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Raven Ridge Memory Scaling

AMD Ryzen 5 2400G reference memory tests for a future article on Phoronix.

Automated Executive Summary

DDR4-3600MHz had the most wins, coming in first place for 57% of the tests.

Based on the geometric mean of all complete results, the fastest (DDR4-3600MHz) was 1.25x the speed of the slowest (DDR4-2133MHz). DDR4-3200MHz was 0.972x the speed of DDR4-3600MHz, DDR4-3000MHz was 0.958x the speed of DDR4-3200MHz, DDR4-2800MHz was 0.968x the speed of DDR4-3000MHz, DDR4-2666MHz was 0.976x the speed of DDR4-2800MHz, DDR4-2400MHz was 0.976x the speed of DDR4-2666MHz, DDR4-2133MHz was 0.932x the speed of DDR4-2400MHz.

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

RAMspeed SMP (Type: Add - Benchmark: Integer) at 1.418x
RAMspeed SMP (Type: Copy - Benchmark: Integer) at 1.382x
Stream (Type: Copy) at 1.362x
RAMspeed SMP (Type: Average - Benchmark: Integer) at 1.341x
RAMspeed SMP (Type: Triad - Benchmark: Integer) at 1.3x
Stream (Type: Scale) at 1.281x
RAMspeed SMP (Type: Scale - Benchmark: Integer) at 1.274x

Stream (Type: Add) at 1.267x
Stream (Type: Triad) at 1.266x
7-Zip Compression (Compress Speed Test) at 1.104x.

Test Systems:

DDR4-2133MHz

DDR4-2400MHz

DDR4-2666MHz

DDR4-2800MHz

DDR4-3000MHz

DDR4-3200MHz

DDR4-3600MHz

Processor: AMD Ryzen 5 2400G @ 3.60GHz (4 Cores / 8 Threads), Motherboard: ASUS PRIME B350M-E (3803 BIOS), Chipset: AMD Device 15d0, Memory: 6144MB, Disk: 525GB Crucial_CT525MX3 + 256GB INTEL SSDPEKKW256G7, Graphics: llvmpipe 6016MB, Audio: AMD Device 15de, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 17.10, Kernel: 4.16.0-999-generic (x86_64) 20180218, Desktop: GNOME Shell 3.26.2, Display Driver: modesetting 1.19.5, OpenGL: 3.3 Mesa 18.1.0-devel- padoka PPA (LLVM 7.0 128 bits), Compiler: GCC 7.2.0, File-System: ext4, Screen Resolution: 1024x768

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --enable-libmpx --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib --with-tune=generic --without-cuda-driver -v
Disk Notes: NONE / data=ordered,errors=remount-ro,relatime,rw
Processor Notes: Scaling Governor: acpi-cpufreq ondemand
Python Notes: Python 2.7.14 + Python 3.6.3
Security Notes: __user pointer sanitization + Full AMD retpoline IBPB Protection

	DDR4-2133 MHz	DDR4-2400 MHz	DDR4-2666 MHz	DDR4-2800 MHz	DDR4-3000 MHz	DDR4-3200 MHz	DDR4-3600 MHz
Compile Bench - Compile (MB/s)	284.82	300.54	285.53	290.18	**284.18**	291.31	**314.08**
Normalized	90.68%	95.69%	90.91%	92.39%	90.48%	92.75%	100%
Standard Deviation	22.5%	37.6%	20.4%	26.4%	22%	23.2%	43.4%

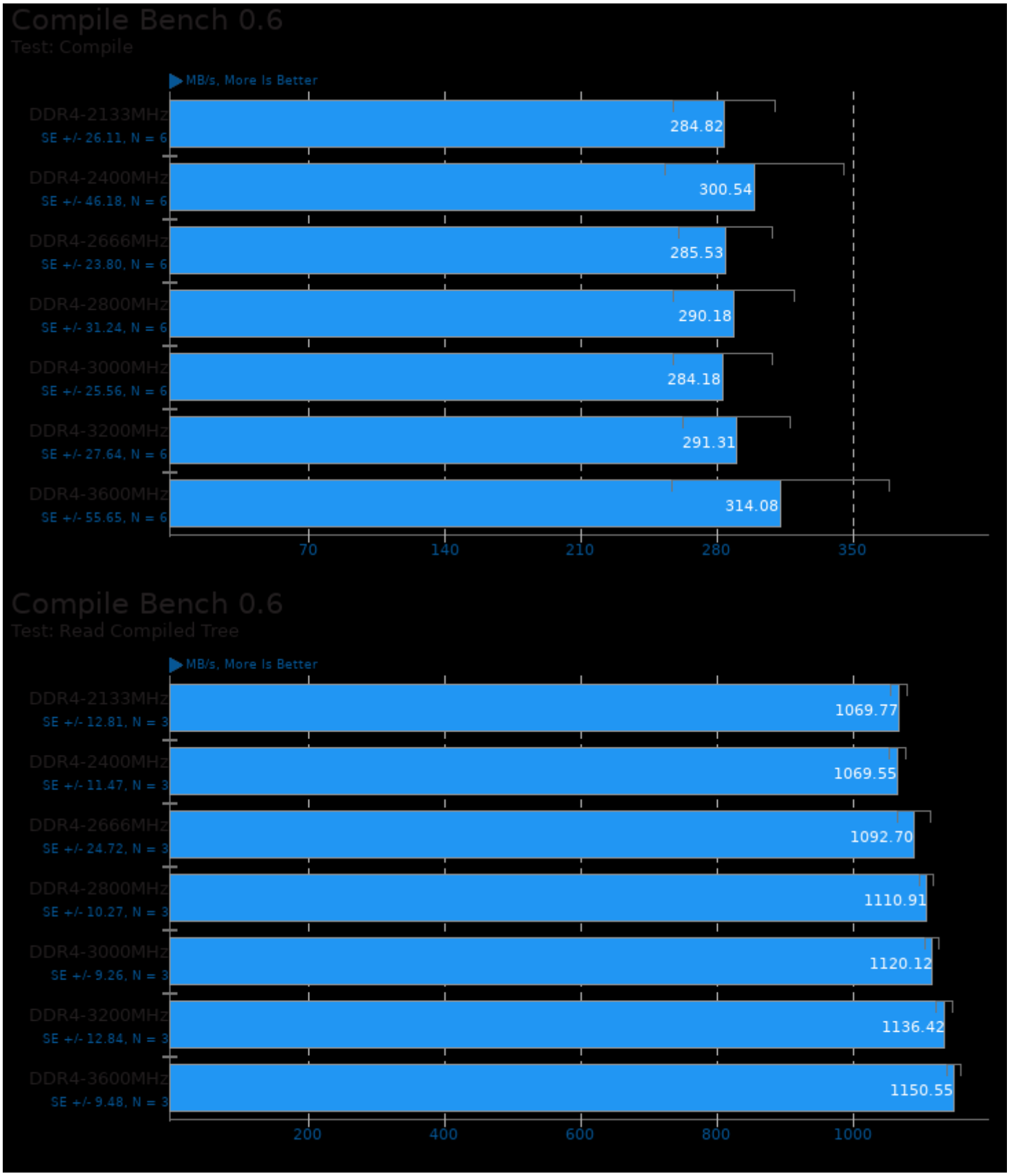
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Compile Bench - Read Compiled Tree (MB/s)	1070	**1070**	1093	1111	1120	1136	**1151**
Normalized	92.98%	92.96%	94.97%	96.55%	97.36%	98.77%	100%
Standard Deviation	2.1%	1.9%	3.9%	1.6%	1.4%	2%	1.4%
RAMspeed SMP - Add - Integer (MB/s)	**17255**	18963	20097	20733	21808	23150	**24469**
Normalized	70.52%	77.5%	82.13%	84.73%	89.12%	94.61%	100%
RAMspeed SMP - Copy - Integer (MB/s)	**14802**	16242	17053	17684	18398	19593	**20457**
Normalized	72.36%	79.39%	83.36%	86.44%	89.93%	95.78%	100%
RAMspeed SMP - Scale - Integer (MB/s)	**13058**	13585	14070	14201	14986	16380	**16634**
Normalized	78.5%	81.67%	84.58%	85.37%	90.09%	98.47%	100%
RAMspeed SMP - Triad - Integer (MB/s)	**15714**	16806	17541	18034	18547	19649	**20423**
Normalized	76.94%	82.29%	85.89%	88.3%	90.82%	96.21%	100%
RAMspeed SMP - Average - Integer (MB/s)	**15171**	16561	17120	17913	18711	19729	**20346**
Normalized	74.56%	81.4%	84.15%	88.04%	91.96%	96.97%	100%
Stream - Copy (MB/s)	**25049**	27564	29349	30087	31534	33365	**34128**
Normalized	73.4%	80.77%	86%	88.16%	92.4%	97.76%	100%
Standard Deviation	0%	0%	0.1%	0%	0.1%	0.1%	0.1%
Stream - Scale (MB/s)	**14276**	15511	16101	16456	17014	17791	**18293**
Normalized	78.04%	84.79%	88.02%	89.96%	93.01%	97.25%	100%
Standard Deviation	0%	0.1%	0.1%	0%	0.1%	0.2%	0.1%
Stream - Triad (MB/s)	**16334**	17717	18360	18734	19332	20183	**20683**
Normalized	78.97%	85.66%	88.77%	90.58%	93.47%	97.58%	100%
Standard Deviation	0%	0%	0%	0.1%	0%	0%	0.1%
Stream - Add (MB/s)	**16484**	17875	18537	18901	19522	20365	**20887**
Normalized	78.92%	85.58%	88.75%	90.49%	93.46%	97.5%	100%
Standard Deviation	0%	0%	0%	0%	0.1%	0%	0%
Himeno Benchmark - P.P.S (MFLOPS)	**1174**	1210	1199	1193	1205	**1211**	
Normalized	96.94%	99.91%	98.96%	98.52%	99.48%	100%	
Standard Deviation	1.4%	0.6%	1.8%	2.2%	1%	0.4%	
7-Zip Compression - C.S.T (MIPS)	**15908**	16381	16732	16816	17036	**17567**	
Normalized	90.56%	93.25%	95.25%	95.72%	96.98%	100%	
Standard Deviation	3.2%	2.7%	0.7%	4.7%	2.5%	1.4%	
NGINX Benchmark - S.W.P.S (Reqs/sec)	29118		29563	**29041**	29114	**29735**	
Normalized	97.93%		99.42%	97.67%	97.91%	100%	
Standard Deviation	1.1%		2.2%	6.6%	1.8%	2.9%	
Timed MAFFT Alignment - M.S.A (sec)	**5.59**	**5.19**	5.54	5.40	5.20	5.39	5.55
Normalized	92.84%	100%	93.68%	96.11%	99.81%	96.29%	93.51%
Standard Deviation	7.9%	2.8%	7.4%	6.9%	4.9%	1.5%	13%
Timed MrBayes Analysis - P.P.A (sec)	**238.93**	234.42	233.74	232.64	231.27	**229.46**	
Normalized	96.04%	97.88%	98.17%	98.63%	99.22%	100%	
Standard Deviation	0.2%	0.3%	0.2%	0.2%	0.1%	0.2%	

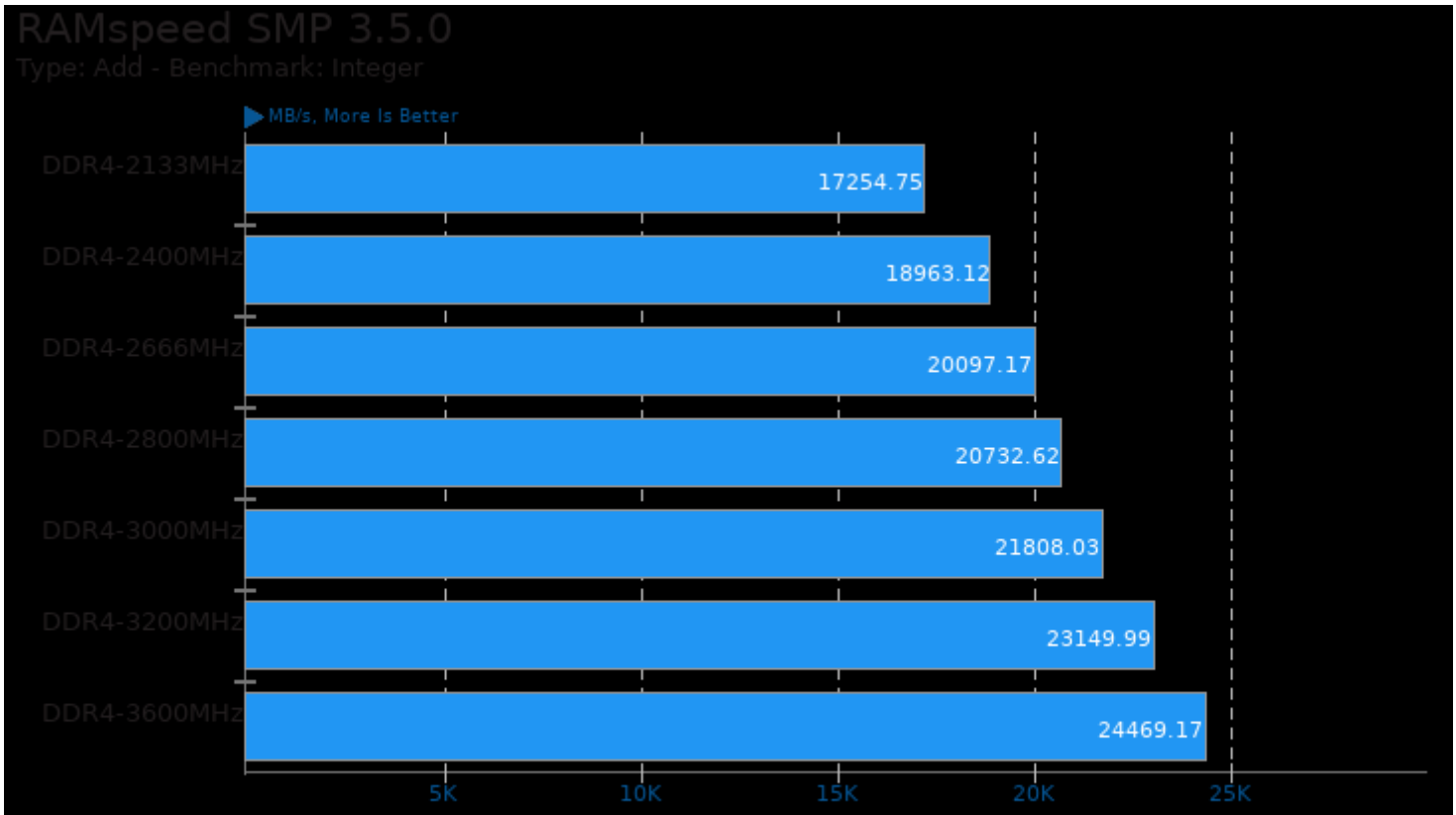
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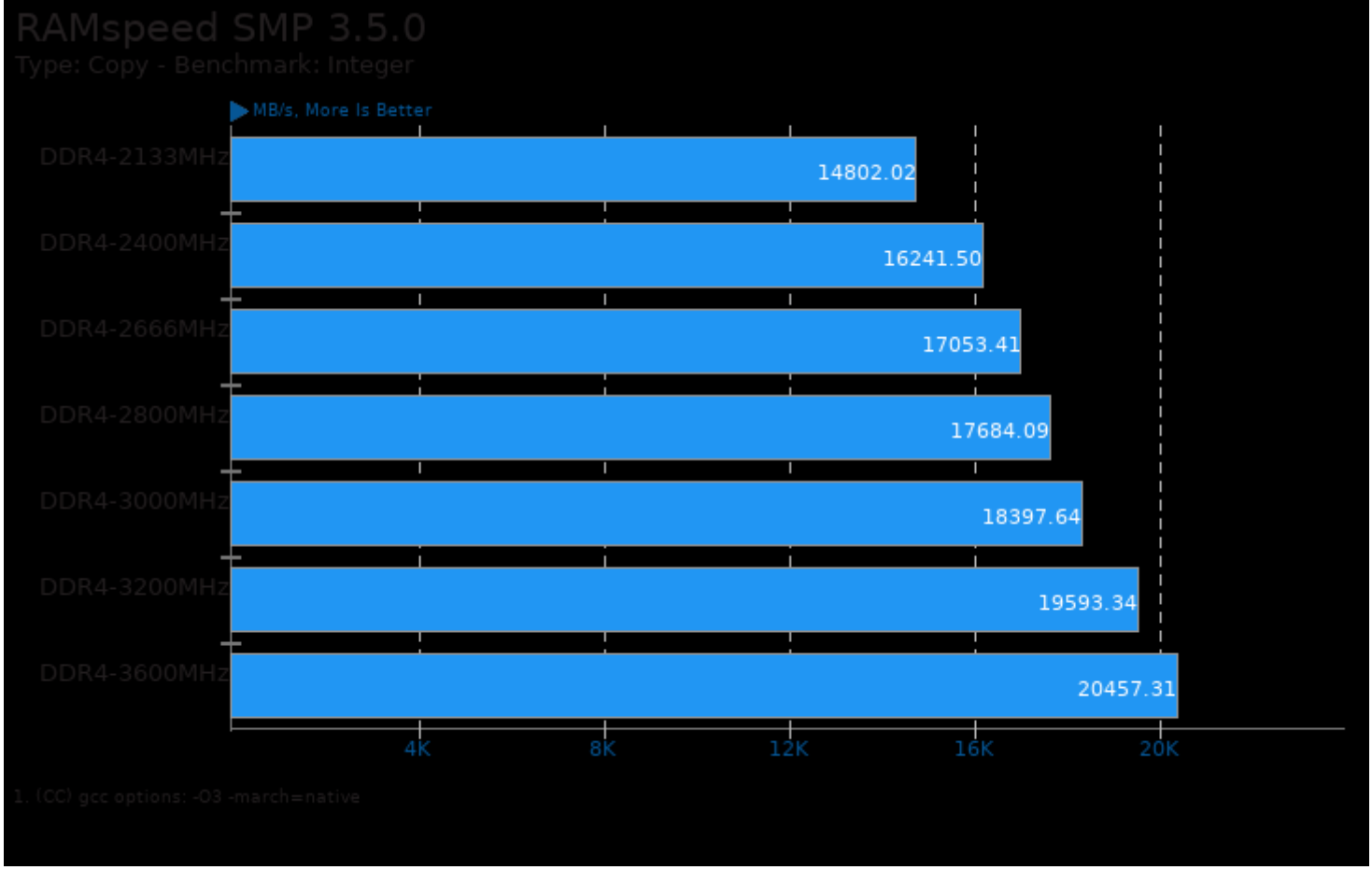
Timed Linux Kernel Compilation - Time To Compile (sec)	**165.89**	160.78	159.07	157.77	156.15	**154.08**
Normalized	92.88%	95.83%	96.86%	97.66%	98.67%	100%
Standard Deviation	1%	1.3%	1.2%	1.1%	0.8%	1.3%
Timed PHP Compilation - Time To Compile (sec)	**110.41**	106.85	105.46	104.63	102.74	**101.18**
Normalized	91.64%	94.69%	95.94%	96.7%	98.48%	100%
Standard Deviation	0.4%	0.6%	0.2%	0.6%	0.8%	0%
FFmpeg - H.2.H.T.N.D	**7.04**	7.01	6.91	6.99	**6.66**	6.89
Normalized	94.6%	95.01%	96.38%	95.28%	100%	96.66%
Standard Deviation	2.8%	3.4%	4.4%	1.2%	2.3%	4.1%

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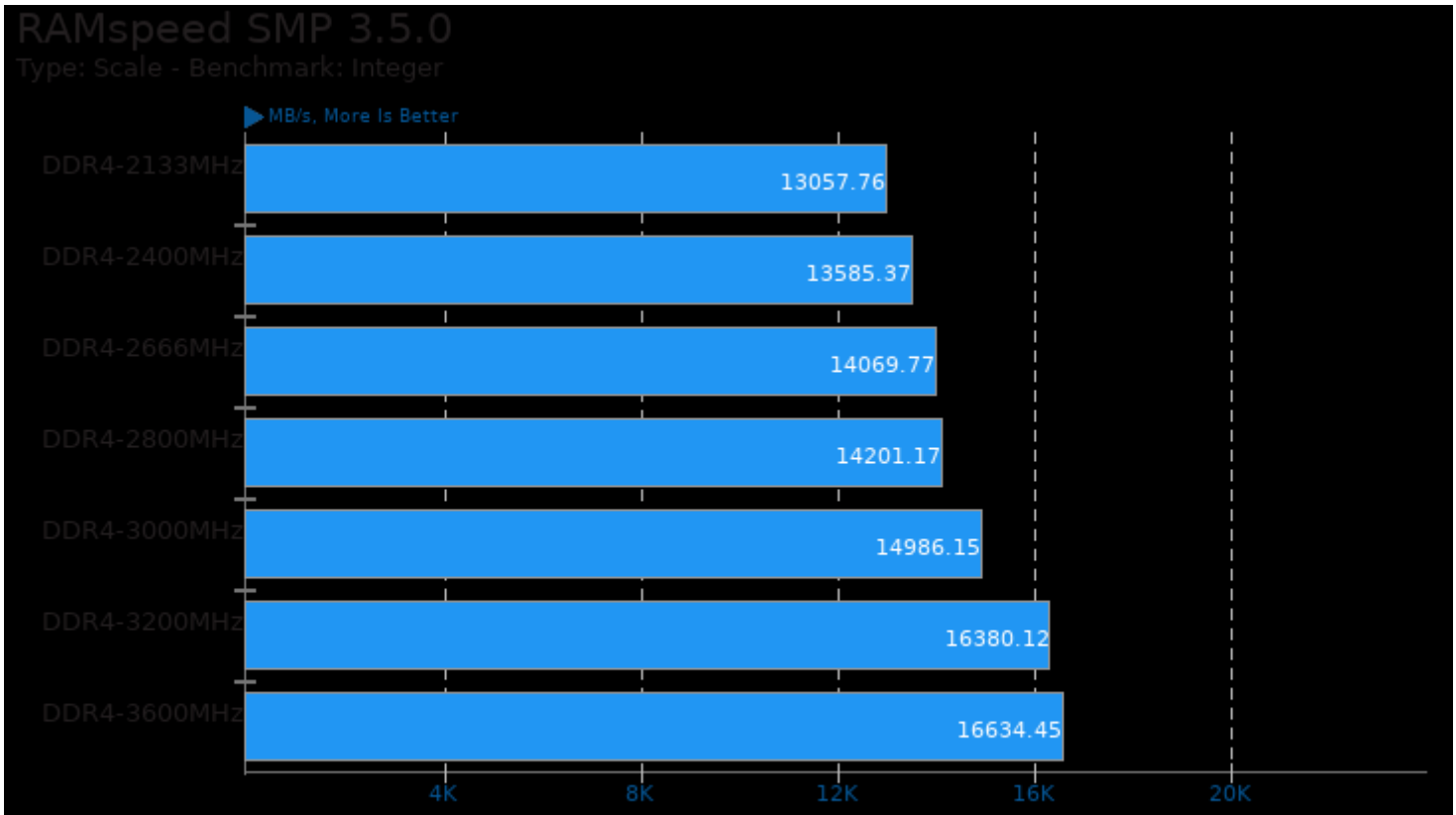


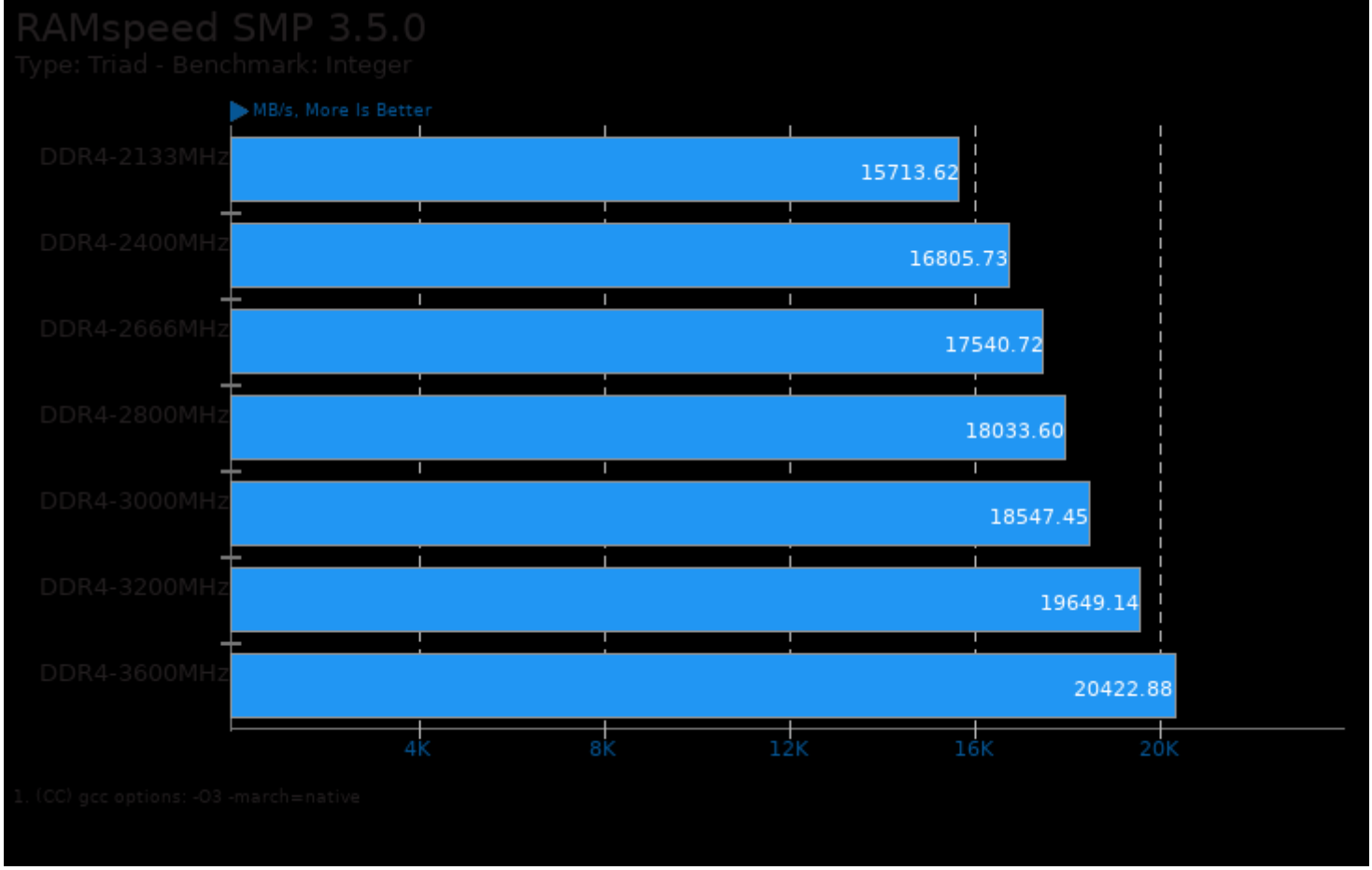
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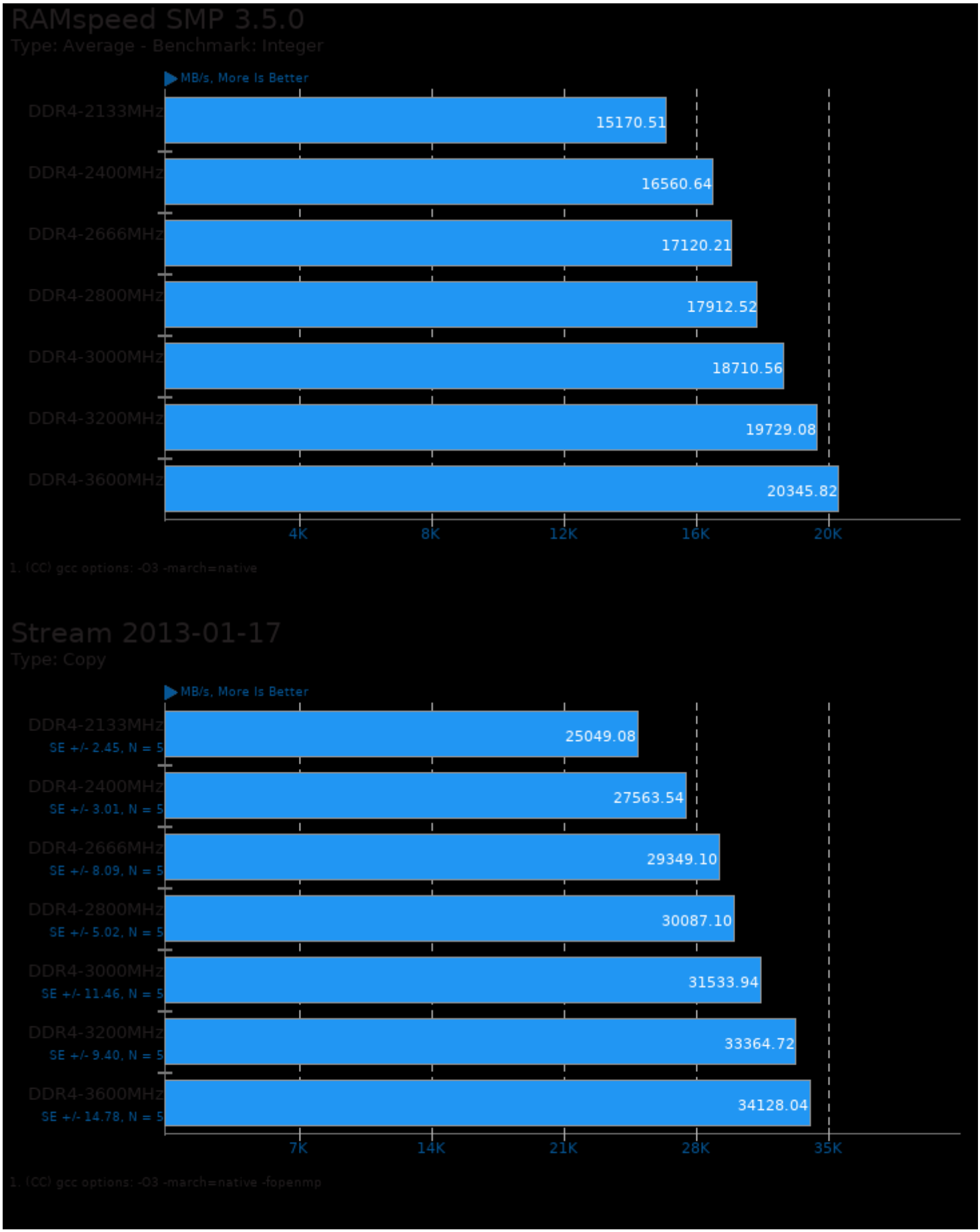


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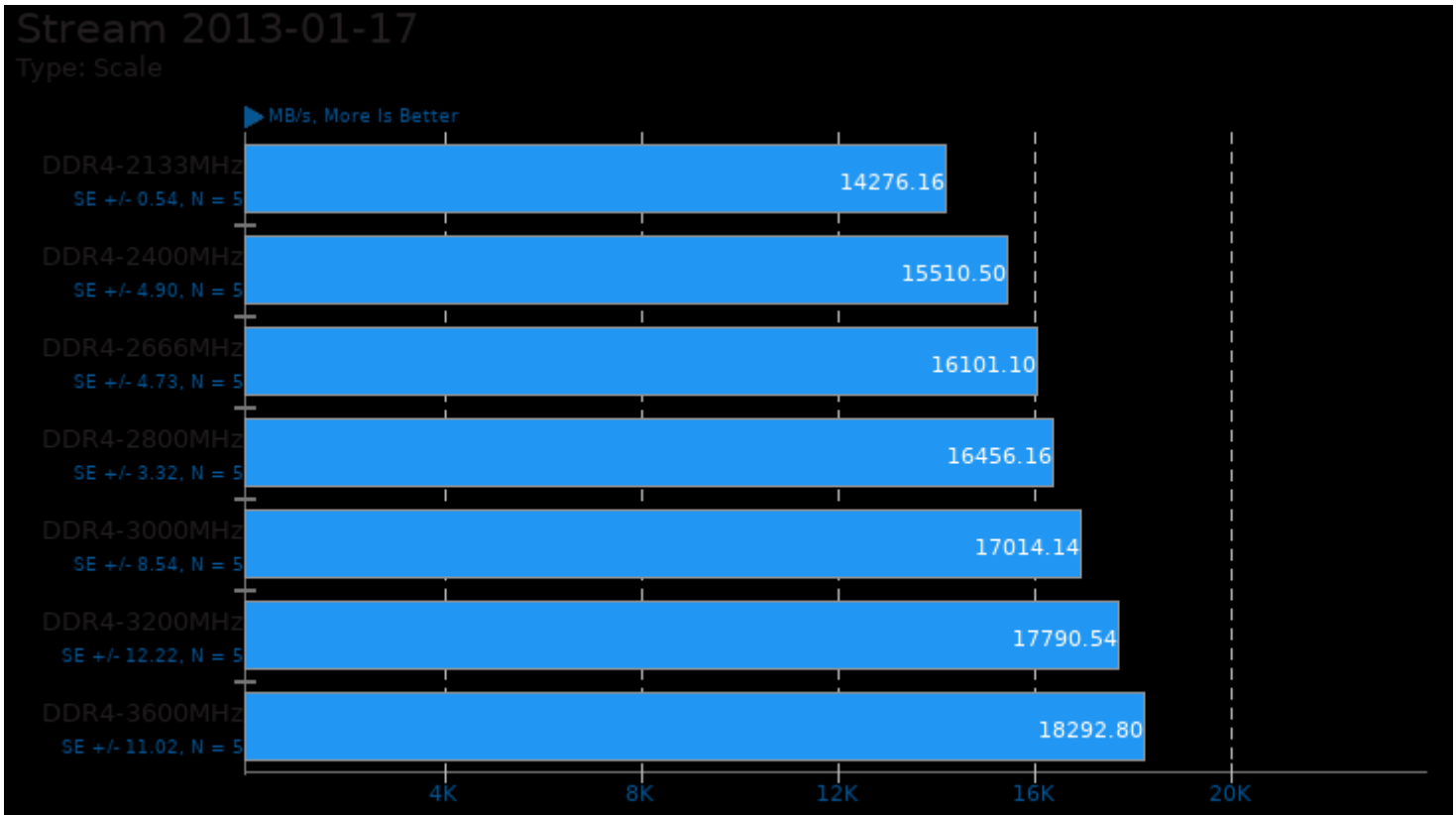


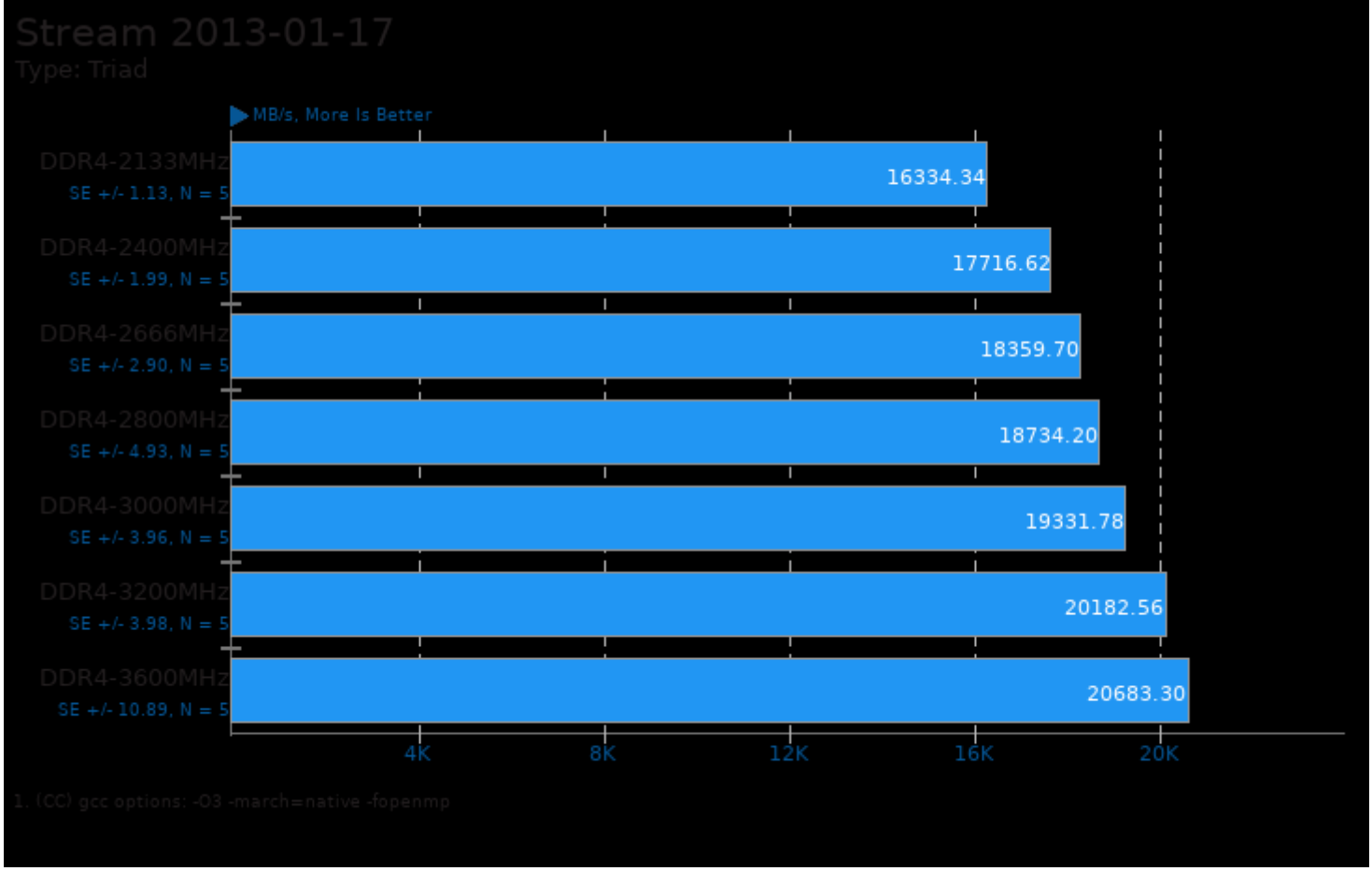


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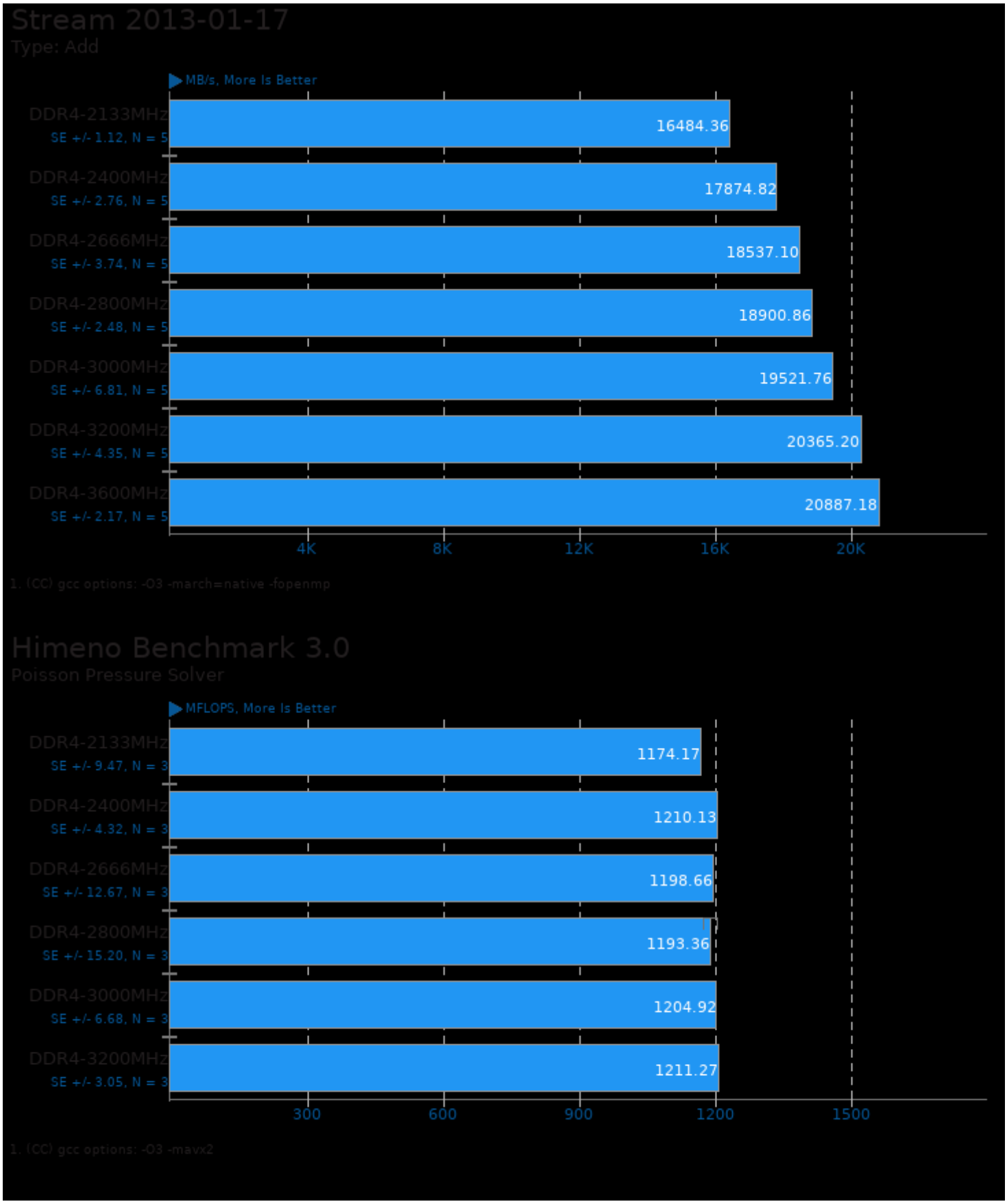


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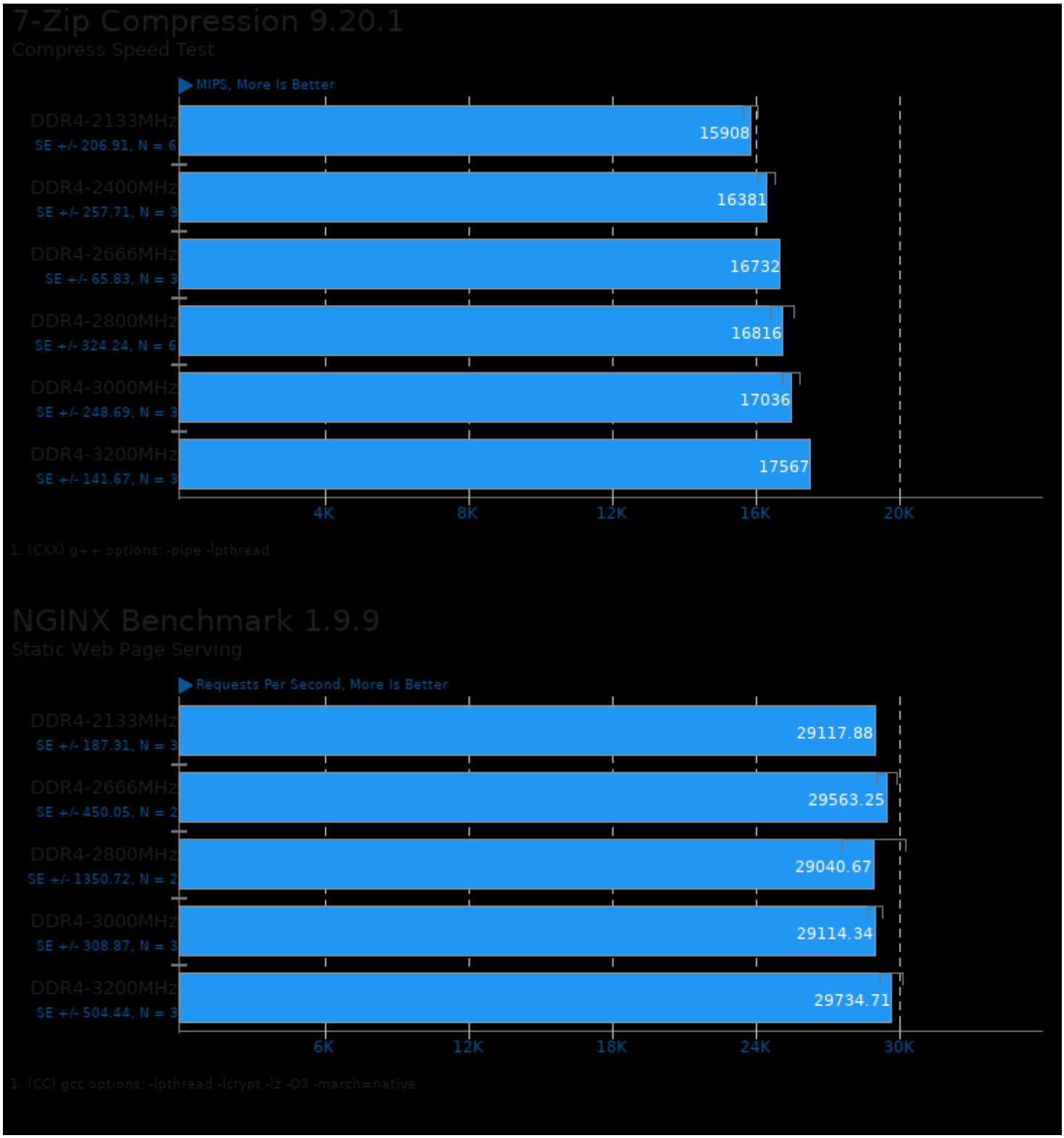




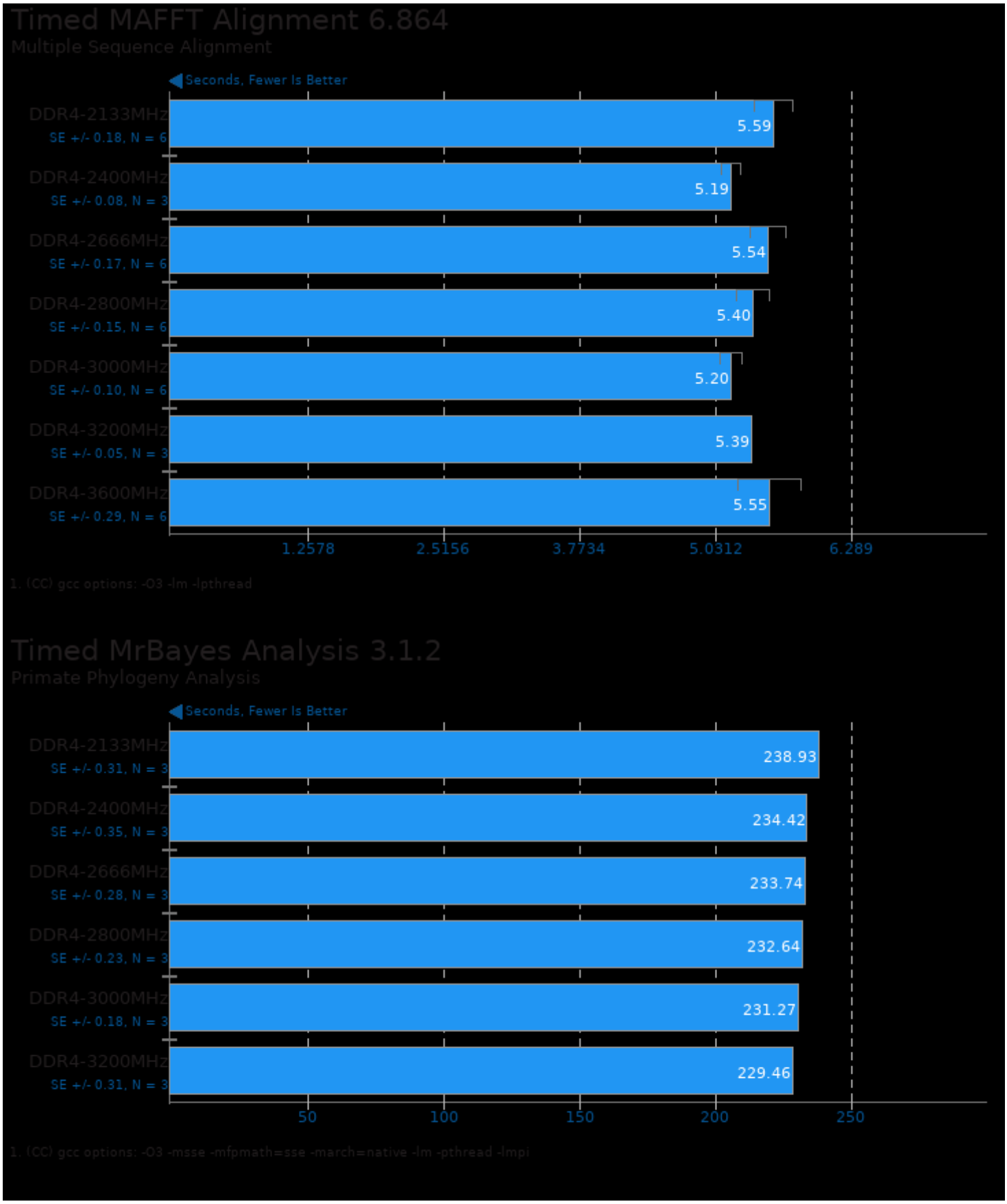
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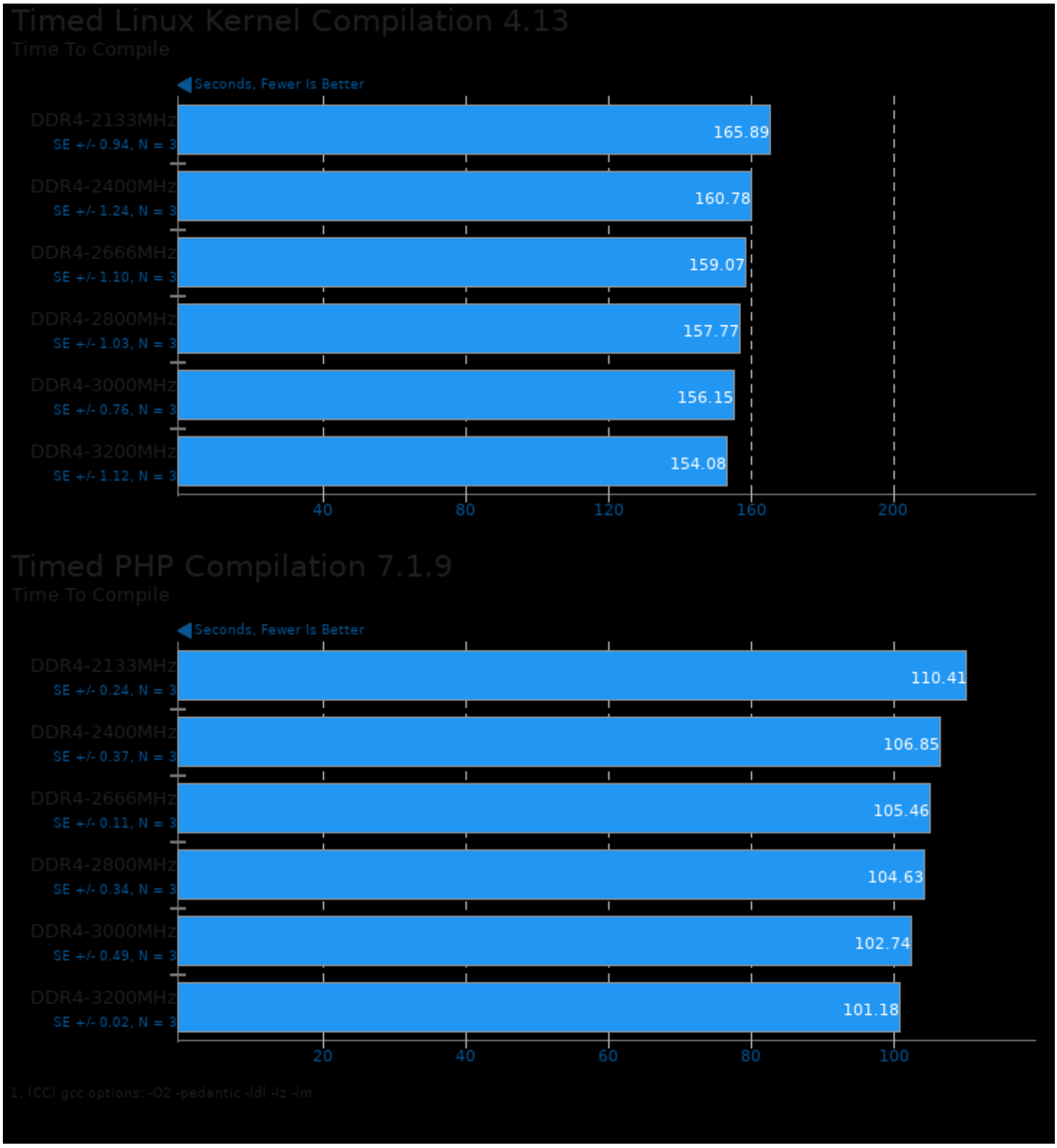
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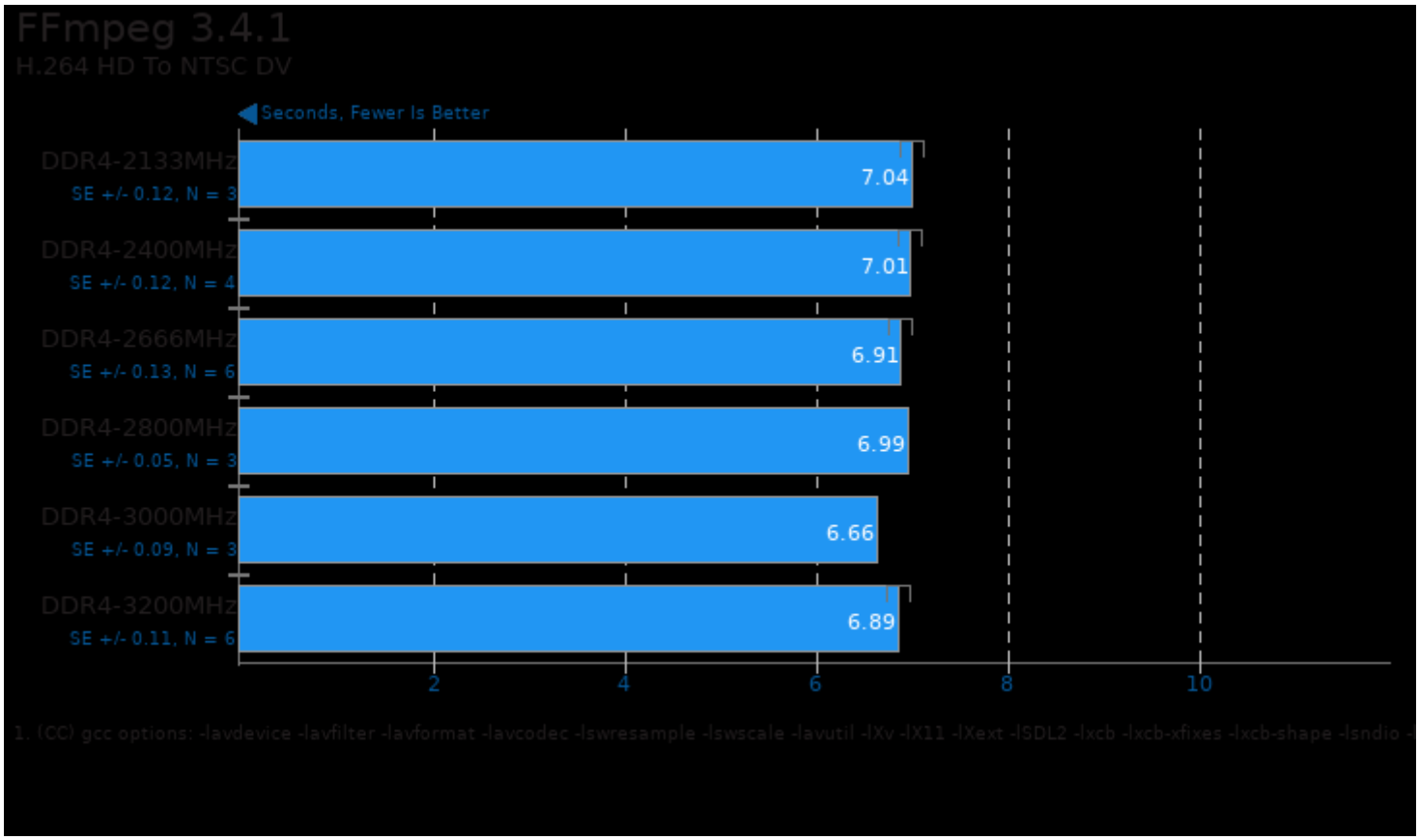
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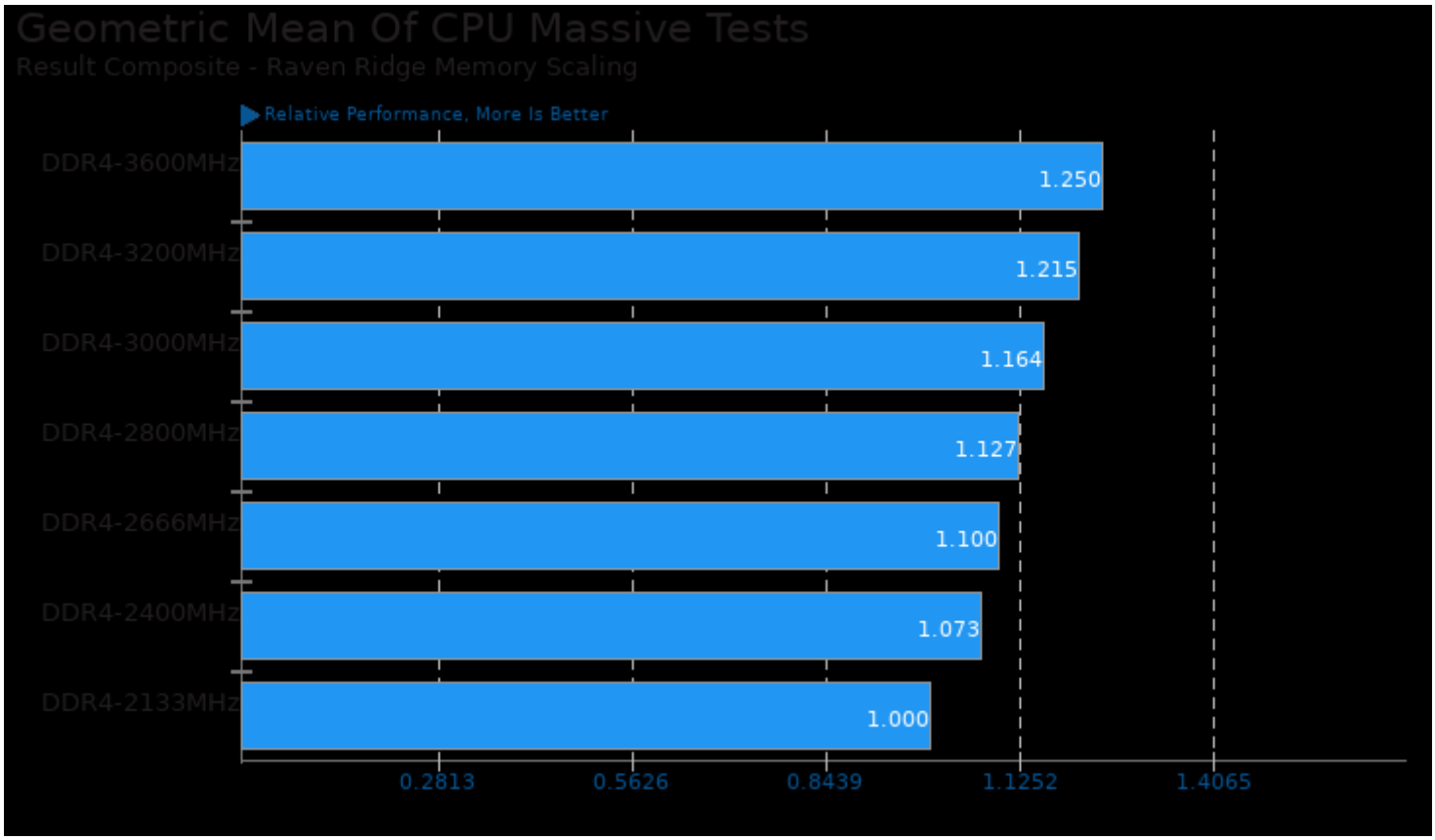


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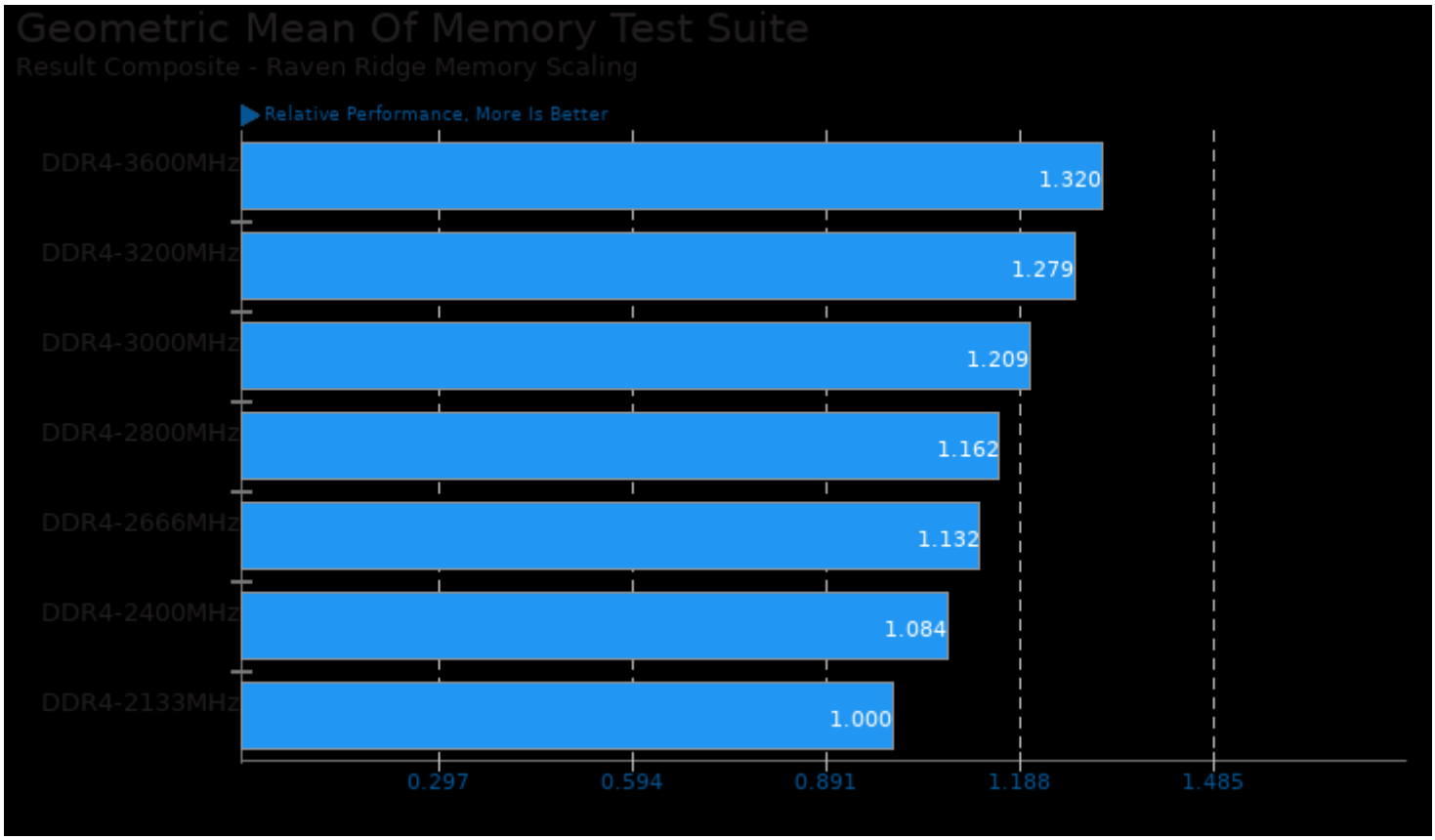
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These geometric means are based upon test groupings / test suites for this result file.

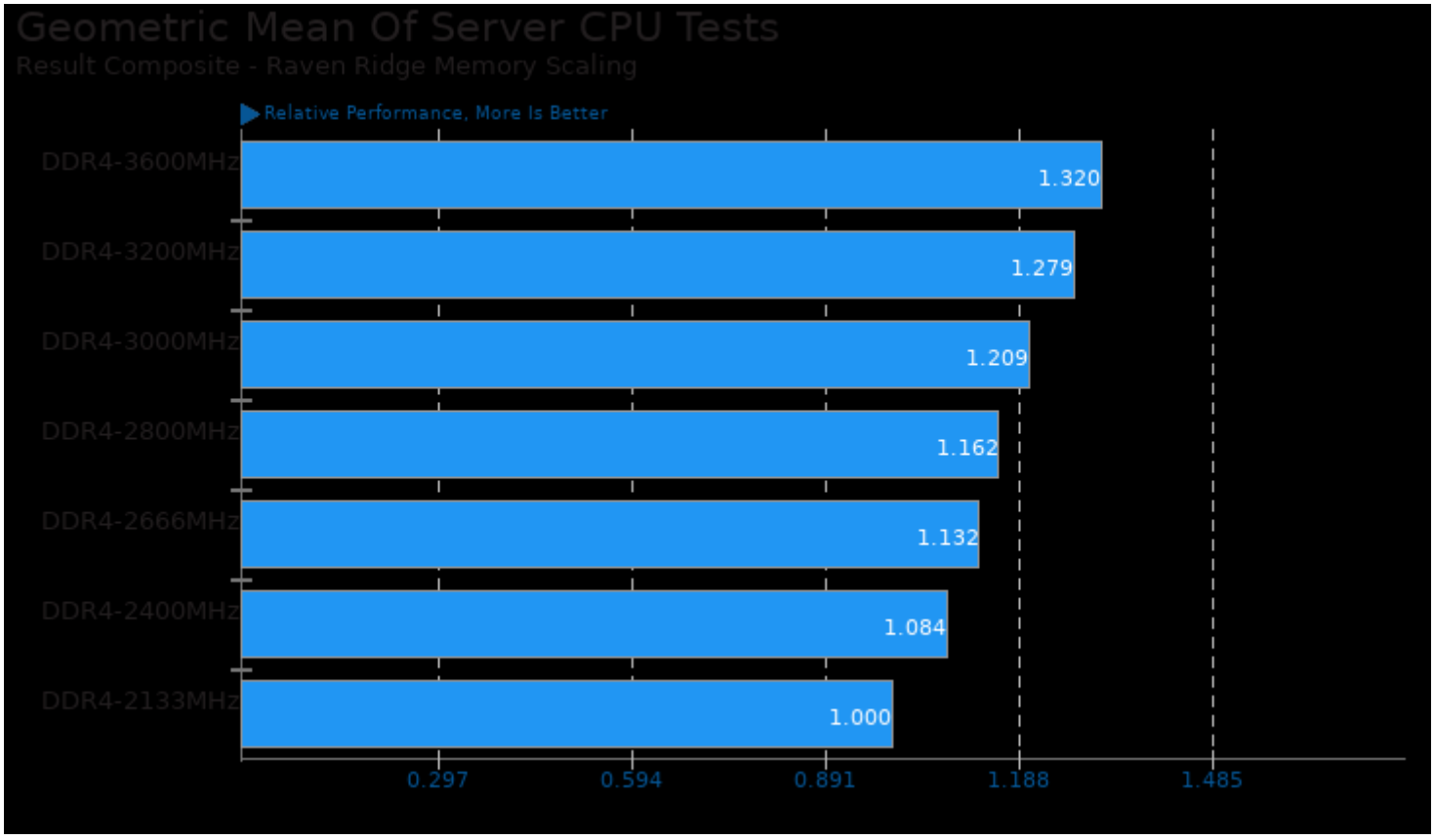


Geometric mean based upon tests: pts/build-linux-kernel, pts/build-php, pts/compilebench, pts/compress-7zip, pts/himeno, pts/mafft, pts/mrbayes, pts/nginx, pts/ramspeed and pts/stream

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Geometric mean based upon tests: pts/ramspeed and pts/stream



Geometric mean based upon tests: pts/himeno, pts/compress-7zip, pts/build-linux-kernel, pts/build-php, pts/ramspeed and pts/stream

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