



Xeon Cascade Lake Refresh vs. AMD EPYC Rome Linux Benchmarks

Benchmarks for a future article by Michael Larabel.

Automated Executive Summary

2 x EPYC 7742 had the most wins, coming in first place for 49% of the tests.

Based on the geometric mean of all complete results, the fastest (2 x EPYC 7742) was 2.879x the speed of the slowest (EPYC 7F32).

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

MKL-DNN DNNL (Harness: Deconvolution Batch deconv_3d - Data Type: u8s8f32) at 12.004x

John The Ripper (Test: Blowfish) at 11.012x

Blender (Blend File: Classroom - Compute: CPU-Only) at 10.627x

LuxCoreRender (Scene: Rainbow Colors and Prism) at 10.079x

asmFish (1024 Hash Memory, 26 Depth) at 9.955x

Stockfish (Total Time) at 9.782x

LuxCoreRender (Scene: DLSC) at 9.665x

OSPray (Demo: San Miguel - Renderer: Path Tracer) at 9.126x

John The Ripper (Test: MD5) at 9.088x

LAMMPS Molecular Dynamics Simulator (Model: Rhodopsin Protein) at 8.475x.

Test Systems:

Xeon Gold 5220R

Processor: Intel Xeon Gold 5220R @ 3.90GHz (18 Cores / 36 Threads), Motherboard: GIGABYTE MD61-SC2-00 v01000100 (T15 BIOS), Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 6 x 32 GB DDR4-2933MT/s HMA84GR7CJR4N-WM, Disk: 280GB INTEL SSDPED1D280GA, Graphics: ASPEED, Network: 2 x Intel X722 for 1GbE + 2 x QLogic FastLinQ QL41000 10/25/40/50GbE

OS: Ubuntu 20.04, Kernel: 5.4.0-18-generic (x86_64), Desktop: GNOME Shell 3.36.0, Display Server: X Server 1.20.7, Display Driver: modesetting 1.20.7, Compiler: GCC 9.3.0, 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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0x500002c

Python Notes: + Python 3.8.2

Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + 11tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swappgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Enhanced IBRS IBPB: conditional RSB filling + tsx_async_abort: Mitigation of TSX disabled

2 x Xeon Gold 5220R

Processor: 2 x Intel Xeon Gold 5220R @ 3.90GHz (36 Cores / 72 Threads), Motherboard: GIGABYTE MD61-SC2-00 v01000100 (T15 BIOS), Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 12 x 32 GB DDR4-2933MT/s HMA84GR7CJR4N-WM, Disk: 280GB INTEL SSDPED1D280GA, Graphics: ASPEED, Network: 2 x Intel X722 for 1GbE + 2 x QLogic FastLinQ QL41000 10/25/40/50GbE

OS: Ubuntu 20.04, Kernel: 5.4.0-18-generic (x86_64), Desktop: GNOME Shell 3.36.0, Display Server: X Server 1.20.7, Display Driver: modesetting 1.20.7, Compiler: GCC 9.3.0, 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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0x500002c

Python Notes: + Python 3.8.2

Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + 11tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swappgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Enhanced IBRS IBPB: conditional RSB filling + tsx_async_abort: Mitigation of TSX disabled

Xeon Gold 6226R

Processor: Intel Xeon Gold 6226R @ 3.90GHz (16 Cores / 32 Threads), Motherboard: GIGABYTE MD61-SC2-00 v01000100 (T15 BIOS), Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 6 x 32 GB DDR4-2933MT/s HMA84GR7CJR4N-WM, Disk: 280GB INTEL SSDPED1D280GA, Graphics: ASPEED, Network: 2 x Intel X722 for 1GbE + 2 x QLogic FastLinQ QL41000 10/25/40/50GbE

OS: Ubuntu 20.04, Kernel: 5.4.0-18-generic (x86_64), Desktop: GNOME Shell 3.36.0, Display Server: X Server 1.20.7, Display Driver: modesetting 1.20.7, Compiler: GCC 9.3.0, 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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0x500002c

Python Notes: + Python 3.8.2

Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Enhanced IBRS IBPB: conditional RSB filling + tsx_async_abort: Mitigation of TSX disabled

2 x Xeon Gold 6226R

Processor: 2 x Intel Xeon Gold 6226R @ 3.90GHz (32 Cores / 64 Threads), Motherboard: GIGABYTE MD61-SC2-00 v01000100 (T15 BIOS), Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 12 x 32 GB DDR4-2933MT/s HMA84GR7CJR4N-WM, Disk: 280GB INTEL SSDPED1D280GA, Graphics: ASPEED, Network: 2 x Intel X722 for 1GbE + 2 x QLogic FastLinQ QL41000 10/25/40/50GbE

OS: Ubuntu 20.04, Kernel: 5.4.0-18-generic (x86_64), Desktop: GNOME Shell 3.36.0, Display Server: X Server 1.20.7, Display Driver: modesetting 1.20.7, Compiler: GCC 9.3.0, 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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0x500002c

Python Notes: + Python 3.8.2

Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Enhanced IBRS IBPB: conditional RSB filling + tsx_async_abort: Mitigation of TSX disabled

Xeon Gold 6250

Processor: Intel Xeon Gold 6250 @ 4.50GHz (8 Cores / 16 Threads), Motherboard: GIGABYTE MD61-SC2-00 v01000100 (T15 BIOS), Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 6 x 32 GB DDR4-2933MT/s HMA84GR7CJR4N-WM, Disk: 280GB INTEL SSDPE21D280GA, Graphics: ASPEED, Network: 2 x Intel X722 for 1GbE + 2 x QLogic FastLinQ QL41000 10/25/40/50GbE

OS: Ubuntu 20.04, Kernel: 5.4.0-21-generic (x86_64), Desktop: GNOME Shell 3.36.0, Display Server: X Server 1.20.7, Display Driver: modesetting 1.20.7, Compiler: GCC 9.3.0, 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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0x500002c

Python Notes: + Python 3.8.2

Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Enhanced IBRS IBPB: conditional RSB filling + tsx_async_abort: Mitigation of TSX disabled

2 x Xeon Gold 6250

Processor: 2 x Intel Xeon Gold 6250 @ 4.50GHz (16 Cores / 32 Threads), Motherboard: GIGABYTE MD61-SC2-00 v01000100 (T15 BIOS), Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 12 x 32 GB DDR4-2933MT/s HMA84GR7CJR4N-WM, Disk: 280GB INTEL SSDPE21D280GA, Graphics: ASPEED, Network: 2 x Intel X722 for 1GbE + 2 x QLogic FastLinQ QL41000 10/25/40/50GbE

OS: Ubuntu 20.04, Kernel: 5.4.0-21-generic (x86_64), Desktop: GNOME Shell 3.36.0, Display Server: X Server 1.20.7, Display Driver: modesetting 1.20.7, Compiler: GCC 9.3.0, 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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new

--with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0x500002c

Python Notes: + Python 3.8.2

Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + 11tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swappgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Enhanced IBRS IBPB: conditional RSB filling + tsx_async_abort: Mitigation of TSX disabled

Xeon Gold 6258R

Processor: Intel Xeon Gold 6258R @ 4.00GHz (28 Cores / 56 Threads), Motherboard: GIGABYTE MD61-SC2-00 v01000100 (T15 BIOS), Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 6 x 32 GB DDR4-2933MT/s HMA84GR7CJR4N-WM, Disk: 280GB INTEL SSDPE21D280GA, Graphics: ASPEED, Network: 2 x Intel X722 for 1GbE + 2 x QLogic FastLinQ QL41000 10/25/40/50GbE

OS: Ubuntu 20.04, Kernel: 5.4.0-21-generic (x86_64), Desktop: GNOME Shell 3.36.0, Display Server: X Server 1.20.7, Display Driver: modesetting 1.20.7, Compiler: GCC 9.3.0, 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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0x500002c

Python Notes: + Python 3.8.2

Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + 11tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swappgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Enhanced IBRS IBPB: conditional RSB filling + tsx_async_abort: Mitigation of TSX disabled

2 x Xeon Gold 6258R

Processor: 2 x Intel Xeon Gold 6258R @ 4.00GHz (56 Cores / 112 Threads), Motherboard: GIGABYTE MD61-SC2-00 v01000100 (T15 BIOS), Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 12 x 32 GB DDR4-2933MT/s HMA84GR7CJR4N-WM, Disk: 280GB INTEL SSDPE21D280GA, Graphics: ASPEED, Network: 2 x Intel X722 for 1GbE + 2 x QLogic FastLinQ QL41000 10/25/40/50GbE

OS: Ubuntu 20.04, Kernel: 5.4.0-21-generic (x86_64), Desktop: GNOME Shell 3.36.0, Display Server: X Server 1.20.7, Display Driver: modesetting 1.20.7, Compiler: GCC 9.3.0, 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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0x500002c

Python Notes: + Python 3.8.2

Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + 11tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swappgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Enhanced IBRS IBPB: conditional RSB filling + tsx_async_abort: Mitigation of TSX disabled

Xeon Platinum 8280

Processor: Intel Xeon Platinum 8280 @ 4.00GHz (28 Cores / 56 Threads), Motherboard: GIGABYTE MD61-SC2-00 v01000100 (T15 BIOS), Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 6 x 32 GB DDR4-2933MT/s HMA84GR7CJR4N-WM, Disk: 280GB INTEL SSDPED1D280GA, Graphics: ASPEED, Network: 2 x Intel X722 for 1GbE + 2 x QLogic FastLinQ QL41000 10/25/40/50GbE

OS: Ubuntu 20.04, Kernel: 5.4.0-18-generic (x86_64), Desktop: GNOME Shell 3.36.0, Display Server: X Server 1.20.7, Display Driver: modesetting 1.20.7, Compiler: GCC 9.3.0, 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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch

```
--enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix
--host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new
--with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0x500002c
Python Notes: + Python 3.8.2
Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + 1tft: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB
disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Enhanced IBRS IBPB:
conditional RSB filling + tsx_async_abort: Mitigation of TSX disabled
```

2 x Xeon Platinum 8280

Processor: 2 x Intel Xeon Platinum 8280 @ 4.00GHz (56 Cores / 112 Threads), Motherboard: GIGABYTE MD61-SC2-00 v01000100 (T15 BIOS), Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 12 x 32 GB DDR4-2933MT/s HMA84GR7CJR4N-WM, Disk: 280GB INTEL SSDPED1D280GA, Graphics: ASPEED, Network: 2 x Intel X722 for 1GbE + 2 x QLogic FastLinQ QL41000 10/25/40/50GbE

OS: Ubuntu 20.04, Kernel: 5.4.0-18-generic (x86_64), Desktop: GNOME Shell 3.36.0, Display Server: X Server 1.20.7, Display Driver: modesetting 1.20.7, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 1920x1080

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Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie
--enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch
--enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix
--host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new
--with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0x500002c
Python Notes: + Python 3.8.2
Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + 1tft: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB
disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Enhanced IBRS IBPB:
conditional RSB filling + tsx_async_abort: Mitigation of TSX disabled
```

EPYC 7282

Processor: AMD EPYC 7282 16-Core @ 2.80GHz (16 Cores / 32 Threads), Motherboard: AMD DAYTONA_X (RDY1006G BIOS), Chipset: AMD Starship/Matisse, Memory: 8 x 32 GB DDR4-3200MT/s 36ASF4G72PZ-3G2E2, Disk: 280GB INTEL SSDPE21D280GA, Graphics: ASPEED, Network: 2 x Mellanox MT27710

OS: Ubuntu 20.04, Kernel: 5.4.0-21-generic (x86_64), Desktop: GNOME Shell 3.36.0, Display Server: X Server 1.20.7, Display Driver: modesetting 1.20.7, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 1920x1080

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Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie
--enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch
--enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix
--host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new
--with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq ondemand - CPU Microcode: 0x8301034
Python Notes: + Python 3.8.2
Security Notes: itlb_multihit: Not affected + 1tft: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and
seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW
STIBP: conditional RSB filling + tsx_async_abort: Not affected
```

2 x EPYC 7282

Processor: 2 x AMD EPYC 7282 16-Core @ 2.80GHz (32 Cores / 64 Threads), Motherboard: AMD DAYTONA_X (RDY1006G BIOS), Chipset: AMD Starship/Matisse, Memory: 16 x 32 GB DDR4-3200MT/s 36ASF4G72PZ-3G2E2, Disk: 280GB INTEL SSDPE21D280GA, Graphics: llvmpipe 504GB, Network: 2 x Mellanox MT27710

OS: Ubuntu 20.04, Kernel: 5.4.0-21-generic (x86_64), Desktop: GNOME Shell 3.36.0, Display Server: X Server 1.20.7, Display Driver: modesetting 1.20.7, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 1920x1080

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--enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch
--enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix
--host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new
```

--with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq ondemand - CPU Microcode: 0x8301034

Python Notes: + Python 3.8.2

Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + tsx_async_abort: Not affected

2 x EPYC 7302

Processor: 2 x AMD EPYC 7302 16-Core @ 3.00GHz (32 Cores / 64 Threads), Motherboard: AMD DAYTONA_X (RDY1006G BIOS), Chipset: AMD Starship/Matisse, Memory: 16 x 32 GB DDR4-3200MT/s 36ASF4G72PZ-3G2E2, Disk: 280GB INTEL SSDPE21D280GA, Graphics: ASPEED, Network: 2 x Mellanox MT27710

OS: Ubuntu 20.04, Kernel: 5.4.0-21-generic (x86_64), Desktop: GNOME Shell 3.36.0, Display Server: X Server 1.20.7, Display Driver: modesetting 1.20.7, Compiler: GCC 9.3.0, 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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq ondemand - CPU Microcode: 0x8301034

Python Notes: + Python 3.8.2

Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + tsx_async_abort: Not affected

2 x EPYC 7352

Processor: 2 x AMD EPYC 7352 24-Core @ 2.30GHz (48 Cores / 96 Threads), Motherboard: AMD DAYTONA_X (RDY1006G BIOS), Chipset: AMD Starship/Matisse, Memory: 16 x 32 GB DDR4-3200MT/s 36ASF4G72PZ-3G2E2, Disk: 280GB INTEL SSDPE21D280GA, Graphics: ASPEED, Network: 2 x Mellanox MT27710

OS: Ubuntu 20.04, Kernel: 5.4.0-21-generic (x86_64), Desktop: GNOME Shell 3.36.0, Display Server: X Server 1.20.7, Display Driver: modesetting 1.20.7, Compiler: GCC 9.3.0, 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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq ondemand - CPU Microcode: 0x8301034

Python Notes: + Python 3.8.2

Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + tsx_async_abort: Not affected

2 x EPYC 7532

Processor: 2 x AMD EPYC 7532 32-Core @ 2.40GHz (64 Cores / 128 Threads), Motherboard: AMD DAYTONA_X (RDY1006G BIOS), Chipset: AMD Starship/Matisse, Memory: 16 x 32 GB DDR4-3200MT/s 36ASF4G72PZ-3G2E2, Disk: 280GB INTEL SSDPE21D280GA, Graphics: Ilvmpipe 504GB, Network: 2 x Mellanox MT27710

OS: Ubuntu 20.04, Kernel: 5.4.0-21-generic (x86_64), Desktop: GNOME Shell 3.36.0, Display Server: X Server 1.20.7, Display Driver: modesetting 1.20.7, Compiler: GCC 9.3.0, 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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq ondemand - CPU Microcode: 0x8301034

Python Notes: + Python 3.8.2

Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + tsx_async_abort: Not affected

2 x EPYC 7452

Processor: AMD EPYC 7452 32-Core @ 2.35GHz (64 Cores / 128 Threads), Motherboard: AMD DAYTONA_X (RDY1006G BIOS), Chipset: AMD Starship/Matisse, Memory: 8 x 32 GB DDR4-3200MT/s 36ASF4G72PZ-3G2E2, Disk: 280GB INTEL SSDPE21D280GA, Graphics: Ilvmpipe 252GB, Network: 2 x Mellanox MT27710

OS: Ubuntu 20.04, Kernel: 5.4.0-21-generic (x86_64), Desktop: GNOME Shell 3.36.0, Display Server: X Server 1.20.7, Display Driver: modesetting 1.20.7, Compiler: GCC 9.3.0, 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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq ondemand - CPU Microcode: 0x8301034

Python Notes: + Python 3.8.2

Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + tsx_async_abort: Not affected

EPYC 7742

Processor: AMD EPYC 7742 64-Core @ 2.25GHz (64 Cores / 128 Threads), Motherboard: AMD DAYTONA_X (RDY1006G BIOS), Chipset: AMD Starship/Matisse, Memory: 8 x 32 GB DDR4-3200MT/s 36ASF4G72PZ-3G2E2, Disk: 280GB INTEL SSDPE21D280GA, Graphics: ASPEED, Network: 2 x Mellanox MT27710

OS: Ubuntu 20.04, Kernel: 5.4.0-21-generic (x86_64), Desktop: GNOME Shell 3.36.0, Display Server: X Server 1.20.7, Display Driver: modesetting 1.20.7, Compiler: GCC 9.3.0, 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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq ondemand - CPU Microcode: 0x8301034

Python Notes: + Python 3.8.2

Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + tsx_async_abort: Not affected

2 x EPYC 7742

Processor: 2 x AMD EPYC 7742 64-Core @ 2.25GHz (128 Cores / 256 Threads), Motherboard: AMD DAYTONA_X (RDY1006G BIOS), Chipset: AMD Starship/Matisse, Memory: 16 x 32 GB DDR4-3200MT/s 36ASF4G72PZ-3G2E2, Disk: 280GB INTEL SSDPE21D280GA, Graphics: ASPEED, Network: 2 x Mellanox MT27710

OS: Ubuntu 20.04, Kernel: 5.4.0-21-generic (x86_64), Desktop: GNOME Shell 3.36.0, Display Server: X Server 1.20.7, Display Driver: modesetting 1.20.7, Compiler: GCC 9.3.0, 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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq ondemand - CPU Microcode: 0x8301034

Python Notes: + Python 3.8.2

Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + tsx_async_abort: Not affected

EPYC 7F32

Processor: AMD EPYC 7F32 8-Core @ 3.70GHz (8 Cores / 16 Threads), Motherboard: AMD DAYTONA_X (RDY1006G BIOS), Chipset: AMD Starship/Matisse, Memory: 8 x 32 GB DDR4-3200MT/s 36ASF4G72PZ-3G2E2, Disk: 280GB INTEL SSDPE21D280GA, Graphics: ASPEED, Network: 2 x Mellanox MT27710

OS: Ubuntu 20.04, Kernel: 5.4.0-21-generic (x86_64), Desktop: GNOME Shell 3.36.0, Display Server: X Server 1.20.7, Display Driver: modesetting 1.20.7, Compiler: GCC 9.3.0, 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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq ondemand - CPU Microcode: 0x8301034

Python Notes: + Python 3.8.2

Security Notes: itlb_multihit: Not affected + 11tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + tsx_async_abort: Not affected

2 x EPYC 7F32

Processor: 2 x AMD EPYC 7F32 8-Core @ 3.70GHz (16 Cores / 32 Threads), Motherboard: AMD DAYTONA_X (RDY1006G BIOS), Chipset: AMD Starship/Matisse, Memory: 16 x 32 GB DDR4-3200MT/s 36ASF4G72PZ-3G2E2, Disk: 280GB INTEL SSDPE21D280GA, Graphics: Ilvmpipe 504GB, Network: 2 x Mellanox MT27710

OS: Ubuntu 20.04, Kernel: 5.4.0-21-generic (x86_64), Desktop: GNOME Shell 3.36.0, Display Server: X Server 1.20.7, Display Driver: modesetting 1.20.7, Compiler: GCC 9.3.0, 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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq ondemand - CPU Microcode: 0x8301034

Python Notes: + Python 3.8.2

Security Notes: itlb_multihit: Not affected + 11tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + tsx_async_abort: Not affected

EPYC 7F52

Processor: AMD EPYC 7F52 16-Core @ 3.50GHz (16 Cores / 32 Threads), Motherboard: AMD DAYTONA_X (RDY1006G BIOS), Chipset: AMD Starship/Matisse, Memory: 8 x 32 GB DDR4-3200MT/s 36ASF4G72PZ-3G2E2, Disk: 280GB INTEL SSDPE21D280GA, Graphics: ASPEED, Network: 2 x Mellanox MT27710

OS: Ubuntu 20.04, Kernel: 5.4.0-21-generic (x86_64), Desktop: GNOME Shell 3.36.0, Display Server: X Server 1.20.7, Display Driver: modesetting 1.20.7, Compiler: GCC 9.3.0, 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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq ondemand - CPU Microcode: 0x8301034

Python Notes: + Python 3.8.2

Security Notes: itlb_multihit: Not affected + 11tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + tsx_async_abort: Not affected

2 x EPYC 7F52

Processor: 2 x AMD EPYC 7F52 16-Core @ 3.50GHz (32 Cores / 64 Threads), Motherboard: AMD DAYTONA_X

(RDY1006G BIOS), Chipset: AMD Starship/Matisse, Memory: 16 x 32 GB DDR4-3200MT/s 36ASF4G72PZ-3G2E2, Disk: 280GB INTEL SSDPE21D280GA, Graphics: ASPEED, Network: 2 x Mellanox MT27710

OS: Ubuntu 20.04, Kernel: 5.4.0-21-generic (x86_64), Desktop: GNOME Shell 3.36.0, Display Server: X Server 1.20.7, Display Driver: modesetting 1.20.7, Compiler: GCC 9.3.0, 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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq ondemand - CPU Microcode: 0x8301034

Python Notes: + Python 3.8.2

Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + tsx_async_abort: Not affected

EPYC 7F72

Processor: AMD EPYC 7F72 24-Core @ 3.20GHz (24 Cores / 48 Threads), Motherboard: AMD DAYTONA_X (RDY1006G BIOS), Chipset: AMD Starship/Matisse, Memory: 8 x 32 GB DDR4-3200MT/s 36ASF4G72PZ-3G2E2, Disk: 280GB INTEL SSDPE21D280GA, Graphics: ASPEED, Network: 2 x Mellanox MT27710

OS: Ubuntu 20.04, Kernel: 5.4.0-21-generic (x86_64), Desktop: GNOME Shell 3.36.0, Display Server: X Server 1.20.7, Display Driver: modesetting 1.20.7, Compiler: GCC 9.3.0, 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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq ondemand - CPU Microcode: 0x8301034

Python Notes: + Python 3.8.2

Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + tsx_async_abort: Not affected

2 x EPYC 7F72

Processor: 2 x AMD EPYC 7F72 24-Core @ 3.20GHz (48 Cores / 96 Threads), Motherboard: AMD DAYTONA_X (RDY1006G BIOS), Chipset: AMD Starship/Matisse, Memory: 16 x 32 GB DDR4-3200MT/s 36ASF4G72PZ-3G2E2, Disk: 280GB INTEL SSDPE21D280GA, Graphics: ASPEED, Network: 2 x Mellanox MT27710

OS: Ubuntu 20.04, Kernel: 5.4.0-21-generic (x86_64), Desktop: GNOME Shell 3.36.0, Display Server: X Server 1.20.7, Display Driver: modesetting 1.20.7, Compiler: GCC 9.3.0, 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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq ondemand - CPU Microcode: 0x8301034

Python Notes: + Python 3.8.2

Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + tsx_async_abort: Not affected

	Xeon Go Id 52 20 R	2 x Go Id 26 R	Xeon Go Id 62 R	2 x Go Id 50 R	Xeon Go Id 62 R	2 x Go Id 58 R	Xeon Go Id 82 R	2 x Go Id 80 R	2 x Go Id 82 R	EPYC 72 82 um	2 x EPYC 72 82	2 x EPYC 73 02	2 x EPYC 73 52	2 x EPYC 75 32	2 x EPYC 74 52	EPYC 77 42	2 x EPYC 77 42	EPYC 7F 32	2 x EPYC 7F 52	EPYC 7F 52	2 x EPYC 7F 52	EPYC 7F 72	2 x EPYC 7F 72	
Apples	28	18	27	17	38	22	19	15	19	15	28	19	19	18	17	18	15	17	39	25	22	16	18	15
eed -	4.2	0.6	6.7	7.6	6.8	9.3	4.1	3.9	7.6	4.9	1.5	6.7	0.2	8.3	6.2	2.5	2.5	6.3	7.1	2.6	7.5	2.2	2.4	7.0
Emily	79	45	68	61	04	19	40	50	49	80	61	09	29	06	25	53	26	13	57	73	68	68	10	88
(sec)	74	79	65	14	86	13	10	73	50	75	55	89	74	41	70	19	94	08	42	89	69	09	94	12
	7	4	8	3	6	3		5	2	5	2	7	3	9	5	5	7	4	1	1	5	3	3	
Normalize	53.6	84.4	55.1	85.8	39.4	66.5	78.5	99.0	77.1	98.4	54.1	77.5	80.1	81%	86.5	83.5	100	86.5	38.4	60.3	67.0	94%	83.6	97.1
d	5%	3%	1%	5%	3%	1%	7%	8%	7%	2%	7%	4%	8%		5%	5%	%	1%	%	7%	2%		2%	%
Apples	52	66	37	47	13	15	78	12	19	31	20	29	40	54	12	80	11	26	83	10	70	10	44	76
eed -	59	83	05	57	42	92	47	44	78	02	97	30	10	79	66	17	47	52	40	61	54	06	69	97
Perfor	18	89	93	77	98	39	14	53	27	40	63	98	04	72	35	74	30	45	31	23	63	06	07	32
mance /					6	2		8	4	5				8			8	4		0		2		
Cost -																								
Emily																								
(sec x																								
Dollar)																								
Normalize	39.8	31.3	56.6	44.0	15.6	13.1	26.7	16.8	10.6	6.76	100	71.5	52.3	38.2	16.5	26.1	18.2	7.91	25.1	19.7	29.7	20.8	46.9	27.2
d	9%	8%	%	9%	2%	7%	3%	5%	%	%	%	7%	1%	8%	6%	6%	8%	%	5%	7%	3%	5%	4%	5%
asmFis	43	85	44	83	27	53	69	13	68	13	41	74	75	10	13	12	13	24	24	42	46	85	65	12
h -	21	50	61	89	86	21	95	49	76	38	75	77	60	13	34	75	23	26	37	33	28	20	30	12
1.H.M.2.	79	18	49	45	62	71	20	32	20	39	23	65	13	38	49	89	46	07	06	19	42	38	08	10
D	39	51	25	14	87	06	80	15	75	89	24	67	64	44	81	23	08	47	27	20	15	31	72	05
(Nodes/								8		6				4	0	7	8	7						5
s)																								
Normalize	17.8	35.2	18.3	34.5	11.4	21.9	28.8	55.6	28.3	55.1	17.2	30.8	31.1	41.7	55.0	52.5	54.5	100	10.0	17.4	19.0	35.1	26.9	49.9
d	1%	4%	9%	8%	9%	4%	3%	2%	4%	7%	1%	2%	6%	7%	1%	9%	5%	%	5%	5%	8%	2%	2%	6%
Standard	1.5	0.2	2.4	2%	0.5	1.6	1.8	0.4	1.1	0.6	0.8	2.9	1.2	2%	0.1	1.5	2.6	0.6	1.1	1.5	0.6	1.2	1.6	2.6
Deviation	%	%	%		%	%	%	%	%	%	%	%	%		%	%	%	%	%	%	%	%	%	%

asmFis	23	23	33	31	80	76	17	16	68	66	56	50	35	34	18	29	17	16	11	10	14	13	26	24
h -	36	10	32	32	26	64	30	69	70	86	04	18	86	82	57	05	59	12	60	07	93	74	65	73
Perfor	1	9	0	7			6	1		3		6	4	4	1	0	5	7	5	9	0	3	3	7
mance /																								
Cost -																								
1.H.M.2.																								
D																								
(Nodes/																								
s/Dollar																								
Normalize	41.6	41.2	59.4	55.9	14.3	13.6	30.8	29.7	12.2	11.9	100	89.5	63.9	62.1	33.1	51.8	31.3	28.7	20.7	17.9	26.6	24.5	47.5	44.1
d	8%	3%	5%	%	2%	7%	8%	8%	6%	3%	%	5%	9%	4%	4%	4%	9%	8%	1%	8%	4%	2%	6%	4%
Basis	46.	27.	44.	27.	66.	37.	30.	19.	30.	19.	40.	25.	24.	21.	17.	17.	17.	13.	60.	33.	33.	20.	26.	17.
Univers	70	98	94	22	38	23	44	71	68	88	94	15	02	05	34	69	76	16	11	73	53	48	50	16
al -	8	1	3	6	1	4	6	4	9	5	5	3	1	8	0	6	0	4	5	7	1	3	6	9
UASTC																								
Level 3																								
(sec)																								
Normalize	28.1	47.0	29.2	48.3	19.8	35.3	43.2	66.7	42.8	66.2	32.1	52.3	54.8	62.5	75.9	74.3	74.1	100	21.9	39.0	39.2	64.2	49.6	76.6
d	8%	5%	9%	5%	3%	5%	4%	7%	9%	%	5%	4%	%	1%	2%	9%	2%	%	%	2%	6%	7%	6%	7%
Standard	0%	0.2	0.1	0.3	0%	0.2	0.1	0.2	0.1	0.2	0%	0.3	0.2	0.2	0.2	0.4	0.2	0.2	0%	0%	0%	0.1	0.1	0.1
Deviation		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%				%	%	%
Basis	86	10	60	72	23	25	12	15	30	39	30	37	50	61	12	77	13	19	12	14	10	12	64	84
Univers	41	35	17	91	04	85	30	93	71	80	50	47	63	27	46	72	35	80	62	16	39	69	94	12
al -	0	30	9	1	75	53	63	68	66	58	4	8	6	9	05	1	91	39	42	95	46	95	0	8
Perfor																								
mance /																								
Cost -																								
UASTC																								
Level 3																								
(sec x																								
Dollar)																								
Normalize	35.3	29.4	50.6	41.8	13.2	11.8	24.7	19.1	9.93	7.66	100	81.3	60.2	49.7	24.4	39.2	22.8	15.4	24.1	21.5	29.3	24.0	46.9	36.2
d	11	6%	9%	4%	4%	%	9%	4%	%	%	%	9%	4%	8%	8%	5%	3%	%	6%	3%	5%	2%	7%	6%
Blender	11	60.	11	59.	16	87.	69.	38.	69.	38.	10	60.	55.	47.	35.	38.	38.	26.	16	84.	85.	45.	64.	36.
-	3.3	67	1.8	45	9.4	10	77	78	80	79	9.0	67	25	23	86	72	33	93	2.6	04	14	31	92	65
BMW27	0	2		7							8								5					
-																								
CPU-O																								
nly																								
Normalize	23.7	44.3	24.0	45.3	15.8	30.9	38.6	69.4	38.5	69.4	24.6	44.3	48.7	57.0	75.1	69.5	70.2	100	16.5	32.0	31.6	59.4	41.4	73.4
d	7%	9%	8%	%	9%	2%	%	4%	8%	3%	9%	9%	4%	2%	%	5%	6%	%	6%	4%	3%	4%	8%	8%
Standard	0.3	0.4	0.3	0.1	0.1	0.4	0.2	0.2	0.2	0.4	0.5	0.1	0.2	0.7	0.4	0.5	1.2	0.9	0.1	0.1	0.5	0.2	0.3	0.4
Deviation	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%

Blender	32	16	32	16	49	25	19	10	19	10	29	15	13	11	82.	88.	89.	46.	43	22	22	11	17	86.	
-	8.8	5.9	1.5	3.3	8.6	0.8	7.7	0.2	8.2	0.4	0.3	0.4	9.1	2.1	13	00	39	92	8.1	1.7	5.2	4.5	1.3	36	
Classroom - CPU-O nly	1	6	3	2	0	7	5	6	5	7	7	0	0	6						2	4	9	8	3	
Normalized Standard Deviation Blender - Fishy Cat - CPU-O nly	14.2	28.2	14.5	28.7	9.41	18.7	23.7	46.8	23.6	46.7	16.1	31.2	33.7	41.8	57.1	53.3	52.4	100	10.7	21.1	20.8	40.9	27.3	54.3	
	7%	7%	9%	3%	%	%	3%	%	7%	%	6%	%	3%	3%	3%	2%	9%	%	1%	6%	3%	5%	9%	3%	
	0.2	0.2	0.1	0.5	0.2	0.1	0.1	0.1	0.3	0.4	0.2	0.1	0.5	0.1	0%	0.2	0.2	0.2	0.1	0.3	0.1	0.3	0.3	0.5	
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
Blender - Fishy Cat - CPU-O nly	17	98.	17	96.	26	13	11	66.	11	66.	15	93.	86.	75.	60.	63.	61.	44.	23	12	12	70.	94.	59.	
-	5.9	24	3.9	41	4.6	6.8	0.6	35	0.6	39	9.9	82	03	45	11	66	43	19	9.7	5.8	3.2	15	81	10	
Barbershop - CPU-O nly	5		5		0	7	9		7		7								4	6	4				
Normalized Standard Deviation Blender - Fishy Cat - CPU-O nly	25.1	44.9	25.4	45.8	16.7	32.2	39.9	66.6	39.9	66.5	27.6	47.1	51.3	58.5	73.5	69.4	71.9	100	18.4	35.1	35.8	62.9	46.6	74.7	
	2%	8%	%	4%	%	9%	2%	%	3%	6%	2%	%	7%	7%	2%	2%	4%	%	3%	1%	6%	9%	1%	7%	
	0.1	0.1	0%	0.4	0.1	0.1	0%	0.4	0.3	0.1	0.5	0.7	0.4	0.2	0.2	0.1	0.5	1.5	0.1	0.2	0.1	0.3	0.4	1.2	
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
Blender - Fishy Cat - CPU-O nly	45	26	45	25	69	36	28	18	28	18	43	26	24	20	17	17	17	14	68	38	35	20	26	16	
-	6.4	0.5	3.2	7.0	0.8	7.0	8.3	6.4	7.8	7.3	6.8	0.0	3.3	6.0	1.3	9.4	2.4	4.6	1.4	3.4	2.2	2.2	7.1	2.7	
Barcelona - CPU-O nly	7	6	2	1	9	8	2	9	0	3	1	3	2	9	8	3	3	5	0	3	8	8	8	7	
Normalized Standard Deviation Blender - Fishy Cat - CPU-O nly	31.6	55.5	31.9	56.2	20.9	39.4	50.1	77.5	50.2	77.2	33.1	55.6	59.4	70.1	84.4	80.6	83.8	100	21.2	37.7	41.0	71.5	54.1	88.8	
	9%	2%	2%	8%	4%	1%	7%	6%	6%	2%	2%	3%	5%	9%	%	2%	9%	%	3%	3%	6%	1%	4%	7%	
	0.1	0.2	0.2	0.2	0.1	0.2	0.1	0.4	0.1	0.4	0.2	0.2	0.2	0.5	0.7	0.8	0.2	0.4	0.1	0.1	0%	0.1	0%	0.4	
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
Blender - Fishy Cat - CPU-O nly	40	20	40	20	62	31	24	12	24	12	36	19	18	15	11	12	11	74.	55	28	28	15	21	11	
-	4.7	8.3	0.9	7.4	2.4	4.8	5.4	8.5	6.3	9.0	7.1	7.3	2.0	0.8	1.9	0.2	8.4	87	4.1	5.2	6.9	1.3	5.9	5.9	
Pabellón Barcelona - CPU-O nly	8	0	6	1	4	8	2	3	1	1	6	7	8	8	1	8	6		4	2	3	6	6	3	
Normalized Standard Deviation Blender - Fishy Cat - CPU-O nly	18.5	35.9	18.6	36.1	12.0	23.7	30.5	58.2	30.4	58.0	20.3	37.9	41.1	49.6	66.9	62.2	63.2	100	13.5	26.2	26.0	49.4	34.6	64.5	
	%	4%	7%	%	3%	8%	1%	5%	%	3%	9%	3%	2%	2%	%	5%	%	%	1%	5%	9%	6%	7%	8%	
	0%	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0%	0.3	0.2	0.7	0.1	1%	0.1	0.4	0.4	1.1	0.2	0.2	0.4	0.2	0.5	1%	
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	

Blender	20	22	14	15	58	60	28	31	69	77	81	90	11	13	25	17	28	40	34	35	26	28	15	17	
-	96	44	97	92	84	48	20	34	86	64	26	39	64	74	76	00	83	51	15	29	39	09	90	95	
Performance / Cost - BMW27	05	79	27	07	00	22	10	98	28	98	5	8	67	39	90	58	18	35	65	68	34	22	54	85	
Performance / Cost - BMW27 CPU-O nly (sec) x																									
Normalized	38.7	36.2	54.2	51.0	13.8	13.4	28.8	25.9	11.6	10.4	100	89.9	69.7	59.1	31.5	47.7	28.1	20.0	23.7	23.0	30.7	28.9	51.0	45.2	
Blender	7%	6%	8%	4%	1%	4%	2%	2%	3%	7%	6%	3%	7%	3%	4%	9%	9%	6%	9%	2%	9%	3%	9%	5%	
-	60	61	43	43	17	17	79	81	19	20	21	22	29	32	59	38	67	70	92	93	69	71	41	42	
Performance / Cost - Classroom - CPU-O nly (sec) x	82	40	05	73	31	42	93	05	84	11	63	40	32	63	01	64	23	58	00	13	83	03	97	31	
Normalized	99	52	29	71	13	04	06	02	28	20	26	96	23	86	86	96	92	64	52	08	99	96	59	64	
Performance / Cost - Classroom - CPU-O nly (sec) x					9	1			4	8															
Normalized	35.5	35.2	50.2	49.4	12.5	12.4	27.0	26.6	10.9	10.7	100	96.5	73.7	66.2	36.6	55.9	32.1	30.6	23.5	23.2	30.9	30.4	51.5	51.1	
Blender	6%	3%	5%	6%	1%	2%	6%	9%	1%	6%	6%	3%	8%	8%	5%	7%	7%	5%	1%	3%	7%	5%	4%	2%	
-	32	36	23	25	91	95	44	53	11	13	11	13	18	21	43	27	46	66	50	52	38	43	23	28	
Performance / Cost - Fishy Cat - CPU-O nly (sec) x	55	34	29	81	86	04	74	63	07	28	91	97	13	95	19	95	20	47	34	86	20	49	22	95	
Normalized	08	88	19	86	91	25	09	73	69	99	78	92	51	60	50	95	76	94	54	12	44	30	85	90	
Performance / Cost - Fishy Cat - CPU-O nly (sec) x									6	5															
Normalized	36.6	32.7	51.1	46.1	12.9	12.5	26.6	22.2	10.7	8.97	100	85.2	65.7	54.2	27.5	42.6	25.7	17.9	23.6	22.5	31.1	27.4	51.3	41.1	
Blender	1%	9%	7%	6%	7%	4%	4%	2%	6%	1%	1%	5%	2%	8%	9%	3%	9%	3%	7%	5%	9%	1%	1%	5%	

Blender	84	96	60	68	23	25	11	15	28	37	32	38	51	59	12	78	12	21	14	16	10	12	65	79
-	44	40	68	82	98	49	65	07	80	49	54	74	29	97	31	80	97	76	30	10	92	54	45	75
Performance / Cost - Barbershop - CPU-Only (sec x)	70	72	62	73	77	00	38	58	59	97	23	45	19	22	53	57	01	11	94	40	06	13	91	73
					0	4	9	5	0	2					7		8	5	0	6	8	6		
Normalize	38.5	33.7	53.6	47.2	13.5	12.7	27.9	21.5	11.3	8.68	100	83.9	63.4	54.2	26.4	41.2	25.0	14.9	22.7	20.2	29.8	25.9	49.7	40.8
Blender	4%	6%	2%	8%	7%	7%	2%	9%	%	%	%	9%	5%	6%	2%	9%	9%	5%	4%	1%	%	5%	1%	%
-	74	77	53	55	21	21	99	10	24	25	27	29	38	43	80	52	89	11	11	11	88	93	52	56
Performance / Cost - Pabellon Barcelona - CPU-Only (sec x)	43	10	85	44	11	52	88	03	31	52	34	81	25	61	85	70	56	34	69	92	83	32	02	57
					2	7		7	7	2								4	4	4				
Normalize	36.5	35.4	50.9	49.2	12.6	12.5	27.5	26.3	11.1	10.5	100	93.0	71.2	62.3	34.0	51.7	30.7	24.2	23.5	22.8	30.7	29.1	51.7	48.1
Build2 - Time To Compil	3%	9%	5%	5%	6%	1%	7%	3%	%	9%	%	1%	7%	%	1%	8%	%	9%	1%	3%	5%	5%	%	5%
-	91.	72.	88.	70.	10	73.	73.	63.	74.	62.	88.	73.	68.	70.	64.	64.	63.	60.	98.	70.	69.	58.	66.	58.
Time To Compil	64	15	97	60	5.5	35	55	04	11	77	69	17	97	28	69	68	78	90	78	67	54	18	24	28
	1	1	7	8	98	3	9	8	8	6	5	1	6	7	3	2	6	9	0	6	2	5	8	4
Normalize	63.4	80.6	65.3	82.4	55.1	79.3	79.1	92.2	78.5	92.6	65.6	79.5	84.3	82.7	89.9	89.9	91.2	95.5	58.9	82.3	83.6	100	87.8	99.8
Standard Deviation	9%	4%	9%	1%	%	2%	%	9%	%	9%	%	2%	6%	8%	4%	6%	2%	3%	%	3%	7%	%	3%	3%
-	0.3	0.3	0.1	0.2	1.9	0.7	0.3	1%	0.3	0.2	0.5	1%	0.3	0.4	0.8	0.2	0.7	1.5	1%	0.5	0.2	0.4	0.2	0.6
Build2 - Performance / Cost - Time To Compil (sec x)	16	26	11	18	36	50	29	50	74	12	66	10	14	20	46	28	47	91	20	29	21	36	16	28
-	95	69	91	90	66	93	73	96	18	56	07	90	54	45	48	40	97	63	74	68	55	07	23	55
Performance / Cost - Time To Compil (sec x)	36	59	40	88	36	63	25	80	47	65	8	25	01	35	84	83	98	15	38	39	80	47	08	92
										0														
Normalize	38.9	24.7	55.4	34.9	18.0	12.9	22.2	12.9	8.91	5.26	100	60.6	45.4	32.3	14.2	23.2	13.7	7.21	31.8	22.2	30.6	18.3	40.7	23.1
Standard Deviation	8%	5%	6%	5%	2%	7%	2%	6%	%	%	%	1%	5%	1%	1%	6%	7%	%	5%	6%	5%	2%	1%	4%

Chaos	21	40	22	34	14	26	34	64	34	64	21	32	35	47	59	57	65	14	24	27	40	36	57	
Group	88	27	07	74	36	51	31	71	71	33	70	58	69	86	52	98	97	28	14	59	79	39	40	
V-RAY - CPU	6	0	4	9	0	6	6	4	0	1	0	0	0	6	9	3	6	4	4	8	0	6	4	
(Ksamples)																								
Normalize	33.1	61.0	33.4	52.6	21.7	40.1	52.0	98.0	52.6	97.5	32.8	49.3	54.1	72.5	90.2	87.8	100	21.6	36.6	41.8	61.8	55.1	87.0	
Standard	0.4	0.8	0.5	1.8	0.2	0.2	0.4	1.6	1.5	1.3	1.2	2.8	2.8	1.6	0.4	2.6	0.8	5%	1.8	0.7	2.1	1.4	0.6	
Deviation	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
Chaos	11.	10.	16.	12.	4.1	3.8	8.4	8.0	3.4	3.2	29.	21.	16.	16.	8.2	13.	8.7	6.8	5.7	8.9	6.5	14.	11.	
Group	83	88	48	97	36	19	90	05	68	14	12	86	93	44	84	20	71	02	49	03	79	85	71	
V-RAY - Performance / Cost - CPU (Ksamples/Dollar)	0	4	5	6						8		6	1	9		2							6	5
Normalize	40.6	37.3	56.6	44.5	14.2	13.1	29.1	27.4	11.9	11.0	100	75.0	58.1	56.4	28.4	45.3	30.1	23.3	19.7	30.5	22.5	51%	40.2	
Standard	1%	7%	%	5%	%	1%	5%	8%	1%	3%	%	7%	3%	7%	4%	2%	1%	5%	4%	7%	9%	2%	2%	
Deviation	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
Chaos	16	17	17	20	14	18	19	22	19	22	19	23	24	26	29	30	33	32	15	19	22	26	28	31
Group	0.5	7.8	0.0	3.1	9.9	4.9	9.3	3.1	9.0	1.3	4.2	8.7	0.3	1.1	6.0	2.3	6.0	2.3	2.0	3.9	2.2	3.7	7.4	4.8
Nature 4K	9	9	7	0	0	9	8	7	8	1	8	8	7	2	6	5	8	5	2	4	3	7	1	0
Normalize	47.7	52.9	50.6	60.4	44.6	55.0	59.3	66.4	59.2	65.8	57.8	71.0	71.5	77.7	88.0	89.9	100	95.9	45.2	57.7	66.1	78.4	85.5	93.6
Standard	0.8	0.8	1.2	1.4	0.3	1%	2.2	0.6	1%	2.9	0.1	0.9	0.3	0.4	0.8	0.4	0.9	0.5	0.3	0.4	0.3	0.8	0.6	0.3
Deviation	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Chaos	27	32	30	35	36	31	32	40	32	40	43	52	53	56	64	65	69	76	37	46	50	61	66	75
Group	4.9	1.8	7.7	8.6	9.4	0.8	5.1	2.9	3.2	9.8	1.0	4.7	3.1	6.8	9.4	8.0	1.0	7.9	3.2	7.4	1.2	8.8	0.5	2.0
(FPS)	8	4	5	2	8	4	0	7	0	8	0	8	2	5	5	9	2	2	8	4	1	7	4	2
Normalize	35.8	41.9	40.0	46.7	48.1	40.4	42.3	52.4	42.0	53.3	56.1	68.3	69.4	73.8	84.5	85.7	89.9	100	48.6	60.8	65.2	80.5	86.0	97.9
Standard	1.5	2.9	0.5	0.9	3%	0.3	0.5	3.7	0.3	3.5	0.1	1.2	1%	0.4	0.5	1.7	1.2	1%	0.2	0.6	0.2	0.4	0.6	0.7
Deviation	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	1%	7%	7%	9%	2%	3%

dav1d	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	
Perfor	87	48	27	76	43	27	49	28	20	11	61	60	14	90	41	69	45	21	72	46	72	43	17	64
mance /																								
Cost -																								
Summe																								
r																								
Nature																								
4K																								
(FPS/D																								
Normaliz	33.3	18.3	48.6	29.1	16.4	10.3	18.7	10.7	7.66	4.21	100	61.3	43.6	34.4	15.7	26.4	17.2	8.05	27.5	17.6	27.5	16.4	44.8	24.5
d	3%	9%	6%	2%	8%	4%	7%	3%	%	%	%	8%	8%	1%	4%	4%	%	9%	2%	9%	8%	3%	2%	
dav1d	0.1	0.0	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.5	0.3	0.2	0.1	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.1
Perfor	49	87	30	34	06	45	80	50	32	20	79	52	53	95	90	50	92	51	78	11	62	00	70	53
mance /																								
Cost -																								
S.N.1																								
(FPS/D																								
ollar)																								
Normaliz	25.7	15.0	39.7	23.1	18.3	7.77	13.8	8.64	5.53	3.45	100	60.7	43.7	33.6	15.5	25.9	15.8	8.81	30.7	19.1	27.9	17.2	46.6	26.4
d	3%	3%	2%	4%	1%	%	2%	%	%	%	%	9%	%	8%	4%	1%	9%	%	4%	7%	8%	7%	3%	2%
Embree	16.	29.	15.	28.	10.	19.	26.	44.	26.	45.	16.	27.	29.	37.	50.	47.	51.	82.	9.8	17.	19.	33.	26.	45.
-	05	51	99	96	17	12	29	74	28	61	26	72	21	46	32	67	40	80	37	26	30	69	78	86
Pathtra	14	53	43	02	18	59	54	34	00	21	17	21	85	07	13	65	95	86	6	52	25	03	24	03
cer -																								
Crown																								
(FPS)																								
Normaliz	19.3	35.6	19.3	34.9	12.2	23.1	31.7	54.0	31.7	55.0	19.6	33.4	35.2	45.2	60.7	57.5	62.0	100	11.8	20.8	23.3	40.6	32.3	55.3
d	8%	4%	1%	7%	8%	%	5%	3%	4%	8%	4%	8%	8%	4%	7%	7%	8%	%	8%	5%	1%	8%	4%	8%
Standard	0.2	0.3	0%	0.5	0.1	0.2	0.2	2.6	0.3	0.3	0.1	0.2	0.2	0.1	0%	0%	2%	1.6	0.1	0.1	0.2	0%	0.3	0.4
Deviation	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Embree	17.	33.	16.	31.	12.	23.	29.	54.	28.	53.	15.	26.	27.	35.	47.	45.	49.	77.	9.3	16.	18.	31.	25.	43.
-	66	44	80	73	18	20	79	80	77	23	54	18	74	62	88	37	71	46	65	28	37	87	66	32
Pathtra	04	69	99	18	34	54	52	77	30	04	11	42	50	04	62	03	96	35	6	48	74	60	14	93
cer																								
ISPC -																								
Crown																								
Normaliz	22.8	43.1	21.7	40.9	15.7	29.9	38.4	70.7	37.1	68.7	20.0	33.8	35.8	45.9	61.8	58.5	64.1	100	12.0	21.0	23.7	41.1	33.1	55.9
d	%	8%	%	6%	3%	6%	6%	5%	4%	2%	6%	%	2%	8%	2%	7%	8%	%	9%	2%	2%	5%	3%	4%
Standard	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	1%	0%	0.4	0.1	0.1	0.2	0.3	0.1	0.7	0.1	0.1	0.1	1.6
Deviation	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%

High	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Performance	07	07	10	10	03	03	04	04	01	01	12	12	13	10	05	07	02	02	06	06	06	06	05	07	07		
Conjugate Gradient Performance / Cost (GFLOP /s/Dollar)																											
Normalized	53.8	53.8	76.9	76.9	23.0	23.0	30.7	30.7	7.69	7.69	92.3	92.3	100	76.9	38.4	53.8	15.3	15.3	46.1	46.1	46.1	38.4	53.8	53.8			
Standard Deviation	5%	5%	2%	2%	8%	8%	7%	7%	%	%	1%	1%	%	2%	6%	5%	8%	8%	5%	5%	5%	6%	5%	5%			
Himeno Benchmark - P.P.S (MFLOPS)	33	34	34	34	38	39	35	35	35	35	36	35	37	36	37	37	38	38	42	42	43	43	42	41			
Standard Deviation	98	05	01	10	91	35	16	27	10	15	97	90	75	47	83	78	21	61	45	26	70	04	13	18			
Normalized	77.7	77.9	77.8	78.0	89.0	90.0	80.4	80.7	80.3	80.4	84.6	82.1	86.3	83.4	86.5	86.4	87.4	88.3	97.1	96.7	100	98.4	96.4	94.2			
Standard Deviation	6%	1%	3%	4%	3%	3%	5%	%	2%	2%	%	6%	8%	6%	7%	4%	3%	6%	3%	%	%	8%	%	3%			
Standard Deviation	0.1	0.3	0.1	0%	0.3	0.1	0.1	0%	0.2	0.3	2.2	1.5	0.5	1.9	0.8	1.8	1.7	2%	2.6	3.9	2.8	2.1	2.2	2.3			
Standard Deviation	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%			
Himeno Benchmark - Performance / Cost - P.P.S (MFLOPS/Dollar)	1.8	0.9	2.5	1.2	1.1	0.5	0.8	0.4	0.3	0.1	4.9	2.4	1.7	1.2	0.5	0.8	0.5	0.2	2.0	1.0	1.4	0.6	1.7	0.8			
Standard Deviation	37	20	40	73	21	67	70	36	51	76	63	10	91	53	26	60	08	57	21	06	10	94	20	40			
Normalized	37.0	18.5	51.1	25.6	22.5	11.4	17.5	8.79	7.07	3.55	100	48.5	36.0	25.2	10.6	17.3	10.2	5.18	40.7	20.2	28.4	13.9	34.6	16.9			
Standard Deviation	1%	4%	8%	5%	9%	2%	3%	%	%	%	6%	9%	5%	%	3%	4%	%	2%	7%	1%	8%	6%	3%				

Intel	18.	27.	22.	33.	15.	22.	31.	34.	31.	34.	10.	16.	15.	19.	24.	23.	26.	33.	7.3	13.	13.	22.	15.	26.
Open	41	97	01	06	71	70	63	95	10	49	26	84	98	80	84	97	88	05	3	07	51	51	91	33
Image Denois																								
e - Memori																								
al (Images / Sec)																								
Normalize	52.6	80.0	62.9	94.5	44.9	64.9	90.5	100	88.9	98.6	29.3	48.1	45.7	56.6	71.0	68.5	76.9	94.5	20.9	37.4	38.6	64.4	45.5	75.3
Standard	8%	3%	8%	9%	5%	5%	%	%	8%	8%	6%	8%	2%	5%	7%	8%	1%	6%	7%	%	6%	1%	2%	4%
Deviation	0.1	0.3	0.2	1.9	0.3	0.4	0.2	0.9	0.1	0.8	2.3	5.5	1.2	0.5	4.4	2.3	0.9	0.8	0.2	0.7	0.1	0.6	1.2	0.8
Intel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Open	10	08	16	12	05	03	08	04	03	02	14	11	08	07	03	05	04	02	03	03	04	04	06	05
Image Denois																								
e - Perform																								
ance / Cost -																								
Memori																								
al (Images /																								
Sec/Dollar)																								
Normalize	62.5	50%	100	75%	31.2	18.7	50%	25%	18.7	12.5	87.5	68.7	50%	43.7	18.7	31.2	25%	12.5	18.7	18.7	25%	25%	37.5	31.2
Standard	25	51	27	53	16	33	42	84	42	84	21	43	41	60	83	79	74	14	13	26	26	52	36	73
Deviation	54	32	12	48	75	26	95	24	86	08	63	11	88	14	73	27	94	51	17	31	34	52	83	09
John Ripper -	7	4	6	5	1	9	2	0	4	4	6	3	6	6	7	3	4	29	9	4	9	5	1	5
Blowfish (Real C/S)																								
Normalize	17.6	35.3	18.6	36.8	11.5	22.9	29.6	58.0	29.5	57.9	14.9	29.7	28.8	41.4	57.7	54.6	51.6	100	9.08	18.1	18.1	36.1	25.3	50.3
Standard	0.5	0%	0.4	0.4	0.4	0.3	0.2	0.8	0.4	1.4	0%	0.1	14.1	0.7	0.2	0.1	0%	0.8	0%	3%	6%	9%	8%	7%
Deviation	25	48	25	49	94	18	22	44	40	78	14	27	29	36	50	46	46	83	91	18	18	30	23	46
John Ripper -	00	00	00	66	14	00	00	00	00	00	00	00	66	00	00	66	00	33	30	33	00	33	00	33
MD5 (Real C/S)																								
Normalize	30.0	57.7	30.9	59.6	11.3	22.2	27.3	53.4	48.9	94.3	17.1	32.6	35.3	43.9	60.0	56.0	55.8	100	11%	21.7	21.7	36.9	28.6	55.1
Standard	0.5	0.3	0.7	0.6	0.2	0.3	0.3	0.3	0.6	1.5	1.5	0.1	0.3	0.3	0.3	0.3	0.1	2.2	0%	0.6	0.1	0.2	0.1	0.9
Deviation	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%

John	13.	13.	20.	19.	4.8	4.7	10.	10.	4.2	4.2	29.	28.	19.	20.	11.	18.	9.9	9.6	6.2	6.2	8.5	8.4	15.	14.
The Ripper - Performance / Cost - Blowfish (Real C/S/Dollar)	80	87	25	97	25	91	62	42	83	00	04	93	87	66	65	04	63	47	76	65	00	72	03	91
Normalized	47.5	47.7	69.7	68.7	16.6	16.5	36.5	35.8	14.7	14.4	100	99.6	68.4	71.1	40.1	62.1	34.3	33.2	21.6	21.5	29.2	29.1	51.7	51.3
John	5%	6%	5%	7%	1%	%	9%	8%	5%	6%	%	3%	2%	7%	2%	5%	1%	2%	1%	7%	7%	7%	6%	6%
The Ripper - Performance / Cost - MD5 (Real C/S/Dollar)	13	13	19	18	27	26	56	55	40	39	19	18	13	12	69	10	61	55	43	43	58	49	97	93
Normalized	55	03	29	59	2.5	7.1	4.5	1.5	8.6	3.6	17	28	98	60	7.3	65	9.9	4.9	7.4	1.7	6.4	8.1	4.6	9.8
John	85				37	72	83	32	46						28		15	28	43	46	52	18	94	64
Normalized	70.2	67.5	100	96.3	14.1	13.8	29.2	28.5	21.1	20.4	99.3	94.7	72.4	65.3	36.1	55.2	32.1	28.7	22.6	22.3	30.4	25.8	50.5	48.7
LAMMPS	2%	4%	%	5%	3%	5%	7%	9%	8%	1%	6%	7%	6%	4%	5%	1%	4%	7%	8%	8%	%	2%	3%	2%
Standard Deviation	9.5	17.	10.	18.	6.7	12.	15.	24.	15.	24.	6.4	6.2	8.2	6.7	6.3	4.6	6.3	2.9	5.5	8.3	8.5	8.5	9.5	7.1
Molecular Dynamics Simulation - Rhodopsin Protein (ns/day)	35	37	32	15	87	65	38	69	31	78	91	10	82	82	36	15	60	25	57	07	74	90	18	76
Normalized	38.4	70.1	41.6	73.2	27.3	51.0	62.0	99.6	61.7	100	26.1	25.0	33.4	27.3	25.5	18.6	25.6	11.8	22.4	33.5	34.5	34.6	38.4	28.9
Standard Deviation	7%	1%	5%	2%	8%	4%	5%	3%	8%	%	9%	5%	1%	6%	6%	2%	6%	%	2%	1%	9%	5%	%	5%
Standard Deviation	0.3	0.5	0.4	0.5	0%	0.8	3%	3.9	2.2	3.8	2.5	1.4	1.1	5.8	9.7	2.7	2.6	9%	2.4	1.8	4.9	2.2	2.9	3%
Standard Deviation	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%

LAMMP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
S	05	05	08	07	02	02	04	03	02	01	09	04	04	02	01	01	01	03	02	03	01	04	01	
Molecular Dynamics Simulator Performance / Cost - Rhodopsin Protein (ns/day/Dollar)																								
Normalized	55.5	55.5	88.8	77.7	22.2	22.2	44.4	33.3	22.2	11.1	100	44.4	44.4	22.2	11.1	11.1	11.1	33.3	22.2	33.3	11.1	44.4	11.1	
Standard Deviation	6%	6%	9%	8%	2%	2%	4%	3%	2%	1%	%	4%	4%	2%	1%	1%	1%	3%	2%	3%	1%	4%	1%	
LuxCor	2.3	4.4	2.3	4.5	1.5	2.9	3.7	7.3	3.7	7.1	2.5	4.7	5.0	6.0	8.3	7.8	7.7	14.	1.6	3.1	3.2	5.9	4.1	7.9
eRender	2	4	5	18	5	6	8	0	9	9	0	09	3	4	5	3	7	98	8	9	1	7	9	6
r - DLSC (M sample)																								
Normalized	15.4	29.6	15.6	30.1	10.3	19.7	25.2	48.7	25.3	48%	16.6	31.4	33.5	40.3	55.7	52.2	51.8	100	11.2	21.3	21.4	39.8	27.9	53.1
Standard Deviation	9%	4%	9%	6%	5%	6%	3%	3%	%		9%	4%	8%	2%	4%	7%	7%	%	1%	%	3%	5%	7%	4%
LuxCor	1.8	0.5	1.1	0.1	0.7	1.3	0.3	0.4	0.1	2.3	1.3	1.2	0.6	1.5	0.6	1.1	0.8	0.6	1.7	2.3	1.7	2.4	0.2	2.1
Deviation	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
LuxCor	2.4	4.4	2.5	4.3	1.6	2.9	4.0	7.7	4.1	7.1	2.6	5.0	5.3	6.7	9.3	8.6	8.5	16.	1.8	3.4	3.5	6.6	4.6	8.7
eRender	8	6	1	2	5	7	9	8	1	5	7	3	8	8	2	9	9	63	1	8	0	7	2	7
r - R.C.a.P (M sample s/sec)																								
Normalized	14.9	26.8	15.0	25.9	9.92	17.8	24.5	46.7	24.7	42.9	16.0	30.2	32.3	40.7	56.0	52.2	51.6	100	10.8	20.9	21.0	40.1	27.7	52.7
Standard Deviation	1%	2%	9%	8%	%	6%	9%	8%	1%	9%	6%	5%	5%	7%	4%	5%	5%	%	8%	3%	5%	1%	8%	4%
LuxCor	1.1	23.1	0.9	11.9	0.4	6.4	3.8	2.8	1.7	21.6	1.1	2.7	2.9	0.5	1.3	1.2	1.3	1%	0.4	0.8	0.1	0.8	0.5	2.1
Deviation	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%

	Xeon Cascade Lake Refresh				Xeon Cascade Lake Refresh				AMD EPYC Rome				AMD EPYC Rome					
LuxCor	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
eRende	01	01	02	02	01	01	02	02	01	02	01	02	01	01	01	01	01	01
r - Perfor mance / Cost - DLSC (M sample s/sec/D ollar)																		
Normalize	33.3	33.3	66.6	66.6	33.3	33.3	66.6	66.6	33.3	66.6	33.3	66.6	33.3	33.3	33.3	33.3	33.3	66.6
d	3%	3%	7%	7%	3%	3%	7%	7%	3%	7%	3%	7%	3%	3%	3%	3%	3%	7%
LuxCor	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
eRende	01	01	02	02	01	01	03	03	01	02	01	02	01	01	01	01	01	01
r - Perfor mance / Cost - R.C.a.P (M sample s/sec/D ollar)																		
Normalize	25%	25%	50%	50%	25%	25%	50%	50%	100	75%	75%	50%	25%	25%	25%	25%	25%	50%
d	4%	4%	8%	8%	4%	4%	8%	8%	100	75%	75%	50%	25%	25%	25%	25%	25%	50%
MKL-D	4.4	2.2	4.4	2.1	5.5	2.9	2.4	1.6	2.3	1.6	4.5	2.8	2.4	2.5	2.2	2.6	1.8	2.0
NN	99	30	13	89	03	38	88	46	94	39	47	72	77	26	73	45	91	43
DNNL - IP Batch 1D - f32 (ms)	85	09	66	75	09	92	06	10	51	86	45	26	18	51	57	94	00	49
Normalize	36.4	73.5	37.1	74.8	29.8	55.8	65.9	99.6	68.4	100	36.0	57.0	66.2	64.9	72.1	61.9	86.7	80.2
d	4%	3%	5%	9%	1%	1%	2%	8%	1%	6%	9%	1%	3%	8%	2%	5%	9%	2%
Standard	0.4	3.8	0.3	1%	1.7	14.5	0.9	2.9	0.8	3.4	0.4	2.1	0.3	1.2	3.5	2.2	0.5	1%
Deviation	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
MKL-D	60	31	58	29	10	50	40	20	37	18	56	28	27	21	15	16	16	84
NN	73	12	64	87	09	74	90	78	17	94	47	70	43	28	33	21	52	0.5
DNNL - D.B.d - u8s8f32 (ms)					0													0.5
Normalize	13.8	27.0	14.3	28.1	8.33	16.5	20.5	40.4	22.6	44.3	14.8	29.2	30.6	39.5	54.8	51.8	50.8	100
d	4%	1%	3%	4%	%	6%	5%	6%	1%	8%	8%	9%	5%	%	4%	4%	8%	%
Standard	0.2	0.2	0.1	0.1	0.1	0%	0.1	0%	0.1	0.5	0%	0.7	0.1	0%	0.2	0.1	0.1	0.2
Deviation	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%

MKL-D	83	82	59	58	19	20	10	13	23	32	33	42	52	73	16	11	14	30	10	14	95	12	58	10
NN	25	51	10	64	10	40	05	30	96	82	88	80	22	52	33	62	22	74	90	07	52	95	79	78
DNNL -					7	8	7	7	7	7					8	1	4	2	2	9		0		0
Perfor																								
mance /																								
Cost -																								
IP																								
Batch																								
1D - f32																								
(ms x																								
Dollar)																								
Normalize	40.7	41.0	57.3	57.7	17.7	16.6	33.6	25.4	14.1	10.3	100	79.1	64.8	46.0	20.7	29.1	23.8	11.0	31.0	24.0	35.4	26.1	57.6	31.4
d	%	6%	3%	7%	3%	%	0%	6%	4%	2%	%	6%	8%	8%	4%	5%	2%	2%	8%	6%	7%	6%	3%	3%
MKL-D	11	11	78	79	35	35	16	16	37	37	42	42	57	61	11	71	12	12	19	19	14	14	82	82
NN	23	51	52	99	03	23	53	79	20	90	06	75	81	92	01	21	42	64	48	49	37	44	01	87
DNNL -	42	57	24	40	10	60	25	50	32	84	96	61	27	65	45	45	51	45	90	39	00	42	08	17
Perfor	55	32	4	0	91	09	88	76	53	87	3	5	4	5	57	2	40	57	50	22	50	64	1	4
mance /																								
Cost -																								
D.B.d -																								
u8s8f32																								
(ms x																								
Dollar)																								
Normalize	37.4	36.5	53.5	52.5	12.0	11.9	25.4	25.0	11.3	11.1	100	98.3	72.7	67.9	38.1	59.0	33.8	33.2	21.5	21.5	29.2	29.1	51.3	50.7
d	5%	3%	8%	9%	1%	4%	5%	5%	1%	%	%	9%	7%	3%	9%	7%	6%	7%	9%	8%	8%	3%	%	6%
Mlpack	68.	77.	61.	74.	50.	55.	67.	63.	67.	63.	63.	77.	76.	70.	65.	64.	57.	55.	53.	60.	53.	67.	61.	61.
Bench	19	41	82	63	09	54	36	38	36	35	62	86	04	28	60	27	69	18	13	75	26	48	93	54
mark -																								
scikit_i																								
ca (sec)																								
Normalize	73.4	64.7	81.0	67.1	100	90.1	74.3	79.0	74.3	79.0	78.7	64.3	65.8	71.2	76.3	77.9	86.8	90.7	94.2	82.4	94.0	74.2	80.8	81.3
d	6%	1%	3%	2%	%	9%	6%	3%	6%	7%	3%	3%	7%	7%	6%	4%	3%	8%	8%	5%	5%	3%	8%	9%
Standard	0.6	2.8	1.3	0.7	1%	2.5	0.3	0.4	0.5	1.6	2.6	2.4	0.2	0.3	0.8	1.2	0.7	1.2	2%	2.3	1.6	1.4	2%	1.8
Deviation	%	%	%	%		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Mlpack	17.	17.	17.	17.	15.	15.	17.	17.	17.	17.	15.	15.	15.	16.	17.	16.	14.	15.	12.	13.	12.	12.	13.	13.
Bench	82	92	92	77	72	47	11	33	19	19	42	52	83	50	23	39	58	95	94	10	86	99	54	70
mark -																								
scikit_s																								
vm																								
Normalize	72.1	71.7	71.7	72.3	81.8	83.1	75.1	74.2	74.8	74.8	83.4	82.8	81.2	77.9	74.6	78.4	88.2	80.6	99.3	98.1	100	99%	94.9	93.8
d	7%	6%	6%	7%	1%	3%	6%	1%	1%	1%	%	6%	4%	4%	4%	6%	%	3%	8%	7%	%	%	8%	7%
Standard	0.9	0.4	0%	1.3	0.5	0.7	0.4	1.1	0.7	0.9	0.1	0.3	5.9	7.5	2%	7.4	0.6	8.1	0.1	1%	0.5	0.7	0.9	0.5
Deviation	%	%		%	%	%	%	%	%	%	%	%	%	%		%	%	%	%	%	%	%	%	%

Mlpack	2.2	2.3	1.9	2.0	2.0	1.7	1.6	1.7	1.6	1.8	2.1	2.0	2.1	2.2	1.9	1.9	1.6	1.7	2.2	1.9	1.7	1.9	1.6	1.8
Benchmark	5	9	3	8	7	4	6	8	7	2	5	7	5	9	5	7	6	6	5	9	8	5	9	4
mark - scikit_learn																								
nearridge regression																								
Normalized	73.7	69.4	86.0	79.8	80.1	95.4	100	93.2	99.4	91.2	77.2	80.1	77.2	72.4	85.1	84.2	100	94.3	73.7	83.4	93.2	85.1	98.2	90.2
Standard Deviation	8%	6%	1%	1%	9%	%	%	6%	%	1%	1%	9%	1%	9%	3%	6%	%	2%	8%	2%	6%	3%	2%	2%
Mlpack	12	28	82	19	17	38	27	51	67	12	47	11	16	20	47	28	43	83	11	25	16	41	15	30
Benchmark	61	64	77	98	39	56	22	23	42	68	39	60	02	45	14	22	39	01	15	51	51	83	17	15
mark - Performance / Cost - scikit_learn	52	17	7	59	12	70	69	64	06	14	7	11	92	15	02	74	44	28	73	50	06	76	29	46
Normalized	37.5	16.5	57.2	23.7	27.2	12.2	17.4	9.25	7.03	3.74	100	40.8	29.5	23.1	10.0	16.7	10.9	5.71	42.4	18.5	28.7	11.3	31.2	15.7
Mlpack	32	66	23	47	54	10	69	14	17	34	11	23	33	48	12	71	10	23	27	55	39	80	33	67
Benchmark	96	30	99	58	58	74	15	00	20	41	48	12	37	01	38	98	96	99	17	02	86	53	17	13
mark - Performance / Cost - scikit_svm	7	4	5	8	0	24	9	96	55	09	8	5	0	5	15	5	71	52	4	0	6	8	3	0
Normalized	34.8	17.3	47.8	24.1	21.0	10.6	16.6	8.2	6.68	3.34	100	49.6	34.4	23.9	9.28	15.9	10.4	4.79	42.2	20.8	28.8	14.2	34.6	17.1
Standard Deviation	5%	3%	8%	4%	5%	9%	1%	%	%	%	%	8%	3%	3%	%	6%	7%	%	8%	8%	2%	6%	3%	1%

Mlpack	41	88	25	55	71	12	67	14	16	36	16	30	45	66	14	86	12	26	47	83	55	12	41	90
Bench	63	43	84	70	87	08	10	39	71	43	02	84	32	64	01	52	48	47	25	58	18	09	41	16
mark -						3		0	5	3					3		7	7				0		
Perfor																								
mance /																								
Cost -																								
scikit_li																								
nearrid																								
geregre																								
ssion																								
(sec x																								
Normalize	38.4	18.1	61.9	28.7	22.2	13.2	23.8	11.1	9.58	4.4	100	51.9	35.3	24.0	11.4	18.5	12.8	6.05	33.9	19.1	29.0	13.2	38.6	17.7
rd	8%	1%	8%	6%	9%	6%	7%	3%	%	%	%	3%	4%	4%	3%	1%	3%	%	%	6%	3%	5%	8%	7%
NAMD -	1.1	0.6	1.1	0.5	1.7	0.8	0.7	0.3	0.7	0.3	1.3	0.7	0.6	0.5	0.3	0.4	0.4	0.2	2.0	1.0	1.0	0.5	0.8	0.4
ATPase	57	03	35	82	58	89	03	60	07	62	67	23	60	40	98	27	27	70	95	59	61	43	02	16
Simulat	45	33	86	37	81	58	81	38	09	26	50	39	24	38	93	81	85	09	28	82	77	79	53	25
ion -																								
327,506																								
Atoms																								
(days/n																								
s)																								
Normalize	23.3	44.7	23.7	46.3	15.3	30.3	38.3	74.9	38.2	74.5	19.7	37.3	40.9	49.9	67.7	63.1	63.1	100	12.8	25.4	25.4	49.6	33.6	64.8
rd	3%	7%	8%	8%	6%	6%	8%	5%	%	6%	5%	4%	1%	8%	%	3%	3%	%	9%	8%	4%	7%	5%	9%
Standard	0.2	1.8	0.2	0.3	0.2	0.4	0.1	0.2	0.1	0.6	0.1	0.1	0%	0.2	0.2	0.1	0.4	0.9	0.1	0.1	0.1	0.1	0.1	0.2
Deviation	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
NAMD -	21	22	15	15	61	61	28	29	70	72	10	10	13	15	28	18	32	40	44	44	32	33	19	20
Perfor	41	32	21	60	07	77	45	13	77	52	19	78	92	73	67	79	18	63	00	51	91	71	66	40
mance /																								
Cost -																								
ATPase																								
Simulat																								
ion -																								
327,506																								
Atoms																								
(days/n																								
s x																								
Normalize	47.5	45.6	66.9	65.3	16.6	16.4	35.8	34.9	14.4	14.0	100	94.5	73.2	64.7	35.5	54.2	31.6	25.0	23.1	22.8	30.9	30.2	51.8	49.9
rd	8%	4%	9%	2%	8%	9%	1%	7%	%	5%	%	2%	%	9%	4%	2%	6%	7%	5%	9%	5%	2%	2%	5%
Nettle -	61	61	61	61	71	71	63	63	63	63	45	45	46	44	46	47	47	47	54	55	54	55	52	52
aes256	34	59	61	57	00	11	06	22	13	20	16	17	57	46	53	24	99	96	98	00	99	06	15	21
(Mbyte/																								
s)																								
Normalize	86.2	86.6	86.6	86.5	99.8	100	88.6	88.9	88.7	88.8	63.5	63.5	65.5	62.5	65.4	66.4	67.4	67.4	77.3	77.3	77.3	77.4	73.3	73.4
rd	6%	1%	4%	9%	5%	%	7%	1%	8%	7%	%	2%	%	2%	3%	4%	8%	4%	2%	4%	4%	2%	3%	2%
Standard	0.1	0.1	0.2	0.2	0.1	0%	0.1	0.1	0.2	0.1	0.1	0.1	0%	0%	0.1	0.1	0.1	0.1	0%	0.1	0.1	0%	0%	0.1
Deviation	%	%	%	%	%		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%

Nettle	48	48	48	48	56	56	49	50	50	50	46	46	47	45	47	48	49	49	56	56	56	56	53	53
sha512	5.8	9.1	8.8	9.4	3.8	4.5	8.9	0.7	1.9	0.9	2.5	2.5	6.8	5.3	6.6	3.8	1.5	1.4	3.4	3.5	3.3	3.0	4.1	4.8
(Mbyte/s)	6	5	1	2	2	4	9	5	8	8	5	3	0	6	5	5	4	7	5	9	9	7	8	6
Normalize	86.0	86.6	86.5	86.6	99.8	100	88.3	88.7	88.9	88.7	81.9	81.9	84.4	80.6	84.4	85.7	87.0	87.0	99.8	99.8	99.8	99.7	94.6	94.7
Standard	6%	5%	9%	9%	7%	%	9%	%	2%	4%	3%	3%	6%	6%	3%	1%	7%	6%	1%	3%	%	4%	2%	4%
Deviation	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Nettle	3.3	1.6	4.6	2.2	2.0	1.0	1.5	0.7	0.6	0.3	6.0	3.0	2.2	1.5	0.6	1.0	0.6	0.3	2.6	1.3	1.7	0.8	2.1	1.0
Performance / Cost - aes256 (Mbyte/s/Dollar)	16	65	02	99	45	24	60	82	31	16	61	32	09	28	47	76	38	19	18	09	74	88	28	65
Normalize	54.7	27.4	75.9	37.9	33.7	16.8	25.7	12.9	10.4	5.21	100	50.0	36.4	25.2	10.6	17.7	10.5	5.26	43.1	21.6	29.2	14.6	35.1	17.5
Standard	1%	7%	3%	3%	4%	9%	4%	%	1%	%	%	2%	5%	1%	7%	5%	3%	%	9%	%	7%	5%	1%	7%
Nettle	0.2	0.1	0.3	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.6	0.3	0.2	0.1	0.0	0.1	0.0	0.0	0.2	0.1	0.1	0.0	0.2	0.1
Performance / Cost - sha512 (Mbyte/s/Dollar)	63	32	65	83	62	81	23	62	50	25	21	10	26	56	66	10	65	33	68	34	82	91	18	09
Normalize	42.3	21.2	58.7	29.4	26.0	13.0	19.8	9.98	8.05	4.03	100	49.9	36.3	25.1	10.6	17.7	10.4	5.31	43.1	21.5	29.3	14.6	35.1	17.5
Standard	5%	6%	8%	7%	9%	4%	1%	%	%	%	%	2%	9%	2%	3%	1%	7%	%	6%	8%	1%	5%	%	5%
Numpy	31	30	31	30	36	36	33	32	33	32	31	30	31	29	30	31	31	32	36	37	36	36	34	34
Benchmark (Score)	3.7	0.7	8.8	4.1	7.4	0.0	7.4	5.6	0.3	1.8	2.0	9.5	7.9	6.1	7.6	0.5	7.3	3.7	8.0	0.1	6.1	4.8	8.7	7.1
Normalize	84.7	81.2	86.1	82.1	99.2	97.2	91.1	87.9	89.2	86.9	84.3	83.6	85.9	80.0	83.1	83.9	85.7	87.4	99.4	100	98.9	98.5	94.2	93.7
Standard	7%	5%	5%	7%	7%	6%	7%	9%	4%	5%	1%	3%	1%	1%	3%	%	5%	5%	4%	%	2%	7%	1%	8%
Deviation	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Numpy	0.1	0.0	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.4	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0
Benchmark - Performance / Cost (Score/Dollar)	70	81	38	14	06	52	83	40	33	16	19	08	51	02	43	71	42	22	75	88	18	59	42	71
Normalize	40.5	19.3	56.8	27.2	25.3	12.4	19.8	9.55	7.88	3.82	100	49.6	36.0	24.3	10.2	16.9	10.0	5.25	41.7	21%	28.1	14.0	33.8	16.9
Standard	7%	3%	%	1%	%	1%	1%	%	%	%	%	4%	4%	4%	6%	5%	2%	%	7%		6%	8%	9%	5%

OpenV	14	26	31	46	18	29	30	36	41	52	51	11	20	21	35	29	43
KL -	5.9	5.8	2.8	7.0	1.8	8.5	7.5	1.3	6.5	3.1	3.1	4.6	6.4	9.2	0.4	1.9	3.2
vkIBen	3	1	0	4	1	9	3	1	2	5	0	7	8	2	9	6	8
chmark																	
(Items / Sec)																	
Normalize	27.8	50.8	59.7	89.2	34.7	57.0	58.7	69.0	79.6	100	98.0	21.9	39.4	41.9	67%	55.8	82.8
Standard	9%	1%	9%	7%	5%	8%	8%	6%	2%	%	8%	2%	7%	%	1%	2%	
Deviation	0.6	1.1	0.9	2.8	0.2	0.3	3%	2.9	2.8	2.8	2.8	0.3	1.4	0.2	2.8	0.7	2.2
OpenV	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
KL -	19	25	24	26	13	14	15	15	16	19	19	12	15	16	18	18	19
vkIBen	66	44	85	51	29	83	45	22	89	77	61	05	55	59	88	02	40
chmark	58	67	67	72	43	88	26	56	43	29	81	85	73	67	50	88	33
VdbVolume	46	38	94	46	76	84	98	42	67	08	79	76	56	19	95	69	59
(Items / Sec)																	
Normalize	74.1	95.9	93.7	100	50.1	55.9	58.2	57.4	63.7	74.5	73.9	45.4	58.6	62.5	71.2	67.9	73.1
Standard	6%	6%	4%	%	3%	6%	7%	2%	1%	7%	8%	7%	7%	9%	2%	9%	7%
Deviation	0.3	2.6	0.1	0.7	0.1	0.2	0.3	0.1	0.3	0.3	0.4	0.2	0.9	0.1	0.3	0.1	1.2
OpenV	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
KL -	51	67	70	78	58	69	72	70	76	93	95	49	68	74	87	79	87
vkIBen	91	92	25	70	56	13	35	98	86	66	56	99	04	03	47	98	23
chmark	97	25	80	02	63	15	19	30	18	58	40	92	69	12	45	35	62
StructuredVolume	33	27	26	43	03	11	25	17	98	86	73	51	51	23	37	07	05
(Items / Sec)																	
Normalize	54.3	71.0	73.5	82.3	61.2	72.3	75.7	74.2	80.4	98.0	100	52.3	71.2	77.4	91.5	83.7	91.2
Standard	3%	8%	2%	5%	8%	4%	1%	8%	3%	1%	%	2%	1%	7%	3%	%	9%
Deviation	0.4	2.9	0.1	4.2	0.9	1.5	0.8	0.8	0.6	1.7	2.4	0.7	1.3	0.2	1.2	0.3	2.7
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%

OpenV	0.0	0.0	0.0	0.0	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
KL -	42	38	77	58	44	00	46	24	95	70	34	55	49	71	57	19	88
Perfor																	
mance /																	
Cost -																	
vkIBen																	
chmark																	
(Items /																	
Sec/Dol																	
lar)																	
Normalize	17.2	15.5	31.5	23.7	100	81.9	59.8	50.8	38.9	28.6	13.9	22.5	20.0	29.1	23.3	48.7	36.0
d	1%	7%	6%	7%	%	7%	4%	2%	3%	9%	3%	4%	8%	%	6%	7%	7%
OpenV	56	36	61	32	17	99	73	52	38	26	13	57	37	53	30	73	39
KL -	64	65	50	80	84	59	31	32	47	29	04	42	04	54	46	59	60
Perfor					5												
mance /																	
Cost -																	
vkIBen																	
chmark																	
VdbVol																	
ume																	
(Items /																	
Sec/Dol																	
lar)																	
Normalize	31.7	20.5	34.4	18.3	100	55.8	41.0	29.3	21.5	14.7	7.31	32.1	20.7	30%	17.0	41.2	22.1
d	4%	4%	6%	8%	%	1%	8%	2%	6%	3%	%	8%	6%		7%	4%	9%

OpenV	14	97	17	97	78	46	34	24	17	12	63	23	16	23	14	32	17								
KL -	95	81	38	35	61	39	32	39	50	45	52	80	20	88	10	64	80								
Perfor	4		2		2	7	3	3	0	2		9	2	1	9	6	3								
mance /																									
Cost -																									
vkIBen																									
chmark																									
Structu																									
redVolu																									
me																									
(Items /																									
Sec/Dol																									
Normaliz		19.0	12.4	22.1	12.3		100	59.0	43.6	31.0		22.2	15.8	8.08	30.2	20.6	30.3	17.9	41.5	22.6					
OSPray	23.	43.	22.	42.	16.	31.	40	71.	38.	69.	19.	33.	35.	42.	58.	55.	62.	90.	12.	21.	24.	41.	33.	54.	
- San	26	48	69	27	67	25		43	46	52	61	33	30	87	82	56	5	91	5	69	39	67	33	82	
Miguel -																									
SciVis																									
(FPS)																									
Normaliz	25.5	47.8	24.9	46.5	18.3	34.3	44%	78.5	42.3	76.4	21.5	36.6	38.8	47.1	64.7	61.1	68.7	100	13.7	23.8	26.8	45.8	36.6	60.3	
Standard	9%	3%	6%	%	4%	7%		7%	1%	7%	7%	6%	3%	6%	%	2%	5%	%	5%	6%	3%	4%	6%	%	
Deviation	0%	0%	0.6	2.5	0%	0%		0%	0%	3.5	0%	0%	2%	2.4	0%	0%	0%	0%	0%	0.7	0%	0%	0%	2.7	
OSPray	2.1	3.9	2.0	3.7	1.4	2.6	3.6	6.7	3.5	6.5	1.5	2.6	2.8	3.6	5.0	4.7	5.2	8.6	0.9	1.6	1.8	3.2	2.6	4.5	
- San	4	5	2	1	3	5	3	1	2	3	9	8	3	9	2	3	5	7	5	5	7	6	4	2	
Miguel -																									
Path																									
Tracer																									
(FPS)																									
Normaliz	24.6	45.5	23.3	42.7	16.4	30.5	41.8	77.3	40.6	75.3	18.3	30.9	32.6	42.5	57.9	54.5	60.5	100	10.9	19.0	21.5	37.6	30.4	52.1	
Standard	8%	6%	%	9%	9%	7%	7%	9%	%	2%	4%	1%	4%	6%	%	6%	5%	%	6%	3%	7%	%	5%	3%	
Deviation	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0%	0.2	0.3	0.1	0.1	0.1	0.1	0.3	0.2	0.3	0.5	0.1	0.1	0.1	0.2	0.2	0.3	
OSPray	28.	55.	29.	55.	21.	41.	52.	90.	50	90.	27.	45.	47.	56.	76.	76.	83.	12	17.	28.	33.	55.	45.	71.	
- NASA	57	56	41	56	28	43	63	91		91	78	45	44	37	92	92	33	5	24	57	33	56	45	43	
Streaml																									
ines -																									
SciVis																									
(FPS)																									
Normaliz	22.8	44.4	23.5	44.4	17.0	33.1	42.1	72.7	40%	72.7	22.2	36.3	37.9	45.1	61.5	61.5	66.6	100	13.7	22.8	26.6	44.4	36.3	57.1	
Standard	6%	5%	3%	5%	2%	4%	%	3%		3%	2%	6%	5%	%	4%	4%	6%	%	9%	6%	6%	5%	6%	4%	
Deviation	0%	0%	0%	0%	0%	1.5	0%	0%		0%	0%	0%	1.3	2.9	0%	0%	0%		0%	0%	0%	0%	0%	0%	

PHPBe	34	17	47	23	21	10	15	80.	64.	32.	66	33	24	16	71.	11	70.	35.	28	14	19	97.	23	11	
nch -	0.3	0.6	2.3	6.2	0.2	5.4	9.2	13	85	45	1.7	2.8	2.2	6.7	77	7.6	08	04	6.8	5.1	5.0	89	3.5	4.4	
Perfor	73	17	16	21	01	08	62	8	8	5	29	28	20	50	3	92	4	4	23	60	41	8	24	88	
mance /																									
Cost -																									
P.B.S																									
(Score/																									
Dollar)																									
Normaliz	51.4	25.7	71.3	35.7	31.7	15.9	24.0	12.1	9.8	4.9	100	50.3	36.6	25.2	10.8	17.7	10.5	5.3	43.3	21.9	29.4	14.7	35.2	17.3	
d	4%	8%	8%	%	7%	3%	7%	1%	%	%	%	%	%	%	5%	9%	9%	%	4%	4%	7%	9%	9%	%	
Postgre	38	59	37	58	24	37	58	90	56	90	34	52	49	58	85	89	98	97	19	30	34	47	51	70	
SQL	31	87	68	78	04	54	09	67	08	99	35	97	35	52	52	23	93	32	72	99	86	43	51	44	
pgbenc	21	99	60	82	85	15	53	71	88	16	44	14	78	93	10	52	33	59	76	97	16	56	61	51	
h -																									
Buffer																									
Test -																									
Normal																									
Load -																									
Read																									
Only																									
(TPS)																									
Normaliz	38.7	60.5	38.0	59.4	24.3	37.9	58.7	91.6	56.6	91.9	34.7	53.5	49.8	59.1	86.4	90.2	100	98.3	19.9	31.3	35.2	47.9	52.0	71.2	
d	3%	3%	9%	2%	1%	5%	2%	5%	9%	7%	2%	4%	9%	6%	4%	%	%	8%	4%	3%	4%	5%	7%	%	
Standard	0.2	0.6	0.2	0.1	0.4	2%	0.1	0.6	0.5	2%	0.4	0.3	1.1	0.3	2.2	0.2	0.7	1.2	0.3	0.1	0.2	0.2	0.2	0.1	
Deviation	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%

PostgreSQL	20	16	28	21	69.	54.	14	11	56.	45.	46	35	23	20	11	20	13	64.	93.	73.	11	76.	21	14
SQL	7.0	1.8	1.4	9.5	26	06	3.7	2.1	03	45	1.1	5.5	4.1	1.1	9.0	3.1	1.5	69	94	80	2.4	50	0.2	3.7
pgbench	92	37	49	23	4	3	29	69	8	5	34	13	45	32	11	77	25	4	1	9	57	9	70	65
h -																								
Performance /																								
Cost -																								
Buffer																								
Test -																								
Normal																								
Load -																								
Read																								
Only																								
(TPS/Dollar)																								
Normalize	44.9	35.1	61.0	47.6	15.0	11.7	31.1	24.3	12.1	9.86	100	77.1	50.7	43.6	25.8	44.0	28.5	14.0	20.3	16.0	24.3	16.5	45.6	31.1
Std	1%	%	3%	1%	2%	2%	7%	2%	5%	%	%	%	8%	2%	1%	6%	2%	3%	7%	1%	9%	9%	%	8%
PyBench	11	11	11	11	95	95	10	10	10	10	12	12	11	12	11	11	11	11	99	99	98	99	10	10
h -	14	00	03	04	5	6	76	73	76	73	03	27	67	30	70	55	35	53	4	4	7	7	65	45
T.F.A.T.																								
T																								
(Millisecons)																								
Normalize	85.7	86.8	86.5	86.5	100	99.9	88.7	89%	88.7	89%	79.3	77.8	81.8	77.6	81.6	82.6	84.1	82.8	96.0	96.0	96.7	95.7	89.6	91.3
Std	3%	2%	8%	%	%	%	5%		5%		8%	3%	3%	4%	2%	8%	4%	3%	8%	8%	6%	9%	7%	9%
Standard	1.9	0.2	0.5	0.1	0.2		0.2	0.3	0.2	0.2	0.2	0.5	0.3	0.4			0.2	1.2	0.4	0.9	0.3	0.6	0.2	1.1
Deviation	%	%	%	%	%		%	%	%	%	%	%	%	%			%	%	%	%	%	%	%	%
PyBench	20	40	14	29	33	66	43	86	10	21	89	18	24	35	84	50	85	17	20	41	30	61	26	51
h -	60	70	76	56	15	38	49	74	76	47	62	28	60	79	07	72	37	34	87	74	59	81	09	20
Performance /	90	00	91	51	76	46	19	13	96	93	35	23	03	30	62	76	47	57	40	80	70	40	25	50
Cost -	0	0	7	2	0	4	2	2	84	14		0	6	0	0	0	0	32	0	0	0	0	0	0
T.F.A.T.																								
T																								
(Millisecons x Dollar)																								
Normalize	43.4	22.0	60.6	30.3	27.0	13.5	20.6	10.3	8.32	4.17	100	49.0	36.4	25.0	10.6	17.6	10.5	5.17	42.9	21.4	29.2	14.5	34.3	17.5
Std	9%	2%	8%	1%	3%	%	1%	3%	%	%	%	2%	3%	4%	6%	7%	%	%	4%	7%	9%	%	5%	%
PyPerf	11	11	11	11	96.	96.	10	10	10	10	14	14	13	14	13	13	13	13	11	11	11	11	12	12
rmance	4	3	5	3	6	5	9	9	9	9	3	5	9	6	9	7	5	5	9	9	8	9	5	5
- float																								
(Millisecons)																								
Normalize	84.6	85.4	83.9	85.4	99.9	100	88.5	88.5	88.5	88.5	67.4	66.5	69.4	66.1	69.4	70.4	71.4	71.4	81.0	81.0	81.7	81.0	77.2	77.2
Std	5%	%	1%	%	%	%	3%	3%	3%	3%	8%	5%	2%	%	2%	4%	8%	8%	9%	9%	8%	9%	%	%
Standard		0.5			0%	0.2					0.4													
Deviation	%				%					%														

PyPerfomance	16	16	16	16	14	14	16	16	16	16	21	21	20	21	20	19	20	17	17	17	17	18	18		
Standard Deviation	8	7	8	7	5	5	4	3	4	4	3	6	8	6	0	4	9	4	6	7	3	5	5	4	
regex_compile (Milliseconds)																									
Normalized	86.3	86.8	86.3	86.8	100	100	88.4	88.9	88.4	88.4	68.0	67.1	69.7	67.1	69.0	71.0	72.8	71.0	82.3	81.9	83.8	82.8	78.3	78.8	
Standard Deviation	1%	3%	1%	3%	%	%	1%	6%	1%	1%	8%	3%	1%	3%	5%	8%	6%	8%	9%	2%	2%	6%	8%	%	
PyPerfomance	21	41	15	30	33	67	44	88	10	21	10	21	29	42	99	60	10	20	24	49	36	73	30	61	
Standard Deviation	09	81	39	26	53	00	05	11	90	81	65	60	30	48	88	17	15	30	99	98	58	78	62	25	
Performance / Cost - float (Milliseconds x Dollar)	-	00	00	85	14	95	96	78	56	98	96	35	50	12	60	54	04	47	94	00	00	00	50	00	
Performance / Cost - regex_compile (Milliseconds x Dollar)																									
Normalized	50.5	25.4	69.1	35.2	31.7	15.9	24.1	12.0	9.77	4.88	100	49.3	36.3	25.0	10.6	17.7	10.4	5.25	42.6	21.3	29.1	14.4	34.7	17.3	
Standard Deviation	1%	8%	9%	%	6%	%	8%	9%	%	%	%	1%	6%	8%	7%	1%	9%	%	3%	2%	2%	4%	9%	9%	
PyPerfomance	31	61	22	44	50	10	66	13	16	32	15	32	43	62	15	89	14	30	36	74	53	10	45	90	
Standard Deviation	08	79	49	72	34	06	28	17	41	82	86	18	84	85	09	59	96	68	96	34	63	85	32	16	
Performance / Cost - benchmark - SMP Parallel (sec)	-	00	00	52	26	40	88	88	69	47	95	85	40	64	60	06	68	87	97	00	00	00	50	00	
Performance / Cost - benchmark - SMP Parallel (sec)																									
Normalized	51.0	25.6	70.5	35.4	31.5	15.7	23.9	12.0	9.67	4.83	100	49.3	36.1	25.2	10.5	17.7	10.6	5.17	42.9	21.3	29.5	14.6	35.0	17.6	
Standard Deviation	6%	8%	4%	8%	2%	6%	4%	4%	%	%	%	1%	9%	5%	2%	1%	%	%	3%	5%	9%	3%	1%	%	
Radiance Benchmark - SMP Parallel (sec)	24	23	24	23	19	19	23	22	23	22	22	22	22	23	22	21	21	21	18	18	18	18	19	19	
Standard Deviation	2.5	0.5	2.0	3.0	8.5	5.8	6.5	5.8	5	6.0	4.3	6.5	0.8	2.1	1.2	5.0	1.2	0.6	2.1	4.7	1.7	7.8	3.9	8.2	
Normalized	74.9	78.8	75.1	78%	91.5	92.8	76.8	80.5	77.3	80.4	81.0	80.2	82.3	78.3	82.1	84.5	86.0	86.2	99.7	98.4	100	96.7	93.7	91.6	
Standard Deviation	5%	4%	1%		5%	1%	6%	%	5%	%	3%	2%	1%	1%	4%	3%	5%	9%	7%	%	%	6%	2%	9%	

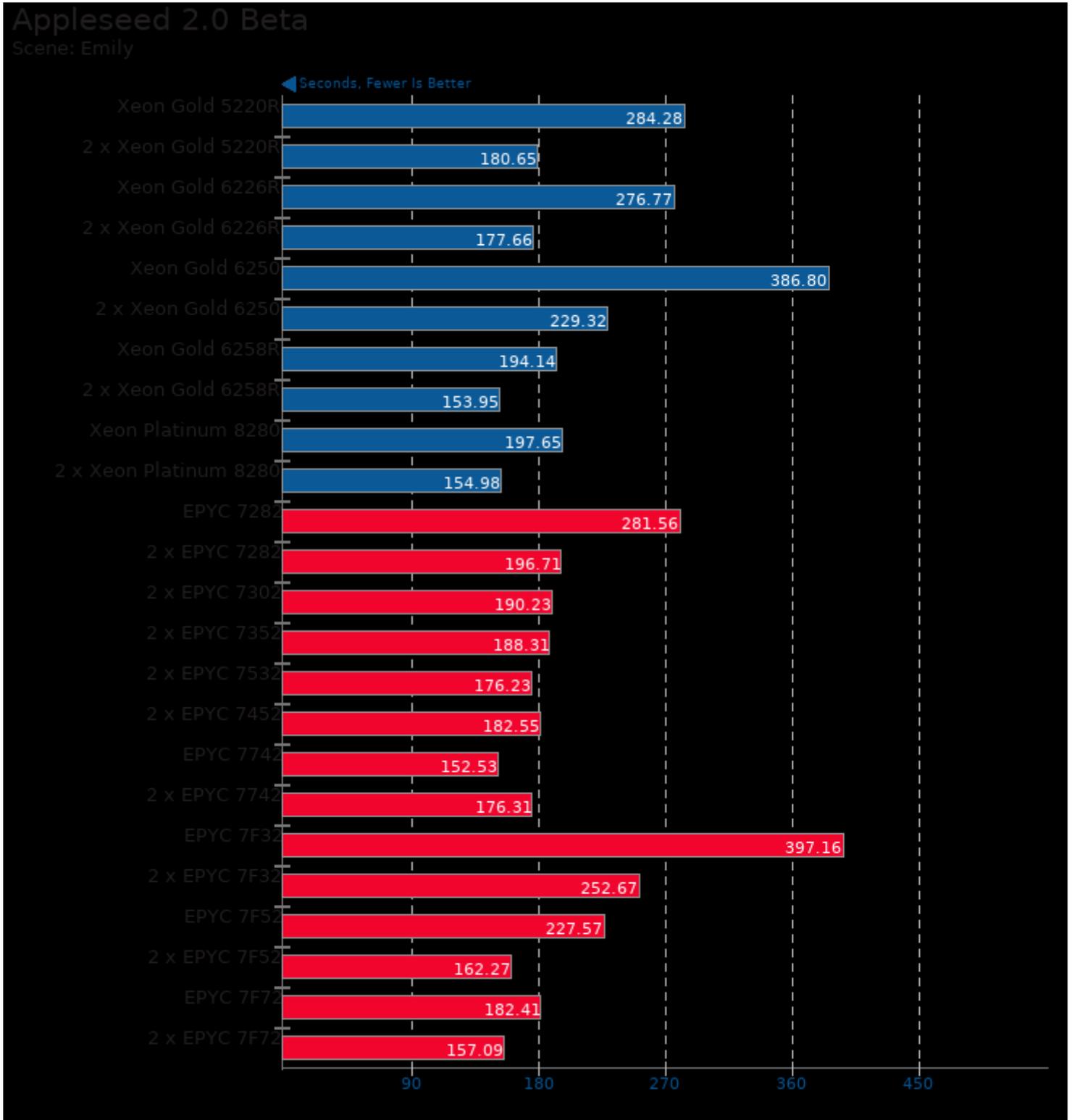
Radian	44	85	32	62	68	13	95	18	23	45	16	33	46	67	15	94	15	31	38	77	56	11	47	97
ce	86	30	40	40	92	59	59	25	52	25	71	75	54	54	90	43	88	69	25	58	34	64	51	13
Bench	53	76	41	86	93	98	33	36	11	58	20	92	84	11	13	59	93	07	76	45	65	72	80	91
mark -						2		7	5	9					2		2	9				6		
Perfor																								
mance /																								
Cost -																								
SMP																								
Parallel																								
(sec x																								
Dollar)																								
Normalize	37.2	19.5	51.5	26.7	24.2	12.2	17.4	9.16	7.11	3.69	100	49.5	35.9	24.7	10.5	17.7	10.5	5.27	43.6	21.5	29.6	14.3	35.1	17.2
d	5%	9%	7%	8%	5%	9%	8%	%	%	%	%	%	%	4%	1%	%	2%	%	8%	4%	6%	5%	7%	%
Scikit-L	10.	10.	9.9	10.	8.5	8.8	9.2	9.4	9.1	9.3	11.	11.	11.	11.	10.	10.	10.	10.	9.7	9.7	9.5	9.8	9.9	10.
earn	11	45	24	44	25	19	83	52	27	92	07	23	05	53	91	78	46	53	42	35	71	88	28	12
(sec)	2	8		9							4	3	3	1	3	8	3	3						5
Normalize	84.3	81.5	85.9	81.5	100	96.6	91.8	90.1	93.4	90.7	76.9	75.8	77.1	73.9	78.1	79.0	81.4	80.9	87.5	87.5	89.0	86.2	85.8	84.2
d	1%	2%	%	9%	%	7%	3%	9%	%	7%	8%	9%	3%	3%	2%	2%	8%	4%	1%	7%	7%	2%	7%	%
Standard	0.6	0.4	0.5	0.9	0.7	1.4	1.7	2.2	0.8	2.2	0.1	0.5	0.4	2.9	0.8	0.8	0.1	0.2	0.1	0.2	0.3	0.5	0.2	1.1
Deviation	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Scikit-L	18	38	13	27	29	61	37	76	91	18	82	16	23	33	78	47	78	15	20	40	29	61	24	49
earn -	70	69	28	98	59	23	52	41	35	80	50	73	30	55	42	38	70	84	45	88	67	30	32	61
Perfor	7	5	8	2	9	9	2	0	2	09		7	0	5	1	1	3	58	8	7	0	6	4	3
mance /																								
Cost																								
(sec x																								
Dollar)																								
Normalize	44.1	21.3	62.0	29.4	27.8	13.4	21.9	10.8	9.03	4.39	100	49.2	35.4	24.5	10.5	17.4	10.4	5.21	40.3	20.1	27.8	13.4	33.9	16.6
d	%	2%	9%	8%	7%	7%	9%	%	%	%	%	9%	1%	9%	2%	1%	8%	%	3%	8%	1%	6%	2%	3%
Stockfi	38	74	39	75	25	48	63	12	62	11	40	71	76	97	13	12	13	23	24	43	47	85	67	12
sh -	16	23	77	20	62	83	71	17	89	97	55	29	18	35	09	57	11	77	30	33	34	75	16	18
Total	73	58	62	37	92	50	82	81	13	15	51	11	63	49	75	53	12	33	30	38	21	52	05	45
Time	26	29	92	29	62	01	59	02	12	79	42	33	63	85	71	47	95	33	39	71	01	73	90	24
(Nodes/							8				5					4	5	7	9					6
Normalize	16.0	31.2	16.7	31.6	10.7	20.5	26.8	51.2	26.4	50.3	17.0	29.9	32.0	40.9	55.0	52.9	55.1	100	10.2	18.2	19.9	36.0	28.2	51.2
d	5%	3%	3%	3%	8%	4%	%	3%	5%	6%	6%	9%	5%	5%	9%	%	5%	%	2%	3%	1%	7%	5%	5%
Standard	0.8	0.7	1.4	2.2	1.5	1.9	1.4	2.2	2.3	1.3	1.5	0.6	1.4	0.8	1.5	1%	0.4	1.9	1%	0.6	2.1	1.1	1.9	2.5
Deviation	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%

Stockfi	20	20	29	28	73	70	15	15	62	59	54	47	36	33	18	28	17	15	11	10	15	13	27	24
sh -	63	06	70	08	82	33	76	06	83	80	43	84	14	45	22	63	43	80	57	31	27	83	41	86
Perfor	1	4	6	2			4	4		6	6	2	5	7	2	1	3	3	8	2	1	2	6	
mance /																								
Cost -																								
Total																								
Time																								
(Nodes/																								
s/Dollar																								
Normalize	37.9	36.8	54.5	51.5	13.5	12.9	28.9	27.6	11.5	10.9	100	87.8	66.3	61.4	33.4	52.6	32.0	29.0	21.2	18.9	28.0	25.4	50.3	45.6
d	%	6%	7%	9%	6%	7%	6%	7%	4%	9%	%	9%	9%	6%	8%	%	7%	3%	6%	5%	5%	1%	6%	8%
SVT-AV	4.2	5.3	4.3	5.4	3.2	5.0	5.9	6.8	6.0	7.0	3.4	4.4	4.7	5.6	6.6	6.2	6.1	6.7	2.9	4.8	4.9	6.5	5.9	7.4
1 - Enc	85	02	40	31	76	49	89	07	30	33	83	17	19	53	88	27	77	87	99	47	23	44	10	28
Mode 4																								
- 1080p																								
(FPS)																								
Normalize	57.6	71.3	58.4	73.1	44.1	67.9	80.6	91.6	81.1	94.6	46.8	59.4	63.5	76.1	90.0	83.8	83.1	91.3	40.3	65.2	66.2	88.1	79.5	100
d	9%	8%	3%	7%	%	7%	3%	4%	8%	8%	9%	6%	3%	%	4%	3%	6%	7%	7%	5%	8%	%	6%	%
Standard	0.6	0.6	0.7	0.3	0.9	1.4	0.8	3%	0.9	1.6	2.7	5.4	4.6	2.8	1.7	6.1	2.4	3%	1.8	1.7	0.6	1.8	0.1	2.8
Deviation	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
SVT-AV	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1 - 02	01	03	02	01	01	01	01	01	01	05	03	02	02	01	01	01	01	01	01	01	02	01	02	02
Perfor																								
mance /																								
Cost -																								
Enc																								
Mode 4																								
- 1080p																								
(FPS/D																								
ollar)																								
Normalize	40%	20%	60%	40%	20%	20%	20%	20%	20%	100	60%	40%	40%	20%	20%	20%	20%	20%	20%	20%	40%	20%	40%	40%
d	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Timed	59.	36.	57.	36.	80.	46.	40.	27.	40.	27.	57.	36.	34.	30.	25.	26.	26.	20.	76.	43.	43.	28.	37.	24.
Linux	01	69	77	59	48	93	62	17	89	30	42	92	32	87	98	61	50	20	78	74	90	06	00	60
Kernel	2	9	2	5	9	6	2	8	8	9	5	9	7	6	3	7	0	3	3	0	9	3	3	3
Compil																								
ation -																								
Time																								
To																								
Compil																								
Normalize	34.2	55.0	34.9	55.2	25.1	43.0	49.7	74.3	49.4	73.9	35.1	54.7	58.8	65.4	77.7	75.9	76.2	100	26.3	46.1	46.0	71.9	54.6	82.1
d	4%	5%	7%	1%	%	4%	3%	4%	%	8%	8%	1%	5%	3%	5%	%	4%	%	1%	9%	1%	9%	%	2%
Standard	3%	3%	2.7	2.9	2.8	2.8	3%	3.5	2.9	3.4	2.9	3%	2.9	2.9	2.8	2.8	3%	3.6	1.2	2.8	2.9	2%	2.8	2.8
Deviation			%	%	%	%		%	%	%	%		%	%	%	%		%	%	%	%		%	%

Timed	10	13	77	98	27	32	16	21	40	54	42	55	72	89	18	11	19	30	16	18	13	17	90	12
Linux	91	57	35	00	94	59	41	97	93	66	78	02	36	84	67	69	93	39	12	37	61	39	65	05
Kernel	72	86	7	1	58	24	94	07	48	72	2	4	1	9	14	02	33	34	44	08	18	91	7	55
Compilation - Performance / Cost - Time To Compile (sec x)																								
Normalized	39.1	31.5	55.3	43.6	15.3	13.1	26.0	19.4	10.4	7.83	100	77.7	59.1	47.6	22.9	36.6	21.4	14.0	26.5	23.2	31.4	24.5	47.1	35.4
Standard Deviation	9%	1%	5%	5%	1%	3%	6%	7%	5%	0%	0%	5%	2%	1%	1%	0%	6%	8%	3%	9%	3%	9%	9%	9%
Timed	43	28	43	27	60	35	30	21	30	22	42	28	26	24	21	22	22	19	57	33	32	21	28	20
LLVM	0.4	6.7	3.1	9.6	9.8	3.7	6.9	9.9	8.7	1.5	9.5	3.1	4.6	8.5	7.7	4.5	3.8	5.8	0.9	2.0	8.7	7.8	2.5	2.1
Compilation - Time To Compile	26	82	91	82	62	56	90	82	41	15	34	50	31	68	43	63	76	80	72	09	64	26	64	33
Normalized	45.5	68.3	45.2	70.0	32.1	55.3	63.8	89.0	63.4	88.4	45.6	69.1	74.0	78.8	89.9	87.2	87.4	100	34.3	59%	59.5	89.9	69.3	96.9
Standard Deviation	1%	0%	2%	4%	2%	7%	1%	4%	4%	3%	0%	8%	2%	0%	6%	3%	9%	0%	1%	0%	8%	2%	2%	1%
Standard	0.7	1.2	0.9	2.2	0.8	0.5	2.2	0.8	2.7	0.8	2.2	1.6	1%	1.4	1.2	0.6	0.1	0.4	0.3	1%	2.7	0.8	1.8	1.1
Deviation	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Timed	79	10	58	74	21	24	12	17	30	44	32	42	55	72	15	98	16	29	11	13	10	13	69	99
LLVM	62	61	00	89	17	56	40	78	90	34	00	18	78	33	64	62	83	46	99	94	19	50	22	04
Compilation - Performance / Cost - Time To Compile (sec x)	88	09	43	88	44	48	85	33	18	28	03	94	42	33	70	81	99	81	04	43	16	52	82	52
Standard Deviation	3				1	2	4	4	9	7					1		5	9	1	8	8	1		
Normalized	40.1	30.1	55.1	42.7	15.1	13.0	25.7	17.9	10.3	7.22	100	75.8	57.3	44.2	20.4	32.4	19%	10.8	26.6	22.9	31.4	23.6	46.2	32.3
Standard Deviation	9%	6%	7%	2%	1%	3%	9%	9%	6%	0%	0%	5%	6%	4%	5%	5%	0%	6%	9%	5%	0%	9%	2%	1%
Timed	13	13	12	12	79	79	10	11	12	12	89	90	86	10	97	10	10	10	72	72	72	79	79	79
MrBayes	4.4	4.9	3.7	4.2	60	44	9.1	1.1	8.8	9.9	00	18	56	2.2	78	3.9	6.5	8.8	18	01	14	09	65	37
Analysis - P.P.A	83	28	02	58	5	5	11	57	48	86	8	6	9	91	0	14	87	72	5	8	6	3	0	3
Normalized	53.5	53.3	58.2	57.9	90.4	90.6	66%	64.7	55.8	55.4	80.9	79.8	83.1	70.4	73.6	69.3	67.5	66.1	99.7	100	99.8	99.9	90.4	90.7
Standard Deviation	5%	8%	2%	6%	7%	5%	0%	9%	9%	0%	1%	5%	9%	1%	5%	1%	7%	5%	7%	0%	2%	0%	2%	3%
Standard	0%	0.3	0.1	0.4	0.9	0.5	0.4	2.7	0%	0.5	0.2	0.1	3%	2.5	0.1	0.2	0.5	0.3	0.3	0.3	0.2	0.3	1.8	0.1
Deviation	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Timed	24	49	16	33	27	55	44	89	12	26	66	13	18	29	70	45	80	16	15	30	22	44	19	38		
MrBayes	87	92	56	27	63	16	10	85	89	02	31	43	24	76	26	63	17	37	15	24	36	69	51	89		
s	94	34	37	63	89	66	27	93	64	06	1	77	87	67	47	90	47	87	89	76	53	77	43	28		
Analysis									0	0									0							
s -																										
Performance /																										
Cost -																										
P.P.A																										
(sec x																										
Dollar)																										
Normalized	26.6	13.2	40.0	19.9	23.9	12.0	15.0	7.38	5.14	2.55	100	49.3	36.3	22.2	9.44	14.5	8.27	4.05	43.7	21.9	29.6	14.8	33.9	17.0		
Standard	5%	8%	3%	3%	9%	2%	4%	%	%	%	%	5%	4%	8%	%	3%	%	%	4%	2%	5%	4%	8%	5%		
Deviation	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
Tungsten	18.	11.	18.	10.	27.	14.	12.	7.4	12.	7.8	17.	10.	9.8	8.7	6.8	7.1	7.0	5.4	26.	14.	14.	8.2	11.	7.0		
Render	98	07	61	66	38	56	39	10	68	27	55	43	85	44	45	24	63	48	44	18	06	53	10	33		
er - Hair	40	26	29	53	12	07	90	34	63	06	22	95	58	98	49	95	98	97	33	70	38	57	90	58		
(sec)																										
Normalized	28.7	49.2	29.2	51.0	19.9	37.4	43.9	73.5	42.9	69.6	31.0	52.2	55.1	62.3	79.6	76.4	77.1	100	20.6	38.4	38.7	66.0	49.0	77.4		
Standard	0.3	0.6	0.6	0.9	0.3	0.8	0.6	1.1	0.5	2.5	0.2	0.3	0.5	0.6	1.3	0.9	1%	1%	0.2	0.4	0.4	0.5	0.2	0.9		
Deviation	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
Tungsten	25.	23.	24.	23.	26.	23.	22.	21.	22.	21.	26.	25.	24.	25.	24.	23.	21.	22.	28.	24.	22.	21.	22.	21.		
Render	00	33	08	19	17	46	21	59	01	58	79	21	61	35	40	97	70	71	36	32	56	53	08	53		
er -	80	67	74	16	75	52	89	87	67	96	02	94	63	89	33	28	91	88	01	55	17	59	99	06		
Water																										
Caustic																										
(sec)																										
Normalized	86.0	92.2	89.3	92.8	82.2	91.7	96.9	99.6	97.7	99.7	80.3	85.3	87.4	84.9	88.2	89.8	99.1	94.7	75.9	88.5	95.4	99.9	97.4	100		
Standard	0.5	0.3	0.5	0.4	0.4	1.3	0.9	0.7	0.6	0.5	0.2	0.4	0.2	2.8	2.8	3.5	0.1	2.1	2.1	0.7	0.5	0.7	0.2	0.6		
Deviation	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	

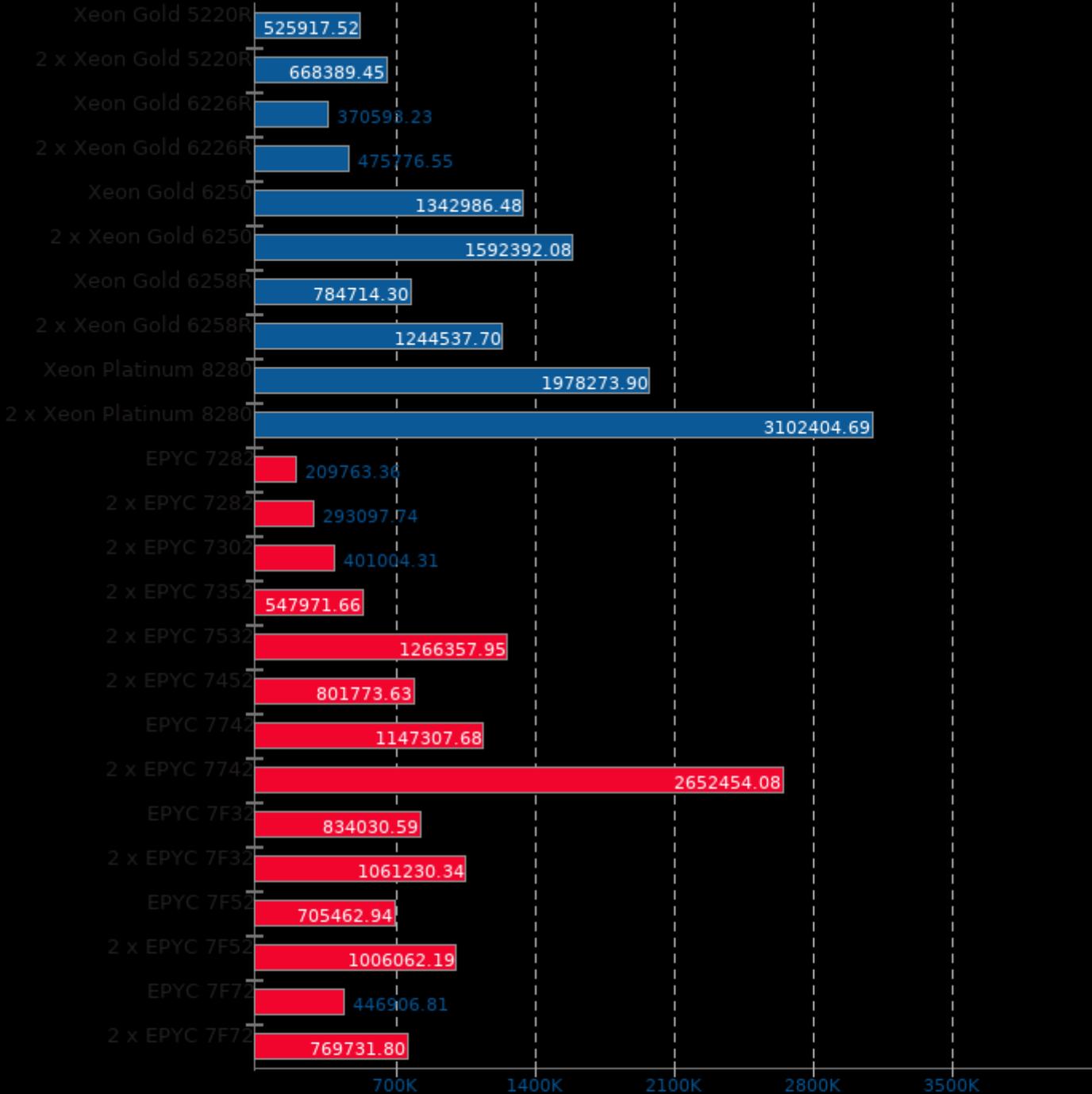
Tungsten	35	40	24	28	95	10	50	59	12	15	13	15	20	25	49	31	53	81	55	59	43	51	27	34
Render	12	96	92	56	06	11	11	90	69	66	07	55	83	44	19	29	13	97	53	58	59	17	21	46
er - Performance / Cost - Hair (sec x Dollar)	0	9	3	2	8	10	7	5	77	82	6	5	9	8	2	3	5	4	1	5	8	2	7	5
Normalized	37.2	31.9	52.4	45.7	13.7	12.9	26.0	21.8	10.3	8.35	100	84.0	62.7	51.3	26.5	41.7	24.6	15.9	23.5	21.9	29.9	25.5	48.0	37.9
Tungsten	3%	2%	7%	8%	5%	3%	9%	3%	%	%	%	7%	5%	8%	8%	9%	1%	5%	5%	5%	9%	5%	4%	4%
Render	46	86	32	62	90	16	89	17	22	43	19	37	51	73	17	10	16	34	59	10	69	13	54	10
er - Performance / Cost - Water Caustic (sec x Dollar)	26	34	25	10	88	29	80	46	03	21	95	57	89	79	53	52	32	17	55	21	94	35	12	55
Normalized	5	6	3	7	8	42	9	04	65	81	9	7	1	4	62	89	96	82	6	67	1	23	0	00
Normalized	43.1	23.1	61.8	32.1	21.9	12.2	22.2	11.4	9.06	4.62	100	53.1	38.4	27.0	11.3	18.9	12.2	5.84	33.5	19.5	28.5	14.9	36.8	18.9
Normalized	4%	1%	8%	4%	6%	5%	2%	3%	%	%	%	1%	6%	5%	8%	6%	2%	%	1%	4%	4%	5%	8%	2%



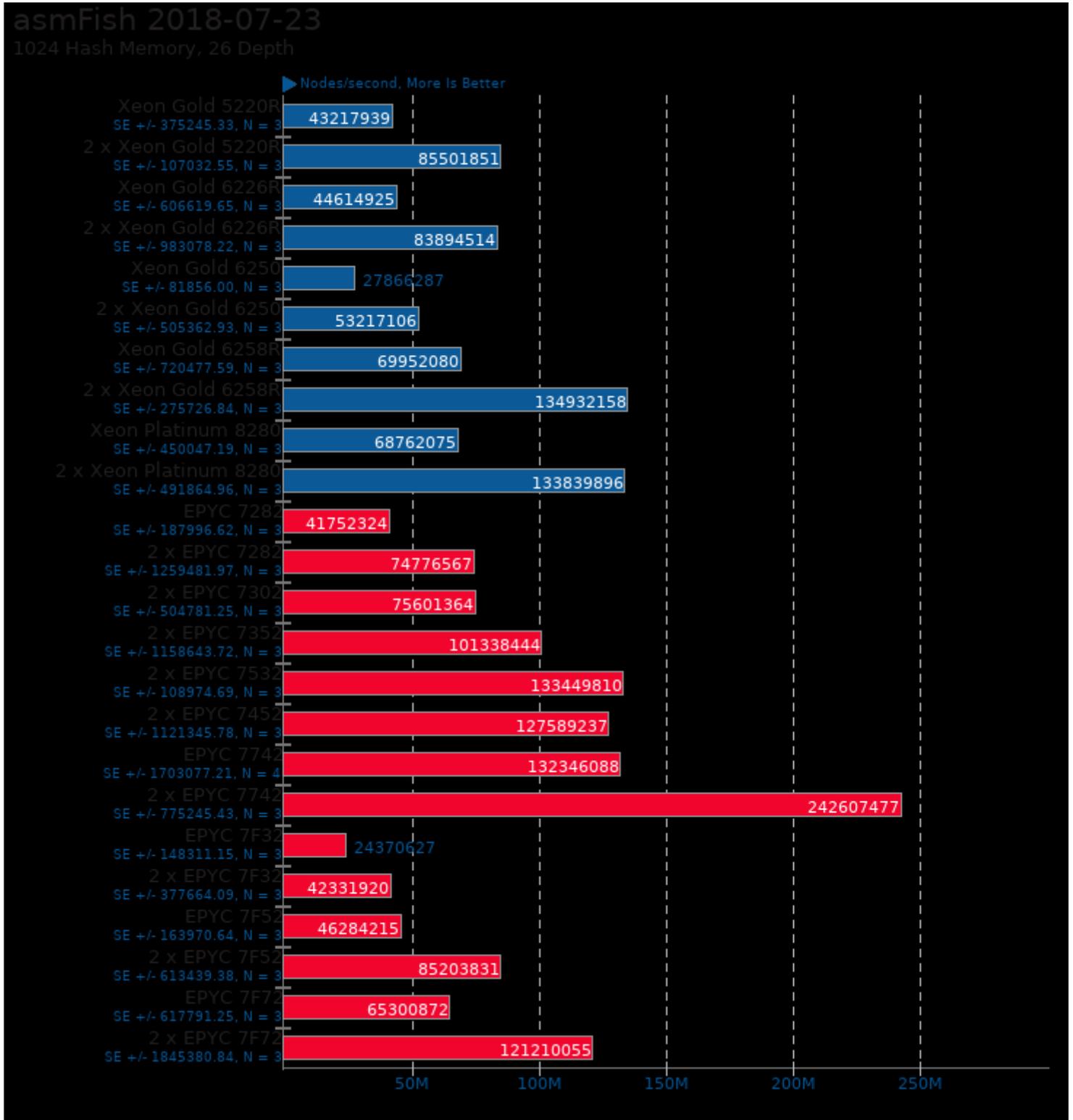
Appleseed 2.0 Beta

Performance / Cost - Scene: Emily

← Seconds x Dollar, Fewer Is Better



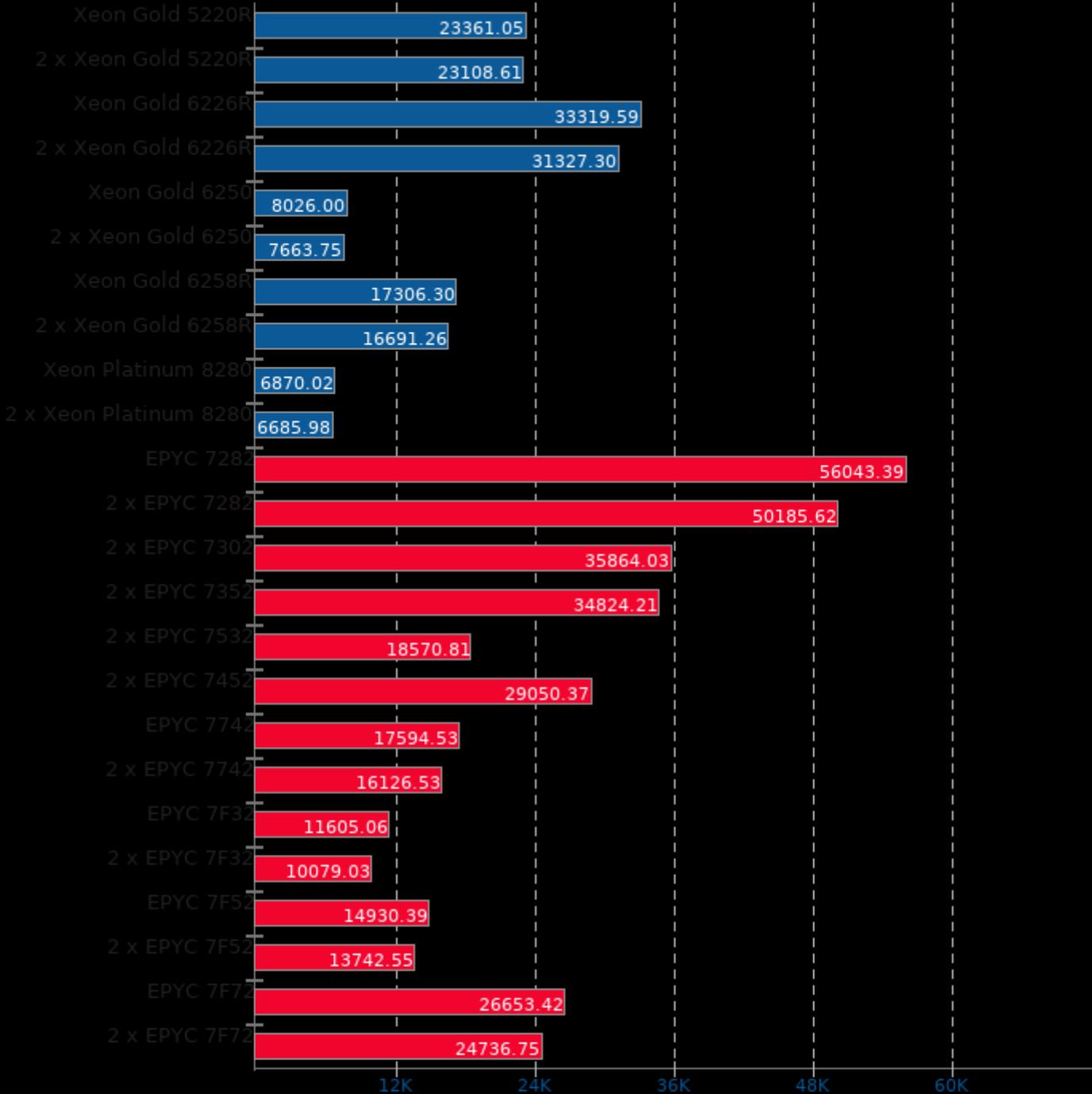
1. Xeon Gold 5220R: \$1850 reported cost.
2. 2 x Xeon Gold 5220R: \$3700 reported cost.
3. Xeon Gold 6226R: \$1339 reported cost.
4. 2 x Xeon Gold 6226R: \$2678 reported cost.
5. Xeon Gold 6250: \$3472 reported cost.
6. 2 x Xeon Gold 6250: \$6944 reported cost.
7. Xeon Gold 6258R: \$4042 reported cost.
8. 2 x Xeon Gold 6258R: \$8084 reported cost.
9. Xeon Platinum 8280: \$10009 reported cost.
10. 2 x Xeon Platinum 8280: \$20018 reported cost.
11. EPYC 7282: \$745 reported cost.
12. 2 x EPYC 7282: \$1490 reported cost.
13. 2 x EPYC 7302: \$2108 reported cost.
14. 2 x EPYC 7352: \$2910 reported cost.
15. 2 x EPYC 7532: \$7186 reported cost.
16. 2 x EPYC 7452: \$4392 reported cost.
17. EPYC 7742: \$7522 reported cost.
18. 2 x EPYC 7742: \$15044 reported cost.
19. EPYC 7F32: \$2100 reported cost.
20. 2 x EPYC 7F32: \$4200 reported cost.
21. EPYC 7F52: \$3100 reported cost.
22. 2 x EPYC 7F52: \$6200 reported cost.



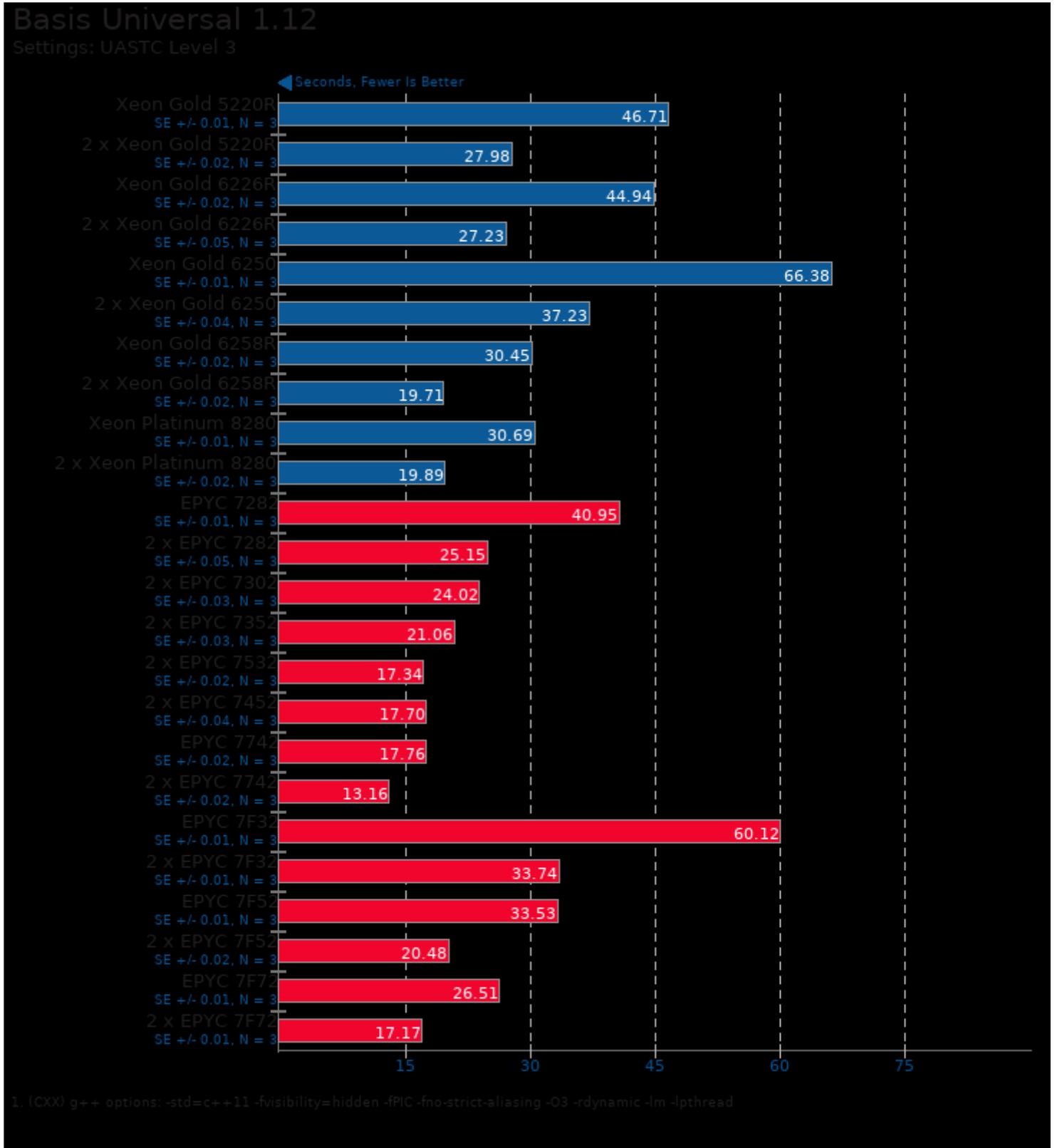
asmFish 2018-07-23

Performance / Cost - 1024 Hash Memory, 26 Depth

Nodes/second Per Dollar, More Is Better



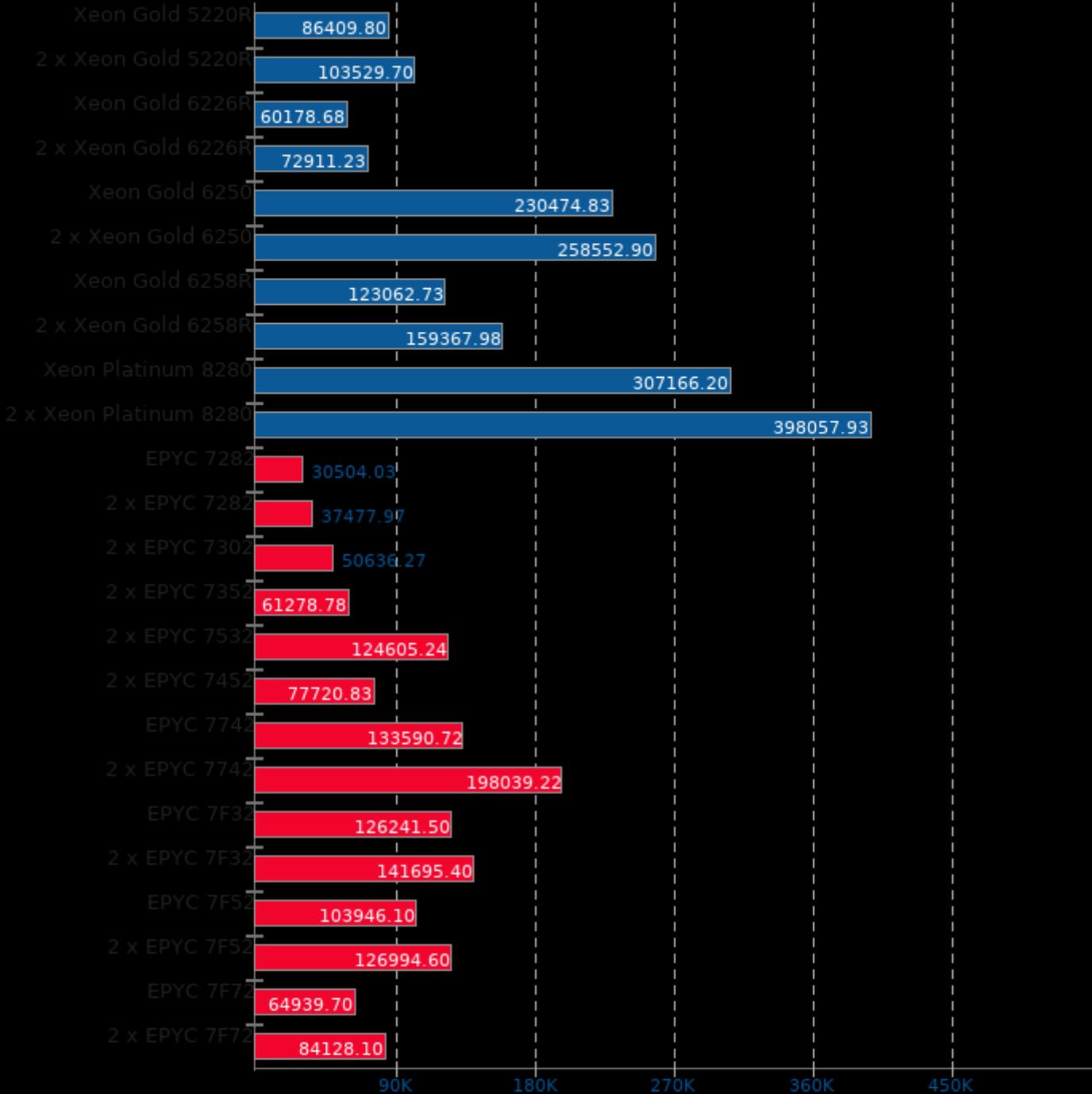
1. Xeon Gold 5220R: \$1850 reported cost.
2. 2 x Xeon Gold 5220R: \$3700 reported cost.
3. Xeon Gold 6226R: \$1339 reported cost.
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11. EPYC 7282: \$745 reported cost.
12. 2 x EPYC 7282: \$1490 reported cost.
13. 2 x EPYC 7302: \$2108 reported cost.
14. 2 x EPYC 7352: \$2910 reported cost.
15. 2 x EPYC 7532: \$7186 reported cost.
16. 2 x EPYC 7452: \$4392 reported cost.
17. EPYC 7742: \$7522 reported cost.
18. 2 x EPYC 7742: \$15044 reported cost.
19. EPYC 7F32: \$2100 reported cost.
20. 2 x EPYC 7F32: \$4200 reported cost.
21. EPYC 7F52: \$3100 reported cost.
22. 2 x EPYC 7F52: \$6200 reported cost.



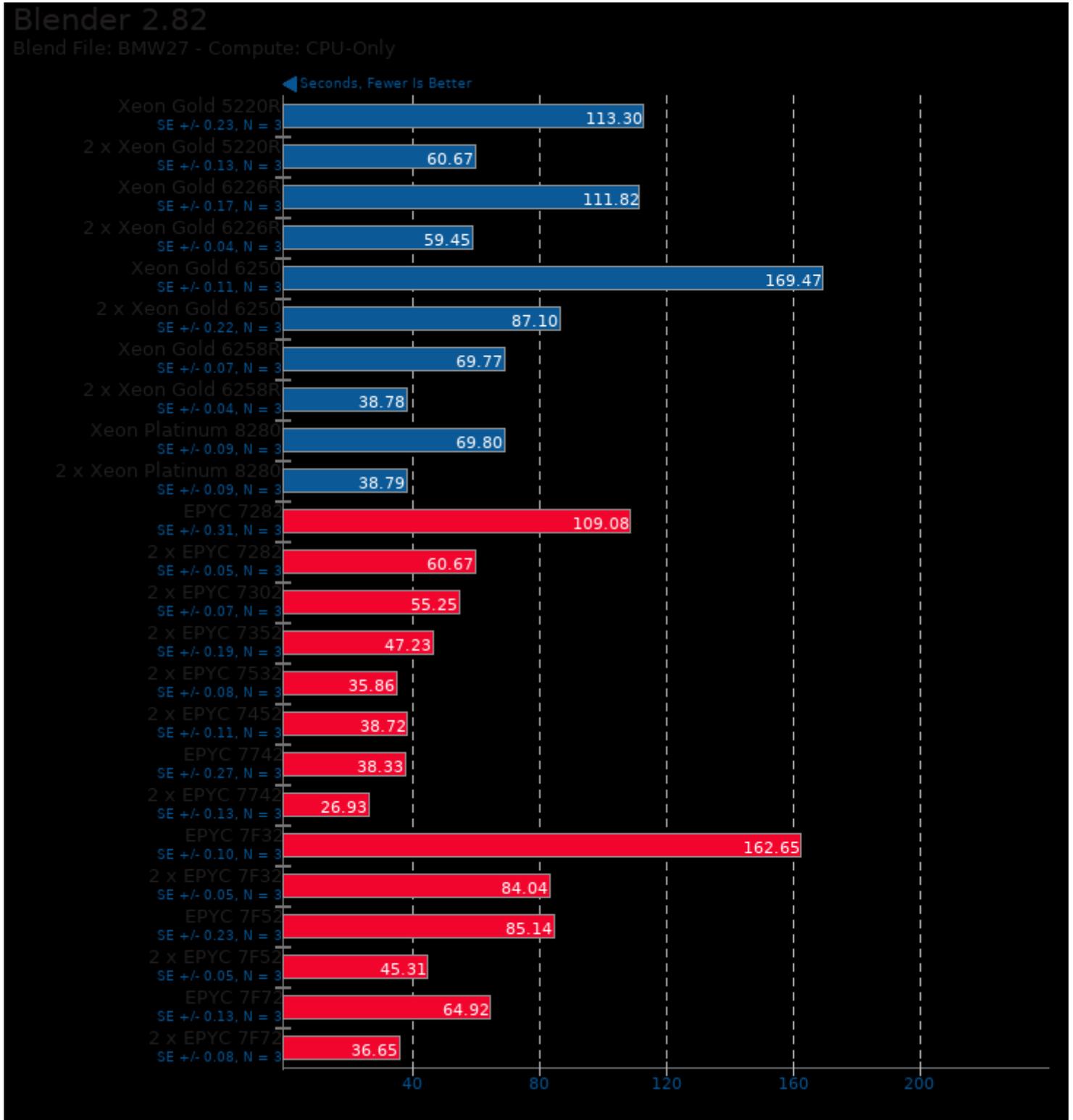
Basis Universal 1.12

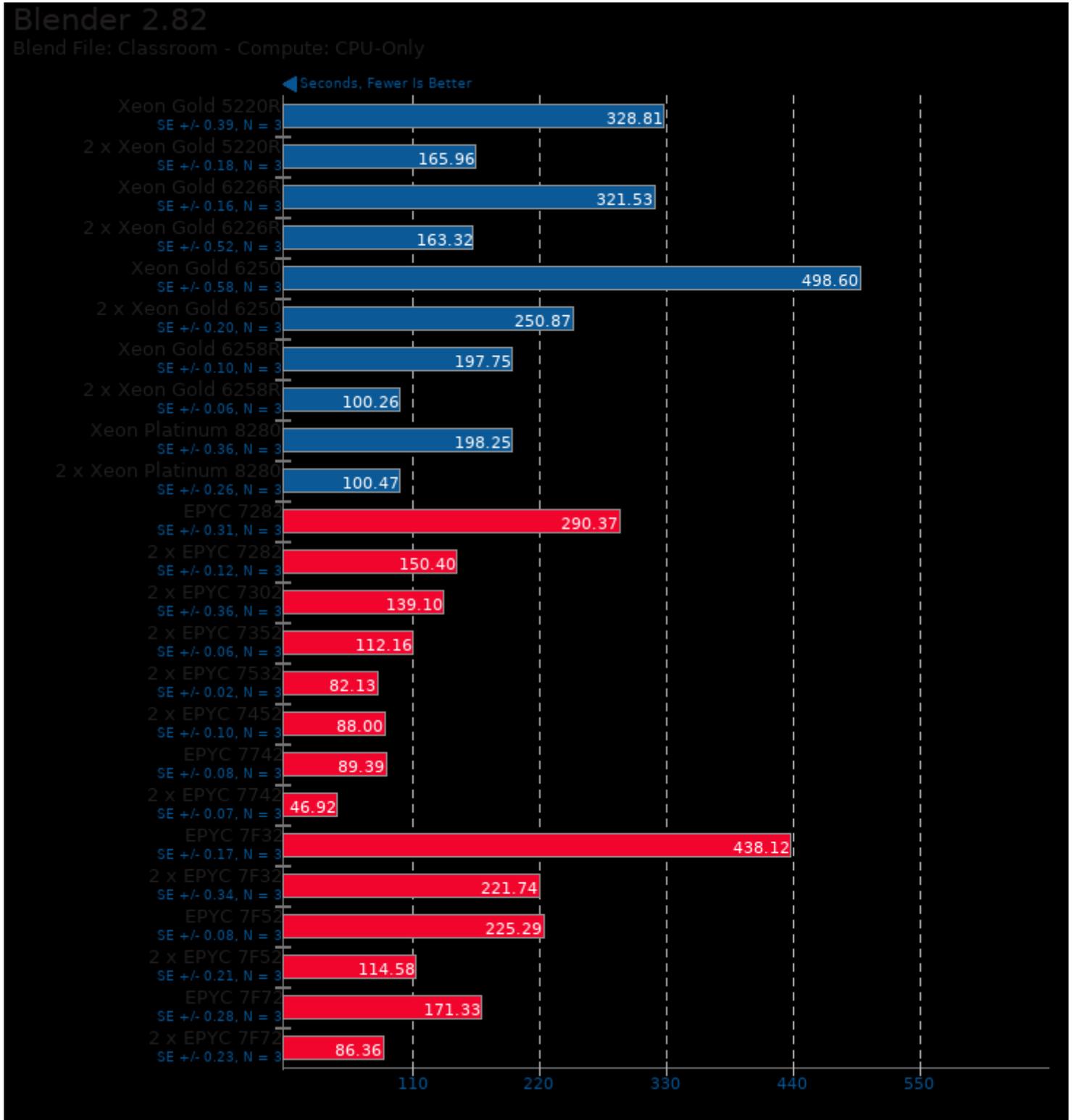
Performance / Cost - Settings: UASTC Level 3

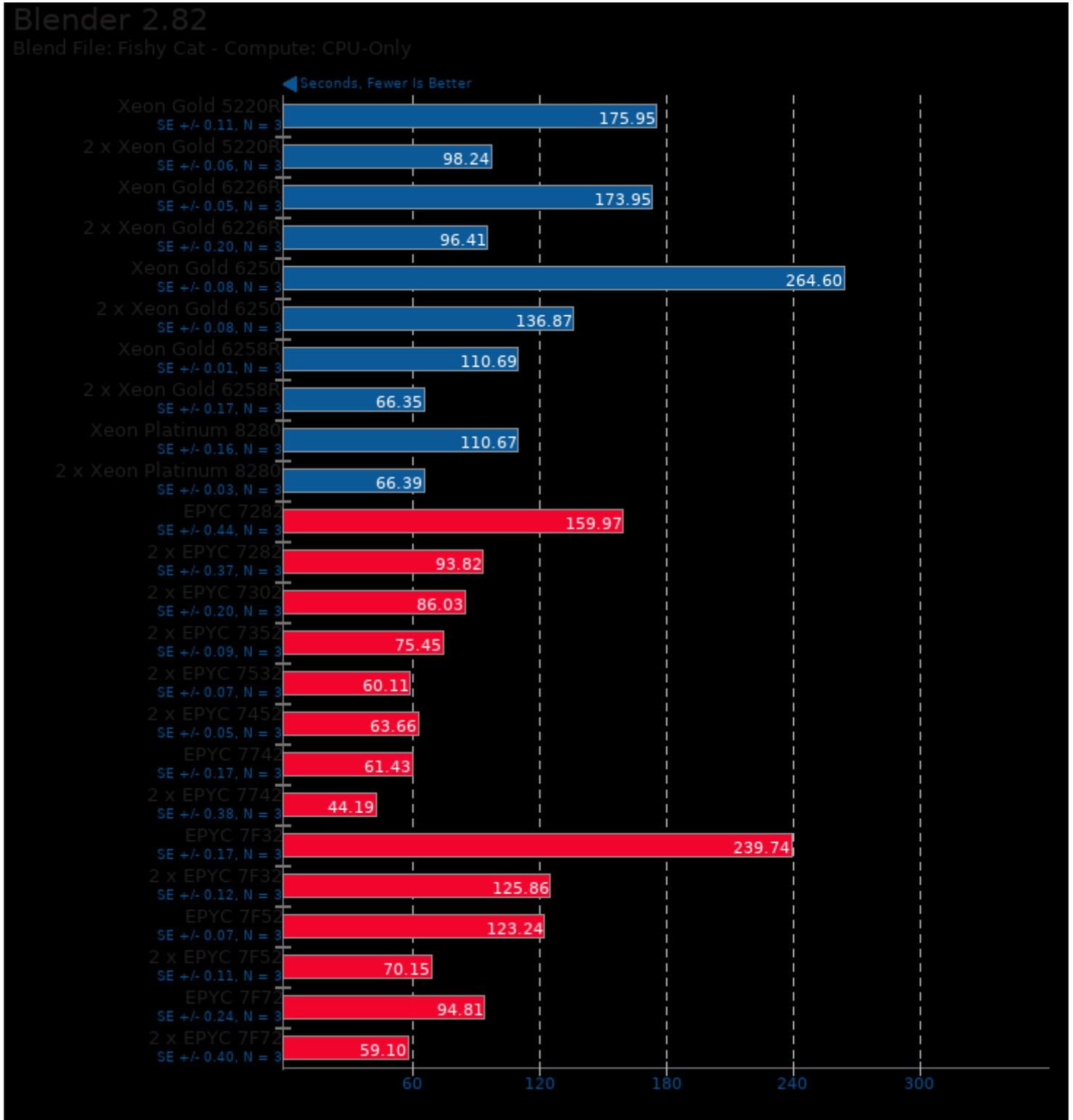
← Seconds x Dollar, Fewer Is Better

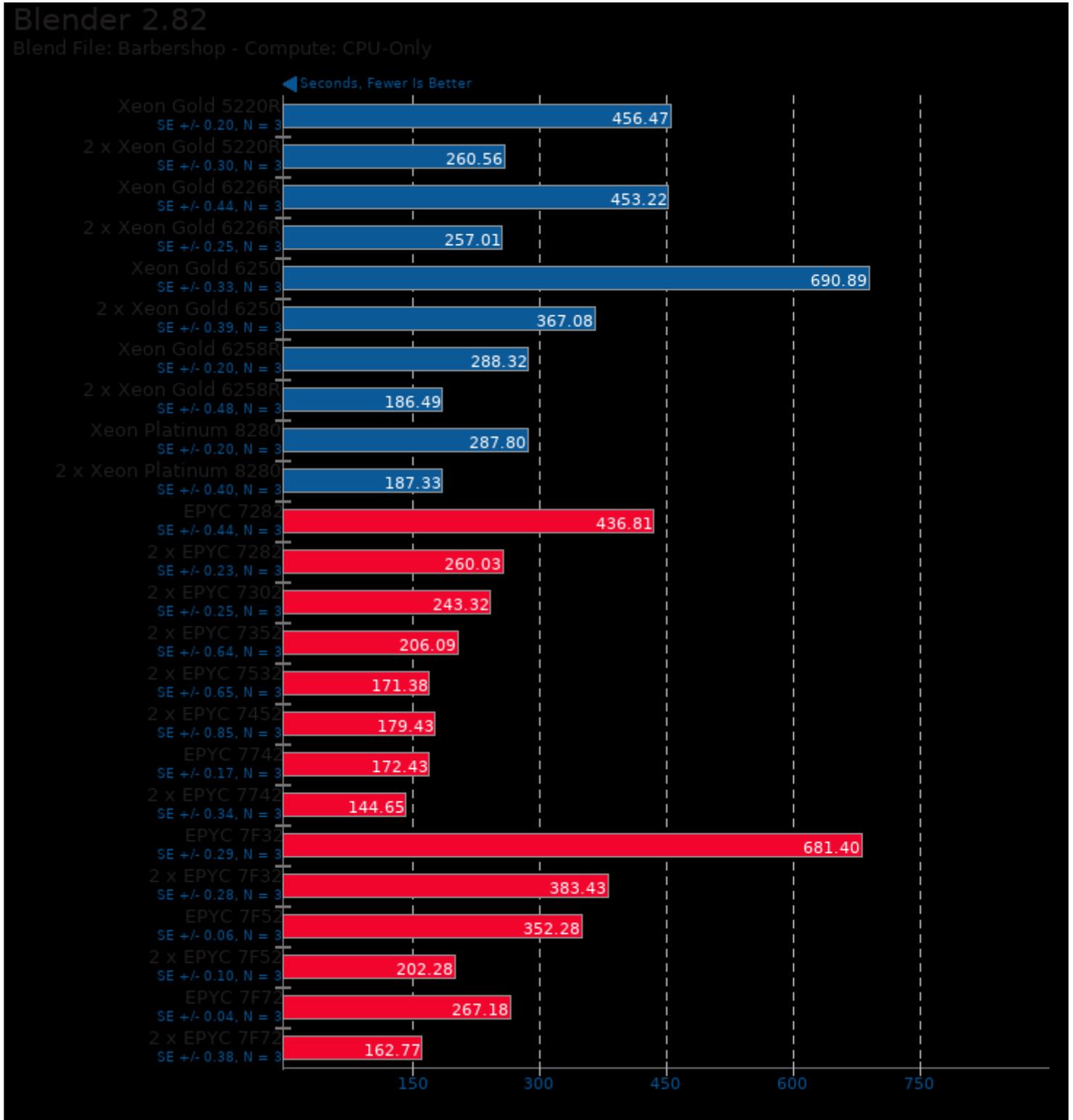


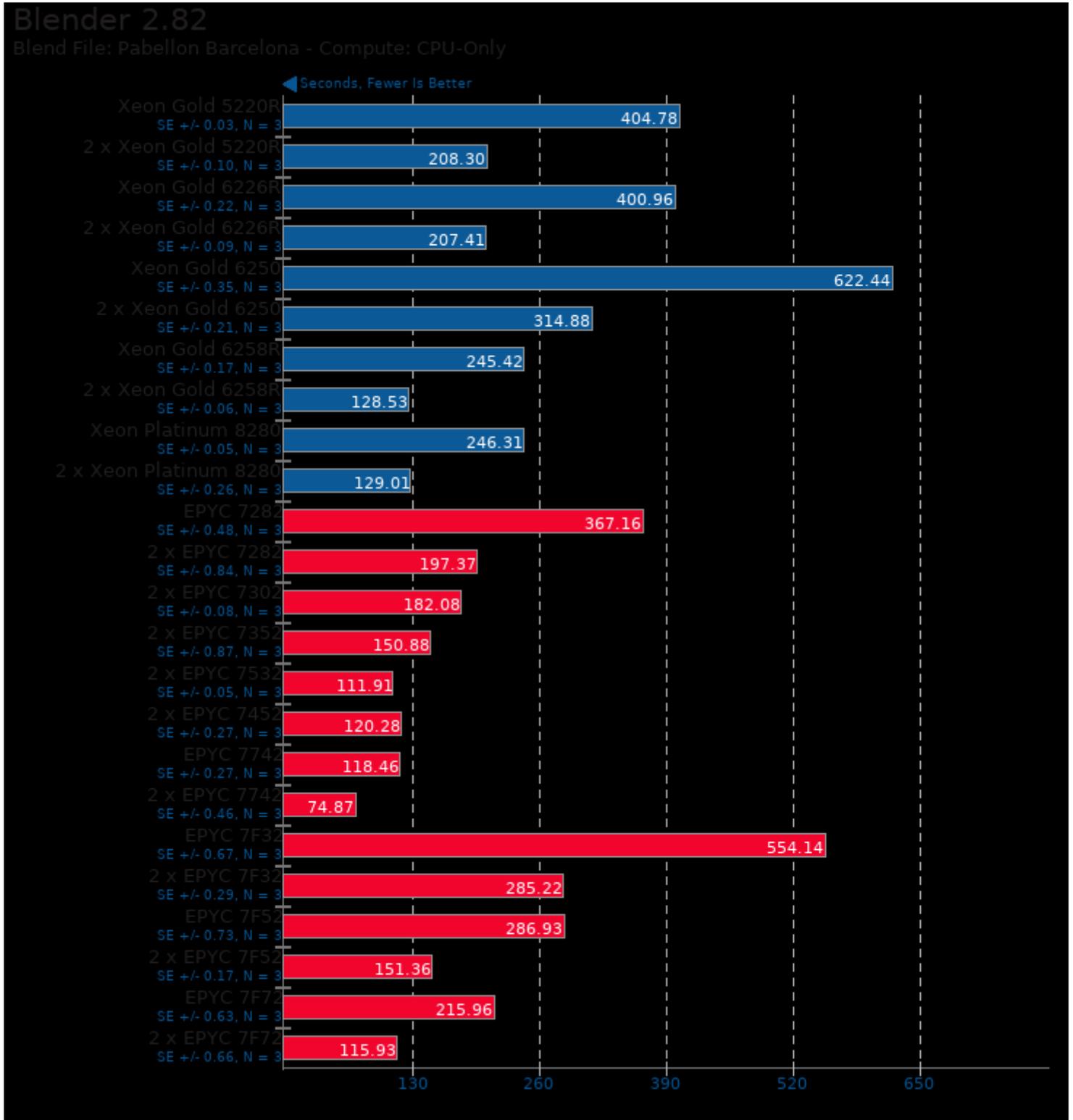
1. Xeon Gold 5220R: \$1850 reported cost.
2. 2 x Xeon Gold 5220R: \$3700 reported cost.
3. Xeon Gold 6226R: \$1339 reported cost.
4. 2 x Xeon Gold 6226R: \$2678 reported cost.
5. Xeon Gold 6250: \$3472 reported cost.
6. 2 x Xeon Gold 6250: \$6944 reported cost.
7. Xeon Gold 6258R: \$4042 reported cost.
8. 2 x Xeon Gold 6258R: \$8084 reported cost.
9. Xeon Platinum 8280: \$10009 reported cost.
10. 2 x Xeon Platinum 8280: \$20018 reported cost.
11. EPYC 7282: \$745 reported cost.
12. 2 x EPYC 7282: \$1490 reported cost.
13. 2 x EPYC 7302: \$2108 reported cost.
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17. EPYC 7742: \$7522 reported cost.
18. 2 x EPYC 7742: \$15044 reported cost.
19. EPYC 7F32: \$2100 reported cost.
20. 2 x EPYC 7F32: \$4200 reported cost.
21. EPYC 7F52: \$3100 reported cost.
22. 2 x EPYC 7F52: \$6200 reported cost.







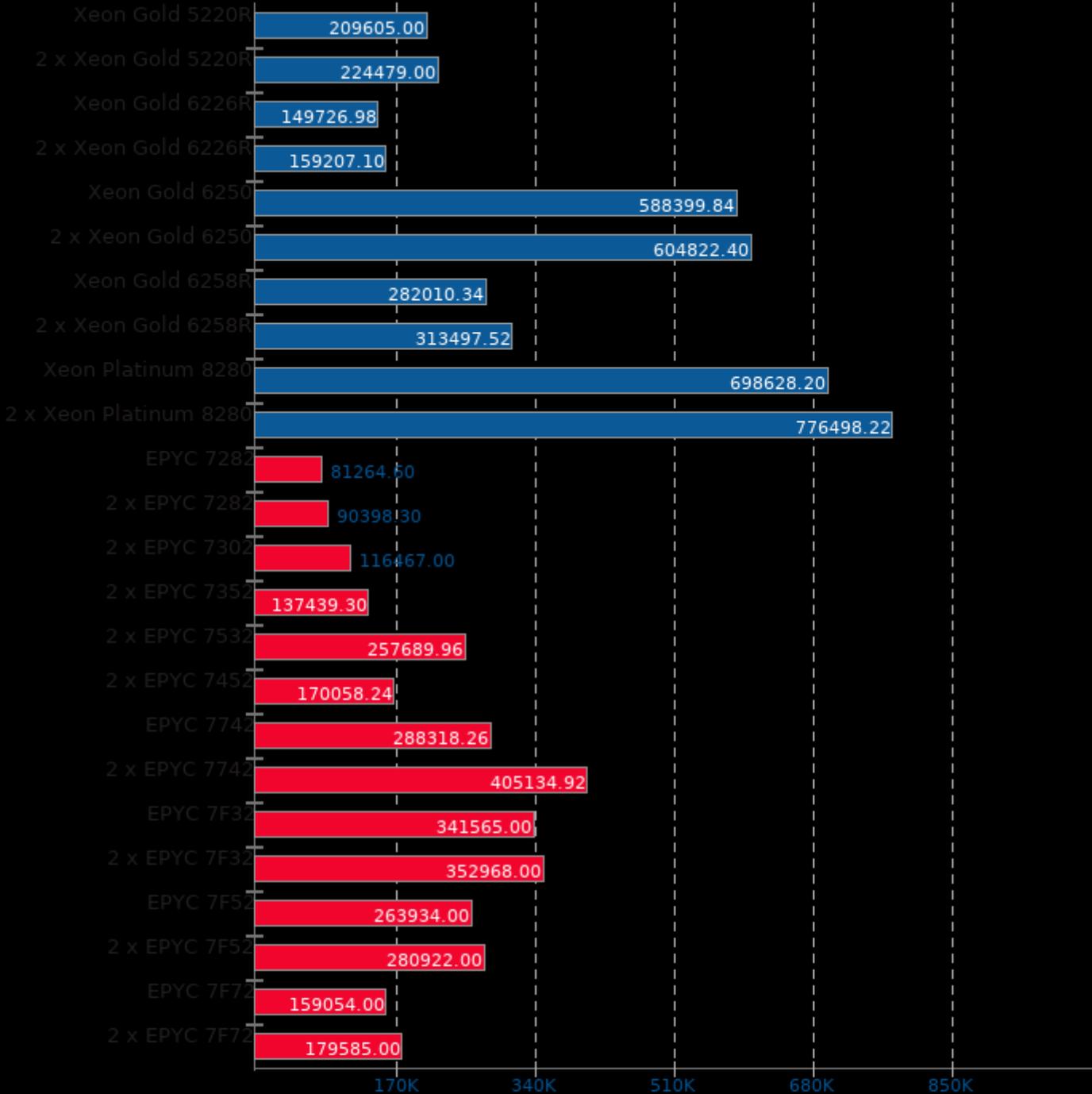




Blender 2.82

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

← Seconds x Dollar, Fewer Is Better

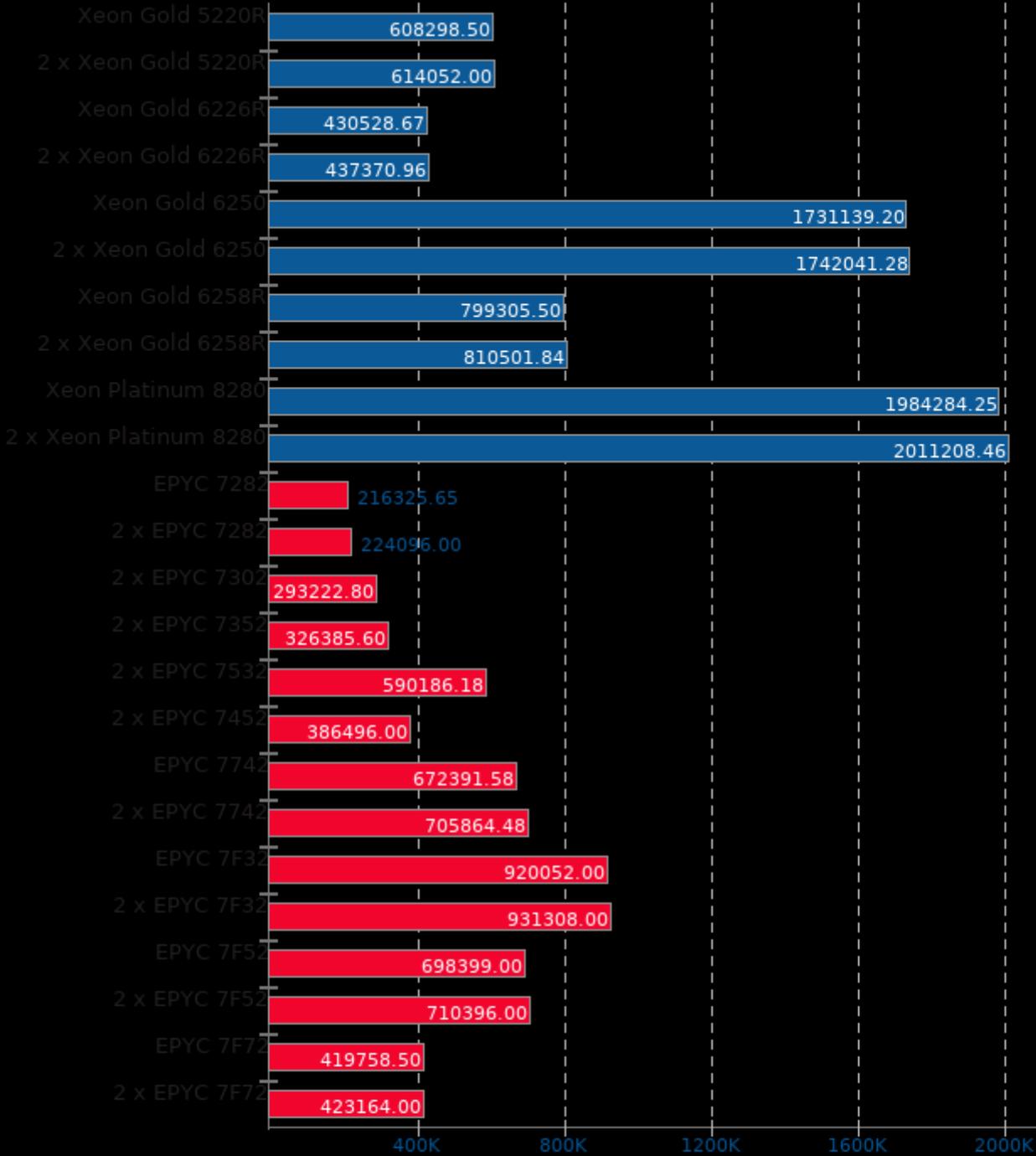


1. Xeon Gold 5220R: \$1850 reported cost.
2. 2 x Xeon Gold 5220R: \$3700 reported cost.
3. Xeon Gold 6226R: \$1339 reported cost.
4. 2 x Xeon Gold 6226R: \$2678 reported cost.
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16. 2 x EPYC 7452: \$4392 reported cost.
17. EPYC 7742: \$7522 reported cost.
18. 2 x EPYC 7742: \$15044 reported cost.
19. EPYC 7F32: \$2100 reported cost.
20. 2 x EPYC 7F32: \$4200 reported cost.
21. EPYC 7F52: \$3100 reported cost.
22. 2 x EPYC 7F52: \$6200 reported cost.

Blender 2.82

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

← Seconds x Dollar, Fewer Is Better

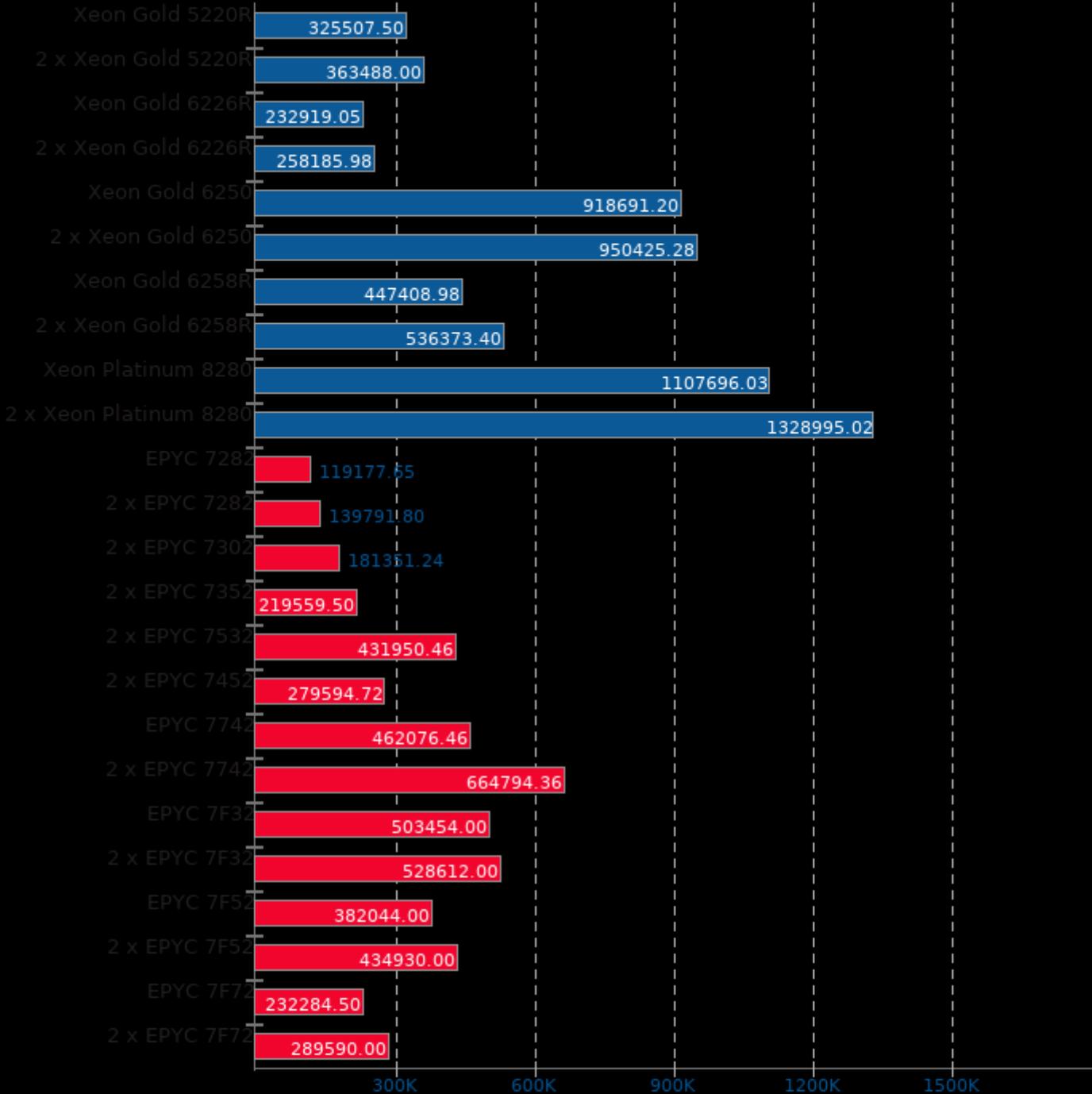


1. Xeon Gold 5220R: \$1850 reported cost.
2. 2 x Xeon Gold 5220R: \$3700 reported cost.
3. Xeon Gold 6226R: \$1339 reported cost.
4. 2 x Xeon Gold 6226R: \$2678 reported cost.
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8. 2 x Xeon Gold 6258R: \$8084 reported cost.
9. Xeon Platinum 8280: \$10009 reported cost.
10. 2 x Xeon Platinum 8280: \$20018 reported cost.
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18. 2 x EPYC 7742: \$15044 reported cost.
19. EPYC 7F32: \$2100 reported cost.
20. 2 x EPYC 7F32: \$4200 reported cost.
21. EPYC 7F52: \$3100 reported cost.
22. 2 x EPYC 7F52: \$6200 reported cost.

Blender 2.82

Performance / Cost - Blend File: Fishy Cat - Compute: CPU-Only

← Seconds x Dollar, Fewer Is Better

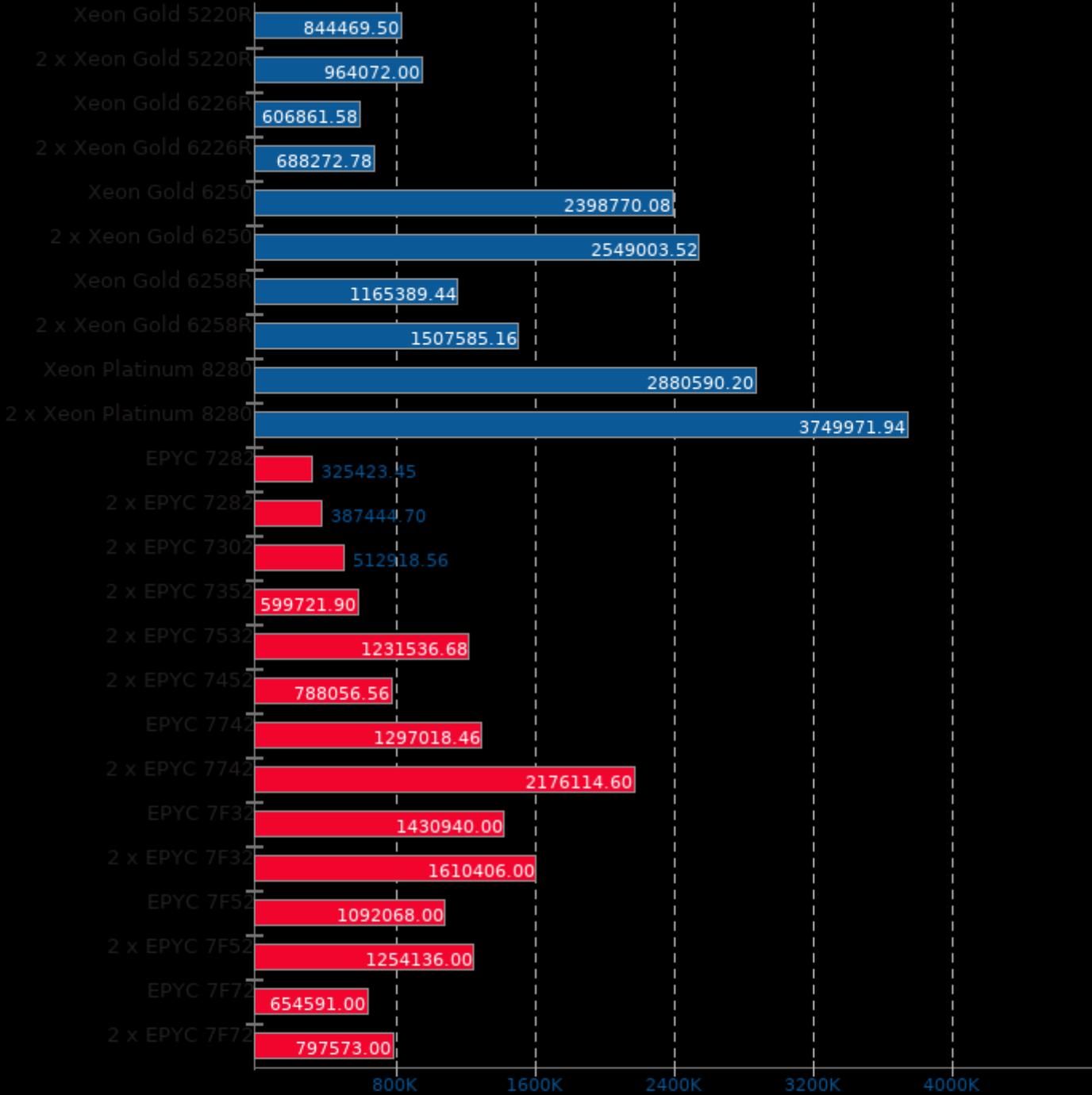


1. Xeon Gold 5220R: \$1850 reported cost.
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18. 2 x EPYC 7742: \$15044 reported cost.
19. EPYC 7F32: \$2100 reported cost.
20. 2 x EPYC 7F32: \$4200 reported cost.
21. EPYC 7F52: \$3100 reported cost.
22. 2 x EPYC 7F52: \$6200 reported cost.

Blender 2.82

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

← Seconds x Dollar, Fewer Is Better

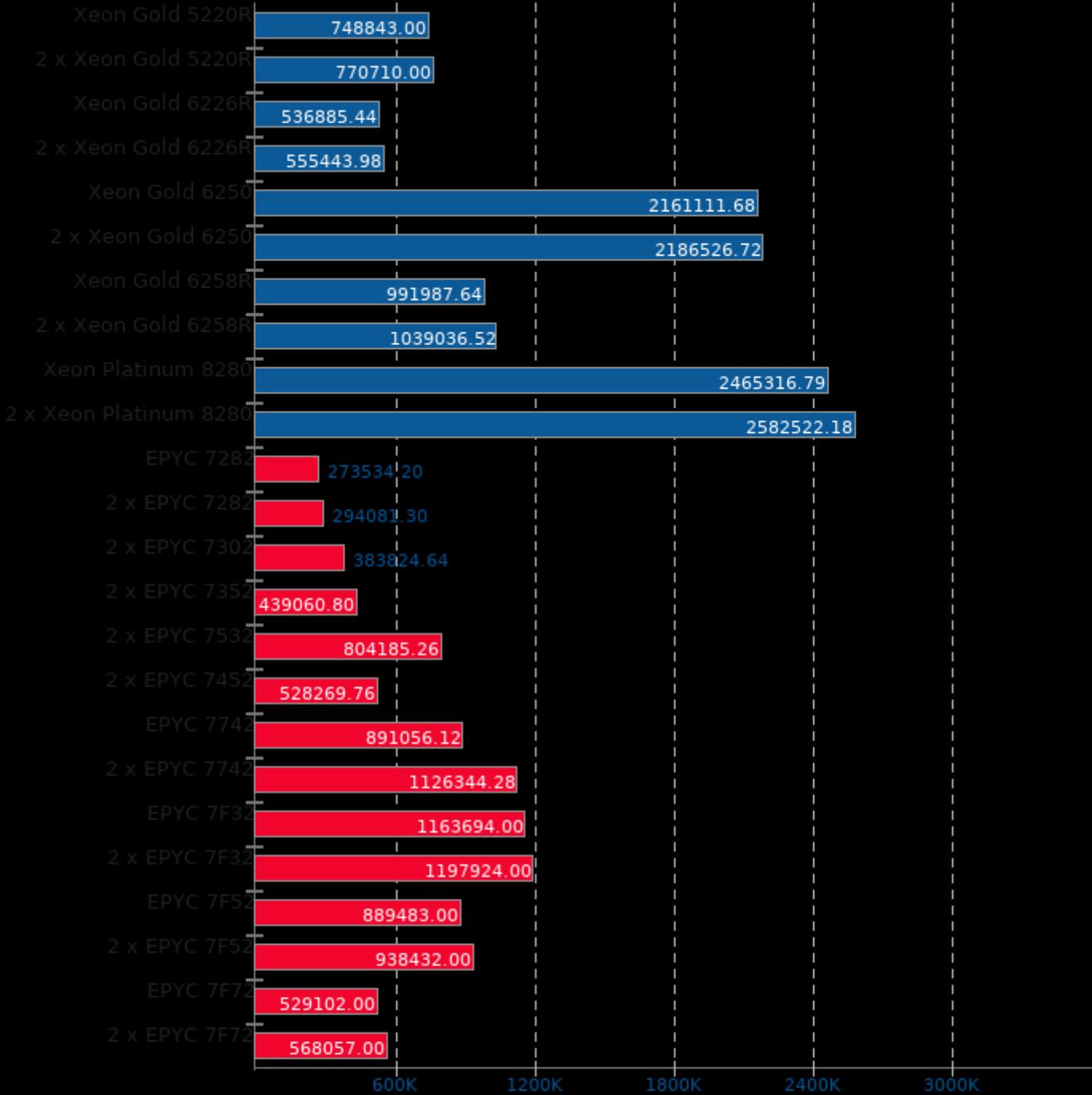


1. Xeon Gold 5220R: \$1850 reported cost.
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3. Xeon Gold 6226R: \$1339 reported cost.
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18. 2 x EPYC 7742: \$15044 reported cost.
19. EPYC 7F32: \$2100 reported cost.
20. 2 x EPYC 7F32: \$4200 reported cost.
21. EPYC 7F52: \$3100 reported cost.
22. 2 x EPYC 7F52: \$6200 reported cost.

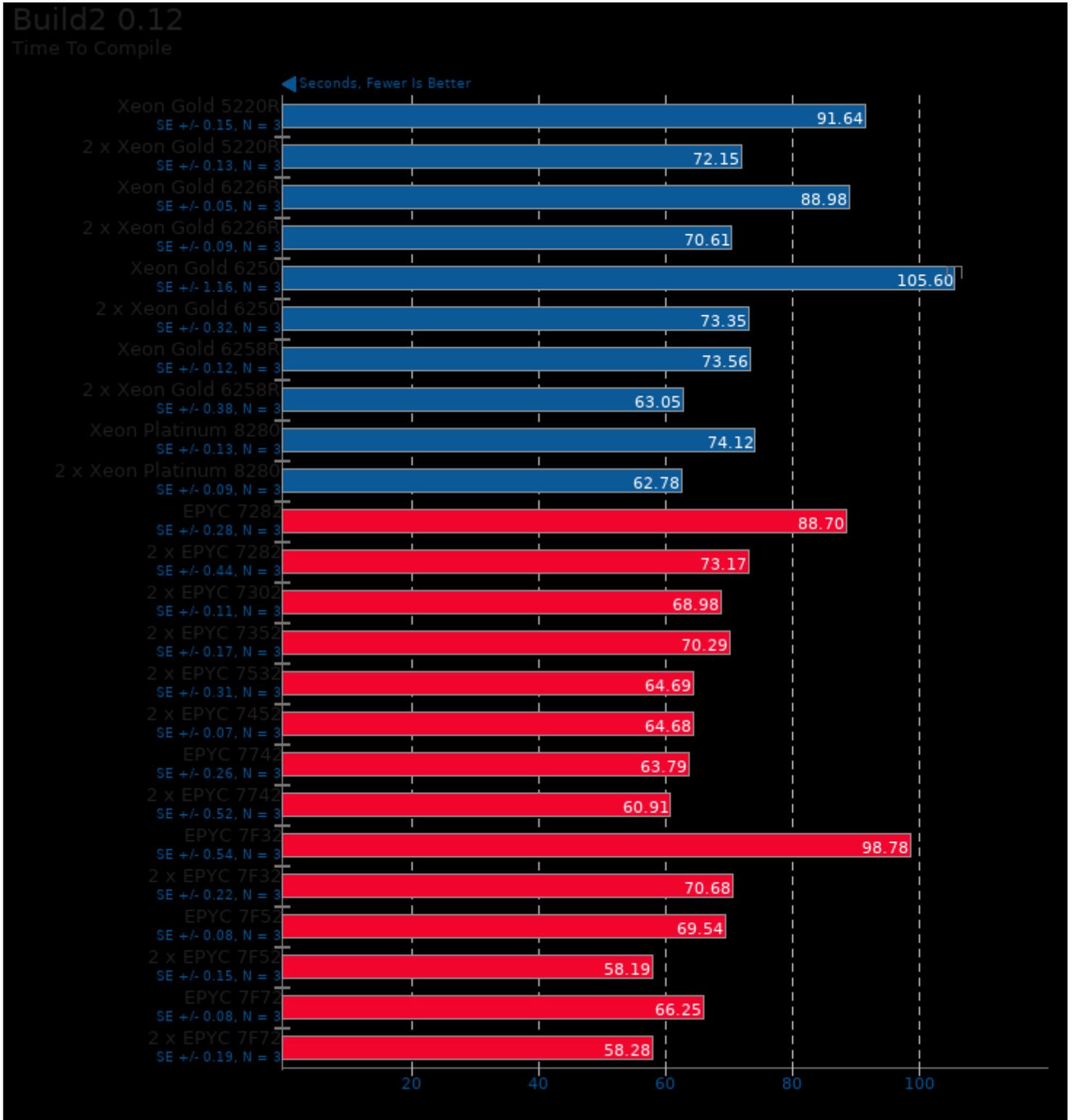
Blender 2.82

Performance / Cost - Blend File: Pabellon Barcelona - Compute: CPU-Only

← Seconds x Dollar, Fewer Is Better



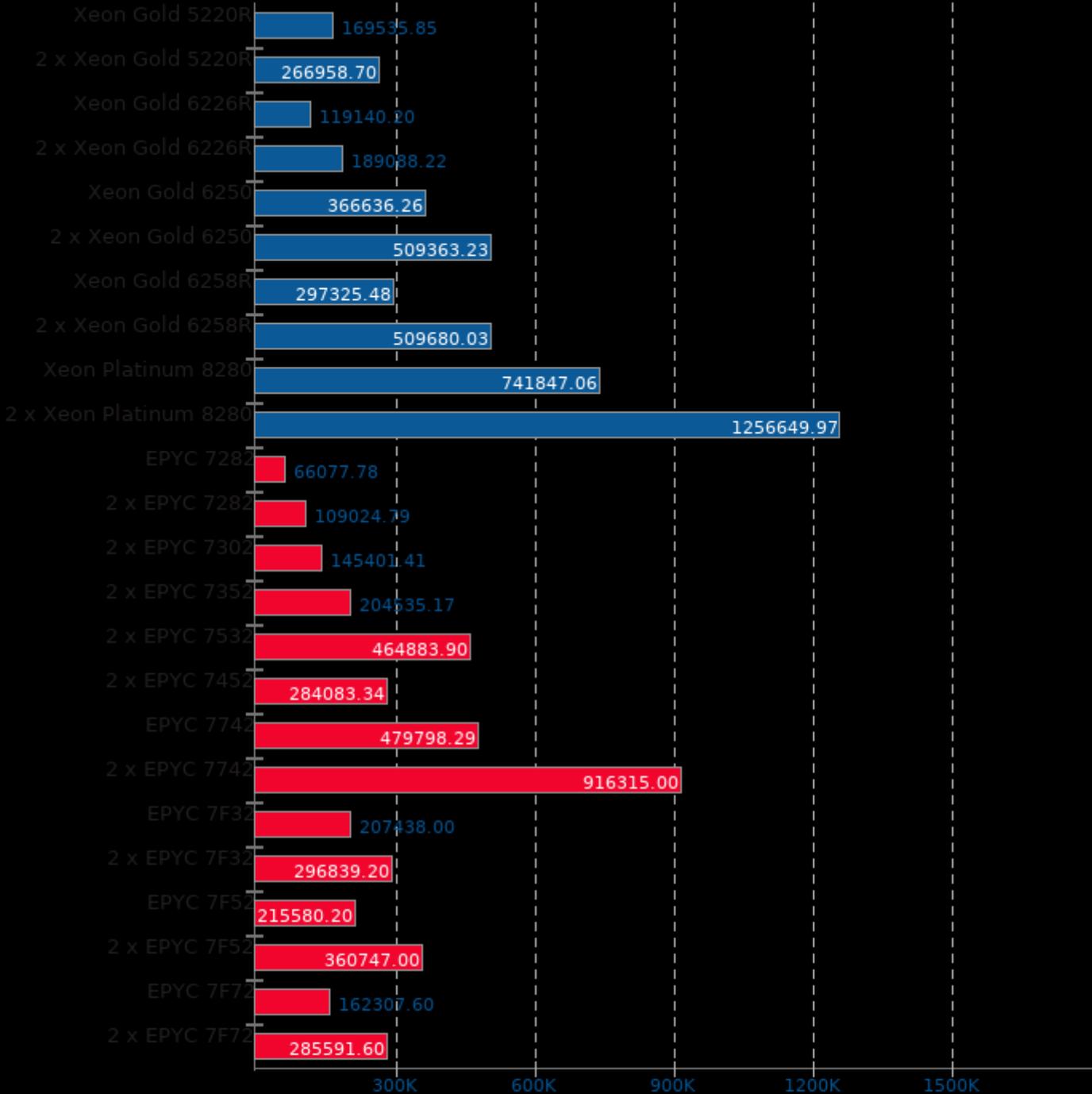
1. Xeon Gold 5220R: \$1850 reported cost.
2. 2 x Xeon Gold 5220R: \$3700 reported cost.
3. Xeon Gold 6226R: \$1339 reported cost.
4. 2 x Xeon Gold 6226R: \$2678 reported cost.
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17. EPYC 7742: \$7522 reported cost.
18. 2 x EPYC 7742: \$15044 reported cost.
19. EPYC 7F32: \$2100 reported cost.
20. 2 x EPYC 7F32: \$4200 reported cost.
21. EPYC 7F52: \$3100 reported cost.
22. 2 x EPYC 7F52: \$6200 reported cost.



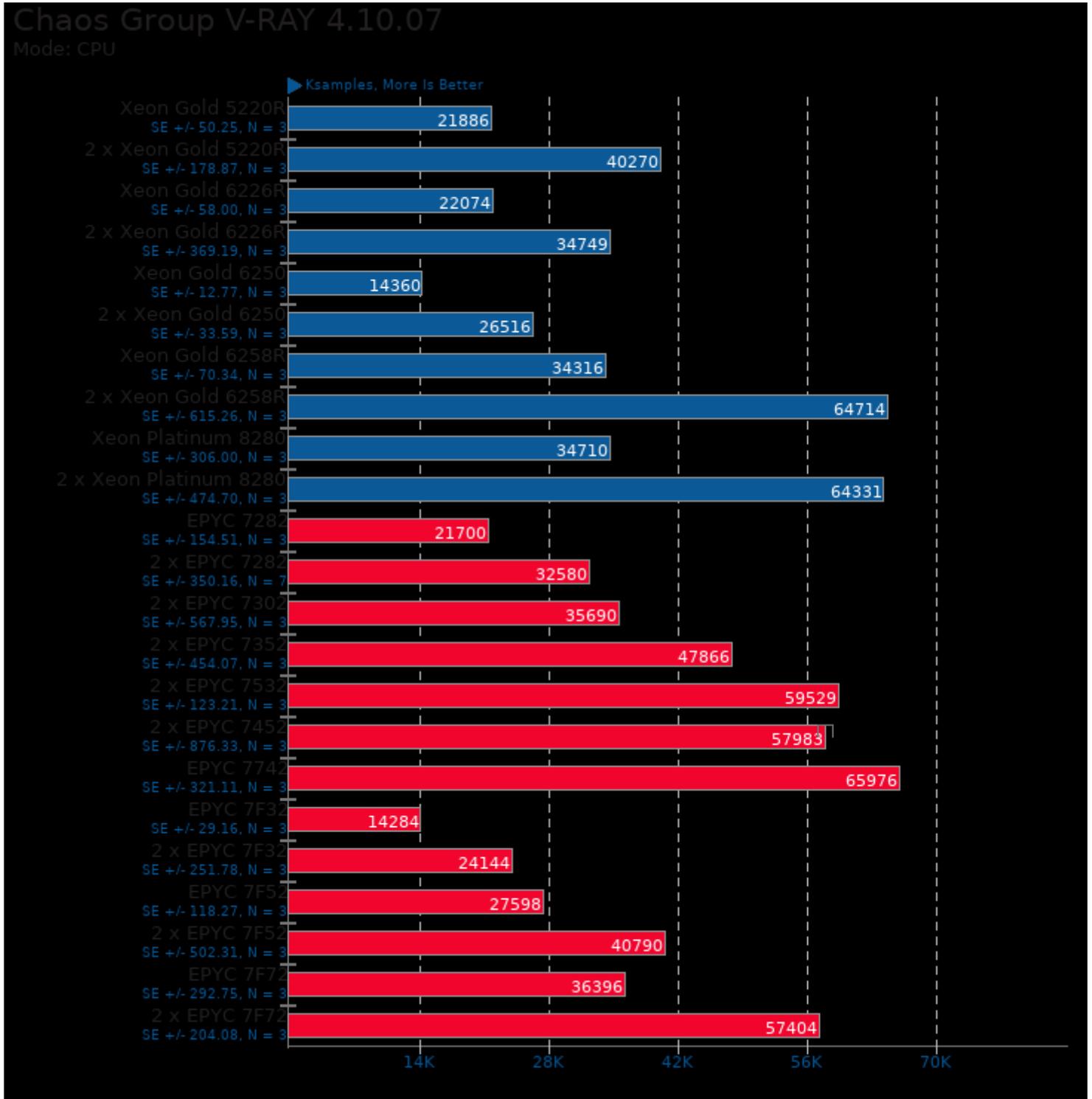
Build2 0.12

Performance / Cost - Time To Compile

Seconds x Dollar, Fewer Is Better



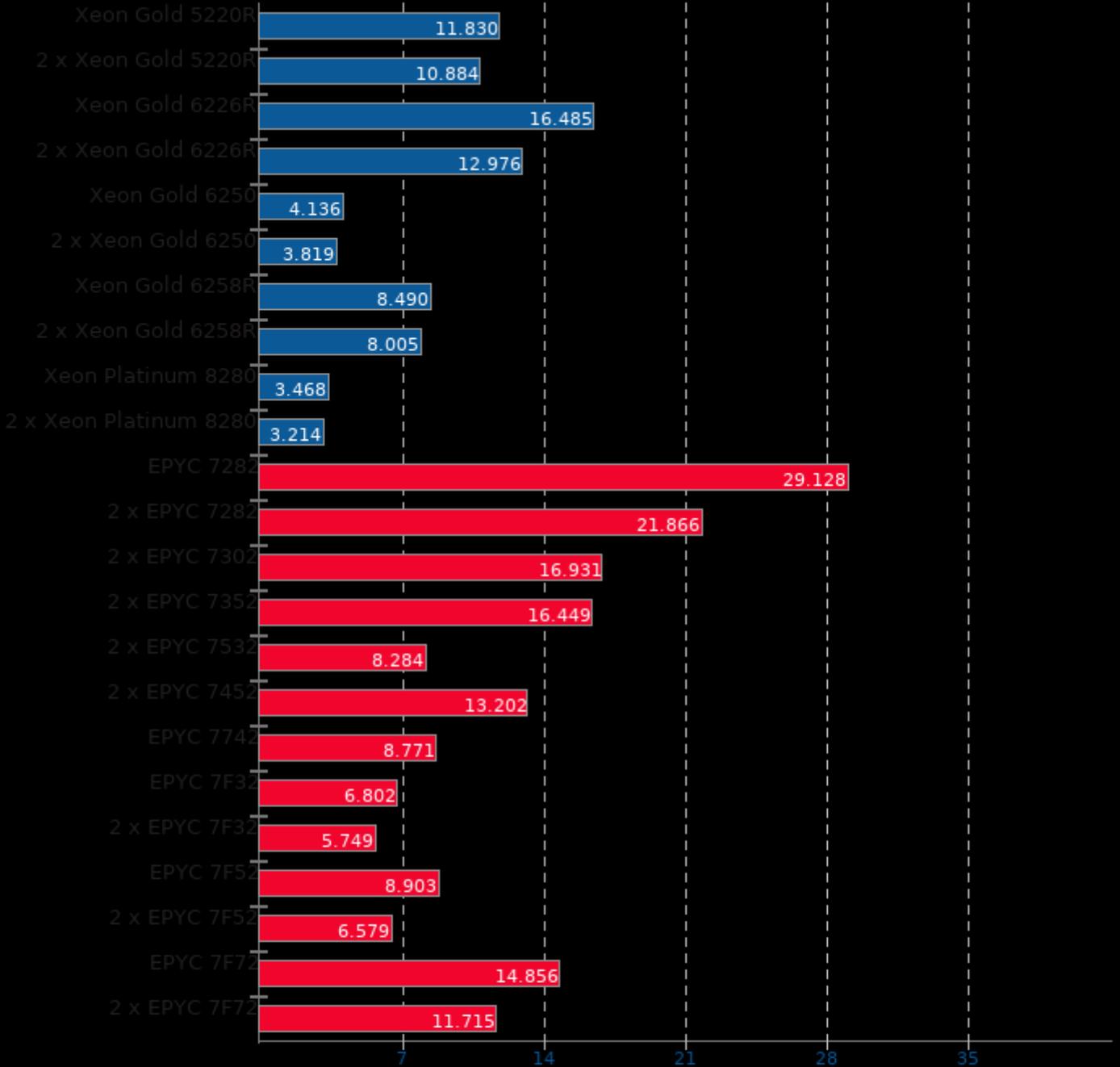
1. Xeon Gold 5220R: \$1850 reported cost.
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21. EPYC 7F52: \$3100 reported cost.
22. 2 x EPYC 7F52: \$6200 reported cost.



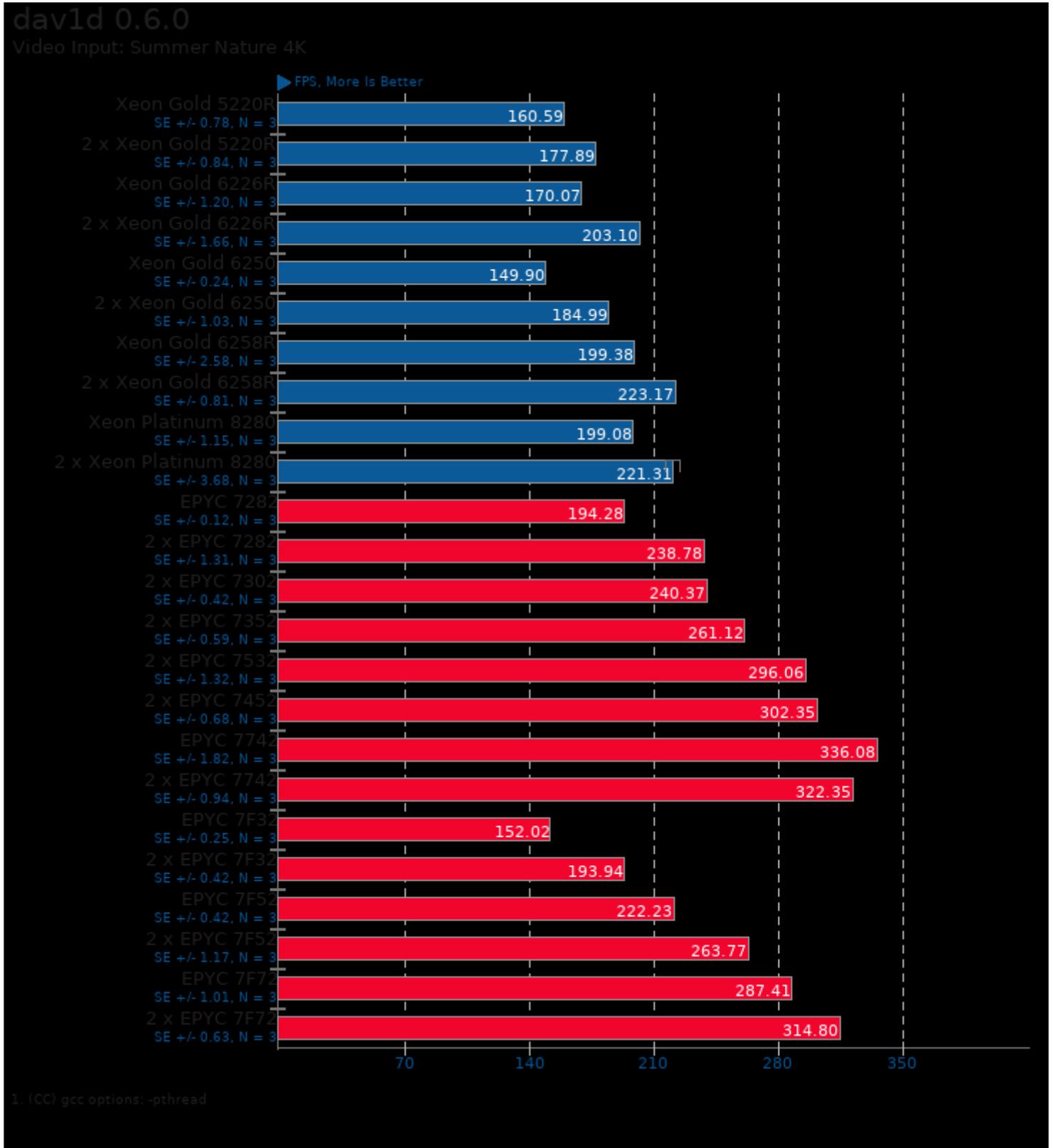
Chaos Group V-RAY 4.10.07

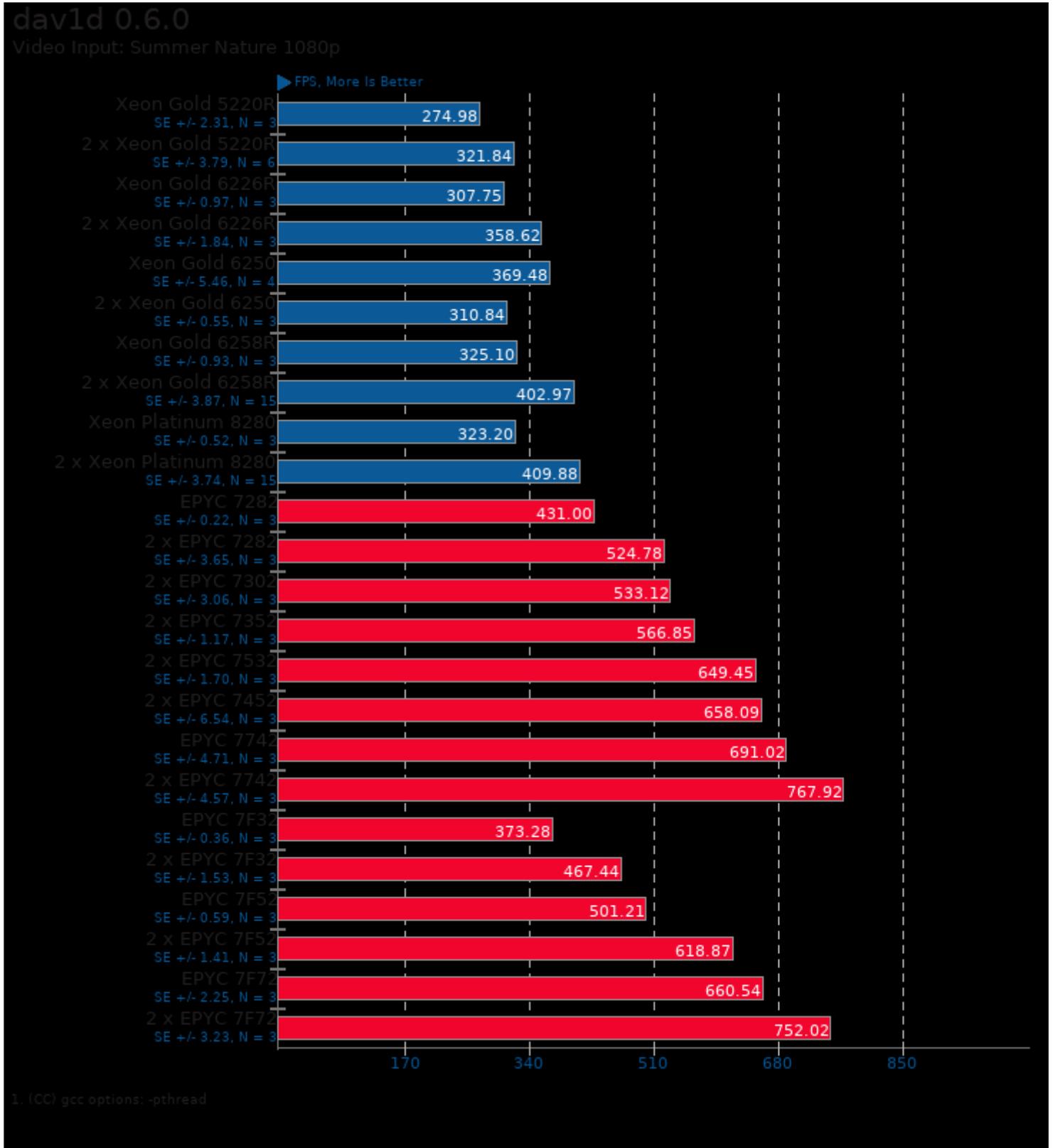
Performance / Cost - Mode: CPU

► Ksamples Per Dollar, More Is Better



1. Xeon Gold 5220R: \$1850 reported cost.
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17. EPYC 7742: \$7522 reported cost.
18. EPYC 7F32: \$2100 reported cost.
19. 2 x EPYC 7F32: \$4200 reported cost.
20. EPYC 7F52: \$3100 reported cost.
21. 2 x EPYC 7F52: \$6200 reported cost.
22. EPYC 7F72: \$2450 reported cost.
23. 2 x EPYC 7F72: \$4900 reported cost.

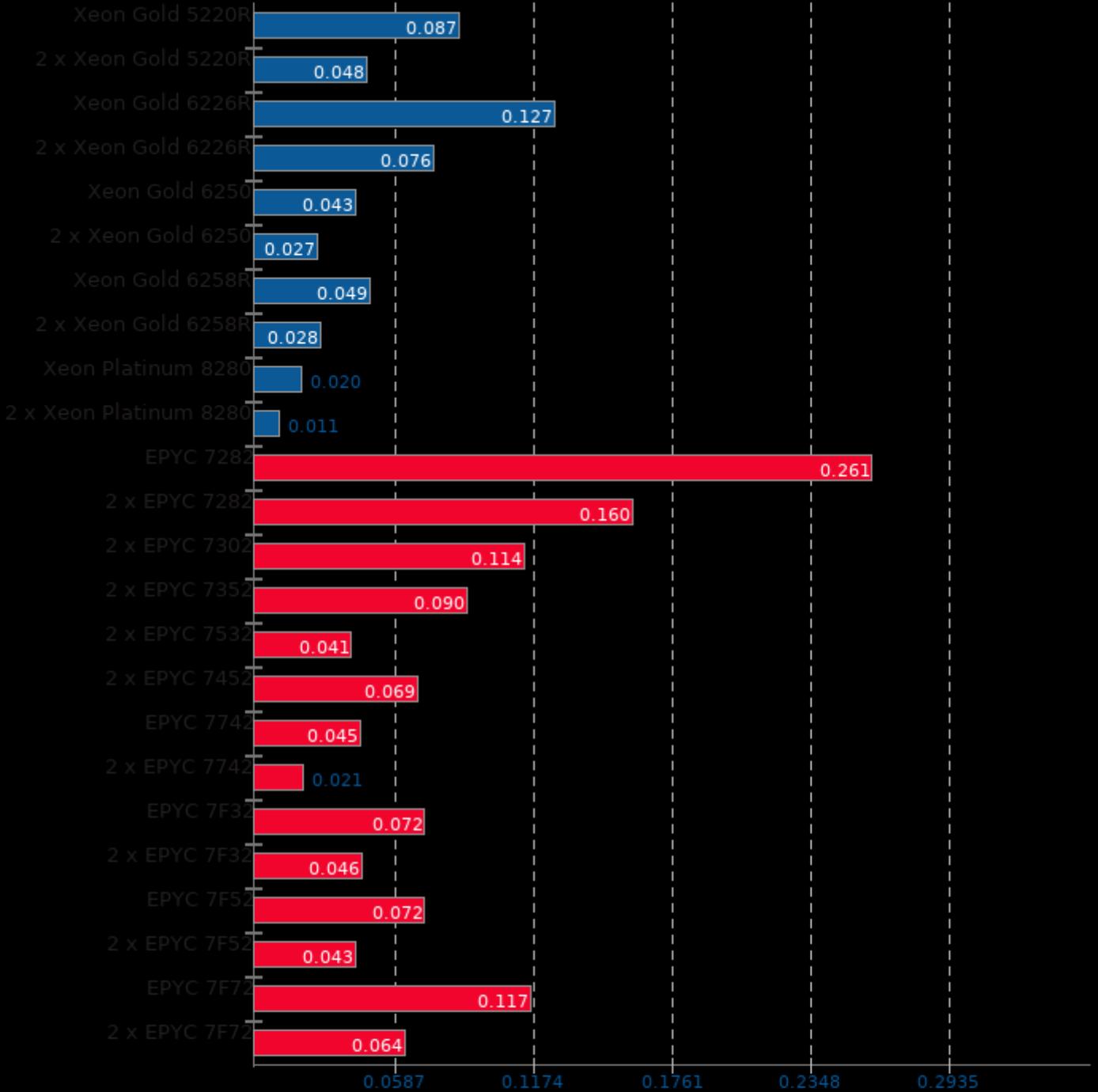




dav1d 0.6.0

Performance / Cost - Video Input: Summer Nature 4K

FPS Per Dollar, More Is Better

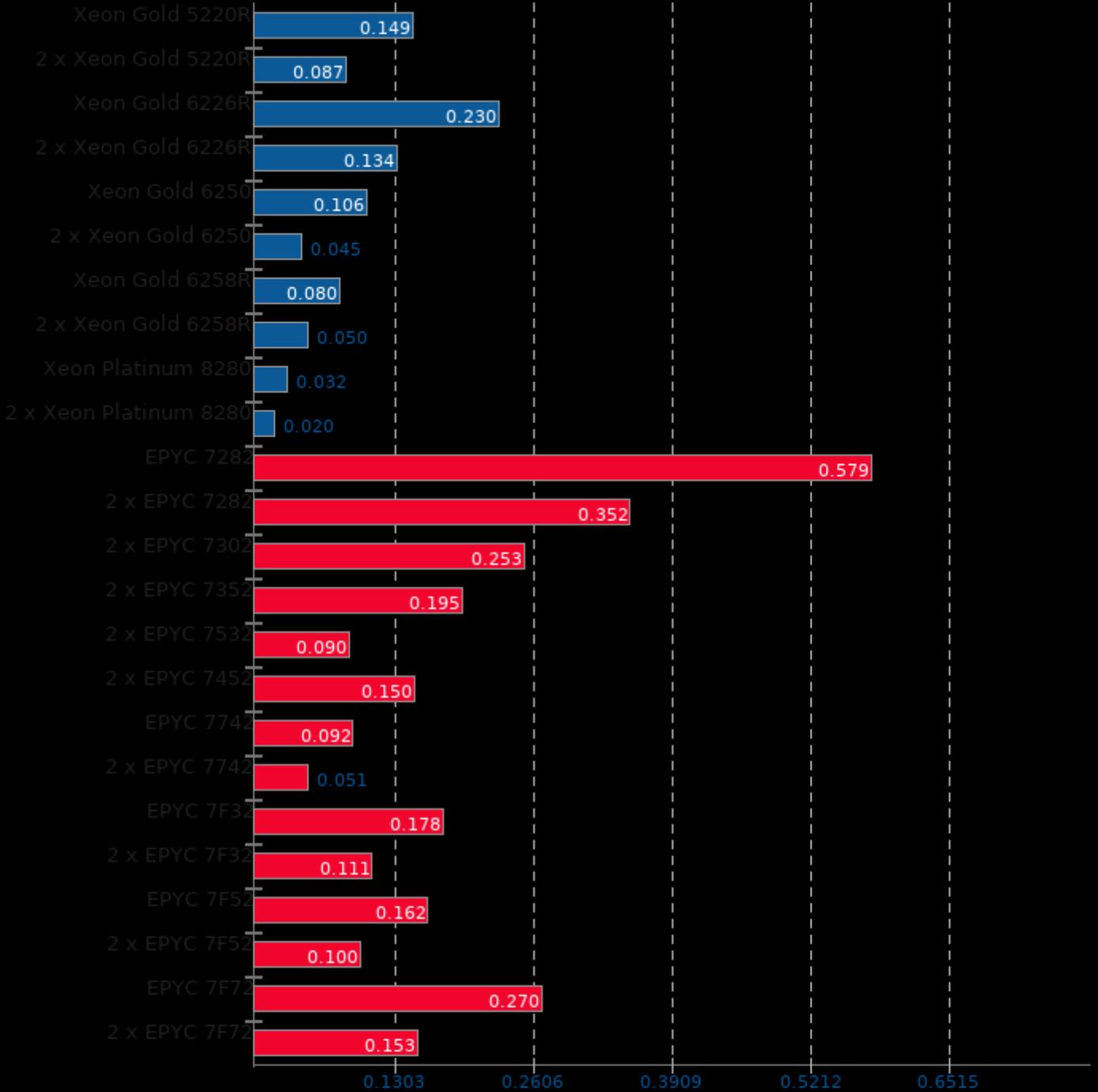


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21. EPYC 7F52: \$3100 reported cost.
22. 2 x EPYC 7F52: \$6200 reported cost.

dav1d 0.6.0

Performance / Cost - Video Input: Summer Nature 1080p

FPS Per Dollar, More Is Better

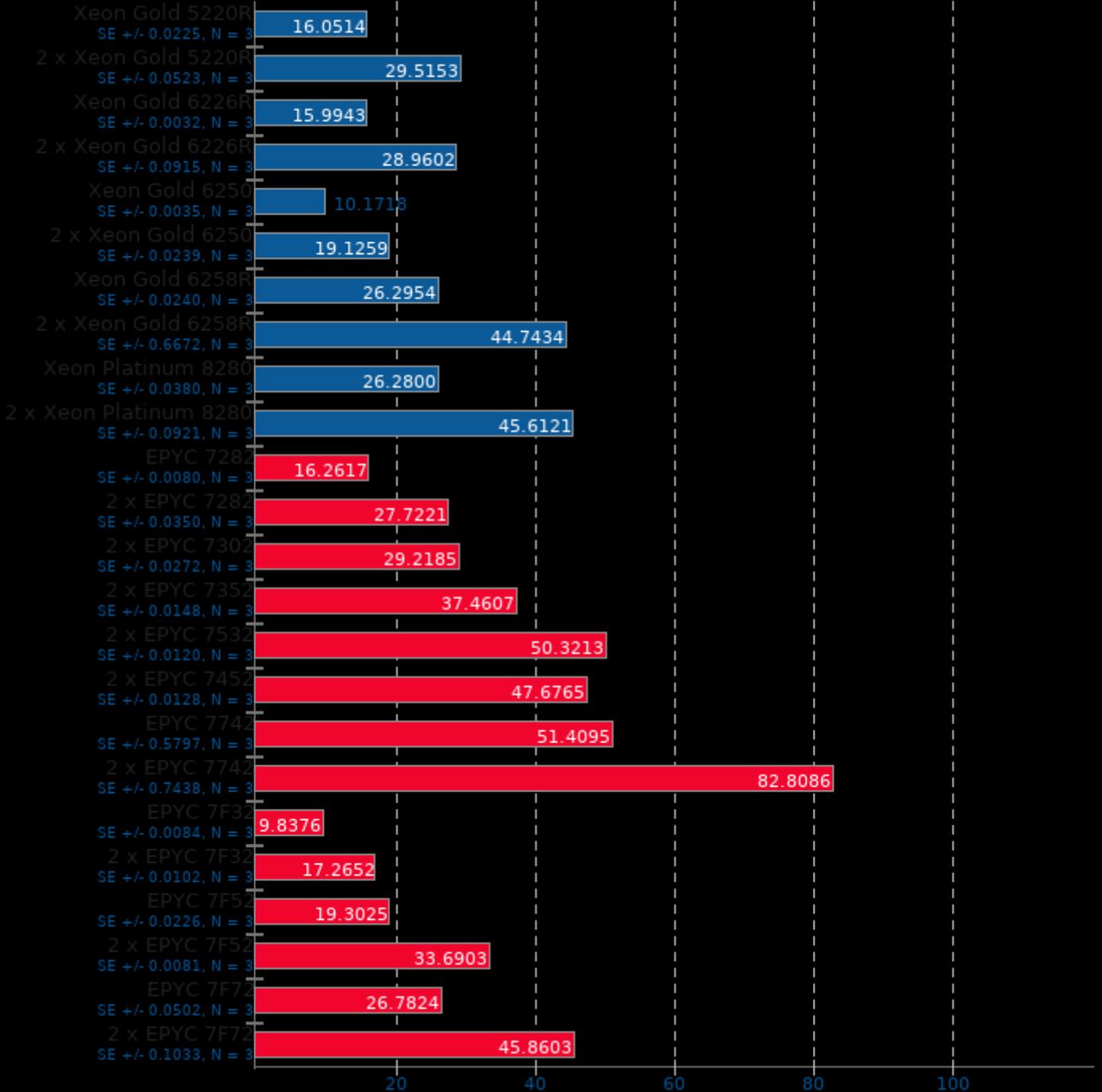


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21. EPYC 7F52: \$3100 reported cost.
22. 2 x EPYC 7F52: \$6200 reported cost.

Embree 3.6.1

Binary: Pathtracer - Model: Crown

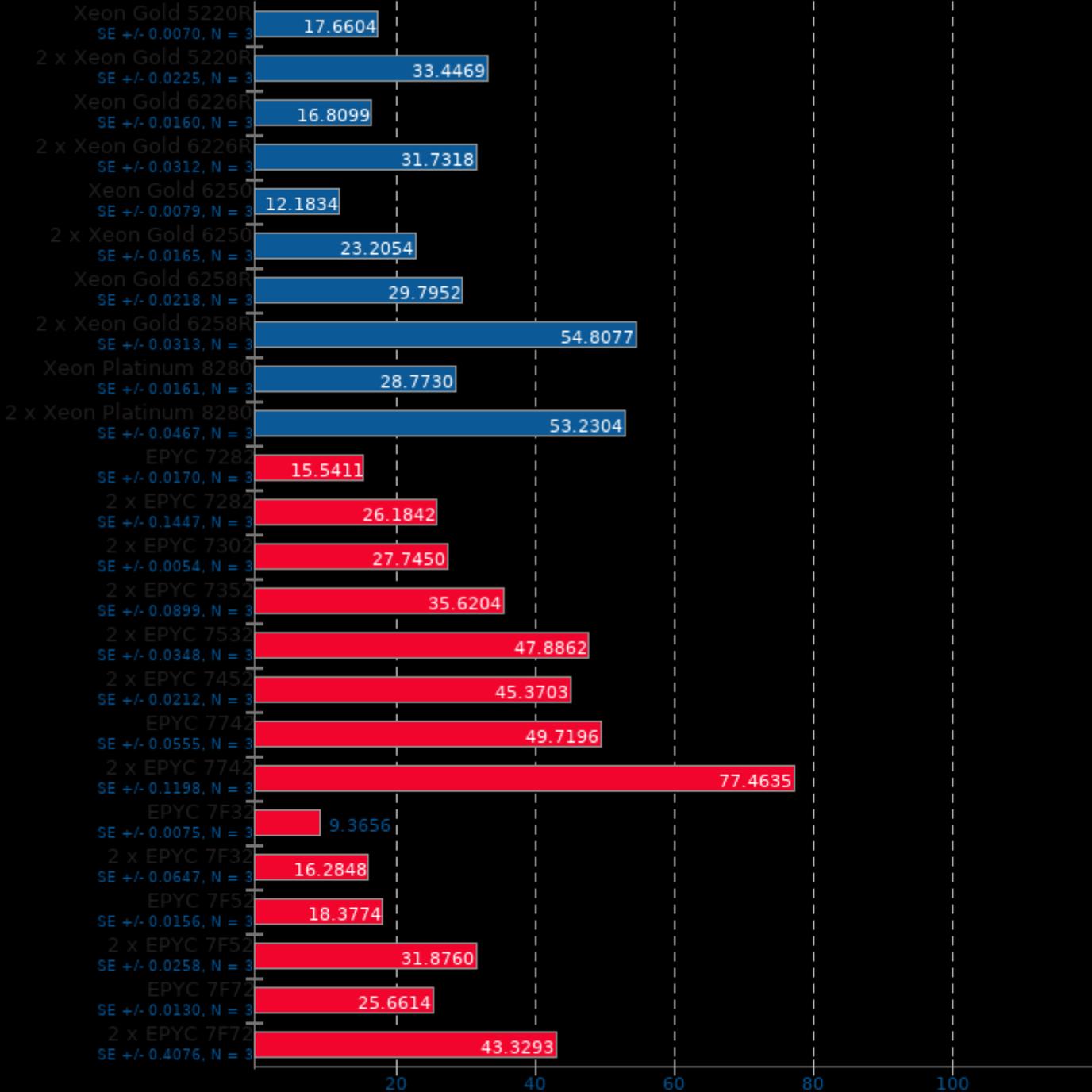
▶ Frames Per Second, More Is Better



Embree 3.6.1

Binary: Pathtracer ISPC - Model: Crown

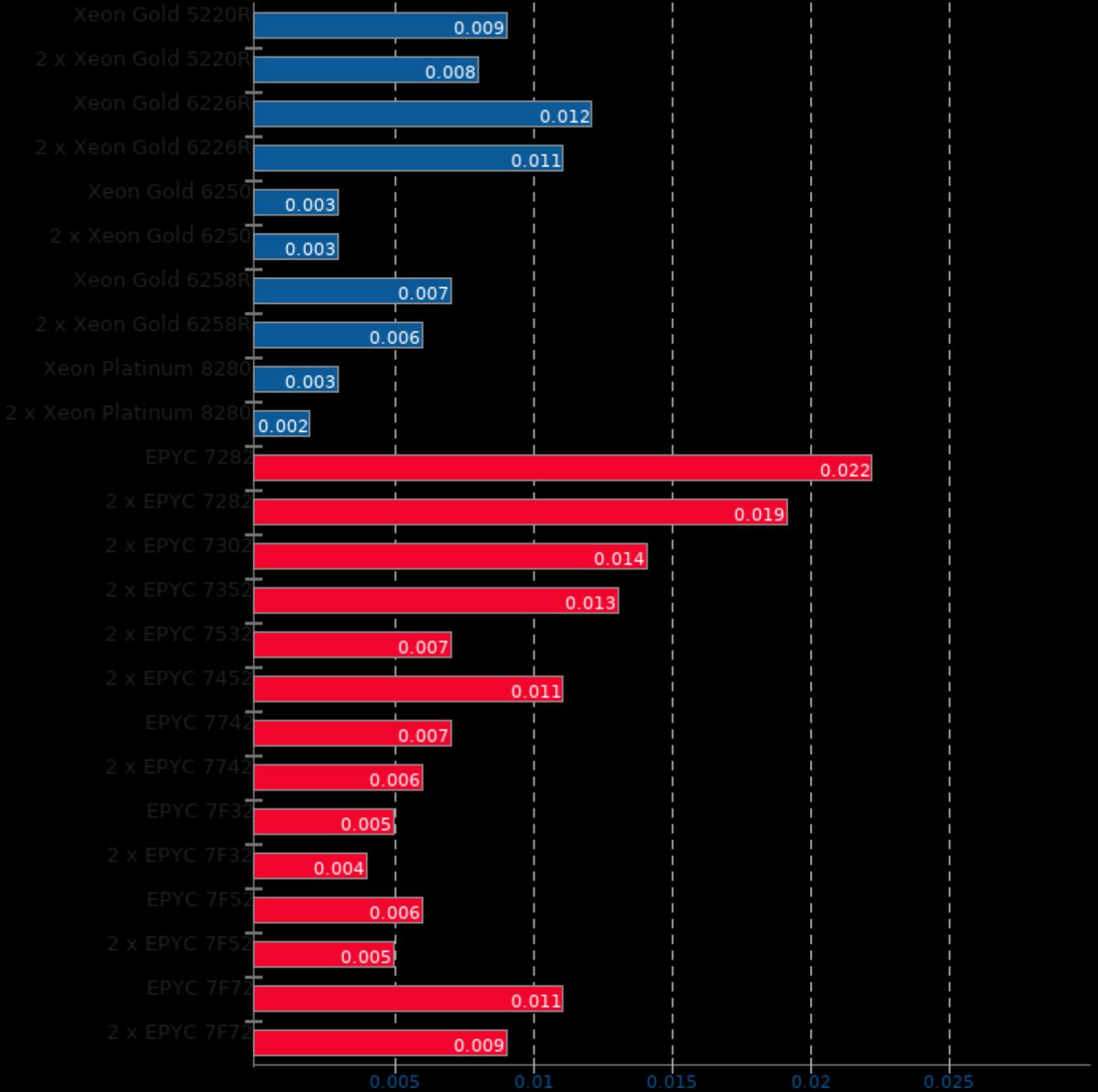
▶ Frames Per Second, More Is Better



Embree 3.6.1

Performance / Cost - Binary: Pathtracer - Model: Crown

▶ Frames Per Second Per Dollar, More Is Better

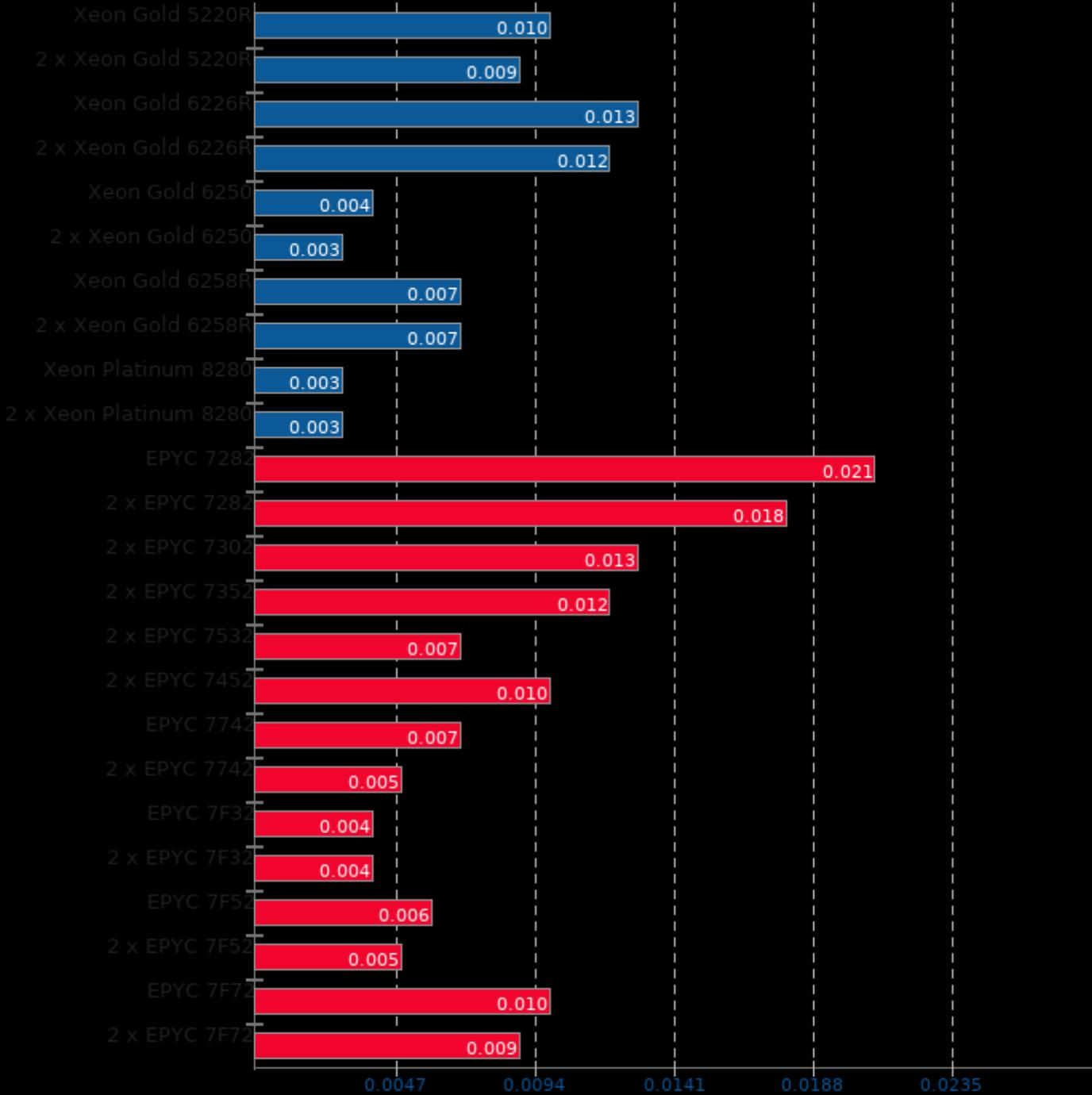


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20. 2 x EPYC 7F32: \$4200 reported cost.
21. EPYC 7F52: \$3100 reported cost.
22. 2 x EPYC 7F52: \$6200 reported cost.

Embree 3.6.1

Performance / Cost - Binary: Pathtracer ISPC - Model: Crown

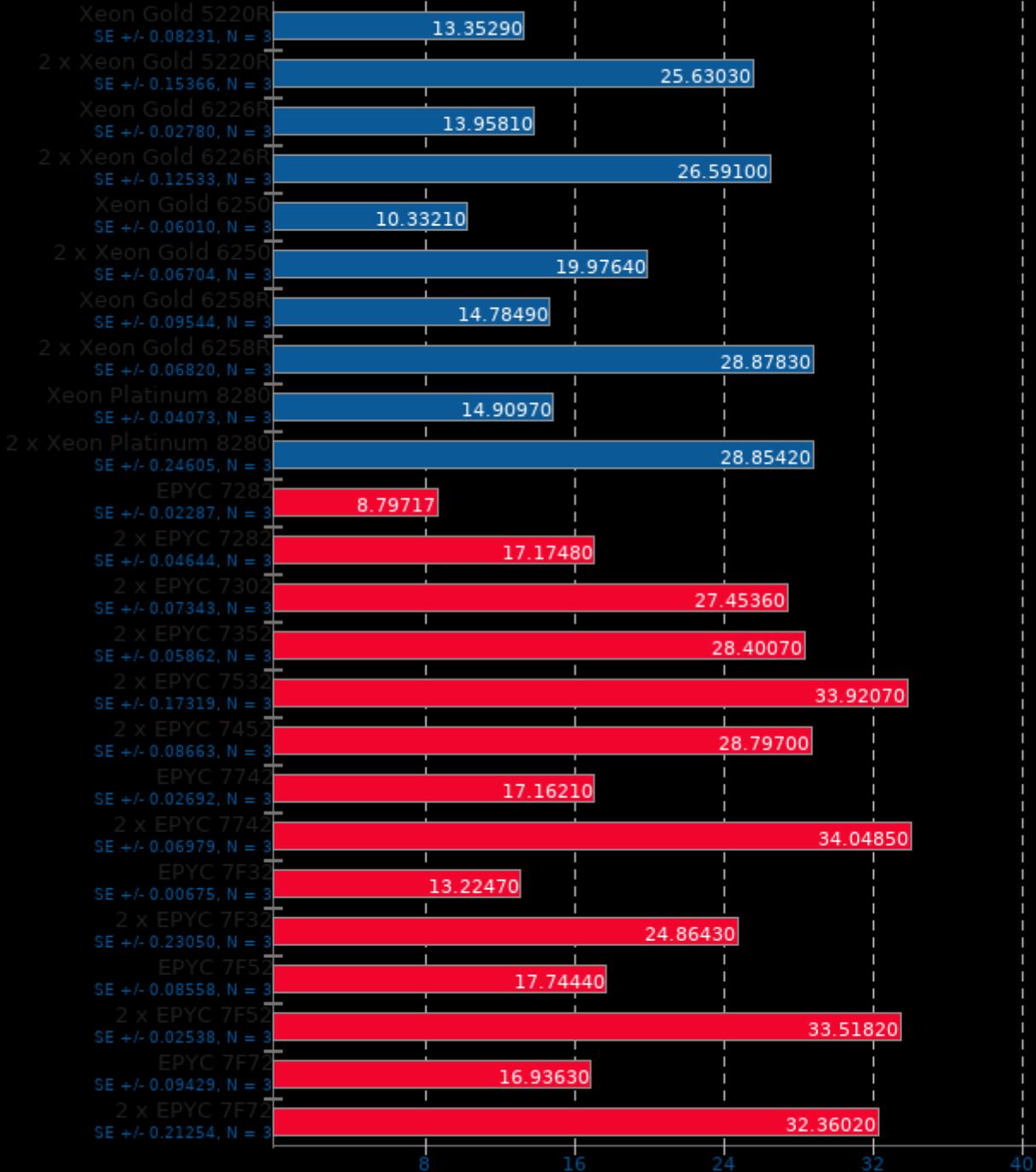
▶ Frames Per Second Per Dollar, More Is Better



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20. 2 x EPYC 7F32: \$4200 reported cost.
21. EPYC 7F52: \$3100 reported cost.
22. 2 x EPYC 7F52: \$6200 reported cost.

High Performance Conjugate Gradient 3.1

GFLOP/s, More Is Better

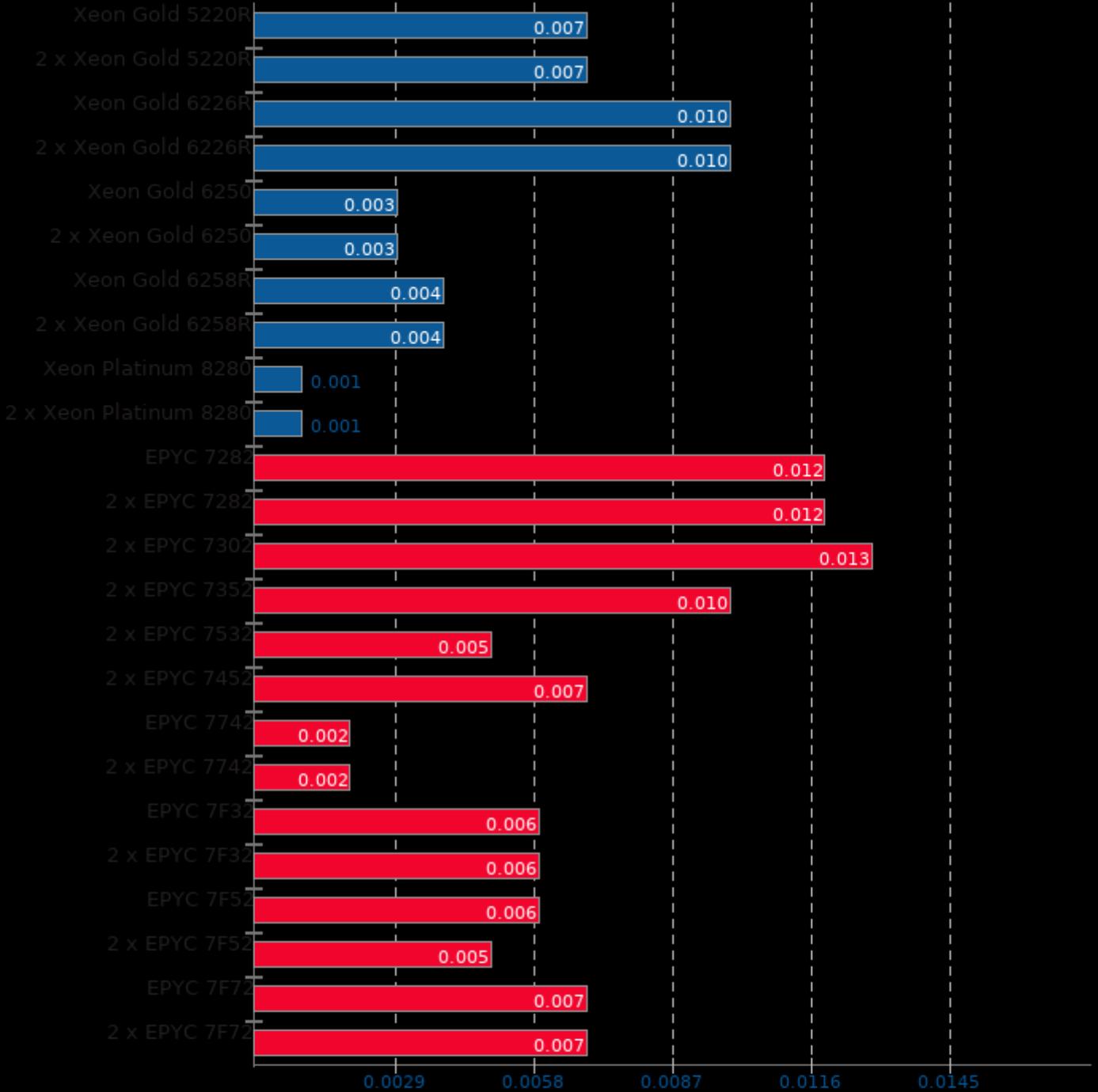


1. (CXX) g++ options: -O3 -fast-math -ftree-vectorize -pthread -mpi_cxx -mpi

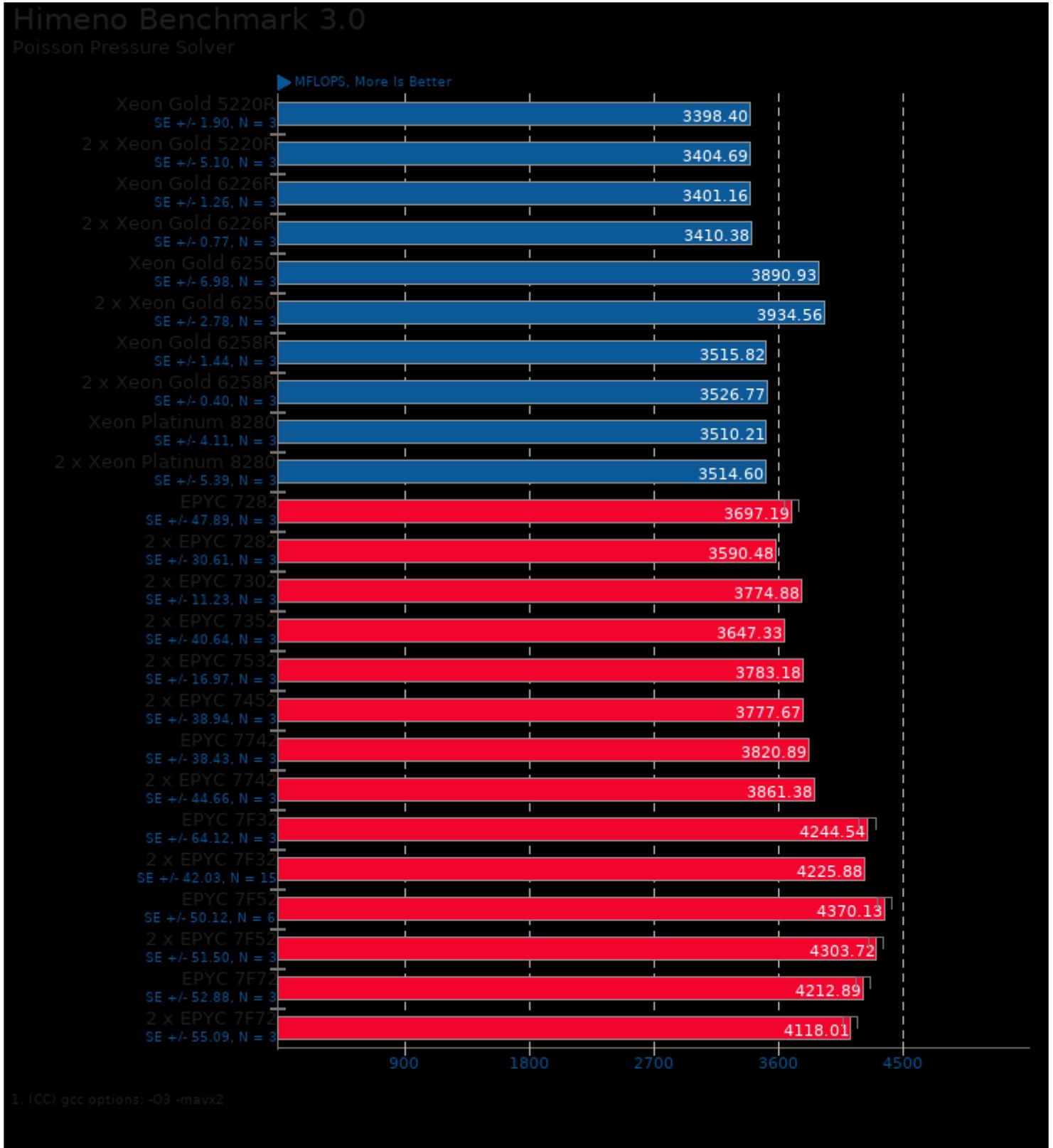
High Performance Conjugate Gradient 3.1

Performance / Cost

GFLOPs Per Dollar, More Is Better



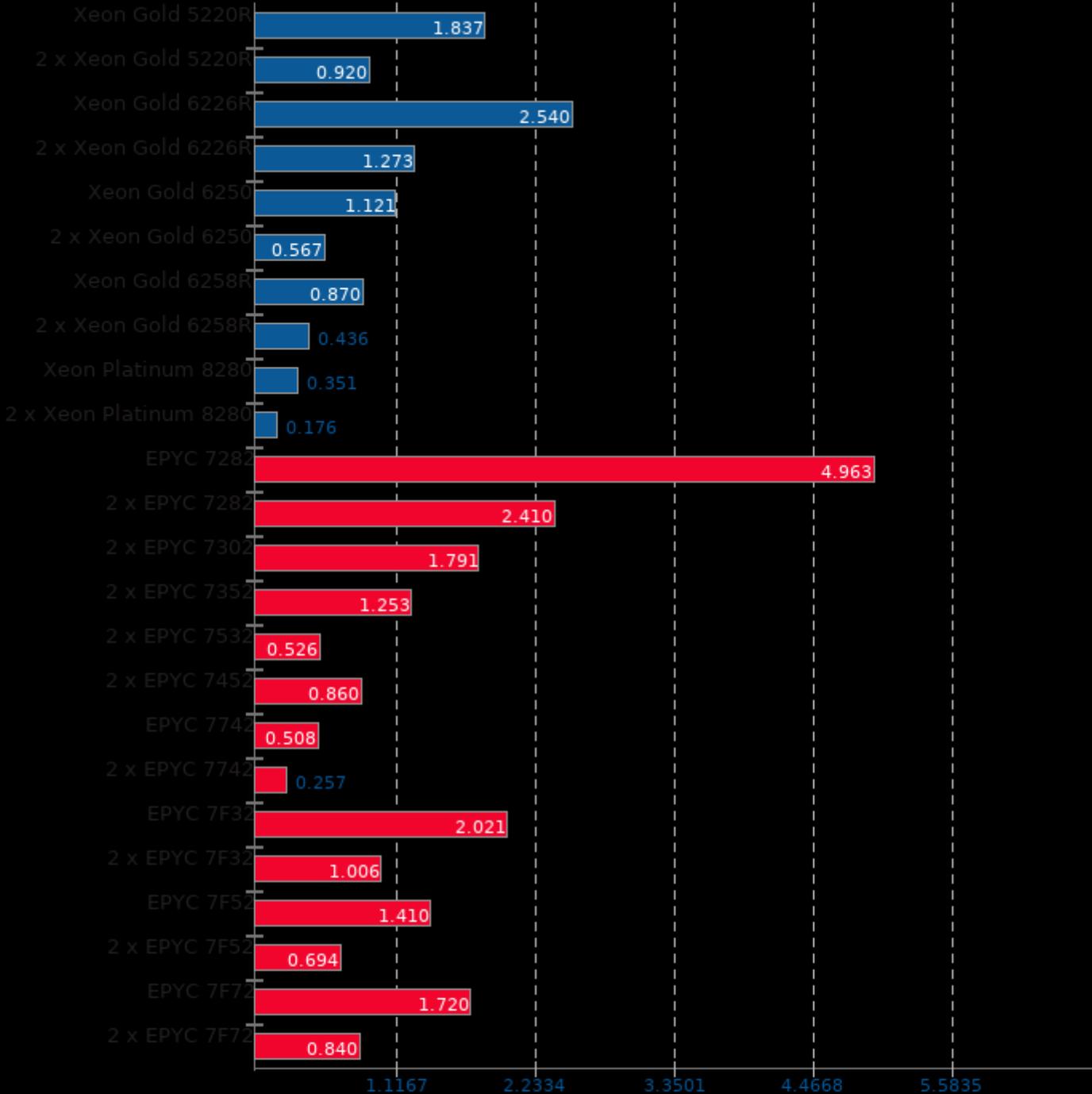
1. Xeon Gold 5220R: \$1850 reported cost.
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21. EPYC 7F52: \$3100 reported cost.
22. 2 x EPYC 7F52: \$6200 reported cost.



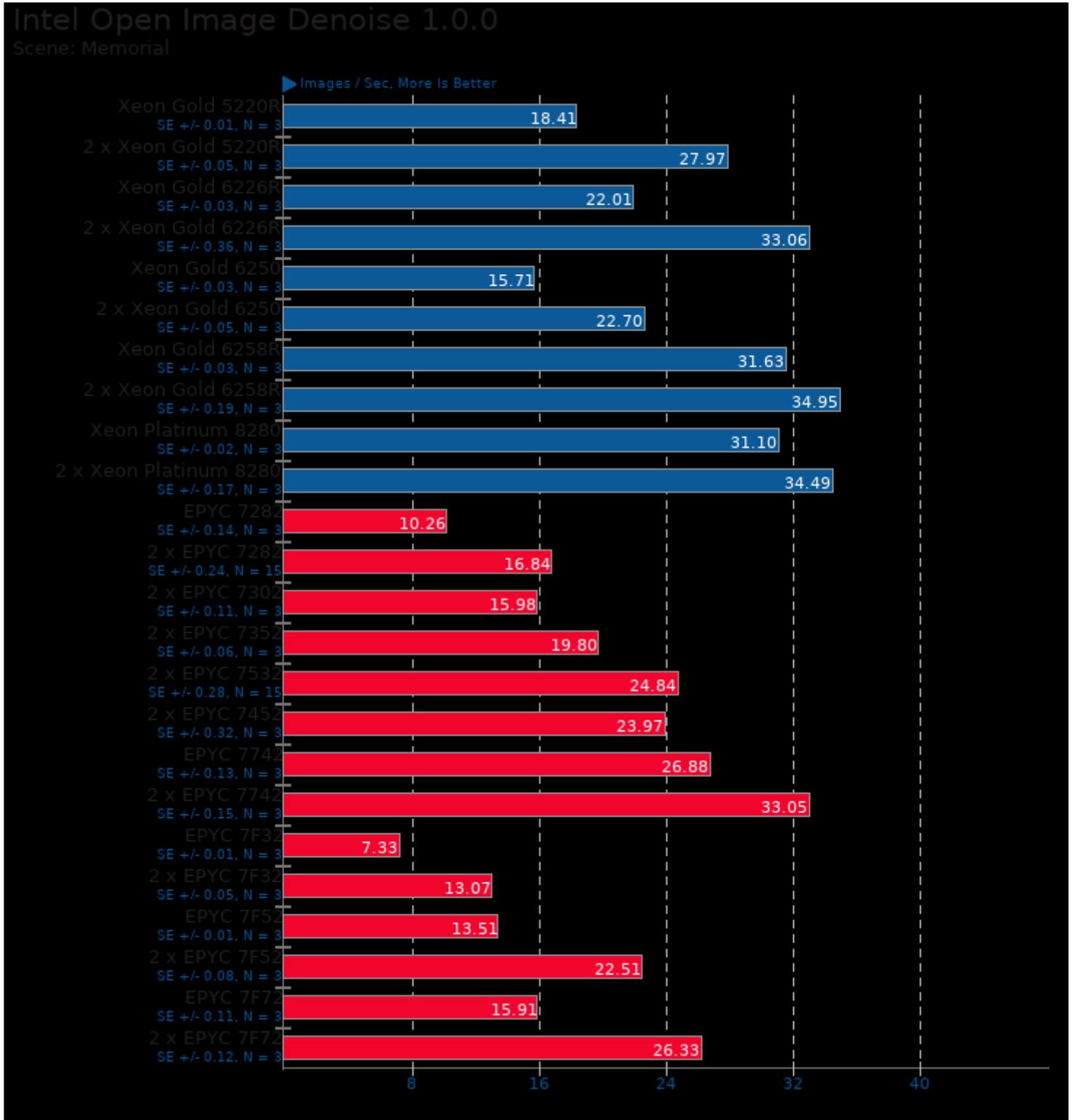
Himeno Benchmark 3.0

Performance / Cost - Poisson Pressure Solver

MFLOPS Per Dollar, More Is Better



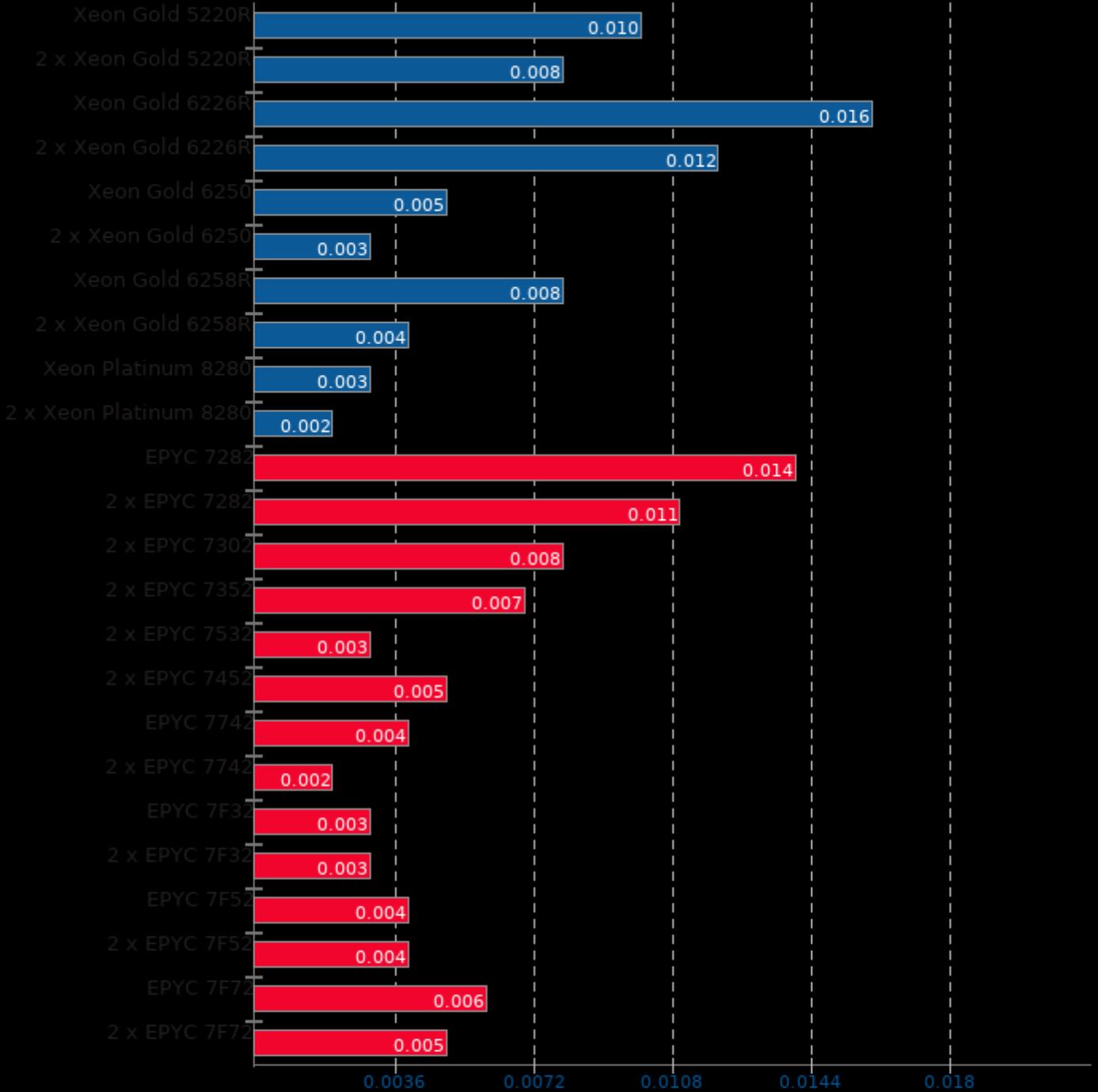
1. Xeon Gold 5220R: \$1850 reported cost.
2. 2 x Xeon Gold 5220R: \$3700 reported cost.
3. Xeon Gold 6226R: \$1339 reported cost.
4. 2 x Xeon Gold 6226R: \$2678 reported cost.
5. Xeon Gold 6250: \$3472 reported cost.
6. 2 x Xeon Gold 6250: \$6944 reported cost.
7. Xeon Gold 6258R: \$4042 reported cost.
8. 2 x Xeon Gold 6258R: \$8084 reported cost.
9. Xeon Platinum 8280: \$10009 reported cost.
10. 2 x Xeon Platinum 8280: \$20018 reported cost.
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20. 2 x EPYC 7F32: \$4200 reported cost.
21. EPYC 7F52: \$3100 reported cost.
22. 2 x EPYC 7F52: \$6200 reported cost.



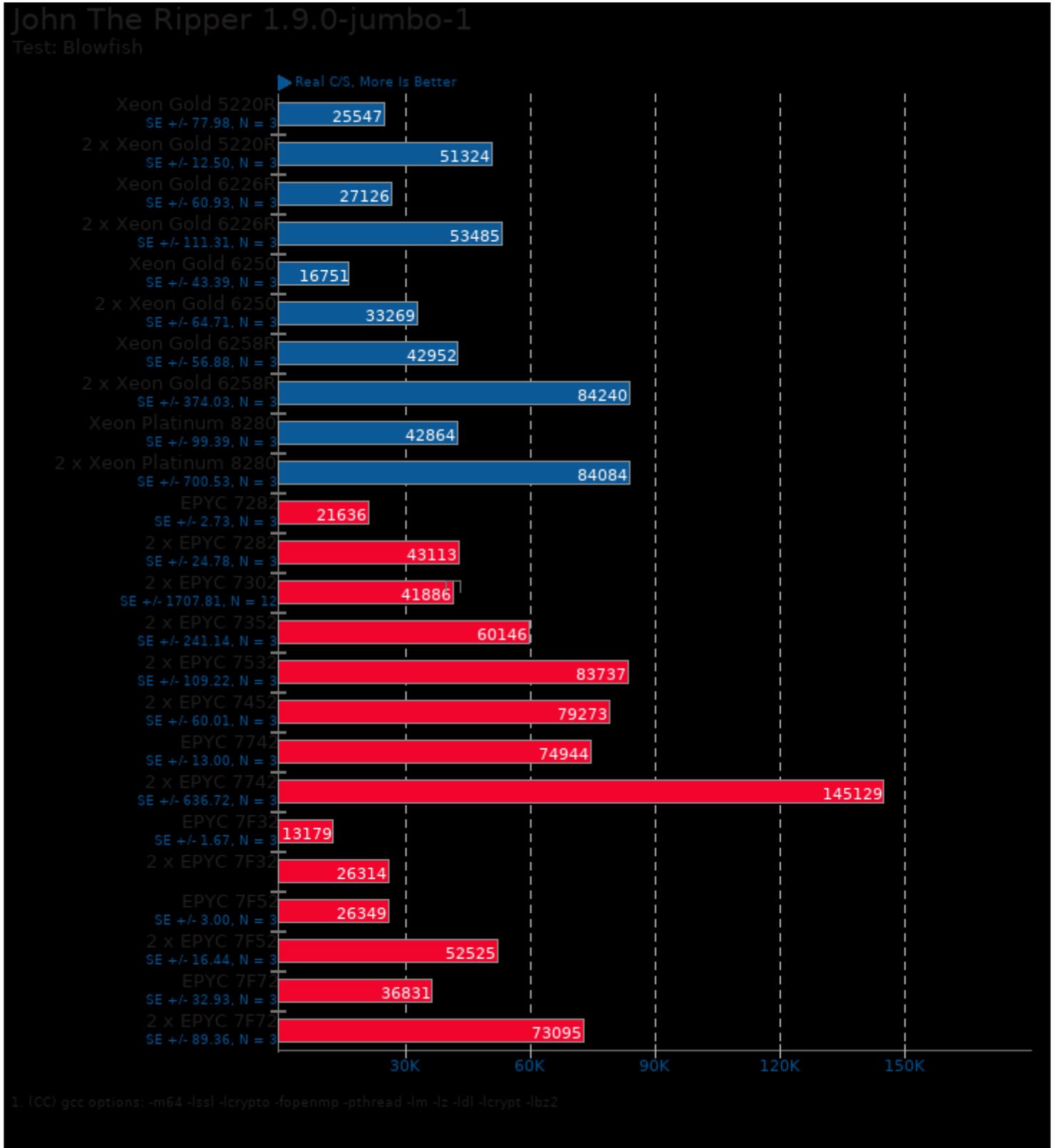
Intel Open Image Denoise 1.0.0

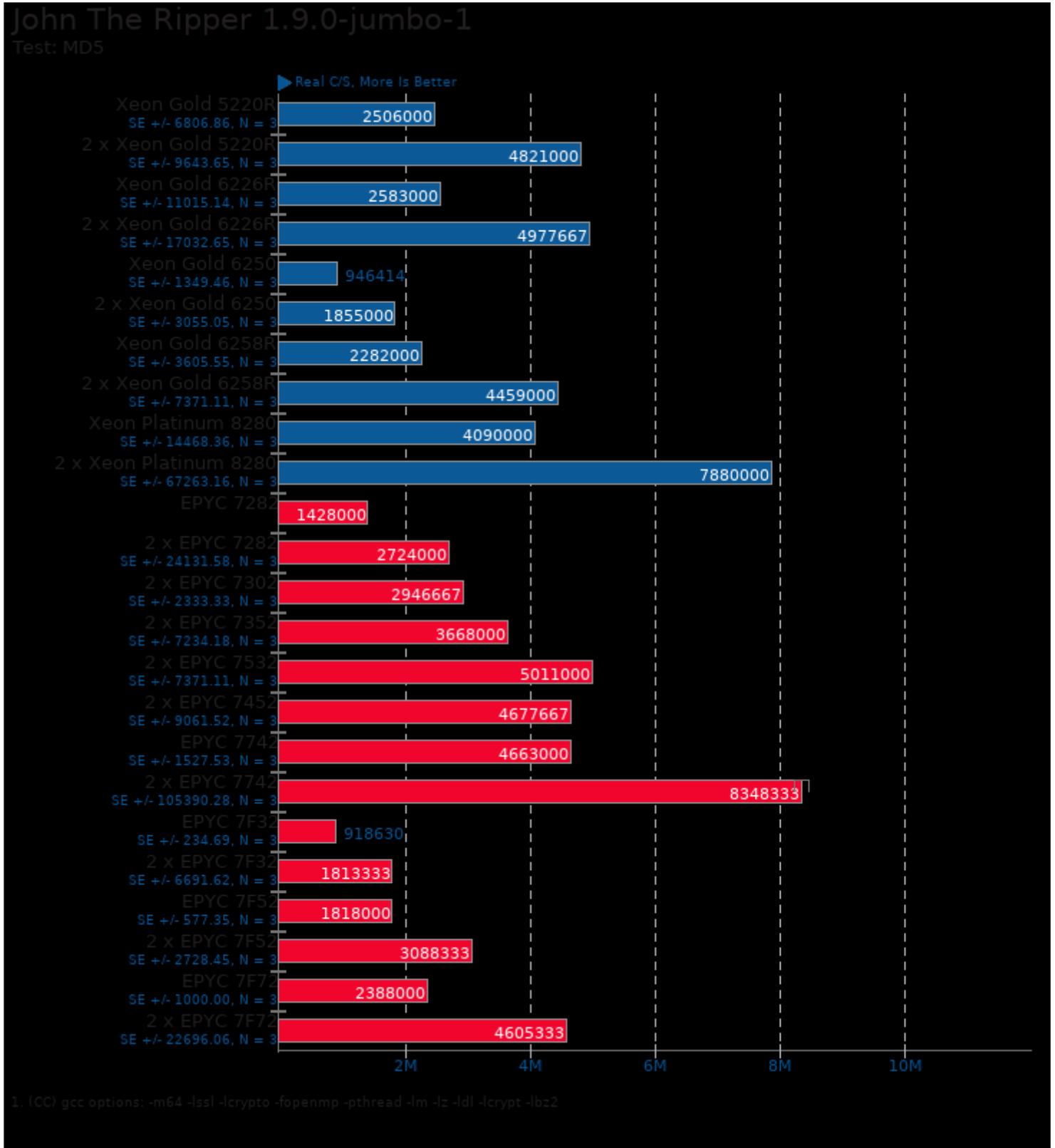
Performance / Cost - Scene: Memorial

Images / Sec Per Dollar, More Is Better



1. Xeon Gold 5220R: \$1850 reported cost.
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3. Xeon Gold 6226R: \$1339 reported cost.
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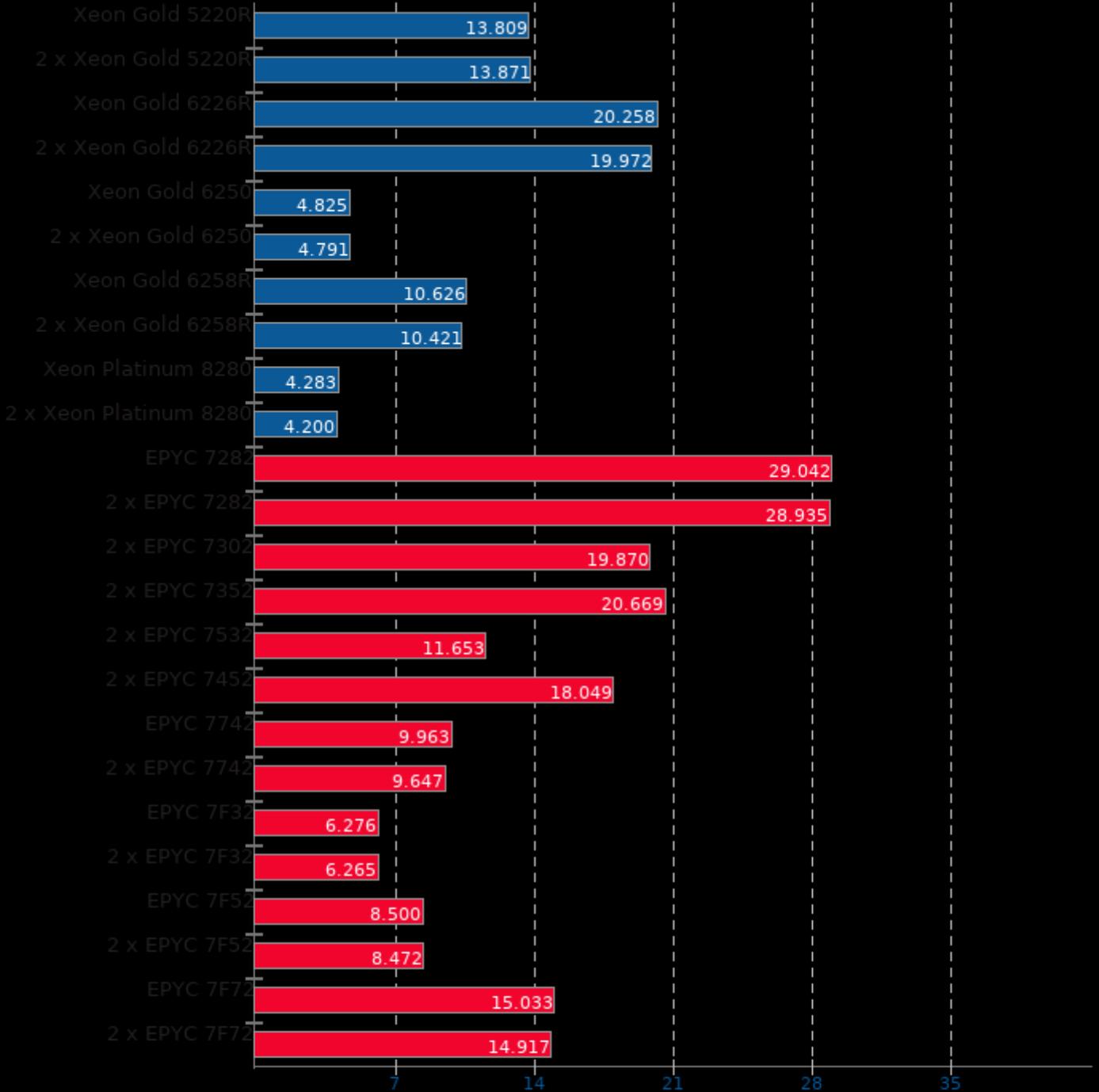




John The Ripper 1.9.0-jumbo-1

Performance / Cost - Test: Blowfish

Real C/S Per Dollar, More Is Better

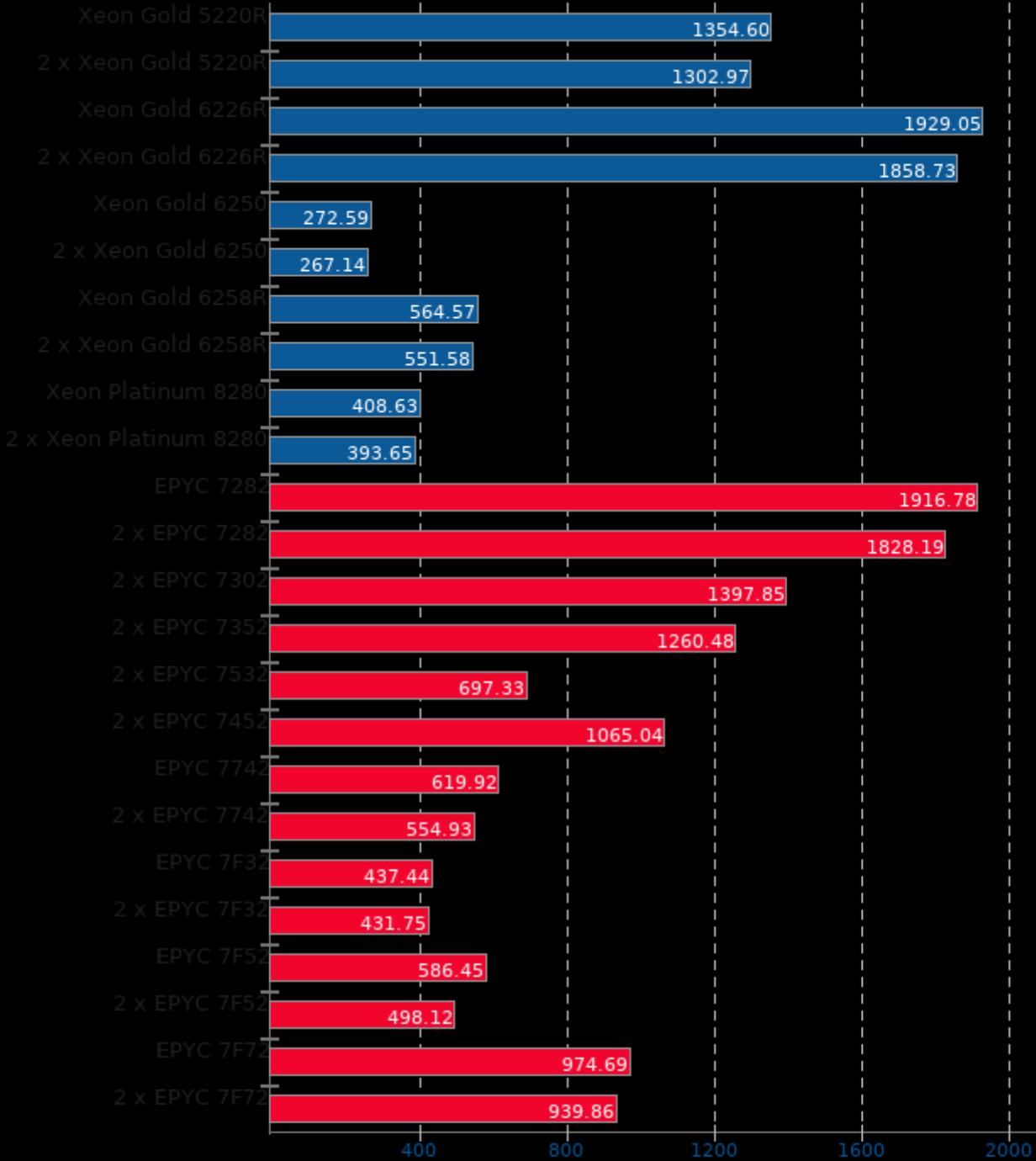


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22. 2 x EPYC 7F52: \$6200 reported cost.

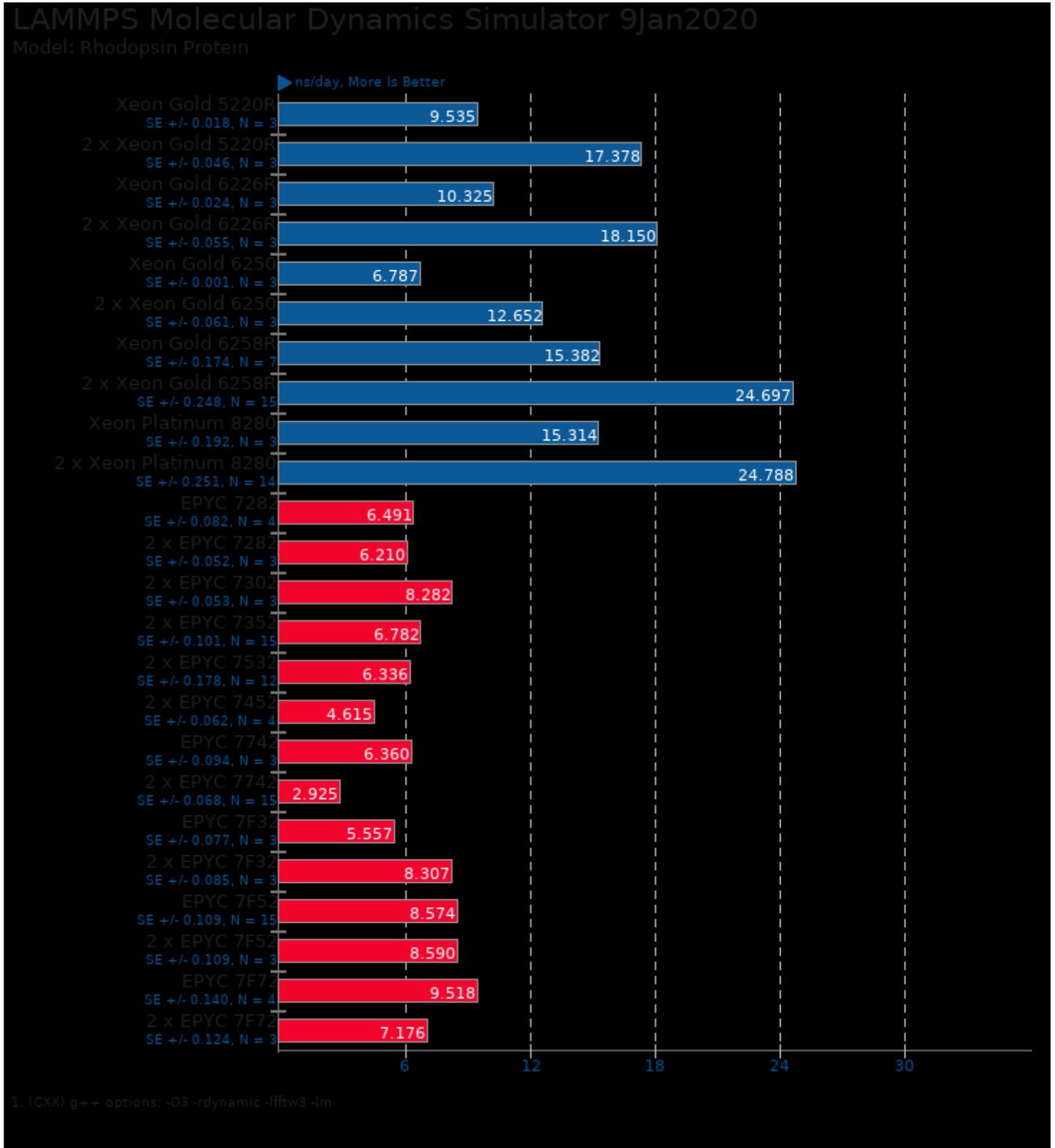
John The Ripper 1.9.0-jumbo-1

Performance / Cost - Test: MD5

Real C/S Per Dollar, More Is Better



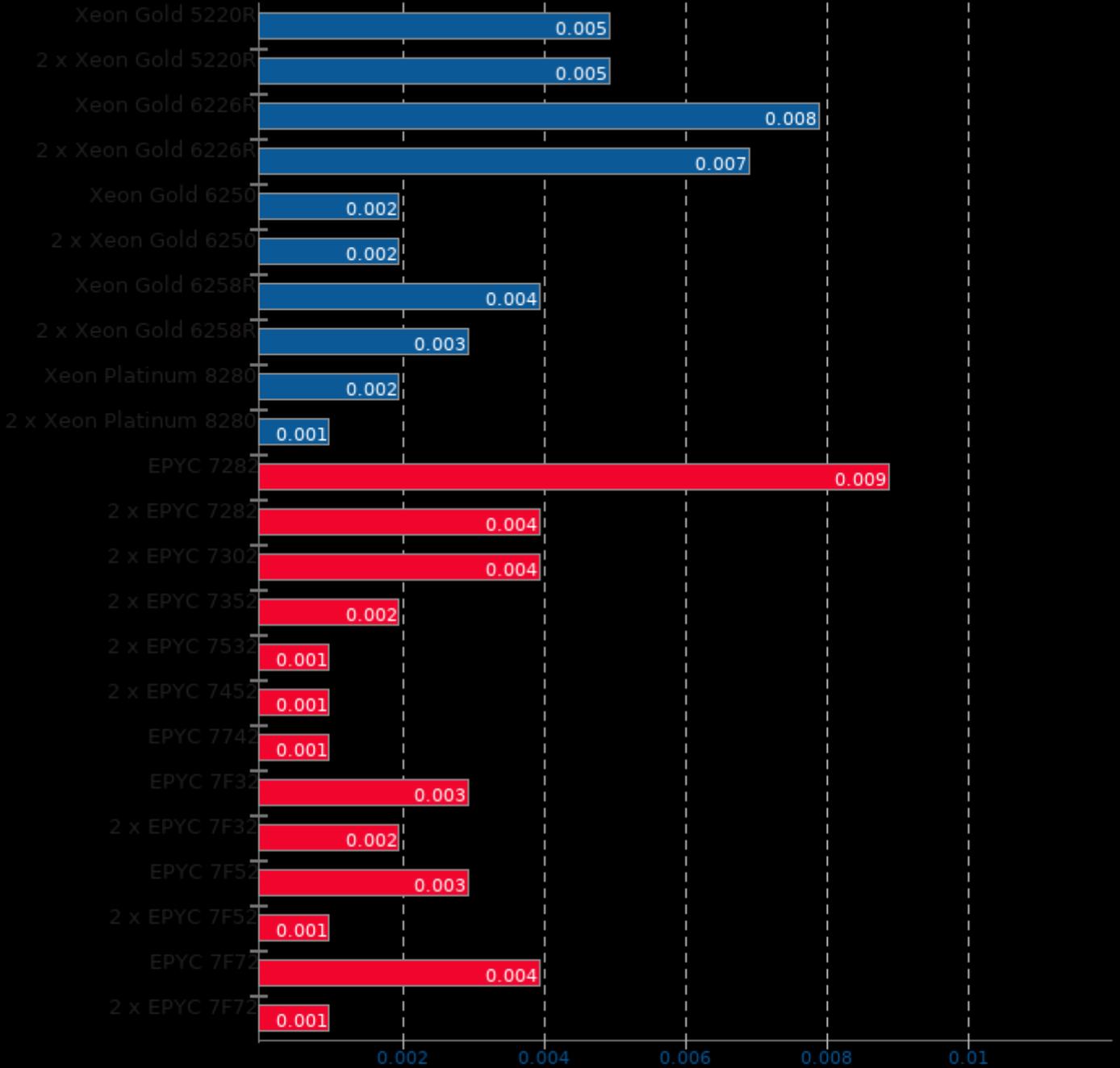
1. Xeon Gold 5220R: \$1850 reported cost.
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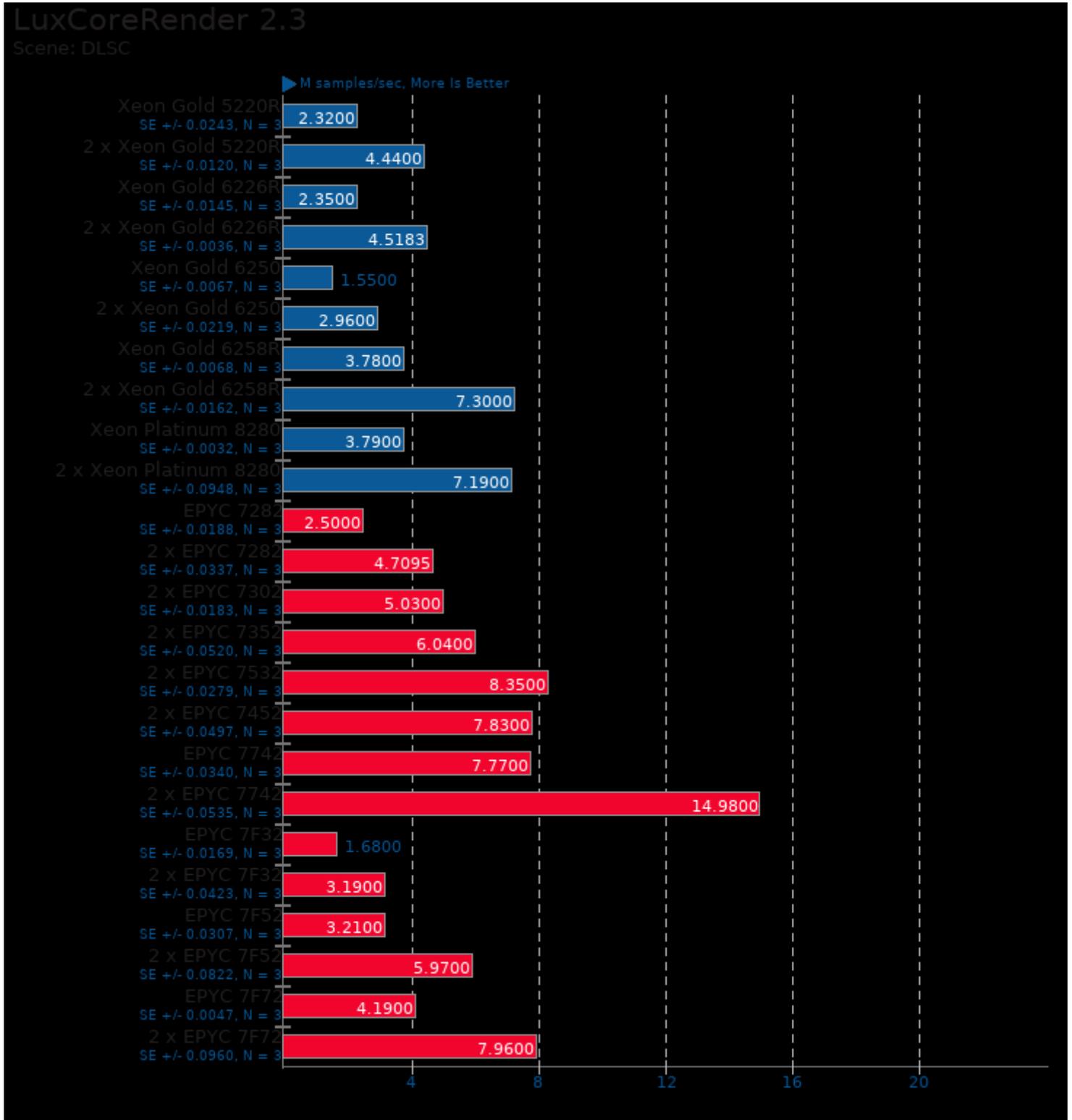
LAMMPS Molecular Dynamics Simulator 9Jan2020

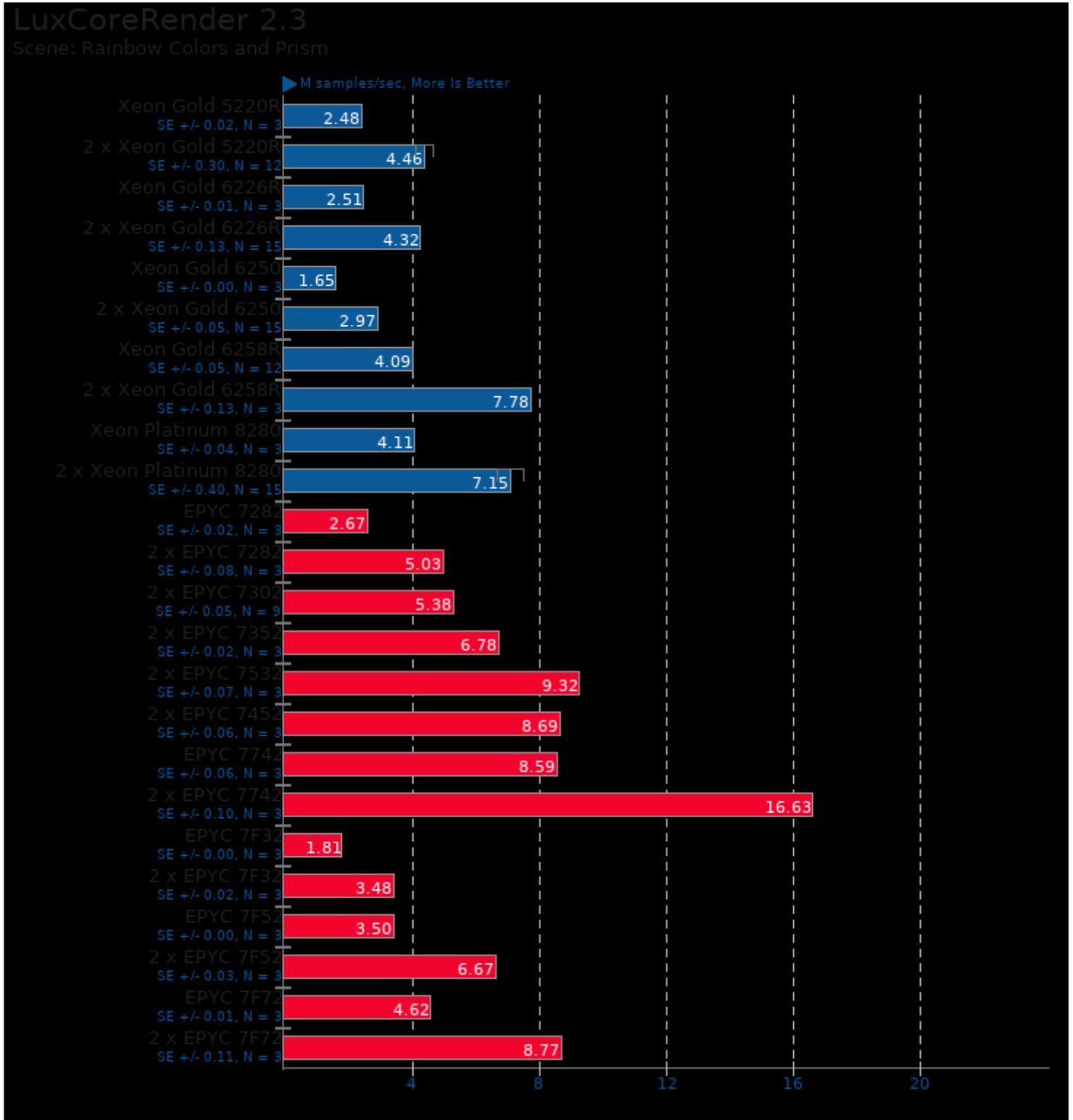
Performance / Cost - Model: Rhodopsin Protein

ns/day Per Dollar, More Is Better



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17. EPYC 7742: \$7522 reported cost.
18. EPYC 7F32: \$2100 reported cost.
19. 2 x EPYC 7F32: \$4200 reported cost.
20. EPYC 7F52: \$3100 reported cost.
21. 2 x EPYC 7F52: \$6200 reported cost.
22. EPYC 7F72: \$2450 reported cost.
23. 2 x EPYC 7F72: \$4900 reported cost.





LuxCoreRender 2.3

Performance / Cost - Scene: DLSC

► M samples/sec Per Dollar, More Is Better

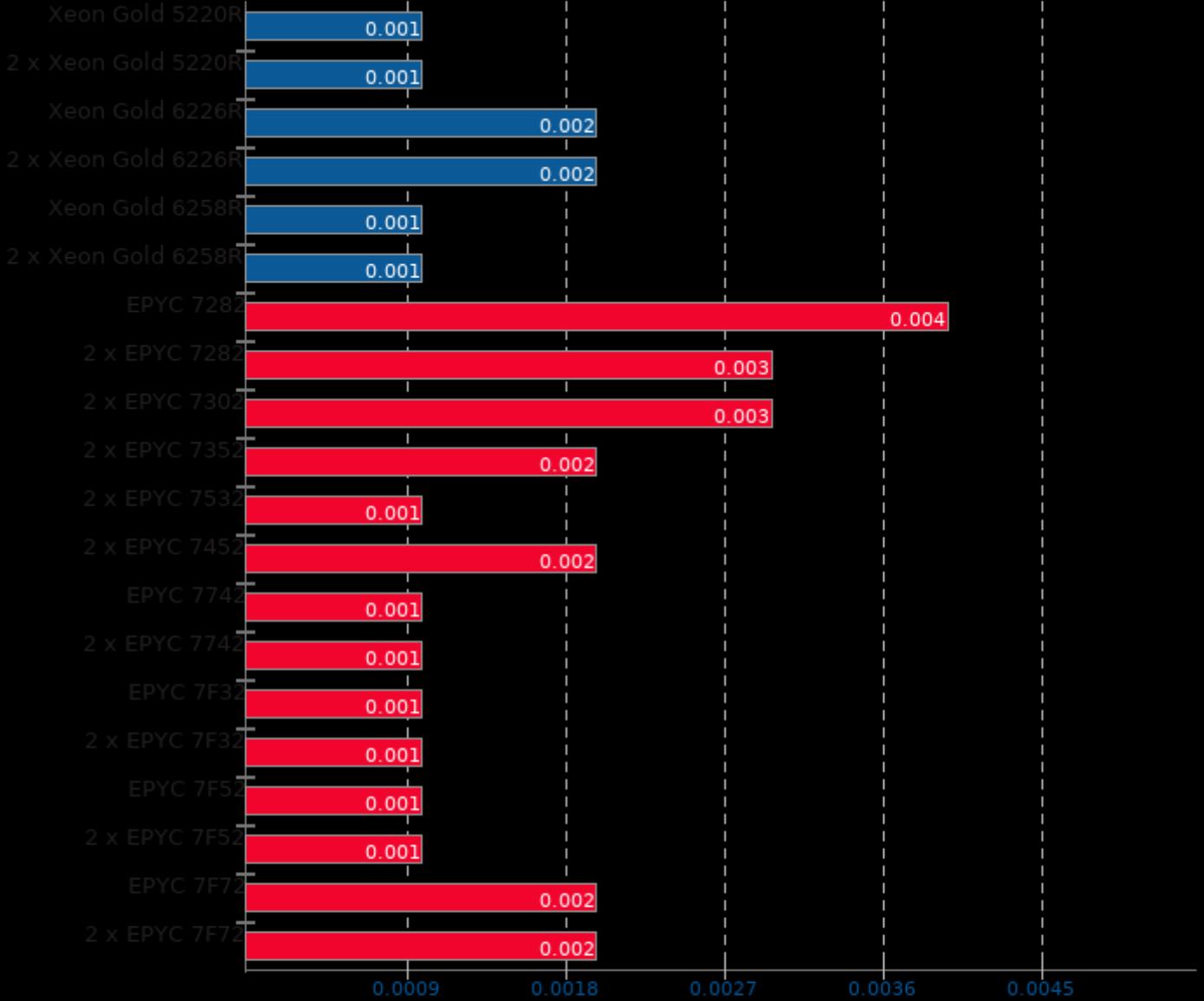


1. Xeon Gold 5220R: \$1850 reported cost.
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18. 2 x EPYC 7F52: \$6200 reported cost.
19. EPYC 7F72: \$2450 reported cost.
20. 2 x EPYC 7F72: \$4900 reported cost.

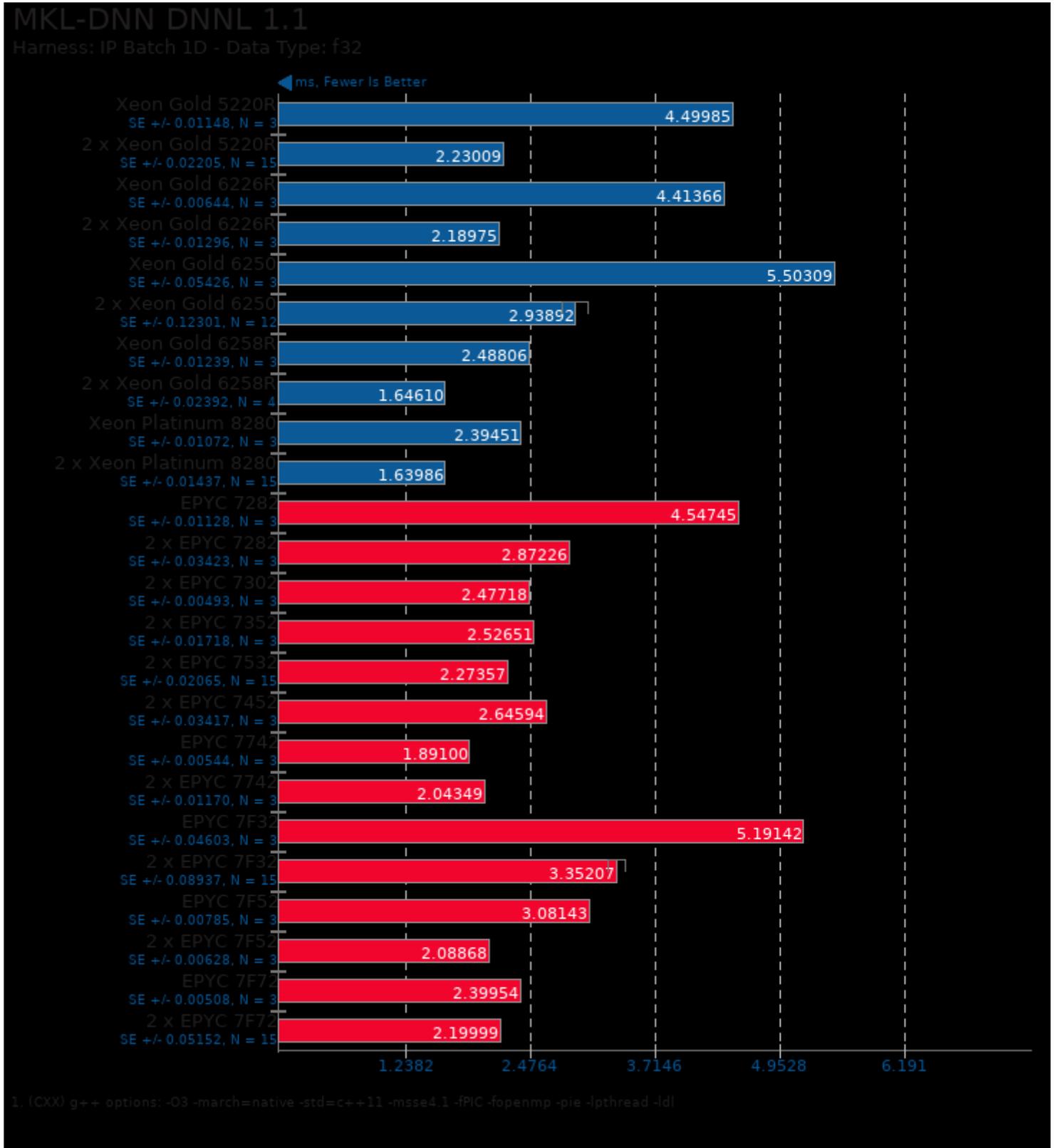
LuxCoreRender 2.3

Performance / Cost - Scene: Rainbow Colors and Prism

► M samples/sec Per Dollar, More Is Better



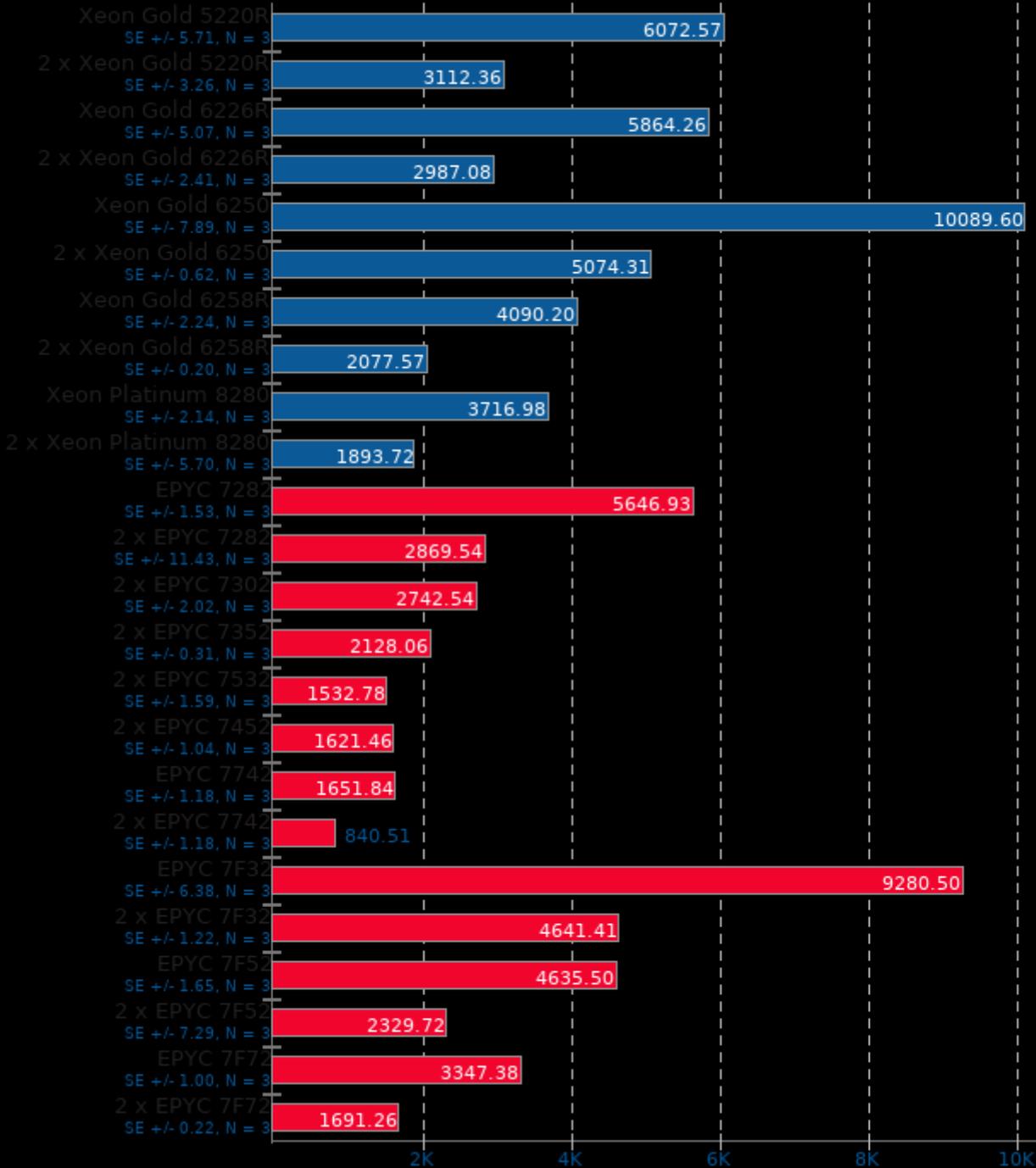
1. Xeon Gold 5220R: \$1850 reported cost.
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18. 2 x EPYC 7F52: \$6200 reported cost.
19. EPYC 7F72: \$2450 reported cost.
20. 2 x EPYC 7F72: \$4900 reported cost.



MKL-DNN DNLL 1.1

Harness: Deconvolution Batch deconv_3d - Data Type: u8s8f32

ms, Fewer Is Better

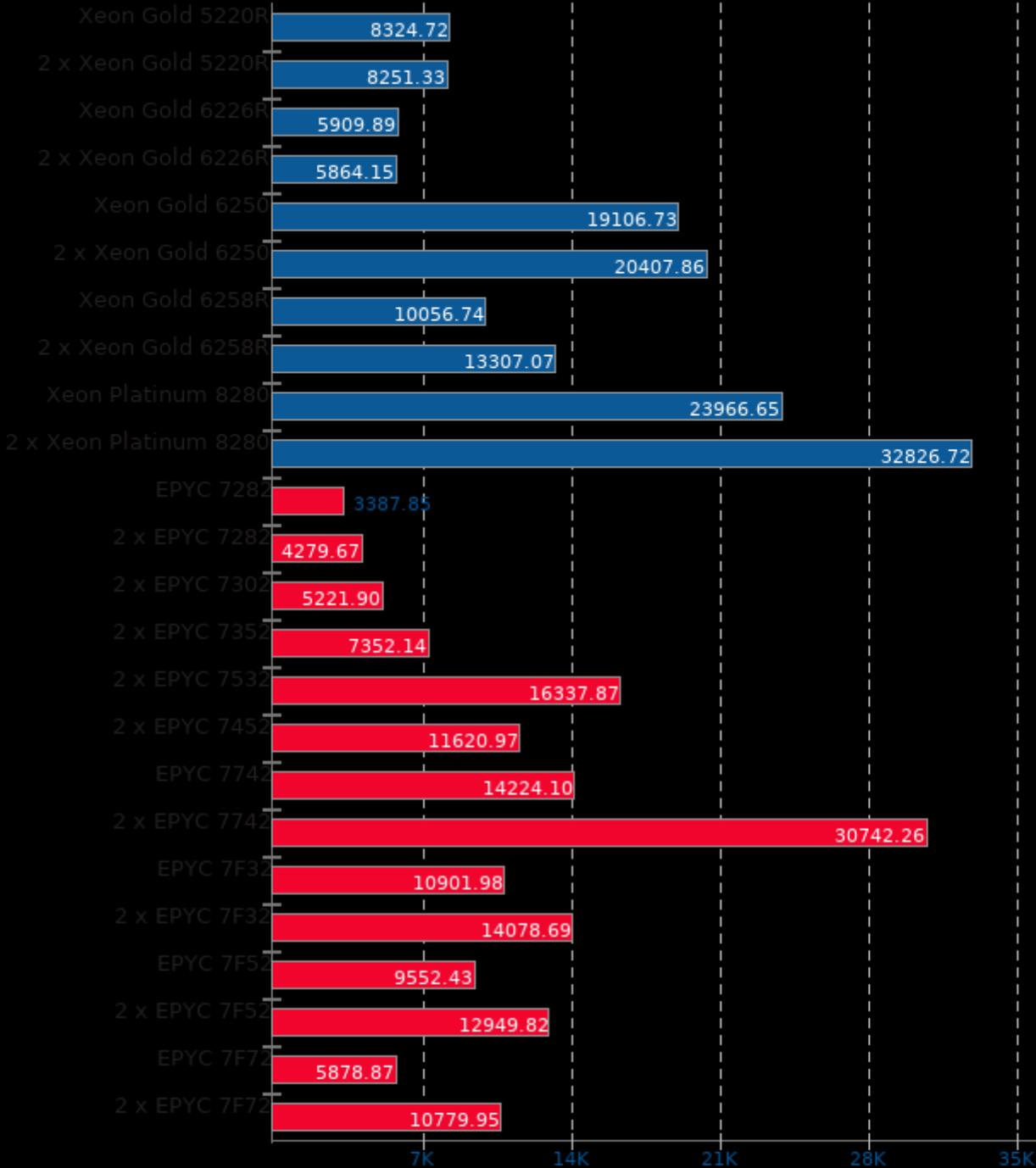


1. (CXX) g++ options: -O3 -march=native -std=c++11 -msse4.1 -fPIC -fopenmp -pie -lpthread -ldl

MKL-DNN DNNL 1.1

Performance / Cost - Harness: IP Batch 1D - Data Type: f32

ms x Dollar, Fewer Is Better

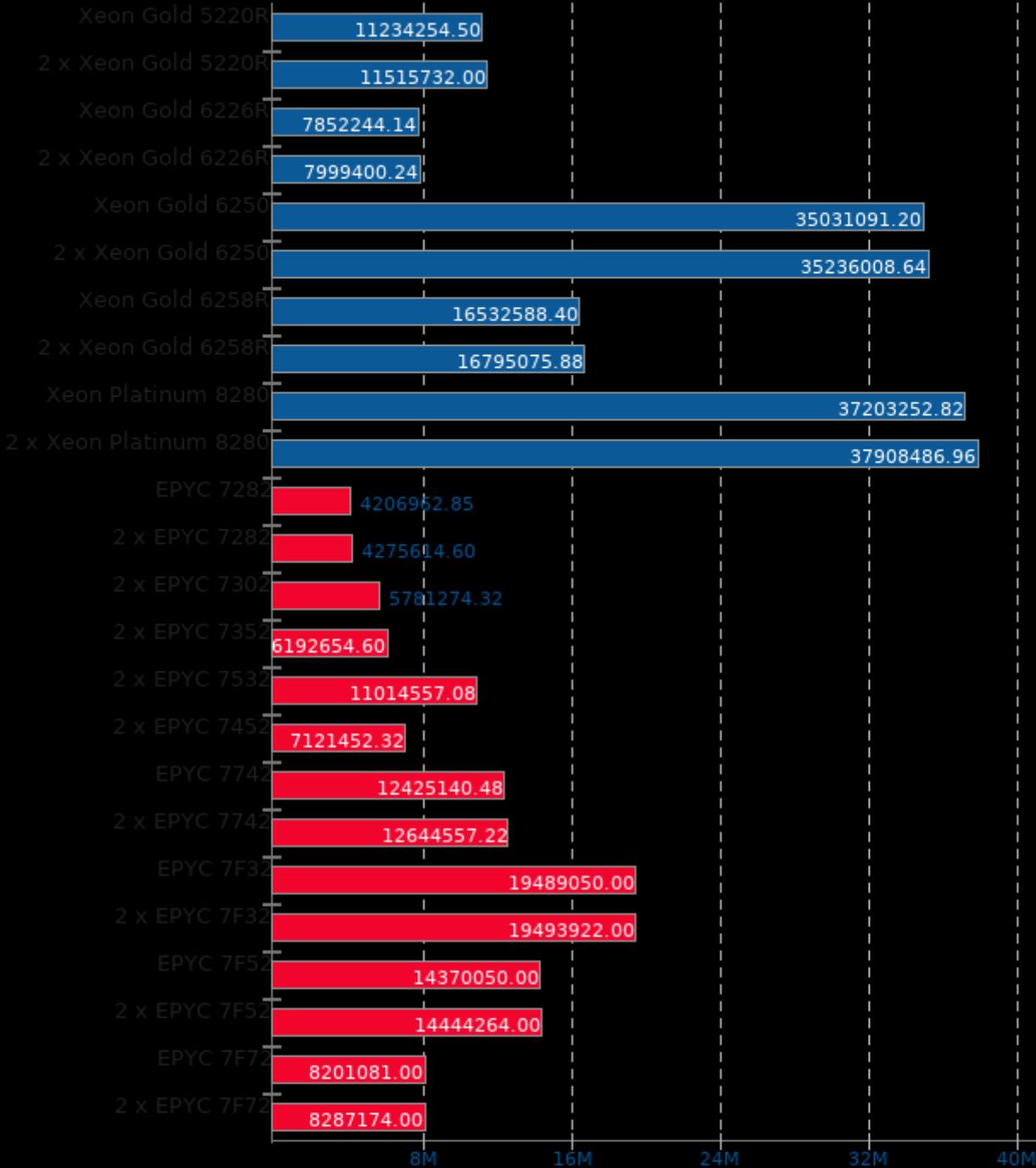


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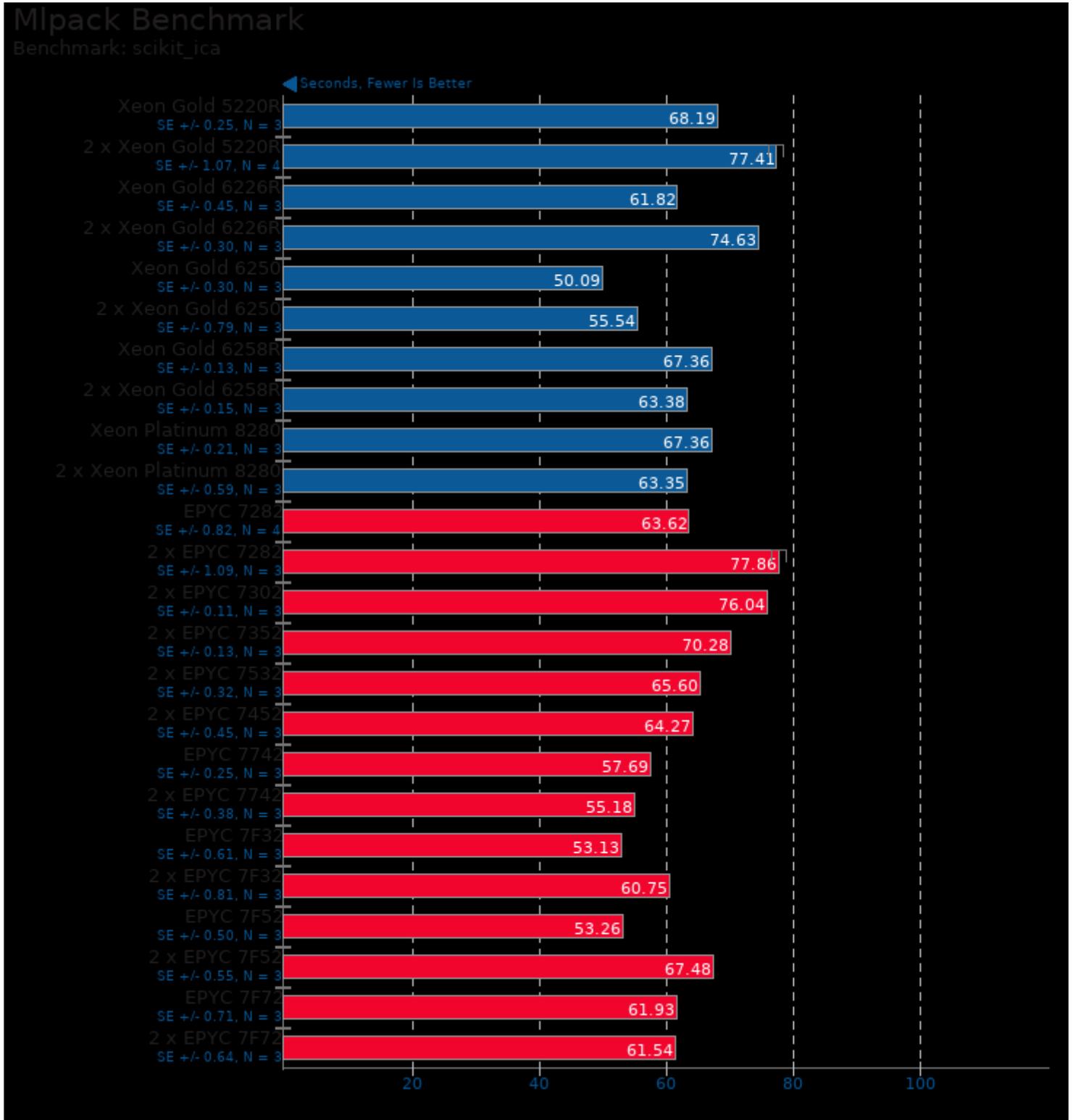
MKL-DNN DNNL 1.1

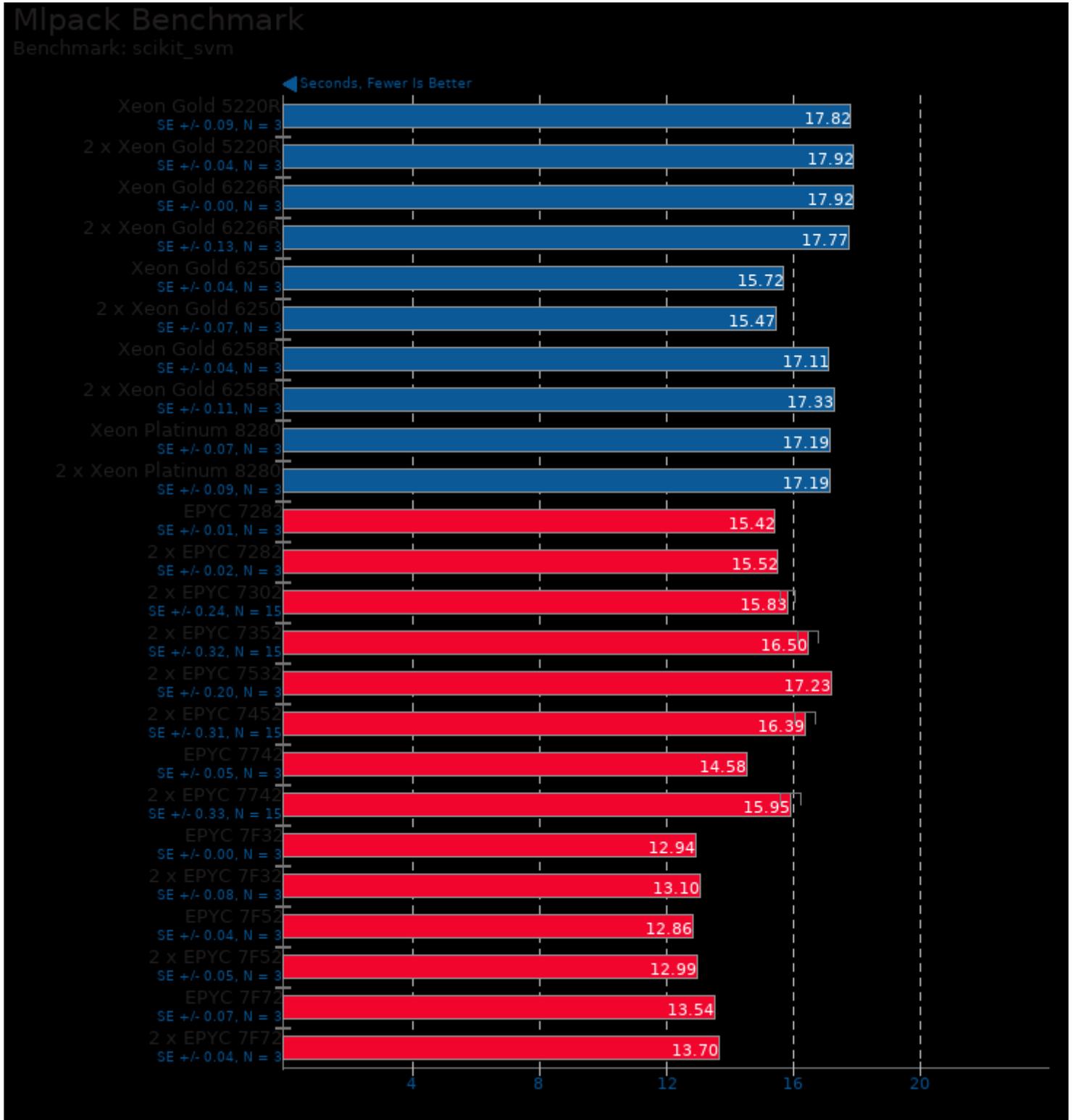
Performance / Cost - Harness: Deconvolution Batch deconv_3d - Data Type: u8s8f32

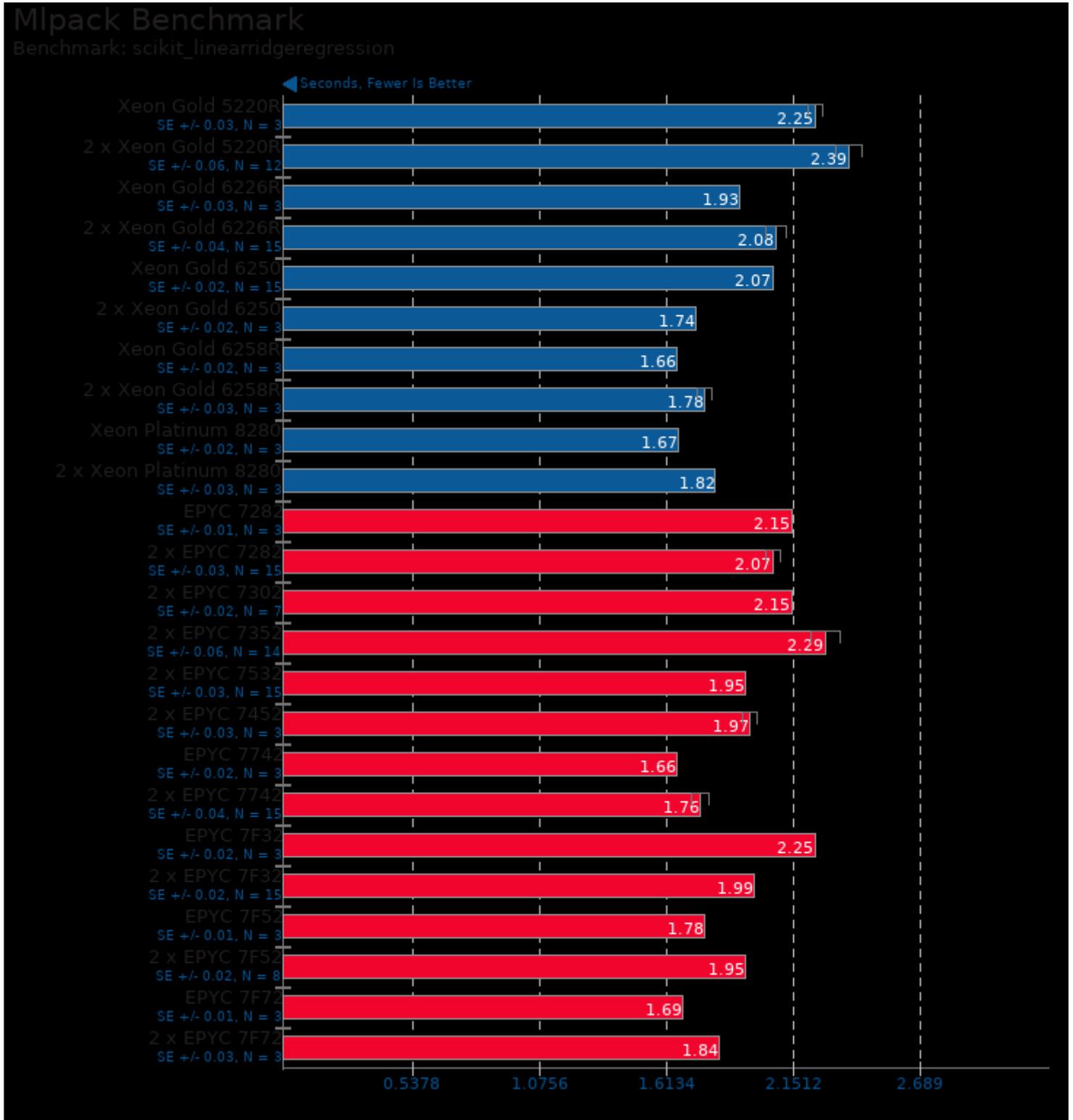
ms x Dollar, Fewer Is Better



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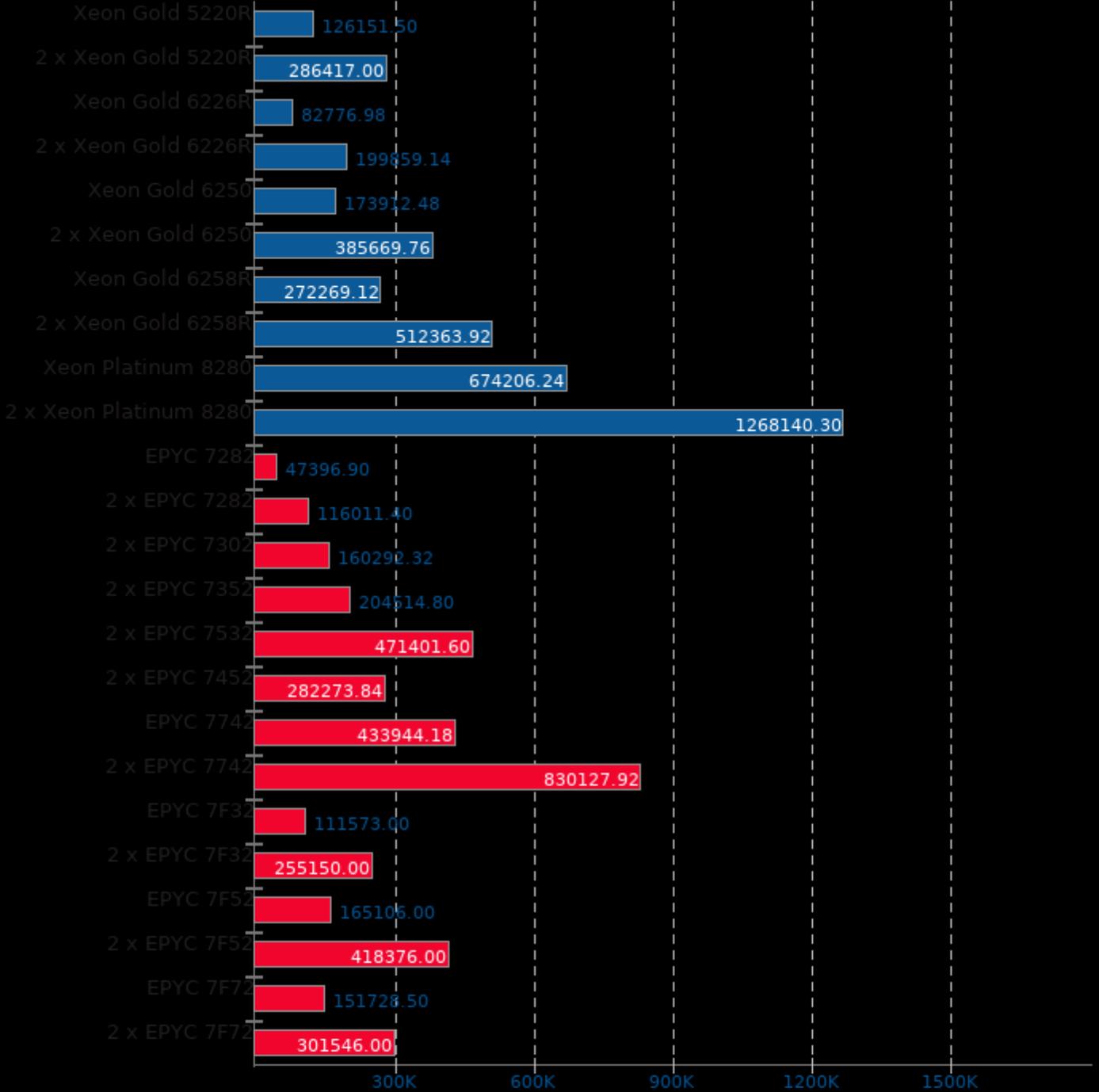




Mlpack Benchmark

Performance / Cost - Benchmark: scikit_ica

← Seconds x Dollar, Fewer Is Better

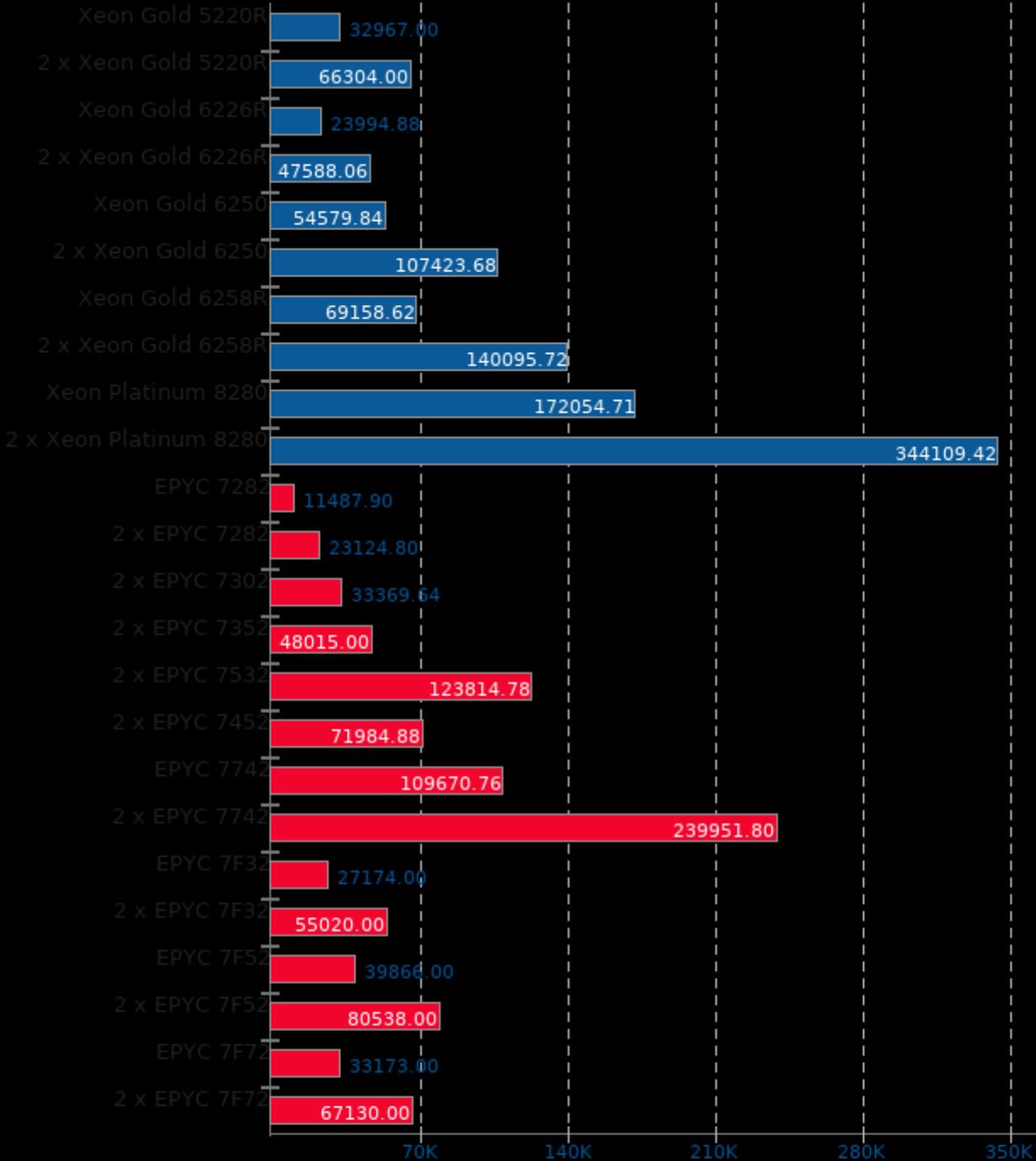


1. Xeon Gold 5220R: \$1850 reported cost.
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22. 2 x EPYC 7F52: \$6200 reported cost.

Mlpack Benchmark

Performance / Cost - Benchmark: scikit_svm

Seconds x Dollar, Fewer Is Better

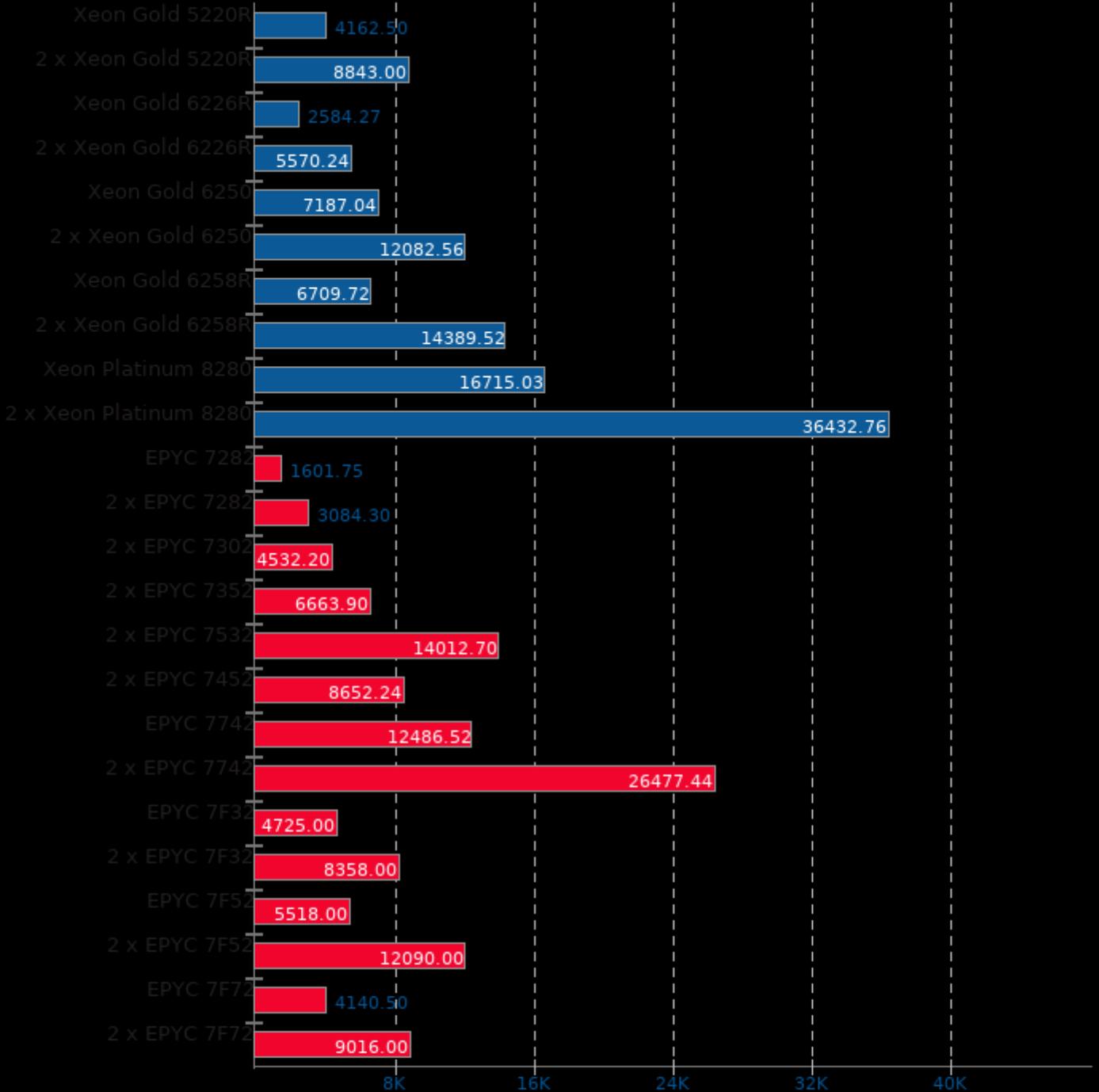


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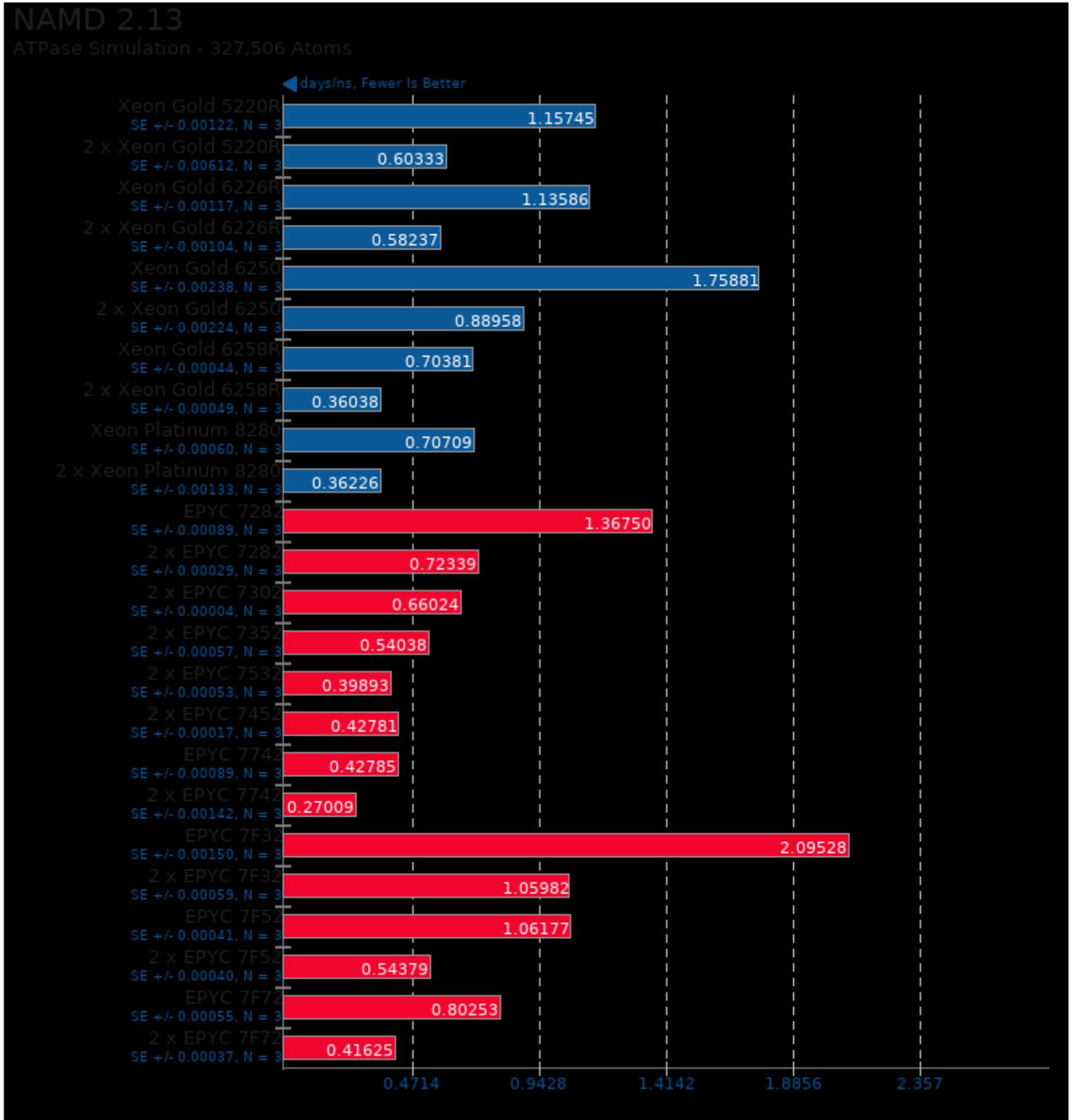
Mlpack Benchmark

Performance / Cost - Benchmark: scikit_linearridgegression

Seconds x Dollar, Fewer Is Better



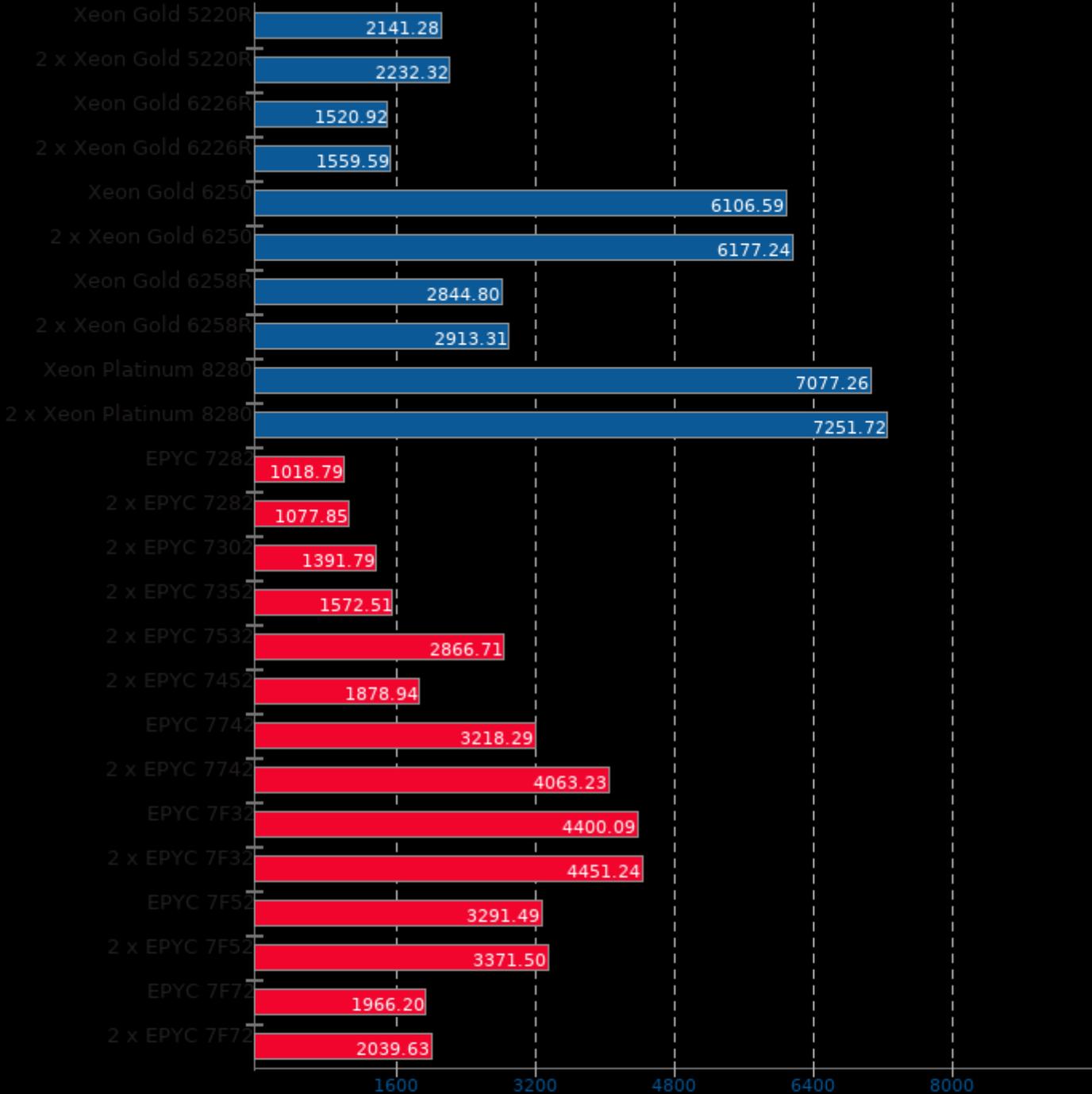
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NAMD 2.13

Performance / Cost - ATPase Simulation - 327,506 Atoms

days/ns x Dollar, Fewer Is Better

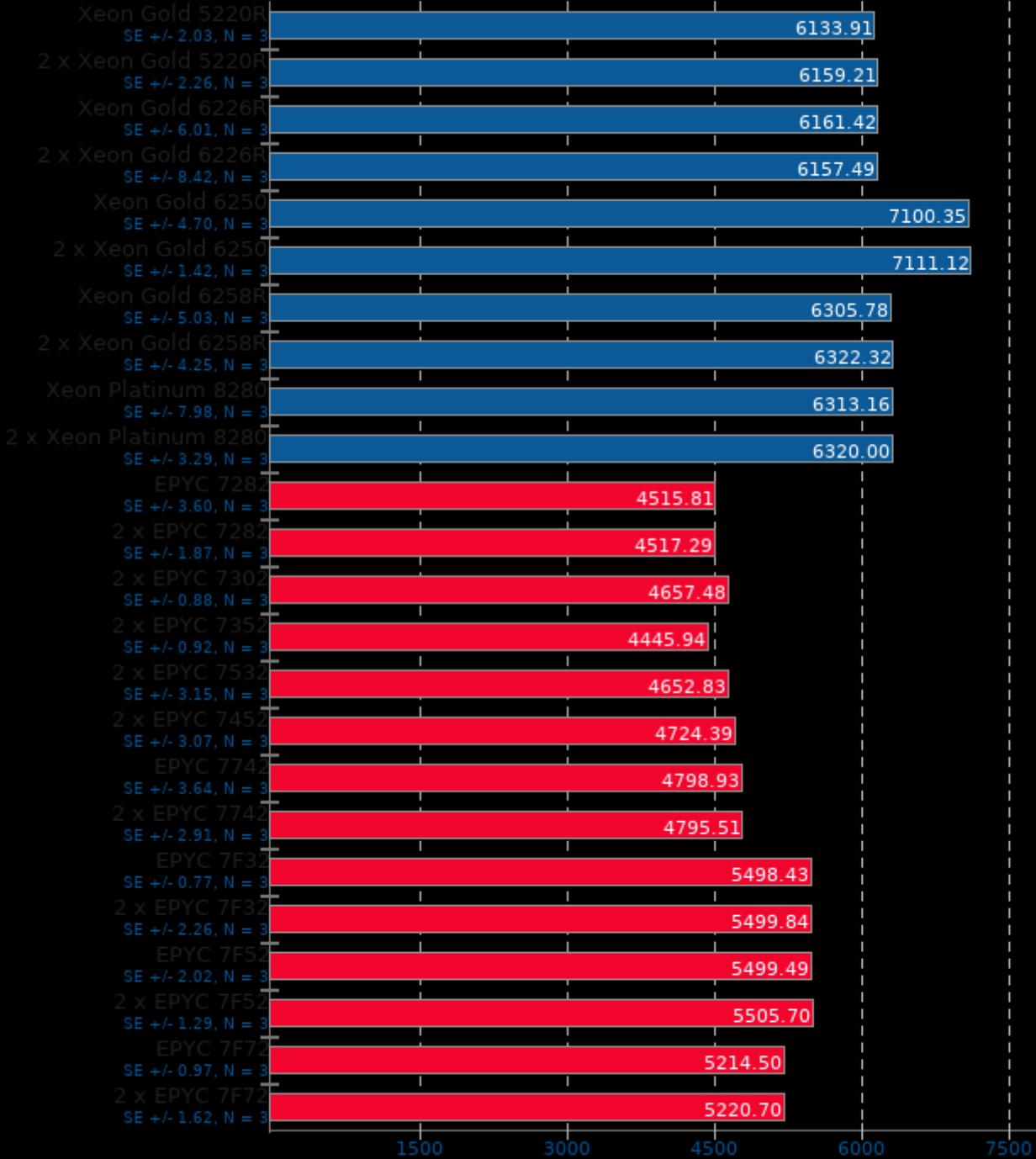


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22. 2 x EPYC 7F52: \$6200 reported cost.

Nettle 3.5.1

Test: aes256

Mbyte/s, More Is Better

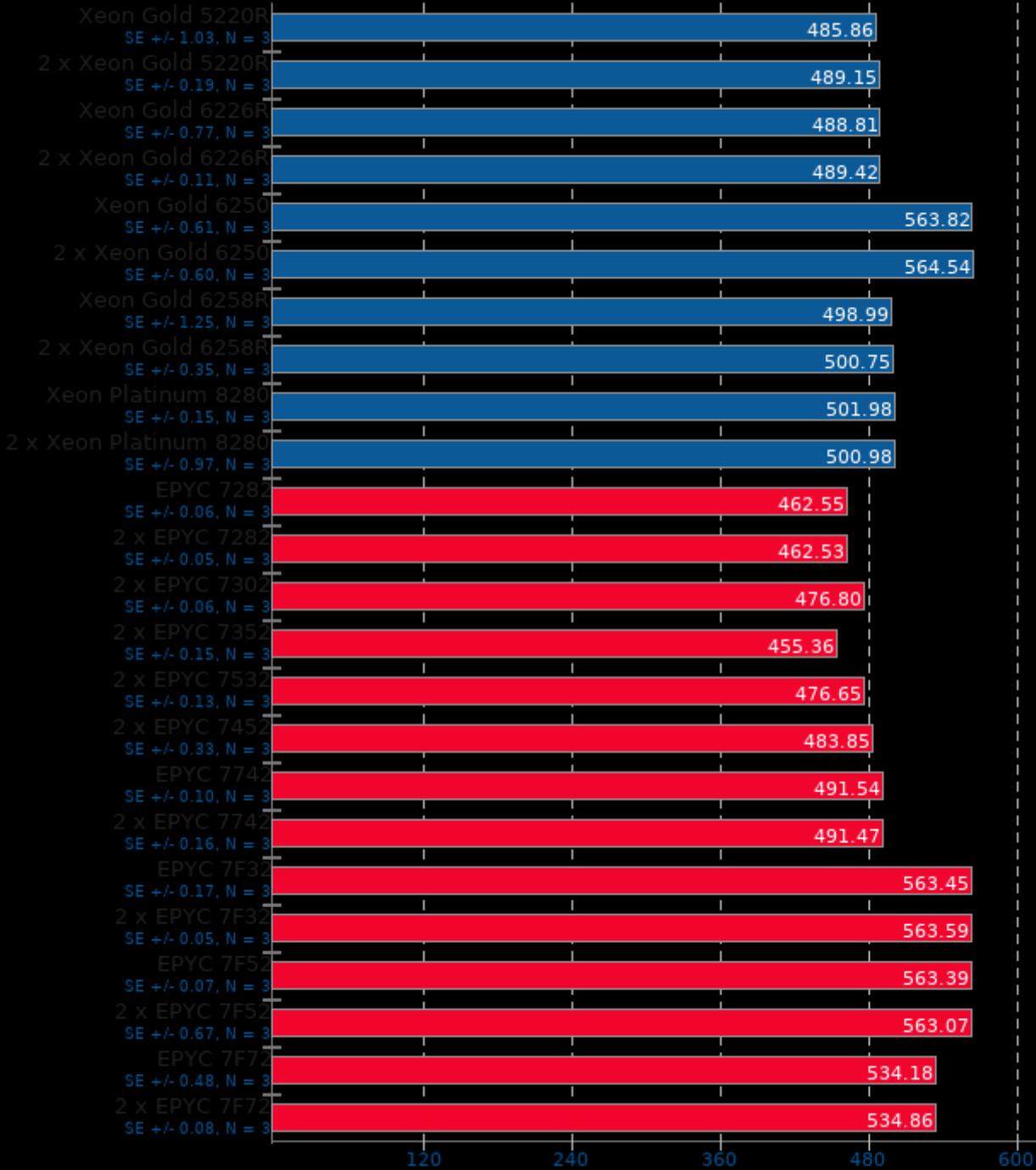


1. (CC) gcc options: -O2 -ggdb3 -lnettle -lm -lcrypto

Nettle 3.5.1

Test: sha512

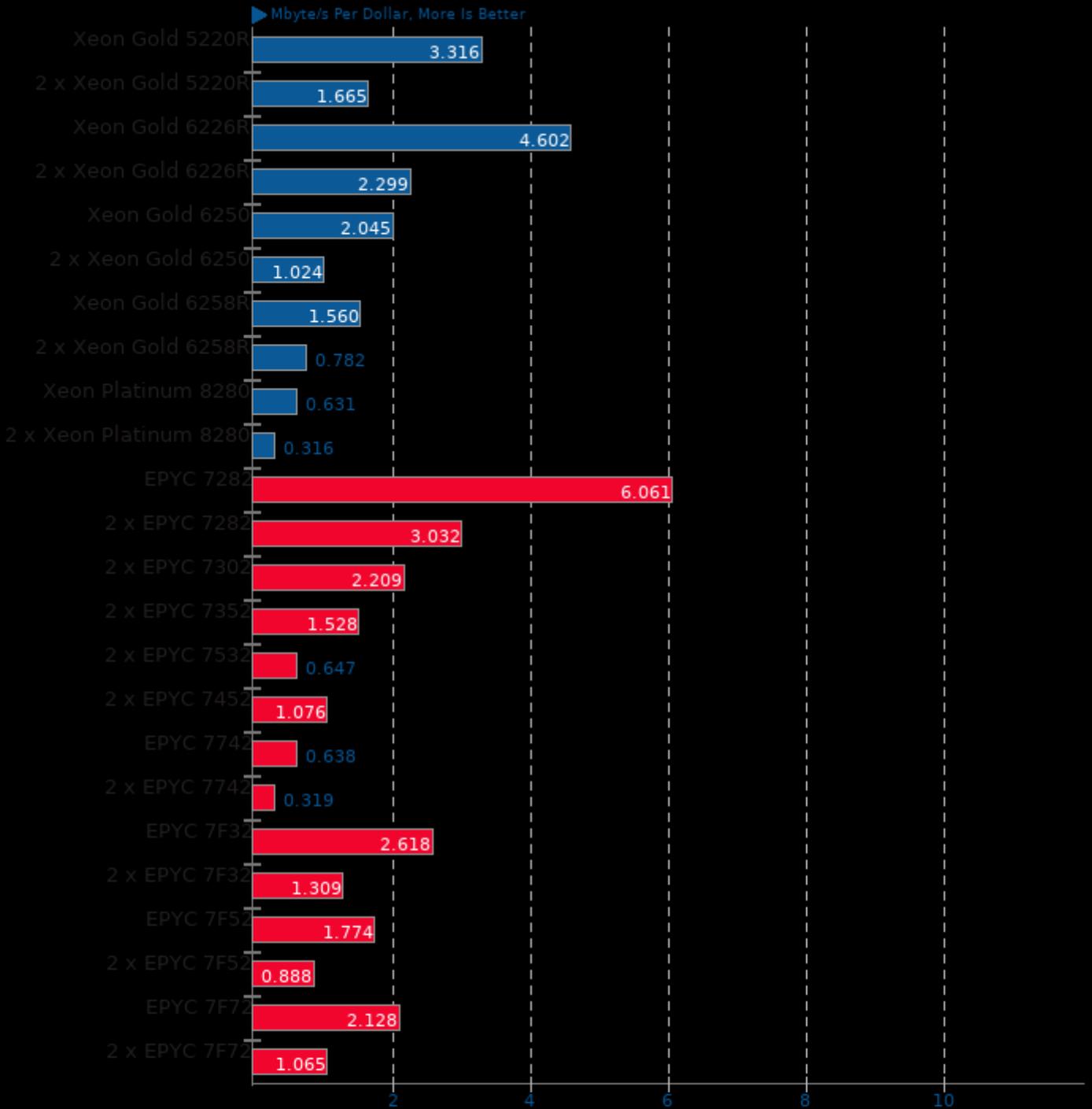
Mbyte/s, More Is Better



1. (CC) gcc options: -O2 -ggdb3 -lnettle -lm -lcrypto

Nettle 3.5.1

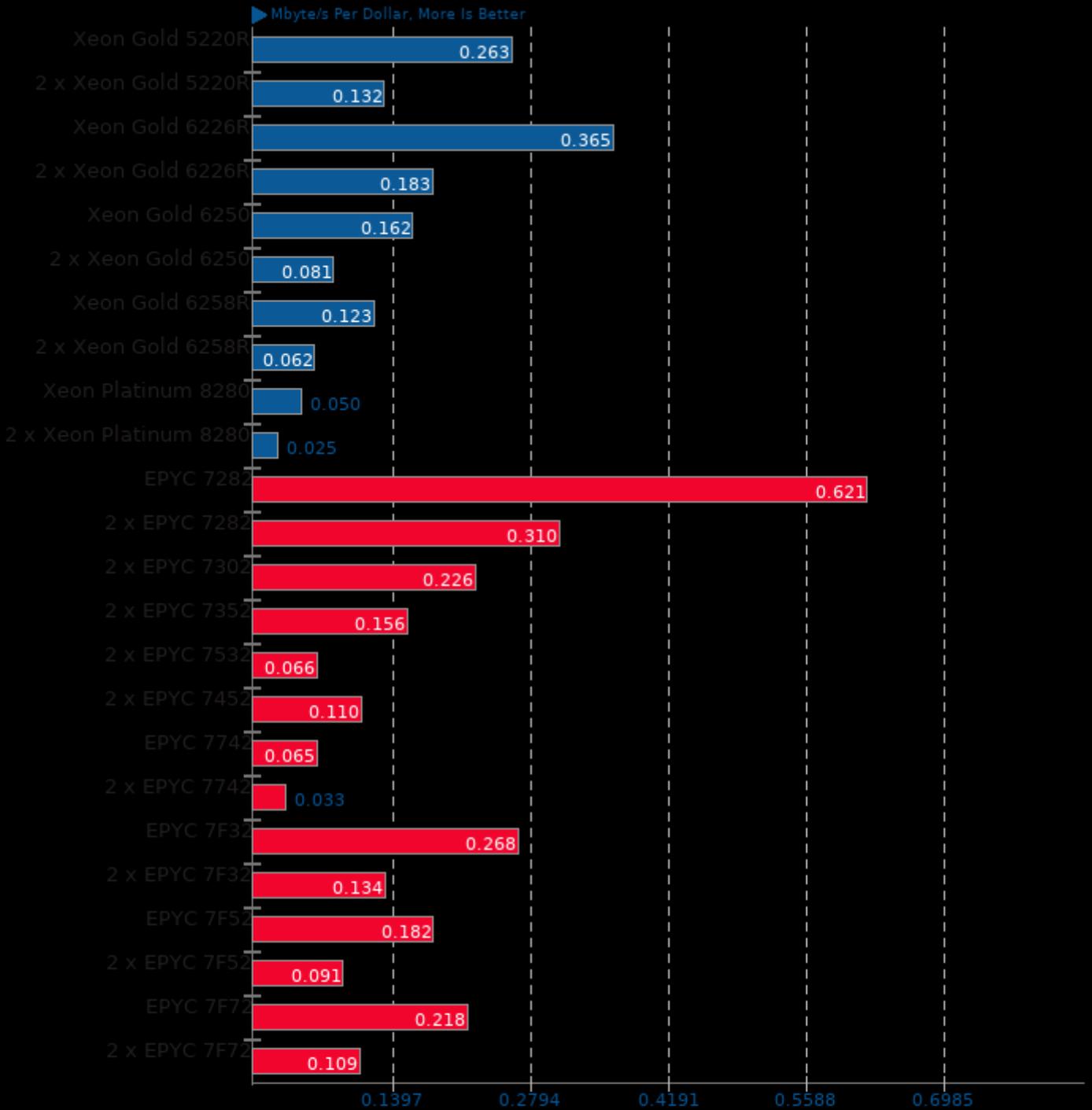
Performance / Cost - Test: aes256



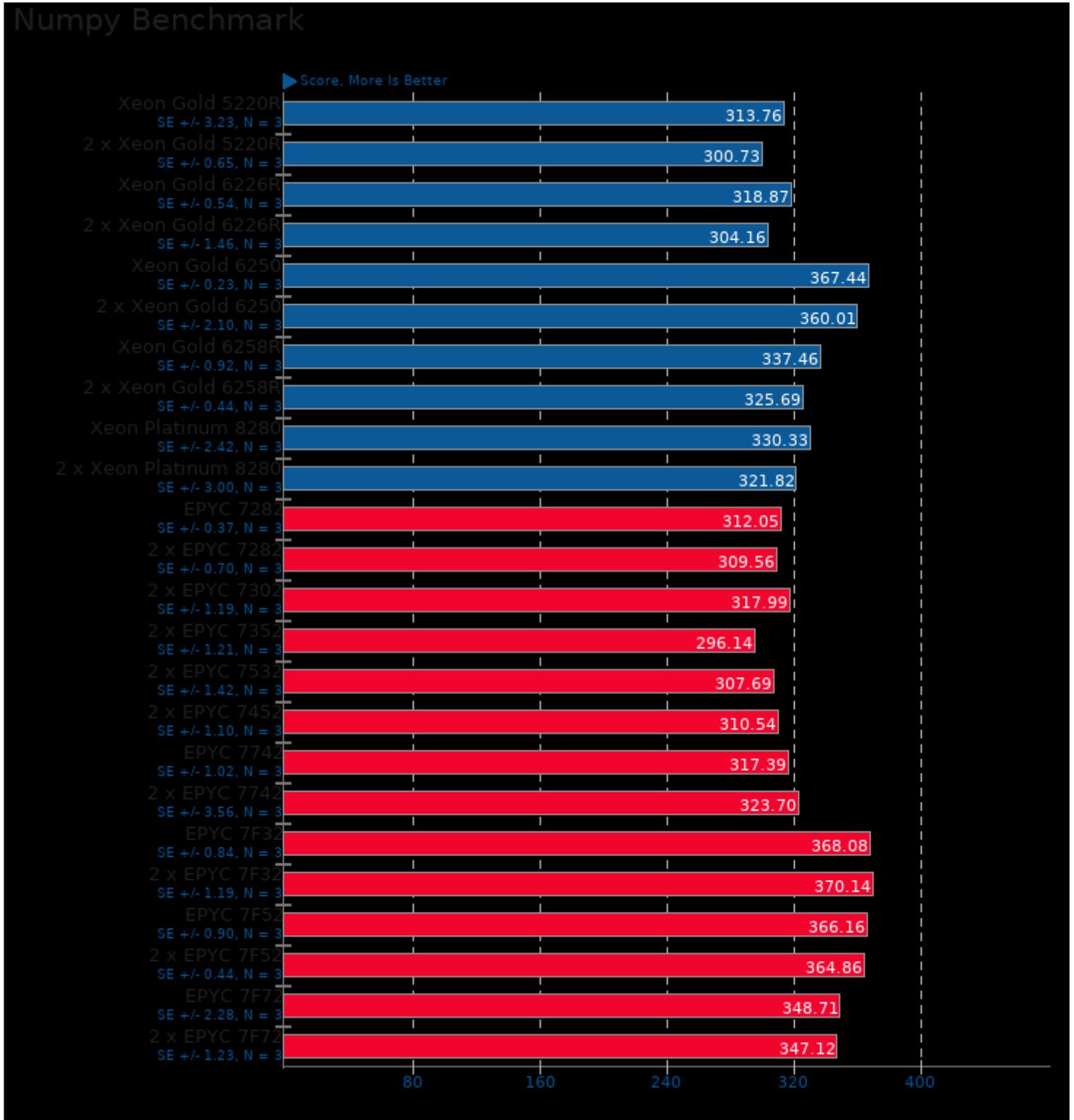
1. Xeon Gold 5220R: \$1850 reported cost.
2. 2 x Xeon Gold 5220R: \$3700 reported cost.
3. Xeon Gold 6226R: \$1339 reported cost.
4. 2 x Xeon Gold 6226R: \$2678 reported cost.
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6. 2 x Xeon Gold 6250: \$6944 reported cost.
7. Xeon Gold 6258R: \$4042 reported cost.
8. 2 x Xeon Gold 6258R: \$8084 reported cost.
9. Xeon Platinum 8280: \$10009 reported cost.
10. 2 x Xeon Platinum 8280: \$20018 reported cost.
11. EPYC 7282: \$745 reported cost.
12. 2 x EPYC 7282: \$1490 reported cost.
13. 2 x EPYC 7302: \$2108 reported cost.
14. 2 x EPYC 7352: \$2910 reported cost.
15. 2 x EPYC 7532: \$7186 reported cost.
16. 2 x EPYC 7452: \$4392 reported cost.
17. EPYC 7742: \$7522 reported cost.
18. 2 x EPYC 7742: \$15044 reported cost.
19. EPYC 7F32: \$2100 reported cost.
20. 2 x EPYC 7F32: \$4200 reported cost.
21. EPYC 7F52: \$3100 reported cost.
22. 2 x EPYC 7F52: \$6200 reported cost.

Nettle 3.5.1

Performance / Cost - Test: sha512



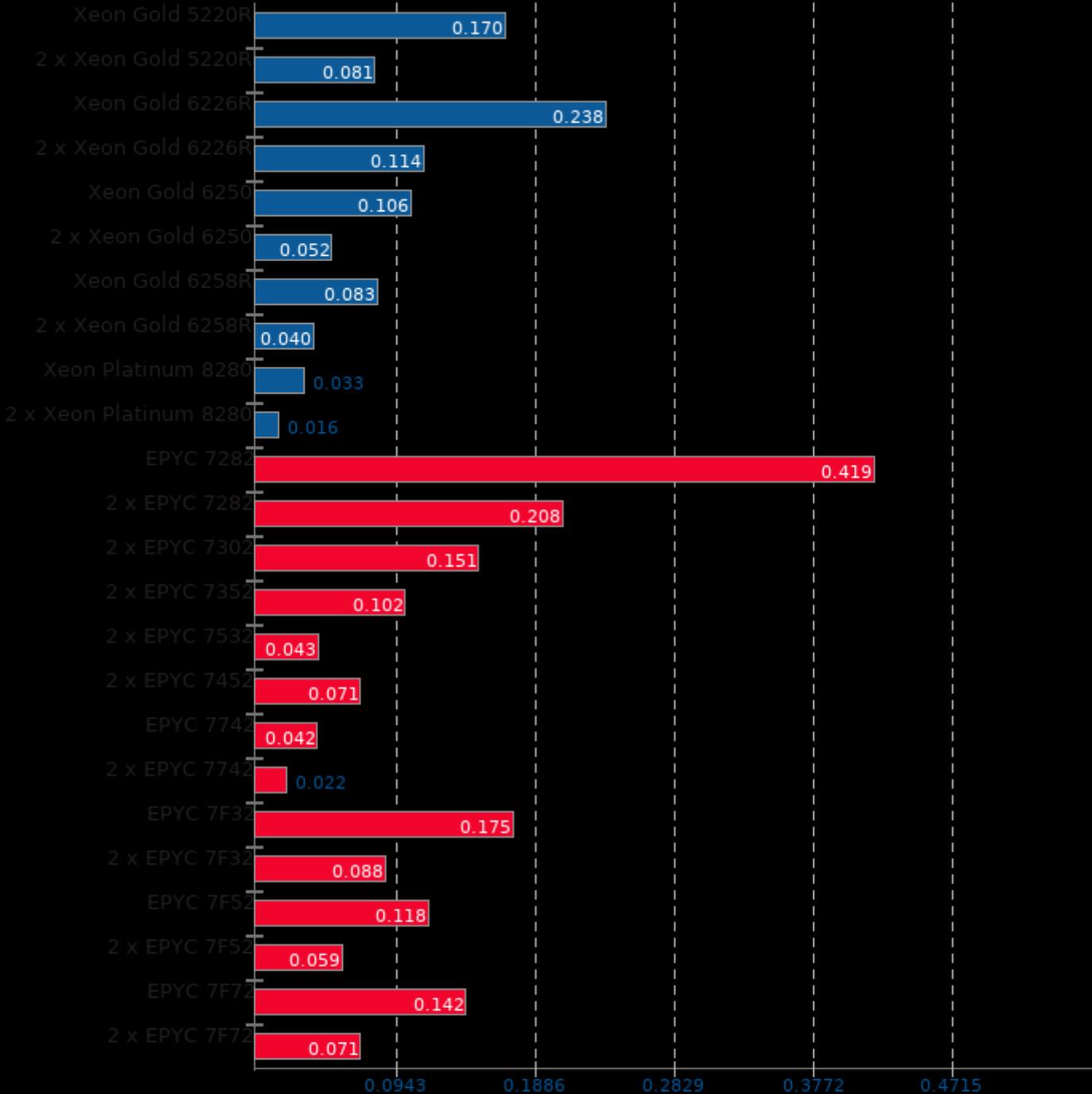
1. Xeon Gold 5220R: \$1850 reported cost.
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3. Xeon Gold 6226R: \$1339 reported cost.
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18. 2 x EPYC 7742: \$15044 reported cost.
19. EPYC 7F32: \$2100 reported cost.
20. 2 x EPYC 7F32: \$4200 reported cost.
21. EPYC 7F52: \$3100 reported cost.
22. 2 x EPYC 7F52: \$6200 reported cost.



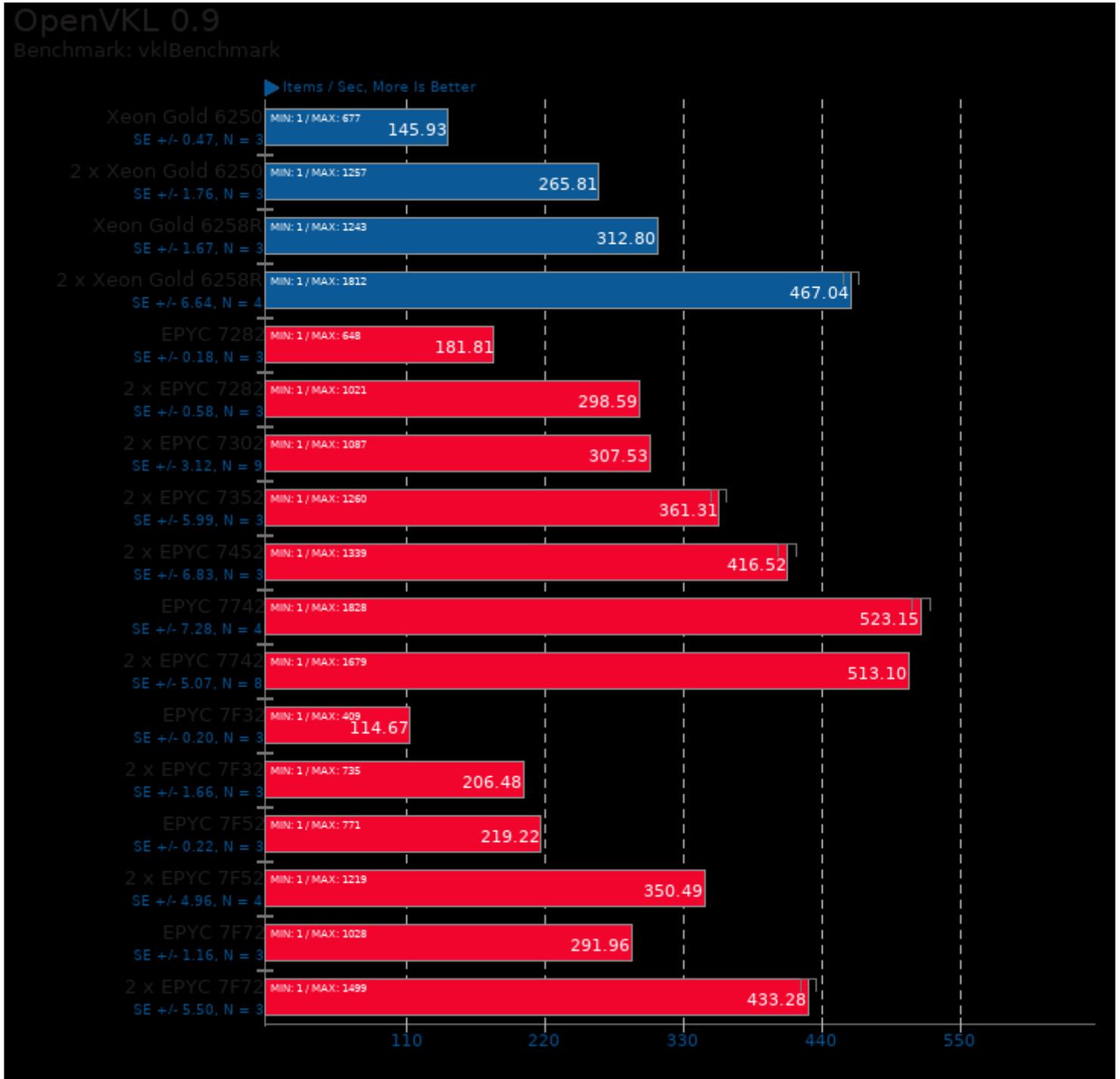
Numpy Benchmark

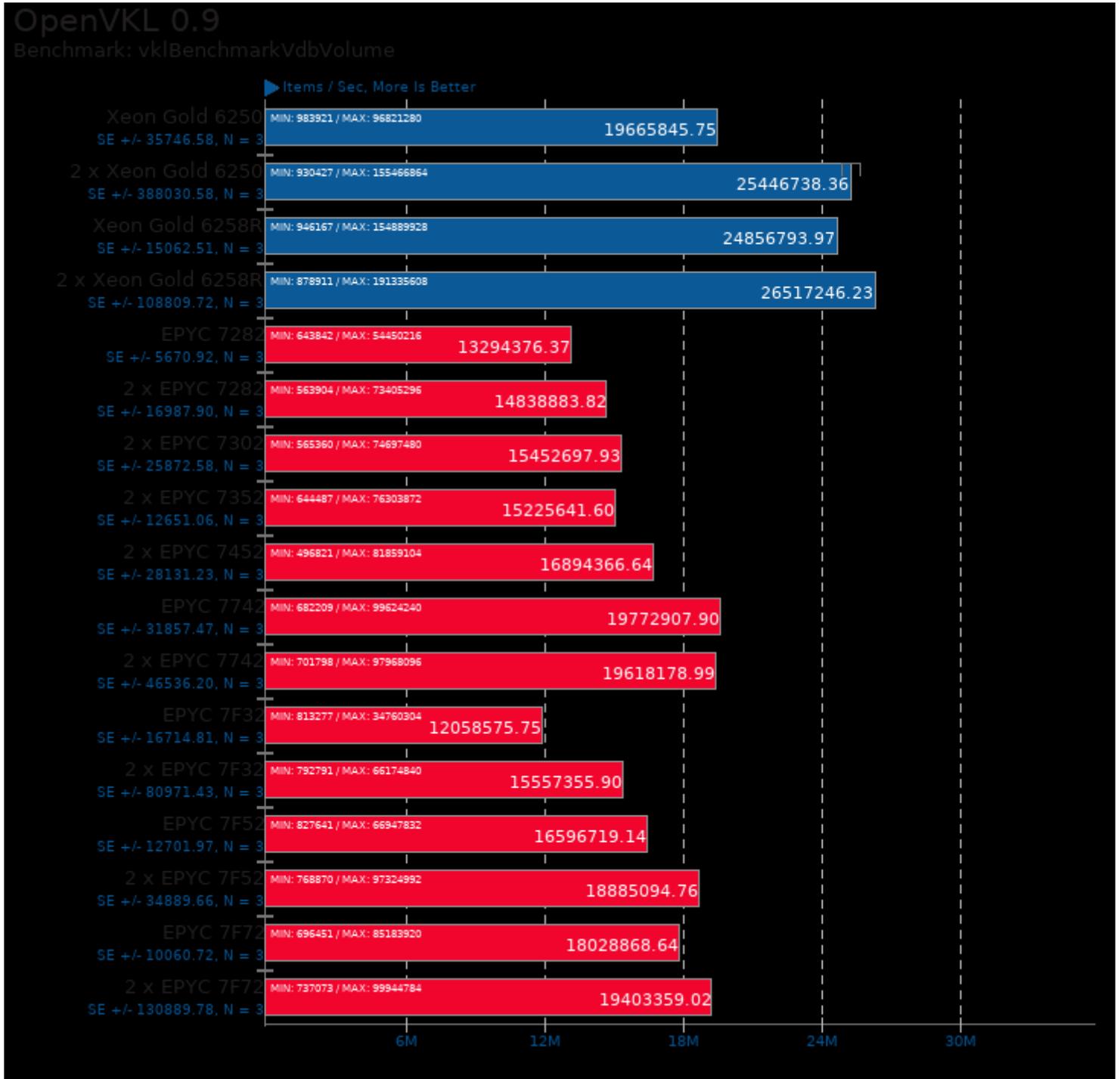
Performance / Cost

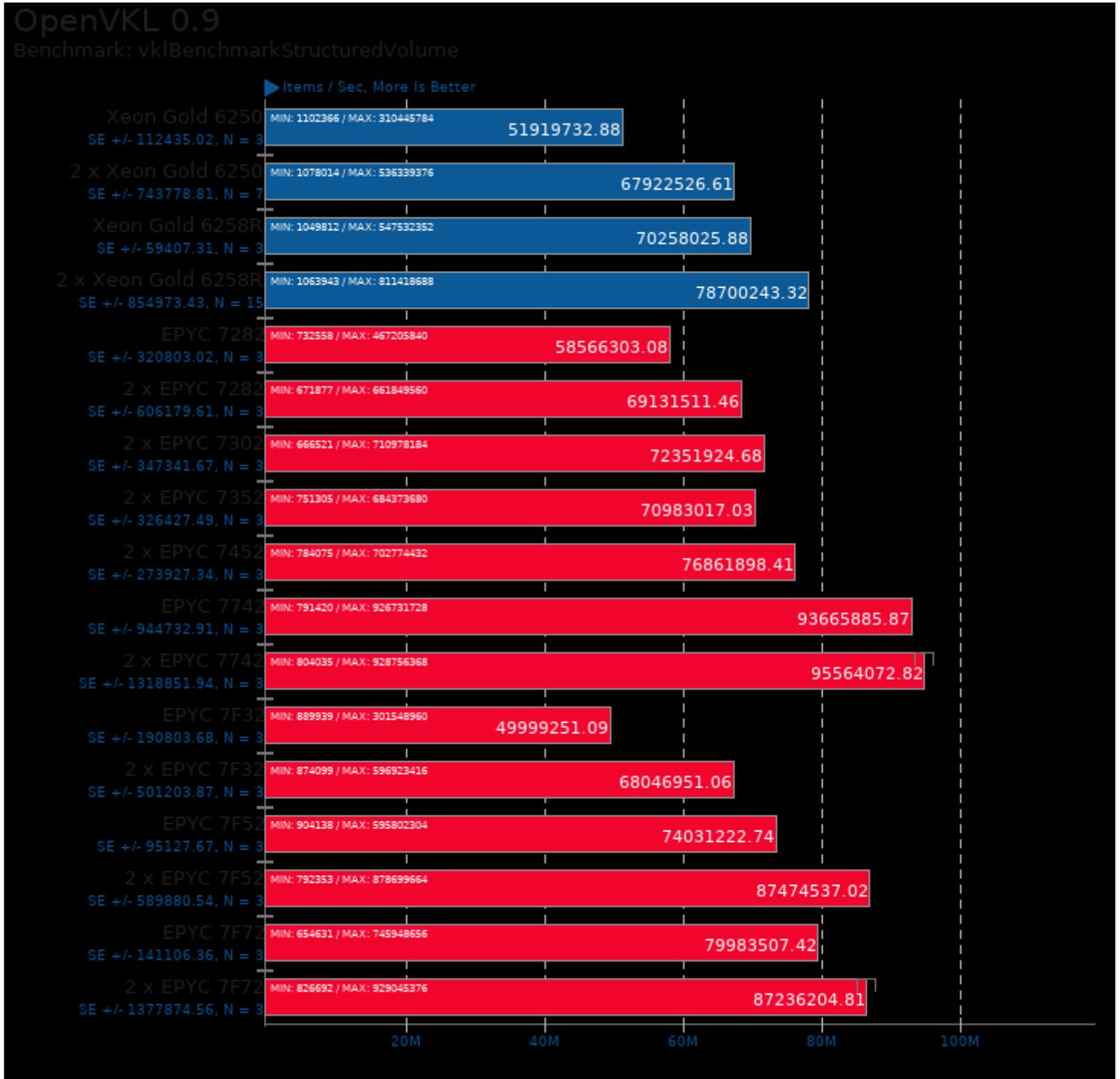
Score Per Dollar, More Is Better



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20. 2 x EPYC 7F32: \$4200 reported cost.
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22. 2 x EPYC 7F52: \$6200 reported cost.



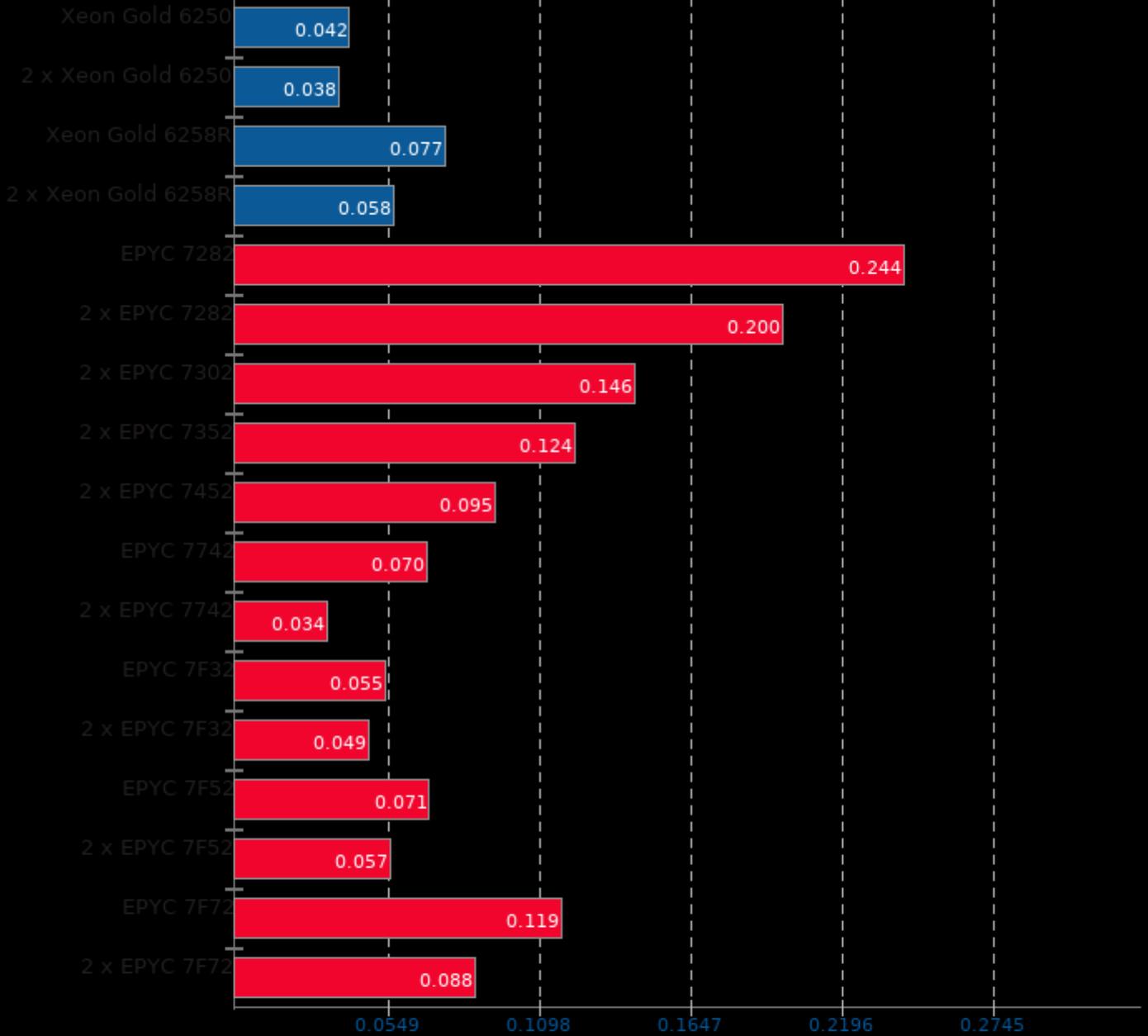




OpenVKL 0.9

Performance / Cost - Benchmark: vklBenchmark

Items / Sec Per Dollar, More Is Better

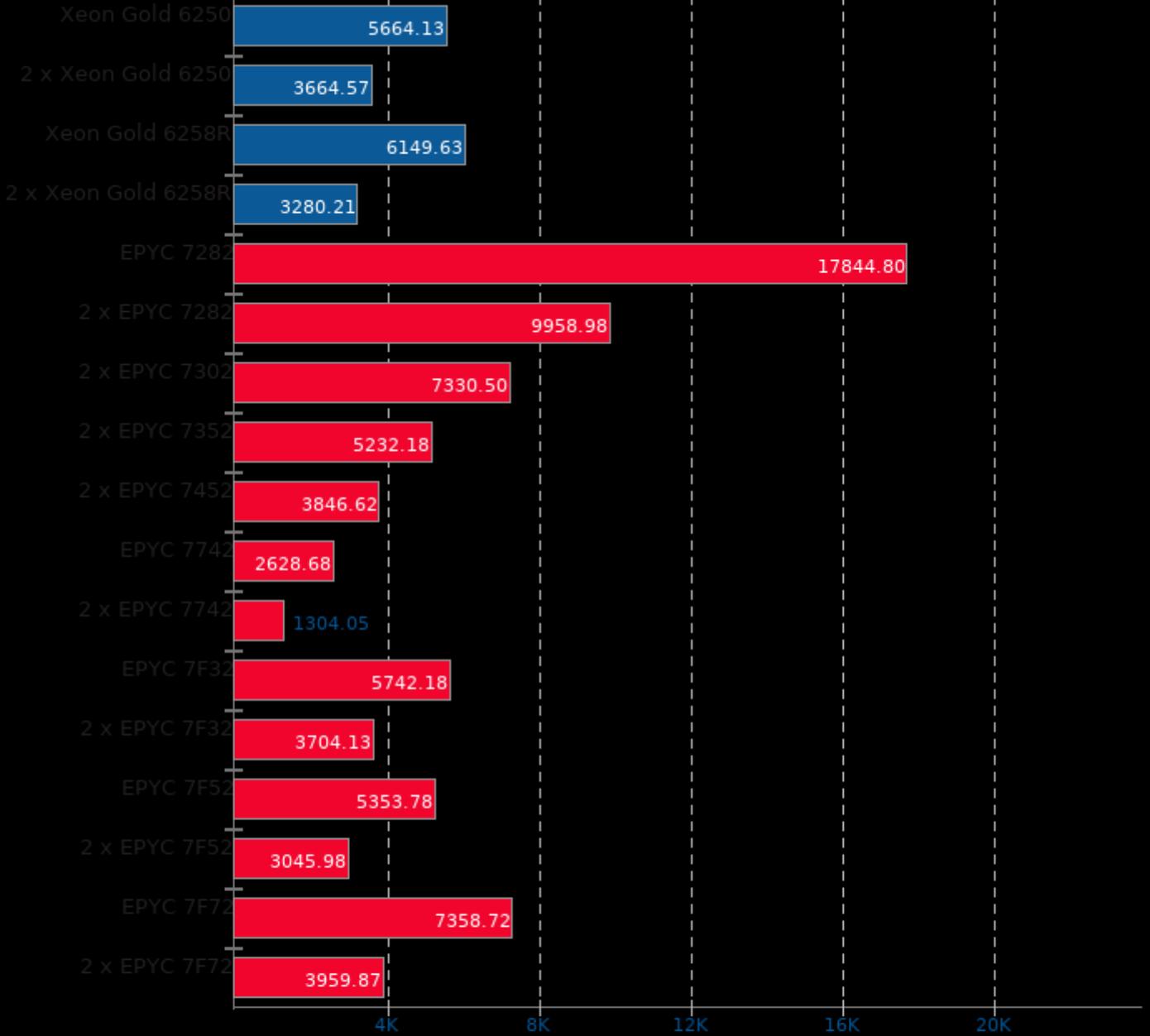


1. Xeon Gold 6250: \$3472 reported cost.
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4. 2 x Xeon Gold 6258R: \$8084 reported cost.
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11. 2 x EPYC 7742: \$15044 reported cost.
12. EPYC 7F32: \$2100 reported cost.
13. 2 x EPYC 7F32: \$4200 reported cost.
14. EPYC 7F52: \$3100 reported cost.
15. 2 x EPYC 7F52: \$6200 reported cost.
16. EPYC 7F72: \$2450 reported cost.
17. 2 x EPYC 7F72: \$4900 reported cost.

OpenVKL 0.9

Performance / Cost - Benchmark: vklBenchmarkVdbVolume

Items / Sec Per Dollar, More Is Better

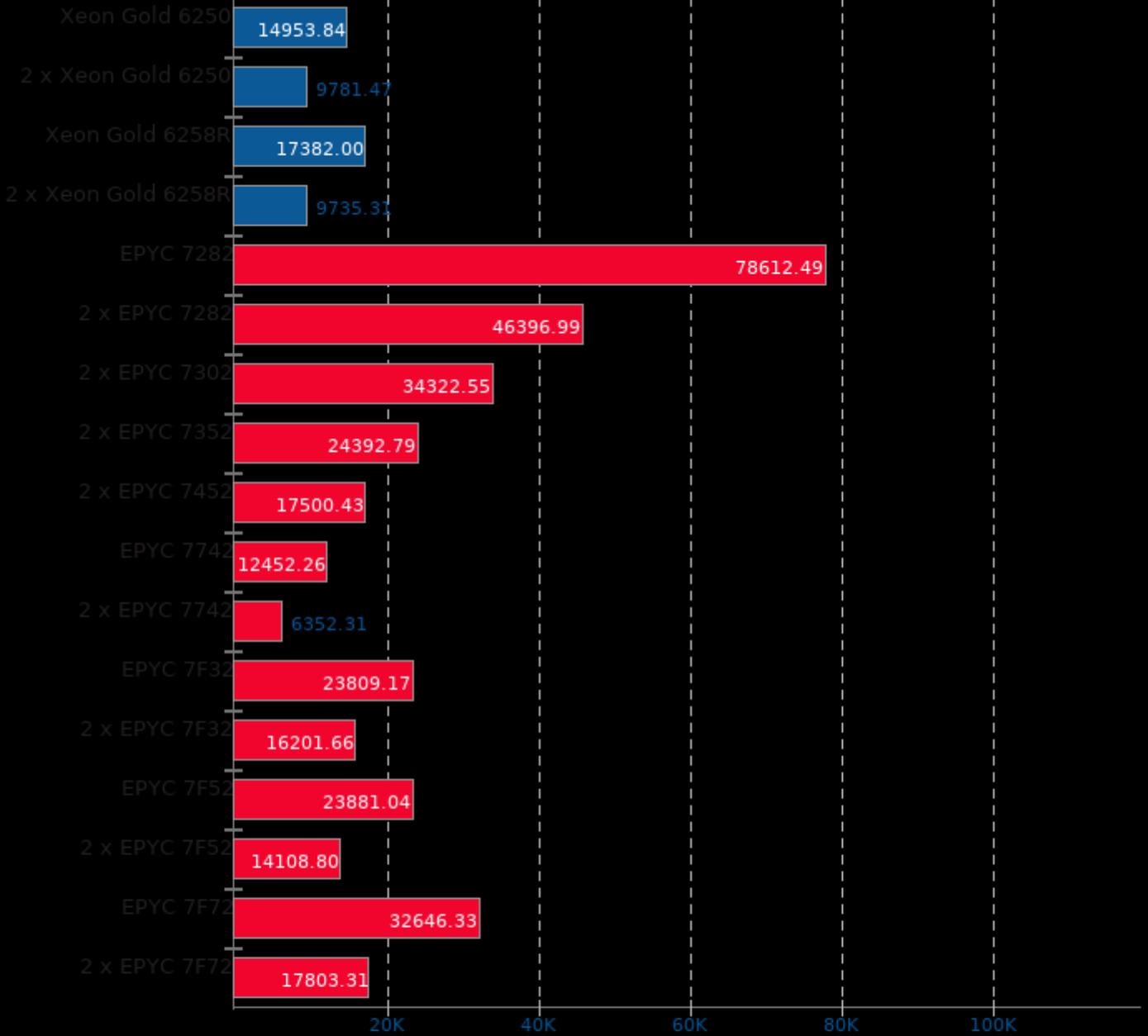


1. Xeon Gold 6250: \$3472 reported cost.
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15. 2 x EPYC 7F52: \$6200 reported cost.
16. EPYC 7F72: \$2450 reported cost.
17. 2 x EPYC 7F72: \$4900 reported cost.

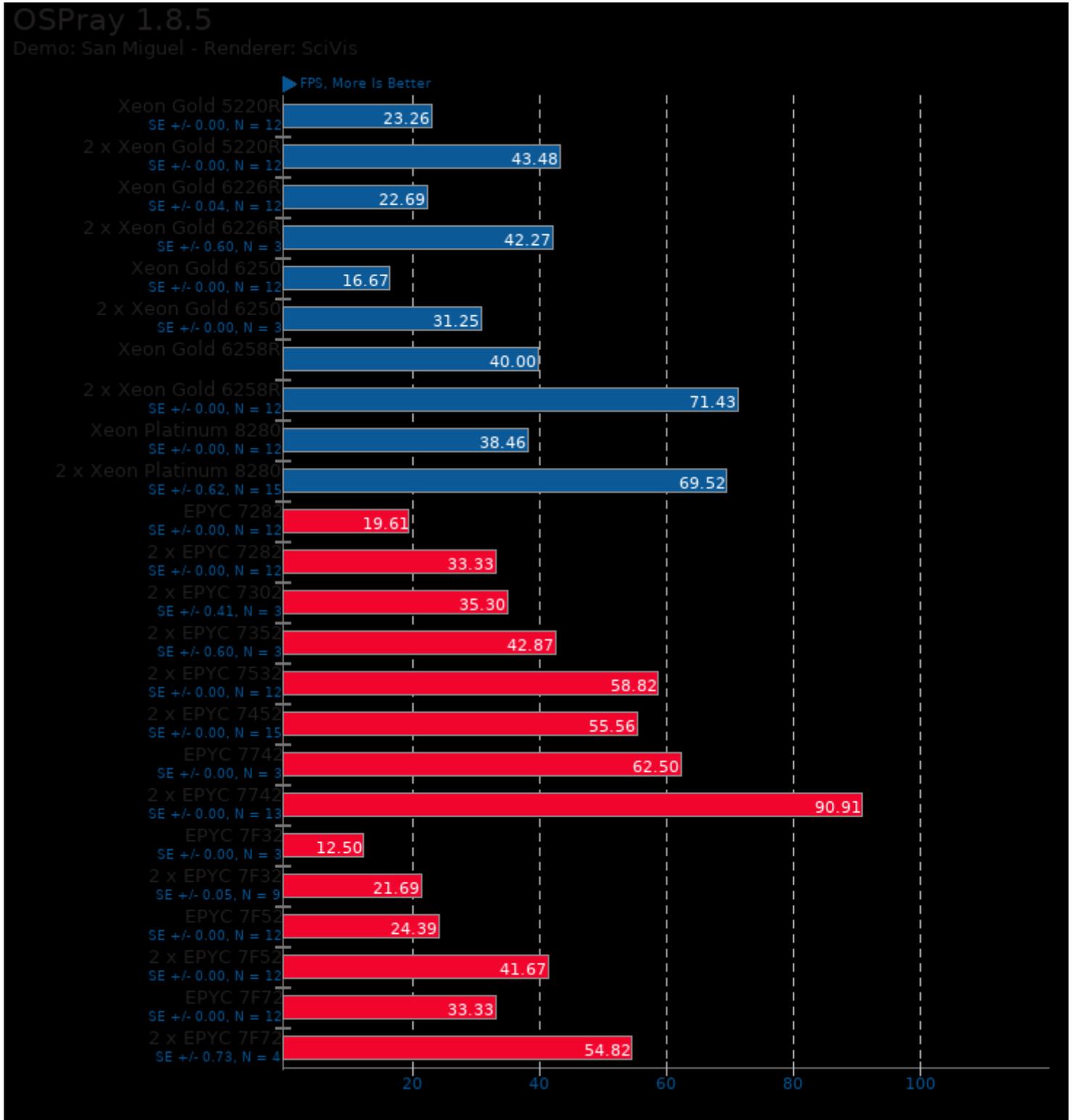
OpenVKL 0.9

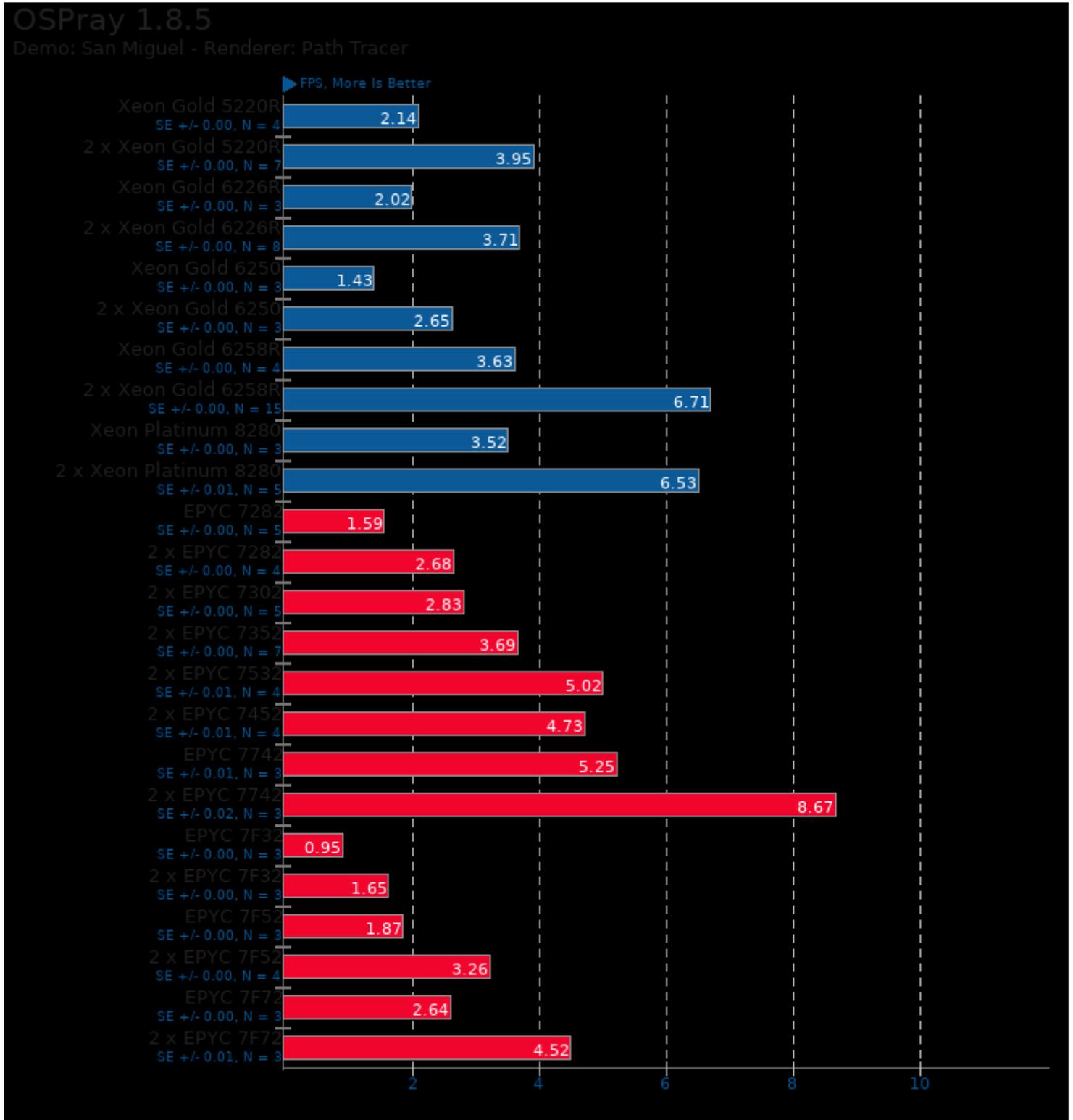
Performance / Cost - Benchmark: vklBenchmarkStructuredVolume

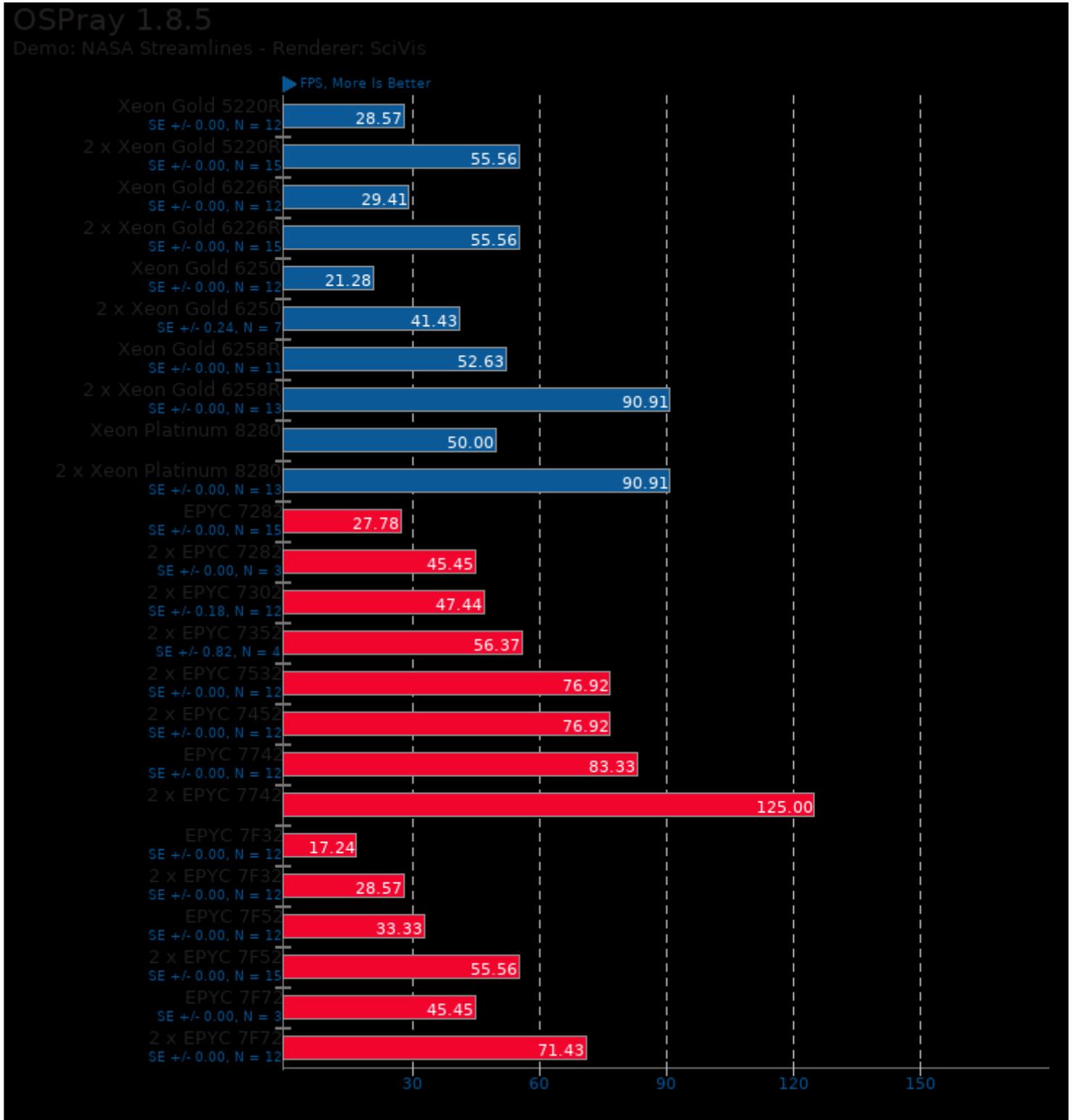
Items / Sec Per Dollar, More Is Better



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15. 2 x EPYC 7F52: \$6200 reported cost.
16. EPYC 7F72: \$2450 reported cost.
17. 2 x EPYC 7F72: \$4900 reported cost.



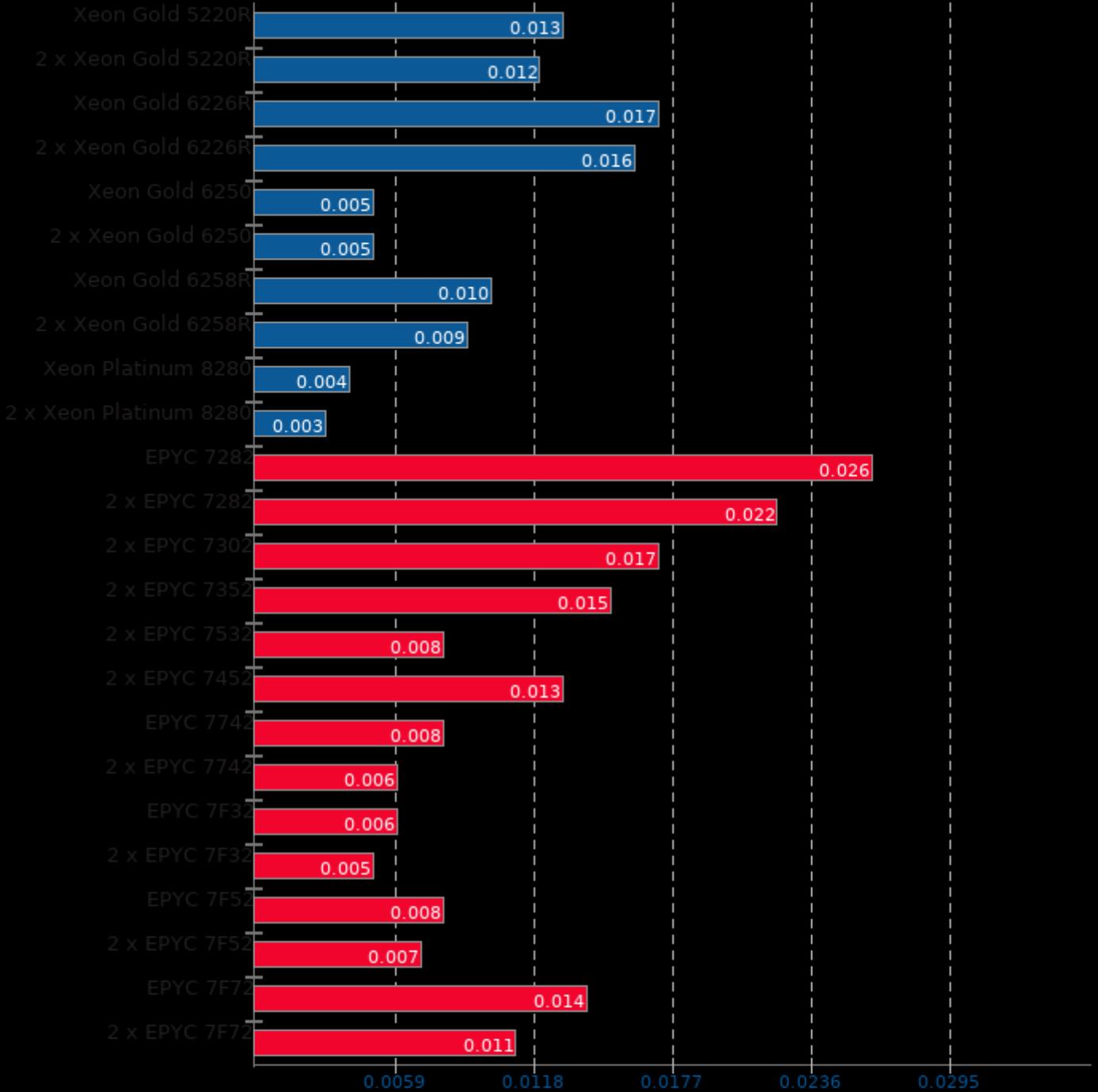




OSPray 1.8.5

Performance / Cost - Demo: San Miguel - Renderer: SciVis

FPS Per Dollar, More Is Better

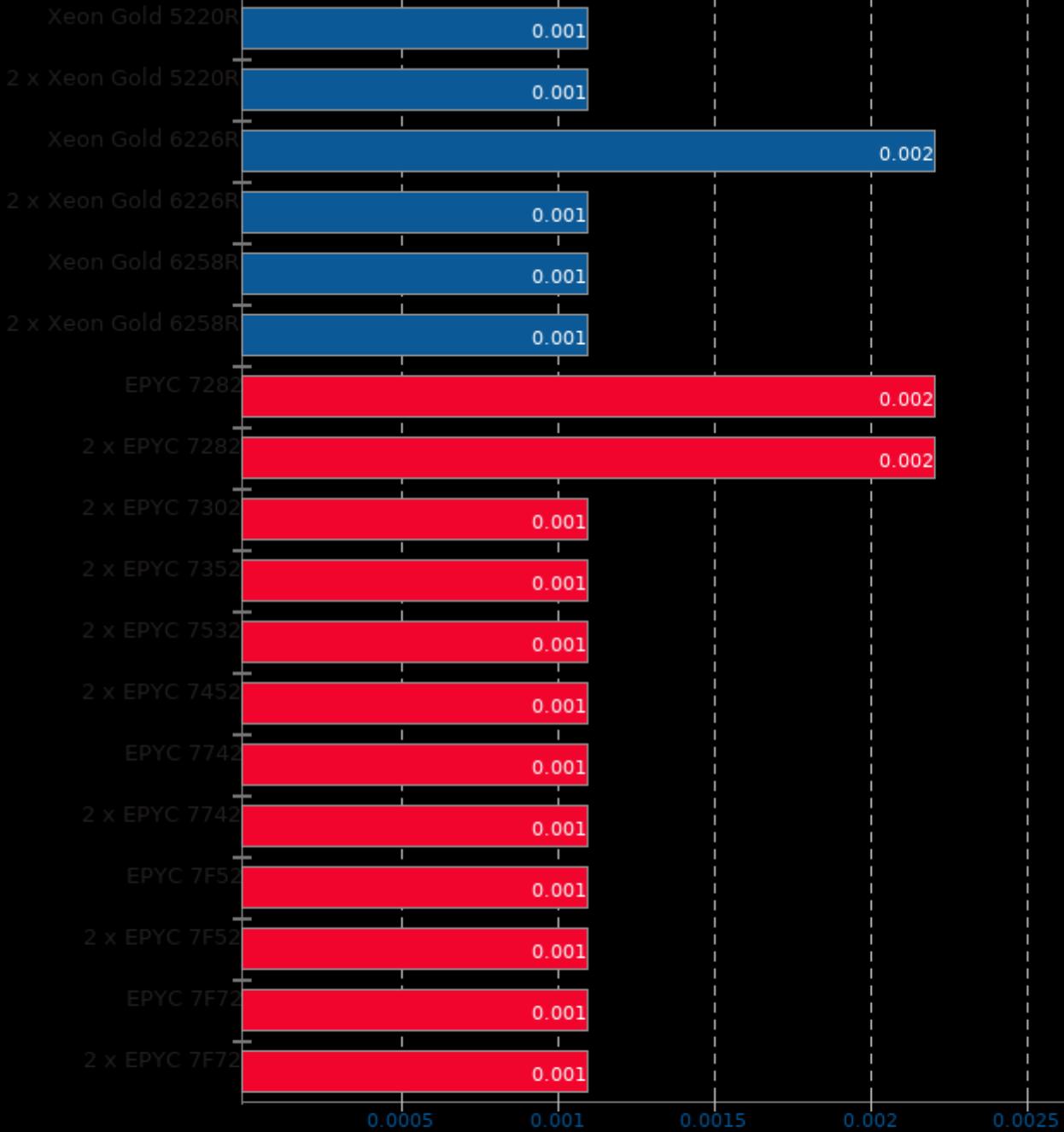


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22. 2 x EPYC 7F52: \$6200 reported cost.

OSPray 1.8.5

Performance / Cost - Demo: San Miguel - Renderer: Path Tracer

FPS Per Dollar, More Is Better

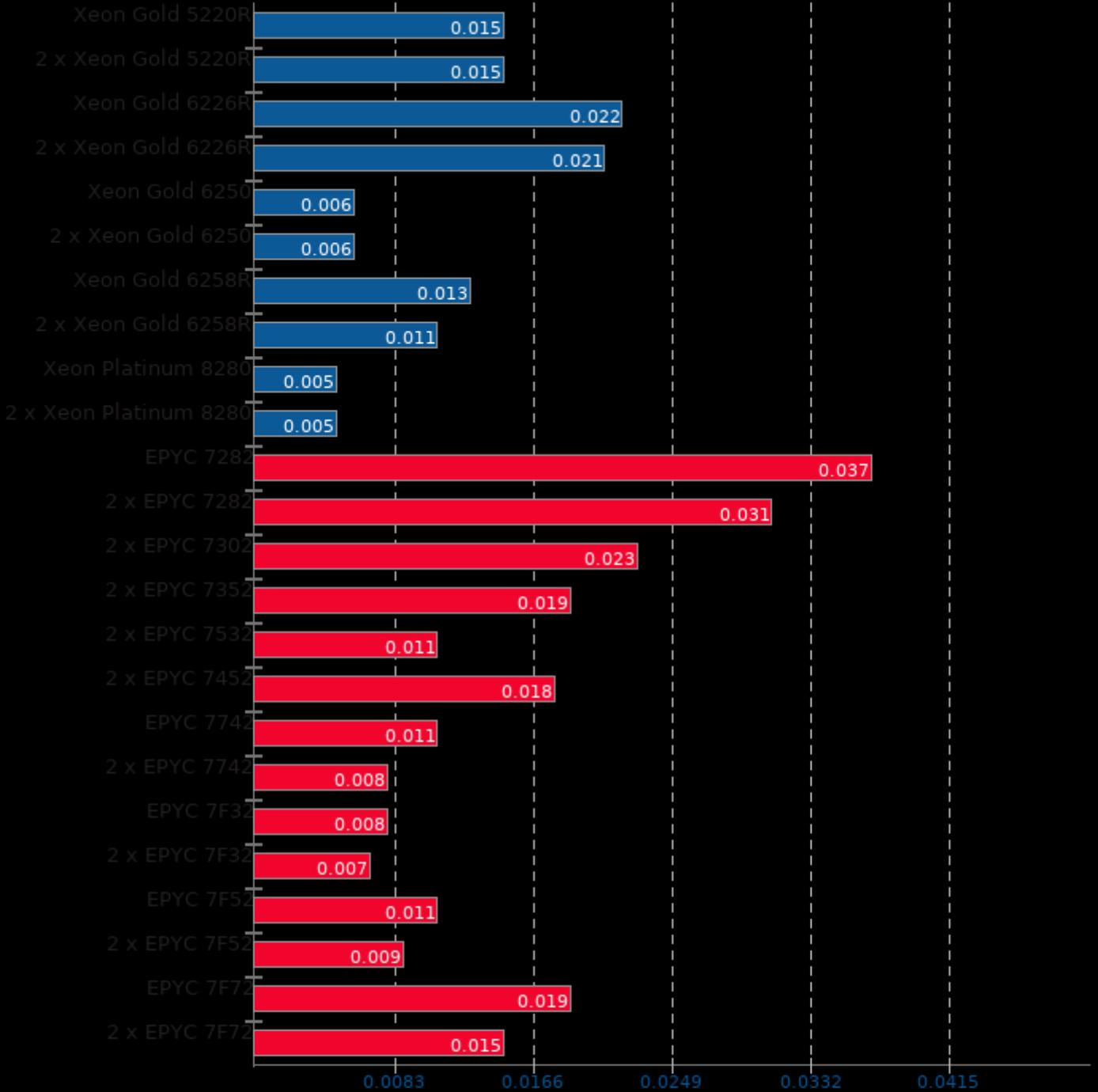


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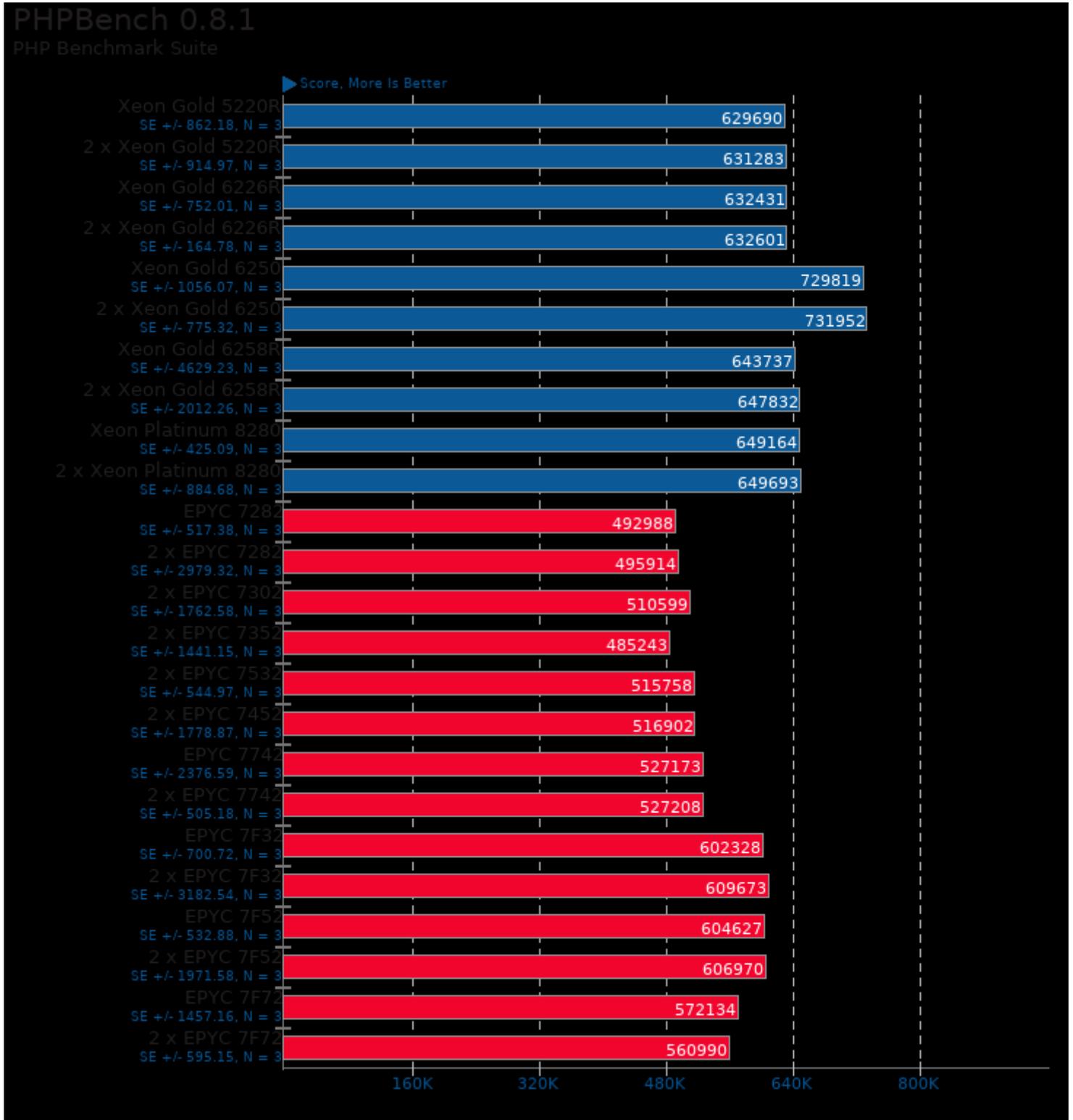
OSPray 1.8.5

Performance / Cost - Demo: NASA Streamlines - Renderer: SciVis

FPS Per Dollar, More Is Better



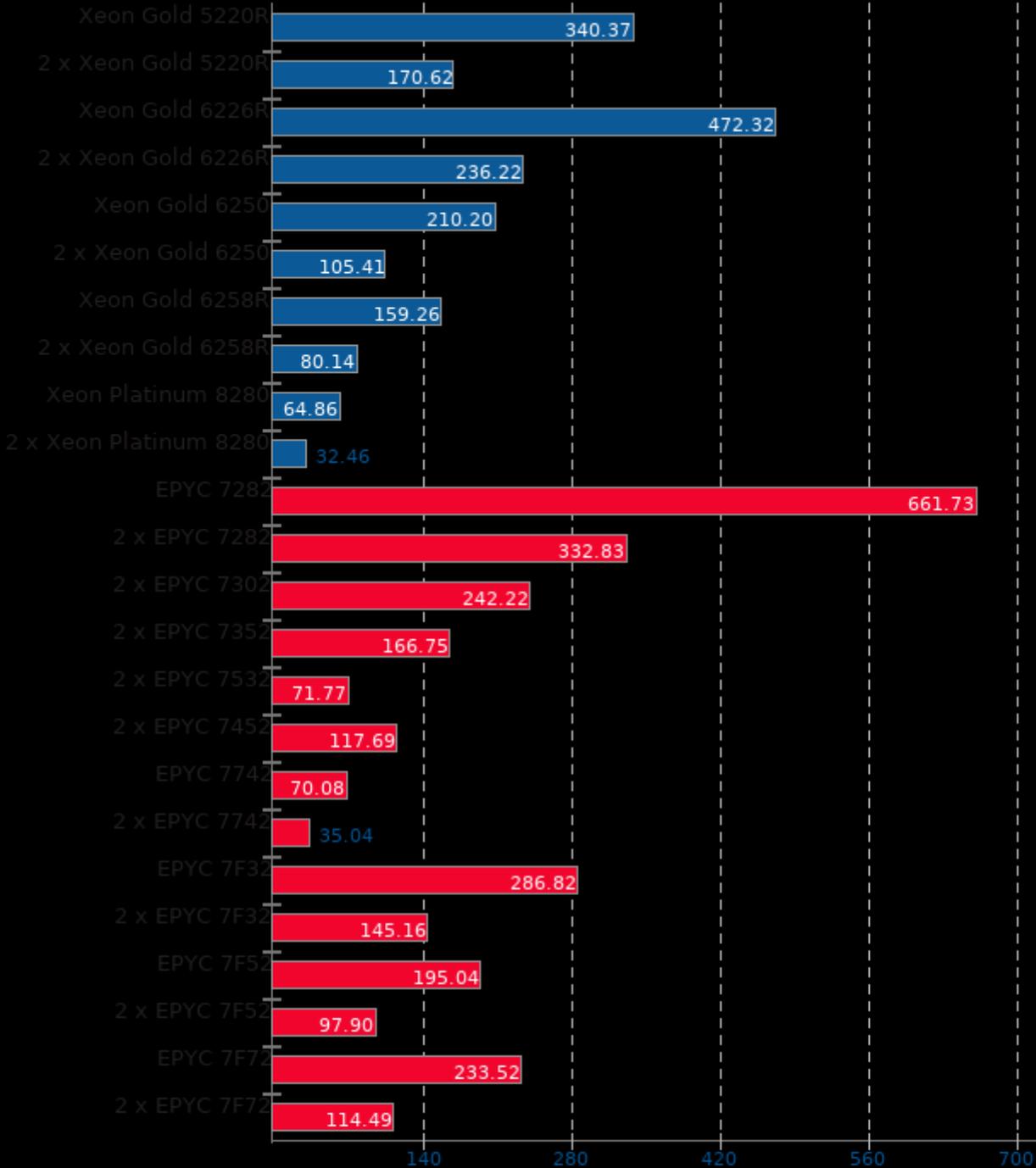
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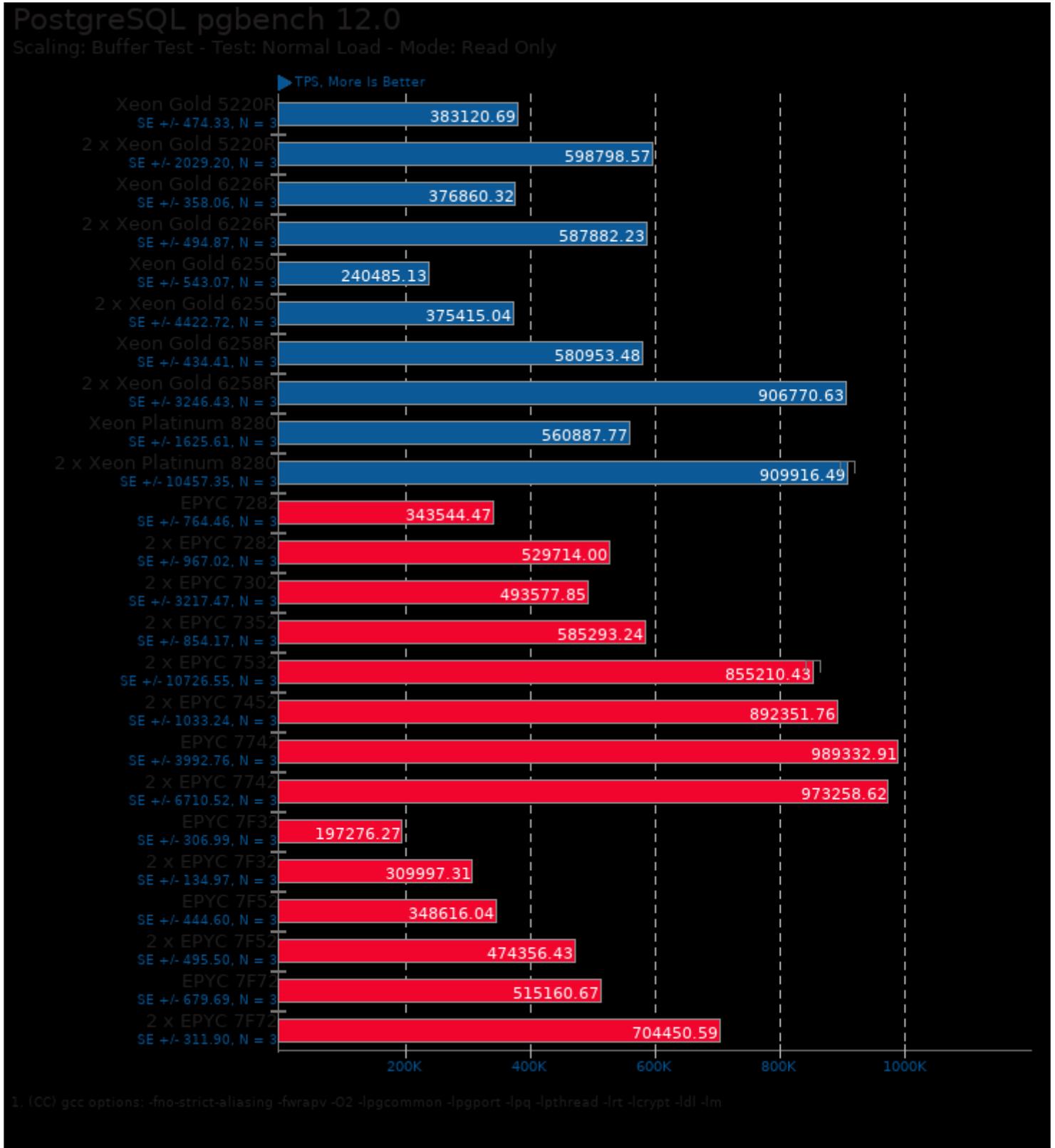
PHPBench 0.8.1

Performance / Cost - PHP Benchmark Suite

▶ Score Per Dollar, More Is Better



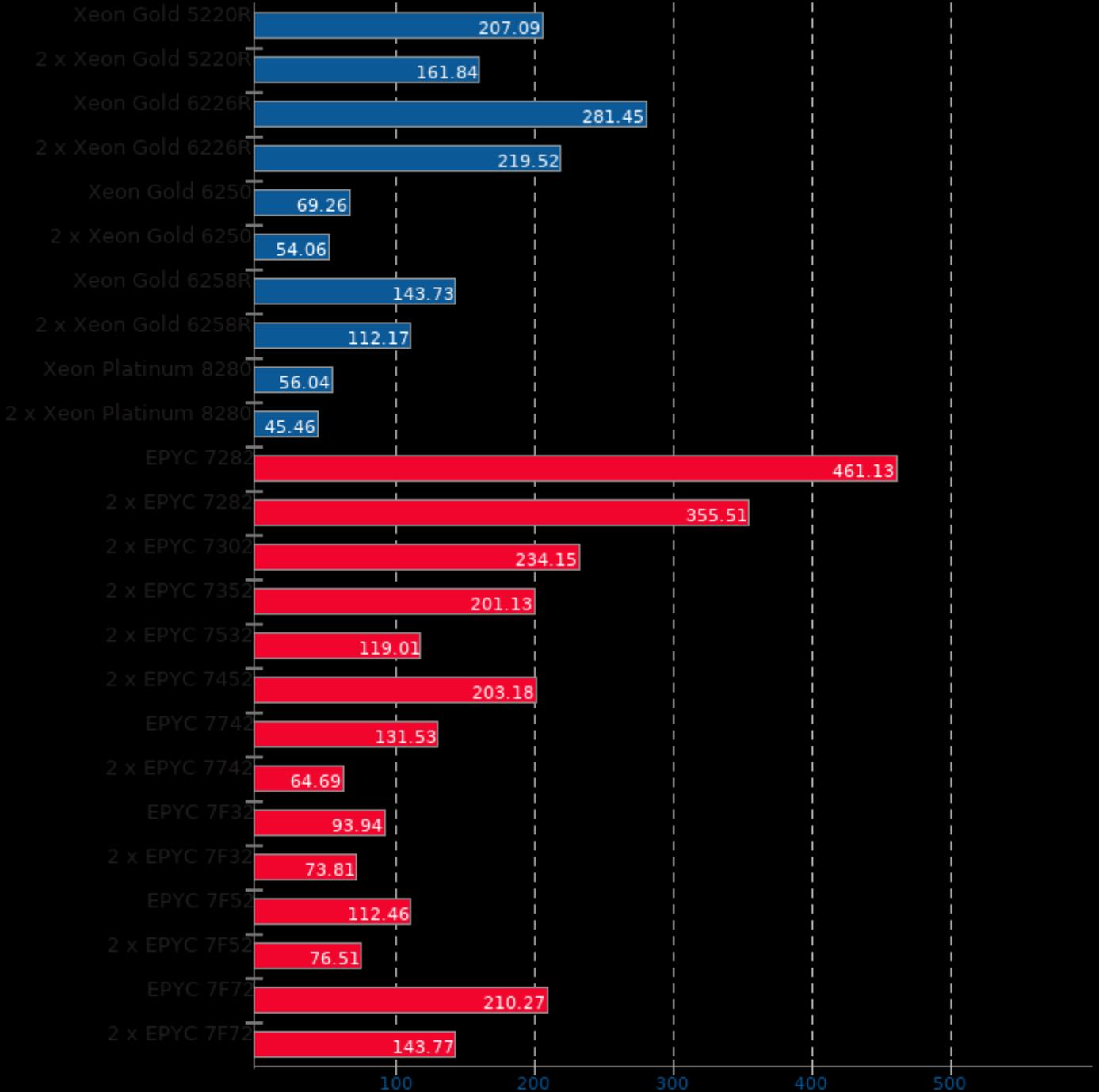
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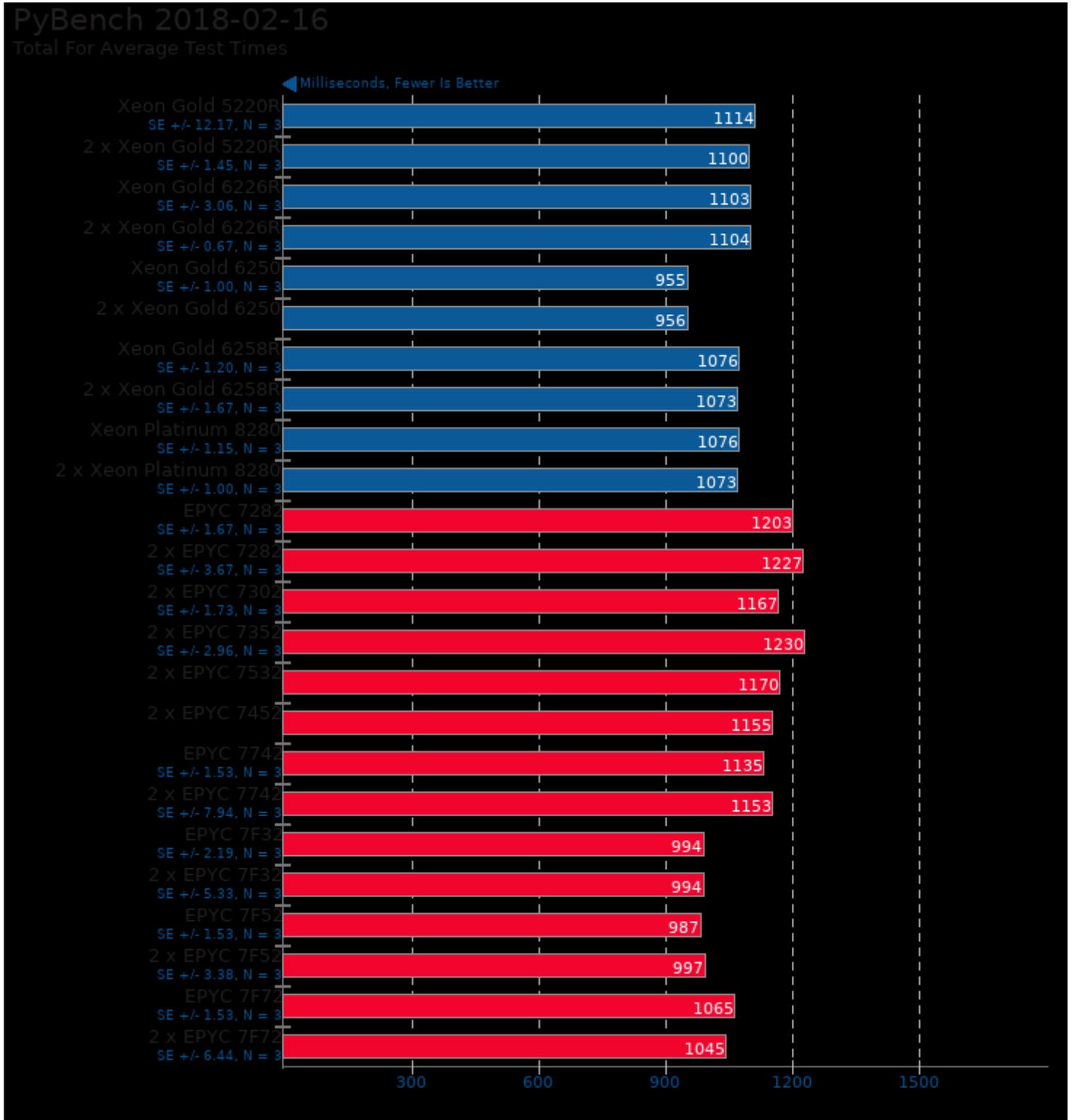
PostgreSQL pgbench 12.0

Performance / Cost - Scaling: Buffer Test - Test: Normal Load - Mode: Read Only

TPS Per Dollar, More Is Better

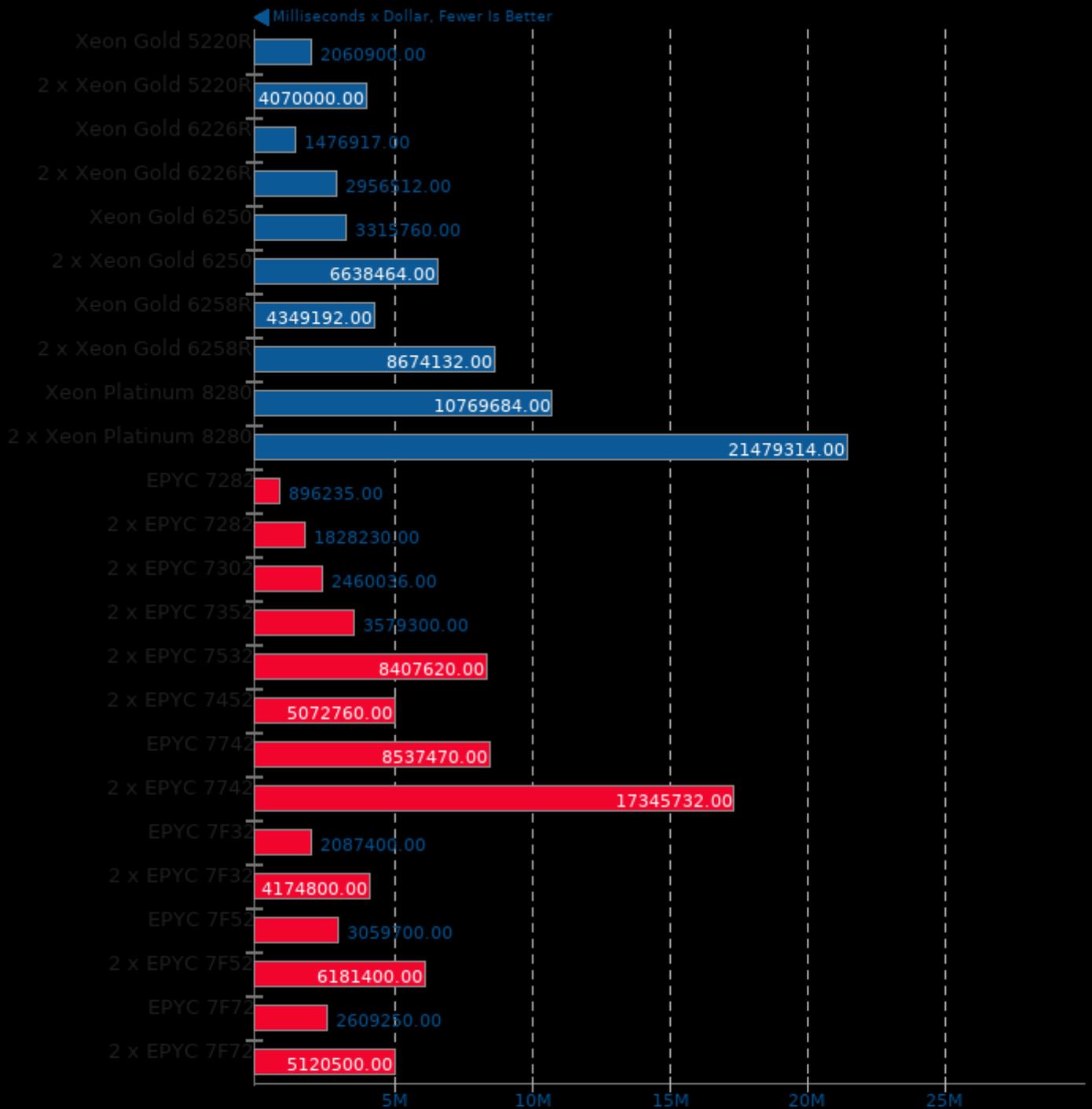


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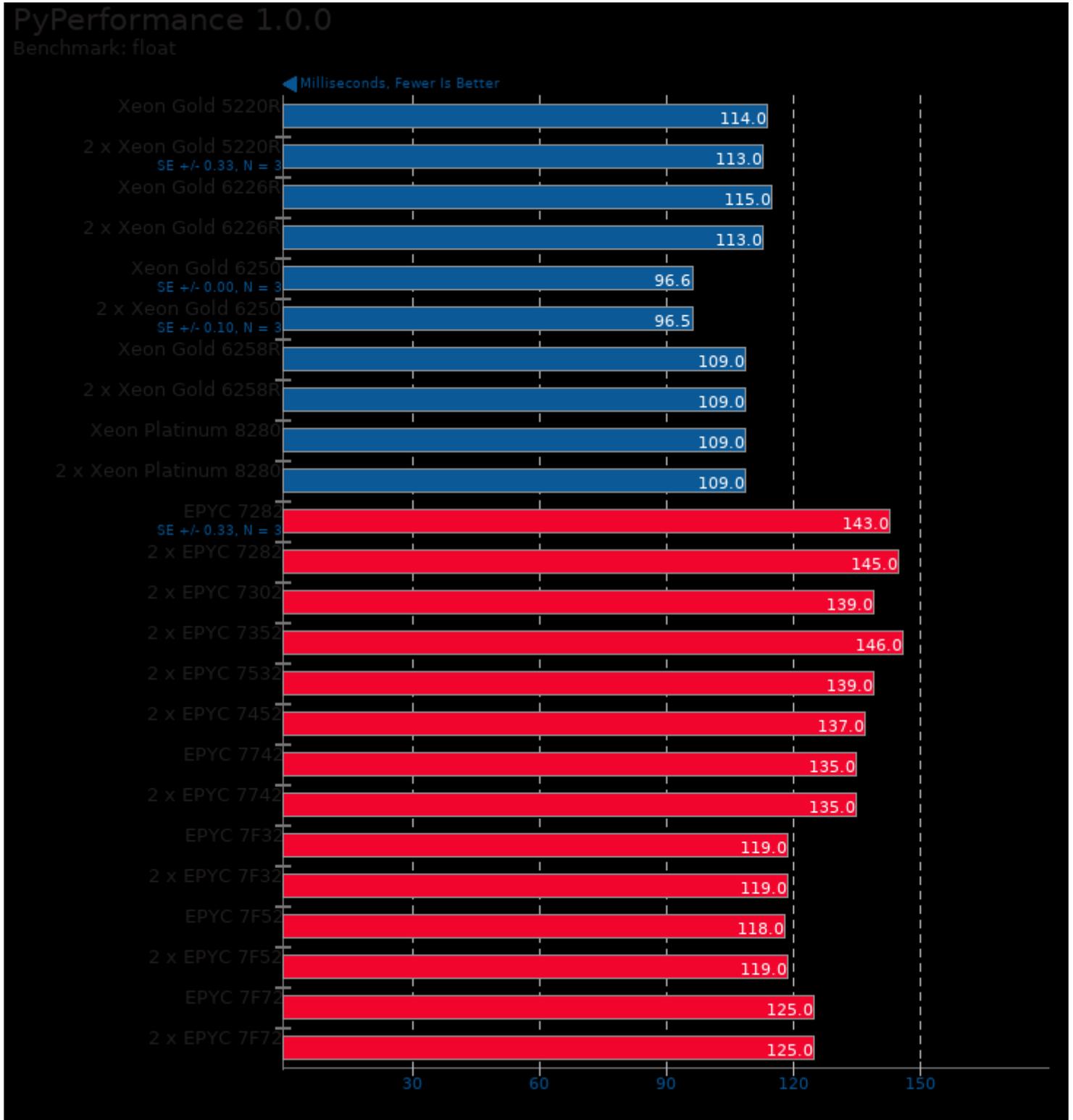


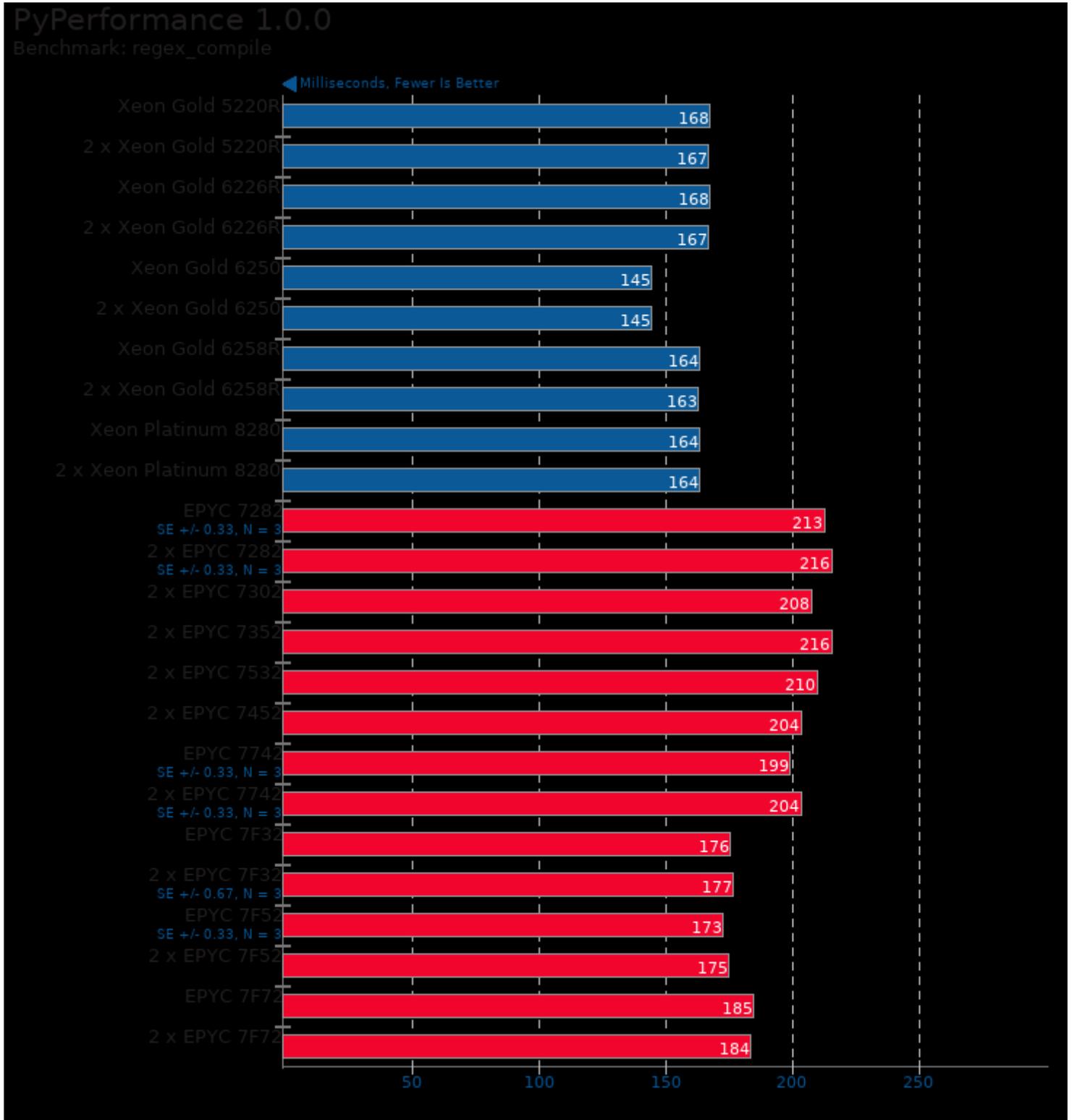
PyBench 2018-02-16

Performance / Cost - Total For Average Test Times



1. Xeon Gold 5220R: \$1850 reported cost.
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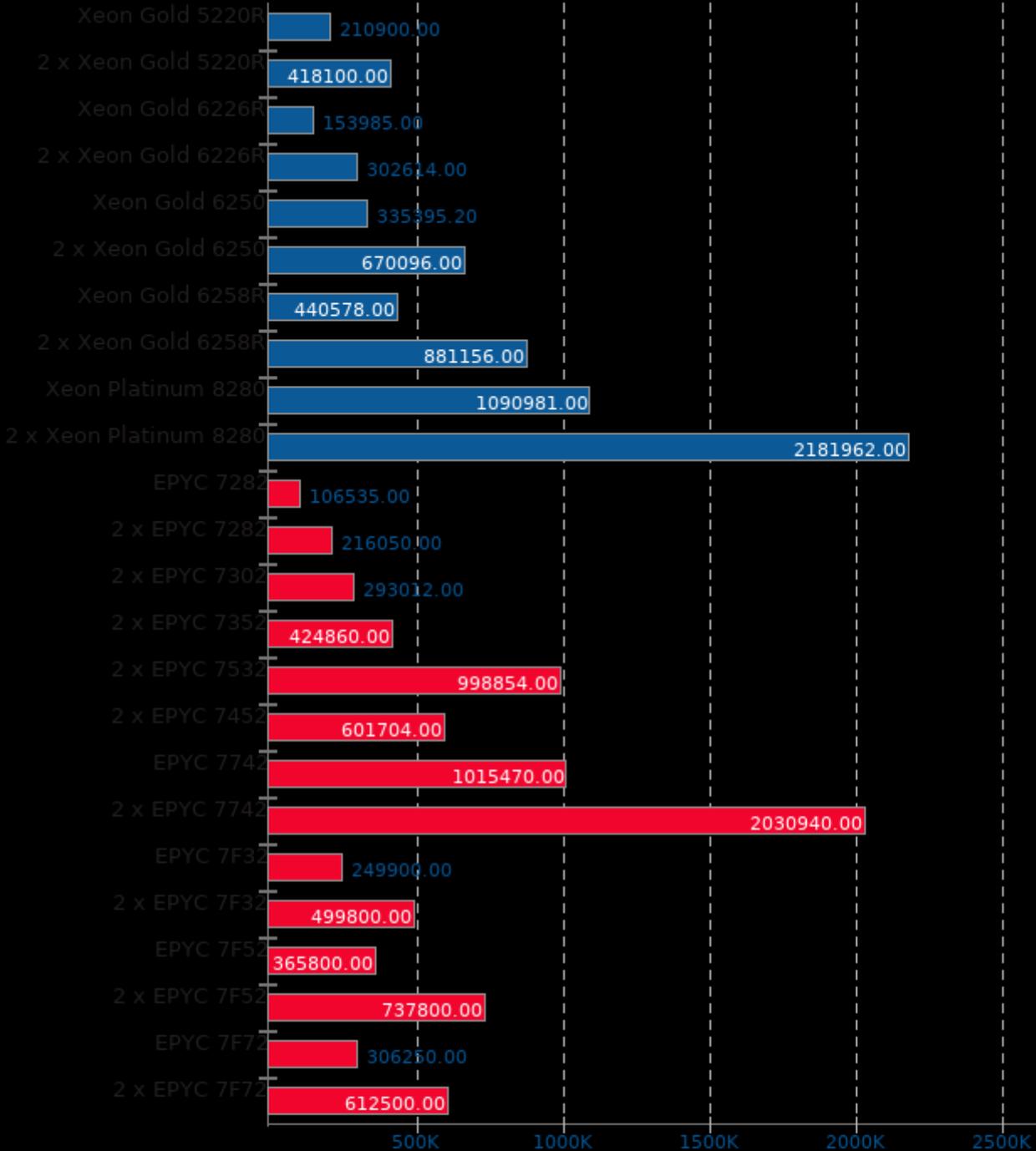




PyPerformance 1.0.0

Performance / Cost - Benchmark: float

◀ Milliseconds x Dollar, Fewer Is Better

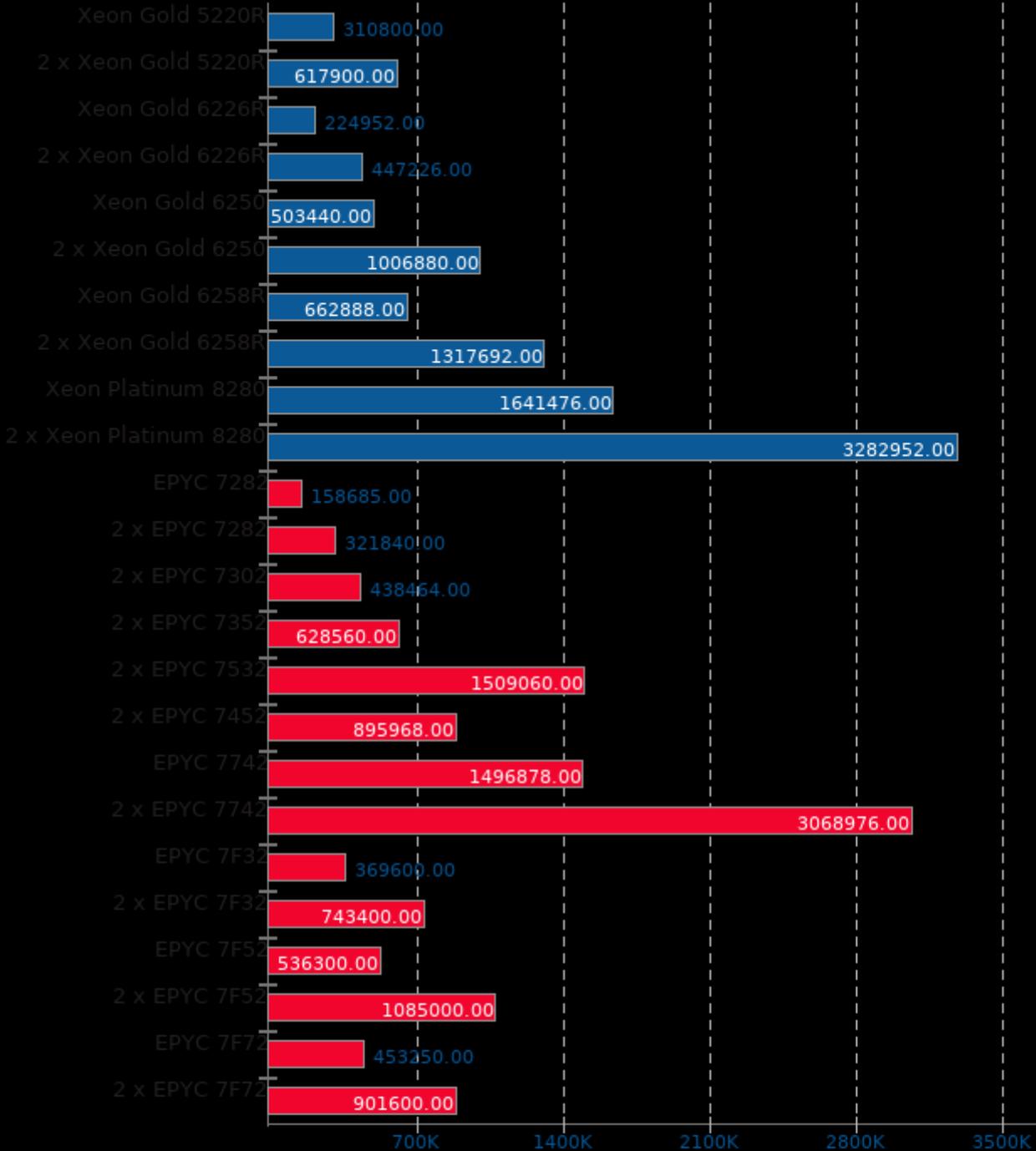


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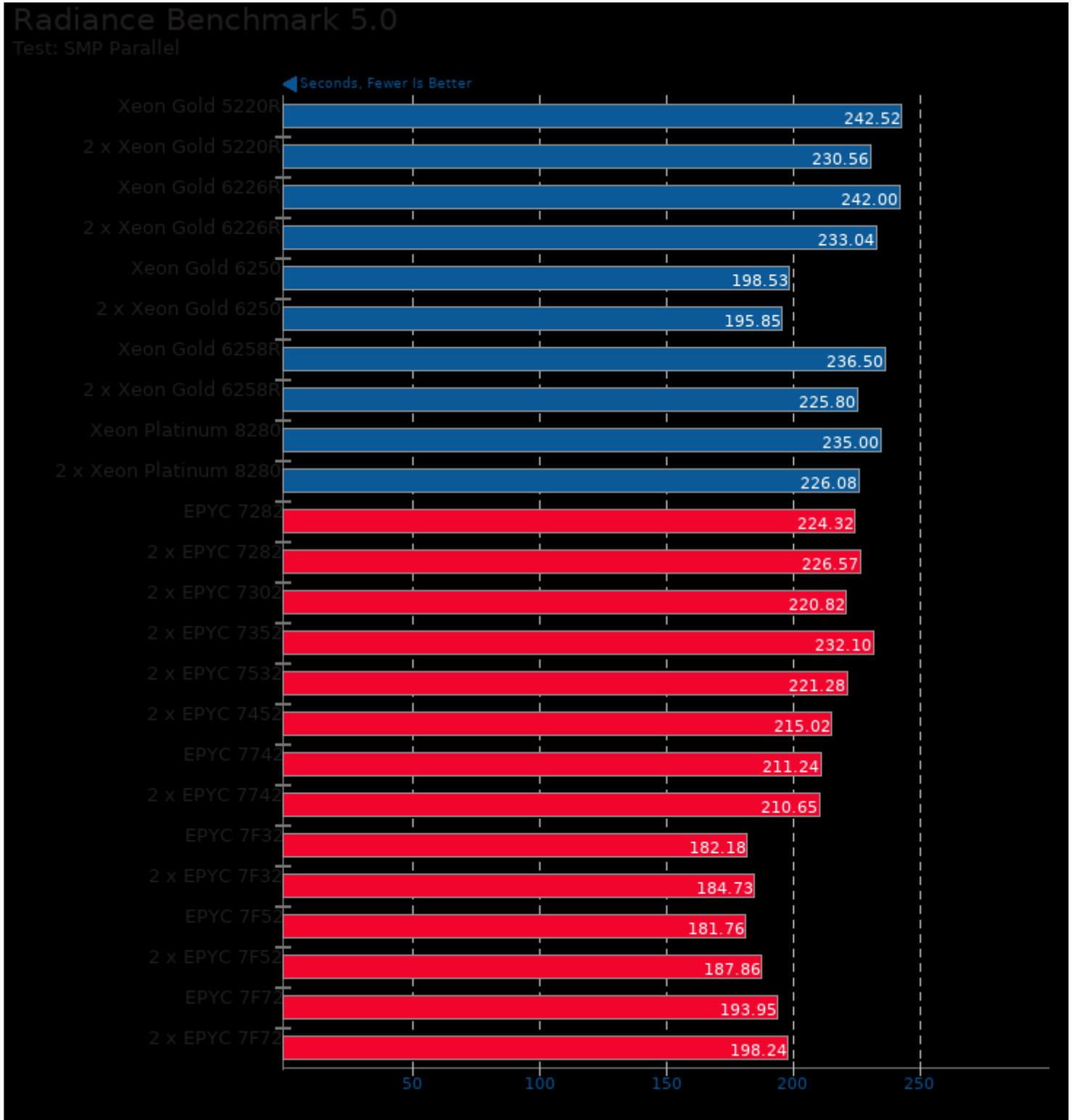
PyPerformance 1.0.0

Performance / Cost - Benchmark: regex_compile

◀ Milliseconds x Dollar, Fewer Is Better



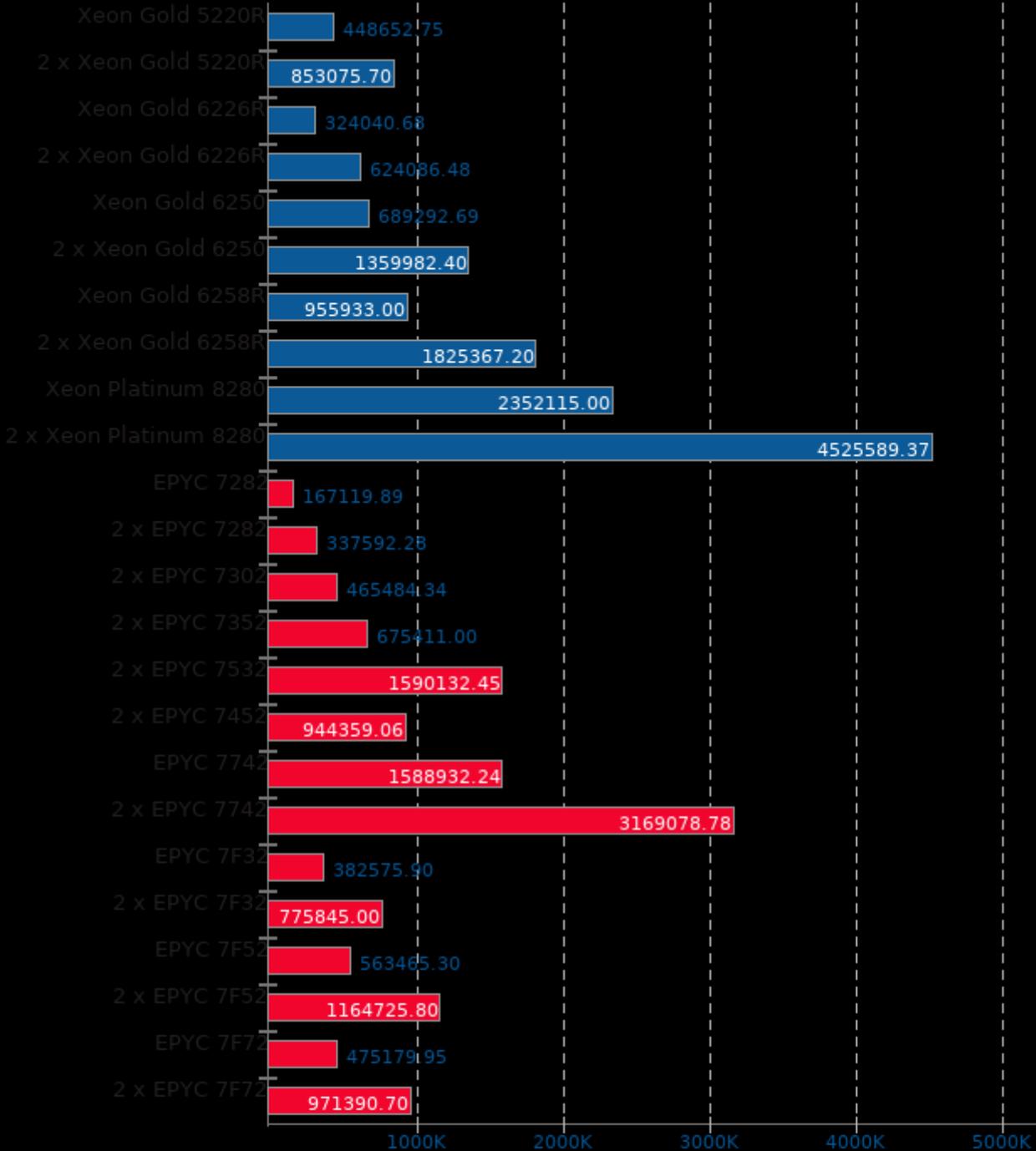
1. Xeon Gold 5220R: \$1850 reported cost.
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Radiance Benchmark 5.0

Performance / Cost - Test: SMP Parallel

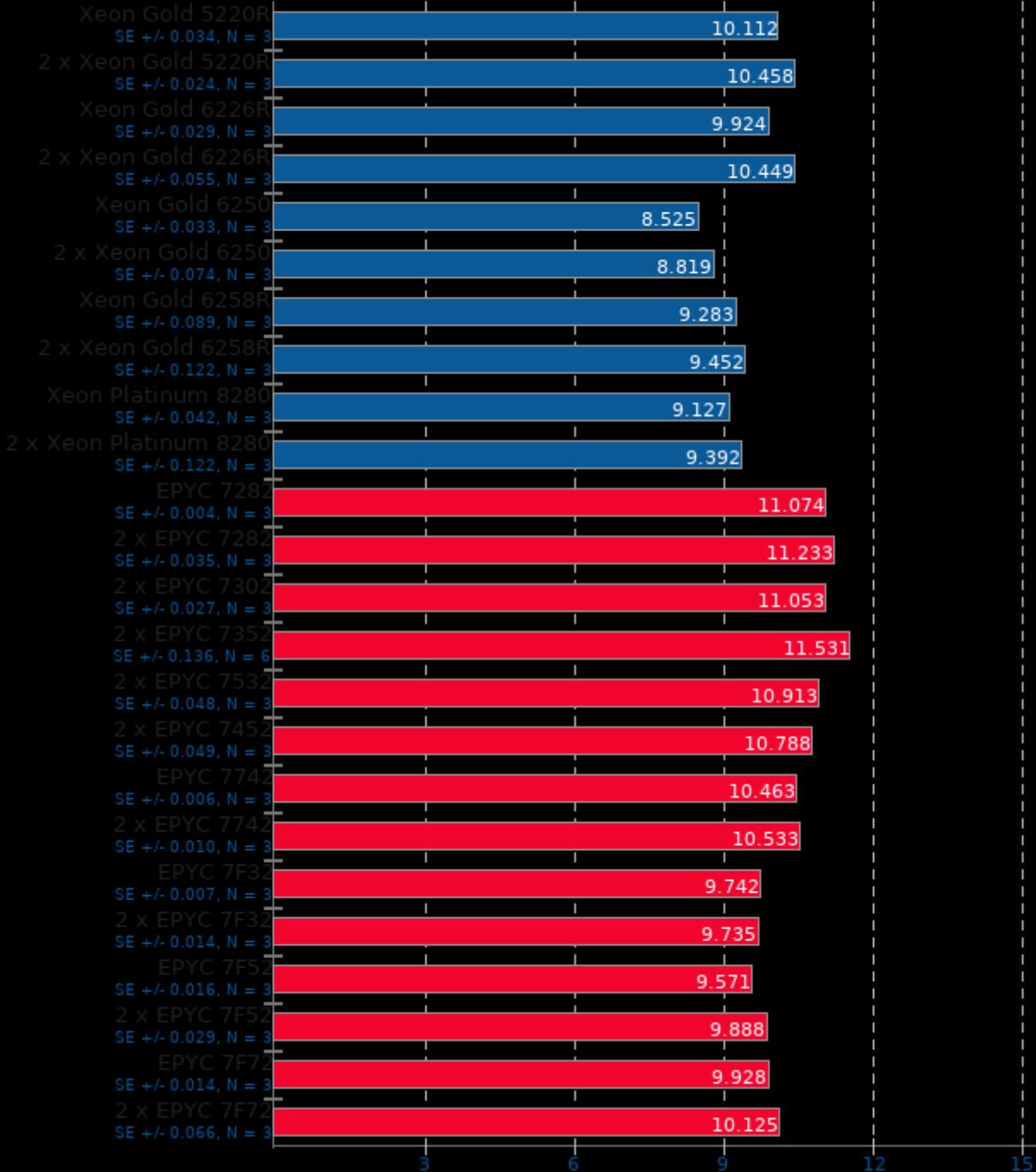
← Seconds x Dollar, Fewer Is Better



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6. 2 x Xeon Gold 6250: \$6944 reported cost.
7. Xeon Gold 6258R: \$4042 reported cost.
8. 2 x Xeon Gold 6258R: \$8084 reported cost.
9. Xeon Platinum 8280: \$10009 reported cost.
10. 2 x Xeon Platinum 8280: \$20018 reported cost.
11. EPYC 7282: \$745 reported cost.
12. 2 x EPYC 7282: \$1490 reported cost.
13. 2 x EPYC 7302: \$2108 reported cost.
14. 2 x EPYC 7352: \$2910 reported cost.
15. 2 x EPYC 7532: \$7186 reported cost.
16. 2 x EPYC 7452: \$4392 reported cost.
17. EPYC 7742: \$7522 reported cost.
18. 2 x EPYC 7742: \$15044 reported cost.
19. EPYC 7F32: \$2100 reported cost.
20. 2 x EPYC 7F32: \$4200 reported cost.
21. EPYC 7F52: \$3100 reported cost.
22. 2 x EPYC 7F52: \$6200 reported cost.

Scikit-Learn 0.22.1

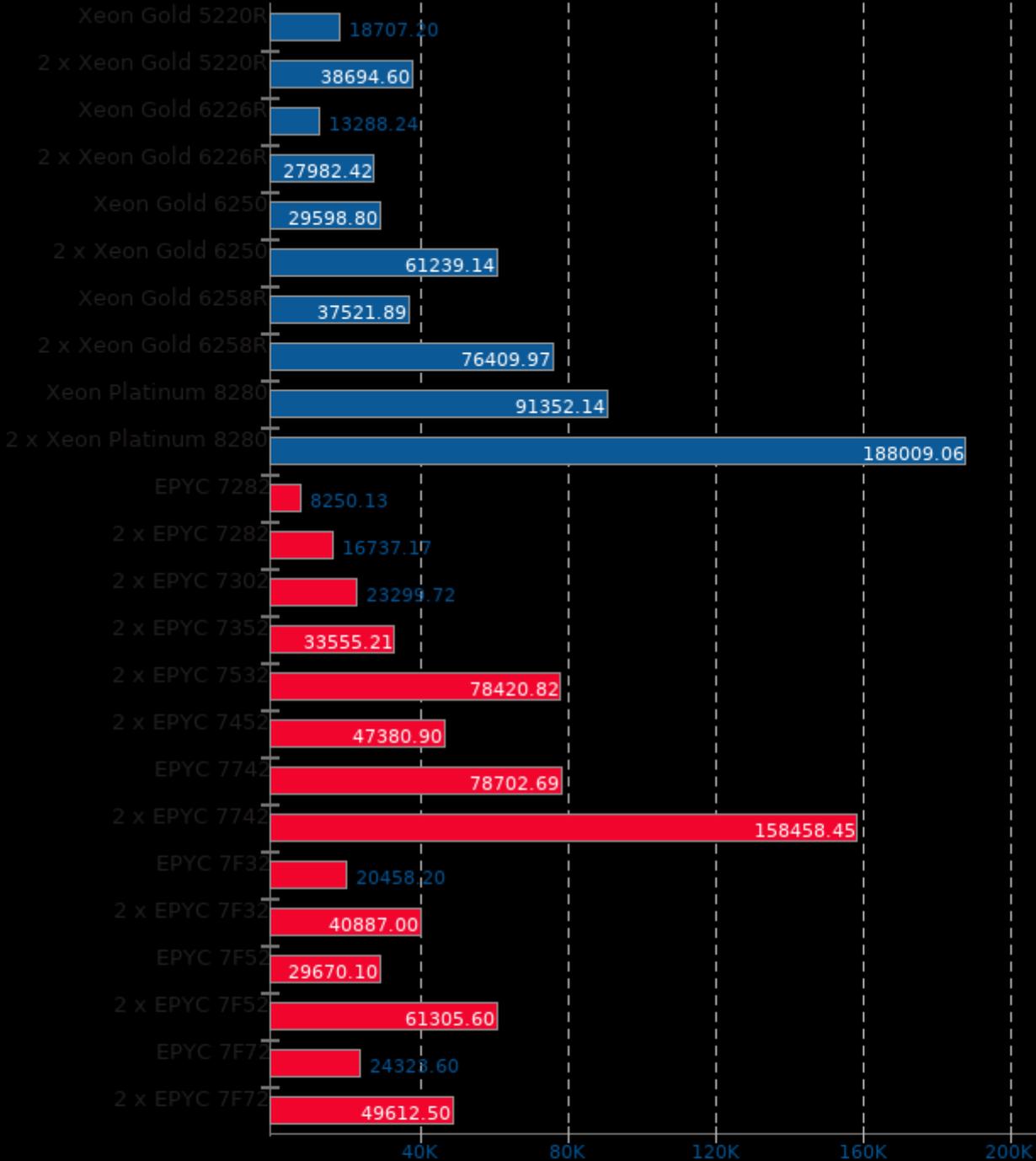
← Seconds, Fewer Is Better



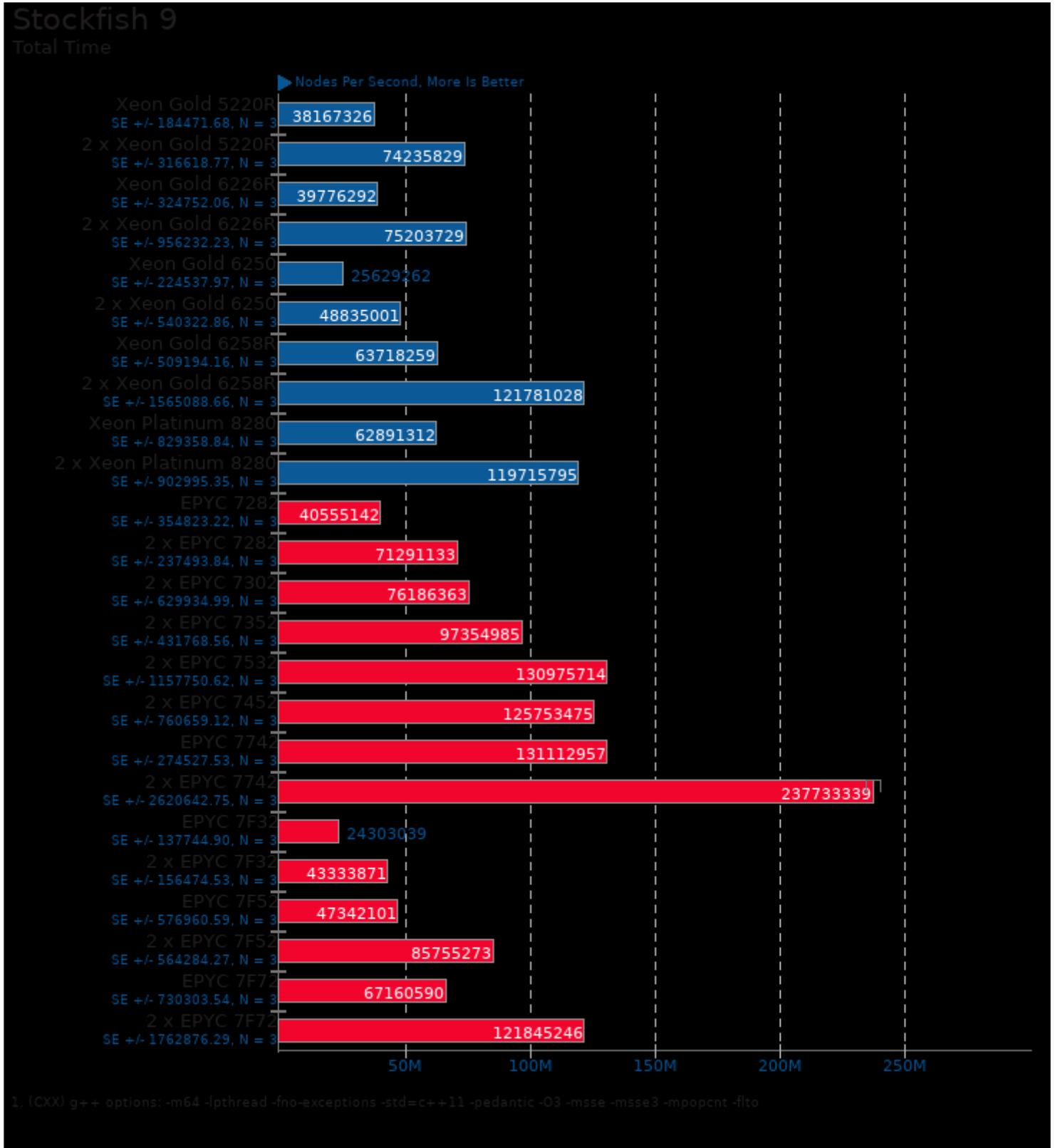
Scikit-Learn 0.22.1

Performance / Cost

← Seconds x Dollar, Fewer Is Better



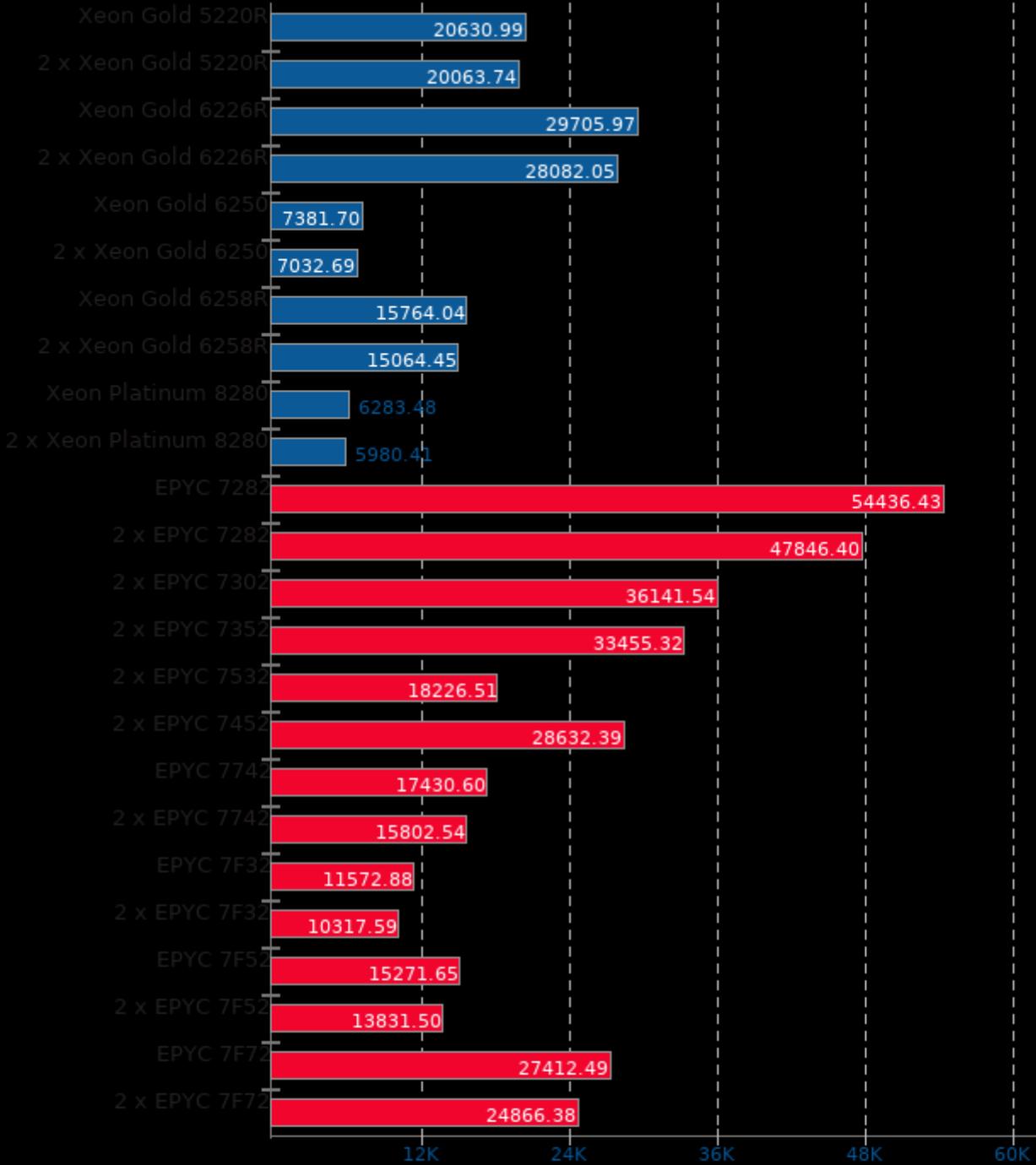
1. Xeon Gold 5220R: \$1850 reported cost.
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21. EPYC 7F52: \$3100 reported cost.
22. 2 x EPYC 7F52: \$6200 reported cost.



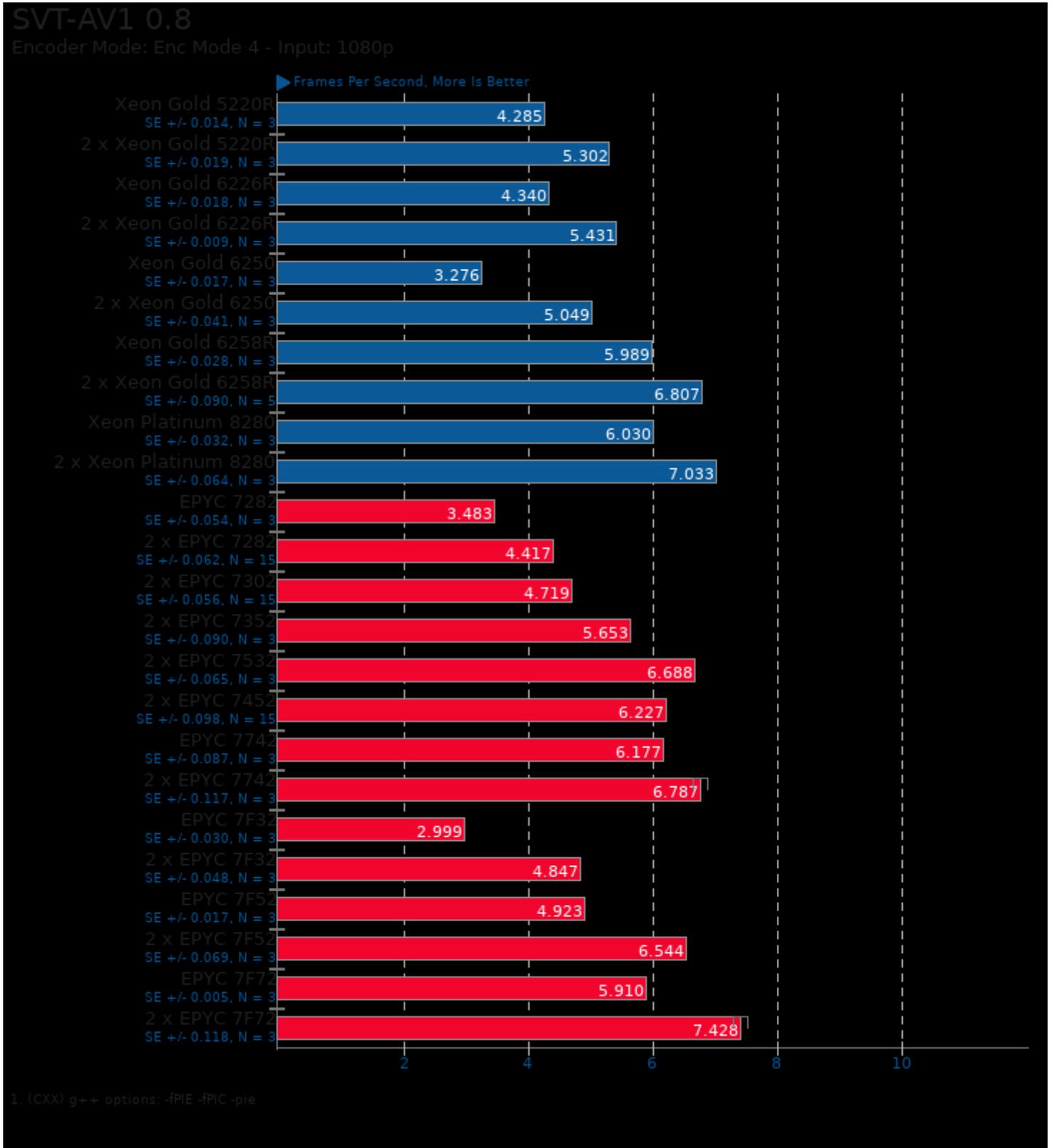
Stockfish 9

Performance / Cost - Total Time

Nodes Per Second Per Dollar, More Is Better



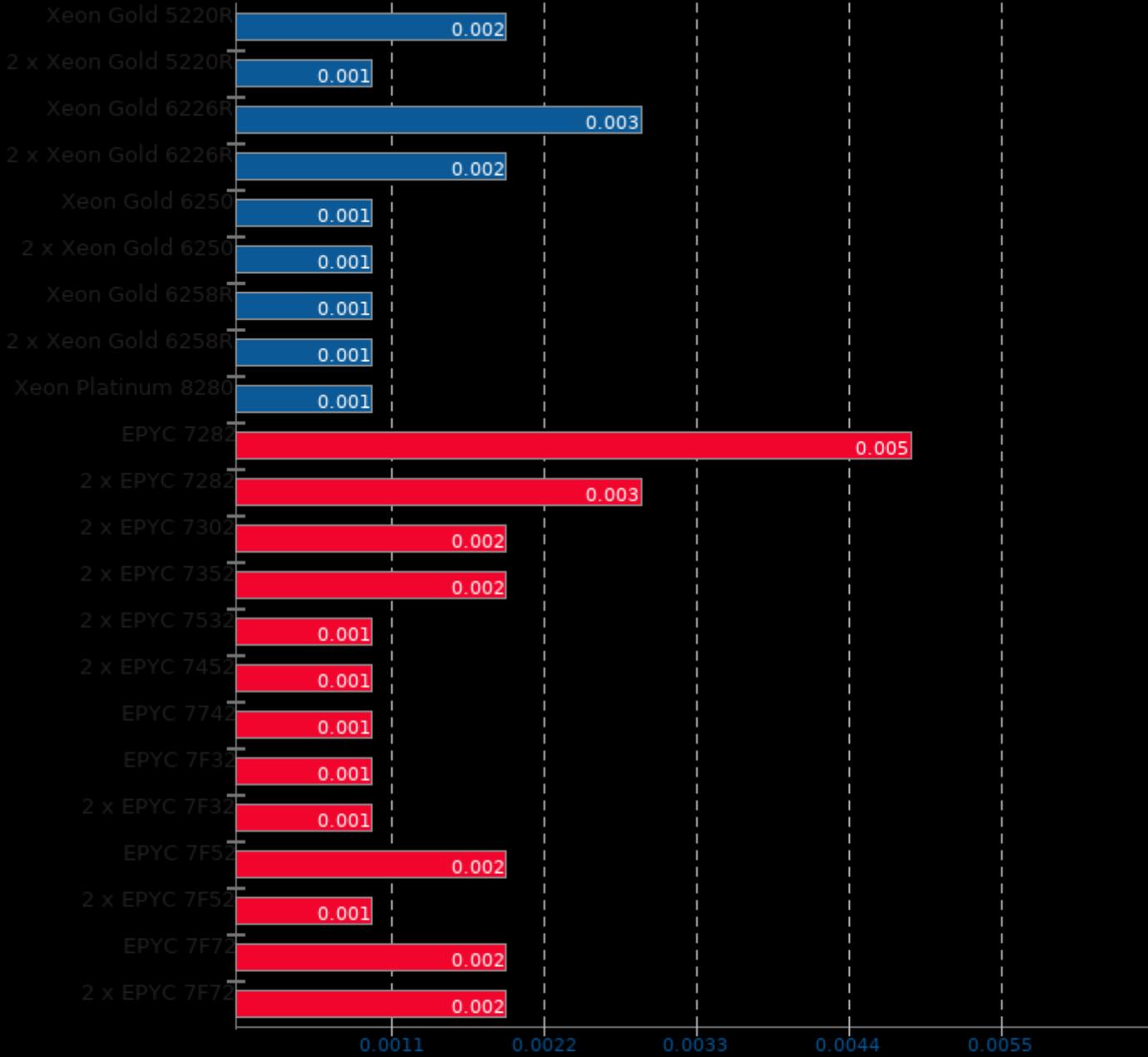
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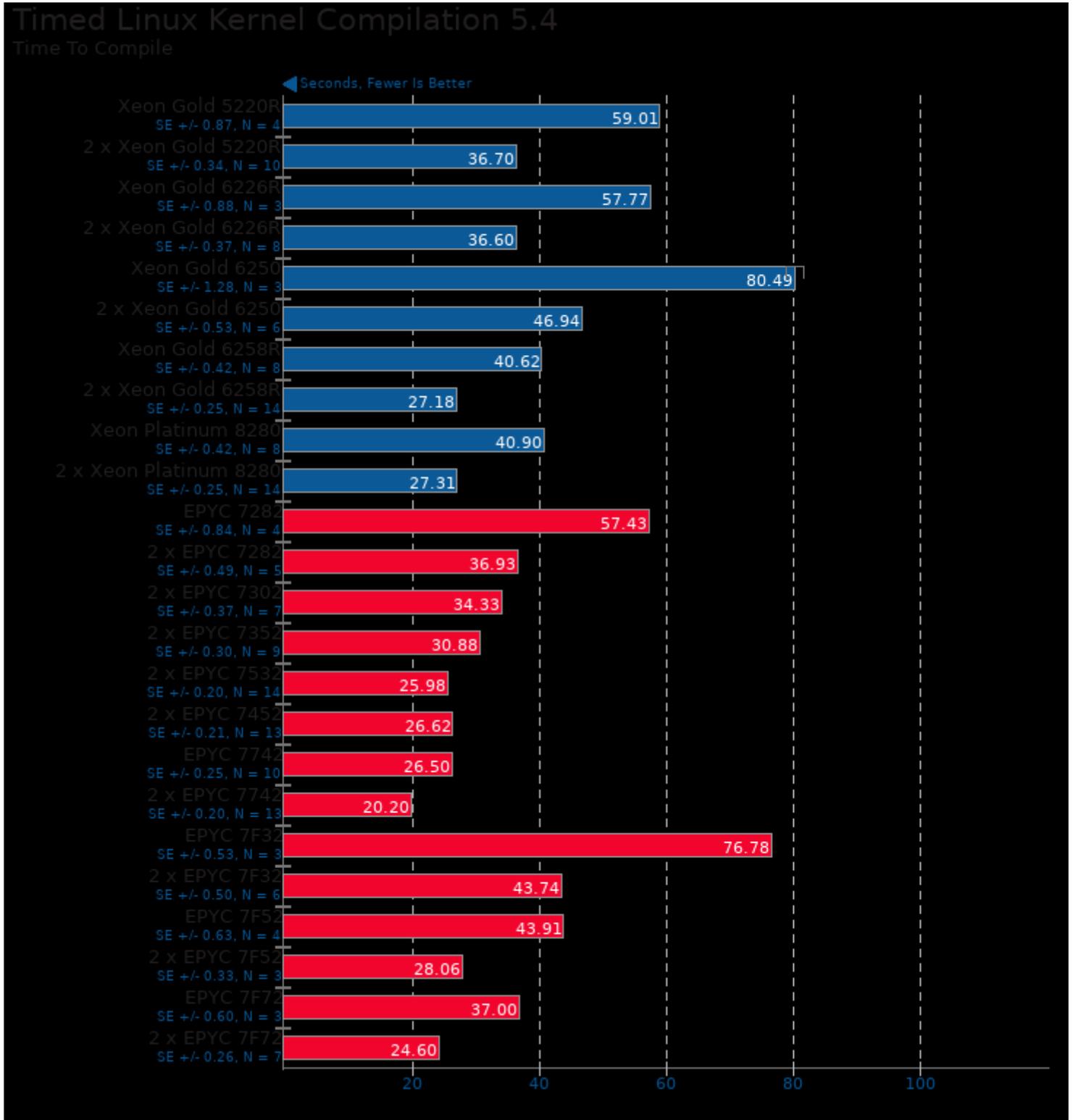
SVT-AV1 0.8

Performance / Cost - Encoder Mode: Enc Mode 4 - Input: 1080p

▶ Frames Per Second Per Dollar, More Is Better



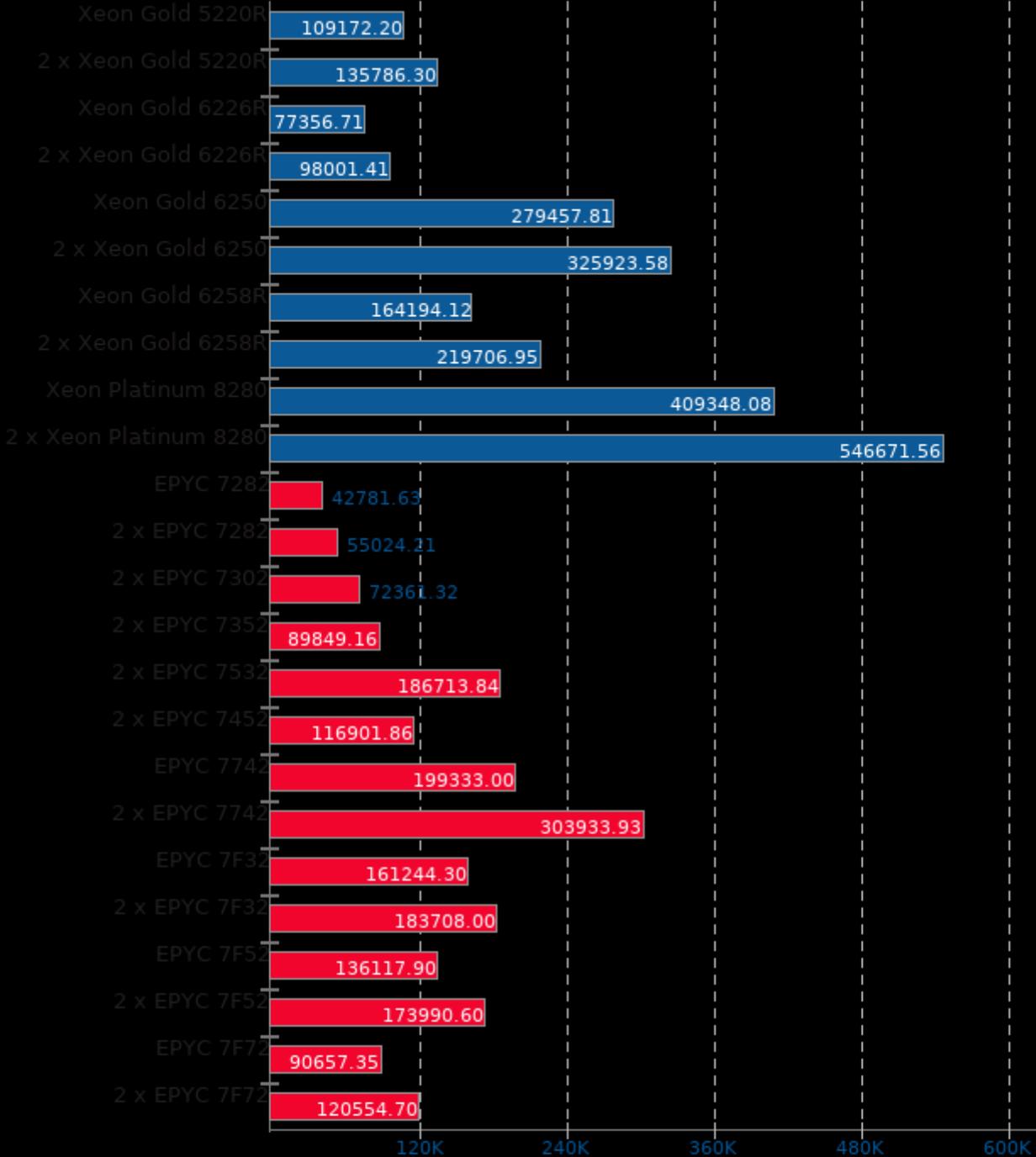
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17. EPYC 7F32: \$2100 reported cost.
18. 2 x EPYC 7F32: \$4200 reported cost.
19. EPYC 7F52: \$3100 reported cost.
20. 2 x EPYC 7F52: \$6200 reported cost.
21. EPYC 7F72: \$2450 reported cost.
22. 2 x EPYC 7F72: \$4900 reported cost.



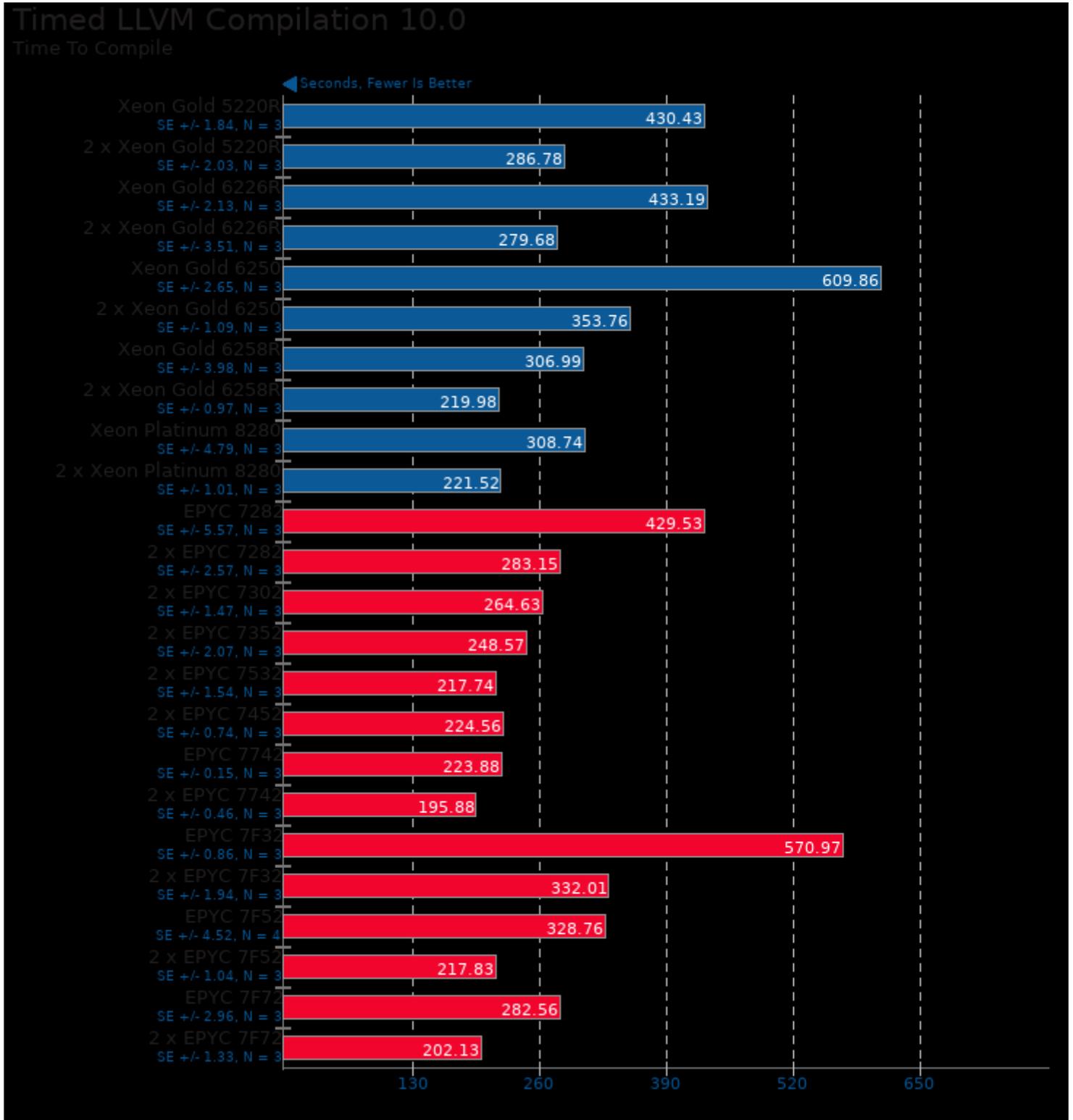
Timed Linux Kernel Compilation 5.4

Performance / Cost - Time To Compile

Seconds x Dollar, Fewer Is Better



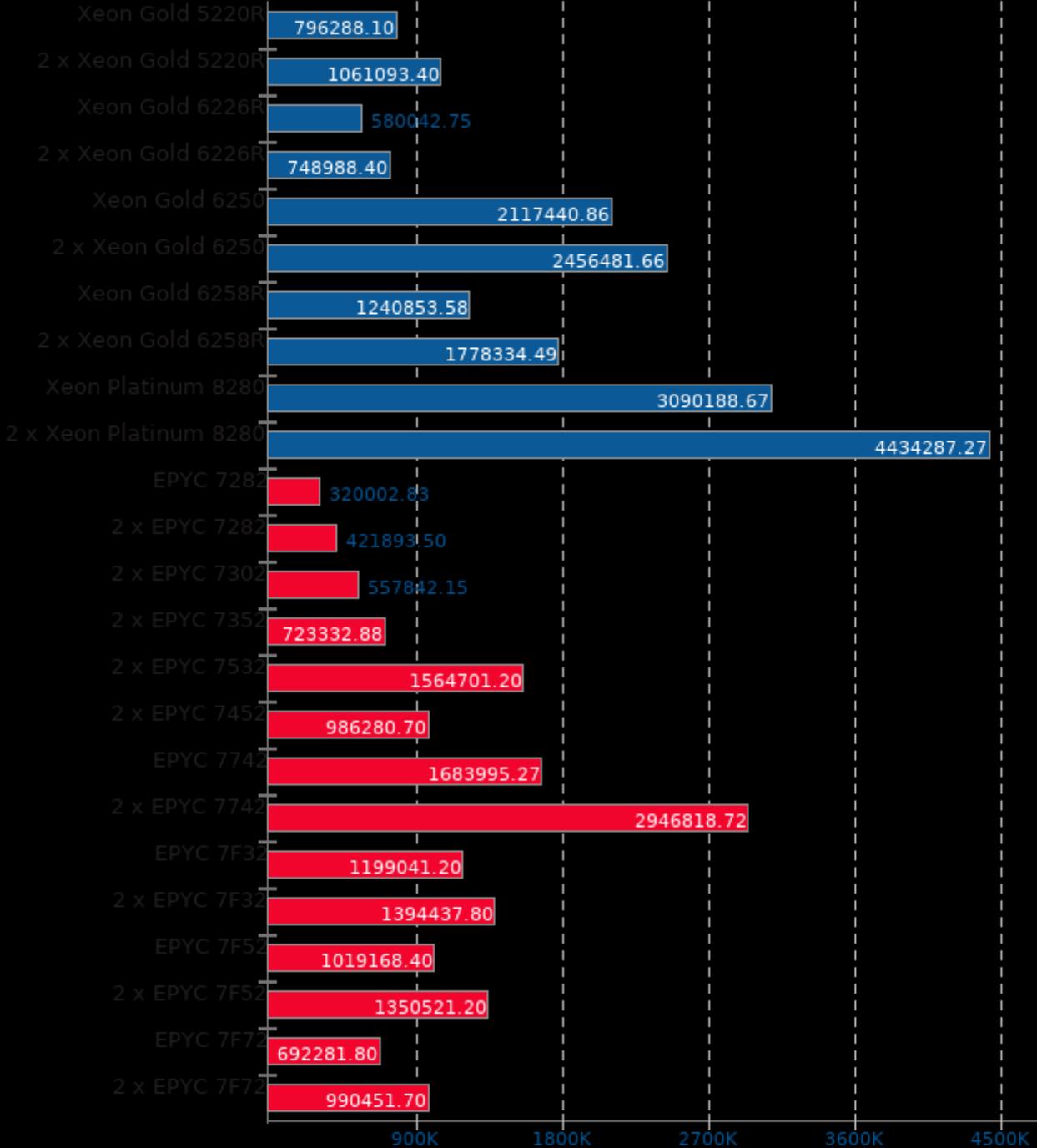
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22. 2 x EPYC 7F52: \$6200 reported cost.



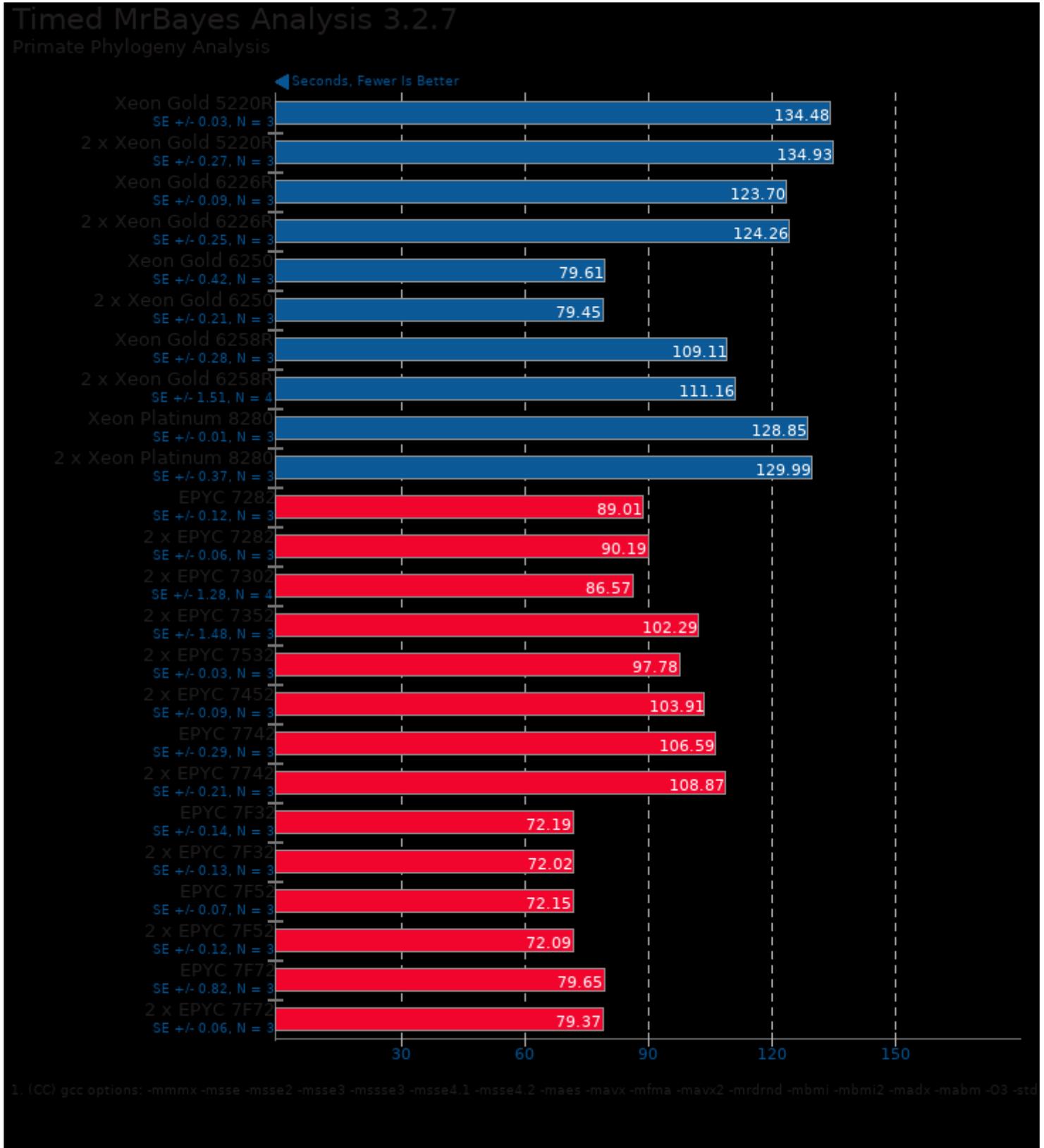
Timed LLVM Compilation 10.0

Performance / Cost - Time To Compile

← Seconds x Dollar, Fewer Is Better



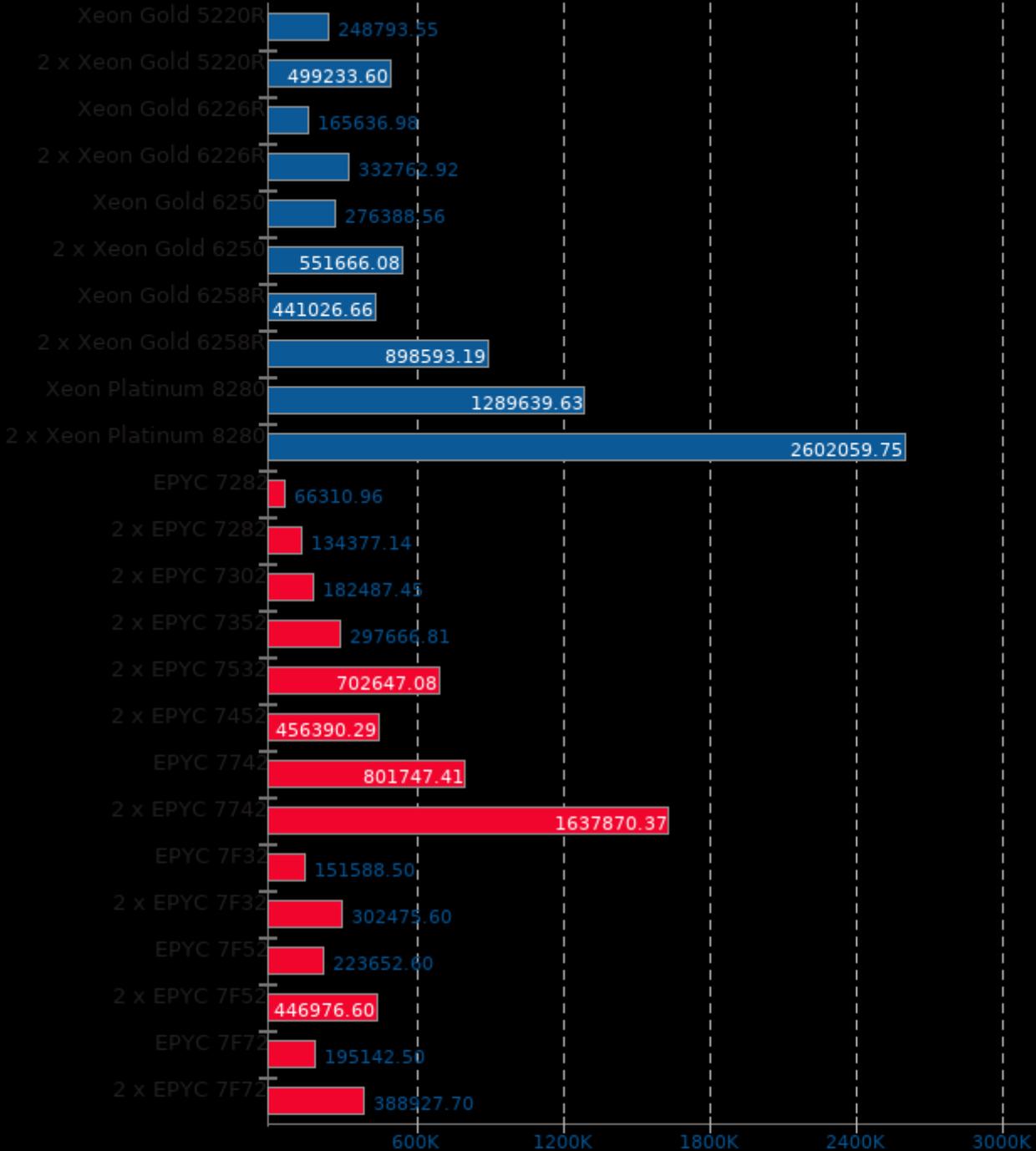
1. Xeon Gold 5220R: \$1850 reported cost.
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21. EPYC 7F52: \$3100 reported cost.
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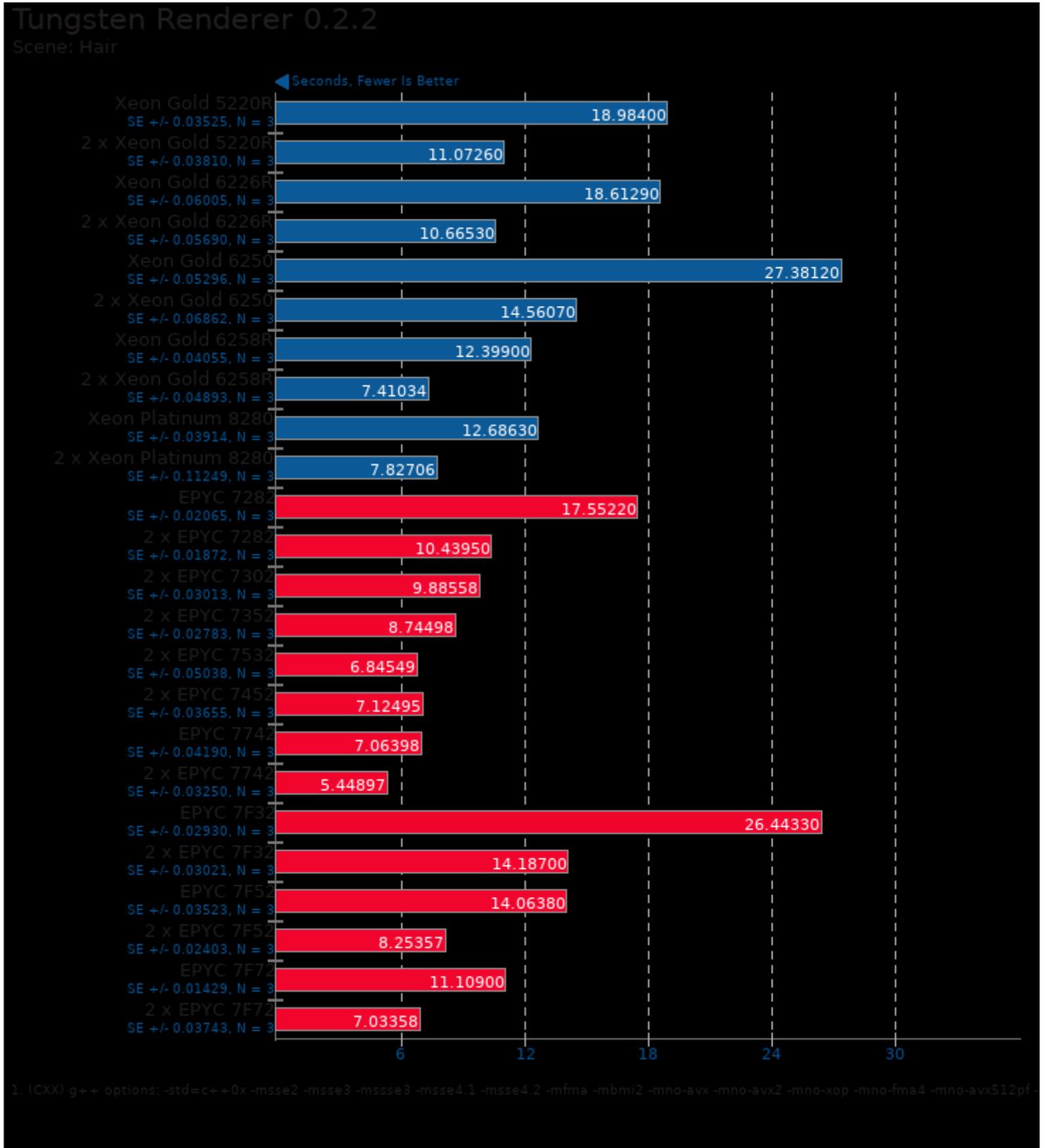
Timed MrBayes Analysis 3.2.7

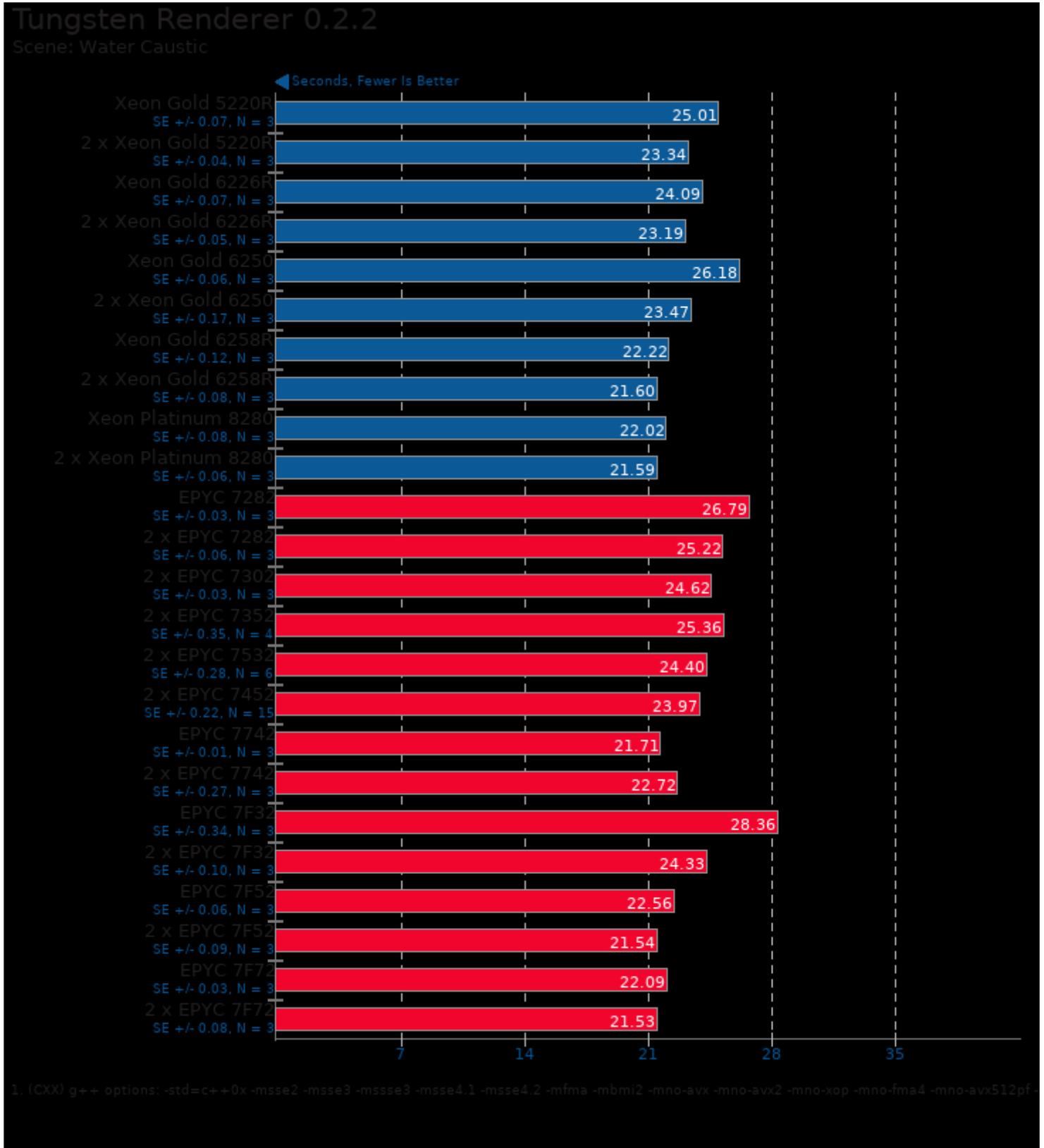
Performance / Cost - Primate Phylogeny Analysis

Seconds x Dollar, Fewer Is Better



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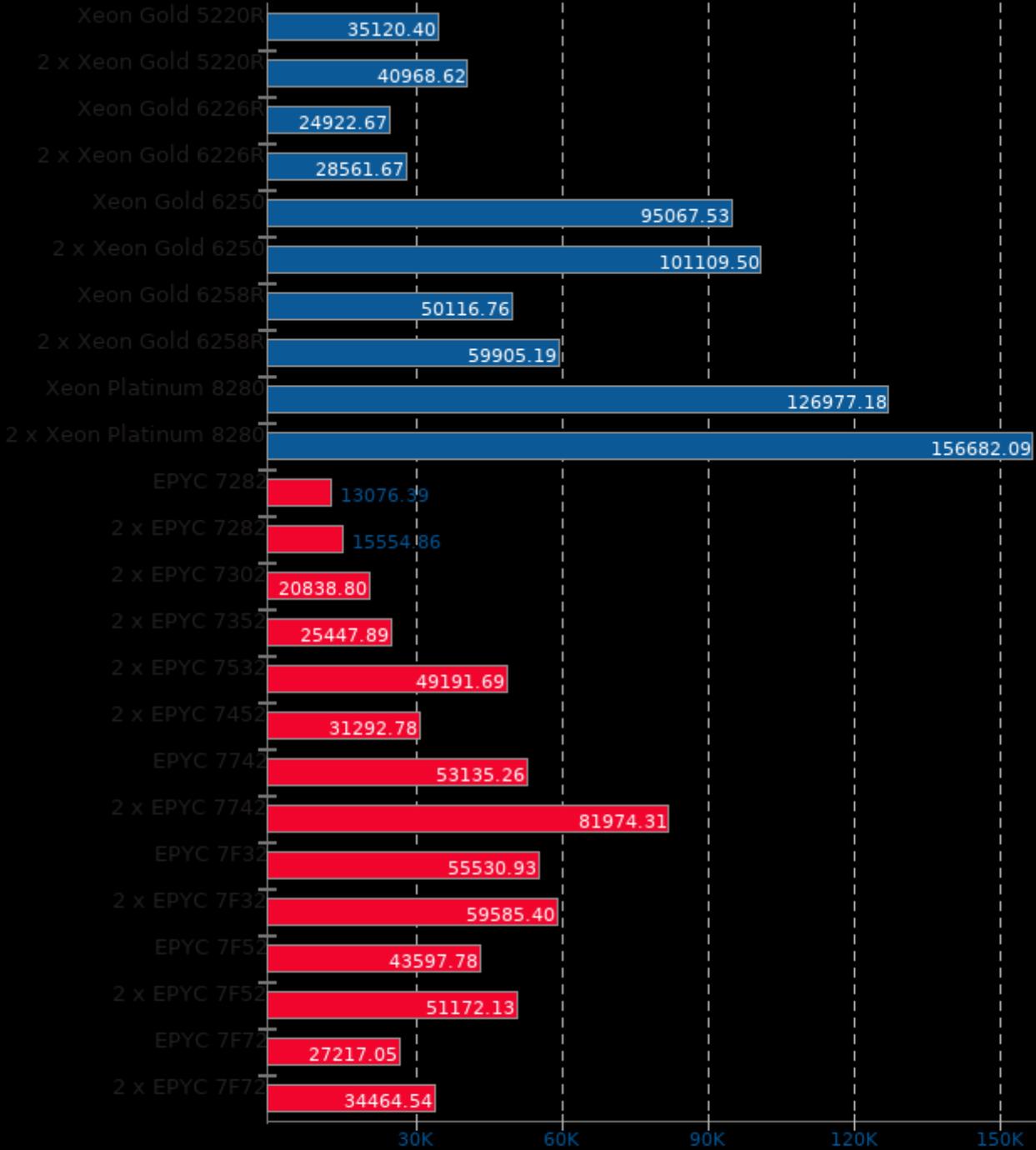




Tungsten Renderer 0.2.2

Performance / Cost - Scene: Hair

← Seconds x Dollar, Fewer Is Better

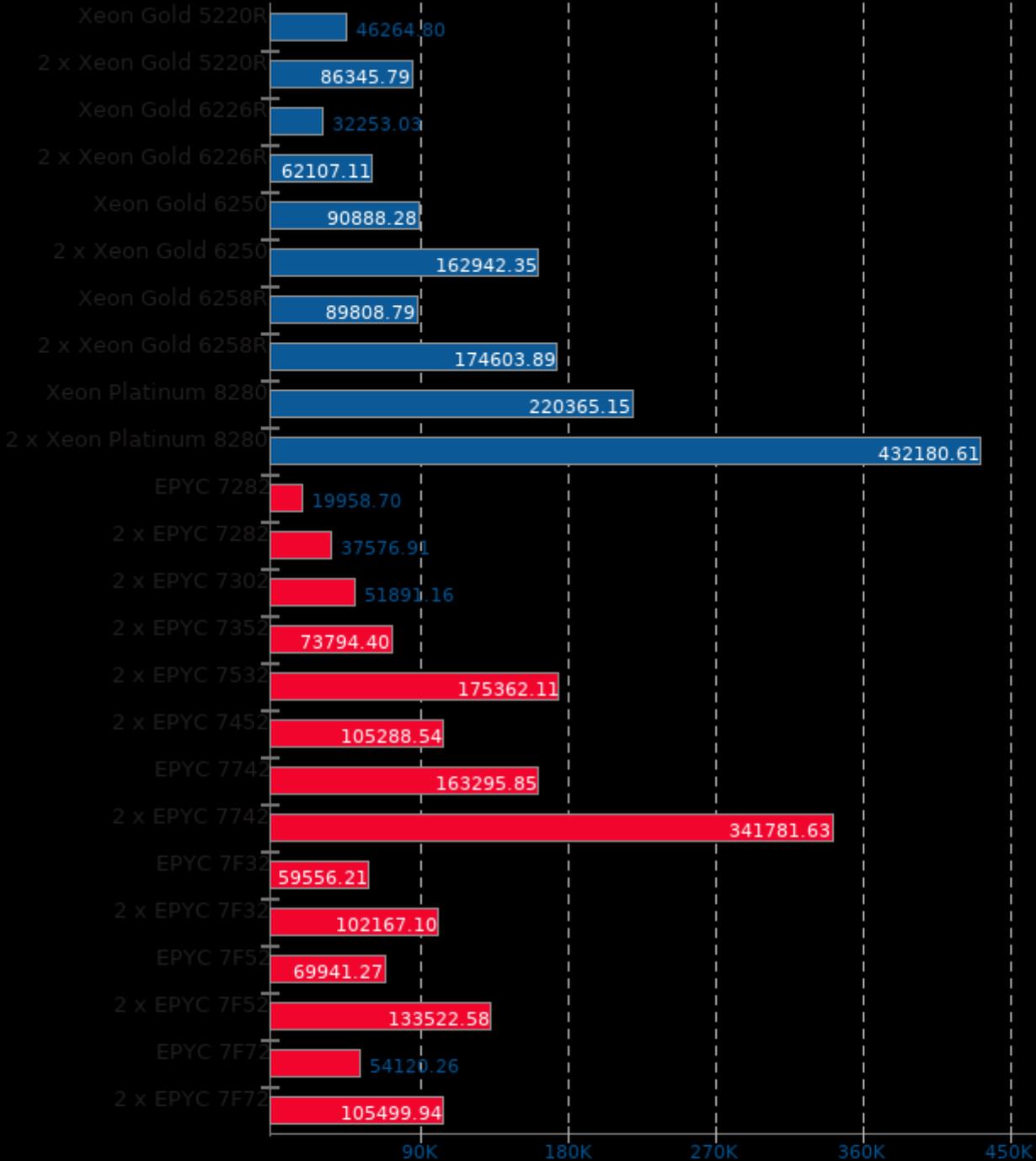


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21. EPYC 7F52: \$3100 reported cost.
22. 2 x EPYC 7F52: \$6200 reported cost.

Tungsten Renderer 0.2.2

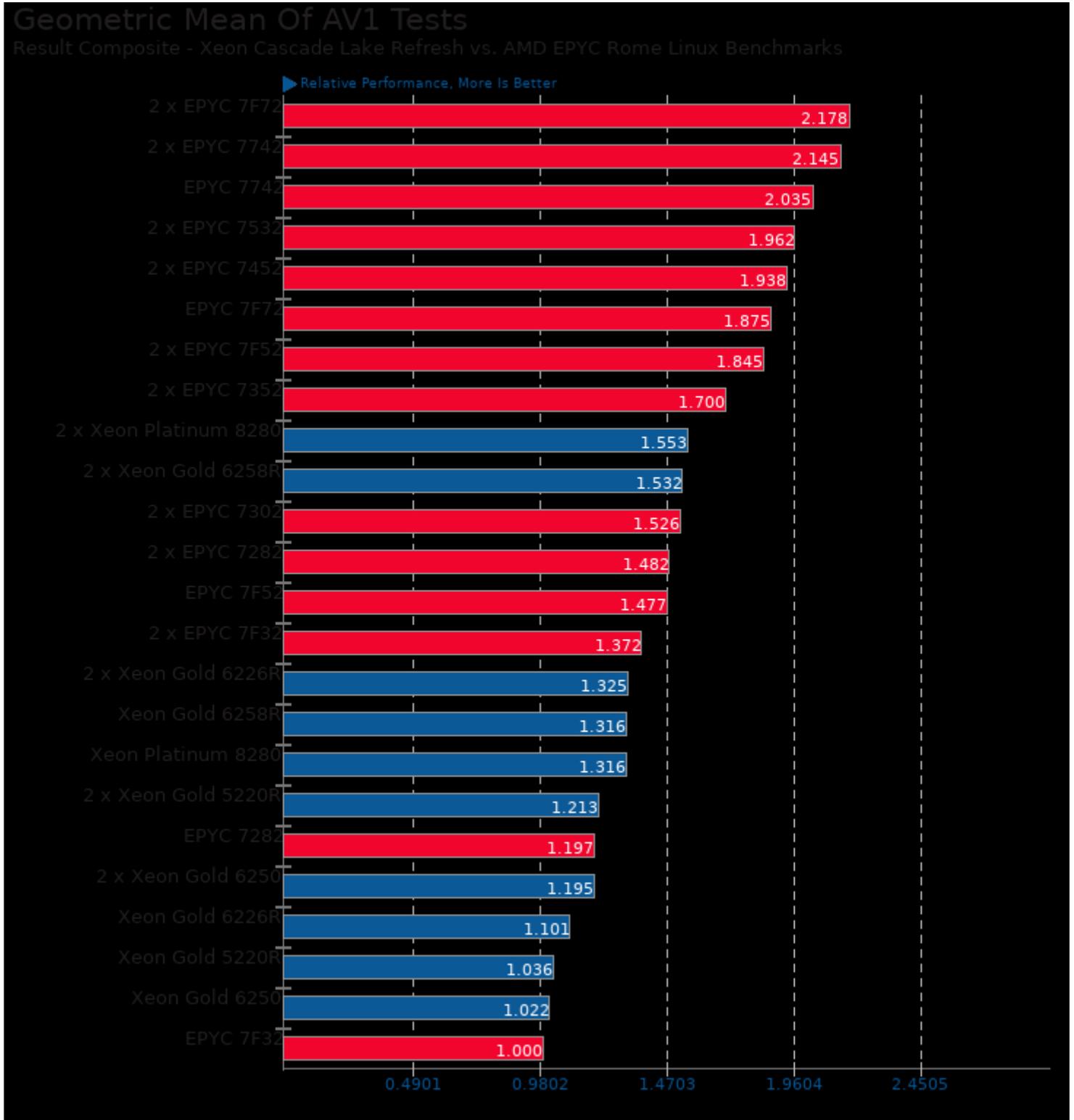
Performance / Cost - Scene: Water Caustic

Seconds x Dollar, Fewer Is Better

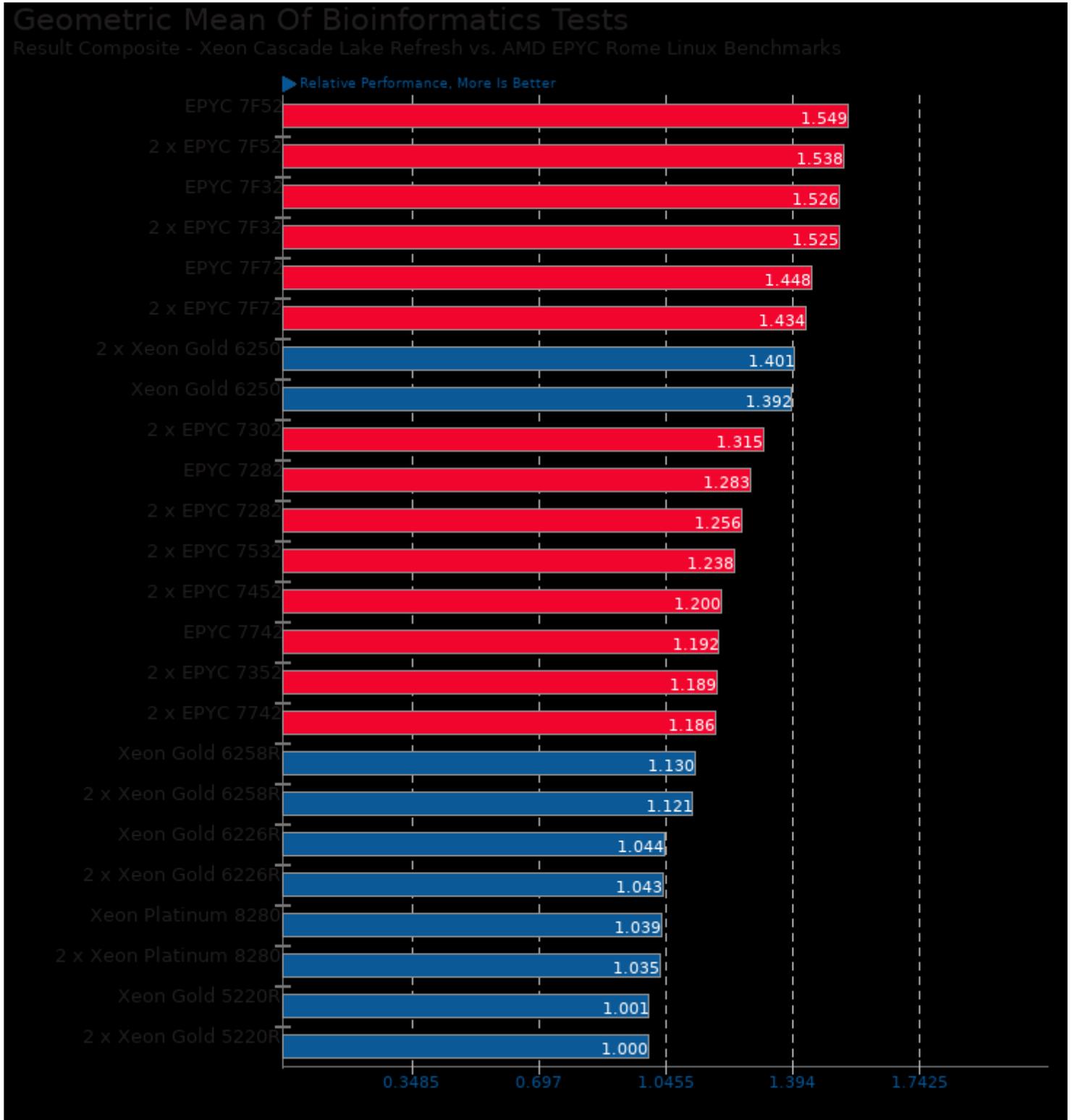


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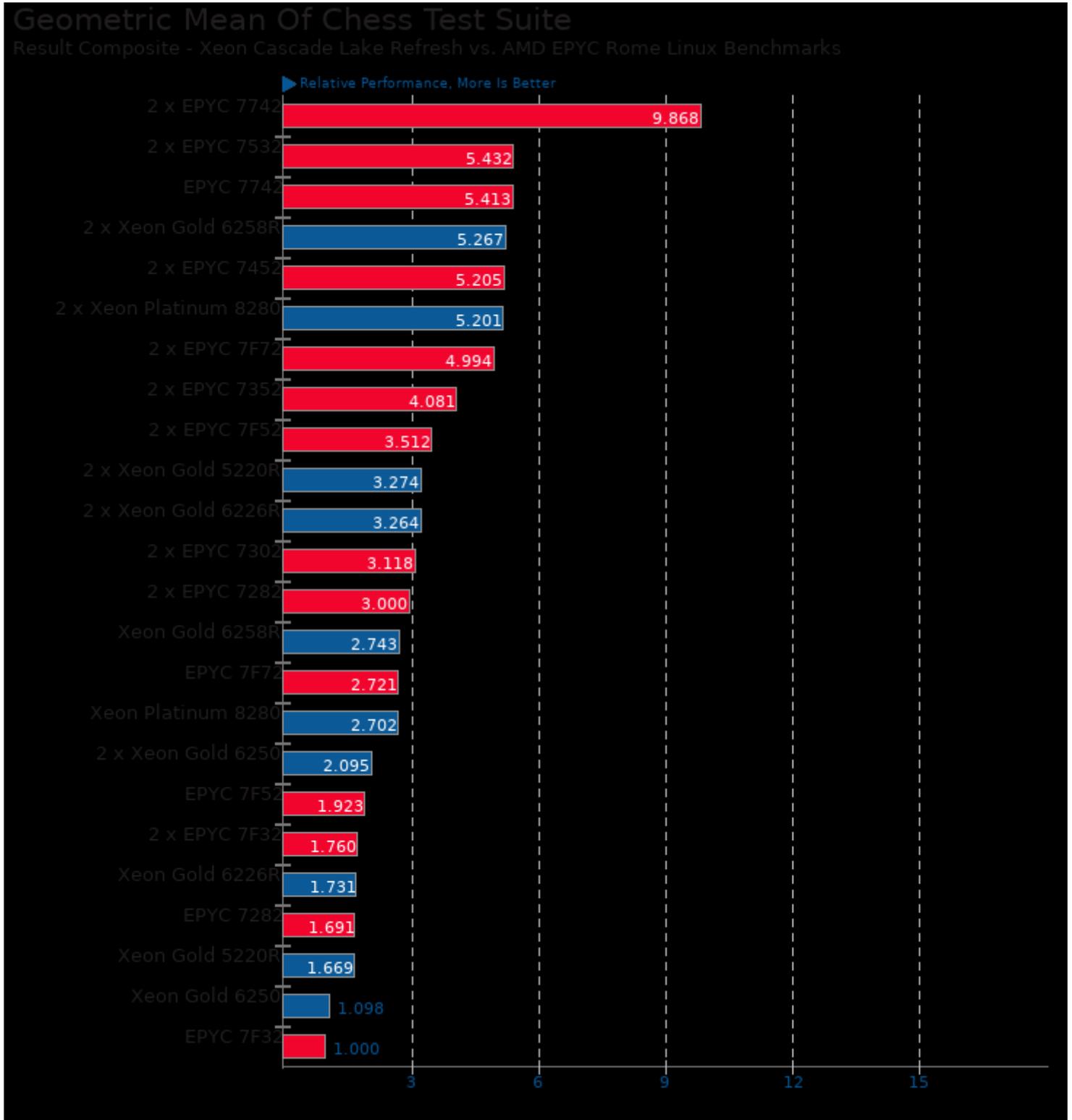
These geometric means are based upon test groupings / test suites for this result file.



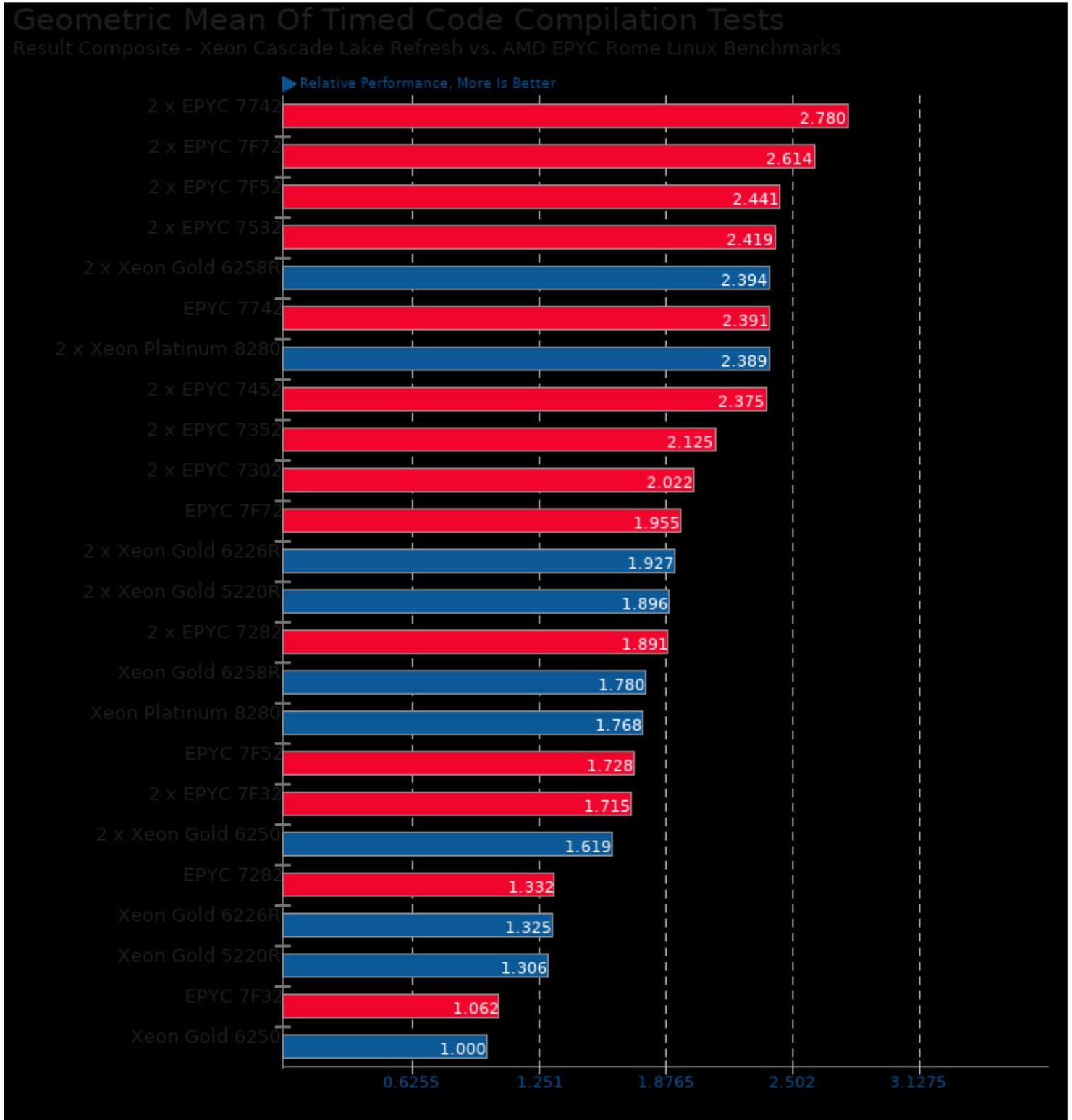
Geometric mean based upon tests: pts/dav1d and pts/svt-av1



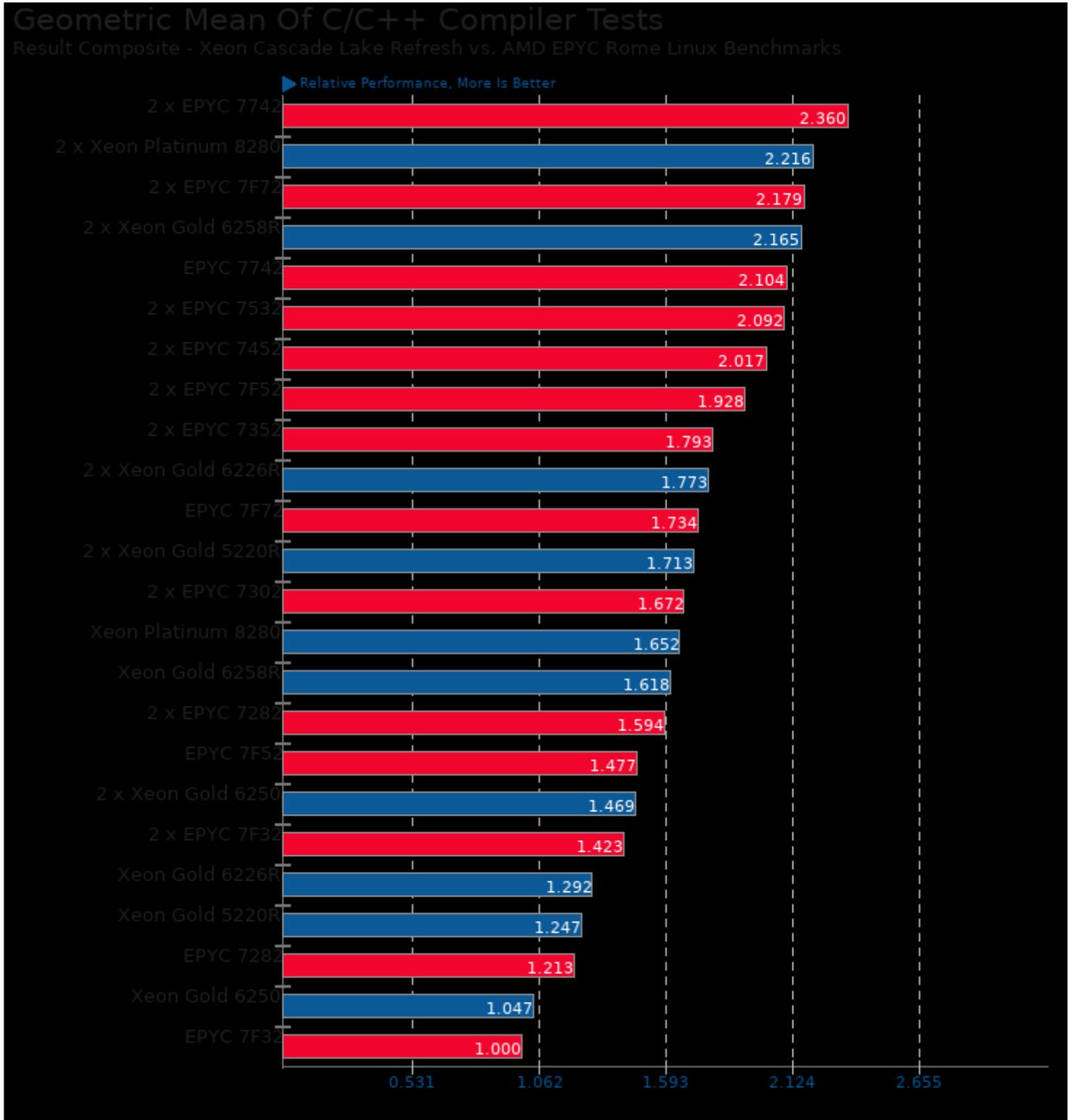
Geometric mean based upon tests: pts/himeno and pts/mrbayes



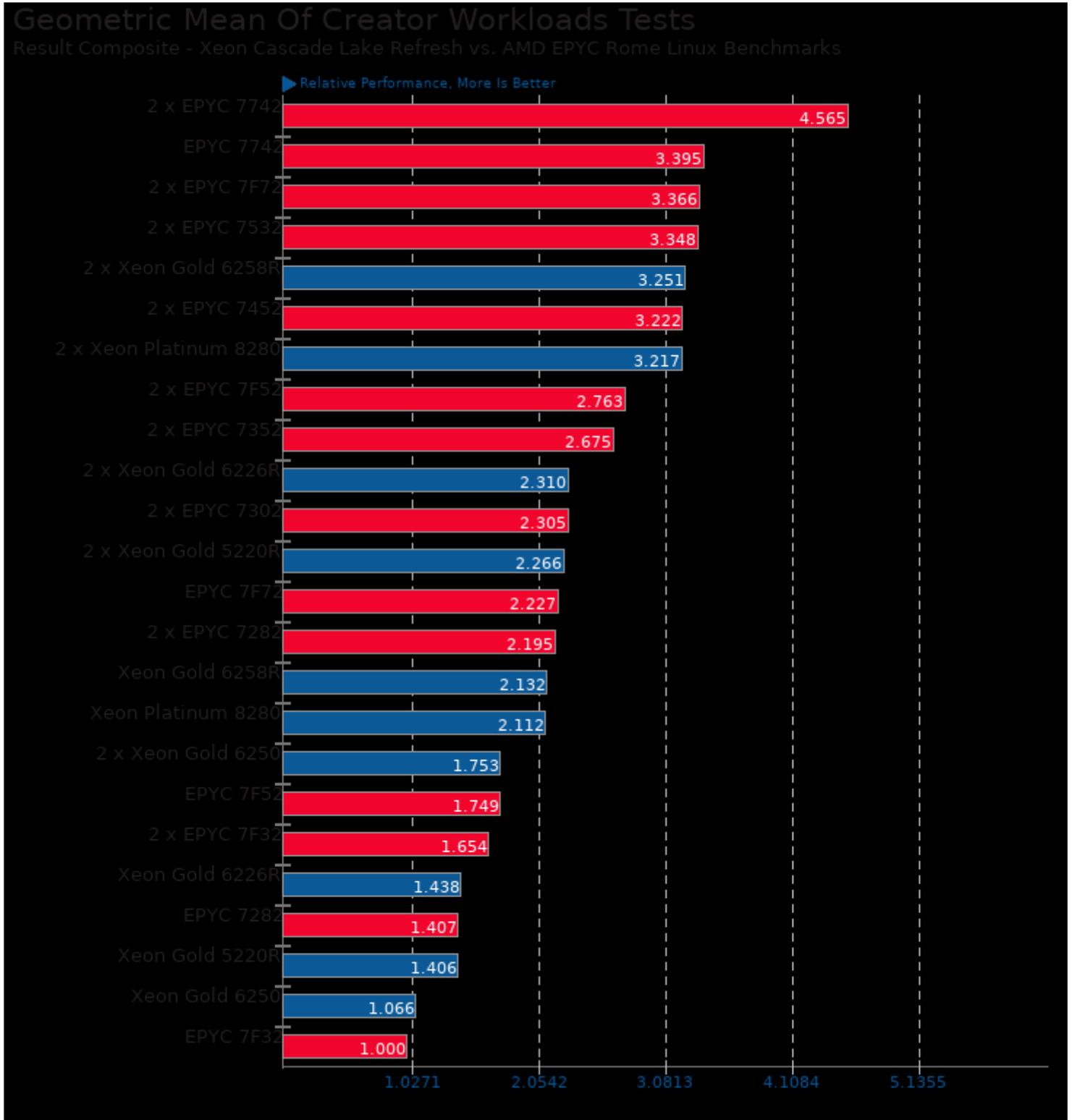
Geometric mean based upon tests: pts/stockfish and pts/asmfish

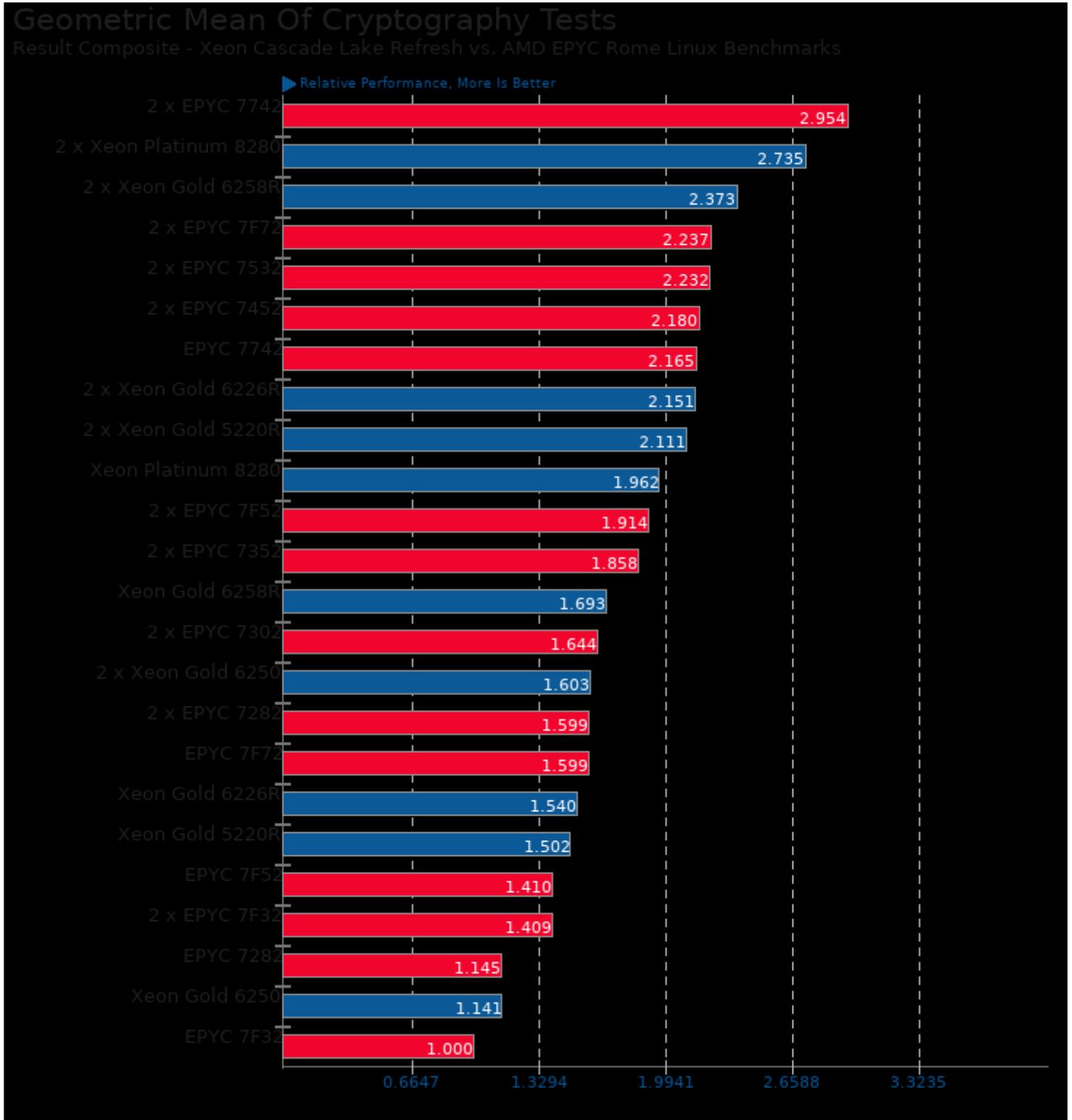


Geometric mean based upon tests: pts/build-linux-kernel, pts/build-llvm and pts/build2

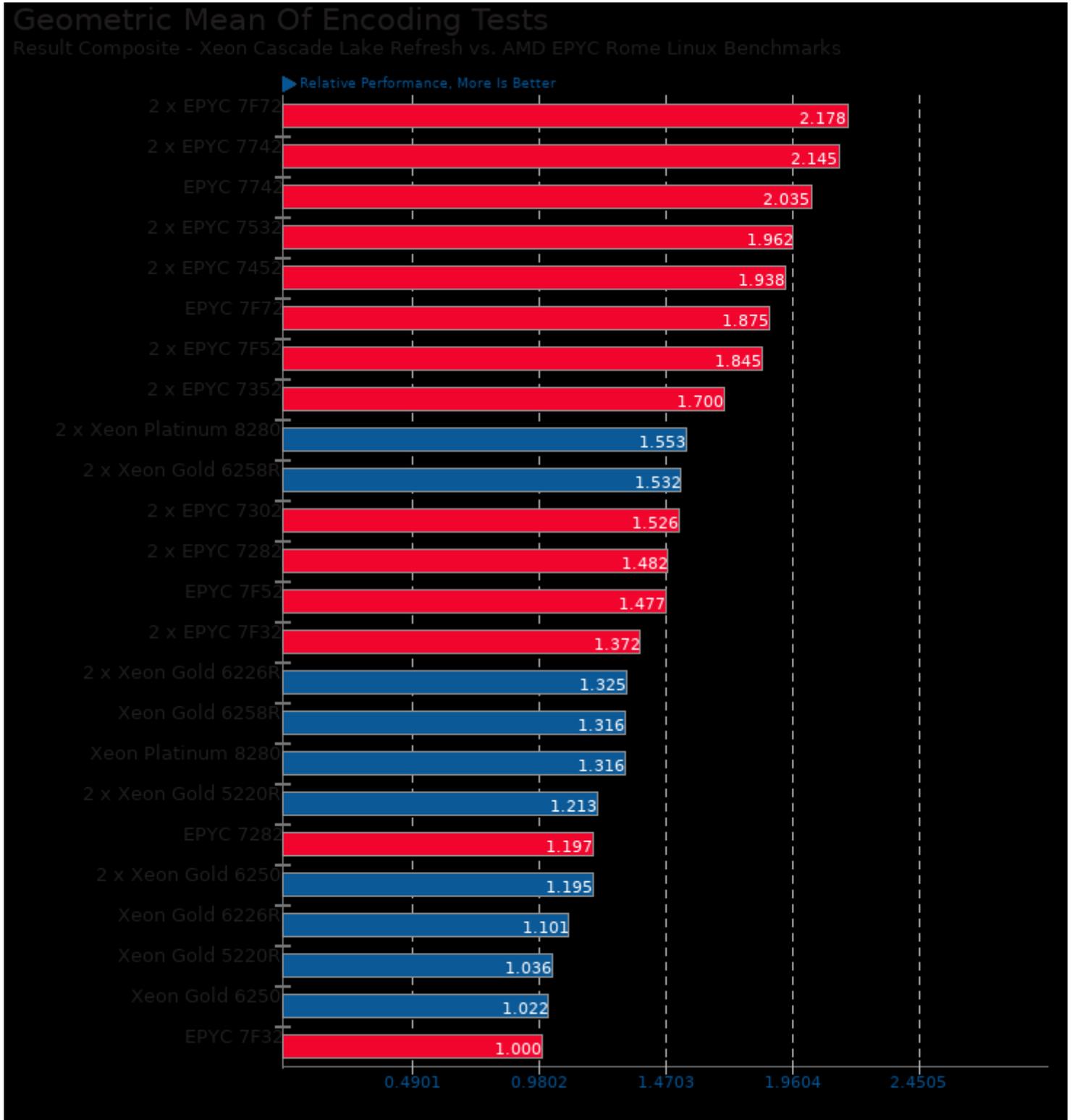


Geometric mean based upon tests: pts/himeno, pts/stockfish, pts/build-llvm, pts/pgbench, pts/mrbbas, pts/john-the-ripper, pts/dav1d, pts/tungsten, pts/lammps, pts/svt-av1, pts/basis and pts/nettle

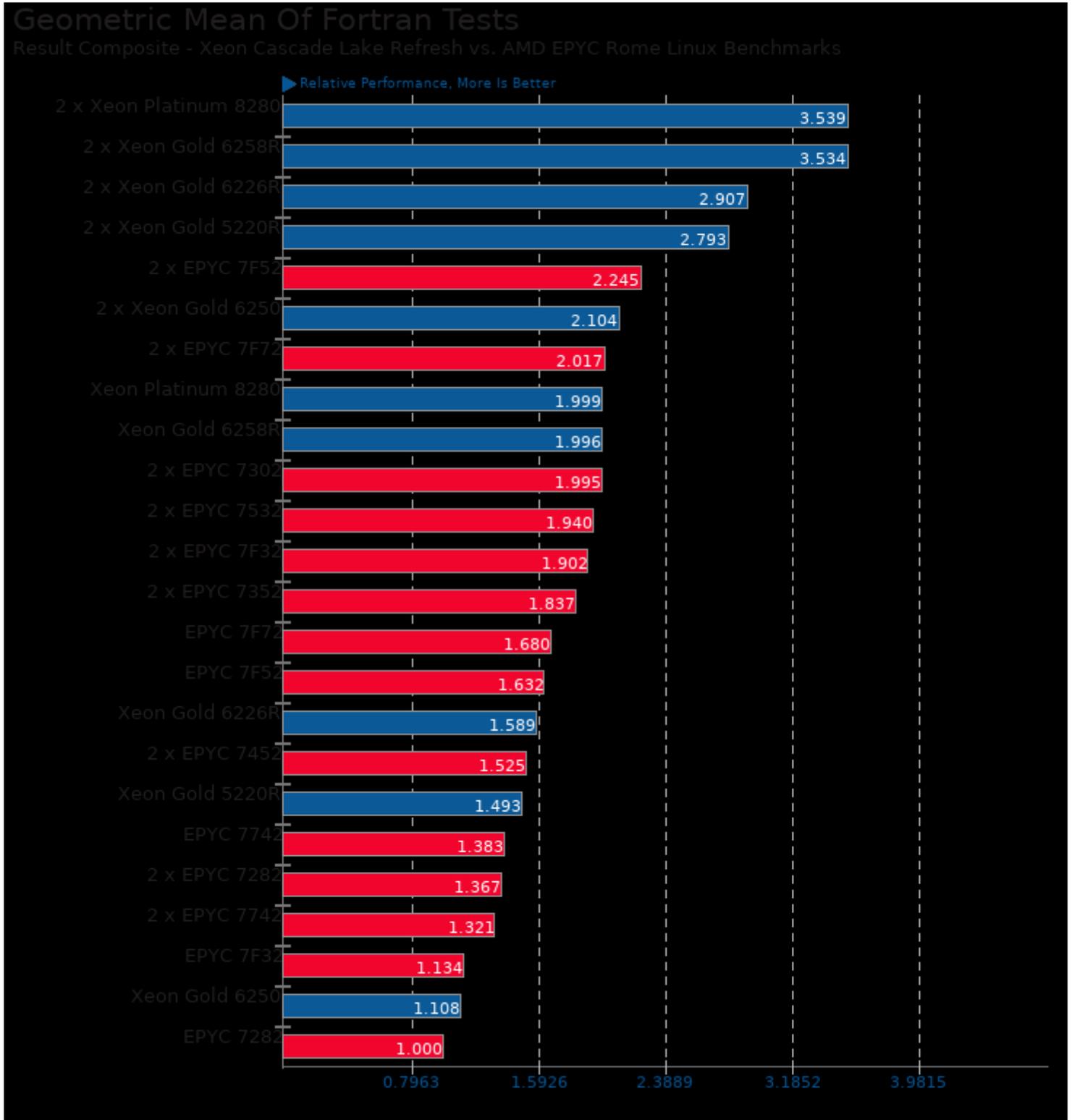




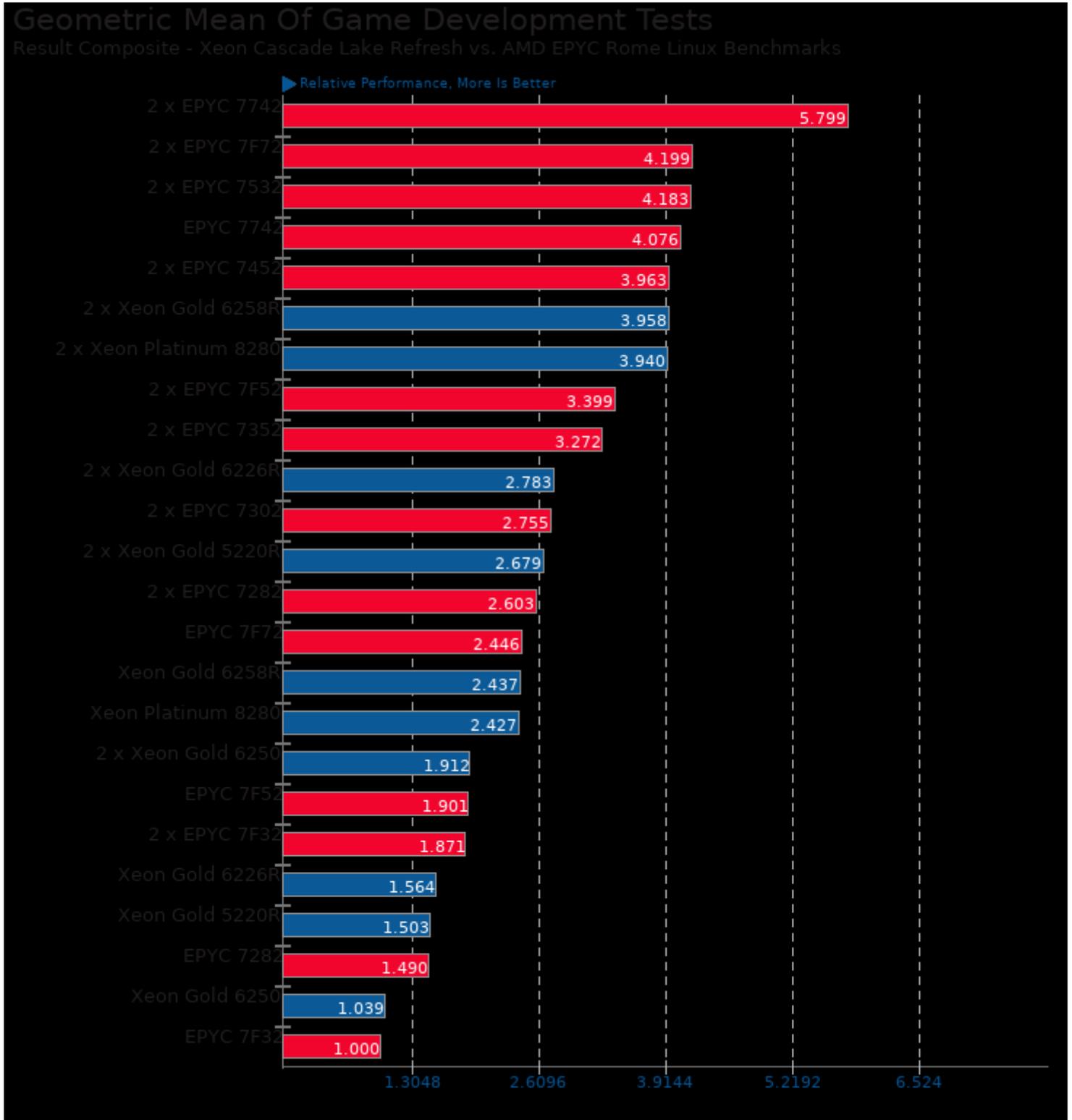
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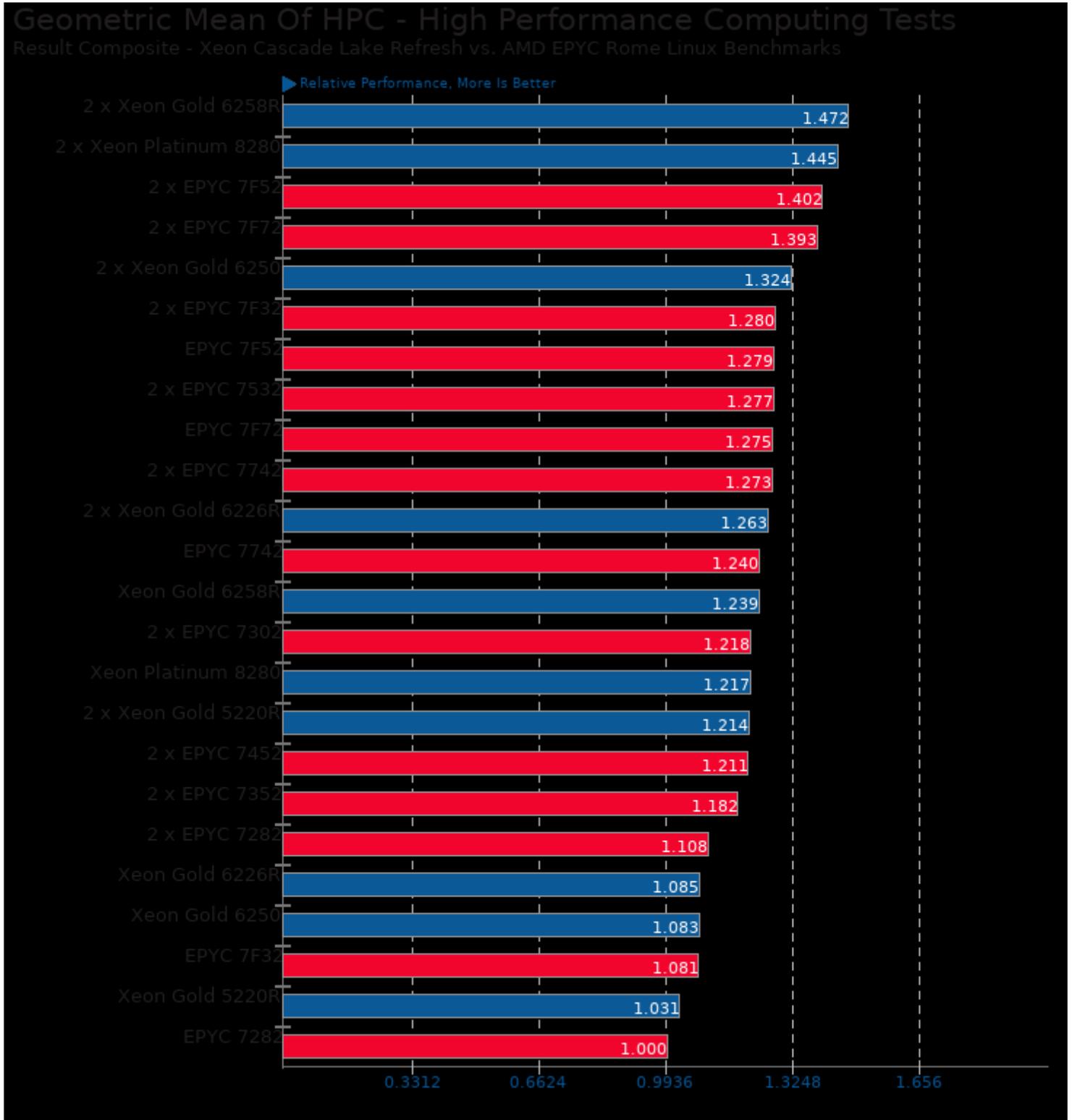
Geometric mean based upon tests: pts/dav1d and pts/svt-av1



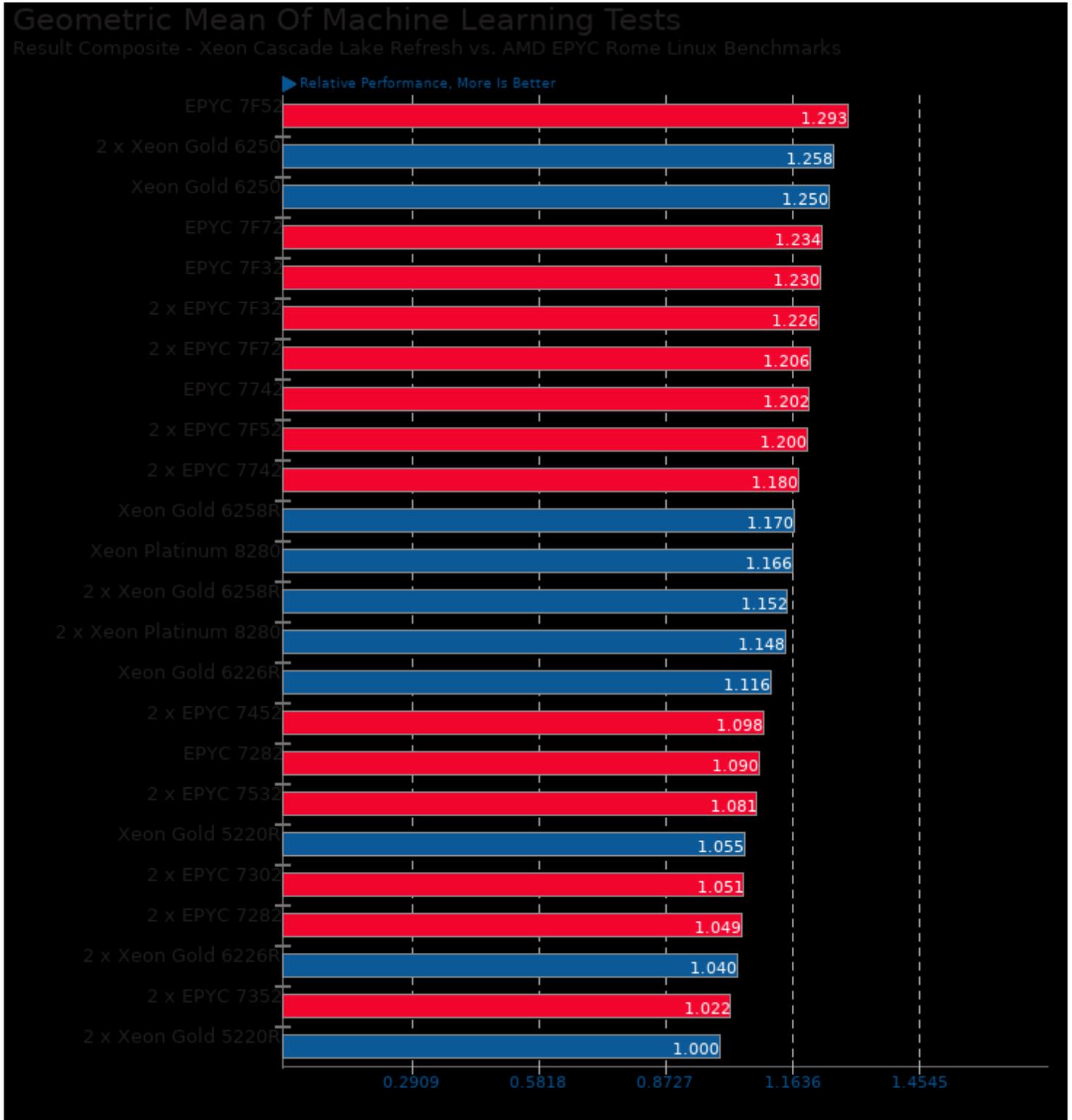
Geometric mean based upon tests: pts/hpcg and pts/lammps



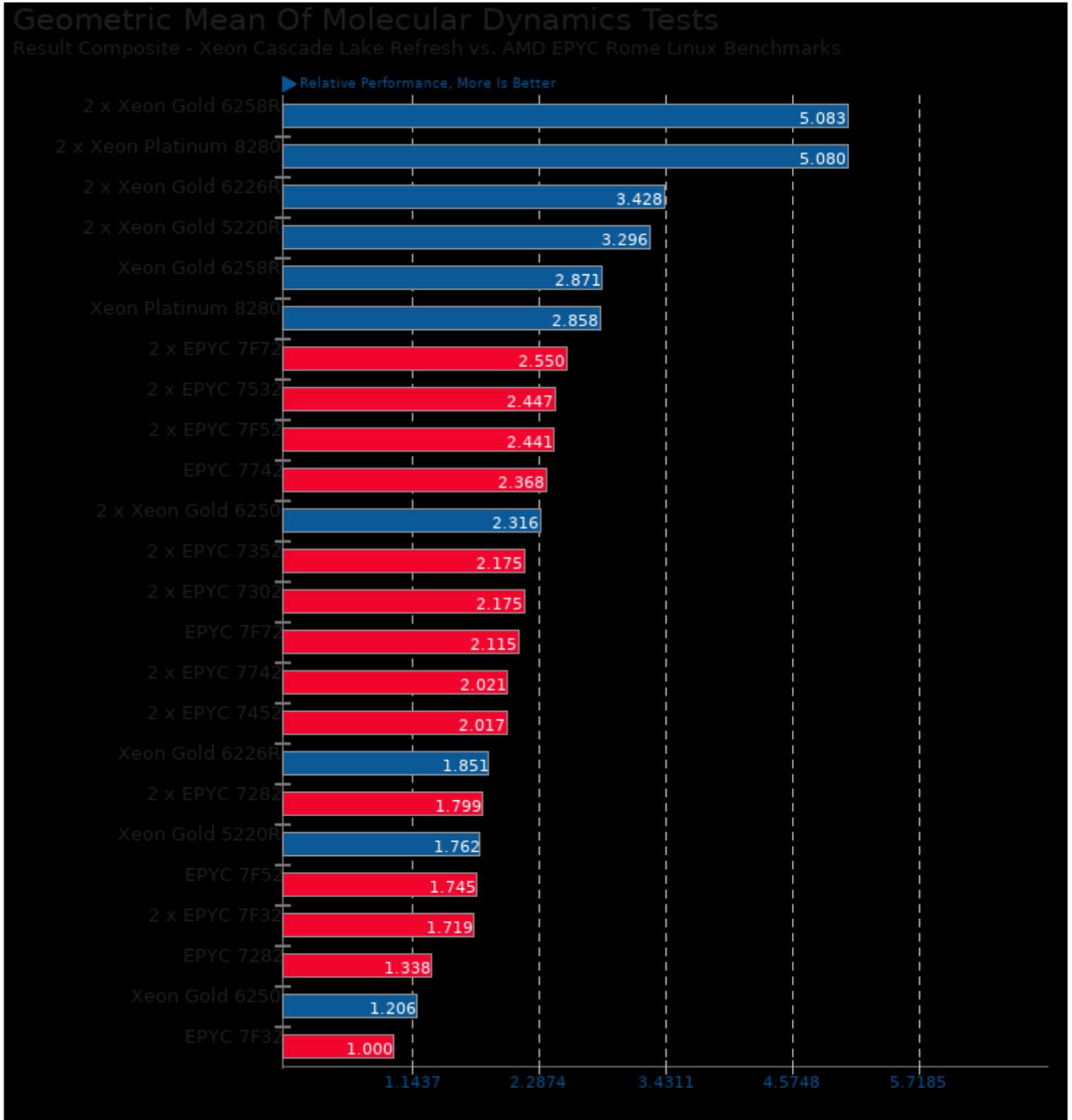
Geometric mean based upon tests: pts/basis, pts/blender, pts/oidn and pts/openvkl

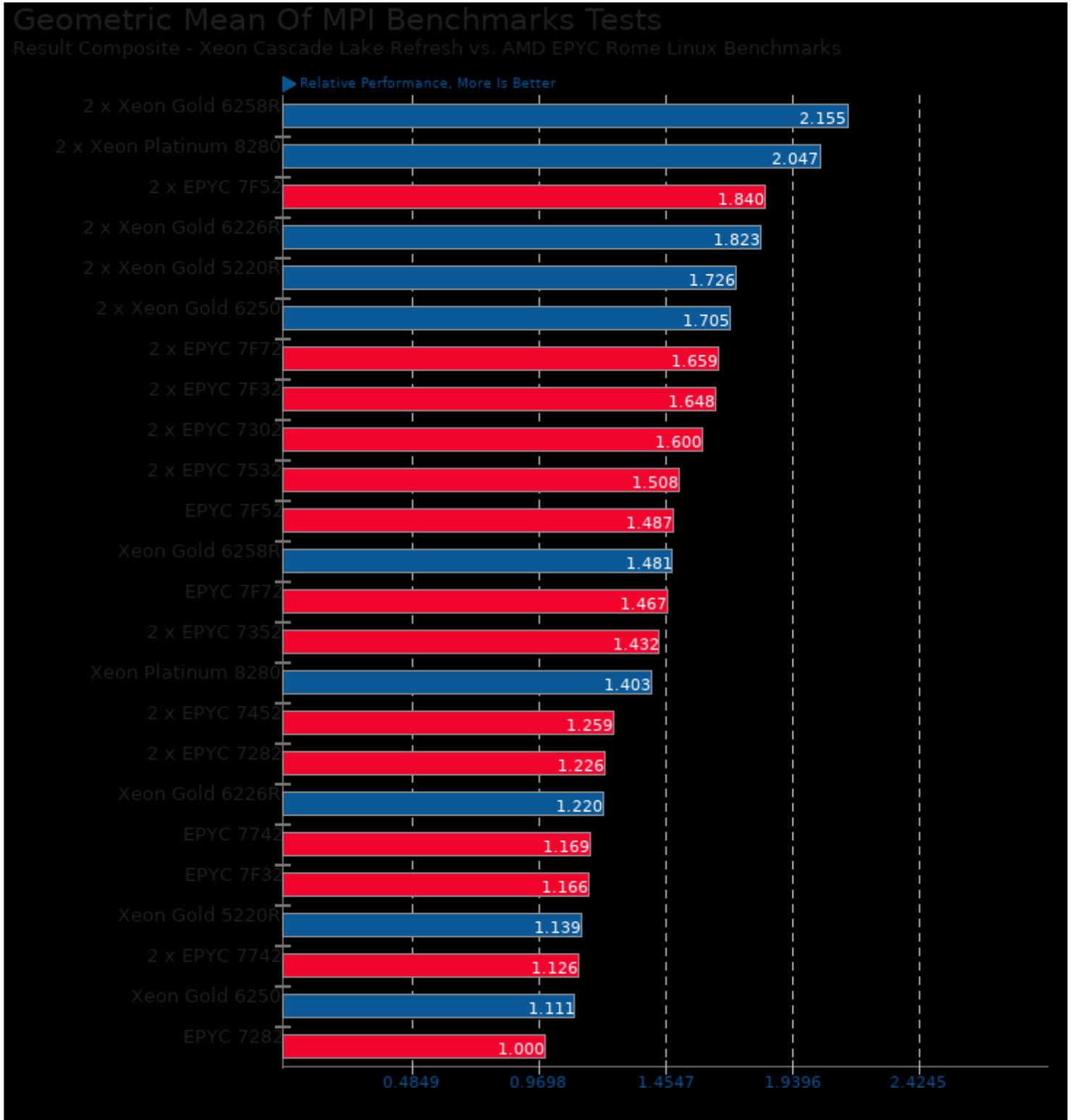


Geometric mean based upon tests: pts/hpcg, pts/namd, pts/lammps, pts/himeno, pts/mrbayes, pts/numpy, pts/scikit-learn and pts/mlpack

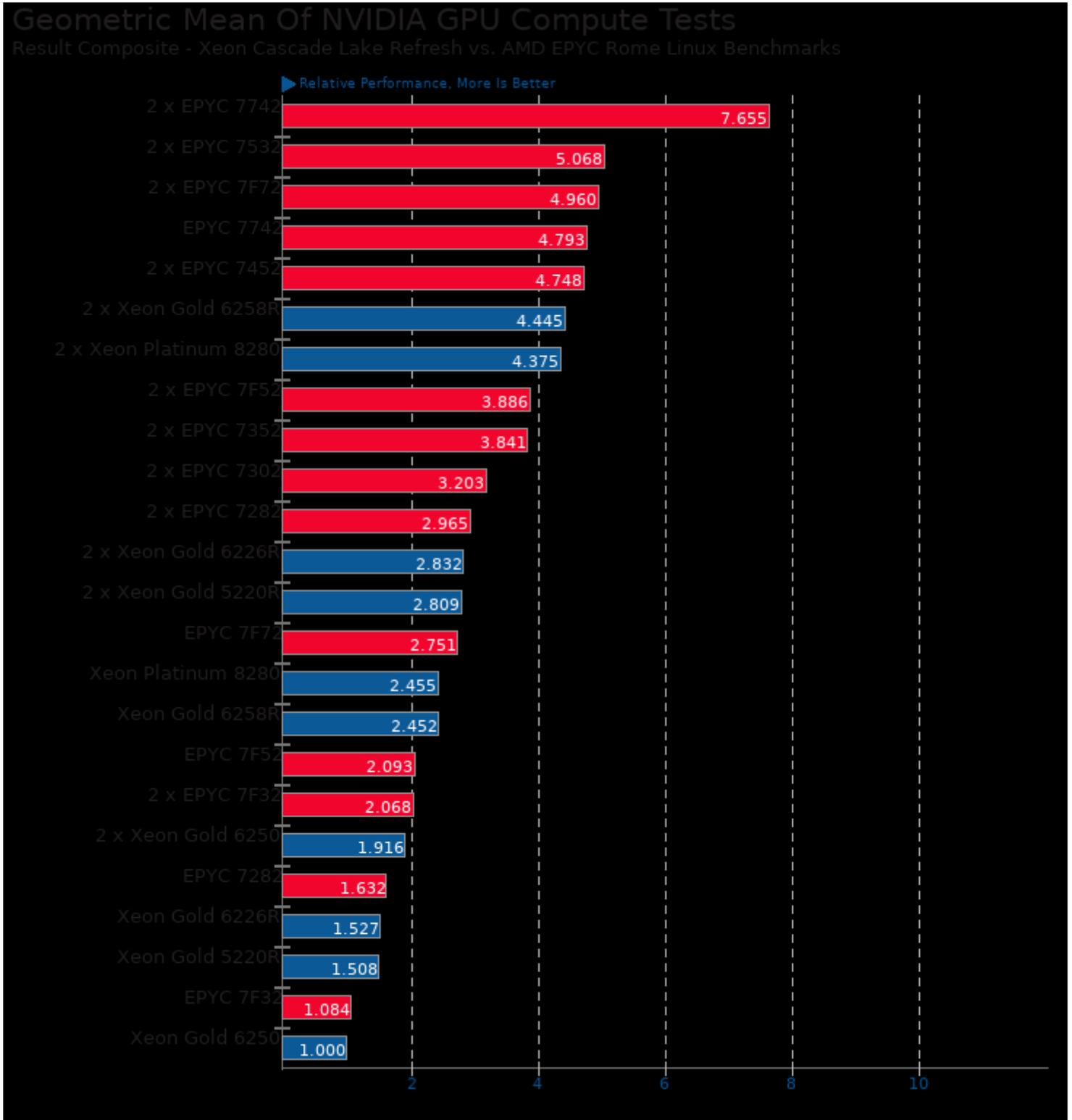


Geometric mean based upon tests: pts/numpy, pts/scikit-learn and pts/mlpack

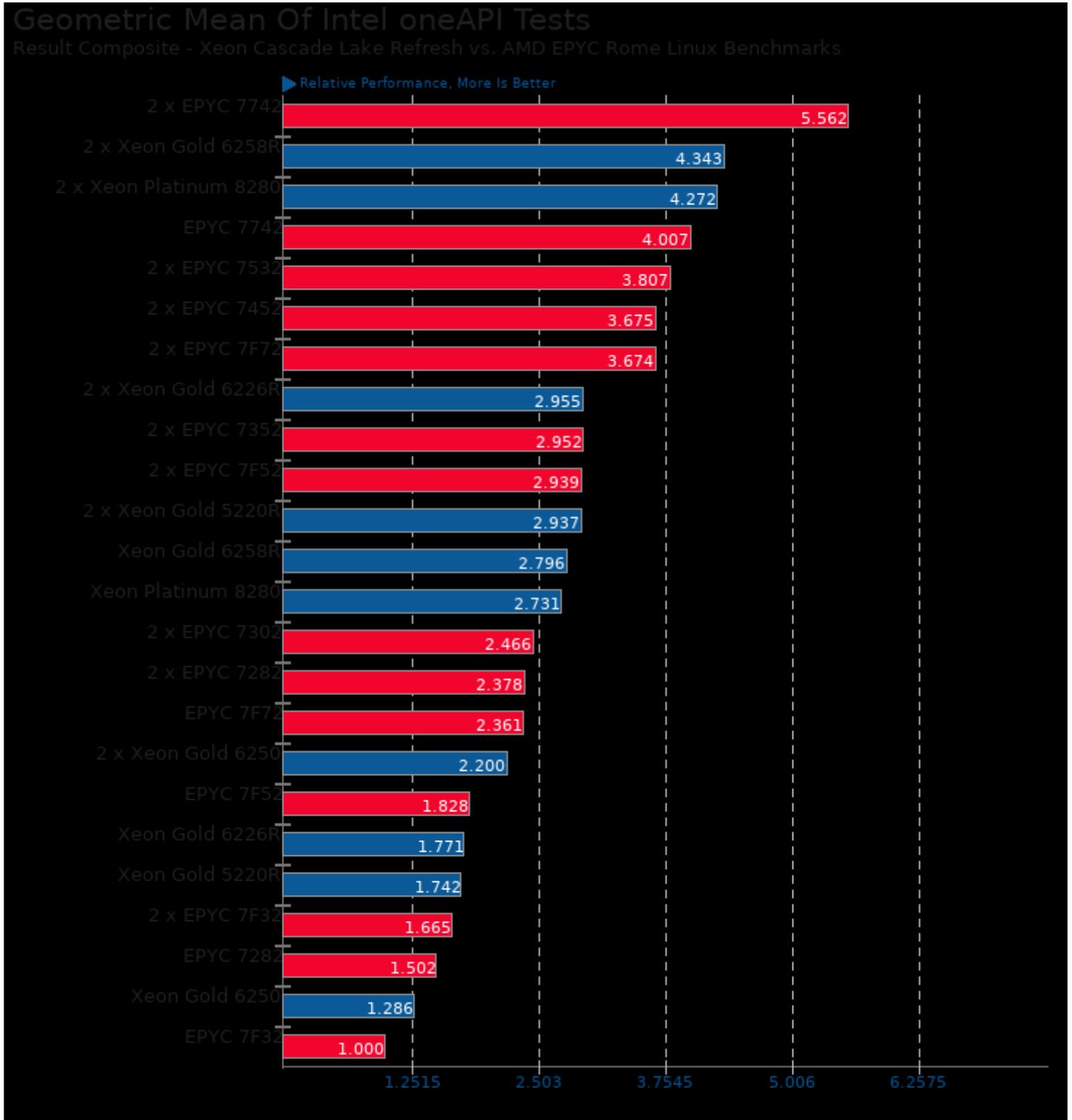


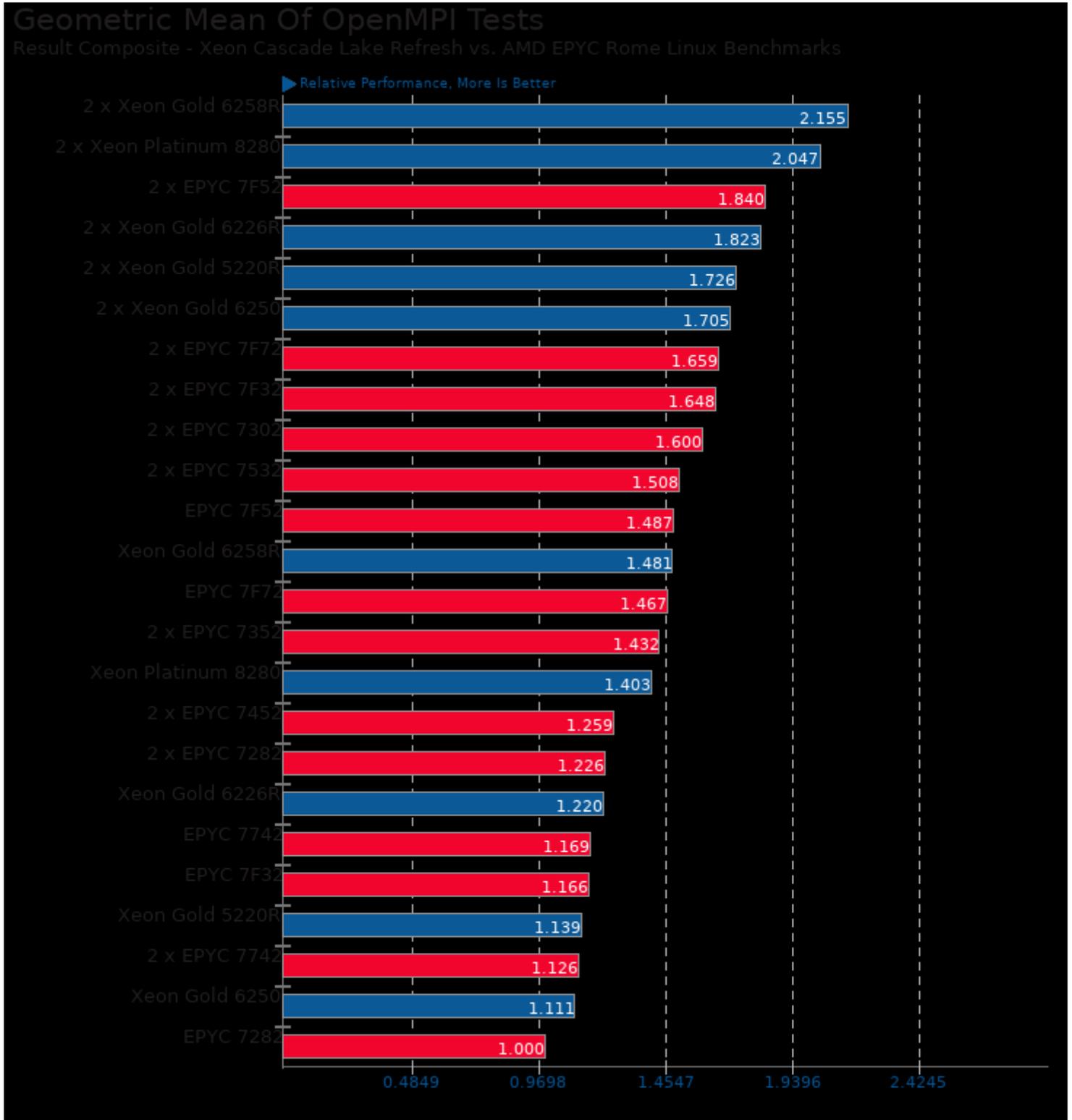


Geometric mean based upon tests: pts/lammps, pts/hpcg and pts/mrbayes

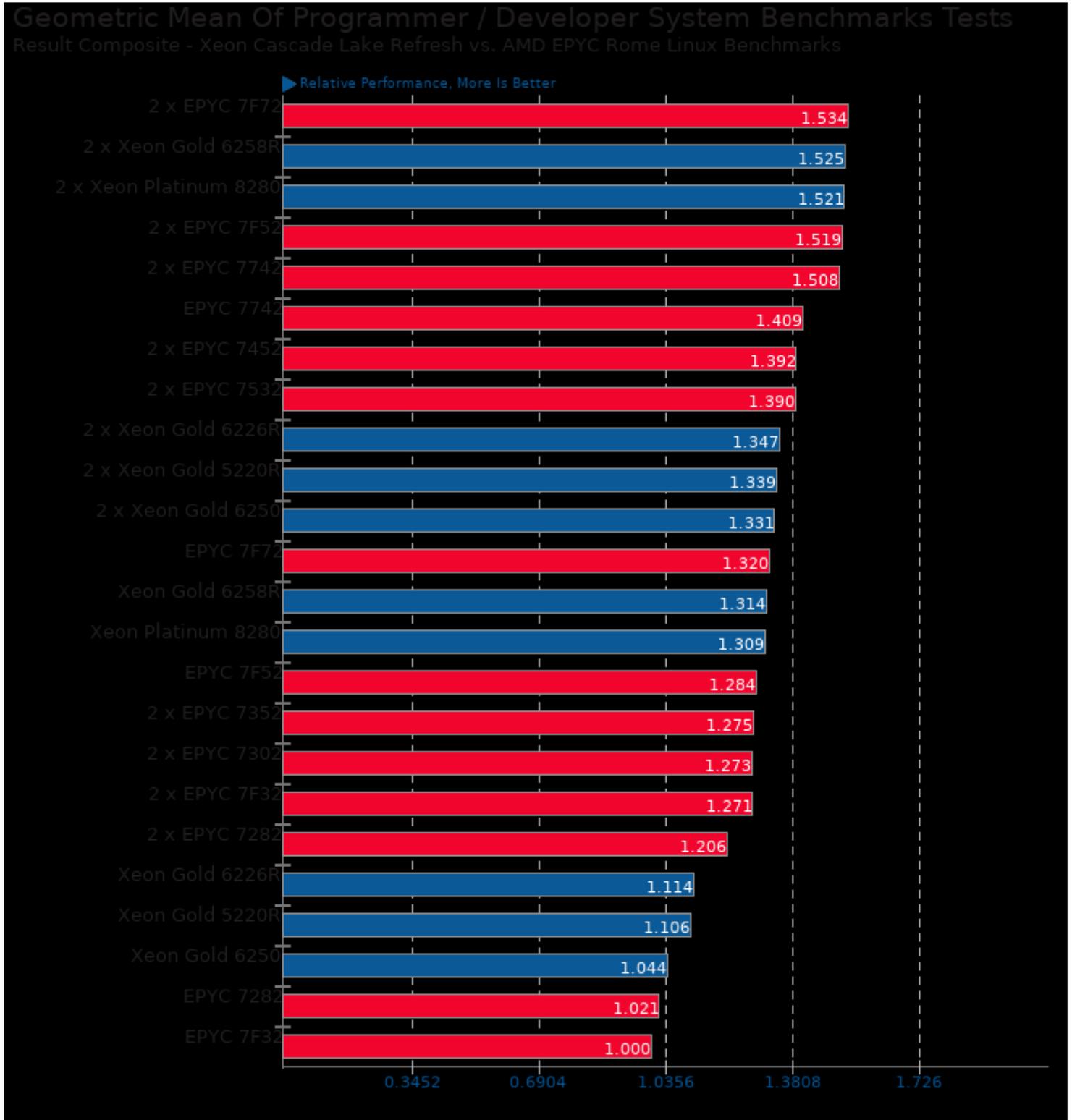


Geometric mean based upon tests: pts/luxcorerender, pts/v-ray and pts/blender

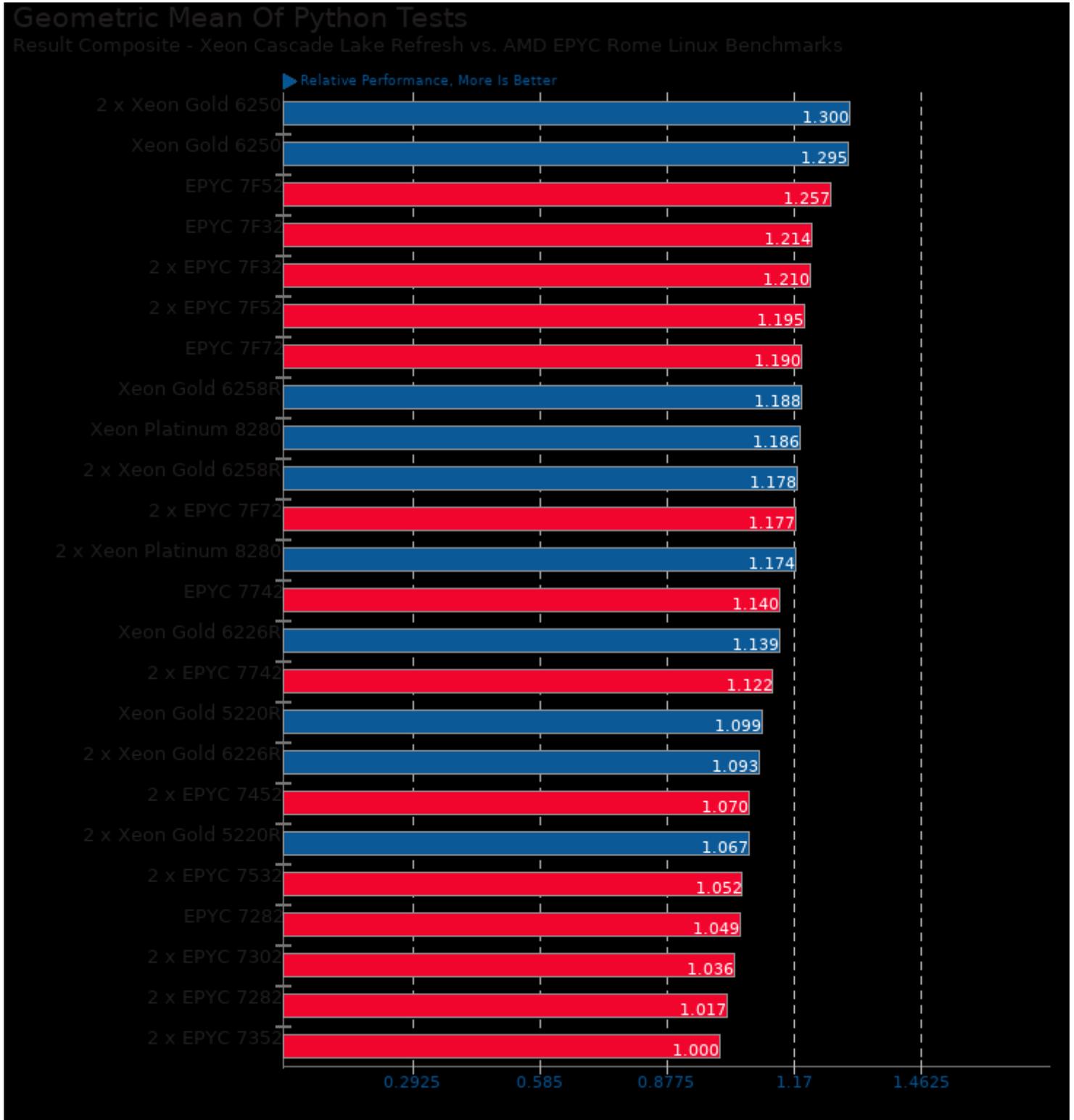




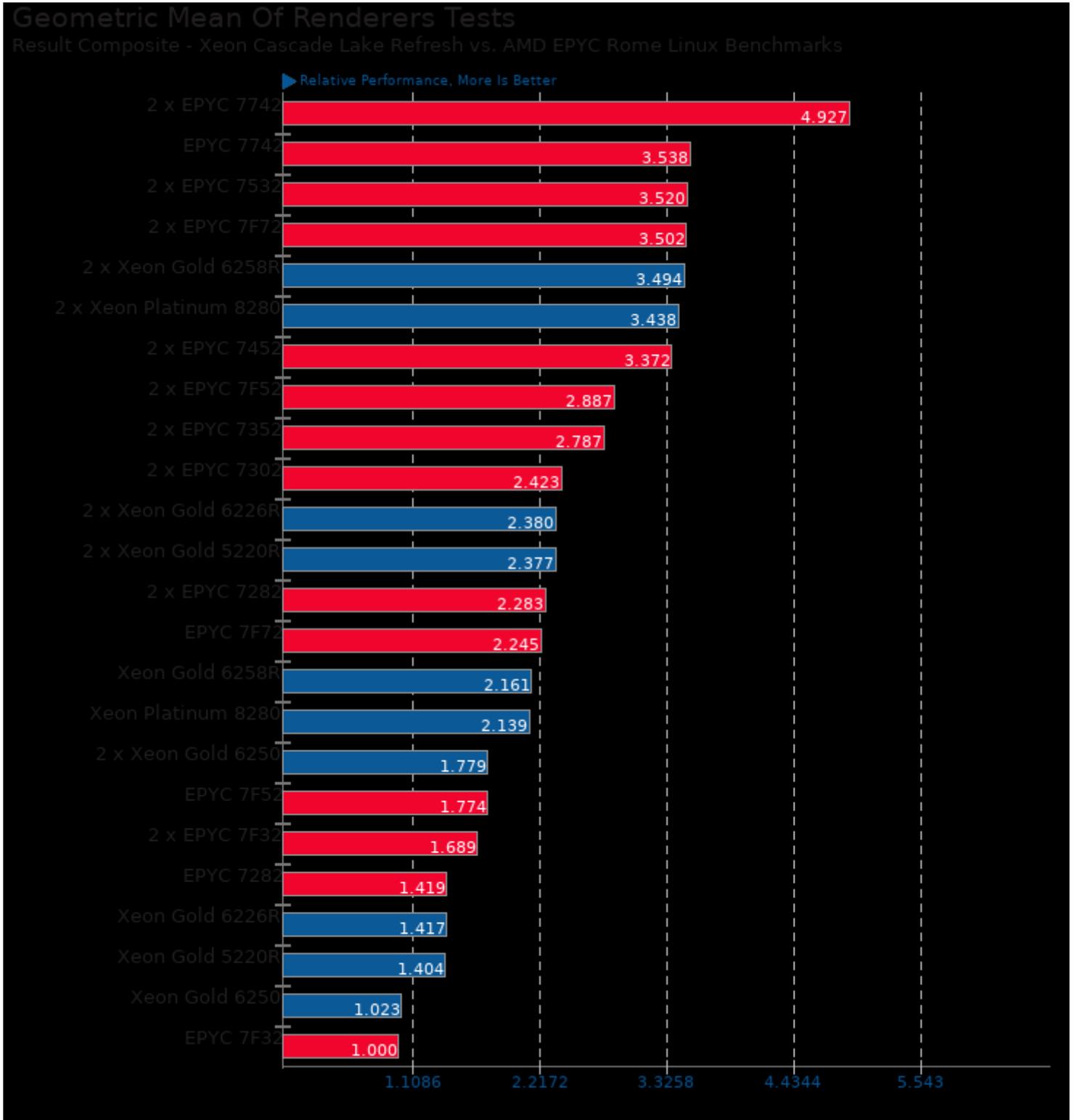
Geometric mean based upon tests: pts/hpcg, pts/lammps and pts/mrbayes



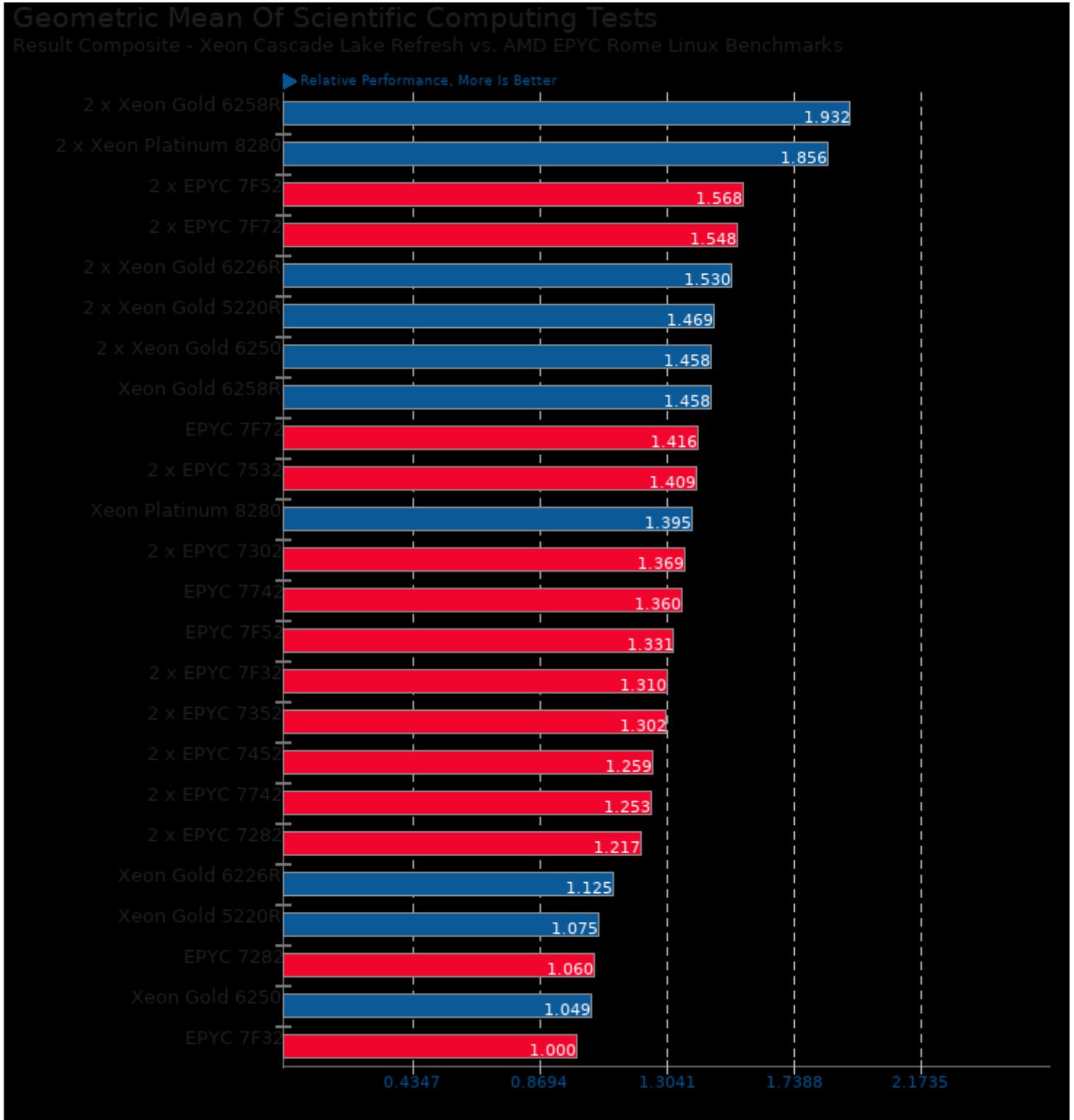
Geometric mean based upon tests: pts/pyperformance, pts/pybench, pts/build-linux-kernel, pts/build-llvm and pts/build2



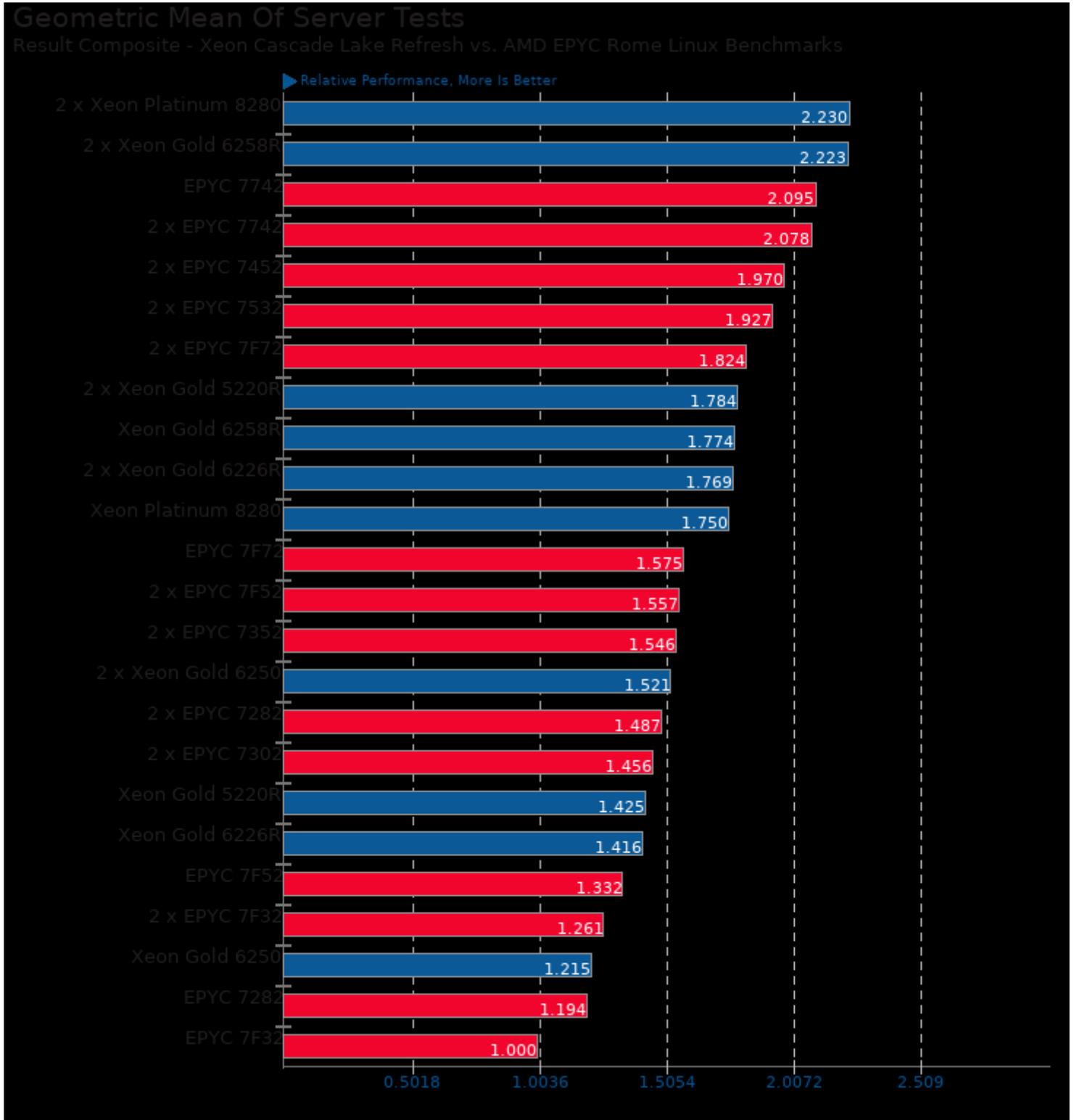
Geometric mean based upon tests: pts/pybench, pts/numpy, pts/mlpack, pts/scikit-learn and pts/pyperformance



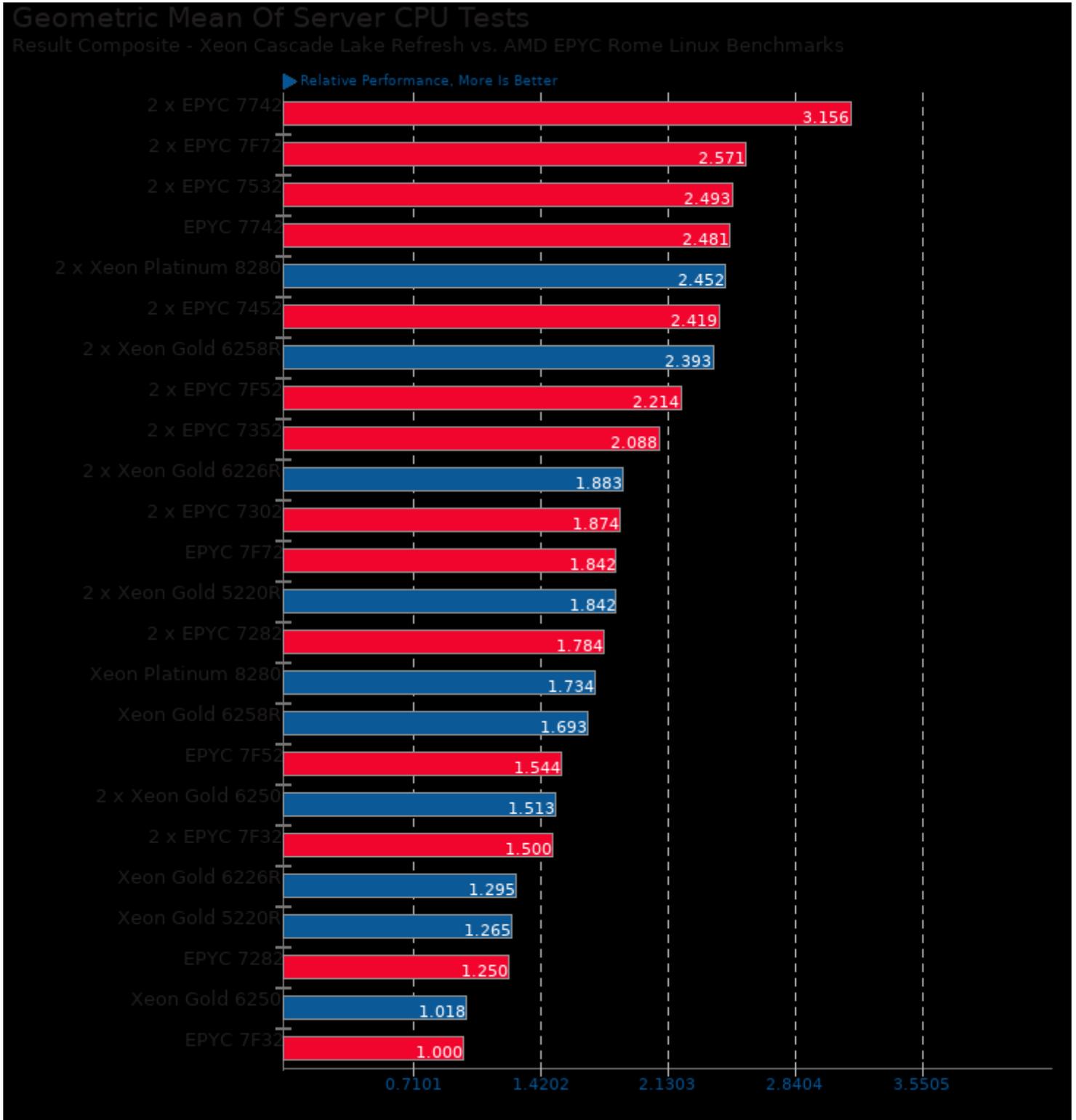
Geometric mean based upon tests: pts/ospray, pts/blender, pts/tungsten, pts/appleseed, pts/radiance, pts/luxcorerender and pts/v-ray



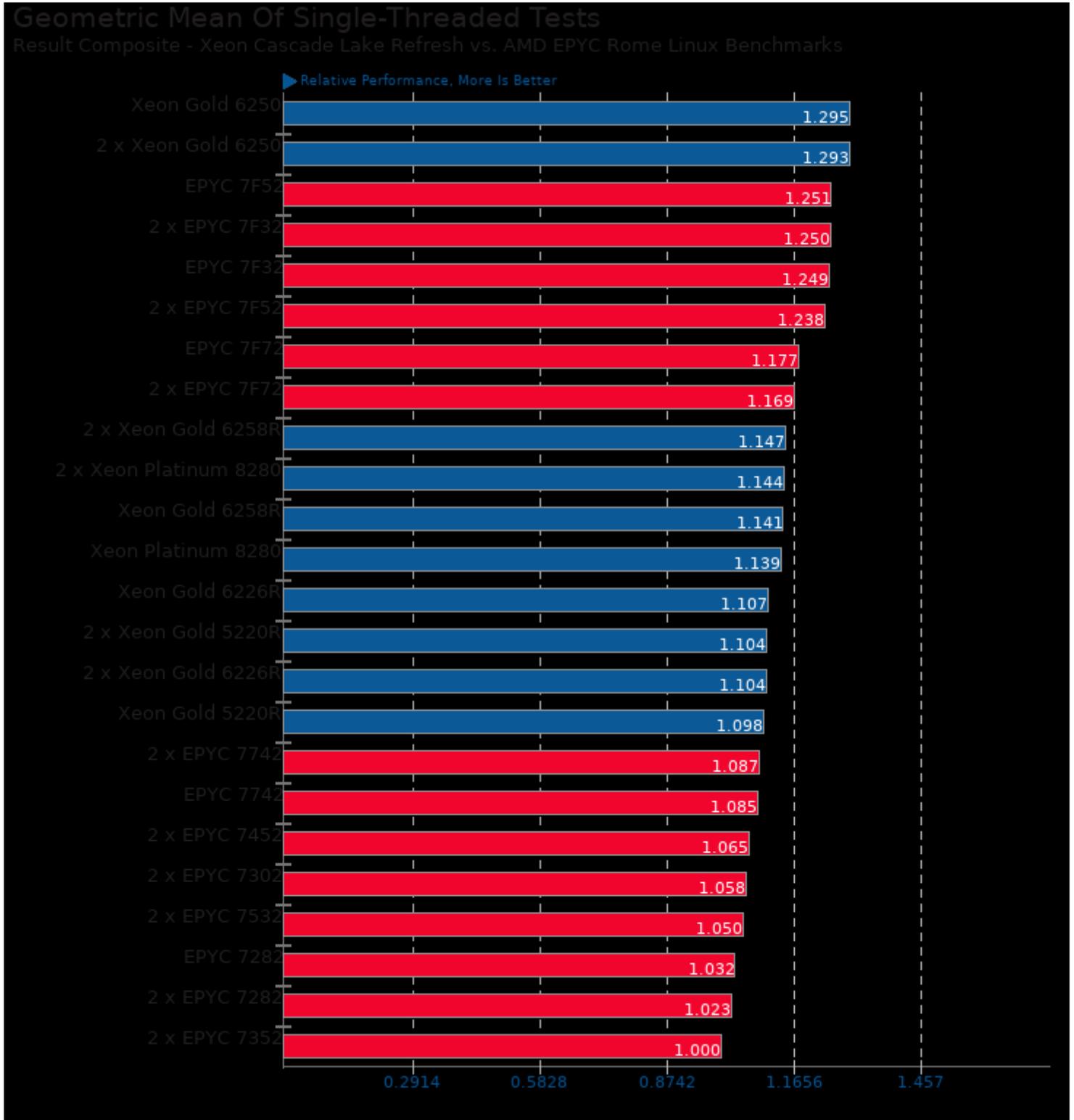
Geometric mean based upon tests: pts/namd, pts/lammps, pts/himeno and pts/mrbyes



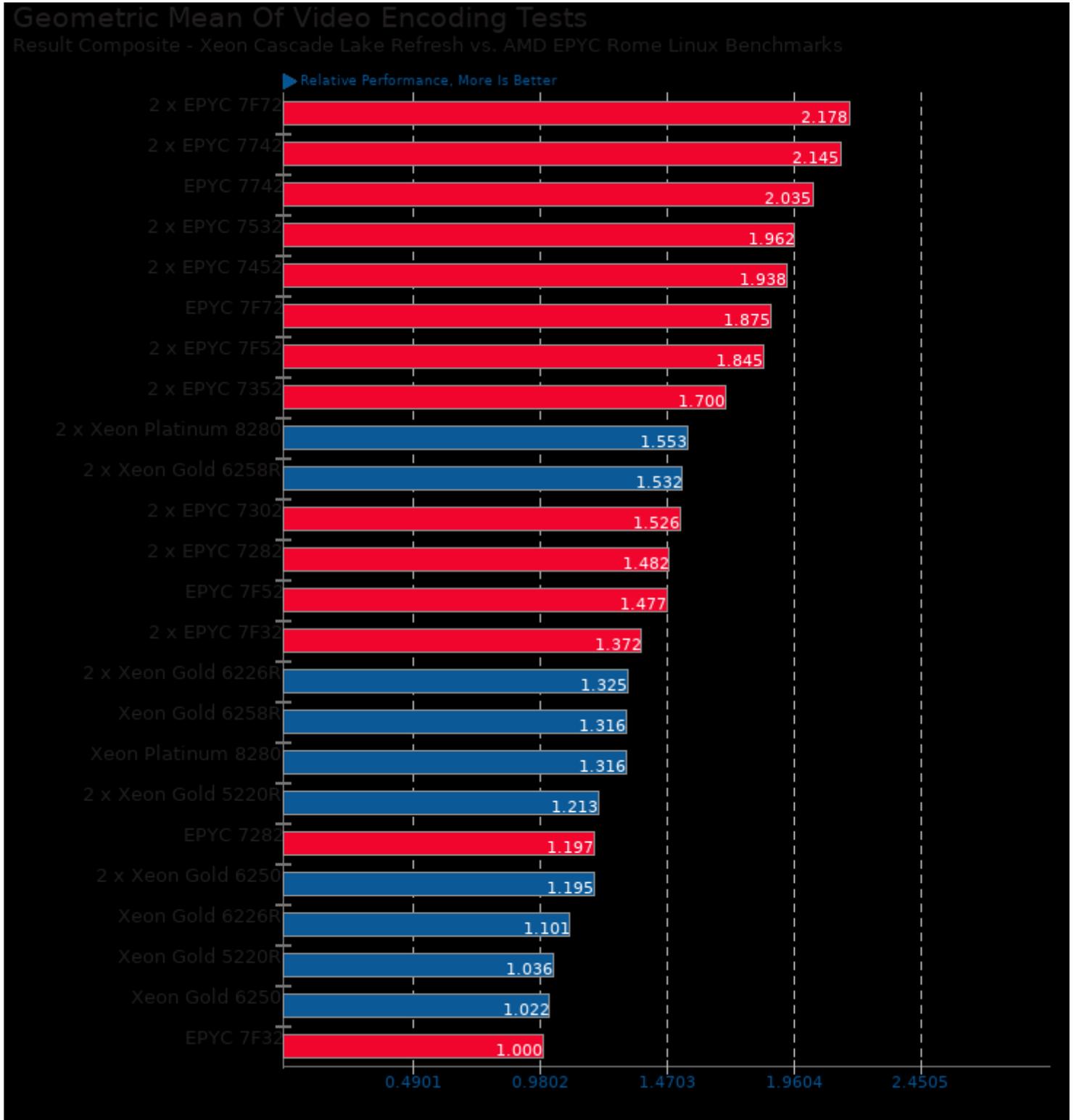
Geometric mean based upon tests: pts/pgbench and pts/phpbench



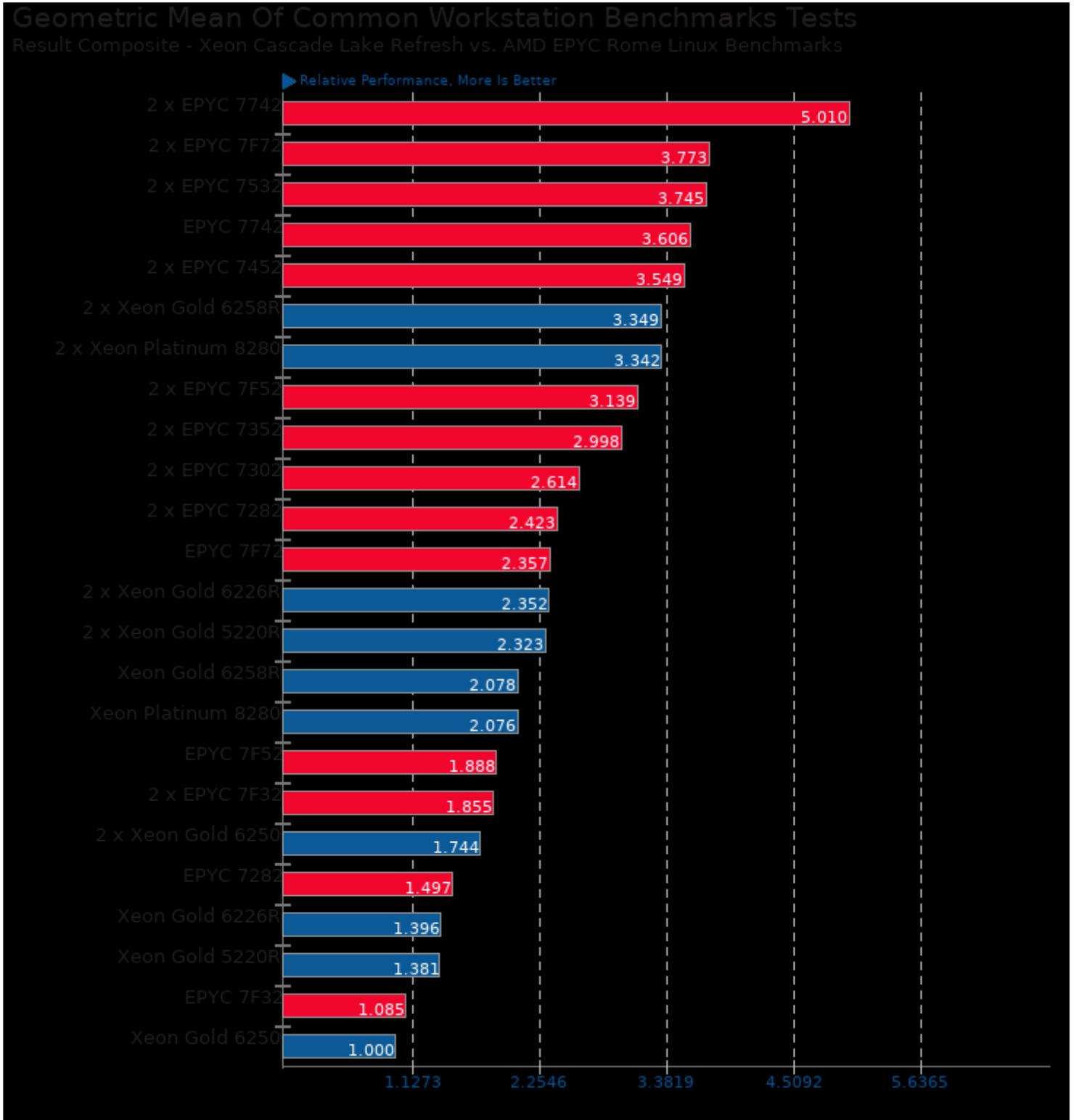
Geometric mean based upon tests: pts/namd, pts/john-the-ripper, pts/svt-av1, pts/dav1d, pts/himeno, pts/stockfish, pts/asmfish, pts/build-linux-kernel, pts/build-llvm, pts/radiance, pts/blender, pts/appleseed, pts/pybench, pts/numpy, pts/phpbench and pts/scikit-learn



Geometric mean based upon tests: pts/numpy, pts/radiance, pts/pybench and pts/phpbench



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



Geometric mean based upon tests: pts/blender and pts/himeno

This file was automatically generated via the Phoronix Test Suite benchmarking software on Thursday, 28 March 2024 18:00.