



## 9-Way Linux Laptop Comparison

Benchmarks by Michael Larabel for a future article on Phoronix.com.

### Automated Executive Summary

*ASUS Zenbook UX301LAA had the most wins, coming in first place for 30% of the tests.*

*Based on the geometric mean of all complete results, the fastest (ASUS Zenbook UX301LAA) was 3.764x the speed of the slowest (MacBook Pro F22586C8). Lenovo X1 Carbon 20BSCTO1WW was 0.935x the speed of ASUS Zenbook UX301LAA, Apple MacBook Pro Retina was 0.955x the speed of Lenovo X1 Carbon 20BSCTO1WW, ASUS Zenbook UX32VDA was 0.89x the speed of Apple MacBook Pro Retina, HP EliteBook 161C was 0.845x the speed of ASUS Zenbook UX32VDA, Lenovo Thinkpad T430s was 0.952x the speed of HP EliteBook 161C, Apple MacBook Air Haswell was 0.949x the speed of Lenovo Thinkpad T430s, Lenovo ThinkPad W510 was 0.763x the speed of Apple MacBook Air Haswell, ASUS K56CA was 0.948x the speed of Lenovo ThinkPad W510, MacBook Pro F22586C8 was 0.606x the speed of ASUS K56CA.*

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

*Flexible IO Tester (Type: Random Write - IO Engine: POSIX AIO - Buffered: No - Block Size: 4KB - Disk Target: Default Test Directory - Result: MB/s) at 113.991x*

*Flexible IO Tester (Type: Sequential Read - IO Engine: POSIX AIO - Buffered: No - Block Size: 4KB - Disk Target: Default Test Directory - Result: MB/s) at 11.446x*

*Xonotic (Resolution: 1680 x 1050 - Effects Quality: High) at 8.774x*

*Xonotic (Resolution: 1280 x 1024 - Effects Quality: High) at 8.749x*

*Flexible IO Tester (Type: Sequential Write - IO Engine: POSIX AIO - Buffered: No - Block Size: 4KB - Disk Target:*

*Default Test Directory - Result: MB/s) at 6.504x*

*x264 (H.264 Video Encoding) at 5.689x*

*Xonotic (Resolution: 1680 x 1050 - Effects Quality: Ultra) at 5.16x*

*Xonotic (Resolution: 1280 x 1024 - Effects Quality: Ultra) at 5.147x*

*Xonotic (Resolution: 1680 x 1050 - Effects Quality: Ultimate) at 4.531x*

*Xonotic (Resolution: 1280 x 1024 - Effects Quality: Ultimate) at 4.53x.*

## Test Systems:

### Lenovo ThinkPad W510

Processor: Intel Core i7 720Q @ 1.60GHz (8 Cores), Motherboard: LENOVO 4318CTO, Chipset: Intel Core DMI, Memory: 4096MB, Disk: 160GB FUJITSU MHZ2160B, Graphics: NVIDIA Quadro FX 880M 1024MB (550/790MHz), Audio: Intel 5 /3400, Monitor: Lenovo Limited, Network: Intel 82577LM Gigabit Connection + Intel Centrino Ultimate-N 6300

OS: Ubuntu 15.04, Kernel: 3.18.0-9-generic (x86\_64), Desktop: Unity 7.3.1, Display Server: X Server 1.16.2.901 (1.16.3 RC 1), Display Driver: NVIDIA 304.125, OpenGL: 3.3.0, Compiler: GCC 4.9.2, File-System: ext4, Screen Resolution: 1600x900

Compiler Notes: --build=x86\_64-linux-gnu --disable-browser-plugin --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdc++-debug --enable-libstdc++-time=yes --enable-multilib --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=x86\_64-linux-gnu --target=x86\_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-arch-directory=amd64 --with-multilib-list=m32,m64,mx32 --with-tune=generic -v

Disk Notes: DEADLINE / data=ordered,errors=remount-ro,relatime,rw

Processor Notes: Scaling Governor: acpi-cpufreq ondemand

System Notes: Disk Scheduler: DEADLINE.

### MacBook Pro F22586C8

Processor: Intel Core i5 520M @ 2.40GHz (4 Cores), Motherboard: Apple Mac-F22586C8, Chipset: Intel Core DRAM, Memory: 4096MB, Disk: 120GB OCZ AGILITY2, Graphics: Intel Core IGP 256MB, Audio: Intel 5 /3400, Monitor: Color LCD, Network: Broadcom NetXtreme BCM5764M Gigabit PCIe + Broadcom BCM43224 802.11a/b/g/n

OS: Ubuntu 15.04, Kernel: 3.18.0-12-generic (x86\_64), Desktop: Unity 7.3.1, Display Server: X Server 1.16.2.901 (1.16.3 RC 1), Display Driver: intel 2.99.917, OpenGL: 3.3 Mesa 10.4.2 Gallium 0.4, Compiler: GCC 4.9.2, File-System: ext4, Screen Resolution: 1440x900

### HP EliteBook 161C

Processor: Intel Core i5-2520M @ 3.20GHz (4 Cores), Motherboard: HP 161C, Chipset: Intel 2nd Generation Core Family DRAM, Memory: 4096MB, Disk: 160GB INTEL SSDSA2M160, Graphics: Intel HD 3000 (1300MHz), Audio: Intel 6 /C200, Network: Intel 82579LM Gigabit Connection + Intel Centrino Advanced-N 6205

OS: Ubuntu 15.04, Kernel: 3.18.0-9-generic (x86\_64), Desktop: Unity 7.3.1, Display Server: X Server 1.16.2.901 (1.16.3 RC 1), Display Driver: intel 2.99.917, OpenGL: 3.1 Mesa 10.3.2, Compiler: GCC 4.9.2, File-System: ext4, Screen Resolution: 1600x900

Compiler Notes: --build=x86\_64-linux-gnu --disable-browser-plugin --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=x86\_64-linux-gnu --target=x86\_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-arch-directory=amd64 --with-multilib-list=m32,m64,mx32 --with-tune=generic -v  
Disk Notes: DEADLINE / data=ordered,errors=remount-ro,relatime,rw  
Processor Notes: Scaling Governor: intel\_pstate powersave  
Graphics Notes: SNA  
System Notes: Disk Scheduler: DEADLINE.

### ASUS K56CA

Processor: Intel Core i3-3217U @ 1.80GHz (4 Cores), Motherboard: ASUS K56CA v1.0, Chipset: Intel 3rd Gen Core DRAM, Memory: 4096MB, Disk: 500GB Hitachi HTS54505 + 24GB SanDisk SSD i100, Graphics: Intel HD 4000 (1050MHz), Audio: Intel 7 /C210, Network: Realtek RTL8111/8168/8411 + Qualcomm Atheros AR9485 Wireless

OS: Ubuntu 15.04, Kernel: 3.18.0-12-generic (x86\_64), Desktop: Unity 7.3.1, Display Server: X Server 1.16.2.901 (1.16.3 RC 1), Display Driver: intel 2.99.917, OpenGL: 3.3 Mesa 10.4.2, Compiler: GCC 4.9.2, File-System: ext4, Screen Resolution: 1366x768

Compiler Notes: --build=x86\_64-linux-gnu --disable-browser-plugin --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=x86\_64-linux-gnu --target=x86\_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-arch-directory=amd64 --with-multilib-list=m32,m64,mx32 --with-tune=generic -v  
Disk Notes: DEADLINE / data=ordered,errors=remount-ro,relatime,rw  
Processor Notes: Scaling Governor: intel\_pstate powersave  
Graphics Notes: SNA  
System Notes: Disk Scheduler: DEADLINE.

### ASUS Zenbook UX32VDA

Processor: Intel Core i7-3517U @ 3.00GHz (4 Cores), Motherboard: ASUS UX32VDA v1.0, Chipset: Intel 3rd Gen Core DRAM, Memory: 4096MB, Disk: 2 x 128GB SanDisk SD5SF212, Graphics: Intel HD 4000 512MB, Audio: Intel 7 /C210, Network: Intel Centrino Advanced-N 6235

OS: Ubuntu 15.04, Kernel: 3.18.0-9-generic (x86\_64), Desktop: Unity 7.3.1, Display Server: X Server 1.16.2.901 (1.16.3 RC 1), Display Driver: nouveau 1.0.11, OpenGL: 3.3 Mesa 10.3.2, Compiler: GCC 4.9.2, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86\_64-linux-gnu --disable-browser-plugin --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=x86\_64-linux-gnu --target=x86\_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-arch-directory=amd64 --with-multilib-list=m32,m64,mx32 --with-tune=generic -v  
Disk Notes: DEADLINE / data=ordered,errors=remount-ro,relatime,rw  
Processor Notes: Scaling Governor: intel\_pstate powersave  
Graphics Notes: SNA  
System Notes: Disk Scheduler: DEADLINE.

### Apple MacBook Pro Retina

Processor: Intel Core i7-3615QM @ 3.30GHz (8 Cores), Motherboard: Apple Mac-C3EC7CD22292981F, Chipset: Intel 3rd Gen Core DRAM, Memory: 8192MB, Disk: 251GB APPLE SSD SM256E, Graphics: Intel HD 4000 1024MB (1200MHz), Audio: Intel 7 /C210, Monitor: Color LCD, Network: Broadcom NetXtreme BCM57786 Gigabit PCIe + Broadcom BCM4331 802.11a/b/g/n

OS: Ubuntu 15.04, Kernel: 3.18.0-9-generic (x86\_64), Desktop: Unity 7.3.1, Display Server: X Server 1.16.2.901 (1.16.3 RC 1), Display Driver: intel 2.99.917, OpenGL: 3.3 Mesa 10.4.2 Gallium 0.4, Compiler: GCC 4.9.2, File-System: ext4, Screen Resolution: 2880x1800

### Apple MacBook Air Haswell

Processor: Intel Core i5-4250U @ 2.60GHz (4 Cores), Motherboard: Apple Mac-35C1E88140C3E6CF, Chipset: Intel Haswell-ULT DRAM, Memory: 4096MB, Disk: 121GB APPLE SSD SD0128, Graphics: Intel Haswell-ULT IGP (1000MHz), Audio: Intel Haswell-ULT HD Audio, Monitor: Color LCD, Network: Broadcom BCM4360 802.11ac Wireless

OS: Ubuntu 15.04, Kernel: 3.18.0-9-generic (x86\_64), Desktop: Unity 7.3.1, Display Server: X Server 1.16.2.901 (1.16.3 RC 1), Display Driver: intel 2.99.917, OpenGL: 3.3 Mesa 10.4.2, Compiler: GCC 4.9.2, File-System: ext4, Screen Resolution: 1366x768

Compiler Notes: --build=x86\_64-linux-gnu --disable-browser-plugin --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multilib --enable-multilib --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=x86\_64-linux-gnu --target=x86\_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-arch-directory=amd64 --with-multilib-list=m32,m64,mx32 --with-tune=generic -v  
Disk Notes: DEADLINE / data=ordered,errors=remount-ro,relatime,rw  
Processor Notes: Scaling Governor: intel\_pstate powersave  
System Notes: Disk Scheduler: DEADLINE.

### ASUS Zenbook UX301LAA

Processor: Intel Core i7-4558U @ 3.30GHz (4 Cores), Motherboard: ASUS UX301LAA v1.0, Chipset: Intel Haswell-ULT DRAM, Memory: 8192MB, Disk: 2 x 128GB SanDisk SD6SP1M1, Graphics: Intel Device 0a2e (1200MHz), Audio: Intel Haswell-ULT HD Audio, Monitor: LQ133T1JW14, Network: Intel Wireless 7260

OS: Ubuntu 15.04, Kernel: 3.18.0-12-generic (x86\_64), Desktop: Unity 7.3.1, Display Server: X Server 1.16.2.901 (1.16.3 RC 1), Display Driver: intel 2.99.917, OpenGL: 3.3 Mesa 10.4.2, Compiler: GCC 4.9.2, File-System: ext4, Screen Resolution: 2560x1440

Compiler Notes: --build=x86\_64-linux-gnu --disable-browser-plugin --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multilib --enable-multilib --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=x86\_64-linux-gnu --target=x86\_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-arch-directory=amd64 --with-multilib-list=m32,m64,mx32 --with-tune=generic -v  
Disk Notes: DEADLINE / data=ordered,errors=remount-ro,relatime,rw  
Processor Notes: Scaling Governor: intel\_pstate powersave  
Graphics Notes: SNA  
System Notes: Disk Scheduler: DEADLINE.

### Lenovo X1 Carbon 20BSCTO1WW

Processor: Intel Core i7-5600U @ 3.20GHz (4 Cores), Motherboard: LENOVO 20BSCTO1WW, Chipset: Intel Broadwell-U-OPI, Memory: 8192MB, Disk: 128GB SAMSUNG MZNT128, Graphics: Intel Broadwell-U (950MHz), Audio: Intel Broadwell-U Audio, Network: Intel Connection + Intel Wireless 7265

OS: Ubuntu 15.04, Kernel: 3.18.0-9-generic (x86\_64), Desktop: Unity 7.3.1, Display Server: X Server 1.16.2.901 (1.16.3 RC 1), Display Driver: intel 2.99.917, OpenGL: 3.3 Mesa 10.3.2, Compiler: GCC 4.9.2, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86\_64-linux-gnu --disable-browser-plugin --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multilib --enable-multilib --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=x86\_64-linux-gnu --target=x86\_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-arch-directory=amd64 --with-multilib-list=m32,m64,mx32 --with-tune=generic

-v

Disk Notes: DEADLINE / data=ordered,errors=remount-ro,relatime,rw

Processor Notes: Scaling Governor: intel\_pstate powersave

Graphics Notes: SNA

System Notes: Disk Scheduler: DEADLINE.

## Lenovo Thinkpad T430s

Processor: Intel Core i7-3520M @ 3.60GHz (2 Cores / 4 Threads), Motherboard: LENOVO 2352CTO (G7ETB2WW 2.72 BIOS), Chipset: Intel 3rd Gen Core DRAM, Memory: 16GB, Disk: 120GB KINGSTON SV300S3, Graphics: Intel Ivybridge Mobile 2GB (1250MHz), Audio: Realtek ALC269VC, Network: Intel 82579LM + Intel Centrino Ultimate-N 6300

OS: openSUSE 15.2, Kernel: 5.3.18-lp152.57-default (x86\_64), Desktop: KDE Plasma 5.18.6, Display Server: X Server 1.20.3, Display Driver: modesetting 1.20.3, OpenGL: 4.2 Mesa 19.3.4, Compiler: GCC 7.5.0, File-System: btrfs, Screen Resolution: 1600x900

Compiler Notes: --build=x86\_64-suse-linux --disable-libc1 --disable-libssp --disable-libstdc++-pch --disable-libvtv --disable-plugin --disable-werror --enable-checking=release --enable-gnu-indirect-function --enable-languages=c,c++,objc,fortran,obj-c++,ada,go --enable-libstdc++-allocator=new --enable-linux-futex --enable-multilib --enable-offload-targets=hsa,nvptx-none=/usr/nvptx-none, --enable-ssp --enable-version-specific-runtime-libs --host=x86\_64-suse-linux --mandir=/usr/share/man --with-arch-32=x86-64 --with-gcc-major-version-only --with-slibdir=/lib64 --with-tune=generic --without-cuda-driver --without-system-libunwind

Disk Notes: MQ-DEADLINE / relatime,rw,space\_cache,ssd,subvol=@/home,subvolid=263

Processor Notes: Scaling Governor: intel\_pstate powersave - CPU Microcode: 0x21

Graphics Notes: ShadowFB

Security Notes: itlb\_multihit: KVM: Mitigation of VMX disabled + 1t: 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 + srbsds: Vulnerable: No microcode + tsx\_async\_abort: Not affected

	Lenovo ThinkPad W510	MacBook Pro F22586C8	HP EliteBook 161C	ASUS K56CA	ASUS Zenbook UX32VDA	Apple MacBook Pro Retina	Apple MacBook Air Haswell	ASUS Zenbook UX301LA A	Lenovo X1 Carbon 20BSC7O1WW	Lenovo Thinkpad T430s
Flexible IO Tester - Rand Read - POSIX AIO - No - 4KB - MB/s (MB/s)		15.99	20.96		28.46	23.43	33.55	33.40	36.86	14.412
Normalized		43.38%	56.86%		77.21%	63.56%	91.02%	90.61%	100%	39.1%
Standard Deviation		3.2%	0.3%		2.4%	0.5%	0.5%	3.4%	0.6%	0.3%
Flexible IO Tester - Rand Write - POSIX AIO - No - 4KB - MB/s (MB/s)	1.10	55.14	62.37		98.56	75.84	121.62	125.39	124.55	82.799
Normalized	0.88%	43.97%	49.74%		78.6%	60.48%	96.99%	100%	99.33%	66.03%
Standard Deviation	0.3%	6.1%	11.9%		1.4%	0.3%	0.6%	3.5%	0.2%	1%
Flexible IO Tester - Seq Read - POSIX AIO - No - 4KB - MB/s (MB/s)	24.29	20.15	78.99	50.41	127.89	125.74	153.66	168.80	159.99	14.748
Normalized	14.39%	11.94%	46.8%	29.86%	75.76%	74.49%	91.03%	100%	94.78%	8.74%
Standard Deviation	0.9%	0.9%	0.1%	1.8%	1.6%	0.7%	0.8%	2.3%	2.6%	0.4%

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Flexible IO Tester - Seq Write - POSIX AIO - No - 4KB - MB/s (MB/s)	24.27	55.24	64.87	44.26	116.32	107.74	140.79	157.85	132.97	80.865
Normalized	15.38%	35%	41.1%	28.04%	73.69%	68.25%	89.19%	100%	84.24%	51.23%
Standard Deviation	4.5%	5.7%	3.4%	0.4%	0.6%	1.4%	1.2%	3.3%	0.2%	0.6%
PostMark - D.T.P (TPS)	3290	1546	4054	2632	4335	4717	3466	5555	5319	3659
Normalized	59.23%	27.83%	72.98%	47.38%	78.04%	84.91%	62.39%	100%	95.75%	65.87%
Standard Deviation	2.3%	0.3%	0.9%	1.8%	1%	1.9%	6%	0%	0%	1.7%
Tesseract - 1280 x 1024 (FPS)	59.19		29.72	45.13	47.10	23.58		55.96	51.32	
Normalized	100%		50.21%	76.25%	79.57%	39.84%		94.54%	86.7%	
Standard Deviation	0.1%		0.3%	1.9%	1%	0.5%		4.3%	0.1%	
Tesseract - 1680 x 1050 (FPS)	51.10		26.86	43.90	37.91	19.98		47.12	41.93	
Normalized	100%		52.56%	85.91%	74.19%	39.1%		92.21%	82.05%	
Standard Deviation	0.2%		0.4%	1.9%	0.3%	0.7%		3.3%	0.3%	
Xonotic - 1280 x 1024 - High (FPS)	112.95		46.88	64.83	65.21	12.91		42.69	74.70	104.1558
Normalized	100%		41.51%	57.4%	57.73%	11.43%		37.8%	66.14%	92.21%
Standard Deviation	0.2%		0%	0.8%	0.3%	0%		1.5%	0.1%	0.9%
Xonotic - 1680 x 1050 - High (FPS)	113.18		46.87	63.54	65.41	12.90		42.50	74.70	102.7694
Normalized	100%		41.41%	56.14%	57.79%	11.4%		37.55%	66%	90.8%
Standard Deviation	0.2%		0%	1.6%	0.8%	0%		0.9%	0.3%	1.9%
Xonotic - 1280 x 1024 - Ultra (FPS)	49.13		32.02	51.35	43.14	10.85		36.86	55.84	54.51284
Normalized	87.98%		57.34%	91.96%	77.26%	19.43%		66.01%	100%	97.62%
Standard Deviation	0.1%		0%	0.7%	0.3%	0.3%		1%	0.2%	1.1%
Xonotic - 1680 x 1050 - Ultra (FPS)	49.18		32.01	50.89	42.95	10.84		37.00	55.93	53.81077
Normalized	87.93%		57.23%	90.99%	76.79%	19.38%		66.15%	100%	96.21%
Standard Deviation	0%		0%	2.5%	0.7%	0%		1.4%	0.2%	0.2%
Xonotic - 1280 x 1024 - Ultimate (FPS)	29.56		21.00	35.76	28.26	8.62		29.69	39.05	32.77282
Normalized	75.7%		53.78%	91.57%	72.37%	22.07%		76.03%	100%	83.93%
Standard Deviation	0.1%		0.1%	1.9%	0.2%	0%		1.1%	0.1%	0.4%
Xonotic - 1680 x 1050 - Ultimate (FPS)	29.57		21.00	36.62	28.07	8.62		29.54	39.06	32.73887
Normalized	75.7%		53.76%	93.75%	71.86%	22.07%		75.63%	100%	83.82%
Standard Deviation	0%		0%	0.5%	0.7%	0%		0.9%	0%	0.4%
FFTW - Stock - 1D FFT Size 1024 (Mflops)	3738	1645	5066	3026	5043	5449	3266	5656	5531	5996
Normalized	62.35%	27.44%	84.48%	50.46%	84.1%	90.88%	54.47%	94.33%	92.25%	100%
Standard Deviation	0.3%	0.3%	0.3%	0.3%	0.2%	1.3%	25.1%	0.2%	0.3%	0.4%

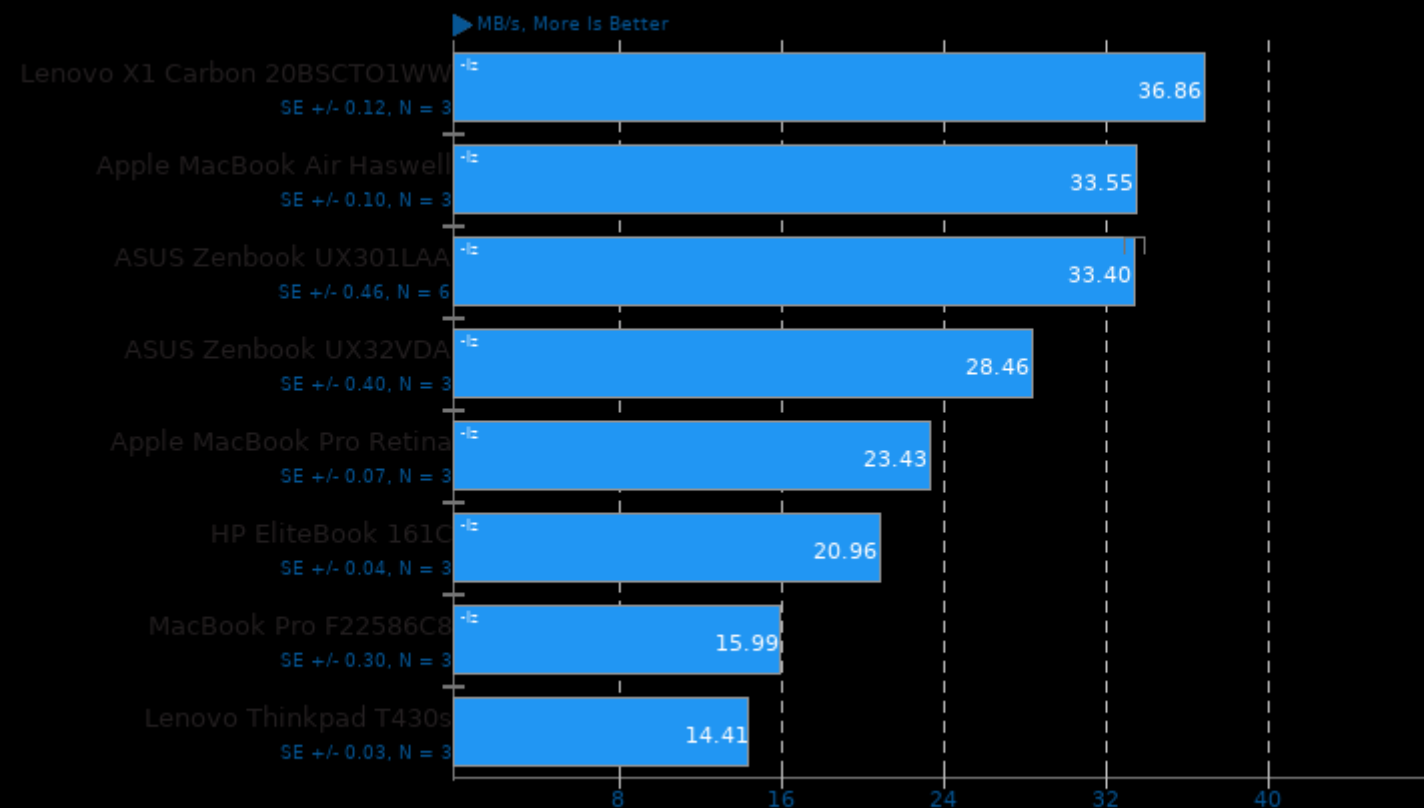
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<b>FFTW - Stock - 2D</b>	2717	<b>1318</b>	3536	2433	3934	3380	2496	4183	4193	<b>4670</b>
<b>FFT Size 1024</b>										
<b>(Mflops)</b>										
<b>Normalized</b>	58.19%	28.22%	75.73%	52.1%	84.25%	72.39%	53.46%	89.57%	89.79%	100%
<b>Standard Deviation</b>	0.3%	0.2%	0.3%	1.3%	0.5%	13.4%	25.4%	0.6%	1.3%	0.6%
<b>John The Ripper -</b>	2132	<b>804</b>	2032	1416	2212	2668	872	<b>2827</b>	2399	2692
<b>Blowfish (Real C/S)</b>										
<b>Normalized</b>	75.42%	28.44%	71.88%	50.09%	78.25%	94.38%	30.85%	100%	84.86%	95.22%
<b>Standard Deviation</b>	0%	1.2%	0.3%	0.4%	0%	21%	17.7%	0.2%	0.3%	0.2%
<b>x264 - H.2.V.E (FPS)</b>	62.33	<b>23.55</b>	61.18	41.06	63.22	<b>133.98</b>	41.81	85.08	73.48	79.57
<b>Normalized</b>	46.52%	17.58%	45.66%	30.65%	47.19%	100%	31.21%	63.5%	54.84%	59.39%
<b>Standard Deviation</b>	2.3%	0.7%	0.7%	2%	0.5%	0.4%	21.6%	0.9%	0.8%	0.3%
<b>Himeno Benchmark</b>	1150	<b>502.19</b>	1285	778.54	1274	1378	1177	1696	<b>1809</b>	1528
<b>- P.P.S (MFLOPS)</b>										
<b>Normalized</b>	63.6%	27.77%	71.05%	43.05%	70.46%	76.17%	65.05%	93.78%	100%	84.49%
<b>Standard Deviation</b>	0.1%	0.2%	0.1%	0.2%	0.1%	1.2%	4.9%	0.1%	0.1%	0.3%
<b>Timed Linux Kernel</b>	275.68		310.44	<b>478.66</b>	310.81		401.98	<b>227.38</b>	283.71	
<b>Compilation - Time</b>										
<b>To Compile (sec)</b>										
<b>Normalized</b>	82.48%		73.24%	47.5%	73.16%		56.57%	100%	80.15%	
<b>Standard Deviation</b>	0.6%		0.5%	0.6%	0.5%		0.4%	1%	0.8%	
<b>C-Ray - Total Time</b>	61.31		70.61	<b>114.96</b>	73.86	<b>44.22</b>	88.51	52.77	63.27	65.776
<b>(sec)</b>										
<b>Normalized</b>	72.13%		62.63%	38.47%	59.87%	100%	49.96%	83.8%	69.89%	67.23%
<b>Standard Deviation</b>	0.1%		0%	0%	0%	18.2%	0%	0.1%	0%	0%
<b>Stockfish - Total</b>	5034		4565	<b>7283</b>	4529	5725	6686	<b>3860</b>	3872	3888
<b>Time (ms)</b>										
<b>Normalized</b>	76.68%		84.56%	53%	85.23%	67.42%	57.73%	100%	99.69%	99.28%
<b>Standard Deviation</b>	0.1%		1.1%	0.3%	0.1%	0.1%	13.3%	0.2%	0.2%	0.1%
<b>LAME MP3</b>	21.25		15.72	<b>26.51</b>	15.96	15.46	18.53	13.04	12.83	<b>11.549</b>
<b>Encoding - WAV To</b>										
<b>MP3 (sec)</b>										
<b>Normalized</b>	54.35%		73.47%	43.56%	72.36%	74.7%	62.33%	88.57%	90.02%	100%
<b>Standard Deviation</b>	0.3%		0.1%	0.3%	0.2%	13.1%	0.1%	0.5%	0.6%	0.1%
<b>OpenSSL - R.4.b.P</b>	150.17		210.63	<b>134.23</b>	208.70	<b>326.02</b>	147.63	263.50	241.97	253.5
<b>(Signs/sec)</b>										
<b>Normalized</b>	46.06%		64.61%	41.17%	64.01%	100%	45.28%	80.82%	74.22%	77.76%
<b>Standard Deviation</b>	0.1%		0.1%	0.1%	0%	26.1%	0.1%	0.3%	0.2%	0.4%



### Flexible IO Tester 2.1.13

Type: Random Read - IO Engine: POSIX AIO - Buffered: No - Block Size: 4KB - Disk Target: Default Test Directory - Result: MB/s

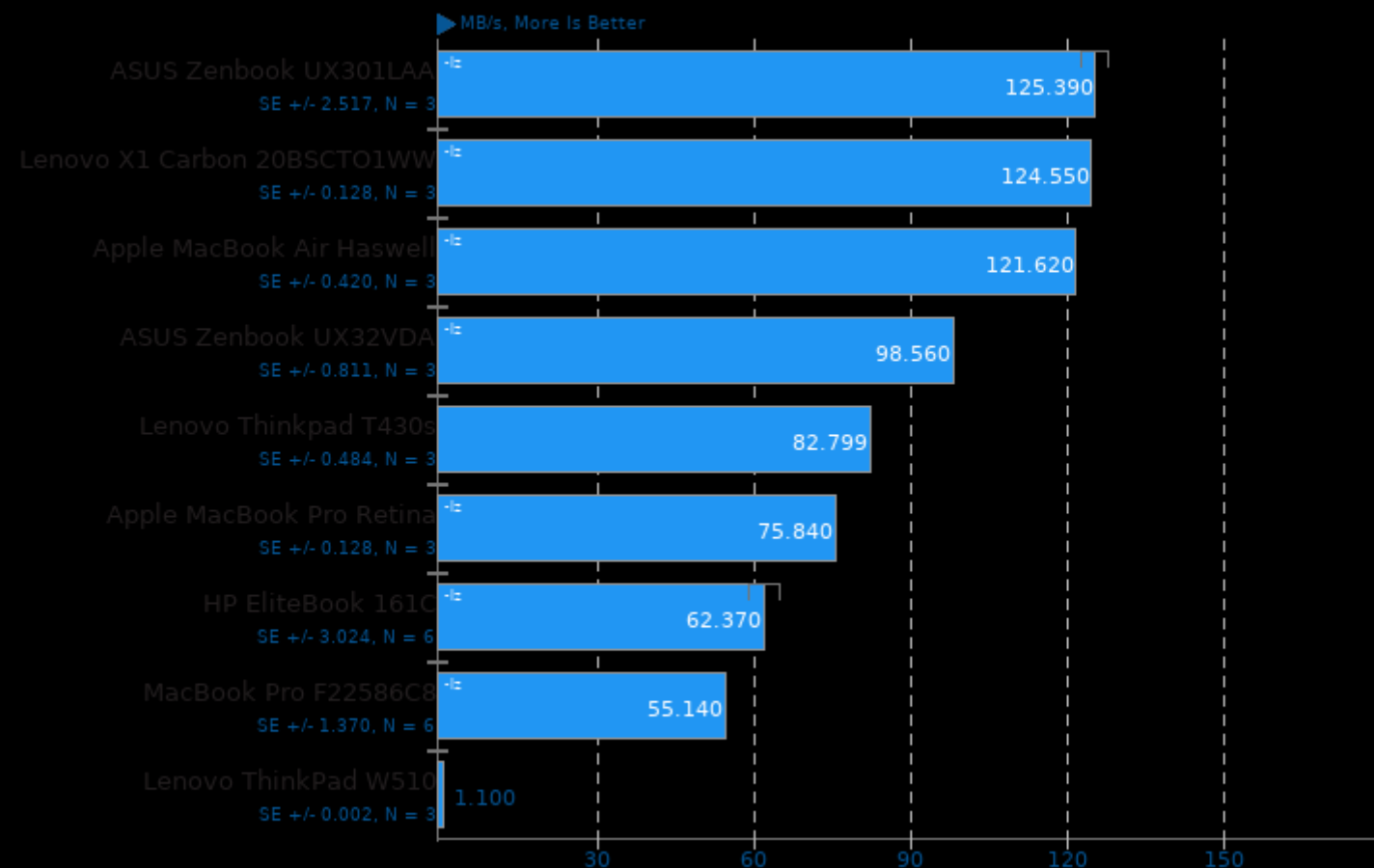


1. (CC) gcc options: -rdynamic -std=gnu99 -O3 -ffast-math -include -lrt -laio -lm -lpthread -ldl



### Flexible IO Tester 2.1.13

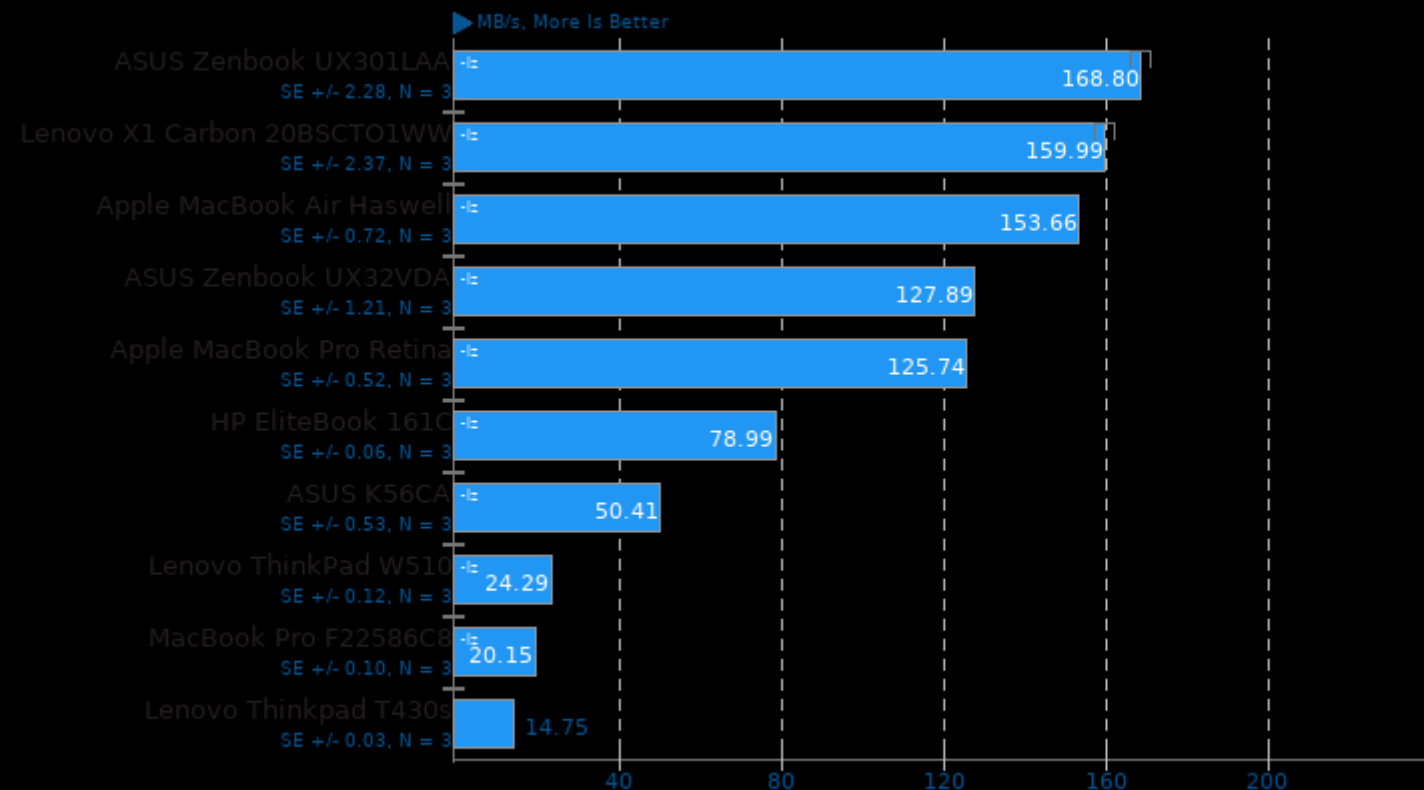
Type: Random Write - IO Engine: POSIX AIO - Buffered: No - Block Size: 4KB - Disk Target: Default Test Directory - Result: MB/s



1. (CC) gcc options: -rdynamic -std=gnu99 -O3 -ffast-math -include -lrt -laio -lm -lpthread -ldl

## Flexible IO Tester 2.1.13

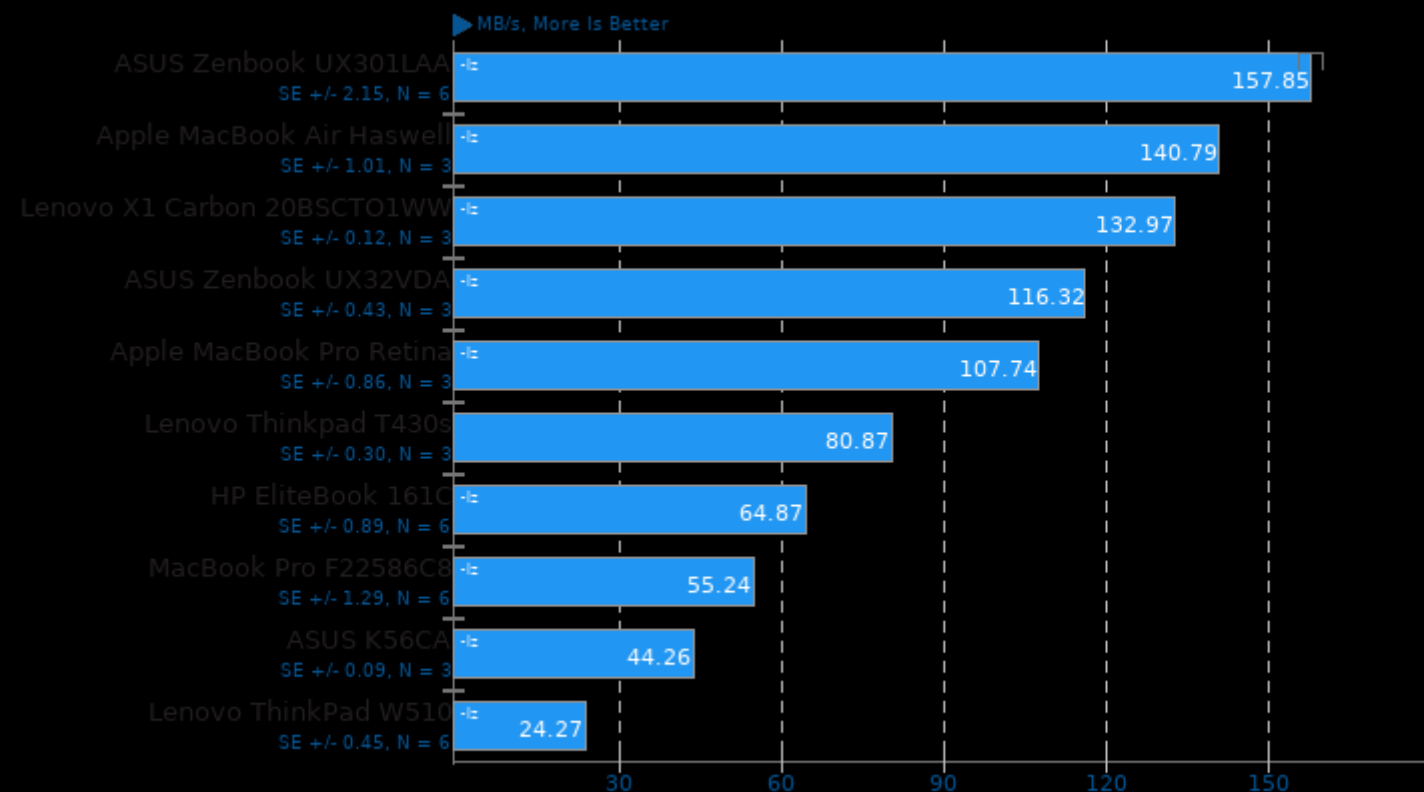
Type: Sequential Read - IO Engine: POSIX AIO - Buffered: No - Block Size: 4KB - Disk Target: Default Test Directory - Result: MB/s



1. (CC) gcc options: -rdynamic -std=gnu99 -O3 -ffast-math -include -lrt -laio -lm -lpthread -ldl

## Flexible IO Tester 2.1.13

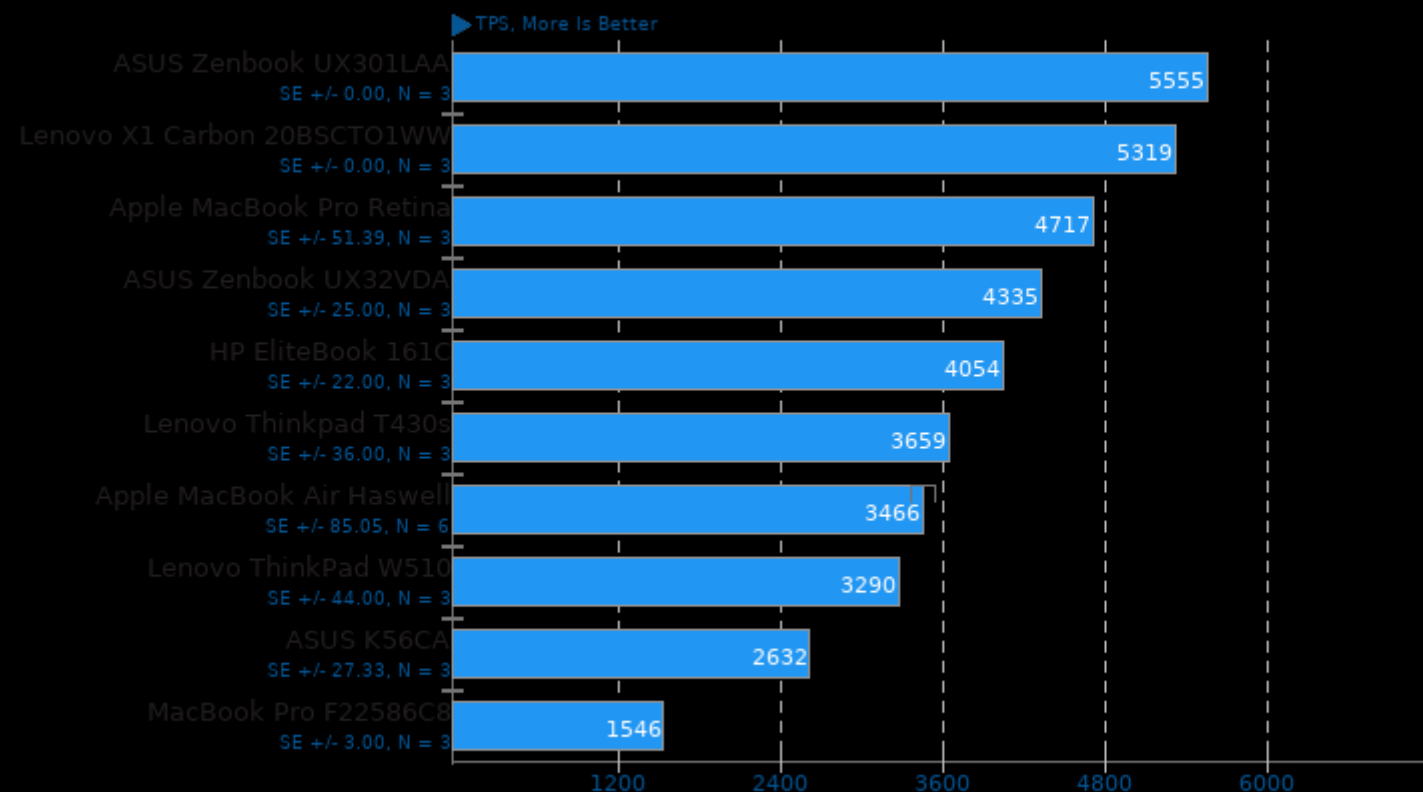
Type: Sequential Write - IO Engine: POSIX AIO - Buffered: No - Block Size: 4KB - Disk Target: Default Test Directory - Result: MB/s



1. (CC) gcc options: -rdynamic -std=gnu99 -O3 -ffast-math -include -lrt -laio -lm -lpthread -ldl

## PostMark 1.51

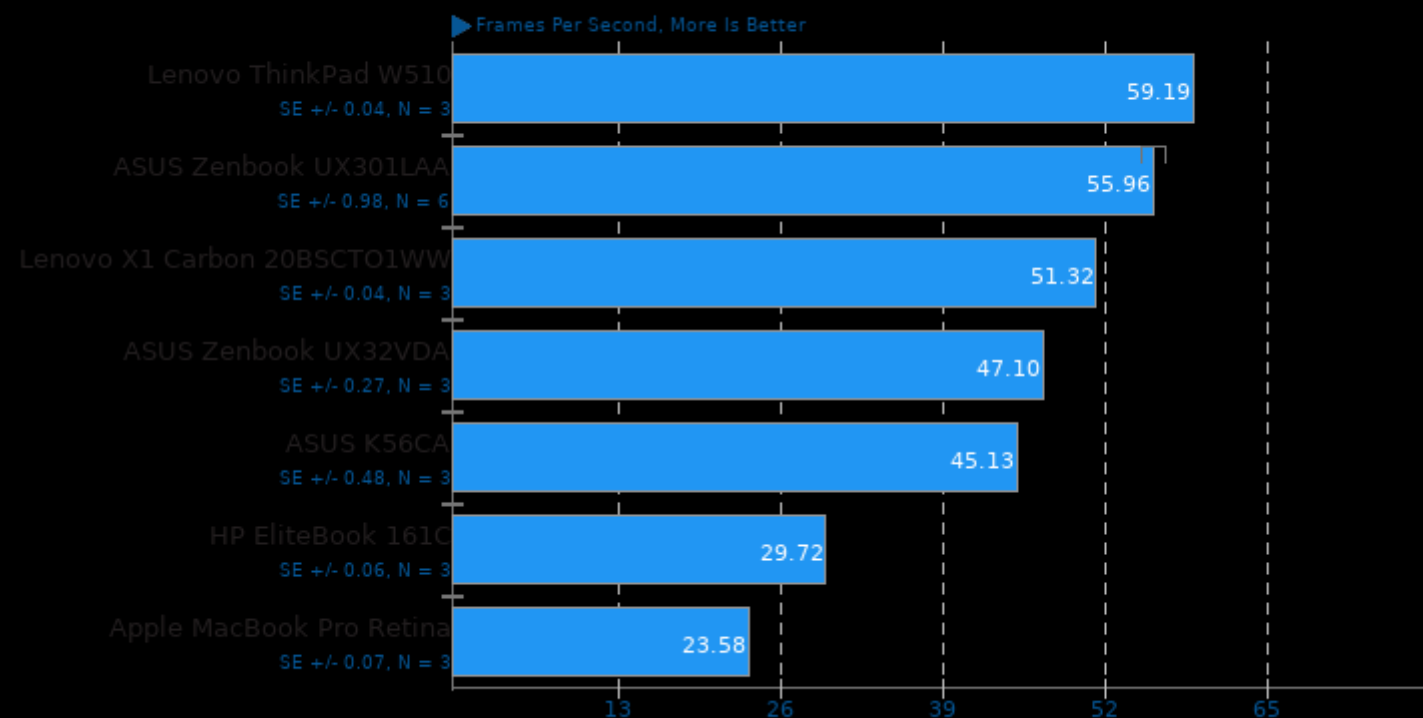
Disk Transaction Performance



1. (CC) gcc options: -O3

## Tesseract 2014-05-12

Resolution: 1280 x 1024

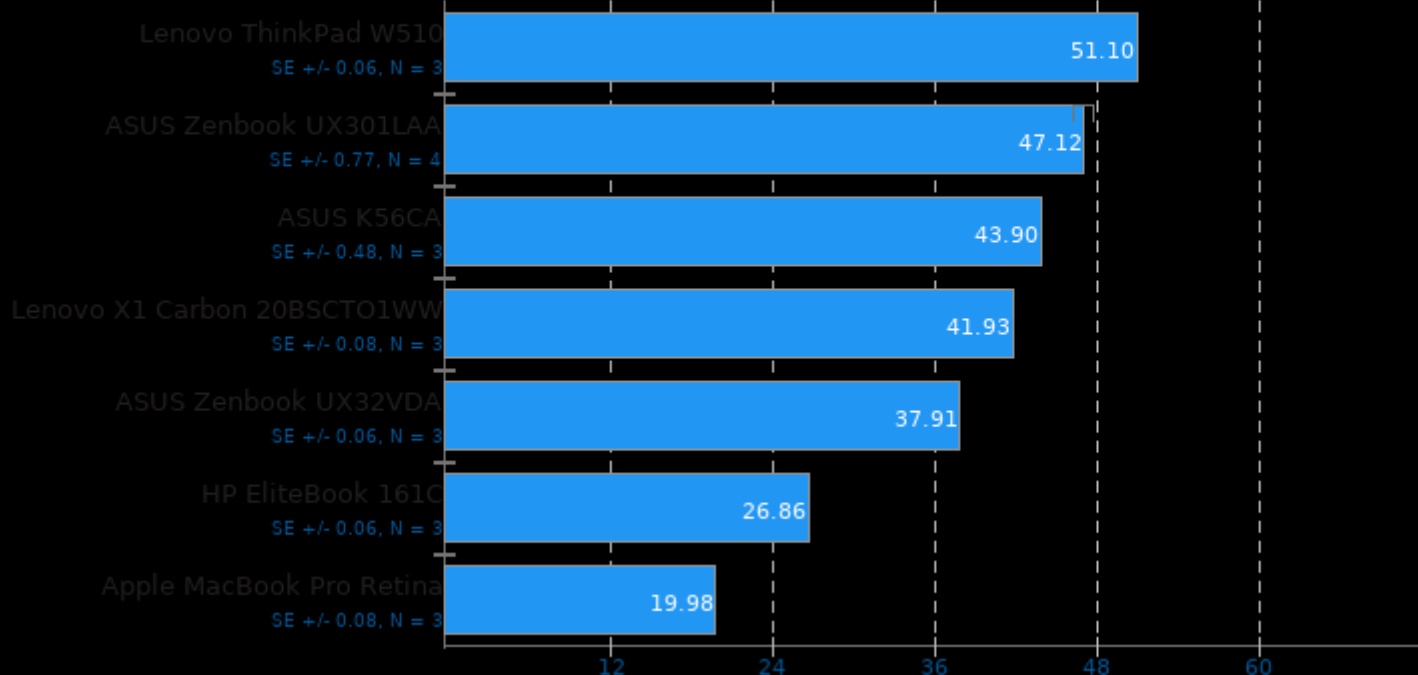


## 9-Way Linux Laptop Comparison

### Tesseract 2014-05-12

Resolution: 1680 x 1050

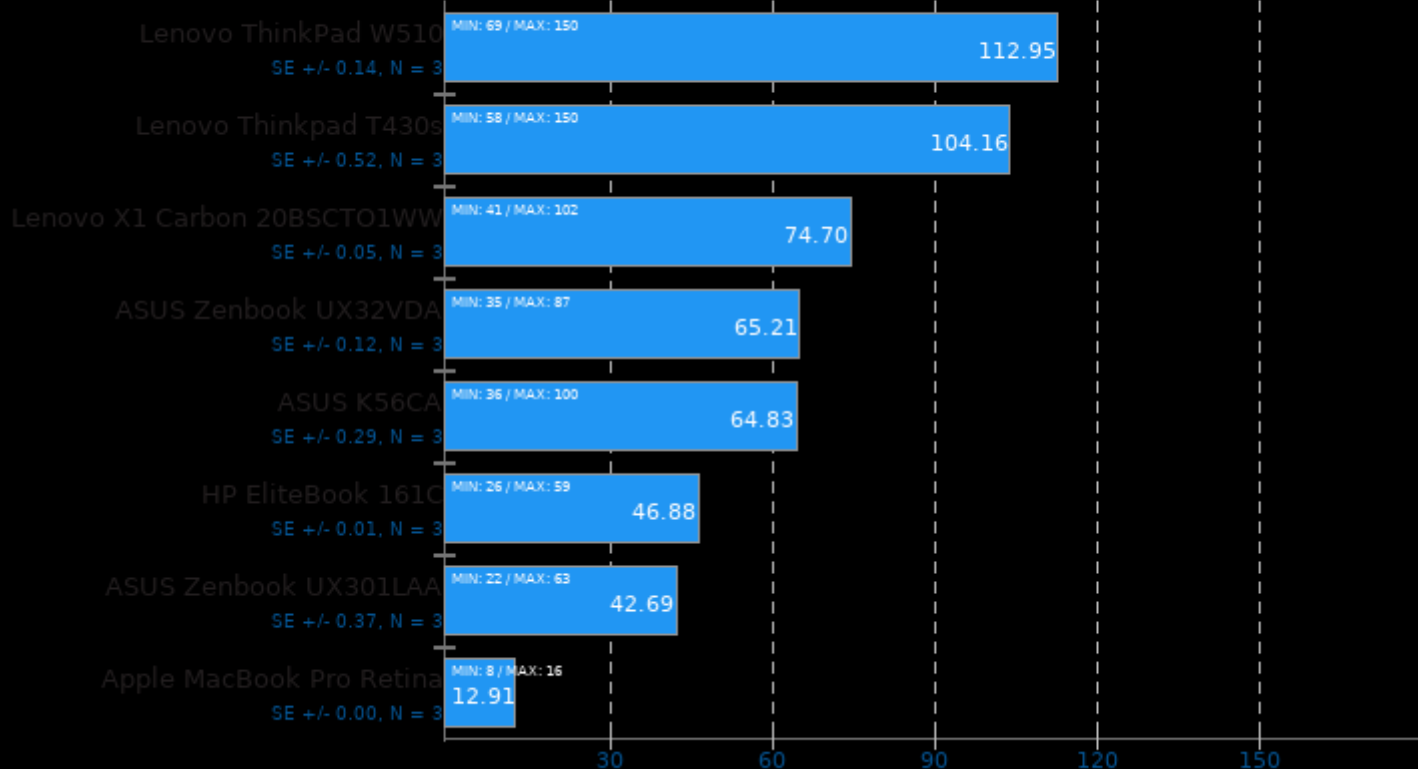
► Frames Per Second, More Is Better



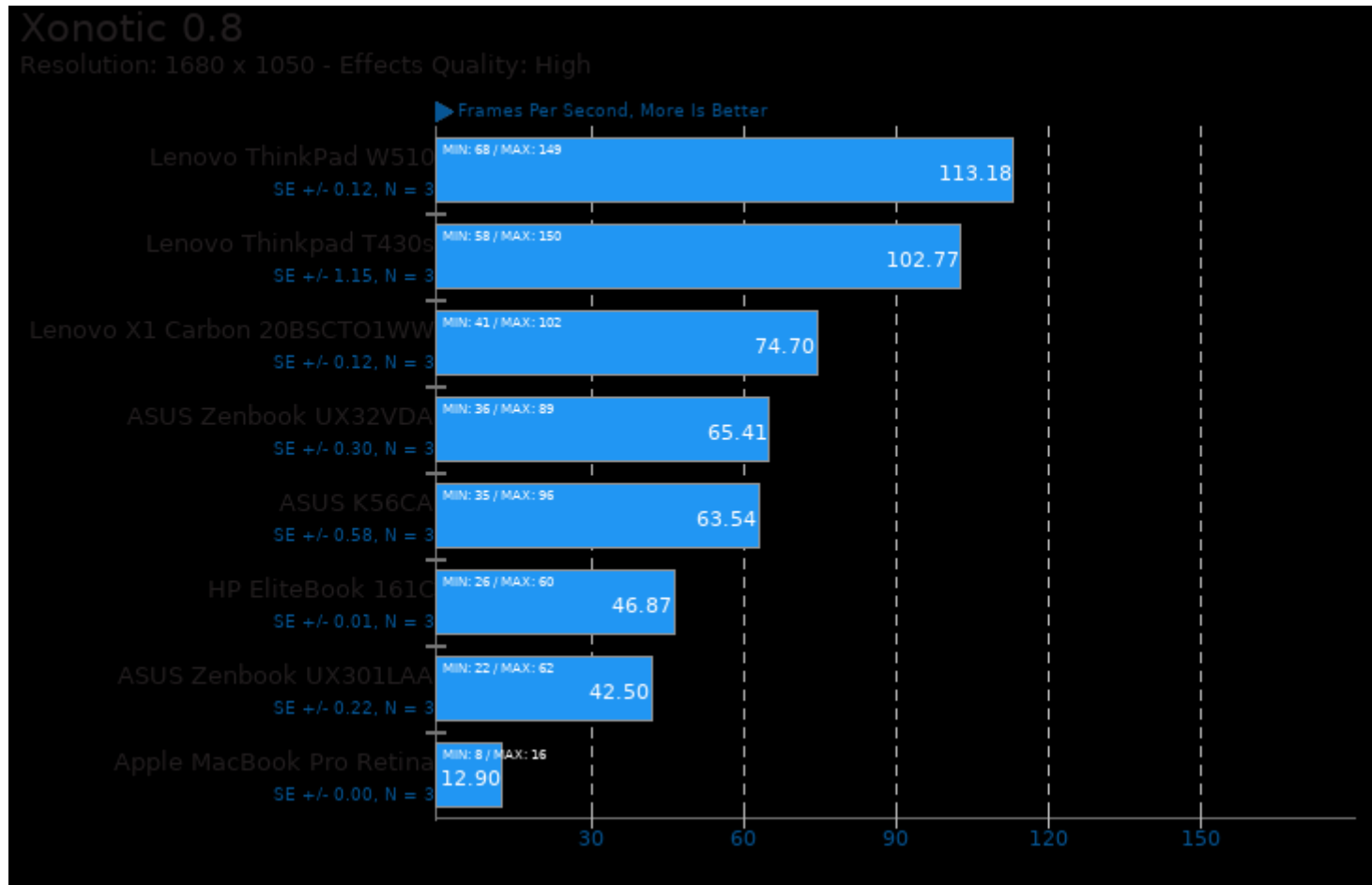
### Xonotic 0.8

Resolution: 1280 x 1024 - Effects Quality: High

► Frames Per Second, More Is Better



## 9-Way Linux Laptop Comparison

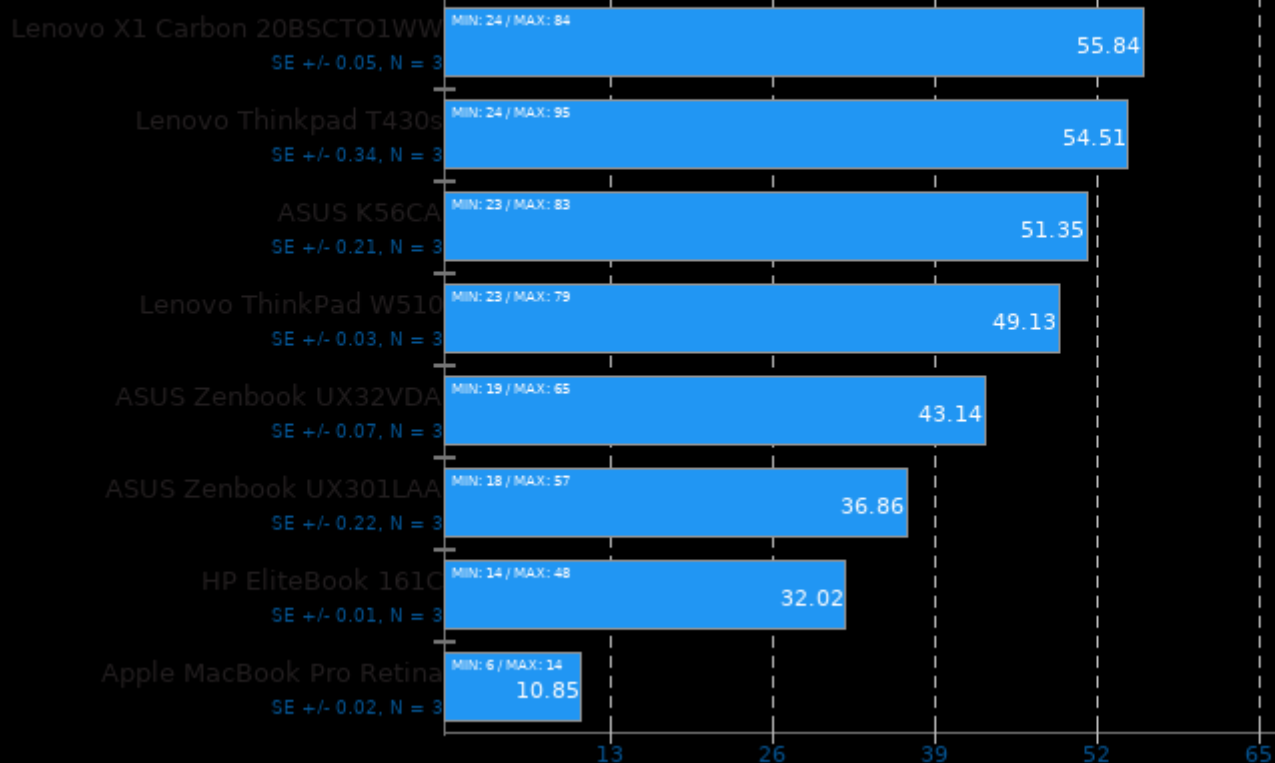


## 9-Way Linux Laptop Comparison

### Xonotic 0.8

Resolution: 1280 x 1024 - Effects Quality: Ultra

► Frames Per Second, More Is Better



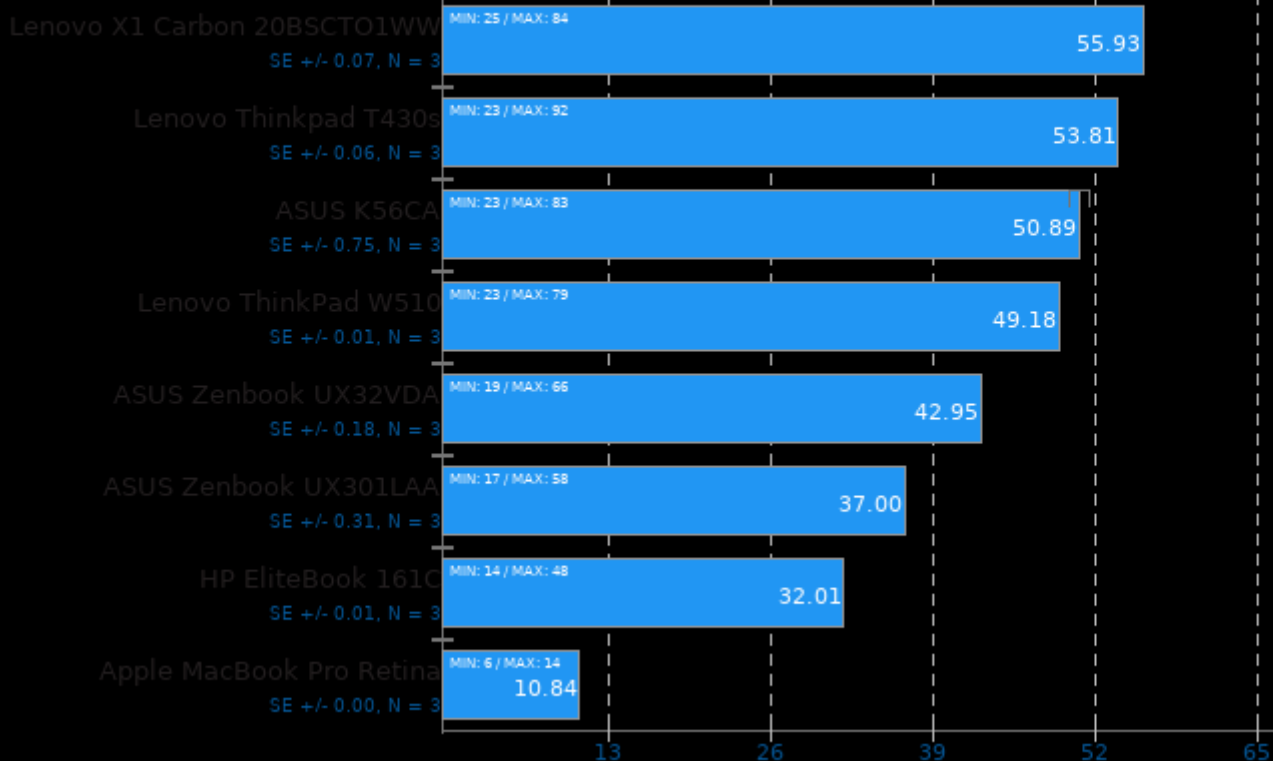


## 9-Way Linux Laptop Comparison

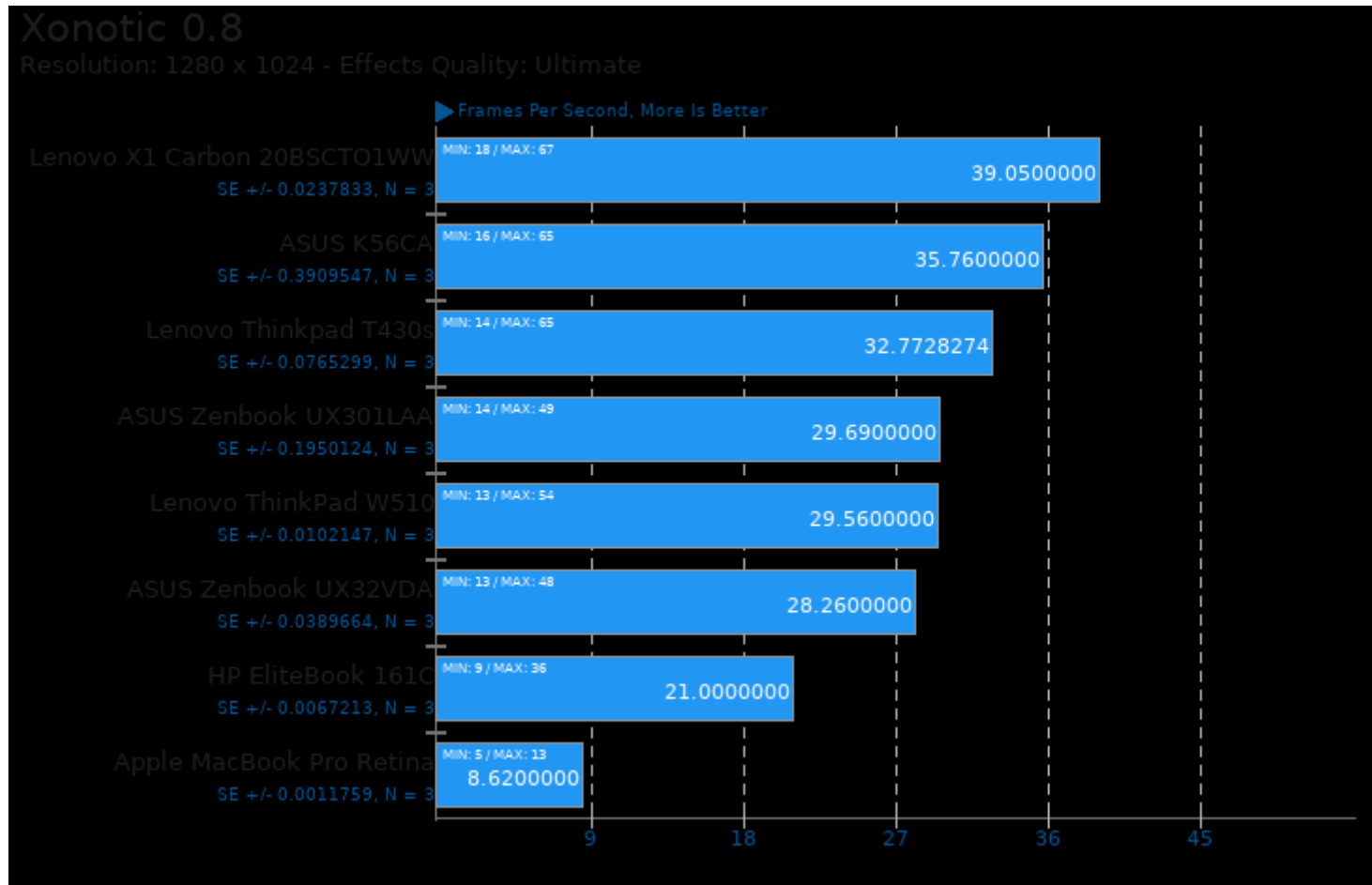
### Xonotic 0.8

Resolution: 1680 x 1050 - Effects Quality: Ultra

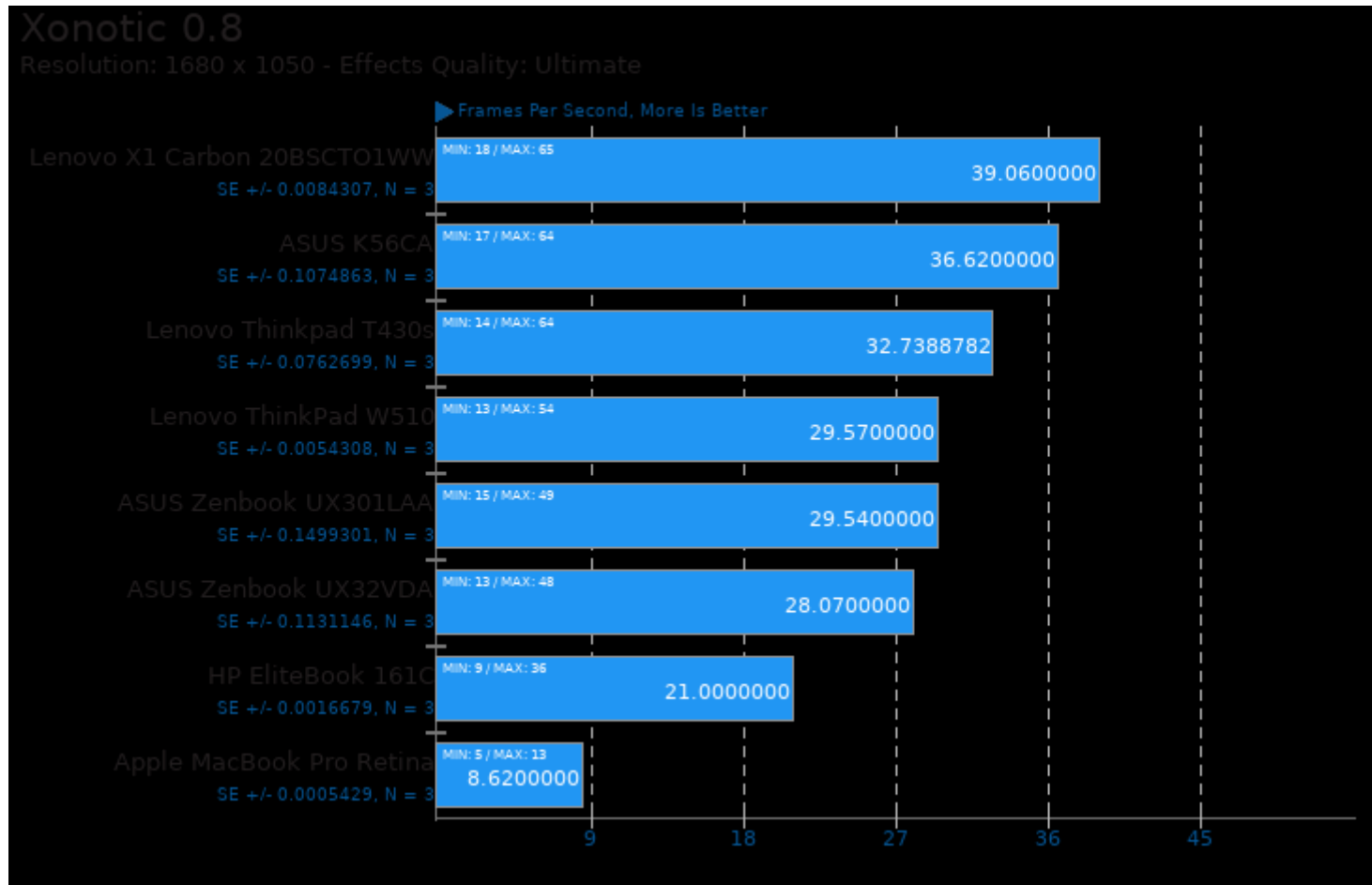
► Frames Per Second, More Is Better



## 9-Way Linux Laptop Comparison



## 9-Way Linux Laptop Comparison



## 9-Way Linux Laptop Comparison

### FFTW 3.3.4

Build: Stock - Size: 1D FFT Size 1024

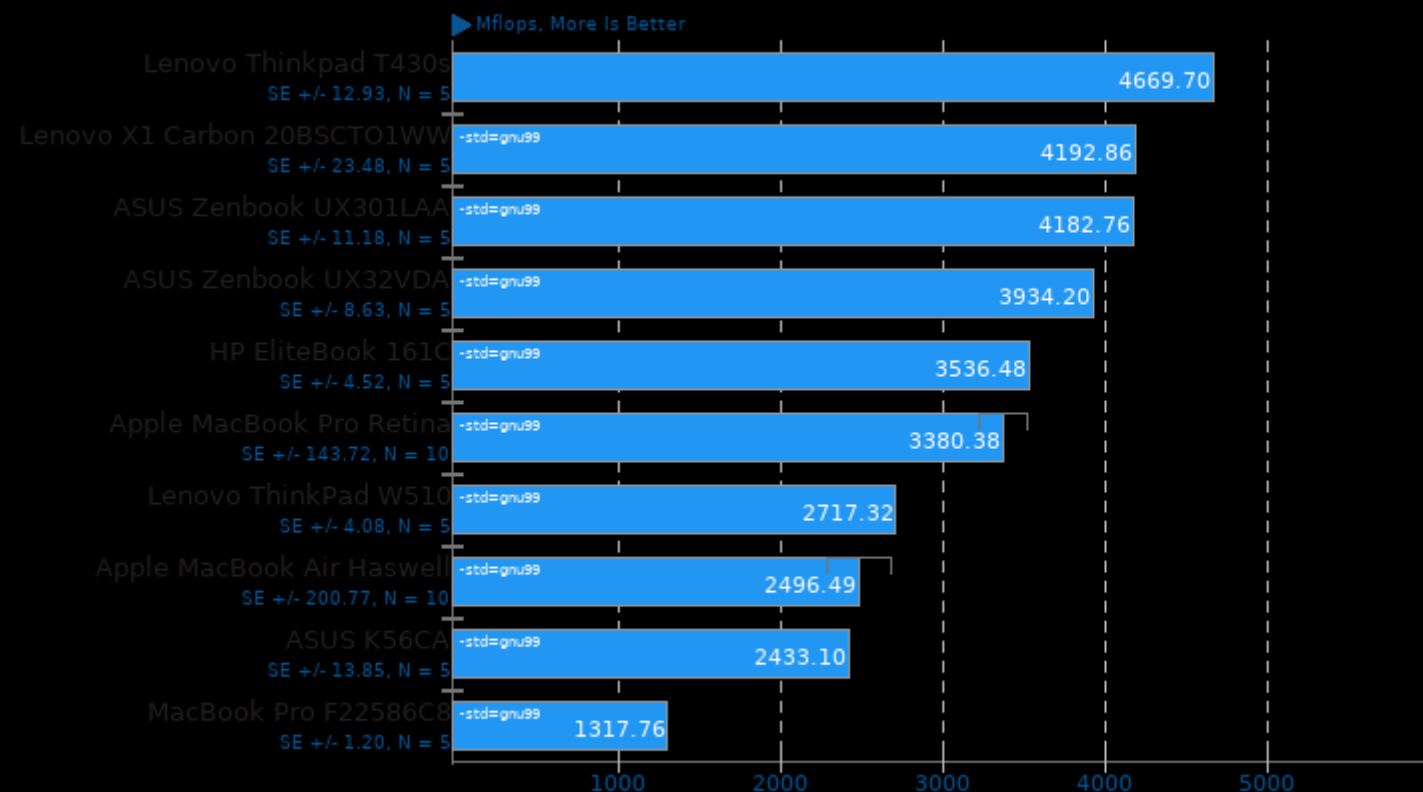


1. (CC) gcc options: -O3 -fomit-frame-pointer -mtune=native -malign-double -fstrict-aliasing -fno-schedule-insns -ffast-math -lm

## 9-Way Linux Laptop Comparison

### FFTW 3.3.4

Build: Stock - Size: 2D FFT Size 1024

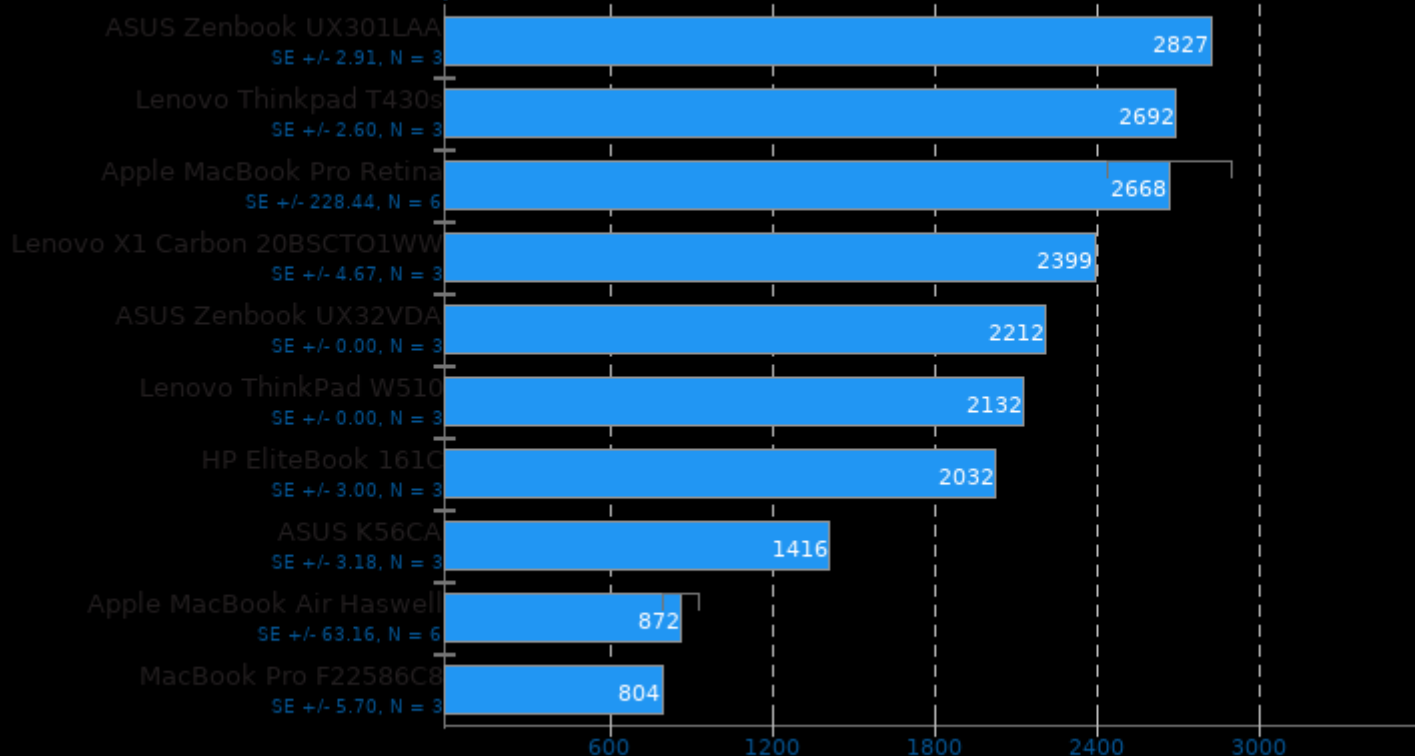


1. (CC) gcc options: -O3 -fomit-frame-pointer -mtune=native -malign-double -fstrict-aliasing -fno-schedule-insns -ffast-math -lm

## John The Ripper 1.8.0

Test: Blowfish

► Real C/S, More Is Better

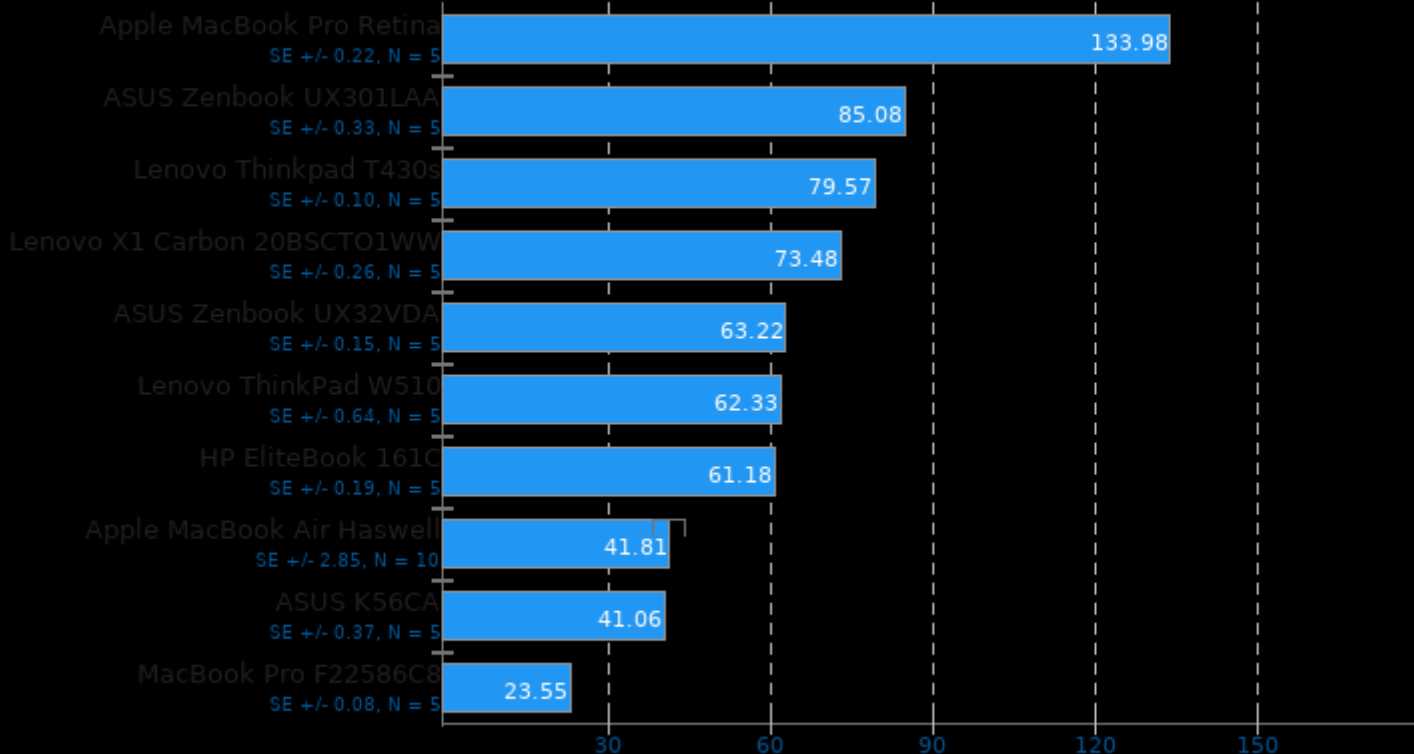


1. (CC) gcc options: -fopenmp -lcrypt

x264 2014-08-30

H.264 Video Encoding

► Frames Per Second, More Is Better

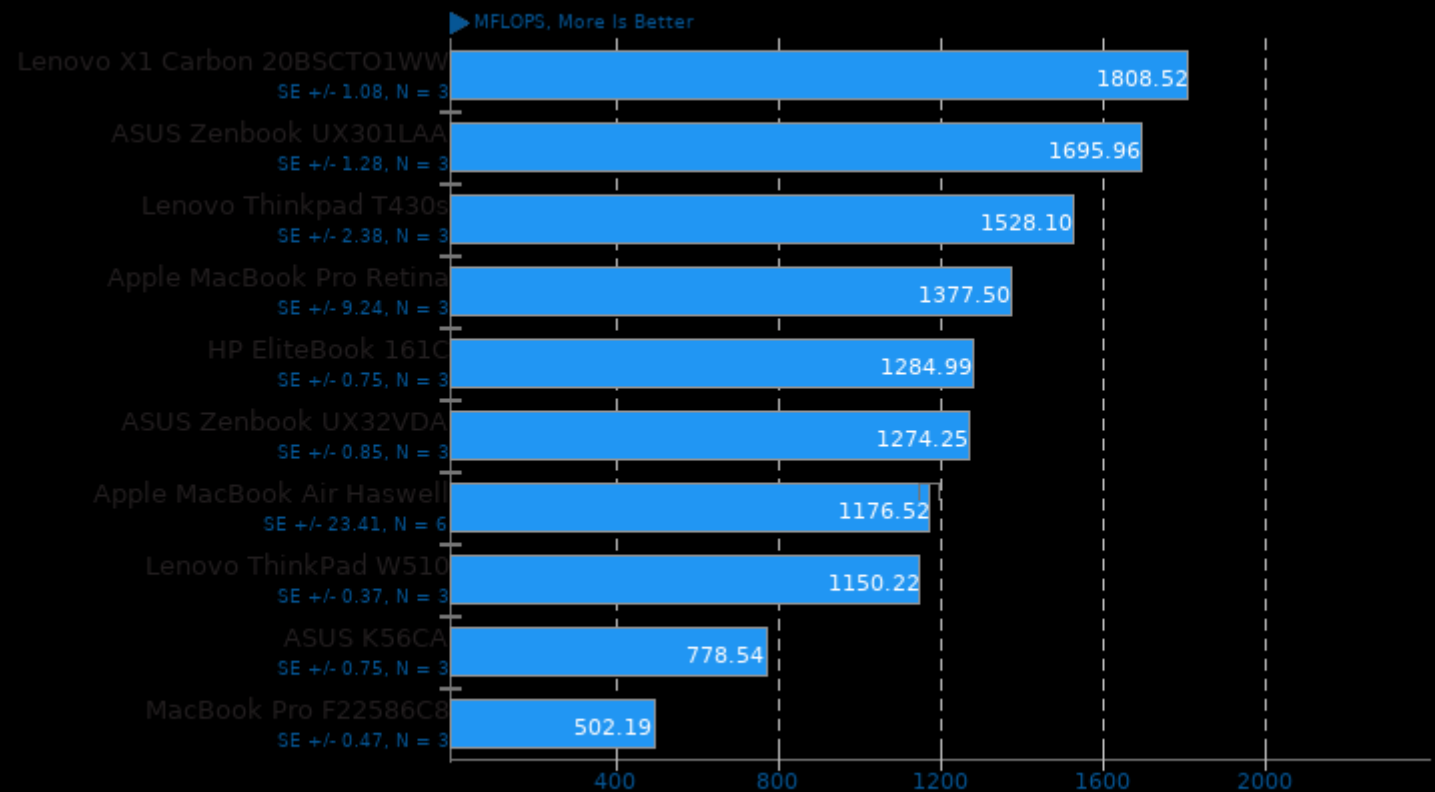


1. (CC) gcc options: -ldl -m64 -lm -lpthread -O3 -ffast-math -std=gnu99 -fomit-frame-pointer -fno-tree-vectorize



## Himeno Benchmark 3.0

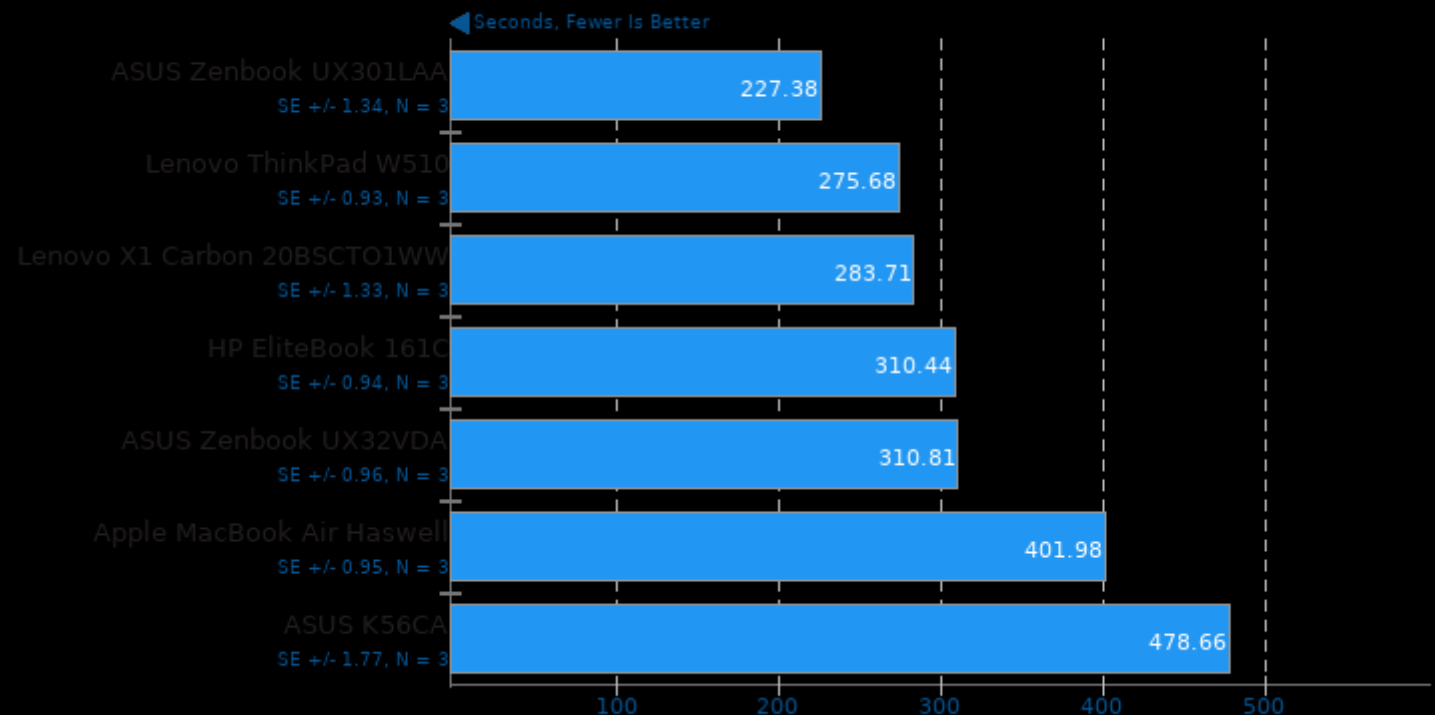
Poisson Pressure Solver

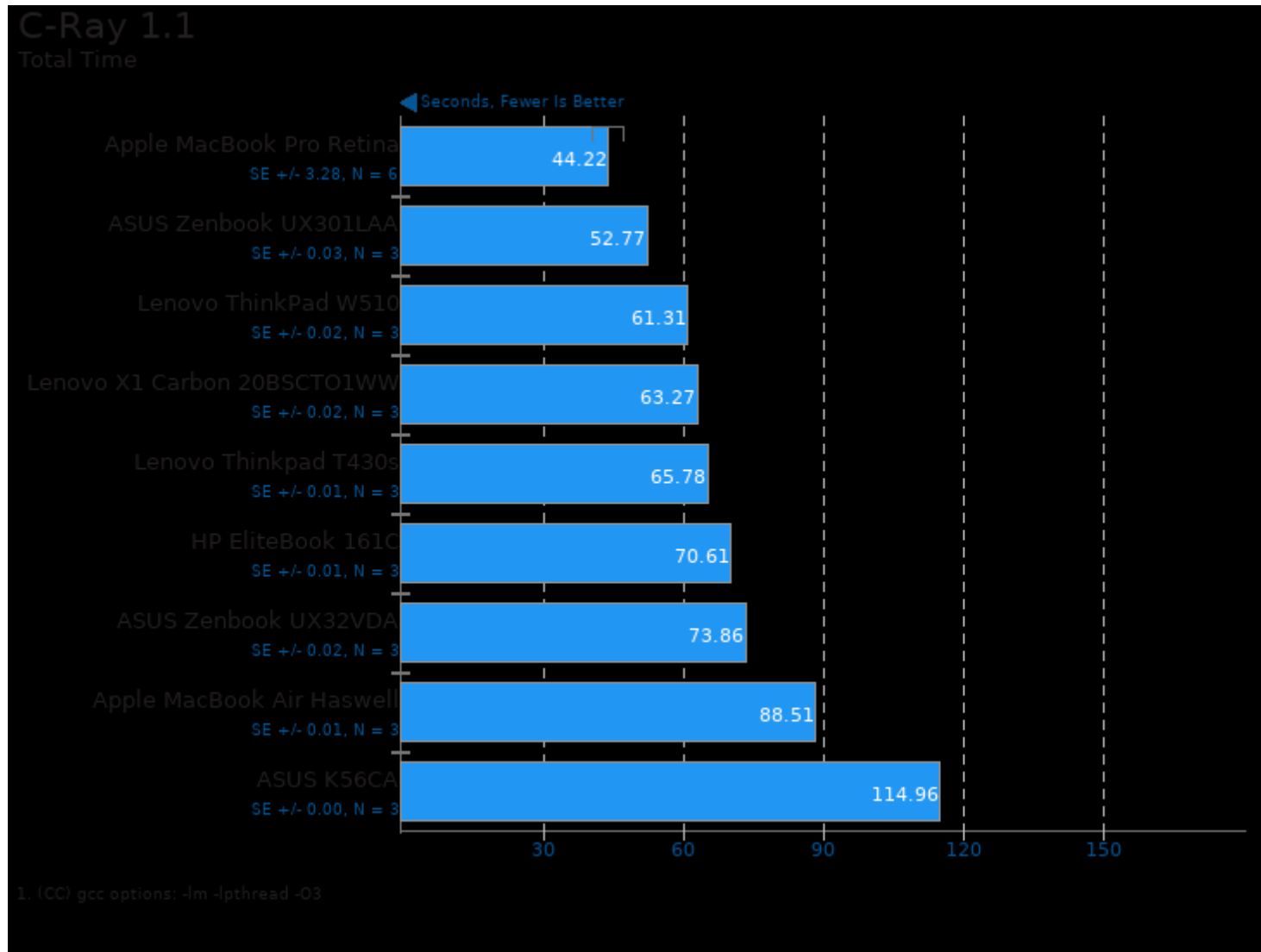


1. (CC) gcc options: -O3

## Timed Linux Kernel Compilation 3.18-rc6

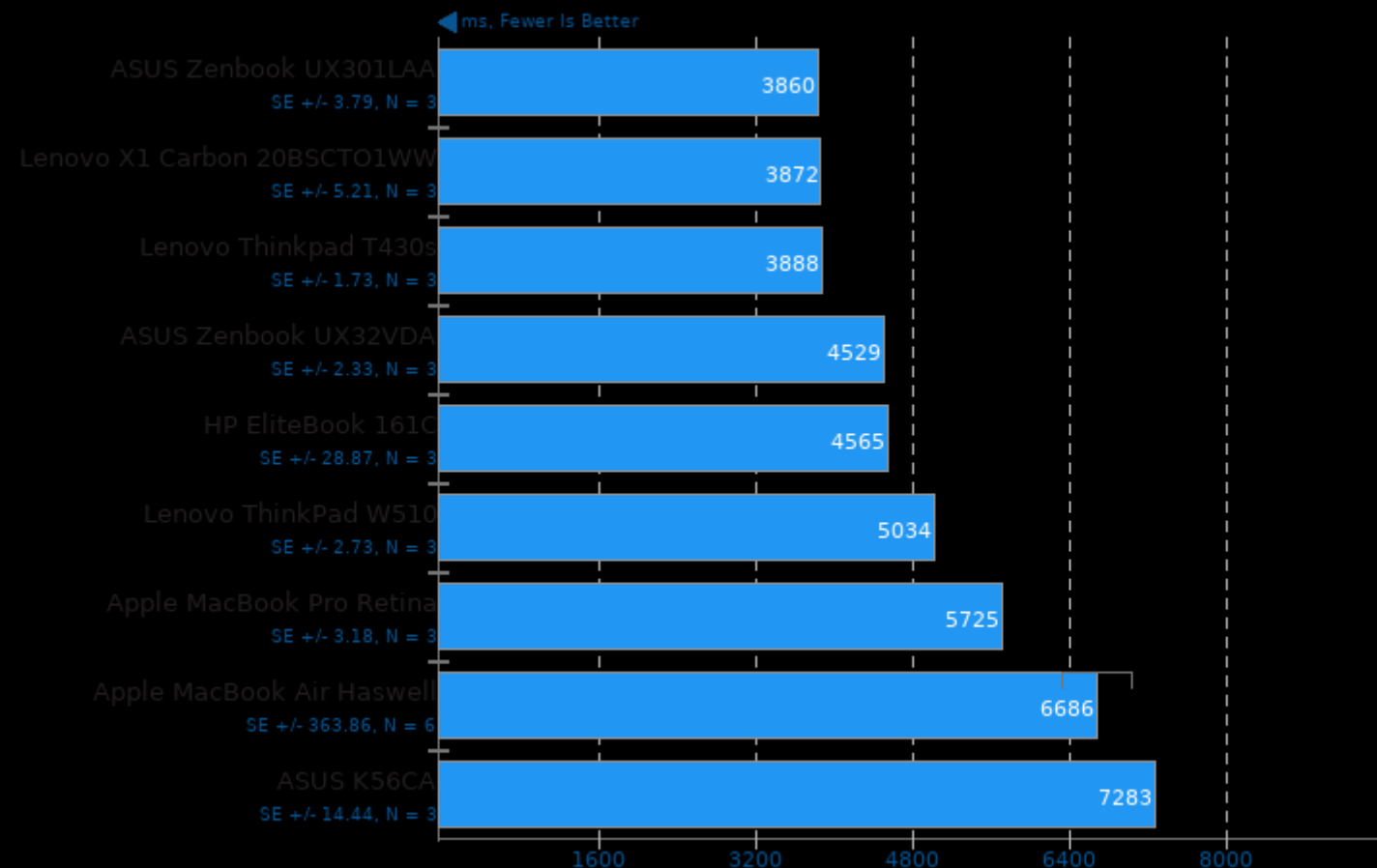
Time To Compile





Stockfish 2014-11-26

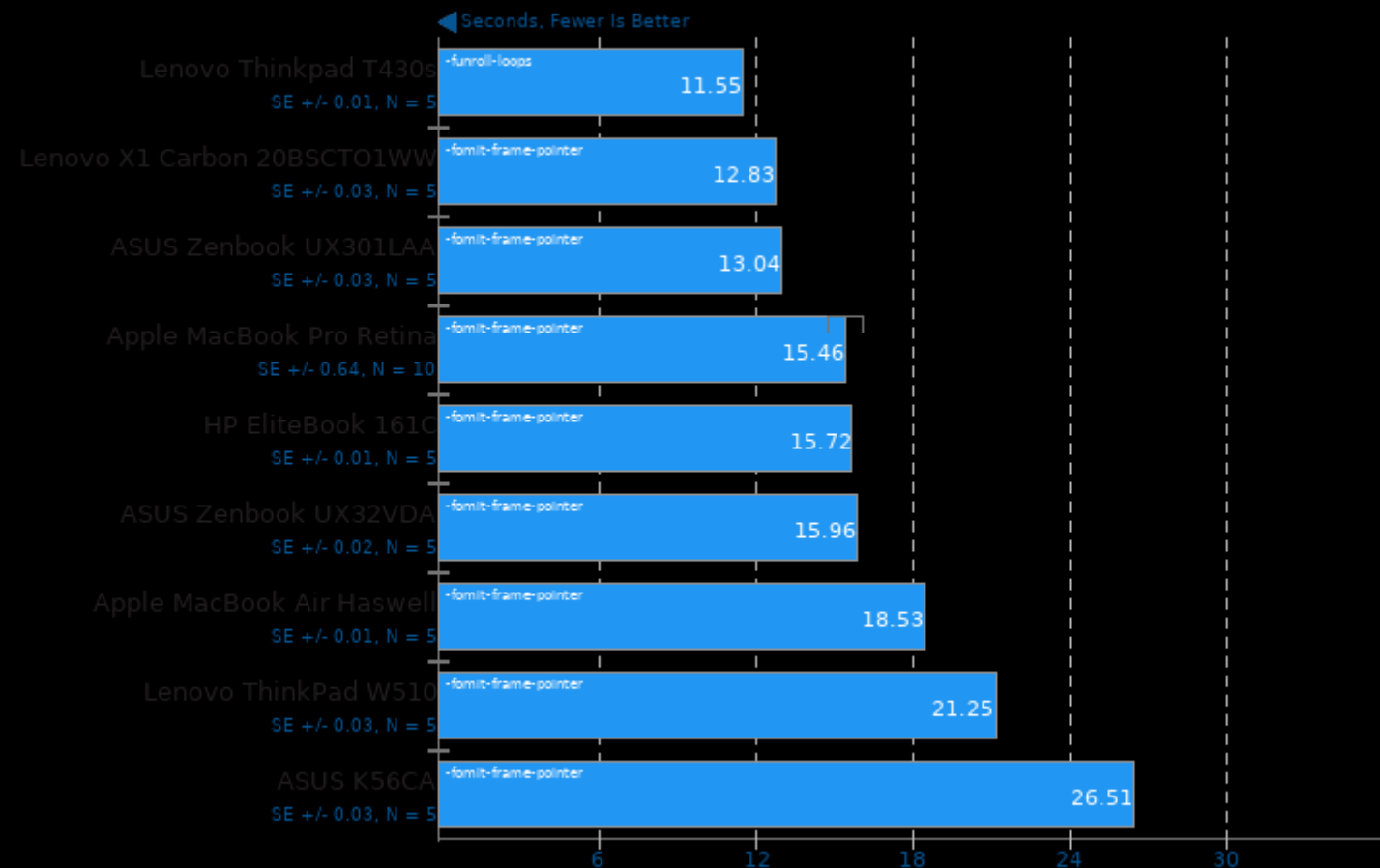
Total Time



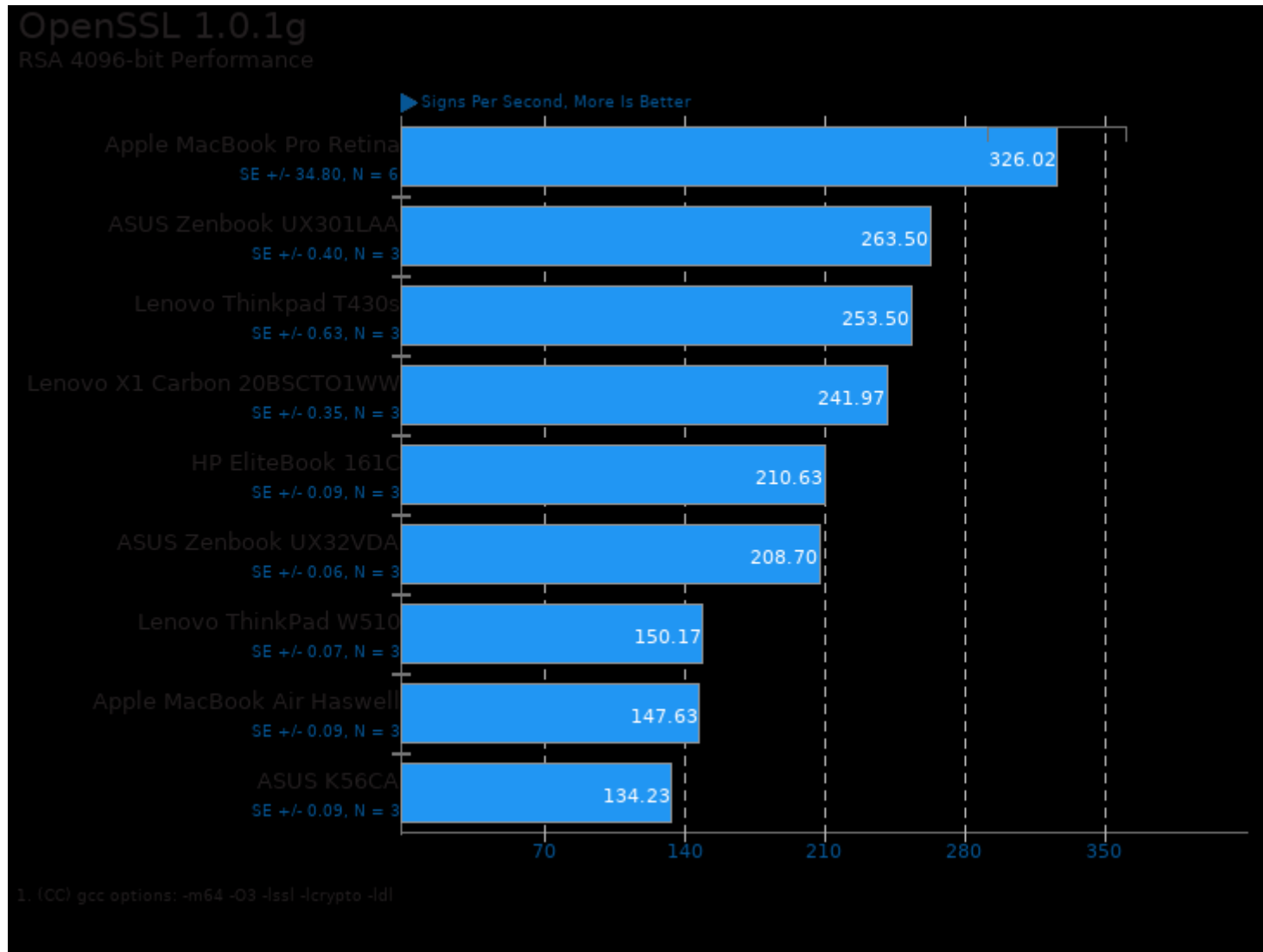
1. (CXX) g++ options: -lpthread -fno-exceptions -fno-rtti -ansi -pedantic -O3 -msse -msse3 -mpopcnt -fno

## LAME MP3 Encoding 3.99.3

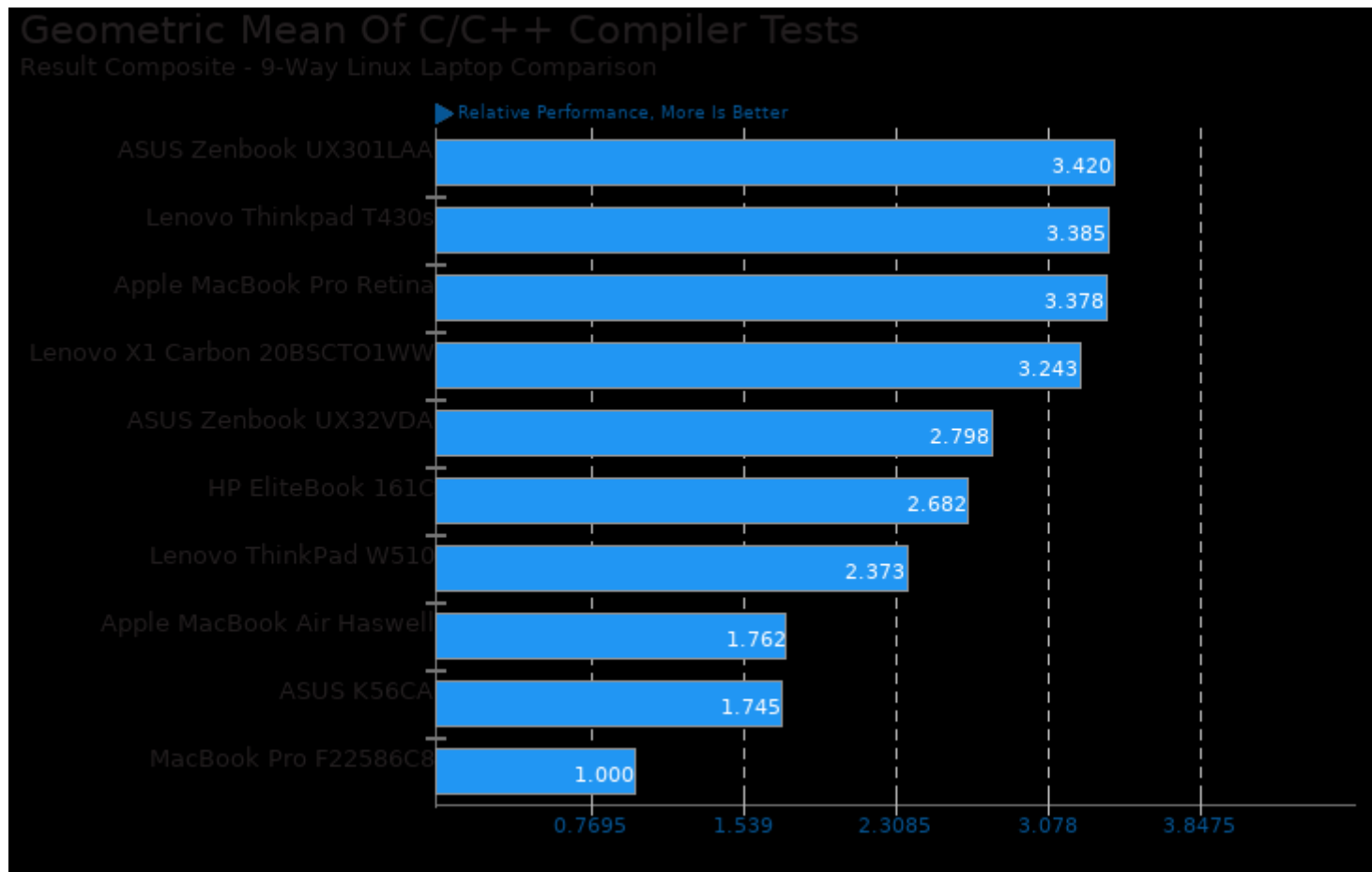
WAV To MP3



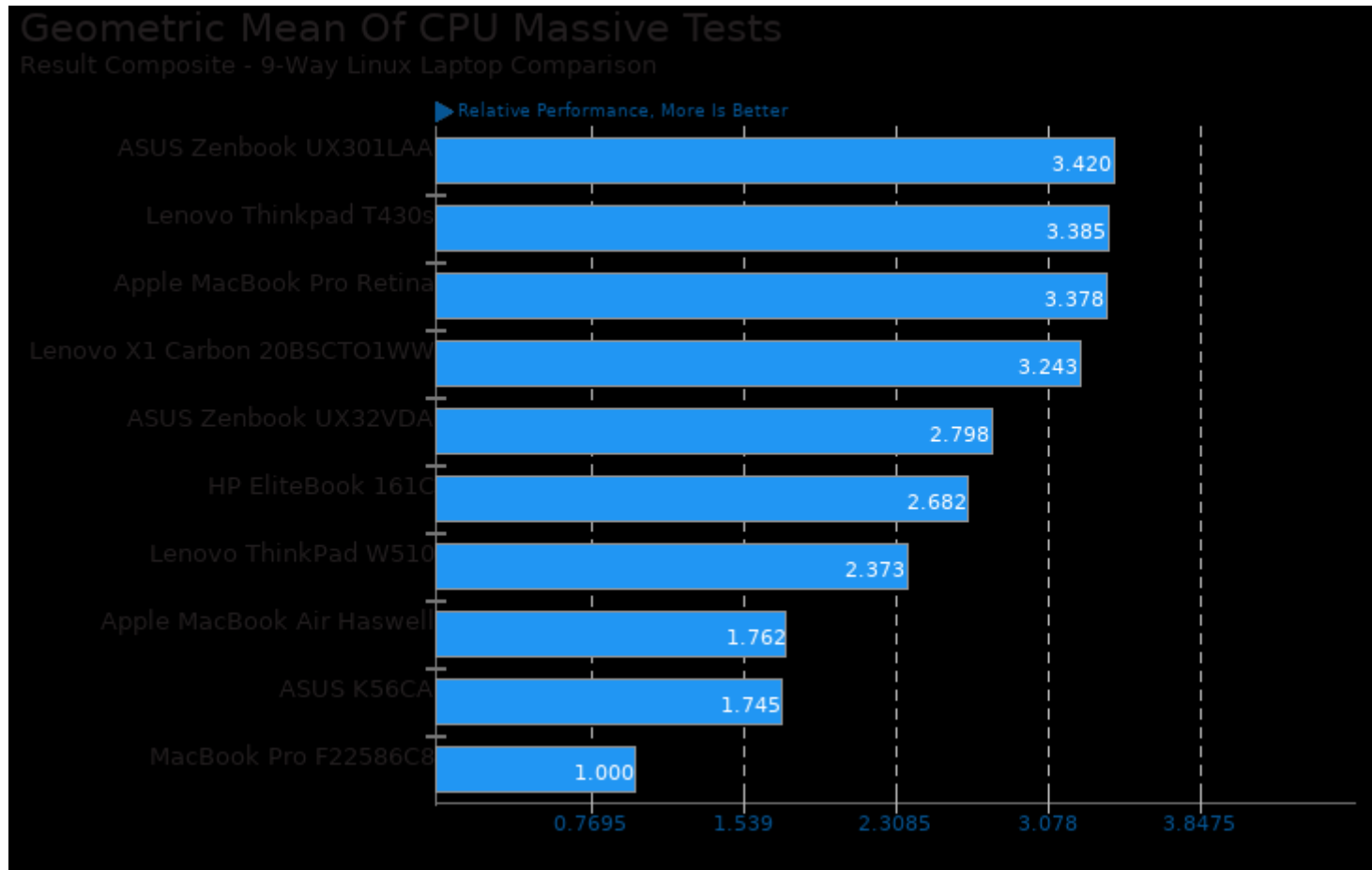
1. (CC) gcc options: -O3 -ffast-math -pipe -lm



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

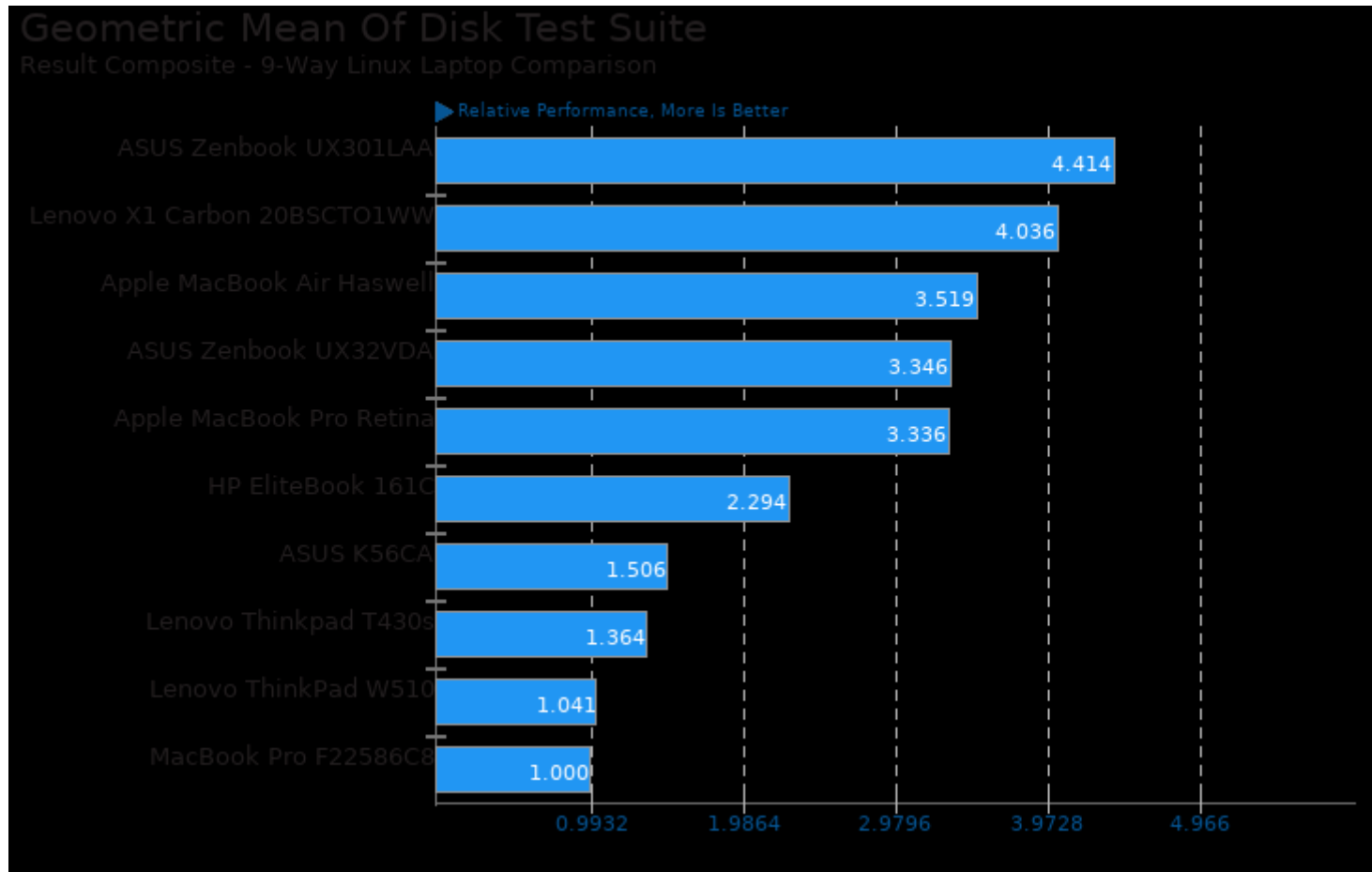


Geometric mean based upon tests: pts/fftw, pts/himeno, pts/stockfish, pts/c-ray, pts/encode-mp3, pts/john-the-ripper, pts/x264 and pts/openssl

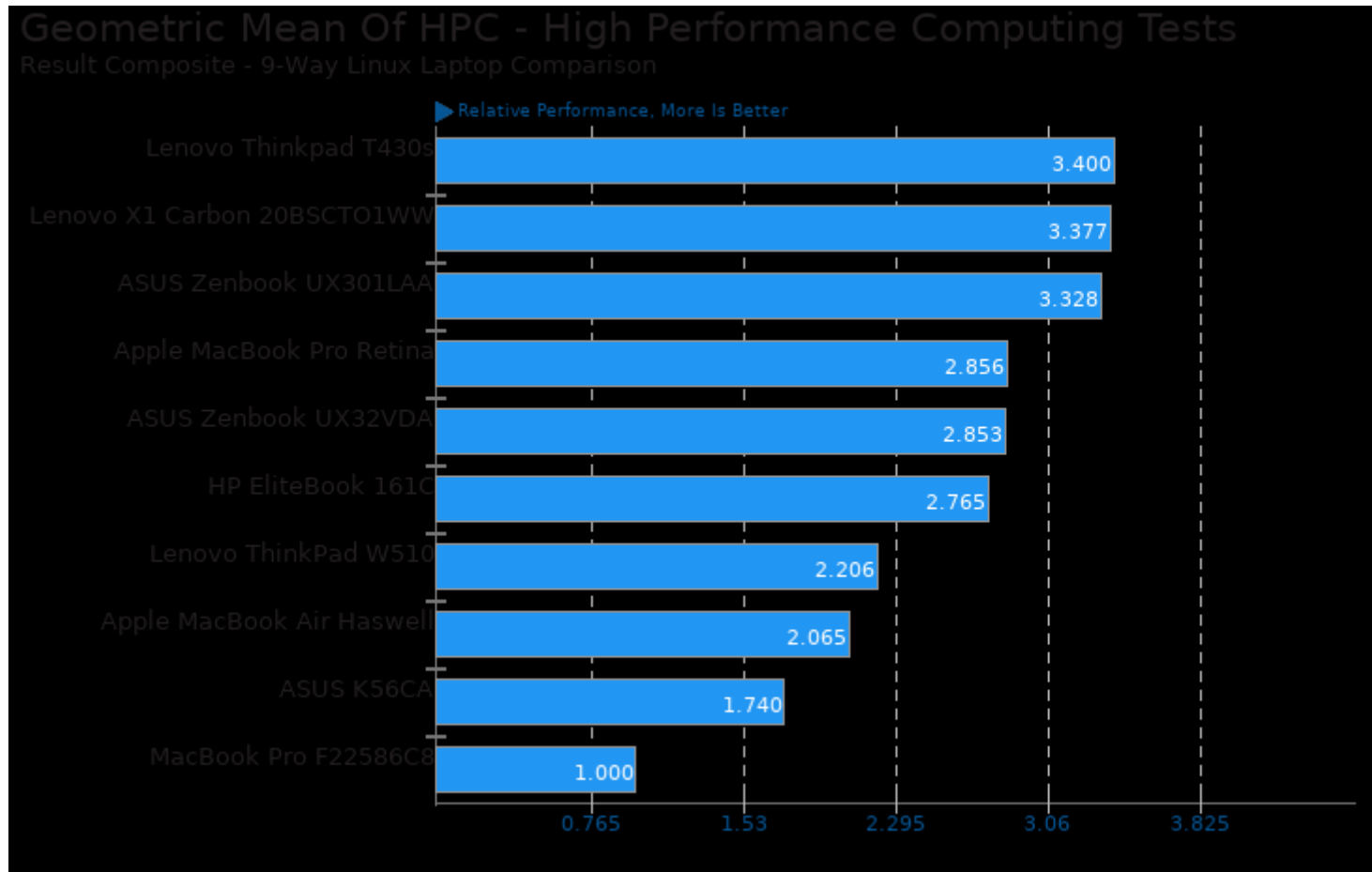


Geometric mean based upon tests: pts/build-linux-kernel, pts/c-ray, pts/x264, pts/encode-mp3, pts/fftw, pts/himeno, pts/john-the-ripper, pts/openssl and pts/stockfish



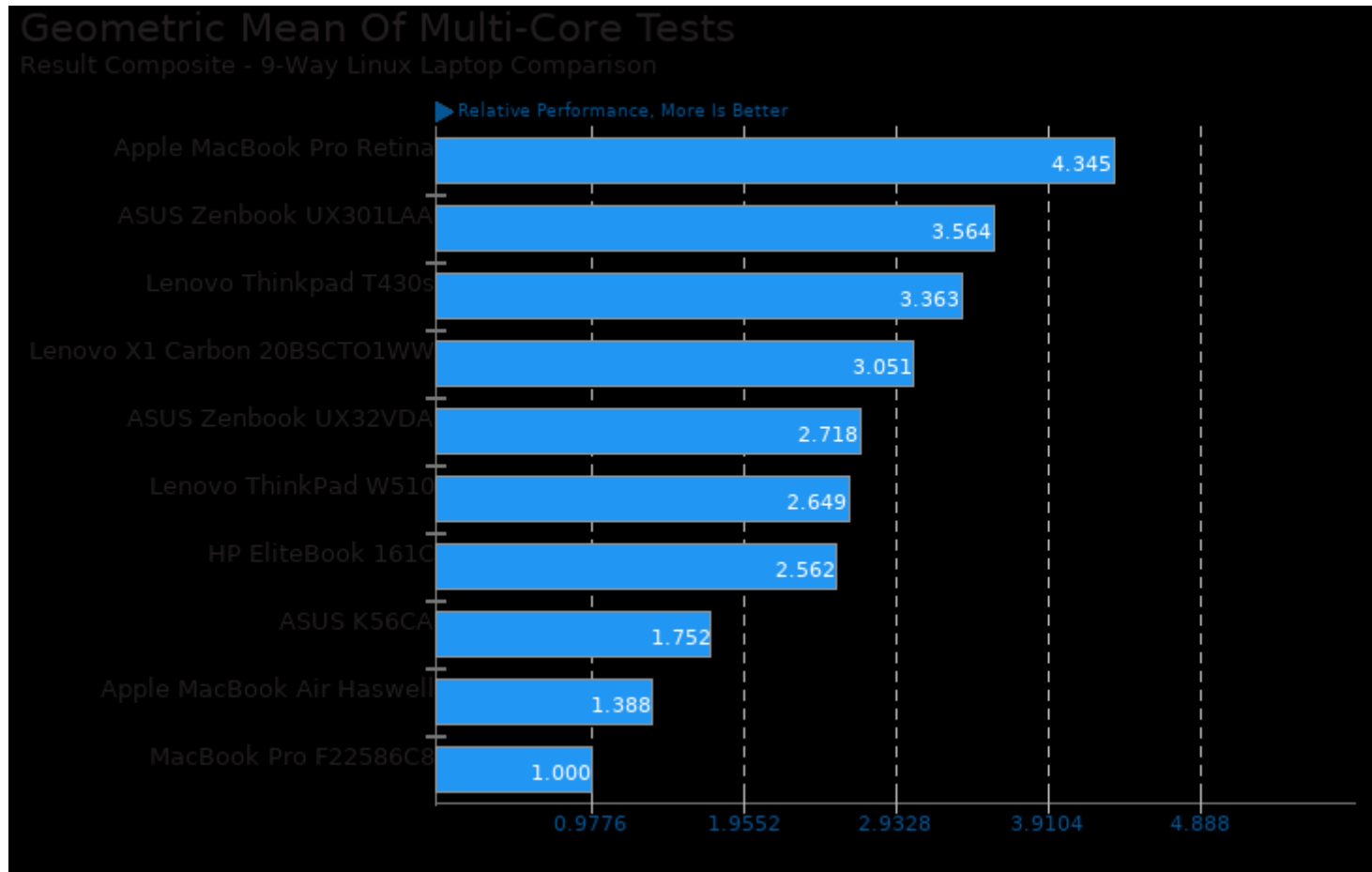


Geometric mean based upon tests: pts/postmark and pts/fio

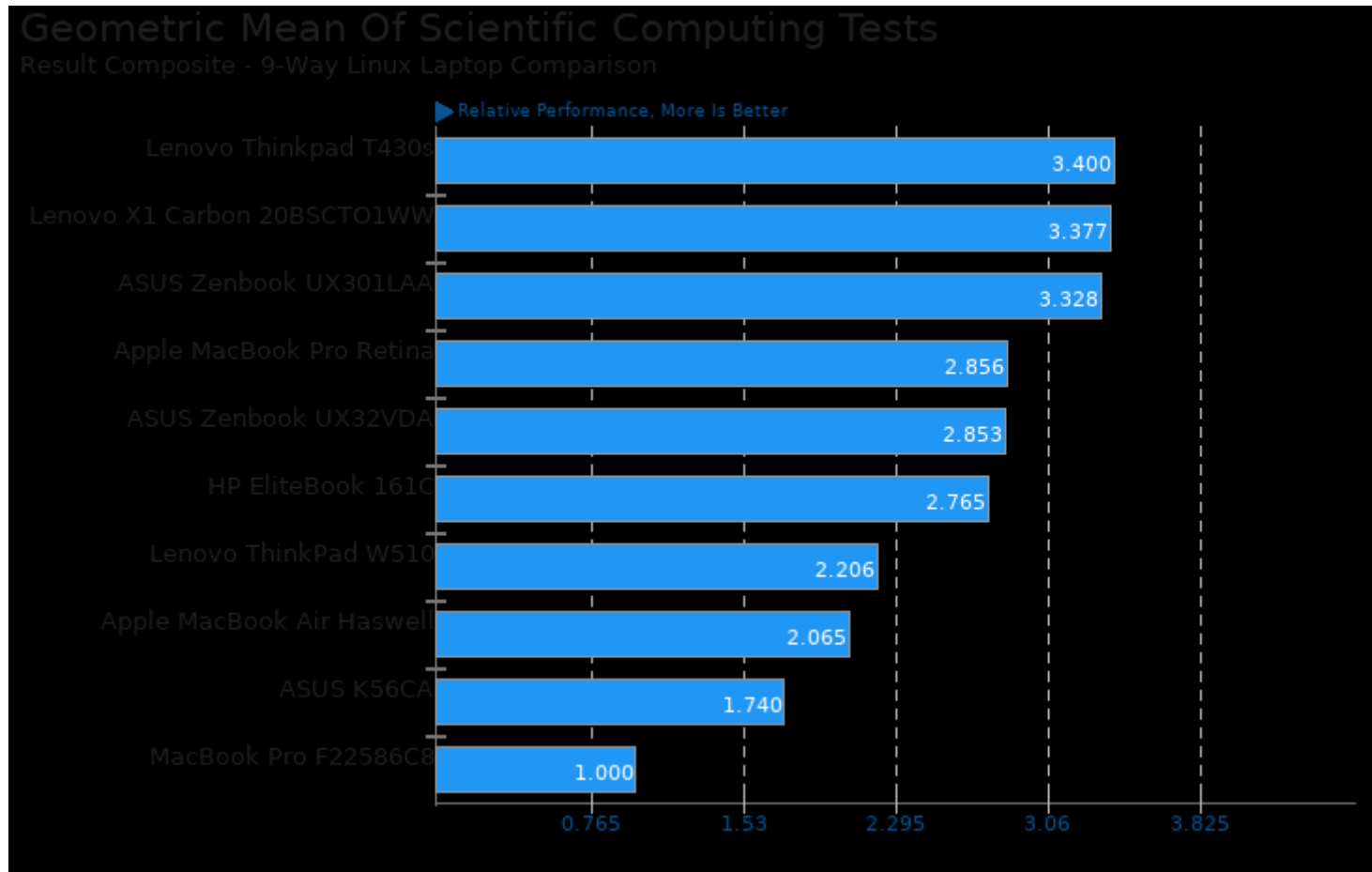


Geometric mean based upon tests: pts/fftw and pts/himeno

## 9-Way Linux Laptop Comparison

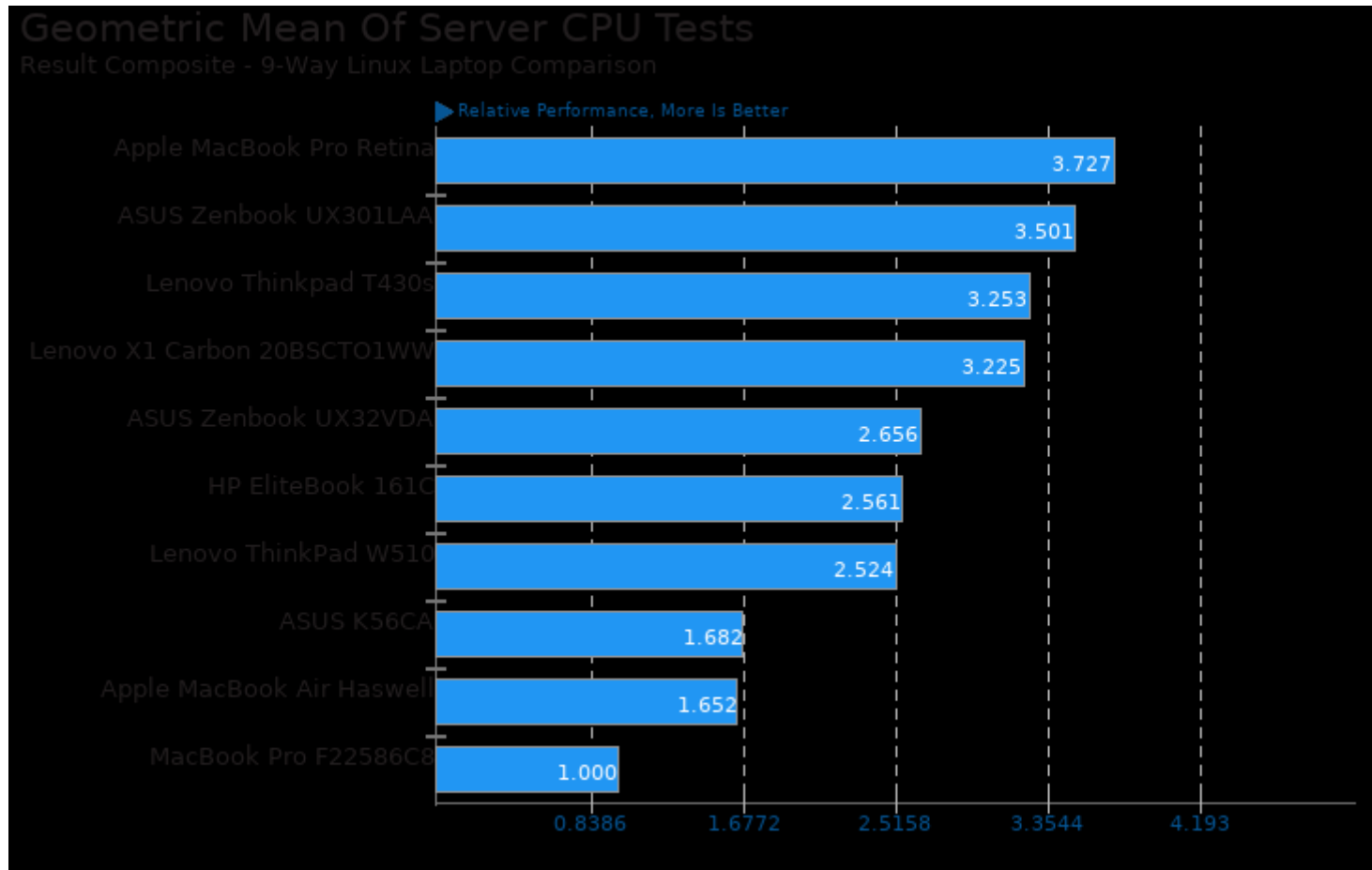


Geometric mean based upon tests: pts/c-ray, pts/stockfish, pts/x264, pts/john-the-ripper and pts/build-linux-kernel



Geometric mean based upon tests: pts/fftw and pts/himeno

## 9-Way Linux Laptop Comparison



Geometric mean based upon tests: pts/john-the-ripper, pts/x264, pts/himeno, pts/stockfish, pts/build-linux-kernel, pts/c-ray and pts/openssl

*This file was automatically generated via the Phoronix Test Suite benchmarking software on Friday, 26 April 2024 18:49.*