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Ryzen 7 4700U / Ryzen 5 4500U vs. Intel Linux Performance

Dell Inspiron G5 15SE w/ Ryzen 7 4800H + Radeon 5600M 512MB, 16GB RAM, NVMe SSD, Windows 10 Pro x64

Automated Executive Summary

Core i7 9750H had the most wins, coming in first place for 36% of the tests.

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

OpenArena (Resolution: 1920 x 1080 - Total Frame Time) at 19.5x
GpuTest (Test: Triangle - Resolution: 1920 x 1080 - Mode: Fullscreen) at 6.661x
C-Ray (Total Time - 4K, 16 Rays Per Pixel) at 5.172x
Embree (Binary: Pathtracer - Model: Crown) at 5.052x
Embree (Binary: Pathtracer - Model: Asian Dragon) at 4.981x
Embree (Binary: Pathtracer - Model: Asian Dragon Obj) at 4.847x
Embree (Binary: Pathtracer ISPC - Model: Crown) at 4.612x
Basis Universal (Settings: UASTC Level 3) at 4.548x
LuxCoreRender (Scene: DLSC) at 4.433x
Embree (Binary: Pathtracer ISPC - Model: Asian Dragon) at 4.431x.

Test Systems:

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: 5.7.0-999-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, Vulkan: 1.2.131, 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: 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

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: 5.7.0-999-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
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 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: 5.7.0-999-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

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), 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)
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

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: 5.7.0-999-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), Vulkan: 1.2.128, 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
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

Ryzen 7 4800H

Processor: AMD Ryzen 7 4800H @ 2.90GHz (8 Cores / 16 Threads), Motherboard: Dell 06WDJ9 (1.2.0 BIOS), Memory: 2 x 8192 MB 3200MHz HMA81GS6DJR8N-XN, Disk: 477GB BC511 NVMe SK hynix 512GB, Graphics: AMD Radeon + AMD Radeon RX 5600M 512MB, Network: Realtek PCIe GbE + Killer Wi-Fi 6 AX1650x 160MHz Wireless (200NGW) + Bluetooth Device (Personal Area)

OS: Microsoft Windows 10 Pro Build 19041, Kernel: 10.0 (x86_64), Display Driver: 27.20.1010.1, OpenCL: OpenCL 2.1

AMD-APP (3075.12), File-System: NTFS, Screen Resolution: 1920x1080

Java Notes: operable program or batch file.
Python Notes: Python 3.7.1
Security Notes: __user pointer sanitization: Disabled + Retpoline: Full + IBPB: Always + IBRS: Enabled + STIBP: Enabled

Ryzen 7 4800H-v1

Processor: AMD Ryzen 7 4800H @ 2.90GHz (8 Cores / 16 Threads), Motherboard: Dell 06WDJ9 (1.2.0 BIOS), Memory: 2 x 8192 MB 3200MHz HMA81GS6DJR8N-XN, Disk: 477GB BC511 NVMe SK hynix 512GB, Graphics: AMD Radeon 512MB, Network: Realtek PCIe GbE + Killer Wi-Fi 6 AX1650x 160MHz Wireless (200NGW) + Bluetooth Device (Personal Area)

OS: Microsoft Windows 10 Pro Build 19041, Kernel: 10.0 (x86_64), Display Driver: 27.20.1010.1, OpenCL: OpenCL 2.1 AMD-APP (3075.12), File-System: NTFS, Screen Resolution: 1920x1080

Java Notes: operable program or batch file.
Python Notes: Python 3.7.1
Security Notes: __user pointer sanitization: Disabled + Retpoline: Full + IBPB: Always + IBRS: Enabled + STIBP: Enabled

	Core i7 1065G7	Core i7 8565U	Core i7 9750H	Ryzen 5 4500U	Ryzen 7 4700U	Ryzen 7 4800H	Ryzen 7 4800H-v1
Stress-NG - MMAP (Bogo Ops/s)	**20.17**	29.34	**77.96**	36.79	58.82		
Normalized	25.87%	37.63%	100%	47.19%	75.45%		
Standard Deviation	0.7%	2.7%	1.1%	0.9%	0.7%		
Stress-NG - NUMA (Bogo Ops/s)	**47.92**	62.08	**120.19**	92.14	117.25		
Normalized	39.87%	51.65%	100%	76.66%	97.55%		
Standard Deviation	0.1%	1.8%	0.7%	2.8%	2.5%		
Stress-NG - MEMFD (Bogo Ops/s)	**121.04**	205.09	**482.49**	166.00	232.75		
Normalized	25.09%	42.51%	100%	34.4%	48.24%		
Standard Deviation	1%	1.7%	0.3%	0.4%	0.4%		
Stress-NG - Atomic (Bogo Ops/s)	**167882**	190154	228374	464738	**492689**		
Normalized	34.07%	38.6%	46.35%	94.33%	100%		
Standard Deviation	2.9%	2.9%	6%	0.1%	0.1%		
Stress-NG - Crypto (Bogo Ops/s)	**357.32**	545.55	1027	1277	**1572**		
Normalized	22.74%	34.71%	65.35%	81.27%	100%		
Standard Deviation	0.2%	2.4%	0.4%	0.9%	0.3%		
Stress-NG - Malloc (Bogo Ops/s)	**12853770**	16757117	**38934995**	22653943	28091580		
Normalized	33.01%	43.04%	100%	58.18%	72.15%		
Standard Deviation	1.7%	0.1%	0.2%	0.3%	0.1%		
Stress-NG - Forking (Bogo Ops/s)	**17317**	26433	**45750**	31151	36147		
Normalized	37.85%	57.78%	100%	68.09%	79.01%		
Standard Deviation	0.9%	3%	0.8%	0.9%	1.3%		

Stress-NG - SENDFILE (Bogo Ops/s)	29575	32979	62522	69854	86886	
Normalized	34.04%	37.96%	71.96%	80.4%	100%	
Standard Deviation	0.3%	2.4%	0.1%	0.8%	0.7%	
Stress-NG - CPU Cache (Bogo Ops/s)	21.43	12.01	20.32	37.14	36.95	
Normalized	57.7%	32.34%	54.71%	100%	99.49%	
Standard Deviation	1.1%	0.8%	2.5%	2.8%	0.6%	
Stress-NG - CPU Stress (Bogo Ops/s)	820.29	1355	2557	1807	2276	
Normalized	32.08%	52.99%	100%	70.69%	89.02%	
Standard Deviation	0.5%	2.9%	0.4%	1.3%	0.2%	
Stress-NG - Semaphores (Bogo Ops/s)	570155	550160	844313	363424	484137	
Normalized	67.53%	65.16%	100%	43.04%	57.34%	
Standard Deviation	1.8%	2.6%	1.7%	0.1%	0.1%	
Stress-NG - Matrix Math (Bogo Ops/s)	8585	12790	21573	15878	23434	
Normalized	36.64%	54.58%	92.06%	67.76%	100%	
Standard Deviation	0.2%	2.9%	0.8%	1.1%	1.8%	
Stress-NG - Vector Math (Bogo Ops/s)	11891	20735	39241	33911	42212	
Normalized	28.17%	49.12%	92.96%	80.33%	100%	
Standard Deviation	0.2%	2.6%	0.1%	0.7%	0.6%	
Stress-NG - Memory Copying (Bogo Ops/s)	1041	1141	1599	1048	868.00	
Normalized	65.12%	71.34%	100%	65.54%	54.29%	
Standard Deviation	0.1%	0.5%	0.3%	0.3%	0.2%	
Stress-NG - Socket Activity (Bogo Ops/s)	1757	2684	5403	1868	2318	
Normalized	32.51%	49.67%	100%	34.58%	42.9%	
Standard Deviation	0.6%	11.8%	1%	0.2%	1.7%	
Stress-NG - Context Switching (Bogo Ops/s)	754892	983865	1683648	1823579	2201519	
Normalized	34.29%	44.69%	76.48%	82.83%	100%	
Standard Deviation	0.3%	2.8%	0.3%	1.2%	1.7%	
Stress-NG - G.C.S.F (Bogo Ops/s)	217768	307974	597960	546193	675941	
Normalized	32.22%	45.56%	88.46%	80.8%	100%	
Standard Deviation	1%	5.9%	1%	2.6%	1%	
Stress-NG - G.Q.D.S (Bogo Ops/s)	26.29	35.94	69.14	58.66	72.27	
Normalized	36.38%	49.73%	95.67%	81.17%	100%	
Standard Deviation	0.6%	2.8%	0.7%	1%	0.9%	
Stress-NG - S.V.M.P (Bogo Ops/s)	3627742	3593116	5362322	4494248	6856635	
Normalized	52.91%	52.4%	78.21%	65.55%	100%	
Standard Deviation	1.7%	2.2%	0.3%	2.4%	8.7%	
dav1d - Chimera 1080p (FPS)	127.84	219.53	388.60	218.07	234.46	403.307500
Normalized	31.7%	54.43%	96.35%	54.07%	58.13%	100%
Standard Deviation	1.6%	3.1%	1.6%	0.2%	2.1%	1.2%

dav1d - Summer Nature 4K (FPS)	**30.45**	54.50	100.60	71.59	81.11	**121.592292**
Normalized	25.04%	44.82%	82.74%	58.88%	66.71%	100%
Standard Deviation	0.5%	1.7%	1.5%	0.1%	0.2%	0.8%
dav1d - S.N.1 (FPS)	**118.70**	209.57	365.83	223.13	233.89	**438.874375**
Normalized	27.05%	47.75%	83.36%	50.84%	53.29%	100%
Standard Deviation	1.5%	2.9%	2.1%	0.4%	0.6%	0.4%
dav1d - C.1.1.b (FPS)	**33.22**	48.61	**83.09**	75.87	78.10	75.320625
Normalized	39.98%	58.5%	100%	91.31%	93.99%	90.65%
Standard Deviation	0.4%	1.8%	1.7%	0.2%	0.2%	0.9%
TTSIOD 3D Renderer - P.R.W.S.S.M (FPS)	**103.268**	152.180	**300.311**	249.626	298.378	
Normalized	34.39%	50.67%	100%	83.12%	99.36%	
Standard Deviation	0.6%	0.9%	0.5%	1.2%	0.4%	
Embree - Pathtracer - Crown (FPS)	**1.6033**	2.9114	5.8454	3.8882	4.8146	**8.1003**
Normalized	19.79%	35.94%	72.16%	48%	59.44%	100%
Standard Deviation	0.3%	0.6%	1%	1.2%	0.4%	1.4%
Embree - Pathtracer ISPC - Crown (FPS)	**1.7872**	3.3784	6.7157	3.7057	4.6517	**8.2424**
Normalized	21.68%	40.99%	81.48%	44.96%	56.44%	100%
Standard Deviation	0.1%	0.6%	0.4%	0.6%	0.1%	0.4%
Embree - Pathtracer - Asian Dragon (FPS)	**1.9709**	3.6461	7.0998	4.5314	5.6838	**9.8163**
Normalized	20.08%	37.14%	72.33%	46.16%	57.9%	100%
Standard Deviation	0.3%	0.4%	0.4%	0.3%	0.9%	0.2%
Embree - Pathtracer - Asian Dragon Obj (FPS)	**1.7984**	3.3479	6.5820	4.1839	5.2000	**8.7161**
Normalized	20.63%	38.41%	75.52%	48%	59.66%	100%
Standard Deviation	0.5%	0.2%	2.4%	0.7%	0.1%	0.8%
Embree - Pathtracer ISPC - Asian Dragon (FPS)	**2.2369**	4.4557	8.5577	4.5322	5.7313	**9.9126**
Normalized	22.57%	44.95%	86.33%	45.72%	57.82%	100%
Standard Deviation	0.2%	0.4%	1%	0.2%	0.5%	2.6%
Embree - Pathtracer ISPC - Asian Dragon Obj (FPS)	**2.6588**	3.9328	7.7235	4.0785	5.1089	**8.7514**
Normalized	30.38%	44.94%	88.25%	46.6%	58.38%	100%
Standard Deviation	13.7%	0.7%	1%	0.4%	0.1%	0.2%
SVT-VP9 - VMAF Optimized - Bosphorus 1080p (FPS)	**45.02**	63.51	109.70	80.55	87.61	**131.11**
Normalized	34.34%	48.44%	83.67%	61.44%	66.82%	100%
Standard Deviation	3.4%	2.6%	0.3%	2%	1.2%	1.8%
SVT-VP9 - P.S.O - Bosphorus 1080p (FPS)	**45.27**	63.81	111.20	83.03	90.76	**136.79**
Normalized	33.09%	46.65%	81.29%	60.7%	66.35%	100%
Standard Deviation	5.5%	4.3%	0.2%	0.1%	0.3%	0.4%
SVT-VP9 - V.Q.O - Bosphorus 1080p (FPS)	**33.42**	47.72	85.03	65.67	75.36	**110.87**
Normalized	30.14%	43.04%	76.69%	59.23%	67.97%	100%
Standard Deviation	4.2%	3.1%	0.2%	0.4%	0.8%	0.5%

ET: Legacy - Renderer2 - 1920 x 1080 (FPS)	70.2	79.6	102.7	138.6	139.5	
Normalized	50.32%	57.06%	73.62%	99.35%	100%	
Standard Deviation	0.2%	1.6%	3.4%	0.2%	0.6%	
OpenArena - 1920 x 1080 (FPS)	78.3	73.8	70.3	137.2	120.7	121.4
Normalized	57.07%	53.79%	51.24%	100%	87.97%	88.48%
Standard Deviation	0.3%	2.8%	0.2%	0.4%	0.6%	9.2%
Tesseract - 1920 x 1080 (FPS)	97.35154	63.72866	61.98837	120.1884	125.5715	
Normalized	77.53%	50.75%	49.36%	95.71%	100%	
Standard Deviation	2.9%	1.6%	0.2%	0.2%	1.4%	
Xonotic - 1920 x 1080 - Low (FPS)	269.1211033	183.3177943	263.4726535	293.1961996	284.9692587	263.3360435
Normalized	91.79%	62.52%	89.86%	100%	97.19%	89.82%
Standard Deviation	0.7%	1%	0%	0.8%	0.4%	0.1%
Xonotic - 1920 x 1080 - High (FPS)	165.7609328	111.0110312	128.9529351	198.6632810	198.3815553	201.0838589
Normalized	82.43%	55.21%	64.13%	98.8%	98.66%	100%
Standard Deviation	0.6%	0.2%	0.1%	0.3%	2%	0.4%
Xonotic - 1920 x 1080 - Ultra (FPS)	83.5365743	91.2788769	99.6489364	171.5145028	165.4308479	174.7042760
Normalized	47.82%	52.25%	57.04%	98.17%	94.69%	100%
Standard Deviation	0.9%	0.5%	0.1%	0.2%	0.4%	4.8%
Xonotic - 1920 x 1080 - Ultimate (FPS)	64.6409086	69.2544370	71.3703740	131.7891661	130.4112096	146.2533510
Normalized	44.2%	47.35%	48.8%	90.11%	89.17%	100%
Standard Deviation	0.5%	0.3%	0.1%	0.1%	0.3%	0.5%
Selenium - Octane - Firefox (Geometric Mean)	26304	28979	30688	26889	27799	40488
Normalized	64.97%	71.57%	75.8%	66.41%	68.66%	100%
Standard Deviation	1.4%	0.7%	1%	0.1%	1%	0.3%
Intel Open Image Denoise - Memorial (Images / Sec)	3.48	2.33	4.62	4.43	5.23	6.93
Normalized	50.22%	33.62%	66.67%	63.92%	75.47%	100%
Standard Deviation	2.2%	0.9%	0.7%	0.5%	1.7%	1.7%
OpenVKL - vklBenchmark (Items / Sec)	57.00	50.69	93.06	58.89	72.17	
Normalized	61.25%	54.47%	100%	63.28%	77.55%	
Standard Deviation	0.8%	0.7%	1.4%	0.3%	0.6%	
LuxCoreRender - DLSC (M samples/sec)	0.30	0.46	0.85	0.72	0.89	1.33
Normalized	22.56%	34.59%	63.91%	54.14%	66.92%	100%
Standard Deviation	2.9%	2.9%	1.1%	1.5%	0.3%	0.4%
LuxCoreRender - R.C.a.P (M samples/sec)	0.33	0.50	0.91	0.81	0.99	1.27
Normalized	25.98%	39.37%	71.65%	63.78%	77.95%	100%
Standard Deviation	2.9%	2.9%	0.9%	0.9%	0.3%	0.4%
C-Blosc - blosclz (MB/s)	6402	6826	9444	4981	4997	
Normalized	67.8%	72.28%	100%	52.74%	52.91%	
Standard Deviation	0.3%	0.6%	1.3%	0.1%	0.4%	

lzbench - XZ 0 - Compression (MB/s)	35	41	43	39	41	38
Normalized	81.4%	95.35%	100%	90.7%	95.35%	88.37%
Standard Deviation						10.7%
lzbench - XZ 0 - Decompression (MB/s)	98	110	118	120	125	127
Normalized	77.17%	86.61%	92.91%	94.49%	98.43%	100%
lzbench - Zstd 1 - Compression (MB/s)	413	479	515	504	529	519
Normalized	78.07%	90.55%	97.35%	95.27%	100%	98.11%
Standard Deviation	0.4%	0.5%	0.5%			0.7%
lzbench - Zstd 1 - Decompression (MB/s)	1089	1300	1382	1372	1434	862
Normalized	75.94%	90.66%	96.37%	95.68%	100%	60.11%
Standard Deviation	0.6%	0.4%	0.2%	0.1%	0.1%	0.2%
lzbench - Zstd 8 - Compression (MB/s)	81	89	95	70	75	70
Normalized	85.26%	93.68%	100%	73.68%	78.95%	73.68%
Standard Deviation			0.6%		1.3%	
lzbench - Zstd 8 - Decompression (MB/s)	1177	1403	1491	1507	1571	892
Normalized	74.92%	89.31%	94.91%	95.93%	100%	56.78%
Standard Deviation	0.1%	0.6%	0.1%		0.3%	
lzbench - Crush 0 - Compression (MB/s)	83	88	110	75	75	77
Normalized	75.45%	80%	100%	68.18%	68.18%	70%
Standard Deviation	0.7%	0.7%	1%			2.2%
lzbench - Crush 0 - Decompression (MB/s)	386	468	503	462	485	473
Normalized	76.74%	93.04%	100%	91.85%	96.42%	94.04%
Standard Deviation	1.1%	0.1%				0.2%
lzbench - Brotli 0 - Compression (MB/s)	409	434	473	488	514	420
Normalized	79.57%	84.44%	92.02%	94.94%	100%	81.71%
Standard Deviation	0.3%	0.5%	0.2%	0.2%	0.3%	0.5%
lzbench - Brotli 0 - Decompression (MB/s)	478	608	645	565	583	608
Normalized	74.11%	94.26%	100%	87.6%	90.39%	94.26%
Standard Deviation		0.2%	0.4%		0.6%	0.3%
lzbench - Brotli 2 - Compression (MB/s)	160	186	203	192	202	191
Normalized	78.82%	91.63%	100%	94.58%	99.51%	94.09%
Standard Deviation		0.3%		0.6%	0.6%	0.5%
lzbench - Brotli 2 - Decompression (MB/s)	569	709	773	644	664	702
Normalized	73.61%	91.72%	100%	83.31%	85.9%	90.82%
Standard Deviation	0.4%	0.2%	0.3%	0.2%	0.6%	
lzbench - Libdeflate 1 - Compression (MB/s)	205	211	225	242	253	260
Normalized	78.85%	81.15%	86.54%	93.08%	97.31%	100%
Standard Deviation			0.5%		0.4%	0.2%

lzbench - Libdeflate 1 - Decompression (MB/s)	874	1158	1244	1144	1198	1254
Normalized	69.7%	92.34%	99.2%	91.23%	95.53%	100%
Standard Deviation	0.3%	0%			0.2%	
Himeno Benchmark - P.P.S (MFLOPS)	3354	3349	3804	4188	4387	
Normalized	76.45%	76.33%	86.71%	95.45%	100%	
Standard Deviation	0.1%	0.5%	0.4%	1.5%	2.9%	
Botan - KASUMI (MiB/s)	83.929	94.386	100.870	82.365	85.948	
Normalized	83.21%	93.57%	100%	81.65%	85.21%	
Standard Deviation	1.2%	0.1%	0.2%	0%	0.1%	
Botan - Twofish (MiB/s)	296.022	364.151	389.505	251.528	259.569	
Normalized	76%	93.49%	100%	64.58%	66.64%	
Standard Deviation	2%	0.1%	0%	0%	0.1%	
Botan - Blowfish (MiB/s)	369.437	453.490	485.233	288.416	296.296	
Normalized	76.14%	93.46%	100%	59.44%	61.06%	
Standard Deviation	1.4%	0.2%	0.1%	0%	0%	
Botan - CAST-256 (MiB/s)	125.876	143.685	153.433	120.275	125.248	
Normalized	82.04%	93.65%	100%	78.39%	81.63%	
Standard Deviation	1.6%	0.1%	0.4%	0%	0%	
7-Zip Compression - C.S.T (MIPS)	13369	18023	31674	23661	27659	43796
Normalized	30.53%	41.15%	72.32%	54.03%	63.15%	100%
Standard Deviation	3.2%	1.6%	2%	1.8%	0.5%	0.6%
GROMACS - Water Benchmark (Ns/Day)	0.266	0.352	0.629	0.472	0.525	
Normalized	42.29%	55.96%	100%	75.04%	83.47%	
Standard Deviation	0.2%	0.2%	1.7%	0.4%	0.3%	
Selenium - Basemark - Firefox (Overall Score)	492.10	454.01	455.14	476.41	475.73	606.67
Normalized	81.11%	74.84%	75.02%	78.53%	78.42%	100%
Standard Deviation	2%	1.5%	7.2%	2.9%	1.5%	4.9%
GpuTest - GiMark - 1920 x 1080 - Fullscreen (Points)	1201	1230	1120	1351	1422	3003
Normalized	39.99%	40.96%	37.3%	44.99%	47.35%	100%
Standard Deviation		0.5%		0%	0%	0%
GpuTest - Plot3D - 1920 x 1080 - Fullscreen (Points)	8818	8490	7372	23737	24127	27294
Normalized	32.31%	31.11%	27.01%	86.97%	88.4%	100%
Standard Deviation	0.2%	0.1%	0%	0.1%	0.2%	0.2%
GpuTest - Furmark - 1920 x 1080 - Fullscreen	740	667	709	1104	1128	1157
Normalized	63.96%	57.65%	61.28%	95.42%	97.49%	100%
Standard Deviation	0.3%	3.2%		0.2%	0.2%	0.2%
GpuTest - TessMark - 1920 x 1080 - Fullscreen	2523	2642	2574	3691	3908	6453
Normalized	39.1%	40.94%	39.89%	57.2%	60.56%	100%
Standard Deviation	0.1%	0.1%		0%	0.1%	2.9%
GpuTest - Triangle - 1920 x 1080 - Fullscreen	53314	44624	55411	297260	248605	135399
Normalized	17.94%	15.01%	18.64%	100%	83.63%	45.55%
Standard Deviation	0.2%	0.8%	0.6%	0.3%	3%	0.4%

GpuTest - Pixmark Piano - 1920 x 1080 - Fullscreen (Points)	224	143	**123**	343	**427**	419
Normalized	52.46%	33.49%	28.81%	80.33%	100%	98.13%
Standard Deviation		0.8%				
GpuTest - Pixmark Volplosion - 1920 x 1080 - Fullscreen (Points)	579	379	**326**	892	1110	**1138**
Normalized	50.88%	33.3%	28.65%	78.38%	97.54%	100%
Standard Deviation		0.3%				
Selenium - StyleBench - Firefox (Runs / Minute)	65.3	73.7	**91.1**	**59.0**	63.0	74.7
Normalized	71.68%	80.9%	100%	64.76%	69.15%	82%
Standard Deviation	0.4%	0.1%	0.3%	1.1%	0.6%	0.6%
Selenium - Speedometer - Firefox (Runs/min)	69.4	77.1	81.6	**63.23**	63.7	**94.6**
Normalized	73.36%	81.5%	86.26%	66.84%	67.34%	100%
Standard Deviation	0.5%	0.3%	0.2%	0.5%	0.2%	2.4%
Selenium - WebXPRT - Firefox (Score)	**225**	**194**	209	203	208	217
Normalized	100%	86.22%	92.89%	90.22%	92.44%	96.44%
Standard Deviation	1%	0.5%	0.6%			2.2%
Selenium - Jetstream - Firefox (Score)	**166.43**	174.30	184.19	167.86	172.67	**235.01**
Normalized	70.82%	74.17%	78.38%	71.43%	73.47%	100%
Standard Deviation	0.4%	0.5%	0.5%	0.3%	0.4%	1.7%
Selenium - CanvasMark - Firefox (Score)	**11304**	10014	10790	9800	10606	**8948**
Normalized	100%	88.59%	95.45%	86.69%	93.83%	79.16%
Standard Deviation	16.4%	1.6%	0.5%	4.6%	22.4%	6.7%
Selenium - Jetstream 2 - Firefox (Score)	77.879	**70.860**	80.683	75.541	75.298	**106.473**
Normalized	73.14%	66.55%	75.78%	70.95%	70.72%	100%
Standard Deviation	2.4%	2.4%	1.2%	0.3%	2.8%	2.6%
NAS Parallel Benchmarks - BT.C (Mop/s)	**7412**	11950	**15244**	13867	12814	
Normalized	48.62%	78.39%	100%	90.97%	84.06%	
Standard Deviation	0.1%	0.3%	0.1%	1.9%	2.8%	
NAS Parallel Benchmarks - CG.C (Mop/s)	**1803**	2723			**4657**	
Normalized	38.7%	58.48%			100%	
Standard Deviation	0.3%	0.9%			1.4%	
NAS Parallel Benchmarks - EP.C (Mop/s)	**262.68**	399.59	**718.15**	501.94	572.38	
Normalized	36.58%	55.64%	100%	69.89%	79.7%	
Standard Deviation	0.3%	3%	3%	1.5%	0.3%	
NAS Parallel Benchmarks - EP.D (Mop/s)	**258.86**	375.94	**735.14**	459.47	565.92	
Normalized	35.21%	51.14%	100%	62.5%	76.98%	
Standard Deviation	0.2%	1.2%	0.4%	1.2%	0.1%	

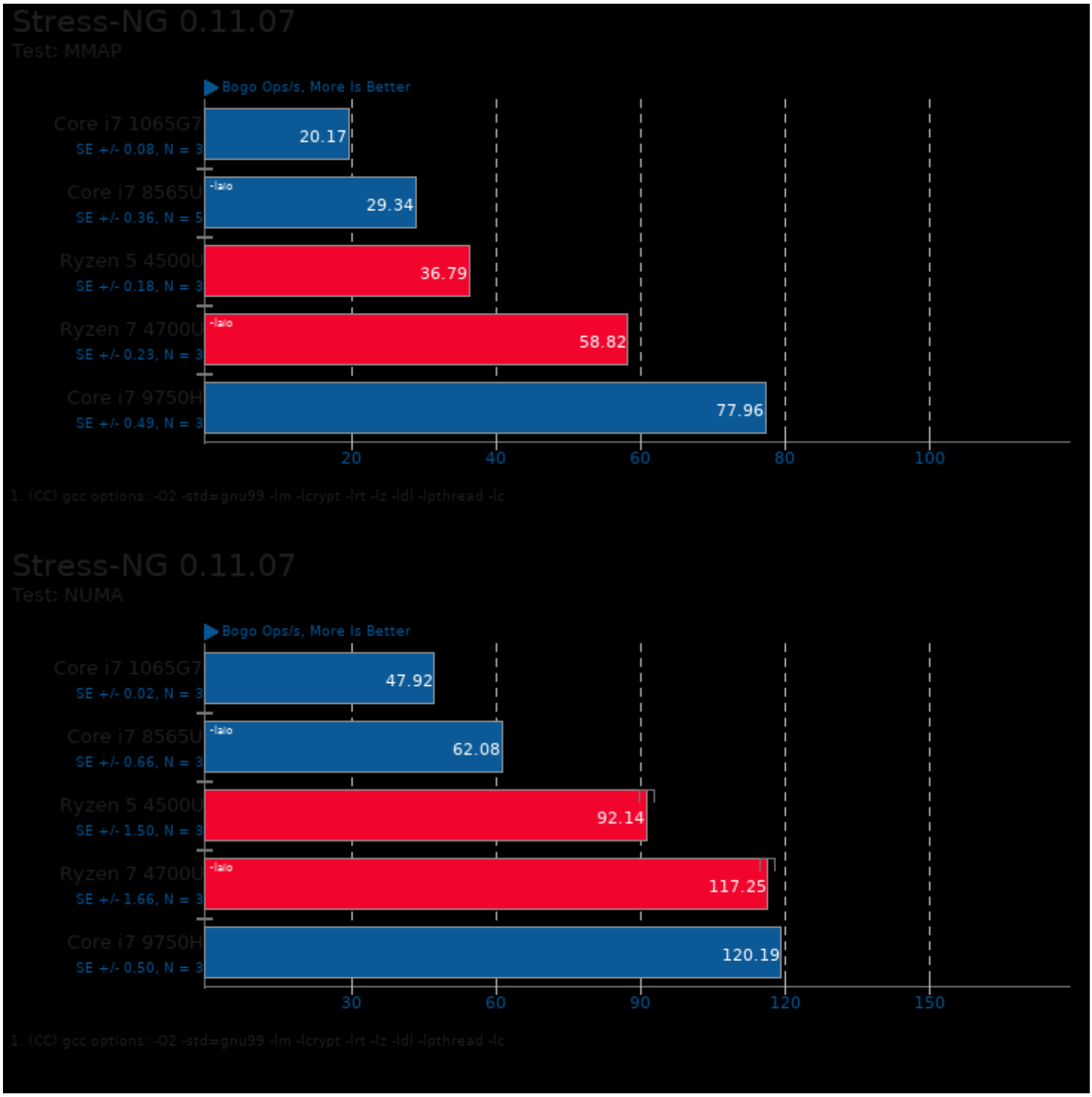
NAS Parallel Benchmarks - FT.C (Mop/s)	**4462**	6442	7554	5808	**8150**	
Normalized	54.75%	79.04%	92.69%	71.25%	100%	
Standard Deviation	0.1%	0.9%	0.5%	0.4%	0.2%	
NAS Parallel Benchmarks - LU.C (Mop/s)	**8502**	12689	**20291**	16706	17812	
Normalized	41.9%	62.54%	100%	82.33%	87.78%	
Standard Deviation	0.2%	0.2%	0.3%	0.6%	0.1%	
NAS Parallel Benchmarks - MG.C (Mop/s)	**5534**	6965	**9564**	6160	6308	
Normalized	57.86%	72.83%	100%	64.4%	65.96%	
Standard Deviation	0.2%	0.2%	0.1%	0.1%	0.1%	
NAS Parallel Benchmarks - SP.B (Mop/s)	3814	4253	**5798**	**3455**	3577	
Normalized	65.79%	73.34%	100%	59.58%	61.69%	
Standard Deviation	0.7%	0.2%	0.2%	0.6%	0.1%	
NAMD - ATPase Simulation - 327,506	**10.30543**	6.48024	**3.18094**	4.48099	3.66325	
Normalized	30.87%	49.09%	100%	70.99%	86.83%	
Standard Deviation	0.1%	0.4%	0.2%	0.5%	0.2%	
toyBrot Fractal Generator - TBB (ms)	**510668**	409961	206785	182353	**147456**	
Normalized	28.88%	35.97%	71.31%	80.86%	100%	
Standard Deviation	0.3%	0.2%	0.5%	0.1%	0.2%	
toyBrot Fractal Generator - OpenMP (ms)	**497214**	410239	206256	194356	**159542**	
Normalized	32.09%	38.89%	77.35%	82.09%	100%	
Standard Deviation	0.1%	0.3%	0.2%	0.3%	0%	
toyBrot Fractal Generator - C++ Tasks (ms)	**507997**	411439	206873	181776	**147210**	
Normalized	28.98%	35.78%	71.16%	80.98%	100%	
Standard Deviation	0.3%	0.2%	0.1%	0.2%	0%	
toyBrot Fractal Generator - C++ Threads (ms)	**550754**	411899	206428	182471	**147637**	
Normalized	26.81%	35.84%	71.52%	80.91%	100%	
Standard Deviation	0.4%	0.2%	0.4%	0.4%	0%	
Selenium - ARES-6 - Firefox (ms)	53.39	**57.54**	53.91	55.89	54.97	**37.86**
Normalized	70.91%	65.8%	70.23%	67.74%	68.87%	100%
Standard Deviation	0.9%	2.3%	1.3%	1.6%	0.9%	1.3%
Selenium - Kraken - Firefox (ms)	**1099**	968.4	929.6	929.0	921.1	**742.2**
Normalized	67.55%	76.64%	79.84%	79.89%	80.58%	100%
Standard Deviation	0.4%	0.6%	0.2%	1.1%	0.3%	1.6%
Selenium - W.i - Firefox (ms)	30.4	**32.7**	31.4	28.8	27.8	**26.5**
Normalized	87.17%	81.04%	84.39%	92.01%	95.32%	100%
Standard Deviation	2.2%	0.5%	0.2%	0.4%	0.2%	0.6%
Selenium - W.c - Firefox (ms)	492.8	**524.6**	504.6	392.8	376.1	**365.2**
Normalized	74.11%	69.61%	72.37%	92.97%	97.1%	100%
Standard Deviation	0.7%	0.2%	1.6%	0.2%	0%	0.1%

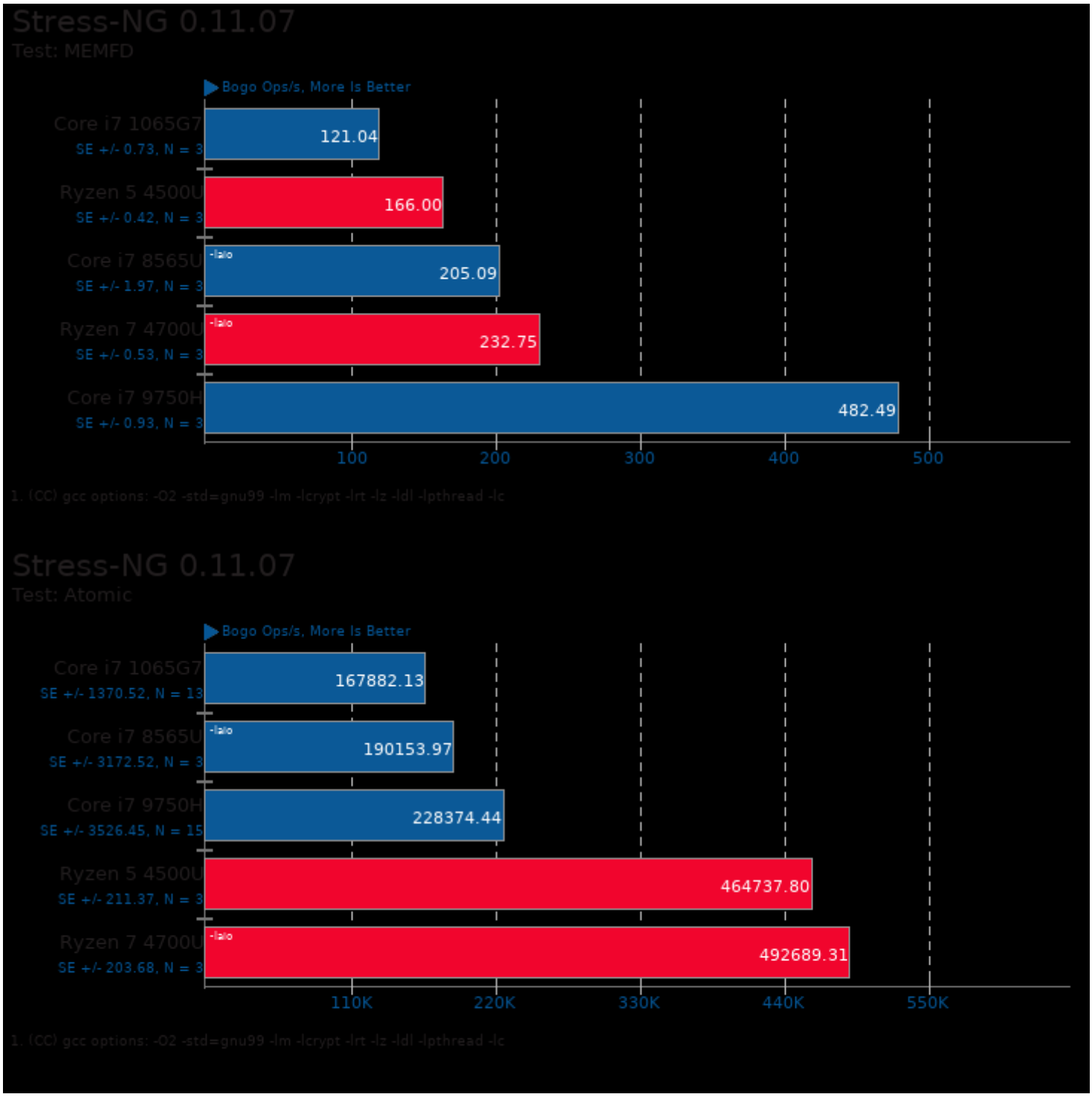
Selenium - PSPDFKit WASM - Firefox (Score)	**2321**	1767	1490	1755	1719	**1283**
Normalized	55.28%	72.61%	86.11%	73.11%	74.64%	100%
Standard Deviation	1.2%	5%	0.5%	1.2%	1.6%	1.1%
Java Gradle Build - Reactor (sec)	**407.353**	287.692	226.316	**217.654**	223.950	
Normalized	53.43%	75.66%	96.17%	100%	97.19%	
Standard Deviation	6.4%	3.4%	2.9%	5.3%	3.1%	
Timed Linux Kernel Compilation - Time To Compile (sec)	**443.144**	305.114	**153.933**	189.249	156.474	
Normalized	34.74%	50.45%	100%	81.34%	98.38%	
Standard Deviation	0.5%	0.4%	0.9%	0.3%	0.9%	
Timed LLVM Compilation - Time To Compile (sec)	**3375**	2281	**1150**	1504	1224	
Normalized	34.07%	50.41%	100%	76.41%	93.94%	
Standard Deviation	0.2%	0%	0.7%	0.2%	0.1%	
YafaRay - T.T.F.S.S (sec)	**858.778**	575.669	289.258		**268.563**	
Normalized	31.27%	46.65%	92.85%		100%	
Standard Deviation	1%	0.9%	0.4%		0.4%	
Basis Universal - ETC1S (sec)	**118.931**	92.308	63.267	64.627	**59.010**	67.966
Normalized	49.62%	63.93%	93.27%	91.31%	100%	86.82%
Standard Deviation	2.2%	0.8%	0.8%	0.7%	0.2%	5.3%
Basis Universal - UASTC Level 0 (sec)	**15.524**	11.682	9.316	9.102	**8.280**	8.373
Normalized	53.34%	70.88%	88.88%	90.97%	100%	98.89%
Standard Deviation	0.3%	2.9%	1.5%	0%	0.3%	0.3%
Basis Universal - UASTC Level 2 (sec)	**162.241**	111.404	58.822	57.895	47.137	**37.433**
Normalized	23.07%	33.6%	63.64%	64.66%	79.41%	100%
Standard Deviation	0.1%	1.9%	0.3%	0.8%	3.9%	0.2%
Basis Universal - UASTC Level 3 (sec)	**327.532**	222.783	115.458	117.647	94.679	**72.019**
Normalized	21.99%	32.33%	62.38%	61.22%	76.07%	100%
Standard Deviation	0.2%	0.1%	0.3%	1.4%	0%	0.3%
Basis Universal - U.L.2.R.P.P (sec)	**1591**	1206	808.933	772.205	**700.908**	1357
Normalized	44.05%	58.1%	86.65%	90.77%	100%	51.67%
Standard Deviation	0%	0.1%	0.3%	0.6%	0.5%	75.3%
G'MIC - P.I.O.A.3.V.1.T (sec)	**21.908**	20.389	**19.014**	20.776	19.710	
Normalized	86.79%	93.26%	100%	91.52%	96.47%	
Standard Deviation	0.9%	0.9%	0.5%	0.6%	0.1%	
Git - T.T.C.C.G.C (sec)	**65.564**	55.518	**51.086**	55.335	53.079	
Normalized	77.92%	92.02%	100%	92.32%	96.25%	
Standard Deviation	1.2%	0%	2.3%	0.3%	0.2%	
Mlpack Benchmark - scikit_ica (sec)	**119.94**	104.12	**69.56**	75.77	77.12	
Normalized	58%	66.81%	100%	91.8%	90.2%	
Standard Deviation	1.6%	1.7%	4.3%	0.4%	4.7%	

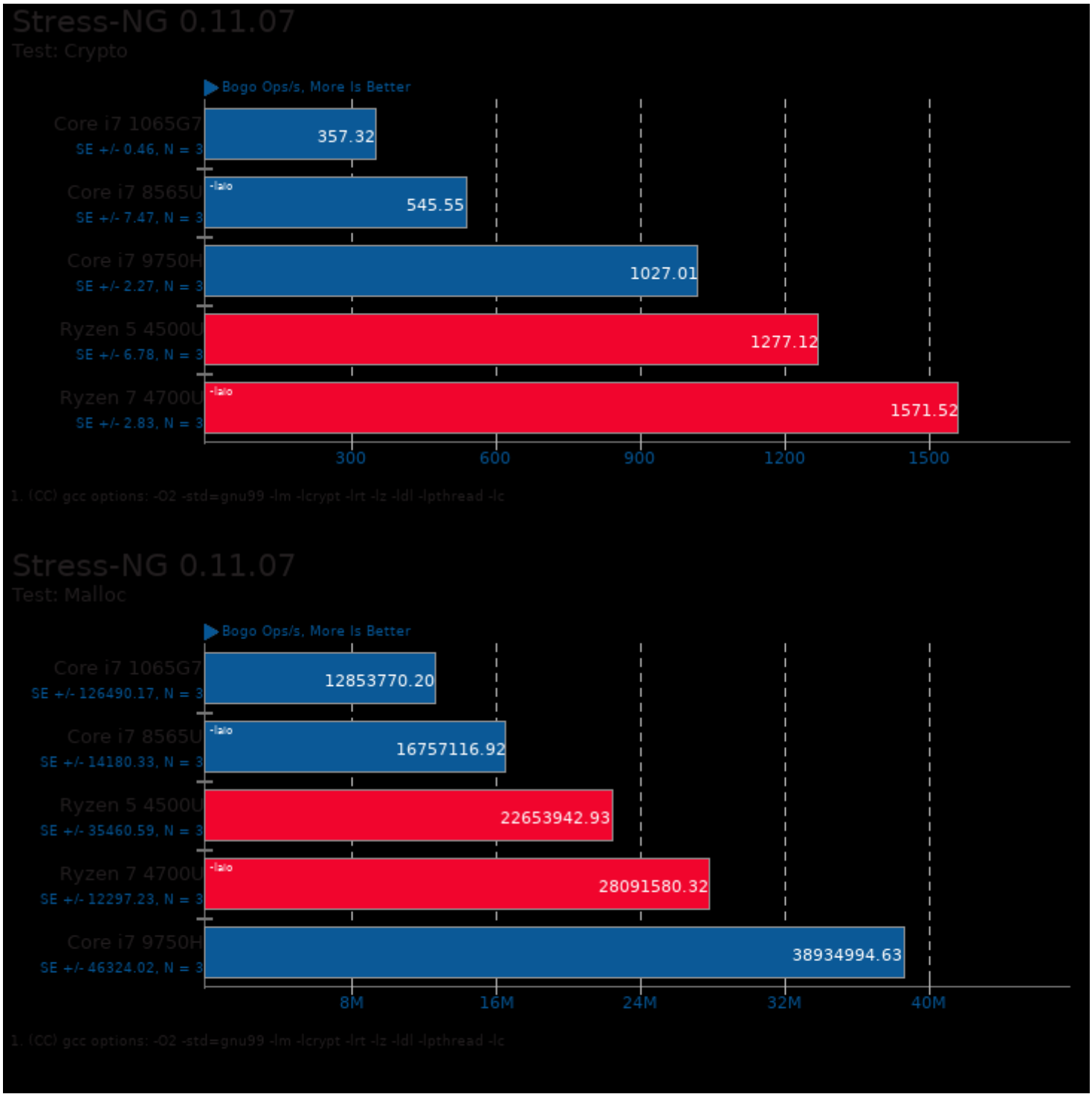
Mlpack Benchmark - scikit_qda (sec)	185.44	127.95	75.16	100.37	95.90	
Normalized	40.53%	58.74%	100%	74.88%	78.37%	
Standard Deviation	0.3%	0.7%	0.5%	0.2%	1.5%	
Mlpack Benchmark - scikit_svm (sec)	30.38	26.83	24.14	22.50	21.73	
Normalized	71.53%	80.99%	90.02%	96.58%	100%	
Standard Deviation	0.1%	0.3%	0.1%	0.7%	0.4%	
Mlpack Benchmark - scikit_linearridgeregression (sec)	9.69	4.72	3.21	7.40	5.12	
Normalized	33.13%	68.01%	100%	43.38%	62.7%	
Standard Deviation	1.5%	1.3%	2.8%	7.2%	4%	
Timed MrBayes Analysis - P.P.A (sec)	200.633	143.982	107.994	92.193	101.989	396.471
Normalized	45.95%	64.03%	85.37%	100%	90.4%	23.25%
Standard Deviation	0.2%	0.6%	0.2%	0.7%	0.9%	1.8%
Timed MAFFT Alignment - M.S.A (sec)	7.580	5.029	3.332	4.043	3.712	
Normalized	43.96%	66.26%	100%	82.41%	89.76%	
Standard Deviation	0.1%	9.4%	1.4%	3.9%	0.8%	
Timed Apache Compilation - Time To	59.656	43.204	26.736	32.372	29.035	
Normalized	44.82%	61.88%	100%	82.59%	92.08%	
Standard Deviation	0.1%	0.3%	1.4%	0.3%	0.1%	
Timed FFmpeg Compilation - Time To	301.599	201.128	102.141	117.164	99.130	
Normalized	32.87%	49.29%	97.05%	84.61%	100%	
Standard Deviation	0.3%	0.1%	1%	0.9%	3.1%	
Timed GDB GNU Debugger Compilation - Time To Compile (sec)	297.124	209.125	127.426	168.194	157.910	
Normalized	42.89%	60.93%	100%	75.76%	80.7%	
Standard Deviation	0.3%	0.3%	0.6%	0.2%	0.5%	
Timed MPlayer Compilation - Time To	218.216	139.373	70.255	83.838	69.550	
Normalized	31.87%	49.9%	99%	82.96%	100%	
Standard Deviation	0.1%	0.1%	0.9%	1%	1.7%	
Timed PHP Compilation - Time To Compile (sec)	224.809	151.659	88.327	111.082	99.847	
Normalized	39.29%	58.24%	100%	79.52%	88.46%	
Standard Deviation	0.2%	0.2%	1%	0.3%	0.5%	
Build2 - Time To Compile (sec)	582.627	371.829	190.898	235.648	199.077	
Normalized	32.77%	51.34%	100%	81.01%	95.89%	
Standard Deviation	0.4%	0.7%	0.4%	0.8%	0.4%	
C-Ray - Total Time - 4.1.R.P.P (sec)	375.368	258.121	131.504	117.206	93.195	72.582
Normalized	19.34%	28.12%	55.19%	61.93%	77.88%	100%
Standard Deviation	0.1%	0.4%	0.3%	0.2%	0.1%	1.2%

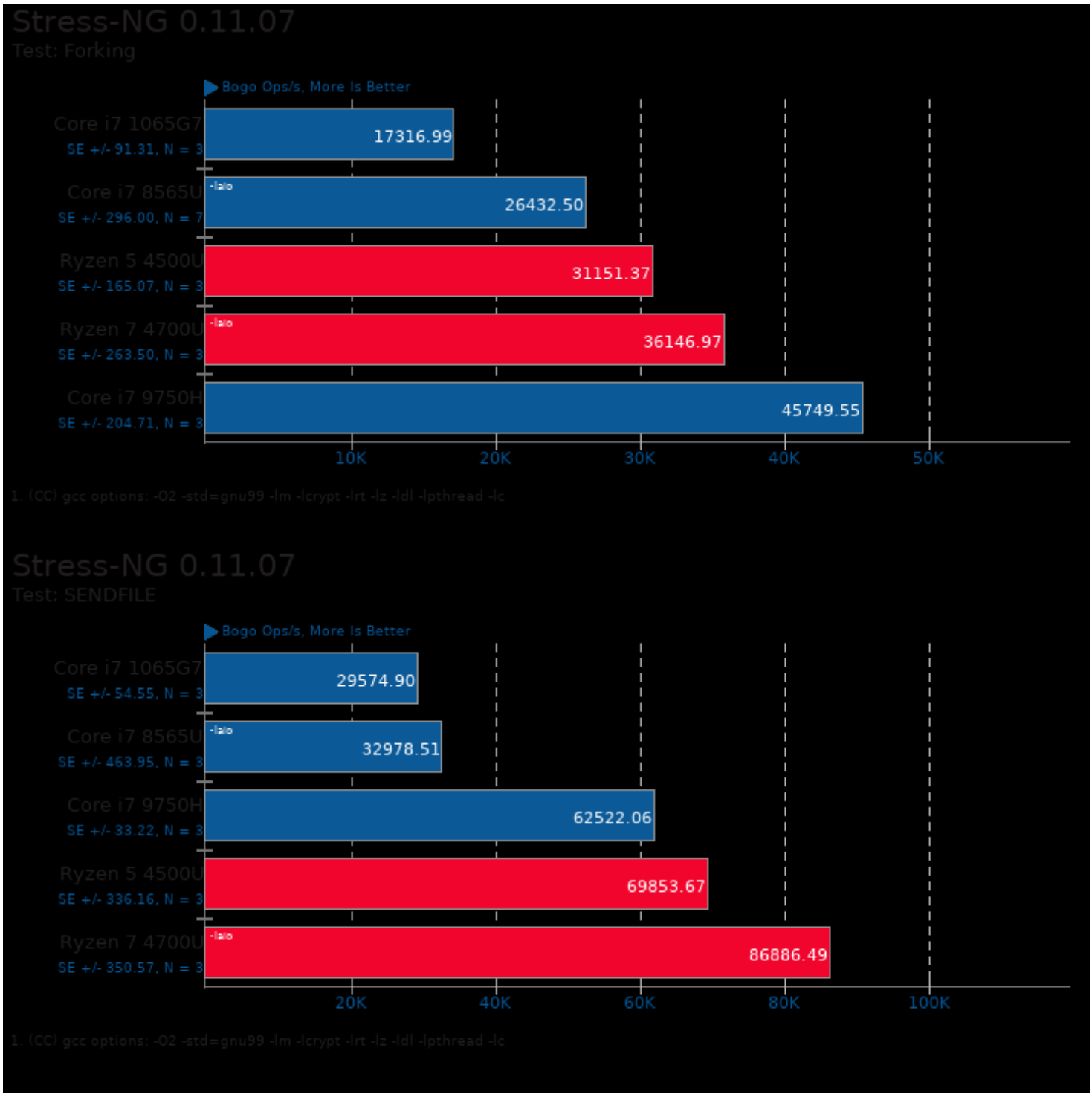
POV-Ray - Trace Time (sec)	283.479	186.797	91.325	108.146	86.865	
Normalized	30.64%	46.5%	95.12%	80.32%	100%	
Standard Deviation	0.1%	0.4%	0.6%	0.5%	0.1%	
Smallpt - G.I.R.1.S (sec)	55.776	38.082	19.743	24.634	19.876	16.608
Normalized	29.78%	43.61%	84.12%	67.42%	83.56%	100%
Standard Deviation	0.3%	2.2%	0.3%	0.4%	0.4%	0.1%
GEGL - Crop (sec)	11.282	9.768	8.819	8.288	8.084	
Normalized	71.65%	82.76%	91.67%	97.54%	100%	
Standard Deviation	0.9%	2.9%	0.8%	1.5%	0.5%	
GEGL - Scale (sec)	9.355	7.875	6.323	5.640	5.656	
Normalized	60.29%	71.62%	89.2%	100%	99.72%	
Standard Deviation	0.2%	2.9%	1.7%	0.7%	0.9%	
GEGL - Cartoon (sec)	117.368	106.447	94.502	95.633	91.659	
Normalized	78.1%	86.11%	96.99%	95.84%	100%	
Standard Deviation	0.5%	0.3%	0.2%	0.1%	0.2%	
GEGL - Reflect (sec)	38.282	34.607	31.273	32.098	31.008	
Normalized	81%	89.6%	99.15%	96.6%	100%	
Standard Deviation	0.4%	2%	1.2%	0.1%	0.2%	
GEGL - Antialias (sec)	52.430	47.334	39.761	41.093	39.194	
Normalized	74.75%	82.8%	98.57%	95.38%	100%	
Standard Deviation	0.5%	1.3%	0.4%	0.2%	0.1%	
GEGL - Tile Glass (sec)	40.015	35.802	29.961	32.773	31.627	
Normalized	74.87%	83.69%	100%	91.42%	94.73%	
Standard Deviation	0.4%	2.4%	0.3%	0.2%	0.2%	
GEGL - Wavelet Blur (sec)	79.832	71.912	63.469	65.162	62.656	
Normalized	78.48%	87.13%	98.72%	96.15%	100%	
Standard Deviation	0.3%	0.5%	0.1%	0.1%	0.1%	
GEGL - Color Enhance (sec)	72.737	66.084	60.227	60.620	58.099	
Normalized	79.88%	87.92%	96.47%	95.84%	100%	
Standard Deviation	0.1%	0.4%	0.6%	0.1%	0.1%	
GEGL - Rotate 90 Degrees (sec)	56.431	49.293	41.100	43.034	41.057	
Normalized	72.76%	83.29%	99.9%	95.41%	100%	
Standard Deviation	0.1%	0.7%	0.3%	0.1%	0.2%	
GIMP - resize (sec)	15.247	11.549	8.485	10.095	9.983	
Normalized	55.65%	73.47%	100%	84.05%	84.99%	
Standard Deviation	0.4%	2.9%	0.6%	1.3%	0.7%	
GIMP - rotate (sec)	13.427	12.795	11.994	13.250	13.562	
Normalized	89.33%	93.74%	100%	90.52%	88.44%	
Standard Deviation	0.6%	0.6%	0.5%	0.4%	0.1%	
GIMP - auto-levels (sec)	16.772	13.736	12.411	13.650	13.797	
Normalized	74%	90.35%	100%	90.92%	89.95%	
Standard Deviation	0.8%	2.8%	0.1%	0.1%	0.4%	
GIMP - unsharp-mask	21.009	17.514	14.993	15.727	16.157	
Normalized	71.36%	85.61%	100%	95.33%	92.8%	
Standard Deviation	0.4%	2.8%	0.3%	0.1%	0.1%	
Inkscape - SVG Files To PNG (sec)	27.483	24.922	24.545	27.553	27.264	
Normalized	89.31%	98.49%	100%	89.08%	90.03%	
Standard Deviation	0.3%	0.2%	1.2%	0.5%	0.1%	
LibreOffice - 2.D.T.P (sec)	7.706	7.959	7.364	7.707	7.499	
Normalized	95.56%	92.52%	100%	95.55%	98.2%	
Standard Deviation	2.8%	9.9%	2.9%	2.2%	3.2%	

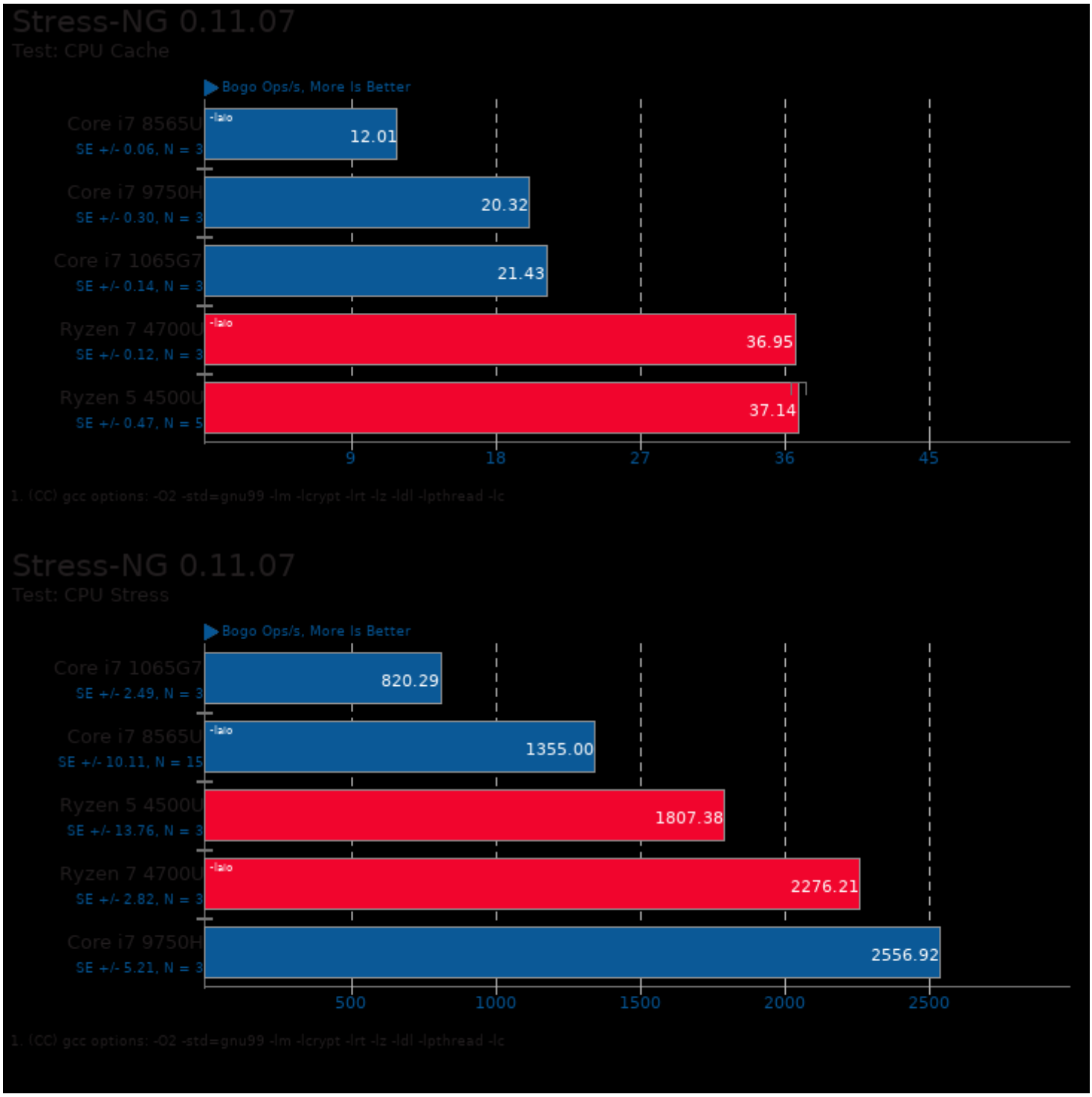
Selenium - Maze Solver - Firefox (sec)	**5.4**	5.6	5.5	6.2	6.2	**15**
Normalized	100%	96.43%	98.18%	87.1%	87.1%	36%
Standard Deviation	1.1%	1%	1.1%	0.9%	0.9%	
GIMP - resize (sec)						18.616
Standard Deviation						2.1%
GIMP - rotate (sec)						27.631
Standard Deviation						0.3%
GIMP - auto-levels (sec)						43.828
Standard Deviation						1.2%
GIMP - unsharp-mask						59.536
Standard Deviation						2.9%

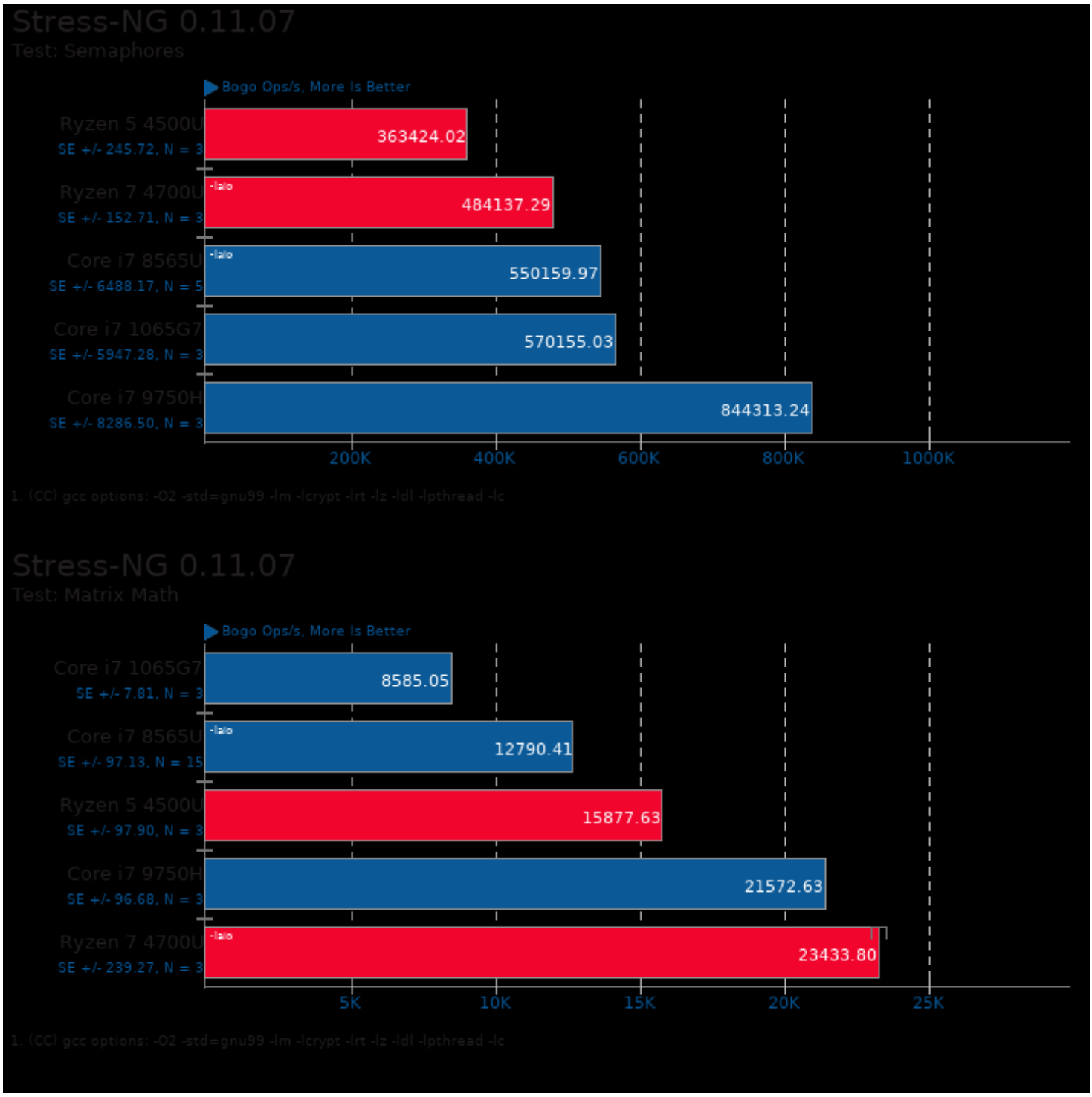

Stress-NG 0.11.07
Test: MMAP
Bogo Ops/s, More Is Better
Core i7 1065G7
SE +/- 0.08, N = 3
20.17
Core i7 8565U
SE +/- 0.36, N = 5
-lalo
29.34
Ryzen 5 4500U
SE +/- 0.18, N = 3
36.79
Ryzen 7 4700U
SE +/- 0.23, N = 3
-lalo
58.82
Core i7 9750H
SE +/- 0.49, N = 3
77.96
20
40
60
80
100
1. (CC) gcc options: -O2 -std=gnu99 -lm -lcrypt -lrt -lz -ldl -lpthread -lc
Stress-NG 0.11.07
Test: NUMA
Bogo Ops/s, More Is Better
Core i7 1065G7
SE +/- 0.02, N = 3
47.92
Core i7 8565U
SE +/- 0.66, N = 3
-lalo
62.08
Ryzen 5 4500U
SE +/- 1.50, N = 3
92.14
Ryzen 7 4700U
SE +/- 1.66, N = 3
-lalo
117.25
Core i7 9750H
SE +/- 0.50, N = 3
120.19
30
60
90
120
150
1. (CC) gcc options: -O2 -std=gnu99 -lm -lcrypt -lrt -lz -ldl -lpthread -lc

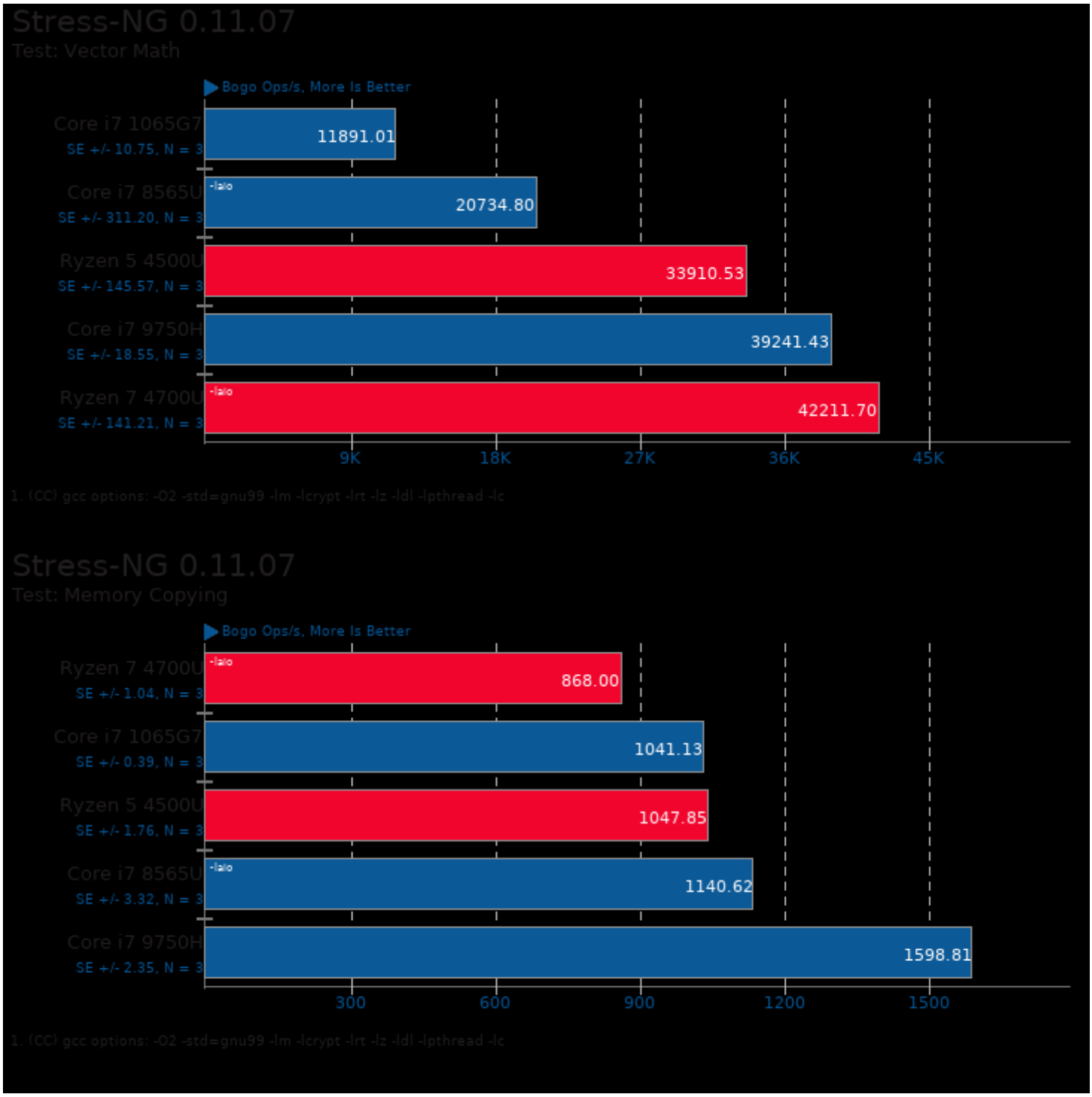

Stress-NG 0.11.07
Test: MEMFD
Bogo Ops/s, More Is Better
Core i7 1065G7
SE +/- 0.73, N = 3
121.04
Ryzen 5 4500U
SE +/- 0.42, N = 3
166.00
Core i7 8565U
SE +/- 1.97, N = 3
-lalo
205.09
Ryzen 7 4700U
SE +/- 0.53, N = 3
-lalo
232.75
Core i7 9750H
SE +/- 0.93, N = 3
482.49
100
200
300
400
500
1. (CC) gcc options: -O2 -std=gnu99 -lm -lcrypt -lrt -lz -ldl -lpthread -lc
Stress-NG 0.11.07
Test: Atomic
Bogo Ops/s, More Is Better
Core i7 1065G7
SE +/- 1370.52, N = 13
167882.13
Core i7 8565U
SE +/- 3172.52, N = 3
-lalo
190153.97
Core i7 9750H
SE +/- 3526.45, N = 15
228374.44
Ryzen 5 4500U
SE +/- 211.37, N = 3
464737.80
Ryzen 7 4700U
SE +/- 203.68, N = 3
-lalo
492689.31
110K
220K
330K
440K
550K
1. (CC) gcc options: -O2 -std=gnu99 -lm -lcrypt -lrt -lz -ldl -lpthread -lc

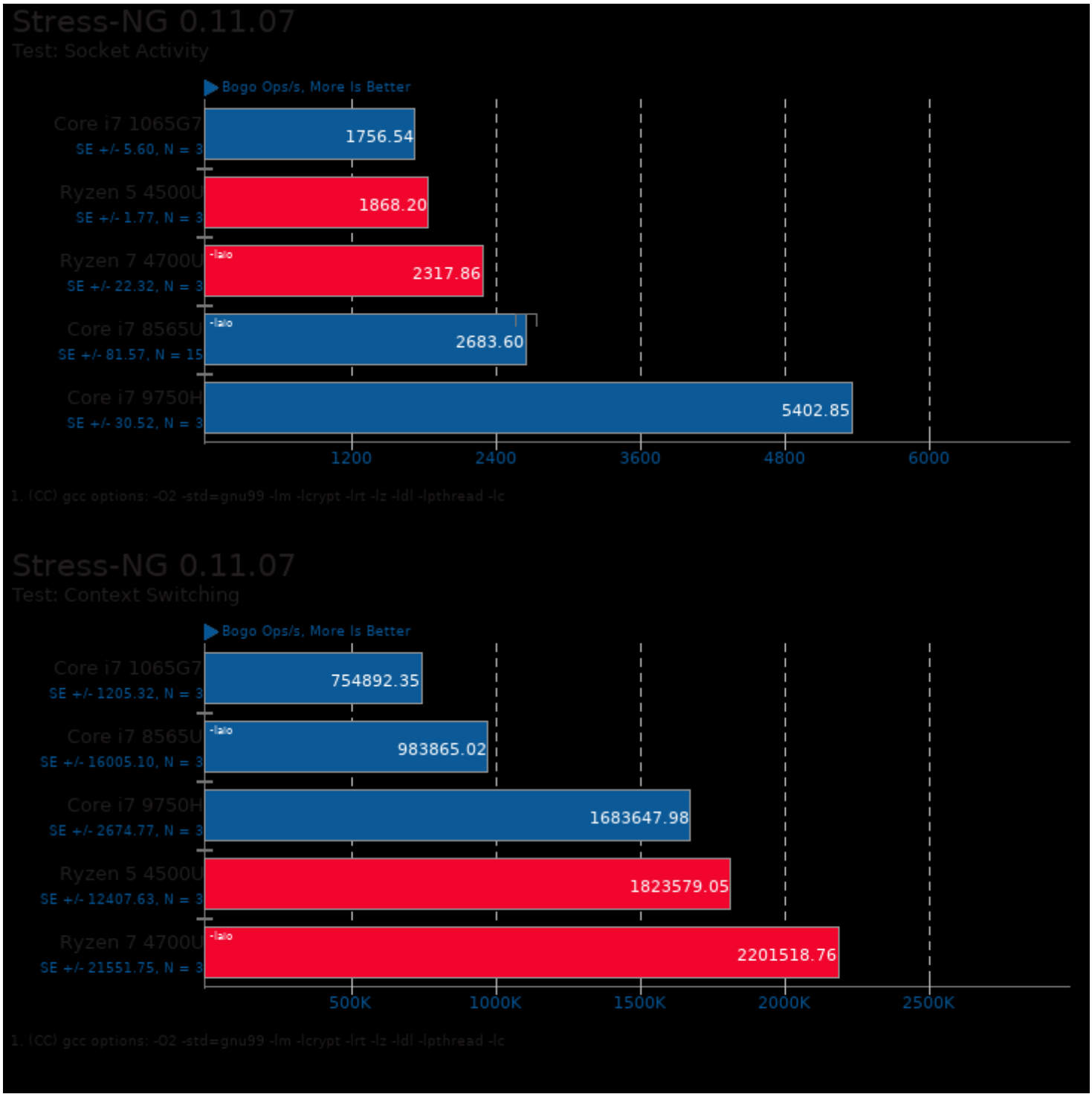

Stress-NG 0.11.07
Test: Crypto
Bogo Ops/s, More Is Better
Core i7 1065G7
SE +/- 0.46, N = 3
357.32
Core i7 8565U
SE +/- 7.47, N = 3
-lalo
545.55
Core i7 9750H
SE +/- 2.27, N = 3
1027.01
Ryzen 5 4500U
SE +/- 6.78, N = 3
1277.12
Ryzen 7 4700U
SE +/- 2.83, N = 3
-lalo
1571.52
300
600
900
1200
1500
1. (CC) gcc options: -O2 -std=gnu99 -lm -lcrypt -lrt -lz -ldl -lpthread -lc
Stress-NG 0.11.07
Test: Malloc
Bogo Ops/s, More Is Better
Core i7 1065G7
SE +/- 126490.17, N = 3
12853770.20
Core i7 8565U
SE +/- 14180.33, N = 3
-lalo
16757116.92
Ryzen 5 4500U
SE +/- 35460.59, N = 3
22653942.93
Ryzen 7 4700U
SE +/- 12297.23, N = 3
-lalo
28091580.32
Core i7 9750H
SE +/- 46324.02, N = 3
38934994.63
8M
16M
24M
32M
40M
1. (CC) gcc options: -O2 -std=gnu99 -lm -lcrypt -lrt -lz -ldl -lpthread -lc

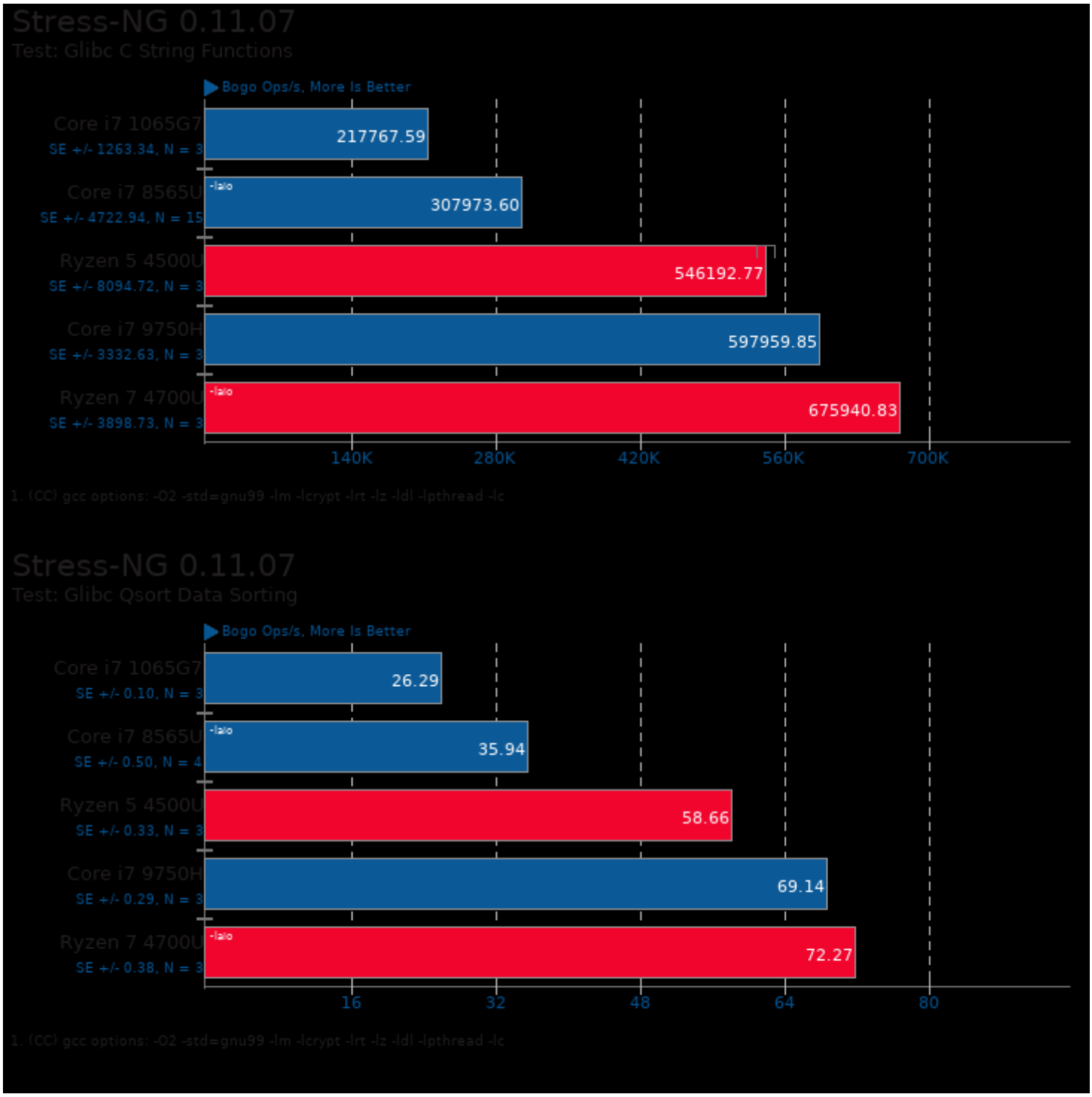

Stress-NG 0.11.07
Test: Forking
Bogo Ops/s, More Is Better
Core i7 1065G7
SE +/- 91.31, N = 3
17316.99
Core i7 8565U
SE +/- 296.00, N = 7
-lalo
26432.50
Ryzen 5 4500U
SE +/- 165.07, N = 3
31151.37
Ryzen 7 4700U
SE +/- 263.50, N = 3
-lalo
36146.97
Core i7 9750H
SE +/- 204.71, N = 3
45749.55
10K
20K
30K
40K
50K
1. (CC) gcc options: -O2 -std=gnu99 -lm -lcrypt -lrt -lz -ldl -lpthread -lc
Stress-NG 0.11.07
Test: SENDFILE
Bogo Ops/s, More Is Better
Core i7 1065G7
SE +/- 54.55, N = 3
29574.90
Core i7 8565U
SE +/- 463.95, N = 3
-lalo
32978.51
Core i7 9750H
SE +/- 33.22, N = 3
62522.06
Ryzen 5 4500U
SE +/- 336.16, N = 3
69853.67
Ryzen 7 4700U
SE +/- 350.57, N = 3
-lalo
86886.49
20K
40K
60K
80K
100K
1. (CC) gcc options: -O2 -std=gnu99 -lm -lcrypt -lrt -lz -ldl -lpthread -lc

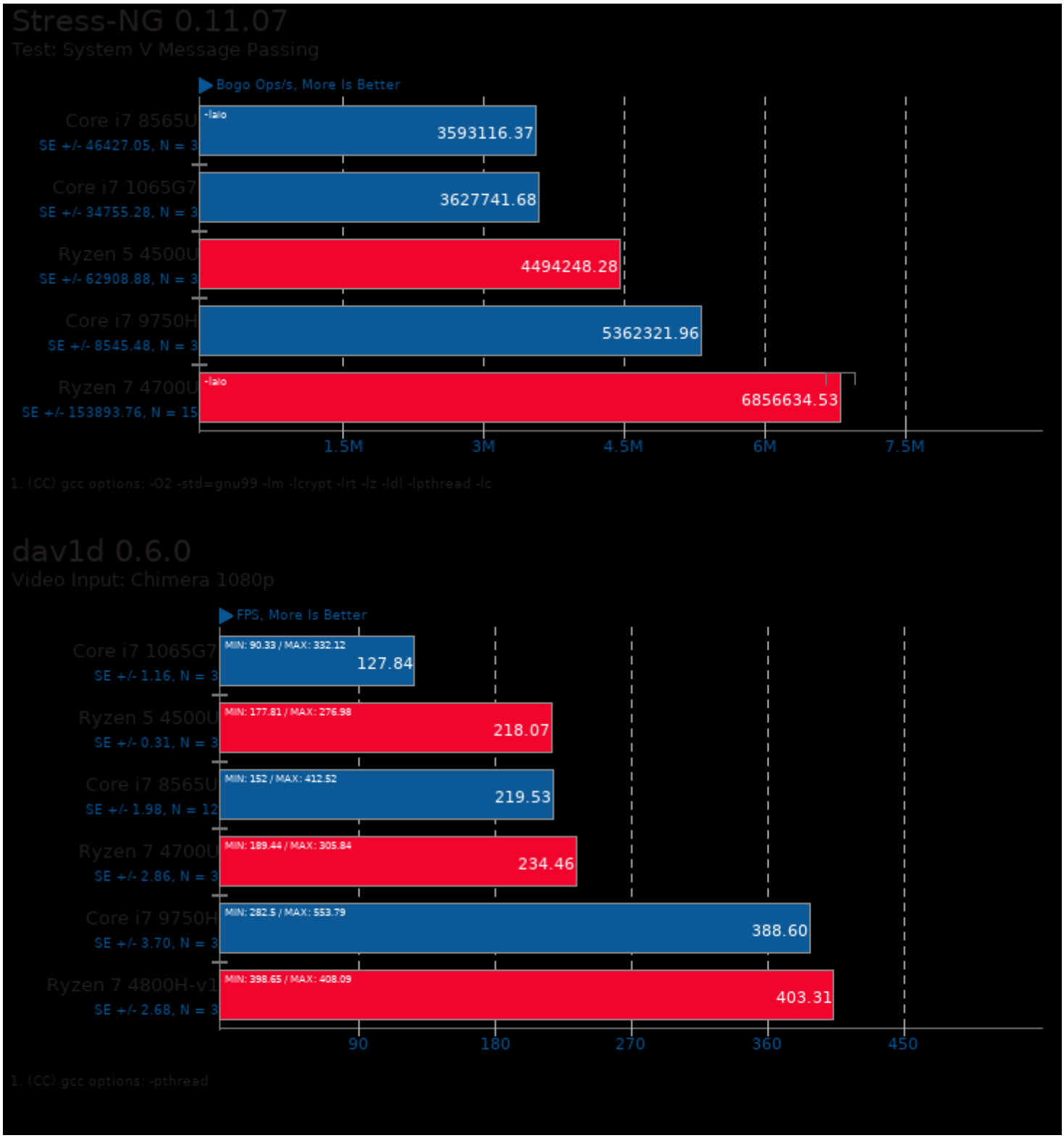

Stress-NG 0.11.07
Test: CPU Cache
Bogo Ops/s, More Is Better
Core i7 8565U
SE +/- 0.06, N = 3
-lalo
12.01
Core i7 9750H
SE +/- 0.30, N = 3
20.32
Core i7 1065G7
SE +/- 0.14, N = 3
21.43
Ryzen 7 4700U
SE +/- 0.12, N = 3
-lalo
36.95
Ryzen 5 4500U
SE +/- 0.47, N = 5
37.14
9
18
27
36
45
1. (CC) gcc options: -O2 -std=gnu99 -lm -lcrypt -lrt -lz -ldl -lpthread -lc
Stress-NG 0.11.07
Test: CPU Stress
Bogo Ops/s, More Is Better
Core i7 1065G7
SE +/- 2.49, N = 3
820.29
Core i7 8565U
SE +/- 10.11, N = 15
-lalo
1355.00
Ryzen 5 4500U
SE +/- 13.76, N = 3
1807.38
Ryzen 7 4700U
SE +/- 2.82, N = 3
-lalo
2276.21
Core i7 9750H
SE +/- 5.21, N = 3
2556.92
500
1000
1500
2000
2500
1. (CC) gcc options: -O2 -std=gnu99 -lm -lcrypt -lrt -lz -ldl -lpthread -lc


Stress-NG 0.11.07
Test: Semaphores
Bogo Ops/s, More Is Better
Ryzen 5 4500U
SE +/- 245.72, N = 3
363424.02
Ryzen 7 4700U
SE +/- 152.71, N = 3
-lalo
484137.29
Core i7 8565U
SE +/- 6488.17, N = 5
-lalo
550159.97
Core i7 1065G7
SE +/- 5947.28, N = 3
570155.03
Core i7 9750H
SE +/- 8286.50, N = 3
844313.24
200K
400K
600K
800K
1000K
1. (CC) gcc options: -O2 -std=gnu99 -lm -lcrypt -lrt -lz -ldl -lpthread -lc
Stress-NG 0.11.07
Test: Matrix Math
Bogo Ops/s, More Is Better
Core i7 1065G7
SE +/- 7.81, N = 3
8585.05
Core i7 8565U
SE +/- 97.13, N = 15
-lalo
12790.41
Ryzen 5 4500U
SE +/- 97.90, N = 3
15877.63
Core i7 9750H
SE +/- 96.68, N = 3
21572.63
Ryzen 7 4700U
SE +/- 239.27, N = 3
-lalo
23433.80
5K
10K
15K
20K
25K
1. (CC) gcc options: -O2 -std=gnu99 -lm -lcrypt -lrt -lz -ldl -lpthread -lc

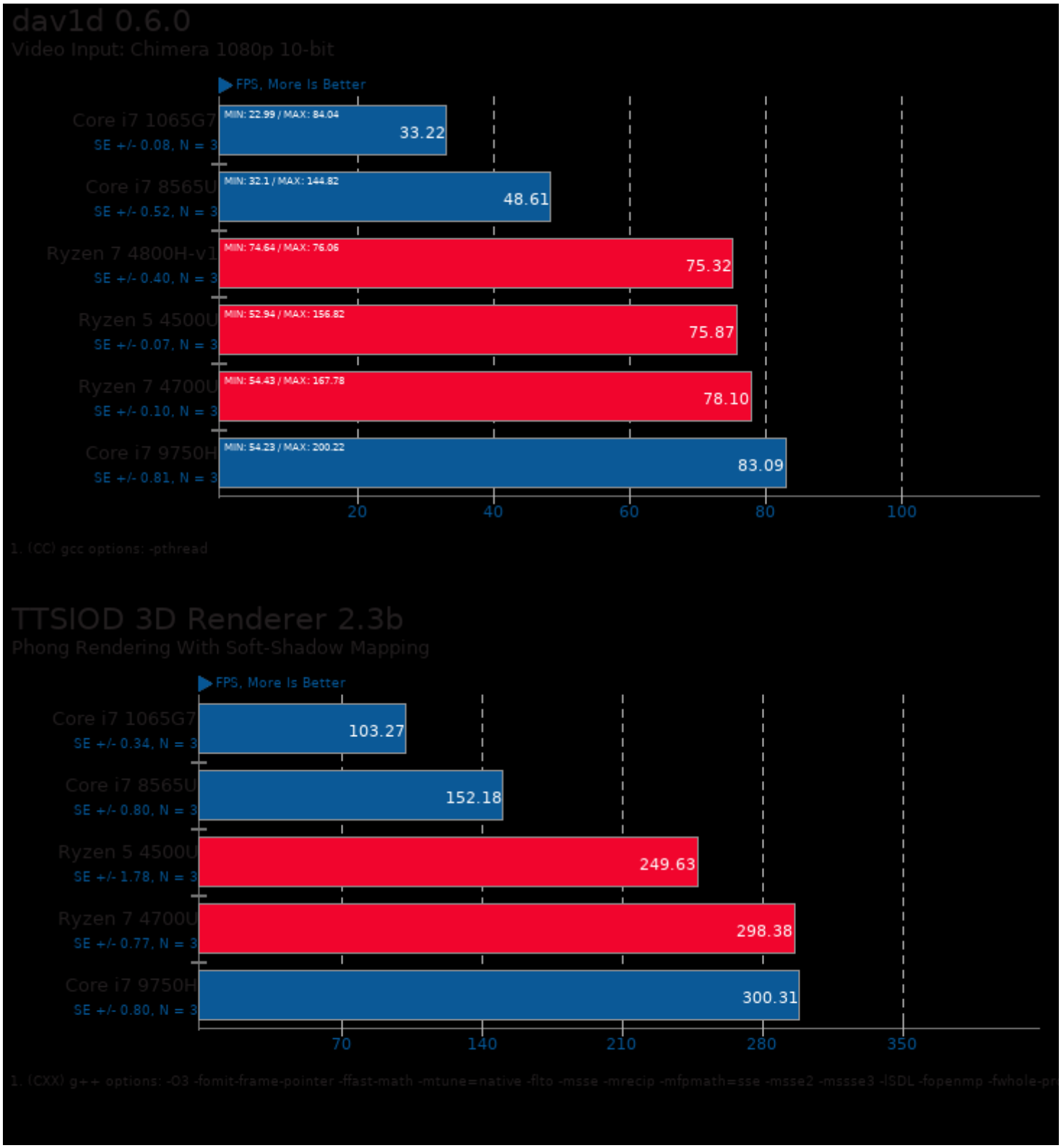

Stress-NG 0.11.07
Test: Vector Math
Bogo Ops/s, More Is Better
Core i7 1065G7
SE +/- 10.75, N = 3
11891.01
Core i7 8565U
SE +/- 311.20, N = 3
-flto
20734.80
Ryzen 5 4500U
SE +/- 145.57, N = 3
33910.53
Core i7 9750H
SE +/- 18.55, N = 3
39241.43
Ryzen 7 4700U
SE +/- 141.21, N = 3
-flto
42211.70
9K
18K
27K
36K
45K
1. (CC) gcc options: -O2 -std=gnu99 -lm -lcrypt -lrt -lz -ldl -lpthread -lc
Stress-NG 0.11.07
Test: Memory Copying
Bogo Ops/s, More Is Better
Ryzen 7 4700U
SE +/- 1.04, N = 3
-flto
868.00
Core i7 1065G7
SE +/- 0.39, N = 3
1041.13
Ryzen 5 4500U
SE +/- 1.76, N = 3
1047.85
Core i7 8565U
SE +/- 3.32, N = 3
-flto
1140.62
Core i7 9750H
SE +/- 2.35, N = 3
1598.81
300
600
900
1200
1500
1. (CC) gcc options: -O2 -std=gnu99 -lm -lcrypt -lrt -lz -ldl -lpthread -lc

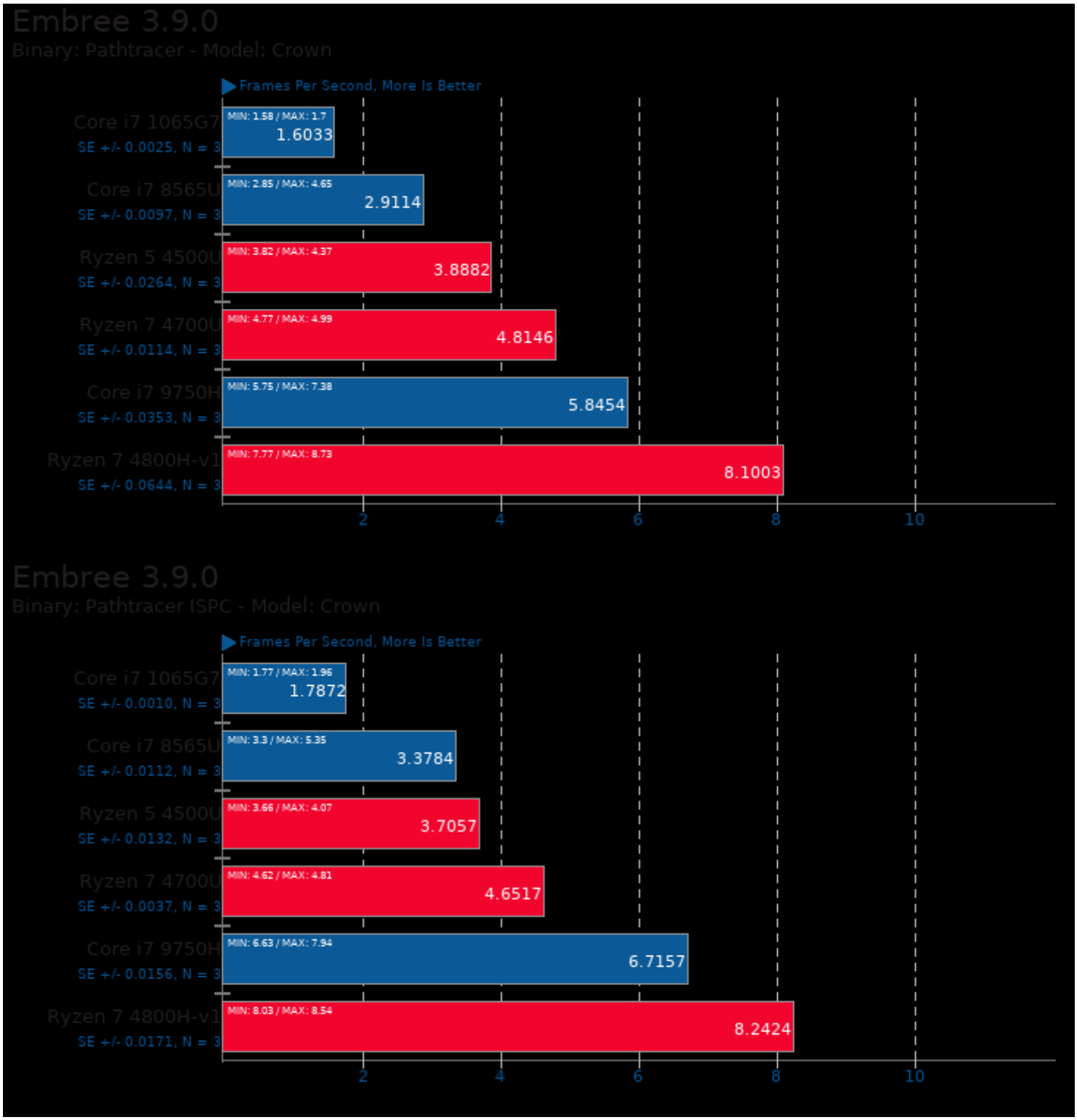

Stress-NG 0.11.07
Test: Socket Activity
Bogo Ops/s, More Is Better
Core i7 1065G7
SE +/- 5.60, N = 3
1756.54
Ryzen 5 4500U
SE +/- 1.77, N = 3
1868.20
Ryzen 7 4700U
SE +/- 22.32, N = 3
-lalo
2317.86
Core i7 8565U
SE +/- 81.57, N = 15
-lalo
2683.60
Core i7 9750H
SE +/- 30.52, N = 3
5402.85
1200
2400
3600
4800
6000
1. (CC) gcc options: -O2 -std=gnu99 -lm -lcrypt -lrt -lz -ldl -lpthread -lc
Stress-NG 0.11.07
Test: Context Switching
Bogo Ops/s, More Is Better
Core i7 1065G7
SE +/- 1205.32, N = 3
754892.35
Core i7 8565U
SE +/- 16005.10, N = 3
-lalo
983865.02
Core i7 9750H
SE +/- 2674.77, N = 3
1683647.98
Ryzen 5 4500U
SE +/- 12407.63, N = 3
1823579.05
Ryzen 7 4700U
SE +/- 21551.75, N = 3
-lalo
2201518.76
500K
1000K
1500K
2000K
2500K
1. (CC) gcc options: -O2 -std=gnu99 -lm -lcrypt -lrt -lz -ldl -lpthread -lc

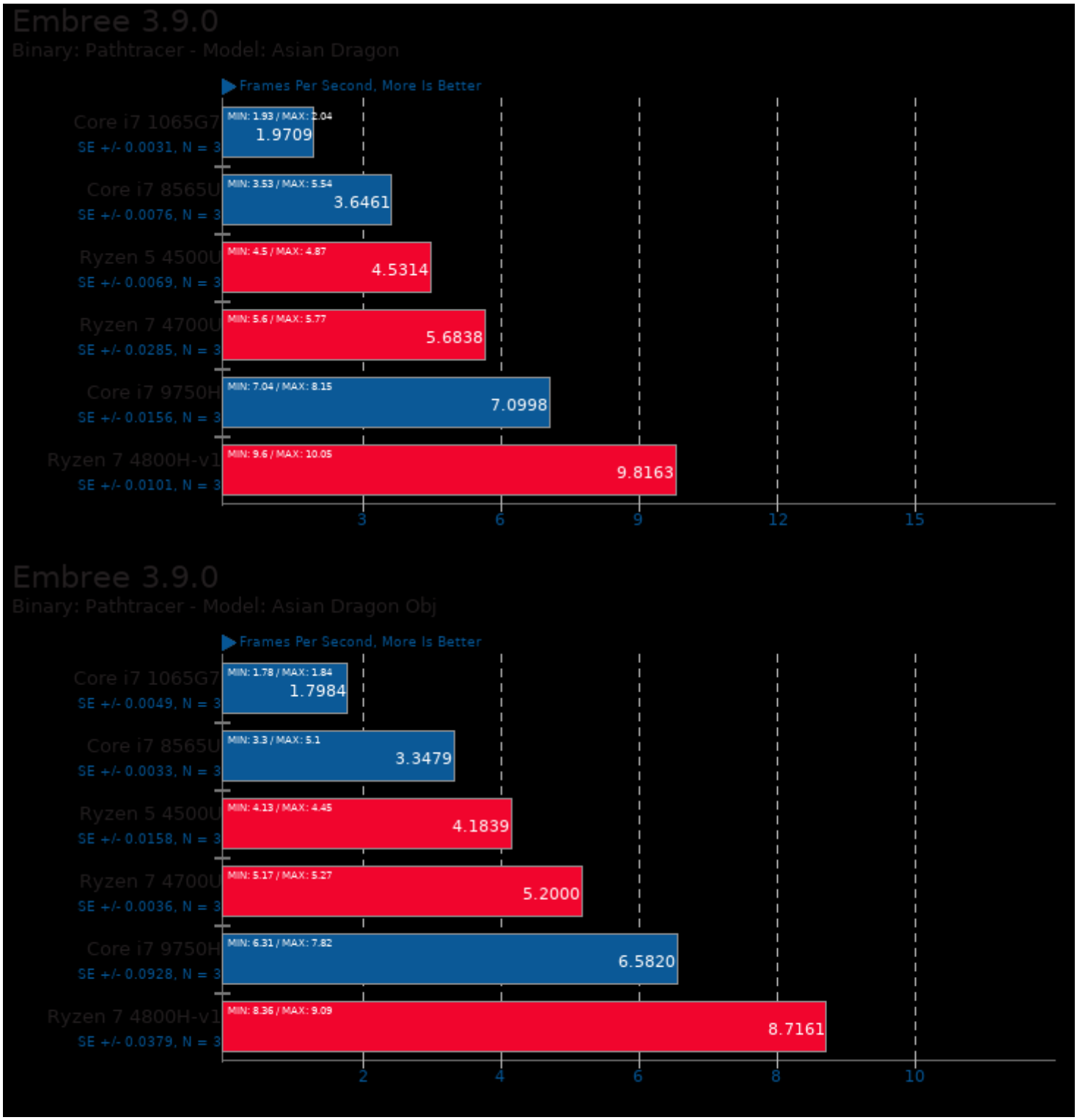

Stress-NG 0.11.07
Test: Glibc C String Functions
Bogo Ops/s, More Is Better
Core i7 1065G7
SE +/- 1263.34, N = 3
217767.59
Core i7 8565U
SE +/- 4722.94, N = 15
-lalo
307973.60
Ryzen 5 4500U
SE +/- 8094.72, N = 3
546192.77
Core i7 9750H
SE +/- 3332.63, N = 3
597959.85
Ryzen 7 4700U
SE +/- 3898.73, N = 3
-lalo
675940.83
140K
280K
420K
560K
700K
1. (CC) gcc options: -O2 -std=gnu99 -lm -lcrypt -lrt -lz -ldl -lpthread -lc
Stress-NG 0.11.07
Test: Glibc Qsort Data Sorting
Bogo Ops/s, More Is Better
Core i7 1065G7
SE +/- 0.10, N = 3
26.29
Core i7 8565U
SE +/- 0.50, N = 4
-lalo
35.94
Ryzen 5 4500U
SE +/- 0.33, N = 3
58.66
Core i7 9750H
SE +/- 0.29, N = 3
69.14
Ryzen 7 4700U
SE +/- 0.38, N = 3
-lalo
72.27
16
32
48
64
80
1. (CC) gcc options: -O2 -std=gnu99 -lm -lcrypt -lrt -lz -ldl -lpthread -lc

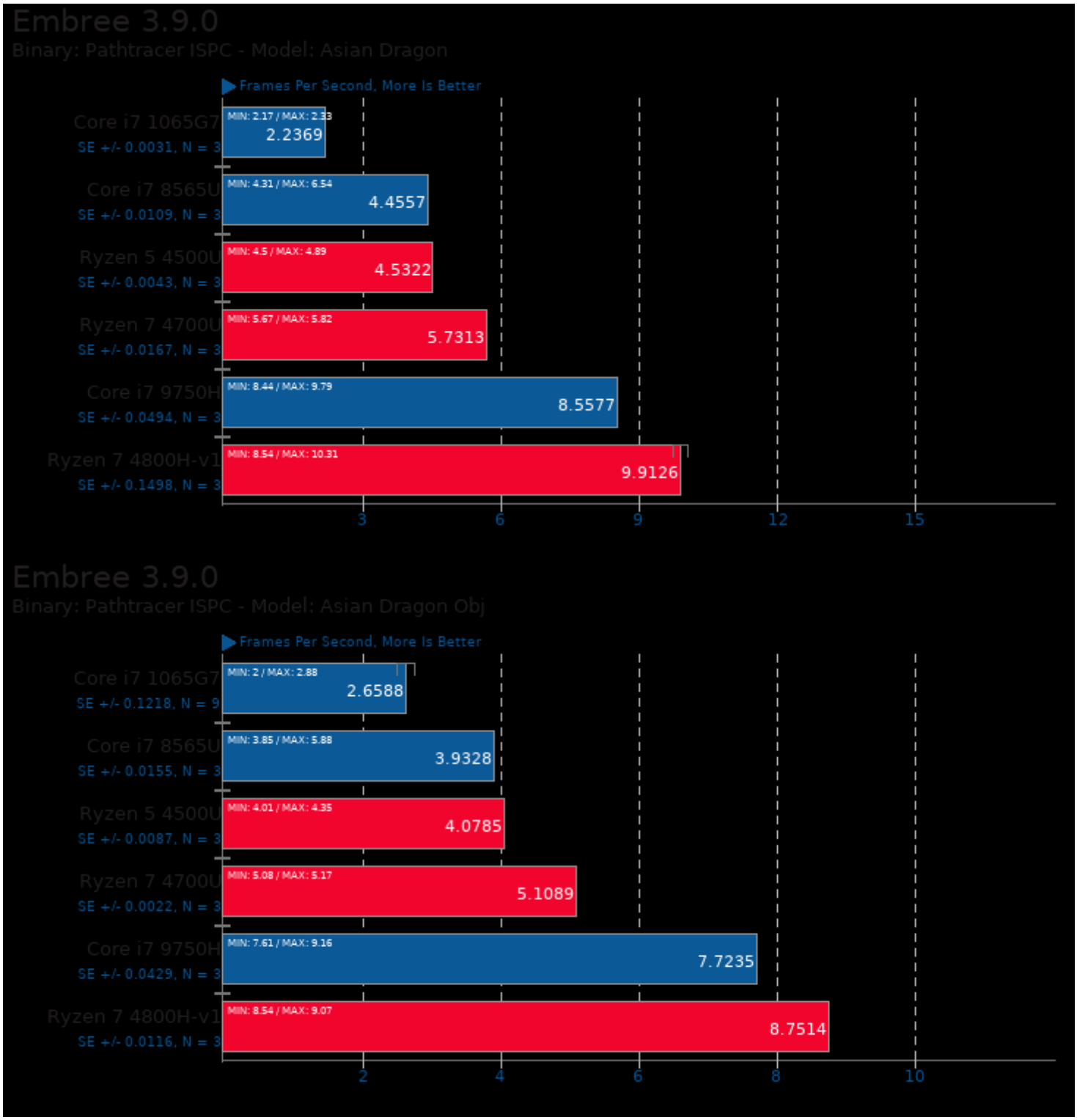

Stress-NG 0.11.07
Test: System V Message Passing
Bogo Ops/s, More Is Better
Core i7 8565U
SE +/- 46427.05, N = 3
-lalo
3593116.37
Core i7 1065G7
SE +/- 34755.28, N = 3
3627741.68
Ryzen 5 4500U
SE +/- 62908.88, N = 3
4494248.28
Core i7 9750H
SE +/- 8545.48, N = 3
5362321.96
Ryzen 7 4700U
SE +/- 153893.76, N = 15
-lalo
6856634.53
1.5M
3M
4.5M
6M
7.5M
1. (CC) gcc options: -O2 -std=gnu99 -lm -lcrypt -lrt -lz -ldl -lpthread -lc
dav1d 0.6.0
Video Input: Chimera 1080p
FPS, More Is Better
Core i7 1065G7
SE +/- 1.16, N = 3
MIN: 90.33 / MAX: 332.12
127.84
Ryzen 5 4500U
SE +/- 0.31, N = 3
MIN: 177.81 / MAX: 276.98
218.07
Core i7 8565U
SE +/- 1.98, N = 12
MIN: 152 / MAX: 412.52
219.53
Ryzen 7 4700U
SE +/- 2.86, N = 3
MIN: 189.44 / MAX: 305.84
234.46
Core i7 9750H
SE +/- 3.70, N = 3
MIN: 282.5 / MAX: 553.79
388.60
Ryzen 7 4800H-v1
SE +/- 2.68, N = 3
MIN: 398.65 / MAX: 408.09
403.31
90
180
270
360
450
1. (CC) gcc options: -pthread

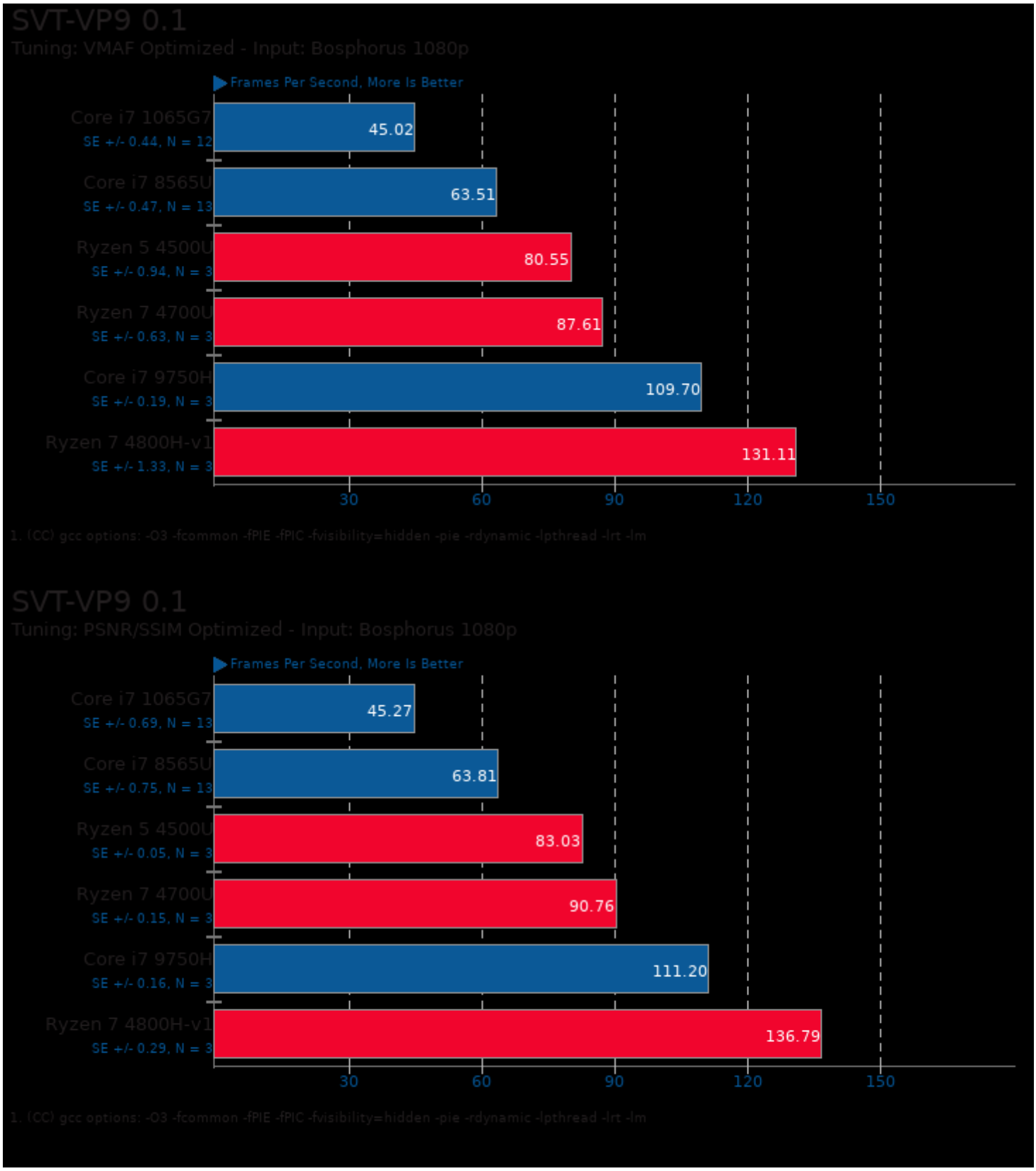

dav1d 0.6.0
Video Input: Summer Nature 4K
FPS, More Is Better
Core i7 1065G7
SE +/- 0.08, N = 3
MIN: 27.51 / MAX: 44.31
30.45
Core i7 8565U
SE +/- 0.53, N = 3
MIN: 47.3 / MAX: 88.26
54.50
Ryzen 5 4500U
SE +/- 0.03, N = 3
MIN: 67.4 / MAX: 80.9
71.59
Ryzen 7 4700U
SE +/- 0.07, N = 3
MIN: 77.02 / MAX: 89.41
81.11
Core i7 9750H
SE +/- 0.89, N = 3
MIN: 91.39 / MAX: 129.45
100.60
Ryzen 7 4800H-v1
SE +/- 0.56, N = 3
MIN: 120.79 / MAX: 122.84
121.59
30
60
90
120
150
1. (CC) gcc options: -pthread
dav1d 0.6.0
Video Input: Summer Nature 1080p
FPS, More Is Better
Core i7 1065G7
SE +/- 1.00, N = 3
MIN: 102.09 / MAX: 265.33
118.70
Core i7 8565U
SE +/- 1.90, N = 10
MIN: 174.06 / MAX: 291.66
209.57
Ryzen 5 4500U
SE +/- 0.54, N = 3
MIN: 209.18 / MAX: 238.95
223.13
Ryzen 7 4700U
SE +/- 0.79, N = 3
MIN: 213.56 / MAX: 251.5
233.89
Core i7 9750H
SE +/- 4.53, N = 3
MIN: 320.07 / MAX: 422.57
365.83
Ryzen 7 4800H-v1
SE +/- 1.09, N = 3
MIN: 436.29 / MAX: 440.49
438.87
100
200
300
400
500
1. (CC) gcc options: -pthread

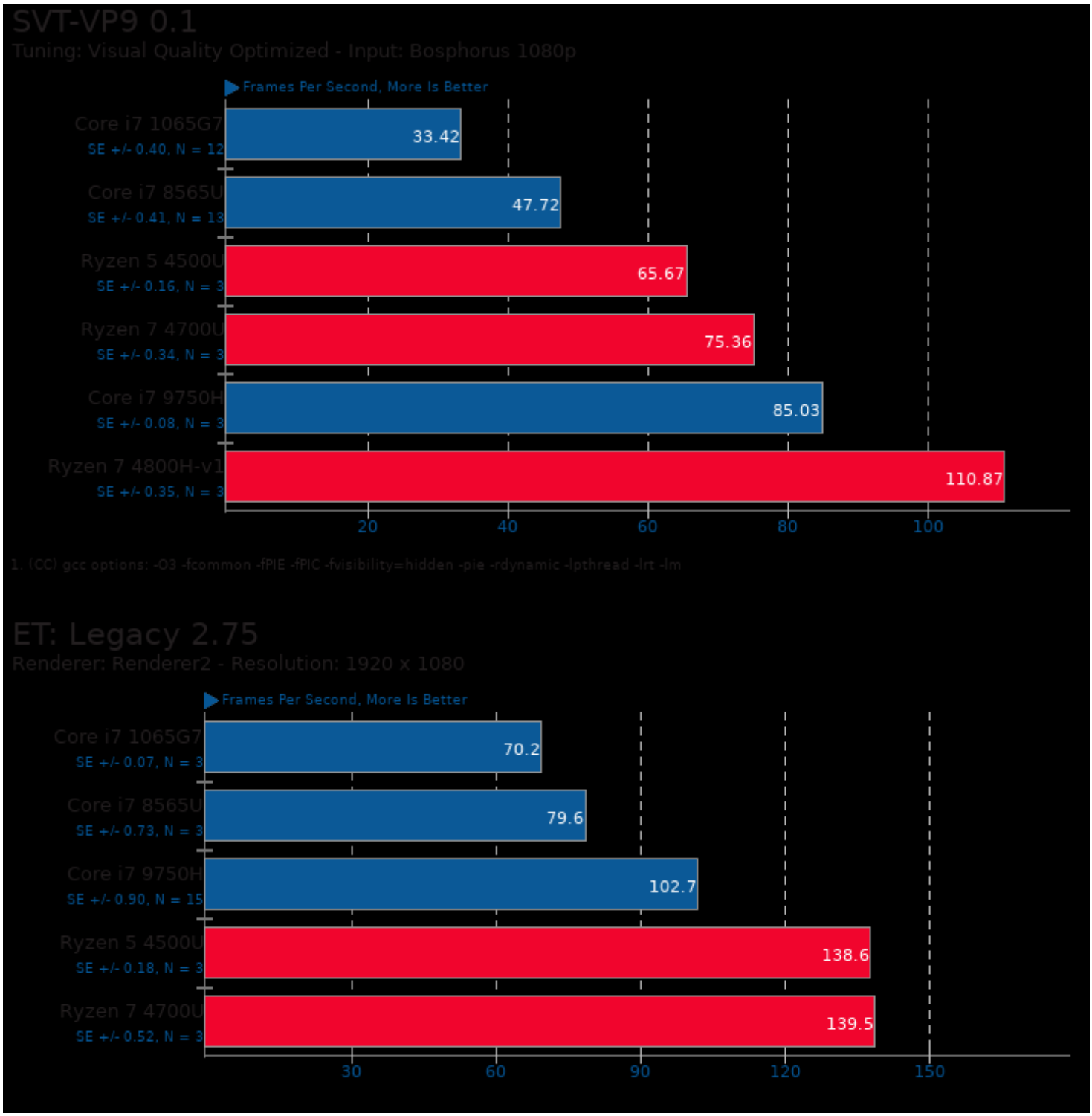

dav1d 0.6.0
Video Input: Chimera 1080p 10-bit
FPS, More Is Better
Core i7 1065G7
SE +/- 0.08, N = 3
MIN: 22.99 / MAX: 84.04
33.22
Core i7 8565U
SE +/- 0.52, N = 3
MIN: 32.1 / MAX: 144.82
48.61
Ryzen 7 4800H-v1
SE +/- 0.40, N = 3
MIN: 74.64 / MAX: 76.06
75.32
Ryzen 5 4500U
SE +/- 0.07, N = 3
MIN: 52.94 / MAX: 156.82
75.87
Ryzen 7 4700U
SE +/- 0.10, N = 3
MIN: 54.43 / MAX: 167.78
78.10
Core i7 9750H
SE +/- 0.81, N = 3
MIN: 54.23 / MAX: 200.22
83.09
20
40
60
80
100
1. (CC) gcc options: -pthread
TTSIOD 3D Renderer 2.3b
Phong Rendering With Soft-Shadow Mapping
FPS, More Is Better
Core i7 1065G7
SE +/- 0.34, N = 3
103.27
Core i7 8565U
SE +/- 0.80, N = 3
152.18
Ryzen 5 4500U
SE +/- 1.78, N = 3
249.63
Ryzen 7 4700U
SE +/- 0.77, N = 3
298.38
Core i7 9750H
SE +/- 0.80, N = 3
300.31
70
140
210
280
350
1. (CXX) g++ options: -O3 -fomit-frame-pointer -ffast-math -mtune=native -flto -msse -mrecip -mfpmath=sse -msse2 -mssse3 -lSDL -fopenmp -fwhole-pr

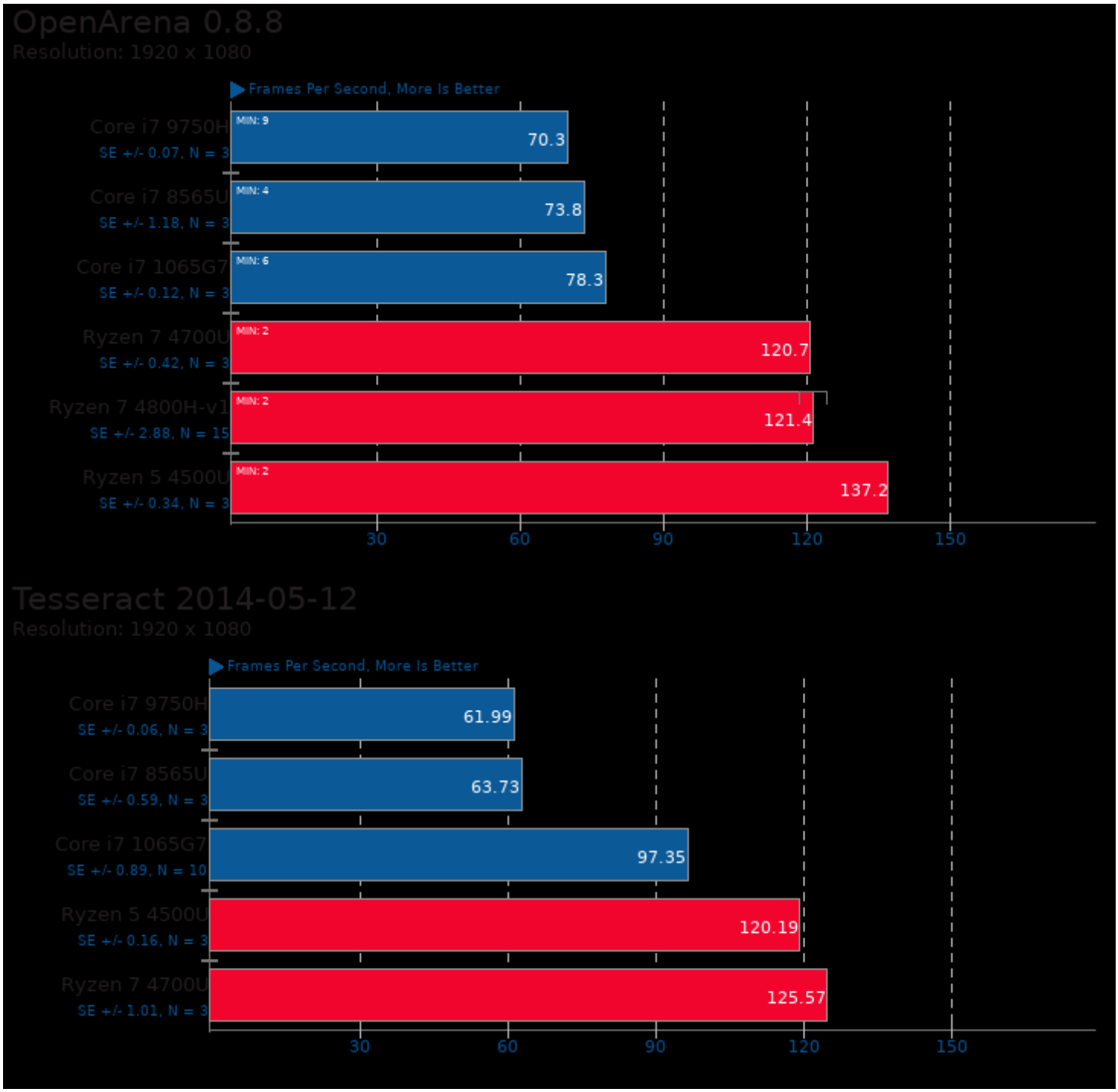

Embree 3.9.0
Binary: Pathtracer - Model: Crown
Frames Per Second, More Is Better
Core i7 1065G7
SE +/- 0.0025, N = 3
MIN: 1.58 / MAX: 1.7
1.6033
Core i7 8565U
SE +/- 0.0097, N = 3
MIN: 2.85 / MAX: 4.65
2.9114
Ryzen 5 4500U
SE +/- 0.0264, N = 3
MIN: 3.82 / MAX: 4.37
3.8882
Ryzen 7 4700U
SE +/- 0.0114, N = 3
MIN: 4.77 / MAX: 4.99
4.8146
Core i7 9750H
SE +/- 0.0353, N = 3
MIN: 5.75 / MAX: 7.38
5.8454
Ryzen 7 4800H-v1
SE +/- 0.0644, N = 3
MIN: 7.77 / MAX: 8.73
8.1003
2
4
6
8
10
Embree 3.9.0
Binary: Pathtracer ISPC - Model: Crown
Frames Per Second, More Is Better
Core i7 1065G7
SE +/- 0.0010, N = 3
MIN: 1.77 / MAX: 1.96
1.7872
Core i7 8565U
SE +/- 0.0112, N = 3
MIN: 3.3 / MAX: 5.35
3.3784
Ryzen 5 4500U
SE +/- 0.0132, N = 3
MIN: 3.66 / MAX: 4.07
3.7057
Ryzen 7 4700U
SE +/- 0.0037, N = 3
MIN: 4.62 / MAX: 4.81
4.6517
Core i7 9750H
SE +/- 0.0156, N = 3
MIN: 6.63 / MAX: 7.94
6.7157
Ryzen 7 4800H-v1
SE +/- 0.0171, N = 3
MIN: 8.03 / MAX: 8.54
8.2424
2
4
6
8
10

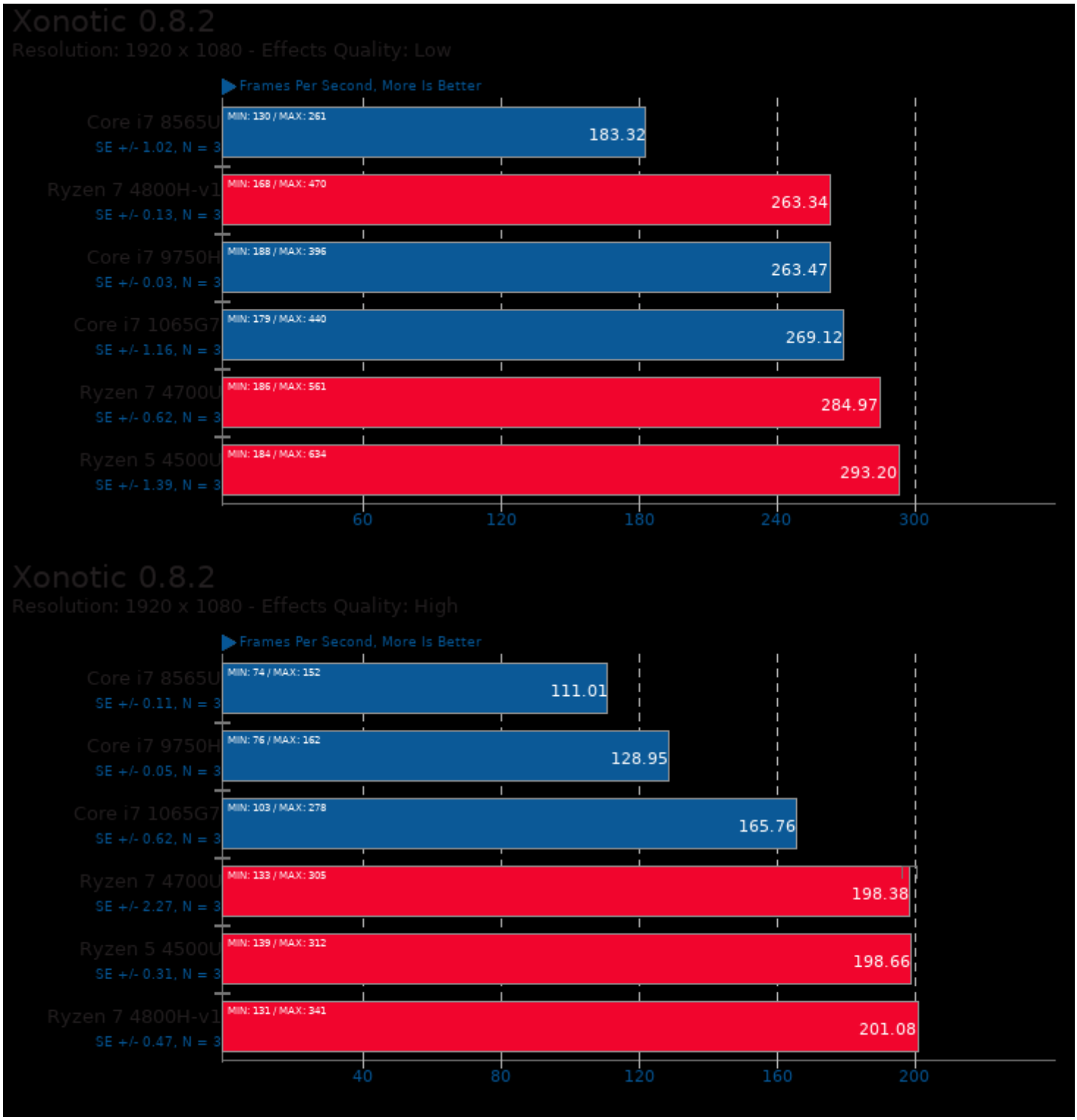

Embree 3.9.0
Binary: Pathtracer - Model: Asian Dragon
Frames Per Second, More Is Better
Core i7 1065G7
SE +/- 0.0031, N = 3
MIN: 1.93 / MAX: 2.04
1.9709
Core i7 8565U
SE +/- 0.0076, N = 3
MIN: 3.53 / MAX: 5.54
3.6461
Ryzen 5 4500U
SE +/- 0.0069, N = 3
MIN: 4.5 / MAX: 4.87
4.5314
Ryzen 7 4700U
SE +/- 0.0285, N = 3
MIN: 5.6 / MAX: 5.77
5.6838
Core i7 9750H
SE +/- 0.0156, N = 3
MIN: 7.04 / MAX: 8.15
7.0998
Ryzen 7 4800H-v1
SE +/- 0.0101, N = 3
MIN: 9.6 / MAX: 10.05
9.8163
3
6
9
12
15
Embree 3.9.0
Binary: Pathtracer - Model: Asian Dragon Obj
Frames Per Second, More Is Better
Core i7 1065G7
SE +/- 0.0049, N = 3
MIN: 1.78 / MAX: 1.84
1.7984
Core i7 8565U
SE +/- 0.0033, N = 3
MIN: 3.3 / MAX: 5.1
3.3479
Ryzen 5 4500U
SE +/- 0.0158, N = 3
MIN: 4.13 / MAX: 4.45
4.1839
Ryzen 7 4700U
SE +/- 0.0036, N = 3
MIN: 5.17 / MAX: 5.27
5.2000
Core i7 9750H
SE +/- 0.0928, N = 3
MIN: 6.31 / MAX: 7.82
6.5820
Ryzen 7 4800H-v1
SE +/- 0.0379, N = 3
MIN: 8.36 / MAX: 9.09
8.7161
2
4
6
8
10


Embree 3.9.0
Binary: Pathtracer ISPC - Model: Asian Dragon
Frames Per Second, More Is Better
Core i7 1065G7
SE +/- 0.0031, N = 3
MIN: 2.17 / MAX: 2.33
2.2369
Core i7 8565U
SE +/- 0.0109, N = 3
MIN: 4.31 / MAX: 6.54
4.4557
Ryzen 5 4500U
SE +/- 0.0043, N = 3
MIN: 4.5 / MAX: 4.89
4.5322
Ryzen 7 4700U
SE +/- 0.0167, N = 3
MIN: 5.67 / MAX: 5.82
5.7313
Core i7 9750H
SE +/- 0.0494, N = 3
MIN: 8.44 / MAX: 9.79
8.5577
Ryzen 7 4800H-v1
SE +/- 0.1498, N = 3
MIN: 8.54 / MAX: 10.31
9.9126
3
6
9
12
15
Embree 3.9.0
Binary: Pathtracer ISPC - Model: Asian Dragon Obj
Frames Per Second, More Is Better
Core i7 1065G7
SE +/- 0.1218, N = 9
MIN: 2 / MAX: 2.88
2.6588
Core i7 8565U
SE +/- 0.0155, N = 3
MIN: 3.85 / MAX: 5.88
3.9328
Ryzen 5 4500U
SE +/- 0.0087, N = 3
MIN: 4.01 / MAX: 4.35
4.0785
Ryzen 7 4700U
SE +/- 0.0022, N = 3
MIN: 5.08 / MAX: 5.17
5.1089
Core i7 9750H
SE +/- 0.0429, N = 3
MIN: 7.61 / MAX: 9.16
7.7235
Ryzen 7 4800H-v1
SE +/- 0.0116, N = 3
MIN: 8.54 / MAX: 9.07
8.7514
2
4
6
8
10


SVT-VP9 0.1
Tuning: VMAF Optimized - Input: Bosphorus 1080p
Frames Per Second, More Is Better
Core i7 1065G7
SE +/- 0.44, N = 12
45.02
Core i7 8565U
SE +/- 0.47, N = 13
63.51
Ryzen 5 4500U
SE +/- 0.94, N = 3
80.55
Ryzen 7 4700U
SE +/- 0.63, N = 3
87.61
Core i7 9750H
SE +/- 0.19, N = 3
109.70
Ryzen 7 4800H-v1
SE +/- 1.33, N = 3
131.11
30
60
90
120
150
1. (CC) gcc options: -O3 -fcommon -fPIE -fPIC -fvisibility=hidden -pie -rdynamic -lpthread -lrt -lm
SVT-VP9 0.1
Tuning: PSNR/SSIM Optimized - Input: Bosphorus 1080p
Frames Per Second, More Is Better
Core i7 1065G7
SE +/- 0.69, N = 13
45.27
Core i7 8565U
SE +/- 0.75, N = 13
63.81
Ryzen 5 4500U
SE +/- 0.05, N = 3
83.03
Ryzen 7 4700U
SE +/- 0.15, N = 3
90.76
Core i7 9750H
SE +/- 0.16, N = 3
111.20
Ryzen 7 4800H-v1
SE +/- 0.29, N = 3
136.79
30
60
90
120
150
1. (CC) gcc options: -O3 -fcommon -fPIE -fPIC -fvisibility=hidden -pie -rdynamic -lpthread -lrt -lm

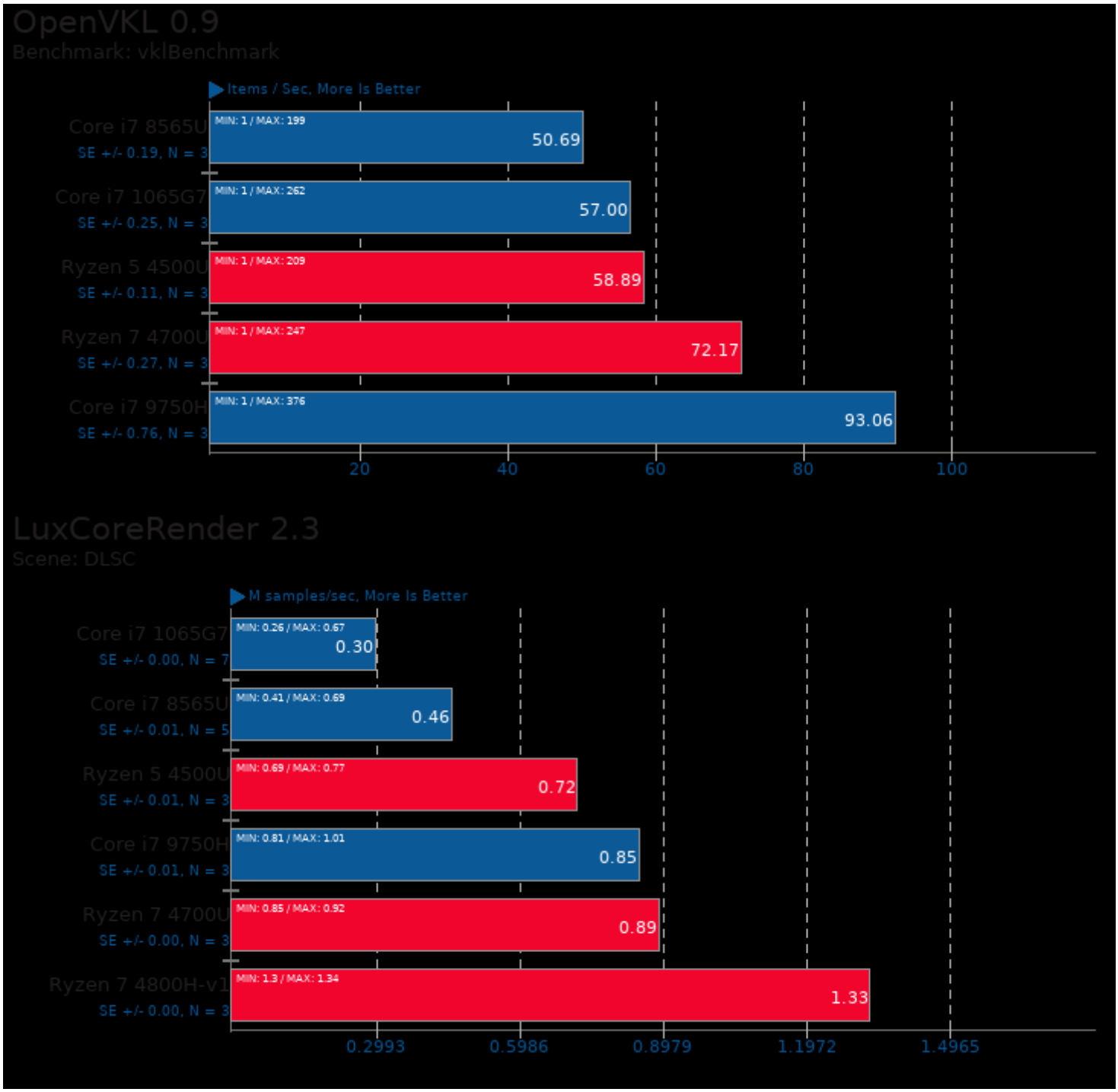

SVT-VP9 0.1
Tuning: Visual Quality Optimized - Input: Bosphorus 1080p
Frames Per Second, More Is Better
Core i7 1065G7
SE +/- 0.40, N = 12
33.42
Core i7 8565U
SE +/- 0.41, N = 13
47.72
Ryzen 5 4500U
SE +/- 0.16, N = 3
65.67
Ryzen 7 4700U
SE +/- 0.34, N = 3
75.36
Core i7 9750H
SE +/- 0.08, N = 3
85.03
Ryzen 7 4800H-v1
SE +/- 0.35, N = 3
110.87
20
40
60
80
100
1. (CC) gcc options: -O3 -fcommon -fPIE -fPIC -fvisibility=hidden -pie -rdynamic -lpthread -lrt -lm
ET: Legacy 2.75
Renderer: Renderer2 - Resolution: 1920 x 1080
Frames Per Second, More Is Better
Core i7 1065G7
SE +/- 0.07, N = 3
70.2
Core i7 8565U
SE +/- 0.73, N = 3
79.6
Core i7 9750H
SE +/- 0.90, N = 15
102.7
Ryzen 5 4500U
SE +/- 0.18, N = 3
138.6
Ryzen 7 4700U
SE +/- 0.52, N = 3
139.5
30
60
90
120
150

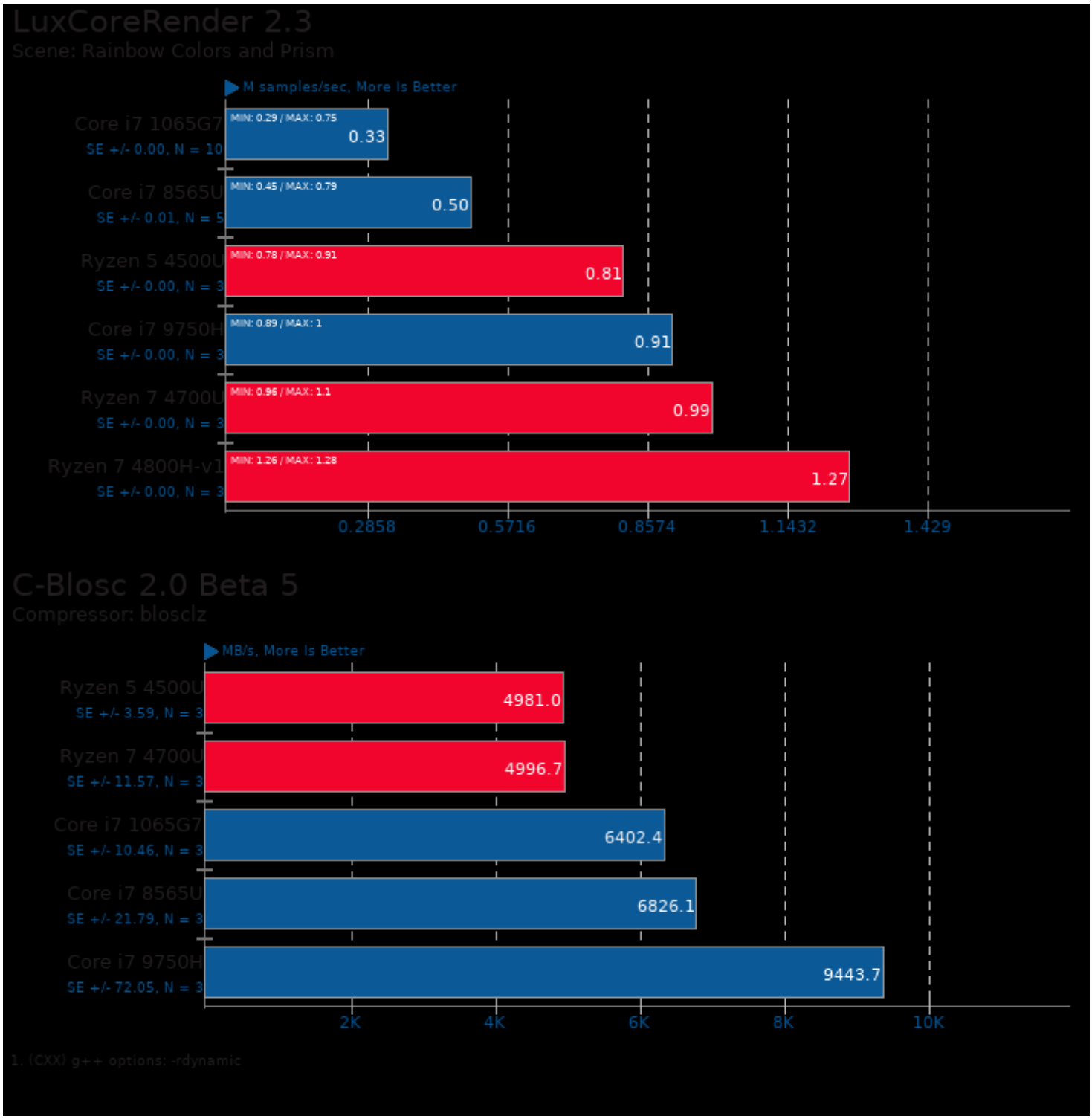

OpenArena 0.8.8
Resolution: 1920 x 1080
Frames Per Second, More Is Better
Core i7 9750H
SE +/- 0.07, N = 3
MIN: 9
70.3
Core i7 8565U
SE +/- 1.18, N = 3
MIN: 4
73.8
Core i7 1065G7
SE +/- 0.12, N = 3
MIN: 6
78.3
Ryzen 7 4700U
SE +/- 0.42, N = 3
MIN: 2
120.7
Ryzen 7 4800H-v1
SE +/- 2.88, N = 15
MIN: 2
121.4
Ryzen 5 4500U
SE +/- 0.34, N = 3
MIN: 2
137.2
30
60
90
120
150
Tesseract 2014-05-12
Resolution: 1920 x 1080
Frames Per Second, More Is Better
Core i7 9750H
SE +/- 0.06, N = 3
61.99
Core i7 8565U
SE +/- 0.59, N = 3
63.73
Core i7 1065G7
SE +/- 0.89, N = 10
97.35
Ryzen 5 4500U
SE +/- 0.16, N = 3
120.19
Ryzen 7 4700U
SE +/- 1.01, N = 3
125.57
30
60
90
120
150

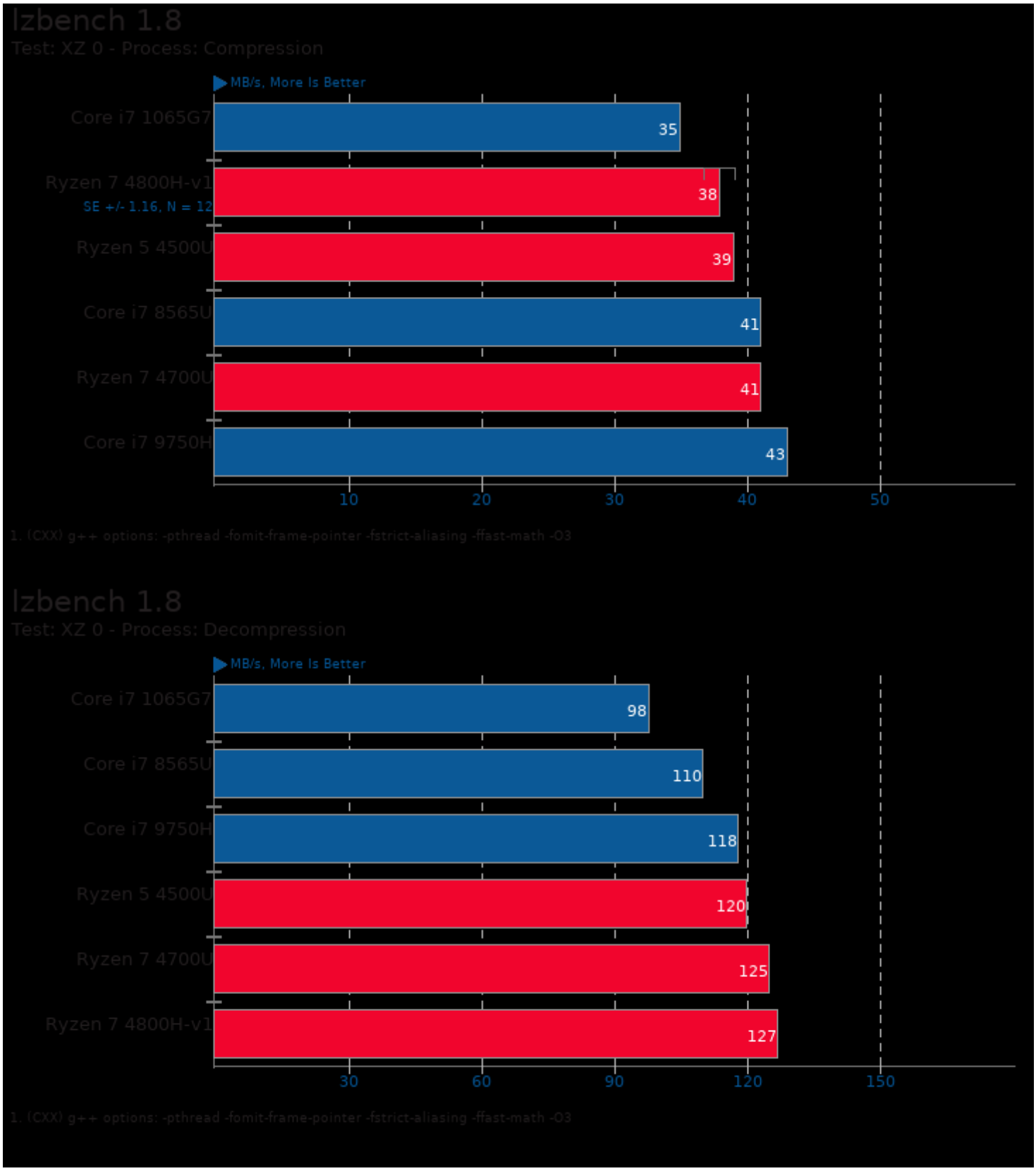

Xonotic 0.8.2
Resolution: 1920 x 1080 - Effects Quality: Low
Frames Per Second, More Is Better
Core i7 8565U
SE +/- 1.02, N = 3
MIN: 130 / MAX: 261
183.32
Ryzen 7 4800H-v1
SE +/- 0.13, N = 3
MIN: 168 / MAX: 470
263.34
Core i7 9750H
SE +/- 0.03, N = 3
MIN: 188 / MAX: 396
263.47
Core i7 1065G7
SE +/- 1.16, N = 3
MIN: 179 / MAX: 440
269.12
Ryzen 7 4700U
SE +/- 0.62, N = 3
MIN: 186 / MAX: 561
284.97
Ryzen 5 4500U
SE +/- 1.39, N = 3
MIN: 184 / MAX: 634
293.20
60
120
180
240
300
Xonotic 0.8.2
Resolution: 1920 x 1080 - Effects Quality: High
Frames Per Second, More Is Better
Core i7 8565U
SE +/- 0.11, N = 3
MIN: 74 / MAX: 152
111.01
Core i7 9750H
SE +/- 0.05, N = 3
MIN: 76 / MAX: 162
128.95
Core i7 1065G7
SE +/- 0.62, N = 3
MIN: 103 / MAX: 278
165.76
Ryzen 7 4700U
SE +/- 2.27, N = 3
MIN: 133 / MAX: 305
198.38
Ryzen 5 4500U
SE +/- 0.31, N = 3
MIN: 139 / MAX: 312
198.66
Ryzen 7 4800H-v1
SE +/- 0.47, N = 3
MIN: 131 / MAX: 341
201.08
40
80
120
160
200

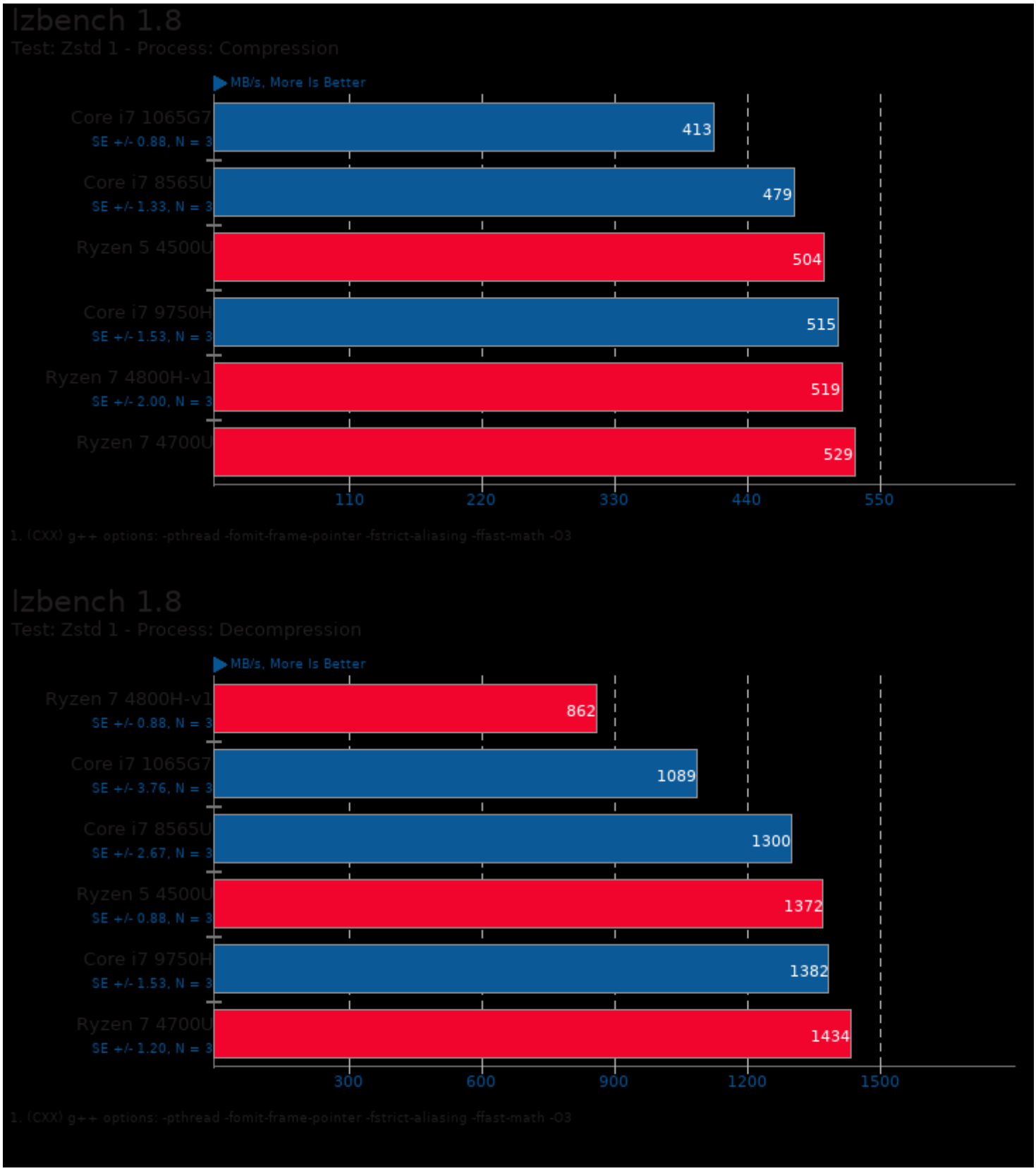

Xonotic 0.8.2
Resolution: 1920 x 1080 - Effects Quality: Ultra
Frames Per Second, More Is Better
Core i7 1065G7
SE +/- 0.43, N = 3
MIN: 47 / MAX: 240
83.54
Core i7 8565U
SE +/- 0.24, N = 3
MIN: 51 / MAX: 135
91.28
Core i7 9750H
SE +/- 0.05, N = 3
MIN: 52 / MAX: 142
99.65
Ryzen 7 4700U
SE +/- 0.40, N = 3
MIN: 104 / MAX: 258
165.43
Ryzen 5 4500U
SE +/- 0.16, N = 3
MIN: 108 / MAX: 264
171.51
Ryzen 7 4800H-v1
SE +/- 2.44, N = 12
MIN: 3 / MAX: 291
174.70
40
80
120
160
200
Xonotic 0.8.2
Resolution: 1920 x 1080 - Effects Quality: Ultimate
Frames Per Second, More Is Better
Core i7 1065G7
SE +/- 0.17, N = 3
MIN: 26 / MAX: 103
64.64
Core i7 8565U
SE +/- 0.11, N = 3
MIN: 24 / MAX: 114
69.25
Core i7 9750H
SE +/- 0.06, N = 3
MIN: 35 / MAX: 115
71.37
Ryzen 7 4700U
SE +/- 0.26, N = 3
MIN: 34 / MAX: 222
130.41
Ryzen 5 4500U
SE +/- 0.07, N = 3
MIN: 36 / MAX: 219
131.79
Ryzen 7 4800H-v1
SE +/- 0.40, N = 3
MIN: 31 / MAX: 268
146.25
30
60
90
120
150

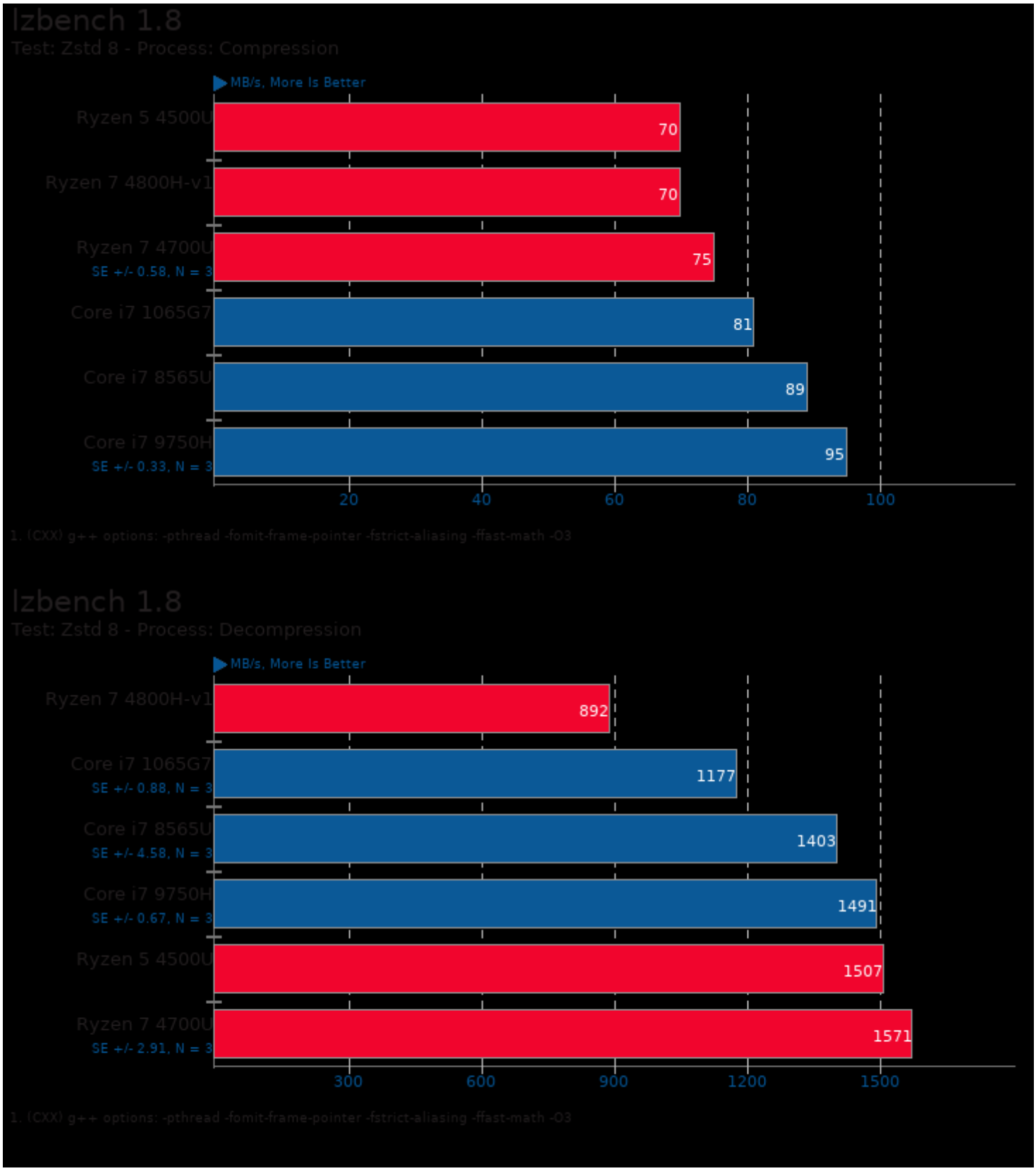

Selenium
Benchmark: Octane - Browser: Firefox
Geometric Mean, More Is Better
Core i7 1065G7
SE +/- 215.33, N = 3
26304
Ryzen 5 4500U
SE +/- 16.22, N = 3
26889
Ryzen 7 4700U
SE +/- 154.16, N = 3
27799
Core i7 8565U
SE +/- 114.85, N = 3
28979
Core i7 9750H
SE +/- 170.06, N = 3
30688
Ryzen 7 4800H-v1
SE +/- 64.88, N = 3
40488
9K
18K
27K
36K
45K
1. Core i7 1065G7: firefox 76.0.1
2. Ryzen 5 4500U: firefox 76.0.1
3. Ryzen 7 4700U: firefox 76.0
4. Core i7 8565U: firefox 76.0.1
5. Core i7 9750H: firefox 76.0.1
6. Ryzen 7 4800H-v1: firefox 77.0.1
Intel Open Image Denoise 1.2.0
Scene: Memorial
Images / Sec, More Is Better
Core i7 8565U
SE +/- 0.01, N = 3
2.33
Core i7 1065G7
SE +/- 0.04, N = 3
3.48
Ryzen 5 4500U
SE +/- 0.01, N = 3
4.43
Core i7 9750H
SE +/- 0.02, N = 3
4.62
Ryzen 7 4700U
SE +/- 0.05, N = 3
5.23
Ryzen 7 4800H-v1
SE +/- 0.07, N = 3
6.93
2
4
6
8
10

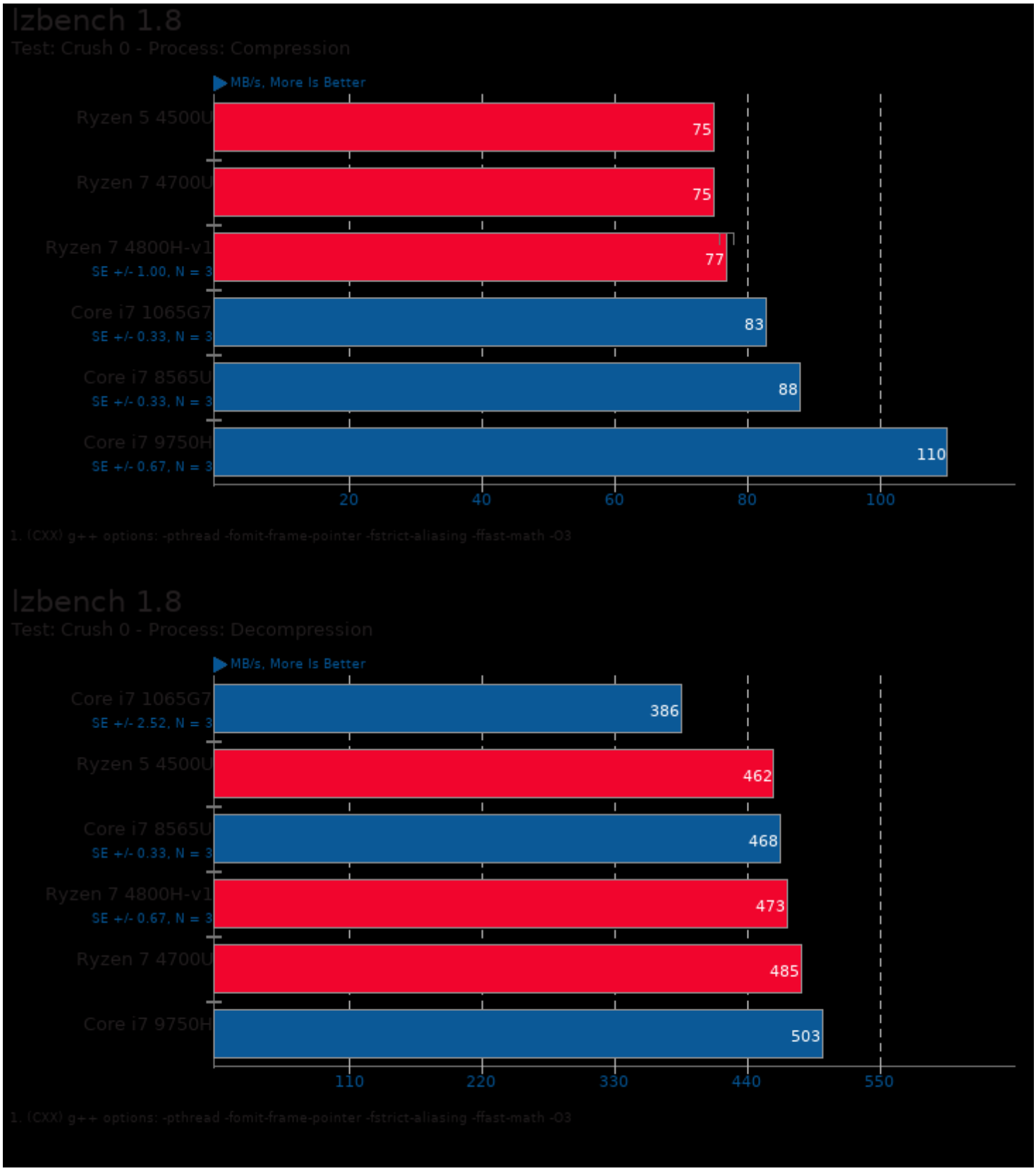

OpenVKL 0.9
Benchmark: vklBenchmark
Items / Sec, More Is Better
Core i7 8565U
SE +/- 0.19, N = 3
MIN: 1 / MAX: 199
50.69
Core i7 1065G7
SE +/- 0.25, N = 3
MIN: 1 / MAX: 262
57.00
Ryzen 5 4500U
SE +/- 0.11, N = 3
MIN: 1 / MAX: 209
58.89
Ryzen 7 4700U
SE +/- 0.27, N = 3
MIN: 1 / MAX: 247
72.17
Core i7 9750H
SE +/- 0.76, N = 3
MIN: 1 / MAX: 376
93.06
20
40
60
80
100
LuxCoreRender 2.3
Scene: DLSC
M samples/sec, More Is Better
Core i7 1065G7
SE +/- 0.00, N = 7
MIN: 0.26 / MAX: 0.67
0.30
Core i7 8565U
SE +/- 0.01, N = 5
MIN: 0.41 / MAX: 0.69
0.46
Ryzen 5 4500U
SE +/- 0.01, N = 3
MIN: 0.69 / MAX: 0.77
0.72
Core i7 9750H
SE +/- 0.01, N = 3
MIN: 0.81 / MAX: 1.01
0.85
Ryzen 7 4700U
SE +/- 0.00, N = 3
MIN: 0.85 / MAX: 0.92
0.89
Ryzen 7 4800H-v1
SE +/- 0.00, N = 3
MIN: 1.3 / MAX: 1.34
1.33
0.2993
0.5986
0.8979
1.1972
1.4965

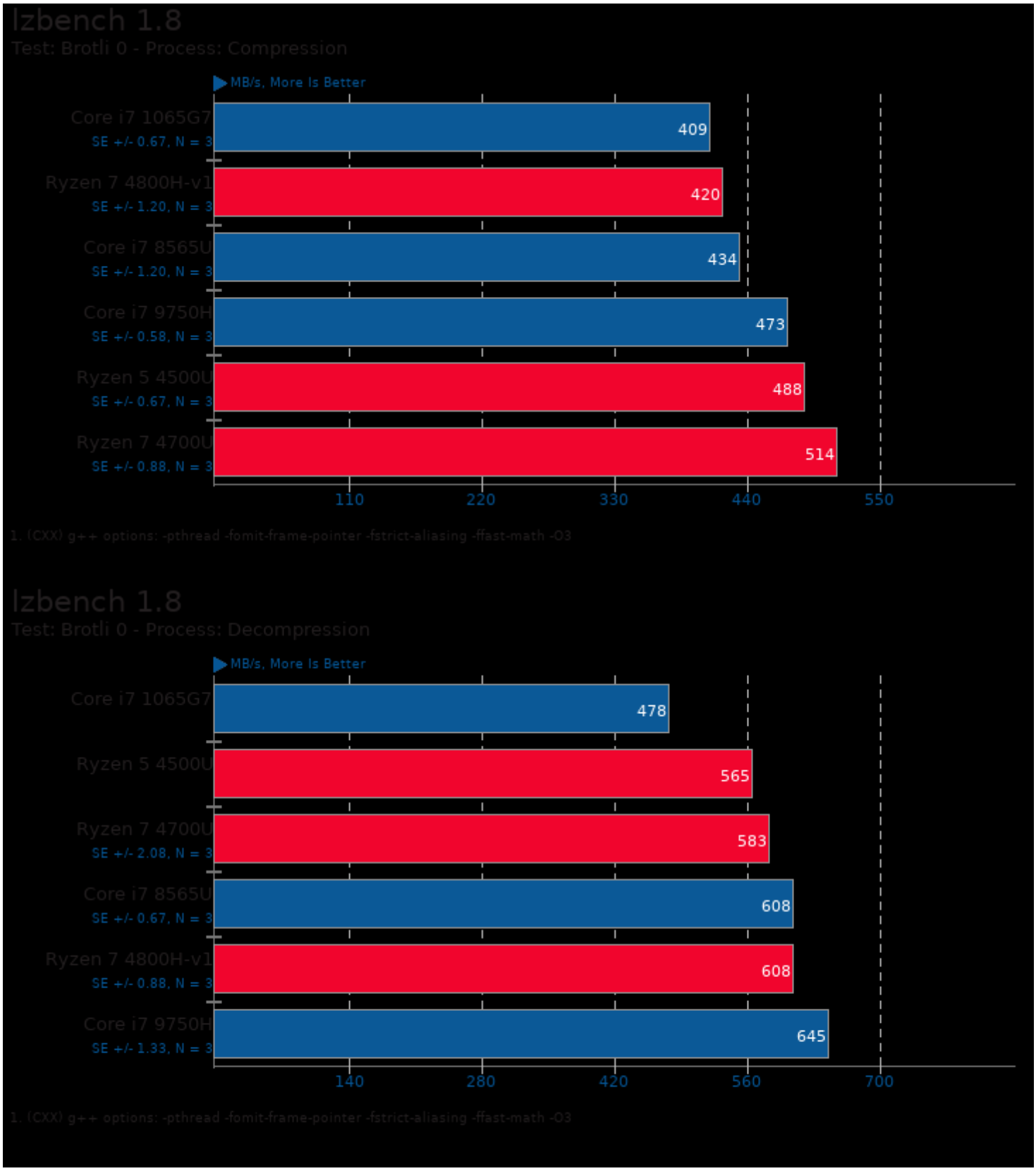

LuxCoreRender 2.3
Scene: Rainbow Colors and Prism
M samples/sec, More Is Better
Core i7 1065G7
SE +/- 0.00, N = 10
MIN: 0.29 / MAX: 0.75
0.33
Core i7 8565U
SE +/- 0.01, N = 5
MIN: 0.45 / MAX: 0.79
0.50
Ryzen 5 4500U
SE +/- 0.00, N = 3
MIN: 0.78 / MAX: 0.91
0.81
Core i7 9750H
SE +/- 0.00, N = 3
MIN: 0.89 / MAX: 1
0.91
Ryzen 7 4700U
SE +/- 0.00, N = 3
MIN: 0.96 / MAX: 1.1
0.99
Ryzen 7 4800H-v1
SE +/- 0.00, N = 3
MIN: 1.26 / MAX: 1.28
1.27
0.2858
0.5716
0.8574
1.1432
1.429
C-Blosc 2.0 Beta 5
Compressor: blosclz
MB/s, More Is Better
Ryzen 5 4500U
SE +/- 3.59, N = 3
4981.0
Ryzen 7 4700U
SE +/- 11.57, N = 3
4996.7
Core i7 1065G7
SE +/- 10.46, N = 3
6402.4
Core i7 8565U
SE +/- 21.79, N = 3
6826.1
Core i7 9750H
SE +/- 72.05, N = 3
9443.7
2K
4K
6K
8K
10K
1: (CXX) g++ options: -rdynamic

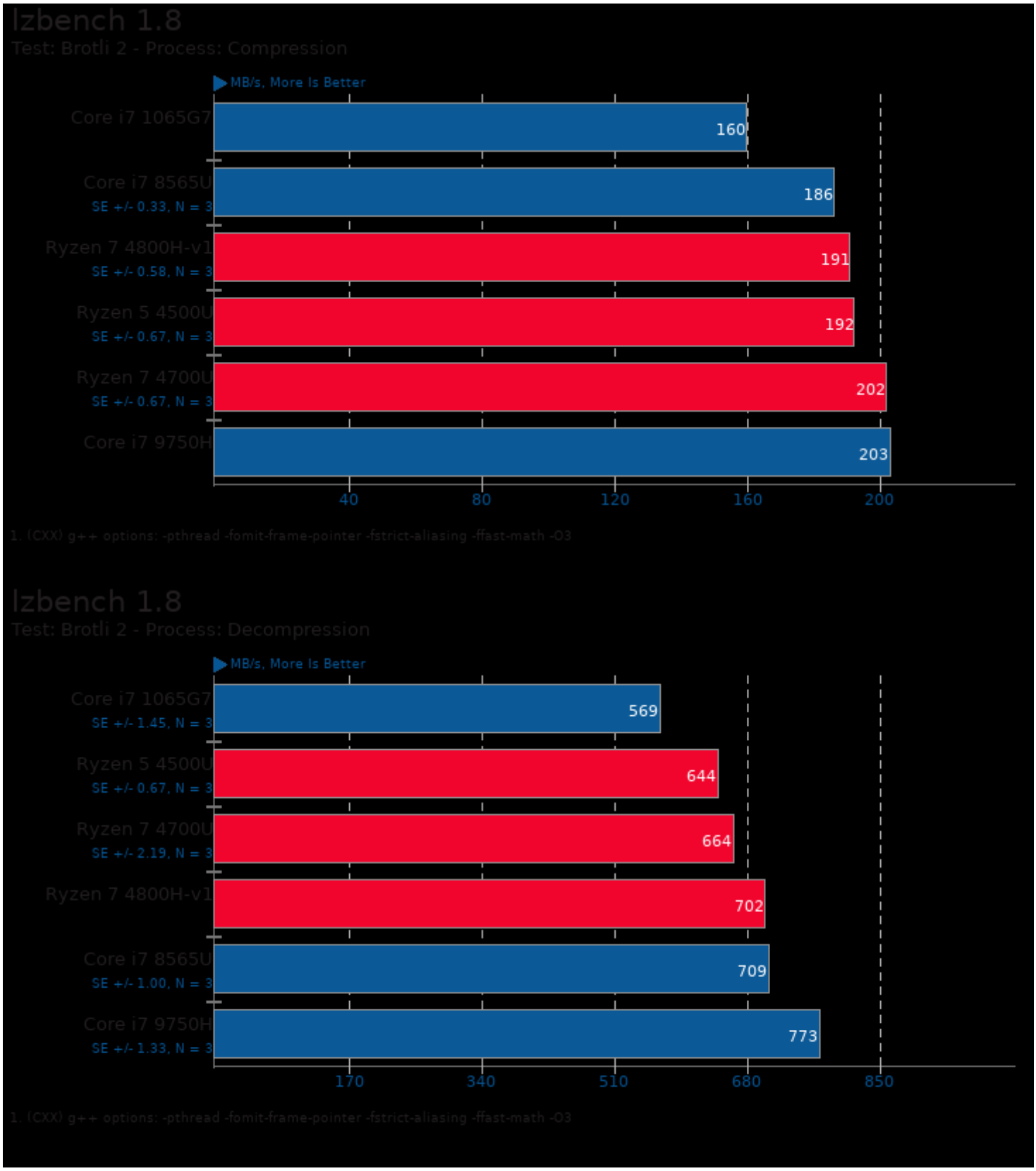

lzbench 1.8
Test: XZ 0 - Process: Compression
MB/s, More Is Better
Core i7 1065G7
35
Ryzen 7 4800H-v1
38
SE +/- 1.16, N = 12
Ryzen 5 4500U
39
Core i7 8565U
41
Ryzen 7 4700U
41
Core i7 9750H
43
10
20
30
40
50
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3
lzbench 1.8
Test: XZ 0 - Process: Decompression
MB/s, More Is Better
Core i7 1065G7
98
Core i7 8565U
110
Core i7 9750H
118
Ryzen 5 4500U
120
Ryzen 7 4700U
125
Ryzen 7 4800H-v1
127
30
60
90
120
150
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3

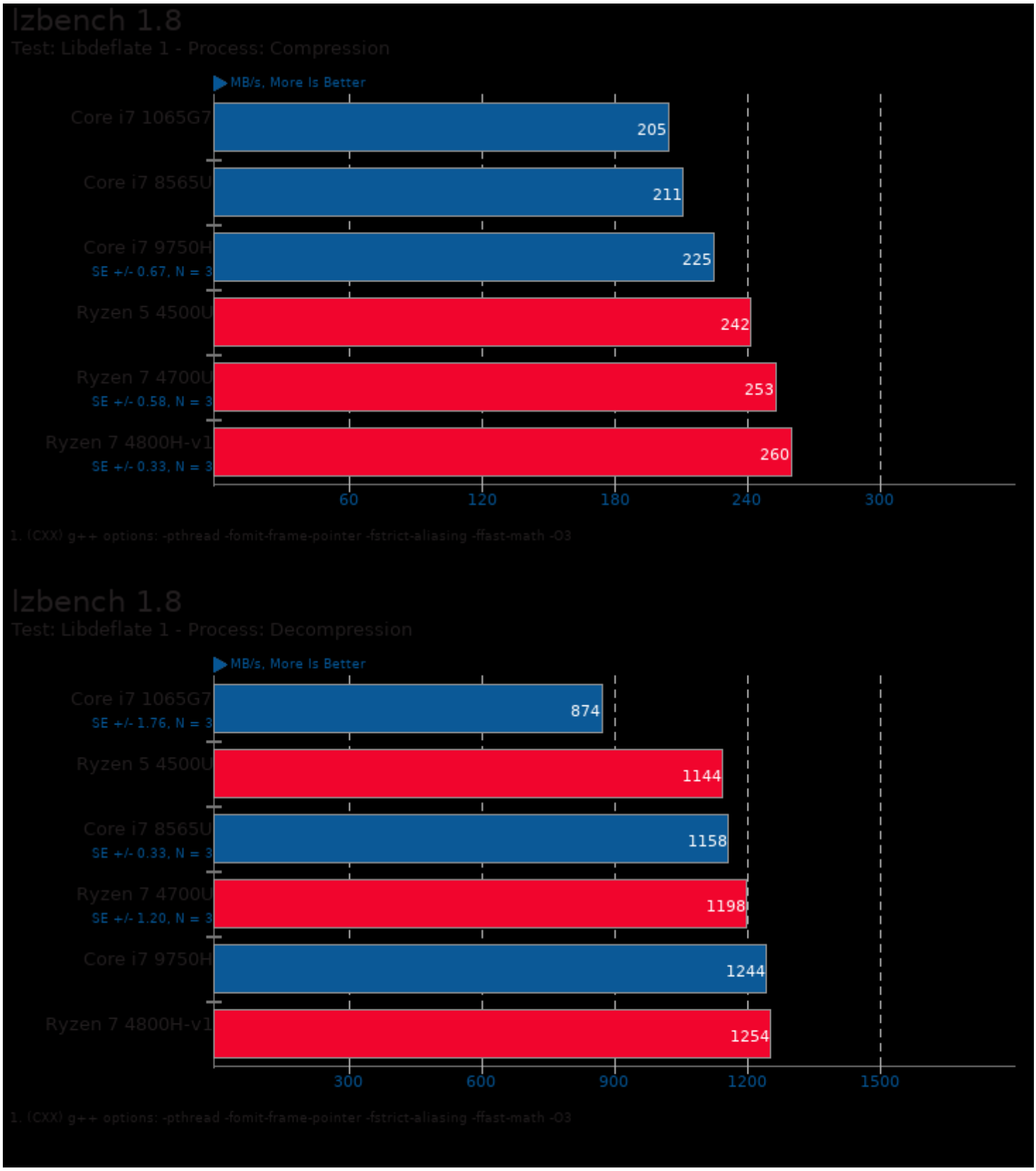

lzbench 1.8
Test: Zstd 1 - Process: Compression
MB/s, More Is Better
Core i7 1065G7
SE +/- 0.88, N = 3
413
Core i7 8565U
SE +/- 1.33, N = 3
479
Ryzen 5 4500U
504
Core i7 9750H
SE +/- 1.53, N = 3
515
Ryzen 7 4800H-v1
SE +/- 2.00, N = 3
519
Ryzen 7 4700U
529
110
220
330
440
550
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3
lzbench 1.8
Test: Zstd 1 - Process: Decompression
MB/s, More Is Better
Ryzen 7 4800H-v1
SE +/- 0.88, N = 3
862
Core i7 1065G7
SE +/- 3.76, N = 3
1089
Core i7 8565U
SE +/- 2.67, N = 3
1300
Ryzen 5 4500U
SE +/- 0.88, N = 3
1372
Core i7 9750H
SE +/- 1.53, N = 3
1382
Ryzen 7 4700U
SE +/- 1.20, N = 3
1434
300
600
900
1200
1500
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3

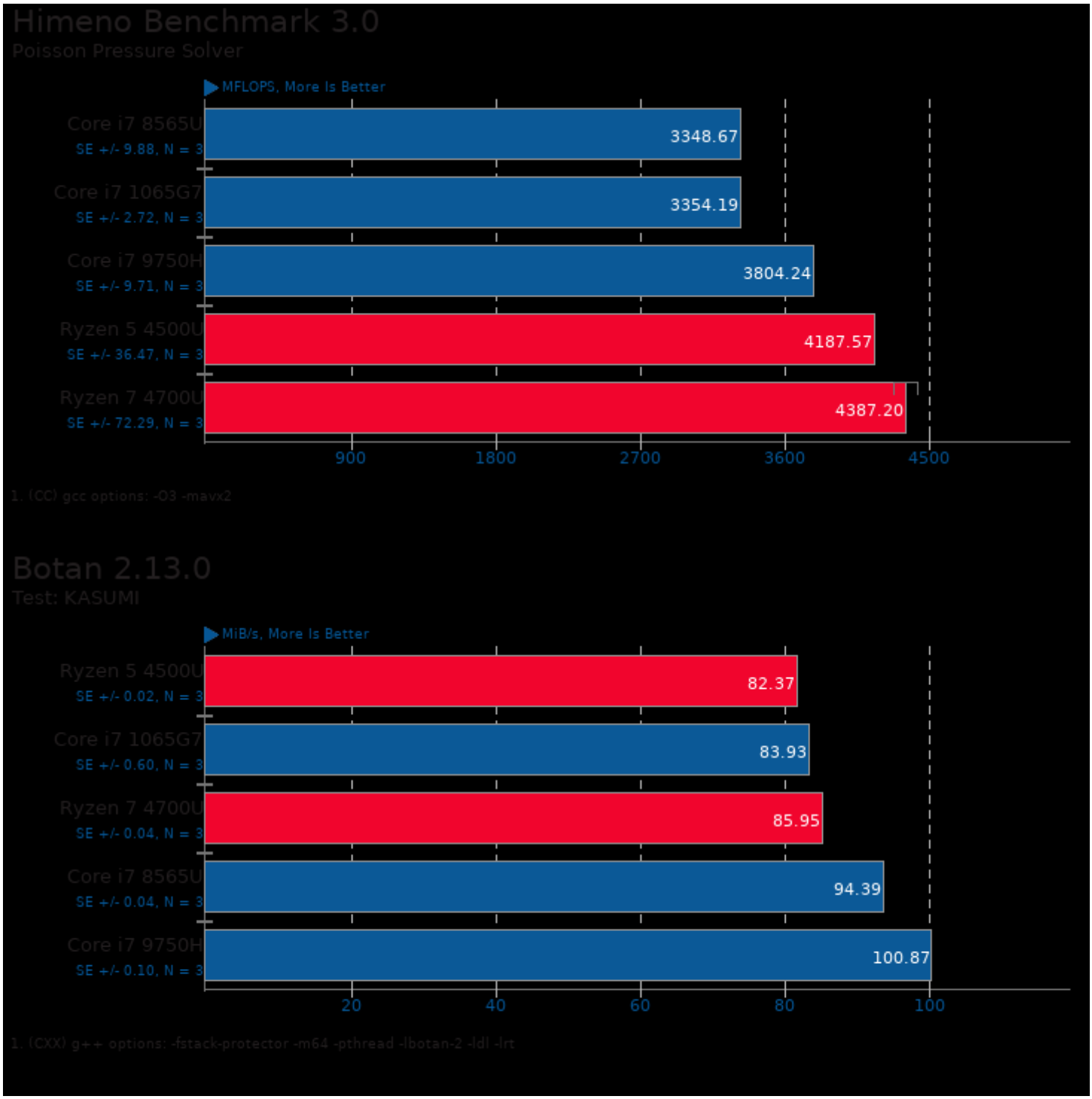

lzbench 1.8
Test: Zstd 8 - Process: Compression
MB/s, More Is Better
Ryzen 5 4500U
70
Ryzen 7 4800H-v1
70
Ryzen 7 4700U
SE +/- 0.58, N = 3
75
Core i7 1065G7
81
Core i7 8565U
89
Core i7 9750H
SE +/- 0.33, N = 3
95
20
40
60
80
100
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3
lzbench 1.8
Test: Zstd 8 - Process: Decompression
MB/s, More Is Better
Ryzen 7 4800H-v1
892
Core i7 1065G7
SE +/- 0.88, N = 3
1177
Core i7 8565U
SE +/- 4.58, N = 3
1403
Core i7 9750H
SE +/- 0.67, N = 3
1491
Ryzen 5 4500U
1507
Ryzen 7 4700U
SE +/- 2.91, N = 3
1571
300
600
900
1200
1500
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3

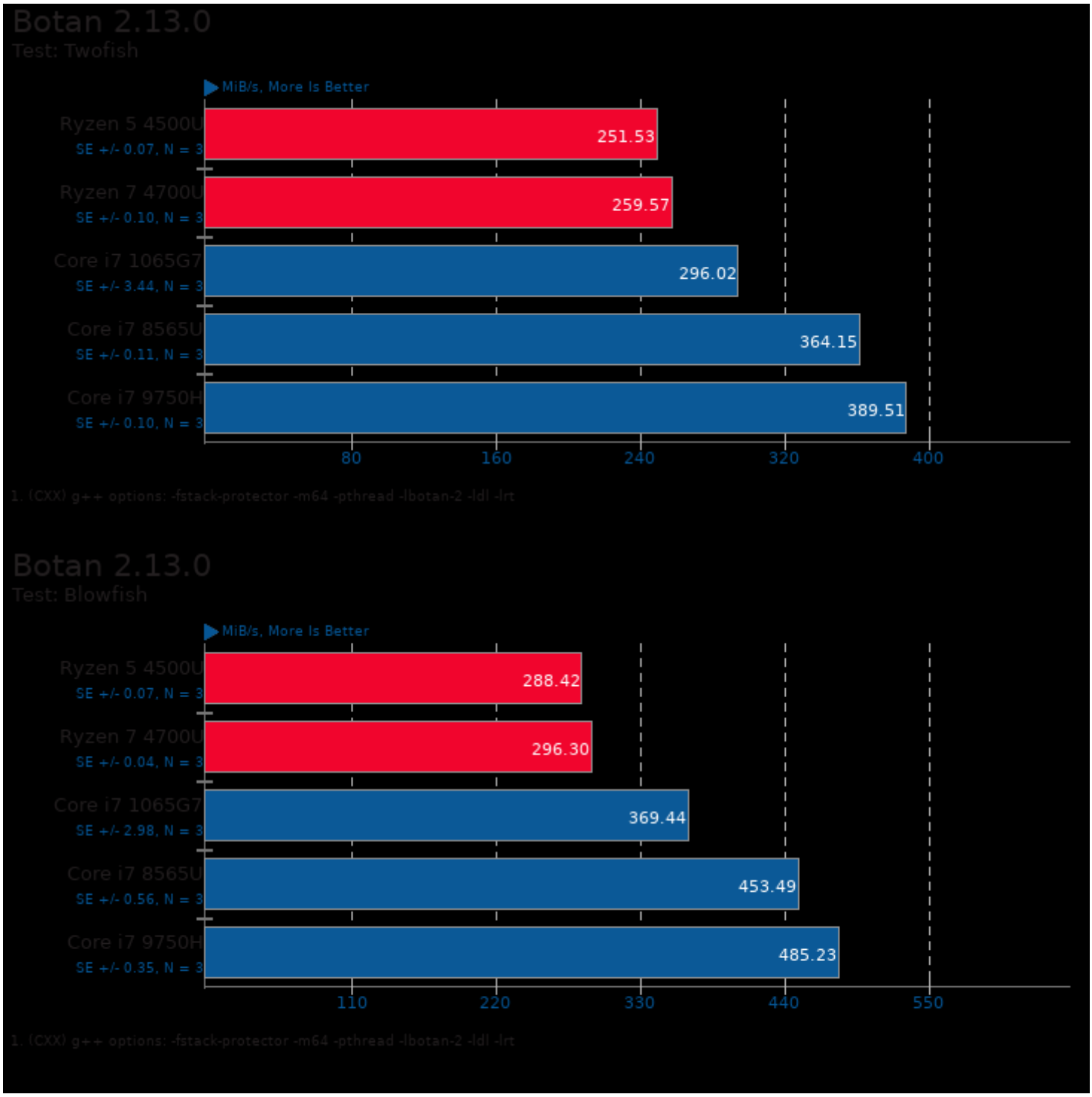

lzbench 1.8
Test: Crush 0 - Process: Compression
MB/s, More Is Better
Ryzen 5 4500U
75
Ryzen 7 4700U
75
Ryzen 7 4800H-v1
SE +/- 1.00, N = 3
77
Core i7 1065G7
SE +/- 0.33, N = 3
83
Core i7 8565U
SE +/- 0.33, N = 3
88
Core i7 9750H
SE +/- 0.67, N = 3
110
20
40
60
80
100
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3
lzbench 1.8
Test: Crush 0 - Process: Decompression
MB/s, More Is Better
Core i7 1065G7
SE +/- 2.52, N = 3
386
Ryzen 5 4500U
462
Core i7 8565U
SE +/- 0.33, N = 3
468
Ryzen 7 4800H-v1
SE +/- 0.67, N = 3
473
Ryzen 7 4700U
485
Core i7 9750H
503
110
220
330
440
550
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3

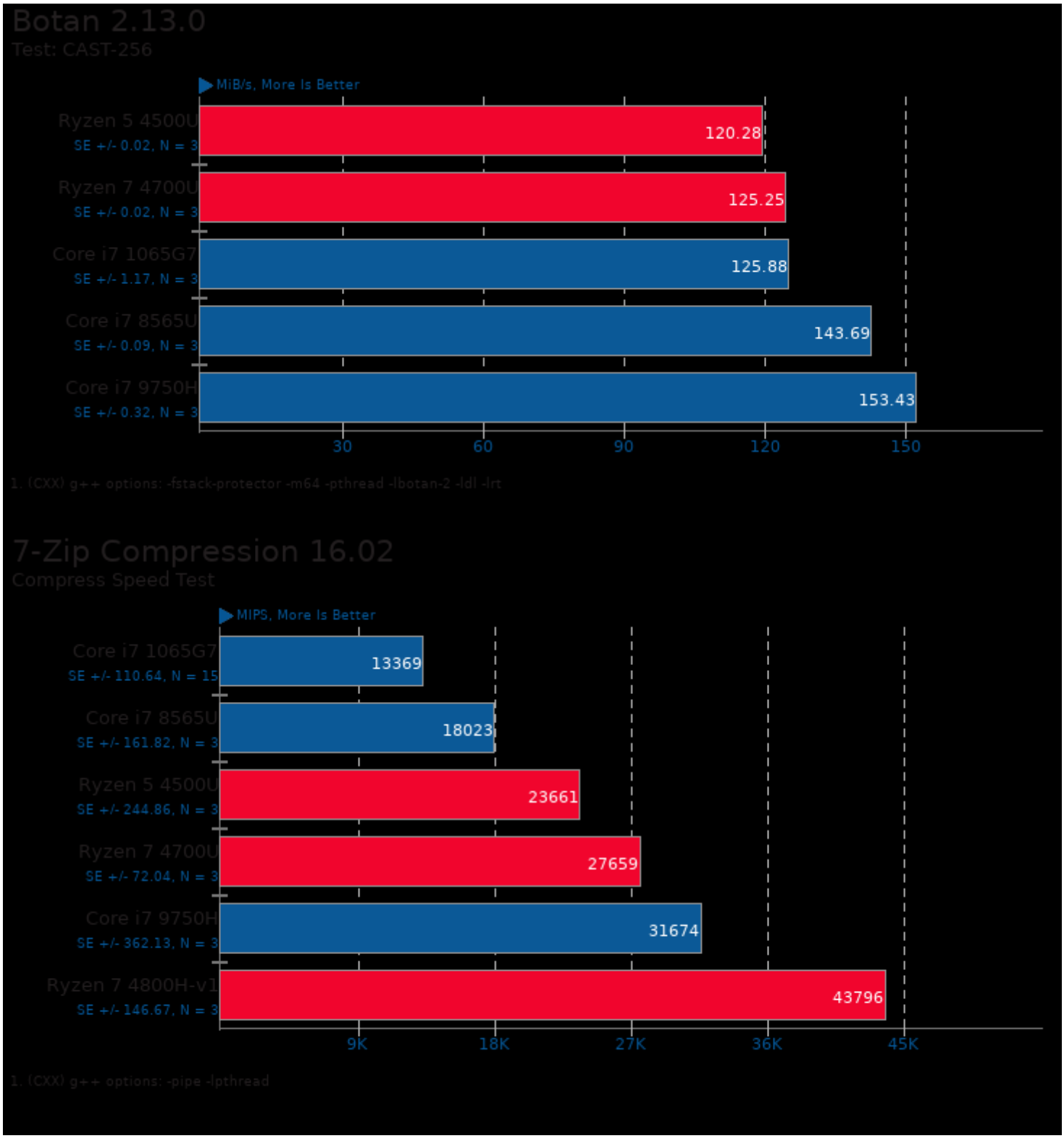

lzbench 1.8
Test: Brotli 0 - Process: Compression
MB/s, More Is Better
Core i7 1065G7
SE +/- 0.67, N = 3
409
Ryzen 7 4800H-v1
SE +/- 1.20, N = 3
420
Core i7 8565U
SE +/- 1.20, N = 3
434
Core i7 9750H
SE +/- 0.58, N = 3
473
Ryzen 5 4500U
SE +/- 0.67, N = 3
488
Ryzen 7 4700U
SE +/- 0.88, N = 3
514
110
220
330
440
550
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3
lzbench 1.8
Test: Brotli 0 - Process: Decompression
MB/s, More Is Better
Core i7 1065G7
478
Ryzen 5 4500U
565
Ryzen 7 4700U
SE +/- 2.08, N = 3
583
Core i7 8565U
SE +/- 0.67, N = 3
608
Ryzen 7 4800H-v1
SE +/- 0.88, N = 3
608
Core i7 9750H
SE +/- 1.33, N = 3
645
140
280
420
560
700
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3

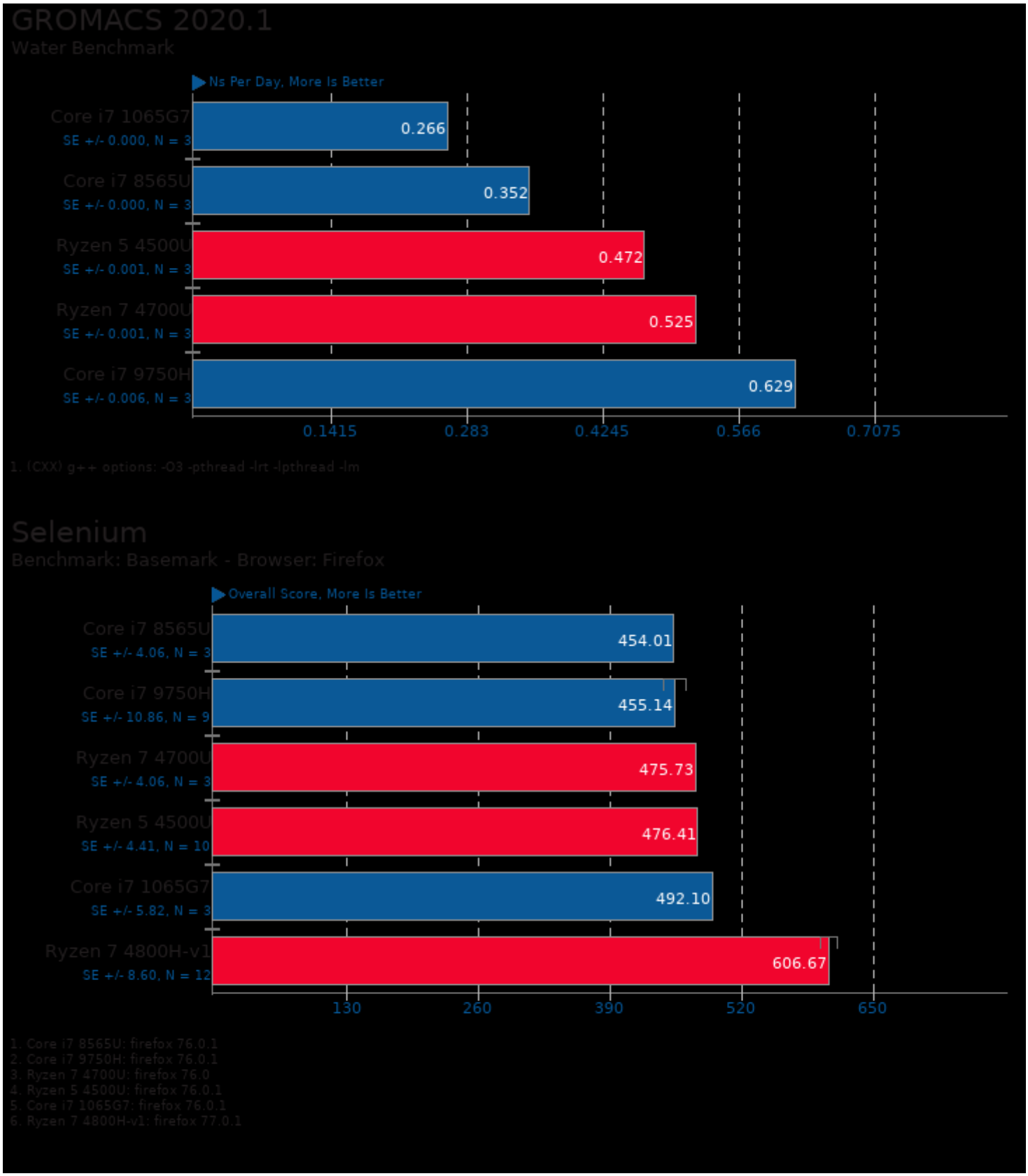

lzbench 1.8
Test: Brotli 2 - Process: Compression
MB/s, More Is Better
Core i7 1065G7
160
Core i7 8565U
SE +/- 0.33, N = 3
186
Ryzen 7 4800H-v1
SE +/- 0.58, N = 3
191
Ryzen 5 4500U
SE +/- 0.67, N = 3
192
Ryzen 7 4700U
SE +/- 0.67, N = 3
202
Core i7 9750H
203
40
80
120
160
200
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3
lzbench 1.8
Test: Brotli 2 - Process: Decompression
MB/s, More Is Better
Core i7 1065G7
SE +/- 1.45, N = 3
569
Ryzen 5 4500U
SE +/- 0.67, N = 3
644
Ryzen 7 4700U
SE +/- 2.19, N = 3
664
Ryzen 7 4800H-v1
702
Core i7 8565U
SE +/- 1.00, N = 3
709
Core i7 9750H
SE +/- 1.33, N = 3
773
170
340
510
680
850
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3

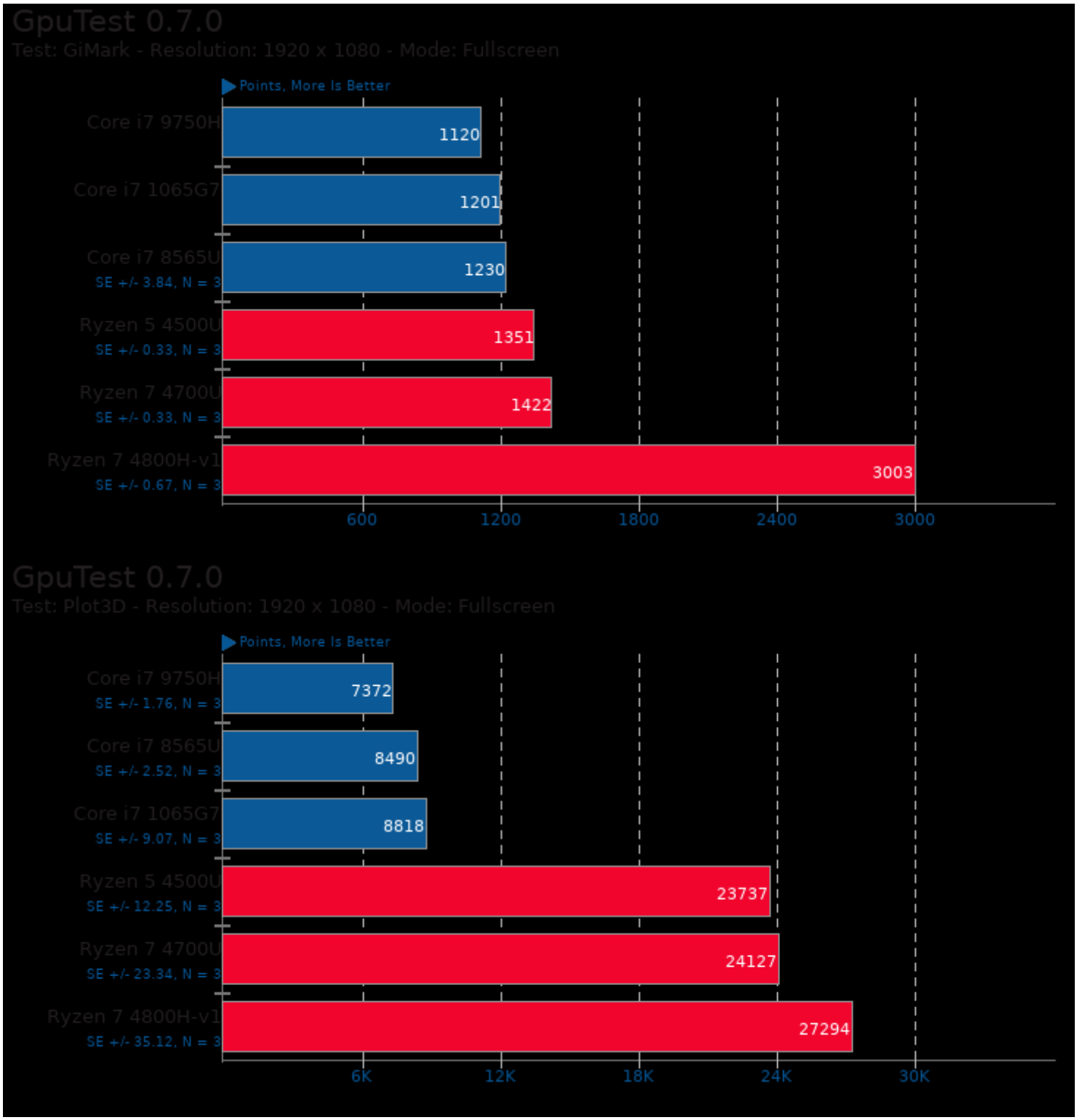

lzbench 1.8
Test: Libdeflate 1 - Process: Compression
MB/s, More Is Better
Core i7 1065G7
205
Core i7 8565U
211
Core i7 9750H
SE +/- 0.67, N = 3
225
Ryzen 5 4500U
242
Ryzen 7 4700U
SE +/- 0.58, N = 3
253
Ryzen 7 4800H-v1
SE +/- 0.33, N = 3
260
60
120
180
240
300
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3
lzbench 1.8
Test: Libdeflate 1 - Process: Decompression
MB/s, More Is Better
Core i7 1065G7
SE +/- 1.76, N = 3
874
Ryzen 5 4500U
1144
Core i7 8565U
SE +/- 0.33, N = 3
1158
Ryzen 7 4700U
SE +/- 1.20, N = 3
1198
Core i7 9750H
1244
Ryzen 7 4800H-v1
1254
300
600
900
1200
1500
1. (CXX) g++ options: -pthread -fomit-frame-pointer -fstrict-aliasing -ffast-math -O3

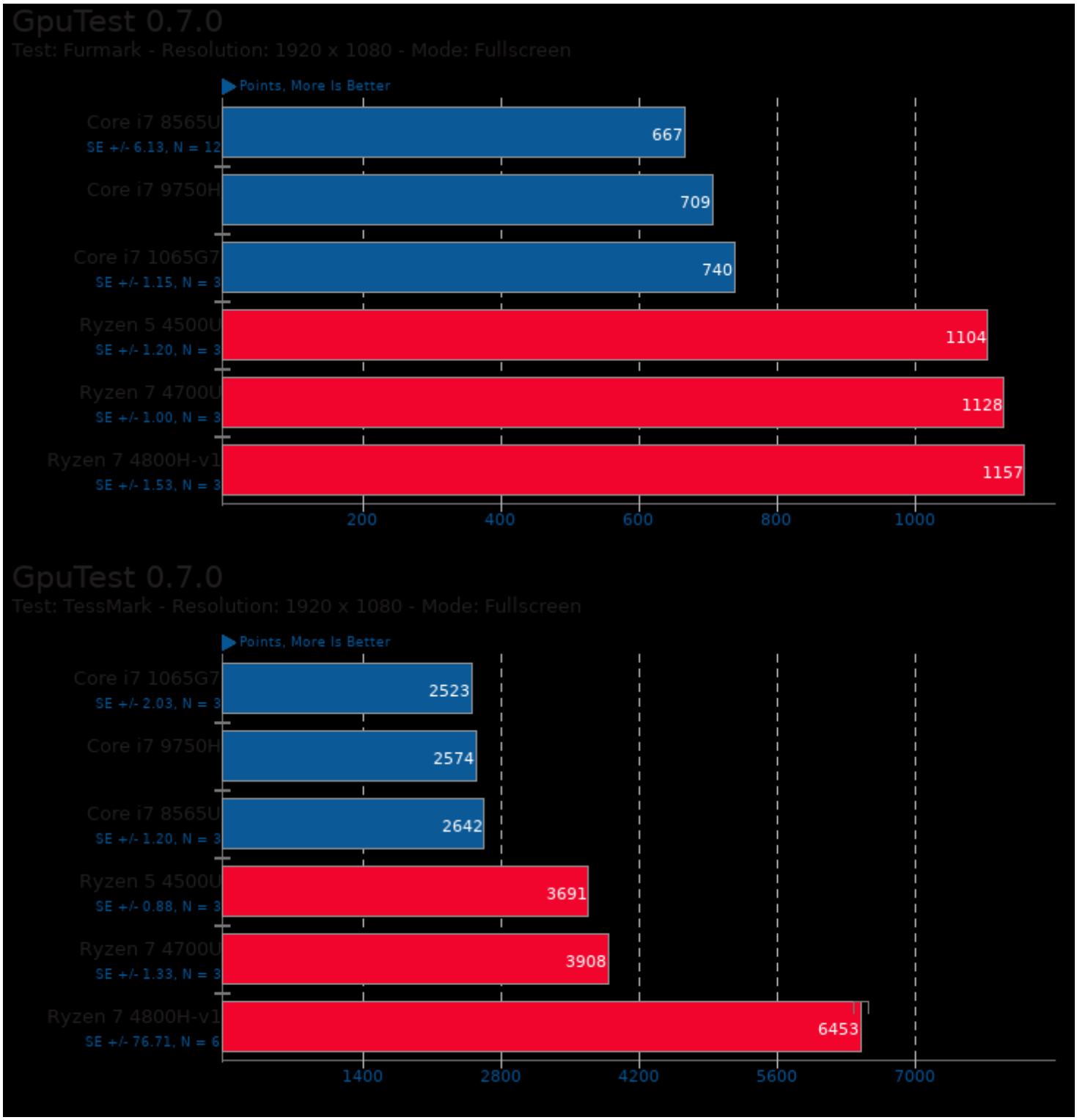

Himeno Benchmark 3.0
Poisson Pressure Solver
MFLOPS, More Is Better
Core i7 8565U
SE +/- 9.88, N = 3
3348.67
Core i7 1065G7
SE +/- 2.72, N = 3
3354.19
Core i7 9750H
SE +/- 9.71, N = 3
3804.24
Ryzen 5 4500U
SE +/- 36.47, N = 3
4187.57
Ryzen 7 4700U
SE +/- 72.29, N = 3
4387.20
900
1800
2700
3600
4500
1. (CC) gcc options: -O3 -mavx2
Botan 2.13.0
Test: KASUMI
MiB/s, More Is Better
Ryzen 5 4500U
SE +/- 0.02, N = 3
82.37
Core i7 1065G7
SE +/- 0.60, N = 3
83.93
Ryzen 7 4700U
SE +/- 0.04, N = 3
85.95
Core i7 8565U
SE +/- 0.04, N = 3
94.39
Core i7 9750H
SE +/- 0.10, N = 3
100.87
20
40
60
80
100
1. (CXX) g++ options: -fstack-protector -m64 -pthread -lbotan-2 -ldl -lrt

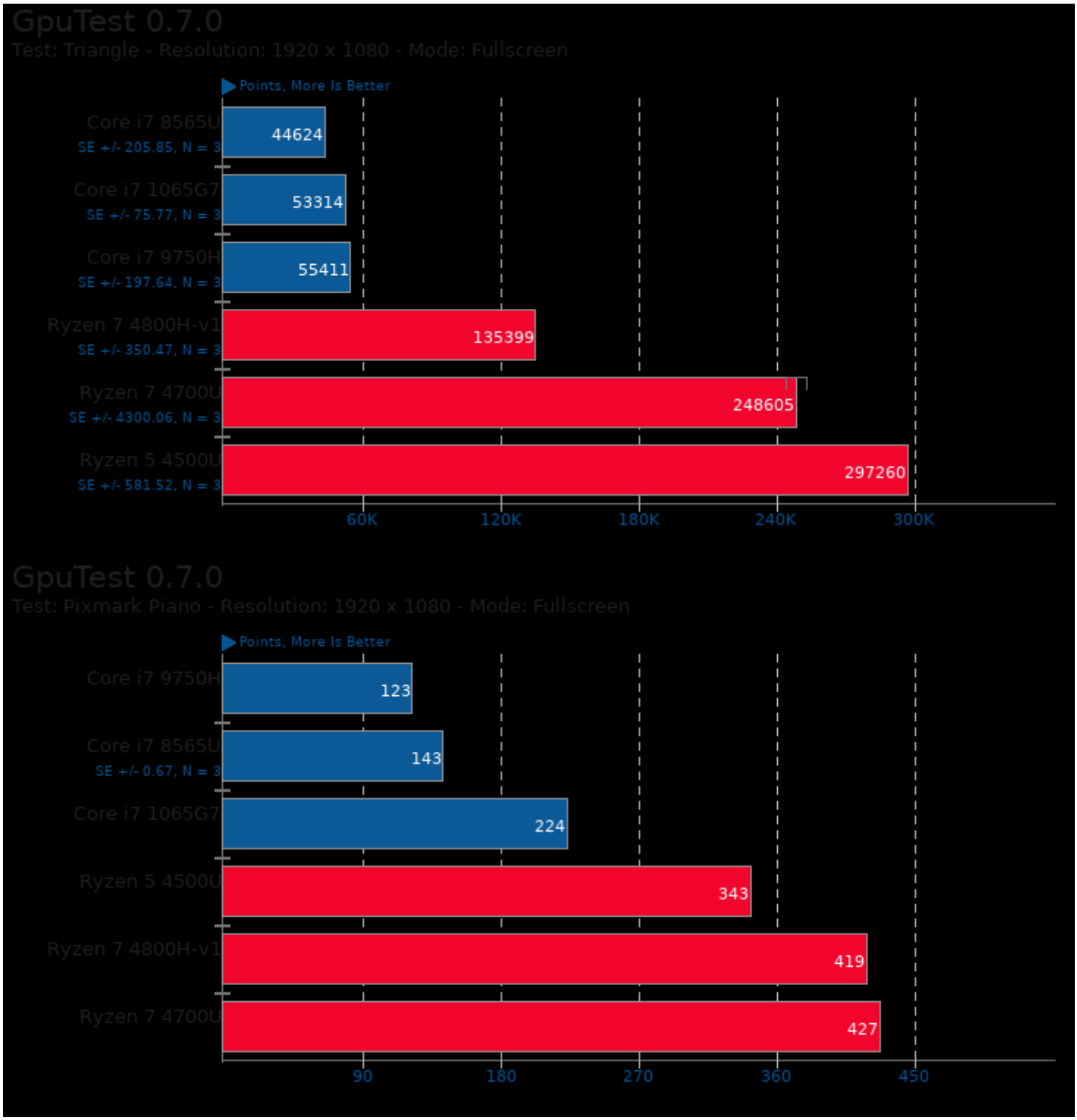

Botan 2.13.0
Test: Twofish
MiB/s, More Is Better
Ryzen 5 4500U
SE +/- 0.07, N = 3
251.53
Ryzen 7 4700U
SE +/- 0.10, N = 3
259.57
Core i7 1065G7
SE +/- 3.44, N = 3
296.02
Core i7 8565U
SE +/- 0.11, N = 3
364.15
Core i7 9750H
SE +/- 0.10, N = 3
389.51
80
160
240
320
400
1. (CXX) g++ options: -fstack-protector -m64 -pthread -lbotan-2 -ldl -lrt
Botan 2.13.0
Test: Blowfish
MiB/s, More Is Better
Ryzen 5 4500U
SE +/- 0.07, N = 3
288.42
Ryzen 7 4700U
SE +/- 0.04, N = 3
296.30
Core i7 1065G7
SE +/- 2.98, N = 3
369.44
Core i7 8565U
SE +/- 0.56, N = 3
453.49
Core i7 9750H
SE +/- 0.35, N = 3
485.23
110
220
330
440
550
1. (CXX) g++ options: -fstack-protector -m64 -pthread -lbotan-2 -ldl -lrt

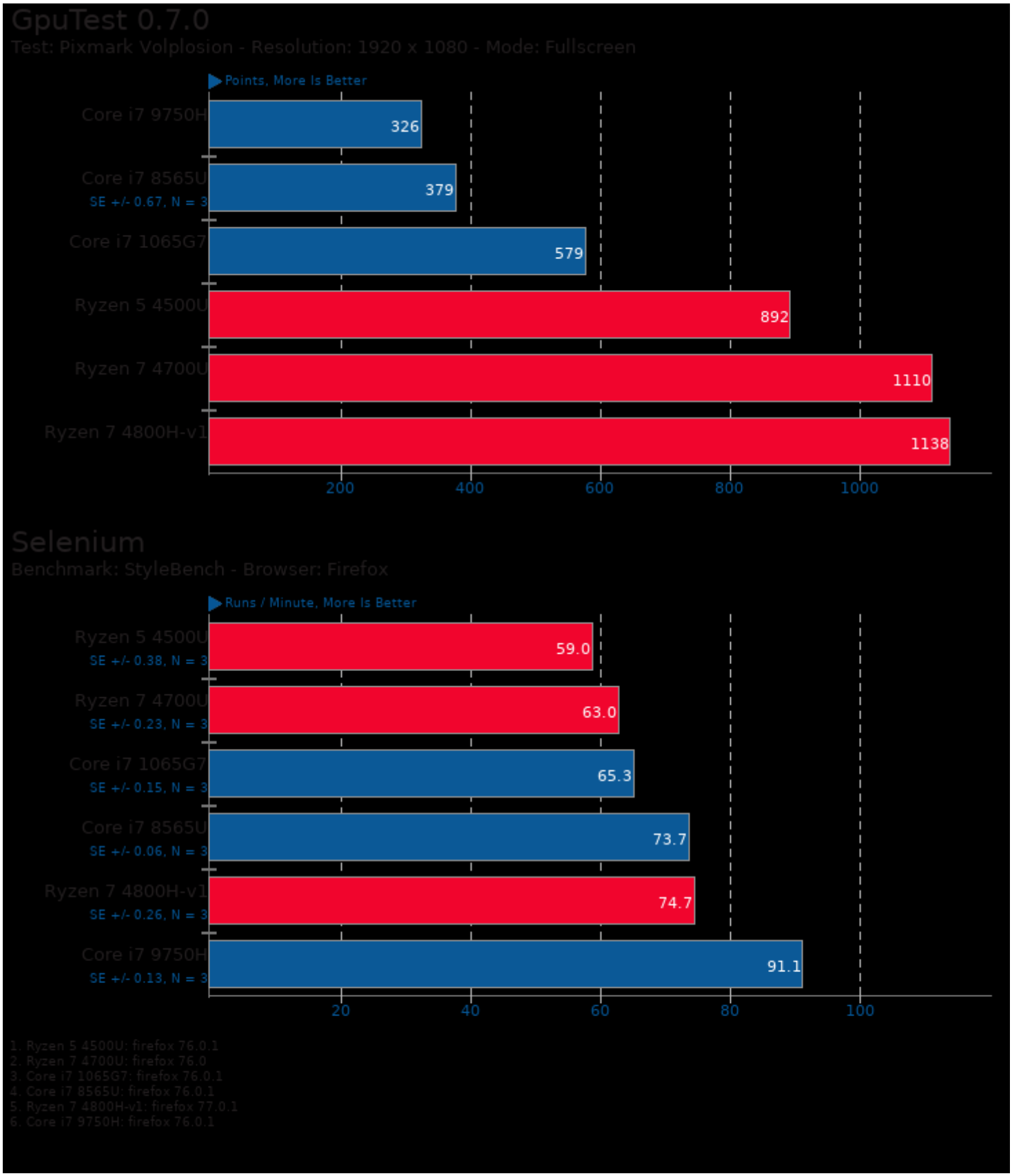

Botan 2.13.0
Test: CAST-256
MiB/s, More Is Better
Ryzen 5 4500U
SE +/- 0.02, N = 3
120.28
Ryzen 7 4700U
SE +/- 0.02, N = 3
125.25
Core i7 1065G7
SE +/- 1.17, N = 3
125.88
Core i7 8565U
SE +/- 0.09, N = 3
143.69
Core i7 9750H
SE +/- 0.32, N = 3
153.43
30
60
90
120
150
1. (CXX) g++ options: -fstack-protector -m64 -pthread -lbotan-2 -ldl -lrt
7-Zip Compression 16.02
Compress Speed Test
MIPS, More Is Better
Core i7 1065G7
SE +/- 110.64, N = 15
13369
Core i7 8565U
SE +/- 161.82, N = 3
18023
Ryzen 5 4500U
SE +/- 244.86, N = 3
23661
Ryzen 7 4700U
SE +/- 72.04, N = 3
27659
Core i7 9750H
SE +/- 362.13, N = 3
31674
Ryzen 7 4800H-v1
SE +/- 146.67, N = 3
43796
9K
18K
27K
36K
45K
1. (CXX) g++ options: -pipe -lpthread

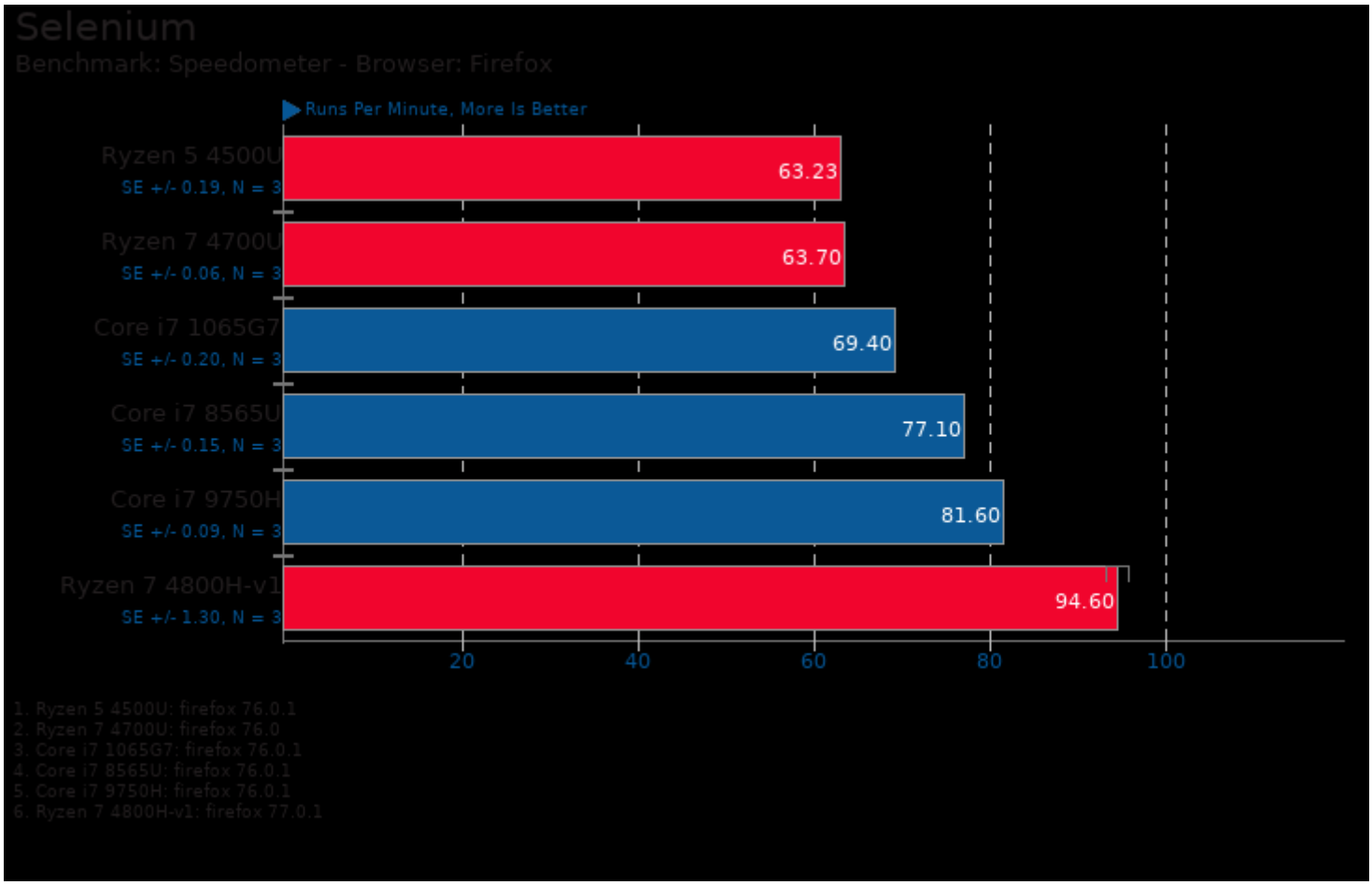

GROMACS 2020.1
Water Benchmark
Ns Per Day, More Is Better
Core i7 1065G7
SE +/- 0.000, N = 3
0.266
Core i7 8565U
SE +/- 0.000, N = 3
0.352
Ryzen 5 4500U
SE +/- 0.001, N = 3
0.472
Ryzen 7 4700U
SE +/- 0.001, N = 3
0.525
Core i7 9750H
SE +/- 0.006, N = 3
0.629
0.1415
0.283
0.4245
0.566
0.7075
1. (CXX) g++ options: -O3 -pthread -lrt -lpthread -lm
Selenium
Benchmark: Basemark - Browser: Firefox
Overall Score, More Is Better
Core i7 8565U
SE +/- 4.06, N = 3
454.01
Core i7 9750H
SE +/- 10.86, N = 9
455.14
Ryzen 7 4700U
SE +/- 4.06, N = 3
475.73
Ryzen 5 4500U
SE +/- 4.41, N = 10
476.41
Core i7 1065G7
SE +/- 5.82, N = 3
492.10
Ryzen 7 4800H-v1
SE +/- 8.60, N = 12
606.67
130
260
390
520
650
1. Core i7 8565U: firefox 76.0.1
2. Core i7 9750H: firefox 76.0.1
3. Ryzen 7 4700U: firefox 76.0
4. Ryzen 5 4500U: firefox 76.0.1
5. Core i7 1065G7: firefox 76.0.1
6. Ryzen 7 4800H-v1: firefox 77.0.1

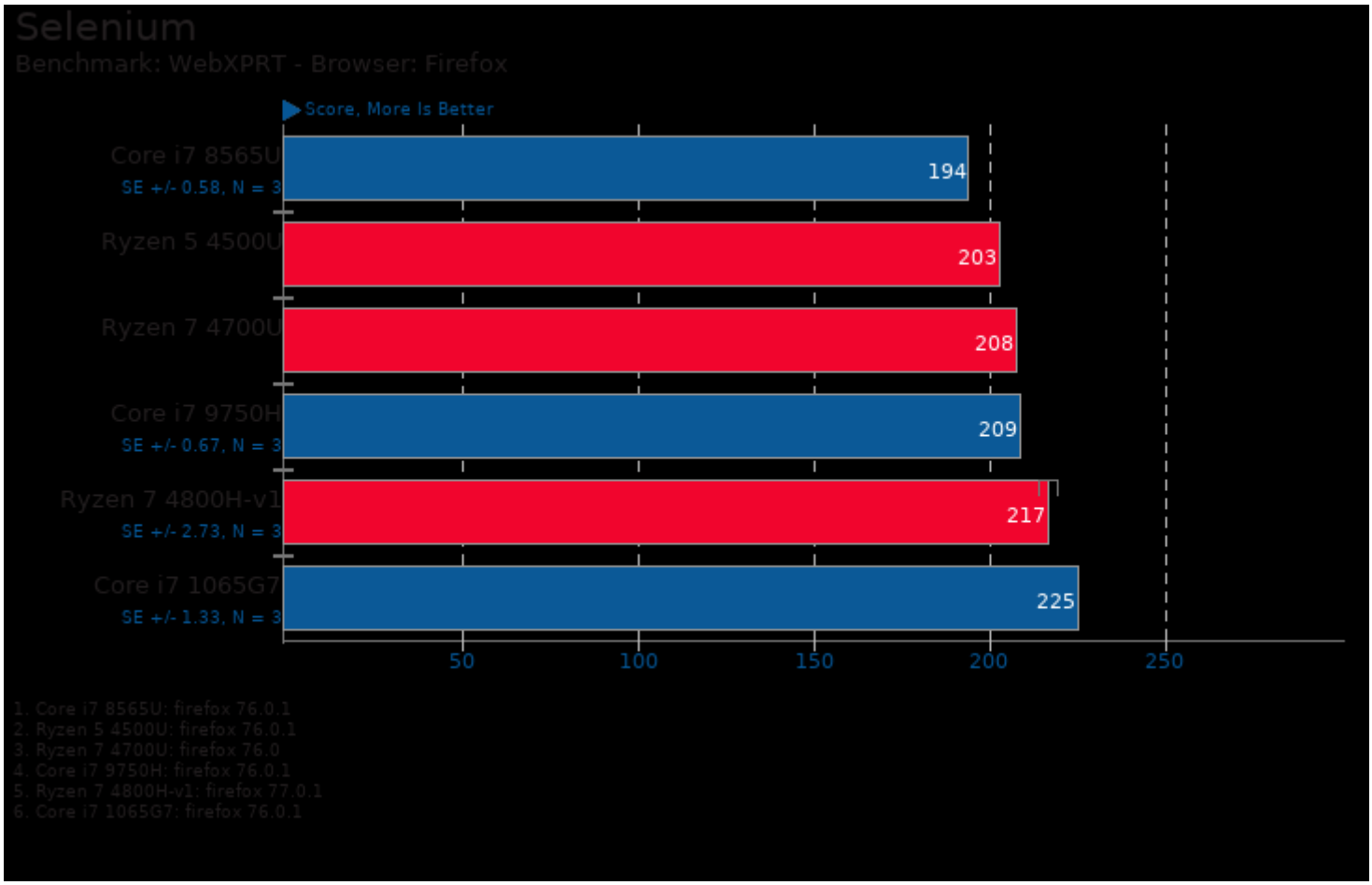

GpuTest 0.7.0
Test: GiMark - Resolution: 1920 x 1080 - Mode: Fullscreen
Points, More Is Better
Core i7 9750H
1120
Core i7 1065G7
1201
Core i7 8565U
SE +/- 3.84, N = 3
1230
Ryzen 5 4500U
SE +/- 0.33, N = 3
1351
Ryzen 7 4700U
SE +/- 0.33, N = 3
1422
Ryzen 7 4800H-v1
SE +/- 0.67, N = 3
3003
600
1200
1800
2400
3000
GpuTest 0.7.0
Test: Plot3D - Resolution: 1920 x 1080 - Mode: Fullscreen
Points, More Is Better
Core i7 9750H
SE +/- 1.76, N = 3
7372
Core i7 8565U
SE +/- 2.52, N = 3
8490
Core i7 1065G7
SE +/- 9.07, N = 3
8818
Ryzen 5 4500U
SE +/- 12.25, N = 3
23737
Ryzen 7 4700U
SE +/- 23.34, N = 3
24127
Ryzen 7 4800H-v1
SE +/- 35.12, N = 3
27294
6K
12K
18K
24K
30K

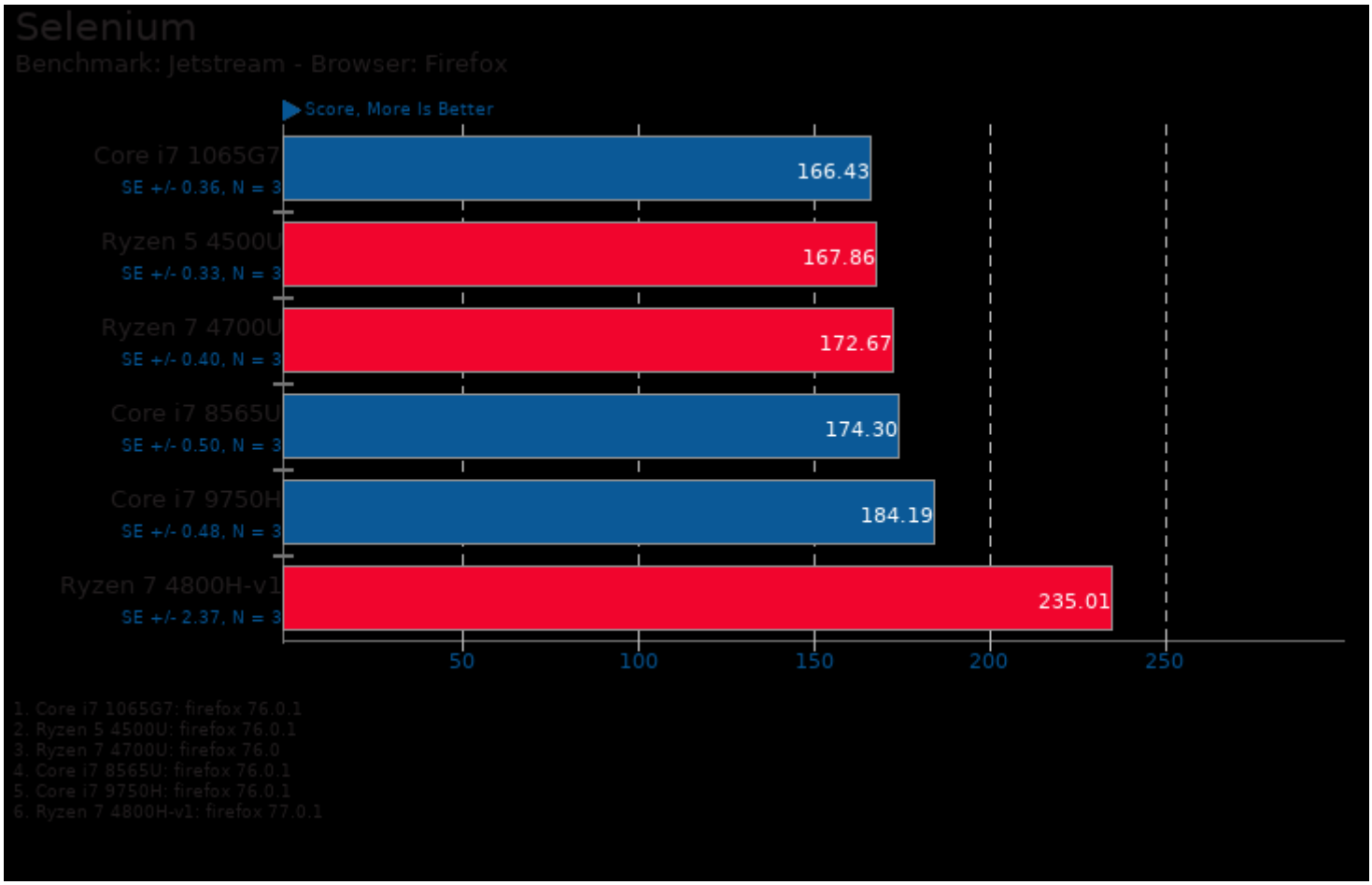

GpuTest 0.7.0
Test: Furmark - Resolution: 1920 x 1080 - Mode: Fullscreen
Points, More Is Better
Core i7 8565U
SE +/- 6.13, N = 12
667
Core i7 9750H
709
Core i7 1065G7
SE +/- 1.15, N = 3
740
Ryzen 5 4500U
SE +/- 1.20, N = 3
1104
Ryzen 7 4700U
SE +/- 1.00, N = 3
1128
Ryzen 7 4800H-v1
SE +/- 1.53, N = 3
1157
200
400
600
800
1000
GpuTest 0.7.0
Test: TessMark - Resolution: 1920 x 1080 - Mode: Fullscreen
Points, More Is Better
Core i7 1065G7
SE +/- 2.03, N = 3
2523
Core i7 9750H
2574
Core i7 8565U
SE +/- 1.20, N = 3
2642
Ryzen 5 4500U
SE +/- 0.88, N = 3
3691
Ryzen 7 4700U
SE +/- 1.33, N = 3
3908
Ryzen 7 4800H-v1
SE +/- 76.71, N = 6
6453
1400
2800
4200
5600
7000

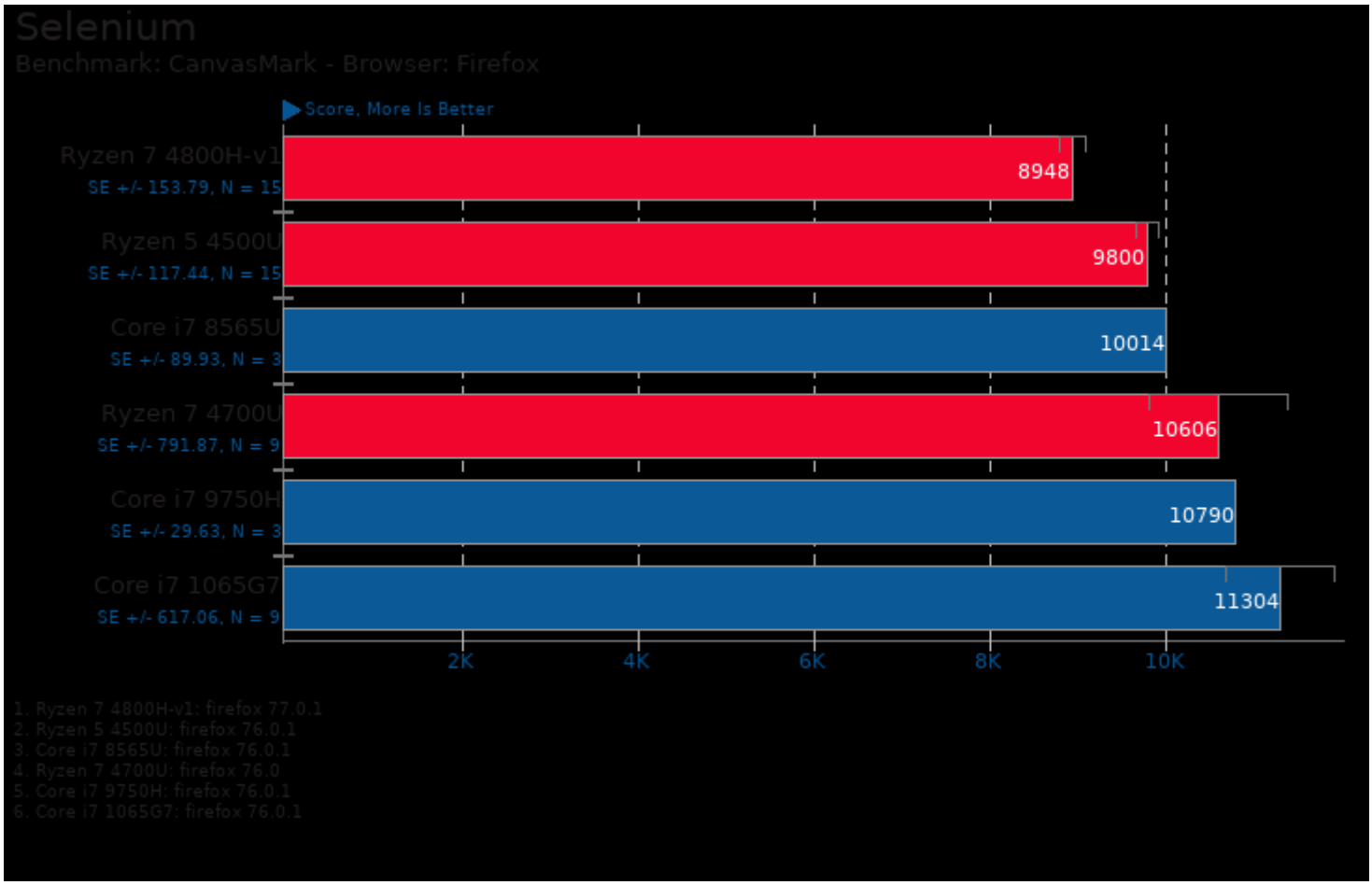

GpuTest 0.7.0
Test: Triangle - Resolution: 1920 x 1080 - Mode: Fullscreen
Points, More Is Better
Core i7 8565U
SE +/- 205.85, N = 3
44624
Core i7 1065G7
SE +/- 75.77, N = 3
53314
Core i7 9750H
SE +/- 197.64, N = 3
55411
Ryzen 7 4800H-v1
SE +/- 350.47, N = 3
135399
Ryzen 7 4700U
SE +/- 4300.06, N = 3
248605
Ryzen 5 4500U
SE +/- 581.52, N = 3
297260
60K
120K
180K
240K
300K
GpuTest 0.7.0
Test: Pixmark Piano - Resolution: 1920 x 1080 - Mode: Fullscreen
Points, More Is Better
Core i7 9750H
123
Core i7 8565U
SE +/- 0.67, N = 3
143
Core i7 1065G7
224
Ryzen 5 4500U
343
Ryzen 7 4800H-v1
419
Ryzen 7 4700U
427
90
180
270
360
450


GpuTest 0.7.0
Test: Pixmark Volplosion - Resolution: 1920 x 1080 - Mode: Fullscreen
Points, More Is Better
Core i7 9750H
326
Core i7 8565U
SE +/- 0.67, N = 3
379
Core i7 1065G7
579
Ryzen 5 4500U
892
Ryzen 7 4700U
1110
Ryzen 7 4800H-v1
1138
200
400
600
800
1000
Selenium
Benchmark: StyleBench - Browser: Firefox
Runs / Minute, More Is Better
Ryzen 5 4500U
SE +/- 0.38, N = 3
59.0
Ryzen 7 4700U
SE +/- 0.23, N = 3
63.0
Core i7 1065G7
SE +/- 0.15, N = 3
65.3
Core i7 8565U
SE +/- 0.06, N = 3
73.7
Ryzen 7 4800H-v1
SE +/- 0.26, N = 3
74.7
Core i7 9750H
SE +/- 0.13, N = 3
91.1
20
40
60
80
100
1. Ryzen 5 4500U: firefox 76.0.1
2. Ryzen 7 4700U: firefox 76.0
3. Core i7 1065G7: firefox 76.0.1
4. Core i7 8565U: firefox 76.0.1
5. Ryzen 7 4800H-v1: firefox 77.0.1
6. Core i7 9750H: firefox 76.0.1


Selenium
Benchmark: Speedometer - Browser: Firefox
Runs Per Minute, More Is Better
Ryzen 5 4500U
SE +/- 0.19, N = 3
63.23
Ryzen 7 4700U
SE +/- 0.06, N = 3
63.70
Core i7 1065G7
SE +/- 0.20, N = 3
69.40
Core i7 8565U
SE +/- 0.15, N = 3
77.10
Core i7 9750H
SE +/- 0.09, N = 3
81.60
Ryzen 7 4800H-v1
SE +/- 1.30, N = 3
94.60
20
40
60
80
100
1. Ryzen 5 4500U: firefox 76.0.1
2. Ryzen 7 4700U: firefox 76.0
3. Core i7 1065G7: firefox 76.0.1
4. Core i7 8565U: firefox 76.0.1
5. Core i7 9750H: firefox 76.0.1
6. Ryzen 7 4800H-v1: firefox 77.0.1

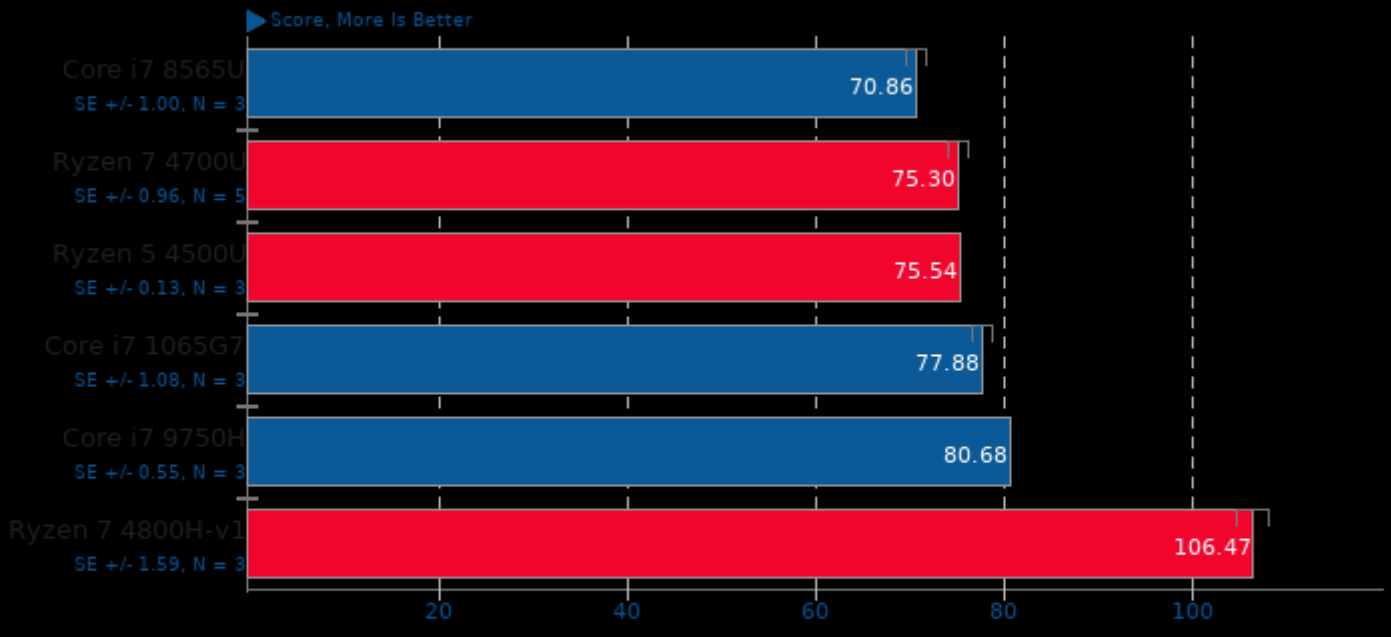

Selenium
Benchmark: WebXPRT - Browser: Firefox
Score, More Is Better
Core i7 8565U
SE +/- 0.58, N = 3
194
Ryzen 5 4500U
203
Ryzen 7 4700U
208
Core i7 9750H
SE +/- 0.67, N = 3
209
Ryzen 7 4800H-v1
SE +/- 2.73, N = 3
217
Core i7 1065G7
SE +/- 1.33, N = 3
225
50
100
150
200
250
1. Core i7 8565U: firefox 76.0.1
2. Ryzen 5 4500U: firefox 76.0.1
3. Ryzen 7 4700U: firefox 76.0
4. Core i7 9750H: firefox 76.0.1
5. Ryzen 7 4800H-v1: firefox 77.0.1
6. Core i7 1065G7: firefox 76.0.1


Selenium
Benchmark: Jetstream - Browser: Firefox
Score, More Is Better
Core i7 1065G7
SE +/- 0.36, N = 3
166.43
Ryzen 5 4500U
SE +/- 0.33, N = 3
167.86
Ryzen 7 4700U
SE +/- 0.40, N = 3
172.67
Core i7 8565U
SE +/- 0.50, N = 3
174.30
Core i7 9750H
SE +/- 0.48, N = 3
184.19
Ryzen 7 4800H-v1
SE +/- 2.37, N = 3
235.01
50
100
150
200
250
1. Core i7 1065G7: firefox 76.0.1
2. Ryzen 5 4500U: firefox 76.0.1
3. Ryzen 7 4700U: firefox 76.0
4. Core i7 8565U: firefox 76.0.1
5. Core i7 9750H: firefox 76.0.1
6. Ryzen 7 4800H-v1: firefox 77.0.1


Selenium
Benchmark: CanvasMark - Browser: Firefox
Score, More Is Better
Ryzen 7 4800H-v1
SE +/- 153.79, N = 15
8948
Ryzen 5 4500U
SE +/- 117.44, N = 15
9800
Core i7 8565U
SE +/- 89.93, N = 3
10014
Ryzen 7 4700U
SE +/- 791.87, N = 9
10606
Core i7 9750H
SE +/- 29.63, N = 3
10790
Core i7 1065G7
SE +/- 617.06, N = 9
11304
2K
4K
6K
8K
10K
1. Ryzen 7 4800H-v1: firefox 77.0.1
2. Ryzen 5 4500U: firefox 76.0.1
3. Core i7 8565U: firefox 76.0.1
4. Ryzen 7 4700U: firefox 76.0
5. Core i7 9750H: firefox 76.0.1
6. Core i7 1065G7: firefox 76.0.1

Selenium

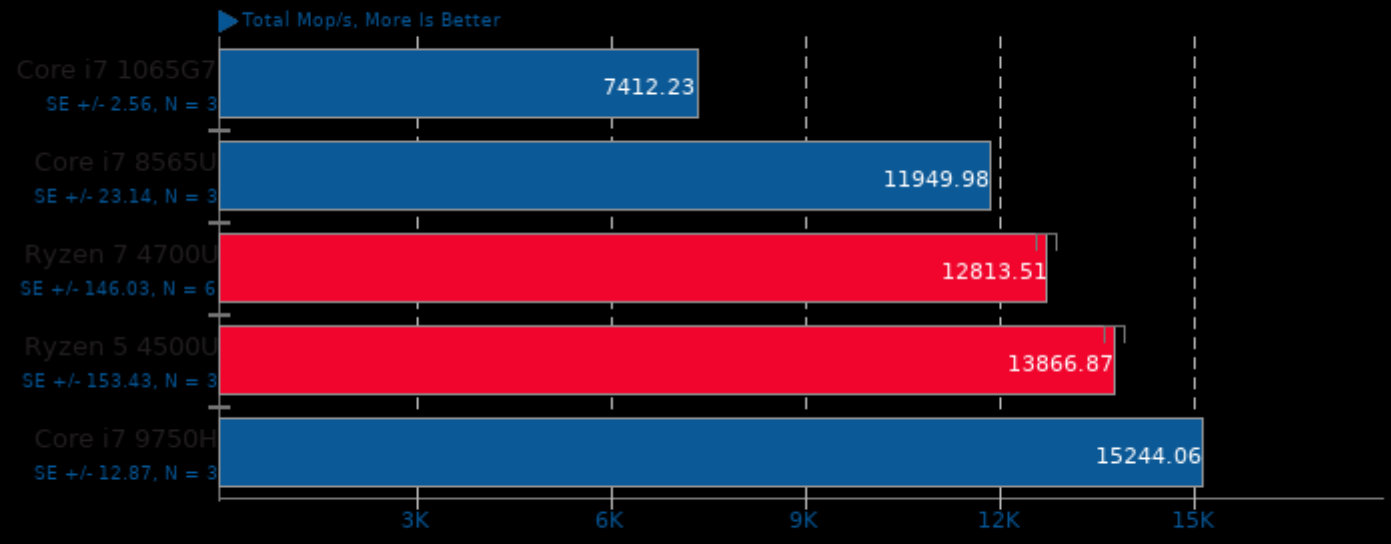
Benchmark: Jetstream 2 - Browser: Firefox



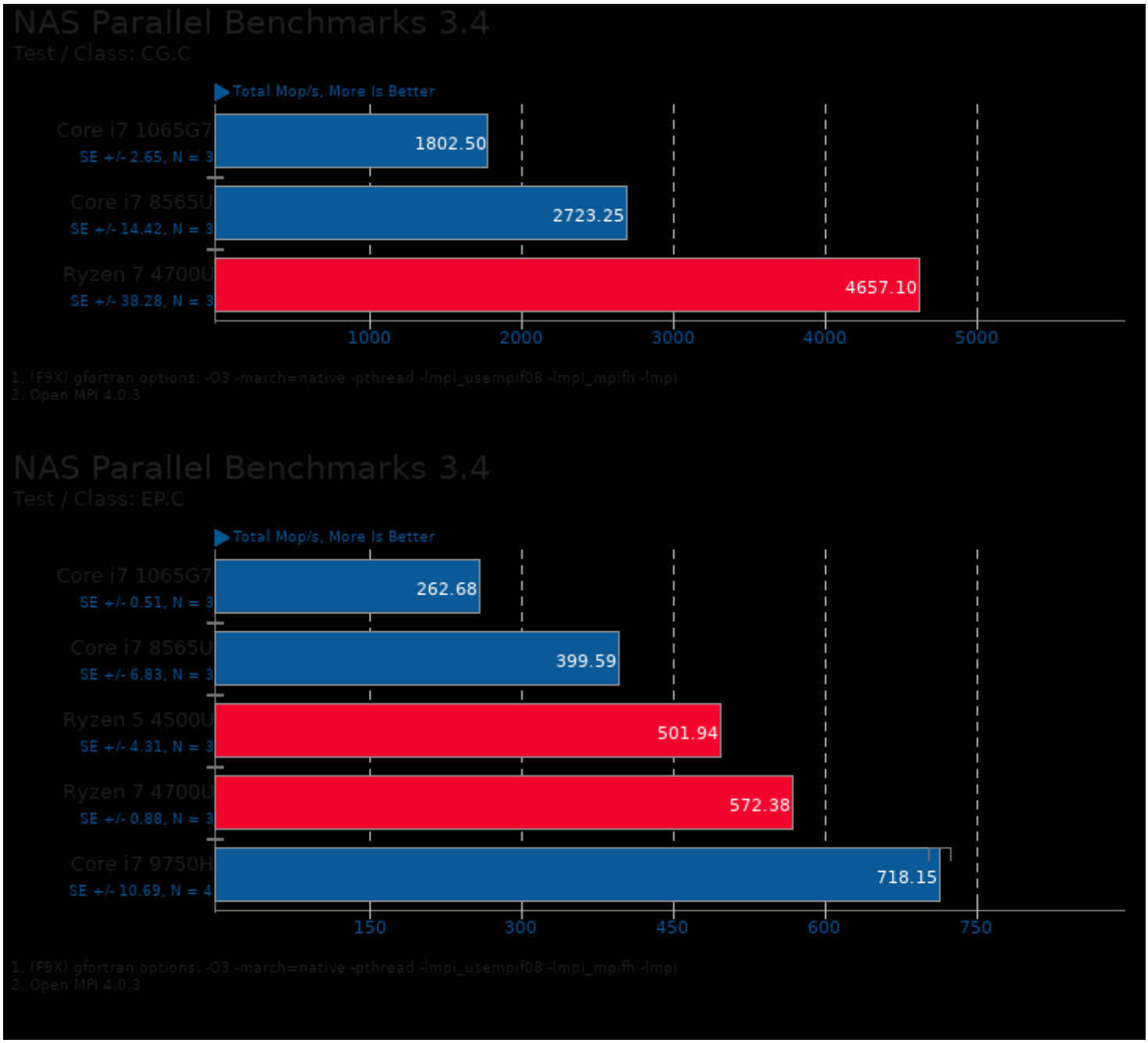
1. Core i7 8565U: firefox 76.0.1
2. Ryzen 7 4700U: firefox 76.0
3. Ryzen 5 4500U: firefox 76.0.1
4. Core i7 1065G7: firefox 76.0.1
5. Core i7 9750H: firefox 76.0.1
6. Ryzen 7 4800H-v1: firefox 77.0.1

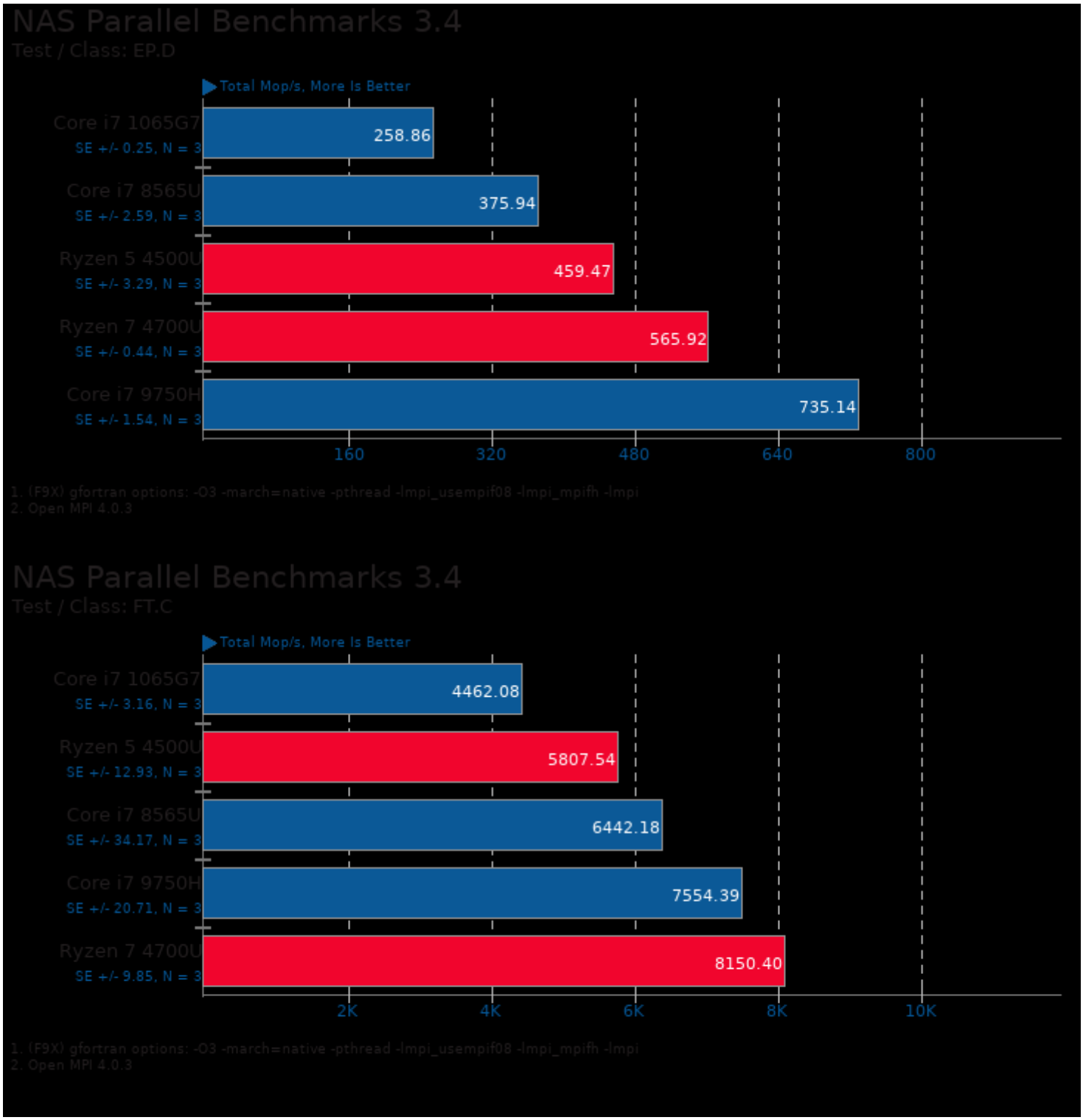
NAS Parallel Benchmarks 3.4

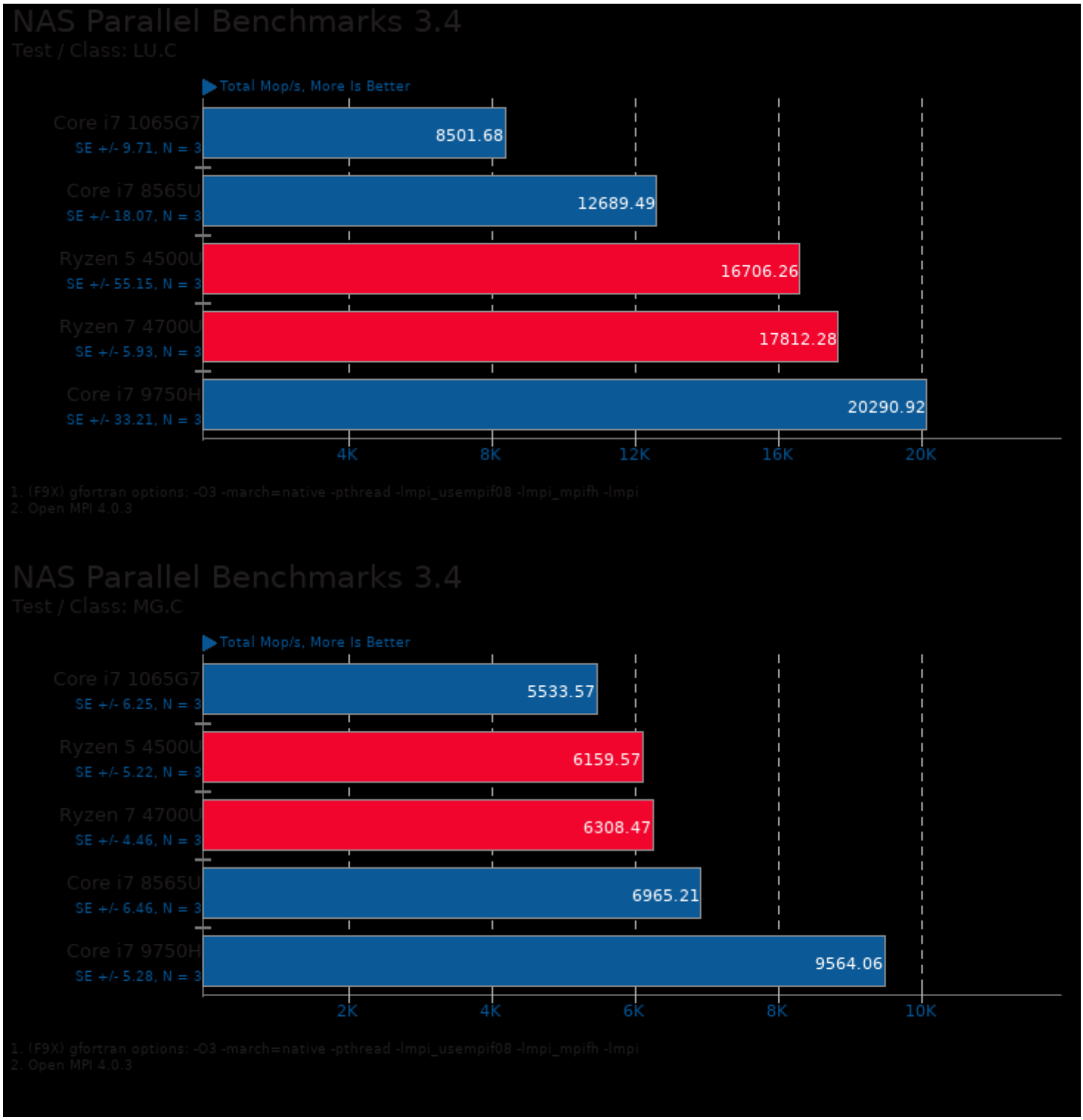
Test / Class: BT.C

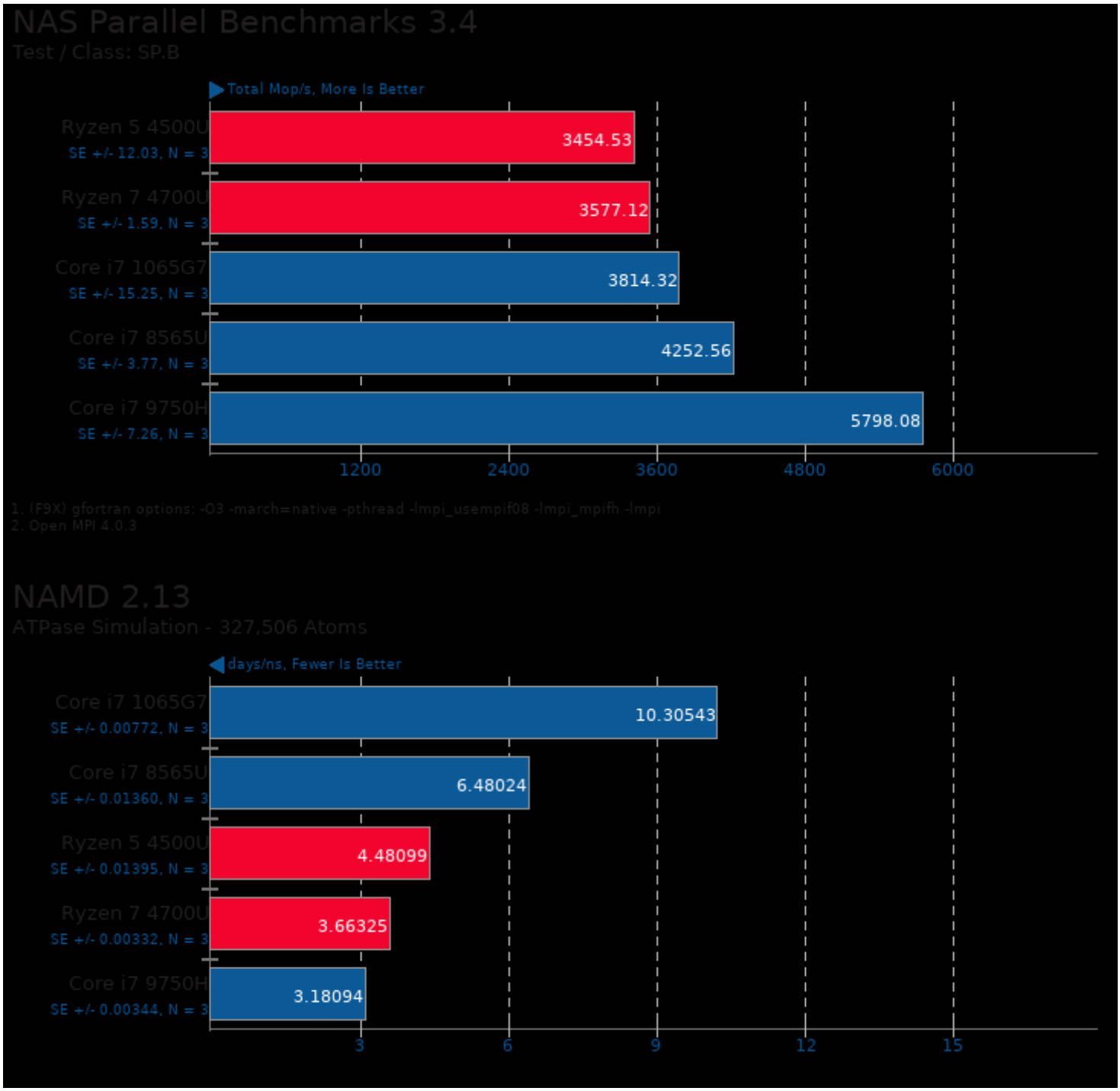


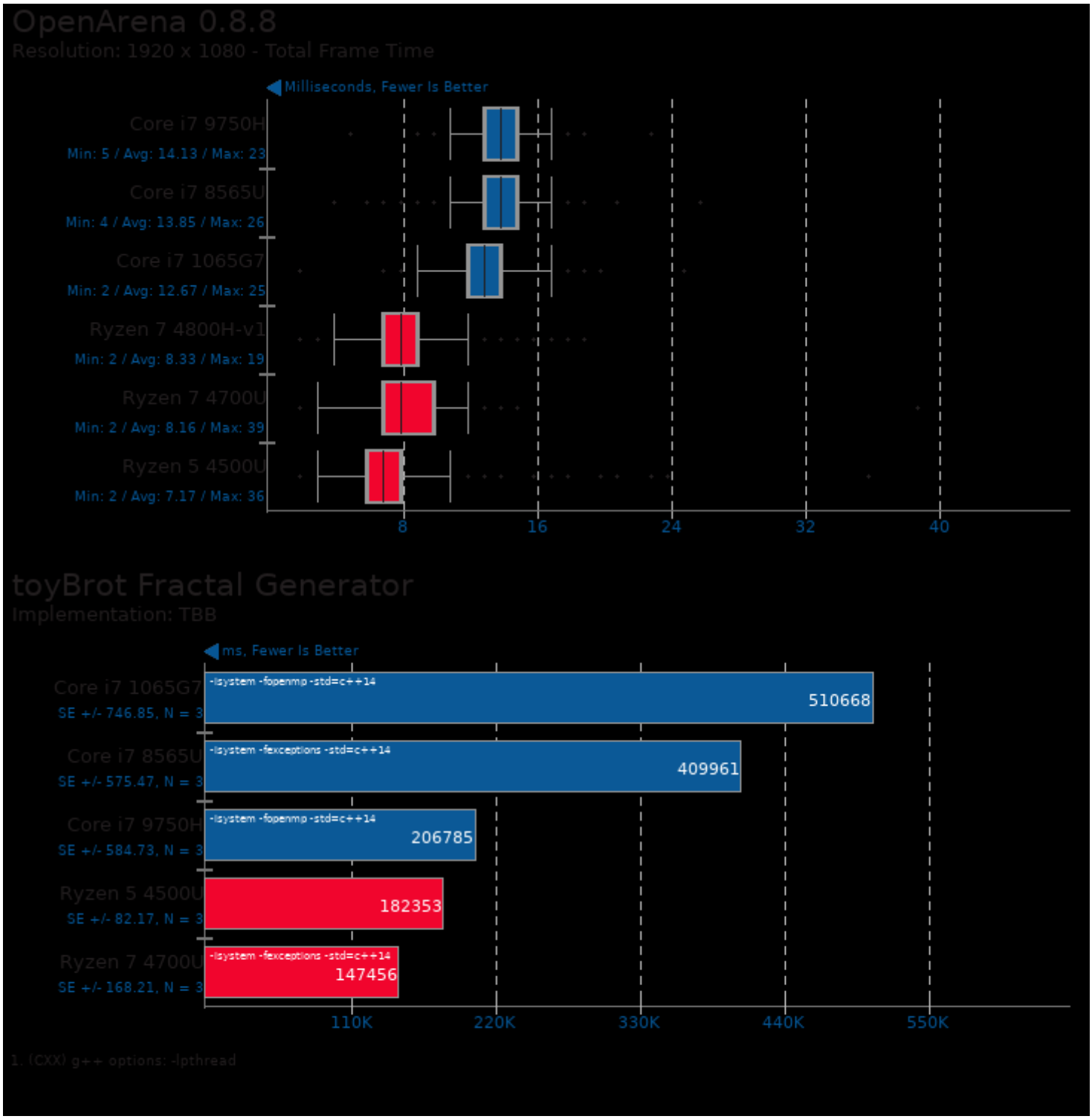
1. (F9X) gfortran options: -O3 -march=native -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi
2. Open MPI 4.0.3

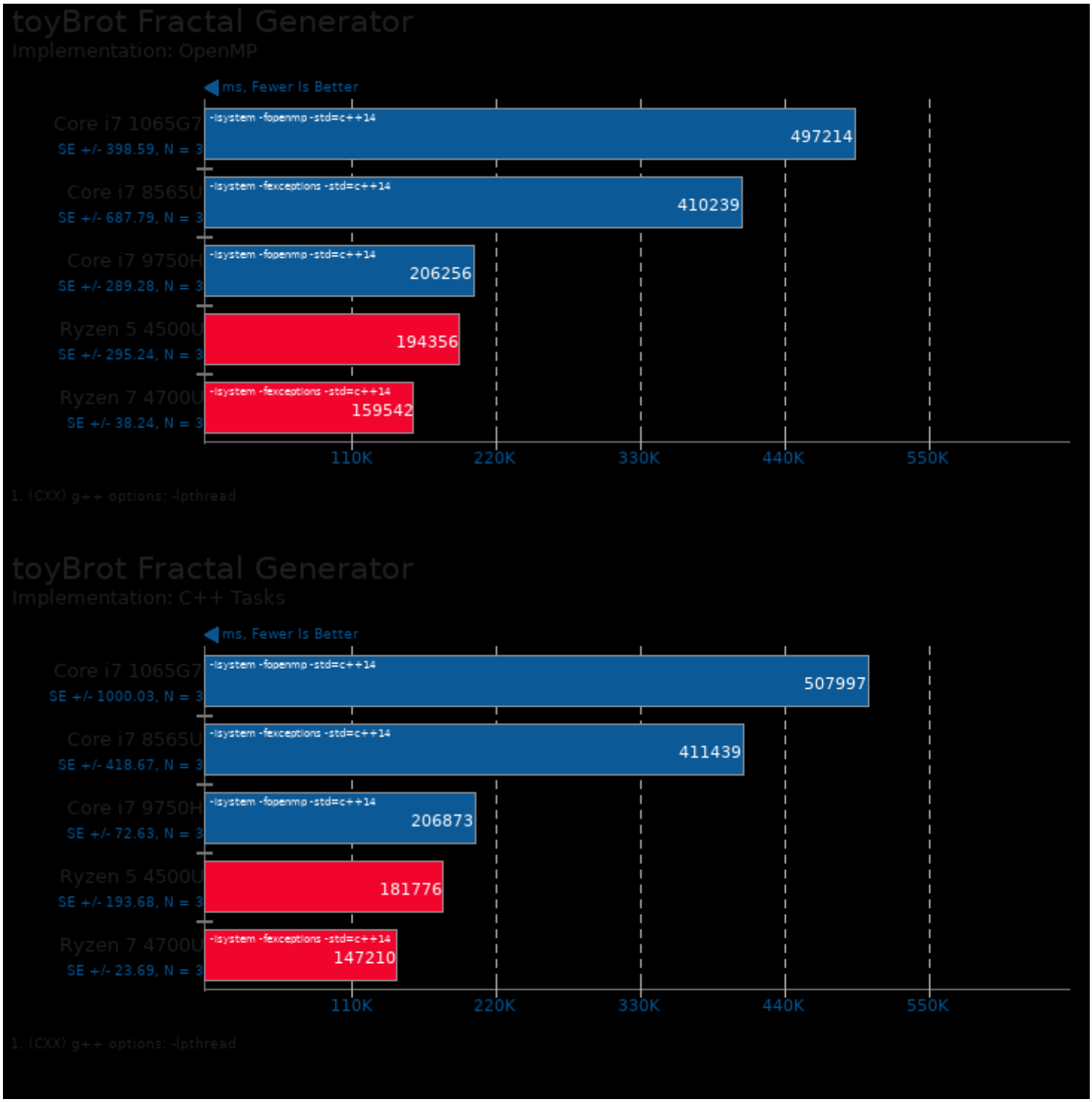

NAS Parallel Benchmarks 3.4
Test / Class: CG.C
Total Mop/s, More Is Better
Core i7 1065G7
SE +/- 2.65, N = 3
1802.50
Core i7 8565U
SE +/- 14.42, N = 3
2723.25
Ryzen 7 4700U
SE +/- 38.28, N = 3
4657.10
1000
2000
3000
4000
5000
1. (F9X) gfortran options: -O3 -march=native -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi
2. Open MPI 4.0.3
NAS Parallel Benchmarks 3.4
Test / Class: EP.C
Total Mop/s, More Is Better
Core i7 1065G7
SE +/- 0.51, N = 3
262.68
Core i7 8565U
SE +/- 6.83, N = 3
399.59
Ryzen 5 4500U
SE +/- 4.31, N = 3
501.94
Ryzen 7 4700U
SE +/- 0.88, N = 3
572.38
Core i7 9750H
SE +/- 10.69, N = 4
718.15
150
300
450
600
750
1. (F9X) gfortran options: -O3 -march=native -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi
2. Open MPI 4.0.3

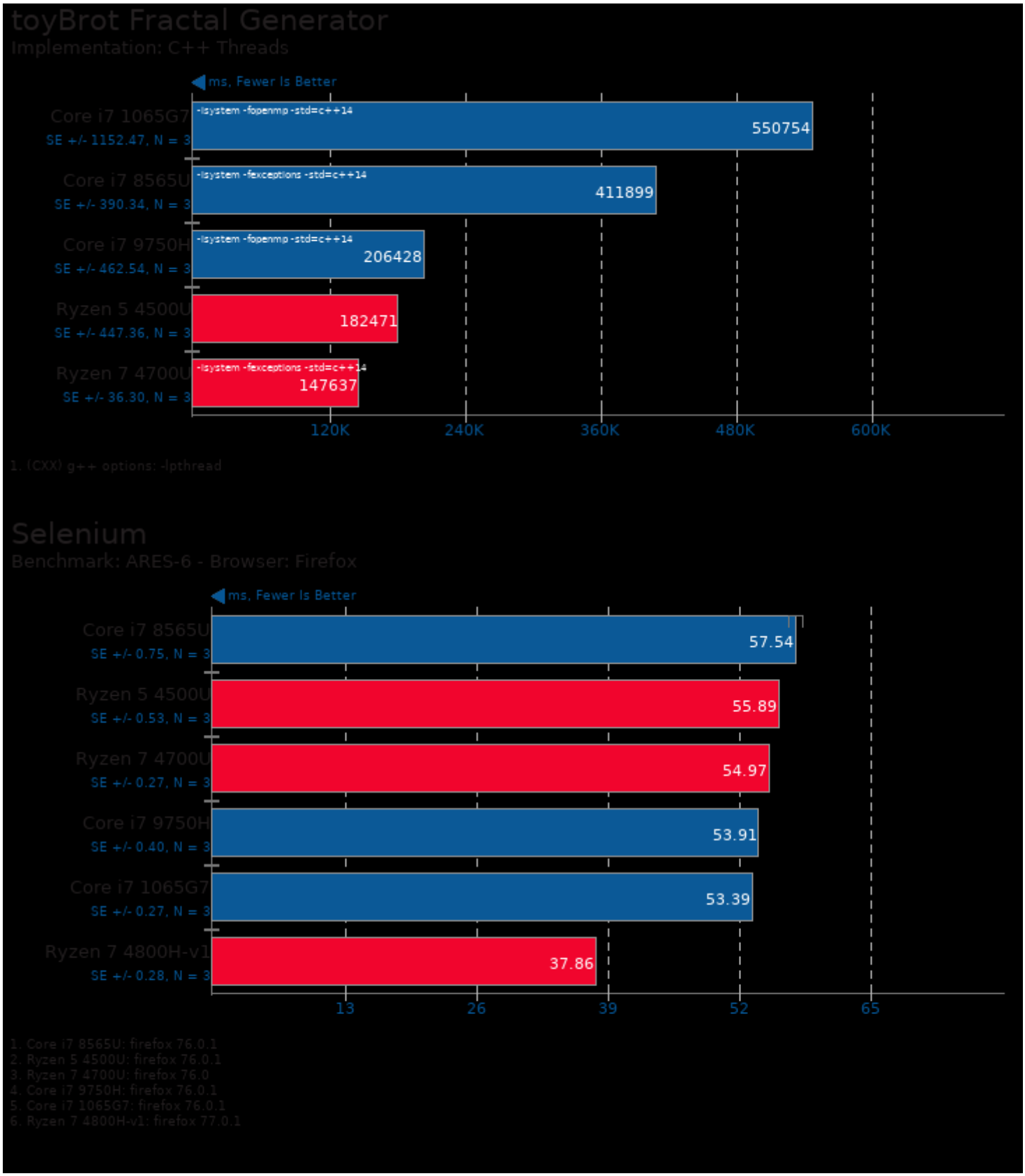

NAS Parallel Benchmarks 3.4
Test / Class: EP.D
Total Mop/s, More Is Better
Core i7 1065G7
SE +/- 0.25, N = 3
258.86
Core i7 8565U
SE +/- 2.59, N = 3
375.94
Ryzen 5 4500U
SE +/- 3.29, N = 3
459.47
Ryzen 7 4700U
SE +/- 0.44, N = 3
565.92
Core i7 9750H
SE +/- 1.54, N = 3
735.14
160
320
480
640
800
1. (F9X) gfortran options: -O3 -march=native -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi
2. Open MPI 4.0.3
NAS Parallel Benchmarks 3.4
Test / Class: FT.C
Total Mop/s, More Is Better
Core i7 1065G7
SE +/- 3.16, N = 3
4462.08
Ryzen 5 4500U
SE +/- 12.93, N = 3
5807.54
Core i7 8565U
SE +/- 34.17, N = 3
6442.18
Core i7 9750H
SE +/- 20.71, N = 3
7554.39
Ryzen 7 4700U
SE +/- 9.85, N = 3
8150.40
2K
4K
6K
8K
10K
1. (F9X) gfortran options: -O3 -march=native -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi
2. Open MPI 4.0.3

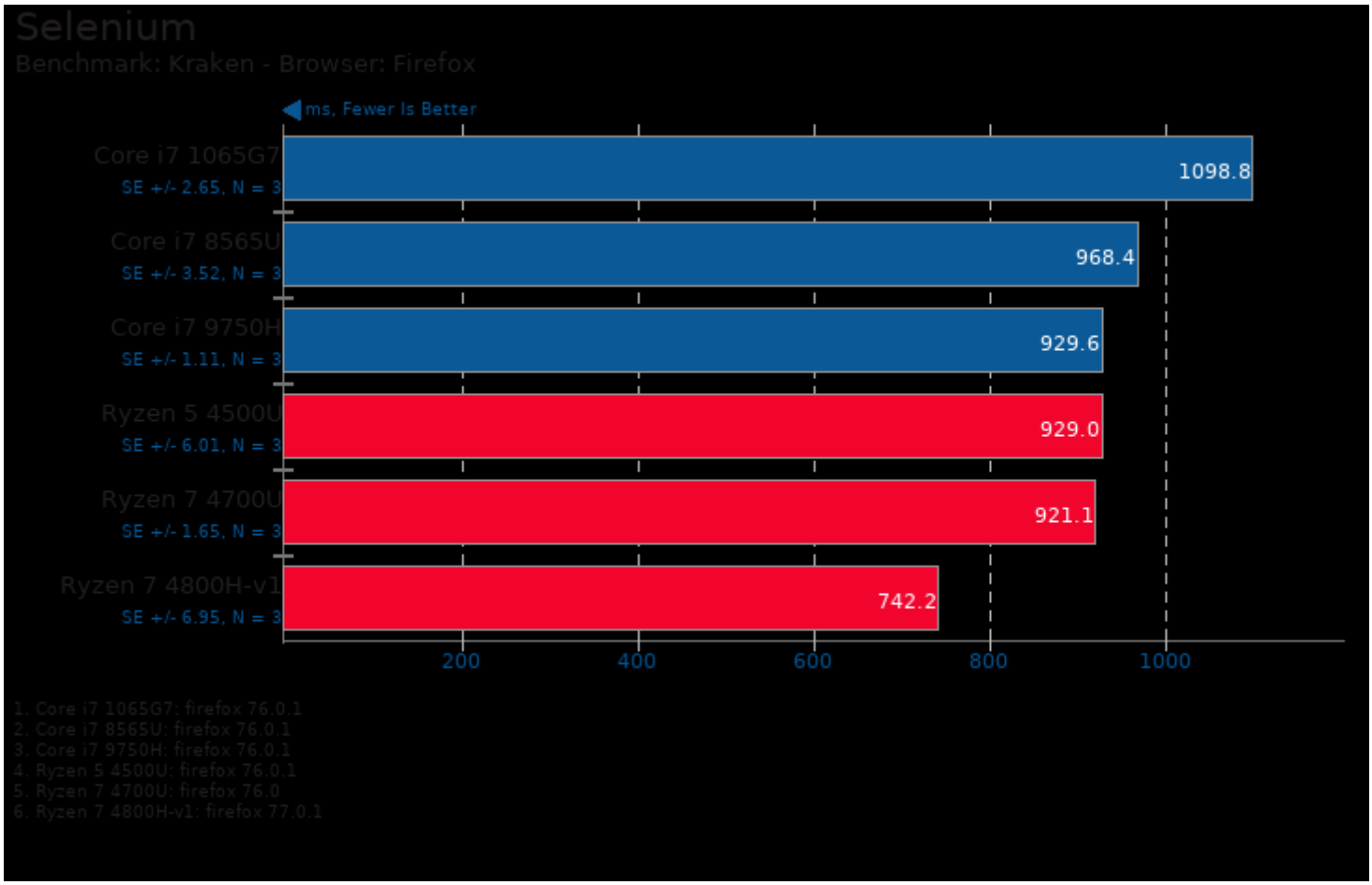

NAS Parallel Benchmarks 3.4
Test / Class: LU.C
Total Mop/s, More Is Better
Core i7 1065G7
SE +/- 9.71, N = 3
8501.68
Core i7 8565U
SE +/- 18.07, N = 3
12689.49
Ryzen 5 4500U
SE +/- 55.15, N = 3
16706.26
Ryzen 7 4700U
SE +/- 5.93, N = 3
17812.28
Core i7 9750H
SE +/- 33.21, N = 3
20290.92
4K
8K
12K
16K
20K
1. (F9X) gfortran options: -O3 -march=native -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi
2. Open MPI 4.0.3
NAS Parallel Benchmarks 3.4
Test / Class: MG.C
Total Mop/s, More Is Better
Core i7 1065G7
SE +/- 6.25, N = 3
5533.57
Ryzen 5 4500U
SE +/- 5.22, N = 3
6159.57
Ryzen 7 4700U
SE +/- 4.46, N = 3
6308.47
Core i7 8565U
SE +/- 6.46, N = 3
6965.21
Core i7 9750H
SE +/- 5.28, N = 3
9564.06
2K
4K
6K
8K
10K
1. (F9X) gfortran options: -O3 -march=native -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi
2. Open MPI 4.0.3

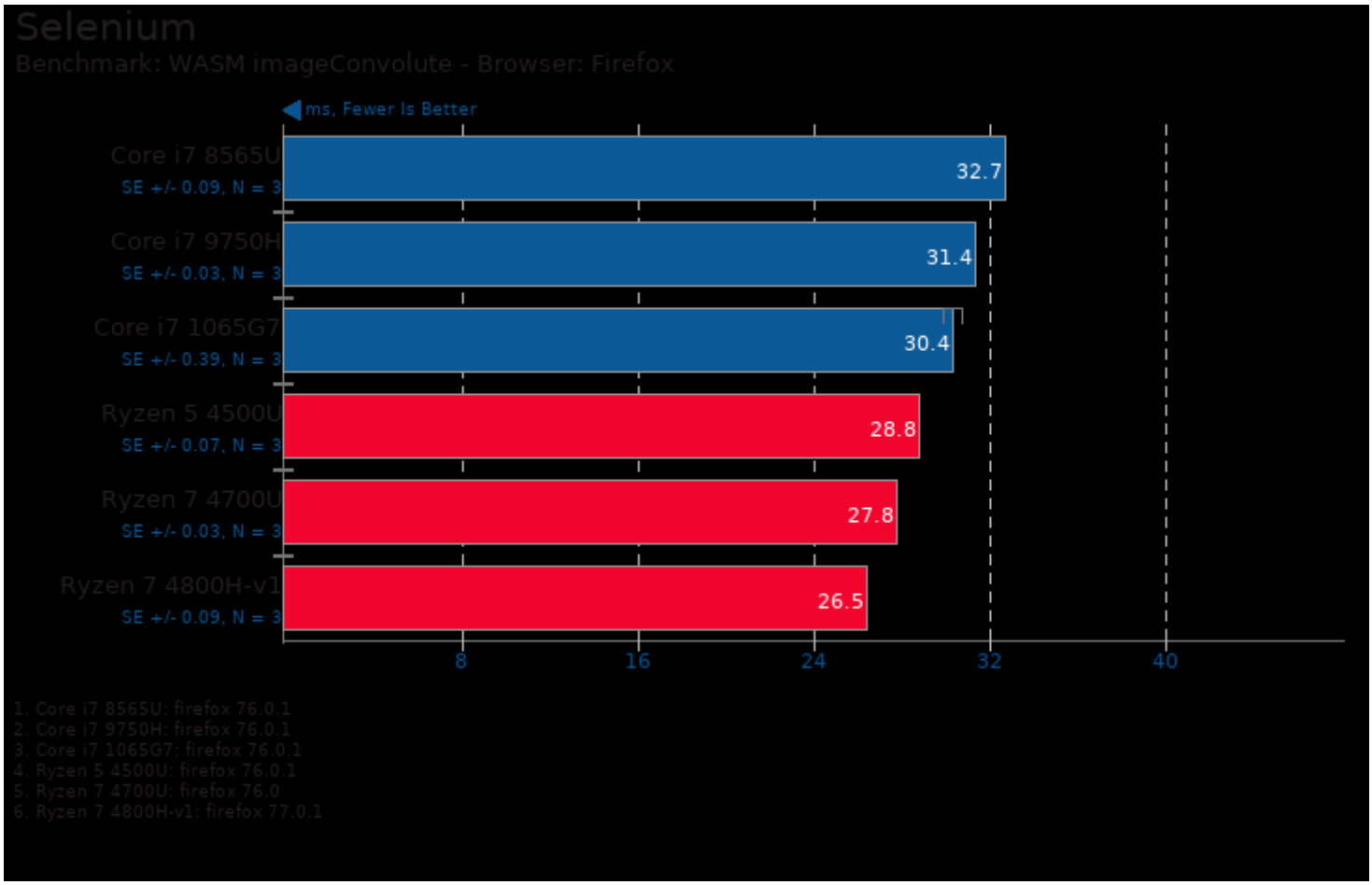

NAS Parallel Benchmarks 3.4
Test / Class: SP.B
Total Mop/s, More Is Better
Ryzen 5 4500U
SE +/- 12.03, N = 3
3454.53
Ryzen 7 4700U
SE +/- 1.59, N = 3
3577.12
Core i7 1065G7
SE +/- 15.25, N = 3
3814.32
Core i7 8565U
SE +/- 3.77, N = 3
4252.56
Core i7 9750H
SE +/- 7.26, N = 3
5798.08
1200
2400
3600
4800
6000
1. (F9X) gfortran options: -O3 -march=native -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi
2. Open MPI 4.0.3
NAMD 2.13
ATPase Simulation - 327,506 Atoms
days/ns, Fewer Is Better
Core i7 1065G7
SE +/- 0.00772, N = 3
10.30543
Core i7 8565U
SE +/- 0.01360, N = 3
6.48024
Ryzen 5 4500U
SE +/- 0.01395, N = 3
4.48099
Ryzen 7 4700U
SE +/- 0.00332, N = 3
3.66325
Core i7 9750H
SE +/- 0.00344, N = 3
3.18094
3
6
9
12
15

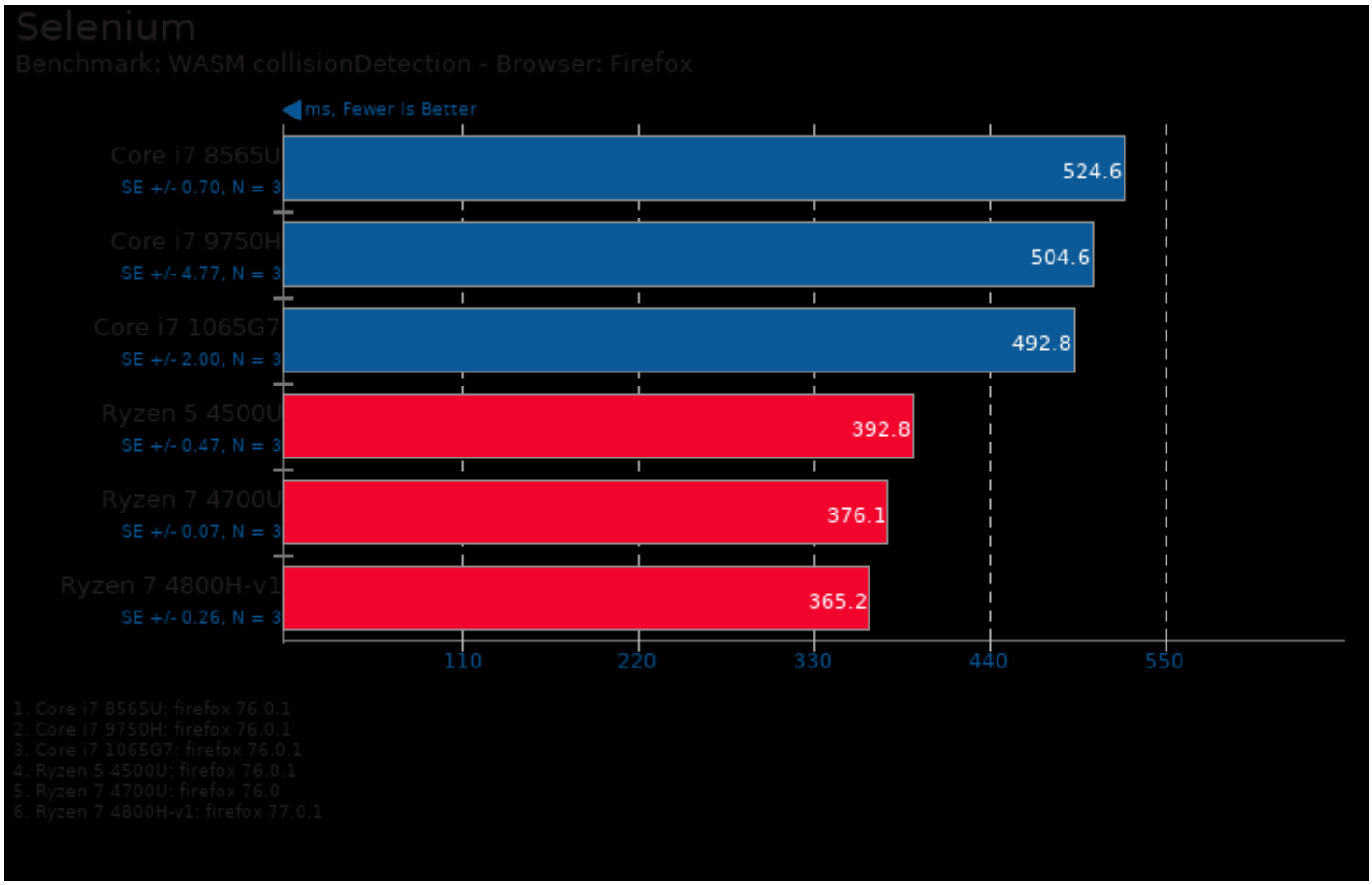

OpenArena 0.8.8
Resolution: 1920 x 1080 - Total Frame Time
Milliseconds, Fewer Is Better
Core i7 9750H
Min: 5 / Avg: 14.13 / Max: 23
Core i7 8565U
Min: 4 / Avg: 13.85 / Max: 26
Core i7 1065G7
Min: 2 / Avg: 12.67 / Max: 25
Ryzen 7 4800H-v1
Min: 2 / Avg: 8.33 / Max: 19
Ryzen 7 4700U
Min: 2 / Avg: 8.16 / Max: 39
Ryzen 5 4500U
Min: 2 / Avg: 7.17 / Max: 36
8
16
24
32
40
toyBrot Fractal Generator
Implementation: TBB
ms, Fewer Is Better
Core i7 1065G7
SE +/- 746.85, N = 3
-lsystem -fopenmp -std=c++14
510668
Core i7 8565U
SE +/- 575.47, N = 3
-lsystem -fexceptions -std=c++14
409961
Core i7 9750H
SE +/- 584.73, N = 3
-lsystem -fopenmp -std=c++14
206785
Ryzen 5 4500U
SE +/- 82.17, N = 3
182353
Ryzen 7 4700U
SE +/- 168.21, N = 3
-lsystem -fexceptions -std=c++14
147456
110K
220K
330K
440K
550K
1: (CXX) g++ options: -lpthread


toyBrot Fractal Generator
Implementation: OpenMP
ms, Fewer Is Better
Core i7 1065G7
SE +/- 398.59, N = 3
-lsystem -fopenmp -std=c++14
497214
Core i7 8565U
SE +/- 687.79, N = 3
-lsystem -fexceptions -std=c++14
410239
Core i7 9750H
SE +/- 289.28, N = 3
-lsystem -fopenmp -std=c++14
206256
Ryzen 5 4500U
SE +/- 295.24, N = 3
194356
Ryzen 7 4700U
SE +/- 38.24, N = 3
-lsystem -fexceptions -std=c++14
159542
110K
220K
330K
440K
550K
1. (CXX) g++ options: -lpthread
toyBrot Fractal Generator
Implementation: C++ Tasks
ms, Fewer Is Better
Core i7 1065G7
SE +/- 1000.03, N = 3
-lsystem -fopenmp -std=c++14
507997
Core i7 8565U
SE +/- 418.67, N = 3
-lsystem -fexceptions -std=c++14
411439
Core i7 9750H
SE +/- 72.63, N = 3
-lsystem -fopenmp -std=c++14
206873
Ryzen 5 4500U
SE +/- 193.68, N = 3
181776
Ryzen 7 4700U
SE +/- 23.69, N = 3
-lsystem -fexceptions -std=c++14
147210
110K
220K
330K
440K
550K
1. (CXX) g++ options: -lpthread


toyBrot Fractal Generator
Implementation: C++ Threads
ms, Fewer Is Better
Core i7 1065G7
SE +/- 1152.47, N = 3
-lsystem -fopenmp -std=c++14
550754
Core i7 8565U
SE +/- 390.34, N = 3
-lsystem -fexceptions -std=c++14
411899
Core i7 9750H
SE +/- 462.54, N = 3
-lsystem -fopenmp -std=c++14
206428
Ryzen 5 4500U
SE +/- 447.36, N = 3
182471
Ryzen 7 4700U
SE +/- 36.30, N = 3
-lsystem -fexceptions -std=c++14
147637
120K
240K
360K
480K
600K
1. (CXX) g++ options: -lpthread
Selenium
Benchmark: ARES-6 - Browser: Firefox
ms, Fewer Is Better
Core i7 8565U
SE +/- 0.75, N = 3
57.54
Ryzen 5 4500U
SE +/- 0.53, N = 3
55.89
Ryzen 7 4700U
SE +/- 0.27, N = 3
54.97
Core i7 9750H
SE +/- 0.40, N = 3
53.91
Core i7 1065G7
SE +/- 0.27, N = 3
53.39
Ryzen 7 4800H-v1
SE +/- 0.28, N = 3
37.86
13
26
39
52
65
1. Core i7 8565U: firefox 76.0.1
2. Ryzen 5 4500U: firefox 76.0.1
3. Ryzen 7 4700U: firefox 76.0
4. Core i7 9750H: firefox 76.0.1
5. Core i7 1065G7: firefox 76.0.1
6. Ryzen 7 4800H-v1: firefox 77.0.1

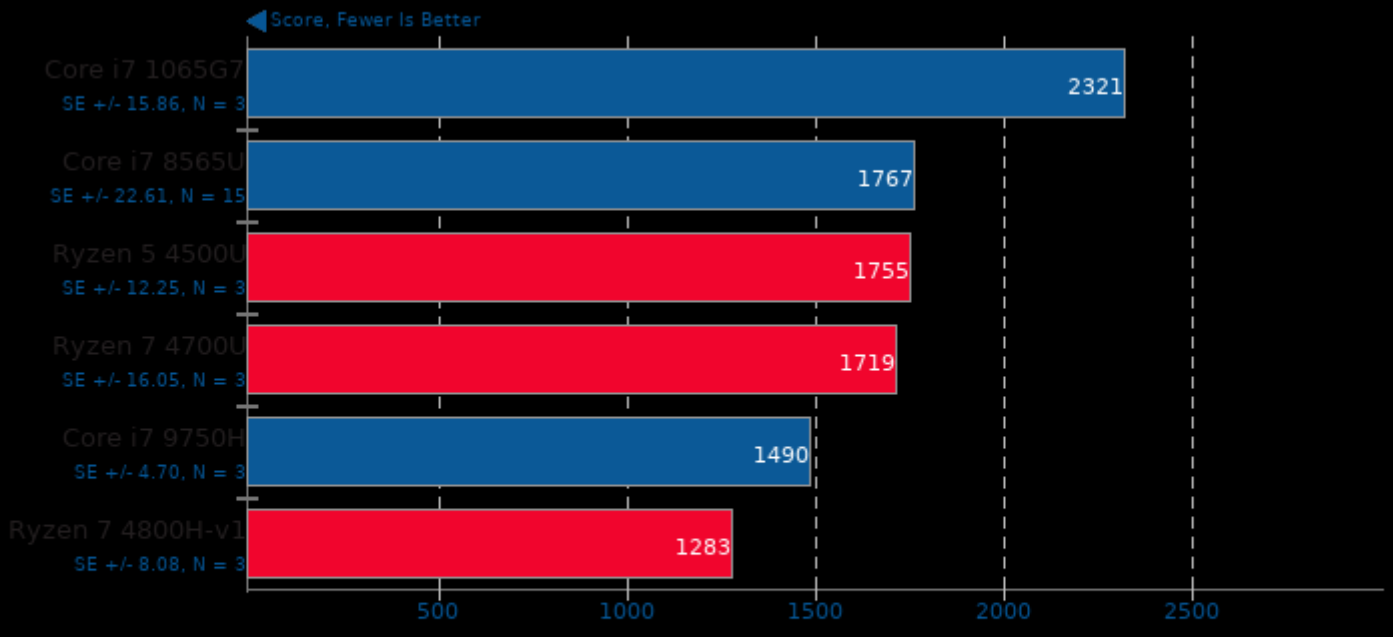

Selenium
Benchmark: Kraken - Browser: Firefox
ms, Fewer Is Better
Core i7 1065G7
SE +/- 2.65, N = 3
1098.8
Core i7 8565U
SE +/- 3.52, N = 3
968.4
Core i7 9750H
SE +/- 1.11, N = 3
929.6
Ryzen 5 4500U
SE +/- 6.01, N = 3
929.0
Ryzen 7 4700U
SE +/- 1.65, N = 3
921.1
Ryzen 7 4800H-v1
SE +/- 6.95, N = 3
742.2
200
400
600
800
1000
1. Core i7 1065G7: firefox 76.0.1
2. Core i7 8565U: firefox 76.0.1
3. Core i7 9750H: firefox 76.0.1
4. Ryzen 5 4500U: firefox 76.0.1
5. Ryzen 7 4700U: firefox 76.0
6. Ryzen 7 4800H-v1: firefox 77.0.1


Selenium
Benchmark: WASM imageConvolute - Browser: Firefox
ms, Fewer Is Better
Core i7 8565U
SE +/- 0.09, N = 3
32.7
Core i7 9750H
SE +/- 0.03, N = 3
31.4
Core i7 1065G7
SE +/- 0.39, N = 3
30.4
Ryzen 5 4500U
SE +/- 0.07, N = 3
28.8
Ryzen 7 4700U
SE +/- 0.03, N = 3
27.8
Ryzen 7 4800H-v1
SE +/- 0.09, N = 3
26.5
8
16
24
32
40
1. Core i7 8565U: firefox 76.0.1
2. Core i7 9750H: firefox 76.0.1
3. Core i7 1065G7: firefox 76.0.1
4. Ryzen 5 4500U: firefox 76.0.1
5. Ryzen 7 4700U: firefox 76.0
6. Ryzen 7 4800H-v1: firefox 77.0.1


Selenium
Benchmark: WASM collisionDetection - Browser: Firefox
ms, Fewer Is Better
Core i7 8565U
SE +/- 0.70, N = 3
524.6
Core i7 9750H
SE +/- 4.77, N = 3
504.6
Core i7 1065G7
SE +/- 2.00, N = 3
492.8
Ryzen 5 4500U
SE +/- 0.47, N = 3
392.8
Ryzen 7 4700U
SE +/- 0.07, N = 3
376.1
Ryzen 7 4800H-v1
SE +/- 0.26, N = 3
365.2
110
220
330
440
550
1. Core i7 8565U: firefox 76.0.1
2. Core i7 9750H: firefox 76.0.1
3. Core i7 1065G7: firefox 76.0.1
4. Ryzen 5 4500U: firefox 76.0.1
5. Ryzen 7 4700U: firefox 76.0
6. Ryzen 7 4800H-v1: firefox 77.0.1

Selenium

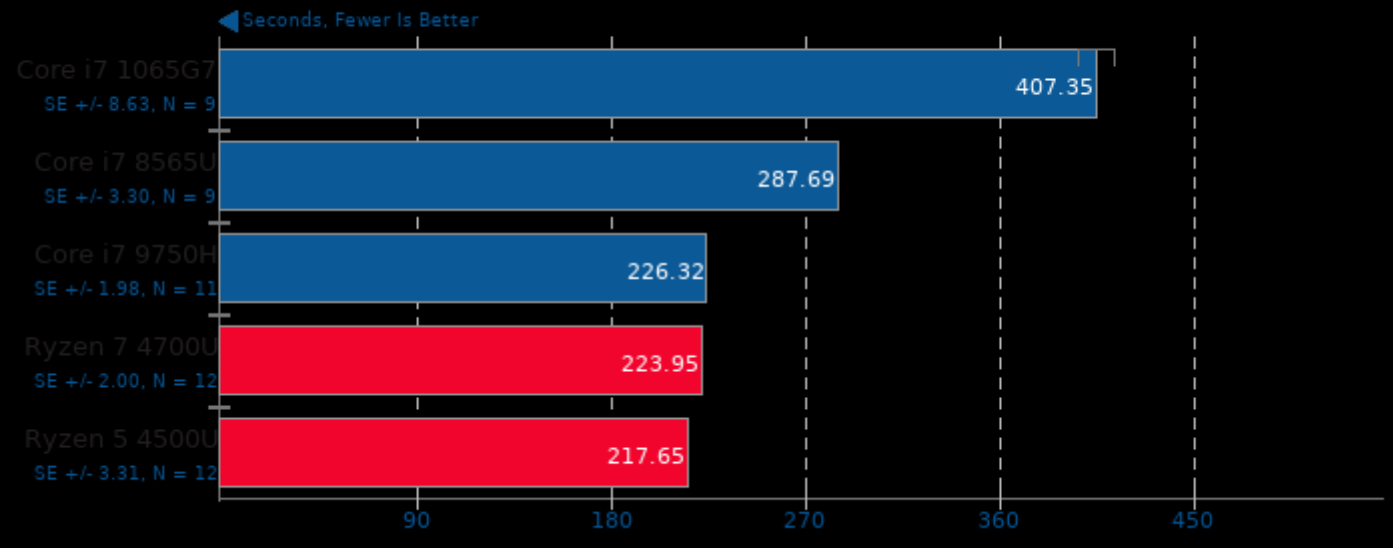
Benchmark: PSPDFKit WASM - Browser: Firefox

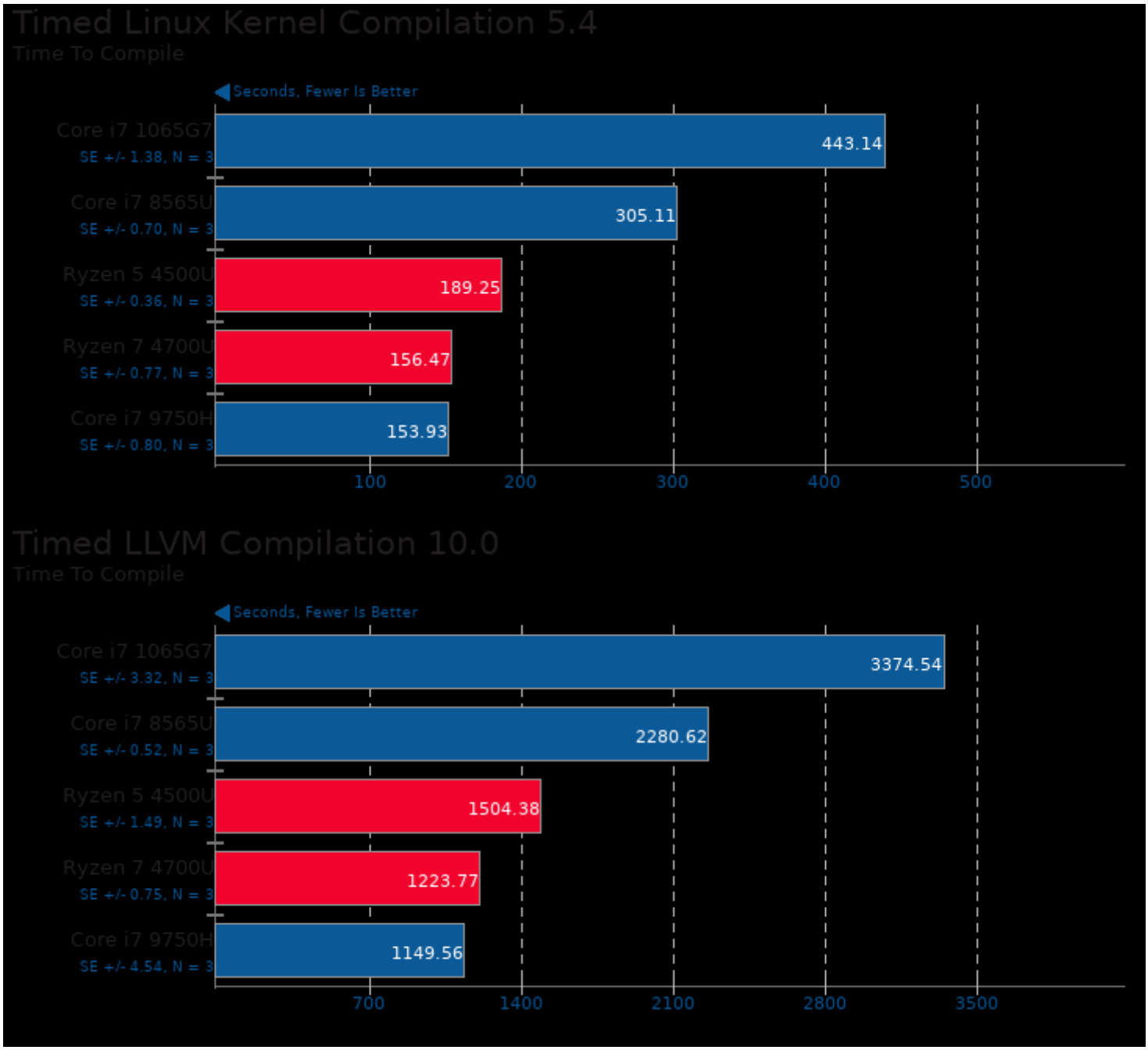


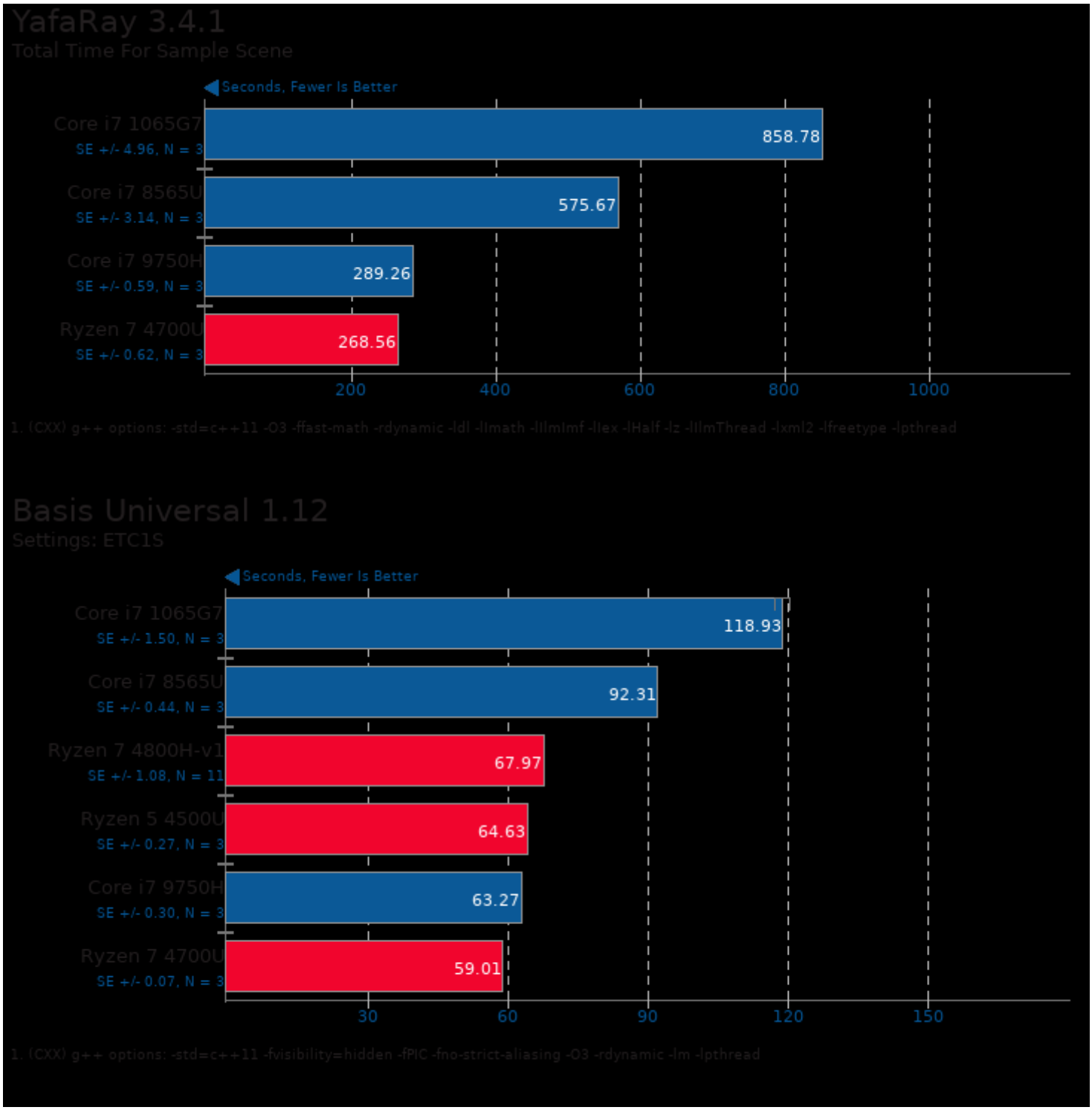
1. Core i7 1065G7: firefox 76.0.1
2. Core i7 8565U: firefox 76.0.1
3. Ryzen 5 4500U: firefox 76.0.1
4. Ryzen 7 4700U: firefox 76.0
5. Core i7 9750H: firefox 76.0.1
6. Ryzen 7 4800H-v1: firefox 77.0.1

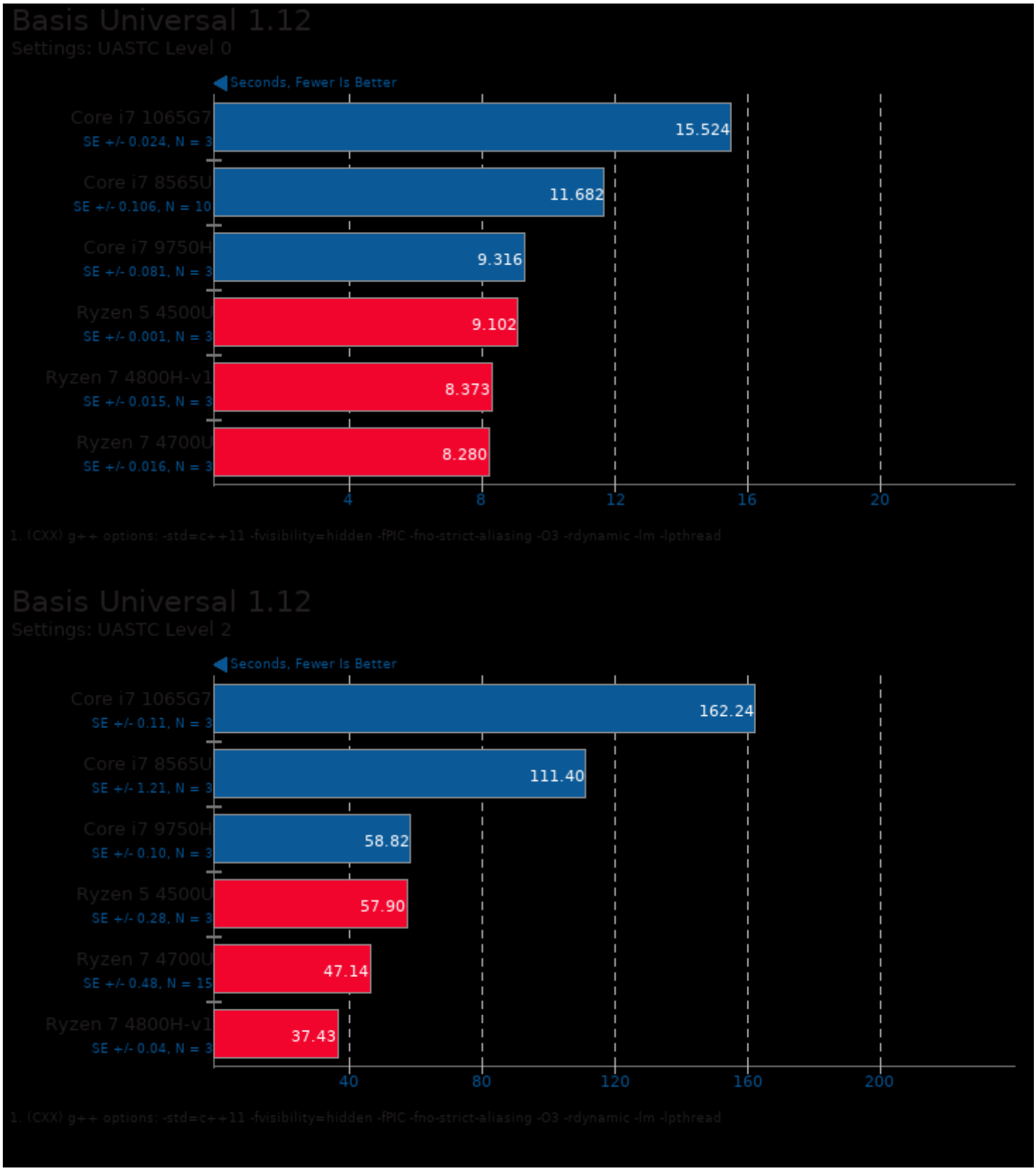
Java Gradle Build

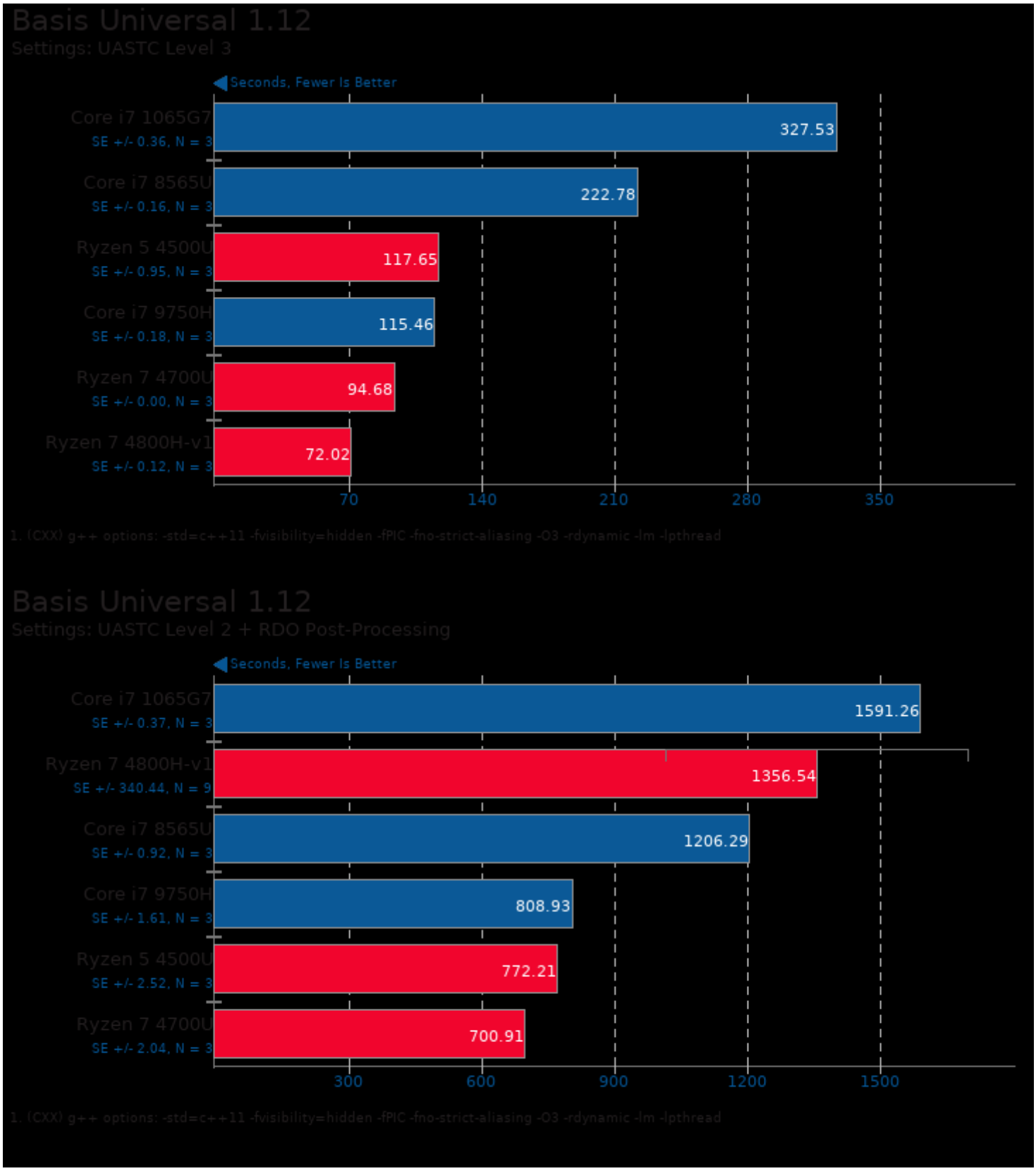
Gradle Build: Reactor

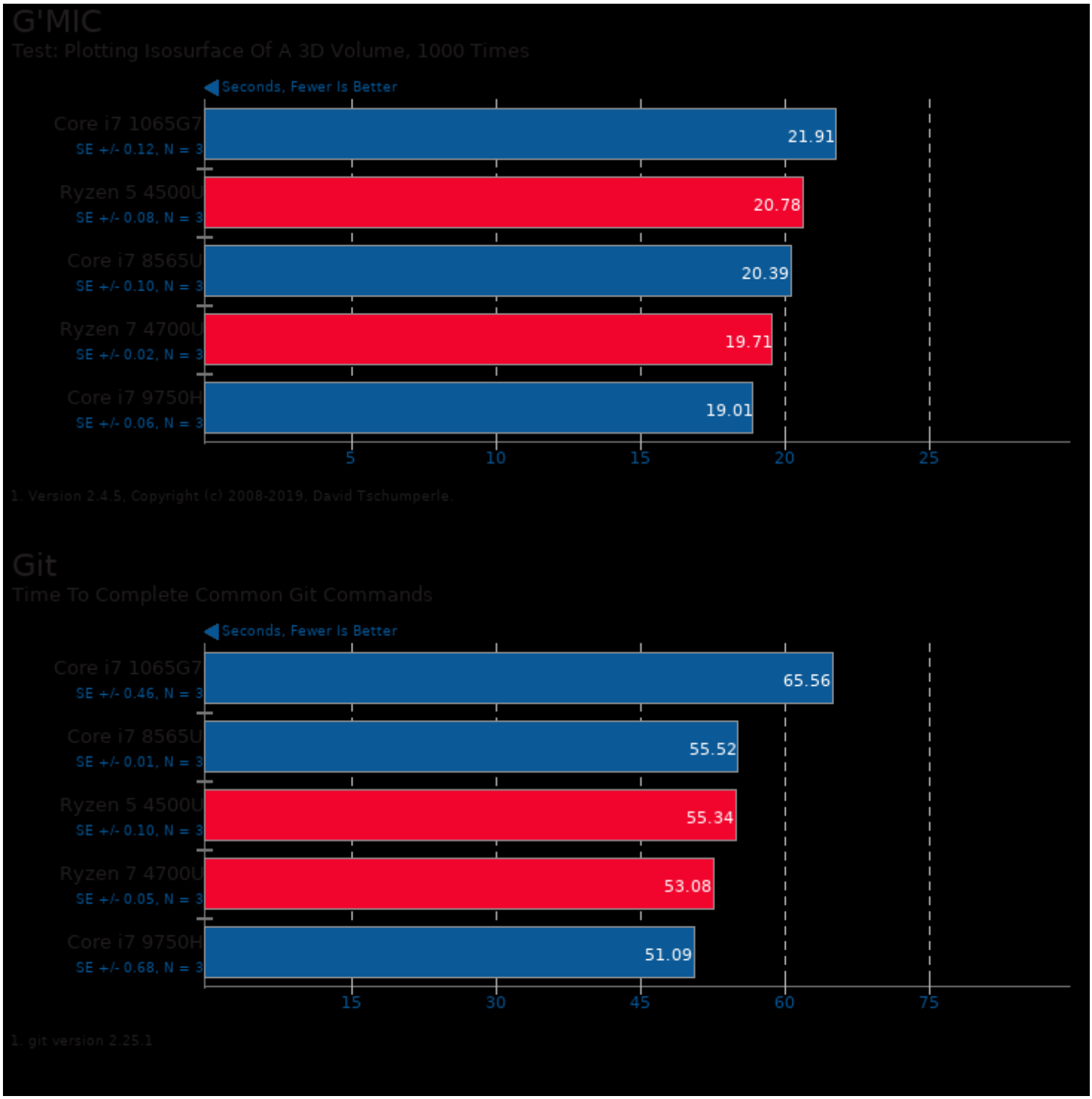


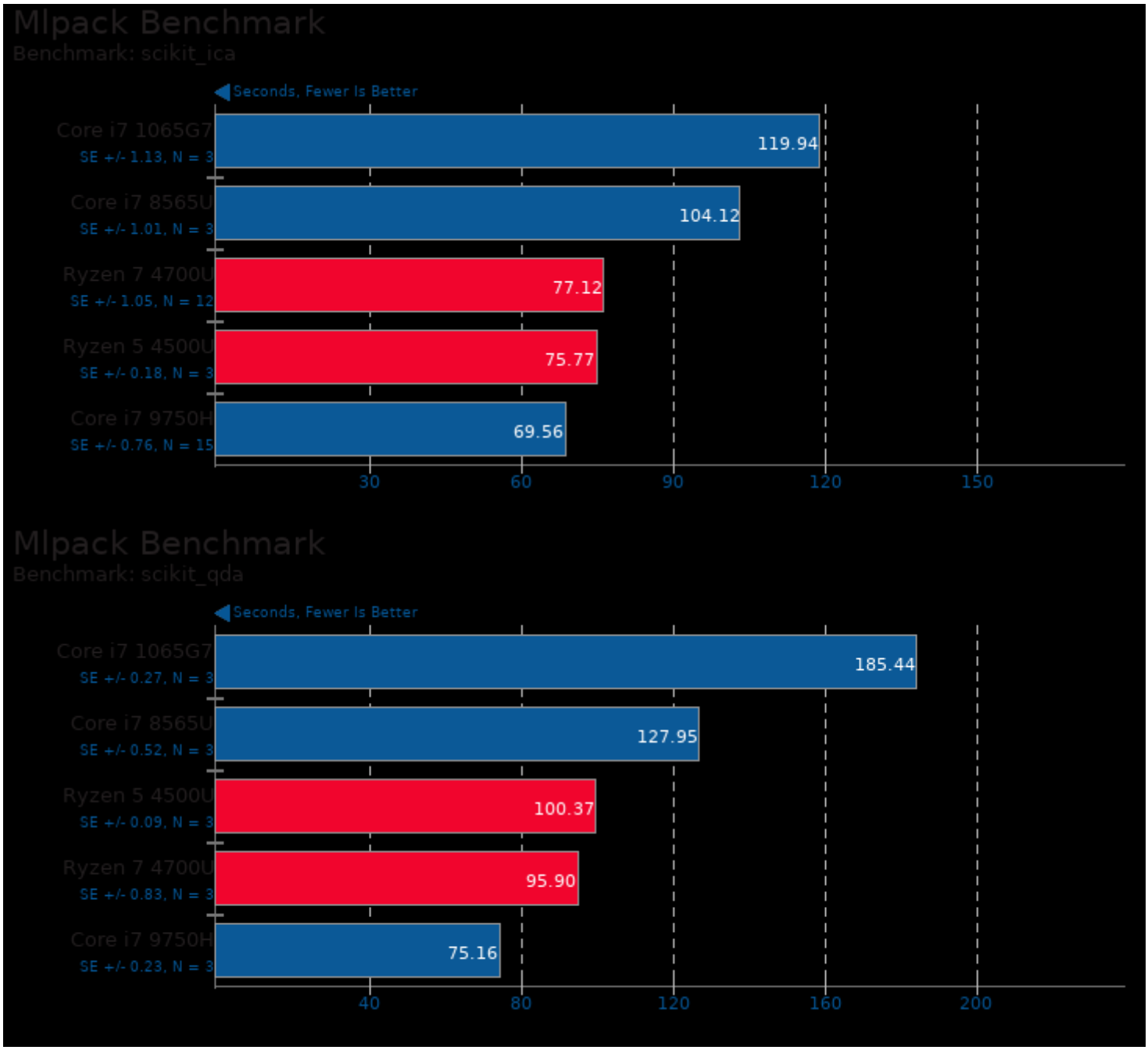

Timed Linux Kernel Compilation 5.4
Time To Compile
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 1.38, N = 3
443.14
Core i7 8565U
SE +/- 0.70, N = 3
305.11
Ryzen 5 4500U
SE +/- 0.36, N = 3
189.25
Ryzen 7 4700U
SE +/- 0.77, N = 3
156.47
Core i7 9750H
SE +/- 0.80, N = 3
153.93
100
200
300
400
500
Timed LLVM Compilation 10.0
Time To Compile
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 3.32, N = 3
3374.54
Core i7 8565U
SE +/- 0.52, N = 3
2280.62
Ryzen 5 4500U
SE +/- 1.49, N = 3
1504.38
Ryzen 7 4700U
SE +/- 0.75, N = 3
1223.77
Core i7 9750H
SE +/- 4.54, N = 3
1149.56
700
1400
2100
2800
3500

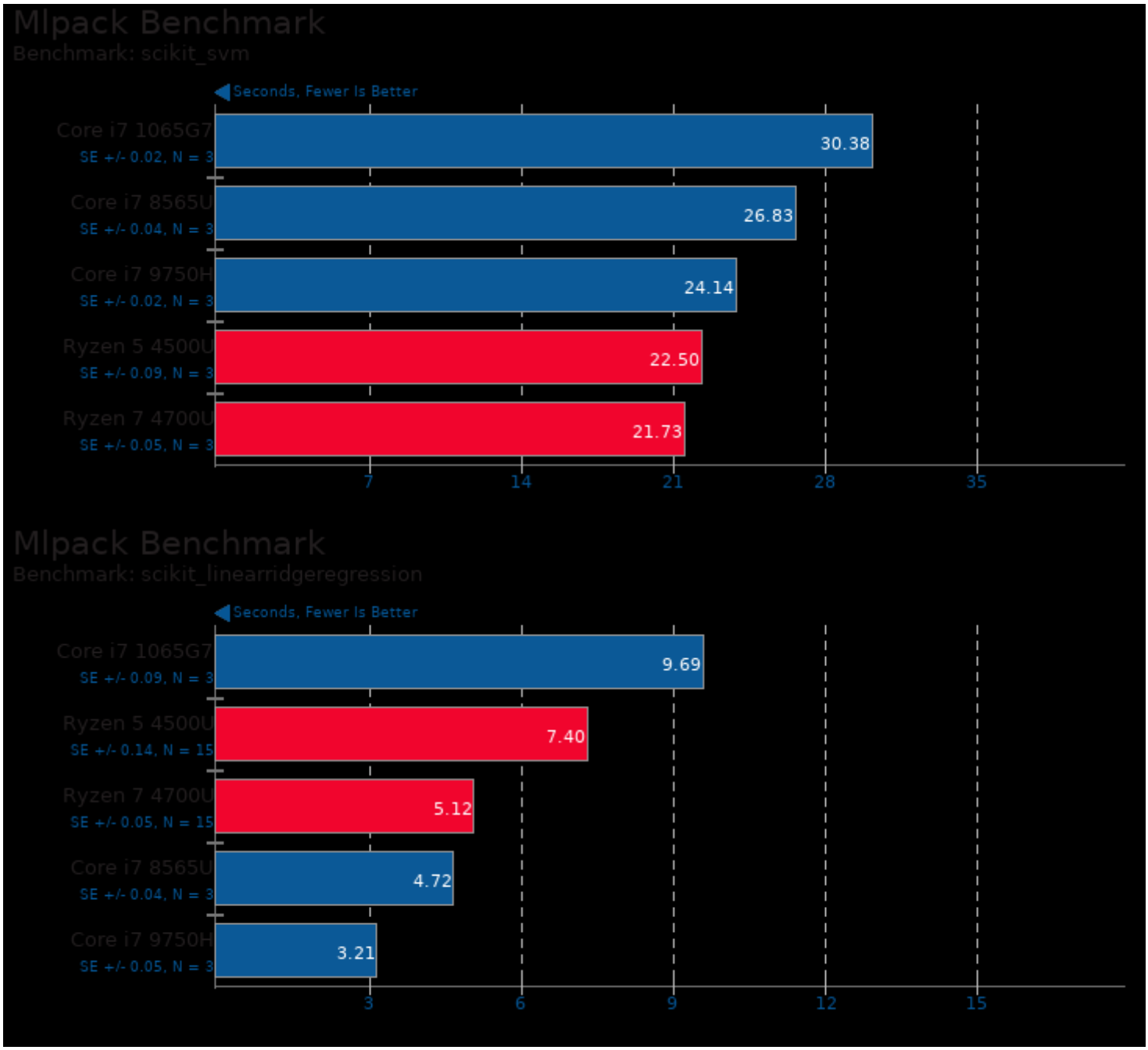

YafaRay 3.4.1
Total Time For Sample Scene
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 4.96, N = 3
858.78
Core i7 8565U
SE +/- 3.14, N = 3
575.67
Core i7 9750H
SE +/- 0.59, N = 3
289.26
Ryzen 7 4700U
SE +/- 0.62, N = 3
268.56
200
400
600
800
1000
1. (CXX) g++ options: -std=c++11 -O3 -ffast-math -rdynamic -ldl -lImath -lIlmImf -lIex -lHalf -lz -lIlmThread -lxml2 -lfreetype -lpthread
Basis Universal 1.12
Settings: ETC1S
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 1.50, N = 3
118.93
Core i7 8565U
SE +/- 0.44, N = 3
92.31
Ryzen 7 4800H-v1
SE +/- 1.08, N = 11
67.97
Ryzen 5 4500U
SE +/- 0.27, N = 3
64.63
Core i7 9750H
SE +/- 0.30, N = 3
63.27
Ryzen 7 4700U
SE +/- 0.07, N = 3
59.01
30
60
90
120
150
1. (CXX) g++ options: -std=c++11 -fvisibility=hidden -fPIC -fno-strict-aliasing -O3 -rdynamic -lm -lpthread

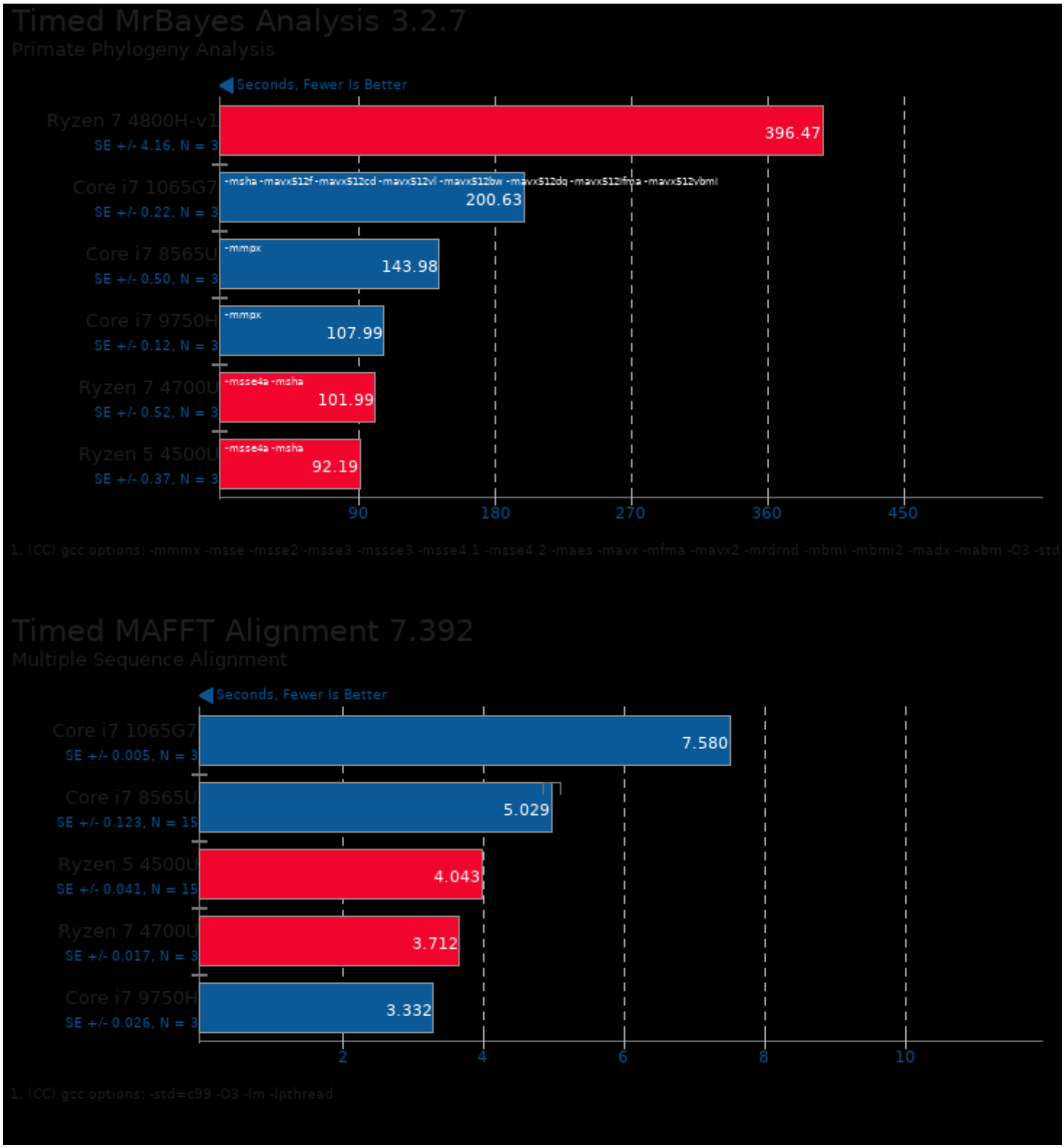

Basis Universal 1.12
Settings: UASTC Level 0
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.024, N = 3
15.524
Core i7 8565U
SE +/- 0.106, N = 10
11.682
Core i7 9750H
SE +/- 0.081, N = 3
9.316
Ryzen 5 4500U
SE +/- 0.001, N = 3
9.102
Ryzen 7 4800H-v1
SE +/- 0.015, N = 3
8.373
Ryzen 7 4700U
SE +/- 0.016, N = 3
8.280
4
8
12
16
20
1. (CXX) g++ options: -std=c++11 -fvisibility=hidden -fPIC -fno-strict-aliasing -O3 -rdynamic -lm -lpthread
Basis Universal 1.12
Settings: UASTC Level 2
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.11, N = 3
162.24
Core i7 8565U
SE +/- 1.21, N = 3
111.40
Core i7 9750H
SE +/- 0.10, N = 3
58.82
Ryzen 5 4500U
SE +/- 0.28, N = 3
57.90
Ryzen 7 4700U
SE +/- 0.48, N = 15
47.14
Ryzen 7 4800H-v1
SE +/- 0.04, N = 3
37.43
40
80
120
160
200
1. (CXX) g++ options: -std=c++11 -fvisibility=hidden -fPIC -fno-strict-aliasing -O3 -rdynamic -lm -lpthread

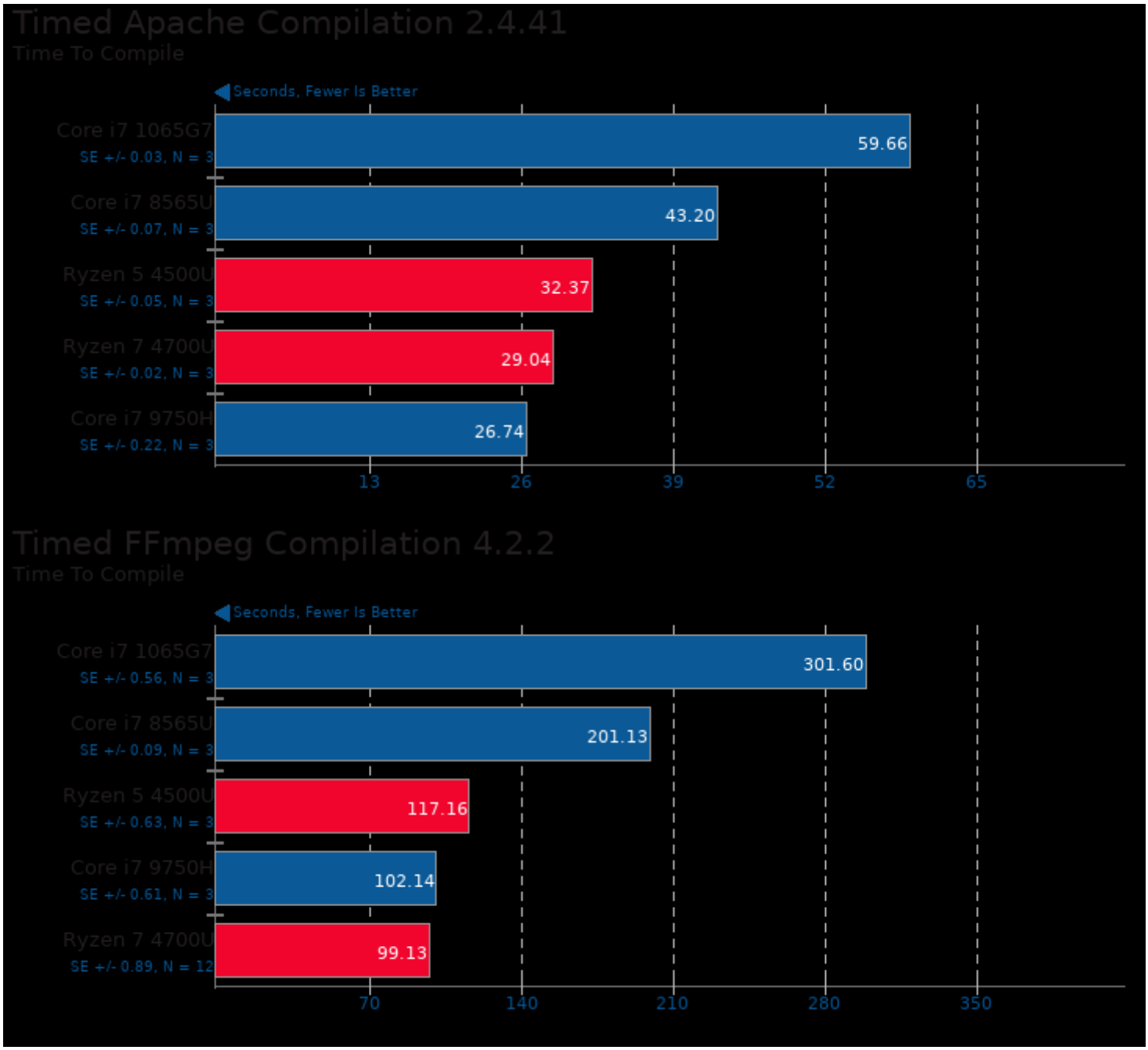

Basis Universal 1.12
Settings: UASTC Level 3
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.36, N = 3
327.53
Core i7 8565U
SE +/- 0.16, N = 3
222.78
Ryzen 5 4500U
SE +/- 0.95, N = 3
117.65
Core i7 9750H
SE +/- 0.18, N = 3
115.46
Ryzen 7 4700U
SE +/- 0.00, N = 3
94.68
Ryzen 7 4800H-v1
SE +/- 0.12, N = 3
72.02
70
140
210
280
350
1. (CXX) g++ options: -std=c++11 -fvisibility=hidden -fPIC -fno-strict-aliasing -O3 -rdynamic -lm -lpthread
Basis Universal 1.12
Settings: UASTC Level 2 + RDO Post-Processing
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.37, N = 3
1591.26
Ryzen 7 4800H-v1
SE +/- 340.44, N = 9
1356.54
Core i7 8565U
SE +/- 0.92, N = 3
1206.29
Core i7 9750H
SE +/- 1.61, N = 3
808.93
Ryzen 5 4500U
SE +/- 2.52, N = 3
772.21
Ryzen 7 4700U
SE +/- 2.04, N = 3
700.91
300
600
900
1200
1500
1. (CXX) g++ options: -std=c++11 -fvisibility=hidden -fPIC -fno-strict-aliasing -O3 -rdynamic -lm -lpthread

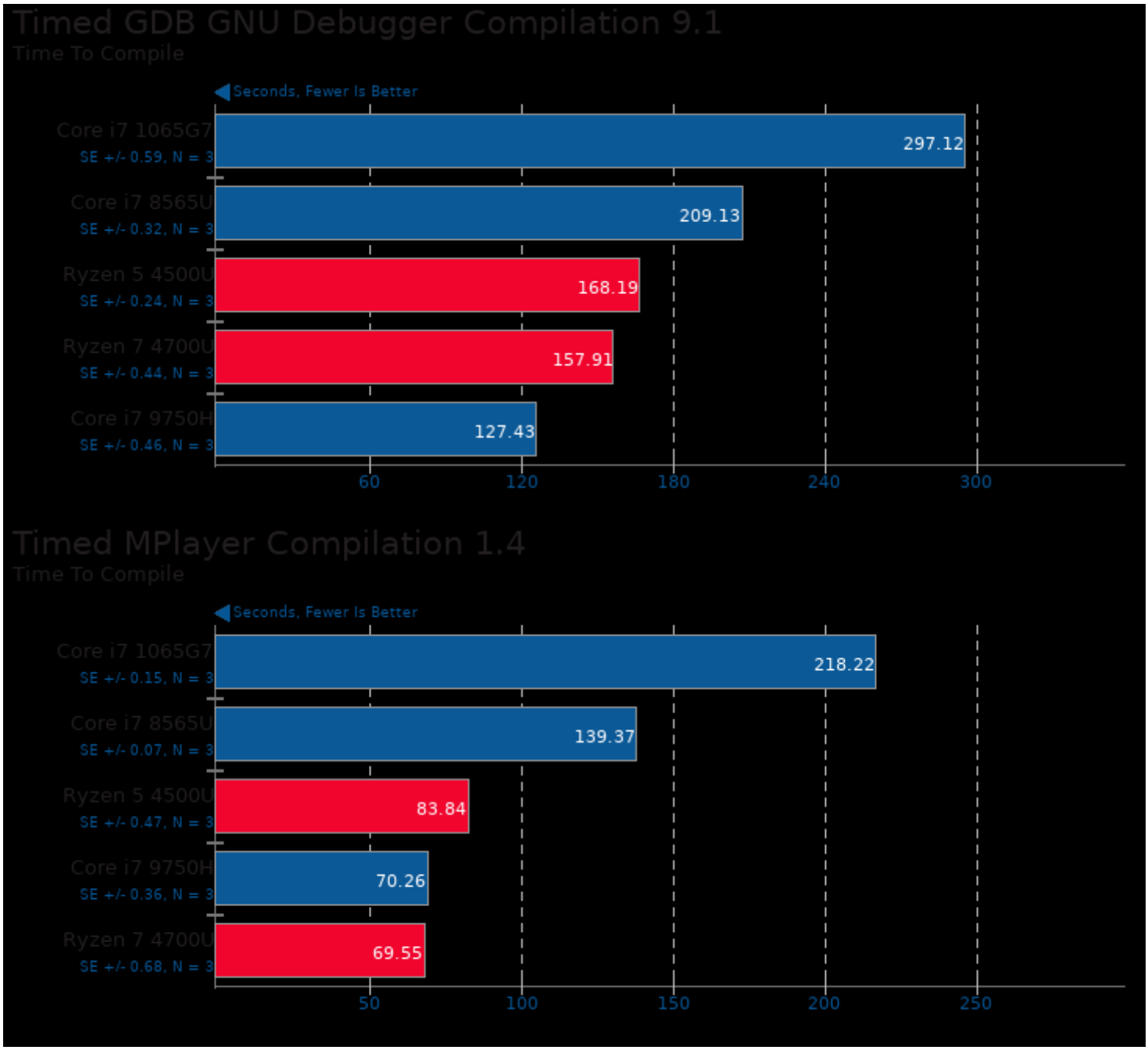

G'MIC
Test: Plotting Isosurface Of A 3D Volume, 1000 Times
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.12, N = 3
21.91
Ryzen 5 4500U
SE +/- 0.08, N = 3
20.78
Core i7 8565U
SE +/- 0.10, N = 3
20.39
Ryzen 7 4700U
SE +/- 0.02, N = 3
19.71
Core i7 9750H
SE +/- 0.06, N = 3
19.01
5
10
15
20
25
1. Version 2.4.5, Copyright (c) 2008-2019, David Tschumperle.
Git
Time To Complete Common Git Commands
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.46, N = 3
65.56
Core i7 8565U
SE +/- 0.01, N = 3
55.52
Ryzen 5 4500U
SE +/- 0.10, N = 3
55.34
Ryzen 7 4700U
SE +/- 0.05, N = 3
53.08
Core i7 9750H
SE +/- 0.68, N = 3
51.09
15
30
45
60
75
1. git version 2.25.1

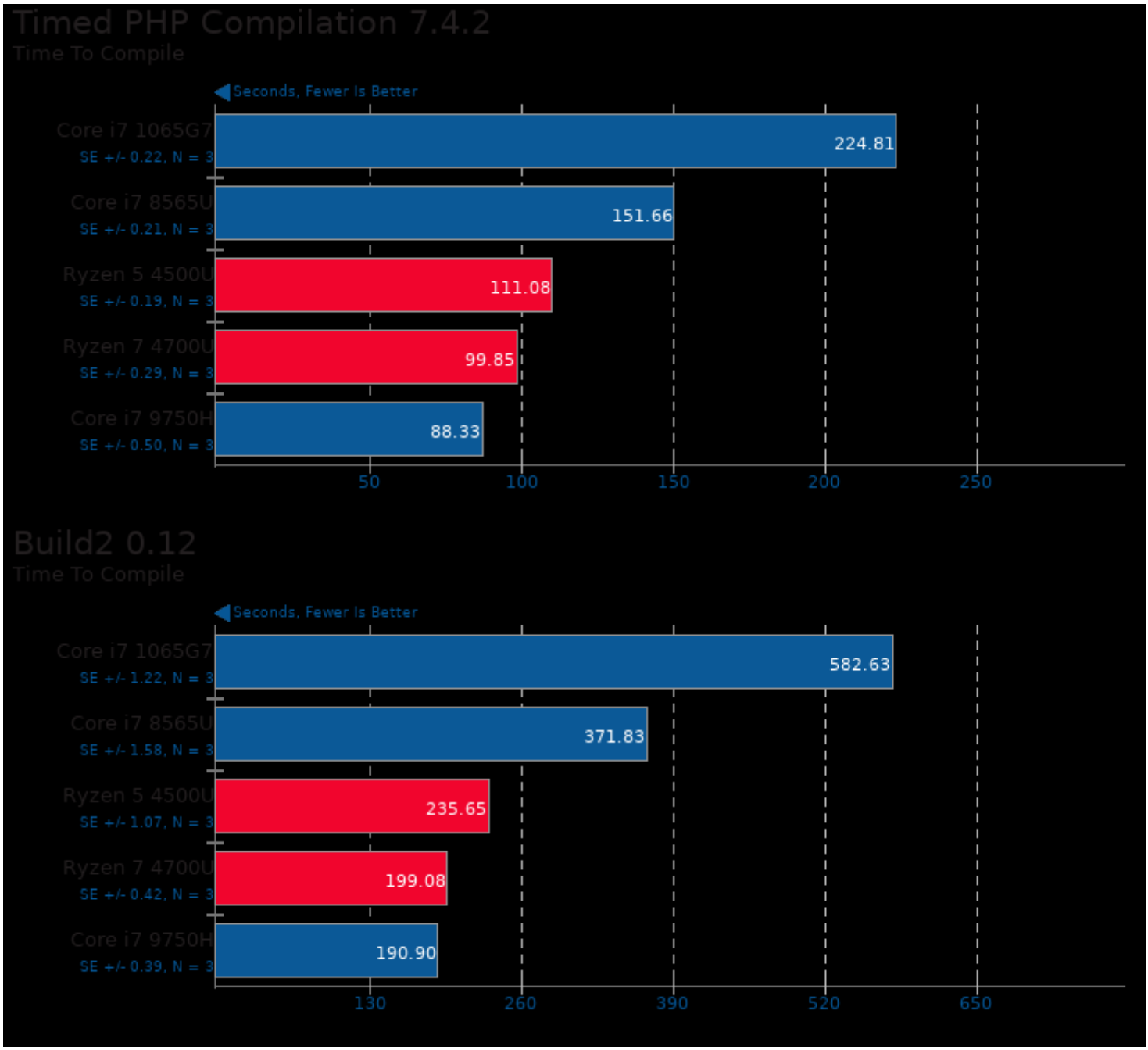

Mlpack Benchmark
Benchmark: scikit_ica
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 1.13, N = 3
119.94
Core i7 8565U
SE +/- 1.01, N = 3
104.12
Ryzen 7 4700U
SE +/- 1.05, N = 12
77.12
Ryzen 5 4500U
SE +/- 0.18, N = 3
75.77
Core i7 9750H
SE +/- 0.76, N = 15
69.56
30
60
90
120
150
Mlpack Benchmark
Benchmark: scikit_qda
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.27, N = 3
185.44
Core i7 8565U
SE +/- 0.52, N = 3
127.95
Ryzen 5 4500U
SE +/- 0.09, N = 3
100.37
Ryzen 7 4700U
SE +/- 0.83, N = 3
95.90
Core i7 9750H
SE +/- 0.23, N = 3
75.16
40
80
120
160
200

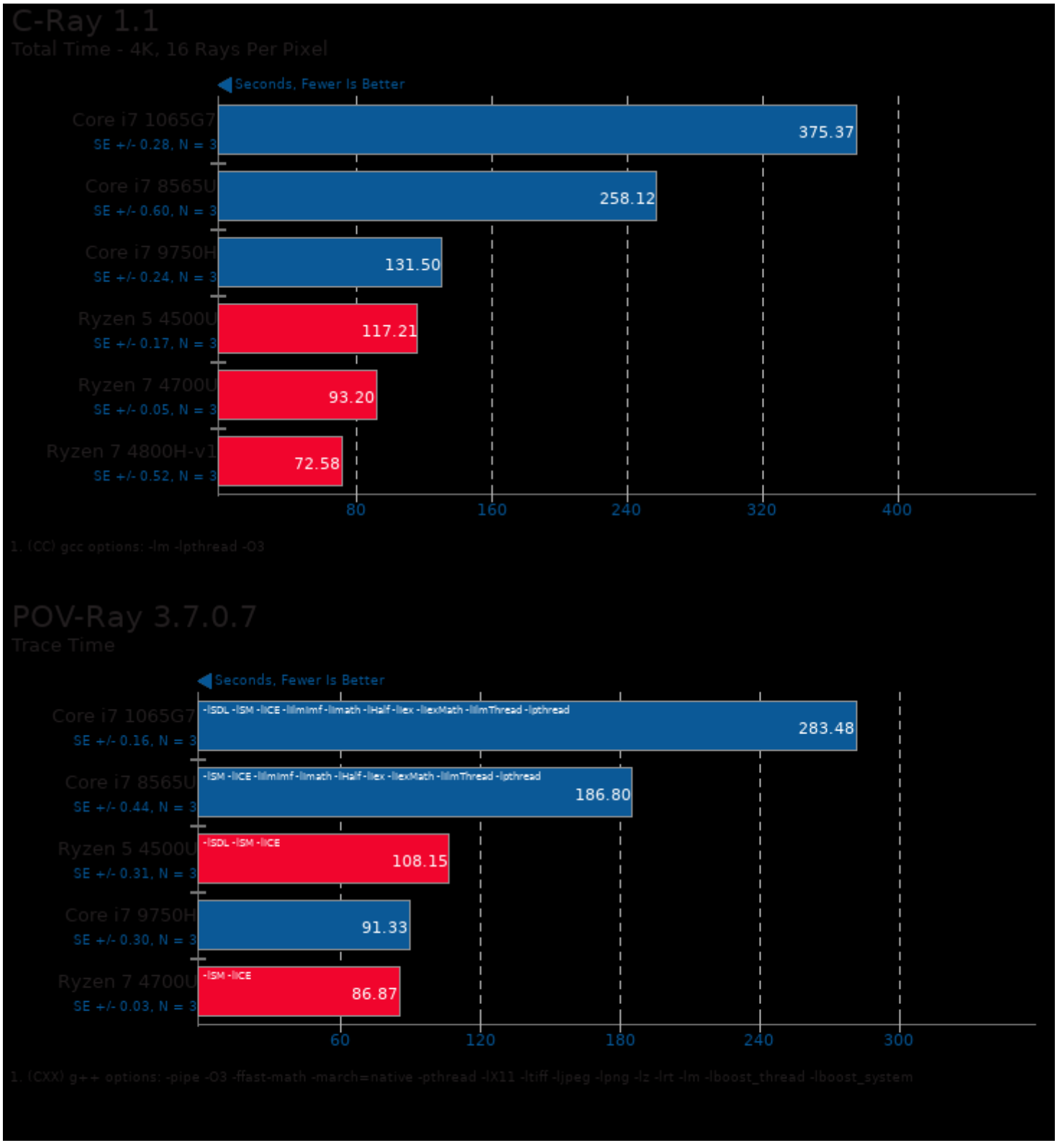

Mlpack Benchmark
Benchmark: scikit_svm
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.02, N = 3
30.38
Core i7 8565U
SE +/- 0.04, N = 3
26.83
Core i7 9750H
SE +/- 0.02, N = 3
24.14
Ryzen 5 4500U
SE +/- 0.09, N = 3
22.50
Ryzen 7 4700U
SE +/- 0.05, N = 3
21.73
7
14
21
28
35
Mlpack Benchmark
Benchmark: scikit_linearridgeregression
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.09, N = 3
9.69
Ryzen 5 4500U
SE +/- 0.14, N = 15
7.40
Ryzen 7 4700U
SE +/- 0.05, N = 15
5.12
Core i7 8565U
SE +/- 0.04, N = 3
4.72
Core i7 9750H
SE +/- 0.05, N = 3
3.21
3
6
9
12
15

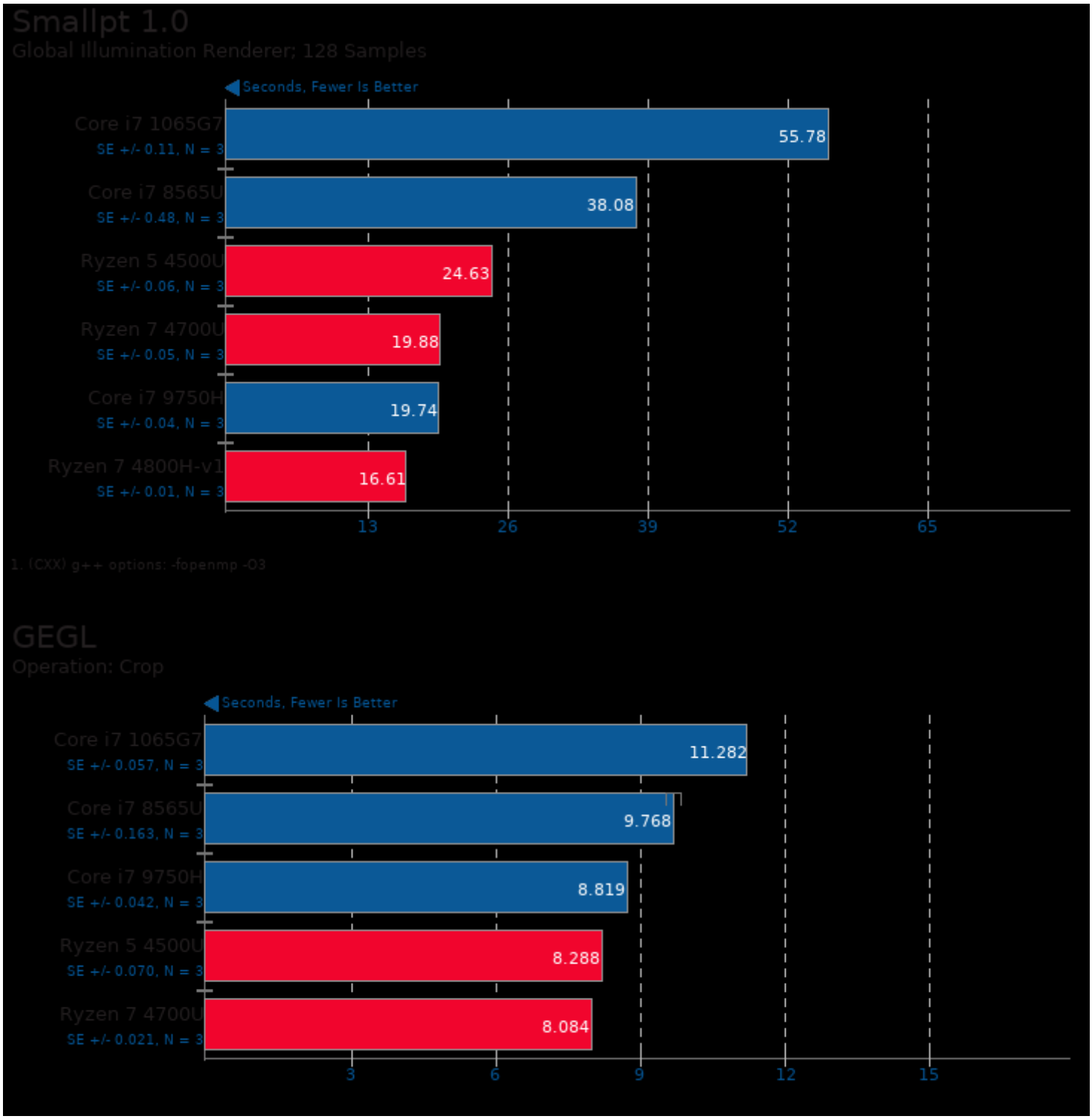

Timed MrBayes Analysis 3.2.7
Primate Phylogeny Analysis
Seconds, Fewer Is Better
Ryzen 7 4800H-v1
SE +/- 4.16, N = 3
396.47
Core i7 1065G7
SE +/- 0.22, N = 3
-msha -mavx512f -mavx512cd -mavx512vl -mavx512bw -mavx512dq -mavx512ifma -mavx512vbmi
200.63
Core i7 8565U
SE +/- 0.50, N = 3
-mmpx
143.98
Core i7 9750H
SE +/- 0.12, N = 3
-mmpx
107.99
Ryzen 7 4700U
SE +/- 0.52, N = 3
-msse4a -msha
101.99
Ryzen 5 4500U
SE +/- 0.37, N = 3
-msse4a -msha
92.19
90
180
270
360
450
1. (CC) gcc options: -mmmx -msse -msse2 -msse3 -mssse3 -msse4.1 -msse4.2 -maes -mavx -mfma -mavx2 -mrdrnd -mbmi -mbmi2 -madx -mabm -O3 -std
Timed MAFFT Alignment 7.392
Multiple Sequence Alignment
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.005, N = 3
7.580
Core i7 8565U
SE +/- 0.123, N = 15
5.029
Ryzen 5 4500U
SE +/- 0.041, N = 15
4.043
Ryzen 7 4700U
SE +/- 0.017, N = 3
3.712
Core i7 9750H
SE +/- 0.026, N = 3
3.332
2
4
6
8
10
1. (CC) gcc options: -std=c99 -O3 -lm -lpthread

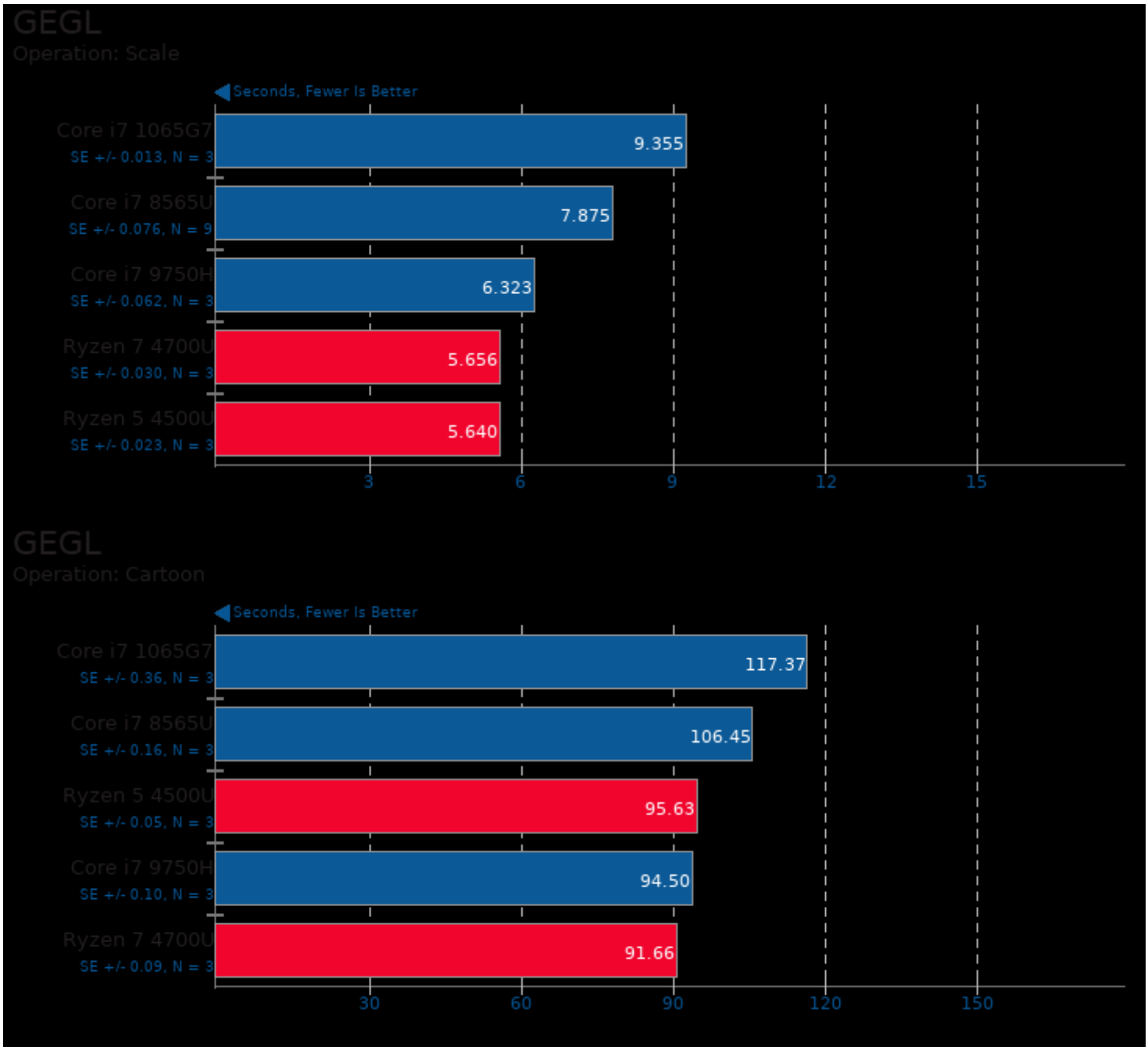

Timed Apache Compilation 2.4.41
Time To Compile
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.03, N = 3
59.66
Core i7 8565U
SE +/- 0.07, N = 3
43.20
Ryzen 5 4500U
SE +/- 0.05, N = 3
32.37
Ryzen 7 4700U
SE +/- 0.02, N = 3
29.04
Core i7 9750H
SE +/- 0.22, N = 3
26.74
13
26
39
52
65
Timed FFmpeg Compilation 4.2.2
Time To Compile
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.56, N = 3
301.60
Core i7 8565U
SE +/- 0.09, N = 3
201.13
Ryzen 5 4500U
SE +/- 0.63, N = 3
117.16
Core i7 9750H
SE +/- 0.61, N = 3
102.14
Ryzen 7 4700U
SE +/- 0.89, N = 12
99.13
70
140
210
280
350

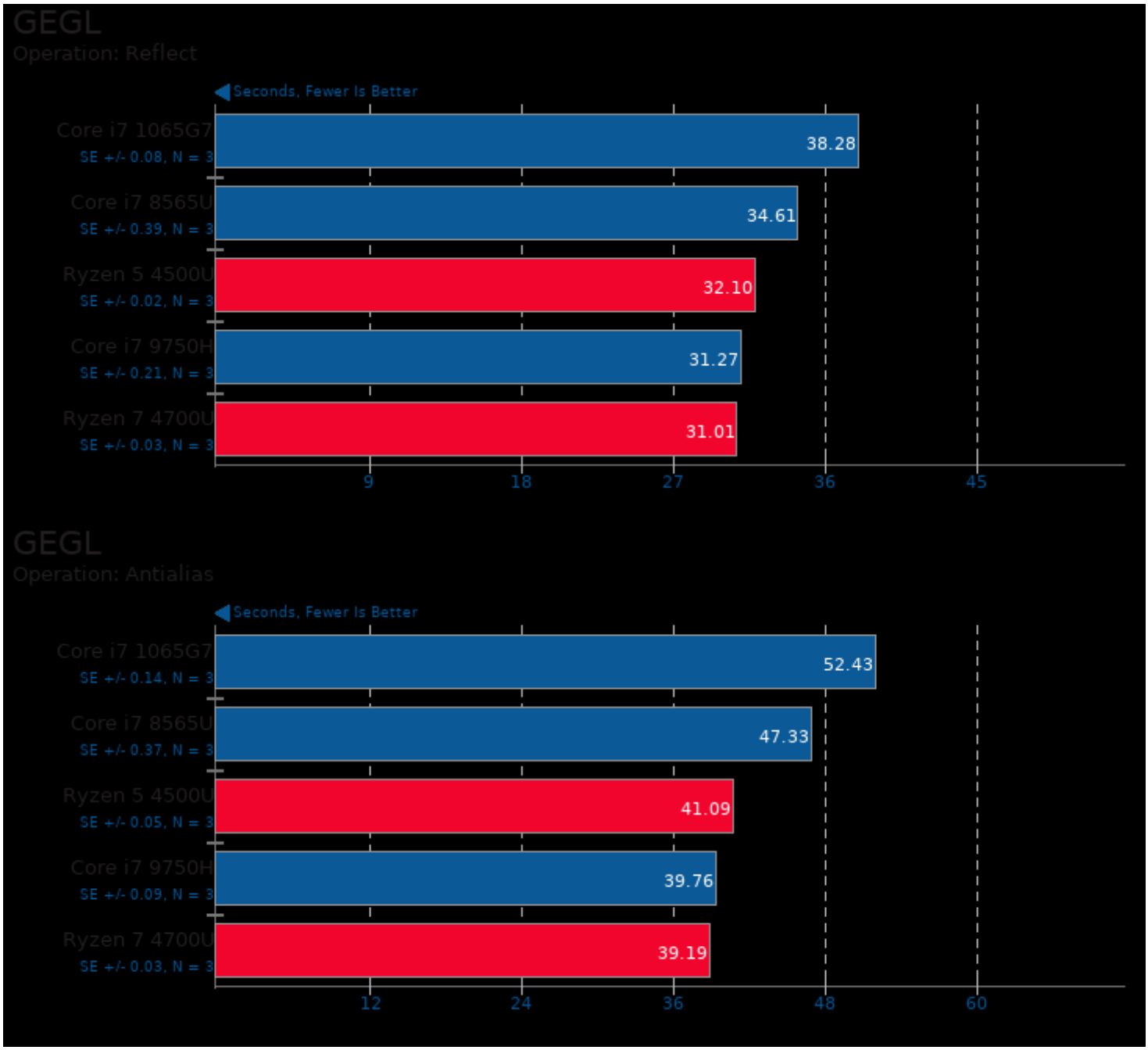

Timed GDB GNU Debugger Compilation 9.1
Time To Compile
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.59, N = 3
297.12
Core i7 8565U
SE +/- 0.32, N = 3
209.13
Ryzen 5 4500U
SE +/- 0.24, N = 3
168.19
Ryzen 7 4700U
SE +/- 0.44, N = 3
157.91
Core i7 9750H
SE +/- 0.46, N = 3
127.43
60
120
180
240
300
Timed MPlayer Compilation 1.4
Time To Compile
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.15, N = 3
218.22
Core i7 8565U
SE +/- 0.07, N = 3
139.37
Ryzen 5 4500U
SE +/- 0.47, N = 3
83.84
Core i7 9750H
SE +/- 0.36, N = 3
70.26
Ryzen 7 4700U
SE +/- 0.68, N = 3
69.55
50
100
150
200
250

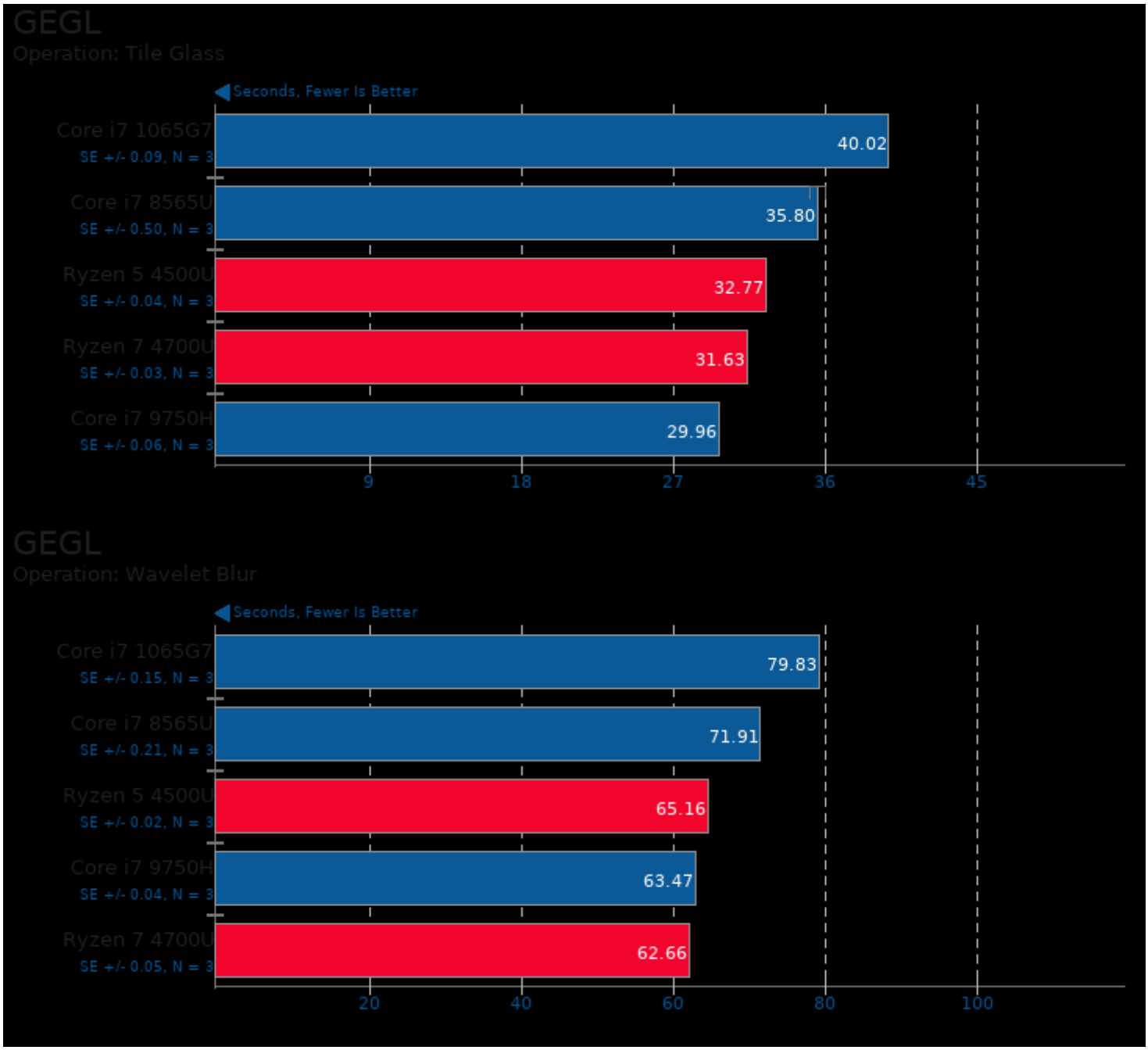

Timed PHP Compilation 7.4.2
Time To Compile
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.22, N = 3
224.81
Core i7 8565U
SE +/- 0.21, N = 3
151.66
Ryzen 5 4500U
SE +/- 0.19, N = 3
111.08
Ryzen 7 4700U
SE +/- 0.29, N = 3
99.85
Core i7 9750H
SE +/- 0.50, N = 3
88.33
50
100
150
200
250
Build2 0.12
Time To Compile
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 1.22, N = 3
582.63
Core i7 8565U
SE +/- 1.58, N = 3
371.83
Ryzen 5 4500U
SE +/- 1.07, N = 3
235.65
Ryzen 7 4700U
SE +/- 0.42, N = 3
199.08
Core i7 9750H
SE +/- 0.39, N = 3
190.90
130
260
390
520
650

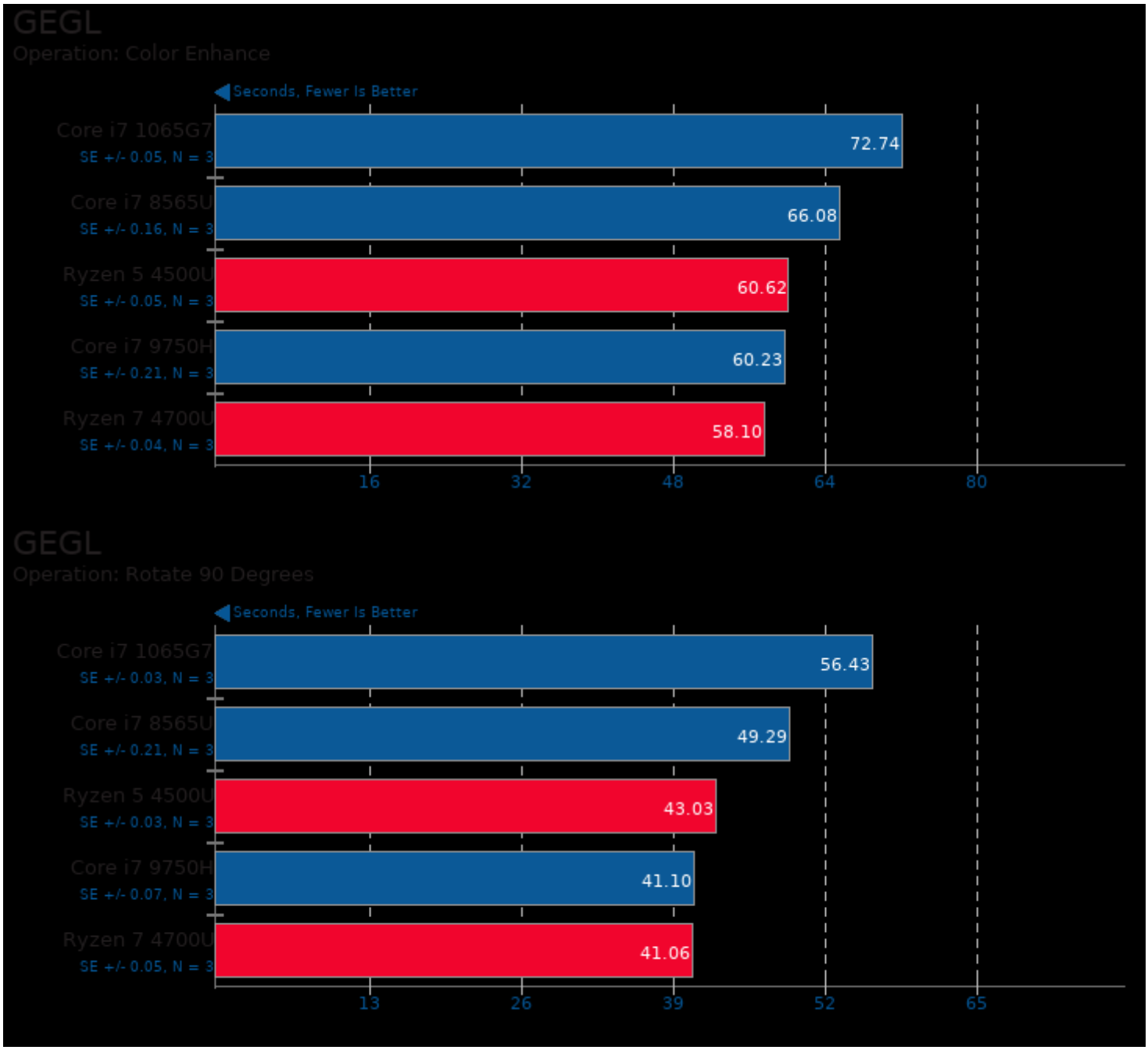

C-Ray 1.1
Total Time - 4K, 16 Rays Per Pixel
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.28, N = 3
375.37
Core i7 8565U
SE +/- 0.60, N = 3
258.12
Core i7 9750H
SE +/- 0.24, N = 3
131.50
Ryzen 5 4500U
SE +/- 0.17, N = 3
117.21
Ryzen 7 4700U
SE +/- 0.05, N = 3
93.20
Ryzen 7 4800H-v1
SE +/- 0.52, N = 3
72.58
80
160
240
320
400
1. (CC) gcc options: -lm -lpthread -O3
POV-Ray 3.7.0.7
Trace Time
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.16, N = 3
-lSDL -lSM -lICE -lIlmImf -lImath -lHalf -lIex -lIexMath -lIlmThread -lpthread
283.48
Core i7 8565U
SE +/- 0.44, N = 3
-lSM -lICE -lIlmImf -lImath -lHalf -lIex -lIexMath -lIlmThread -lpthread
186.80
Ryzen 5 4500U
SE +/- 0.31, N = 3
-lSDL -lSM -lICE
108.15
Core i7 9750H
SE +/- 0.30, N = 3
91.33
Ryzen 7 4700U
SE +/- 0.03, N = 3
-lSM -lICE
86.87
60
120
180
240
300
1. (CXX) g++ options: -pipe -O3 -ffast-math -march=native -pthread -lX11 -ltiff -ljpeg -lpng -lz -lrt -lm -lboost_thread -lboost_system

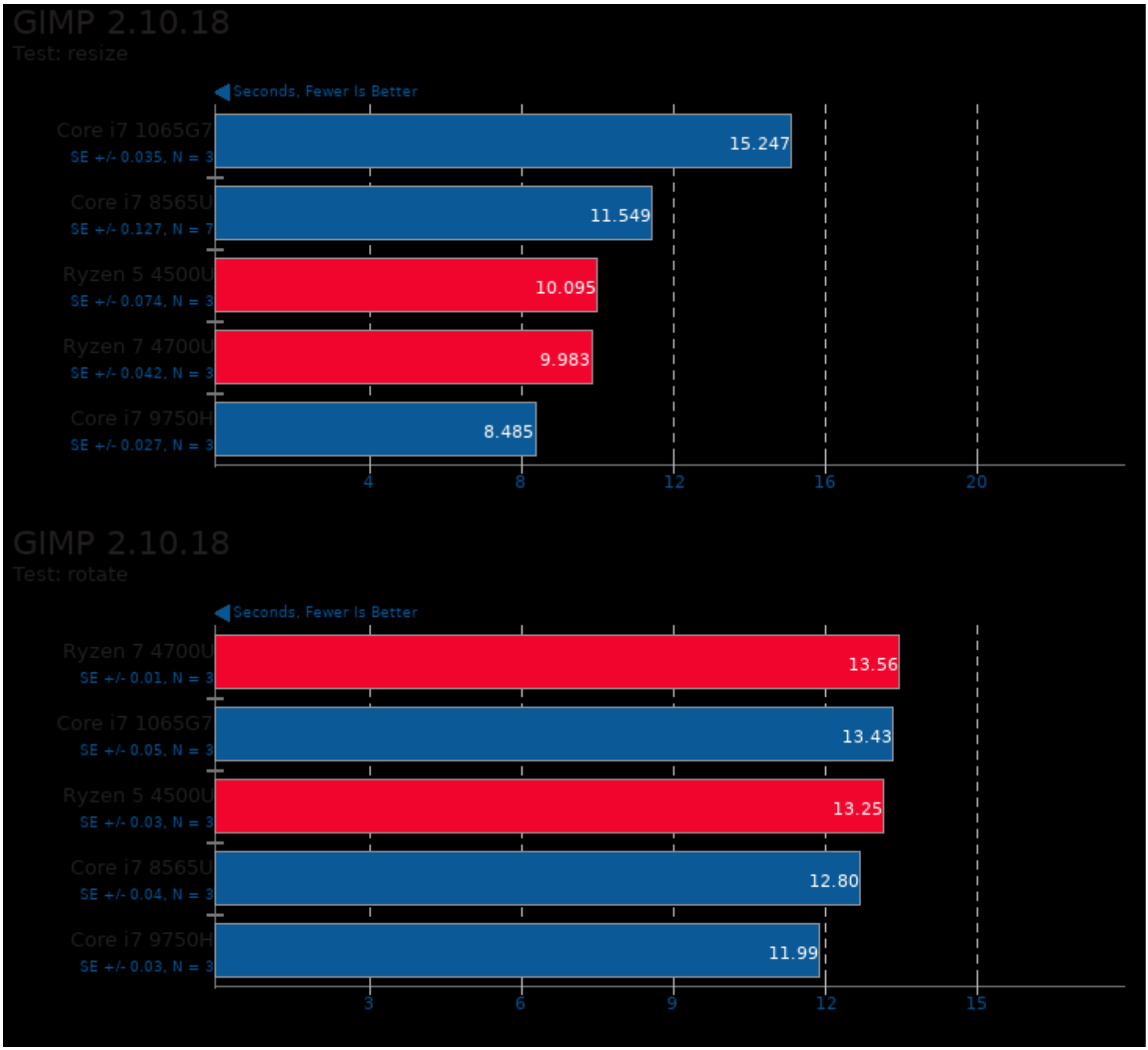

Smallpt 1.0
Global Illumination Renderer; 128 Samples
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.11, N = 3
55.78
Core i7 8565U
SE +/- 0.48, N = 3
38.08
Ryzen 5 4500U
SE +/- 0.06, N = 3
24.63
Ryzen 7 4700U
SE +/- 0.05, N = 3
19.88
Core i7 9750H
SE +/- 0.04, N = 3
19.74
Ryzen 7 4800H-v1
SE +/- 0.01, N = 3
16.61
13
26
39
52
65
1. (CXX) g++ options: -fopenmp -O3
GEGL
Operation: Crop
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.057, N = 3
11.282
Core i7 8565U
SE +/- 0.163, N = 3
9.768
Core i7 9750H
SE +/- 0.042, N = 3
8.819
Ryzen 5 4500U
SE +/- 0.070, N = 3
8.288
Ryzen 7 4700U
SE +/- 0.021, N = 3
8.084
3
6
9
12
15

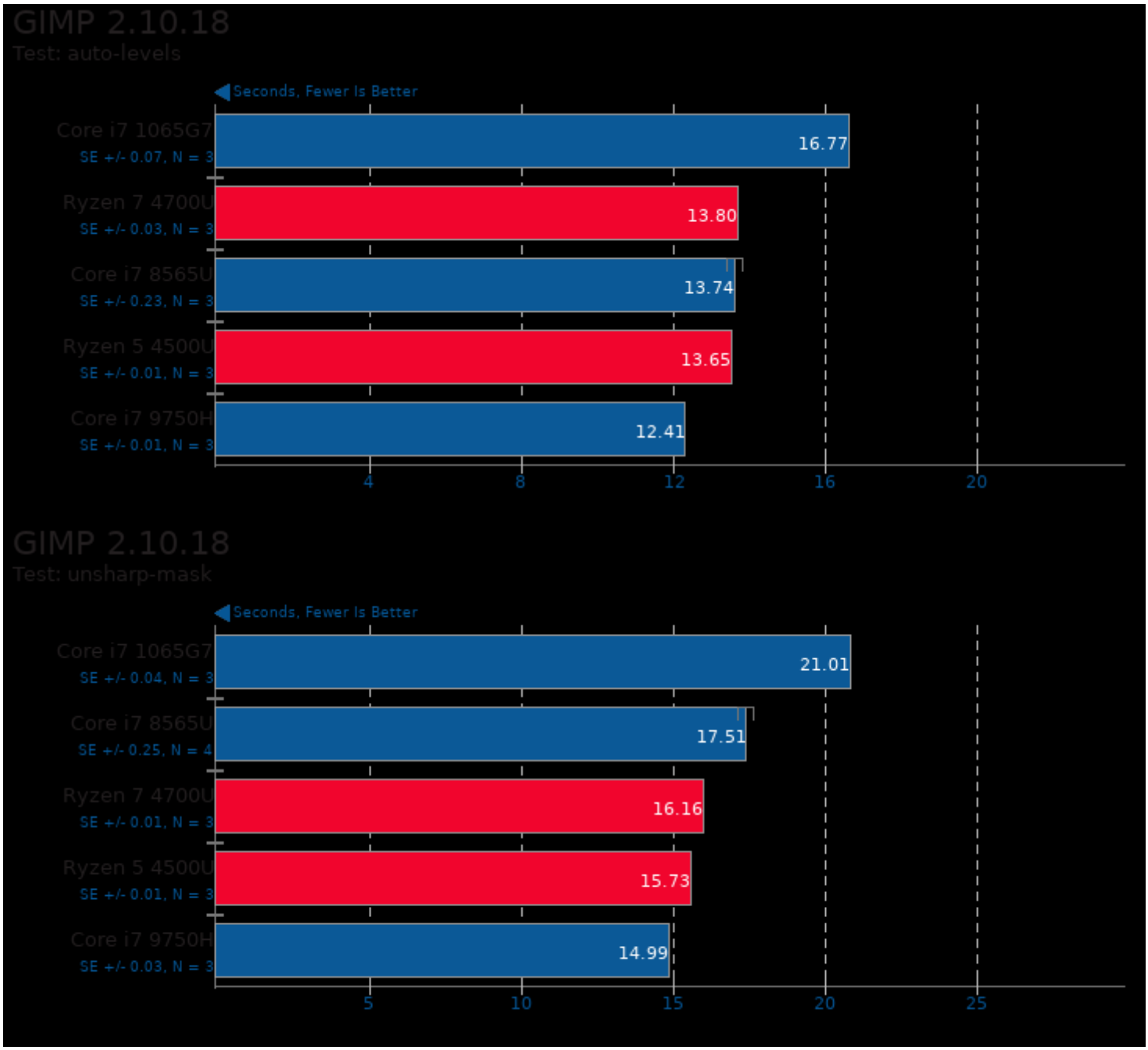

GEGL
Operation: Scale
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.013, N = 3
9.355
Core i7 8565U
SE +/- 0.076, N = 9
7.875
Core i7 9750H
SE +/- 0.062, N = 3
6.323
Ryzen 7 4700U
SE +/- 0.030, N = 3
5.656
Ryzen 5 4500U
SE +/- 0.023, N = 3
5.640
3
6
9
12
15
GEGL
Operation: Cartoon
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.36, N = 3
117.37
Core i7 8565U
SE +/- 0.16, N = 3
106.45
Ryzen 5 4500U
SE +/- 0.05, N = 3
95.63
Core i7 9750H
SE +/- 0.10, N = 3
94.50
Ryzen 7 4700U
SE +/- 0.09, N = 3
91.66
30
60
90
120
150

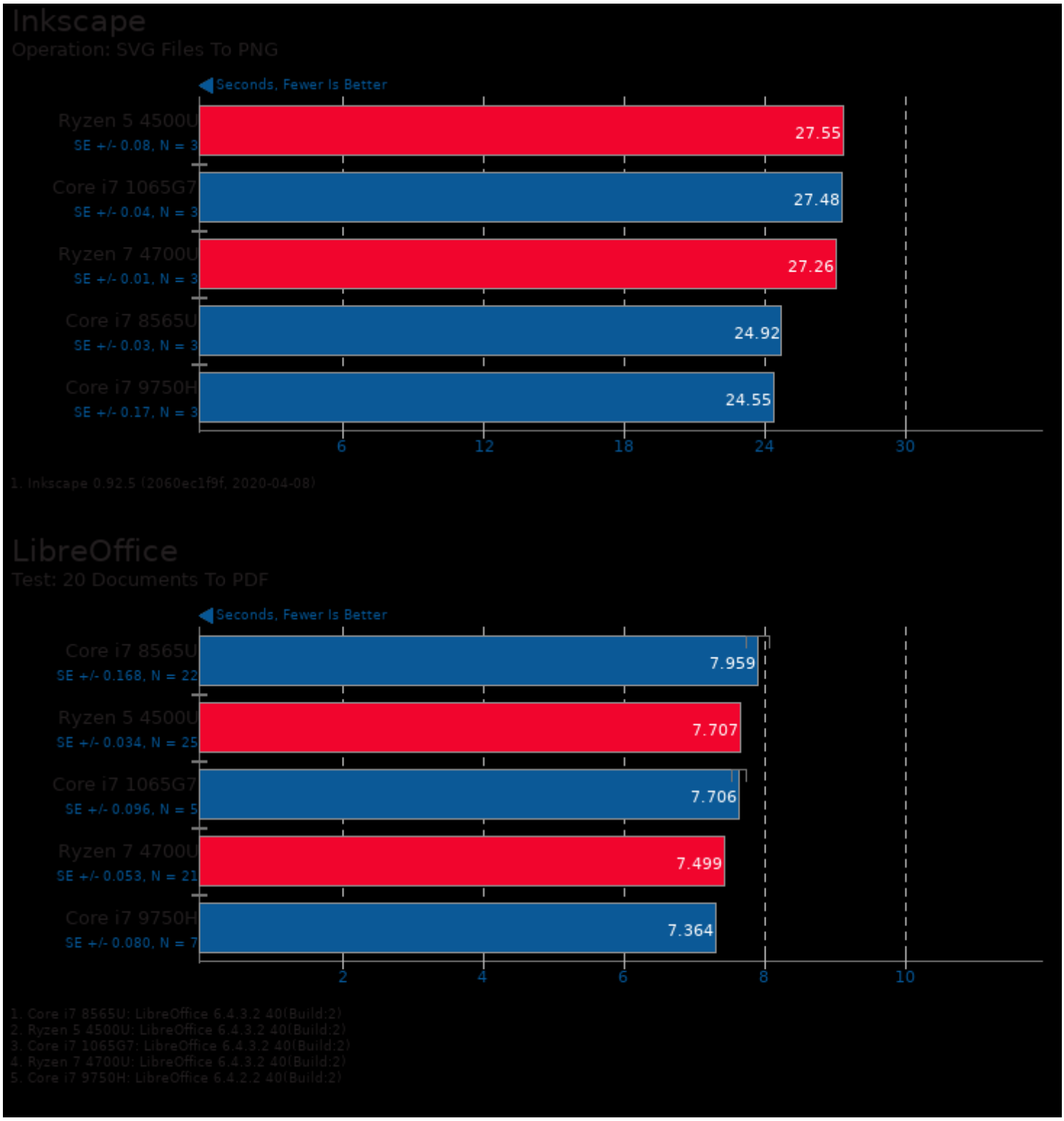

GEGL
Operation: Reflect
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.08, N = 3
38.28
Core i7 8565U
SE +/- 0.39, N = 3
34.61
Ryzen 5 4500U
SE +/- 0.02, N = 3
32.10
Core i7 9750H
SE +/- 0.21, N = 3
31.27
Ryzen 7 4700U
SE +/- 0.03, N = 3
31.01
9
18
27
36
45
GEGL
Operation: Antialias
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.14, N = 3
52.43
Core i7 8565U
SE +/- 0.37, N = 3
47.33
Ryzen 5 4500U
SE +/- 0.05, N = 3
41.09
Core i7 9750H
SE +/- 0.09, N = 3
39.76
Ryzen 7 4700U
SE +/- 0.03, N = 3
39.19
12
24
36
48
60


GEGL
Operation: Tile Glass
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.09, N = 3
40.02
Core i7 8565U
SE +/- 0.50, N = 3
35.80
Ryzen 5 4500U
SE +/- 0.04, N = 3
32.77
Ryzen 7 4700U
SE +/- 0.03, N = 3
31.63
Core i7 9750H
SE +/- 0.06, N = 3
29.96
9
18
27
36
45
GEGL
Operation: Wavelet Blur
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.15, N = 3
79.83
Core i7 8565U
SE +/- 0.21, N = 3
71.91
Ryzen 5 4500U
SE +/- 0.02, N = 3
65.16
Core i7 9750H
SE +/- 0.04, N = 3
63.47
Ryzen 7 4700U
SE +/- 0.05, N = 3
62.66
20
40
60
80
100


GEGL
Operation: Color Enhance
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.05, N = 3
72.74
Core i7 8565U
SE +/- 0.16, N = 3
66.08
Ryzen 5 4500U
SE +/- 0.05, N = 3
60.62
Core i7 9750H
SE +/- 0.21, N = 3
60.23
Ryzen 7 4700U
SE +/- 0.04, N = 3
58.10
16
32
48
64
80
GEGL
Operation: Rotate 90 Degrees
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.03, N = 3
56.43
Core i7 8565U
SE +/- 0.21, N = 3
49.29
Ryzen 5 4500U
SE +/- 0.03, N = 3
43.03
Core i7 9750H
SE +/- 0.07, N = 3
41.10
Ryzen 7 4700U
SE +/- 0.05, N = 3
41.06
13
26
39
52
65

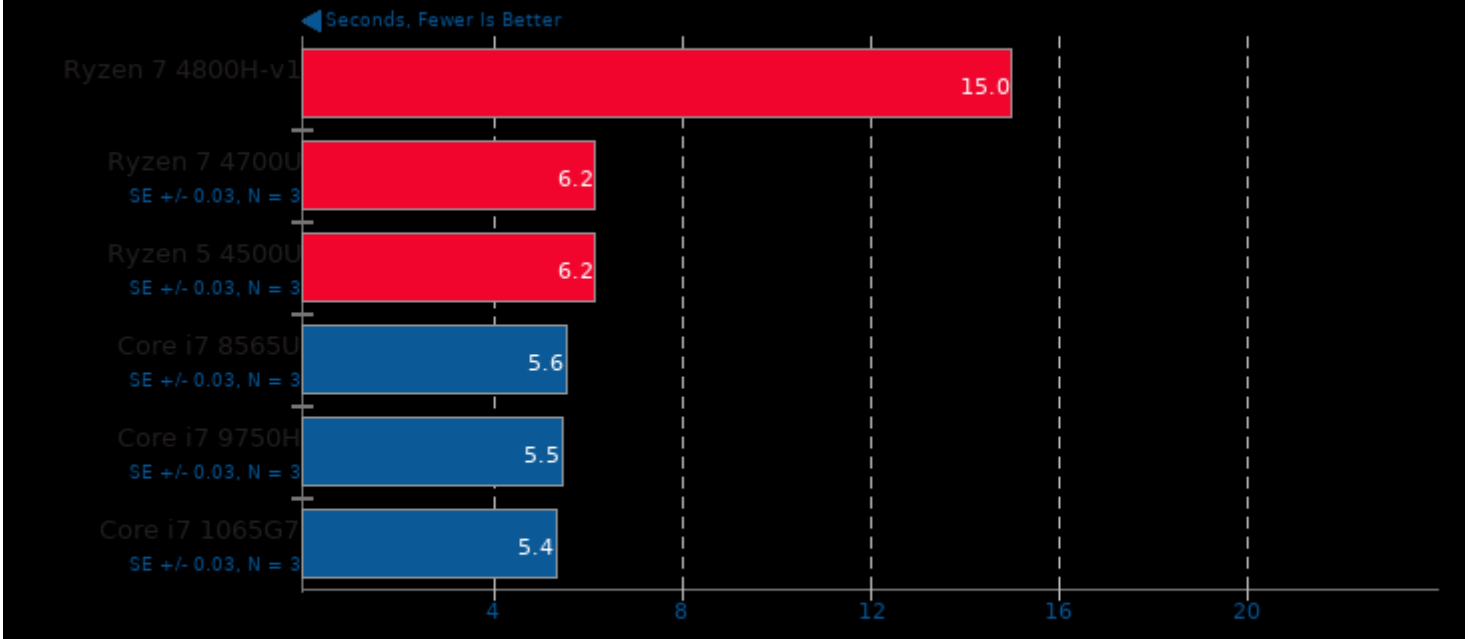

GIMP 2.10.18
Test: resize
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.035, N = 3
15.247
Core i7 8565U
SE +/- 0.127, N = 7
11.549
Ryzen 5 4500U
SE +/- 0.074, N = 3
10.095
Ryzen 7 4700U
SE +/- 0.042, N = 3
9.983
Core i7 9750H
SE +/- 0.027, N = 3
8.485
4
8
12
16
20
GIMP 2.10.18
Test: rotate
Seconds, Fewer Is Better
Ryzen 7 4700U
SE +/- 0.01, N = 3
13.56
Core i7 1065G7
SE +/- 0.05, N = 3
13.43
Ryzen 5 4500U
SE +/- 0.03, N = 3
13.25
Core i7 8565U
SE +/- 0.04, N = 3
12.80
Core i7 9750H
SE +/- 0.03, N = 3
11.99
3
6
9
12
15


GIMP 2.10.18
Test: auto-levels
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.07, N = 3
16.77
Ryzen 7 4700U
SE +/- 0.03, N = 3
13.80
Core i7 8565U
SE +/- 0.23, N = 3
13.74
Ryzen 5 4500U
SE +/- 0.01, N = 3
13.65
Core i7 9750H
SE +/- 0.01, N = 3
12.41
4
8
12
16
20
GIMP 2.10.18
Test: unsharp-mask
Seconds, Fewer Is Better
Core i7 1065G7
SE +/- 0.04, N = 3
21.01
Core i7 8565U
SE +/- 0.25, N = 4
17.51
Ryzen 7 4700U
SE +/- 0.01, N = 3
16.16
Ryzen 5 4500U
SE +/- 0.01, N = 3
15.73
Core i7 9750H
SE +/- 0.03, N = 3
14.99
5
10
15
20
25


Inkscape
Operation: SVG Files To PNG
Seconds, Fewer Is Better
Ryzen 5 4500U
SE +/- 0.08, N = 3
27.55
Core i7 1065G7
SE +/- 0.04, N = 3
27.48
Ryzen 7 4700U
SE +/- 0.01, N = 3
27.26
Core i7 8565U
SE +/- 0.03, N = 3
24.92
Core i7 9750H
SE +/- 0.17, N = 3
24.55
6
12
18
24
30
1. Inkscape 0.92.5 (2060ec1f9f, 2020-04-08)
LibreOffice
Test: 20 Documents To PDF
Seconds, Fewer Is Better
Core i7 8565U
SE +/- 0.168, N = 22
7.959
Ryzen 5 4500U
SE +/- 0.034, N = 25
7.707
Core i7 1065G7
SE +/- 0.096, N = 5
7.706
Ryzen 7 4700U
SE +/- 0.053, N = 21
7.499
Core i7 9750H
SE +/- 0.080, N = 7
7.364
2
4
6
8
10
1. Core i7 8565U: LibreOffice 6.4.3.2 40(Build:2)
2. Ryzen 5 4500U: LibreOffice 6.4.3.2 40(Build:2)
3. Core i7 1065G7: LibreOffice 6.4.3.2 40(Build:2)
4. Ryzen 7 4700U: LibreOffice 6.4.3.2 40(Build:2)
5. Core i7 9750H: LibreOffice 6.4.2.2 40(Build:2)

Selenium

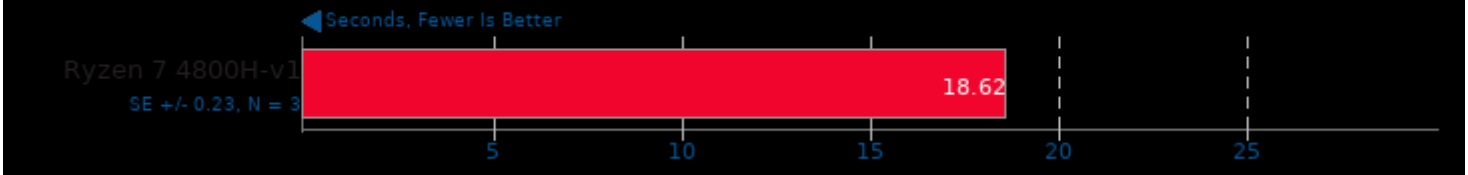
Benchmark: Maze Solver - Browser: Firefox



1. Ryzen 7 4800H-v1: firefox 77.0.1
2. Ryzen 7 4700U: firefox 76.0
3. Ryzen 5 4500U: firefox 76.0.1
4. Core i7 8565U: firefox 76.0.1
5. Core i7 9750H: firefox 76.0.1
6. Core i7 1065G7: firefox 76.0.1

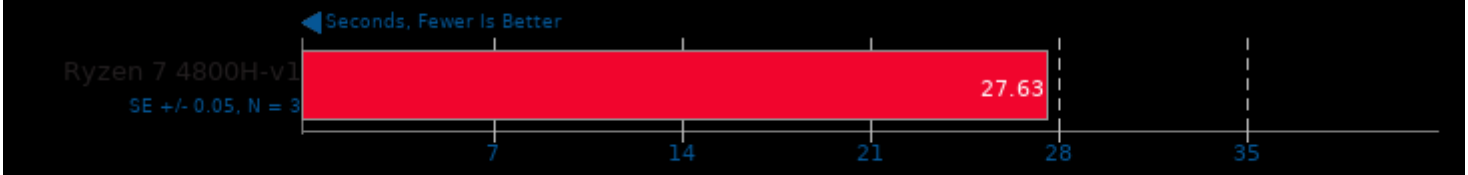
GIMP 2.10.0

Test: resize



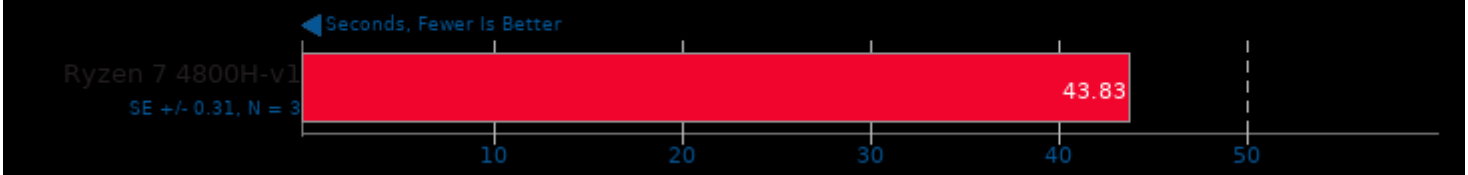
GIMP 2.10.0

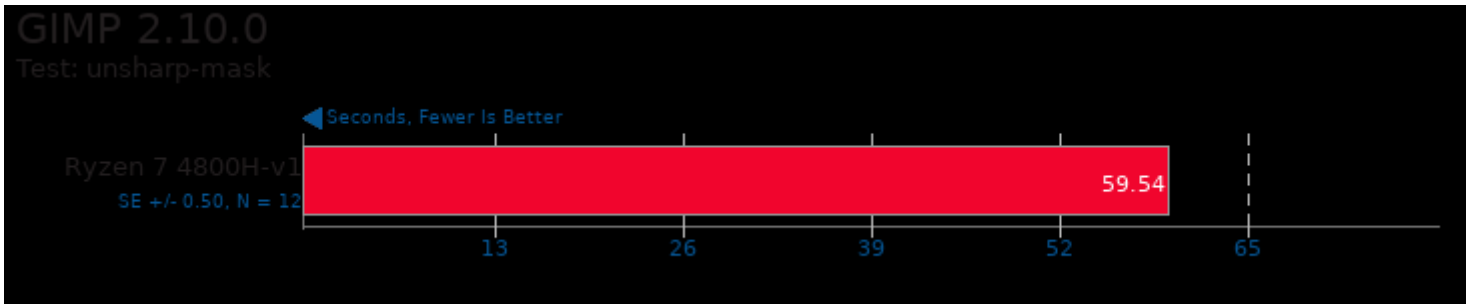
Test: rotate



GIMP 2.10.0

Test: auto-levels





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