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# Large Intel AMD Linux CPU Benchmark Comparison

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

**Automated Executive Summary**

*c5.18xlarge had the most wins, coming in first place for 52% of the tests.*

*Based on the geometric mean of all complete results, the fastest (2 x Xeon Gold 6138) was 15.05x the speed of the slowest (m5.large).*

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

*POV-Ray (Performance / Cost - Trace Time) at 95.66x*
*OpenSSL (RSA 4096-bit Performance) at 53.216x*
*C-Ray (Total Time) at 48.43x*
*Rodinia (Performance / Cost - Test: OpenMP LavaMD) at 42.358x*
*Parboil (Test: OpenMP CUTCP) at 41.732x*
*NAS Parallel Benchmarks (Test / Class: EP.C) at 41.2x*
*NAS Parallel Benchmarks (Performance / Cost - Test / Class: EP.C) at 41.2x*
*John The Ripper (Test: Blowfish) at 38.608x*
*Java JMH (Throughput) at 38.335x*
*Rodinia (Test: OpenMP LavaMD) at 36.406x.*

# 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

--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

## m5.4xlarge

Processor: Intel Xeon Platinum 8175M @ 2.50GHz (8 Cores / 16 Threads), Motherboard: Amazon EC2 m5.4xlarge (1.0 BIOS), Chipset: Intel 440FX- 82441FX PMC, Memory: 63488MB, Disk: 30GB Amazon Elastic Block Store, Network: Device 1d0f:ec20

OS: Ubuntu 16.04, Kernel: 4.4.0-1050-aws (x86_64), Compiler: GCC 5.4.0 20160609, File-System: ext4, System Layer: KVM

Kernel Notes: nvme.io_timeout=4294967295
Compiler Notes: --build=x86_64-linux-gnu --disable-browser-plugin --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,ada,c++,java,go,d,fortran,objc,obj-c++ --enable-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

## m5.12xlarge

Processor: Intel Xeon Platinum 8175M @ 2.50GHz (24 Cores / 48 Threads), Motherboard: Amazon EC2 m5.12xlarge (1.0 BIOS), Chipset: Intel 440FX- 82441FX PMC, Memory: 189440MB, Disk: 30GB Amazon Elastic Block Store, Network: Device 1d0f:ec20

OS: Ubuntu 16.04, Kernel: 4.4.0-1050-aws (x86_64), Compiler: GCC 5.4.0 20160609, File-System: ext4, System Layer: KVM

Kernel Notes: nvme.io_timeout=4294967295
Compiler Notes: --build=x86_64-linux-gnu --disable-browser-plugin --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,ada,c++,java,go,d,fortran,objc,obj-c++ --enable-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

## c5.9xlarge

Processor: Intel Xeon Platinum 8124M @ 3.00GHz (18 Cores / 36 Threads), Motherboard: Amazon EC2 c5.9xlarge (1.0 BIOS), Chipset: Intel 440FX- 82441FX PMC, Memory: 70656MB, Disk: 30GB Amazon Elastic Block Store, Network: Device 1d0f:ec20

OS: Ubuntu 16.04, Kernel: 4.4.0-1050-aws (x86_64), Compiler: GCC 5.4.0 20160609, File-System: ext4, System Layer: KVM

Kernel Notes: nvme.io_timeout=4294967295
Compiler Notes: --build=x86_64-linux-gnu --disable-browser-plugin --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,ada,c++,java,go,d,fortran,objc,obj-c++ --enable-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

## c5.18xlarge

Processor: 2 x Intel Xeon Platinum 8124M @ 3.00GHz (36 Cores / 72 Threads), Motherboard: Amazon EC2 c5.18xlarge (1.0 BIOS), Chipset: Intel 440FX- 82441FX PMC, Memory: 141312MB, Disk: 30GB Amazon Elastic Block Store, Network: Device 1d0f:ec20

OS: Ubuntu 16.04, Kernel: 4.4.0-1050-aws (x86_64), Compiler: GCC 5.4.0 20160609, File-System: ext4, System Layer: KVM

Kernel Notes: nvme.io_timeout=4294967295
Compiler Notes: --build=x86_64-linux-gnu --disable-browser-plugin --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,ada,c++,java,go,d,fortran,objc,obj-c++ --enable-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

## m4.16xlarge

Processor: 2 x Intel Xeon E5-2686 v4 @ 3.00GHz (32 Cores / 64 Threads), Motherboard: Xen HVM domU (4.2.amazon BIOS), Chipset: Intel 440FX- 82441FX PMC, Memory: 258048MB, Disk: 28GB, Graphics: Cirrus Logic GD 5446, Network: Device 1d0f:ec20

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 --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
Processor Notes: Scaling Governor: intel_pstate powersave
Python Notes: Python 2.7.12 + Python 3.5.2
Security Notes: KPTI Protection

## m5.large

Processor: Intel Xeon Platinum 8175M @ 2.50GHz (1 Core / 2 Threads), Motherboard: Amazon EC2 m5.large (1.0 BIOS), Chipset: Intel 440FX- 82441FX PMC, Memory: 8192MB, Disk: 30GB Amazon Elastic Block Store, Network: Device 1d0f:ec20

OS: Ubuntu 16.04, Kernel: 4.4.0-1050-aws (x86_64), Compiler: GCC 5.4.0 20160609, File-System: ext4, System Layer: KVM

Kernel Notes: nvme.io_timeout=4294967295
Compiler Notes: --build=x86_64-linux-gnu --disable-browser-plugin --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,ada,c++,java,go,d,fortran,objc,obj-c++ --enable-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

## i7-7700t tdp 35w

Processor: Intel Core i7-7700T @ 3.80GHz (4 Cores / 8 Threads), Motherboard: ASUS PRIME Z270-A (1009 BIOS), Chipset: Intel Device 591f, Memory: 16384MB, Disk: 240GB KINGSTON SKC1000240G, Graphics: ASUS NVIDIA GeForce GTX 1060 3GB 3072MB (1506/4006MHz), Audio: Realtek ALC1220, Monitor: X223HQ, Network: Intel Connection

# Large Intel AMD Linux CPU Benchmark Comparison

OS: Ubuntu 16.04, Kernel: 4.13.0-36-generic (x86_64), Desktop: Unity 7.4.0, Display Driver: NVIDIA 387.34, OpenGL: 4.5.0, OpenCL: OpenCL 1.2 CUDA 9.1.98, Compiler: GCC 5.4.0 20160609, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-browser-plugin --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,ada,c++,java,go,d,fortran,objc,obj-c++ --enable-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
Processor Notes: Scaling Governor: intel_pstate powersave
OpenCL Notes: GPU Compute Cores: 1152
Python Notes: Python 2.7.12 + Python 3.5.2
Security Notes: KPTI + OSB (observable speculation barrier Intel v6) + Full generic retpoline 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 7700K | Core i7 8700K | Core i9 7980XE | Xeon Silver 4108 | 2 x Xeon Gold 6138 | t2.xlarge | m5.4xlarge | m5.12xlarge | c5.9xlarge | c5.18xlarge | m4.16xlarge | m5.large | i7-7700td p35w |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7-Zip Compression - C.S.T (MIPS) | 9912 | 11404 | 12907 | 12601 | 15808 | 15587 | 17429 | 30677 | 33229 | 71592 | 95962 | 89022 | 92962 | 82107 | 146705 | 165000 | 180700 | 177056 | 216299 | 217854 | 239039 | 189180 | 237852 | 291887 | 273188 | 214707 | 233986 | 144219 | 164611 | 212993 | 193311 | 160822 | 159098 | 509090 | 204604 |
| Normalized | 6.21% | 7.11% | 13.74% | 7.84% | 9.87% | 9.79% | 11.02% | 19.04% | 20.53% | 44.52% | 59.01% | 5.59% | 8.02% | 10.71% | 8.77% | 10.32% | 9.24% | 11.42% | 11.20% | 16.81% | 13.47% | 23.15% | 18.% | 24.27% | 56.67% | 17.43% | 86.87% | 14.78% | 22.78% | 70.76% | 57.16% | 10.% | 71.8% | 3.16% | 12.72% |
| 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% | 1.3% | 0.7% | 0.4% | 0.3% | 0.7% | 1% | 0.1% |

# Large Intel AMD Linux CPU Benchmark Comparison

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **7-Zip Compression - Performance / Cost - C.S.T (MIPS/Do** | 23970100 | 18306200 | 11936700 | 12982100 | 14962100 | 76053200 | | |
| **Normalized** | 100% | 76.6% | 67.32 | 96.1% | 61.13 | 32.2 | | |
| **AOBench - 2048 x 2048 - Total Time (sec)** | 62.218 | 65.488 | 66.21 | 58.704 | 58.427 | 64.561 | 65.261 | 51.225 |
| **Normalized** | 82.4 | 78.2 | 77.4 | 87.3 | 87.7 | 79.3 | 78.23 | 100% |
| **Standard Deviation** | 0.1% | 0.4% | 2.48% | 1.1% | 0.3% | 2.8% | 1.3% | 0.4% |

# Large Intel AMD Linux CPU Benchmark Comparison

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AOBench - Performance / Cost - 2048 x 2048 - Total Time (sec x Dollar)** | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.24 | 2.62 | 8.61 | 4.70 | 8.76 | **11.62** | **0.66** | |
| **Normalized** | | | | | | | | | | | | | | | | | | | | | | | | | | | 53.23% | 25.19% | 7.67% | 14.04% | 7.53% | 5.68% | 100% | |
| **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 | 13.97 | 18.69 | 12.78 | 5.46 | 19.69 | **3.14** | 16.52 | 29.48 | 9.94 | 11.00 | 5.72 | 4.16 | **152.07** | 26.30 |
| **Normalized** | 5.09% | 5.7% | 11.21% | 12.59% | 14.6% | 14.9% | 16.12% | 27.96% | 32.37% | 60.85% | 90.49% | 5.78% | 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% | 10.65% | 31.59% | 28.55% | 54.9% | 75.48% | 2.06% | 11.94% |
| **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% | 0.2% | 0.2% | 0.1% | 0.2% | 0.2% | 6.5% | 0.1% |

# Large Intel AMD Linux CPU Benchmark Comparison

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|---|---|---|---|---|---|---|---|---|
| C-Ray - Performance / Cost - Total Time (sec x Dollar) | 0.17 | 0.159 | 0.202 | 0.221 | 0.211 | 0.180 | 1.525 | |
| Normalized | 47.06 | 13.56 | 40% | 36.36 | 72.73 | 100% | 5.26% | |
| Cost To Run Tests - C.P.P.H (Cost / Price /Hour) | | 0.89 | 2.02 | 1.24 | 2.84 | 2.81 | 0.34 | |
| Normalized | | 38.2% | 17% | 26.56 | 13.99 | 12.1% | 100% | |
| Crafty - Elapsed Time (Nodes/s) | 5 | 6 | 6 | 6 | 6 | 5 | 5 | 7 |
| | 8 | 0 | 3 | 9 | 9 | 3 | 6 | 4 |
| | 2 | 2 | 7 | 6 | 7 | 7 | 9 | 2 |
| | 4 | 3 | 2 | 8 | 4 | 8 | 1 | 2 |
| | 0 | 9 | 5 | 8 | 9 | 0 | 5 | 2 |
| | 4 | 9 | 9 | 0 | 4 | 6 | 7 | 4 |
| | 5 | 2 | 6 | 1 | 2 | 2 | 9 | 0 |
| Normalized | 78.47 | 81.16 | 85.86 | 93.89 | 93.97 | 72.46 | 76.8 | 100% |
| Standard Deviation | 0.1% | 0.2% | 0.1% | 0.2% | 0.2% | 0.5% | 2.7% | 0.3% |

# Large Intel AMD Linux CPU Benchmark Comparison

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Craftty - Performance / Cost - Elapsed Time (Nodes/s/Dollar)** | | | | | | | | | | | | | | | | | | | | | | | | | | | 582404500 | 301199600 | 106209933 | 174220025 | 87186775 | 53780620 | | |
| **Normalized** | | | | | | | | | | | | | | | | | | | | | | | | | | | 100% | 51.72% | 18.24% | 29.91% | 14.97% | 9.23% | | |
| **Java JMH - Throughput (Ops/s)** | 3487059908 | 3894123975 | 8056296946 | 6174078043 | 7169110974 | 7385107172 | 7405453445 | 12783688167 | 14780854841 | 27825981931 | 41830658064 | 6739708281 | 7790129336 | 14382333765 | 12391166252 | 14337275795 | 13187679150 | 15582092811 | 15983591764 | 22775463201 | 15499195579 | 26230888035 | 17920802344 | 25756200608 | 61042410556 | 16741624531 | 105230027922 | 4217431039 | 24447443004 | 74086333554 | 60940889046 | 121829911181 | 84002323903 | 3178036199 | 14326799191 |
| **Normalized** | 2.86% | 3.2% | 6.61% | 5.07% | 5.88% | 6.06% | 6.08% | 10.49% | 12.13% | 22.84% | 34.34% | 5.53% | 6.39% | 11.81% | 10.17% | 11.77% | 10.82% | 12.79% | 13.12% | 18.69% | 12.72% | 21.53% | 14.71% | 21.14% | 50.1% | 13.74% | 86.37% | 3.46% | 20.07% | 60.81% | 50.02% | 100% | 68.95% | 2.61% | 11.76% |

# Large Intel AMD Linux CPU Benchmark Comparison

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Java JMH - Performance / Cost - Throughput (Ops/s/Dollar)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | 105435775968 | 271638255599 | 274393827978 | 338560494700 | 338416419947 | 221058747113 | 317803619944 | |
| **Normalized** | | | | | | | | | | | | | | | | | | | | | | | | | | | | 31.14 | 80.23 | 81.05 | 100% | 99.96 | 65.29 | 93.87 | |
| **John The Ripper - Blowfish (Real C/S)** | 3373 | 3775 | 6826 | 3711 | 4393 | 4540 | 6022 | 10431 | 12445 | 23001 | 23552 | 3008 | 3859 | 4411 | 2992 | 4080 | 4046 | 4785 | 4910 | 6998 | 6800 | 11710 | 8880 | 12758 | 30104 | 8275 | 50248 | 6067 | 12094 | 37069 | 30593 | 60305 | 39091 | 1562 | 7049 |
| **Normalized** | 5.59% | 6.26% | 11.32 | 6.15% | 7.28% | 7.53% | 9.99% | 17.3% | 20.64 | 38.14 | 39.05 | 4.99% | 6.4% | 7.31% | 4.96% | 6.77% | 6.71% | 7.93% | 8.14% | 11.6% | 11.28 | 19.42 | 14.73 | 21.16 | 49.92 | 13.72 | 83.32 | 10.06 | 20.05 | 61.47 | 50.73 | 100% | 64.82 | 2.59% | 11.69 |
| **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% | | 0.3% | 0.2% | 0.1% | 0.1% | 0.9% | 2.6% | 0.6% |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **John The Ripper - Performance / Cost - Blowfish (Real C/S/ Dollar)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | 303350 | 302350 | 285146 | 339922 | 354735 | 217172 | 156200 | |
| **Normalized** | | | | | | | | | | | | | | | | | | | | | | | | | | | | 85.51 | 85.23 | 80.38 | 95.82 | 100% | 61.22 | 44.03 | |
| **LAME MP3 Encoding - WAV To MP3** | 54.17 | 48.37 | 47.03 | 39.68 | 35.78 | 37.13 | 35.19 | 36.59 | 33.50 | 33.75 | 42.77 | 38.94 | 31.08 | 33.30 | 37.36 | 33.25 | 33.51 | 30.95 | 28.77 | 30.01 | 32.54 | 36.18 | 27.50 | 26.07 | 28.50 | 39.90 | 32.33 | 42.12 | 43.90 | 43.57 | 35.63 | 35.62 | 45.22 | 41.09 | 31.60 |
| **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 | 59.38 | 59.83 | 73.17 | 73.19 | 57.65 | 63.45 | 82.5% |
| **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% | 0.1% | 0.1% | 0.1% | 0% | 0.7% | 7.2% | 0.3% |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **LAME MP3 Encoding - Performance / Cost - WAV To MP3 (sec x Dolla** | | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.42** | 1.32 | 3.92 | 1.78 | 3.21 | **5.43** | | |
| **Normalized** | | | | | | | | | | | | | | | | | | | | | | | | | | | | 100% | 31.82 | 10.71 | 23.6% | 13.08 | 7.73% | | |
| **NAS Parallel Benchmarks - EP.C (Mop/s)** | 83.11 | 92.05 | 221.13 | 122.00 | 141.62 | 144.02 | 293.90 | 489.65 | 571.10 | 1090 | 1623 | 143.51 | 175.07 | 202.48 | 180.13 | 198.48 | 185.67 | 219.61 | 225.62 | 321.50 | 331.54 | 564.87 | 394.63 | 577.05 | 1268 | 319.97 | 1999 | 146.20 | 459.35 | 1385 | 1256 | **2513** | 1035 | **60.99** | 316.55 |
| **Normalized** | 3.31% | 3.66% | 8.8% | 4.86% | 5.64% | 5.73% | 11.7% | 19.49 | 22.73 | 43.39 | 64.58 | 5.71% | 6.97% | 8.06% | 7.17% | 7.9% | 7.39% | 8.74% | 8.98% | 12.79 | 13.19 | 22.48 | 15.7% | 22.96 | 50.45 | 12.73 | 79.55 | 5.82% | 18.28 | 55.14 | 49.99 | 100% | 41.19 | 2.43% | 12.6% |
| **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% | 0.4% | 0.2% | 2.7% | 2% | 0.2% | 8.6% | 0.7% |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NAS Parallel Benchmarks - Performance / Cost - EP.C (Mop/s/Dollar)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | 7310 | 45935 | 69275 | 125619 | **251281** | 34498 | **6099** | |
| **Normalized** | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2.91% | 18.28% | 27.57% | 49.99% | 100% | 13.73% | 2.43% | |
| **NGINX Benchmark - S.W.P.S (Reqs/sec)** | 19113 | 21359 | 19628 | 29145 | 32633 | 33621 | 33450 | 29820 | 32964 | 31198 | 24020 | 20655 | 36757 | 36311 | 20762 | 35672 | 34800 | 39234 | 40483 | 40533 | 36374 | 28457 | **45476** | 49916 | 42841 | 31670 | 30959 | 18175 | 20161 | 25555 | 29999 | 26619 | 21411 | **12133** | 26461 |
| **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 | 44.33 | 56.2% | 65.97 | 54.14 | 47.08 | 26.68 | 58.19 |
| **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% | 0.8% | 1% | 0.3% | 0.6% | 2.3% | 2.7% | 0.1% |

# Large Intel AMD Linux CPU Benchmark Comparison

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NGINX Benchmark - Performance / Cost - S.W.P.S (Reqs/sec/Dollar)** | | | | | | | | | | | | | | | | | | | | | | | | | | | 454381 | 288010 | 159720 | 333322 | 111906 | **79298** | **1213251** | |
| **Normalized** | | | | | | | | | | | | | | | | | | | | | | | | | | | 37.45 | 23.74 | 13.16 | 27.47 | 9.22% | 6.54% | 100% | |
| **Open FMM Nero 2D - Total Time** | 280.43 | 251.40 | 119.89 | 109.59 | 94.39 | 92.09 | 90.56 | 57.48 | 50.15 | 30.16 | 26.15 | 209.51 | 165.73 | 92.61 | 141.12 | 102.83 | 100.83 | 85.71 | 83.98 | 61.04 | 98.21 | 60.13 | 76.36 | 54.98 | 27.99 | 86.84 | **21.44** | 87.04 | 115.44 | 48.78 | 60.15 | 32.19 | 26.13 | **534.08** | 135.34 |
| **Normalized** | 7.65% | 8.53% | 17.86 | 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 | 100% | 24.63 | 18.57 | 43.95 | 35.64 | 66.6% | 82.05 | 4.01% | 15.84 |
| **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% | 7.5% | 28.1% | 2.8% | 26% | 0.9% | 2.9% | 0.3% |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **OpenFMM Nero2D - Performance / Cost - Total Time (sec x Dolla** | | | | | | | | | | | | | | | | | | | | | | | | | | | 2.61 | 8.08 | 4.88 | 4.81 | 2.90 | **1.83** | **21.36** | |
| **Normalized** | | | | | | | | | | | | | | | | | | | | | | | | | | | 70.11 | 22.65 | 37.5% | 38.05 | 63.1% | 100% | 8.57% | |
| **OpenSSL - R.4.b.P (Signs/sec** | 299.73 | 339.70 | 705.20 | | 710.53 | 734.20 | 793.80 | 1380 | 1593 | 3021 | 4567 | 308.97 | 597.13 | 1043 | 499.23 | 645.10 | 942.73 | 1143 | 1148 | 1671 | 689.30 | 1203 | 1313 | 1980 | 4695 | 1285 | 7858 | **174.83** | 1861 | 5669 | 4672 | **9304** | 3963 | 242.00 | 1090 |
| **Normalized** | 3.22% | 3.65% | 7.58% | | 7.64% | 7.89% | 8.53% | 14.83 | 17.12 | 32.47 | 49.09 | 3.32% | 6.42% | 11.21 | 5.37% | 6.93% | 10.13 | 12.29 | 12.34 | 17.96 | 7.41% | 12.93 | 14.11 | 21.28 | 50.47 | 13.82 | 84.46 | 1.88% | 20% | 60.93 | 50.21 | 100% | 42.59 | 2.6% | 11.72 |
| **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% | 0.2% | 0.4% | 0% | 0.4% | 0.2% | 0.7% | 0.4% |

# Large Intel AMD Linux CPU Benchmark Comparison

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **OpenSSL - Performance / Cost - R.4.b.P (Signs/sec/Doll** | | | | | | | | | | | | | | | | | | | | | | | | | | | | 17483 | 186093 | 141728 | 155717 | 150561 | 66045 | | |
| **Normalized** | | | | | | | | | | | | | | | | | | | | | | | | | | | | 9.39% | 100% | 76.16 | 83.68 | 83.32 | 35.49 | | |
| **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 | 13.82 | 13.46 | 9.47 | 12.99 | 7.83 | 10.13 | 7.08 | 3.28 | 10.99 | 2.35 | 11.46 | 16.11 | 5.80 | 6.17 | 3.75 | 3.18 | 98.07 | 20.47 |
| **Normalized** | 6.58% | 7.44% | 13.91 | 13.54 | 15.64 | 15.03 | 20.72 | 36.21 | 42.11 | 72.53 | 89.35 | 7.7% | 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 | 100% | 20.51 | 14.59 | 40.52 | 38.09 | 62.67 | 73.9% | 2.4% | 11.48 |
| **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% | 0.4% | 1.2% | 0.4% | 2.2% | 3.1% | 0.8% | 0.8% |

# Large Intel AMD Linux CPU Benchmark Comparison

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Parboil - Performance / Cost - OpenMP CUTCP (sec x Dollar)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.16 | 0.166 | 0.004 | 0.0 | **0.03** | **0.98** |
| **Normalized** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 18.75% | 50% | 50% | 75% | 100% | 3.06% |
| **POV-Ray - Trace Time (sec)** | 27 | 24 | 13 | 18 | 15 | 15 | 10 | 64.2 | 63.0 | 30 | 19.7 | 67.0 | 20 | 39.2 | 32.3 | 47.4 | 42.2 | 22.5 | 17.9 | 13.1 | 20.7 | 30.9 | 70.2 | 95.8 | 63.1 | 18.9 | 37.5 | 47.4 | 42.1 | 72.8 | 45.4 | 17.7 | 22.8 |
| **Normalized** | 6.55% | 7.33% | 13.24% | 9.79% | 11.35% | 11.55% | 16.52% | 27.55% | 31.56% | 58.55% | 80.77% | 6.63% | 8.84% | 12.76% | 7.75% | 12.0% | 11.84% | 13.9% | 14.0% | 20.17% | 13.5% | 25.2% | 20.17% | 29.1% | 54.7% | 9.06% | 69.0% | 3.15% | 20.3% | 59.3% | 54.8% | 10% | 73.5% | 2.87% |
| **Standard Deviation** | 0.2% | 0.1% | 3% | 1% | 2% | 4% | 3% | % | 1% | 3% | 6% | 2% | 1% | 1% | 5% | 1% | 1% | 1% | 9% | 1% | 2% | 2% | 1% | 2% | 6% | 4% | .3% | % | 3% | 2% | 9% | 3% | 5% | .4% |

## Large Intel AMD Linux CPU Benchmark Comparison

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **POV-Ray - Performance / Cost - Trace Time (sec x Dollar)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | **101.40** | 5.23 | 2.09 | 1.62 | **1.06** | 1.93 | 30.86 | |
| **Normalized** | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.05% | 20.27% | 50.72% | 65.43% | 100% | 54.92% | 3.43% | |
| **PyBench - T.F.A.T.T (Milliseconds)** | **2264** | 2028 | 2048 | 1655 | 1498 | 1547 | 1458 | 1518 | 1395 | 1420 | 1781 | 1565 | 1237 | 1340 | 1723 | 1390 | 1342 | 1239 | 1149 | 1209 | 1356 | 1514 | 1075 | **1031** | 1150 | 1615 | 1307 | 1837 | 1637 | 1604 | 1459 | 1453 | 1992 | 1559 | 1311 |
| **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% | 68.1% | 95.91% | 100% | 89.65% | 63.84% | 78.88% | 56.12% | 62.98% | 64.28% | 70.66% | 70.96% | 51.76% | 66.13% | 78.64% |
| **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% | 0.9% | 1.2% | 0.5% | 0.9% | 0.5% | 0.2% | 0.4% |

# Large Intel AMD Linux CPU Benchmark Comparison

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|---|---|---|---|---|---|---|---|---|
| PyBench - Performance / Cost - T.F.A.T.T (Milliseconds x Dolla | 18.37 | 2.174 | 12.28 | 8.36 | 3.07 | 39.04 | | |
| Normalized | 100% | 56.16% | 16.31% | 31.48% | 14.05% | 7.68% | | |
| PyBench - T.F.A.T.T (Milliseconds) | 2044 | 1977 | 1706 | 1760 | 1669 | 2239 | 1721 | 1418 |
| Normalized | 70.84% | 80.8% | 81.49% | 90.1% | 89.9% | 64.67% | 84.14% | 100% |
| Standard Deviation | 0% | 0.4% | 0.4% | 0.4% | 0.4% | 0.2% | 1.5% | 0.6% |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PyBench - Performance / Cost - T.F.A.T.T (Milliseconds x Dollar)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | **20.44** | 53.76 | 142.16 | 80.35 | 160.90 | **313.46** | | |
| **Normalized** | | | | | | | | | | | | | | | | | | | | | | | | | | | | 100% | 38.02 | 14.38 | 25.44 | 12.7% | 6.52% | | |
| **Rodinia - OpenMP LavaMD (sec)** | 446.42 | 397.52 | 211.52 | 258.67 | 223.34 | 217.13 | 160.28 | 95.15 | 82.39 | 45.95 | 31.58 | 440.27 | 354.52 | 226.21 | 400.13 | 322.61 | 246.20 | 208.84 | 203.35 | 143.15 | 199.36 | 114.38 | 154.42 | 107.19 | 46.64 | 170.83 | 285.2 | 213.70 | 115.20 | 39.53 | 44.56 | **22.77** | 34.10 | **28.97** | 18.20 |
| **Normalized** | 5.1% | 5.73% | 10.76 | 8.8% | 10.2% | 10.49 | 14.21 | 23.93 | 27.64 | 49.55 | 72.1% | 5.17% | 6.42% | 10.07 | 5.69% | 7.06% | 9.25% | 10.9% | 11.2% | 15.91 | 11.42 | 19.91 | 14.75 | 21.24 | 48.82 | 13.33 | 79.84 | 10.66 | 19.77 | 57.6% | 51.1% | 100% | 66.77 | 2.75% | 12.5% |
| **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% | 3.3% | 3.5% | 1.3% | 1.2% | 0.2% | 1.6% | 0.2% |

# Large Intel AMD Linux CPU Benchmark Comparison

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|---|---|---|---|---|---|---|---|---|
| **Rodinia - Performance / Cost - OpenMP LavaMD (sec x Dollar)** | 14.96 | 8.06 | 3.16 | 2.67 | **1.37** | 3.41 | **5.03** | **8.06** |
| **Normalized** | 9.16% | 17% | 43.35 | 51.31 | 100% | 40.18 | 2.36% | |
| **Scikit-Learn (sec)** | 17.90 | 21.08 | 20.54 | 10.59 | 9.98 | 8.22 | **21.75** | **16.79** |
| **Normalized** | 93.81% | 79.27 | 82.16 | 88.36 | 88.15 | 91.28 | 78.20% | 100% |
| **Standard Deviation** | 0.1% | 0.1% | 0% | 0% | 0.2% | 0.1% | 8% | 0.2% |

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| **Scikit-Learn - Performance / Cost - (sec x Dollar** | | | | | | | | | | | | | | | | | | | | | | | | | | | 10.74 | 29.66 | 79.77 | 45.62 | 93.35 | 89.63 | 4.30 | |
| **Normalized** | | | | | | | | | | | | | | | | | | | | | | | | | | | 40.04 | 14.5% | 5.39% | 9.43% | 4.61% | 4.8% | 100% | |
| **Timed Linux Kernel Compilation - Time To Compile** | 342.81 | 300.92 | 167.85 | 484.57 | 458.00 | 201.48 | 153.49 | 95.17 | 85.22 | 48.48 | 38.39 | 426.59 | 246.44 | 167.81 | 264.97 | 180.98 | 181.66 | 158.43 | 157.58 | 108.02 | 150.12 | 89.15 | 106.97 | 79.10 | 39.70 | 127.47 | 30.41 | 106.83 | 85.77 | 35.61 | 37.99 | 24.48 | 33.90 | 641.51 | 118.88 |
| **Normalized** | 7.14% | 8.14% | 14.58 | 5.05% | 5.34% | 12.15 | 15.95 | 25.72 | 28.73 | 50.5% | 63.77 | 5.74% | 9.93% | 14.59 | 9.24% | 13.53 | 13.48 | 15.45 | 15.53 | 22.66 | 16.31 | 27.46 | 22.88 | 30.95 | 61.66 | 19.2% | 80.5% | 22.91 | 28.54 | 68.74 | 64.44 | 100% | 72.21 | 3.82% | 20.59 |
| **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% | 2.8% | 7.6% | 7.2% | 10.4% | 5.8% | 12.6% | 1.5% |

# Large Intel AMD Linux CPU Benchmark Comparison

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Timed Linux Kernel Compilation - Performance / Cost - Time To Compile (sec x Dolla** | | | | | | | | | | | | | | | | | | | | | | | | | | | | 4.27 | 5.15 | 2.85 | 2.28 | **1.96** | 3.73 | **32.08** | |
| **Normalized** | | | | | | | | | | | | | | | | | | | | | | | | | | | | 45.9% | 38.06 | 68.77 | 85.96 | 100% | 52.55 | 6.11% | |
| **Timed MAFFT Alignment - M.S.A (sec)** | 11.96 | 10.40 | 5.92 | 7.25 | 5.99 | 6.27 | 5.73 | 4.26 | 3.65 | 3.13 | 4.69 | 10.45 | 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 | 10.15 | 4.26 | 4.35 | 3.18 | **2.72** | 4.23 | 8.84 | **20.00** | 5.37 |
| **Normalized** | 22.74 | 26.15 | 45.95 | 37.52 | 45.41 | 43.38 | 47.47 | 63.85 | 74.52 | 86.9% | 58% | 26.03 | 34.65 | 47.64 | 39.25 | 46.5% | 43.04 | 50.75 | 50.18 | 73.91 | 55.74 | 76.84 | 68.51 | | 89.47 | 49.82 | 26.8% | 63.85 | 62.53 | 85.53 | 100% | 64.3% | 30.77 | 13.6% | 50.65 |
| **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% | 9.6% | 7.2% | 3.5% | 8.6% | 1.5% | 0.6% | 5.5% |

# Large Intel AMD Linux CPU Benchmark Comparison

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Timed MAFFT Alignment - Performance / Cost - M.S.A (sec x Dollar)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.003** | **0.003** | 0.004 | **0.027** | | |
| **Normalized** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 100% | 100% | 75% | 11.11 | | |
| **TTSIOD 3D Renderer - P.R. W.S. S.M (FPS)** | 67.42 | 82.93 | 142.75 | 122.95 | 134.97 | 178.17 | 211.60 | 274.64 | 312.22 | 466.13 | 447.71 | 73.55 | 121.69 | 168.27 | 129.90 | 155.77 | 158.22 | 184.72 | 187.90 | 263.63 | 204.31 | 325.51 | 277.43 | 391.67 | 690.00 | 210.84 | **733.58** | 231.07 | 184.83 | 504.82 | 460.27 | 336.76 | 465.90 | **26.88** | 183.28 |
| **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 | 100% | 31.5% | 25.2% | 68.82 | 62.74 | 45.91 | 63.51 | 3.66% | 24.98 |
| **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% | 0.5% | 1.6% | 1.6% | 6.4% | 7.7% | 14.8% | 0.1% |

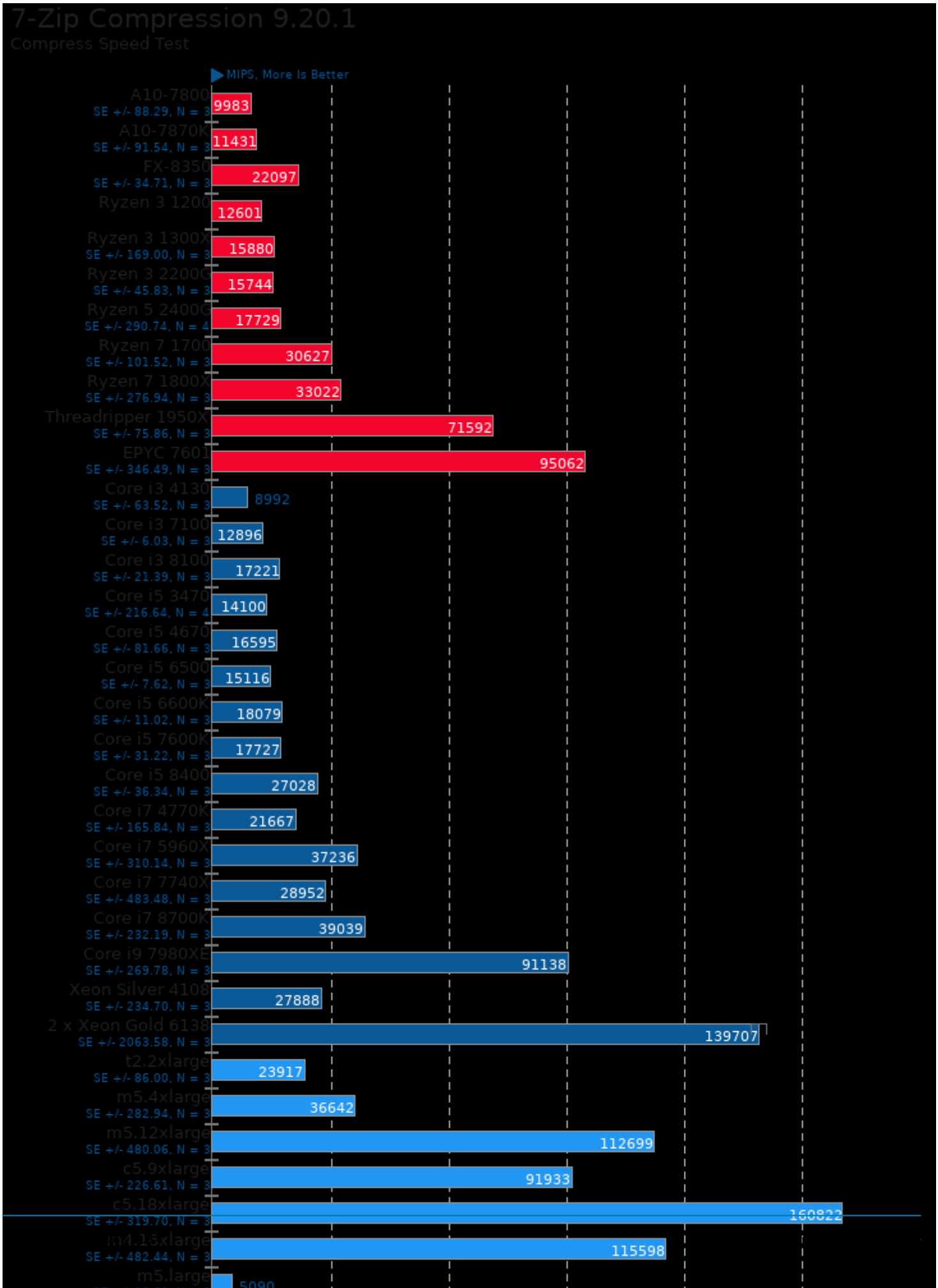
# Large Intel AMD Linux CPU Benchmark Comparison

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TTSIOD 3D Renderer - Performance / Cost - P.R.W.S.S.M (FPS/Dollar)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | **23107** | 9242 | 16827 | 23014 | 5613 | 9318 | **1344** | |
| **Normalized** | | | | | | | | | | | | | | | | | | | | | | | | | | | | 100% | 39.99 | 72.82 | 99.6% | 24.29 | 40.33 | 5.82% | |
| **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 | 30.42 | 19.83 | 28.16 | 28.47 | 33.11 | 33.49 | 56.11 | 37.64 | 58.01 | 49.95 | 72.96 | 125.28 | 32.75 | 107.89 | 38.43 | 55.46 | 129.66 | 134.10 | **176.03** | 115.34 | **11.02** | 39.94 |
| **Normalized** | 8.87% | 9.99% | 17.37 | 13.33 | 15.53 | 15.68 | 19.74 | 34.6% | 40.6% | 72.15 | 61.39 | 8.79% | 13.57 | 17.28 | 11.27 | 16% | 16.17 | 18.81 | 19.03 | 31.88 | 21.38 | 32.95 | 28.38 | 41.45 | 71.17 | 18.6% | 61.29 | 21.83 | 31.51 | 73.66 | 76.18 | 100% | 65.52 | 6.26% | 22.69 |
| **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% | 1.7% | 0.4% | 0.6% | 1.4% | 1.9% | 0.3% | 1.1% |

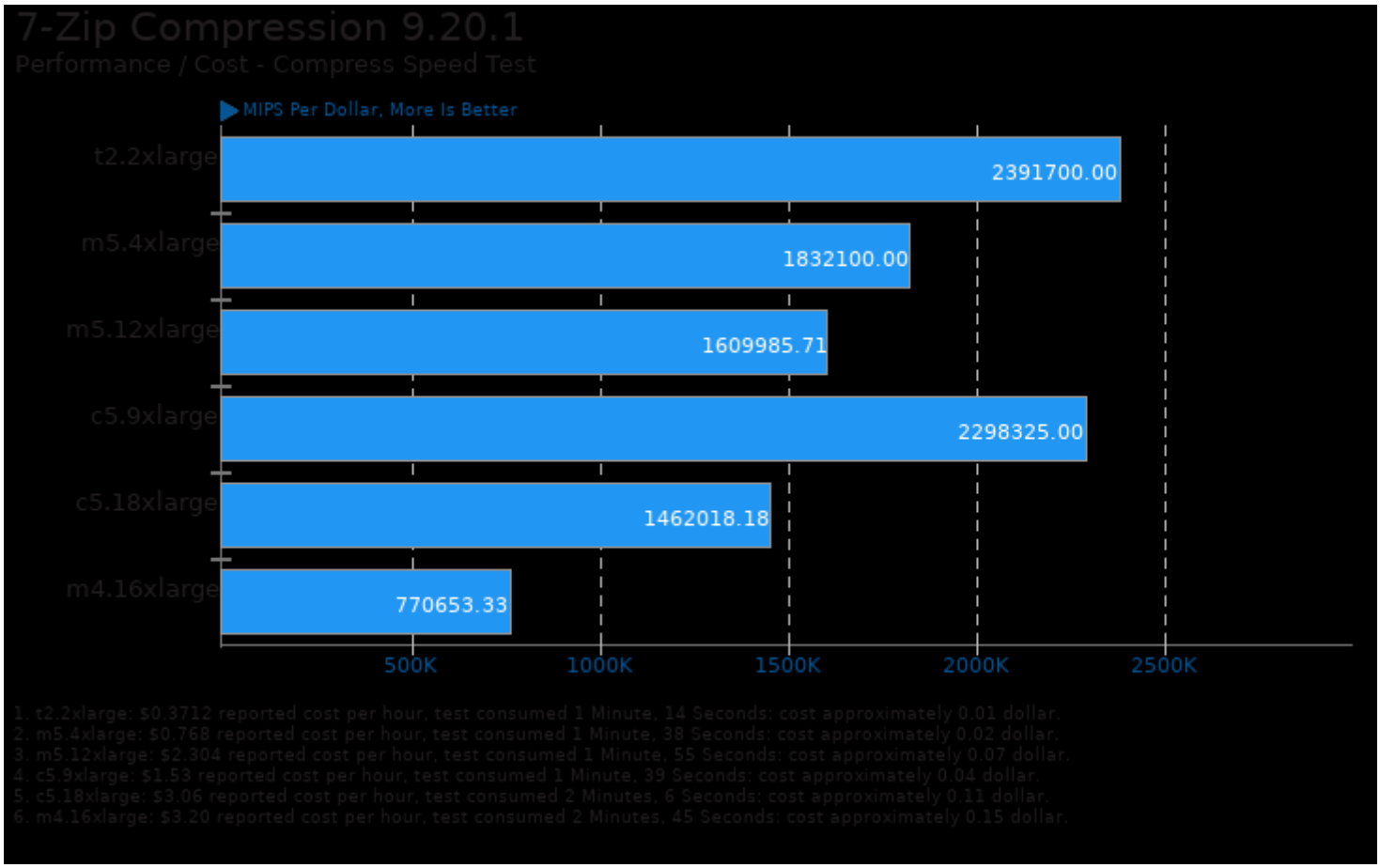
# Large Intel AMD Linux CPU Benchmark Comparison

| | | | | | | |
|---|---|---|---|---|---|---|
| **x264 - Performance / Cost - H.2.V.E (FPS /Dollar)** | 3 | 5 | 1 | 1 | 1 | 5 |
| | 8 | 5 | 2 | 3 | 7 | 7 |
| | 4 | 4 | 9 | 4 | 6 | 6 |
| | 3 | 6 | 6 | 1 | 0 | 7 |
| | | | 6 | 0 | 3 | |
| **Normalized** | 21.83% | 31.51% | 73.66% | 76.18% | 100% | 32.76% |

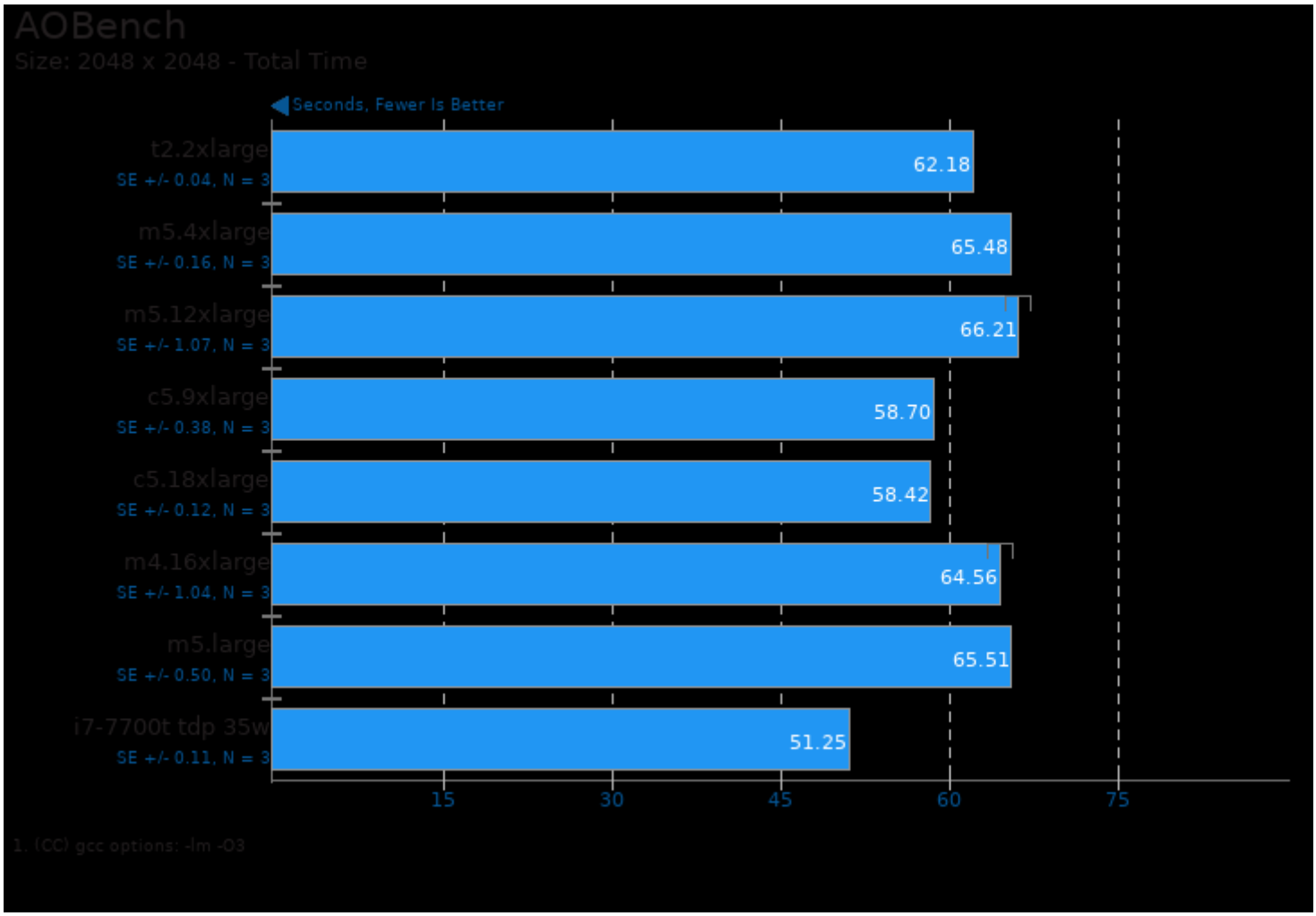
# Large Intel AMD Linux CPU Benchmark Comparison


7-Zip Compression 9.20.1
Compress Speed Test
MIPS, More Is Better
A10-7800
SE +/- 88.29, N = 3
9983
A10-7870K
SE +/- 91.54, N = 3
11431
FX-8350
SE +/- 34.71, N = 3
22097
Ryzen 3 1200
12601
Ryzen 3 1300X
SE +/- 169.00, N = 3
15880
Ryzen 3 2200G
SE +/- 45.83, N = 3
15744
Ryzen 5 2400G
SE +/- 290.74, N = 4
17729
Ryzen 7 1700
SE +/- 101.52, N = 3
30627
Ryzen 7 1800X
SE +/- 276.94, N = 3
33022
Threadripper 1950X
SE +/- 75.86, N = 3
71592
EPYC 7601
SE +/- 346.49, N = 3
95062
Core i3 4130
SE +/- 63.52, N = 3
8992
Core i3 7100
SE +/- 6.03, N = 3
12896
Core i3 8100
SE +/- 21.39, N = 3
17221
Core i5 3470
SE +/- 216.64, N = 4
14100
Core i5 4670
SE +/- 81.66, N = 3
16595
Core i5 6500
SE +/- 7.62, N = 3
15116
Core i5 6600K
SE +/- 11.02, N = 3
18079
Core i5 7600K
SE +/- 31.22, N = 3
17727
Core i5 8400
SE +/- 36.34, N = 3
27028
Core i7 4770K
SE +/- 165.84, N = 3
21667
Core i7 5960X
SE +/- 310.14, N = 3
37236
Core i7 7740X
SE +/- 483.48, N = 3
28952
Core i7 8700K
SE +/- 232.19, N = 3
39039
Core i9 7980XE
SE +/- 269.78, N = 3
91138
Xeon Silver 4108
SE +/- 234.70, N = 3
27888
2 x Xeon Gold 6138
SE +/- 2063.58, N = 3
139707
t2.2xlarge
SE +/- 86.00, N = 3
23917
m5.4xlarge
SE +/- 282.94, N = 3
36642
m5.12xlarge
SE +/- 480.06, N = 3
112699
c5.9xlarge
SE +/- 226.61, N = 3
91933
c5.18xlarge
SE +/- 319.70, N = 3
160822
m4.16xlarge
SE +/- 482.44, N = 3
115598
m5.large
5090

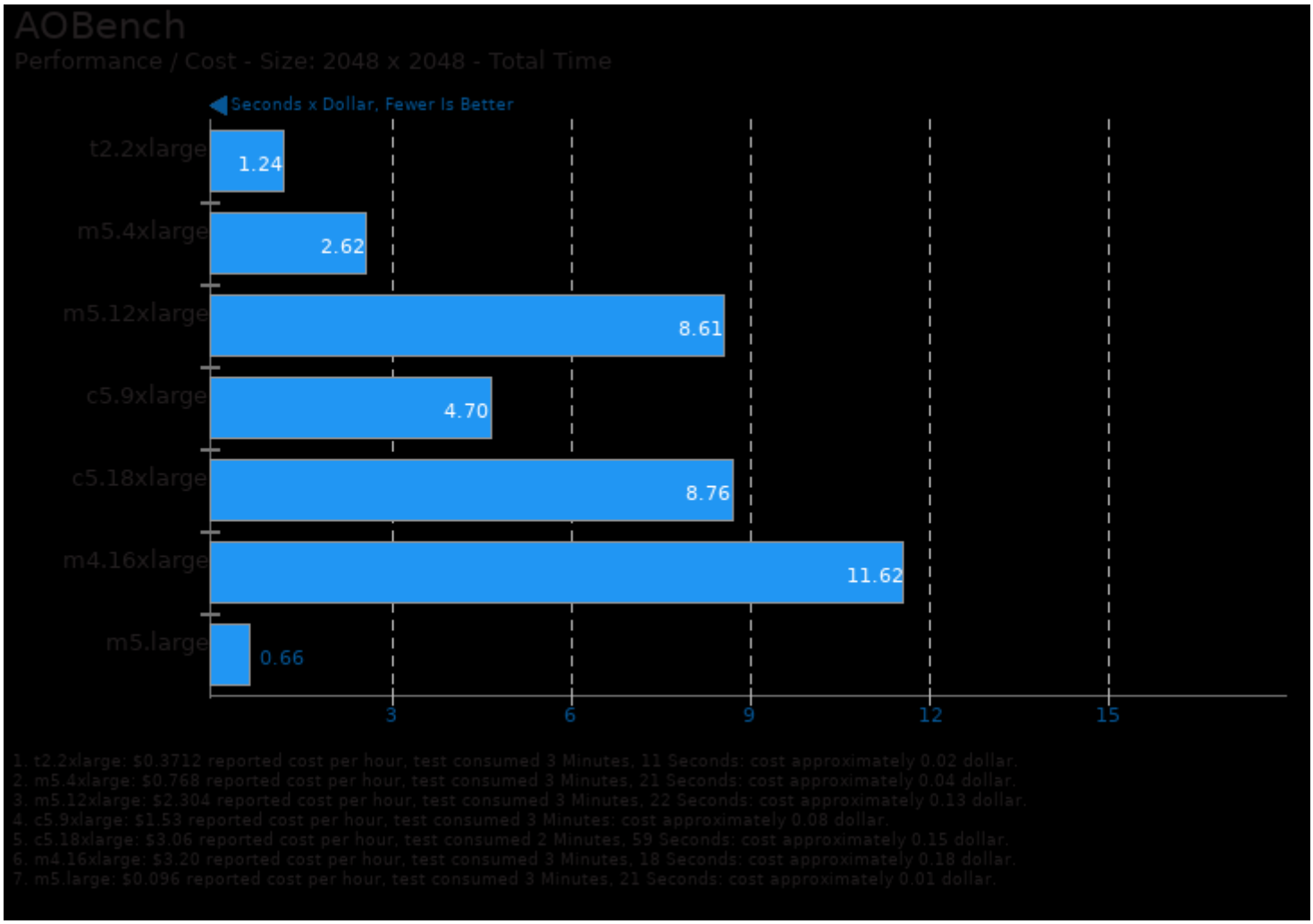
# Large Intel AMD Linux CPU Benchmark Comparison

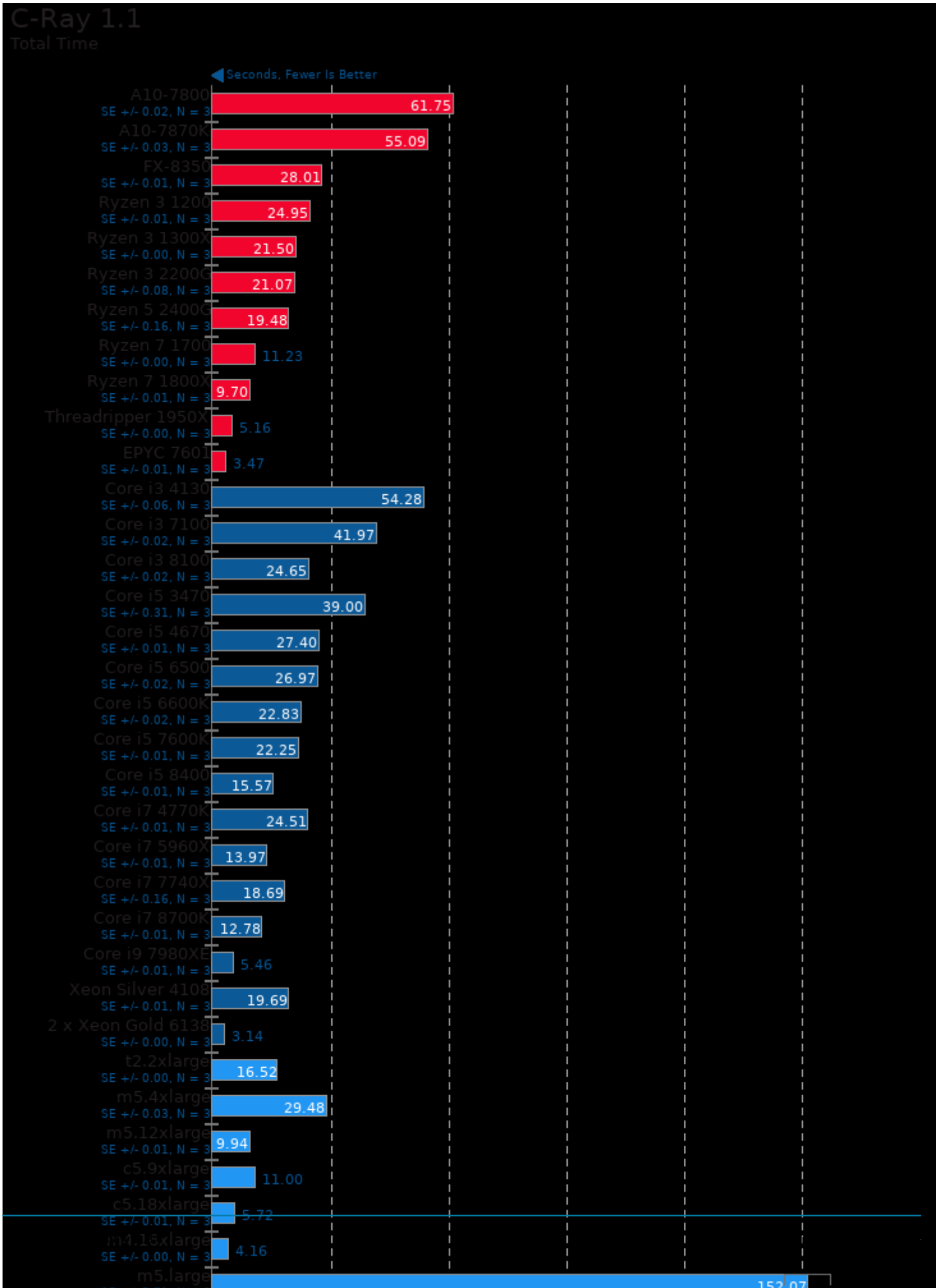


# Large Intel AMD Linux CPU Benchmark Comparison

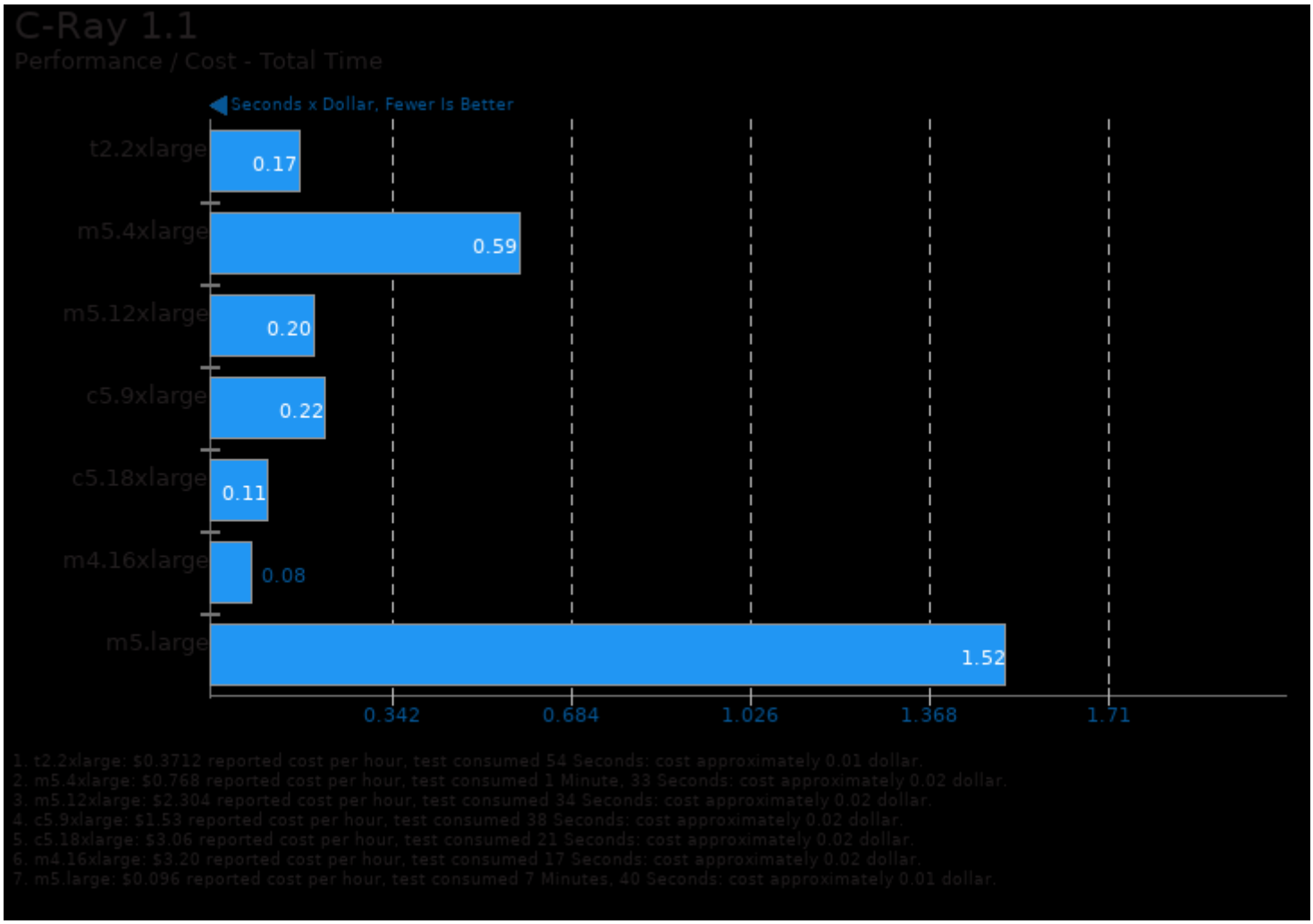


# Large Intel AMD Linux CPU Benchmark Comparison

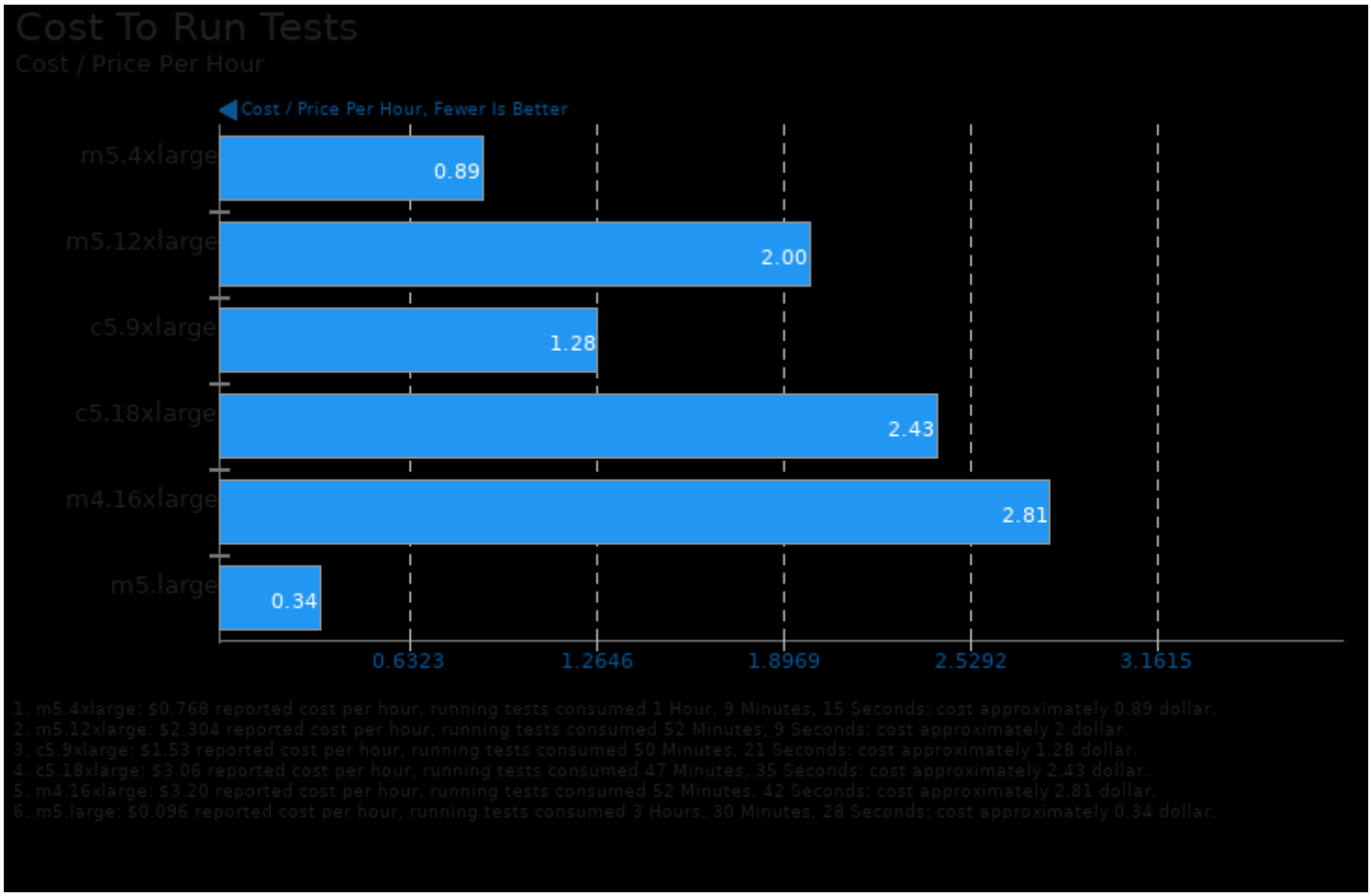



C-Ray 1.1
Total Time
Seconds, Fewer Is Better
A10-7800
SE +/- 0.02, N = 3
61.75
A10-7870K
SE +/- 0.03, N = 3
55.09
FX-8350
SE +/- 0.01, N = 3
28.01
Ryzen 3 1200
SE +/- 0.01, N = 3
24.95
Ryzen 3 1300X
SE +/- 0.00, N = 3
21.50
Ryzen 3 2200G
SE +/- 0.08, N = 3
21.07
Ryzen 5 2400G
SE +/- 0.16, N = 3
19.48
Ryzen 7 1700
SE +/- 0.00, N = 3
11.23
Ryzen 7 1800X
SE +/- 0.01, N = 3
9.70
Threadripper 1950X
SE +/- 0.00, N = 3
5.16
EPYC 7601
SE +/- 0.01, N = 3
3.47
Core i3 4130
SE +/- 0.06, N = 3
54.28
Core i3 7100
SE +/- 0.02, N = 3
41.97
Core i3 8100
SE +/- 0.02, N = 3
24.65
Core i5 3470
SE +/- 0.31, N = 3
39.00
Core i5 4670
SE +/- 0.01, N = 3
27.40
Core i5 6500
SE +/- 0.02, N = 3
26.97
Core i5 6600K
SE +/- 0.02, N = 3
22.83
Core i5 7600K
SE +/- 0.01, N = 3
22.25
Core i5 8400
SE +/- 0.01, N = 3
15.57
Core i7 4770K
SE +/- 0.01, N = 3
24.51
Core i7 5960X
SE +/- 0.01, N = 3
13.97
Core i7 7740X
SE +/- 0.16, N = 3
18.69
Core i7 8700K
SE +/- 0.01, N = 3
12.78
Core i9 7980XE
SE +/- 0.01, N = 3
5.46
Xeon Silver 4108
SE +/- 0.01, N = 3
19.69
2 x Xeon Gold 6138
SE +/- 0.00, N = 3
3.14
t2.2xlarge
SE +/- 0.00, N = 3
16.52
m5.4xlarge
SE +/- 0.03, N = 3
29.48
m5.12xlarge
SE +/- 0.01, N = 3
9.94
c5.9xlarge
SE +/- 0.01, N = 3
11.00
c5.18xlarge
SE +/- 0.01, N = 3
5.72
m4.16xlarge
SE +/- 0.00, N = 3
4.16
m5.large

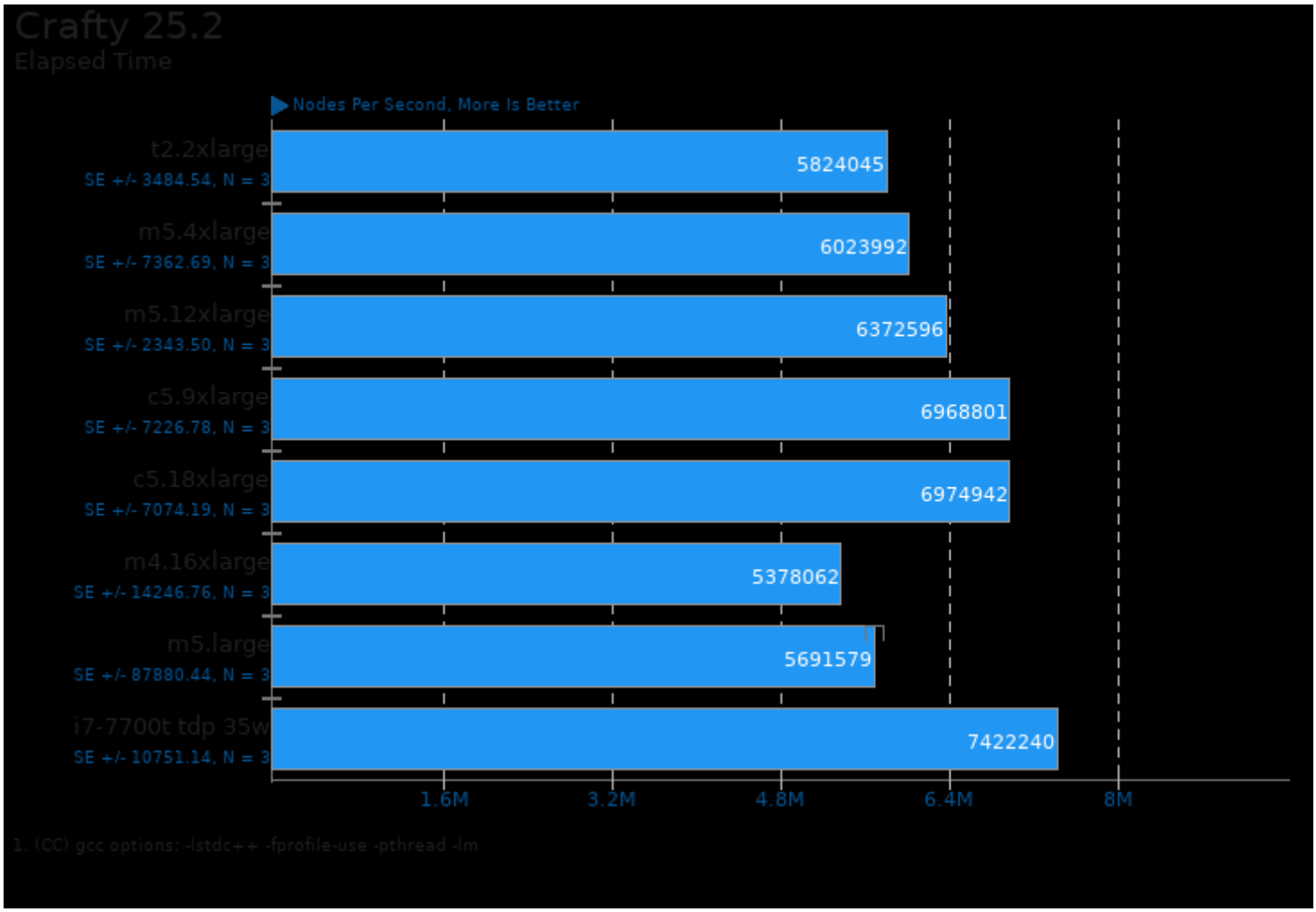
# Large Intel AMD Linux CPU Benchmark Comparison



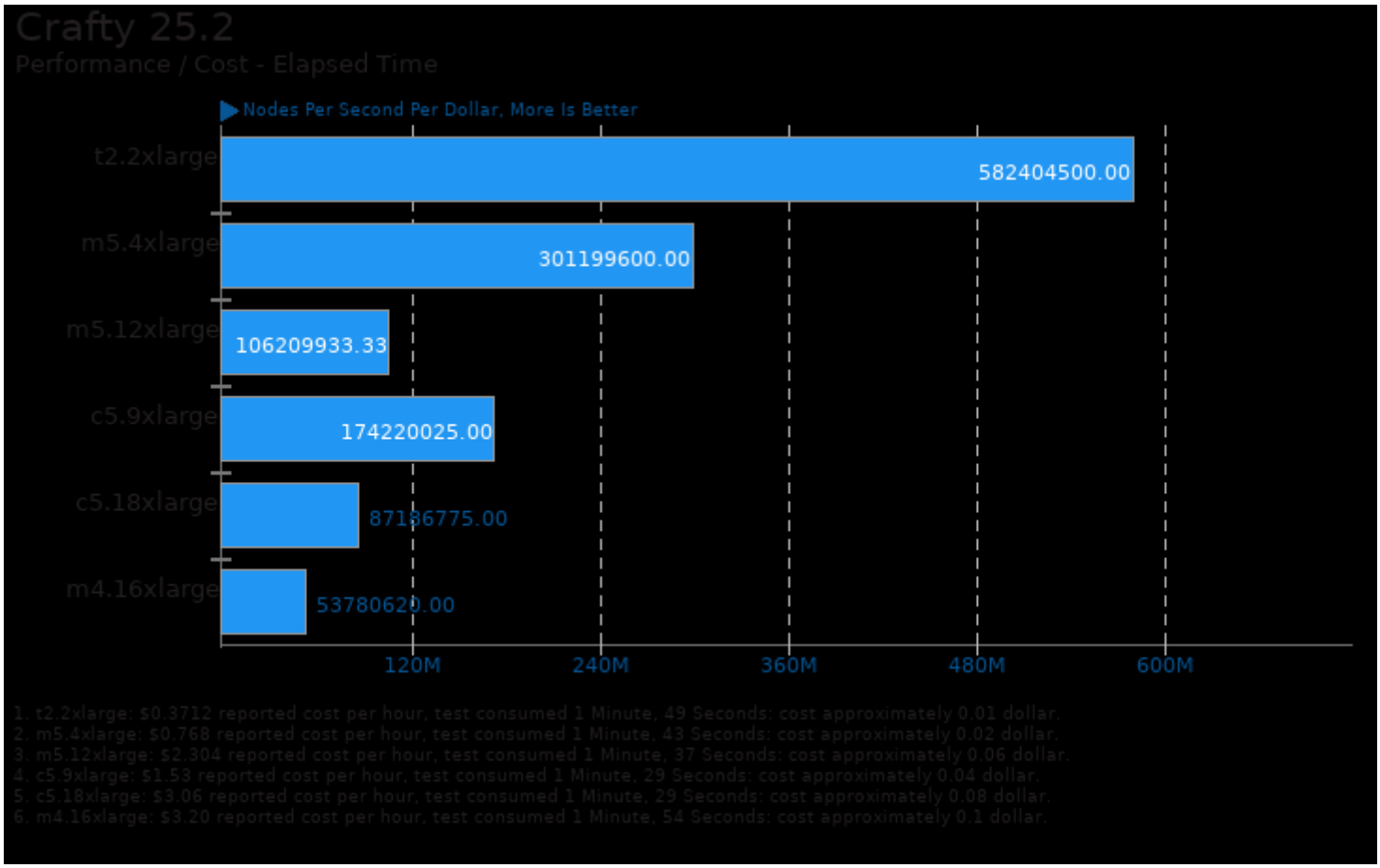
# Large Intel AMD Linux CPU Benchmark Comparison



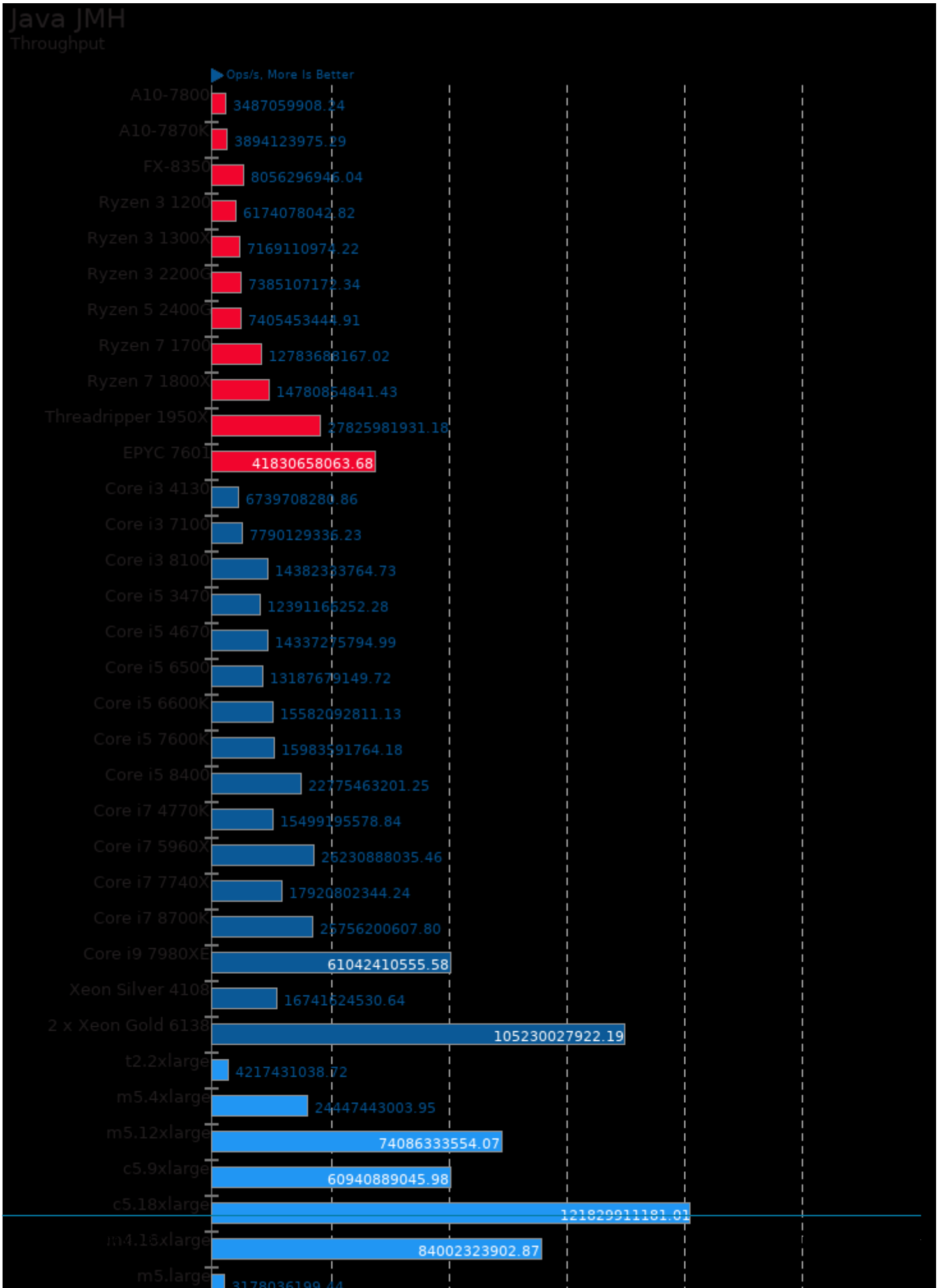
# Large Intel AMD Linux CPU Benchmark Comparison



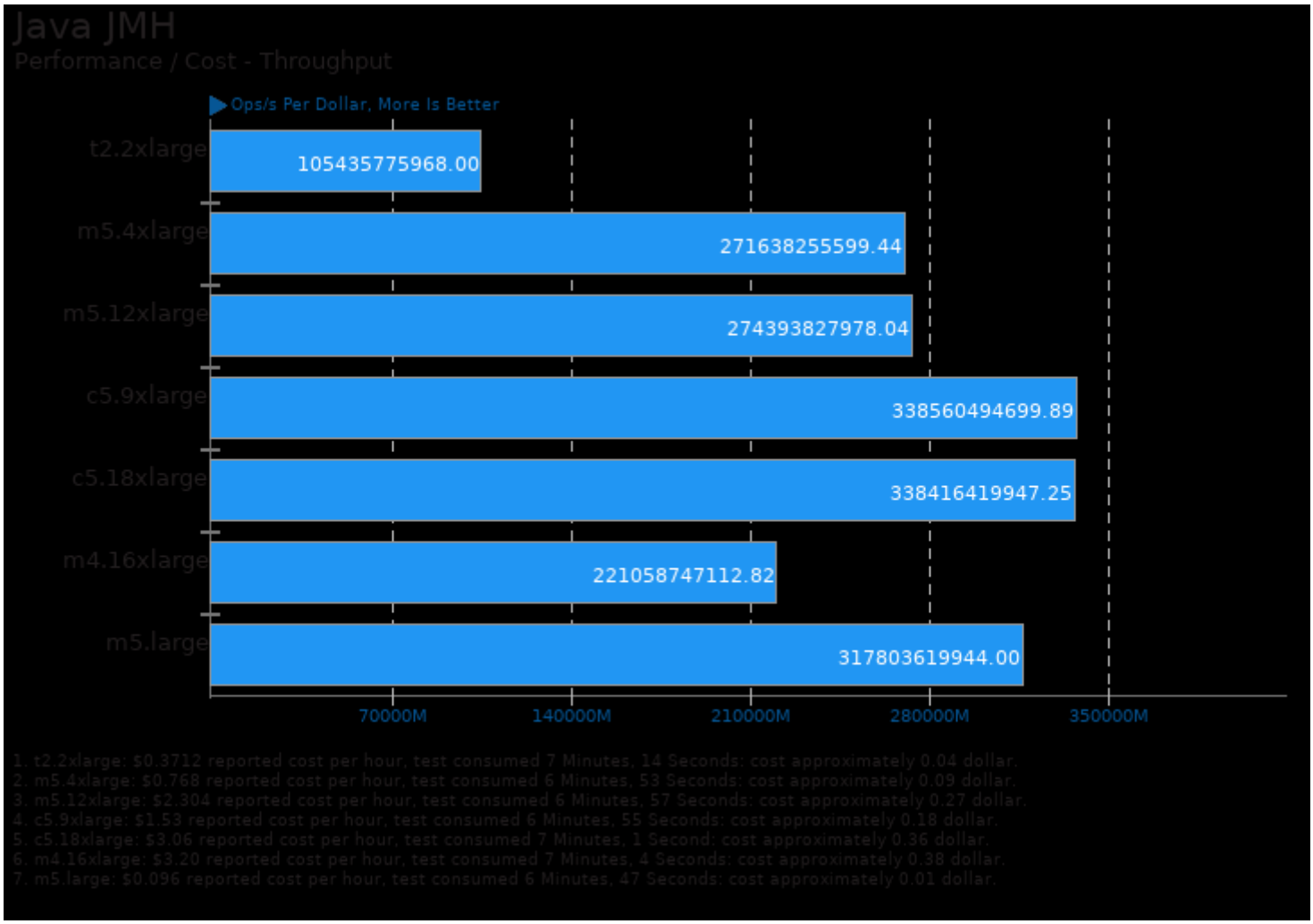
# Large Intel AMD Linux CPU Benchmark Comparison

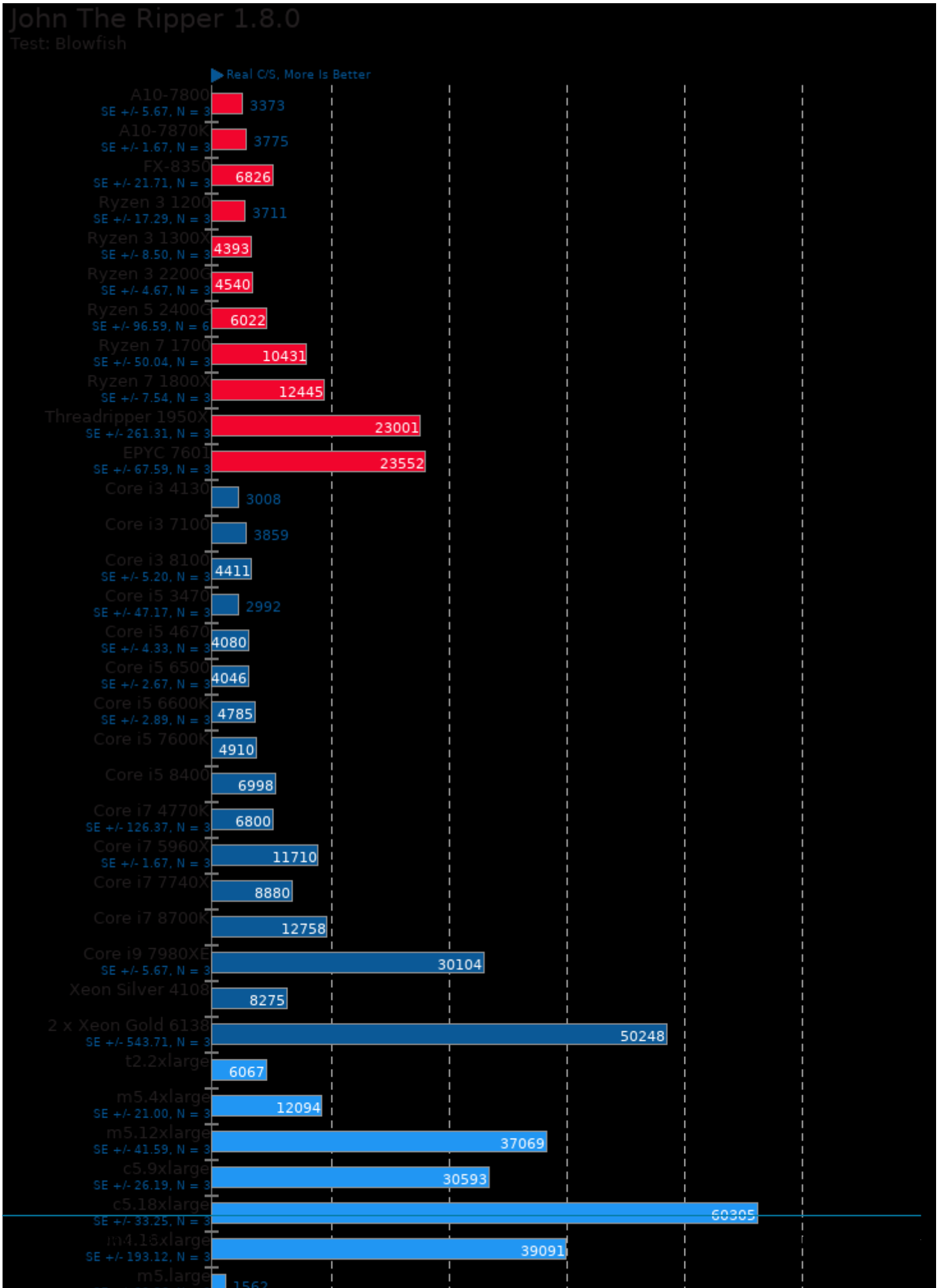


# Large Intel AMD Linux CPU Benchmark Comparison

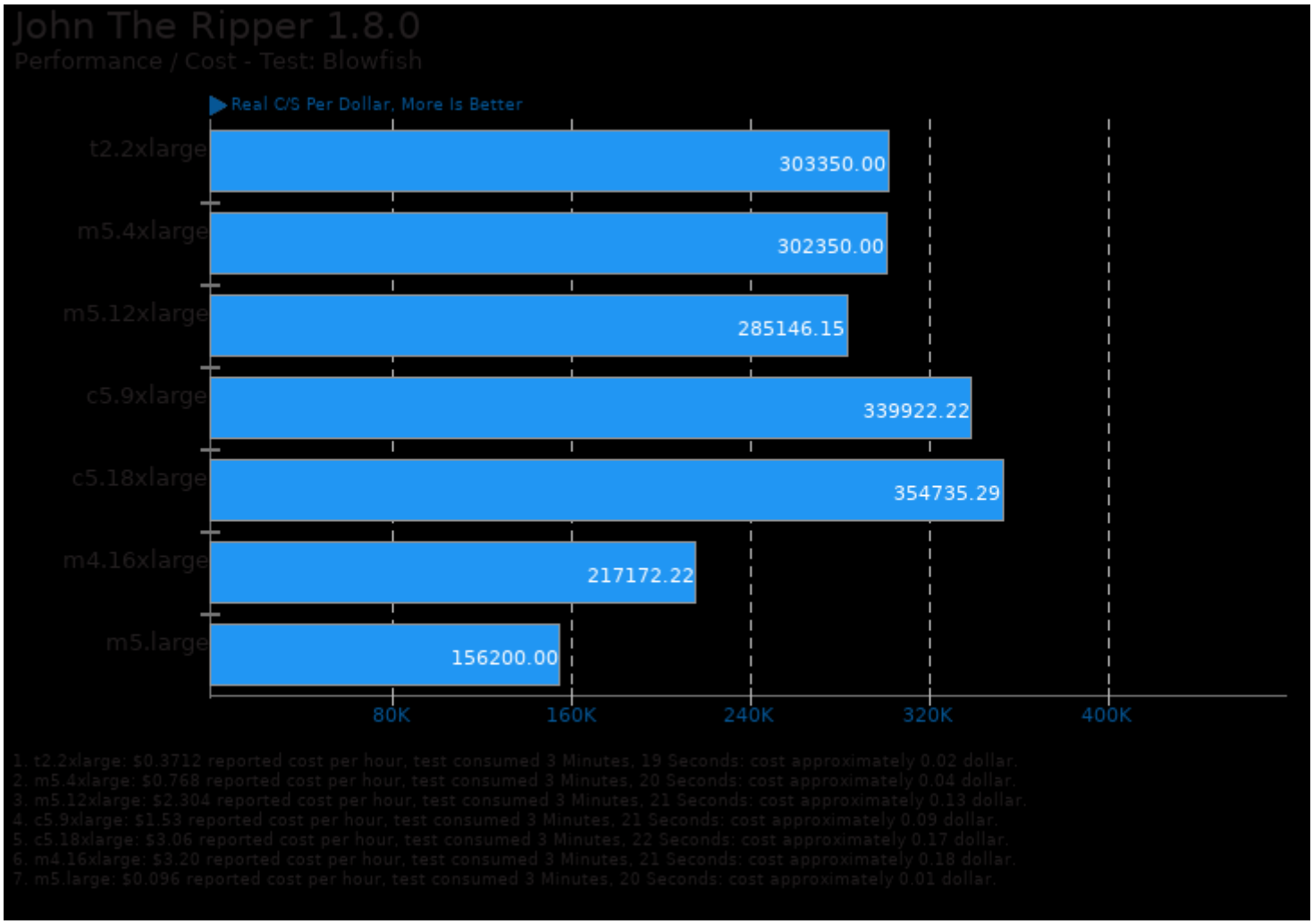


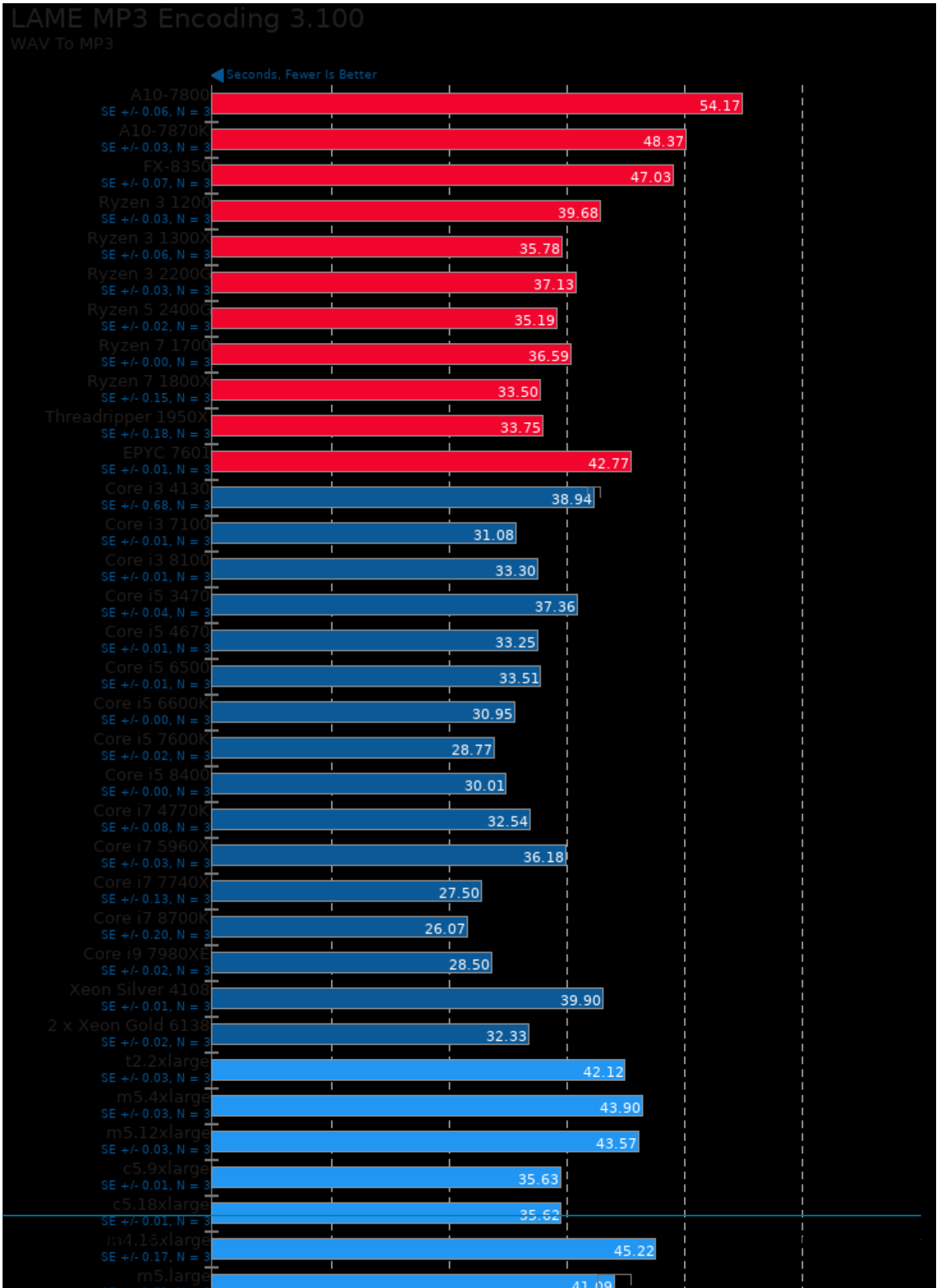
# Large Intel AMD Linux CPU Benchmark Comparison



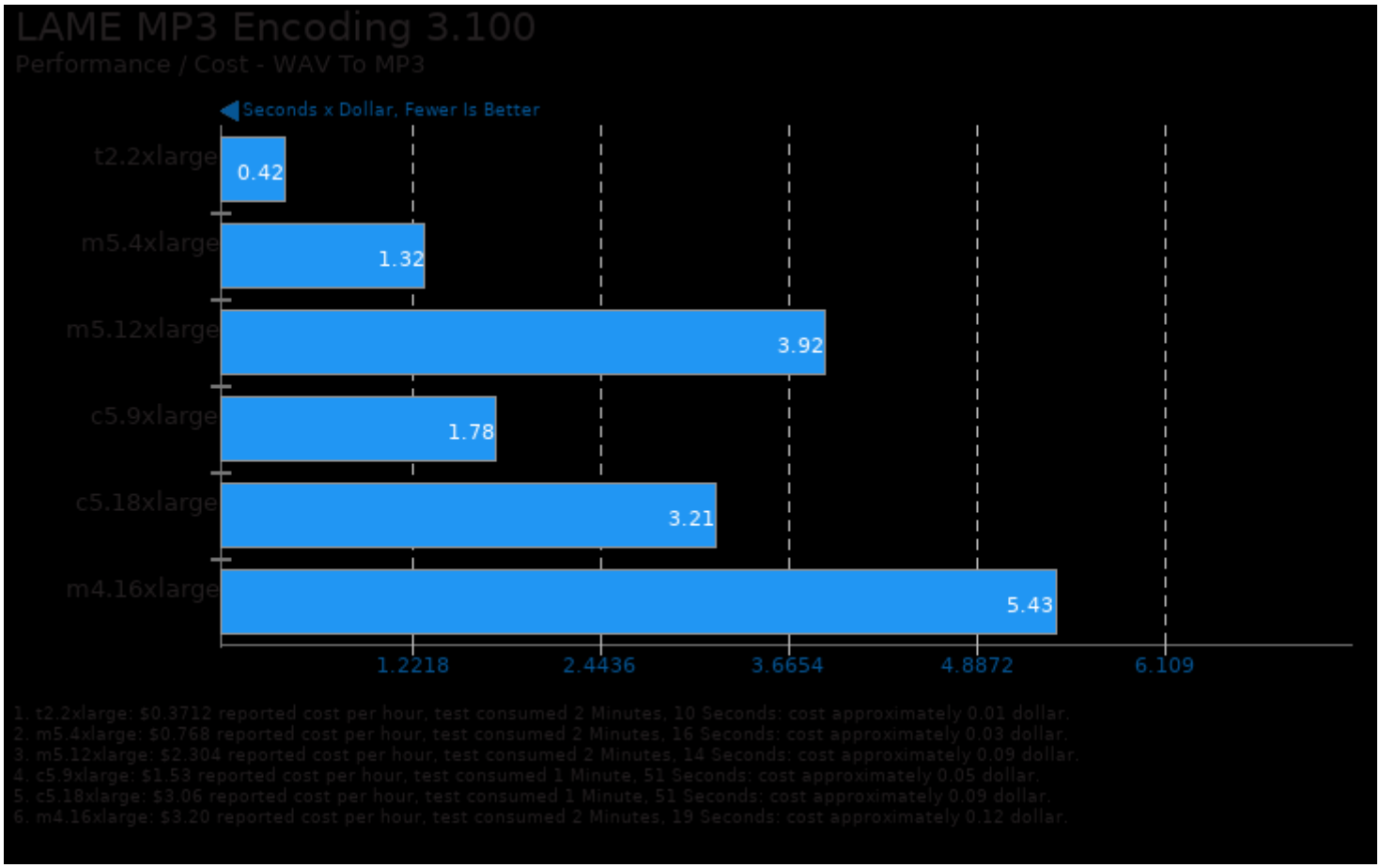

John The Ripper 1.8.0
Test: Blowfish
Real C/S, More Is Better
A10-7800
SE +/- 5.67, N = 3
3373
A10-7870K
SE +/- 1.67, N = 3
3775
FX-8350
SE +/- 21.71, N = 3
6826
Ryzen 3 1200
SE +/- 17.29, N = 3
3711
Ryzen 3 1300X
SE +/- 8.50, N = 3
4393
Ryzen 3 2200G
SE +/- 4.67, N = 3
4540
Ryzen 5 2400G
SE +/- 96.59, N = 6
6022
Ryzen 7 1700
SE +/- 50.04, N = 3
10431
Ryzen 7 1800X
SE +/- 7.54, N = 3
12445
Threadripper 1950X
SE +/- 261.31, N = 3
23001
EPYC 7601
SE +/- 67.59, N = 3
23552
Core i3 4130
3008
Core i3 7100
3859
Core i3 8100
SE +/- 5.20, N = 3
4411
Core i5 3470
SE +/- 47.17, N = 3
2992
Core i5 4670
SE +/- 4.33, N = 3
4080
Core i5 6500
SE +/- 2.67, N = 3
4046
Core i5 6600K
SE +/- 2.89, N = 3
4785
Core i5 7600K
4910
Core i5 8400
6998
Core i7 4770K
SE +/- 126.37, N = 3
6800
Core i7 5960X
SE +/- 1.67, N = 3
11710
Core i7 7740X
8880
Core i7 8700K
12758
Core i9 7980XE
SE +/- 5.67, N = 3
30104
Xeon Silver 4108
8275
2 x Xeon Gold 6138
SE +/- 543.71, N = 3
50248
t2.2xlarge
6067
m5.4xlarge
SE +/- 21.00, N = 3
12094
m5.12xlarge
SE +/- 41.59, N = 3
37069
c5.9xlarge
SE +/- 26.19, N = 3
30593
c5.18xlarge
SE +/- 33.25, N = 3
60305
m4.16xlarge
SE +/- 193.12, N = 3
39091
m5.large
1562

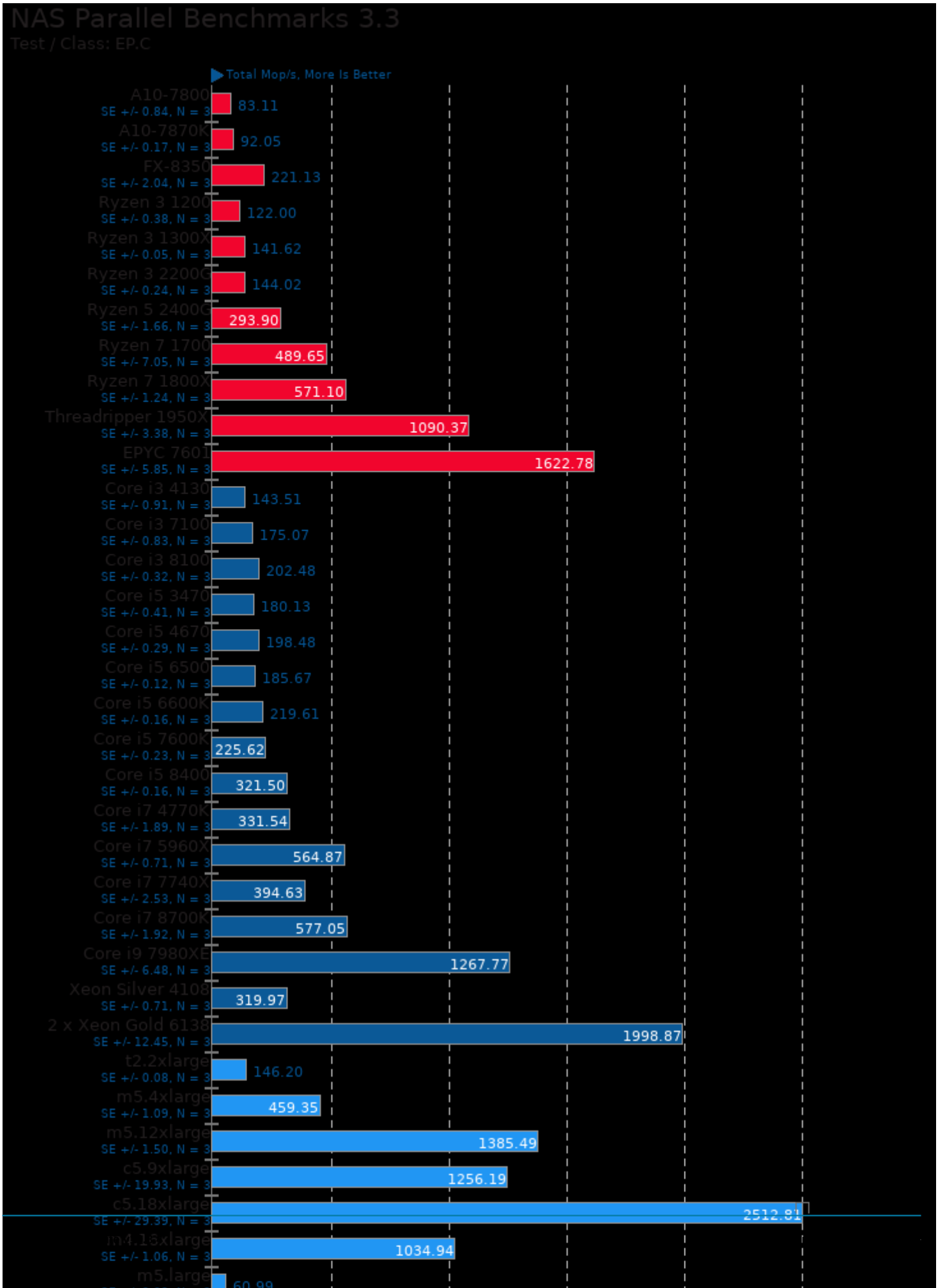
# Large Intel AMD Linux CPU Benchmark Comparison



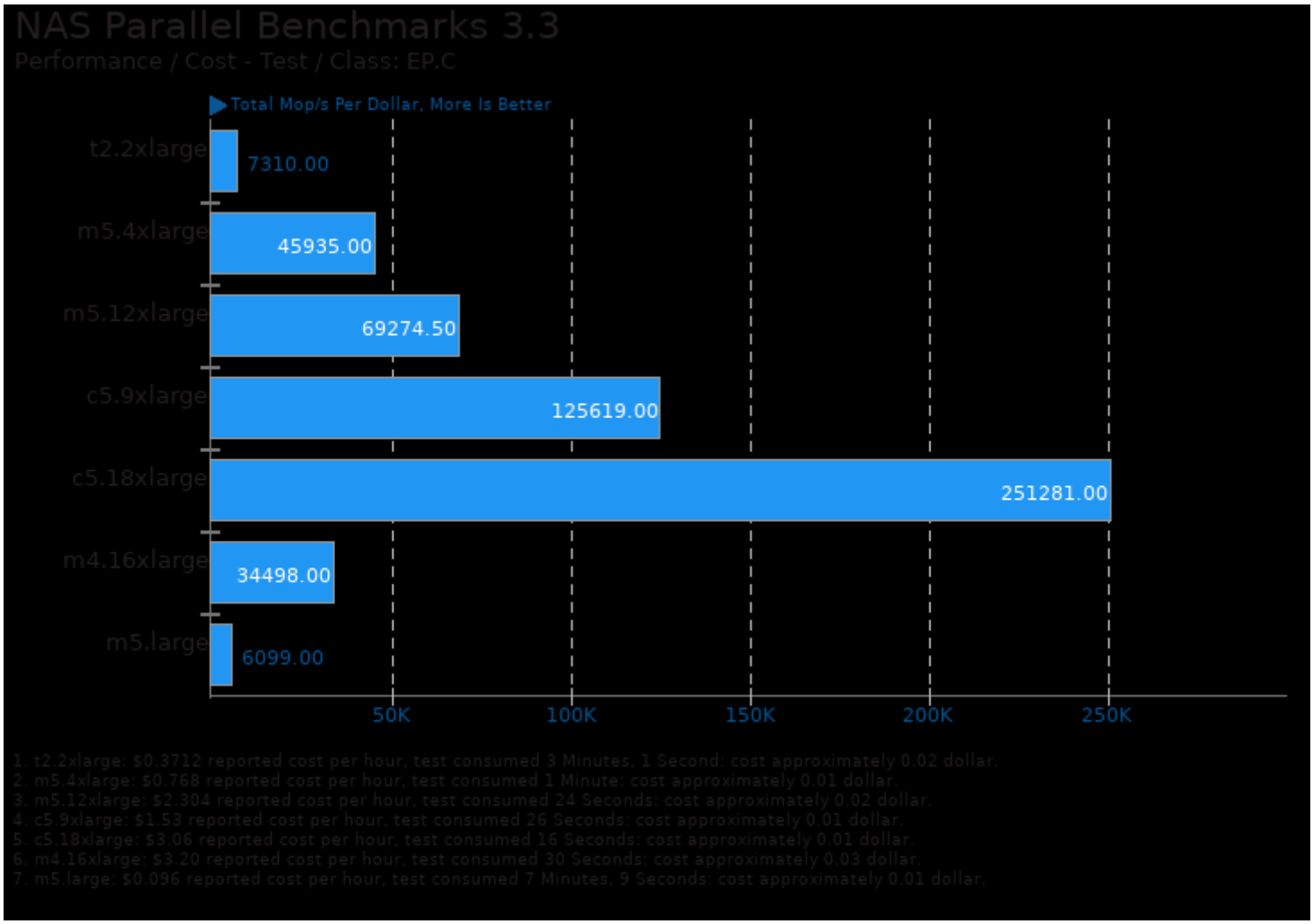

LAME MP3 Encoding 3.100
WAV To MP3
Seconds, Fewer Is Better
A10-7800
SE +/- 0.06, N = 3
54.17
A10-7870K
SE +/- 0.03, N = 3
48.37
FX-8350
SE +/- 0.07, N = 3
47.03
Ryzen 3 1200
SE +/- 0.03, N = 3
39.68
Ryzen 3 1300X
SE +/- 0.06, N = 3
35.78
Ryzen 3 2200G
SE +/- 0.03, N = 3
37.13
Ryzen 5 2400G
SE +/- 0.02, N = 3
35.19
Ryzen 7 1700
SE +/- 0.00, N = 3
36.59
Ryzen 7 1800X
SE +/- 0.15, N = 3
33.50
Threadripper 1950X
SE +/- 0.18, N = 3
33.75
EPYC 7601
SE +/- 0.01, N = 3
42.77
Core i3 4130
SE +/- 0.68, N = 3
38.94
Core i3 7100
SE +/- 0.01, N = 3
31.08
Core i3 8100
SE +/- 0.01, N = 3
33.30
Core i5 3470
SE +/- 0.04, N = 3
37.36
Core i5 4670
SE +/- 0.01, N = 3
33.25
Core i5 6500
SE +/- 0.01, N = 3
33.51
Core i5 6600K
SE +/- 0.00, N = 3
30.95
Core i5 7600K
SE +/- 0.02, N = 3
28.77
Core i5 8400
SE +/- 0.00, N = 3
30.01
Core i7 4770K
SE +/- 0.08, N = 3
32.54
Core i7 5960X
SE +/- 0.03, N = 3
36.18
Core i7 7740X
SE +/- 0.13, N = 3
27.50
Core i7 8700K
SE +/- 0.20, N = 3
26.07
Core i9 7980XE
SE +/- 0.02, N = 3
28.50
Xeon Silver 4108
SE +/- 0.01, N = 3
39.90
2 x Xeon Gold 6138
SE +/- 0.02, N = 3
32.33
t2.2xlarge
SE +/- 0.03, N = 3
42.12
m5.4xlarge
SE +/- 0.03, N = 3
43.90
m5.12xlarge
SE +/- 0.03, N = 3
43.57
c5.9xlarge
SE +/- 0.01, N = 3
35.63
c5.18xlarge
SE +/- 0.01, N = 3
35.62
m4.16xlarge
SE +/- 0.17, N = 3
45.22
m5.large
41.09

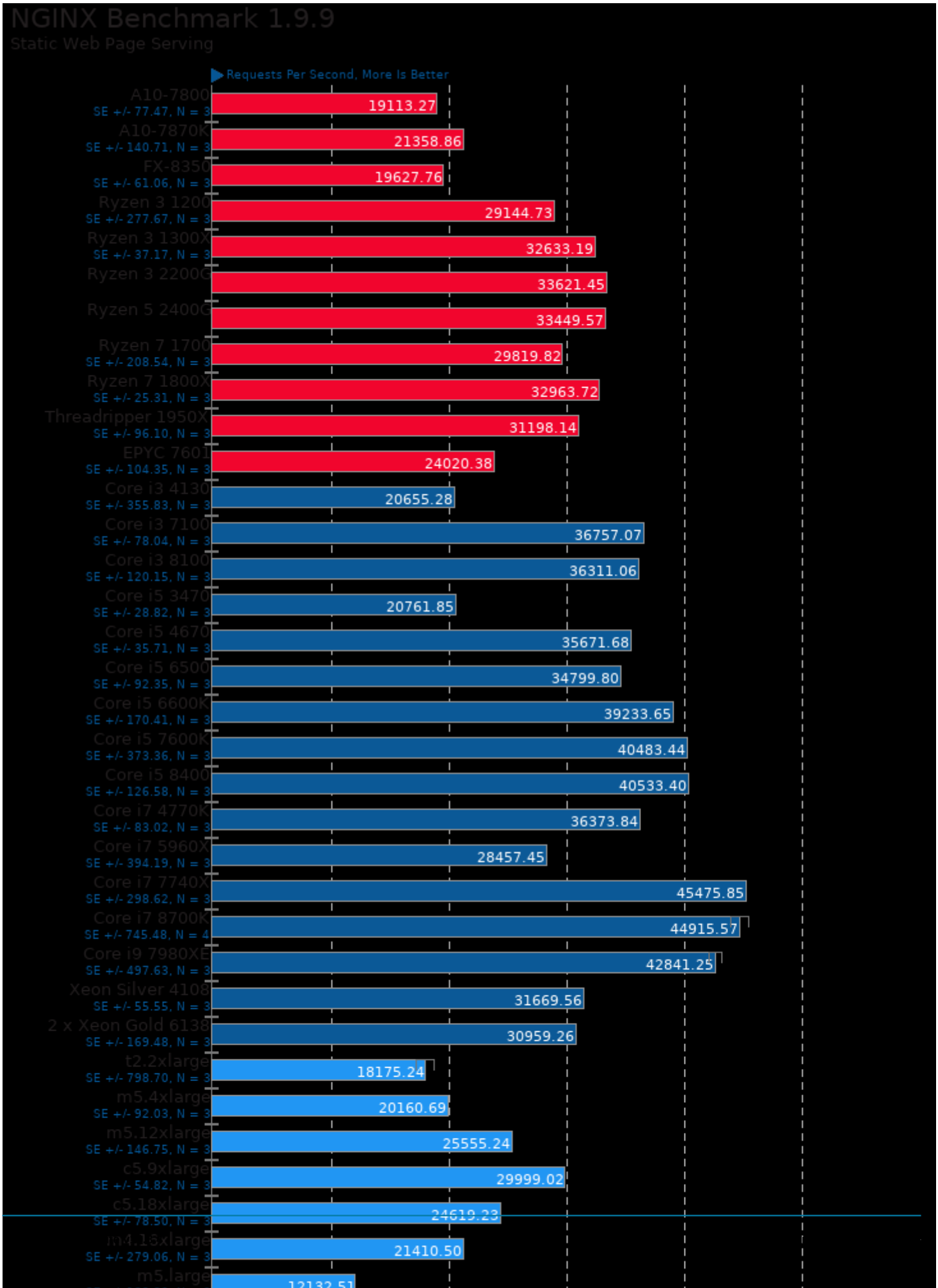
# Large Intel AMD Linux CPU Benchmark Comparison



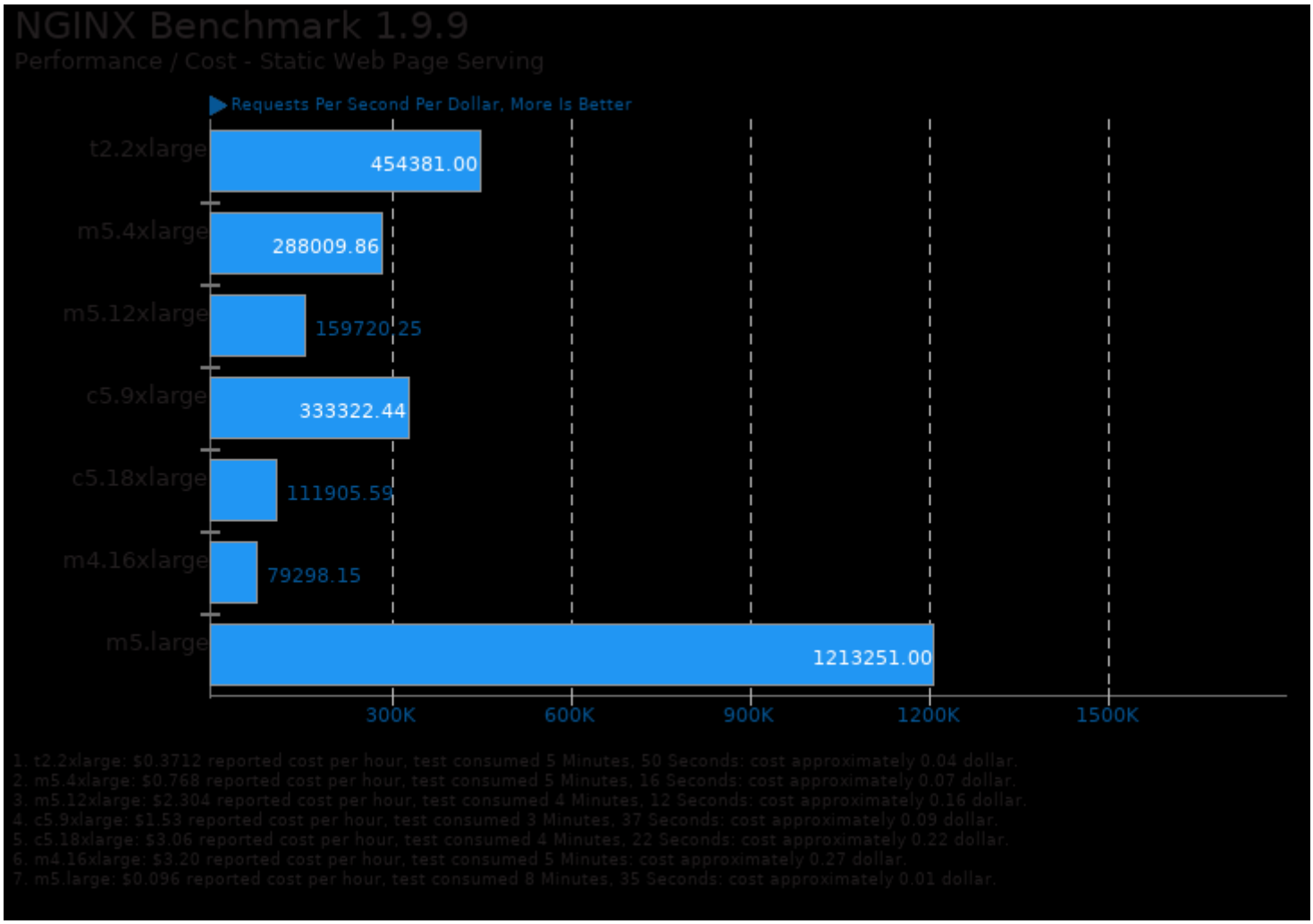

NAS Parallel Benchmarks 3.3
Test / Class: EP.C
Total Mop/s, More Is Better
A10-7800
SE +/- 0.84, N = 3
83.11
A10-7870K
SE +/- 0.17, N = 3
92.05
FX-8350
SE +/- 2.04, N = 3
221.13
Ryzen 3 1200
SE +/- 0.38, N = 3
122.00
Ryzen 3 1300X
SE +/- 0.05, N = 3
141.62
Ryzen 3 2200G
SE +/- 0.24, N = 3
144.02
Ryzen 5 2400G
SE +/- 1.66, N = 3
293.90
Ryzen 7 1700
SE +/- 7.05, N = 3
489.65
Ryzen 7 1800X
SE +/- 1.24, N = 3
571.10
Threadripper 1950X
SE +/- 3.38, N = 3
1090.37
EPYC 7601
SE +/- 5.85, N = 3
1622.78
Core i3 4130
SE +/- 0.91, N = 3
143.51
Core i3 7100
SE +/- 0.83, N = 3
175.07
Core i3 8100
SE +/- 0.32, N = 3
202.48
Core i5 3470
SE +/- 0.41, N = 3
180.13
Core i5 4670
SE +/- 0.29, N = 3
198.48
Core i5 6500
SE +/- 0.12, N = 3
185.67
Core i5 6600K
SE +/- 0.16, N = 3
219.61
Core i5 7600K
SE +/- 0.23, N = 3
225.62
Core i5 8400
SE +/- 0.16, N = 3
321.50
Core i7 4770K
SE +/- 1.89, N = 3
331.54
Core i7 5960X
SE +/- 0.71, N = 3
564.87
Core i7 7740X
SE +/- 2.53, N = 3
394.63
Core i7 8700K
SE +/- 1.92, N = 3
577.05
Core i9 7980XE
SE +/- 6.48, N = 3
1267.77
Xeon Silver 4108
SE +/- 0.71, N = 3
319.97
2 x Xeon Gold 6138
SE +/- 12.45, N = 3
1998.87
t2.2xlarge
SE +/- 0.08, N = 3
146.20
m5.4xlarge
SE +/- 1.09, N = 3
459.35
m5.12xlarge
SE +/- 1.50, N = 3
1385.49
c5.9xlarge
SE +/- 19.93, N = 3
1256.19
c5.18xlarge
SE +/- 29.39, N = 3
2512.81
m4.16xlarge
SE +/- 1.06, N = 3
1034.94
m5.large
60.99

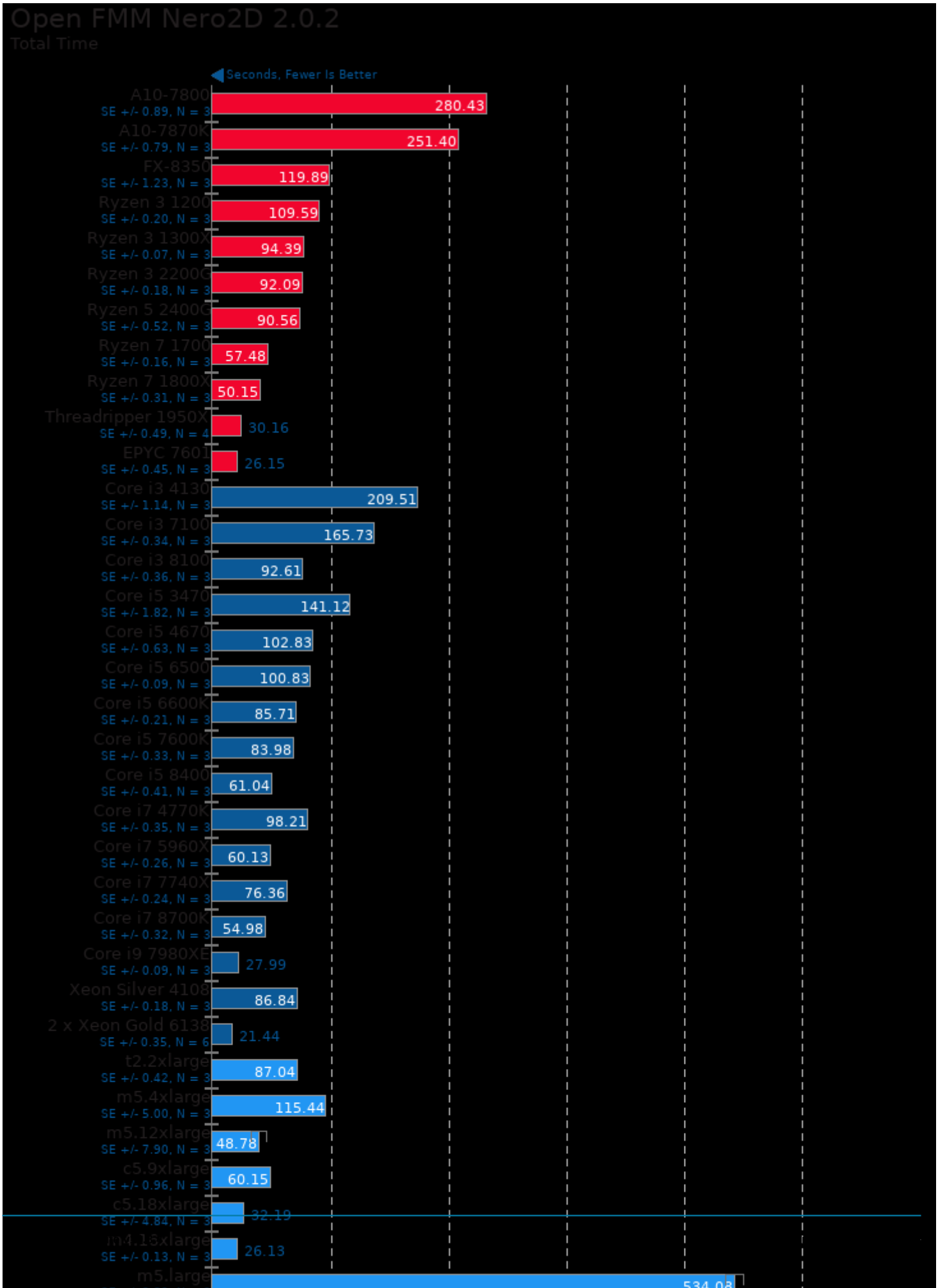
# Large Intel AMD Linux CPU Benchmark Comparison

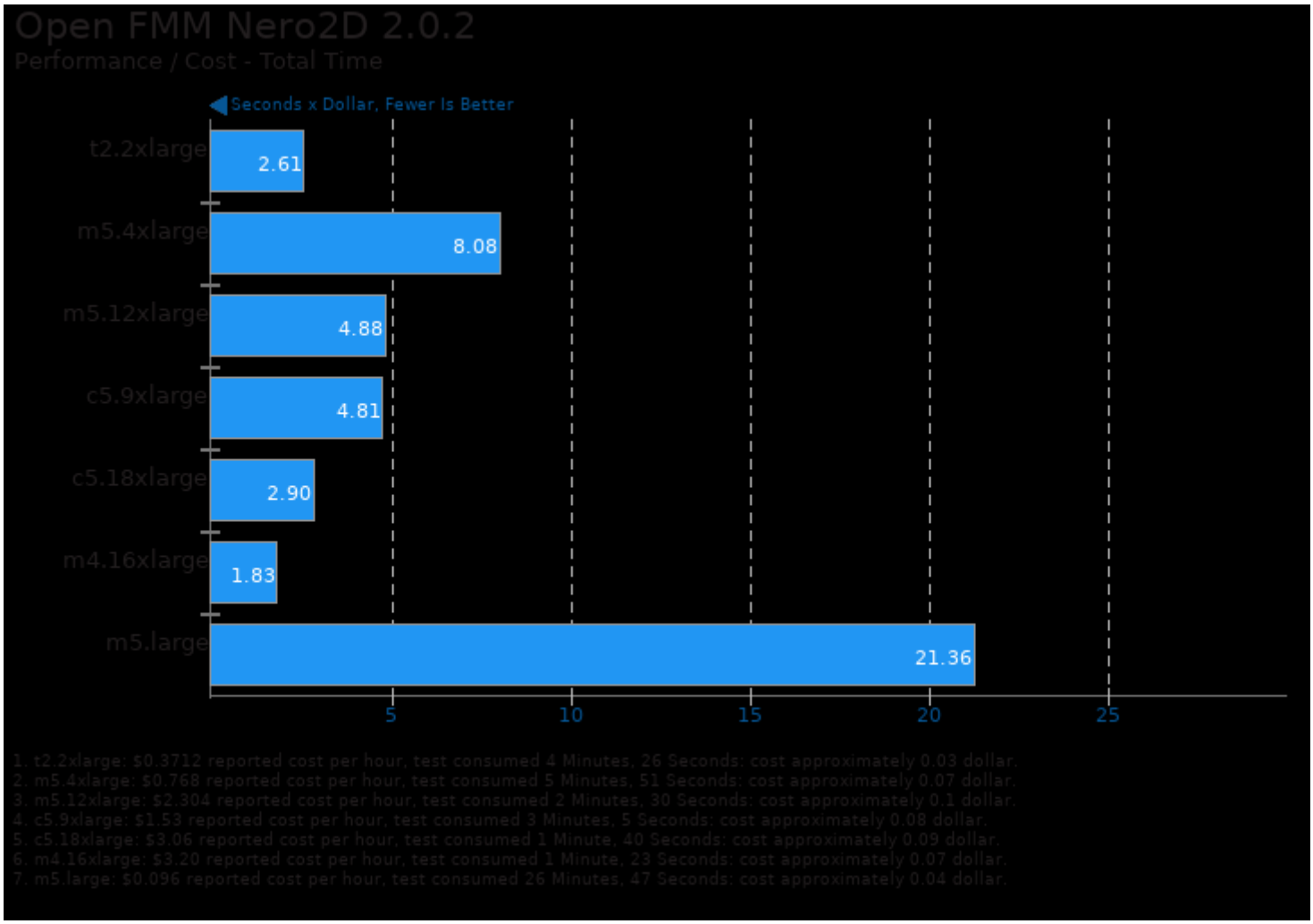


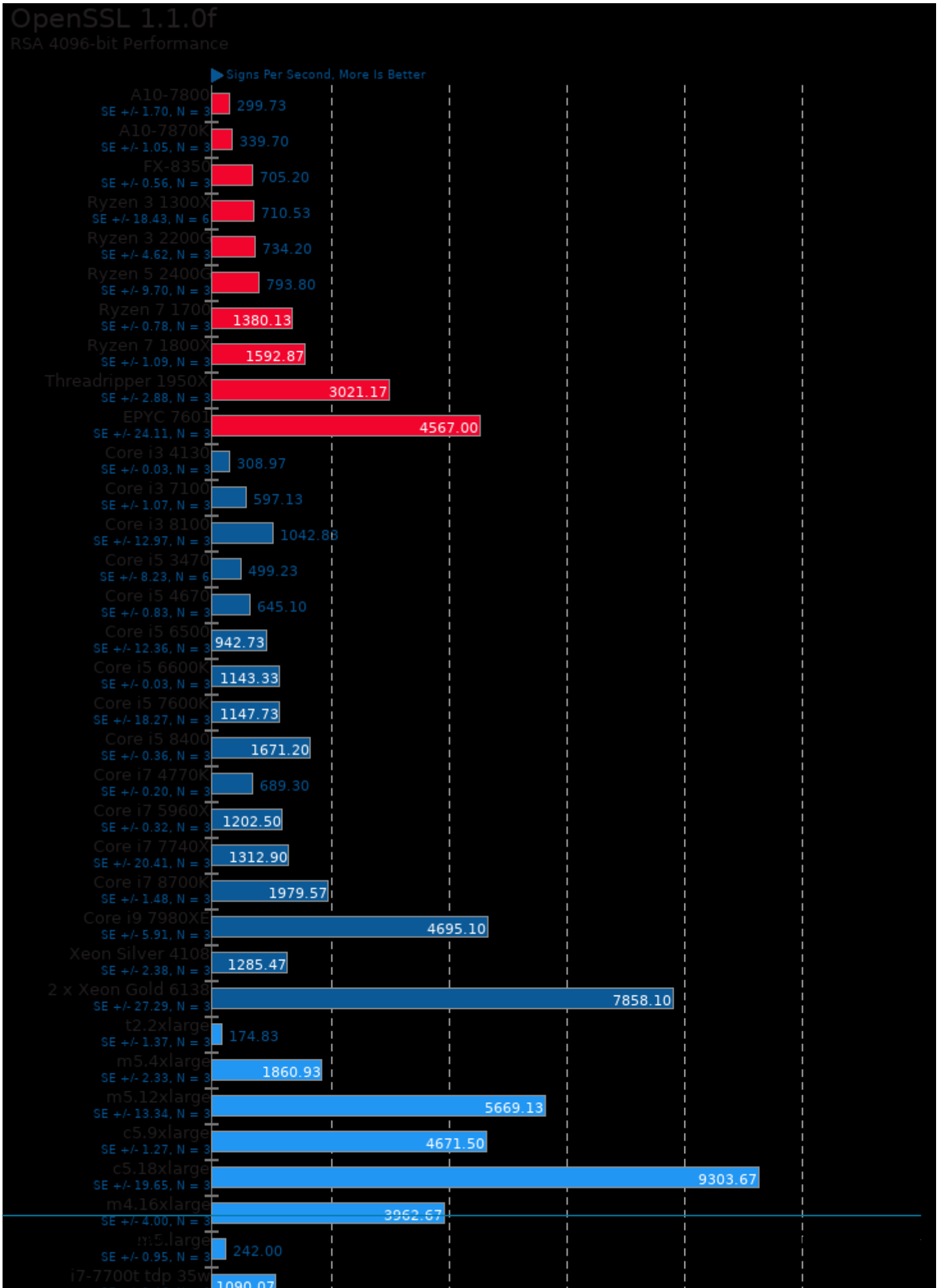

NGINX Benchmark 1.9.9
Static Web Page Serving
Requests Per Second, More Is Better
A10-7800
SE +/- 77.47, N = 3
19113.27
A10-7870K
SE +/- 140.71, N = 3
21358.86
FX-8350
SE +/- 61.06, N = 3
19627.76
Ryzen 3 1200
SE +/- 277.67, N = 3
29144.73
Ryzen 3 1300X
SE +/- 37.17, N = 3
32633.19
Ryzen 3 2200G
33621.45
Ryzen 5 2400G
33449.57
Ryzen 7 1700
SE +/- 208.54, N = 3
29819.82
Ryzen 7 1800X
SE +/- 25.31, N = 3
32963.72
Threadripper 1950X
SE +/- 96.10, N = 3
31198.14
EPYC 7601
SE +/- 104.35, N = 3
24020.38
Core i3 4130
SE +/- 355.83, N = 3
20655.28
Core i3 7100
SE +/- 78.04, N = 3
36757.07
Core i3 8100
SE +/- 120.15, N = 3
36311.06
Core i5 3470
SE +/- 28.82, N = 3
20761.85
Core i5 4670
SE +/- 35.71, N = 3
35671.68
Core i5 6500
SE +/- 92.35, N = 3
34799.80
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 i7 4770K
SE +/- 83.02, N = 3
36373.84
Core i7 5960X
SE +/- 394.19, N = 3
28457.45
Core i7 7740X
SE +/- 298.62, N = 3
45475.85
Core i7 8700K
SE +/- 745.48, N = 4
44915.57
Core i9 7980XE
SE +/- 497.63, N = 3
42841.25
Xeon Silver 4108
SE +/- 55.55, N = 3
31669.56
2 x Xeon Gold 6138
SE +/- 169.48, N = 3
30959.26
t2.2xlarge
SE +/- 798.70, N = 3
18175.24
m5.4xlarge
SE +/- 92.03, N = 3
20160.69
m5.12xlarge
SE +/- 146.75, N = 3
25555.24
c5.9xlarge
SE +/- 54.82, N = 3
29999.02
c5.18xlarge
SE +/- 78.50, N = 3
24619.23
m4.16xlarge
SE +/- 279.06, N = 3
21410.50
m5.large

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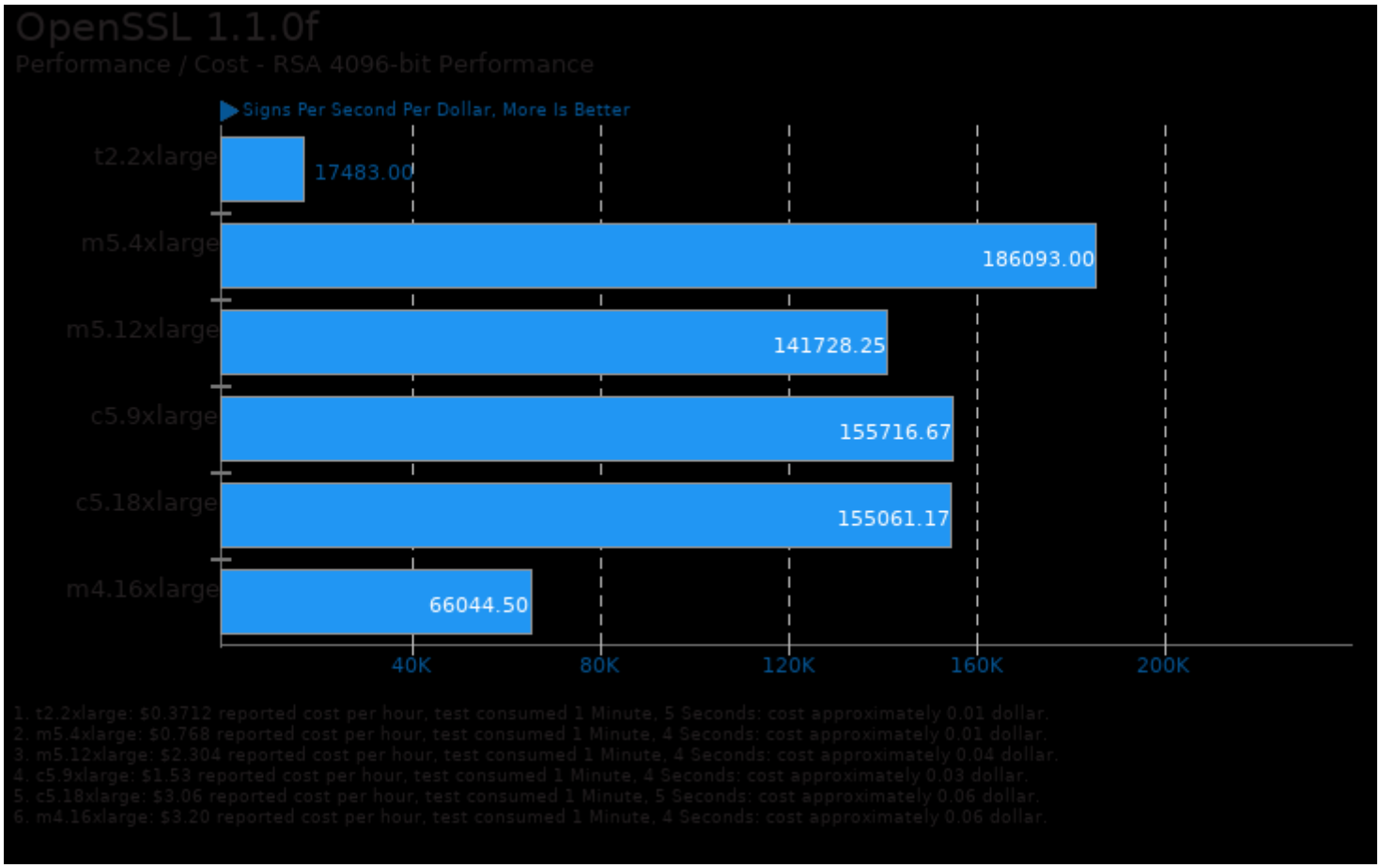


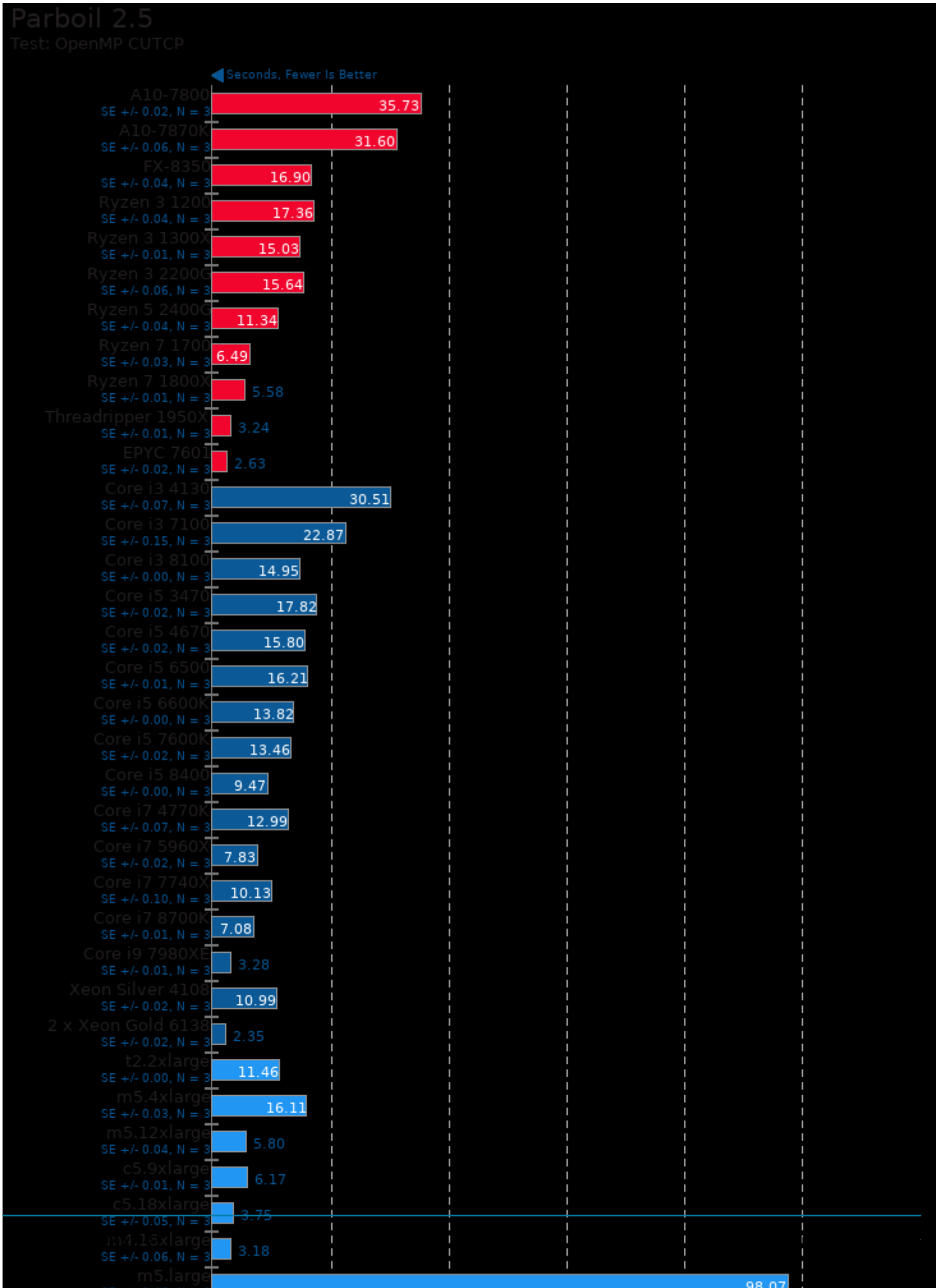

Open FMM Nero2D 2.0.2
Total Time
Seconds, Fewer Is Better
A10-7800
SE +/- 0.89, N = 3
280.43
A10-7870K
SE +/- 0.79, N = 3
251.40
FX-8350
SE +/- 1.23, N = 3
119.89
Ryzen 3 1200
SE +/- 0.20, N = 3
109.59
Ryzen 3 1300X
SE +/- 0.07, N = 3
94.39
Ryzen 3 2200G
SE +/- 0.18, N = 3
92.09
Ryzen 5 2400G
SE +/- 0.52, N = 3
90.56
Ryzen 7 1700
SE +/- 0.16, N = 3
57.48
Ryzen 7 1800X
SE +/- 0.31, N = 3
50.15
Threadripper 1950X
SE +/- 0.49, N = 4
30.16
EPYC 7601
SE +/- 0.45, N = 3
26.15
Core i3 4130
SE +/- 1.14, N = 3
209.51
Core i3 7100
SE +/- 0.34, N = 3
165.73
Core i3 8100
SE +/- 0.36, N = 3
92.61
Core i5 3470
SE +/- 1.82, N = 3
141.12
Core i5 4670
SE +/- 0.63, N = 3
102.83
Core i5 6500
SE +/- 0.09, N = 3
100.83
Core i5 6600K
SE +/- 0.21, N = 3
85.71
Core i5 7600K
SE +/- 0.33, N = 3
83.98
Core i5 8400
SE +/- 0.41, N = 3
61.04
Core i7 4770K
SE +/- 0.35, N = 3
98.21
Core i7 5960X
SE +/- 0.26, N = 3
60.13
Core i7 7740X
SE +/- 0.24, N = 3
76.36
Core i7 8700K
SE +/- 0.32, N = 3
54.98
Core i9 7980XE
SE +/- 0.09, N = 3
27.99
Xeon Silver 4108
SE +/- 0.18, N = 3
86.84
2 x Xeon Gold 6138
SE +/- 0.35, N = 6
21.44
t2.2xlarge
SE +/- 0.42, N = 3
87.04
m5.4xlarge
SE +/- 5.00, N = 3
115.44
m5.12xlarge
SE +/- 7.90, N = 3
48.78
c5.9xlarge
SE +/- 0.96, N = 3
60.15
c5.18xlarge
SE +/- 4.84, N = 3
32.19
m4.16xlarge
SE +/- 0.13, N = 3
26.13
m5.large
534.08


Open FMM Nero2D 2.0.2
Performance / Cost - Total Time
Seconds x Dollar, Fewer Is Better
t2.2xlarge
2.61
m5.4xlarge
8.08
m5.12xlarge
4.88
c5.9xlarge
4.81
c5.18xlarge
2.90
m4.16xlarge
1.83
m5.large
21.36
5
10
15
20
25
1. t2.2xlarge: $0.3712 reported cost per hour, test consumed 4 Minutes, 26 Seconds: cost approximately 0.03 dollar.
2. m5.4xlarge: $0.768 reported cost per hour, test consumed 5 Minutes, 51 Seconds: cost approximately 0.07 dollar.
3. m5.12xlarge: $2.304 reported cost per hour, test consumed 2 Minutes, 30 Seconds: cost approximately 0.1 dollar.
4. c5.9xlarge: $1.53 reported cost per hour, test consumed 3 Minutes, 5 Seconds: cost approximately 0.08 dollar.
5. c5.18xlarge: $3.06 reported cost per hour, test consumed 1 Minute, 40 Seconds: cost approximately 0.09 dollar.
6. m4.16xlarge: $3.20 reported cost per hour, test consumed 1 Minute, 23 Seconds: cost approximately 0.07 dollar.
7. m5.large: $0.096 reported cost per hour, test consumed 26 Minutes, 47 Seconds: cost approximately 0.04 dollar.

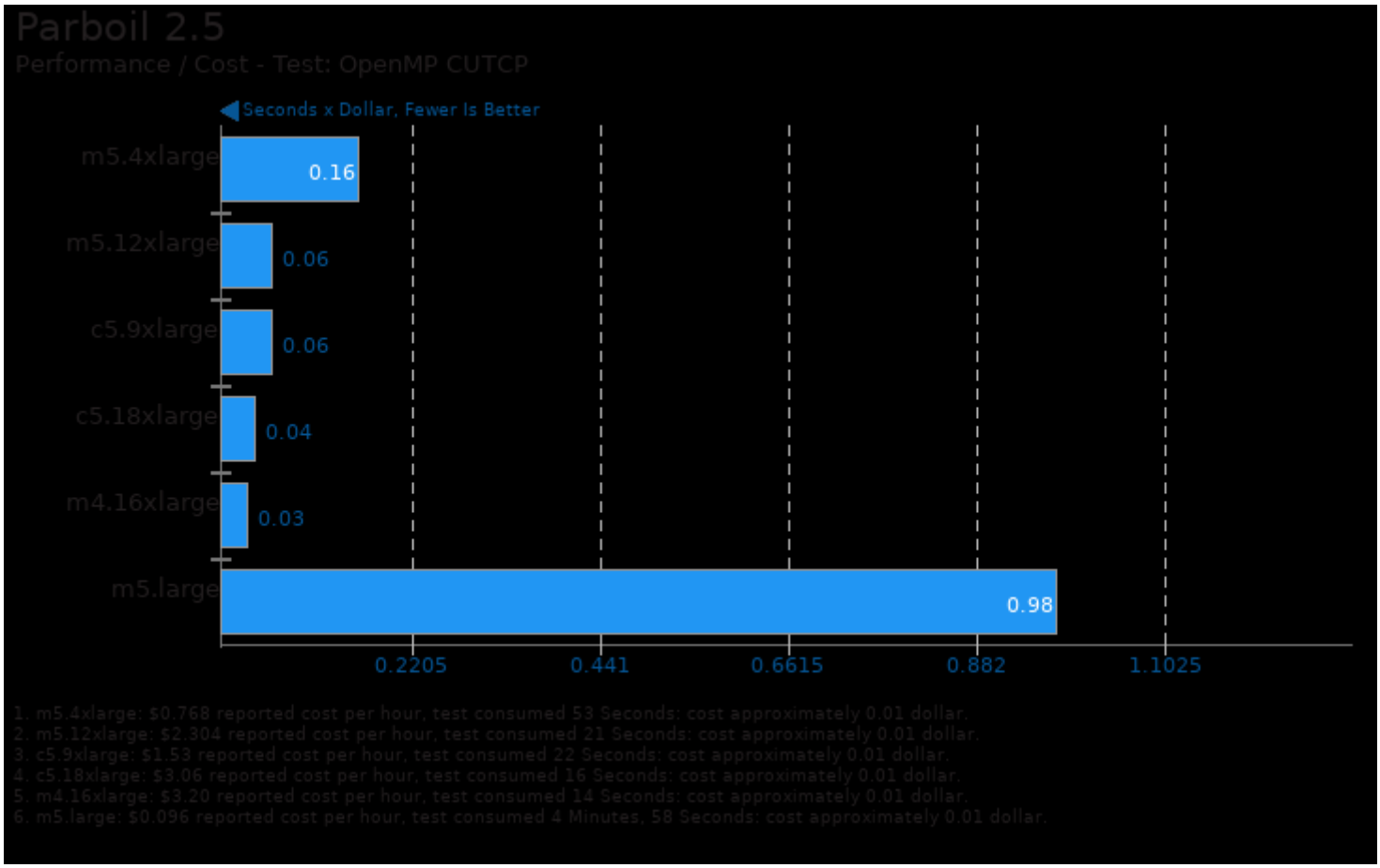

OpenSSL 1.1.0f
RSA 4096-bit Performance
Signs Per Second, More Is Better
A10-7800
SE +/- 1.70, N = 3
299.73
A10-7870K
SE +/- 1.05, N = 3
339.70
FX-8350
SE +/- 0.56, N = 3
705.20
Ryzen 3 1300X
SE +/- 18.43, N = 6
710.53
Ryzen 3 2200G
SE +/- 4.62, N = 3
734.20
Ryzen 5 2400G
SE +/- 9.70, N = 3
793.80
Ryzen 7 1700
SE +/- 0.78, N = 3
1380.13
Ryzen 7 1800X
SE +/- 1.09, N = 3
1592.87
Threadripper 1950X
SE +/- 2.88, N = 3
3021.17
EPYC 7601
SE +/- 24.11, N = 3
4567.00
Core i3 4130
SE +/- 0.03, N = 3
308.97
Core i3 7100
SE +/- 1.07, N = 3
597.13
Core i3 8100
SE +/- 12.97, N = 3
1042.88
Core i5 3470
SE +/- 8.23, N = 6
499.23
Core i5 4670
SE +/- 0.83, N = 3
645.10
Core i5 6500
SE +/- 12.36, N = 3
942.73
Core i5 6600K
SE +/- 0.03, N = 3
1143.33
Core i5 7600K
SE +/- 18.27, N = 3
1147.73
Core i5 8400
SE +/- 0.36, N = 3
1671.20
Core i7 4770K
SE +/- 0.20, N = 3
689.30
Core i7 5960X
SE +/- 0.32, N = 3
1202.50
Core i7 7740X
SE +/- 20.41, N = 3
1312.90
Core i7 8700K
SE +/- 1.48, N = 3
1979.57
Core i9 7980XE
SE +/- 5.91, N = 3
4695.10
Xeon Silver 4108
SE +/- 2.38, N = 3
1285.47
2 x Xeon Gold 6138
SE +/- 27.29, N = 3
7858.10
t2.2xlarge
SE +/- 1.37, N = 3
174.83
m5.4xlarge
SE +/- 2.33, N = 3
1860.93
m5.12xlarge
SE +/- 13.34, N = 3
5669.13
c5.9xlarge
SE +/- 1.27, N = 3
4671.50
c5.18xlarge
SE +/- 19.65, N = 3
9303.67
m4.16xlarge
SE +/- 4.00, N = 3
3962.67
m5.large
SE +/- 0.95, N = 3
242.00
i7-7700t tdp 35w
1090.07

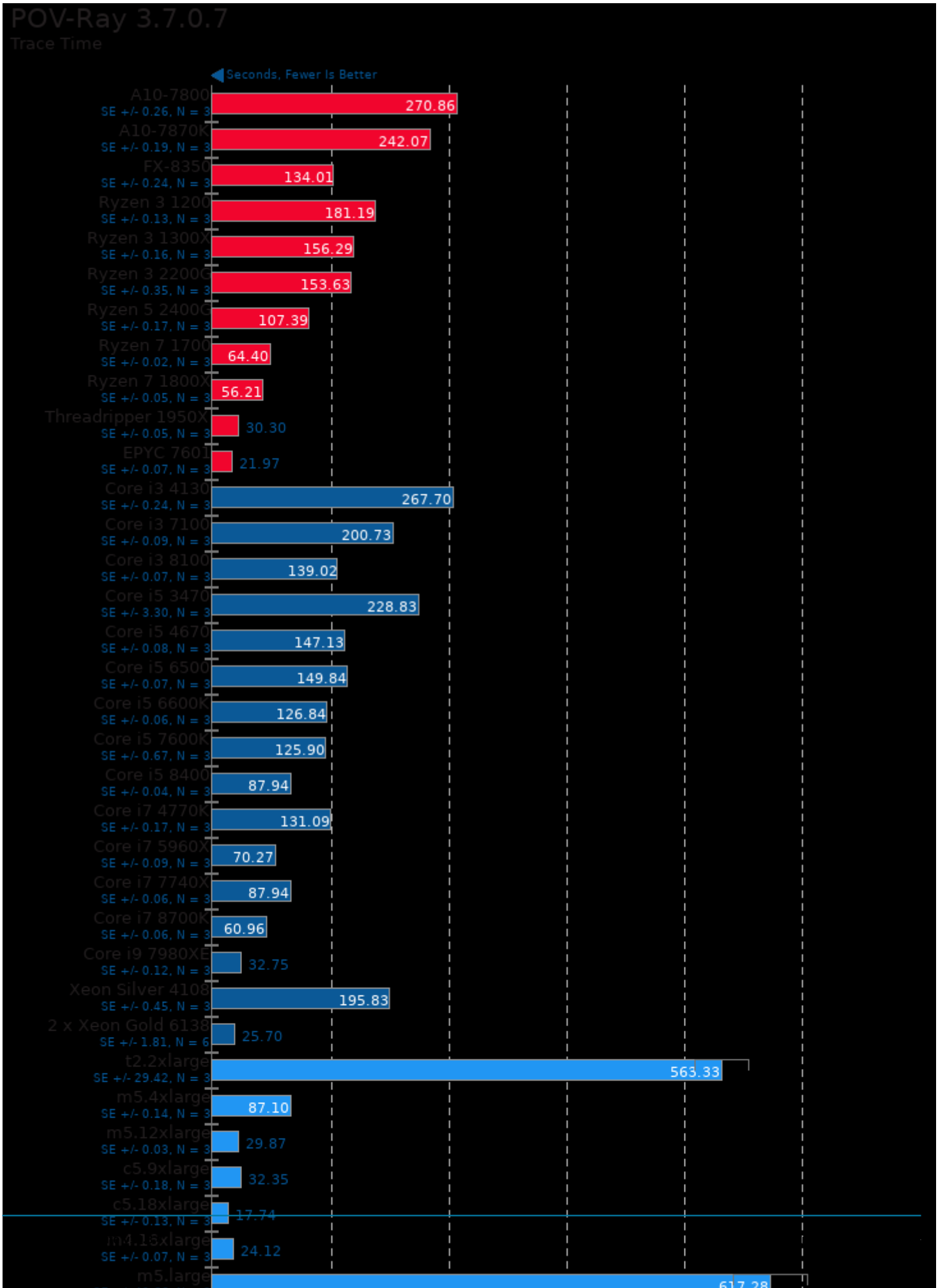
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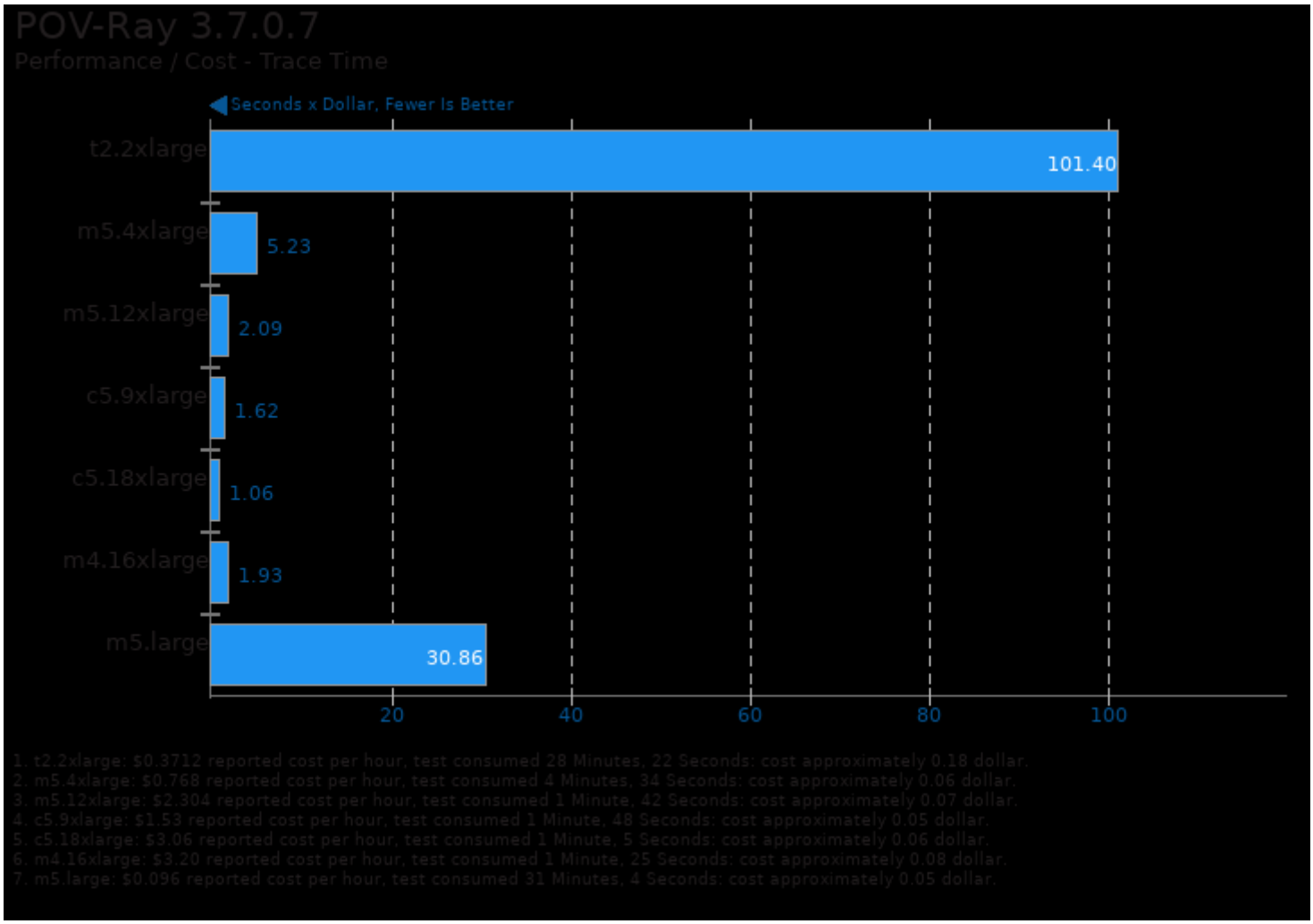

Parboil 2.5
Test: OpenMP CUTCP
Seconds, Fewer Is Better
A10-7800
SE +/- 0.02, N = 3
35.73
A10-7870K
SE +/- 0.06, N = 3
31.60
FX-8350
SE +/- 0.04, N = 3
16.90
Ryzen 3 1200
SE +/- 0.04, N = 3
17.36
Ryzen 3 1300X
SE +/- 0.01, N = 3
15.03
Ryzen 3 2200G
SE +/- 0.06, N = 3
15.64
Ryzen 5 2400G
SE +/- 0.04, N = 3
11.34
Ryzen 7 1700
SE +/- 0.03, N = 3
6.49
Ryzen 7 1800X
SE +/- 0.01, N = 3
5.58
Threadripper 1950X
SE +/- 0.01, N = 3
3.24
EPYC 7601
SE +/- 0.02, N = 3
2.63
Core i3 4130
SE +/- 0.07, N = 3
30.51
Core i3 7100
SE +/- 0.15, N = 3
22.87
Core i3 8100
SE +/- 0.00, N = 3
14.95
Core i5 3470
SE +/- 0.02, N = 3
17.82
Core i5 4670
SE +/- 0.02, N = 3
15.80
Core i5 6500
SE +/- 0.01, N = 3
16.21
Core i5 6600K
SE +/- 0.00, N = 3
13.82
Core i5 7600K
SE +/- 0.02, N = 3
13.46
Core i5 8400
SE +/- 0.00, N = 3
9.47
Core i7 4770K
SE +/- 0.07, N = 3
12.99
Core i7 5960X
SE +/- 0.02, N = 3
7.83
Core i7 7740X
SE +/- 0.10, N = 3
10.13
Core i7 8700K
SE +/- 0.01, N = 3
7.08
Core i9 7980XE
SE +/- 0.01, N = 3
3.28
Xeon Silver 4108
SE +/- 0.02, N = 3
10.99
2 x Xeon Gold 6138
SE +/- 0.02, N = 3
2.35
t2.2xlarge
SE +/- 0.00, N = 3
11.46
m5.4xlarge
SE +/- 0.03, N = 3
16.11
m5.12xlarge
SE +/- 0.04, N = 3
5.80
c5.9xlarge
SE +/- 0.01, N = 3
6.17
c5.18xlarge
SE +/- 0.05, N = 3
3.75
m4.16xlarge
SE +/- 0.06, N = 3
3.18
m5.large
98.07

# Large Intel AMD Linux CPU Benchmark Comparison

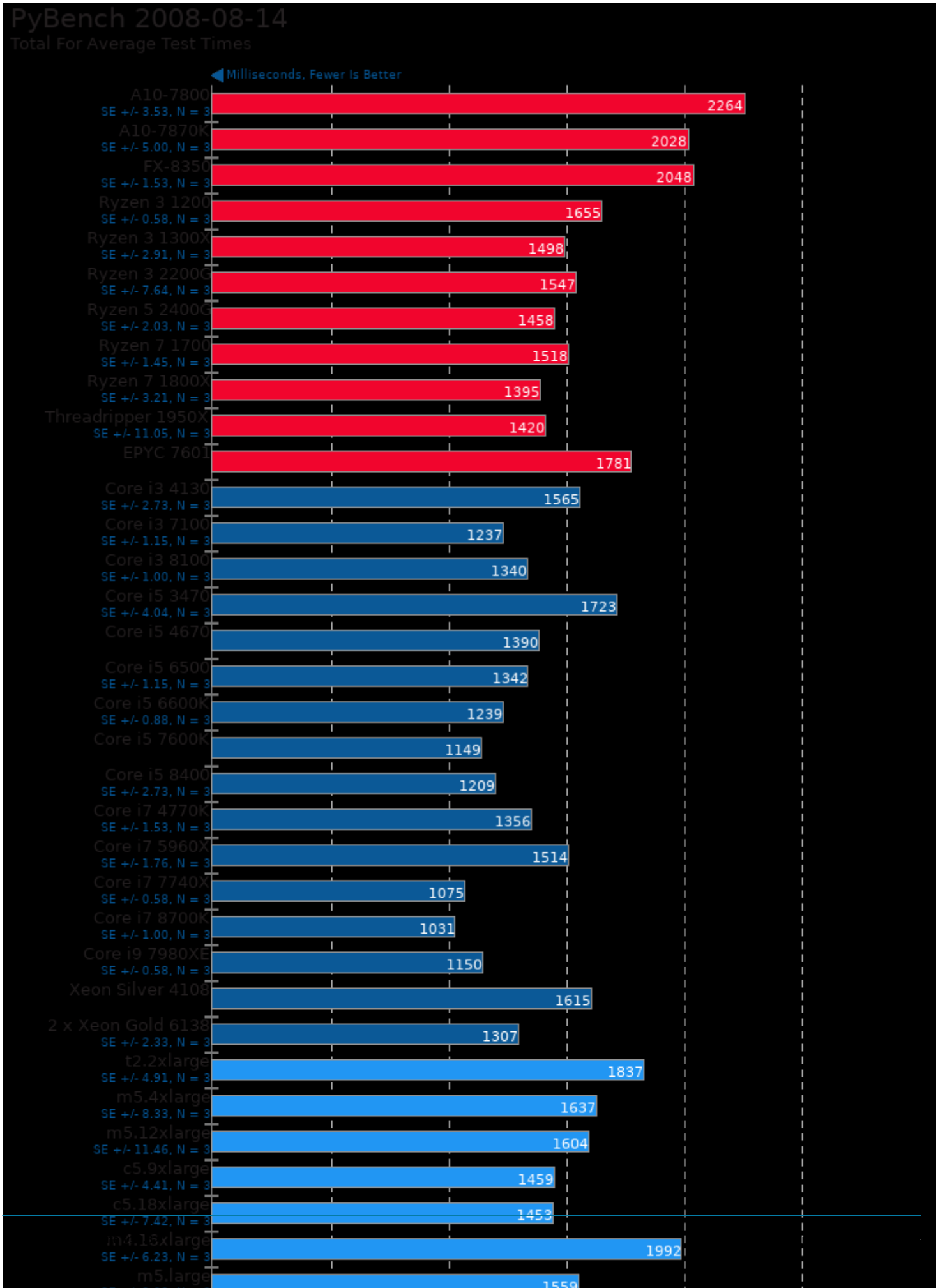



POV-Ray 3.7.0.7
Trace Time
Seconds, Fewer Is Better
A10-7800
SE +/- 0.26, N = 3
270.86
A10-7870K
SE +/- 0.19, N = 3
242.07
FX-8350
SE +/- 0.24, N = 3
134.01
Ryzen 3 1200
SE +/- 0.13, N = 3
181.19
Ryzen 3 1300X
SE +/- 0.16, N = 3
156.29
Ryzen 3 2200G
SE +/- 0.35, N = 3
153.63
Ryzen 5 2400G
SE +/- 0.17, N = 3
107.39
Ryzen 7 1700
SE +/- 0.02, N = 3
64.40
Ryzen 7 1800X
SE +/- 0.05, N = 3
56.21
Threadripper 1950X
SE +/- 0.05, N = 3
30.30
EPYC 7601
SE +/- 0.07, N = 3
21.97
Core i3 4130
SE +/- 0.24, N = 3
267.70
Core i3 7100
SE +/- 0.09, N = 3
200.73
Core i3 8100
SE +/- 0.07, N = 3
139.02
Core i5 3470
SE +/- 3.30, N = 3
228.83
Core i5 4670
SE +/- 0.08, N = 3
147.13
Core i5 6500
SE +/- 0.07, N = 3
149.84
Core i5 6600K
SE +/- 0.06, N = 3
126.84
Core i5 7600K
SE +/- 0.67, N = 3
125.90
Core i5 8400
SE +/- 0.04, N = 3
87.94
Core i7 4770K
SE +/- 0.17, N = 3
131.09
Core i7 5960X
SE +/- 0.09, N = 3
70.27
Core i7 7740X
SE +/- 0.06, N = 3
87.94
Core i7 8700K
SE +/- 0.06, N = 3
60.96
Core i9 7980XE
SE +/- 0.12, N = 3
32.75
Xeon Silver 4108
SE +/- 0.45, N = 3
195.83
2 x Xeon Gold 6138
SE +/- 1.81, N = 6
25.70
t2.2xlarge
SE +/- 29.42, N = 3
563.33
m5.4xlarge
SE +/- 0.14, N = 3
87.10
m5.12xlarge
SE +/- 0.03, N = 3
29.87
c5.9xlarge
SE +/- 0.18, N = 3
32.35
c5.18xlarge
SE +/- 0.13, N = 3
17.74
m4.16xlarge
SE +/- 0.07, N = 3
24.12
m5.large
617.28

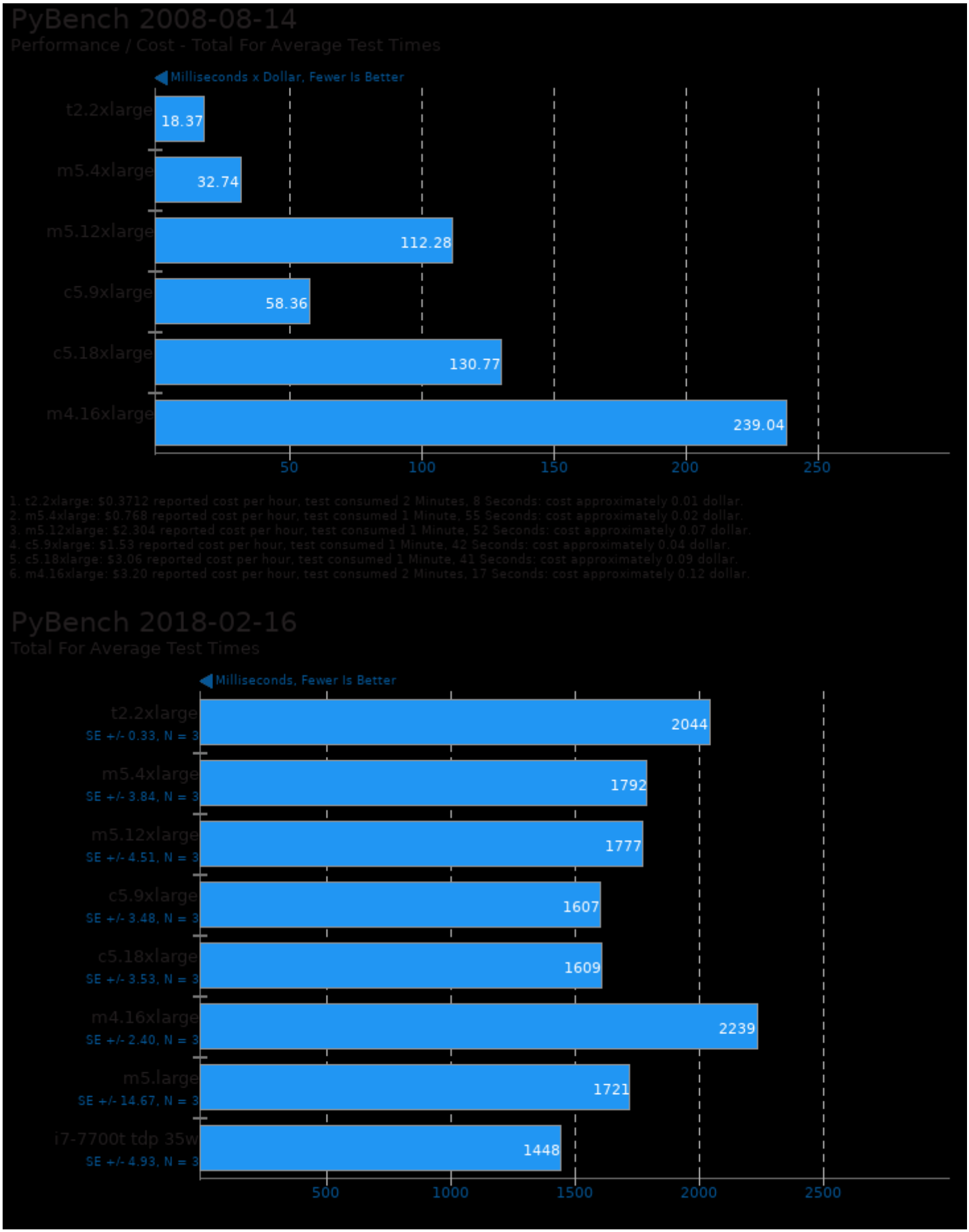
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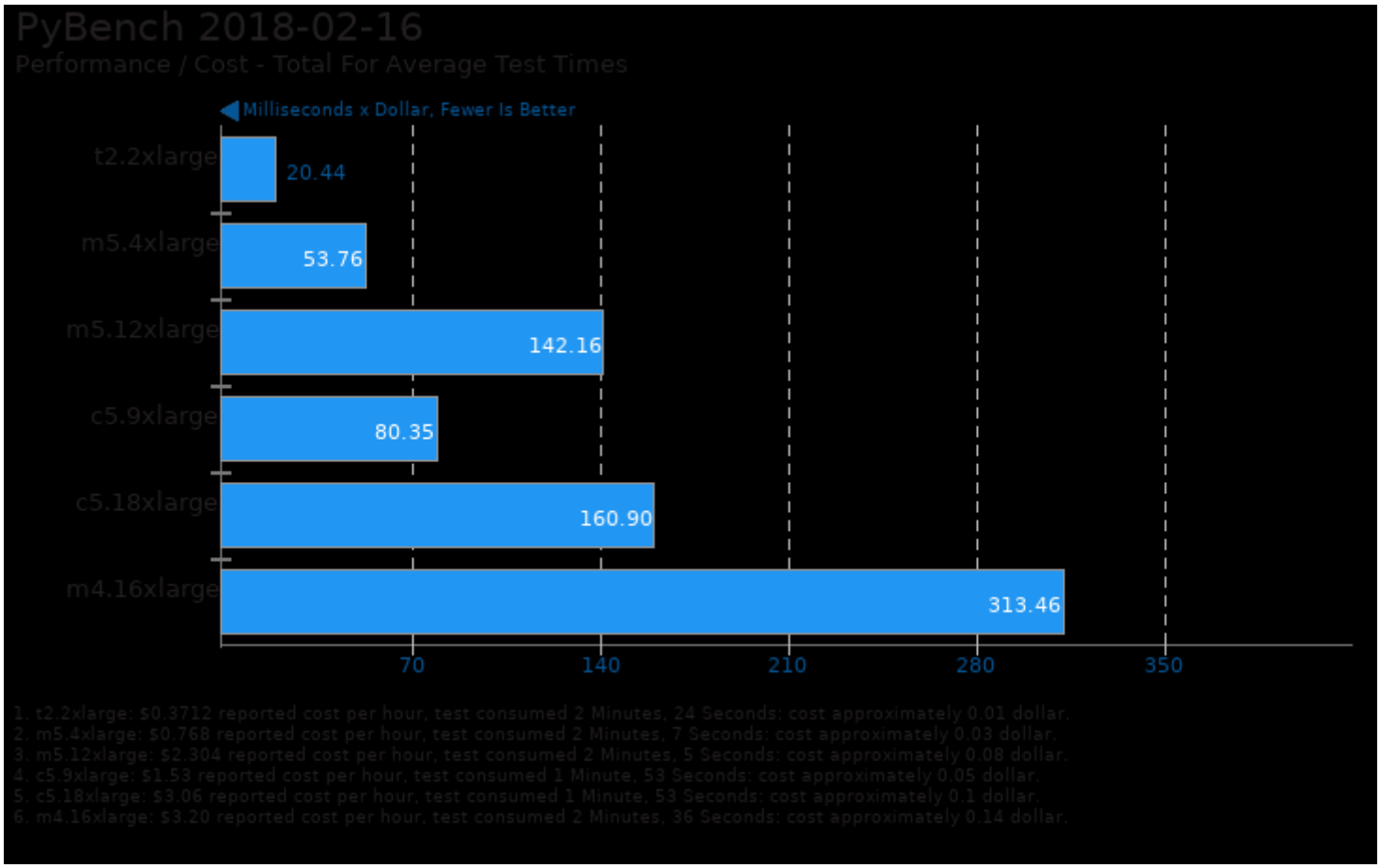
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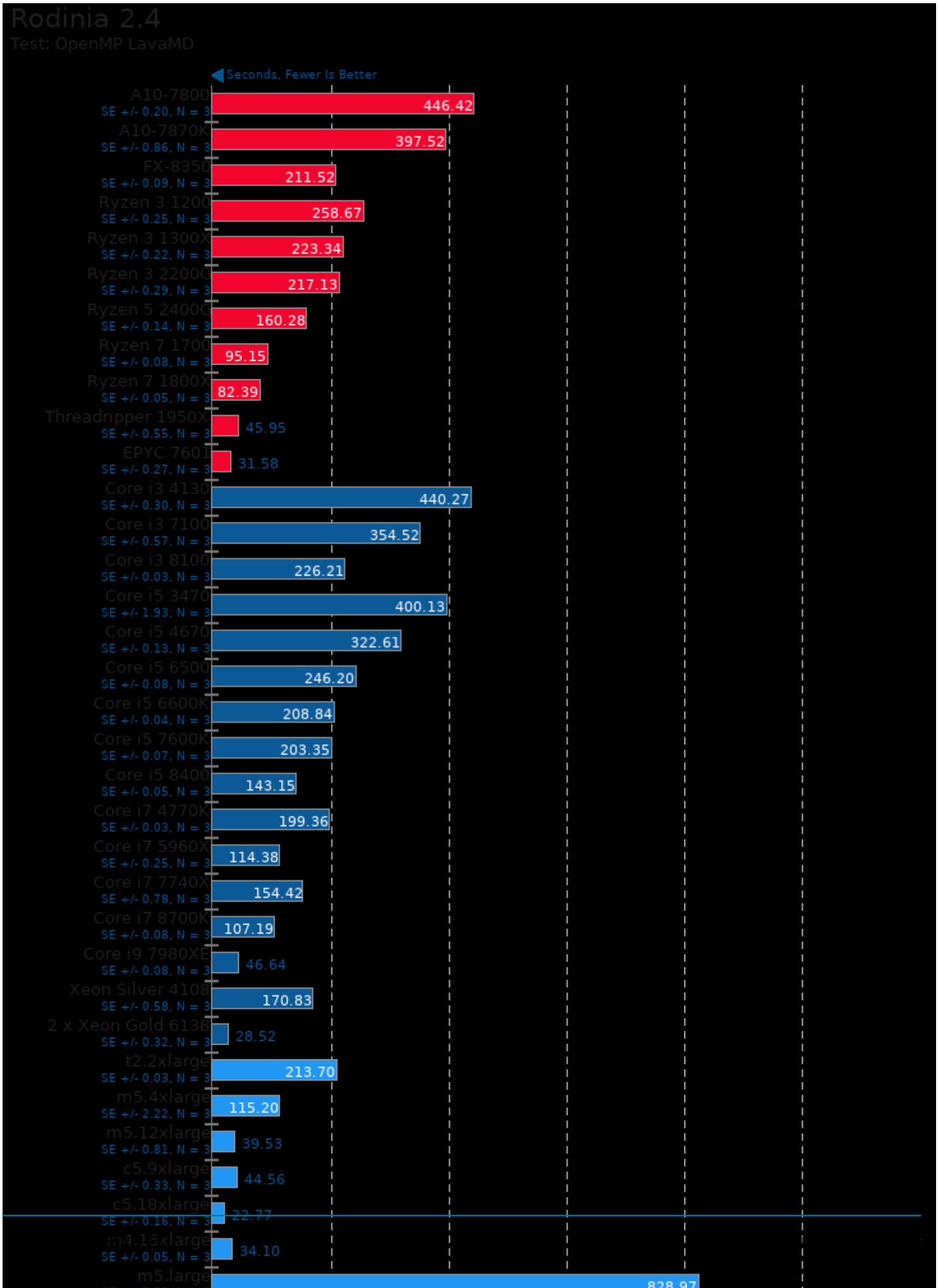


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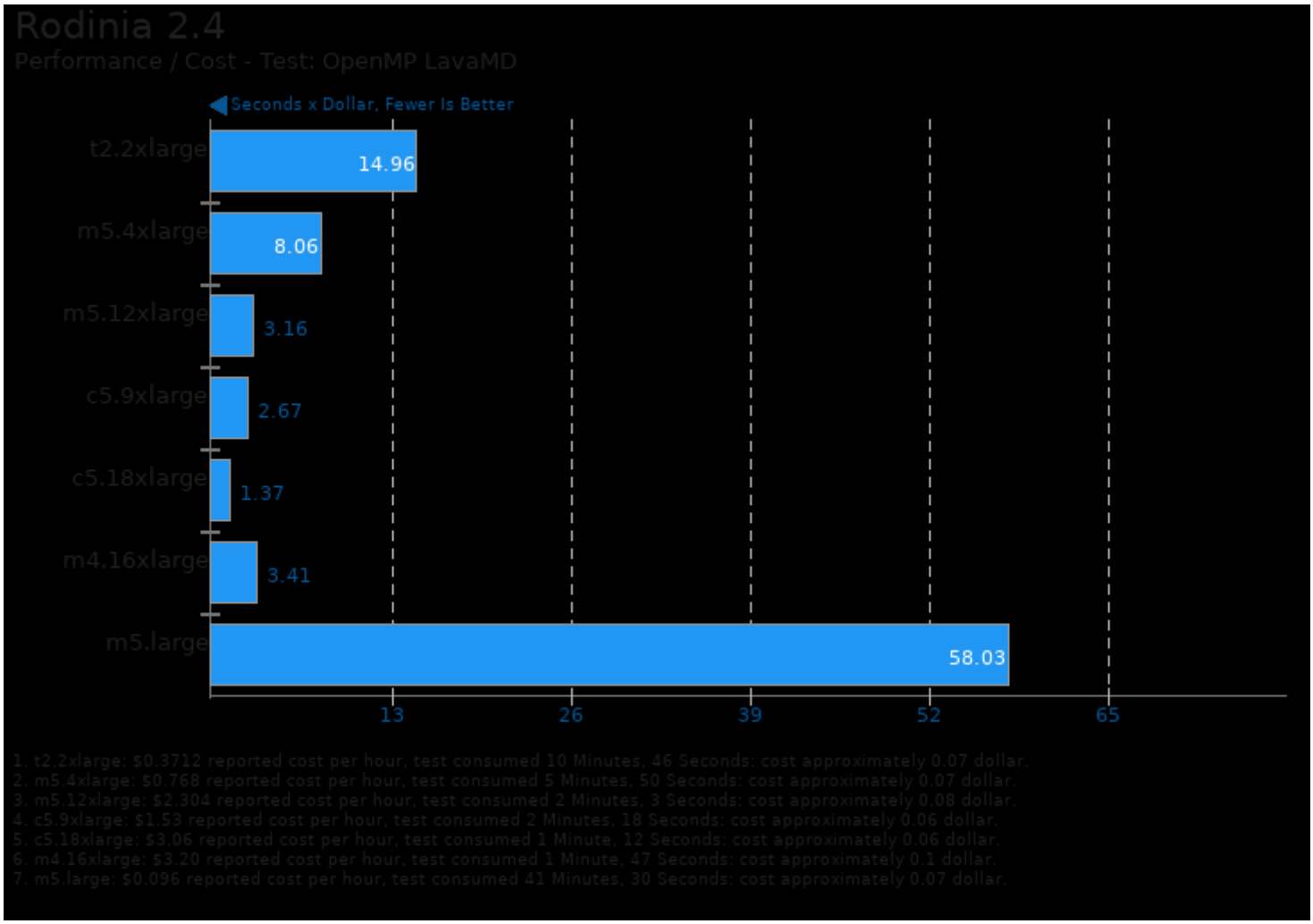


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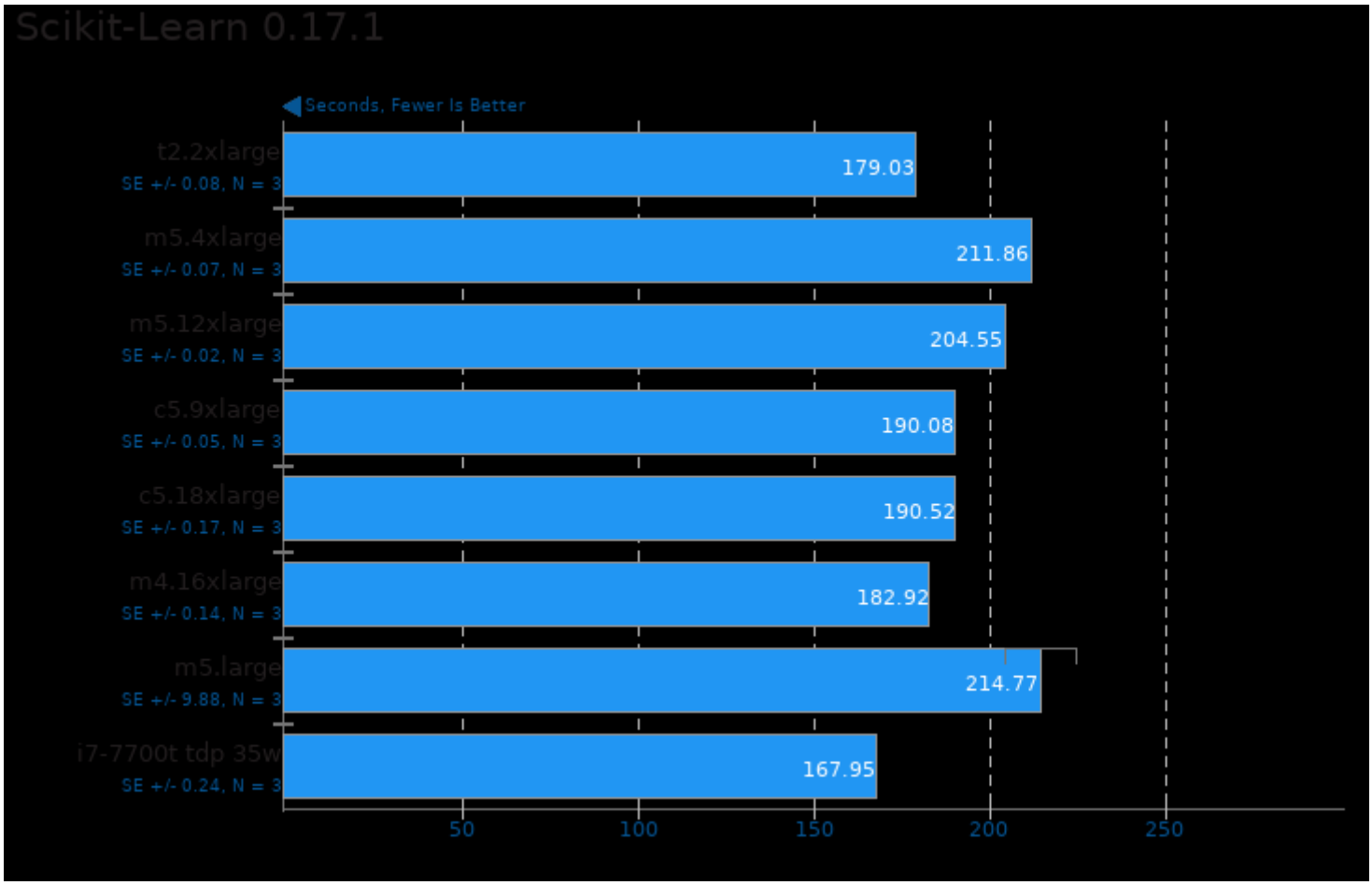



Rodinia 2.4
Test: OpenMP LavaMD
Seconds, Fewer Is Better
A10-7800
SE +/- 0.20, N = 3
446.42
A10-7870K
SE +/- 0.86, N = 3
397.52
FX-8350
SE +/- 0.09, N = 3
211.52
Ryzen 3 1200
SE +/- 0.25, N = 3
258.67
Ryzen 3 1300X
SE +/- 0.22, N = 3
223.34
Ryzen 3 2200G
SE +/- 0.29, N = 3
217.13
Ryzen 5 2400G
SE +/- 0.14, N = 3
160.28
Ryzen 7 1700
SE +/- 0.08, N = 3
95.15
Ryzen 7 1800X
SE +/- 0.05, N = 3
82.39
Threadripper 1950X
SE +/- 0.55, N = 3
45.95
EPYC 7601
SE +/- 0.27, N = 3
31.58
Core i3 4130
SE +/- 0.30, N = 3
440.27
Core i3 7100
SE +/- 0.57, N = 3
354.52
Core i3 8100
SE +/- 0.03, N = 3
226.21
Core i5 3470
SE +/- 1.93, N = 3
400.13
Core i5 4670
SE +/- 0.13, N = 3
322.61
Core i5 6500
SE +/- 0.08, N = 3
246.20
Core i5 6600K
SE +/- 0.04, N = 3
208.84
Core i5 7600K
SE +/- 0.07, N = 3
203.35
Core i5 8400
SE +/- 0.05, N = 3
143.15
Core i7 4770K
SE +/- 0.03, N = 3
199.36
Core i7 5960X
SE +/- 0.25, N = 3
114.38
Core i7 7740X
SE +/- 0.78, N = 3
154.42
Core i7 8700K
SE +/- 0.08, N = 3
107.19
Core i9 7980XE
SE +/- 0.08, N = 3
46.64
Xeon Silver 4108
SE +/- 0.58, N = 3
170.83
2 x Xeon Gold 6138
SE +/- 0.32, N = 3
28.52
t2.2xlarge
SE +/- 0.03, N = 3
213.70
m5.4xlarge
SE +/- 2.22, N = 3
115.20
m5.12xlarge
SE +/- 0.81, N = 3
39.53
c5.9xlarge
SE +/- 0.33, N = 3
44.56
c5.18xlarge
SE +/- 0.16, N = 3
22.77
m4.16xlarge
SE +/- 0.05, N = 3
34.10
m5.large
828.97

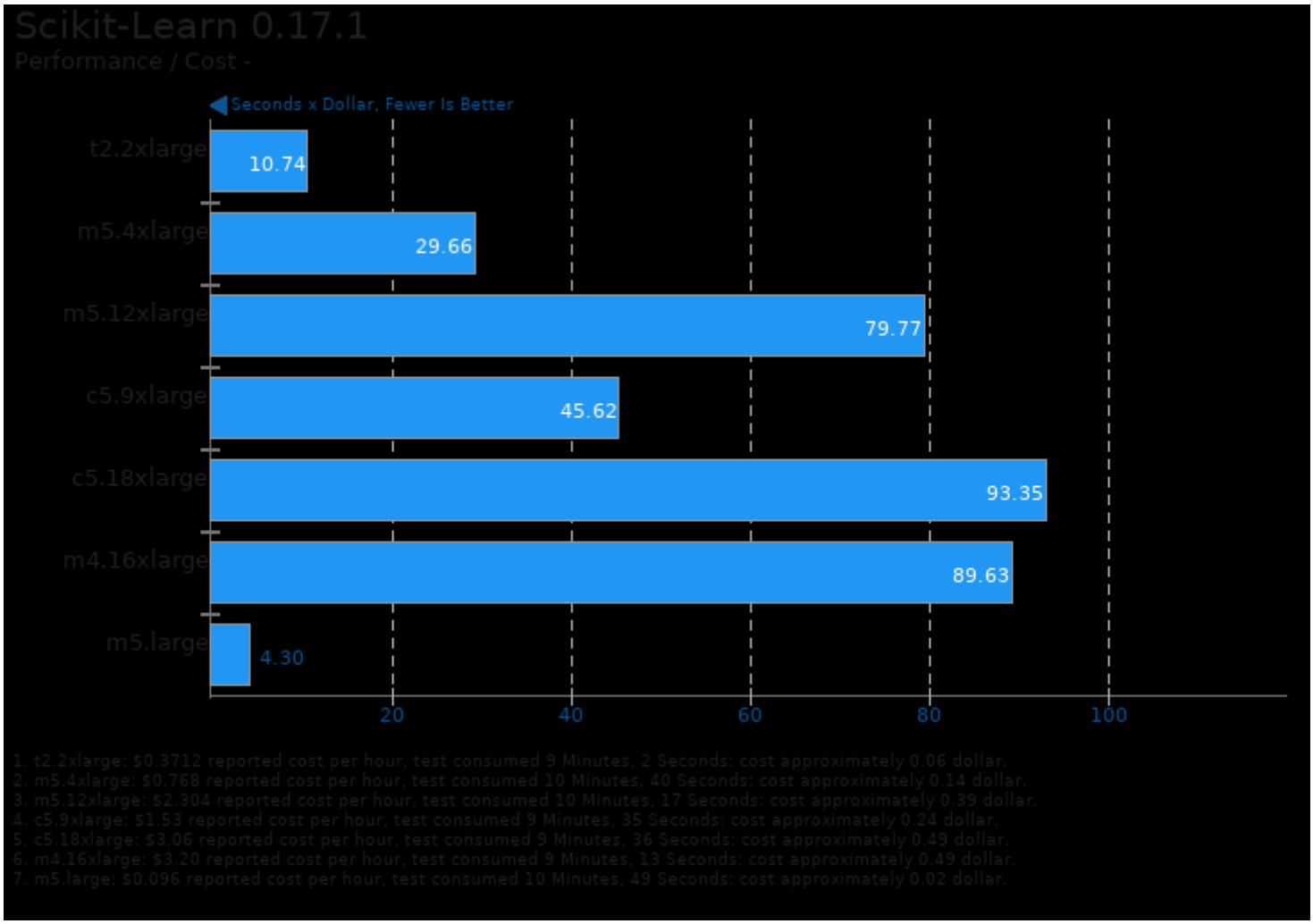
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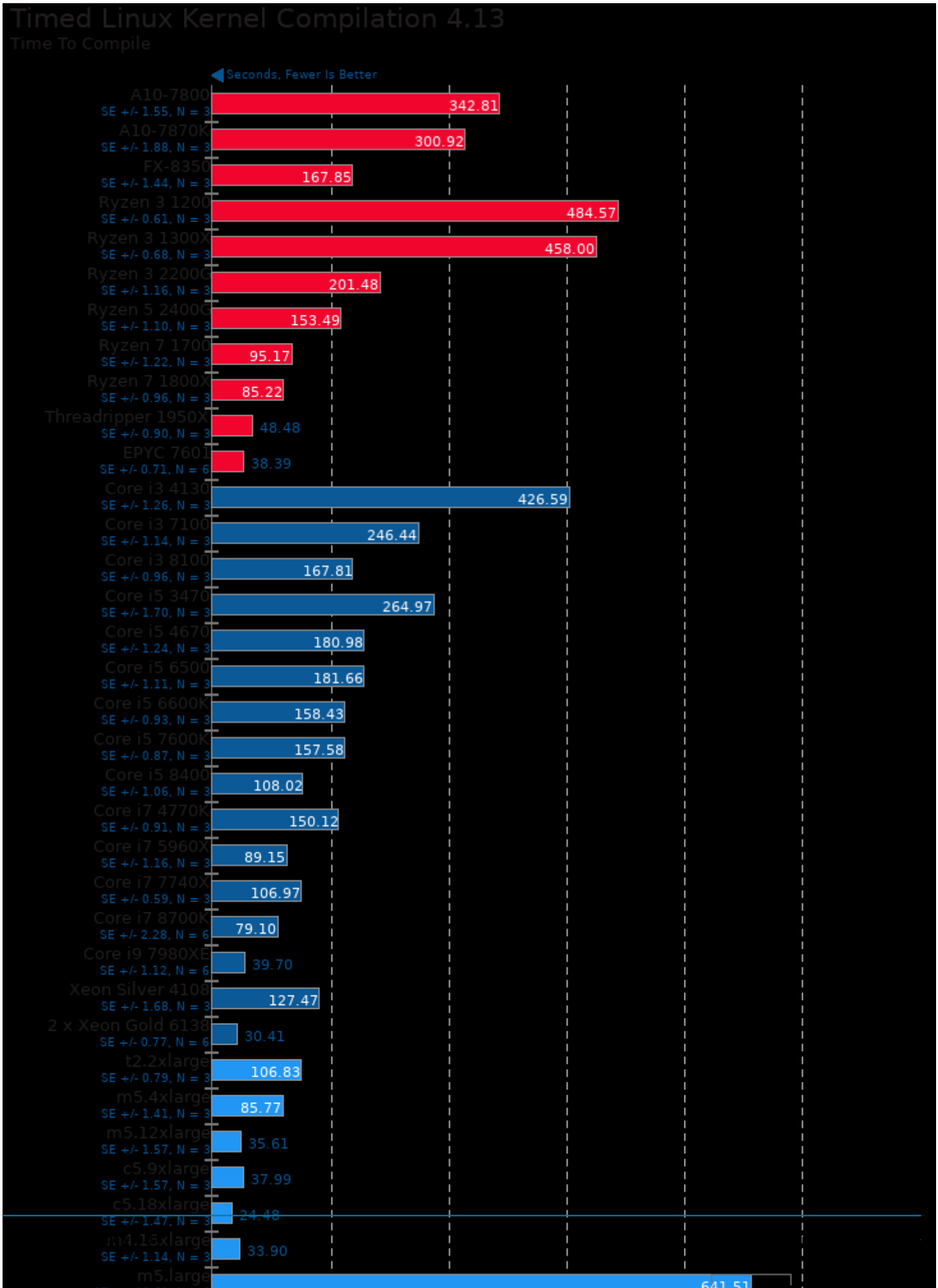


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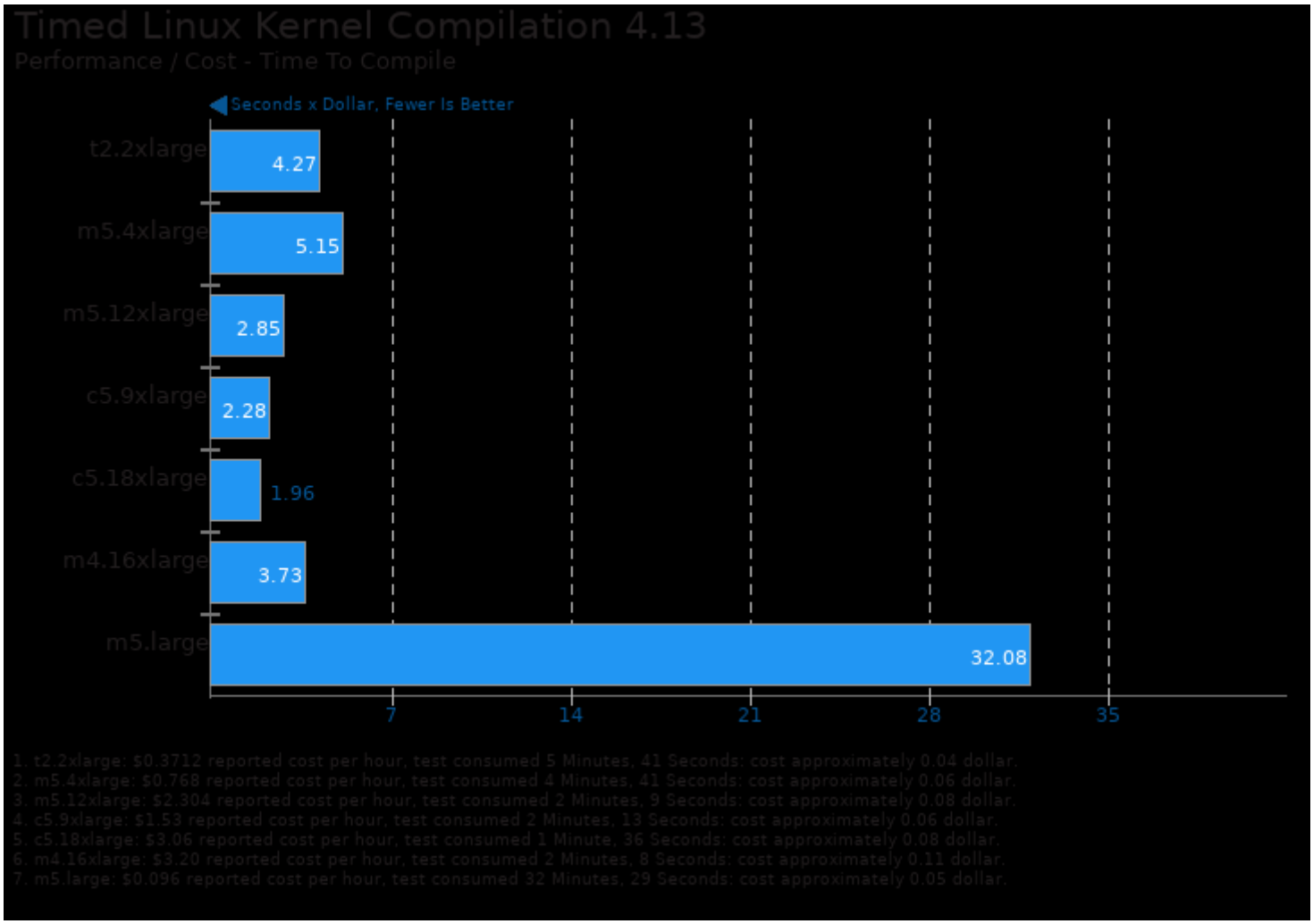


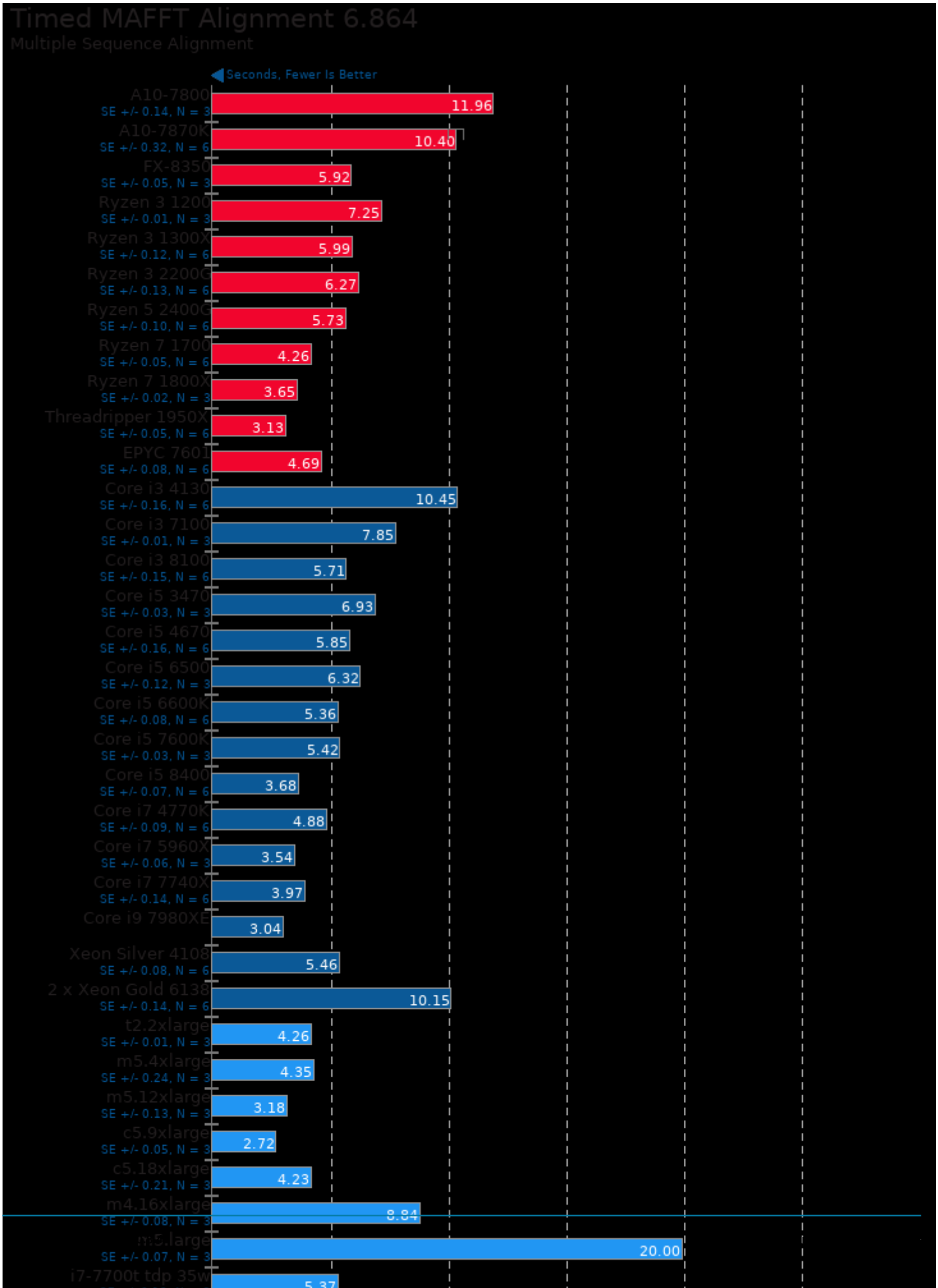
# Large Intel AMD Linux CPU Benchmark Comparison



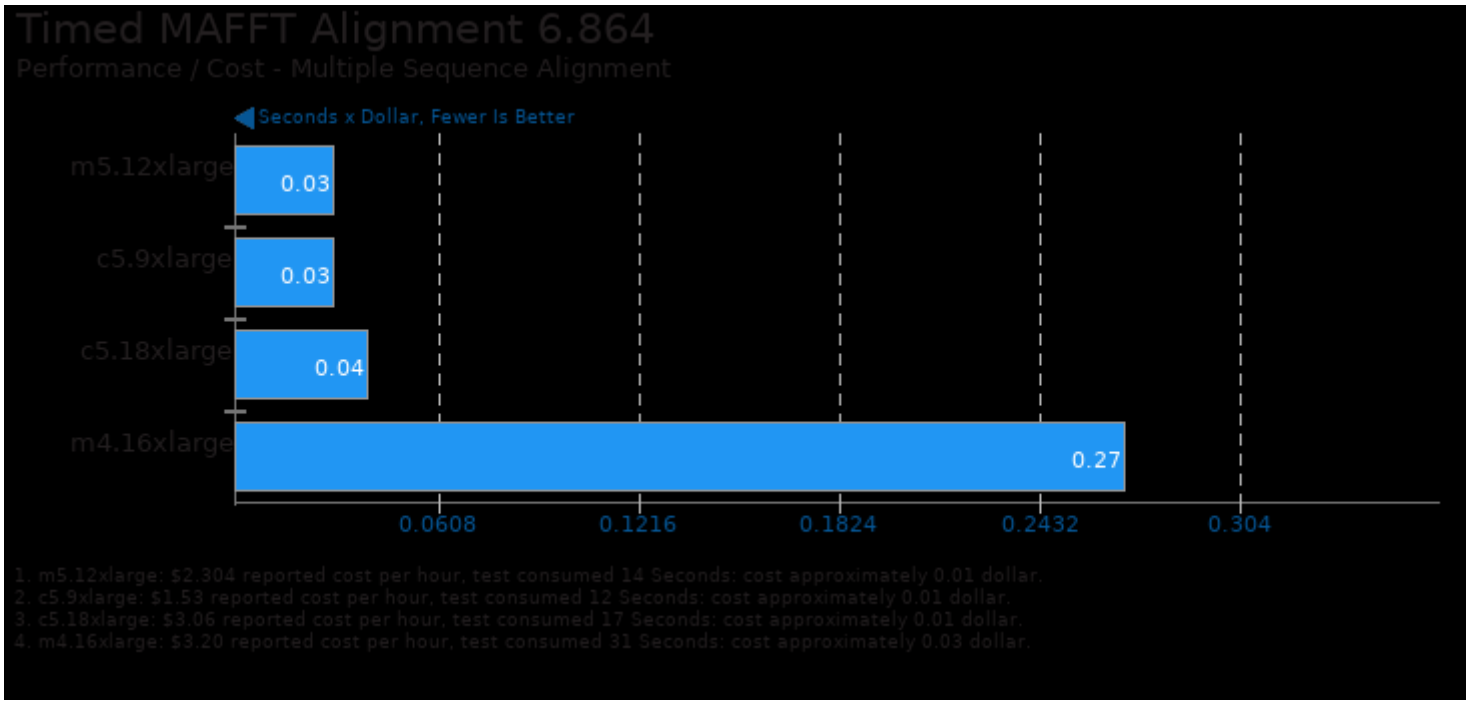

Timed Linux Kernel Compilation 4.13
Time To Compile
Seconds, Fewer Is Better
A10-7800
SE +/- 1.55, N = 3
342.81
A10-7870K
SE +/- 1.88, N = 3
300.92
FX-8350
SE +/- 1.44, N = 3
167.85
Ryzen 3 1200
SE +/- 0.61, N = 3
484.57
Ryzen 3 1300X
SE +/- 0.68, N = 3
458.00
Ryzen 3 2200G
SE +/- 1.16, N = 3
201.48
Ryzen 5 2400G
SE +/- 1.10, N = 3
153.49
Ryzen 7 1700
SE +/- 1.22, N = 3
95.17
Ryzen 7 1800X
SE +/- 0.96, N = 3
85.22
Threadripper 1950X
SE +/- 0.90, N = 3
48.48
EPYC 7601
SE +/- 0.71, N = 6
38.39
Core i3 4130
SE +/- 1.26, N = 3
426.59
Core i3 7100
SE +/- 1.14, N = 3
246.44
Core i3 8100
SE +/- 0.96, N = 3
167.81
Core i5 3470
SE +/- 1.70, N = 3
264.97
Core i5 4670
SE +/- 1.24, N = 3
180.98
Core i5 6500
SE +/- 1.11, N = 3
181.66
Core i5 6600K
SE +/- 0.93, N = 3
158.43
Core i5 7600K
SE +/- 0.87, N = 3
157.58
Core i5 8400
SE +/- 1.06, N = 3
108.02
Core i7 4770K
SE +/- 0.91, N = 3
150.12
Core i7 5960X
SE +/- 1.16, N = 3
89.15
Core i7 7740X
SE +/- 0.59, N = 3
106.97
Core i7 8700K
SE +/- 2.28, N = 6
79.10
Core i9 7980XE
SE +/- 1.12, N = 6
39.70
Xeon Silver 4108
SE +/- 1.68, N = 3
127.47
2 x Xeon Gold 6138
SE +/- 0.77, N = 6
30.41
t2.2xlarge
SE +/- 0.79, N = 3
106.83
m5.4xlarge
SE +/- 1.41, N = 3
85.77
m5.12xlarge
SE +/- 1.57, N = 3
35.61
c5.9xlarge
SE +/- 1.57, N = 3
37.99
c5.18xlarge
SE +/- 1.47, N = 3
24.48
m4.16xlarge
SE +/- 1.14, N = 3
33.90
m5.large
641.51

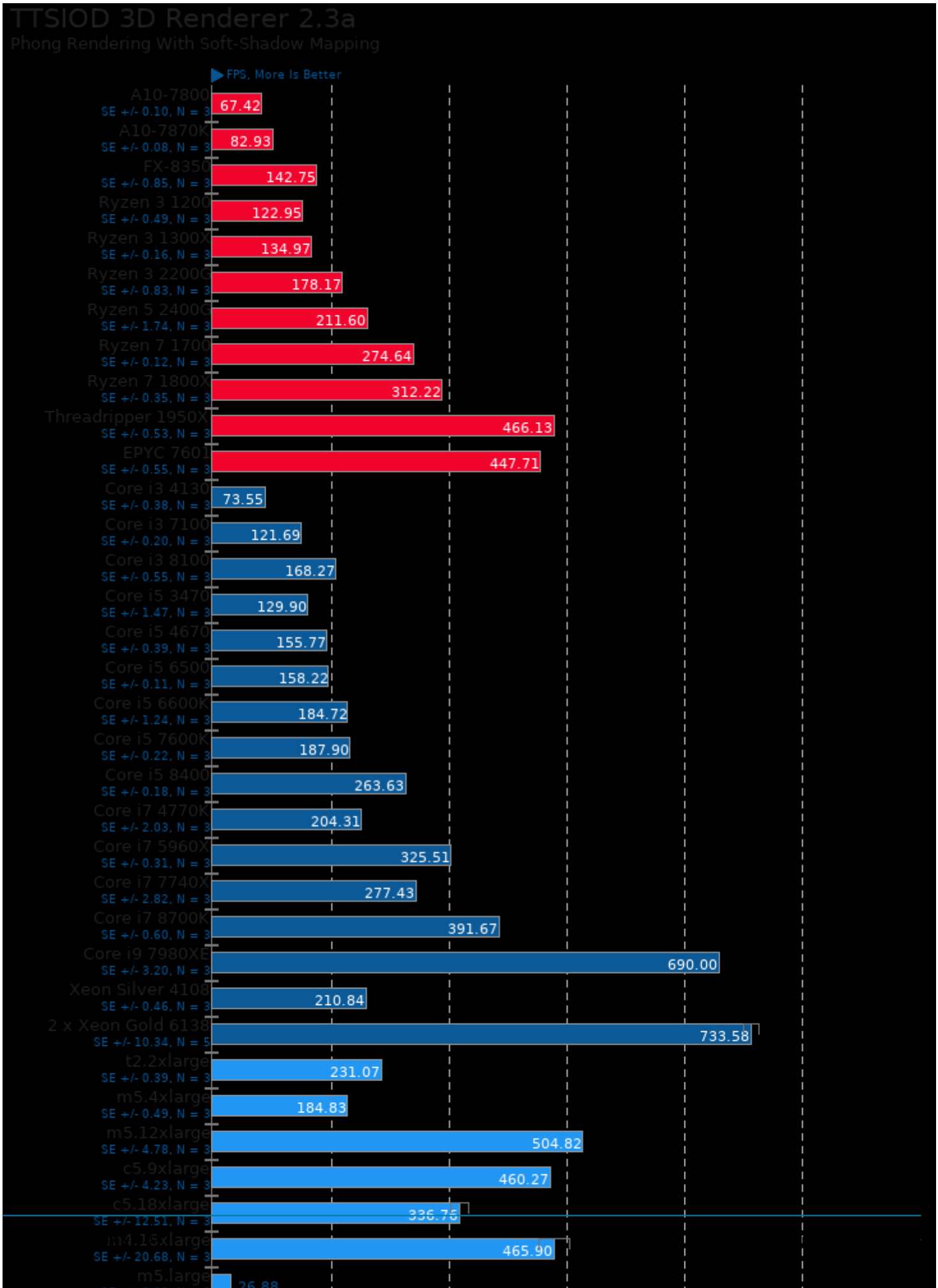
# Large Intel AMD Linux CPU Benchmark Comparison

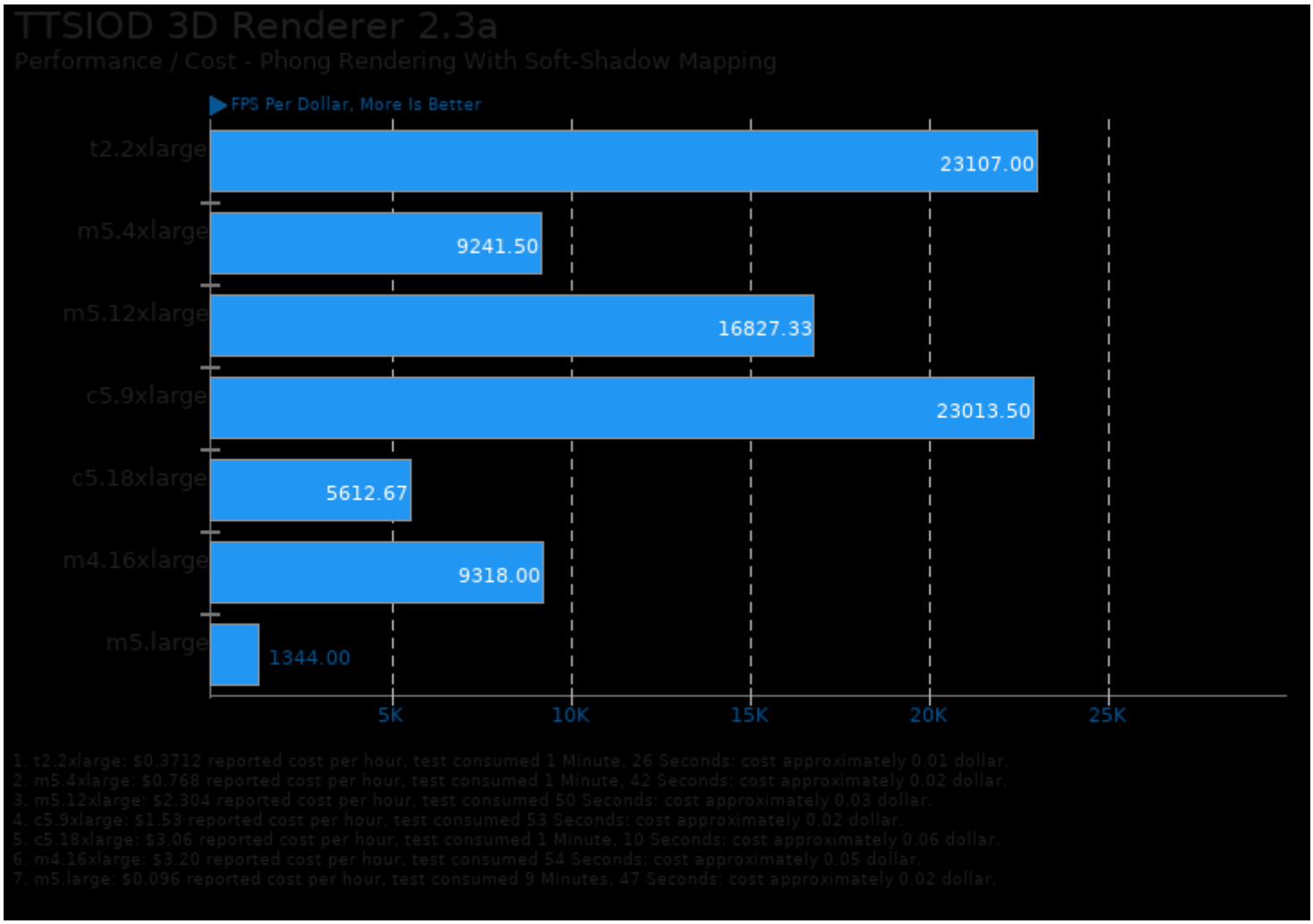


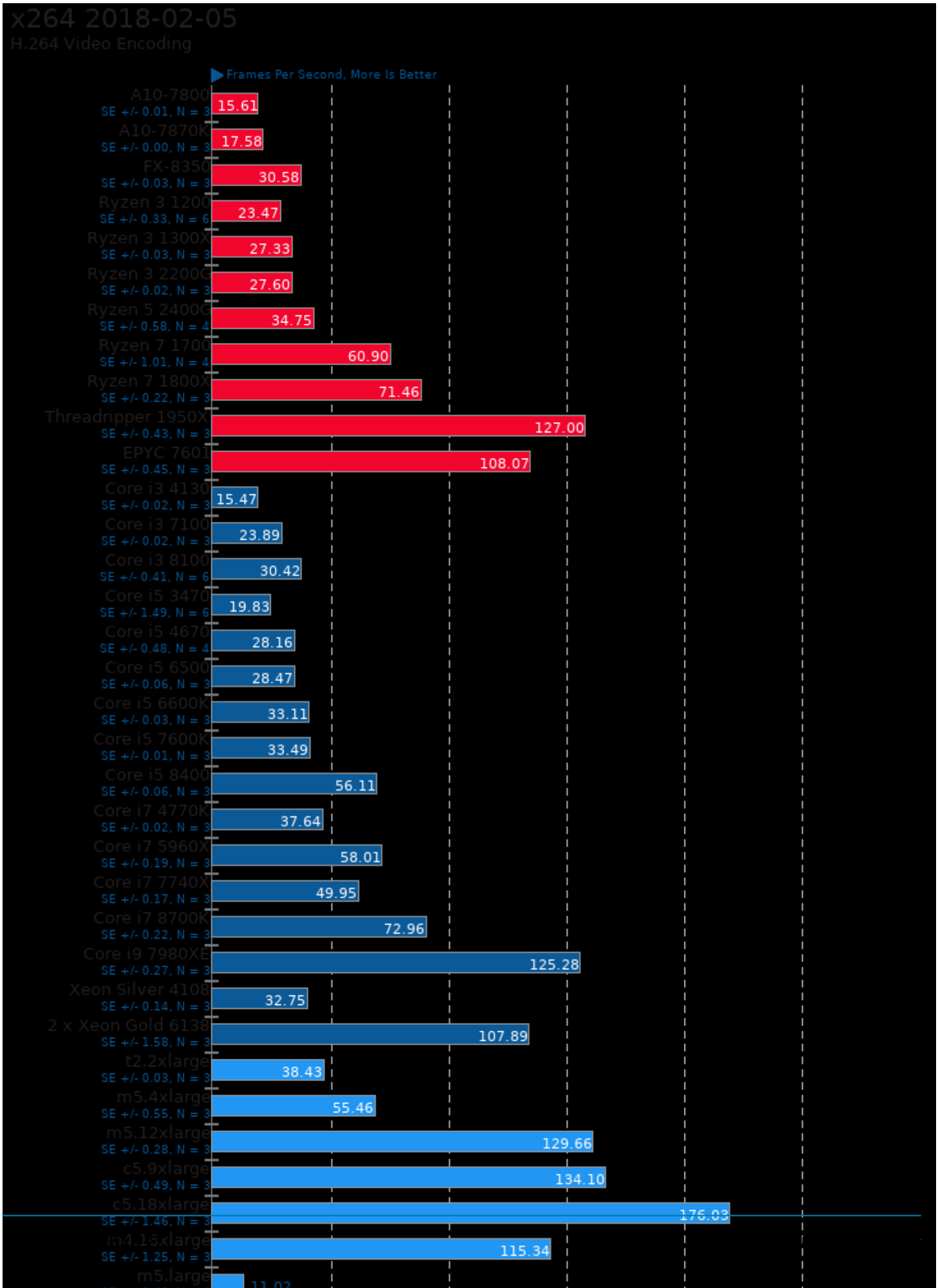

Timed MAFFT Alignment 6.864
Multiple Sequence Alignment
Seconds, Fewer Is Better
A10-7800
SE +/- 0.14, N = 3
11.96
A10-7870K
SE +/- 0.32, N = 6
10.40
FX-8350
SE +/- 0.05, N = 3
5.92
Ryzen 3 1200
SE +/- 0.01, N = 3
7.25
Ryzen 3 1300X
SE +/- 0.12, N = 6
5.99
Ryzen 3 2200G
SE +/- 0.13, N = 6
6.27
Ryzen 5 2400G
SE +/- 0.10, N = 6
5.73
Ryzen 7 1700
SE +/- 0.05, N = 6
4.26
Ryzen 7 1800X
SE +/- 0.02, N = 3
3.65
Threadripper 1950X
SE +/- 0.05, N = 6
3.13
EPYC 7601
SE +/- 0.08, N = 6
4.69
Core i3 4130
SE +/- 0.16, N = 6
10.45
Core i3 7100
SE +/- 0.01, N = 3
7.85
Core i3 8100
SE +/- 0.15, N = 6
5.71
Core i5 3470
SE +/- 0.03, N = 3
6.93
Core i5 4670
SE +/- 0.16, N = 6
5.85
Core i5 6500
SE +/- 0.12, N = 3
6.32
Core i5 6600K
SE +/- 0.08, N = 6
5.36
Core i5 7600K
SE +/- 0.03, N = 3
5.42
Core i5 8400
SE +/- 0.07, N = 6
3.68
Core i7 4770K
SE +/- 0.09, N = 6
4.88
Core i7 5960X
SE +/- 0.06, N = 3
3.54
Core i7 7740X
SE +/- 0.14, N = 6
3.97
Core i9 7980XE
3.04
Xeon Silver 4108
SE +/- 0.08, N = 6
5.46
2 x Xeon Gold 6138
SE +/- 0.14, N = 6
10.15
t2.2xlarge
SE +/- 0.01, N = 3
4.26
m5.4xlarge
SE +/- 0.24, N = 3
4.35
m5.12xlarge
SE +/- 0.13, N = 3
3.18
c5.9xlarge
SE +/- 0.05, N = 3
2.72
c5.18xlarge
SE +/- 0.21, N = 3
4.23
m4.16xlarge
SE +/- 0.08, N = 3
8.84
m5.large
SE +/- 0.07, N = 3
20.00
i7-7700t tdp 35w
5.37

# Large Intel AMD Linux CPU Benchmark Comparison

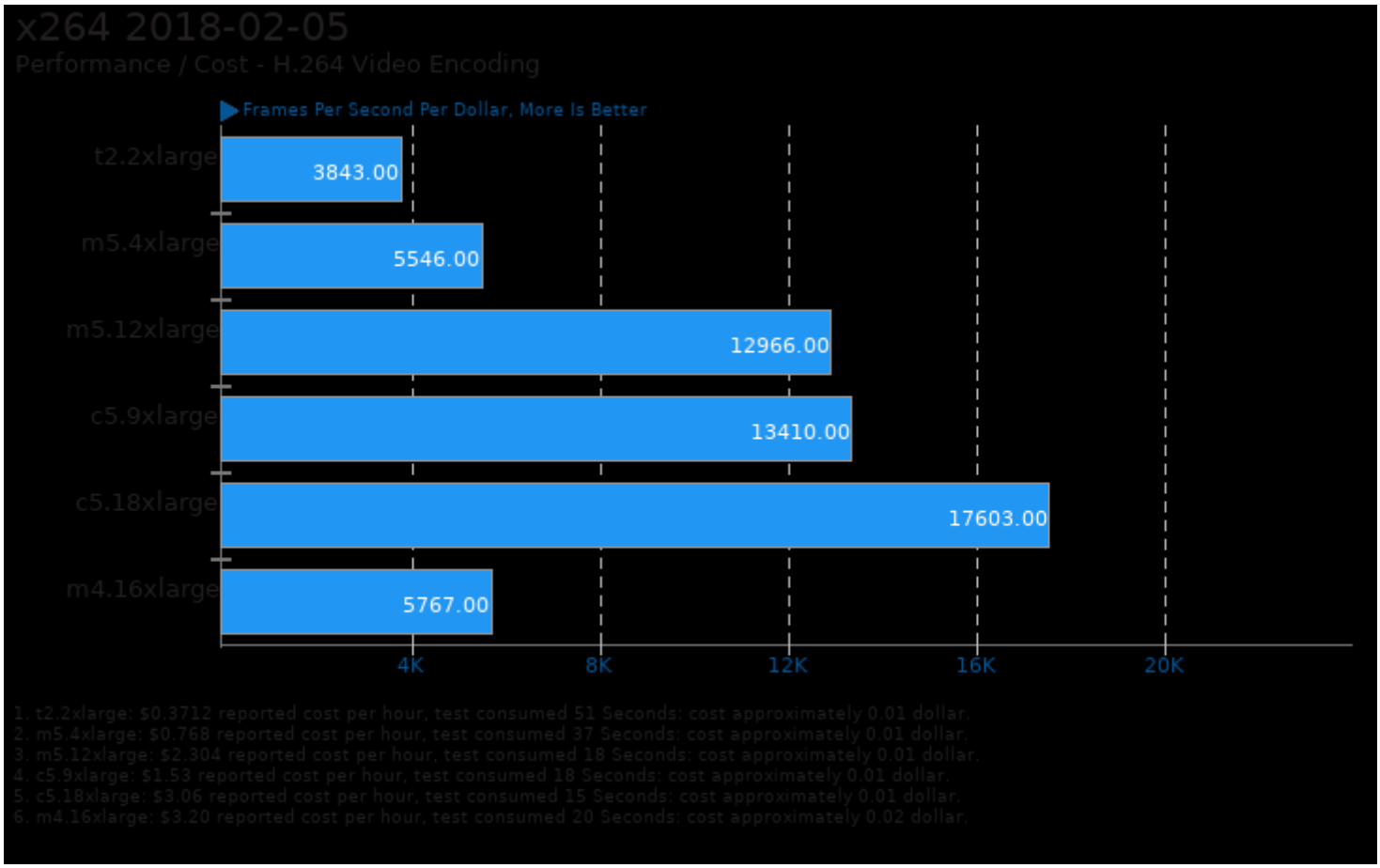



TTSIOD 3D Renderer 2.3a
Phong Rendering With Soft-Shadow Mapping
FPS, More Is Better
A10-7800
SE +/- 0.10, N = 3
67.42
A10-7870K
SE +/- 0.08, N = 3
82.93
FX-8350
SE +/- 0.85, N = 3
142.75
Ryzen 3 1200
SE +/- 0.49, N = 3
122.95
Ryzen 3 1300X
SE +/- 0.16, N = 3
134.97
Ryzen 3 2200G
SE +/- 0.83, N = 3
178.17
Ryzen 5 2400G
SE +/- 1.74, N = 3
211.60
Ryzen 7 1700
SE +/- 0.12, N = 3
274.64
Ryzen 7 1800X
SE +/- 0.35, N = 3
312.22
Threadripper 1950X
SE +/- 0.53, N = 3
466.13
EPYC 7601
SE +/- 0.55, N = 3
447.71
Core i3 4130
SE +/- 0.38, N = 3
73.55
Core i3 7100
SE +/- 0.20, N = 3
121.69
Core i3 8100
SE +/- 0.55, N = 3
168.27
Core i5 3470
SE +/- 1.47, N = 3
129.90
Core i5 4670
SE +/- 0.39, N = 3
155.77
Core i5 6500
SE +/- 0.11, N = 3
158.22
Core i5 6600K
SE +/- 1.24, N = 3
184.72
Core i5 7600K
SE +/- 0.22, N = 3
187.90
Core i5 8400
SE +/- 0.18, N = 3
263.63
Core i7 4770K
SE +/- 2.03, N = 3
204.31
Core i7 5960X
SE +/- 0.31, N = 3
325.51
Core i7 7740X
SE +/- 2.82, N = 3
277.43
Core i7 8700K
SE +/- 0.60, N = 3
391.67
Core i9 7980XE
SE +/- 3.20, N = 3
690.00
Xeon Silver 4108
SE +/- 0.46, N = 3
210.84
2 x Xeon Gold 6138
SE +/- 10.34, N = 5
733.58
t2.2xlarge
SE +/- 0.39, N = 3
231.07
m5.4xlarge
SE +/- 0.49, N = 3
184.83
m5.12xlarge
SE +/- 4.78, N = 3
504.82
c5.9xlarge
SE +/- 4.23, N = 3
460.27
c5.18xlarge
SE +/- 12.51, N = 3
m4.16xlarge
SE +/- 20.68, N = 3
465.90
m5.large


TTSIOD 3D Renderer 2.3a
Performance / Cost - Phong Rendering With Soft-Shadow Mapping
FPS Per Dollar, More Is Better
t2.2xlarge
23107.00
m5.4xlarge
9241.50
m5.12xlarge
16827.33
c5.9xlarge
23013.50
c5.18xlarge
5612.67
m4.16xlarge
9318.00
m5.large
1344.00
5K
10K
15K
20K
25K
1. t2.2xlarge: $0.3712 reported cost per hour, test consumed 1 Minute, 26 Seconds: cost approximately 0.01 dollar.
2. m5.4xlarge: $0.768 reported cost per hour, test consumed 1 Minute, 42 Seconds: cost approximately 0.02 dollar.
3. m5.12xlarge: $2.304 reported cost per hour, test consumed 50 Seconds: cost approximately 0.03 dollar.
4. c5.9xlarge: $1.53 reported cost per hour, test consumed 53 Seconds: cost approximately 0.02 dollar.
5. c5.18xlarge: $3.06 reported cost per hour, test consumed 1 Minute, 10 Seconds: cost approximately 0.06 dollar.
6. m4.16xlarge: $3.20 reported cost per hour, test consumed 54 Seconds: cost approximately 0.05 dollar.
7. m5.large: $0.096 reported cost per hour, test consumed 9 Minutes, 47 Seconds: cost approximately 0.02 dollar.

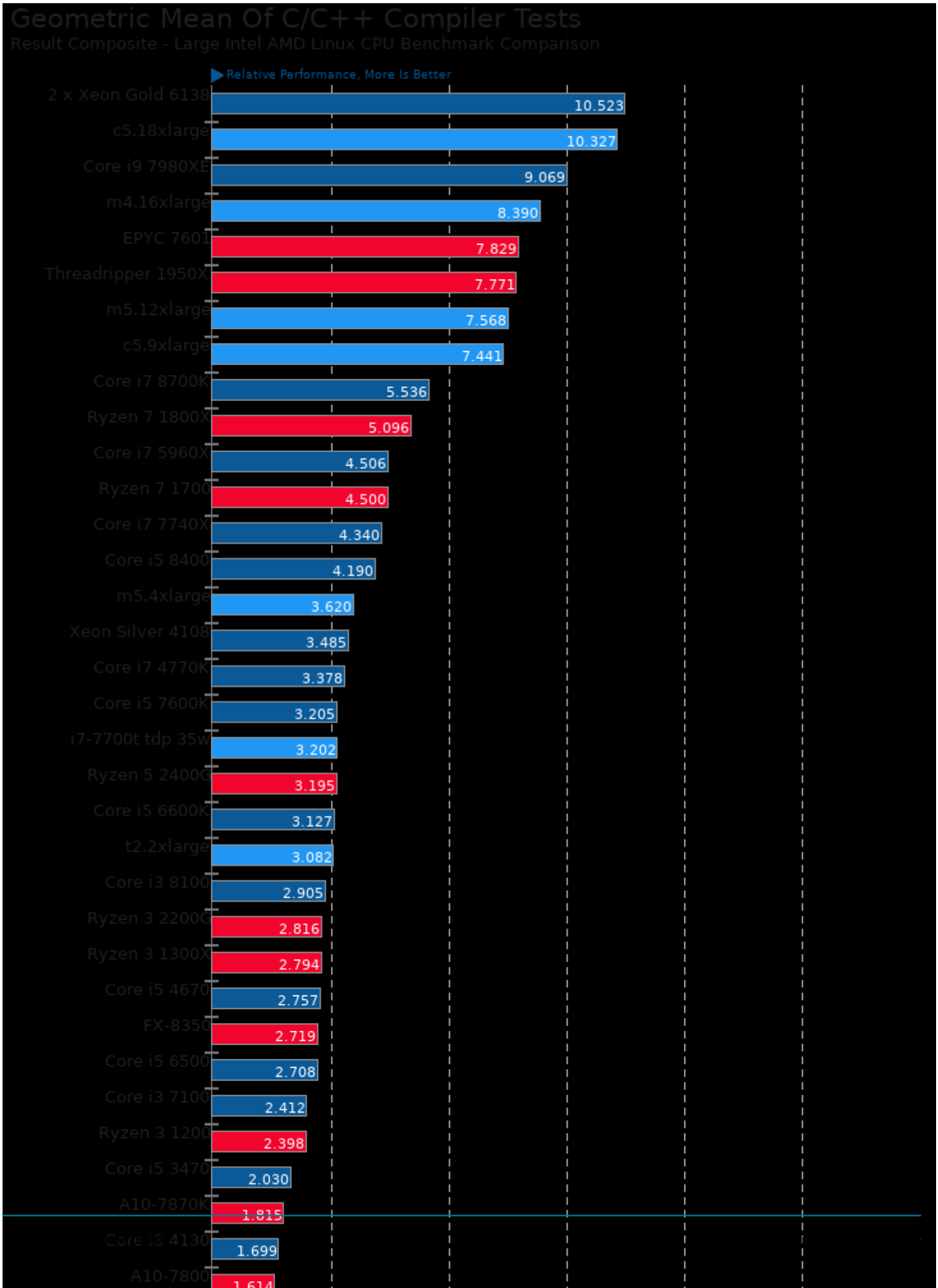

x264 2018-02-05
H.264 Video Encoding
Frames Per Second, More Is Better
A10-7800
SE +/- 0.01, N = 3
15.61
A10-7870K
SE +/- 0.00, N = 3
17.58
FX-8350
SE +/- 0.03, N = 3
30.58
Ryzen 3 1200
SE +/- 0.33, N = 6
23.47
Ryzen 3 1300X
SE +/- 0.03, N = 3
27.33
Ryzen 3 2200G
SE +/- 0.02, N = 3
27.60
Ryzen 5 2400G
SE +/- 0.58, N = 4
34.75
Ryzen 7 1700
SE +/- 1.01, N = 4
60.90
Ryzen 7 1800X
SE +/- 0.22, N = 3
71.46
Threadripper 1950X
SE +/- 0.43, N = 3
127.00
EPYC 7601
SE +/- 0.45, N = 3
108.07
Core i3 4130
SE +/- 0.02, N = 3
15.47
Core i3 7100
SE +/- 0.02, N = 3
23.89
Core i3 8100
SE +/- 0.41, N = 6
30.42
Core i5 3470
SE +/- 1.49, N = 6
19.83
Core i5 4670
SE +/- 0.48, N = 4
28.16
Core i5 6500
SE +/- 0.06, N = 3
28.47
Core i5 6600K
SE +/- 0.03, N = 3
33.11
Core i5 7600K
SE +/- 0.01, N = 3
33.49
Core i5 8400
SE +/- 0.06, N = 3
56.11
Core i7 4770K
SE +/- 0.02, N = 3
37.64
Core i7 5960X
SE +/- 0.19, N = 3
58.01
Core i7 7740X
SE +/- 0.17, N = 3
49.95
Core i7 8700K
SE +/- 0.22, N = 3
72.96
Core i9 7980XE
SE +/- 0.27, N = 3
125.28
Xeon Silver 4108
SE +/- 0.14, N = 3
32.75
2 x Xeon Gold 6138
SE +/- 1.58, N = 3
107.89
t2.2xlarge
SE +/- 0.03, N = 3
38.43
m5.4xlarge
SE +/- 0.55, N = 3
55.46
m5.12xlarge
SE +/- 0.28, N = 3
129.66
c5.9xlarge
SE +/- 0.49, N = 3
134.10
c5.18xlarge
SE +/- 1.46, N = 3
176.03
m4.16xlarge
SE +/- 1.25, N = 3
115.34
m5.large

# Large Intel AMD Linux CPU Benchmark Comparison



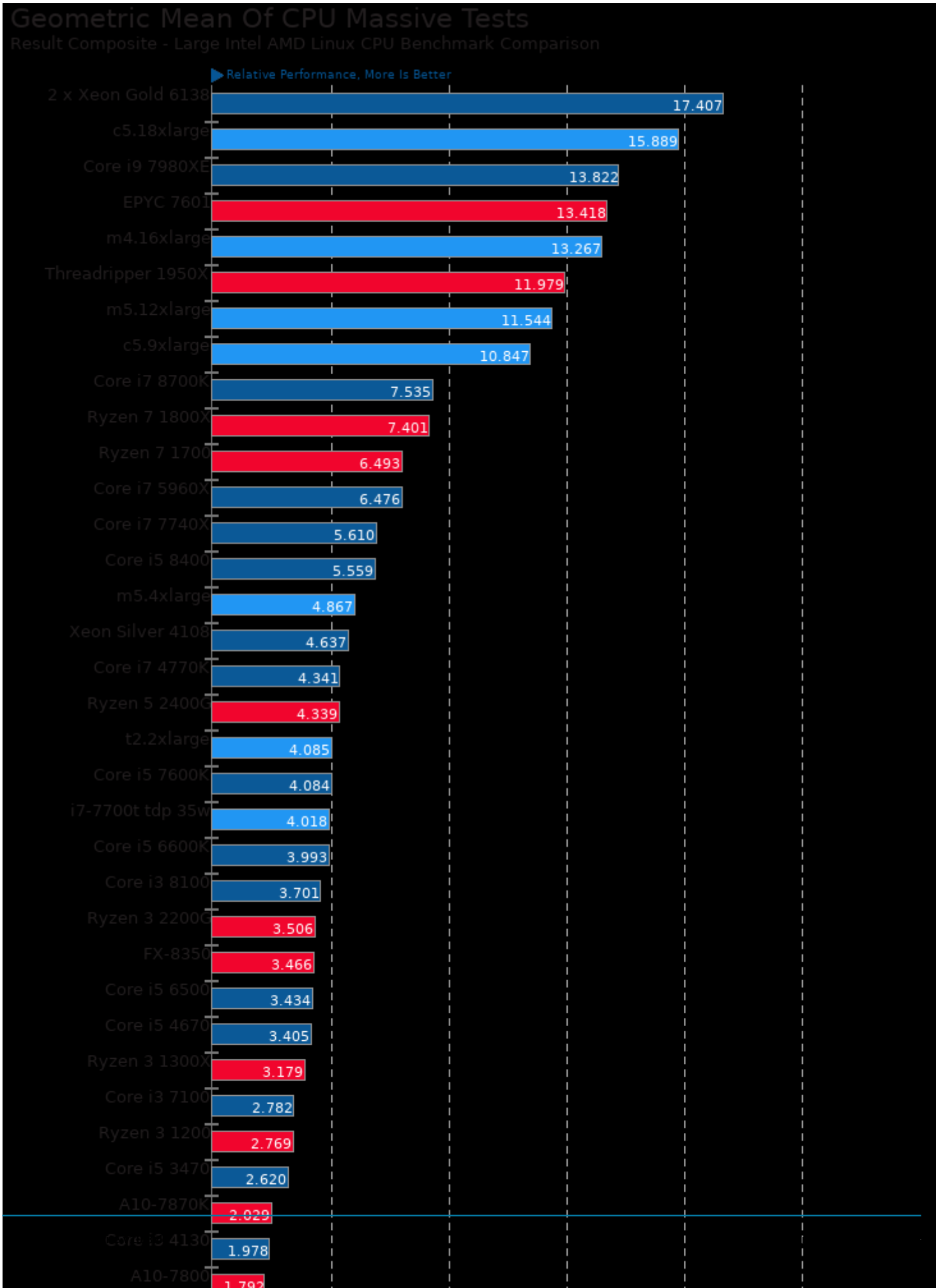
# Large Intel AMD Linux CPU Benchmark Comparison

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


Geometric Mean Of C/C++ Compiler Tests
Result Composite - Large Intel AMD Linux CPU Benchmark Comparison
Relative Performance, More Is Better
2 x Xeon Gold 6138
10.523
c5.18xlarge
10.327
Core i9 7980XE
9.069
m4.16xlarge
8.390
EPYC 7601
7.829
Threadripper 1950X
7.771
m5.12xlarge
7.568
c5.9xlarge
7.441
Core i7 8700K
5.536
Ryzen 7 1800X
5.096
Core i7 5960X
4.506
Ryzen 7 1700
4.500
Core i7 7740X
4.340
Core i5 8400
4.190
m5.4xlarge
3.620
Xeon Silver 4108
3.485
Core i7 4770K
3.378
Core i5 7600K
3.205
i7-7700t tdp 35w
3.202
Ryzen 5 2400G
3.195
Core i5 6600K
3.127
t2.2xlarge
3.082
Core i3 8100
2.905
Ryzen 3 2200G
2.816
Ryzen 3 1300X
2.794
Core i5 4670
2.757
FX-8350
2.719
Core i5 6500
2.708
Core i3 7100
2.412
Ryzen 3 1200
2.398
Core i5 3470
2.030
A10-7870K
1.815
Core i3 4130
1.699
A10-7800
1.614

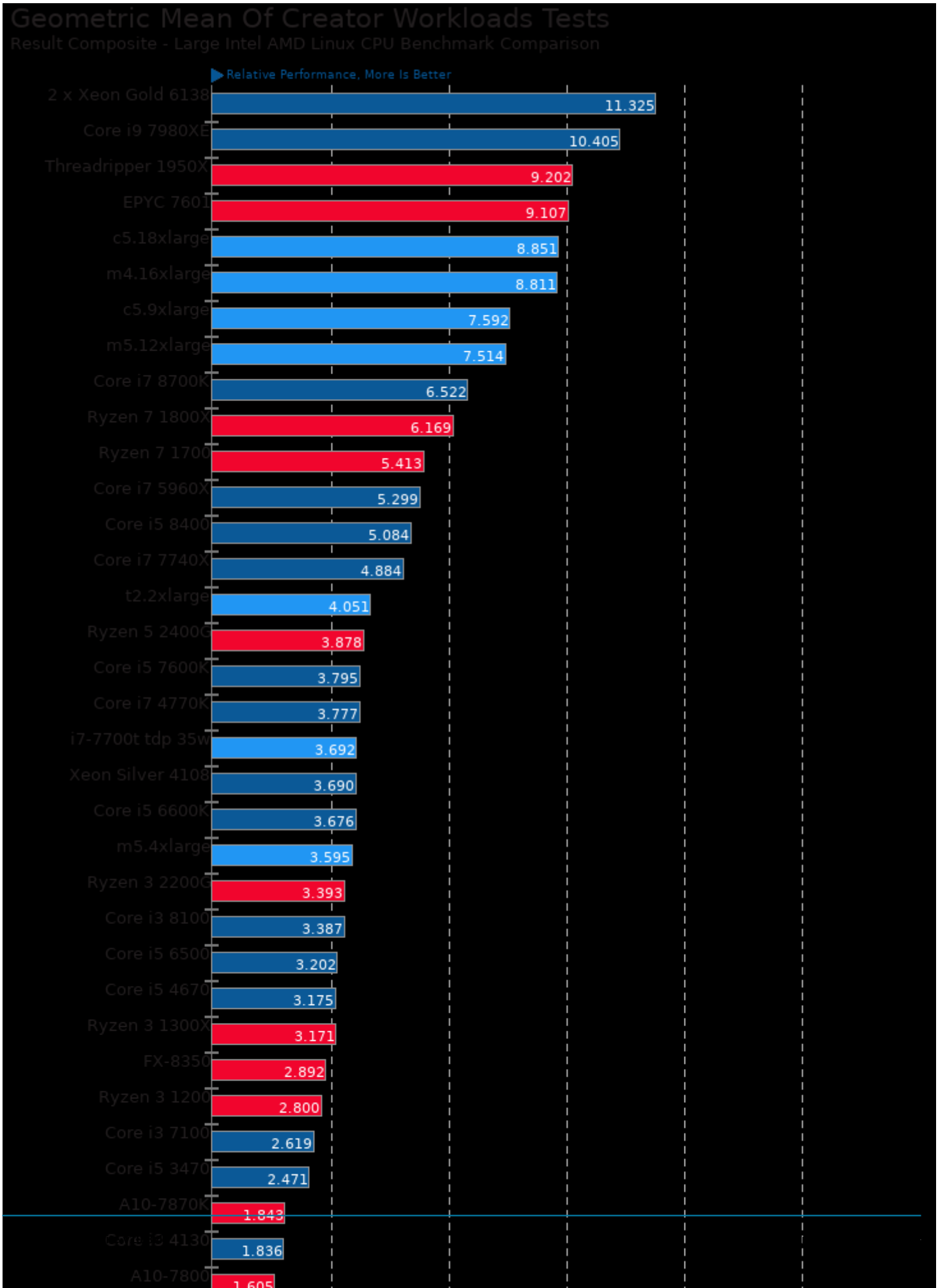
# Large Intel AMD Linux CPU Benchmark Comparison

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 Of CPU Massive Tests
Result Composite - Large Intel AMD Linux CPU Benchmark Comparison
Relative Performance, More Is Better
2 x Xeon Gold 6138
17.407
c5.18xlarge
15.889
Core i9 7980XE
13.822
EPYC 7601
13.418
m4.16xlarge
13.267
Threadripper 1950X
11.979
m5.12xlarge
11.544
c5.9xlarge
10.847
Core i7 8700K
7.535
Ryzen 7 1800X
7.401
Ryzen 7 1700
6.493
Core i7 5960X
6.476
Core i7 7740X
5.610
Core i5 8400
5.559
m5.4xlarge
4.867
Xeon Silver 4108
4.637
Core i7 4770K
4.341
Ryzen 5 2400G
4.339
t2.2xlarge
4.085
Core i5 7600K
4.084
i7-7700t tdp 35w
4.018
Core i5 6600K
3.993
Core i3 8100
3.701
Ryzen 3 2200G
3.506
FX-8350
3.466
Core i5 6500
3.434
Core i5 4670
3.405
Ryzen 3 1300X
3.179
Core i3 7100
2.782
Ryzen 3 1200
2.769
Core i5 3470
2.620
A10-7870K
2.029
Core i3 4130
1.978
A10-7800
1.792

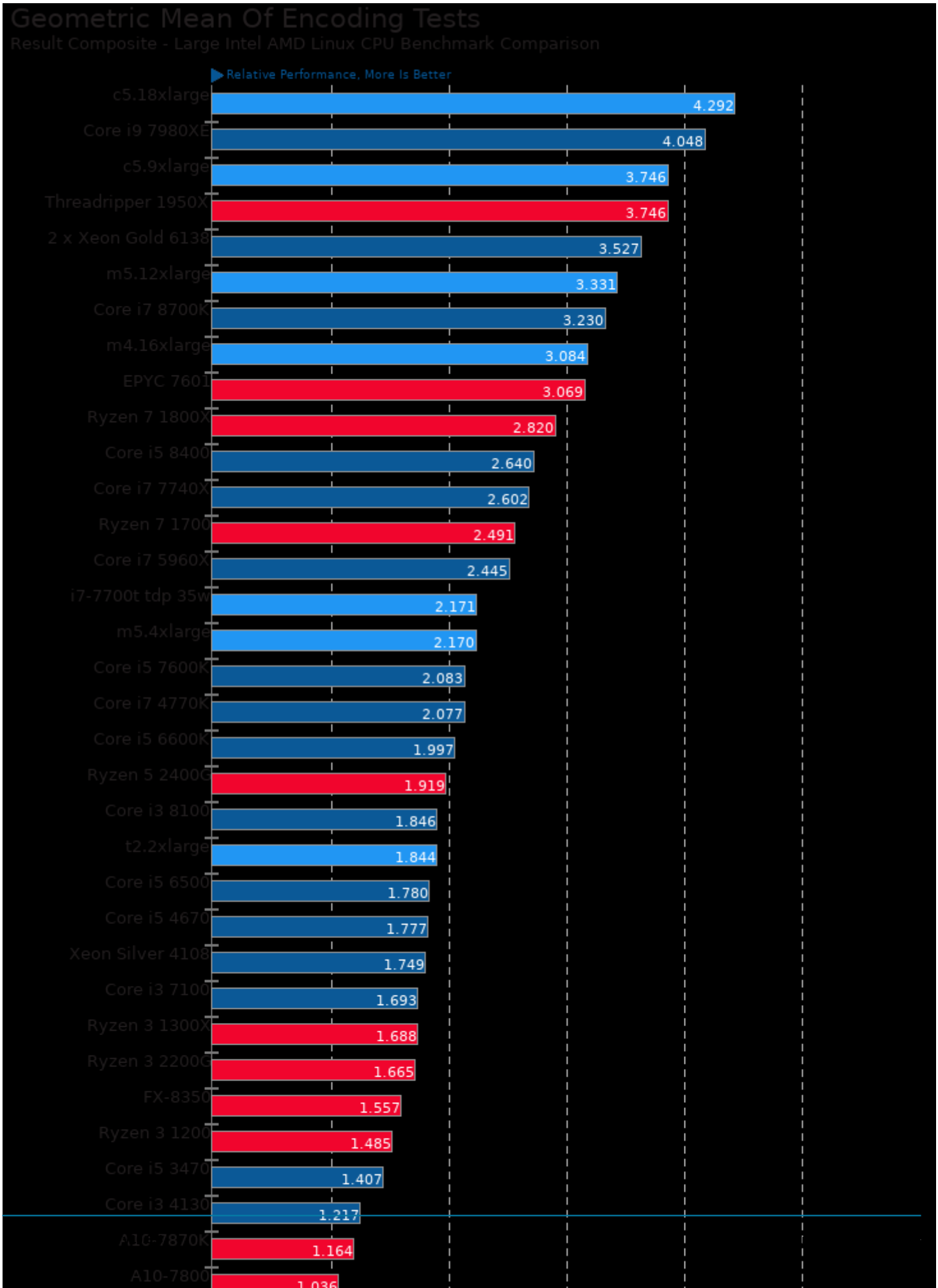
# Large Intel AMD Linux CPU Benchmark Comparison

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


Geometric Mean Of Creator Workloads Tests
Result Composite - Large Intel AMD Linux CPU Benchmark Comparison
Relative Performance, More Is Better
2 x Xeon Gold 6138
11.325
Core i9 7980XE
10.405
Threadripper 1950X
9.202
EPYC 7601
9.107
c5.18xlarge
8.851
m4.16xlarge
8.811
c5.9xlarge
7.592
m5.12xlarge
7.514
Core i7 8700K
6.522
Ryzen 7 1800X
6.169
Ryzen 7 1700
5.413
Core i7 5960X
5.299
Core i5 8400
5.084
Core i7 7740X
4.884
t2.2xlarge
4.051
Ryzen 5 2400G
3.878
Core i5 7600K
3.795
Core i7 4770K
3.777
i7-7700t tdp 35w
3.692
Xeon Silver 4108
3.690
Core i5 6600K
3.676
m5.4xlarge
3.595
Ryzen 3 2200G
3.393
Core i3 8100
3.387
Core i5 6500
3.202
Core i5 4670
3.175
Ryzen 3 1300X
3.171
FX-8350
2.892
Ryzen 3 1200
2.800
Core i3 7100
2.619
Core i5 3470
2.471
A10-7870K
1.843
Core i3 4130
1.836
A10-7800
1.605

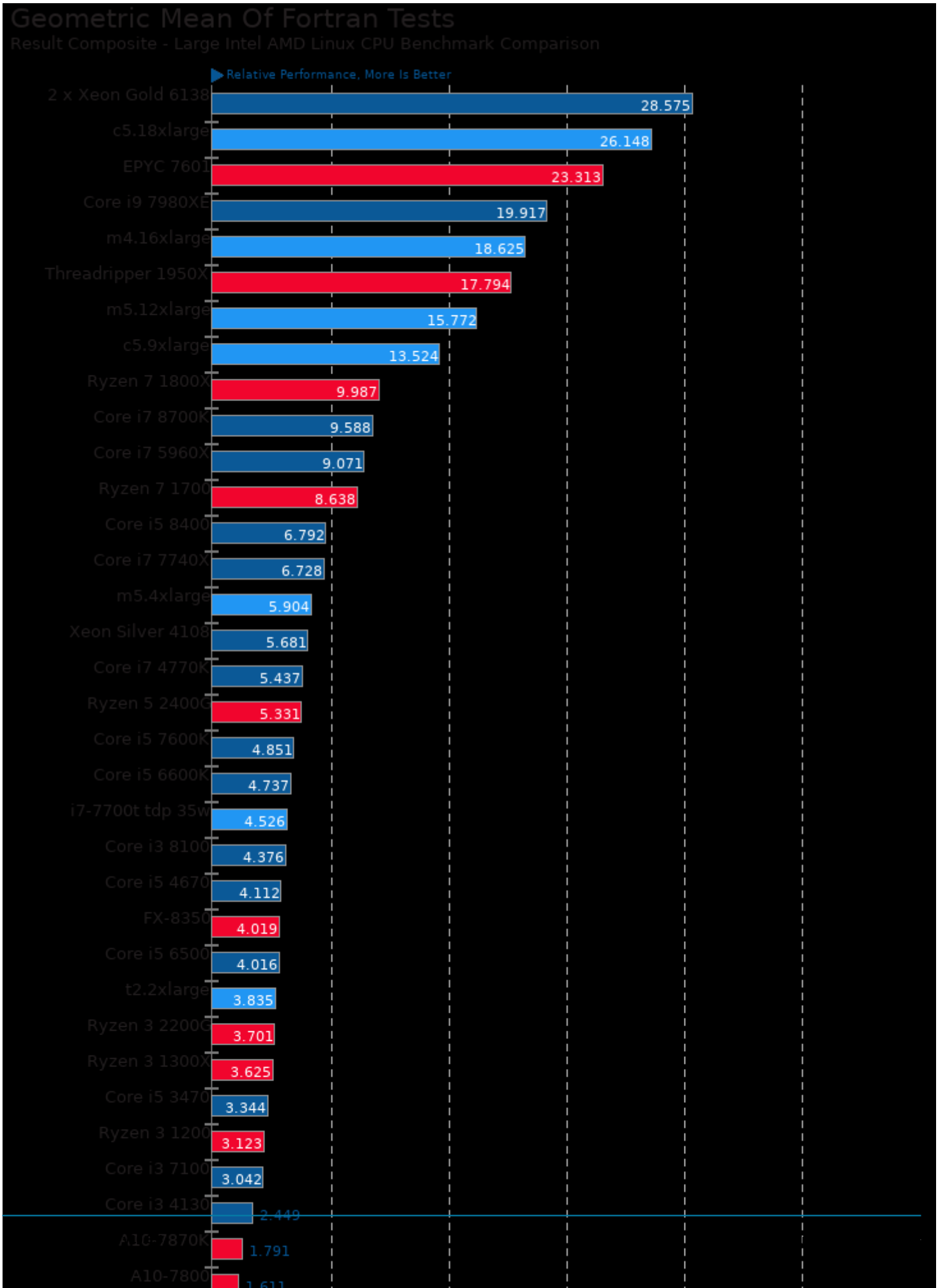
# Large Intel AMD Linux CPU Benchmark Comparison

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


Geometric Mean Of Encoding Tests
Result Composite - Large Intel AMD Linux CPU Benchmark Comparison
Relative Performance, More Is Better
c5.18xlarge 4.292
Core i9 7980XE 4.048
c5.9xlarge 3.746
Threadripper 1950X 3.746
2 x Xeon Gold 6138 3.527
m5.12xlarge 3.331
Core i7 8700K 3.230
m4.16xlarge 3.084
EPYC 7601 3.069
Ryzen 7 1800X 2.820
Core i5 8400 2.640
Core i7 7740X 2.602
Ryzen 7 1700 2.491
Core i7 5960X 2.445
i7-7700t tdp 35w 2.171
m5.4xlarge 2.170
Core i5 7600K 2.083
Core i7 4770K 2.077
Core i5 6600K 1.997
Ryzen 5 2400G 1.919
Core i3 8100 1.846
t2.2xlarge 1.844
Core i5 6500 1.780
Core i5 4670 1.777
Xeon Silver 4108 1.749
Core i3 7100 1.693
Ryzen 3 1300X 1.688
Ryzen 3 2200G 1.665
FX-8350 1.557
Ryzen 3 1200 1.485
Core i5 3470 1.407
Core i3 4130 1.217
A10-7870K 1.164
A10-7800 1.036

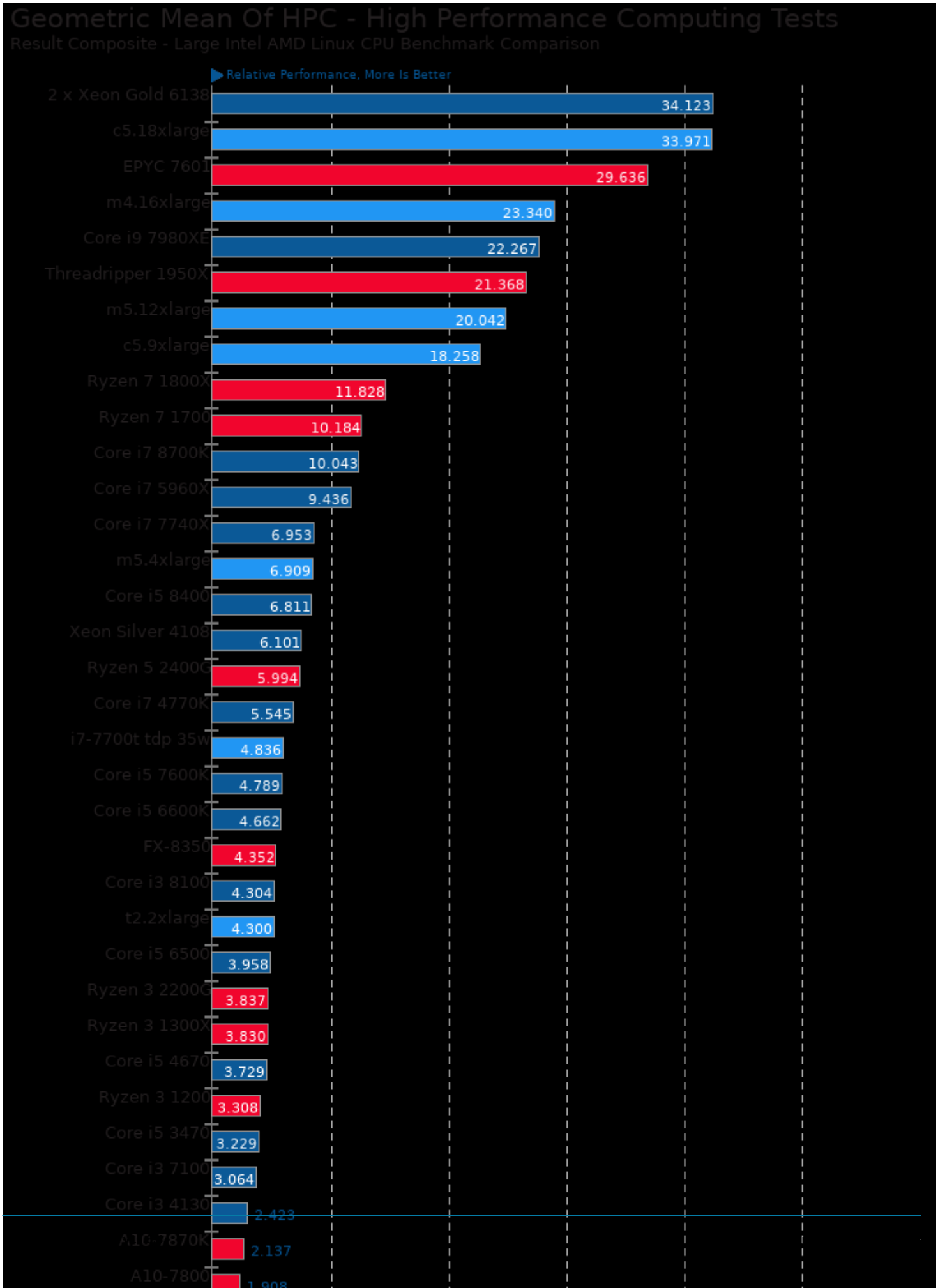
# Large Intel AMD Linux CPU Benchmark Comparison

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


Geometric Mean Of Fortran Tests
Result Composite - Large Intel AMD Linux CPU Benchmark Comparison
Relative Performance, More Is Better
2 x Xeon Gold 6138
28.575
c5.18xlarge
26.148
EPYC 7601
23.313
Core i9 7980XE
19.917
m4.16xlarge
18.625
Threadripper 1950X
17.794
m5.12xlarge
15.772
c5.9xlarge
13.524
Ryzen 7 1800X
9.987
Core i7 8700K
9.588
Core i7 5960X
9.071
Ryzen 7 1700
8.638
Core i5 8400
6.792
Core i7 7740X
6.728
m5.4xlarge
5.904
Xeon Silver 4108
5.681
Core i7 4770K
5.437
Ryzen 5 2400G
5.331
Core i5 7600K
4.851
Core i5 6600K
4.737
i7-7700t tdp 35w
4.526
Core i3 8100
4.376
Core i5 4670
4.112
FX-8350
4.019
Core i5 6500
4.016
t2.2xlarge
3.835
Ryzen 3 2200G
3.701
Ryzen 3 1300X
3.625
Core i5 3470
3.344
Ryzen 3 1200
3.123
Core i3 7100
3.042
Core i3 4130
2.449
A10-7870K
1.791
A10-7800
1.611

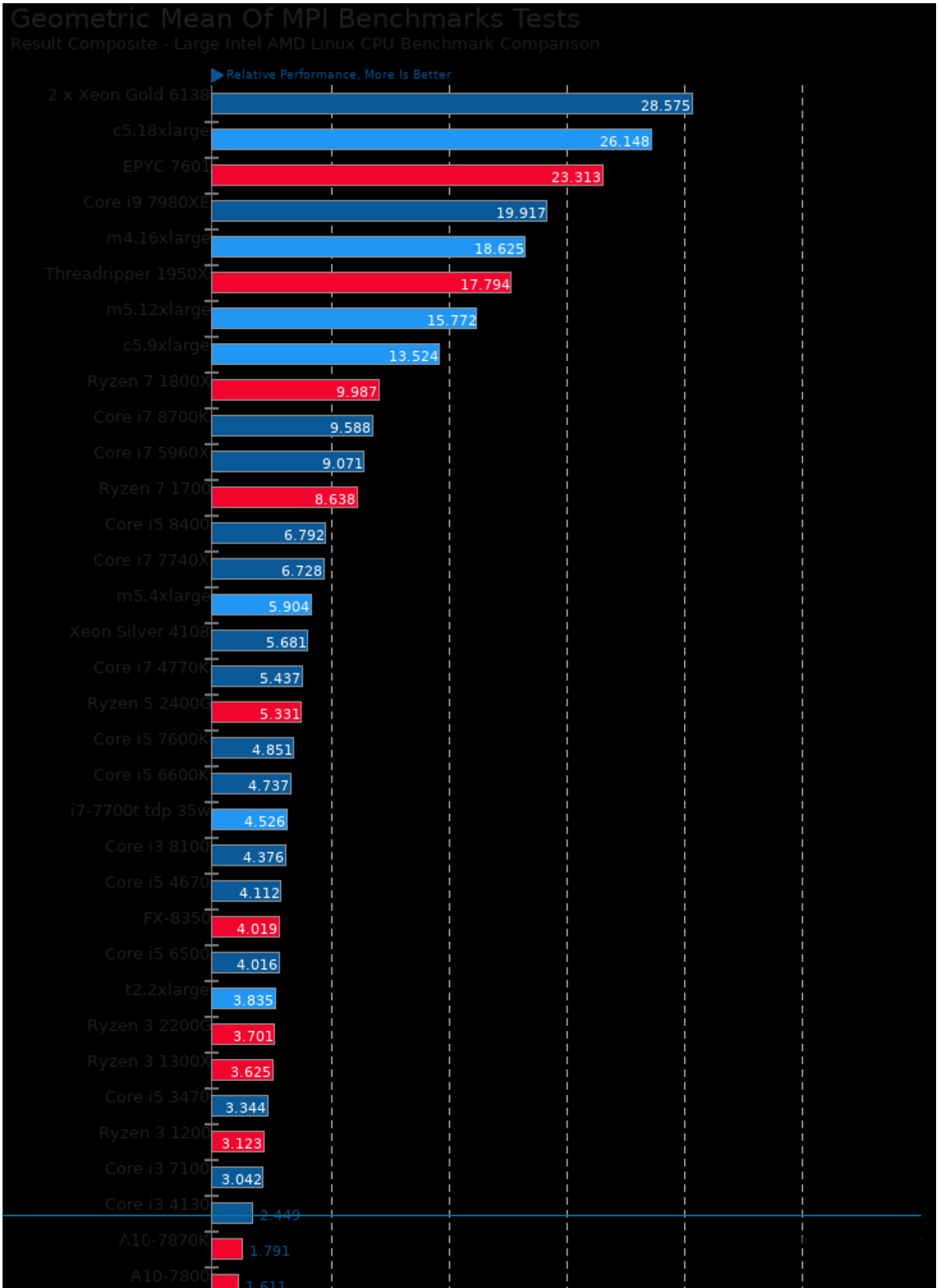
# Large Intel AMD Linux CPU Benchmark Comparison

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


Geometric Mean Of HPC - High Performance Computing Tests
Result Composite - Large Intel AMD Linux CPU Benchmark Comparison
Relative Performance, More Is Better
2 x Xeon Gold 6138
34.123
c5.18xlarge
33.971
EPYC 7601
29.636
m4.16xlarge
23.340
Core i9 7980XE
22.267
Threadripper 1950X
21.368
m5.12xlarge
20.042
c5.9xlarge
18.258
Ryzen 7 1800X
11.828
Ryzen 7 1700
10.184
Core i7 8700K
10.043
Core i7 5960X
9.436
Core i7 7740X
6.953
m5.4xlarge
6.909
Core i5 8400
6.811
Xeon Silver 4108
6.101
Ryzen 5 2400G
5.994
Core i7 4770K
5.545
i7-7700t tdp 35w
4.836
Core i5 7600K
4.789
Core i5 6600K
4.662
FX-8350
4.352
Core i3 8100
4.304
t2.2xlarge
4.300
Core i5 6500
3.958
Ryzen 3 2200G
3.837
Ryzen 3 1300X
3.830
Core i5 4670
3.729
Ryzen 3 1200
3.308
Core i5 3470
3.229
Core i3 7100
3.064
Core i3 4130
2.423
A10-7870K
2.137
A10-7800
1.908

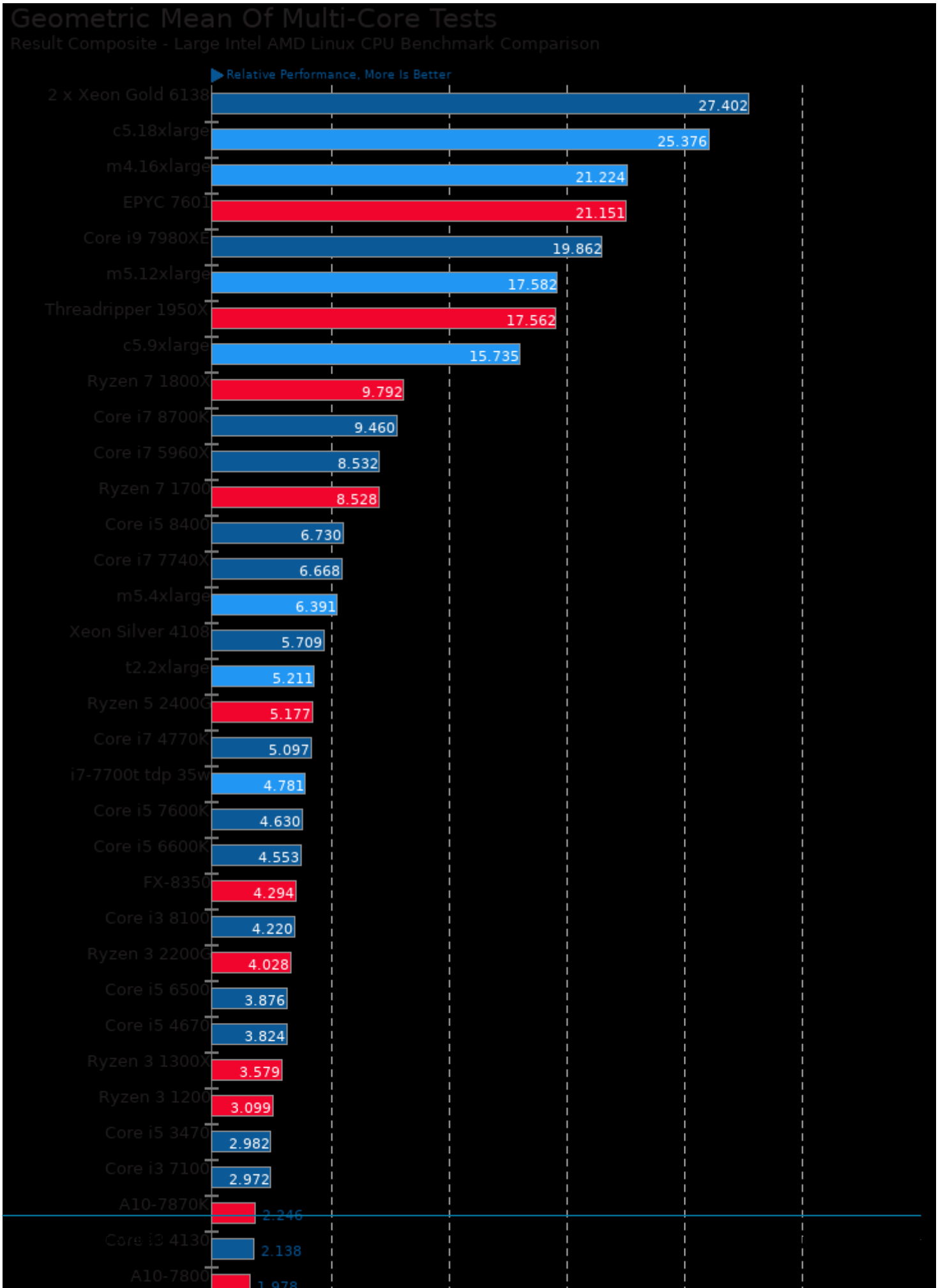
# Large Intel AMD Linux CPU Benchmark Comparison

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


Geometric Mean Of MPI Benchmarks Tests
Result Composite - Large Intel AMD Linux CPU Benchmark Comparison
Relative Performance, More Is Better
2 x Xeon Gold 6138
28.575
c5.18xlarge
26.148
EPYC 7601
23.313
Core i9 7980XE
19.917
m4.16xlarge
18.625
Threadripper 1950X
17.794
m5.12xlarge
15.772
c5.9xlarge
13.524
Ryzen 7 1800X
9.987
Core i7 8700K
9.588
Core i7 5960X
9.071
Ryzen 7 1700
8.638
Core i5 8400
6.792
Core i7 7740X
6.728
m5.4xlarge
5.904
Xeon Silver 4108
5.681
Core i7 4770K
5.437
Ryzen 5 2400G
5.331
Core i5 7600K
4.851
Core i5 6600K
4.737
i7-7700t tdp 35w
4.526
Core i3 8100
4.376
Core i5 4670
4.112
FX-8350
4.019
Core i5 6500
4.016
t2.2xlarge
3.835
Ryzen 3 2200G
3.701
Ryzen 3 1300X
3.625
Core i5 3470
3.344
Ryzen 3 1200
3.123
Core i3 7100
3.042
Core i3 4130
2.449
A10-7870K
1.791
A10-7800
1.611

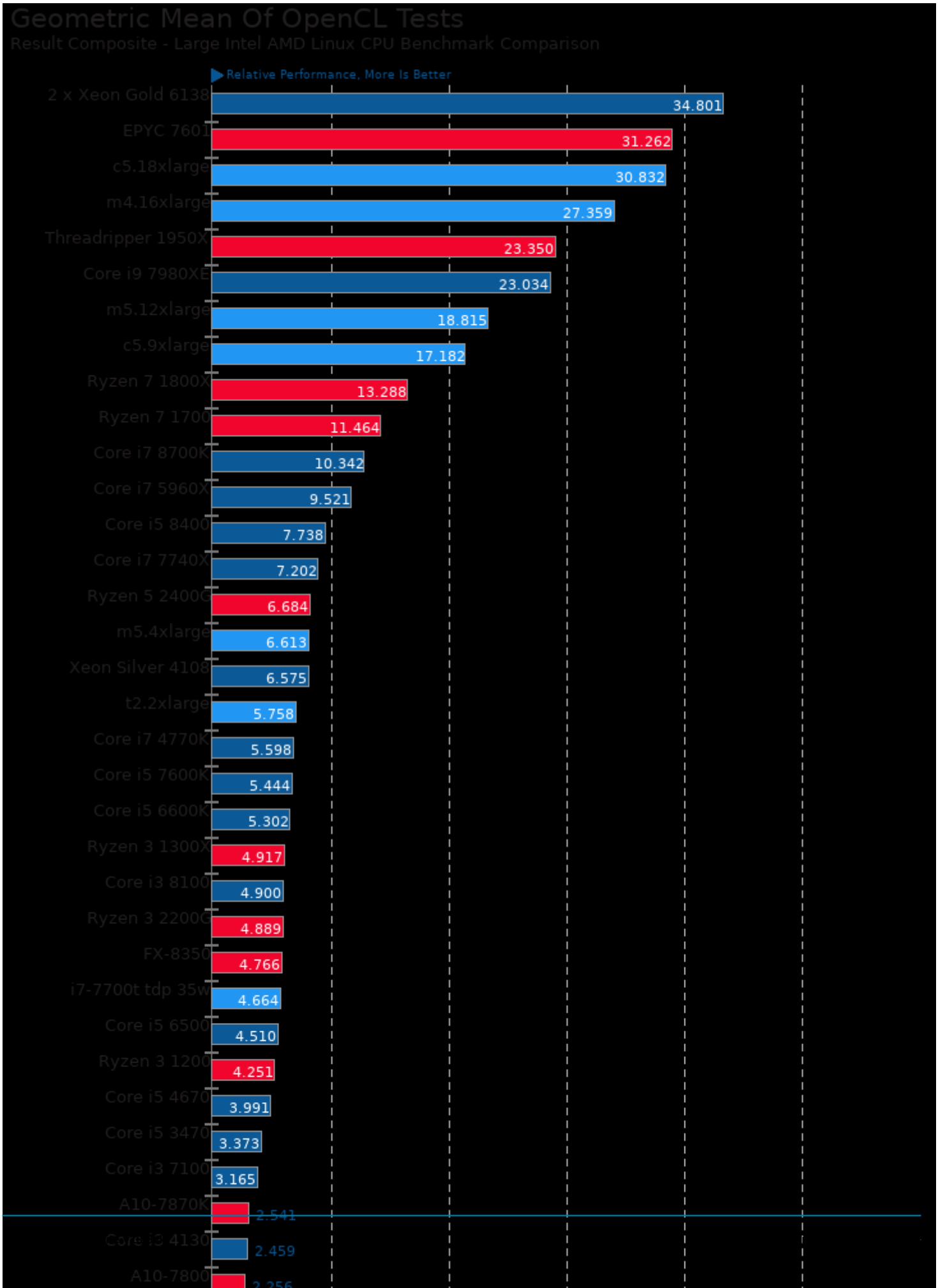
# Large Intel AMD Linux CPU Benchmark Comparison

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


Geometric Mean Of Multi-Core Tests
Result Composite - Large Intel AMD Linux CPU Benchmark Comparison
Relative Performance, More Is Better
2 x Xeon Gold 6138
27.402
c5.18xlarge
25.376
m4.16xlarge
21.224
EPYC 7601
21.151
Core i9 7980XE
19.862
m5.12xlarge
17.582
Threadripper 1950X
17.562
c5.9xlarge
15.735
Ryzen 7 1800X
9.792
Core i7 8700K
9.460
Core i7 5960X
8.532
Ryzen 7 1700
8.528
Core i5 8400
6.730
Core i7 7740X
6.668
m5.4xlarge
6.391
Xeon Silver 4108
5.709
t2.2xlarge
5.211
Ryzen 5 2400G
5.177
Core i7 4770K
5.097
i7-7700t tdp 35w
4.781
Core i5 7600K
4.630
Core i5 6600K
4.553
FX-8350
4.294
Core i3 8100
4.220
Ryzen 3 2200G
4.028
Core i5 6500
3.876
Core i5 4670
3.824
Ryzen 3 1300X
3.579
Ryzen 3 1200
3.099
Core i5 3470
2.982
Core i3 7100
2.972
A10-7870K
2.246
Core i3 4130
2.138
A10-7800

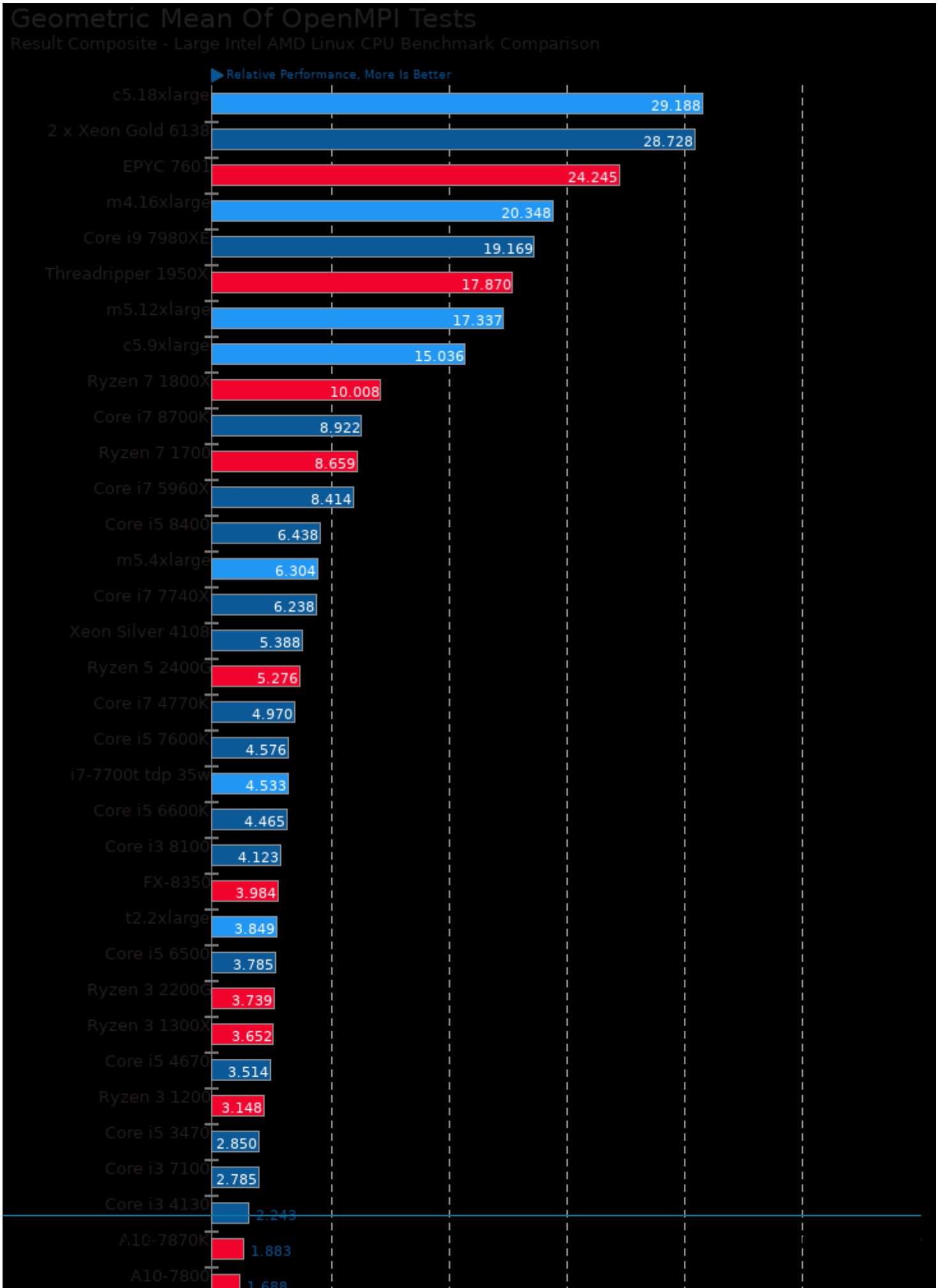
# Large Intel AMD Linux CPU Benchmark Comparison

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 Of OpenCL Tests
Result Composite - Large Intel AMD Linux CPU Benchmark Comparison
Relative Performance, More Is Better
2 x Xeon Gold 6138
34.801
EPYC 7601
31.262
c5.18xlarge
30.832
m4.16xlarge
27.359
Threadripper 1950X
23.350
Core i9 7980XE
23.034
m5.12xlarge
18.815
c5.9xlarge
17.182
Ryzen 7 1800X
13.288
Ryzen 7 1700
11.464
Core i7 8700K
10.342
Core i7 5960X
9.521
Core i5 8400
7.738
Core i7 7740X
7.202
Ryzen 5 2400G
6.684
m5.4xlarge
6.613
Xeon Silver 4108
6.575
t2.2xlarge
5.758
Core i7 4770K
5.598
Core i5 7600K
5.444
Core i5 6600K
5.302
Ryzen 3 1300X
4.917
Core i3 8100
4.900
Ryzen 3 2200G
4.889
FX-8350
4.766
i7-7700t tdp 35w
4.664
Core i5 6500
4.510
Ryzen 3 1200
4.251
Core i5 4670
3.991
Core i5 3470
3.373
Core i3 7100
3.165
A10-7870K
2.541
Core i3 4130
2.459
A10-7800
2.256

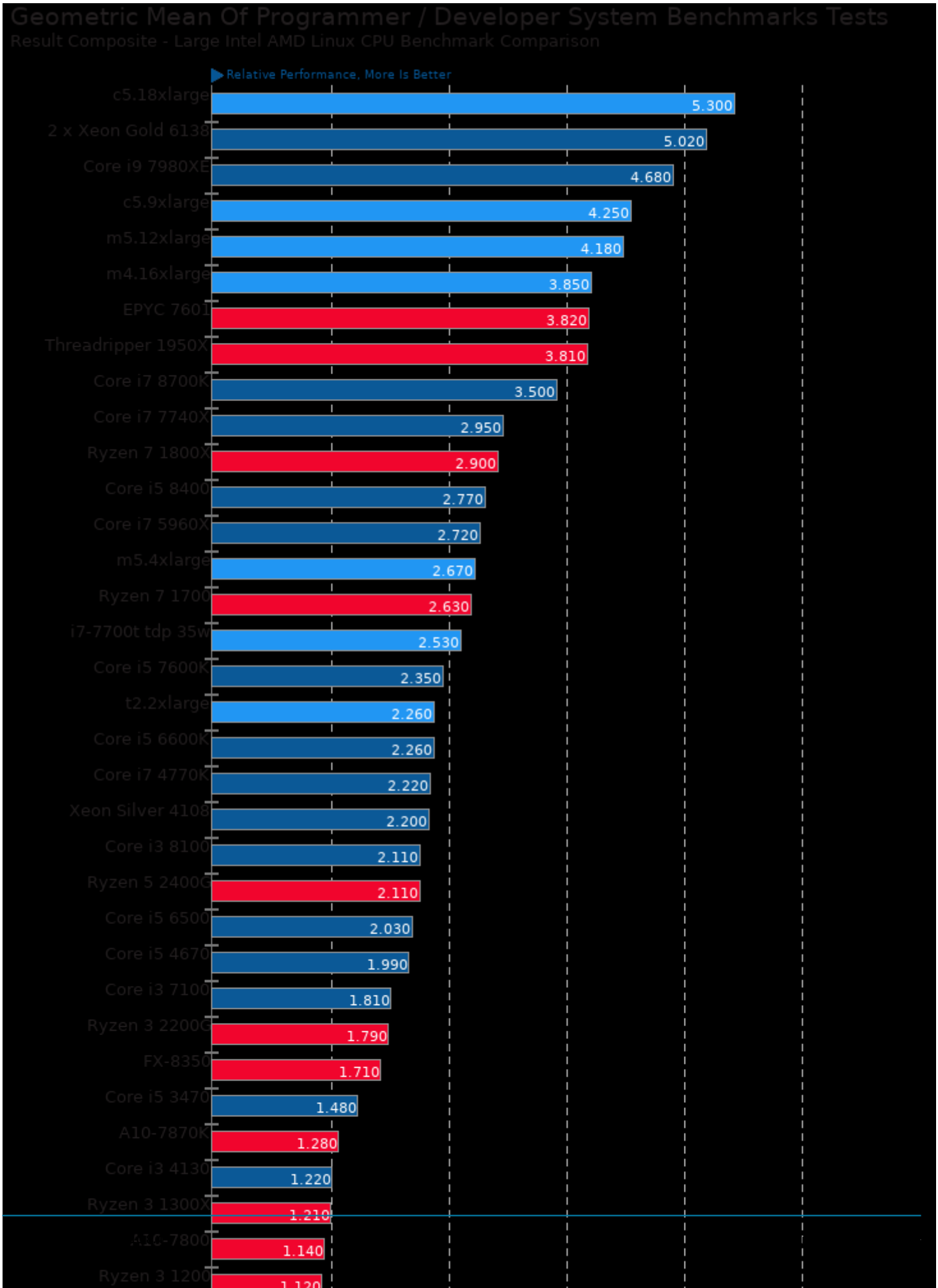
# Large Intel AMD Linux CPU Benchmark Comparison

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


Geometric Mean Of OpenMPI Tests
Result Composite - Large Intel AMD Linux CPU Benchmark Comparison
Relative Performance, More Is Better
c5.18xlarge
29.188
2 x Xeon Gold 6138
28.728
EPYC 7601
24.245
m4.16xlarge
20.348
Core i9 7980XE
19.169
Threadripper 1950X
17.870
m5.12xlarge
17.337
c5.9xlarge
15.036
Ryzen 7 1800X
10.008
Core i7 8700K
8.922
Ryzen 7 1700
8.659
Core i7 5960X
8.414
Core i5 8400
6.438
m5.4xlarge
6.304
Core i7 7740X
6.238
Xeon Silver 4108
5.388
Ryzen 5 2400G
5.276
Core i7 4770K
4.970
Core i5 7600K
4.576
i7-7700t tdp 35w
4.533
Core i5 6600K
4.465
Core i3 8100
4.123
FX-8350
3.984
t2.2xlarge
3.849
Core i5 6500
3.785
Ryzen 3 2200G
3.739
Ryzen 3 1300X
3.652
Core i5 4670
3.514
Ryzen 3 1200
3.148
Core i5 3470
2.850
Core i3 7100
2.785
Core i3 4130
2.243
A10-7870K
1.883
A10-7800
1.688

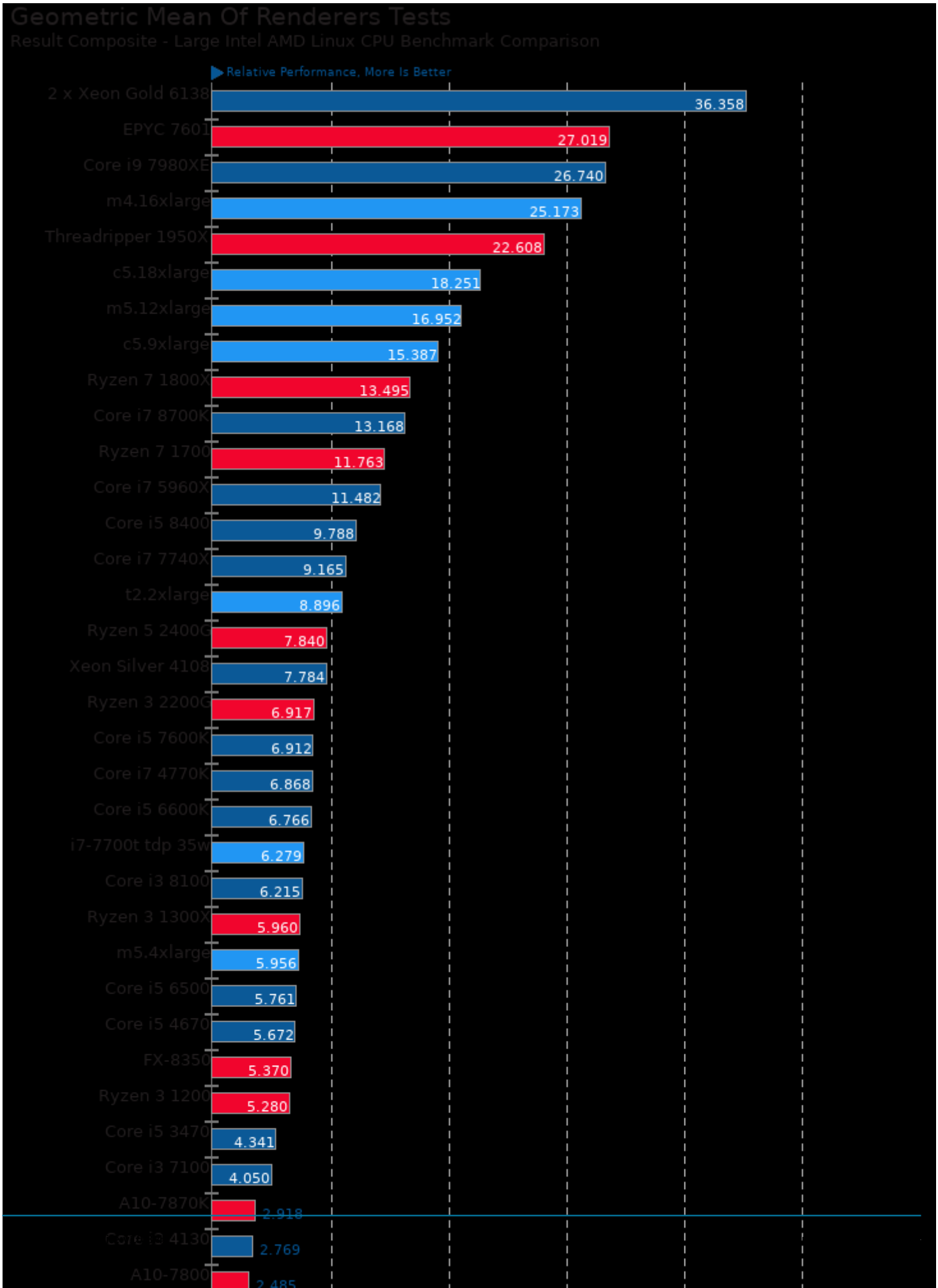
# Large Intel AMD Linux CPU Benchmark Comparison

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


Geometric Mean Of Programmer / Developer System Benchmarks Tests
Result Composite - Large Intel AMD Linux CPU Benchmark Comparison
Relative Performance, More Is Better
c5.18xlarge 5.300
2 x Xeon Gold 6138 5.020
Core i9 7980XE 4.680
c5.9xlarge 4.250
m5.12xlarge 4.180
m4.16xlarge 3.850
EPYC 7601 3.820
Threadripper 1950X 3.810
Core i7 8700K 3.500
Core i7 7740X 2.950
Ryzen 7 1800X 2.900
Core i5 8400 2.770
Core i7 5960X 2.720
m5.4xlarge 2.670
Ryzen 7 1700 2.630
i7-7700t tdp 35w 2.530
Core i5 7600K 2.350
t2.2xlarge 2.260
Core i5 6600K 2.260
Core i7 4770K 2.220
Xeon Silver 4108 2.200
Core i3 8100 2.110
Ryzen 5 2400G 2.110
Core i5 6500 2.030
Core i5 4670 1.990
Core i3 7100 1.810
Ryzen 3 2200G 1.790
FX-8350 1.710
Core i5 3470 1.480
A10-7870K 1.280
Core i3 4130 1.220
Ryzen 3 1300X 1.210
A10-7800 1.140
Ryzen 3 1200 1.120

# Large Intel AMD Linux CPU Benchmark Comparison

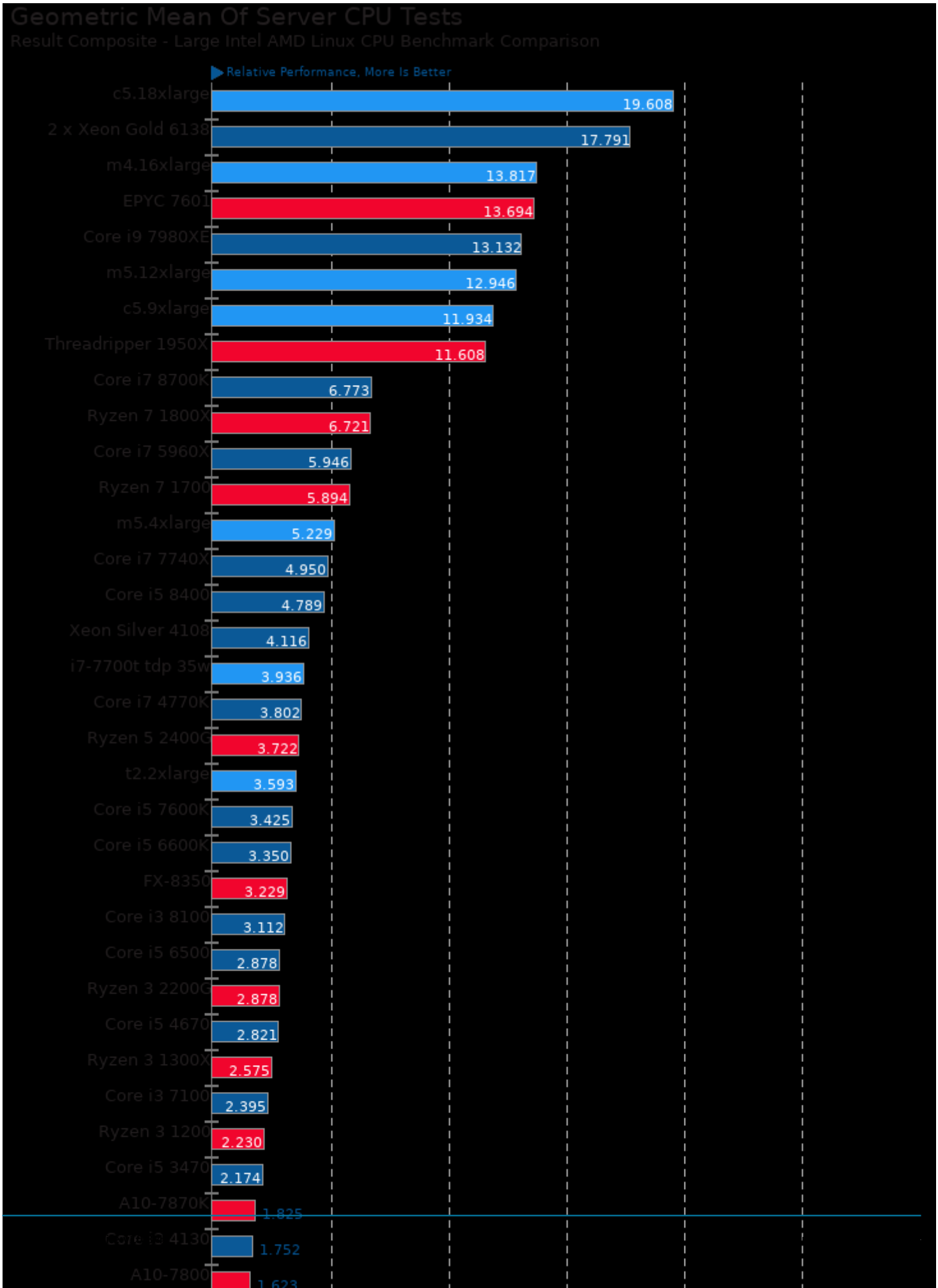
Geometric mean based upon tests: pts/pybench and pts/build-linux-kernel


Geometric Mean Of Renderers Tests
Result Composite - Large Intel AMD Linux CPU Benchmark Comparison
Relative Performance, More Is Better
2 x Xeon Gold 6138
36.358
EPYC 7601
27.019
Core i9 7980XE
26.740
m4.16xlarge
25.173
Threadripper 1950X
22.608
c5.18xlarge
18.251
m5.12xlarge
16.952
c5.9xlarge
15.387
Ryzen 7 1800X
13.495
Core i7 8700K
13.168
Ryzen 7 1700
11.763
Core i7 5960X
11.482
Core i5 8400
9.788
Core i7 7740X
9.165
t2.2xlarge
8.896
Ryzen 5 2400G
7.840
Xeon Silver 4108
7.784
Ryzen 3 2200G
6.917
Core i5 7600K
6.912
Core i7 4770K
6.868
Core i5 6600K
6.766
i7-7700t tdp 35w
6.279
Core i3 8100
6.215
Ryzen 3 1300X
5.960
m5.4xlarge
5.956
Core i5 6500
5.761
Core i5 4670
5.672
FX-8350
5.370
Ryzen 3 1200
5.280
Core i5 3470
4.341
Core i3 7100
4.050
A10-7870K
2.918
Core i3 4130
2.769
A10-7800
2.485

# Large Intel AMD Linux CPU Benchmark Comparison

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

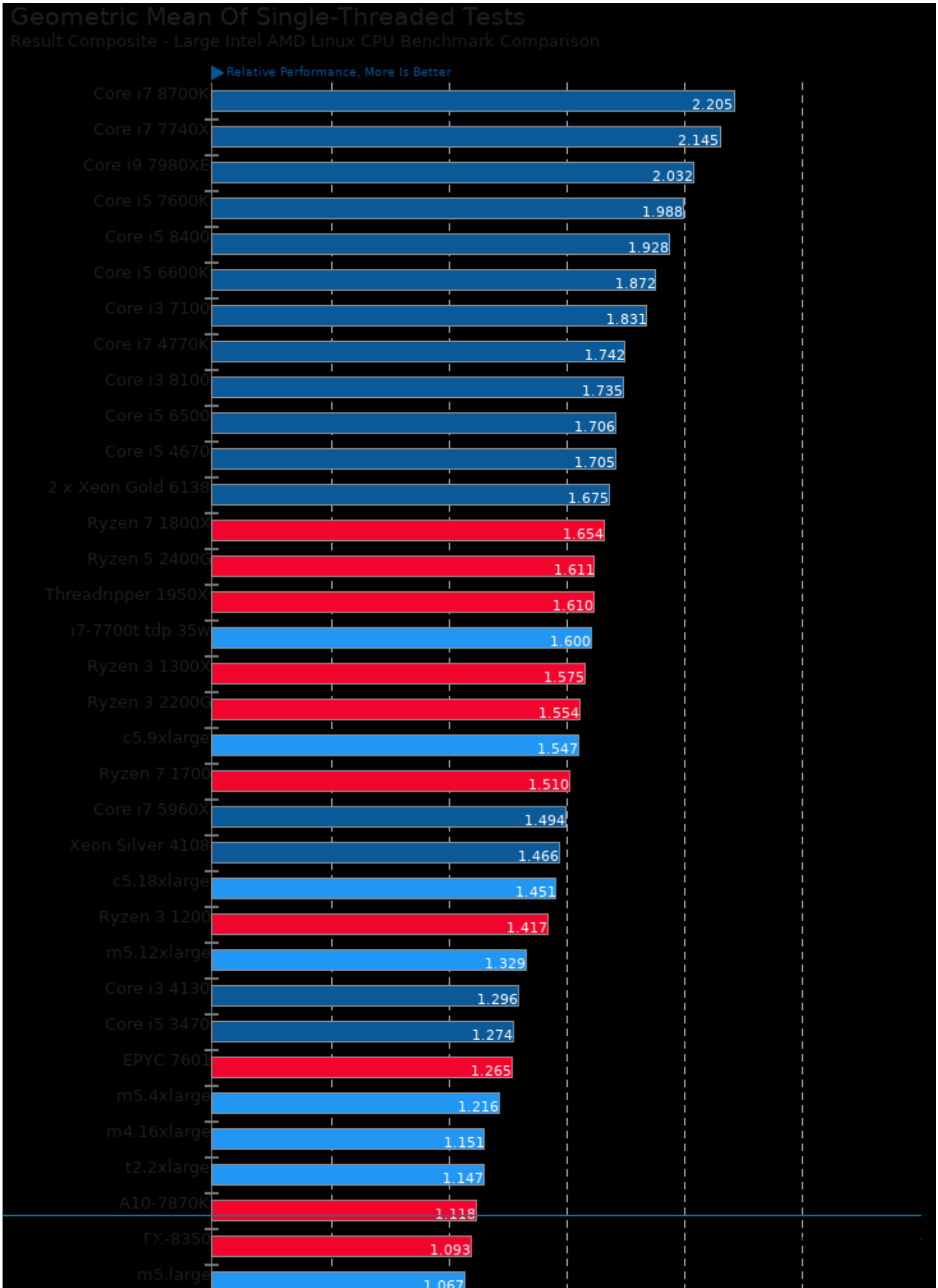
# Large Intel AMD Linux CPU Benchmark Comparison



# 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 and pts/scikit-learn

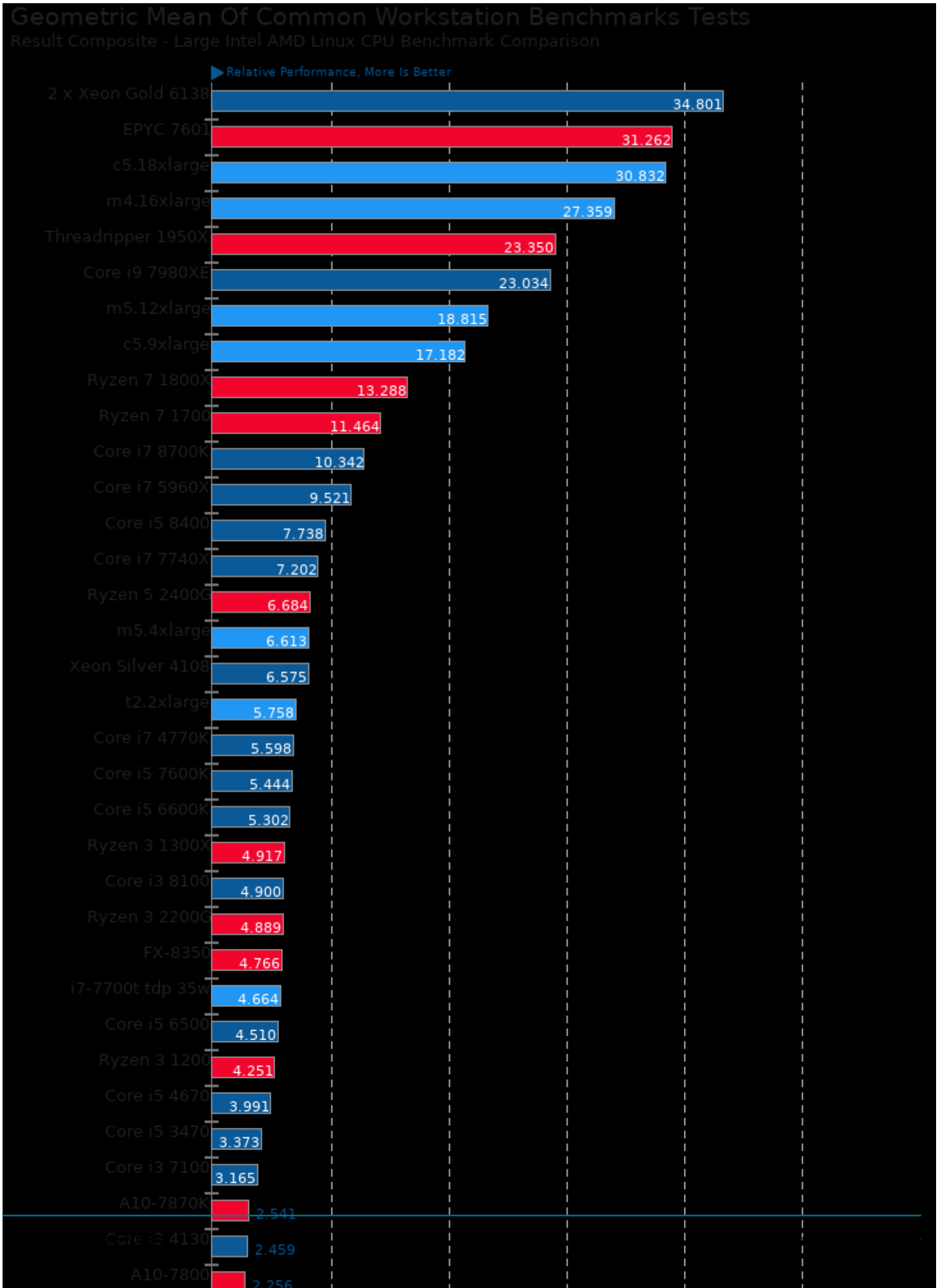
# Large Intel AMD Linux CPU Benchmark Comparison



# Large Intel AMD Linux CPU Benchmark Comparison

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

# Large Intel AMD Linux CPU Benchmark Comparison



# Large Intel AMD Linux CPU Benchmark Comparison

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

*This file was automatically generated via the Phoronix Test Suite benchmarking software on Thursday, 28 March 2024 09:06.*