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EPYC Tyan Server

AMD EPYC 7543 32-Core testing with a TYAN S8036GM2NE-LE (V2.00.B21 BIOS) and llvmpipe on openSUSE Tumbleweed 20210623 via the Phoronix Test Suite.

Automated Executive Summary

Clear Linux 34770 had the most wins, coming in first place for 28% of the tests.

Based on the geometric mean of all complete results, the fastest (Clear Linux 34770) was 1.076x the speed of the slowest (Ubuntu 21.04). openSUSE Tumbleweed was 0.983x the speed of Clear Linux 34770, openSUSE Leap 15.3 was 0.99x the speed of openSUSE Tumbleweed, Debian 10.10 was 0.996x the speed of openSUSE Leap 15.3, CentOS Stream was 0.999x the speed of Debian 10.10, Fedora Server 34 was 0.996x the speed of CentOS Stream, Arch Linux was 1x the speed of Fedora Server 34, Ubuntu 20.04.2 LTS was 0.996x the speed of Arch Linux, Debian Bullseye was 0.978x the speed of Ubuntu 20.04.2 LTS, Ubuntu 21.04 was 0.988x the speed of Debian Bullseye.

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

NAS Parallel Benchmarks (Test / Class: BT.C) at 4.349x

NAS Parallel Benchmarks (Test / Class: SP.C) at 3.369x

NAS Parallel Benchmarks (Test / Class: EP.D) at 2.947x

NAS Parallel Benchmarks (Test / Class: FT.C) at 2.759x

NAS Parallel Benchmarks (Test / Class: CG.C) at 2.401x

NAS Parallel Benchmarks (Test / Class: IS.D) at 2.273x

VP9 libvpx Encoding (Speed: Speed 5 - Input: Bosphorus 4K) at 1.89x

Timed Wasmer Compilation (Time To Compile) at 1.644x

SVT-AV1 (Encoder Mode: Preset 8 - Input: Bosphorus 4K) at 1.608x

libavif avifenc (Encoder Speed: 10) at 1.463x.

Test Systems:

Ubuntu 20.04.2 LTS

Processor: AMD EPYC 7543 32-Core @ 2.80GHz (32 Cores / 64 Threads), Motherboard: TYAN S8036GM2NE-LE (V2.00.B21 BIOS), Chipset: AMD Starship/Matisse, Memory: 64GB, Disk: 1000GB Western Digital WD_BLACK SN850 1TB, Graphics: ASPEED, Monitor: VE228, Network: 2 x Broadcom NetXtreme BCM5720 2-port PCIe

OS: Ubuntu 20.04, Kernel: 5.8.0-55-generic (x86_64), Desktop: GNOME Shell 3.36.4, Display Server: X Server 1.20.9, OpenGL: 4.5 Mesa 20.2.6 (LLVM 11.0.0 256 bits), Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 1920x1080

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale-gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEA/gcc-9-9.3.0/debian/tmp-nvptx/usr.hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq ondemand (Boost: Enabled) - CPU Microcode: 0xa001119

Python Notes: Python 3.8.5

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: always-on RSB filling + srbs: Not affected + tsx_async_abort: Not affected

Fedor a Server 34

Processor: AMD EPYC 7543 32-Core @ 2.80GHz (32 Cores / 64 Threads), Motherboard: TYAN S8036GM2NE-LE (V2.00.B21 BIOS), Chipset: AMD Starship/Matisse, Memory: 64GB, Disk: 1000GB Western Digital WD_BLACK SN850 1TB, Graphics: ASPEED, Monitor: VE228, Network: 2 x Broadcom NetXtreme BCM5720 PCIe

OS: Fedora 34, Kernel: 5.12.11-300.fc34.x86_64 (x86_64), Compiler: GCC 11.1.1 20210531, File-System: xfs, Screen Resolution: 1920x1080

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-redhat-linux --disable-libunwind-exceptions --enable-_cxa_atexit --enable-bootstrap --enable-cet --enable-checking=release --enable-gnu-indirect-function --enable-gnu-unique-object --enable-initfini-array --enable-languages=c,c++,fortran,objc,obj-c++,ada,go,d,lto --enable-multilib --enable-offload-targets=nvptx-none --enable-plugin --enable-shared --enable-threads=posix --mandir=/usr/share/man --with-arch_32=i686 --with-gcc-major-version-only --with-linker-hash-style=gnu --with-tune=generic --without-cuda-driver
Processor Notes: Scaling Governor: acpi-cpufreq schedutil (Boost: Enabled) - CPU Microcode: 0xa001119

Python Notes: Python 3.9.5

Security Notes: SELinux + 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: always-on RSB filling + srbs: Not affected + tsx_async_abort: Not affected

Debian 10.10

Processor: AMD EPYC 7543 32-Core @ 2.80GHz (32 Cores / 64 Threads), Motherboard: TYAN S8036GM2NE-LE (V2.00.B21 BIOS), Chipset: AMD Starship/Matisse, Memory: 64GB, Disk: 1000GB Western Digital WD_BLACK SN850

1TB, Graphics: ASPEED, Monitor: VE228, Network: 2 x Broadcom NetXtreme BCM5720 PCIe

OS: Debian 10, Kernel: 4.19.0-17-amd64 (x86_64), Desktop: GNOME Shell 3.30.2, Display Server: X Server, Compiler: GCC 8.3.0, File-System: ext4, Screen Resolution: 1920x1080

Kernel Notes: Transparent Huge Pages: always
 Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --enable-libmpx --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib --with-tune=generic --without-cuda-driver -v
 Processor Notes: Scaling Governor: acpi-cpufreq ondemand (Boost: Enabled) - CPU Microcode: 0xa001119
 Python Notes: Python 2.7.16 + Python 3.7.3

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 retrpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbd: Not affected + tsx_async_abort: Not affected

Debian Bullseye

Processor: AMD EPYC 7543 32-Core @ 2.80GHz (32 Cores / 64 Threads), Motherboard: TYAN S8036GM2NE-LE (V2.00.B21 BIOS), Chipset: AMD Starship/Matisse, Memory: 64GB, Disk: 1000GB Western Digital WD_BLACK SN850 1TB, Graphics: ASPEED, Monitor: VE228, Network: 2 x Broadcom NetXtreme BCM5720 2-port PCIe

OS: Debian 11, Kernel: 5.10.0-7-amd64 (x86_64), Desktop: GNOME Shell 3.38.4, Display Server: X Server, Vulkan: 1.0.2, Compiler: GCC 10.2.1 20210110, File-System: ext4, Screen Resolution: 1920x1080

Kernel Notes: Transparent Huge Pages: always
 Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-link-mutex --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-Km9U7s/gcc-10-10.2.1/debian/tmp-nvptx/usr,amdgn-amdhba=/build/gcc-10-Km9U7s/gcc-10-10.2.1/debian/tmp-gcn/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-build-config=bootstrap-lto-lean --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 schedutil (Boost: Enabled) - CPU Microcode: 0xa001119
 Python Notes: Python 3.9.2
 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 retrpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbd: Not affected + tsx_async_abort: Not affected

CentOS Stream

Processor: AMD EPYC 7543 32-Core @ 2.80GHz (32 Cores / 64 Threads), Motherboard: TYAN S8036GM2NE-LE (V2.00.B21 BIOS), Chipset: AMD Starship/Matisse, Memory: 64GB, Disk: 1000GB Western Digital WD_BLACK SN850 1TB, Graphics: llvmpipe, Monitor: VE228, Network: 2 x Broadcom NetXtreme BCM5720 2-port PCIe

OS: CentOS Stream 8, Kernel: 4.18.0-310.el8.x86_64 (x86_64), Desktop: GNOME Shell 3.32.2, Display Server: X Server + Wayland, OpenGL: 4.5 Mesa 21.1.1 (LLVM 11.0.0 256 bits), Compiler: GCC 8.5.0 20210514, File-System: xfs, Screen Resolution: 1920x1080

Kernel Notes: Transparent Huge Pages: always
 Compiler Notes: --build=x86_64-redhat-linux --disable-libmpx --disable-libunwind-exceptions --enable-_cxa_atexit --enable-bootstrap --enable-cet --enable-checking-release --enable-gnu-indirect-function --enable-gnu-unique-object --enable-initfini-array --enable-languages=c,c++,fortran,lto --enable-multilib --enable-offload-targets=nvptx-none --enable-plugin --enable-shared --enable-threads=posix --mandir=/usr/share/man --with-arch_32=x86-64 --with-gcc-major-version-only --with-isl --with-linker-hash-style=gnu --with-tune=generic --without-cuda-driver
 Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa001119
 Python Notes: Python 3.6.8
 Security Notes: SELinux + 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 retrpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbd: Not affected + tsx_async_abort: Not affected

Clear Linux 34770

Processor: AMD EPYC 7543 32-Core @ 2.80GHz (32 Cores / 64 Threads), Motherboard: TYAN S8036GM2NE-LE (V2.00.B21 BIOS), Chipset: AMD Starship/Matisse, Memory: 64GB, Disk: 1000GB Western Digital WD_BLACK SN850 1TB, Graphics: llvmpipe, Monitor: VE228, Network: 2 x Broadcom NetXtreme BCM5720 2-port PCIe

OS: Clear Linux OS 34770, Kernel: 5.12.8-1045.native (x86_64), Desktop: GNOME Shell 40.2, Display Server: X Server 1.20.11, OpenGL: 4.5 Mesa 21.1.3 (LLVM 11.1.0 256 bits), Compiler: GCC 11.1.1 20210621 releases/gcc-11.1.0-335-g2348a458e1 + Clang 11.1.0 + LLVM 11.1.0, File-System: ext4, Screen Resolution: 1920x1080

Kernel Notes: Transparent Huge Pages: always
 Environment Notes: FFLAGS="-g -O3 -feliminate-unused-debug-types -pipe -Wall -Wp,-D_FORTIFY_SOURCE=2 -fexceptions -fstack-protector --param=ssp-buffer-size=32 -m64 -fasynchronous-unwind-tables -Wp,-D_REENTRANT -ffree-loop-distribute-patterns -WI,-z -WI,now -WI,-z -WI,retro -malign-data=abi -fno-semantic-interposition -ffree-vectorize -ffree-loop-vectorize -WI,--enable-new-dtags -Wa,-mbranches-within-32B-boundaries" CXFLAGS="-g -O3 -feliminate-unused-debug-types -pipe -Wall -Wp,-D_FORTIFY_SOURCE=2 -fexceptions -fstack-protector --param=ssp-buffer-size=32 -Wformat -Wformat-security -m64 -fasynchronous-unwind-tables -Wp,-D_REENTRANT -ffree-loop-distribute-patterns -WI,-z -WI,now -WI,-z -WI,retro -fno-semantic-interposition -ffat-lto-objects -fno-trapping-math -WI,-sort-common -WI,--enable-new-dtags -mtune=skylake -Wa,-mbranches-within-32B-boundaries -fvisibility-inlines-hidden -WI,--enable-new-dtags" MESA_GLSL_CACHE_DISABLE=0 FCFLAGS="-g -O3 -feliminate-unused-debug-types -pipe -Wall -Wp,-D_FORTIFY_SOURCE=2 -fexceptions -fstack-protector --param=ssp-buffer-size=32 -m64 -fasynchronous-unwind-tables -Wp,-D_REENTRANT -ffree-loop-distribute-patterns -WI,-z -WI,now -WI,-z -WI,retro -malign-data=abi -fno-semantic-interposition -ffree-vectorize -ffree-loop-vectorize -WI,-sort-common -WI,--enable-new-dtags" CFLAGS="-g -O3 -feliminate-unused-debug-types -pipe -Wall -Wp,-D_FORTIFY_SOURCE=2 -fexceptions -fstack-protector --param=ssp-buffer-size=32 -Wformat -Wformat-security -m64 -fasynchronous-unwind-tables -Wp,-D_REENTRANT -ffree-loop-distribute-patterns -WI,-z -WI,now -WI,-z -WI,retro -fno-semantic-interposition -ffat-lto-objects -fno-trapping-math -WI,-sort-common -WI,--enable-new-dtags -mtune=skylake -Wa,-mbranches-within-32B-boundaries" THEANO_FLAGS="floatX=float32,openmp=true,gcc.cxxflags=-ffree-vectorize -mavx" Compiler Notes: --build=x86_64-generic-linux --disable-libmpx --disable-libunwind-exceptions --disable-multiarch --disable-vtable-verify --disable-werror --enable__cxa_atexit --enable-bootstrap --enable-cet --enable-clocale-gnu --enable-default-pie --enable-gnu-indirect-function --enable-languages=c,c++,fortran,go --enable-ld=default --enable-libstdcxx-pch --enable-lto --enable-multilib --enable-plugin --enable-shared --enable-threads=posix --exec-prefix=/usr --includedir=/usr/include --target=x86_64-generic-linux --with-arch=westmere --with-gcc-major-version-only --with-glibc-version=2.19 --with-gnu-ld --with-isl --with-ppl=yes --with-tune=skylake-avx512

Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa001119

Python Notes: Python 3.9.5

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: always-on RSB filling + srbd: Not affected + tsx_async_abort: Not affected

Ubuntu 21.04

Processor: AMD EPYC 7543 32-Core @ 2.80GHz (32 Cores / 64 Threads), Motherboard: TYAN S8036GM2NE-LE (V2.00.B21 BIOS), Chipset: AMD Starship/Matisse, Memory: 64GB, Disk: 1000GB Western Digital WD_BLACK SN850 1TB, Graphics: ASPEED, Monitor: VE228, Network: 2 x Broadcom NetXtreme BCM5720 2-port PCIe

OS: Ubuntu 21.04, Kernel: 5.11.0-22-generic (x86_64), Desktop: GNOME Shell 3.38.4, Display Server: X Server + Wayland, Compiler: GCC 10.3.0, File-System: ext4, Screen Resolution: 1920x1080

Kernel Notes: Transparent Huge Pages: madvise
 Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale-gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-link-mutex --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-gDeRY6/gcc-10-10.3.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-gDeRY6/gcc-10-10.3.0/debian/tmp-gcn/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-build-config=bootstrap-lto-lean --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 schedutil (Boost: Enabled) - CPU Microcode: 0xa001119
 Python Notes: Python 3.9.5

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: always-on RSB filling + srbd: Not affected + tsx_async_abort: Not affected

openSUSE Leap 15.3

Processor: AMD EPYC 7543 32-Core @ 2.80GHz (32 Cores / 64 Threads), Motherboard: TYAN S8036GM2NE-LE (V2.00.B21 BIOS), Chipset: AMD Starship/Matisse, Memory: 64GB, Disk: 1000GB Western Digital WD_BLACK SN850 1TB, Graphics: ASPEED, Monitor: VE228, Network: 2 x Broadcom NetXtreme BCM5720 PCIe

OS: openSUSE Leap 15.3, Kernel: 5.3.18-59.5-default (x86_64), Compiler: GCC 7.5.0, File-System: btrfs, Screen Resolution: 1920x1080

Kernel Notes: Transparent Huge Pages: always
Compiler Notes: --build=x86_64-suse-linux --disable-libcc1 --disable-libssp --disable-libstdcxx-pch --disable-libvtv --disable-plugin --disable-werror --enable-checking=release --enable-gnu-indirect-function --enable-languages=c,c++,objc,fortran,obj-c++,ada,go --enable-libstdcxx-allocator=new --enable-linux-futex --enable-multilib --enable-offload-targets=hsa,nvptx-none, --enable-ssp --enable-version-specific-runtime-libs --host=x86_64-suse-linux --mandir=/usr/share/man --with-arch-32=x86-64 --with-gcc-major-version-only --with-slibdir=/lib64 --with-tune=generic --without-cuda-driver --without-system-libunwind
Processor Notes: Scaling Governor: acpi-cpufreq ondemand (Boost: Enabled) - CPU Microcode: 0xa001119
Python Notes: Python 3.6.13
Security Notes: itlb_multithit: 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: always-on RSB filling + srbd: Not affected + tsx_async_abort: Not affected

Arch Linux

Processor: AMD EPYC 7543 32-Core @ 2.80GHz (32 Cores / 64 Threads), Motherboard: TYAN S8036GM2NE-LE (V2.00.B21 BIOS), Chipset: AMD Starship/Matisse, Memory: 64GB, Disk: 1000GB Western Digital WD_BLACK SN850 1TB, Graphics: ASPEED, Monitor: VE228, Network: 2 x Broadcom NetXtreme BCM5720 PCIe

OS: Arch Linux, Kernel: 5.12.12-arch1-1 (x86_64), Compiler: GCC 11.1.0, File-System: ext4, Screen Resolution: 1920x1080

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --disable-libssp --disable-libstdcxx-pch --disable-libunwind-exceptions --disable-werror --enable-__cxa_atexit --enable-cet=auto --enable-checking=release --enable-clocale-gnu --enable-default-pie --enable-default-ssp --enable-gnu-indirect-function --enable-gnu-unique-object --enable-install-liberty --enable-languages=c,c++,ada,fortran,go,ito,objc,objc,obj-c++,d --enable-lto --enable-multilib --enable-plugin --enable-shared --enable-threads=posix --mandir=/usr/share/man --with-isl --with-linker-hash-style=gnu
Processor Notes: Scaling Governor: acpi-cpufreq schedutil (Boost: Enabled) - CPU Microcode: 0xa001119
Python Notes: Python 3.9.5
Security Notes: itlb_multithit: 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: always-on RSB filling + srbd: Not affected + tsx_async_abort: Not affected

openSUSE Tumbleweed

Processor: AMD EPYC 7543 32-Core @ 2.80GHz (32 Cores / 64 Threads), Motherboard: TYAN S8036GM2NE-LE (V2.00.B21 BIOS), Chipset: AMD Starship/Matisse, Memory: 64GB, Disk: 1000GB Western Digital WD_BLACK SN850 1TB + 15GB Ultra USB 3.0, Graphics: llvmpipe, Monitor: VE228, Network: 2 x Broadcom NetXtreme BCM5720 PCIe

OS: openSUSE Tumbleweed 20210623, Kernel: 5.12.12-1-default (x86_64), Desktop: KDE Plasma 5.22.1, Display Server: X Server 1.20.11, OpenGL: 4.5 Mesa 21.1.2 (LLVM 12.0.0 256 bits), Compiler: GCC 11.1.1 20210617 [revision 79c1185de4a05fdea13b6b020795892913f8184e], File-System: btrfs, Screen Resolution: 1920x1080

Kernel Notes: Transparent Huge Pages: always
Environment Notes: DEBUGINFO_URLS=https://debuginfod.opensuse.org/
Compiler Notes: --build=x86_64-suse-linux --disable-libcc1 --disable-libssp --disable-libstdcxx-pch --disable-libvtv --disable-werror --enable-cet=auto --enable-checking=release --enable-gnu-indirect-function --enable-host-shared --enable-languages=c,c++,objc,fortran,obj-c++,ada,go,d,jit --enable-libphobos --enable-libstdcxx-allocator=new --enable-link-mutex --enable-linux-futex --enable-multilib --enable-offload-targets=nvptx-none,amdgcn-amdhsa, --enable-plugin --enable-ssp --enable-version-specific-runtime-libs --host=x86_64-suse-linux --mandir=/usr/share/man --with-arch-32=x86-64 --with-build-config=bootstrap-lto-lean --with-gcc-major-version-only --with-slibdir=/lib64 --with-tune=generic --without-cuda-driver --without-system-libunwind
Processor Notes: Scaling Governor: acpi-cpufreq schedutil (Boost: Enabled) - CPU Microcode: 0xa001119
Python Notes: Python 3.8.10
Security Notes: itlb_multithit: 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: always-on RSB filling + srbd: Not affected + tsx_async_abort: Not affected

	Ubuntu 20.04.2 LTS	Fedora Server 34	Debian 10.10	Debian Bullseye	CentOS Stream	Clear Linux 34770	Ubuntu 21.04	openSUSE Leap 15.3	Arch Linux	openSUSE Tumbleweed
miniFE - Small (GFlops)	11203	10018	10918	13355	7928	10394	11861		10132	
Normalized	83.88%	75.01%	81.75%	100%	59.36%	77.82%	88.81%		75.86%	
Standard Deviation	9%	7%	8.6%	9.7%	16.7%	8.2%	4.5%		8.8%	
OSpray - San Miguel - Path	3.72	3.70	3.73	3.78	3.74	3.76	3.70	3.77	3.72	3.78
Normalized	98.41%	97.88%	98.68%	100%	98.94%	99.47%	97.88%	99.74%	98.41%	100%
Standard Deviation	0%	0.6%	0%	0.2%	1.2%	0.2%	0%	0%	0%	0.2%
OSpray - NASA Streamlines - Path Tracer (FPS)	12.35	12.35	12.5	12.66	12.5	12.5	12.35	12.5	12.35	12.5
Normalized	97.55%	97.55%	98.74%	100%	98.74%	98.74%	97.55%	98.74%	97.55%	98.74%
Standard Deviation	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
OSpray - M.R. - Path Tracer (FPS)	500	500	444.44	422.22	500	500	500	500	500	486.11
Normalized	100%	100%	88.89%	84.44%	100%	100%	100%	100%	100%	97.22%
Standard Deviation			18.3%	20.4%		0%			0%	9.9%
PlaidML - No - Inference - VGG16 - CPU (FPS)	26.73	26.96	33.54	33.87	33.59	34.20	27.43	33.34	26.94	34.18
Normalized	78.16%	78.83%	98.07%	99.04%	98.22%	100%	80.2%	97.49%	78.77%	99.94%
Standard Deviation	1.5%	1.2%	1.3%	2.4%	1.4%	1.2%	0.7%	0.7%	1.6%	2.1%
PlaidML - No - Inference - VGG19 - CPU (FPS)	22.49	22.13	27.95	27.67	27.92	28.34	22.86	27.86	22.92	28.58
Normalized	78.69%	77.43%	97.8%	96.82%	97.69%	99.16%	79.99%	97.48%	80.2%	100%
Standard Deviation	1.4%	2.4%	2%	1.5%	1.6%	1.6%	1.1%	2.1%	0.9%	2%
PlaidML - No - Inference - ResNet 50 - CPU (FPS)	9.04	8.59	9.60	9.61	7.59	7.74	9.38	7.51	8.45	7.36
Normalized	94.07%	89.39%	99.9%	100%	78.98%	80.54%	97.61%	78.15%	87.93%	76.59%
Standard Deviation	0.5%	0.5%	1.9%	0.4%	0.4%	1%	2.1%	0.9%	0.6%	0.9%
Embree - Pathtracer ISPC - Asian Dragon (FPS)	33.3187	33.3893	32.5872	33.5204	33.2960	33.4857	33.2569	33.2921	33.5502	33.4436
Normalized	99.31%	99.52%	97.13%	99.91%	99.24%	99.81%	99.13%	99.23%	100%	99.68%
Standard Deviation	0.1%	0.3%	0.6%	0.4%	0.4%	0.2%	0.2%	0.1%	0.2%	0.2%
Embree - Pathtracer ISPC - Bosphorus 4K	37.1865	37.3838	32.4410	37.3153	37.2281	37.3454	37.0053	37.7809	37.4231	37.5510
Normalized	98.43%	98.95%	85.87%	98.77%	98.54%	98.85%	97.95%	100%	99.05%	99.39%
Standard Deviation	1.2%	0.7%	7.6%	1%	0.5%	1.2%	1.1%	0.3%	0.9%	1.1%
SVT-AV1 - Preset 4 - Bosphorus 4K	1.931	1.913	1.852	1.707	1.959	2.071	1.875	1.940	1.922	1.939
Normalized	93.24%	92.37%	89.43%	82.42%	94.59%	100%	90.54%	93.67%	92.81%	93.63%
Standard Deviation	0.1%	0.3%	0.3%	0.5%	0.7%	0.4%	0.4%	0.2%	0.3%	0.4%
SVT-AV1 - Preset 8 - Bosphorus 4K	20.851	18.345	20.716	14.875	22.402	23.919	17.809	21.464	18.448	19.172
Normalized	87.17%	76.7%	86.61%	62.19%	93.66%	100%	74.46%	89.74%	77.13%	80.15%

Standard Deviation	1%	1%	0.9%	1.4%	0.6%	0.5%	0.6%	1%	1.1%	1.3%
SVT-HEVC - 1 -	24.65	24.71	25.19	24.96	24.76	25.15	24.69	23.98	24.71	24.98
Bosphorus 1080p (FPS)										
Normalized	97.86%	98.09%	100%	99.09%	98.29%	99.84%	98.02%	95.2%	98.09%	99.17%
Standard Deviation	0.6%	0.7%	0.3%	0.6%	0.4%	0.2%	0.4%	0.1%	0.6%	0.3%
SVT-HEVC - 7 -	282.38	281.37	296.57	273.70	285.20	299.80	284.09	286.38	278.52	295.05
Bosphorus 1080p (FPS)										
Normalized	94.19%	93.85%	98.92%	91.29%	95.13%	100%	94.76%	95.52%	92.9%	98.42%
Standard Deviation	2.4%	1.4%	2%	2.2%	1.2%	2.3%	2.5%	2.3%	0.8%	2.3%
SVT-HEVC - 10 -	458.18	434.07	537.01	429.71	467.20	463.76	470.53	459.35	465.56	490.50
Bosphorus 1080p (FPS)										
Normalized	85.32%	80.83%	100%	80.02%	87%	86.36%	87.62%	85.54%	86.69%	91.34%
Standard Deviation	10.3%	5.5%	2.3%	7.4%	9%	6.5%	8%	8.2%	11.2%	2.5%
SVT-VP9 - VMAF	349.16	291.76	344.93	256.35	303.33	298.74	251.54	301.69	290.31	296.62
Optimized - Bosphorus 1080p (FPS)										
Normalized	100%	83.56%	98.79%	73.42%	86.87%	85.56%	72.04%	86.4%	83.15%	84.95%
Standard Deviation	4.2%	1.1%	2.9%	1.4%	4.4%	2.2%	5.1%	2.5%	3.1%	1.7%
SVT-VP9 - P.S.O -	353.98	305.14	353.73	259.56	303.00	302.64	257.98	302.99	298.81	297.47
Bosphorus 1080p (FPS)										
Normalized	100%	86.2%	99.93%	73.33%	85.6%	85.5%	72.88%	85.6%	84.41%	84.04%
Standard Deviation	1.1%	2.8%	0.7%	0.2%	1.4%	2.3%	12.6%	1.2%	1%	1.8%
SVT-VP9 - V.Q.O -	264.89	272.55	297.41	236.32	274.02	273.38	241.51	277.37	272.07	270.60
Bosphorus 1080p (FPS)										
Normalized	89.07%	91.64%	100%	79.46%	92.14%	91.92%	81.2%	93.26%	91.48%	90.99%
Standard Deviation	1.5%	1.4%	1.7%	2.5%	1.3%	1.7%	0.7%	0.7%	1%	1.6%
VP9 libvpx	6.16	6.89	6.05	6.52	6.48	7.25	6.23	6.64	6.85	7.00
Encoding - Speed 0 - Bosphorus 4K										
Normalized	84.97%	95.03%	83.45%	89.93%	89.38%	100%	85.93%	91.59%	94.48%	96.55%
Standard Deviation	0.2%	0.9%	0.3%	1.4%	0.9%	0.3%	0.4%	0.3%	0.8%	1.7%
VP9 libvpx	13.63	16.23	13.03	9.31	14.89	17.60	14.60	14.09	16.20	16.02
Encoding - Speed 5 - Bosphorus 4K										
Normalized	77.44%	92.22%	74.03%	52.9%	84.6%	100%	82.95%	80.06%	92.05%	91.02%
Standard Deviation	0.9%	1.4%	0.7%	0.8%	2.5%	1.1%	1.1%	1.5%	0.3%	2%
High Performance	12.8778	11.7130		11.7941	12.4586	19.4305	12.6926	12.1209	18.2641	
Conjugate Gradient (GFLOP/s)										
Normalized	66.28%	60.28%		60.7%	64.12%	100%	65.32%	62.38%	94%	
Standard Deviation	0.1%	17.8%		16.2%	3.6%	8.2%	19.5%	11.2%	21.5%	
Xmrig - Monero - 1M (H/s)	21915		22335	23576					22021	
Normalized	92.95%		94.73%	100%					93.4%	
Standard Deviation	0.3%		0.4%	0.2%					0.2%	

Xmrig - Wownero -	23123		23003	24478					23169	
1M (H/s)										
Normalized	94.46%		93.97%	100%					94.65%	
Standard Deviation	0.3%		0.6%	0.2%					0.1%	
Intel Open Image	0.90	0.96	0.87	0.89	0.94	0.97	0.89	0.96	0.95	0.91
Denoise -										
RT.hdr_alb_nrm.38										
40x2160 (Images / Sec)										
Normalized	92.78%	98.97%	89.69%	91.75%	96.91%	100%	91.75%	98.97%	97.94%	93.81%
Standard Deviation	0.6%	0.4%	1%	2.2%	0.8%	0.4%	1.3%	0.4%	0.3%	2.2%
Intel Open Image	0.90	0.96	0.87	0.94	0.95	0.97	0.89	0.96	0.91	0.94
Denoise -										
RT.Idr_alb_nrm.384										
0x2160 (Images / Sec)										
Normalized	92.78%	98.97%	89.69%	96.91%	97.94%	100%	91.75%	98.97%	93.81%	96.91%
Standard Deviation	0.7%	0.2%	0.4%	2.5%	0.8%	0.5%	0.2%	0.8%	0.8%	0.3%
Intel Open Image	0.45	0.48	0.44	0.46	0.47	0.48	0.45	0.47	0.46	0.47
Denoise -										
RTLightmap.hdr.40										
96x4096 (Images / Sec)										
Normalized	93.75%	100%	91.67%	95.83%	97.92%	100%	93.75%	97.92%	95.83%	97.92%
Standard Deviation	1.2%	0.1%	1.3%	0.5%	1%	2%	0.4%	2.3%	0.2%	0.1%
ONNX Runtime -	291	277	233	282	242		257	242	294	265
yolov4 - OpenMP										
CPU										
(Inferences/min)										
Normalized	98.98%	94.22%	79.25%	95.92%	82.31%		87.41%	82.31%	100%	90.14%
Standard Deviation	5.2%	1.2%	6.9%	5.1%	3.9%		5.9%	2.8%	1.8%	1.6%
ONNX Runtime -	445	440	432	424	427		395	429	442	419
bertsqaud-10 -										
OpenMP CPU										
(Inferences/min)										
Normalized	100%	98.88%	97.08%	95.28%	95.96%		88.76%	96.4%	99.33%	94.16%
Standard Deviation	2.9%	3.3%	5.1%	3.5%	2%		4%	5.6%	3.7%	4.6%
ONNX Runtime -	93	84	75	73	74		90	71	83	83
fcn-resnet101-11 -										
OpenMP CPU										
(Inferences/min)										
Normalized	100%	90.32%	80.65%	78.49%	79.57%		96.77%	76.34%	89.25%	89.25%
Standard Deviation	13.3%	14%	8.9%	13.9%	10.6%		14.3%	20.2%	16.2%	16.3%
ONNX Runtime -	10866	10911	11064	11283	9699		10193	10321	11449	11100
shufflenet-v2-10 -										
OpenMP CPU										
(Inferences/min)										
Normalized	94.91%	95.3%	96.64%	98.55%	84.71%		89.03%	90.15%	100%	96.95%
Standard Deviation	0.8%	1.3%	1.7%	0.8%	2.3%		0.7%	1.9%	0.5%	1.2%

ONNX Runtime - super-resolution-10	4775	4884	5018	4597	4475		4684	5237	4985	4744
- OpenMP CPU (Inferences/min)										
vkIBenchmark (Items / Sec)										
Normalized	91.18%	93.26%	95.82%	87.78%	85.45%		89.44%	100%	95.19%	90.59%
Standard Deviation	1.3%	0.9%	6.6%	0.9%	4.3%		1%	8.5%	0.5%	0.8%
OpenVKL -	297	296	282	287	293	292	319	291	298	292
LuxCoreRender -										
DLSC - CPU (M samples/sec)										
Normalized	98.73%	98.91%	99.09%	98.73%	98.91%	100%	99.09%	99.64%	99.46%	99.28%
Standard Deviation	0.3%	1.2%	0.6%	0.5%	0.3%	0.2%	0.7%	0.4%	0.5%	0.2%
LuxCoreRender -	4.32	4.39	4.36	4.42	4.40	4.47	4.30	4.46	4.33	4.46
Danish Mood - CPU (M samples/sec)										
Normalized	96.64%	98.21%	97.54%	98.88%	98.43%	100%	96.2%	99.78%	96.87%	99.78%
Standard Deviation	0.7%	1.6%	1%	0.3%	1.7%	0.3%	0.3%	1.8%	0.7%	0.4%
LuxCoreRender -	8.29	8.29	8.33	8.39	8.25	8.36	8.30	8.39	8.34	8.36
Orange Juice - CPU (M samples/sec)										
Normalized	98.81%	98.81%	99.28%	100%	98.33%	99.64%	98.93%	100%	99.4%	99.64%
Standard Deviation	0.1%	0.3%	0.2%	0.5%	0.5%	0.1%	0.2%	0.6%	0.4%	0.1%
LuxCoreRender -	4.73	4.68	4.74	4.79	4.74	4.80	4.66	4.73	4.74	4.85
LuxCore Benchmark - CPU (M samples/sec)										
Normalized	97.53%	96.49%	97.73%	98.76%	97.73%	98.97%	96.08%	97.53%	97.73%	100%
Standard Deviation	0.2%	0.3%	0.7%	0.6%	0.5%	0.3%	1%	0.9%	1.2%	0.6%
LuxCoreRender -	16.38	16.11	17.14	16.75	17.01	17.48	16.29	16.16	15.96	16.71
R.C.a.P - CPU (M samples/sec)										
Normalized	93.71%	92.16%	98.05%	95.82%	97.31%	100%	93.19%	92.45%	91.3%	95.59%
Standard Deviation	4.4%	1.1%	6.9%	5.9%	6.6%	6.9%	4.3%	9.5%	1.1%	5.3%
GROMACS - MPI	3.639	3.640		3.756	3.801	3.777	3.581	3.837	3.715	
CPU - water_GMX50_bare (Ns/Day)										
Normalized	94.84%	94.87%		97.89%	99.06%	98.44%	93.33%	100%	96.82%	
Standard Deviation	0.5%	0.4%		0.2%	0.1%	0.2%	0.3%	0.8%	1.3%	
Kripke (Throughput FoM)	7865897	7847051	7843311	7811213	7763192	9050215	7358494	8696495	7577925	8298867
Normalized	86.91%	86.71%	86.66%	86.31%	85.78%	100%	81.31%	96.09%	83.73%	91.7%
Standard Deviation	9.5%	11.1%	12.5%	5.9%	5.9%	1.1%	9.8%	5.2%	9.5%	9%

NAS Parallel	87955	20508	87888	89193	21314	87029	87240	21380		
Benchmarks - BT.C										
(Mop/s)										
Normalized	98.61%	22.99%	98.54%	100%	23.9%	97.57%	97.81%	23.97%		
Standard Deviation	0.4%	7.1%	0.6%	0.1%	0%	0.2%	0.2%	0.2%		
NAS Parallel	29892	13588		30352	12925	29640	28970	12641		
Benchmarks - CG.C										
(Mop/s)										
Normalized	98.48%	44.77%		100%	42.58%	97.65%	95.45%	41.65%		
Standard Deviation	1.6%	0.1%		1.4%	2.1%	1%	2.4%	4.3%		
NAS Parallel	2934	1601		2965	1006	2844	2930	1362		
Benchmarks - EP.D										
(Mop/s)										
Normalized	98.96%	54%		100%	33.93%	95.93%	98.8%	45.94%		
Standard Deviation	2.6%	6.7%		0.5%	5.5%	4.3%	2.9%	0%		
NAS Parallel	47060	17996		49076	18870	48460	46811	17789		
Benchmarks - FT.C										
(Mop/s)										
Normalized	95.89%	36.67%		100%	38.45%	98.74%	95.38%	36.25%		
Standard Deviation	0.2%	0.4%		0.5%	0.5%	1.1%	2.5%	0.9%		
NAS Parallel	1787	1092		1731	958.16	2178	1985	1153	1147	
Benchmarks - IS.D										
(Mop/s)										
Normalized	82.05%	50.15%		79.5%	44%	100%	91.14%	52.96%	52.67%	
Standard Deviation	0.8%	2.2%		1.1%	1.1%	7%	1.7%	2.4%	1.8%	
NAS Parallel	33234	10058	33844	33101	10304	33882	32826	10268		
Benchmarks - SP.C										
(Mop/s)										
Normalized	98.09%	29.69%	99.89%	97.7%	30.41%	100%	96.88%	30.31%		
Standard Deviation	0.3%	0.8%	0.4%	0.4%	0.1%	0.3%	0.2%	0.1%		
BRL-CAD - V.P.M	422481	417781	409125	420156	406823		419835		413318	
(VGR Performance Metric)										
Normalized	100%	98.89%	96.84%	99.45%	96.29%		99.37%		97.83%	
NAMD - ATPase	0.67252	0.67355	0.67193	0.67131	0.67415	0.67373	0.67638	0.67262	0.67235	0.67239
Simulation - 327,506 Atoms										
Normalized	99.82%	99.67%	99.91%	100%	99.58%	99.64%	99.25%	99.81%	99.85%	99.84%
Standard Deviation	0.1%	0.1%	0%	0.1%	0.1%	0%	0.9%	0.1%	0.1%	0.2%
TensorFlow Lite -	69193	70454	69846	69107	87581	72316	83601	68977	69933	68648
SqueezeNet (us)										
Normalized	99.21%	97.44%	98.28%	99.34%	78.38%	94.93%	82.11%	99.52%	98.16%	100%
Standard Deviation	0.5%	1.3%	0.9%	0.7%	9.3%	1.9%	9.7%	0.4%	0.5%	0.2%
TensorFlow Lite -	936694	941892	942408	932251	944105	940126	1052955	932224	935779	931747
Inception V4 (us)										
Normalized	99.47%	98.92%	98.87%	99.95%	98.69%	99.11%	88.49%	99.95%	99.57%	100%
Standard Deviation	0.4%	1.1%	0.8%	0.3%	0.9%	0.9%	2.8%	0.6%	0.1%	0%
TensorFlow Lite -	43688	43886	44223	43712	45933	43841	50144	44085	43481	43729
Mobilenet Float (us)										
Normalized	99.53%	99.08%	98.32%	99.47%	94.66%	99.18%	86.71%	98.63%	100%	99.43%
Standard Deviation	0.6%	0.4%	0.4%	0.4%	7%	0.4%	5.3%	0.5%	0.3%	0.1%

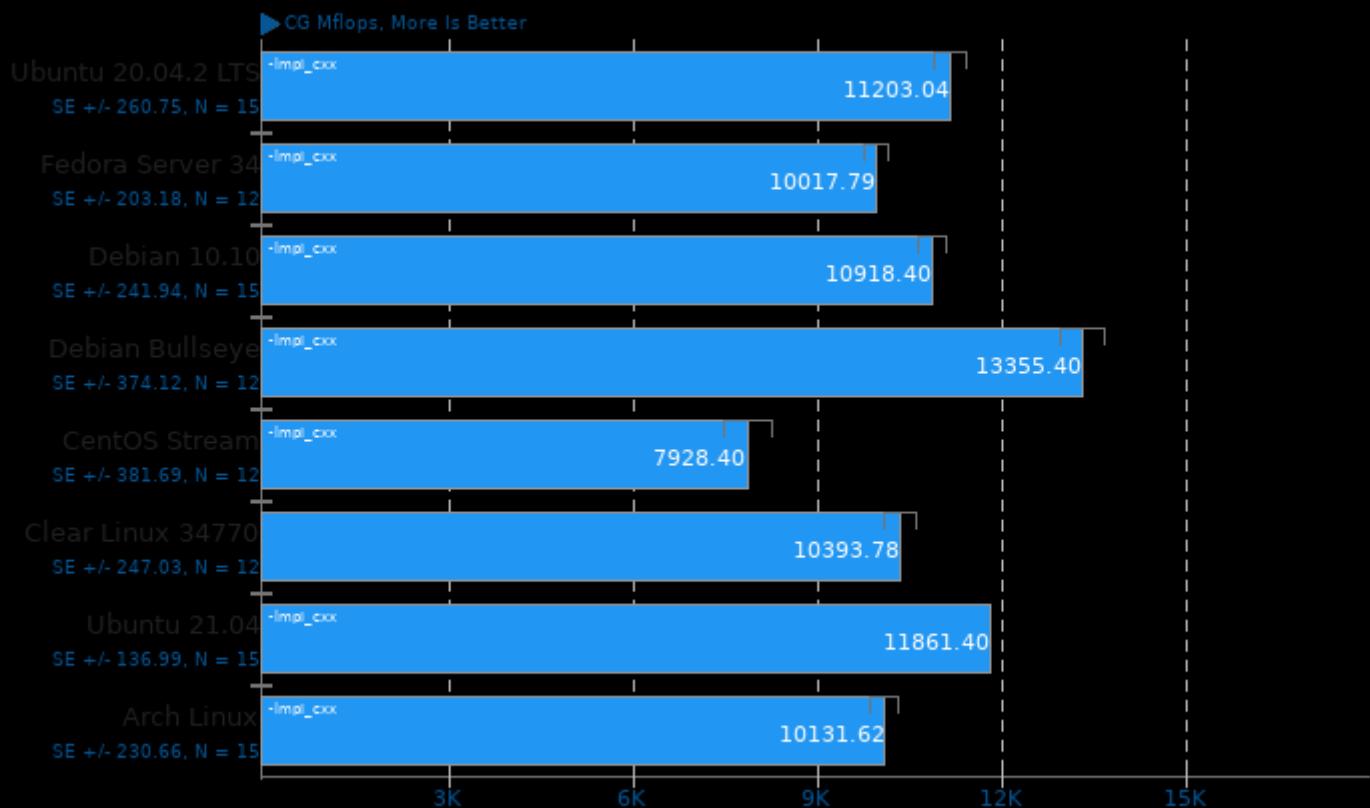
TensorFlow Lite -	46473	46558	46650	46350	47417	46346	52962	46366	46479	46218
Mobilenet Quant										
Normalized	99.45%	99.27%	99.07%	99.71%	97.47%	99.72%	87.27%	99.68%	99.44%	100%
Standard Deviation	0.3%	0.6%	0.4%	0.1%	1.7%	0%	3.8%	0.1%	0.8%	0%
TensorFlow Lite -	835539	837065	834724	834703	843780	837254	943408	838331	834905	833316
I.R.V (us)										
Normalized	99.73%	99.55%	99.83%	99.83%	98.76%	99.53%	88.33%	99.4%	99.81%	100%
Standard Deviation	0.3%	0.4%	0%	0.3%	0.6%	0.4%	6.8%	0.9%	0.2%	0.3%
Mobile Neural	2.572	2.535	2.906	2.616	2.584	2.264	2.496	2.805	2.330	2.462
Network -										
mobilenetV3 (ms)										
Normalized	88.02%	89.31%	77.91%	86.54%	87.62%	100%	90.71%	80.71%	97.17%	91.96%
Standard Deviation	2.3%	4.4%	6.5%	4.9%	1.2%	3%	1.7%	2.3%	5.7%	1.1%
Mobile Neural	4.144	4.042	4.720	4.676	4.355	4.409	4.377	4.622	3.909	4.094
Network -										
squeezeNetv1.1										
Normalized	94.33%	96.71%	82.82%	83.6%	89.76%	88.66%	89.31%	84.57%	100%	95.48%
Standard Deviation	2%	3.4%	3.4%	2.4%	3.3%	4%	1.1%	1.3%	2%	2.5%
Mobile Neural	21.954	18.933	23.736	22.520	22.034	22.347	21.663	24.443	19.548	21.150
Network -										
resnet-v2-50 (ms)										
Normalized	86.24%	100%	79.76%	84.07%	85.93%	84.72%	87.4%	77.46%	96.85%	89.52%
Standard Deviation	0.9%	5.7%	4.1%	6.6%	3.4%	4.6%	2%	5%	4.7%	2.7%
Mobile Neural	6.094	5.767	6.326	6.204	6.776	6.539	6.900	6.713	5.836	6.187
Network -										
SqueezeNetV1.0 (ms)										
Normalized	94.63%	100%	91.16%	92.96%	85.11%	88.19%	83.58%	85.91%	98.82%	93.21%
Standard Deviation	3.5%	3.3%	5.4%	5.8%	2.2%	6.9%	0.7%	2%	3%	2.1%
Mobile Neural	3.947	3.975	4.242	4.034	4.275	4.026	3.955	4.221	3.715	4.140
Network -										
MobileNetV2_224 (ms)										
Normalized	94.12%	93.46%	87.58%	92.09%	86.9%	92.28%	93.93%	88.01%	100%	89.73%
Standard Deviation	5.4%	4.3%	5.9%	10.3%	2.1%	7.5%	1.1%	1.2%	4.7%	4.2%
Mobile Neural	2.849	2.894	3.482	3.796	2.932	2.981	2.734	3.405	3.012	3.416
Network -										
mobilenet-v1-1.0 (ms)										
Normalized	95.96%	94.47%	78.52%	72.02%	93.25%	91.71%	100%	80.29%	90.77%	80.04%
Standard Deviation	6%	7.7%	8.5%	8.5%	11.5%	10.6%	0.8%	18.6%	5.8%	16%
Mobile Neural	24.361	22.603	26.471	27.651	27.519	23.754	24.418	25.508	22.742	22.539
Network -										
inception-v3 (ms)										
Normalized	92.52%	99.72%	85.15%	81.51%	81.9%	94.89%	92.3%	88.36%	99.11%	100%
Standard Deviation	2%	2.4%	3.1%	1.4%	2.1%	3.9%	1.3%	2.4%	2.6%	2.2%
TNN - CPU -	2907	3043	2822	3098	2957	2895	3183	2907	2991	2971
DenseNet (ms)										
Normalized	97.08%	92.75%	100%	91.09%	95.45%	97.48%	88.68%	97.08%	94.37%	94.99%
Standard Deviation	0%	1.2%	0.2%	0.5%	0.2%	0.2%	5.5%	0.5%	0.8%	0.3%

TNN - CPU -	290.337	296.547	286.254	307.534	301.637	289.527	316.885	289.223	289.976	295.467
MobileNet v2 (ms)										
Normalized	98.59%	96.53%	100%	93.08%	94.9%	98.87%	90.33%	98.97%	98.72%	96.88%
Standard Deviation	0.4%	1.5%	1.7%	2.3%	0.3%	0.1%	2.4%	1.7%	0.4%	2.5%
TNN - CPU -	62.597	64.811	62.217	62.165	62.620	65.828	66.292	60.825	63.364	64.865
SqueezeNet v2 (ms)										
Normalized	97.17%	93.85%	97.76%	97.84%	97.13%	92.4%	91.75%	100%	95.99%	93.77%
Standard Deviation	0.9%	0.2%	2.4%	1.3%	0.5%	2.4%	0.3%	0.2%	0.4%	0.3%
TNN - CPU -	269.182	271.391	268.003	269.358	269.467	270.350	277.579	266.809	271.068	270.875
SqueezeNet v1.1 (ms)										
Normalized	99.12%	98.31%	99.55%	99.05%	99.01%	98.69%	96.12%	100%	98.43%	98.5%
Standard Deviation	0.1%	0.1%	0.2%	0.4%	0.1%	0.1%	0%	0.4%	0%	0.1%
Xcompact3d	27.87694	29.03664		27.70186	28.64774	27.16345	28.80799	29.13082	29.46209	
Incompact3d - i.i.1.C.P.D (sec)	80	78		50	26	98	55	44	72	
Normalized	97.44%	93.55%		98.06%	94.82%	100%	94.29%	93.25%	92.2%	
Standard Deviation	2.5%	0.5%		2.8%	1.1%	1.3%	1.1%	1.4%	0.3%	
libavif avifenc - 10 (sec)	3.817	3.620	2.785	2.873	2.817	2.609	3.785	2.779	3.637	2.784
Normalized	68.35%	72.07%	93.68%	90.81%	92.62%	100%	68.93%	93.88%	71.73%	93.71%
Standard Deviation	0.8%	2.5%	2.3%	2.8%	3.2%	2.3%	2.3%	1%	2%	2.2%
libavif avifenc - 6, Lossless (sec)	30.222	27.881	27.237	27.395	27.000	26.150	30.515	26.826	28.546	26.680
Normalized	86.53%	93.79%	96.01%	95.46%	96.85%	100%	85.7%	97.48%	91.61%	98.01%
Standard Deviation	1.2%	0.1%	2%	0.6%	0.7%	0.3%	1.3%	0.3%	1%	0.3%
libavif avifenc - 10, Lossless (sec)	6.287	6.185	5.323	5.298	5.188	4.915	6.302	5.199	6.107	5.117
Normalized	78.18%	79.47%	92.34%	92.77%	94.74%	100%	77.99%	94.54%	80.48%	96.05%
Standard Deviation	2.4%	0.2%	5.7%	0.5%	2.1%	1%	2.5%	0.4%	2.1%	1.6%
Timed Godot Game	57.907	54.948	63.293	53.426			54.630		60.578	
Engine Compilation - Time To Compile (sec)										
Normalized	92.26%	97.23%	84.41%	100%			97.8%		88.19%	
Standard Deviation	0.8%	0.3%	1%	0.6%			2%		0.1%	
Timed Linux Kernel	35.137	34.019	29.492	32.031	31.134	31.165	31.450	28.874	38.480	32.375
Compilation - Time To Compile (sec)										
Normalized	82.18%	84.88%	97.9%	90.14%	92.74%	92.65%	91.81%	100%	75.04%	89.19%
Standard Deviation	2.3%	2.4%	2.4%	2.5%	2.4%	2.4%	2.2%	2.5%	2.6%	2.4%
Timed LLVM	232.758	209.690	185.201	202.013	192.197		209.931	204.165	241.640	207.066
Compilation - Ninja (sec)										
Normalized	79.57%	88.32%	100%	91.68%	96.36%		88.22%	90.71%	76.64%	89.44%
Standard Deviation	0.6%	0.6%	0.1%	0.1%	0.6%		0.8%	0%	0.2%	0.3%
Timed LLVM	286.375	257.168	223.264	250.573	227.741		250.224	242.618	288.513	251.078
Compilation - Unix Makefiles (sec)										
Normalized	77.96%	86.82%	100%	89.1%	98.03%		89.23%	92.02%	77.38%	88.92%
Standard Deviation	0.9%	1.2%	2.5%	1.6%	0.7%		0.4%	1.9%	0.9%	0.7%

Timed Node.js	151.647	137.588	123.139	134.407	127.498		140.352	124.995	157.696	134.370
Compilation - Time										
To Compile (sec)										
Normalized	81.2%	89.5%	100%	91.62%	96.58%		87.74%	98.52%	78.09%	91.64%
Standard Deviation	0.1%	0.3%	0.2%	0.2%	0.2%		0.6%	0.2%	0.2%	0.3%
Timed Wasmer	61.241	41.498		60.641	45.007		40.231		39.109	37.253
Compilation - Time										
To Compile (sec)										
Normalized	60.83%	89.77%		61.43%	82.77%		92.6%		95.25%	100%
Standard Deviation	1%	0.8%		1.6%	2.4%		1%		2.4%	0.6%
ASTC Encoder -	23.6779	23.5167		23.4605	23.9299	23.5118	23.5801	24.0241	23.4204	23.4190
Exhaustive (sec)										
Normalized	98.91%	99.58%		99.82%	97.87%	99.61%	99.32%	97.48%	99.99%	100%
Standard Deviation	0.1%	0%		0.1%	0.1%	0%	0.1%	0%	0%	0%
Blender - BMW27 -	52.85	53.13	52.44	52.55	52.25	52.25	53.59	52.38	53.17	52.47
CPU-Only (sec)										
Normalized	98.86%	98.34%	99.64%	99.43%	100%	100%	97.5%	99.75%	98.27%	99.58%
Standard Deviation	0.2%	0.3%	0.2%	0.2%	0.2%	0.1%	0.3%	0%	0.2%	0.5%
Blender -	146.51	146.65	146.09	145.38	146.29	145.82	147.55	145.40	146.41	145.39
Classroom -										
Normalized	99.23%	99.13%	99.51%	100%	99.38%	99.7%	98.53%	99.99%	99.3%	99.99%
Standard Deviation	0.2%	0.1%	0.3%	0.2%	0.2%	0.4%	0.1%	0.3%	0.1%	0.3%
Blender -	195.79	196.64	192.55	189.90	190.76	190.95	197.52	189.89	196.10	190.82
Barbershop -										
CPU-Only (sec)										
Normalized	96.99%	96.57%	98.62%	99.99%	99.54%	99.44%	96.14%	100%	96.83%	99.51%
Standard Deviation	0%	0.3%	0.9%	0.3%	0.1%	0.1%	0.2%	0.2%	0.1%	0.5%
Numenta Anomaly	6.805		6.671		6.293	5.938			7.877	
Benchmark -										
Windowed										
Gaussian (sec)										
Normalized	87.26%		89.01%		94.36%	100%		75.38%		
Standard Deviation	1.8%		0.9%		1.9%	1.9%		0.7%		

miniFE 2.2

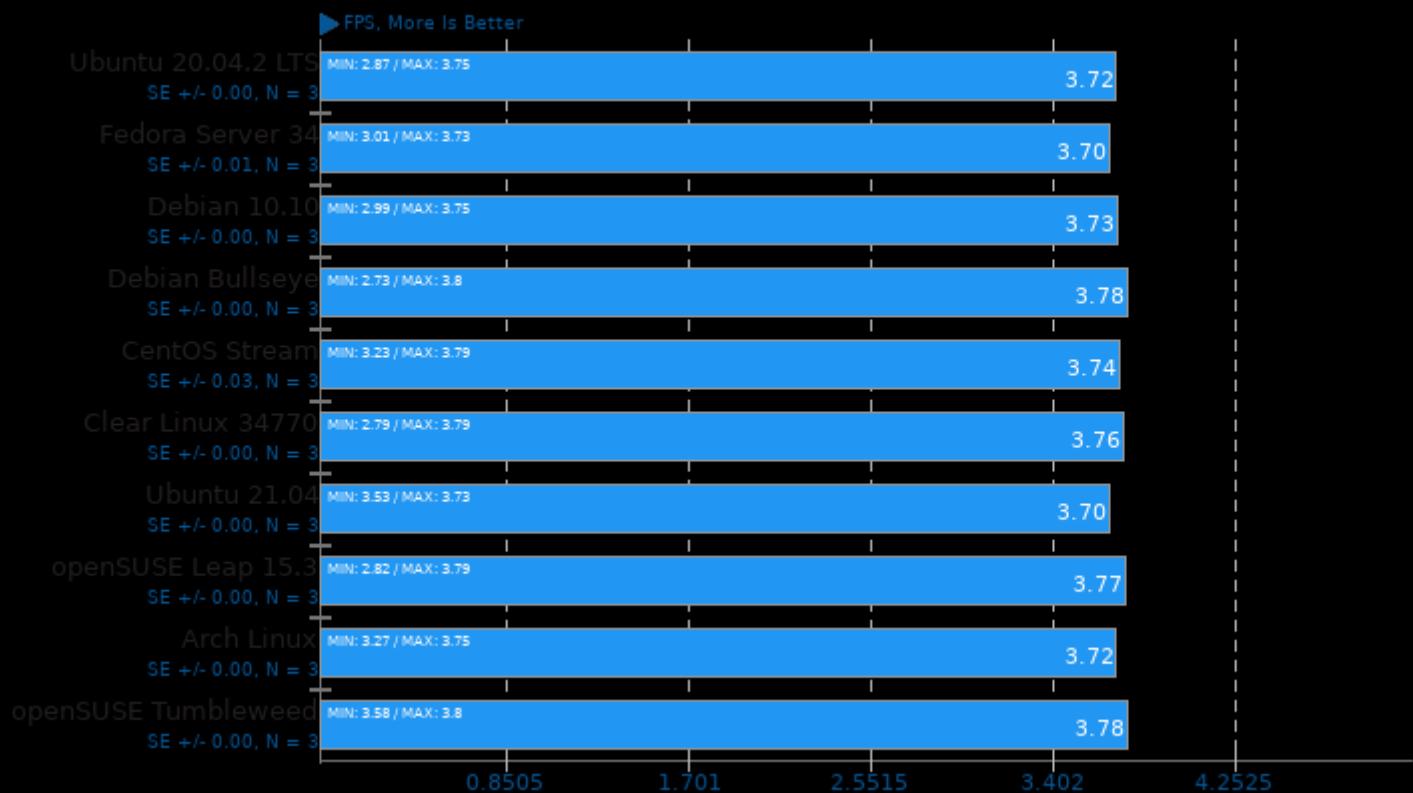
Problem Size: Small



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

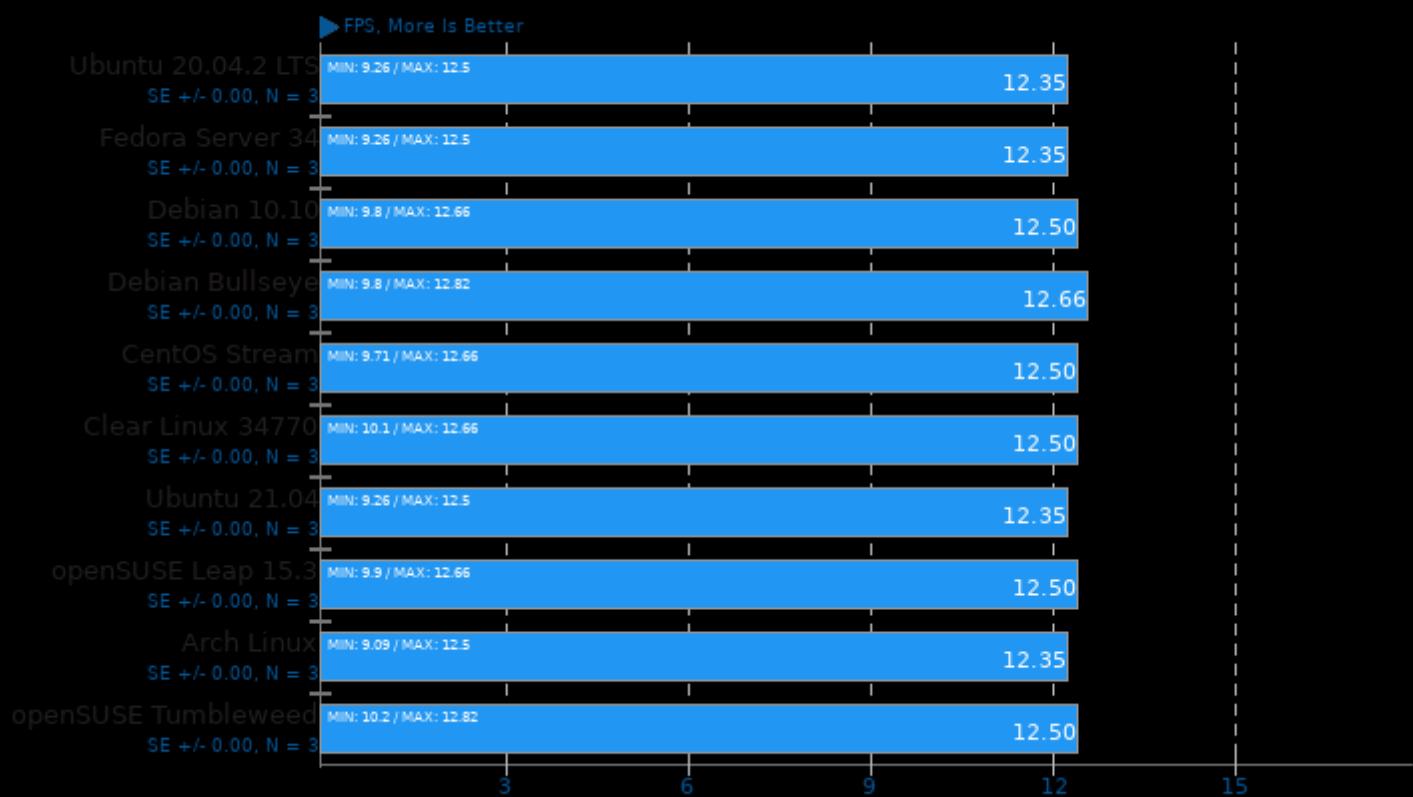
OSPray 1.8.5

Demo: San Miguel - Renderer: Path Tracer



OSPray 1.8.5

Demo: NASA Streamlines - Renderer: Path Tracer



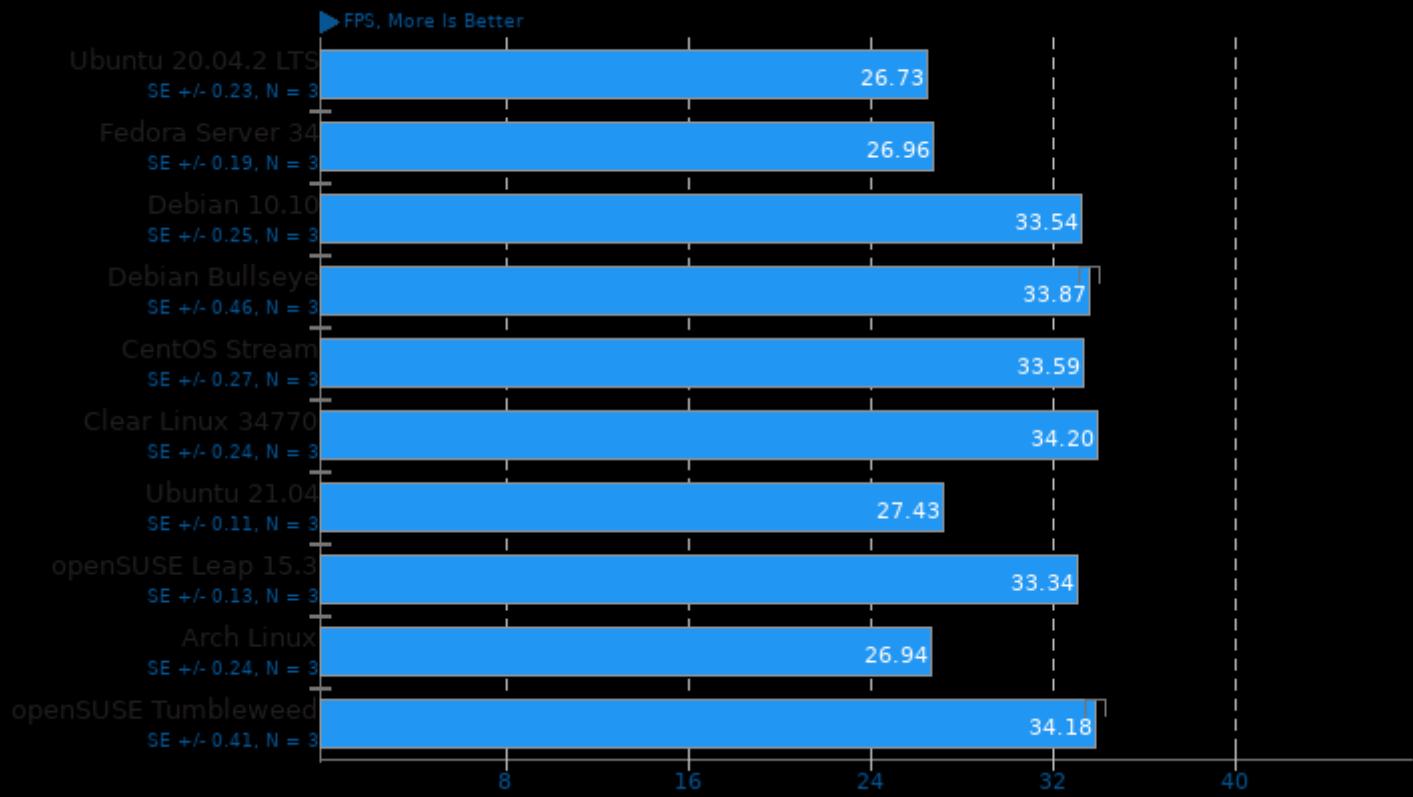
OSPray 1.8.5

Demo: Magnetic Reconnection - Renderer: Path Tracer



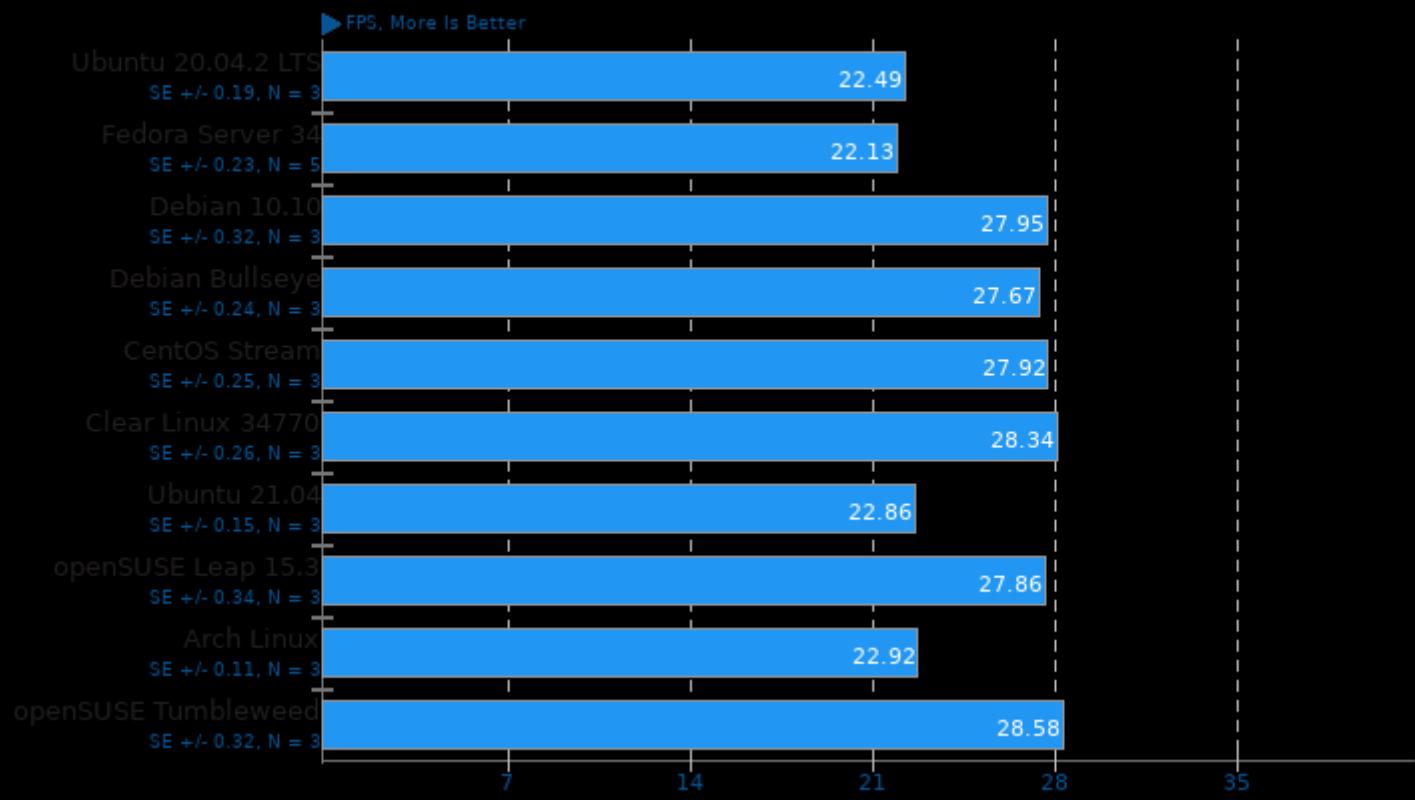
PlaidML

FP16: No - Mode: Inference - Network: VGG16 - Device: CPU



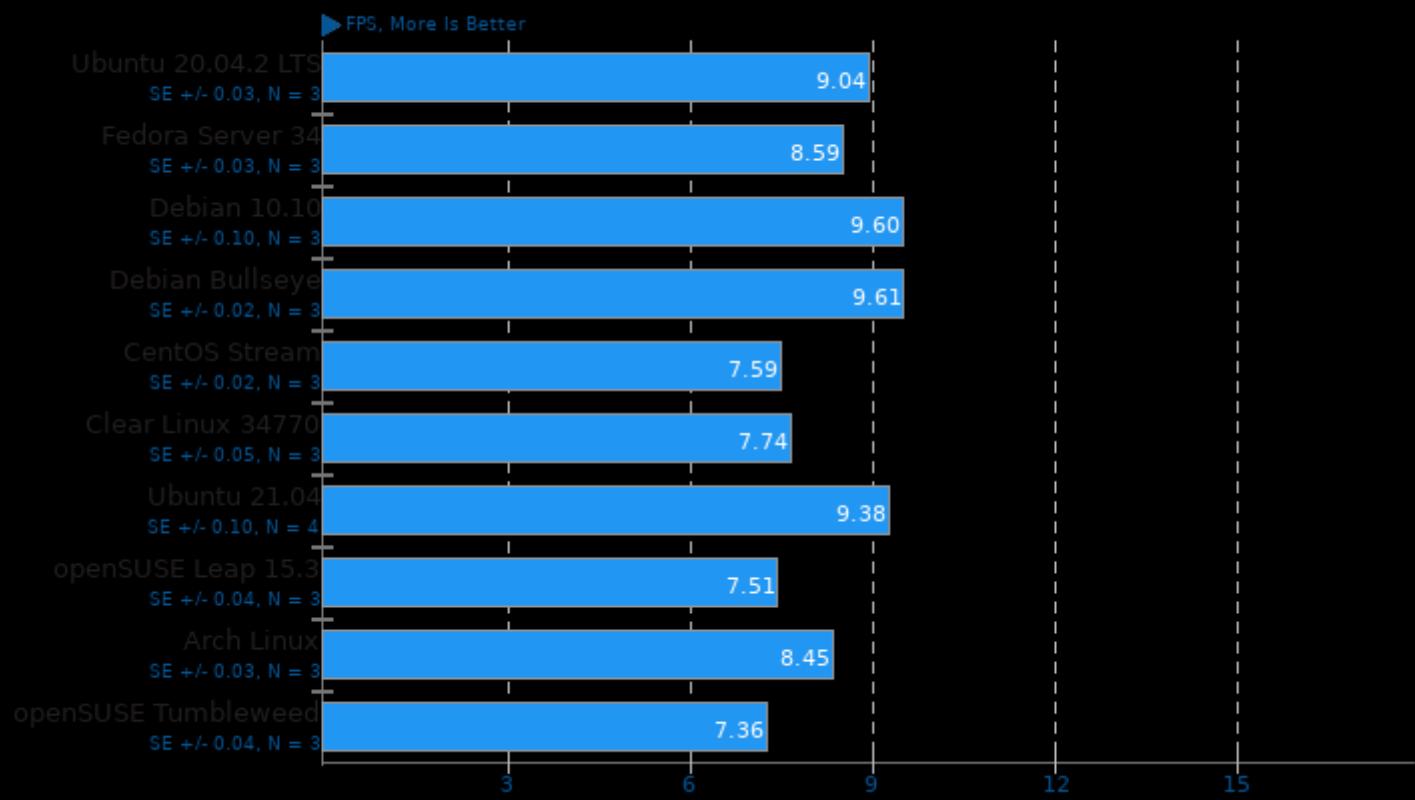
PlaidML

FP16: No - Mode: Inference - Network: VGG19 - Device: CPU



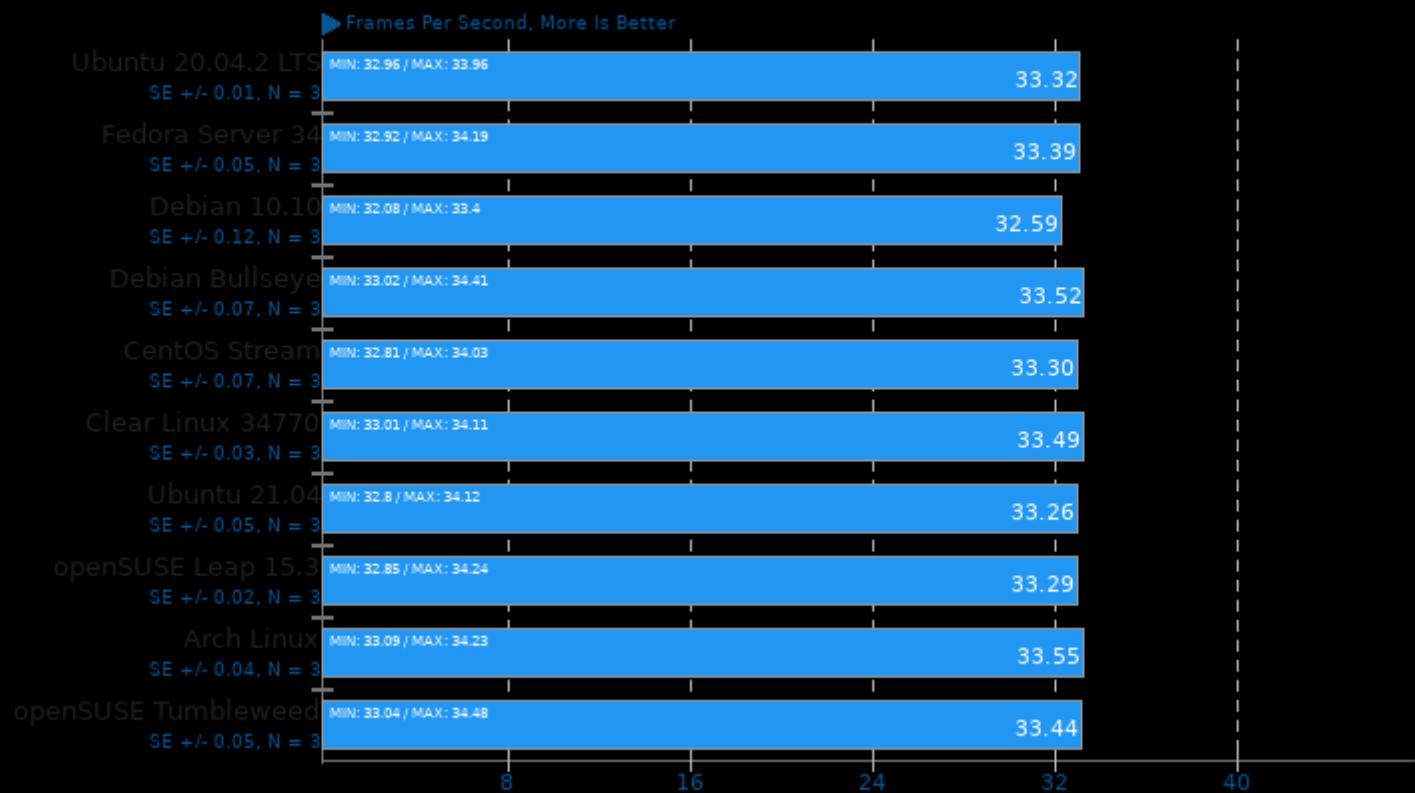
PlaidML

FP16: No - Mode: Inference - Network: ResNet 50 - Device: CPU



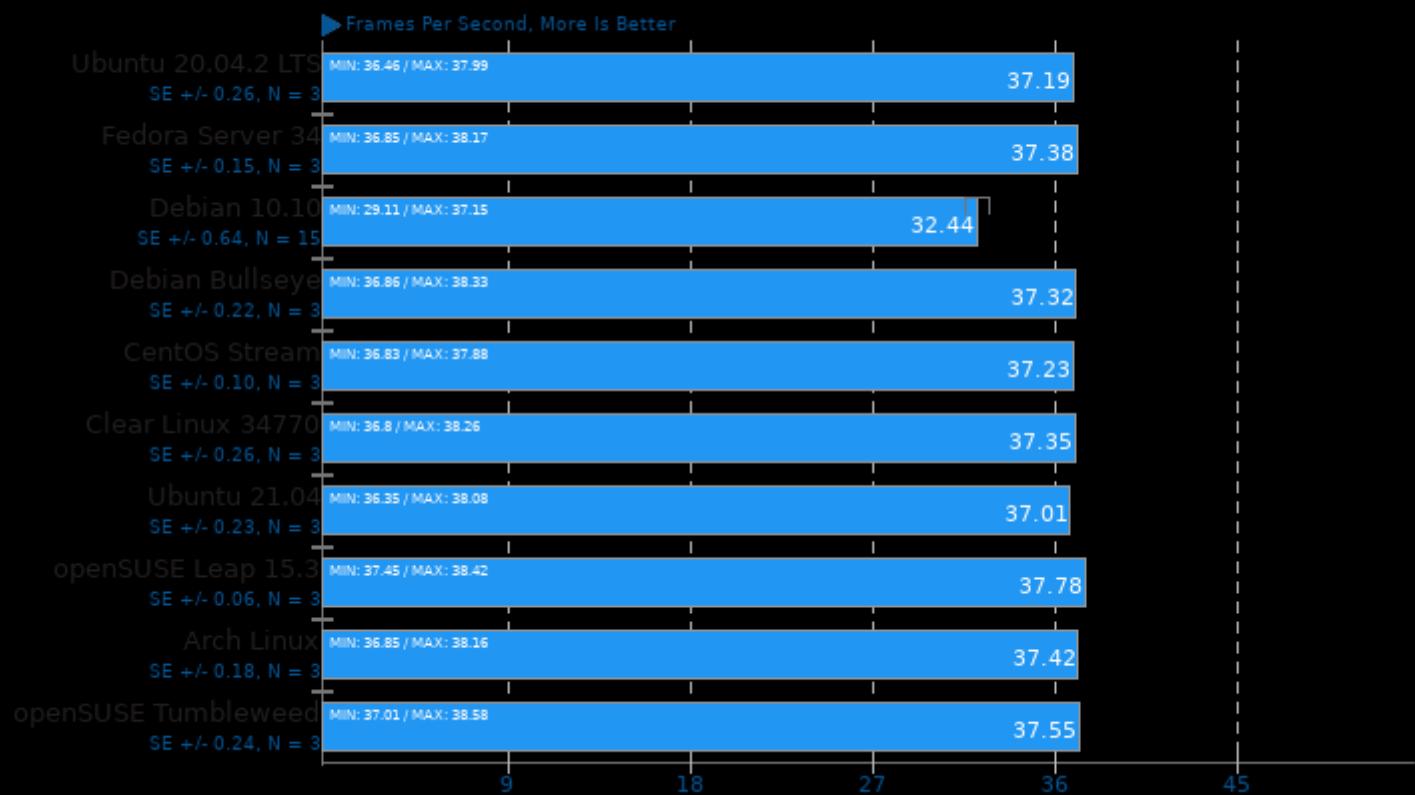
Embree 3.13

Binary: Pathtracer ISPC - Model: Crown



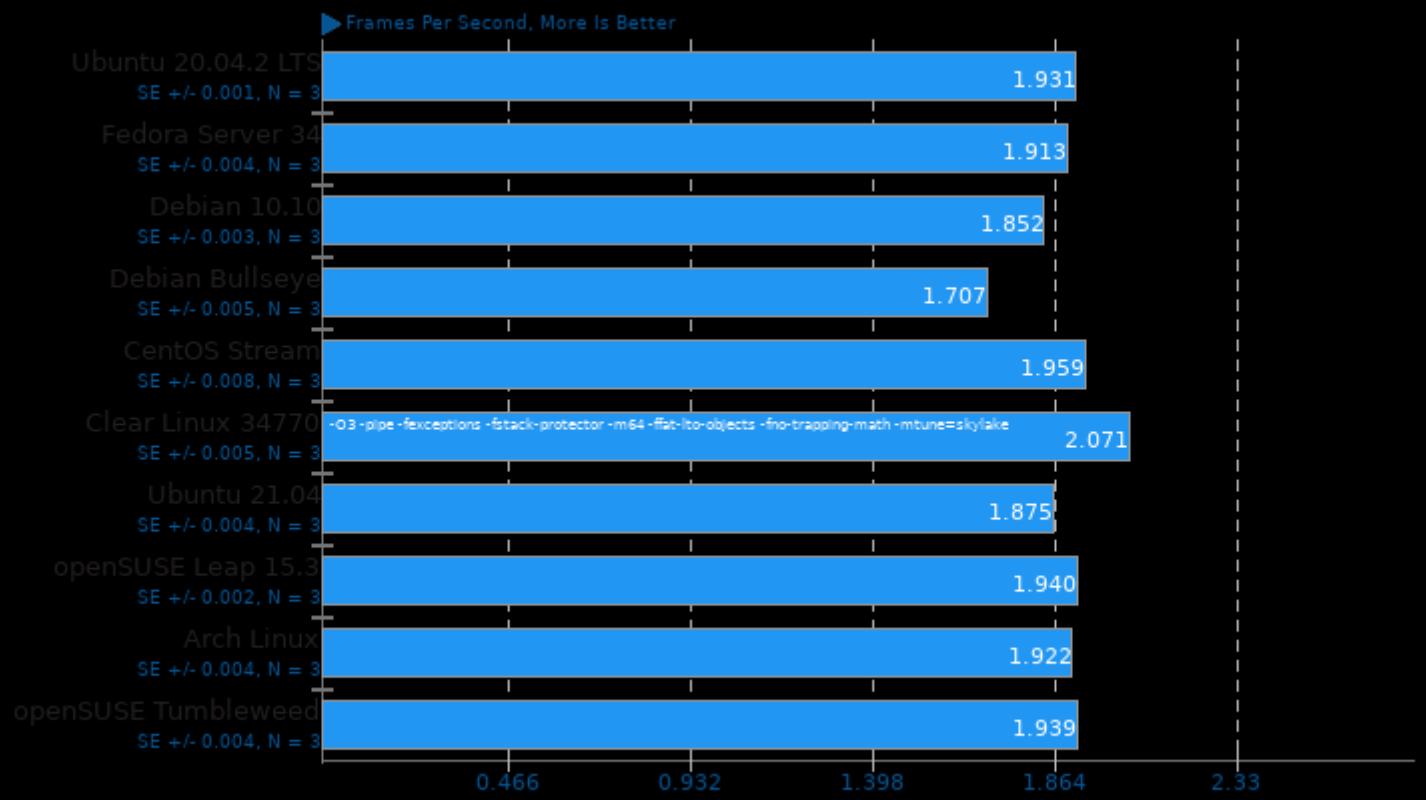
Embree 3.13

Binary: Pathtracer ISPC - Model: Asian Dragon



SVT-AV1 0.8.7

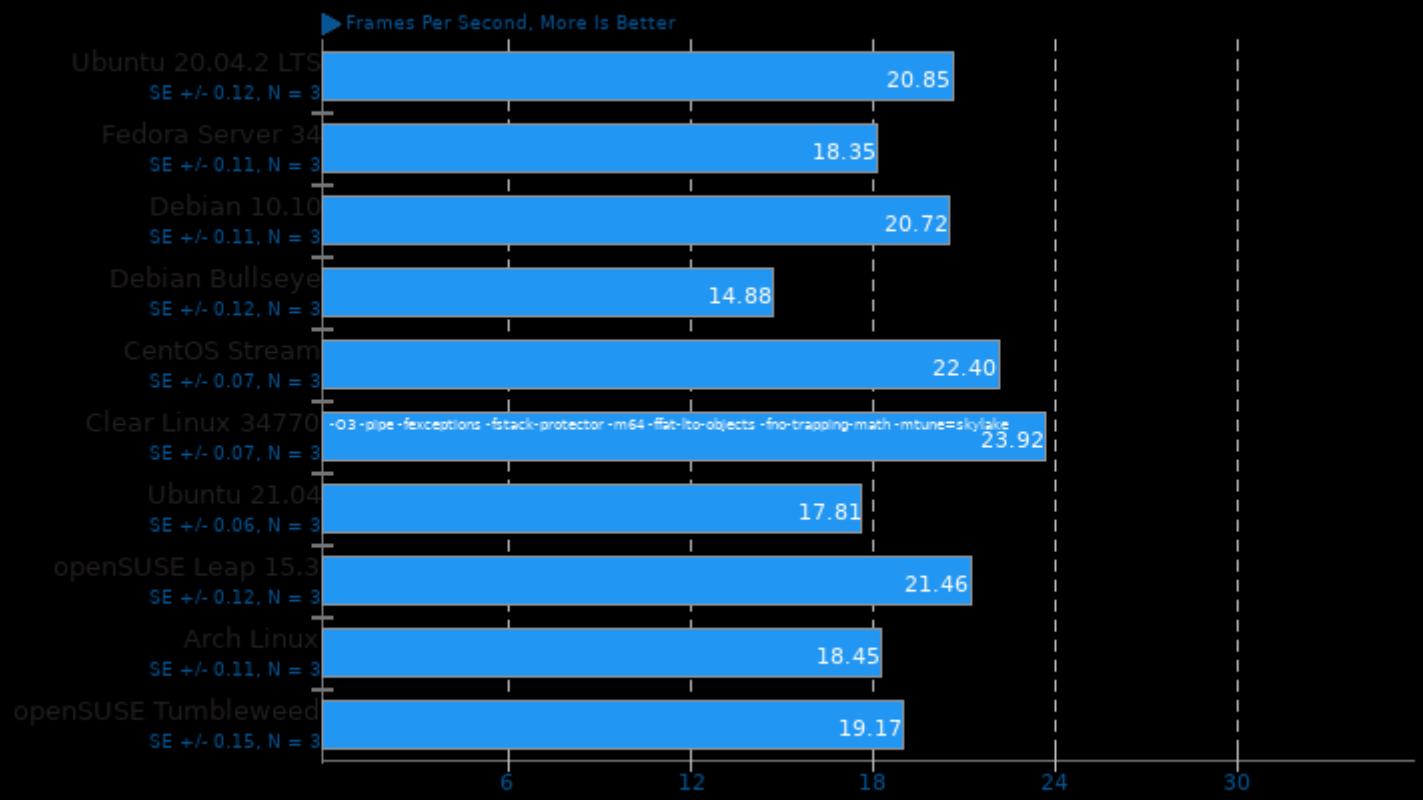
Encoder Mode: Preset 4 - Input: Bosphorus 4K



1. (CXX) g++ options: -mno-avx -mavx2 -mavx512f -mavx512bw -mavx512dq -pie

SVT-AV1 0.8.7

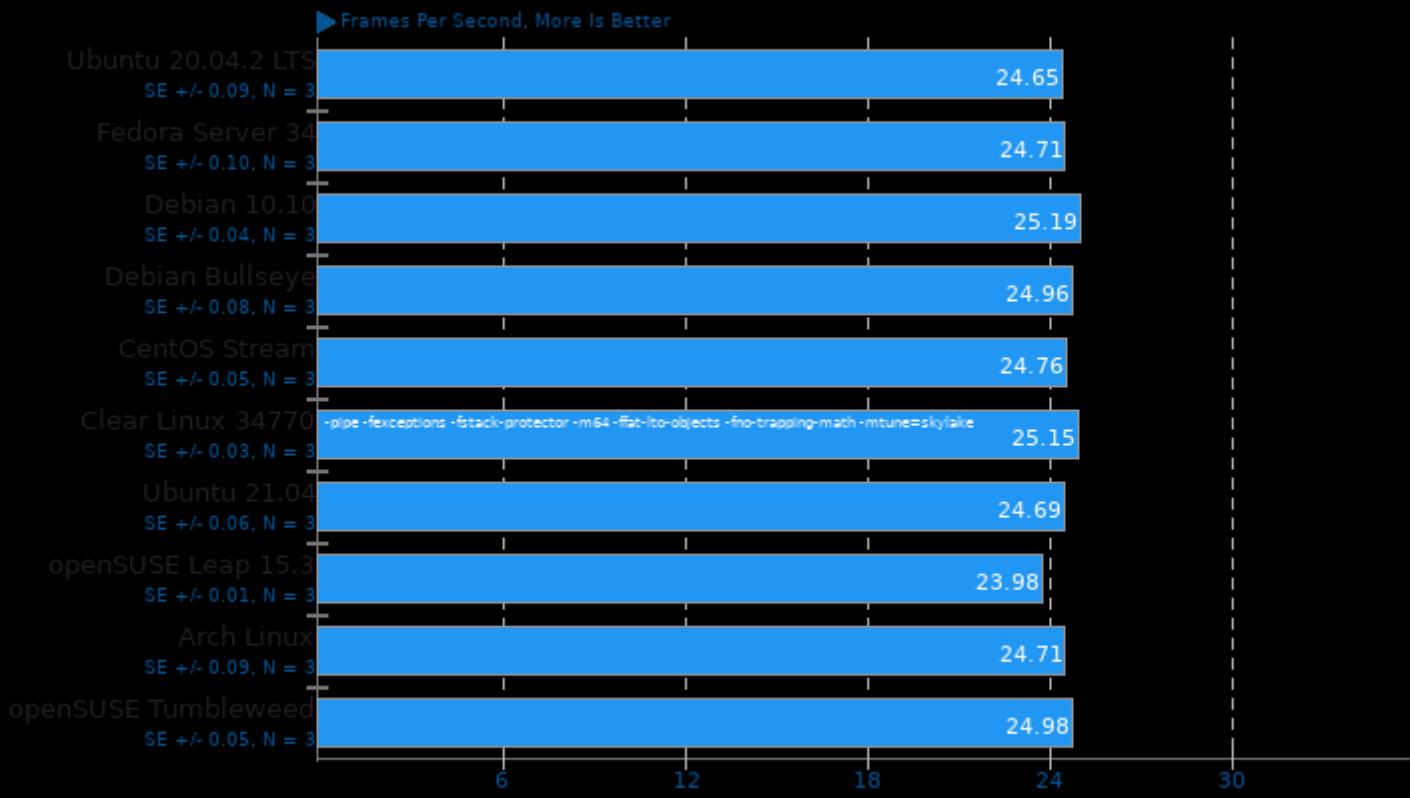
Encoder Mode: Preset 8 - Input: Bosphorus 4K



1. (CXX) g++ options: -mno-avx -mavx2 -mavx512f -mavx512bw -mavx512dq -pie

SVT-HEVC 1.5.0

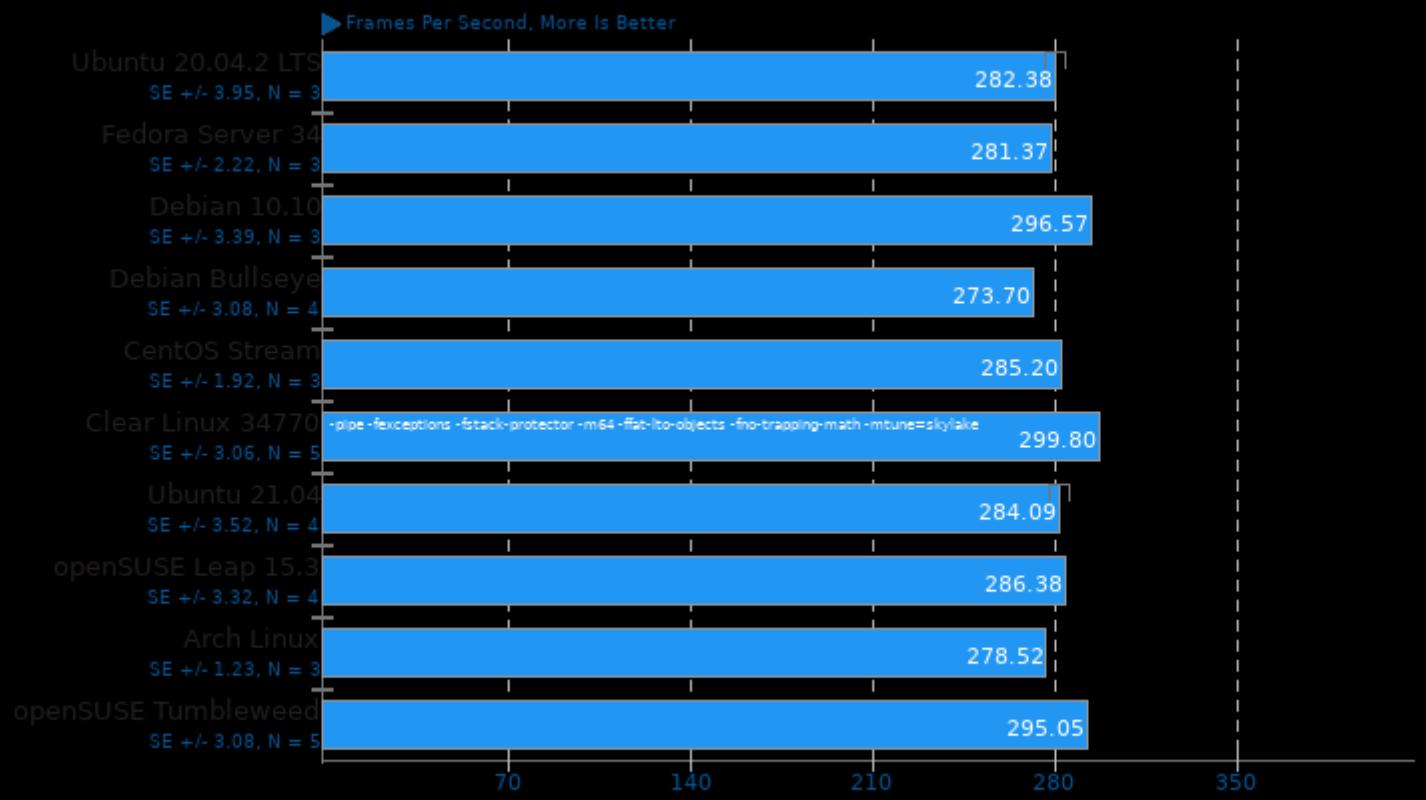
Tuning: 1 - Input: Bosphorus 1080p



1. (CC) gcc options: -fPIE -fPIC -O3 -O2 -pie -rdynamic -lpthread -lrt

SVT-HEVC 1.5.0

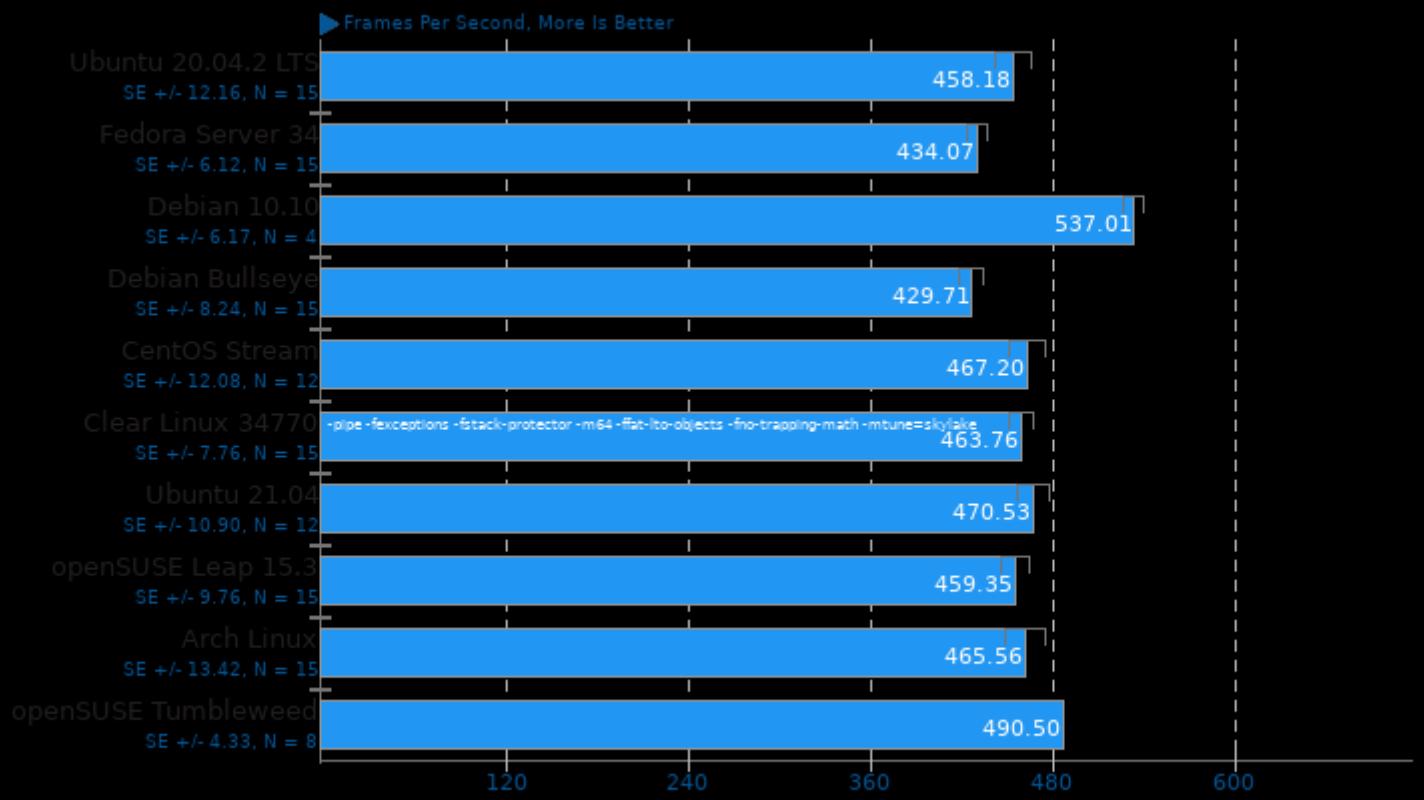
Tuning: 7 - Input: Bosphorus 1080p



1. (CC) gcc options: -fPIE -fPIC -O3 -O2 -pie -rdynamic -lpthread -lrt

SVT-HEVC 1.5.0

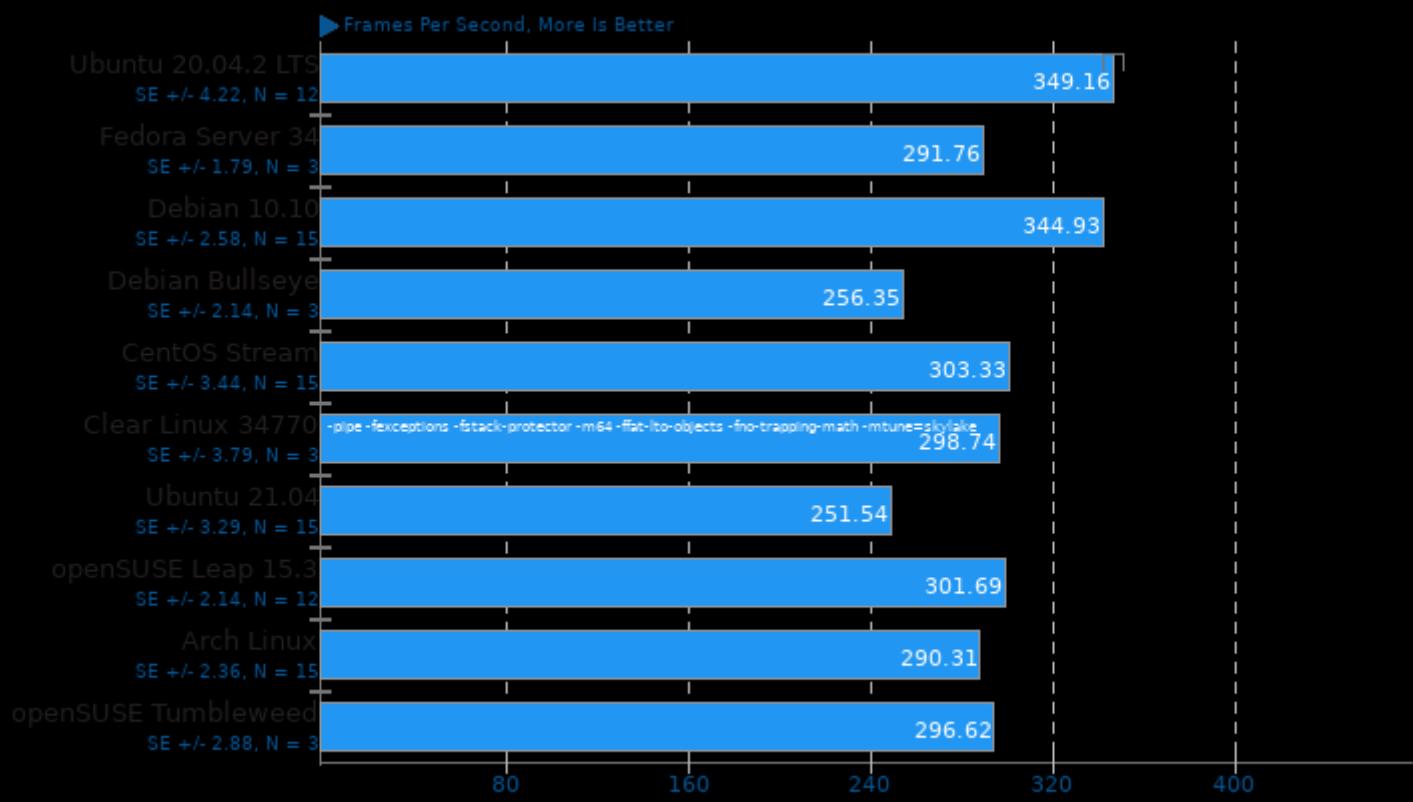
Tuning: 10 - Input: Bosphorus 1080p



1. (CC) gcc options: -fPIE -fPIC -O3 -O2 -pie -rdynamic -lpthread -lrt

SVT-VP9 0.3

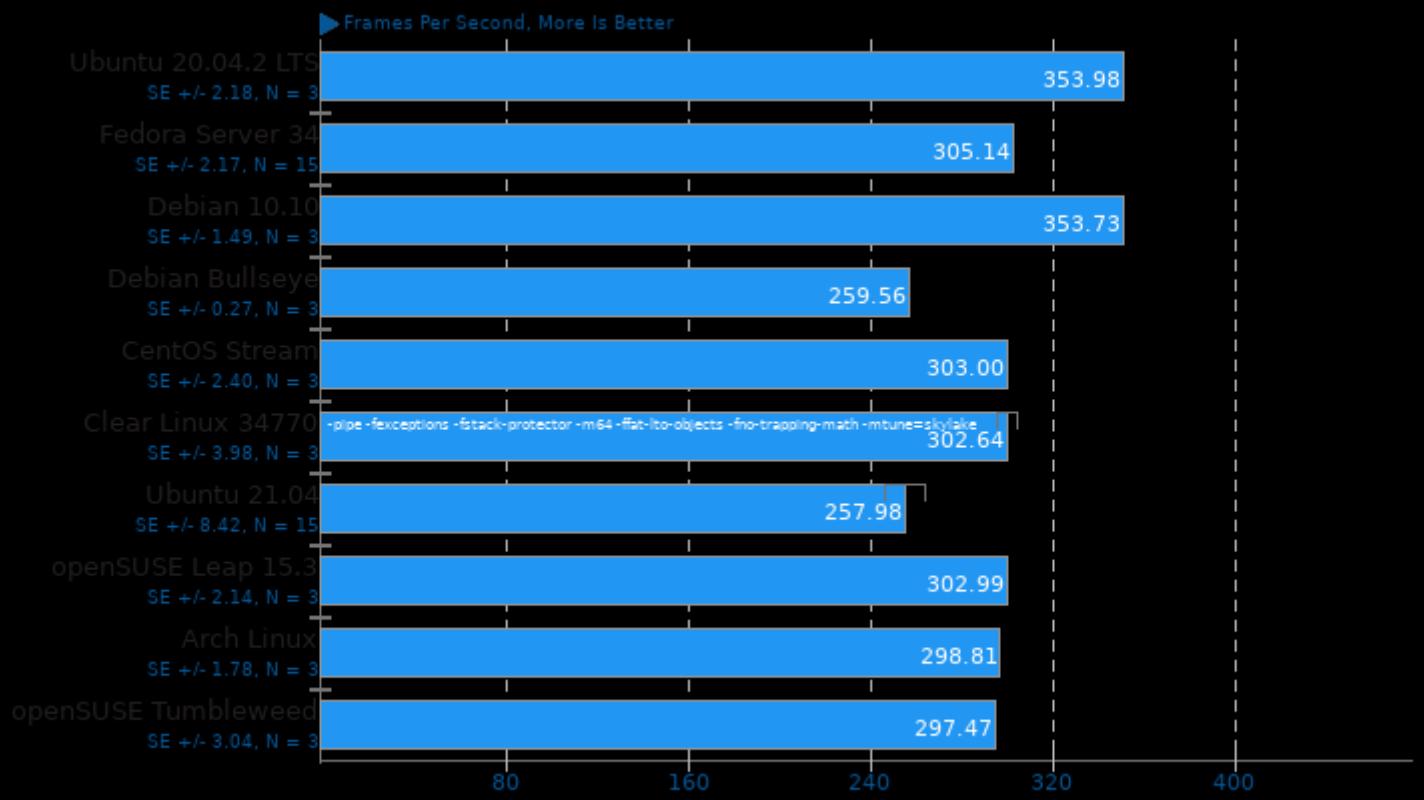
Tuning: VMAF Optimized - Input: Bosphorus 1080p



1. (CC) gcc options: -O3 -fcommon -fPIE -fPIC -fvisibility=hidden -pie -rdynamic -lpthread -lrt -lm

SVT-VP9 0.3

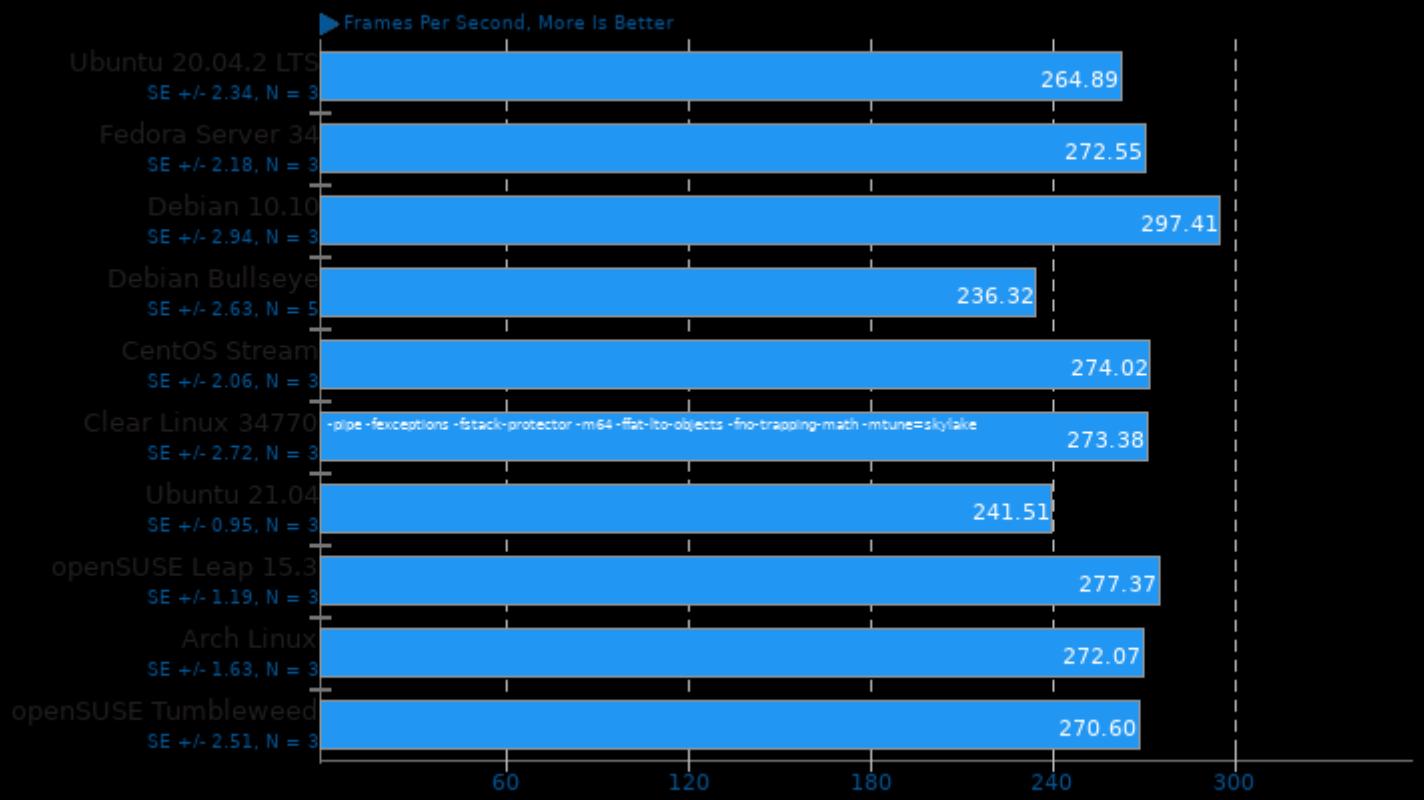
Tuning: PSNR/SSIM Optimized - Input: Bosphorus 1080p



1. (CC) gcc options: -O3 -fcommon -fPIE -fPIC -fvisibility=hidden -pie -rdynamic -lpthread -lrt -lm

SVT-VP9 0.3

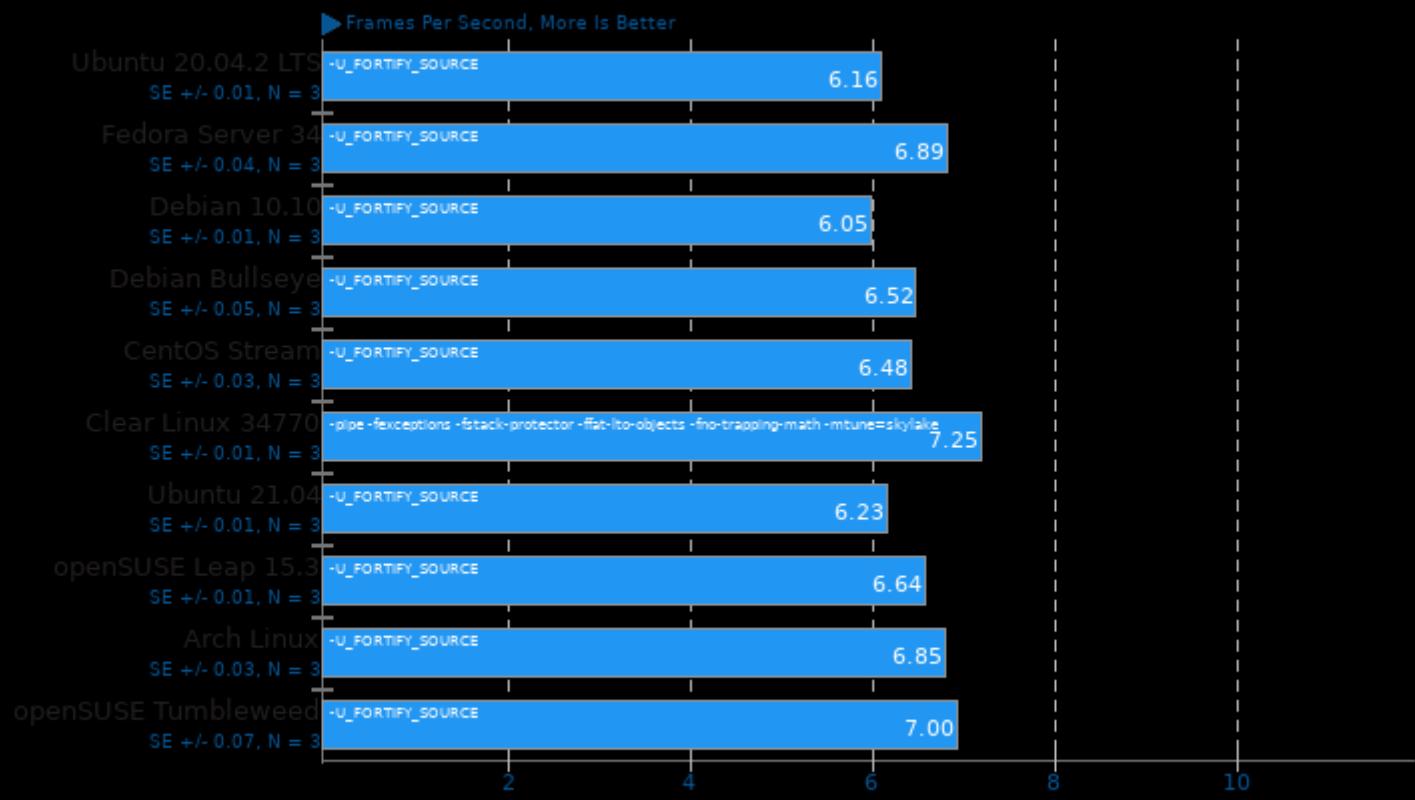
Tuning: Visual Quality Optimized - Input: Bosphorus 1080p



1. (CC) gcc options: -O3 -fcommon -fPIE -fPIC -fvisibility=hidden -pie -rdynamic -lpthread -lrt -lm

VP9 libvpx Encoding 1.10.0

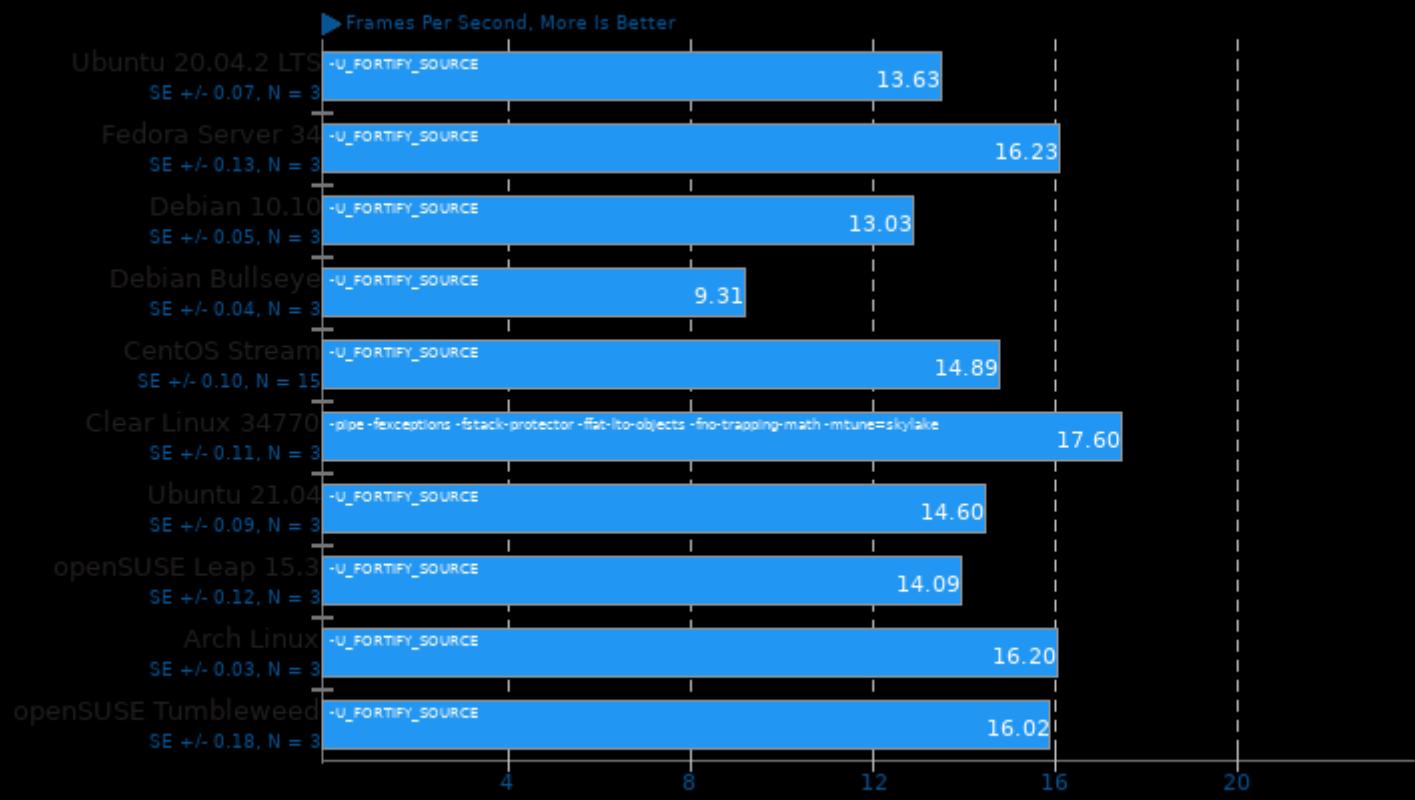
Speed: Speed 0 - Input: Bosphorus 4K



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

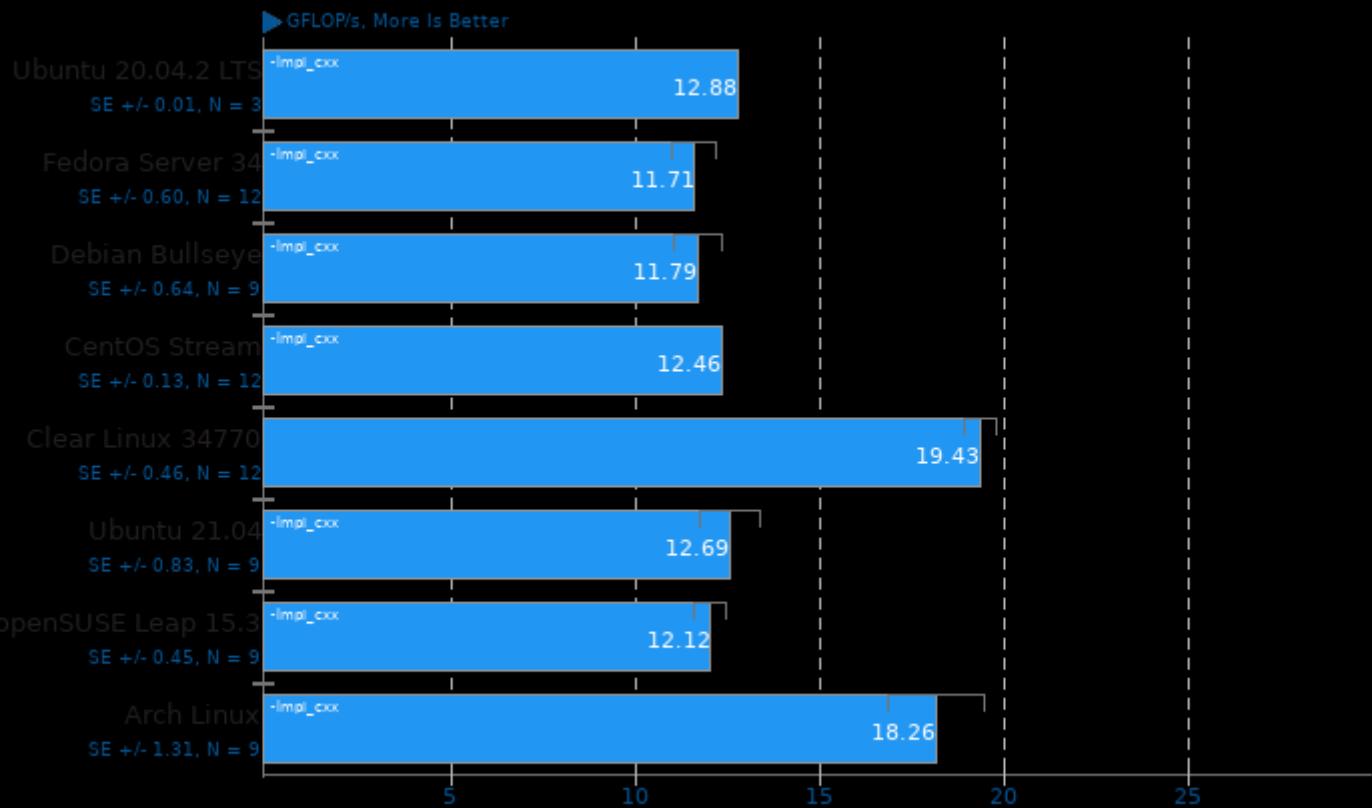
VP9 libvpx Encoding 1.10.0

Speed: Speed 5 - Input: Bosphorus 4K



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

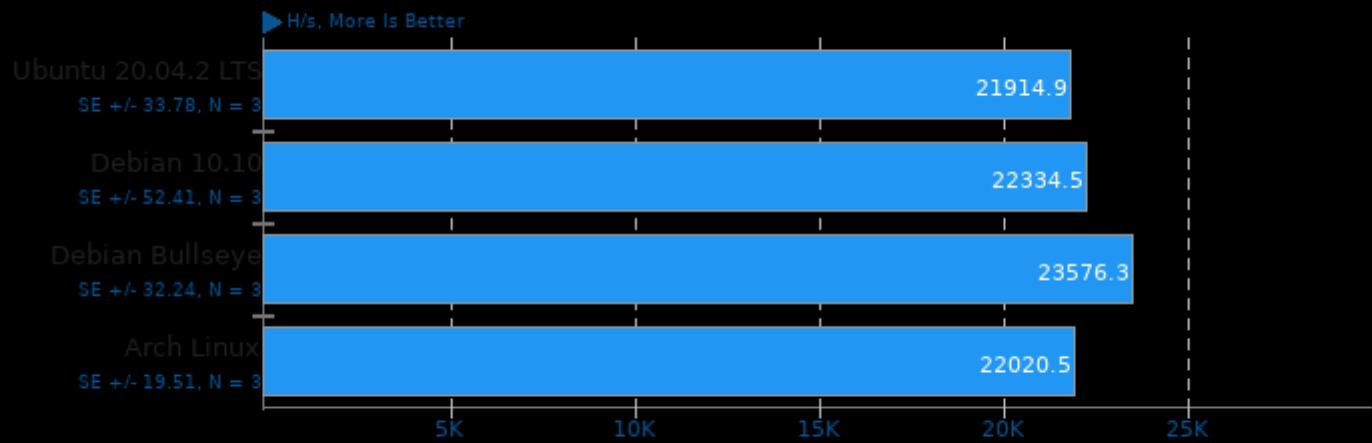
High Performance Conjugate Gradient 3.1



1. (CXX) g++ options: -O3 -ffast-math -ftree-vectorize -pthread -lmpi

Xmrig 6.12.1

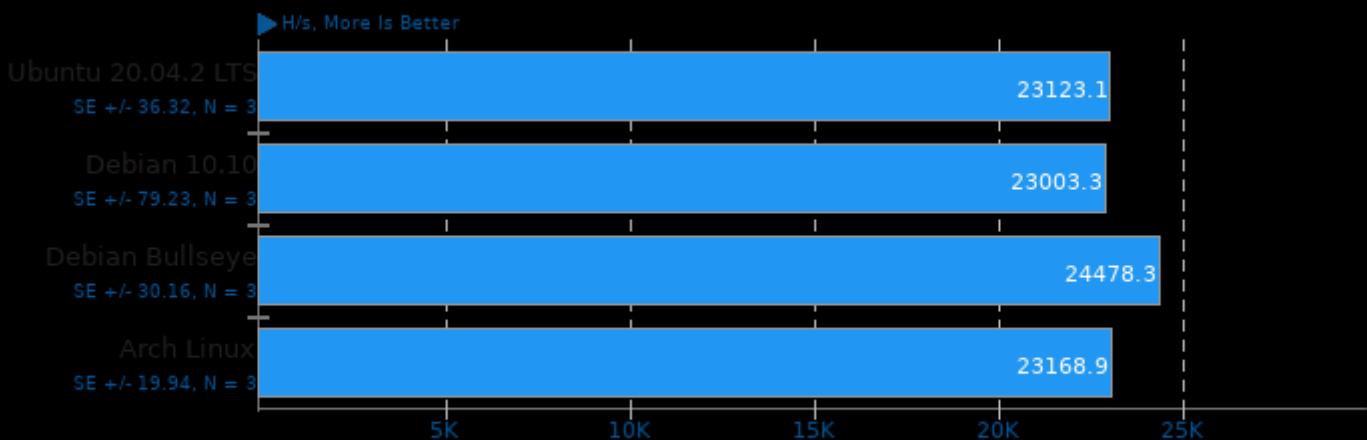
Variant: Monero - Hash Count: 1M



1. (CXX) g++ options: -fexceptions -fno-rtti -maes -O3 -Ofast -static-libgcc -static-libstdc++ -rdynamic -lssl -lcrypto -luv -pthread -lrt -ldl -lhwloc

Xmrig 6.12.1

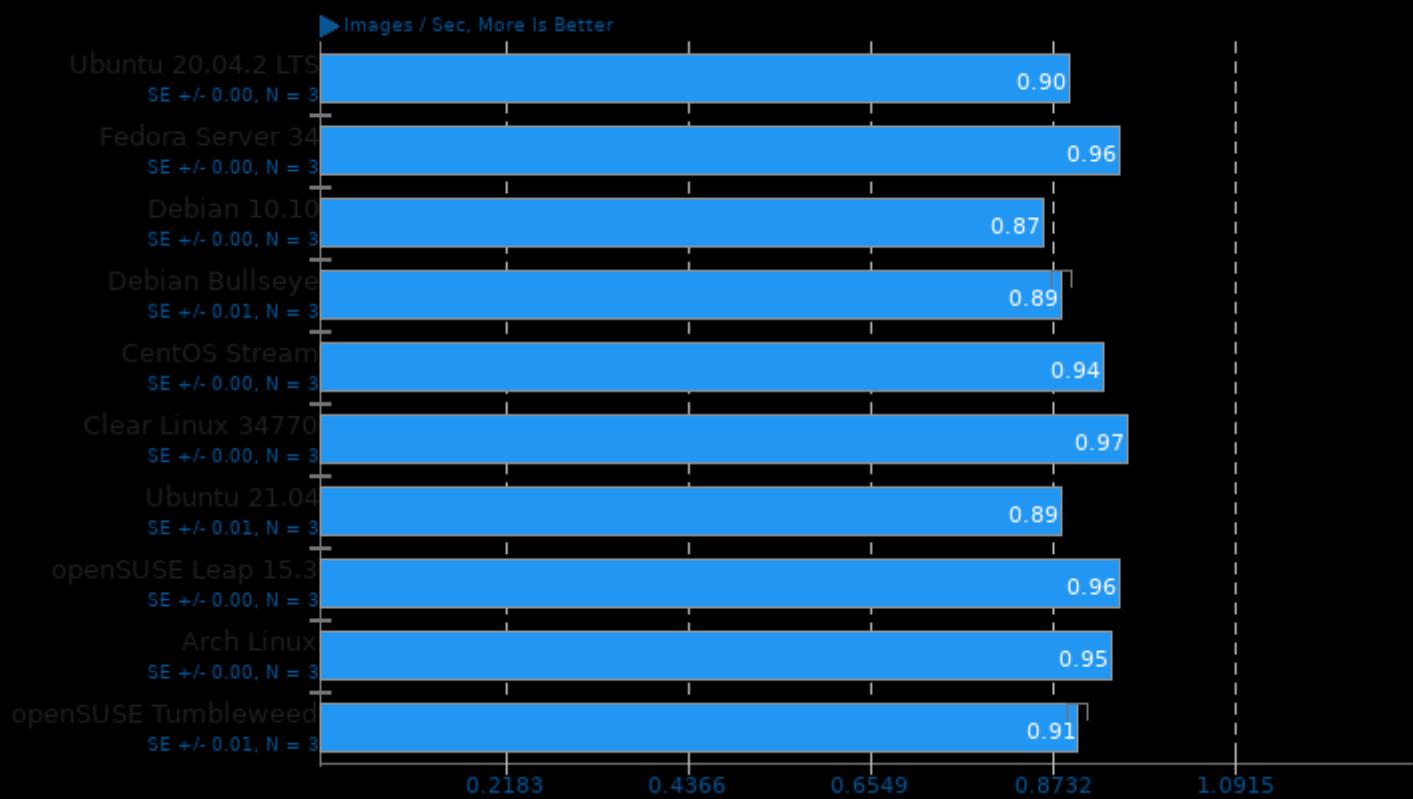
Variant: Wownero - Hash Count: 1M



1. (CXX) g++ options: -fexceptions -fno-rtti -maes -O3 -Ofast -static-libgcc -static-libstdc++ -rdynamic -lssl -lcrypto -luv -lpthread -lrt -ldl -lhwloc

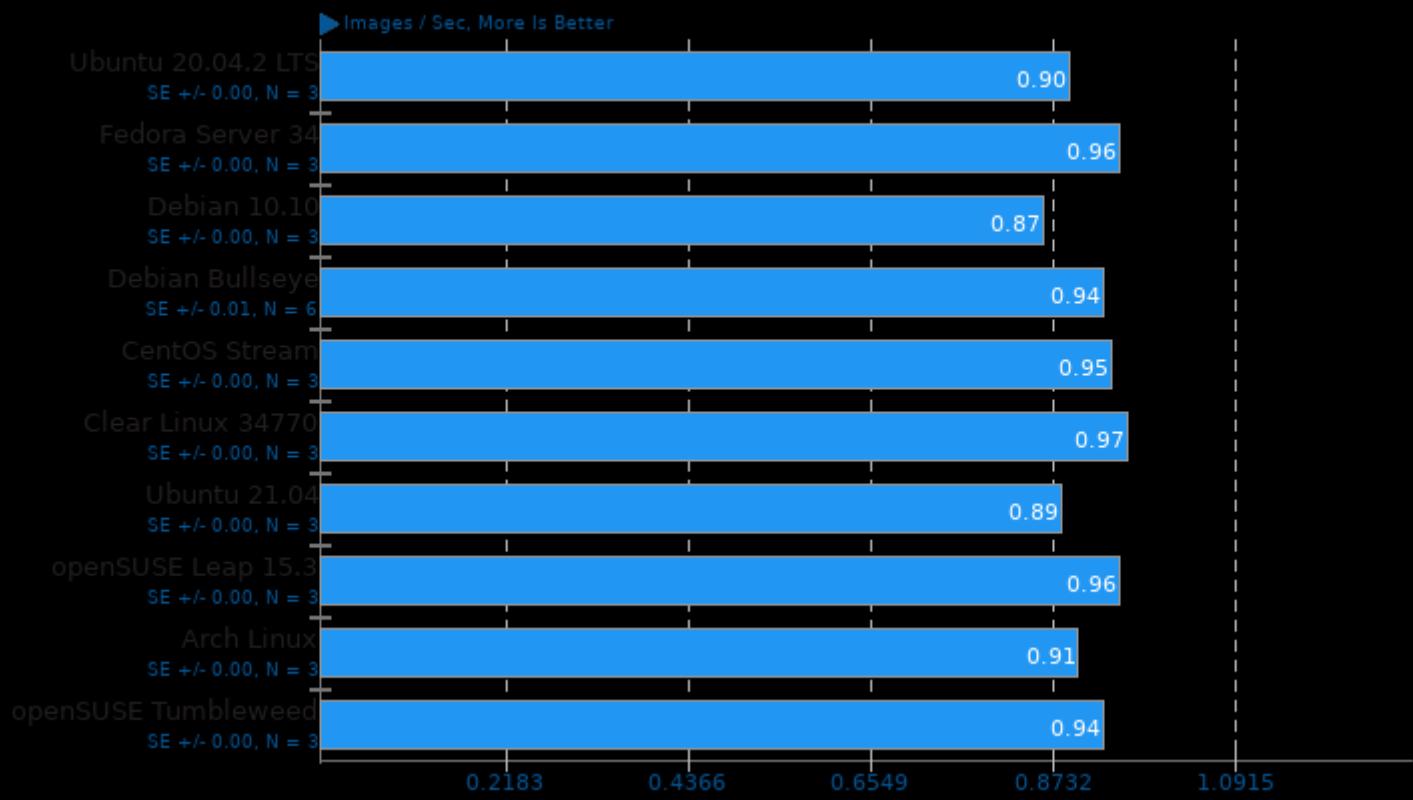
Intel Open Image Denoise 1.4.0

Run: RT.hdr_alb_nrm.3840x2160



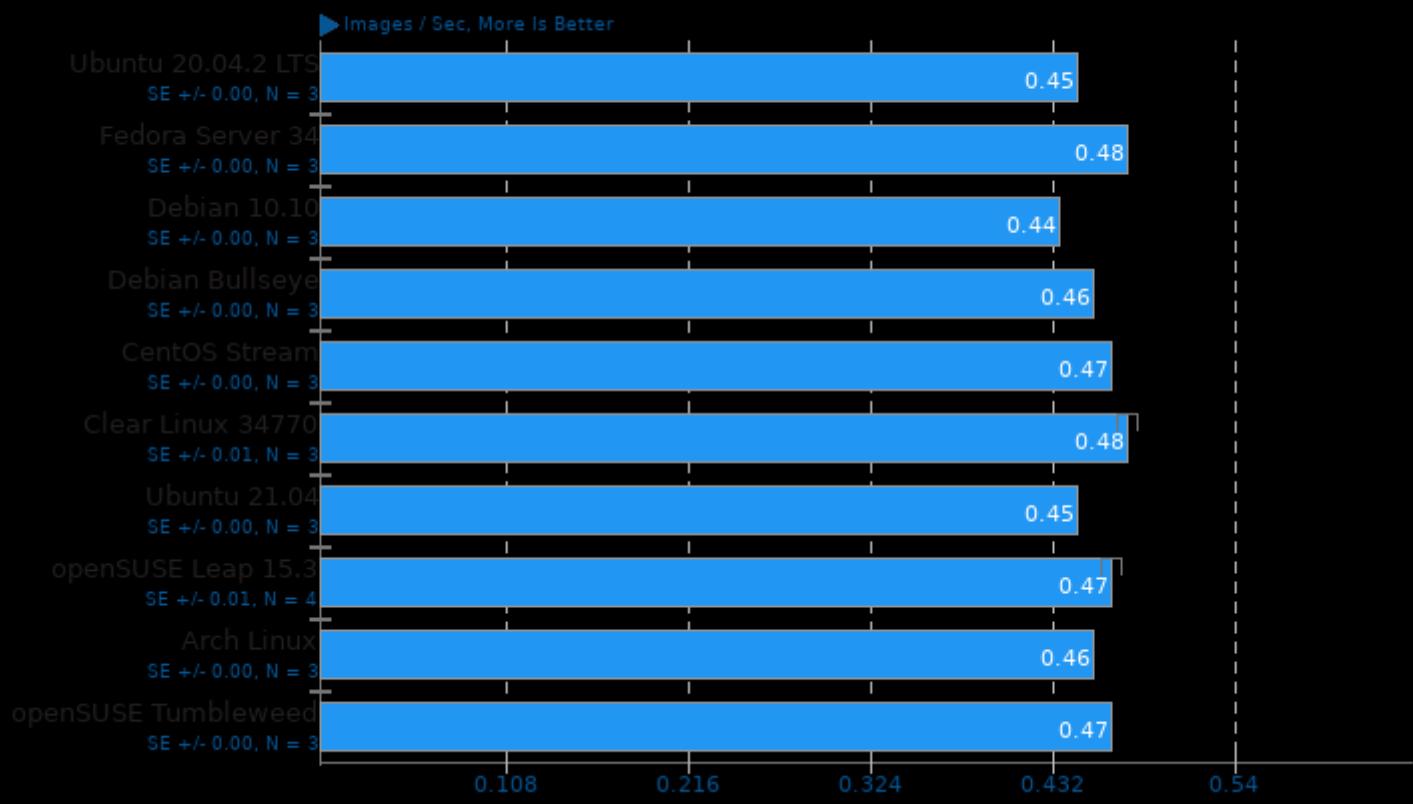
Intel Open Image Denoise 1.4.0

Run: RT.Idr_alb_nrm.3840x2160



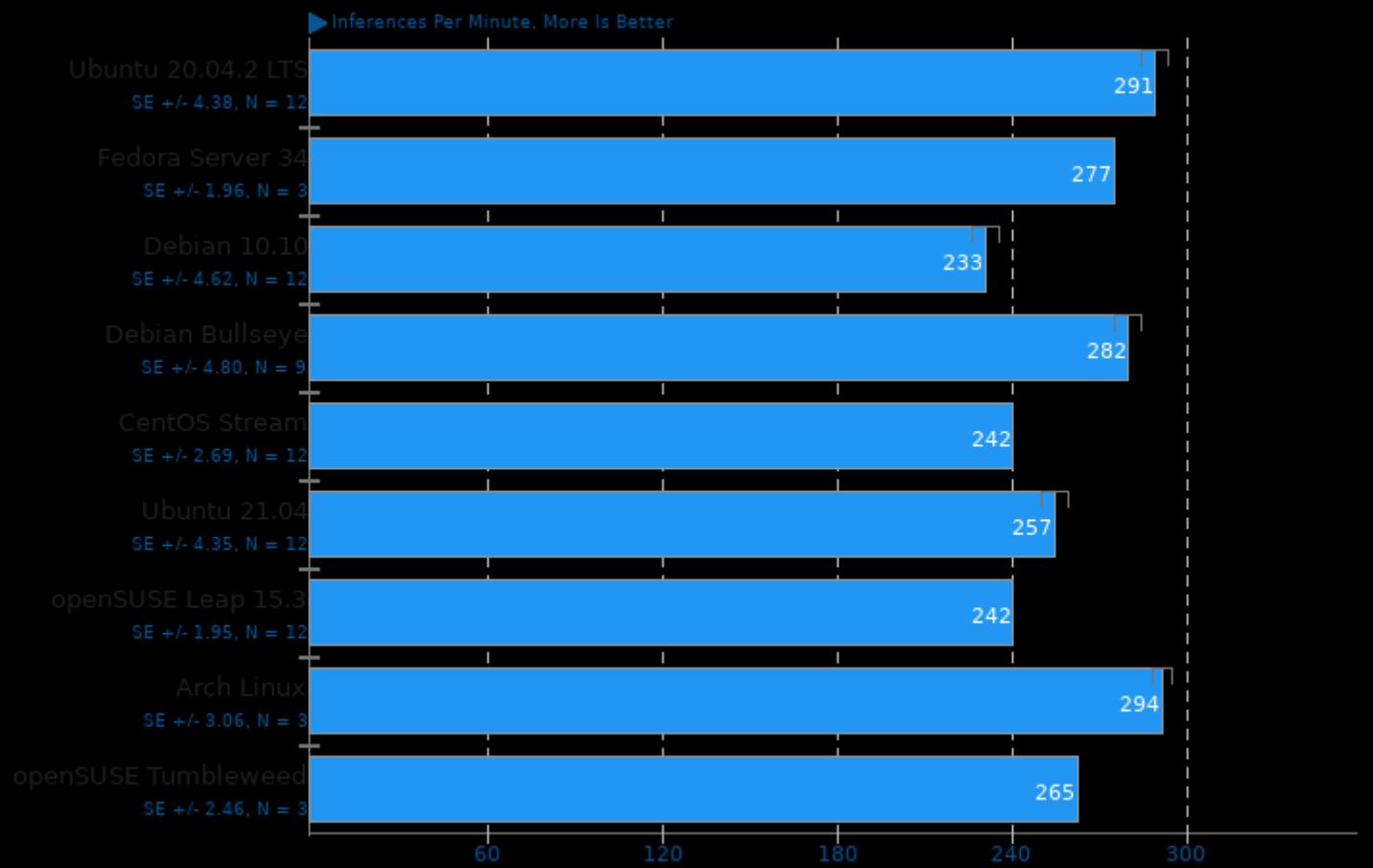
Intel Open Image Denoise 1.4.0

Run: RTLightmap.hdr.4096x4096



ONNX Runtime 1.6

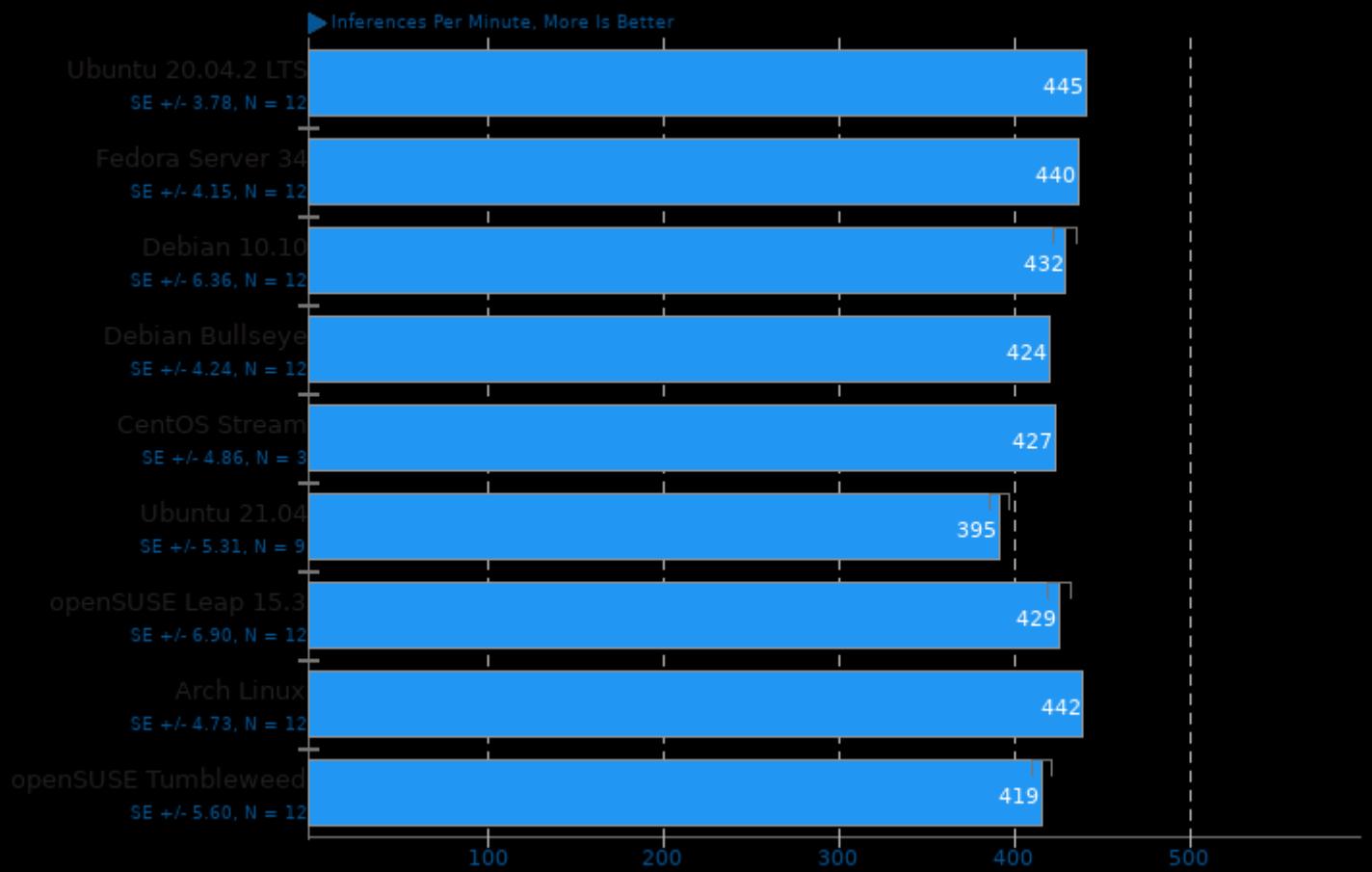
Model: yolov4 - Device: OpenMP CPU



1. (CXX) g++ options: -fopenmp -ffunction-sections -fdata-sections -O3 -ldl -lrt

ONNX Runtime 1.6

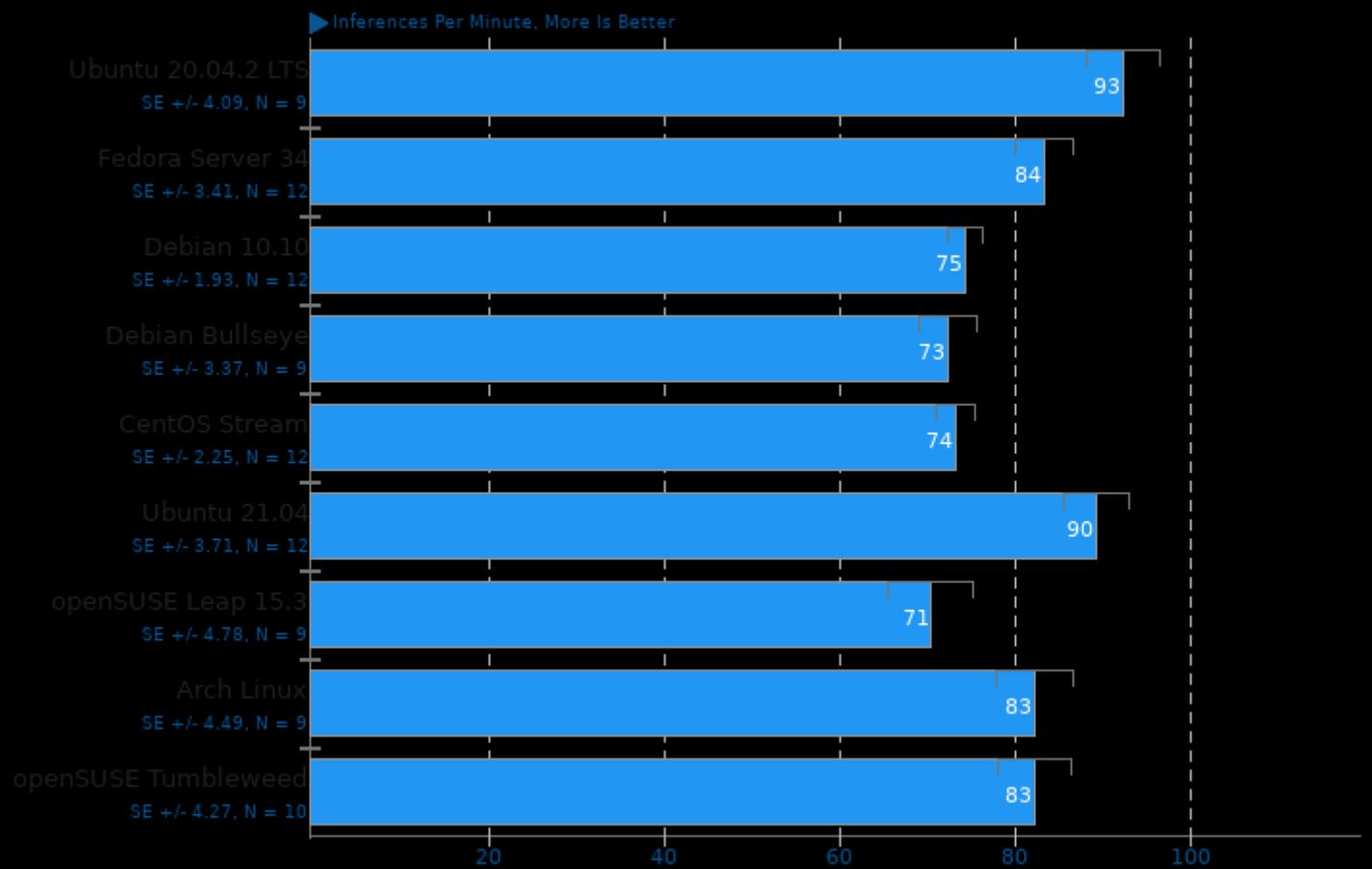
Model: bertsquad-10 - Device: OpenMP CPU



1. (CXX) g++ options: -fopenmp -ffunction-sections -fdata-sections -O3 -ldl -lrt

ONNX Runtime 1.6

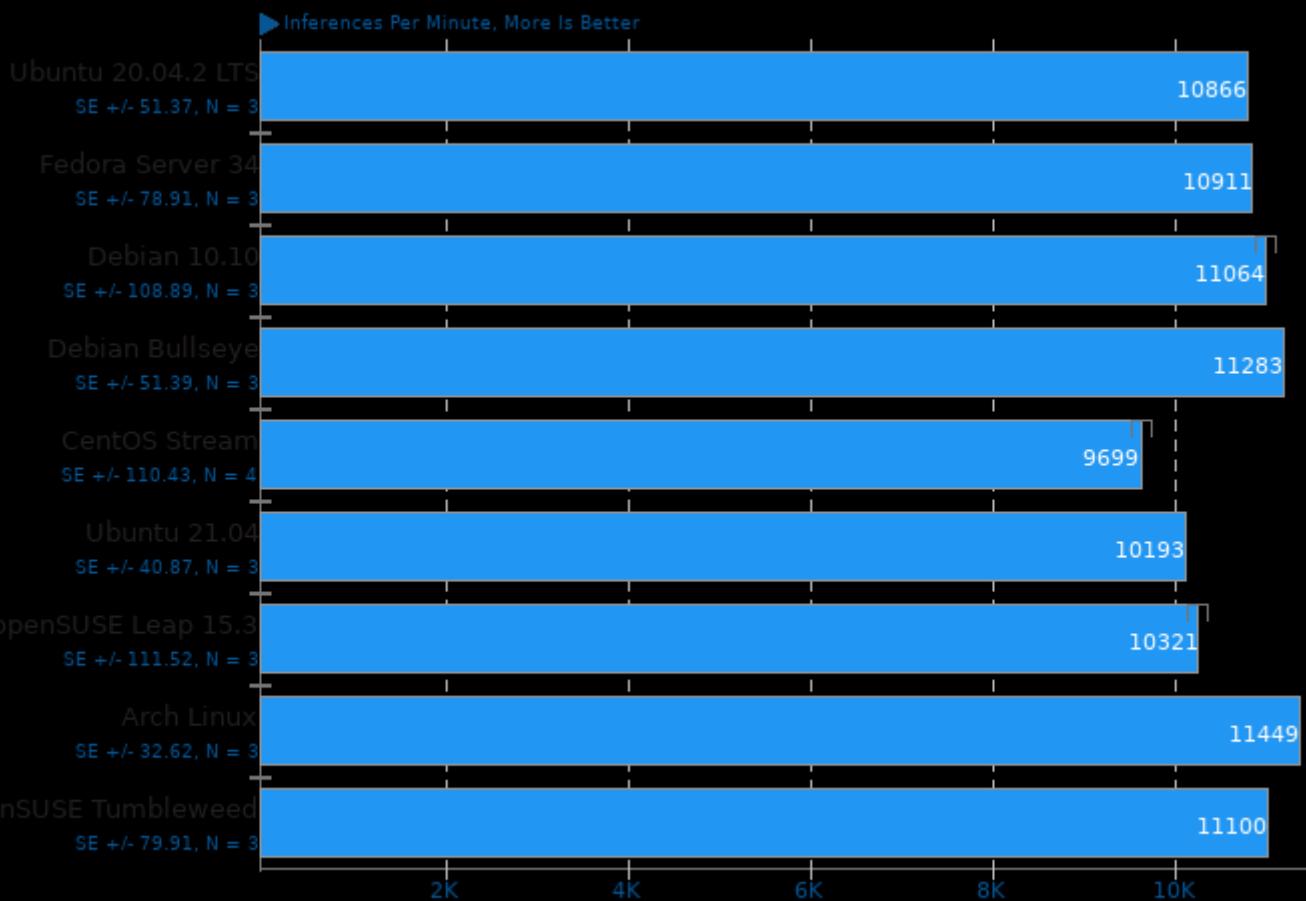
Model: fcn-resnet101-11 - Device: OpenMP CPU



1. (CXX) g++ options: -fopenmp -ffunction-sections -fdata-sections -O3 -ldl -lrt

ONNX Runtime 1.6

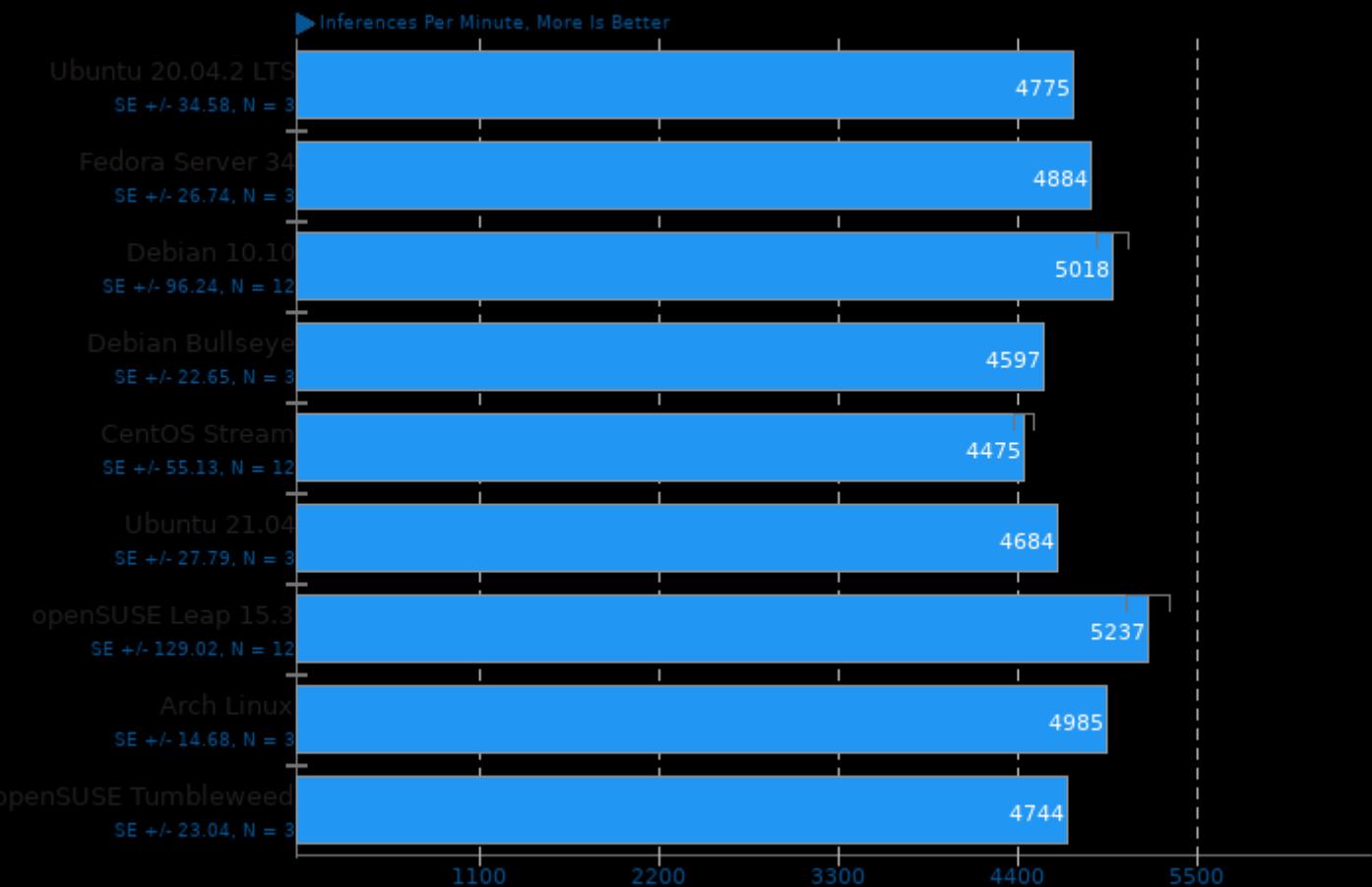
Model: shufflenet-v2-10 - Device: OpenMP CPU



1. (CXX) g++ options: -fopenmp -ffunction-sections -fdata-sections -O3 -ldl -lrt

ONNX Runtime 1.6

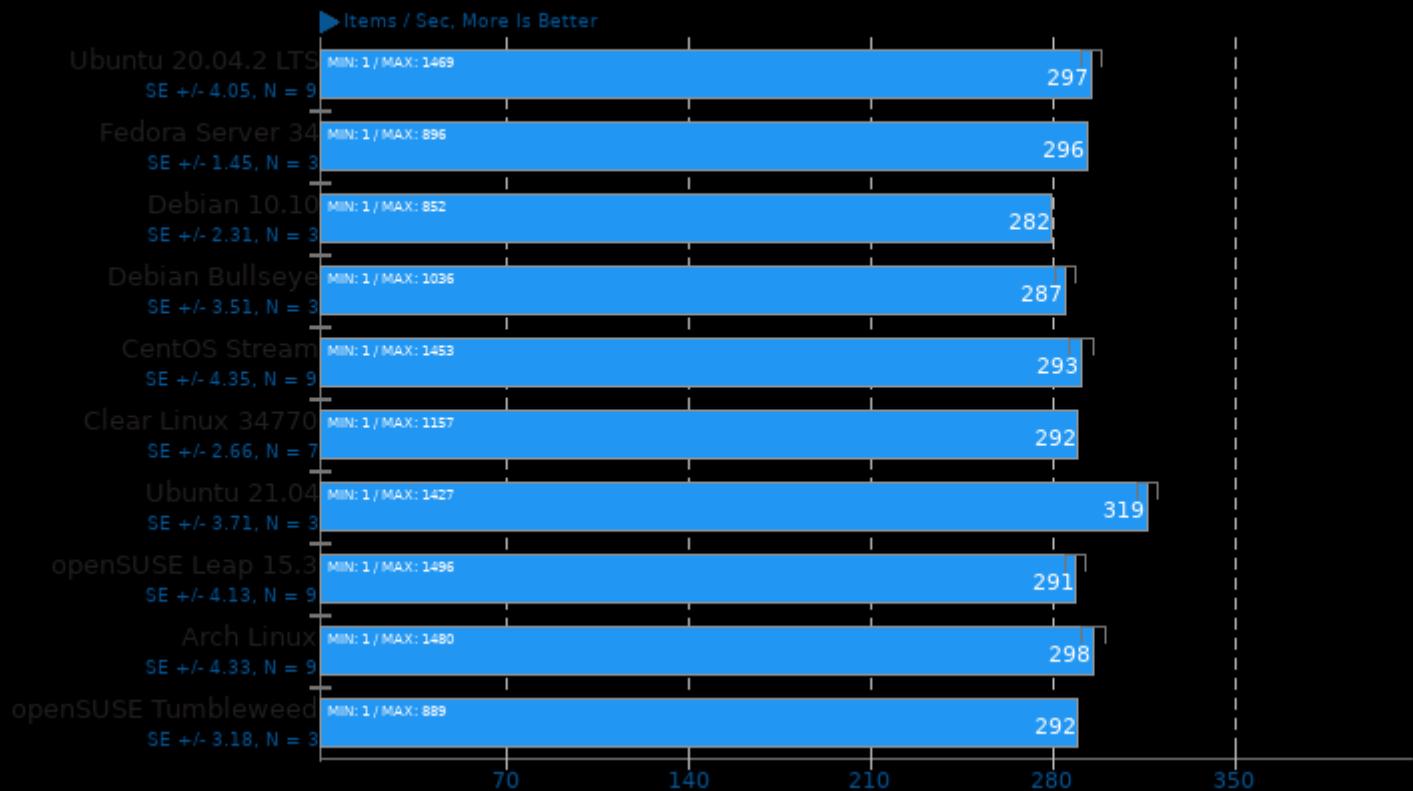
Model: super-resolution-10 - Device: OpenMP CPU



1. (CXX) g++ options: -fopenmp -ffunction-sections -fdata-sections -O3 -ldl -lrt

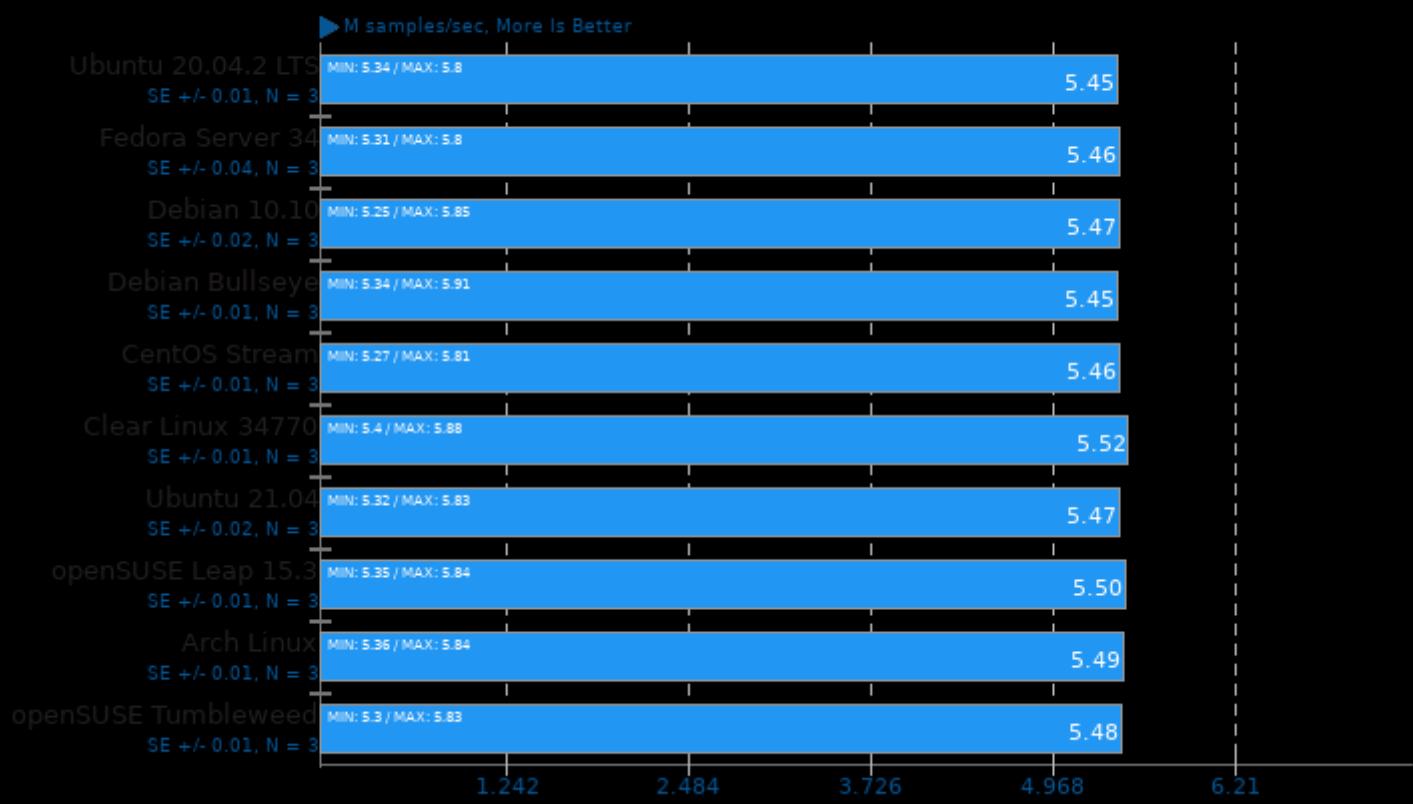
OpenVKL 0.9

Benchmark: vklBenchmark



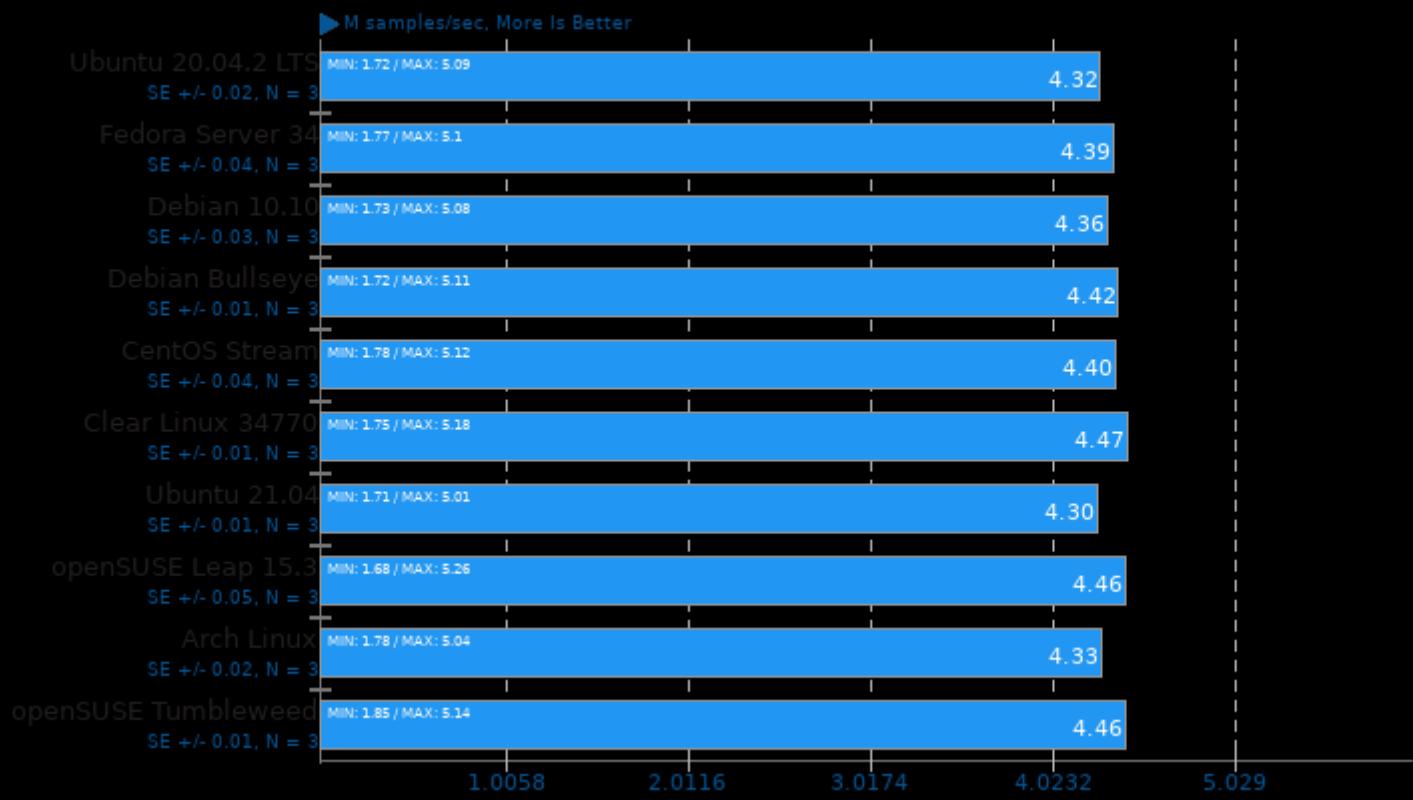
LuxCoreRender 2.5

Scene: DLSC - Acceleration: CPU



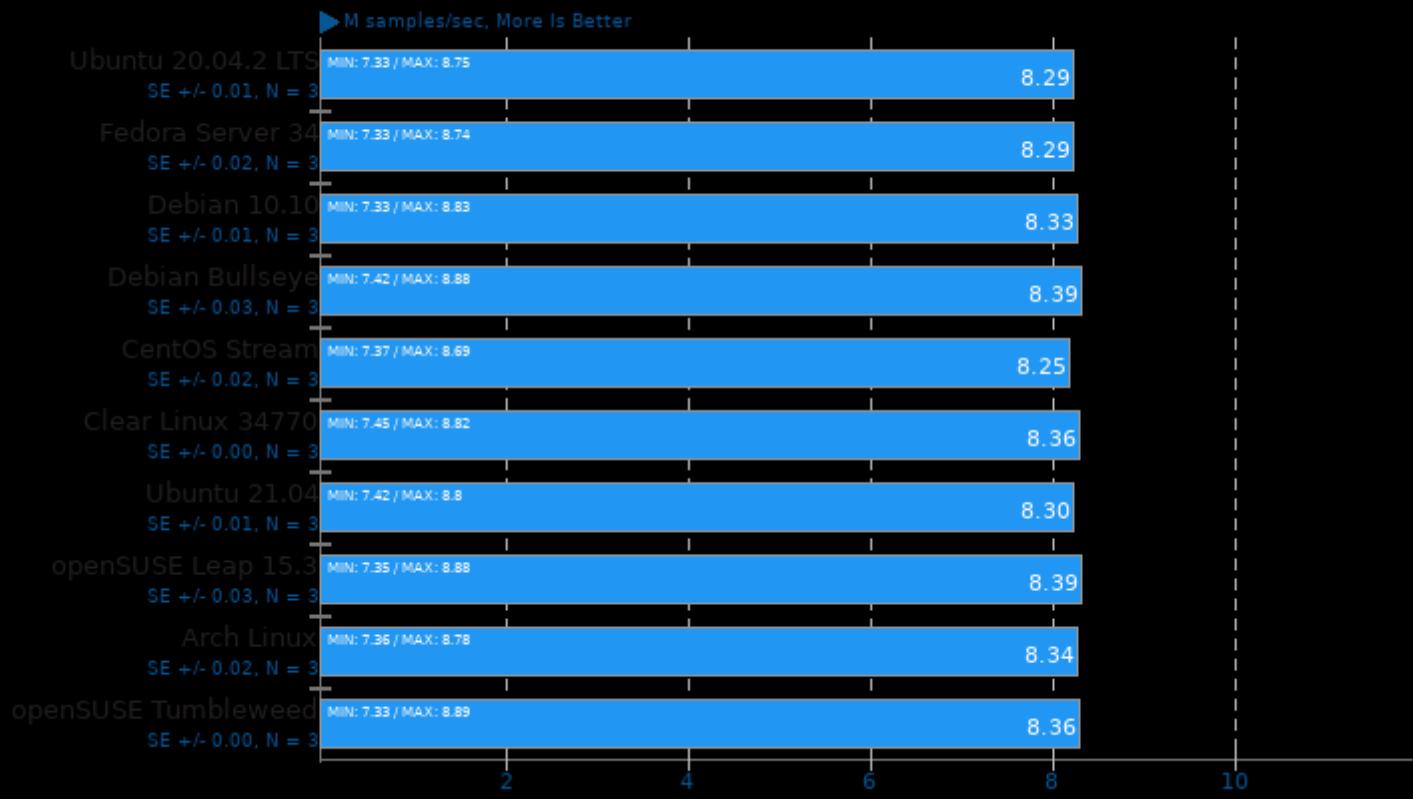
LuxCoreRender 2.5

Scene: Danish Mood - Acceleration: CPU



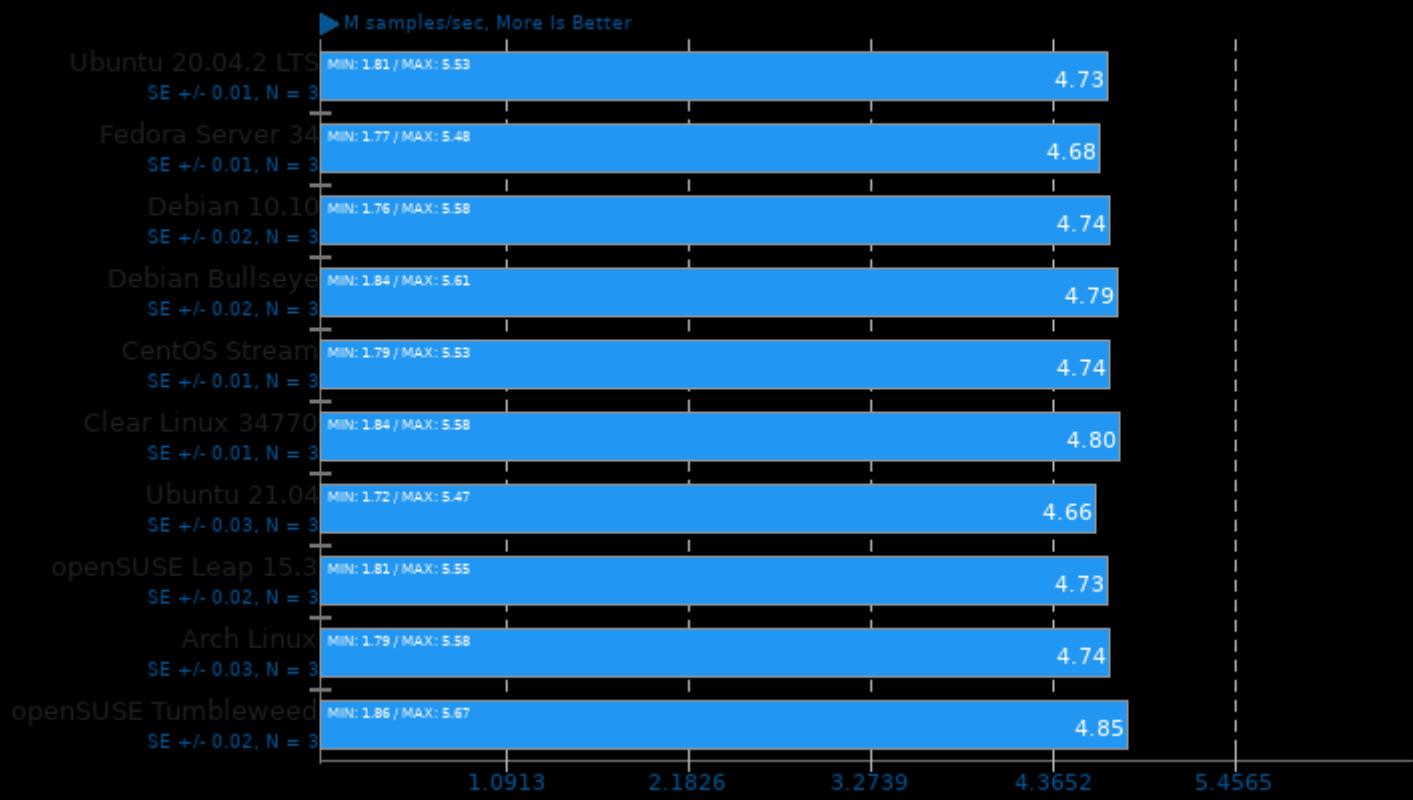
LuxCoreRender 2.5

Scene: Orange Juice - Acceleration: CPU



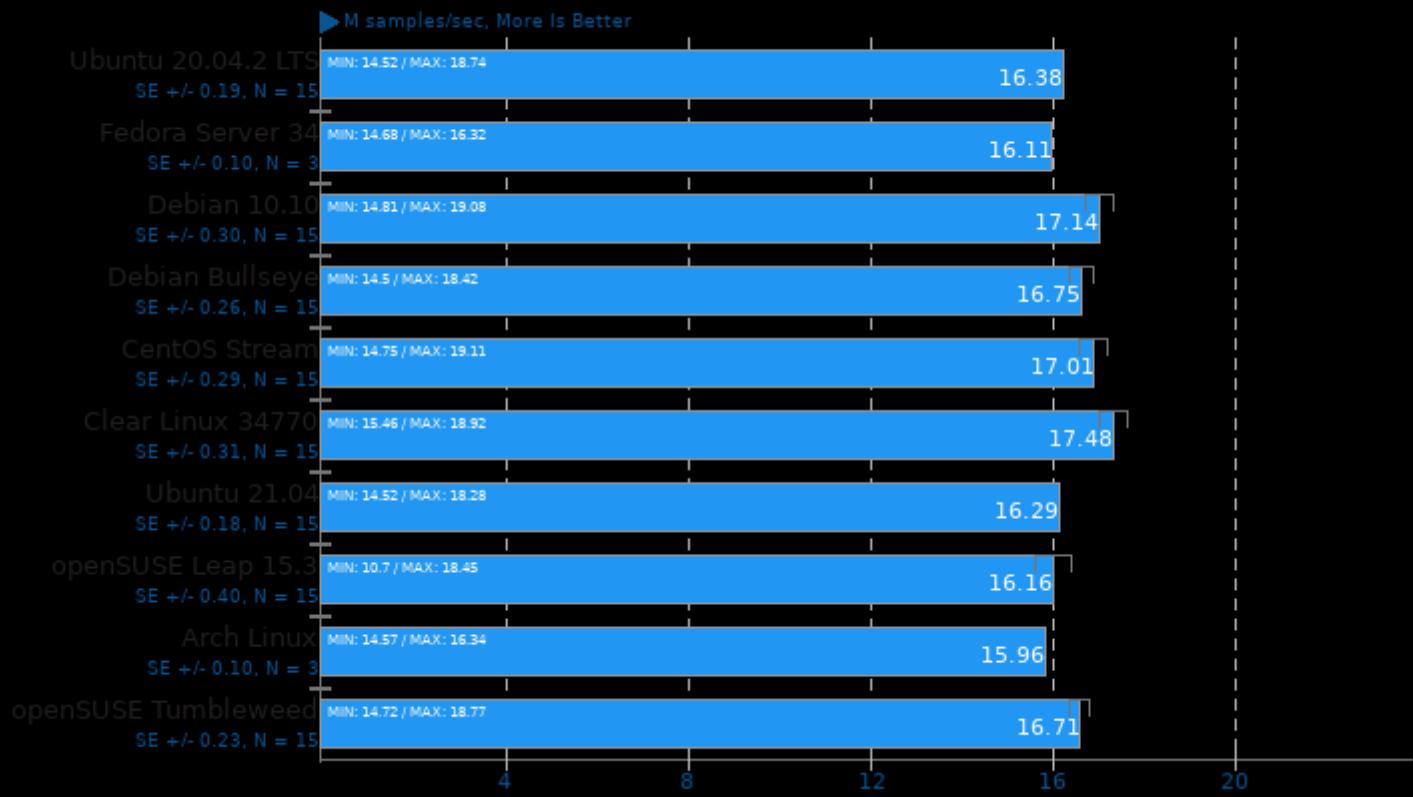
LuxCoreRender 2.5

Scene: LuxCore Benchmark - Acceleration: CPU



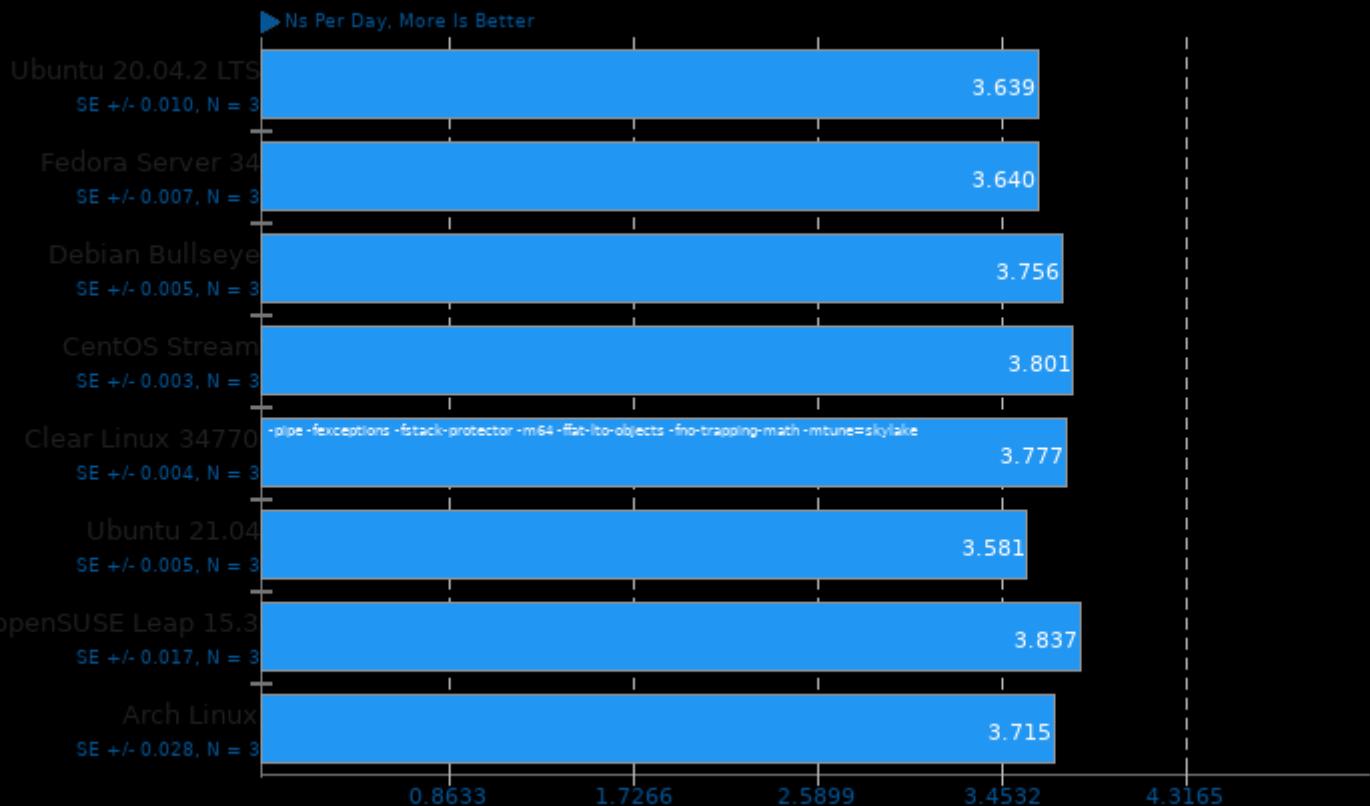
LuxCoreRender 2.5

Scene: Rainbow Colors and Prism - Acceleration: CPU



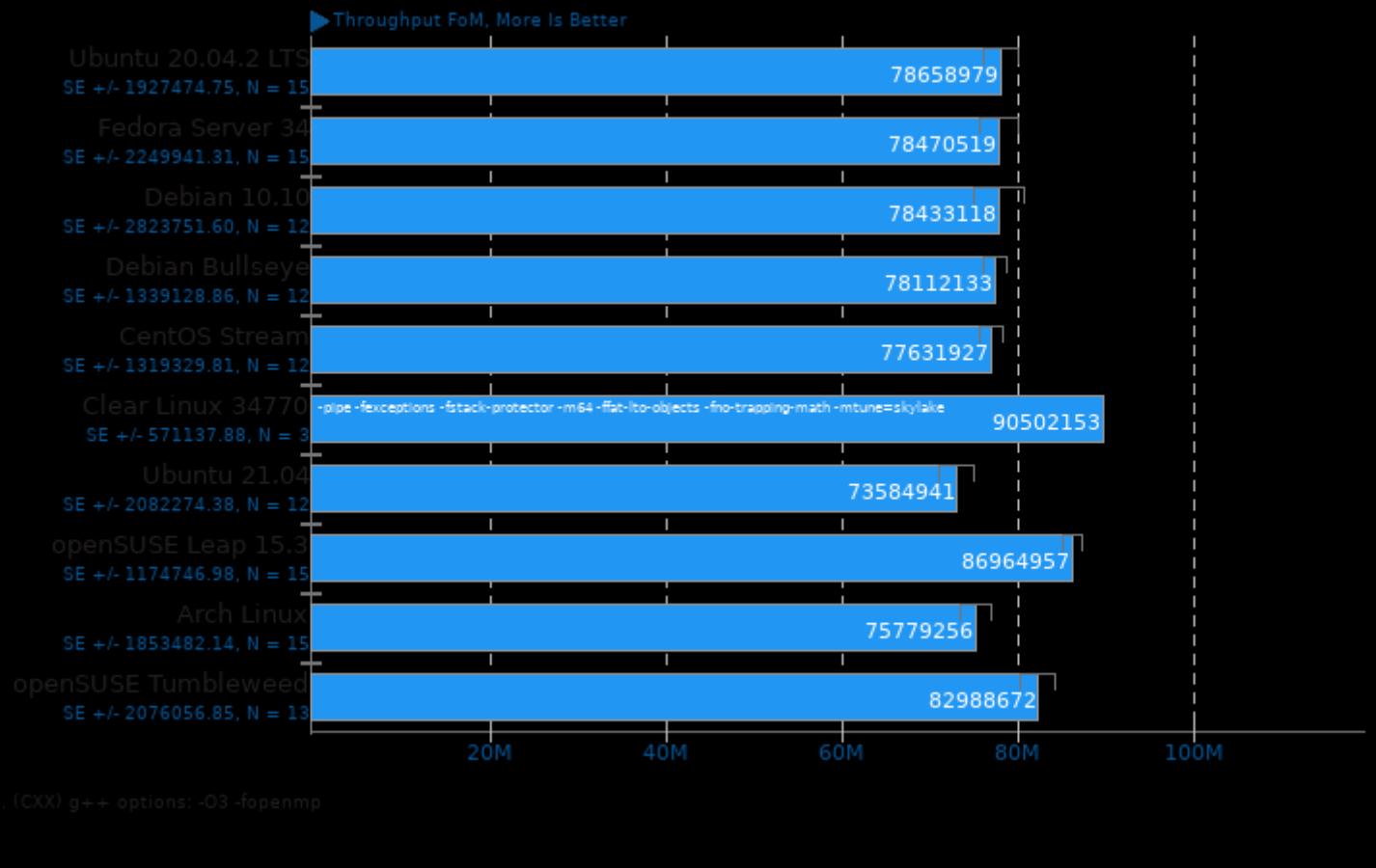
GROMACS 2021.2

Implementation: MPI CPU - Input: water_GMX50_bare



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

Kripke 1.2.4



NAS Parallel Benchmarks 3.4

Test / Class: BT.C



1. (F9X) gfortran options: -O3 -march=native -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi

2. Ubuntu 20.04.2 LTS: Open MPI 4.0.3

3. Debian 10.10: Open MPI 3.1.3

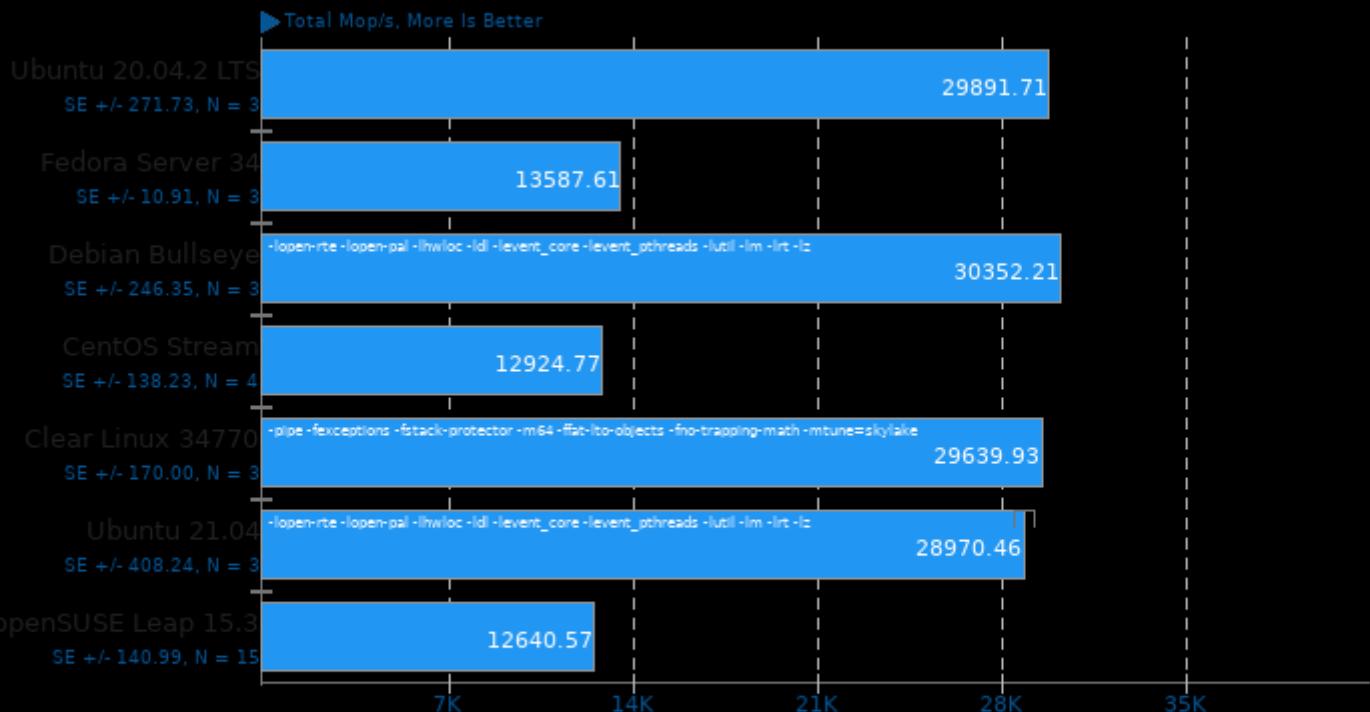
4. Debian Bullseye: Open MPI 4.1.0

5. Clear Linux 34770: 3.2

6. Ubuntu 21.04: Open MPI 4.1.0

NAS Parallel Benchmarks 3.4

Test / Class: CG.C



1. (F9X) gfortran options: -O3 -march=native -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi

2. Ubuntu 20.04.2 LTS: Open MPI 4.0.3

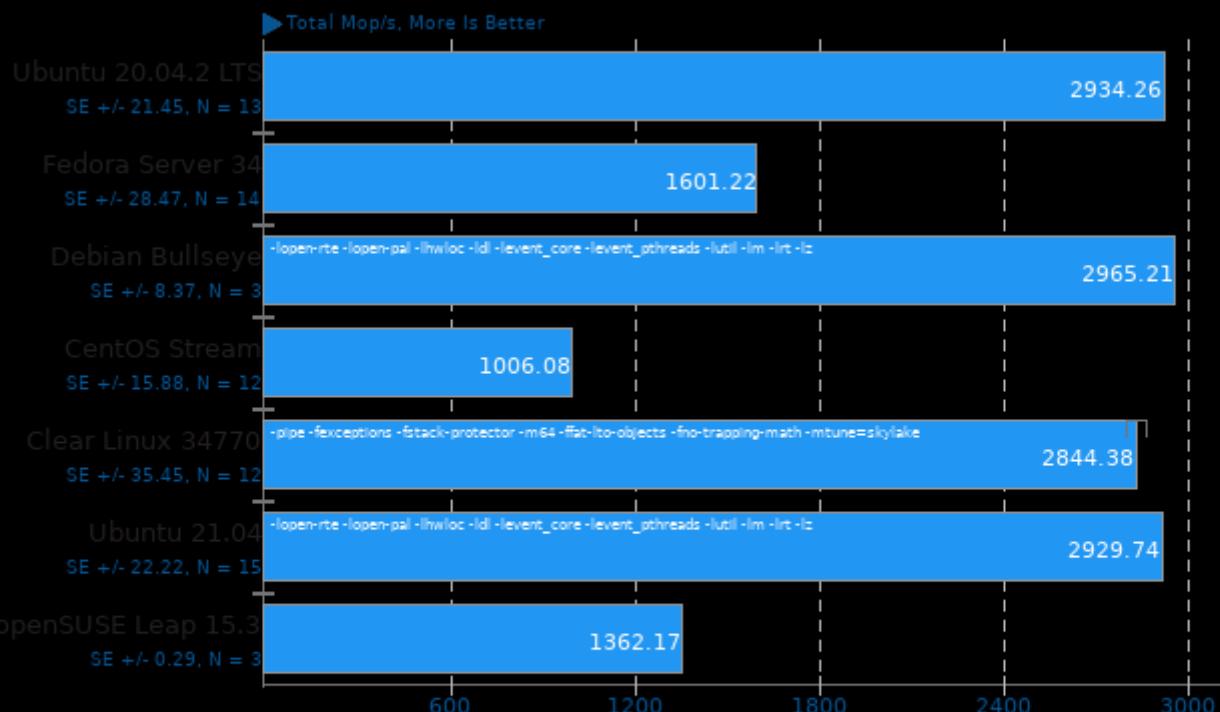
3. Debian Bullseye: Open MPI 4.1.0

4. Clear Linux 34770: 3.2

5. Ubuntu 21.04: Open MPI 4.1.0

NAS Parallel Benchmarks 3.4

Test / Class: EP.D



1. (F9X) gfortran options: -O3 -march=native -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi

2. Ubuntu 20.04.2 LTS: Open MPI 4.0.3

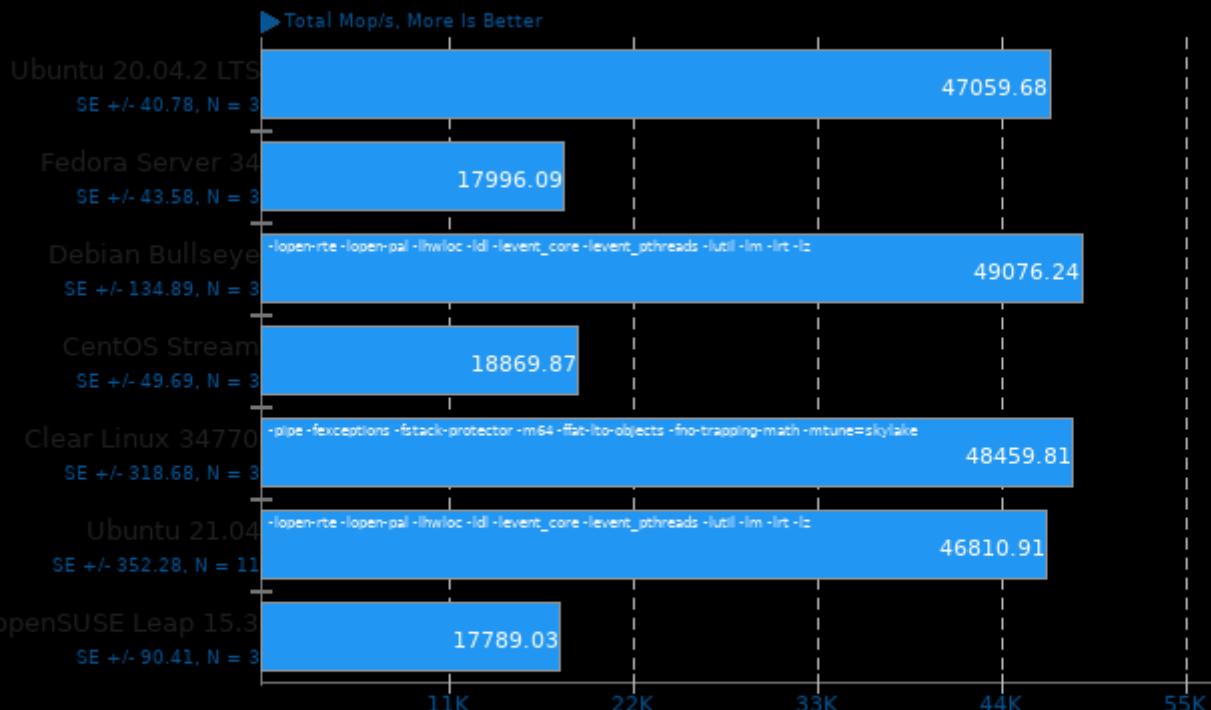
3. Debian Bullseye: Open MPI 4.1.0

4. Clear Linux 34770: 3.2

5. Ubuntu 21.04: Open MPI 4.1.0

NAS Parallel Benchmarks 3.4

Test / Class: FT.C



1. (F9X) gfortran options: -O3 -march=native -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi

2. Ubuntu 20.04.2 LTS: Open MPI 4.0.3

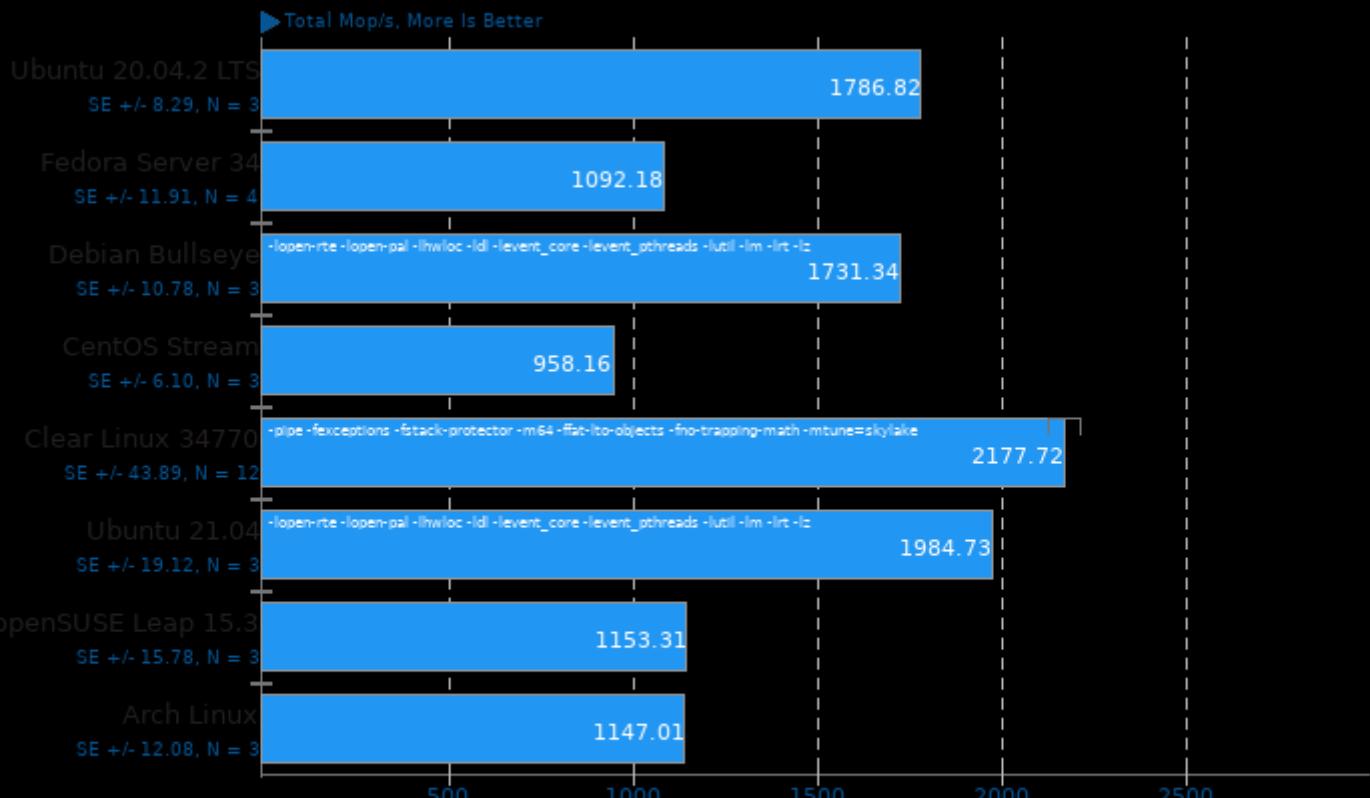
3. Debian Bullseye: Open MPI 4.1.0

4. Clear Linux 34770: 3.2

5. Ubuntu 21.04: Open MPI 4.1.0

NAS Parallel Benchmarks 3.4

Test / Class: IS.D



1. (F9X) gfortran options: -O3 -march=native -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi

2. Ubuntu 20.04.2 LTS: Open MPI 4.0.3

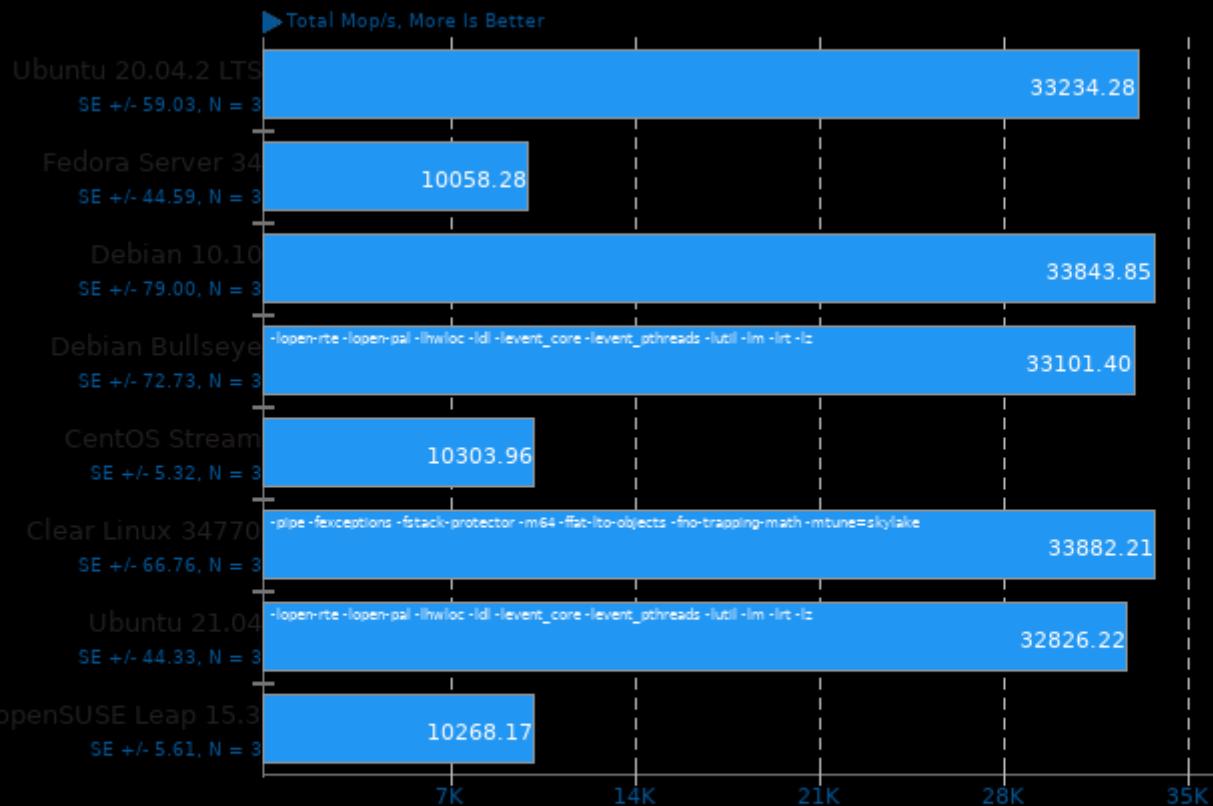
3. Debian Bullseye: Open MPI 4.1.0

4. Clear Linux 34770: 3.2

5. Ubuntu 21.04: Open MPI 4.1.0

NAS Parallel Benchmarks 3.4

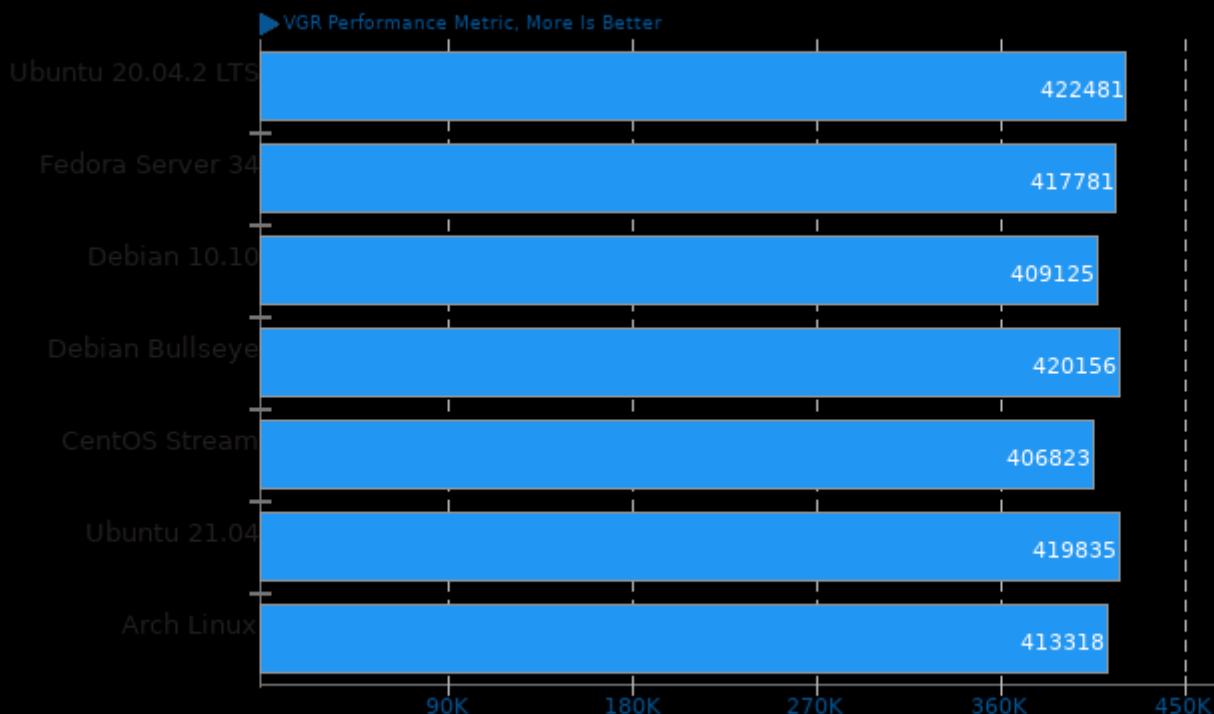
Test / Class: SPC



1. (F9X) gfortran options: -O3 -march=native -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi
2. Ubuntu 20.04.2 LTS: Open MPI 4.0.3
3. Debian 10.10: Open MPI 3.1.3
4. Debian Bullseye: Open MPI 4.1.0
5. Clear Linux 34770: 3.2
6. Ubuntu 21.04: Open MPI 4.1.0

BRL-CAD 7.32.2

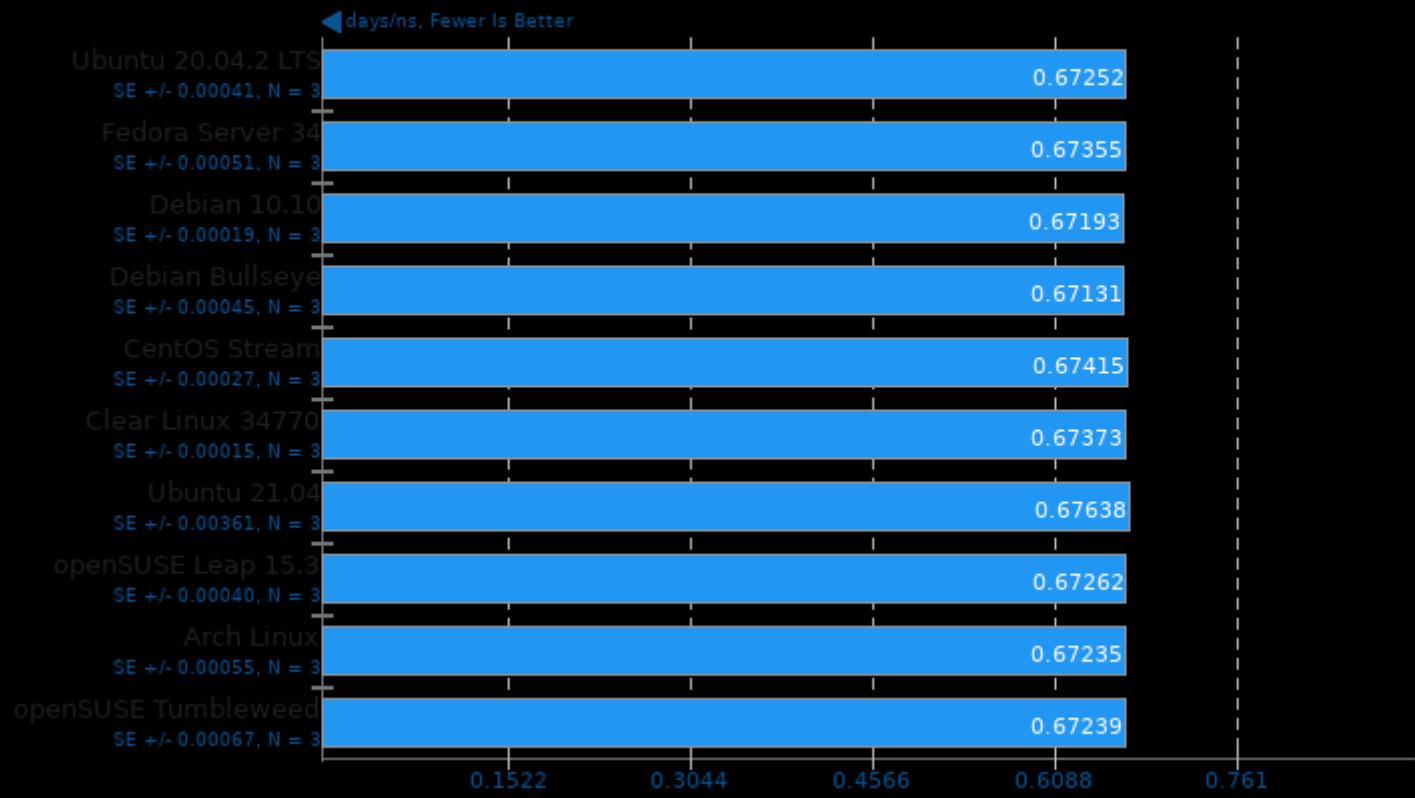
VGR Performance Metric



1. (CXX) g++ options: -std=c++11 -pipe -fvisibility=hidden -fno-strict-aliasing -fno-common -fexceptions -ftemplate-depth=128 -m64 -ggdb3 -O3 -fipa-pt

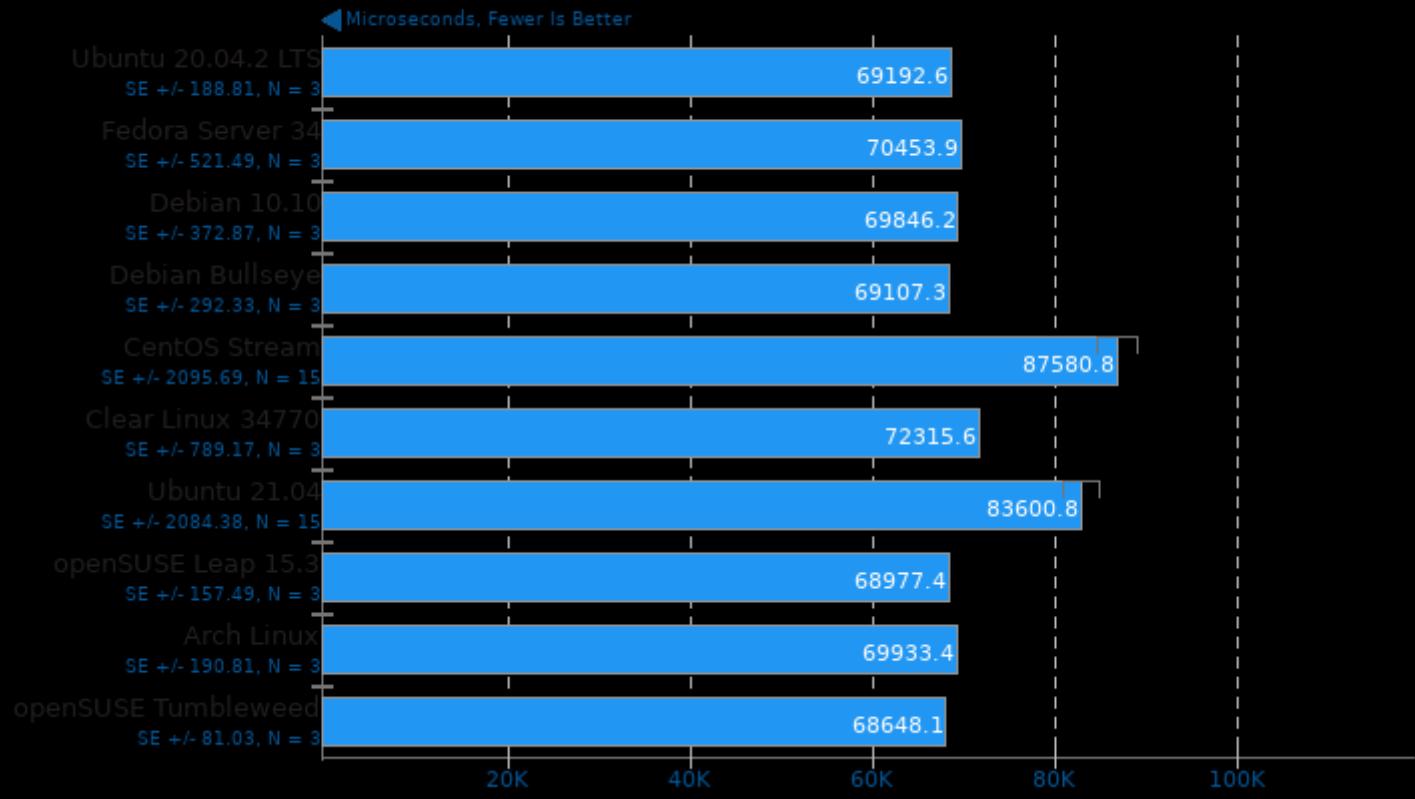
NAMD 2.14

ATPase Simulation - 327,506 Atoms



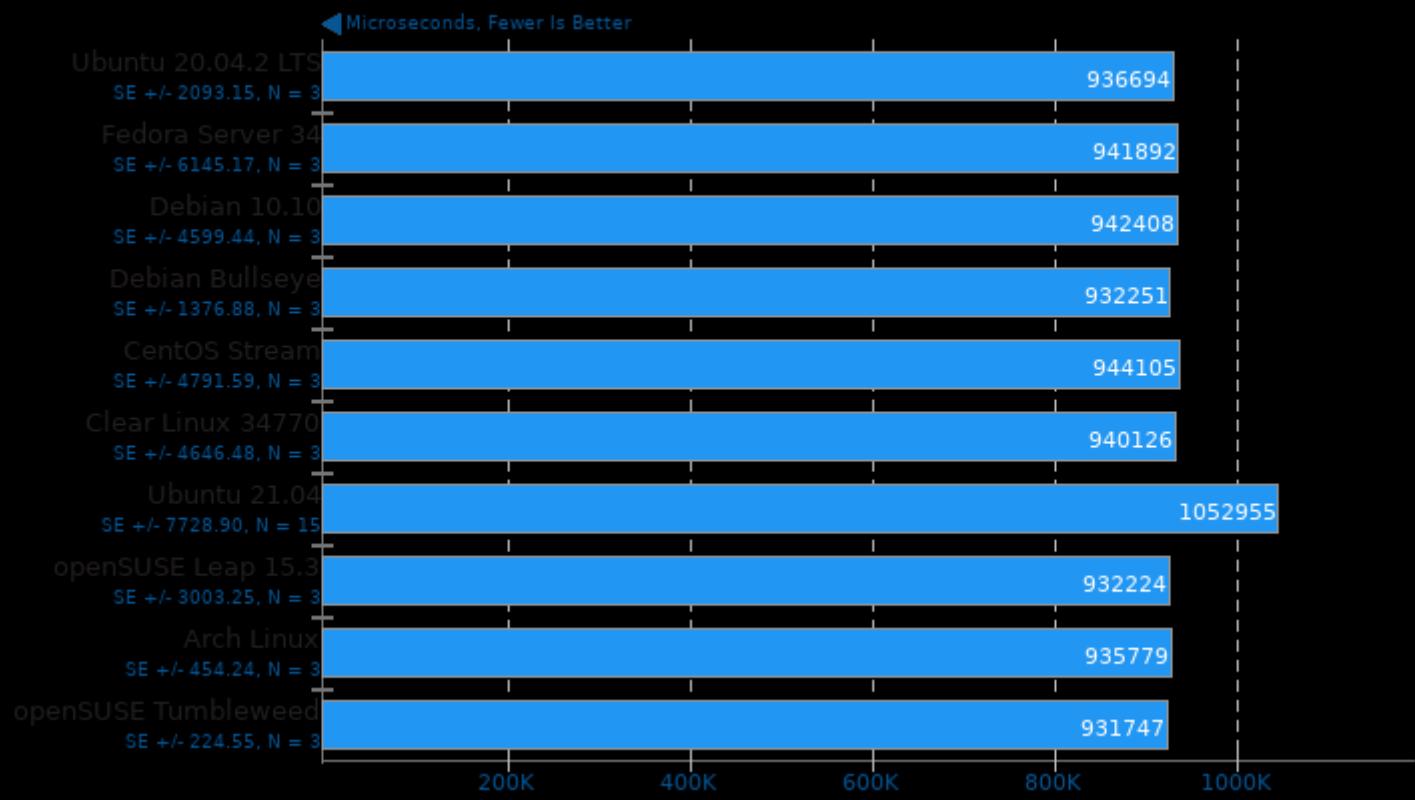
TensorFlow Lite 2020-08-23

Model: SqueezeNet



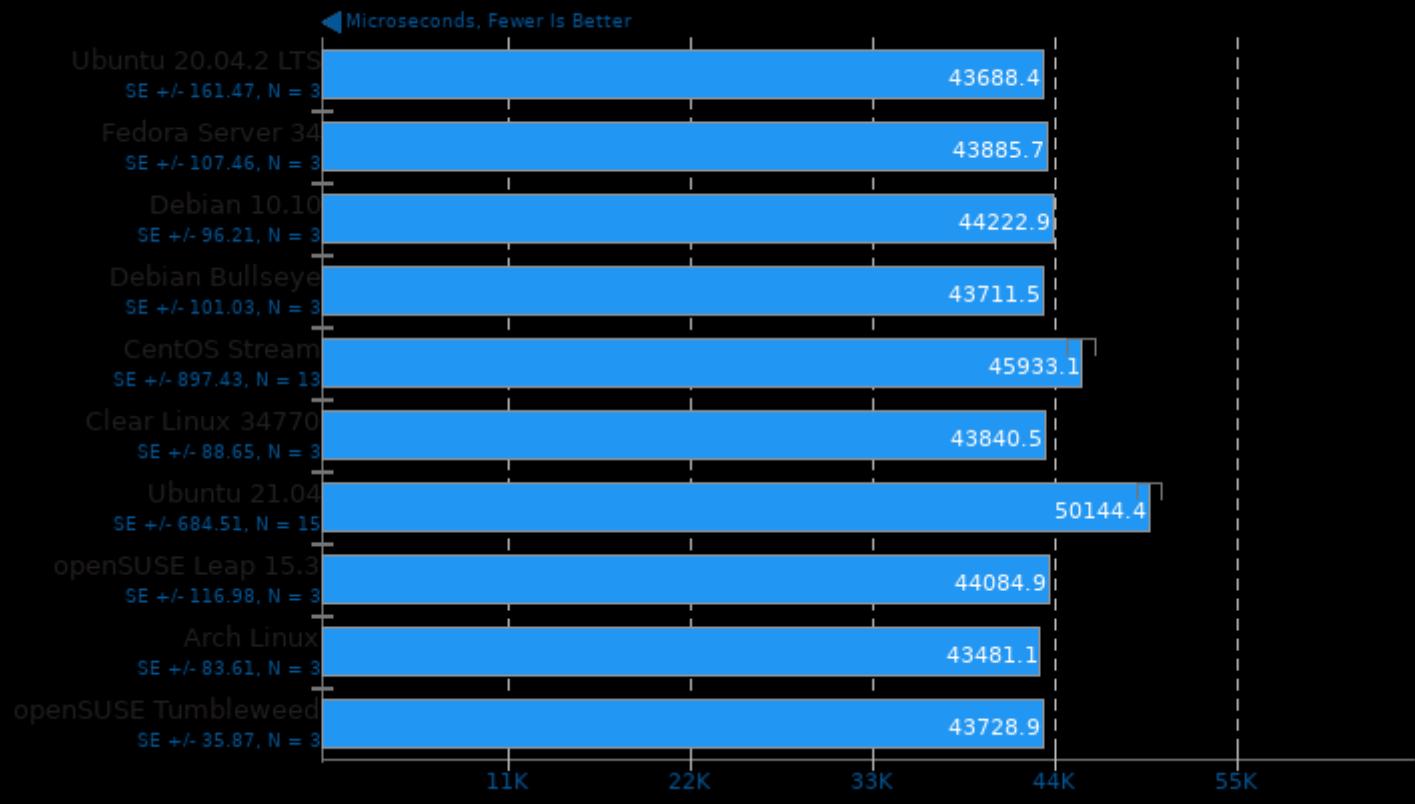
TensorFlow Lite 2020-08-23

Model: Inception V4



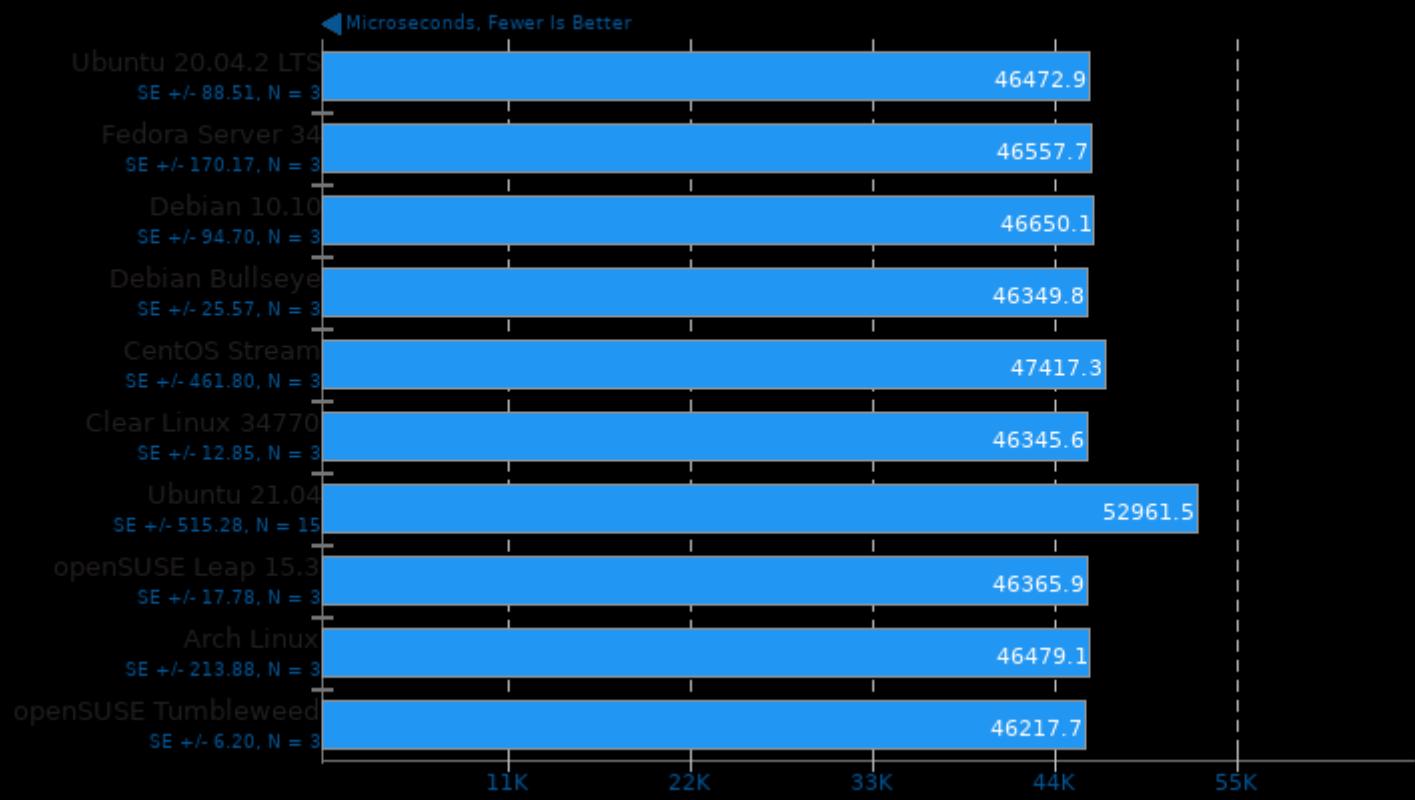
TensorFlow Lite 2020-08-23

Model: Mobilenet Float



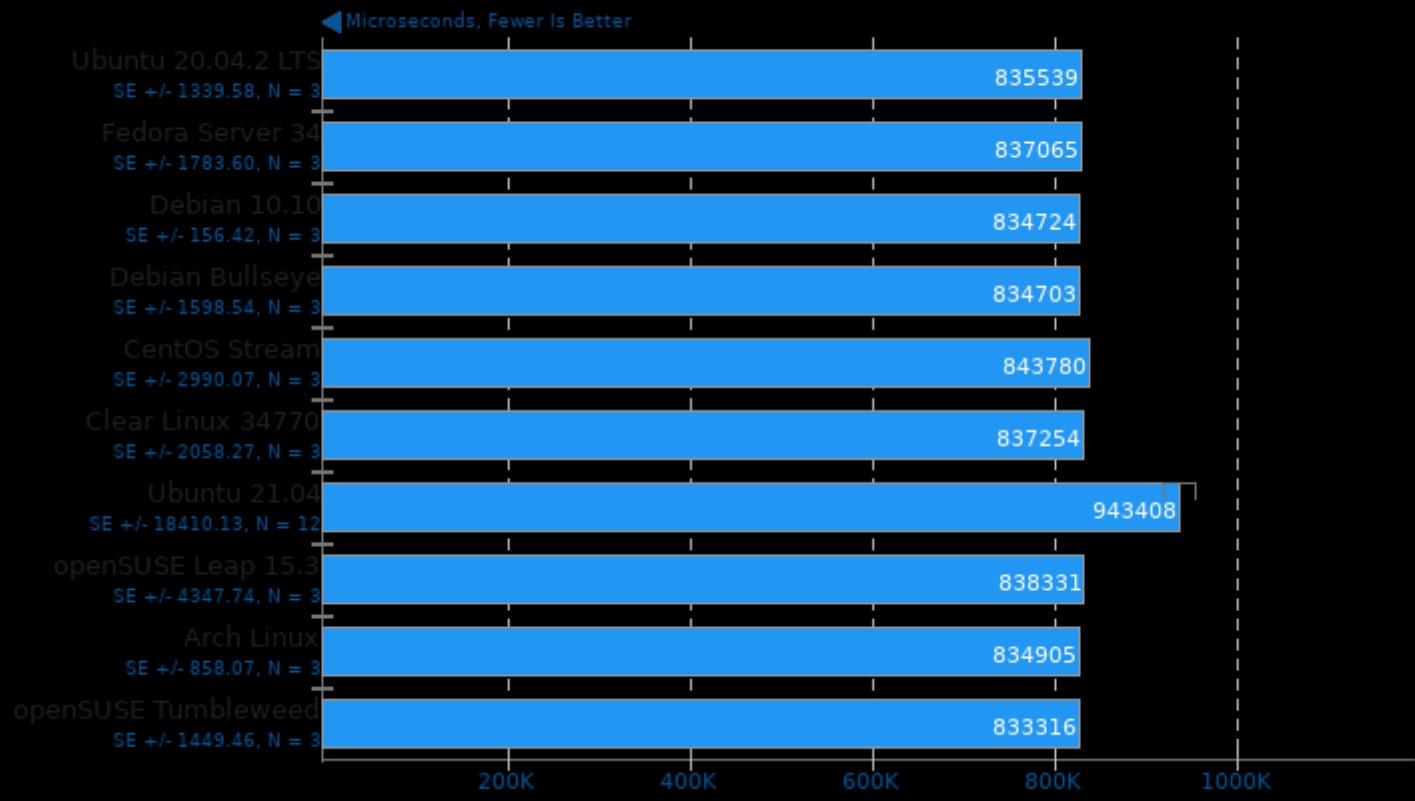
TensorFlow Lite 2020-08-23

Model: Mobilenet Quant



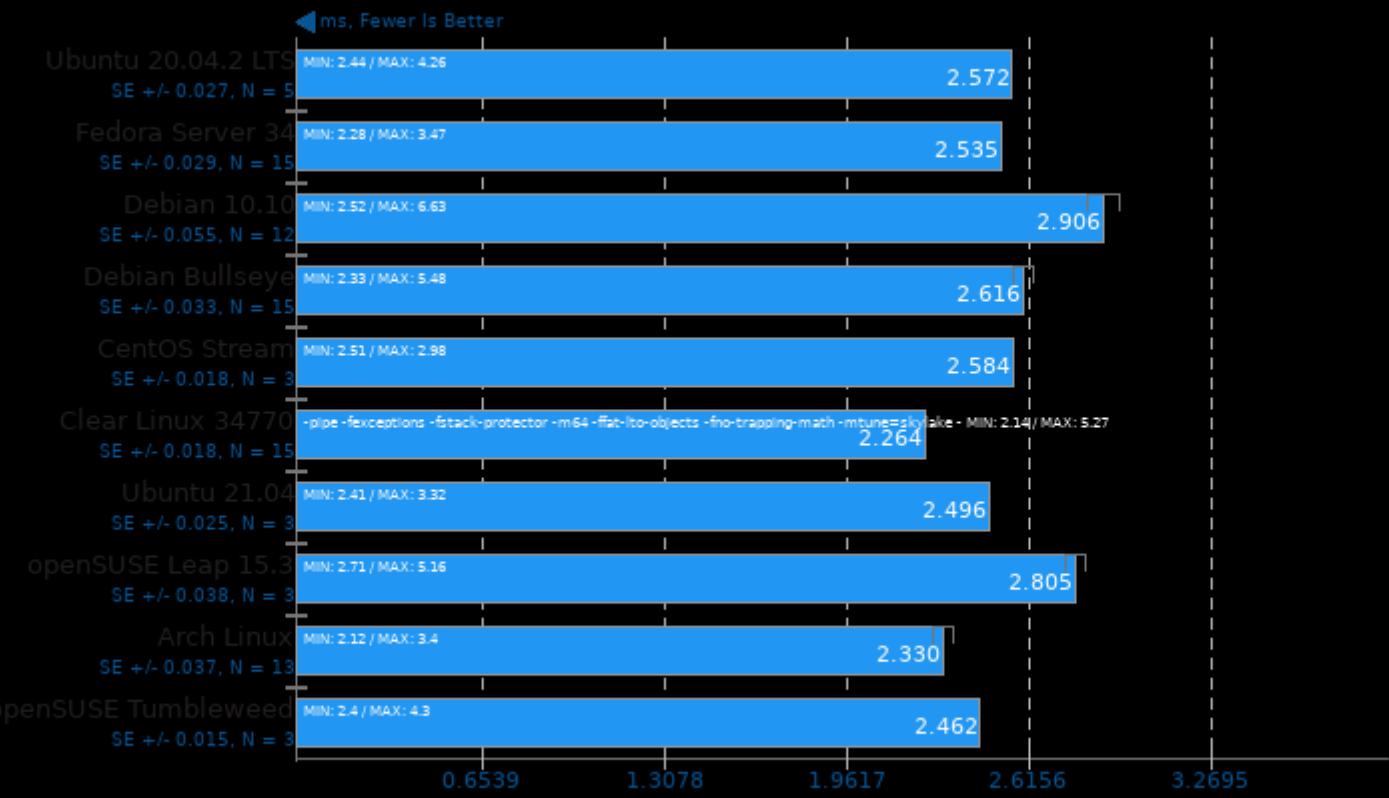
TensorFlow Lite 2020-08-23

Model: Inception ResNet V2



Mobile Neural Network 1.2

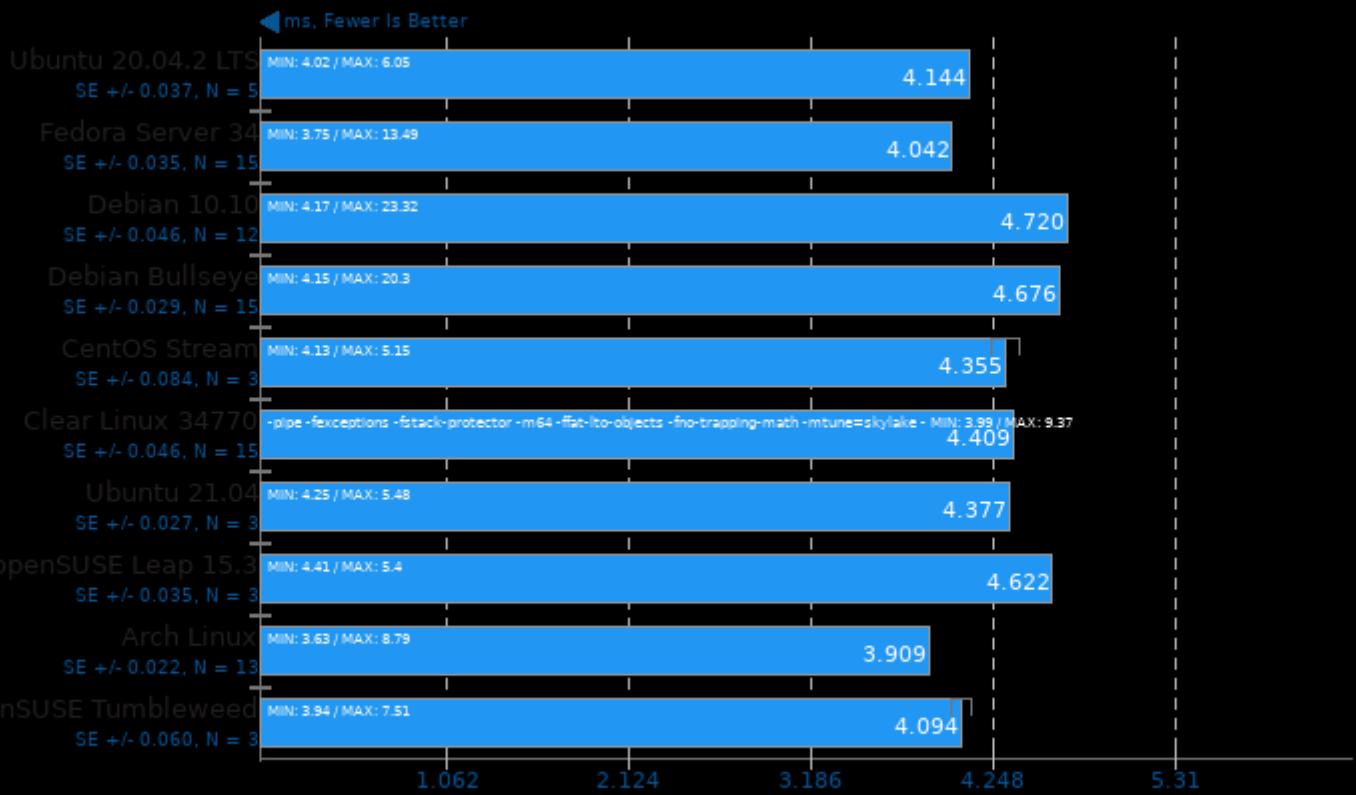
Model: mobilenetV3



1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fno-exceptions -fstack-protector -m64 -ffat-lto-objects -fno-trapping-math -mtune=skylake -MfPIC -fno-rtti

Mobile Neural Network 1.2

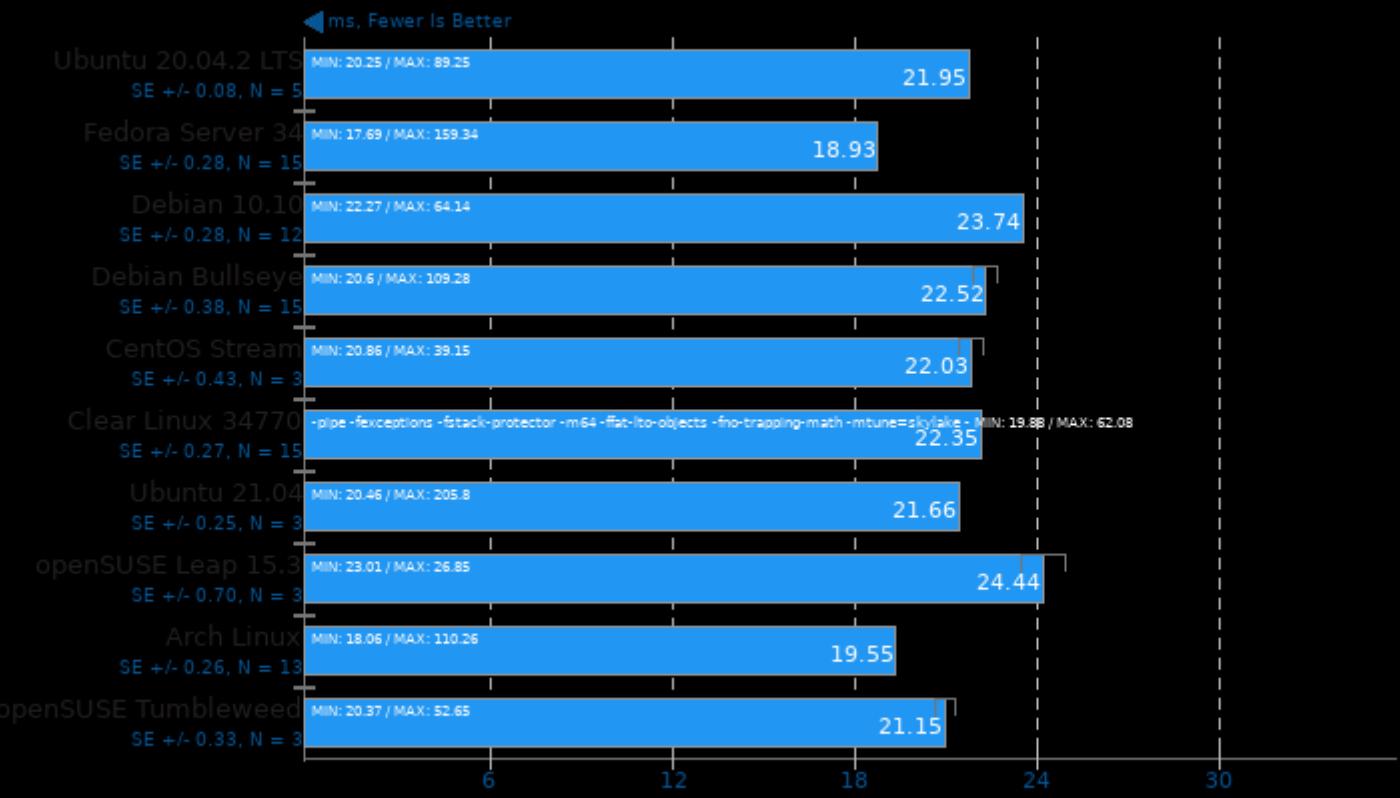
Model: squeezenetv1.1



1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fno-threadsafe-statics -fno-exceptions -fstack-protector -m64 -ffat-lto-objects -fno-trapping-math -mtune=skyline -Mso

Mobile Neural Network 1.2

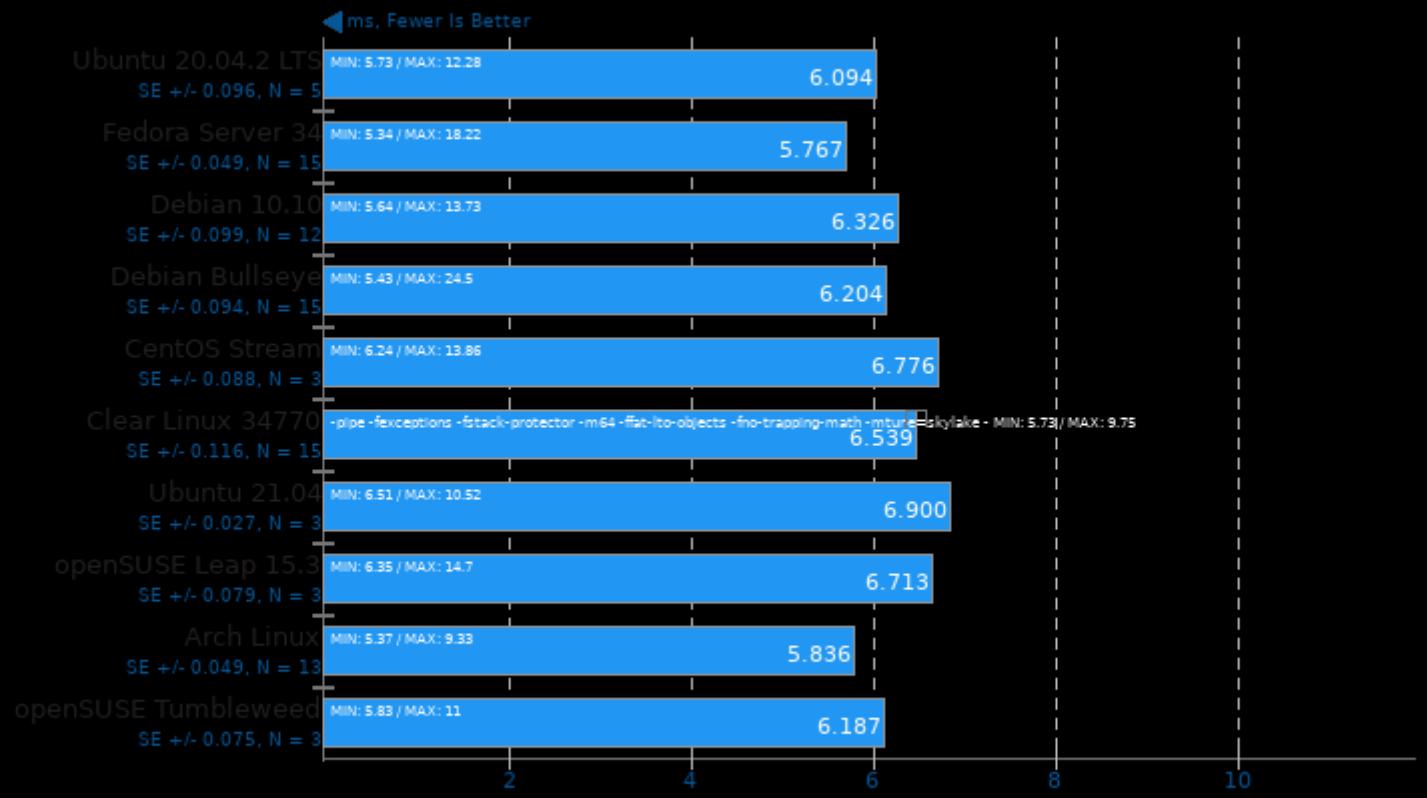
Model: resnet-v2-50



1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fno-exceptions -fstack-protector -m64 -fno-tilt-objects -fno-trapping-math -mtune=slytake -fno-pie

Mobile Neural Network 1.2

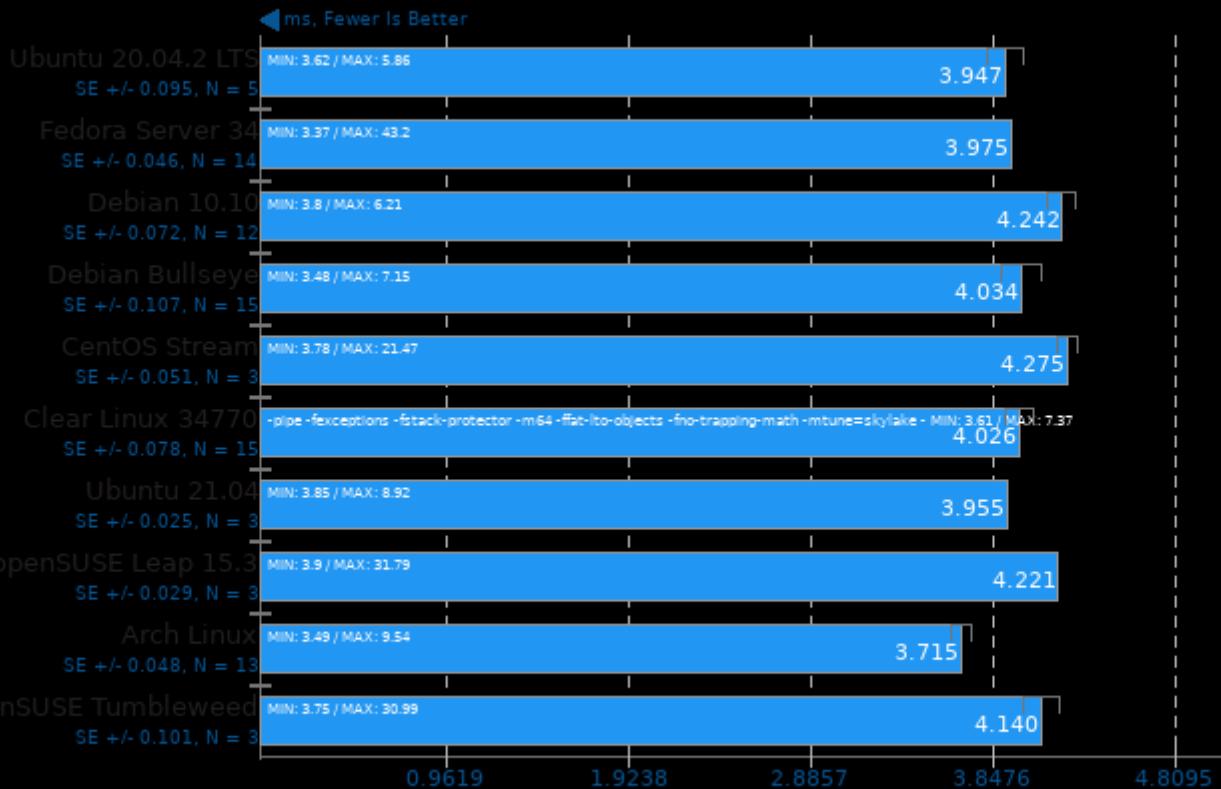
Model: SqueezeNetV1.0



1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fno-rounding-math

Mobile Neural Network 1.2

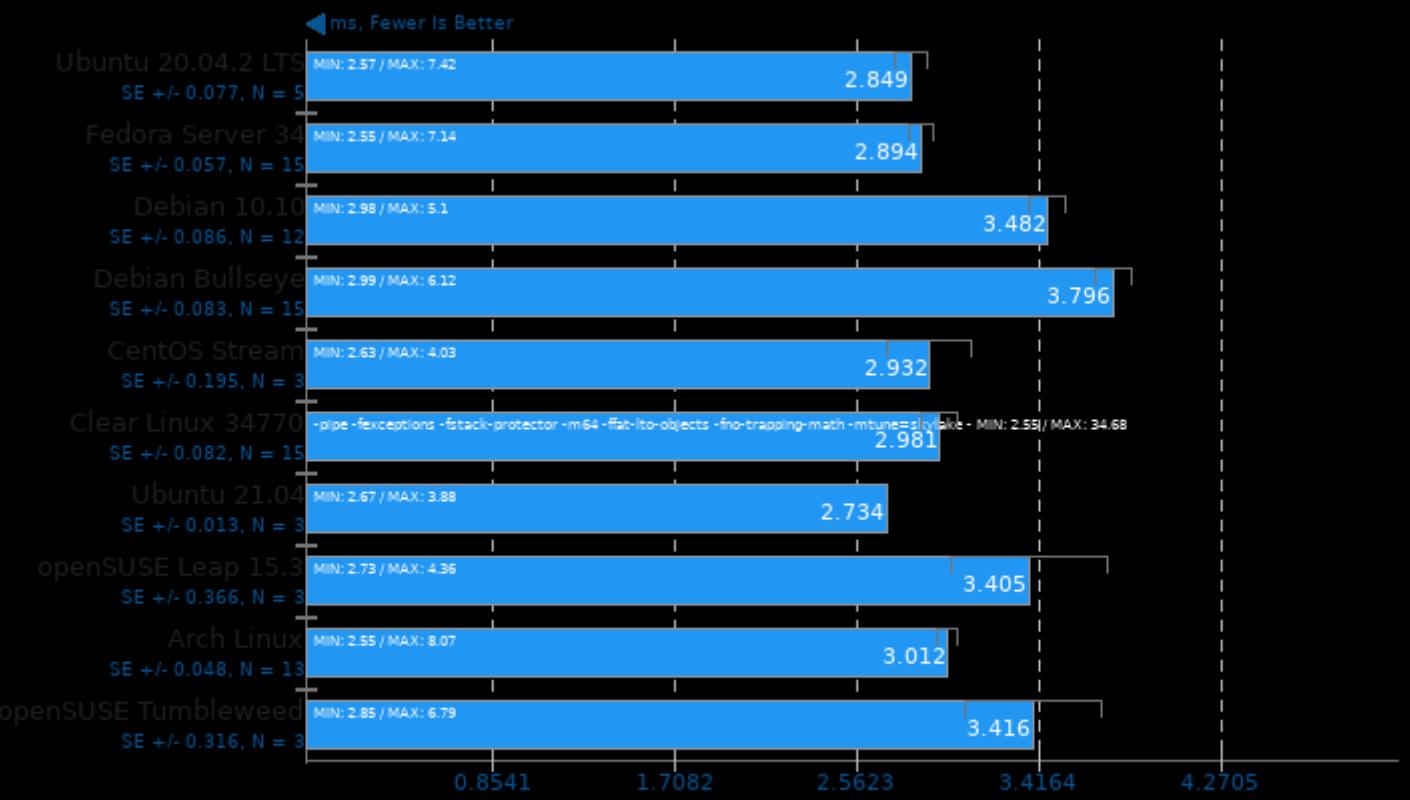
Model: MobileNetV2_224



1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fno-exceptions -fstack-protector -m64 -ffat-lto-objects -fno-trapping-math -mtune=skyline -M 3.61 / MAX: 7.37
SE +/- 0.078, N = 15

Mobile Neural Network 1.2

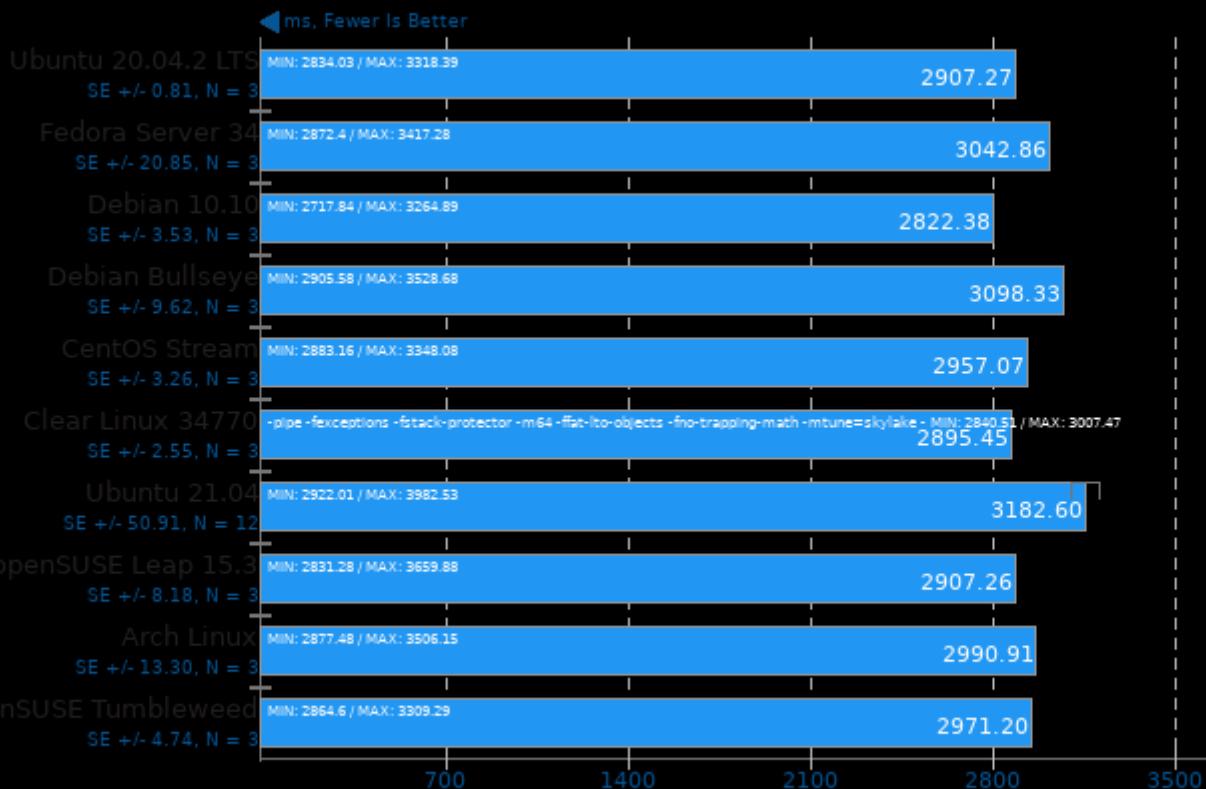
Model: mobilenet-v1-1.0



1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fno-threadsafe-statics -fno-exceptions -fstack-protector -m64 -ffat-lto-objects -fno-trapping-math -mtune=sandybridge -MIN: 2.55 / MAX: 34.68

TNN 0.3

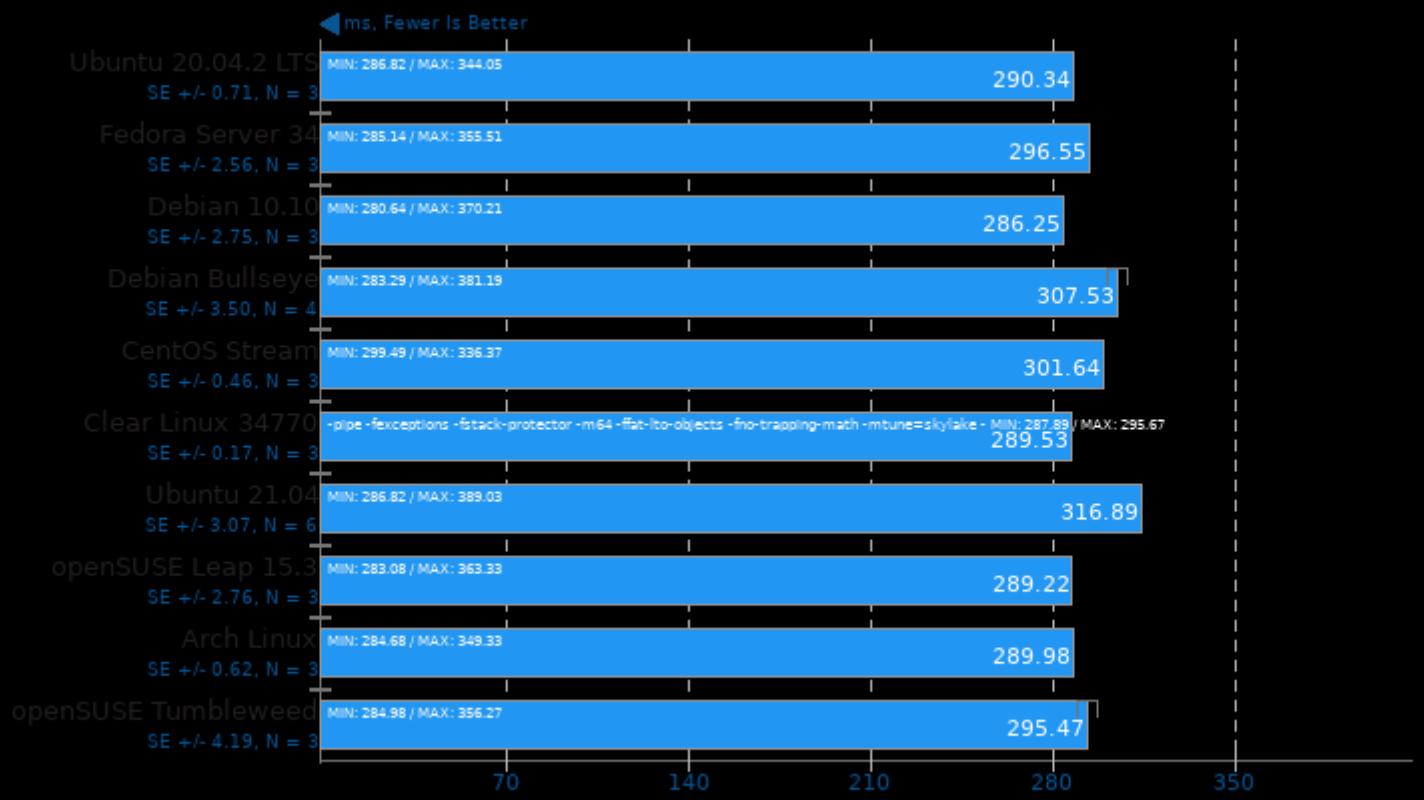
Target: CPU - Model: DenseNet



1. (CXX) g++ options: -fopenmp -pthread -fvisibility=hidden -fvisibility=default -O3 -rdynamic -ldl

TNN 0.3

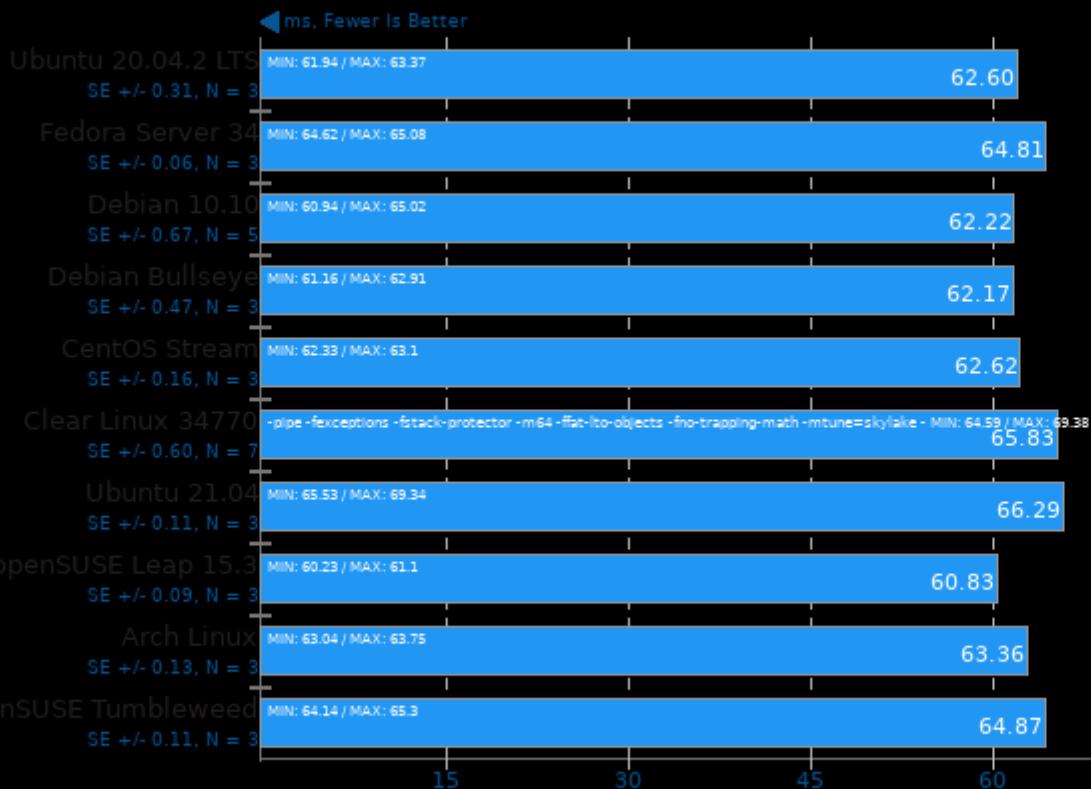
Target: CPU - Model: MobileNet v2



1. (CXX) g++ options: -fopenmp -pthread -fvisibility=hidden -fvisibility=default -O3 -rdynamic -ldl

TNN 0.3

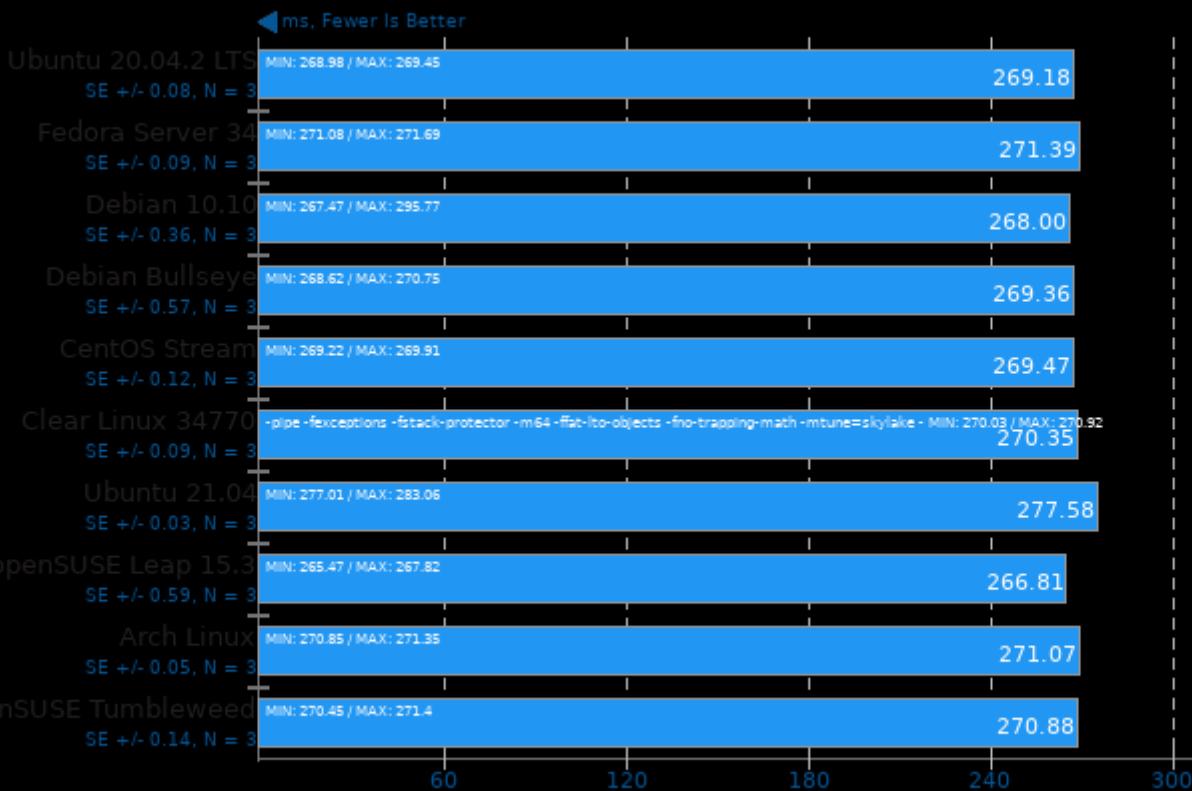
Target: CPU - Model: SqueezeNet v2



1. (CXX) g++ options: -fopenmp -pthread -fvisibility=hidden -fvisibility=default -O3 -rdynamic -ldl

TNN 0.3

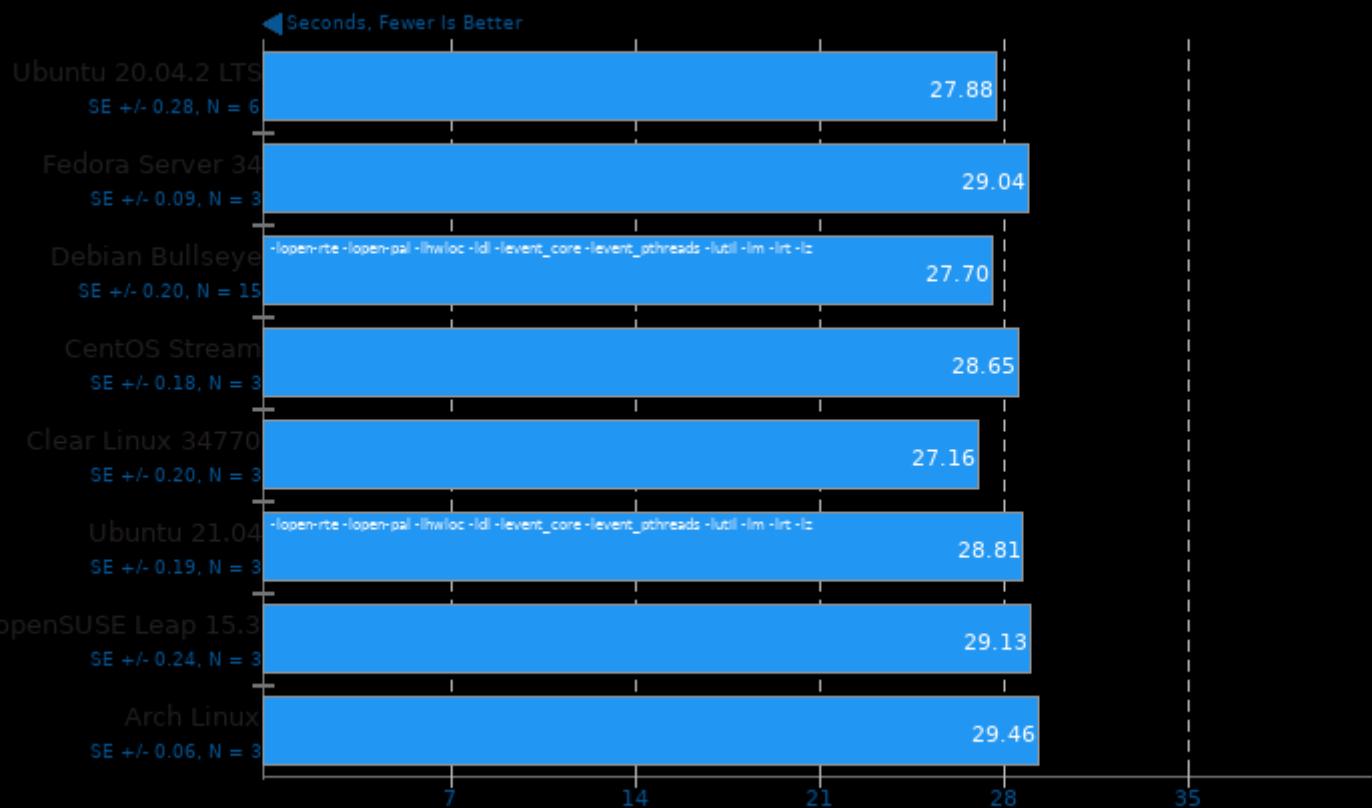
Target: CPU - Model: SqueezeNet v1.1



1. (CXX) g++ options: -fopenmp -pthread -fvisibility=hidden -fvisibility=default -O3 -rdynamic -ldl

Xcompact3d Incompact3d 2021-03-11

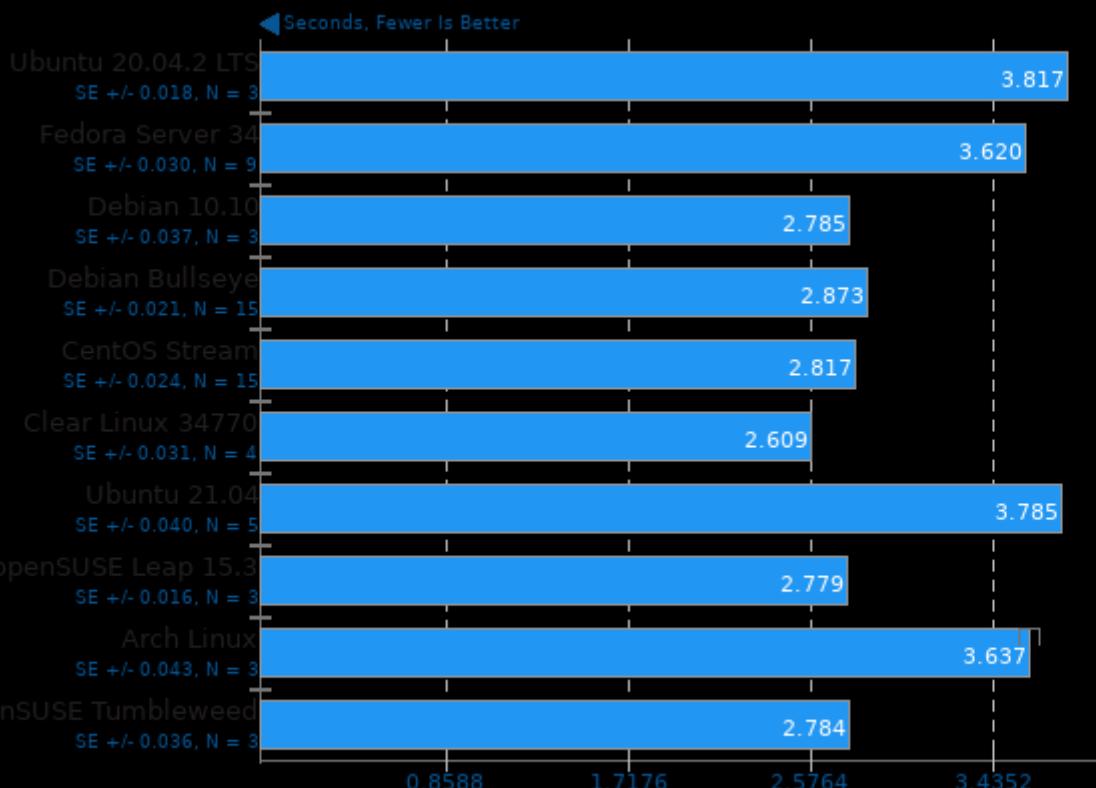
Input: input.i3d 193 Cells Per Direction



1. (F9X) gfortran options: -cpp -O2 -funroll-loops -floop-optimize -fcray-pointer -fbacktrace -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi

libavif avifenc 0.9.0

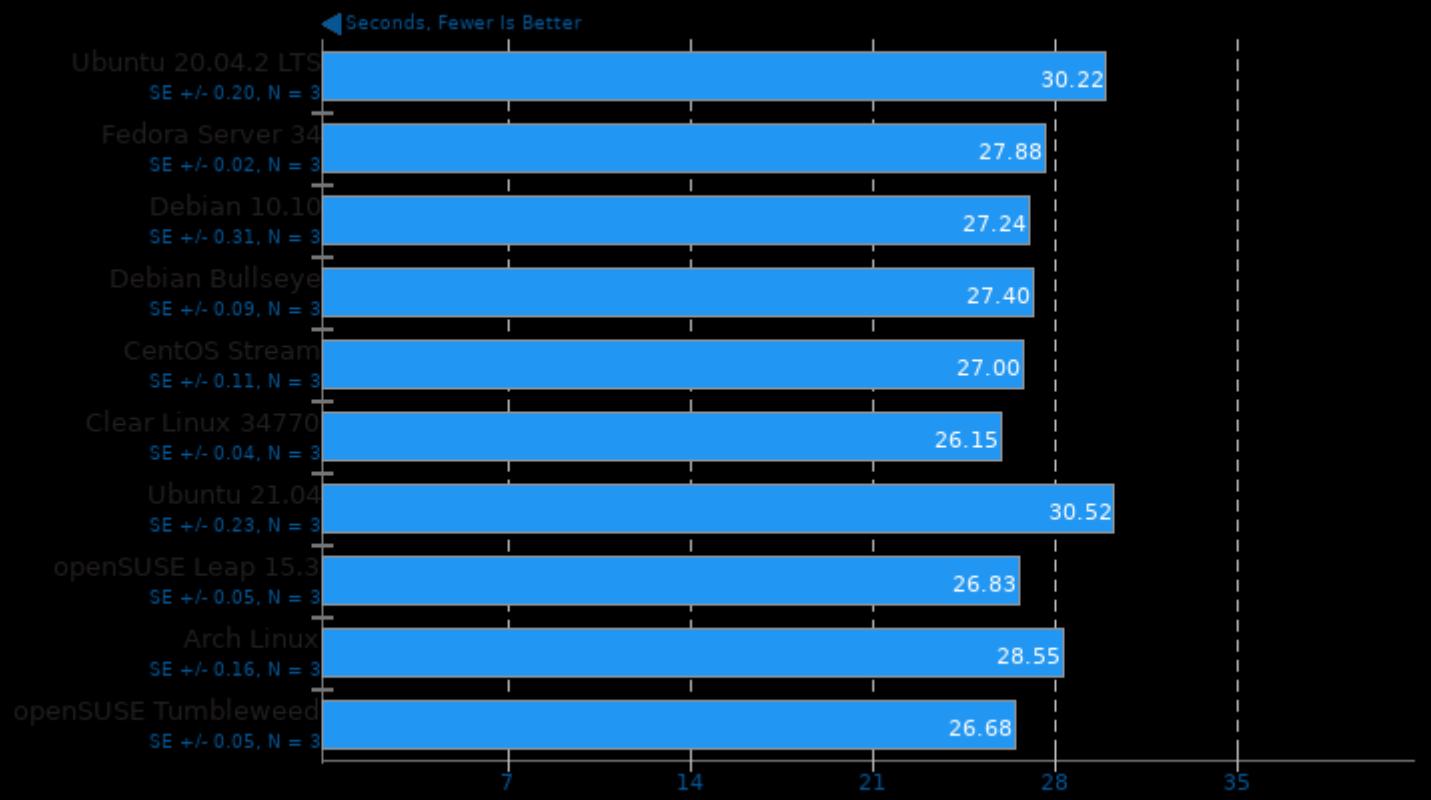
Encoder Speed: 10



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

libavif avifenc 0.9.0

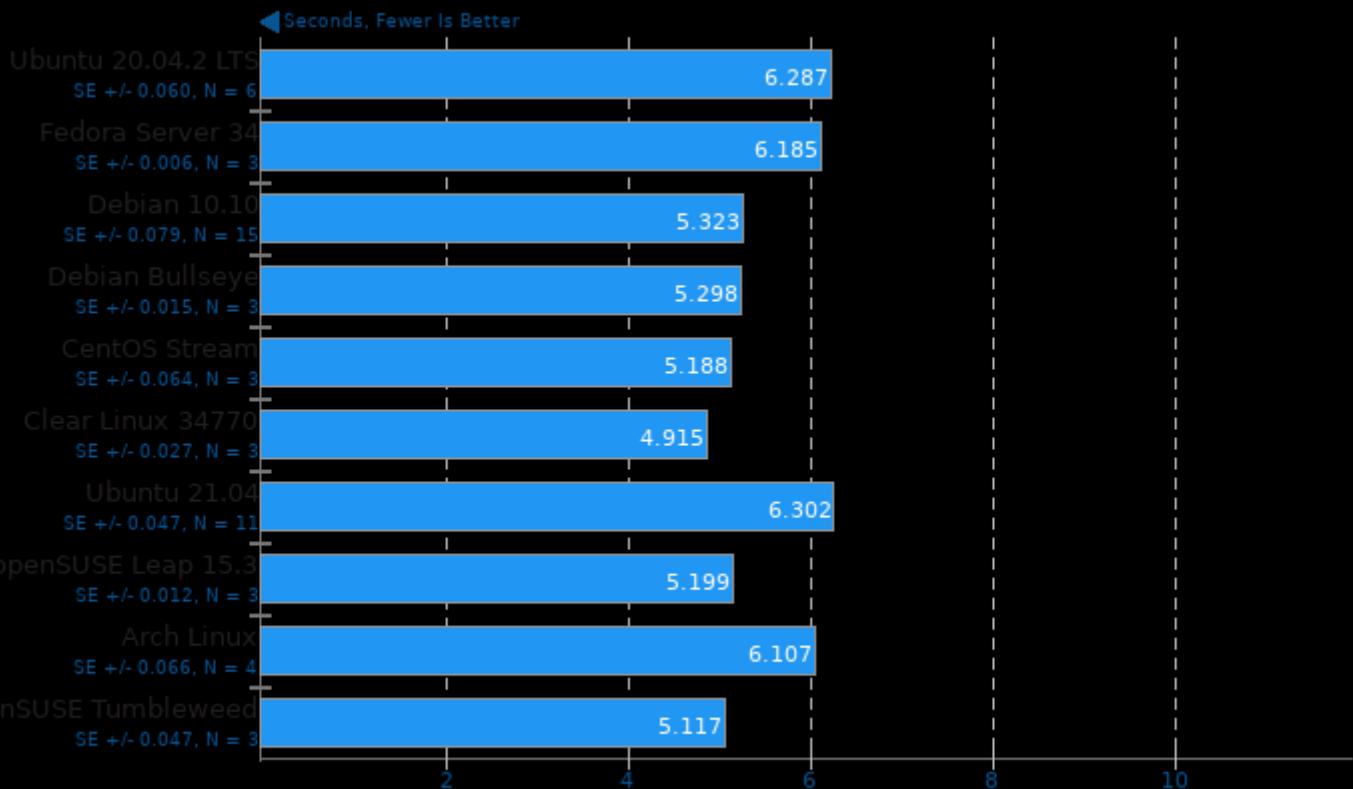
Encoder Speed: 6, Lossless



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

libavif avifenc 0.9.0

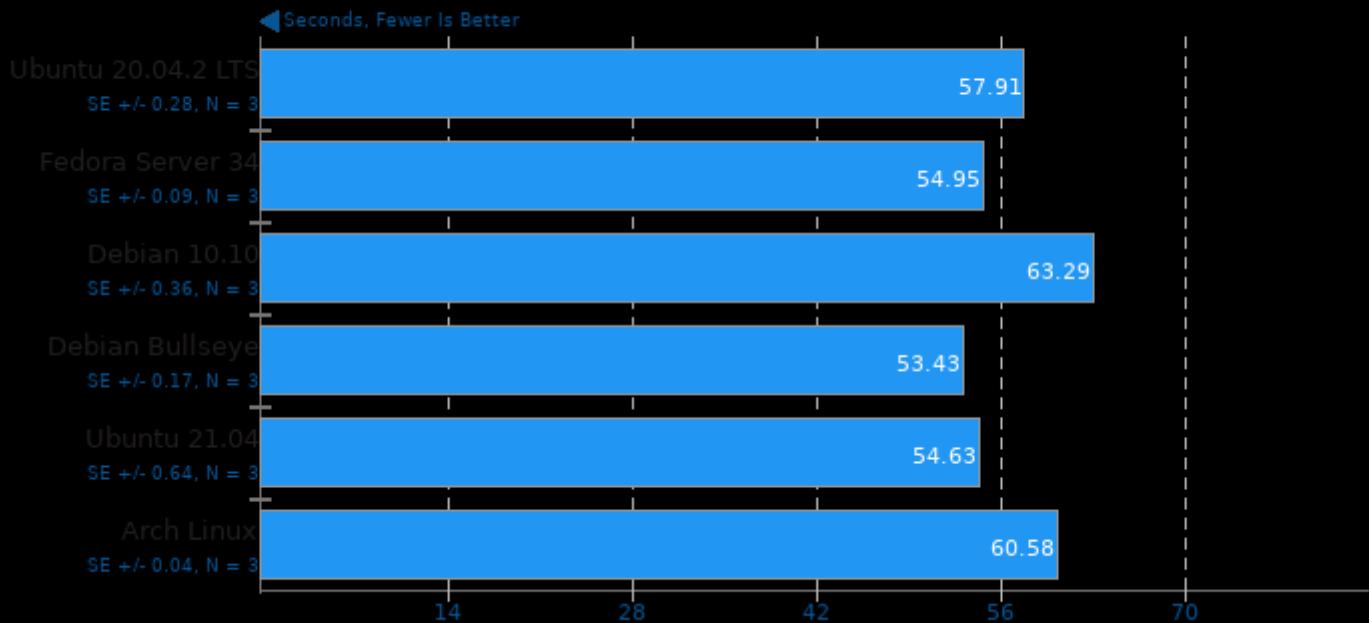
Encoder Speed: 10, Lossless



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

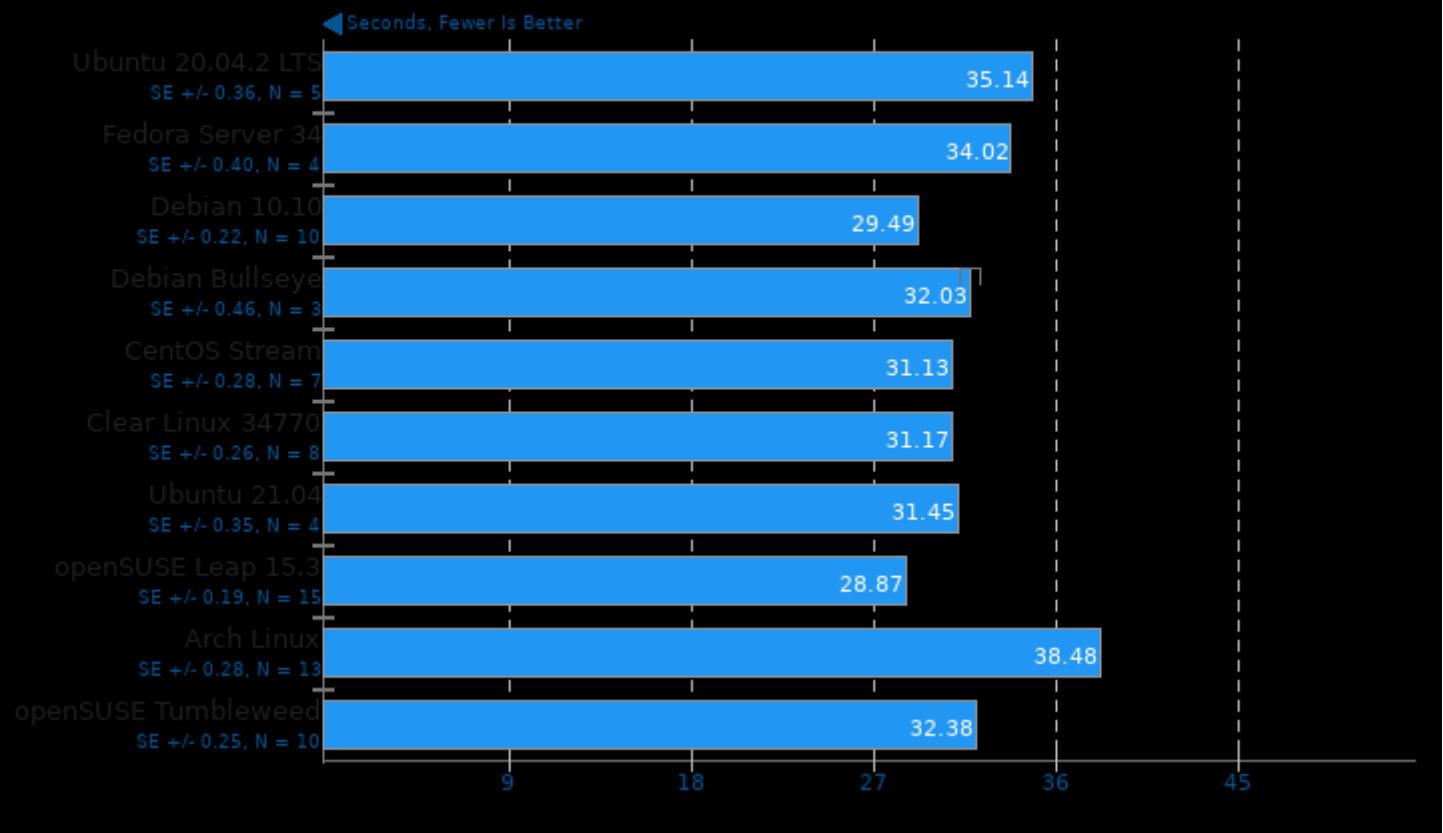
Timed Godot Game Engine Compilation 3.2.3

Time To Compile



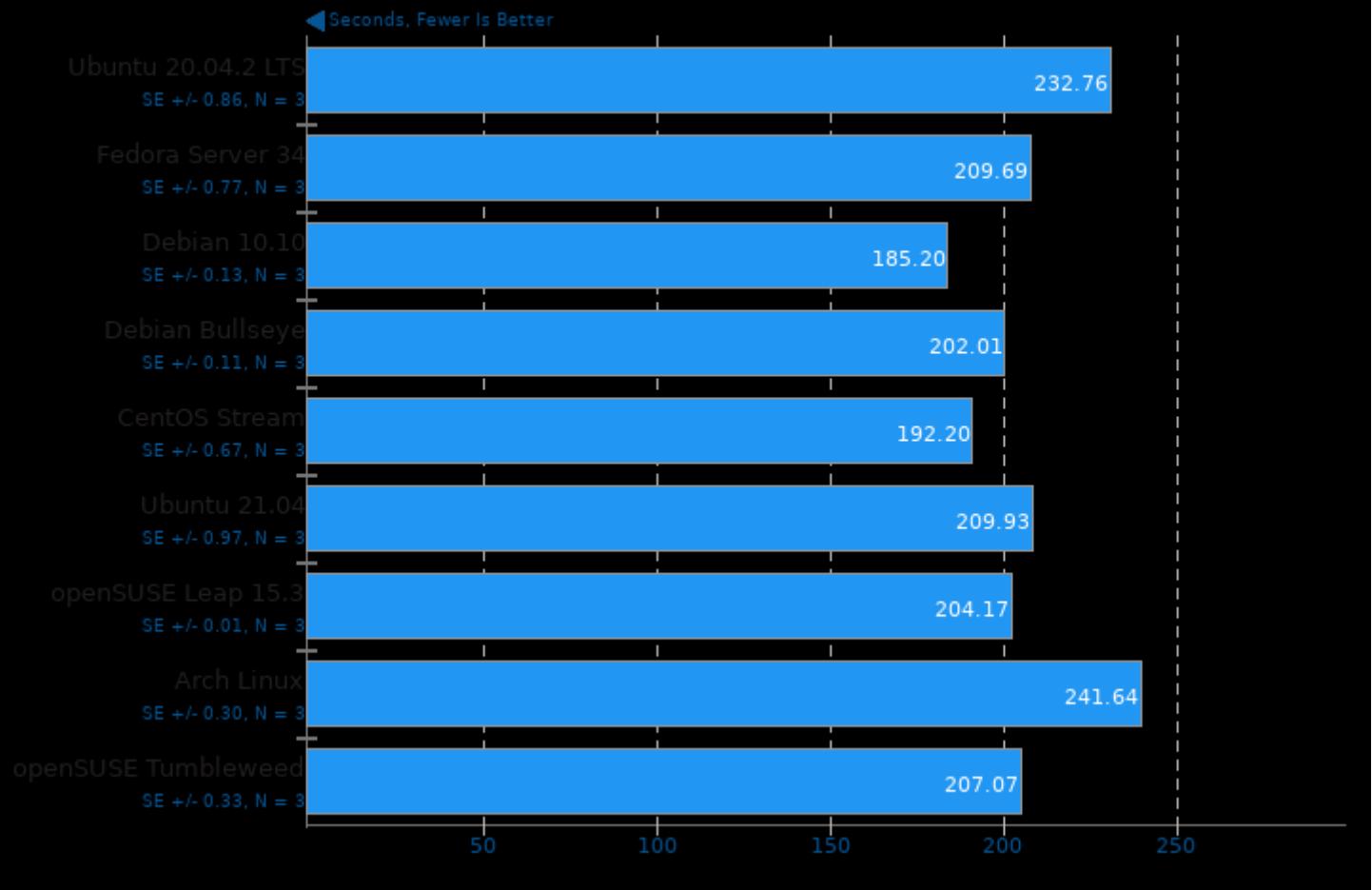
Timed Linux Kernel Compilation 5.10.20

Time To Compile



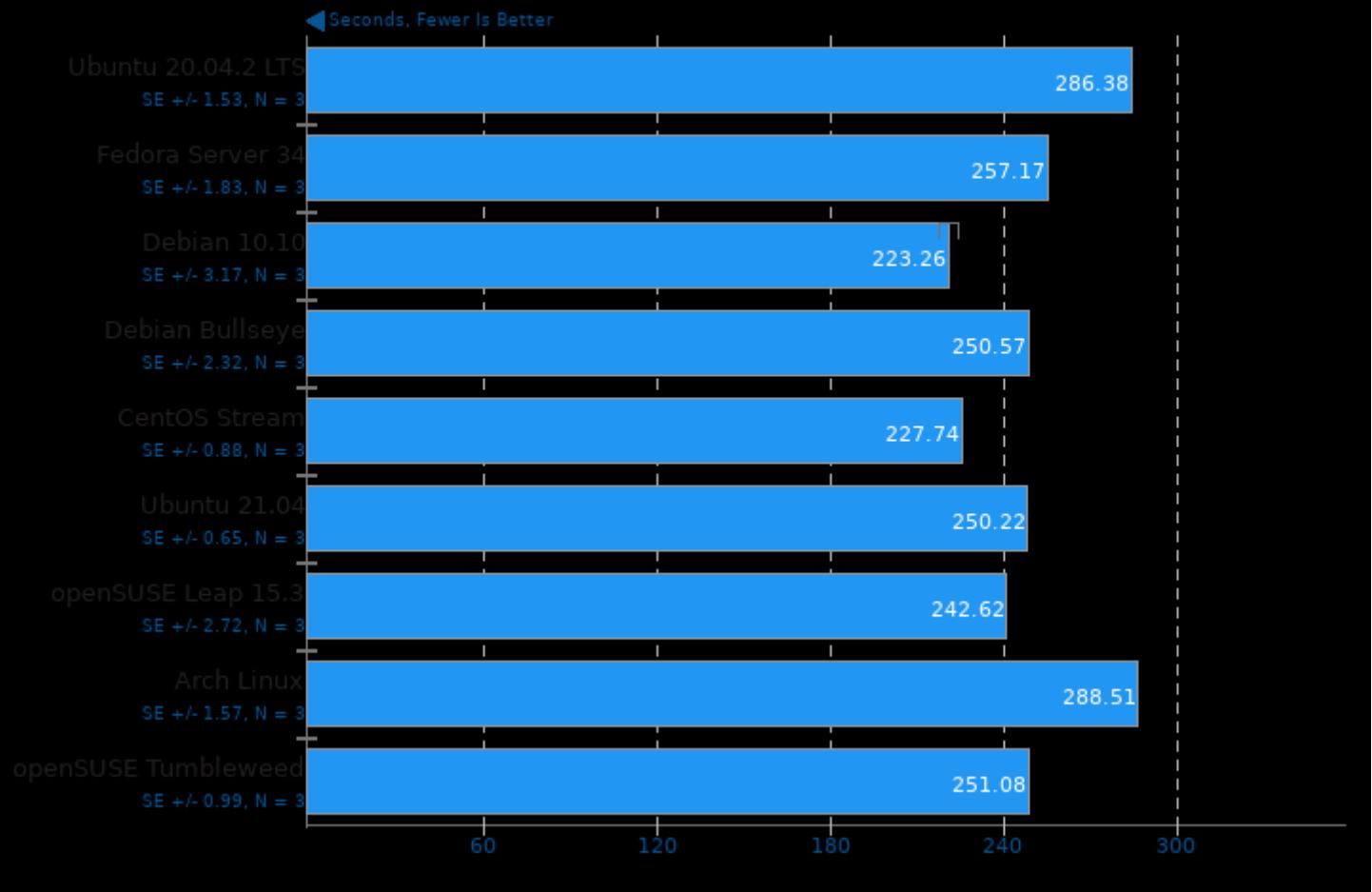
Timed LLVM Compilation 12.0

Build System: Ninja



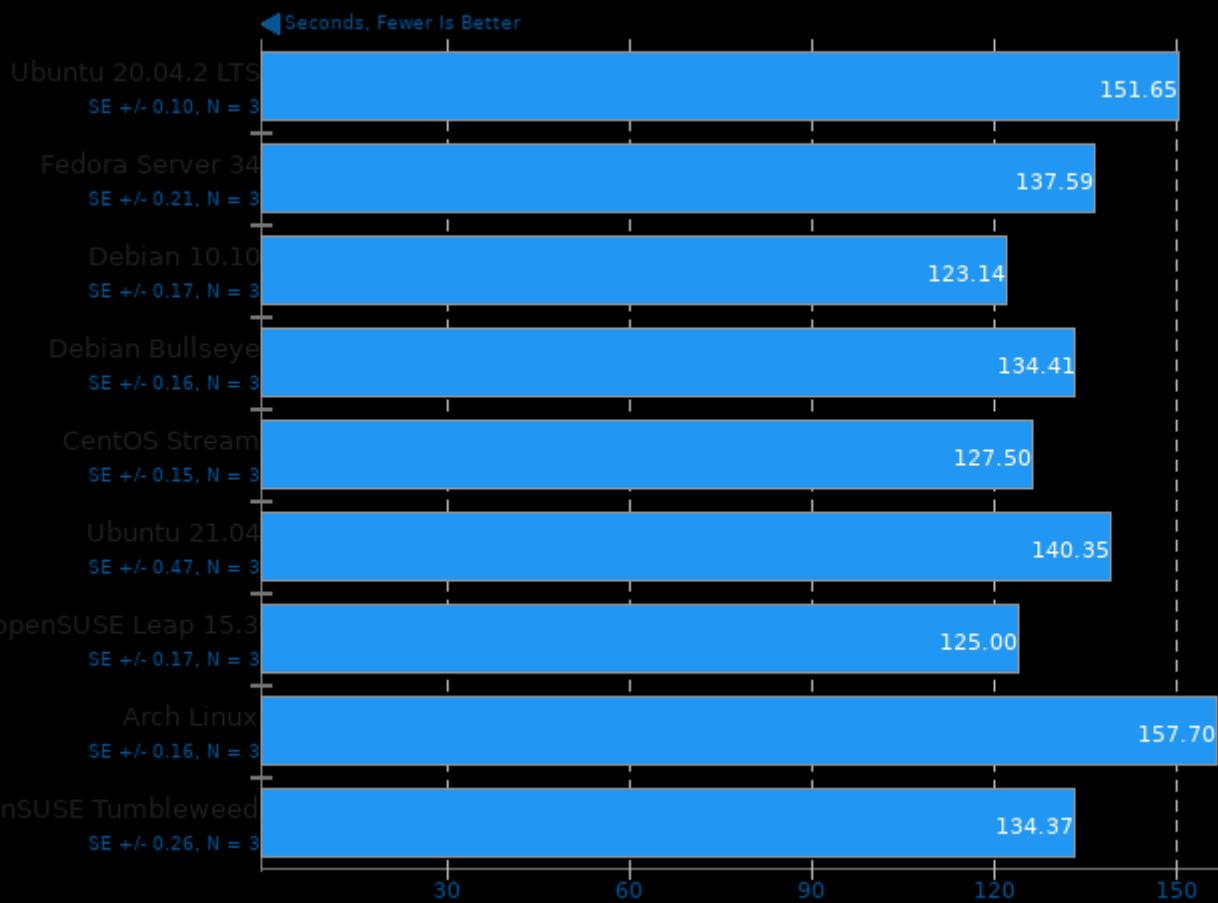
Timed LLVM Compilation 12.0

Build System: Unix Makefiles



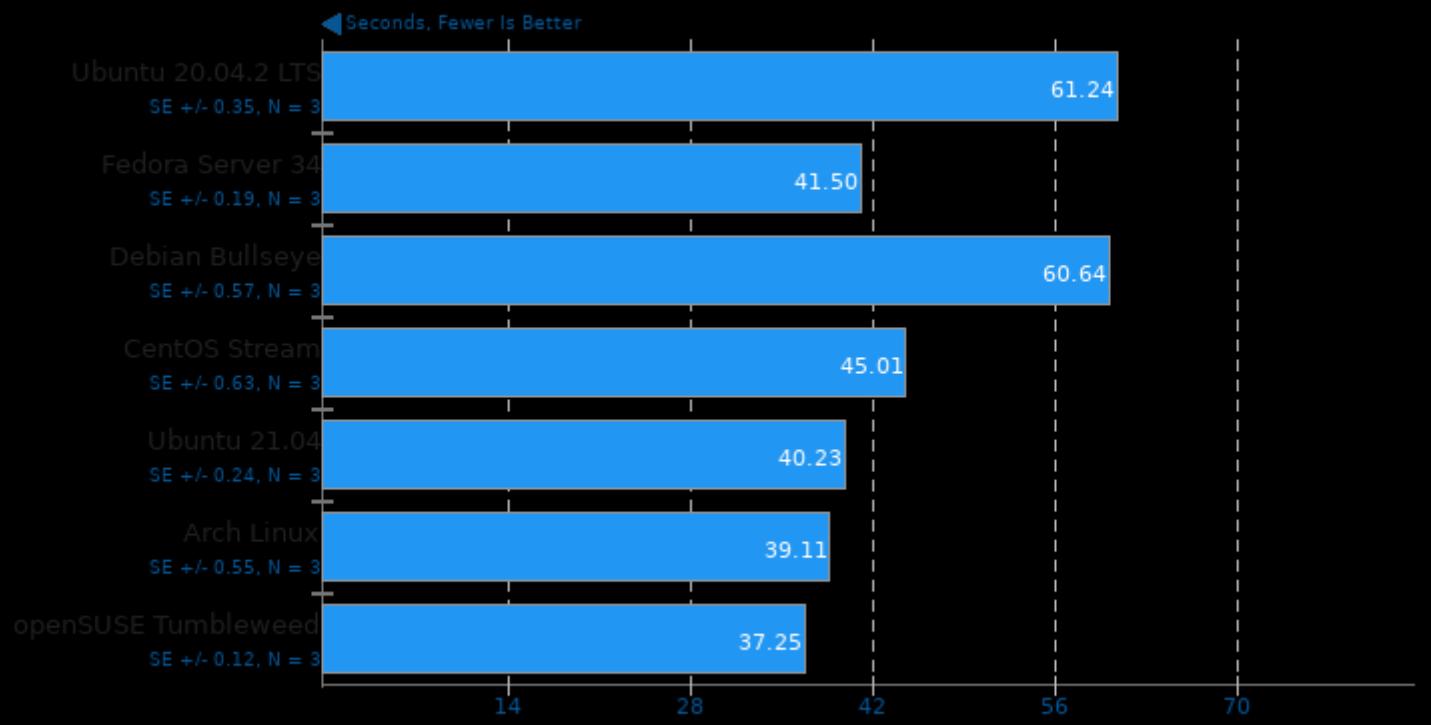
Timed Node.js Compilation 15.11

Time To Compile



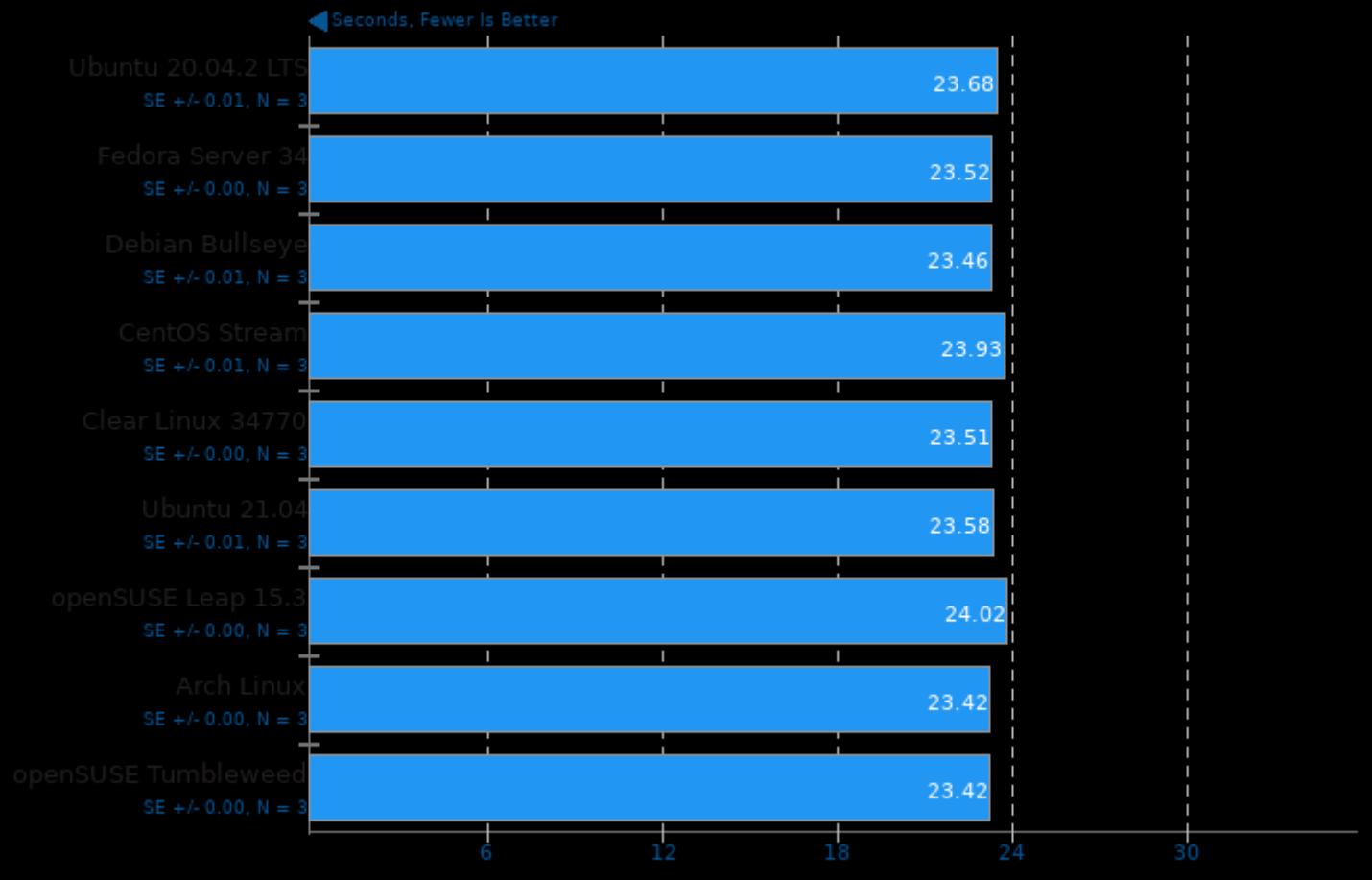
Timed Wasmer Compilation 1.0.2

Time To Compile



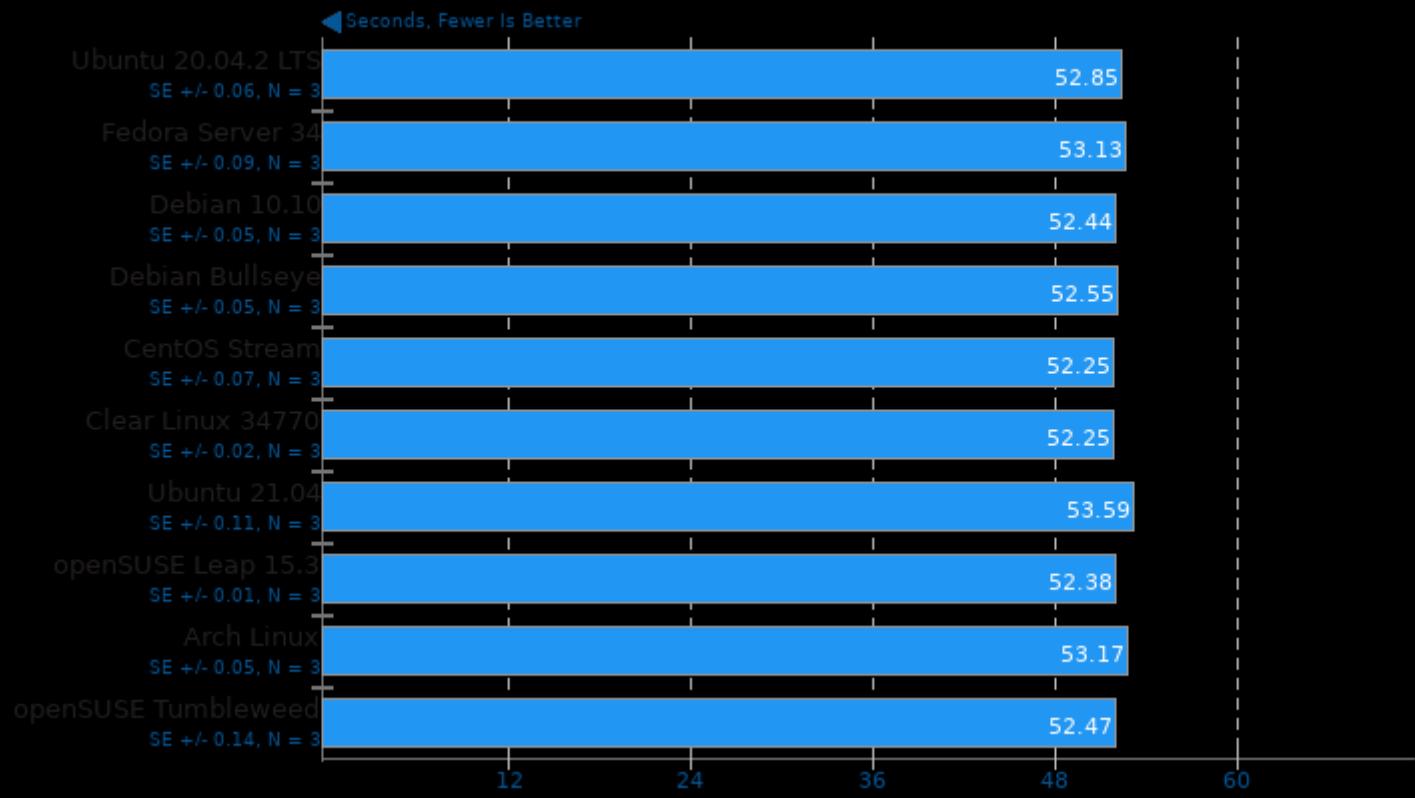
ASTC Encoder 3.0

Preset: Exhaustive



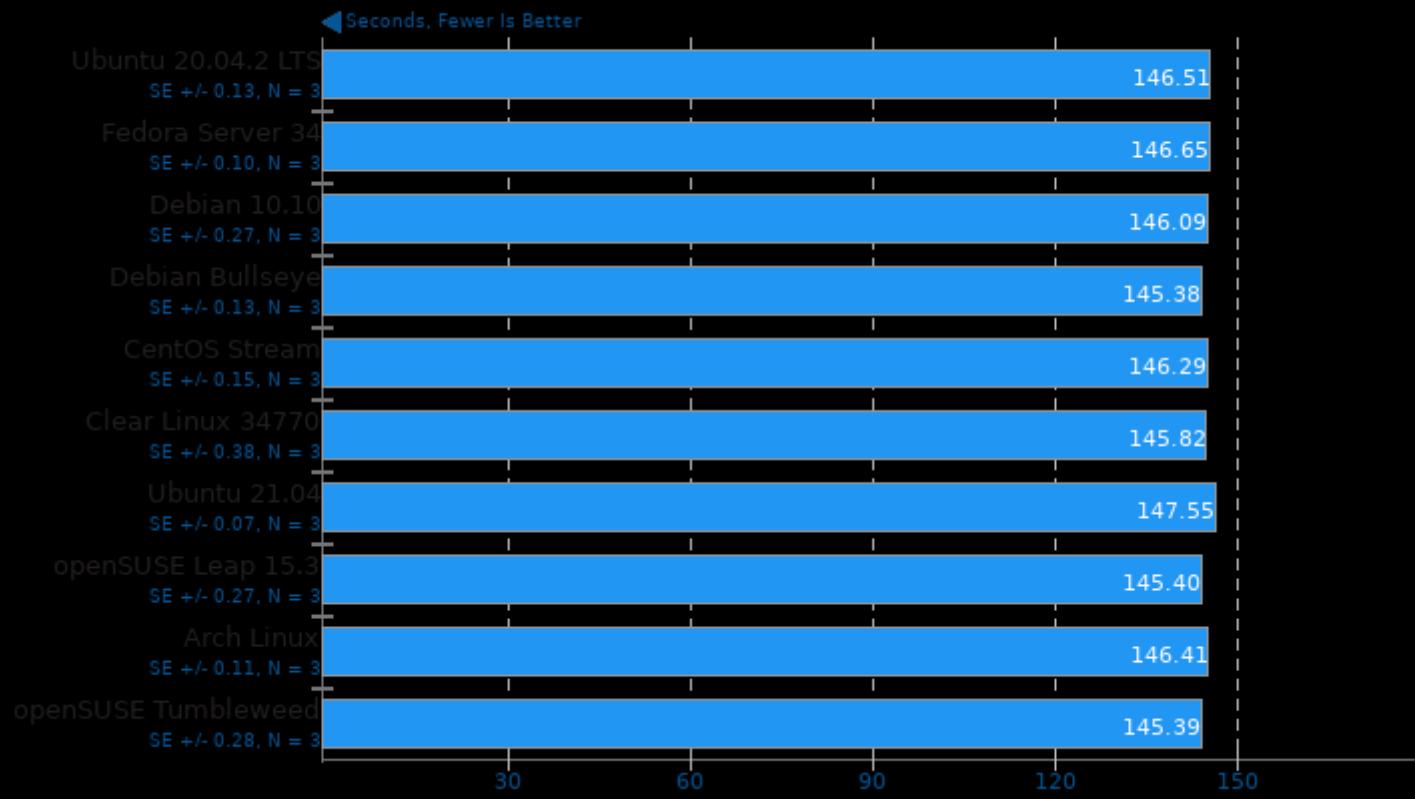
Blender 2.92

Blend File: BMW27 - Compute: CPU-Only



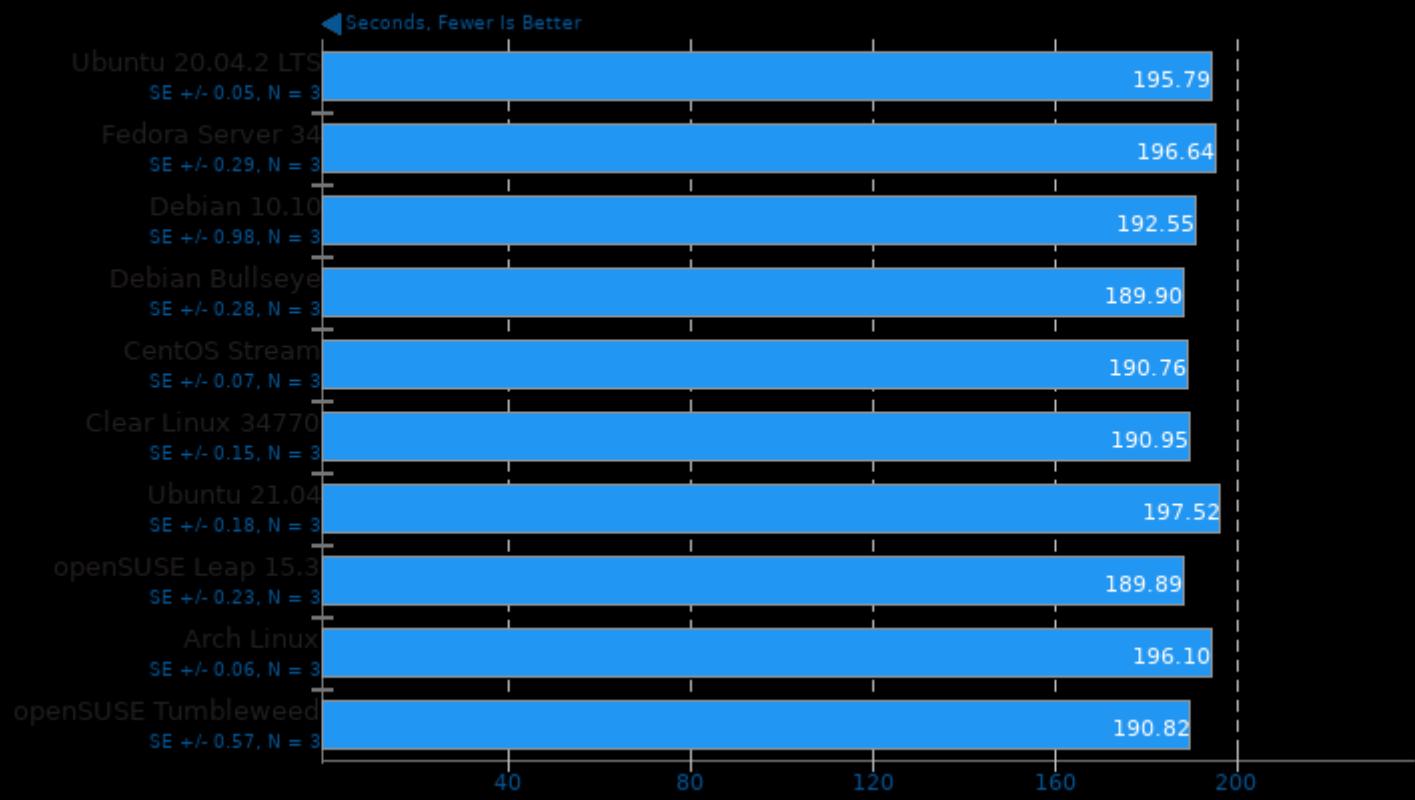
Blender 2.92

Blend File: Classroom - Compute: CPU-Only



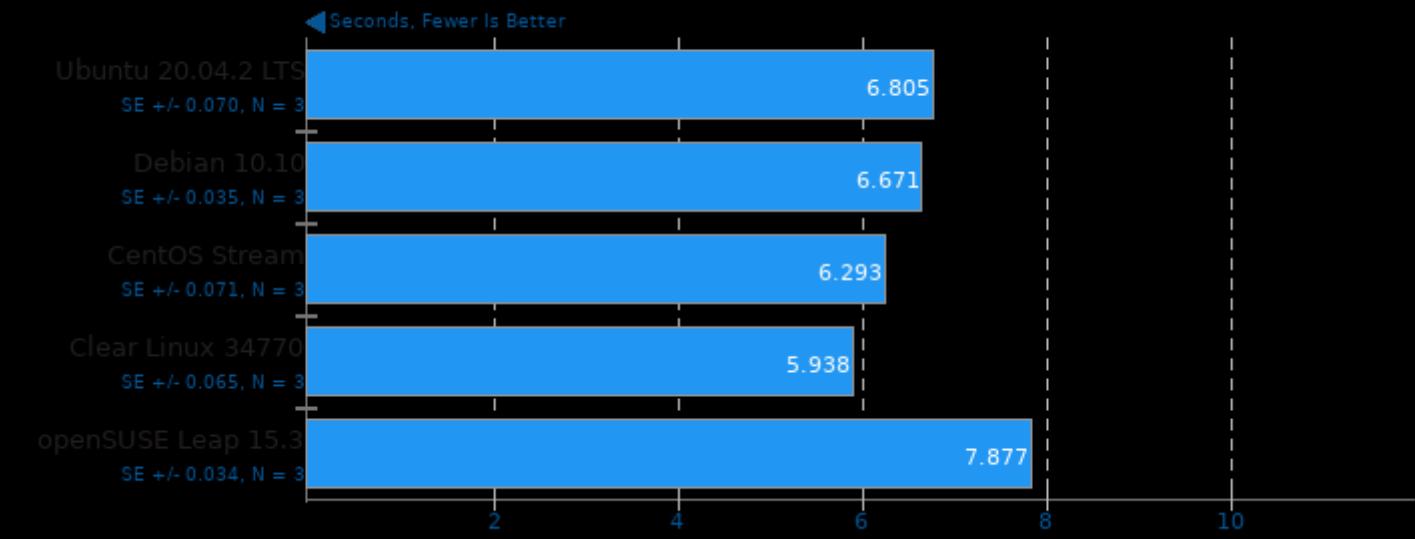
Blender 2.92

Blend File: Barbershop - Compute: CPU-Only

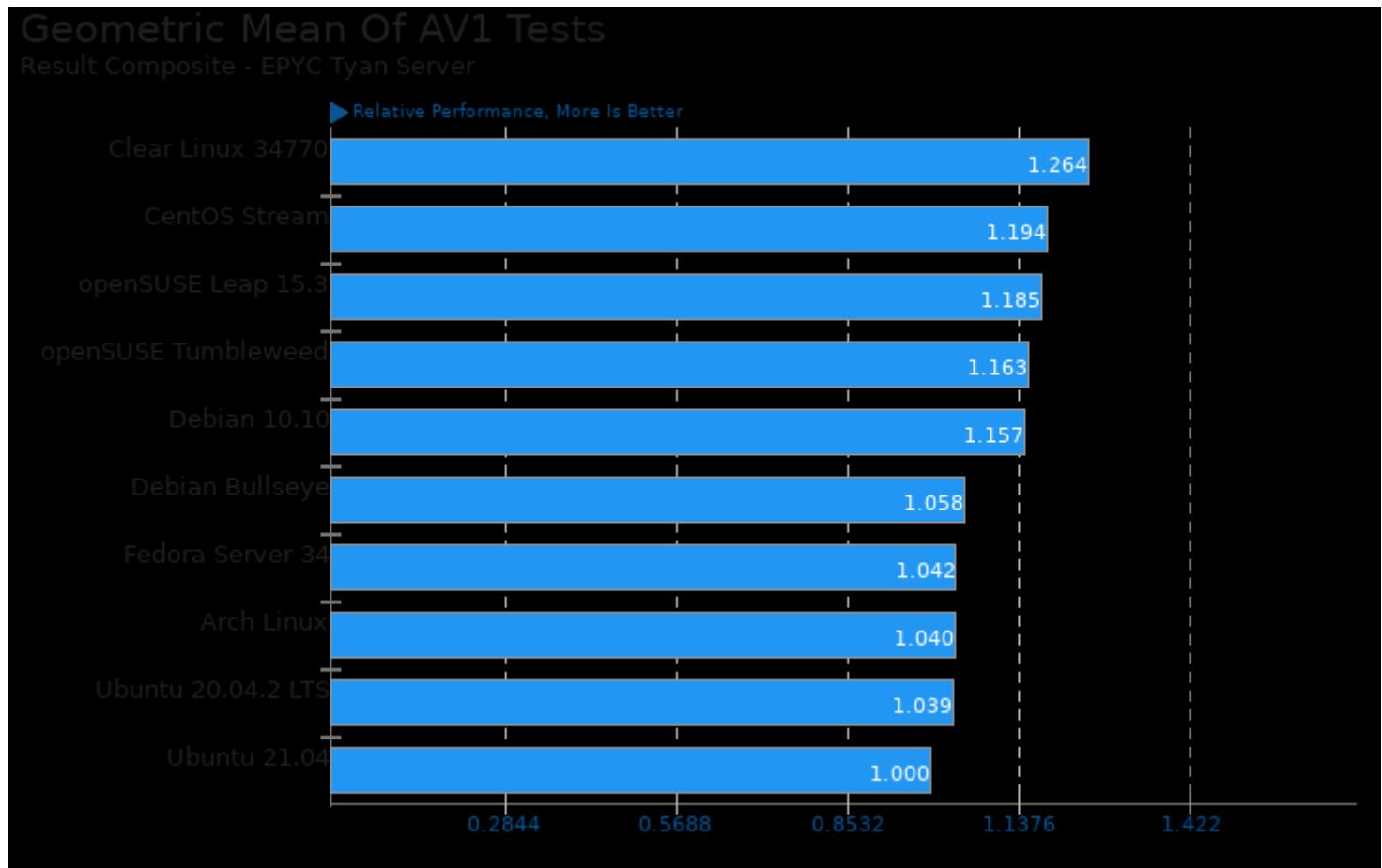


Numenta Anomaly Benchmark 1.1

Detector: Windowed Gaussian



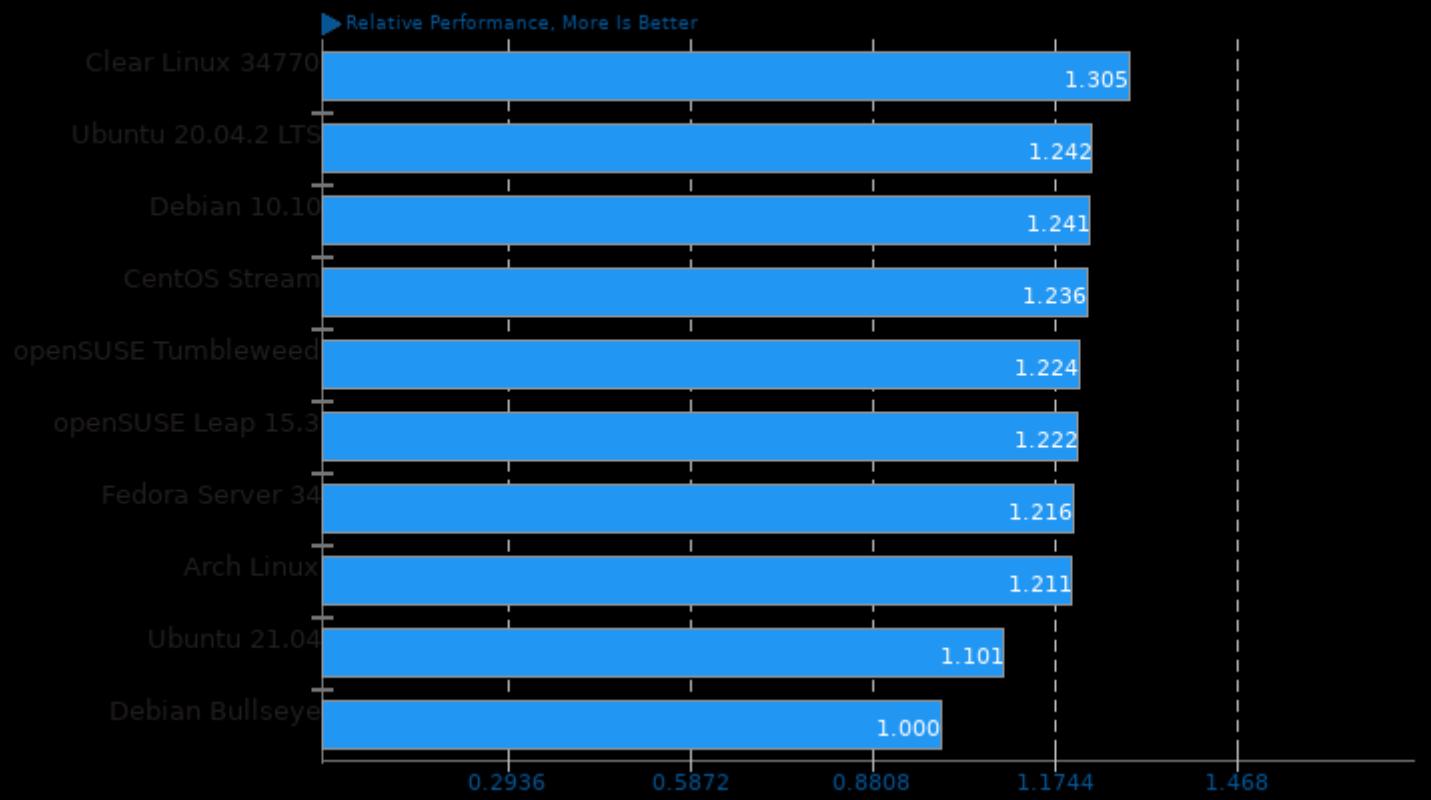
These geometric means are based upon test groupings / test suites for this result file.



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

Geometric Mean Of C/C++ Compiler Tests

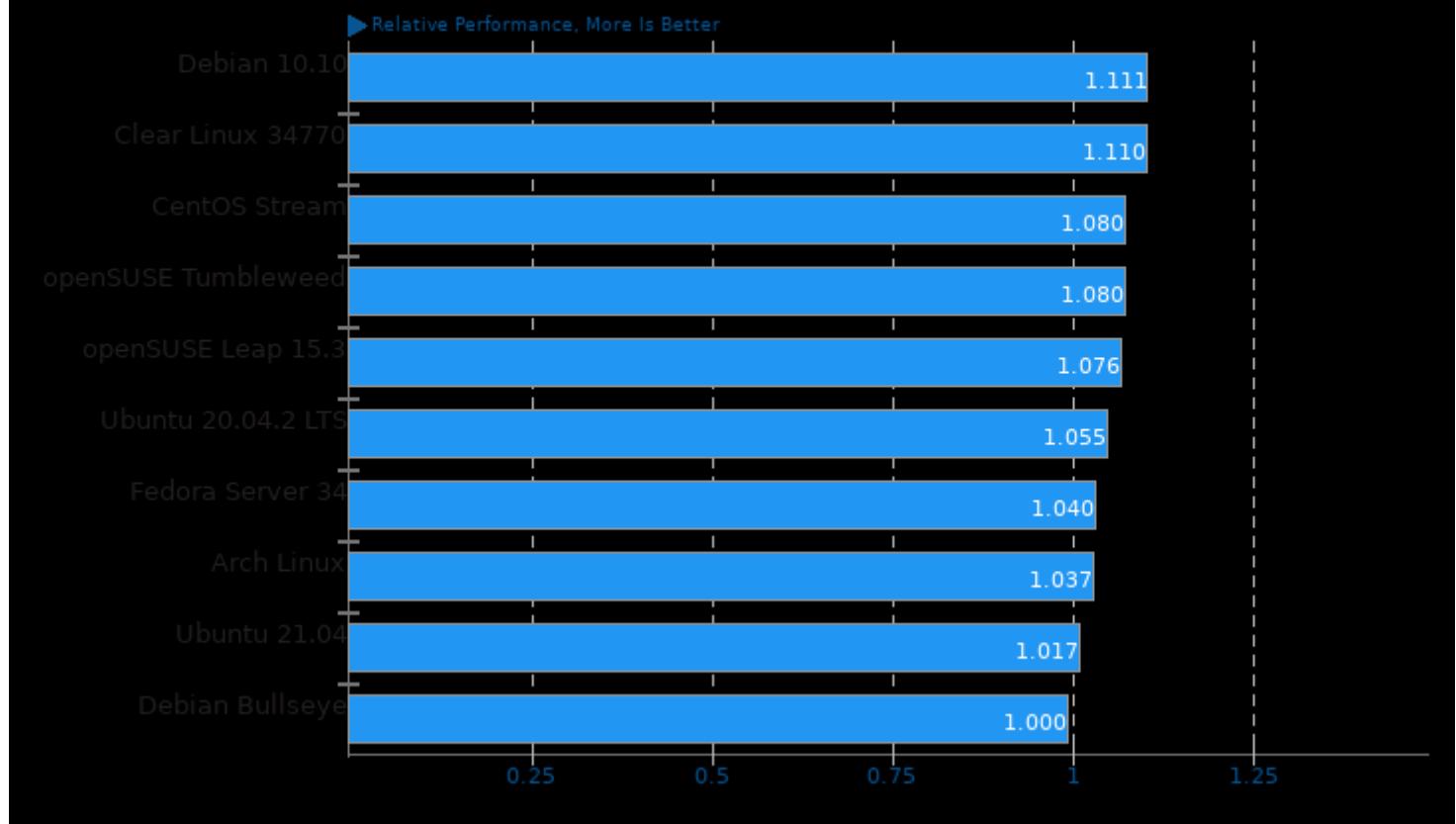
Result Composite - EPYC Tyan Server



Geometric mean based upon tests: pts/vpxenc, pts/build-llvm, pts/svt-av1, pts/svt-vp9 and pts/gromacs

Geometric Mean Of CPU Massive Tests

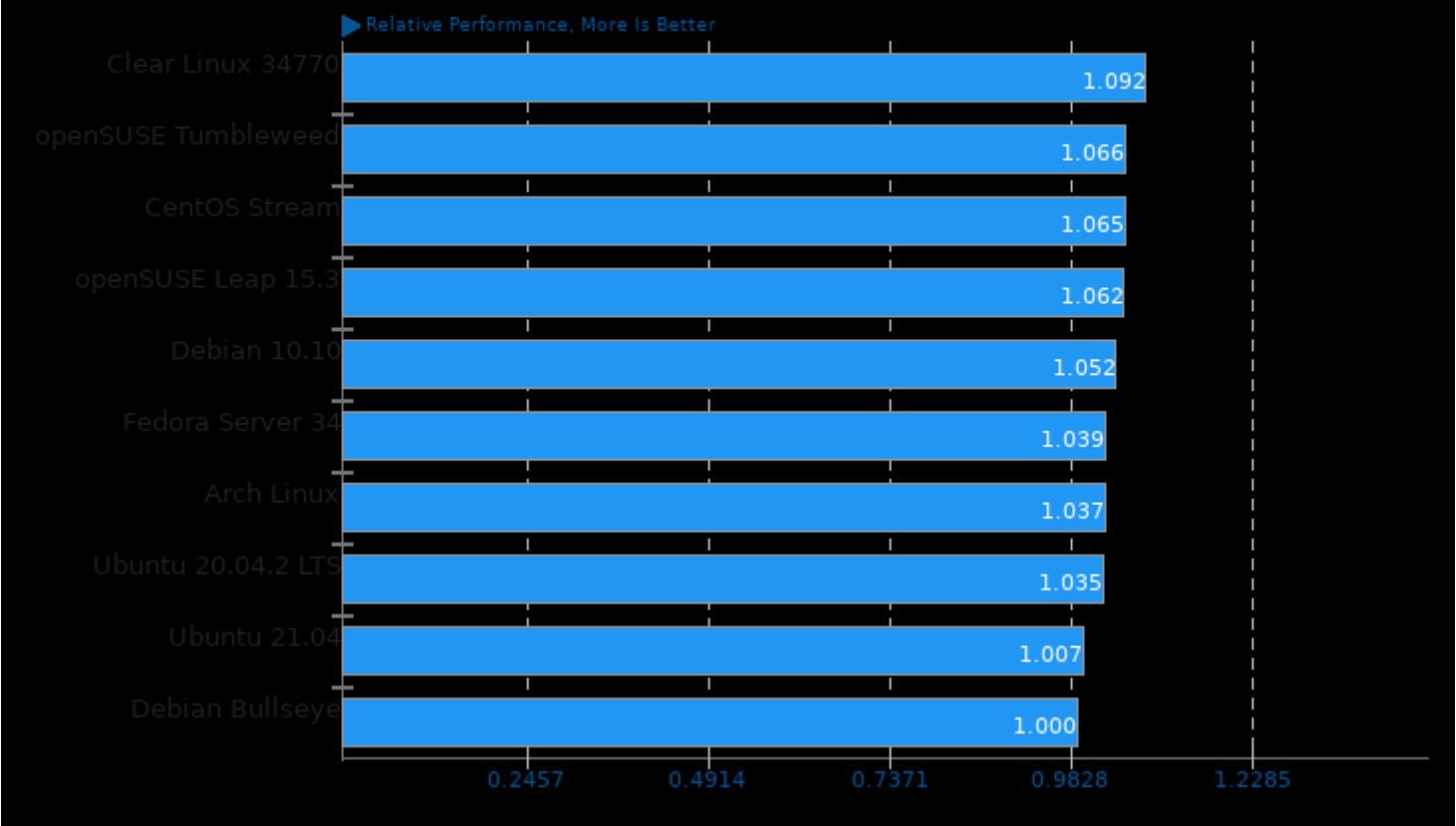
Result Composite - EPYC Tyan Server



Geometric mean based upon tests: pts/brl-cad, pts/build-llvm, pts/build-linux-kernel, pts/svt-av1, pts/svt-hevc, pts/svt-vp9, pts/vpxenc, pts/hpcg, pts/namd, pts/npb, pts/numenta-nab, pts/plaidml and pts/blender

Geometric Mean Of Creator Workloads Tests

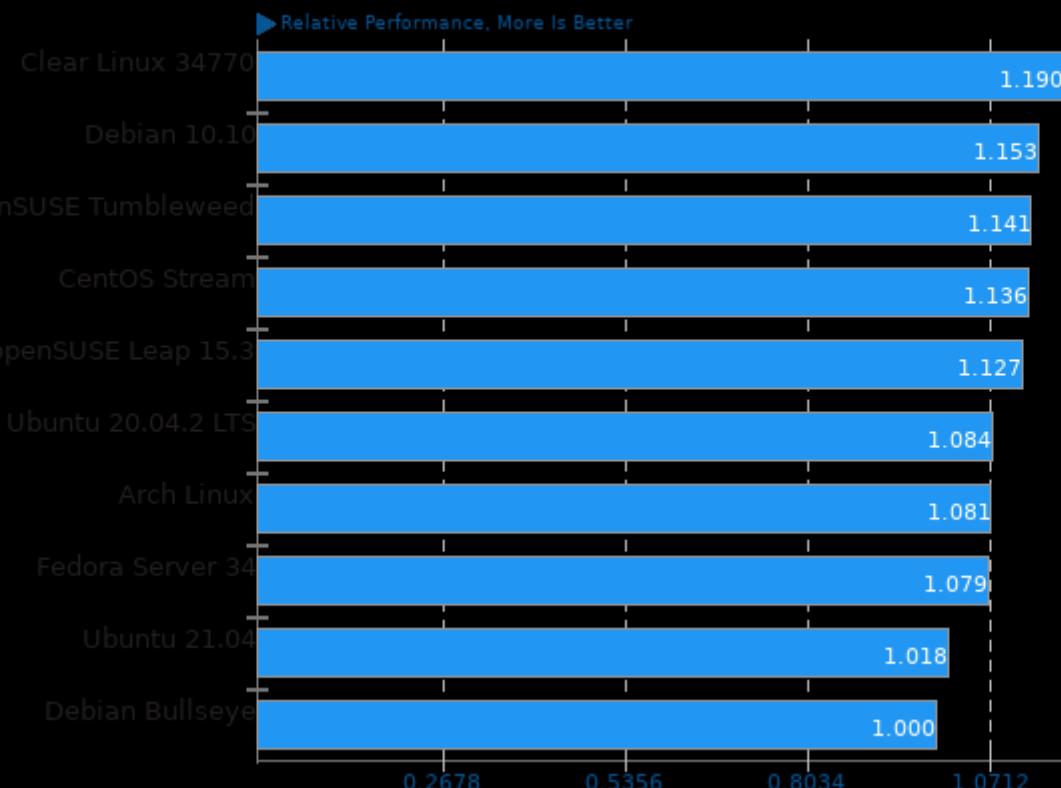
Result Composite - EPYC Tyan Server



Geometric mean based upon tests: pts/ospray, pts/blender, pts/luxcorerender, pts/svt-vp9, pts/svt-hevc, pts/vpxenc, pts/svt-av1, pts/avifenc, pts/embree, pts/oidn, pts/openvkl, pts/astcenc, pts/build-godot and pts/brl-cad

Geometric Mean Of Encoding Tests

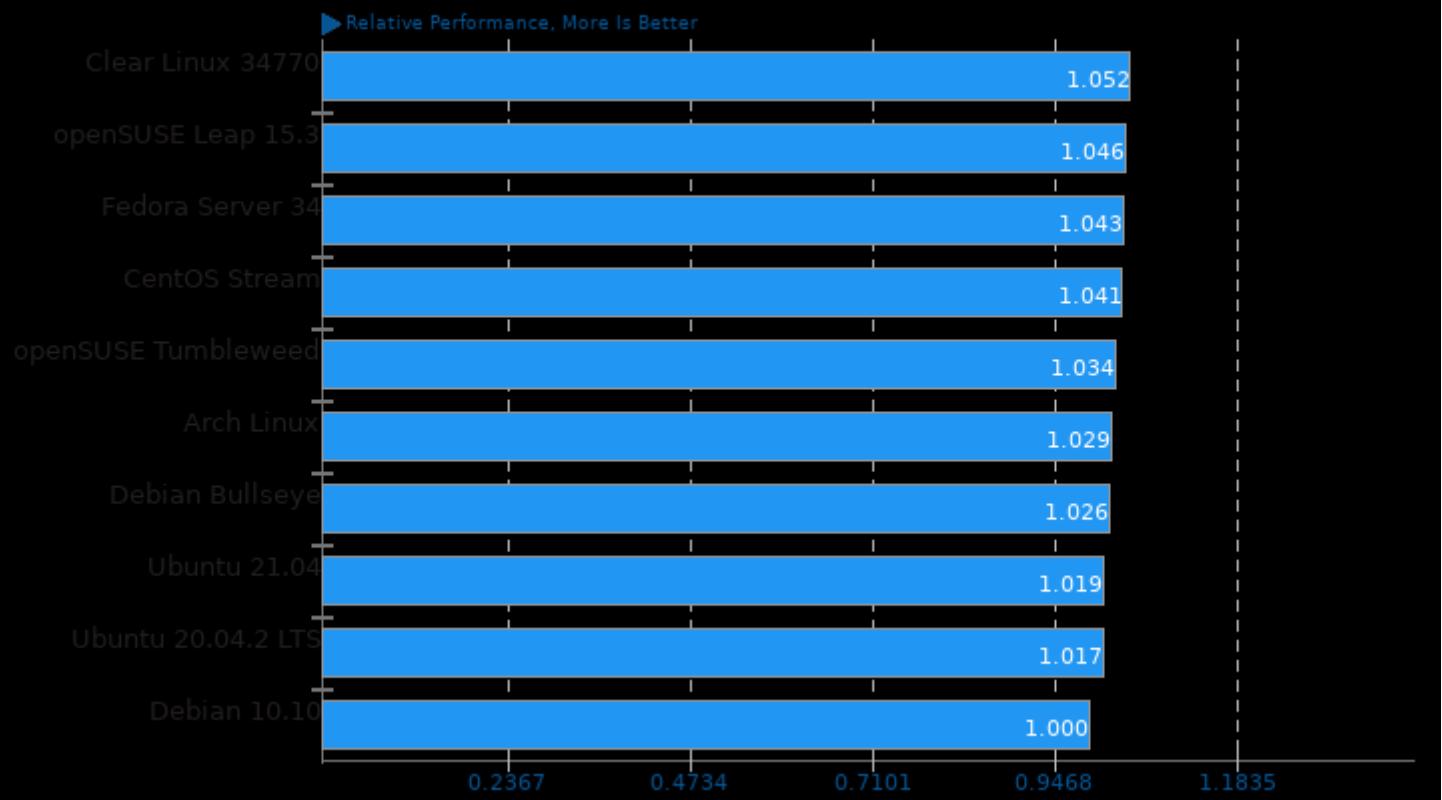
Result Composite - EPYC Tyan Server



Geometric mean based upon tests: pts/svt-vp9, pts/svt-hevc, pts/vpxenc, pts/svt-av1 and pts/avifenc

Geometric Mean Of Game Development Tests

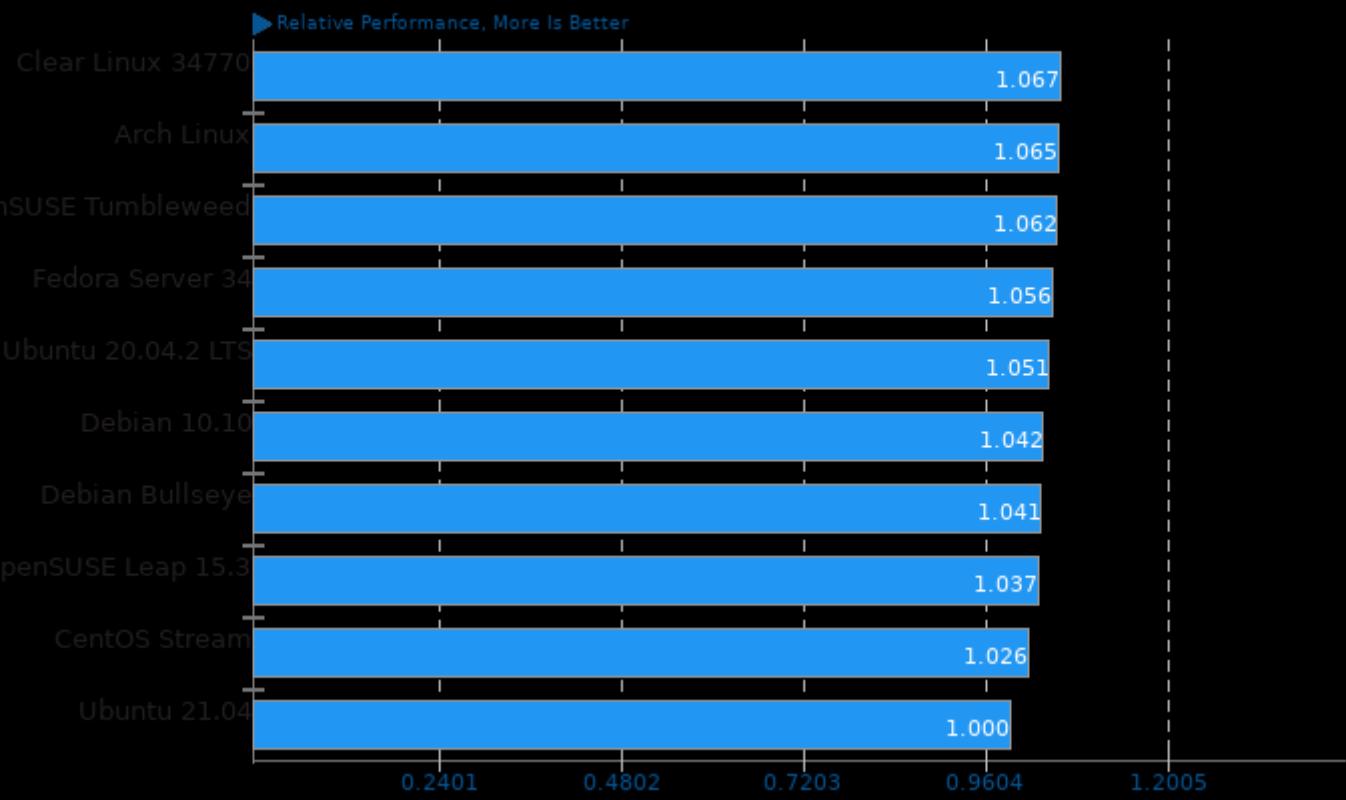
Result Composite - EPYC Tyan Server



Geometric mean based upon tests: pts/astcenc, pts/build-godot, pts/blender, pts/oidn and pts/openvkl

Geometric Mean Of HPC - High Performance Computing Tests

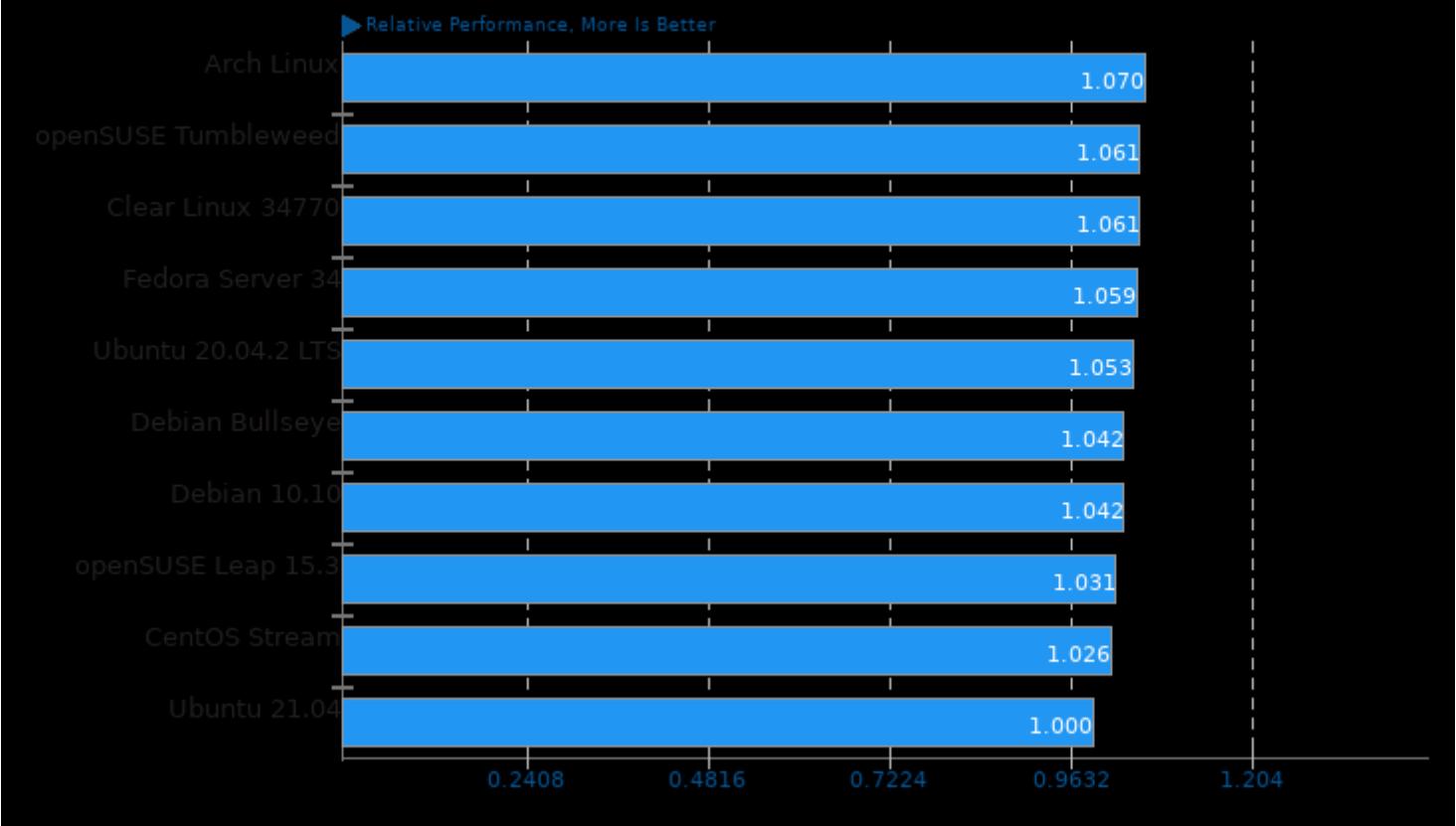
Result Composite - EPYC Tyan Server



Geometric mean based upon tests: pts/npb, pts/hpcg, pts/namd, pts/gromacs, pts/minife, pts/incompact3d, pts/kripke, pts/mnn, pts/tnn, pts/numenta-nab, pts/tensorflow-lite, pts/onnx and pts/plaidml

Geometric Mean Of Machine Learning Tests

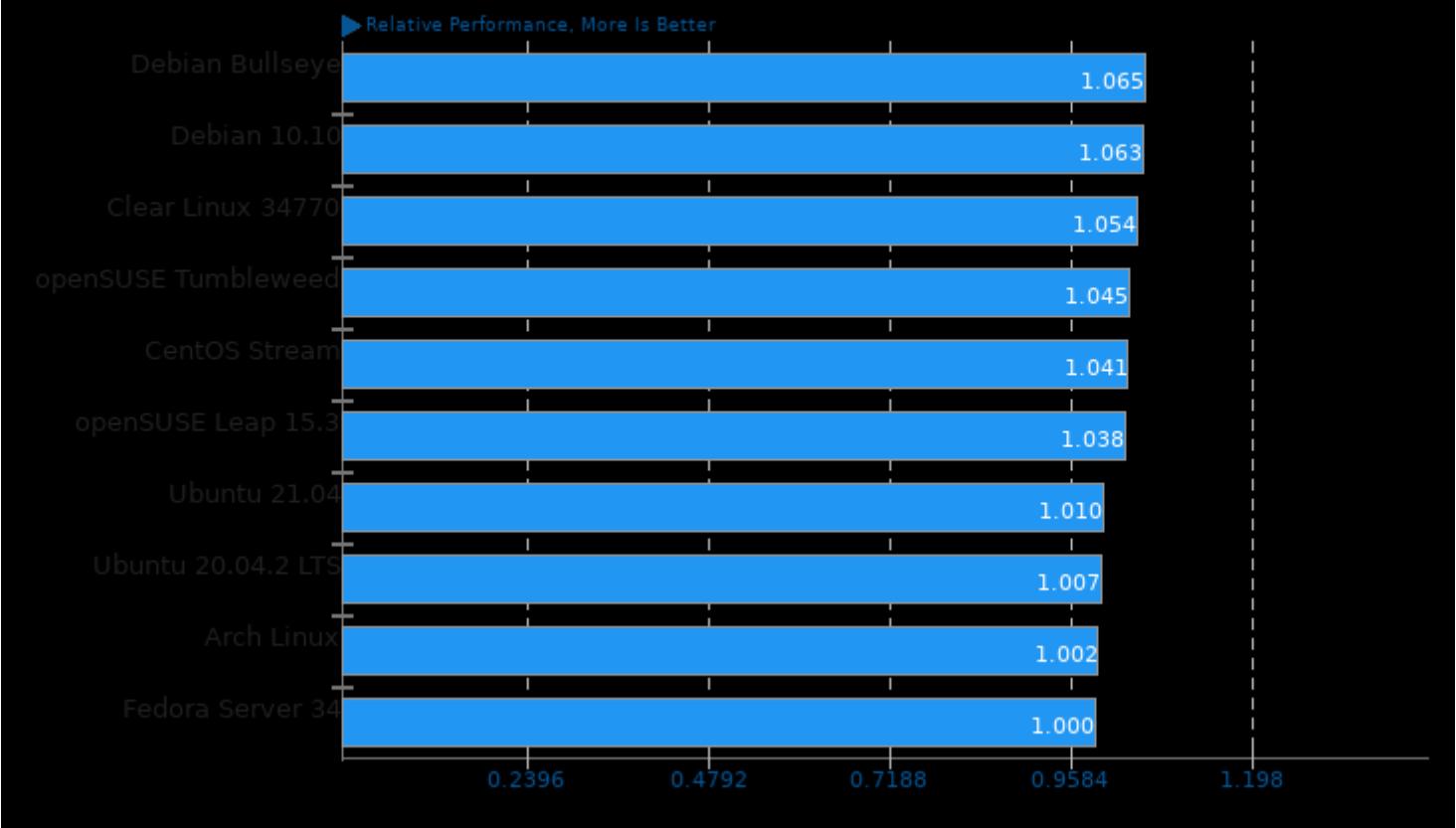
Result Composite - EPYC Tyan Server



Geometric mean based upon tests: pts/mnn, pts/tnn, pts/numenta-nab, pts/tensorflow-lite, pts/onnx and pts/plaidml

Geometric Mean Of NVIDIA GPU Compute Tests

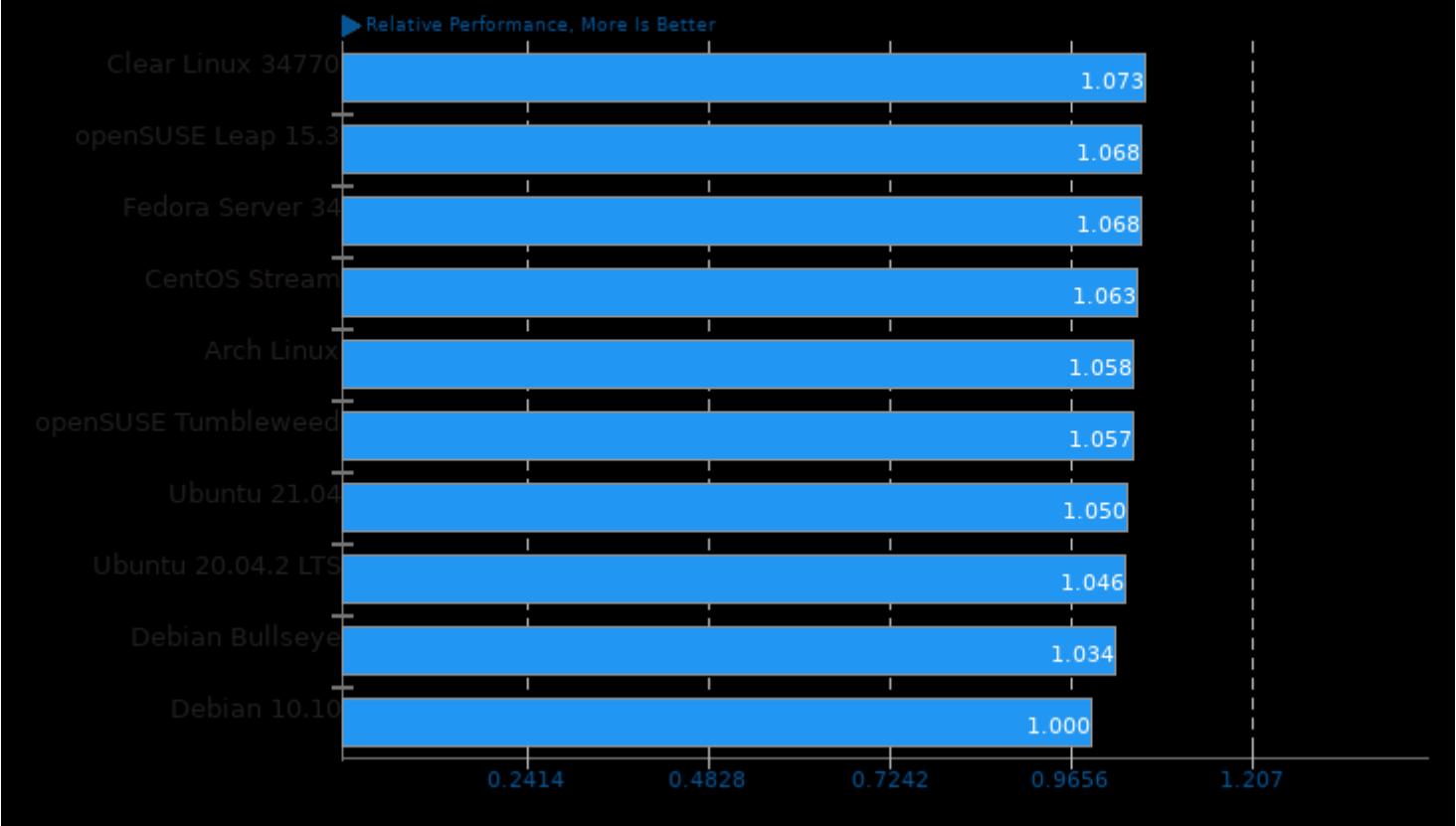
Result Composite - EPYC Tyan Server



Geometric mean based upon tests: pts/gromacs, pts/luxcorerender, pts/plaidml and pts/blender

Geometric Mean Of Intel oneAPI Tests

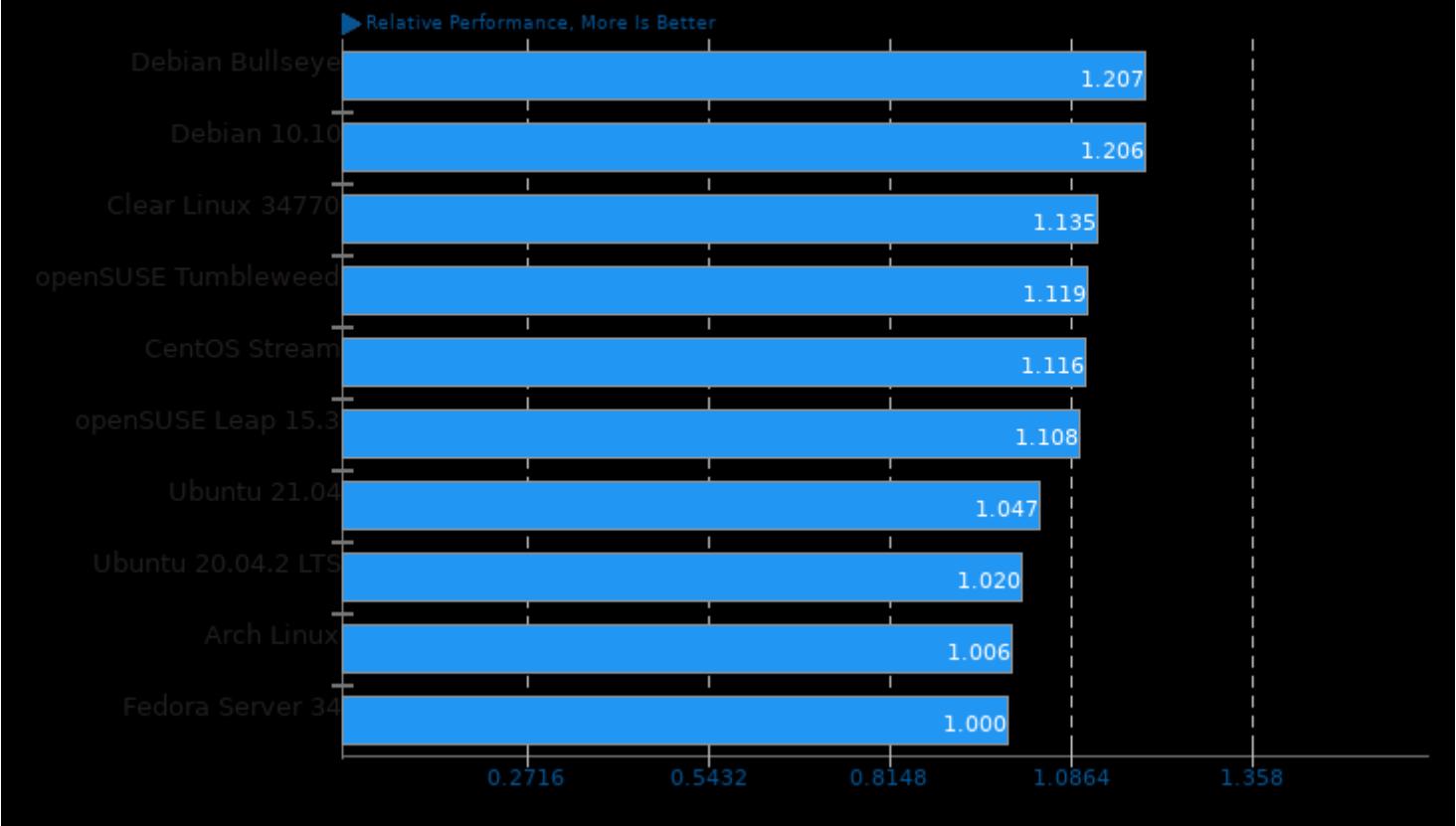
Result Composite - EPYC Tyan Server



Geometric mean based upon tests: pts/embree, pts/oidn, pts/ospray and pts/openvkl

Geometric Mean Of Python Tests

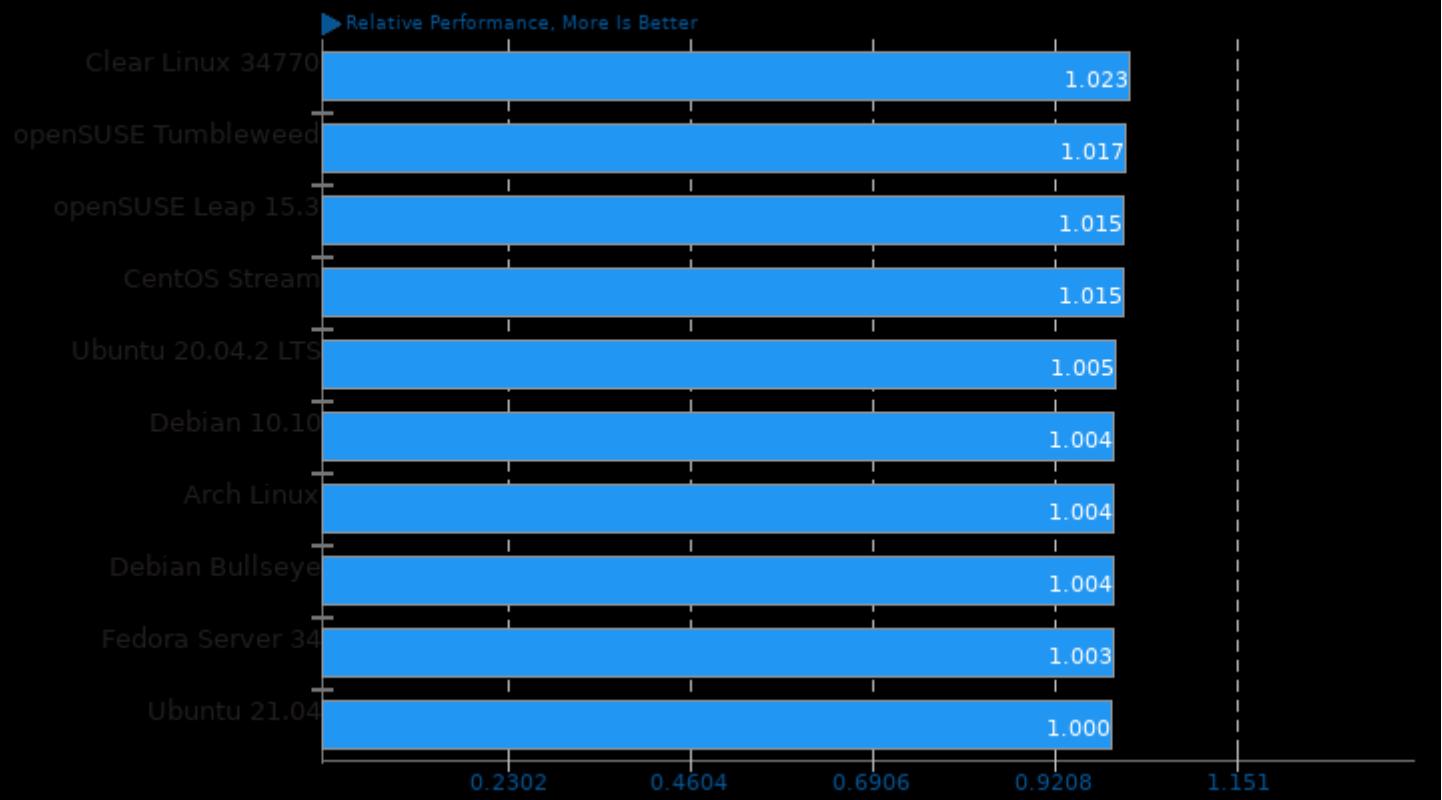
Result Composite - EPYC Tyan Server



Geometric mean based upon tests: pts/plaidml, pts/onnx, pts/build-godot, pts/build-llvm, pts/build-nodejs and pts/numamenta-nab

Geometric Mean Of Renderers Tests

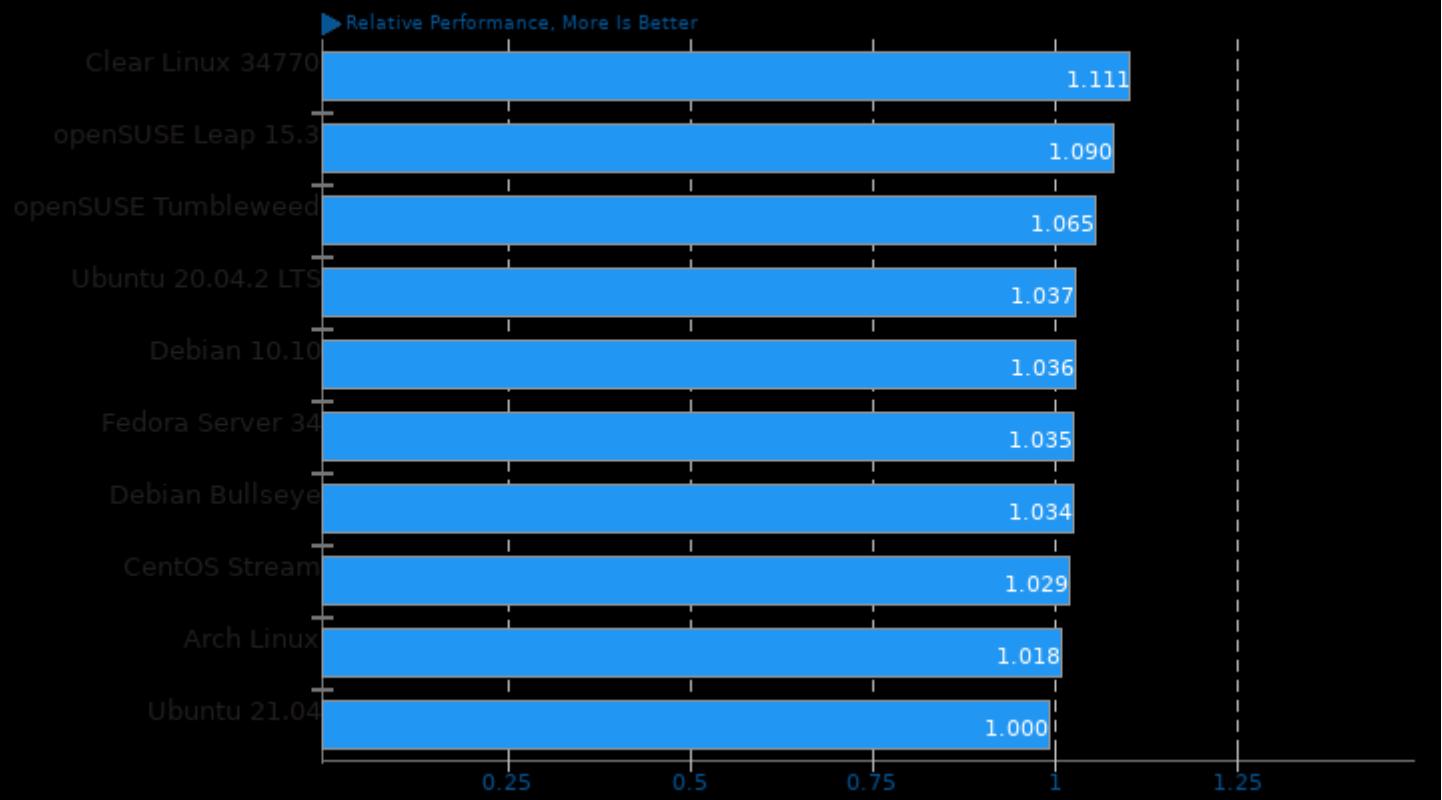
Result Composite - EPYC Tyan Server



Geometric mean based upon tests: pts/ospray, pts/blender and pts/luxcorerender

Geometric Mean Of Scientific Computing Tests

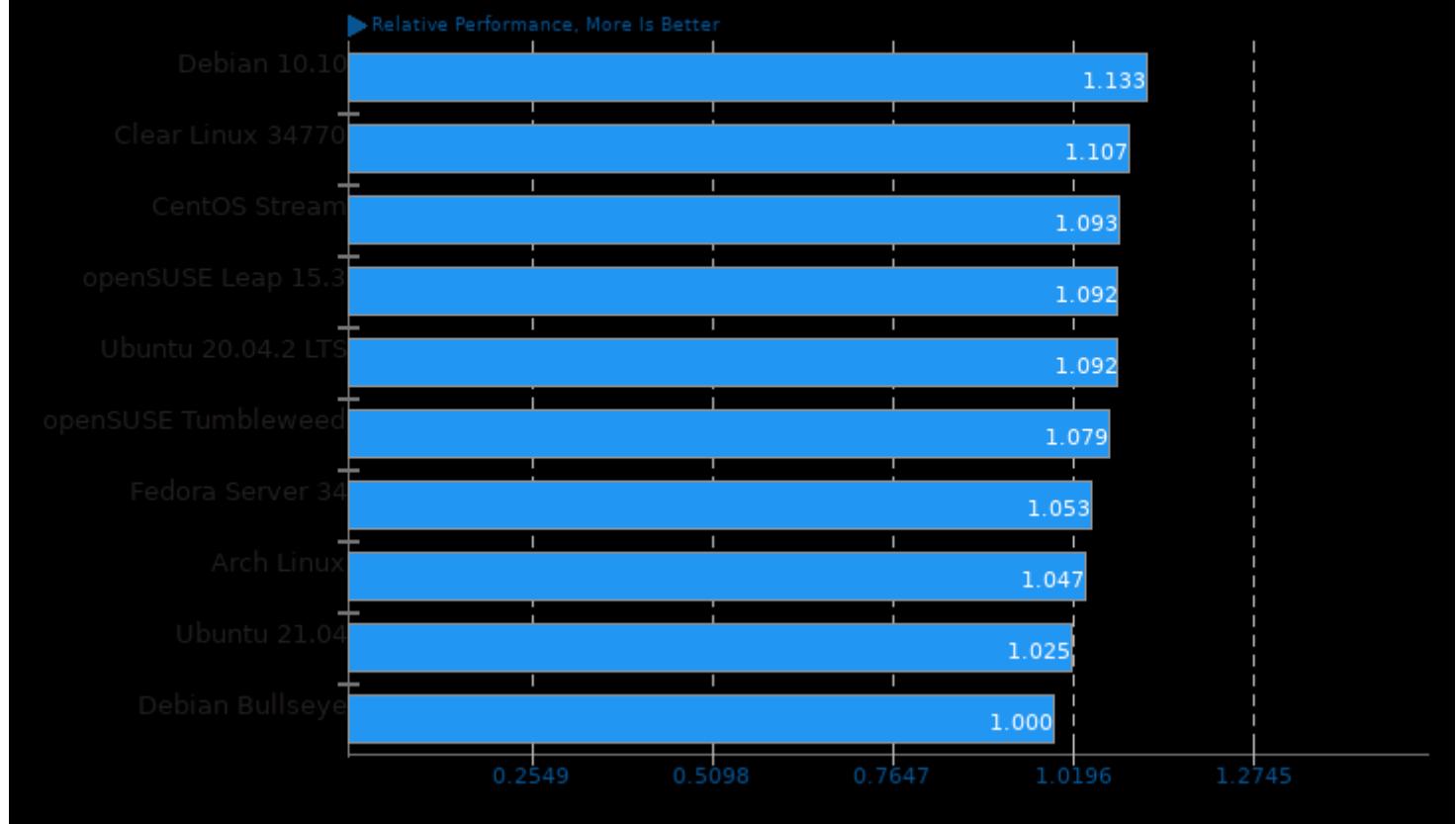
Result Composite - EPYC Tyan Server



Geometric mean based upon tests: pts/namd, pts/gromacs, pts/minife, pts/incompact3d and pts/kripke

Geometric Mean Of Server CPU Tests

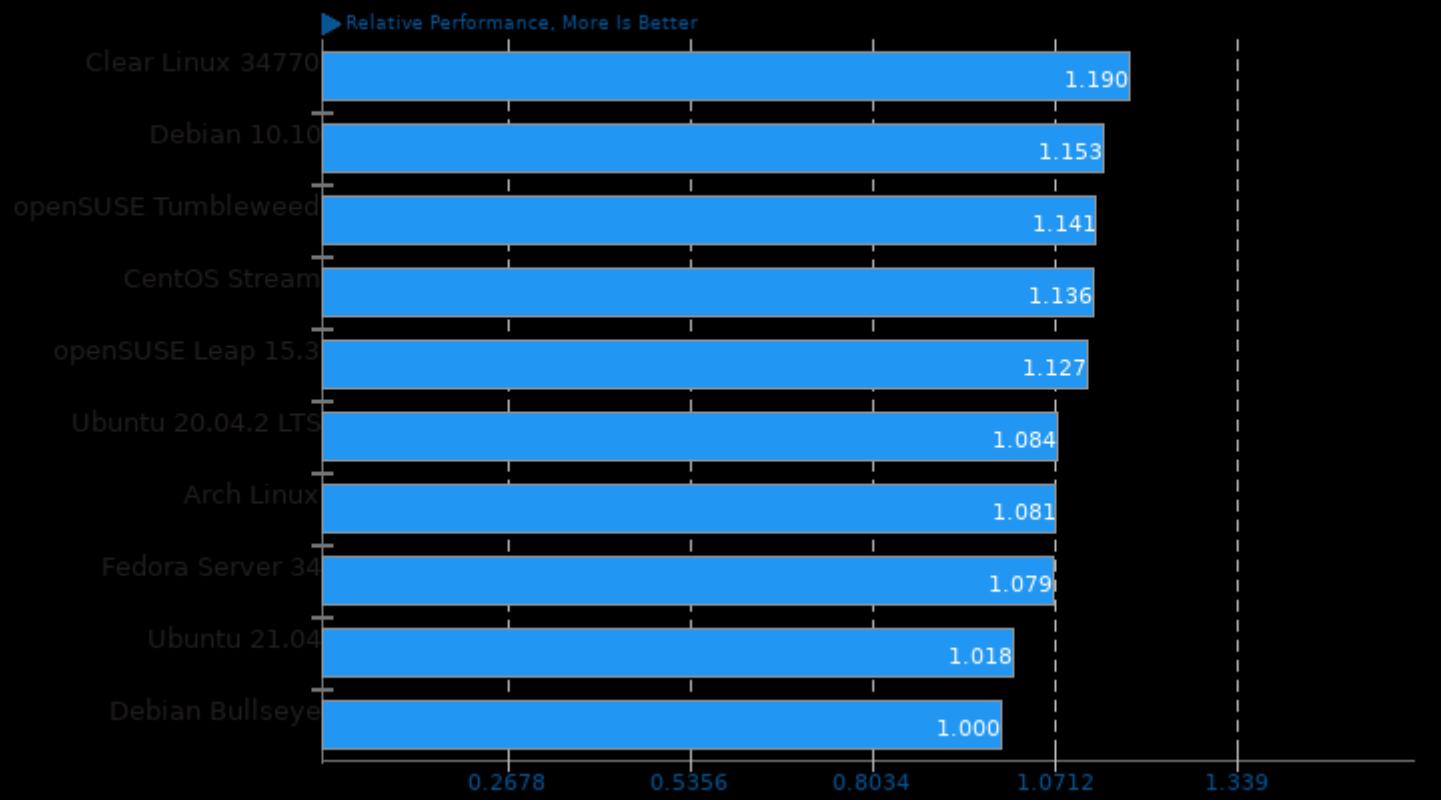
Result Composite - EPYC Tyan Server



Geometric mean based upon tests: pts/npb, pts/namd, pts/svt-av1, pts/svt-hevc, pts/svt-vp9, pts/build-linux-kernel, pts/build-llvm, pts/blender and pts/numerata-nab

Geometric Mean Of Video Encoding Tests

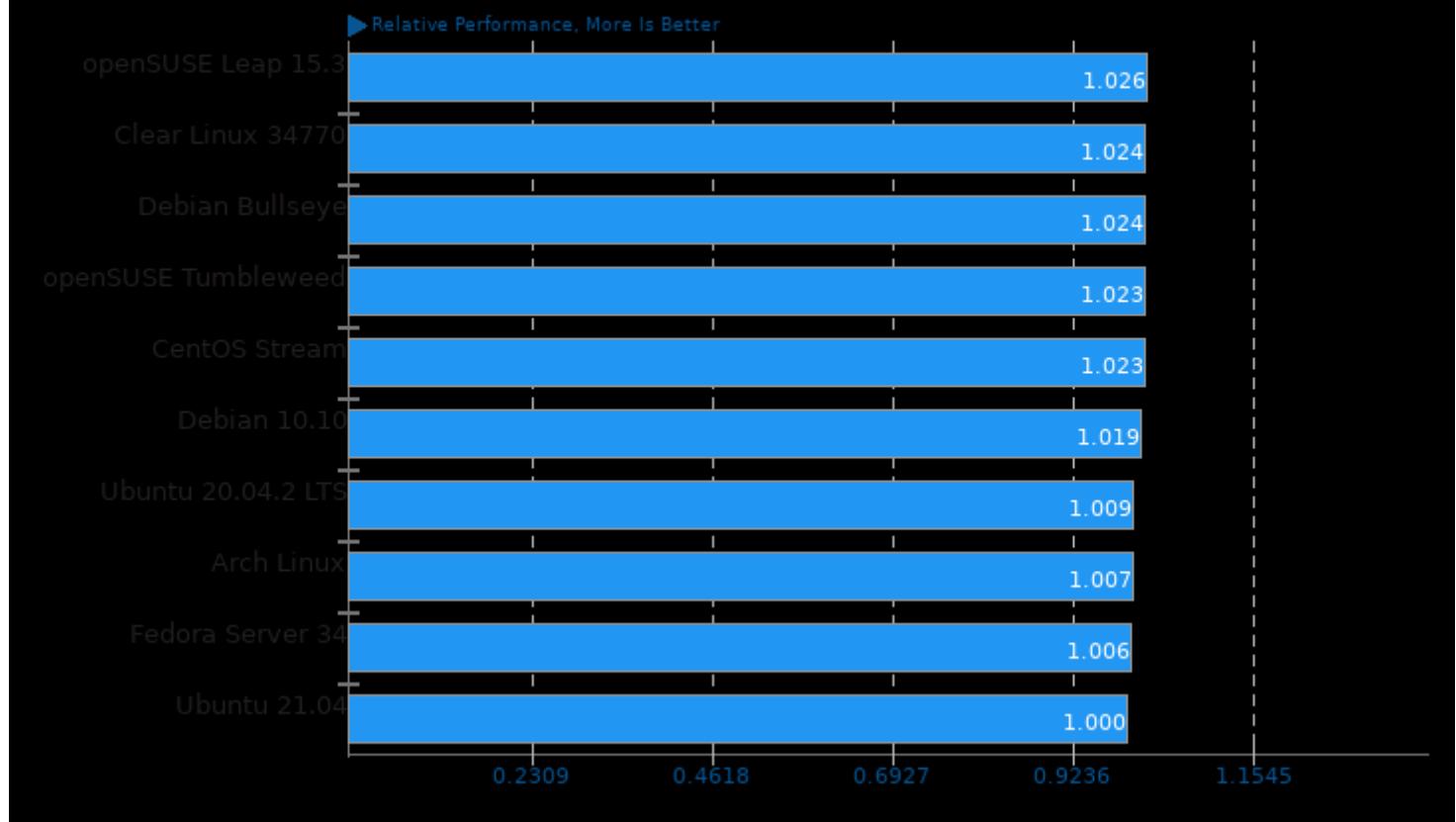
Result Composite - EPYC Tyan Server



Geometric mean based upon tests: pts/svt-vp9, pts/svt-hevc, pts/vpxenc, pts/svt-av1 and pts/avifenc

Geometric Mean Of Common Workstation Benchmarks Tests

Result Composite - EPYC Tyan Server



Geometric mean based upon tests: pts/blender and pts/brl-cad

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