, N = 3
134.97
FX-8350
SE +/- 0.85, N = 3
142.75
Core i5 4670
SE +/- 0.39, N = 3
155.77
Core i5 6500
SE +/- 0.11, N = 3
158.22
Core i3 8100
SE +/- 0.55, N = 3
168.27
Ryzen 3 2200G
SE +/- 0.83, N = 3
178.17
Core i5 6600K
SE +/- 1.24, N = 3
184.72
Core i5 7600K
SE +/- 0.22, N = 3
187.90
Core i7 4770K
SE +/- 2.03, N = 3
204.31
Xeon Silver 4108
SE +/- 0.46, N = 3
210.84
Ryzen 5 2400G
SE +/- 1.74, N = 3
211.60
t2.2xlarge
SE +/- 0.39, N = 3
231.07
Core i5 8400
SE +/- 0.18, N = 3
263.63
Ryzen 7 1700
SE +/- 0.12, N = 3
274.64
Core i7 7740X
SE +/- 2.82, N = 3
277.43
Ryzen 7 1800X
SE +/- 0.35, N = 3
312.22
Core i7 5960X
SE +/- 0.31, N = 3
325.51
Core i7 8700K
SE +/- 0.60, N = 3
391.67
EPYC 7601
SE +/- 0.55, N = 3
447.71
Threadripper 1950X
SE +/- 0.53, N = 3
466.13
Core i9 7980XE
SE +/- 3.20, N = 3
690.00
2 x Xeon Gold 6138
SE +/- 10.34, N = 5
733.58
160
320
480
640
800
1. (CXX) g++ options: -O3 -fomit-frame-pointer -ffast-math -mtune=native -flto -msse -mrecip -mfpmath=sse -msse2 -mssse3 -lSDL -lstdc++

# Large Intel AMD Linux CPU Benchmark Comparison

## Cost To Run Tests

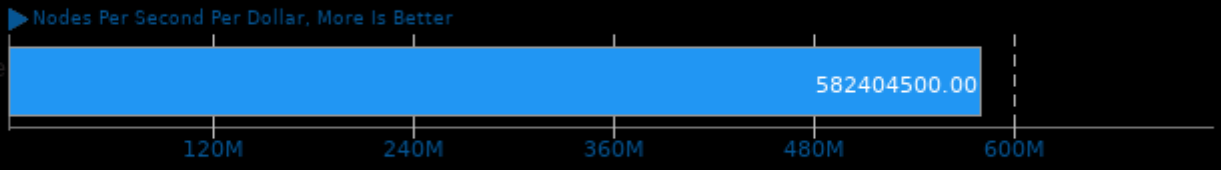
Cost / Price Per Hour




1. $0.3712 reported cost per hour, running tests consumed 2 Hours, 33 Minutes, 44 Seconds: cost approximately 0.95 dollar.

## Crafty 25.2

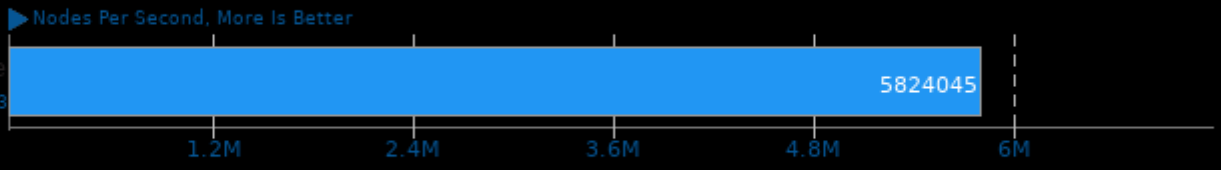
Performance / Cost - Elapsed Time




1. $0.3712 reported cost per hour, test consumed 1 Minute, 49 Seconds: cost approximately 0.01 dollar.

## Crafty 25.2

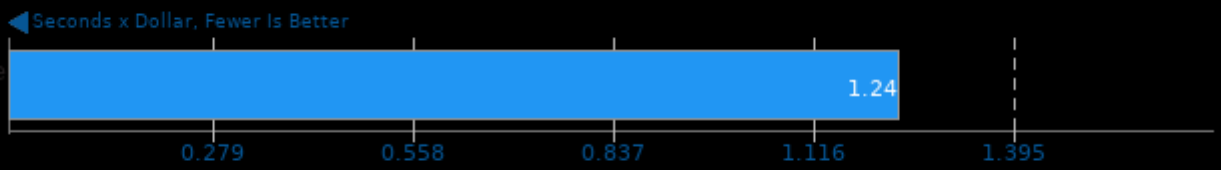
Elapsed Time




1. (CC) gcc options: -lstdc++ -fprofile-use -pthread -lm

## AOBench

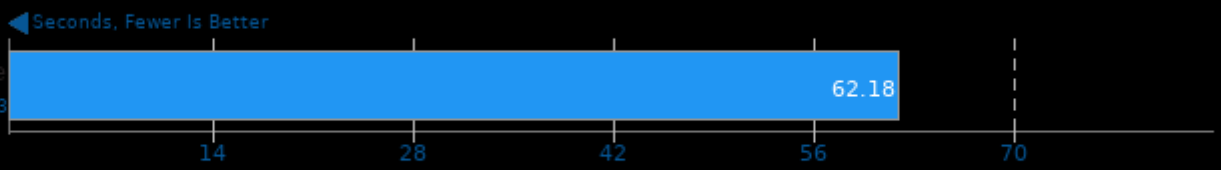
Performance / Cost - Size: 2048 x 2048 - Total Time




1. $0.3712 reported cost per hour, test consumed 3 Minutes, 11 Seconds: cost approximately 0.02 dollar.

## AOBench

Size: 2048 x 2048 - Total Time

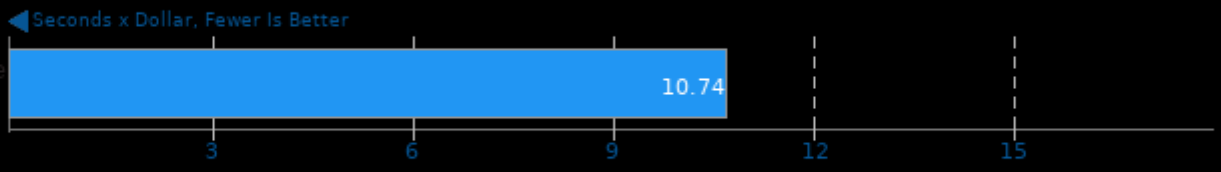



1. (CC) gcc options: -lm -O3

# Large Intel AMD Linux CPU Benchmark Comparison

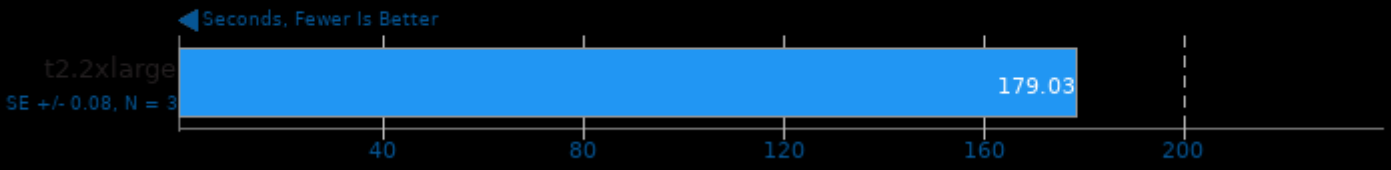
## Scikit-Learn 0.17.1

Performance / Cost -



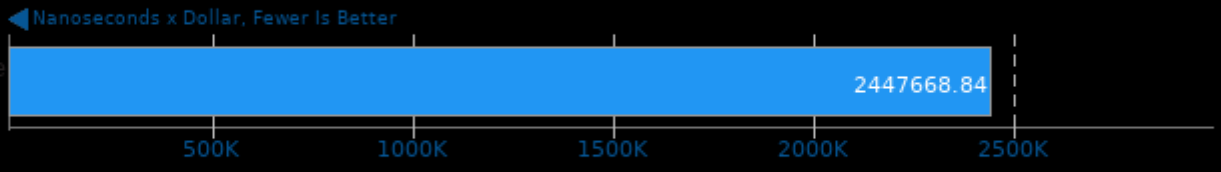

1. $0.3712 reported cost per hour, test consumed 9 Minutes, 2 Seconds: cost approximately 0.06 dollar.

## Scikit-Learn 0.17.1



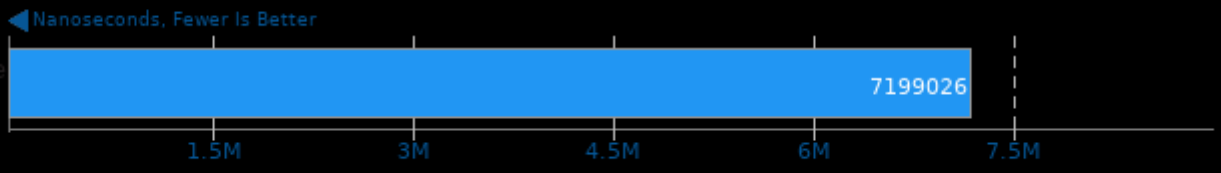

## Numpy Benchmark

Performance / Cost -



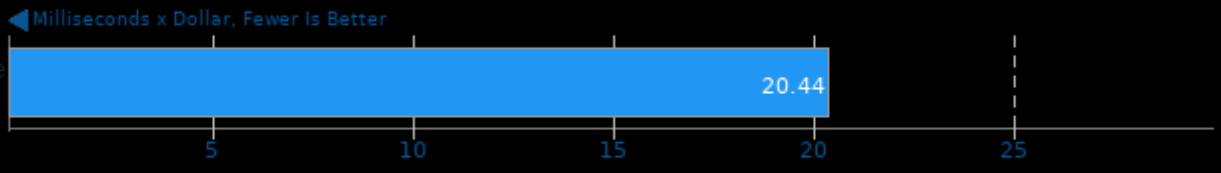

1. $0.3712 reported cost per hour, test consumed 55 Minutes, 39 Seconds: cost approximately 0.34 dollar.

## Numpy Benchmark



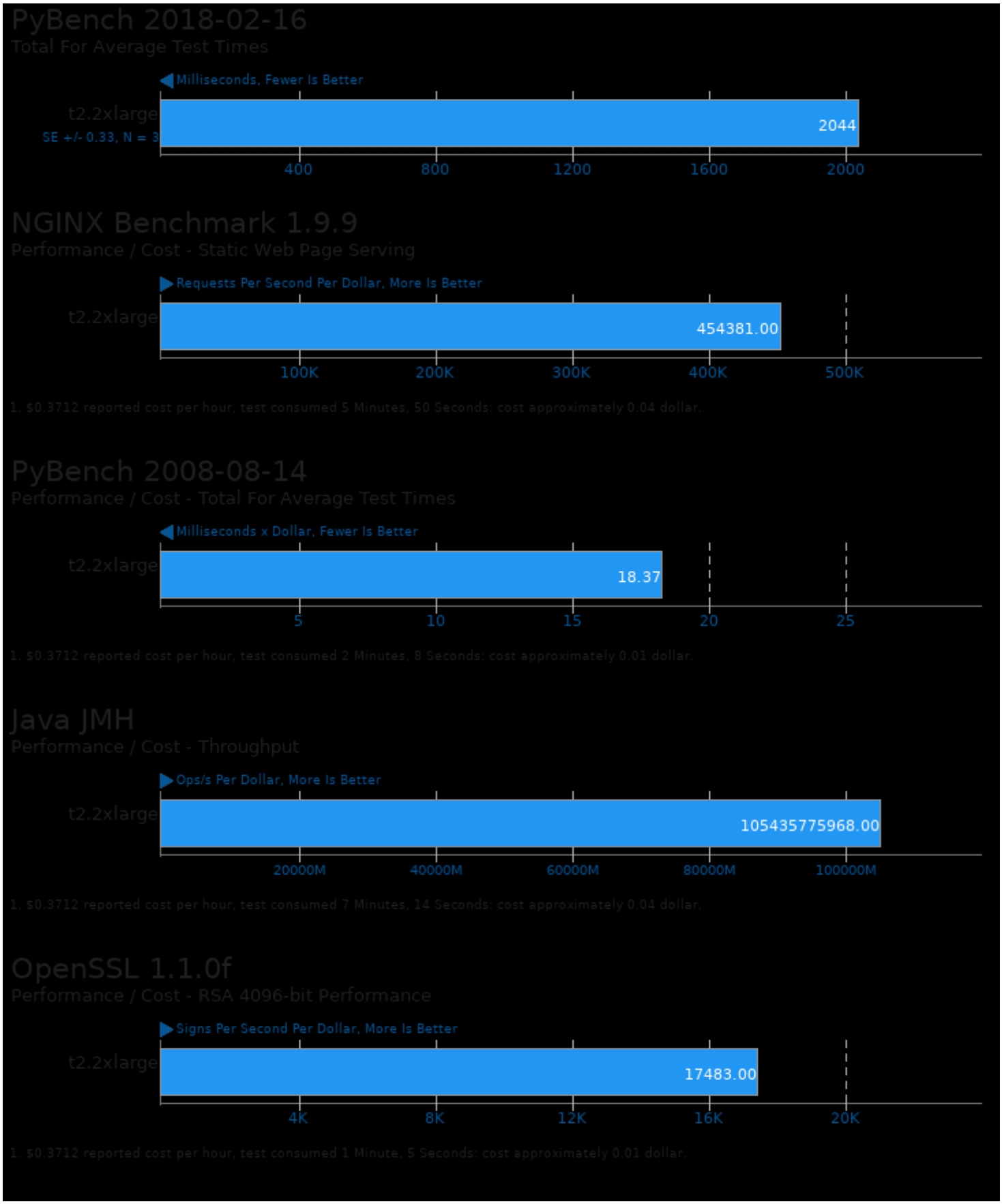

## PyBench 2018-02-16

Performance / Cost - Total For Average Test Times




1. $0.3712 reported cost per hour, test consumed 2 Minutes, 24 Seconds: cost approximately 0.01 dollar.

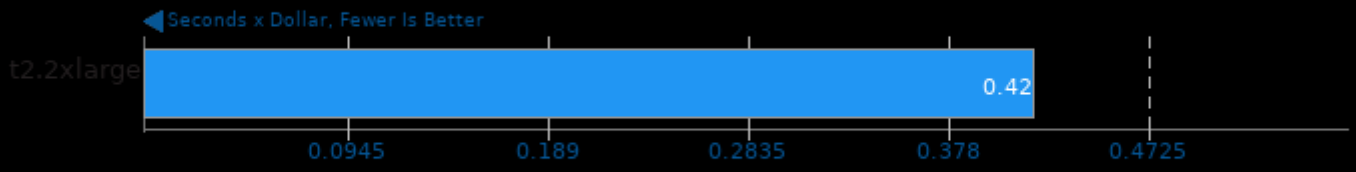
# Large Intel AMD Linux CPU Benchmark Comparison



# Large Intel AMD Linux CPU Benchmark Comparison

## LAME MP3 Encoding 3.100

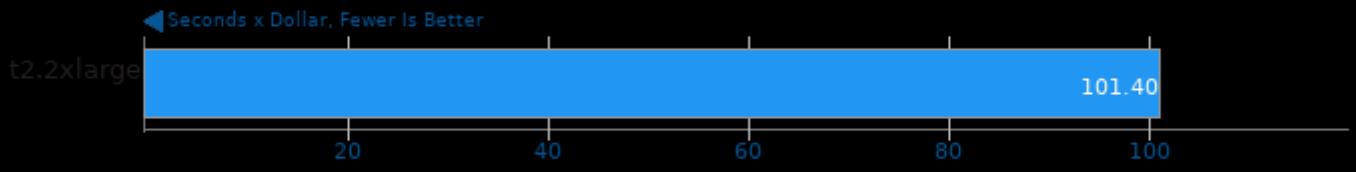
Performance / Cost - WAV To MP3




1. $0.3712 reported cost per hour, test consumed 2 Minutes, 10 Seconds: cost approximately 0.01 dollar.

## POV-Ray 3.7.0.7

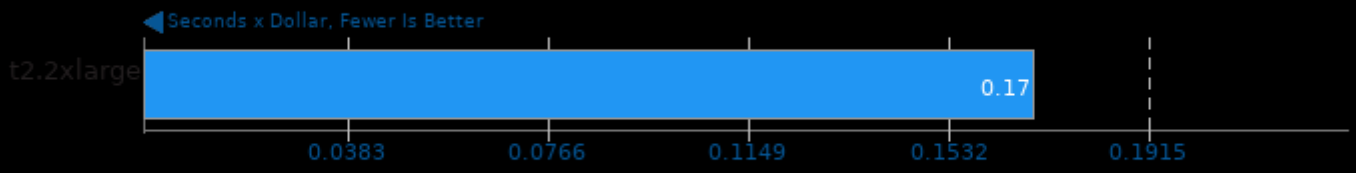
Performance / Cost - Trace Time




1. $0.3712 reported cost per hour, test consumed 28 Minutes, 22 Seconds: cost approximately 0.18 dollar.

## C-Ray 1.1

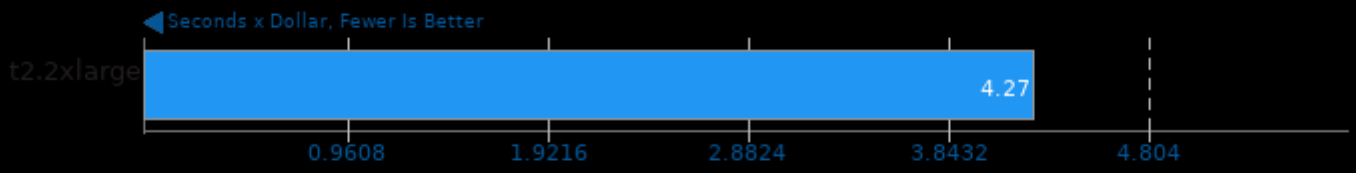
Performance / Cost - Total Time




1. $0.3712 reported cost per hour, test consumed 54 Seconds: cost approximately 0.01 dollar.

## Timed Linux Kernel Compilation 4.13

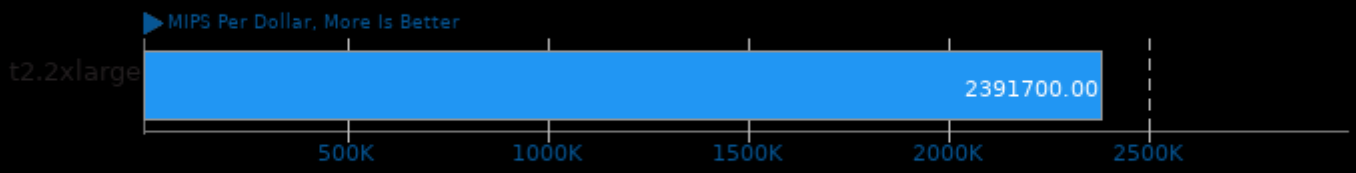
Performance / Cost - Time To Compile




1. $0.3712 reported cost per hour, test consumed 5 Minutes, 41 Seconds: cost approximately 0.04 dollar.

## 7-Zip Compression 9.20.1

Performance / Cost - Compress Speed Test

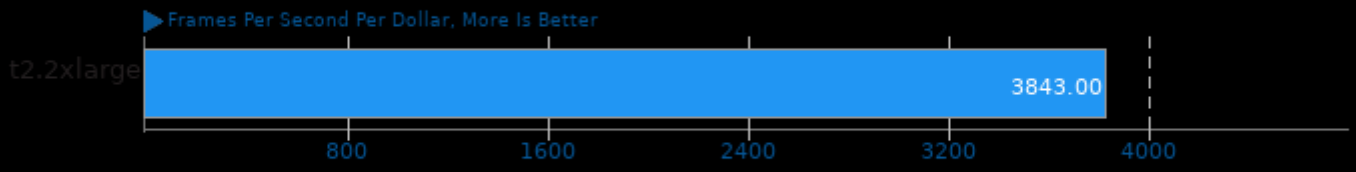



1. $0.3712 reported cost per hour, test consumed 1 Minute, 14 Seconds: cost approximately 0.01 dollar.

# Large Intel AMD Linux CPU Benchmark Comparison

## x264 2018-02-05

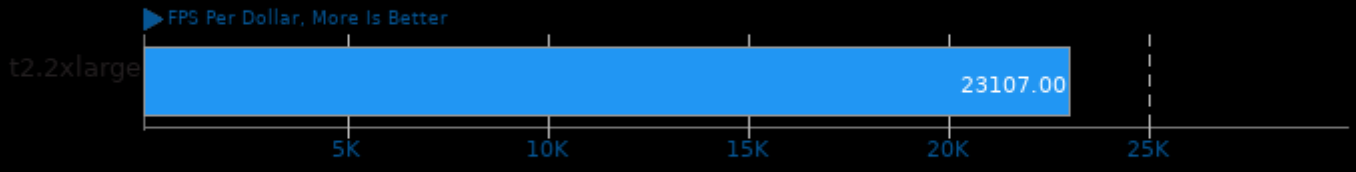
Performance / Cost - H.264 Video Encoding




1. $0.3712 reported cost per hour, test consumed 51 Seconds: cost approximately 0.01 dollar.

## TTSIOD 3D Renderer 2.3a

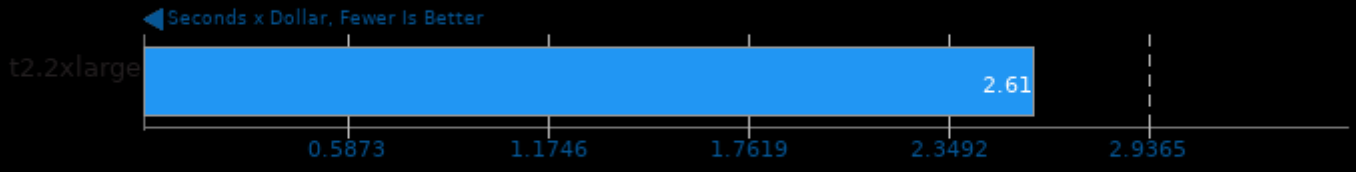
Performance / Cost - Phong Rendering With Soft-Shadow Mapping




1. $0.3712 reported cost per hour, test consumed 1 Minute, 26 Seconds: cost approximately 0.01 dollar.

## Open FMM Nero2D 2.0.2

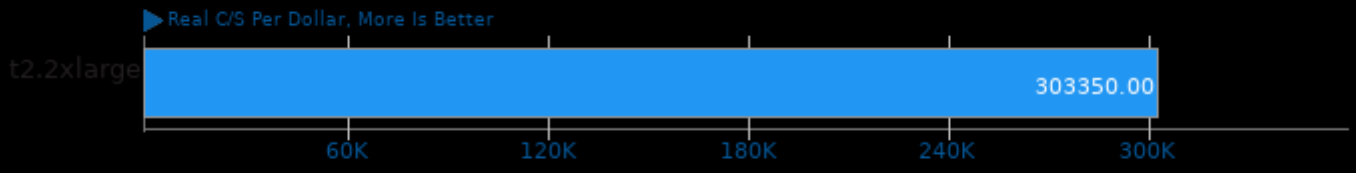
Performance / Cost - Total Time




1. $0.3712 reported cost per hour, test consumed 4 Minutes, 26 Seconds: cost approximately 0.03 dollar.

## John The Ripper 1.8.0

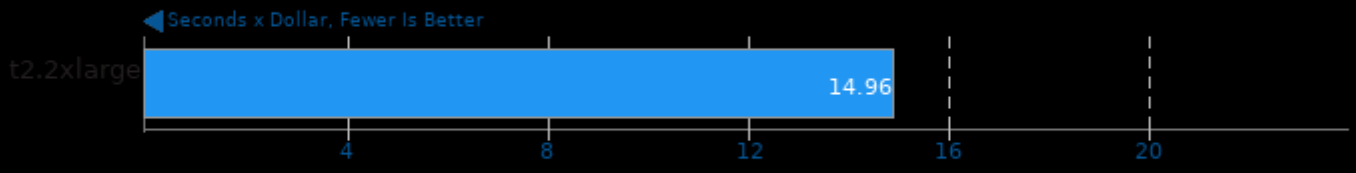
Performance / Cost - Test: Blowfish




1. $0.3712 reported cost per hour, test consumed 3 Minutes, 19 Seconds: cost approximately 0.02 dollar.

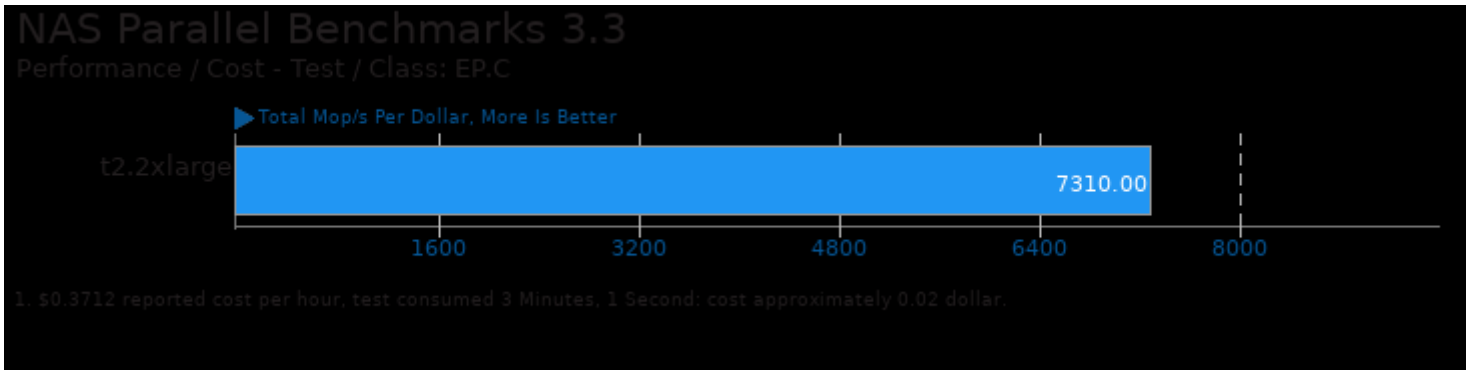
## Rodinia 2.4

Performance / Cost - Test: OpenMP LavaMD



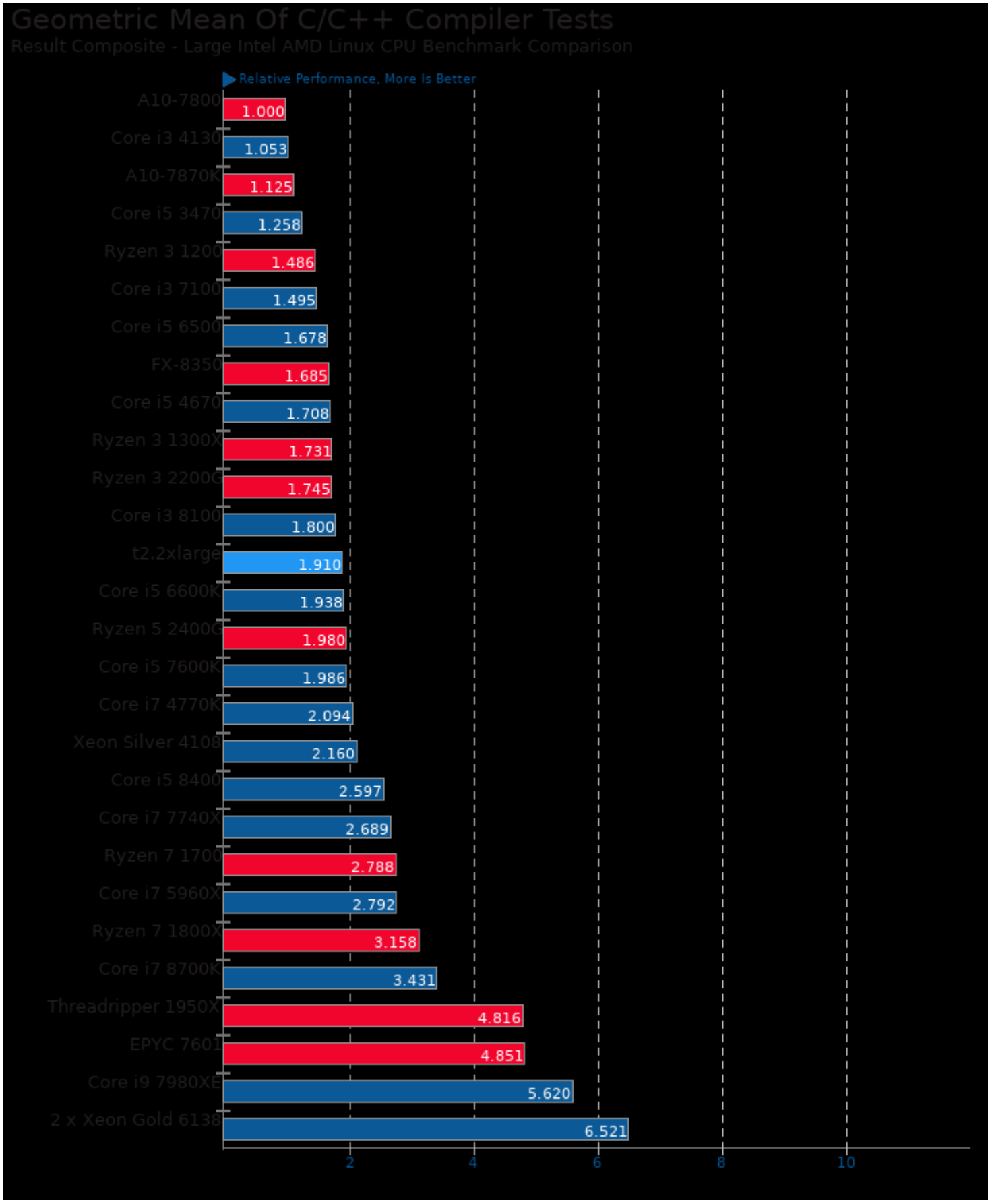

1. $0.3712 reported cost per hour, test consumed 10 Minutes, 46 Seconds: cost approximately 0.07 dollar.

# Large Intel AMD Linux CPU Benchmark Comparison



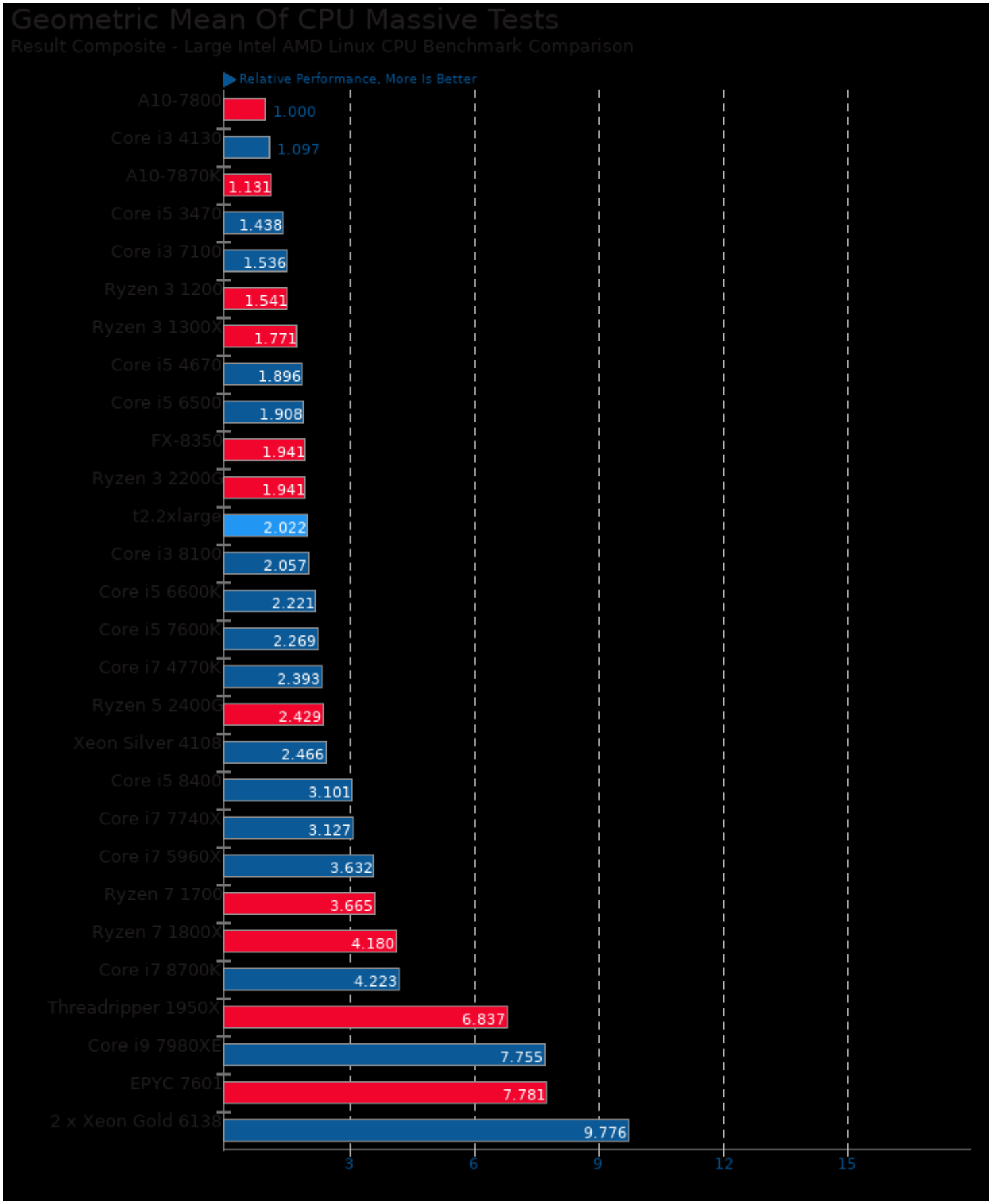
# Large Intel AMD Linux CPU Benchmark Comparison

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



# Large Intel AMD Linux CPU Benchmark Comparison

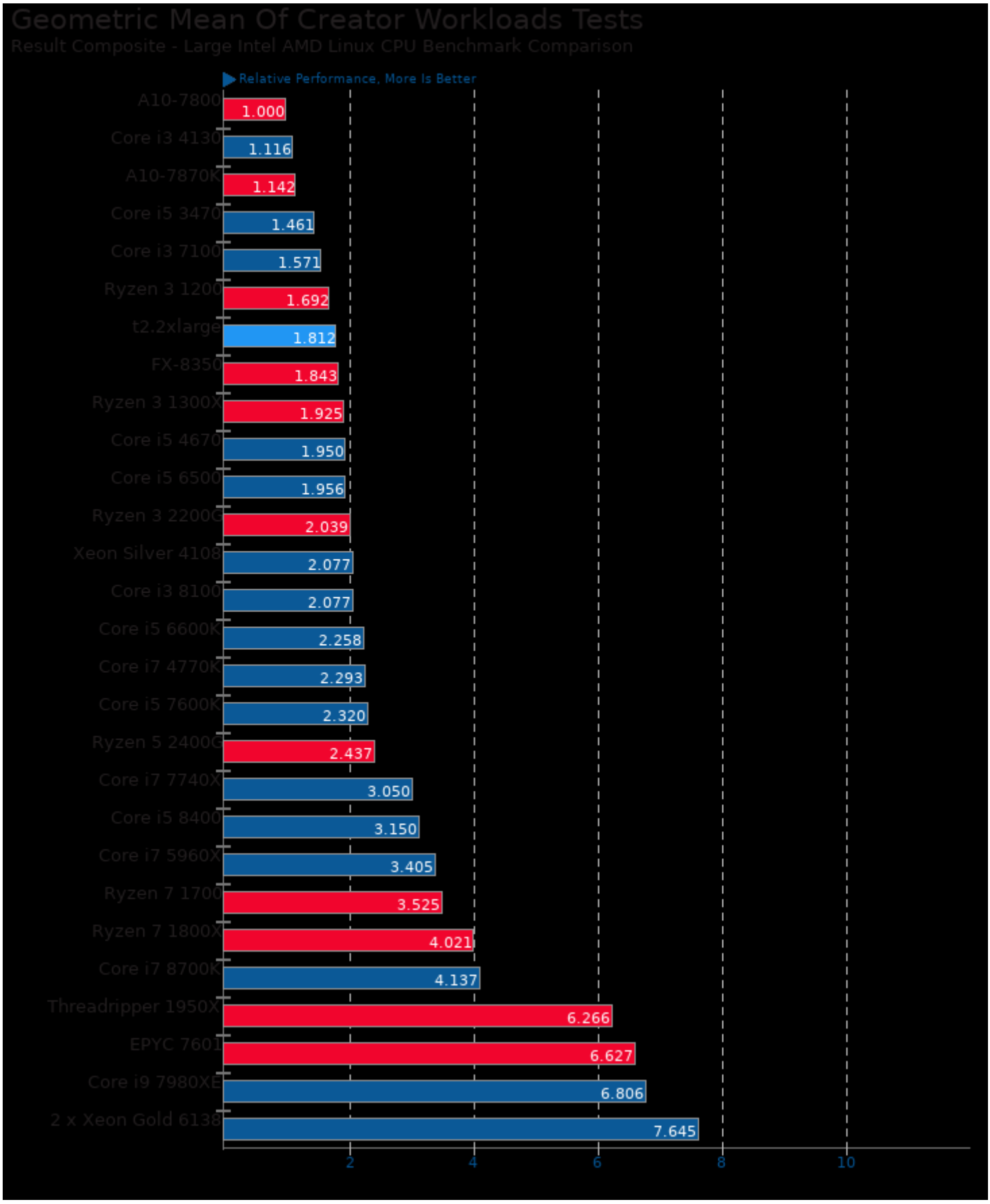
Geometric mean based upon tests: pts/mafft, pts/aobench, pts/c-ray, pts/compress-7zip, pts/encode-mp3, pts/john-the-ripper, pts/x264, pts/openssl and pts/nginx




Geometric mean based upon tests: pts/build-linux-kernel, pts/c-ray, pts/compress-7zip, pts/crafty, pts/x264, pts/encode-mp3, pts/john-the-ripper, pts/openssl, pts/mafft, pts/nero2d, pts/nginx, pts/npb, pts/numpy, pts/parboil,

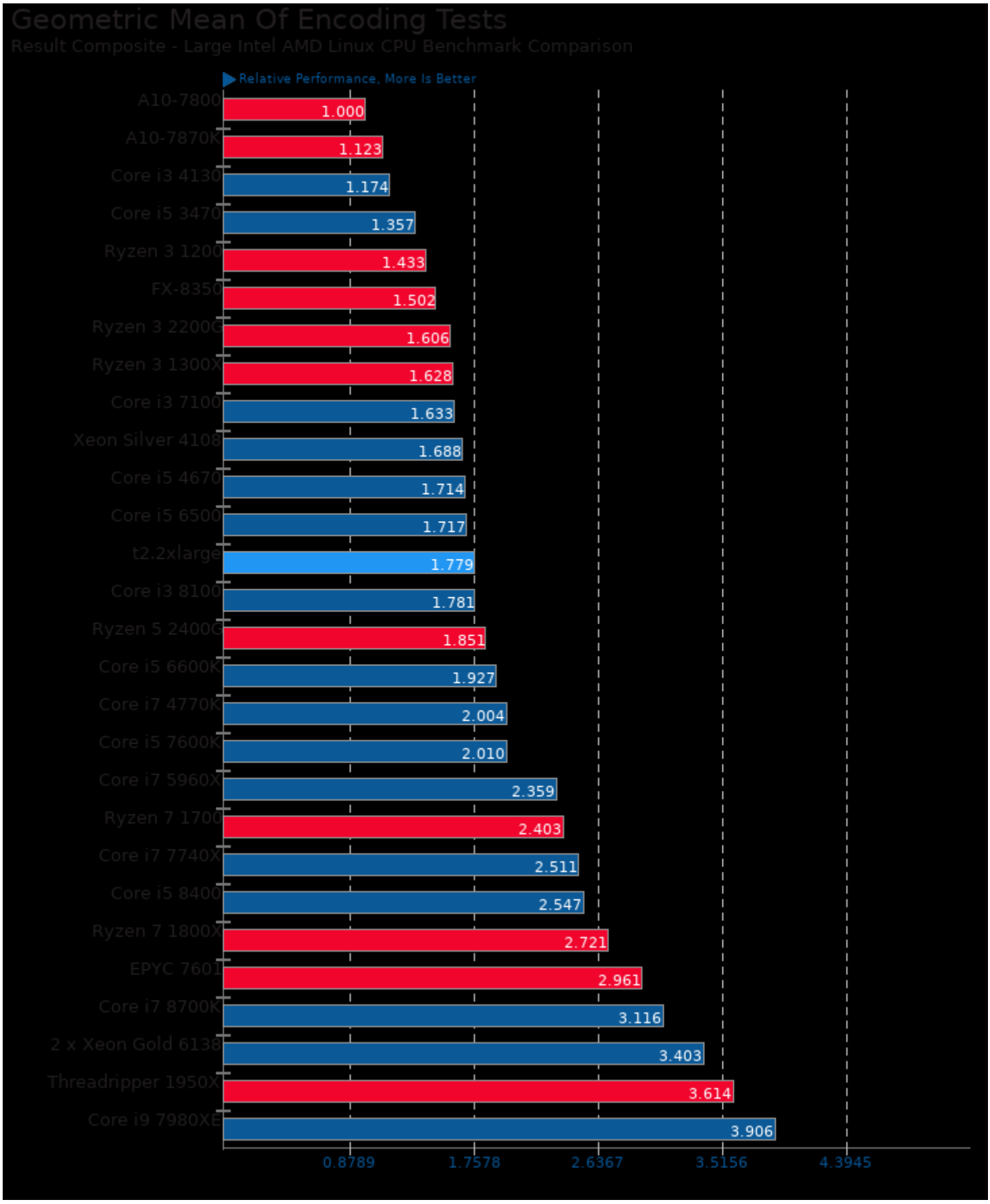
# Large Intel AMD Linux CPU Benchmark Comparison

pts/povray, pts/rodinia, pts/scikit-learn and pts/ttsiod-renderer



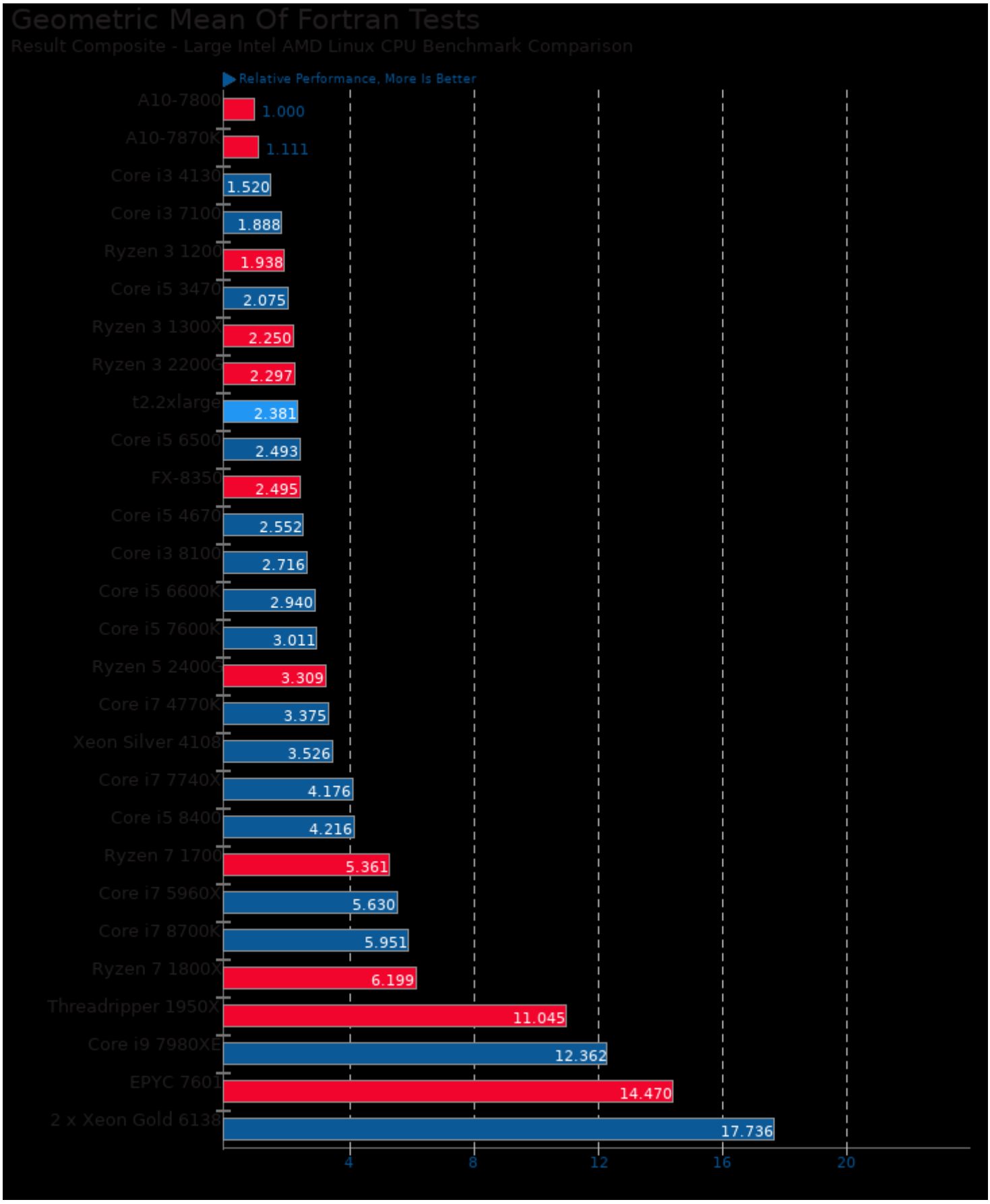
# Large Intel AMD Linux CPU Benchmark Comparison

Geometric mean based upon tests: pts/c-ray, pts/povray, pts/aobench, pts/ttsiod-renderer, pts/x264 and pts/encode-mp3



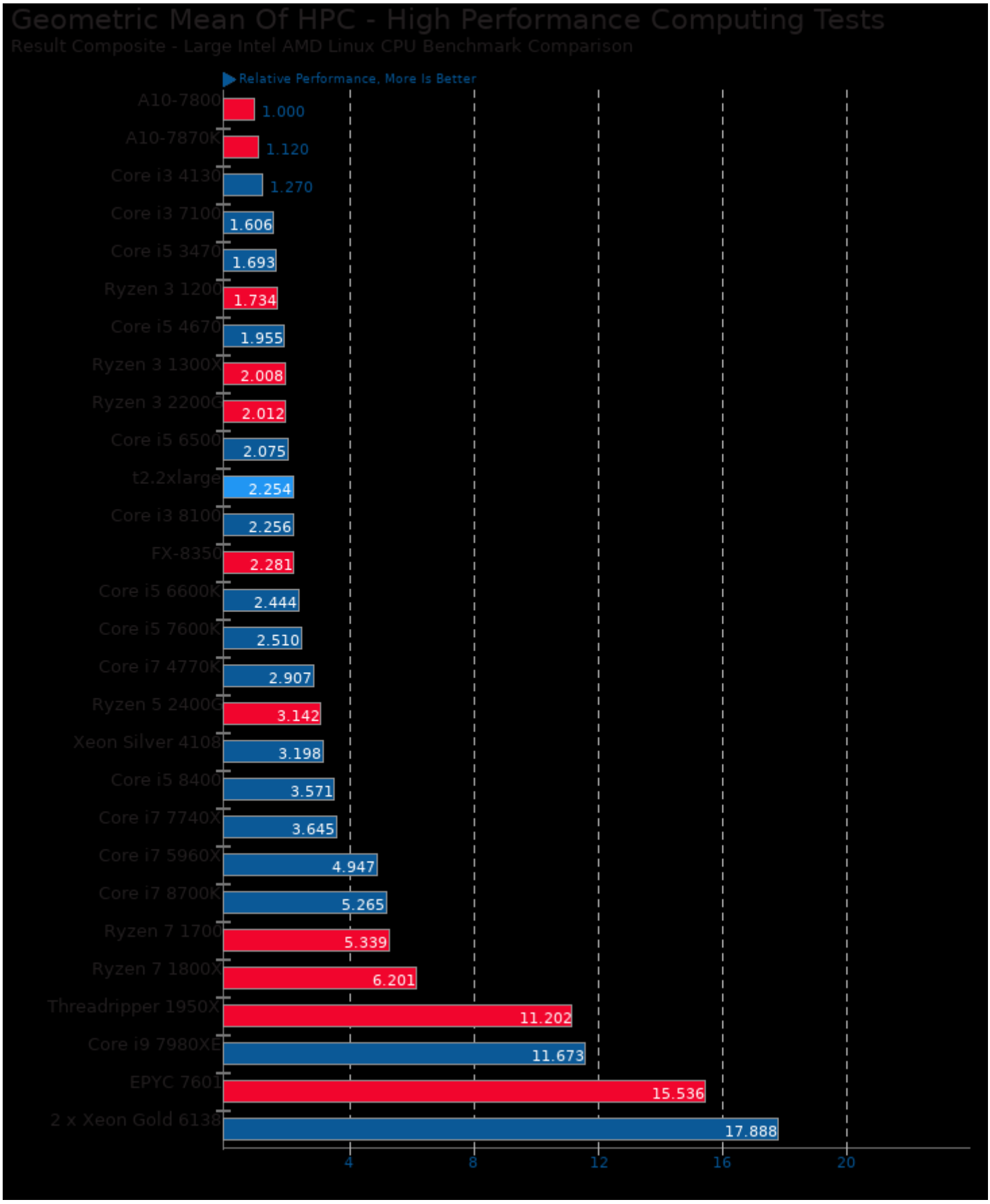
# Large Intel AMD Linux CPU Benchmark Comparison

Geometric mean based upon tests: pts/encode-mp3 and pts/x264



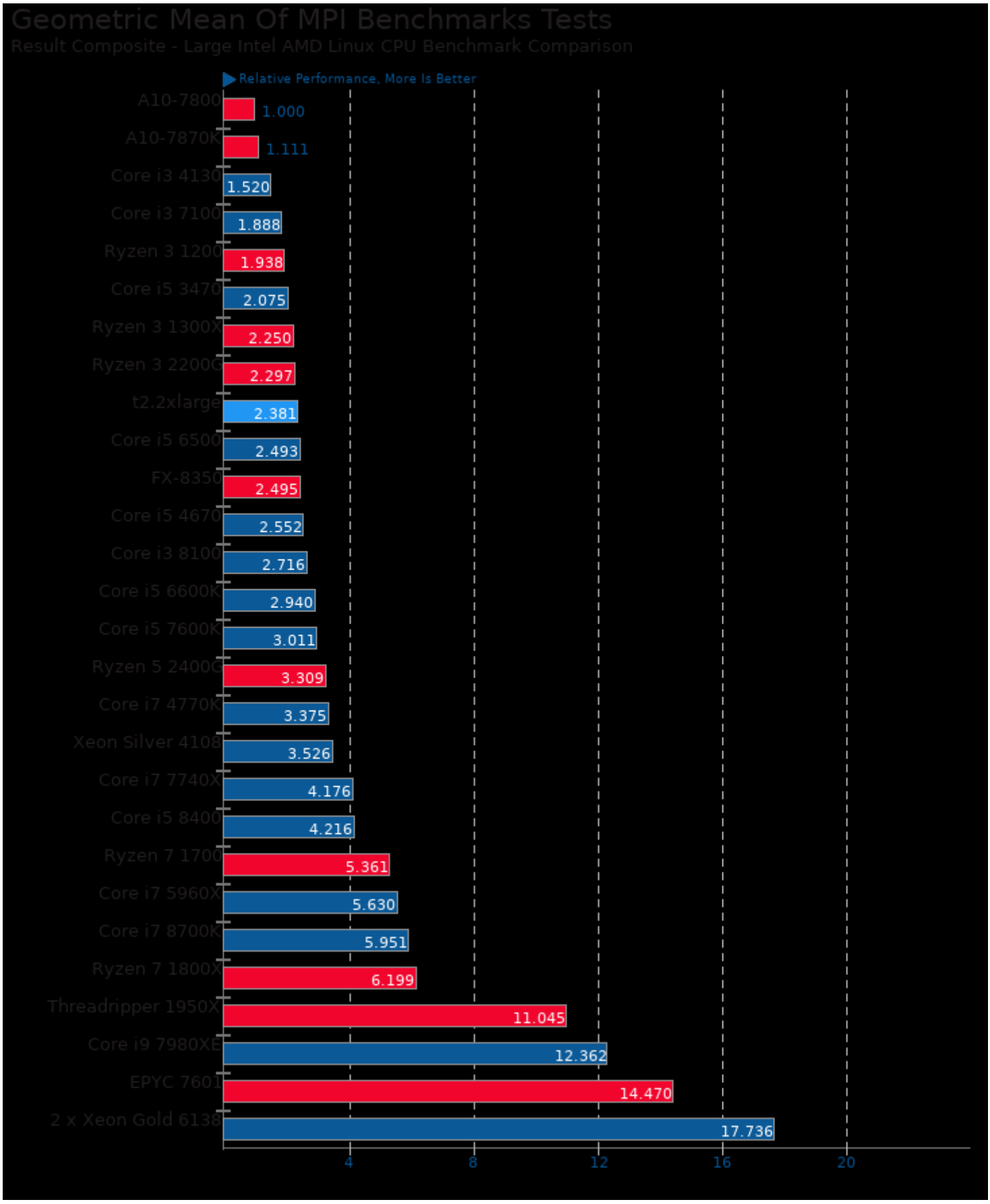
# Large Intel AMD Linux CPU Benchmark Comparison

Geometric mean based upon tests: pts/npb and pts/nero2d



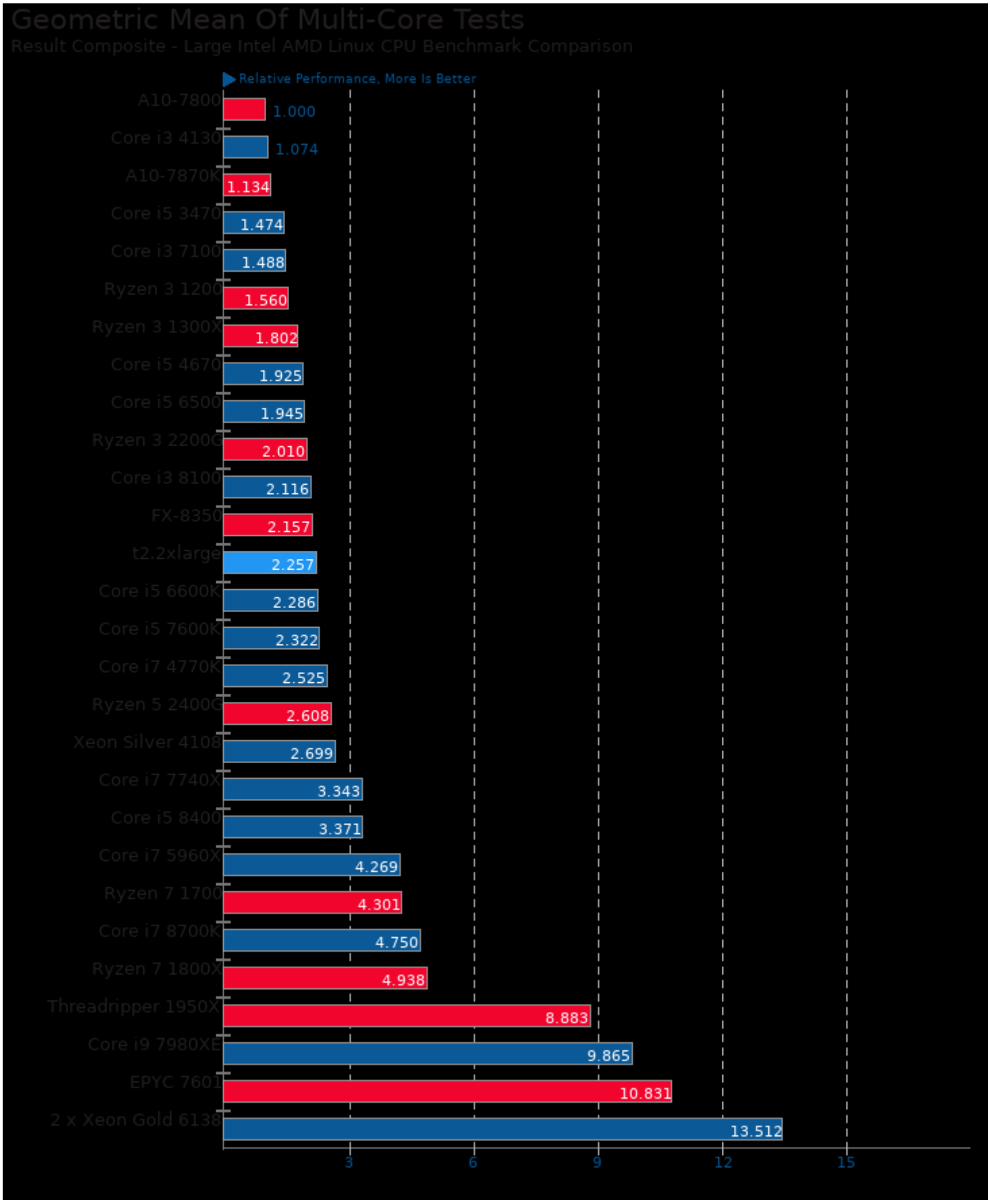
# Large Intel AMD Linux CPU Benchmark Comparison

Geometric mean based upon tests: pts/npb, pts/rodinia, pts/parboil, pts/mafft, pts/numpy and pts/scikit-learn



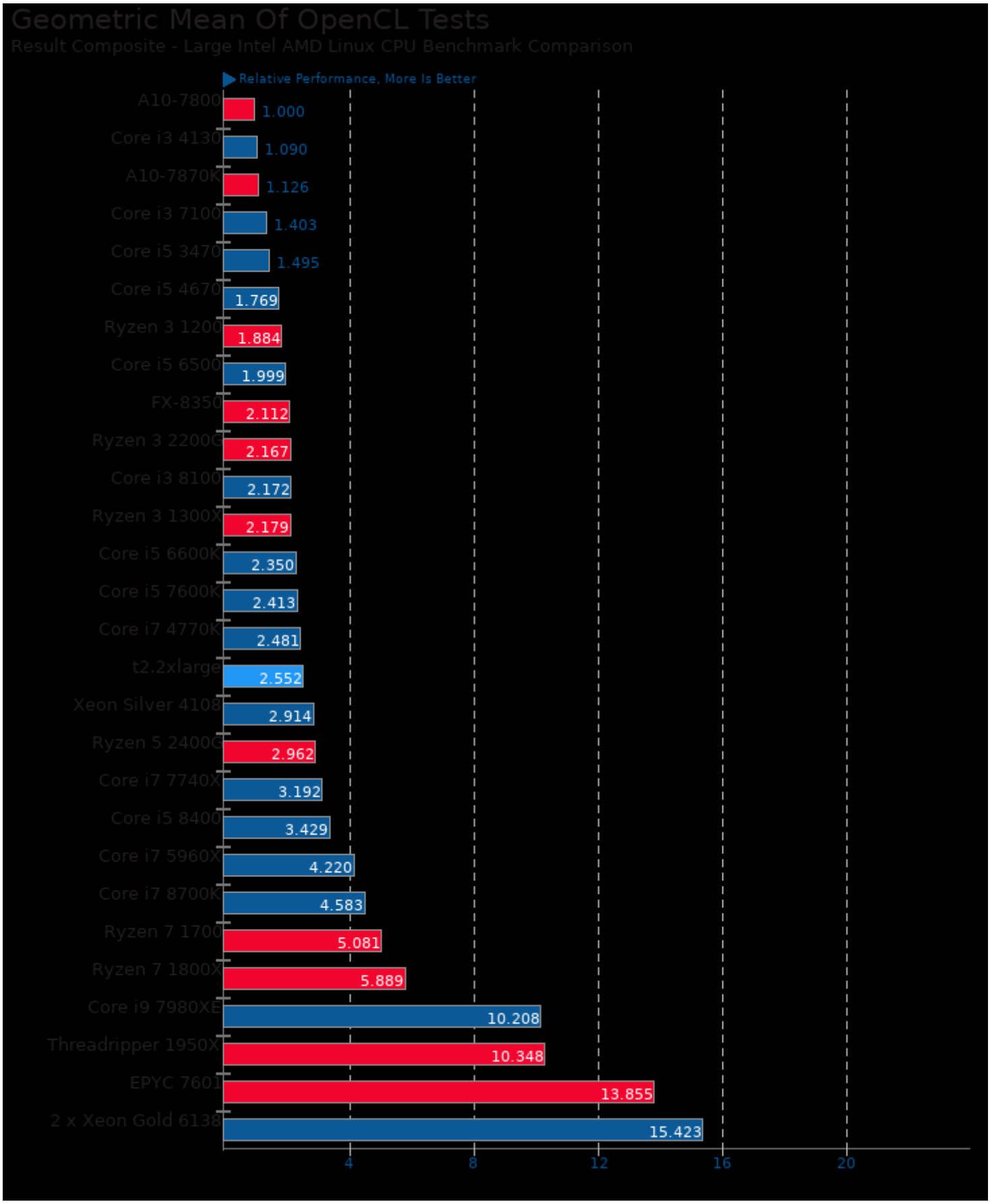
# Large Intel AMD Linux CPU Benchmark Comparison

Geometric mean based upon tests: pts/nero2d and pts/npb

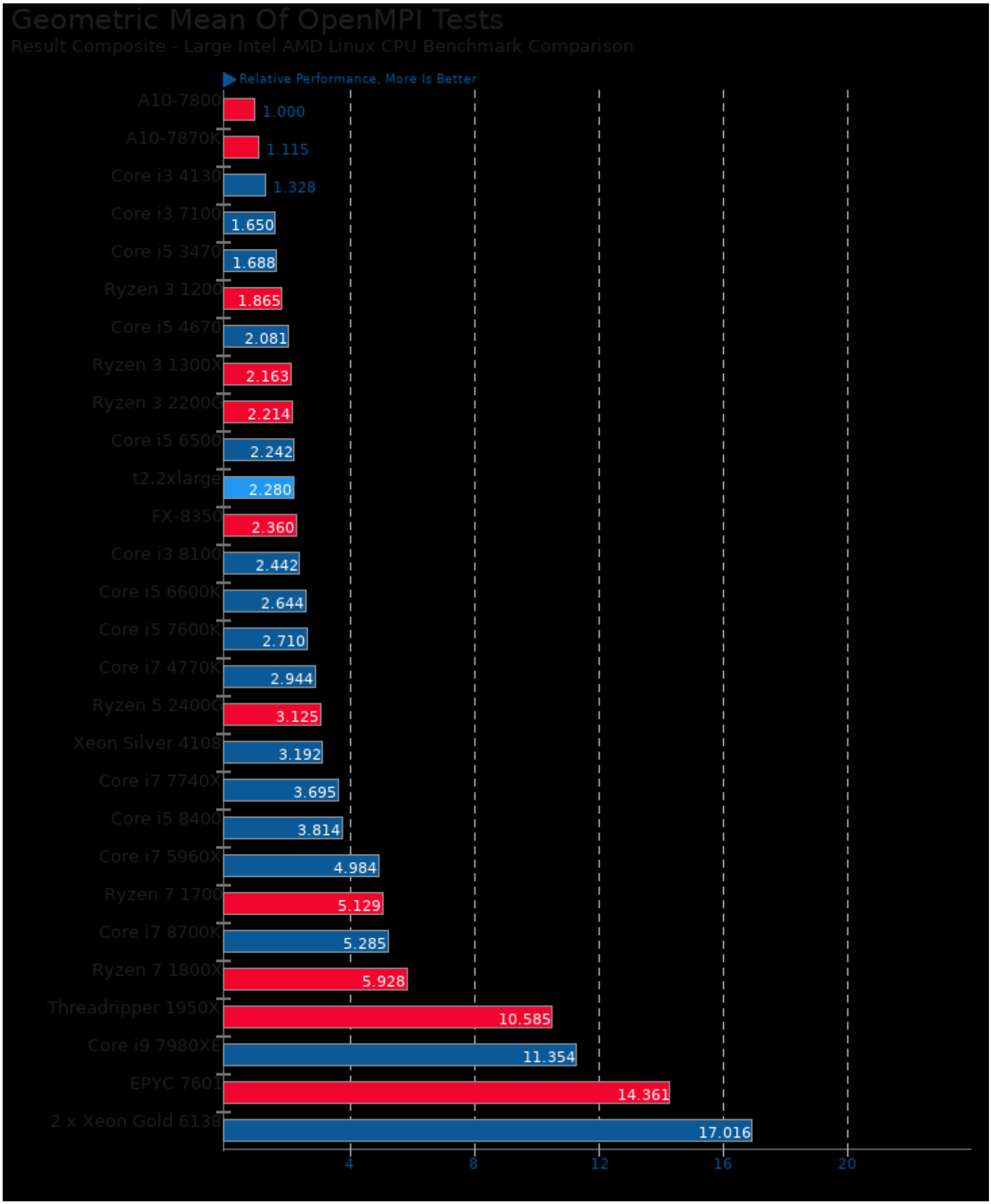


# Large Intel AMD Linux CPU Benchmark Comparison

Geometric mean based upon tests: pts/c-ray, pts/povray, pts/x264, pts/rodinia, pts/parboil, pts/npb, pts/john-the-ripper, pts/nero2d, pts/compress-7zip, pts/build-linux-kernel, pts/aobench and pts/ttsiod-renderer

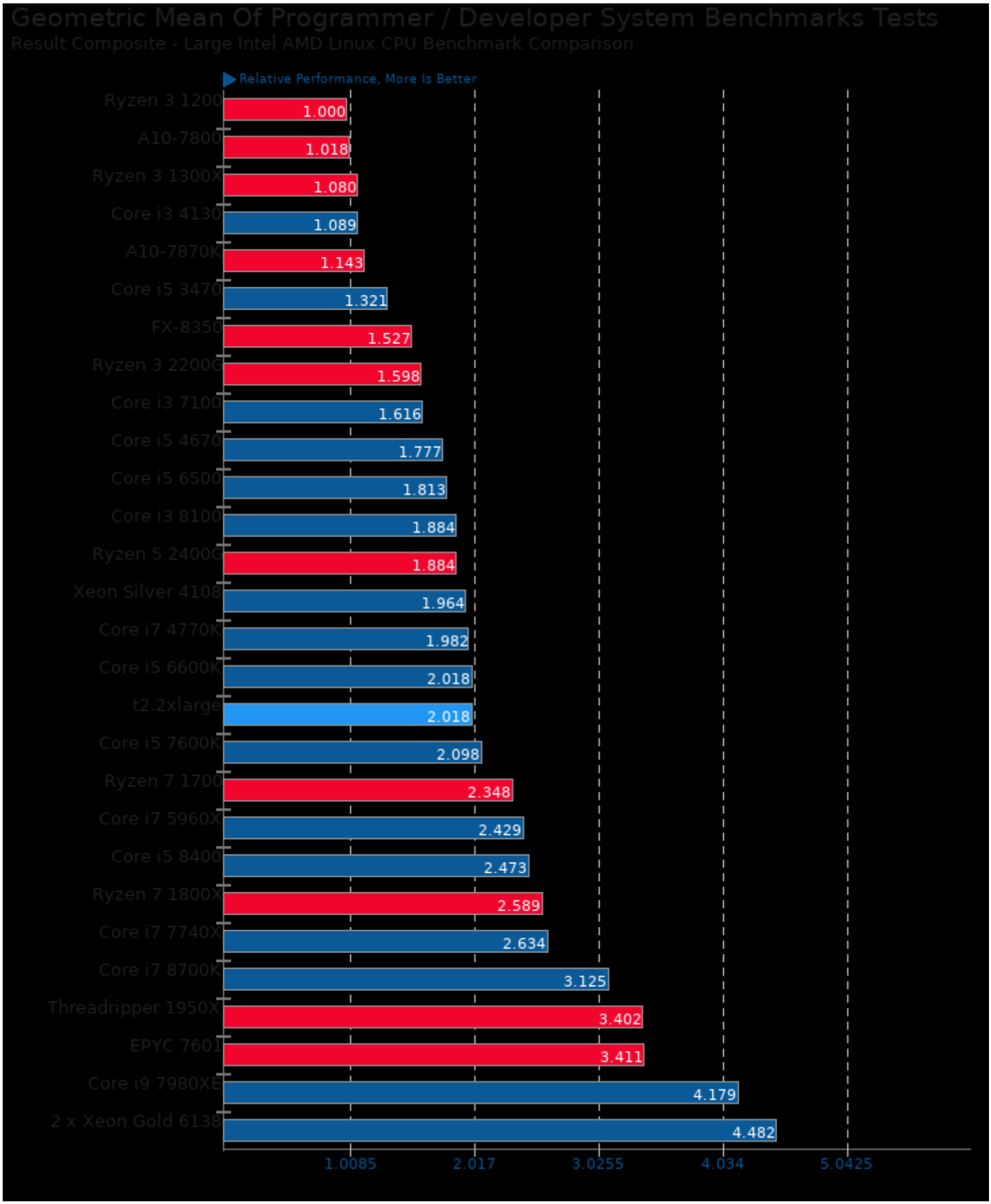



Geometric mean based upon tests: pts/rodinia and pts/parboil

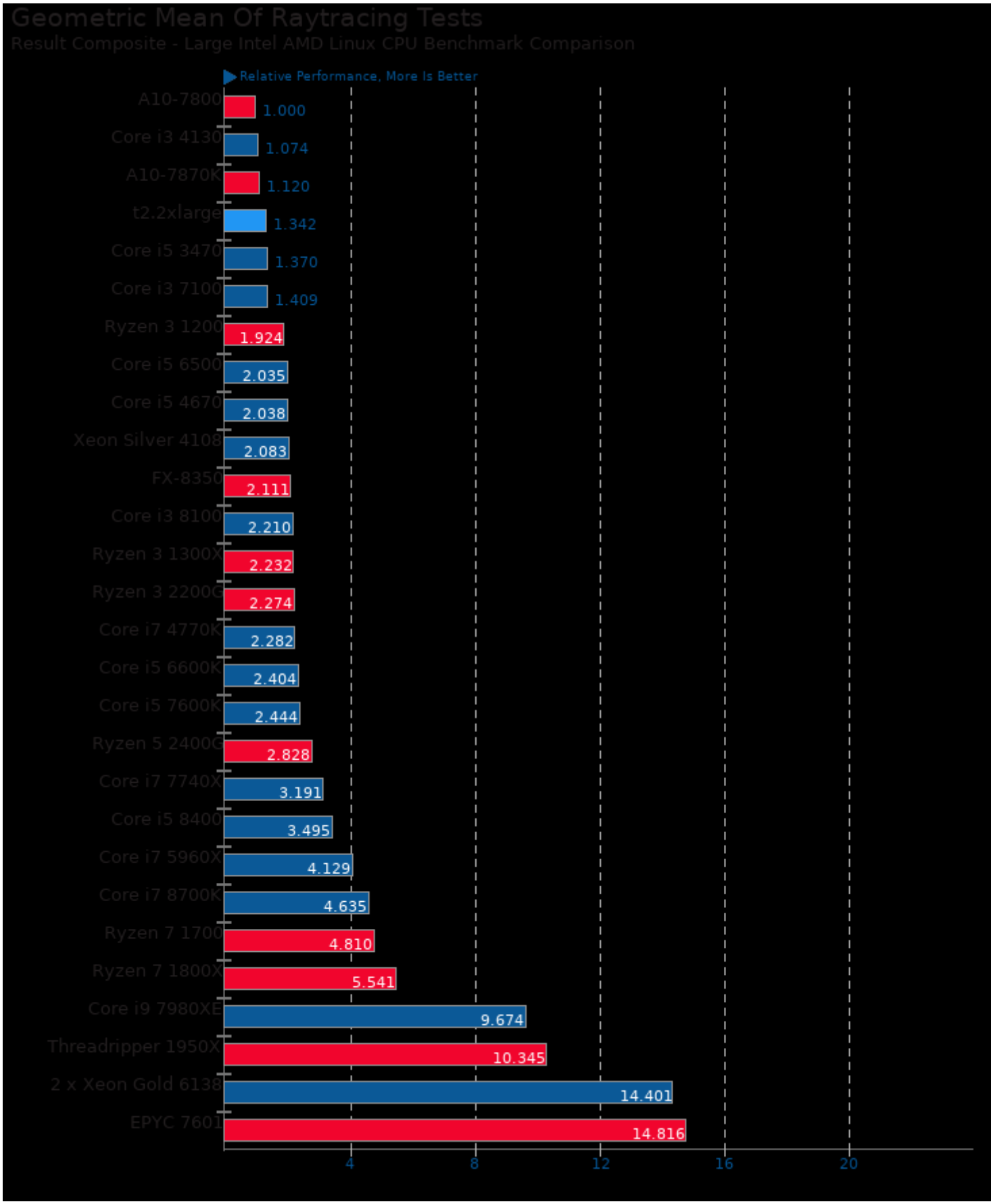



Geometric mean based upon tests: pts/npb, pts/rodinia and pts/nero2d

# Large Intel AMD Linux CPU Benchmark Comparison

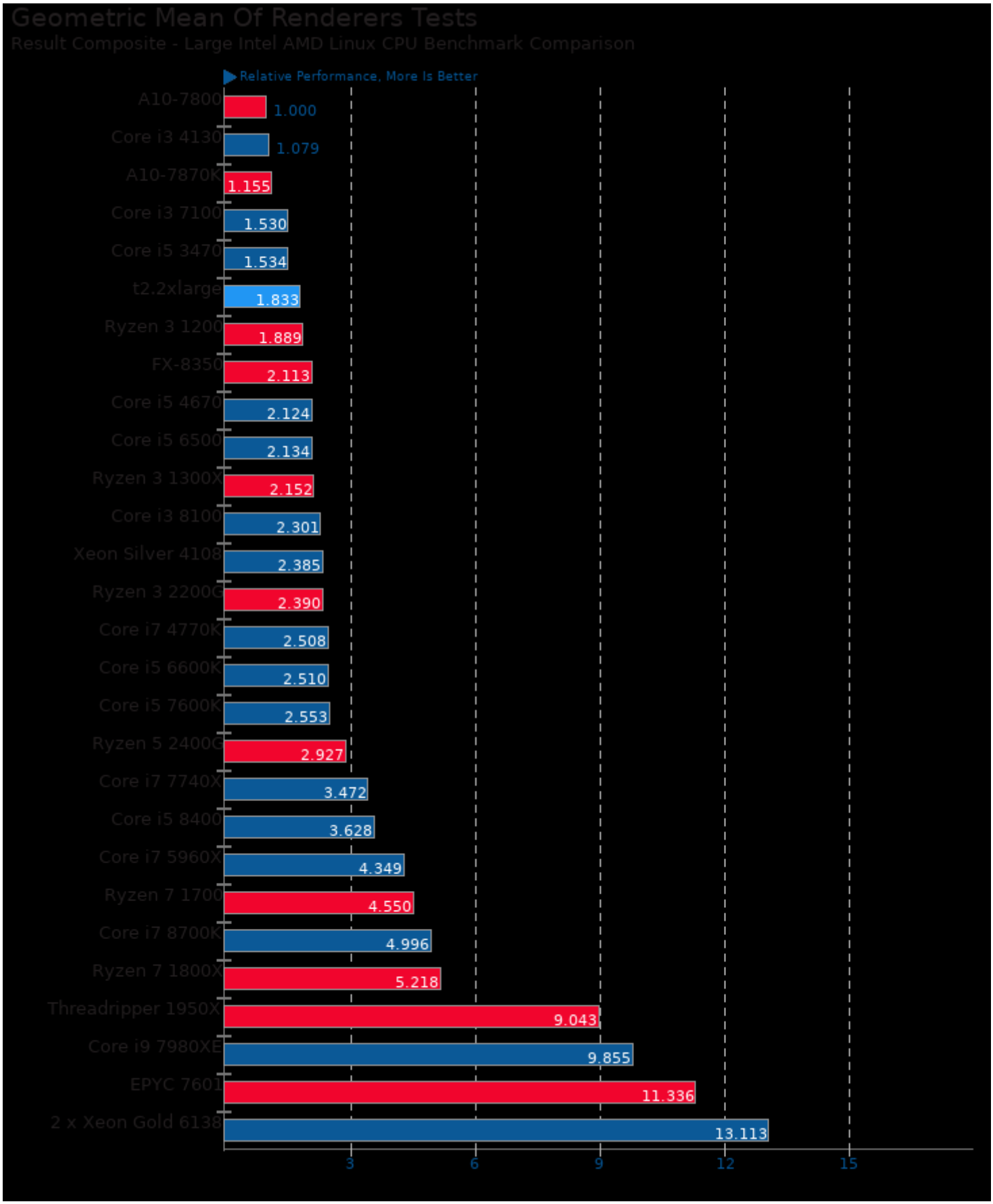



Geometric mean based upon tests: pts/pybench and pts/build-linux-kernel



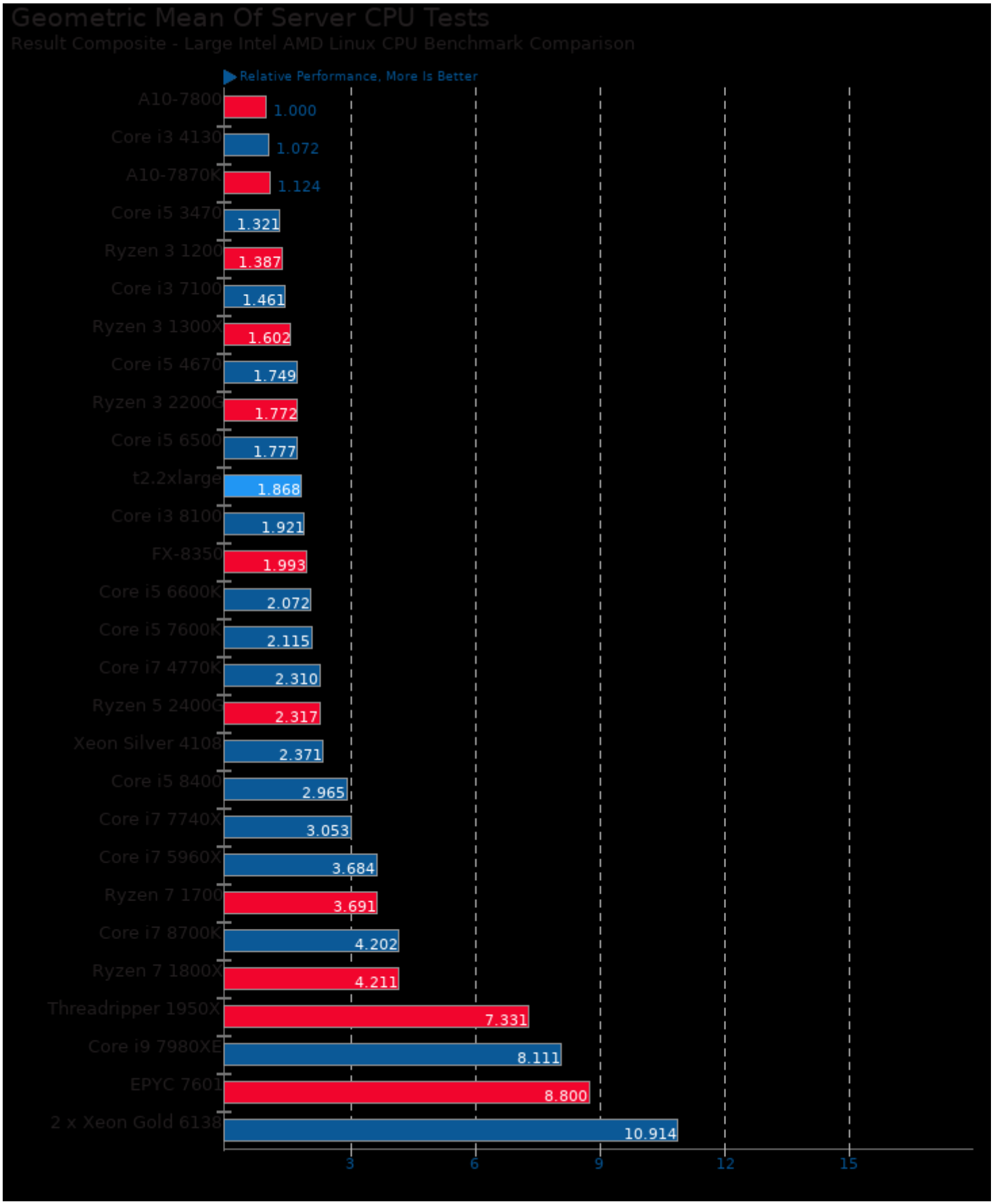

Geometric mean based upon tests: pts/c-ray and pts/povray

# Large Intel AMD Linux CPU Benchmark Comparison



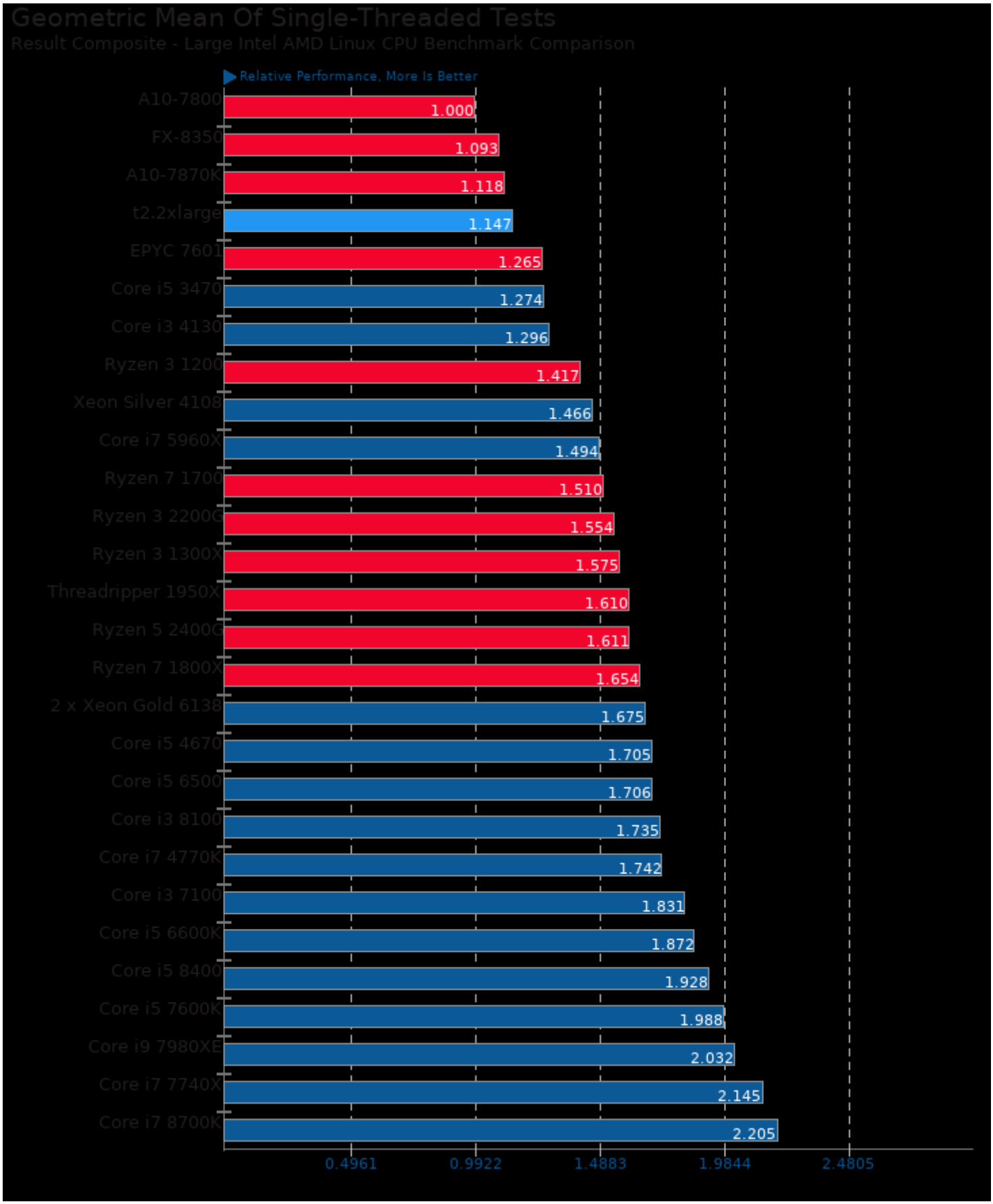

Geometric mean based upon tests: pts/c-ray, pts/povray, pts/aobench and pts/ttsiod-renderer

# Large Intel AMD Linux CPU Benchmark Comparison



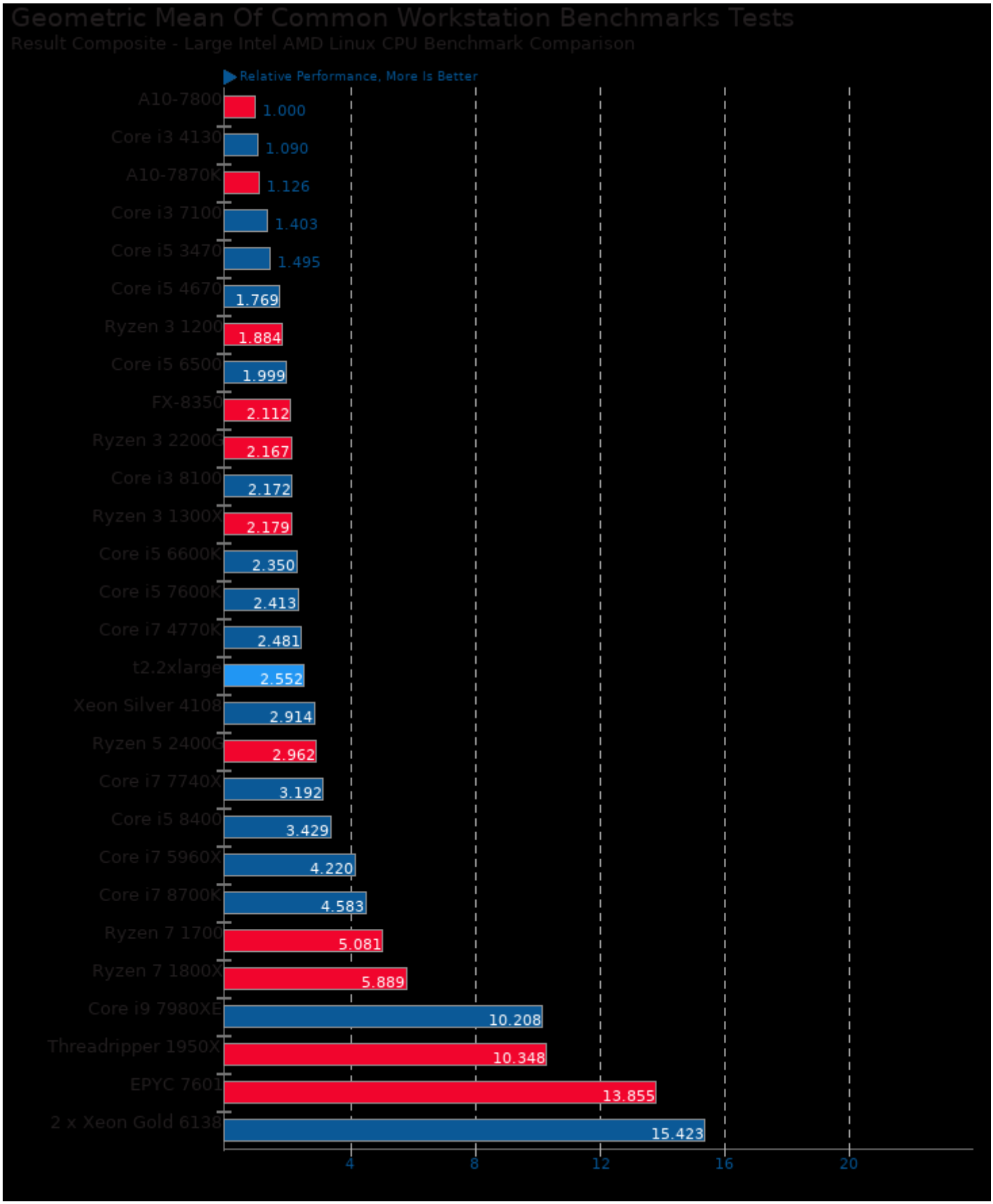

Geometric mean based upon tests: pts/npb, pts/rodinia, pts/john-the-ripper, pts/x264, pts/compress-7zip, pts/build-linux-kernel, pts/c-ray, pts/povray, pts/openssl, pts/pybench, pts/numpy and pts/scikit-learn

# Large Intel AMD Linux CPU Benchmark Comparison




Geometric mean based upon tests: pts/numpy, pts/encode-mp3, pts/pybench and pts/nginx

# Large Intel AMD Linux CPU Benchmark Comparison




Geometric mean based upon tests: pts/rodinia and pts/parboil

# Large Intel AMD Linux CPU Benchmark Comparison

*This file was automatically generated via the Phoronix Test Suite benchmarking software on Thursday, 28 March 2024 13:58.*