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Lenovo Flex 5 AMD Ryzen 5 45ooU

Intel Core i5 4300U testing on Lenovo X240

Automated Executive Summary

Core i7 9750H had the most wins, coming in first place for 48% of the tests.

Based on the geometric mean of all complete results, the fastest (Core i7 9750H) was 3.672x the speed of the slowest (Core i5 4300U).

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

OSPray (Demo: Magnetic Reconnection - Renderer: Path Tracer) at 6.211x
Intel Open Image Denoise (Scene: Memorial) at 5.949x
LAMMPS Molecular Dynamics Simulator (Model: Rhodopsin Protein) at 4.849x
POV-Ray (Trace Time) at 4.575x
GROMACS (Water Benchmark) at 4.44x
NAMD (ATPase Simulation - 327,506 Atoms) at 4.389x
Timed MPlayer Compilation (Time To Compile) at 4.322x
OSPray (Demo: NASA Streamlines - Renderer: SciVis) at 4.249x
Tungsten Renderer (Scene: Hair) at 4.143x
Embree (Binary: Pathtracer - Model: Crown) at 4.108x.

Test Systems:

Core i5 5300U

Processor: Intel Core i5-5300U @ 2.90GHz (2 Cores / 4 Threads), Motherboard: HP 2216 (M71 Ver. 01.27 BIOS), Chipset: Intel Broadwell-U-OPI, Memory: 8GB, Disk: 256GB MTFDDAK256MAM-1K, Graphics: Intel HD 5500 (900MHz), Audio: Intel Broadwell-U Audio, Network: Intel I218-LM + Intel 7265

OS: Ubuntu 20.04, Kernel: 5.4.0-33-generic (x86_64), Desktop: GNOME Shell 3.36.1, Display Server: X Server 1.20.8, Display Driver: modesetting 1.20.8, OpenGL: 4.6 Mesa 20.0.4, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 1366x768

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0x2e
Java Notes: OpenJDK Runtime Environment (build 11.0.7+10-post-Ubuntu-3ubuntu1)
Python Notes: Python 3.8.2
Security Notes: 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 + tsx_async_abort: Mitigation of Clear buffers; SMT vulnerable

Core i7 5600U

Processor: Intel Core i7-5600U @ 3.20GHz (2 Cores / 4 Threads), Motherboard: LENOVO 20BSCTO1WW (N14ET49W 1.27 BIOS), Chipset: Intel Broadwell-U-OPI, Memory: 8GB, Disk: 128GB SAMSUNG MZNTE128, Graphics: Intel HD 5500 3GB (950MHz), Audio: Intel Broadwell-U Audio, Network: Intel I218-LM + Intel 7265

OS: Ubuntu 20.04, Kernel: 5.4.0-33-generic (x86_64), Desktop: GNOME Shell 3.36.1, Display Server: X Server 1.20.8, Display Driver: modesetting 1.20.8, OpenGL: 4.6 Mesa 20.0.4, OpenCL: OpenCL 2.1, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0x2e
Java Notes: OpenJDK Runtime Environment (build 11.0.7+10-post-Ubuntu-3ubuntu1)
Python Notes: Python 3.8.2
Security Notes: 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 + tsx_async_abort: Mitigation of Clear buffers; SMT vulnerable

Core i5 8265U

Processor: Intel Core i5-8265U @ 3.90GHz (4 Cores / 8 Threads), Motherboard: Raticate_WL (V1.09 BIOS), Chipset: Intel Cannon Point-LP, Memory: 8GB, Disk: 256GB Micron_1100_MTFD, Graphics: Intel UHD 620 3GB (1100MHz), Audio: Realtek ALC255, Network: Realtek RTL8111/8168/8411 + Intel Cannon Point-LP CNVi

OS: Ubuntu 20.04, Kernel: 5.4.0-33-generic (x86_64), Desktop: GNOME Shell 3.36.2, Display Server: X Server 1.20.8, Display Driver: modesetting 1.20.8, OpenGL: 4.6 Mesa 20.0.4, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch

--enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0xca
Java Notes: OpenJDK Runtime Environment (build 11.0.7+10-post-Ubuntu-3ubuntu1)
Python Notes: Python 3.8.2
Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + l1tf: Not affected + mds: Mitigation of Clear buffers; SMT vulnerable + 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 generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + tsx_async_abort: Not affected

Core i7 6700HQ

Processor: Intel Core i7-6700HQ @ 3.50GHz (4 Cores / 8 Threads), Motherboard: Apple Mac-A5C67F76ED83108C (265.0.0.0.0 BIOS), Chipset: Intel Xeon E3-1200 v5/E3-1500, Memory: 16GB, Disk: 251GB APPLE SSD SM0256L, Graphics: AMD Radeon RX 460/560D / Pro 450/455/460/555/555X/560/560X 2GB (800/1270MHz), Audio: Cirrus Logic Generic, Monitor: Color LCD, Network: Broadcom BCM43602 802.11ac LAN SoC

OS: Ubuntu 20.04, Kernel: 5.4.0-33-generic (x86_64), Desktop: GNOME Shell 3.36.2, Display Server: X Server 1.20.8, Display Driver: amdgpu 19.1.0, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 2880x1800

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0xd6
Java Notes: OpenJDK Runtime Environment (build 11.0.7+10-post-Ubuntu-3ubuntu1)
Python Notes: Python 3.8.2
Security Notes: 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 + tsx_async_abort: Mitigation of Clear buffers; SMT vulnerable

Core i7 8550U

Processor: Intel Core i7-8550U @ 4.00GHz (4 Cores / 8 Threads), Motherboard: Dell 0H0VG3 (1.10.0 BIOS), Chipset: Intel Xeon E3-1200 v6/7th, Memory: 8GB, Disk: PM961 NVMe SAMSUNG 256GB, Graphics: Intel UHD 620 3GB (1150MHz), Audio: Realtek ALC3271, Network: Qualcomm Atheros QCA6174 802.11ac

OS: Ubuntu 20.04, Kernel: 5.4.0-29-generic (x86_64), Desktop: GNOME Shell 3.36.1, Display Server: X Server 1.20.8, Display Driver: modesetting 1.20.8, OpenGL: 4.6 Mesa 20.0.4, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Disk Notes: NONE / errors=remount-ro,relatime,rw
Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0xca
Python Notes: + Python 3.8.2
Security Notes: 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 + tsx_async_abort: Not affected

Core i7 8565U

Processor: Intel Core i7-8565U @ 4.60GHz (4 Cores / 8 Threads), Motherboard: Dell 0KTW76 (1.0.0 BIOS), Chipset: Intel Cannon Point-LP, Memory: 16GB, Disk: PC401 NVMe SK hynix 256GB, Graphics: Intel UHD 620 3GB (1150MHz), Audio: Realtek ALC3271, Network: Qualcomm Atheros QCA6174 802.11ac

OS: Ubuntu 20.04, Kernel: 5.4.0-31-generic (x86_64), Desktop: GNOME Shell 3.36.1, Display Server: X Server 1.20.8,

Display Driver: modesetting 1.20.8, OpenGL: 4.6 Mesa 20.0.4, OpenCL: OpenCL 2.1, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0xca
Python Notes: Python 3.8.2
Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + l1tf: Not affected + mds: Mitigation of Clear buffers; SMT vulnerable + 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 generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + tsx_async_abort: Not affected

Core i7 9750H

Processor: Intel Core i7-9750H @ 4.50GHz (6 Cores / 12 Threads), Motherboard: Notebook P95_96_97Ex Rx (1.07.13MIN29 BIOS), Chipset: Intel Cannon Lake PCH, Memory: 32GB, Disk: 1000GB Samsung SSD 970 EVO Plus 1TB, Graphics: Intel UHD 630 3GB (1150MHz), Audio: Realtek ALC1220, Network: Realtek RTL8111/8168/8411 + Intel-AC 9560

OS: Ubuntu 20.04, Kernel: 5.4.0-33-generic (x86_64), Desktop: GNOME Shell 3.36.1, Display Server: X Server 1.20.8, Display Driver: modesetting 1.20.8, OpenGL: 4.6 Mesa 20.0.4, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0xca
Java Notes: OpenJDK Runtime Environment (build 11.0.7+10-post-Ubuntu-3ubuntu1)
Python Notes: Python 3.8.2
Security Notes: 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 + tsx_async_abort: Not affected

Core i7 1065G7

Processor: Intel Core i7-1065G7 @ 3.90GHz (4 Cores / 8 Threads), Motherboard: Dell 06CDVY (1.0.9 BIOS), Chipset: Intel Device 34ef, Memory: 16GB, Disk: KBG40ZPZ512G NVMe TOSHIBA 512GB, Graphics: Intel Iris Plus G7 3GB (1100MHz), Audio: Realtek ALC289, Network: Intel Killer Wi-Fi 6 AX1650i 160MHz

OS: Ubuntu 20.04, Kernel: 5.4.0-33-generic (x86_64), Desktop: GNOME Shell 3.36.2, Display Server: X Server 1.20.8, Display Driver: modesetting 1.20.8, OpenGL: 4.6 Mesa 20.0.4, Vulkan: 1.2.131, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 1920x1200

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0x78
Java Notes: OpenJDK Runtime Environment (build 11.0.7+10-post-Ubuntu-3ubuntu1)
Python Notes: Python 3.8.2
Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Enhanced IBRS IBPB: conditional RSB filling + tsx_async_abort: Not affected

Ryzen 3 3200U

Processor: AMD Ryzen 3 3200U @ 2.60GHz (2 Cores / 4 Threads), Motherboard: MOTILE PF4PU1F (N.1.03 BIOS),

Chipset: AMD Raven/Raven2, Memory: 3584MB, Disk: 128GB BIWIN SSD, Graphics: AMD Picasso 512MB (1200/1200MHz), Audio: AMD Raven/Raven2/Fenghuang, Network: Realtek RTL8111/8168/8411 + Intel Dual Band-AC 3168NGW

OS: Ubuntu 20.04, Kernel: 5.4.0-28-generic (x86_64), Desktop: GNOME Shell 3.36.1, Display Server: X Server 1.20.8, Display Driver: amdgpu 19.1.0, OpenGL: 4.6 Mesa 20.0.4 (LLVM 9.0.1), Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Disk Notes: MQ-DEADLINE / errors=remount-ro,relatime,rw
Processor Notes: Scaling Governor: acpi-cpufreq ondemand - CPU Microcode: 0x8108102
Graphics Notes: GLAMOR
Python Notes: + Python 3.8.2
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional STIBP: disabled RSB filling + tsx_async_abort: Not affected

Ryzen 5 4500U

Processor: AMD Ryzen 5 4500U @ 2.38GHz (6 Cores), Motherboard: LENOVO LNVNB161216 (EECN20WW BIOS), Chipset: AMD Renoir Root Complex, Memory: 16GB, Disk: 256GB SKHynix_HFM256GDHTNI-87A0B, Graphics: AMD Renoir 512MB (1500/400MHz), Audio: AMD Device 1637, Network: Realtek RTL8822CE 802.11ac PCIe

OS: Ubuntu 20.04, Kernel: 5.7.0-999-generic (x86_64) 20200530, Desktop: GNOME Shell 3.36.2, Display Server: X Server 1.20.8, Display Driver: modesetting 1.20.8, OpenGL: 4.6 Mesa 20.0.4 (LLVM 9.0.1), Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq ondemand - CPU Microcode: 0x8600102
Java Notes: OpenJDK Runtime Environment (build 11.0.7+10-post-Ubuntu-3ubuntu1)
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: disabled RSB filling + tsx_async_abort: Not affected

Ryzen 7 4700U

Processor: AMD Ryzen 7 4700U @ 2.00GHz (8 Cores), Motherboard: LENOVO LNVNB161216 (DTCN18WWV1.04 BIOS), Chipset: AMD Renoir Root Complex, Memory: 16GB, Disk: 512GB SAMSUNG MZALQ512HALU-000L2, Graphics: AMD Renoir 512MB (1600/400MHz), Audio: AMD Device 1637, Network: Intel Wi-Fi 6 AX200

OS: Ubuntu 20.04, Kernel: 5.6.11-050611-generic (x86_64), Desktop: GNOME Shell 3.36.1, Display Server: X Server 1.20.8, Display Driver: modesetting 1.20.8, OpenGL: 4.6 Mesa 20.0.4 (LLVM 9.0.1), Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Disk Notes: NONE / errors=remount-ro,relatime,rw
Processor Notes: Scaling Governor: acpi-cpufreq ondemand - CPU Microcode: 0x8600102
Python Notes: Python 3.8.2
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: disabled RSB filling + tsx_async_abort: Not affected

Lenovo Flex 5 AMD Ryzen 5 45ooU

Core i5 4300U

Processor: Intel Core i5-4300U @ 2.90GHz (2 Cores / 4 Threads), Motherboard: LENOVO 20AMS01703 (GIET99WW 2.49 BIOS), Chipset: Intel Haswell-ULT DRAM, Memory: 8GB, Disk: 250GB Samsung SSD 860, Graphics: Intel HD 4400 2GB (1100MHz), Audio: Intel Haswell-ULT HD Audio, Network: Intel I218-LM + Intel 7260

OS: Ubuntu 20.04, Kernel: 5.4.0-65-generic (x86_64), Desktop: GNOME Shell 3.36.4, Display Server: X Server 1.20.9, Display Driver: intel, OpenGL: 4.5 Mesa 20.2.6, Vulkan: 1.2.145, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 1366x768

Kernel Notes: psmouse.synaptics_intertouch=0 - 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: intel_pstate performance - CPU Microcode: 0x26 - Thermald 1.9.1
Java Notes: OpenJDK Runtime Environment (build 11.0.9.1+1-Ubuntu-0ubuntu1.20.04)
Security Notes: 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: Mitigation of Microcode + tsx_async_abort: Not affected

	Core i5 5300U	Core i7 5600U	Core i5 8265U	Core i7 6700HQ	Core i7 8550U	Core i7 8565U	Core i7 9750H	Core i7 1065G7	Ryzen 3 3200U	Ryzen 5 4500U	Ryzen 7 4700U	Core i5 4300U
NAMD - ATPase Simulation - 327,506 Atoms (days/ns)	11.03320	11.22133	6.77301	4.77208	6.39663	6.93891	**3.19628**	5.88158	12.34447	4.33797	3.54061	**14.02907**
Normalized	28.97%	28.48%	47.19%	66.98%	49.97%	46.06%	100%	54.34%	25.89%	73.68%	90.27%	22.78%
Standard Deviation	0.1%	0.2%	0.6%	2.4%	0.2%	1%	0.3%	0.1%	0.3%	1.8%	0.1%	0.2%
LAMMPS Molecular Dynamics Simulator - Rhodopsin Protein (ns/day)	1.082	1.192	2.020	2.355	2.141	2.090	3.755	2.418	1.223	4.142	**4.747**	**0.979**
Normalized	22.79%	25.11%	42.55%	49.61%	45.1%	44.03%	79.1%	50.94%	25.76%	87.26%	100%	20.62%
Standard Deviation	0.1%	0.5%	5%	0.5%	4.3%	5.1%	0.4%	7.4%	1.1%	0.4%	0.2%	1.3%
Java Gradle Build - Reactor	**406.172**	370.141	309.814	302.623		308.153	217.922	267.741	327.900	**215.331**		
Normalized	53.01%	58.18%	69.5%	71.15%		69.88%	98.81%	80.43%	65.67%	100%		
Standard Deviation	7.2%	6.5%	1.6%	2.1%		3%	2.8%	6.1%	3.8%	3.3%		
OSPray - NASA Streamlines - SciVis (FPS)	3.00	3.03	4.82	6.44	5.06	4.98	**10.24**	5.10	**2.41**	7.48	8.92	2.50
Normalized	29.3%	29.59%	47.07%	62.89%	49.41%	48.63%	100%	49.8%	23.54%	73.05%	87.11%	24.41%
Standard Deviation	0.3%	0.5%	0.6%	0.4%	0.3%	0.2%	0.6%	0%	0.1%	1.1%	0.4%	0.5%
OSPray - M.R - Path Tracer	30.19	31.25	51.64	76.01	64.16	59.76	111.11	**142.86**	**23.00**	74.36	83.33	26.55
Normalized	21.13%	21.87%	36.15%	53.21%	44.91%	41.83%	77.78%	100%	16.1%	52.05%	58.33%	18.58%
Standard Deviation	1%	0%	12.4%	3%	7.2%	18.7%	0%	0%	2.2%	3.8%	0%	1.5%

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Embree - Pathtracer - Crown (FPS)	1.5878	1.6563	2.6058	3.4172	2.8183	2.7580	**5.5763**	2.8196	1.6401	3.8661	4.8415	**1.3574**
Normalized	28.47%	29.7%	46.73%	61.28%	50.54%	49.46%	100%	50.56%	29.41%	69.33%	86.82%	24.34%
Standard Deviation	0.9%	0.6%	0.4%	0.5%	0.6%	0.6%	0.3%	0.8%	0.8%	1.8%	2.9%	0.1%
SVT-AV1 - Enc Mode 8 - 1080p (FPS)	4.159	4.314	7.518	10.243	8.255	8.095	**14.986**	9.207	4.190	10.843	12.457	**3.669**
Normalized	27.75%	28.79%	50.17%	68.35%	55.08%	54.02%	100%	61.44%	27.96%	72.35%	83.12%	24.48%
Standard Deviation	0.4%	0.4%	0.2%	0.1%	1.3%	1.2%	0.2%	1.8%	0.3%	0.4%	0.7%	0.4%
SVT-VP9 - V.Q.O - Bosphorus 1080p (FPS)	24.87	25.77	43.54	60.07	48.45	47.80	**83.68**	51.11	23.92	70.00	75.96	**21.95**
Normalized	29.72%	30.8%	52.03%	71.79%	57.9%	57.12%	100%	61.08%	28.59%	83.65%	90.77%	26.23%
Standard Deviation	1.7%	0.3%	1.2%	1.1%	3.6%	2.7%	0.7%	3.2%	0.9%	2.4%	1.8%	2%
VP9 libvpx Encoding - Speed 5 (FPS)	9.27	9.04	15.23	17.41	16.24	16.21	**23.23**	16.76	9.10	18.90	18.93	**8.41**
Normalized	39.91%	38.92%	65.56%	74.95%	69.91%	69.78%	100%	72.15%	39.17%	81.36%	81.49%	36.2%
Standard Deviation	0.5%	2.8%	2.6%	0.2%	0.9%	0.5%	0.3%	1.6%	0.6%	0.1%	0.8%	2.3%
x264 - H.2.V.E (FPS)	14.44	14.94	26.27	34.76	28.37	27.79	**54.20**	28.32	15.77	45.29	51.19	**13.30**
Normalized	26.64%	27.56%	48.47%	64.13%	52.34%	51.27%	100%	52.25%	29.1%	83.56%	94.45%	24.54%
Standard Deviation	2.3%	1.7%	2.7%	1.2%	2.8%	0.7%	2.9%	2.9%	0.5%	2.3%	1.8%	1.8%
Intel Open Image Denoise - Memorial (Images / Sec)	1.27	1.12	2.05	2.95	2.24	2.21	4.29	4.56	**0.78**	4.24	**4.64**	1.03
Normalized	27.37%	24.14%	44.18%	63.58%	48.28%	47.63%	92.46%	98.28%	16.81%	91.38%	100%	22.2%
Standard Deviation	0.5%	0.4%	0.1%	0.3%	2%	1.8%	0.1%	2.8%	0.2%	0.9%	4.5%	1.1%
Timed FFmpeg Compilation - Time To Compile (sec)	354.809	343.791	209.327	162.176	197.516	201.295	101.365	180.476	317.678	116.454	**98.890**	**405.101**
Normalized	27.87%	28.76%	47.24%	60.98%	50.07%	49.13%	97.56%	54.79%	31.13%	84.92%	100%	24.41%
Standard Deviation	0.2%	0.3%	0.2%	0.2%	0.3%	0.1%	0.4%	0.6%	1.2%	1%	0.1%	0.2%
Timed GDB GNU Debugger Compilation - Time To Compile (sec)		**333.390**	217.022	198.053		210.836	**135.631**	193.638	330.682	166.157	156.144	
Normalized		40.68%	62.5%	68.48%		64.33%	100%	70.04%	41.02%	81.63%	86.86%	
Standard Deviation		0.2%	0.2%	0.1%		0.1%	0.6%	0.3%	0.2%	0.2%	0.2%	

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Timed Linux Kernel Compilation - Time To Compile (sec)	560.120	532.743	318.544	253.100	303.800	303.567	**152.935**	278.417	501.866	185.734	157.374	**626.733**
Normalized	27.3%	28.71%	48.01%	60.42%	50.34%	50.38%	100%	54.93%	30.47%	82.34%	97.18%	24.4%
Standard Deviation	0.3%	1%	0.5%	0.6%	0.4%	0.6%	0.9%	0.4%	0.2%	0.1%	1.4%	0.6%
Timed MPlayer Compilation - Time To Compile (sec)	257.297	245.683	146.847	113.647	134.396	138.730	68.998	130.440	231.427	84.211	**68.112**	**294.376**
Normalized	26.47%	27.72%	46.38%	59.93%	50.68%	49.1%	98.72%	52.22%	29.43%	80.88%	100%	23.14%
Standard Deviation	0.1%	0.3%	0.2%	0.1%	1%	0.7%	0.1%	0.7%	0.4%	0.9%	0.1%	0.2%
Build2 - Time To Compile (sec)	710.020	655.597	394.694	329.995		388.692	**192.118**	351.168	683.828	237.107		**767.549**
Normalized	27.06%	29.3%	48.68%	58.22%		49.43%	100%	54.71%	28.09%	81.03%		25.03%
Standard Deviation	0.2%	0.3%	0.2%	1.2%		0.6%	0.6%	0.2%	1.1%	0.5%		0.2%
POV-Ray - Trace Time (sec)	322.946	330.294	191.341	140.685	184.326	187.372	91.974	193.330	272.777	108.862	**88.867**	**406.547**
Normalized	27.52%	26.91%	46.44%	63.17%	48.21%	47.43%	96.62%	45.97%	32.58%	81.63%	100%	21.86%
Standard Deviation	0.1%	0.2%	0.4%	0.4%	0.3%	0.2%	0.1%	0.4%	0.1%	0.5%	0.1%	0.1%
Tungsten Renderer - Hair (sec)	188.772	180.157	109.531	79.6416	105.818	103.263	52.9393	96.7661	149.163	66.0687	**51.6625**	**214.058**
Normalized	27.37%	28.68%	47.17%	64.87%	48.82%	50.03%	97.59%	53.39%	34.63%	78.2%	100%	24.13%
Standard Deviation	0.6%	0.3%	0.7%	0.5%	1.3%	1.1%	1.5%	1%	0.1%	0.1%	0.2%	0.4%
Tungsten Renderer - Volumetric Caustic (sec)	61.4973	60.7307	38.8272	26.5910	35.6110	36.3705	19.0081	36.2836	54.1216	25.0327	**18.4727**	**75.7172**
Normalized	30.04%	30.42%	47.58%	69.47%	51.87%	50.79%	97.18%	50.91%	34.13%	73.79%	100%	24.4%
Standard Deviation	0.1%	0.5%	1.4%	0.5%	2.7%	2.2%	0%	2.3%	0.2%	0.2%	0.2%	1.5%
FLAC Audio Encoding - WAV To FLAC (sec)	14.507	**14.654**	10.230	11.058	9.586	9.685	8.729	8.903	11.763	8.599	**8.147**	13.952
Normalized	56.16%	55.6%	79.64%	73.68%	84.99%	84.12%	93.33%	91.51%	69.26%	94.74%	100%	58.39%
Standard Deviation	0.4%	4.5%	1.9%	0.5%	0.3%	1.4%	0.7%	0.8%	1.4%	0.3%	0.2%	0.3%
GROMACS - Water Benchmark	0.182	0.171	0.299	0.405	0.344	0.350	**0.626**	0.381	0.145	0.479	0.534	**0.141**
Normalized	29.07%	27.32%	47.76%	64.7%	54.95%	55.91%	100%	60.86%	23.16%	76.52%	85.3%	22.52%
Standard Deviation	1%	1%	0.7%	1.2%	0.9%	0.7%	1.4%	0.5%	0.4%	0.8%	0.2%	1.1%
SQLite Speedtest - Timed Time -	110.655	96.691	75.032	91.618	78.223	69.676	65.194	**58.863**	92.356	70.733	66.993	**114.902**
Normalized	53.2%	60.88%	78.45%	64.25%	75.25%	84.48%	90.29%	100%	63.73%	83.22%	87.86%	51.23%
Standard Deviation	0.5%	0.3%	0.2%	0.2%	1.5%	0.5%	0.5%	0.5%	0.2%	0.3%	1.6%	2.1%
GEGL - Crop (sec)		**11.930**	10.375	11.028	8.811	9.997	8.762	8.740	10.335	8.206	**8.051**	
Normalized		67.49%	77.6%	73.01%	91.37%	80.53%	91.89%	92.12%	77.9%	98.11%	100%	
Standard Deviation		3.5%	1.9%	0.8%	1.7%	2.9%	1.4%	2.4%	2.4%	1.3%	1%	

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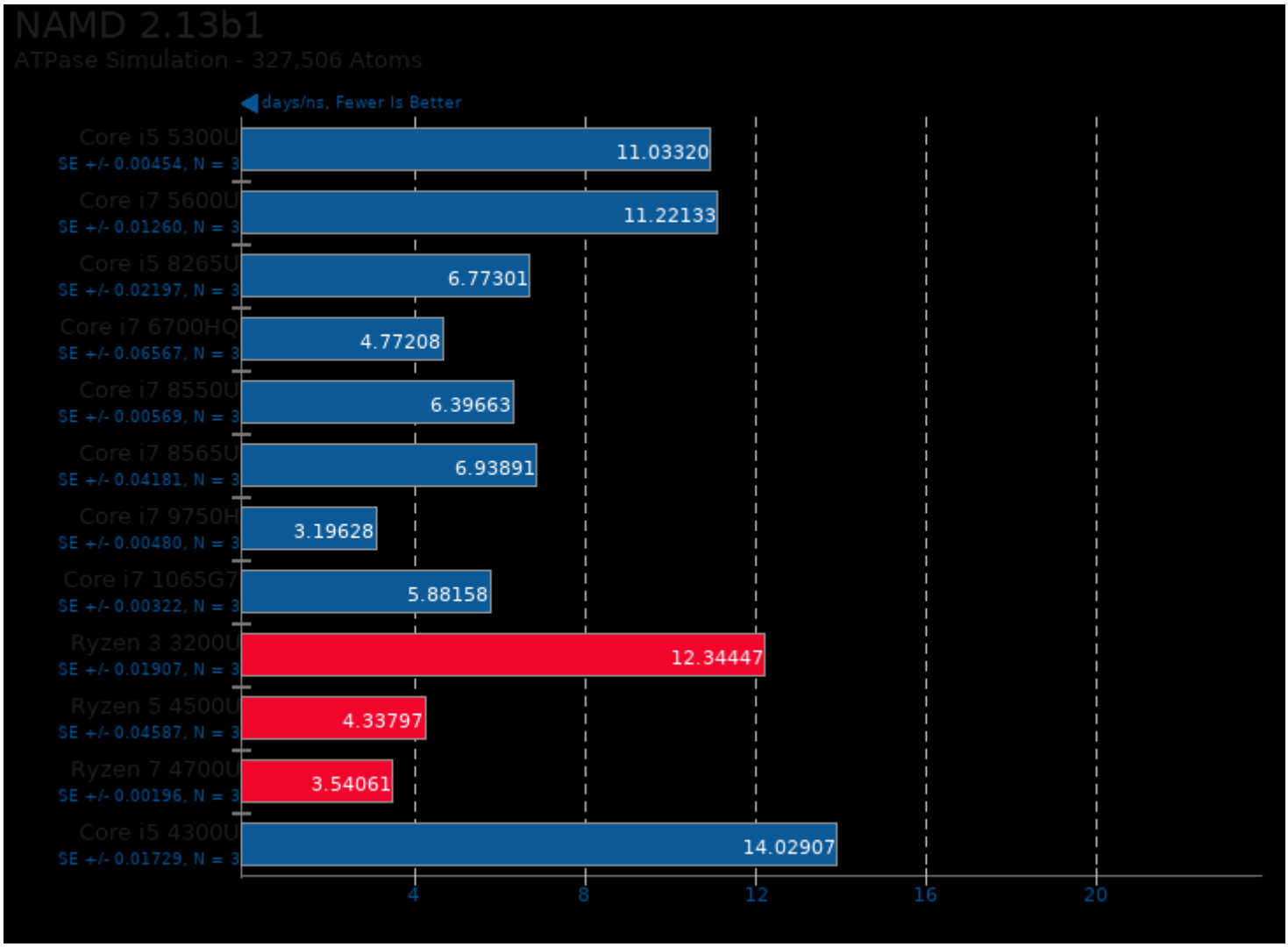
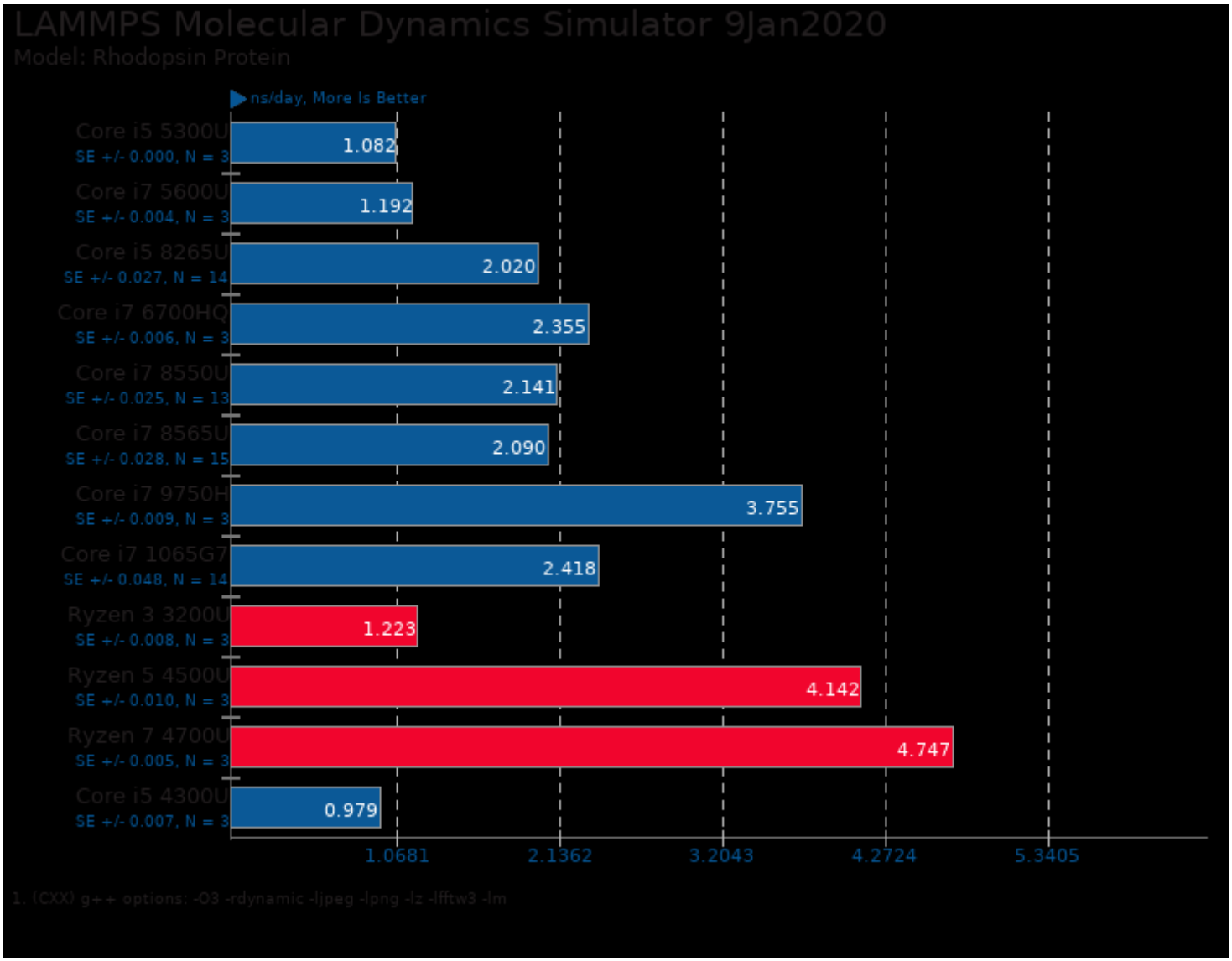
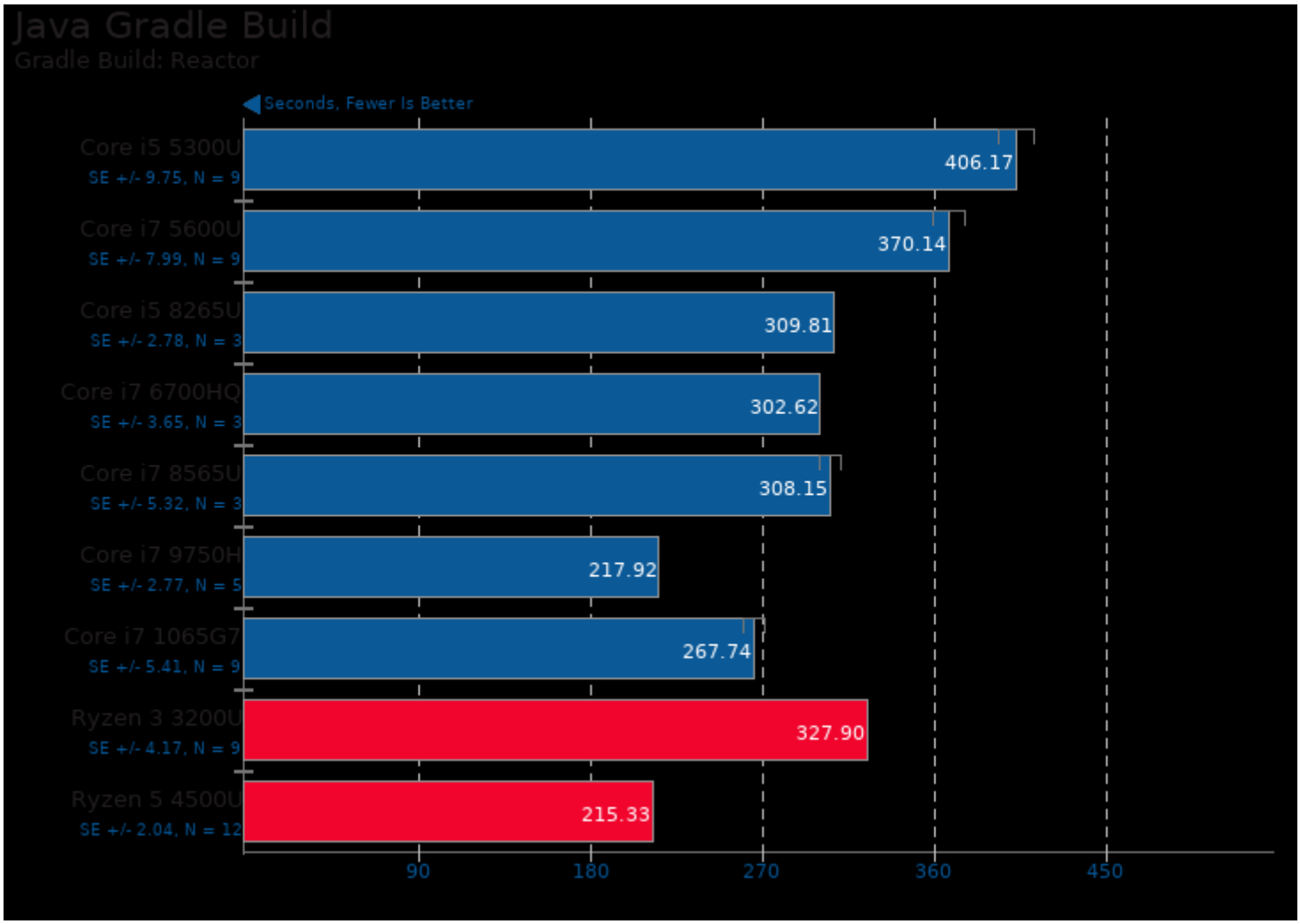
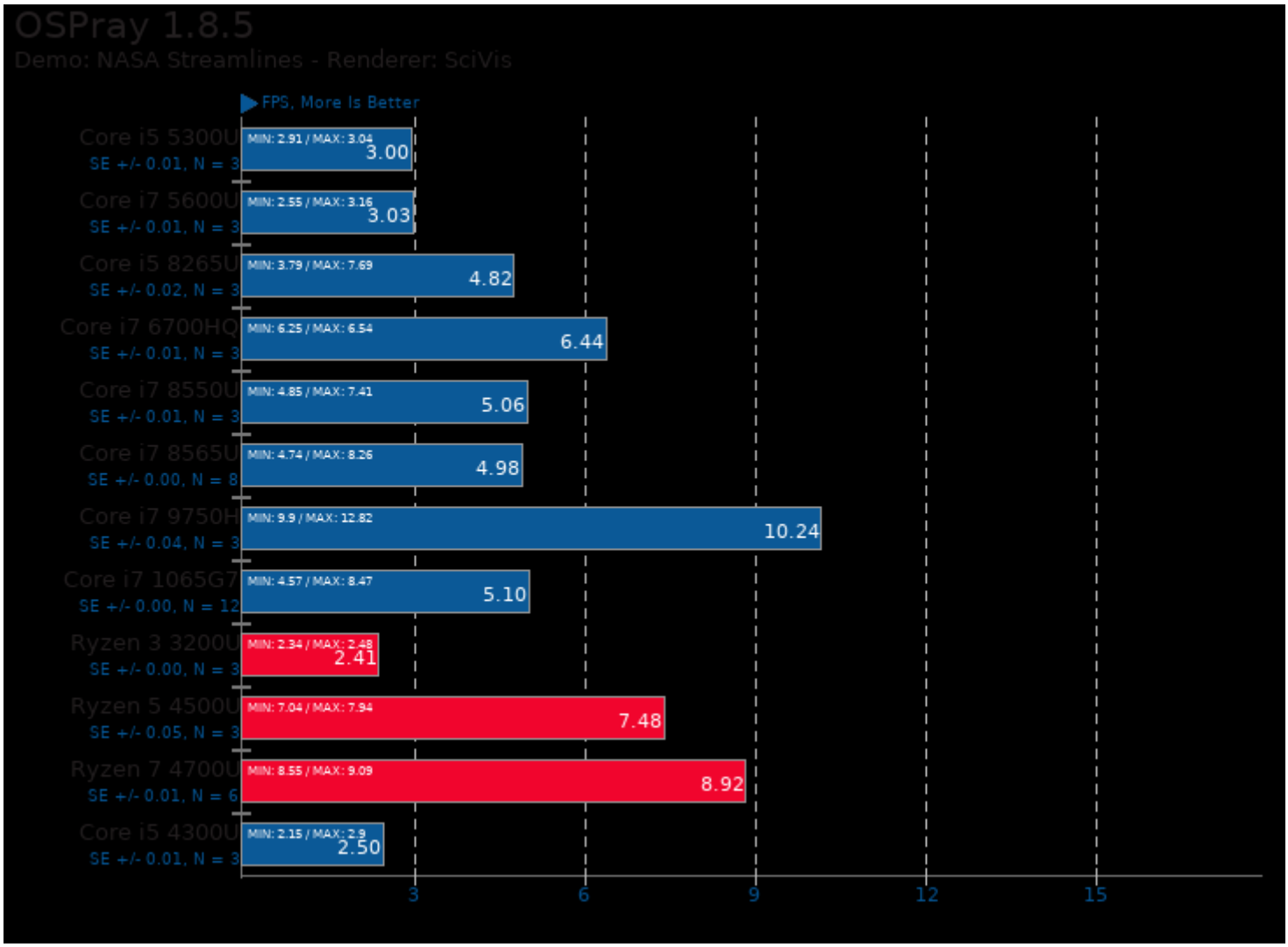
GEGL - Rotate 90 Degrees (sec)		**64.114**	50.632	53.582	48.217	49.246	41.107	45.109	57.694	42.980	**40.547**
Normalized		63.24%	80.08%	75.67%	84.09%	82.34%	98.64%	89.89%	70.28%	94.34%	100%
Standard Deviation		0.1%	1.3%	0.1%	0.7%	1%	0.6%	1%	0.3%	0.2%	0.4%
GNU Octave Benchmark (sec)		10.473	10.317	10.449		8.966	7.487	**6.754**	**11.369**	8.771	
Normalized		64.49%	65.46%	64.64%		75.33%	90.21%	100%	59.41%	77%	
Standard Deviation		3%	0.6%	0.7%		1.3%	0.6%	0.8%	0.9%	2%	
RawTherapee - T.B.T (sec)		**201.304**	145.453	117.269		133.935	**79.022**	114.997	176.238	88.060	
Normalized		39.26%	54.33%	67.39%		59%	100%	68.72%	44.84%	89.74%	
Standard Deviation		0.9%	0.5%	0.1%		0.8%	0.9%	1.2%	0.5%	0.6%	
Chaos Group V-RAY - CPU (Ksamples)	**2096**	2287	3698	4603	3935	3863	**7791**	4090	2335	5584	7067
Normalized	26.9%	29.35%	47.47%	59.08%	50.51%	49.58%	100%	52.5%	29.97%	71.67%	90.71%
Standard Deviation	1.6%	1.2%	1.1%	0.6%	1%	1%	0.3%	0.7%	1.6%	0.4%	4.8%


NAMD 2.13b1
ATPase Simulation - 327,506 Atoms
days/ns, Fewer Is Better
Core i5 5300U
SE +/- 0.00454, N = 3
11.03320
Core i7 5600U
SE +/- 0.01260, N = 3
11.22133
Core i5 8265U
SE +/- 0.02197, N = 3
6.77301
Core i7 6700HQ
SE +/- 0.06567, N = 3
4.77208
Core i7 8550U
SE +/- 0.00569, N = 3
6.39663
Core i7 8565U
SE +/- 0.04181, N = 3
6.93891
Core i7 9750H
SE +/- 0.00480, N = 3
3.19628
Core i7 1065G7
SE +/- 0.00322, N = 3
5.88158
Ryzen 3 3200U
SE +/- 0.01907, N = 3
12.34447
Ryzen 5 4500U
SE +/- 0.04587, N = 3
4.33797
Ryzen 7 4700U
SE +/- 0.00196, N = 3
3.54061
Core i5 4300U
SE +/- 0.01729, N = 3
14.02907
4
8
12
16
20


LAMMPS Molecular Dynamics Simulator 9Jan2020
Model: Rhodopsin Protein
ns/day, More Is Better
Core i5 5300U
SE +/- 0.000, N = 3
1.082
Core i7 5600U
SE +/- 0.004, N = 3
1.192
Core i5 8265U
SE +/- 0.027, N = 14
2.020
Core i7 6700HQ
SE +/- 0.006, N = 3
2.355
Core i7 8550U
SE +/- 0.025, N = 13
2.141
Core i7 8565U
SE +/- 0.028, N = 15
2.090
Core i7 9750H
SE +/- 0.009, N = 3
3.755
Core i7 1065G7
SE +/- 0.048, N = 14
2.418
Ryzen 3 3200U
SE +/- 0.008, N = 3
1.223
Ryzen 5 4500U
SE +/- 0.010, N = 3
4.142
Ryzen 7 4700U
SE +/- 0.005, N = 3
4.747
Core i5 4300U
SE +/- 0.007, N = 3
0.979
1.0681
2.1362
3.2043
4.2724
5.3405
1. (CXX) g++ options: -O3 -rdynamic -ljpeg -lpng -lz -lfftw3 -lm


Java Gradle Build
Gradle Build: Reactor
Seconds, Fewer Is Better
Core i5 5300U
SE +/- 9.75, N = 9
406.17
Core i7 5600U
SE +/- 7.99, N = 9
370.14
Core i5 8265U
SE +/- 2.78, N = 3
309.81
Core i7 6700HQ
SE +/- 3.65, N = 3
302.62
Core i7 8565U
SE +/- 5.32, N = 3
308.15
Core i7 9750H
SE +/- 2.77, N = 5
217.92
Core i7 1065G7
SE +/- 5.41, N = 9
267.74
Ryzen 3 3200U
SE +/- 4.17, N = 9
327.90
Ryzen 5 4500U
SE +/- 2.04, N = 12
215.33
90
180
270
360
450


OSPray 1.8.5
Demo: NASA Streamlines - Renderer: SciVis
FPS, More Is Better
Core i5 5300U
SE +/- 0.01, N = 3
MIN: 2.91 / MAX: 3.04
3.00
Core i7 5600U
SE +/- 0.01, N = 3
MIN: 2.55 / MAX: 3.16
3.03
Core i5 8265U
SE +/- 0.02, N = 3
MIN: 3.79 / MAX: 7.69
4.82
Core i7 6700HQ
SE +/- 0.01, N = 3
MIN: 6.25 / MAX: 6.54
6.44
Core i7 8550U
SE +/- 0.01, N = 3
MIN: 4.85 / MAX: 7.41
5.06
Core i7 8565U
SE +/- 0.00, N = 8
MIN: 4.74 / MAX: 8.26
4.98
Core i7 9750H
SE +/- 0.04, N = 3
MIN: 9.9 / MAX: 12.82
10.24
Core i7 1065G7
SE +/- 0.00, N = 12
MIN: 4.57 / MAX: 8.47
5.10
Ryzen 3 3200U
SE +/- 0.00, N = 3
MIN: 2.34 / MAX: 2.48
2.41
Ryzen 5 4500U
SE +/- 0.05, N = 3
MIN: 7.04 / MAX: 7.94
7.48
Ryzen 7 4700U
SE +/- 0.01, N = 6
MIN: 8.55 / MAX: 9.09
8.92
Core i5 4300U
SE +/- 0.01, N = 3
MIN: 2.15 / MAX: 2.9
2.50
3
6
9
12
15

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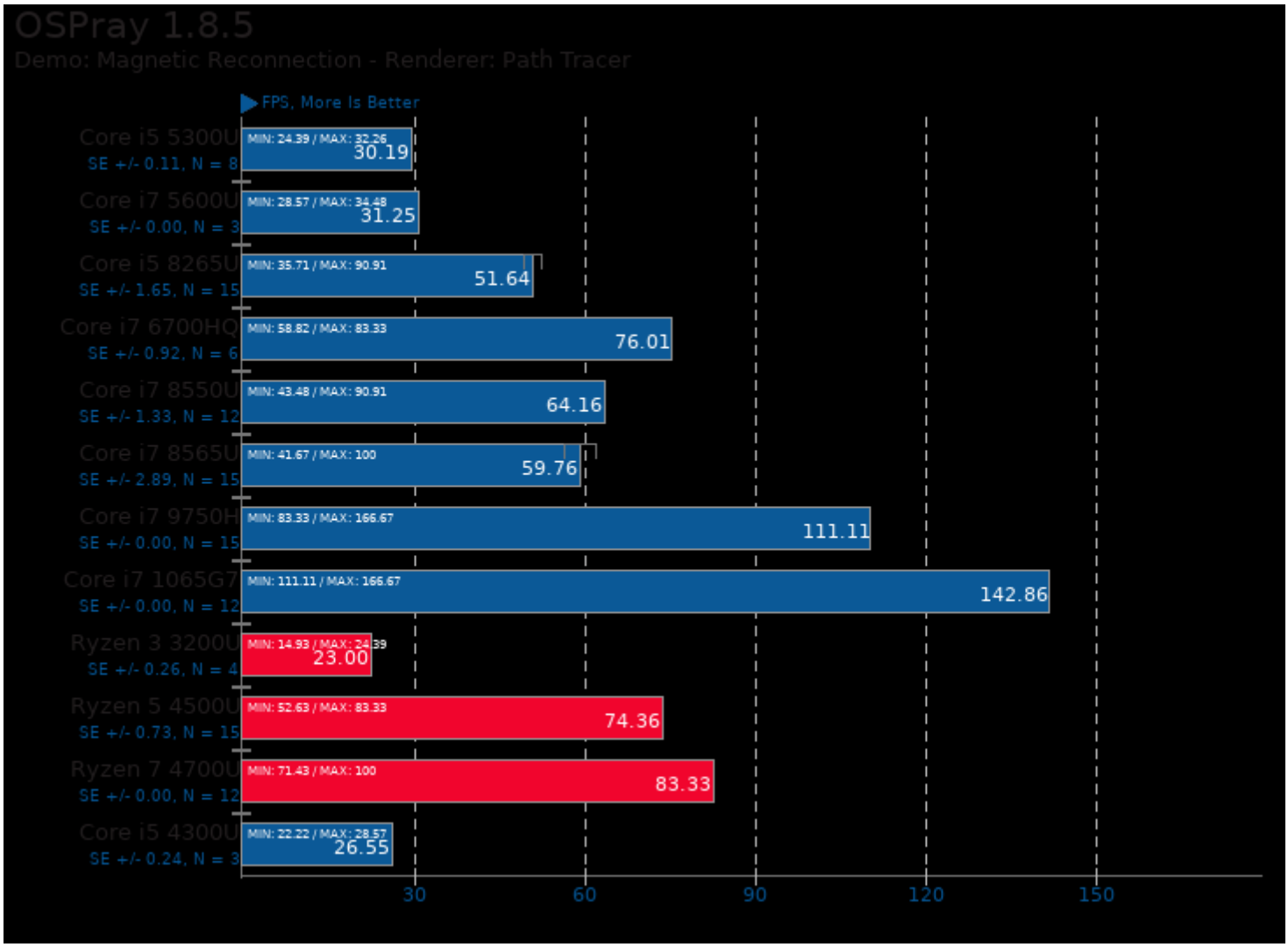

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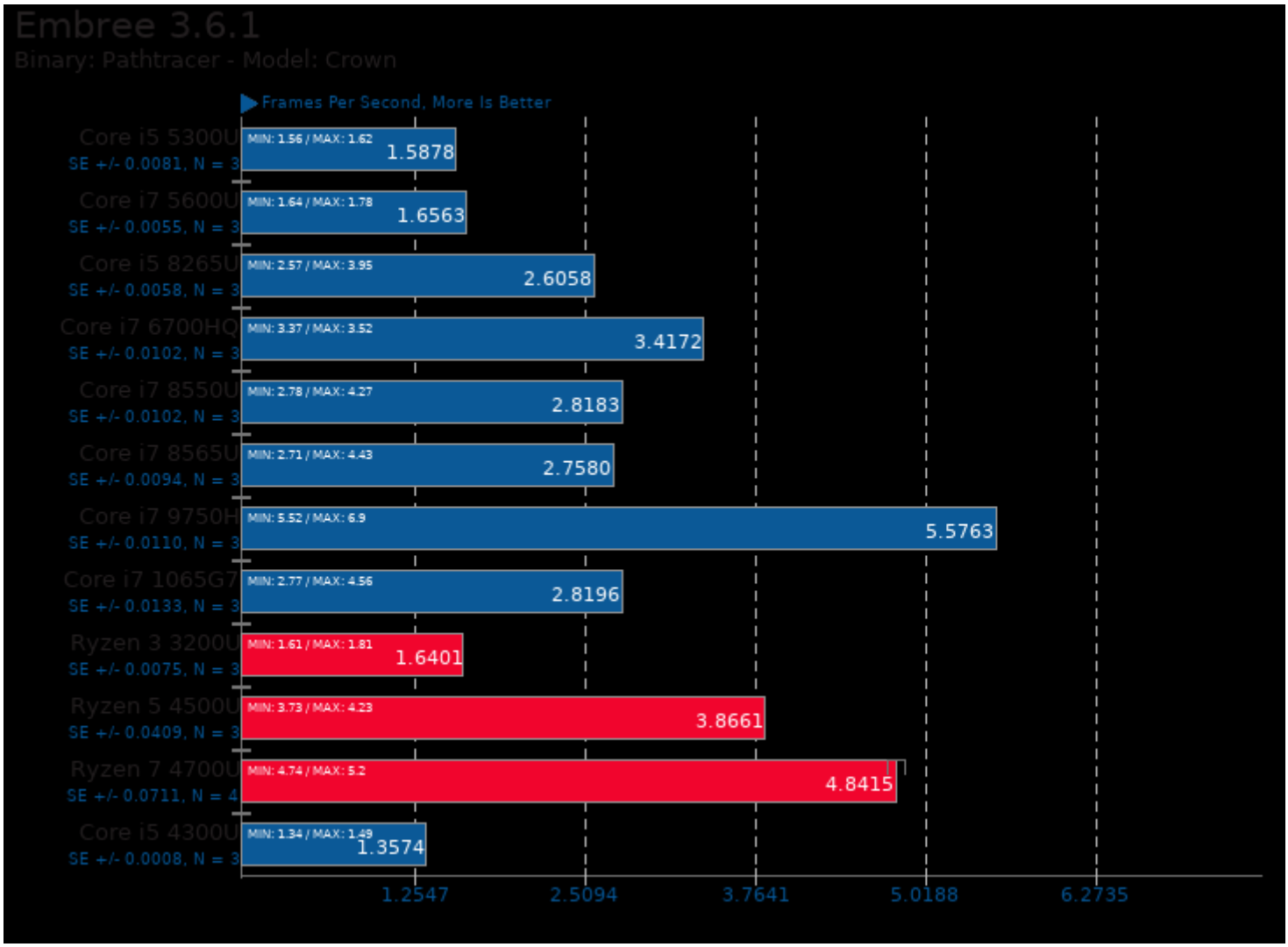
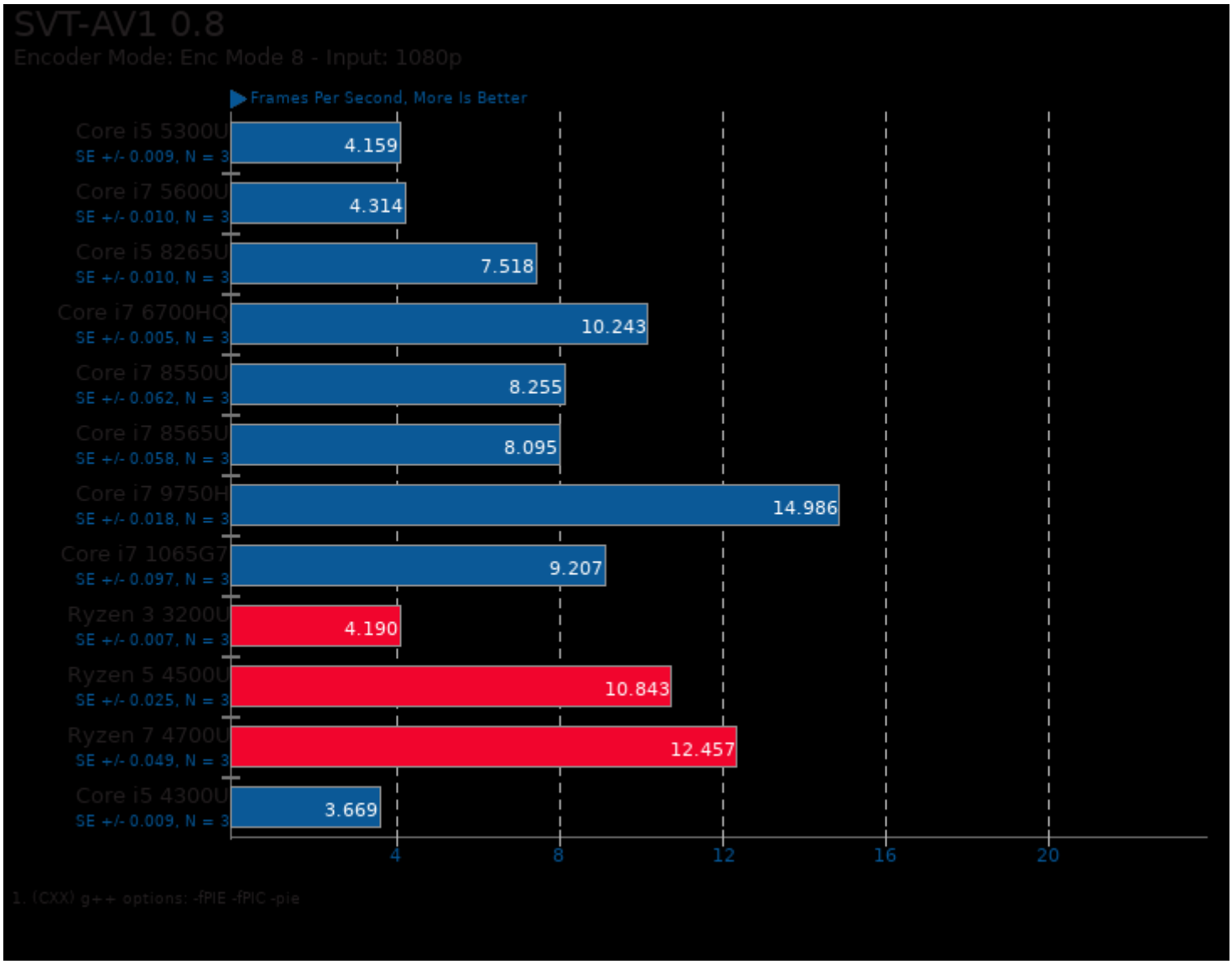
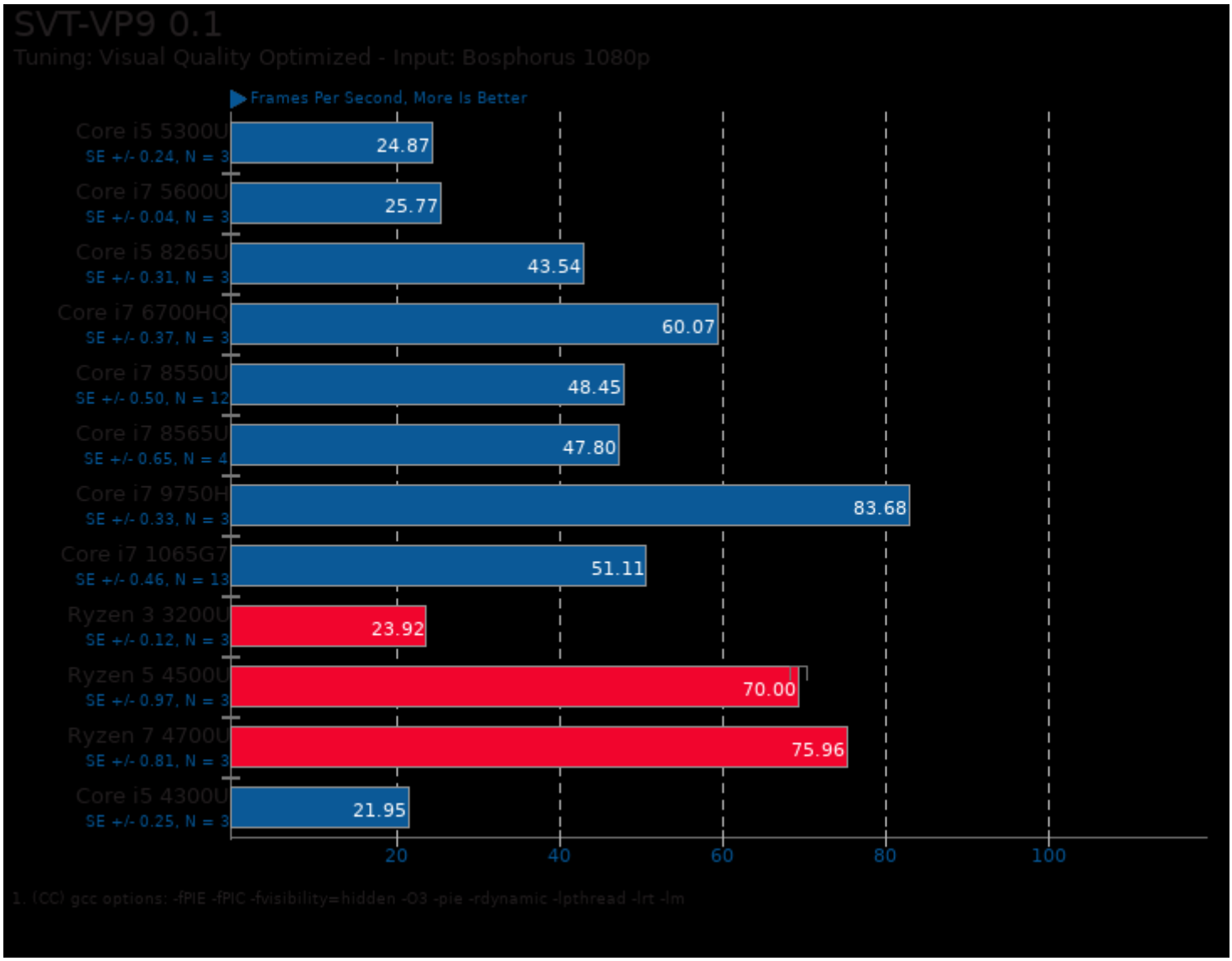
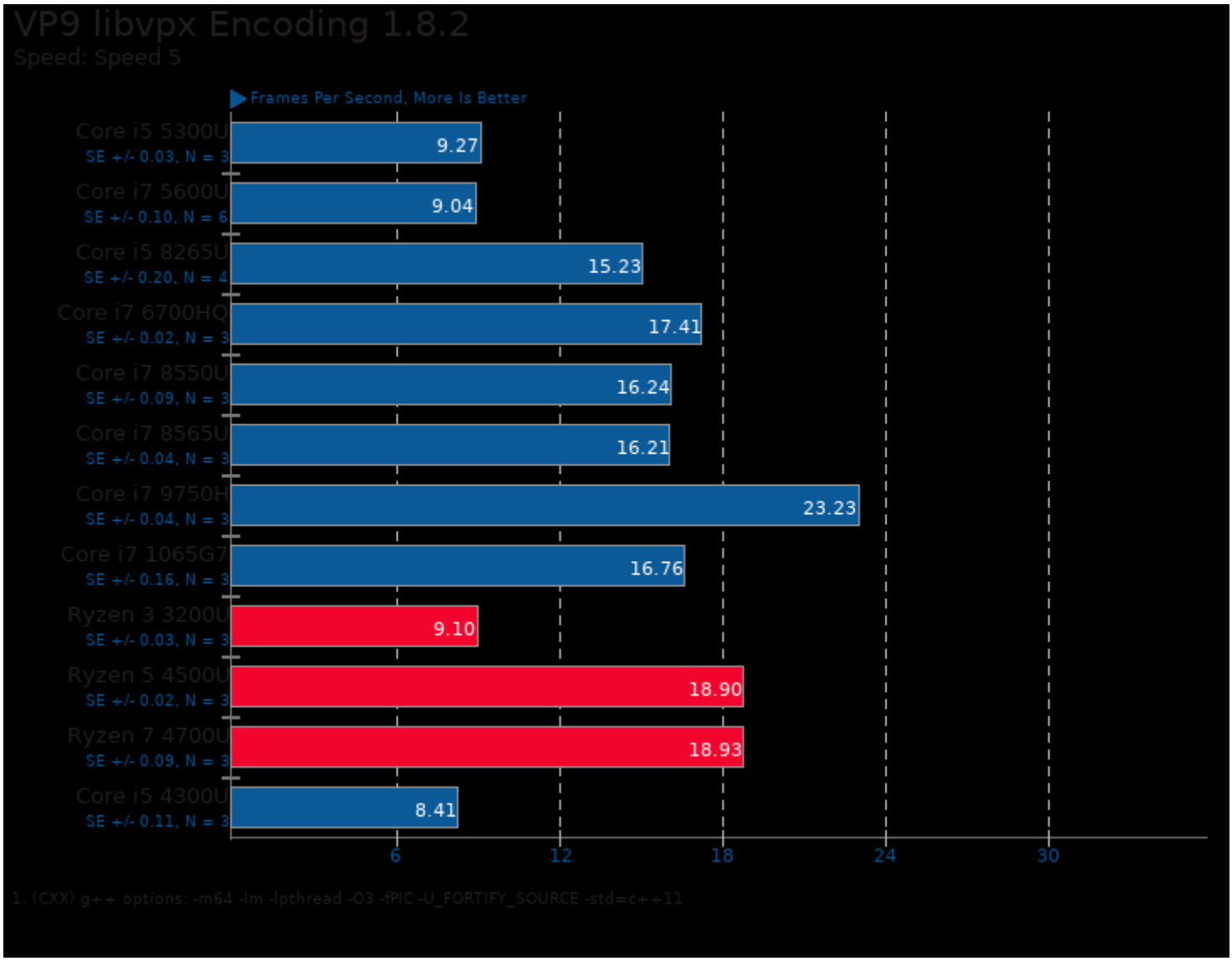
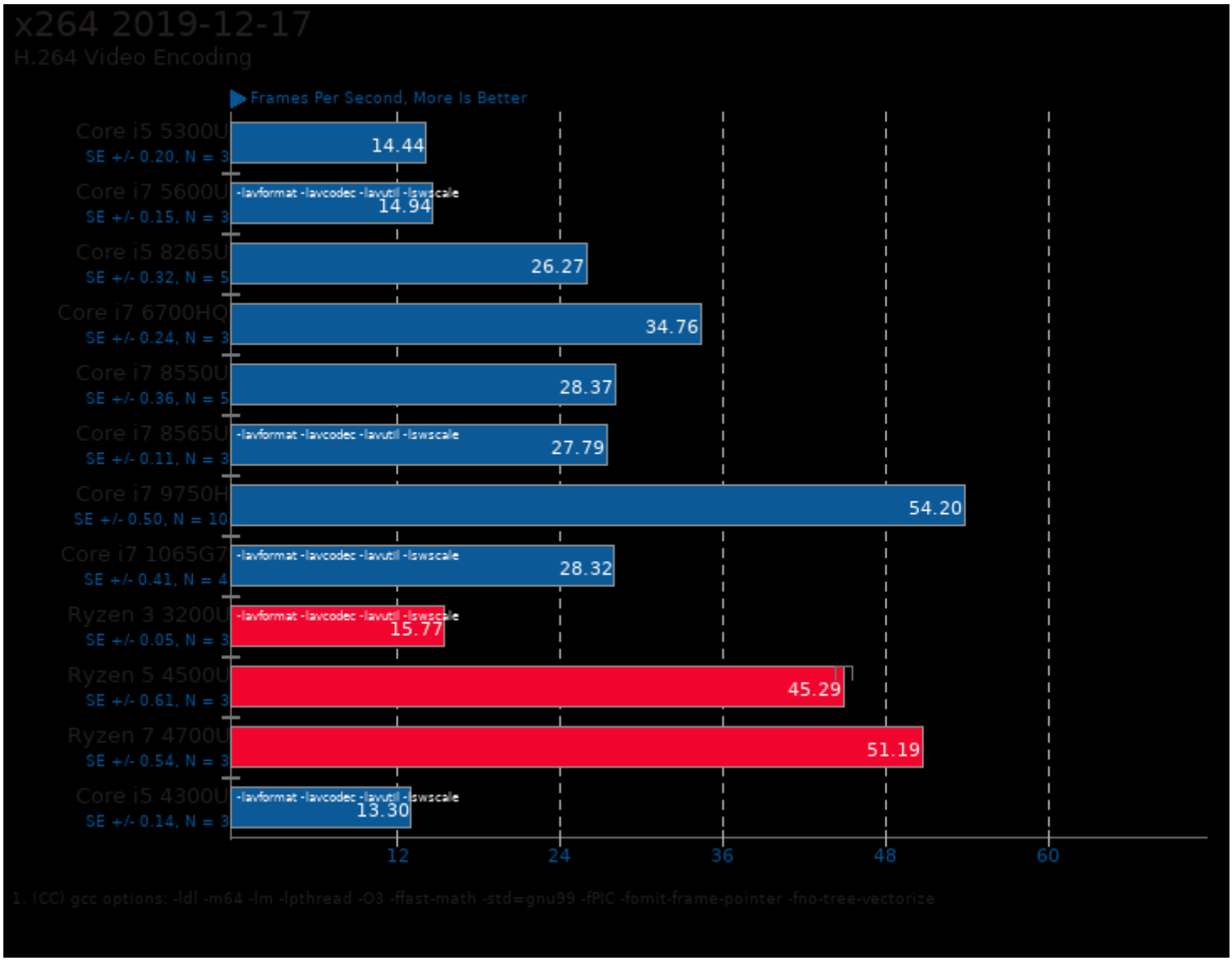


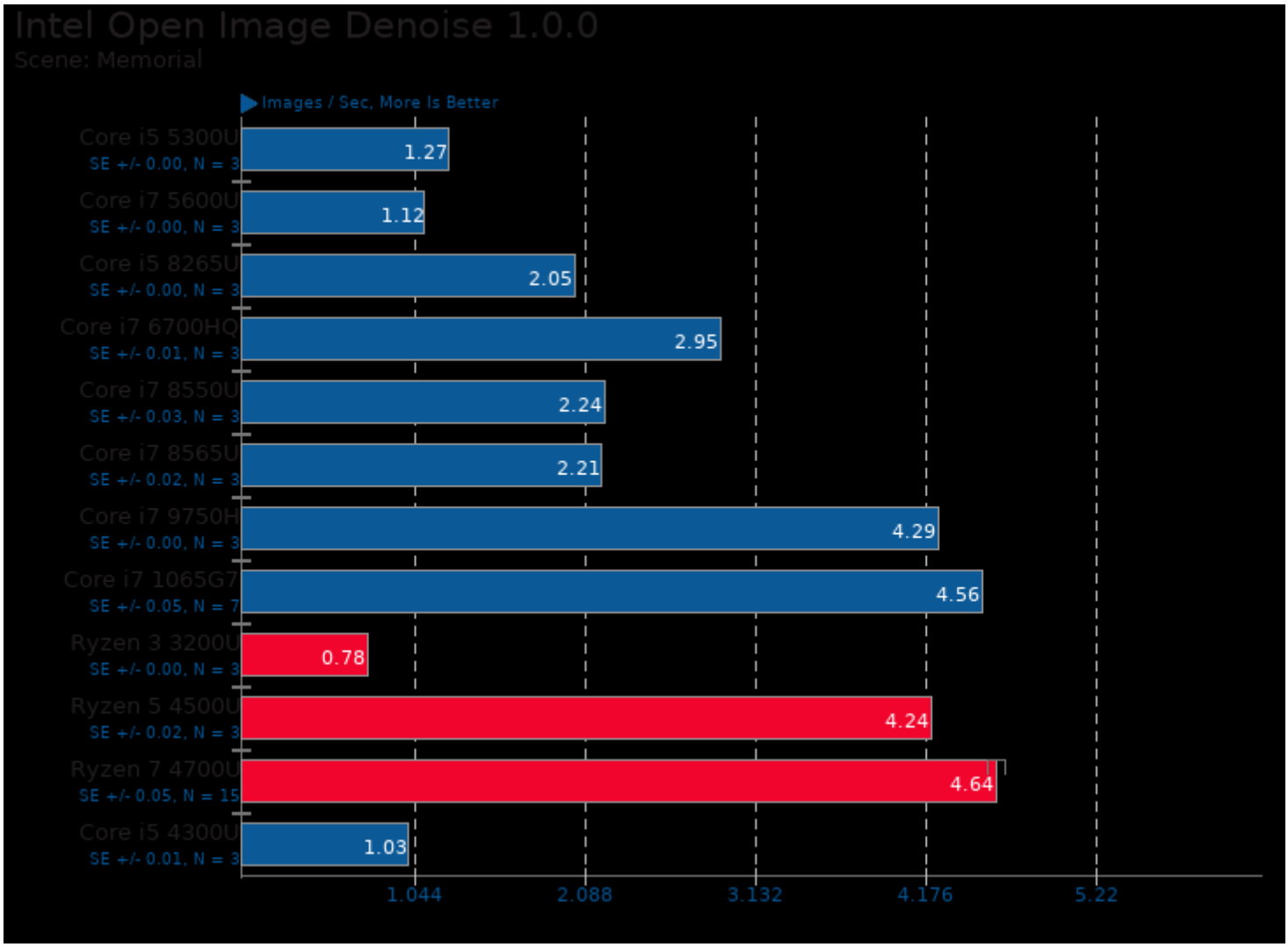

SVT-AV1 0.8
Encoder Mode: Enc Mode 8 - Input: 1080p
Frames Per Second, More Is Better
Core i5 5300U
SE +/- 0.009, N = 3
4.159
Core i7 5600U
SE +/- 0.010, N = 3
4.314
Core i5 8265U
SE +/- 0.010, N = 3
7.518
Core i7 6700HQ
SE +/- 0.005, N = 3
10.243
Core i7 8550U
SE +/- 0.062, N = 3
8.255
Core i7 8565U
SE +/- 0.058, N = 3
8.095
Core i7 9750H
SE +/- 0.018, N = 3
14.986
Core i7 1065G7
SE +/- 0.097, N = 3
9.207
Ryzen 3 3200U
SE +/- 0.007, N = 3
4.190
Ryzen 5 4500U
SE +/- 0.025, N = 3
10.843
Ryzen 7 4700U
SE +/- 0.049, N = 3
12.457
Core i5 4300U
SE +/- 0.009, N = 3
3.669
4
8
12
16
20
1. (CXX) g++ options: -fPIE -fPIC -pie

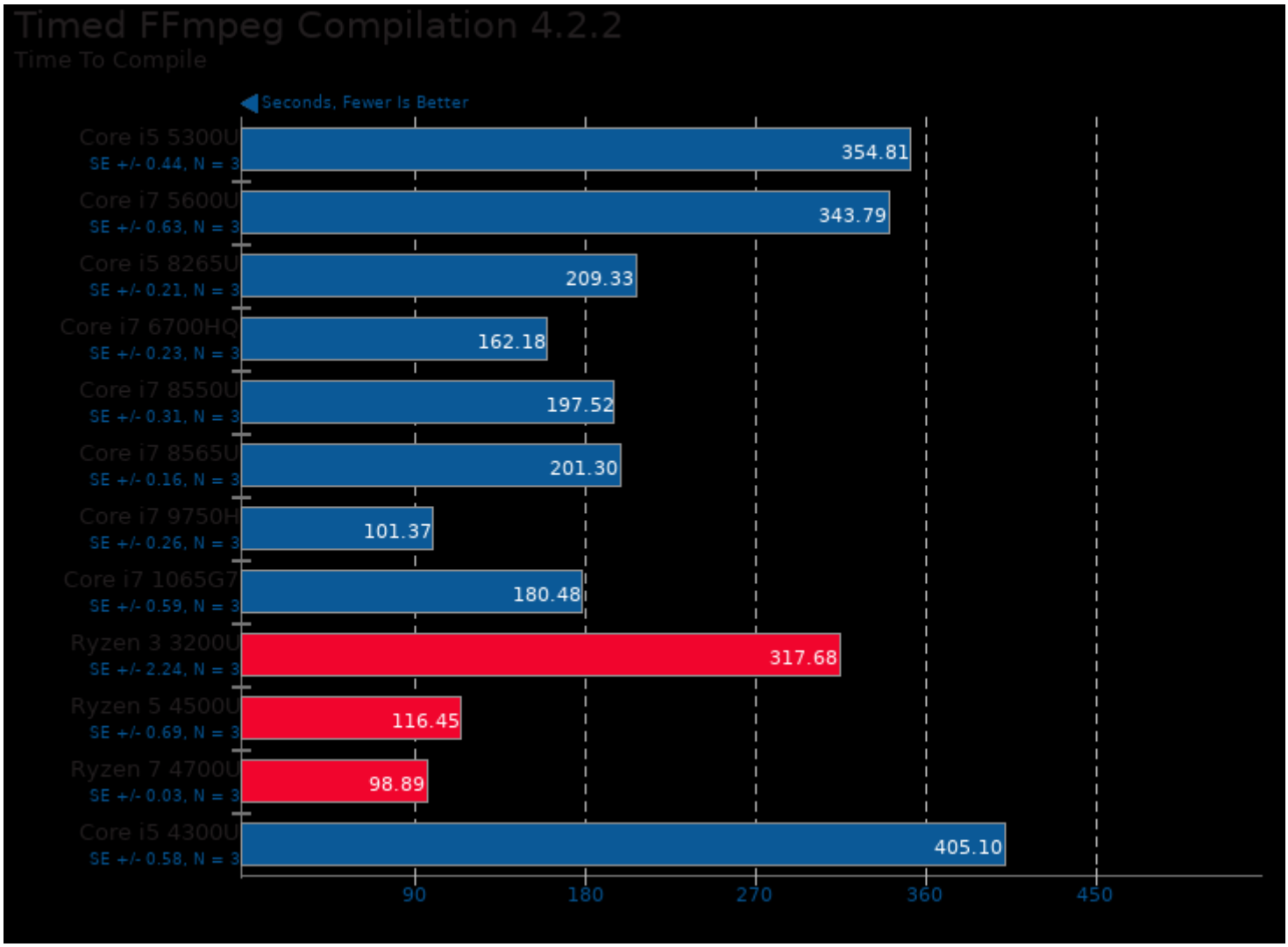
Lenovo Flex 5 AMD Ryzen 5 45ooU



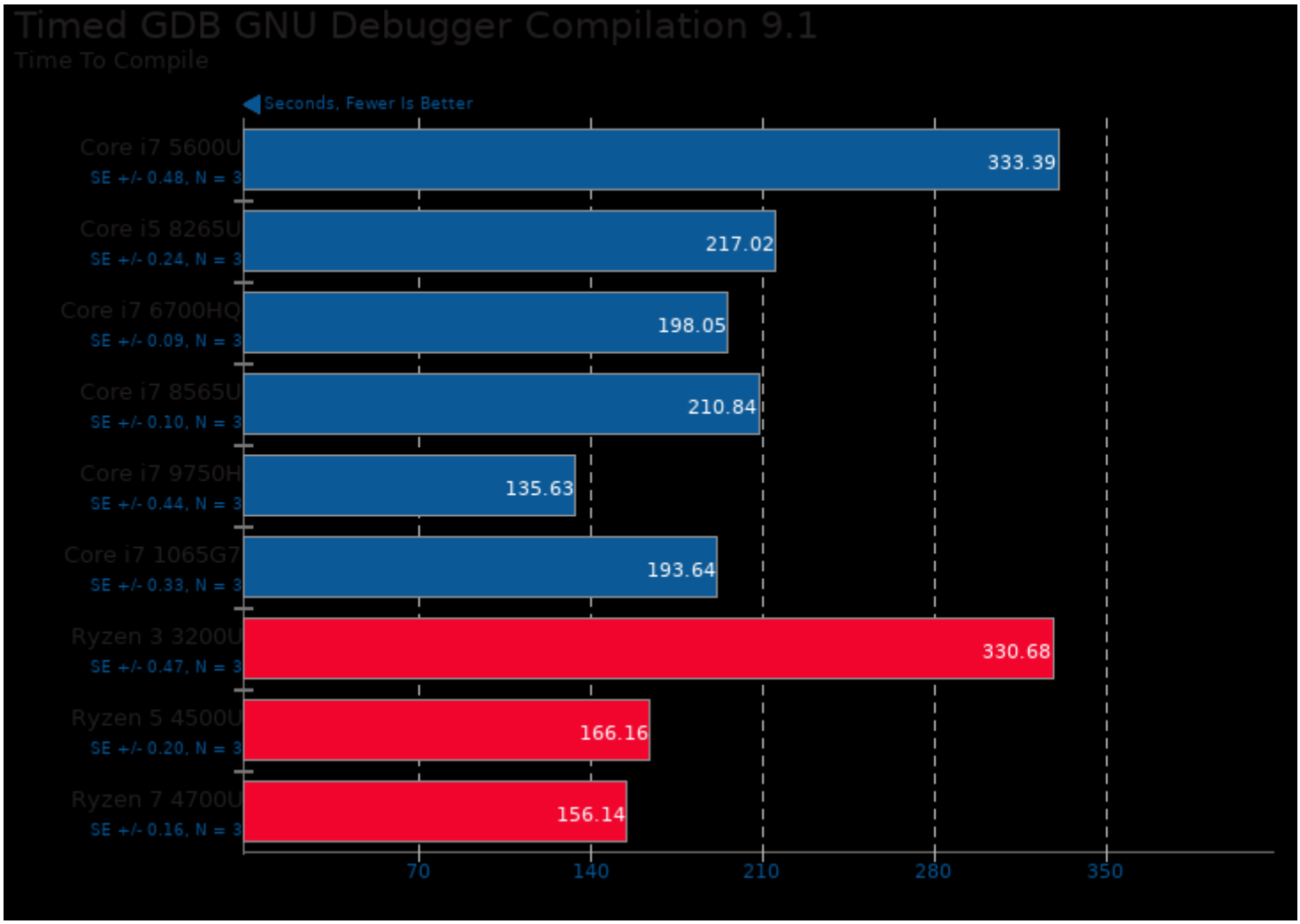

VP9 libvpx Encoding 1.8.2
Speed: Speed 5
Frames Per Second, More Is Better
Core i5 5300U
SE +/- 0.03, N = 3
9.27
Core i7 5600U
SE +/- 0.10, N = 6
9.04
Core i5 8265U
SE +/- 0.20, N = 4
15.23
Core i7 6700HQ
SE +/- 0.02, N = 3
17.41
Core i7 8550U
SE +/- 0.09, N = 3
16.24
Core i7 8565U
SE +/- 0.04, N = 3
16.21
Core i7 9750H
SE +/- 0.04, N = 3
23.23
Core i7 1065G7
SE +/- 0.16, N = 3
16.76
Ryzen 3 3200U
SE +/- 0.03, N = 3
9.10
Ryzen 5 4500U
SE +/- 0.02, N = 3
18.90
Ryzen 7 4700U
SE +/- 0.09, N = 3
18.93
Core i5 4300U
SE +/- 0.11, N = 3
8.41
6
12
18
24
30
1. (CXX) g++ options: -m64 -lm -lpthread -O3 -fPIC -U_FORTIFY_SOURCE -std=c++11


x264 2019-12-17
H.264 Video Encoding
Frames Per Second, More Is Better
Core i5 5300U
SE +/- 0.20, N = 3
14.44
Core i7 5600U
SE +/- 0.15, N = 3
-lavformat -lavcodec -lavutil -lswscale
14.94
Core i5 8265U
SE +/- 0.32, N = 5
26.27
Core i7 6700HQ
SE +/- 0.24, N = 3
34.76
Core i7 8550U
SE +/- 0.36, N = 5
28.37
Core i7 8565U
SE +/- 0.11, N = 3
-lavformat -lavcodec -lavutil -lswscale
27.79
Core i7 9750H
SE +/- 0.50, N = 10
54.20
Core i7 1065G7
SE +/- 0.41, N = 4
-lavformat -lavcodec -lavutil -lswscale
28.32
Ryzen 3 3200U
SE +/- 0.05, N = 3
-lavformat -lavcodec -lavutil -lswscale
15.77
Ryzen 5 4500U
SE +/- 0.61, N = 3
45.29
Ryzen 7 4700U
SE +/- 0.54, N = 3
51.19
Core i5 4300U
SE +/- 0.14, N = 3
-lavformat -lavcodec -lavutil -lswscale
13.30
12
24
36
48
60
1. (CC) gcc options: -ldl -m64 -lm -lpthread -O3 -ffast-math -std=gnu99 -fPIC -fomit-frame-pointer -fno-tree-vectorize

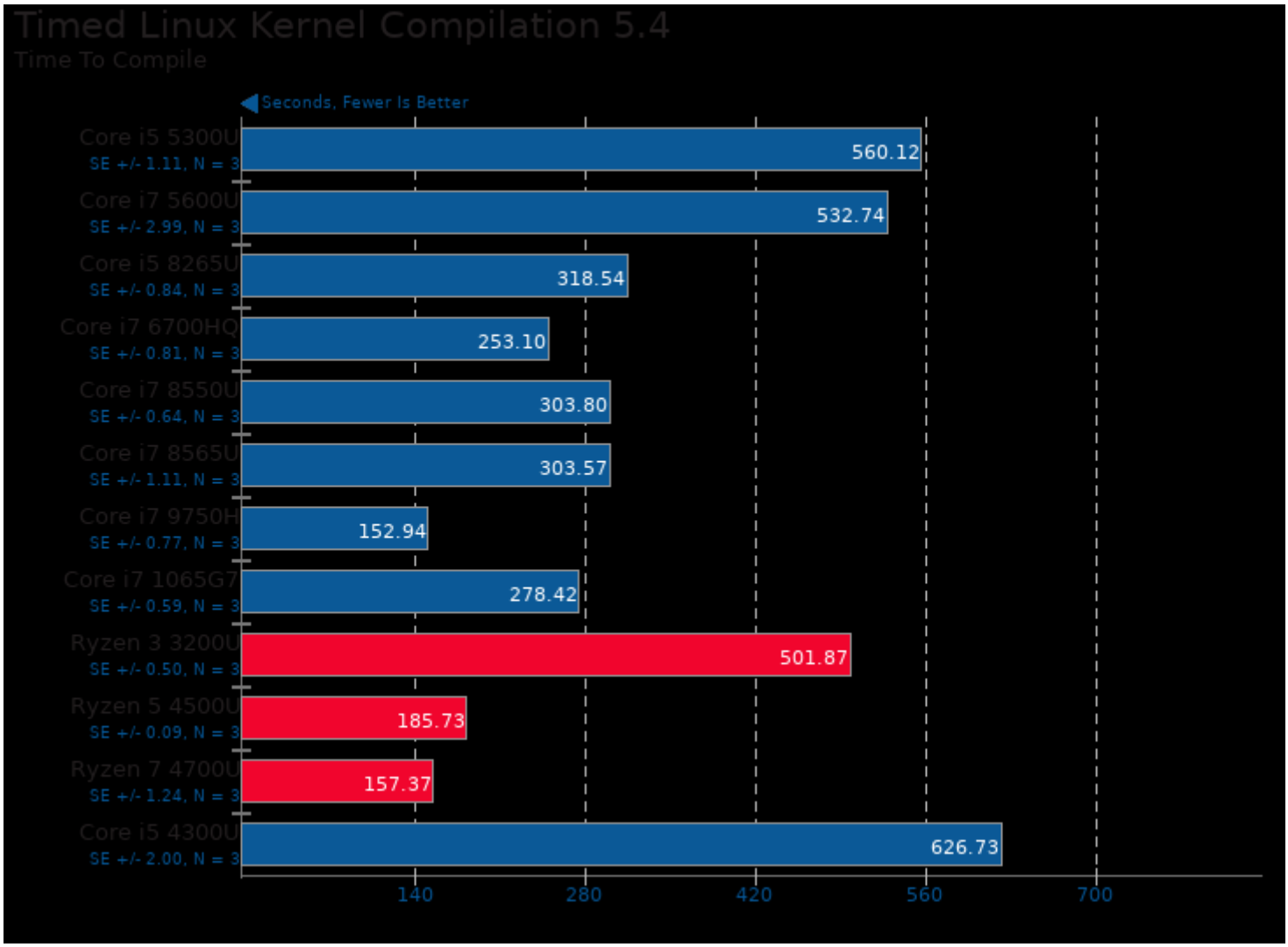

Intel Open Image Denoise 1.0.0
Scene: Memorial
Images / Sec, More Is Better
Core i5 5300U
SE +/- 0.00, N = 3
1.27
Core i7 5600U
SE +/- 0.00, N = 3
1.12
Core i5 8265U
SE +/- 0.00, N = 3
2.05
Core i7 6700HQ
SE +/- 0.01, N = 3
2.95
Core i7 8550U
SE +/- 0.03, N = 3
2.24
Core i7 8565U
SE +/- 0.02, N = 3
2.21
Core i7 9750H
SE +/- 0.00, N = 3
4.29
Core i7 1065G7
SE +/- 0.05, N = 7
4.56
Ryzen 3 3200U
SE +/- 0.00, N = 3
0.78
Ryzen 5 4500U
SE +/- 0.02, N = 3
4.24
Ryzen 7 4700U
SE +/- 0.05, N = 15
4.64
Core i5 4300U
SE +/- 0.01, N = 3
1.03
1.044
2.088
3.132
4.176
5.22


Timed FFmpeg Compilation 4.2.2
Time To Compile
Seconds, Fewer Is Better
Core i5 5300U
SE +/- 0.44, N = 3
354.81
Core i7 5600U
SE +/- 0.63, N = 3
343.79
Core i5 8265U
SE +/- 0.21, N = 3
209.33
Core i7 6700HQ
SE +/- 0.23, N = 3
162.18
Core i7 8550U
SE +/- 0.31, N = 3
197.52
Core i7 8565U
SE +/- 0.16, N = 3
201.30
Core i7 9750H
SE +/- 0.26, N = 3
101.37
Core i7 1065G7
SE +/- 0.59, N = 3
180.48
Ryzen 3 3200U
SE +/- 2.24, N = 3
317.68
Ryzen 5 4500U
SE +/- 0.69, N = 3
116.45
Ryzen 7 4700U
SE +/- 0.03, N = 3
98.89
Core i5 4300U
SE +/- 0.58, N = 3
405.10
90
180
270
360
450

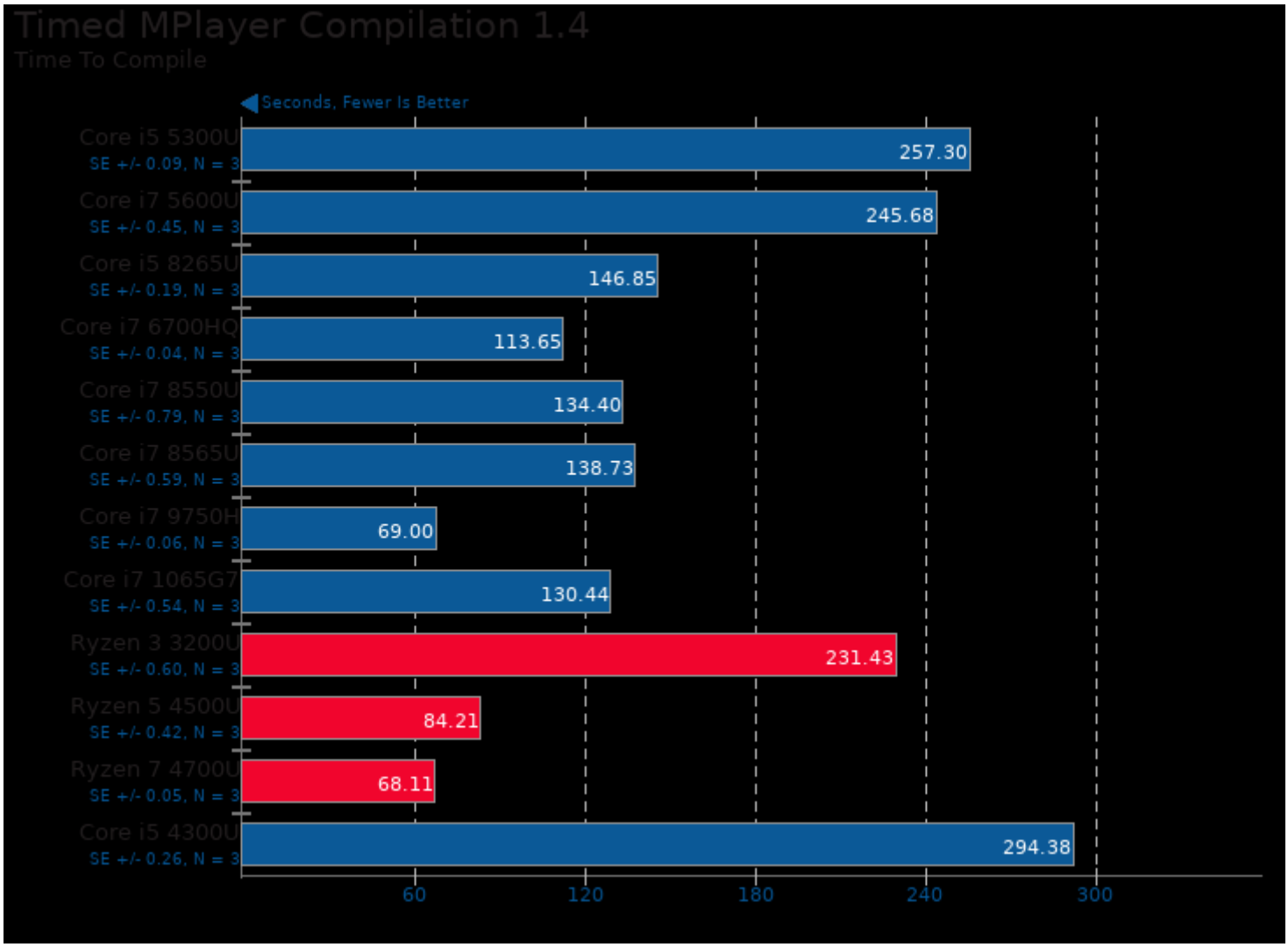
Lenovo Flex 5 AMD Ryzen 5 45ooU



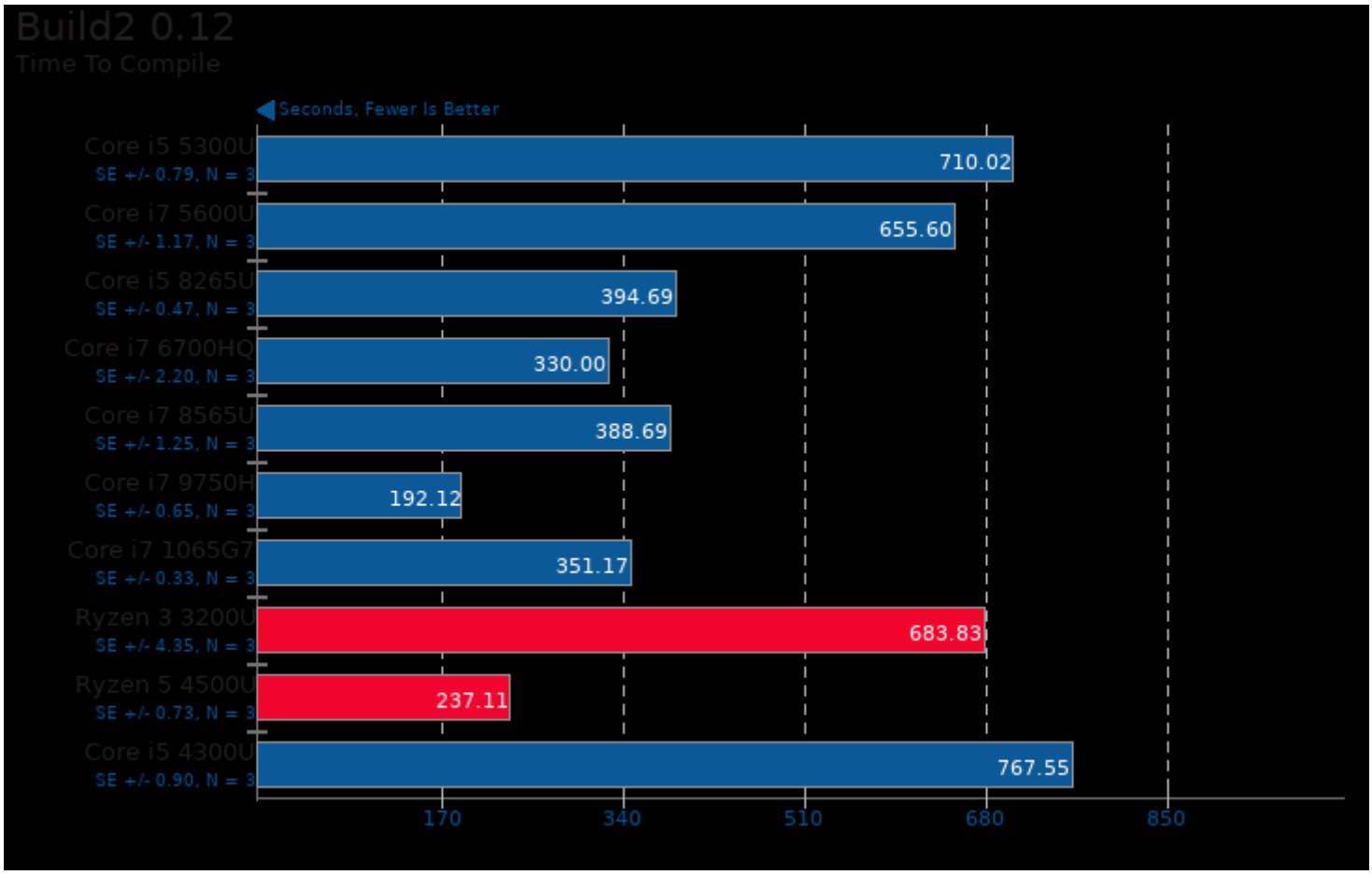
Lenovo Flex 5 AMD Ryzen 5 45ooU



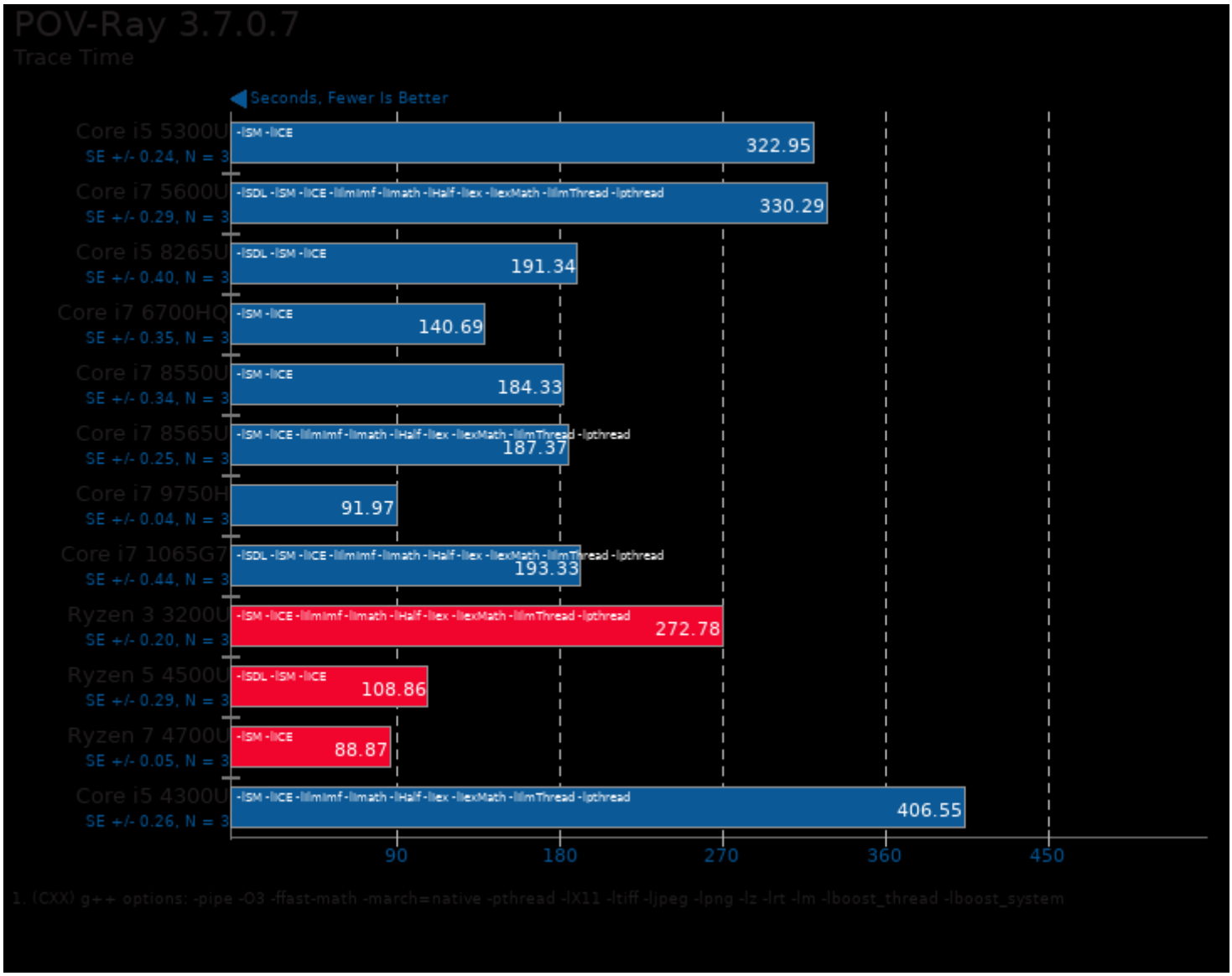
Lenovo Flex 5 AMD Ryzen 5 45ooU



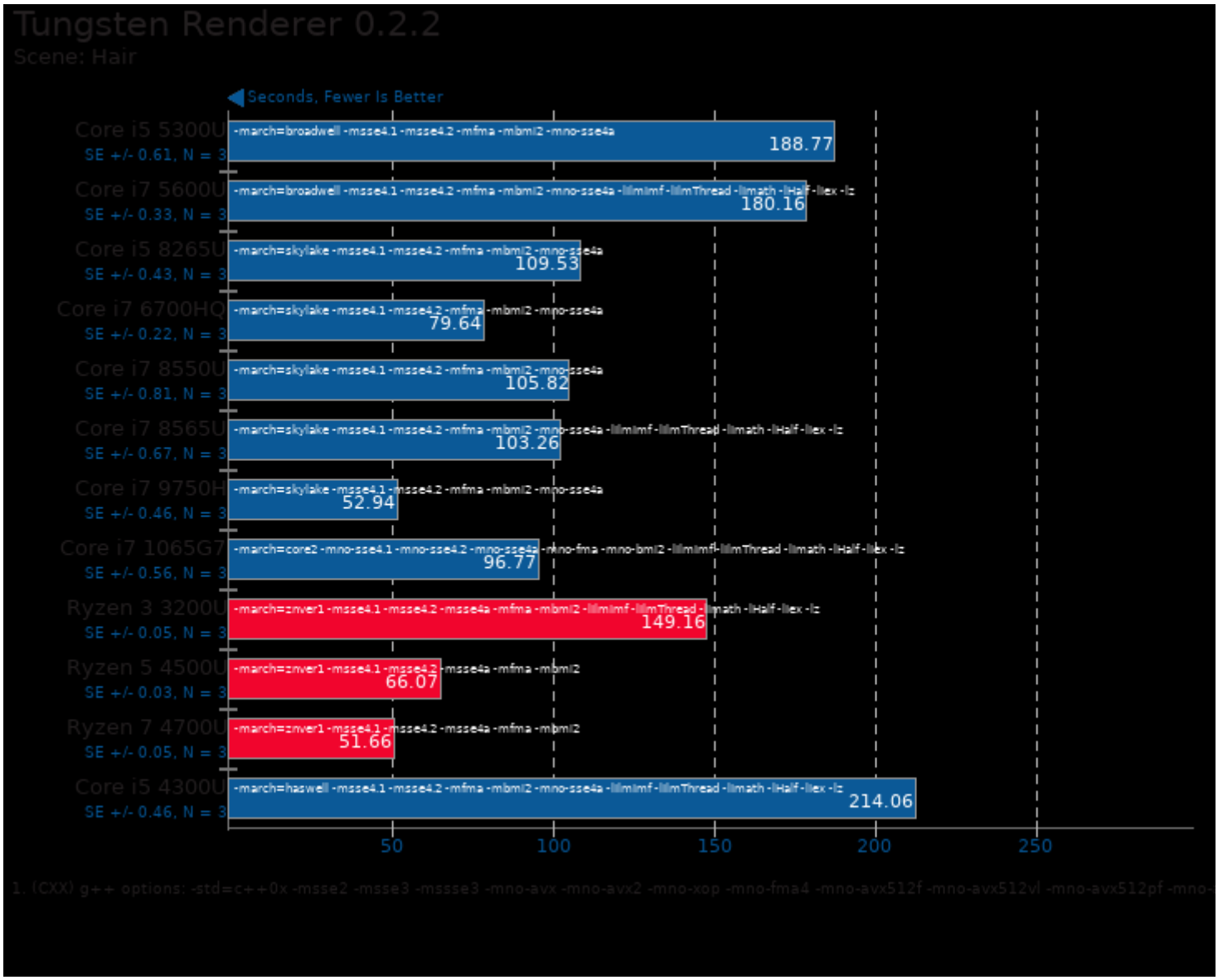
Lenovo Flex 5 AMD Ryzen 5 45ooU

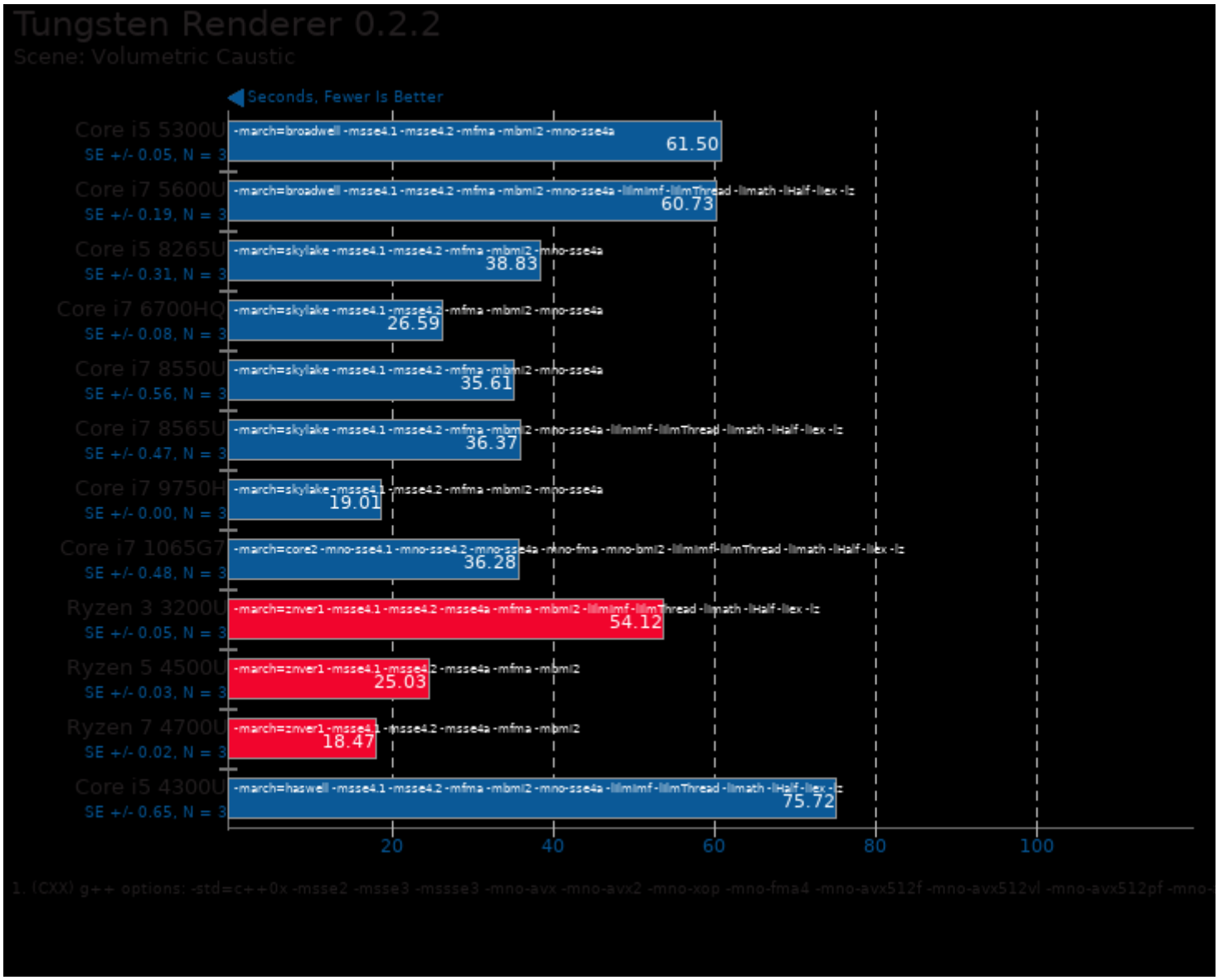


Lenovo Flex 5 AMD Ryzen 5 45ooU

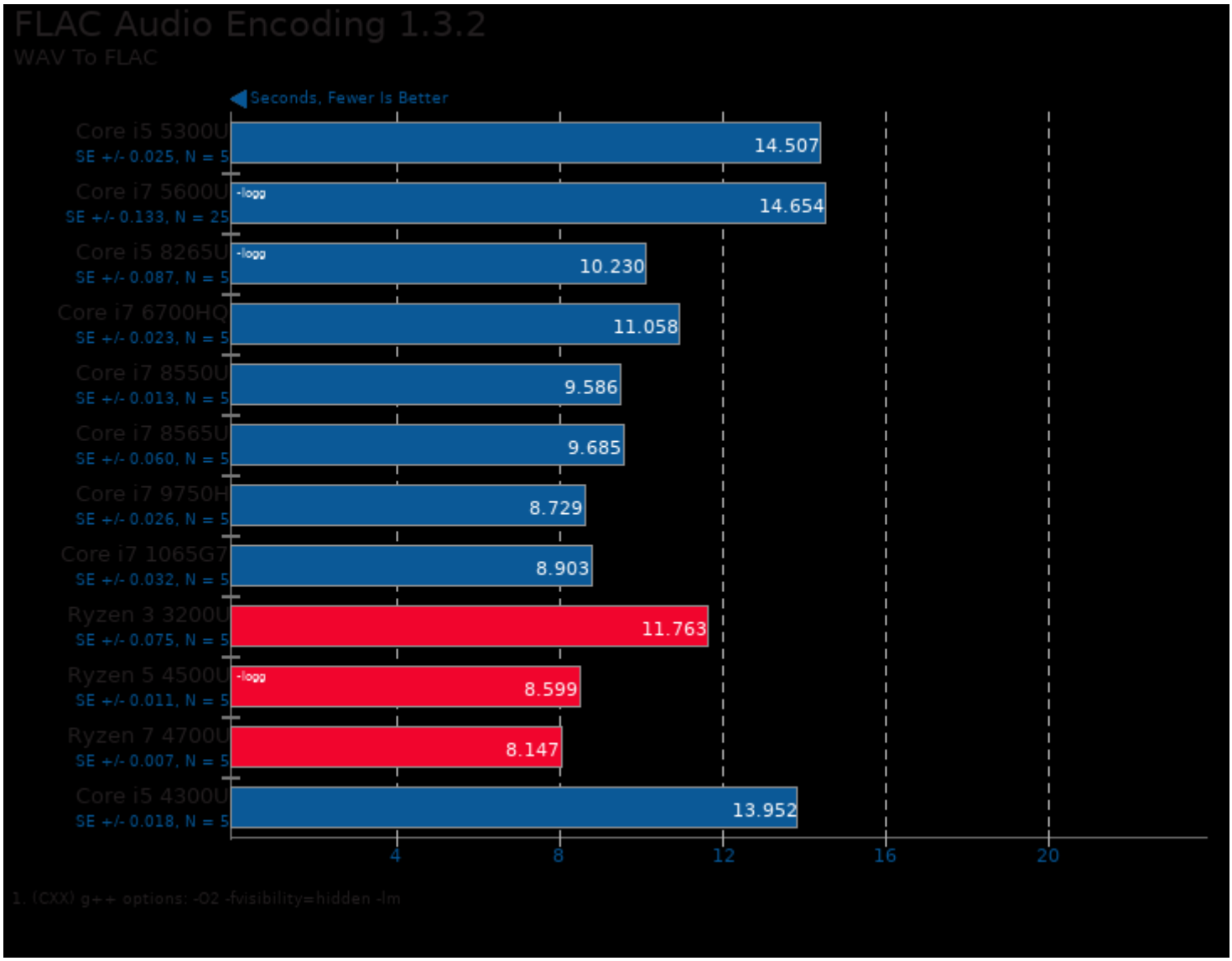


Lenovo Flex 5 AMD Ryzen 5 45ooU

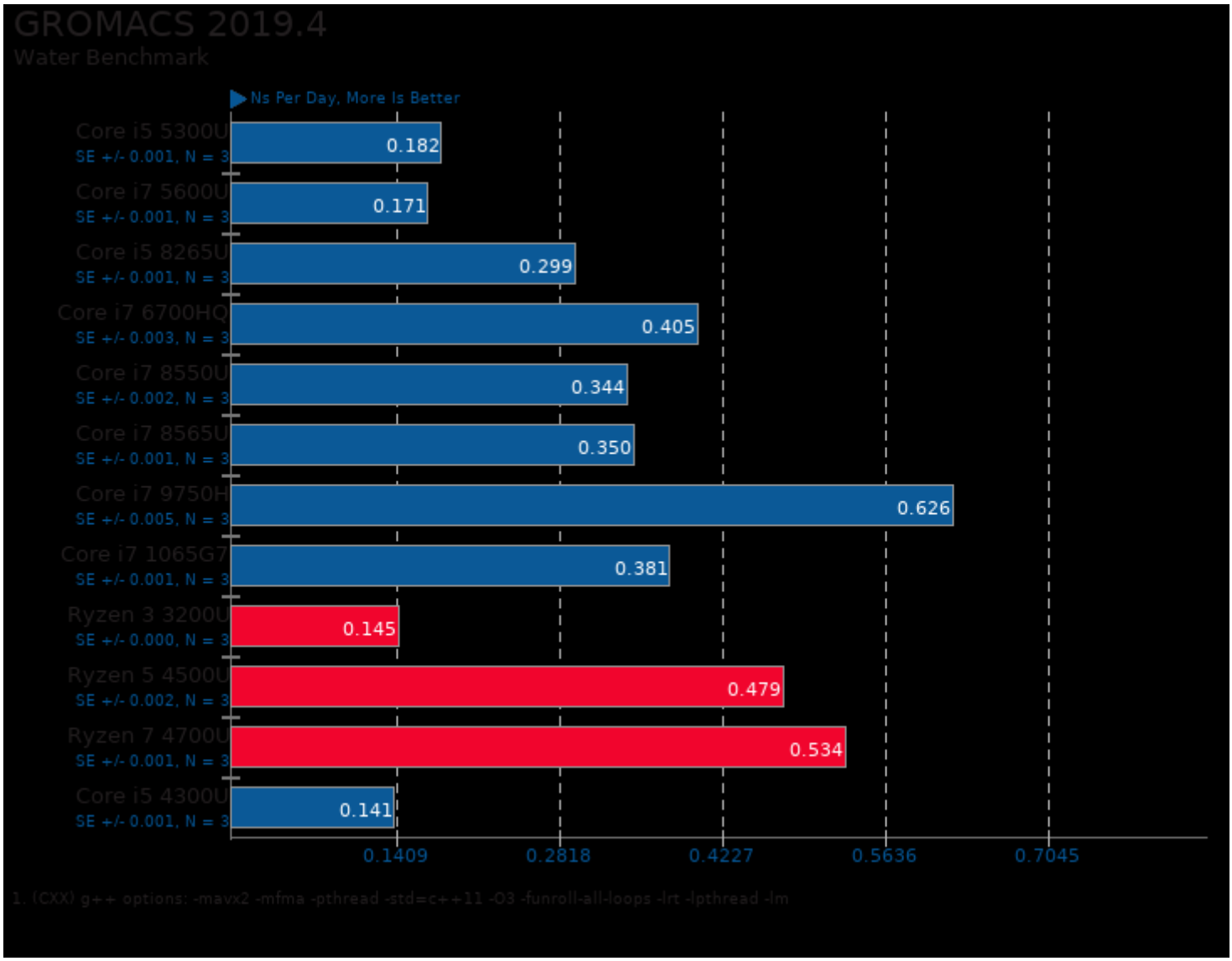



Tungsten Renderer 0.2.2
Scene: Volumetric Caustic
Seconds, Fewer Is Better
Core i5 5300U
SE +/- 0.05, N = 3
-march=broadwell -msse4.1 -msse4.2 -mfma -mbmi2 -mno-sse4a
61.50
Core i7 5600U
SE +/- 0.19, N = 3
-march=broadwell -msse4.1 -msse4.2 -mfma -mbmi2 -mno-sse4a -lilmimf -lilmThread -limath -lHalf -liex -lz
60.73
Core i5 8265U
SE +/- 0.31, N = 3
-march=skylake -msse4.1 -msse4.2 -mfma -mbmi2 -mno-sse4a
38.83
Core i7 6700HQ
SE +/- 0.08, N = 3
-march=skylake -msse4.1 -msse4.2 -mfma -mbmi2 -mno-sse4a
26.59
Core i7 8550U
SE +/- 0.56, N = 3
-march=skylake -msse4.1 -msse4.2 -mfma -mbmi2 -mno-sse4a
35.61
Core i7 8565U
SE +/- 0.47, N = 3
-march=skylake -msse4.1 -msse4.2 -mfma -mbmi2 -mno-sse4a -lilmimf -lilmThread -limath -lHalf -liex -lz
36.37
Core i7 9750H
SE +/- 0.00, N = 3
-march=skylake -msse4.1 -msse4.2 -mfma -mbmi2 -mno-sse4a
19.01
Core i7 1065G7
SE +/- 0.48, N = 3
-march=core2 -mno-sse4.1 -mno-sse4.2 -mno-sse4a -mno-fma -mno-bmi2 -lilmimf -lilmThread -limath -lHalf -liex -lz
36.28
Ryzen 3 3200U
SE +/- 0.05, N = 3
-march=znver1 -msse4.1 -msse4.2 -msse4a -mfma -mbmi2 -lilmimf -lilmThread -limath -lHalf -liex -lz
54.12
Ryzen 5 4500U
SE +/- 0.03, N = 3
-march=znver1 -msse4.1 -msse4.2 -msse4a -mfma -mbmi2
25.03
Ryzen 7 4700U
SE +/- 0.02, N = 3
-march=znver1 -msse4.1 -msse4.2 -msse4a -mfma -mbmi2
18.47
Core i5 4300U
SE +/- 0.65, N = 3
-march=haswell -msse4.1 -msse4.2 -mfma -mbmi2 -mno-sse4a -lilmimf -lilmThread -limath -lHalf -liex -lz
75.72
20
40
60
80
100
1. (CXX) g++ options: -std=c++0x -msse2 -msse3 -mssse3 -mno-avx -mno-avx2 -mno-xop -mno-fma4 -mno-avx512f -mno-avx512vl -mno-avx512pf -mno-

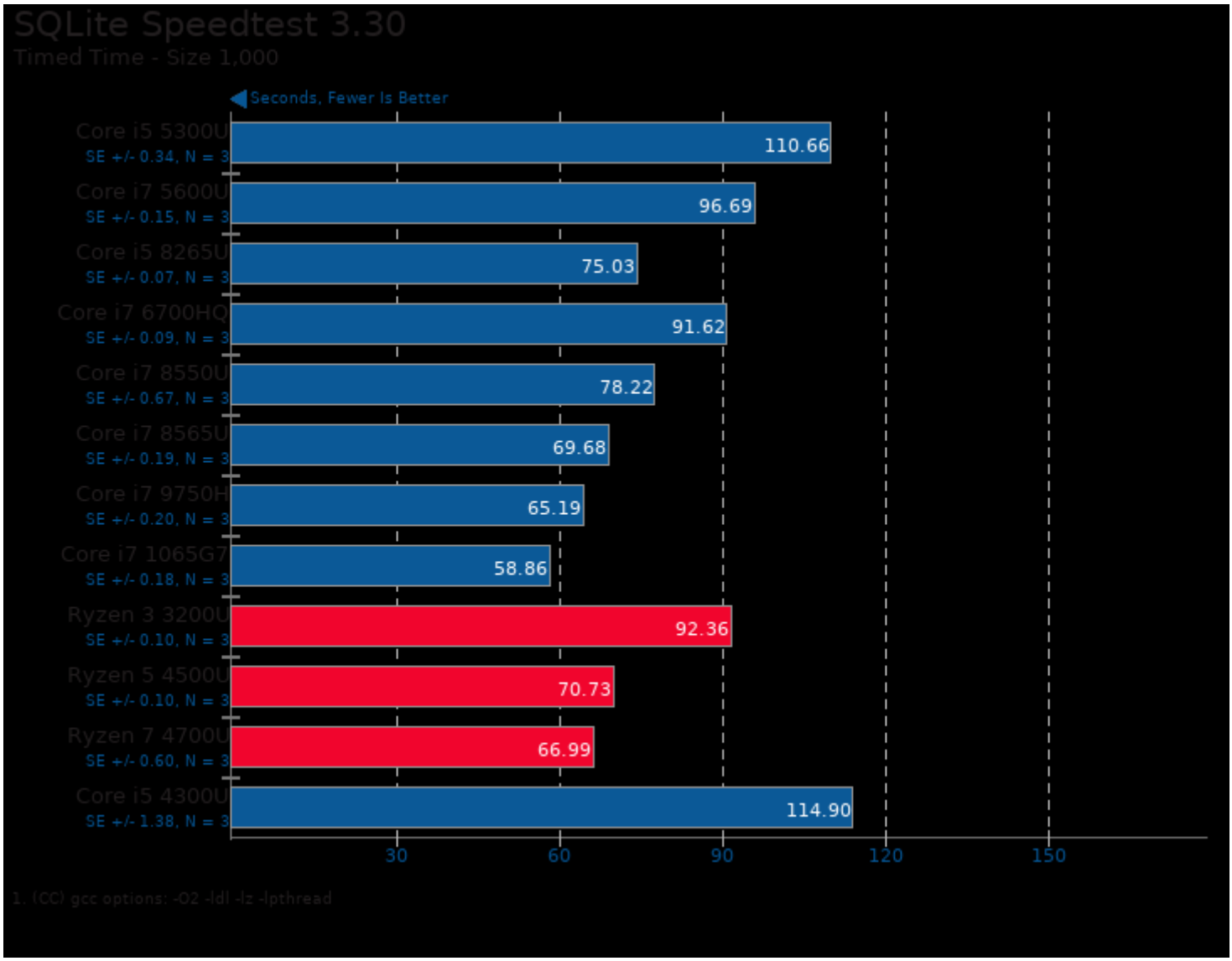
Lenovo Flex 5 AMD Ryzen 5 45ooU

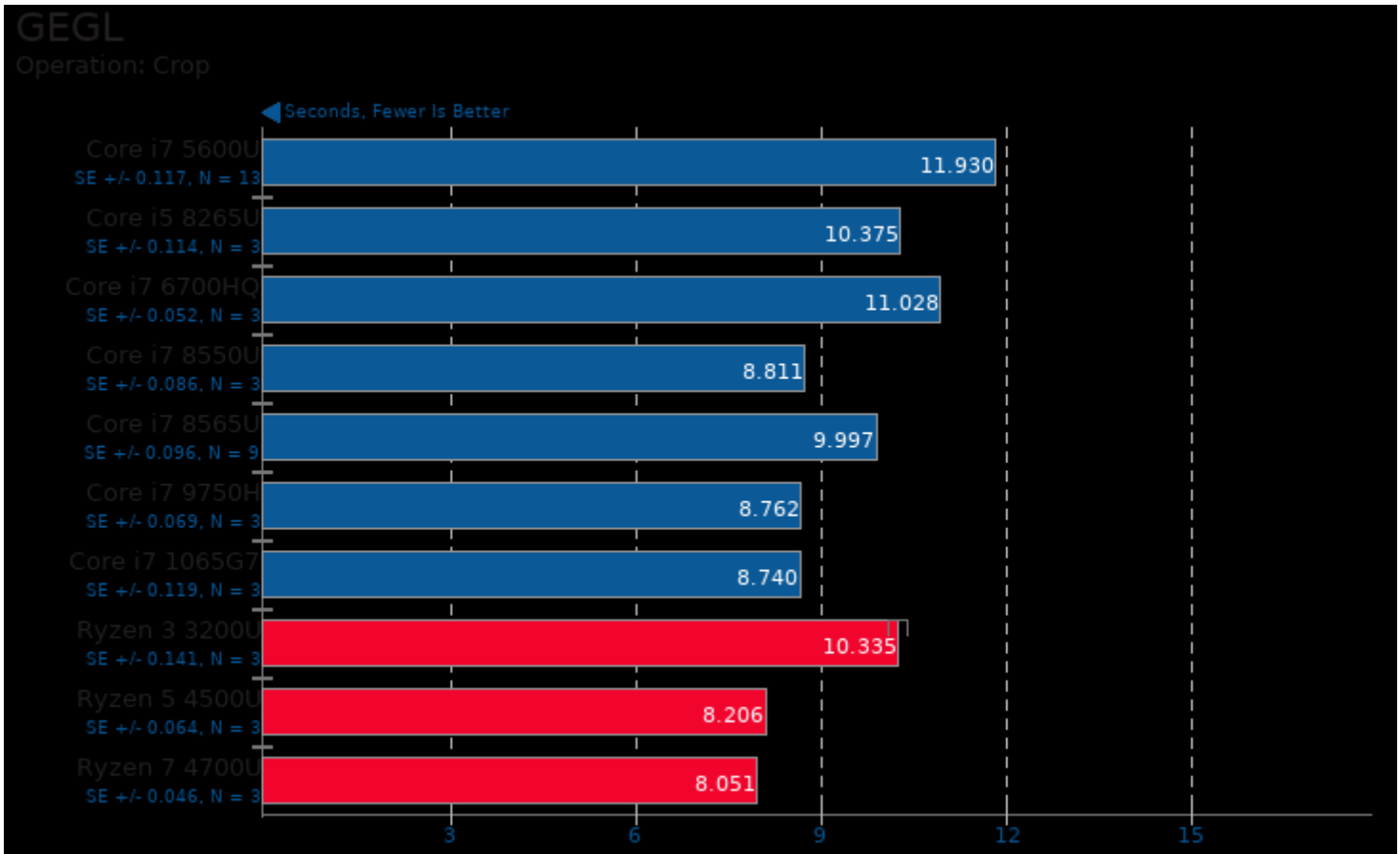


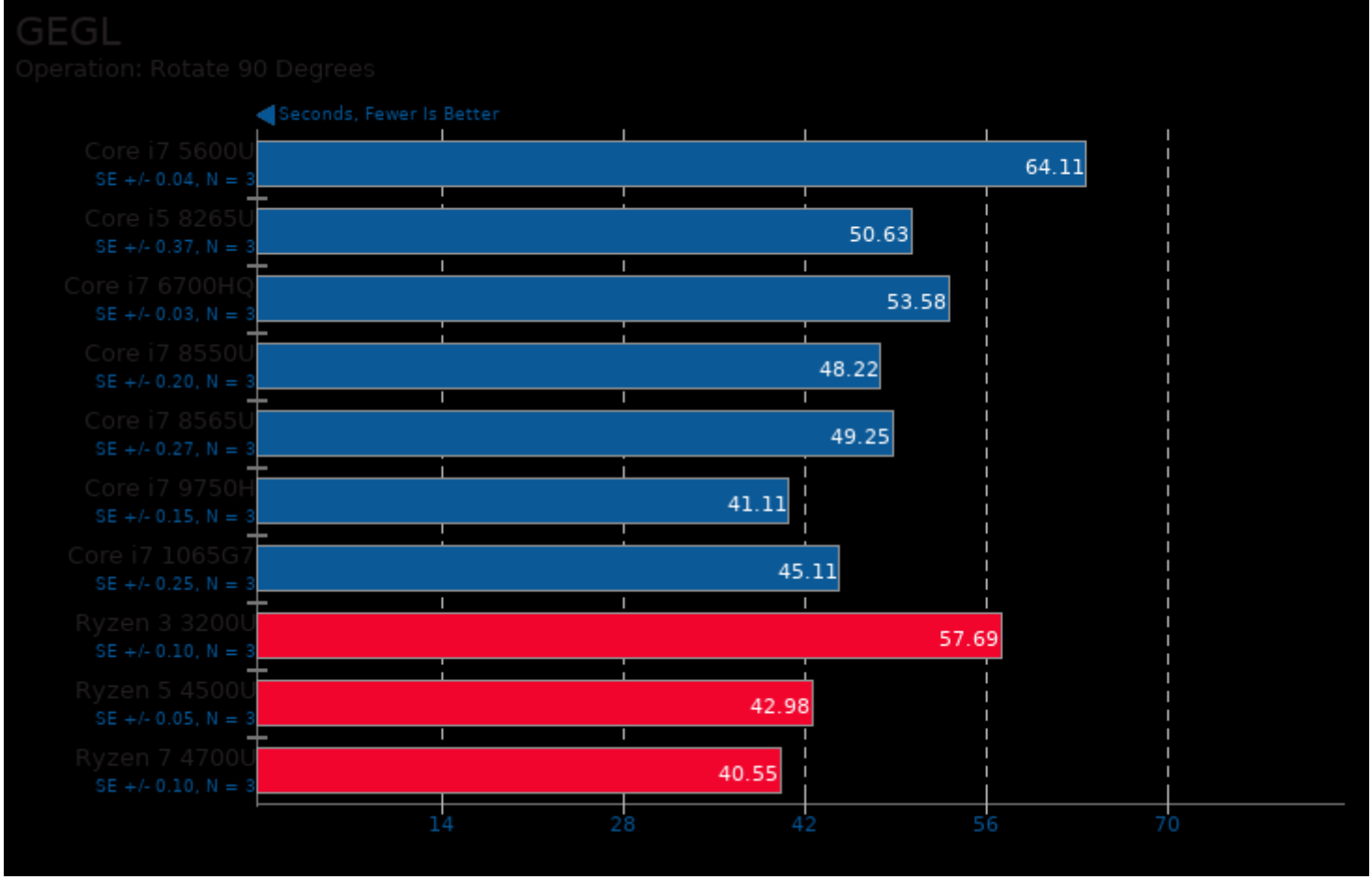
Lenovo Flex 5 AMD Ryzen 5 45ooU

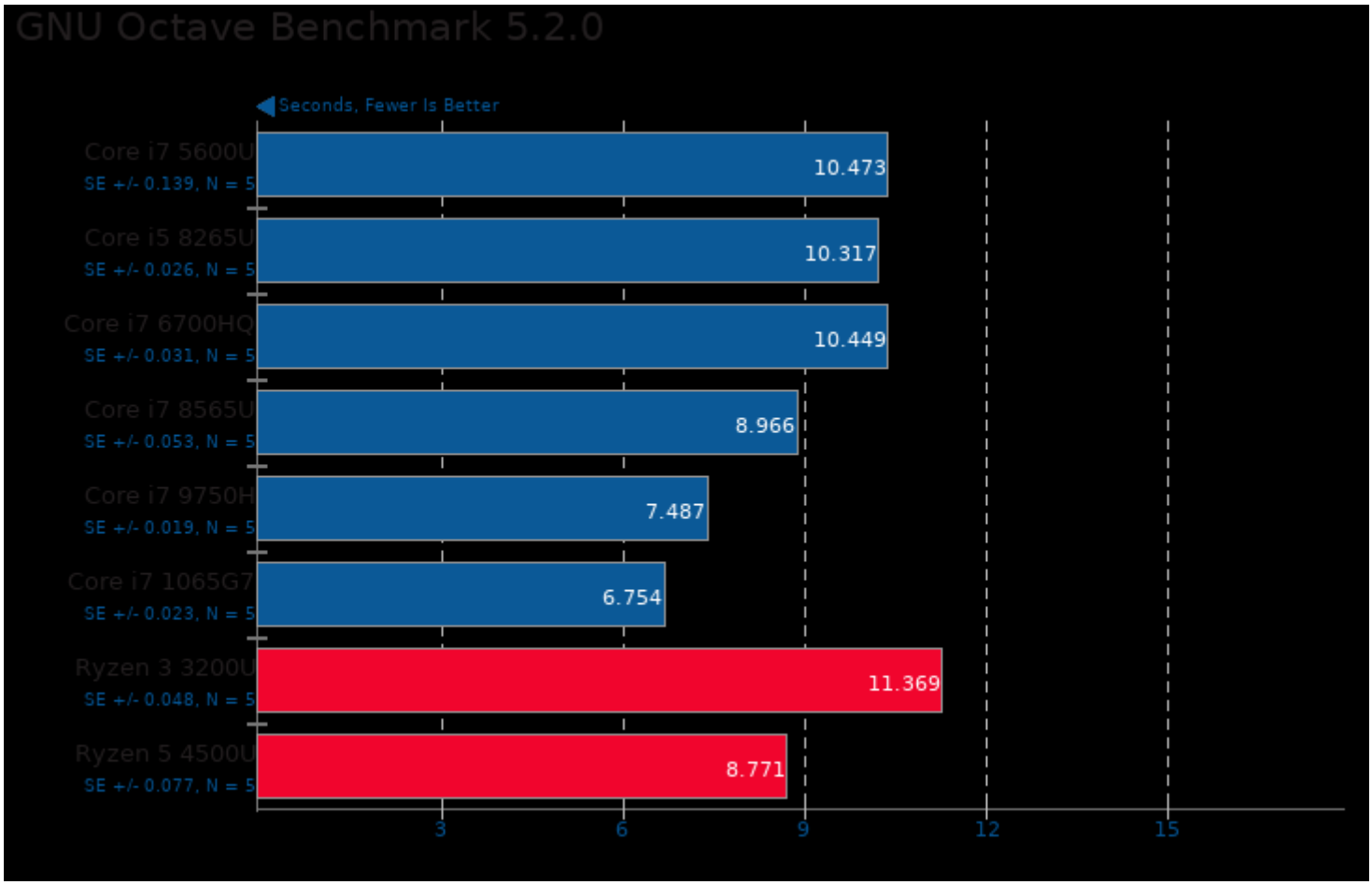


Lenovo Flex 5 AMD Ryzen 5 45ooU

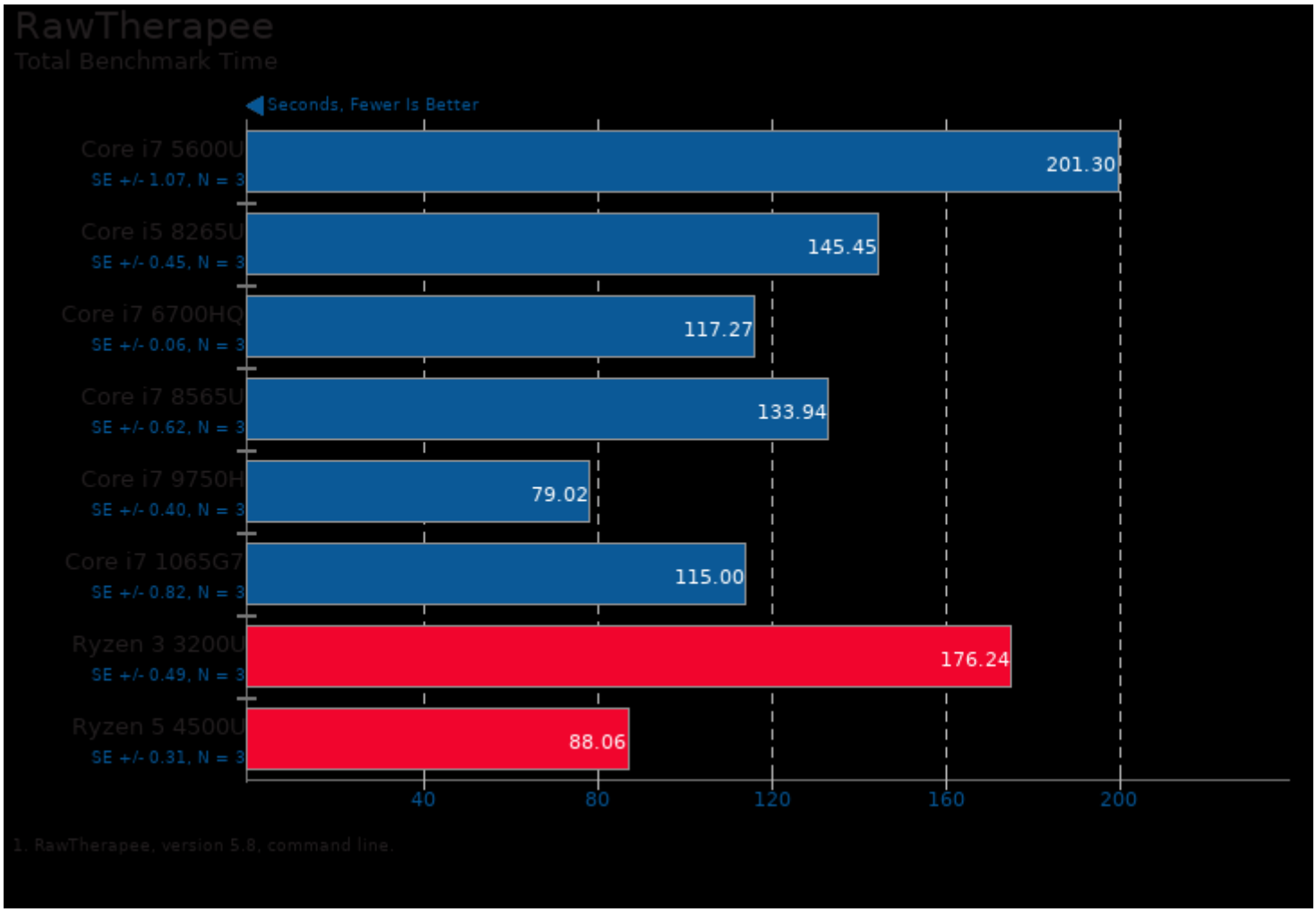


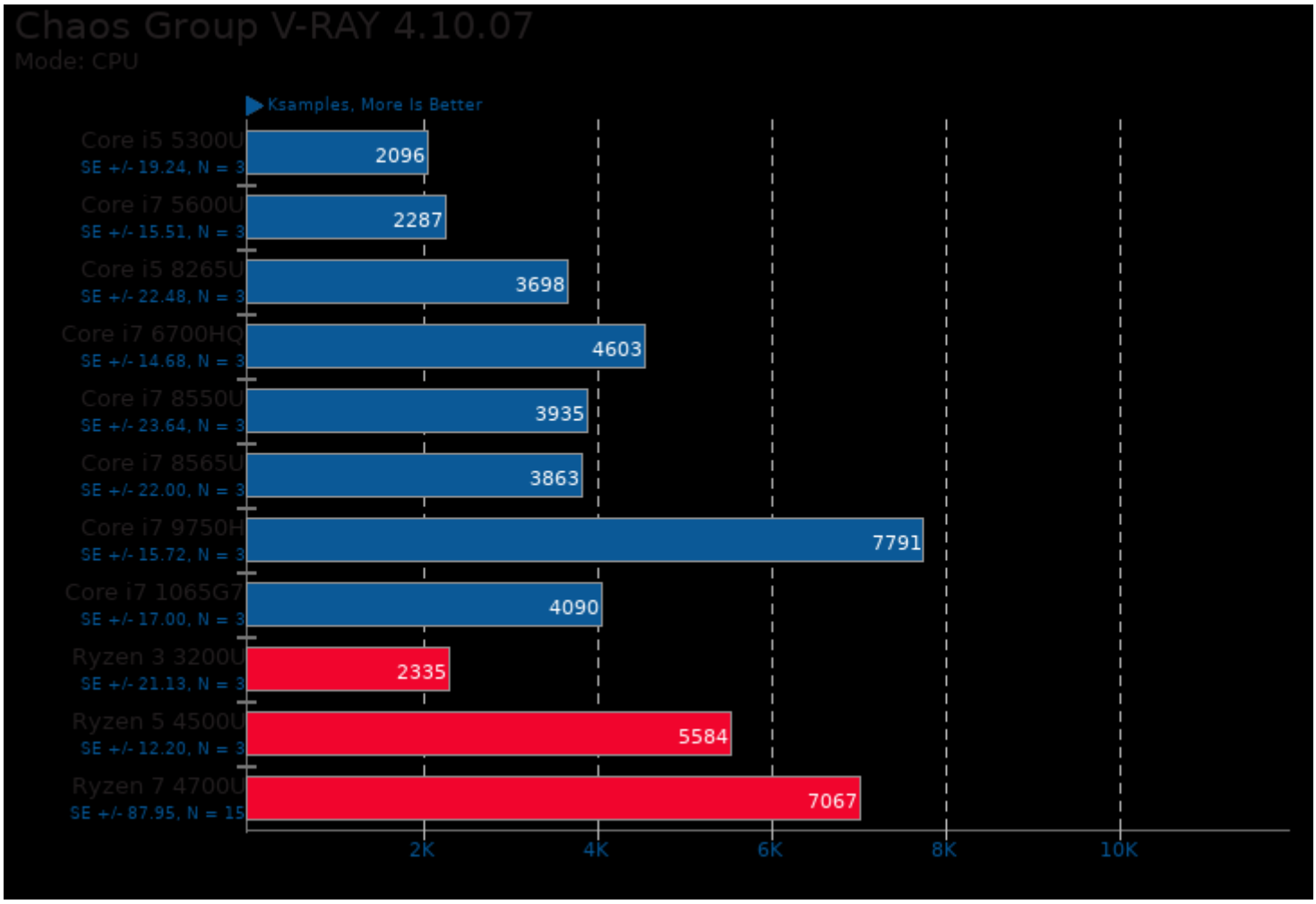

GEGL
Operation: Crop
Seconds, Fewer Is Better
Core i7 5600U
SE +/- 0.117, N = 13
11.930
Core i5 8265U
SE +/- 0.114, N = 3
10.375
Core i7 6700HQ
SE +/- 0.052, N = 3
11.028
Core i7 8550U
SE +/- 0.086, N = 3
8.811
Core i7 8565U
SE +/- 0.096, N = 9
9.997
Core i7 9750H
SE +/- 0.069, N = 3
8.762
Core i7 1065G7
SE +/- 0.119, N = 3
8.740
Ryzen 3 3200U
SE +/- 0.141, N = 3
10.335
Ryzen 5 4500U
SE +/- 0.064, N = 3
8.206
Ryzen 7 4700U
SE +/- 0.046, N = 3
8.051
3
6
9
12
15


GEGL
Operation: Rotate 90 Degrees
Seconds, Fewer Is Better
Core i7 5600U
SE +/- 0.04, N = 3
64.11
Core i5 8265U
SE +/- 0.37, N = 3
50.63
Core i7 6700HQ
SE +/- 0.03, N = 3
53.58
Core i7 8550U
SE +/- 0.20, N = 3
48.22
Core i7 8565U
SE +/- 0.27, N = 3
49.25
Core i7 9750H
SE +/- 0.15, N = 3
41.11
Core i7 1065G7
SE +/- 0.25, N = 3
45.11
Ryzen 3 3200U
SE +/- 0.10, N = 3
57.69
Ryzen 5 4500U
SE +/- 0.05, N = 3
42.98
Ryzen 7 4700U
SE +/- 0.10, N = 3
40.55
14
28
42
56
70

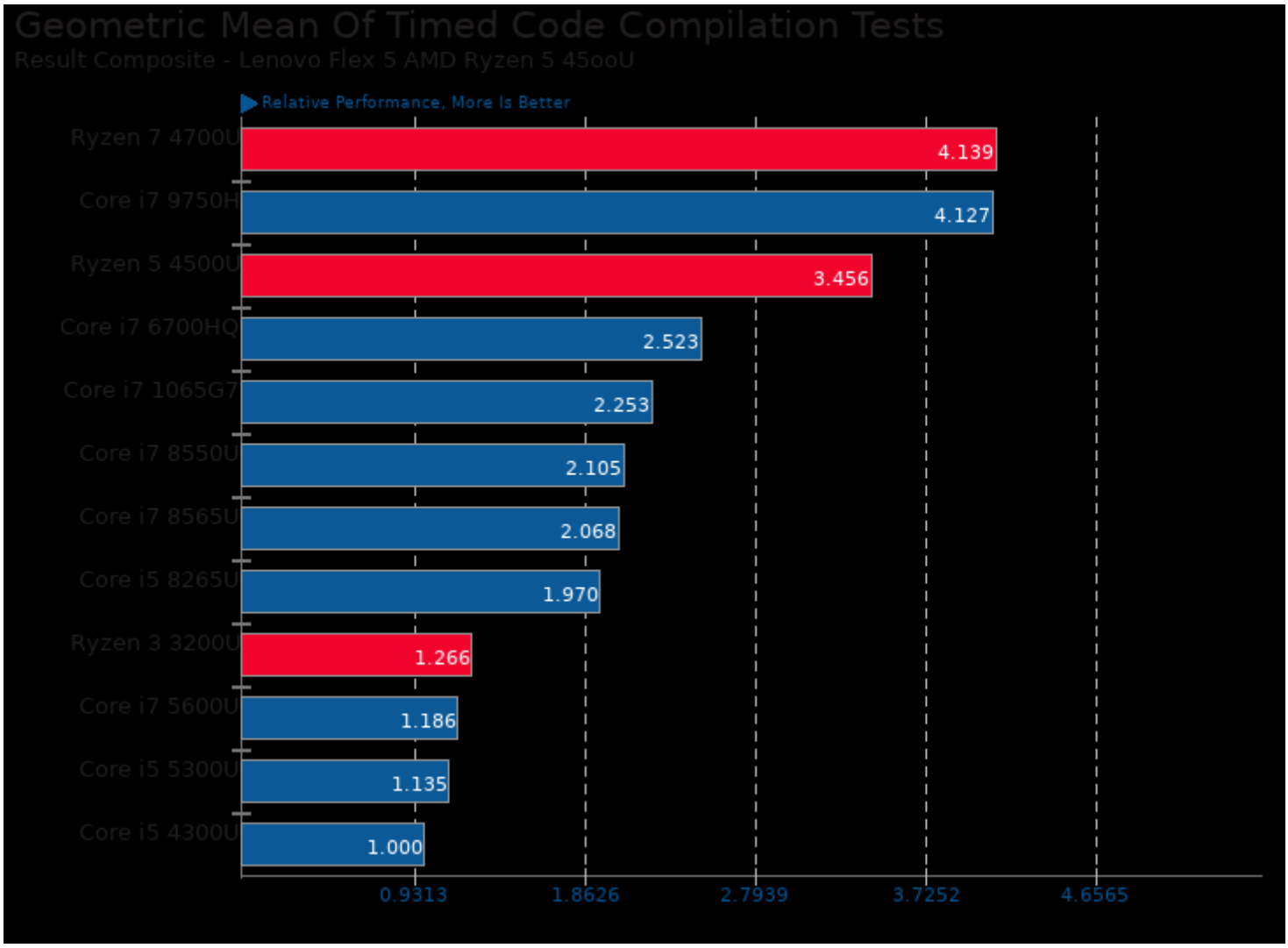

GNU Octave Benchmark 5.2.0
Seconds, Fewer Is Better
Core i7 5600U
SE +/- 0.139, N = 5
10.473
Core i5 8265U
SE +/- 0.026, N = 5
10.317
Core i7 6700HQ
SE +/- 0.031, N = 5
10.449
Core i7 8565U
SE +/- 0.053, N = 5
8.966
Core i7 9750H
SE +/- 0.019, N = 5
7.487
Core i7 1065G7
SE +/- 0.023, N = 5
6.754
Ryzen 3 3200U
SE +/- 0.048, N = 5
11.369
Ryzen 5 4500U
SE +/- 0.077, N = 5
8.771
3
6
9
12
15

Lenovo Flex 5 AMD Ryzen 5 45ooU

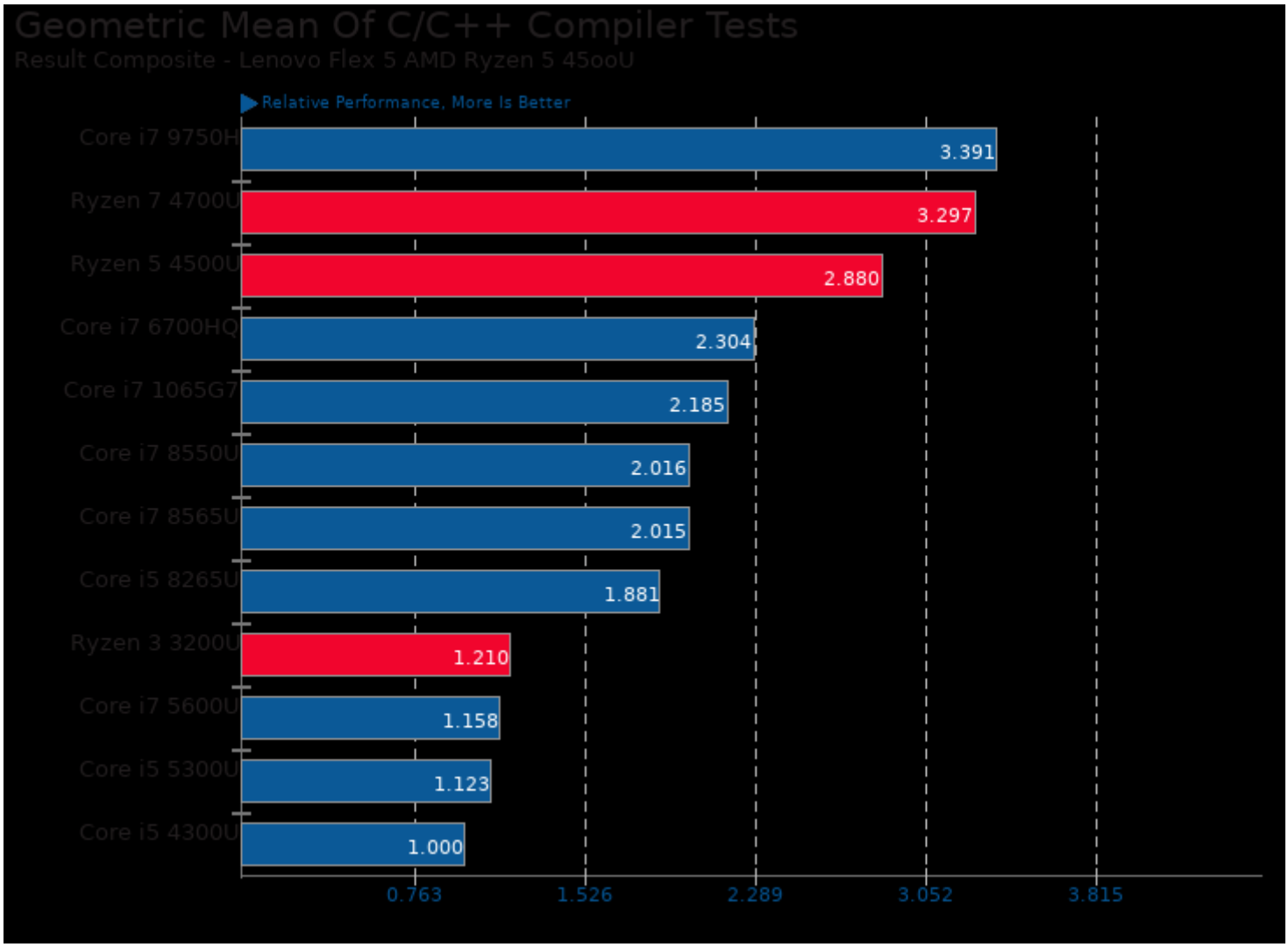



Chaos Group V-RAY 4.10.07
Mode: CPU
Ksamples, More Is Better
Core i5 5300U
SE +/- 19.24, N = 3
2096
Core i7 5600U
SE +/- 15.51, N = 3
2287
Core i5 8265U
SE +/- 22.48, N = 3
3698
Core i7 6700HQ
SE +/- 14.68, N = 3
4603
Core i7 8550U
SE +/- 23.64, N = 3
3935
Core i7 8565U
SE +/- 22.00, N = 3
3863
Core i7 9750H
SE +/- 15.72, N = 3
7791
Core i7 1065G7
SE +/- 17.00, N = 3
4090
Ryzen 3 3200U
SE +/- 21.13, N = 3
2335
Ryzen 5 4500U
SE +/- 12.20, N = 3
5584
Ryzen 7 4700U
SE +/- 87.95, N = 15
7067
2K
4K
6K
8K
10K

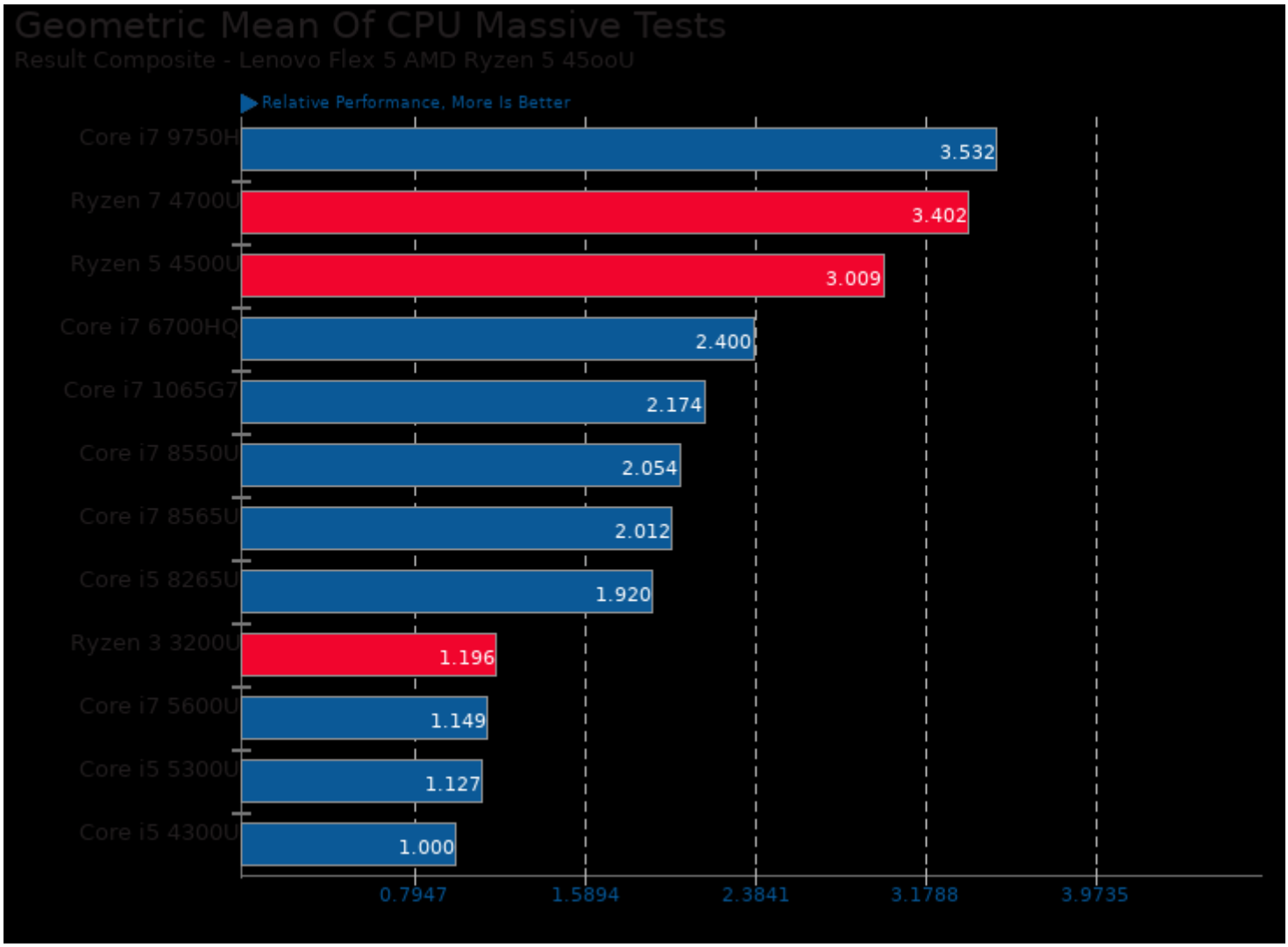
These geometric means are based upon test groupings / test suites for this result file.



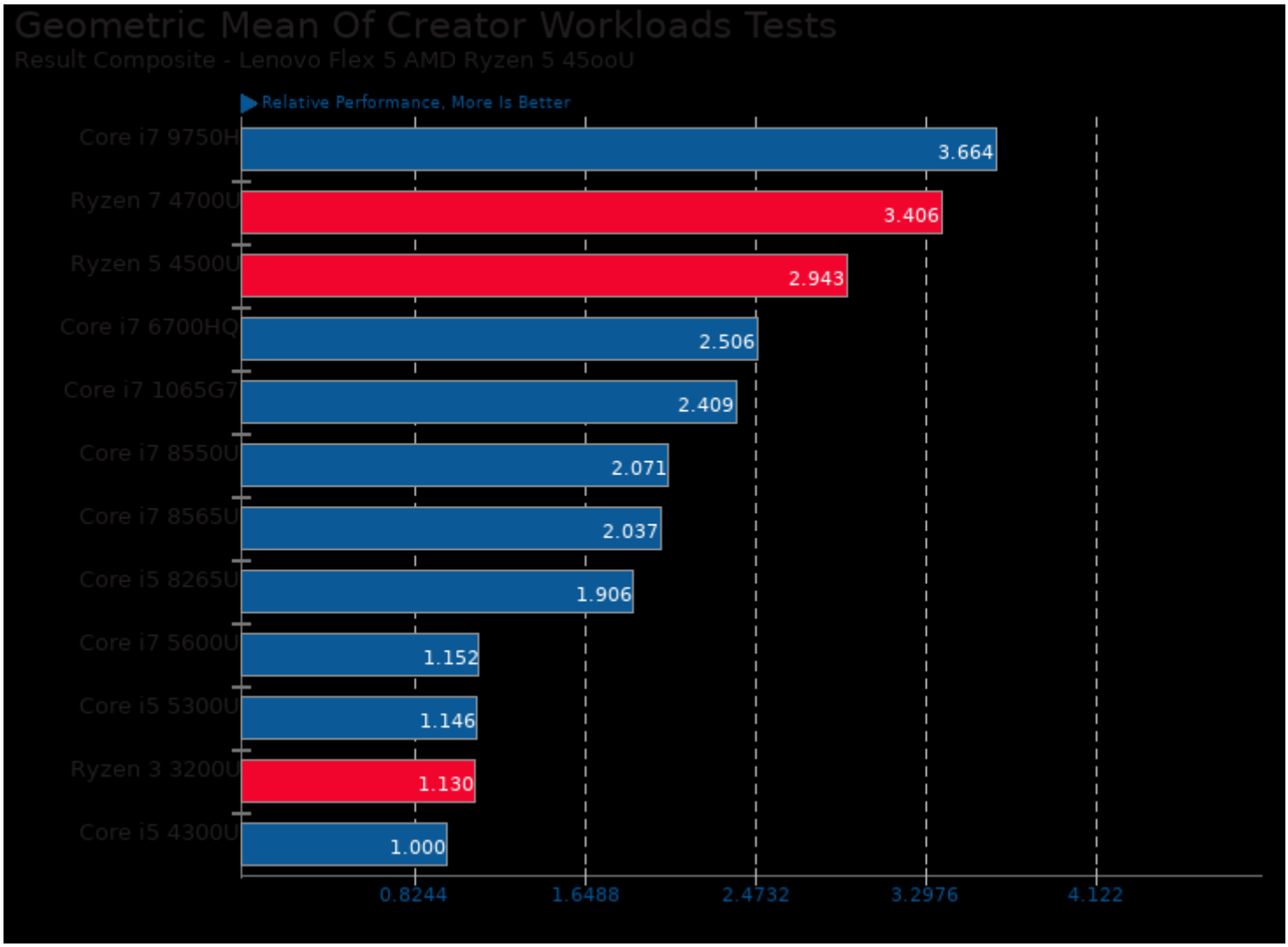
Geometric mean based upon tests: pts/build-linux-kernel, pts/build-gdb, pts/build-ffmpeg, pts/build-mplayer and pts/build2



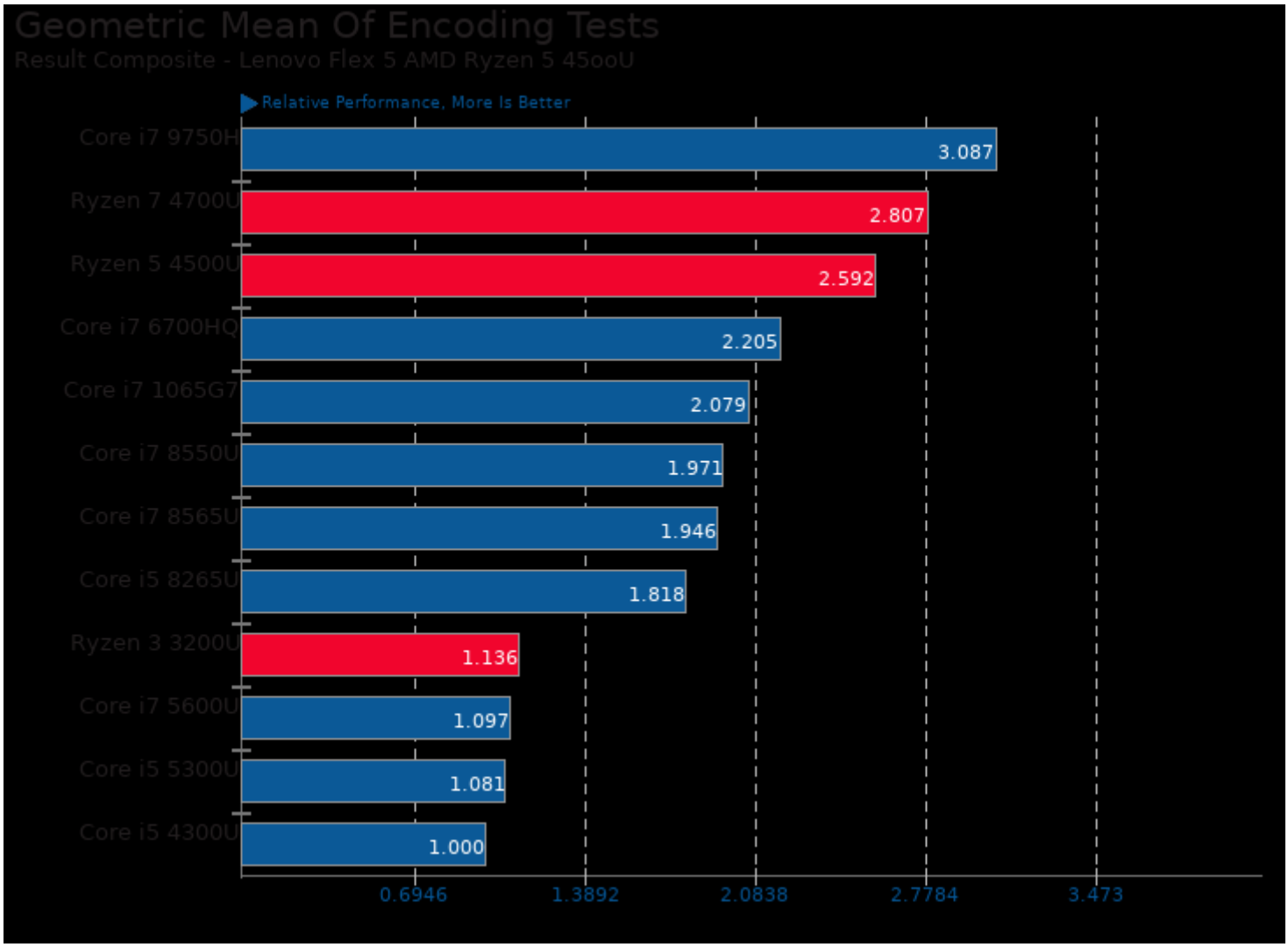
Geometric mean based upon tests: pts/vpxenc, pts/encode-flac, pts/sqlite-speedtest, pts/x264, pts/tungsten, pts/lammps, pts/svt-av1, pts/svt-vp9, pts/gromacs, pts/build-gdb, pts/build-ffmpeg and pts/build-mplayer



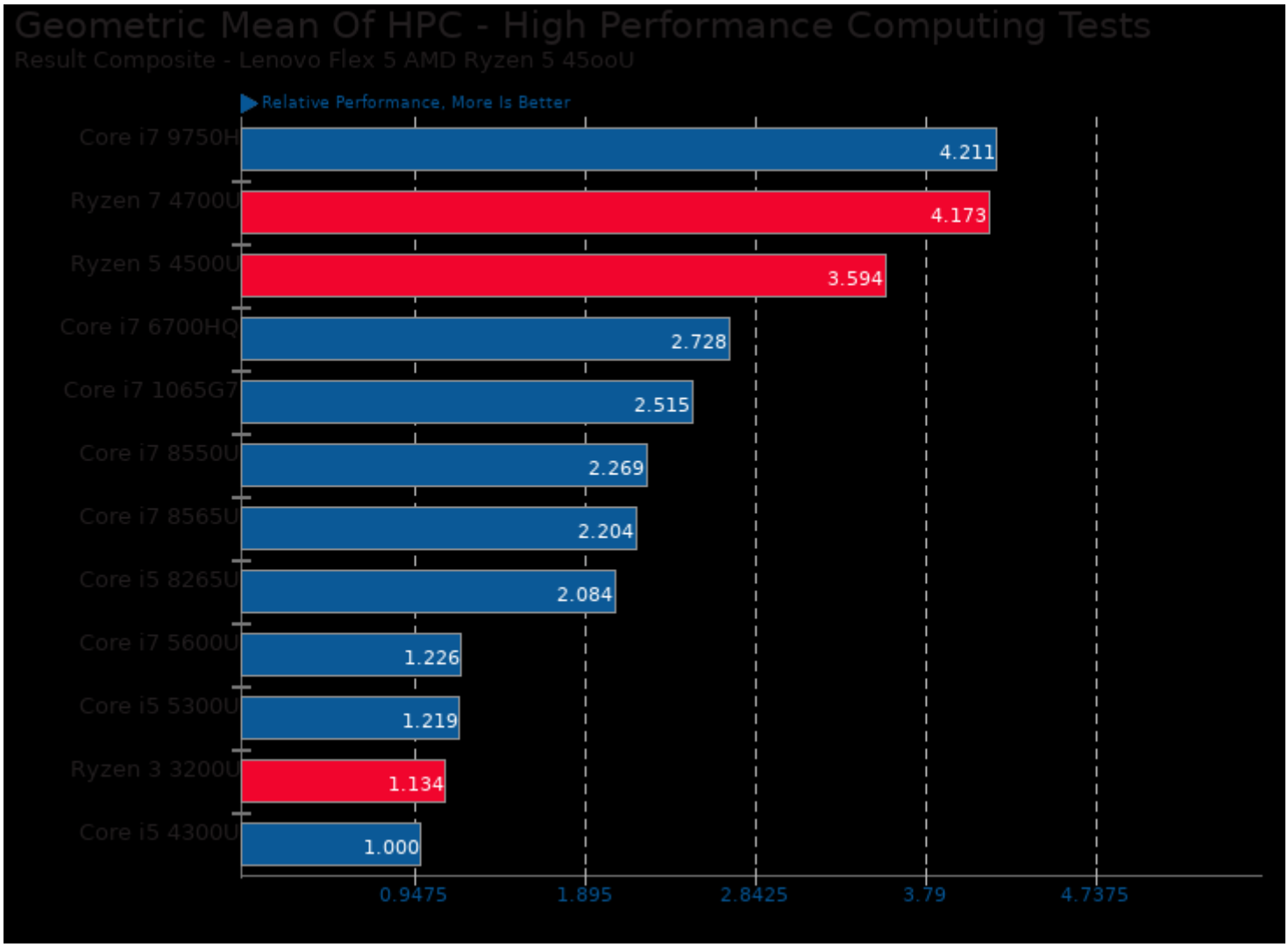
Geometric mean based upon tests: pts/build-linux-kernel, pts/svt-av1, pts/svt-vp9, pts/vpxenc, pts/x264, pts/encode-flac, pts/java-gradle-perf, pts/lammps, pts/namd, pts/povray, pts/v-ray and system/octave-benchmark



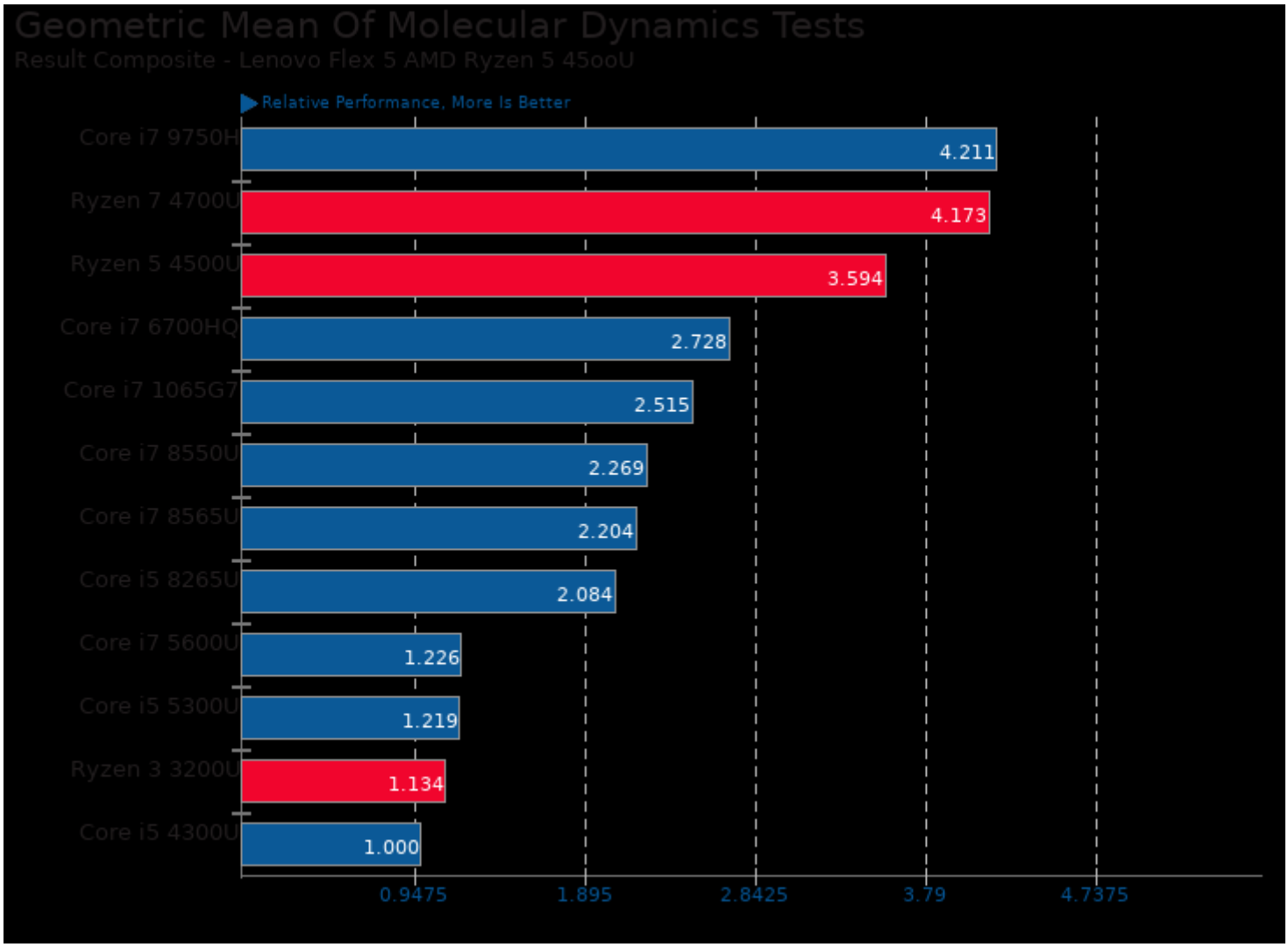
Geometric mean based upon tests: pts/ospray, pts/povray, pts/tungsten, pts/v-ray, pts/svt-vp9, pts/x264, pts/vpxenc, pts/svt-av1, pts/encode-flac, system/rawtherapee, system/gegl, pts/embree and pts/oidn



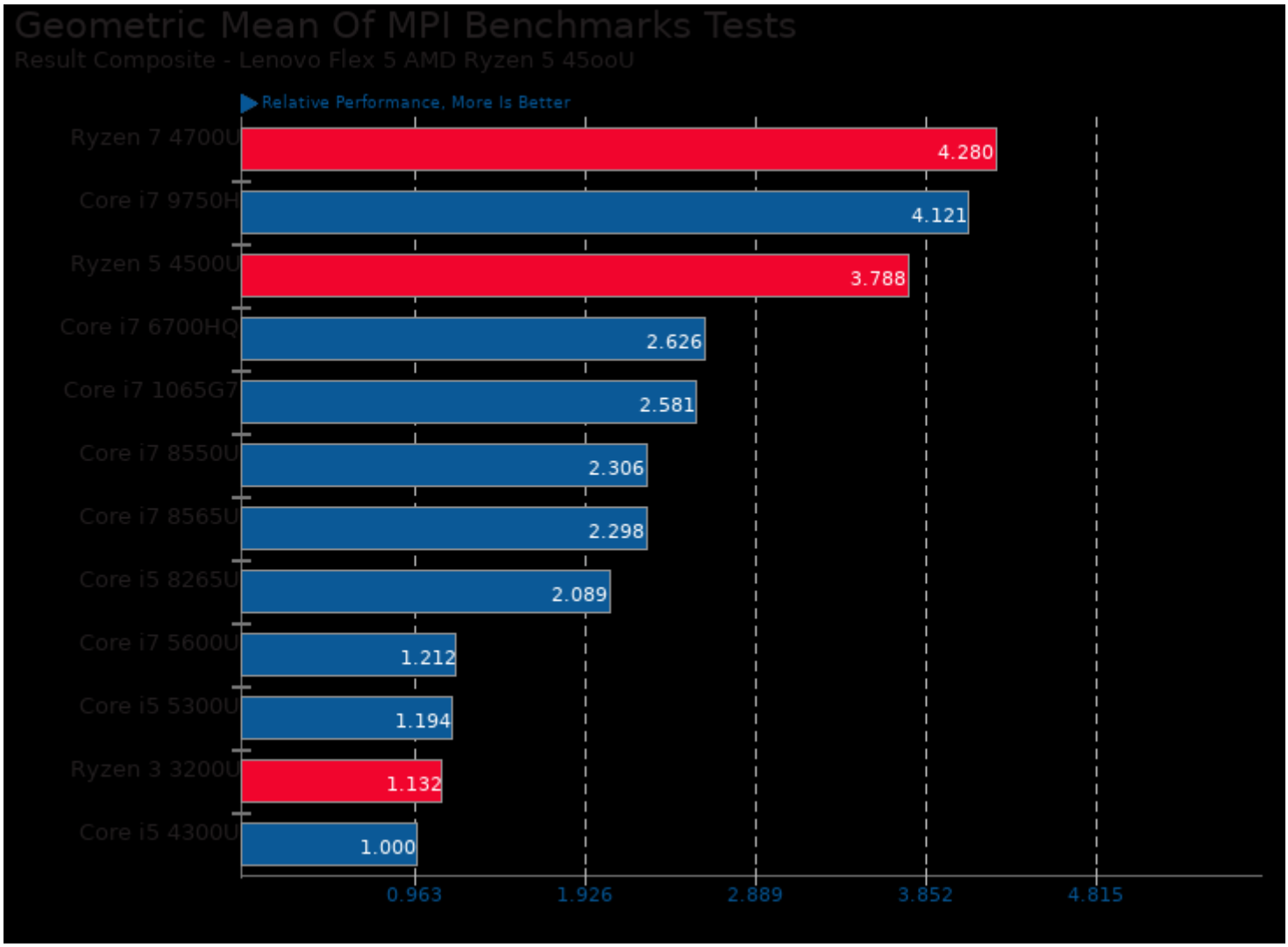
Geometric mean based upon tests: pts/encode-flac, pts/svt-vp9, pts/x264, pts/vpxenc and pts/svt-av1



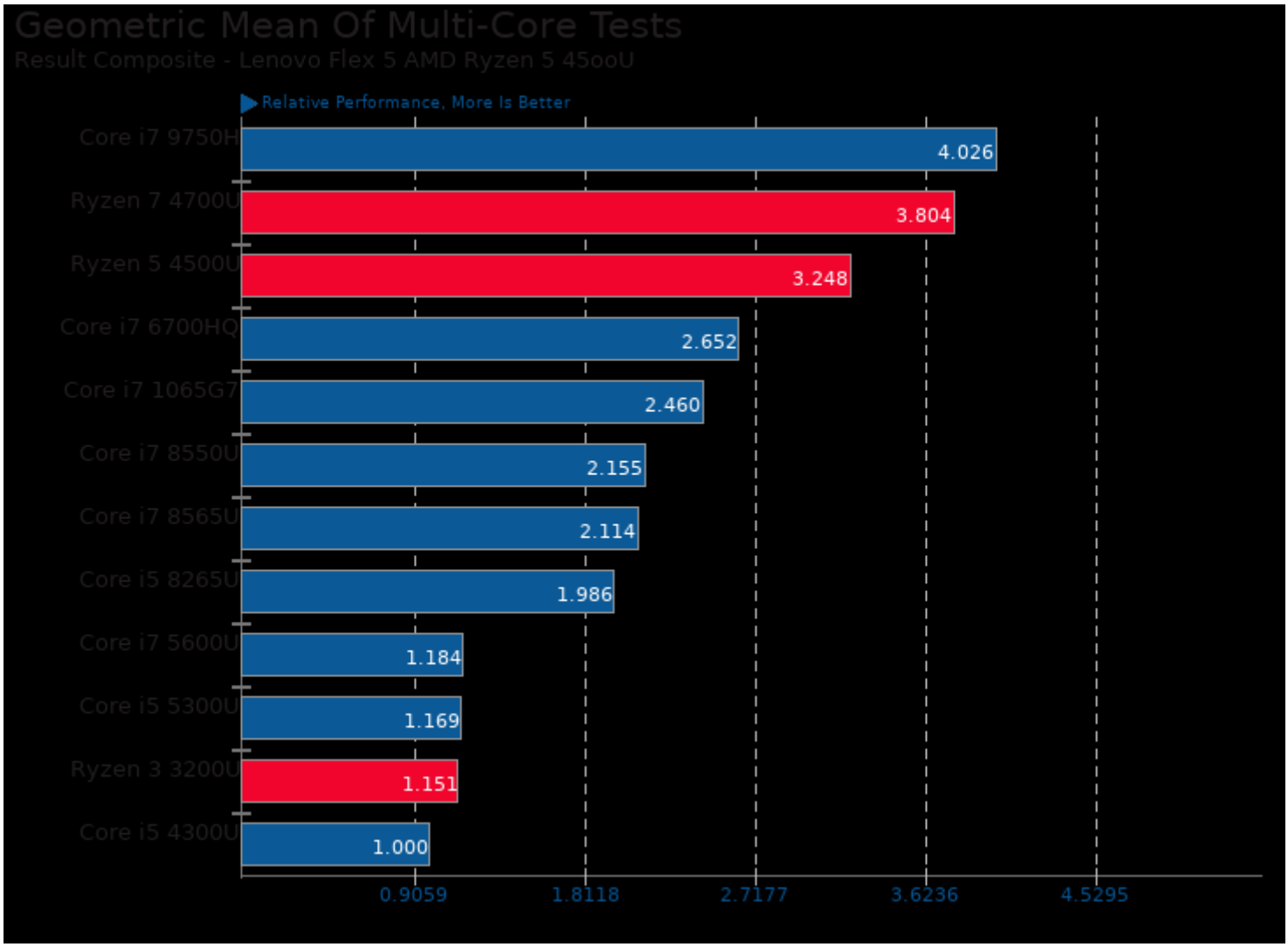
Geometric mean based upon tests: system/octave-benchmark, pts/namd, pts/gromacs and pts/lammps



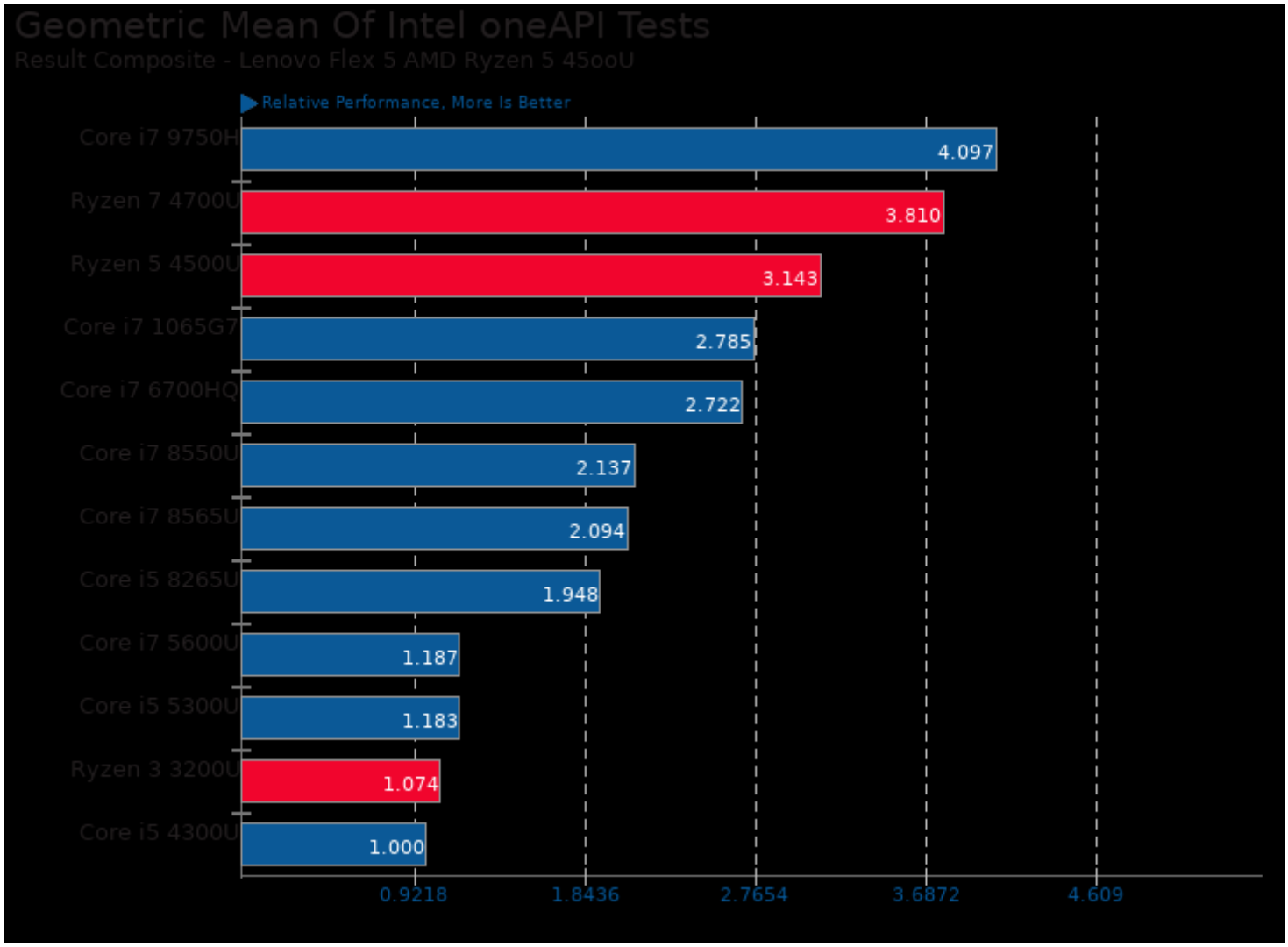
Geometric mean based upon tests: pts/namd, pts/gromacs and pts/lammps



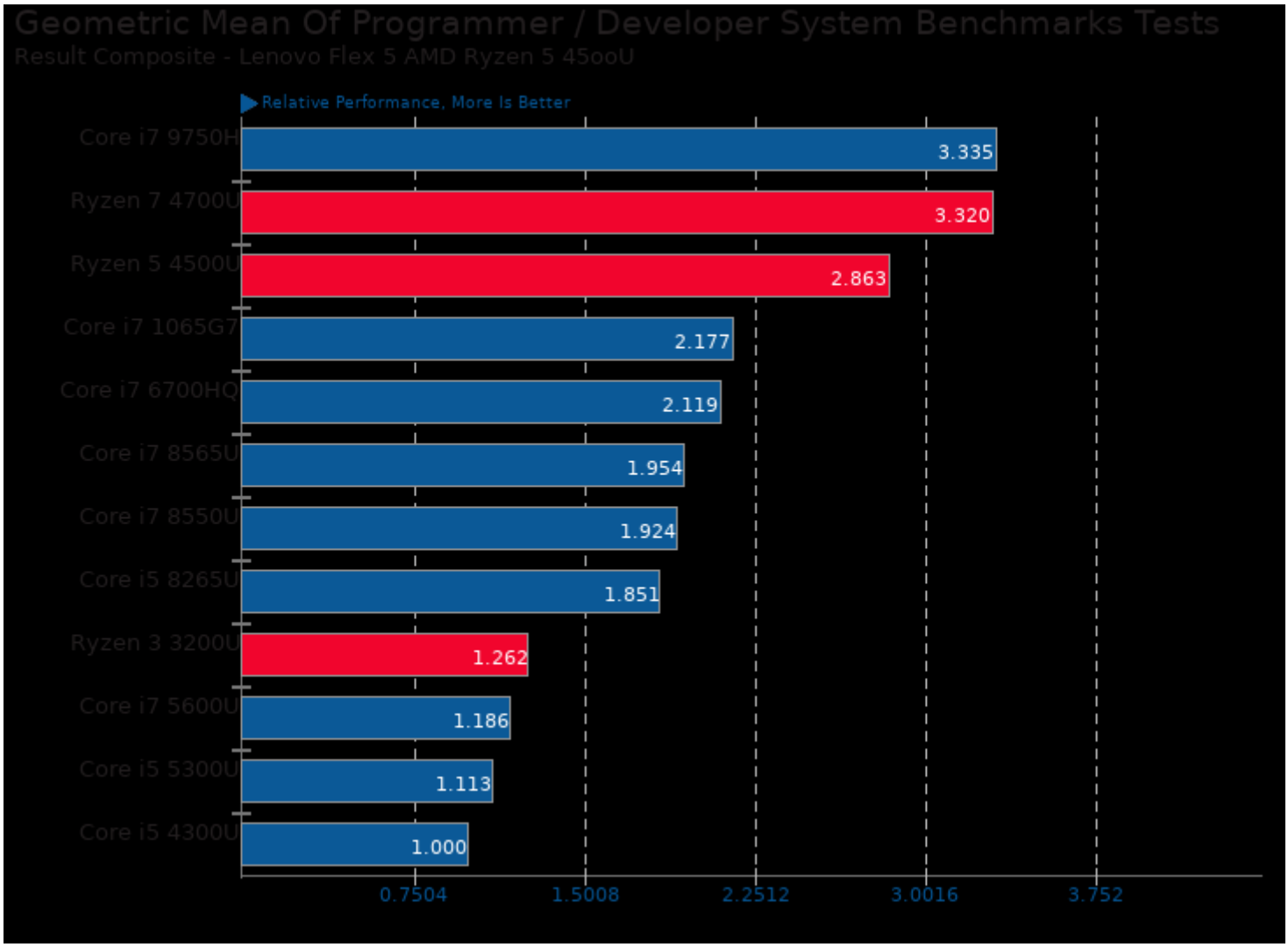
Geometric mean based upon tests: pts/lammps and pts/gromacs



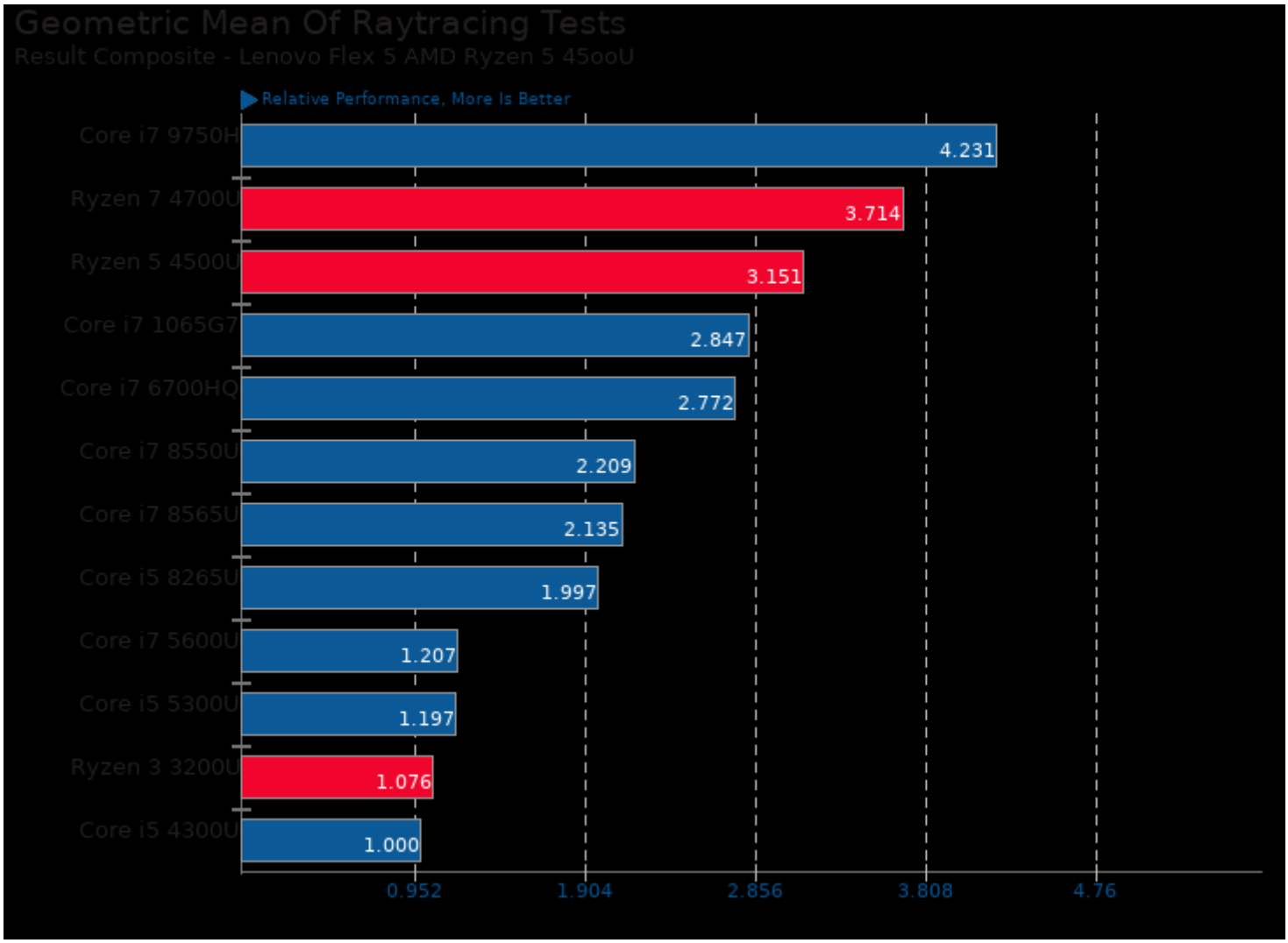
Geometric mean based upon tests: pts/ospray, pts/povray, pts/svt-vp9, pts/x264, pts/vpxenc, pts/svt-av1, pts/namd, pts/lammps, pts/gromacs, pts/build-linux-kernel, pts/build-gdb, pts/build-ffmpeg, pts/build-mplayer, pts/build2, pts/tungsten, pts/v-ray, pts/embree and pts/oidn



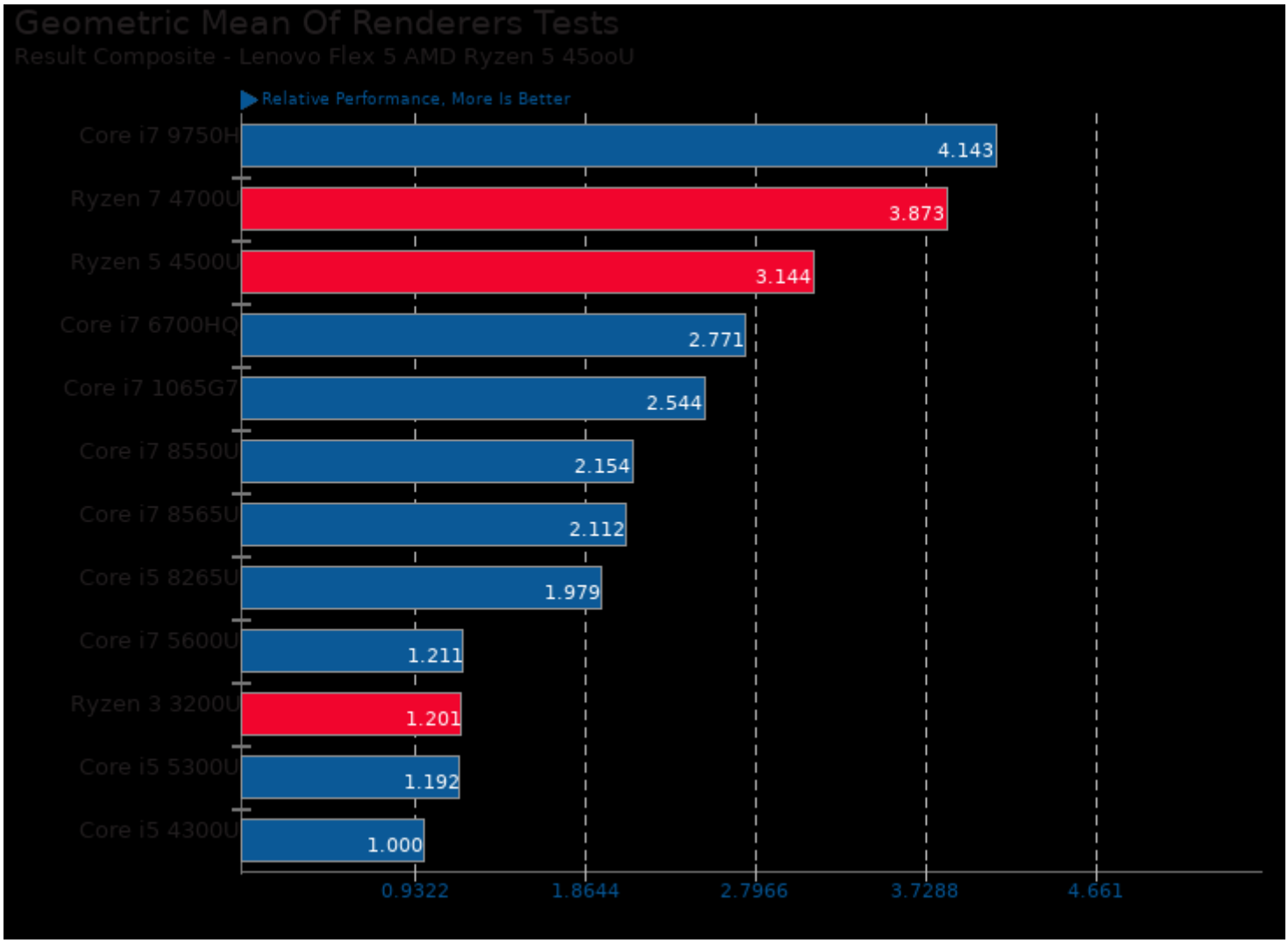
Geometric mean based upon tests: pts/embree, pts/oidn, pts/ospray and pts/tungsten



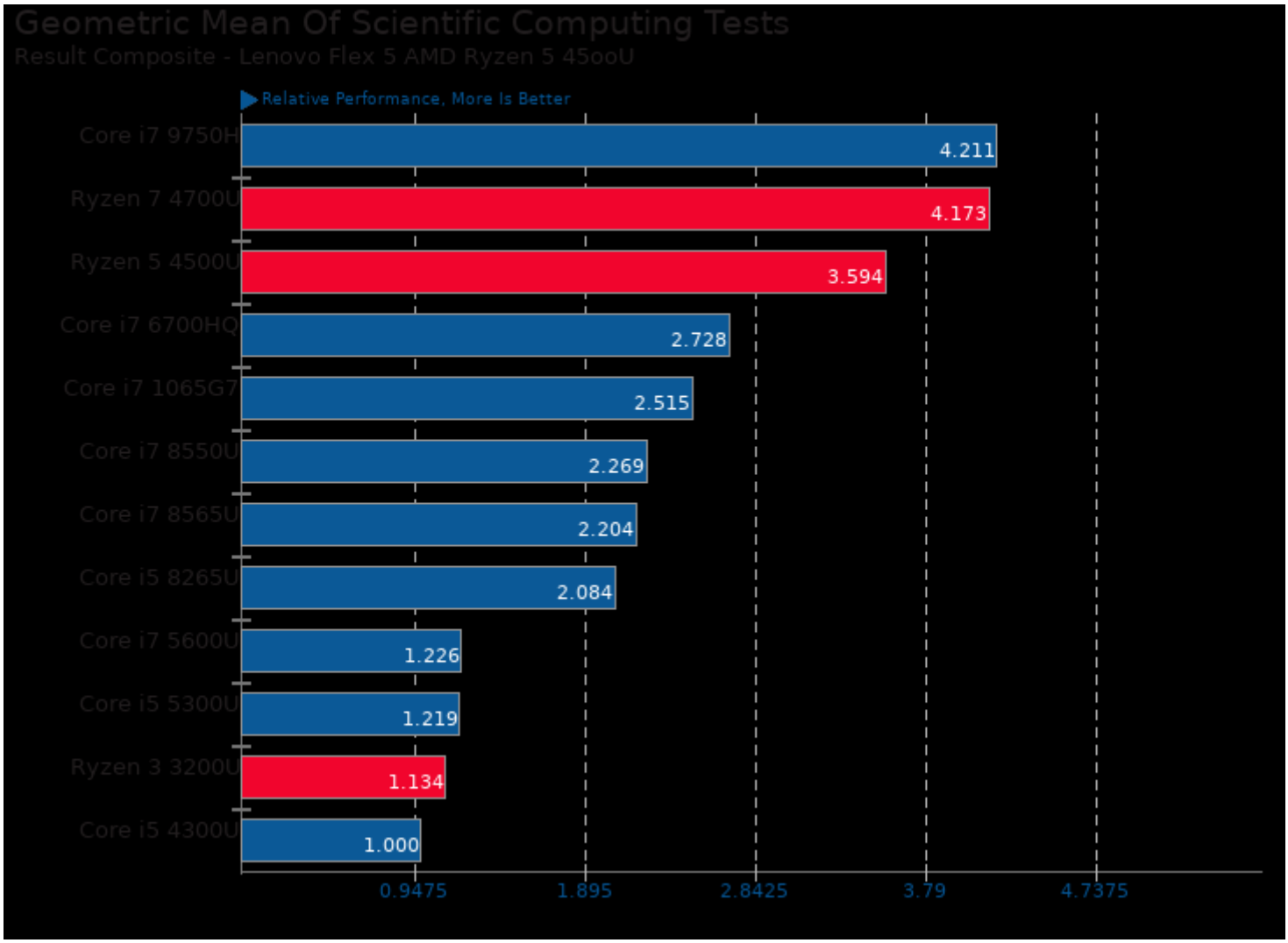
Geometric mean based upon tests: pts/sqlite-speedtest, pts/build-linux-kernel, pts/build-gdb, pts/build-ffmpeg, pts/build-mplayer and pts/build2



Geometric mean based upon tests: pts/ospray and pts/povray



Geometric mean based upon tests: pts/ospray, pts/povray, pts/tungsten and pts/v-ray



Geometric mean based upon tests: system/octave-benchmark, pts/namd, pts/gromacs and pts/lammps

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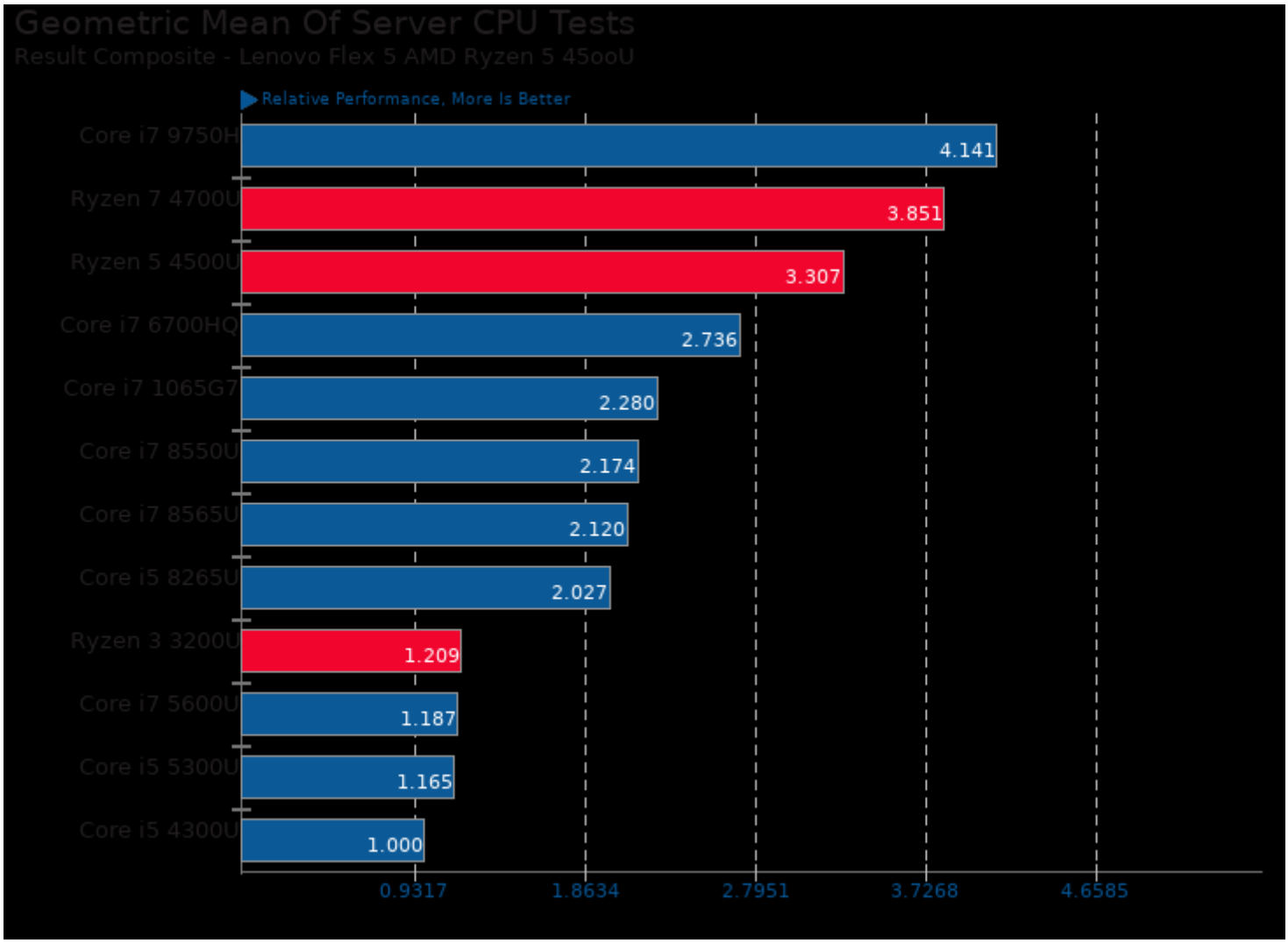
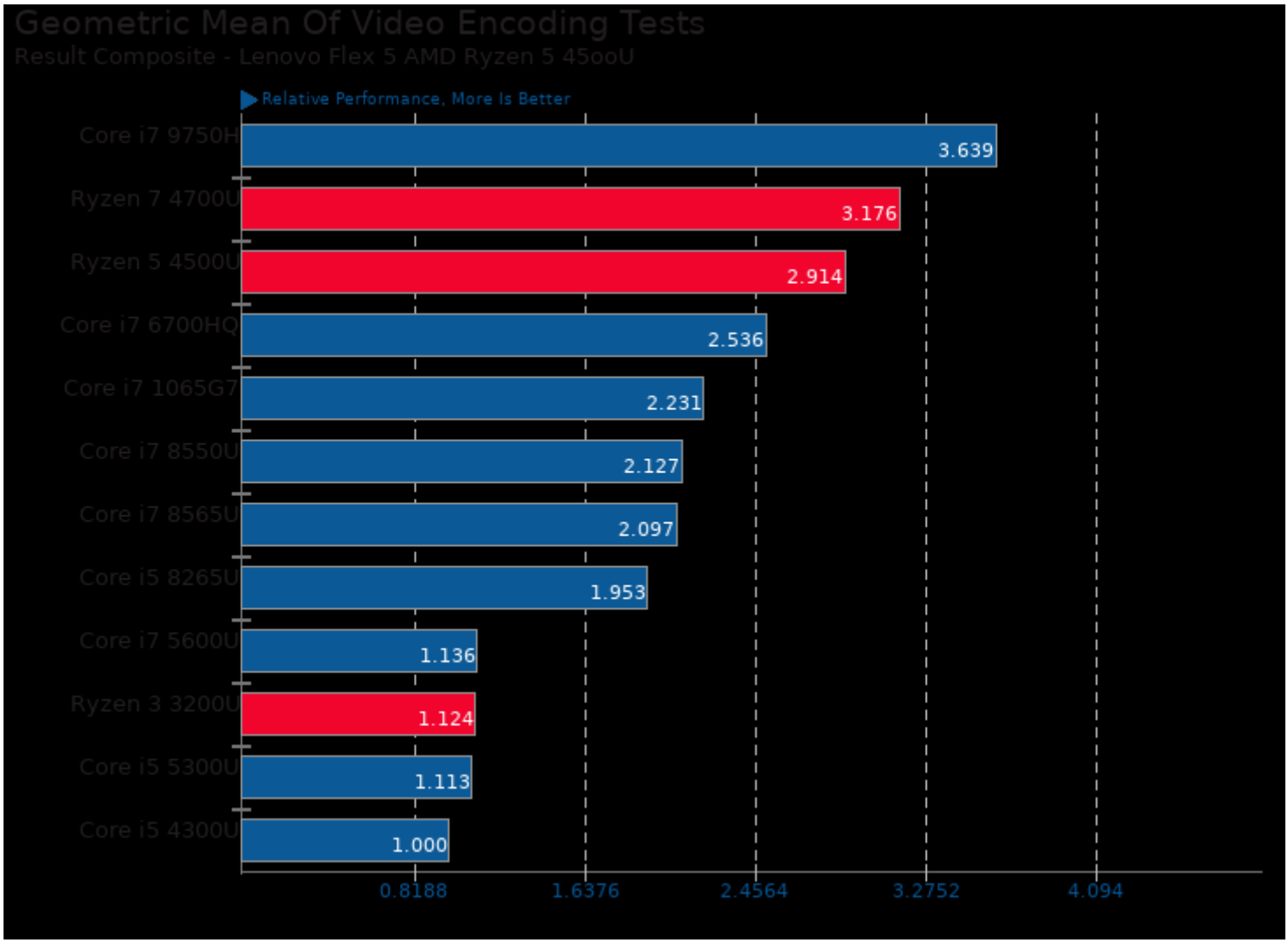


Geometric mean based upon tests: pts/namd, pts/svt-av1, pts/svt-vp9, pts/x264, pts/build-linux-kernel and pts/povray

Lenovo Flex 5 AMD Ryzen 5 45ooU



Geometric mean based upon tests: pts/svt-vp9, pts/x264, pts/vpxenc and pts/svt-av1

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