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Lemur Pro vs InfinityBook Pro 14

HP ProBook x360 435 G8 AMD Ryzen 7 5800U

Automated Executive Summary

HP ProBook 435 had the most wins, coming in first place for 50% of the tests.

Test Systems:

Lemur Pro (CPU Performance)

Processor: Intel Core i7-10510U @ 4.90GHz (4 Cores / 8 Threads), Motherboard: System76 Lemur Pro (2020-05-15_e2baafa BIOS), Chipset: Intel Device 02ef, Memory: 40GB, Disk: Samsung SSD 970 EVO Plus 500GB, Graphics: Intel UHD (1150MHz), Audio: Realtek ALC293, Network: Intel-AC 9462

OS: Pop 20.04, Kernel: 5.4.0-7634-generic (x86_64), Desktop: GNOME Shell 3.36.4, 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 performance - CPU Microcode: 0xca
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

InfinityBook Pro 14 2021 (CPU Performance)

Processor: Intel Core i7-1165G7 @ 4.70GHz (4 Cores / 8 Threads), Motherboard: TUXEDO PHxTxX1 (N.1.12A04 BIOS), Chipset: Intel Device a0ef, Memory: 32GB, Disk: Samsung SSD 970 EVO Plus 500GB, Graphics: Intel Xe TGL GT2 3GB (1300MHz), Audio: Realtek ALC256, Network: Intel Wi-Fi 6 AX200

OS: Ubuntu 20.04, Kernel: 5.8.0-59-generic (x86_64), Desktop: KDE Plasma 5.18.5, Display Server: X Server 1.20.9, OpenGL: 4.6 Mesa 20.2.6, Vulkan: 1.2.145, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 2880x1800

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEa/gcc-9-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: intel_pstate performance - CPU Microcode: 0x8a - Thermald 1.9.1
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 Enhanced IBRS IBPB: conditional RSB filling + srbds: Not affected + tsx_async_abort: Not affected

Slimbook Executive K5.8

Processor: Intel Core i7-1165G7 @ 4.70GHz (4 Cores / 8 Threads), Motherboard: SLIMBOOK EXECUTIVE-14 (N.1.09GRU00 BIOS), Chipset: Intel Device a0ef, Memory: 16GB, Disk: 500GB KINGSTON SA2000M8500G, Graphics: i915drmfb (1300MHz), Audio: Realtek ALC256, Network: Intel Device a0f0

OS: Ubuntu 20.04, Kernel: 5.8.0-63-generic (x86_64), Desktop: GNOME Shell 3.36.9, Display Server: X Server 1.20.9, Vulkan: 1.2.145, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 2880x1800

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEa/gcc-9-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0x88 - Thermald 1.9.1
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 Enhanced IBRS IBPB: conditional RSB filling + srbds: Not affected + tsx_async_abort: Not affected

Intel Core i7-1165G7

Slimbook Executive K5.8-0.63

Slimbook Executive K5.8-0.631

Processor: Intel Core i7-1165G7 @ 4.70GHz (4 Cores / 8 Threads), Motherboard: SLIMBOOK EXECUTIVE-14 (N.1.09GRU00 BIOS), Chipset: Intel Device a0ef, Memory: 16GB, Disk: 500GB KINGSTON SA2000M8500G, Graphics: Intel Xe TGL GT2 3GB (1300MHz), Audio: Realtek ALC256, Network: Intel Device a0f0

OS: Ubuntu 20.04, Kernel: 5.8.0-63-generic (x86_64), Desktop: GNOME Shell 3.36.9, Display Server: X Server 1.20.9, OpenGL: 4.6 Mesa 20.2.6, Vulkan: 1.2.145, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 2880x1800

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEa/gcc-9-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: intel_pstate performance - CPU Microcode: 0x88 - Thermald 1.9.1
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 Enhanced IBRS IBPB: conditional RSB filling + srbds: Not affected + tsx_async_abort: Not affected

AMD Ryzen 7 4800H TFG CPU Performance

Processor: AMD Ryzen 7 4800H @ 2.90GHz (8 Cores / 16 Threads), Motherboard: TongFang GK7NR0R (N.1.16PCS03 BIOS), Chipset: AMD Renoir Root Complex, Memory: 16GB, Disk: 512GB PCS PCIe M.2 SSD + 1024GB M.2 2280-1TB SSD, Graphics: NVIDIA GeForce RTX 2060 Mobile 6GB, Audio: NVIDIA TU106 HD Audio, Monitor: C24F390, Network: Realtek RTL8111/8168/8411 + Intel Wi-Fi 6 AX200

OS: Pop 21.04, Kernel: 5.11.0-7620-generic (x86_64), Desktop: GNOME Shell 3.38.4, Display Server: X Server 1.20.11, Display Driver: NVIDIA 470.57.02, OpenGL: 4.6 Mesa 21.0.1 (LLVM 11.0.1), OpenCL: OpenCL 3.0 CUDA 11.4.94, Vulkan: 1.2.145, Compiler: GCC 10.3.0, File-System: ext4, Screen Resolution: 3840x1080

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-link-mutex --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-gDeRY6/gcc-10-10.3.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-gDeRY6/gcc-10-10.3.0/debian/tmp-gcn/usr, hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-build-config=bootstrap-lto-lean --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0x8600103
OpenCL Notes: GPU Compute Cores: 1920
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: conditional RSB filling + srbds: Not affected + tsx_async_abort: Not affected

HP ProBook 435

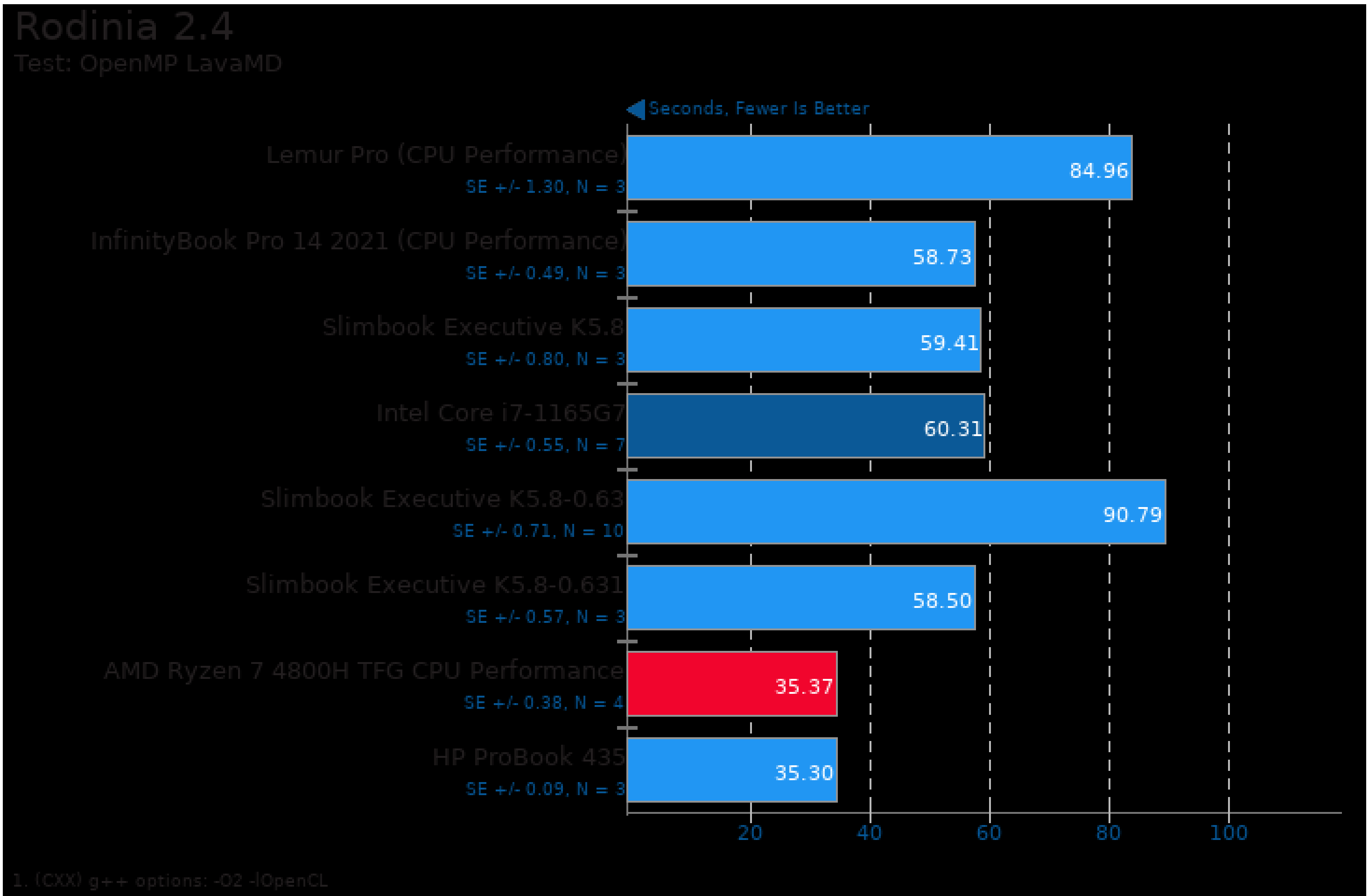
Processor: AMD Ryzen 7 5800U @ 1.90GHz (8 Cores / 16 Threads), Motherboard: HP 8886 (T80 Ver. 01.02.02 BIOS), Chipset: AMD Renoir Root Complex, Memory: 16GB, Disk: 2000GB CT2000P5SSD8, Graphics: AMD Cezanne 512MB (2000/400MHz), Audio: AMD Device 1637, Network: Realtek RTL8822CE 802.11ac PCIe

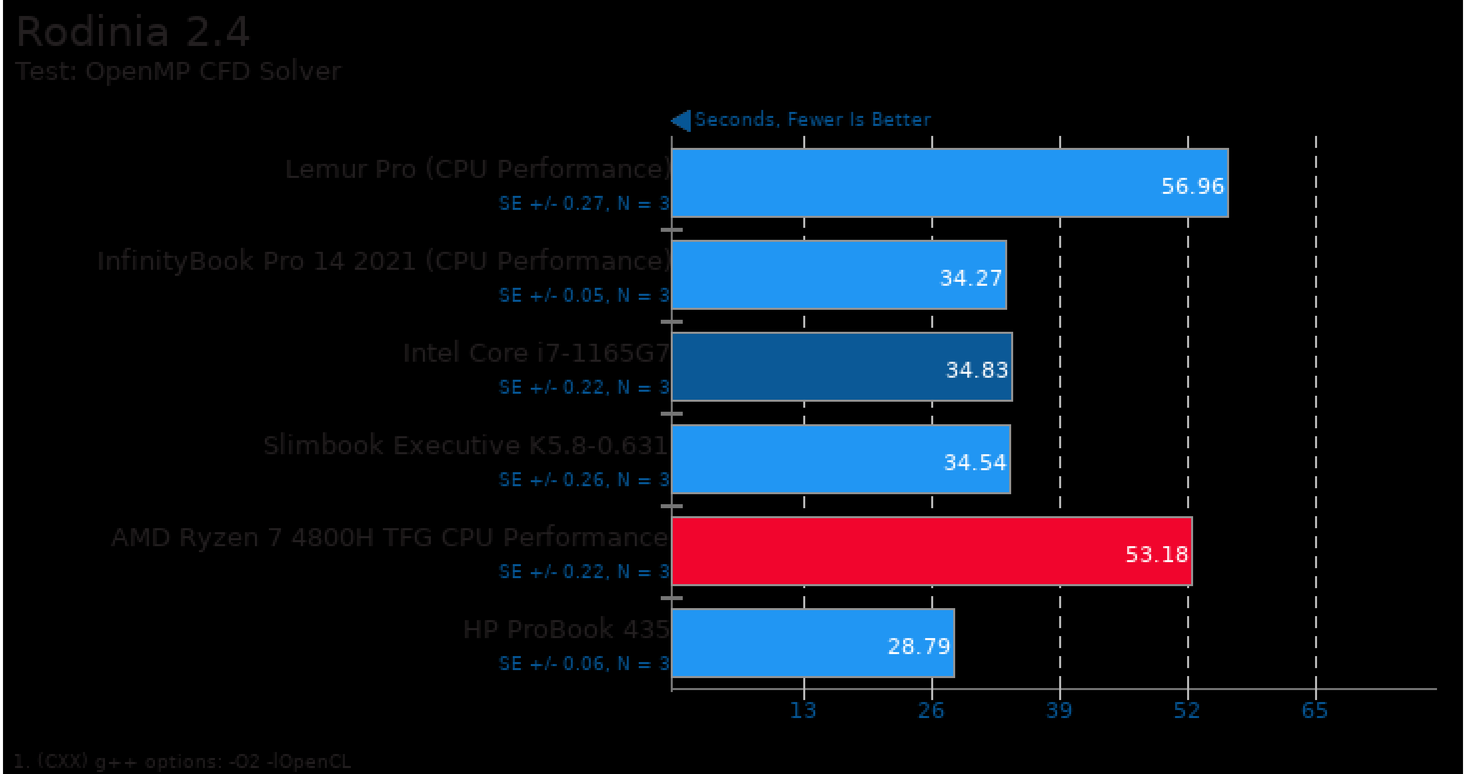
OS: Ubuntu 21.10, Kernel: 5.14.0-051400rc5-generic (x86_64) 20210808, Desktop: GNOME Shell 40.2, Display Server: X Server + Wayland, OpenGL: 4.6 Mesa 21.1.4 (LLVM 12.0.1), Vulkan: 1.2.168, Compiler: GCC 11.2.0, File-System: ext4, Screen Resolution: 1920x1080

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-bootstrap --enable-cet --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-link-serialization=2 --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-11-M6DaQn/gcc-11-11.2.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-11-M6DaQn/gcc-11-11.2.0/debian/tmp-gcn/usr --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-build-config=bootstrap-lto-lean --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa50000c
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

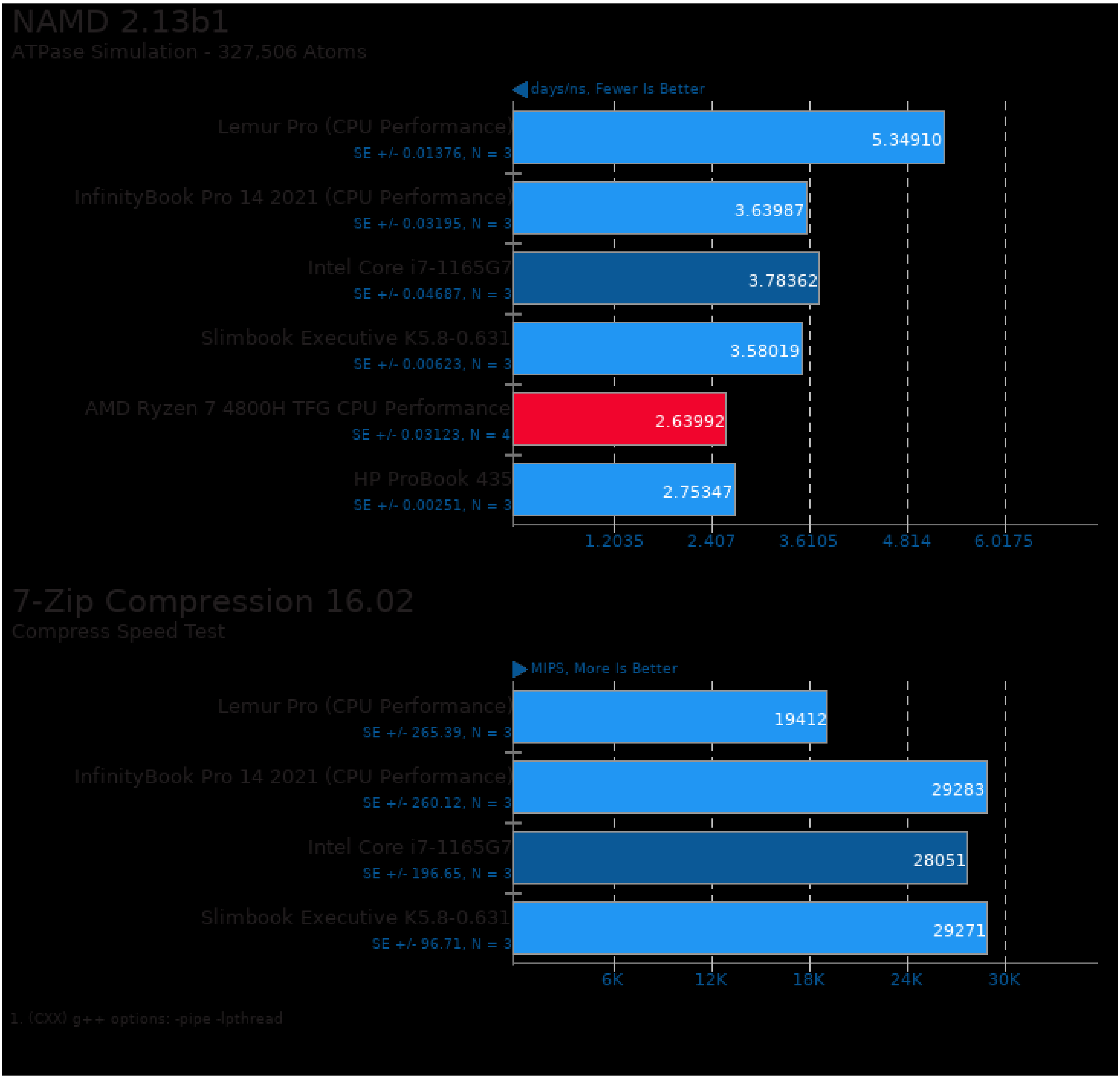
Lemur Pro vs InfinityBook Pro 14

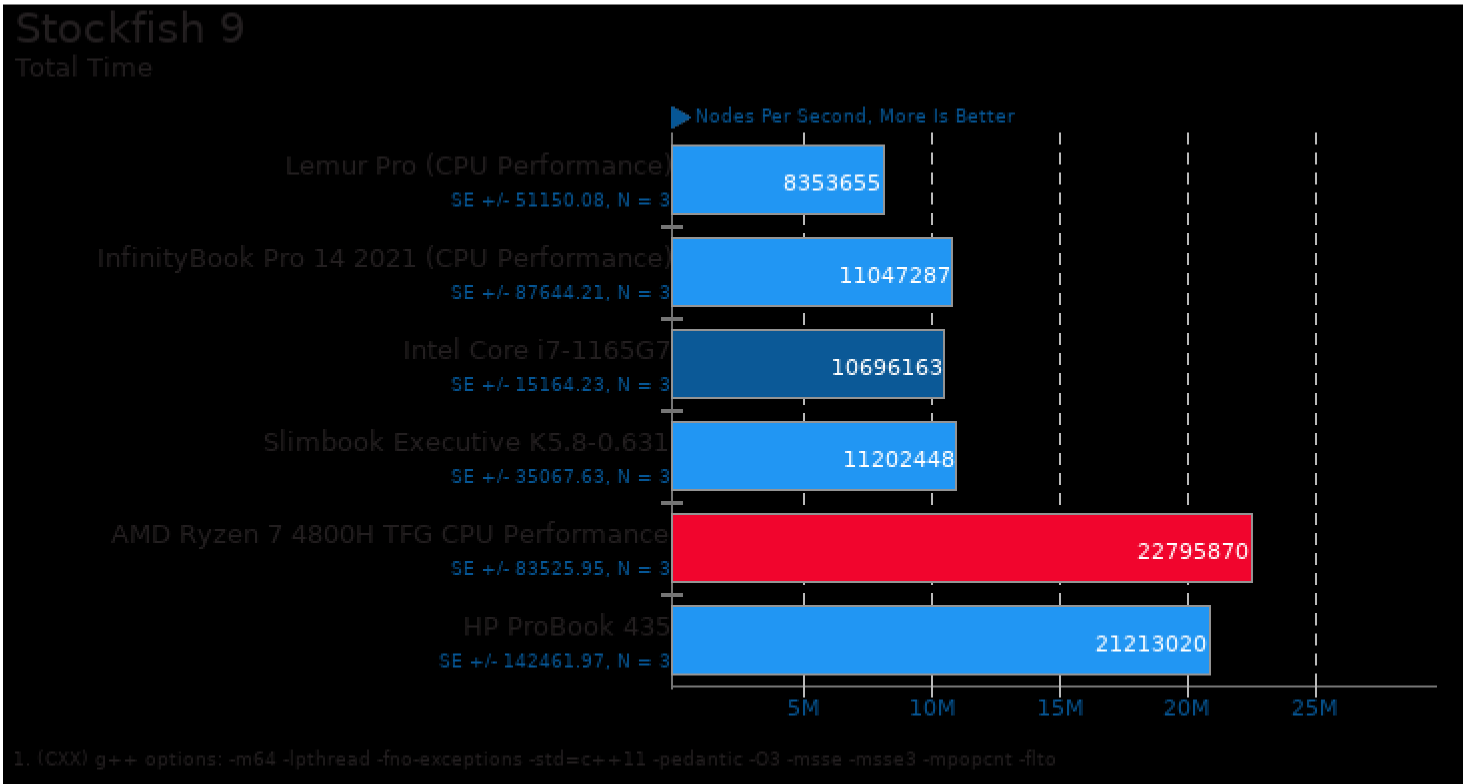
	Lemur Pro (CPU Performance)	InfinityBook Pro 14 2021 (CPU Performance)	Slimbook Executive K5.8	Intel Core i7-1165G7	Slimbook Executive K5.8-0.63	Slimbook Executive K5.8-0.631	AMD Ryzen 7 4800H TFG CPU Performan	HP ProBook 435
Rodinia - OpenMP LavaMD (sec)	84.958	58.729	59.411	60.306	90.792	58.503	35.368	35.304
Normalized	41.55%	60.11%	59.42%	58.54%	38.88%	60.35%	99.82%	100%
Standard Deviation	2.6%	1.4%	2.3%	2.4%	2.5%	1.7%	2.1%	0.4%
Rodinia - OpenMP CFD Solver (sec)	56.955	34.274		34.826		34.542	53.183	28.785
Normalized	50.54%	83.98%		82.65%		83.33%	54.12%	100%
Standard Deviation	0.8%	0.2%		1.1%		1.3%	0.7%	0.4%
NAMD - ATPase Simulation - 327,506 Atoms (days/ns)	5.34910	3.63987		3.78362		3.58019	2.63992	2.75347
Normalized	49.35%	72.53%		69.77%		73.74%	100%	95.88%
Standard Deviation	0.4%	1.5%		2.1%		0.3%	2.4%	0.2%
7-Zip Compression - C.S.T (MIPS)	19412	29283		28051		29271		
Normalized	66.29%	100%		95.79%		99.96%		
Standard Deviation	2.4%	1.5%		1.2%		0.6%		
Stockfish - Total Time (Nodes/s)	8353655	11047287		10696163		11202448	22795870	21213020
Normalized	36.65%	48.46%		46.92%		49.14%	100%	93.06%
Standard Deviation	1.1%	1.4%		0.2%		0.5%	0.6%	1.2%
asmFish - 1.H.M.2.D (Nodes/s)	9356807	12162436		12156535		12308780	23315402	23001618
Normalized	40.13%	52.16%		52.14%		52.79%	100%	98.65%
Standard Deviation	1.6%	1.5%		1.6%		2.3%	2.1%	0.3%
Radiance Benchmark - Serial (sec)	740.097	519.191		493.97		488.875	632.389	488.756
Normalized	66.04%	94.14%		98.94%		99.98%	77.29%	100%
Radiance Benchmark - SMP Parallel (sec)	303.41	185.872		184.004		185.179	200.677	180.222
Normalized	59.4%	96.96%		97.94%		97.32%	89.81%	100%
OpenSSL - R.4.b.P (Signs/sec)	932.4	1225		1246		1249	2288	1916
Normalized	40.75%	53.55%		54.45%		54.6%	100%	83.73%
Standard Deviation	1.8%	0.8%		1.2%		1.2%	0.7%	1%
ctx_clock - C.S.T (Clocks)	95	133		134		134	145	76
Normalized	80%	57.14%		56.72%		56.72%	52.41%	100%
Standard Deviation	1.2%	0.9%						0%

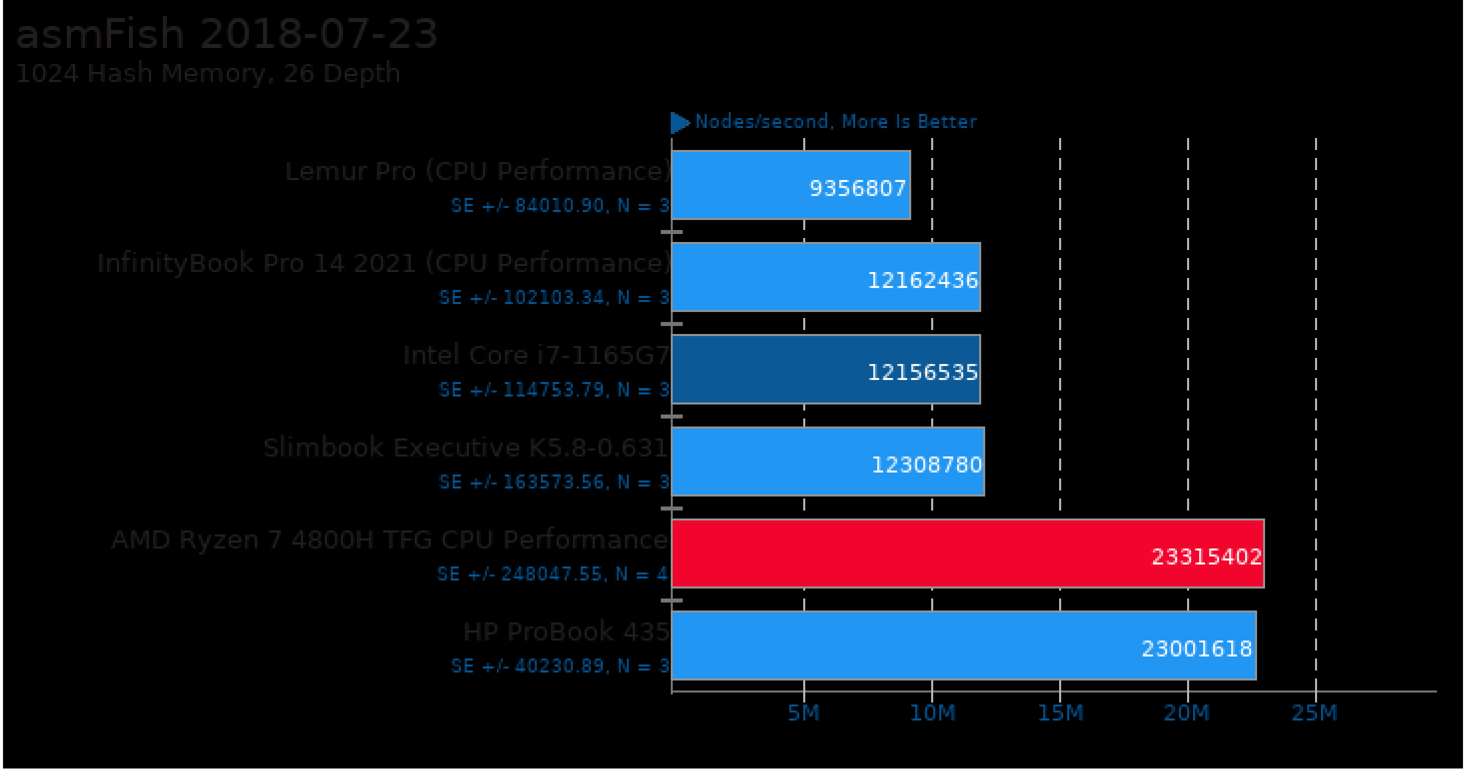

Rodinia 2.4
Test: OpenMP LavaMD
Seconds, Fewer Is Better
Lemur Pro (CPU Performance)
SE +/- 1.30, N = 3
84.96
InfinityBook Pro 14 2021 (CPU Performance)
SE +/- 0.49, N = 3
58.73
Slimbook Executive K5.8
SE +/- 0.80, N = 3
59.41
Intel Core i7-1165G7
SE +/- 0.55, N = 7
60.31
Slimbook Executive K5.8-0.63
SE +/- 0.71, N = 10
90.79
Slimbook Executive K5.8-0.631
SE +/- 0.57, N = 3
58.50
AMD Ryzen 7 4800H TFG CPU Performance
SE +/- 0.38, N = 4
35.37
HP ProBook 435
SE +/- 0.09, N = 3
35.30
20
40
60
80
100
1. (CXX) g++ options: -O2 -lOpenCL


Rodinia 2.4
Test: OpenMP CFD Solver
Seconds, Fewer Is Better
Lemur Pro (CPU Performance)
SE +/- 0.27, N = 3
56.96
InfinityBook Pro 14 2021 (CPU Performance)
SE +/- 0.05, N = 3
34.27
Intel Core i7-1165G7
SE +/- 0.22, N = 3
34.83
Slimbook Executive K5.8-0.631
SE +/- 0.26, N = 3
34.54
AMD Ryzen 7 4800H TFG CPU Performance
SE +/- 0.22, N = 3
53.18
HP ProBook 435
SE +/- 0.06, N = 3
28.79
13
26
39
52
65
1. (CXX) g++ options: -O2 -lOpenCL

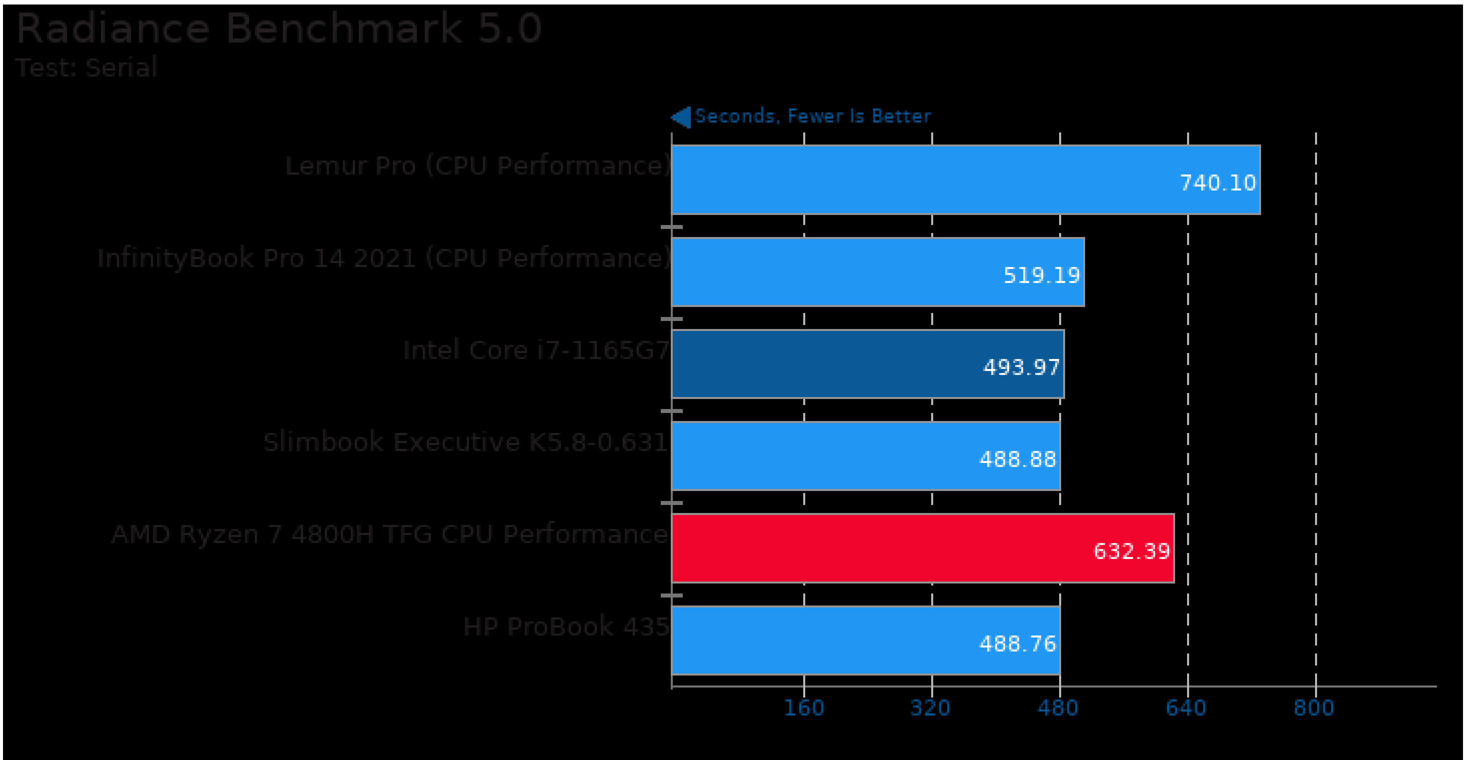
Lemur Pro vs InfinityBook Pro 14

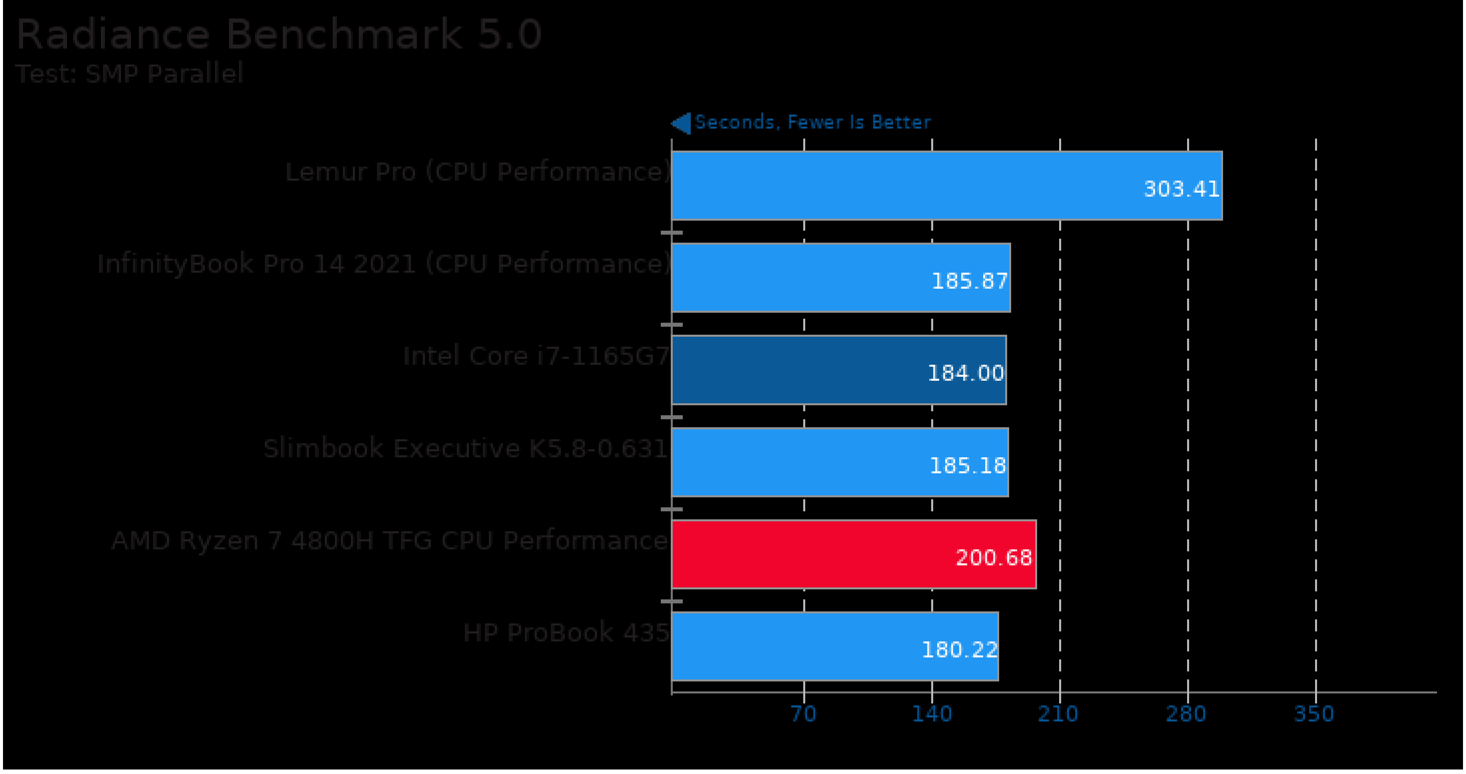


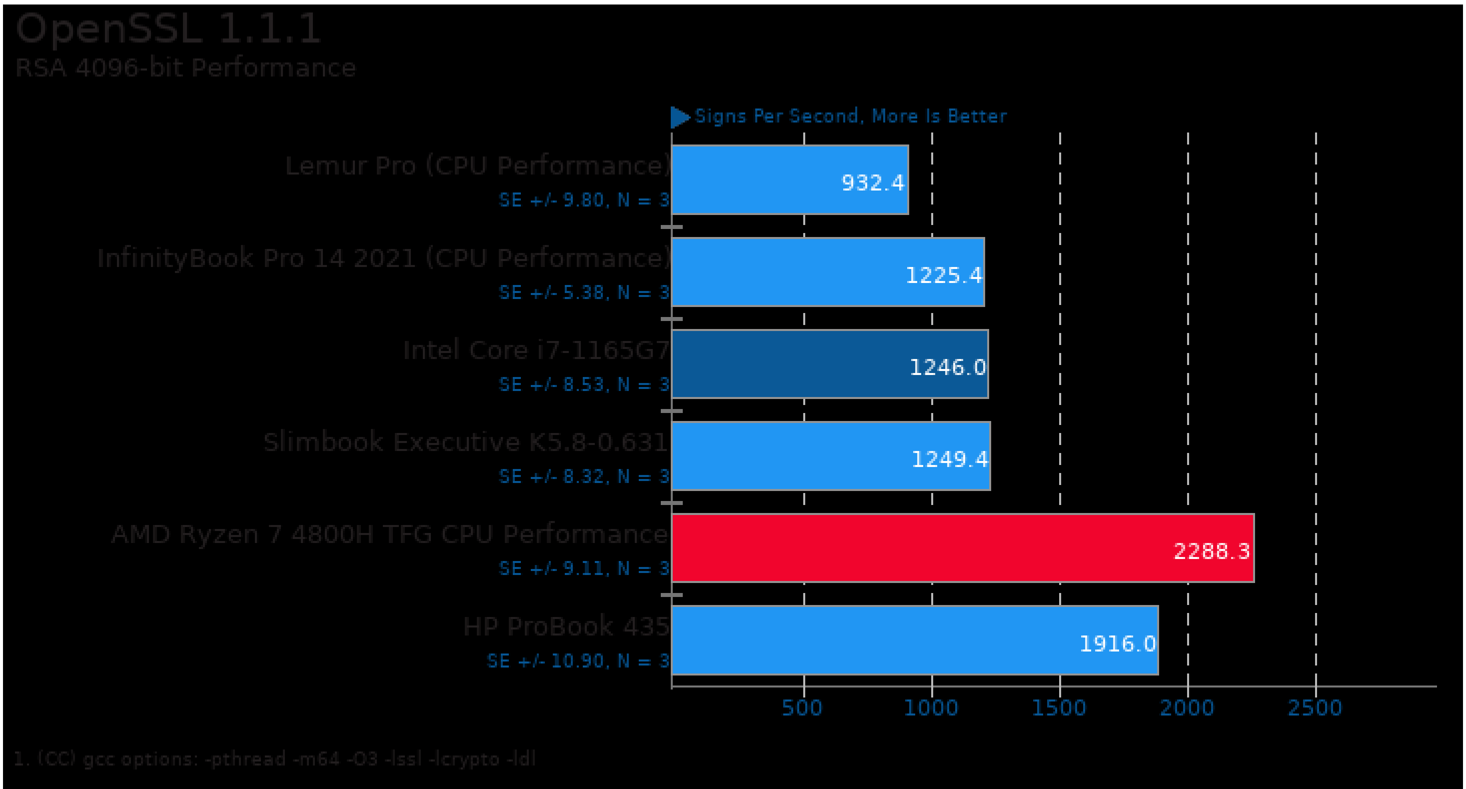

Stockfish 9
Total Time
Nodes Per Second, More Is Better
Lemur Pro (CPU Performance)
SE +/- 51150.08, N = 3
8353655
InfinityBook Pro 14 2021 (CPU Performance)
SE +/- 87644.21, N = 3
11047287
Intel Core i7-1165G7
SE +/- 15164.23, N = 3
10696163
Slimbook Executive K5.8-0.631
SE +/- 35067.63, N = 3
11202448
AMD Ryzen 7 4800H TFG CPU Performance
SE +/- 83525.95, N = 3
22795870
HP ProBook 435
SE +/- 142461.97, N = 3
21213020
5M
10M
15M
20M
25M
1. (CXX) g++ options: -m64 -lpthread -fno-exceptions -std=c++11 -pedantic -O3 -msse -msse3 -mpopcnt -flto

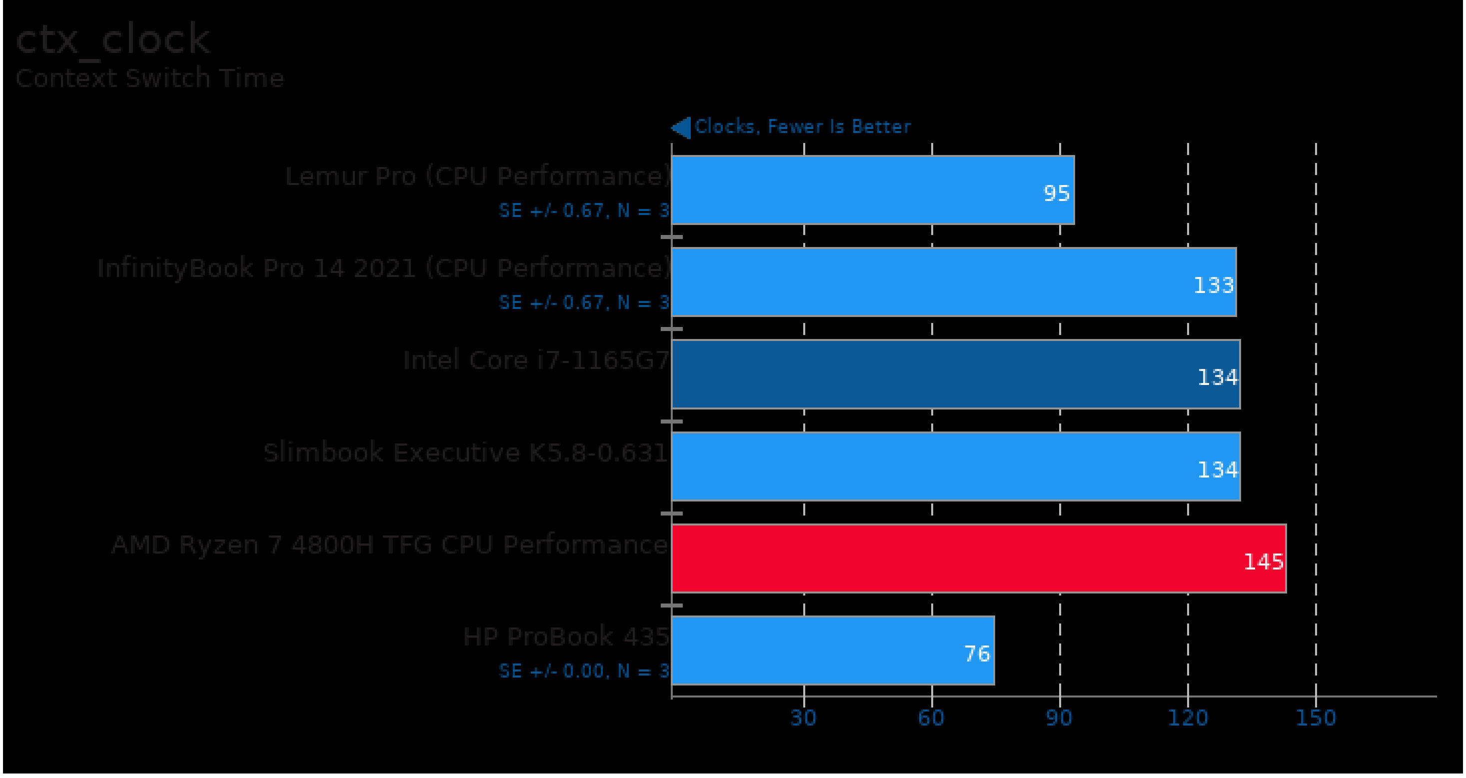

asmFish 2018-07-23
1024 Hash Memory, 26 Depth
Nodes/second, More Is Better
Lemur Pro (CPU Performance)
SE +/- 84010.90, N = 3
9356807
InfinityBook Pro 14 2021 (CPU Performance)
SE +/- 102103.34, N = 3
12162436
Intel Core i7-1165G7
SE +/- 114753.79, N = 3
12156535
Slimbook Executive K5.8-0.631
SE +/- 163573.56, N = 3
12308780
AMD Ryzen 7 4800H TFG CPU Performance
SE +/- 248047.55, N = 4
23315402
HP ProBook 435
SE +/- 40230.89, N = 3
23001618
5M
10M
15M
20M
25M

Lemur Pro vs InfinityBook Pro 14









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