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Lenovo Kernel

Intel Core i3-3110M testing with a LENOVO (78CN25WWV2.03 BIOS) and Intel HD 4000 2GB on Calculate/Linux via the Phoronix Test Suite.

Automated Executive Summary

Gentoo -miti 5.12-Stock GCC 10.2 had the most wins, coming in first place for 42% of the tests.

Test Systems:

Ubuntu 21.04 -miti GCC 10.3

Processor: Intel Core i3-3110M @ 2.40GHz (2 Cores / 4 Threads), Motherboard: LENOVO (78CN25WWV2.03 BIOS), Chipset: Intel 3rd Gen Core DRAM, Memory: 8GB, Disk: 1000GB Samsung SSD 860, Graphics: Intel HD 4000 2GB (1000MHz), Audio: Conexant CX20757, Network: Qualcomm Atheros QCA8172 + Intel Centrino-N 135

OS: Ubuntu 21.04, Kernel: 5.11.0-16-generic (x86_64), Desktop: MATE 1.24.1, Display Server: X Server 1.20.11, OpenGL: 4.2 Mesa 21.0.1, Vulkan: 1.2.145, Compiler: GCC 10.3.0 + Clang 12.0.0-1ubuntu1 + LLVM 12.0.0,

File-System: zfs, Screen Resolution: 1366x768

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,armdgn-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: intel_cpf freq performance - CPU Microcode: 0x21 - ThermalD 2.4.3
 Disk Scheduler Notes: NONE
 Python Notes: Python 3.9.4
 Security Notes: iflb_multithit: KVM: Mitigation of VMX disabled + l1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT vulnerable + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Mitigation of PTI + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + srbs: Not affected + tsx_async_abort: Not affected

ClearLinux 34600 miti GCC 11.1

Processor: Intel Core i3-3110M @ 2.40GHz (2 Cores / 4 Threads), Motherboard: LENOVO (78CN25WWV2.03 BIOS), Chipset: Intel 3rd Gen Core DRAM, Memory: 8GB, Disk: 1000GB Samsung SSD 860, Graphics: Intel HD 4000 2GB (1000MHz), Audio: Conexant CX20757, Network: Qualcomm Atheros QCA8172 + Intel Centrino-N 135

OS: Clear Linux OS 34600, Kernel: 5.12.2-1038.native (x86_64), Desktop: GNOME Shell 40.0, Display Server: X Server 1.20.11, OpenGL: 4.2 Mesa 21.1.0, Vulkan: 1.2.168, Compiler: GCC 11.1.1 20210507 releases/gcc-11.1.0-76-g3068b39d12 + Clang 11.1.0 + LLVM 11.1.0, File-System: ext4, Screen Resolution: 1366x768

Kernel Notes: Transparent Huge Pages: always
 Environment Notes: FFLAGS="-g -O3 -feliminate-unused-debug-types -pipe -Wall -Wp,-D_FORTIFY_SOURCE=2 -fexceptions -fstack-protector --param=ssp-buffer-size=32 -m64 -fasynchronous-unwind-tables -Wp,-D_REENTRANT -ffree-loop-distribute-patterns -WI,-z -WI,now -WI,-z -WI,retro -malign-data=abi -fno-semantic-interposition -ffree-vectorize -ffree-loop-vectorize -WI,--enable-new-dtags -Wa,-mbranches-within-32B-boundaries" 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 -ffree-loop-distribute-patterns -WI,-z -WI,now -WI,-z -WI,retro -fno-semantic-interposition -ffat-lto-objects -fno-trapping-math -WI,-sort-common -WI,--enable-new-dtags -mtune=skylake -Wa,-mbranches-within-32B-boundaries -fvisibility-inlines-hidden -WI,--enable-new-dtags" MESA_GLSL_CACHE_DISABLE=0 FCFLAGS="-g -O3 -feliminate-unused-debug-types -pipe -Wall -Wp,-D_FORTIFY_SOURCE=2 -fexceptions -fstack-protector --param=ssp-buffer-size=32 -m64 -fasynchronous-unwind-tables -Wp,-D_REENTRANT -ffree-loop-distribute-patterns -WI,-z -WI,now -WI,-z -WI,retro -malign-data=abi -fno-semantic-interposition -ffree-vectorize -ffree-loop-vectorize -WI,-sort-common -WI,--enable-new-dtags" CFLAGS="-g -O3 -feliminate-unused-debug-types -pipe -Wall -Wp,-D_FORTIFY_SOURCE=2 -fexceptions -fstack-protector --param=ssp-buffer-size=32 -Wformat -Wformat-security -m64 -fasynchronous-unwind-tables -Wp,-D_REENTRANT -ffree-loop-distribute-patterns -WI,-z -WI,now -WI,-z -WI,retro -fno-semantic-interposition -ffat-lto-objects -fno-trapping-math -WI,-sort-common -WI,--enable-new-dtags -mtune=skylake -Wa,-mbranches-within-32B-boundaries" THEANO_FLAGS="floatX=float32,openmp=true,gcc.cxxflags=-ffree-vectorize -mavx" Compiler Notes: --build=x86_64-generic-linux --disable-libmpx --disable-libunwind-exceptions --disable-multiarch --disable-vtable-verify --disable-werror --enable-cxa_atexit --enable-bootstrap --enable-cet --enable-clocale=gnu --enable-default-pie --enable-gnu-indirect-function --enable-languages=c,c++,fortran,go --enable-ld=default --enable-libstdcxx-pch --enable-lto --enable-multilib --enable-plugin --enable-shared --enable-threads=posix --exec-prefix=/usr --includedir=/usr/include --target=x86_64-generic-linux --with-arch=westmere --with-gcc-major-version-only --with-glibc-version=2.19 --with-gnu-ld --with-isl --with-ppl=yes --with-tune=skylake-avx512
 Processor Notes: Scaling Governor: intel_cpf freq performance - CPU Microcode: 0x21 - ThermalD 2.4.4
 Security Notes: iflb_multithit: KVM: Mitigation of VMX disabled + l1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT vulnerable + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Mitigation of PTI + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + srbs: Not affected + tsx_async_abort: Not affected

VoidLinux Musl miti GCC 10.2

pluma ./phoronix-test-suite/installed-tests/pts/mutex-1.0.0/install-failed.log

VoidLinux Musl miti GCC 10.2 v2

Processor: Intel Core i3-3110M @ 2.40GHz (2 Cores / 4 Threads), Motherboard: LENOVO (78CN25WWV2.03 BIOS), Chipset: Intel 3rd Gen Core DRAM, Memory: 8GB, Disk: 1000GB Samsung SSD 860, Graphics: Intel HD 4000 (1000MHz), Audio: Conexant CX20757, Network: Qualcomm Atheros QCA8172 + Intel Centrino-N 135

OS: VoidLinux rolling, Kernel: 5.11.21_1 (x86_64), Display Server: X Server 1.20.11, Display Driver: intel 2.99.917, Compiler: GCC 10.2.1 20201203 + Clang 11.0.0 + LLVM 11.0.0, File-System: f2fs, Screen Resolution: 1366x768

Compiler Notes: --build=x86_64-linux-musl --disable-gnu-unique-object --disable-libasanitizer --disable-libstdcxx-pch --disable-multilib --disable-nls --disable-sjlj-exceptions --disable-symvers --disable-target-liberty --disable-werror --enable-__cxa_atexit --enable-checking=release --enable-default-pie --enable-default-ssp --enable-languages=c,c++,objc,obj-c++,fortran,lto,go,ada --enable-lto --enable-plugins --enable-shared --enable-threads=posix --enable-vtable-verify --mandir=/usr/share/man --with-isl --with-linker-hash-style=gnu

Processor Notes: Scaling Governor: intel_cpfreq schedutil - CPU Microcode: 0x21

Security Notes: itlb_multihit: KVM: Mitigation of VMX disabled + l1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT vulnerable + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Mitigation of PTI + 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 generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + srbds: Not affected + tsx_async_abort: Not affected

CentOS Stream 8 -miti 4.18 GCC 8.4

Processor: Intel Core i3-3110M @ 2.40GHz (2 Cores / 4 Threads), Motherboard: LENOVO (78CN25WWV2.03 BIOS), Chipset: Intel 3rd Gen Core DRAM, Memory: 8GB, Disk: 1000GB Samsung SSD 860, Graphics: Intel HD 4000 2GB (1000MHz), Audio: Conexant CX20757, Network: Qualcomm Atheros QCA8172 + Intel Centrino-N 135

OS: CentOS Stream 8, Kernel: 4.18.0-301.1.el8.x86_64 (x86_64), Desktop: GNOME Shell 3.32.2, Display Server: X Server + Wayland, OpenGL: 4.2 Mesa 20.3.3, Compiler: GCC 8.4.1 20210423 + Clang 11.0.0 + LLVM 11.0.0, File-System: xfs, Screen Resolution: 1366x768

Kernel Notes: Transparent Huge Pages: always

Processor Notes: Scaling Governor: intel_pstate performance - CPU Microcode: 0x21

Security Notes: SELinux + itlb_multihit: KVM: Mitigation of Split huge pages + l1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT vulnerable + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Mitigation of PTI + 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 generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + srbds: Not affected + tsx_async_abort: Not affected

OpenMandriva LX 4.2 miti 5.11 Clang 11.0

Processor: Intel Core i3-3110M @ 2.40GHz (2 Cores / 4 Threads), Motherboard: LENOVO (78CN25WWV2.03 BIOS), Chipset: Intel 3rd Gen Core DRAM, Memory: 8GB, Disk: 1000GB Samsung SSD 860 + 8GB Flash Disk, Graphics: Intel HD 4000 2GB (1000MHz), Audio: Conexant CX20757, Network: Qualcomm Atheros QCA8172 + Intel Centrino-N 135

OS: OpenMandrivaLinux 4.2, Kernel: 5.11.12-desktop-1omv4002 (x86_64), Desktop: KDE Plasma 5.20.5, Display Server: X Server 1.20.10, OpenGL: 4.2 Mesa 20.3.4, Vulkan: 1.0.2, Compiler: Clang 11.0.1 + GCC 10.2.1 20201205 + LLVM 11.0.1, File-System: ext4, Screen Resolution: 1366x768

Kernel Notes: dm_mod.use_blk_mq=1 - Transparent Huge Pages: always

Compiler Notes: Optimized build with assertions; Default target: x86_64-pc-linux-gnu; Host CPU: ivybridge

Processor Notes: Scaling Governor: intel_cpfreq performance - CPU Microcode: 0x21

Security Notes: itlb_multihit: KVM: Mitigation of VMX disabled + l1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT vulnerable + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Mitigation of PTI + 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 generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + srbds: Not affected + tsx_async_abort: Not affected

Gentoo -miti 5.12-Stock GCC 10.2

Processor: Intel Core i3-3110M @ 2.40GHz (2 Cores / 4 Threads), Motherboard: LENOVO (78CN25WWV2.03 BIOS), Chipset: Intel 3rd Gen Core DRAM, Memory: 8GB, Disk: 1000GB Samsung SSD 860, Graphics: Intel 3rd Gen Core (1000MHz), Audio: Conexant CX20757, Network: Qualcomm Atheros QCA8172 + Intel Centrino-N 135

OS: Gentoo/Linux, Kernel: 5.12.8-gentoo-dist (x86_64), Desktop: MATE 1.24.0, Display Server: X Server 1.20.11, Compiler: GCC 10.2.0 + Clang 11.1.0 + LLVM 11.1.0, File-System: btrfs, Screen Resolution: 1366x768

Kernel Notes: Transparent Huge Pages: madvise

Processor Notes: Scaling Governor: intel_cpfreq performance - CPU Microcode: 0x21

Security Notes: itlb_multihit: KVM: Mitigation of VMX disabled + l1tf: Mitigation of PTE Inversion; VMX: vulnerable + mds: Vulnerable; SMT vulnerable + meltdown: Vulnerable + spec_store_bypass: Vulnerable + spectre_v1: Vulnerable: __user pointer sanitization and usercopy barriers only; no swapgs barriers + spectre_v2: Vulnerable IBPB: disabled STIBP: disabled + srbds: Not affected + tsx_async_abort: Not affected

Ubuntu 21.04 -miti 5.12 GCC 11.1

Processor: Intel Core i3-3110M @ 2.40GHz (2 Cores / 4 Threads), Motherboard: LENOVO (78CN25WWV2.03 BIOS), Chipset: Intel 3rd Gen Core DRAM, Memory: 8GB, Disk: 1000GB Samsung SSD 860, Graphics: Intel HD 4000 2GB (1000MHz), Audio: Conexant CX20757, Network: Qualcomm Atheros QCA8172 + Intel Centrino-N 135

OS: Ubuntu 21.04, Kernel: 5.12.8-051208-generic (x86_64), Desktop: MATE 1.24.1, Display Server: X Server 1.20.11, OpenGL: 4.2 Mesa 21.0.1, Vulkan: 1.2.145, Compiler: GCC 11.1.0 + Clang 12.0.0-1ubuntu1 + LLVM 12.0.0, File-System: btrfs, Screen Resolution: 1366x768

Kernel Notes: Transparent Huge Pages: madvise
 Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-bootstrap --enable-cet --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-serialization=2 --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc-auto --enable-offload-targets=nvptx-none=/build/gcc-11-RPS7jb/gcc-11-11.1.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-11-RPS7jb/gcc-11-11.1.0/debian/tmp-gcn/usr --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-ldo-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: intel_cpufreq performance - CPU Microcode: 0x21 - ThermalD 2.4.3

Security Notes: itlb_multihit: KVM: Mitigation of VMX disabled + l1tf: Mitigation of PTE Inversion; VMX: vulnerable + mds: Vulnerable; SMT vulnerable + meltdown: Vulnerable + spec_store_bypass: Vulnerable + spectre_v1: Vulnerable: __user pointer sanitization and usercopy barriers only; no swapgs barriers + spectre_v2: Vulnerable IBPB: disabled STIBP: disabled + srbs: Not affected + tsx_async_abort: Not affected

Calculate -miti 5.10 GCC 10.2

Processor: Intel Core i3-3110M @ 2.40GHz (2 Cores / 4 Threads), Motherboard: LENOVO (78CN25WWV2.03 BIOS), Chipset: Intel 3rd Gen Core DRAM, Memory: 8GB, Disk: 1000GB Samsung SSD 860, Graphics: Intel HD 4000 2GB (1000MHz), Audio: Conexant CX20757, Network: Qualcomm Atheros QCA8172 + Intel Centrino-N 135

OS: Calculate/Linux, Kernel: 5.10.32-calculate (x86_64), Desktop: MATE 1.24.1, Display Server: X Server 1.20.11, OpenGL: 4.2 Mesa 21.0.3, Compiler: GCC 10.2.0 + Clang 11.1.0 + LLVM 11.1.0, File-System: btrfs, Screen Resolution: 1366x768

Processor Notes: Scaling Governor: intel_cpufreq performance - CPU Microcode: 0x15

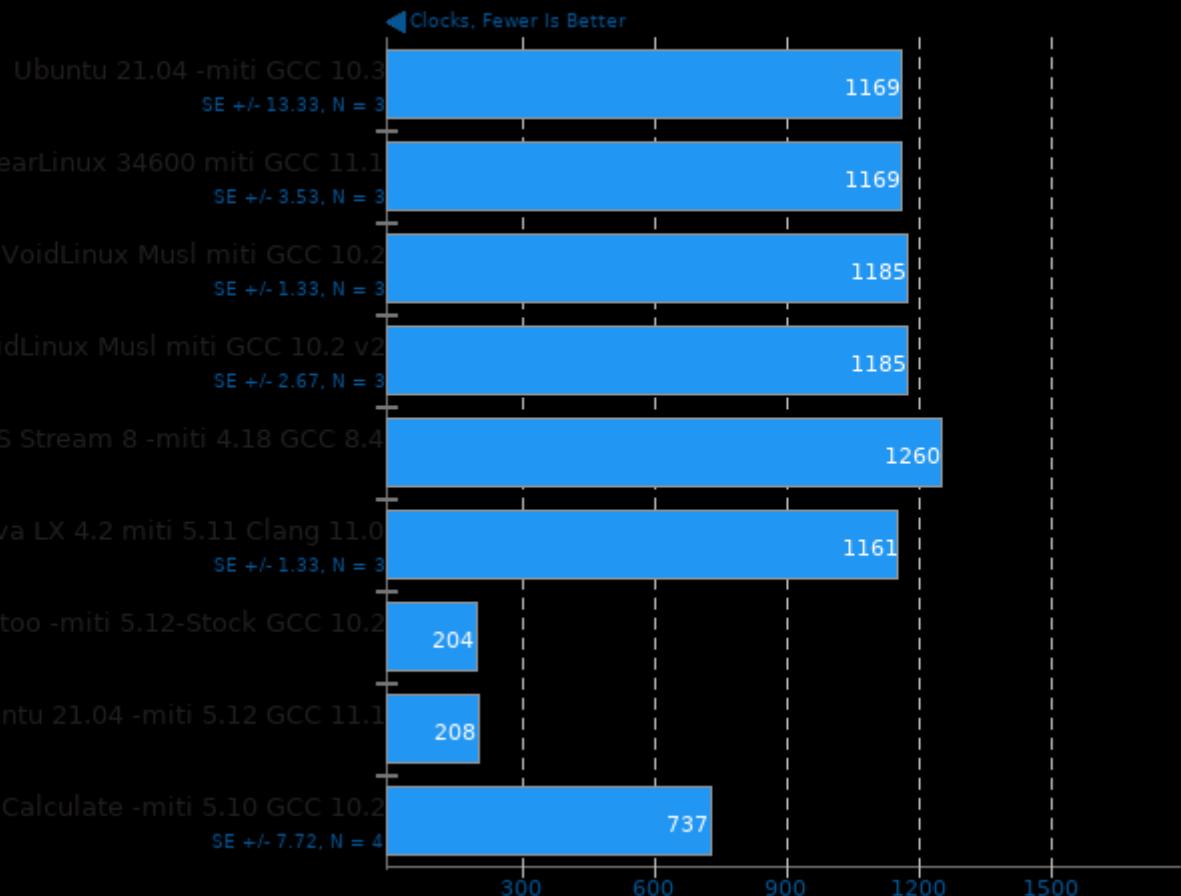
Security Notes: itlb_multihit: KVM: Mitigation of VMX disabled + l1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT vulnerable + mds: Vulnerable; Clear buffers attempted no microcode; SMT vulnerable + meltdown: Mitigation of PTI + spec_store_bypass: Vulnerable + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline STIBP: disabled RSB filling + srbs: Not affected + tsx_async_abort: Not affected

	Ubuntu 21.04 -miti	ClearLin 11.1 -miti	VoidLinu 10.2 -miti	pluma /phroni	VoidLinu 10.2 v2 miti	CentOS 8.4 -miti	OpenMa 5.11 -miti	Gentoo 5.12-Sto ck	Ubuntu 21.04 -miti	Calculate 5.10 GCC 10.2
ctx_clock - C.S.T (Clocks)	1169	1169	1185		1185	1260	1161	204	208	737
Normalized	17.45%	17.45%	17.22%		17.22%	16.19%	17.57%	100%	98.08%	27.68%
Standard Deviation	2%	0.5%	0.2%		0.4%	0.2%				2.1%
Hackbench - 4 - Process (sec)	118.984	93.072	90.676		92.796	102.619	101.183	50.796	77.051	59.047
Normalized	42.69%	54.58%	56.02%		54.74%	49.5%	50.2%	100%	65.93%	86.03%
Standard Deviation	0.7%	0.3%	0.5%		0.6%	0.5%	0.7%	0.4%	1.2%	0.7%

t-test1 - 2 (sec)	11.986	11.872	11.308	11.508	12.252	5.771	10.049	10.283	10.831
Normalized	48.15%	48.61%	51.03%	50.15%	47.1%	100%	57.43%	56.12%	53.28%
Standard Deviation	0.1%	0.6%	6.2%	5.2%	0%	0.5%	0.1%	0.4%	0.3%
Schbench - 4 - 4	40512	38640	40427	38848	50027	38336	40188	41690	38592
(usec, 99.9th Latency Percentile)									
Normalized	94.63%	99.21%	94.83%	98.68%	76.63%	100%	95.39%	91.95%	99.34%
Standard Deviation	1.6%	2.5%	2.4%	1.8%	1.9%	1.2%	2.5%	3.3%	0.6%
Facebook RocksDB	5618169			5870988	5555113		6155242		6177988
- Rand Read (Op/s)									
Normalized	90.94%			95.03%	89.92%		99.63%		100%
Standard Deviation	0.5%			1.6%	0.1%		0.2%		0.1%
MBW - Memory	7056	6658	6464	6480	6939	6556	7024	6991	6995
Copy - 1024 MiB (MiB/s)									
Normalized	100%	94.36%	91.6%	91.83%	98.35%	92.92%	99.54%	99.08%	99.14%
Standard Deviation	0.5%	1.5%	0.6%	0.2%	0.3%	0.2%	0%	0.9%	0.4%
BenchmarkMutex -	40.4				40.1		38.0	39.9	38.2
M.L.U.s.m (ns)									
Normalized	94.06%				94.76%		100%	95.24%	99.48%
Standard Deviation	0.4%				2.5%		0.2%	0.1%	2.9%

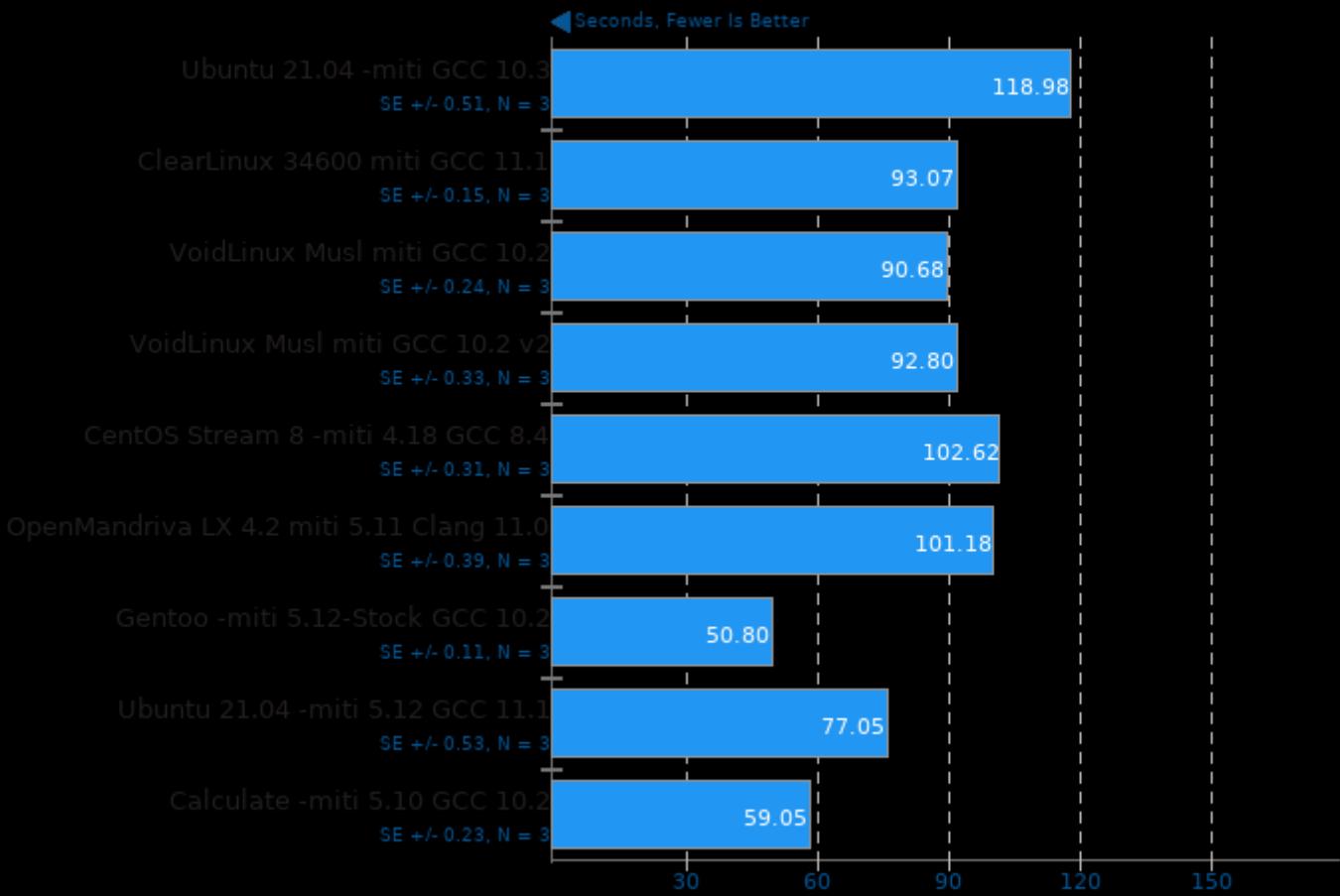
ctx_clock

Context Switch Time



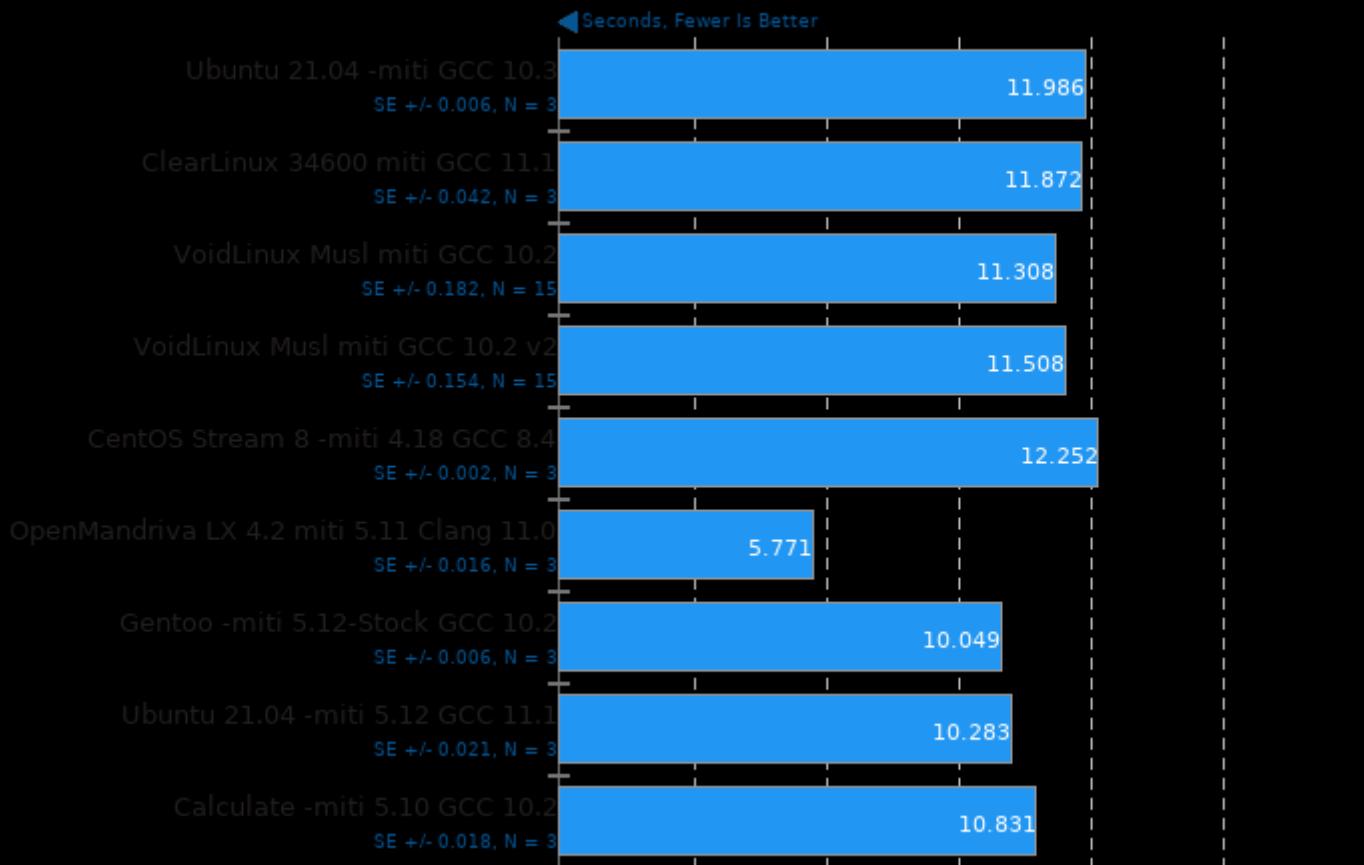
Hackbench

Count: 4 - Type: Process



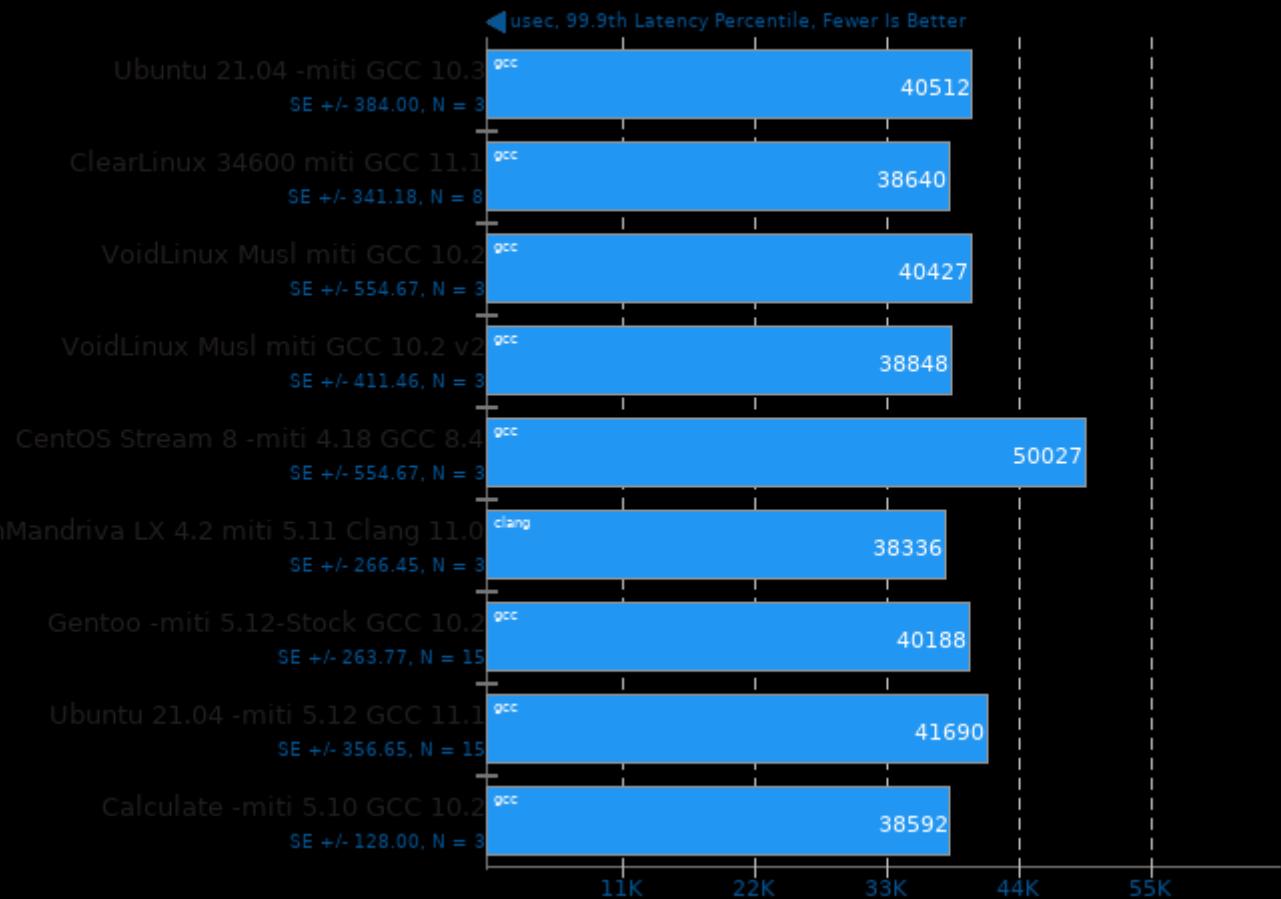
t-test1 2017-01-13

Threads: 2



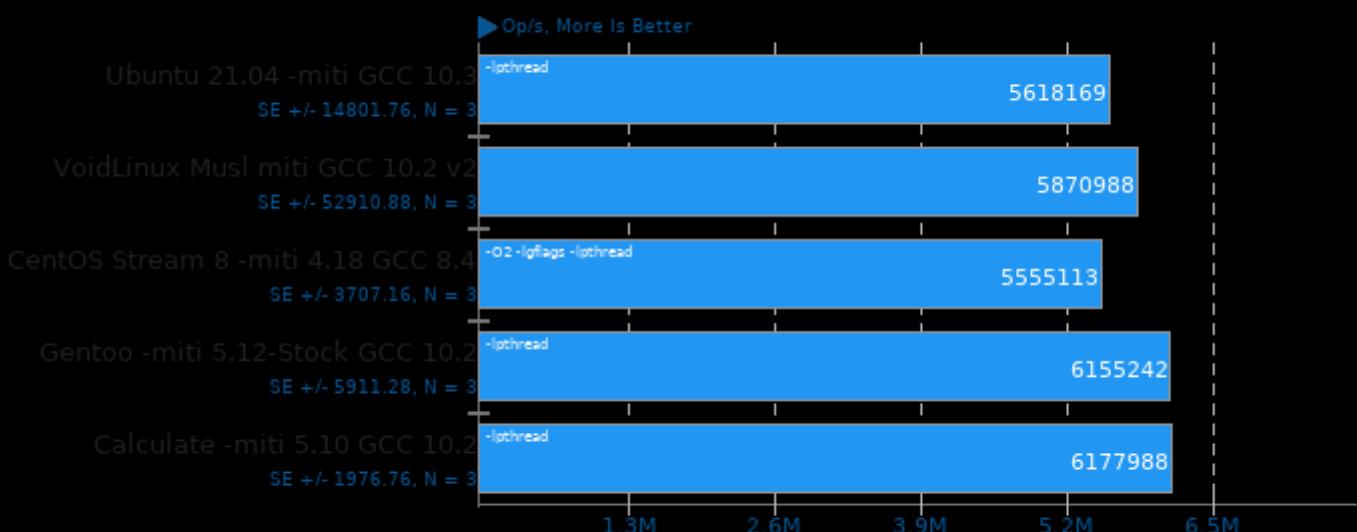
Schbench

Message Threads: 4 - Workers Per Message Thread: 4



Facebook RocksDB 6.3.6

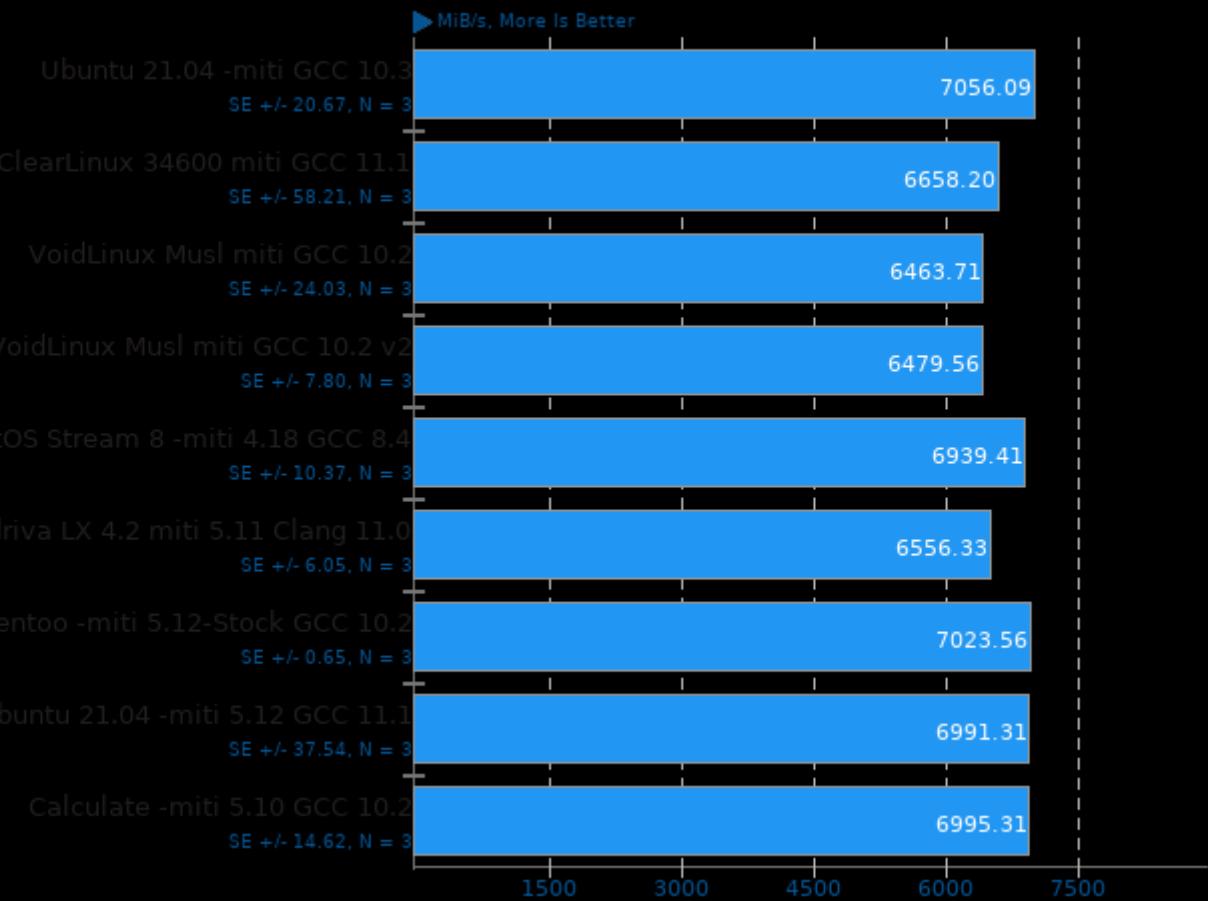
Test: Random Read



1. (CXX) g++ options: -O3 -march=native -std=c++11 -fno-built-in-memcmp -fno-rtti -rdynamic

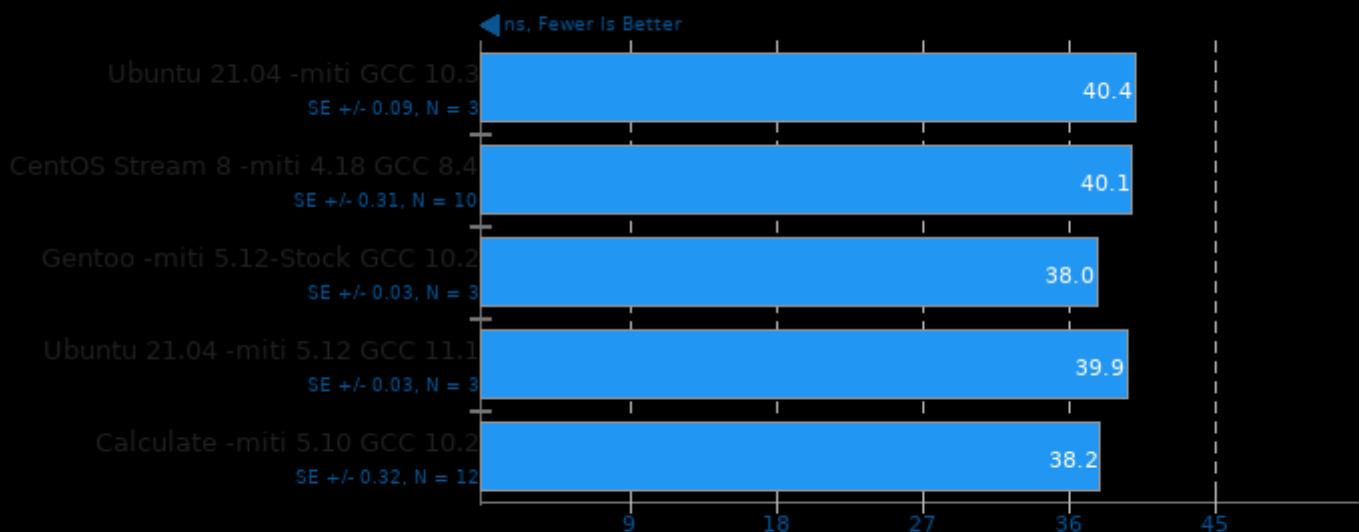
MBW 2018-09-08

Test: Memory Copy - Array Size: 1024 MiB



BenchmarkMutex

Benchmark: Mutex Lock Unlock std::mutex



1. (CXX) g++ options: -std=c++17 -lbenchmark -pthread

This file was automatically generated via the Phoronix Test Suite benchmarking software on Thursday, 28 March 2024 14:17.