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FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks

Early benchmarks by Michael Larabel.

Automated Executive Summary

FreeBSD 12.2 had the most wins, coming in first place for 60% of the tests.

Based on the geometric mean of all complete results, the fastest (FreeBSD 12.2) was 2.173x the speed of the slowest (Helix 500: FreeBSD 12.2). Helix 500: FreeBSD 13 BETA1 was 0.836x the speed of FreeBSD 12.2, Karbon 700: FreeBSD 13 BETA1 was 0.98x the speed of Helix 500: FreeBSD 13 BETA1, Karbon 700: FreeBSD 12.2 was 0.59x the speed of Karbon 700: FreeBSD 13 BETA1, Helix 500: FreeBSD 12.2 was 0.952x the speed of Karbon 700: FreeBSD 12.2.

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

OSBench (Test: Create Threads) at 8.603x
Stress-NG (Test: Malloc) at 6.305x
John The Ripper (Test: Blowfish) at 5.571x
m-queens (Time To Solve) at 4.946x
Stress-NG (Test: Memory Copying) at 4.768x
GraphicsMagick (Operation: Noise-Gaussian) at 4.691x
GraphicsMagick (Operation: Enhanced) at 4.686x

Smallpt (Global Illumination Renderer; 128 Samples) at 4.602x
GraphicsMagick (Operation: Sharpen) at 4.6x
Stress-NG (Test: Matrix Math) at 4.481x.

Test Systems:

Karbon 700: FreeBSD 12.2

Processor: Intel Xeon E-2278GEL @ 2.00GHz (16 Cores), Motherboard: Logic Supply RXM-181 TBD by OEM, Chipset: Intel, Memory: 16GB, Disk: TS512GMTE510T, Graphics: Intel, Audio: Intel Coffee Lake HDA, Network: Intel PRO/1000 Connection

OS: FreeBSD, Kernel: 12.2-RELEASE (x86_64), Compiler: Clang 10.0.1, File-System: zfs, Screen Resolution: 800x600

Java Notes: OpenJDK Runtime Environment (build 11.0.9+11-1)
Python Notes: Python 3.7.9

Karbon 700: FreeBSD 13 BETA1

Processor: Intel Xeon E-2278GEL @ 1.99GHz (16 Cores), Motherboard: Logic Supply RXM-181 TBD by OEM, Chipset: Intel, Memory: 16GB, Disk: TS512GMTE510T, Graphics: Intel, Audio: Intel Coffee Lake HDA, Network: Intel PRO/1000 Connection

OS: FreeBSD, Kernel: 13.0-BETA1 (x86_64), Compiler: Clang 11.0.1, File-System: zfs, Screen Resolution: 800x600

Java Notes: OpenJDK Runtime Environment (build 11.0.9+11-1)
Python Notes: Python 3.7.9

Helix 500: FreeBSD 12.2

Processor: Intel Core i7-10700T @ 2.00GHz (16 Cores), Motherboard: Insyde CometLake TBD by OEM, Chipset: Intel, Memory: 32GB, Disk: TS256GMTS800 P1225CH1 + AHCI SGPIO Enclosure 2.00 0001, Graphics: Intel, Audio: Intel Comet Lake-H HDA, Network: Intel PRO/1000 Connection

OS: FreeBSD, Kernel: 12.2-RELEASE (x86_64), Compiler: Clang 10.0.1, File-System: zfs, Screen Resolution: 1024x768

Java Notes: OpenJDK Runtime Environment (build 11.0.9+11-1)
Python Notes: Python 3.7.9

Helix 500: FreeBSD 13 BETA1

Processor: Intel Core i7-10700T @ 1.99GHz (16 Cores), Motherboard: Insyde CometLake TBD by OEM, Chipset: Intel, Memory: 32GB, Disk: TS256GMTS800 P1225CH1 + AHCI SGPIO Enclosure 2.00 0001, Graphics: Intel, Audio: Intel Comet Lake-H HDA, Network: Intel PRO/1000 Connection

OS: FreeBSD, Kernel: 13.0-BETA1 (x86_64), Compiler: Clang 11.0.1, File-System: zfs, Screen Resolution: 1024x768

Java Notes: OpenJDK Runtime Environment (build 11.0.9+11-1)

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Python Notes: Python 3.7.9

FreeBSD 12.2

Processor: AMD EPYC 7F52 16-Core @ 3.50GHz (32 Cores), Motherboard: Supermicro Super Server 0123456789, Chipset: AMD [AMD] Starship/Matisse Root Complex, Memory: 64GB, Disk: INTEL SSDPE21D280GA, Graphics: ASPEED

OS: FreeBSD, Kernel: 12.2-RELEASE (x86_64), Compiler: Clang 10.0.1, File-System: zfs, Screen Resolution: 800x600

Java Notes: OpenJDK Runtime Environment (build 11.0.9+11-1)
Python Notes: Python 3.7.9

	Karbon 700: FreeBSD 12.2	Karbon 700: FreeBSD 13 BETA1	Helix 500: FreeBSD 12.2	Helix 500: FreeBSD 13 BETA1	FreeBSD 12.2
SMHasher - wyhash	33.333	18.838	**35.236**	**17.839**	
Normalized	53.52%	94.7%	50.63%	100%	
Standard Deviation	0%	0%	0%	0%	
GNU MPC - M.P.B (Global Score)	4593	8020	**3990**	7763	**8117**
Normalized	56.58%	98.8%	49.16%	95.64%	100%
Standard Deviation	0.1%			0.1%	0.1%
SMHasher - wyhash (MiB/sec)	12711	24086	**11679**	**26835**	
Normalized	47.37%	89.75%	43.52%	100%	
Standard Deviation	0.2%	0.2%	0.8%	0.2%	
SMHasher - MeowHash (MiB/sec)	29576	50310	**27598**	**53634**	
Normalized	55.14%	93.8%	51.46%	100%	
Standard Deviation	0.9%	0.8%	0.6%	0.1%	
SMHasher - MeowHash (cycles/hash)	72.770	41.421	**76.451**	**38.968**	
Normalized	53.55%	94.08%	50.97%	100%	
Standard Deviation	0%	0.2%	0%	0%	
SMHasher - Spooky32 (MiB/sec)	11927	20891	**11180**	**22733**	
Normalized	52.47%	91.9%	49.18%	100%	
Standard Deviation	0.8%	0.3%	0.4%	0%	
SMHasher - Spooky32 (cycles/hash)	56.679	32.106	**59.769**	**30.530**	
Normalized	53.86%	95.09%	51.08%	100%	
Standard Deviation	0.1%	0%	0%	0%	
SMHasher - fasthash32 (MiB/sec)	5390	9433	**5111**	**9970**	
Normalized	54.06%	94.61%	51.26%	100%	
Standard Deviation	0%	0%	0%	0%	
SMHasher - fasthash32 (cycles/hash)	45.231	25.996	**47.567**	**24.621**	
Normalized	54.43%	94.71%	51.76%	100%	
Standard Deviation	0%	0%	0.1%	0%	
SMHasher - t1ha2_atonce (MiB/sec)	12108	**21002**	**10485**	20943	
Normalized	57.65%	100%	49.93%	99.72%	
Standard Deviation	0.4%	0.5%	0%	0%	

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SMHasher - t1ha2_atonce (cycles/hash)	44.670	25.354	**46.925**	**23.831**	
Normalized	53.35%	93.99%	50.79%	100%	
Standard Deviation	0.1%	0%	0.1%	0.1%	
SMHasher - t1ha0_aes_avx2 (MiB/sec)	33407	60166	**31601**	**72402**	
Normalized	46.14%	83.1%	43.65%	100%	
Standard Deviation	3.9%	1.4%	3.4%	0.1%	
SMHasher - t1ha0_aes_avx2 (cycles/hash)	44.475	25.178	**46.755**	**23.626**	
Normalized	53.12%	93.84%	50.53%	100%	
Standard Deviation	0%	0.2%	0.1%	0%	
SciMark - Composite (Mflops)	354.06	613.82	**340.88**	**664.97**	651.88
Normalized	53.24%	92.31%	51.26%	100%	98.03%
Standard Deviation	0.1%	0.1%	0.2%	0.3%	0.1%
Go Benchmarks - json (ns/op)	9043850	6029985	**9538525**	7129231	**3064084**
Normalized	33.88%	50.81%	32.12%	42.98%	100%
Standard Deviation	0.1%	5.3%	0.4%	6.3%	7.8%
Go Benchmarks - build (ns/op)	38410777180	22342101760	**40047668537**	20875309325	**20680805140**
Normalized	53.84%	92.56%	51.64%	99.07%	100%
Standard Deviation	1.1%	2%	0.5%	0.8%	0.4%
Go Benchmarks - garbage	2171602	**1441863**	**2303848**	1701560	1719738
Normalized	66.4%	100%	62.58%	84.74%	83.84%
Standard Deviation	0.1%	3.8%	0.2%	4.9%	15.3%
MBW - M.C.F.B.S - 1024 MiB (MiB/s)	6831	7371	**6211**	**10811**	8203
Normalized	63.18%	68.18%	57.45%	100%	75.87%
Standard Deviation	1%	0.3%	1.8%	0.8%	1%
Stress-NG - MMAP (Bogo Ops/s)	114.63	216.97	**101.96**	212.59	**243.58**
Normalized	47.06%	89.08%	41.86%	87.28%	100%
Standard Deviation	5.9%	3.1%	11%	6.7%	1.1%
Stress-NG - Malloc (Bogo Ops/s)	90297292	160803472	**85352349**	143900729	**538132674**
Normalized	16.78%	29.88%	15.86%	26.74%	100%
Standard Deviation	0.1%	1.6%	0.3%	2.1%	0.1%
Stress-NG - Forking (Bogo	15458	**38093**	13801	26910	**12819**
Normalized	40.58%	100%	36.23%	70.64%	33.65%
Standard Deviation	3.9%	1.2%	4.4%	2.2%	0.3%
Stress-NG - CPU Stress (Bogo Ops/s)	1437	2381	**1357**	2103	**5267**
Normalized	27.27%	45.2%	25.76%	39.94%	100%
Standard Deviation	0.5%	2.5%	0.2%	2.3%	0.1%
Stress-NG - Semaphores (Bogo Ops/s)	12107606	20109853	**11429812**	17337245	**41915809**
Normalized	28.89%	47.98%	27.27%	41.36%	100%
Standard Deviation	3.3%	3.8%	5.1%	2.3%	6.2%
Stress-NG - Matrix Math (Bogo Ops/s)	22147	33294	**21297**	29095	**95423**
Normalized	23.21%	34.89%	22.32%	30.49%	100%
Standard Deviation	0.4%	2.2%	1.8%	1.3%	0.3%
Stress-NG - Memory Copying (Bogo Ops/s)	841.92	**796.42**	1511	1610	**3798**
Normalized	22.17%	20.97%	39.78%	42.39%	100%
Standard Deviation	0.8%	0.4%	0.7%	0.5%	2.3%

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Stress-NG - Socket Activity (Bogo Ops/s)	1557	3189	**1025**	**3218**	1393
Normalized	48.39%	99.12%	31.85%	100%	43.29%
Standard Deviation	3.3%	2.5%	0.2%	0.9%	1.4%
Stress-NG - Context Switching (Bogo Ops/s)	10089739	18590880	**9683382**	14550134	**41347533**
Normalized	24.4%	44.96%	23.42%	35.19%	100%
Standard Deviation	1.5%	7.2%	4%	2.4%	5.3%
Stress-NG - G.C.S.F (Bogo	46245	66805	**43488**	60362	**189065**
Normalized	24.46%	35.33%	23%	31.93%	100%
Standard Deviation	0.2%	2.5%	0%	2.3%	0.2%
Stress-NG - G.Q.D.S (Bogo	122.74	185.89	**116.43**	160.95	**441.80**
Normalized	27.78%	42.08%	26.35%	36.43%	100%
Standard Deviation	0%	2.5%	0.1%	2.4%	0.2%
Stress-NG - S.V.M.P (Bogo	777714	1465334	675814	**1543793**	**570520**
Normalized	50.38%	94.92%	43.78%	100%	36.96%
Standard Deviation	0.3%	0.3%	0.2%	0.2%	0.8%
DaCapo Benchmark - H2 (msec)	4916	3710	**5139**	**3266**	3377
Normalized	66.44%	88.03%	63.55%	100%	96.71%
Standard Deviation	2.4%	7.6%	2.4%	6.3%	2.5%
DaCapo Benchmark - Jython (msec)	8322	5005	**8648**	**4499**	4557
Normalized	54.06%	89.89%	52.02%	100%	98.73%
Standard Deviation	0.3%	1.1%	1.3%	1.3%	3.8%
Renaissance - Scala Dotty (ms)	3350	1934	**3396**	1804	**1561**
Normalized	46.58%	80.68%	45.96%	86.49%	100%
Standard Deviation	1%	1.1%	1%	0.9%	1%
Renaissance - Savina Reactors.IO (ms)	33209	19121	**40991**	17989	**16678**
Normalized	50.22%	87.22%	40.69%	92.71%	100%
Standard Deviation	0.5%	1.4%	1.9%	1.4%	22.9%
Renaissance - T.H.R (ms)	**4013**	**2702**	4009	3107	3436
Normalized	67.32%	100%	67.4%	86.96%	78.63%
Standard Deviation	1.4%	1.3%	1.5%	1.4%	0.5%
Hierarchical INTegration - FLOAT (QUIPs)	191826538	330736003	**185131230**	**353263833**	318506562
Normalized	54.3%	93.62%	52.41%	100%	90.16%
Standard Deviation	0.2%	0.2%	0.1%	0.2%	0.2%
BLAKE2 (Cycles/Byte)	5.10	2.91	5.38	**2.76**	**5.44**
Normalized	54.12%	94.85%	51.3%	100%	50.74%
Standard Deviation	0.1%	0%	0.1%	0.2%	0.2%
Botan - KASUMI (MiB/s)	45.653	73.008	**43.493**	77.183	**87.661**
Normalized	52.08%	83.28%	49.61%	88.05%	100%
Standard Deviation	0%	0%	0%	0%	0.1%
Botan - AES-256 (MiB/s)	1806	3182	**1717**	3365	**3976**
Normalized	45.42%	80.03%	43.17%	84.62%	100%
Standard Deviation	0%	0%	0%	0%	0.1%
Botan - Twofish (MiB/s)	149.513	255.691	**142.139**	272.245	**309.598**
Normalized	48.29%	82.59%	45.91%	87.93%	100%
Standard Deviation	0%	0.1%	0%	0.1%	0.1%
Botan - Blowfish (MiB/s)	181.840	315.925	**173.428**	336.257	**366.147**
Normalized	49.66%	86.28%	47.37%	91.84%	100%
Standard Deviation	0.1%	0%	0.2%	0.1%	0.1%
Botan - CAST-256 (MiB/s)	64.355	112.752	**61.419**	119.680	**129.381**

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Normalized	49.74%	87.15%	47.47%	92.5%	100%
Standard Deviation	0.1%	0%	0%	0%	0.2%
Java SciMark - Composite	1145	2012	**1077**	2101	**2776**
Normalized	41.24%	72.45%	38.8%	75.68%	100%
Standard Deviation	5.4%	5.4%	5.3%	5.2%	0.1%
CacheBench - Read (MB/s)	3805	6663	**3615**	7044	**9893**
Normalized	38.47%	67.35%	36.54%	71.2%	100%
Standard Deviation	0%	0%	0%	0%	0.1%
FLAC Audio Encoding - WAV To FLAC (sec)	21.935	12.418	**23.005**	11.773	**10.197**
Normalized	46.49%	82.11%	44.33%	86.61%	100%
Standard Deviation	0.1%	0.1%	0.1%	0.1%	0.2%
LAME MP3 Encoding - WAV To MP3 (sec)	21.230	11.707	**22.578**	11.197	**9.564**
Normalized	45.05%	81.69%	42.36%	85.42%	100%
Standard Deviation	0%	0%	0.1%	0.1%	0%
libjpeg-turbo tjbench - D.T (Megapixels/sec)	92.159009	169.459136	**87.701109**	179.169436	**195.832053**
Normalized	47.06%	86.53%	44.78%	91.49%	100%
Standard Deviation	0%	0.1%	0.1%	0.1%	0%
Monkey Audio Encoding - WAV To APE (sec)	68.114	35.125	**72.441**	33.682	**26.670**
Normalized	39.15%	75.93%	36.82%	79.18%	100%
Standard Deviation	0%	0%	0%	0%	0.1%
LibRaw - P.P.B (Mpix/sec)	18.77	30.33	**17.51**	28.89	**39.38**
Normalized	47.66%	77.02%	44.46%	73.36%	100%
Standard Deviation	0.2%	0.1%	0.1%	2.4%	0.2%
LuaJIT - Composite (Mflops)	752.26	1304	**709.13**	1385	**1478**
Normalized	50.91%	88.28%	47.99%	93.76%	100%
Standard Deviation	0.1%	0.1%	0.5%	0.4%	0.1%
LuaJIT - Monte Carlo (Mflops)	251.72	441.46	**239.72**	467.48	**472.89**
Normalized	53.23%	93.35%	50.69%	98.86%	100%
Standard Deviation	0%	0.2%	0.2%	0.3%	1.3%
LuaJIT - F.F.T (Mflops)	284.23	439.56	238.16	**457.09**	**138.17**
Normalized	62.18%	96.16%	52.1%	100%	30.23%
Standard Deviation	0.5%	0.5%	2.1%	2%	0.1%
LuaJIT - S.M.M (Mflops)	647.27	1129	**617.78**	1206	**1227**
Normalized	52.76%	92.03%	50.35%	98.31%	100%
Standard Deviation	0%	0.1%	0.1%	0.4%	0.1%
LuaJIT - D.L.M.F (Mflops)	1825	3195	**1736**	3399	**3657**
Normalized	49.91%	87.36%	47.46%	92.95%	100%
Standard Deviation	0.3%	0.1%	0.6%	0.4%	0.2%
LuaJIT - J.S.O.R (Mflops)	752.74	1317	**714.38**	1397	**1893**
Normalized	39.77%	69.57%	37.74%	73.78%	100%
Standard Deviation	0.2%	0%	0.2%	0%	0.1%
dcraw - R.T.P.I.C (sec)	73.995	42.263	**78.007**	40.080	**35.606**
Normalized	48.12%	84.25%	45.64%	88.84%	100%
Standard Deviation	0.1%	0.1%	0.1%	0.4%	0.2%
FFTW - Stock - 2D FFT Size 4096 (Mflops)	3023	4660	**2802**	5585	**5795**
Normalized	52.16%	80.41%	48.34%	96.36%	100%
Standard Deviation	1.1%	0.5%	0.4%	0.2%	0.4%

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FFTW - Float + SSE - 2D FFT Size 4096 (Mflops)	9471	13846	**8966**	14893	**15228**
Normalized	62.19%	90.92%	58.88%	97.8%	100%
Standard Deviation	0%	4.9%	0.6%	0.4%	0.2%
Timed HMMer Search - P.D.S (sec)	229.865	130.592	**269.920**	126.047	**117.306**
Normalized	51.03%	89.83%	43.46%	93.07%	100%
Standard Deviation	0.2%	0.2%	0.7%	0.6%	0.3%
Himeno Benchmark - P.P.S (MFLOPS)	1658	2879	**1523**	2917	**4789**
Normalized	34.63%	60.11%	31.81%	60.91%	100%
Standard Deviation	0%	0.1%	0.2%	0.1%	0.2%
Scikit-Learn (sec)	291.104	168.313	**318.782**	171.043	**117.793**
Normalized	40.46%	69.98%	36.95%	68.87%	100%
Standard Deviation	0%	0%	0.2%	0.2%	0.1%
R Benchmark (sec)	1.3919	0.7841	**1.4291**	0.7487	**0.6786**
Normalized	48.75%	86.55%	47.48%	90.64%	100%
Standard Deviation	0.3%	0.4%	0.3%	0.2%	0.2%
Numpy Benchmark (Score)	192.59	290.02	**185.47**	311.95	**361.51**
Normalized	53.27%	80.22%	51.3%	86.29%	100%
Standard Deviation	0.2%	0.4%	0%	0.5%	0.1%
Rodinia - OpenMP CFD Solver (sec)	**45.227**	33.306	43.771	27.382	**14.377**
Normalized	31.79%	43.17%	32.85%	52.51%	100%
Standard Deviation	0.1%	1.2%	0.4%	2.4%	0.7%
FFTE - N.2.3.C.F.R (MFLOPS)	**16402**	18436	22589	31144	**36277**
Normalized	45.21%	50.82%	62.27%	85.85%	100%
Standard Deviation	0.1%	0.4%	0.1%	0.3%	0.2%
OSBench - Create Files	**123.229822**	67.993345	75.523087	36.165431	**36.137867**
Normalized	29.33%	53.15%	47.85%	99.92%	100%
Standard Deviation	11.1%	51.5%	1.1%	0.5%	0.5%
OSBench - Create Threads (us/Event)	15.397072	**2.956391**	17.385483	3.126463	**25.432904**
Normalized	19.2%	100%	17%	94.56%	11.62%
Standard Deviation	0.7%	1.5%	0.4%	1.8%	1.2%
OSBench - Launch Programs (us/Event)	127.126376	**49.739679**	**173.850060**	70.159435	167.190234
Normalized	39.13%	100%	28.61%	70.9%	29.75%
Standard Deviation	0.2%	0.4%	0.6%	2.1%	1.3%
OSBench - Create Processes (us/Event)	60.876210	27.066866	**73.312521**	**26.769638**	71.473122
Normalized	43.97%	98.9%	36.51%	100%	37.45%
Standard Deviation	0.7%	0.8%	2.3%	1.3%	1.3%
OSBench - Memory Allocations (Ns/Event)	60.998678	26.557922	**65.539910**	**25.064010**	33.377330
Normalized	41.09%	94.37%	38.24%	100%	75.09%
Standard Deviation	0.3%	0.1%	2.9%	3.6%	0.3%
iPerf - 5201 - 10 Seconds - UDP - 1000Mbit Objective - 32 (Mbits/s)	27600	30597	**19509**	**30652**	22195
Normalized	90.04%	99.82%	63.65%	100%	72.41%
Standard Deviation	1.7%	0.6%	3%	2.2%	3.4%

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iPerf - 5201 - 10 Seconds - TCP - 1 (Mbits/s)	35013	69905	**24531**	**71529**	26628
Normalized	48.95%	97.73%	34.3%	100%	37.23%
Standard Deviation	3.8%	1%	2.7%	2.9%	1.5%
iPerf - 5201 - 10 Seconds - TCP - 32 (Mbits/s)	34030	62574	25384	**63263**	**24311**
Normalized	53.79%	98.91%	40.12%	100%	38.43%
Standard Deviation	1.4%	1%	10.7%	1.9%	5.5%
Coremark - CoreMark Size 666 - I.P.S (Iterations/Sec)	153627	245018	**139264**	198249	**613968**
Normalized	25.02%	39.91%	22.68%	32.29%	100%
Standard Deviation	0.1%	2.5%	0.2%	2.2%	0%
Aircrack-ng (k/s)	15542	26757	**14764**	27595	**57961**
Normalized	26.81%	46.16%	25.47%	47.61%	100%
Standard Deviation	0.1%	0%	0.2%	0.2%	0.1%
Primesieve - 1.P.N.G (sec)	59.443	42.439	**62.947**	49.040	**15.986**
Normalized	26.89%	37.67%	25.4%	32.6%	100%
Standard Deviation	0.1%	2.4%	0.4%	1.2%	1.6%
Rust Prime Benchmark - P.N.T.T.2.0.0 (sec)	24.298	**13.883**	**25.654**	16.057	21.476
Normalized	57.14%	100%	54.12%	86.46%	64.64%
Standard Deviation	0.2%	0.1%	0%	2.5%	0%
Stockfish - Total Time (Nodes/s)	**9083381**	12872811	9132396	11051619	**38906581**
Normalized	23.35%	33.09%	23.47%	28.41%	100%
Standard Deviation	1.1%	3.5%	0.8%	2.4%	1.8%
John The Ripper - Blowfish (Real C/S)	7356	10942	**6990**	9600	**38943**
Normalized	18.89%	28.1%	17.95%	24.65%	100%
Standard Deviation		2.4%	0%	2.4%	0.1%
John The Ripper - MD5 (Real	372525	498026	**353647**	426519	**1239000**
Normalized	30.07%	40.2%	28.54%	34.42%	100%
Standard Deviation	0%	2.2%	0%	2.2%	0.3%
Timed PHP Compilation - Time To Compile (sec)	85.209	52.808	**87.218**	58.163	**27.947**
Normalized	32.8%	52.92%	32.04%	48.05%	100%
Standard Deviation	0.7%	1.4%	0.1%	2.4%	2.6%
Rust Mandelbrot - T.T.C.S.P.M (sec)	109.013	61.733	**113.782**	59.564	**38.907**
Normalized	35.69%	63.02%	34.19%	65.32%	100%
Standard Deviation	0.6%	0%	0.1%	0.2%	1.1%
m-queens - Time To Solve (sec)	202.222	124.431	**212.902**	143.379	**43.047**
Normalized	21.29%	34.6%	20.22%	30.02%	100%
Standard Deviation	0%	1.2%	0%	1.3%	0%
Swet - Average (Operations/sec)	185466551	323138442	**171943966**	**331636377**	318265620
Normalized	55.92%	97.44%	51.85%	100%	95.97%
Standard Deviation	1.5%	0.4%	0.7%	0.5%	0.3%
AOBench - 2048 x 2048 - Total Time (sec)	82.006	46.765	**85.865**	43.877	**39.463**
Normalized	48.12%	84.39%	45.96%	89.94%	100%
Standard Deviation	0%	0%	0.1%	0.1%	0.7%
GraphicsMagick - Sharpen (Iterations/min)	58	87	**55**	76	**253**
Normalized	22.92%	34.39%	21.74%	30.04%	100%
Standard Deviation		2.4%		2.3%	0.5%

FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks

GraphicsMagick - Enhanced (Iterations/min)	90	139	86	123	403
Normalized	22.33%	34.49%	21.34%	30.52%	100%
Standard Deviation		1.2%		0.9%	
GraphicsMagick - Resizing (Iterations/min)	421	594	455	582	747
Normalized	56.36%	79.52%	60.91%	77.91%	100%
Standard Deviation		1.1%	0.8%	1.4%	20.9%
GraphicsMagick - Noise-Gaussian (Iterations/min)	114	159	110	144	516
Normalized	22.09%	30.81%	21.32%	27.91%	100%
Standard Deviation		1.1%		1.2%	0.7%
GraphicsMagick - HWB Color Space (Iterations/min)	620	855	739	984	1950
Normalized	31.79%	43.85%	37.9%	50.46%	100%
Standard Deviation		0.8%		1.2%	2.3%
x264 - H.2.V.E (FPS)	44.40	72.79	41.58	62.37	139.89
Normalized	31.74%	52.03%	29.72%	44.59%	100%
Standard Deviation	2.5%	2.6%	0.7%	3.8%	1.4%
x265 - Bosphorus 4K (FPS)	6.15	8.40	6.27	8.33	21.99
Normalized	27.97%	38.2%	28.51%	37.88%	100%
Standard Deviation	0.7%	2.5%	0.2%	1.7%	1.6%
x265 - Bosphorus 1080p (FPS)	28.86	44.39	28.09	40.25	71.91
Normalized	40.13%	61.73%	39.06%	55.97%	100%
Standard Deviation	1.1%	1.8%	0.5%	2.5%	2.1%
C-Ray - Total Time - 4.1.R.P.P (sec)	201.976	138.167	211.923	156.857	54.211
Normalized	26.84%	39.24%	25.58%	34.56%	100%
Standard Deviation	0.1%	0.6%	0.1%	0.5%	0.2%
TTSIOD 3D Renderer - P.R.W.S.S.M (FPS)	24.7638	40.5254	23.7989	49.2219	56.5721
Normalized	43.77%	71.63%	42.07%	87.01%	100%
Standard Deviation	0.4%	0.1%	0.4%	0.2%	0.1%
rav1e - 5 (FPS)	0.604	1.061	0.572	1.060	1.222
Normalized	49.43%	86.82%	46.81%	86.74%	100%
Standard Deviation	0.7%	0.2%	0.7%	2.5%	0.3%
rav1e - 6 (FPS)	0.813	1.409	0.757	1.445	1.649
Normalized	49.3%	85.45%	45.91%	87.63%	100%
Standard Deviation	0.1%	0.7%	1.1%	0.7%	0.2%
rav1e - 10 (FPS)	1.808	3.129	1.713	3.300	3.570
Normalized	50.64%	87.65%	47.98%	92.44%	100%
Standard Deviation	0.3%	0.3%	0.4%	0.3%	0.1%
libavif avifenc - 8 (sec)	11.978	7.137	12.480	6.576	5.167
Normalized	43.14%	72.4%	41.4%	78.57%	100%
Standard Deviation	0.6%	0.5%	0.6%	0.4%	0.3%
libavif avifenc - 10 (sec)	11.355	6.795	11.950	6.286	5.033
Normalized	44.32%	74.07%	42.12%	80.07%	100%
Standard Deviation	0.2%	0.7%	0.1%	0.7%	0.3%
Smallpt - G.I.R.1.S (sec)	28.235	18.005	29.690	20.805	6.451
Normalized	22.85%	35.83%	21.73%	31.01%	100%
Standard Deviation	0.1%	2.5%	0.1%	2.4%	0.1%
Timed Eigen Compilation - Time To Compile (sec)	152.194	90.517	159.836	85.201	73.933
Normalized	48.58%	81.68%	46.26%	86.77%	100%

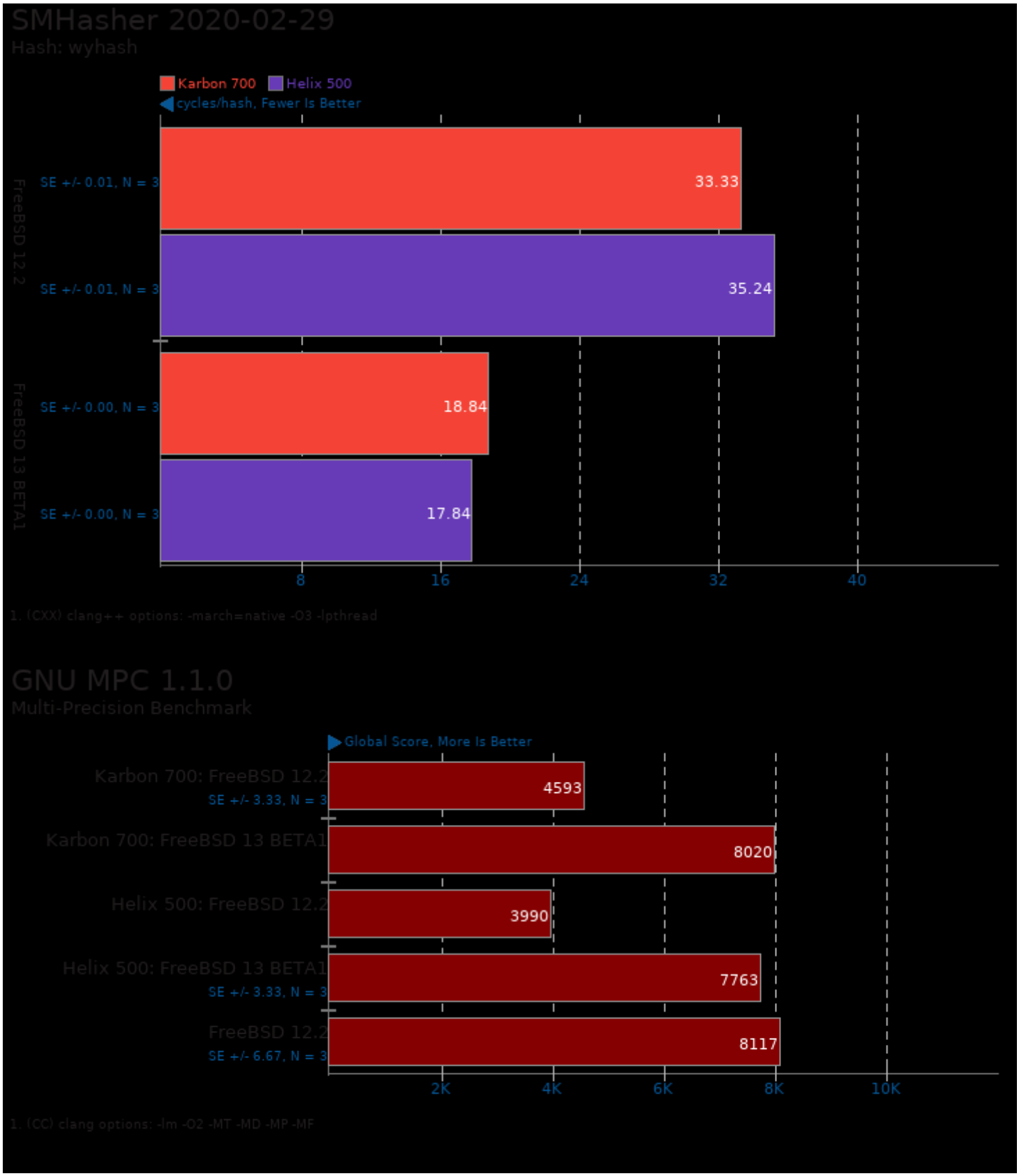
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks

Standard Deviation	0.1%	0.2%	0.1%	0.2%	0%
PyPerformance - go	796	463	**837**	**439**	459
Normalized	55.15%	94.82%	52.45%	100%	95.64%
Standard Deviation	0.1%	0.1%	0.2%	0.3%	0.1%
PyPerformance - 2to3 (Milliseconds)	903	526	**949**	**495**	510
Normalized	54.82%	94.11%	52.16%	100%	97.06%
Standard Deviation	0.2%	0.1%			0.1%
PyPerformance - float (Milliseconds)	308	185	**323**	**175**	195
Normalized	56.82%	94.59%	54.18%	100%	89.74%
Standard Deviation			0.2%		
PyPerformance - nbody (Milliseconds)	370	233	**389**	220	**204**
Normalized	55.14%	87.55%	52.44%	92.73%	100%
PyPerformance - pathlib (Milliseconds)	71.8	36.3	**74.8**	34.4	**34.3**
Normalized	47.77%	94.49%	45.86%	99.71%	100%
Standard Deviation	0.3%	0.2%	0.2%	0.2%	0%
PyPerformance - json_loads (Milliseconds)	81.8	42.6	**87.3**	**40.7**	45.7
Normalized	49.76%	95.54%	46.62%	100%	89.06%
Standard Deviation	0.1%	0.2%	0.3%	0.1%	0.1%
PyPerformance - crypto_pyaes (Milliseconds)	318	187	**334**	**177**	197
Normalized	55.66%	94.65%	52.99%	100%	89.85%
Standard Deviation	0.2%				
PyPerformance - regex_compile (Milliseconds)	549	329	**578**	**311**	335
Normalized	56.65%	94.53%	53.81%	100%	92.84%
Standard Deviation			0.2%		
PyPerformance - python_startup (Milliseconds)	21	13.7	**22**	13.3	**11.1**
Normalized	52.86%	81.02%	50.45%	83.46%	100%
Standard Deviation		0%		0.4%	0%
PyPerformance - django_template (Milliseconds)	190	113	**201**	**107**	111
Normalized	56.32%	94.69%	53.23%	100%	96.4%
Standard Deviation	0.3%		0.3%		
PHP Micro Benchmarks - Zend bench (sec)	0.995	0.575	**1.044**	**0.54**	0.578
Normalized	54.27%	93.91%	51.72%	100%	93.43%
Standard Deviation	0%	2.5%	0.1%	0%	0.5%
PHP Micro Benchmarks - Zend micro_bench (sec)	5.174	2.998	**5.426**	**2.822**	2.879
Normalized	54.54%	94.13%	52.01%	100%	98.02%
Standard Deviation	0%	0.5%	0%	0%	0.1%
BlogBench - Read (Final Score)	728692	1652105	874264	**1811112**	**728551**
Normalized	40.23%	91.22%	48.27%	100%	40.23%
Standard Deviation	4.8%	1.6%	5.4%	0.2%	3.2%
BlogBench - Write (Final Score)	**4370**	10259	5013	10280	**12177**
Normalized	35.89%	84.25%	41.17%	84.42%	100%
Standard Deviation	6.1%		1.9%		1.8%

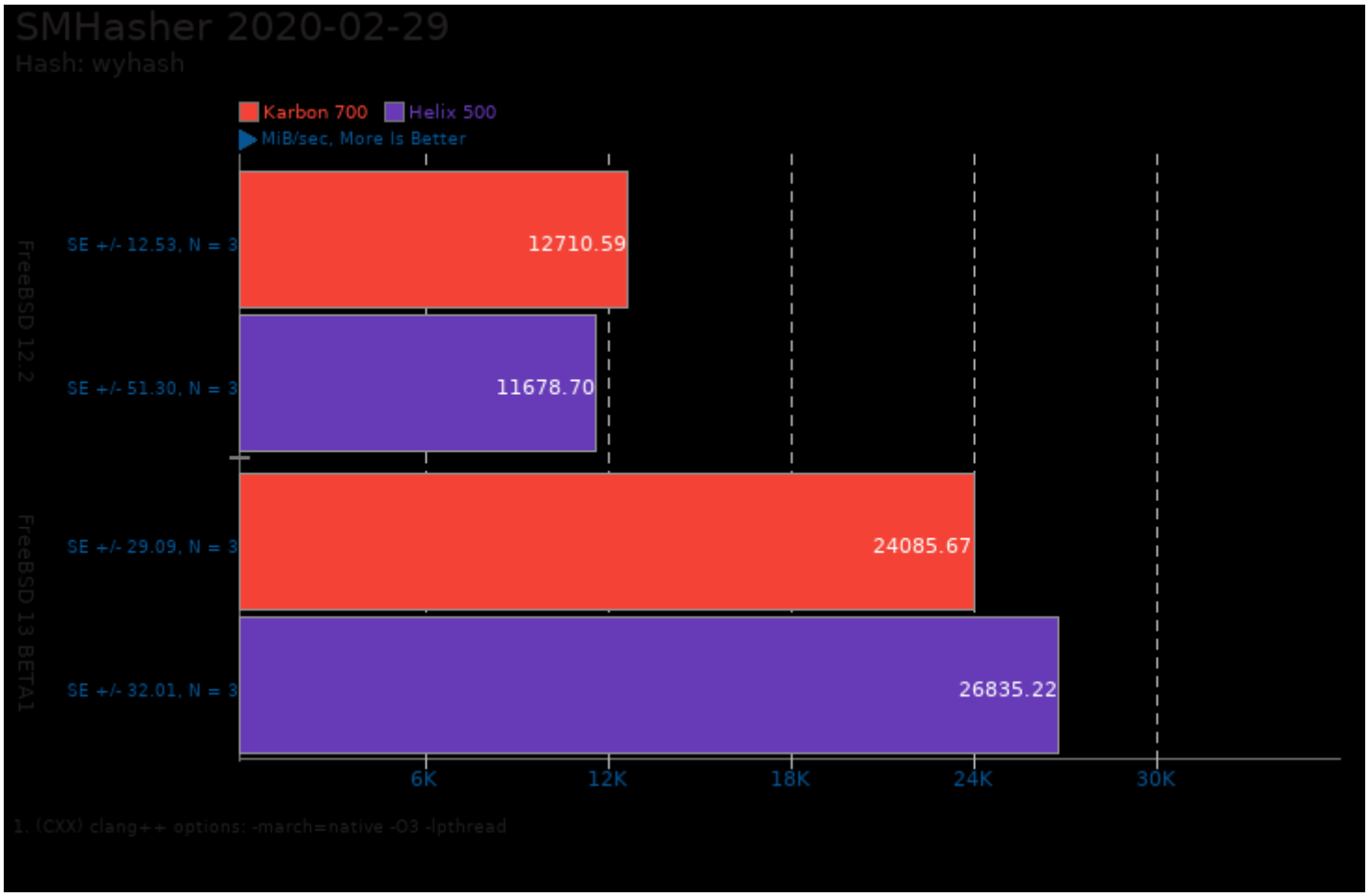
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks

OpenSSL - R.4.b.P (Signs/sec)	778.6	1353	**739.2**	1169	**3299**
Normalized	23.6%	41.02%	22.41%	35.44%	100%
Standard Deviation	0%	1.2%	0%	6.6%	0%
Node.js Express HTTP Load Test (Reqs/sec)	3958	6979	**3952**	7380	**7750**
Normalized	51.07%	90.05%	50.99%	95.23%	100%
Standard Deviation	0.1%	0.4%	0.4%	0.7%	0.9%
PHPBench - P.B.S (Score)	273777	483162	**262992**	**511621**	483436
Normalized	53.51%	94.44%	51.4%	100%	94.49%
Standard Deviation	0%	0%	0.2%	0.1%	0.2%
SQLite Speedtest - Timed Time - Size 1,000 (sec)	221.539	112.301	**233.356**	**106.113**	112.606
Normalized	47.9%	94.49%	45.47%	100%	94.23%
Standard Deviation	0.1%	0.1%	0.3%	0.6%	0.1%
simdjson - Kostya (GB/s)	0.46	0.83	**0.42**	**0.85**	0.6
Normalized	54.12%	97.65%	49.41%	100%	70.59%
Standard Deviation	0%	0%	0%	0%	0%
simdjson - LargeRand (GB/s)	0.24	0.46	**0.23**	**0.48**	0.43
Normalized	50%	95.83%	47.92%	100%	89.58%
Standard Deviation	0%	0%	0%	0%	1.3%
simdjson - PartialTweets (GB/s)	0.35	0.64	**0.33**	**0.66**	0.50
Normalized	53.03%	96.97%	50%	100%	75.76%
Standard Deviation	0%	0%	0%	0%	1.1%
simdjson - DistinctUserID (GB/s)	0.37	0.66	**0.34**	**0.68**	0.52
Normalized	54.41%	97.06%	50%	100%	76.47%
Standard Deviation	0%	0%	0%	0%	0%
Perl Benchmarks - Pod2html	0.31573604	0.16873474	**0.33328397**	**0.15992416**	0.16794986
Normalized	50.65%	94.78%	47.98%	100%	95.22%
Standard Deviation	1.4%	0.9%	0.7%	0.5%	0%
Fhourstones - C.C.4.S (Kpos /	**8129**	12858	8231	**13969**	13091
Normalized	58.19%	92.04%	58.92%	100%	93.71%
Standard Deviation	0.1%	0.2%	0.2%	0.5%	0%
Optcarrot - O.B (FPS)	67.68	114.64	**64.56**	121.14	**130.63**
Normalized	51.81%	87.76%	49.42%	92.74%	100%
Standard Deviation	0.2%	0.1%	0.3%	0.2%	0.4%
PolyBench-C - 3.M.M (sec)	5.817	3.343	**6.085**	2.963	**2.164**
Normalized	37.2%	64.73%	35.56%	73.03%	100%
Standard Deviation	0.5%	0.6%	0.2%	0.1%	0.1%
Bork File Encrypter - F.E.T (sec)	28.569	15.324	**30.133**	14.420	**14.127**
Normalized	49.45%	92.19%	46.88%	97.97%	100%
Standard Deviation	1.2%	1.3%	0.8%	1.3%	1.2%
Git - T.T.C.C.G.C (sec)	111.530	68.457	**120.284**	64.843	**56.738**
Normalized	50.87%	82.88%	47.17%	87.5%	100%
Standard Deviation	0.3%	0.3%	0.2%	0.2%	0.7%
PyBench - T.F.A.T.T	3180	1836	**3290**	**1750**	1767
Normalized	55.03%	95.32%	53.19%	100%	99.04%
Standard Deviation	0.2%	0.3%	0.2%	0.3%	0.1%

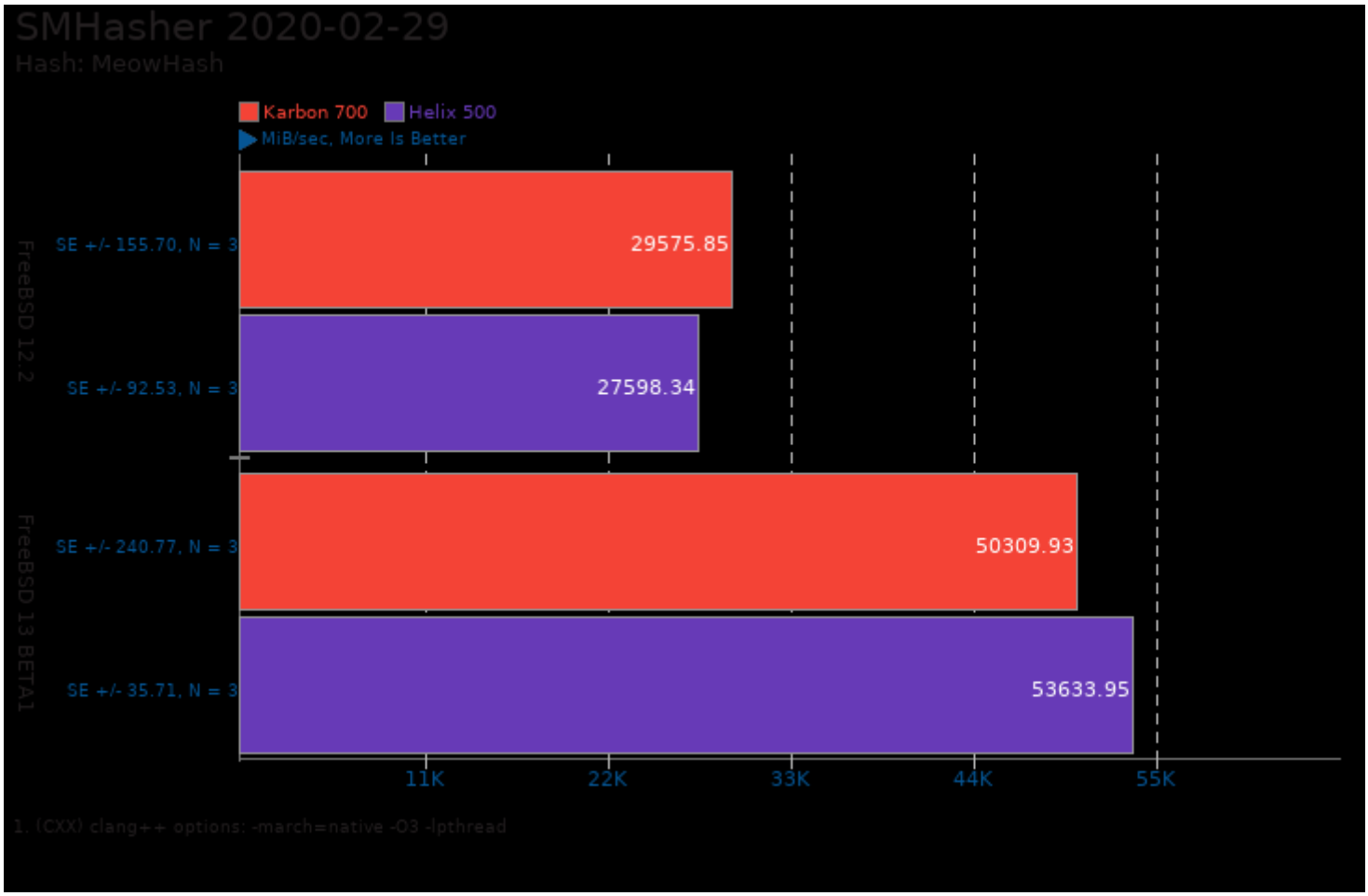
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks

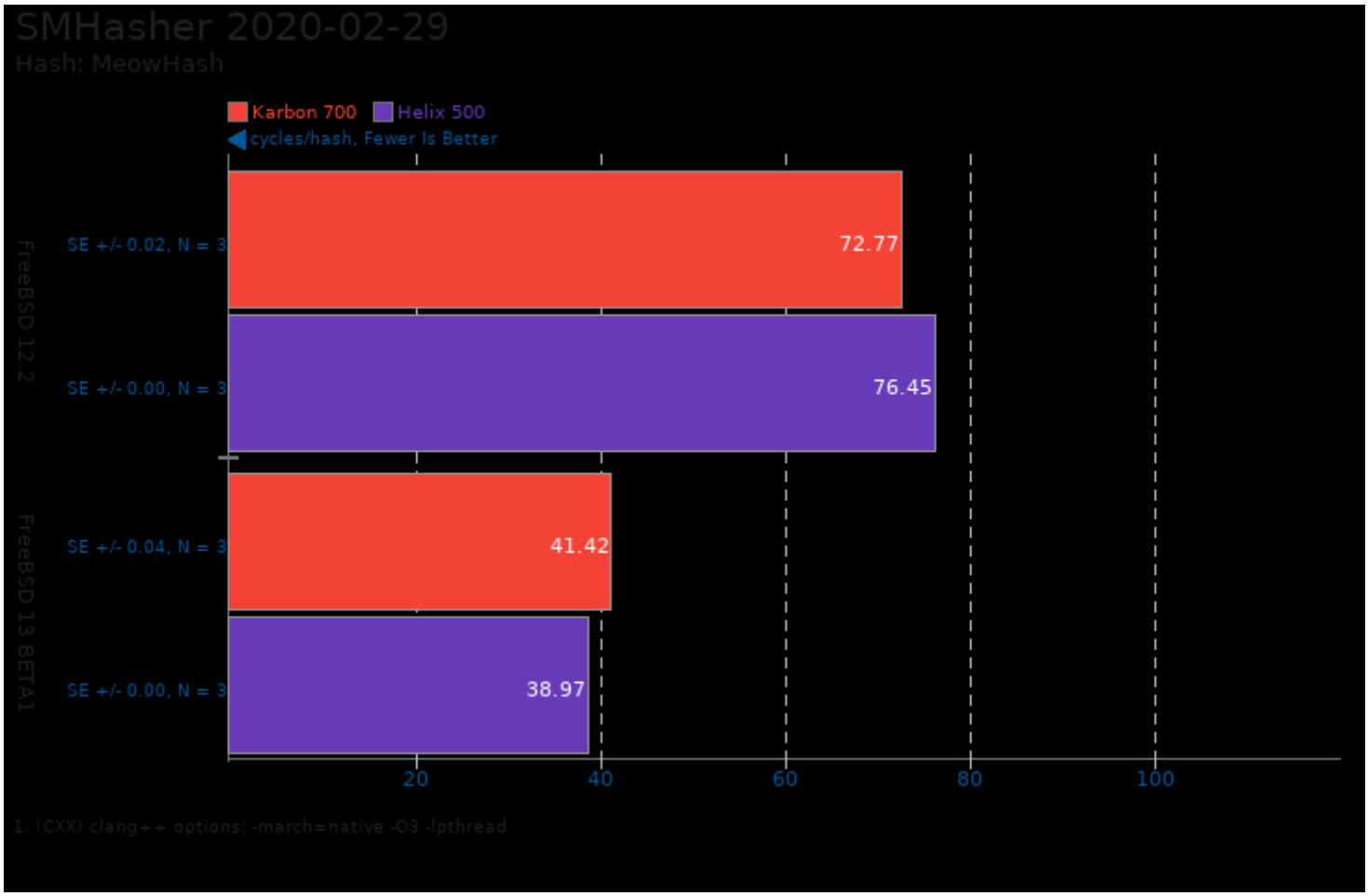


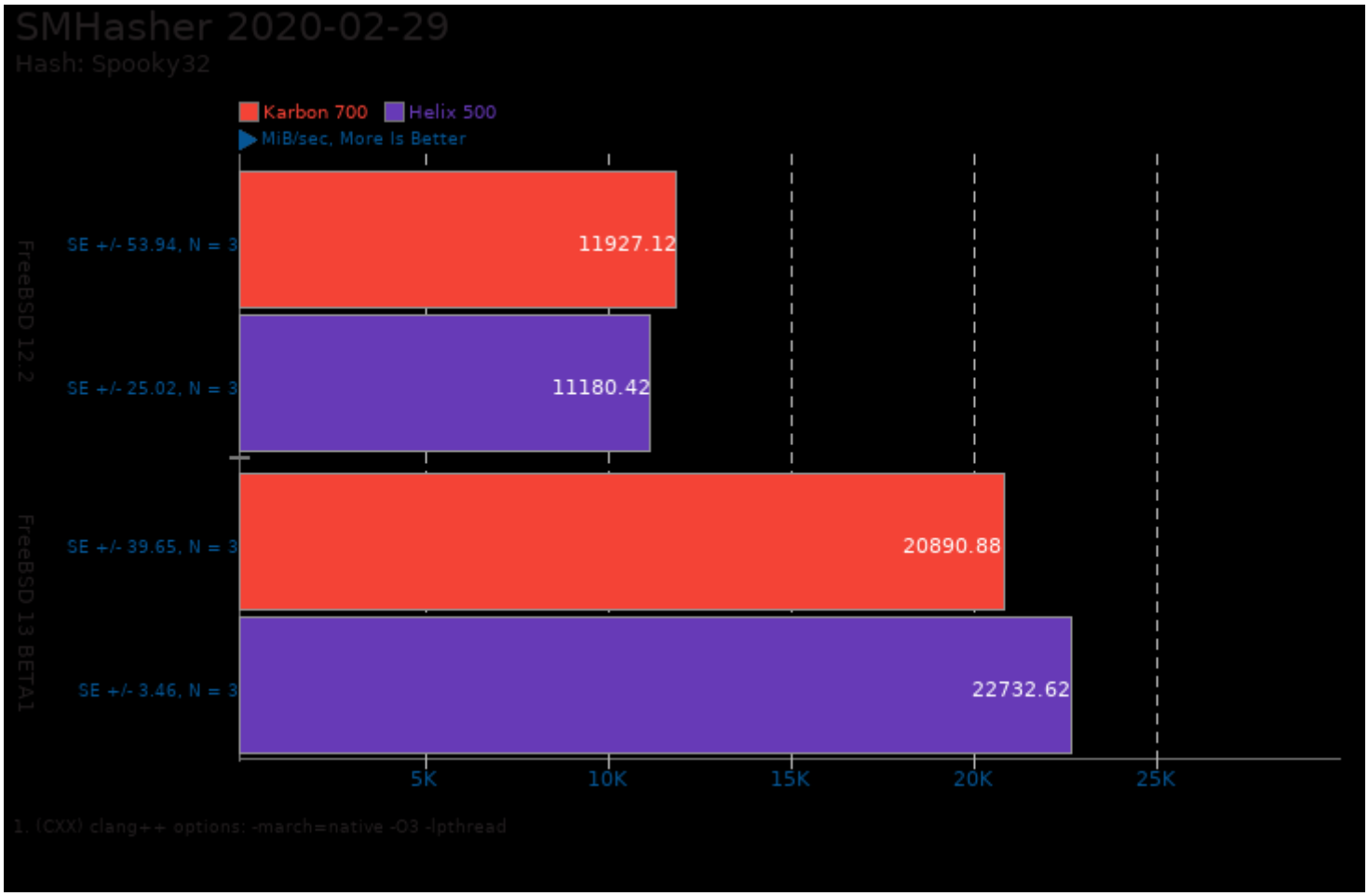
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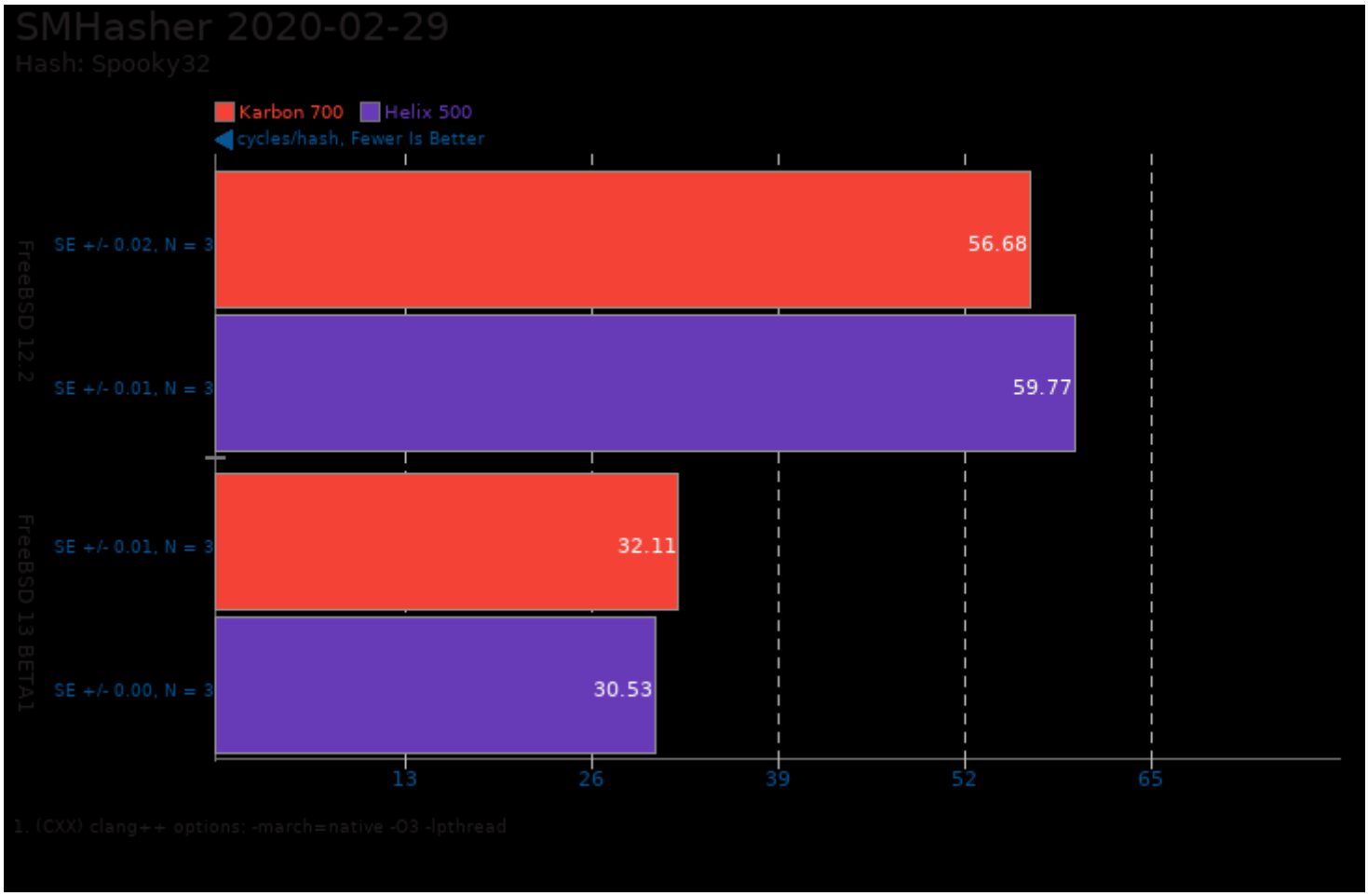
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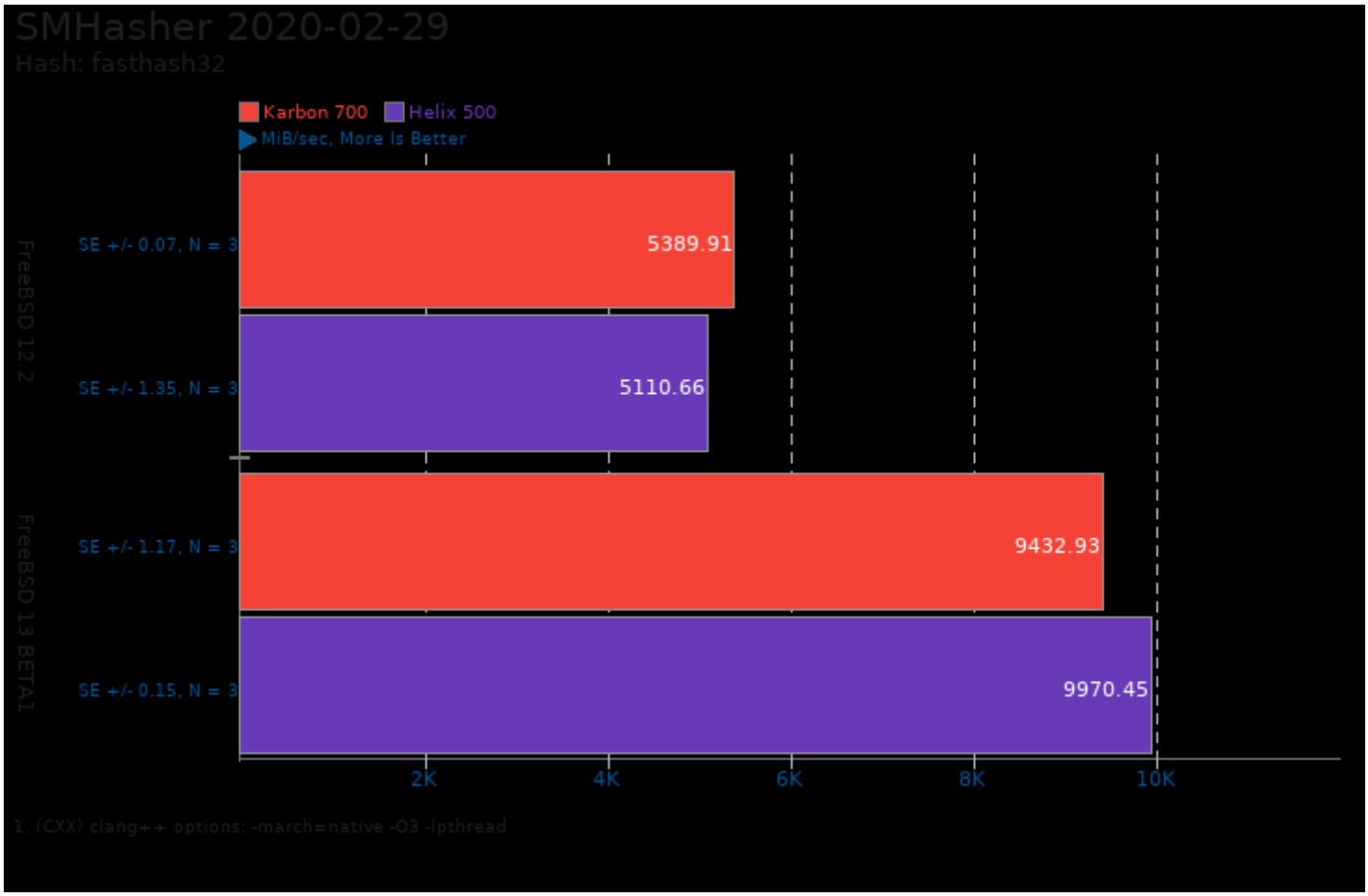

SMHasher 2020-02-29
Hash: MeowHash
Karbon 700
Helix 500
cycles/hash, Fewer Is Better
FreeBSD 12.2
FreeBSD 13 BETA1
SE +/- 0.02, N = 3
72.77
SE +/- 0.00, N = 3
76.45
SE +/- 0.04, N = 3
41.42
SE +/- 0.00, N = 3
38.97
20
40
60
80
100
1. (CXX) clang++ options: -march=native -O3 -lpthread


SMHasher 2020-02-29
Hash: Spooky32
Karbon 700
Helix 500
MiB/sec, More Is Better
FreeBSD 12.2
SE +/- 53.94, N = 3
11927.12
SE +/- 25.02, N = 3
11180.42
FreeBSD 13 BETA1
SE +/- 39.65, N = 3
20890.88
SE +/- 3.46, N = 3
22732.62
5K
10K
15K
20K
25K
1. (CXX) clang++ options: -march=native -O3 -lpthread

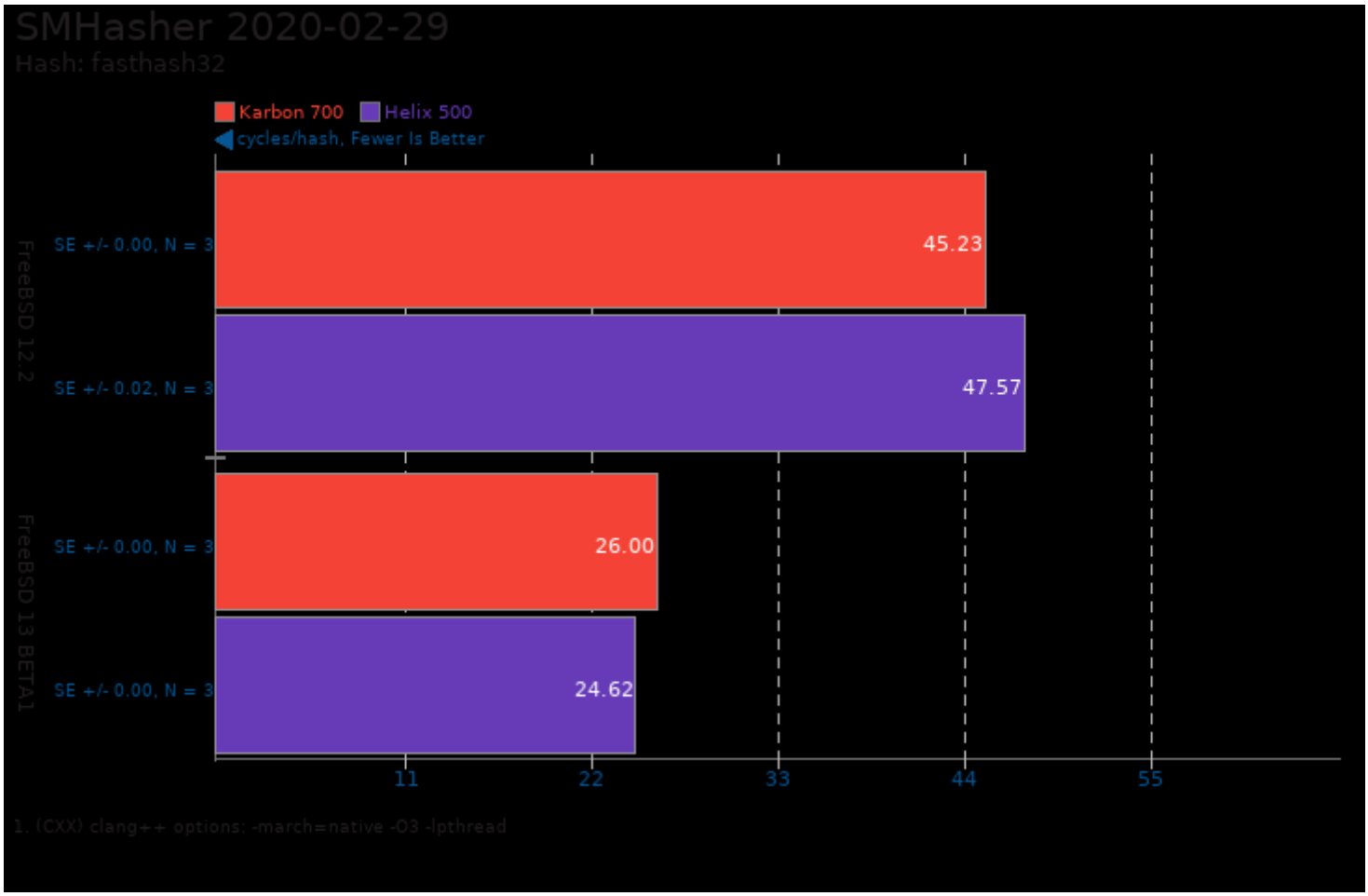
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



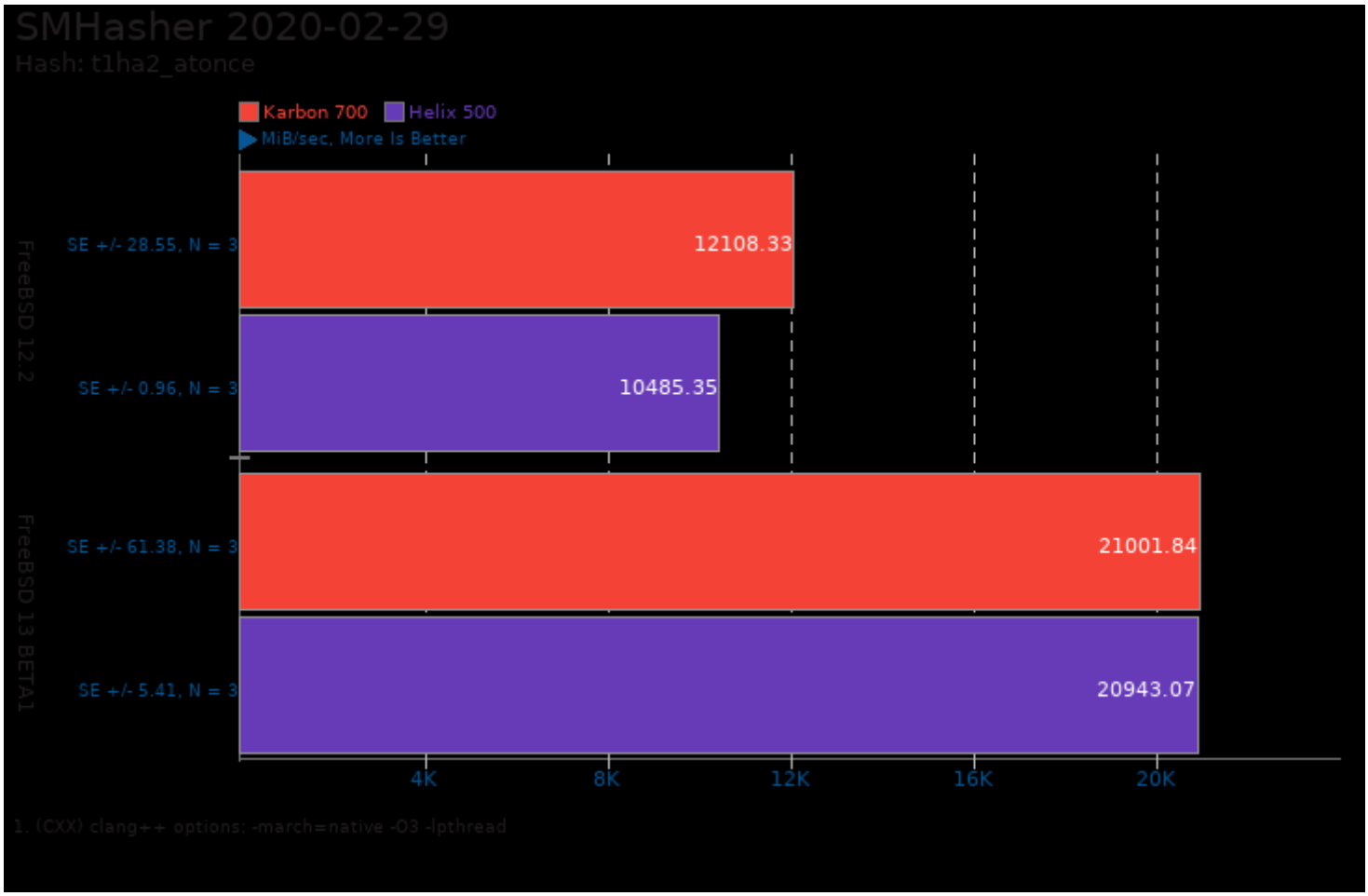
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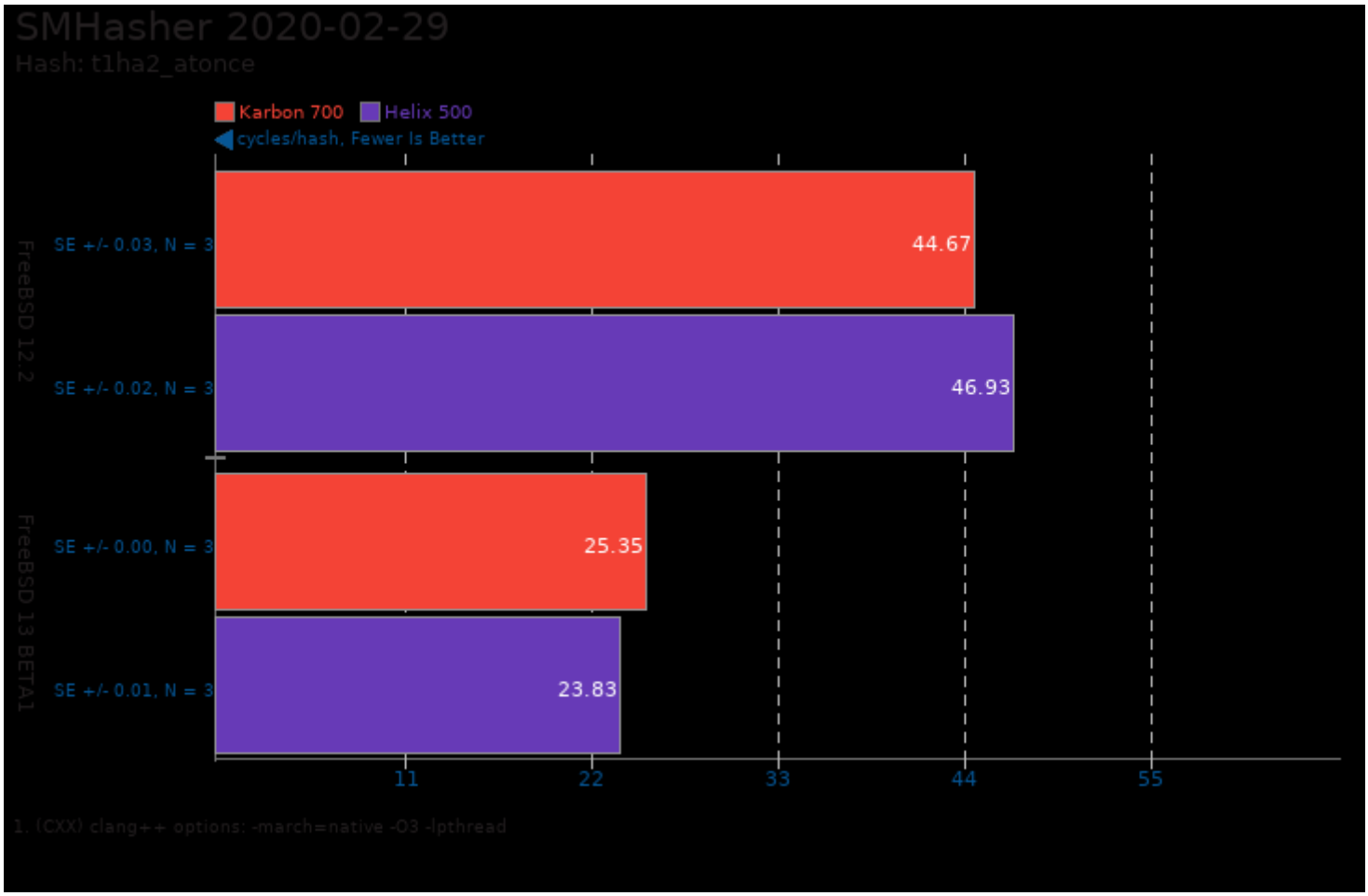
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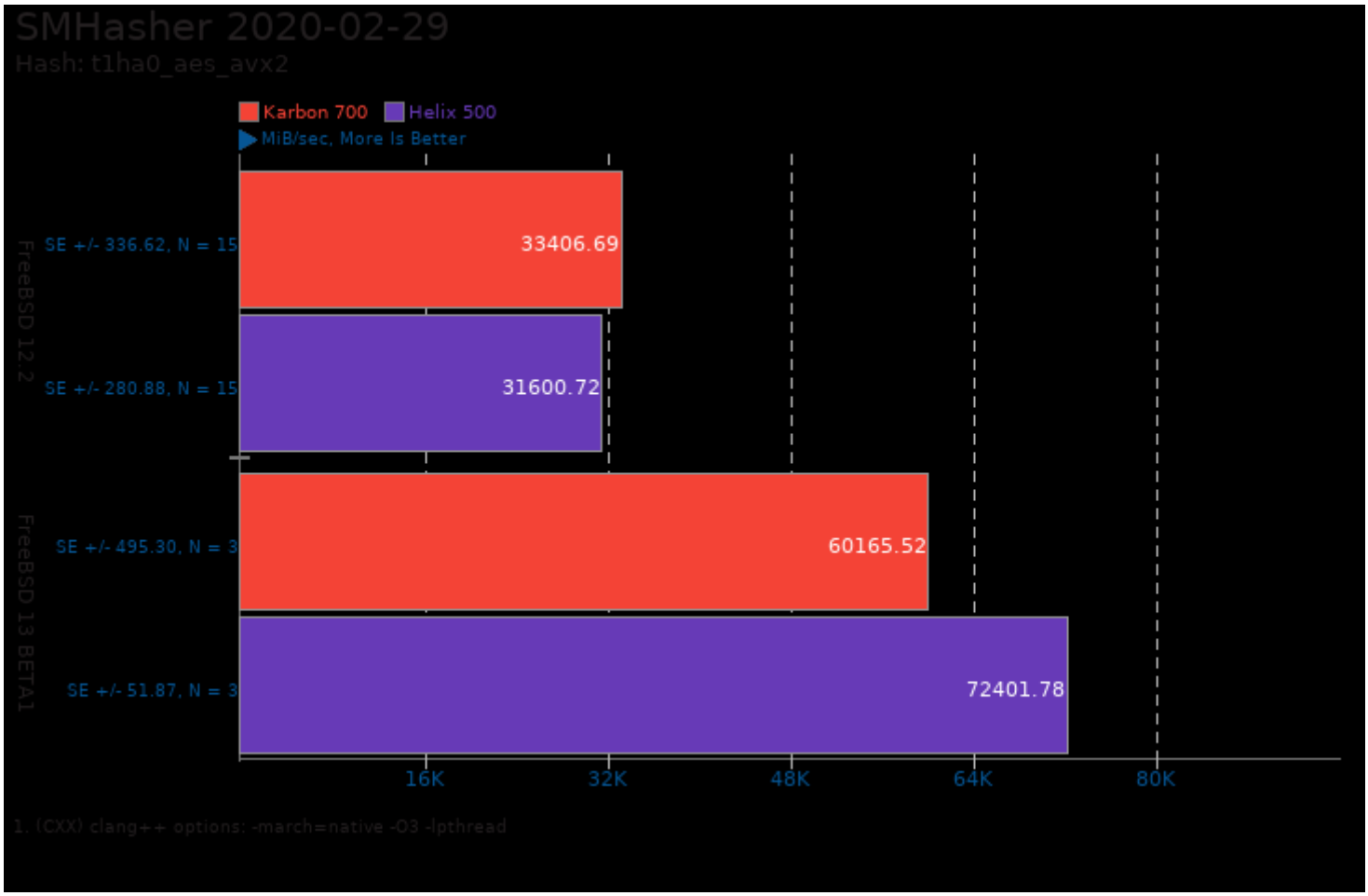
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



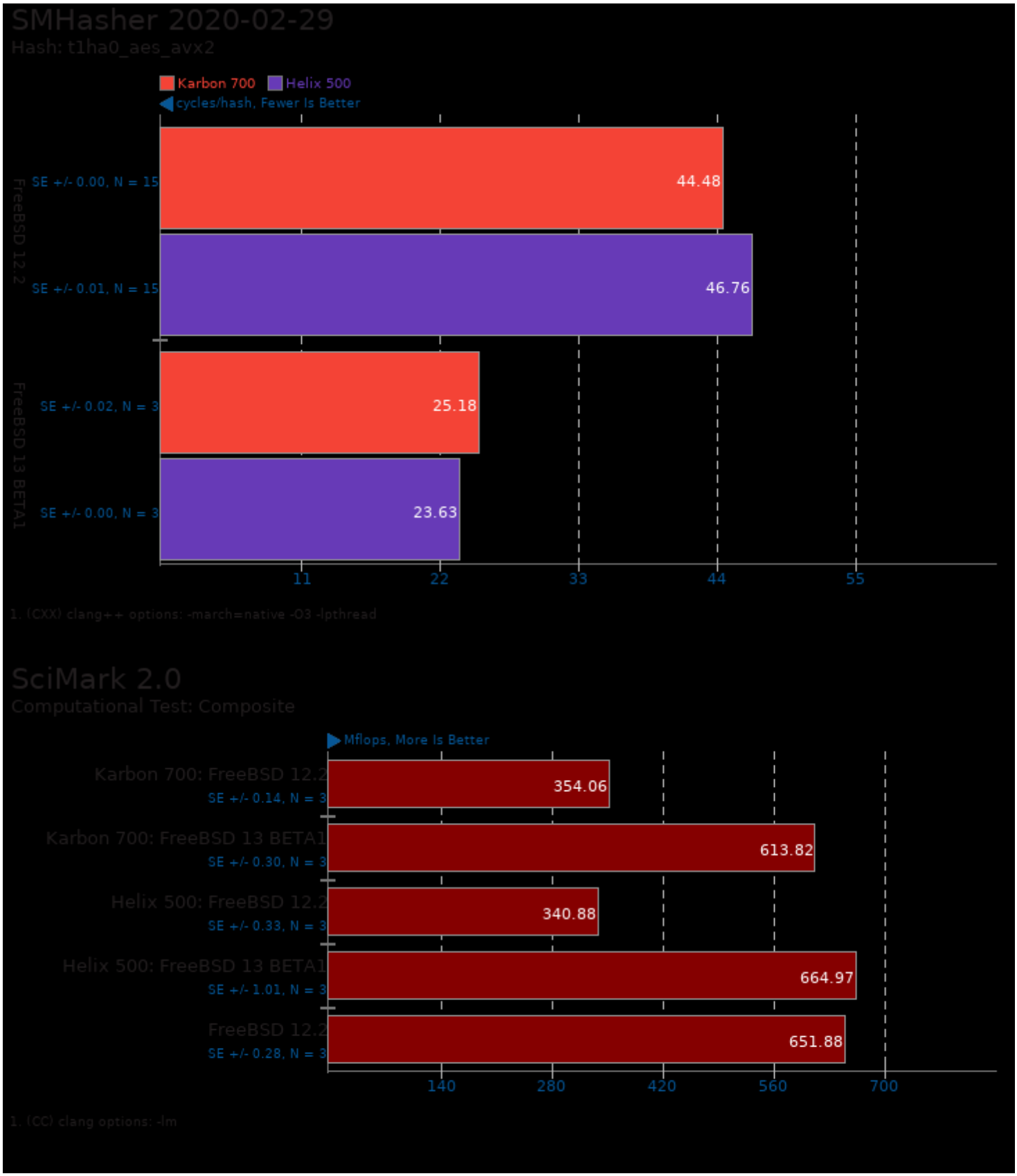
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



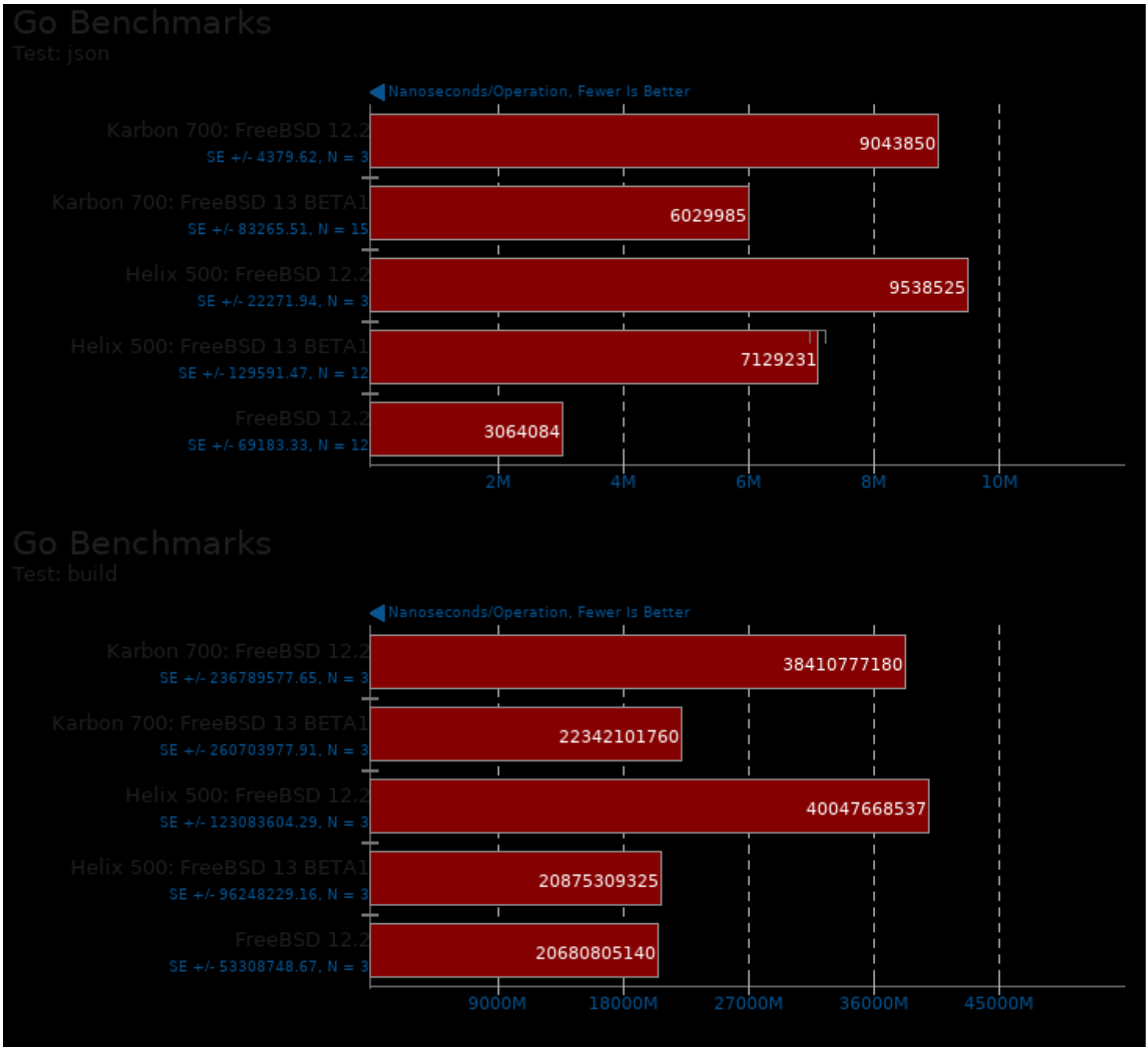
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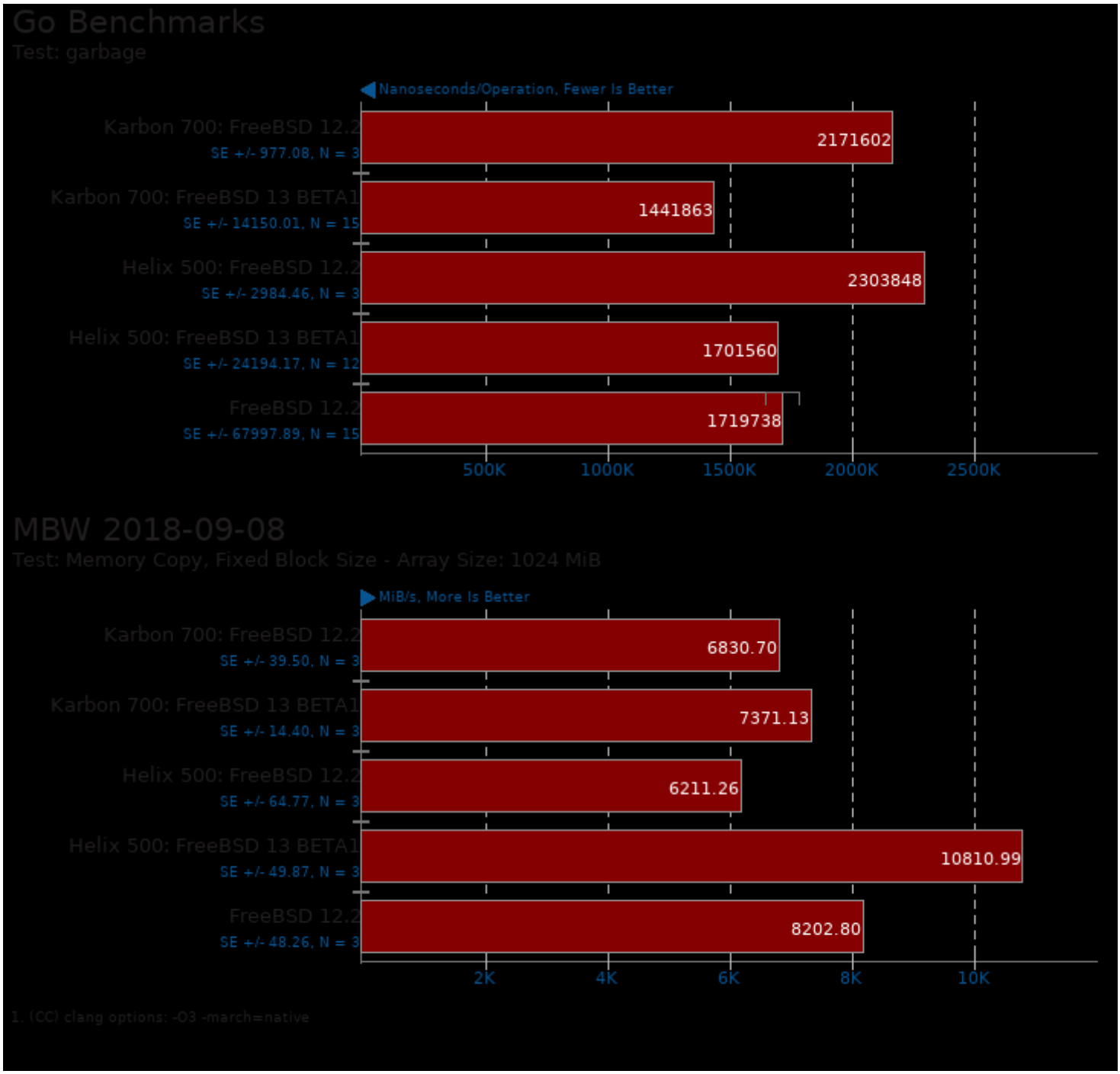
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



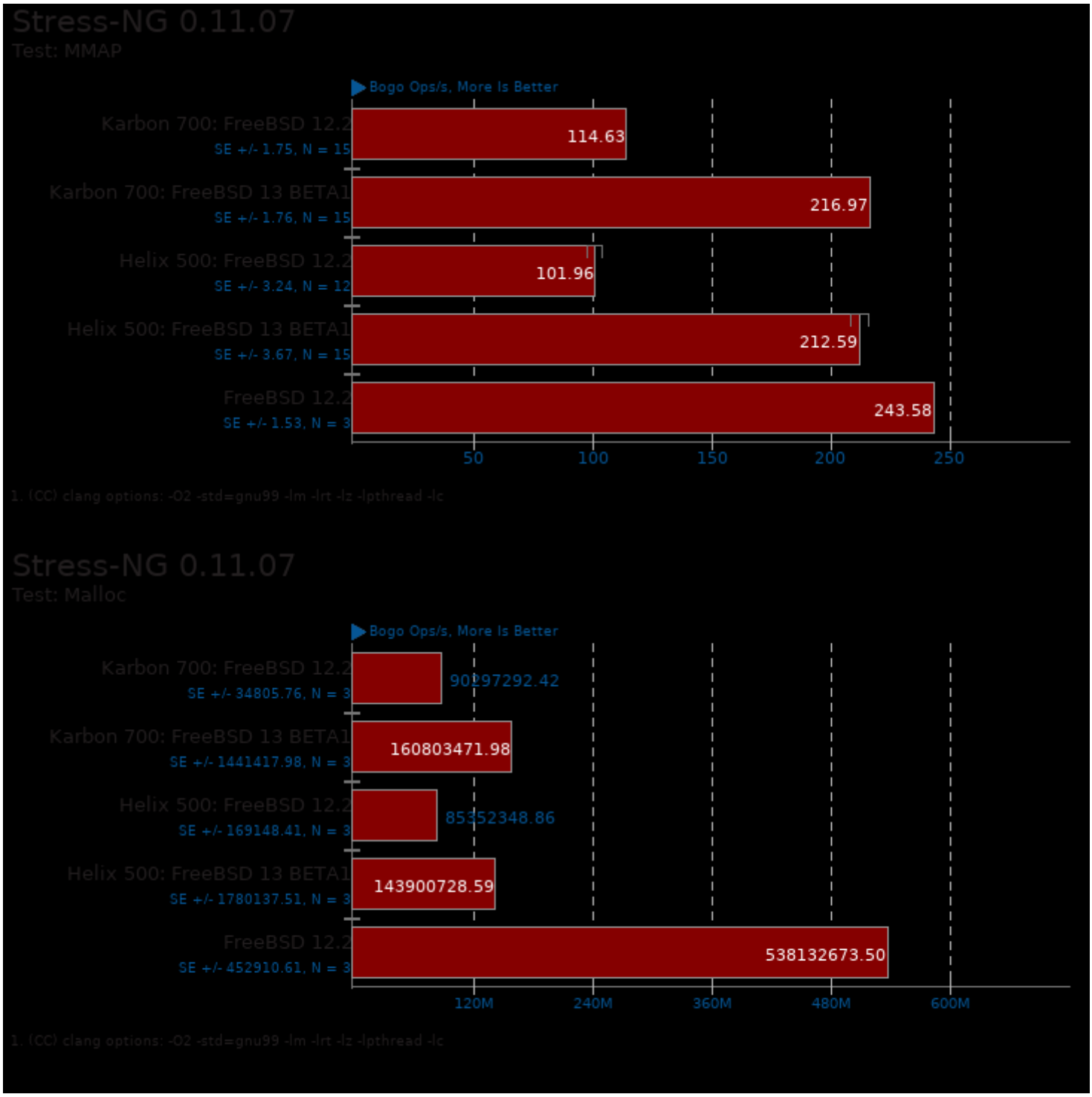
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



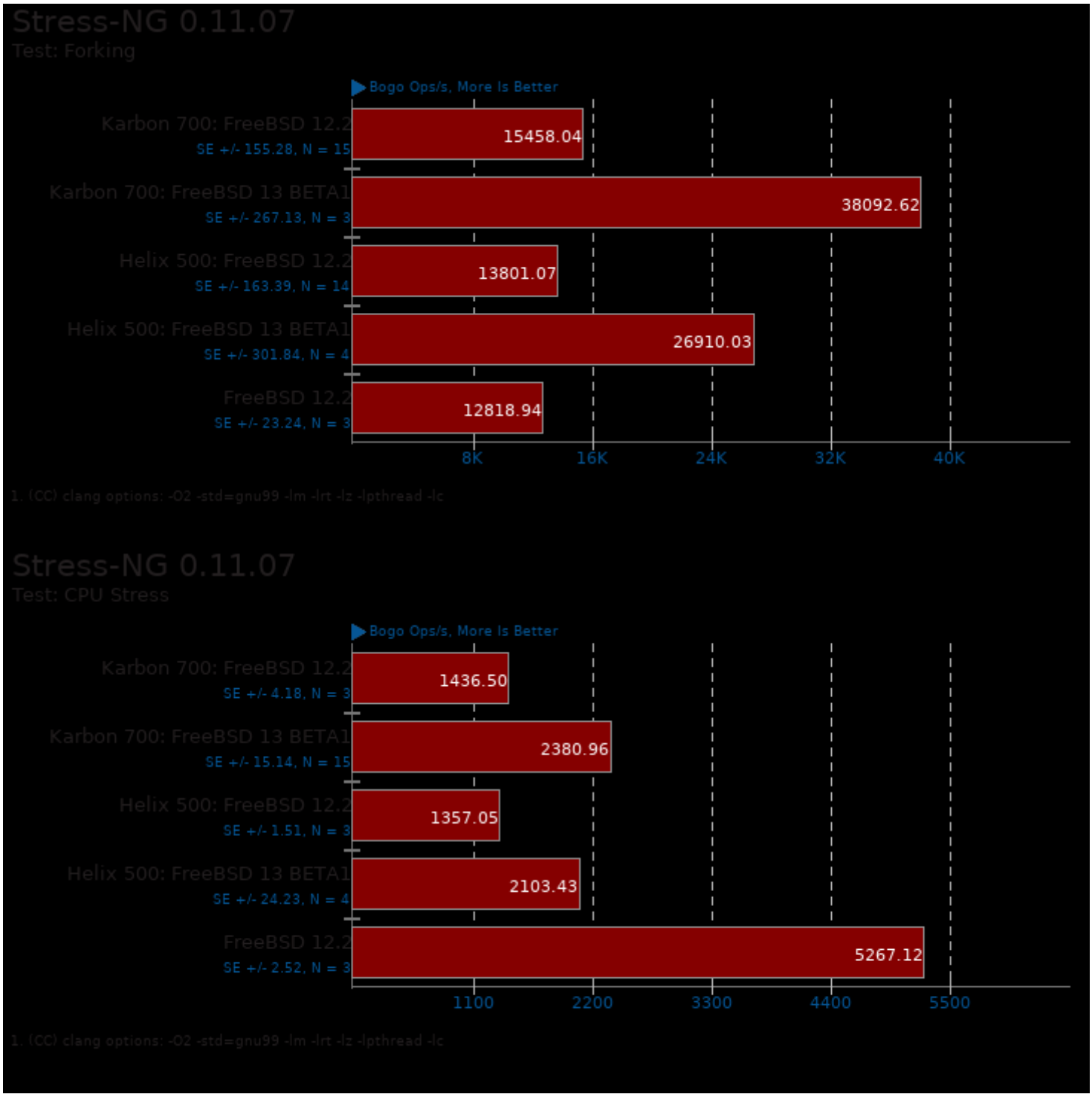
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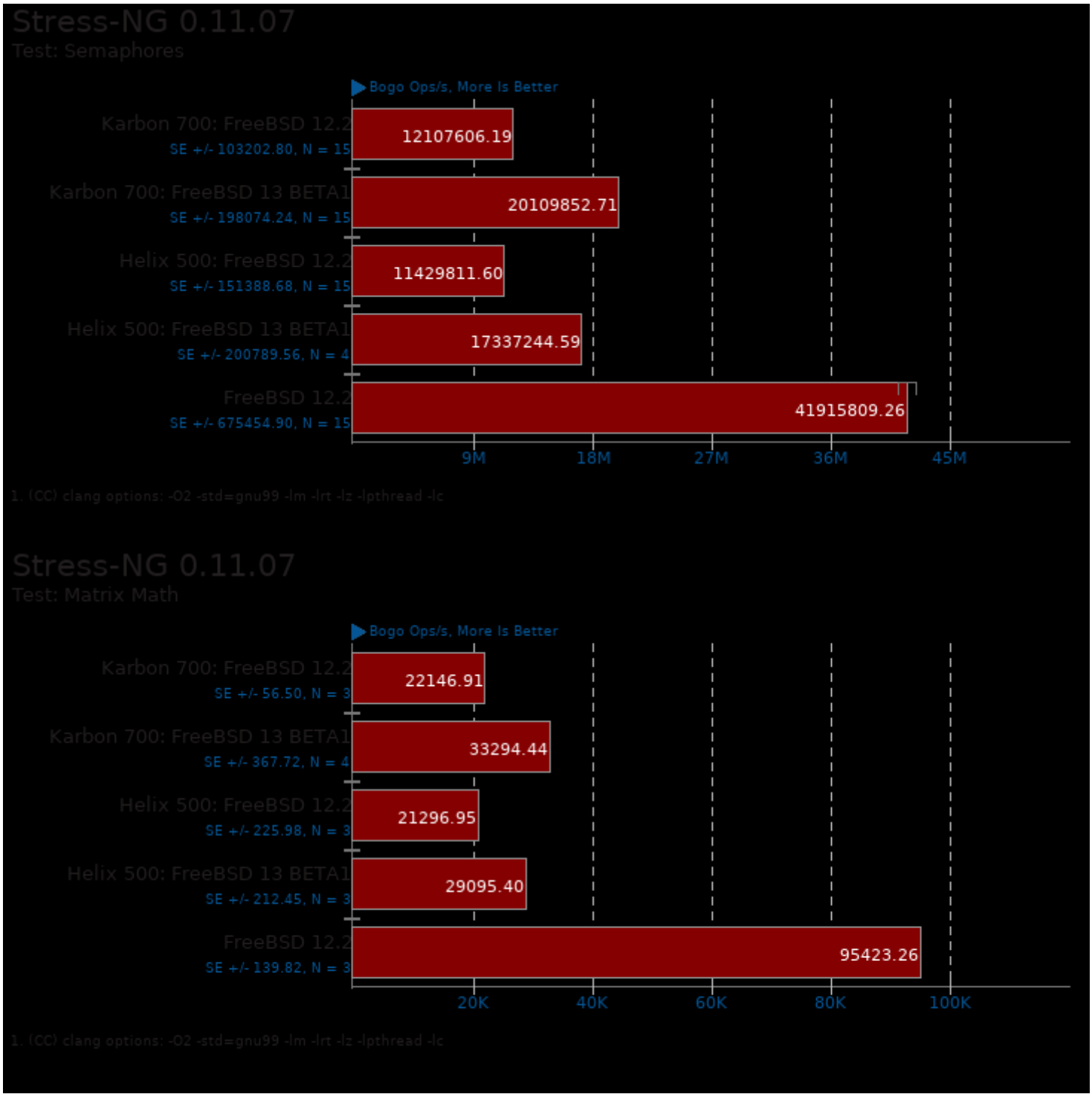
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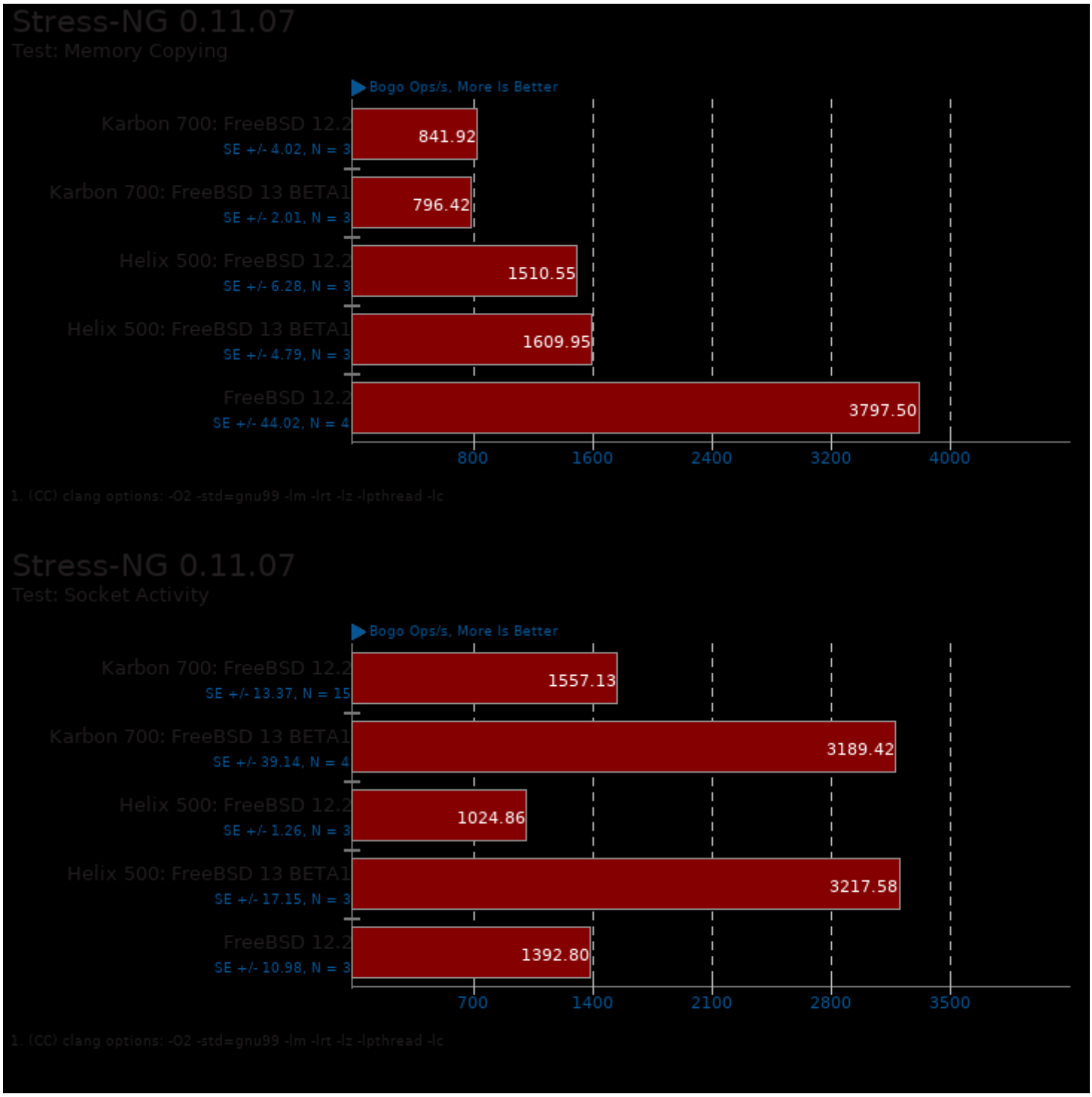
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



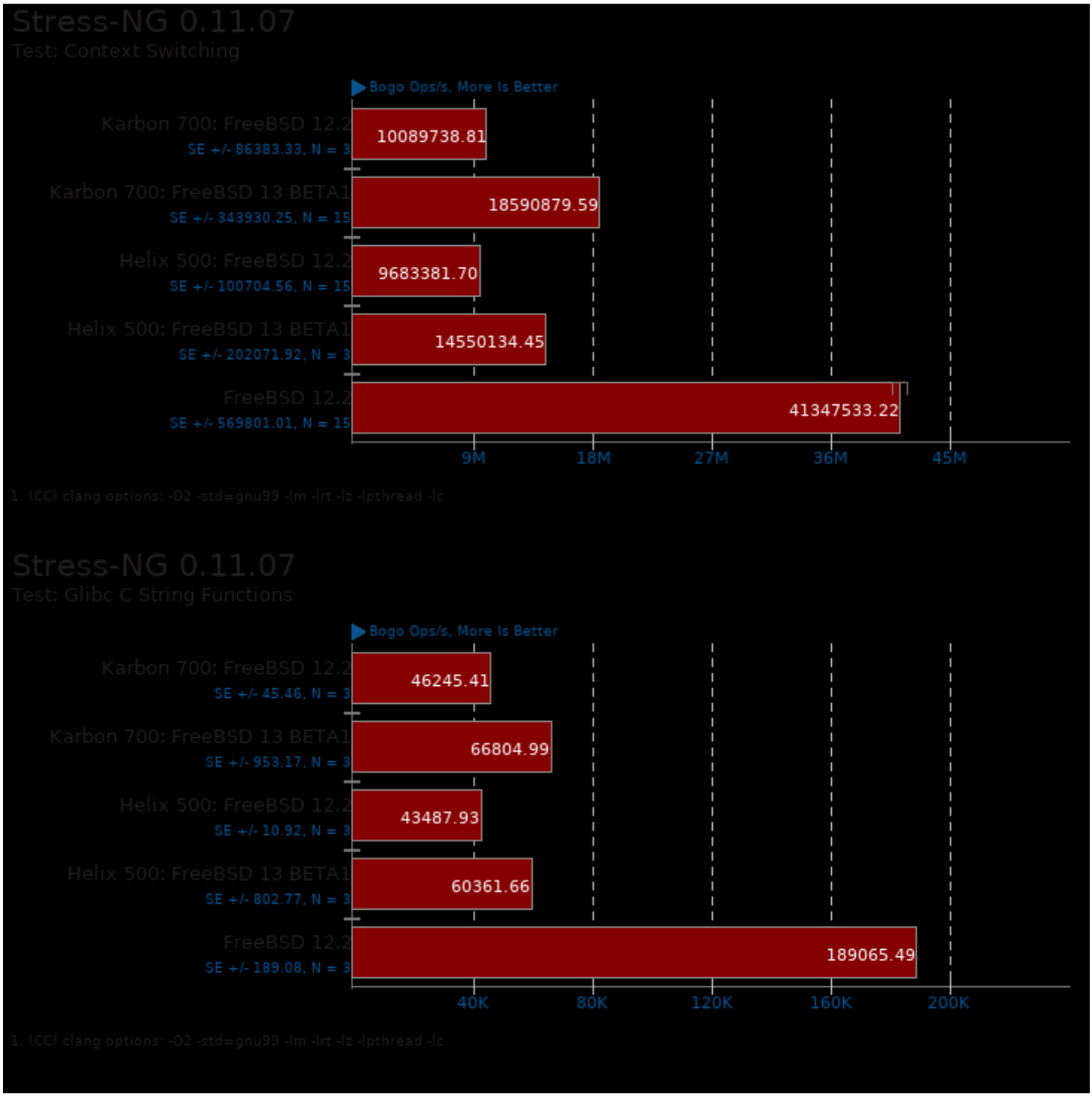
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



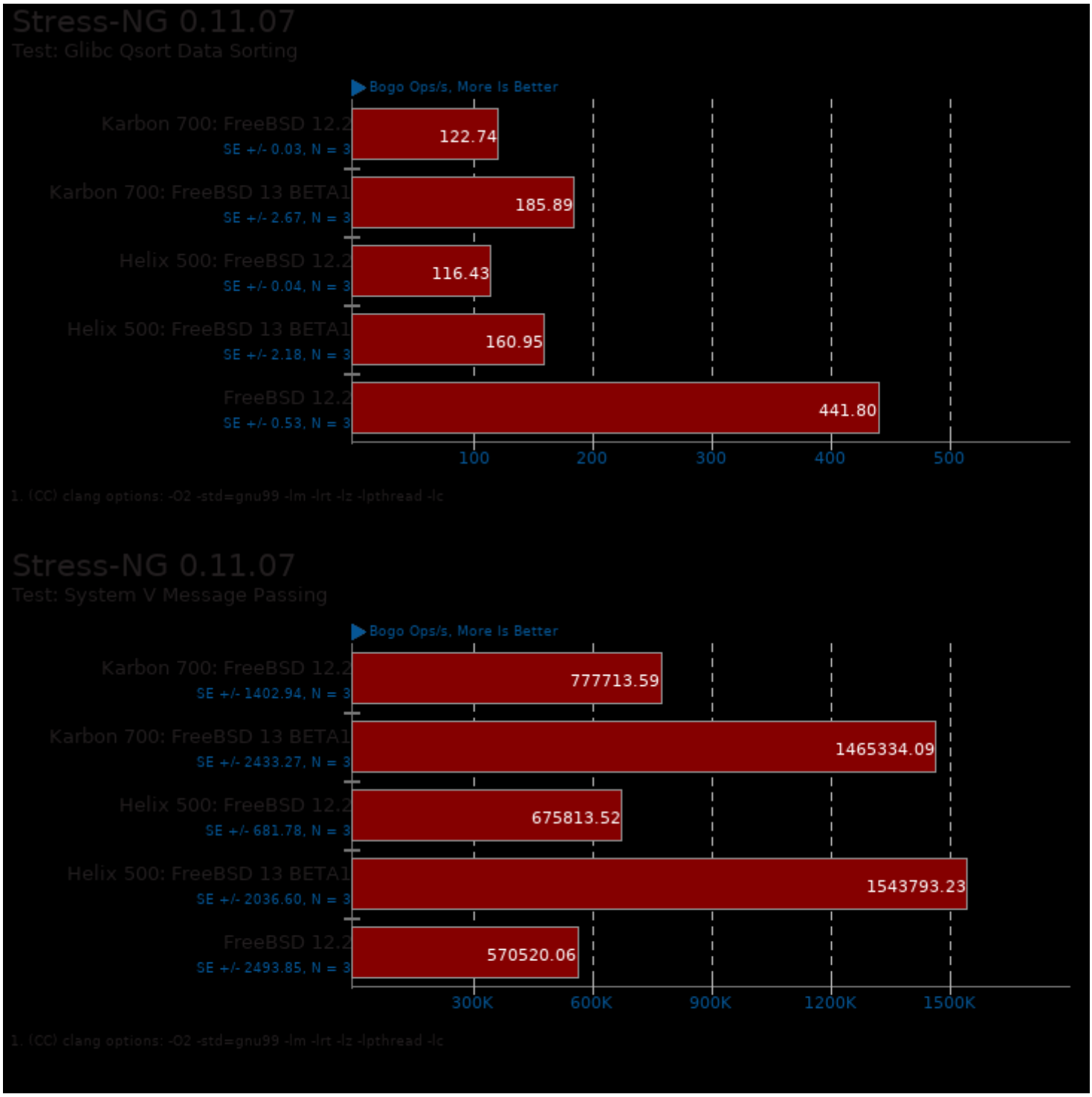
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



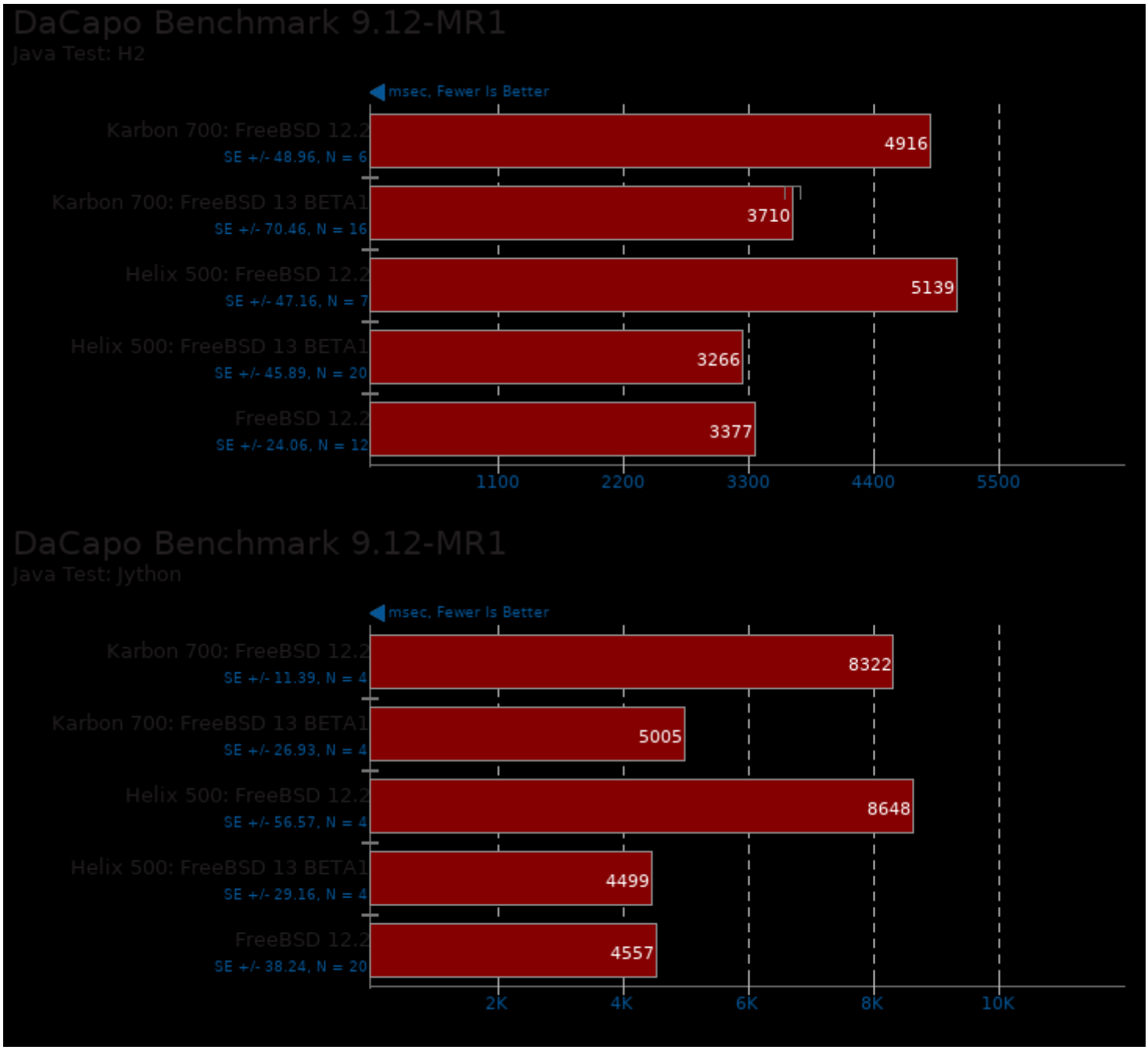
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



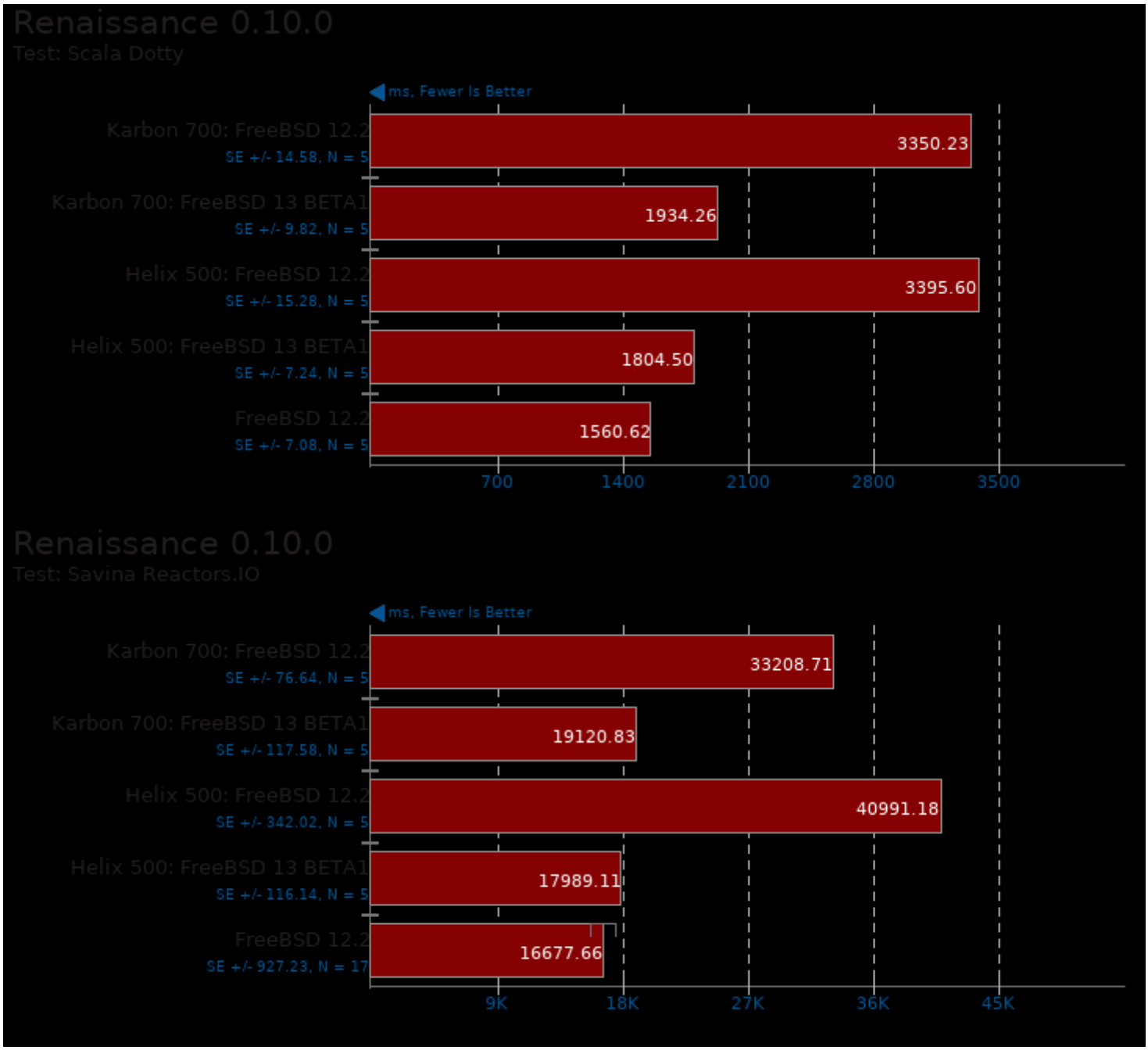
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



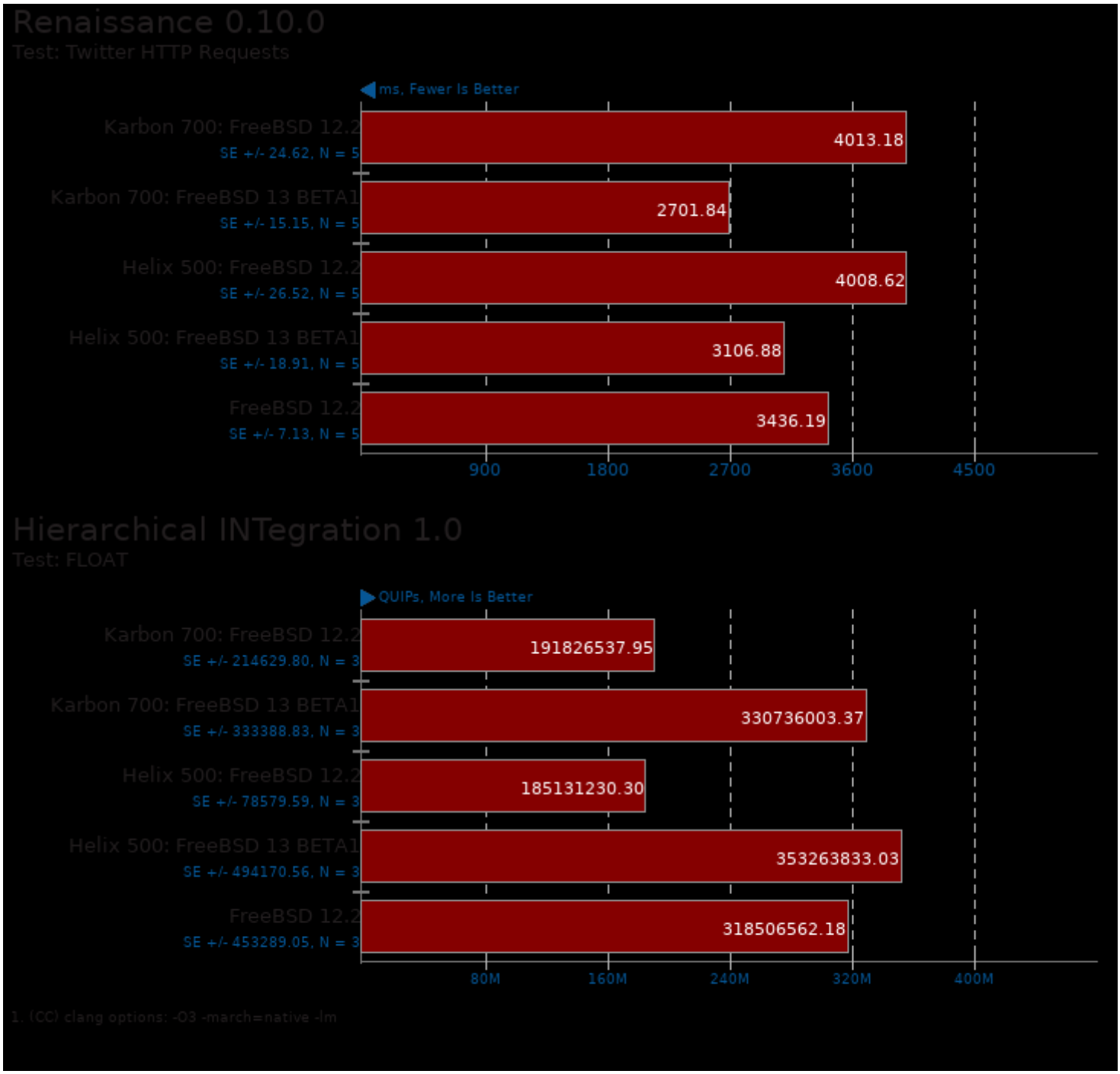
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



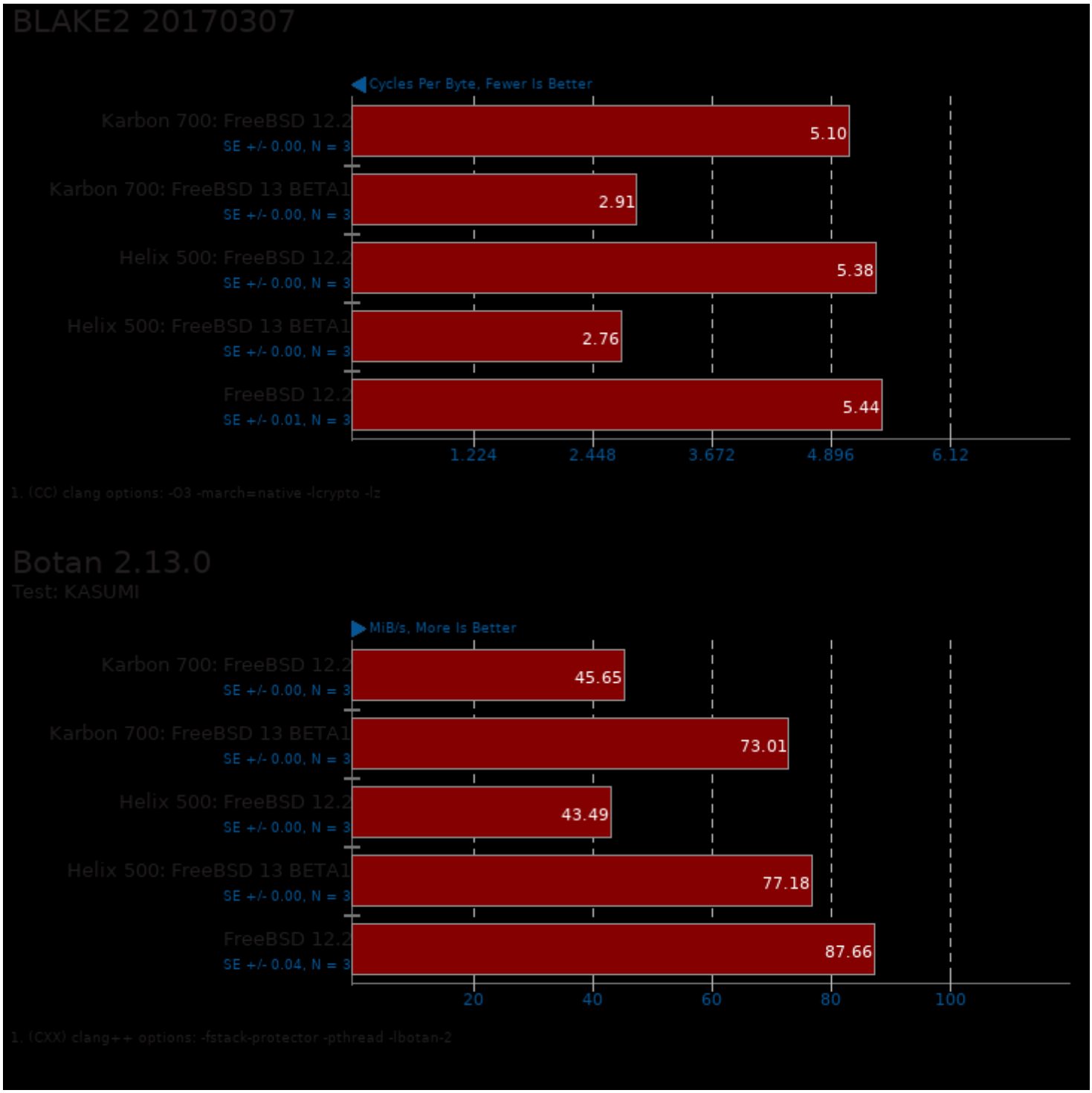
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



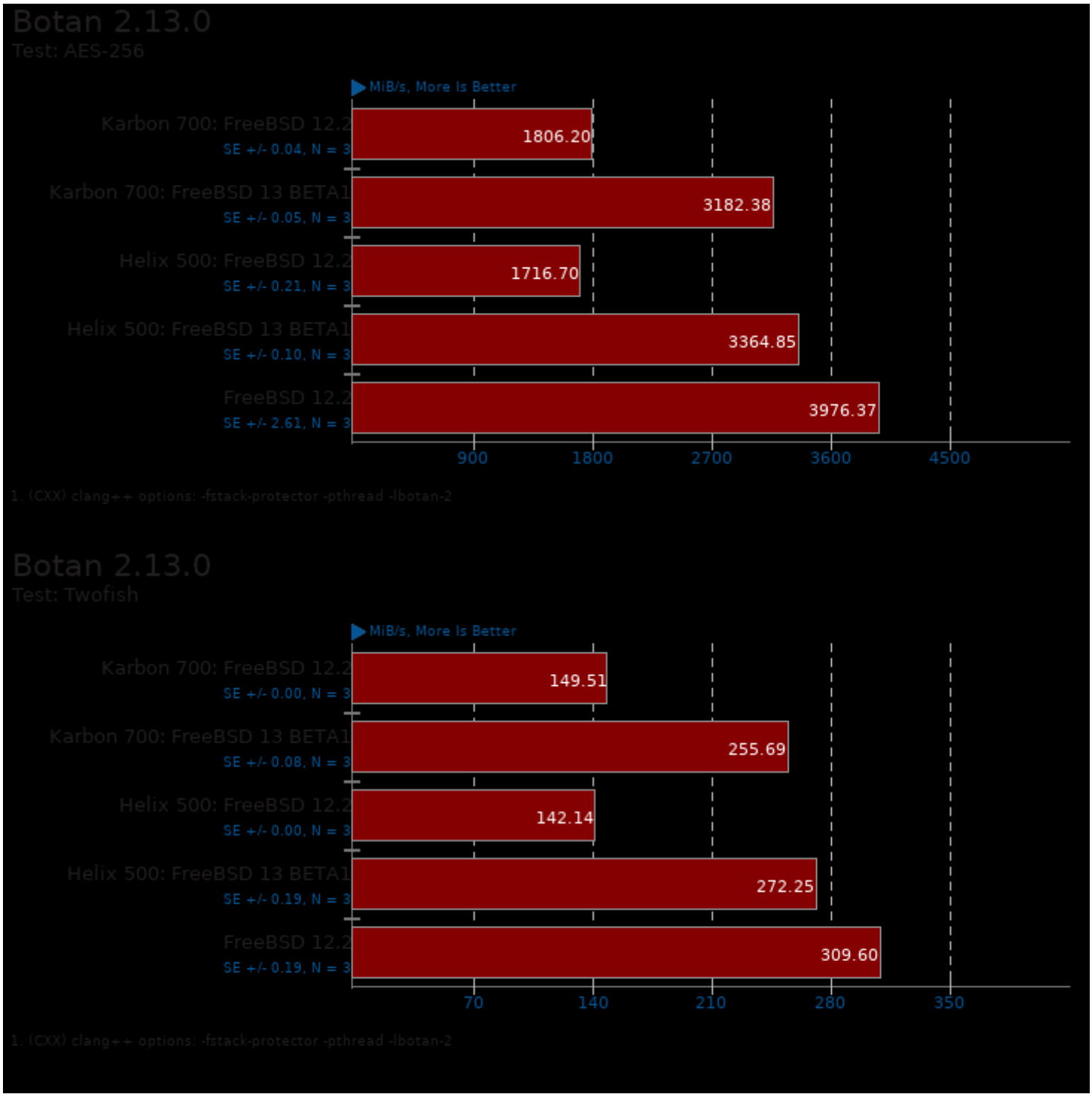
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



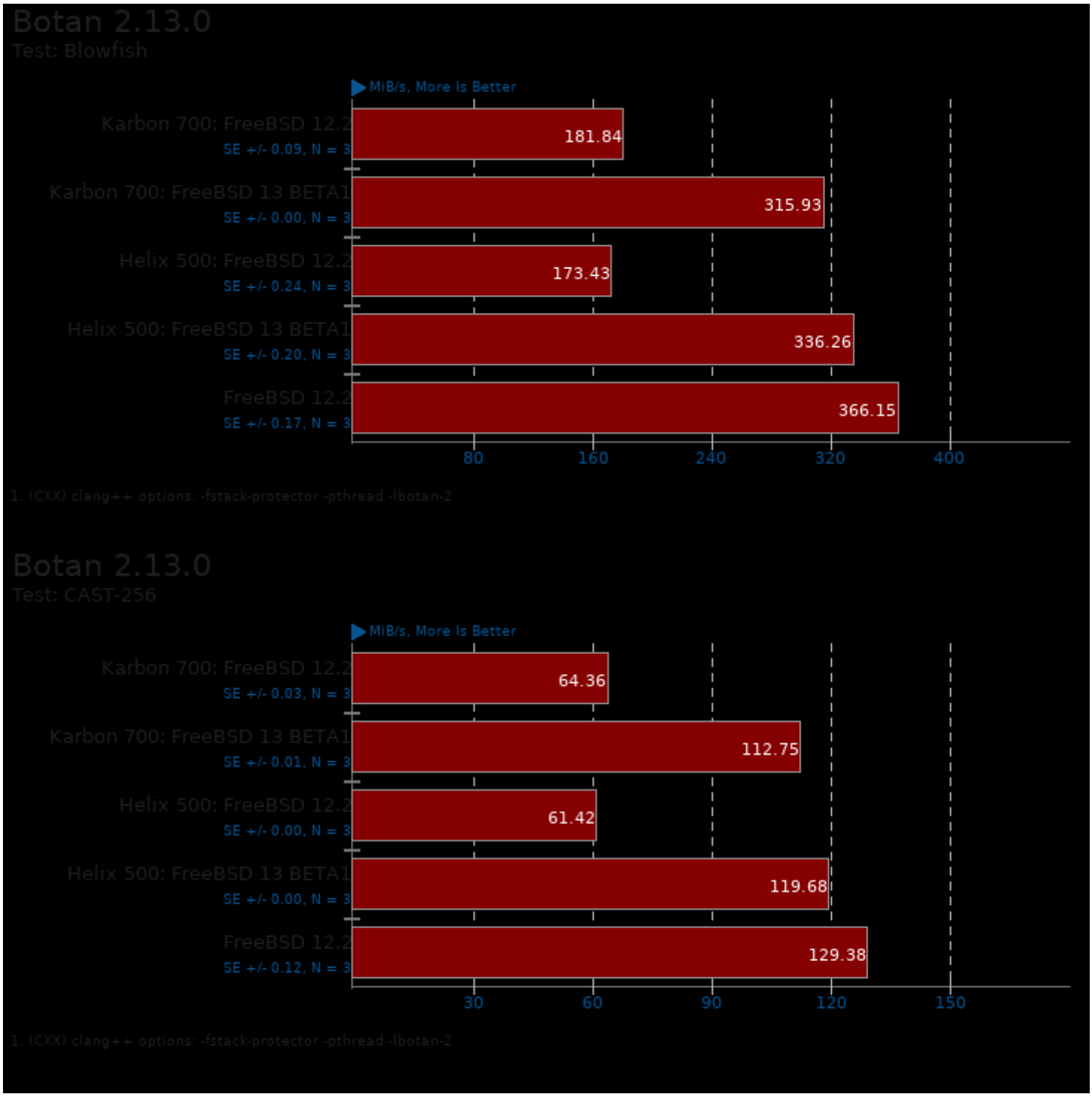
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



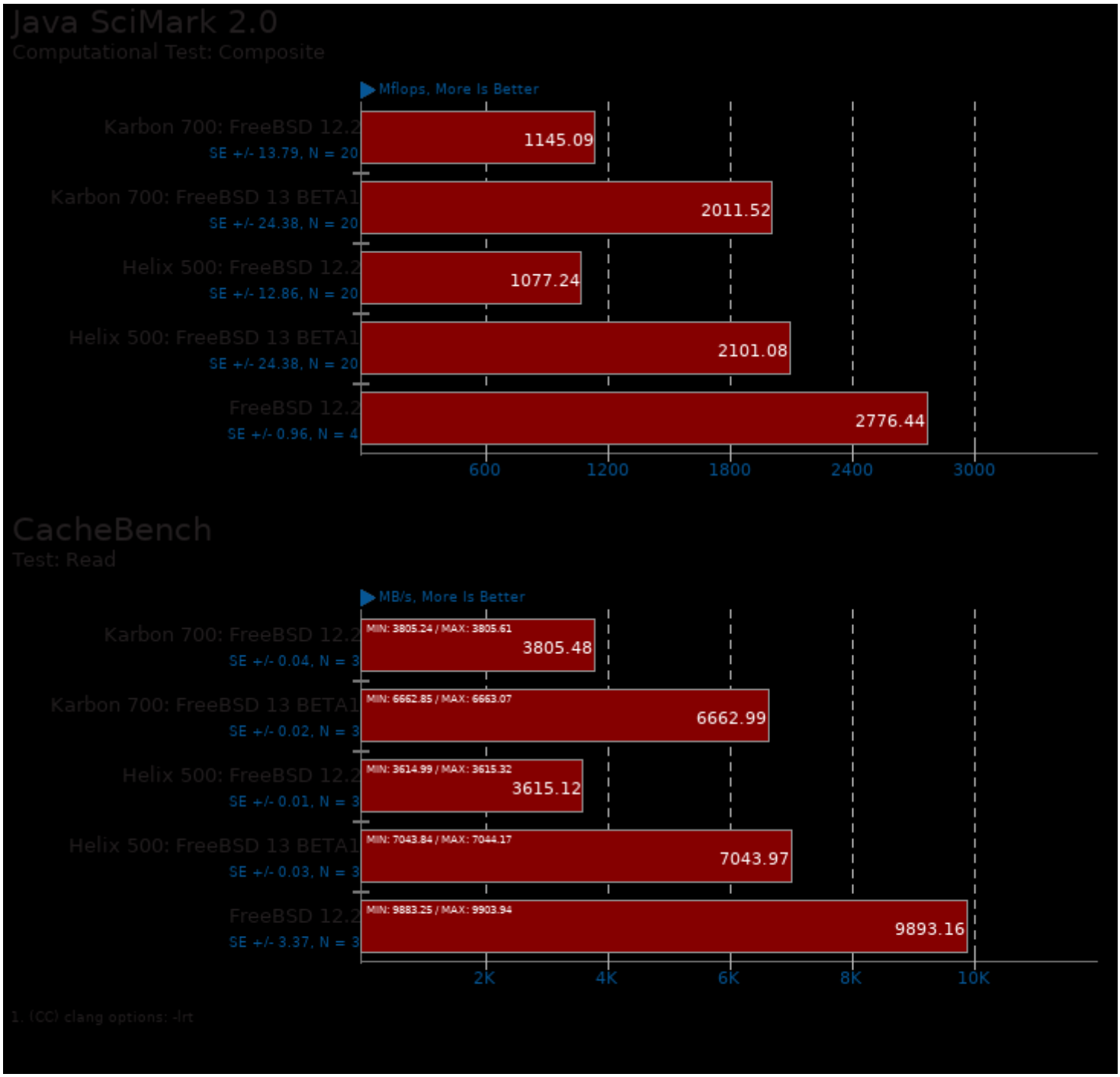
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



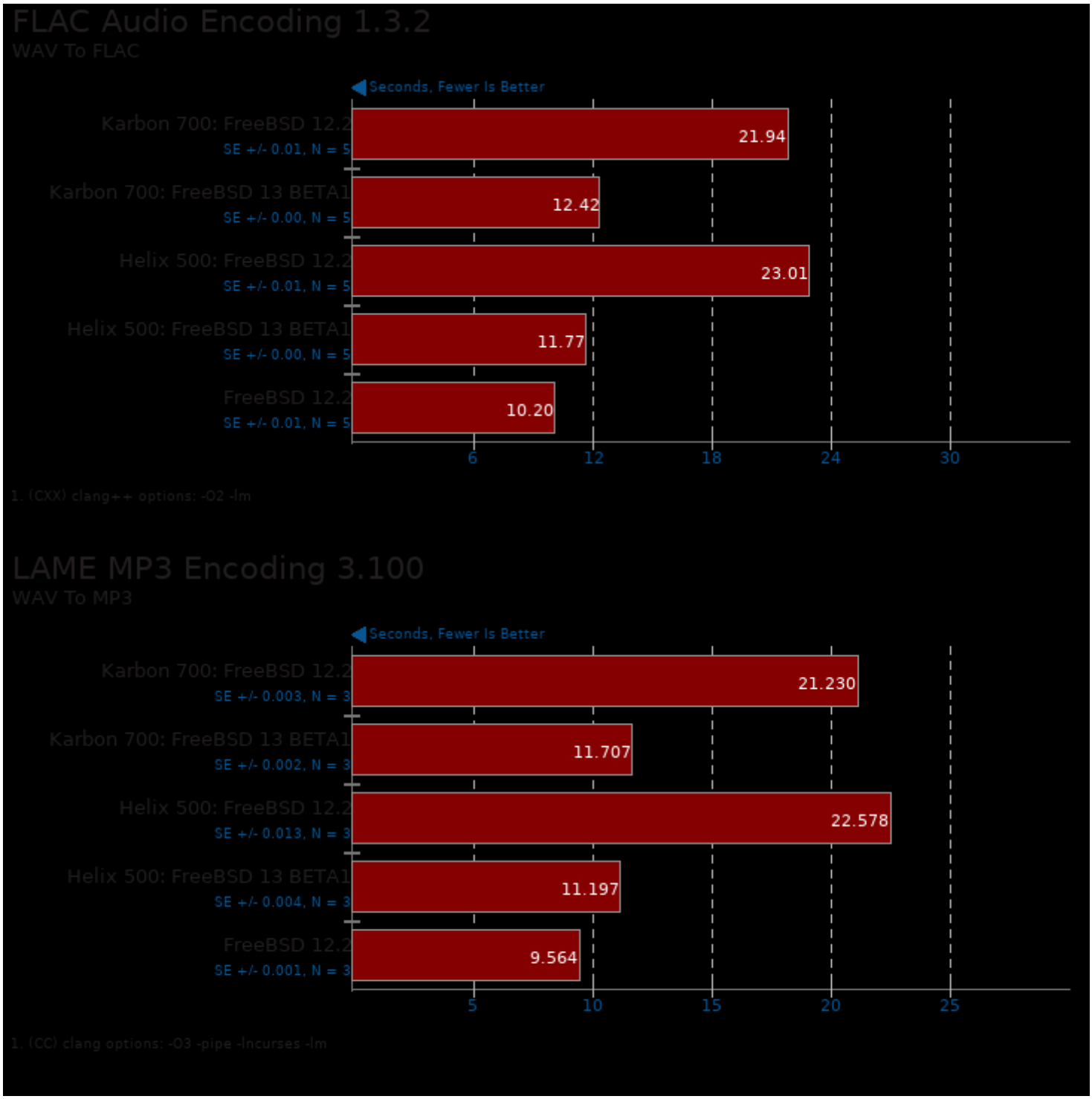
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks

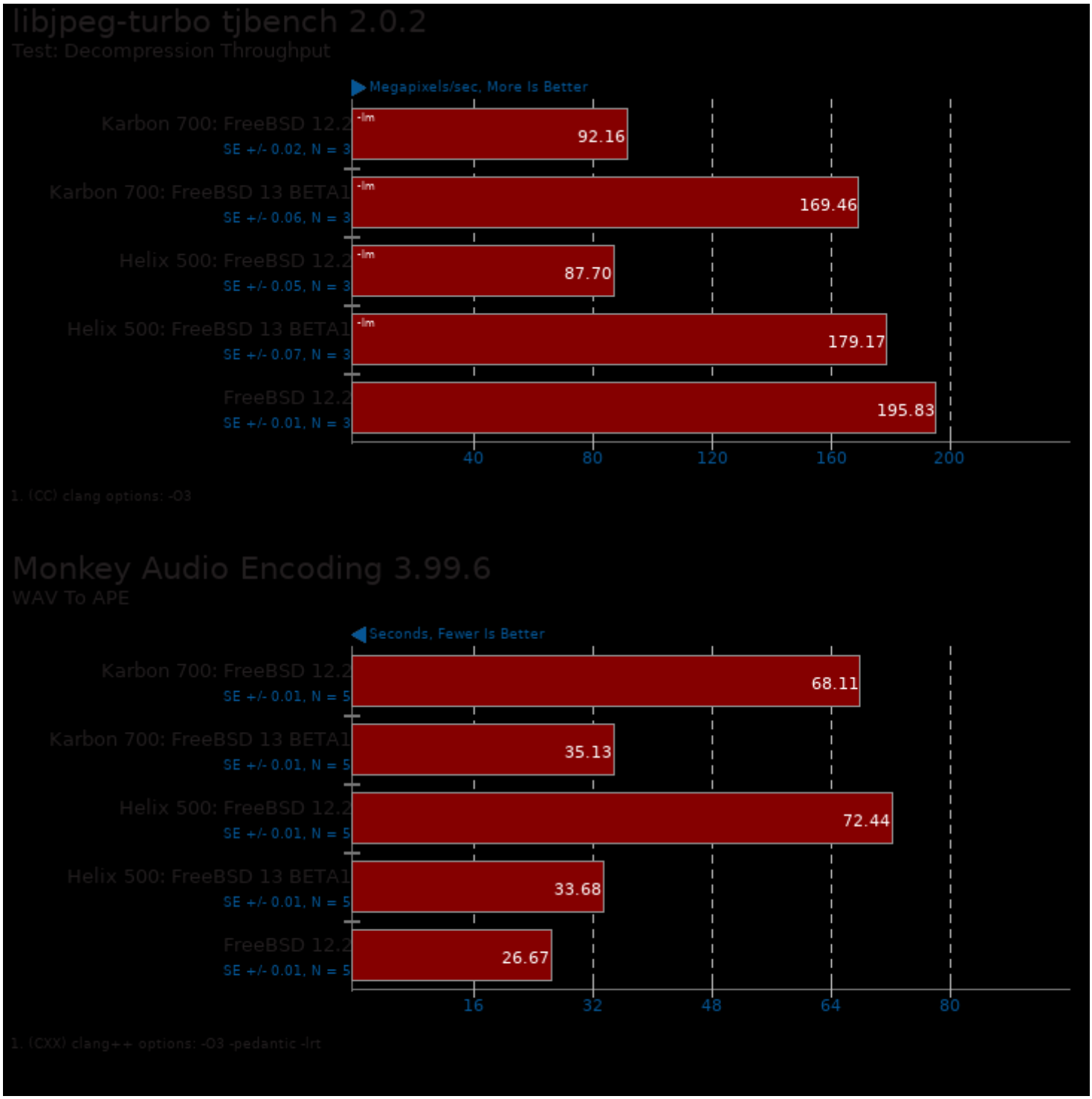


FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks

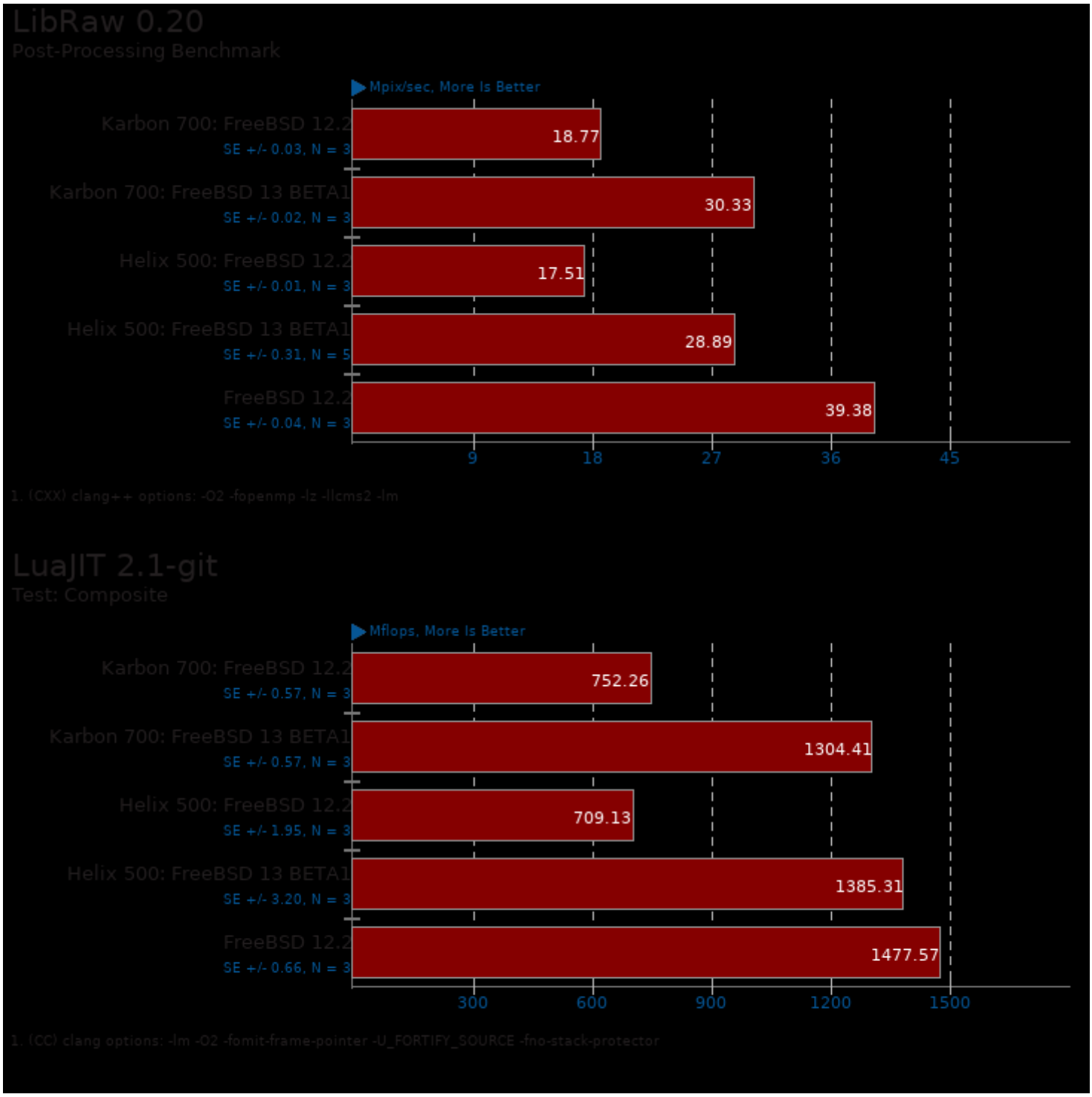


FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks

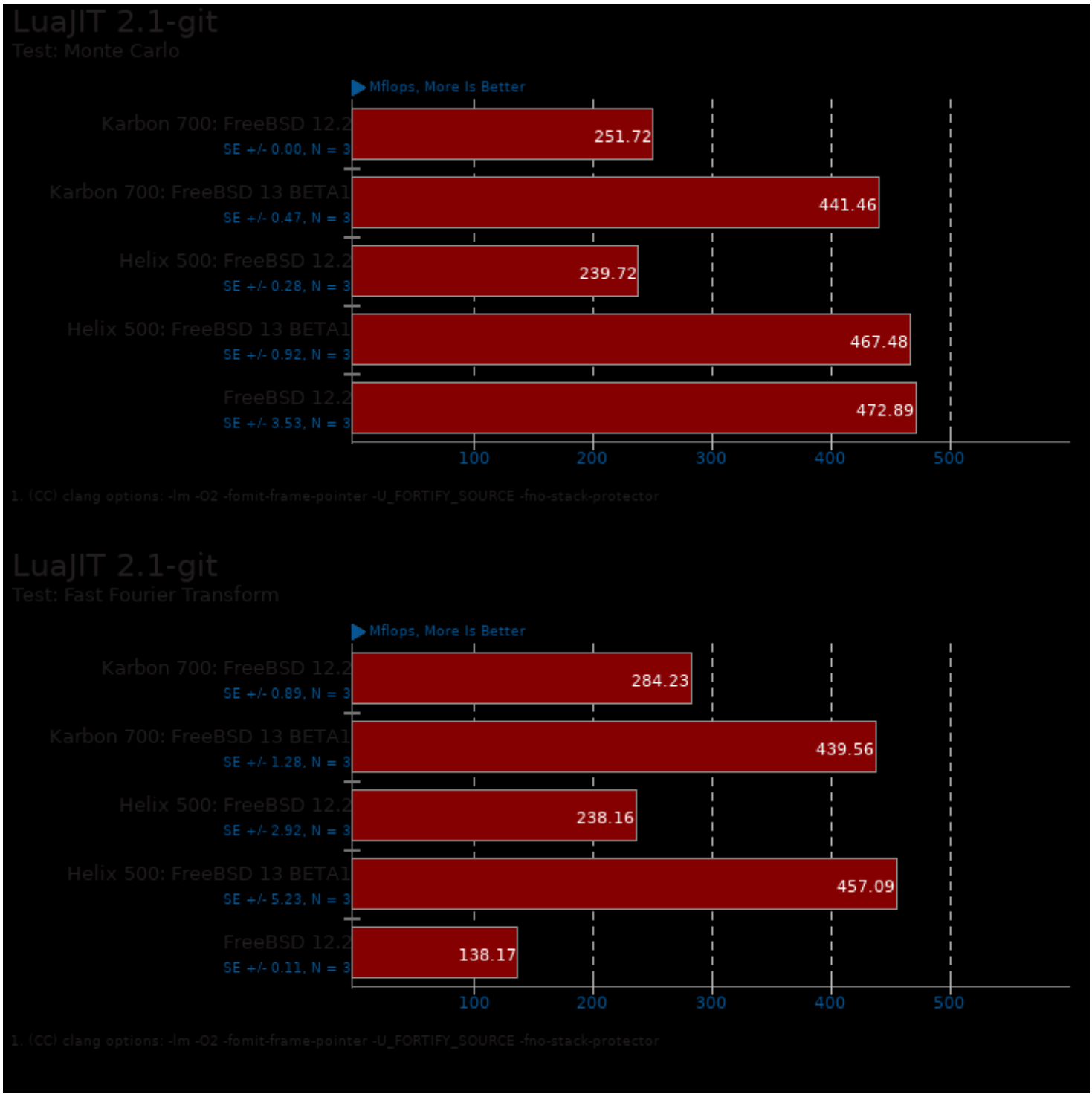


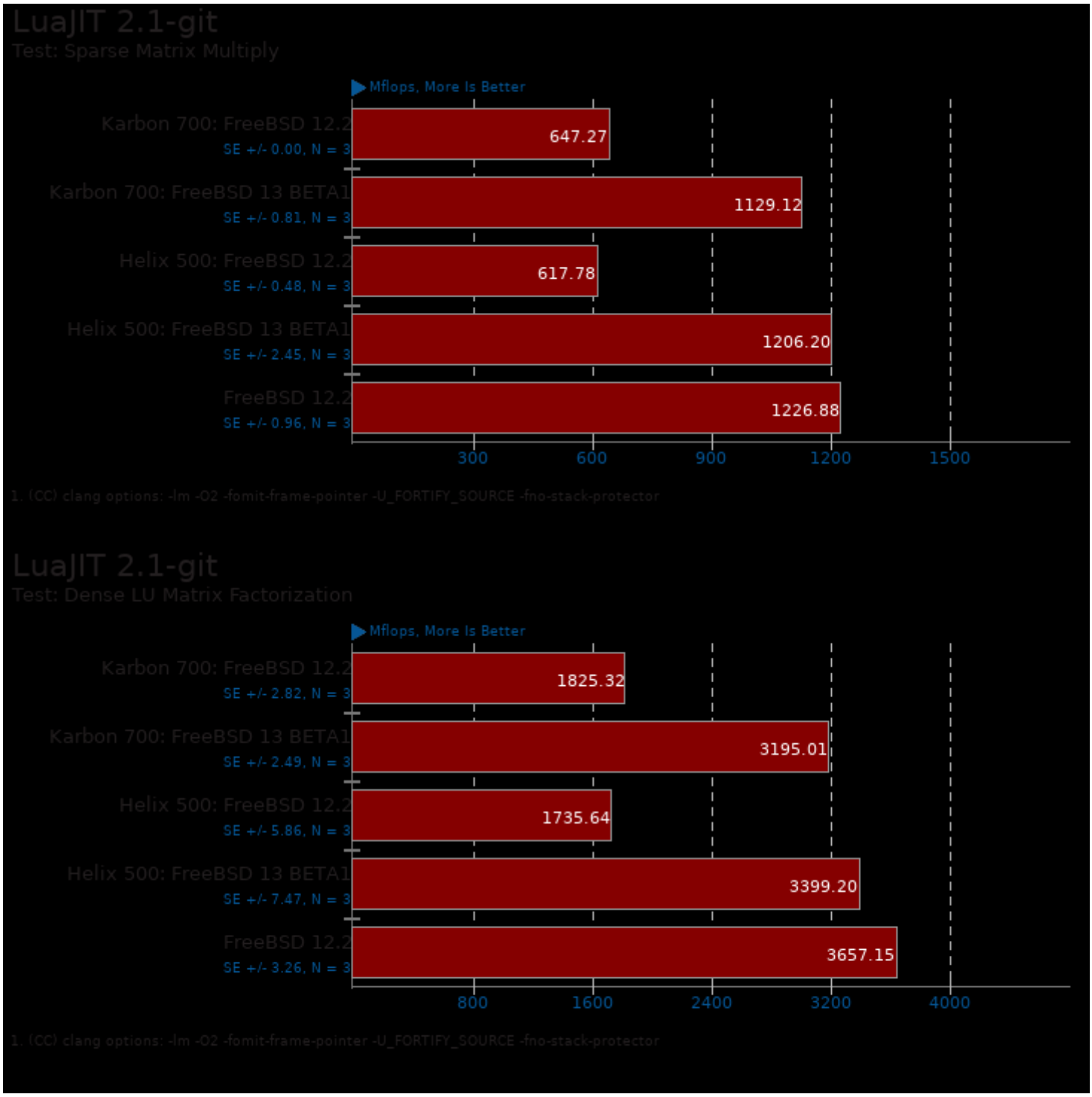

libjpeg-turbo tjbench 2.0.2
Test: Decompression Throughput
Megapixels/sec, More Is Better
Karbon 700: FreeBSD 12.2
SE +/- 0.02, N = 3
-lm
92.16
Karbon 700: FreeBSD 13 BETA1
SE +/- 0.06, N = 3
-lm
169.46
Helix 500: FreeBSD 12.2
SE +/- 0.05, N = 3
-lm
87.70
Helix 500: FreeBSD 13 BETA1
SE +/- 0.07, N = 3
-lm
179.17
FreeBSD 12.2
SE +/- 0.01, N = 3
195.83
40
80
120
160
200
1. (CC) clang options: -O3
Monkey Audio Encoding 3.99.6
WAV To APE
Seconds, Fewer Is Better
Karbon 700: FreeBSD 12.2
SE +/- 0.01, N = 5
68.11
Karbon 700: FreeBSD 13 BETA1
SE +/- 0.01, N = 5
35.13
Helix 500: FreeBSD 12.2
SE +/- 0.01, N = 5
72.44
Helix 500: FreeBSD 13 BETA1
SE +/- 0.01, N = 5
33.68
FreeBSD 12.2
SE +/- 0.01, N = 5
26.67
16
32
48
64
80
1. (CXX) clang++ options: -O3 -pedantic -lrt

FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks

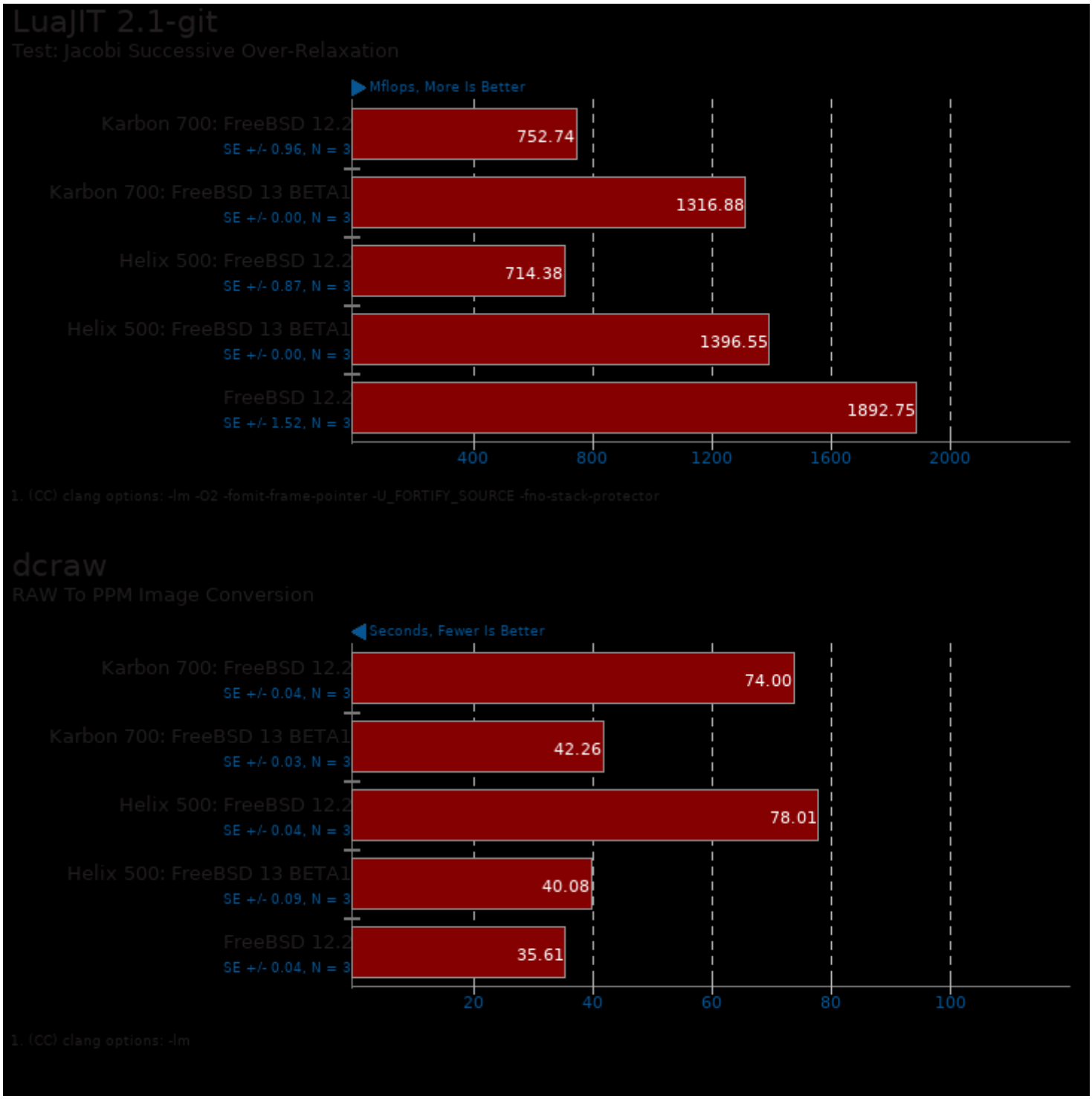


FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks

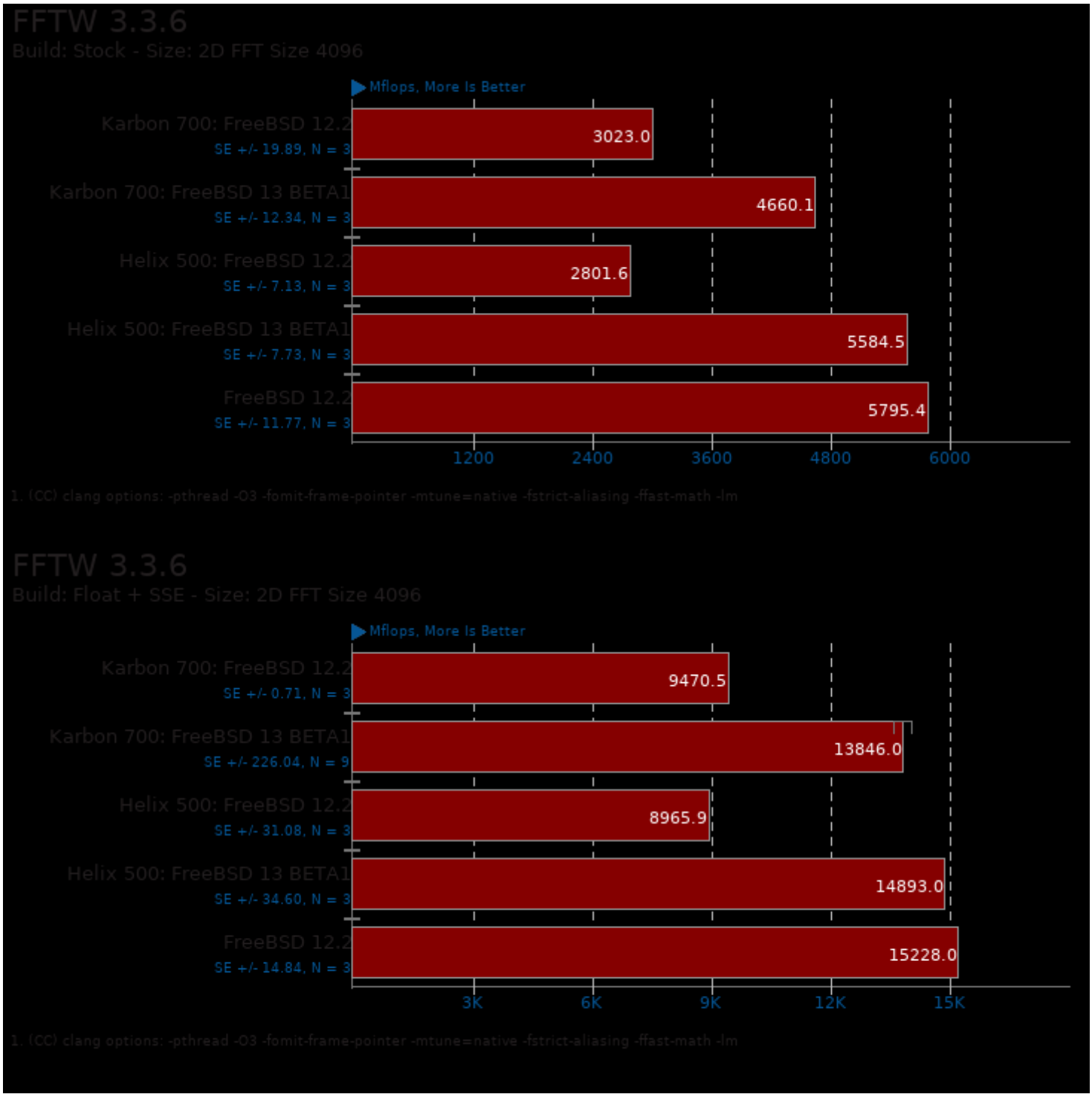



LuaJIT 2.1-git
Test: Sparse Matrix Multiply
Mflops, More Is Better
Karbon 700: FreeBSD 12.2
SE +/- 0.00, N = 3
647.27
Karbon 700: FreeBSD 13 BETA1
SE +/- 0.81, N = 3
1129.12
Helix 500: FreeBSD 12.2
SE +/- 0.48, N = 3
617.78
Helix 500: FreeBSD 13 BETA1
SE +/- 2.45, N = 3
1206.20
FreeBSD 12.2
SE +/- 0.96, N = 3
1226.88
300
600
900
1200
1500
1. (CC) clang options: -lm -O2 -fomit-frame-pointer -U_FORTIFY_SOURCE -fno-stack-protector
LuaJIT 2.1-git
Test: Dense LU Matrix Factorization
Mflops, More Is Better
Karbon 700: FreeBSD 12.2
SE +/- 2.82, N = 3
1825.32
Karbon 700: FreeBSD 13 BETA1
SE +/- 2.49, N = 3
3195.01
Helix 500: FreeBSD 12.2
SE +/- 5.86, N = 3
1735.64
Helix 500: FreeBSD 13 BETA1
SE +/- 7.47, N = 3
3399.20
FreeBSD 12.2
SE +/- 3.26, N = 3
3657.15
800
1600
2400
3200
4000
1. (CC) clang options: -lm -O2 -fomit-frame-pointer -U_FORTIFY_SOURCE -fno-stack-protector

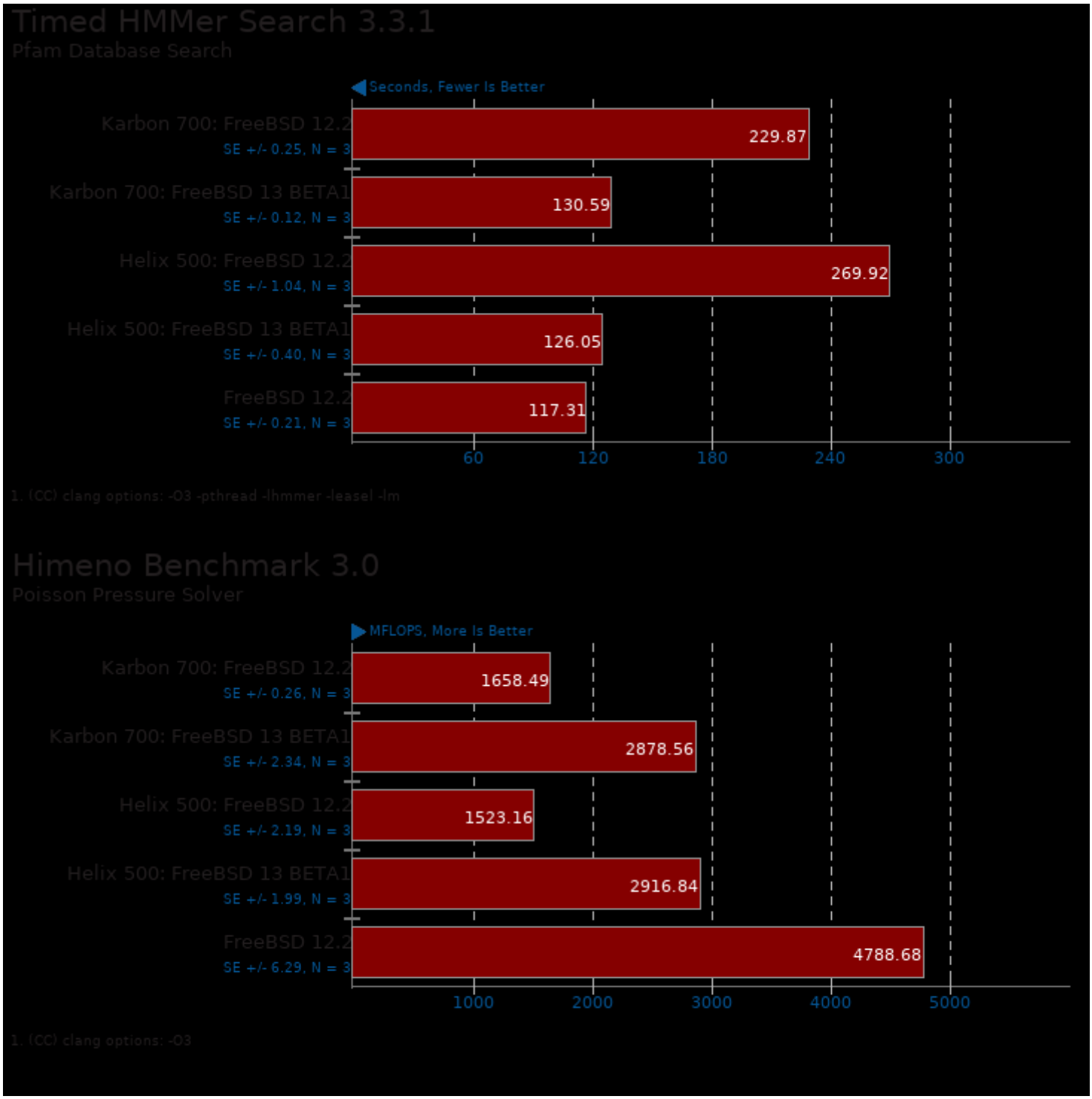
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



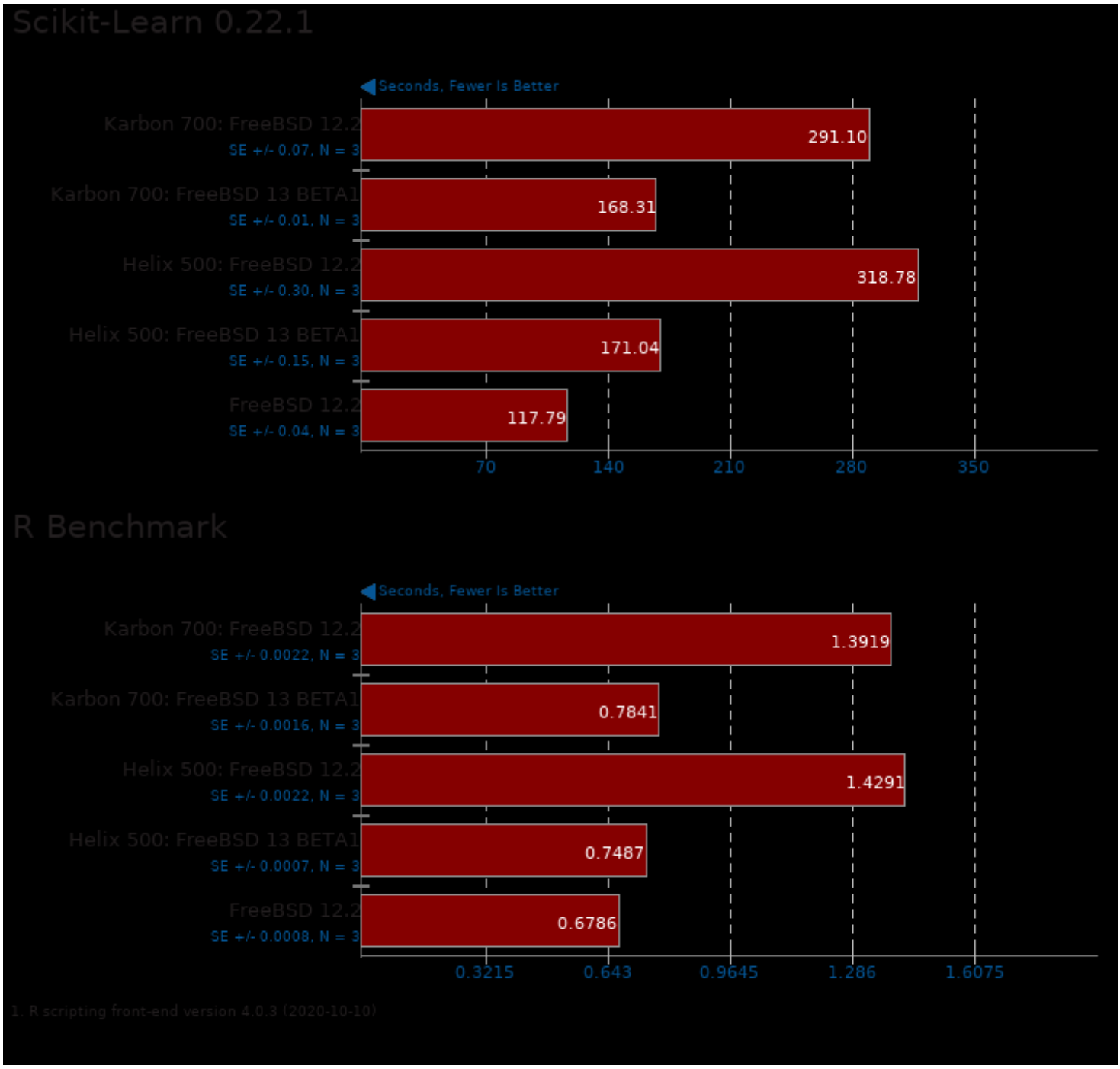
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



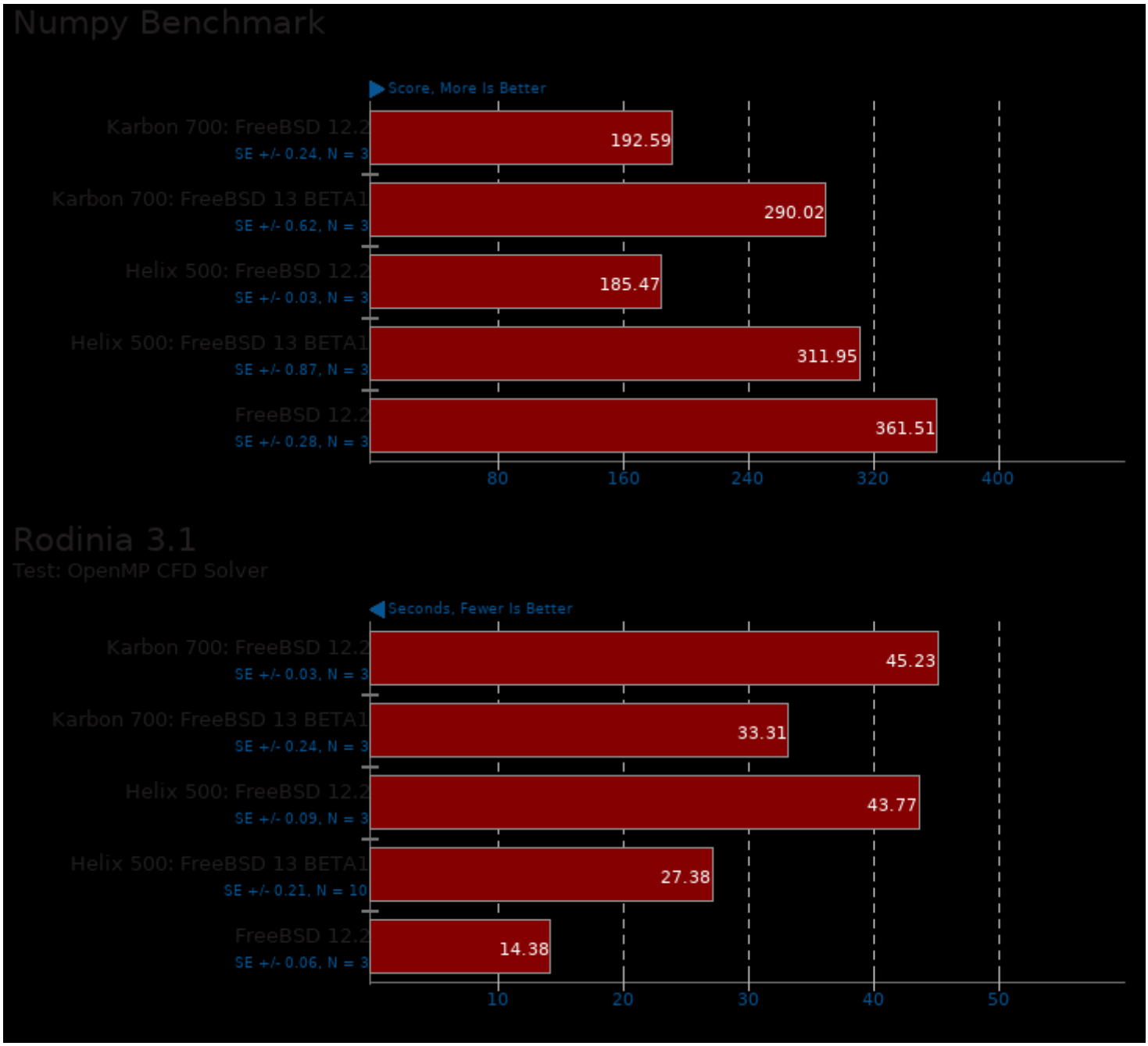
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



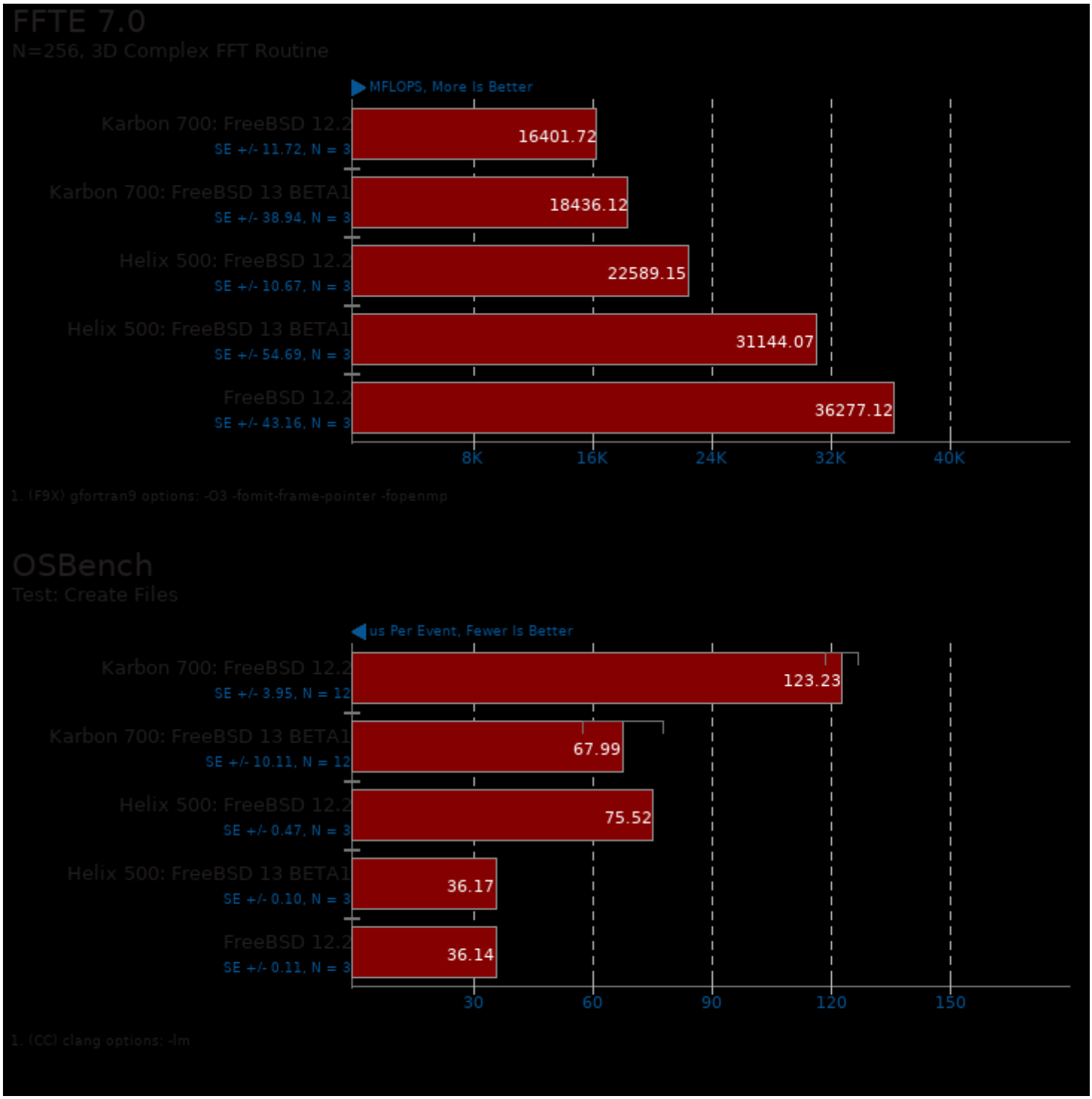
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks

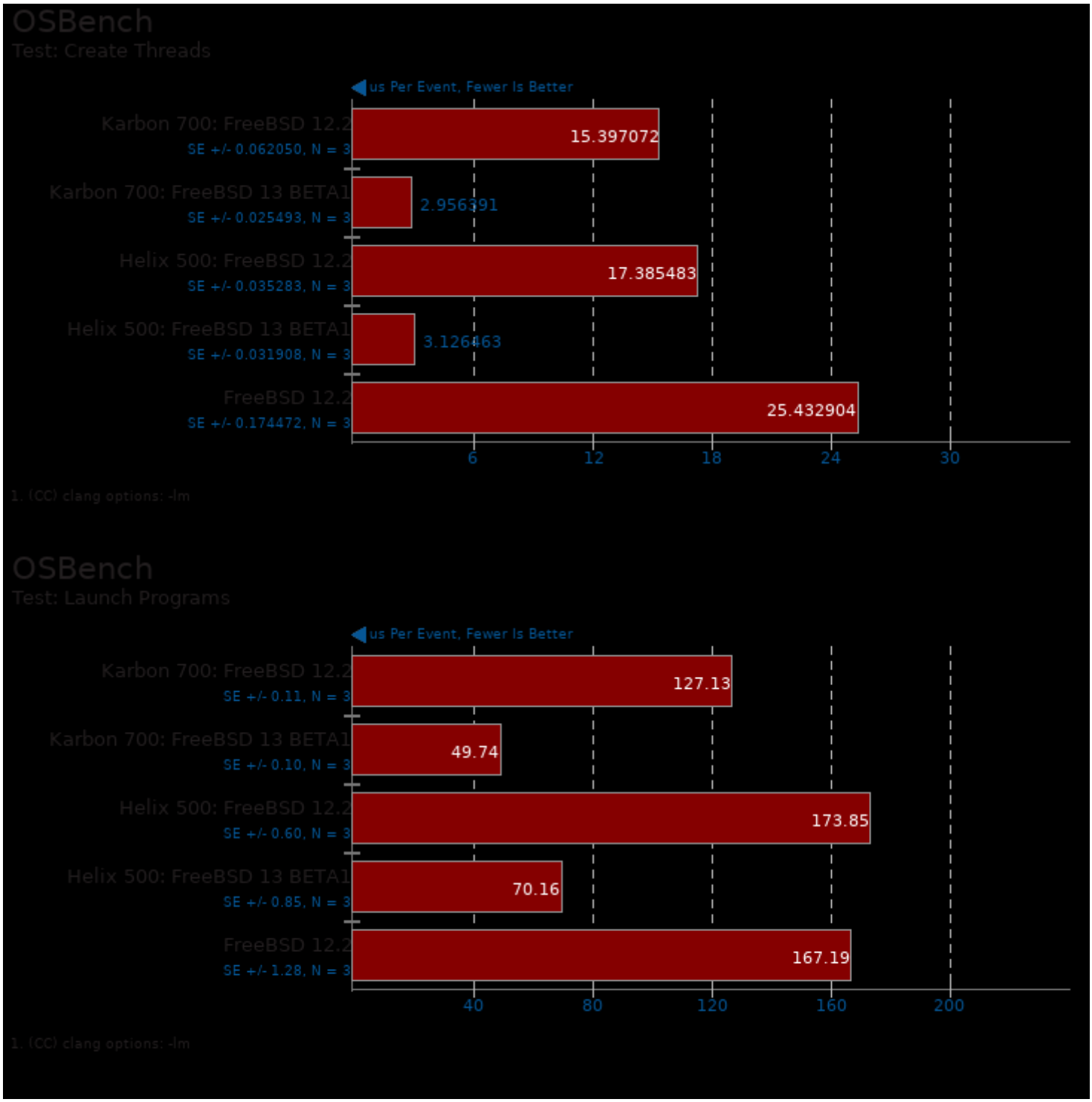


FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks

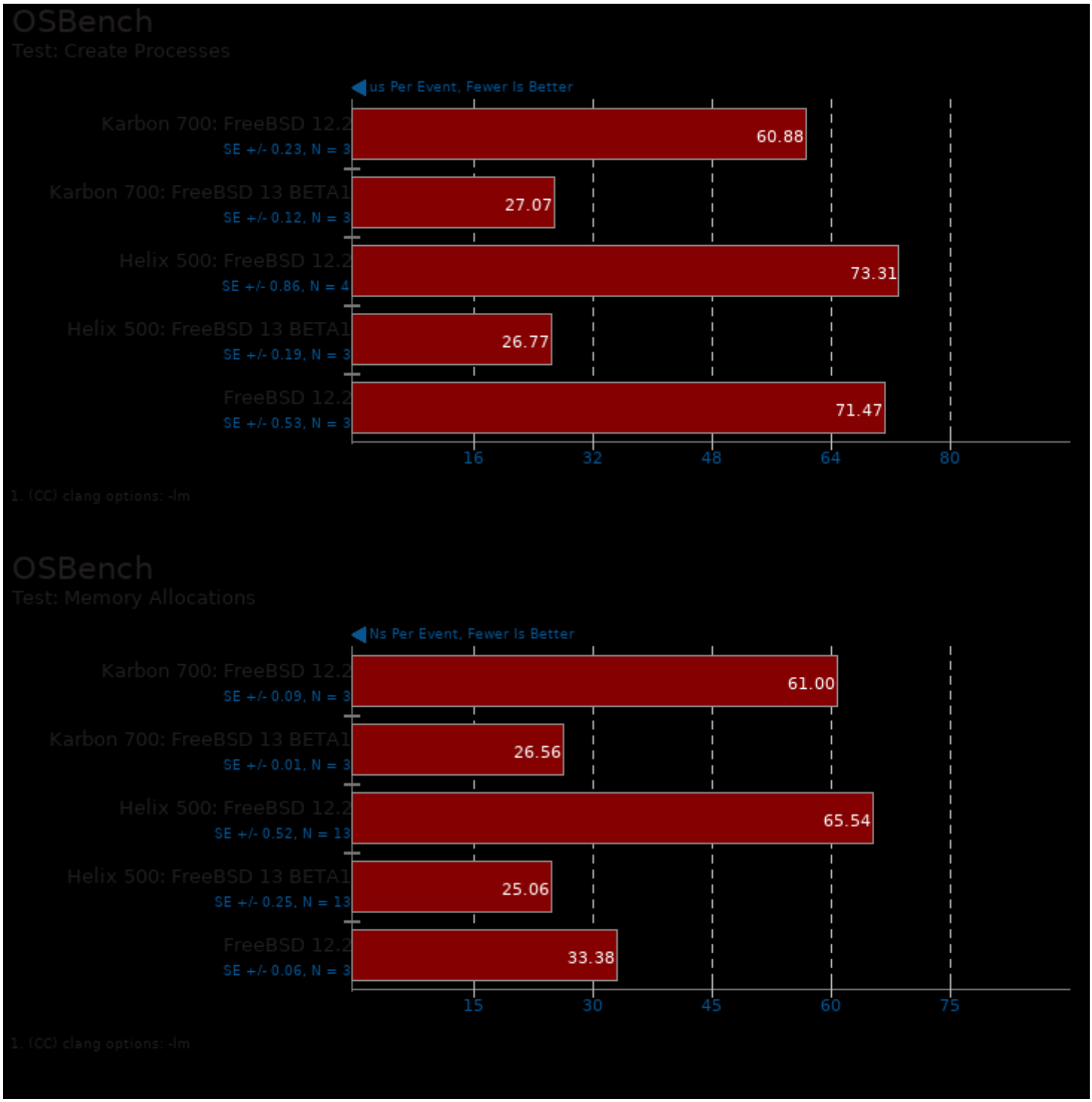


FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks

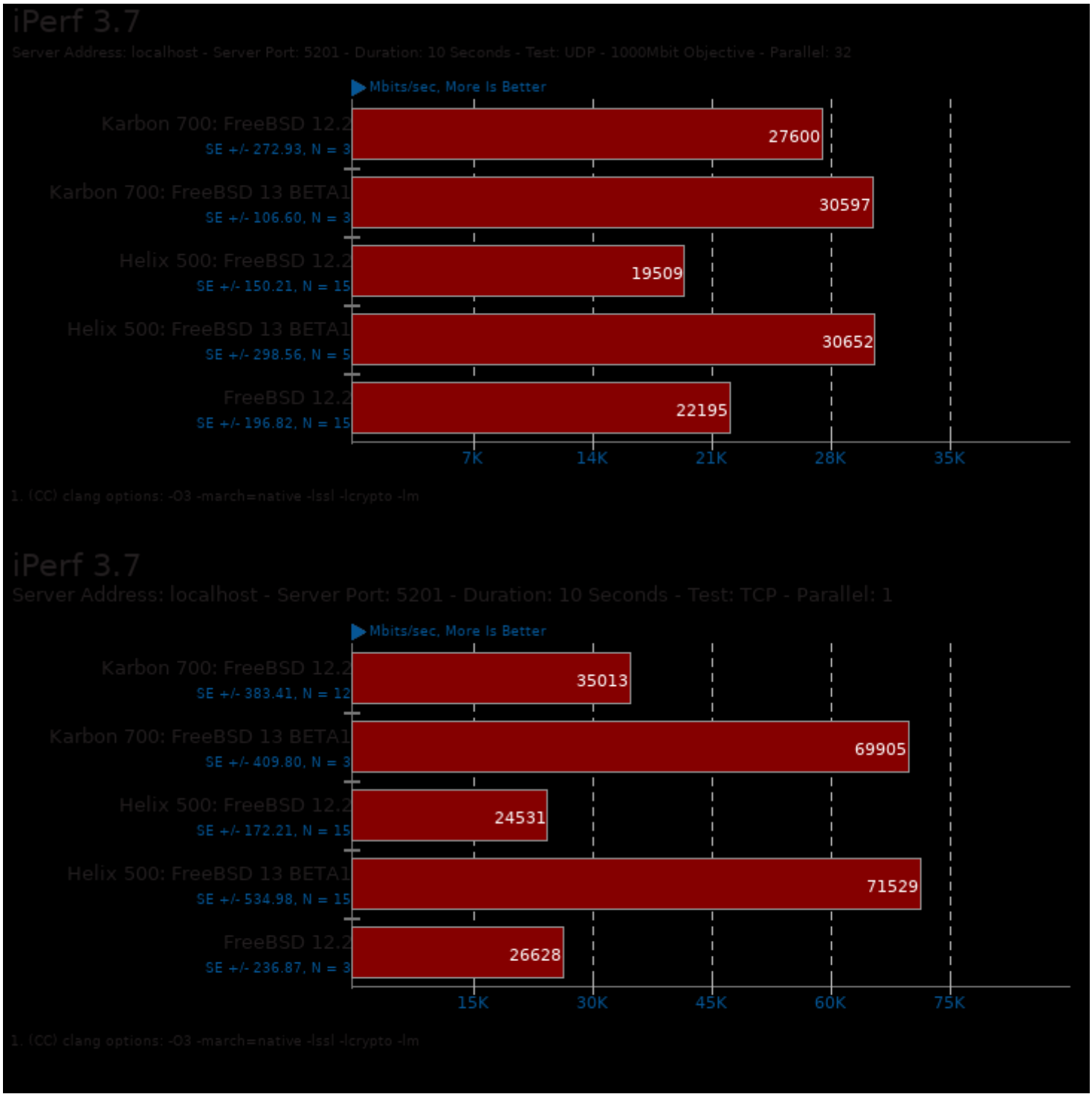



OSBench
Test: Create Threads
us Per Event, Fewer Is Better
Karbon 700: FreeBSD 12.2
SE +/- 0.062050, N = 3
15.397072
Karbon 700: FreeBSD 13 BETA1
SE +/- 0.025493, N = 3
2.956391
Helix 500: FreeBSD 12.2
SE +/- 0.035283, N = 3
17.385483
Helix 500: FreeBSD 13 BETA1
SE +/- 0.031908, N = 3
3.126463
FreeBSD 12.2
SE +/- 0.174472, N = 3
25.432904
6
12
18
24
30
1. (CC) clang options: -lm
OSBench
Test: Launch Programs
us Per Event, Fewer Is Better
Karbon 700: FreeBSD 12.2
SE +/- 0.11, N = 3
127.13
Karbon 700: FreeBSD 13 BETA1
SE +/- 0.10, N = 3
49.74
Helix 500: FreeBSD 12.2
SE +/- 0.60, N = 3
173.85
Helix 500: FreeBSD 13 BETA1
SE +/- 0.85, N = 3
70.16
FreeBSD 12.2
SE +/- 1.28, N = 3
167.19
40
80
120
160
200
1. (CC) clang options: -lm

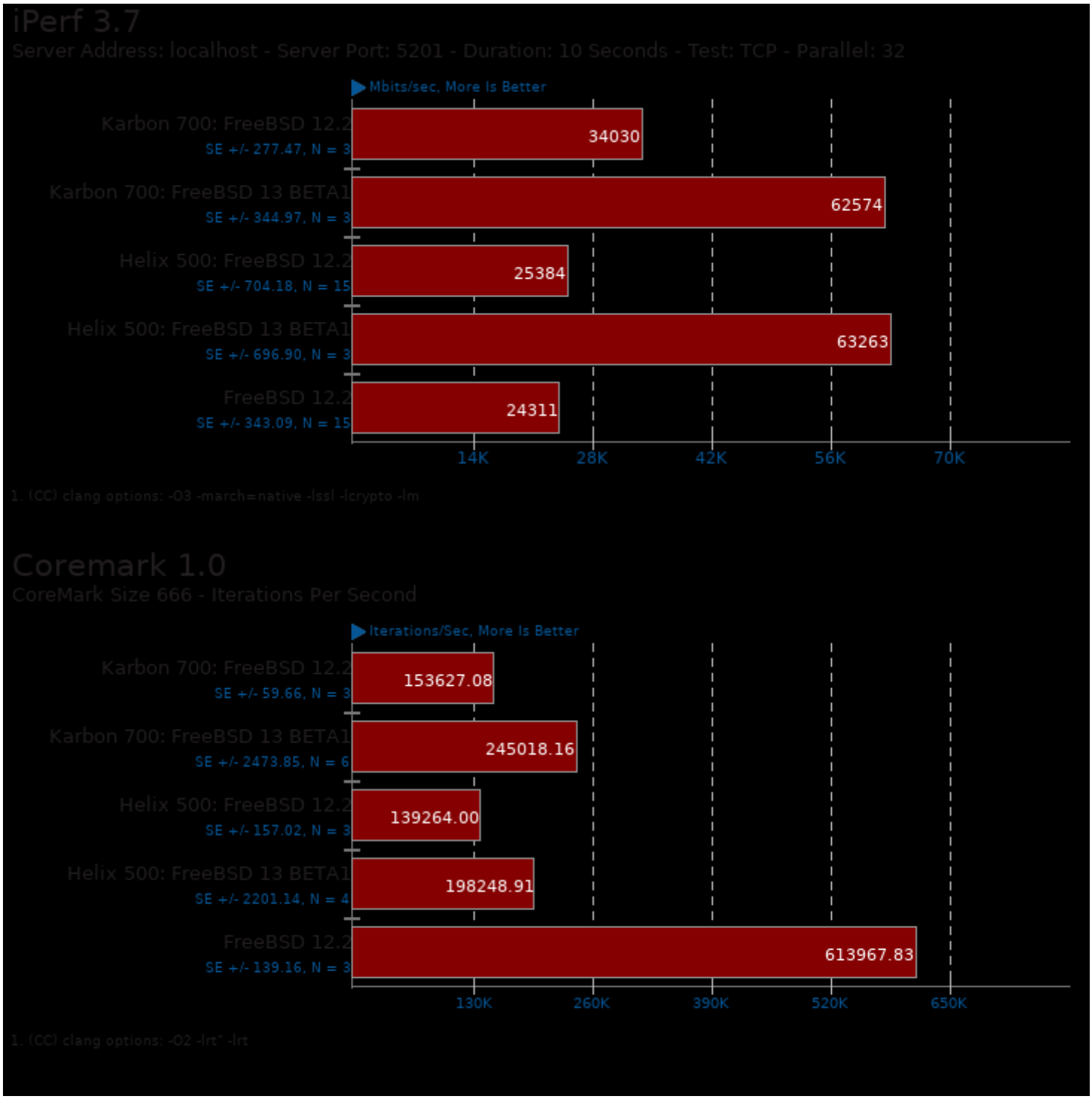
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



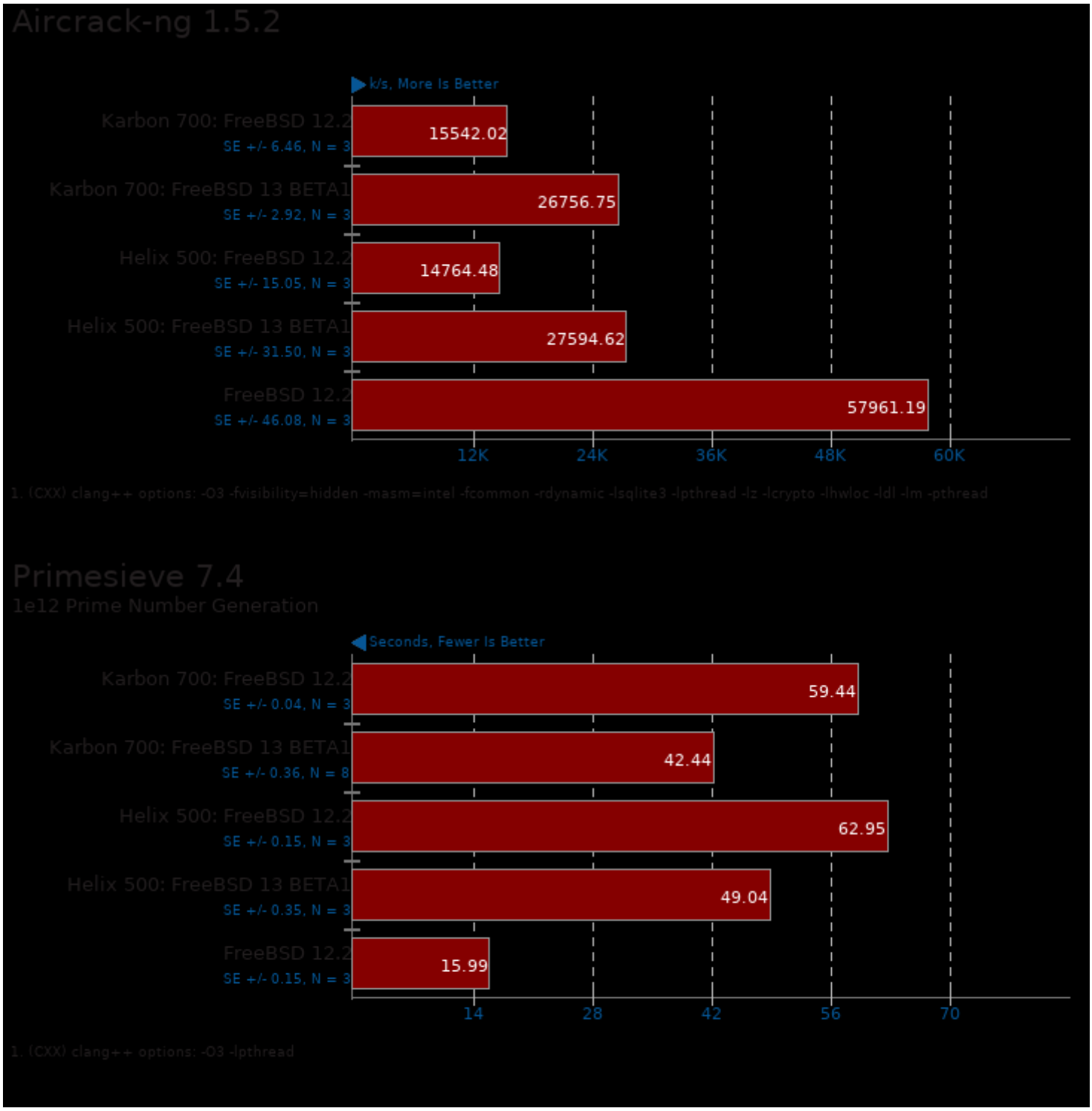
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



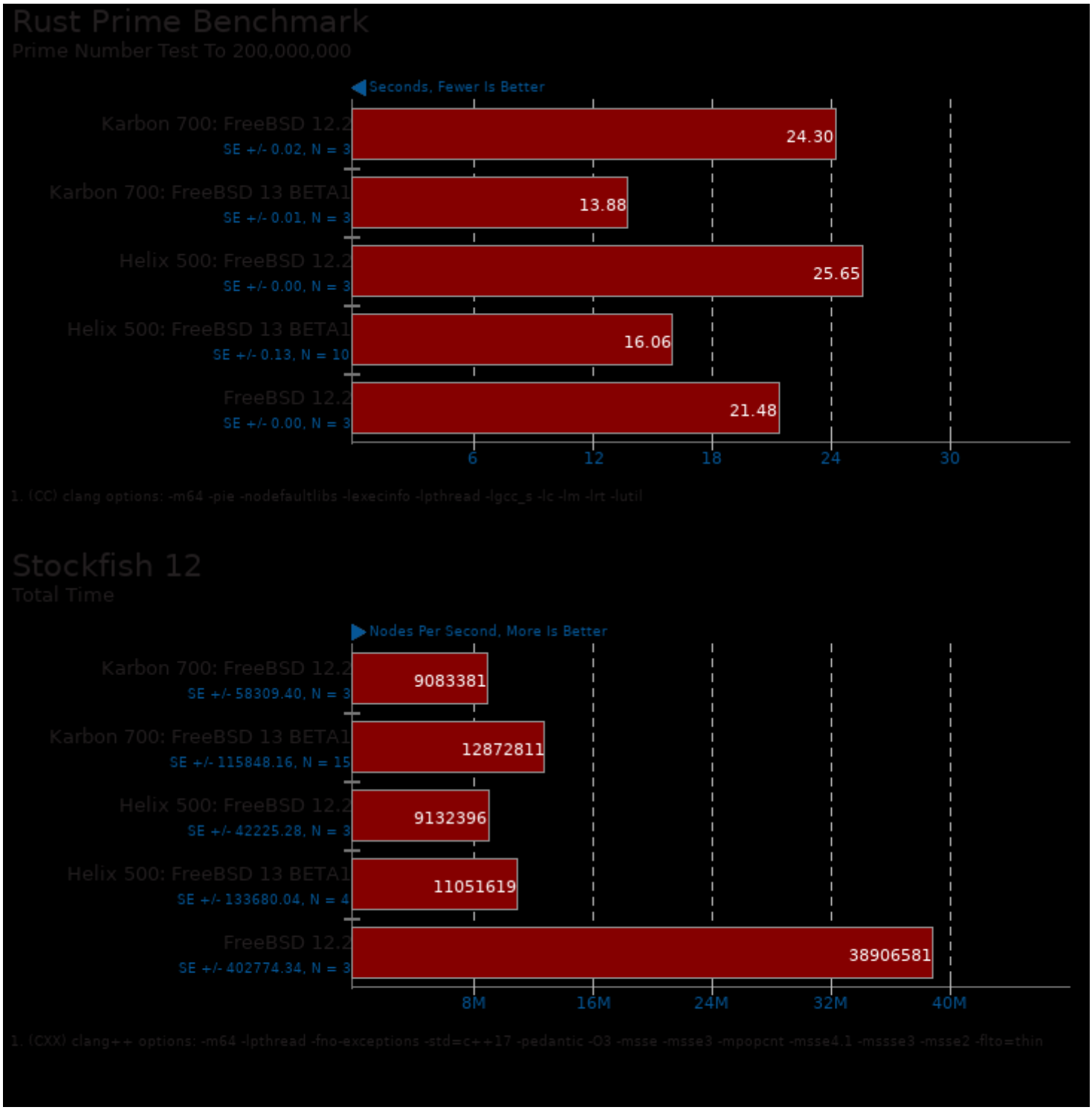
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



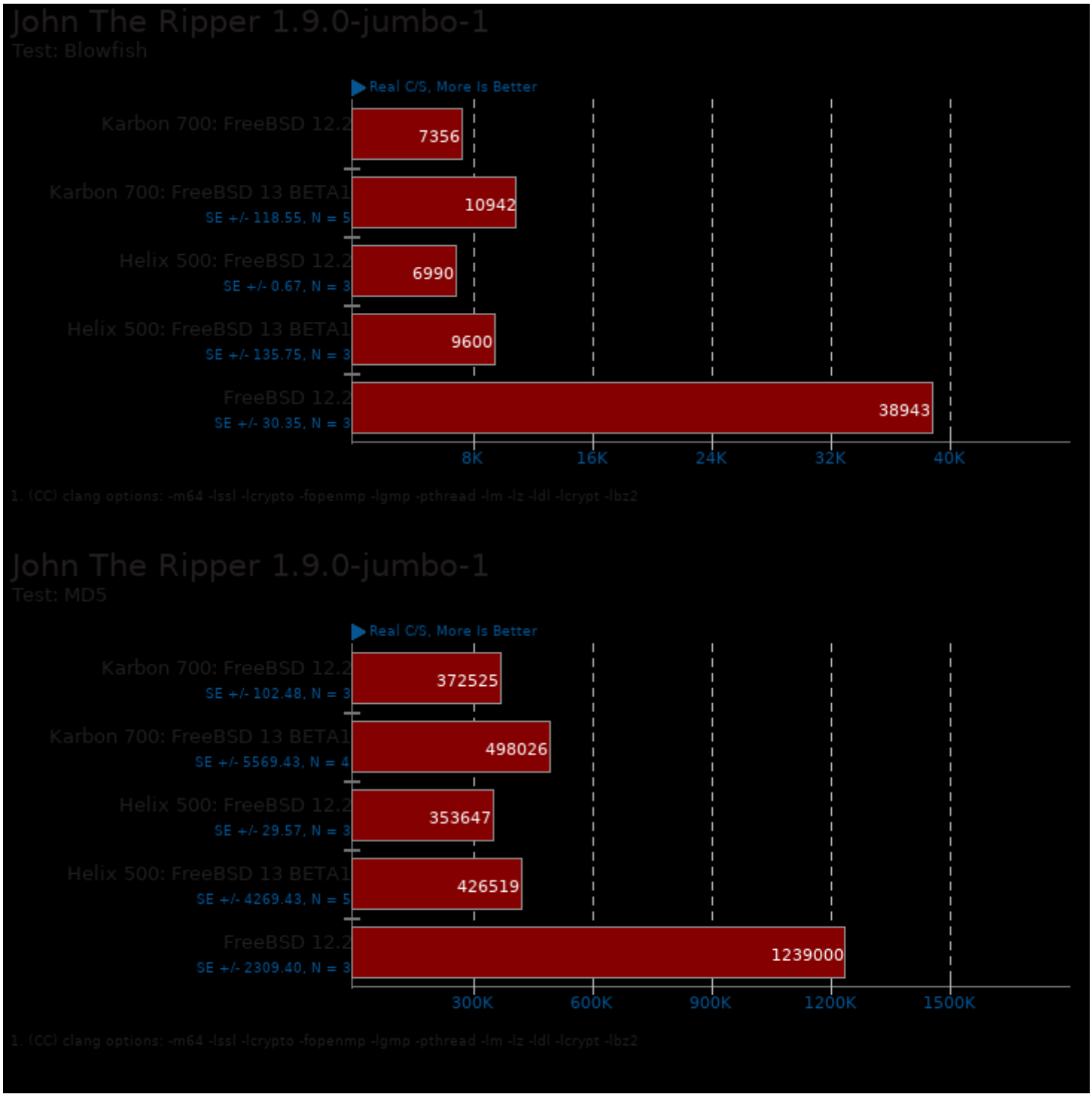
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



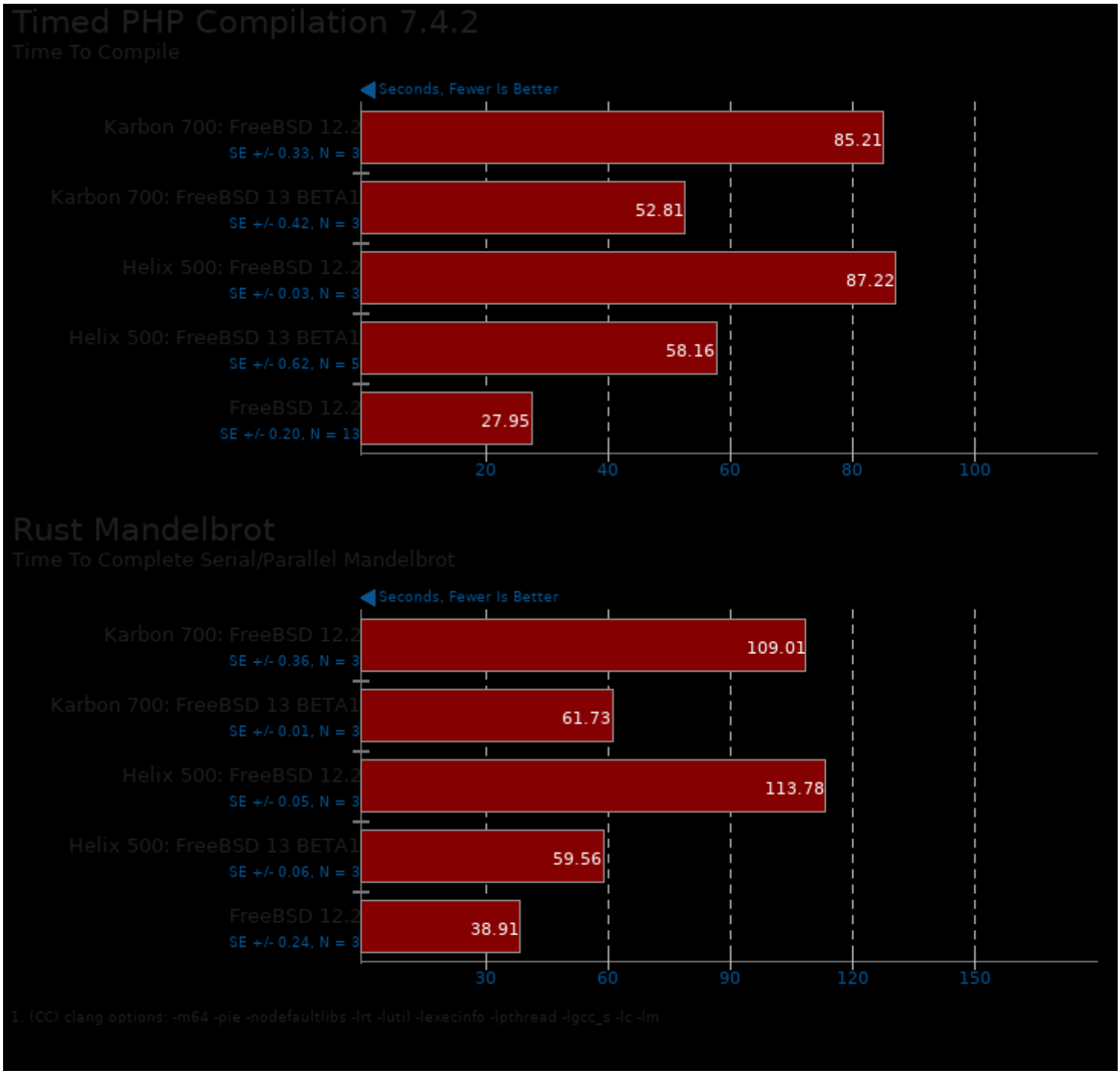
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



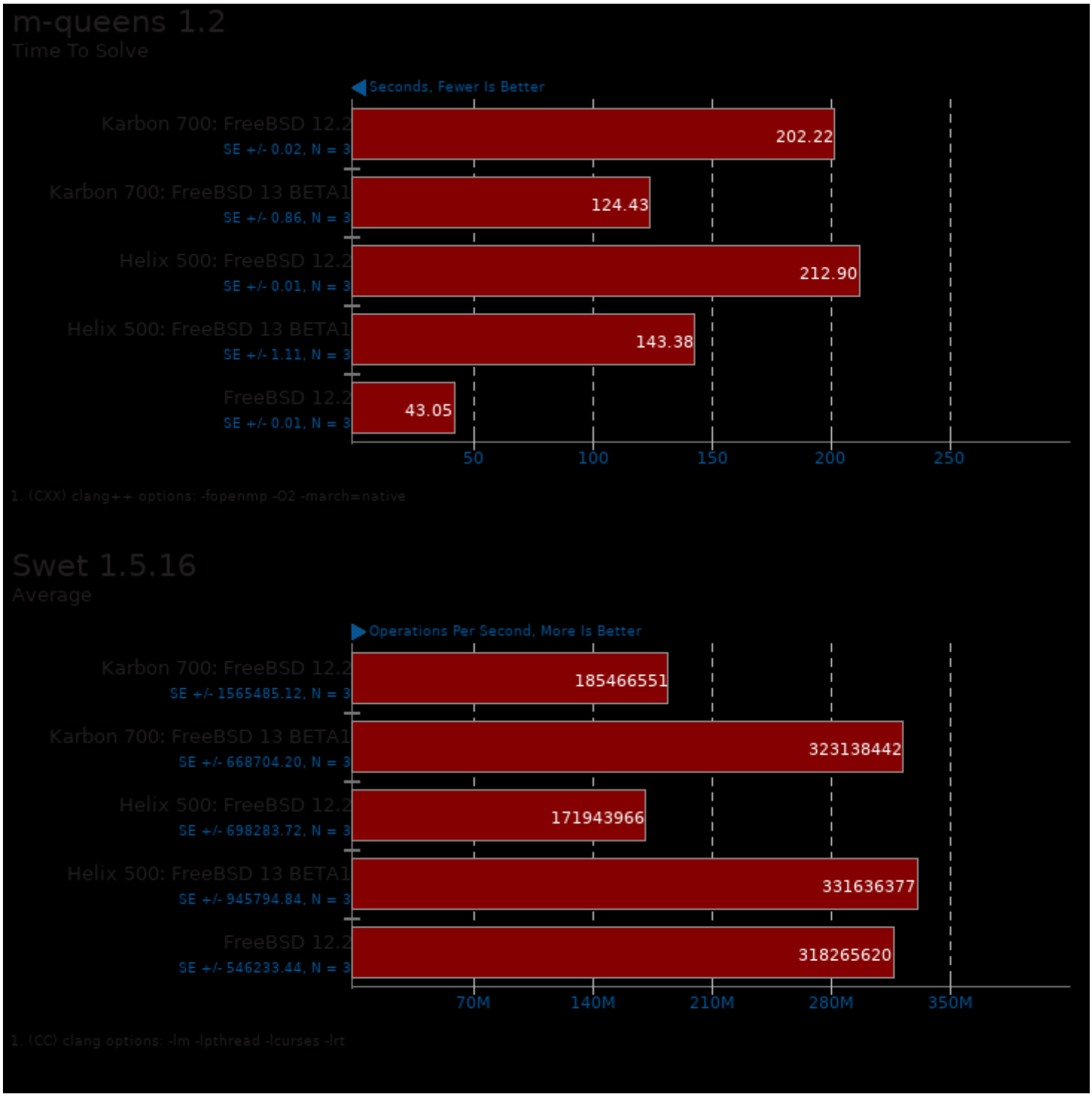
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



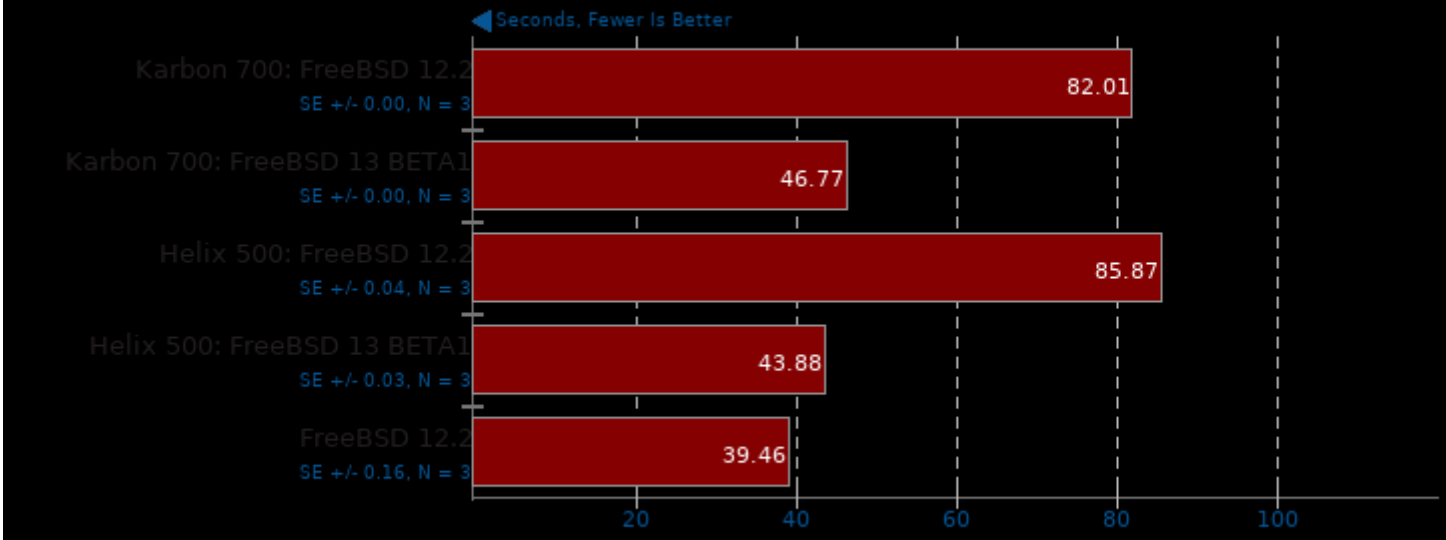
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks

AOBench

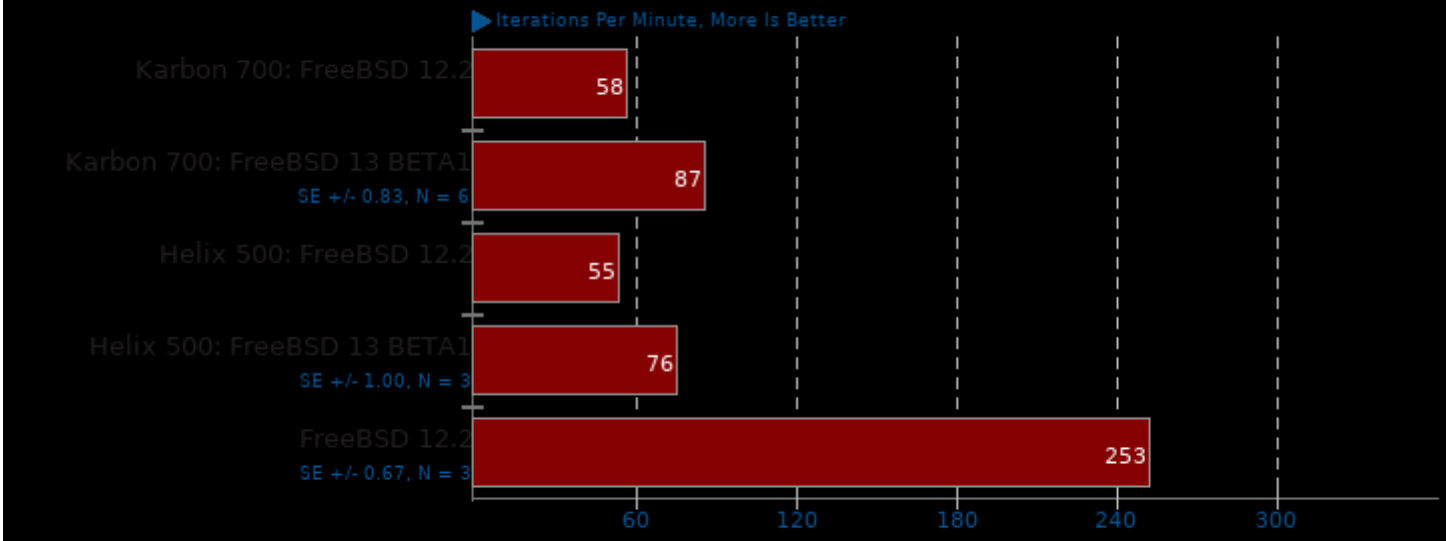
Size: 2048 x 2048 - Total Time



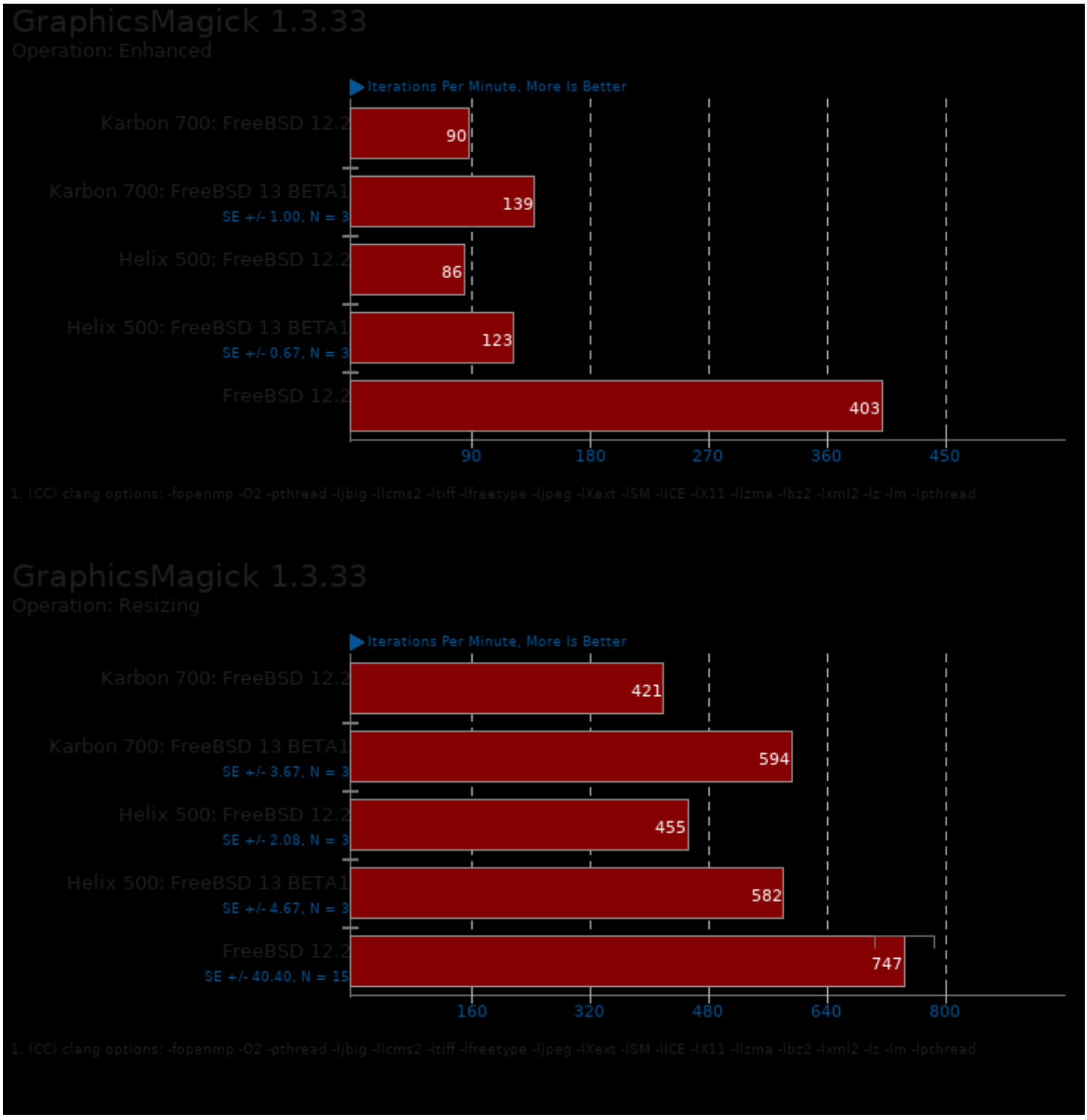
1. (CC) clang options: -lm -O3

GraphicsMagick 1.3.33

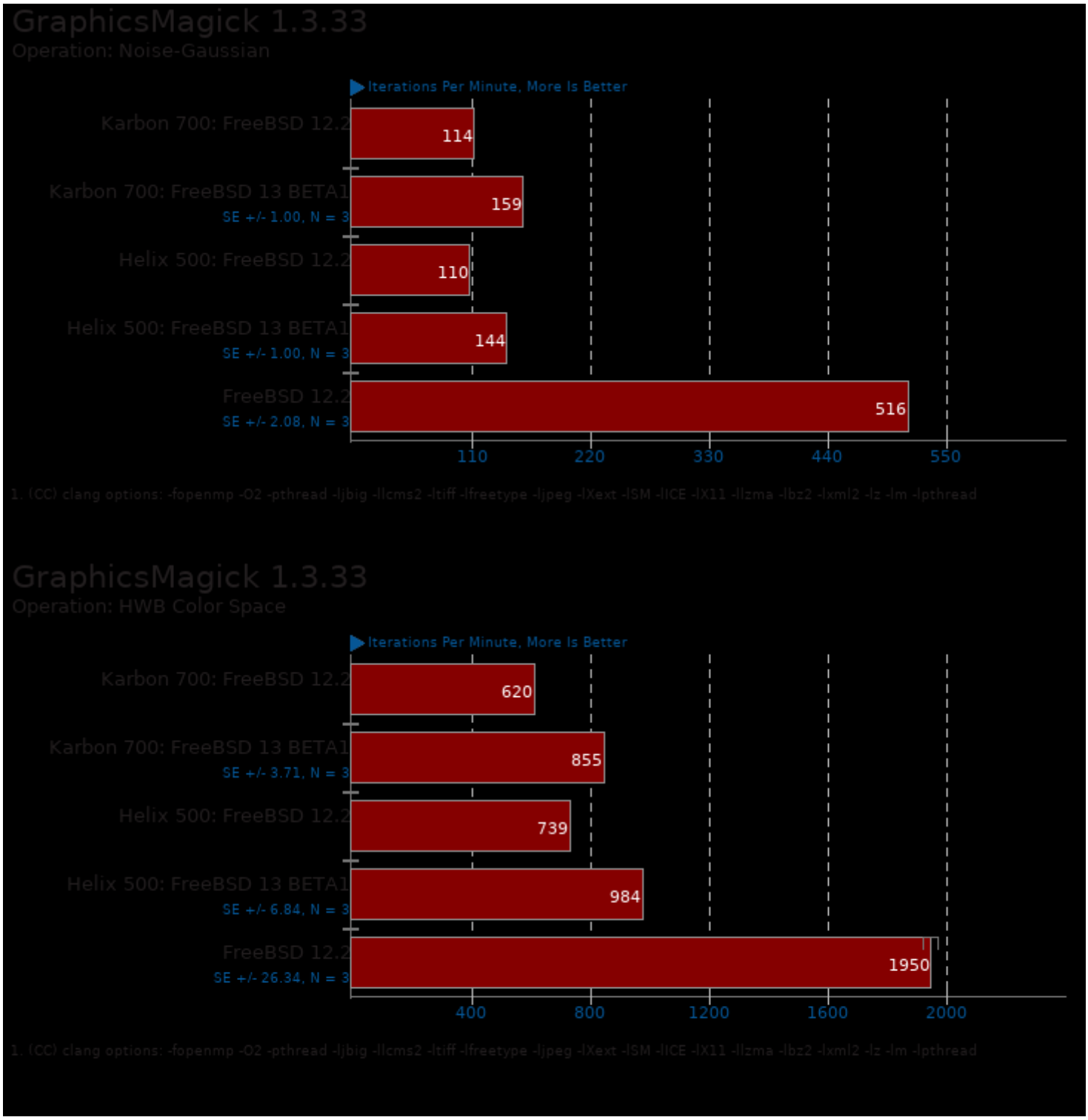
Operation: Sharpen

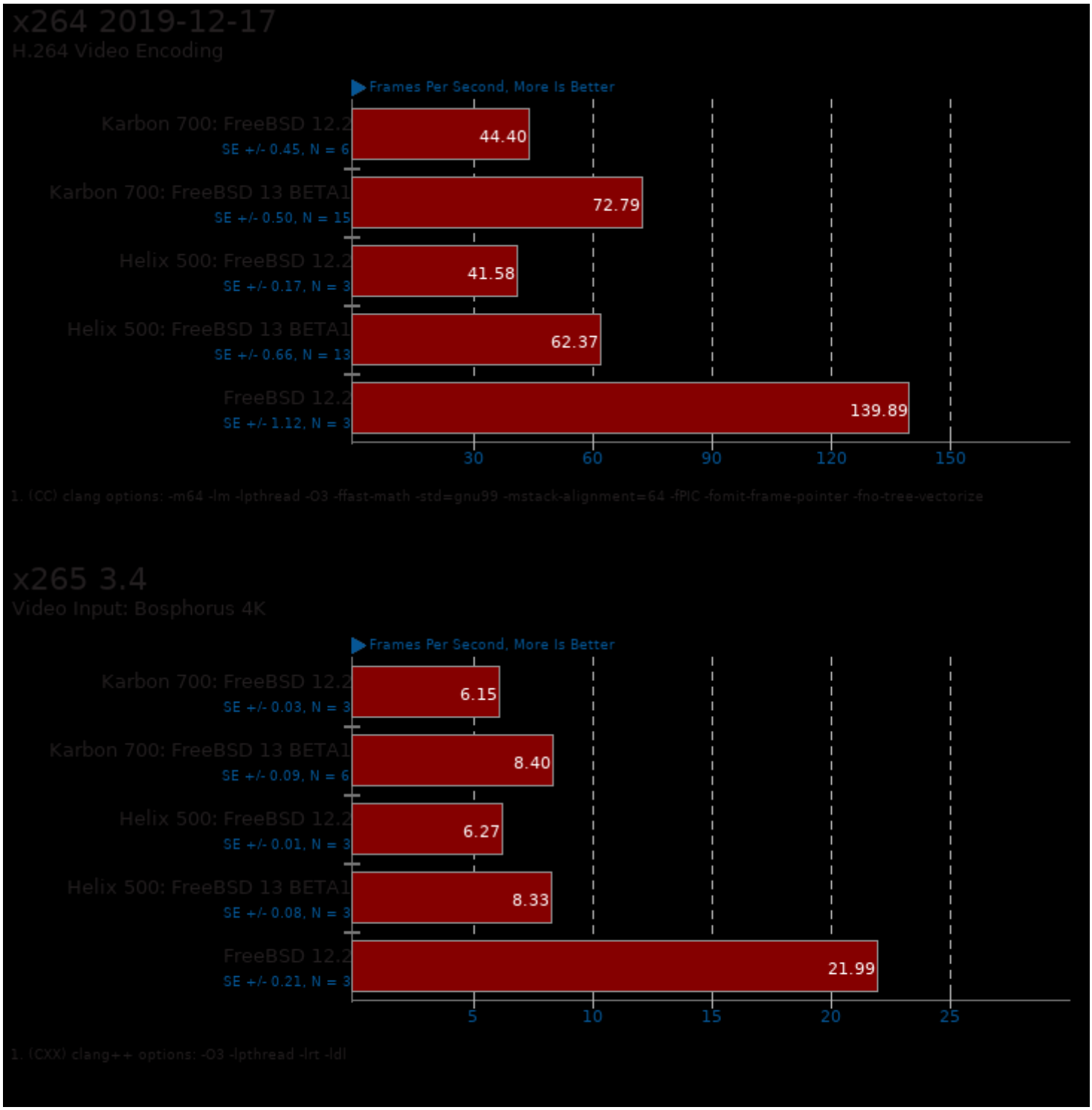


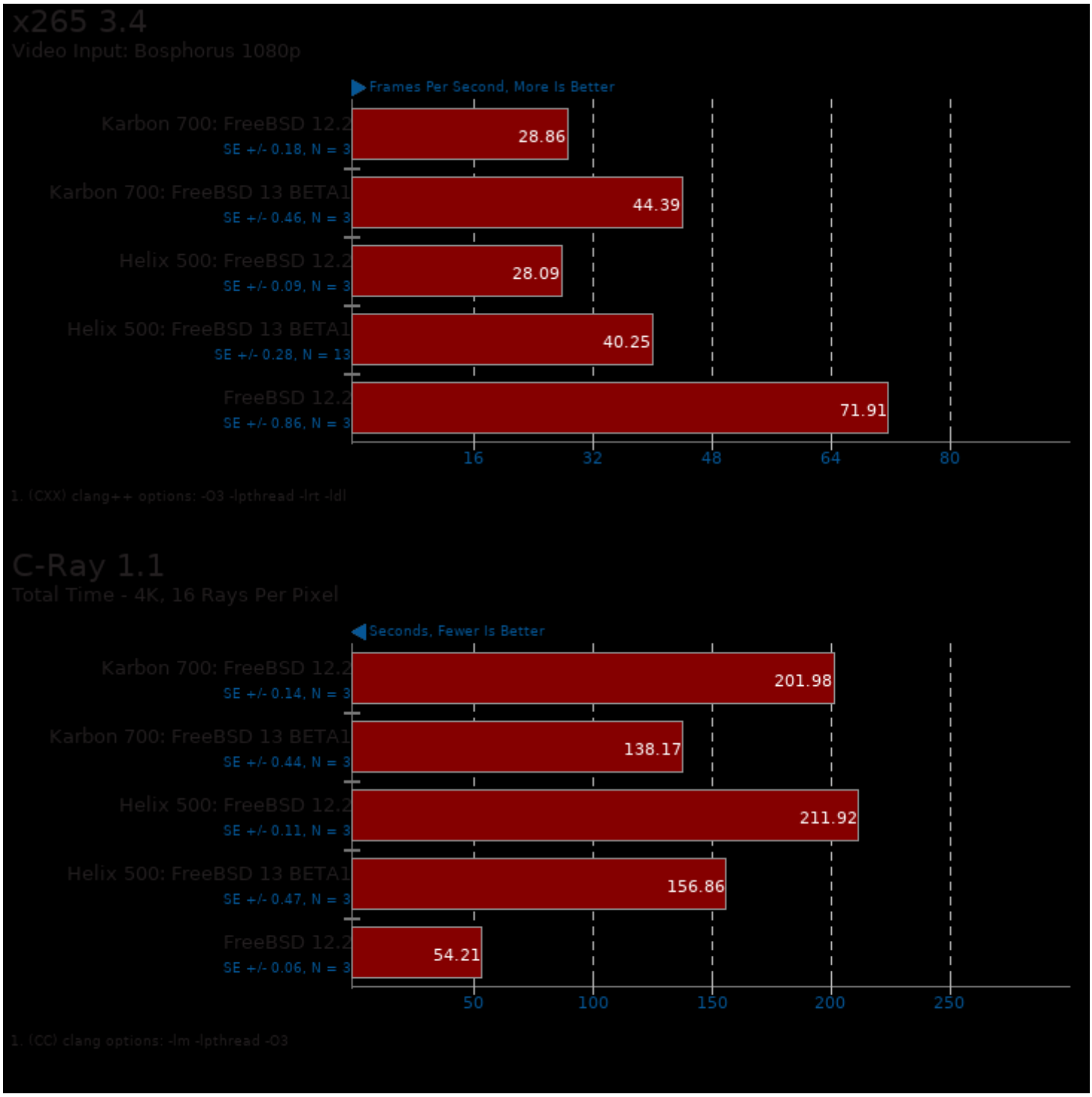
1. (CC) clang options: -fopenmp -O2 -pthread -ljbig -llcms2 -ltiff -lfreetype -ljpeg -lXext -lSM -lICE -lX11 -llzma -lbz2 -lxml2 -lz -lm -lpthread


GraphicsMagick 1.3.33
Operation: Enhanced
Iterations Per Minute, More Is Better
Karbon 700: FreeBSD 12.2
90
Karbon 700: FreeBSD 13 BETA1
SE +/- 1.00, N = 3
139
Helix 500: FreeBSD 12.2
86
Helix 500: FreeBSD 13 BETA1
SE +/- 0.67, N = 3
123
FreeBSD 12.2
403
90
180
270
360
450
1. (CC) clang options: -fopenmp -O2 -pthread -ljbig -llcms2 -ltiff -lfreetype -ljpeg -lXext -lSM -lICE -lX11 -llzma -lbz2 -lxml2 -lz -lm -lpthread
GraphicsMagick 1.3.33
Operation: Resizing
Iterations Per Minute, More Is Better
Karbon 700: FreeBSD 12.2
421
Karbon 700: FreeBSD 13 BETA1
SE +/- 3.67, N = 3
594
Helix 500: FreeBSD 12.2
SE +/- 2.08, N = 3
455
Helix 500: FreeBSD 13 BETA1
SE +/- 4.67, N = 3
582
FreeBSD 12.2
SE +/- 40.40, N = 15
747
160
320
480
640
800
1. (CC) clang options: -fopenmp -O2 -pthread -ljbig -llcms2 -ltiff -lfreetype -ljpeg -lXext -lSM -lICE -lX11 -llzma -lbz2 -lxml2 -lz -lm -lpthread

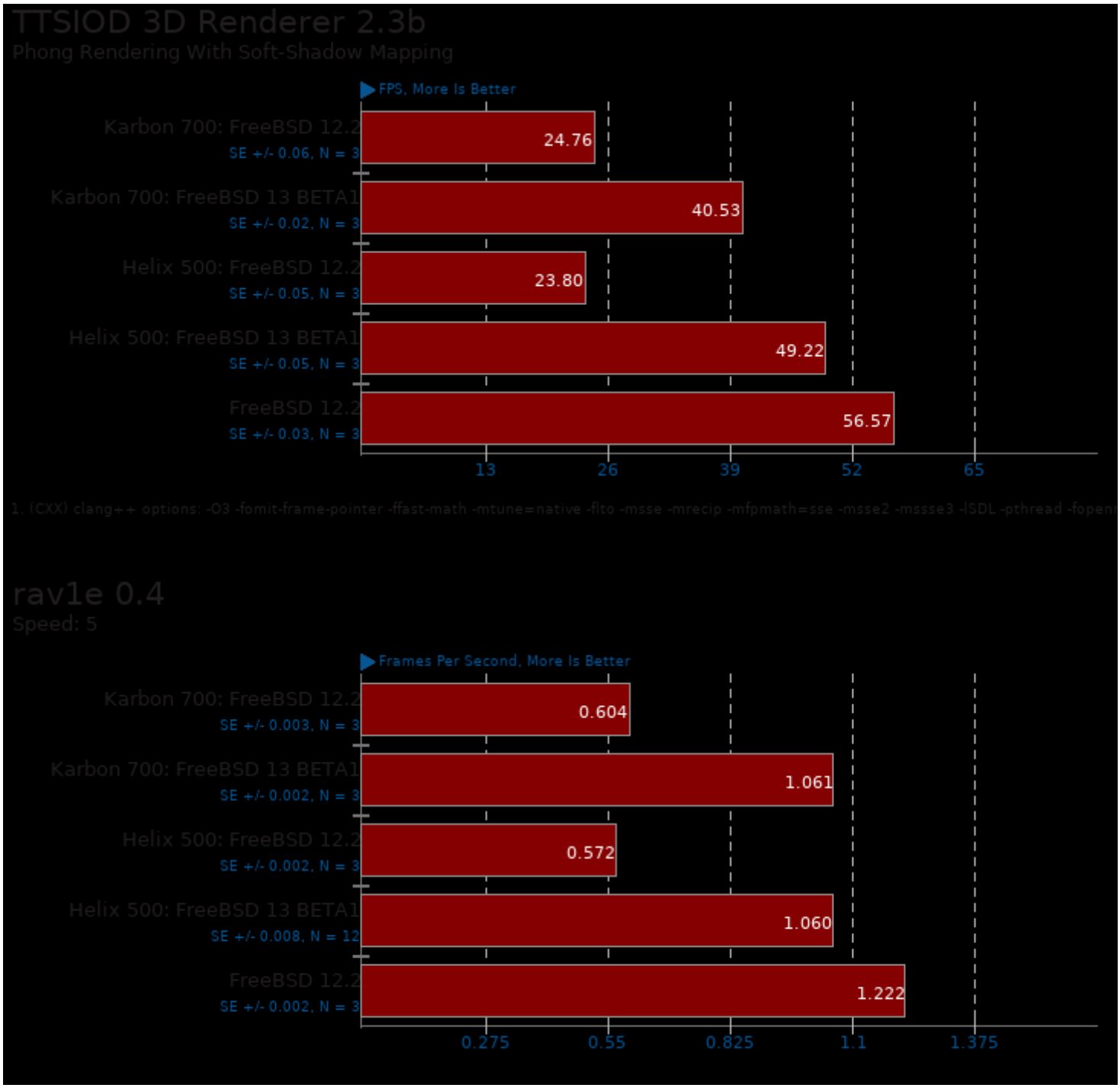
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



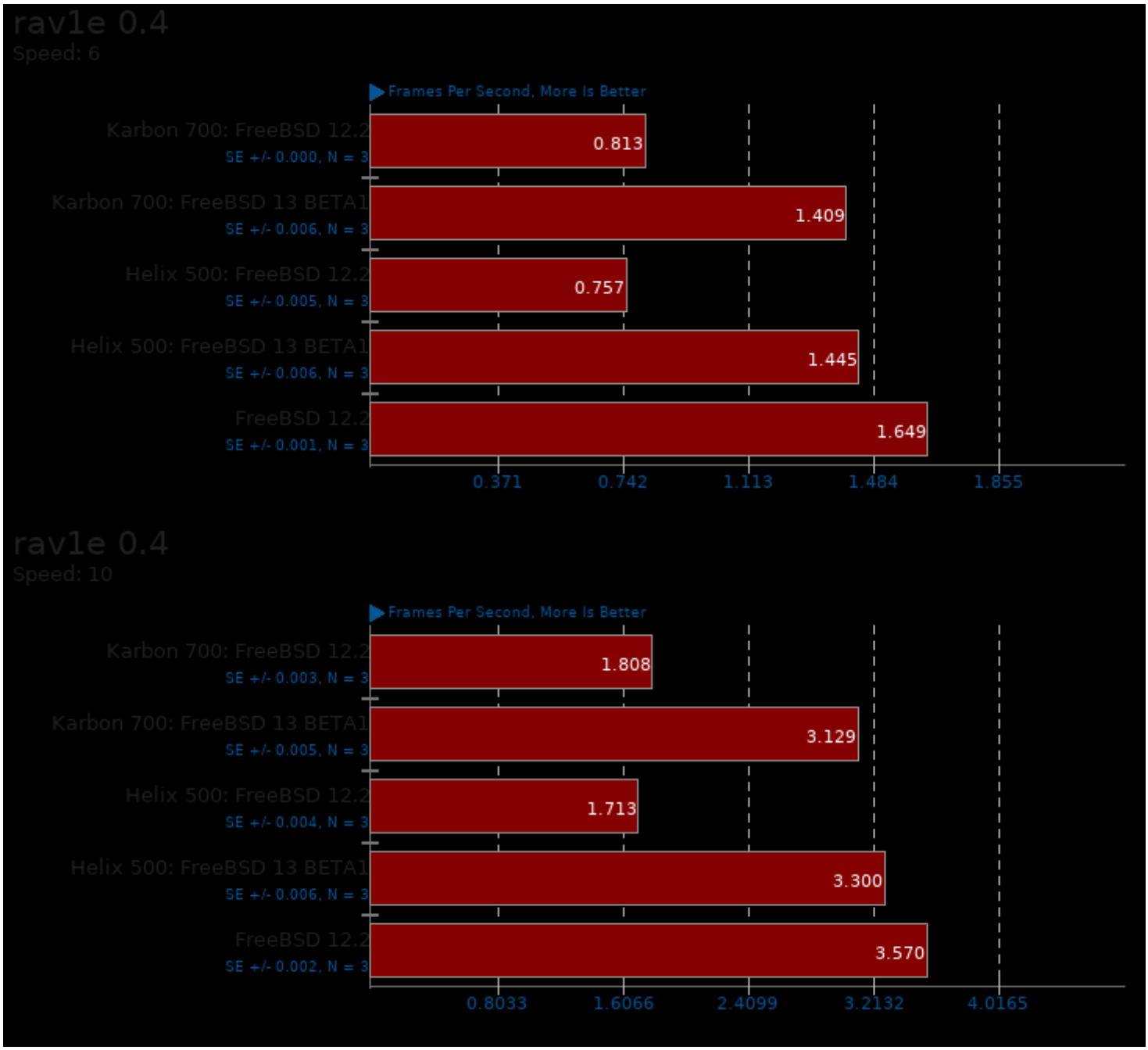

x264 2019-12-17
H.264 Video Encoding
Frames Per Second, More Is Better
Karbon 700: FreeBSD 12.2
SE +/- 0.45, N = 6
44.40
Karbon 700: FreeBSD 13 BETA1
SE +/- 0.50, N = 15
72.79
Helix 500: FreeBSD 12.2
SE +/- 0.17, N = 3
41.58
Helix 500: FreeBSD 13 BETA1
SE +/- 0.66, N = 13
62.37
FreeBSD 12.2
SE +/- 1.12, N = 3
139.89
30
60
90
120
150
1. (CC) clang options: -m64 -lm -lpthread -O3 -ffast-math -std=gnu99 -mstack-alignment=64 -fPIC -fomit-frame-pointer -fno-tree-vectorize
x265 3.4
Video Input: Bosphorus 4K
Frames Per Second, More Is Better
Karbon 700: FreeBSD 12.2
SE +/- 0.03, N = 3
6.15
Karbon 700: FreeBSD 13 BETA1
SE +/- 0.09, N = 6
8.40
Helix 500: FreeBSD 12.2
SE +/- 0.01, N = 3
6.27
Helix 500: FreeBSD 13 BETA1
SE +/- 0.08, N = 3
8.33
FreeBSD 12.2
SE +/- 0.21, N = 3
21.99
5
10
15
20
25
1. (CXX) clang++ options: -O3 -lpthread -lrt -ldl

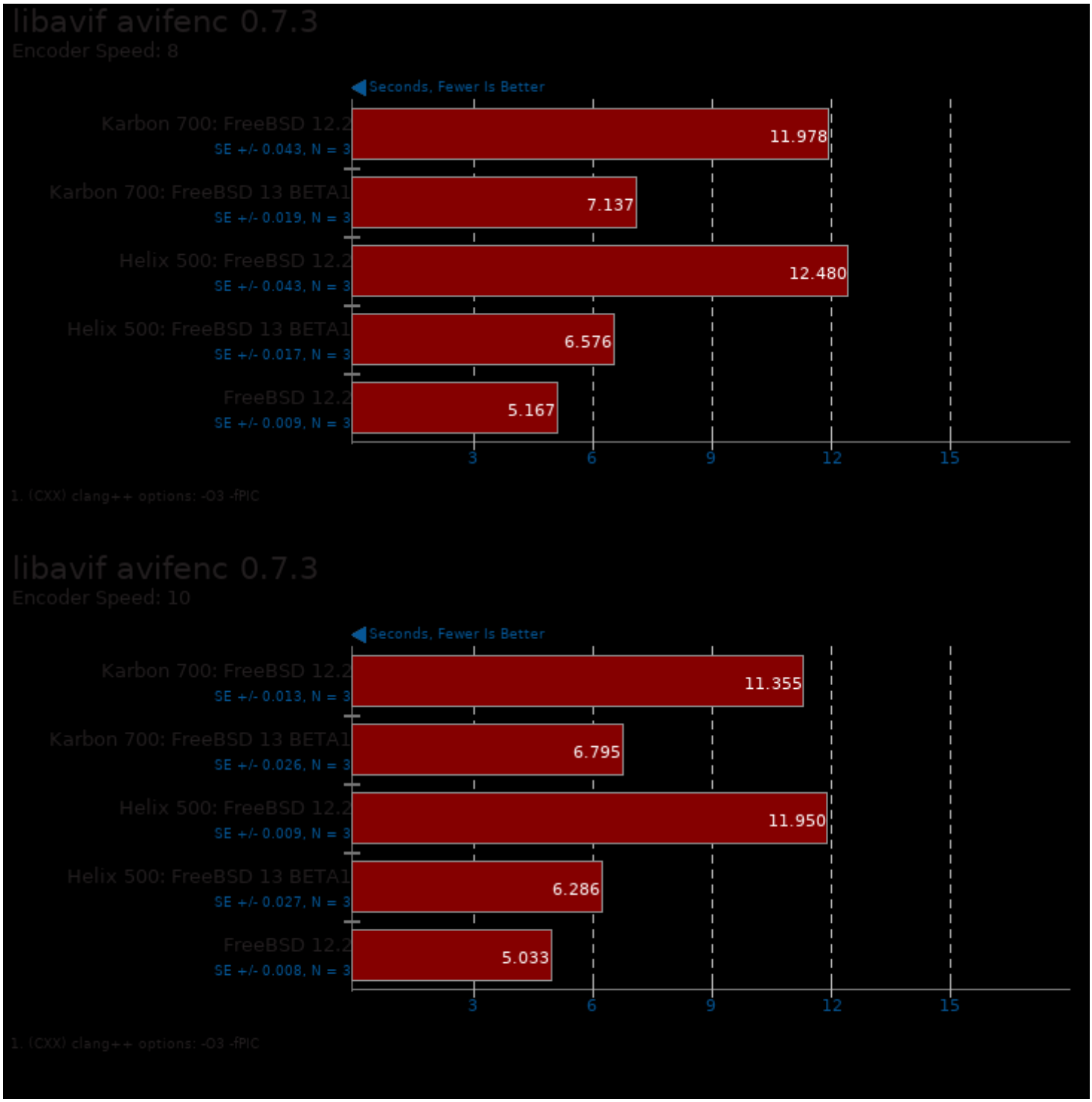

x265 3.4
Video Input: Bosphorus 1080p
Frames Per Second, More Is Better
Karbon 700: FreeBSD 12.2
SE +/- 0.18, N = 3
28.86
Karbon 700: FreeBSD 13 BETA1
SE +/- 0.46, N = 3
44.39
Helix 500: FreeBSD 12.2
SE +/- 0.09, N = 3
28.09
Helix 500: FreeBSD 13 BETA1
SE +/- 0.28, N = 13
40.25
FreeBSD 12.2
SE +/- 0.86, N = 3
71.91
16
32
48
64
80
1. (CXX) clang++ options: -O3 -lpthread -lrt -ldl
C-Ray 1.1
Total Time - 4K, 16 Rays Per Pixel
Seconds, Fewer Is Better
Karbon 700: FreeBSD 12.2
SE +/- 0.14, N = 3
201.98
Karbon 700: FreeBSD 13 BETA1
SE +/- 0.44, N = 3
138.17
Helix 500: FreeBSD 12.2
SE +/- 0.11, N = 3
211.92
Helix 500: FreeBSD 13 BETA1
SE +/- 0.47, N = 3
156.86
FreeBSD 12.2
SE +/- 0.06, N = 3
54.21
50
100
150
200
250
1. (CC) clang options: -lm -lpthread -O3

FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks

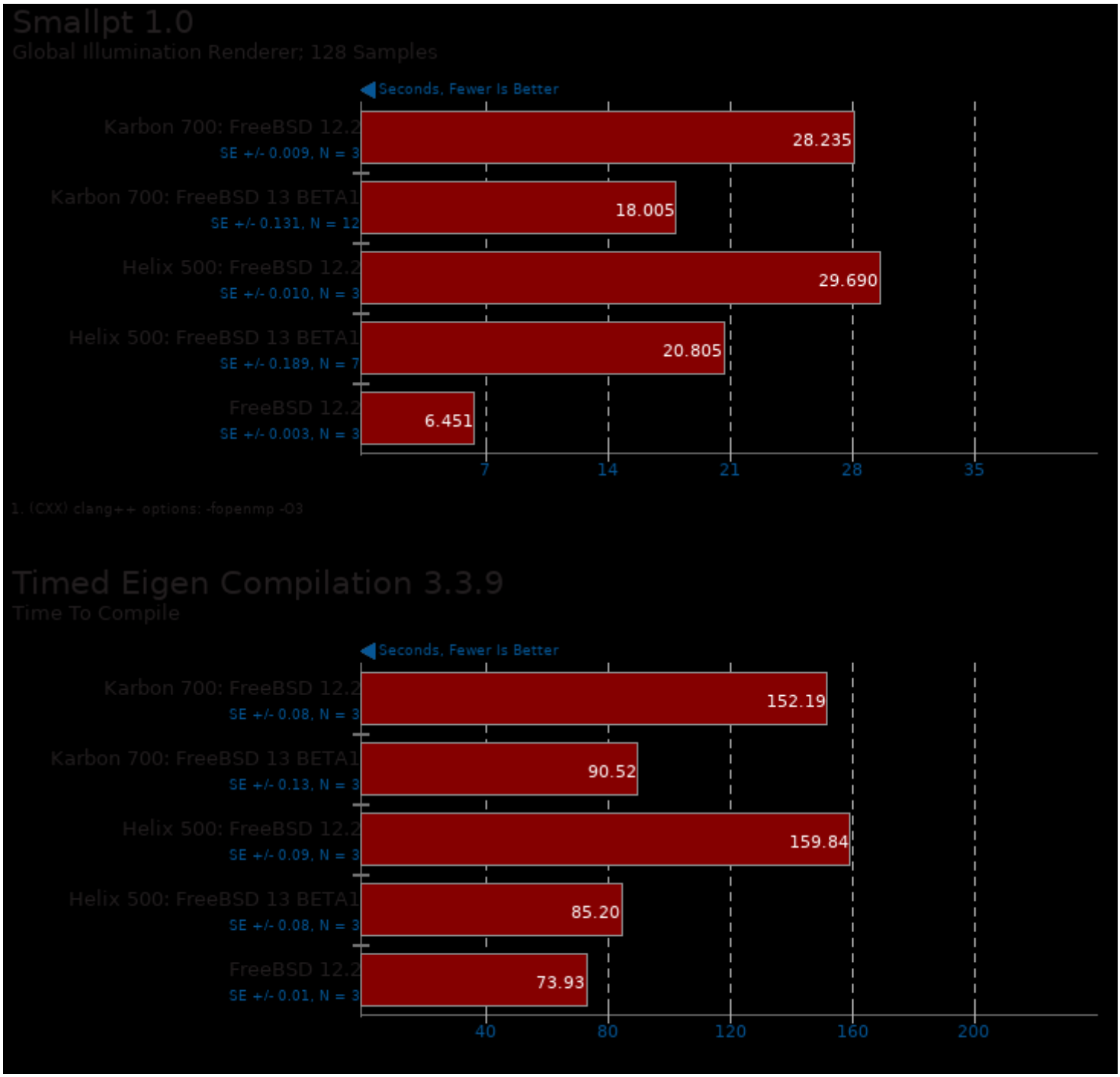


FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks

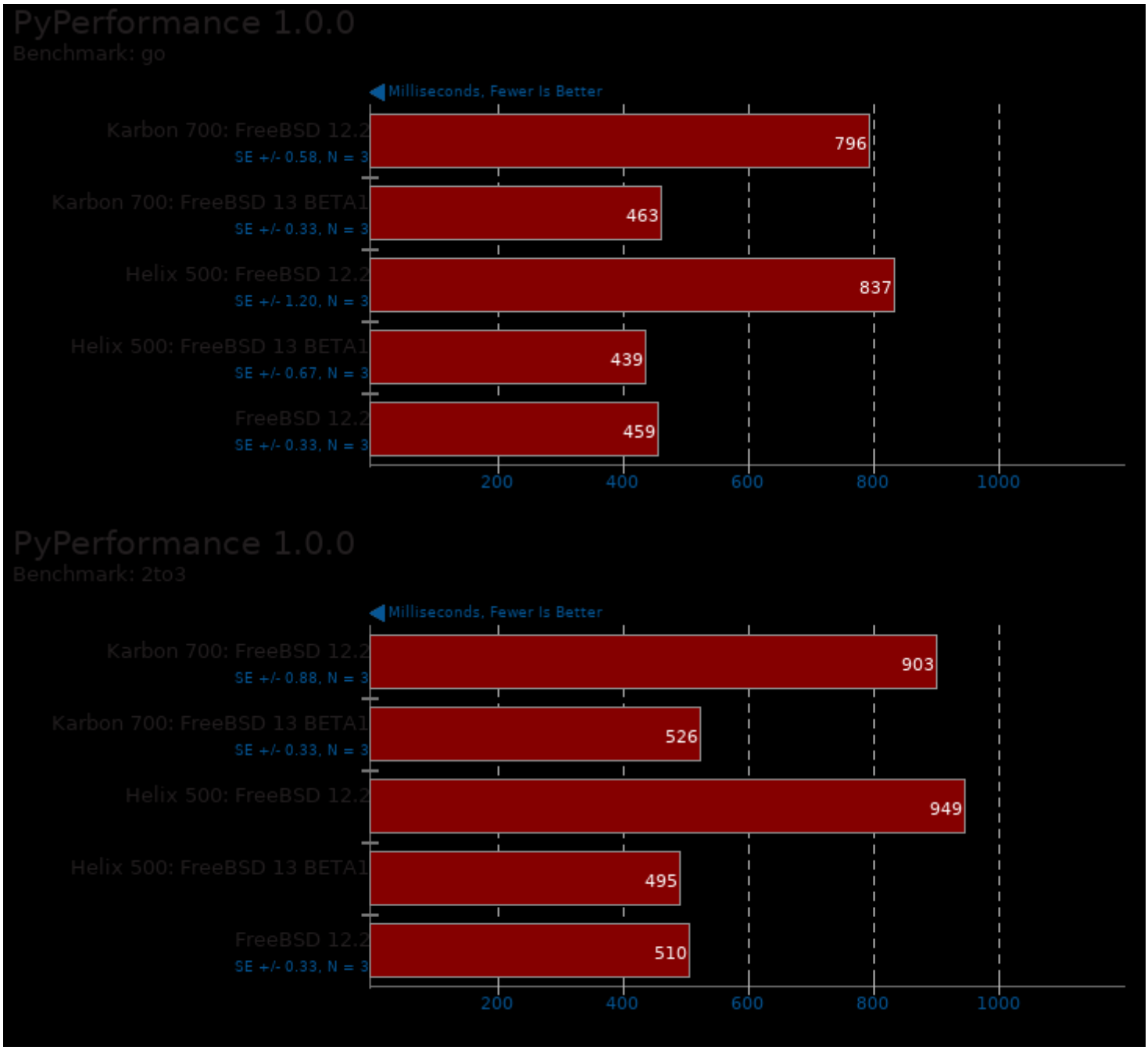



libavif avifenc 0.7.3
Encoder Speed: 8
Seconds, Fewer Is Better
Karbon 700: FreeBSD 12.2
SE +/- 0.043, N = 3
11.978
Karbon 700: FreeBSD 13 BETA1
SE +/- 0.019, N = 3
7.137
Helix 500: FreeBSD 12.2
SE +/- 0.043, N = 3
12.480
Helix 500: FreeBSD 13 BETA1
SE +/- 0.017, N = 3
6.576
FreeBSD 12.2
SE +/- 0.009, N = 3
5.167
3
6
9
12
15
1. (CXX) clang++ options: -O3 -fPIC
libavif avifenc 0.7.3
Encoder Speed: 10
Seconds, Fewer Is Better
Karbon 700: FreeBSD 12.2
SE +/- 0.013, N = 3
11.355
Karbon 700: FreeBSD 13 BETA1
SE +/- 0.026, N = 3
6.795
Helix 500: FreeBSD 12.2
SE +/- 0.009, N = 3
11.950
Helix 500: FreeBSD 13 BETA1
SE +/- 0.027, N = 3
6.286
FreeBSD 12.2
SE +/- 0.008, N = 3
5.033
3
6
9
12
15
1. (CXX) clang++ options: -O3 -fPIC

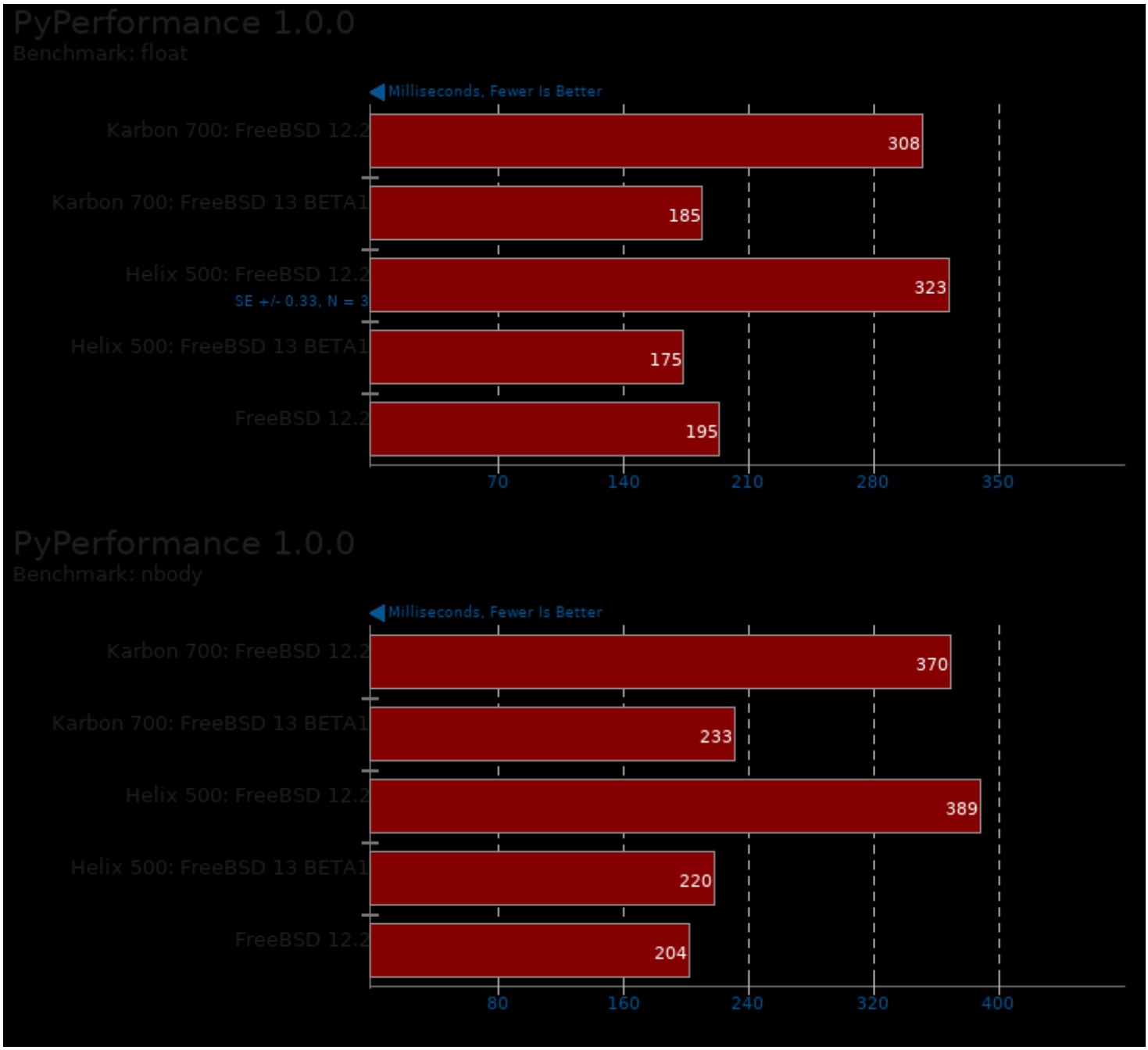
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



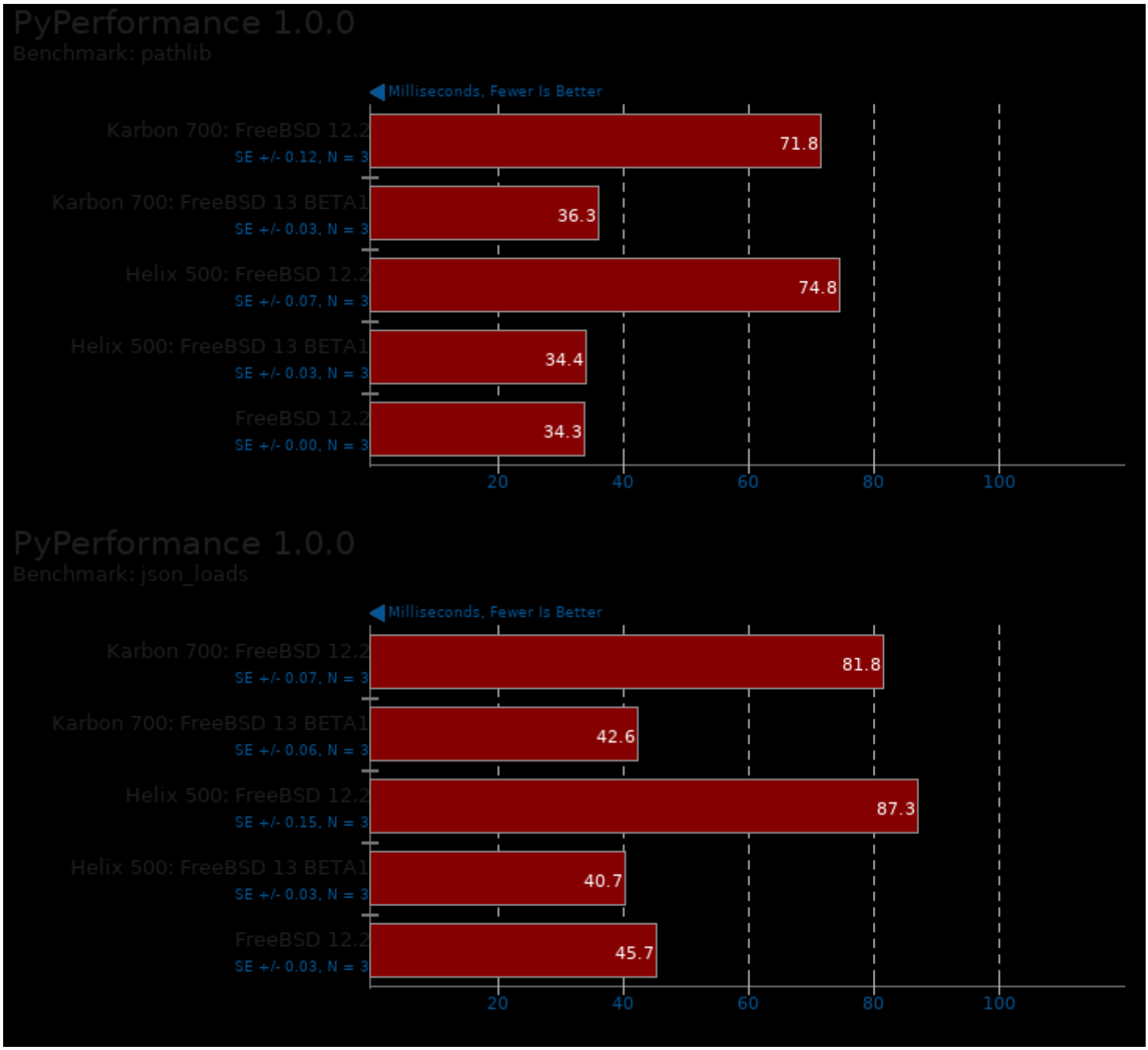
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



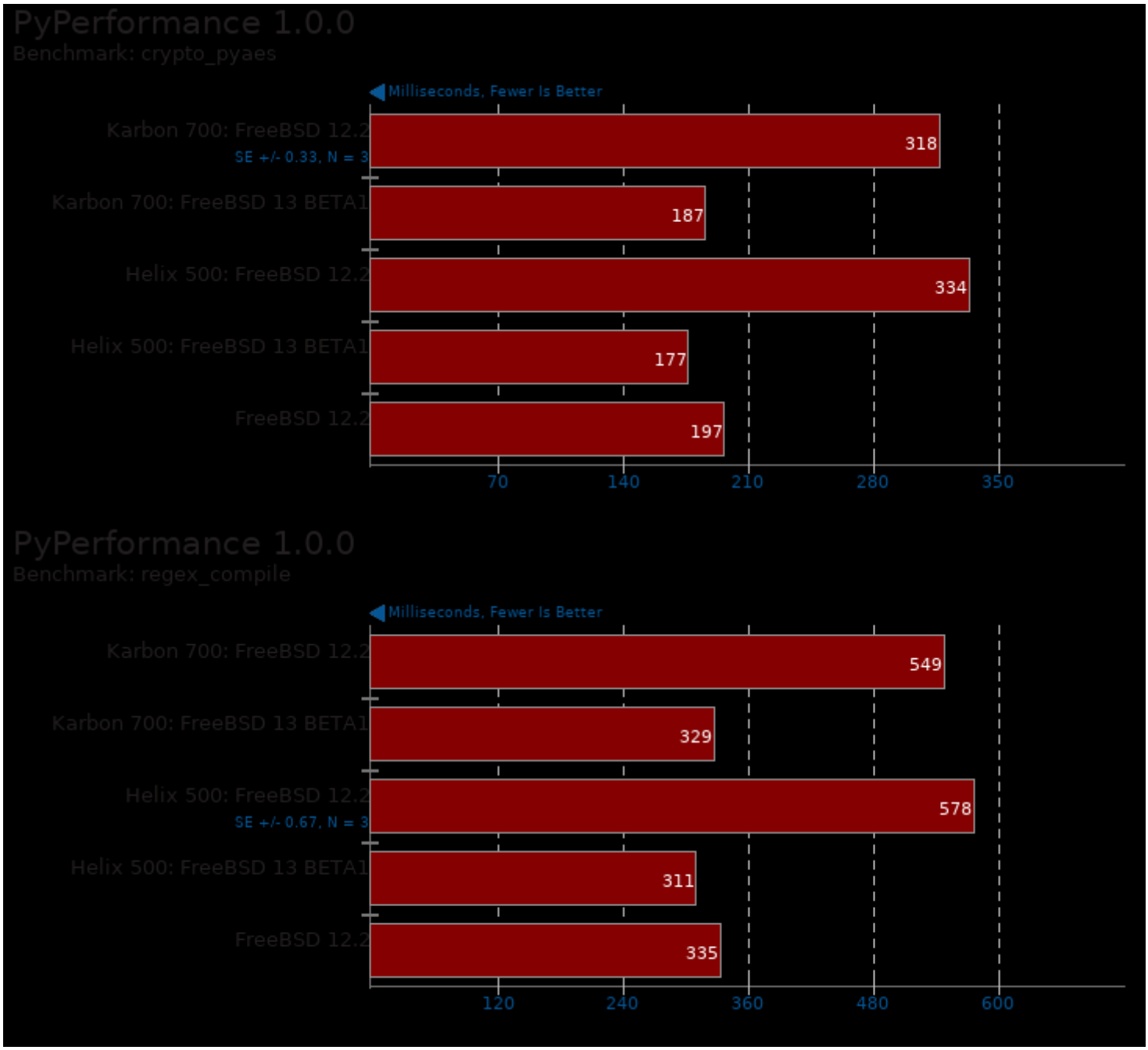
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks

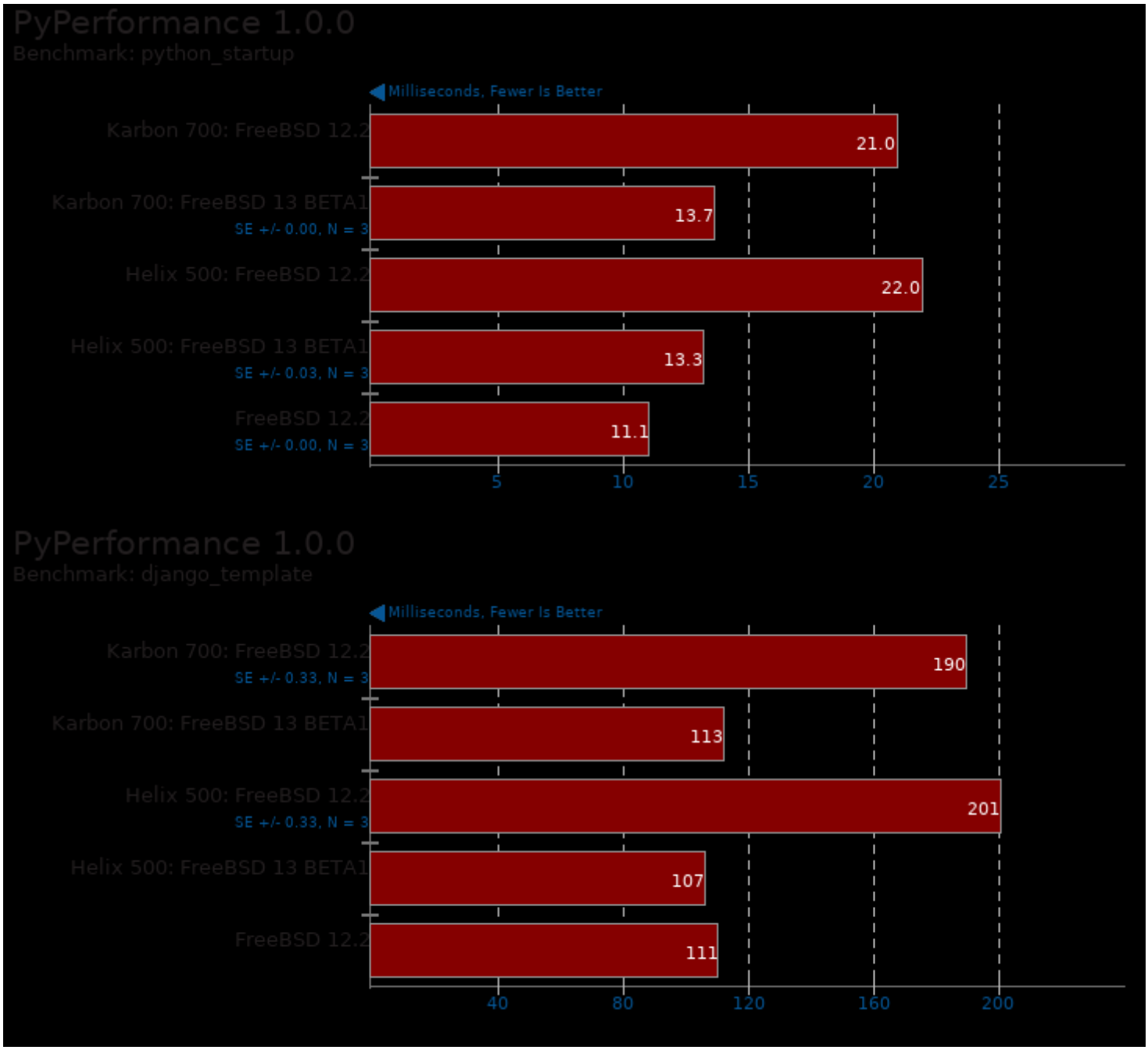


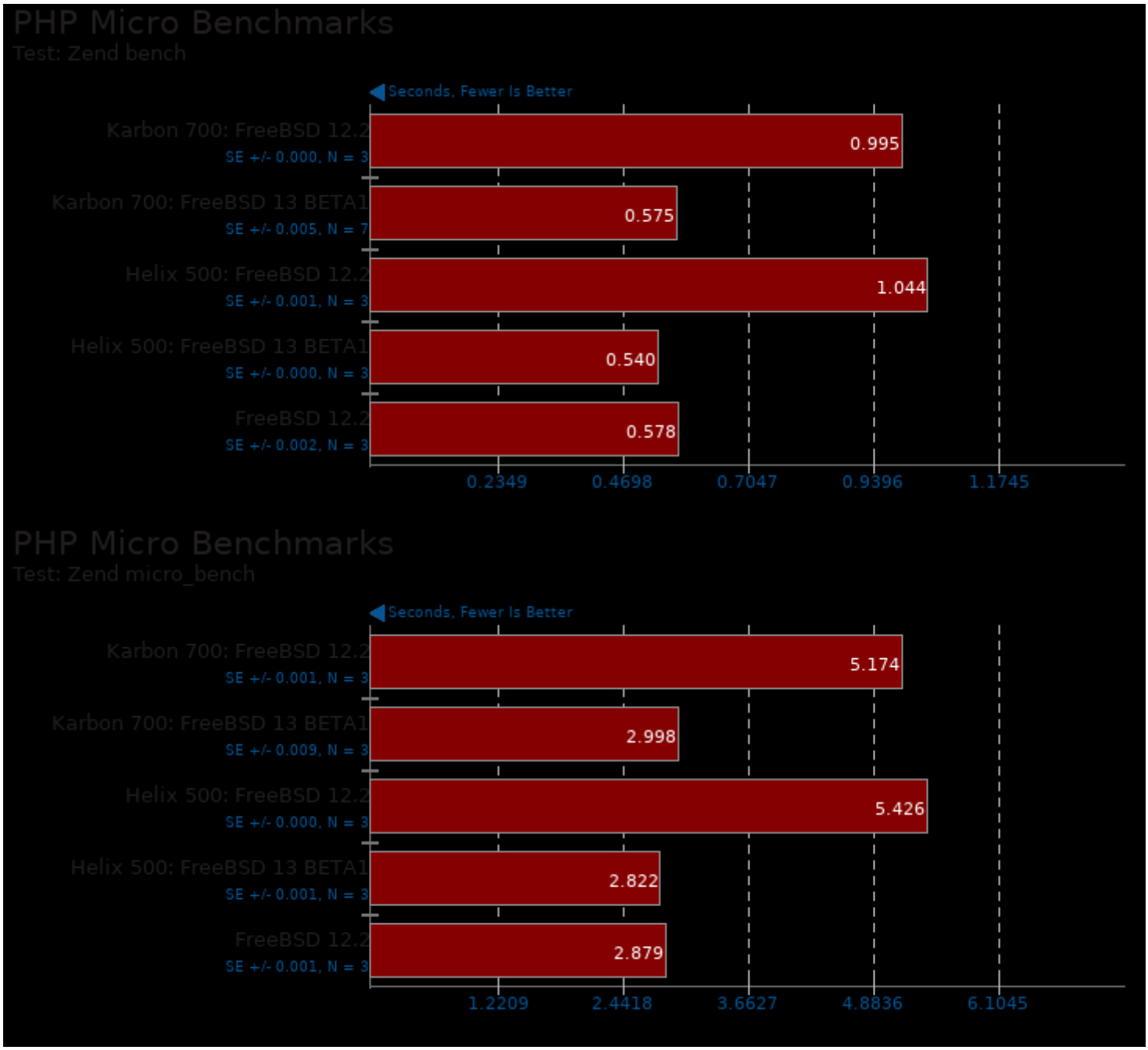
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



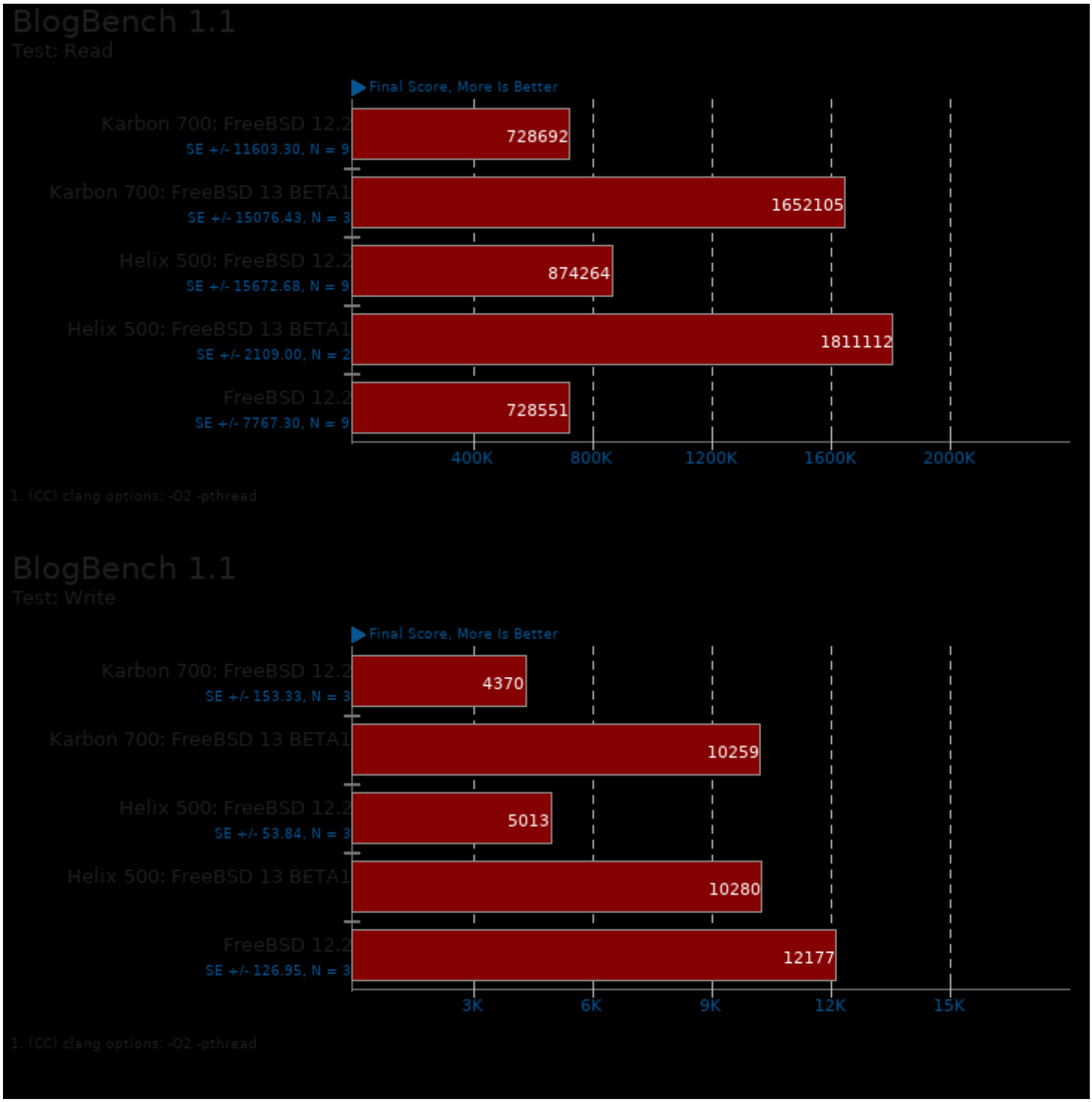
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



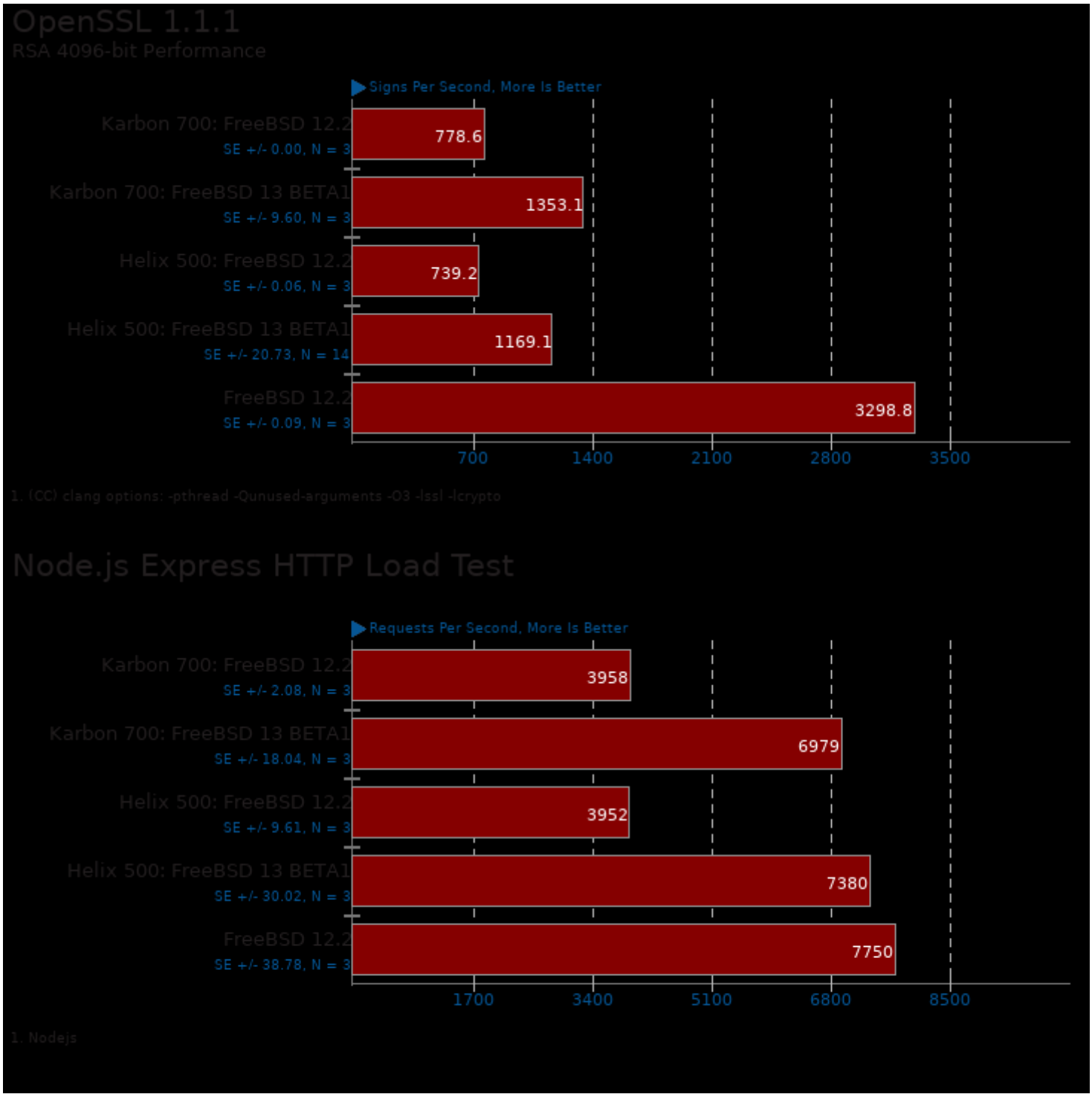

PyPerformance 1.0.0
Benchmark: python_startup
Milliseconds, Fewer Is Better
Karbon 700: FreeBSD 12.2
21.0
Karbon 700: FreeBSD 13 BETA1
SE +/- 0.00, N = 3
13.7
Helix 500: FreeBSD 12.2
22.0
Helix 500: FreeBSD 13 BETA1
SE +/- 0.03, N = 3
13.3
FreeBSD 12.2
SE +/- 0.00, N = 3
11.1
5
10
15
20
25
PyPerformance 1.0.0
Benchmark: django_template
Milliseconds, Fewer Is Better
Karbon 700: FreeBSD 12.2
SE +/- 0.33, N = 3
190
Karbon 700: FreeBSD 13 BETA1
113
Helix 500: FreeBSD 12.2
SE +/- 0.33, N = 3
201
Helix 500: FreeBSD 13 BETA1
107
FreeBSD 12.2
111
40
80
120
160
200


PHP Micro Benchmarks
Test: Zend bench
Seconds, Fewer Is Better
Karbon 700: FreeBSD 12.2
SE +/- 0.000, N = 3
0.995
Karbon 700: FreeBSD 13 BETA1
SE +/- 0.005, N = 7
0.575
Helix 500: FreeBSD 12.2
SE +/- 0.001, N = 3
1.044
Helix 500: FreeBSD 13 BETA1
SE +/- 0.000, N = 3
0.540
FreeBSD 12.2
SE +/- 0.002, N = 3
0.578
0.2349
0.4698
0.7047
0.9396
1.1745
PHP Micro Benchmarks
Test: Zend micro_bench
Seconds, Fewer Is Better
Karbon 700: FreeBSD 12.2
SE +/- 0.001, N = 3
5.174
Karbon 700: FreeBSD 13 BETA1
SE +/- 0.009, N = 3
2.998
Helix 500: FreeBSD 12.2
SE +/- 0.000, N = 3
5.426
Helix 500: FreeBSD 13 BETA1
SE +/- 0.001, N = 3
2.822
FreeBSD 12.2
SE +/- 0.001, N = 3
2.879
1.2209
2.4418
3.6627
4.8836
6.1045

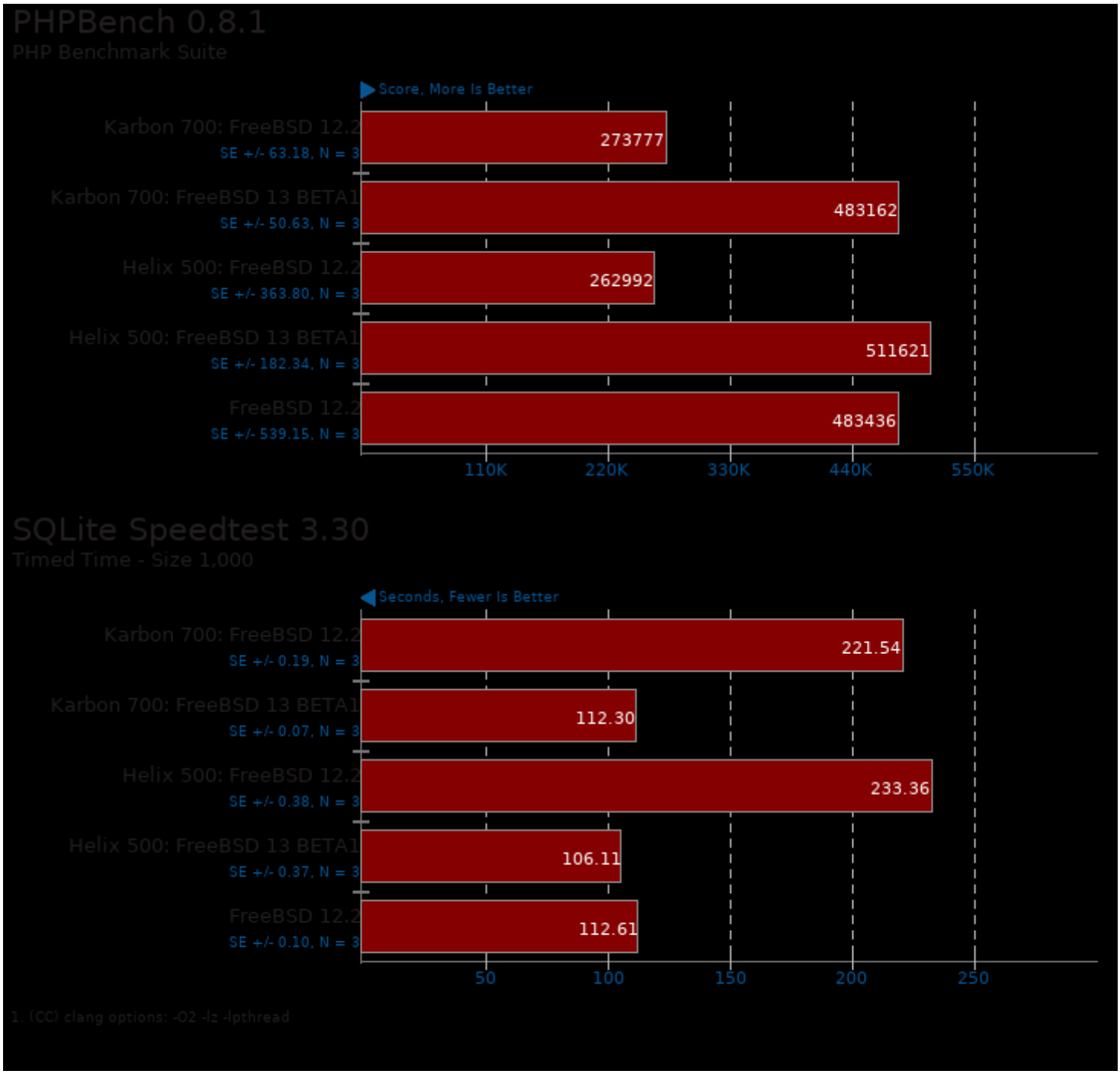
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



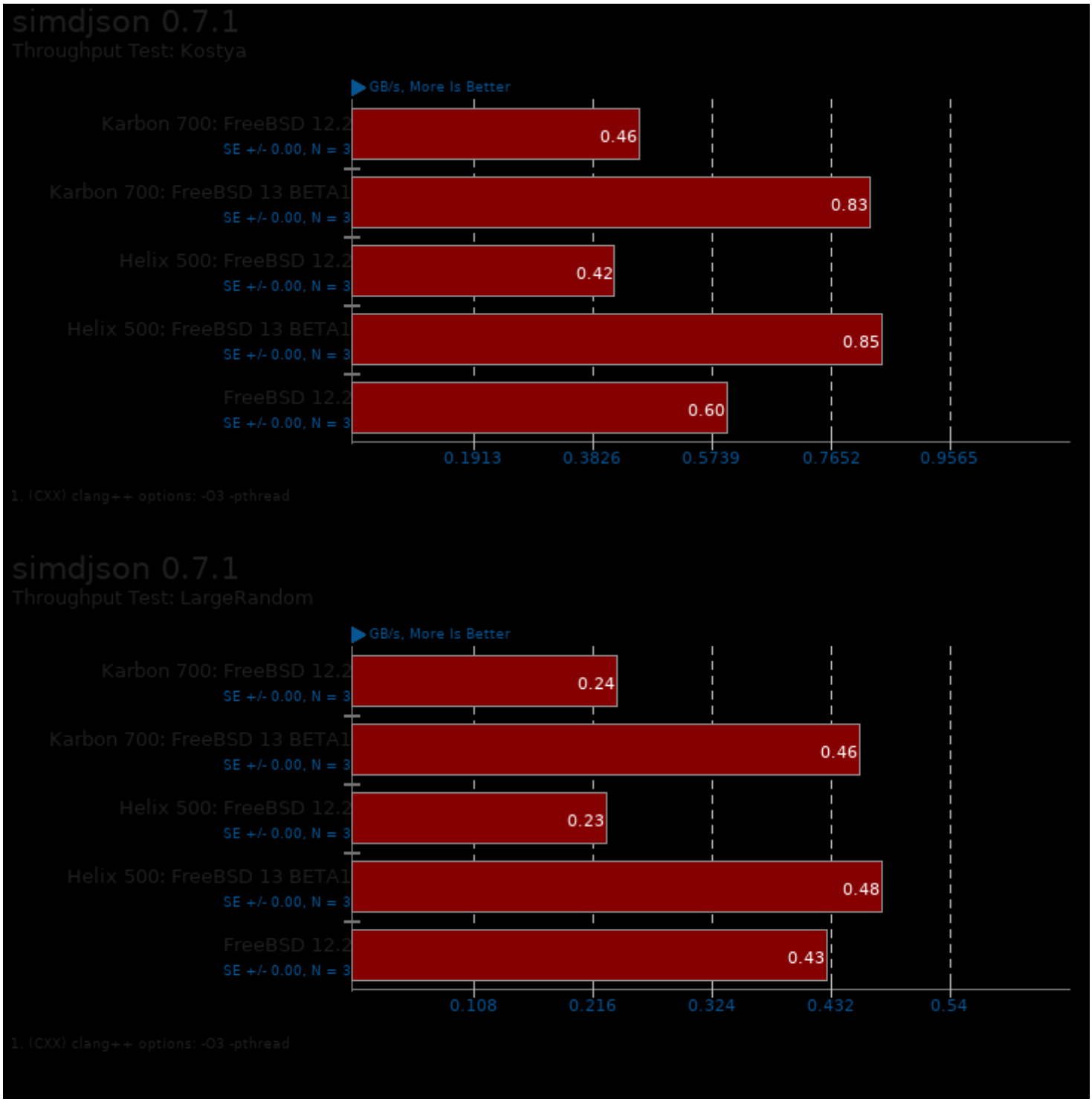
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



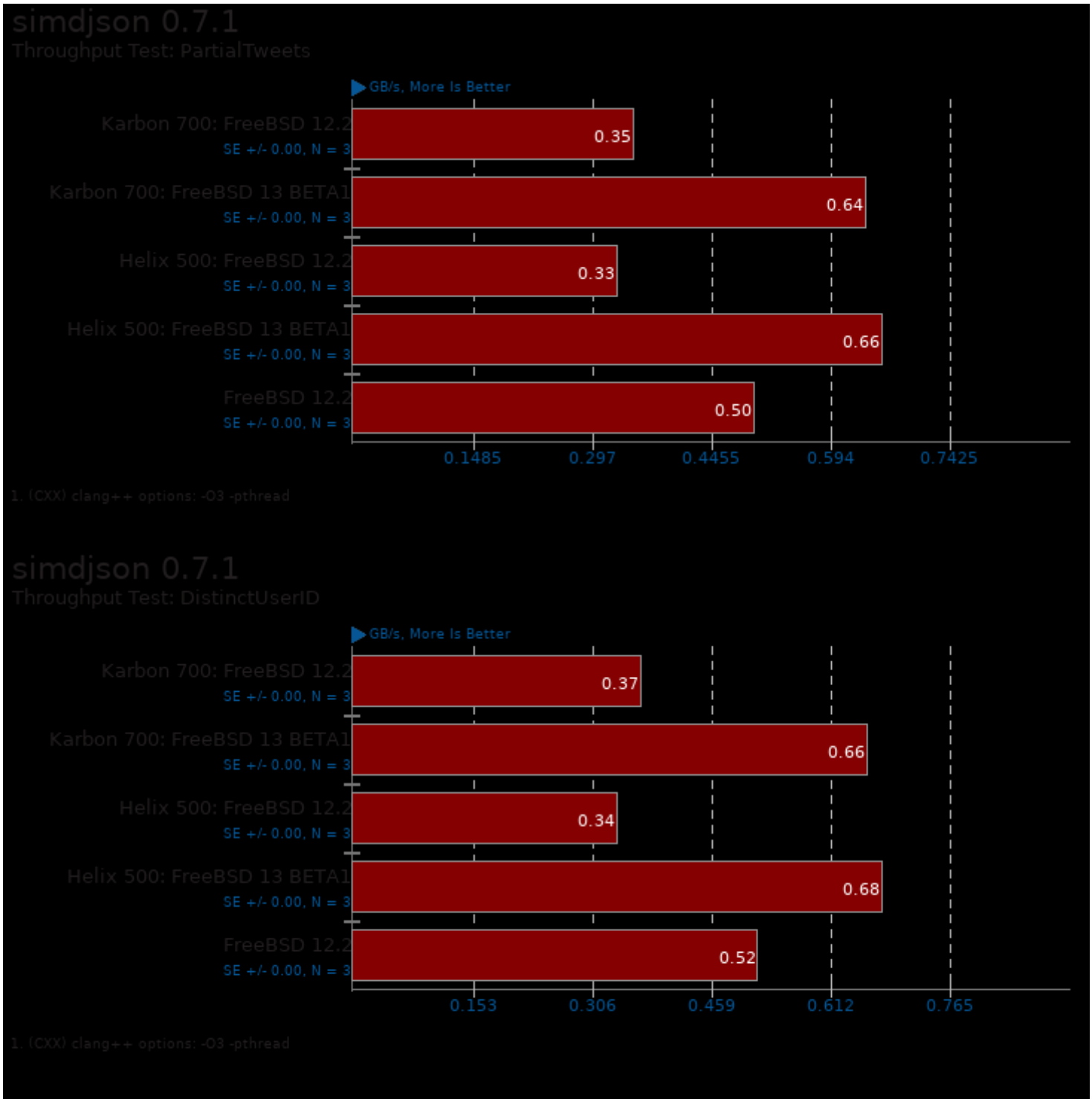
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



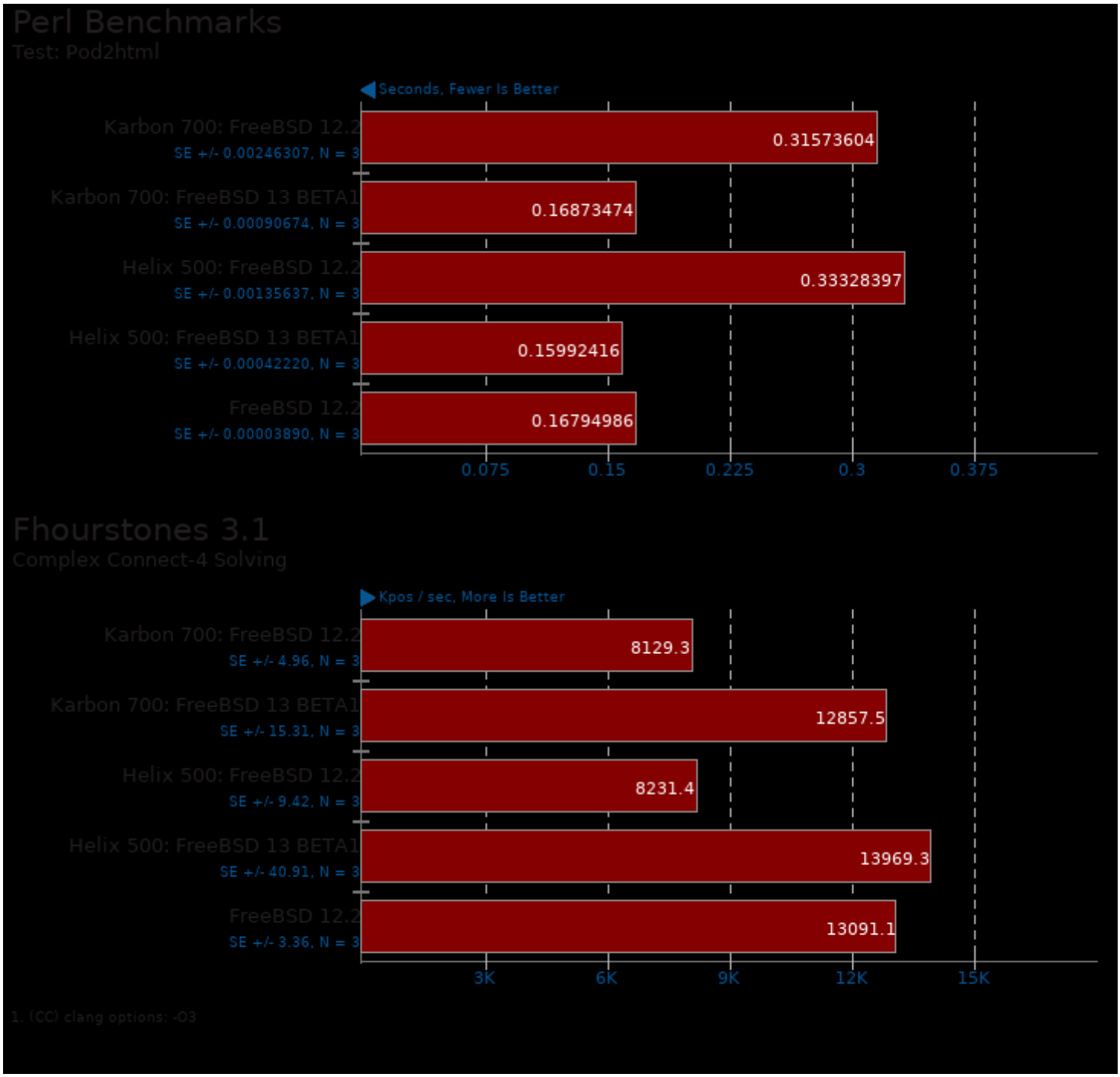
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



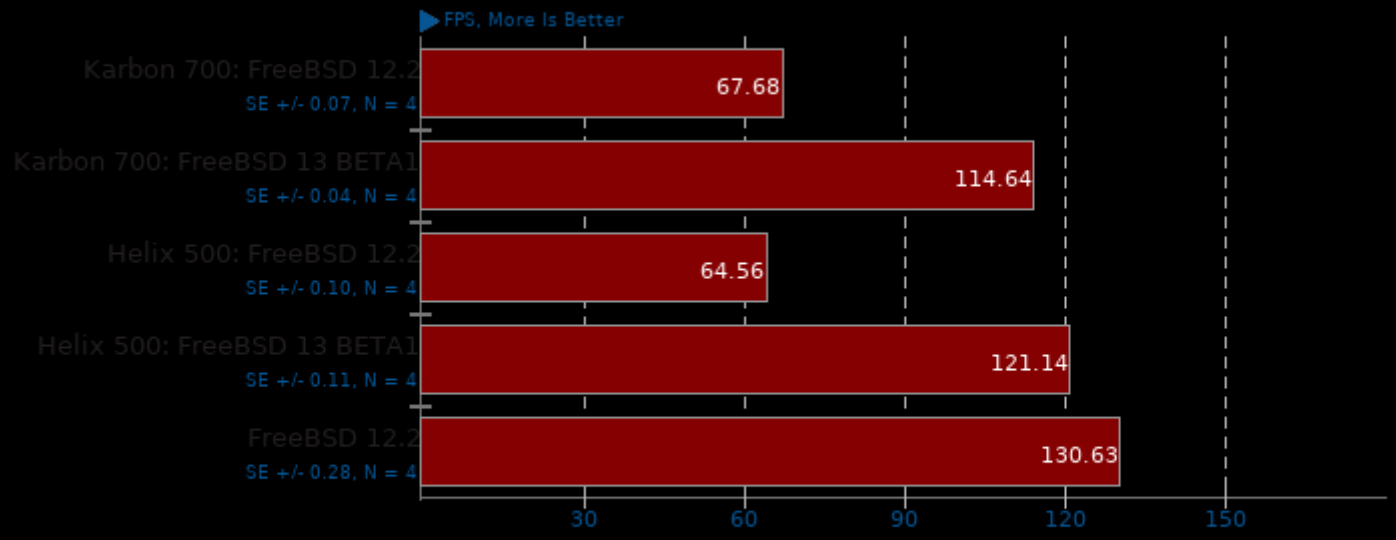
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks

Optcarrot

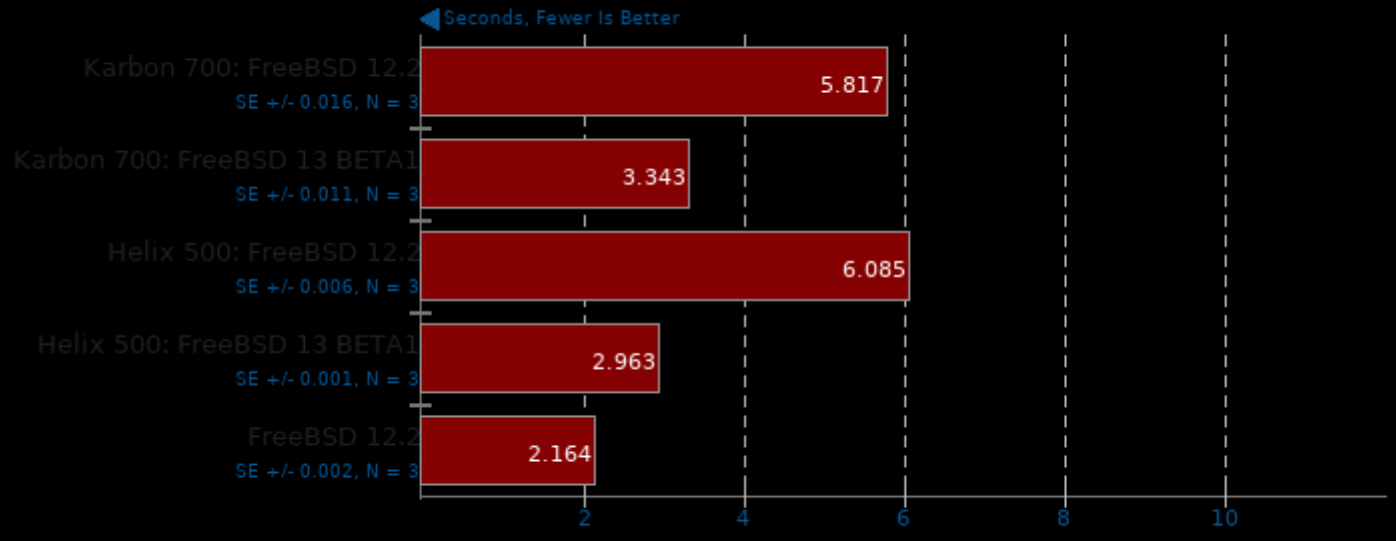
Optimized Benchmark



1. Karbon 700: FreeBSD 12.2: ruby 2.7.2p137 (2020-10-01 revision 5445e04352) [amd64-freebsd12]
2. Karbon 700: FreeBSD 13 BETA1: ruby 2.7.2p137 (2020-10-01 revision 5445e04352) [amd64-freebsd13]
3. Helix 500: FreeBSD 12.2: ruby 2.7.2p137 (2020-10-01 revision 5445e04352) [amd64-freebsd12]
4. Helix 500: FreeBSD 13 BETA1: ruby 2.7.2p137 (2020-10-01 revision 5445e04352) [amd64-freebsd13]
5. FreeBSD 12.2: ruby 2.7.2p137 (2020-10-01 revision 5445e04352) [amd64-freebsd12]

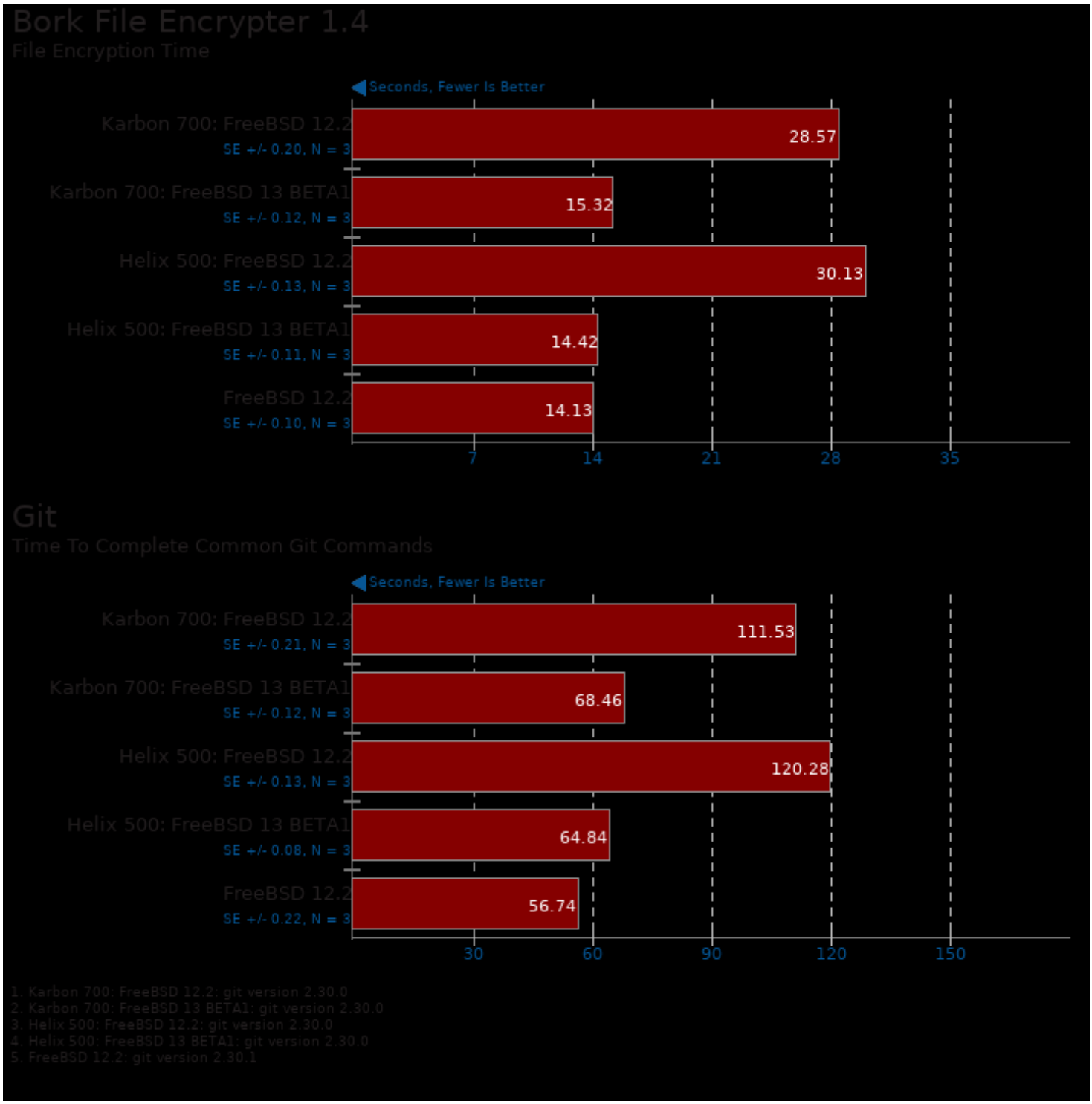
PolyBench-C 4.2

Test: 3 Matrix Multiplications

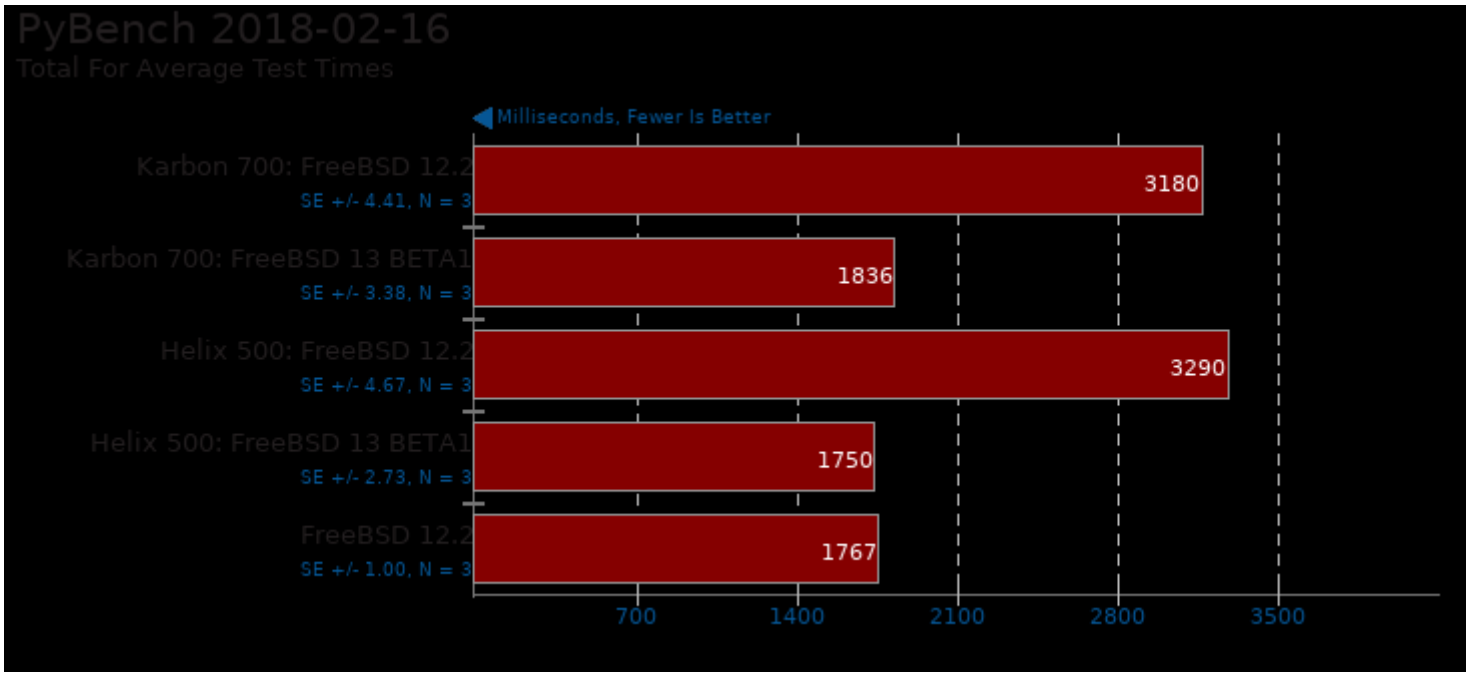


1. (CC) clang options: -O3 -march=native

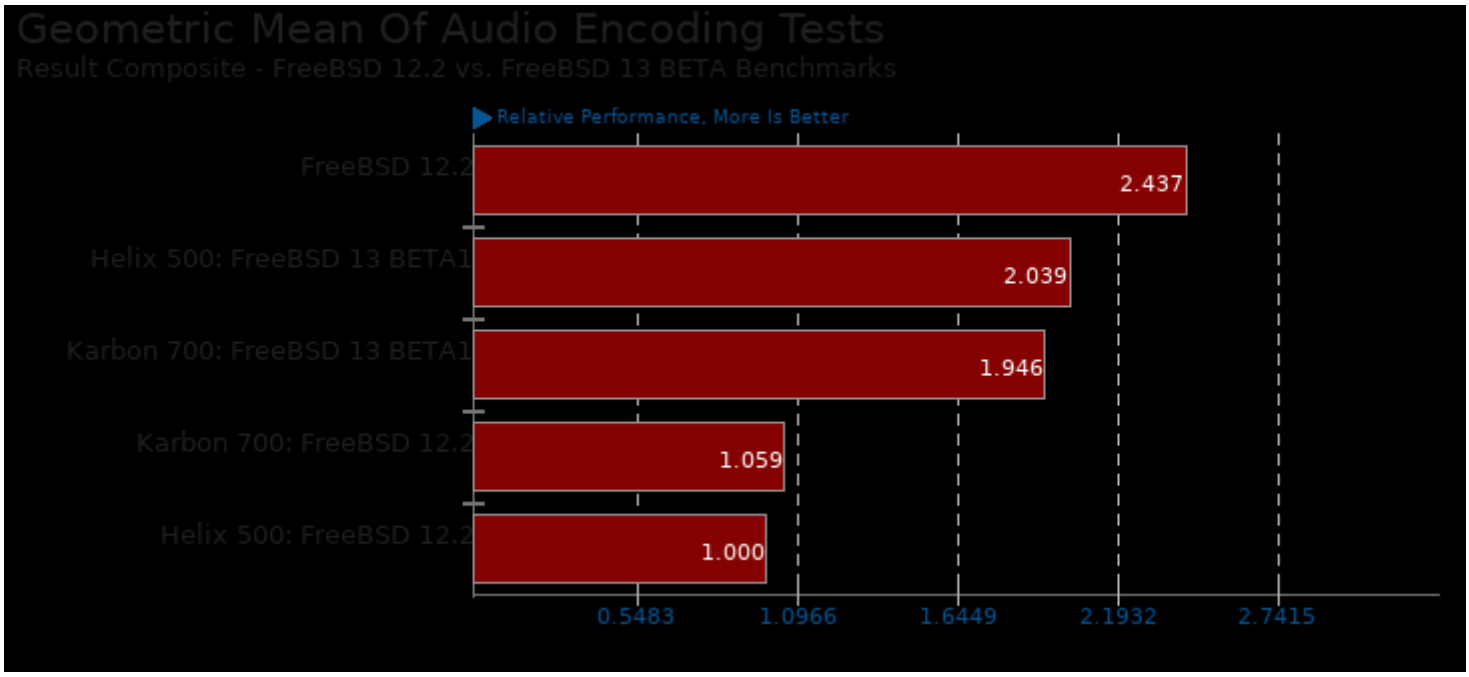
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



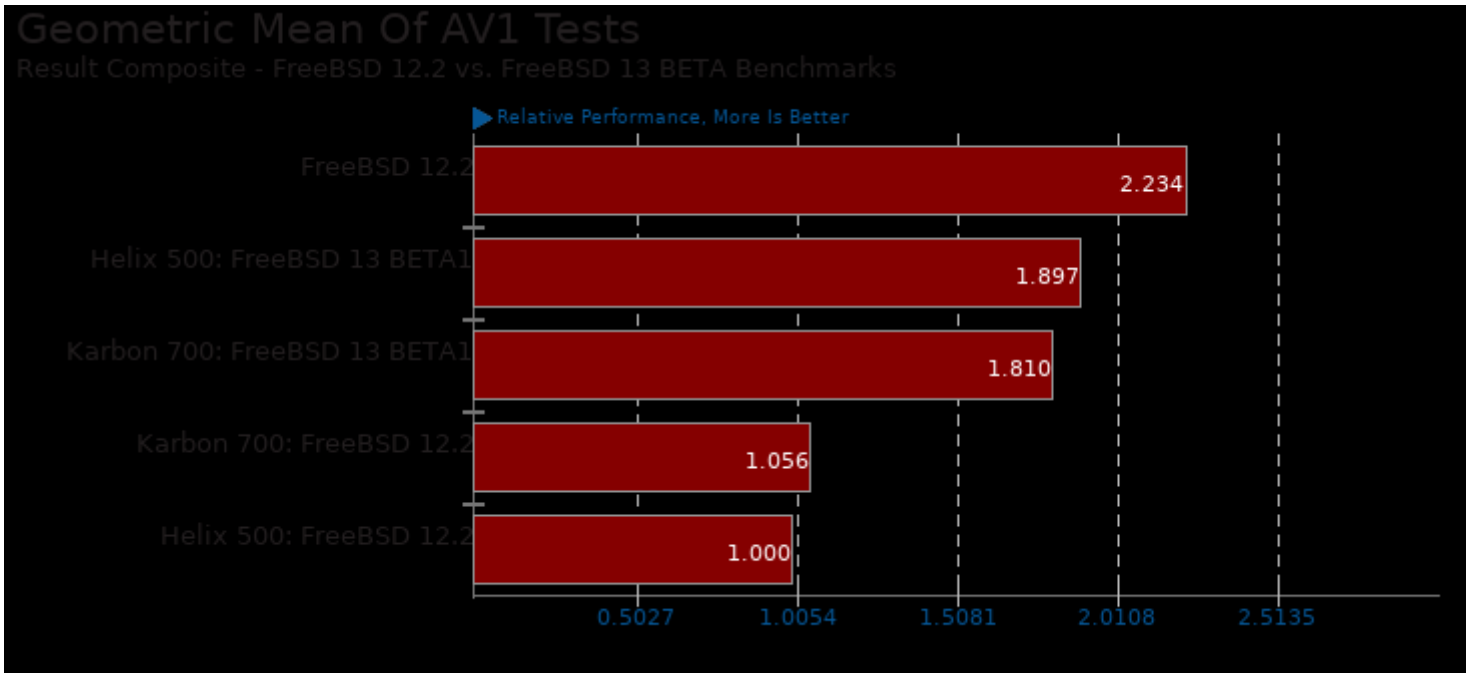
FreeBSD 12.2 vs. FreeBSD 13 BETA Benchmarks



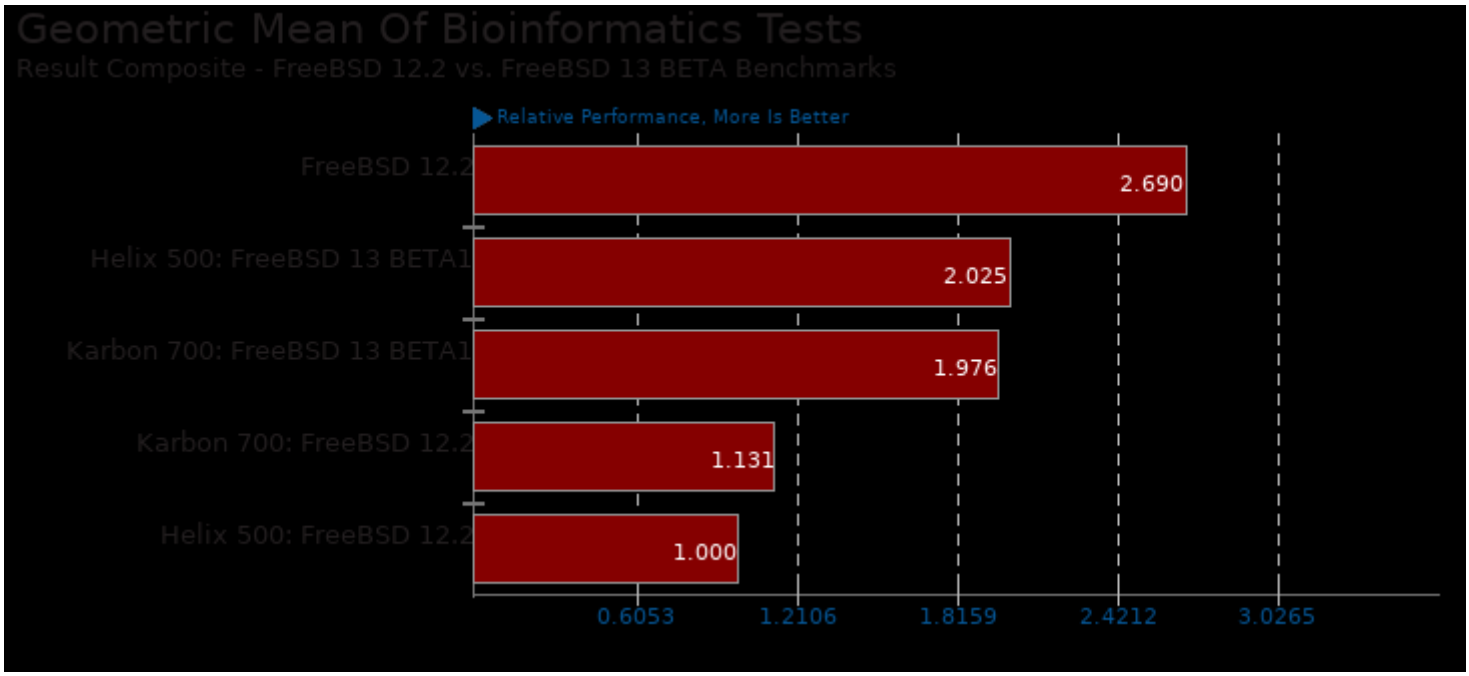
These geometric means are based upon test groupings / test suites for this result file.



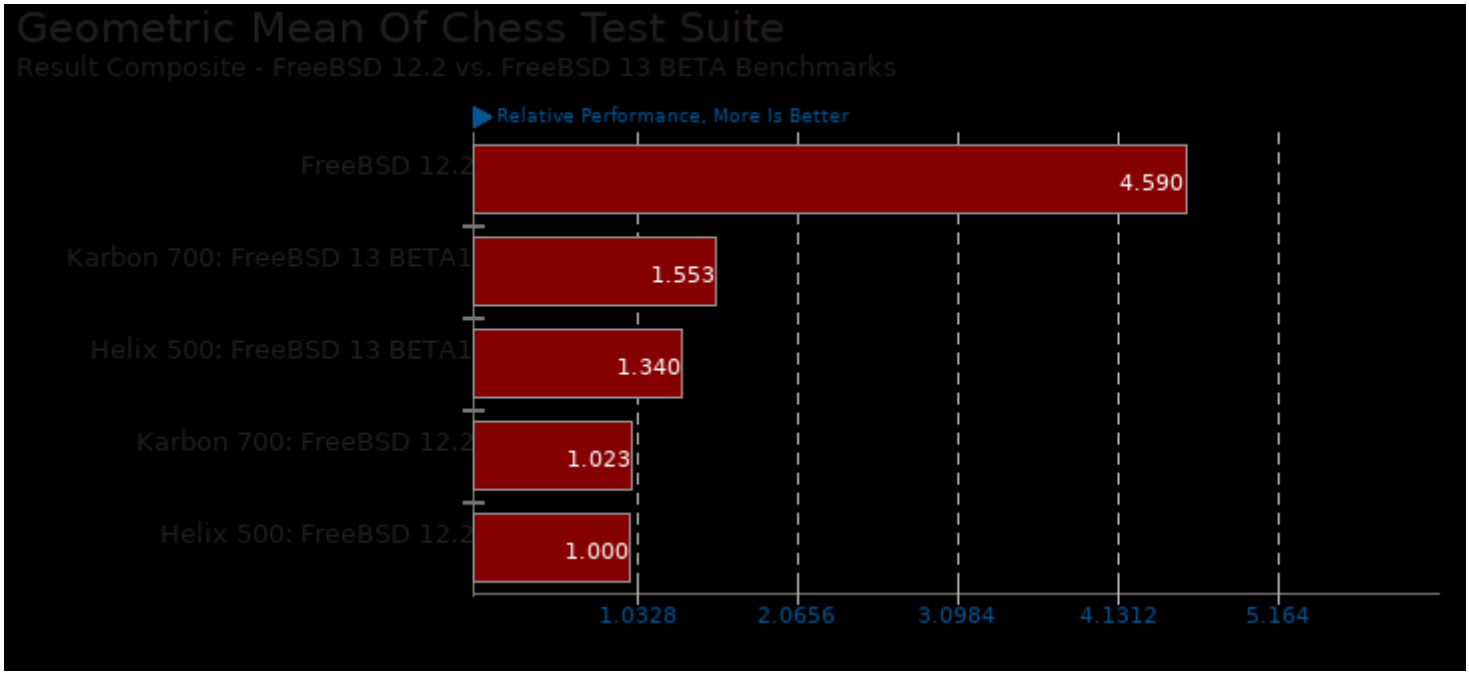
Geometric mean based upon tests: pts/encode-mp3, pts/encode-flac and pts/encode-ape



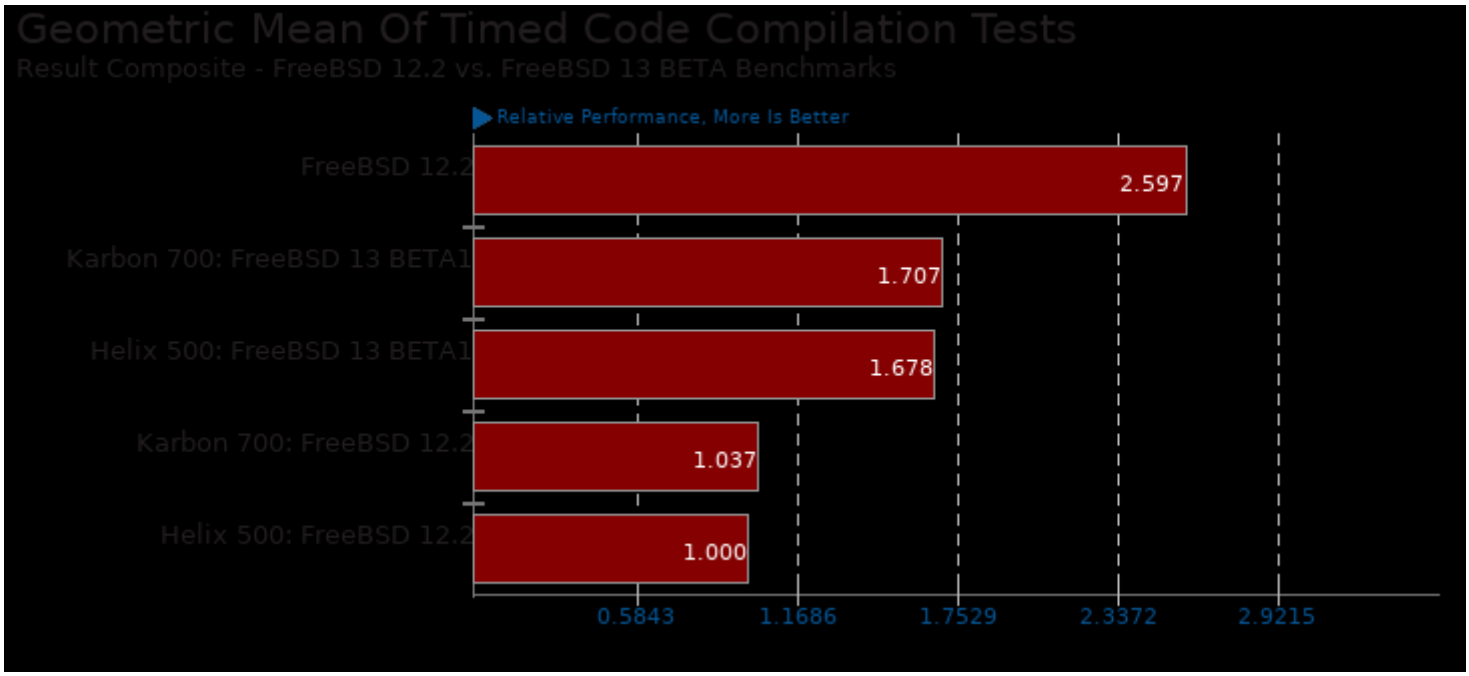
Geometric mean based upon tests: pts/rav1e and pts/avifenc



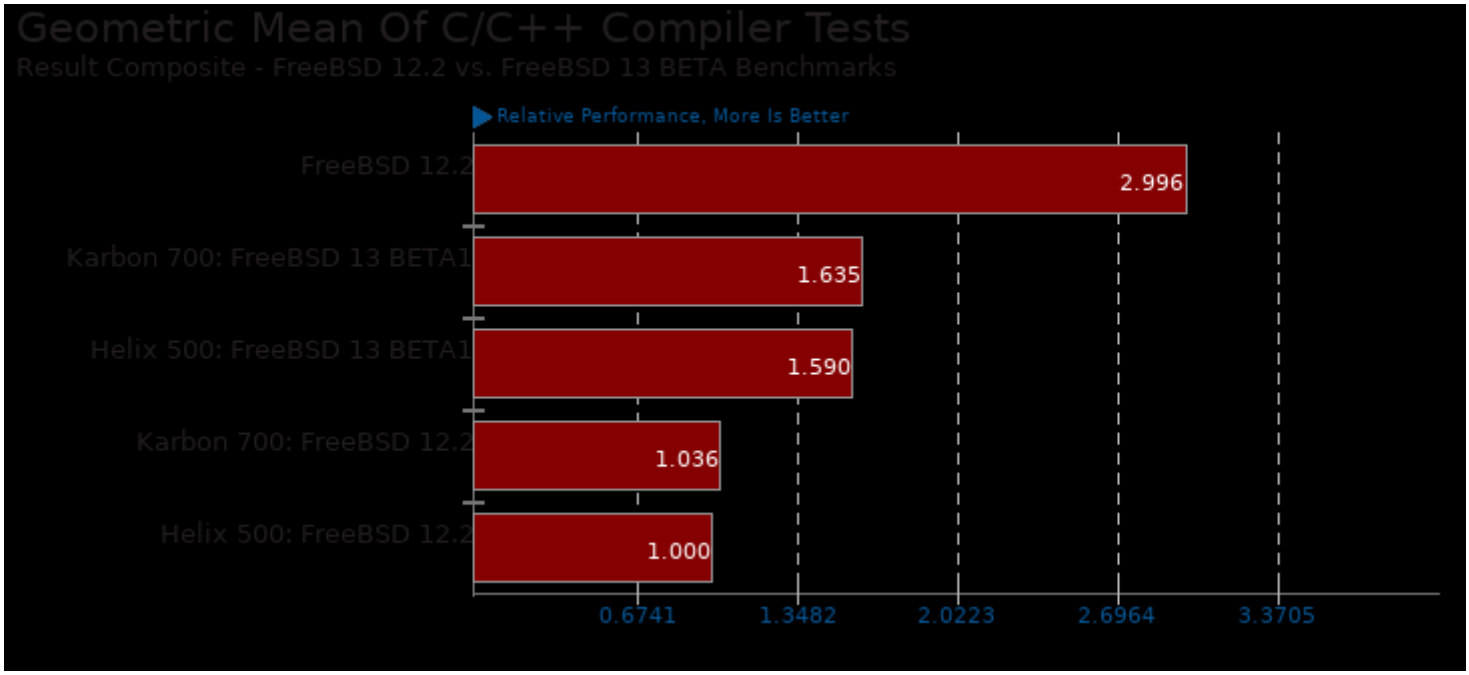
Geometric mean based upon tests: pts/himeno and pts/hmmer



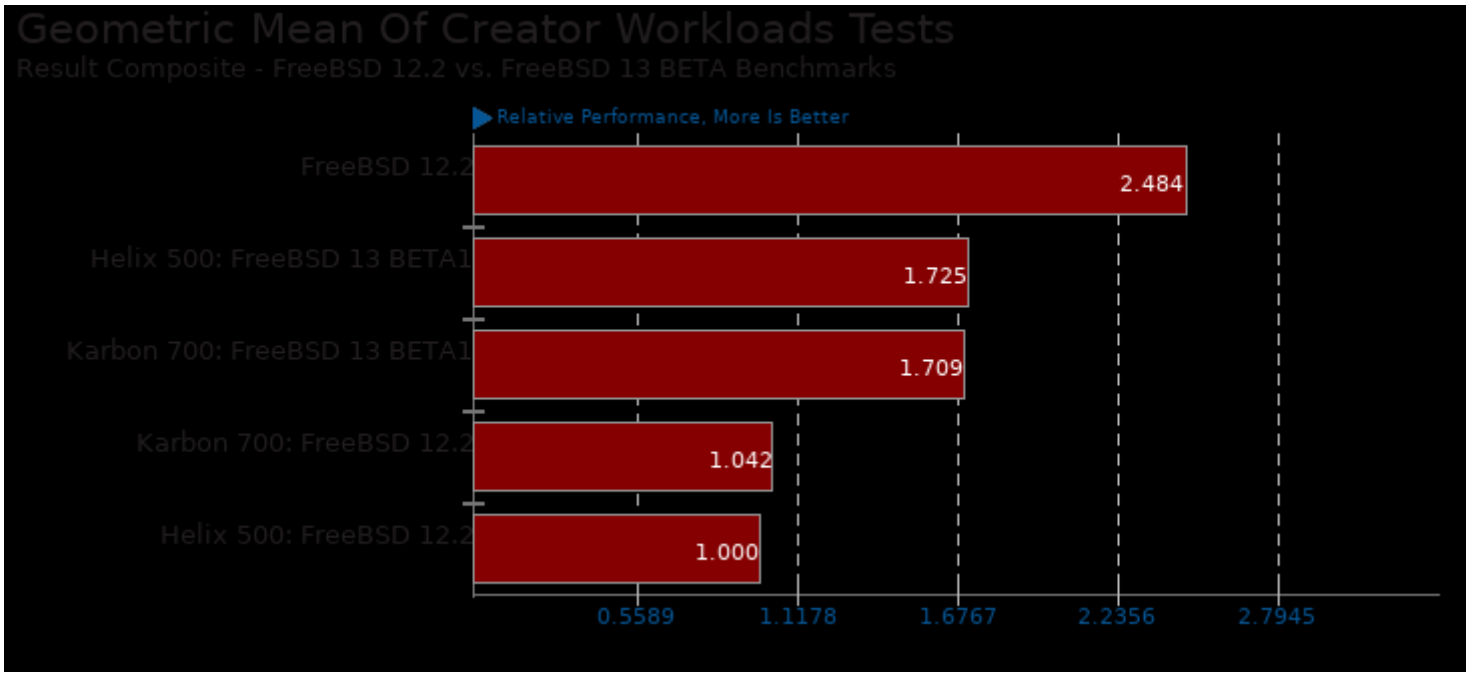
Geometric mean based upon tests: pts/stockfish and pts/m-queens



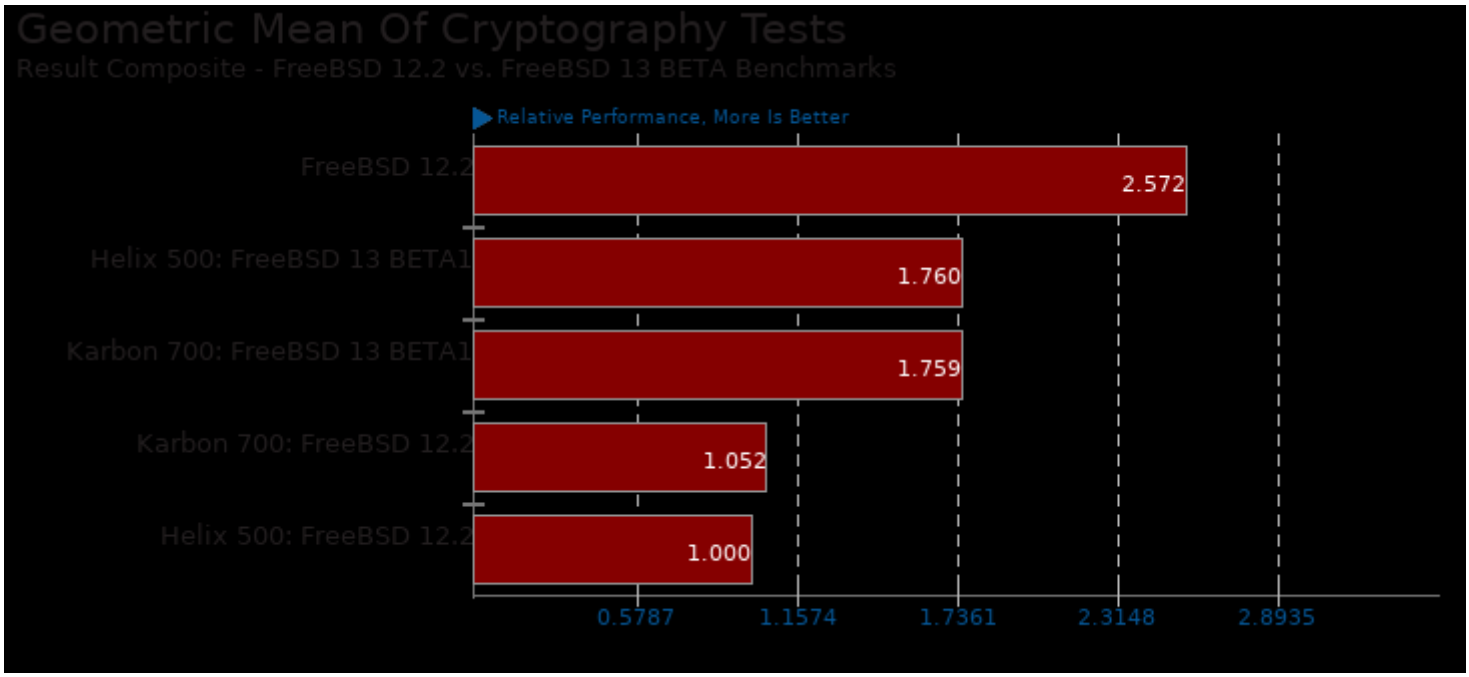
Geometric mean based upon tests: pts/build-php and pts/build-eigen



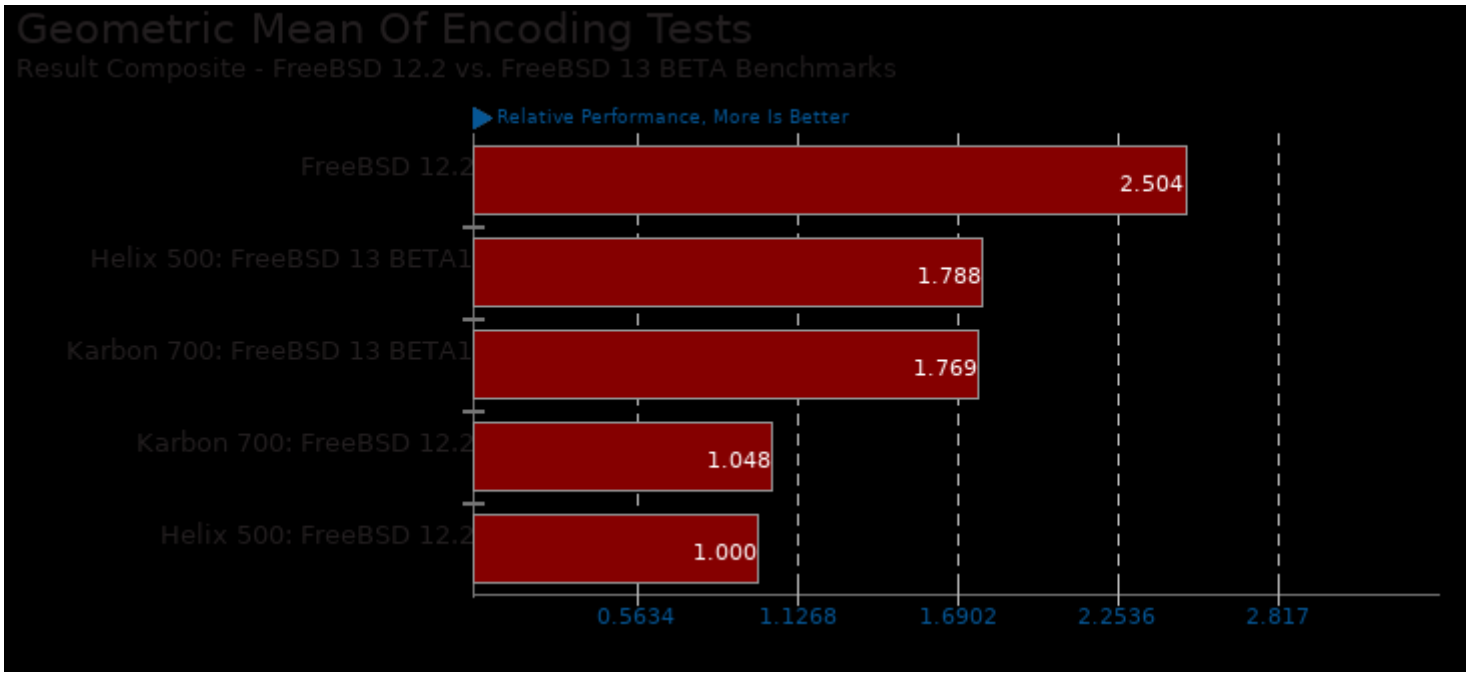
Geometric mean based upon tests: pts/fftw, pts/scimark2, pts/aobench, pts/graphics-magick, pts/himeno, pts/stockfish, pts/hmmer, pts/build-php, pts/c-ray, pts/encode-mp3, pts/encode-flac, pts/sqlite-speedtest, pts/john-the-ripper, pts/x264, pts/x265, pts/openssl, pts/aircrack-ng and pts/smhasher



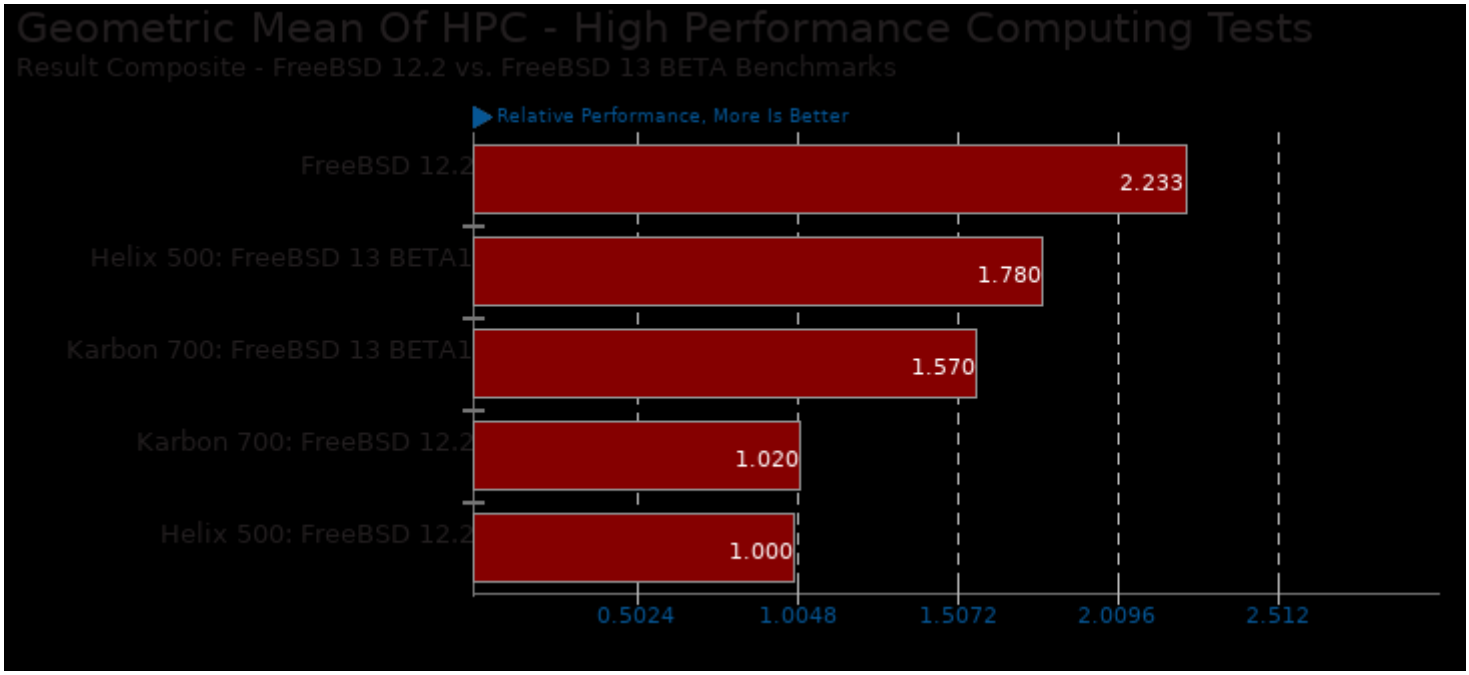
Geometric mean based upon tests: pts/c-ray, pts/aobench, pts/smallpt, pts/ttsiod-renderer, pts/x264, pts/x265, pts/rav1e, pts/avifenc, pts/encode-mp3, pts/encode-flac, pts/encode-ape, pts/graphics-magick, pts/libraw, pts/tjbench, pts/dcraw and pts/luajit



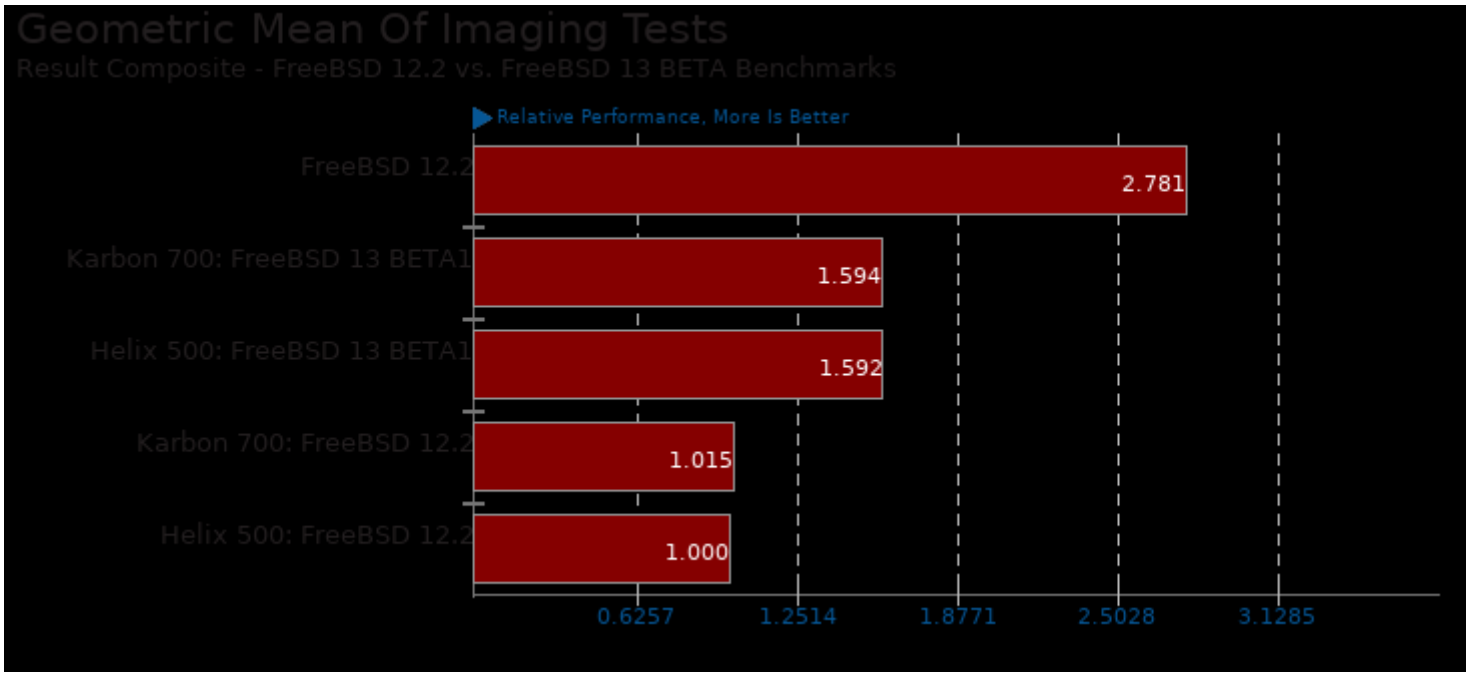
Geometric mean based upon tests: pts/openssl, pts/blake2, pts/john-the-ripper, pts/smhasher, pts/botan, pts/bork and pts/aircrack-ng



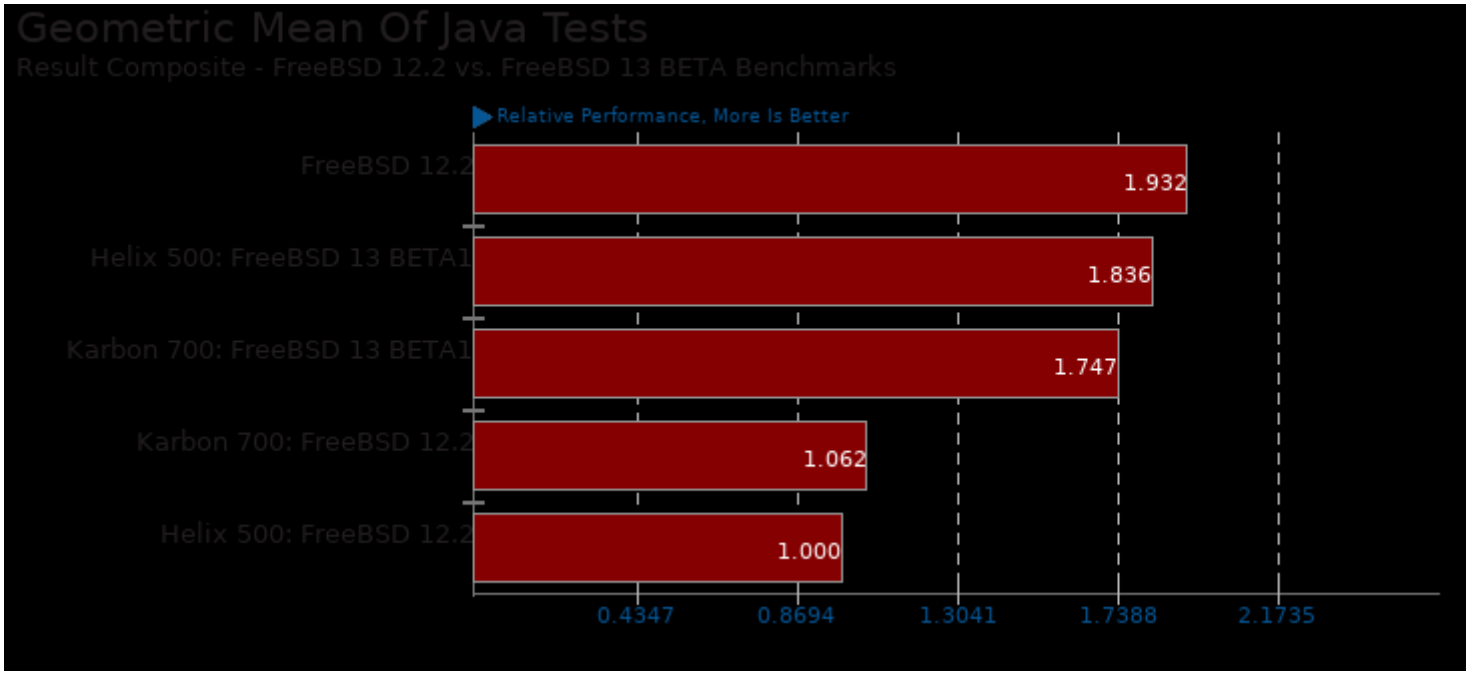
Geometric mean based upon tests: pts/encode-mp3, pts/encode-flac, pts/encode-ape, pts/x264, pts/x265, pts/rav1e and pts/avifenc



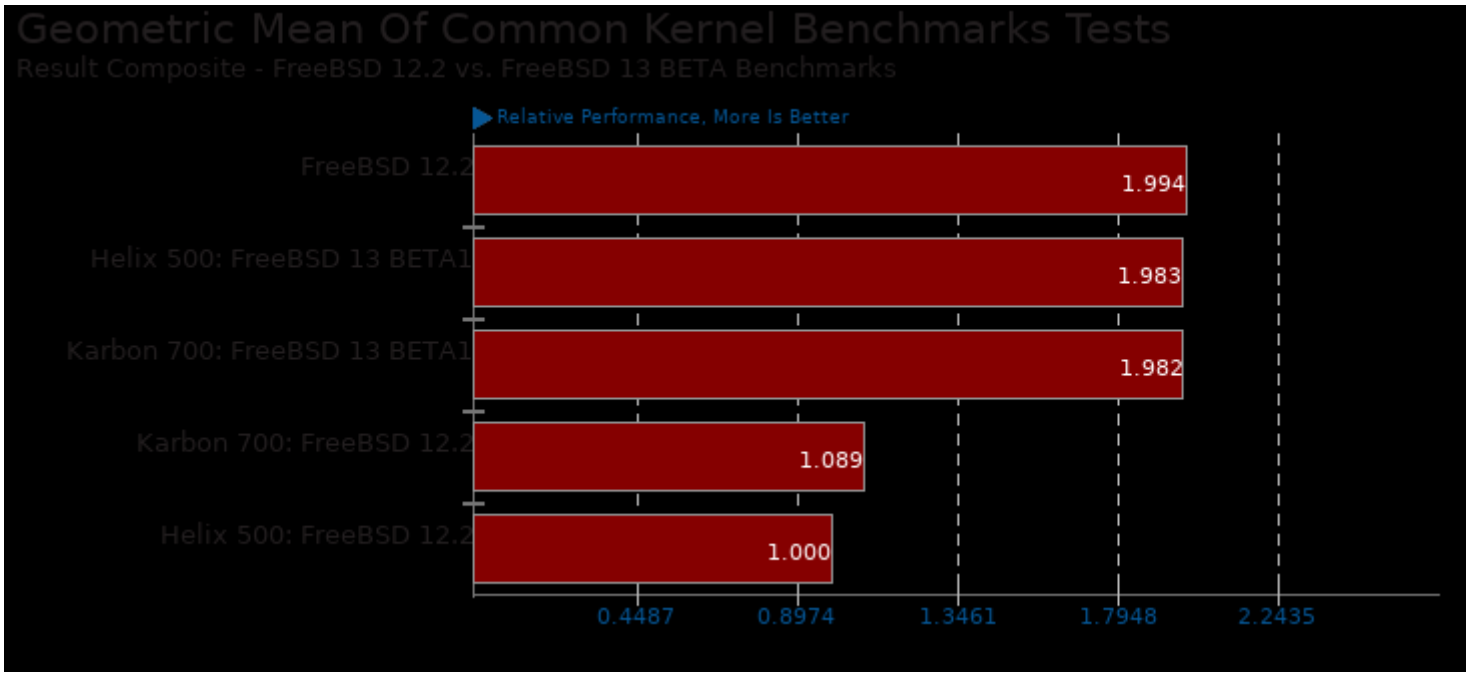
Geometric mean based upon tests: pts/rodinia, pts/ffte, pts/fftw, pts/himeno, pts/hmmer, pts/rbenchmark, pts/numpy and pts/scikit-learn



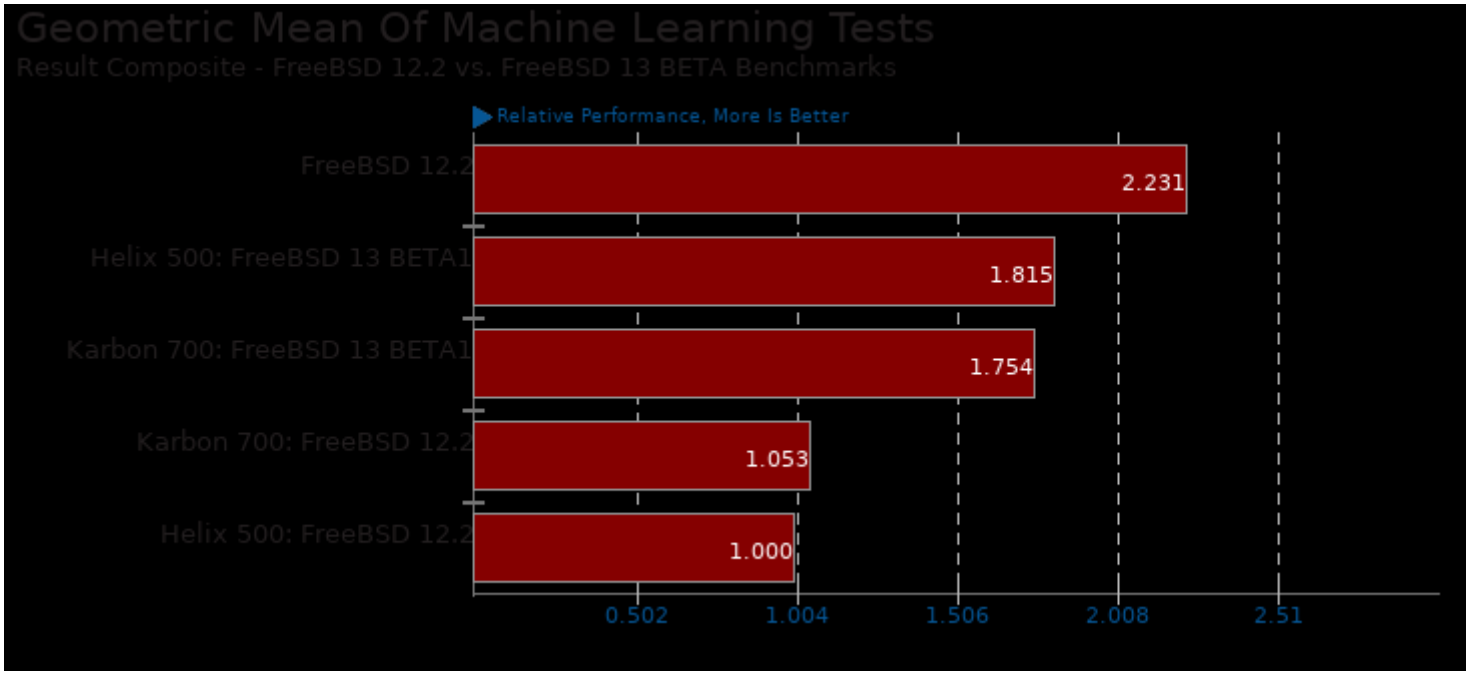
Geometric mean based upon tests: pts/graphics-magick, pts/libraw, pts/tjbench, pts/dcraw and pts/avifenc



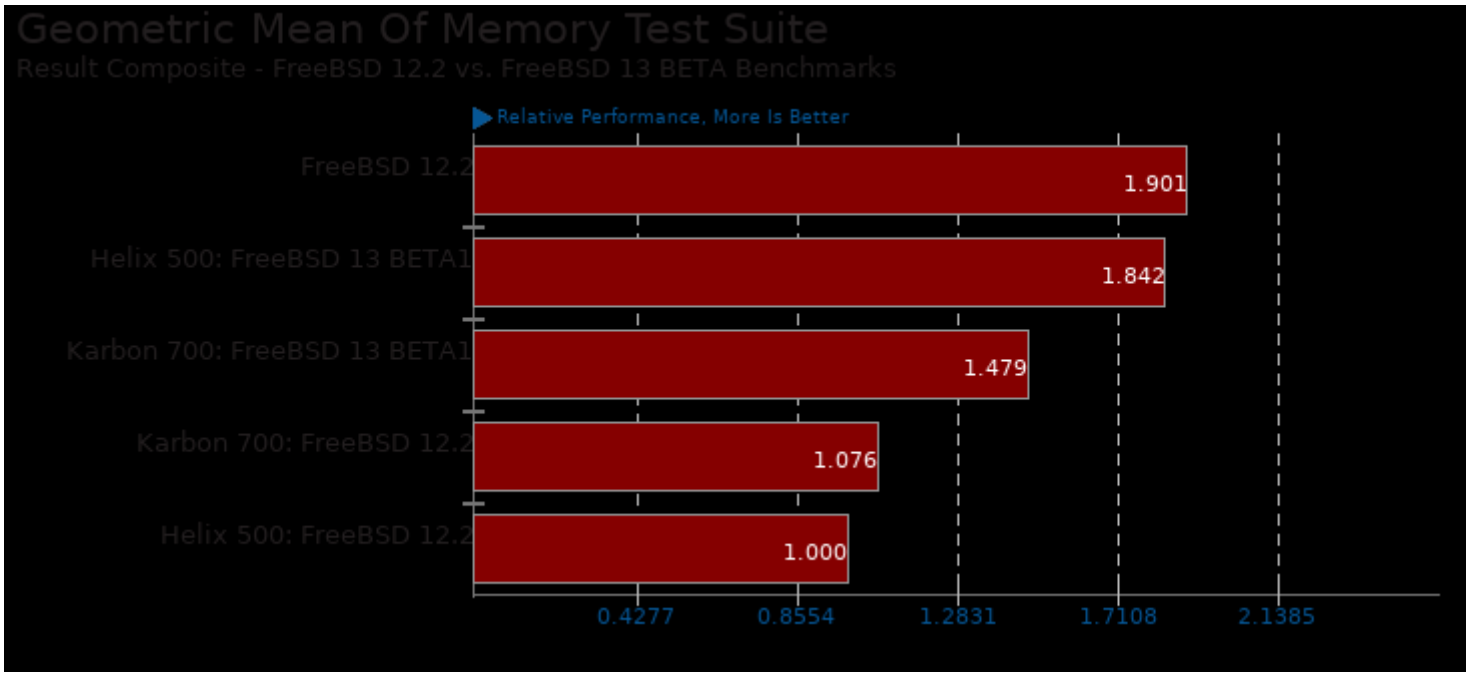
Geometric mean based upon tests: pts/bork, pts/java-scimark2, pts/dacapobench and pts/renaissance



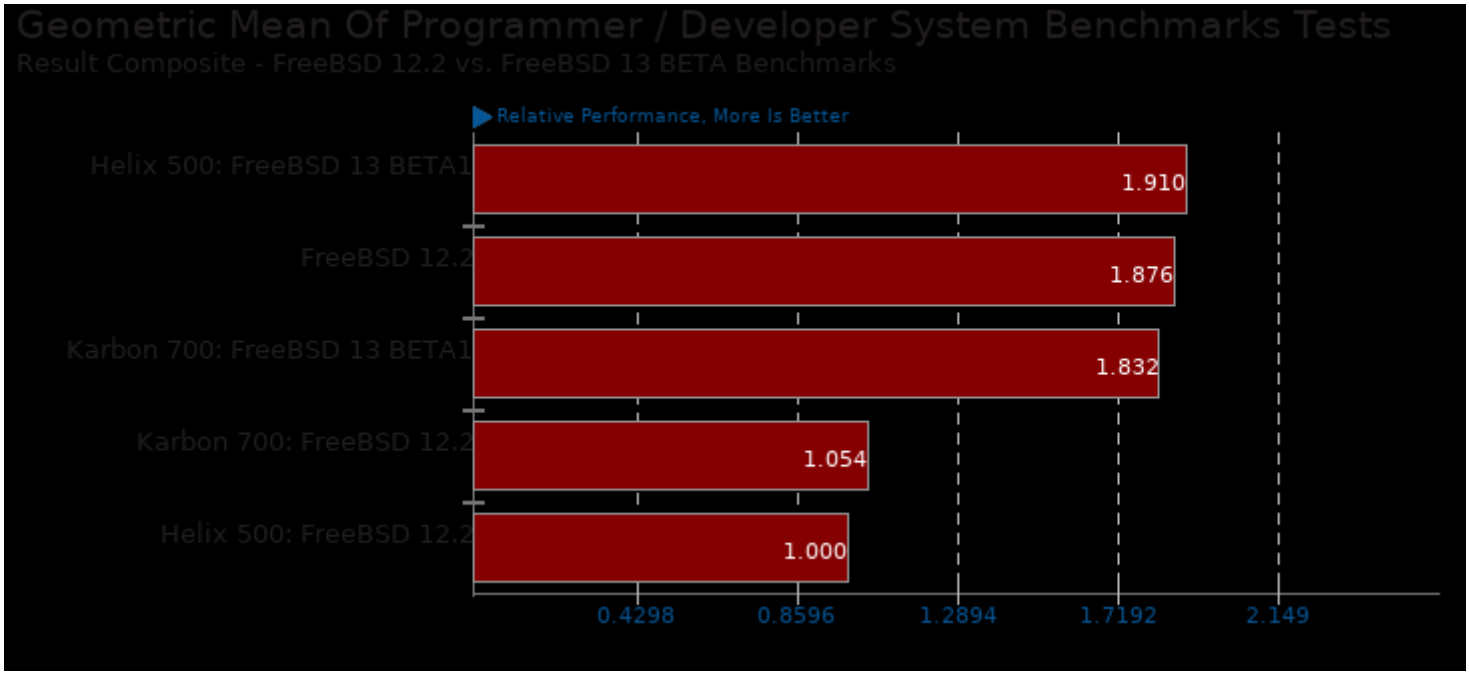
Geometric mean based upon tests: pts/sqlite-speedtest, pts/mbw, pts/openssl, pts/stress-ng, pts/osbench and pts/iperf



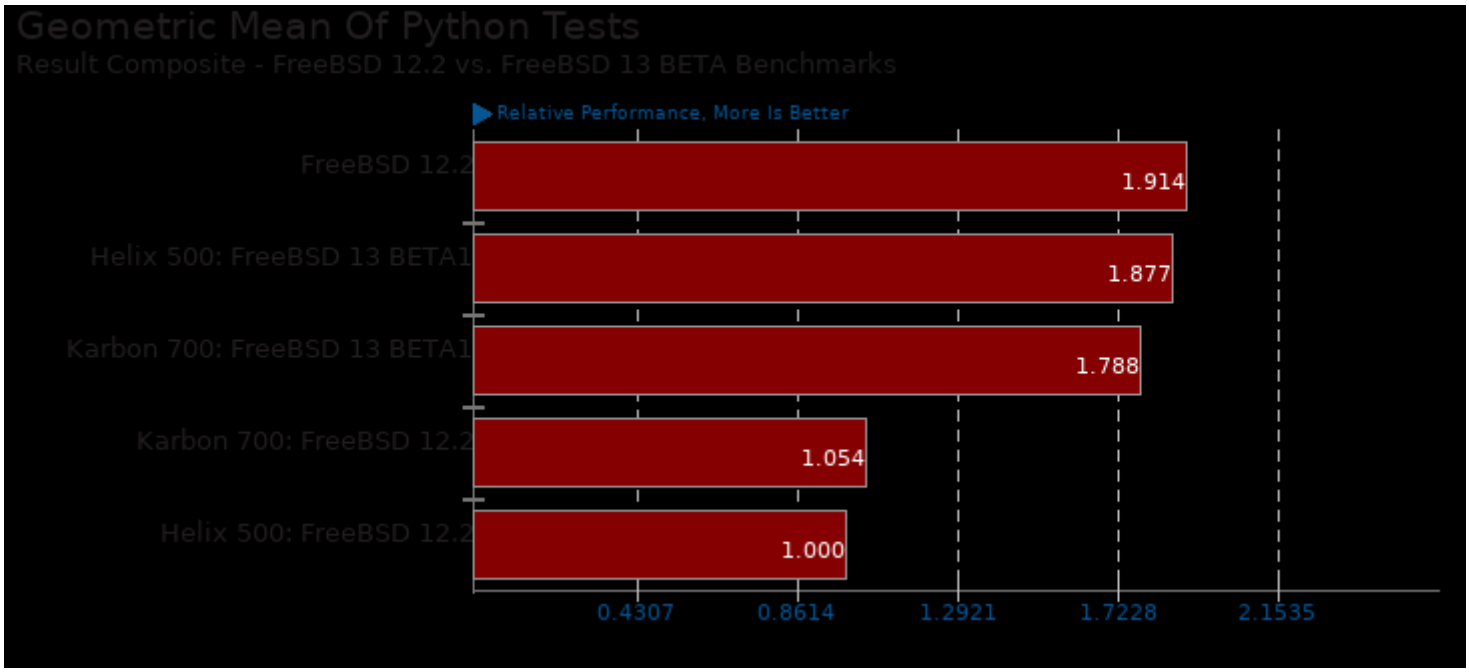
Geometric mean based upon tests: pts/rbenchmark, pts/numpy and pts/scikit-learn



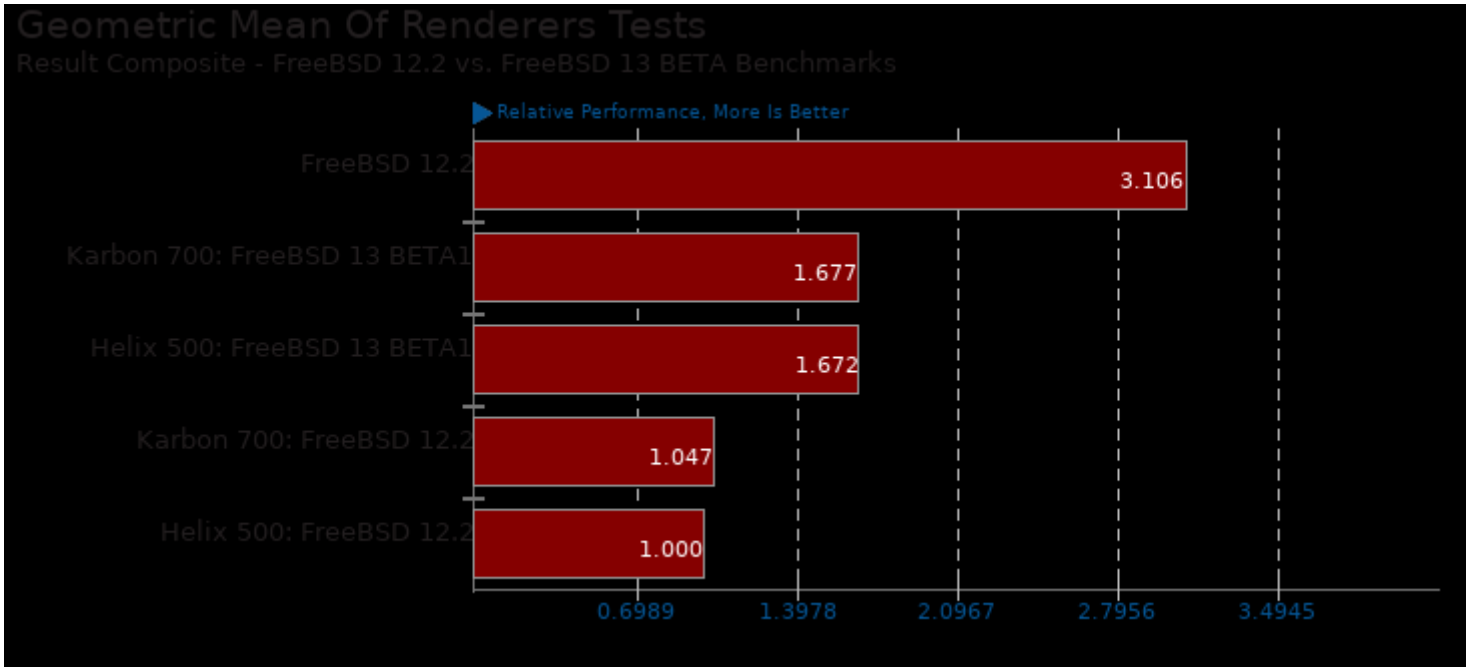
Geometric mean based upon tests: pts/cachebench and pts/mbw



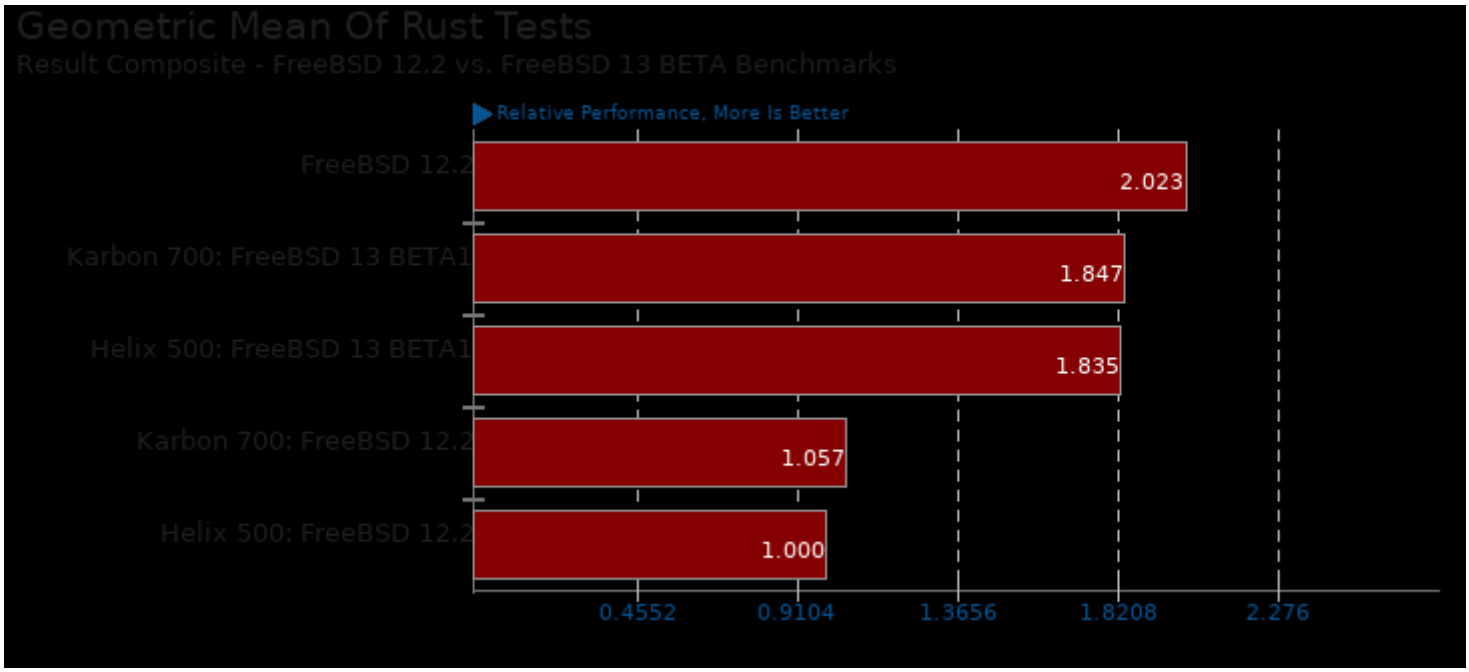
Geometric mean based upon tests: pts/simdjson, pts/sqlite-speedtest, pts/git, pts/pyperformance, pts/pybench, pts/build-php and pts/build-eigen



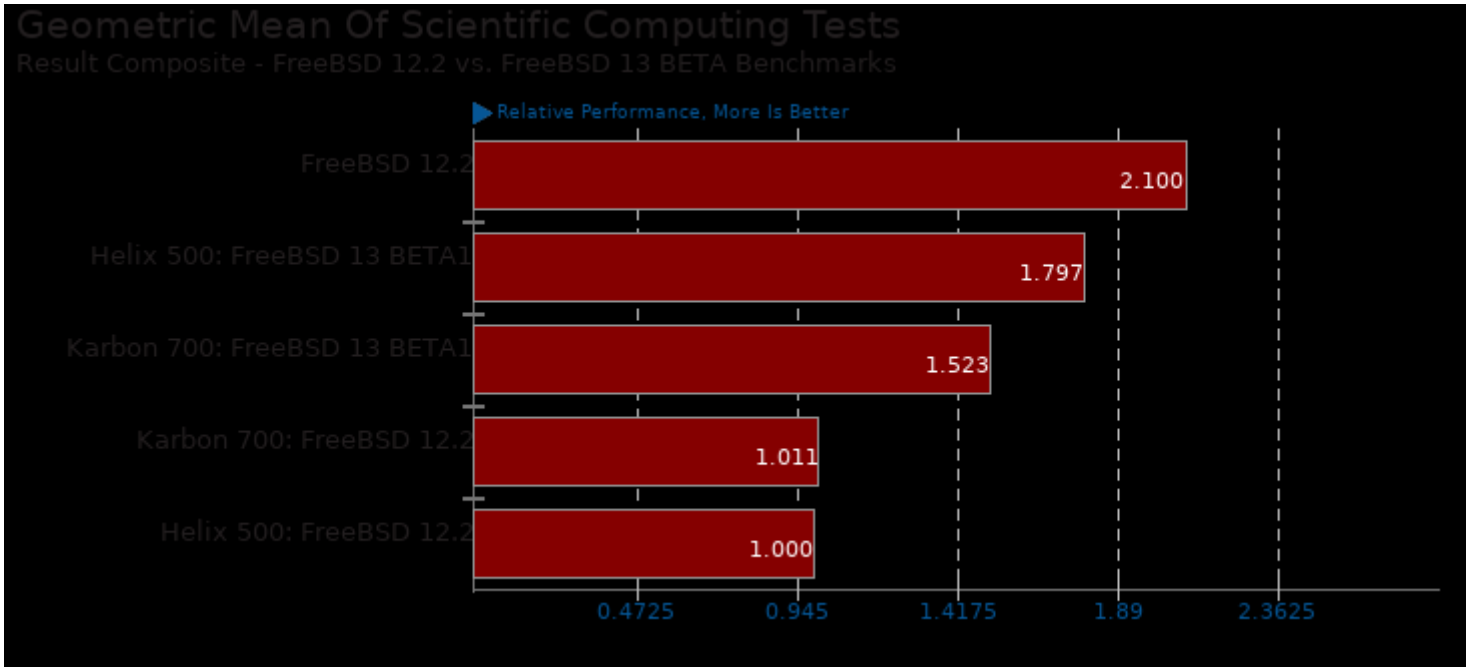
Geometric mean based upon tests: pts/pybench, pts/numpy, pts/scikit-learn and pts/pyperformance



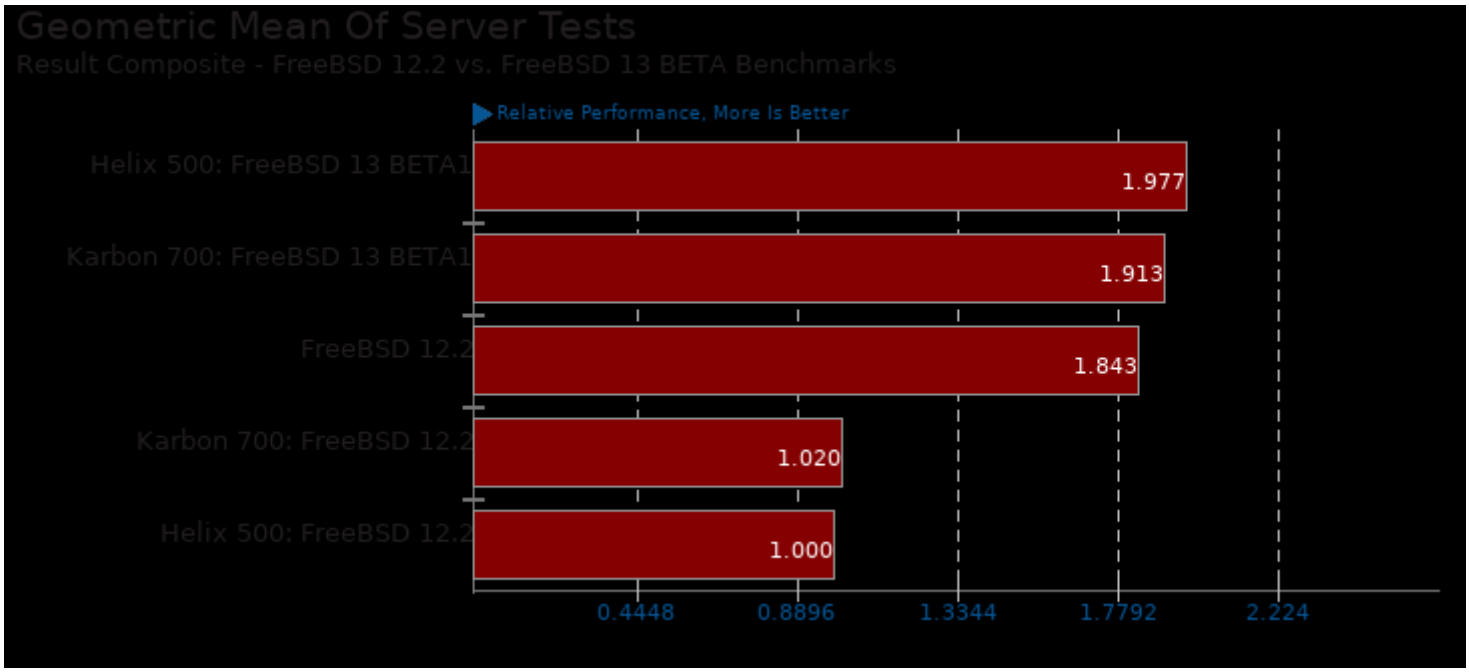
Geometric mean based upon tests: pts/c-ray, pts/aobench, pts/smallpt and pts/ttsiod-renderer



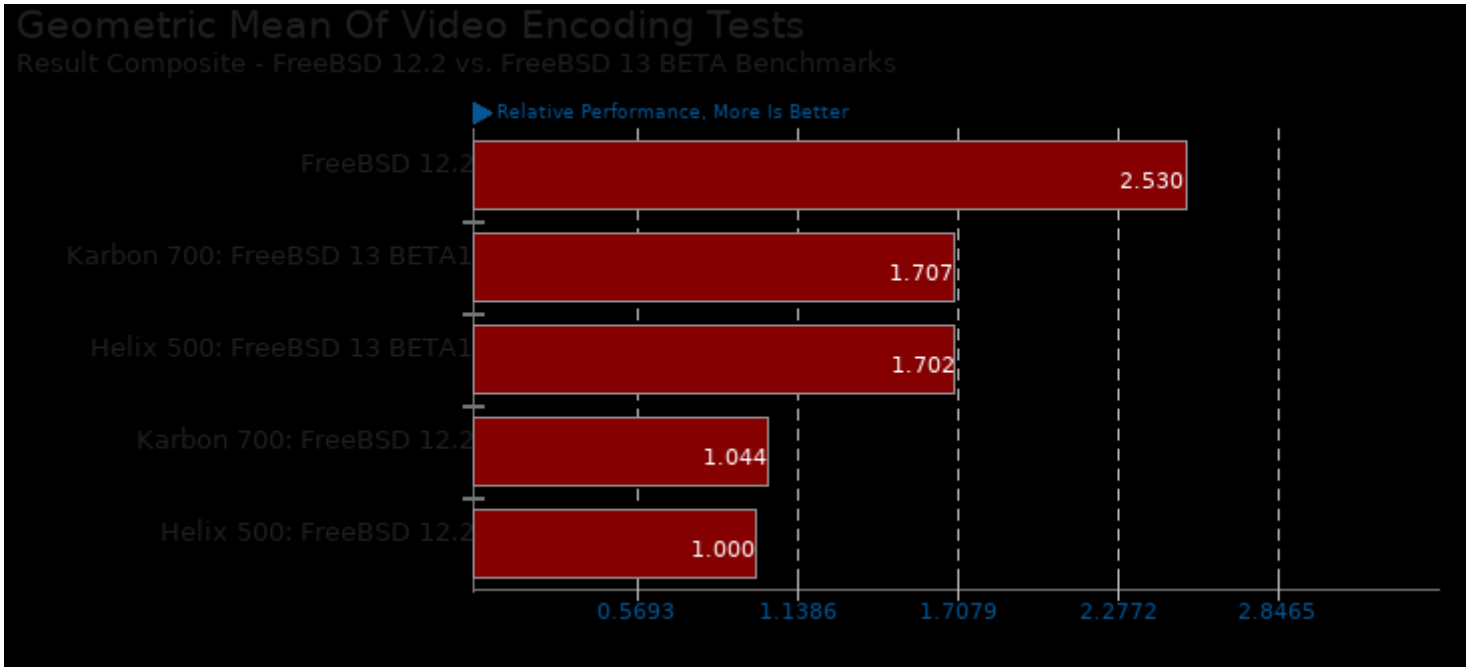
Geometric mean based upon tests: pts/rust-prime, pts/rust-mandel and pts/rav1e



Geometric mean based upon tests: pts/ffte, pts/fftw, pts/himeno and pts/hmmer

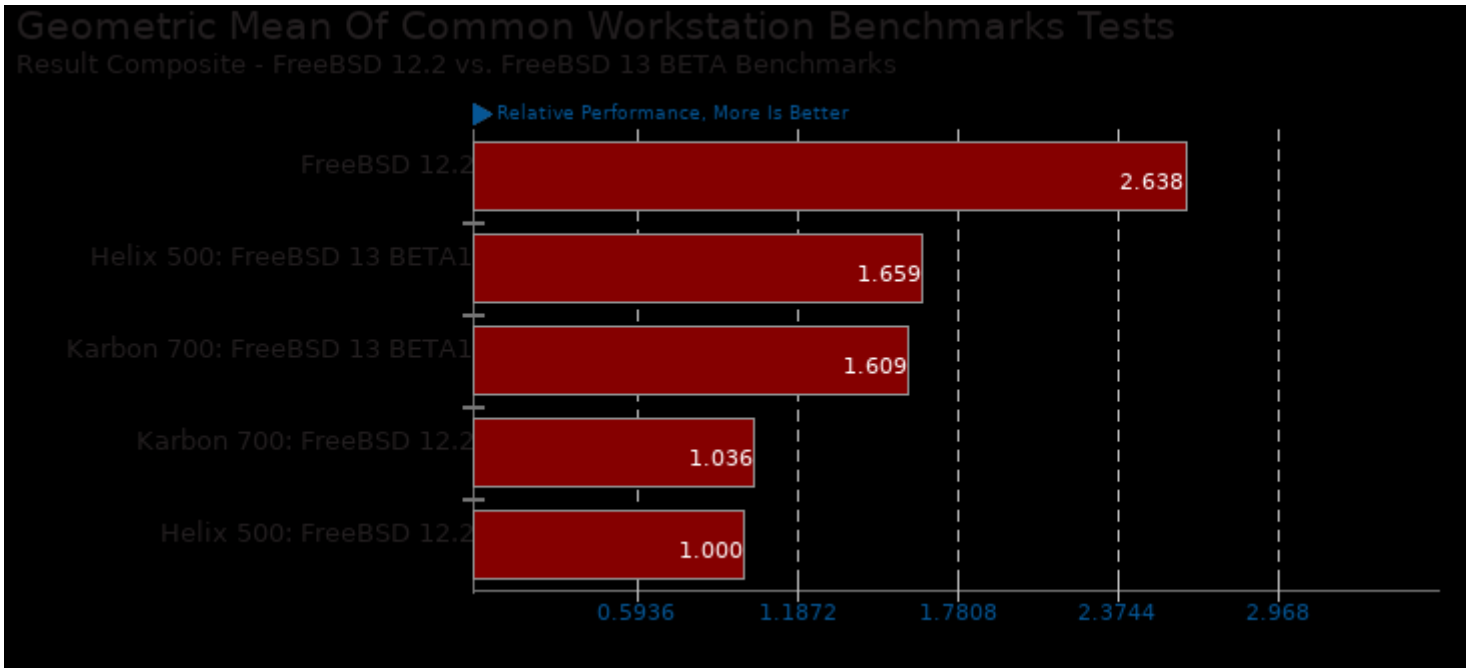


Geometric mean based upon tests: pts/blogbench, pts/php, pts/phpbench, pts/node-express-loadtest, pts/openssl, pts/perl-benchmark, pts/simdjson and pts/sqlite-speedtest



Geometric mean based upon tests: pts/x264, pts/x265, pts/rav1e and pts/avifenc

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Geometric mean based upon tests: pts/rodinia, pts/himeno, pts/x265, pts/swet and pts/git

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