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# EPYC Tyan Server

AMD EPYC 7543 32-Core testing with a TYAN S8036GM2NE-LE (V2.00.B21 BIOS) and ASPEED on openSUSE Leap 15.3 via the Phoronix Test Suite.

**Automated Executive Summary**

*Clear Linux 34770 had the most wins, coming in first place for 32% of the tests.*

*Based on the geometric mean of all complete results, the fastest (Clear Linux 34770) was 1.086x the speed of the slowest (Fedora Server 34). Debian 10.10 was 0.972x the speed of Clear Linux 34770, Ubuntu 20.04.2 LTS was 0.991x the speed of Debian 10.10, Debian Bullseye was 0.979x the speed of Ubuntu 20.04.2 LTS, Ubuntu 21.04 was 0.988x the speed of Debian Bullseye, openSUSE Leap 15.3 was 0.998x the speed of Ubuntu 21.04, CentOS Stream was 0.996x the speed of openSUSE Leap 15.3, Fedora Server 34 was 0.995x the speed of CentOS Stream.*

*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*
*SVT-AV1 (Encoder Mode: Preset 8 - Input: Bosphorus 4K) at 1.608x*
*Timed Wasmer Compilation (Time To Compile) at 1.522x*
*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/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

## Fedora 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/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: 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/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: 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,amdgcn-amdhsa=/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/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: 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/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: 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 -ftree-loop-distribute-patterns -Wl,-z -Wl,now -Wl,-z -Wl,relro -malign-data=abi -fno-semantic-interposition -ftree-vectorize -ftree-loop-vectorize -Wl,--enable-new-dtags -Wa,-mbranches-within-32B-boundaries" CXXFLAGS="-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 -ftree-loop-distribute-patterns -Wl,-z -Wl,now -Wl,-z -Wl,relro -fno-semantic-interposition -ffat-lto-objects -fno-trapping-math -Wl,-sort-common -Wl,--enable-new-dtags -mtune=skylake -Wa,-mbranches-within-32B-boundaries -fvisibility-inlines-hidden -Wl,--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 -ftree-loop-distribute-patterns -Wl,-z -Wl,now -Wl,-z -Wl,relro -malign-data=abi -fno-semantic-interposition -ftree-vectorize -ftree-loop-vectorize -Wl,-sort-common -Wl,--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 -ftree-loop-distribute-patterns -Wl,-z -Wl,now -Wl,-z -Wl,relro -fno-semantic-interposition -ffat-lto-objects -fno-trapping-math -Wl,-sort-common -Wl,--enable-new-dtags -mtune=skylake -Wa,-mbranches-within-32B-boundaries" THEANO_FLAGS="floatX=float32,openmp=true,gcc.cxxflags="-ftree-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/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: 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/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: 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

# EPYC Tyan Server

--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_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/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: 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 |
|---|---|---|---|---|---|---|---|---|
| **High Performance Conjugate Gradient (GFLOP/s)** | 12.8778 | **11.7130** | | 11.7941 | 12.4586 | **19.4305** | 12.6926 | 12.1209 |
| **Normalized** | 66.28% | 60.28% | | 60.7% | 64.12% | 100% | 65.32% | 62.38% |
| **Standard Deviation** | 0.1% | 17.8% | | 16.2% | 3.6% | 8.2% | 19.5% | 11.2% |
| **NAS Parallel Benchmarks - BT.C (Mop/s)** | 87955 | **20508** | 87888 | **89193** | 21314 | 87029 | 87240 | 21380 |
| **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 Benchmarks - CG.C (Mop/s)** | 29892 | 13588 | | **30352** | 12925 | 29640 | 28970 | **12641** |
| **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 Benchmarks - EP.D (Mop/s)** | 2934 | 1601 | | **2965** | **1006** | 2844 | 2930 | 1362 |
| **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 Benchmarks - FT.C (Mop/s)** | 47060 | 17996 | | **49076** | 18870 | 48460 | 46811 | **17789** |
| **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 Benchmarks - IS.D (Mop/s)** | 1787 | 1092 | | 1731 | **958.16** | **2178** | 1985 | 1153 |
| **Normalized** | 82.05% | 50.15% | | 79.5% | 44% | 100% | 91.14% | 52.96% |
| **Standard Deviation** | 0.8% | 2.2% | | 1.1% | 1.1% | 7% | 1.7% | 2.4% |
| **NAS Parallel Benchmarks - SP.C (Mop/s)** | 33234 | **10058** | 33844 | 33101 | 10304 | **33882** | 32826 | 10268 |
| **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% |
| **miniFE - Small (CG Mflops)** | 11203 | 10018 | 10918 | **13355** | **7928** | 10394 | 11861 | |
| **Normalized** | 83.88% | 75.01% | 81.75% | 100% | 59.36% | 77.82% | 88.81% | |
| **Standard Deviation** | 9% | 7% | 8.6% | 9.7% | 16.7% | 8.2% | 4.5% | |

# EPYC Tyan Server

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|---|---|---|---|---|---|---|---|---|
| **NAMD - ATPase Simulation - 327,506 Atoms (days/ns)** | 0.67252 | 0.67355 | 0.67193 | **0.67131** | 0.67415 | 0.67373 | **0.67638** | 0.67262 |
| **Normalized** | 99.82% | 99.67% | 99.91% | 100% | 99.58% | 99.64% | 99.25% | 99.81% |
| **Standard Deviation** | 0.1% | 0.1% | 0% | 0.1% | 0.1% | 0% | 0.9% | 0.1% |
| **Xcompact3d Incompact3d - i.i.1.C.P.D (sec)** | 27.8769480 | 29.0366478 | | 27.7018650 | 28.6477426 | **27.1634598** | 28.8079955 | **29.1308244** |
| **Normalized** | 97.44% | 93.55% | | 98.06% | 94.82% | 100% | 94.29% | 93.25% |
| **Standard Deviation** | 2.5% | 0.5% | | 2.8% | 1.1% | 1.3% | 1.1% | 1.4% |
| **Xmrig - Monero - 1M (H/s)** | **21915** | | 22335 | **23576** | | | | |
| **Normalized** | 92.95% | | 94.73% | 100% | | | | |
| **Standard Deviation** | 0.3% | | 0.4% | 0.2% | | | | |
| **Xmrig - Wownero - 1M (H/s)** | 23123 | | **23003** | **24478** | | | | |
| **Normalized** | 94.46% | | 93.97% | 100% | | | | |
| **Standard Deviation** | 0.3% | | 0.6% | 0.2% | | | | |
| **LuxCoreRender - DLSC - CPU (M samples/sec)** | **5.45** | 5.46 | 5.47 | **5.45** | 5.46 | **5.52** | 5.47 | 5.50 |
| **Normalized** | 98.73% | 98.91% | 99.09% | 98.73% | 98.91% | 100% | 99.09% | 99.64% |
| **Standard Deviation** | 0.3% | 1.2% | 0.6% | 0.5% | 0.3% | 0.2% | 0.7% | 0.4% |
| **LuxCoreRender - Danish Mood - CPU (M samples/sec)** | 4.32 | 4.39 | 4.36 | 4.42 | 4.40 | **4.47** | **4.30** | 4.46 |
| **Normalized** | 96.64% | 98.21% | 97.54% | 98.88% | 98.43% | 100% | 96.2% | 99.78% |
| **Standard Deviation** | 0.7% | 1.6% | 1% | 0.3% | 1.7% | 0.3% | 0.3% | 1.8% |
| **LuxCoreRender - Orange Juice - CPU (M samples/sec)** | 8.29 | 8.29 | 8.33 | **8.39** | **8.25** | 8.36 | 8.30 | **8.39** |
| **Normalized** | 98.81% | 98.81% | 99.28% | 100% | 98.33% | 99.64% | 98.93% | 100% |
| **Standard Deviation** | 0.1% | 0.3% | 0.2% | 0.5% | 0.5% | 0.1% | 0.2% | 0.6% |
| **LuxCoreRender - LuxCore Benchmark - CPU (M samples/sec)** | 4.73 | 4.68 | 4.74 | 4.79 | 4.74 | **4.80** | **4.66** | 4.73 |
| **Normalized** | 98.54% | 97.5% | 98.75% | 99.79% | 98.75% | 100% | 97.08% | 98.54% |
| **Standard Deviation** | 0.2% | 0.3% | 0.7% | 0.6% | 0.5% | 0.3% | 1% | 0.9% |
| **LuxCoreRender - R.C.a.P - CPU (M samples/sec)** | 16.38 | **16.11** | 17.14 | 16.75 | 17.01 | **17.48** | 16.29 | 16.16 |
| **Normalized** | 93.71% | 92.16% | 98.05% | 95.82% | 97.31% | 100% | 93.19% | 92.45% |
| **Standard Deviation** | 4.4% | 1.1% | 6.9% | 5.9% | 6.6% | 6.9% | 4.3% | 9.5% |
| **OSPray - San Miguel - Path Tracer (FPS)** | 3.72 | **3.70** | 3.73 | **3.78** | 3.74 | 3.76 | **3.70** | 3.77 |
| **Normalized** | 98.41% | 97.88% | 98.68% | 100% | 98.94% | 99.47% | 97.88% | 99.74% |
| **Standard Deviation** | 0% | 0.6% | 0% | 0.2% | 1.2% | 0.2% | 0% | 0% |
| **OSPray - NASA Streamlines - Path Tracer (FPS)** | **12.35** | **12.35** | 12.5 | **12.66** | 12.5 | 12.5 | **12.35** | 12.5 |
| **Normalized** | 97.55% | 97.55% | 98.74% | 100% | 98.74% | 98.74% | 97.55% | 98.74% |
| **Standard Deviation** | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |

# EPYC Tyan Server

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **OSPray - M.R - Path Tracer (FPS)** | 500 | 500 | 444.44 | 422.22 | 500 | 500 | 500 | 500 |
| Normalized | 100% | 100% | 88.89% | 84.44% | 100% | 100% | 100% | 100% |
| Standard Deviation | | | 18.3% | 20.4% | | 0% | | |
| **Embree - Pathtracer ISPC - Crown (FPS)** | 33.3187 | 33.3893 | 32.5872 | 33.5204 | 33.2960 | 33.4857 | 33.2569 | 33.2921 |
| Normalized | 99.4% | 99.61% | 97.22% | 100% | 99.33% | 99.9% | 99.21% | 99.32% |
| Standard Deviation | 0.1% | 0.3% | 0.6% | 0.4% | 0.4% | 0.2% | 0.2% | 0.1% |
| **Embree - Pathtracer ISPC - Asian Dragon (FPS)** | 37.1865 | 37.3838 | 32.4410 | 37.3153 | 37.2281 | 37.3454 | 37.0053 | 37.7809 |
| Normalized | 98.43% | 98.95% | 85.87% | 98.77% | 98.54% | 98.85% | 97.95% | 100% |
| Standard Deviation | 1.2% | 0.7% | 7.6% | 1% | 0.5% | 1.2% | 1.1% | 0.3% |
| **SVT-AV1 - Preset 4 - Bosphorus 4K (FPS)** | 1.931 | 1.913 | 1.852 | 1.707 | 1.959 | 2.071 | 1.875 | 1.940 |
| Normalized | 93.24% | 92.37% | 89.43% | 82.42% | 94.59% | 100% | 90.54% | 93.67% |
| Standard Deviation | 0.1% | 0.3% | 0.3% | 0.5% | 0.7% | 0.4% | 0.4% | 0.2% |
| **SVT-AV1 - Preset 8 - Bosphorus 4K (FPS)** | 20.851 | 18.345 | 20.716 | 14.875 | 22.402 | 23.919 | 17.809 | 21.464 |
| Normalized | 87.17% | 76.7% | 86.61% | 62.19% | 93.66% | 100% | 74.46% | 89.74% |
| Standard Deviation | 1% | 1% | 0.9% | 1.4% | 0.6% | 0.5% | 0.6% | 1% |
| **SVT-HEVC - 1 - Bosphorus 1080p (FPS)** | 24.65 | 24.71 | 25.19 | 24.96 | 24.76 | 25.15 | 24.69 | 23.98 |
| Normalized | 97.86% | 98.09% | 100% | 99.09% | 98.29% | 99.84% | 98.02% | 95.2% |
| Standard Deviation | 0.6% | 0.7% | 0.3% | 0.6% | 0.4% | 0.2% | 0.4% | 0.1% |
| **SVT-HEVC - 7 - Bosphorus 1080p (FPS)** | 282.38 | 281.37 | 296.57 | 273.70 | 285.20 | 299.80 | 284.09 | 286.38 |
| Normalized | 94.19% | 93.85% | 98.92% | 91.29% | 95.13% | 100% | 94.76% | 95.52% |
| Standard Deviation | 2.4% | 1.4% | 2% | 2.2% | 1.2% | 2.3% | 2.5% | 2.3% |
| **SVT-HEVC - 10 - Bosphorus 1080p (FPS)** | 458.18 | 434.07 | 537.01 | 429.71 | 467.20 | 463.76 | 470.53 | 459.35 |
| Normalized | 85.32% | 80.83% | 100% | 80.02% | 87% | 86.36% | 87.62% | 85.54% |
| Standard Deviation | 10.3% | 5.5% | 2.3% | 7.4% | 9% | 6.5% | 8% | 8.2% |
| **SVT-VP9 - VMAF Optimized - Bosphorus 1080p (FPS)** | 349.16 | 291.76 | 344.93 | 256.35 | 303.33 | 298.74 | 251.54 | 301.69 |
| Normalized | 100% | 83.56% | 98.79% | 73.42% | 86.87% | 85.56% | 72.04% | 86.4% |
| Standard Deviation | 4.2% | 1.1% | 2.9% | 1.4% | 4.4% | 2.2% | 5.1% | 2.5% |
| **SVT-VP9 - P.S.O - Bosphorus 1080p (FPS)** | 353.98 | 305.14 | 353.73 | 259.56 | 303.00 | 302.64 | 257.98 | 302.99 |
| Normalized | 100% | 86.2% | 99.93% | 73.33% | 85.6% | 85.5% | 72.88% | 85.6% |
| Standard Deviation | 1.1% | 2.8% | 0.7% | 0.2% | 1.4% | 2.3% | 12.6% | 1.2% |
| **SVT-VP9 - V.Q.O - Bosphorus 1080p (FPS)** | 264.89 | 272.55 | 297.41 | 236.32 | 274.02 | 273.38 | 241.51 | 277.37 |
| Normalized | 89.07% | 91.64% | 100% | 79.46% | 92.14% | 91.92% | 81.2% | 93.26% |
| Standard Deviation | 1.5% | 1.4% | 1.7% | 2.5% | 1.3% | 1.7% | 0.7% | 0.7% |
| **VP9 libvpx Encoding - Speed 0 - Bosphorus 4K (FPS)** | 6.16 | 6.89 | 6.05 | 6.52 | 6.48 | 7.25 | 6.23 | 6.64 |
| Normalized | 84.97% | 95.03% | 83.45% | 89.93% | 89.38% | 100% | 85.93% | 91.59% |
| Standard Deviation | 0.2% | 0.9% | 0.3% | 1.4% | 0.9% | 0.3% | 0.4% | 0.3% |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **VP9 libvpx Encoding - Speed 5 - Bosphorus 4K (FPS)** | 13.63 | 16.23 | 13.03 | **9.31** | 14.89 | **17.60** | 14.60 | 14.09 |
| **Normalized** | 77.44% | 92.22% | 74.03% | 52.9% | 84.6% | 100% | 82.95% | 80.06% |
| **Standard Deviation** | 0.9% | 1.4% | 0.7% | 0.8% | 2.5% | 1.1% | 1.1% | 1.5% |
| **Intel Open Image Denoise - RT.hdr_alb_nrm.3840x2160 (Images / Sec)** | 0.90 | 0.96 | **0.87** | 0.89 | 0.94 | **0.97** | 0.89 | 0.96 |
| **Normalized** | 92.78% | 98.97% | 89.69% | 91.75% | 96.91% | 100% | 91.75% | 98.97% |
| **Standard Deviation** | 0.6% | 0.4% | 1% | 2.2% | 0.8% | 0.4% | 1.3% | 0.4% |
| **Intel Open Image Denoise - RT.ldr_alb_nrm.3840x2160 (Images / Sec)** | 0.90 | 0.96 | **0.87** | 0.94 | 0.95 | **0.97** | 0.89 | 0.96 |
| **Normalized** | 92.78% | 98.97% | 89.69% | 96.91% | 97.94% | 100% | 91.75% | 98.97% |
| **Standard Deviation** | 0.7% | 0.2% | 0.4% | 2.5% | 0.8% | 0.5% | 0.2% | 0.8% |
| **Intel Open Image Denoise - RTLightmap.hdr.4096x4096 (Images / Sec)** | 0.45 | **0.48** | **0.44** | 0.46 | 0.47 | **0.48** | 0.45 | 0.47 |
| **Normalized** | 93.75% | 100% | 91.67% | 95.83% | 97.92% | 100% | 93.75% | 97.92% |
| **Standard Deviation** | 1.2% | 0.1% | 1.3% | 0.5% | 1% | 2% | 0.4% | 2.3% |
| **OpenVKL - vklBenchmark (Items / Sec)** | 297 | 296 | **282** | 287 | 293 | 292 | **319** | 291 |
| **Normalized** | 93.1% | 92.79% | 88.4% | 89.97% | 91.85% | 91.54% | 100% | 91.22% |
| **Standard Deviation** | 4.1% | 0.8% | 1.4% | 2.1% | 4.4% | 2.4% | 2% | 4.3% |
| **libavif avifenc - 10 (sec)** | **3.817** | 3.620 | 2.785 | 2.873 | 2.817 | **2.609** | 3.785 | 2.779 |
| **Normalized** | 68.35% | 72.07% | 93.68% | 90.81% | 92.62% | 100% | 68.93% | 93.88% |
| **Standard Deviation** | 0.8% | 2.5% | 2.3% | 2.8% | 3.2% | 2.3% | 2.3% | 1% |
| **libavif avifenc - 6, Lossless (sec)** | 30.222 | 27.881 | 27.237 | 27.395 | 27.000 | **26.150** | **30.515** | 26.826 |
| **Normalized** | 86.53% | 93.79% | 96.01% | 95.46% | 96.85% | 100% | 85.7% | 97.48% |
| **Standard Deviation** | 1.2% | 0.1% | 2% | 0.6% | 0.7% | 0.3% | 1.3% | 0.3% |
| **libavif avifenc - 10, Lossless (sec)** | 6.287 | 6.185 | 5.323 | 5.298 | 5.188 | **4.915** | **6.302** | 5.199 |
| **Normalized** | 78.18% | 79.47% | 92.34% | 92.77% | 94.74% | 100% | 77.99% | 94.54% |
| **Standard Deviation** | 2.4% | 0.2% | 5.7% | 0.5% | 2.1% | 1% | 2.5% | 0.4% |
| **Timed Godot Game Engine Compilation - Time To Compile (sec)** | 57.907 | 54.948 | **63.293** | **53.426** | | | 54.630 | |
| **Normalized** | 92.26% | 97.23% | 84.41% | 100% | | | 97.8% | |
| **Standard Deviation** | 0.8% | 0.3% | 1% | 0.6% | | | 2% | |
| **Timed Linux Kernel Compilation - Time To Compile (sec)** | **35.137** | 34.019 | 29.492 | 32.031 | 31.134 | 31.165 | 31.450 | **28.874** |
| **Normalized** | 82.18% | 84.88% | 97.9% | 90.14% | 92.74% | 92.65% | 91.81% | 100% |
| **Standard Deviation** | 2.3% | 2.4% | 2.4% | 2.5% | 2.4% | 2.4% | 2.2% | 2.5% |
| **Timed LLVM Compilation - Ninja** | **232.758** | 209.690 | **185.201** | 202.013 | 192.197 | | 209.931 | 204.165 |
| **Normalized** | 79.57% | 88.32% | 100% | 91.68% | 96.36% | | 88.22% | 90.71% |

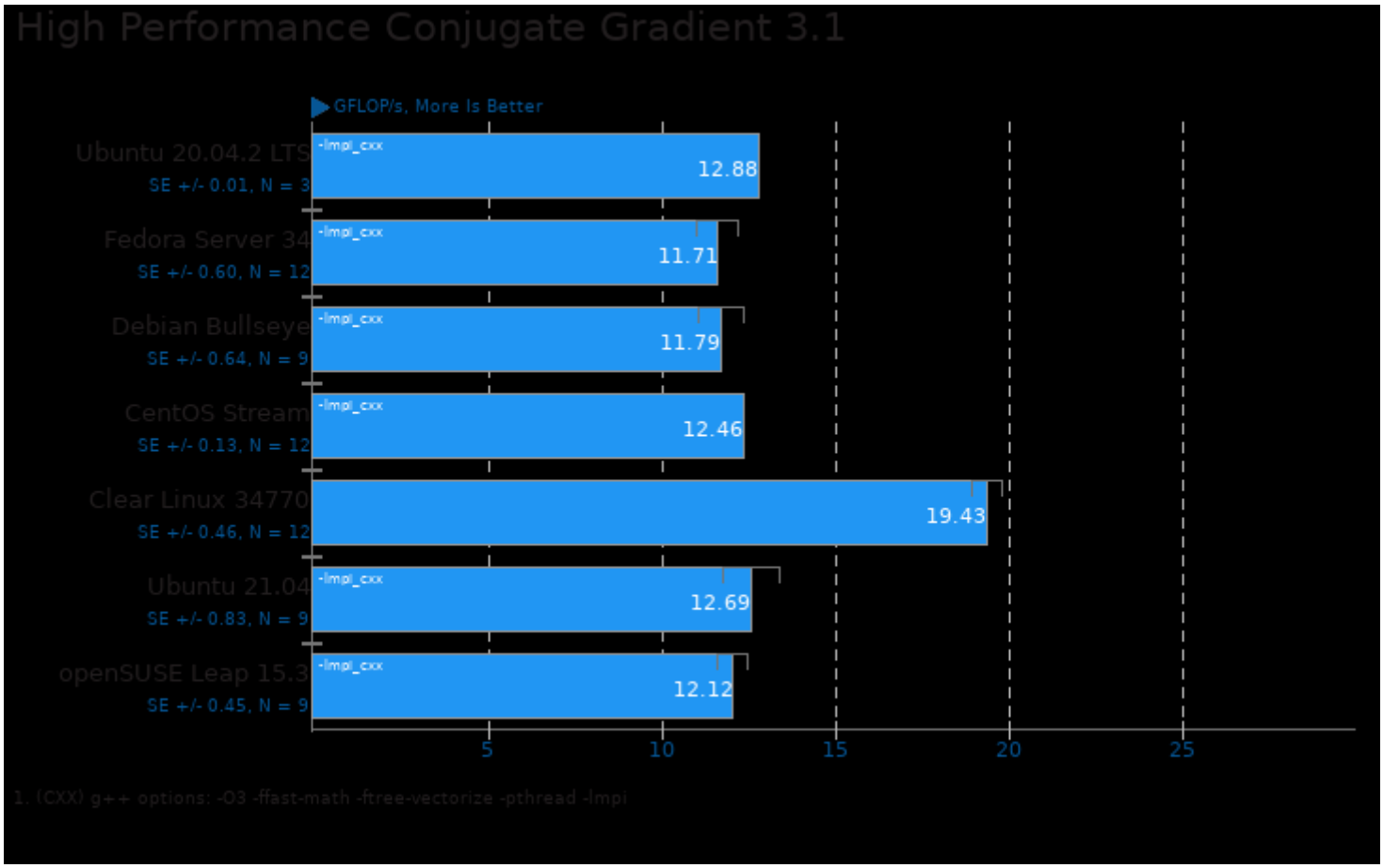
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|---|---|---|---|---|---|---|---|---|
| Standard Deviation | 0.6% | 0.6% | 0.1% | 0.1% | 0.6% | | 0.8% | 0% |
| **Timed LLVM Compilation - Unix** | 286.375 | 257.168 | 223.264 | 250.573 | 227.741 | | 250.224 | 242.618 |
| Normalized | 77.96% | 86.82% | 100% | 89.1% | 98.03% | | 89.23% | 92.02% |
| Standard Deviation | 0.9% | 1.2% | 2.5% | 1.6% | 0.7% | | 0.4% | 1.9% |
| **Timed Node.js Compilation - Time To Compile (sec)** | 151.647 | 137.588 | 123.139 | 134.407 | 127.498 | | 140.352 | 124.995 |
| Normalized | 81.2% | 89.5% | 100% | 91.62% | 96.58% | | 87.74% | 98.52% |
| Standard Deviation | 0.1% | 0.3% | 0.2% | 0.2% | 0.2% | | 0.6% | 0.2% |
| **Timed Wasmer Compilation - Time To Compile (sec)** | 61.241 | 41.498 | | 60.641 | 45.007 | | 40.231 | |
| Normalized | 65.69% | 96.95% | | 66.34% | 89.39% | | 100% | |
| Standard Deviation | 1% | 0.8% | | 1.6% | 2.4% | | 1% | |
| **GROMACS - MPI CPU - water_GMX50_bare (Ns/Day)** | 3.639 | 3.640 | | 3.756 | 3.801 | 3.777 | 3.581 | 3.837 |
| Normalized | 94.84% | 94.87% | | 97.89% | 99.06% | 98.44% | 93.33% | 100% |
| Standard Deviation | 0.5% | 0.4% | | 0.2% | 0.1% | 0.2% | 0.3% | 0.8% |
| **TensorFlow Lite - SqueezeNet (us)** | 69193 | 70454 | 69846 | 69107 | 87581 | 72316 | 83601 | 68977 |
| Normalized | 99.69% | 97.9% | 98.76% | 99.81% | 78.76% | 95.38% | 82.51% | 100% |
| Standard Deviation | 0.5% | 1.3% | 0.9% | 0.7% | 9.3% | 1.9% | 9.7% | 0.4% |
| **TensorFlow Lite - Inception V4 (us)** | 936694 | 941892 | 942408 | 932251 | 944105 | 940126 | 1052955 | 932224 |
| Normalized | 99.52% | 98.97% | 98.92% | 100% | 98.74% | 99.16% | 88.53% | 100% |
| Standard Deviation | 0.4% | 1.1% | 0.8% | 0.3% | 0.9% | 0.9% | 2.8% | 0.6% |
| **TensorFlow Lite - Mobilenet Float (us)** | 43688 | 43886 | 44223 | 43712 | 45933 | 43841 | 50144 | 44085 |
| Normalized | 100% | 99.55% | 98.79% | 99.95% | 95.11% | 99.65% | 87.13% | 99.1% |
| Standard Deviation | 0.6% | 0.4% | 0.4% | 0.4% | 7% | 0.4% | 5.3% | 0.5% |
| **TensorFlow Lite - Mobilenet Quant (us)** | 46473 | 46558 | 46650 | 46350 | 47417 | 46346 | 52962 | 46366 |
| Normalized | 99.73% | 99.54% | 99.35% | 99.99% | 97.74% | 100% | 87.51% | 99.96% |
| Standard Deviation | 0.3% | 0.6% | 0.4% | 0.1% | 1.7% | 0% | 3.8% | 0.1% |
| **TensorFlow Lite - I.R.V (us)** | 835539 | 837065 | 834724 | 834703 | 843780 | 837254 | 943408 | 838331 |
| Normalized | 99.9% | 99.72% | 100% | 100% | 98.92% | 99.7% | 88.48% | 99.57% |
| Standard Deviation | 0.3% | 0.4% | 0% | 0.3% | 0.6% | 0.4% | 6.8% | 0.9% |
| **ASTC Encoder - Exhaustive (sec)** | 23.6779 | 23.5167 | | 23.4605 | 23.9299 | 23.5118 | 23.5801 | 24.0241 |
| Normalized | 99.08% | 99.76% | | 100% | 98.04% | 99.78% | 99.49% | 97.65% |
| Standard Deviation | 0.1% | 0% | | 0.1% | 0.1% | 0% | 0.1% | 0% |
| **Mobile Neural Network - mobilenetV3 (ms)** | 2.572 | 2.535 | 2.906 | 2.616 | 2.584 | 2.264 | 2.496 | 2.805 |
| Normalized | 88.02% | 89.31% | 77.91% | 86.54% | 87.62% | 100% | 90.71% | 80.71% |
| Standard Deviation | 2.3% | 4.4% | 6.5% | 4.9% | 1.2% | 3% | 1.7% | 2.3% |
| **Mobile Neural Network - squeezenetv1.1 (ms)** | 4.144 | 4.042 | 4.720 | 4.676 | 4.355 | 4.409 | 4.377 | 4.622 |
| Normalized | 97.54% | 100% | 85.64% | 86.44% | 92.81% | 91.68% | 92.35% | 87.45% |
| Standard Deviation | 2% | 3.4% | 3.4% | 2.4% | 3.3% | 4% | 1.1% | 1.3% |

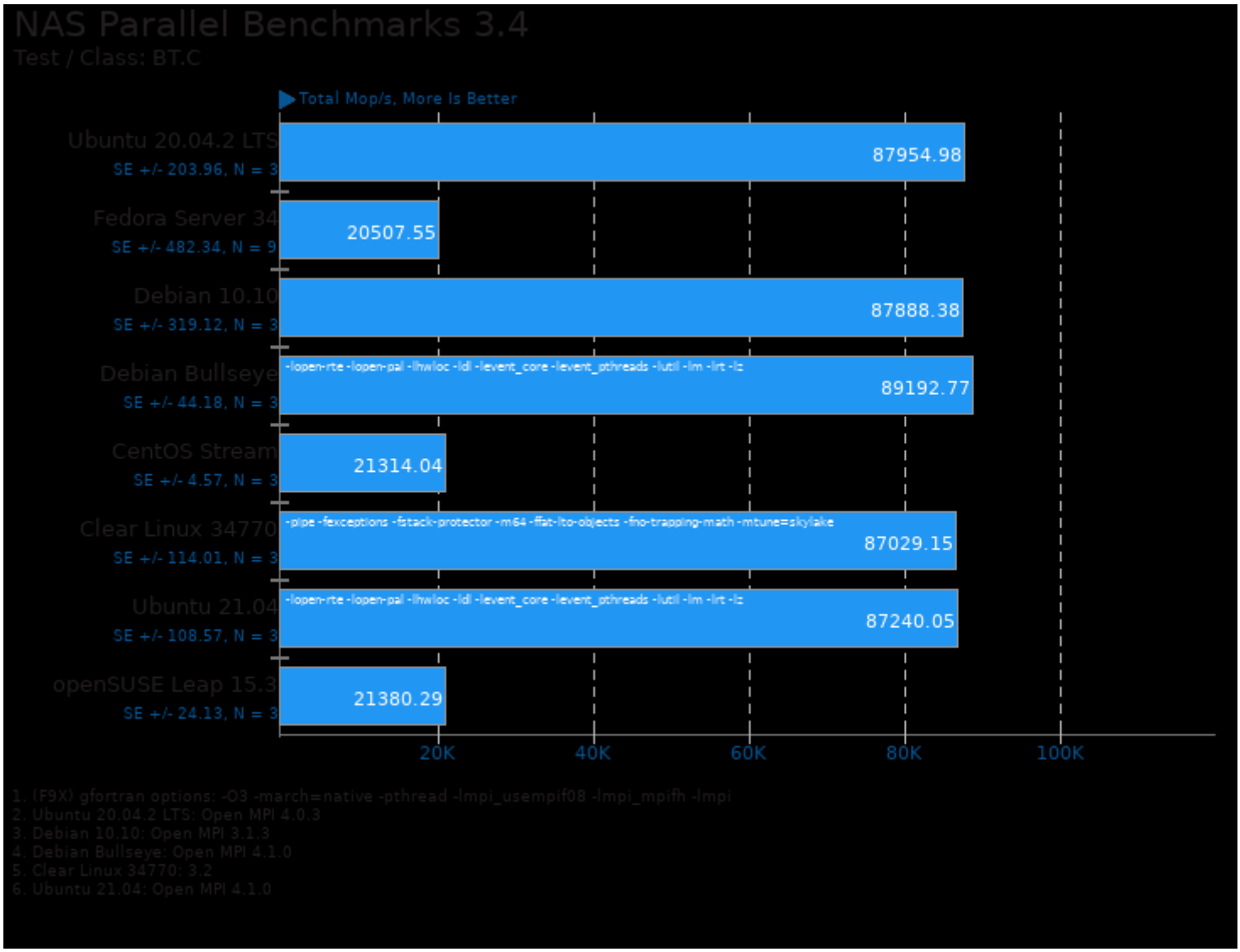
# EPYC Tyan Server

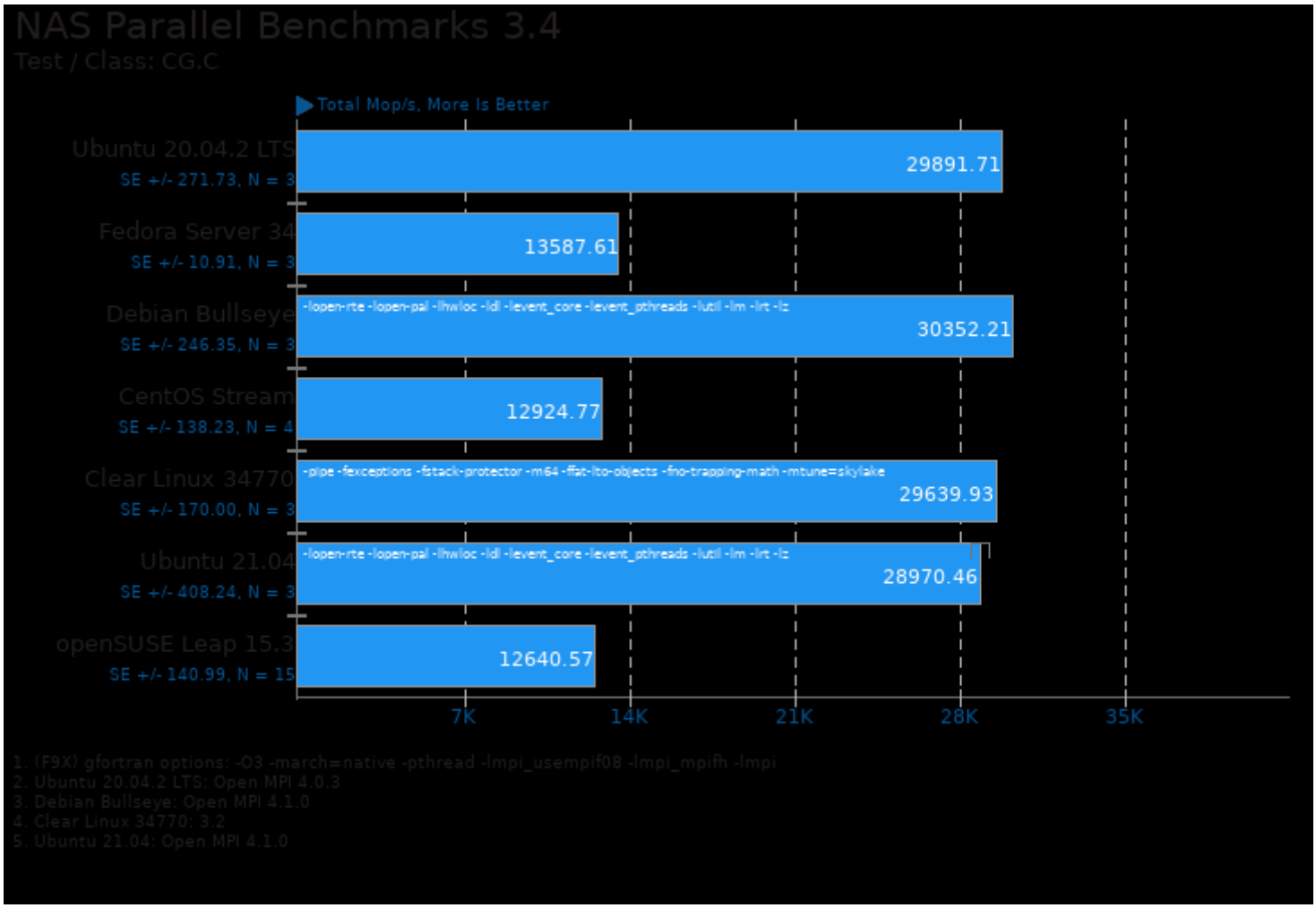
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Mobile Neural Network - resnet-v2-50 (ms)** | 21.954 | **18.933** | 23.736 | 22.520 | 22.034 | 22.347 | 21.663 | **24.443** |
| **Normalized** | 86.24% | 100% | 79.76% | 84.07% | 85.93% | 84.72% | 87.4% | 77.46% |
| **Standard Deviation** | 0.9% | 5.7% | 4.1% | 6.6% | 3.4% | 4.6% | 2% | 5% |
| **Mobile Neural Network - SqueezeNetV1.0 (ms)** | 6.094 | **5.767** | 6.326 | 6.204 | 6.776 | 6.539 | **6.900** | 6.713 |
| **Normalized** | 94.63% | 100% | 91.16% | 92.96% | 85.11% | 88.19% | 83.58% | 85.91% |
| **Standard Deviation** | 3.5% | 3.3% | 5.4% | 5.8% | 2.2% | 6.9% | 0.7% | 2% |
| **Mobile Neural Network - MobileNetV2_224 (ms)** | **3.947** | 3.975 | 4.242 | 4.034 | **4.275** | 4.026 | 3.955 | 4.221 |
| **Normalized** | 100% | 99.3% | 93.05% | 97.84% | 92.33% | 98.04% | 99.8% | 93.51% |
| **Standard Deviation** | 5.4% | 4.3% | 5.9% | 10.3% | 2.1% | 7.5% | 1.1% | 1.2% |
| **Mobile Neural Network - mobilenet-v1-1.0 (ms)** | 2.849 | 2.894 | 3.482 | **3.796** | 2.932 | 2.981 | **2.734** | 3.405 |
| **Normalized** | 95.96% | 94.47% | 78.52% | 72.02% | 93.25% | 91.71% | 100% | 80.29% |
| **Standard Deviation** | 6% | 7.7% | 8.5% | 8.5% | 11.5% | 10.6% | 0.8% | 18.6% |
| **Mobile Neural Network - inception-v3 (ms)** | 24.361 | **22.603** | 26.471 | **27.651** | 27.519 | 23.754 | 24.418 | 25.508 |
| **Normalized** | 92.78% | 100% | 85.39% | 81.74% | 82.14% | 95.15% | 92.57% | 88.61% |
| **Standard Deviation** | 2% | 2.4% | 3.1% | 1.4% | 2.1% | 3.9% | 1.3% | 2.4% |
| **TNN - CPU - DenseNet (ms)** | 2907 | 3043 | **2822** | 3098 | 2957 | 2895 | **3183** | 2907 |
| **Normalized** | 97.08% | 92.75% | 100% | 91.09% | 95.45% | 97.48% | 88.68% | 97.08% |
| **Standard Deviation** | 0% | 1.2% | 0.2% | 0.5% | 0.2% | 0.2% | 5.5% | 0.5% |
| **TNN - CPU - MobileNet v2 (ms)** | 290.337 | 296.547 | **286.254** | 307.534 | 301.637 | 289.527 | **316.885** | 289.223 |
| **Normalized** | 98.59% | 96.53% | 100% | 93.08% | 94.9% | 98.87% | 90.33% | 98.97% |
| **Standard Deviation** | 0.4% | 1.5% | 1.7% | 2.3% | 0.3% | 0.1% | 2.4% | 1.7% |
| **TNN - CPU - SqueezeNet v2 (ms)** | 62.597 | 64.811 | 62.217 | 62.165 | 62.620 | 65.828 | **66.292** | **60.825** |
| **Normalized** | 97.17% | 93.85% | 97.76% | 97.84% | 97.13% | 92.4% | 91.75% | 100% |
| **Standard Deviation** | 0.9% | 0.2% | 2.4% | 1.3% | 0.5% | 2.4% | 0.3% | 0.2% |
| **TNN - CPU - SqueezeNet v1.1 (ms)** | 269.182 | 271.391 | 268.003 | 269.358 | 269.467 | 270.350 | **277.579** | **266.809** |
| **Normalized** | 99.12% | 98.31% | 99.55% | 99.05% | 99.01% | 98.69% | 96.12% | 100% |
| **Standard Deviation** | 0.1% | 0.1% | 0.2% | 0.4% | 0.1% | 0.1% | 0% | 0.4% |
| **PlaidML - No Inference - VGG16 -** | **26.73** | 26.96 | 33.54 | 33.87 | 33.59 | **34.20** | 27.43 | 33.34 |
| **Normalized** | 78.16% | 78.83% | 98.07% | 99.04% | 98.22% | 100% | 80.2% | 97.49% |
| **Standard Deviation** | 1.5% | 1.2% | 1.3% | 2.4% | 1.4% | 1.2% | 0.7% | 0.7% |
| **PlaidML - No Inference - VGG19 -** | 22.49 | **22.13** | 27.95 | 27.67 | 27.92 | **28.34** | 22.86 | 27.86 |
| **Normalized** | 79.36% | 78.09% | 98.62% | 97.64% | 98.52% | 100% | 80.66% | 98.31% |
| **Standard Deviation** | 1.4% | 2.4% | 2% | 1.5% | 1.6% | 1.6% | 1.1% | 2.1% |
| **PlaidML - No Inference - ResNet 50 -** | 9.04 | 8.59 | 9.60 | **9.61** | 7.59 | 7.74 | 9.38 | **7.51** |
| **Normalized** | 94.07% | 89.39% | 99.9% | 100% | 78.98% | 80.54% | 97.61% | 78.15% |
| **Standard Deviation** | 0.5% | 0.5% | 1.9% | 0.4% | 0.4% | 1% | 2.1% | 0.9% |
| **Blender - BMW27 - CPU-Only (sec)** | 52.85 | 53.13 | 52.44 | 52.55 | **52.25** | **52.25** | **53.59** | 52.38 |
| **Normalized** | 98.86% | 98.34% | 99.64% | 99.43% | 100% | 100% | 97.5% | 99.75% |
| **Standard Deviation** | 0.2% | 0.3% | 0.2% | 0.2% | 0.2% | 0.1% | 0.3% | 0% |

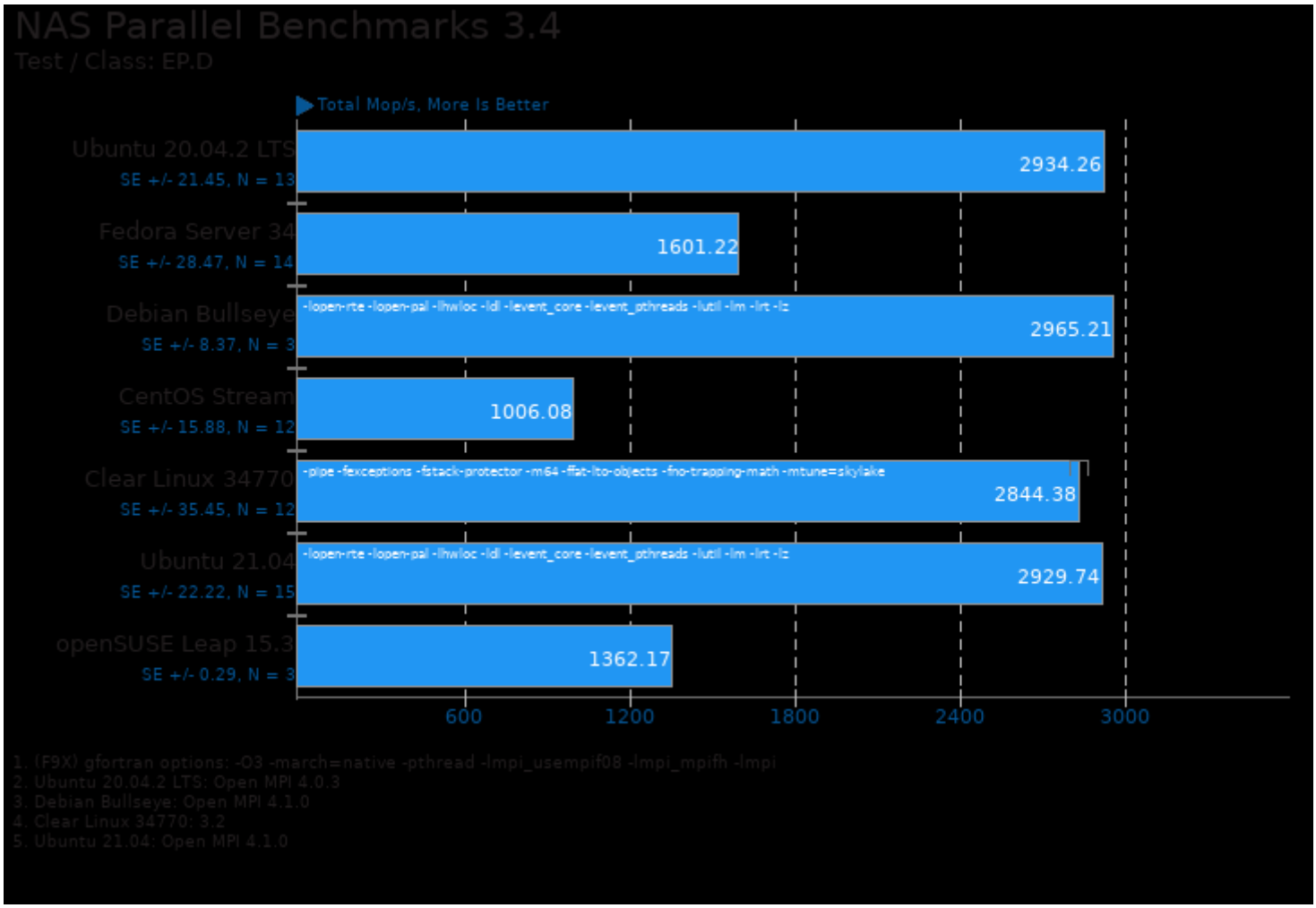
# EPYC Tyan Server

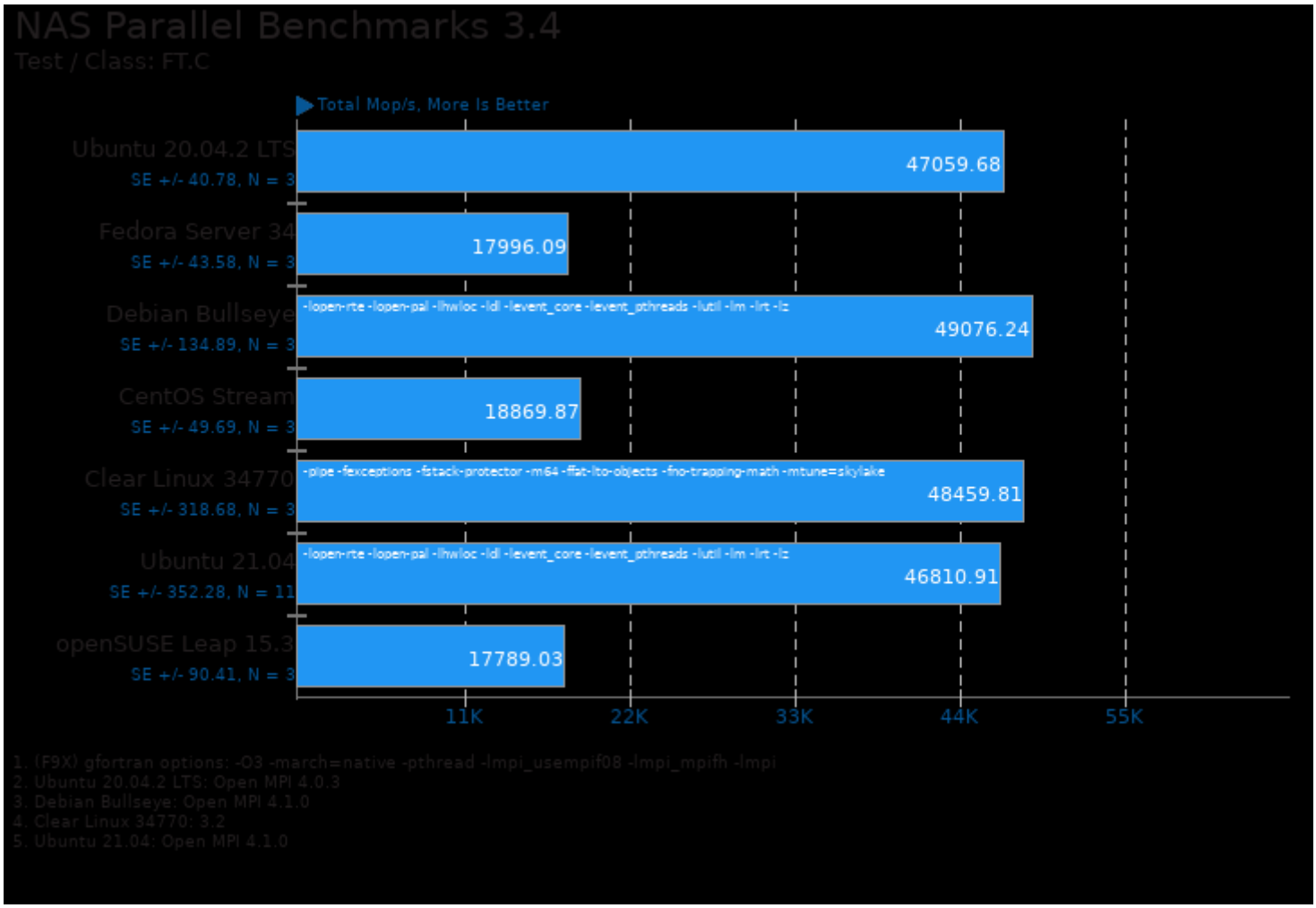
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Blender - Classroom - CPU-Only (sec)** | 146.51 | 146.65 | 146.09 | **145.38** | 146.29 | 145.82 | **147.55** | 145.40 |
| **Normalized** | 99.23% | 99.13% | 99.51% | 100% | 99.38% | 99.7% | 98.53% | 99.99% |
| **Standard Deviation** | 0.2% | 0.1% | 0.3% | 0.2% | 0.2% | 0.4% | 0.1% | 0.3% |
| **Blender - Barbershop - CPU-Only (sec)** | 195.79 | 196.64 | 192.55 | 189.90 | 190.76 | 190.95 | **197.52** | **189.89** |
| **Normalized** | 96.99% | 96.57% | 98.62% | 99.99% | 99.54% | 99.44% | 96.14% | 100% |
| **Standard Deviation** | 0% | 0.3% | 0.9% | 0.3% | 0.1% | 0.1% | 0.2% | 0.2% |
| **ONNX Runtime - yolov4 - OpenMP CPU (Inferences/min)** | **291** | 277 | **233** | 282 | 242 | | 257 | 242 |
| **Normalized** | 100% | 95.19% | 80.07% | 96.91% | 83.16% | | 88.32% | 83.16% |
| **Standard Deviation** | 5.2% | 1.2% | 6.9% | 5.1% | 3.9% | | 5.9% | 2.8% |
| **ONNX Runtime - bertsquad-10 - OpenMP CPU (Inferences/min)** | **445** | 440 | 432 | 424 | 427 | | **395** | 429 |
| **Normalized** | 100% | 98.88% | 97.08% | 95.28% | 95.96% | | 88.76% | 96.4% |
| **Standard Deviation** | 2.9% | 3.3% | 5.1% | 3.5% | 2% | | 4% | 5.6% |
| **ONNX Runtime - fcn-resnet101-11 - OpenMP CPU (Inferences/min)** | **93** | 84 | 75 | 73 | 74 | | 90 | **71** |
| **Normalized** | 100% | 90.32% | 80.65% | 78.49% | 79.57% | | 96.77% | 76.34% |
| **Standard Deviation** | 13.3% | 14% | 8.9% | 13.9% | 10.6% | | 14.3% | 20.2% |
| **ONNX Runtime - shufflenet-v2-10 - OpenMP CPU (Inferences/min)** | 10866 | 10911 | 11064 | **11283** | **9699** | | 10193 | 10321 |
| **Normalized** | 96.3% | 96.7% | 98.06% | 100% | 85.96% | | 90.34% | 91.47% |
| **Standard Deviation** | 0.8% | 1.3% | 1.7% | 0.8% | 2.3% | | 0.7% | 1.9% |
| **ONNX Runtime - super-resolution-10 - OpenMP CPU (Inferences/min)** | 4775 | 4884 | 5018 | 4597 | **4475** | | 4684 | **5237** |
| **Normalized** | 91.18% | 93.26% | 95.82% | 87.78% | 85.45% | | 89.44% | 100% |
| **Standard Deviation** | 1.3% | 0.9% | 6.6% | 0.9% | 4.3% | | 1% | 8.5% |
| **Numenta Anomaly Benchmark - Windowed Gaussian (sec)** | 6.805 | | 6.671 | | 6.293 | **5.938** | | **7.877** |
| **Normalized** | 87.26% | | 89.01% | | 94.36% | 100% | | 75.38% |
| **Standard Deviation** | 1.8% | | 0.9% | | 1.9% | 1.9% | | 0.7% |
| **Kripke (Throughput** | 78658979 | 78470519 | 78433118 | 78112133 | 77631927 | **90502153** | **73584941** | 86964957 |
| **Normalized** | 86.91% | 86.71% | 86.66% | 86.31% | 85.78% | 100% | 81.31% | 96.09% |
| **Standard Deviation** | 9.5% | 11.1% | 12.5% | 5.9% | 5.9% | 1.1% | 9.8% | 5.2% |
| **BRL-CAD - V.P.M (VGR Performance Metric)** | **422481** | 417781 | 409125 | 420156 | **406823** | | 419835 | |
| **Normalized** | 100% | 98.89% | 96.84% | 99.45% | 96.29% | | 99.37% | |

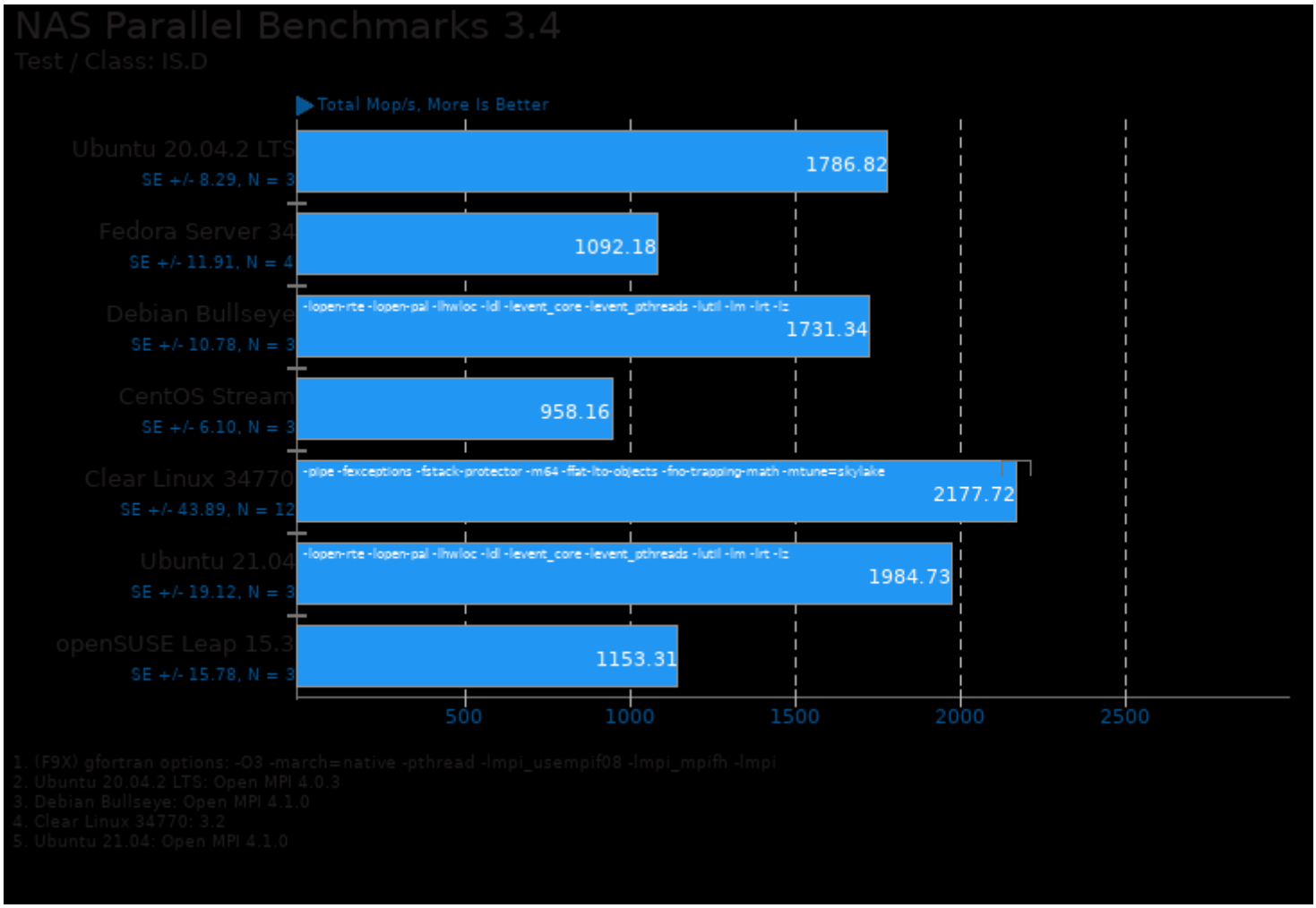

High Performance Conjugate Gradient 3.1
GFLOP/s, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.01, N = 3
-lmpi_cxx
12.88
Fedora Server 34
SE +/- 0.60, N = 12
-lmpi_cxx
11.71
Debian Bullseye
SE +/- 0.64, N = 9
-lmpi_cxx
11.79
CentOS Stream
SE +/- 0.13, N = 12
-lmpi_cxx
12.46
Clear Linux 34770
SE +/- 0.46, N = 12
19.43
Ubuntu 21.04
SE +/- 0.83, N = 9
-lmpi_cxx
12.69
openSUSE Leap 15.3
SE +/- 0.45, N = 9
-lmpi_cxx
12.12
5
10
15
20
25
1. (CXX) g++ options: -O3 -ffast-math -ftree-vectorize -pthread -lmpi

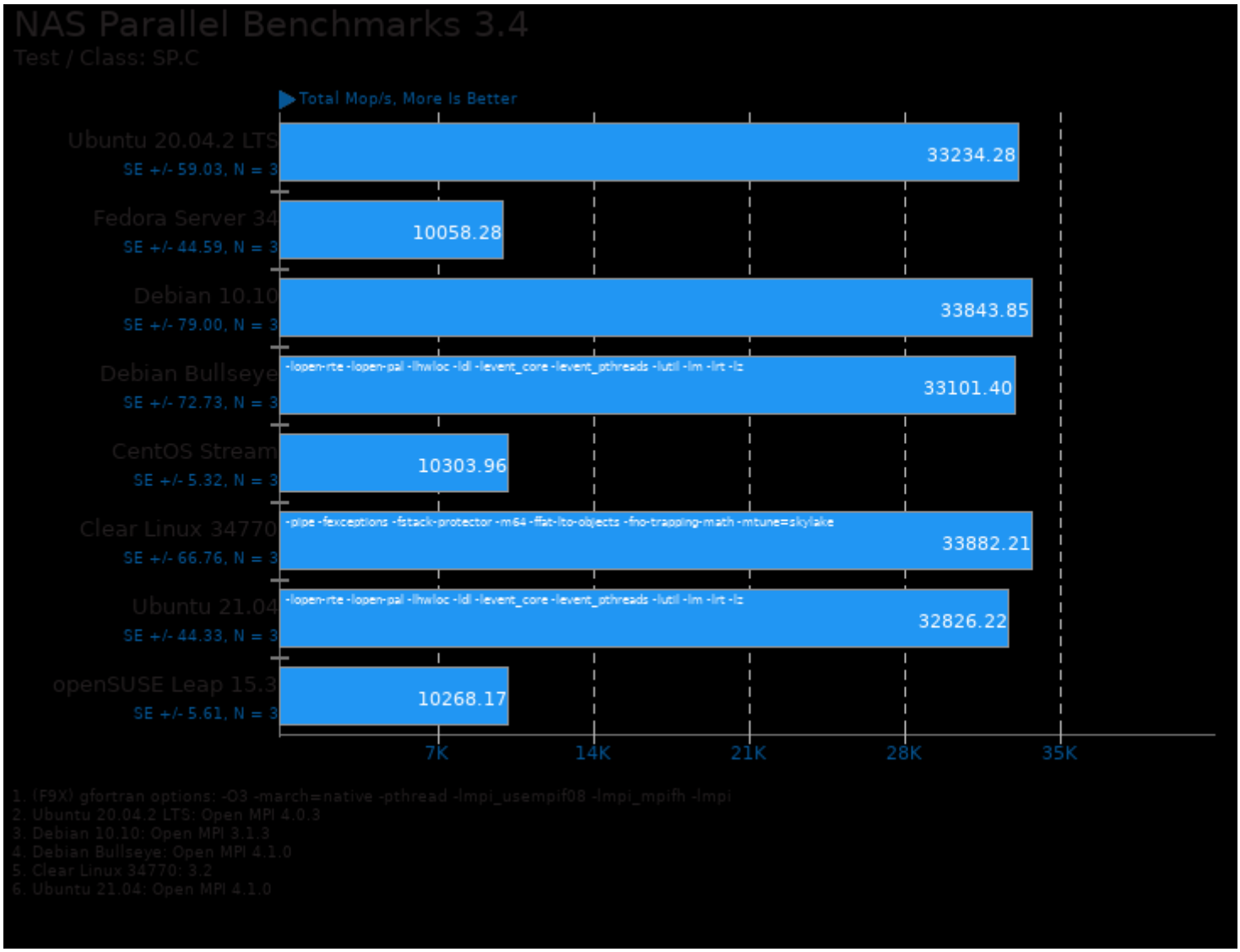

NAS Parallel Benchmarks 3.4
Test / Class: BT.C
Total Mop/s, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 203.96, N = 3
87954.98
Fedora Server 34
SE +/- 482.34, N = 9
20507.55
Debian 10.10
SE +/- 319.12, N = 3
87888.38
Debian Bullseye
SE +/- 44.18, N = 3
-lopen-rte -lopen-pal -lhwloc -ldl -levent_core -levent_pthreads -lutil -lm -lrt -lz
89192.77
CentOS Stream
SE +/- 4.57, N = 3
21314.04
Clear Linux 34770
SE +/- 114.01, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake
87029.15
Ubuntu 21.04
SE +/- 108.57, N = 3
-lopen-rte -lopen-pal -lhwloc -ldl -levent_core -levent_pthreads -lutil -lm -lrt -lz
87240.05
openSUSE Leap 15.3
SE +/- 24.13, N = 3
21380.29
20K
40K
60K
80K
100K
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

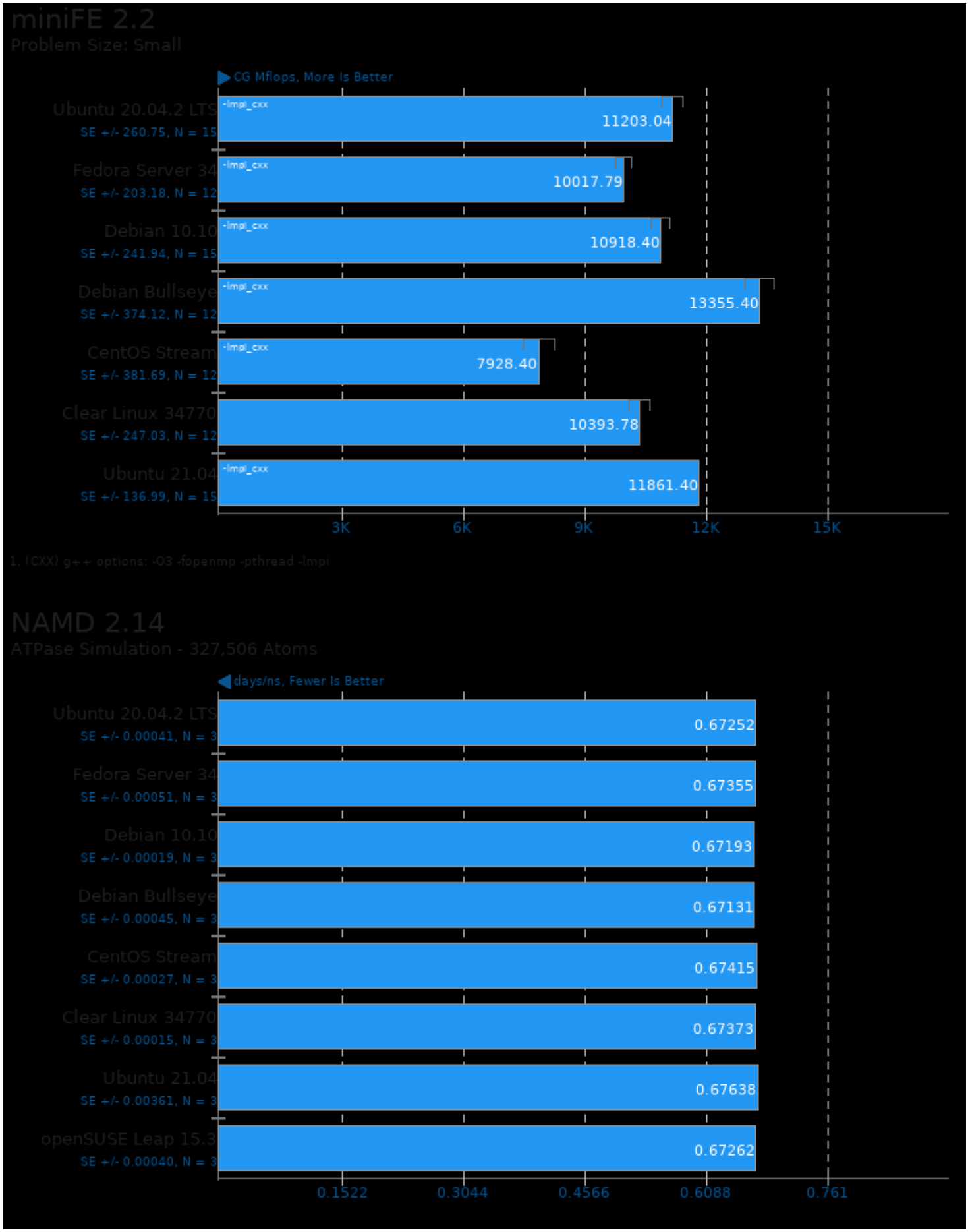

NAS Parallel Benchmarks 3.4
Test / Class: CG.C
Total Mop/s, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 271.73, N = 3
29891.71
Fedora Server 34
SE +/- 10.91, N = 3
13587.61
Debian Bullseye
SE +/- 246.35, N = 3
-lopen-rte -lopen-pal -lhwloc -ldl -levent_core -levent_pthreads -lutil -lm -lrt -lz
30352.21
CentOS Stream
SE +/- 138.23, N = 4
12924.77
Clear Linux 34770
SE +/- 170.00, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake
29639.93
Ubuntu 21.04
SE +/- 408.24, N = 3
-lopen-rte -lopen-pal -lhwloc -ldl -levent_core -levent_pthreads -lutil -lm -lrt -lz
28970.46
openSUSE Leap 15.3
SE +/- 140.99, N = 15
12640.57
7K
14K
21K
28K
35K
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

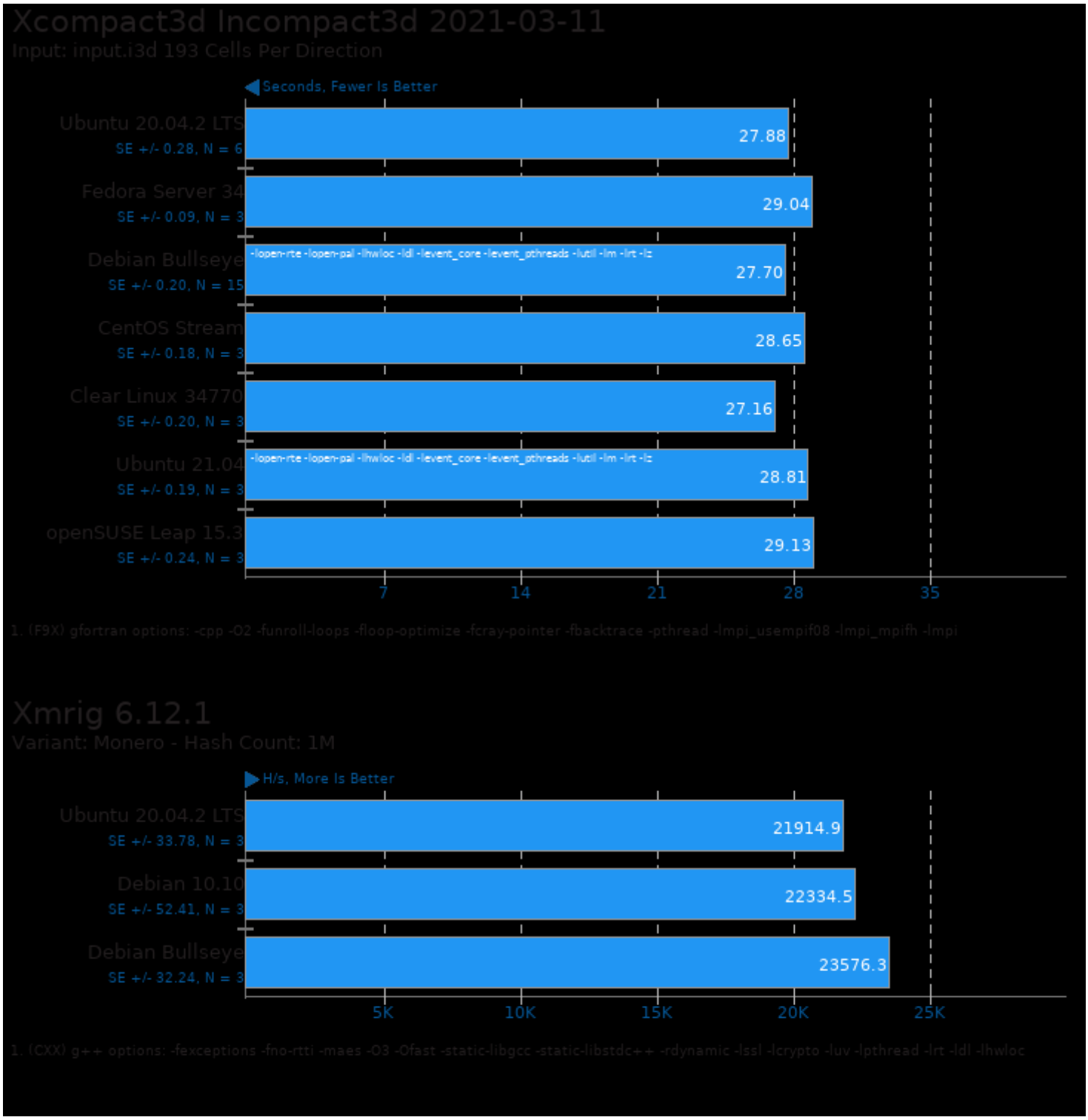

NAS Parallel Benchmarks 3.4
Test / Class: EP.D
Total Mop/s, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 21.45, N = 13
2934.26
Fedora Server 34
SE +/- 28.47, N = 14
1601.22
Debian Bullseye
SE +/- 8.37, N = 3
-lopen-rte -lopen-pal -lhwloc -ldl -levent_core -levent_pthreads -lutil -lm -lrt -lz
2965.21
CentOS Stream
SE +/- 15.88, N = 12
1006.08
Clear Linux 34770
SE +/- 35.45, N = 12
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake
2844.38
Ubuntu 21.04
SE +/- 22.22, N = 15
-lopen-rte -lopen-pal -lhwloc -ldl -levent_core -levent_pthreads -lutil -lm -lrt -lz
2929.74
openSUSE Leap 15.3
SE +/- 0.29, N = 3
1362.17
600
1200
1800
2400
3000
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

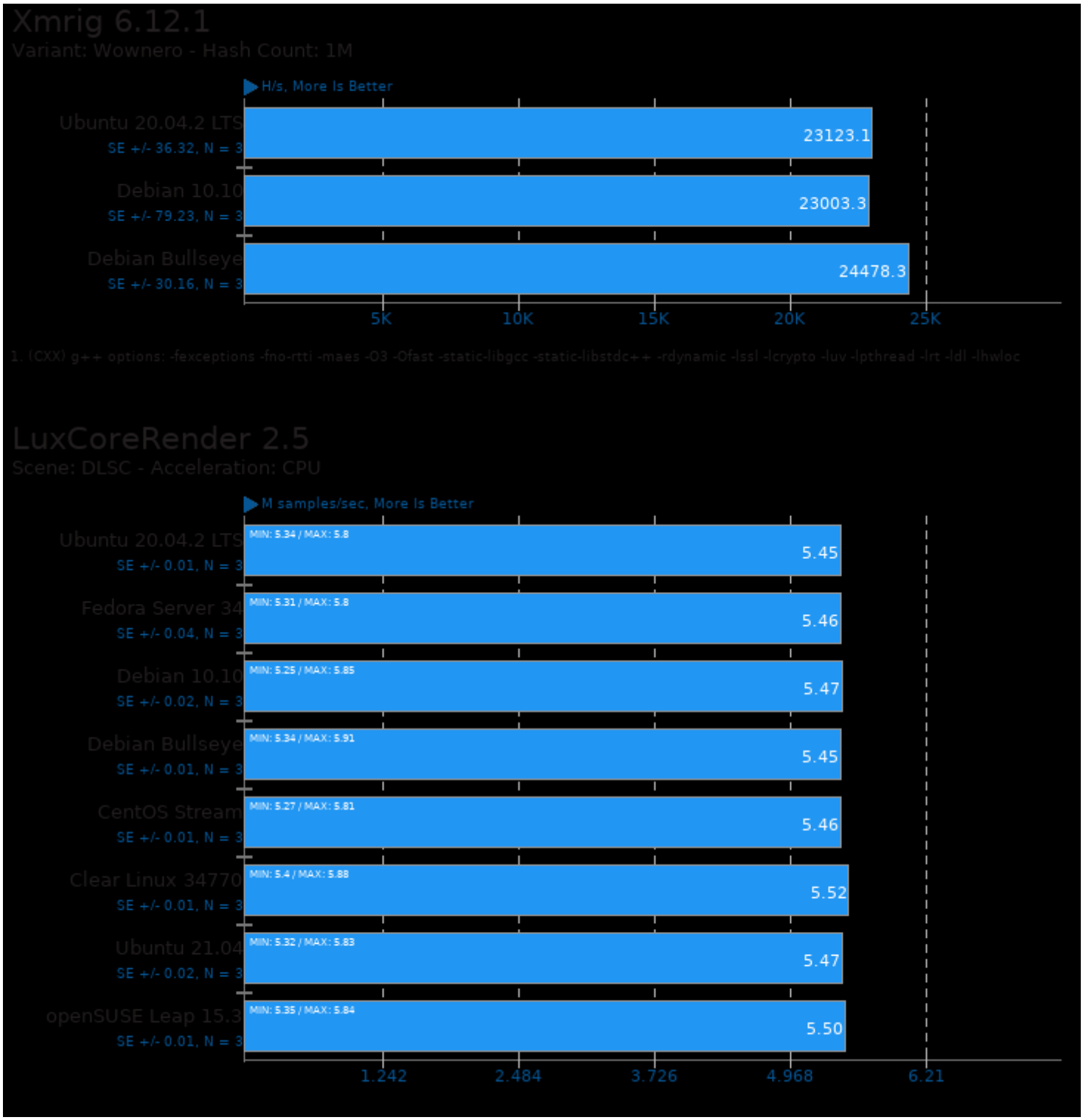

NAS Parallel Benchmarks 3.4
Test / Class: FT.C
Total Mop/s, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 40.78, N = 3
47059.68
Fedora Server 34
SE +/- 43.58, N = 3
17996.09
Debian Bullseye
SE +/- 134.89, N = 3
-lopen-rte -lopen-pal -lhwloc -ldl -levent_core -levent_pthreads -lutil -lm -lrt -lz
49076.24
CentOS Stream
SE +/- 49.69, N = 3
18869.87
Clear Linux 34770
SE +/- 318.68, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake
48459.81
Ubuntu 21.04
SE +/- 352.28, N = 11
-lopen-rte -lopen-pal -lhwloc -ldl -levent_core -levent_pthreads -lutil -lm -lrt -lz
46810.91
openSUSE Leap 15.3
SE +/- 90.41, N = 3
17789.03
11K
22K
33K
44K
55K
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

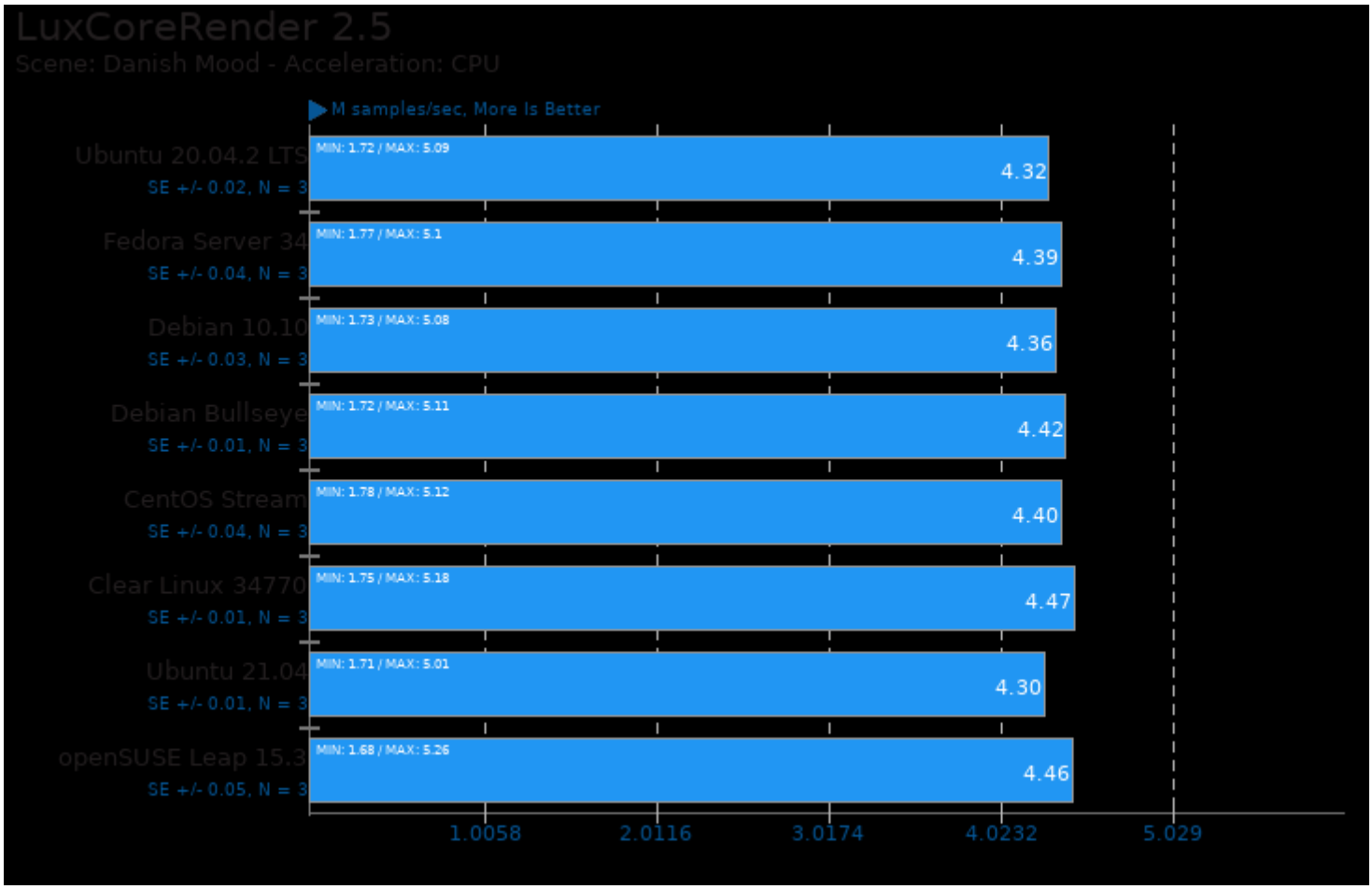

NAS Parallel Benchmarks 3.4
Test / Class: IS.D
Total Mop/s, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 8.29, N = 3
1786.82
Fedora Server 34
SE +/- 11.91, N = 4
1092.18
Debian Bullseye
SE +/- 10.78, N = 3
-lopen-rte -lopen-pal -lhwloc -ldl -levent_core -levent_pthreads -lutil -lm -lrt -lz
1731.34
CentOS Stream
SE +/- 6.10, N = 3
958.16
Clear Linux 34770
SE +/- 43.89, N = 12
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake
2177.72
Ubuntu 21.04
SE +/- 19.12, N = 3
-lopen-rte -lopen-pal -lhwloc -ldl -levent_core -levent_pthreads -lutil -lm -lrt -lz
1984.73
openSUSE Leap 15.3
SE +/- 15.78, N = 3
1153.31
500
1000
1500
2000
2500
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

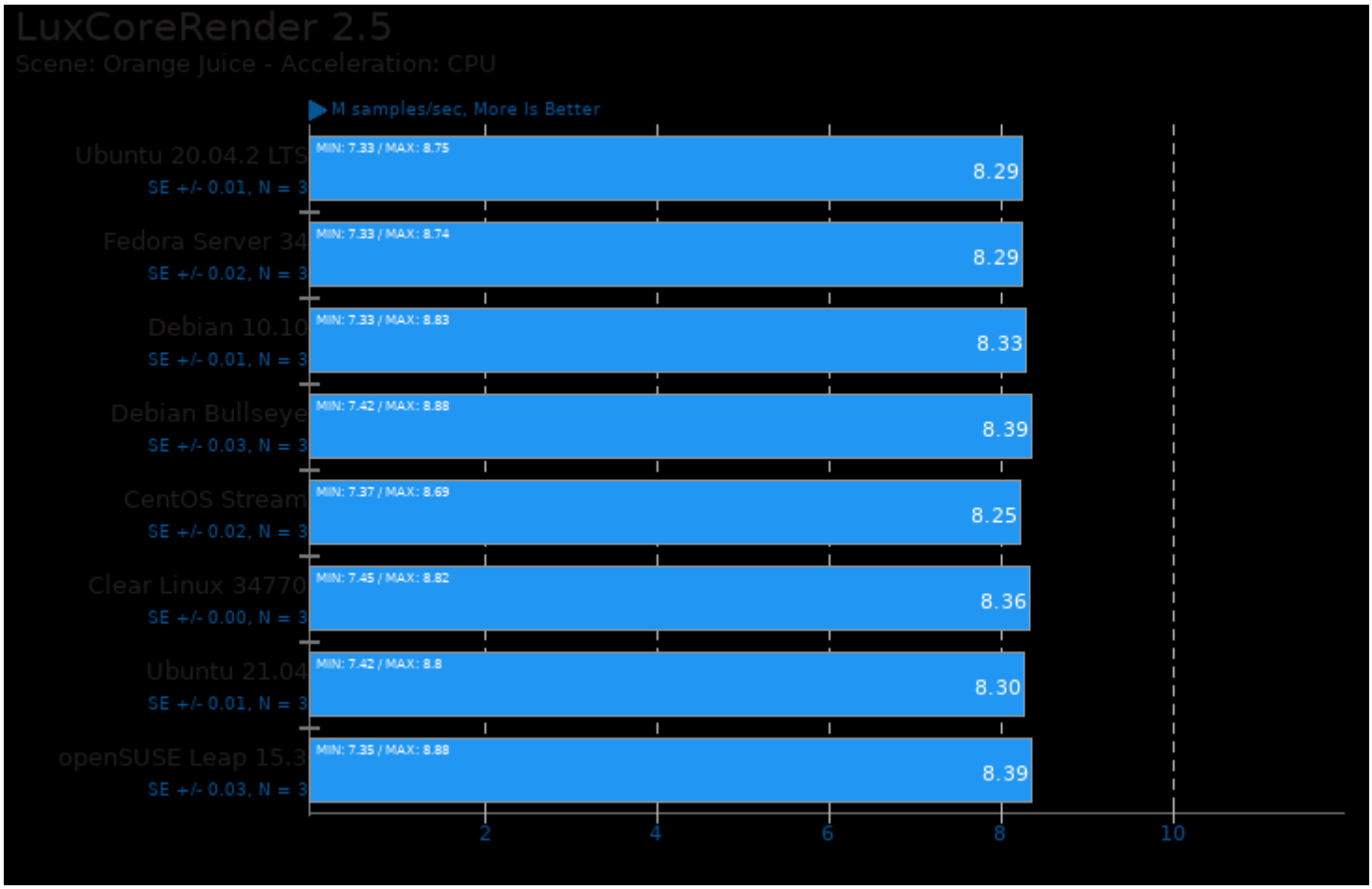

NAS Parallel Benchmarks 3.4
Test / Class: SP.C
Total Mop/s, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 59.03, N = 3
33234.28
Fedora Server 34
SE +/- 44.59, N = 3
10058.28
Debian 10.10
SE +/- 79.00, N = 3
33843.85
Debian Bullseye
SE +/- 72.73, N = 3
-lopen-rte -lopen-pal -lhwloc -ldl -levent_core -levent_pthreads -lutil -lm -lrt -lz
33101.40
CentOS Stream
SE +/- 5.32, N = 3
10303.96
Clear Linux 34770
SE +/- 66.76, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake
33882.21
Ubuntu 21.04
SE +/- 44.33, N = 3
-lopen-rte -lopen-pal -lhwloc -ldl -levent_core -levent_pthreads -lutil -lm -lrt -lz
32826.22
openSUSE Leap 15.3
SE +/- 5.61, N = 3
10268.17
7K
14K
21K
28K
35K
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

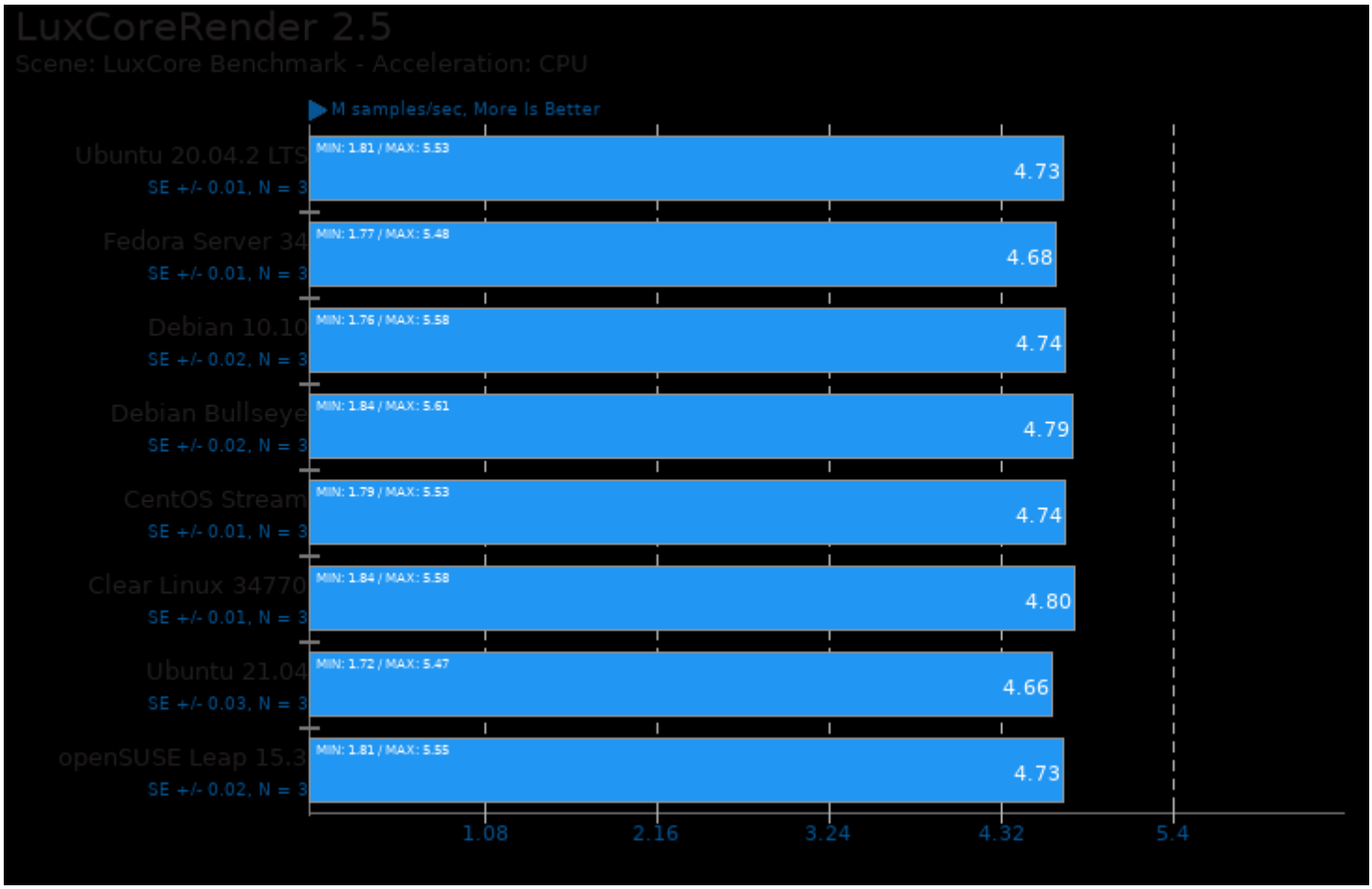

miniFE 2.2
Problem Size: Small
CG Mflops, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 260.75, N = 15
-lmpi_cxx
11203.04
Fedora Server 34
SE +/- 203.18, N = 12
-lmpi_cxx
10017.79
Debian 10.10
SE +/- 241.94, N = 15
-lmpi_cxx
10918.40
Debian Bullseye
SE +/- 374.12, N = 12
-lmpi_cxx
13355.40
CentOS Stream
SE +/- 381.69, N = 12
-lmpi_cxx
7928.40
Clear Linux 34770
SE +/- 247.03, N = 12
10393.78
Ubuntu 21.04
SE +/- 136.99, N = 15
-lmpi_cxx
11861.40
3K
6K
9K
12K
15K
1. (CXX) g++ options: -O3 -fopenmp -pthread -lmpi
NAMD 2.14
ATPase Simulation - 327,506 Atoms
days/ns, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.00041, N = 3
0.67252
Fedora Server 34
SE +/- 0.00051, N = 3
0.67355
Debian 10.10
SE +/- 0.00019, N = 3
0.67193
Debian Bullseye
SE +/- 0.00045, N = 3
0.67131
CentOS Stream
SE +/- 0.00027, N = 3
0.67415
Clear Linux 34770
SE +/- 0.00015, N = 3
0.67373
Ubuntu 21.04
SE +/- 0.00361, N = 3
0.67638
openSUSE Leap 15.3
SE +/- 0.00040, N = 3
0.67262
0.1522
0.3044
0.4566
0.6088
0.761

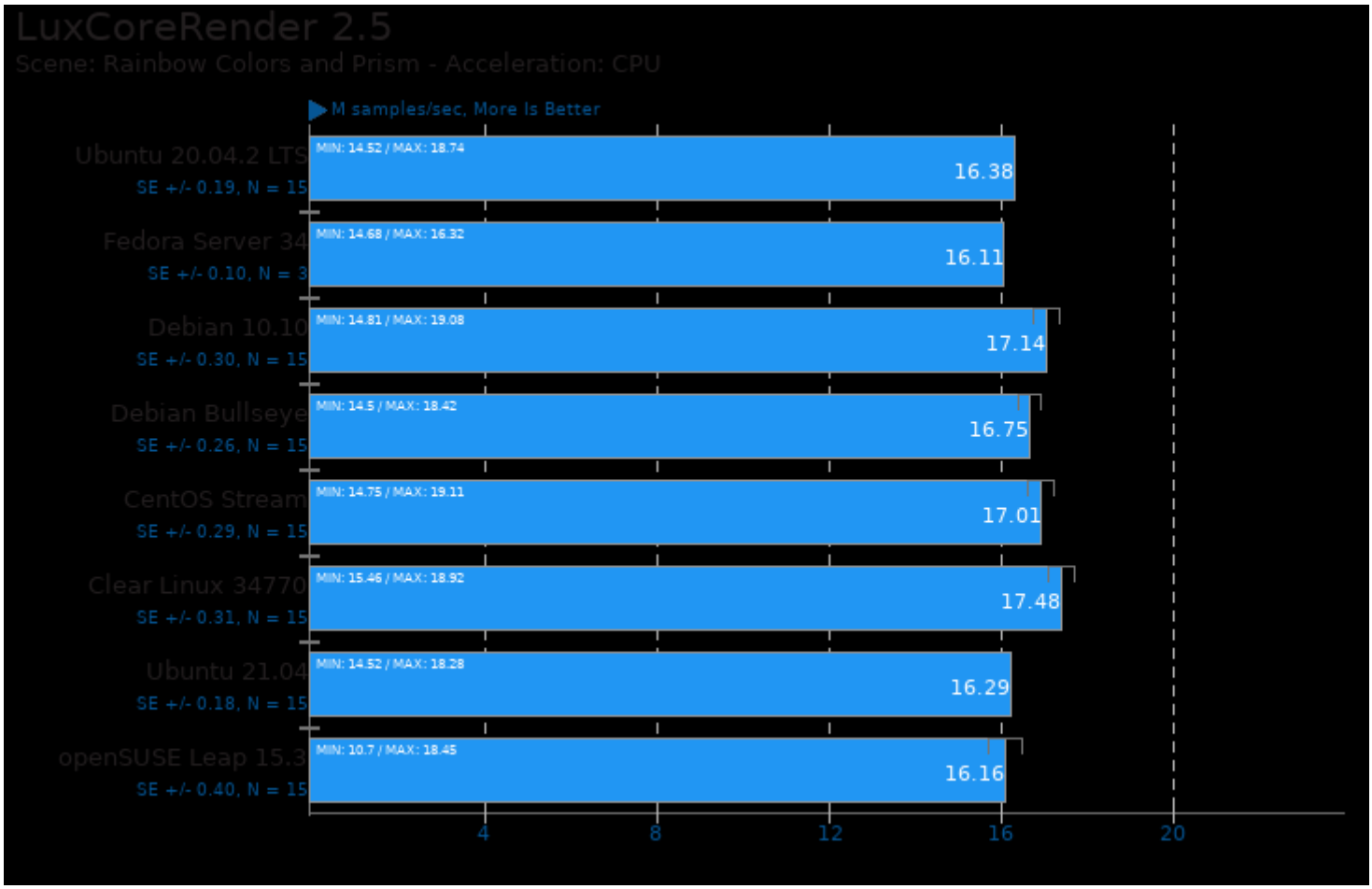

Xcompact3d Incompact3d 2021-03-11
Input: input.i3d 193 Cells Per Direction
Seconds, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.28, N = 6
27.88
Fedora Server 34
SE +/- 0.09, N = 3
29.04
Debian Bullseye
SE +/- 0.20, N = 15
-lopen-rte -lopen-pal -lhwloc -ldl -levent_core -levent_pthreads -lutil -lm -lrt -lz
27.70
CentOS Stream
SE +/- 0.18, N = 3
28.65
Clear Linux 34770
SE +/- 0.20, N = 3
27.16
Ubuntu 21.04
SE +/- 0.19, N = 3
-lopen-rte -lopen-pal -lhwloc -ldl -levent_core -levent_pthreads -lutil -lm -lrt -lz
28.81
openSUSE Leap 15.3
SE +/- 0.24, N = 3
29.13
7
14
21
28
35
1. (F9X) gfortran options: -cpp -O2 -funroll-loops -floop-optimize -fcray-pointer -fbacktrace -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi
Xmrig 6.12.1
Variant: Monero - Hash Count: 1M
H/s, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 33.78, N = 3
21914.9
Debian 10.10
SE +/- 52.41, N = 3
22334.5
Debian Bullseye
SE +/- 32.24, N = 3
23576.3
5K
10K
15K
20K
25K
1. (CXX) g++ options: -fexceptions -fno-rtti -maes -O3 -Ofast -static-libgcc -static-libstdc++ -rdynamic -lssl -lcrypto -luv -lpthread -lrt -ldl -lhwloc

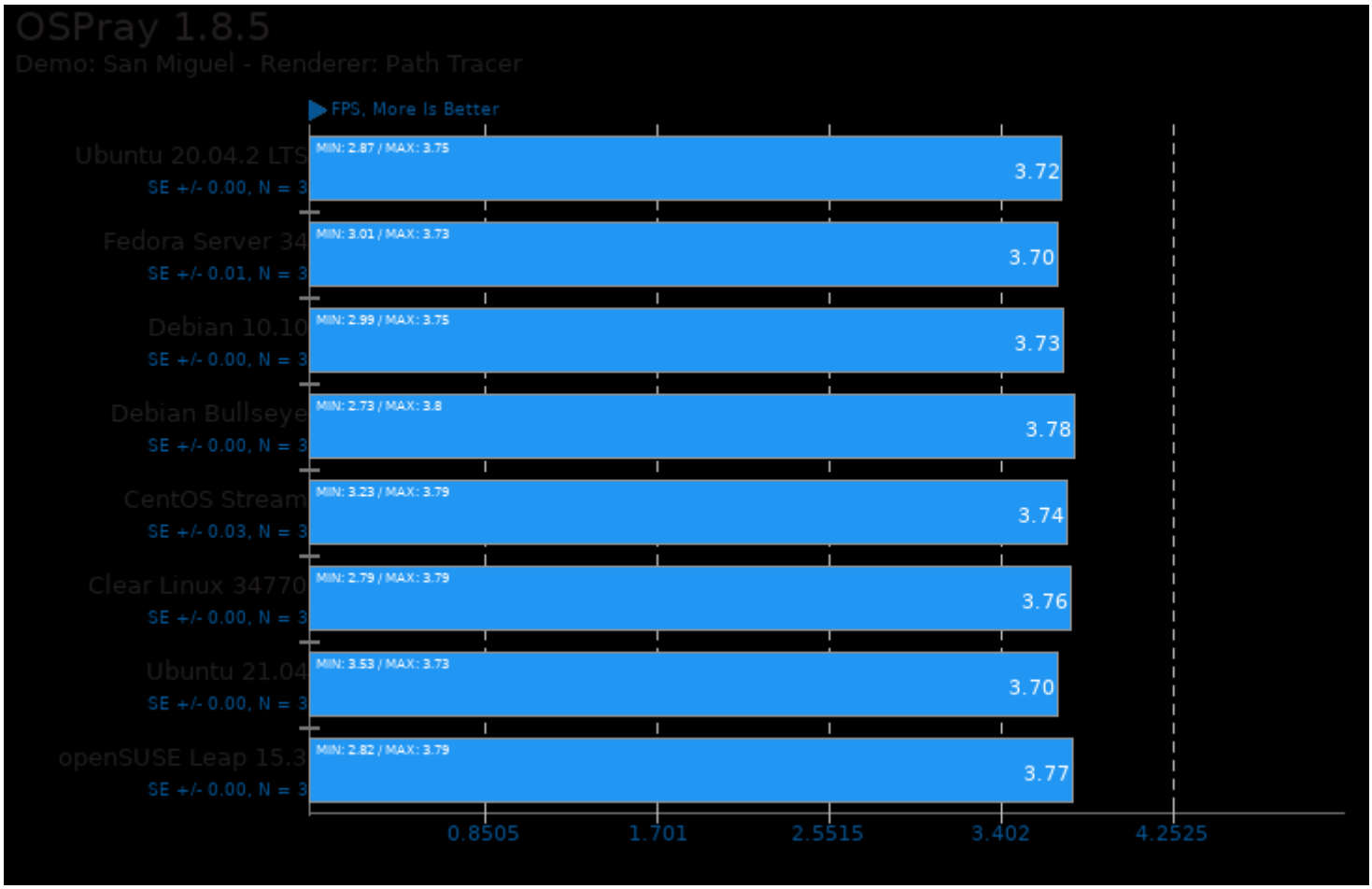

Xmrig 6.12.1
Variant: Wownero - Hash Count: 1M
H/s, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 36.32, N = 3
23123.1
Debian 10.10
SE +/- 79.23, N = 3
23003.3
Debian Bullseye
SE +/- 30.16, N = 3
24478.3
5K
10K
15K
20K
25K
1. (CXX) g++ options: -fexceptions -fno-rtti -maes -O3 -Ofast -static-libgcc -static-libstdc++ -rdynamic -lssl -lcrypto -luv -lpthread -lrt -ldl -lhwloc
LuxCoreRender 2.5
Scene: DLSC - Acceleration: CPU
M samples/sec, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.01, N = 3
MIN: 5.34 / MAX: 5.8
5.45
Fedora Server 34
SE +/- 0.04, N = 3
MIN: 5.31 / MAX: 5.8
5.46
Debian 10.10
SE +/- 0.02, N = 3
MIN: 5.25 / MAX: 5.85
5.47
Debian Bullseye
SE +/- 0.01, N = 3
MIN: 5.34 / MAX: 5.91
5.45
CentOS Stream
SE +/- 0.01, N = 3
MIN: 5.27 / MAX: 5.81
5.46
Clear Linux 34770
SE +/- 0.01, N = 3
MIN: 5.4 / MAX: 5.88
5.52
Ubuntu 21.04
SE +/- 0.02, N = 3
MIN: 5.32 / MAX: 5.83
5.47
openSUSE Leap 15.3
SE +/- 0.01, N = 3
MIN: 5.35 / MAX: 5.84
5.50
1.242
2.484
3.726
4.968
6.21

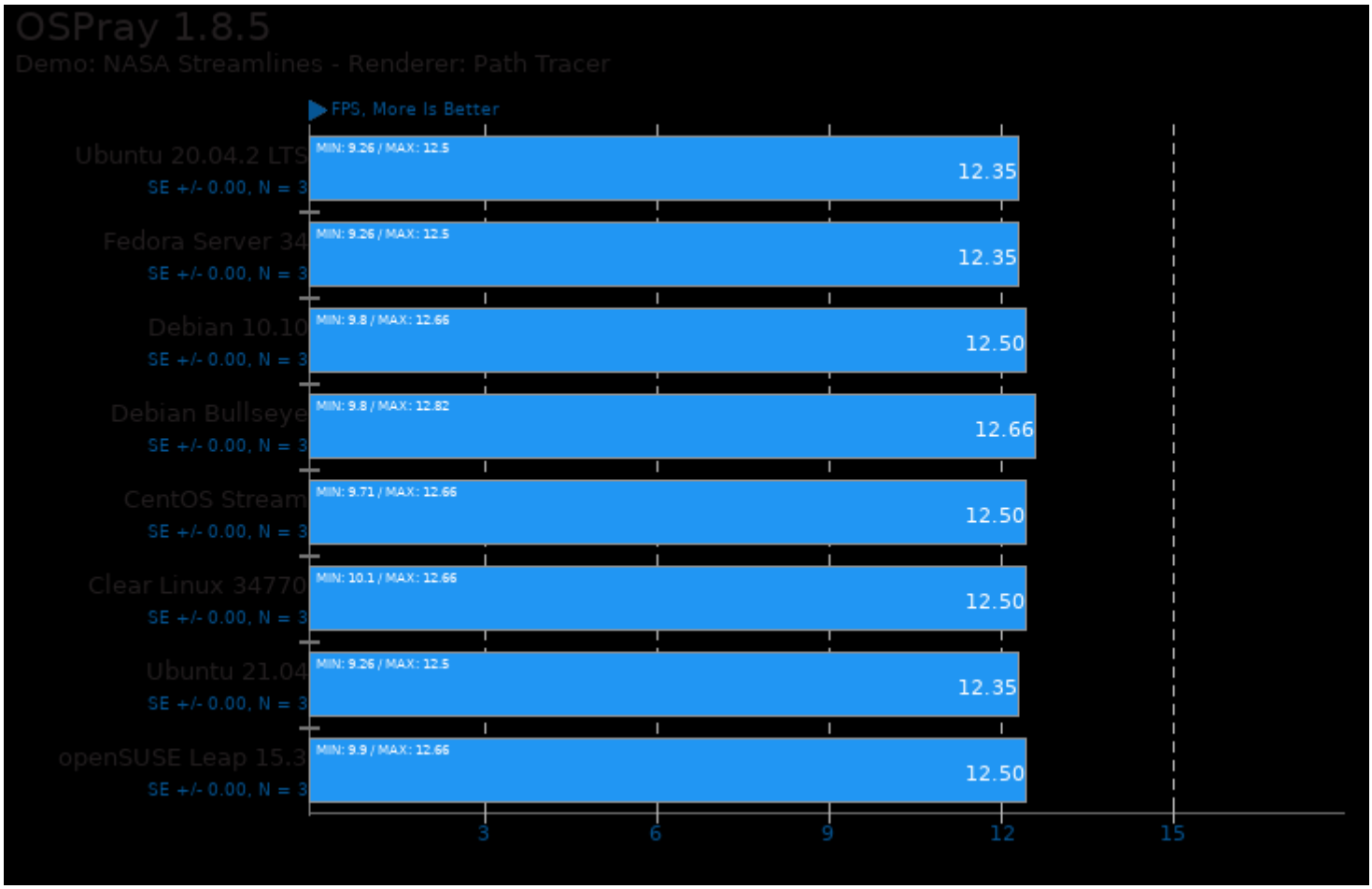

LuxCoreRender 2.5
Scene: Danish Mood - Acceleration: CPU
M samples/sec, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.02, N = 3
MIN: 1.72 / MAX: 5.09
4.32
Fedora Server 34
SE +/- 0.04, N = 3
MIN: 1.77 / MAX: 5.1
4.39
Debian 10.10
SE +/- 0.03, N = 3
MIN: 1.73 / MAX: 5.08
4.36
Debian Bullseye
SE +/- 0.01, N = 3
MIN: 1.72 / MAX: 5.11
4.42
CentOS Stream
SE +/- 0.04, N = 3
MIN: 1.78 / MAX: 5.12
4.40
Clear Linux 34770
SE +/- 0.01, N = 3
MIN: 1.75 / MAX: 5.18
4.47
Ubuntu 21.04
SE +/- 0.01, N = 3
MIN: 1.71 / MAX: 5.01
4.30
openSUSE Leap 15.3
SE +/- 0.05, N = 3
MIN: 1.68 / MAX: 5.26
4.46
1.0058
2.0116
3.0174
4.0232
5.029

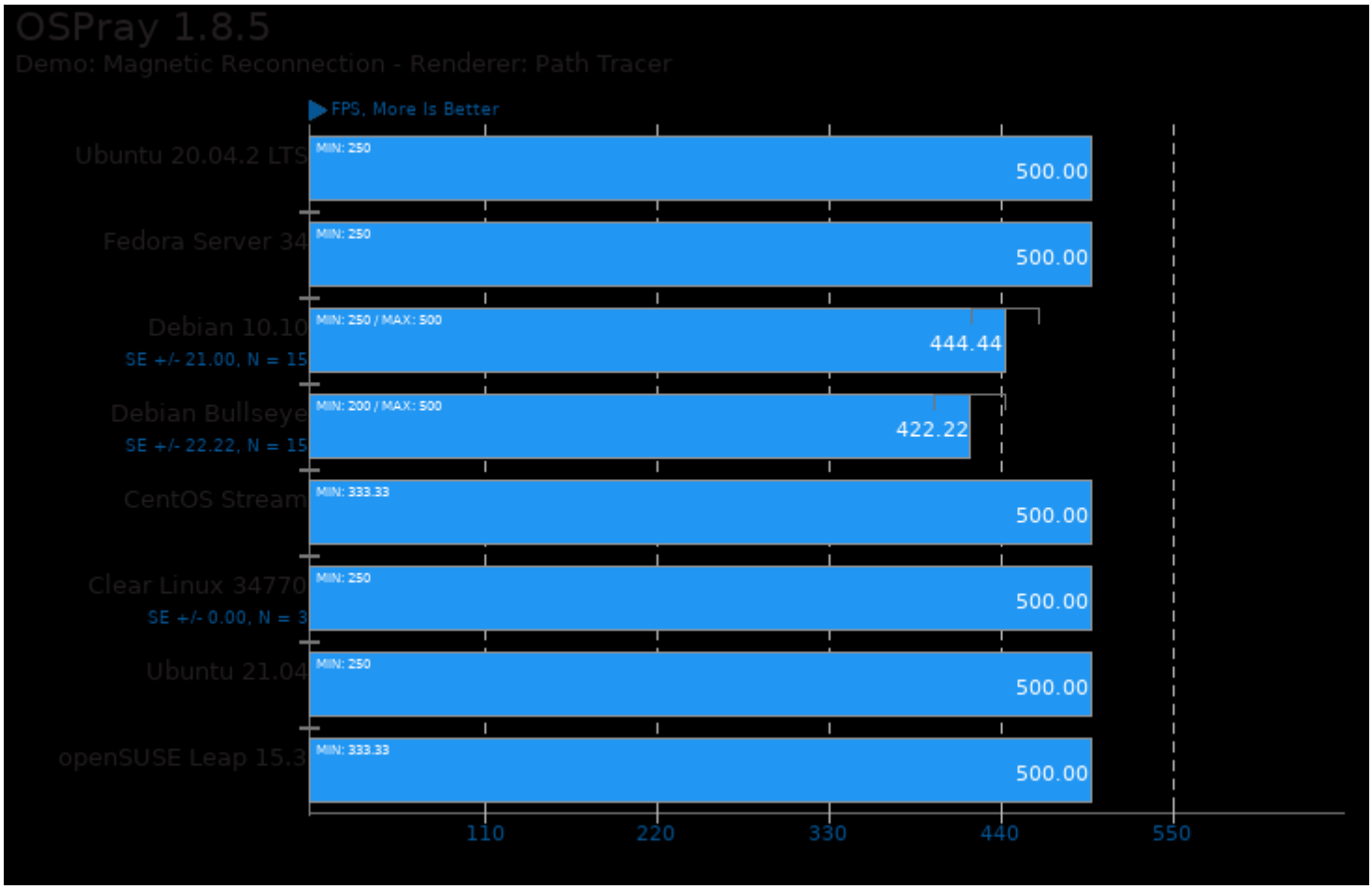

LuxCoreRender 2.5
Scene: Orange Juice - Acceleration: CPU
M samples/sec, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.01, N = 3
MIN: 7.33 / MAX: 8.75
8.29
Fedora Server 34
SE +/- 0.02, N = 3
MIN: 7.33 / MAX: 8.74
8.29
Debian 10.10
SE +/- 0.01, N = 3
MIN: 7.33 / MAX: 8.83
8.33
Debian Bullseye
SE +/- 0.03, N = 3
MIN: 7.42 / MAX: 8.88
8.39
CentOS Stream
SE +/- 0.02, N = 3
MIN: 7.37 / MAX: 8.69
8.25
Clear Linux 34770
SE +/- 0.00, N = 3
MIN: 7.45 / MAX: 8.82
8.36
Ubuntu 21.04
SE +/- 0.01, N = 3
MIN: 7.42 / MAX: 8.8
8.30
openSUSE Leap 15.3
SE +/- 0.03, N = 3
MIN: 7.35 / MAX: 8.88
8.39
2
4
6
8
10

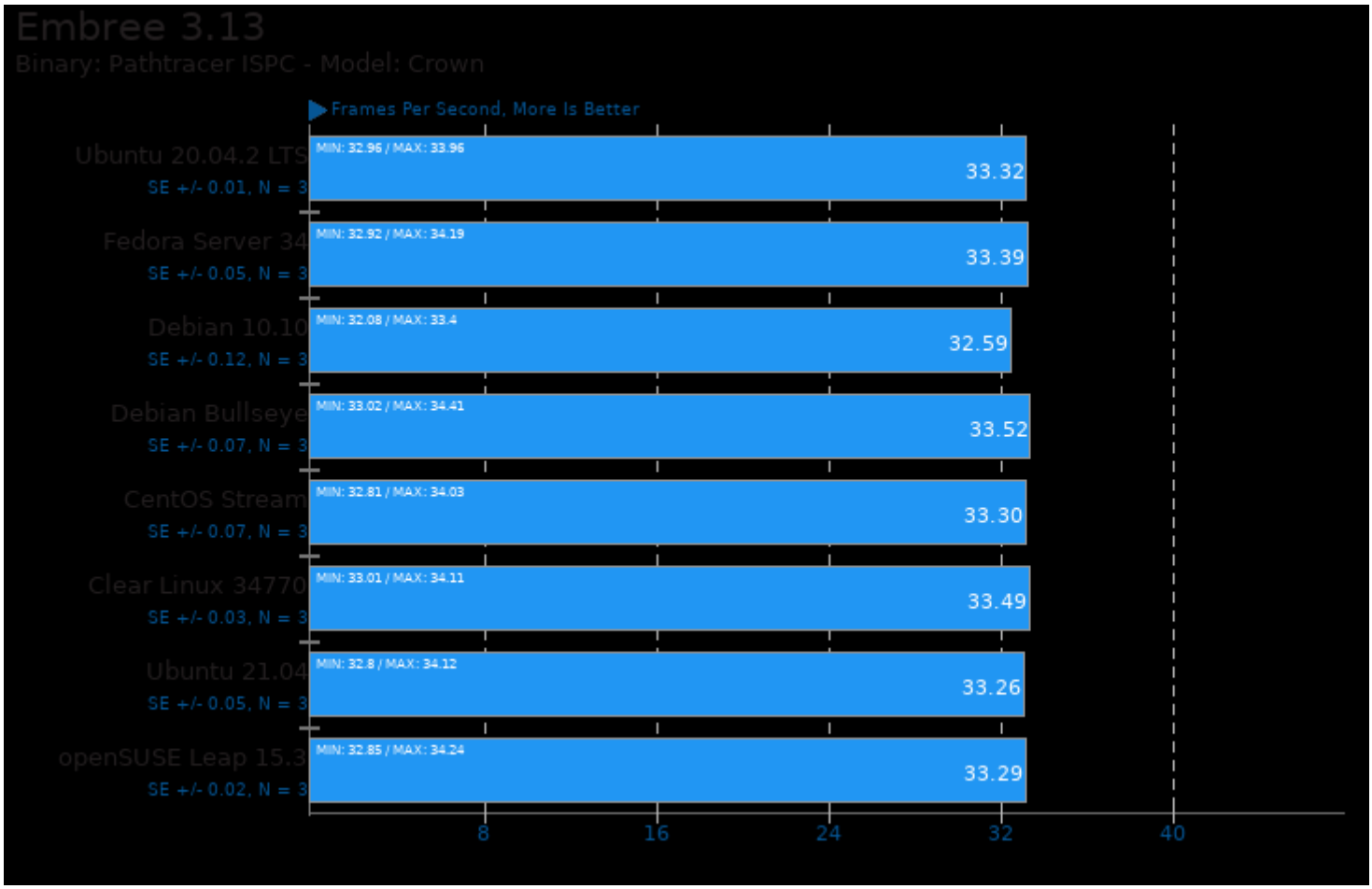

LuxCoreRender 2.5
Scene: LuxCore Benchmark - Acceleration: CPU
M samples/sec, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.01, N = 3
MIN: 1.81 / MAX: 5.53
4.73
Fedora Server 34
SE +/- 0.01, N = 3
MIN: 1.77 / MAX: 5.48
4.68
Debian 10.10
SE +/- 0.02, N = 3
MIN: 1.76 / MAX: 5.58
4.74
Debian Bullseye
SE +/- 0.02, N = 3
MIN: 1.84 / MAX: 5.61
4.79
CentOS Stream
SE +/- 0.01, N = 3
MIN: 1.79 / MAX: 5.53
4.74
Clear Linux 34770
SE +/- 0.01, N = 3
MIN: 1.84 / MAX: 5.58
4.80
Ubuntu 21.04
SE +/- 0.03, N = 3
MIN: 1.72 / MAX: 5.47
4.66
openSUSE Leap 15.3
SE +/- 0.02, N = 3
MIN: 1.81 / MAX: 5.55
4.73
1.08
2.16
3.24
4.32
5.4

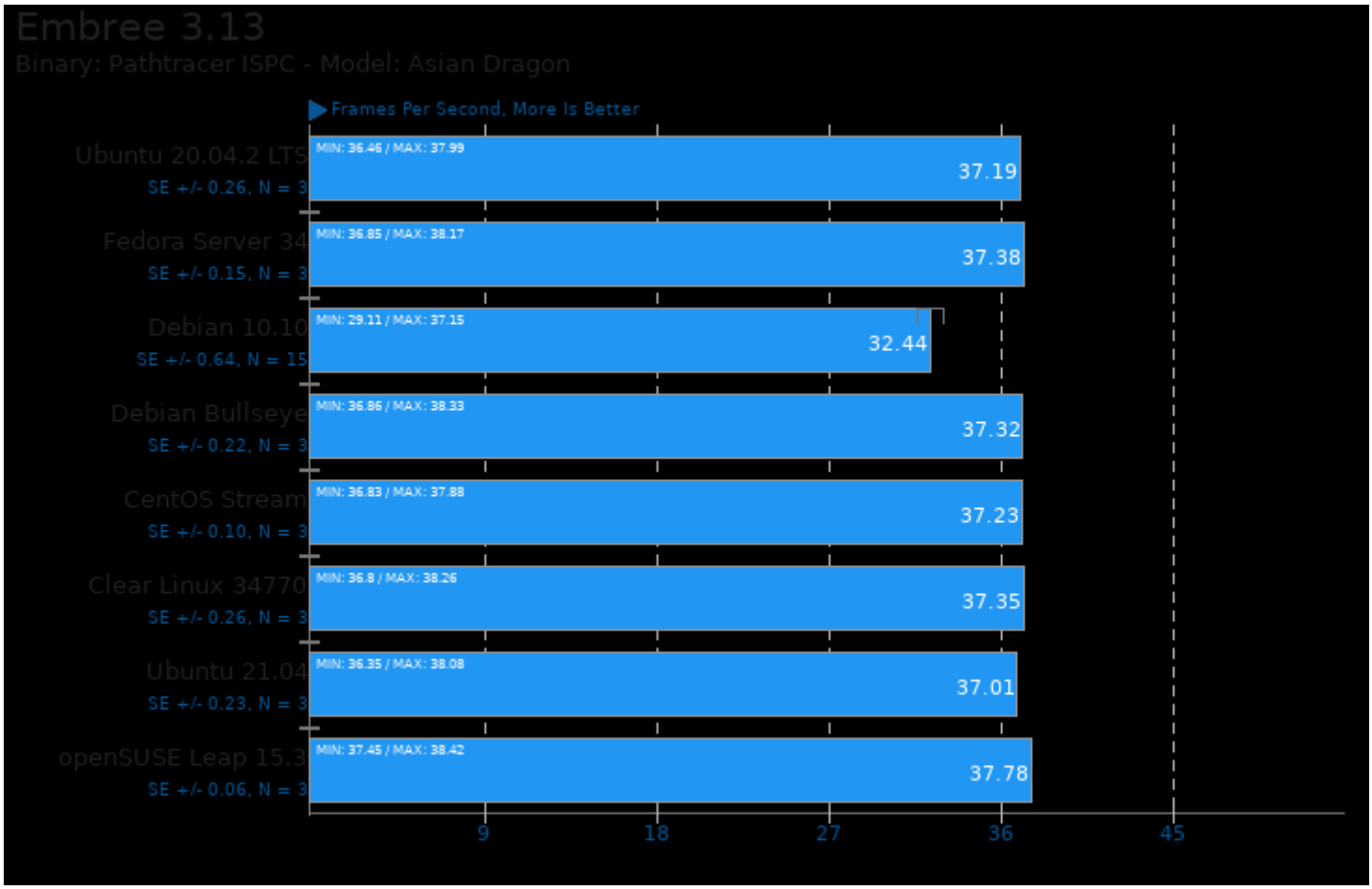

LuxCoreRender 2.5
Scene: Rainbow Colors and Prism - Acceleration: CPU
M samples/sec, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.19, N = 15
MIN: 14.52 / MAX: 18.74
16.38
Fedora Server 34
SE +/- 0.10, N = 3
MIN: 14.68 / MAX: 16.32
16.11
Debian 10.10
SE +/- 0.30, N = 15
MIN: 14.81 / MAX: 19.08
17.14
Debian Bullseye
SE +/- 0.26, N = 15
MIN: 14.5 / MAX: 18.42
16.75
CentOS Stream
SE +/- 0.29, N = 15
MIN: 14.75 / MAX: 19.11
17.01
Clear Linux 34770
SE +/- 0.31, N = 15
MIN: 15.46 / MAX: 18.92
17.48
Ubuntu 21.04
SE +/- 0.18, N = 15
MIN: 14.52 / MAX: 18.28
16.29
openSUSE Leap 15.3
SE +/- 0.40, N = 15
MIN: 10.7 / MAX: 18.45
16.16
4
8
12
16
20

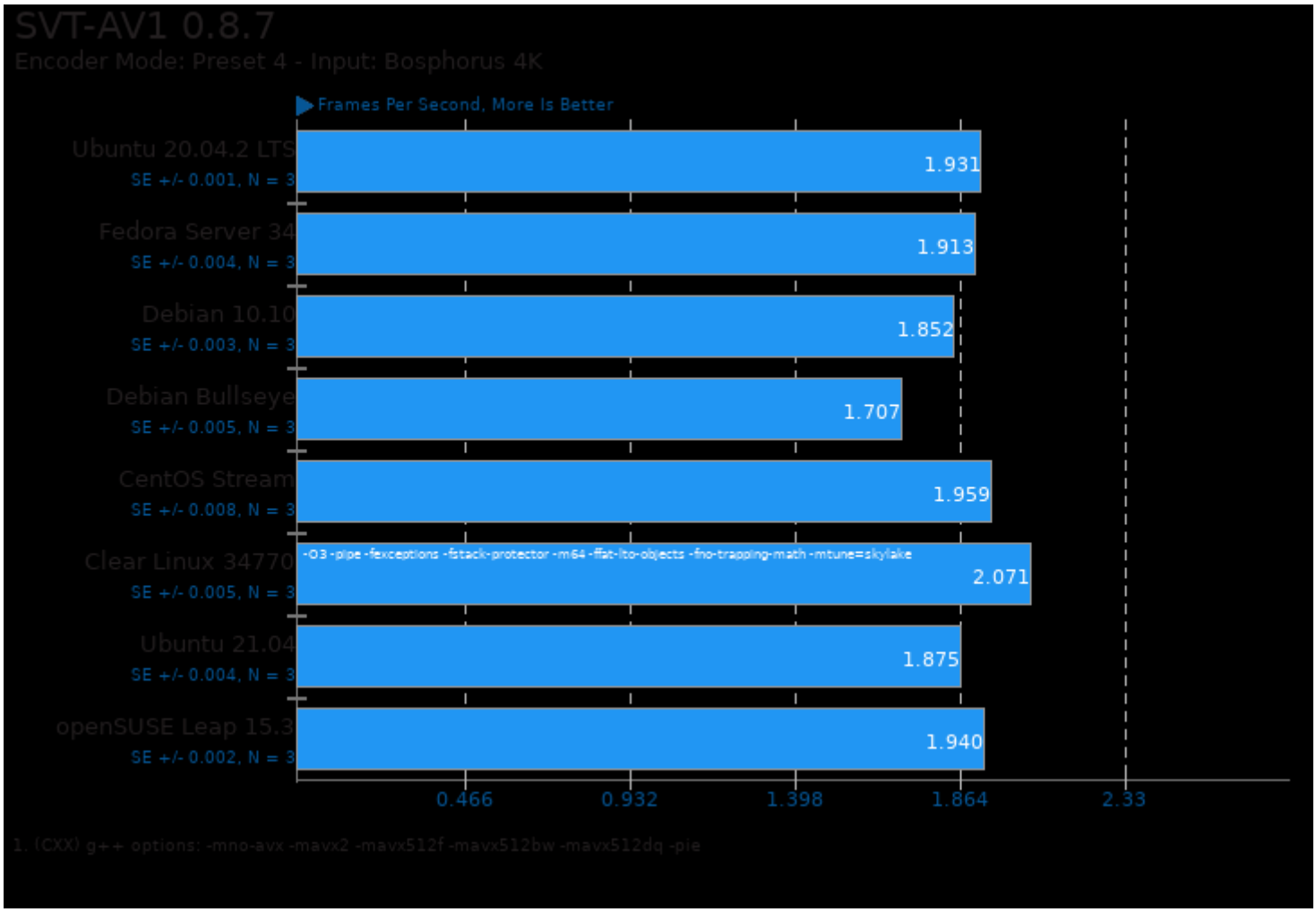

OSPray 1.8.5
Demo: San Miguel - Renderer: Path Tracer
FPS, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.00, N = 3
MIN: 2.87 / MAX: 3.75
3.72
Fedora Server 34
SE +/- 0.01, N = 3
MIN: 3.01 / MAX: 3.73
3.70
Debian 10.10
SE +/- 0.00, N = 3
MIN: 2.99 / MAX: 3.75
3.73
Debian Bullseye
SE +/- 0.00, N = 3
MIN: 2.73 / MAX: 3.8
3.78
CentOS Stream
SE +/- 0.03, N = 3
MIN: 3.23 / MAX: 3.79
3.74
Clear Linux 34770
SE +/- 0.00, N = 3
MIN: 2.79 / MAX: 3.79
3.76
Ubuntu 21.04
SE +/- 0.00, N = 3
MIN: 3.53 / MAX: 3.73
3.70
openSUSE Leap 15.3
SE +/- 0.00, N = 3
MIN: 2.82 / MAX: 3.79
3.77
0.8505
1.701
2.5515
3.402
4.2525

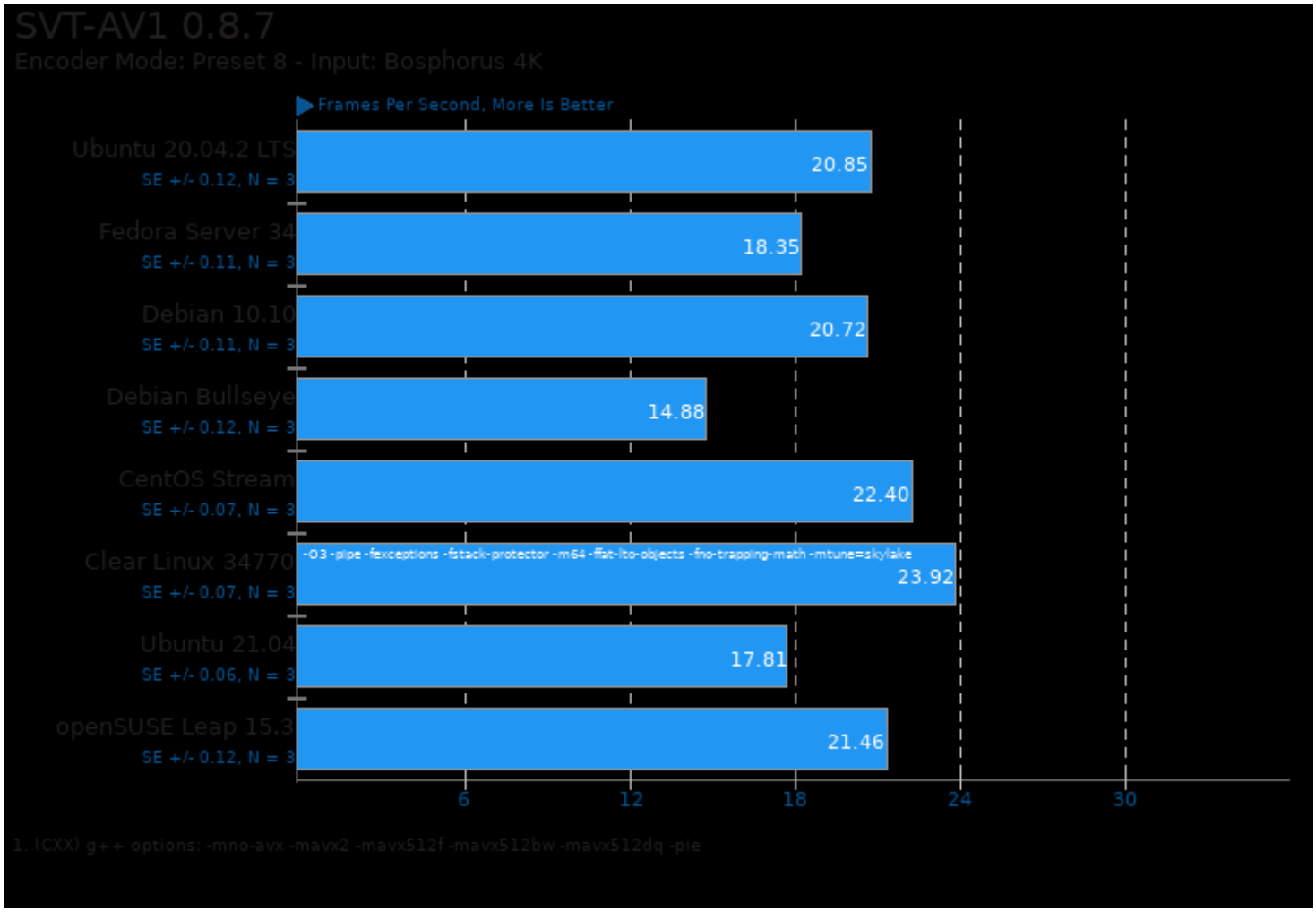

OSPray 1.8.5
Demo: NASA Streamlines - Renderer: Path Tracer
FPS, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.00, N = 3
MIN: 9.26 / MAX: 12.5
12.35
Fedora Server 34
SE +/- 0.00, N = 3
MIN: 9.26 / MAX: 12.5
12.35
Debian 10.10
SE +/- 0.00, N = 3
MIN: 9.8 / MAX: 12.66
12.50
Debian Bullseye
SE +/- 0.00, N = 3
MIN: 9.8 / MAX: 12.82
12.66
CentOS Stream
SE +/- 0.00, N = 3
MIN: 9.71 / MAX: 12.66
12.50
Clear Linux 34770
SE +/- 0.00, N = 3
MIN: 10.1 / MAX: 12.66
12.50
Ubuntu 21.04
SE +/- 0.00, N = 3
MIN: 9.26 / MAX: 12.5
12.35
openSUSE Leap 15.3
SE +/- 0.00, N = 3
MIN: 9.9 / MAX: 12.66
12.50
3
6
9
12
15

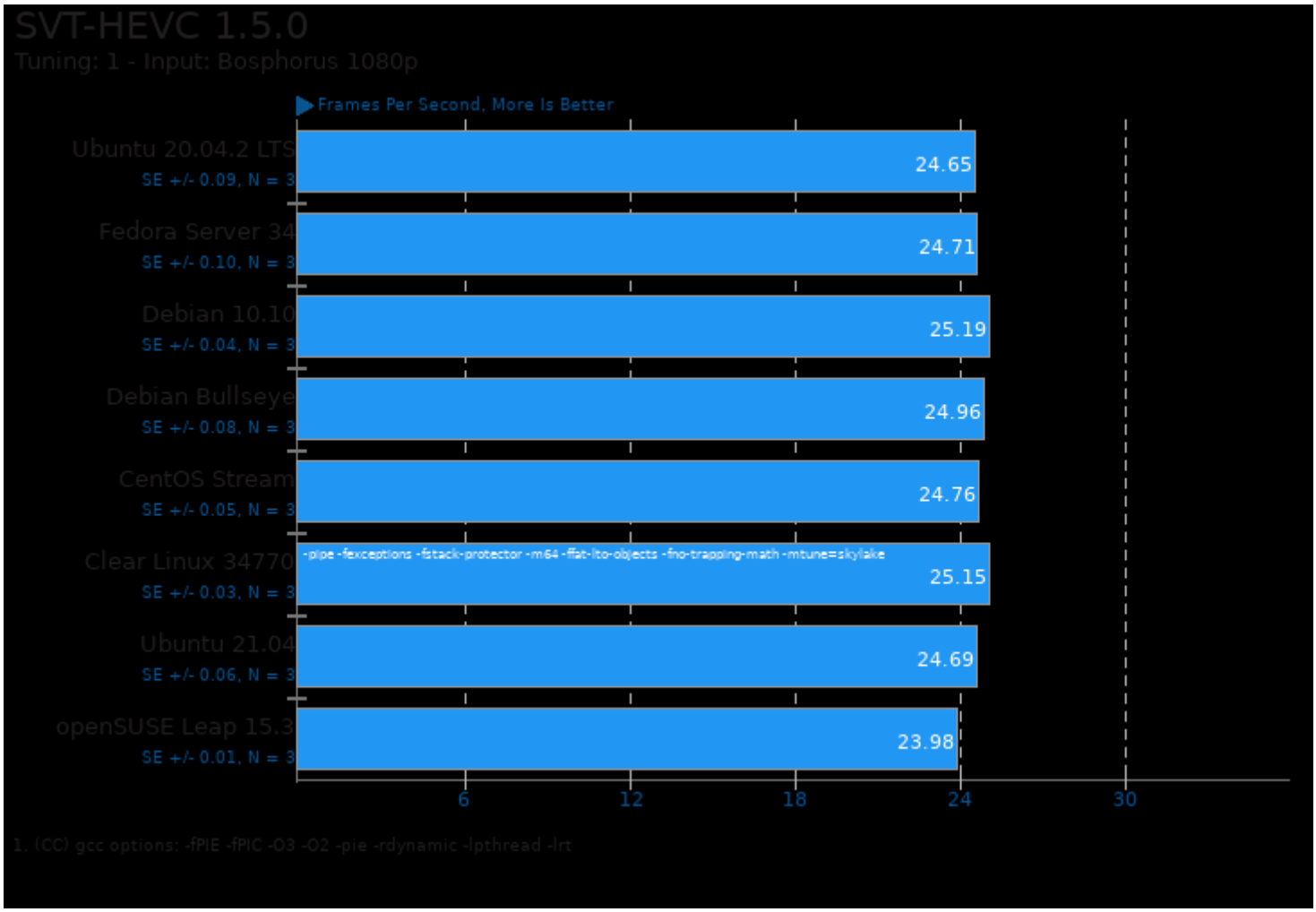

OSPray 1.8.5
Demo: Magnetic Reconnection - Renderer: Path Tracer
FPS, More Is Better
Ubuntu 20.04.2 LTS
MIN: 250
500.00
Fedora Server 34
MIN: 250
500.00
Debian 10.10
SE +/- 21.00, N = 15
MIN: 250 / MAX: 500
444.44
Debian Bullseye
SE +/- 22.22, N = 15
MIN: 200 / MAX: 500
422.22
CentOS Stream
MIN: 333.33
500.00
Clear Linux 34770
SE +/- 0.00, N = 3
MIN: 250
500.00
Ubuntu 21.04
MIN: 250
500.00
openSUSE Leap 15.3
MIN: 333.33
500.00
110
220
330
440
550

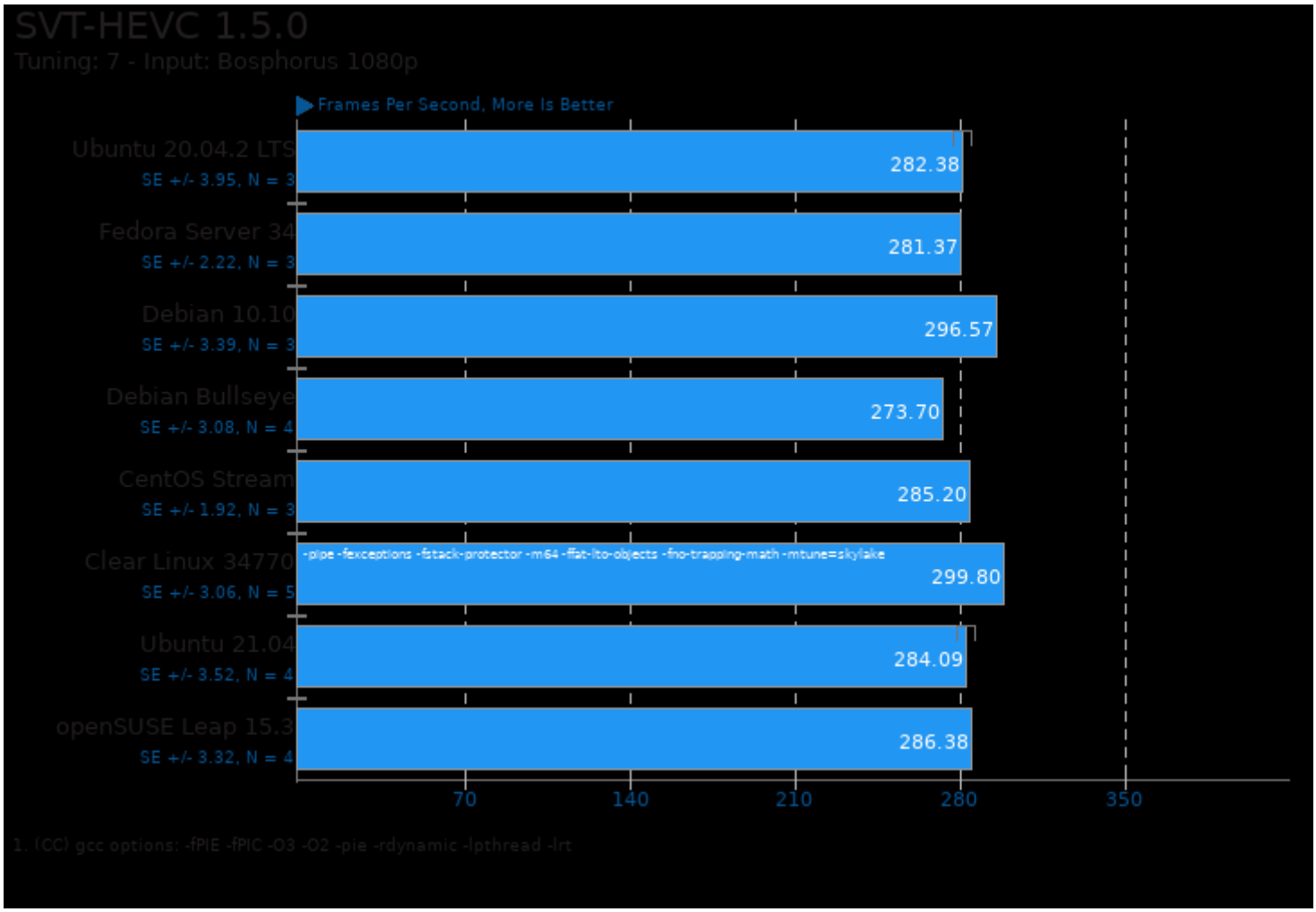

Embree 3.13
Binary: Pathtracer ISPC - Model: Crown
Frames Per Second, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.01, N = 3
MIN: 32.96 / MAX: 33.96
33.32
Fedora Server 34
SE +/- 0.05, N = 3
MIN: 32.92 / MAX: 34.19
33.39
Debian 10.10
SE +/- 0.12, N = 3
MIN: 32.08 / MAX: 33.4
32.59
Debian Bullseye
SE +/- 0.07, N = 3
MIN: 33.02 / MAX: 34.41
33.52
CentOS Stream
SE +/- 0.07, N = 3
MIN: 32.81 / MAX: 34.03
33.30
Clear Linux 34770
SE +/- 0.03, N = 3
MIN: 33.01 / MAX: 34.11
33.49
Ubuntu 21.04
SE +/- 0.05, N = 3
MIN: 32.8 / MAX: 34.12
33.26
openSUSE Leap 15.3
SE +/- 0.02, N = 3
MIN: 32.85 / MAX: 34.24
33.29
8
16
24
32
40

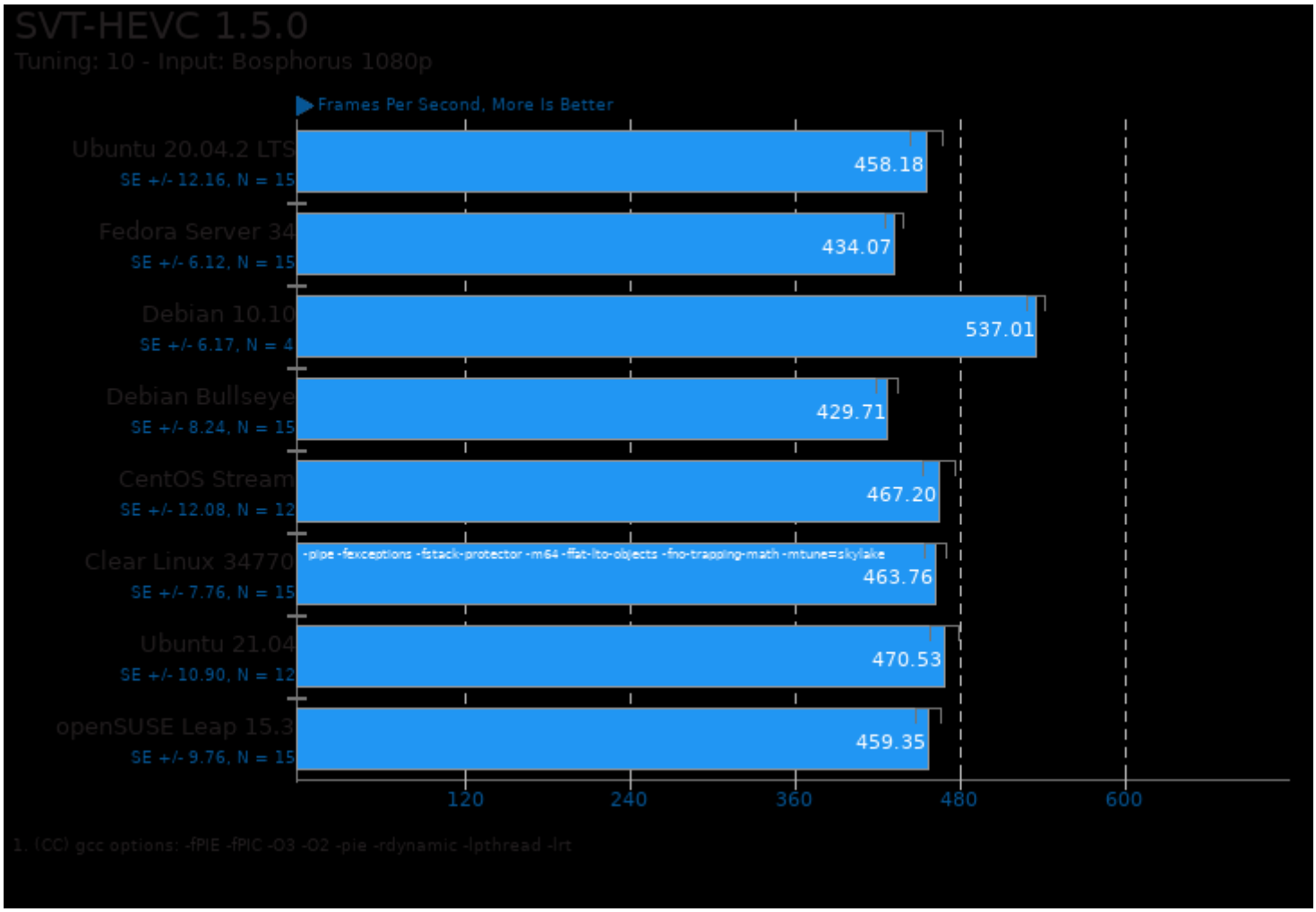

Embree 3.13
Binary: Pathtracer ISPC - Model: Asian Dragon
Frames Per Second, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.26, N = 3
MIN: 36.46 / MAX: 37.99
37.19
Fedora Server 34
SE +/- 0.15, N = 3
MIN: 36.85 / MAX: 38.17
37.38
Debian 10.10
SE +/- 0.64, N = 15
MIN: 29.11 / MAX: 37.15
32.44
Debian Bullseye
SE +/- 0.22, N = 3
MIN: 36.86 / MAX: 38.33
37.32
CentOS Stream
SE +/- 0.10, N = 3
MIN: 36.83 / MAX: 37.88
37.23
Clear Linux 34770
SE +/- 0.26, N = 3
MIN: 36.8 / MAX: 38.26
37.35
Ubuntu 21.04
SE +/- 0.23, N = 3
MIN: 36.35 / MAX: 38.08
37.01
openSUSE Leap 15.3
SE +/- 0.06, N = 3
MIN: 37.45 / MAX: 38.42
37.78
9
18
27
36
45

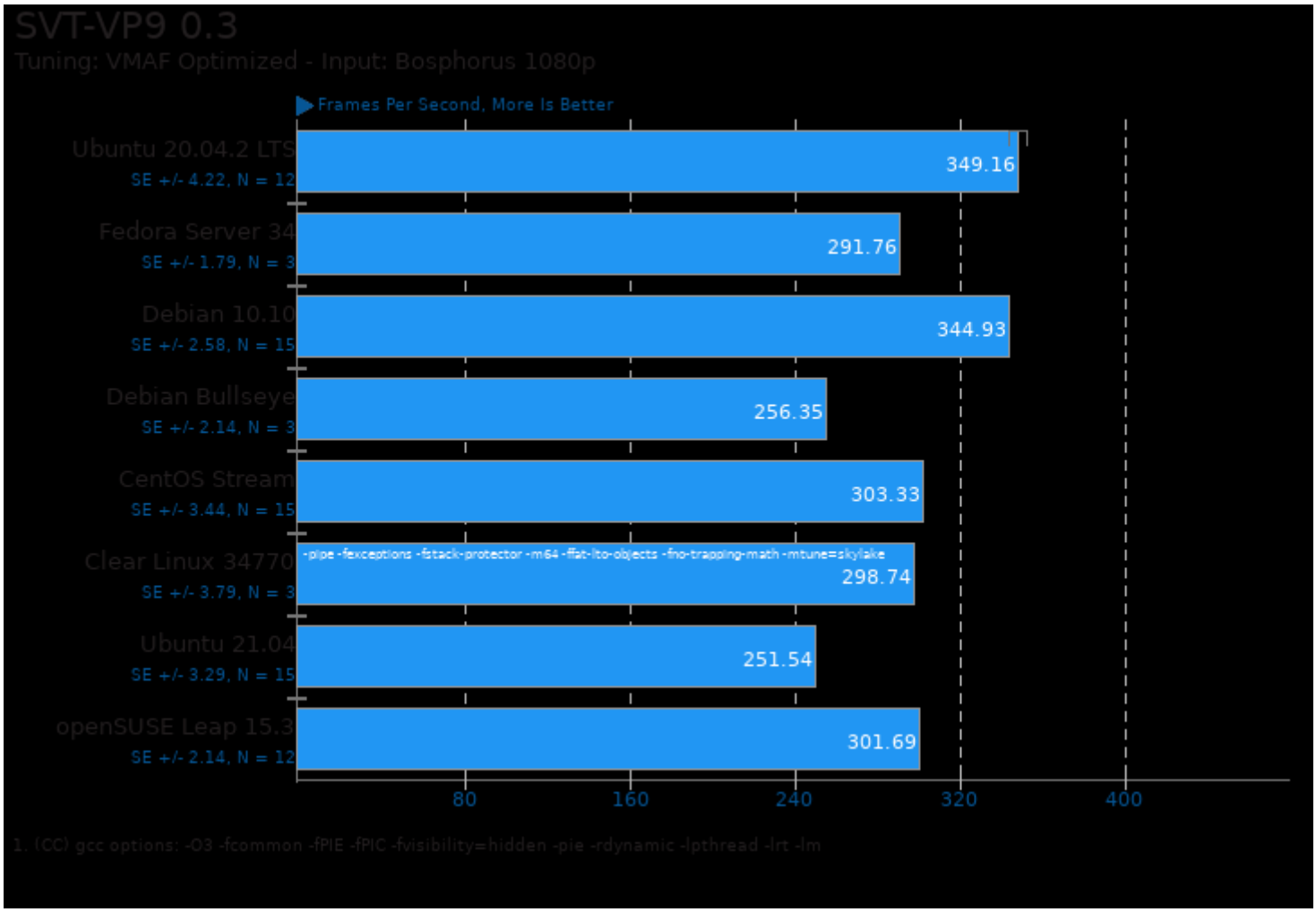

SVT-AV1 0.8.7
Encoder Mode: Preset 4 - Input: Bosphorus 4K
Frames Per Second, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.001, N = 3
1.931
Fedora Server 34
SE +/- 0.004, N = 3
1.913
Debian 10.10
SE +/- 0.003, N = 3
1.852
Debian Bullseye
SE +/- 0.005, N = 3
1.707
CentOS Stream
SE +/- 0.008, N = 3
1.959
Clear Linux 34770
SE +/- 0.005, N = 3
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake
2.071
Ubuntu 21.04
SE +/- 0.004, N = 3
1.875
openSUSE Leap 15.3
SE +/- 0.002, N = 3
1.940
0.466
0.932
1.398
1.864
2.33
1. (CXX) g++ options: -mno-avx -mavx2 -mavx512f -mavx512bw -mavx512dq -pie

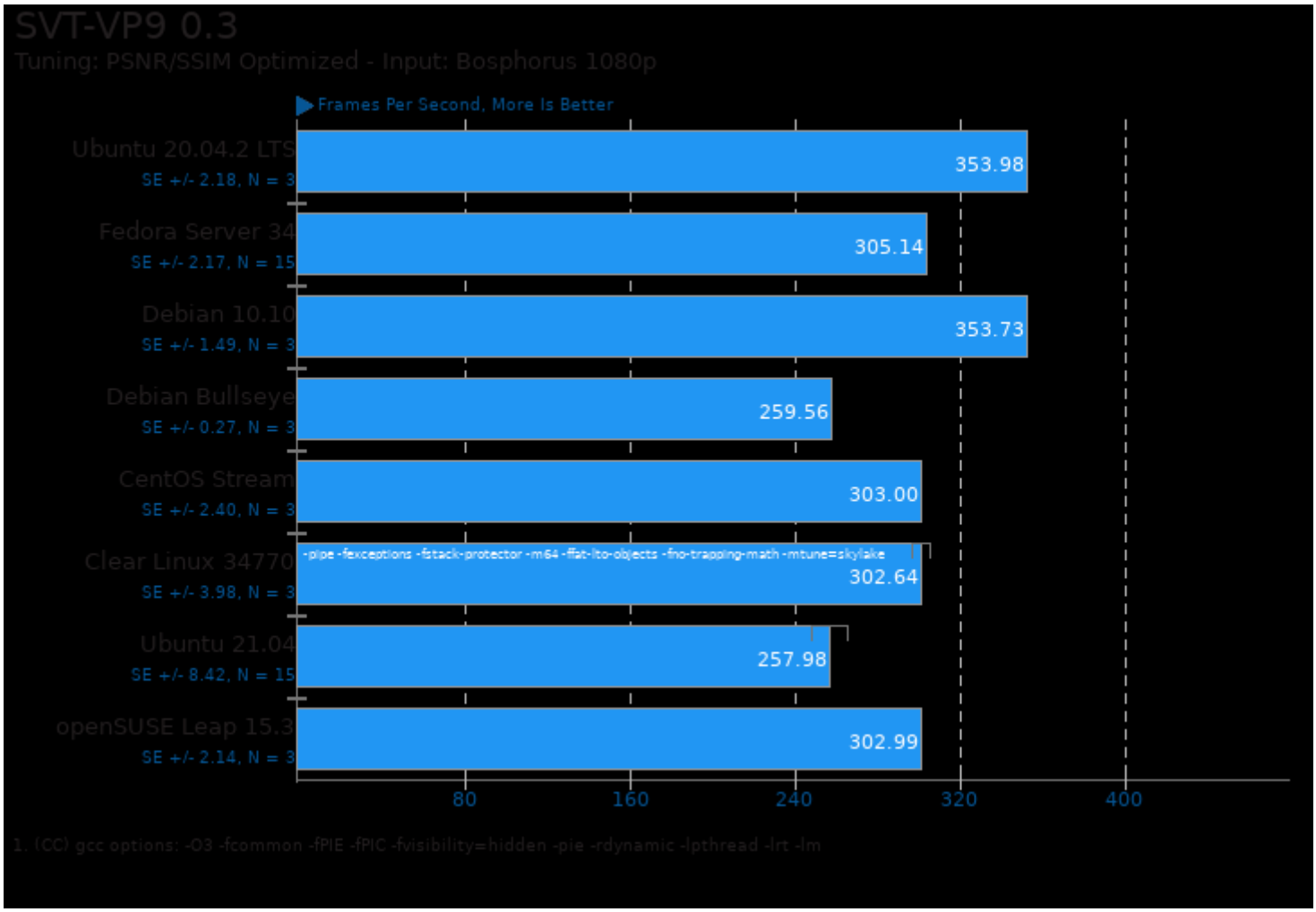

SVT-AV1 0.8.7
Encoder Mode: Preset 8 - Input: Bosphorus 4K
Frames Per Second, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.12, N = 3
20.85
Fedora Server 34
SE +/- 0.11, N = 3
18.35
Debian 10.10
SE +/- 0.11, N = 3
20.72
Debian Bullseye
SE +/- 0.12, N = 3
14.88
CentOS Stream
SE +/- 0.07, N = 3
22.40
Clear Linux 34770
SE +/- 0.07, N = 3
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake
23.92
Ubuntu 21.04
SE +/- 0.06, N = 3
17.81
openSUSE Leap 15.3
SE +/- 0.12, N = 3
21.46
6
12
18
24
30
1. (CXX) g++ options: -mno-avx -mavx2 -mavx512f -mavx512bw -mavx512dq -pie

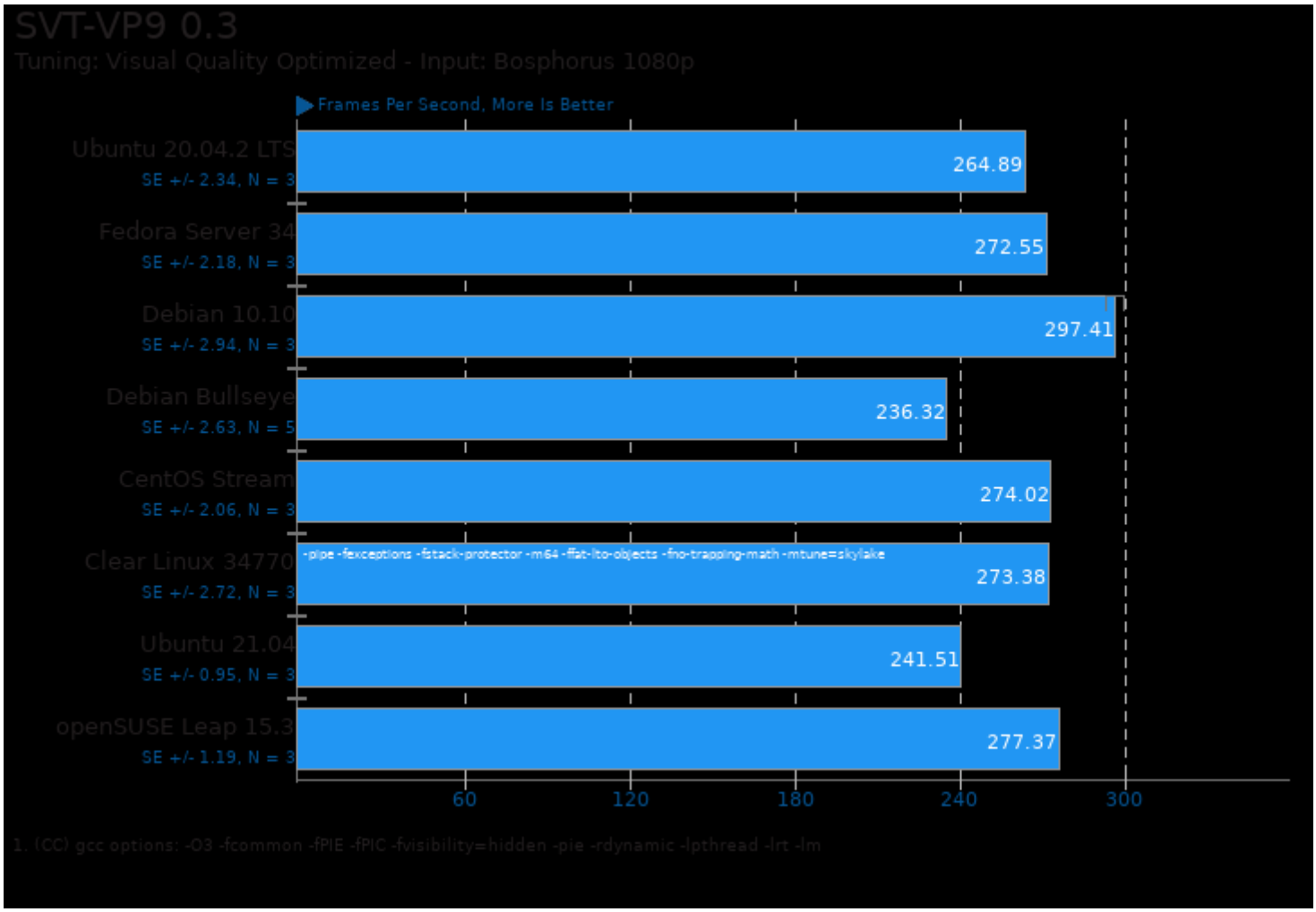

SVT-HEVC 1.5.0
Tuning: 1 - Input: Bosphorus 1080p
Frames Per Second, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.09, N = 3
24.65
Fedora Server 34
SE +/- 0.10, N = 3
24.71
Debian 10.10
SE +/- 0.04, N = 3
25.19
Debian Bullseye
SE +/- 0.08, N = 3
24.96
CentOS Stream
SE +/- 0.05, N = 3
24.76
Clear Linux 34770
SE +/- 0.03, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake
25.15
Ubuntu 21.04
SE +/- 0.06, N = 3
24.69
openSUSE Leap 15.3
SE +/- 0.01, N = 3
23.98
6
12
18
24
30
1. (CC) gcc options: -fPIE -fPIC -O3 -O2 -pie -rdynamic -lpthread -lrt

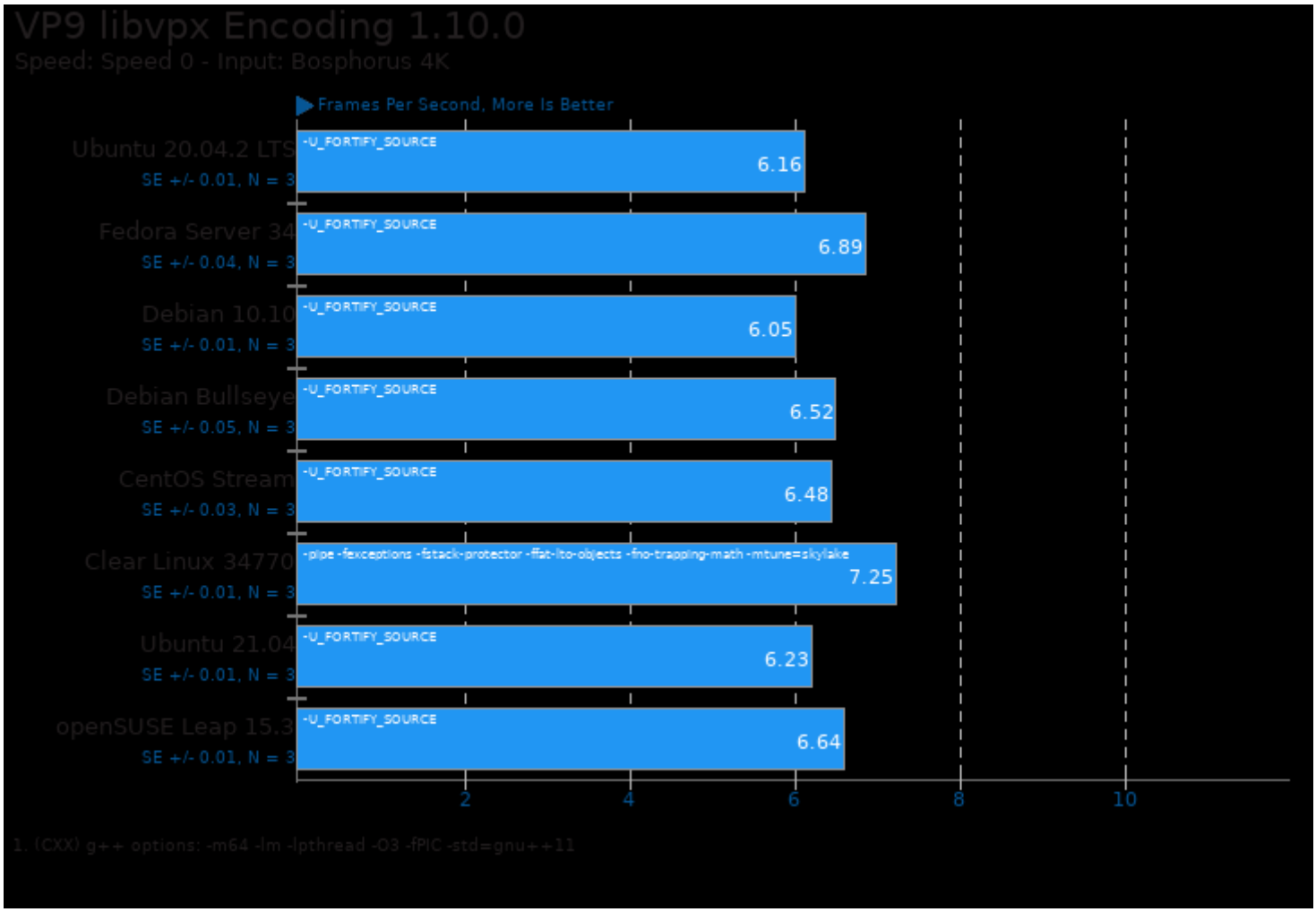

SVT-HEVC 1.5.0
Tuning: 7 - Input: Bosphorus 1080p
Frames Per Second, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 3.95, N = 3
282.38
Fedora Server 34
SE +/- 2.22, N = 3
281.37
Debian 10.10
SE +/- 3.39, N = 3
296.57
Debian Bullseye
SE +/- 3.08, N = 4
273.70
CentOS Stream
SE +/- 1.92, N = 3
285.20
Clear Linux 34770
SE +/- 3.06, N = 5
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake
299.80
Ubuntu 21.04
SE +/- 3.52, N = 4
284.09
openSUSE Leap 15.3
SE +/- 3.32, N = 4
286.38
70
140
210
280
350
1. (CC) gcc options: -fPIE -fPIC -O3 -O2 -pie -rdynamic -lpthread -lrt

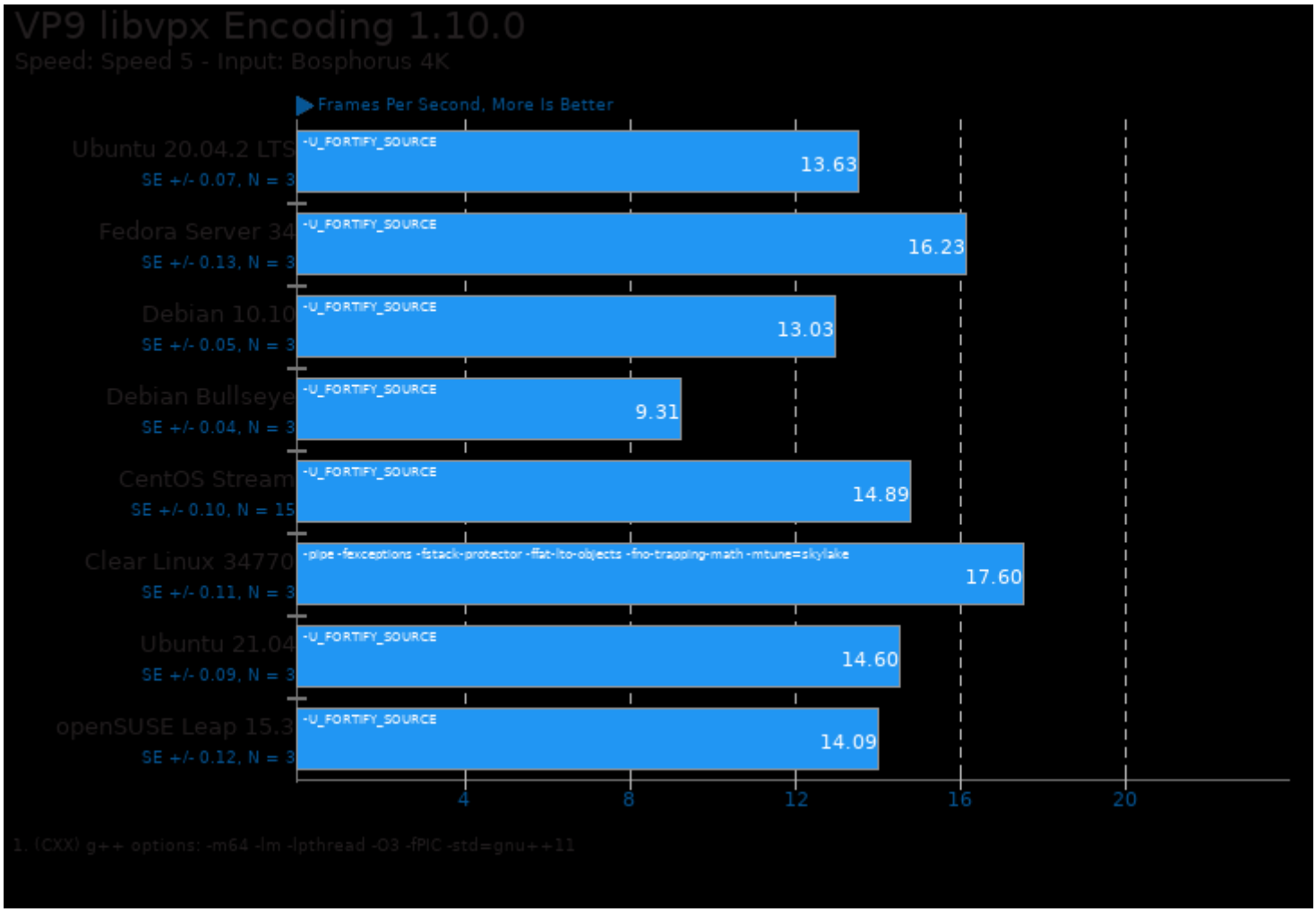

SVT-HEVC 1.5.0
Tuning: 10 - Input: Bosphorus 1080p
Frames Per Second, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 12.16, N = 15
458.18
Fedora Server 34
SE +/- 6.12, N = 15
434.07
Debian 10.10
SE +/- 6.17, N = 4
537.01
Debian Bullseye
SE +/- 8.24, N = 15
429.71
CentOS Stream
SE +/- 12.08, N = 12
467.20
Clear Linux 34770
SE +/- 7.76, N = 15
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake
463.76
Ubuntu 21.04
SE +/- 10.90, N = 12
470.53
openSUSE Leap 15.3
SE +/- 9.76, N = 15
459.35
120
240
360
480
600
1. (CC) gcc options: -fPIE -fPIC -O3 -O2 -pie -rdynamic -lpthread -lrt

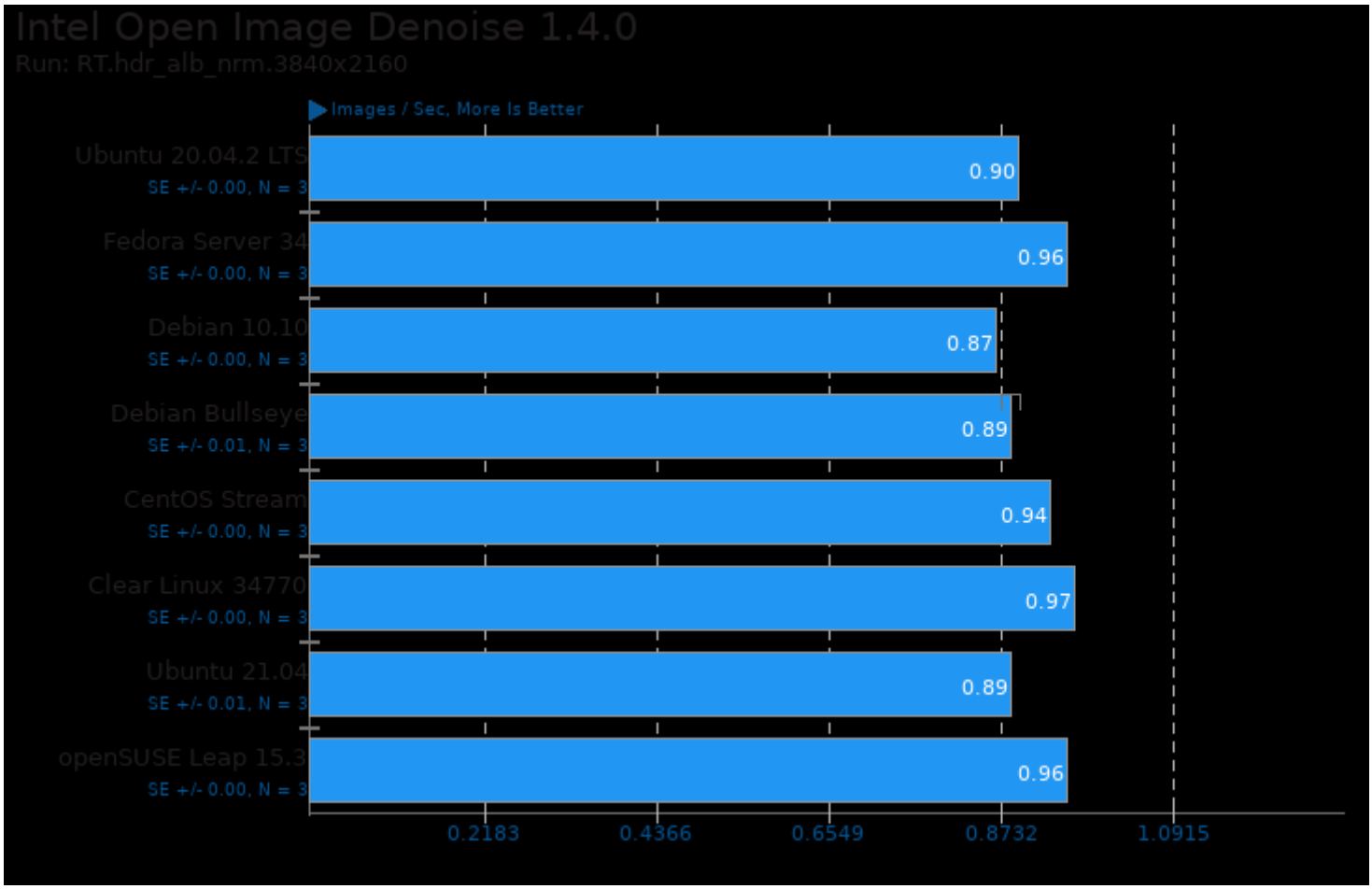

SVT-VP9 0.3
Tuning: VMAF Optimized - Input: Bosphorus 1080p
Frames Per Second, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 4.22, N = 12
349.16
Fedora Server 34
SE +/- 1.79, N = 3
291.76
Debian 10.10
SE +/- 2.58, N = 15
344.93
Debian Bullseye
SE +/- 2.14, N = 3
256.35
CentOS Stream
SE +/- 3.44, N = 15
303.33
Clear Linux 34770
SE +/- 3.79, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake
298.74
Ubuntu 21.04
SE +/- 3.29, N = 15
251.54
openSUSE Leap 15.3
SE +/- 2.14, N = 12
301.69
80
160
240
320
400
1. (CC) gcc options: -O3 -fcommon -fPIE -fPIC -fvisibility=hidden -pie -rdynamic -lpthread -lrt -lm

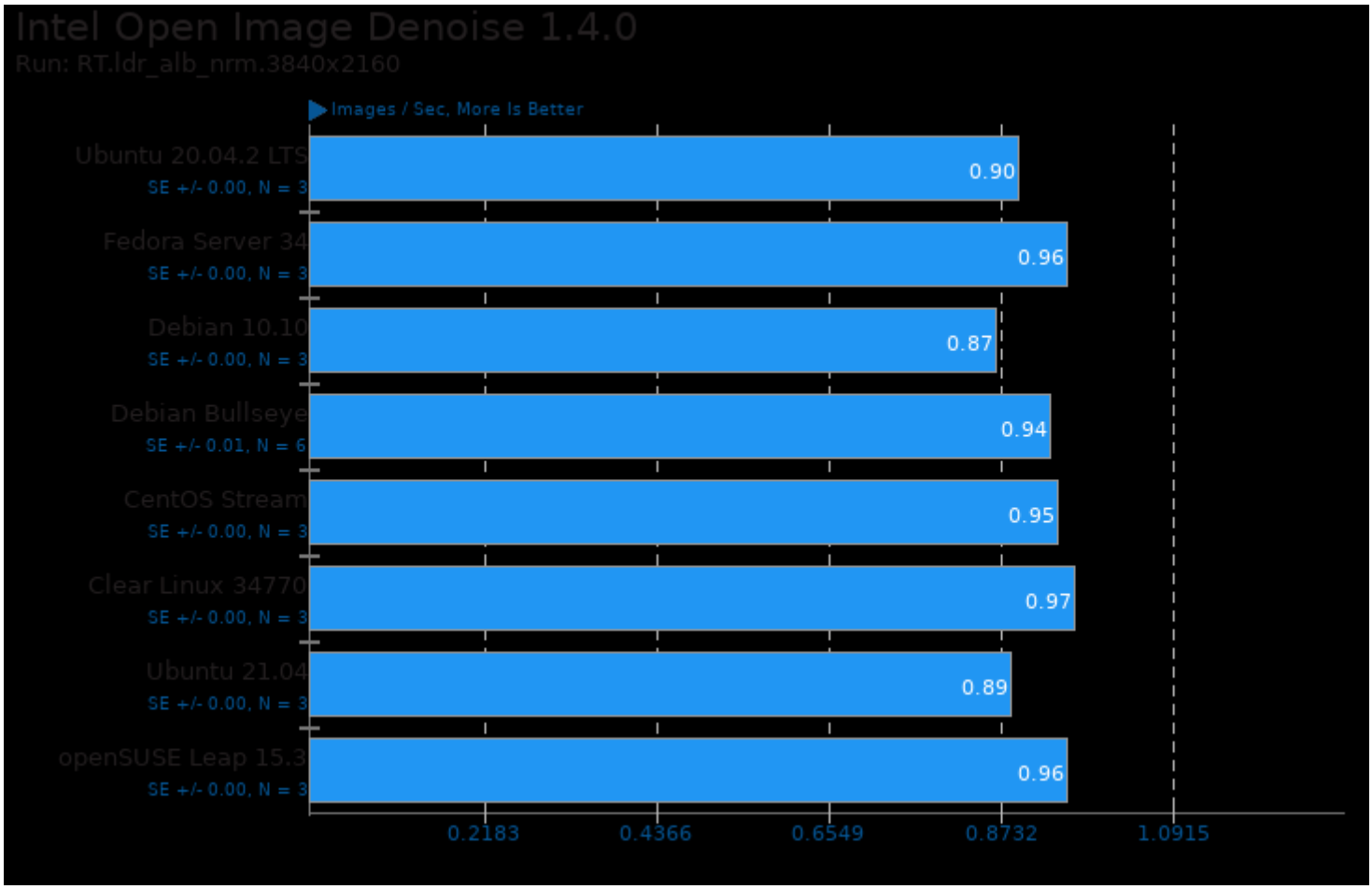

SVT-VP9 0.3
Tuning: PSNR/SSIM Optimized - Input: Bosphorus 1080p
Frames Per Second, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 2.18, N = 3
353.98
Fedora Server 34
SE +/- 2.17, N = 15
305.14
Debian 10.10
SE +/- 1.49, N = 3
353.73
Debian Bullseye
SE +/- 0.27, N = 3
259.56
CentOS Stream
SE +/- 2.40, N = 3
303.00
Clear Linux 34770
SE +/- 3.98, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake
302.64
Ubuntu 21.04
SE +/- 8.42, N = 15
257.98
openSUSE Leap 15.3
SE +/- 2.14, N = 3
302.99
80
160
240
320
400
1. (CC) gcc options: -O3 -fcommon -fPIE -fPIC -fvisibility=hidden -pie -rdynamic -lpthread -lrt -lm

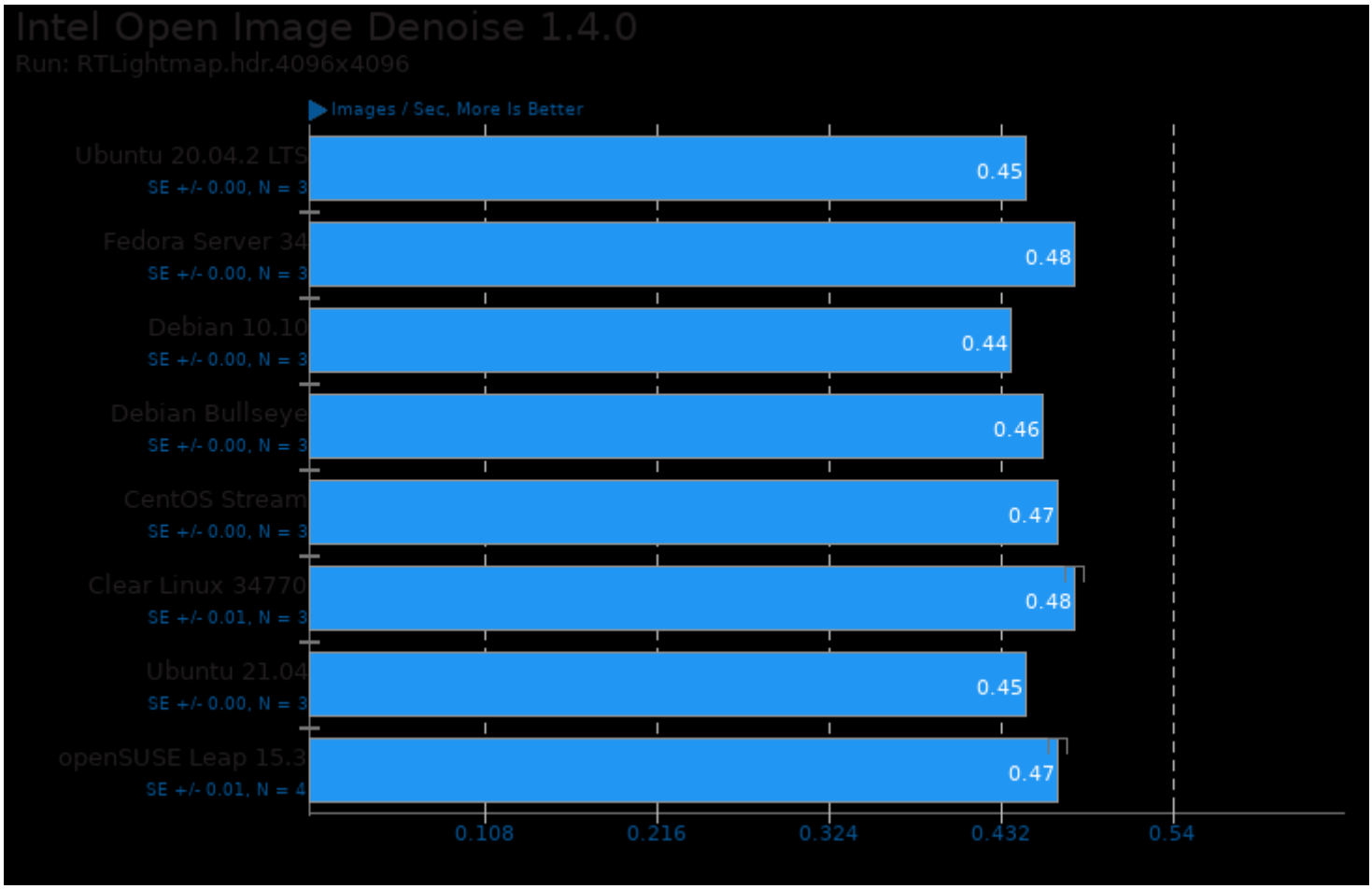

SVT-VP9 0.3
Tuning: Visual Quality Optimized - Input: Bosphorus 1080p
Frames Per Second, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 2.34, N = 3
264.89
Fedora Server 34
SE +/- 2.18, N = 3
272.55
Debian 10.10
SE +/- 2.94, N = 3
297.41
Debian Bullseye
SE +/- 2.63, N = 5
236.32
CentOS Stream
SE +/- 2.06, N = 3
274.02
Clear Linux 34770
SE +/- 2.72, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake
273.38
Ubuntu 21.04
SE +/- 0.95, N = 3
241.51
openSUSE Leap 15.3
SE +/- 1.19, N = 3
277.37
60
120
180
240
300
1. (CC) gcc options: -O3 -fcommon -fPIE -fPIC -fvisibility=hidden -pie -rdynamic -lpthread -lrt -lm

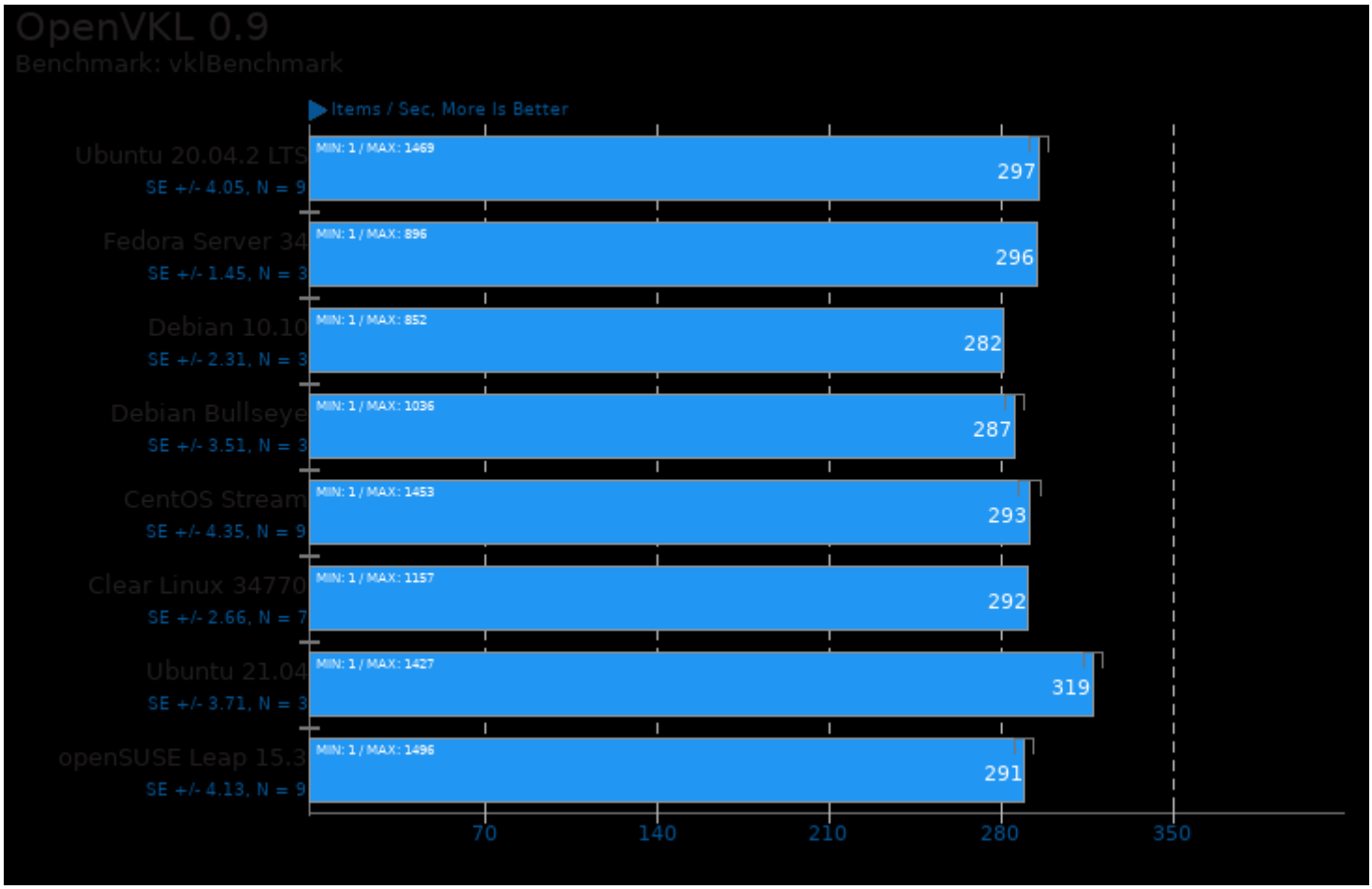

VP9 libvpx Encoding 1.10.0
Speed: Speed 0 - Input: Bosphorus 4K
Frames Per Second, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.01, N = 3
-U_FORTIFY_SOURCE
6.16
Fedora Server 34
SE +/- 0.04, N = 3
-U_FORTIFY_SOURCE
6.89
Debian 10.10
SE +/- 0.01, N = 3
-U_FORTIFY_SOURCE
6.05
Debian Bullseye
SE +/- 0.05, N = 3
-U_FORTIFY_SOURCE
6.52
CentOS Stream
SE +/- 0.03, N = 3
-U_FORTIFY_SOURCE
6.48
Clear Linux 34770
SE +/- 0.01, N = 3
-pipe -fexceptions -fstack-protector -ffat-lto-objects -fno-trapping-math -mtune=skylake
7.25
Ubuntu 21.04
SE +/- 0.01, N = 3
-U_FORTIFY_SOURCE
6.23
openSUSE Leap 15.3
SE +/- 0.01, N = 3
-U_FORTIFY_SOURCE
6.64
2
4
6
8
10
1. (CXX) g++ options: -m64 -lm -lpthread -O3 -fPIC -std=gnu++11

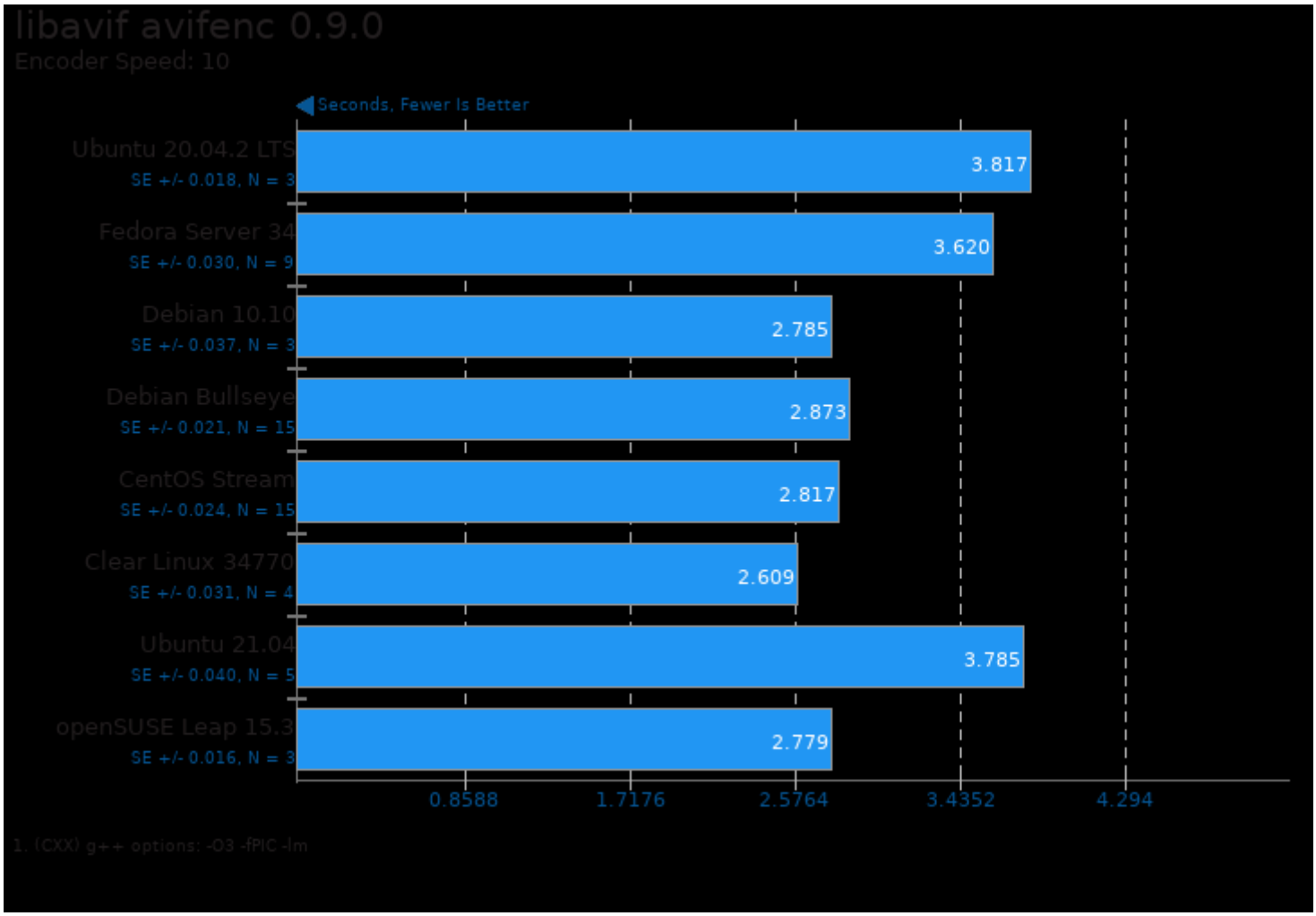

VP9 libvpx Encoding 1.10.0
Speed: Speed 5 - Input: Bosphorus 4K
Frames Per Second, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.07, N = 3
-U_FORTIFY_SOURCE
13.63
Fedora Server 34
SE +/- 0.13, N = 3
-U_FORTIFY_SOURCE
16.23
Debian 10.10
SE +/- 0.05, N = 3
-U_FORTIFY_SOURCE
13.03
Debian Bullseye
SE +/- 0.04, N = 3
-U_FORTIFY_SOURCE
9.31
CentOS Stream
SE +/- 0.10, N = 15
-U_FORTIFY_SOURCE
14.89
Clear Linux 34770
SE +/- 0.11, N = 3
-pipe -fexceptions -fstack-protector -ffat-lto-objects -fno-trapping-math -mtune=skylake
17.60
Ubuntu 21.04
SE +/- 0.09, N = 3
-U_FORTIFY_SOURCE
14.60
openSUSE Leap 15.3
SE +/- 0.12, N = 3
-U_FORTIFY_SOURCE
14.09
4
8
12
16
20
1. (CXX) g++ options: -m64 -lm -lpthread -O3 -fPIC -std=gnu++11

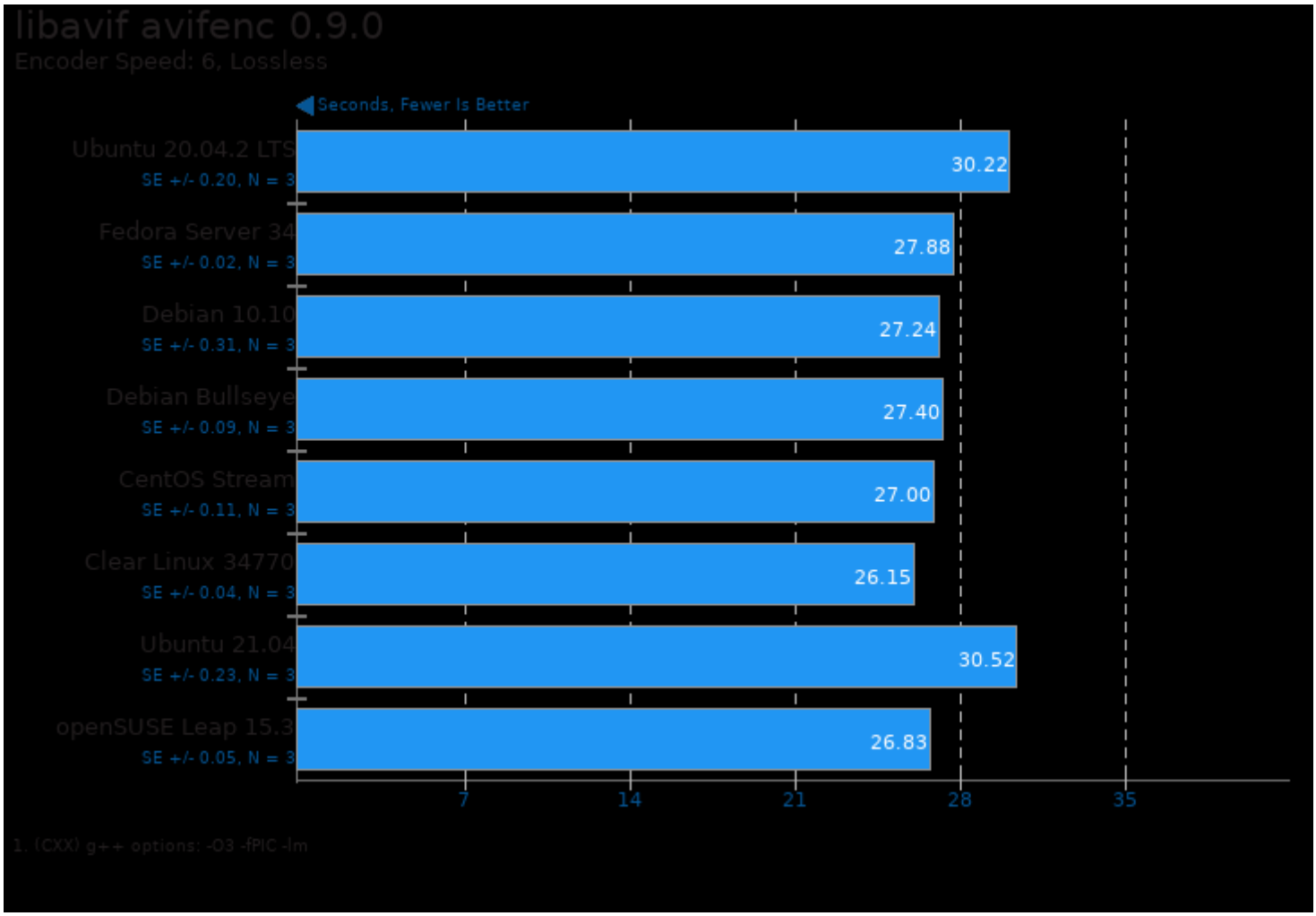

Intel Open Image Denoise 1.4.0
Run: RT.hdr_alb_nrm.3840x2160
Images / Sec, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.00, N = 3
0.90
Fedora Server 34
SE +/- 0.00, N = 3
0.96
Debian 10.10
SE +/- 0.00, N = 3
0.87
Debian Bullseye
SE +/- 0.01, N = 3
0.89
CentOS Stream
SE +/- 0.00, N = 3
0.94
Clear Linux 34770
SE +/- 0.00, N = 3
0.97
Ubuntu 21.04
SE +/- 0.01, N = 3
0.89
openSUSE Leap 15.3
SE +/- 0.00, N = 3
0.96
0.2183
0.4366
0.6549
0.8732
1.0915

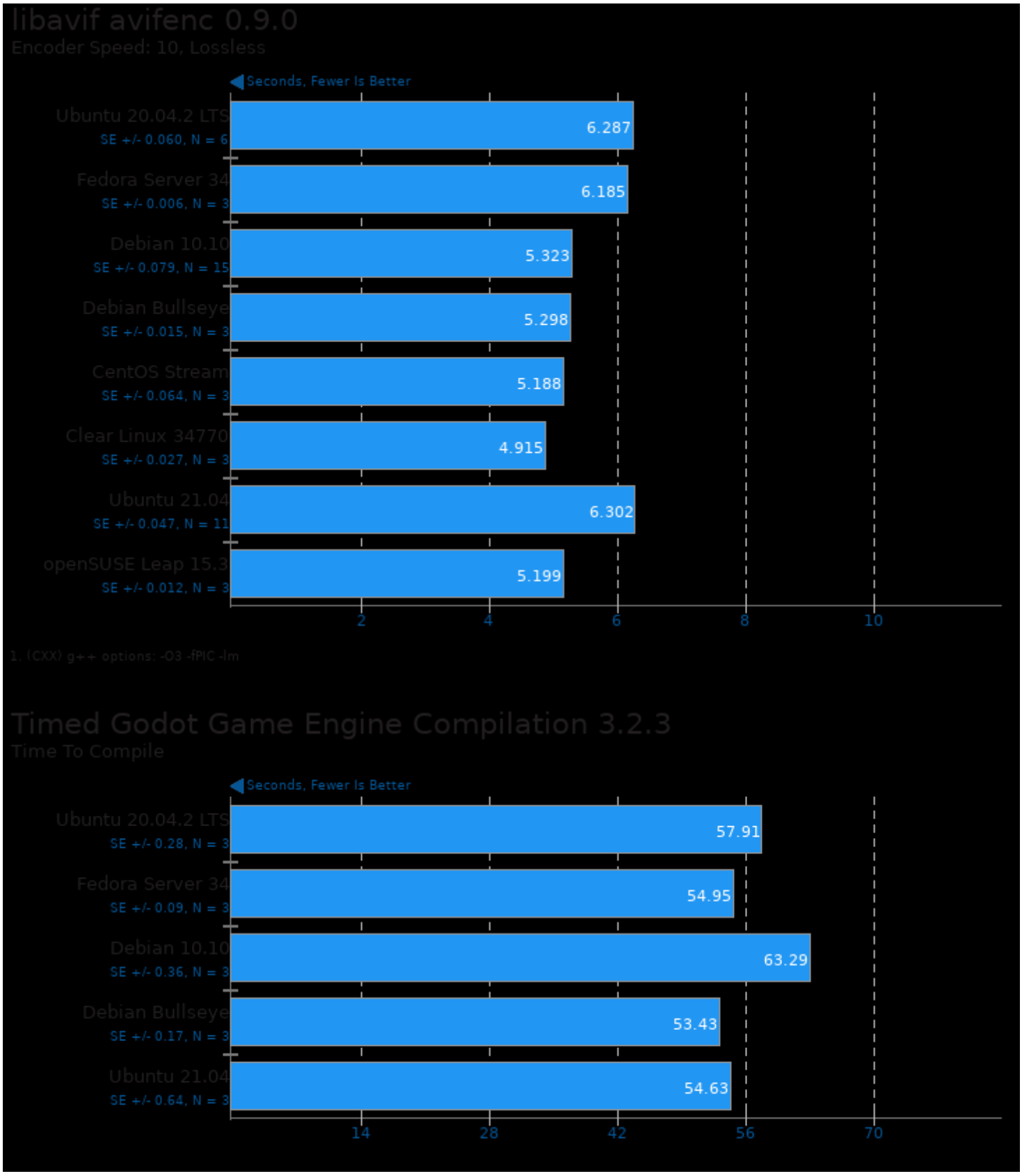

Intel Open Image Denoise 1.4.0
Run: RT.ldr_alb_nrm.3840x2160
Images / Sec, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.00, N = 3
0.90
Fedora Server 34
SE +/- 0.00, N = 3
0.96
Debian 10.10
SE +/- 0.00, N = 3
0.87
Debian Bullseye
SE +/- 0.01, N = 6
0.94
CentOS Stream
SE +/- 0.00, N = 3
0.95
Clear Linux 34770
SE +/- 0.00, N = 3
0.97
Ubuntu 21.04
SE +/- 0.00, N = 3
0.89
openSUSE Leap 15.3
SE +/- 0.00, N = 3
0.96
0.2183
0.4366
0.6549
0.8732
1.0915

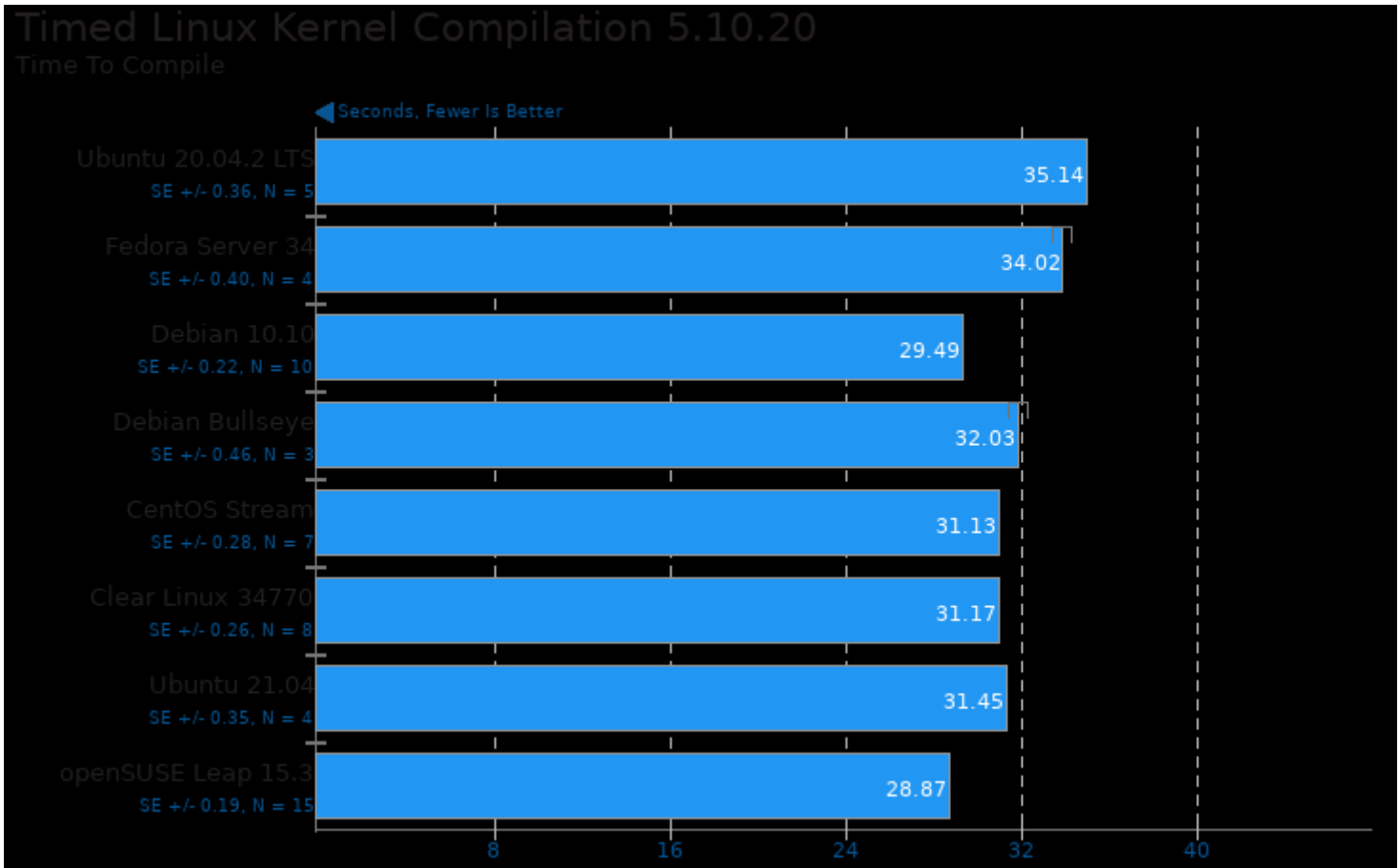

Intel Open Image Denoise 1.4.0
Run: RTLightmap.hdr.4096x4096
Images / Sec, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.00, N = 3
0.45
Fedora Server 34
SE +/- 0.00, N = 3
0.48
Debian 10.10
SE +/- 0.00, N = 3
0.44
Debian Bullseye
SE +/- 0.00, N = 3
0.46
CentOS Stream
SE +/- 0.00, N = 3
0.47
Clear Linux 34770
SE +/- 0.01, N = 3
0.48
Ubuntu 21.04
SE +/- 0.00, N = 3
0.45
openSUSE Leap 15.3
SE +/- 0.01, N = 4
0.47
0.108
0.216
0.324
0.432
0.54

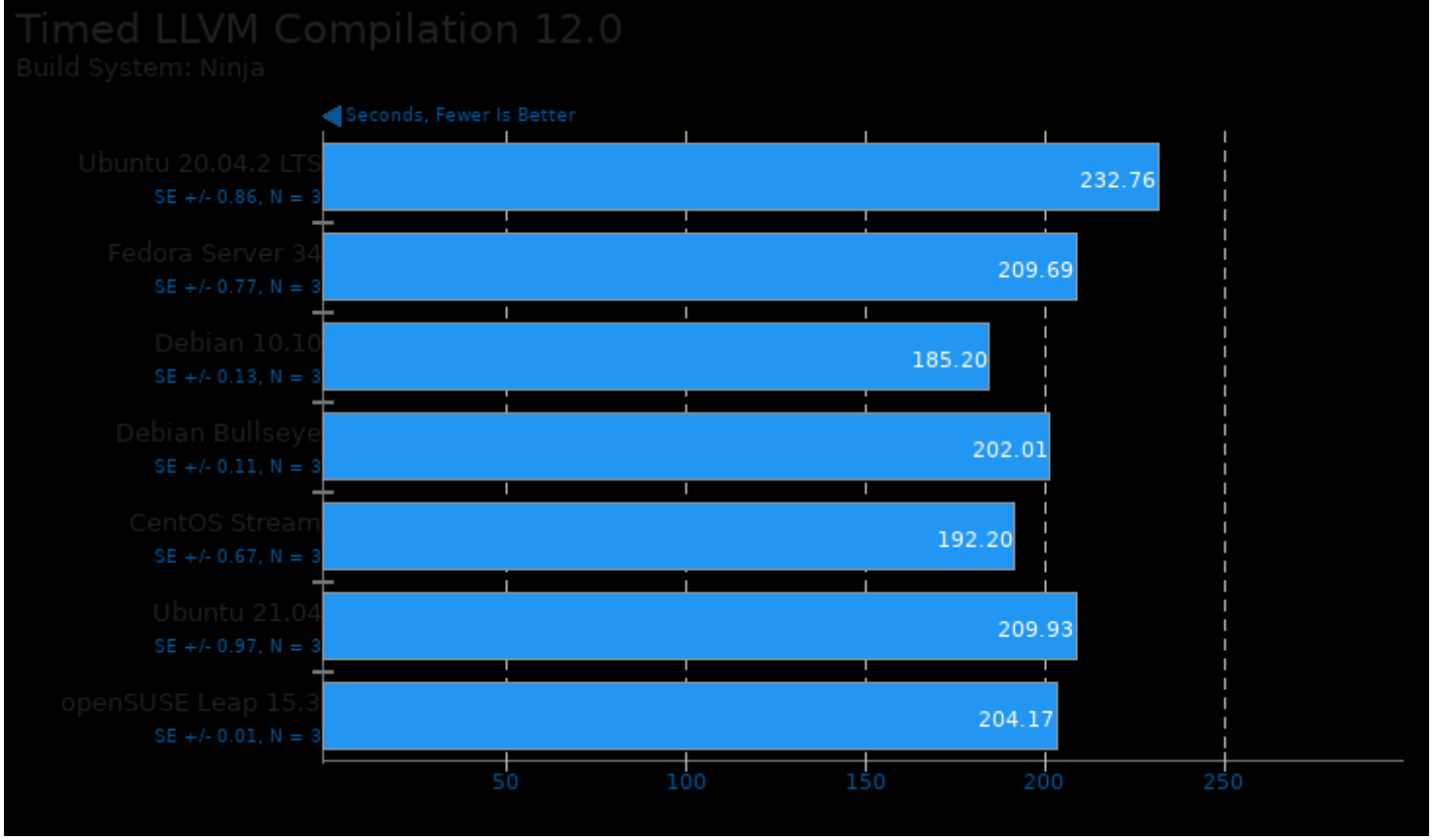

OpenVKL 0.9
Benchmark: vklBenchmark
Items / Sec, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 4.05, N = 9
MIN: 1 / MAX: 1469
297
Fedora Server 34
SE +/- 1.45, N = 3
MIN: 1 / MAX: 896
296
Debian 10.10
SE +/- 2.31, N = 3
MIN: 1 / MAX: 852
282
Debian Bullseye
SE +/- 3.51, N = 3
MIN: 1 / MAX: 1036
287
CentOS Stream
SE +/- 4.35, N = 9
MIN: 1 / MAX: 1453
293
Clear Linux 34770
SE +/- 2.66, N = 7
MIN: 1 / MAX: 1157
292
Ubuntu 21.04
SE +/- 3.71, N = 3
MIN: 1 / MAX: 1427
319
openSUSE Leap 15.3
SE +/- 4.13, N = 9
MIN: 1 / MAX: 1496
291
70
140
210
280
350

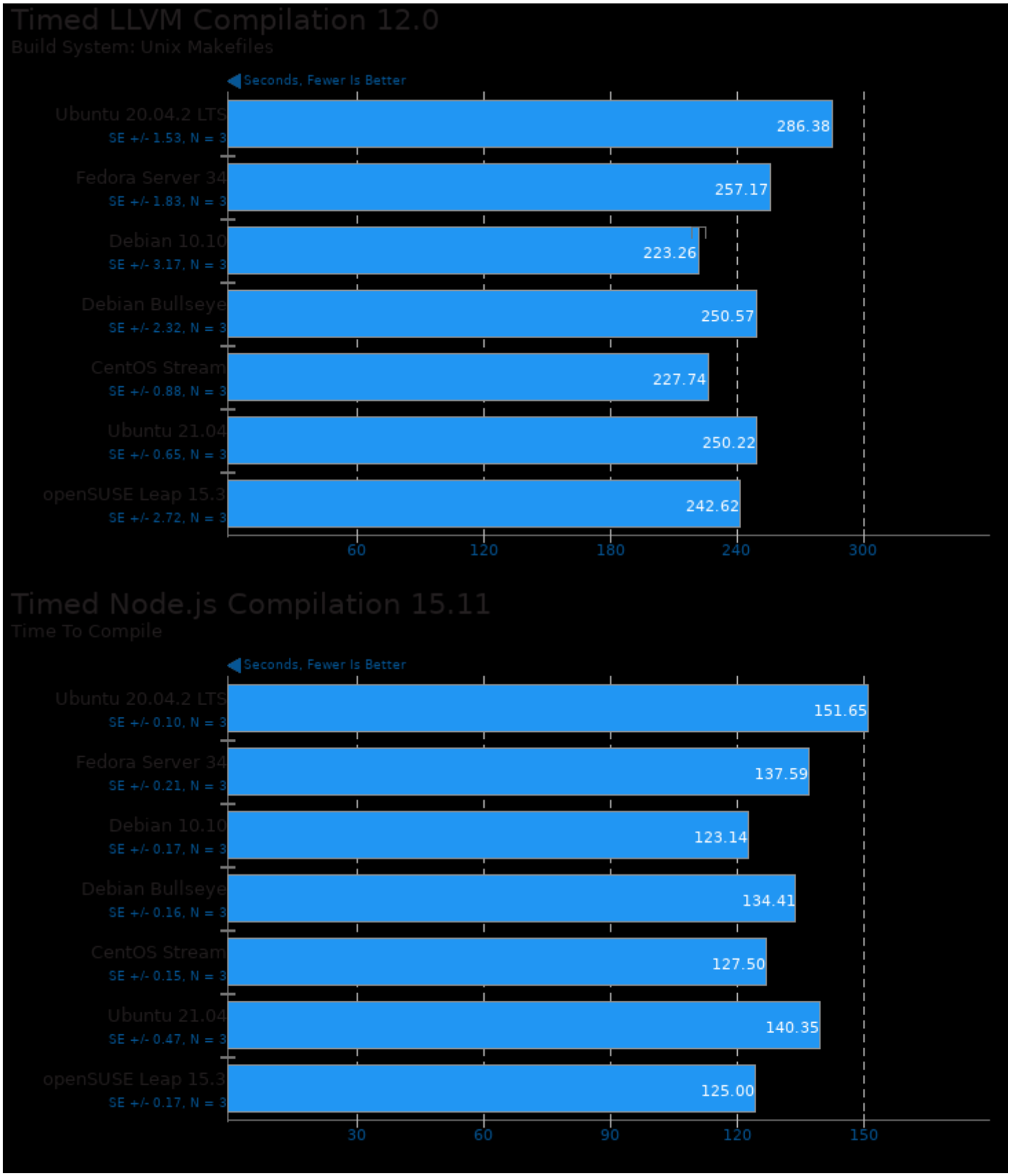

libavif avifenc 0.9.0
Encoder Speed: 10
Seconds, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.018, N = 3
3.817
Fedora Server 34
SE +/- 0.030, N = 9
3.620
Debian 10.10
SE +/- 0.037, N = 3
2.785
Debian Bullseye
SE +/- 0.021, N = 15
2.873
CentOS Stream
SE +/- 0.024, N = 15
2.817
Clear Linux 34770
SE +/- 0.031, N = 4
2.609
Ubuntu 21.04
SE +/- 0.040, N = 5
3.785
openSUSE Leap 15.3
SE +/- 0.016, N = 3
2.779
0.8588
1.7176
2.5764
3.4352
4.294
1. (CXX) g++ options: -O3 -fPIC -lm

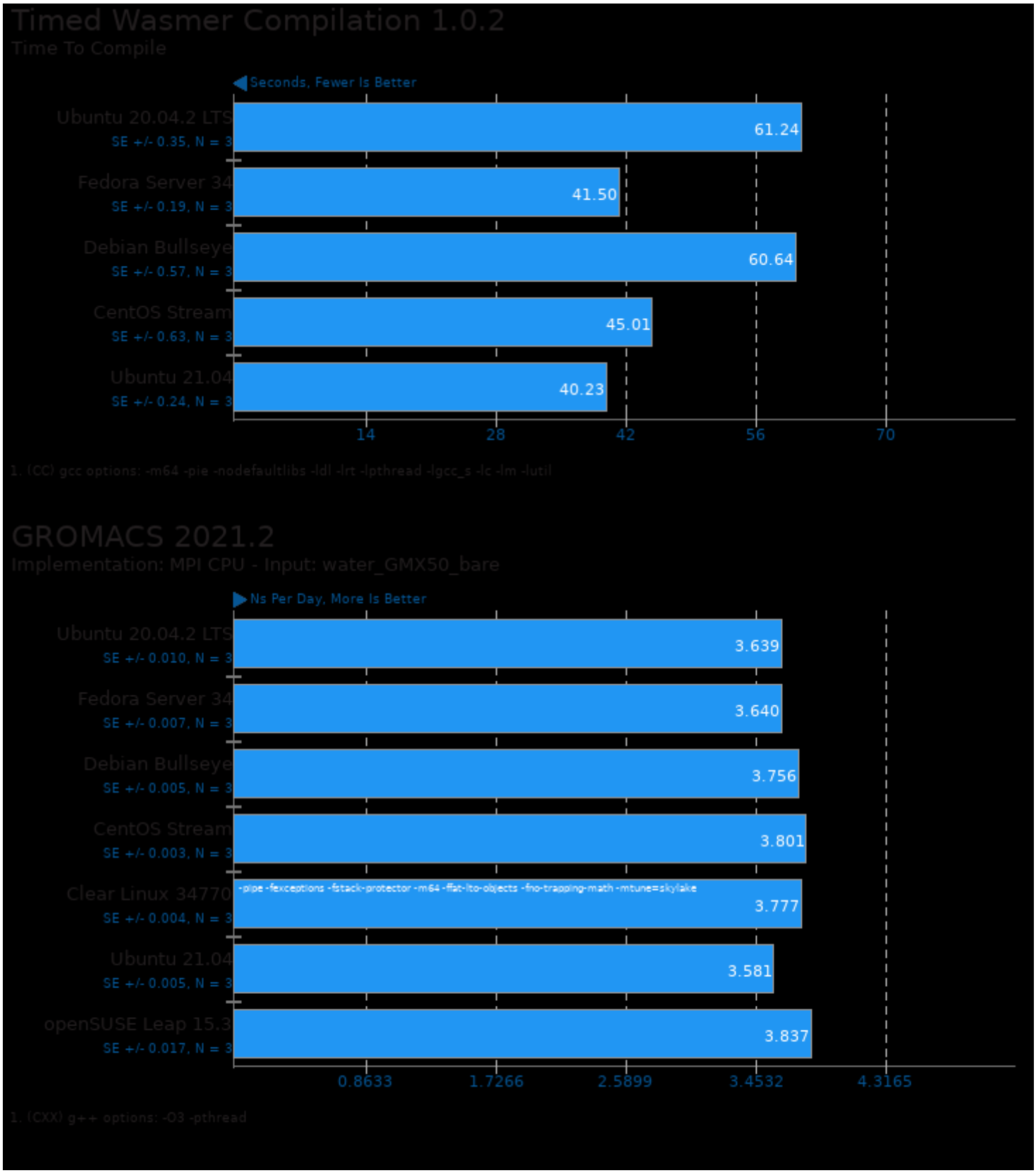

libavif avifenc 0.9.0
Encoder Speed: 6, Lossless
Seconds, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.20, N = 3
30.22
Fedora Server 34
SE +/- 0.02, N = 3
27.88
Debian 10.10
SE +/- 0.31, N = 3
27.24
Debian Bullseye
SE +/- 0.09, N = 3
27.40
CentOS Stream
SE +/- 0.11, N = 3
27.00
Clear Linux 34770
SE +/- 0.04, N = 3
26.15
Ubuntu 21.04
SE +/- 0.23, N = 3
30.52
openSUSE Leap 15.3
SE +/- 0.05, N = 3
26.83
7
14
21
28
35
1. (CXX) g++ options: -O3 -fPIC -lm

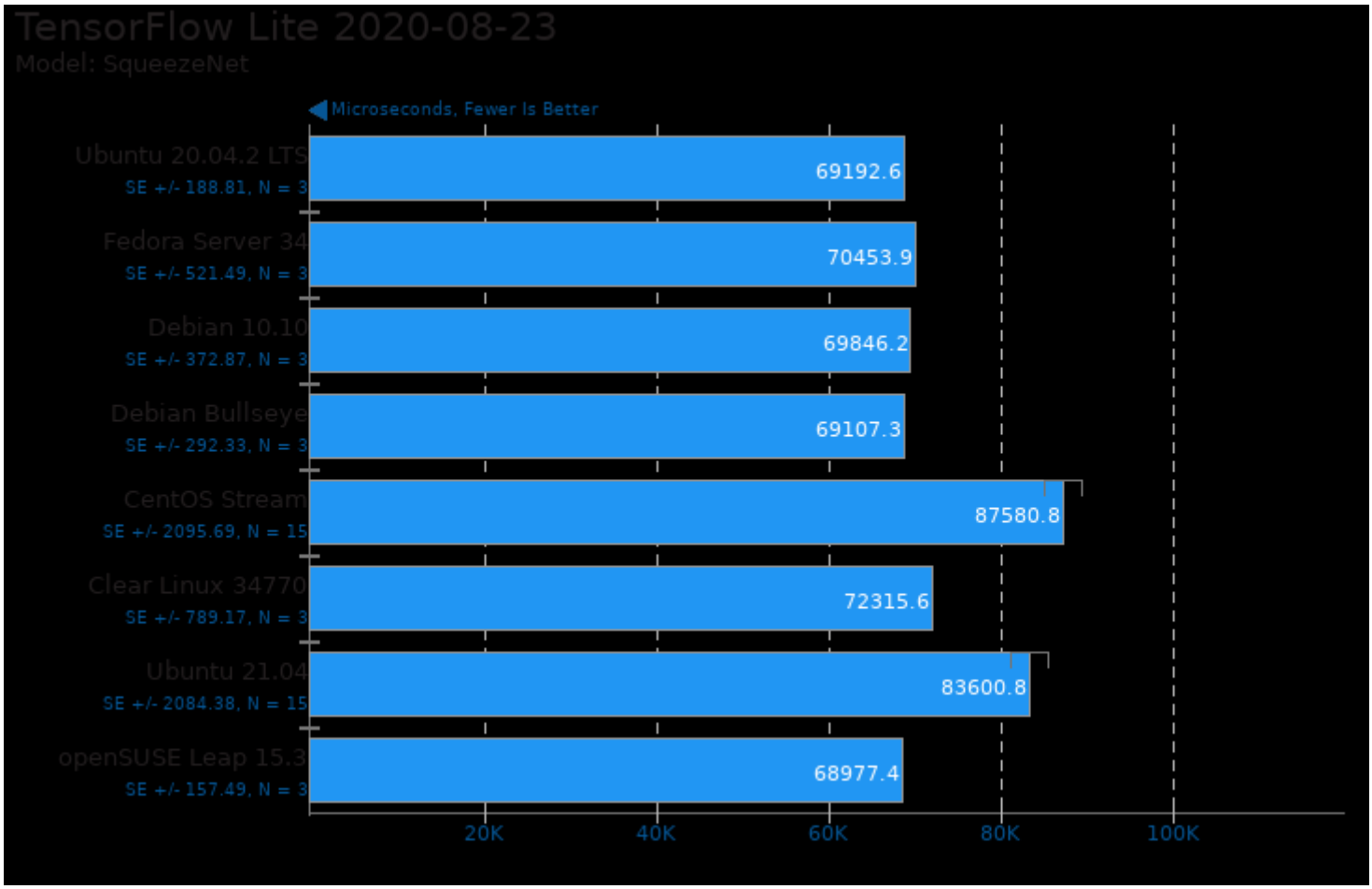

libavif avifenc 0.9.0
Encoder Speed: 10, Lossless
Seconds, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.060, N = 6
6.287
Fedora Server 34
SE +/- 0.006, N = 3
6.185
Debian 10.10
SE +/- 0.079, N = 15
5.323
Debian Bullseye
SE +/- 0.015, N = 3
5.298
CentOS Stream
SE +/- 0.064, N = 3
5.188
Clear Linux 34770
SE +/- 0.027, N = 3
4.915
Ubuntu 21.04
SE +/- 0.047, N = 11
6.302
openSUSE Leap 15.3
SE +/- 0.012, N = 3
5.199
2
4
6
8
10
1. (CXX) g++ options: -O3 -fPIC -lm
Timed Godot Game Engine Compilation 3.2.3
Time To Compile
Seconds, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.28, N = 3
57.91
Fedora Server 34
SE +/- 0.09, N = 3
54.95
Debian 10.10
SE +/- 0.36, N = 3
63.29
Debian Bullseye
SE +/- 0.17, N = 3
53.43
Ubuntu 21.04
SE +/- 0.64, N = 3
54.63
14
28
42
56
70

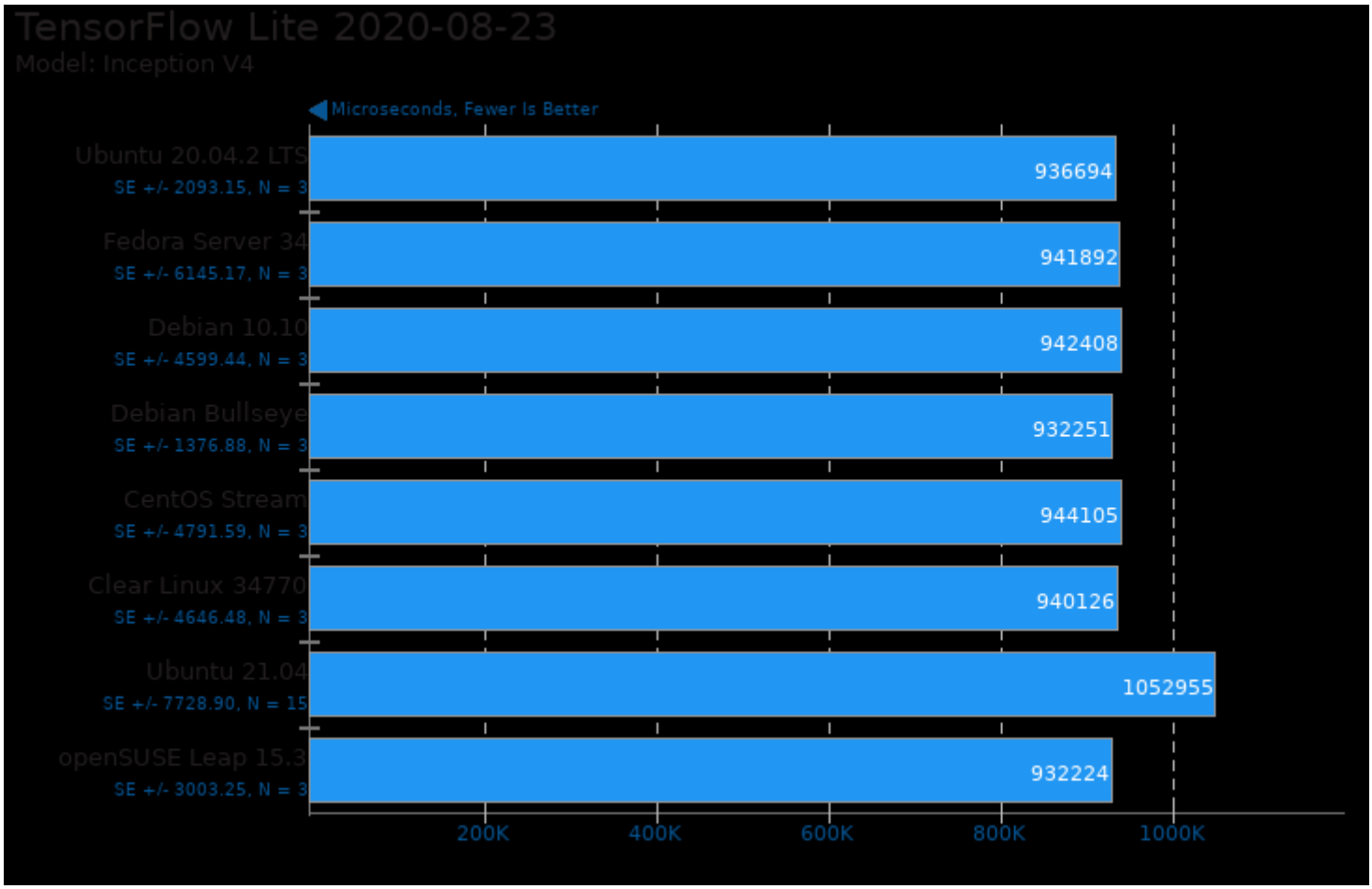

Timed Linux Kernel Compilation 5.10.20
Time To Compile
Seconds, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.36, N = 5
35.14
Fedora Server 34
SE +/- 0.40, N = 4
34.02
Debian 10.10
SE +/- 0.22, N = 10
29.49
Debian Bullseye
SE +/- 0.46, N = 3
32.03
CentOS Stream
SE +/- 0.28, N = 7
31.13
Clear Linux 34770
SE +/- 0.26, N = 8
31.17
Ubuntu 21.04
SE +/- 0.35, N = 4
31.45
openSUSE Leap 15.3
SE +/- 0.19, N = 15
28.87
8
16
24
32
40

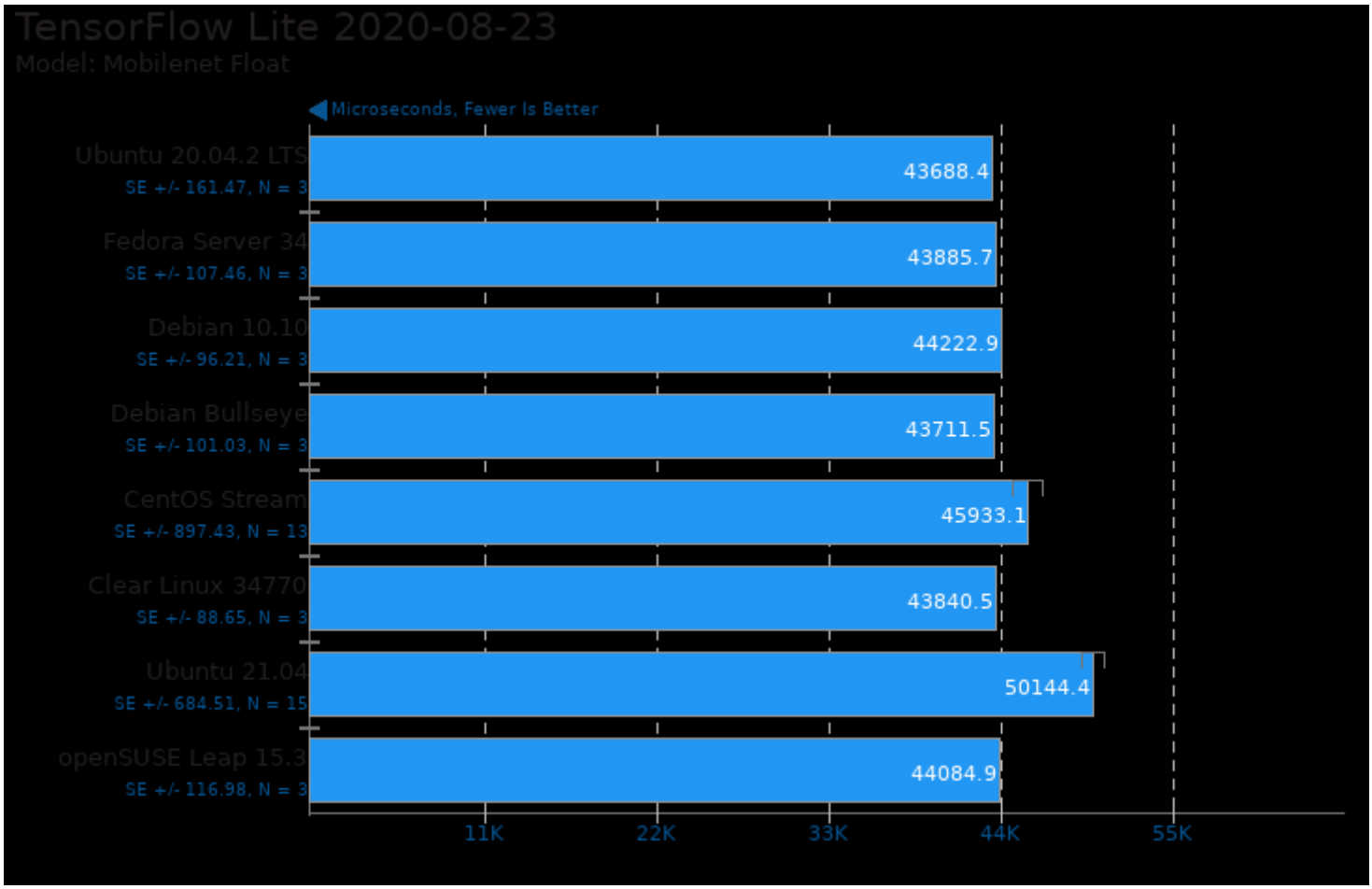

Timed LLVM Compilation 12.0
Build System: Ninja
Seconds, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.86, N = 3
232.76
Fedora Server 34
SE +/- 0.77, N = 3
209.69
Debian 10.10
SE +/- 0.13, N = 3
185.20
Debian Bullseye
SE +/- 0.11, N = 3
202.01
CentOS Stream
SE +/- 0.67, N = 3
192.20
Ubuntu 21.04
SE +/- 0.97, N = 3
209.93
openSUSE Leap 15.3
SE +/- 0.01, N = 3
204.17
50
100
150
200
250

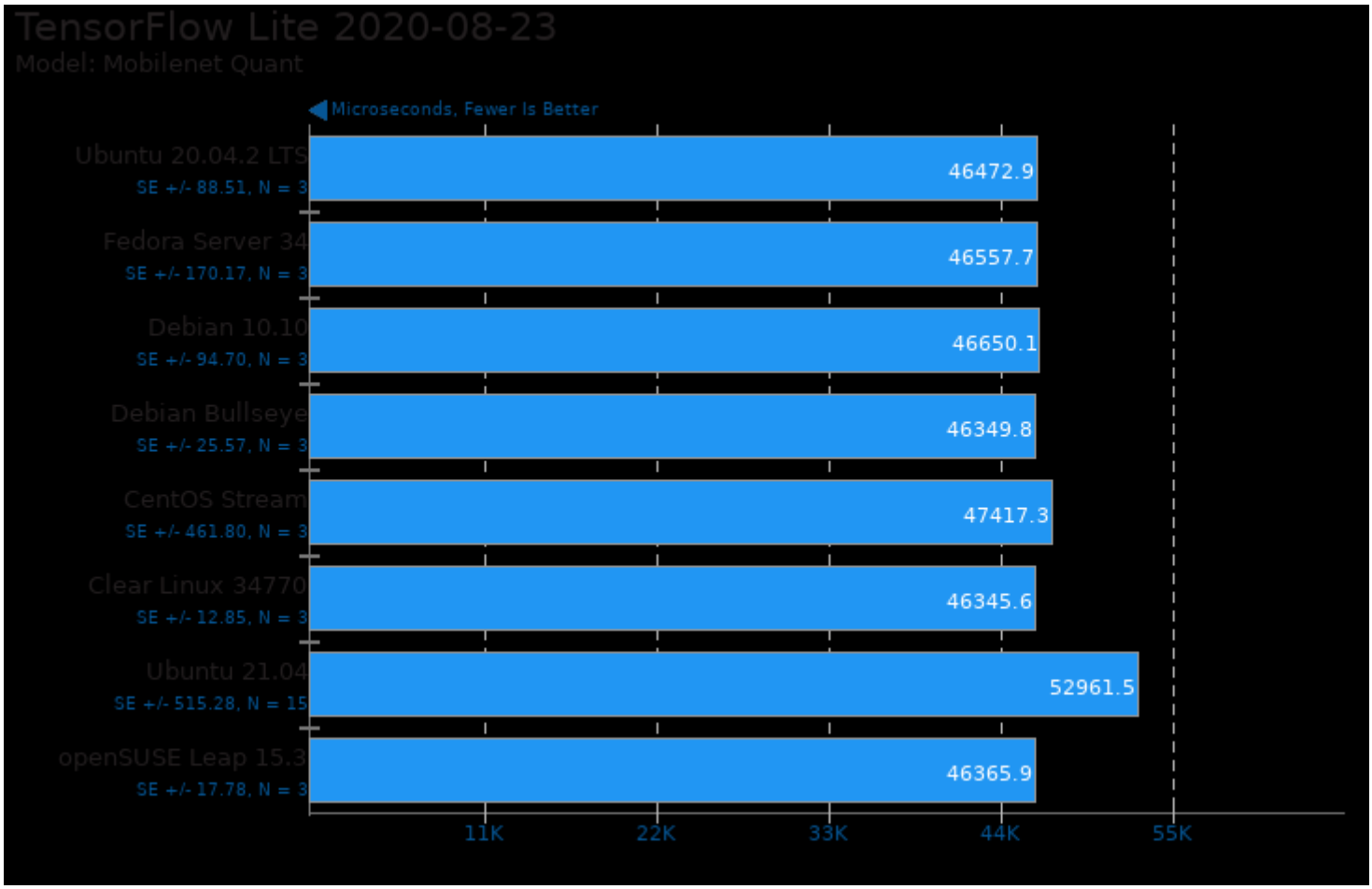

Timed LLVM Compilation 12.0
Build System: Unix Makefiles
Seconds, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 1.53, N = 3
286.38
Fedora Server 34
SE +/- 1.83, N = 3
257.17
Debian 10.10
SE +/- 3.17, N = 3
223.26
Debian Bullseye
SE +/- 2.32, N = 3
250.57
CentOS Stream
SE +/- 0.88, N = 3
227.74
Ubuntu 21.04
SE +/- 0.65, N = 3
250.22
openSUSE Leap 15.3
SE +/- 2.72, N = 3
242.62
60
120
180
240
300
Timed Node.js Compilation 15.11
Time To Compile
Seconds, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.10, N = 3
151.65
Fedora Server 34
SE +/- 0.21, N = 3
137.59
Debian 10.10
SE +/- 0.17, N = 3
123.14
Debian Bullseye
SE +/- 0.16, N = 3
134.41
CentOS Stream
SE +/- 0.15, N = 3
127.50
Ubuntu 21.04
SE +/- 0.47, N = 3
140.35
openSUSE Leap 15.3
SE +/- 0.17, N = 3
125.00
30
60
90
120
150

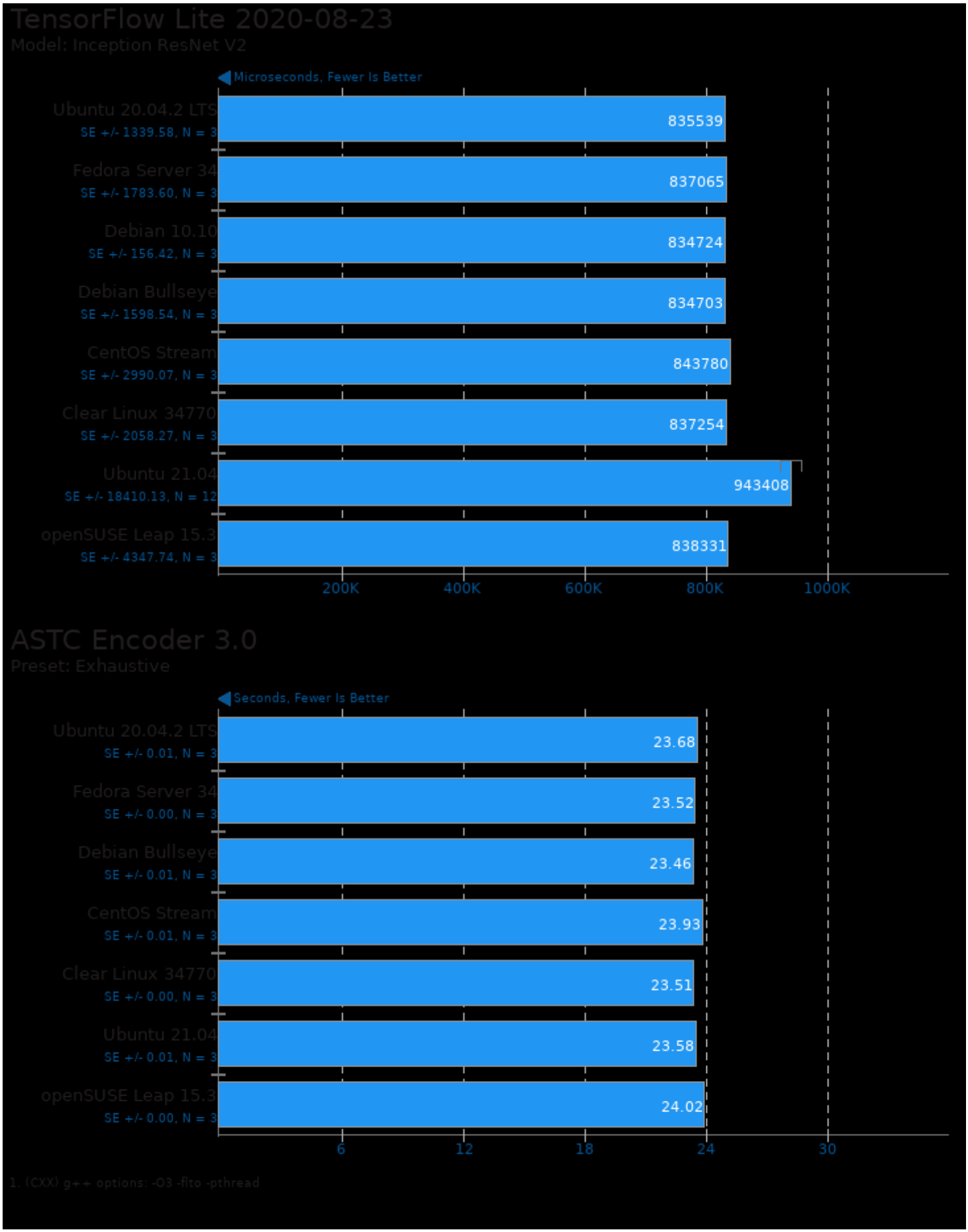

Timed Wasmer Compilation 1.0.2
Time To Compile
Seconds, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.35, N = 3
61.24
Fedora Server 34
SE +/- 0.19, N = 3
41.50
Debian Bullseye
SE +/- 0.57, N = 3
60.64
CentOS Stream
SE +/- 0.63, N = 3
45.01
Ubuntu 21.04
SE +/- 0.24, N = 3
40.23
14
28
42
56
70
1. (CC) gcc options: -m64 -pie -nodefaultlibs -ldl -lrt -lpthread -lgcc_s -lc -lm -lutil
GROMACS 2021.2
Implementation: MPI CPU - Input: water_GMX50_bare
Ns Per Day, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.010, N = 3
3.639
Fedora Server 34
SE +/- 0.007, N = 3
3.640
Debian Bullseye
SE +/- 0.005, N = 3
3.756
CentOS Stream
SE +/- 0.003, N = 3
3.801
Clear Linux 34770
SE +/- 0.004, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake
3.777
Ubuntu 21.04
SE +/- 0.005, N = 3
3.581
openSUSE Leap 15.3
SE +/- 0.017, N = 3
3.837
0.8633
1.7266
2.5899
3.4532
4.3165
1. (CXX) g++ options: -O3 -pthread

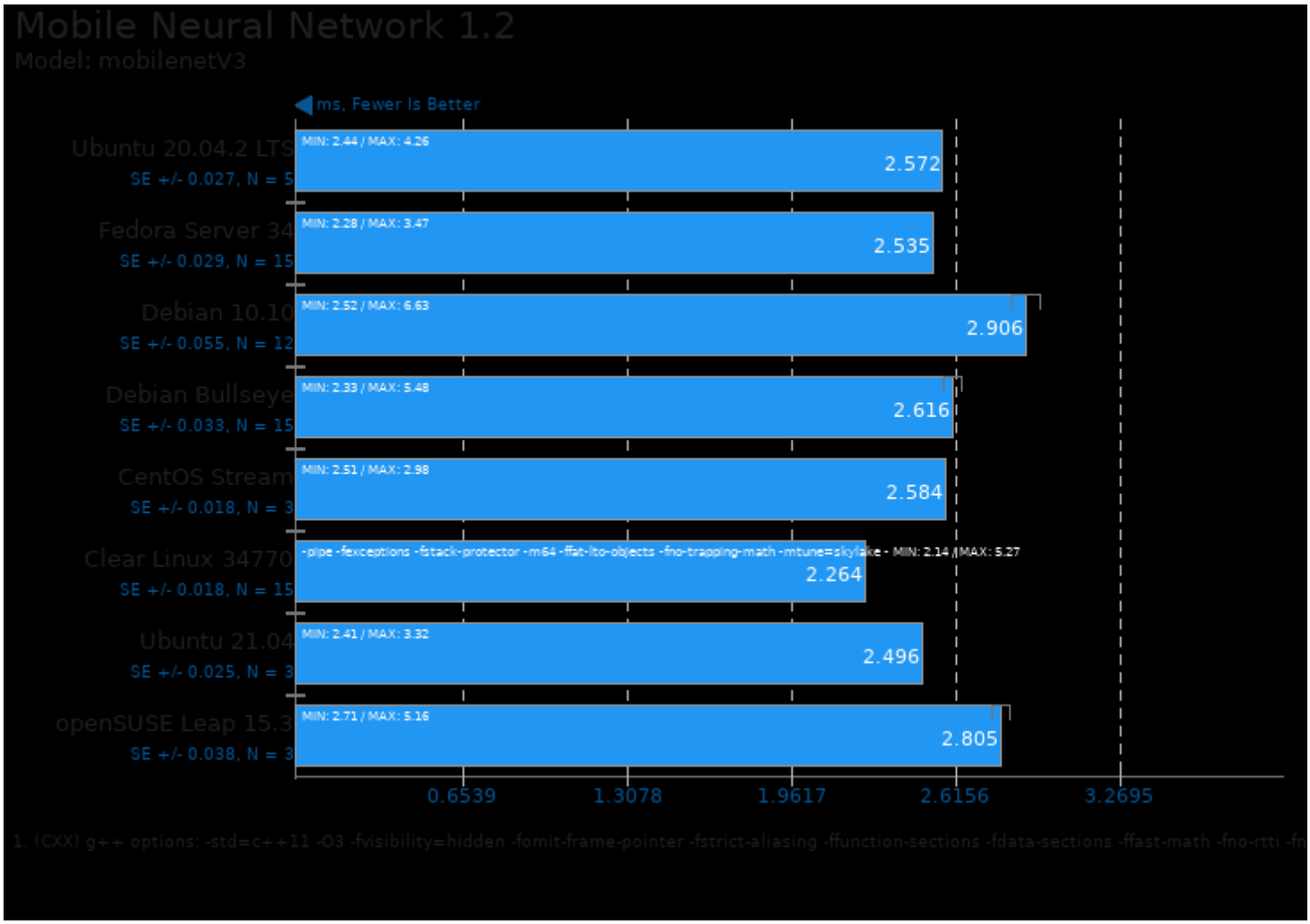

TensorFlow Lite 2020-08-23
Model: SqueezeNet
Microseconds, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 188.81, N = 3
69192.6
Fedora Server 34
SE +/- 521.49, N = 3
70453.9
Debian 10.10
SE +/- 372.87, N = 3
69846.2
Debian Bullseye
SE +/- 292.33, N = 3
69107.3
CentOS Stream
SE +/- 2095.69, N = 15
87580.8
Clear Linux 34770
SE +/- 789.17, N = 3
72315.6
Ubuntu 21.04
SE +/- 2084.38, N = 15
83600.8
openSUSE Leap 15.3
SE +/- 157.49, N = 3
68977.4
20K
40K
60K
80K
100K

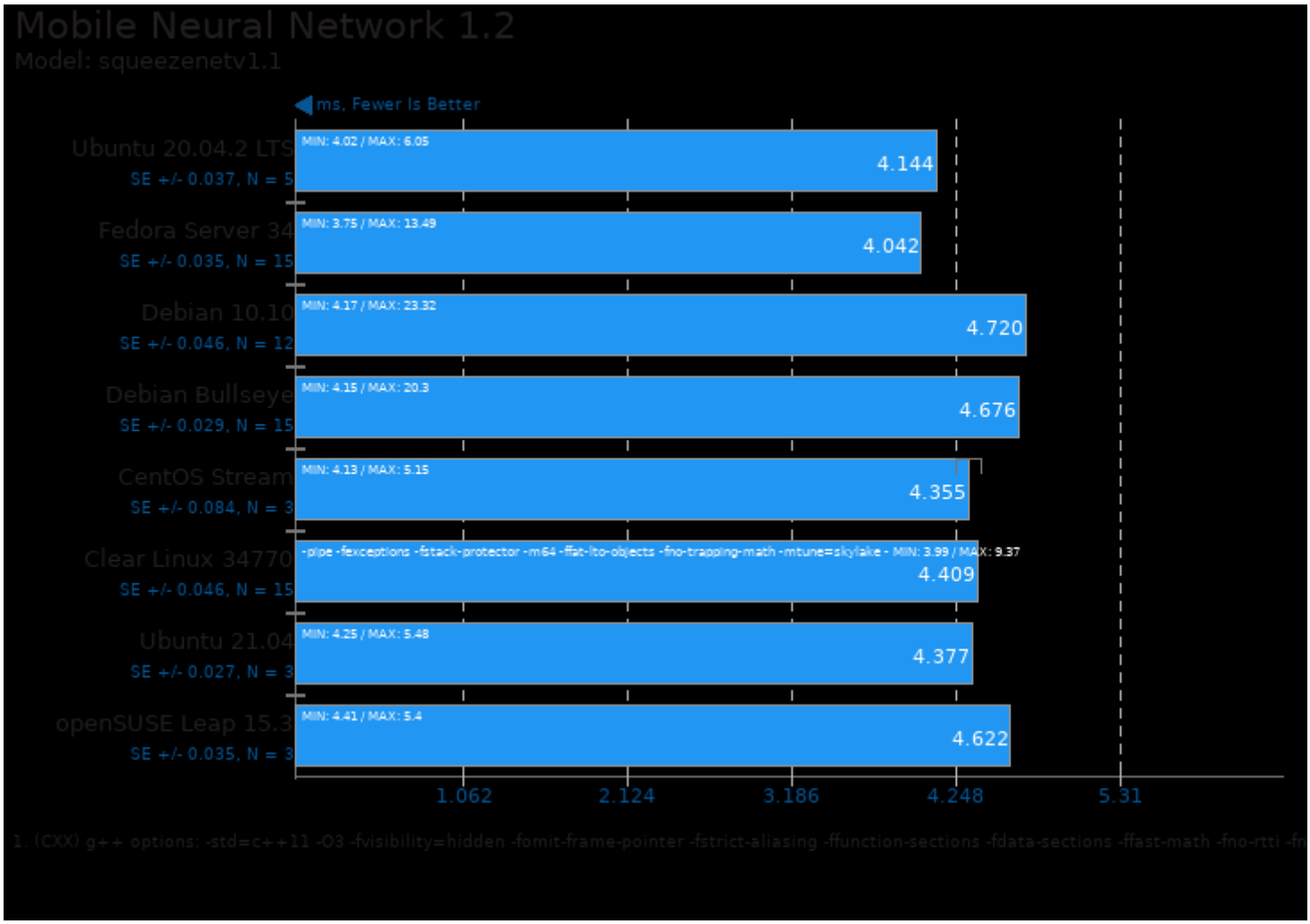

TensorFlow Lite 2020-08-23
Model: Inception V4
Microseconds, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 2093.15, N = 3
936694
Fedora Server 34
SE +/- 6145.17, N = 3
941892
Debian 10.10
SE +/- 4599.44, N = 3
942408
Debian Bullseye
SE +/- 1376.88, N = 3
932251
CentOS Stream
SE +/- 4791.59, N = 3
944105
Clear Linux 34770
SE +/- 4646.48, N = 3
940126
Ubuntu 21.04
SE +/- 7728.90, N = 15
1052955
openSUSE Leap 15.3
SE +/- 3003.25, N = 3
932224
200K
400K
600K
800K
1000K

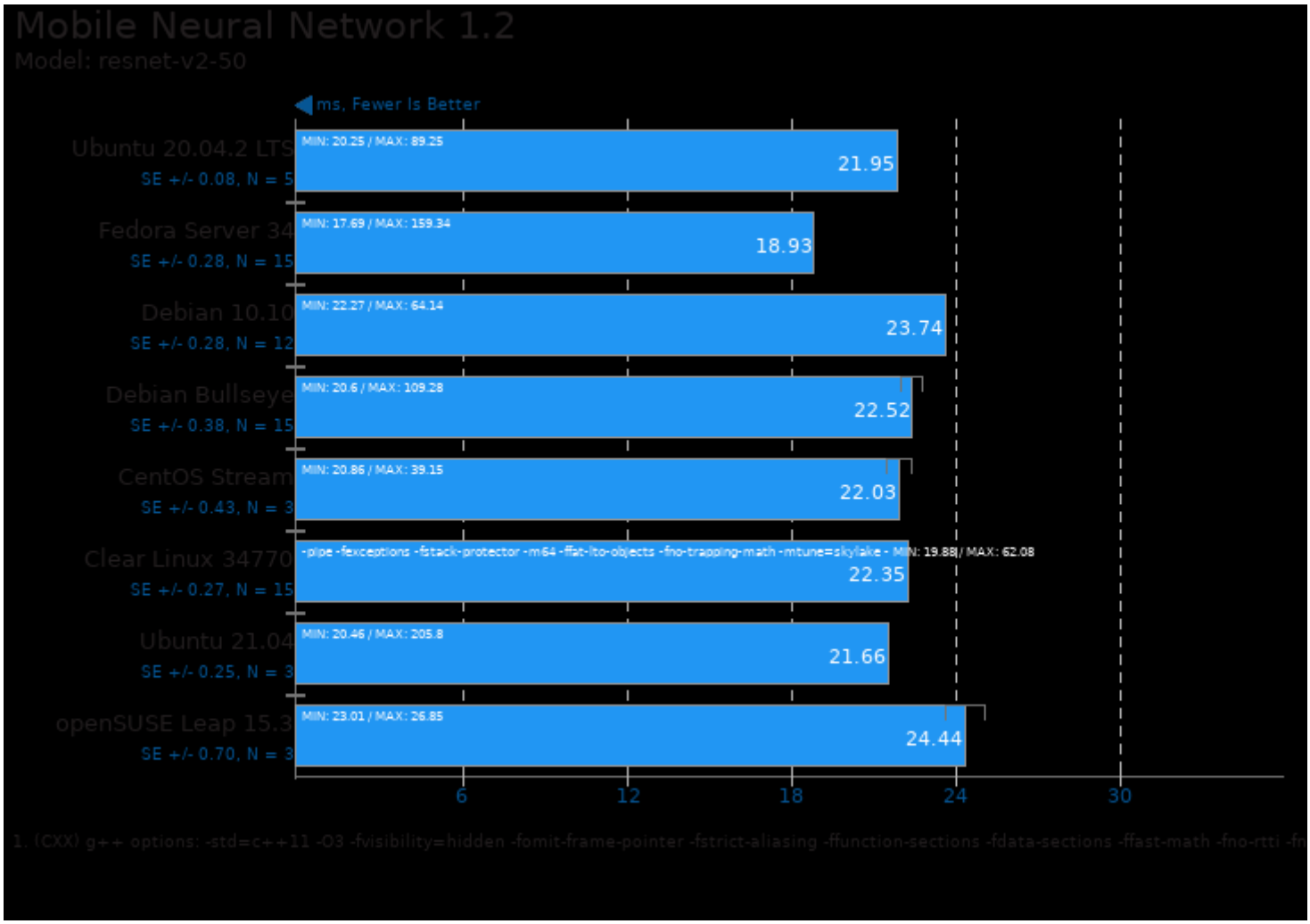

TensorFlow Lite 2020-08-23
Model: Mobilenet Float
Microseconds, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 161.47, N = 3
43688.4
Fedora Server 34
SE +/- 107.46, N = 3
43885.7
Debian 10.10
SE +/- 96.21, N = 3
44222.9
Debian Bullseye
SE +/- 101.03, N = 3
43711.5
CentOS Stream
SE +/- 897.43, N = 13
45933.1
Clear Linux 34770
SE +/- 88.65, N = 3
43840.5
Ubuntu 21.04
SE +/- 684.51, N = 15
50144.4
openSUSE Leap 15.3
SE +/- 116.98, N = 3
44084.9
11K
22K
33K
44K
55K

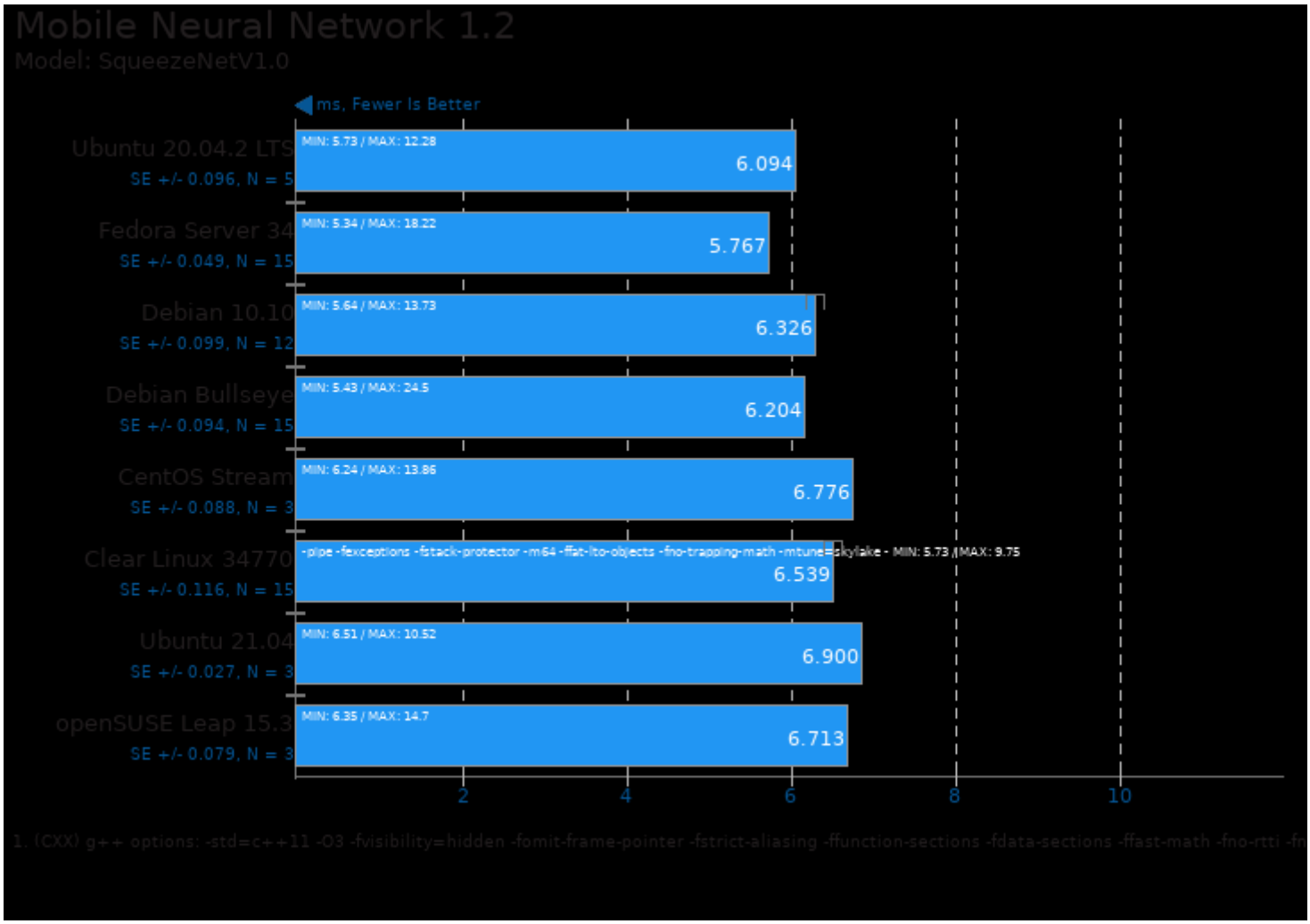

TensorFlow Lite 2020-08-23
Model: Mobilenet Quant
Microseconds, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 88.51, N = 3
46472.9
Fedora Server 34
SE +/- 170.17, N = 3
46557.7
Debian 10.10
SE +/- 94.70, N = 3
46650.1
Debian Bullseye
SE +/- 25.57, N = 3
46349.8
CentOS Stream
SE +/- 461.80, N = 3
47417.3
Clear Linux 34770
SE +/- 12.85, N = 3
46345.6
Ubuntu 21.04
SE +/- 515.28, N = 15
52961.5
openSUSE Leap 15.3
SE +/- 17.78, N = 3
46365.9
11K
22K
33K
44K
55K

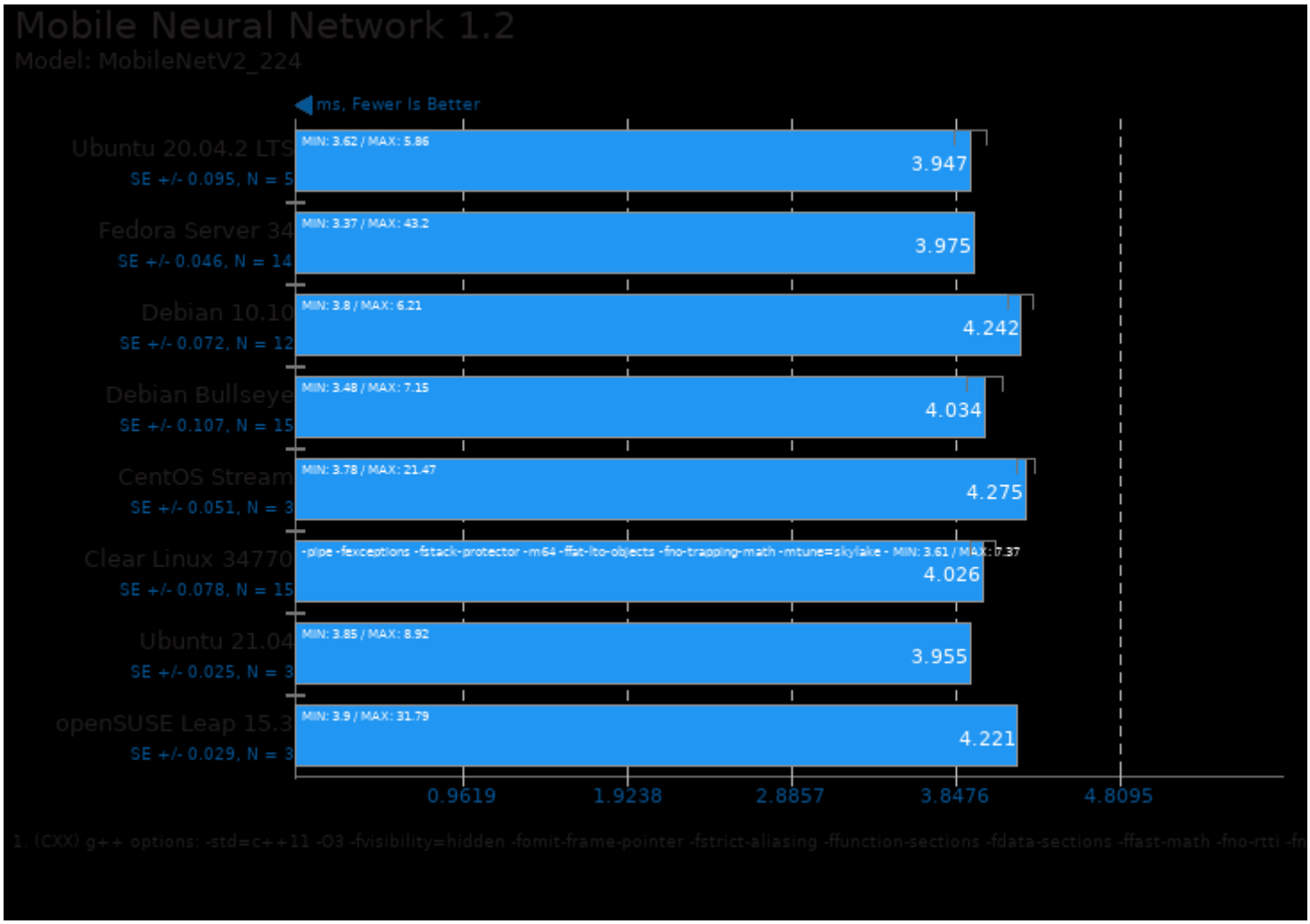

TensorFlow Lite 2020-08-23
Model: Inception ResNet V2
Microseconds, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 1339.58, N = 3
835539
Fedora Server 34
SE +/- 1783.60, N = 3
837065
Debian 10.10
SE +/- 156.42, N = 3
834724
Debian Bullseye
SE +/- 1598.54, N = 3
834703
CentOS Stream
SE +/- 2990.07, N = 3
843780
Clear Linux 34770
SE +/- 2058.27, N = 3
837254
Ubuntu 21.04
SE +/- 18410.13, N = 12
943408
openSUSE Leap 15.3
SE +/- 4347.74, N = 3
838331
200K
400K
600K
800K
1000K
ASTC Encoder 3.0
Preset: Exhaustive
Seconds, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.01, N = 3
23.68
Fedora Server 34
SE +/- 0.00, N = 3
23.52
Debian Bullseye
SE +/- 0.01, N = 3
23.46
CentOS Stream
SE +/- 0.01, N = 3
23.93
Clear Linux 34770
SE +/- 0.00, N = 3
23.51
Ubuntu 21.04
SE +/- 0.01, N = 3
23.58
openSUSE Leap 15.3
SE +/- 0.00, N = 3
24.02
6
12
18
24
30
1. (CXX) g++ options: -O3 -flto -pthread

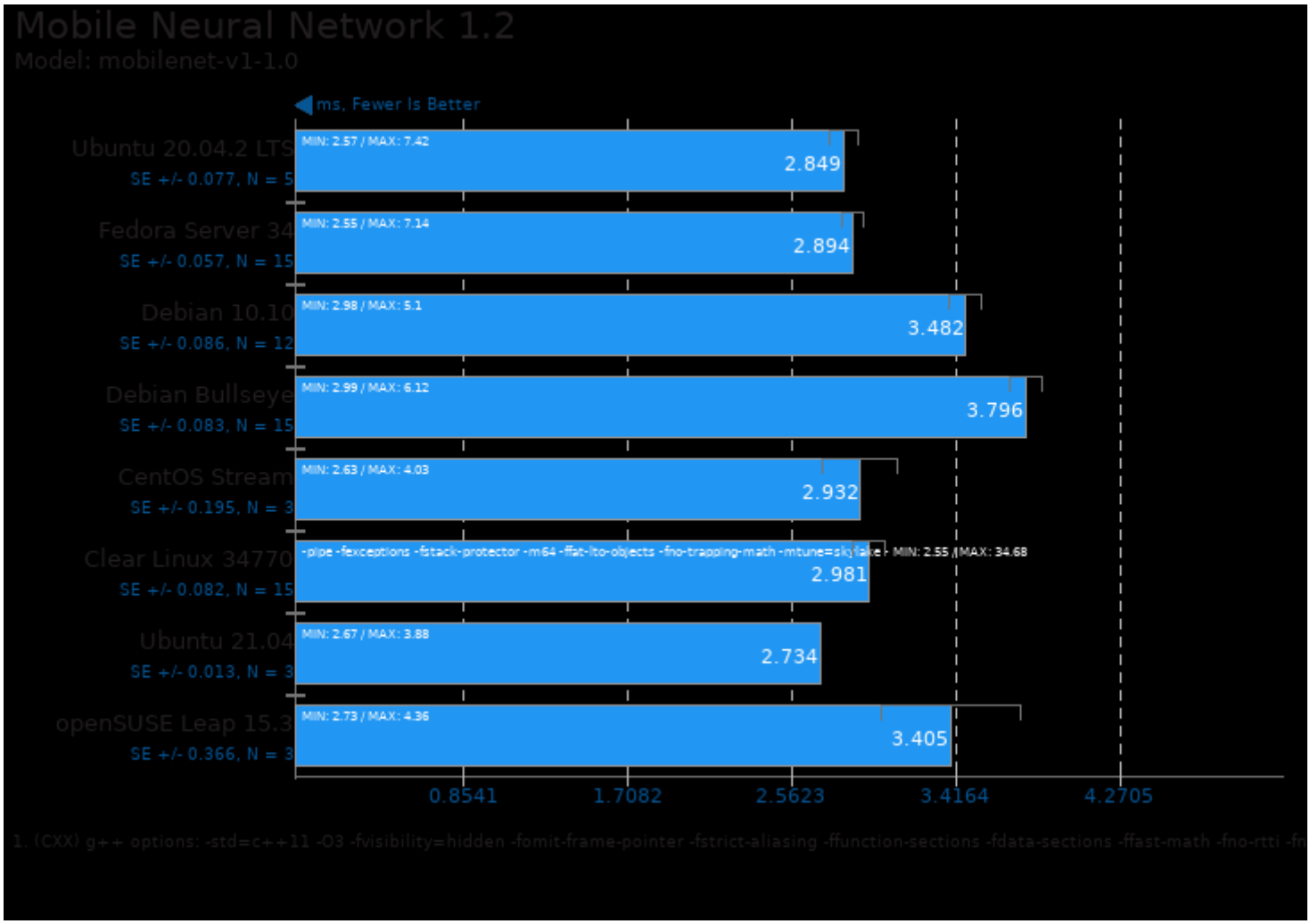

Mobile Neural Network 1.2
Model: mobilenetV3
ms, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.027, N = 5
MIN: 2.44 / MAX: 4.26
2.572
Fedora Server 34
SE +/- 0.029, N = 15
MIN: 2.28 / MAX: 3.47
2.535
Debian 10.10
SE +/- 0.055, N = 12
MIN: 2.52 / MAX: 6.63
2.906
Debian Bullseye
SE +/- 0.033, N = 15
MIN: 2.33 / MAX: 5.48
2.616
CentOS Stream
SE +/- 0.018, N = 3
MIN: 2.51 / MAX: 2.98
2.584
Clear Linux 34770
SE +/- 0.018, N = 15
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake - MIN: 2.14 / MAX: 5.27
2.264
Ubuntu 21.04
SE +/- 0.025, N = 3
MIN: 2.41 / MAX: 3.32
2.496
openSUSE Leap 15.3
SE +/- 0.038, N = 3
MIN: 2.71 / MAX: 5.16
2.805
0.6539
1.3078
1.9617
2.6156
3.2695
1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti

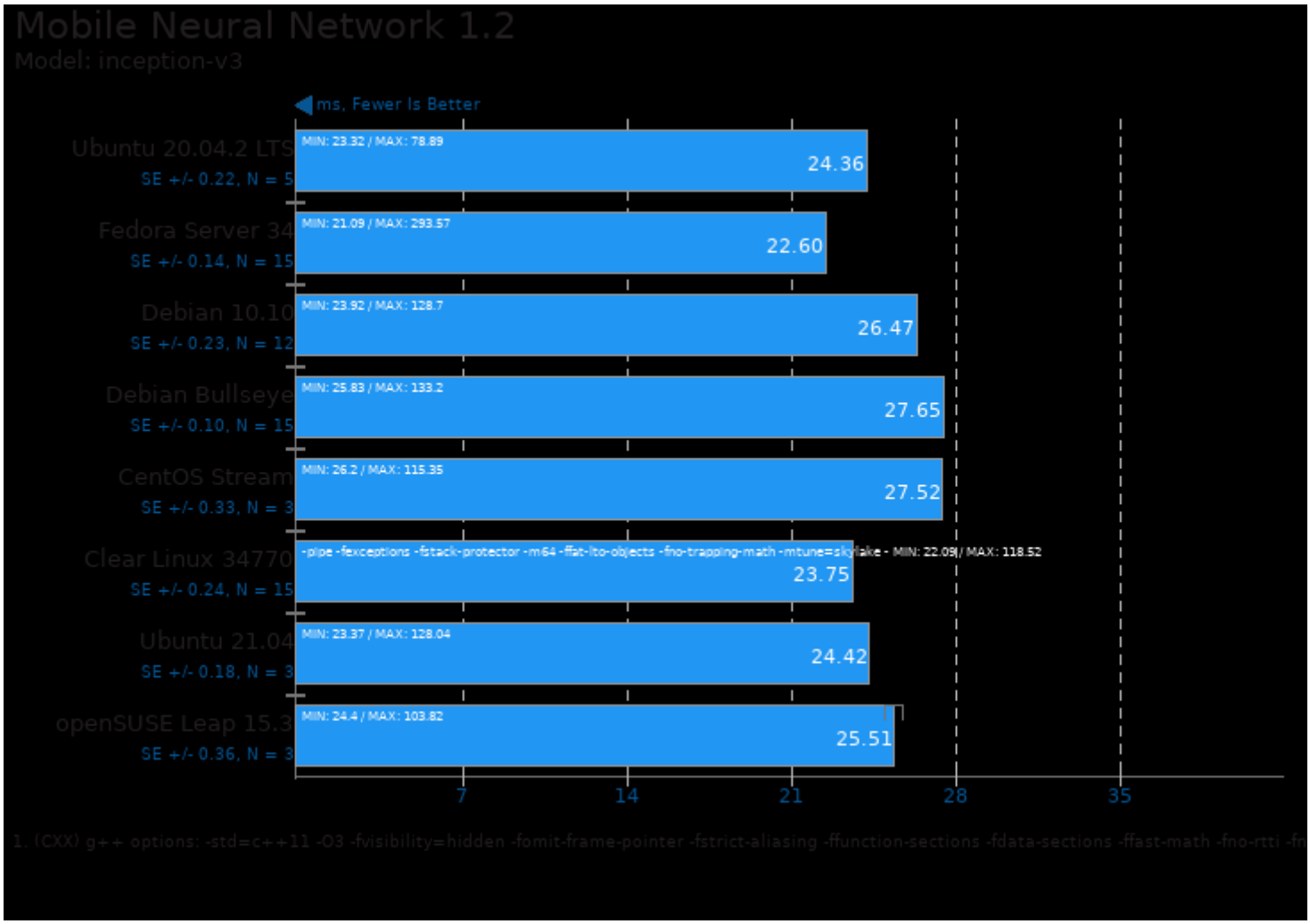

Mobile Neural Network 1.2
Model: squeezenetv1.1
ms, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.037, N = 5
MIN: 4.02 / MAX: 6.05
4.144
Fedora Server 34
SE +/- 0.035, N = 15
MIN: 3.75 / MAX: 13.49
4.042
Debian 10.10
SE +/- 0.046, N = 12
MIN: 4.17 / MAX: 23.32
4.720
Debian Bullseye
SE +/- 0.029, N = 15
MIN: 4.15 / MAX: 20.3
4.676
CentOS Stream
SE +/- 0.084, N = 3
MIN: 4.13 / MAX: 5.15
4.355
Clear Linux 34770
SE +/- 0.046, N = 15
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake - MIN: 3.99 / MAX: 9.37
4.409
Ubuntu 21.04
SE +/- 0.027, N = 3
MIN: 4.25 / MAX: 5.48
4.377
openSUSE Leap 15.3
SE +/- 0.035, N = 3
MIN: 4.41 / MAX: 5.4
4.622
1.062
2.124
3.186
4.248
5.31
1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fv

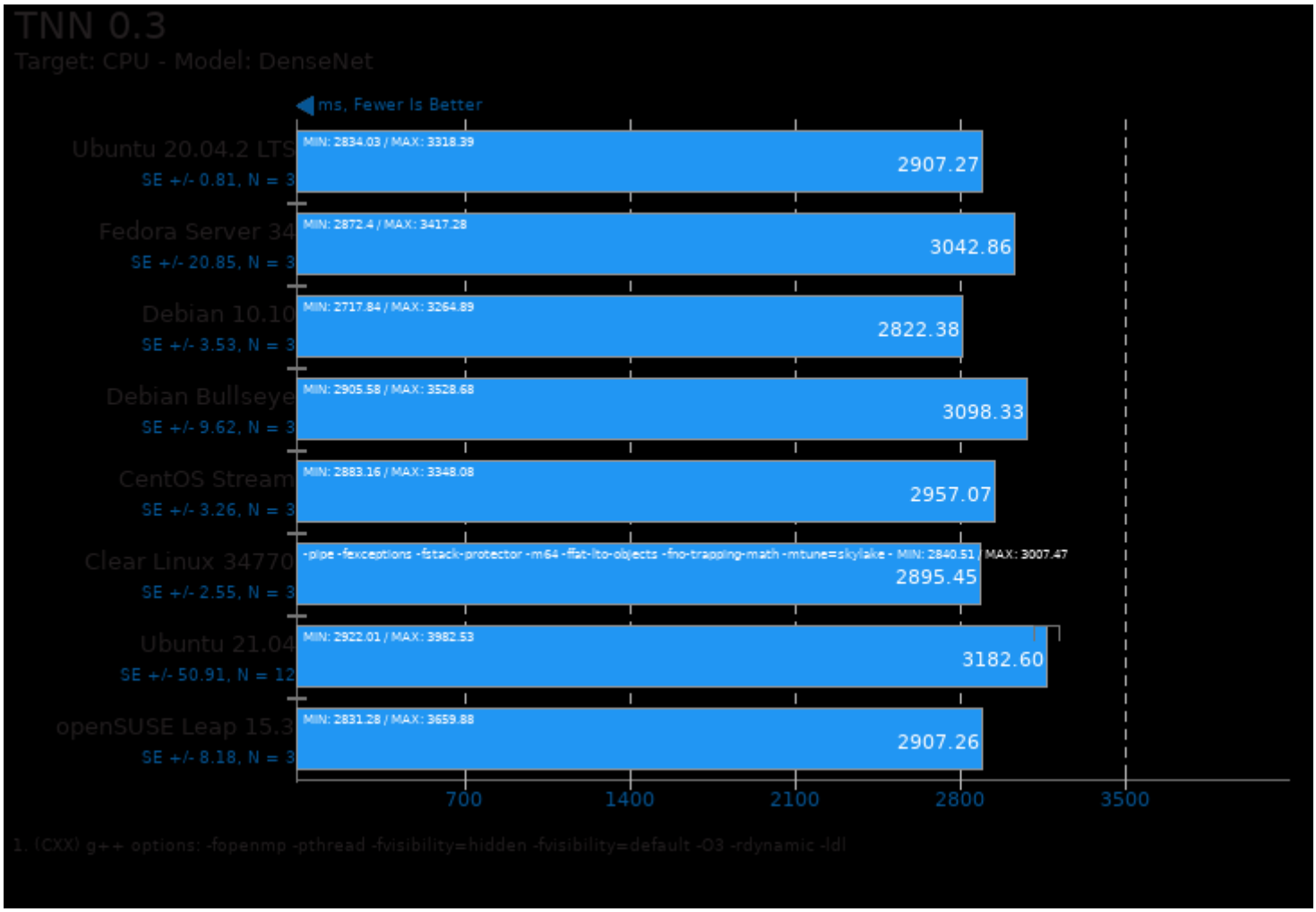

Mobile Neural Network 1.2
Model: resnet-v2-50
ms, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.08, N = 5
MIN: 20.25 / MAX: 89.25
21.95
Fedora Server 34
SE +/- 0.28, N = 15
MIN: 17.69 / MAX: 159.34
18.93
Debian 10.10
SE +/- 0.28, N = 12
MIN: 22.27 / MAX: 64.14
23.74
Debian Bullseye
SE +/- 0.38, N = 15
MIN: 20.6 / MAX: 109.28
22.52
CentOS Stream
SE +/- 0.43, N = 3
MIN: 20.86 / MAX: 39.15
22.03
Clear Linux 34770
SE +/- 0.27, N = 15
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake - MIN: 19.88 / MAX: 62.08
22.35
Ubuntu 21.04
SE +/- 0.25, N = 3
MIN: 20.46 / MAX: 205.8
21.66
openSUSE Leap 15.3
SE +/- 0.70, N = 3
MIN: 23.01 / MAX: 26.85
24.44
6
12
18
24
30
1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fv

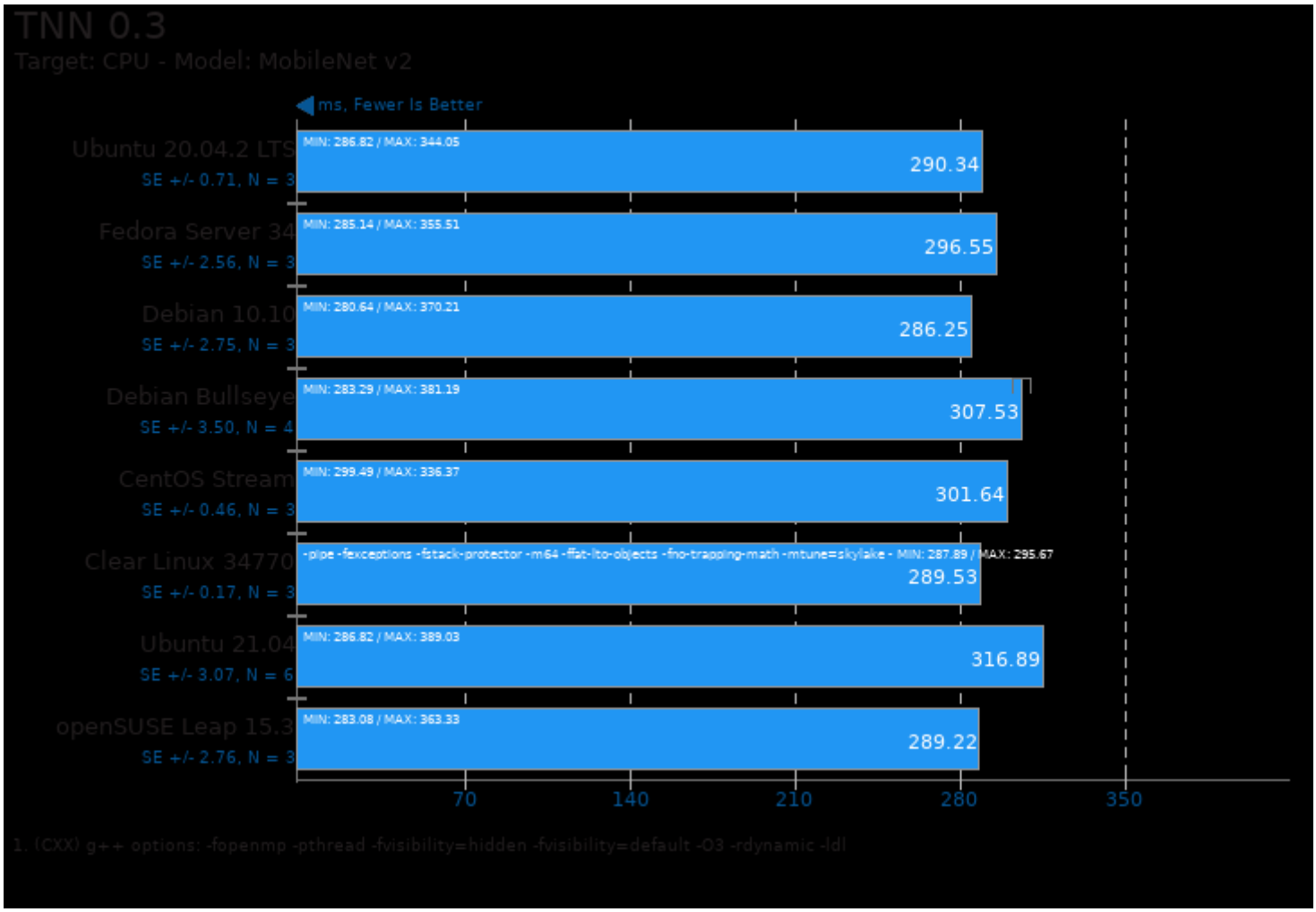

Mobile Neural Network 1.2
Model: SqueezeNetV1.0
ms, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.096, N = 5
MIN: 5.73 / MAX: 12.28
6.094
Fedora Server 34
SE +/- 0.049, N = 15
MIN: 5.34 / MAX: 18.22
5.767
Debian 10.10
SE +/- 0.099, N = 12
MIN: 5.64 / MAX: 13.73
6.326
Debian Bullseye
SE +/- 0.094, N = 15
MIN: 5.43 / MAX: 24.5
6.204
CentOS Stream
SE +/- 0.088, N = 3
MIN: 6.24 / MAX: 13.86
6.776
Clear Linux 34770
SE +/- 0.116, N = 15
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake - MIN: 5.73 / MAX: 9.75
6.539
Ubuntu 21.04
SE +/- 0.027, N = 3
MIN: 6.51 / MAX: 10.52
6.900
openSUSE Leap 15.3
SE +/- 0.079, N = 3
MIN: 6.35 / MAX: 14.7
6.713
2
4
6
8
10
1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti

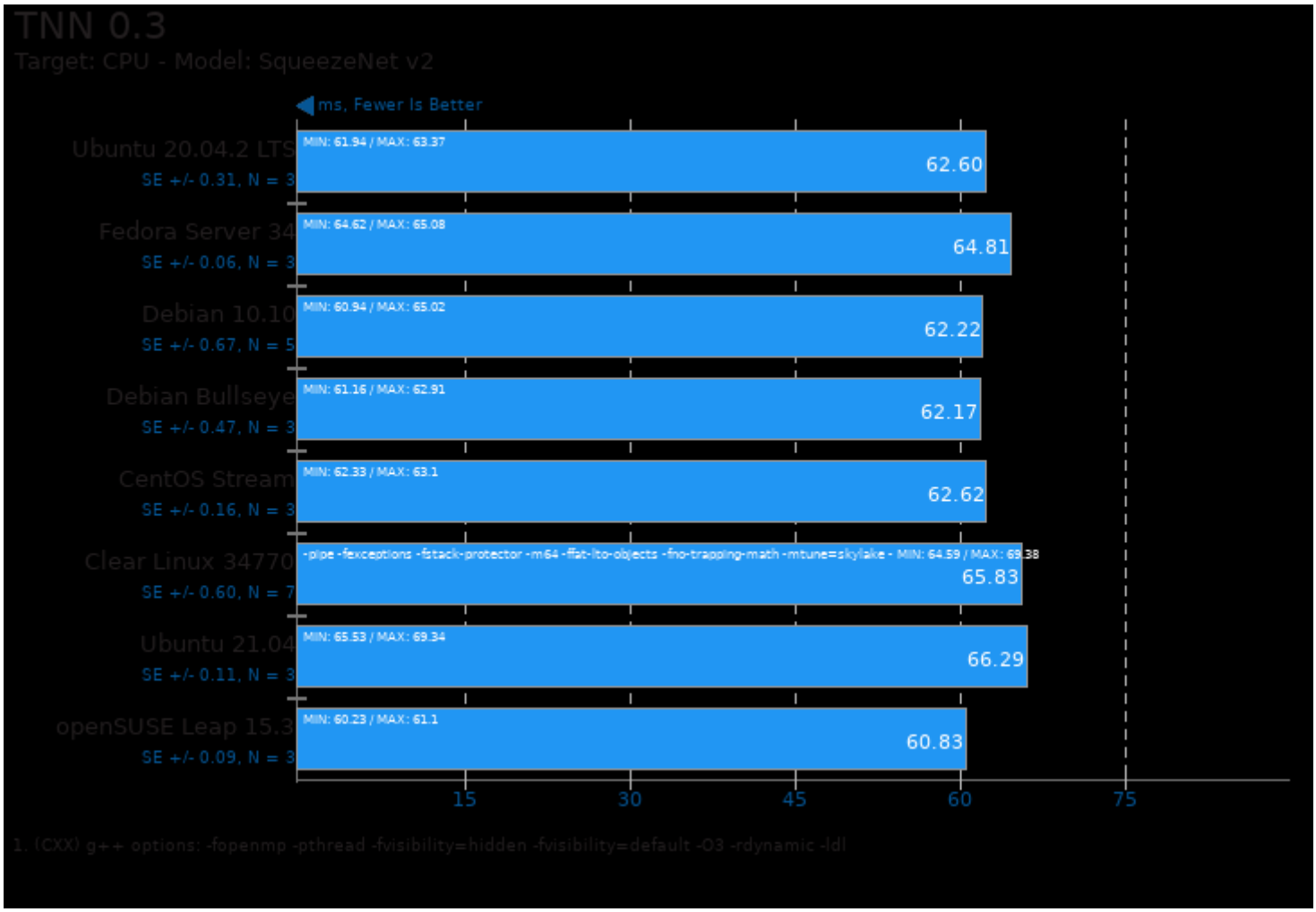

Mobile Neural Network 1.2
Model: MobileNetV2_224
ms, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.095, N = 5
MIN: 3.62 / MAX: 5.86
3.947
Fedora Server 34
SE +/- 0.046, N = 14
MIN: 3.37 / MAX: 43.2
3.975
Debian 10.10
SE +/- 0.072, N = 12
MIN: 3.8 / MAX: 6.21
4.242
Debian Bullseye
SE +/- 0.107, N = 15
MIN: 3.48 / MAX: 7.15
4.034
CentOS Stream
SE +/- 0.051, N = 3
MIN: 3.78 / MAX: 21.47
4.275
Clear Linux 34770
SE +/- 0.078, N = 15
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake -
MIN: 3.61 / MAX: 7.37
4.026
Ubuntu 21.04
SE +/- 0.025, N = 3
MIN: 3.85 / MAX: 8.92
3.955
openSUSE Leap 15.3
SE +/- 0.029, N = 3
MIN: 3.9 / MAX: 31.79
4.221
0.9619
1.9238
2.8857
3.8476
4.8095
1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti

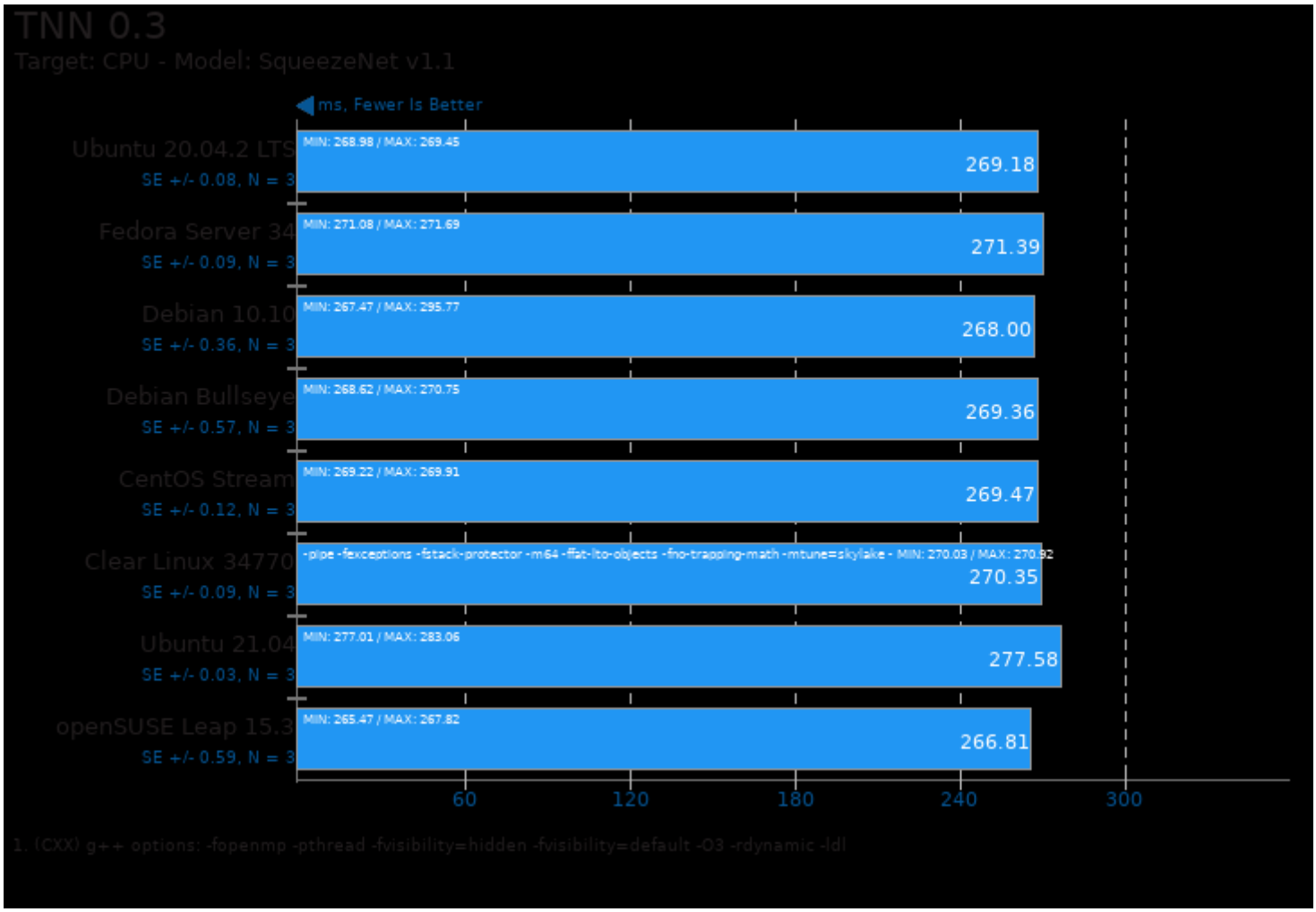

Mobile Neural Network 1.2
Model: mobilenet-v1-1.0
ms, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.077, N = 5
MIN: 2.57 / MAX: 7.42
2.849
Fedora Server 34
SE +/- 0.057, N = 15
MIN: 2.55 / MAX: 7.14
2.894
Debian 10.10
SE +/- 0.086, N = 12
MIN: 2.98 / MAX: 5.1
3.482
Debian Bullseye
SE +/- 0.083, N = 15
MIN: 2.99 / MAX: 6.12
3.796
CentOS Stream
SE +/- 0.195, N = 3
MIN: 2.63 / MAX: 4.03
2.932
Clear Linux 34770
SE +/- 0.082, N = 15
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake
MIN: 2.55 / MAX: 34.68
2.981
Ubuntu 21.04
SE +/- 0.013, N = 3
MIN: 2.67 / MAX: 3.88
2.734
openSUSE Leap 15.3
SE +/- 0.366, N = 3
MIN: 2.73 / MAX: 4.36
3.405
0.8541
1.7082
2.5623
3.4164
4.2705
1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fv

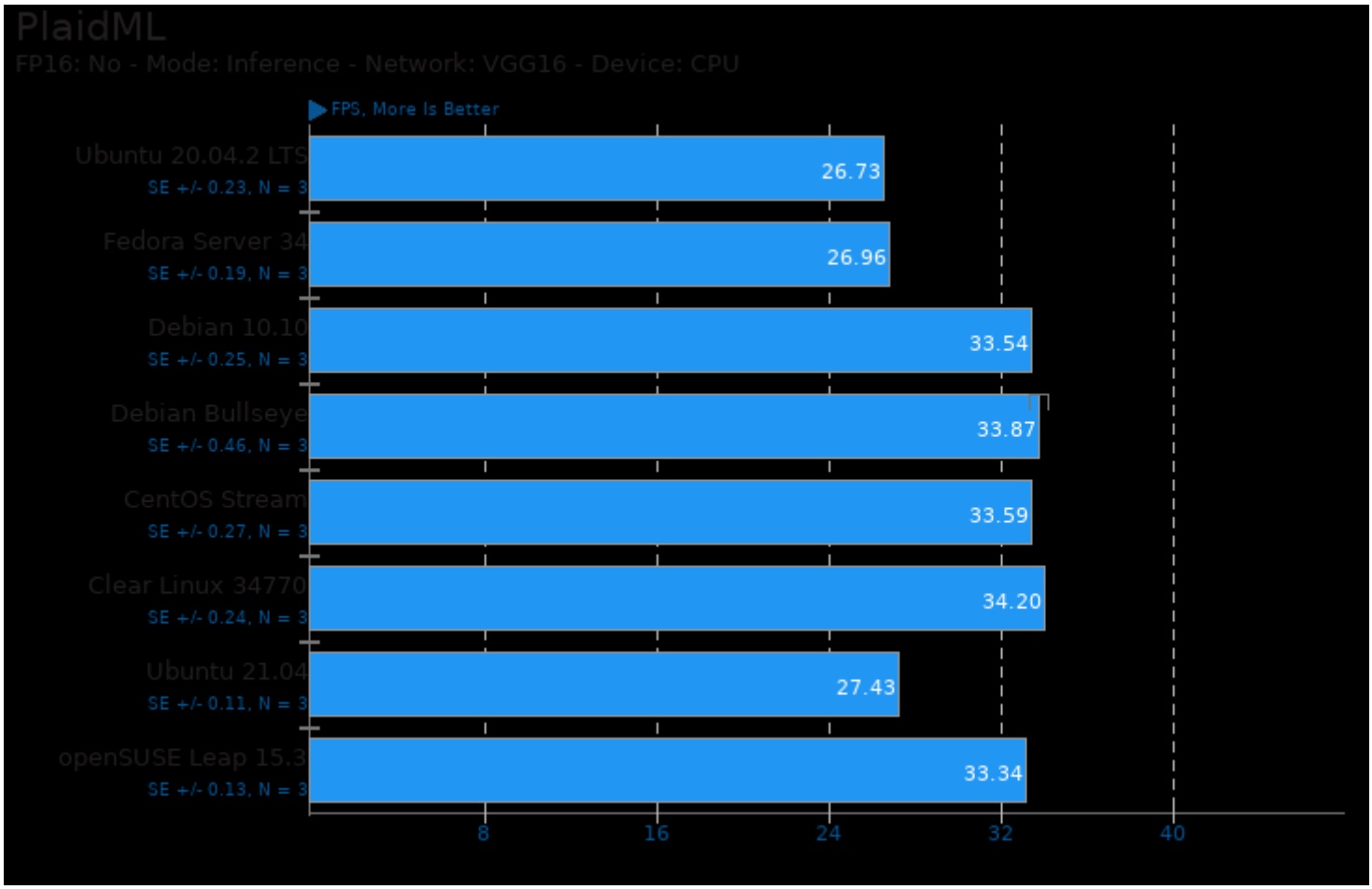

Mobile Neural Network 1.2
Model: inception-v3
ms, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.22, N = 5
MIN: 23.32 / MAX: 78.89
24.36
Fedora Server 34
SE +/- 0.14, N = 15
MIN: 21.09 / MAX: 293.57
22.60
Debian 10.10
SE +/- 0.23, N = 12
MIN: 23.92 / MAX: 128.7
26.47
Debian Bullseye
SE +/- 0.10, N = 15
MIN: 25.83 / MAX: 133.2
27.65
CentOS Stream
SE +/- 0.33, N = 3
MIN: 26.2 / MAX: 115.35
27.52
Clear Linux 34770
SE +/- 0.24, N = 15
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake - MIN: 22.09 / MAX: 118.52
23.75
Ubuntu 21.04
SE +/- 0.18, N = 3
MIN: 23.37 / MAX: 128.04
24.42
openSUSE Leap 15.3
SE +/- 0.36, N = 3
MIN: 24.4 / MAX: 103.82
25.51
7
14
21
28
35
1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fv

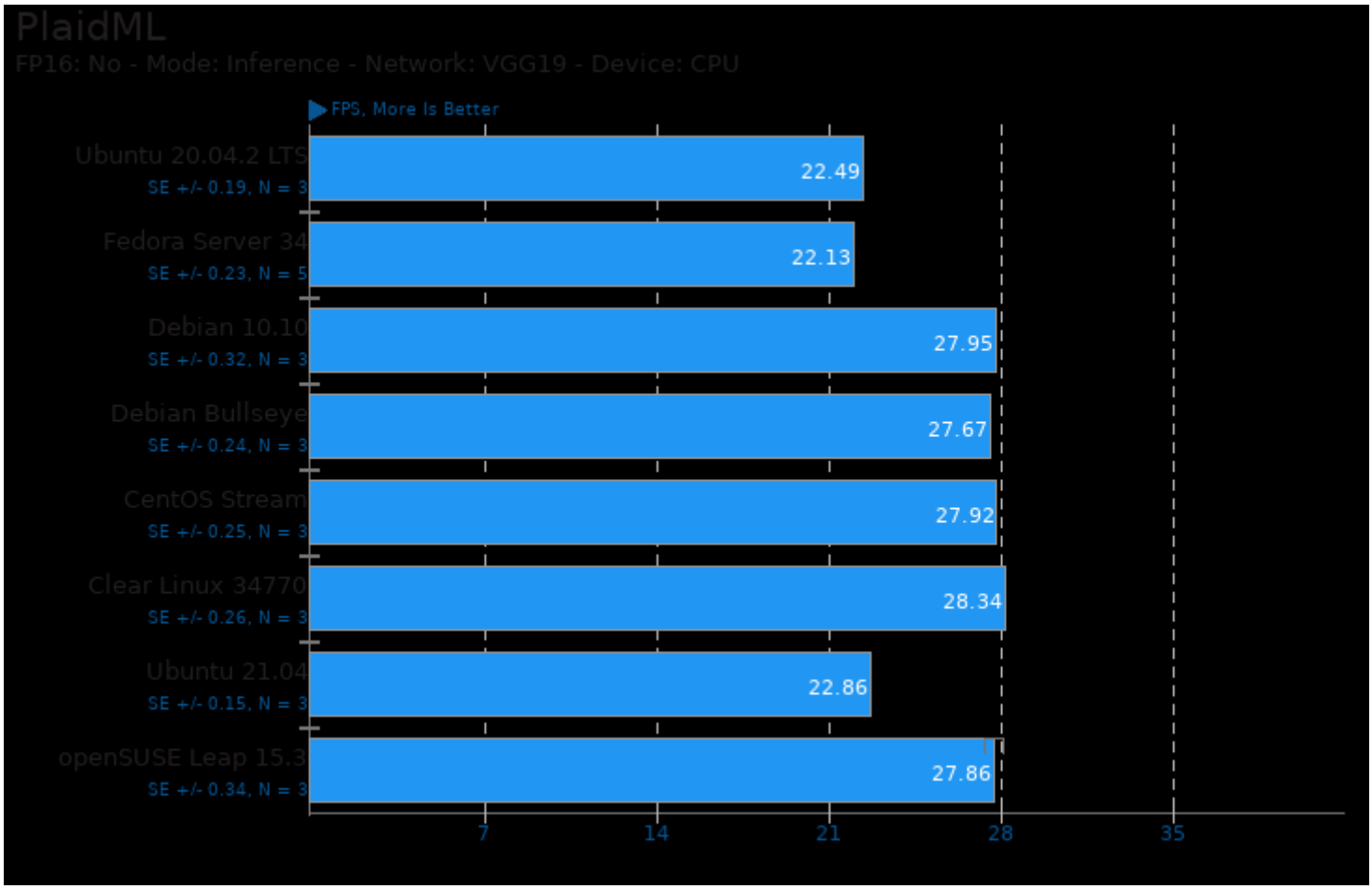

TNN 0.3
Target: CPU - Model: DenseNet
ms, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.81, N = 3
MIN: 2834.03 / MAX: 3318.39
2907.27
Fedora Server 34
SE +/- 20.85, N = 3
MIN: 2872.4 / MAX: 3417.28
3042.86
Debian 10.10
SE +/- 3.53, N = 3
MIN: 2717.84 / MAX: 3264.89
2822.38
Debian Bullseye
SE +/- 9.62, N = 3
MIN: 2905.58 / MAX: 3528.68
3098.33
CentOS Stream
SE +/- 3.26, N = 3
MIN: 2883.16 / MAX: 3348.08
2957.07
Clear Linux 34770
SE +/- 2.55, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake - MIN: 2840.51 / MAX: 3007.47
2895.45
Ubuntu 21.04
SE +/- 50.91, N = 12
MIN: 2922.01 / MAX: 3982.53
3182.60
openSUSE Leap 15.3
SE +/- 8.18, N = 3
MIN: 2831.28 / MAX: 3659.88
2907.26
700
1400
2100
2800
3500
1. (CXX) g++ options: -fopenmp -pthread -fvisibility=hidden -fvisibility=default -O3 -rdynamic -ldl

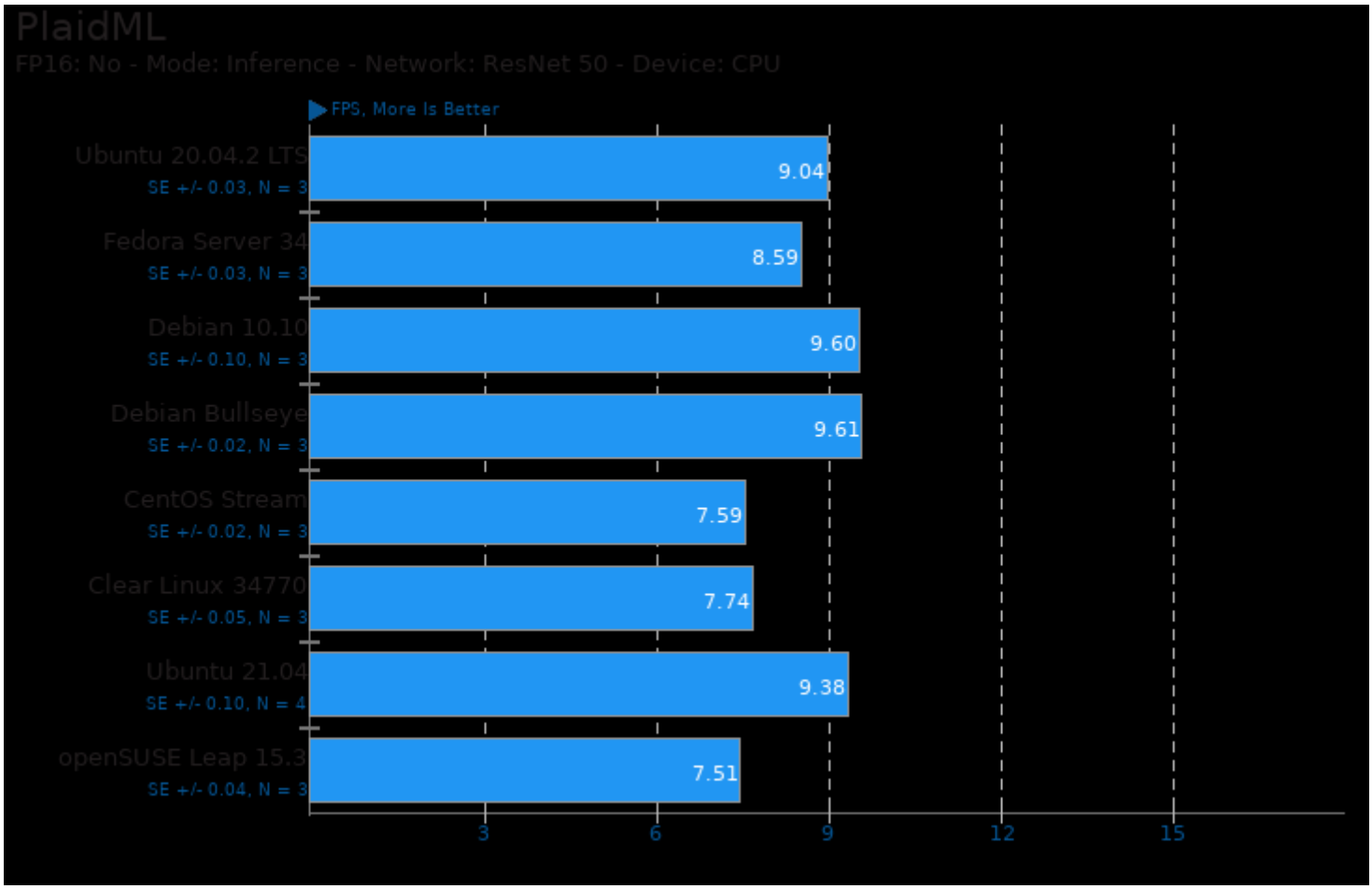

TNN 0.3
Target: CPU - Model: MobileNet v2
ms, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.71, N = 3
MIN: 286.82 / MAX: 344.05
290.34
Fedora Server 34
SE +/- 2.56, N = 3
MIN: 285.14 / MAX: 355.51
296.55
Debian 10.10
SE +/- 2.75, N = 3
MIN: 280.64 / MAX: 370.21
286.25
Debian Bullseye
SE +/- 3.50, N = 4
MIN: 283.29 / MAX: 381.19
307.53
CentOS Stream
SE +/- 0.46, N = 3
MIN: 299.49 / MAX: 336.37
301.64
Clear Linux 34770
SE +/- 0.17, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake - MIN: 287.89 / MAX: 295.67
289.53
Ubuntu 21.04
SE +/- 3.07, N = 6
MIN: 286.82 / MAX: 389.03
316.89
openSUSE Leap 15.3
SE +/- 2.76, N = 3
MIN: 283.08 / MAX: 363.33
289.22
70
140
210
280
350
1. (CXX) g++ options: -fopenmp -pthread -fvisibility=hidden -fvisibility=default -O3 -rdynamic -ldl

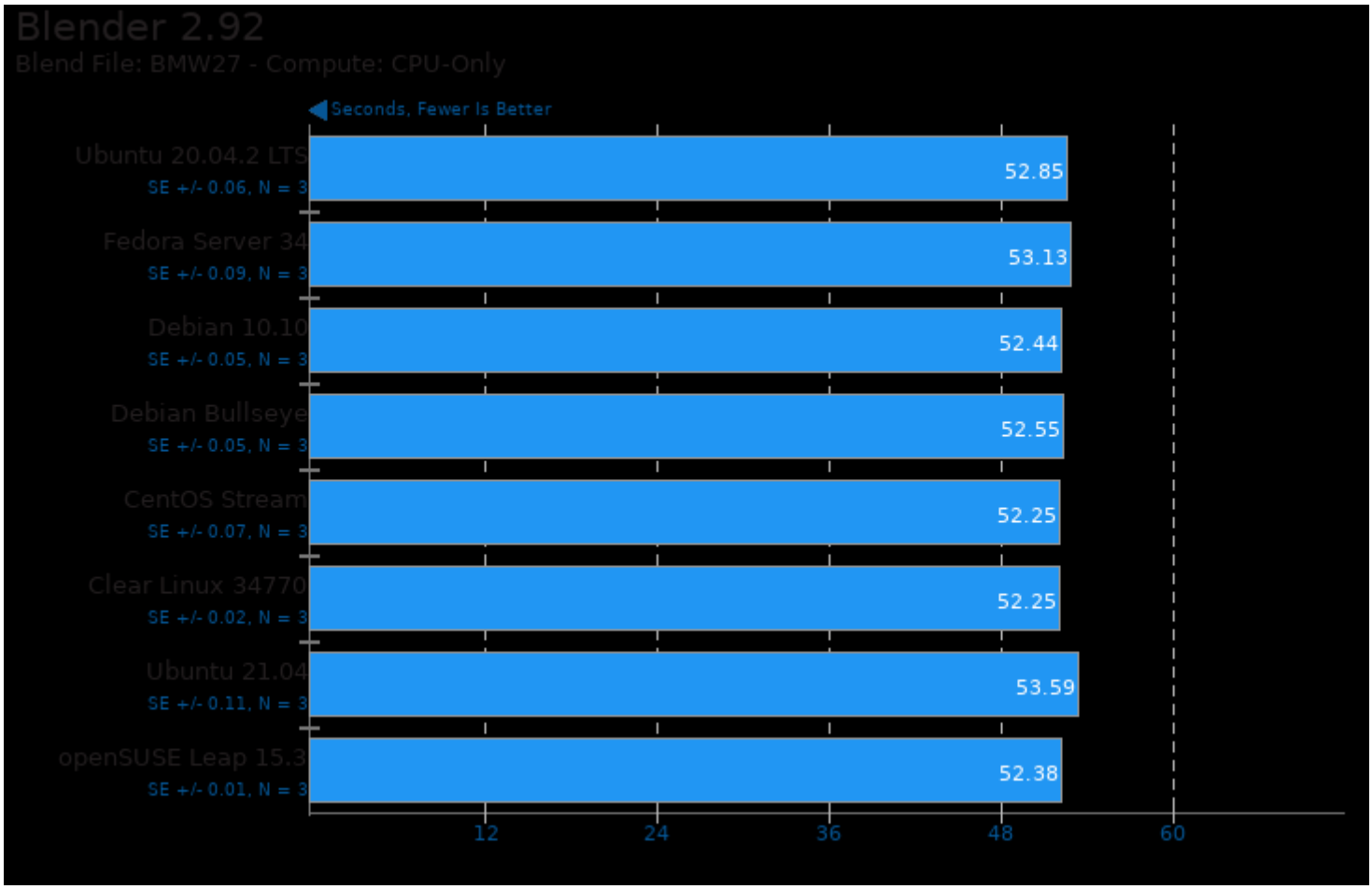

TNN 0.3
Target: CPU - Model: SqueezeNet v2
ms, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.31, N = 3
MIN: 61.94 / MAX: 63.37
62.60
Fedora Server 34
SE +/- 0.06, N = 3
MIN: 64.62 / MAX: 65.08
64.81
Debian 10.10
SE +/- 0.67, N = 5
MIN: 60.94 / MAX: 65.02
62.22
Debian Bullseye
SE +/- 0.47, N = 3
MIN: 61.16 / MAX: 62.91
62.17
CentOS Stream
SE +/- 0.16, N = 3
MIN: 62.33 / MAX: 63.1
62.62
Clear Linux 34770
SE +/- 0.60, N = 7
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake - MIN: 64.59 / MAX: 69.38
65.83
Ubuntu 21.04
SE +/- 0.11, N = 3
MIN: 65.53 / MAX: 69.34
66.29
openSUSE Leap 15.3
SE +/- 0.09, N = 3
MIN: 60.23 / MAX: 61.1
60.83
15
30
45
60
75
1. (CXX) g++ options: -fopenmp -pthread -fvisibility=hidden -fvisibility=default -O3 -rdynamic -ldl

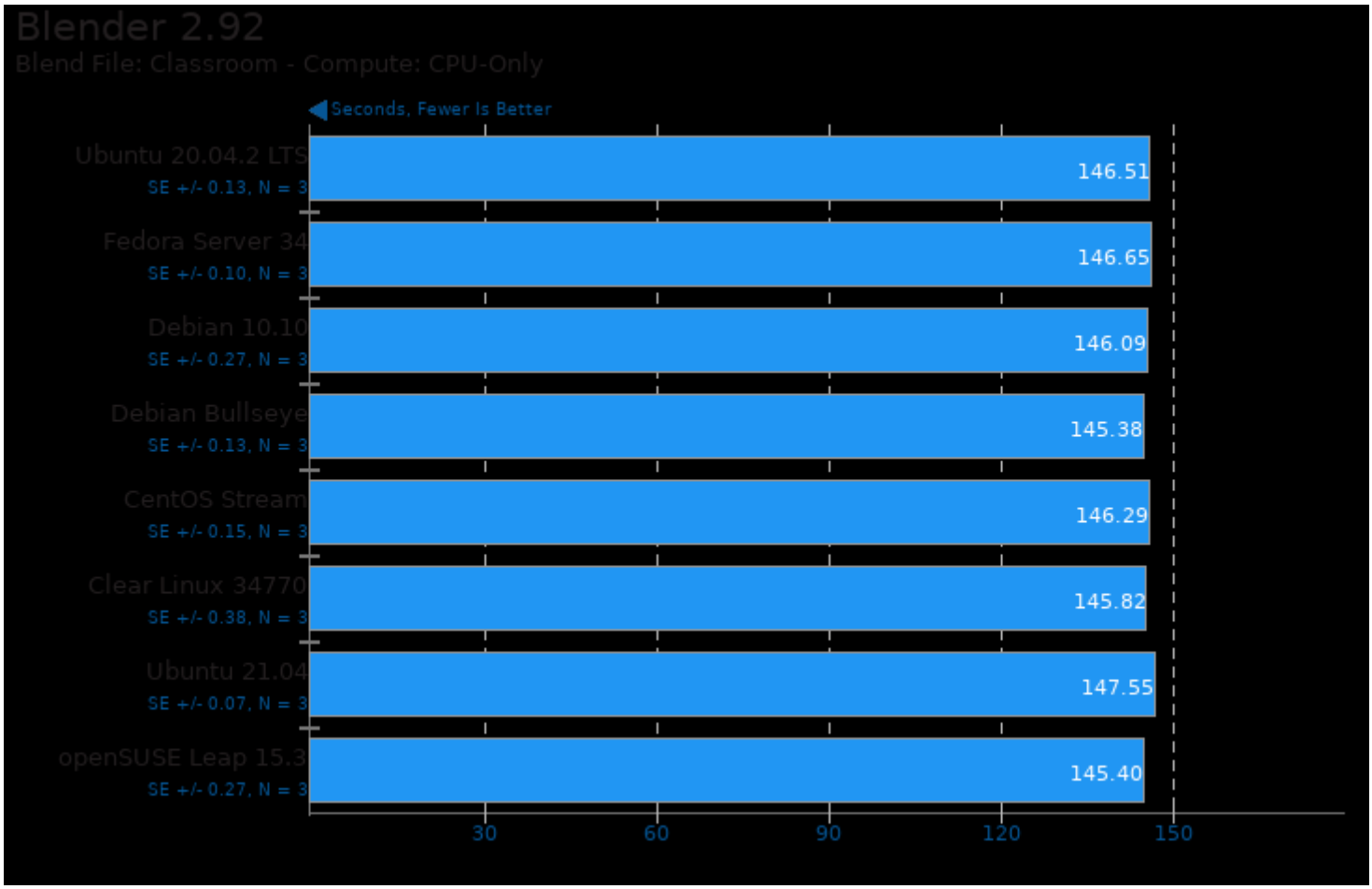

TNN 0.3
Target: CPU - Model: SqueezeNet v1.1
ms, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.08, N = 3
MIN: 268.98 / MAX: 269.45
269.18
Fedora Server 34
SE +/- 0.09, N = 3
MIN: 271.08 / MAX: 271.69
271.39
Debian 10.10
SE +/- 0.36, N = 3
MIN: 267.47 / MAX: 295.77
268.00
Debian Bullseye
SE +/- 0.57, N = 3
MIN: 268.62 / MAX: 270.75
269.36
CentOS Stream
SE +/- 0.12, N = 3
MIN: 269.22 / MAX: 269.91
269.47
Clear Linux 34770
SE +/- 0.09, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake - MIN: 270.03 / MAX: 270.92
270.35
Ubuntu 21.04
SE +/- 0.03, N = 3
MIN: 277.01 / MAX: 283.06
277.58
openSUSE Leap 15.3
SE +/- 0.59, N = 3
MIN: 265.47 / MAX: 267.82
266.81
60
120
180
240
300
1. (CXX) g++ options: -fopenmp -pthread -fvisibility=hidden -fvisibility=default -O3 -rdynamic -ldl

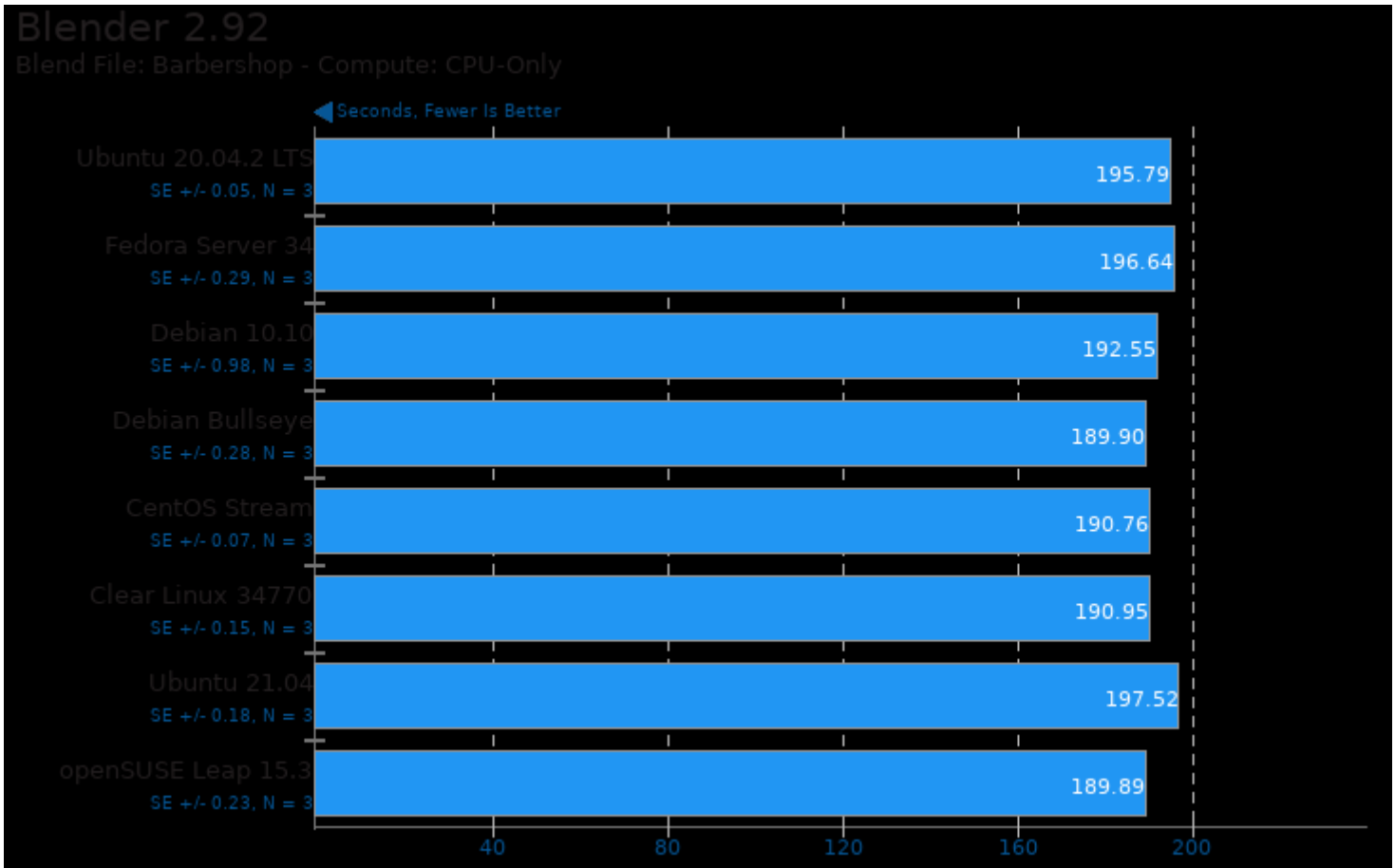

PlaidML
FP16: No - Mode: Inference - Network: VGG16 - Device: CPU
FPS, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.23, N = 3
26.73
Fedora Server 34
SE +/- 0.19, N = 3
26.96
Debian 10.10
SE +/- 0.25, N = 3
33.54
Debian Bullseye
SE +/- 0.46, N = 3
33.87
CentOS Stream
SE +/- 0.27, N = 3
33.59
Clear Linux 34770
SE +/- 0.24, N = 3
34.20
Ubuntu 21.04
SE +/- 0.11, N = 3
27.43
openSUSE Leap 15.3
SE +/- 0.13, N = 3
33.34
8
16
24
32
40

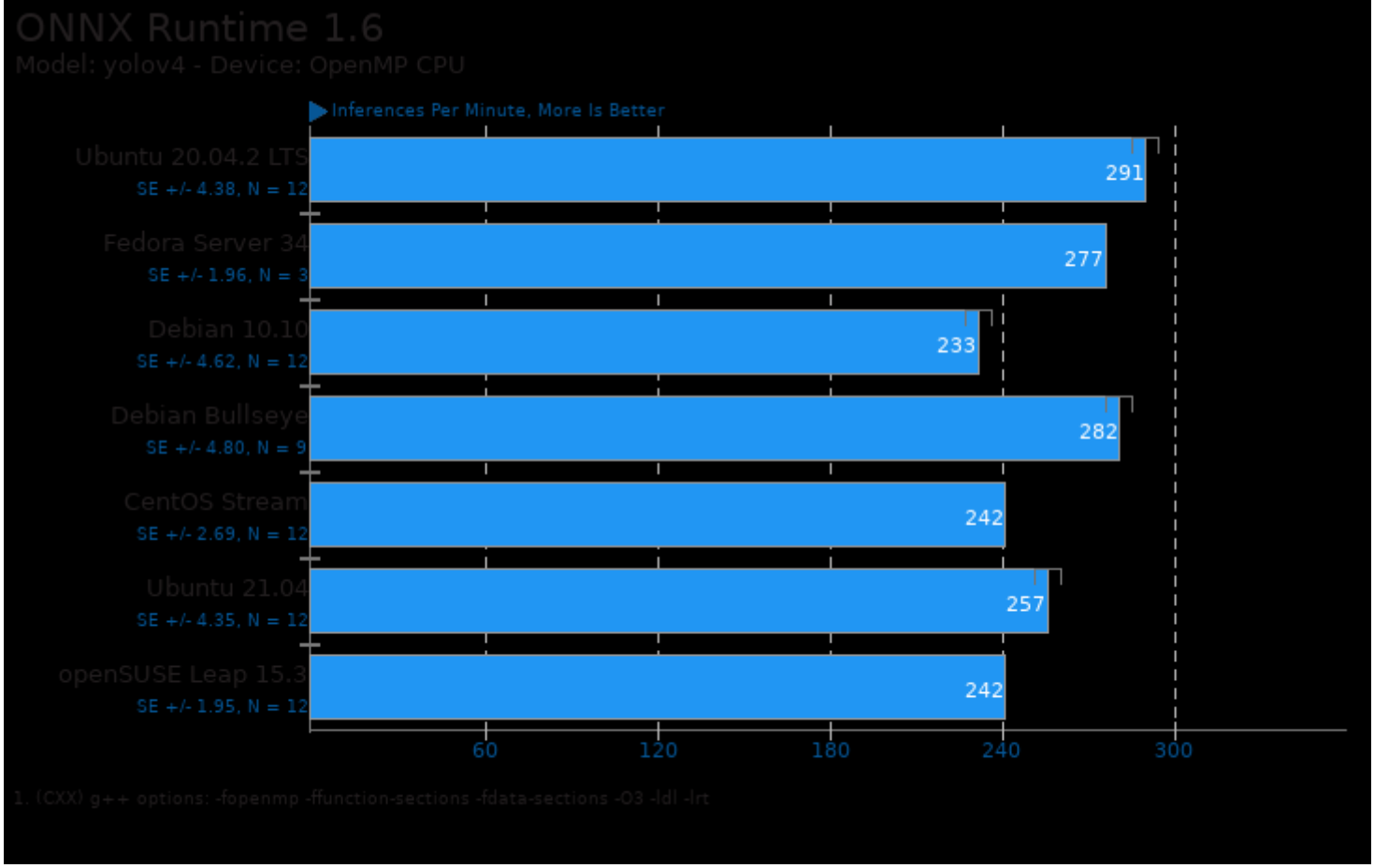

PlaidML
FP16: No - Mode: Inference - Network: VGG19 - Device: CPU
FPS, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.19, N = 3
22.49
Fedora Server 34
SE +/- 0.23, N = 5
22.13
Debian 10.10
SE +/- 0.32, N = 3
27.95
Debian Bullseye
SE +/- 0.24, N = 3
27.67
CentOS Stream
SE +/- 0.25, N = 3
27.92
Clear Linux 34770
SE +/- 0.26, N = 3
28.34
Ubuntu 21.04
SE +/- 0.15, N = 3
22.86
openSUSE Leap 15.3
SE +/- 0.34, N = 3
27.86
7
14
21
28
35

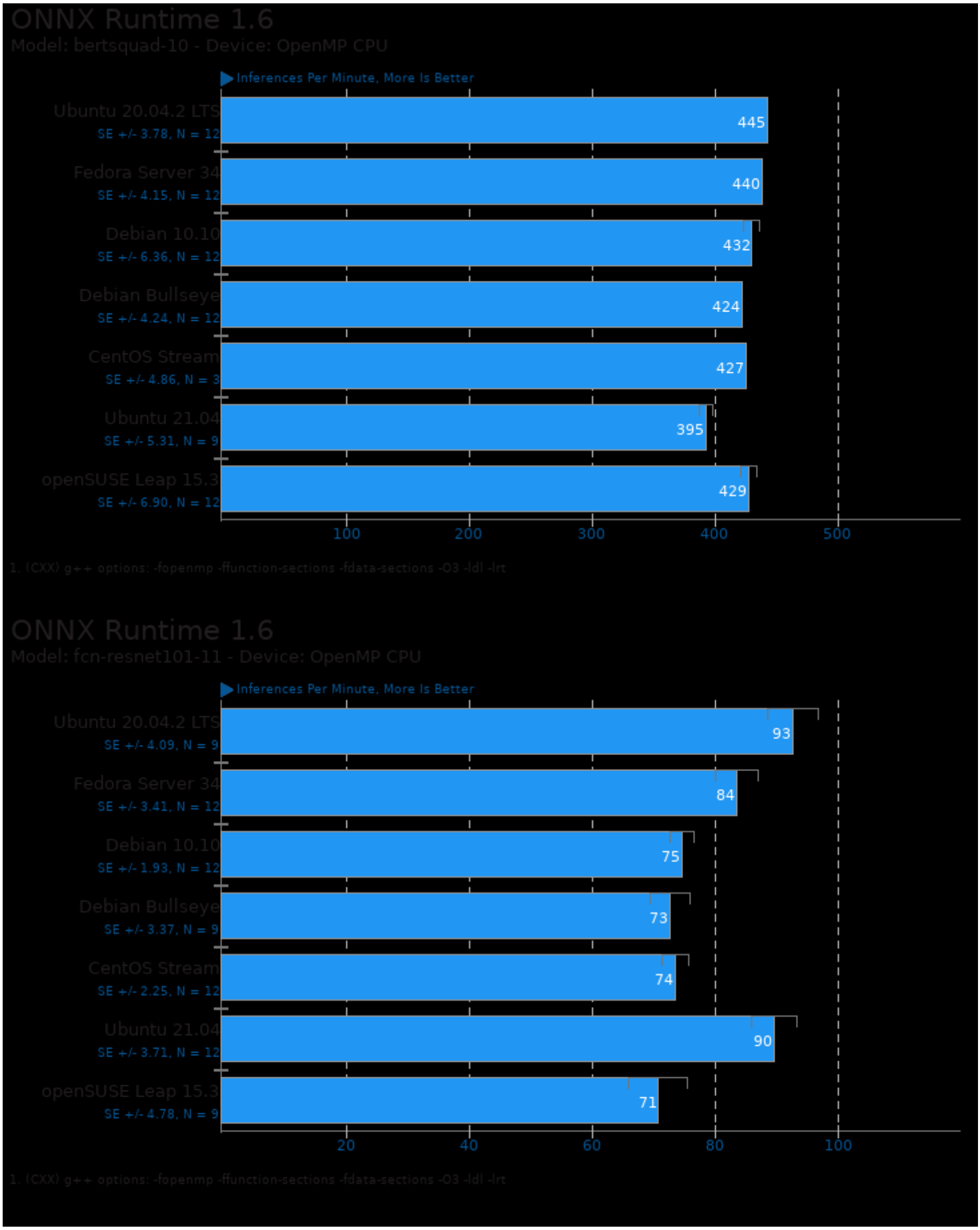

PlaidML
FP16: No - Mode: Inference - Network: ResNet 50 - Device: CPU
FPS, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.03, N = 3
9.04
Fedora Server 34
SE +/- 0.03, N = 3
8.59
Debian 10.10
SE +/- 0.10, N = 3
9.60
Debian Bullseye
SE +/- 0.02, N = 3
9.61
CentOS Stream
SE +/- 0.02, N = 3
7.59
Clear Linux 34770
SE +/- 0.05, N = 3
7.74
Ubuntu 21.04
SE +/- 0.10, N = 4
9.38
openSUSE Leap 15.3
SE +/- 0.04, N = 3
7.51
3
6
9
12
15

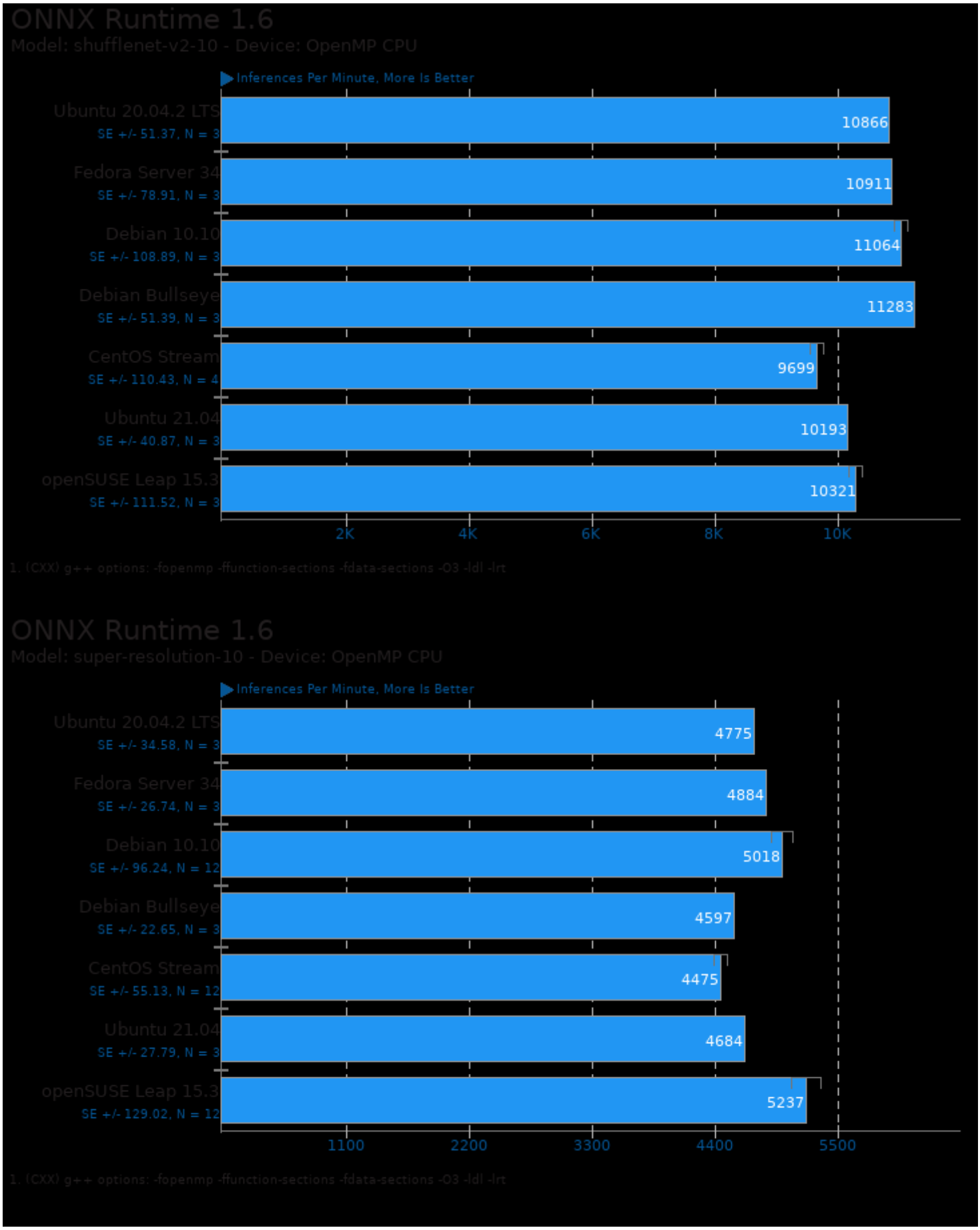

Blender 2.92
Blend File: BMW27 - Compute: CPU-Only
Seconds, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.06, N = 3
52.85
Fedora Server 34
SE +/- 0.09, N = 3
53.13
Debian 10.10
SE +/- 0.05, N = 3
52.44
Debian Bullseye
SE +/- 0.05, N = 3
52.55
CentOS Stream
SE +/- 0.07, N = 3
52.25
Clear Linux 34770
SE +/- 0.02, N = 3
52.25
Ubuntu 21.04
SE +/- 0.11, N = 3
53.59
openSUSE Leap 15.3
SE +/- 0.01, N = 3
52.38
12
24
36
48
60

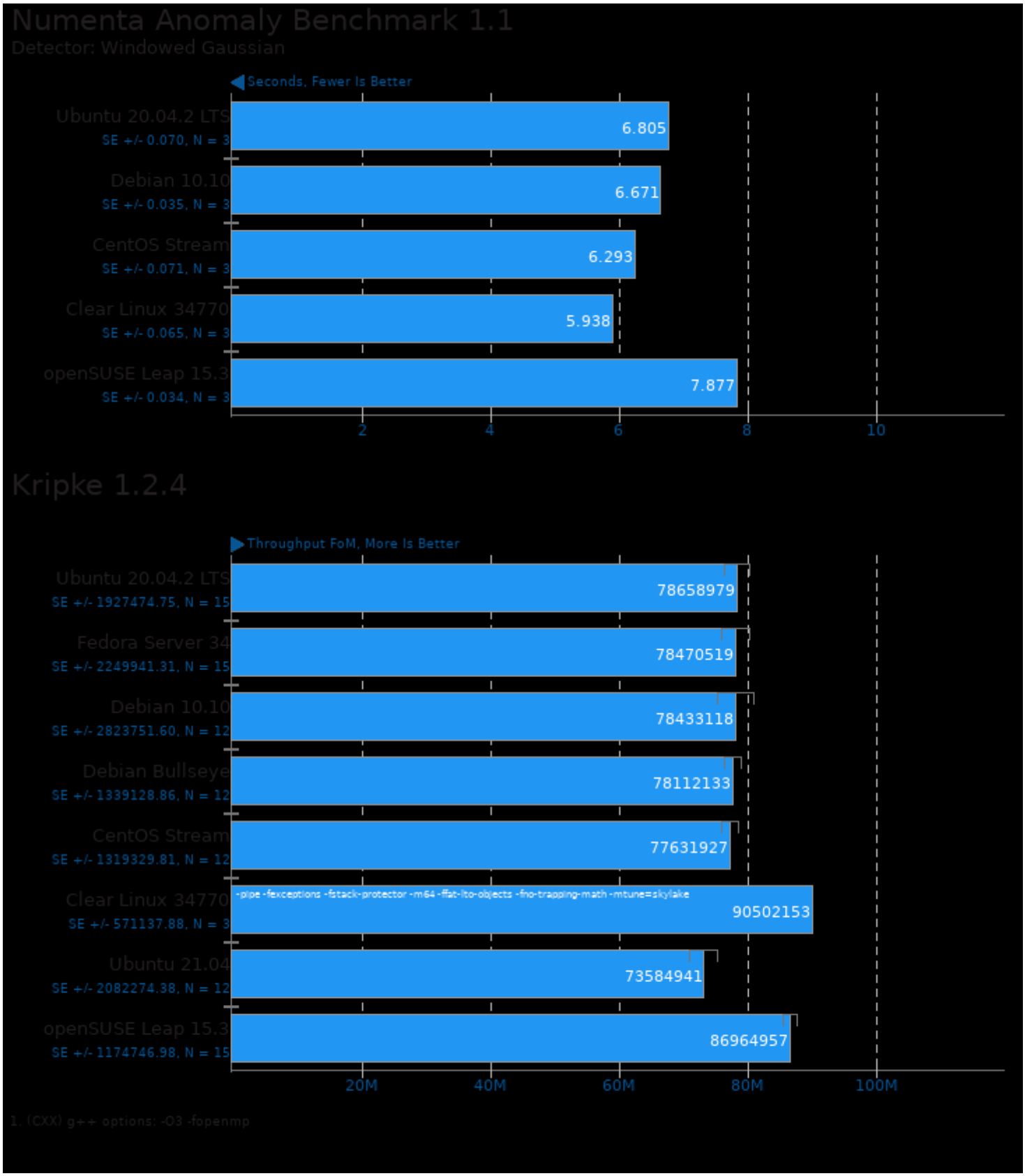

Blender 2.92
Blend File: Classroom - Compute: CPU-Only
Seconds, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.13, N = 3
146.51
Fedora Server 34
SE +/- 0.10, N = 3
146.65
Debian 10.10
SE +/- 0.27, N = 3
146.09
Debian Bullseye
SE +/- 0.13, N = 3
145.38
CentOS Stream
SE +/- 0.15, N = 3
146.29
Clear Linux 34770
SE +/- 0.38, N = 3
145.82
Ubuntu 21.04
SE +/- 0.07, N = 3
147.55
openSUSE Leap 15.3
SE +/- 0.27, N = 3
145.40
30
60
90
120
150

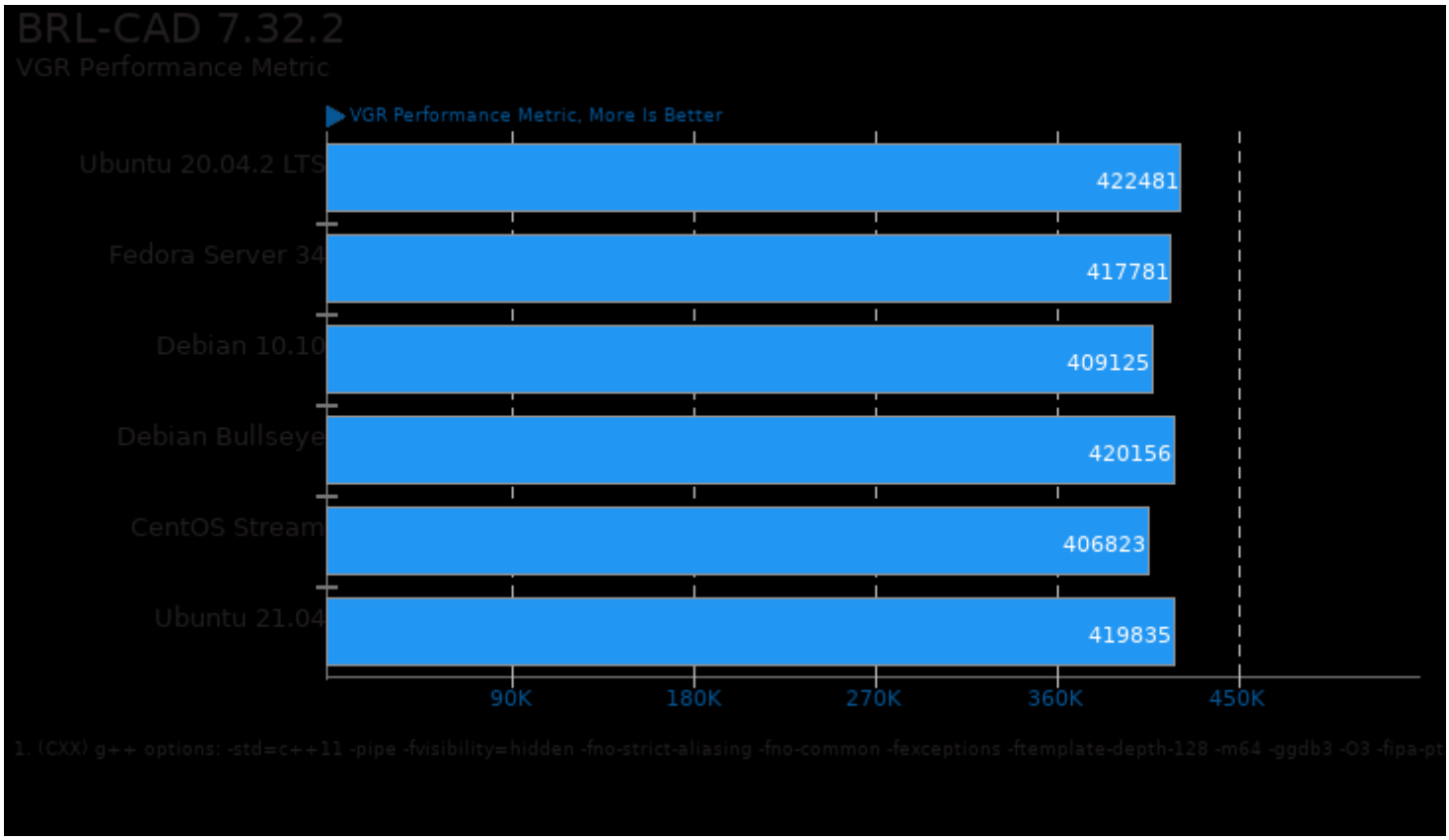

Blender 2.92
Blend File: Barbershop - Compute: CPU-Only
Seconds, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.05, N = 3
195.79
Fedora Server 34
SE +/- 0.29, N = 3
196.64
Debian 10.10
SE +/- 0.98, N = 3
192.55
Debian Bullseye
SE +/- 0.28, N = 3
189.90
CentOS Stream
SE +/- 0.07, N = 3
190.76
Clear Linux 34770
SE +/- 0.15, N = 3
190.95
Ubuntu 21.04
SE +/- 0.18, N = 3
197.52
openSUSE Leap 15.3
SE +/- 0.23, N = 3
189.89
40
80
120
160
200


ONNX Runtime 1.6
Model: yolov4 - Device: OpenMP CPU
Inferences Per Minute, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 4.38, N = 12
291
Fedora Server 34
SE +/- 1.96, N = 3
277
Debian 10.10
SE +/- 4.62, N = 12
233
Debian Bullseye
SE +/- 4.80, N = 9
282
CentOS Stream
SE +/- 2.69, N = 12
242
Ubuntu 21.04
SE +/- 4.35, N = 12
257
openSUSE Leap 15.3
SE +/- 1.95, N = 12
242
60
120
180
240
300
1. (CXX) g++ options: -fopenmp -ffunction-sections -fdata-sections -O3 -ldl -lrt

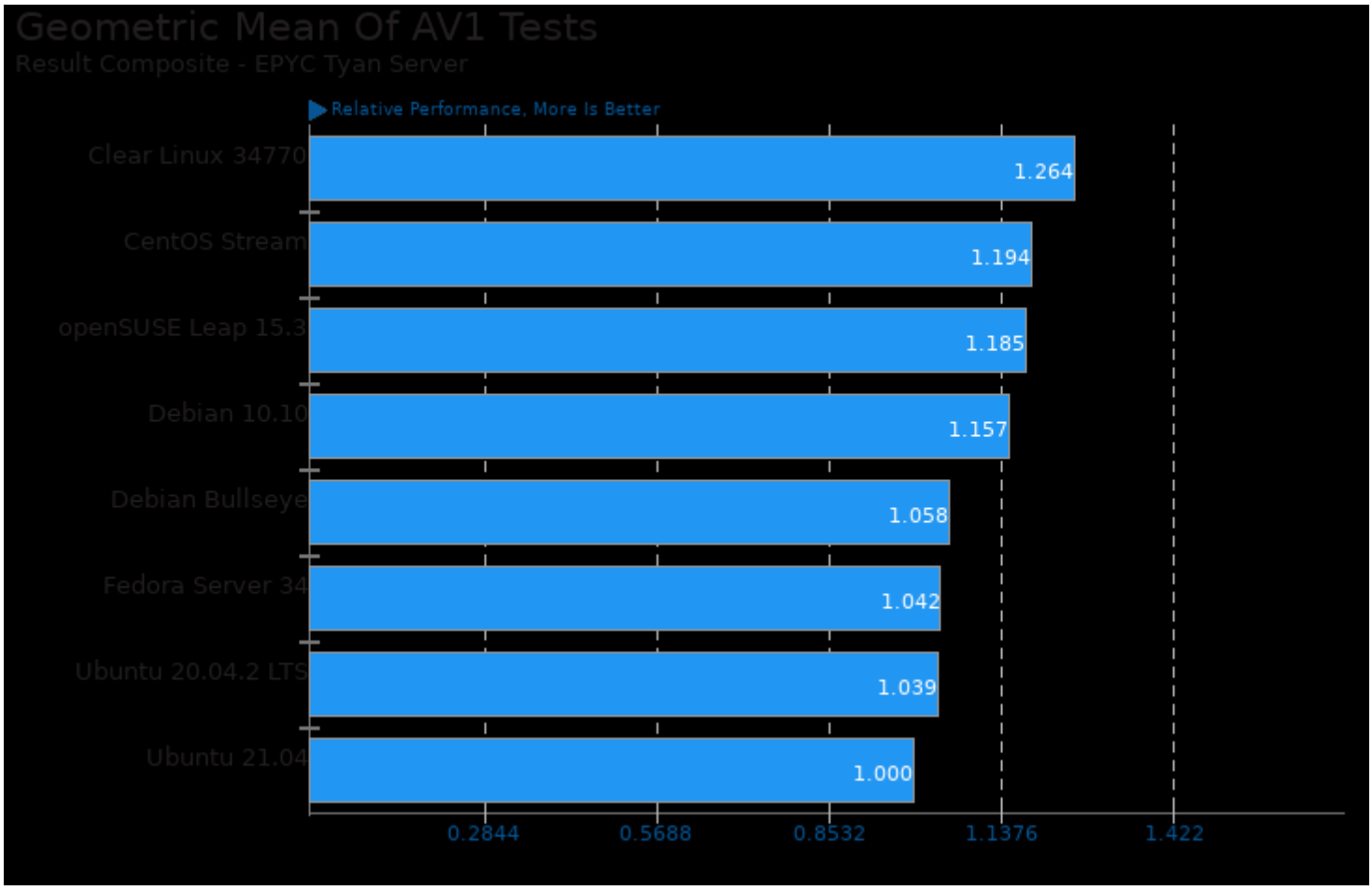

ONNX Runtime 1.6
Model: bertsquad-10 - Device: OpenMP CPU
Inferences Per Minute, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 3.78, N = 12
445
Fedora Server 34
SE +/- 4.15, N = 12
440
Debian 10.10
SE +/- 6.36, N = 12
432
Debian Bullseye
SE +/- 4.24, N = 12
424
CentOS Stream
SE +/- 4.86, N = 3
427
Ubuntu 21.04
SE +/- 5.31, N = 9
395
openSUSE Leap 15.3
SE +/- 6.90, N = 12
429
100
200
300
400
500
1. (CXX) g++ options: -fopenmp -ffunction-sections -fdata-sections -O3 -ldl -lrt
ONNX Runtime 1.6
Model: fcn-resnet101-11 - Device: OpenMP CPU
Inferences Per Minute, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 4.09, N = 9
93
Fedora Server 34
SE +/- 3.41, N = 12
84
Debian 10.10
SE +/- 1.93, N = 12
75
Debian Bullseye
SE +/- 3.37, N = 9
73
CentOS Stream
SE +/- 2.25, N = 12
74
Ubuntu 21.04
SE +/- 3.71, N = 12
90
openSUSE Leap 15.3
SE +/- 4.78, N = 9
71
20
40
60
80
100
1. (CXX) g++ options: -fopenmp -ffunction-sections -fdata-sections -O3 -ldl -lrt


ONNX Runtime 1.6
Model: shufflenet-v2-10 - Device: OpenMP CPU
Inferences Per Minute, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 51.37, N = 3
10866
Fedora Server 34
SE +/- 78.91, N = 3
10911
Debian 10.10
SE +/- 108.89, N = 3
11064
Debian Bullseye
SE +/- 51.39, N = 3
11283
CentOS Stream
SE +/- 110.43, N = 4
9699
Ubuntu 21.04
SE +/- 40.87, N = 3
10193
openSUSE Leap 15.3
SE +/- 111.52, N = 3
10321
2K
4K
6K
8K
10K
1. (CXX) g++ options: -fopenmp -ffunction-sections -fdata-sections -O3 -ldl -lrt
ONNX Runtime 1.6
Model: super-resolution-10 - Device: OpenMP CPU
Inferences Per Minute, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 34.58, N = 3
4775
Fedora Server 34
SE +/- 26.74, N = 3
4884
Debian 10.10
SE +/- 96.24, N = 12
5018
Debian Bullseye
SE +/- 22.65, N = 3
4597
CentOS Stream
SE +/- 55.13, N = 12
4475
Ubuntu 21.04
SE +/- 27.79, N = 3
4684
openSUSE Leap 15.3
SE +/- 129.02, N = 12
5237
1100
2200
3300
4400
5500
1. (CXX) g++ options: -fopenmp -ffunction-sections -fdata-sections -O3 -ldl -lrt

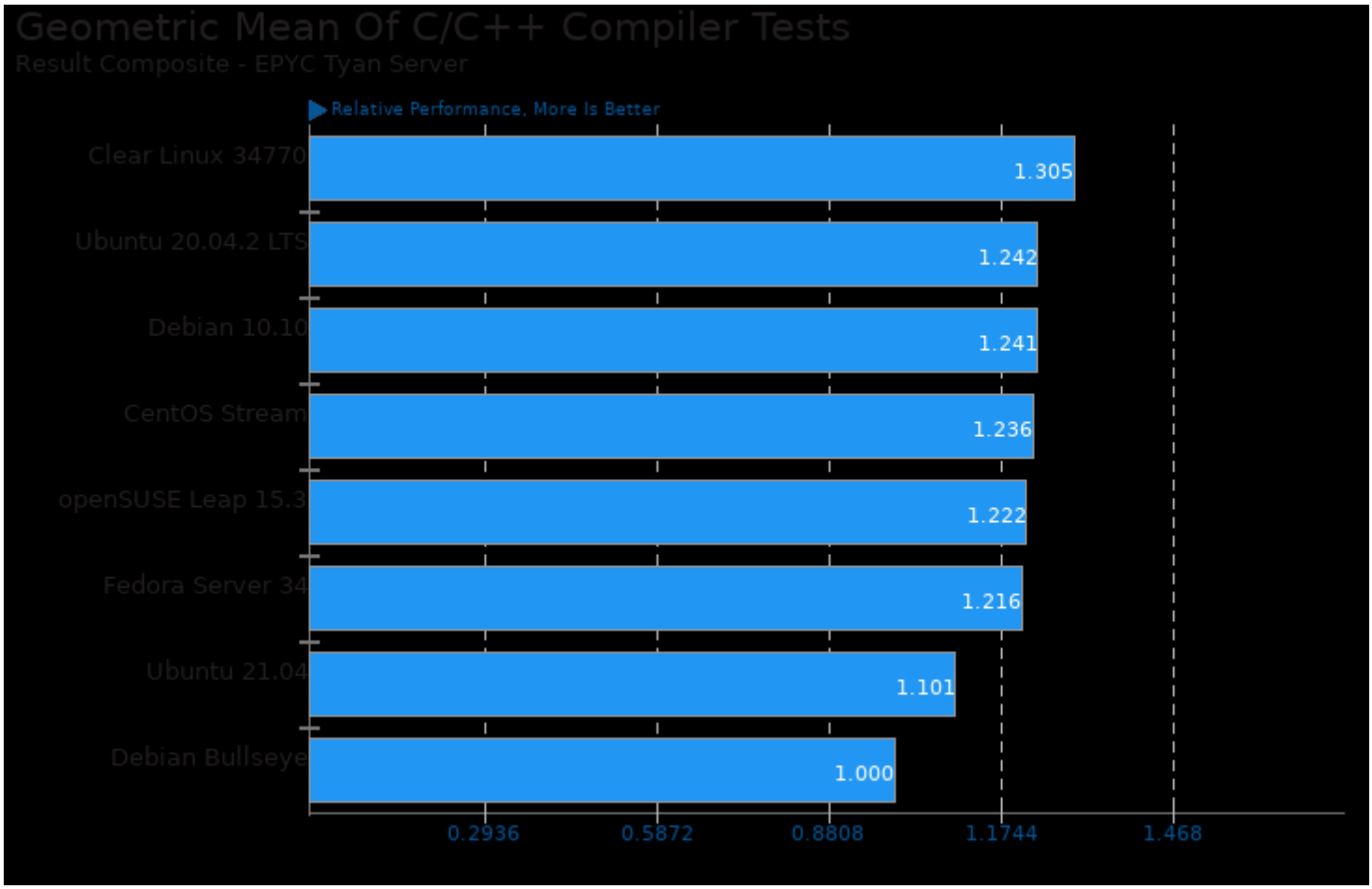

Numenta Anomaly Benchmark 1.1
Detector: Windowed Gaussian
Seconds, Fewer Is Better
Ubuntu 20.04.2 LTS
SE +/- 0.070, N = 3
6.805
Debian 10.10
SE +/- 0.035, N = 3
6.671
CentOS Stream
SE +/- 0.071, N = 3
6.293
Clear Linux 34770
SE +/- 0.065, N = 3
5.938
openSUSE Leap 15.3
SE +/- 0.034, N = 3
7.877
2
4
6
8
10
Kripke 1.2.4
Throughput FoM, More Is Better
Ubuntu 20.04.2 LTS
SE +/- 1927474.75, N = 15
78658979
Fedora Server 34
SE +/- 2249941.31, N = 15
78470519
Debian 10.10
SE +/- 2823751.60, N = 12
78433118
Debian Bullseye
SE +/- 1339128.86, N = 12
78112133
CentOS Stream
SE +/- 1319329.81, N = 12
77631927
Clear Linux 34770
SE +/- 571137.88, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-trapping-math -mtune=skylake
90502153
Ubuntu 21.04
SE +/- 2082274.38, N = 12
73584941
openSUSE Leap 15.3
SE +/- 1174746.98, N = 15
86964957
20M
40M
60M
80M
100M
1. (CXX) g++ options: -O3 -fopenmp


BRL-CAD 7.32.2
VGR Performance Metric
VGR Performance Metric, More Is Better
Ubuntu 20.04.2 LTS
422481
Fedora Server 34
417781
Debian 10.10
409125
Debian Bullseye
420156
CentOS Stream
406823
Ubuntu 21.04
419835
90K
180K
270K
360K
450K
1. (CXX) g++ options: -std=c++11 -pipe -fvisibility=hidden -fno-strict-aliasing -fno-common -fexceptions -ftemplate-depth-128 -m64 -ggdb3 -O3 -fipa-pt

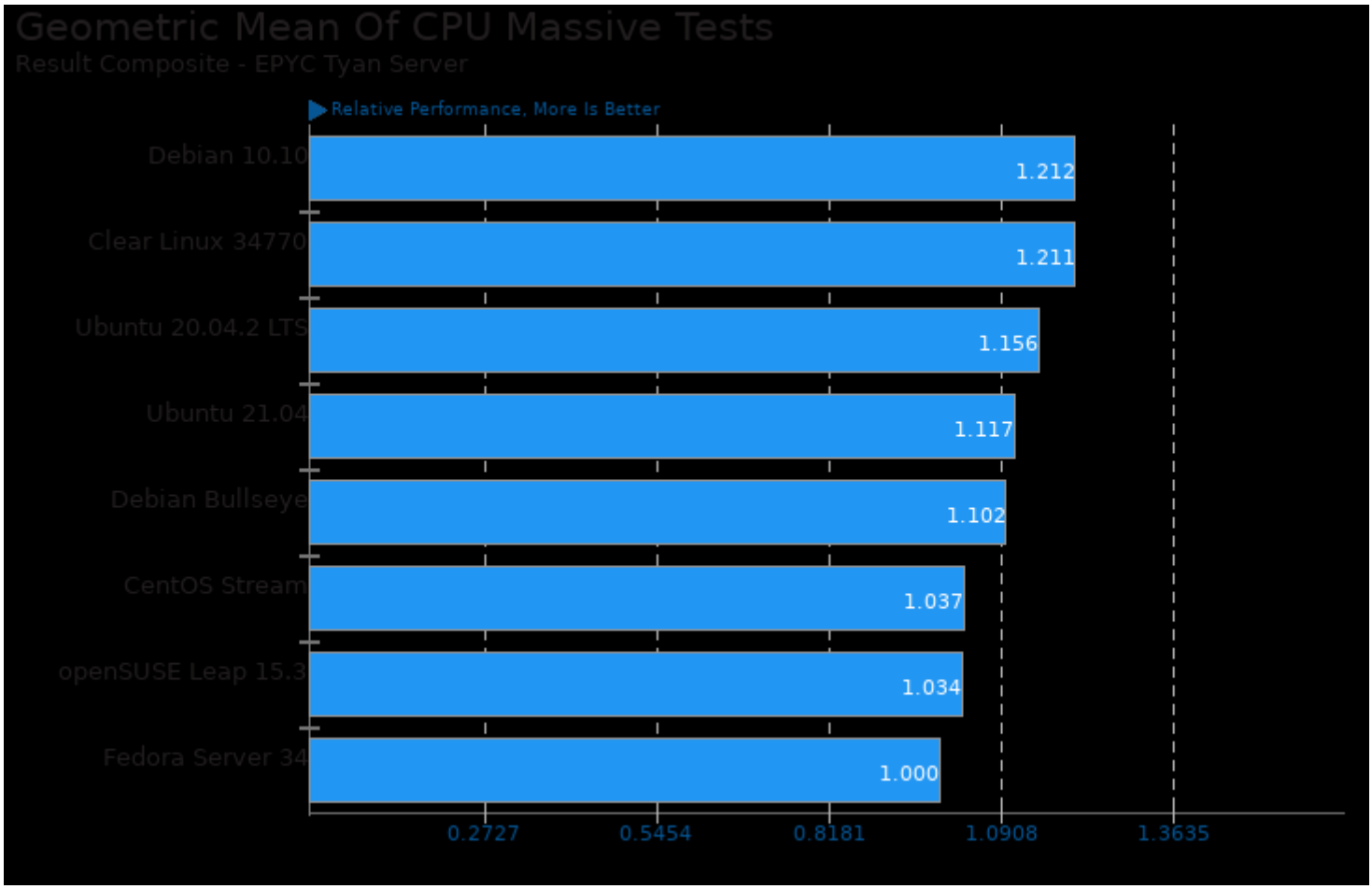
These geometric means are based upon test groupings / test suites for this result file.



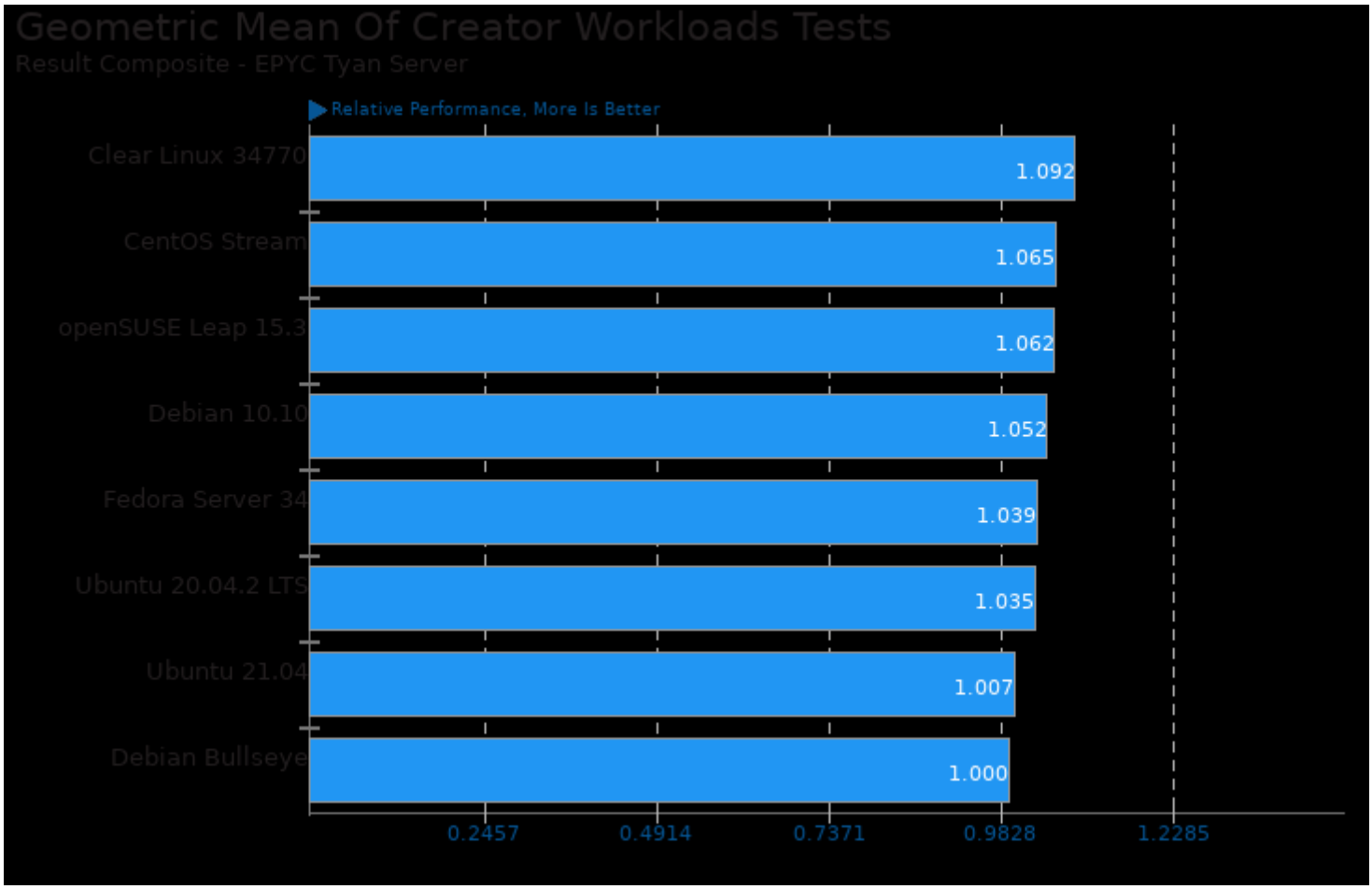

Geometric mean based upon tests: pts/svt-av1 and pts/avifenc



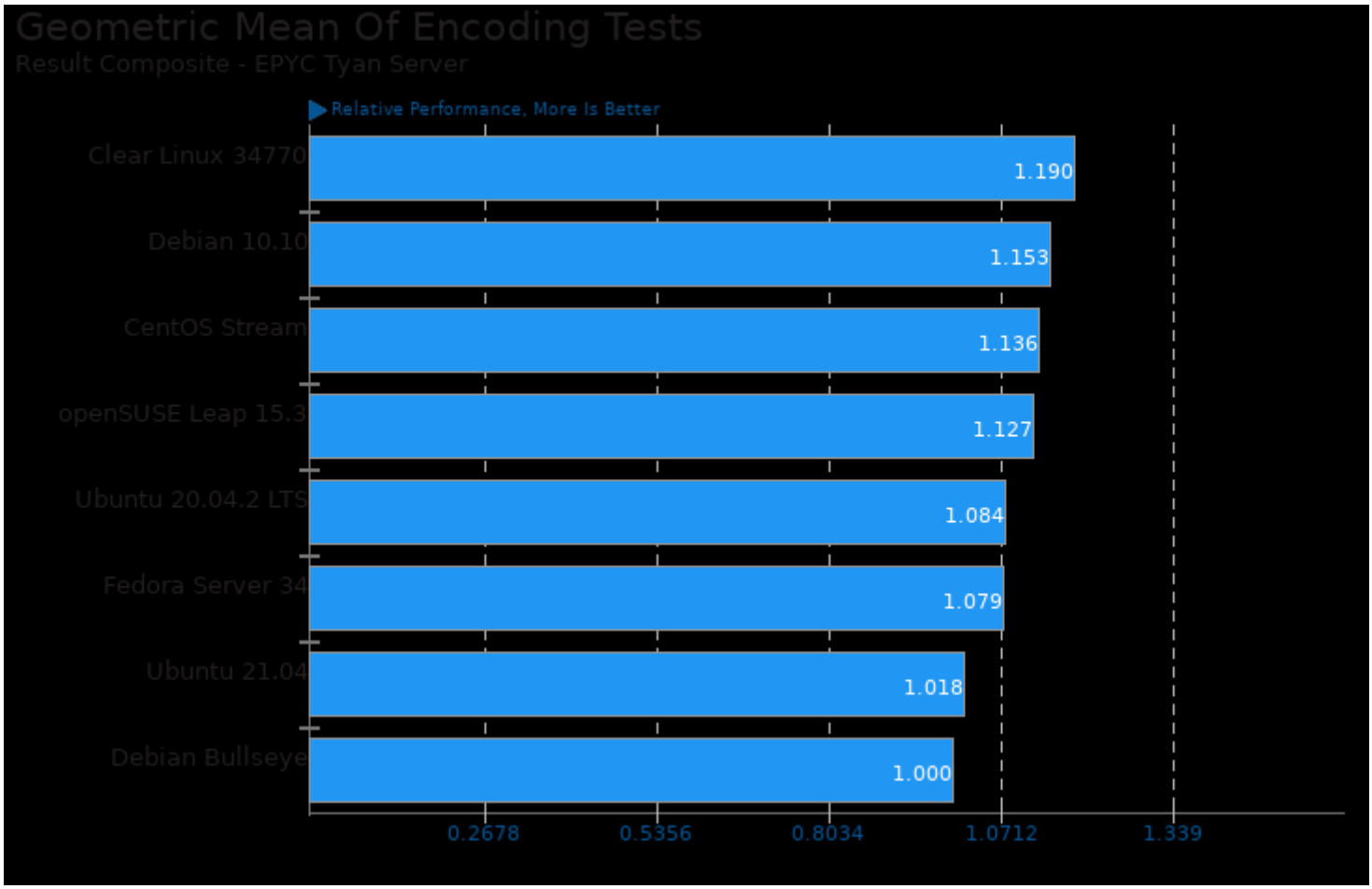

Geometric mean based upon tests: pts/vpxenc, pts/build-llvm, pts/svt-av1, pts/svt-vp9 and pts/gromacs



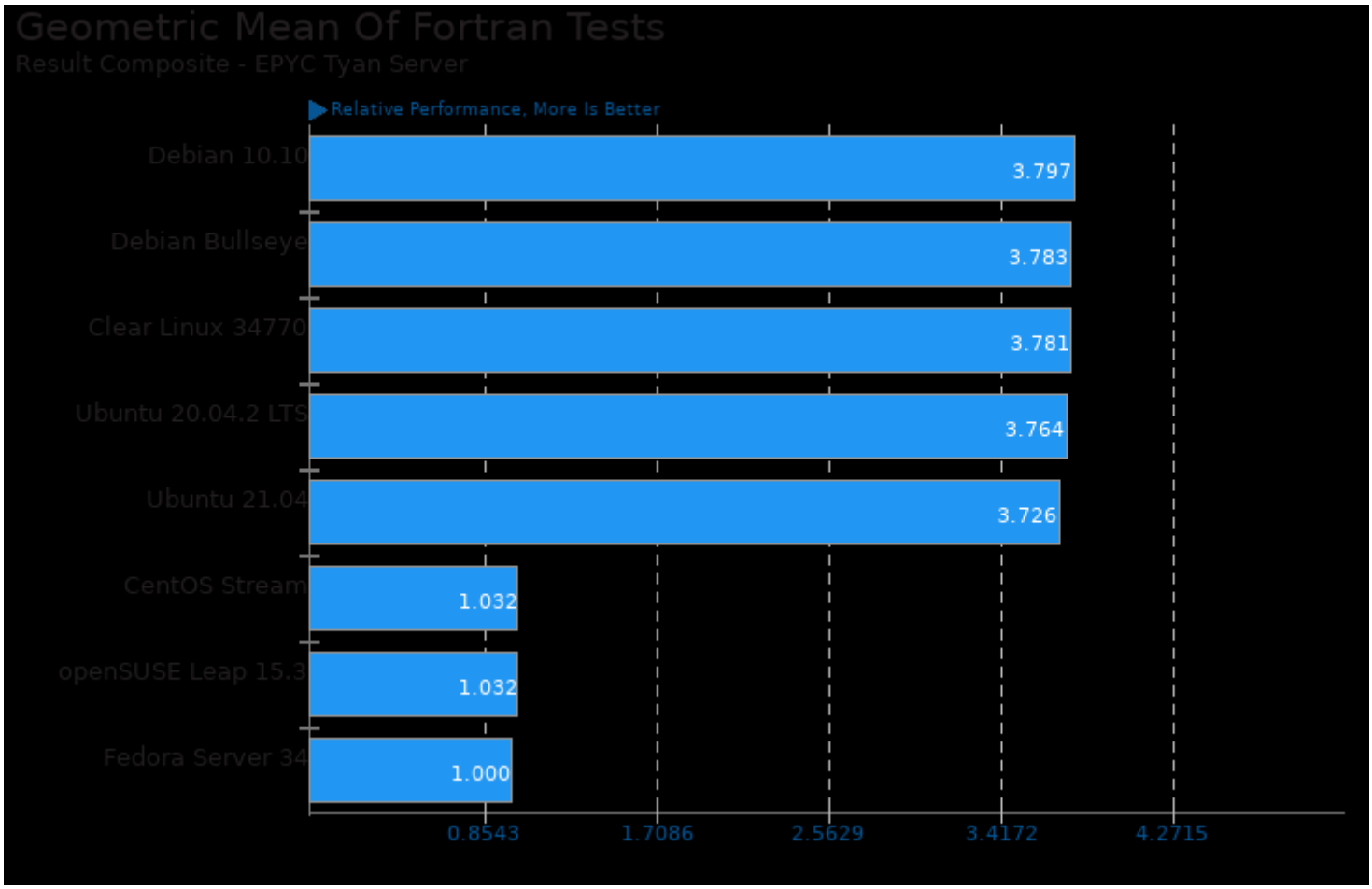

Geometric mean based upon tests: pts/brl-cad, pts/build-llvm, pts/build-linux-kernel, pts/svt-av1, pts/svt-hevc, pts/svt-vp9, pts/vpxenc, pts/hpcg, pts/namd, pts/npb, pts/numenta-nab, pts/plaidml and pts/blender



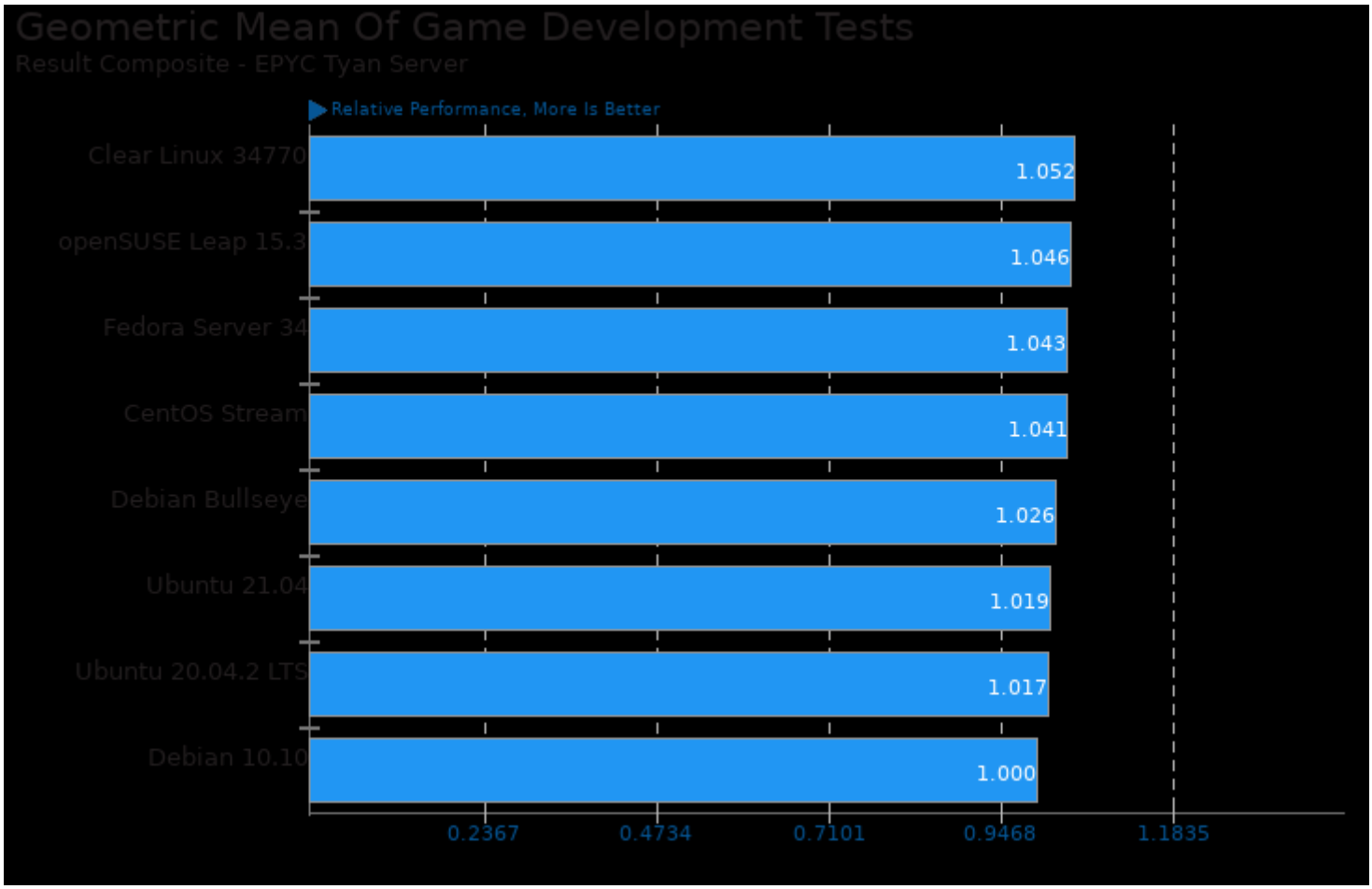

Geometric mean based upon tests: pts/ospray, pts/blender, pts/luxcorerender, pts/svt-vp9, pts/svt-hevc, pts/vpxenc, pts/svt-av1, pts/avifenc, pts/embree, pts/oidn, pts/openvkl, pts/astcenc, pts/build-godot and pts/brl-cad



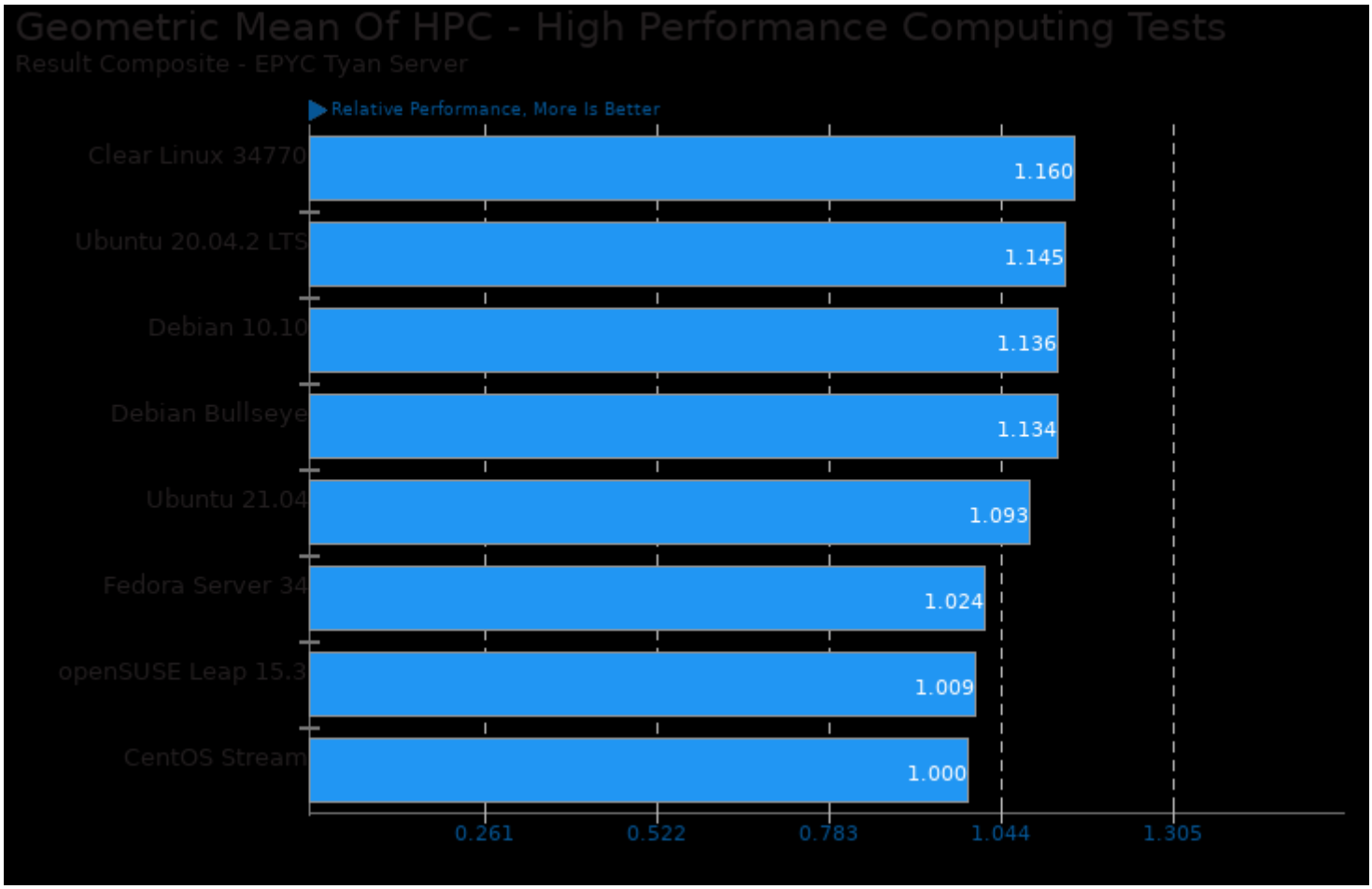

Geometric mean based upon tests: pts/svt-vp9, pts/svt-hevc, pts/vpxenc, pts/svt-av1 and pts/avifenc



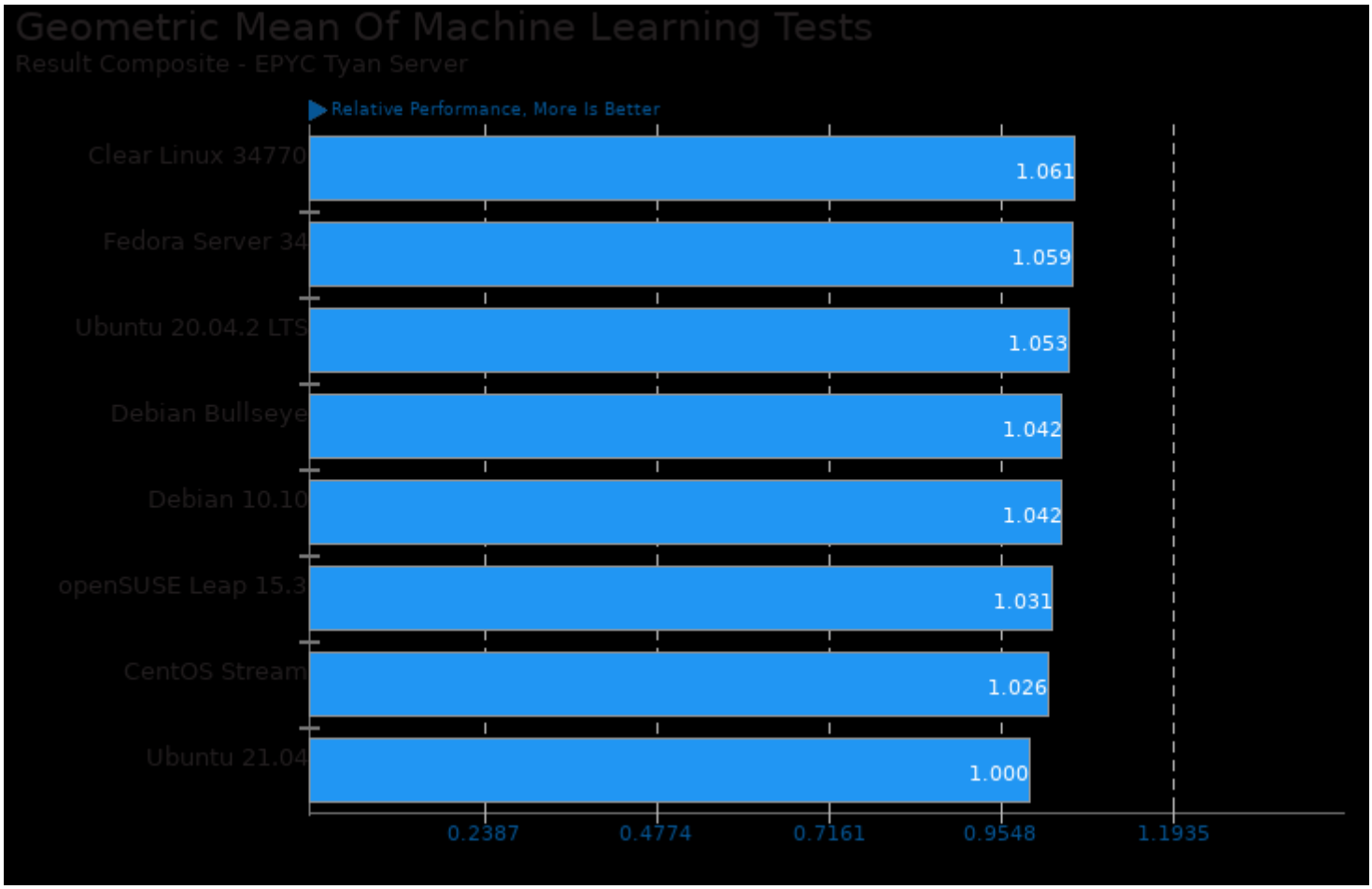

Geometric mean based upon tests: pts/hpcg, pts/npb and pts/incompact3d



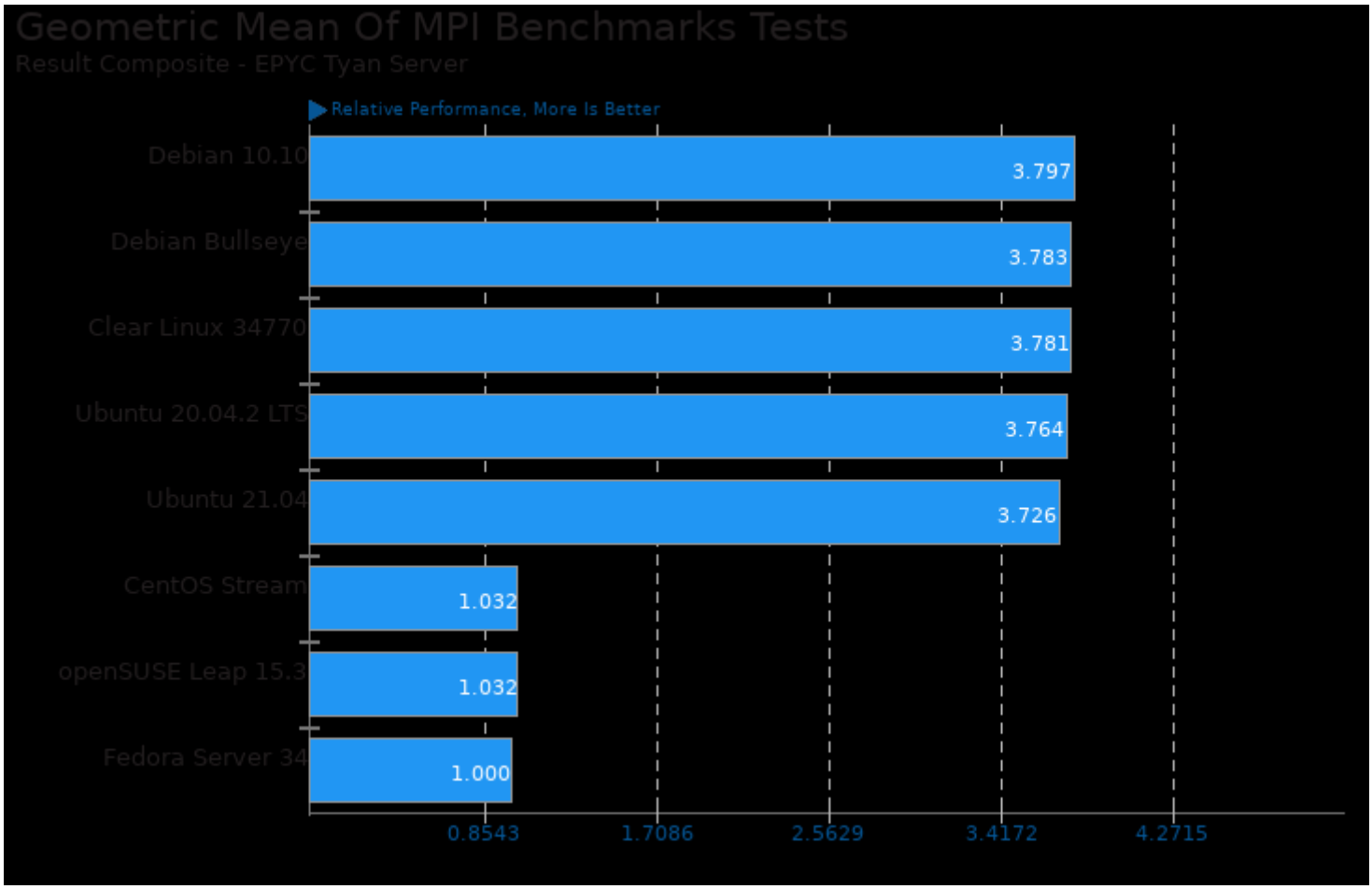

Geometric mean based upon tests: pts/astcenc, pts/build-godot, pts/blender, pts/oidn and pts/openvkl



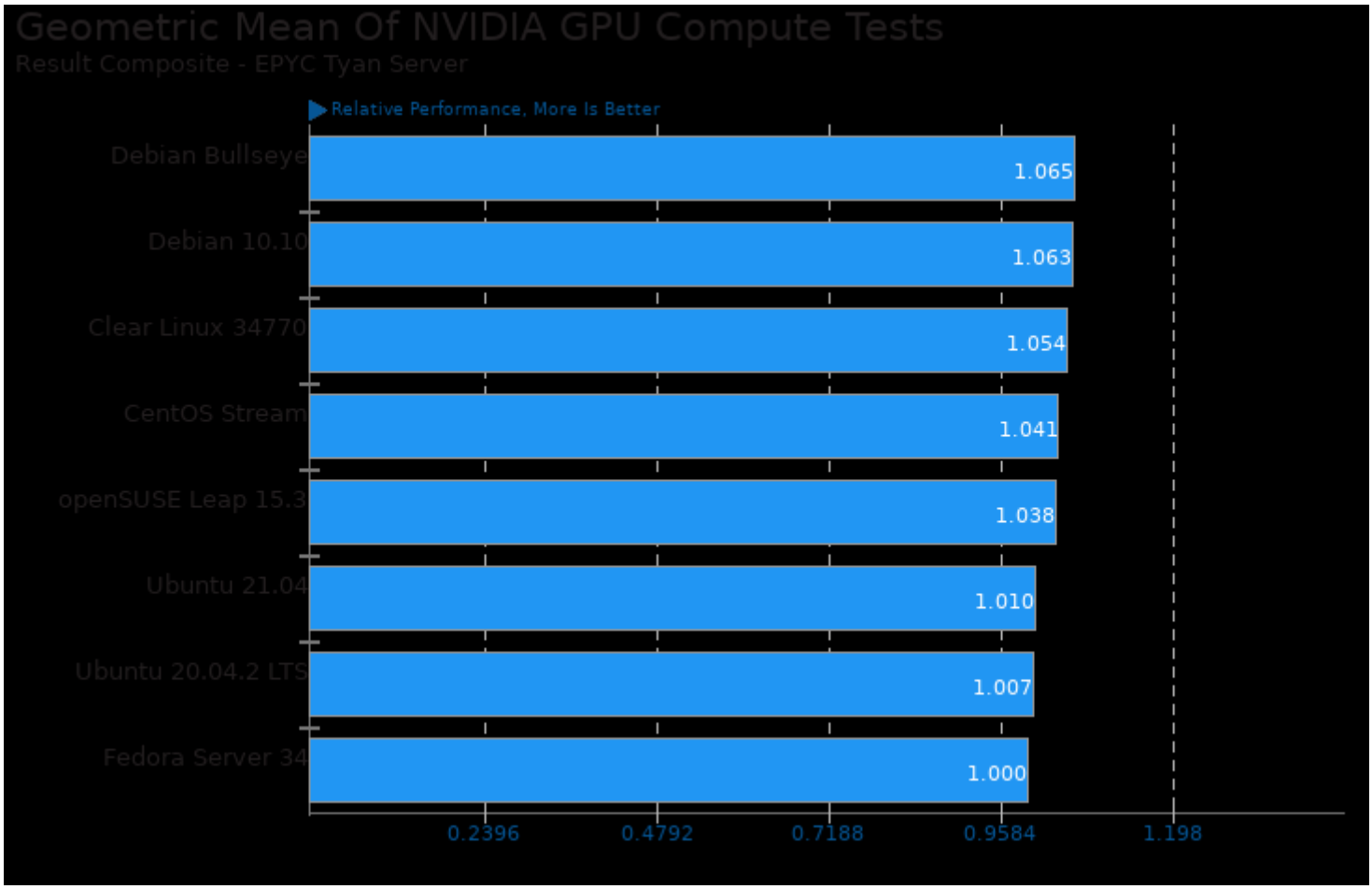

Geometric mean based upon tests: pts/npb, pts/hpcg, pts/namd, pts/gromacs, pts/minife, pts/incompact3d, pts/kripke, pts/mnn, pts/tnn, pts/numenta-nab, pts/tensorflow-lite, pts/onnx and pts/plaidml



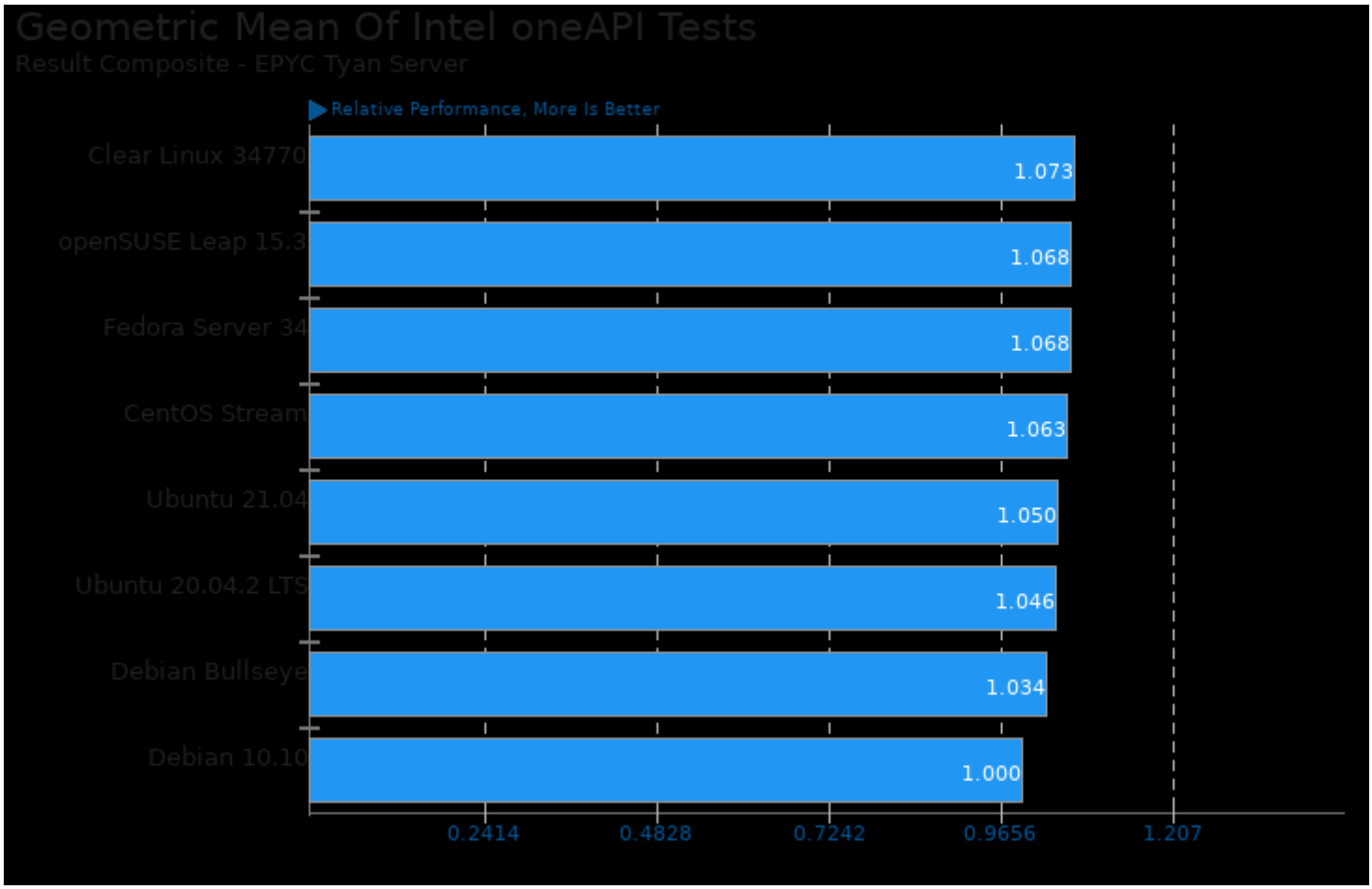

Geometric mean based upon tests: pts/mnn, pts/tnn, pts/numenta-nab, pts/tensorflow-lite, pts/onnx and pts/plaidml



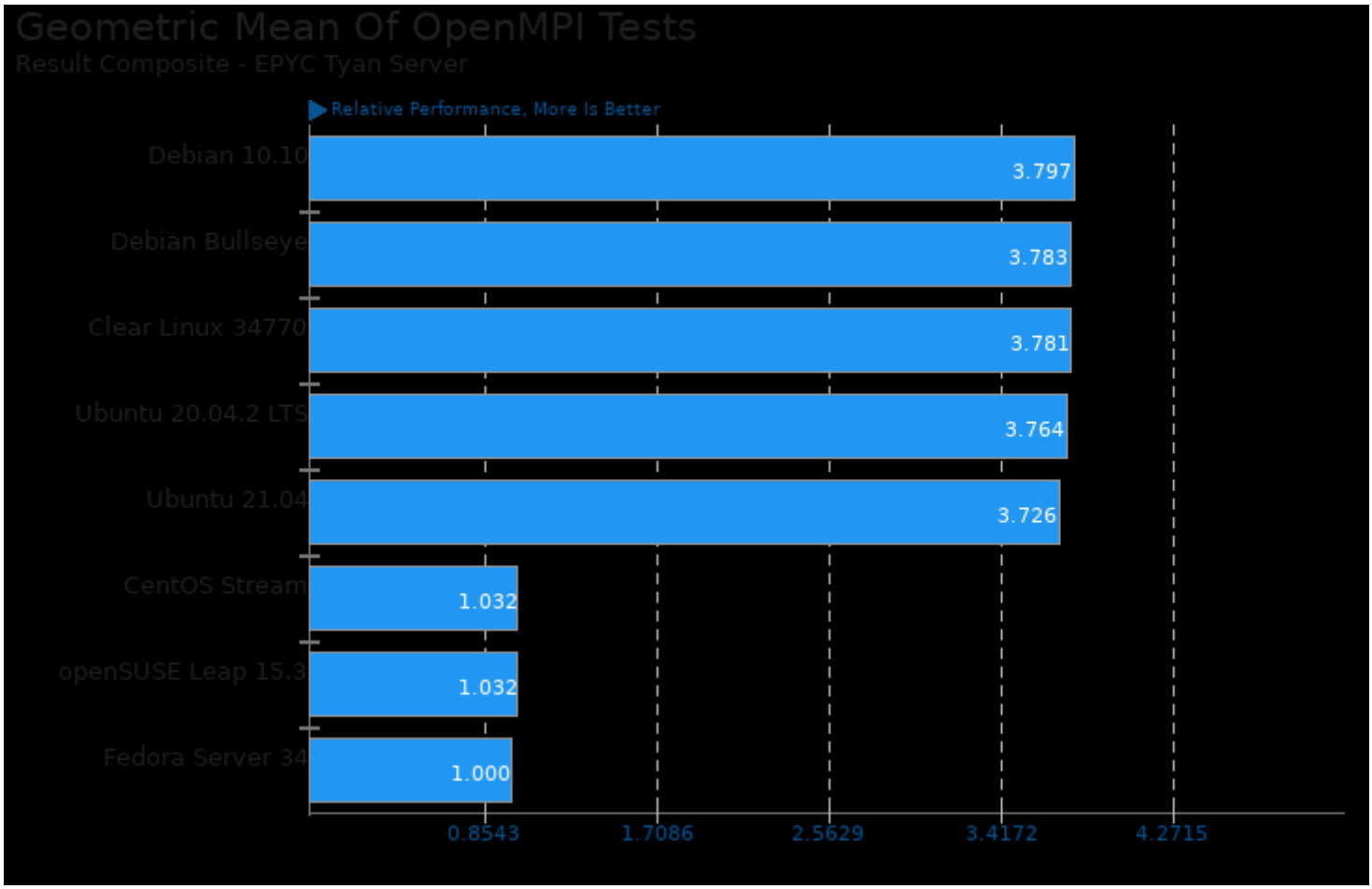

Geometric mean based upon tests: pts/incompact3d, pts/gromacs, pts/hpcg, pts/npb and pts/minife



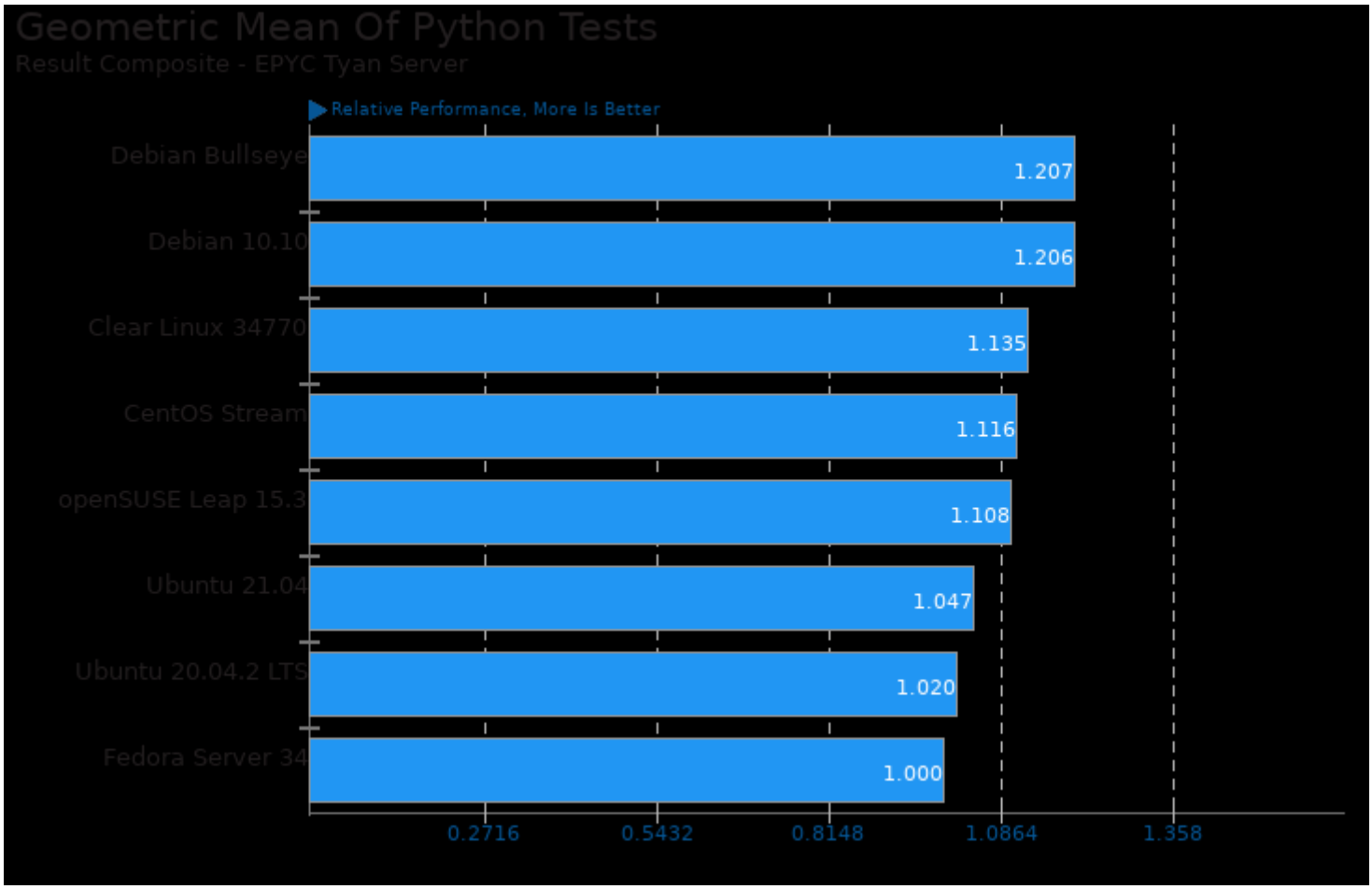

Geometric mean based upon tests: pts/gromacs, pts/luxcorerender, pts/plaidml and pts/blender



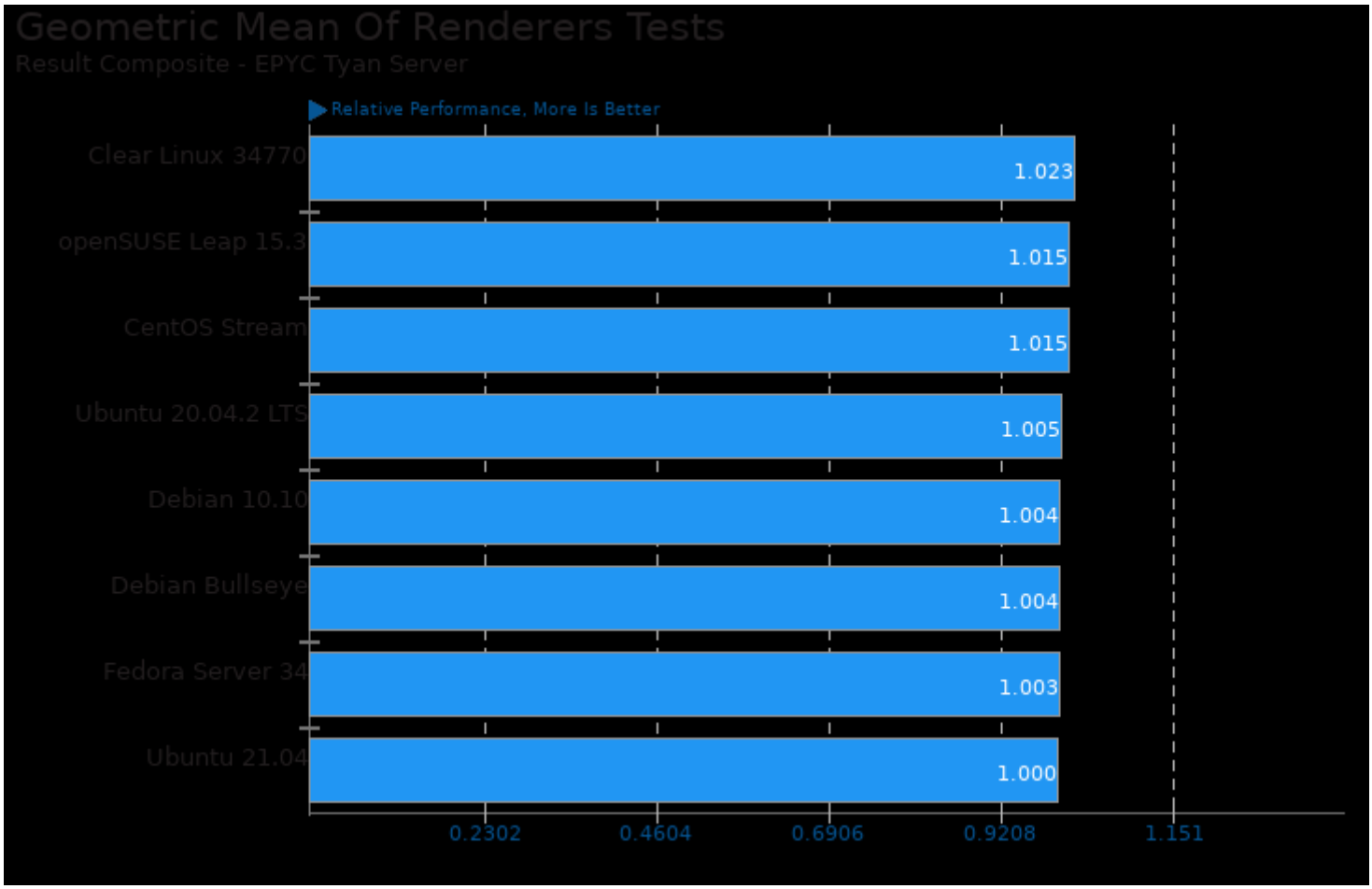

Geometric mean based upon tests: pts/embree, pts/oidn, pts/ospray and pts/openvkl



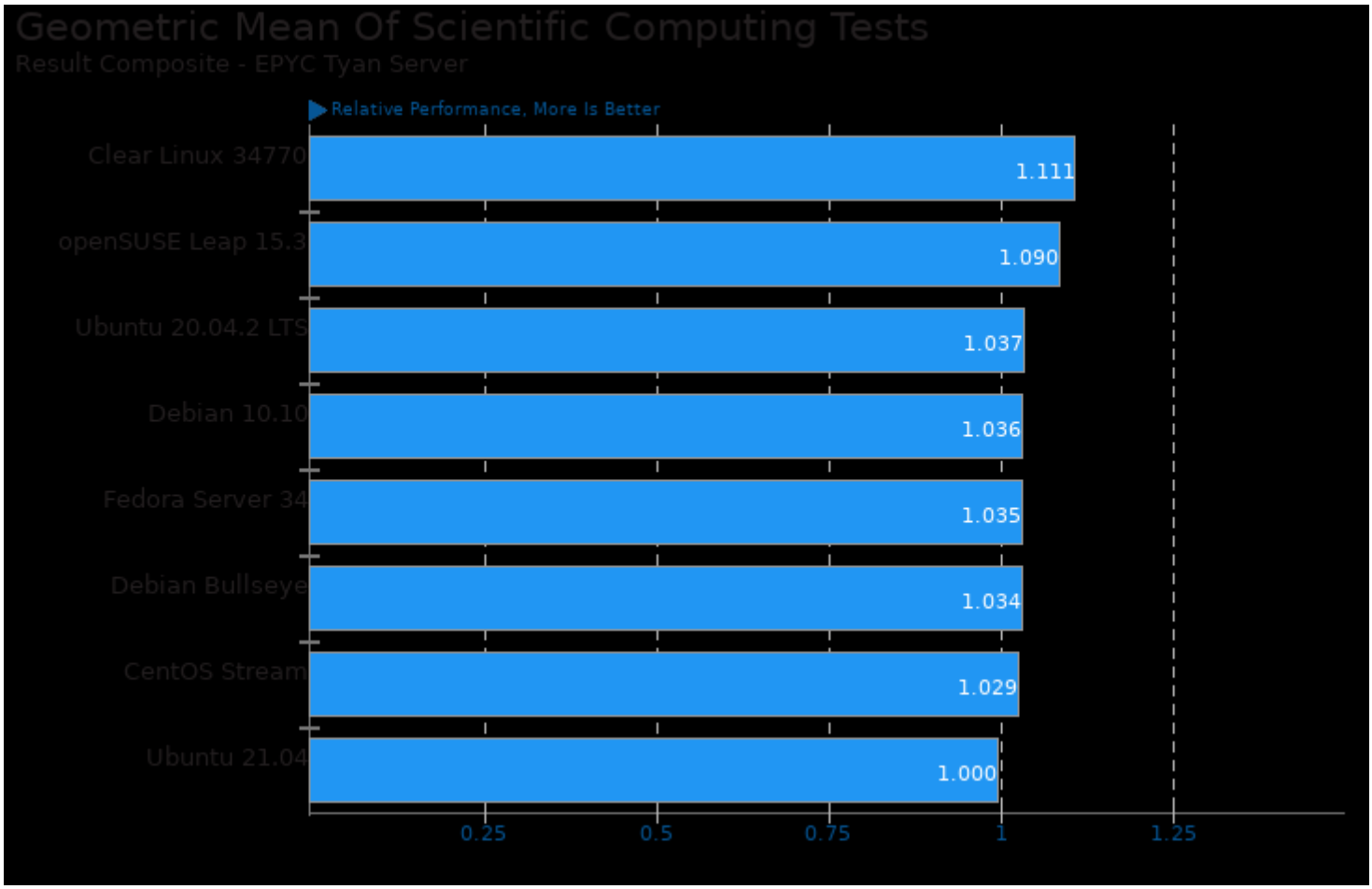

Geometric mean based upon tests: pts/hpcg, pts/npb, pts/minife, pts/incompact3d and pts/gromacs



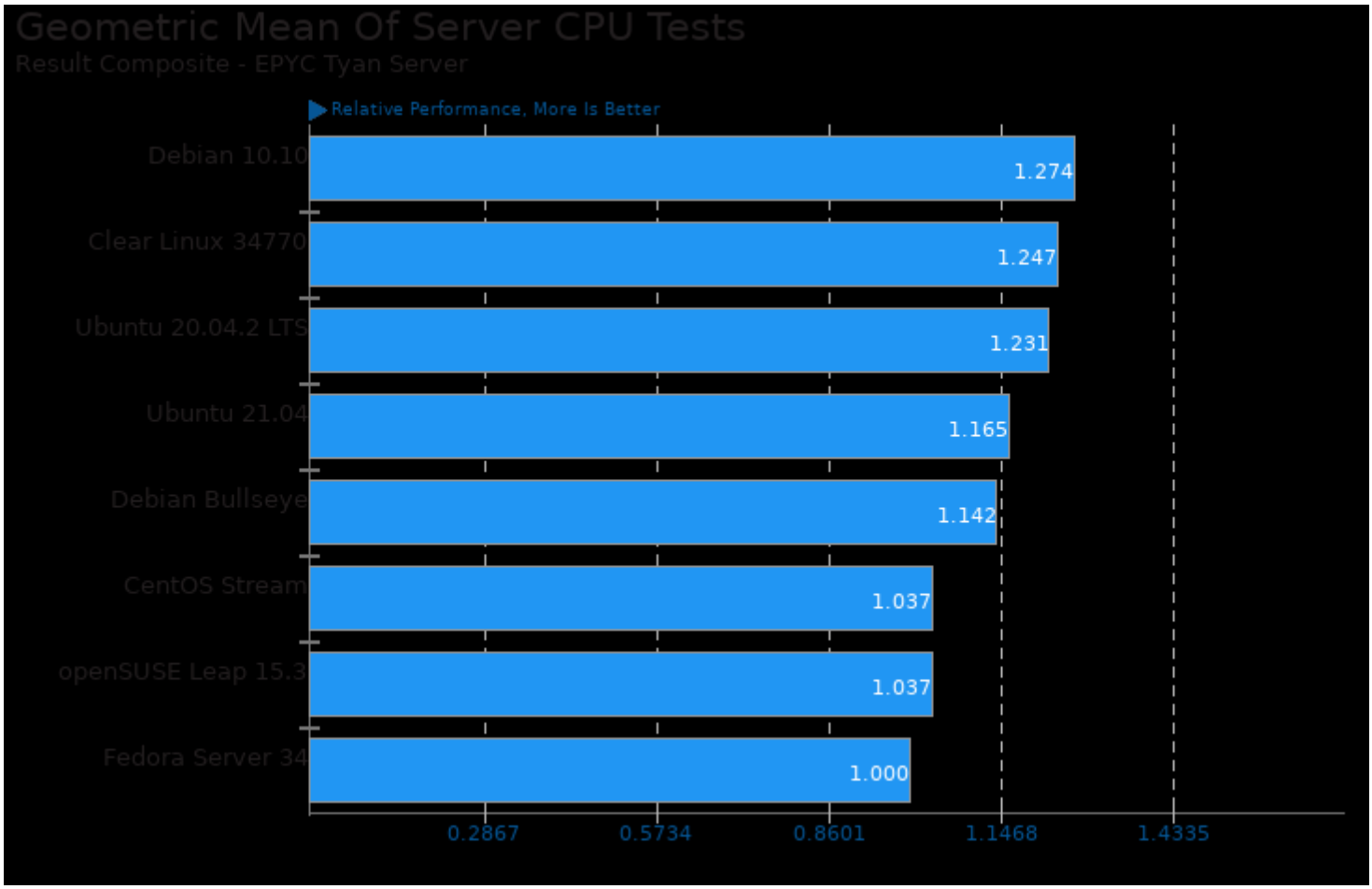

Geometric mean based upon tests: pts/build-godot, pts/build-llvm, pts/build-nodejs, pts/plaidml, pts/onnx and pts/numenta-nab



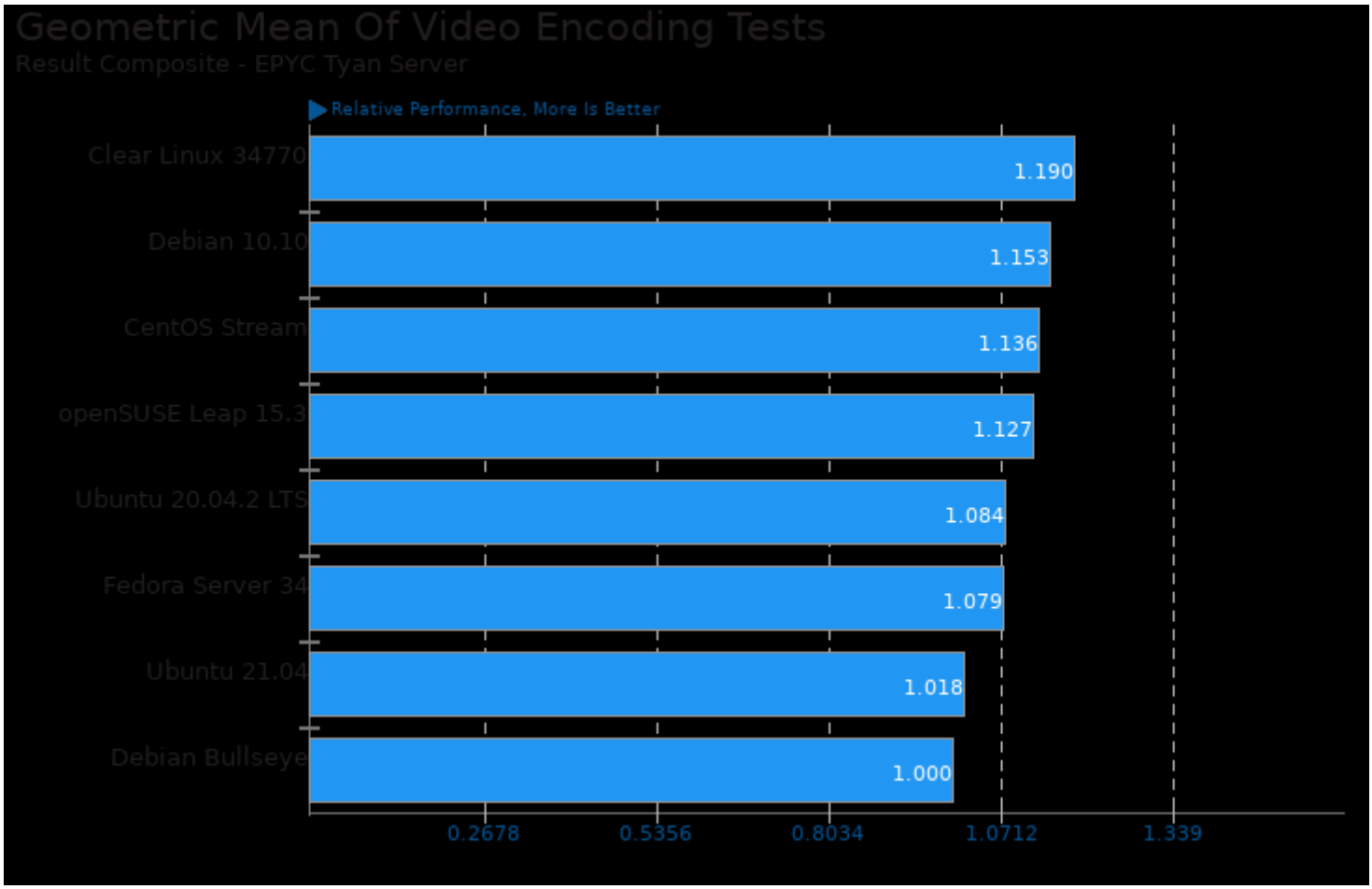

Geometric mean based upon tests: pts/ospray, pts/blender and pts/luxcorerender



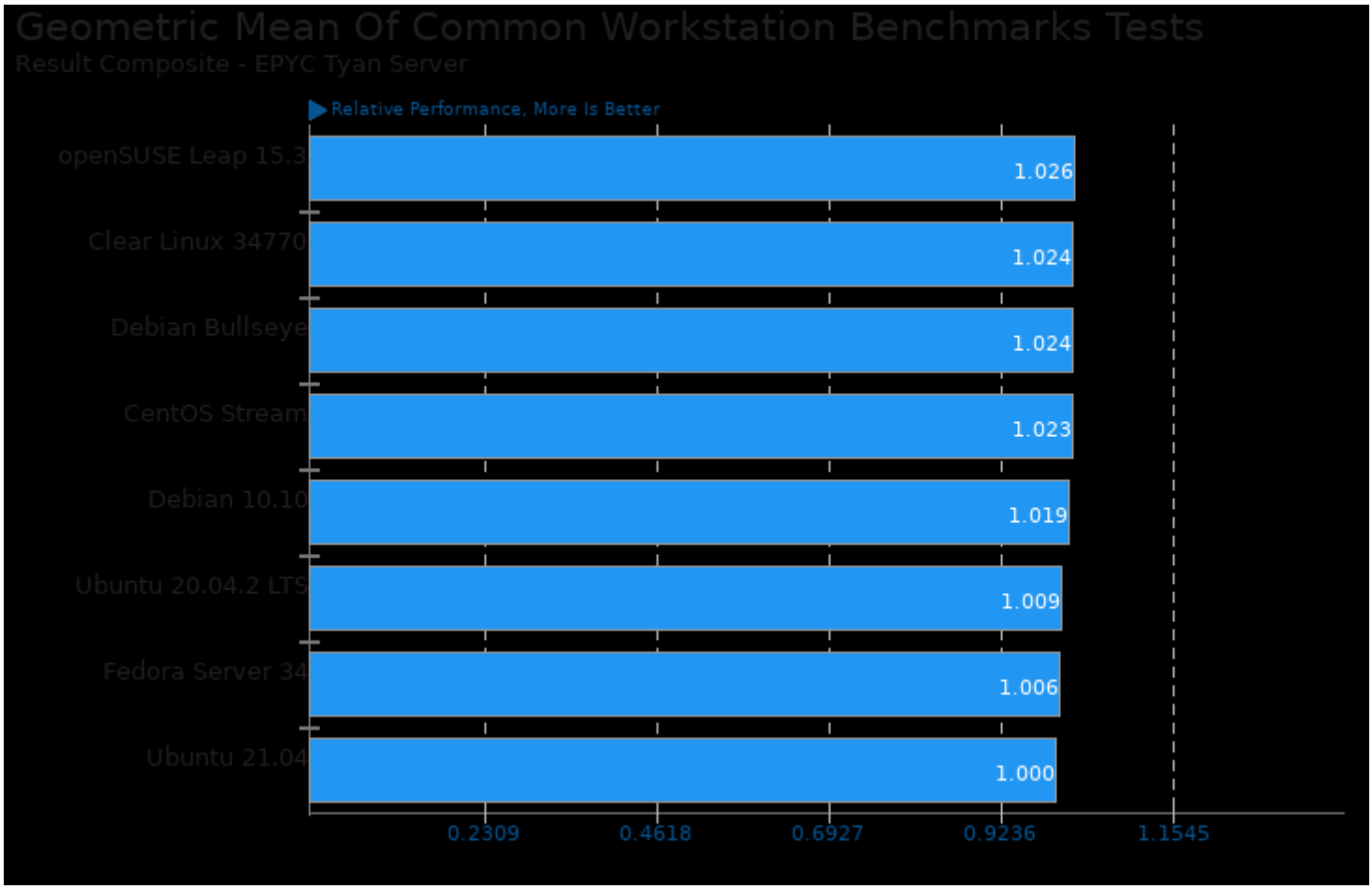

Geometric mean based upon tests: pts/namd, pts/gromacs, pts/minife, pts/incompact3d and pts/kripke




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/numenta-nab




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




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

*This file was automatically generated via the Phoronix Test Suite benchmarking software on Friday, 29 March 2024 08:31.*