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Lenovo Flex 5 AMD Ryzen 5 45ooU

AMD Ryzen 5 4500U testing with a LENOVO LNVNB161216 for a future article on Phoronix.

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 3.598x the speed of the slowest (Samsung Ativ Book 6 - ArchLinux).

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 6.187x
GROMACS (Water Benchmark) at 4.742x
LAMMPS Molecular Dynamics Simulator (Model: Rhodopsin Protein) at 4.551x
Timed MPlayer Compilation (Time To Compile) at 4.517x
OSPray (Demo: NASA Streamlines - Renderer: SciVis) at 4.249x
POV-Ray (Trace Time) at 4.244x
x264 (H.264 Video Encoding) at 4.179x
Timed FFmpeg Compilation (Time To Compile) at 4.171x
NAMD (ATPase Simulation - 327,506 Atoms) at 3.862x.

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

Samsung Ativ Book 6 - ArchLinux

Processor: Intel Core i5-3230M @ 3.20GHz (2 Cores / 4 Threads), Motherboard: SAMSUNG NP670Z5E-XD1BR (P05ADG.010.140421.SH BIOS), Chipset: Intel 3rd Gen Core DRAM, Memory: 8GB, Disk: 960GB CT960BX500SSD1, Graphics: Intel HD 4000 2GB (1100MHz), Audio: Realtek ALC269VC, Network: Realtek RTL8111/8168/8411 + Intel Centrino Advanced-N 6235

OS: Arch rolling, Kernel: 5.6.15-arch1-1 (x86_64), Desktop: GNOME Shell 3.36.2, Display Server: X Server 1.20.8 + Wayland, Display Driver: intel 2.99.917, OpenGL: 4.2 Mesa 20.0.7, OpenCL: OpenCL 2.1 AMD-APP (3075.10) + OpenCL 1.1 Mesa 20.0.7 + OpenCL 1.2 pocl 1.5 LLVM 10.0.0 RELOC SPIR SLEEF POCL_DEBUG, Vulkan: 1.2.128, Compiler: GCC 10.1.0 + Clang 10.0.0, File-System: btrfs, Screen Resolution: 1366x768

Kernel Notes: radeon.si_support=0 amdgpu.si_support=1
Compiler Notes: --disable-libssp --disable-libstdcxx-pch --disable-libunwind-exceptions --disable-werror --enable-__cxa_atexit --enable-cet=auto --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-default-ssp --enable-gnu-indirect-function --enable-gnu-unique-object --enable-install-libiberty --enable-languages=c,c++,ada,fortran,go,lto,objc,obj-c++,d --enable-lto --enable-multilib --enable-plugin --enable-shared --enable-threads=posix --mandir=/usr/share/man --with-isl --with-linker-hash-style=gnu
Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0x21
Java Notes: OpenJDK Runtime Environment (build 1.8.0_252-b09)
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 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	Samsung Ativ Book 6 - ArchLin
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	11.03767
Normalized	28.97%	28.48%	47.19%	66.98%	49.97%	46.06%	100%	54.34%	25.89%	73.68%	90.27%	28.96%
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**	**1.043**
Normalized	22.79%	25.11%	42.55%	49.61%	45.1%	44.03%	79.1%	50.94%	25.76%	87.26%	100%	21.97%
Standard Deviation	0.1%	0.5%	5%	0.5%	4.3%	5.1%	0.4%	7.4%	1.1%	0.4%	0.2%	1.6%
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%		

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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	2.56
Normalized	29.3%	29.59%	47.07%	62.89%	49.41%	48.63%	100%	49.8%	23.54%	73.05%	87.11%	25%
Standard Deviation	0.3%	0.5%	0.6%	0.4%	0.3%	0.2%	0.6%	0%	0.1%	1.1%	0.4%	0.9%
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	
Normalized	21.13%	21.87%	36.15%	53.21%	44.91%	41.83%	77.78%	100%	16.1%	52.05%	58.33%	
Standard Deviation	1%	0%	12.4%	3%	7.2%	18.7%	0%	0%	2.2%	3.8%	0%	
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	**1.4509**
Normalized	28.47%	29.7%	46.73%	61.28%	50.54%	49.46%	100%	50.56%	29.41%	69.33%	86.82%	26.02%
Standard Deviation	0.9%	0.6%	0.4%	0.5%	0.6%	0.6%	0.3%	0.8%	0.8%	1.8%	2.9%	0.3%
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	
Normalized	27.75%	28.79%	50.17%	68.35%	55.08%	54.02%	100%	61.44%	27.96%	72.35%	83.12%	
Standard Deviation	0.4%	0.4%	0.2%	0.1%	1.3%	1.2%	0.2%	1.8%	0.3%	0.4%	0.7%	
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	
Normalized	29.72%	30.8%	52.03%	71.79%	57.9%	57.12%	100%	61.08%	28.59%	83.65%	90.77%	
Standard Deviation	1.7%	0.3%	1.2%	1.1%	3.6%	2.7%	0.7%	3.2%	0.9%	2.4%	1.8%	
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	**7.59**
Normalized	39.91%	38.92%	65.56%	74.95%	69.91%	69.78%	100%	72.15%	39.17%	81.36%	81.49%	32.67%
Standard Deviation	0.5%	2.8%	2.6%	0.2%	0.9%	0.5%	0.3%	1.6%	0.6%	0.1%	0.8%	1.1%
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	**12.97**
Normalized	26.64%	27.56%	48.47%	64.13%	52.34%	51.27%	100%	52.25%	29.1%	83.56%	94.45%	23.93%
Standard Deviation	2.3%	1.7%	2.7%	1.2%	2.8%	0.7%	2.9%	2.9%	0.5%	2.3%	1.8%	2.9%
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**	**0.75**
Normalized	27.37%	24.14%	44.18%	63.58%	48.28%	47.63%	92.46%	98.28%	16.81%	91.38%	100%	16.16%
Standard Deviation	0.5%	0.4%	0.1%	0.3%	2%	1.8%	0.1%	2.8%	0.2%	0.9%	4.5%	0.2%
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**	**412.487**
Normalized	27.87%	28.76%	47.24%	60.98%	50.07%	49.13%	97.56%	54.79%	31.13%	84.92%	100%	23.97%
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%

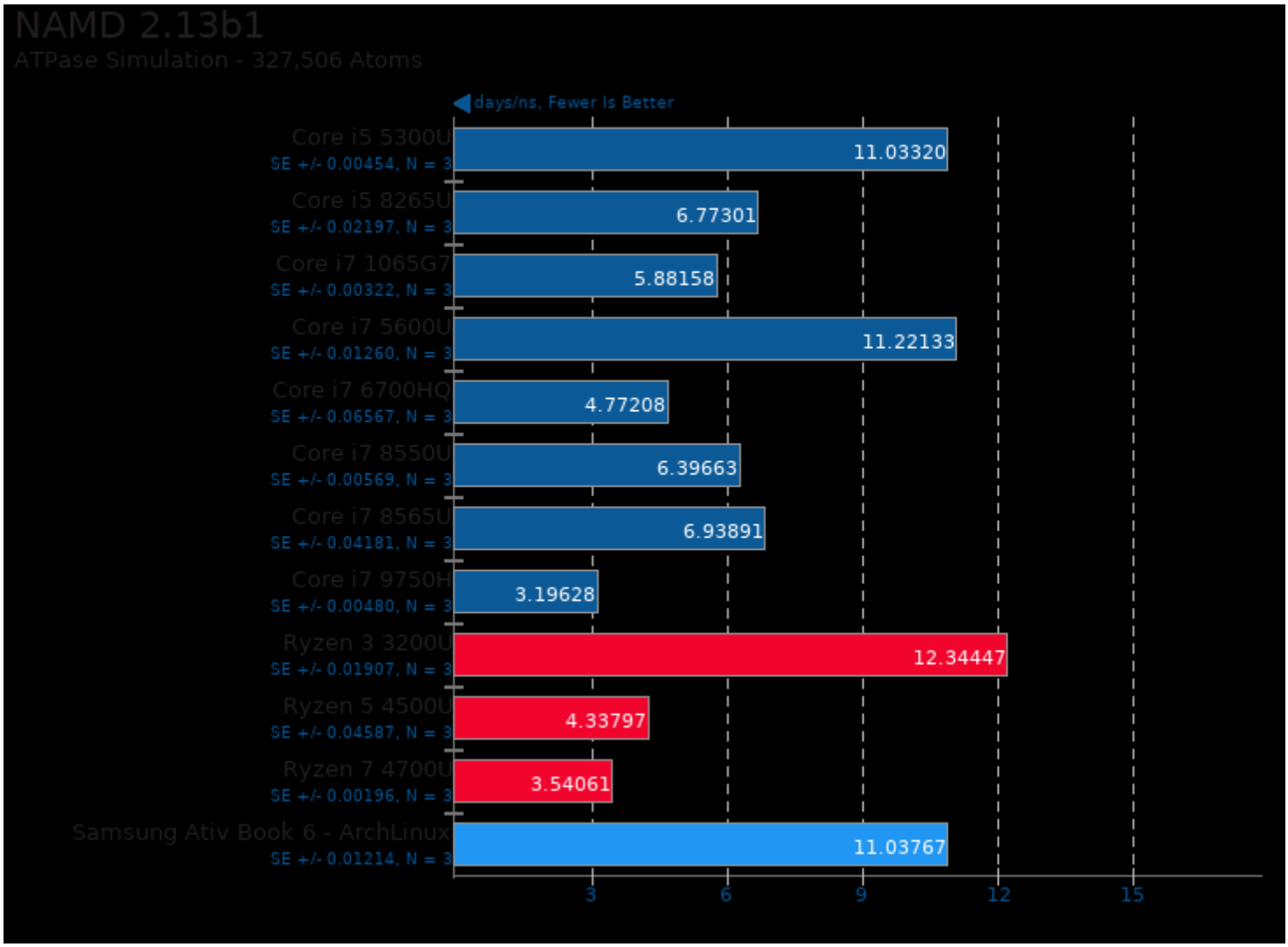
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Timed GDB GNU Debugger Compilation - Time To Compile (sec)		333.390	217.022	198.053		210.836	**135.631**	193.638	330.682	166.157	156.144	**511.383**
Normalized		40.68%	62.5%	68.48%		64.33%	100%	70.04%	41.02%	81.63%	86.86%	26.52%
Standard Deviation		0.2%	0.2%	0.1%		0.1%	0.6%	0.3%	0.2%	0.2%	0.2%	2.7%
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	
Normalized	27.3%	28.71%	48.01%	60.42%	50.34%	50.38%	100%	54.93%	30.47%	82.34%	97.18%	
Standard Deviation	0.3%	1%	0.5%	0.6%	0.4%	0.6%	0.9%	0.4%	0.2%	0.1%	1.4%	
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**	**307.687**
Normalized	26.47%	27.72%	46.38%	59.93%	50.68%	49.1%	98.72%	52.22%	29.43%	80.88%	100%	22.14%
Standard Deviation	0.1%	0.3%	0.2%	0.1%	1%	0.7%	0.1%	0.7%	0.4%	0.9%	0.1%	1.3%
Build2 - Time To Compile (sec)	**710.020**	655.597	394.694	329.995		388.692	**192.118**	351.168	683.828	237.107		
Normalized	27.06%	29.3%	48.68%	58.22%		49.43%	100%	54.71%	28.09%	81.03%		
Standard Deviation	0.2%	0.3%	0.2%	1.2%		0.6%	0.6%	0.2%	1.1%	0.5%		
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**	**377.160**
Normalized	27.52%	26.91%	46.44%	63.17%	48.21%	47.43%	96.62%	45.97%	32.58%	81.63%	100%	23.56%
Standard Deviation	0.1%	0.2%	0.4%	0.4%	0.3%	0.2%	0.1%	0.4%	0.1%	0.5%	0.1%	0.6%
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**	177.141
Normalized	27.37%	28.68%	47.17%	64.87%	48.82%	50.03%	97.59%	53.39%	34.63%	78.2%	100%	29.16%
Standard Deviation	0.6%	0.3%	0.7%	0.5%	1.3%	1.1%	1.5%	1%	0.1%	0.1%	0.2%	0.2%
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**	**64.2969**
Normalized	30.04%	30.42%	47.58%	69.47%	51.87%	50.79%	97.18%	50.91%	34.13%	73.79%	100%	28.73%
Standard Deviation	0.1%	0.5%	1.4%	0.5%	2.7%	2.2%	0%	2.3%	0.2%	0.2%	0.2%	0.5%
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**	13.975
Normalized	56.16%	55.6%	79.64%	73.68%	84.99%	84.12%	93.33%	91.51%	69.26%	94.74%	100%	58.3%
Standard Deviation	0.4%	4.5%	1.9%	0.5%	0.3%	1.4%	0.7%	0.8%	1.4%	0.3%	0.2%	0.2%
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	**0.132**
Normalized	29.07%	27.32%	47.76%	64.7%	54.95%	55.91%	100%	60.86%	23.16%	76.52%	85.3%	21.09%
Standard Deviation	1%	1%	0.7%	1.2%	0.9%	0.7%	1.4%	0.5%	0.4%	0.8%	0.2%	0.8%

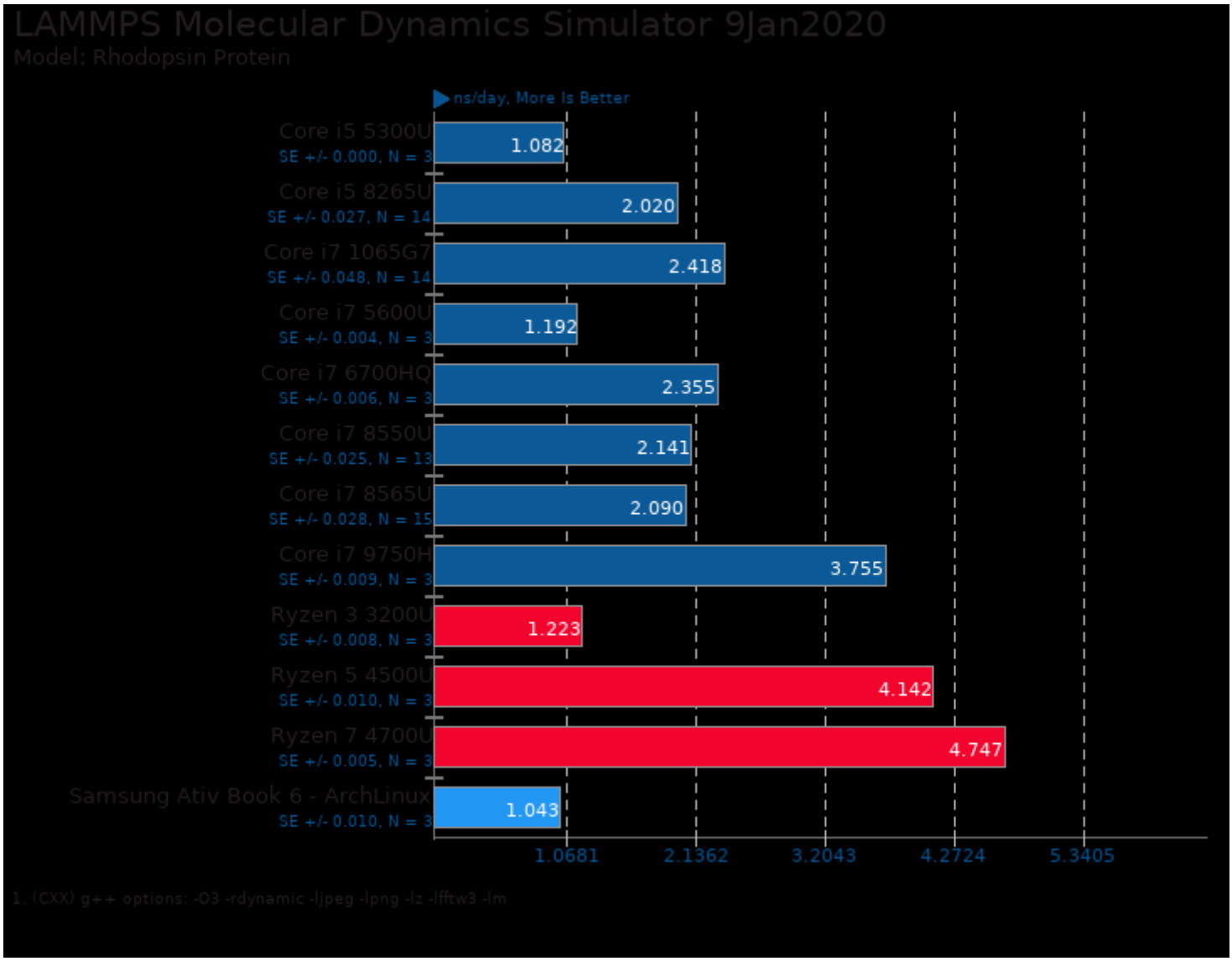
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SQLite Speedtest - Timed Time -	110.655	96.691	75.032	91.618	78.223	69.676	65.194	**58.863**	92.356	70.733	66.993	**160.047**
Normalized	53.2%	60.88%	78.45%	64.25%	75.25%	84.48%	90.29%	100%	63.73%	83.22%	87.86%	36.78%
Standard Deviation	0.5%	0.3%	0.2%	0.2%	1.5%	0.5%	0.5%	0.5%	0.2%	0.3%	1.6%	6.9%
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%	
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%	

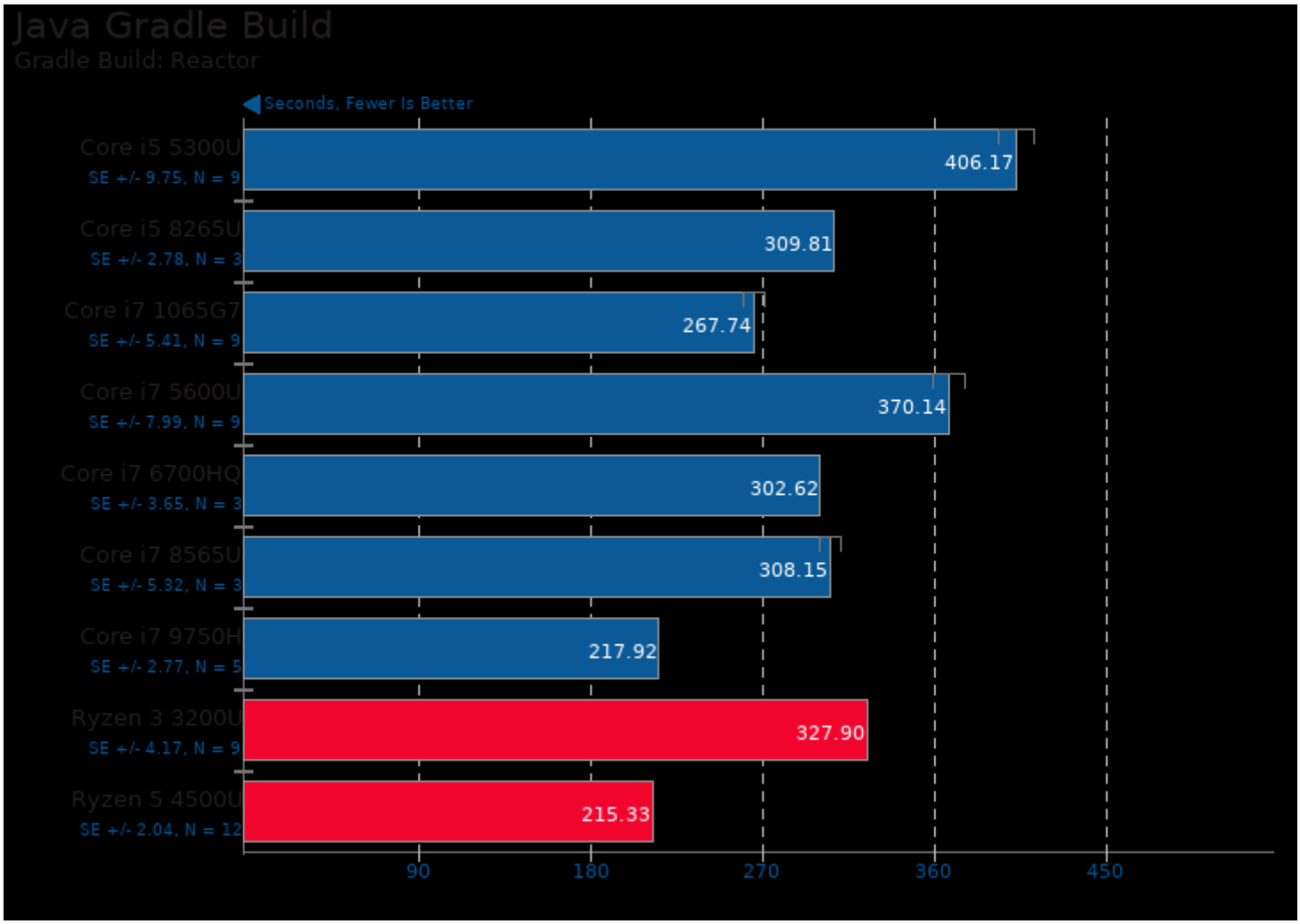
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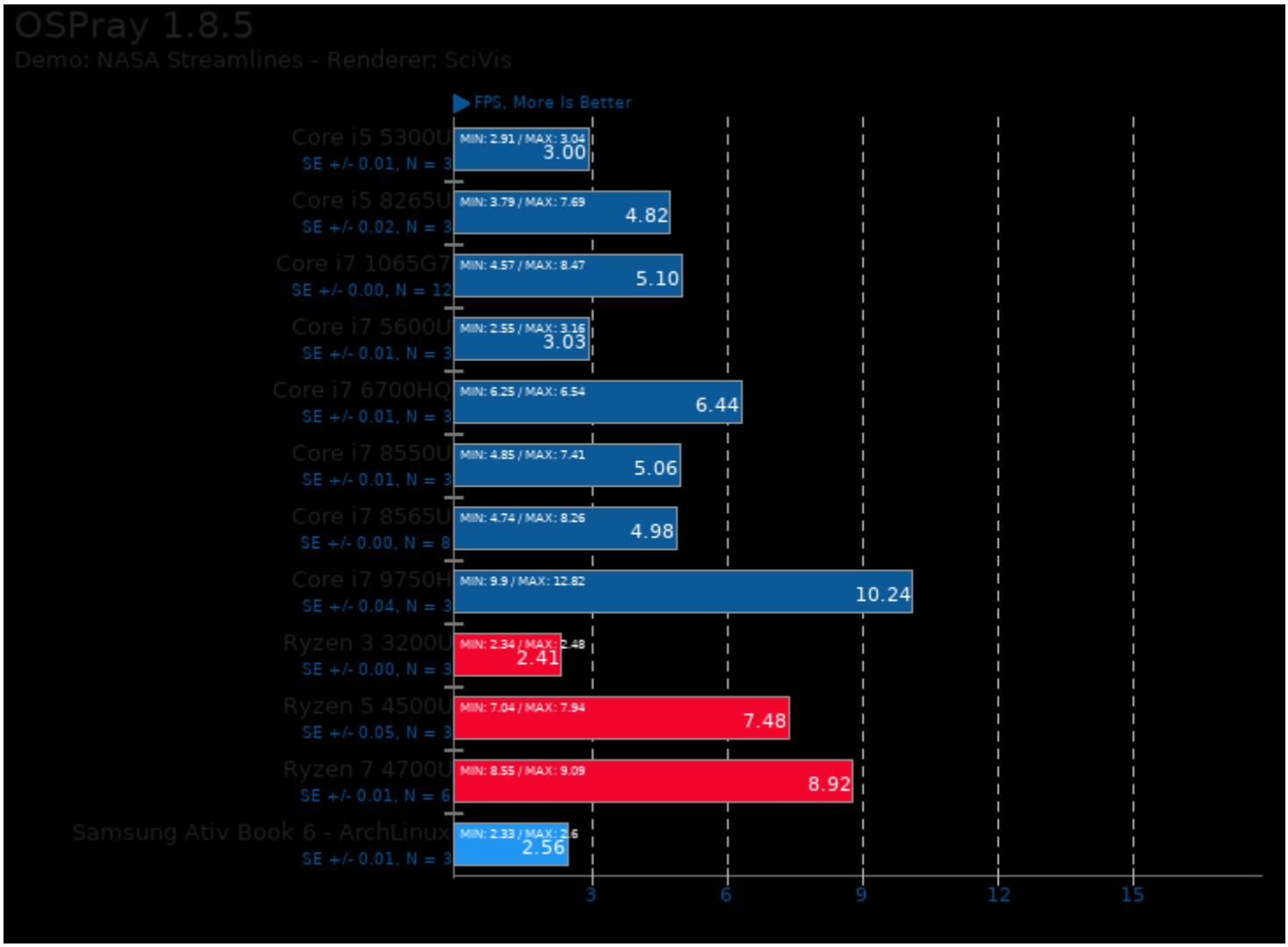
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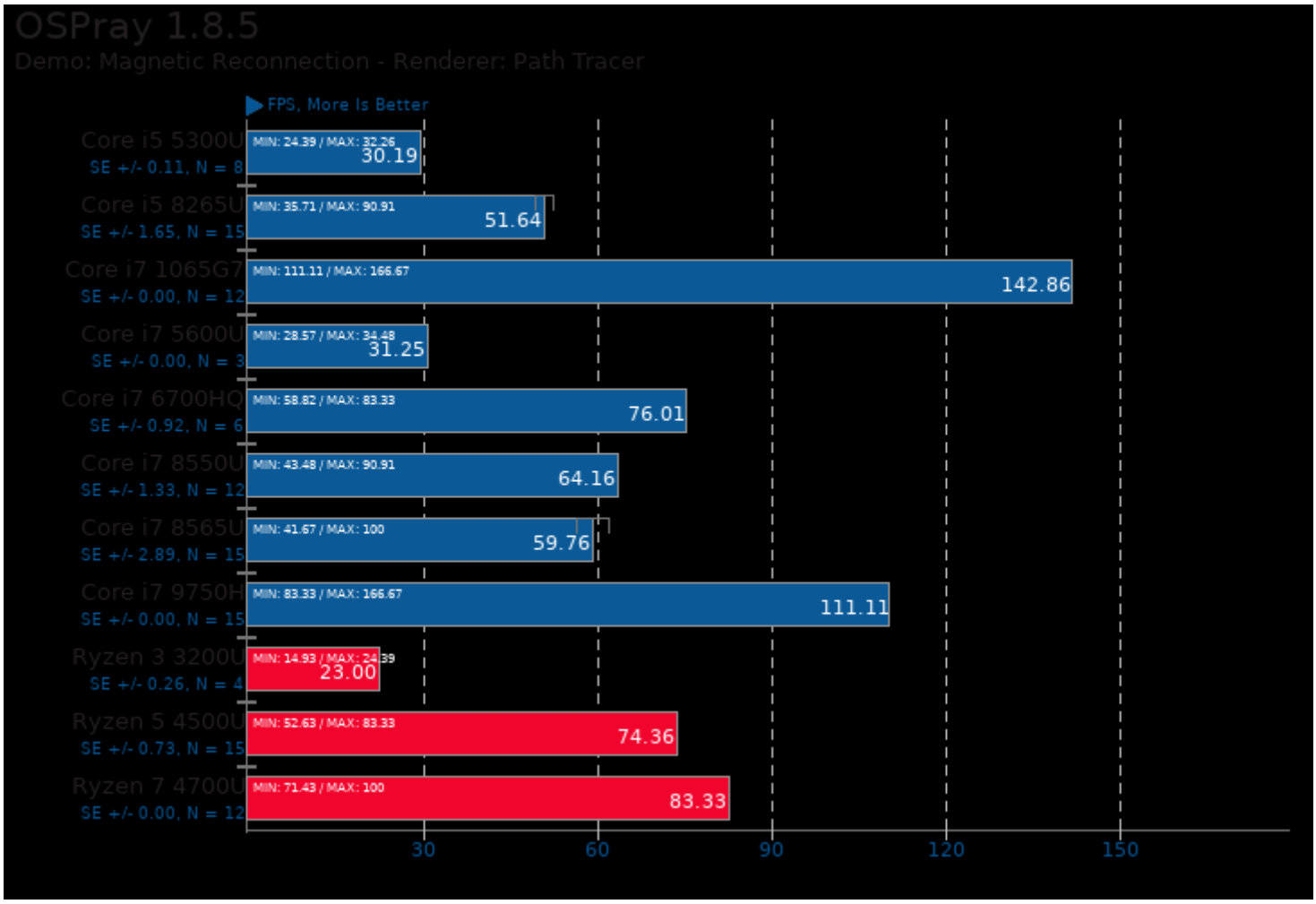
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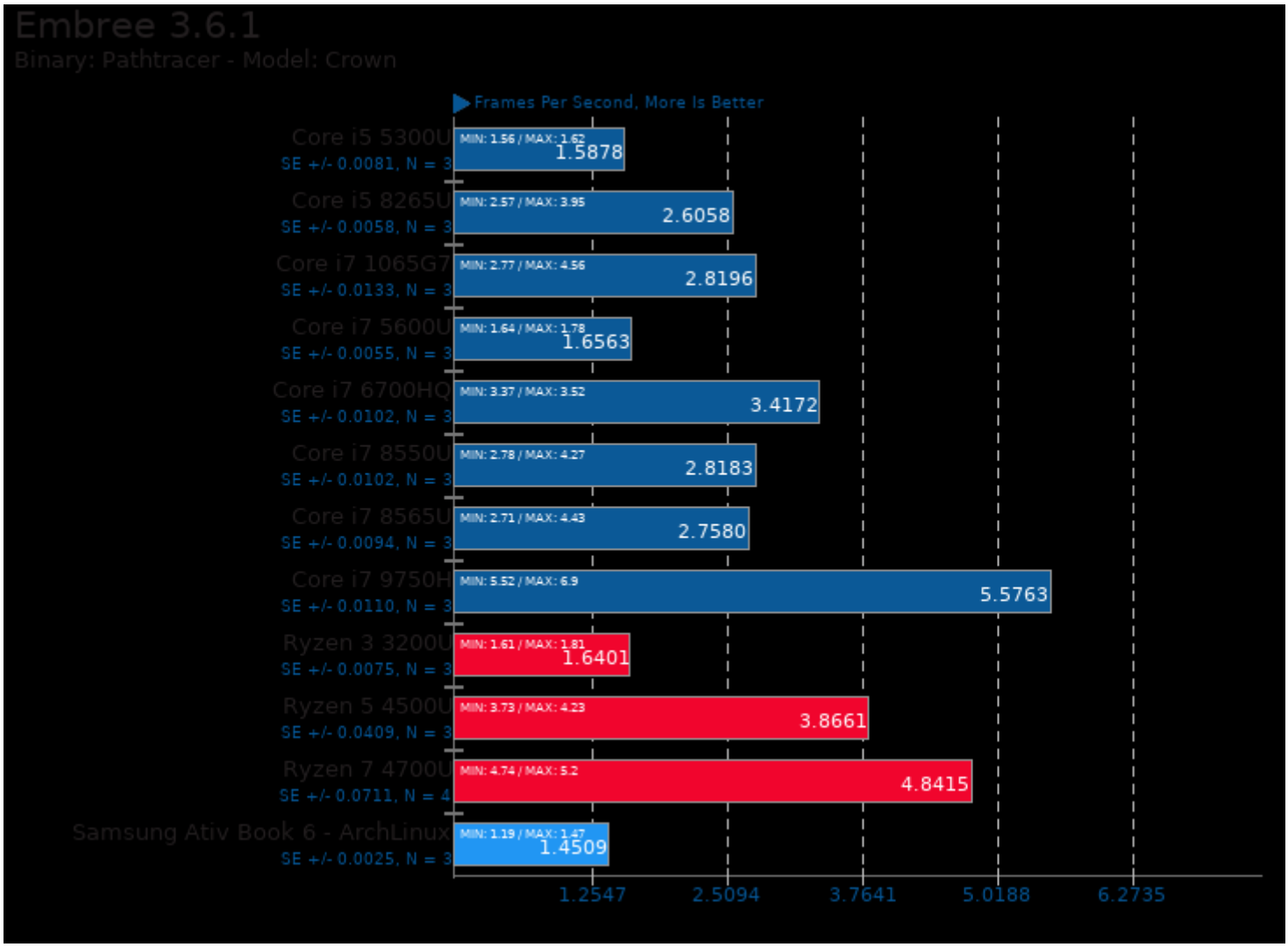
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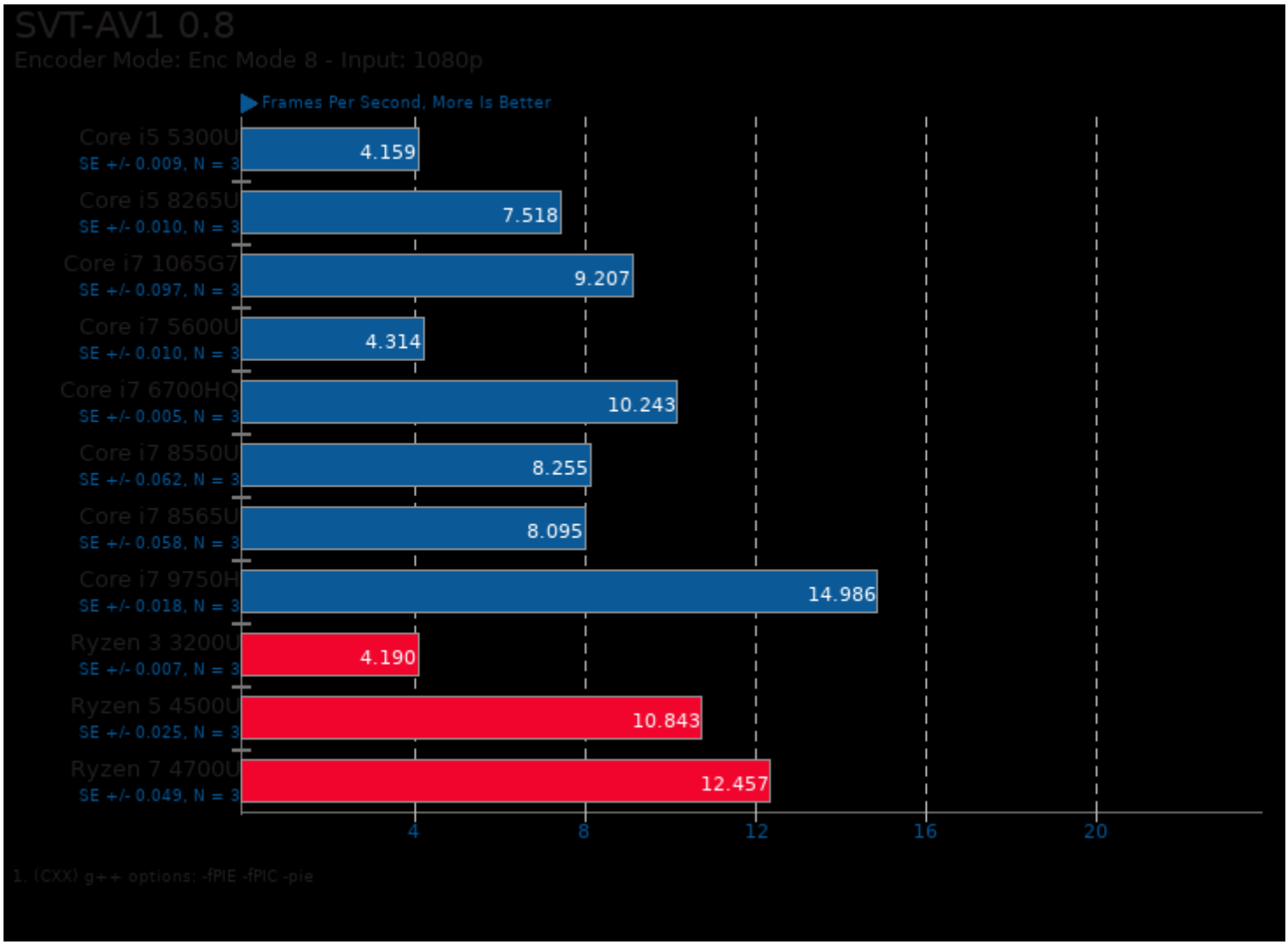


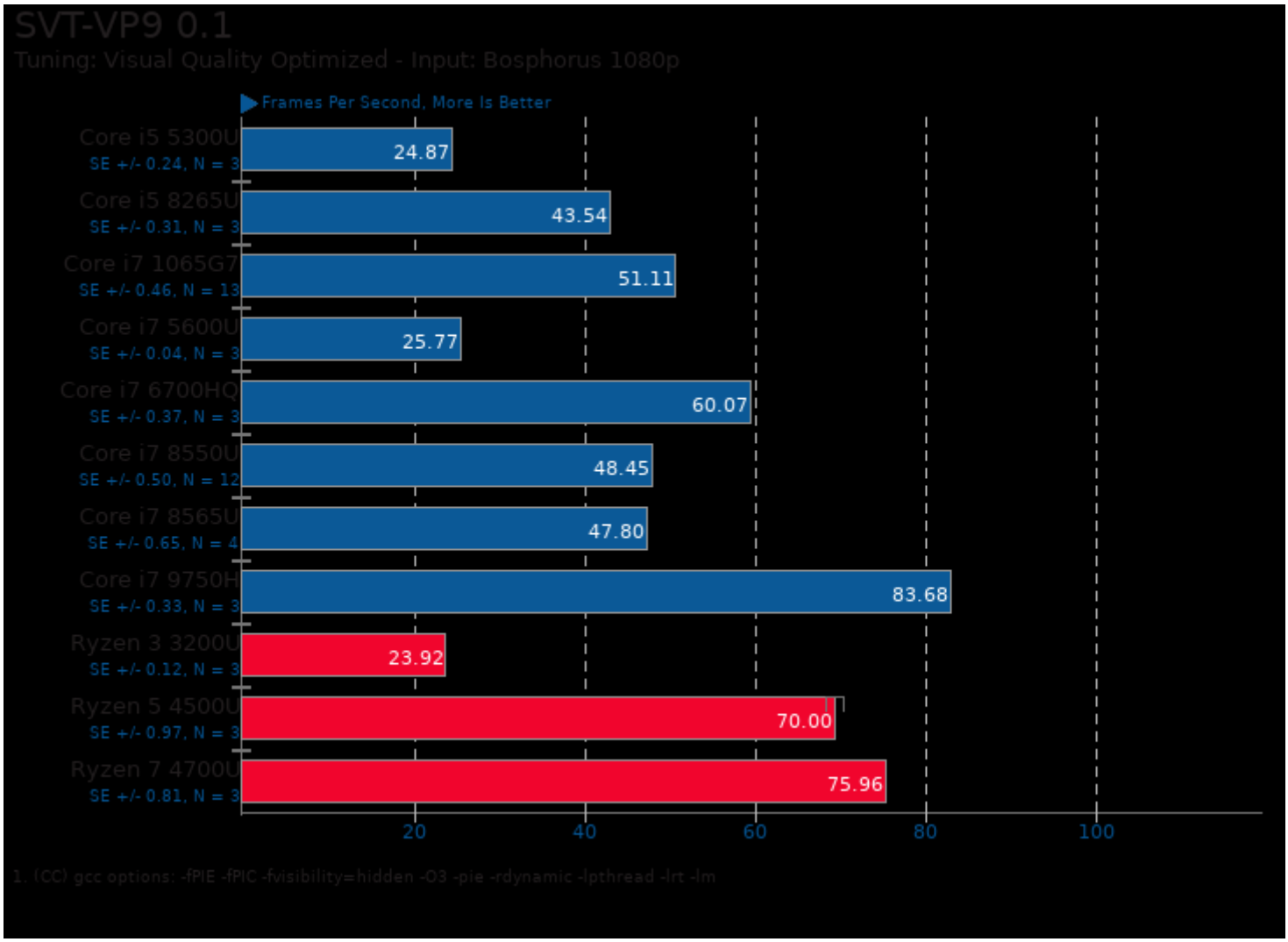
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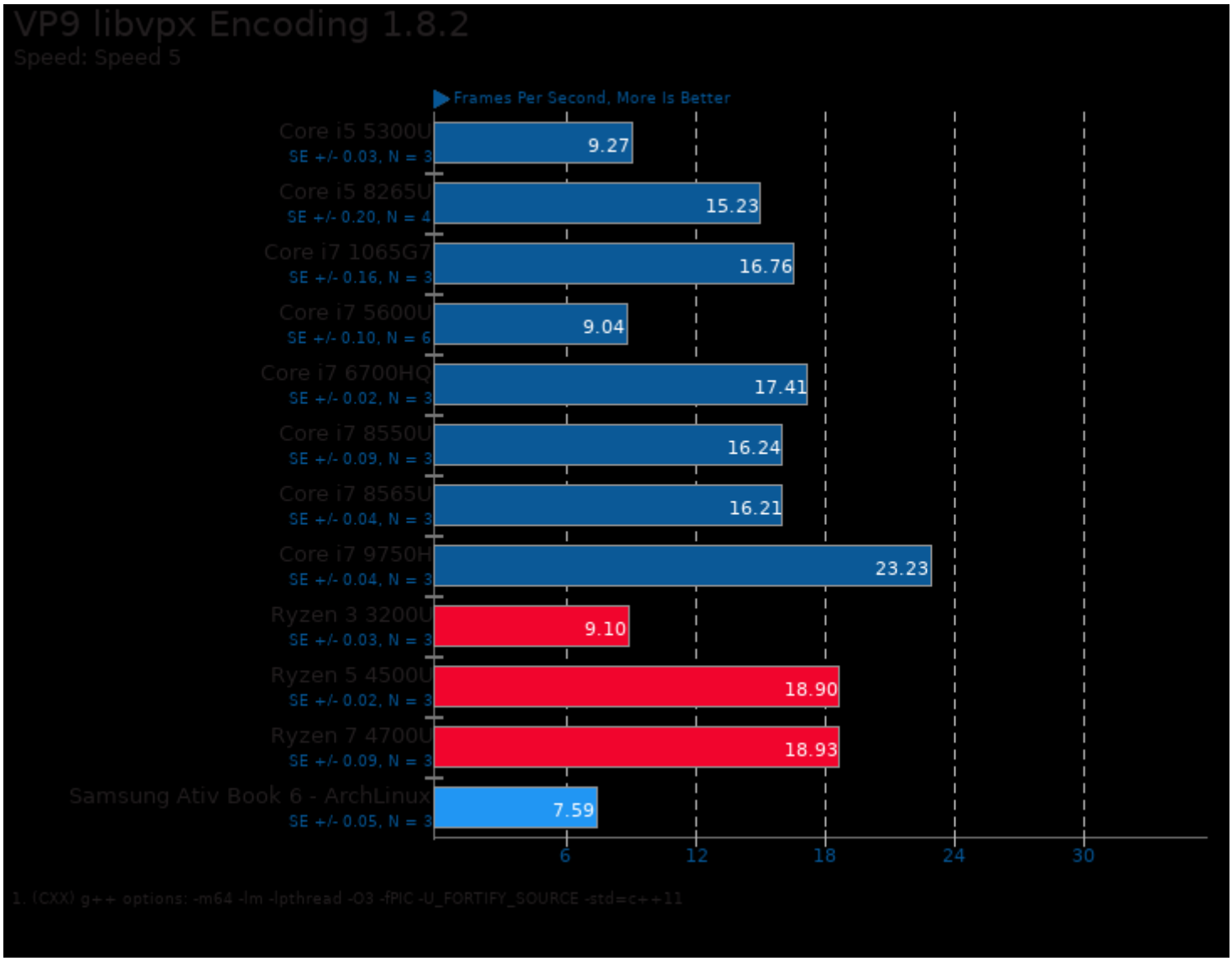


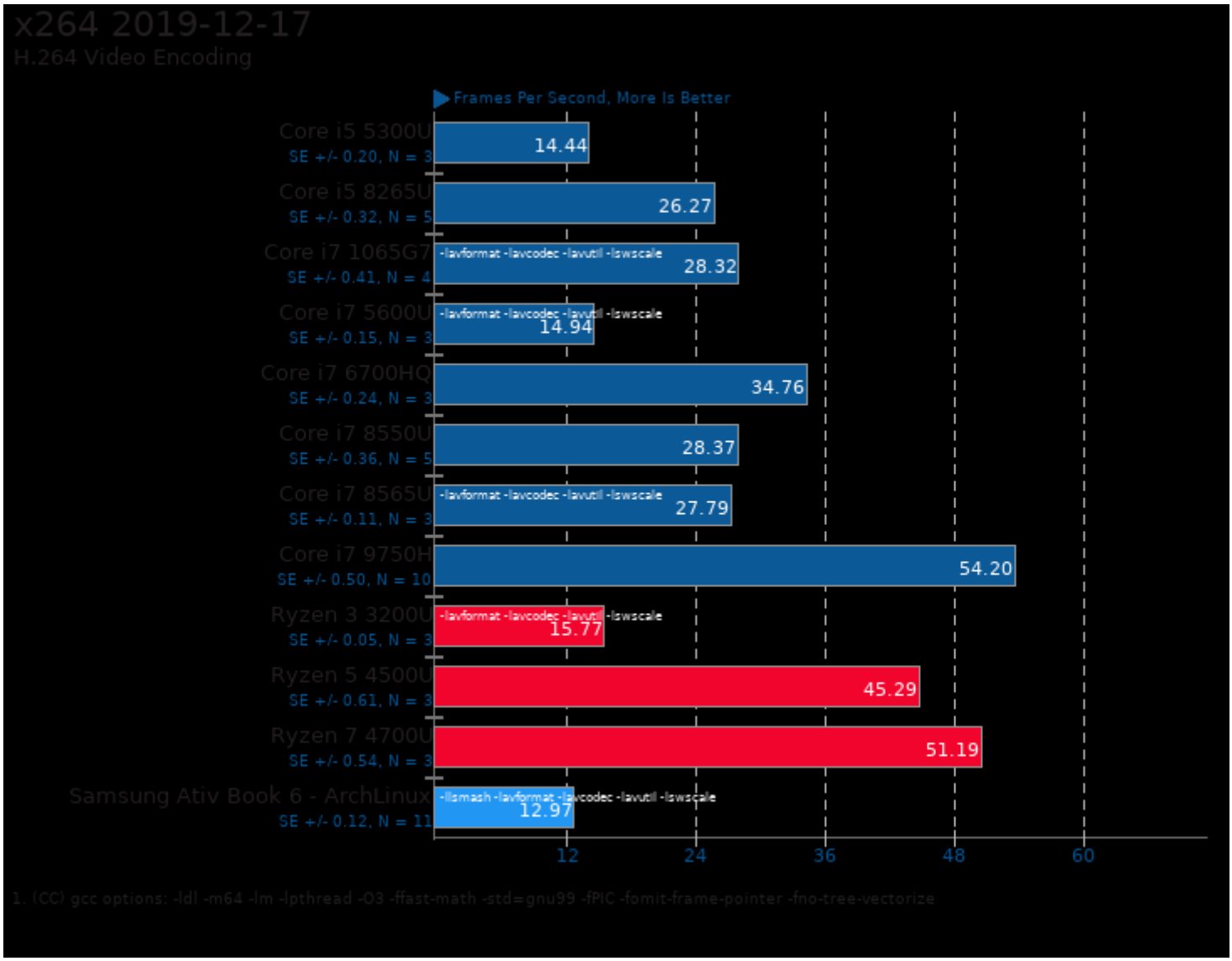
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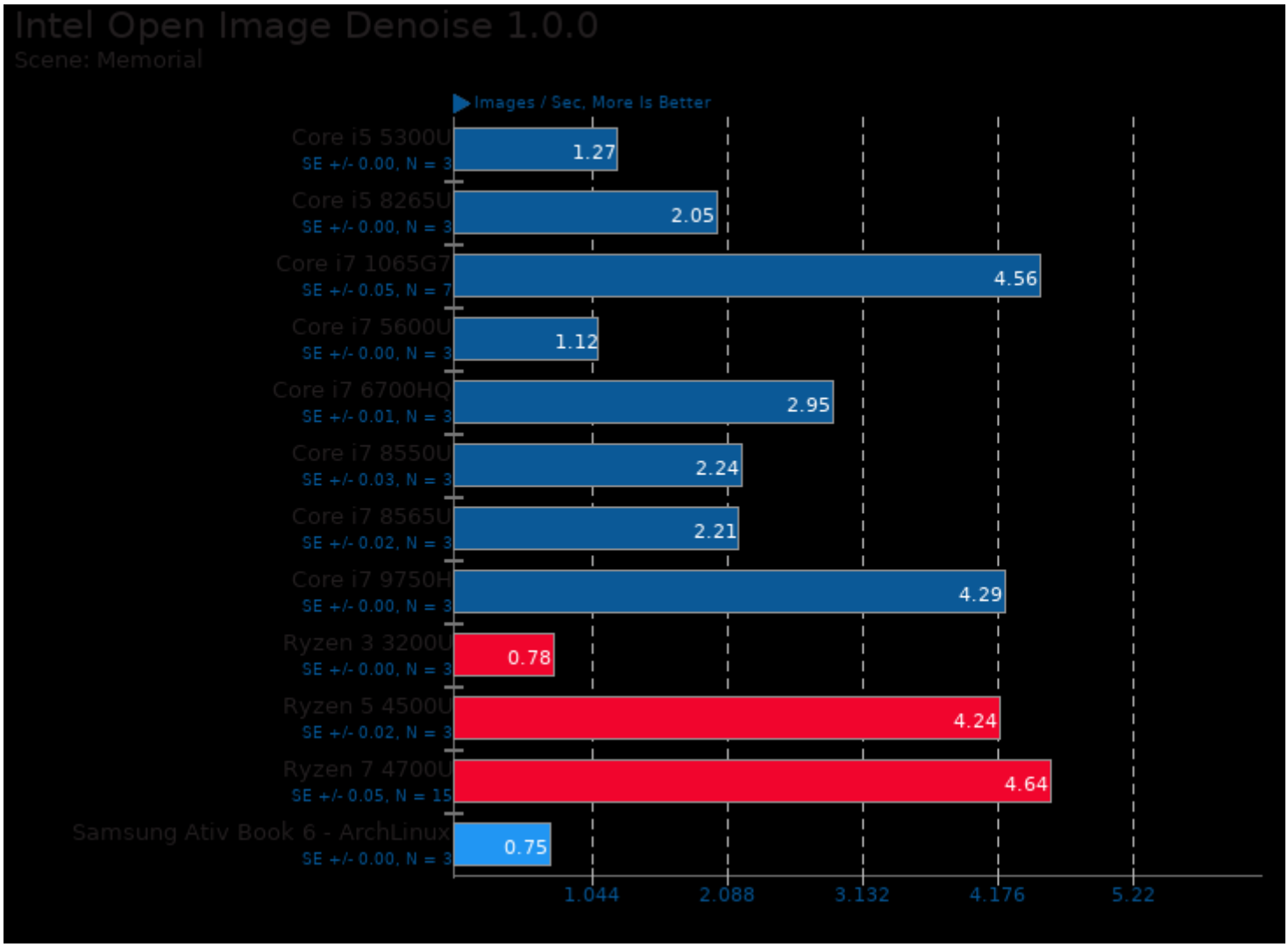



SVT-AV1 0.8
Encoder Mode: Enc Mode 8 - Input: 1080p
Frames Per Second, More Is Better
Core i5 5300U
SE +/- 0.009, N = 3
4.159
Core i5 8265U
SE +/- 0.010, N = 3
7.518
Core i7 1065G7
SE +/- 0.097, N = 3
9.207
Core i7 5600U
SE +/- 0.010, N = 3
4.314
Core i7 6700HQ
SE +/- 0.005, N = 3
10.243
Core i7 8550U
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
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
4
8
12
16
20
1. (CXX) g++ options: -fPIE -fPIC -pie

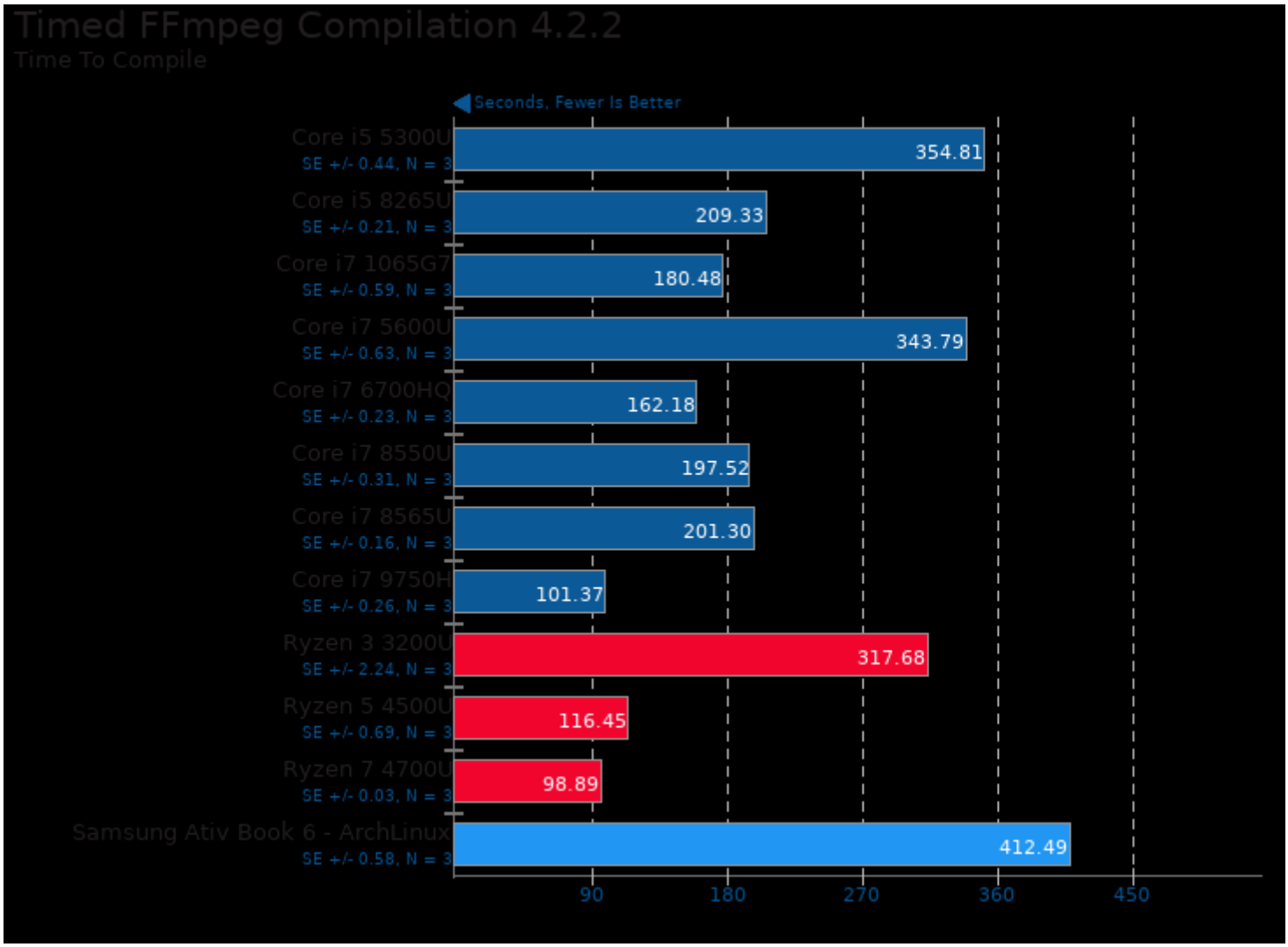

SVT-VP9 0.1
Tuning: Visual Quality Optimized - Input: Bosphorus 1080p
Frames Per Second, More Is Better
Core i5 5300U
SE +/- 0.24, N = 3
24.87
Core i5 8265U
SE +/- 0.31, N = 3
43.54
Core i7 1065G7
SE +/- 0.46, N = 13
51.11
Core i7 5600U
SE +/- 0.04, N = 3
25.77
Core i7 6700HQ
SE +/- 0.37, N = 3
60.07
Core i7 8550U
SE +/- 0.50, N = 12
48.45
Core i7 8565U
SE +/- 0.65, N = 4
47.80
Core i7 9750H
SE +/- 0.33, N = 3
83.68
Ryzen 3 3200U
SE +/- 0.12, N = 3
23.92
Ryzen 5 4500U
SE +/- 0.97, N = 3
70.00
Ryzen 7 4700U
SE +/- 0.81, N = 3
75.96
20
40
60
80
100
1. (CC) gcc options: -fPIE -fPIC -fvisibility=hidden -O3 -pie -rdynamic -lpthread -lrt -lm


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 i5 8265U
SE +/- 0.20, N = 4
15.23
Core i7 1065G7
SE +/- 0.16, N = 3
16.76
Core i7 5600U
SE +/- 0.10, N = 6
9.04
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
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
Samsung Ativ Book 6 - ArchLinux
SE +/- 0.05, N = 3
7.59
6
12
18
24
30
1. (CXX) g++ options: -m64 -lm -lpthread -O3 -fPIC -U_FORTIFY_SOURCE -std=c++11

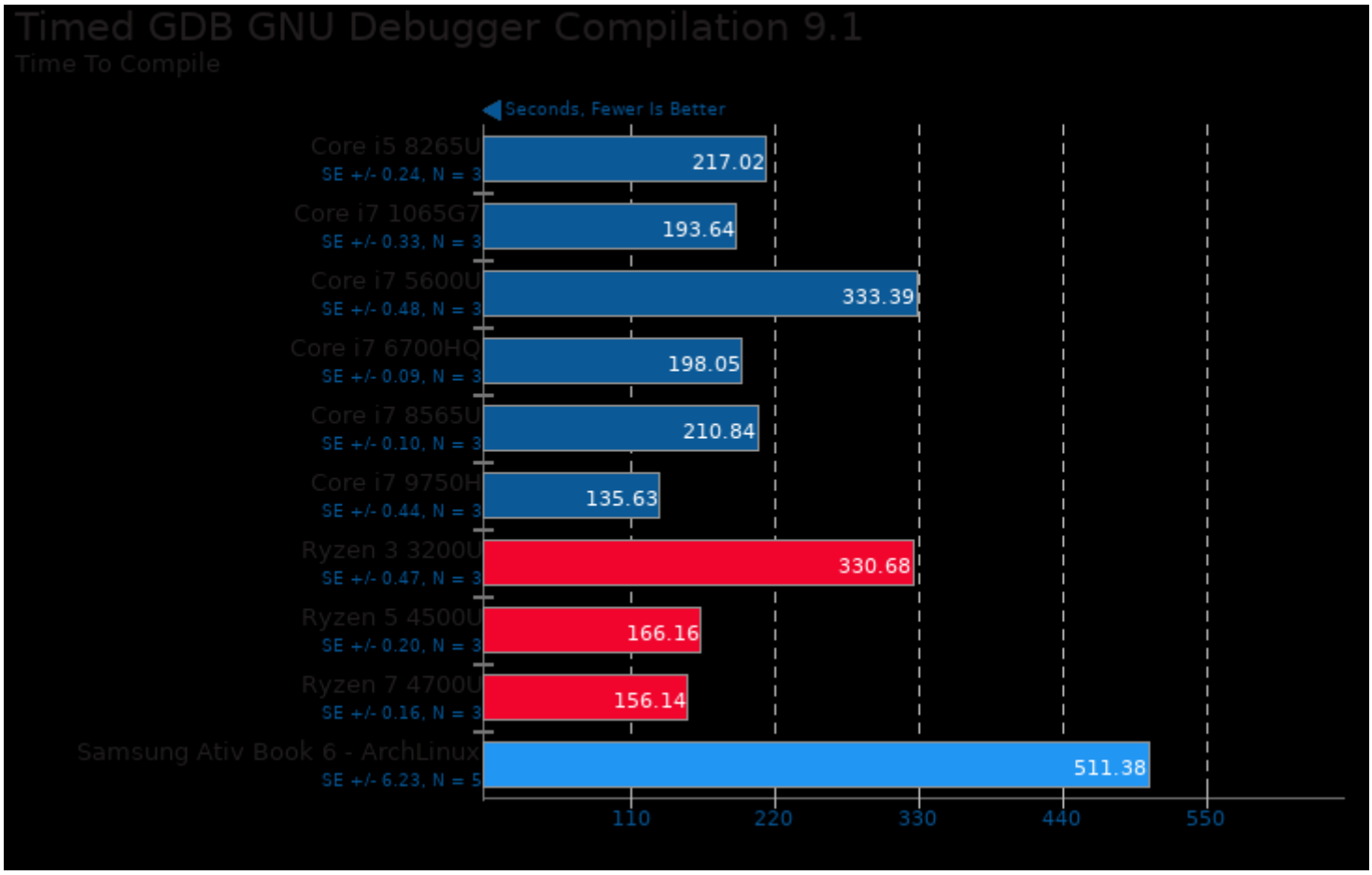

x264 2019-12-17
H.264 Video Encoding
Frames Per Second, More Is Better
Core i5 5300U
SE +/- 0.20, N = 3
14.44
Core i5 8265U
SE +/- 0.32, N = 5
26.27
Core i7 1065G7
SE +/- 0.41, N = 4
-lavformat -lavcodec -lavutil -lswscale
28.32
Core i7 5600U
SE +/- 0.15, N = 3
-lavformat -lavcodec -lavutil -lswscale
14.94
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
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
Samsung Ativ Book 6 - ArchLinux
SE +/- 0.12, N = 11
-llsmash -lavformat -lavcodec -lavutil -lswscale
12.97
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

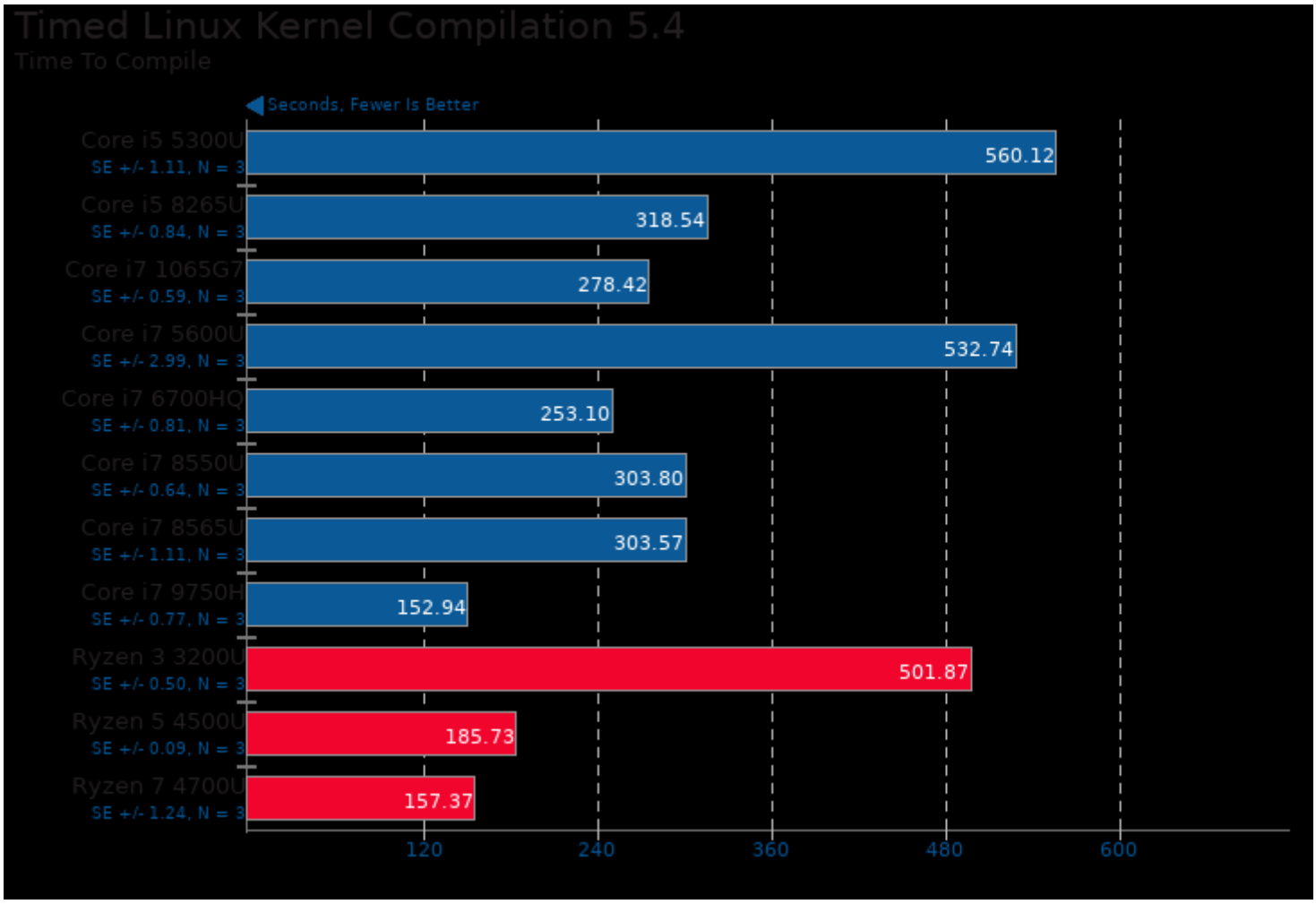

Intel Open Image Denoise 1.0.0
Scene: Memorial
Images / Sec, More Is Better
Core i5 5300U
SE +/- 0.00, N = 3
1.27
Core i5 8265U
SE +/- 0.00, N = 3
2.05
Core i7 1065G7
SE +/- 0.05, N = 7
4.56
Core i7 5600U
SE +/- 0.00, N = 3
1.12
Core i7 6700HQ
SE +/- 0.01, N = 3
2.95
Core i7 8550U
SE +/- 0.03, N = 3
2.24
Core i7 8565U
SE +/- 0.02, N = 3
2.21
Core i7 9750H
SE +/- 0.00, N = 3
4.29
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
Samsung Ativ Book 6 - ArchLinux
SE +/- 0.00, N = 3
0.75
1.044
2.088
3.132
4.176
5.22

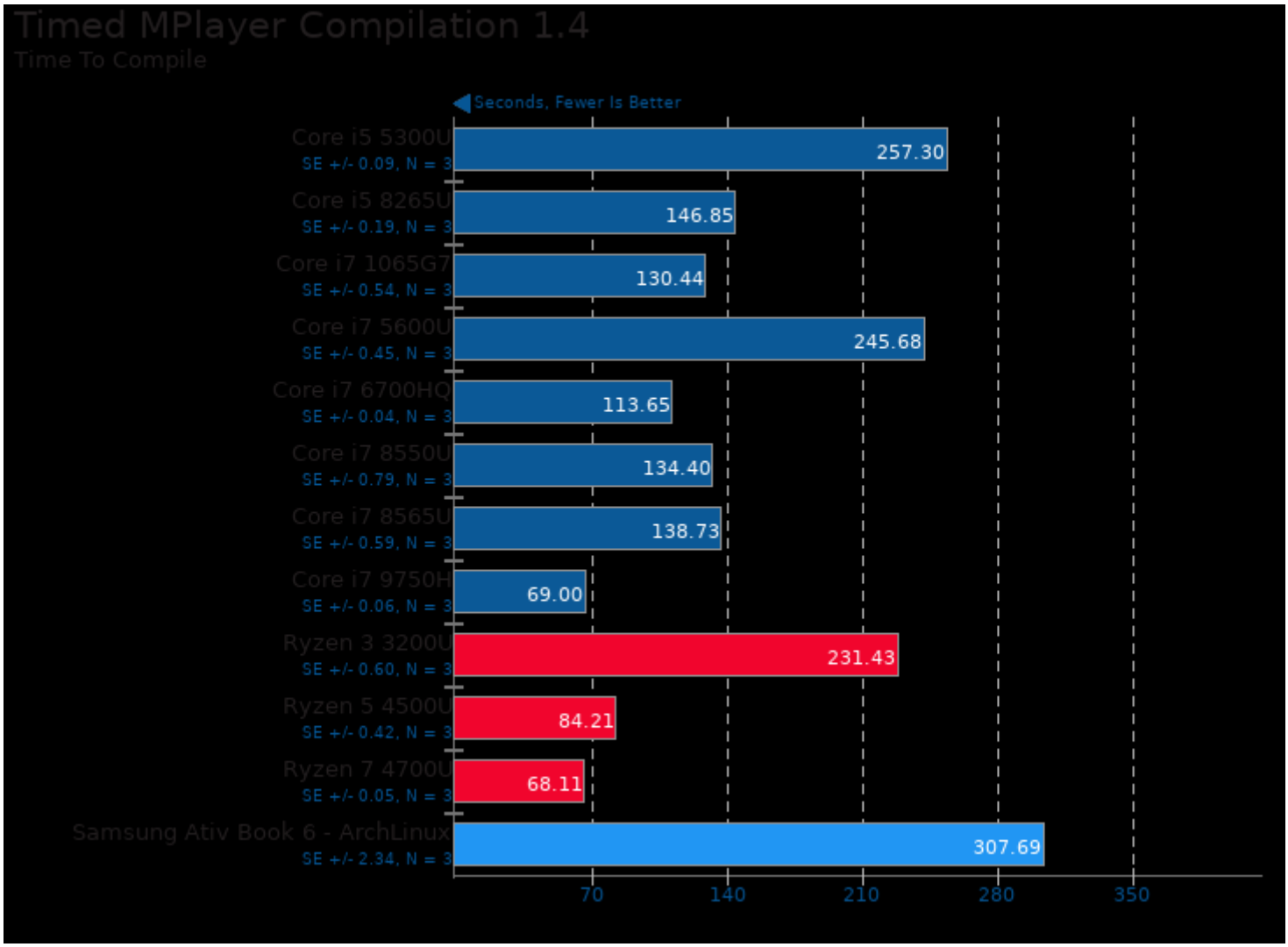
Lenovo Flex 5 AMD Ryzen 5 45ooU



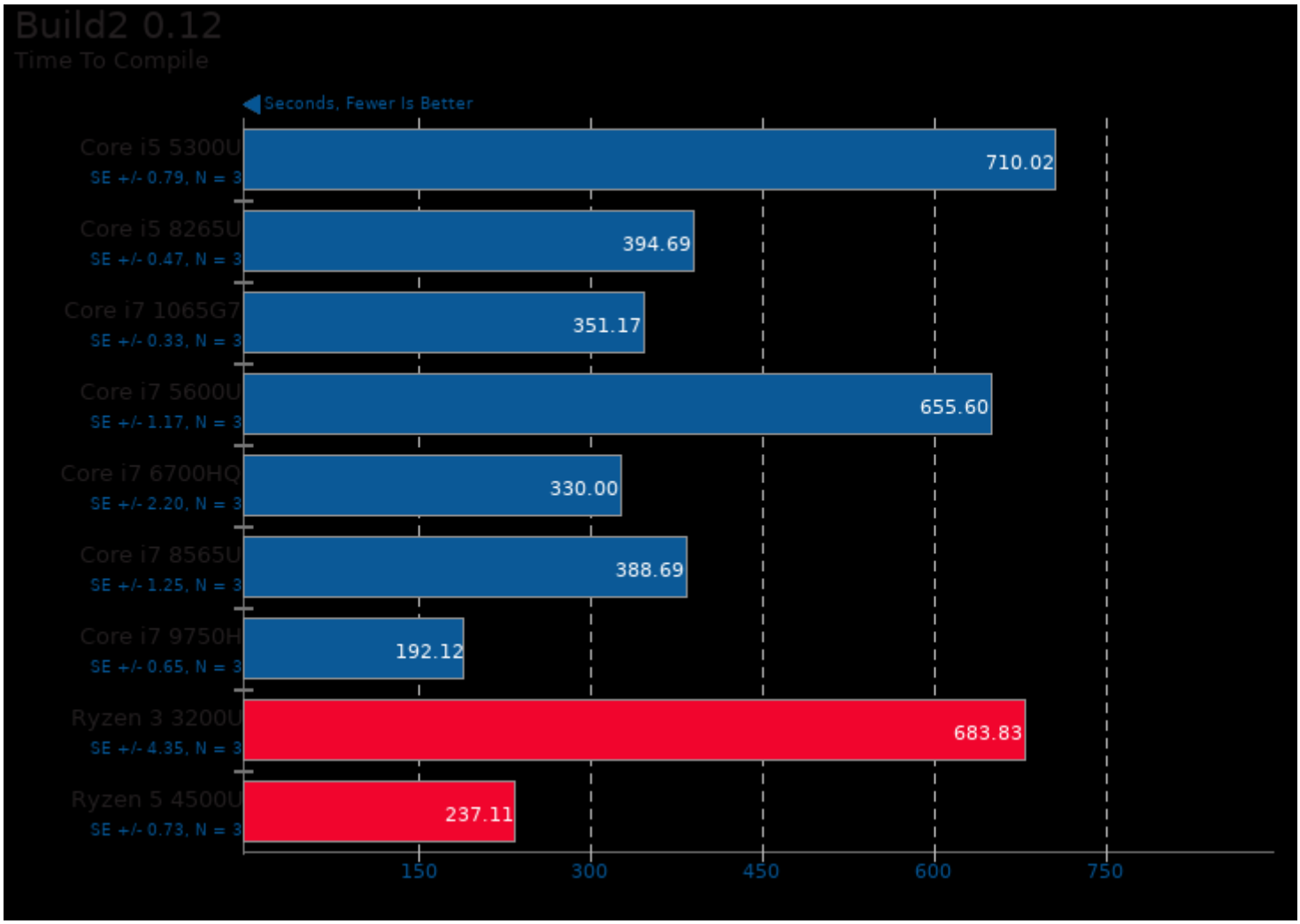
Lenovo Flex 5 AMD Ryzen 5 45ooU

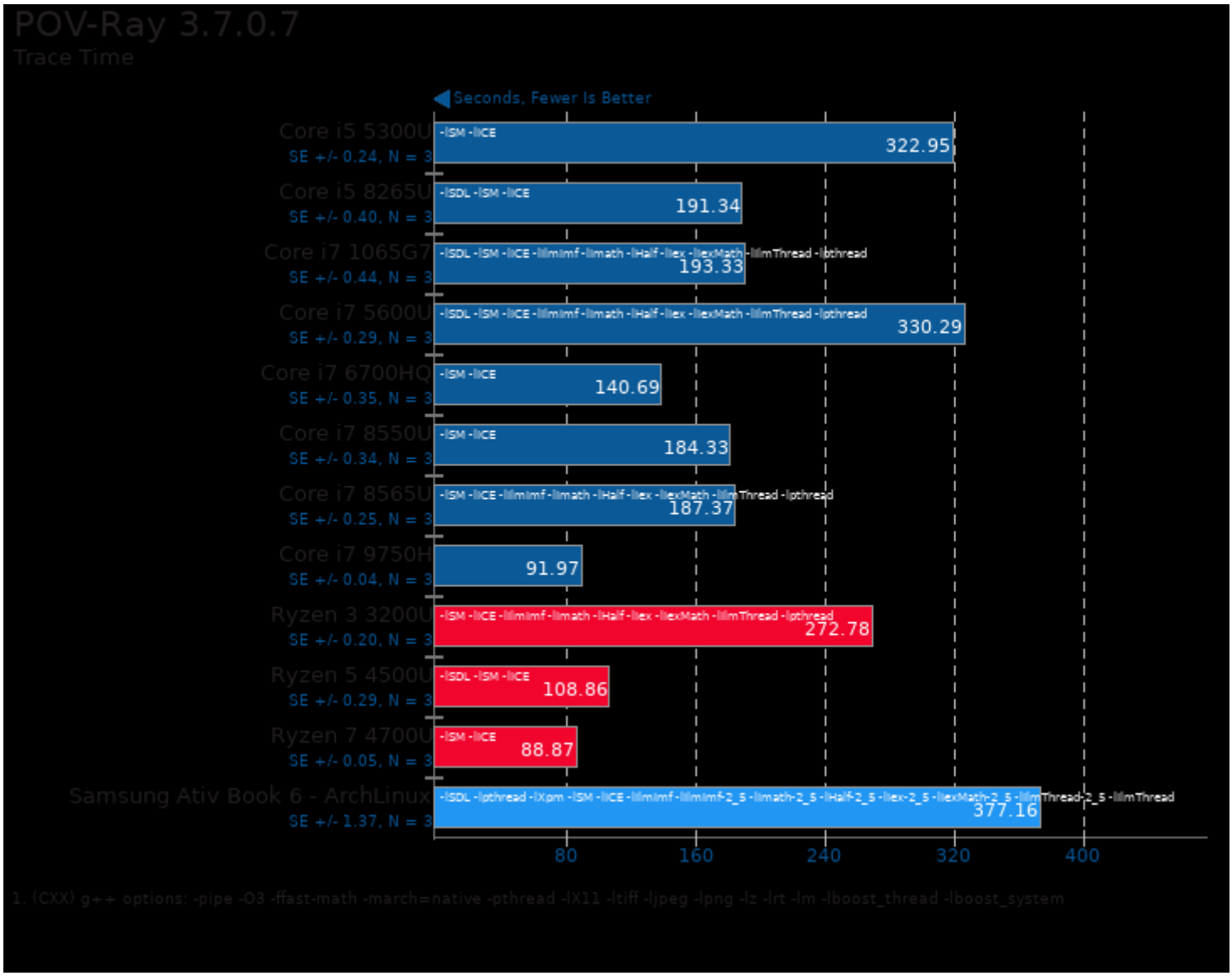


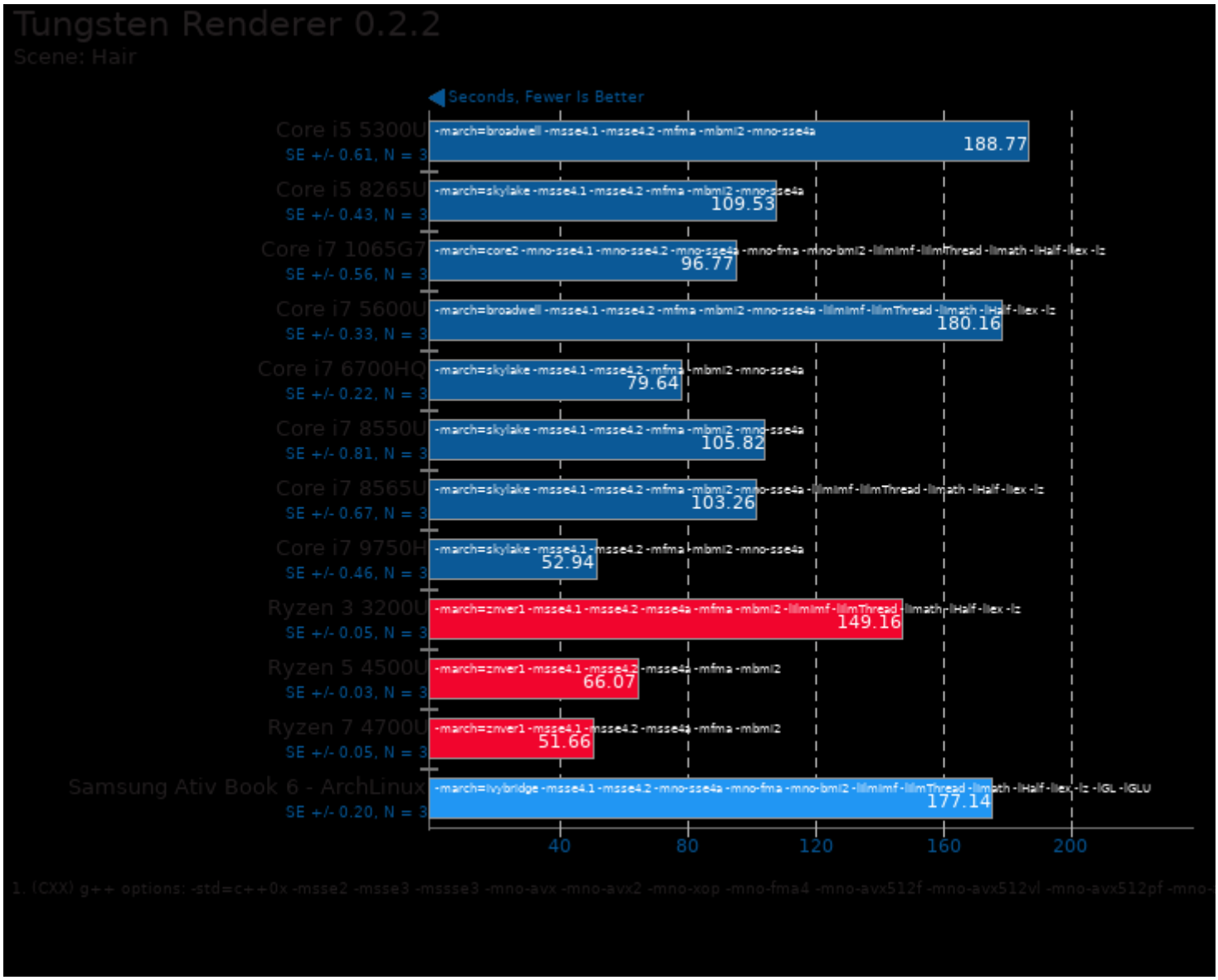

Timed Linux Kernel Compilation 5.4
Time To Compile
Seconds, Fewer Is Better
Core i5 5300U
SE +/- 1.11, N = 3
560.12
Core i5 8265U
SE +/- 0.84, N = 3
318.54
Core i7 1065G7
SE +/- 0.59, N = 3
278.42
Core i7 5600U
SE +/- 2.99, N = 3
532.74
Core i7 6700HQ
SE +/- 0.81, N = 3
253.10
Core i7 8550U
SE +/- 0.64, N = 3
303.80
Core i7 8565U
SE +/- 1.11, N = 3
303.57
Core i7 9750H
SE +/- 0.77, N = 3
152.94
Ryzen 3 3200U
SE +/- 0.50, N = 3
501.87
Ryzen 5 4500U
SE +/- 0.09, N = 3
185.73
Ryzen 7 4700U
SE +/- 1.24, N = 3
157.37
120
240
360
480
600

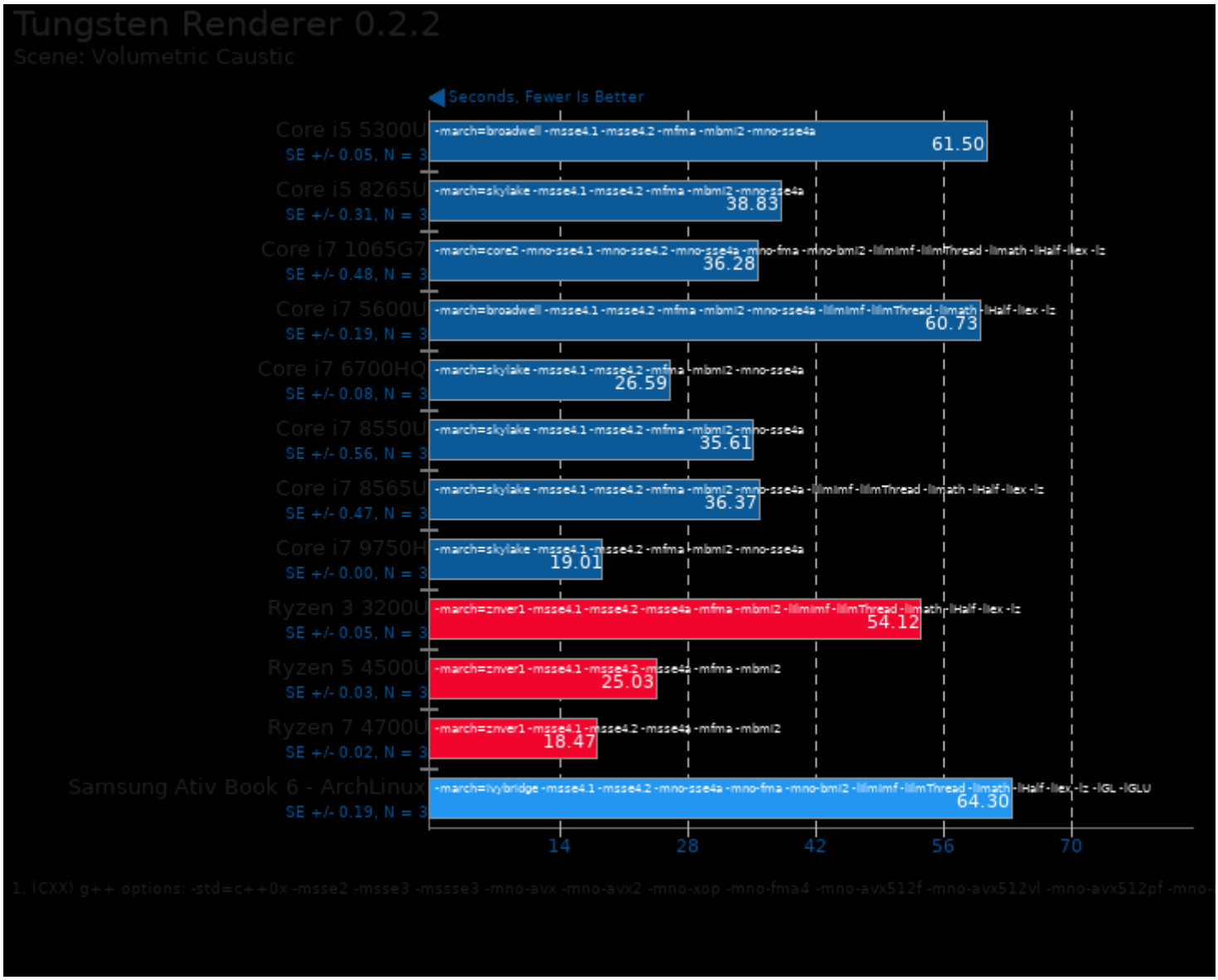

Timed MPlayer Compilation 1.4
Time To Compile
Seconds, Fewer Is Better
Core i5 5300U
SE +/- 0.09, N = 3
257.30
Core i5 8265U
SE +/- 0.19, N = 3
146.85
Core i7 1065G7
SE +/- 0.54, N = 3
130.44
Core i7 5600U
SE +/- 0.45, N = 3
245.68
Core i7 6700HQ
SE +/- 0.04, N = 3
113.65
Core i7 8550U
SE +/- 0.79, N = 3
134.40
Core i7 8565U
SE +/- 0.59, N = 3
138.73
Core i7 9750H
SE +/- 0.06, N = 3
69.00
Ryzen 3 3200U
SE +/- 0.60, N = 3
231.43
Ryzen 5 4500U
SE +/- 0.42, N = 3
84.21
Ryzen 7 4700U
SE +/- 0.05, N = 3
68.11
Samsung Ativ Book 6 - ArchLinux
SE +/- 2.34, N = 3
307.69
70
140
210
280
350

Lenovo Flex 5 AMD Ryzen 5 45ooU

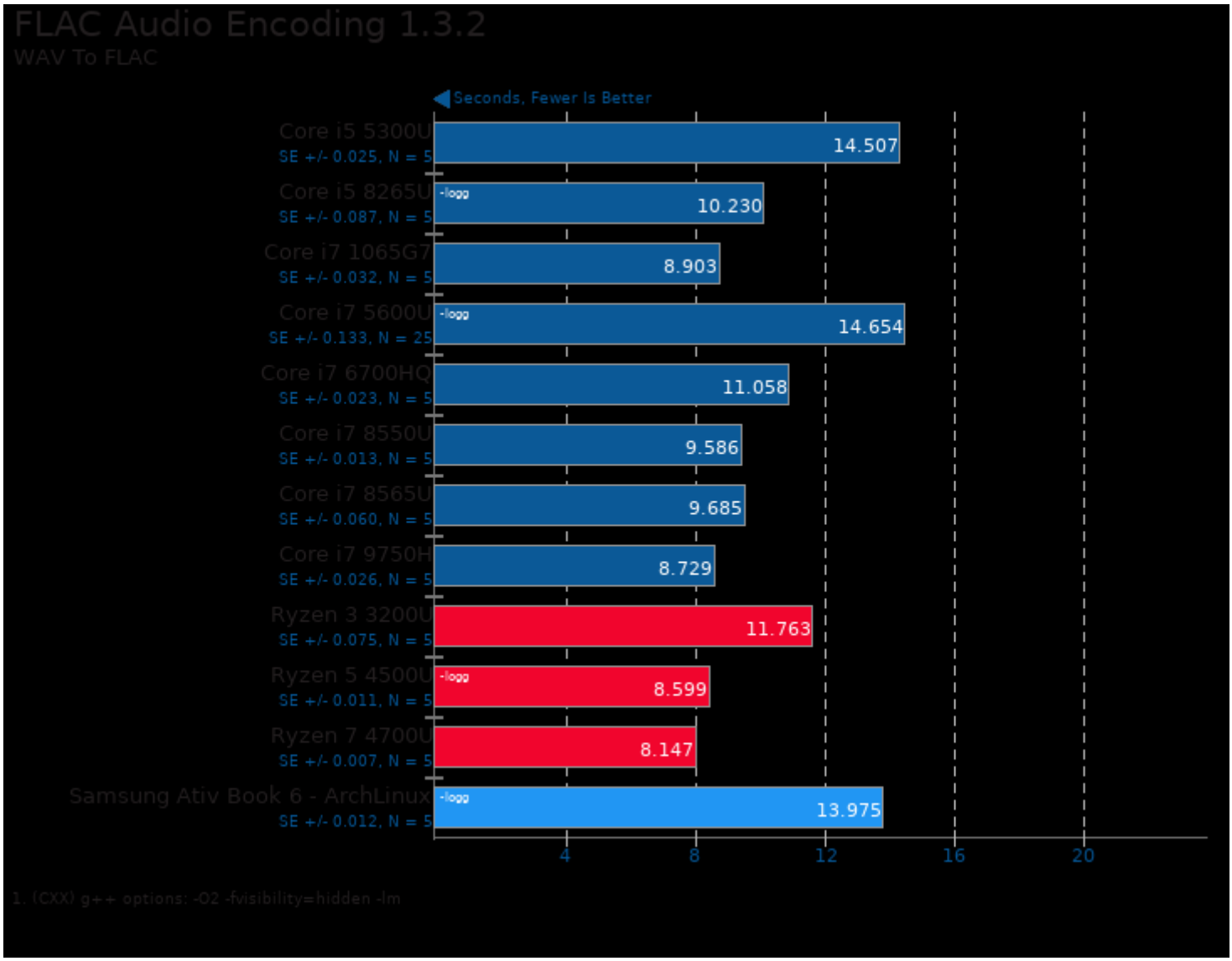



POV-Ray 3.7.0.7
Trace Time
Seconds, Fewer Is Better
Core i5 5300U
SE +/- 0.24, N = 3
-ISM -lICE
322.95
Core i5 8265U
SE +/- 0.40, N = 3
-ISDL -ISM -lICE
191.34
Core i7 1065G7
SE +/- 0.44, N = 3
-ISDL -ISM -lICE -lilmimf -limath -lHalf -llex -llexMath -lilmThread -lpthread
193.33
Core i7 5600U
SE +/- 0.29, N = 3
-ISDL -ISM -lICE -lilmimf -limath -lHalf -llex -llexMath -lilmThread -lpthread
330.29
Core i7 6700HQ
SE +/- 0.35, N = 3
-ISM -lICE
140.69
Core i7 8550U
SE +/- 0.34, N = 3
-ISM -lICE
184.33
Core i7 8565U
SE +/- 0.25, N = 3
-ISM -lICE -lilmimf -limath -lHalf -llex -llexMath -lilmThread -lpthread
187.37
Core i7 9750H
SE +/- 0.04, N = 3
91.97
Ryzen 3 3200U
SE +/- 0.20, N = 3
-ISM -lICE -lilmimf -limath -lHalf -llex -llexMath -lilmThread -lpthread
272.78
Ryzen 5 4500U
SE +/- 0.29, N = 3
-ISDL -ISM -lICE
108.86
Ryzen 7 4700U
SE +/- 0.05, N = 3
-ISM -lICE
88.87
Samsung Ativ Book 6 - ArchLinux
SE +/- 1.37, N = 3
-ISDL -lpthread -lXpm -ISM -lICE -lilmimf -lilmimf-2_5 -limath-2_5 -lHalf-2_5 -llex-2_5 -llexMath-2_5 -lilmThread-2_5 -lilmThread
377.16
80
160
240
320
400
1. (CXX) g++ options: -pipe -O3 -ffast-math -march=native -pthread -lX11 -ltiff -ljpeg -lpng -lz -lrt -lm -lboost_thread -lboost_system

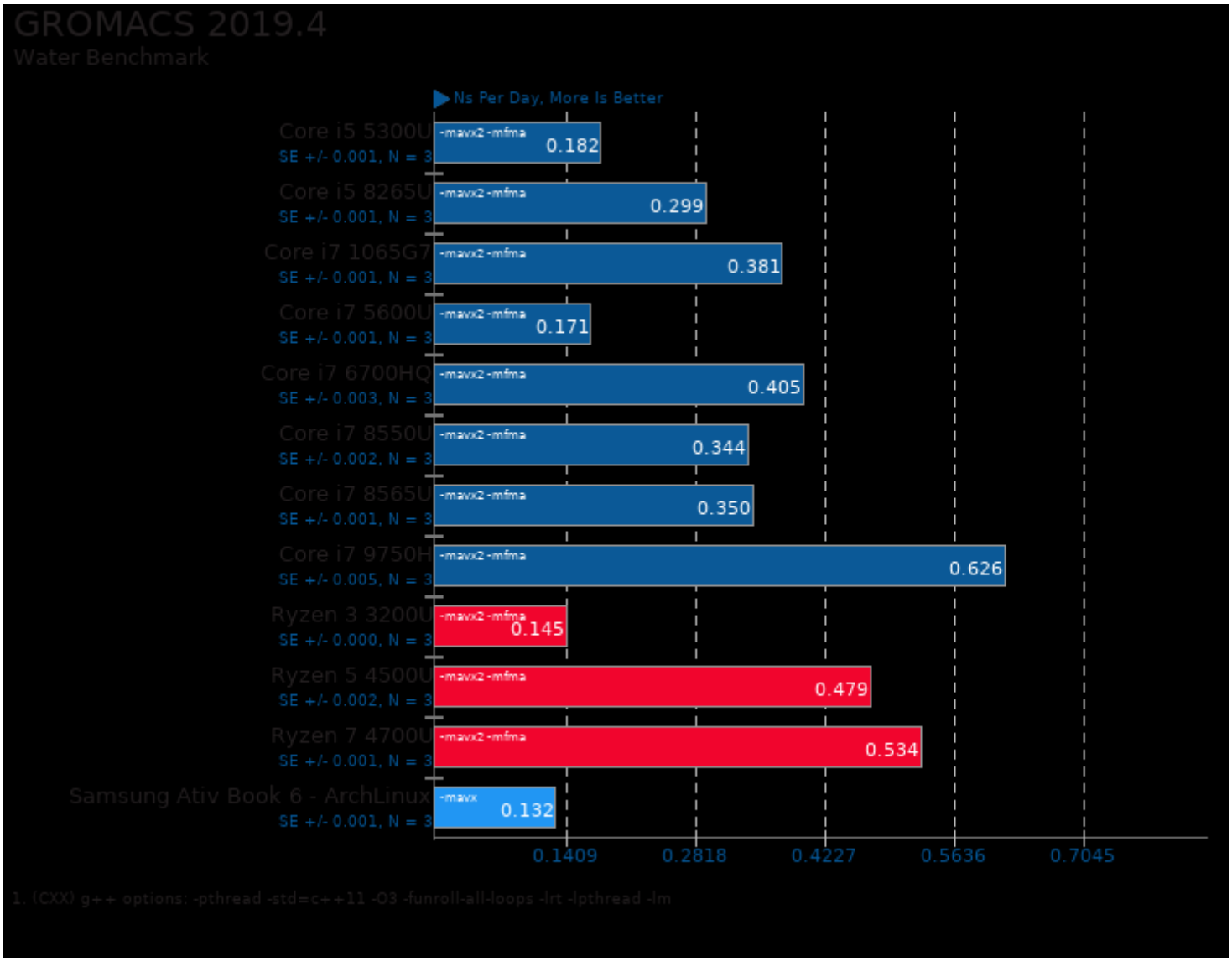

Tungsten Renderer 0.2.2
Scene: Hair
Seconds, Fewer Is Better
Core i5 5300U
SE +/- 0.61, N = 3
-march=broadwell -msse4.1 -msse4.2 -mfma -mbmi2 -mno-sse4a
188.77
Core i5 8265U
SE +/- 0.43, N = 3
-march=skylake -msse4.1 -msse4.2 -mfma -mbmi2 -mno-sse4a
109.53
Core i7 1065G7
SE +/- 0.56, N = 3
-march=core2 -mno-sse4.1 -mno-sse4.2 -mno-sse4a -mno-fma -mno-bmi2 -lIlmImf -lIlmThread -lImath -lHalf -lIex -lz
96.77
Core i7 5600U
SE +/- 0.33, N = 3
-march=broadwell -msse4.1 -msse4.2 -mfma -mbmi2 -mno-sse4a -lIlmImf -lIlmThread -lImath -lHalf -lIex -lz
180.16
Core i7 6700HQ
SE +/- 0.22, N = 3
-march=skylake -msse4.1 -msse4.2 -mfma -mbmi2 -mno-sse4a
79.64
Core i7 8550U
SE +/- 0.81, N = 3
-march=skylake -msse4.1 -msse4.2 -mfma -mbmi2 -mno-sse4a
105.82
Core i7 8565U
SE +/- 0.67, N = 3
-march=skylake -msse4.1 -msse4.2 -mfma -mbmi2 -mno-sse4a -lIlmImf -lIlmThread -lImath -lHalf -lIex -lz
103.26
Core i7 9750H
SE +/- 0.46, N = 3
-march=skylake -msse4.1 -msse4.2 -mfma -mbmi2 -mno-sse4a
52.94
Ryzen 3 3200U
SE +/- 0.05, N = 3
-march=znver1 -msse4.1 -msse4.2 -msse4a -mfma -mbmi2 -lIlmImf -lIlmThread -lImath -lHalf -lIex -lz
149.16
Ryzen 5 4500U
SE +/- 0.03, N = 3
-march=znver1 -msse4.1 -msse4.2 -msse4a -mfma -mbmi2
66.07
Ryzen 7 4700U
SE +/- 0.05, N = 3
-march=znver1 -msse4.1 -msse4.2 -msse4a -mfma -mbmi2
51.66
Samsung Ativ Book 6 - ArchLinux
SE +/- 0.20, N = 3
-march=ivybridge -msse4.1 -msse4.2 -mno-sse4a -mno-fma -mno-bmi2 -lIlmImf -lIlmThread -lImath -lHalf -lIex -lz -lGL -lGLU
177.14
40
80
120
160
200
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-


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 i5 8265U
SE +/- 0.31, N = 3
-march=skylake -msse4.1 -msse4.2 -mfma -mbmi2 -mno-sse4a
38.83
Core i7 1065G7
SE +/- 0.48, N = 3
-march=core2 -mno-sse4.1 -mno-sse4.2 -mno-sse4a -mno-fma -mno-bmi2 -llimimf -llimThread -limath -lHalf -llex -lz
36.28
Core i7 5600U
SE +/- 0.19, N = 3
-march=broadwell -msse4.1 -msse4.2 -mfma -mbmi2 -mno-sse4a -llimimf -llimThread -limath -lHalf -llex -lz
60.73
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 -llimimf -llimThread -limath -lHalf -llex -lz
36.37
Core i7 9750H
SE +/- 0.00, N = 3
-march=skylake -msse4.1 -msse4.2 -mfma -mbmi2 -mno-sse4a
19.01
Ryzen 3 3200U
SE +/- 0.05, N = 3
-march=znver1 -msse4.1 -msse4.2 -msse4a -mfma -mbmi2 -llimimf -llimThread -limath -lHalf -llex -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
Samsung Ativ Book 6 - ArchLinux
SE +/- 0.19, N = 3
-march=ivybridge -msse4.1 -msse4.2 -mno-sse4a -mno-fma -mno-bmi2 -llimimf -llimThread -limath -lHalf -llex -lz -lGL -lGLU
64.30
14
28
42
56
70
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-

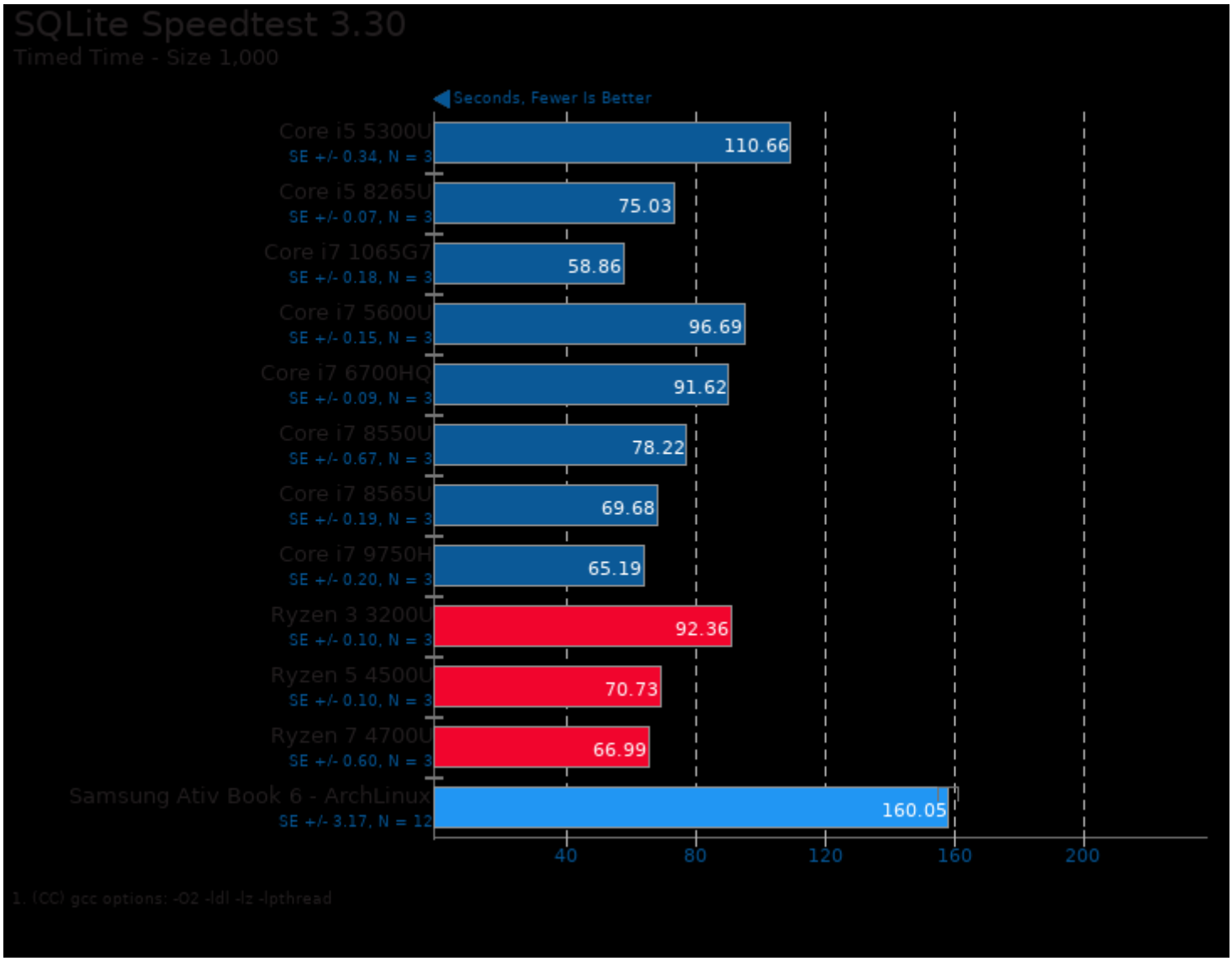
Lenovo Flex 5 AMD Ryzen 5 45ooU



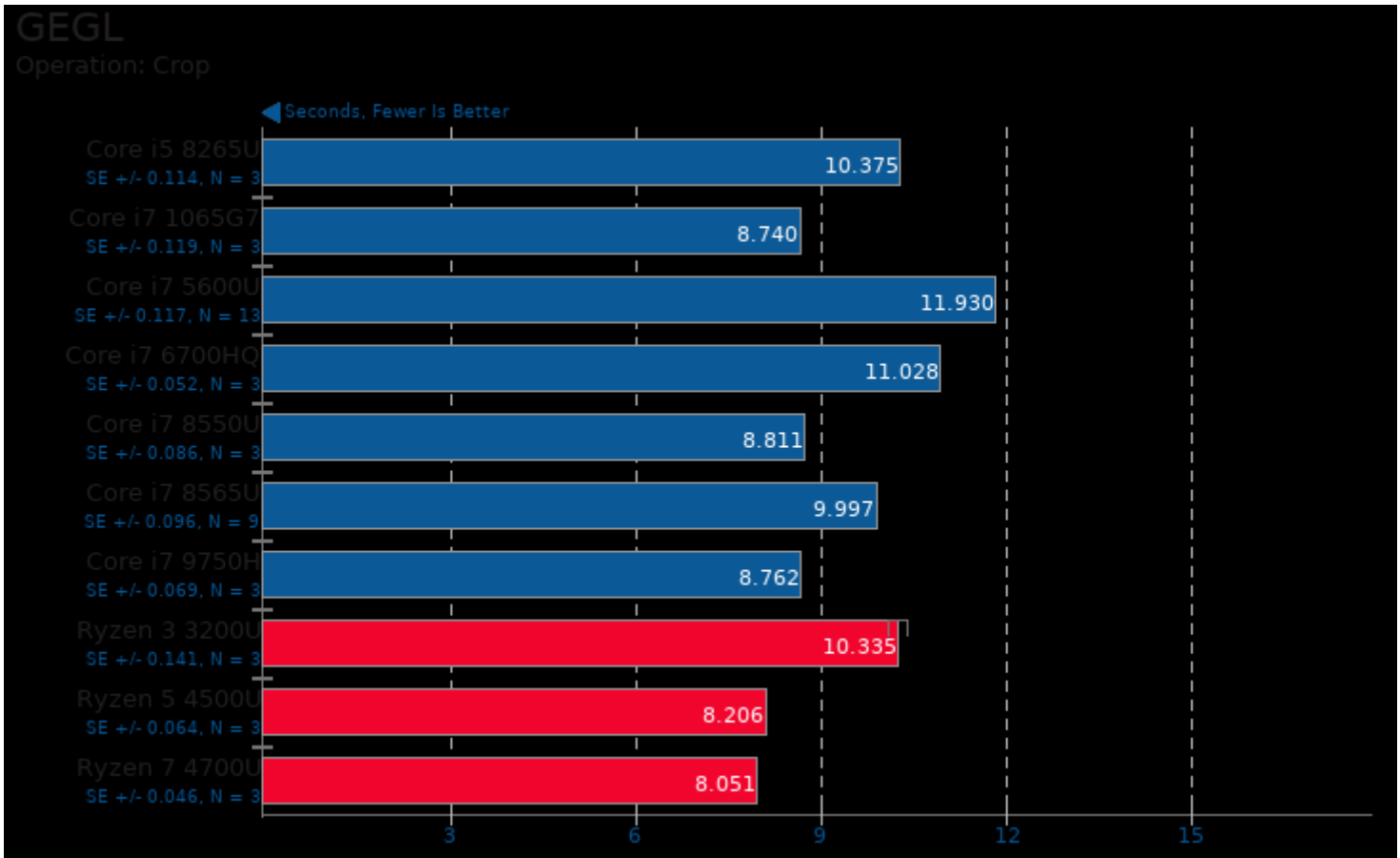
Lenovo Flex 5 AMD Ryzen 5 45ooU

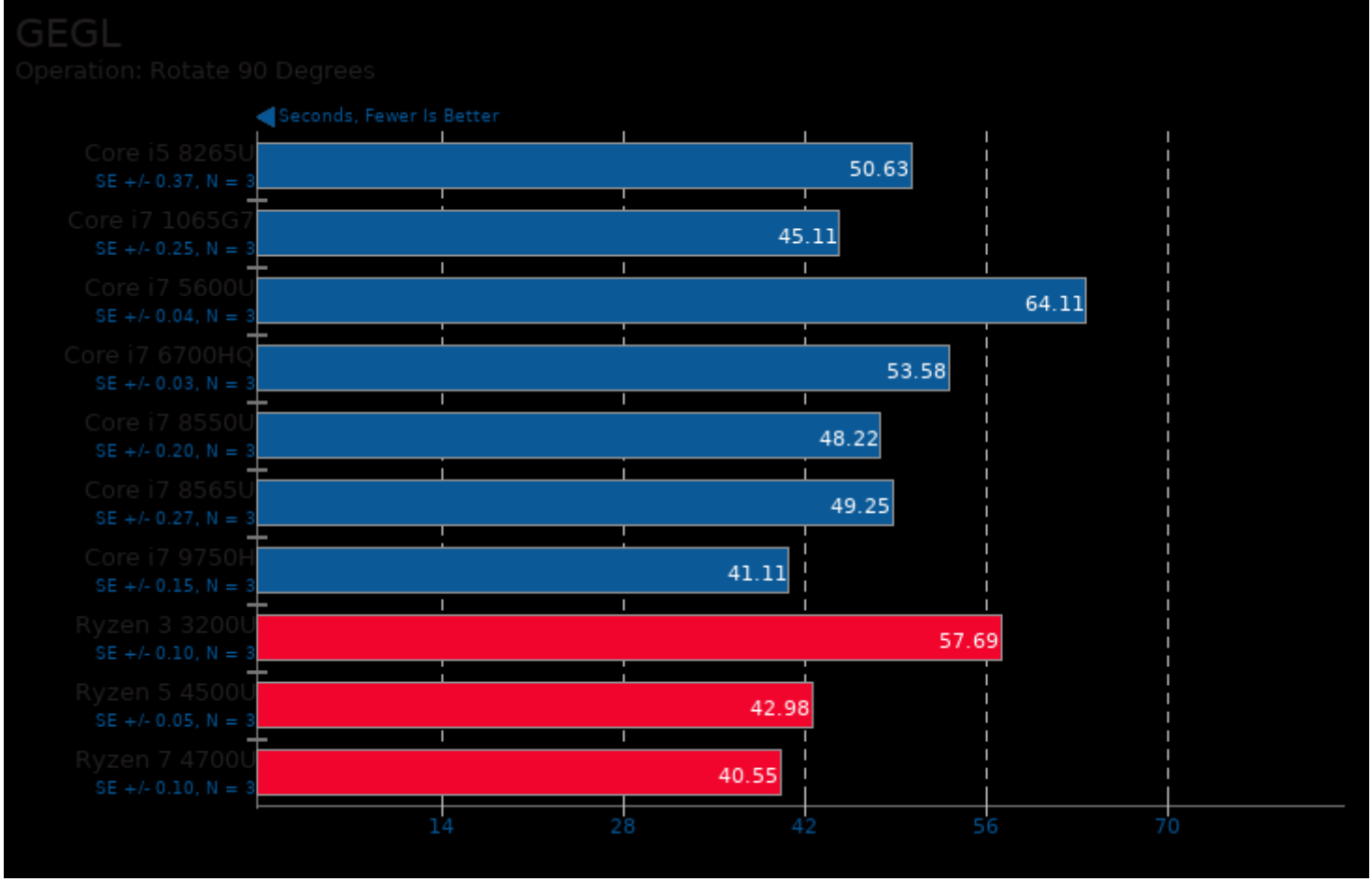


Lenovo Flex 5 AMD Ryzen 5 45ooU

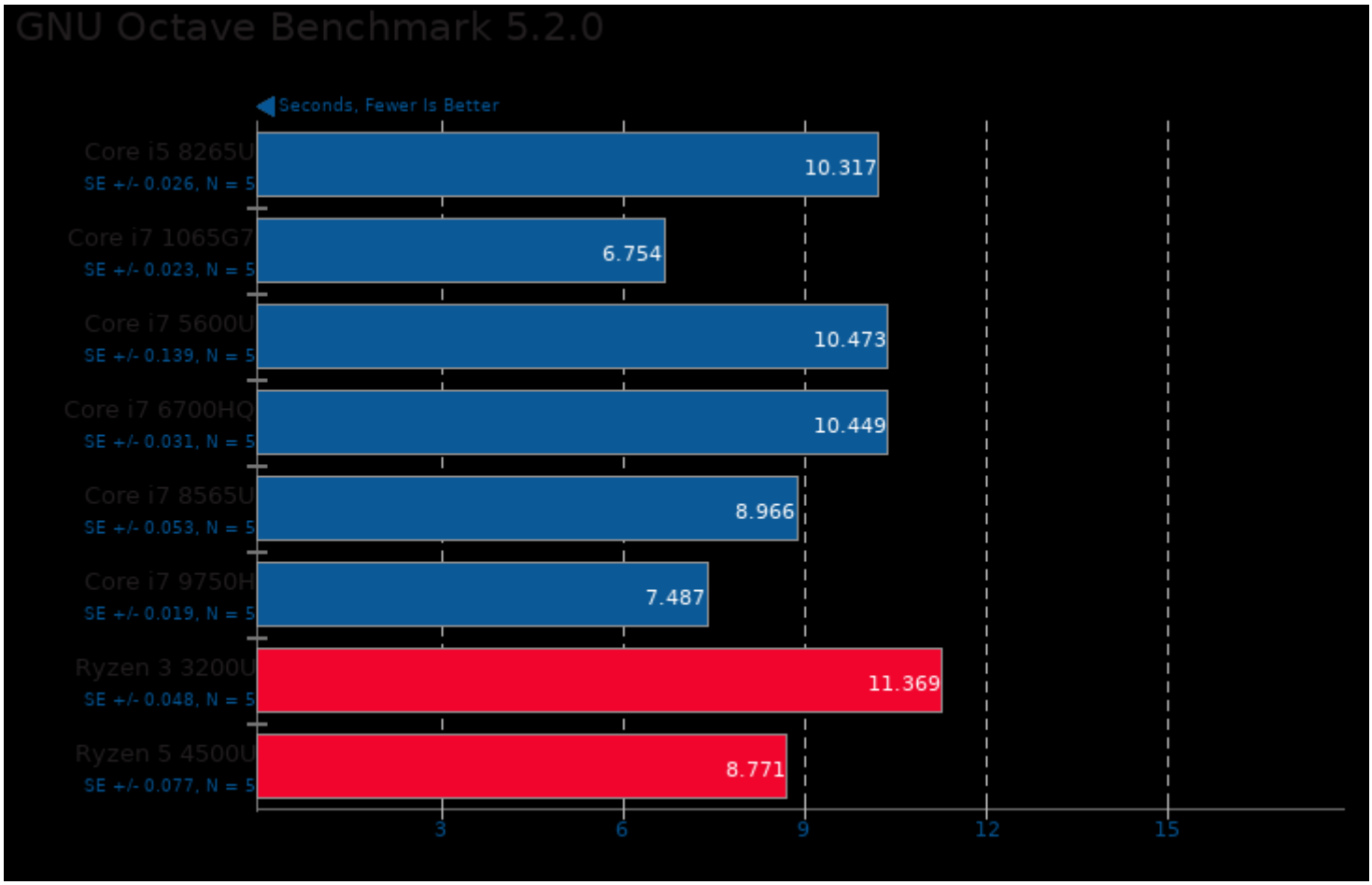


Lenovo Flex 5 AMD Ryzen 5 45ooU

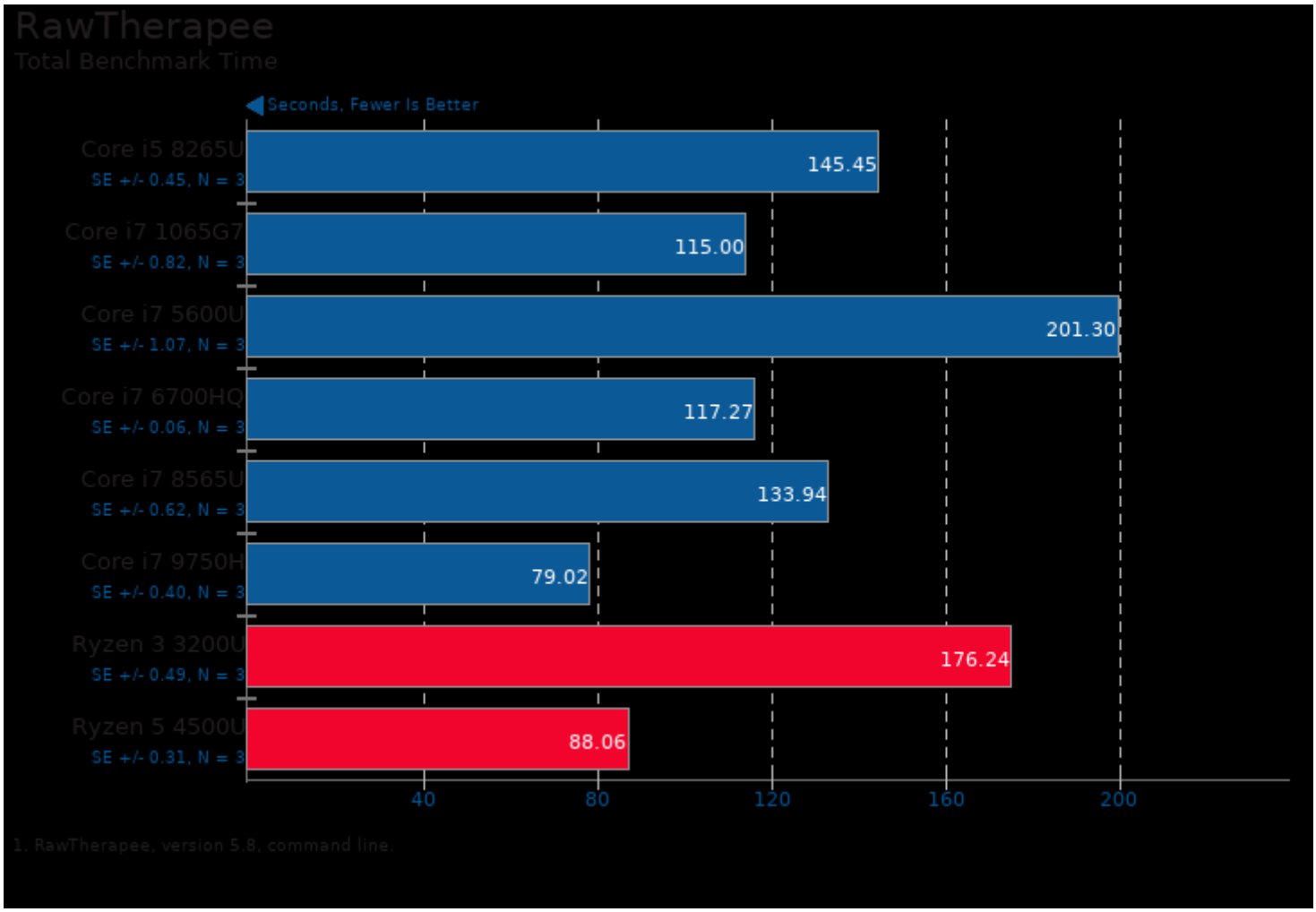




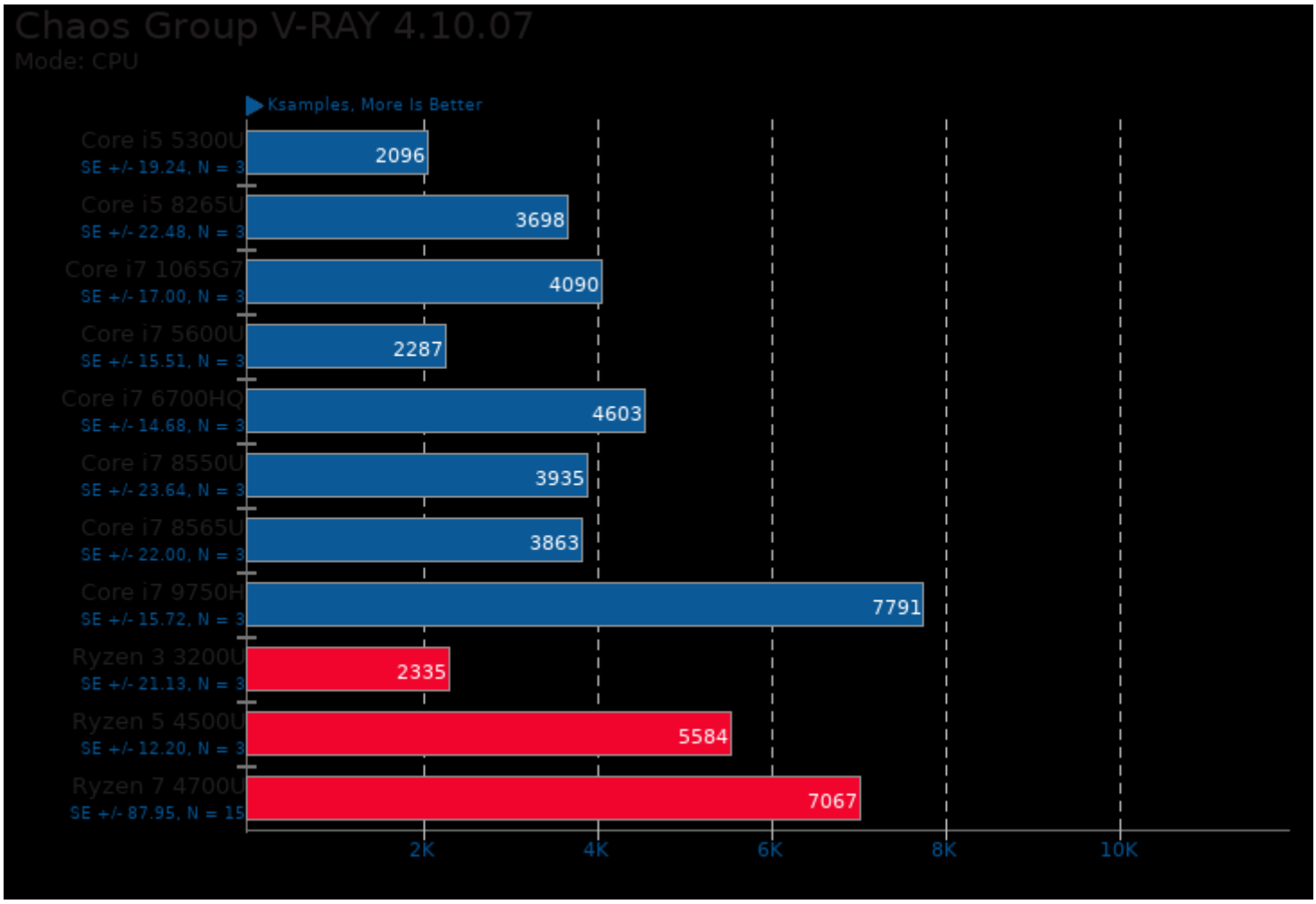
Lenovo Flex 5 AMD Ryzen 5 45ooU



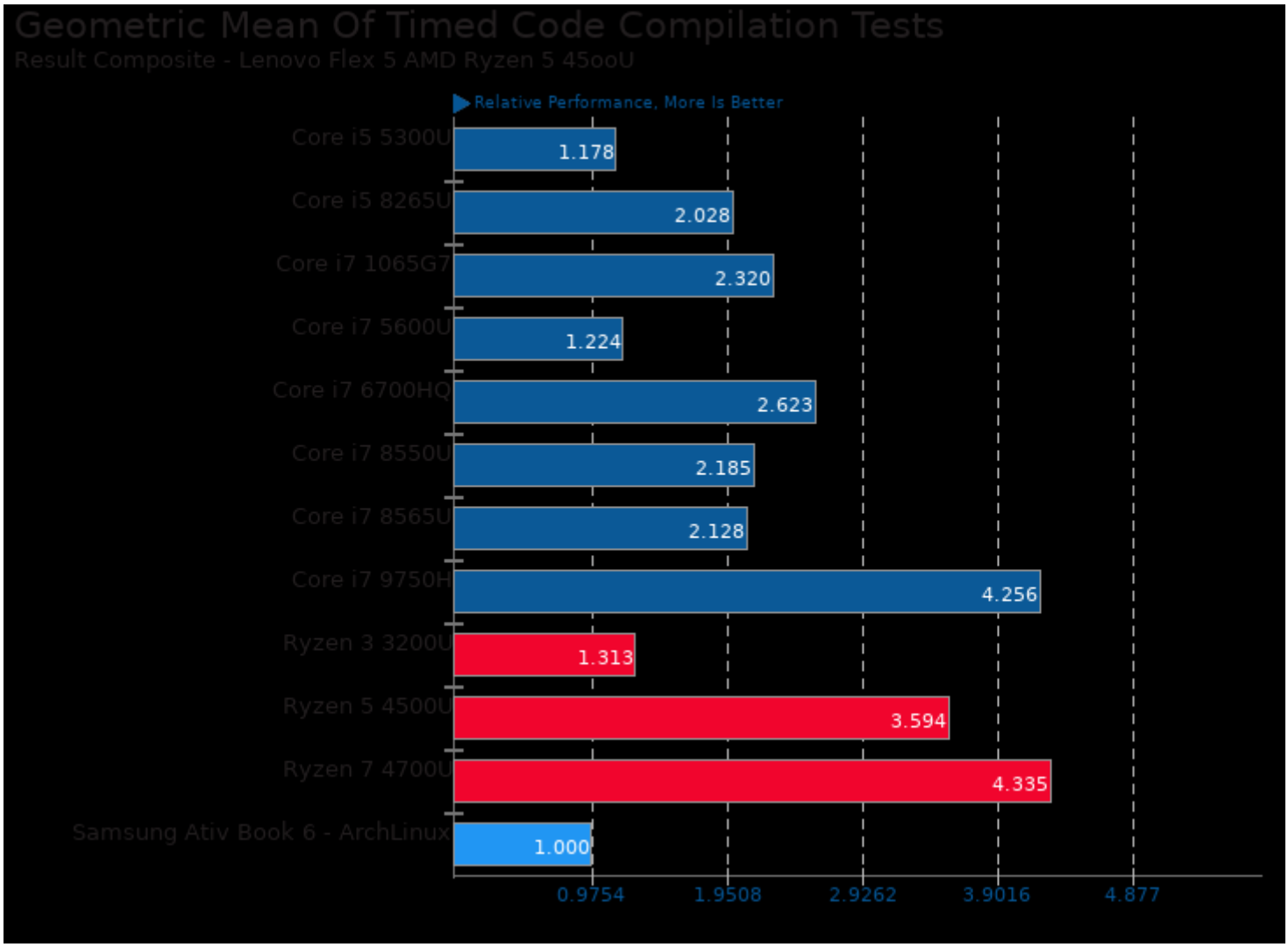
Lenovo Flex 5 AMD Ryzen 5 45ooU



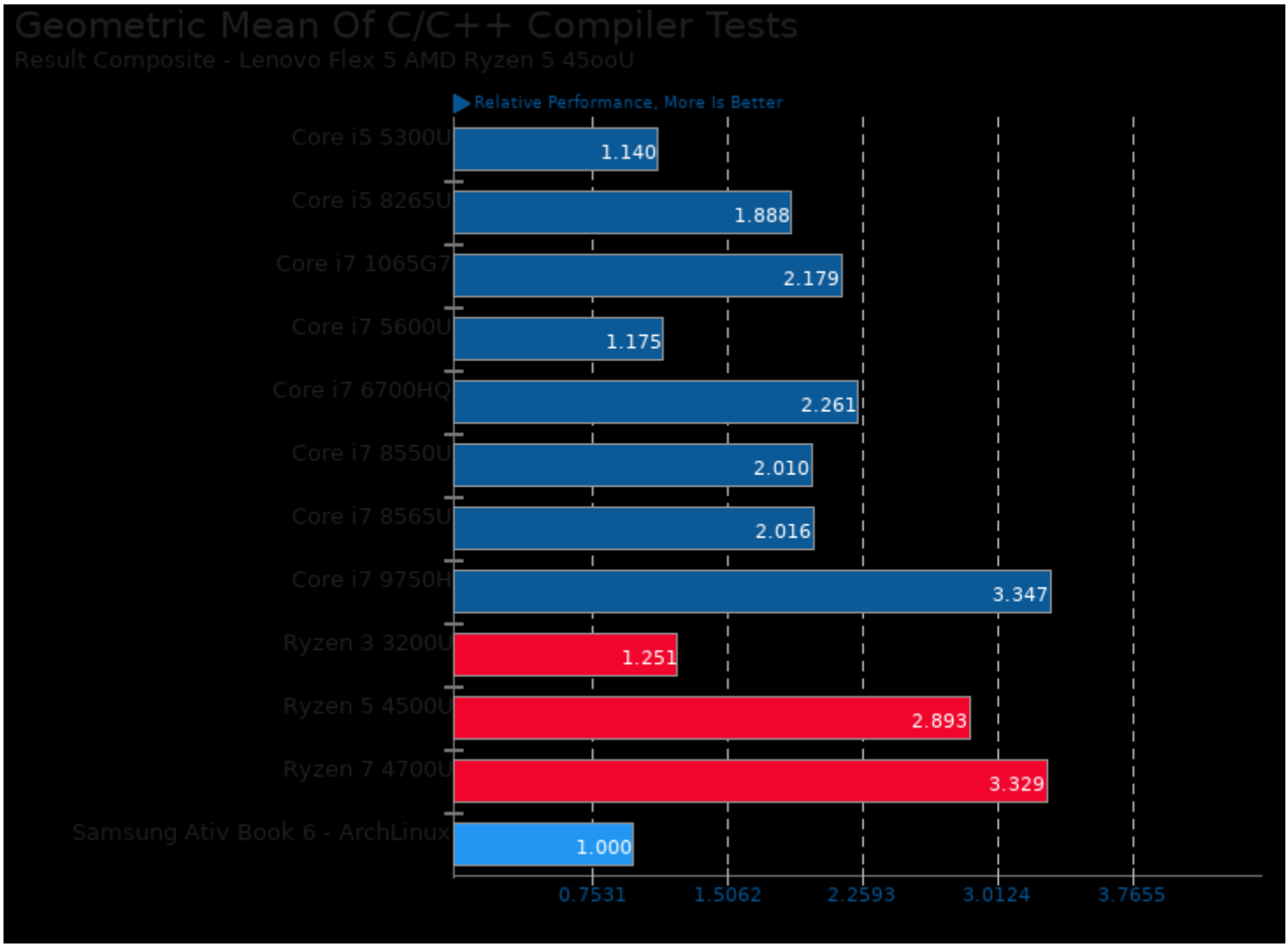
Lenovo Flex 5 AMD Ryzen 5 45ooU



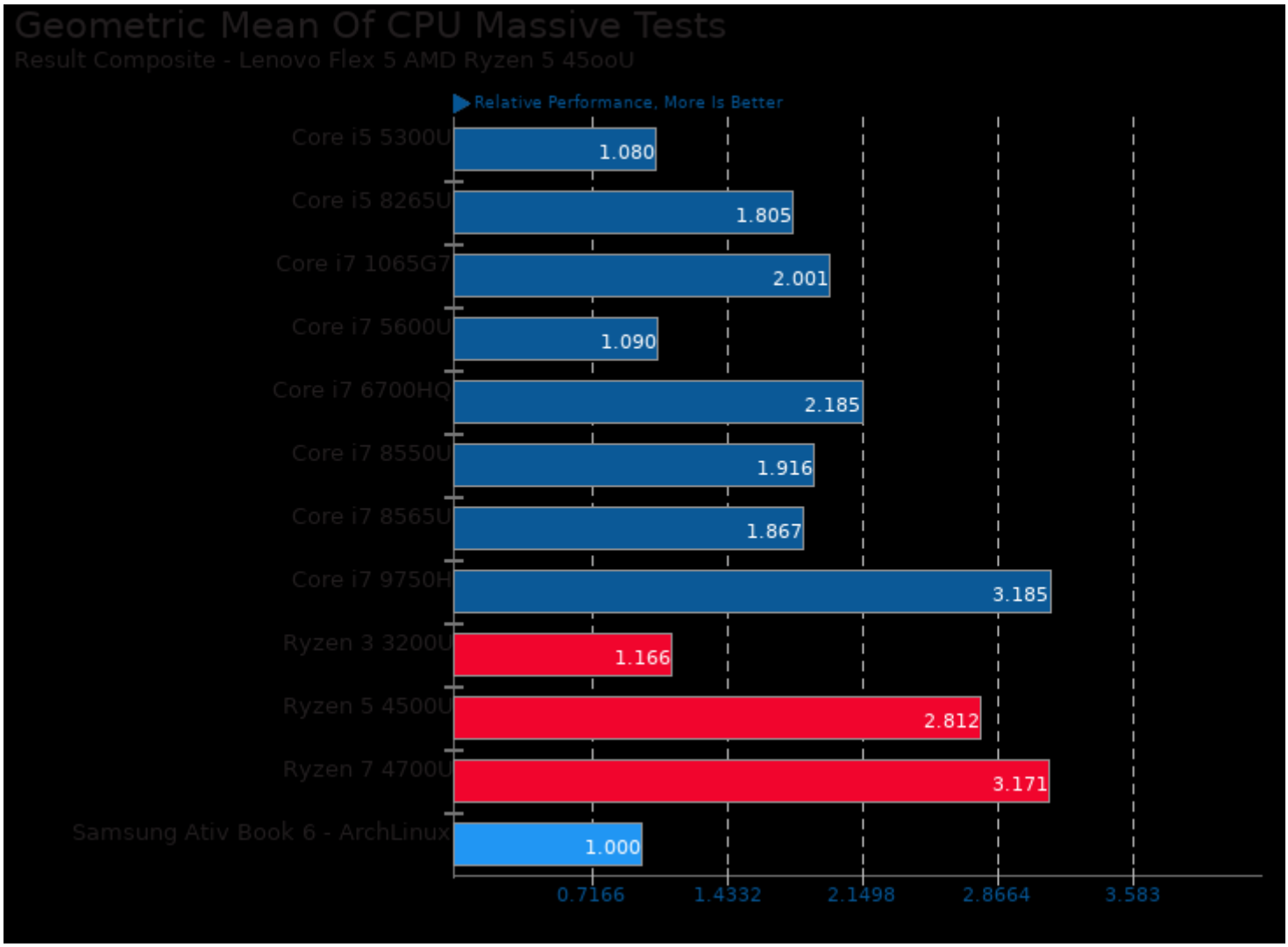
These geometric means are based upon test groupings / test suites for this result file.



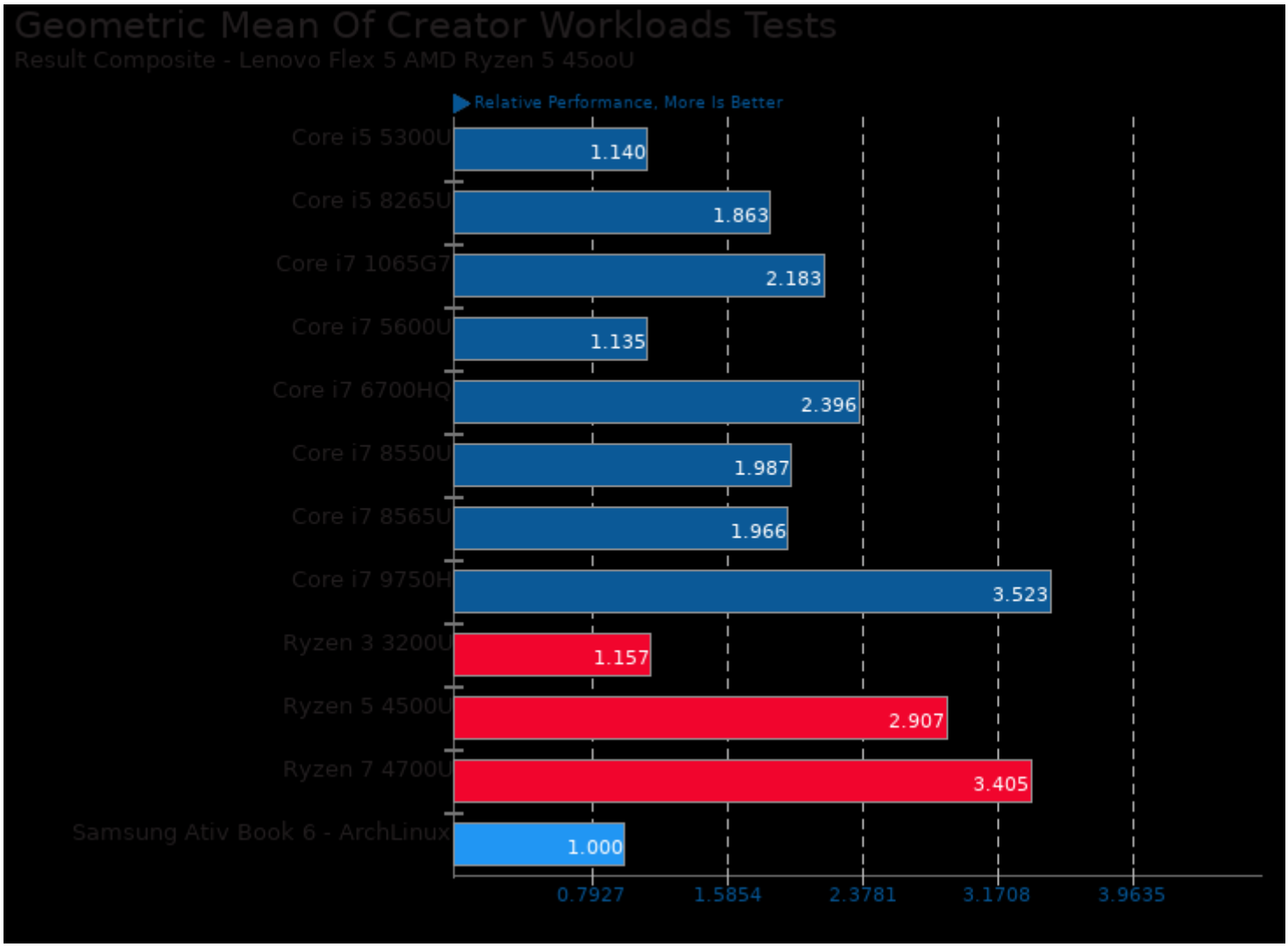
Geometric mean based upon tests: pts/build-linux-kernel, pts/build-gdb, pts/build-ffmpeg, pts/build-mplayer and pts/build2



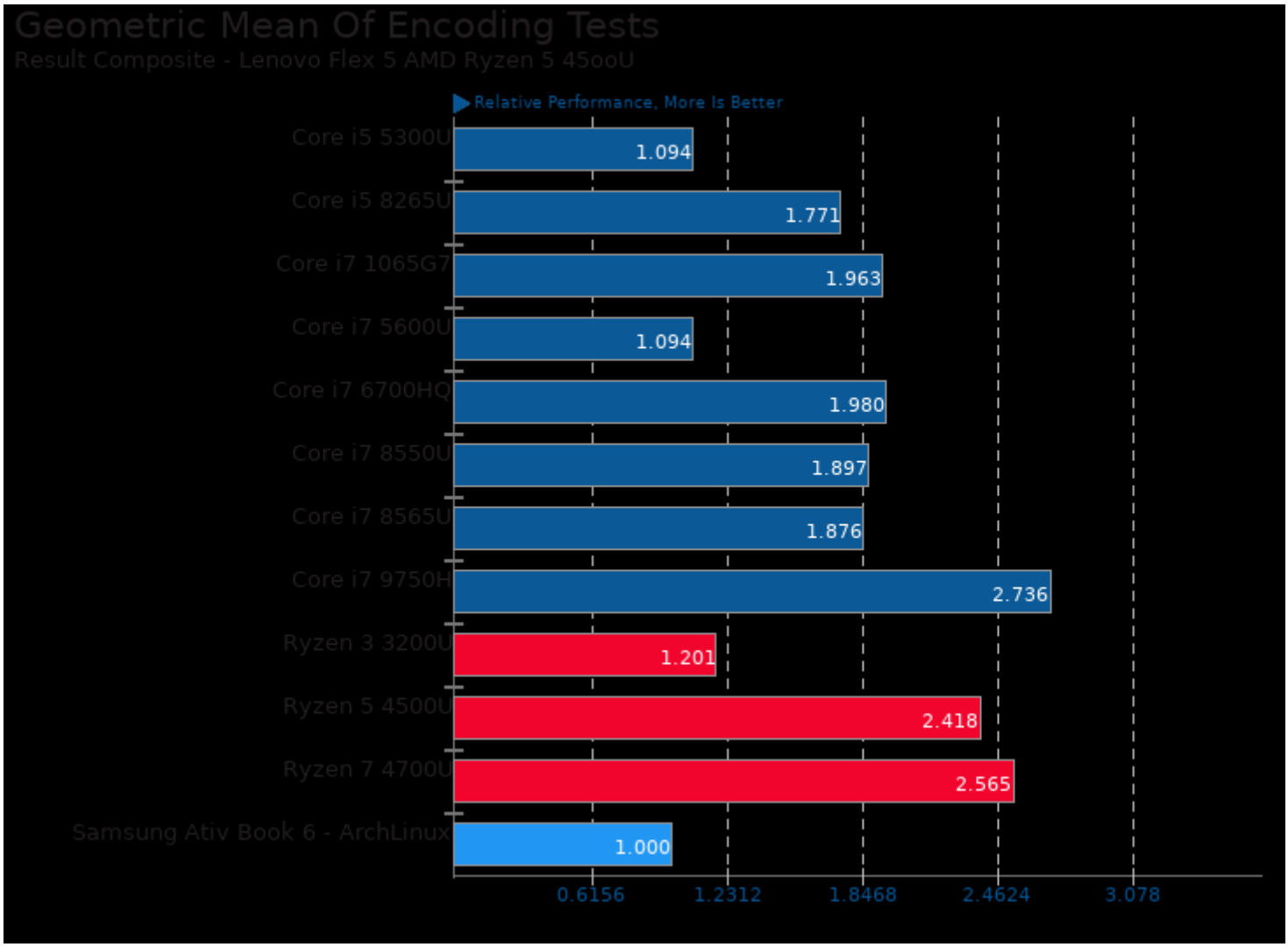
Geometric mean based upon tests: pts/vpxenc, pts/encode-flac, pts/sqlite-speedtest, pts/x264, pts/tungsten, pts/lammps, pts/svt-av1, pts/svt-vp9, pts/gromacs, pts/build-gdb, pts/build-ffmpeg and pts/build-mplayer



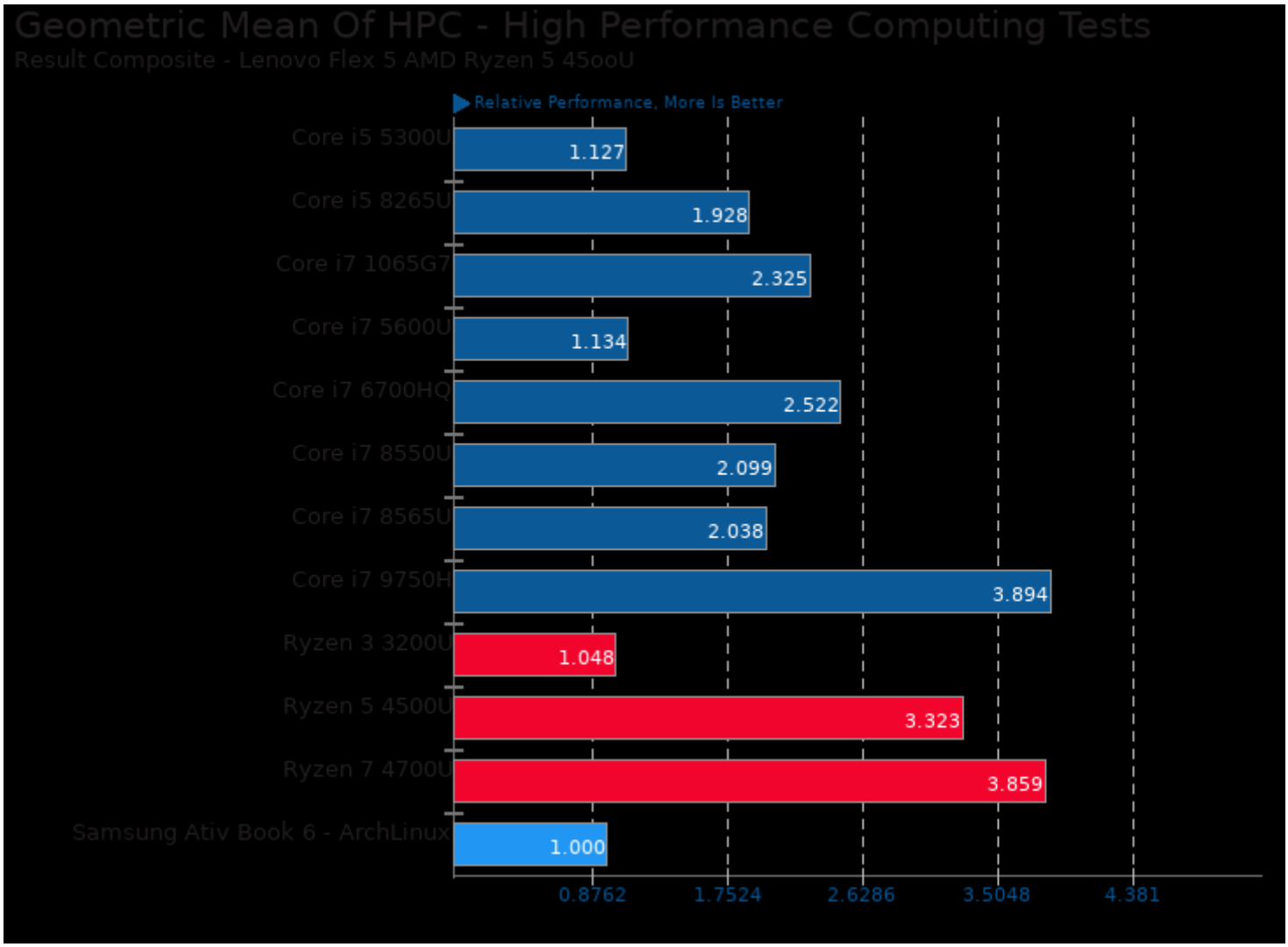
Geometric mean based upon tests: pts/build-linux-kernel, pts/svt-av1, pts/svt-vp9, pts/vpxenc, pts/x264, pts/encode-flac, pts/java-gradle-perf, pts/lammps, pts/namd, pts/povray, pts/v-ray and system/octave-benchmark



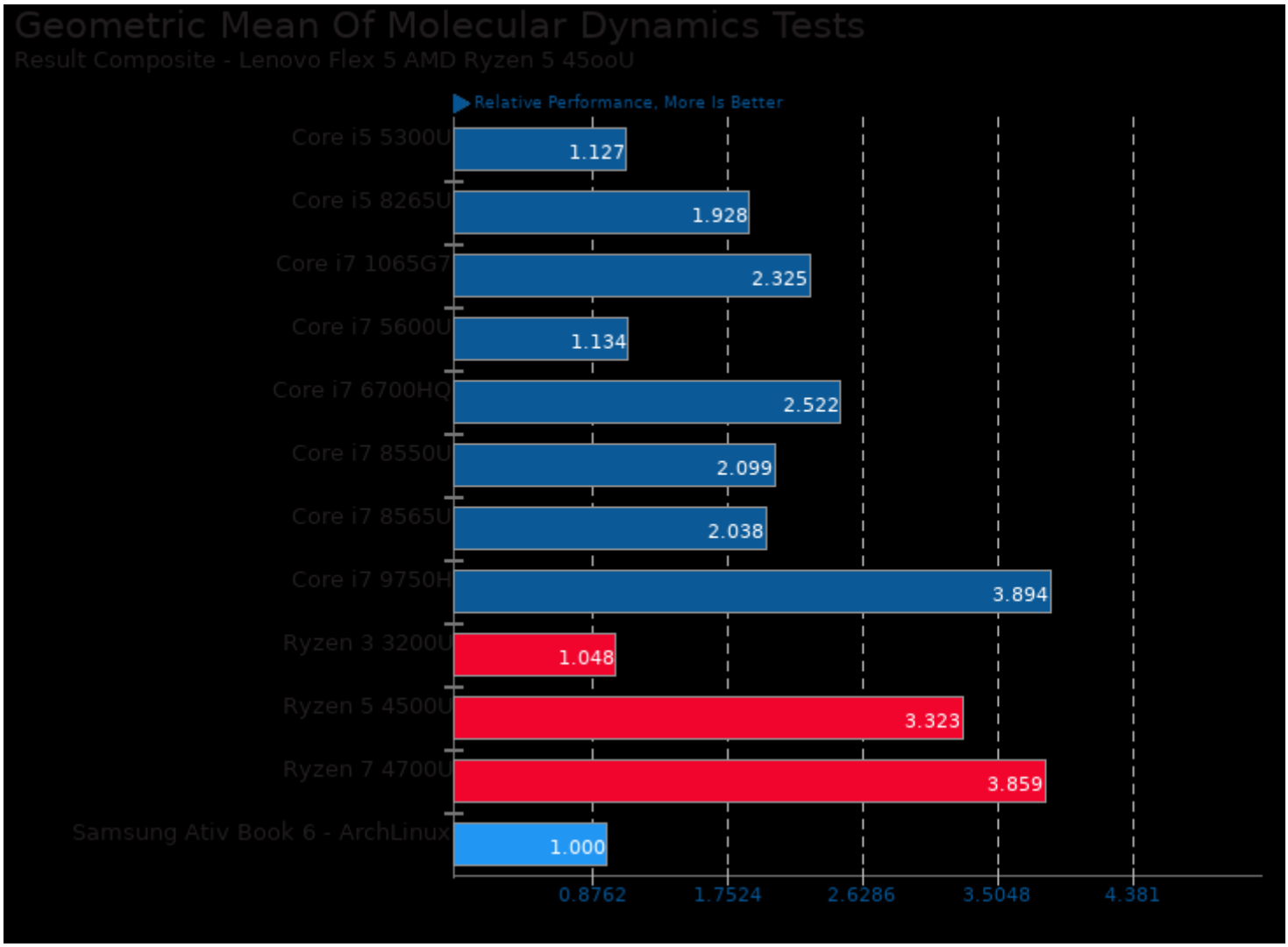
Geometric mean based upon tests: pts/ospray, pts/povray, pts/tungsten, pts/v-ray, pts/svt-vp9, pts/x264, pts/vpxenc, pts/svt-av1, pts/encode-flac, system/rawtherapee, system/gegl, pts/embree and pts/oidn



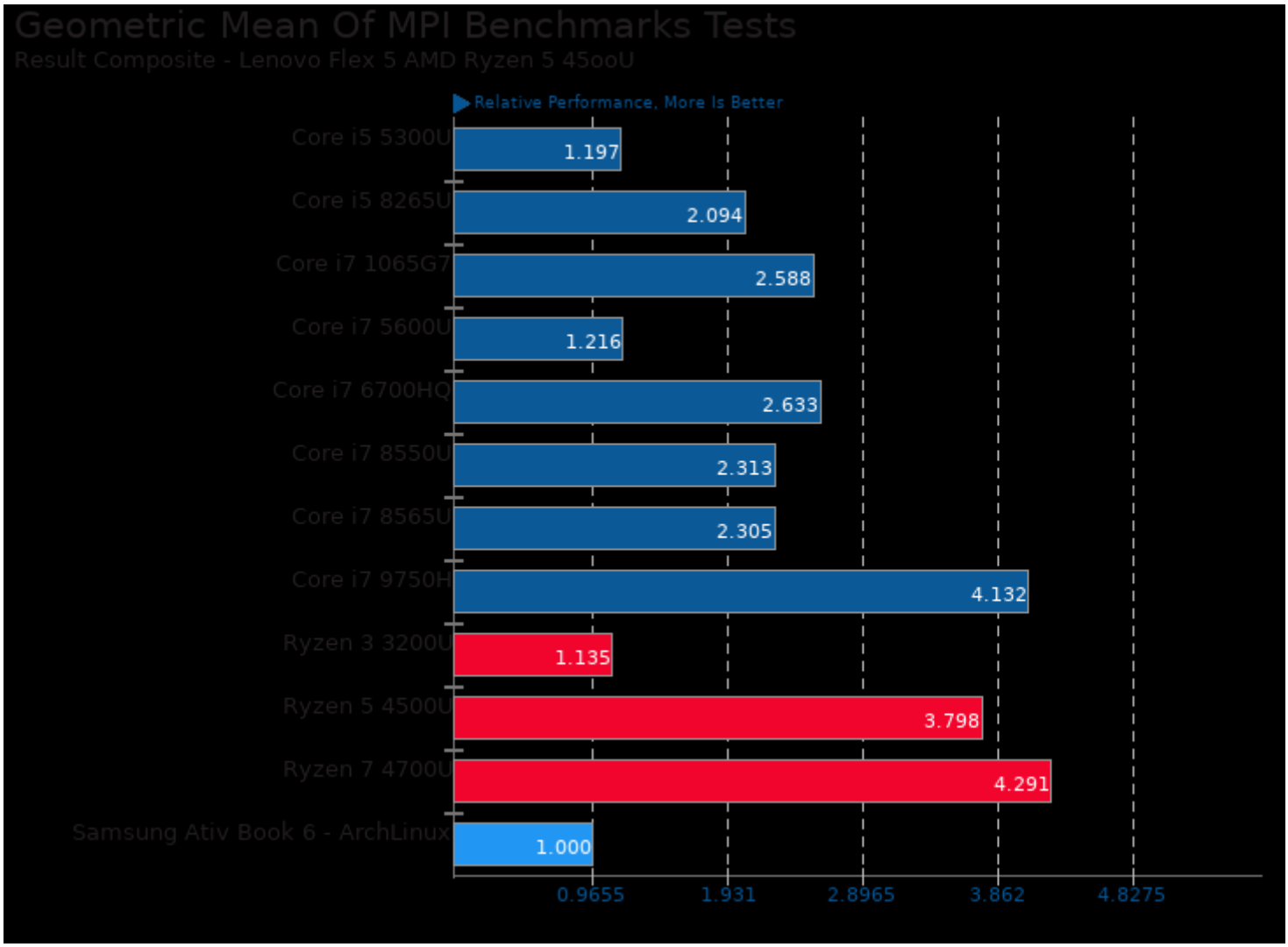
Geometric mean based upon tests: pts/encode-flac, pts/svt-vp9, pts/x264, pts/vpxenc and pts/svt-av1



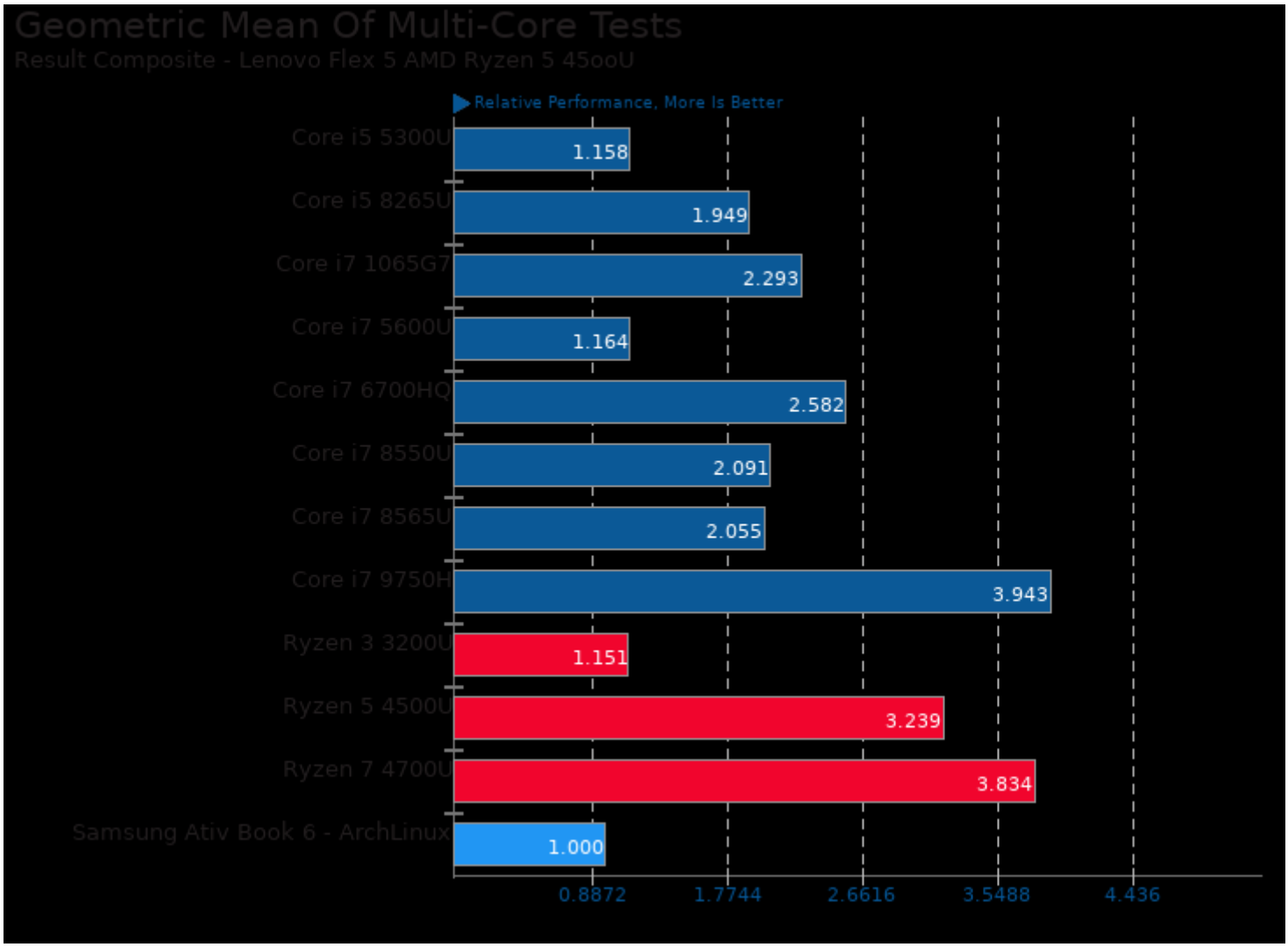
Geometric mean based upon tests: system/octave-benchmark, pts/namd, pts/gromacs and pts/lammps



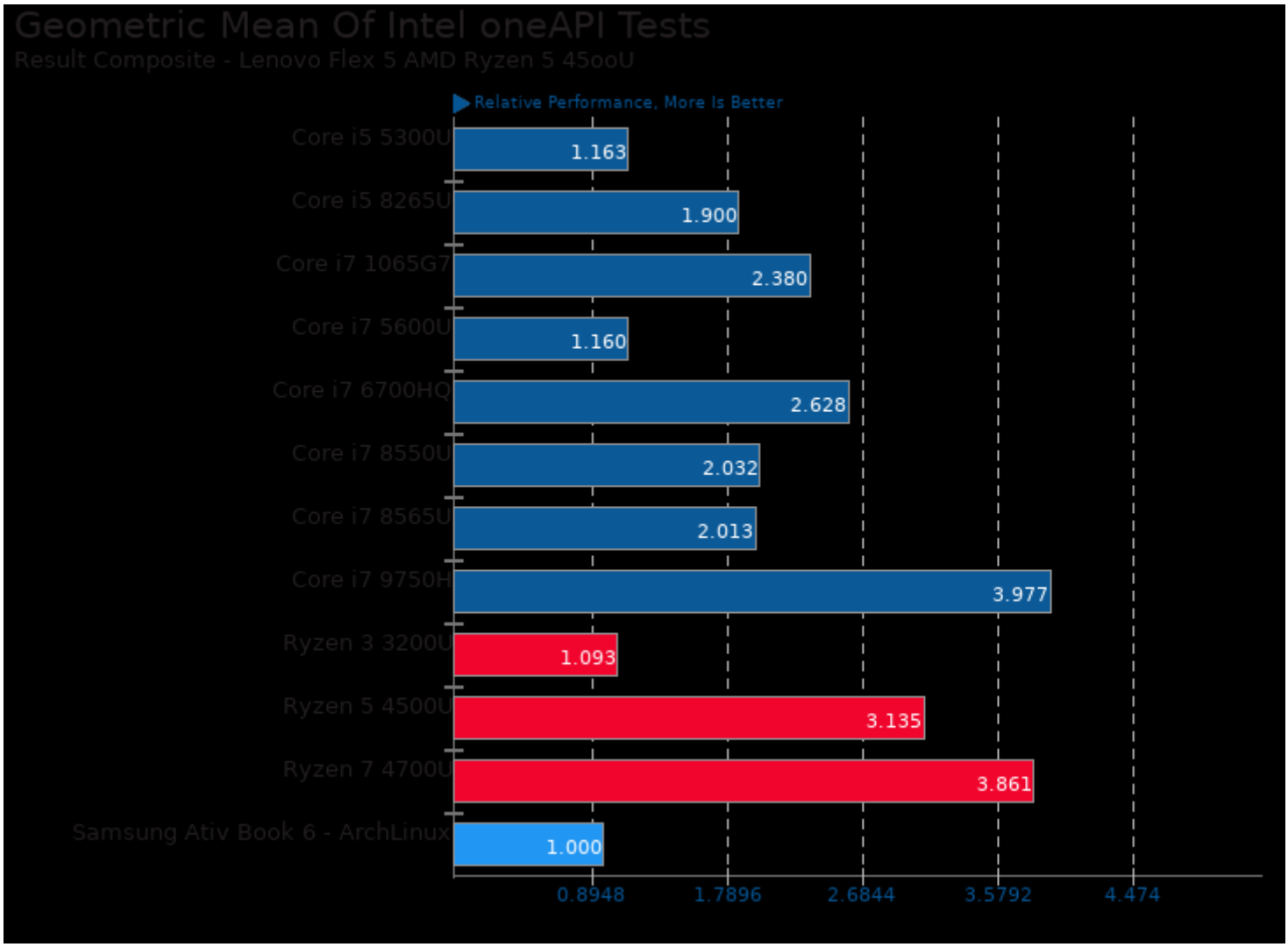
Geometric mean based upon tests: pts/namd, pts/gromacs and pts/lammps



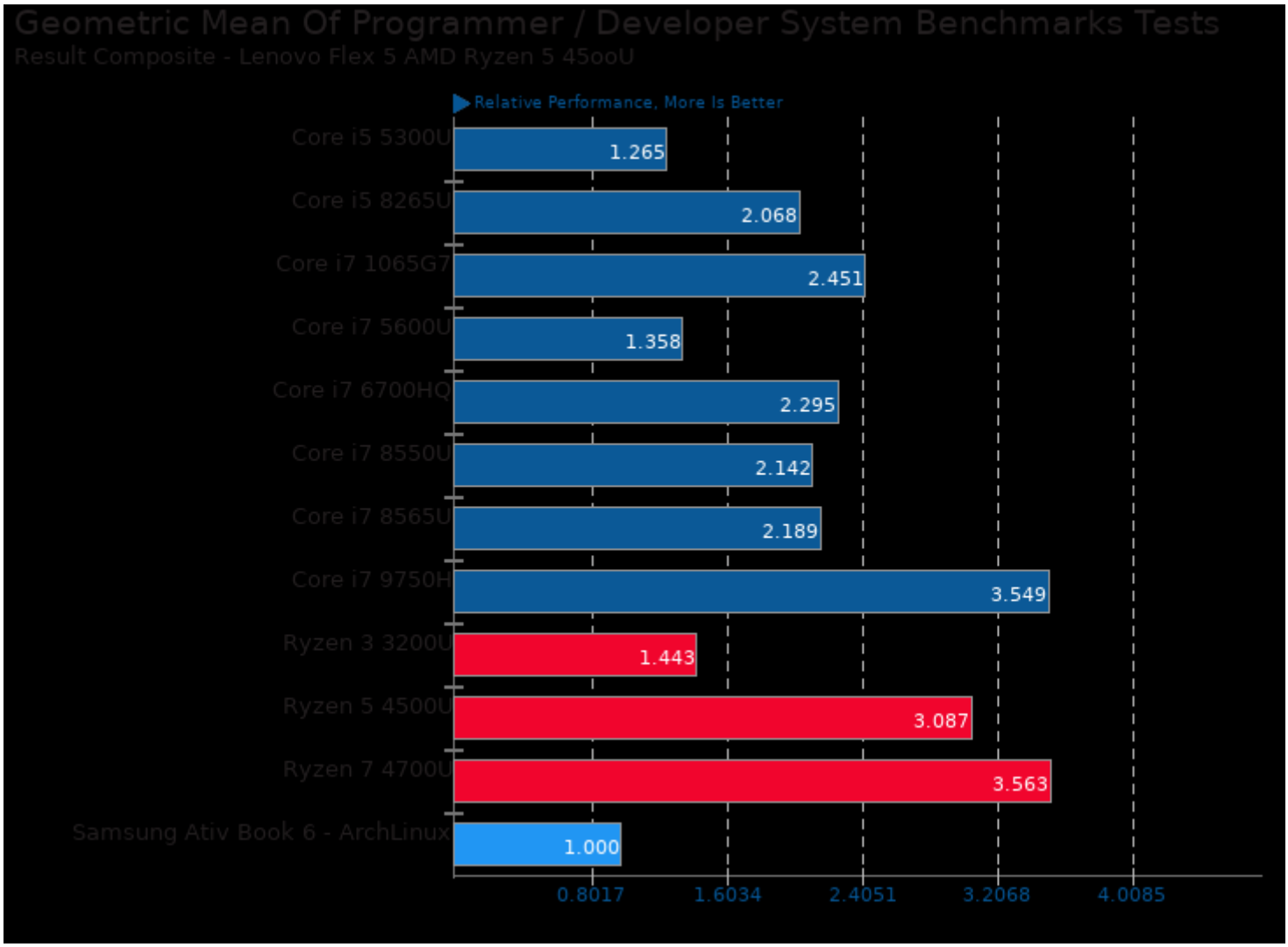
Geometric mean based upon tests: pts/lammps and pts/gromacs



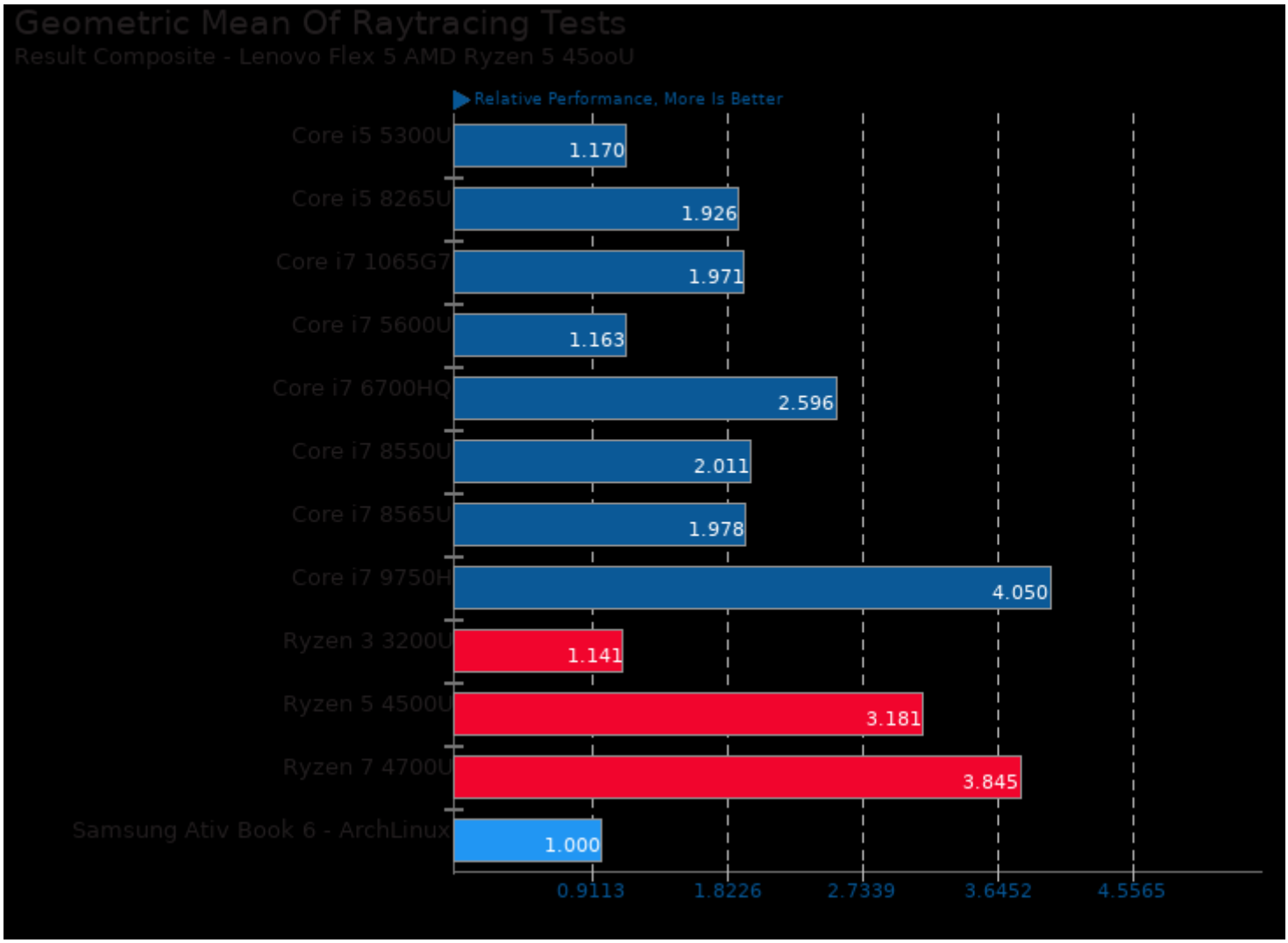
Geometric mean based upon tests: pts/ospray, pts/povray, pts/svt-vp9, pts/x264, pts/vpxenc, pts/svt-av1, pts/namd, pts/lammps, pts/gromacs, pts/build-linux-kernel, pts/build-gdb, pts/build-ffmpeg, pts/build-mplayer, pts/build2, pts/tungsten, pts/v-ray, pts/embree and pts/oidn



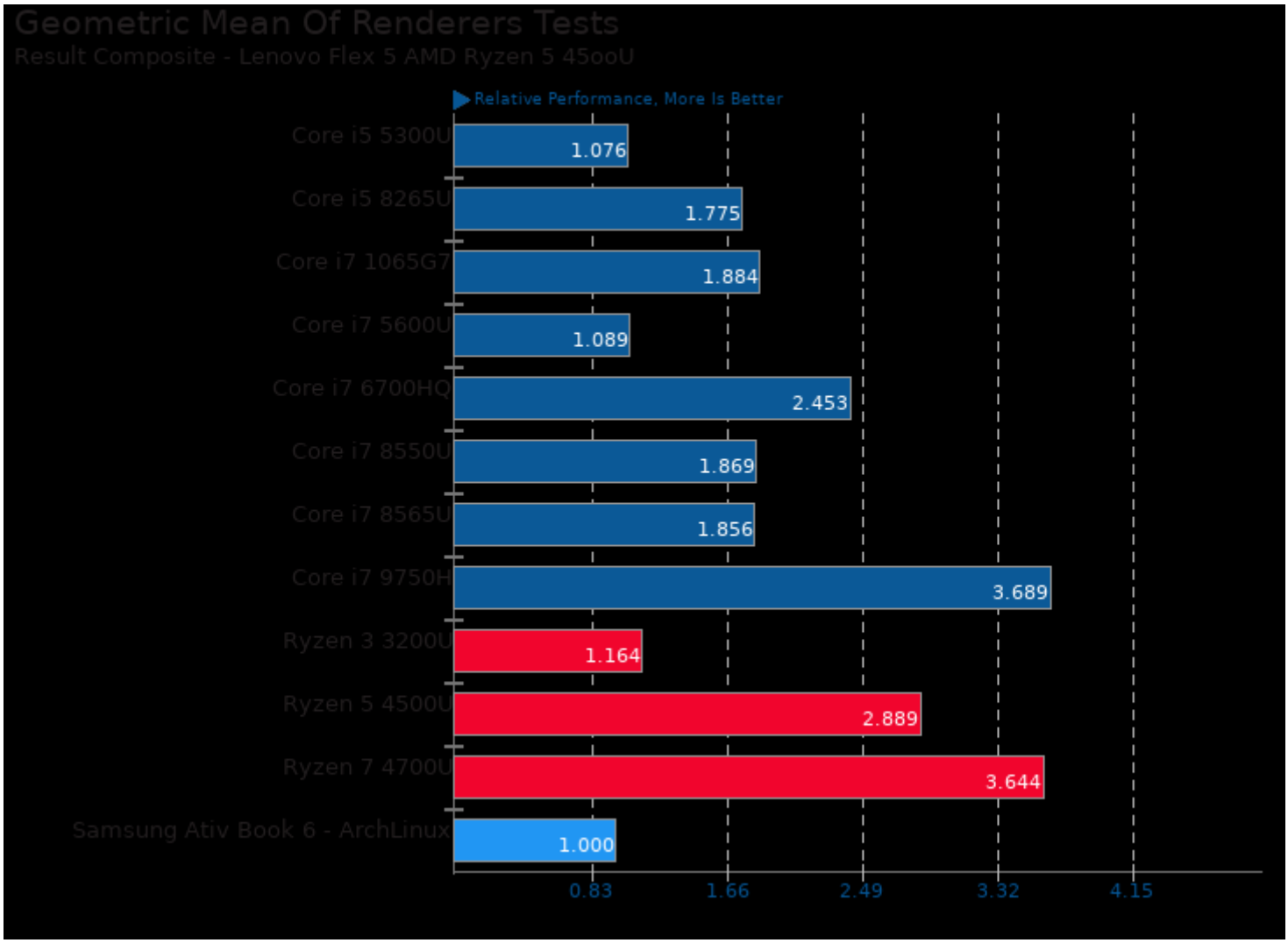
Geometric mean based upon tests: pts/embree, pts/oidn, pts/ospray and pts/tungsten



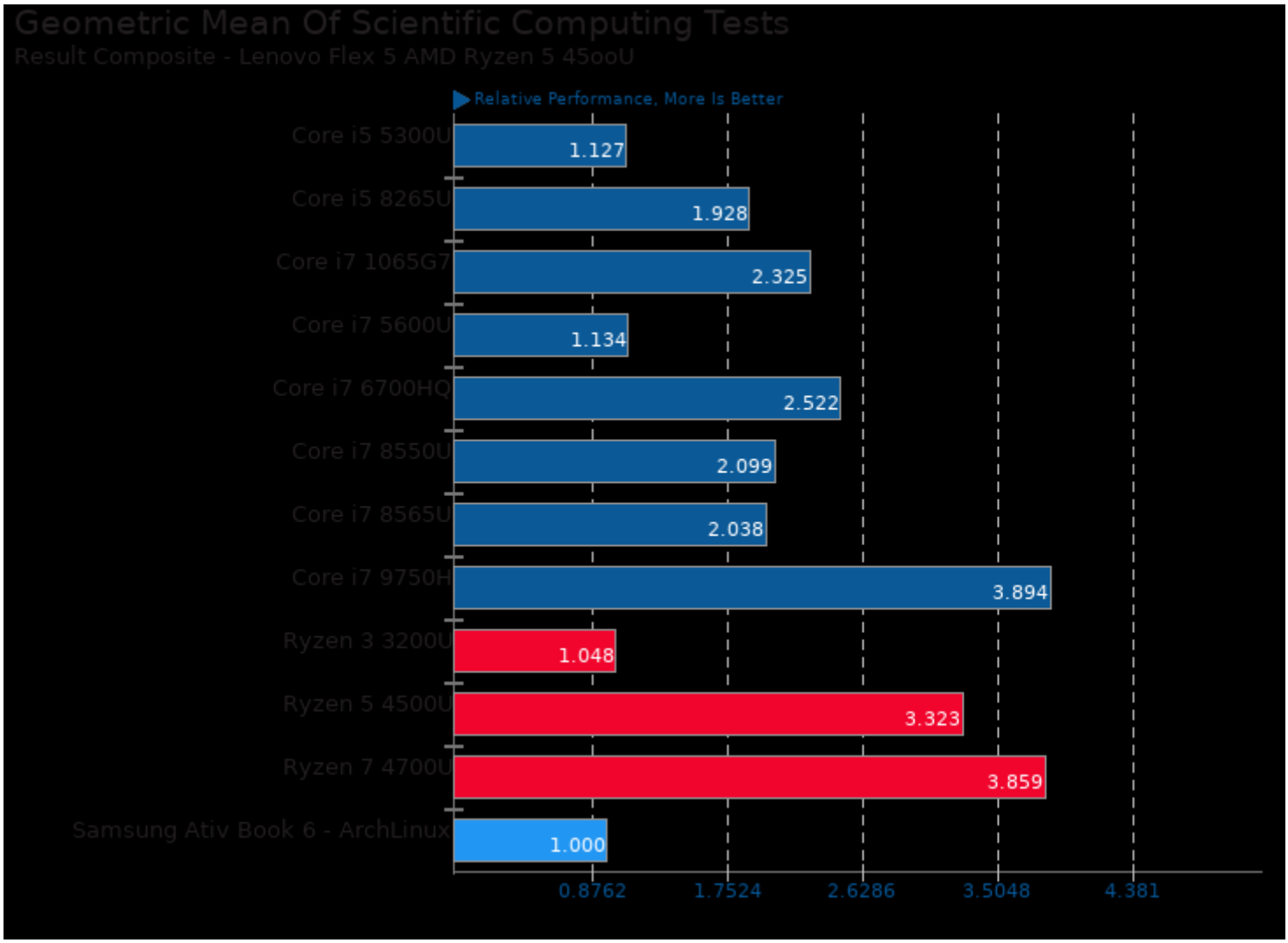
Geometric mean based upon tests: pts/sqlite-speedtest, pts/build-linux-kernel, pts/build-gdb, pts/build-ffmpeg, pts/build-mplayer and pts/build2



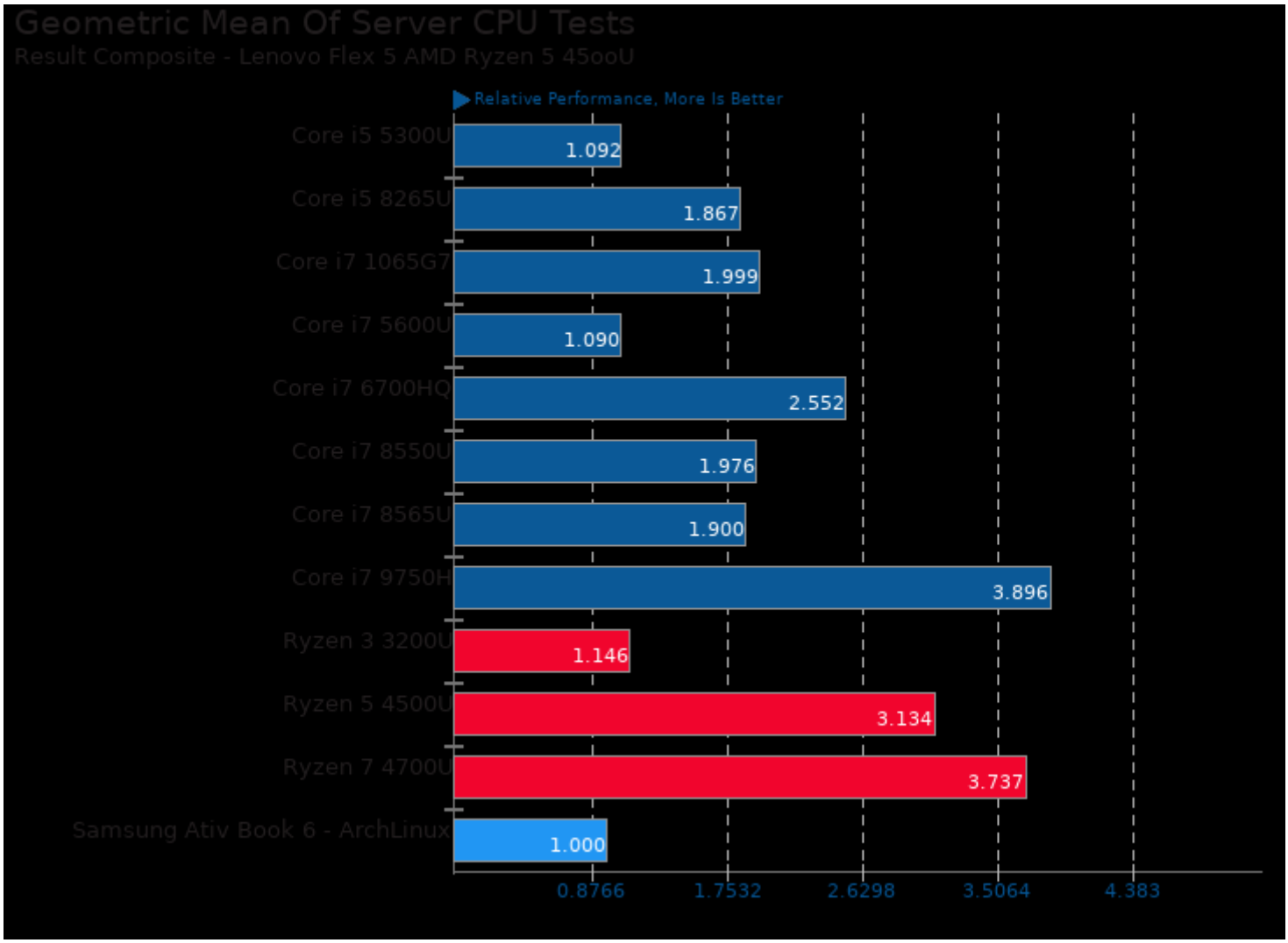
Geometric mean based upon tests: pts/ospray and pts/povray



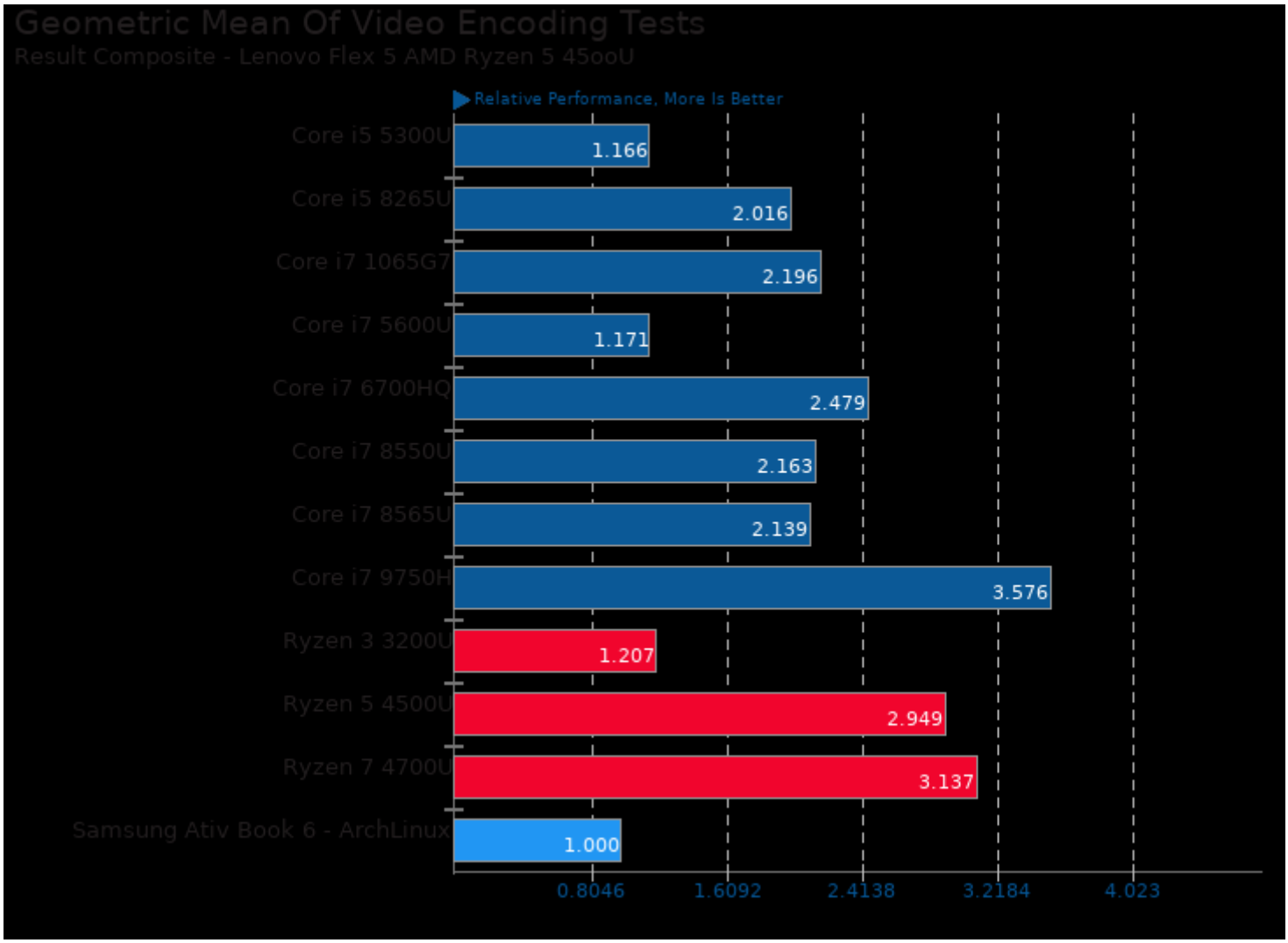
Geometric mean based upon tests: pts/ospray, pts/povray, pts/tungsten and pts/v-ray



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



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



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

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