



Intel Xeon Ice Lake-SP and Cascade Lake-SP vs. AMD EPYC Milan Preliminary Test (Clea

AMD EPYC 7763 | AMD EPYC 7543 | Intel Xeon Platinum 8368 | Intel Xeon Platinum 8260M on Ubuntu 20.10 via the Phoronix Test Suite.

Automated Executive Summary

2 x Intel Xeon Platinum 8368 had the most wins, coming in first place for 45% of the tests.

Based on the geometric mean of all complete results, the fastest (2 x Intel Xeon Platinum 8368) was 1.349x the speed of the slowest (2 x Intel Xeon Platinum 8260M). 2 x AMD EPYC 7543 was 0.866x the speed of 2 x Intel Xeon Platinum 8368, 2 x AMD EPYC 7763 was 0.976x the speed of 2 x AMD EPYC 7543, 2 x Intel Xeon Platinum 8260M was 0.877x the speed of 2 x AMD EPYC 7763.

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

oneDNN (Harness: Convolution Batch Shapes Auto - Data Type: f32 - Engine: CPU) at 7.388x

Sysbench (Test: CPU) at 6.325x

oneDNN (Harness: Deconvolution Batch shapes_1d - Data Type: u8s8f32 - Engine: CPU) at 4.943x

Pennant (Test: leblancbig) at 3.468x

Blender (Blend File: Classroom - Compute: CPU-Only) at 3.26x

oneDNN (Harness: Matrix Multiply Batch Shapes Transformer - Data Type: u8s8f32 - Engine: CPU) at 3.247x

Coremark (CoreMark Size 666 - Iterations Per Second) at 2.822x

Rodinia (Test: OpenMP LavaMD) at 2.803x

oneDNN (Harness: Recurrent Neural Network Training - Data Type: bf16bf16bf16 - Engine: CPU) at 2.795x

CacheBench (Test: Read / Modify / Write) at 2.736x.

Test Systems:

2 x AMD EPYC 7763

Processor: 2 x AMD EPYC 7763 64-Core @ 2.45GHz (128 Cores / 256 Threads), Motherboard: AMD DAYTONA_X (RYM1001D BIOS), Chipset: AMD Starship/Matisse, Memory: 1008GB, Disk: 3201GB HUSMR7632BDP3M1 + 256GB Micron_1100_MTFD, Graphics: ASPEED, Network: 2 x Mellanox MT27710

OS: Ubuntu 20.10, Kernel: 5.8.0-44-generic (x86_64), Compiler: GCC 10.2.0, File-System: xfs, Screen Resolution: 1024x768

Kernel Notes: Transparent Huge Pages: madvise

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-nvptx/usr,amdgc-nl-amdhsa=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-gcn/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa001119

Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

2 x AMD EPYC 7543

Processor: 2 x AMD EPYC 7543 32-Core @ 2.80GHz (64 Cores / 128 Threads), Motherboard: AMD DAYTONA_X (RYM1001D BIOS), Chipset: AMD Starship/Matisse, Memory: 504GB, Disk: 3201GB HUSMR7632BDP3M1 + 256GB Micron_1100_MTFD, Graphics: ASPEED, Network: 2 x Mellanox MT27710

OS: Ubuntu 20.10, Kernel: 5.8.0-44-generic (x86_64), Compiler: GCC 10.2.0, File-System: xfs, Screen Resolution: 1024x768

Kernel Notes: Transparent Huge Pages: madvise

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-nvptx/usr,amdgc-nl-amdhsa=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-gcn/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Disk Notes: NONE / attr2,inode64,logbsize=32k,logbufs=8,noquota,relatime,rw / Block Size: 4096

Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa001119

Java Notes: OpenJDK Runtime Environment (build 11.0.10+9-Ubuntu-0ubuntu1.20.10)

Python Notes: Python 2.7.18 + Python 3.8.6

Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

2 x Intel Xeon Platinum 8368

Processor: 2 x Intel Xeon Platinum 8368 @ 3.40GHz (76 Cores / 152 Threads), Motherboard: Intel M50CYP2SB2U

(SE5C6200.86B.0022.D08.2103221623 BIOS), Chipset: Intel Device 0998, Memory: 1008GB, Disk: 400GB INTEL SSDPF21Q400GB + 15363GB INTEL SSDPE2NV153T8 + 240GB INTEL SSDSCKKB24, Graphics: ASPEED, Monitor: PHL 223V5, Network: 2 x Intel 10G X550T + 2 x Intel XXV710 for 25GbE SFP28

OS: Ubuntu 20.10, Kernel: 5.8.0-48-generic (x86_64), Compiler: GCC 10.2.0, File-System: xfs, Screen Resolution: 1920x1080

Kernel Notes: Transparent Huge Pages: madvise
 Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-nvptx/usr,amdgc-n-amdhsa=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-gcn/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
 Disk Notes: NONE / attr2,inode64,logbsize=32k,logbufs=8,noquota,relatime,rw / Block Size: 4096
 Processor Notes: Scaling Governor: intel_pstate performance - CPU Microcode: 0xd000270
 Java Notes: OpenJDK Runtime Environment (build 11.0.10+9-Ubuntu-0ubuntu1.20.10)
 Python Notes: Python 3.8.6
 Security Notes: itlb_multihit: Not affected + I1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Enhanced IBRS IBPB: conditional RSB filling + srbds: Not affected + tsx_async_abort: Not affected

2 x Intel Xeon Platinum 8260M

Processor: 2 x Intel Xeon Platinum 8260M @ 3.90GHz (48 Cores / 96 Threads), Motherboard: Intel S2600WFT (SE5C620.86B.02.01.0013.121520200651 BIOS), Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 756GB, Disk: 15363GB INTEL SSDPE2NV153T8 + 400GB INTEL SSDPF21Q400GB + 240GB INTEL SSDSCKJB24, Graphics: ASPEED, Monitor: PHL 223V5, Network: 2 x Intel X722 for 10GBASE-T + 2 x Intel XXV710 for 25GbE SFP28

OS: Ubuntu 20.10, Kernel: 5.8.0-48-generic (x86_64), Compiler: GCC 10.2.0, File-System: xfs, Screen Resolution: 1920x1080

Kernel Notes: Transparent Huge Pages: madvise
 Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-nvptx/usr,amdgc-n-amdhsa=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-gcn/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
 Disk Notes: NONE / attr2,inode64,logbsize=32k,logbufs=8,noquota,relatime,rw / Block Size: 4096
 Processor Notes: Scaling Governor: intel_pstate performance - CPU Microcode: 0x4003003
 Java Notes: OpenJDK Runtime Environment (build 11.0.10+9-Ubuntu-0ubuntu1.20.10)
 Python Notes: Python 3.8.6
 Security Notes: itlb_multihit: KVM: Mitigation of VMX disabled + I1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Enhanced IBRS IBPB: conditional RSB filling + srbds: Not affected + tsx_async_abort: Mitigation of TSX disabled

	2 x AMD EPYC 7763	2 x AMD EPYC 7543	2 x Intel Xeon Platinum 8368	2 x Intel Xeon Platinum 8260M
NAS Parallel Benchmarks - EP.D	10363	5866	9119	4856
(Mop/s)				
Normalized	100%	56.6%	87.99%	46.86%
Standard Deviation	1.9%	2.9%	13.7%	2.1%
Rodinia - OpenMP LavaMD (sec)	26.213	37.575	38.708	73.474
Normalized	100%	69.76%	67.72%	35.68%

	Standard Deviation	2.5%	2.4%	0.8%	0.6%
Rodinia - OpenMP HotSpot3D (sec)		97.471	89.083	102.906	114.729
	Normalized	91.39%	100%	86.57%	77.65%
	Standard Deviation	6.1%	5.6%	0.5%	1.4%
Rodinia - OpenMP Leukocyte (sec)		54.235	49.399	45.537	69.554
	Normalized	83.96%	92.18%	100%	65.47%
	Standard Deviation	2.4%	1.4%	6%	1.1%
Rodinia - OpenMP CFD Solver (sec)		6.224	6.397	3.925	6.346
	Normalized	63.06%	61.36%	100%	61.85%
	Standard Deviation	2%	13.4%	0.5%	0.7%
NAMD - ATPase Simulation - 327,506 Atoms (days/ns)		0.22771	0.34152	0.26675	0.49704
	Normalized	100%	66.68%	85.36%	45.81%
	Standard Deviation	1.5%	0.1%	0.5%	0.6%
Dolfyn - C.F.D (sec)		18.324	17.148	20.649	21.607
	Normalized	93.58%	100%	83.05%	79.36%
	Standard Deviation	0.1%	0%	0.1%	0.1%
Nebular Empirical Analysis Tool (sec)		30.563	28.237	20.655	33.695
	Normalized	67.58%	73.15%	100%	61.3%
	Standard Deviation	5.1%	2.2%	4.9%	3.1%
Pennant - leblancbig (Hydro Cycle Time - sec)		16.95403	12.68979	4.888998	11.66005
	Normalized	28.84%	38.53%	100%	41.93%
	Standard Deviation	0.9%	2.2%	2%	2.2%
Timed MAFFT Alignment - M.S.A - LSU RNA (sec)		10.426	9.311	8.715	10.659
	Normalized	83.59%	93.6%	100%	81.76%
	Standard Deviation	4.4%	1.9%	2.2%	3.3%
OpenFOAM - Motorbike 60M (sec)		765.47	377.23	102.12	204.76
	Normalized	13.34%	27.07%	100%	49.87%
	Standard Deviation	19.9%	1%	0.1%	0.3%
ACES DGEMM - S.F.P.R (GFLOP/s)		37.604790	18.311647	28.425921	14.063351
	Normalized	100%	48.69%	75.59%	37.4%
	Standard Deviation	2.3%	2.1%	0.2%	2.5%
Himeno Benchmark - P.P.S (MFLOPS)		3703	3709	4129	3328
	Normalized	89.67%	89.84%	100%	80.59%
	Standard Deviation	5.6%	1.8%	0%	0.1%
Numpy Benchmark (Score)		363.22	391.75	396.14	355.52
	Normalized	91.69%	98.89%	100%	89.75%
	Standard Deviation	0.7%	0.4%	0.2%	0.7%
Ngspice - C2670 (sec)		145.824	136.144	128.633	158.370
	Normalized	88.21%	94.48%	100%	81.22%
	Standard Deviation	0.9%	0.8%	0.6%	0.5%
Ngspice - C7552 (sec)		113.354	103.659	148.553	152.358
	Normalized	91.45%	100%	69.78%	68.04%
	Standard Deviation	1.1%	2.1%	0.1%	0.2%
Kripke (Throughput FoM)		119412673	132528867	173672467	97292812
	Normalized	68.76%	76.31%	100%	56.02%
	Standard Deviation	5.8%	1.1%	0.7%	6.3%
OSBench - Create Files (us/Event)		24.004262	21.967675	22.004364	24.712765
	Normalized	91.52%	100%	99.83%	88.89%
	Standard Deviation	1%	0.7%	0.7%	1.3%
OSBench - Create Threads (us/Event)		28.843085	23.477674	16.019344	16.891956
	Normalized	55.54%	68.23%	100%	94.83%
	Standard Deviation	2.4%	2.4%	0.6%	0.9%

OSBench - Launch Programs	69.567045	62.649250	32.489300	39.626758
Normalized	46.7%	51.86%	100%	81.99%
Standard Deviation	4.9%	1.9%	1.3%	0.5%
OSBench - Create Processes	48.923492	47.276338	28.825601	32.223860
Normalized	58.92%	60.97%	100%	89.45%
Standard Deviation	1.5%	3.9%	0.3%	1.5%
OSBench - Memory Allocations	77.320893	68.823973	69.346666	104.860703
(Ns/Event)				
Normalized	89.01%	100%	99.25%	65.63%
Standard Deviation	0.3%	0.5%	0.1%	1.7%
BYTE Unix Benchmark - Dhrystone 2	40277917	43248926	41456410	38182436
(LPS)				
Normalized	93.13%	100%	95.86%	88.29%
Standard Deviation	1%	0.2%	0.1%	0.1%
CacheBench - Read (MB/s)	2601	2782	2877	3712
Normalized	70.07%	74.95%	77.51%	100%
Standard Deviation	0%	0%	0%	0%
CacheBench - Write (MB/s)	24981	26691	23648	27566
Normalized	90.62%	96.82%	85.79%	100%
Standard Deviation	0%	0%	0%	0%
CacheBench - R.M.W (MB/s)	49620	53030	37399	19382
Normalized	93.57%	100%	70.52%	36.55%
Standard Deviation	0%	0%	0%	0%
Coremark - CoreMark Size 666 - I.P.S	3733027	2633539	2359710	1322885
(Iterations/Sec)				
Normalized	100%	70.55%	63.21%	35.44%
Standard Deviation	2.4%	0.2%	3.5%	2.3%
ctx_clock - C.S.T (Clocks)	147	140	156	128
Normalized	87.07%	91.43%	82.05%	100%
Sysbench - Memory (Events/sec)	7458386	6007638	13427383	12819941
Normalized	55.55%	44.74%	100%	95.48%
Standard Deviation	0.7%	0.7%	0.1%	1.8%
Sysbench - CPU (Events/sec)	477380	274610	217291	75476
Normalized	100%	57.52%	45.52%	15.81%
Standard Deviation	0.2%	0.8%	0%	0.3%
FinanceBench - Repo OpenMP (ms)	40846	37281	38934	43008
Normalized	91.27%	100%	95.75%	86.68%
Standard Deviation	1.5%	1.1%	0.1%	0.2%
FinanceBench - Bonds OpenMP (ms)	55531	52390	57178	60569
Normalized	94.34%	100%	91.63%	86.5%
Standard Deviation	0.5%	0.5%	0.1%	1.1%
MariaDB - 128 (Queries/sec)	384	378	202	182
Normalized	100%	98.44%	52.6%	47.4%
Standard Deviation	5.3%	0.2%	1.5%	0%
MariaDB - 256 (Queries/sec)	287	324	171	172
Normalized	88.58%	100%	52.78%	53.09%
Standard Deviation	2.5%	0.9%	0.4%	0.4%
MariaDB - 512 (Queries/sec)	314	325	173	173
Normalized	96.62%	100%	53.23%	53.23%
Standard Deviation	10%	0.4%	0.5%	0.1%
PostgreSQL pgbench - 100 - 250 -	704577	716556	924156	525874
Read Only (TPS)				
Normalized	76.24%	77.54%	100%	56.9%
Standard Deviation	9.7%	8%	6.4%	1.8%

PostgreSQL pgbench - 100 - 250 - 0.360	0.352	0.273	0.476
Read Only - Average Latency (ms)			
Normalized	75.83%	77.56%	100%
Standard Deviation	10.5%	9.2%	6.5%
PostgreSQL pgbench - 100 - 250 - 51183	35338	37436	31338
Read Write (TPS)			
Normalized	100%	69.04%	73.14%
Standard Deviation	4.8%	2.2%	4.3%
PostgreSQL pgbench - 100 - 250 - 4.918	7.094	6.708	8.002
Read Write - Average Latency (ms)			
Normalized	100%	69.33%	73.32%
Standard Deviation	5.3%	2.2%	4.3%
SQLite Speedtest - Timed Time - Size 59.337	55.777	59.555	65.235
1,000 (sec)			
Normalized	94%	100%	93.66%
Standard Deviation	0.4%	0.7%	1.2%
Redis - LPOP (Reqs/sec) 2359254	2410419	2843902	2659032
Normalized	82.96%	84.76%	100%
Standard Deviation	8.4%	2.4%	0.1%
Redis - SADD (Reqs/sec) 2037944	1985172	2224301	2077706
Normalized	91.62%	89.25%	100%
Standard Deviation	7.9%	0.9%	2%
Redis - LPUSH (Reqs/sec) 1560259	1569646	1679884	1633413
Normalized	92.88%	93.44%	100%
Standard Deviation	6.9%	1.4%	1.1%
Redis - GET (Reqs/sec) 2319619	2382131	2712763	2483483
Normalized	85.51%	87.81%	100%
Standard Deviation	4.4%	1.6%	0.2%
Redis - SET (Reqs/sec) 1772195	1782419	1975204	1854411
Normalized	89.72%	90.24%	100%
Standard Deviation	6.8%	1.6%	0.7%
Apache Cassandra - Mixed 1:3 (Op/s) 15671	13407	29971	35945
Normalized	43.6%	37.3%	83.38%
Standard Deviation	171.9%	148.4%	148.2%
FLAC Audio Encoding - WAV To 8.874	8.565	9.999	10.032
FLAC (sec)			
Normalized	96.52%	100%	85.66%
Standard Deviation	0.2%	0.6%	0.3%
LAME MP3 Encoding - WAV To MP3 8.089	7.590	9.087	10.114
(sec)			
Normalized	93.83%	100%	83.53%
Standard Deviation	0.1%	0.3%	0.2%
Zstd Compression - 8 - Compression 2580	3116	1984	1083
Speed (MB/s)			
Normalized	82.78%	100%	63.67%
Standard Deviation	7.1%	5.5%	3.3%
Zstd Compression - 8 - D.S (MB/s) 3433	3650	3013	2457
Normalized	94.06%	100%	82.56%
Standard Deviation	2.7%	2.2%	0.6%
John The Ripper - Blowfish (Real C/S) 177138	121560	120750	65049
Normalized	100%	68.62%	68.17%
Standard Deviation	0.2%	0.4%	0.1%
John The Ripper - MD5 (Real C/S) 11282667	6787000	10405667	6128667
Normalized	100%	60.15%	92.23%

	Standard Deviation	0.2%	0.7%	0.1%	0.3%
dav1d - Chimera 1080p (FPS)	1438	1179	1324	899.38	
	Normalized	100%	82.02%	92.1%	62.56%
	Standard Deviation	4.9%	2.7%	0.2%	0.8%
dav1d - C.1.1.b (FPS)	339.89	275.05	261.53	194.70	
	Normalized	100%	80.92%	76.95%	57.28%
	Standard Deviation	2.3%	0.8%	2.9%	0.2%
OSPray - M.R - SciVis (FPS)	66.67	52.63	111.11	55.56	
	Normalized	60%	47.37%	100%	50%
	Standard Deviation	0%	0%	0%	0%
OSPray - M.R - Path Tracer (FPS)	500	500	1000	500	
	Normalized	50%	50%	100%	50%
Kvazaar - Bosphorus 1080p - Medium (FPS)	74.72	82.65	67.50	43.09	
	Normalized	90.41%	100%	81.67%	52.14%
	Standard Deviation	0.1%	1.1%	0.9%	0.1%
SVT-VP9 - P.S.O - Bosphorus 1080p (FPS)	403.66	386.94	479.67	306.77	
	Normalized	84.15%	80.67%	100%	63.95%
	Standard Deviation	9.5%	14.9%	9.7%	5.3%
x264 - H.2.V.E (FPS)	212.80	230.85	225.74	147.33	
	Normalized	92.18%	100%	97.79%	63.82%
	Standard Deviation	4.2%	10%	14.9%	9.3%
x265 - Bosphorus 1080p (FPS)	69.73	70.40	76.78	62.75	
	Normalized	90.82%	91.69%	100%	81.73%
	Standard Deviation	2.5%	4.1%	1%	0.4%
7-Zip Compression - C.S.T (MIPS)	428677	306883	329337	182082	
	Normalized	100%	71.59%	76.83%	42.48%
	Standard Deviation	3.4%	2%	1.8%	1.6%
Timed GCC Compilation - Time To Compile (sec)	668.311	641.125	606.060	722.148	
	Normalized	90.69%	94.53%	100%	83.92%
	Standard Deviation	0.3%	0.3%	0.1%	0.2%
Timed Linux Kernel Compilation - Time To Compile (sec)	19.526	24.134	22.460	34.706	
	Normalized	100%	80.91%	86.94%	56.26%
	Standard Deviation	2.7%	3.2%	2.4%	2.2%
Timed LLVM Compilation - Time To Compile (sec)	187.095	190.060	192.378	264.955	
	Normalized	100%	98.44%	97.25%	70.61%
	Standard Deviation	0.2%	1.1%	0.7%	2.3%
C-Ray - Total Time - 4.1.R.P.P (sec)	6.095	10.079	10.590	20.458	
	Normalized	100%	60.47%	57.55%	29.79%
	Standard Deviation	1%	0.9%	0.2%	19.7%
POV-Ray - Trace Time (sec)	7.691	9.211	9.275	18.215	
	Normalized	100%	83.5%	82.92%	42.22%
	Standard Deviation	2.2%	1.3%	1%	18%
Gzip Compression - L.S.T.A.T.t.g (sec)	41.393	38.798	40.871	41.432	
	Normalized	93.73%	100%	94.93%	93.64%
	Standard Deviation	0.1%	0.2%	0.1%	0.9%
OpenSSL - R.4.b.P (Signs/sec)	26545	15764	18137	10412	
	Normalized	100%	59.39%	68.33%	39.22%
	Standard Deviation	0.1%	0.1%	0.2%	0.2%
Blender - BMW27 - CPU-Only (sec)	21.37	29.30	28.38	48.61	

	Normalized	100%	72.94%	75.3%	43.96%
	Standard Deviation	1.5%	0.9%	0.5%	0.2%
Blender - Classroom - CPU-Only (sec)		42.14	72.52	70.43	137.39
	Normalized	100%	58.11%	59.83%	30.67%
	Standard Deviation	0.1%	0.7%	0.2%	0.2%
GnuPG - 2.7.S.F.E (sec)		76.436	71.486	77.601	72.750
	Normalized	93.52%	100%	92.12%	98.26%
	Standard Deviation	1.2%	1.1%	0.8%	1.2%
Java SciMark - Composite (Mflops)		2587	2785	2113	2032
	Normalized	92.89%	100%	75.86%	72.95%
	Standard Deviation	0.8%	0.7%	0.4%	1.2%
Java SciMark - Monte Carlo (Mflops)		1377	1472	839.19	959.23
	Normalized	93.55%	100%	57%	65.16%
	Standard Deviation	0.4%	0.5%	0%	0%
Java SciMark - F.F.T (Mflops)		1952	2098	1536	1298
	Normalized	93.07%	100%	73.21%	61.88%
	Standard Deviation	0.7%	0.9%	0.7%	6.2%
Java SciMark - S.M.M (Mflops)		2281	2449	2143	1553
	Normalized	93.14%	100%	87.48%	63.39%
	Standard Deviation	0.6%	0.1%	0%	0%
Java SciMark - D.L.M.F (Mflops)		5715	6183	4576	4785
	Normalized	92.42%	100%	74%	77.38%
	Standard Deviation	1.7%	1.6%	0.7%	1.4%
Java SciMark - J.S.O.R (Mflops)		1612	1725	1472	1565
	Normalized	93.44%	100%	85.34%	90.74%
	Standard Deviation	0%	0.1%	0%	0%
Renaissance - Scala Dotty (ms)		1572	1498	1667	1883
	Normalized	95.34%	100%	89.91%	79.56%
	Standard Deviation	2.4%	2.4%	0.9%	2.4%
Renaissance - Rand Forest (ms)		1687	1616	1789	1993
	Normalized	95.79%	100%	90.32%	81.08%
	Standard Deviation	3%	4.5%	2.4%	2.4%
Renaissance - Apache Spark ALS		2072	1915	2172	2528
	Normalized	92.4%	100%	88.16%	75.74%
	Standard Deviation	5.4%	1.8%	1.2%	1.1%
Renaissance - Apache Spark Bayes (ms)		97.114	98.685	91.491	129.600
	Normalized	94.21%	92.71%	100%	70.59%
	Standard Deviation	25.9%	33.6%	24.4%	25.4%
Renaissance - Savina Reactors.IO		19448	15477	19939	25770
	Normalized	79.58%	100%	77.62%	60.06%
	Standard Deviation	11.5%	12.4%	13.2%	10.9%
Renaissance - A.S.P (ms)		4601	4082	3306	4357
	Normalized	71.85%	80.98%	100%	75.88%
	Standard Deviation	9.8%	8.5%	6.2%	4.5%
Renaissance - T.H.R (ms)		5558	3447	3158	3737
	Normalized	56.82%	91.63%	100%	84.51%
	Standard Deviation	4.4%	0.9%	1.4%	2%
Renaissance - I.M.D.S (ms)		6419	6234	4007	5877
	Normalized	62.43%	64.27%	100%	68.18%
	Standard Deviation	7.2%	7.1%	5.5%	4.1%
Renaissance - A.U.C.T (ms)		31103	26851	12307	17099
	Normalized	39.57%	45.84%	100%	71.98%
	Standard Deviation	3.1%	2.8%	4.2%	2.1%
Renaissance - G.A.U.J.F (ms)		1742	1619	1558	1905

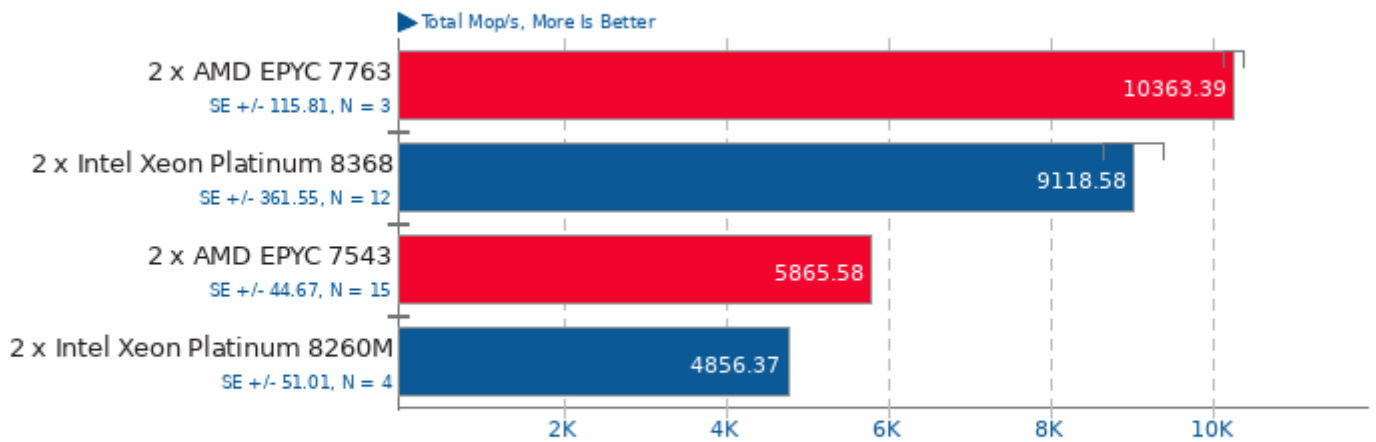
	Normalized	89.49%	96.27%	100%	81.82%
	Standard Deviation	10.7%	14%	12.1%	6%
PostMark - D.T.P (TPS)		8524	8928	7896	6522
	Normalized	95.47%	100%	88.44%	73.05%
	Standard Deviation	1.9%		1.8%	1.5%
Go Benchmarks - json (ns/op)		1430231	1409180	1145003	1672463
	Normalized	80.06%	81.25%	100%	68.46%
	Standard Deviation	3.4%	2%	0.5%	0.3%
Go Benchmarks - build (ns/op)		22679779928	19867833291	22148540653	24143096918
	Normalized	87.6%	100%	89.7%	82.29%
	Standard Deviation	1%	1.6%	0.8%	1.3%
Go Benchmarks - garbage (ns/op)		847371	815016	551177	750575
	Normalized	65.05%	67.63%	100%	73.43%
	Standard Deviation	1.1%	0.7%	1.3%	0.7%
oneDNN - C.B.S.A - f32 - CPU (ms)		0.618082	0.746819	1.56305	4.56668
	Normalized	100%	82.76%	39.54%	13.53%
	Standard Deviation	0.3%	1.6%	0.2%	0.1%
oneDNN - D.B.s - f32 - CPU (ms)		2.53956	1.88246	1.08309	1.48023
	Normalized	42.65%	57.54%	100%	73.17%
	Standard Deviation	2.2%	2.1%	0.2%	1.2%
oneDNN - C.B.S.A - u8s8f32 - CPU		1.040769	1.015001	1.20263	4.33270
	Normalized	97.52%	100%	84.4%	23.43%
	Standard Deviation	11.3%	11%	0.7%	0.4%
oneDNN - D.B.s - u8s8f32 - CPU (ms)		1.65651	1.42739	0.335154	0.438041
	Normalized	20.23%	23.48%	100%	76.51%
	Standard Deviation	1.9%	2.4%	0.8%	0.4%
oneDNN - R.N.N.T - f32 - CPU (ms)		1850	1400	623.537	1140
	Normalized	33.71%	44.54%	100%	54.69%
	Standard Deviation	4.6%	4.8%	0.1%	9.9%
oneDNN - R.N.N.I - f32 - CPU (ms)		1718	1117	411.961	730.360
	Normalized	23.99%	36.88%	100%	56.41%
	Standard Deviation	6.4%	8.2%	1.2%	4.1%
oneDNN - R.N.N.T - u8s8f32 - CPU		1817	1413	623.629	1112
	Normalized	34.32%	44.12%	100%	56.07%
	Standard Deviation	7.1%	5.8%	0.7%	6.2%
oneDNN - R.N.N.I - u8s8f32 - CPU (ms)		1723	1115	409.647	731.058
	Normalized	23.78%	36.73%	100%	56.03%
	Standard Deviation	8.8%	5.8%	0.7%	4.6%
oneDNN - M.M.B.S.T - f32 - CPU (ms)		0.498212	0.435059	0.235915	0.398769
	Normalized	47.35%	54.23%	100%	59.16%
	Standard Deviation	1.3%	4.1%	1.8%	2.4%
oneDNN - R.N.N.T - bf16bf16bf16 - CPU (ms)		1757	1375	628.754	1078
	Normalized	35.78%	45.74%	100%	58.34%
	Standard Deviation	5%	1.6%	1.5%	0.3%
oneDNN - R.N.N.I - bf16bf16bf16 - CPU (ms)		1707	1234	411.918	719.112
	Normalized	24.12%	33.38%	100%	57.28%
	Standard Deviation	9.4%	0.8%	0.2%	2.1%
oneDNN - M.M.B.S.T - u8s8f32 - CPU (ms)		0.701525	0.689266	0.216025	0.324278
	Normalized	30.79%	31.34%	100%	66.62%
	Standard Deviation	1.3%	0.8%	1.9%	3.6%
TensorFlow Lite - SqueezeNet (us)		68821	52139	44779	81410
	Normalized	65.07%	85.88%	100%	55%

	Standard Deviation	1.4%	3.7%	0.4%	2.4%
TensorFlow Lite - Inception V4 (us)	659401	844623	623887	1145795	
	Normalized	94.61%	73.87%	100%	54.45%
	Standard Deviation	5.2%	2.3%	0.2%	2.4%
TensorFlow Lite - NASNet Mobile (us)	166094	193408	73292	115676	
	Normalized	44.13%	37.9%	100%	63.36%
	Standard Deviation	1.1%	11.4%	2.3%	1.2%
TensorFlow Lite - Mobilenet Float (us)	56184	32834	31558	61270	
	Normalized	56.17%	96.11%	100%	51.51%
	Standard Deviation	1.1%	3.2%	1.8%	1.8%
TensorFlow Lite - Mobilenet Quant	56291	32765	31903	63135	
	Normalized	56.67%	97.37%	100%	50.53%
	Standard Deviation	1.8%	2.2%	1.1%	0.6%
TensorFlow Lite - I.R.V (us)	695459	756430	543326	1045843	
	Normalized	78.12%	71.83%	100%	51.95%
	Standard Deviation	2.5%	1.7%	0.7%	1.1%
TNN - CPU - MobileNet v2 (ms)	345.543	288.849	357.927	362.408	
	Normalized	83.59%	100%	80.7%	79.7%
	Standard Deviation	0.4%	1.4%	0%	0.5%
TNN - CPU - SqueezeNet v1.1 (ms)	295.740	276.862	366.176	345.567	
	Normalized	93.62%	100%	75.61%	80.12%
	Standard Deviation	0%	0.1%	0%	0%
PlaidML - No - Inference - VGG19 -	24.99	26.62	32.63	21.15	
	CPU (FPS)				
	Normalized	76.59%	81.58%	100%	64.82%
	Standard Deviation	2%	4.6%	3.5%	2.2%
PlaidML - No - Inference - ResNet 50 -	5.91	7.80	6.16	3.91	
	CPU (FPS)				
	Normalized	75.77%	100%	78.97%	50.13%
	Standard Deviation	0.8%	0.5%	1.3%	1.9%
ONNX Runtime - yolov4 - OpenMP	190	249	516	311	
	CPU (Inferences/min)				
	Normalized	36.82%	48.26%	100%	60.27%
	Standard Deviation	7.6%	5.1%	2.4%	2.2%
ONNX Runtime - fcn-resnet101-11 -	72	90	196	125	
	OpenMP CPU (Inferences/min)				
	Normalized	36.73%	45.92%	100%	63.78%
	Standard Deviation	7.7%	4.8%	1%	1.9%
ONNX Runtime - shufflenet-v2-10 -	4621	6198	8613	6977	
	OpenMP CPU (Inferences/min)				
	Normalized	53.65%	71.96%	100%	81.01%
	Standard Deviation	14.6%	8.7%	2.9%	2.5%
ONNX Runtime - super-resolution-10 -	3580	5352	7222	5701	
	OpenMP CPU (Inferences/min)				
	Normalized	49.57%	74.11%	100%	78.94%
	Standard Deviation	11.8%	8.7%	10.7%	5.5%
PyBench - T.F.A.T.T (Milliseconds)	972	917	984	1135	
	Normalized	94.34%	100%	93.19%	80.79%
	Standard Deviation	0.5%	0.5%	0.2%	
PyPerformance - go (Milliseconds)	256	238	250	250	
	Normalized	92.97%	100%	95.2%	95.2%
	Standard Deviation		0.2%		
PyPerformance - 2to3 (Milliseconds)	321	301	309	321	
	Normalized	93.77%	100%	97.41%	93.77%

	Standard Deviation	0.2%			
PyPerformance - chaos (Milliseconds)		111	104	102	106
	Normalized	91.89%	98.08%	100%	96.23%
	Standard Deviation	1%	0.6%		
PyPerformance - float (Milliseconds)		115	107	112	114
	Normalized	93.04%	100%	95.54%	93.86%
PyPerformance - nbody (Milliseconds)		119	111	108	127
	Normalized	90.76%	97.3%	100%	85.04%
	Standard Deviation		0.5%		
PyPerformance - pathlib		18.1	17.3	16.4	18.0
	Normalized	90.61%	94.8%	100%	91.11%
	Standard Deviation	0%	0%	0.4%	0.3%
PyPerformance - raytrace		478	447	472	474
	Normalized	93.51%	100%	94.7%	94.3%
	Standard Deviation	0.2%	0.2%	0.3%	
PyPerformance - json_loads (Milliseconds)		23.8	22.3	22.4	26.7
	Normalized	93.7%	100%	99.55%	83.52%
	Standard Deviation	0.2%	0.3%	0%	0.2%
PyPerformance - crypto_pyaes (Milliseconds)		106	99.5	103	113
	Normalized	93.87%	100%	96.6%	88.05%
	Standard Deviation		0.3%		
PyPerformance - regex_compile (Milliseconds)		171	159	165	167
	Normalized	92.98%	100%	96.36%	95.21%
PyPerformance - python_startup (Milliseconds)		8.17	7.68	8.00	8.32
	Normalized	94%	100%	96%	92.31%
	Standard Deviation	0.3%	0.5%	0.1%	0.2%
PyPerformance - django_template (Milliseconds)		49.2	45.2	47.3	48.1
	Normalized	91.87%	100%	95.56%	93.97%
	Standard Deviation	0.1%	0.1%	0.2%	0.2%
PyPerformance - pickle_pure_python (Milliseconds)		447	404	428	435
	Normalized	90.38%	100%	94.39%	92.87%
	Standard Deviation	0.4%	0.4%		0.4%
NGINX Benchmark - S.W.P.S (Reqs/sec)		33827	24918	48290	43722
	Normalized	70.05%	51.6%	100%	90.54%
	Standard Deviation	2.5%	14.8%	11.3%	0.1%
Apache Benchmark - S.W.P.S (Reqs/sec)		22343	23701	35223	25464
	Normalized	63.43%	67.29%	100%	72.29%
	Standard Deviation	8.6%	1.3%	2.4%	0.7%
PHPBench - P.B.S (Score)		592611	639114	721246	655461
	Normalized	82.16%	88.61%	100%	90.88%
	Standard Deviation	0.9%	0.5%	0.6%	0.1%
WireGuard + Linux Networking Stack Stress Test (sec)		457.877	415.246	246.323	338.281
	Normalized	53.8%	59.32%	100%	72.82%
	Standard Deviation	1.7%	1.9%	2.2%	0.3%

NAS Parallel Benchmarks 3.4

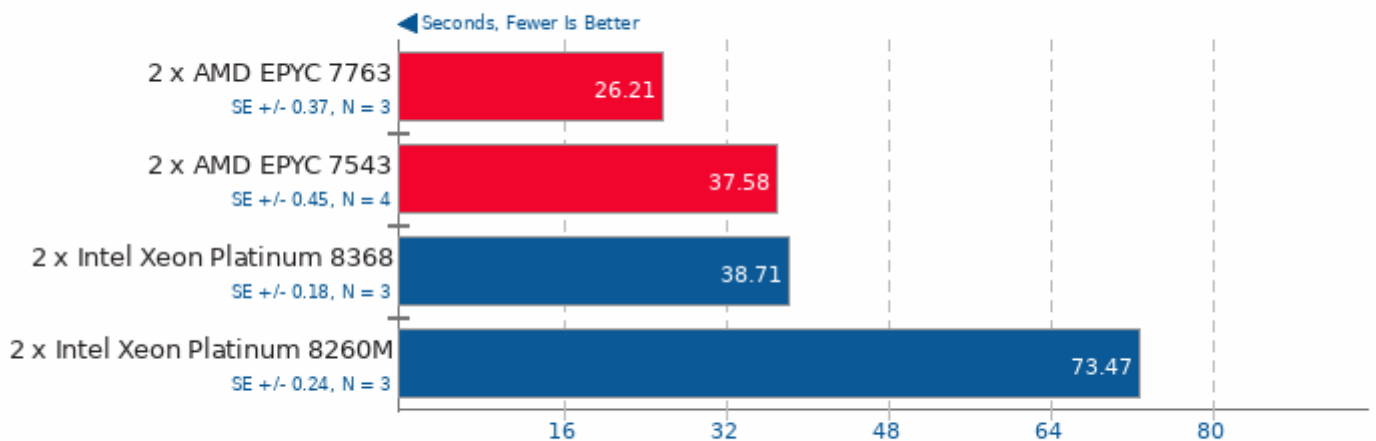
Test / Class: EP.D



- (F9X) gfortran options: -O3 -march=native -pthread -lm -lmpif08 -lm -lmpifh -lm -lopen-rte -lopen-pal -lhwloc -ldl -levent -levent_pthreads -lutil -lm -lrt -lz
- Open MPI 4.0.3

Rodinia 3.1

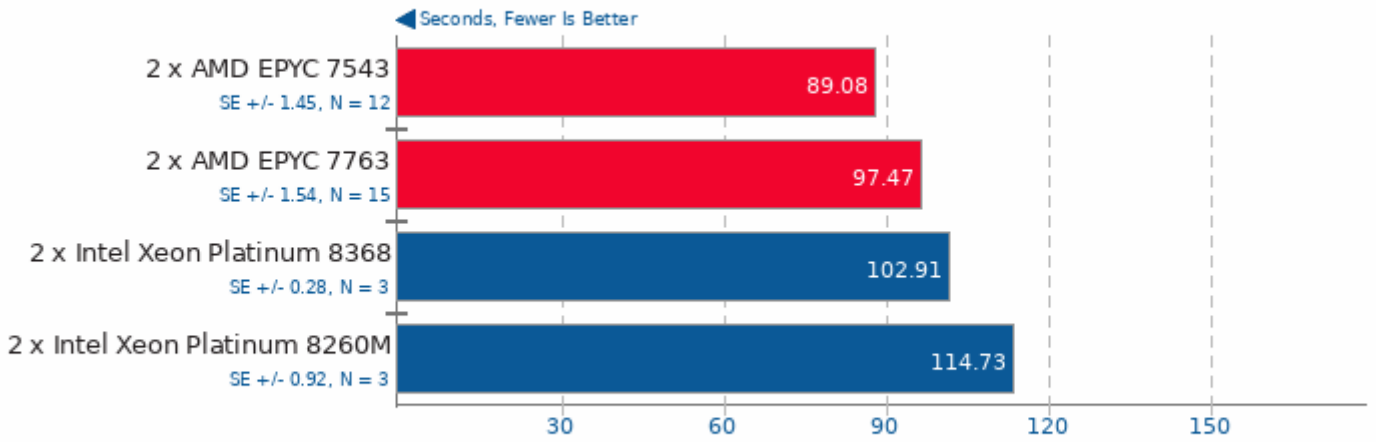
Test: OpenMP LavaMD



- (CXX) g++ options: -O2 -lOpenCL

Rodinia 3.1

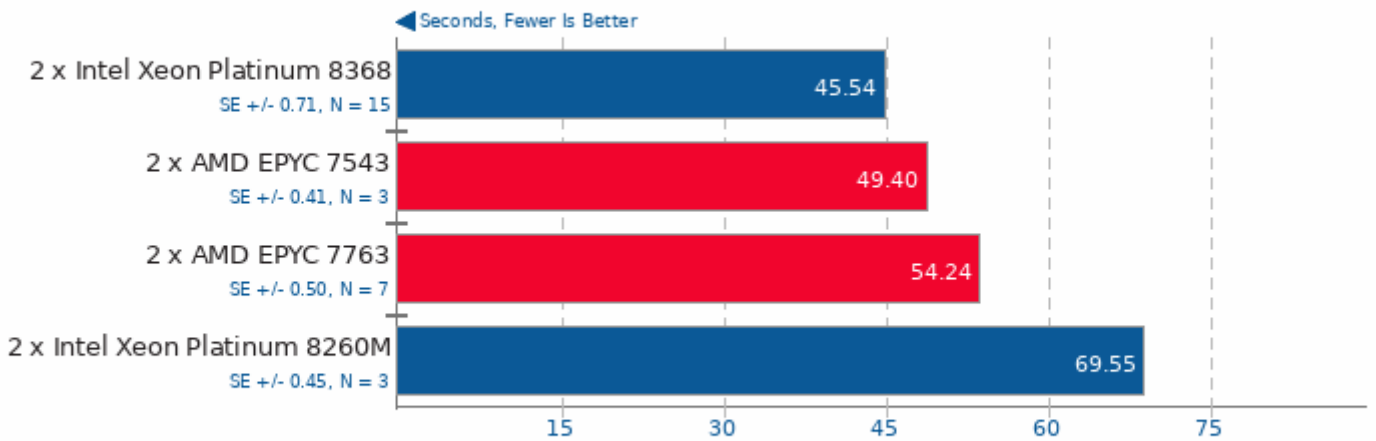
Test: OpenMP HotSpot3D



1. (CXX) g++ options: -O2 -lOpenCL

Rodinia 3.1

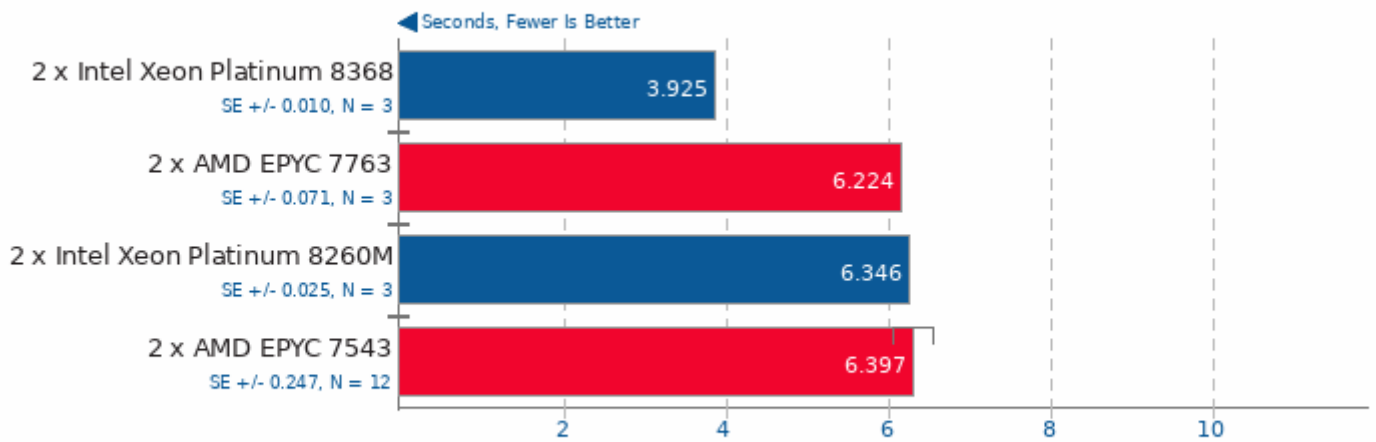
Test: OpenMP Leukocyte



1. (CXX) g++ options: -O2 -lOpenCL

Rodinia 3.1

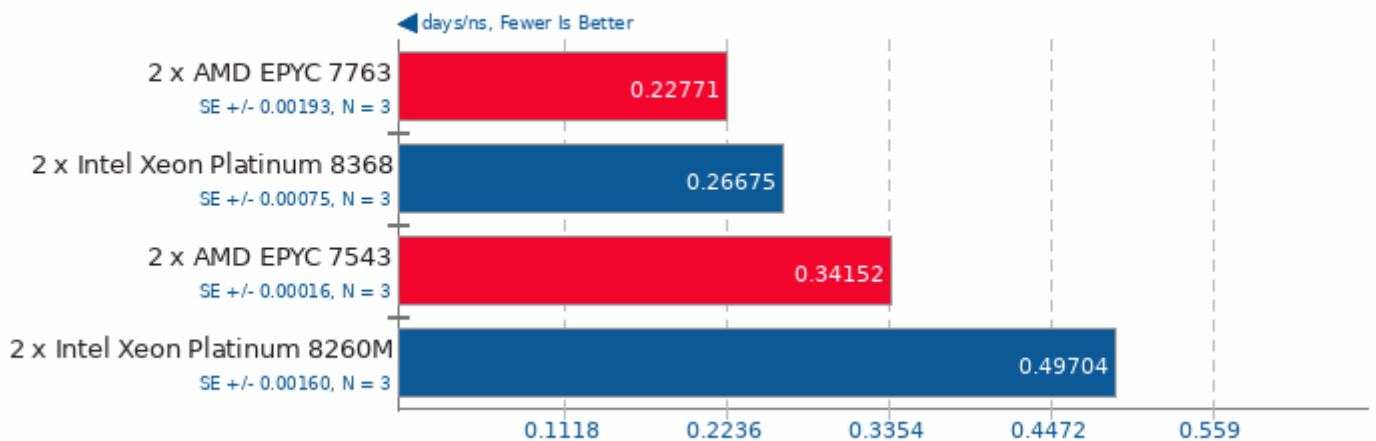
Test: OpenMP CFD Solver



1. (CXX) g++ options: -O2 -lOpenCL

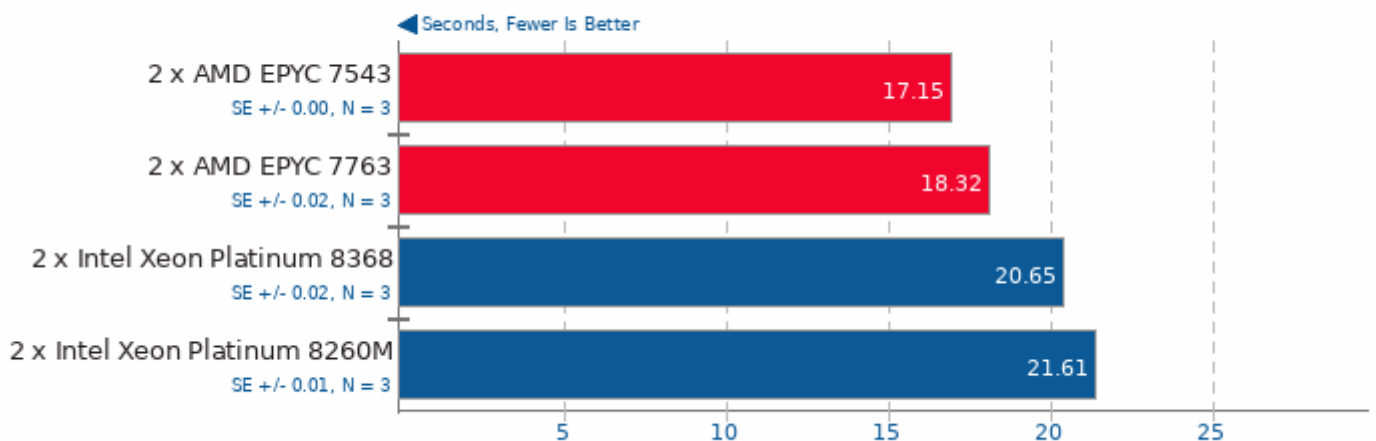
NAMD 2.14

ATPase Simulation - 327,506 Atoms

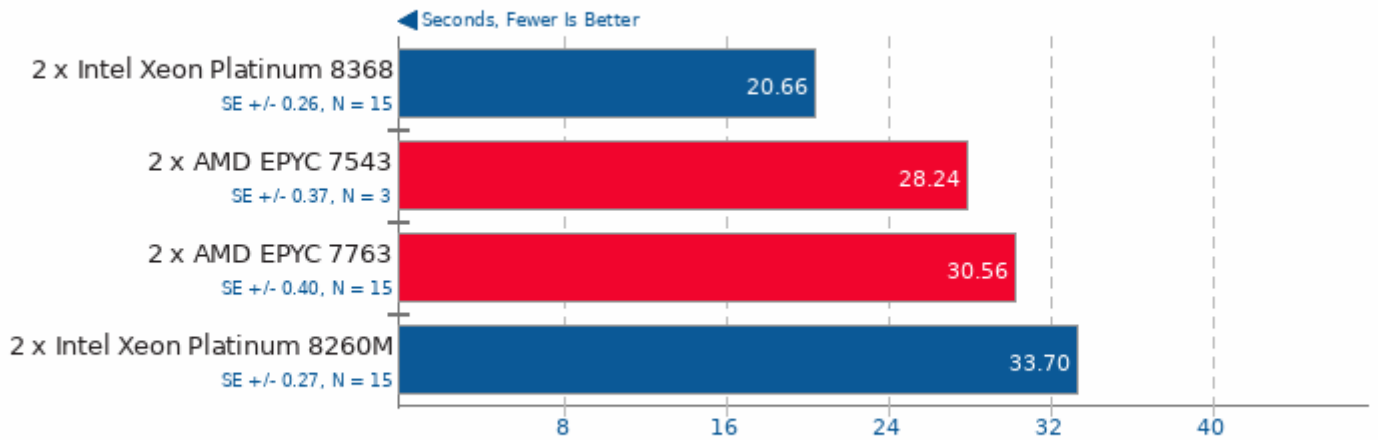


Dolfyn 0.527

Computational Fluid Dynamics



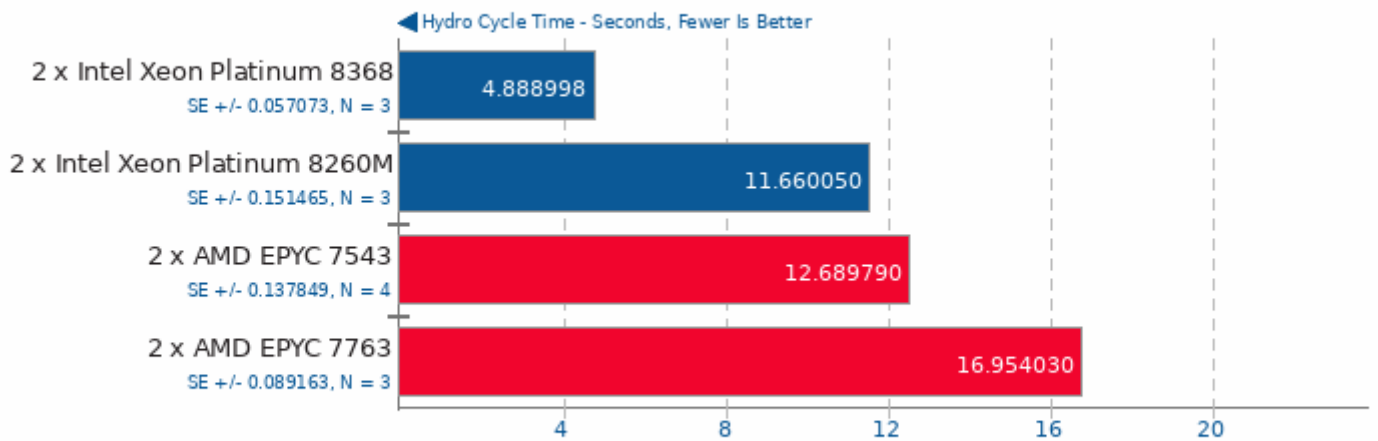
Nebular Empirical Analysis Tool 2020-02-29



1. (F9X) gfortran options: -cpp -ffree-line-length-0 -jsource/ -fopenmp -O3 -fno-backtrace

Pennant 1.0.1

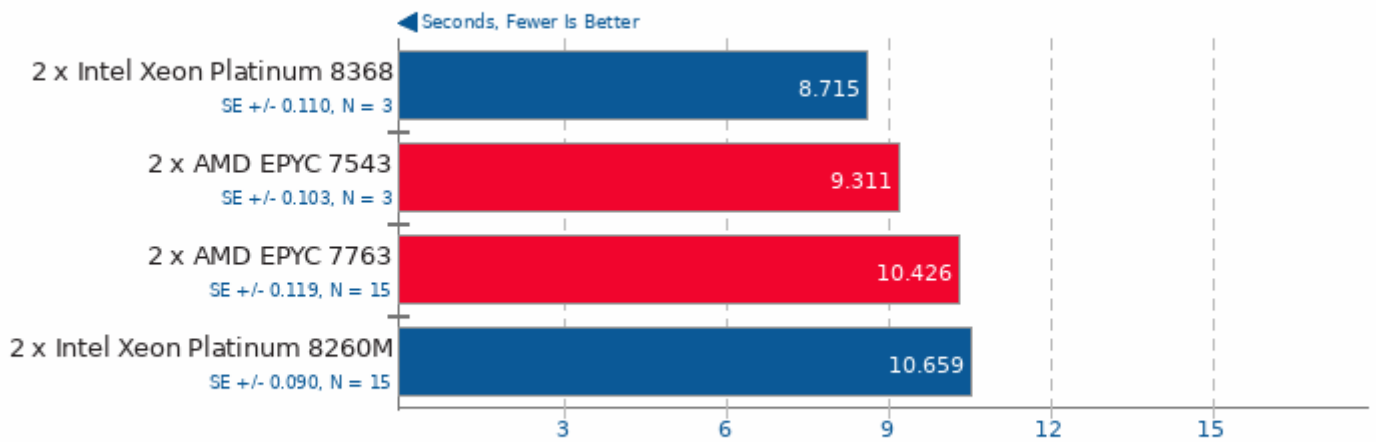
Test: leblanbig



1. (CXX) g++ options: -fopenmp -pthread -lmpi_cxx -lmpi

Timed MAFFT Alignment 7.471

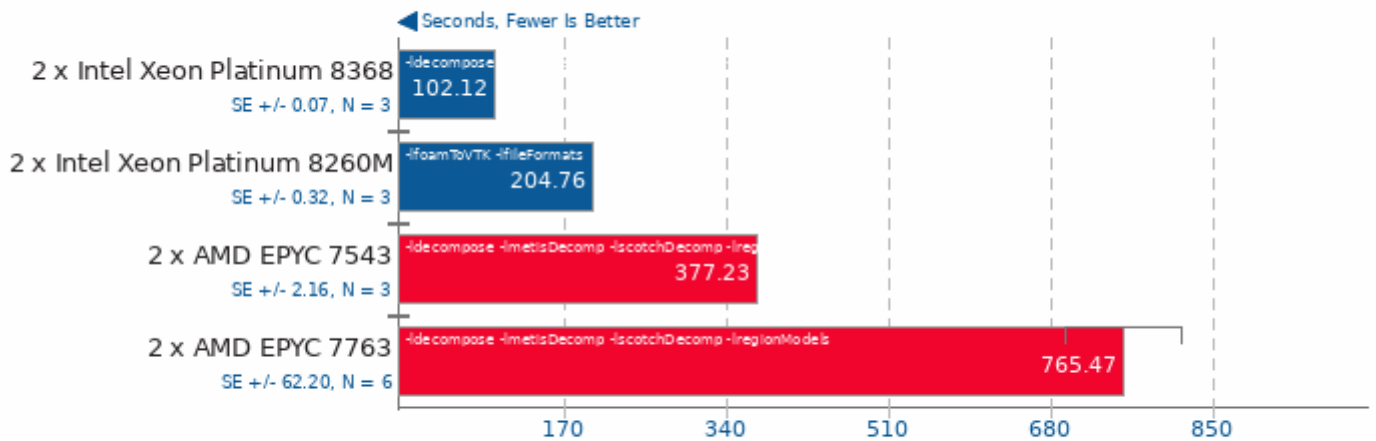
Multiple Sequence Alignment - LSU RNA



1. (CC) gcc options: -std=c99 -O3 -lm -lpthread

OpenFOAM 8

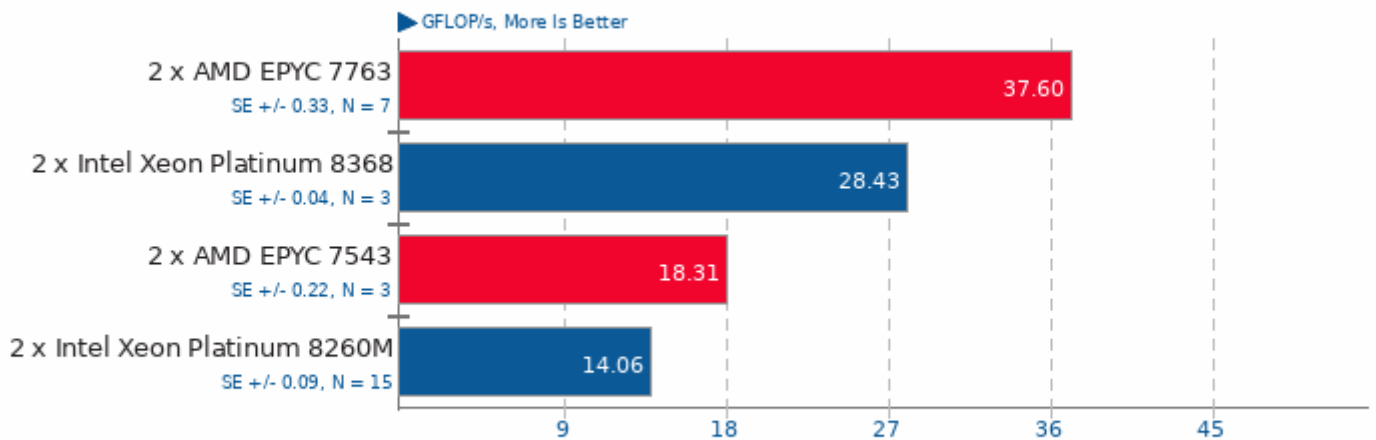
Input: Motorbike 60M



1. (CXX) g++ options: -std=c++11 -m64 -O3 -ftemplate-depth-100 -fPIC -fuse-ld=bfd -Xlinker --add-needed --no-as-needed -ldynamicMesh -lgenericPatchFields -llag

ACES DGEMM 1.0

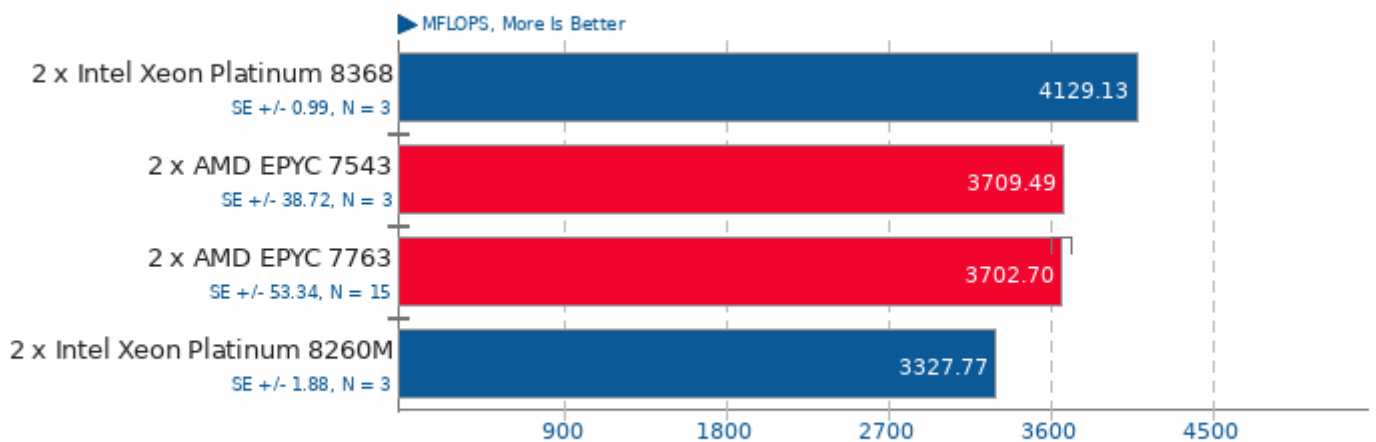
Sustained Floating-Point Rate



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

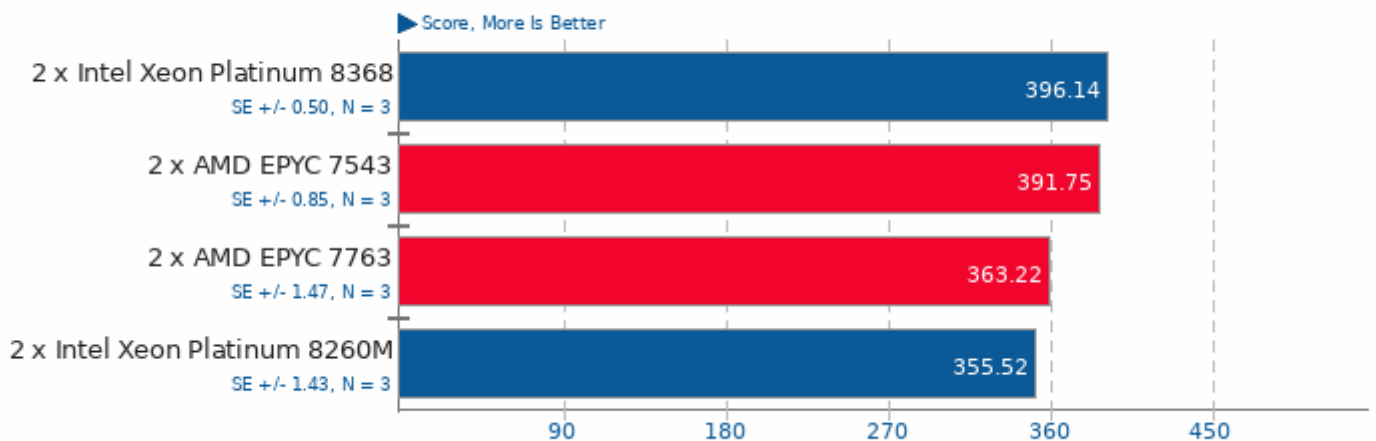
Himeno Benchmark 3.0

Poisson Pressure Solver



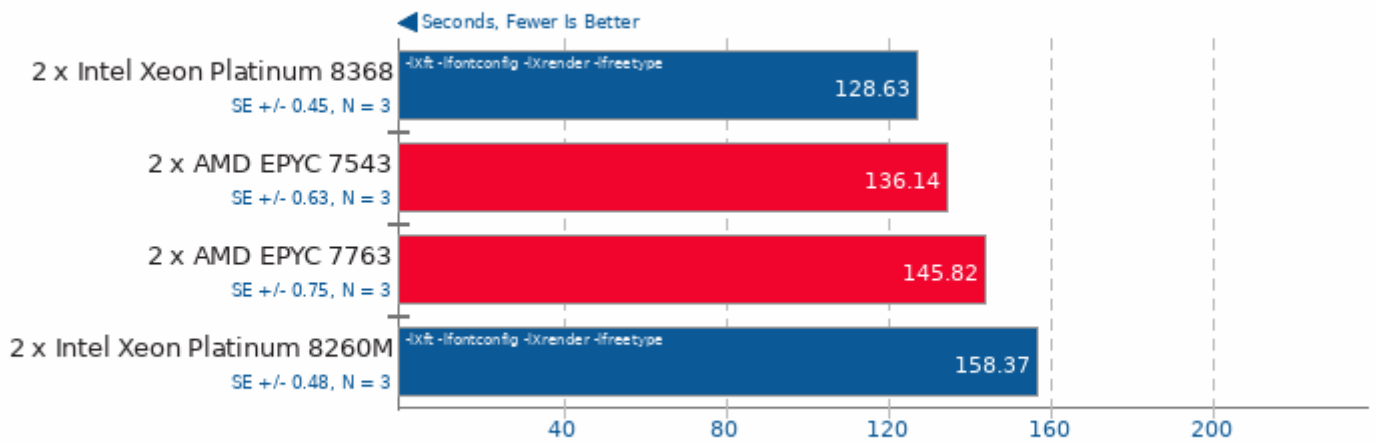
1. (CC) gcc options: -O3 -mavx2

Numpy Benchmark



Ngspice 34

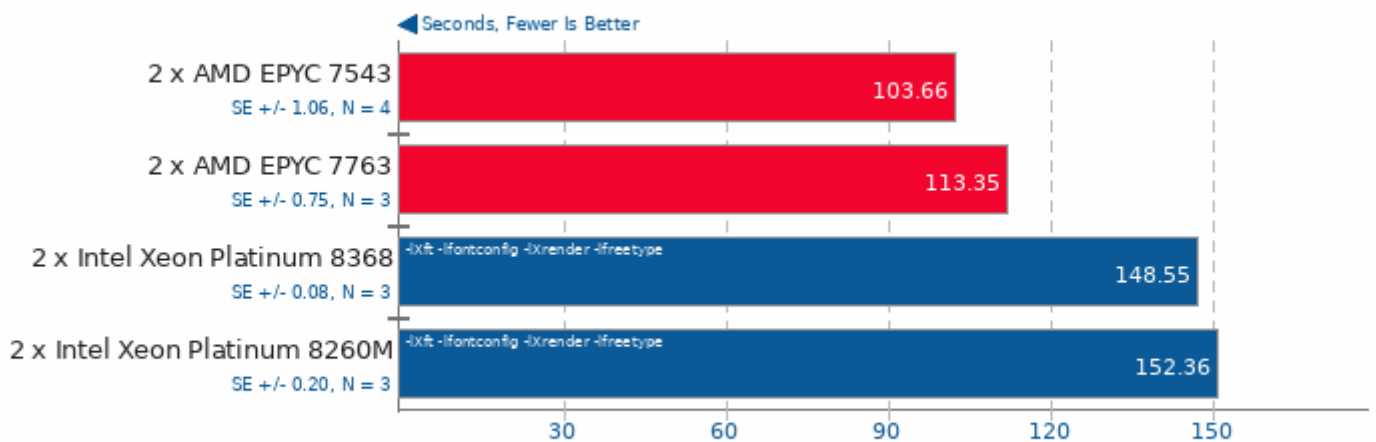
Circuit: C2670



1. (CC) gcc options: -O0 -fopenmp -lm -lstdc++ -lfftw3 -lXaw -lXmu -lXt -lXext -lX11 -lSM -lICE

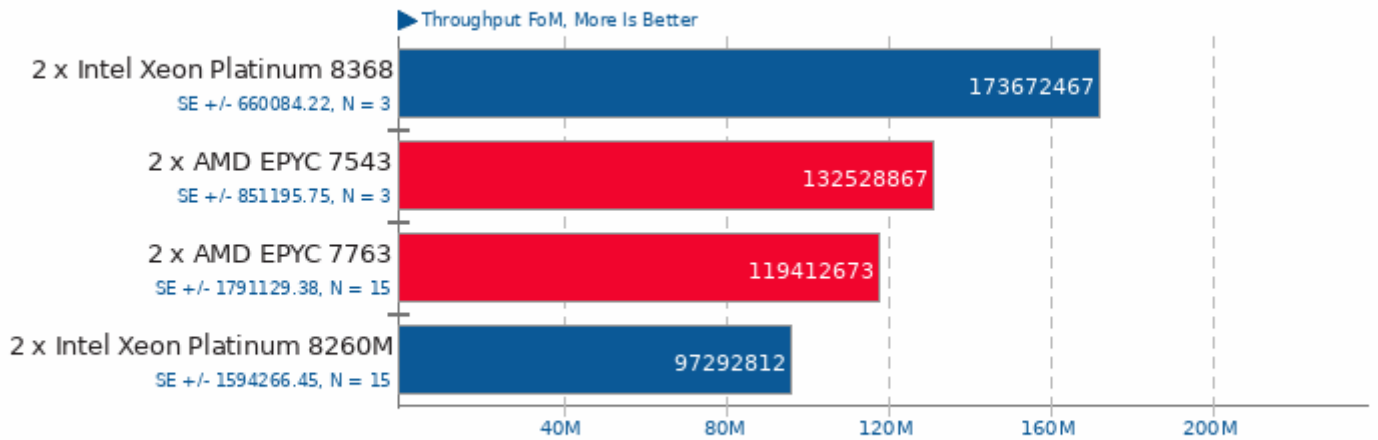
Ngspice 34

Circuit: C7552



1. (CC) gcc options: -O0 -fopenmp -lm -lstdc++ -lfftw3 -lXaw -lXmu -lXt -lXext -lX11 -lSM -lICE

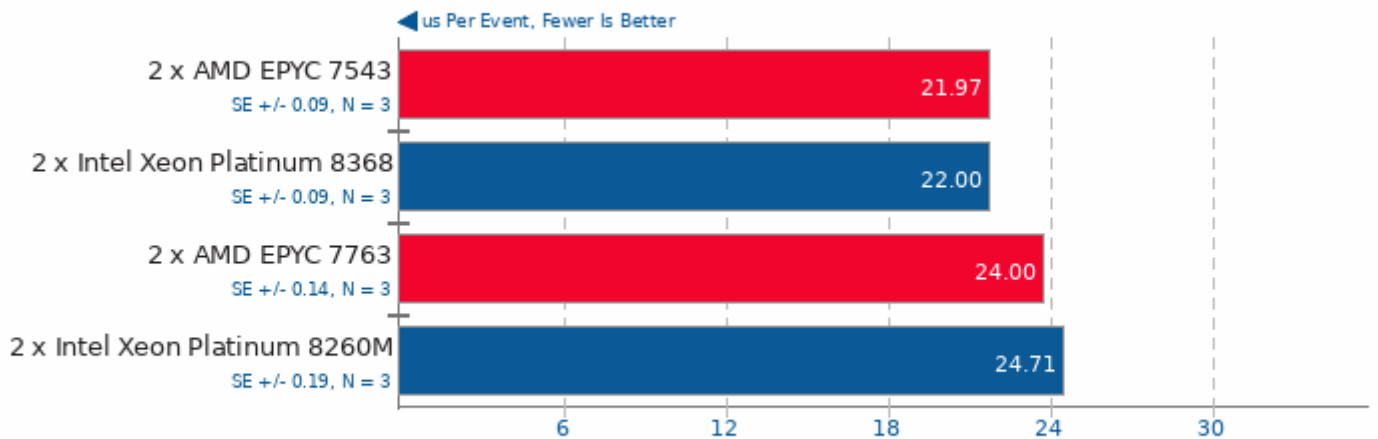
Kripke 1.2.4



1. (CXX) g++ options: -O3 -fopenmp

OSBench

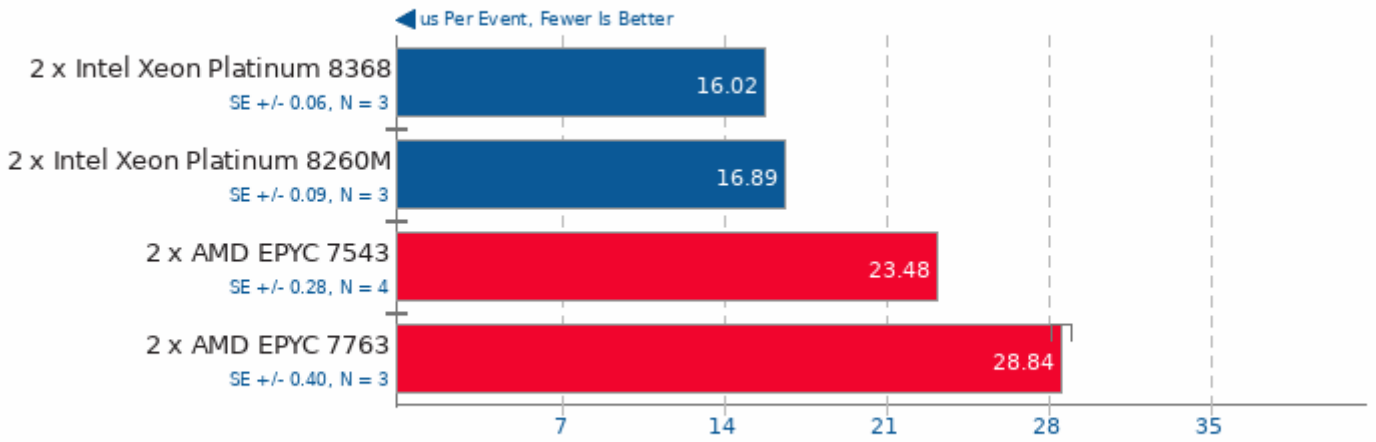
Test: Create Files



1. (CC) gcc options: -lm

OSBench

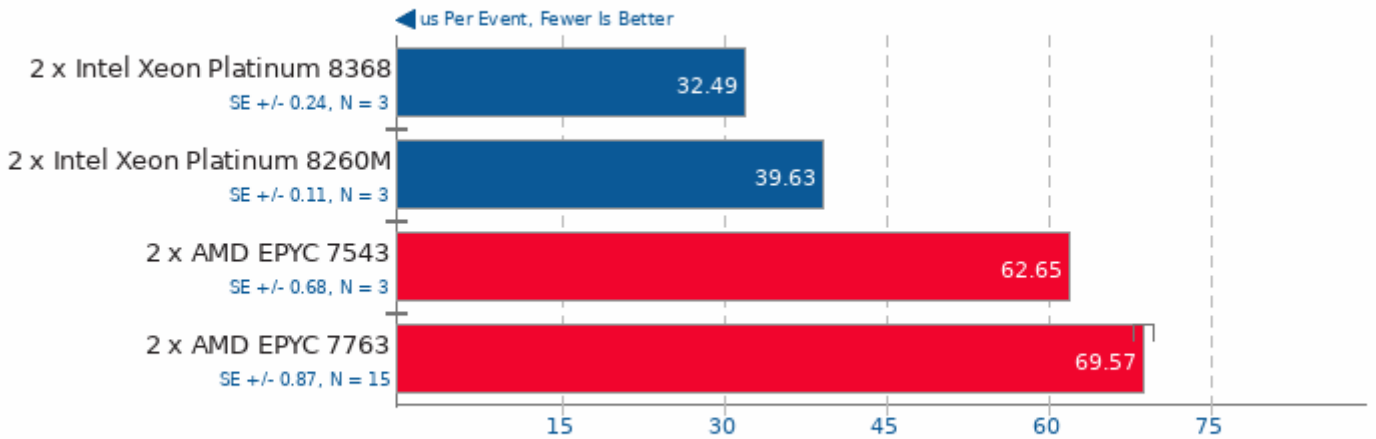
Test: Create Threads



1. (CC) gcc options: -lm

OSBench

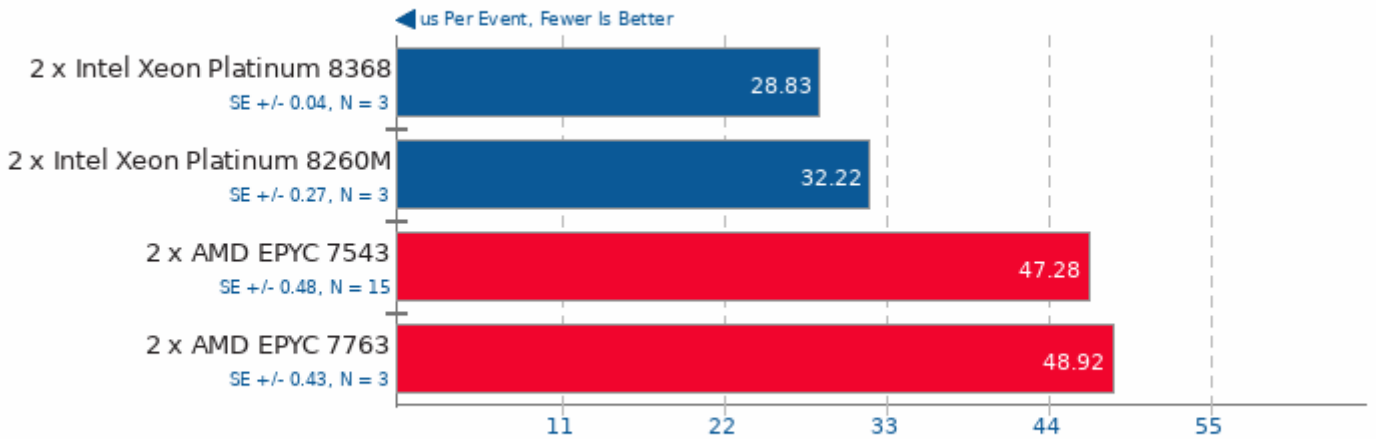
Test: Launch Programs



1. (CC) gcc options: -lm

OSBench

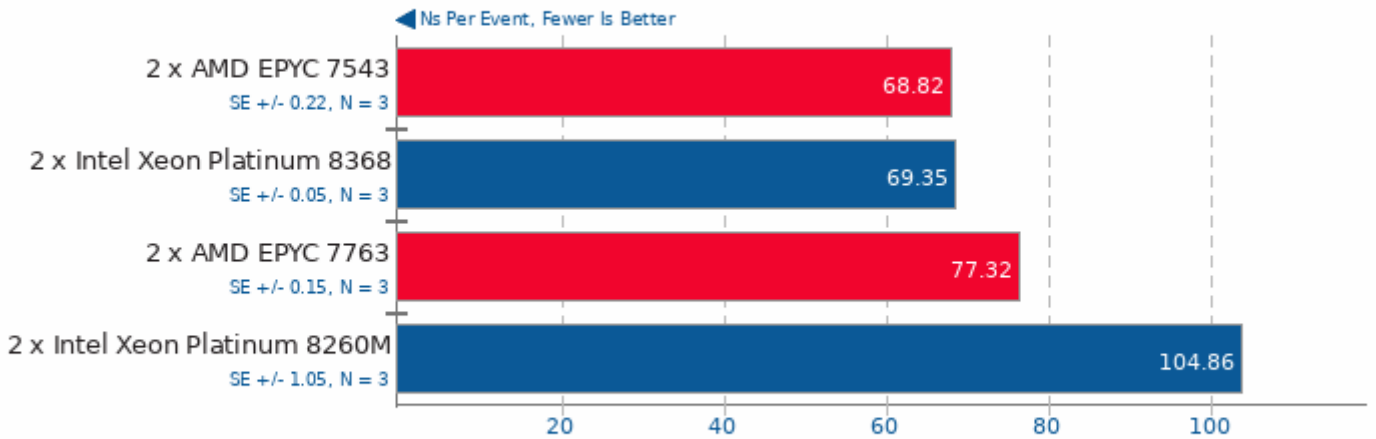
Test: Create Processes



1. (CC) gcc options: -lm

OSBench

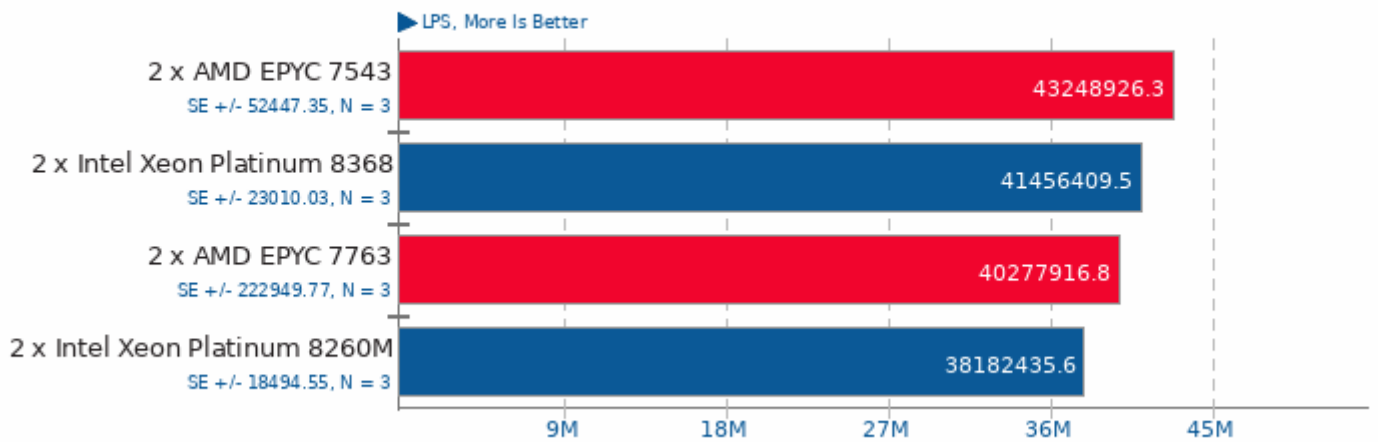
Test: Memory Allocations



1. (CC) gcc options: -lm

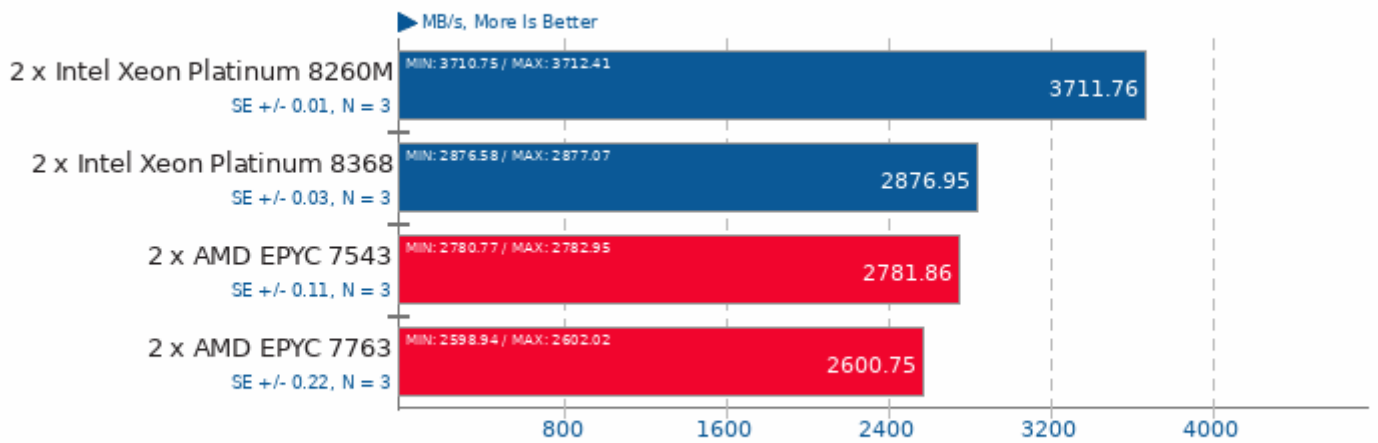
BYTE Unix Benchmark 3.6

Computational Test: Dhrystone 2



CacheBench

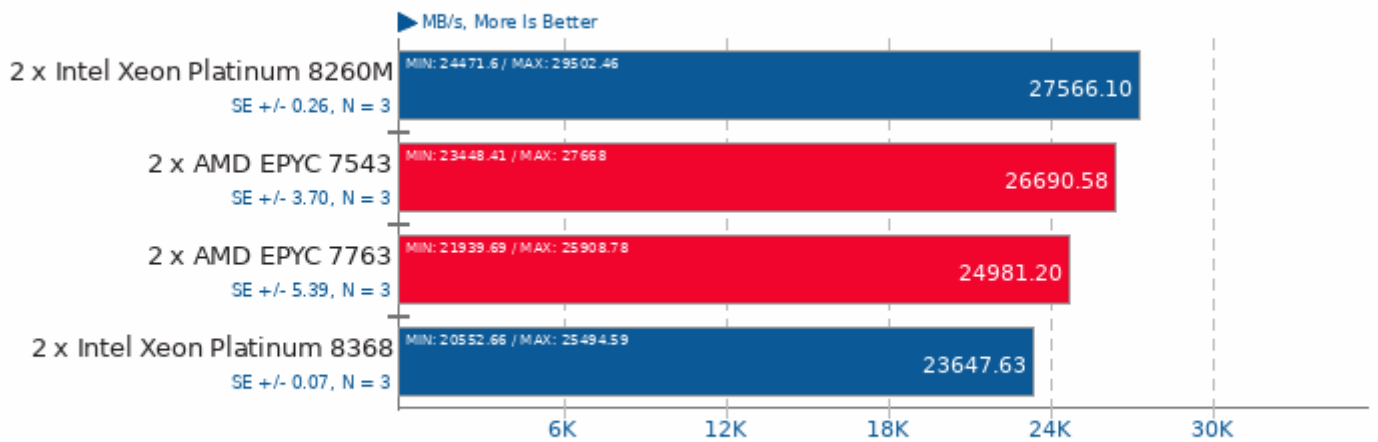
Test: Read



1. (CC) gcc options: -lrt

CacheBench

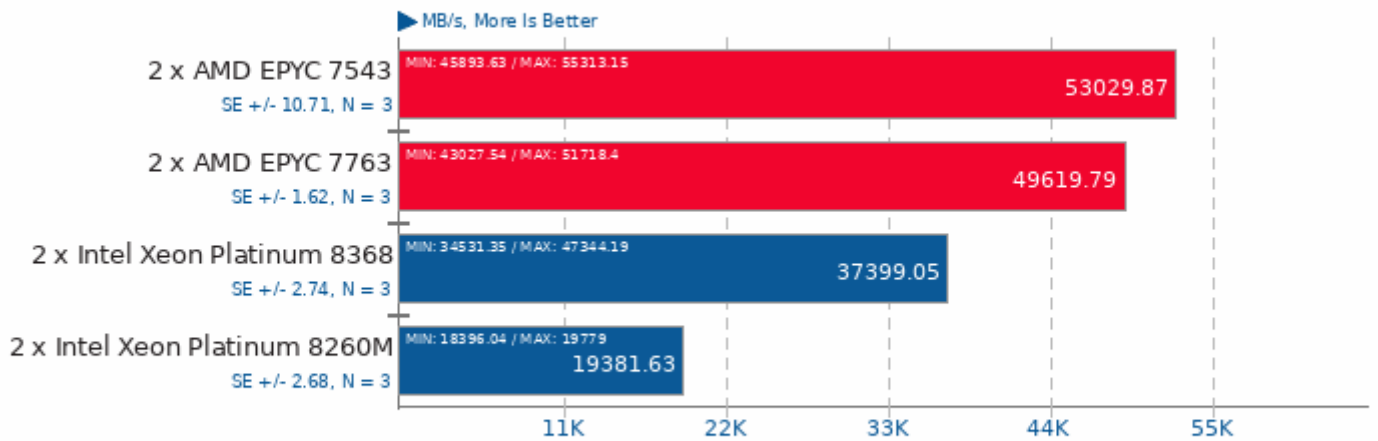
Test: Write



1. (CC) gcc options: -lrt

CacheBench

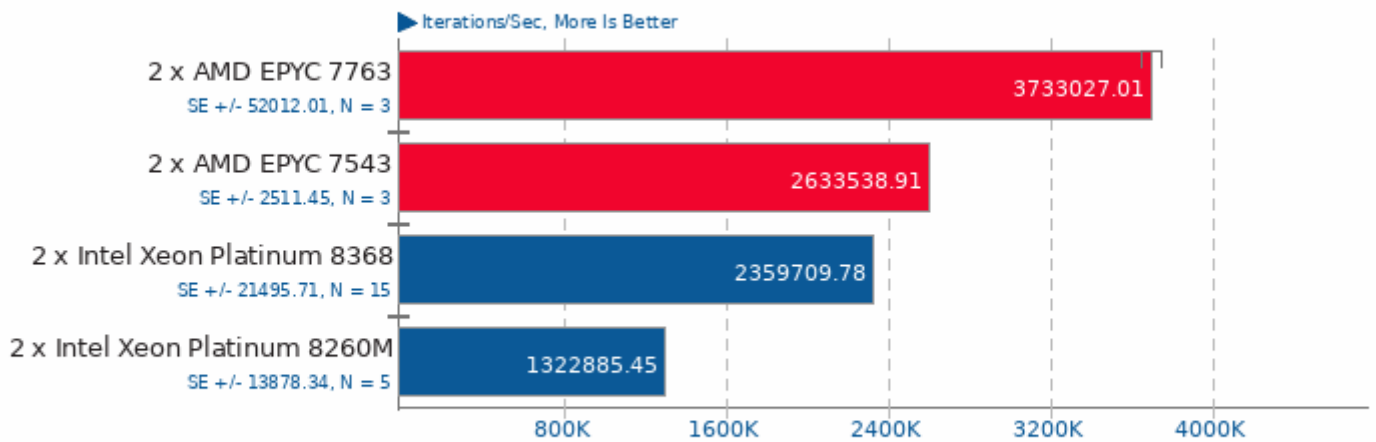
Test: Read / Modify / Write



1. (CC) gcc options: -lrt

Coremark 1.0

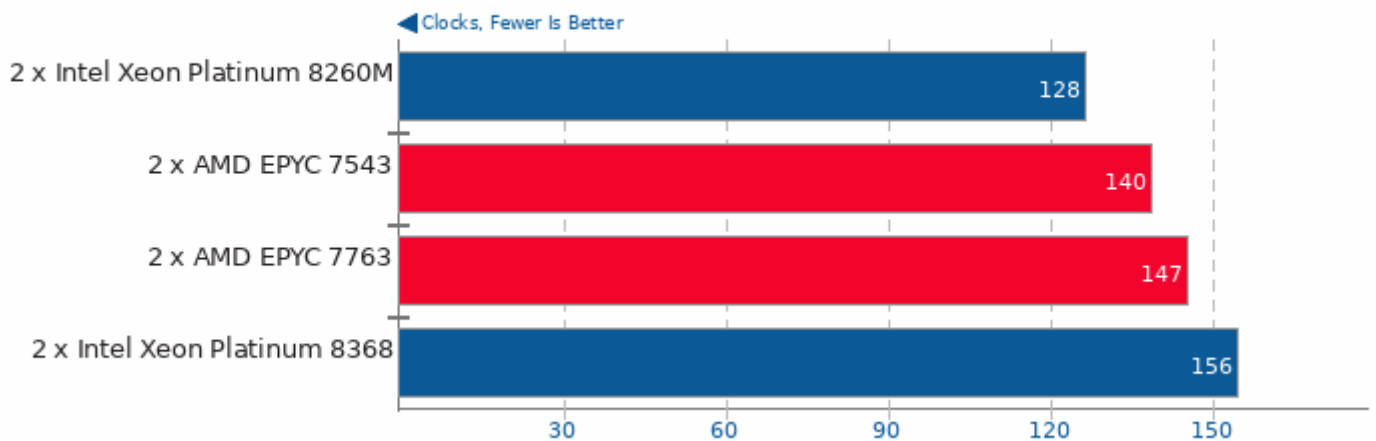
CoreMark Size 666 - Iterations Per Second



1. (CC) gcc options: -O2 -lrt -lrt

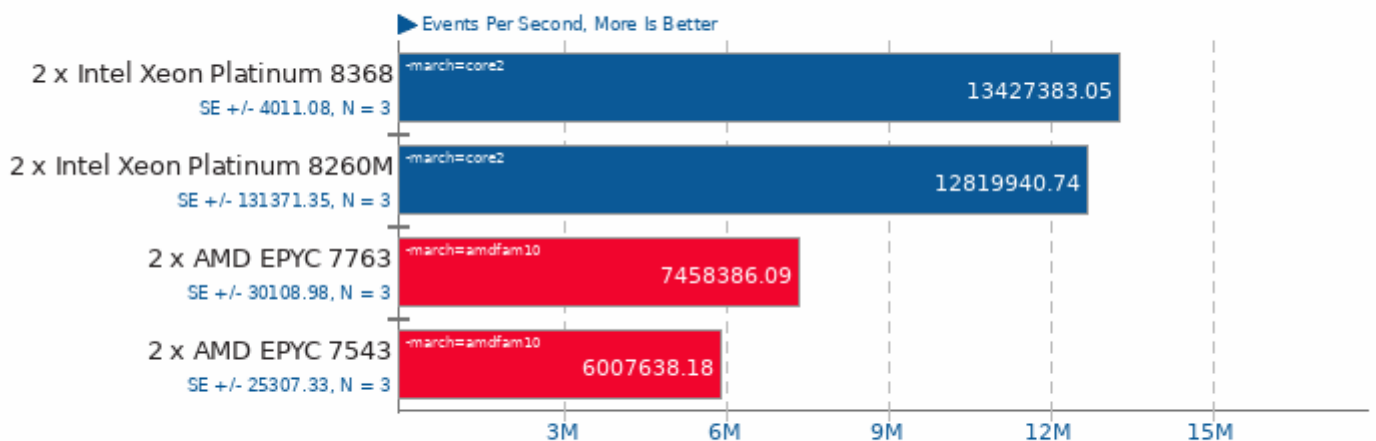
ctx_clock

Context Switch Time



Sysbench 2018-07-28

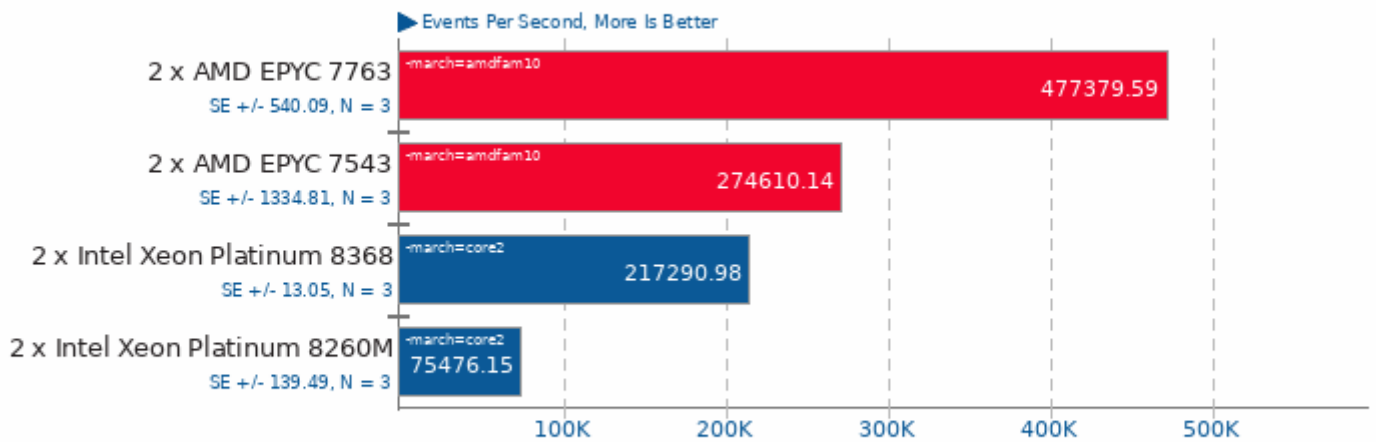
Test: Memory



1. (CC) gcc options: -pthread -O3 -funroll-loops -ggdb3 -rdynamic -ldl -laio -lm

Sysbench 2018-07-28

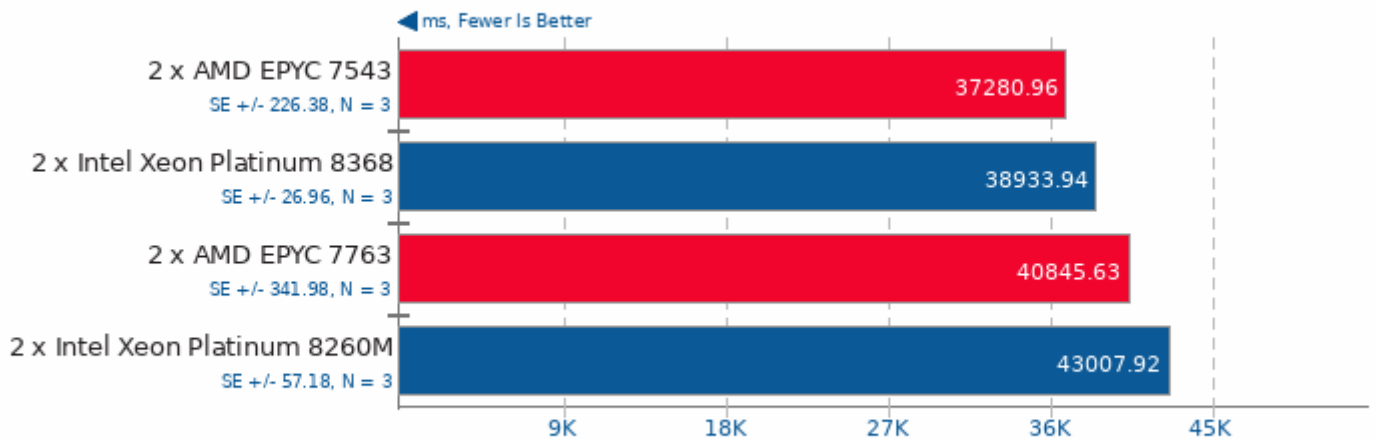
Test: CPU



1. (CC) gcc options: -pthread -O3 -funroll-loops -ggdb3 -rdynamic -ldl -laio -lm

FinanceBench 2016-07-25

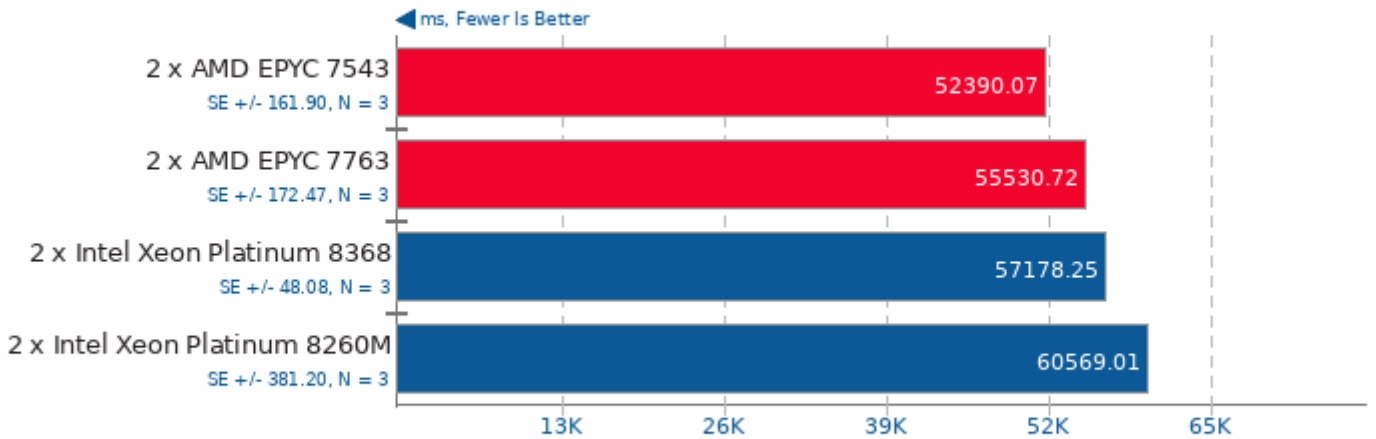
Benchmark: Repo OpenMP



1. (CXX) g++ options: -O3 -march=native -fopenmp

FinanceBench 2016-07-25

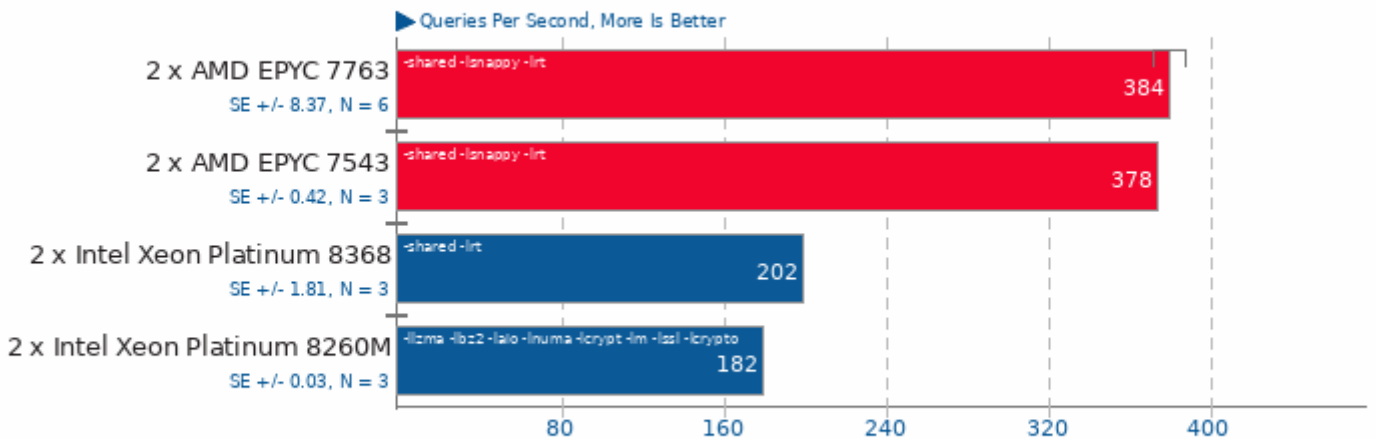
Benchmark: Bonds OpenMP



1. (CXX) g++ options: -O3 -march=native -fopenmp

MariaDB 10.5.2

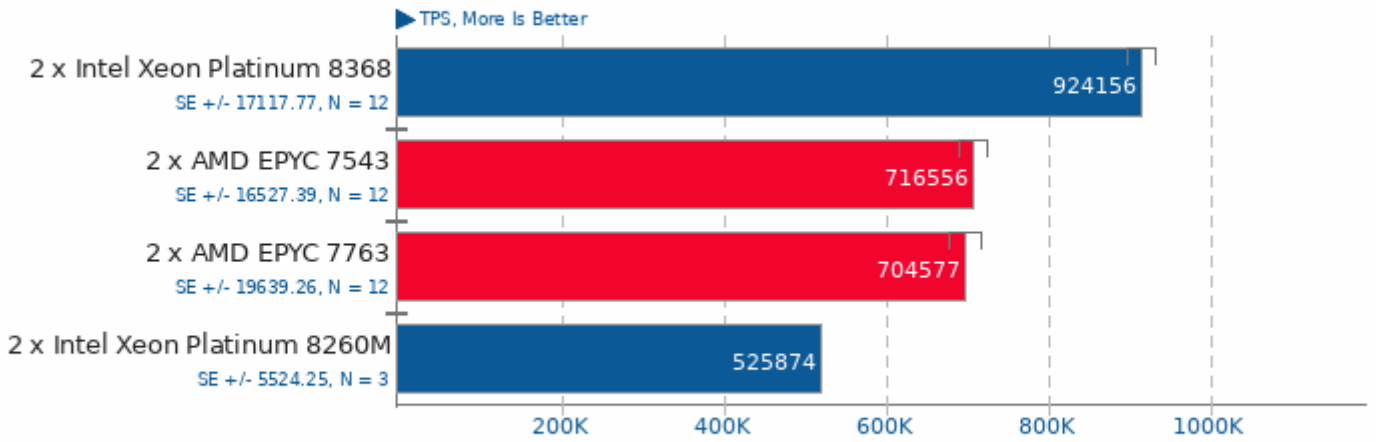
Clients: 128



1. (CXX) g++ options: -fPIC -pie -fstack-protector -O2 -lpthread -ldl -lz

PostgreSQL pgbench 13.0

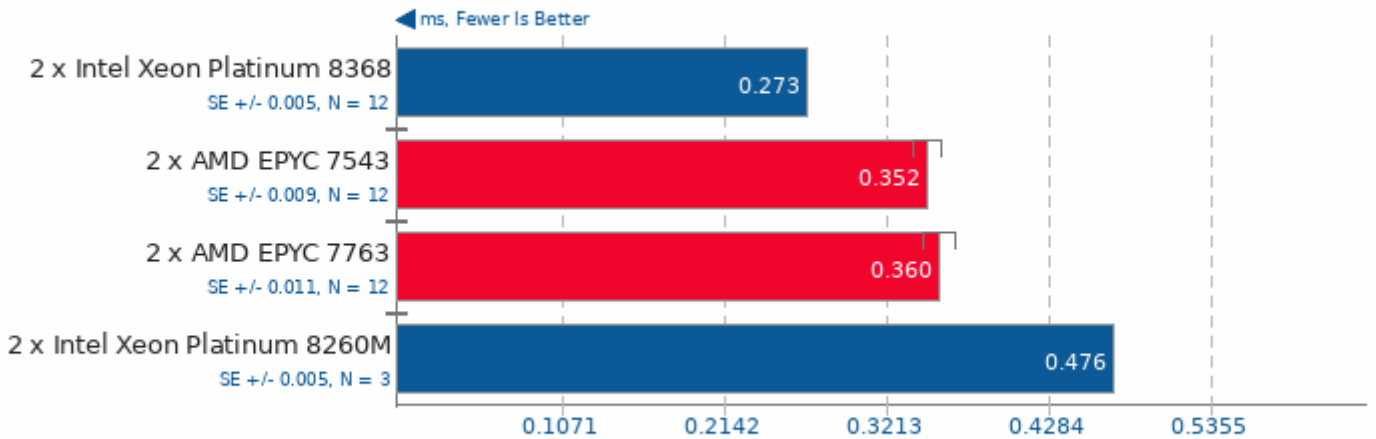
Scaling Factor: 100 - Clients: 250 - Mode: Read Only



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

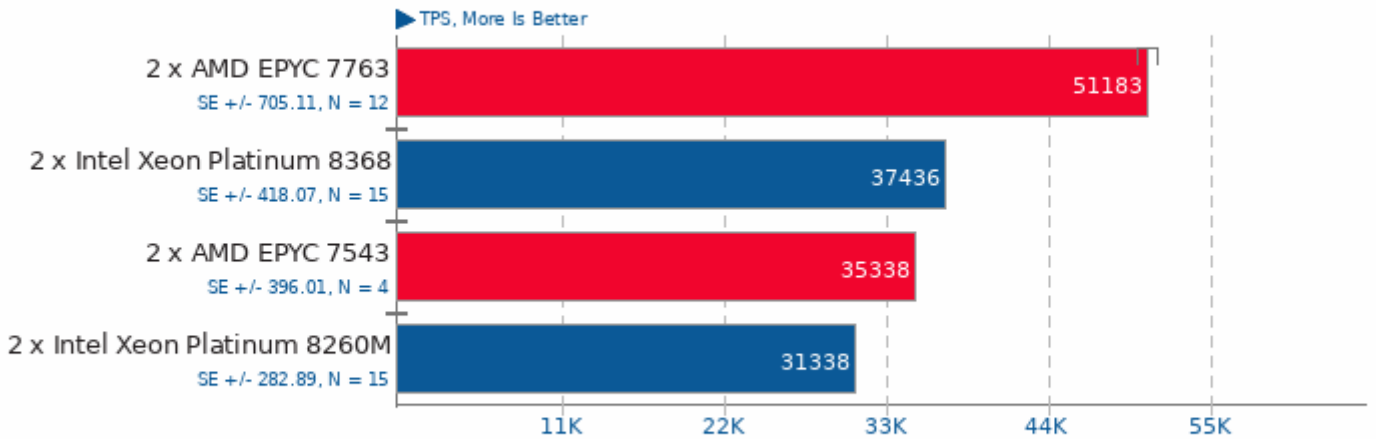
Scaling Factor: 100 - Clients: 250 - Mode: Read Only - Average Latency



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

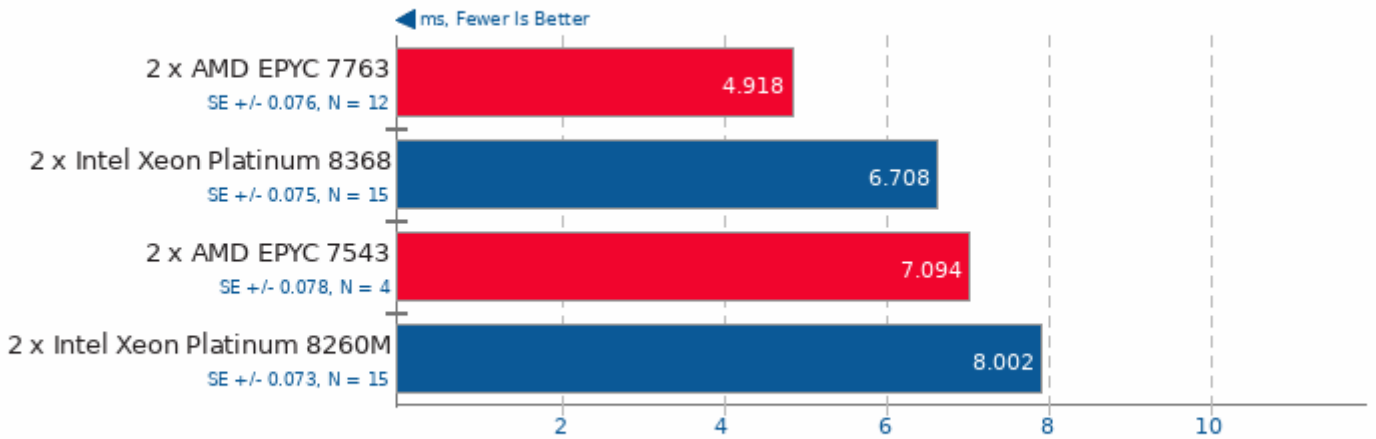
Scaling Factor: 100 - Clients: 250 - Mode: Read Write



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

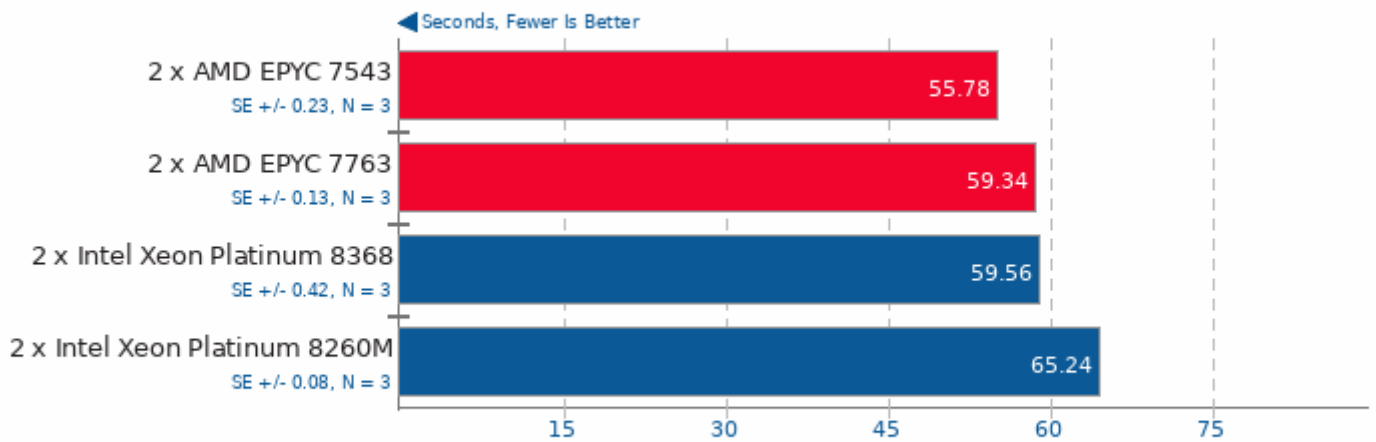
Scaling Factor: 100 - Clients: 250 - Mode: Read Write - Average Latency



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

SQLite Speedtest 3.30

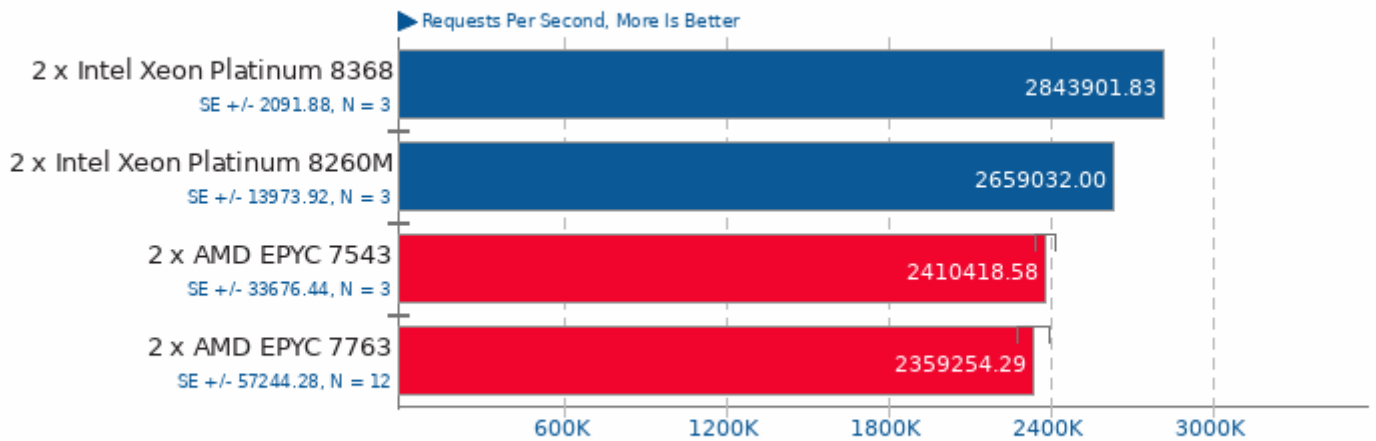
Timed Time - Size 1,000



1. (CC) gcc options: -O2 -ldl -lz -lpthread

Redis 6.0.9

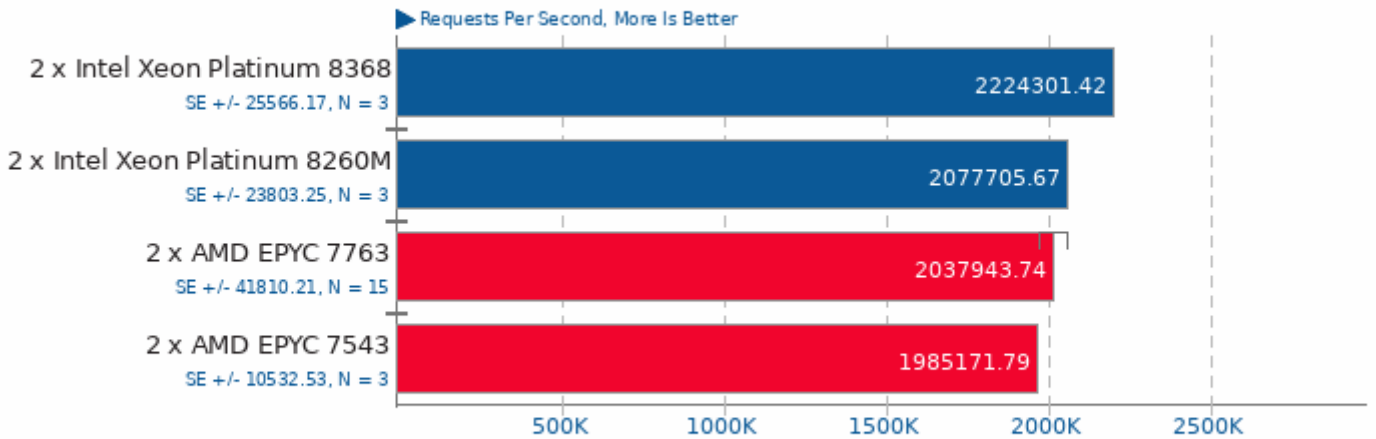
Test: LPOP



1. (CXX) g++ options: -MM -MT -g3 -fvisibility=hidden -O3

Redis 6.0.9

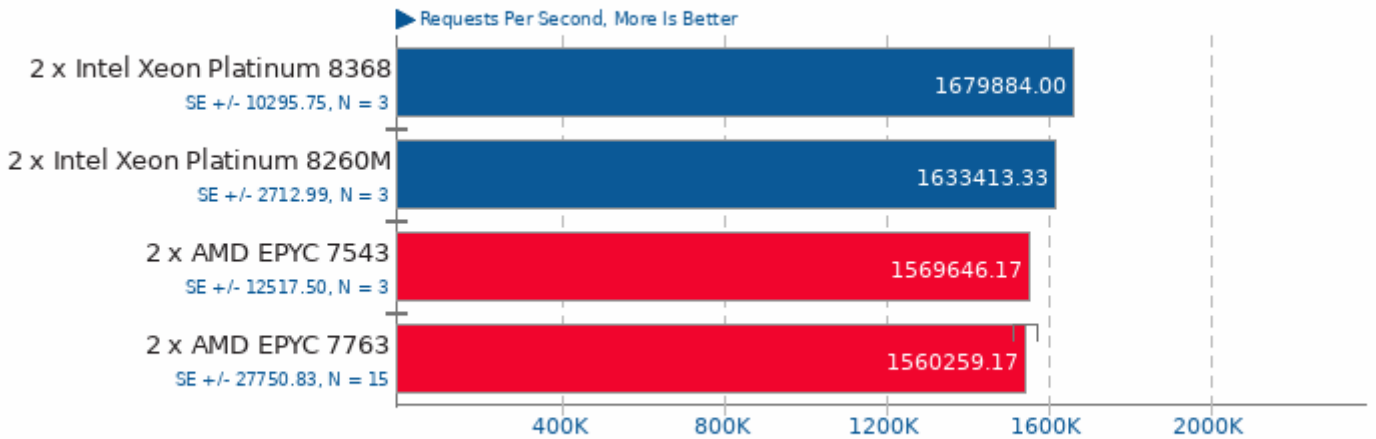
Test: SADD



1. (CXX) g++ options: -MM -MT -g3 -fvisibility=hidden -O3

Redis 6.0.9

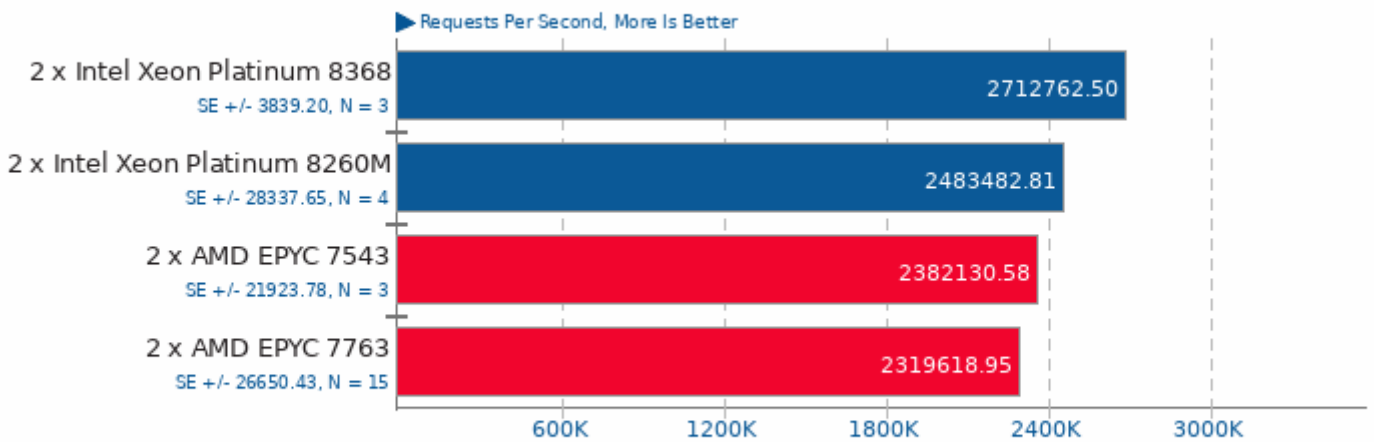
Test: LPUSH



1. (CXX) g++ options: -MM -MT -g3 -fvisibility=hidden -O3

Redis 6.0.9

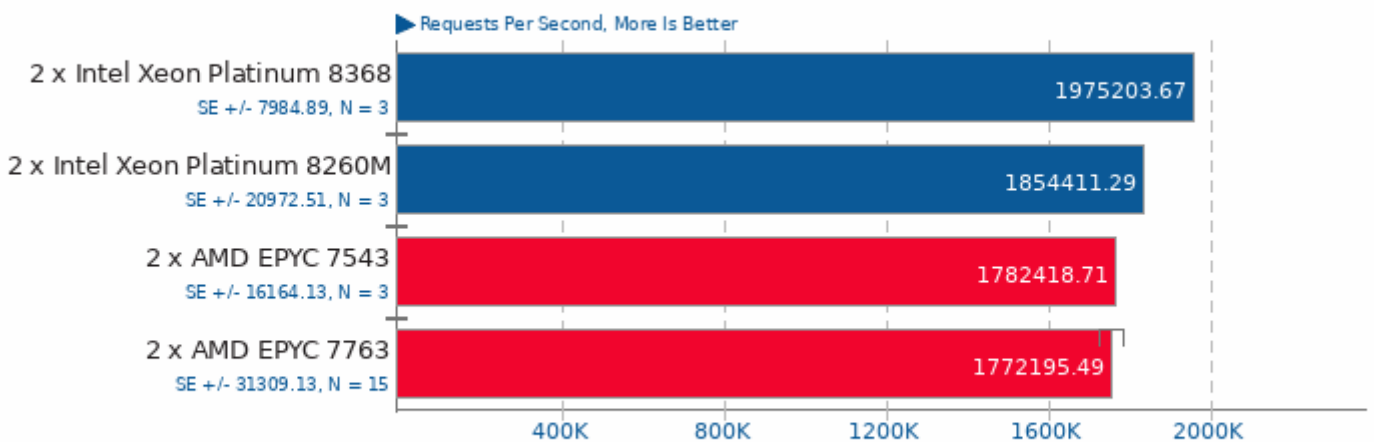
Test: GET



1. (CXX) g++ options: -MM -MT -g3 -fvisibility=hidden -O3

Redis 6.0.9

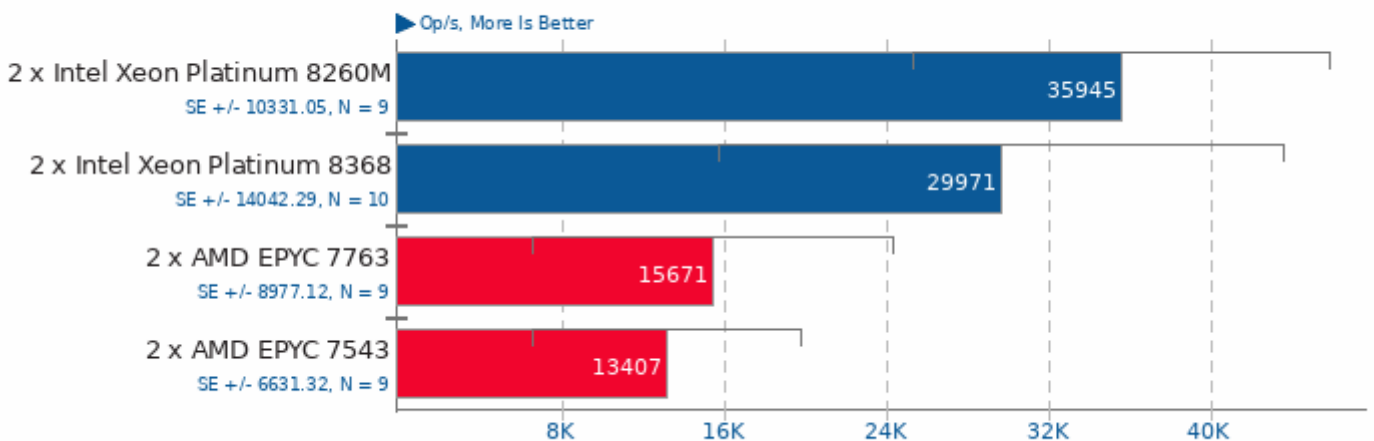
Test: SET



1. (CXX) g++ options: -MM -MT -g3 -fvisibility=hidden -O3

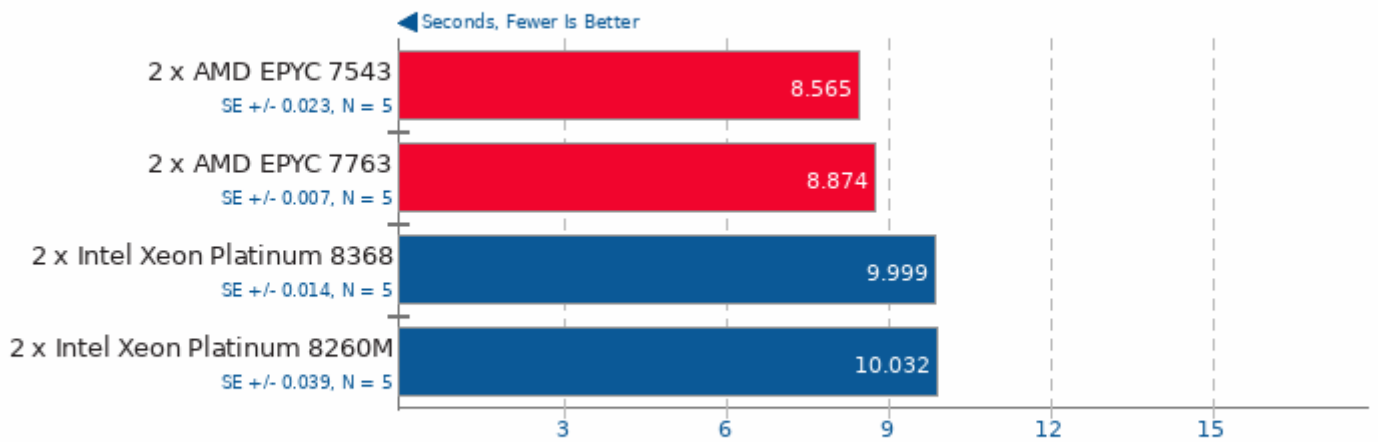
Apache Cassandra 3.11.4

Test: Mixed 1:3



FLAC Audio Encoding 1.3.2

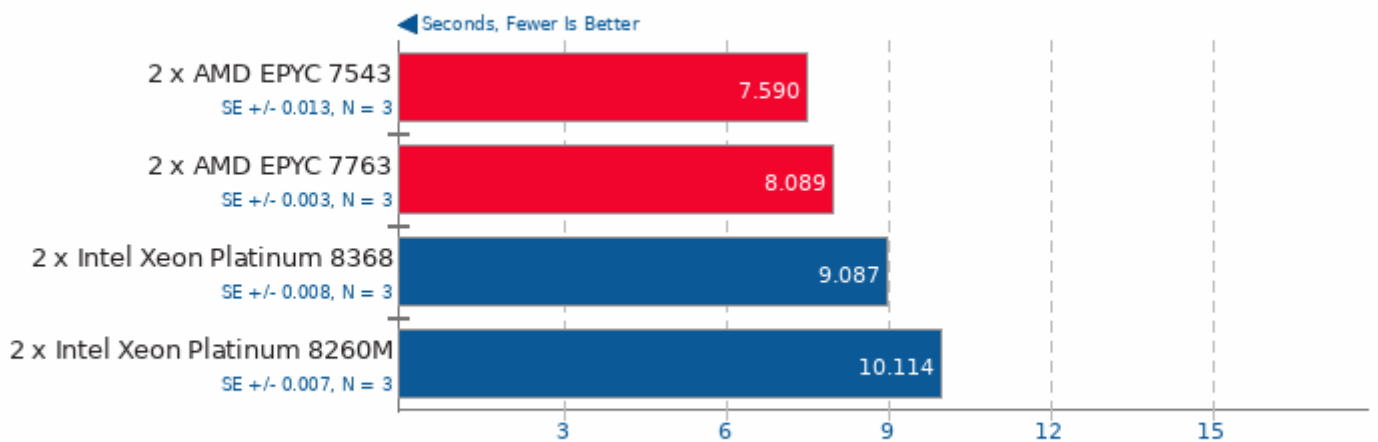
WAV To FLAC



1. (CXX) g++ options: -O2 -fvisibility=hidden -lm

LAME MP3 Encoding 3.100

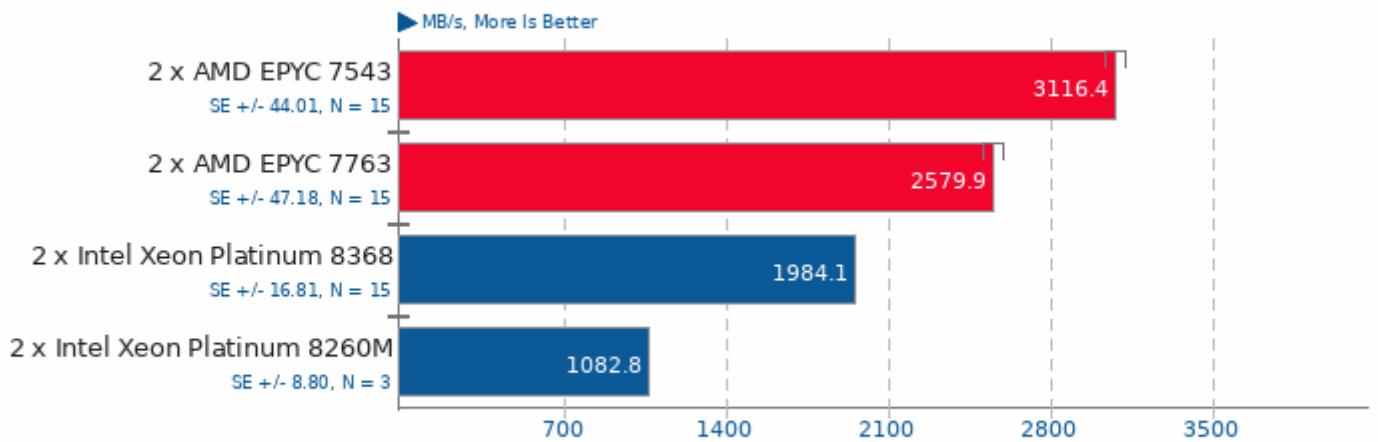
WAV To MP3



1. (CC) gcc options: -O3 -ffast-math -funroll-loops -fschedule-insns2 -fbranch-count-reg -fforce-addr-pipe -Incurses -lm

Zstd Compression 1.4.9

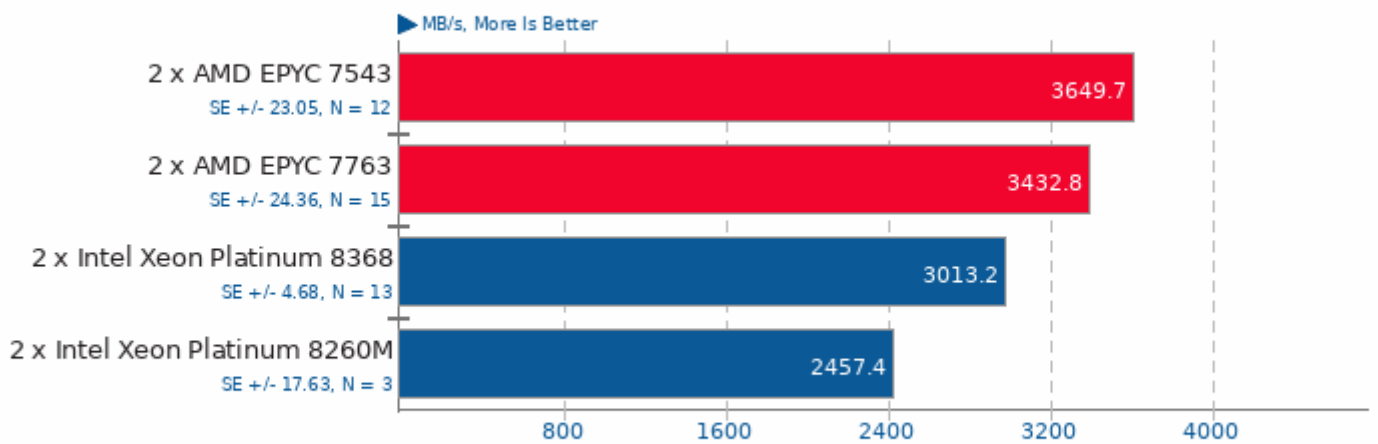
Compression Level: 8 - Compression Speed



1. (CC) gcc options: -O3 -pthread -lz -llzma

Zstd Compression 1.4.9

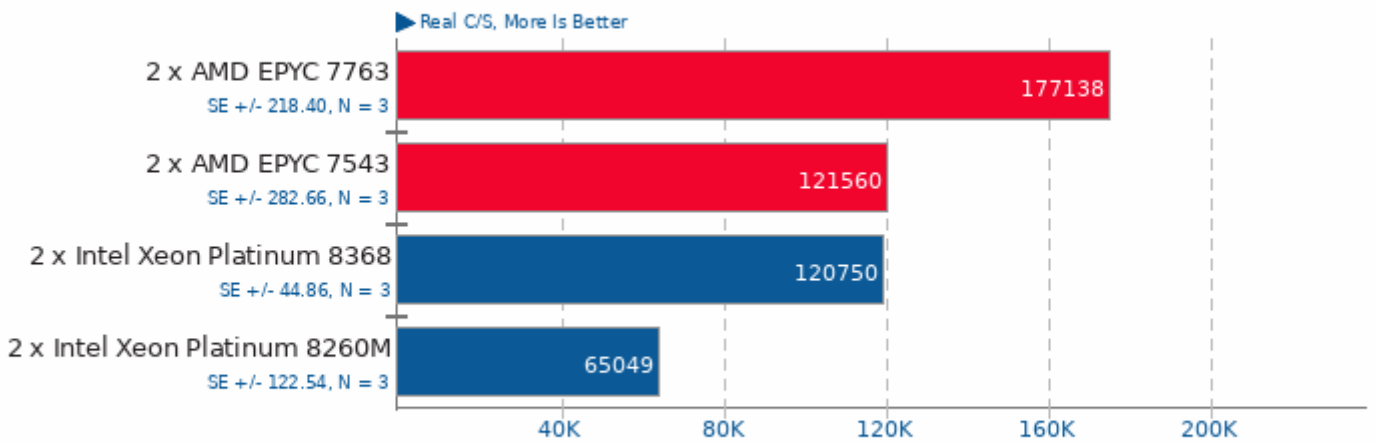
Compression Level: 8 - Decompression Speed



1. (CC) gcc options: -O3 -pthread -lz -llzma

John The Ripper 1.9.0-jumbo-1

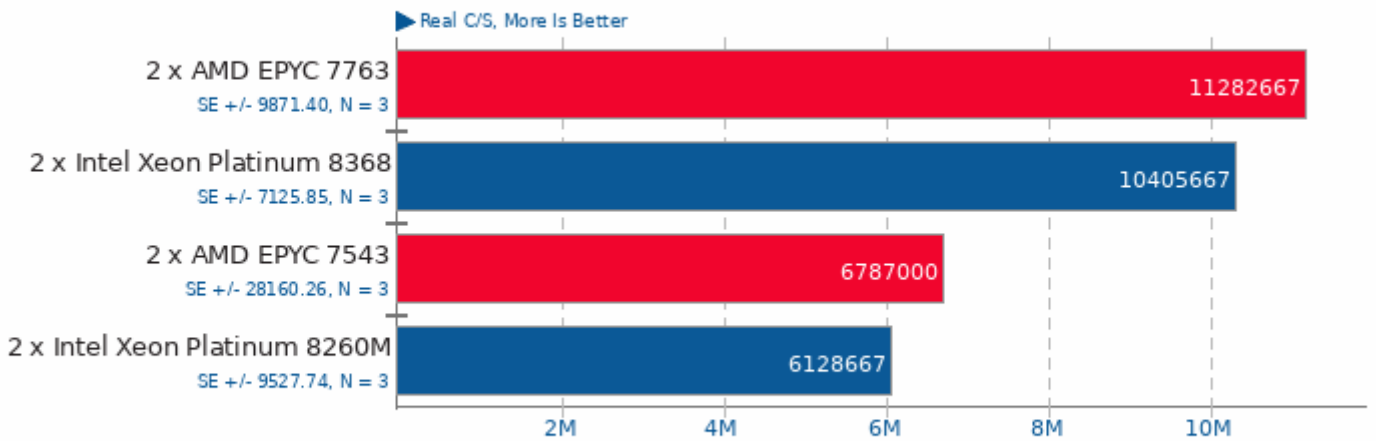
Test: Blowfish



1. (CC) gcc options: -m64 -lssl -lcrypto -fopenmp -lgmp -pthread -lm -lz -ldl -lcrypt -lbz2

John The Ripper 1.9.0-jumbo-1

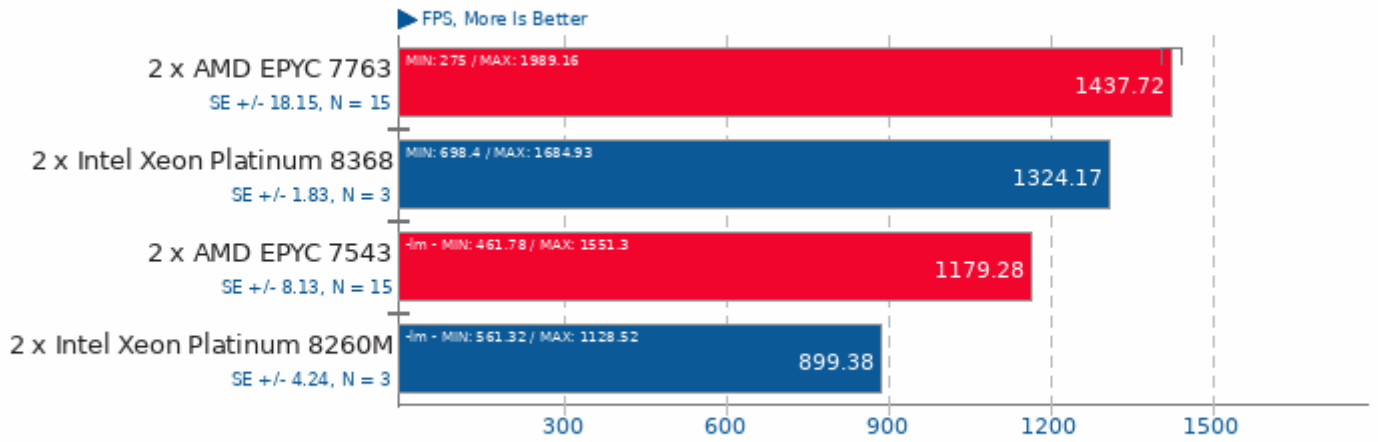
Test: MD5



1. (CC) gcc options: -m64 -lssl -lcrypto -fopenmp -lgmp -pthread -lm -lz -ldl -lcrypt -lbz2

dav1d 0.8.2

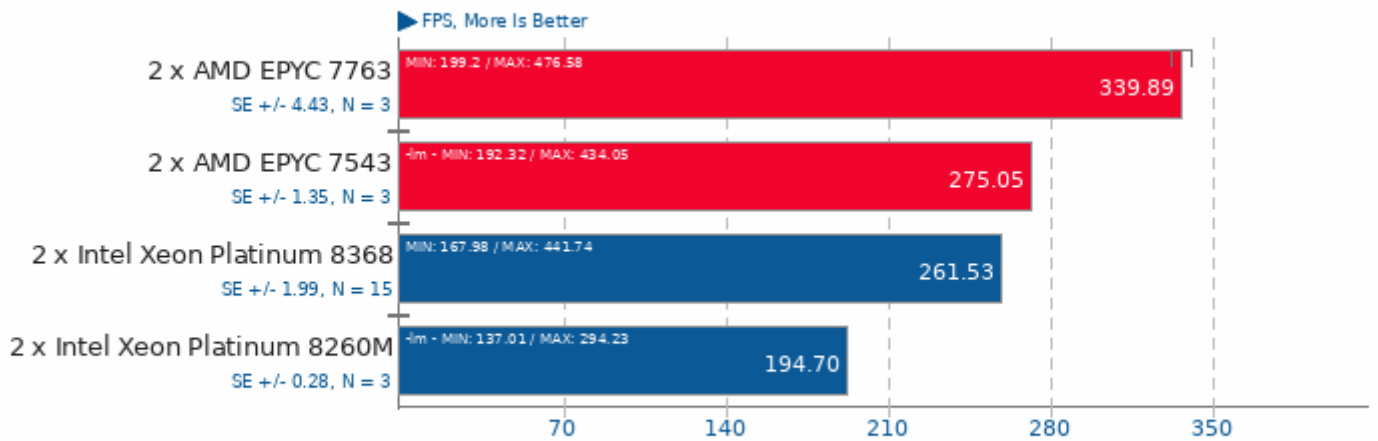
Video Input: Chimera 1080p



1. (CC) gcc options: -pthread

dav1d 0.8.2

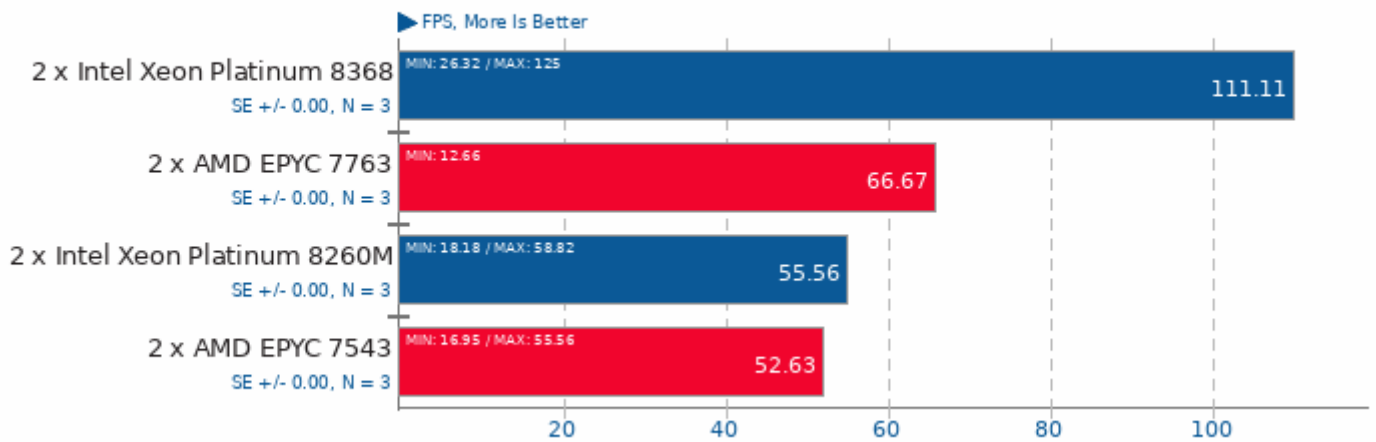
Video Input: Chimera 1080p 10-bit



1. (CC) gcc options: -pthread

OSPray 1.8.5

Demo: Magnetic Reconnection - Renderer: SciVis



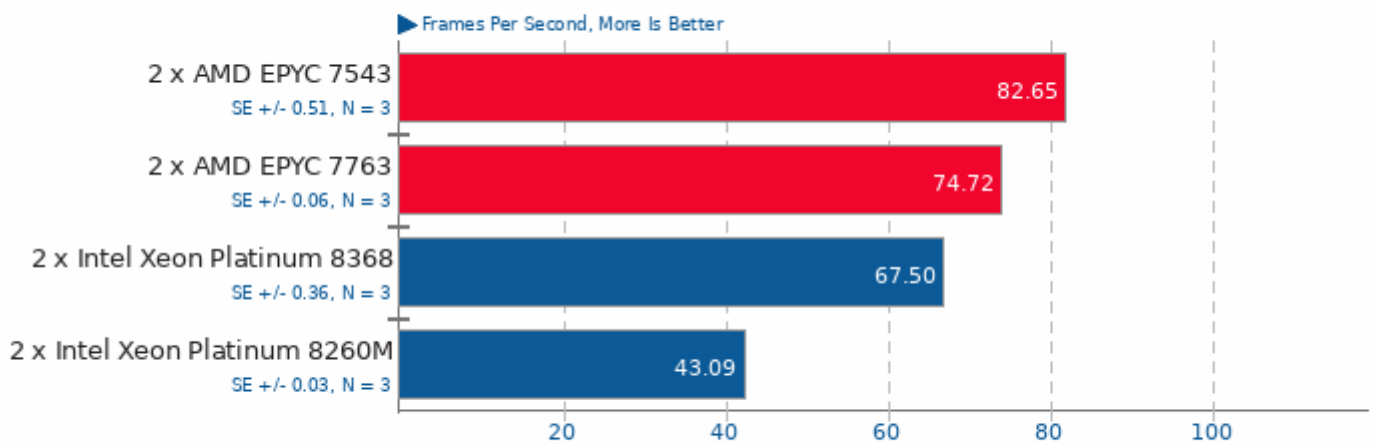
OSPray 1.8.5

Demo: Magnetic Reconnection - Renderer: Path Tracer



Kvazaar 2.0

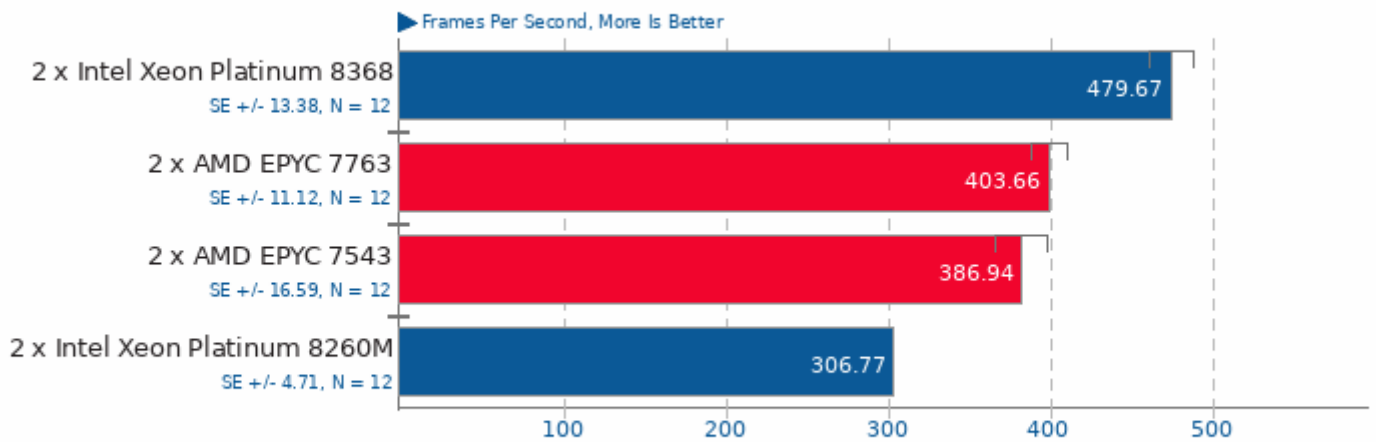
Video Input: Bosphorus 1080p - Video Preset: Medium



1. (CC) gcc options: -pthread -ftree-vectorize -fvisibility=hidden -O2 -lthread -lm -lrt

SVT-VP9 0.1

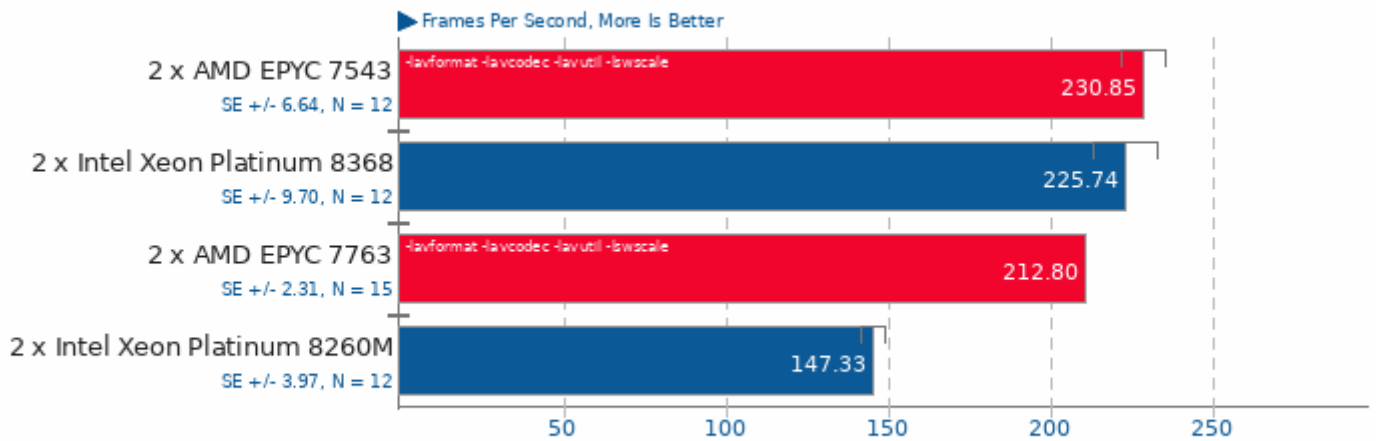
Tuning: PSNR/SSIM Optimized - Input: Bosphorus 1080p



1. (CC) gcc options: -O3 -fcommon -fPIE -fPIC -fvisibility=hidden -pie -rdynamic -lpthread -lrt -lm

x264 2019-12-17

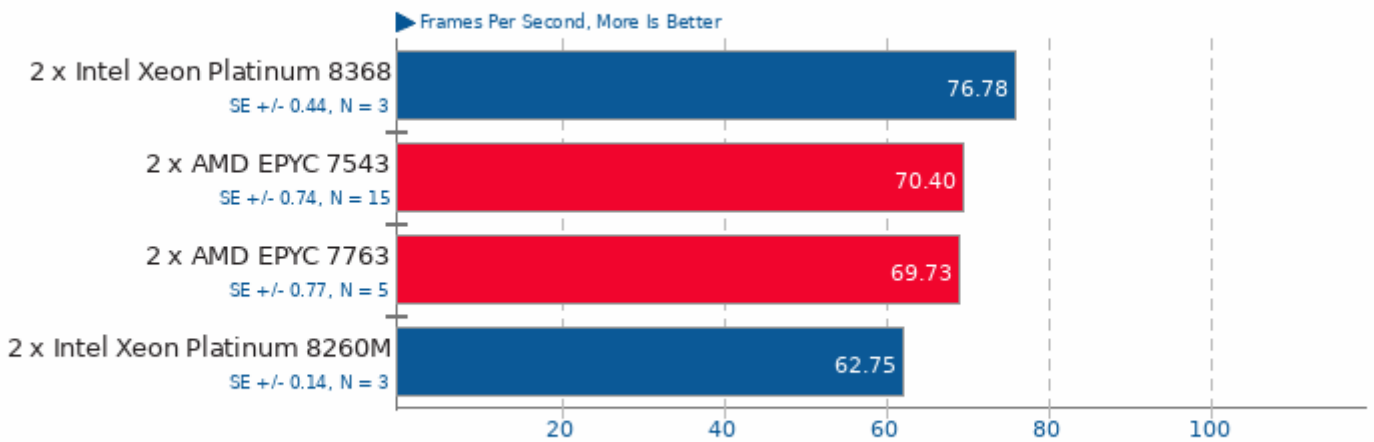
H.264 Video Encoding



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

x265 3.4

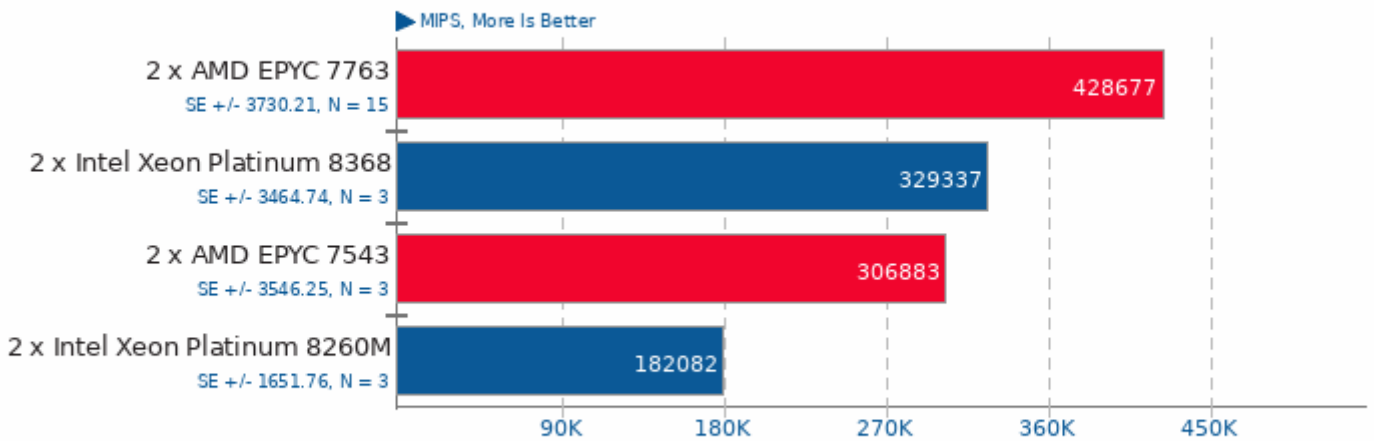
Video Input: Bosphorus 1080p



1. (CXX) g++ options: -O3 -rdynamic -lthread -lrt -ldl -lnuma

7-Zip Compression 16.02

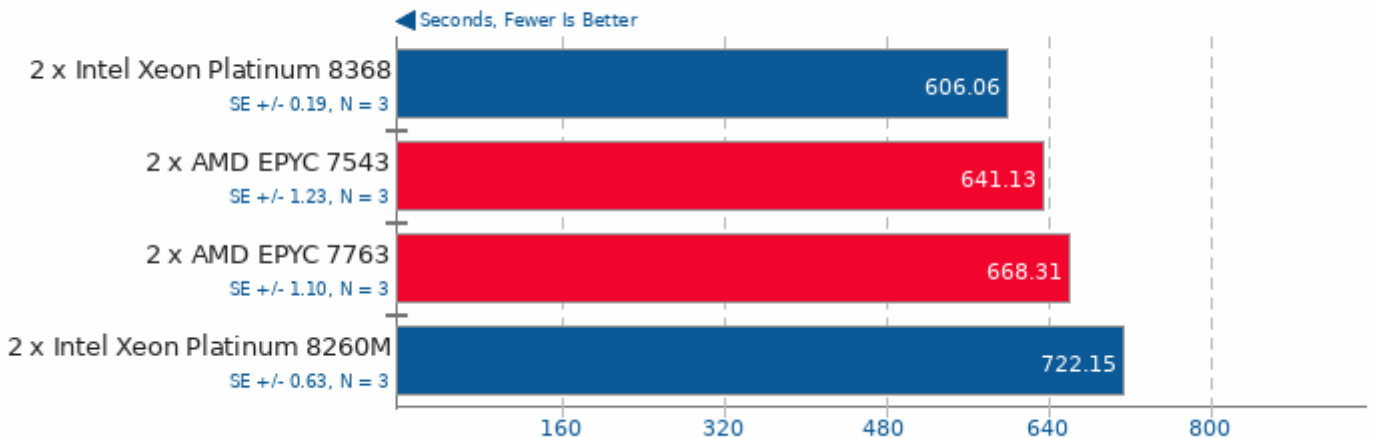
Compress Speed Test



1. (CXX) g++ options: -pipe -lthread

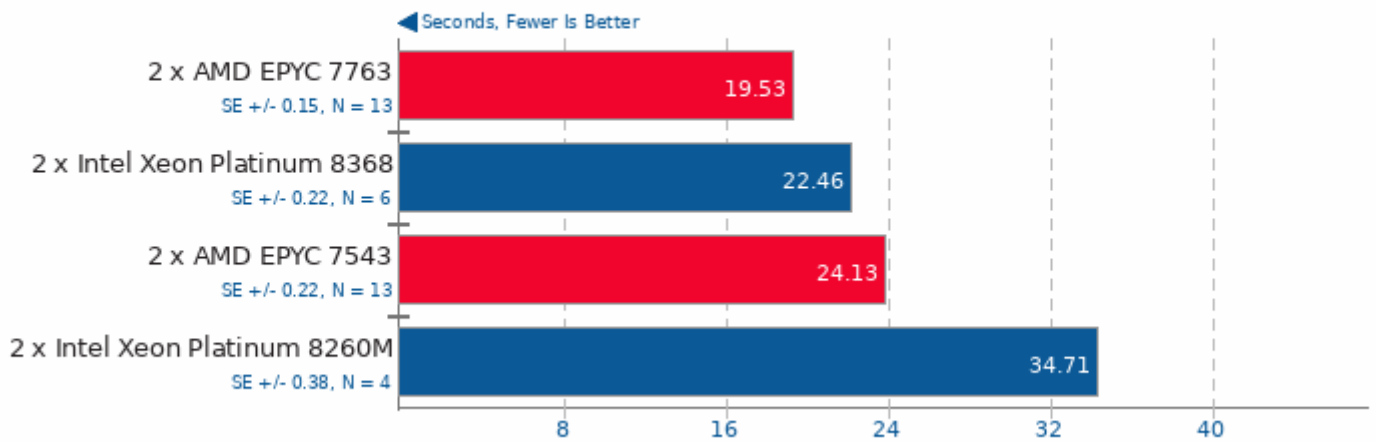
Timed GCC Compilation 9.3.0

Time To Compile



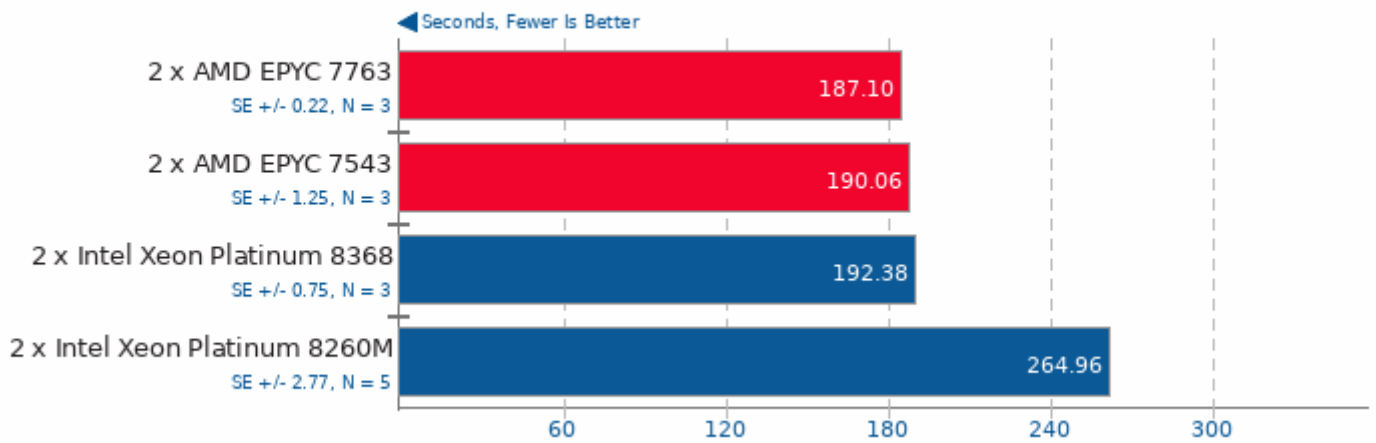
Timed Linux Kernel Compilation 5.10.20

Time To Compile



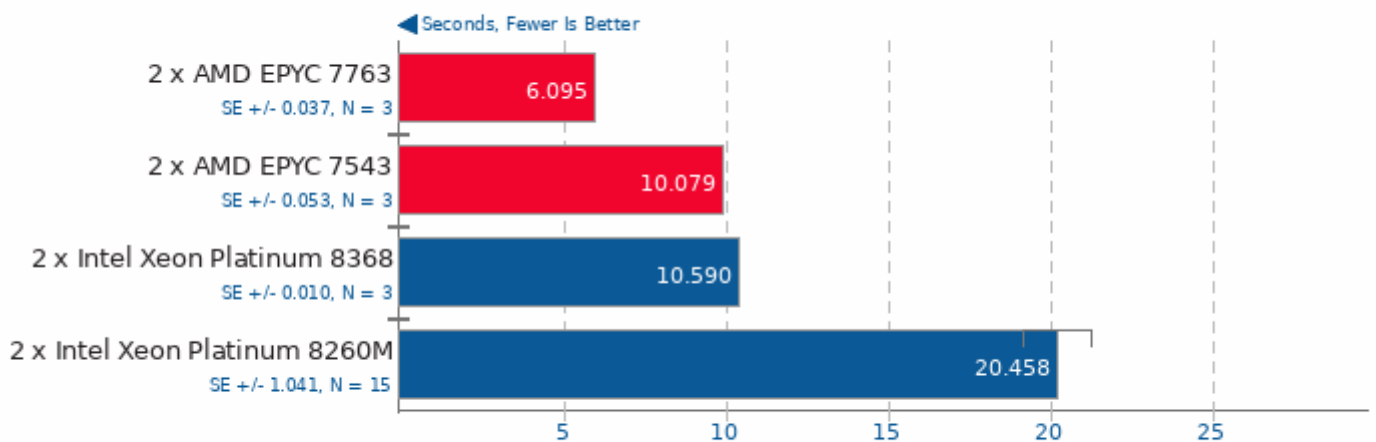
Timed LLVM Compilation 10.0

Time To Compile



C-Ray 1.1

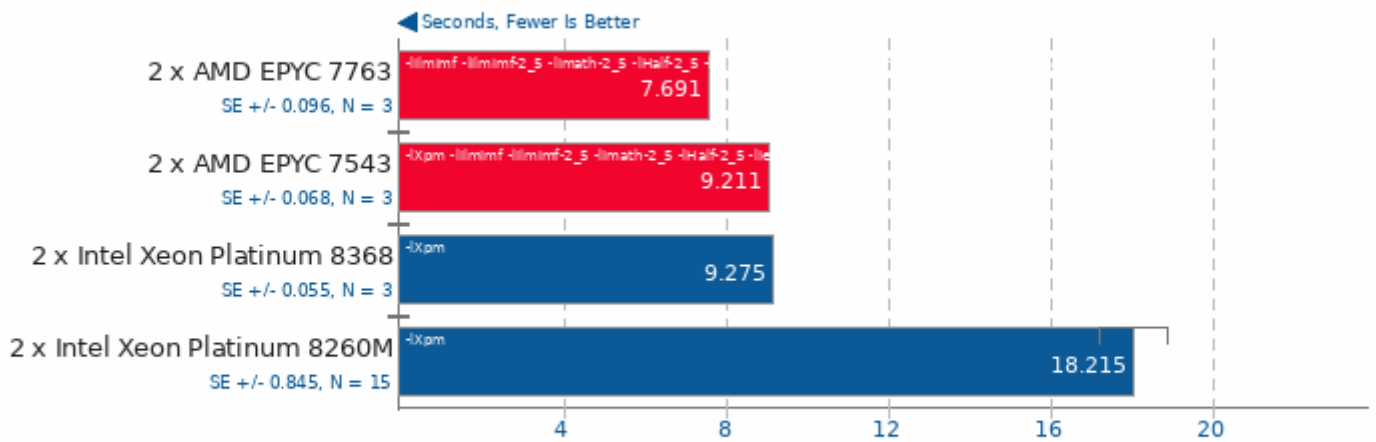
Total Time - 4K, 16 Rays Per Pixel



1. (CC) gcc options: -lm -lthread -O3

POV-Ray 3.7.0.7

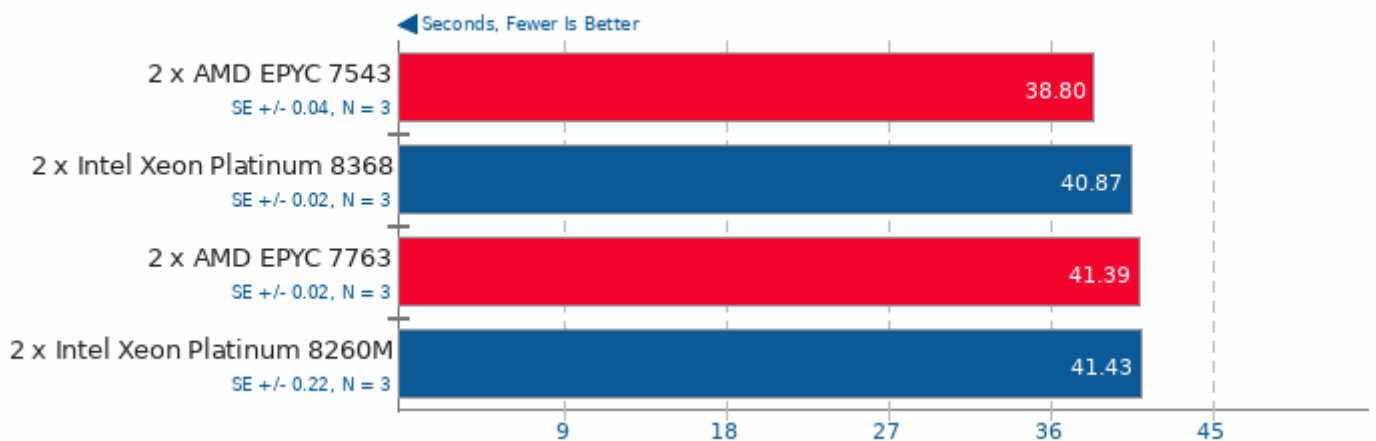
Trace Time



1. (CXX) g++ options: -pipe -O3 -ffast-math -march=native -pthread -ISM -ICE -lX11 -ltiff -ljpeg -lpng -lz -lrt -lm -lboost_thread -lboost_system

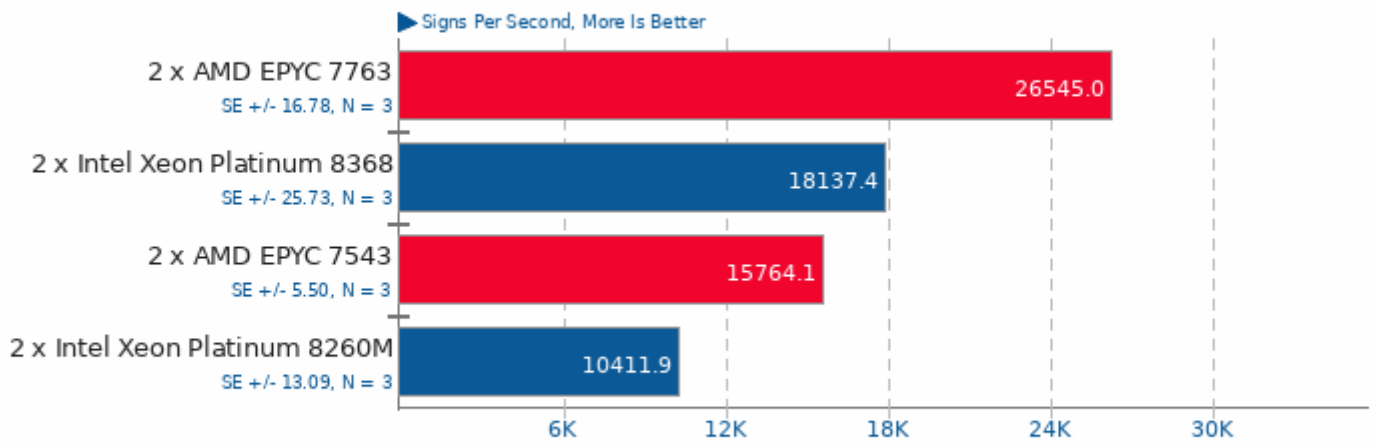
Gzip Compression

Linux Source Tree Archiving To .tar.gz



OpenSSL 1.1.1

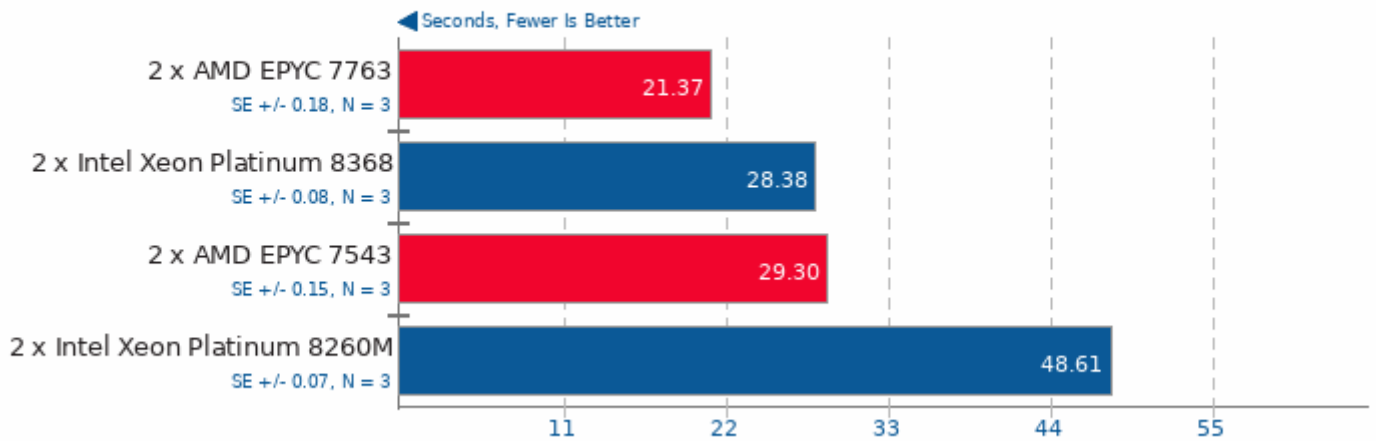
RSA 4096-bit Performance



1. (CC) gcc options: -pthread -m64 -O3 -lssl -lcrypto -ldl

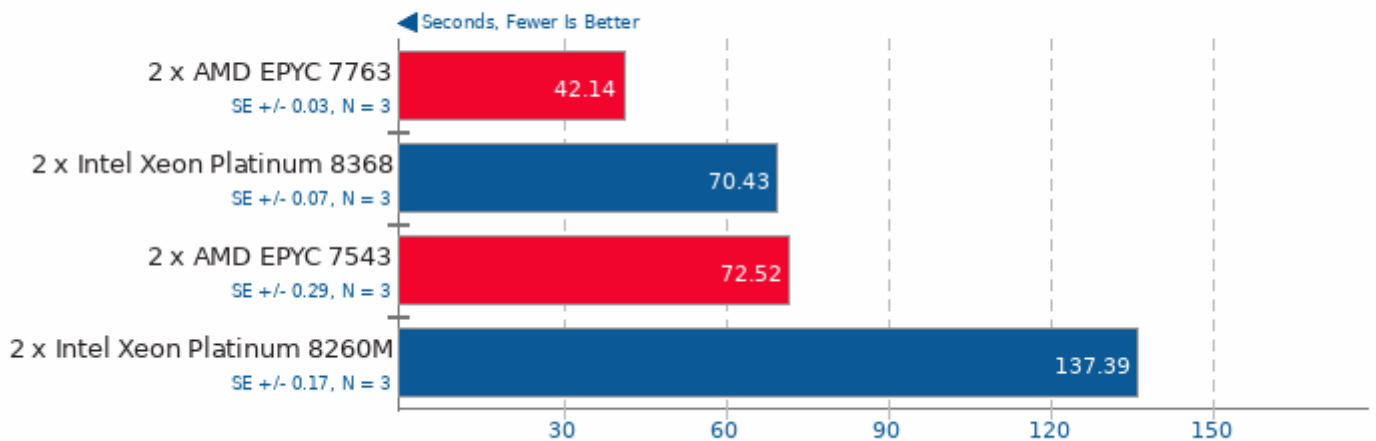
Blender 2.92

Blend File: BMW27 - Compute: CPU-Only



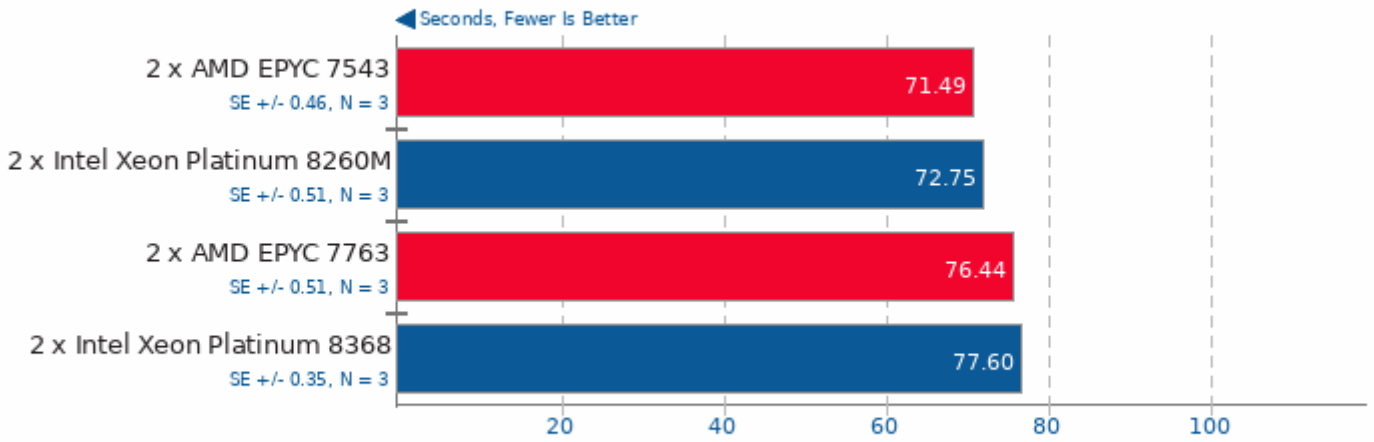
Blender 2.92

Blend File: Classroom - Compute: CPU-Only



GnuPG 2.2.27

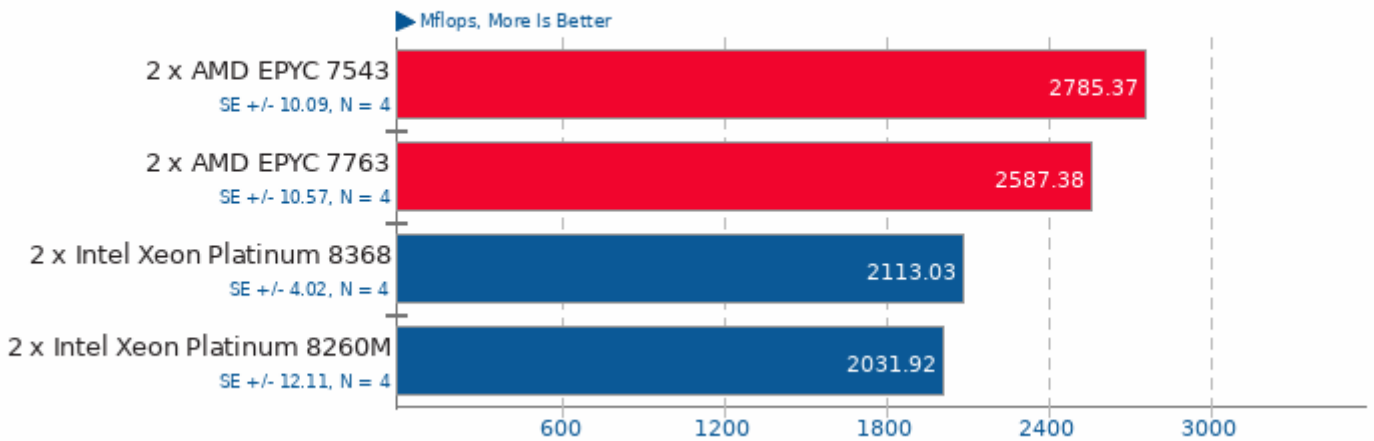
2.7GB Sample File Encryption



1. (CC) gcc options: -O2

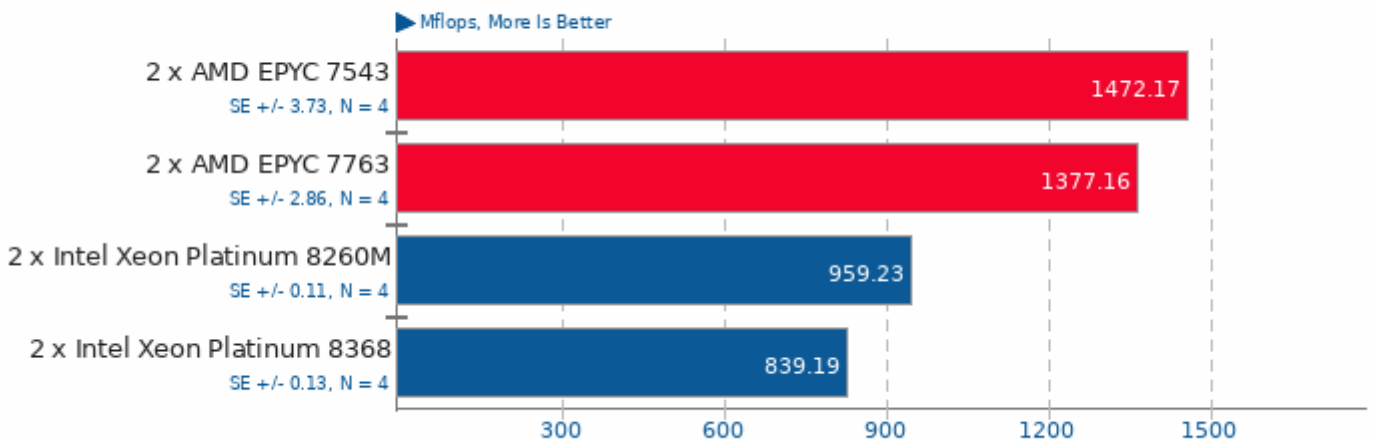
Java SciMark 2.0

Computational Test: Composite



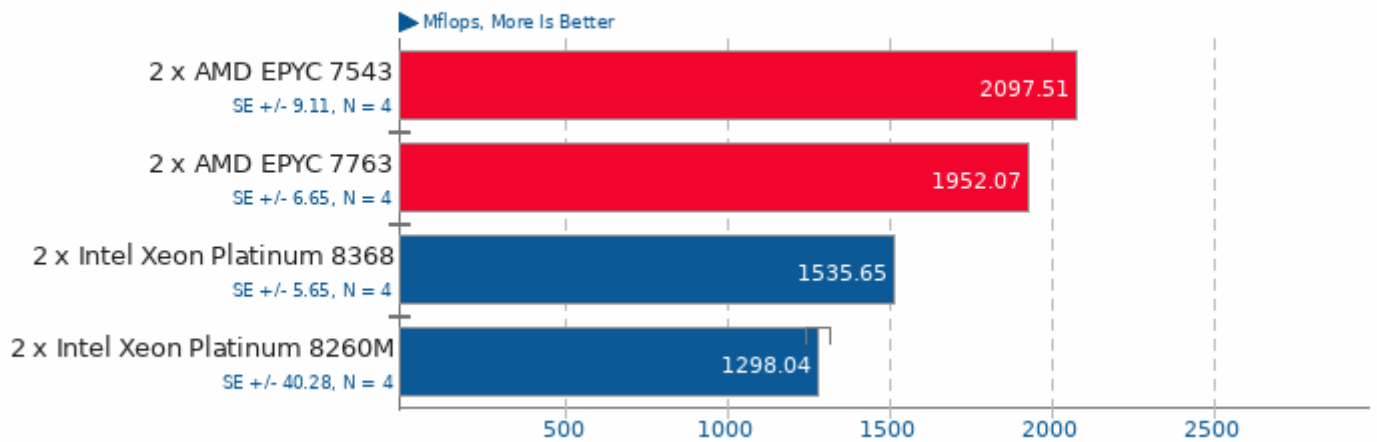
Java SciMark 2.0

Computational Test: Monte Carlo



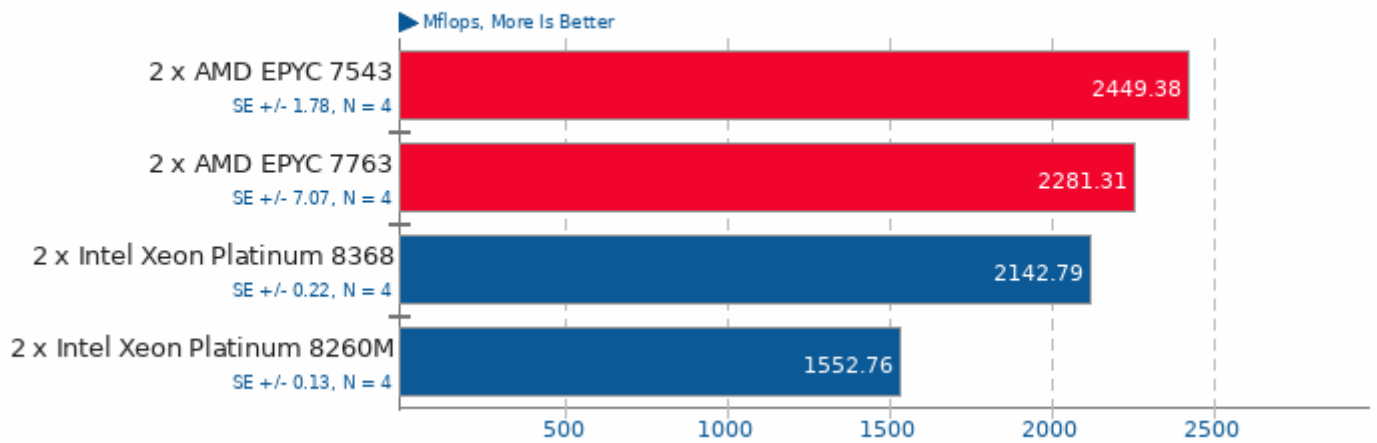
Java SciMark 2.0

Computational Test: Fast Fourier Transform



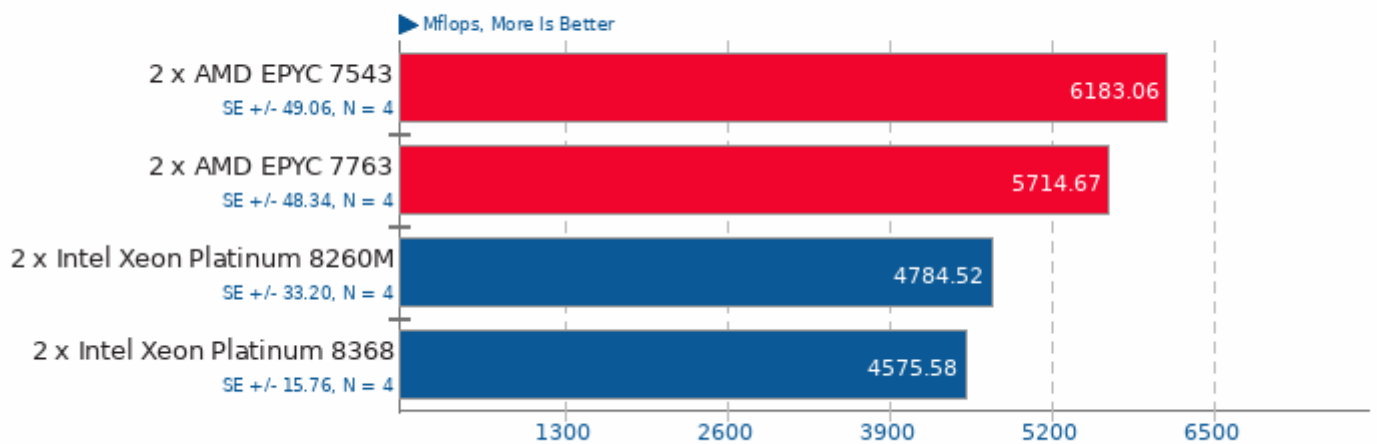
Java SciMark 2.0

Computational Test: Sparse Matrix Multiply



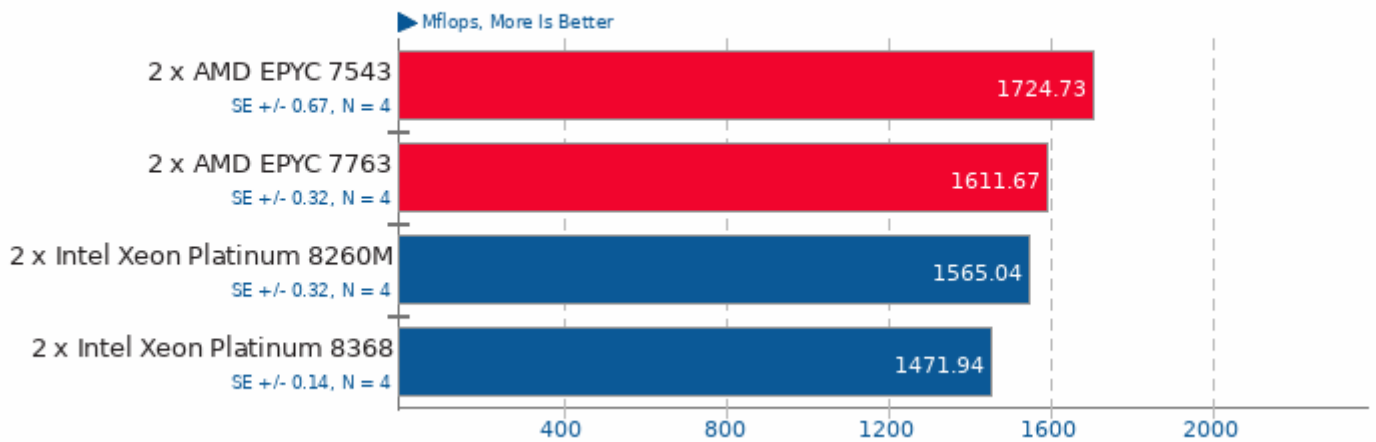
Java SciMark 2.0

Computational Test: Dense LU Matrix Factorization



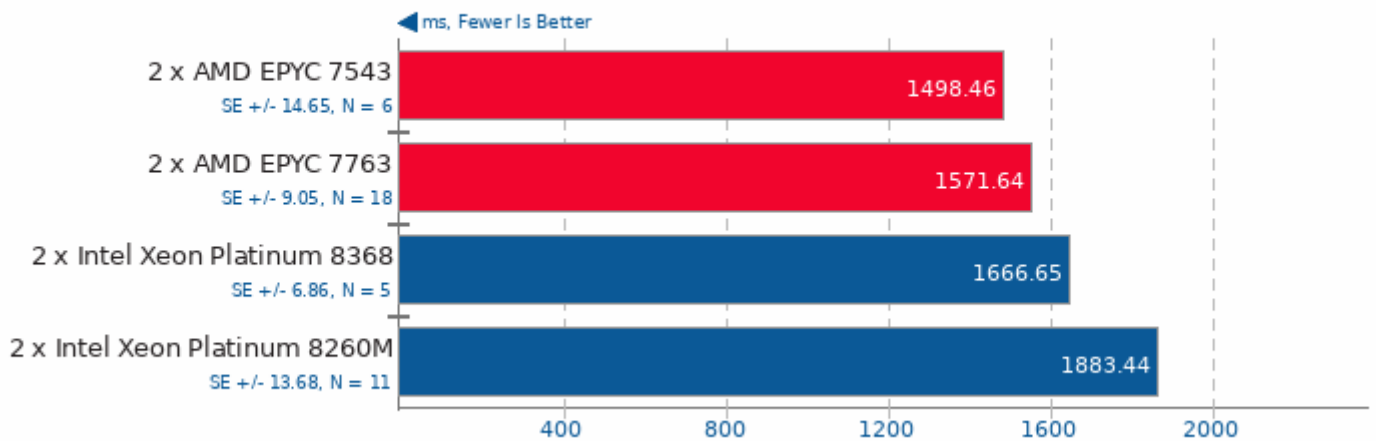
Java SciMark 2.0

Computational Test: Jacobi Successive Over-Relaxation



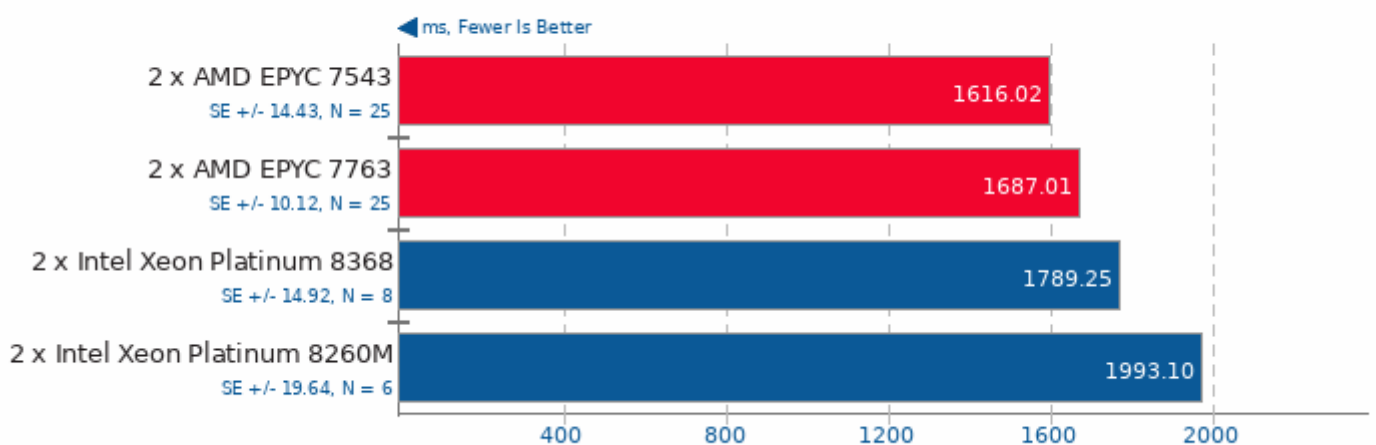
Renaissance 0.10.0

Test: Scala Dotty



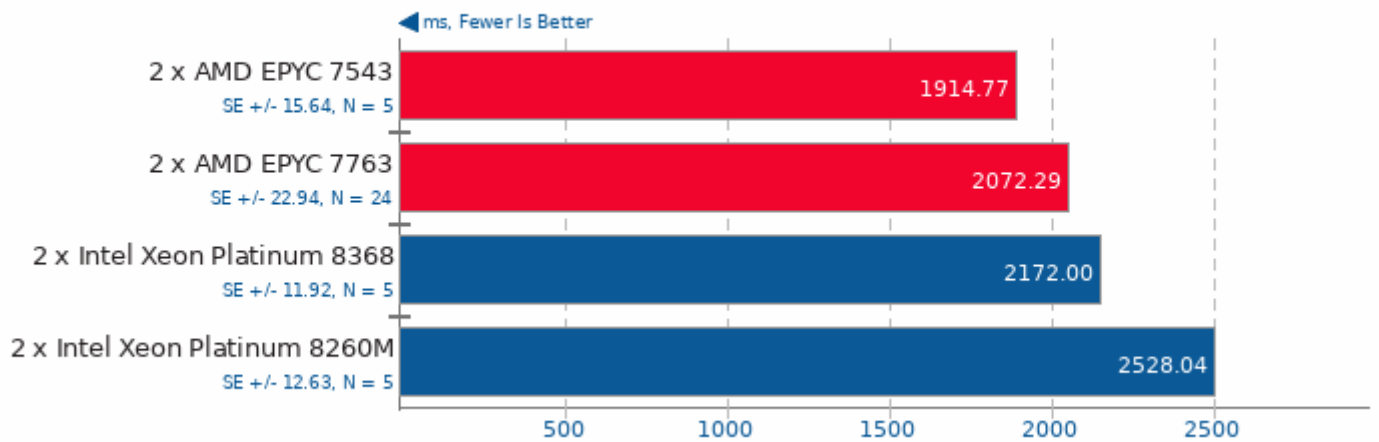
Renaissance 0.10.0

Test: Random Forest



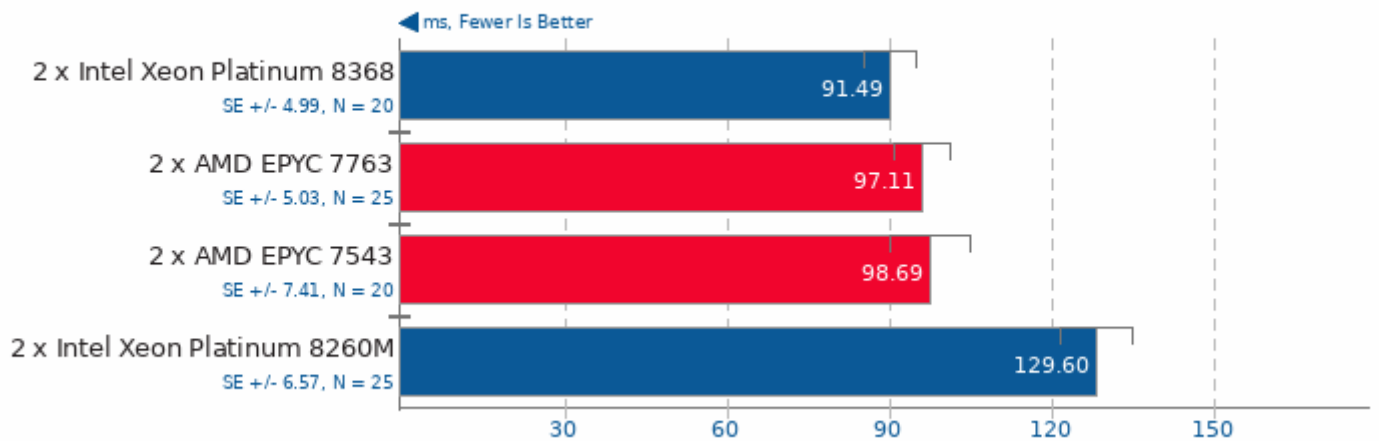
Renaissance 0.10.0

Test: Apache Spark ALS



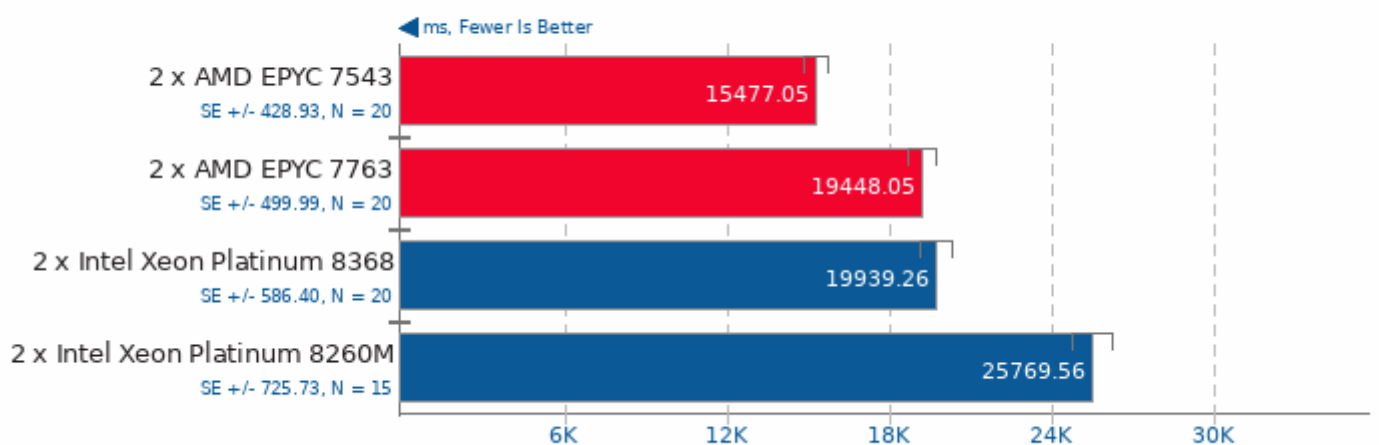
Renaissance 0.10.0

Test: Apache Spark Bayes



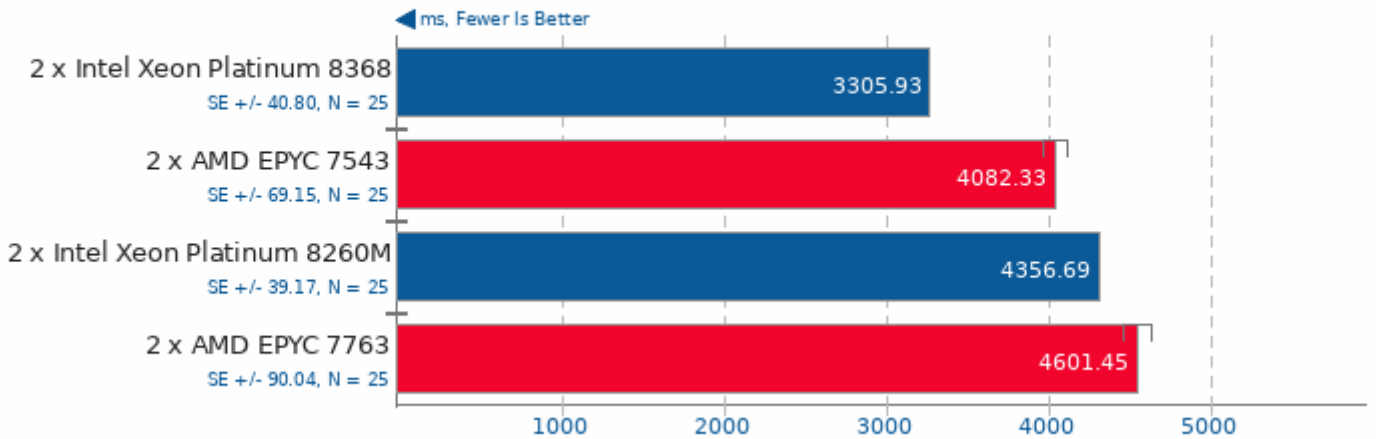
Renaissance 0.10.0

Test: Savina Reactors.IO



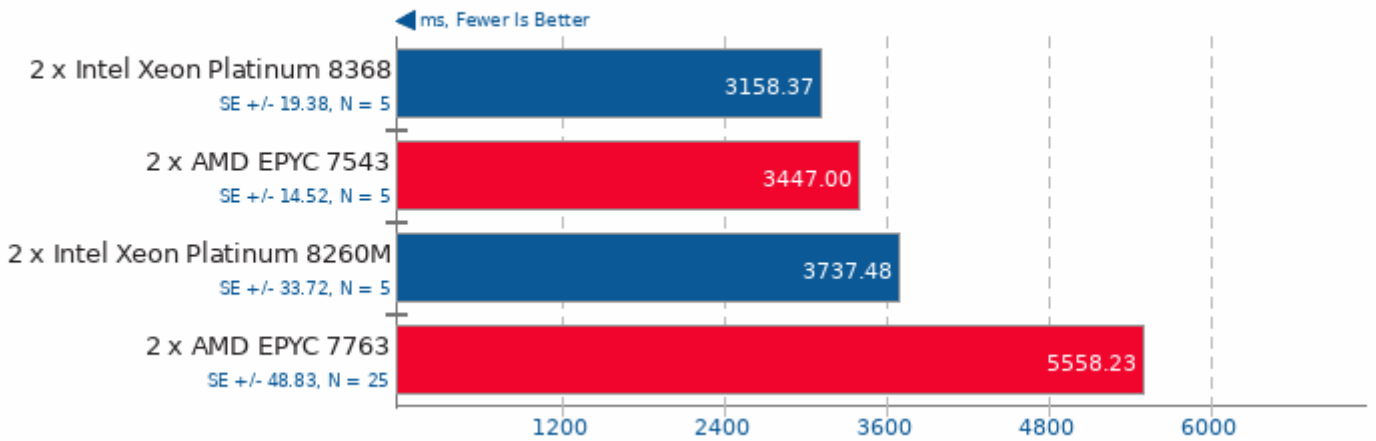
Renaissance 0.10.0

Test: Apache Spark PageRank



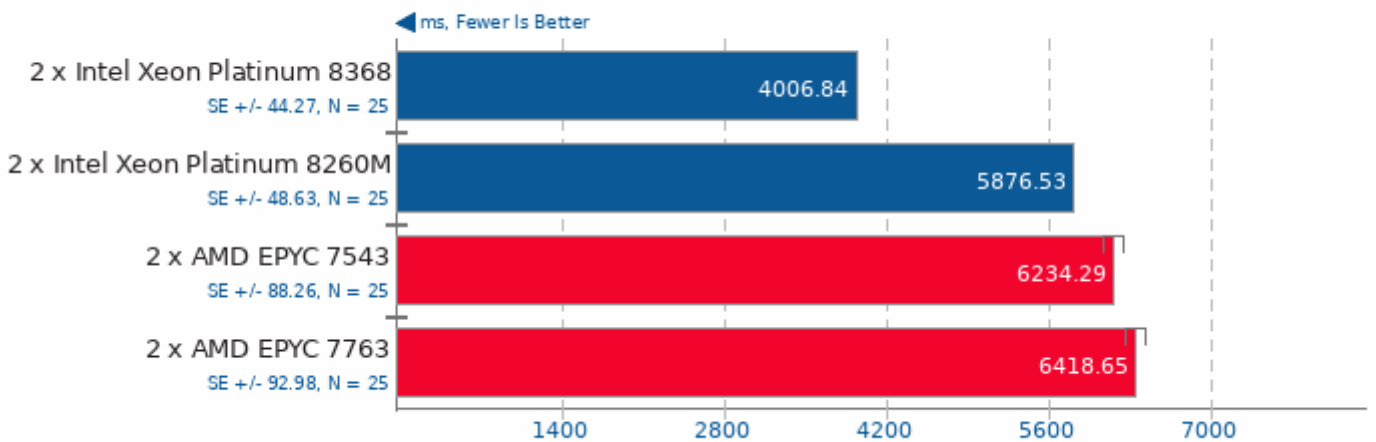
Renaissance 0.10.0

Test: Twitter HTTP Requests



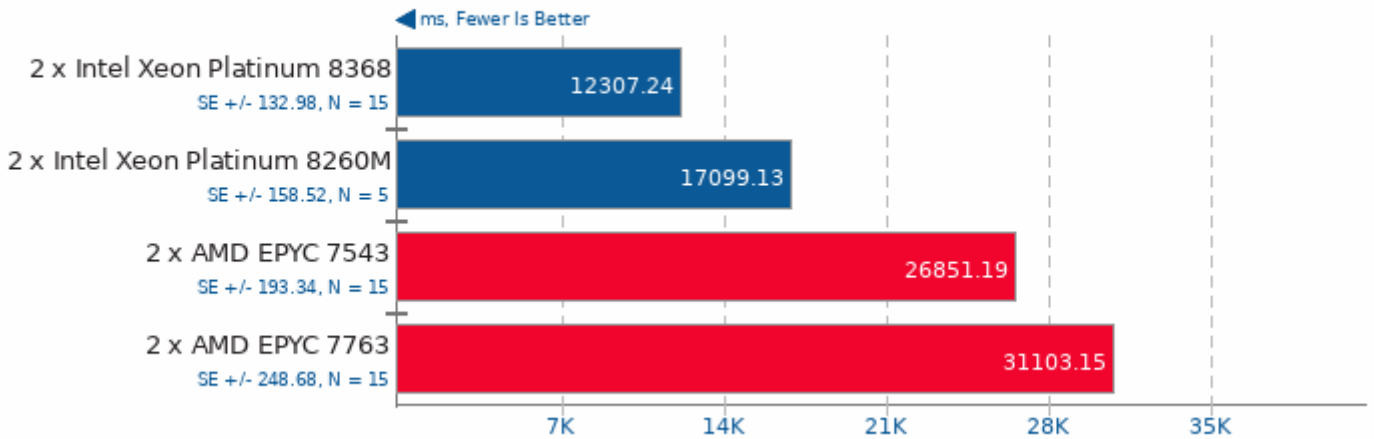
Renaissance 0.10.0

Test: In-Memory Database Shootout



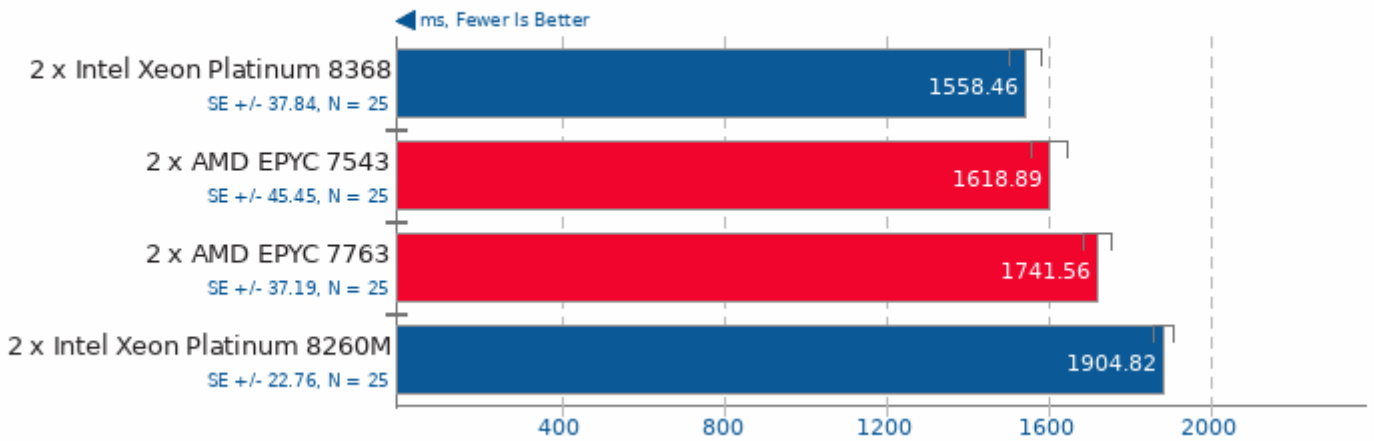
Renaissance 0.10.0

Test: Akka Unbalanced Cobwebbed Tree



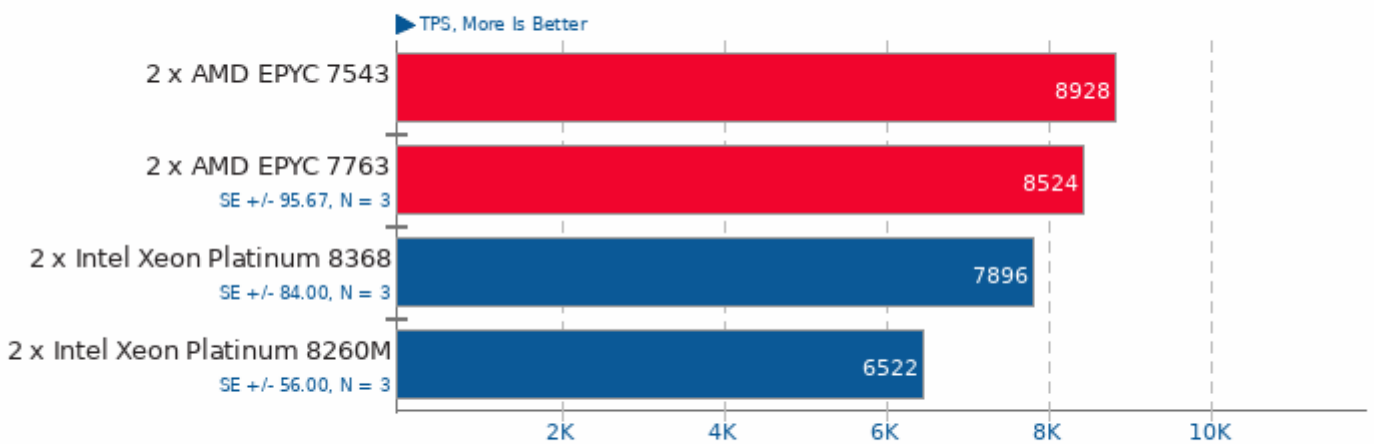
Renaissance 0.10.0

Test: Genetic Algorithm Using Jenetics + Futures



PostMark 1.51

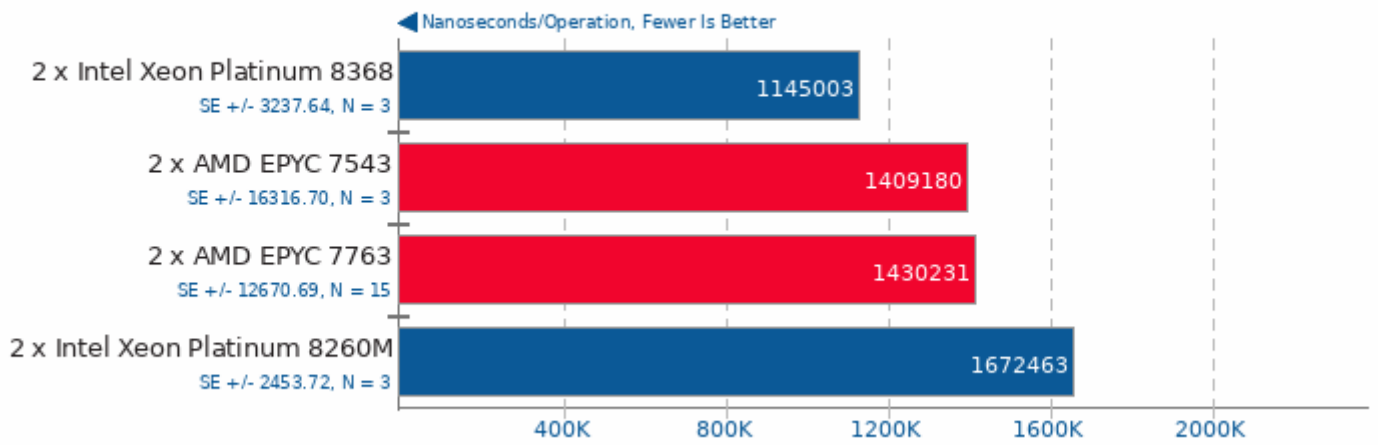
Disk Transaction Performance



1. (CC) gcc options: -O3

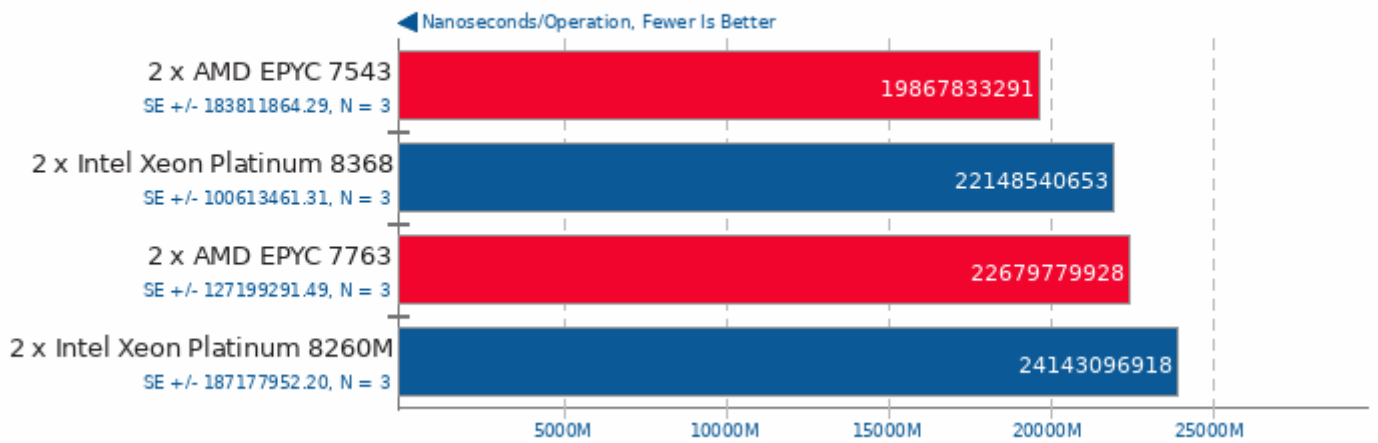
Go Benchmarks

Test: json



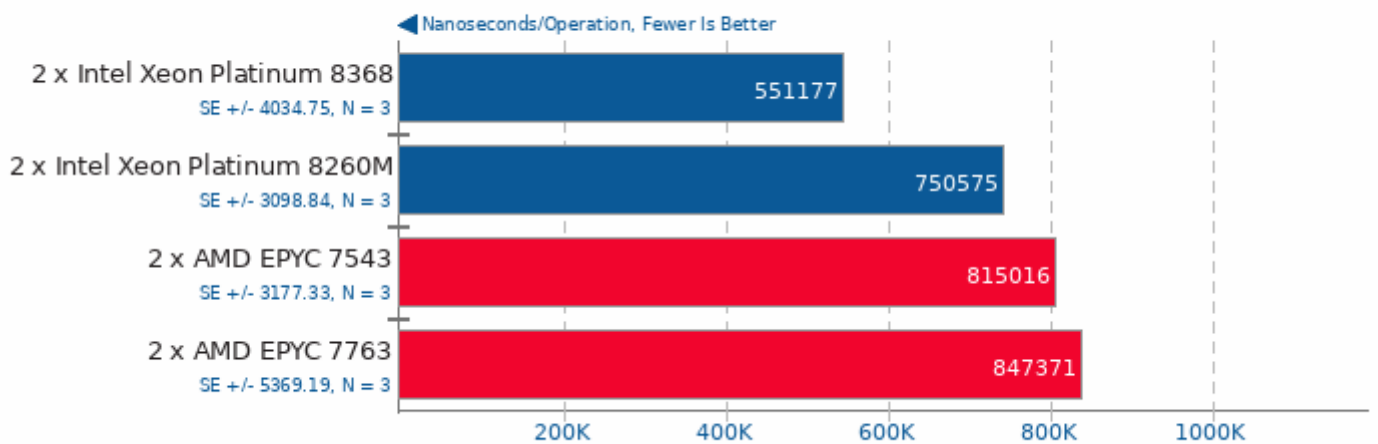
Go Benchmarks

Test: build



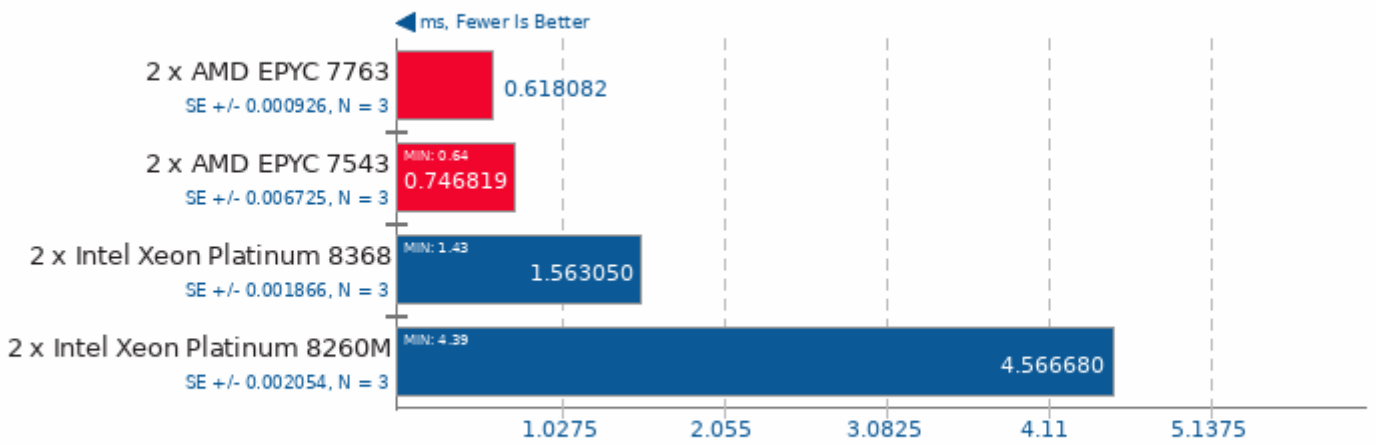
Go Benchmarks

Test: garbage



oneDNN 2.0

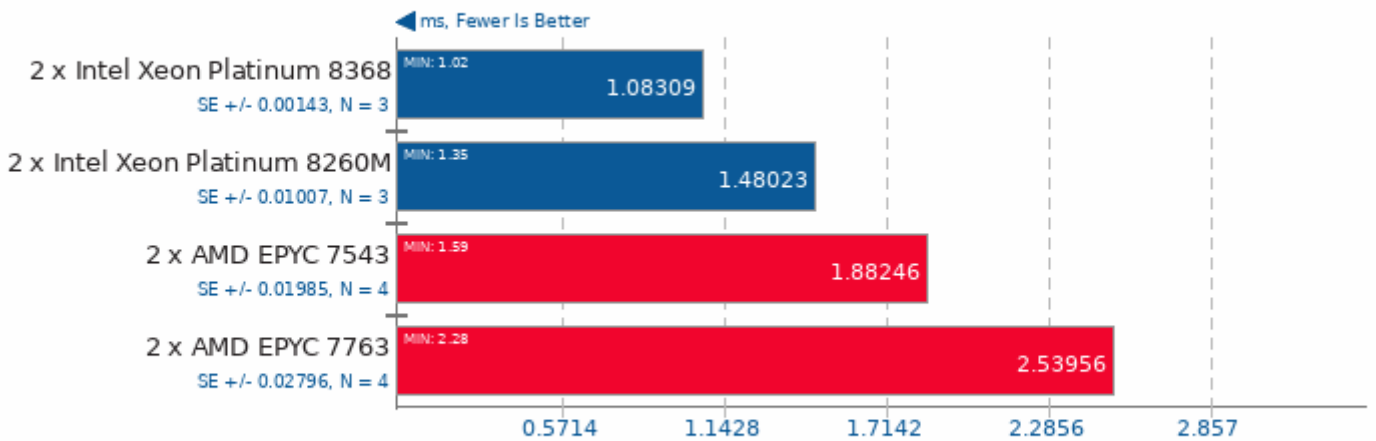
Harness: Convolution Batch Shapes Auto - Data Type: f32 - Engine: CPU



1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -mssse4.1 -fPIC -pie -lpthread

oneDNN 2.0

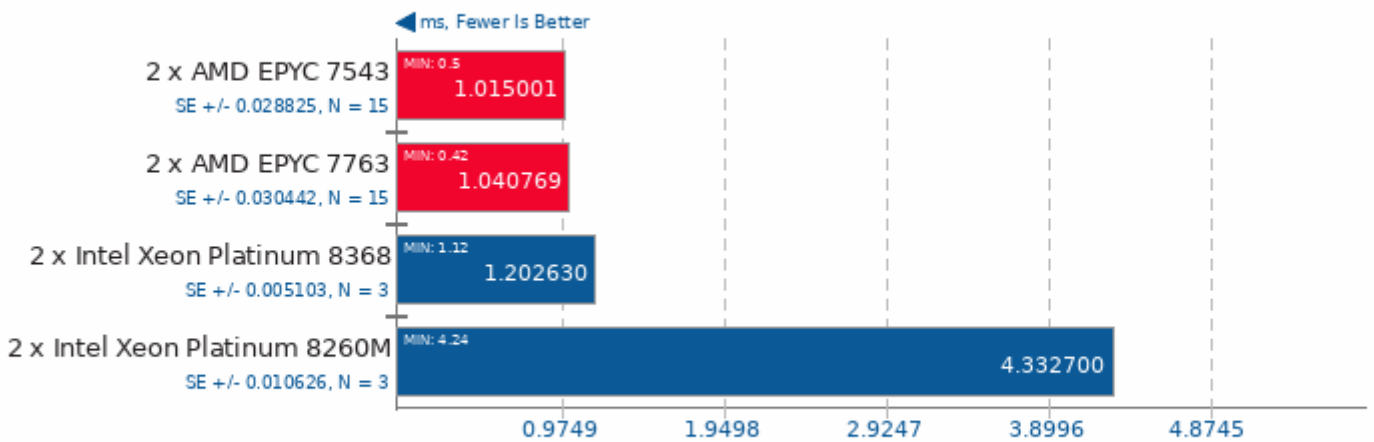
Harness: Deconvolution Batch shapes_1d - Data Type: f32 - Engine: CPU



1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -mssse4.1 -fPIC -pie -lpthread

oneDNN 2.0

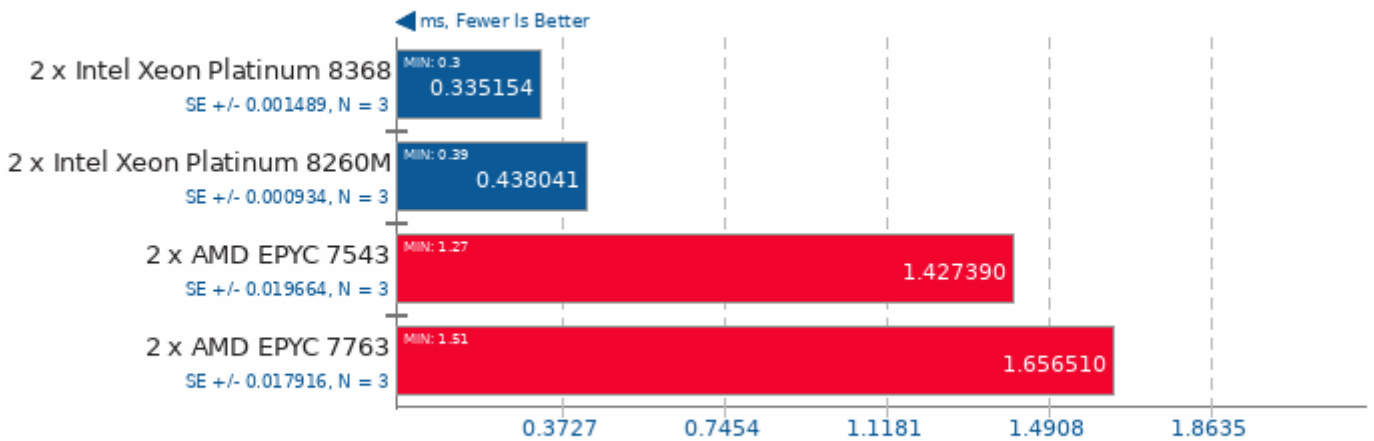
Harness: Convolution Batch Shapes Auto - Data Type: u8s8f32 - Engine: CPU



1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -mssse4.1 -fPIC -pie -lpthread

oneDNN 2.0

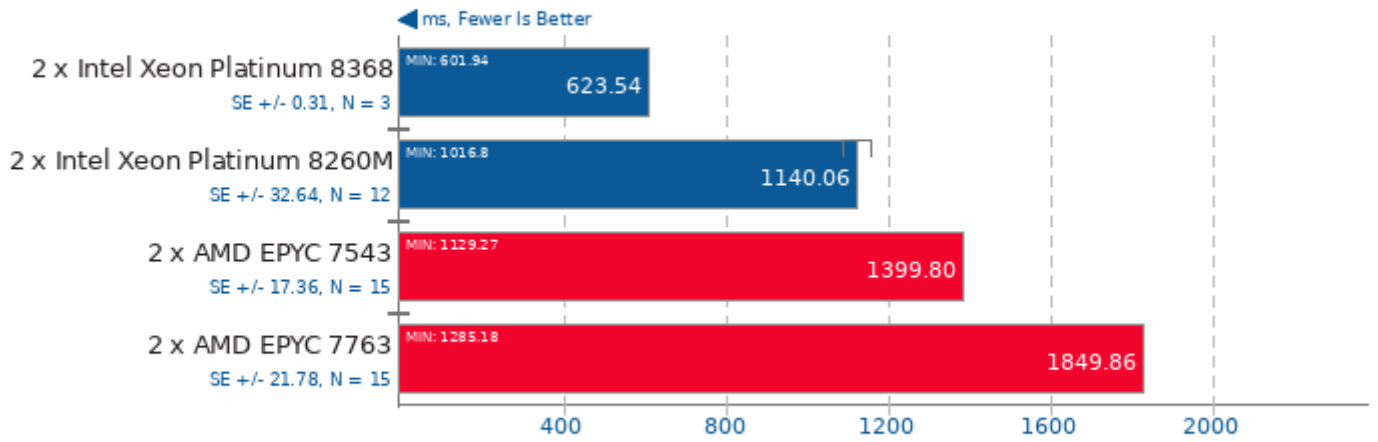
Harness: Deconvolution Batch shapes_1d - Data Type: u8s8f32 - Engine: CPU



1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -mssse4.1 -fPIC -pie -lpthread

oneDNN 2.0

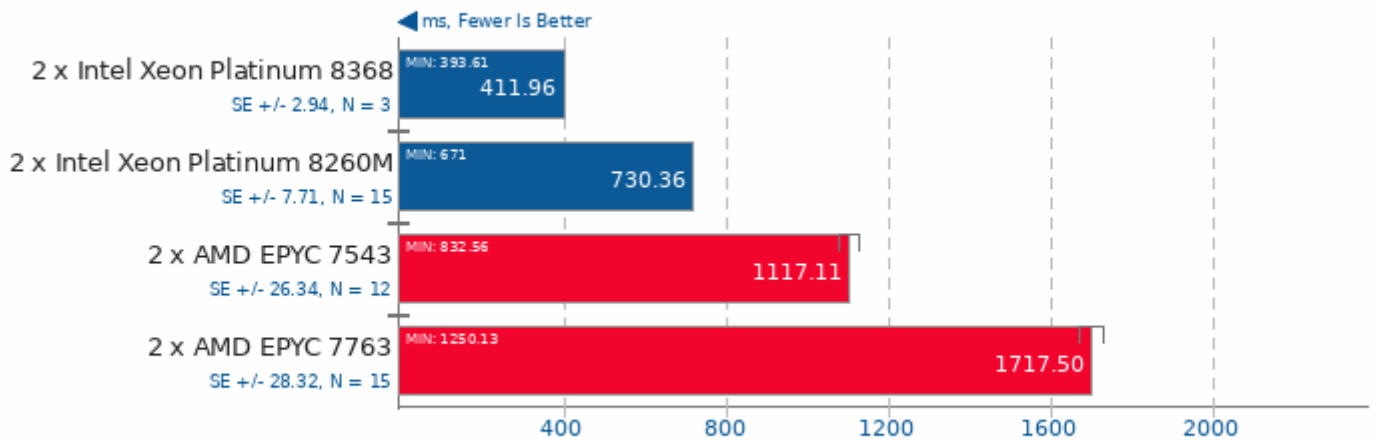
Harness: Recurrent Neural Network Training - Data Type: f32 - Engine: CPU



1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -mssse4.1 -fPIC -pie -lpthread

oneDNN 2.0

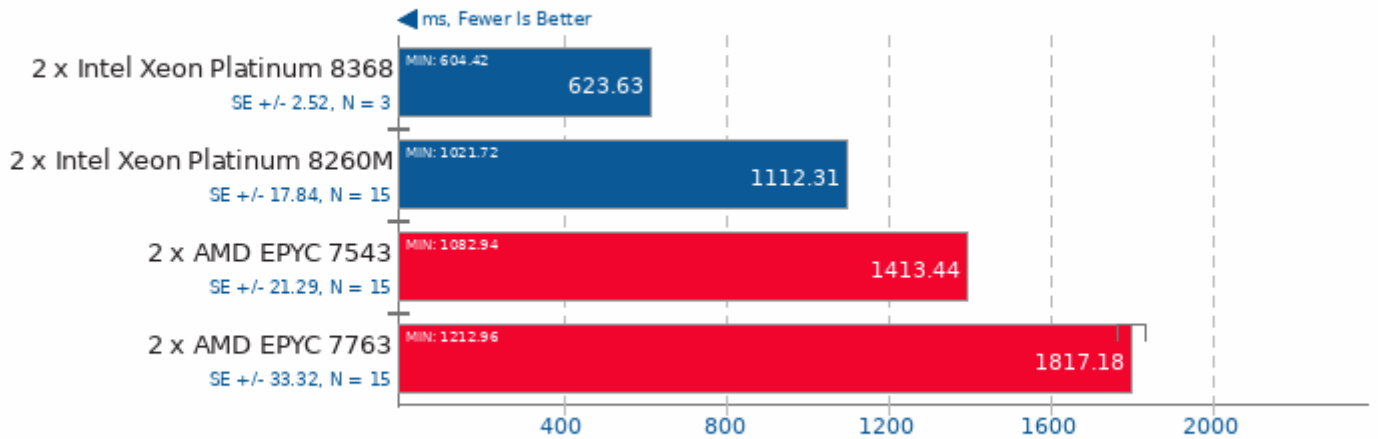
Harness: Recurrent Neural Network Inference - Data Type: f32 - Engine: CPU



1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -mssse4.1 -fPIC -pie -lpthread

oneDNN 2.0

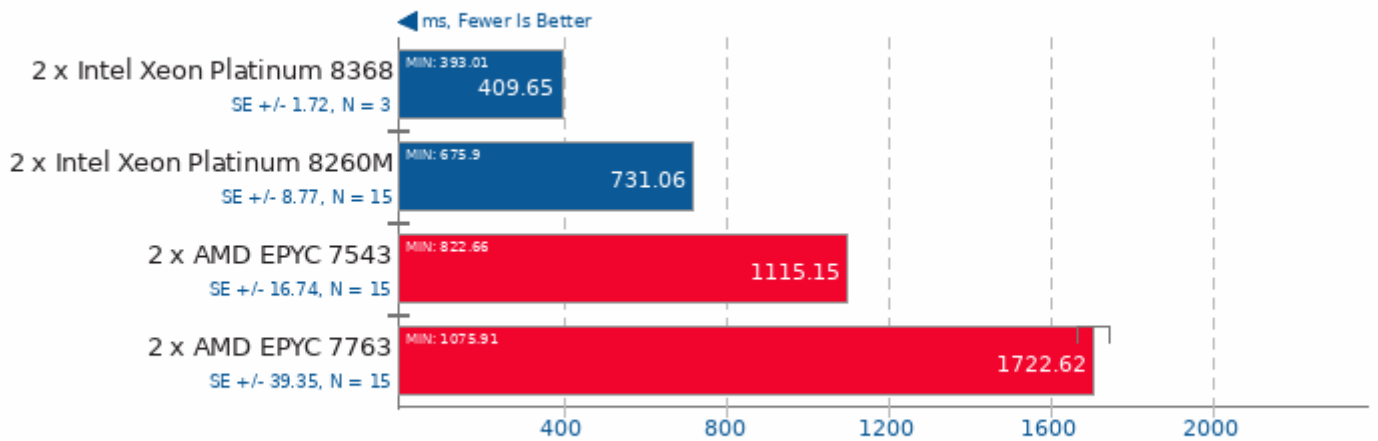
Harness: Recurrent Neural Network Training - Data Type: u8s8f32 - Engine: CPU



1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -mssse4.1 -fPIC -pie -lpthread

oneDNN 2.0

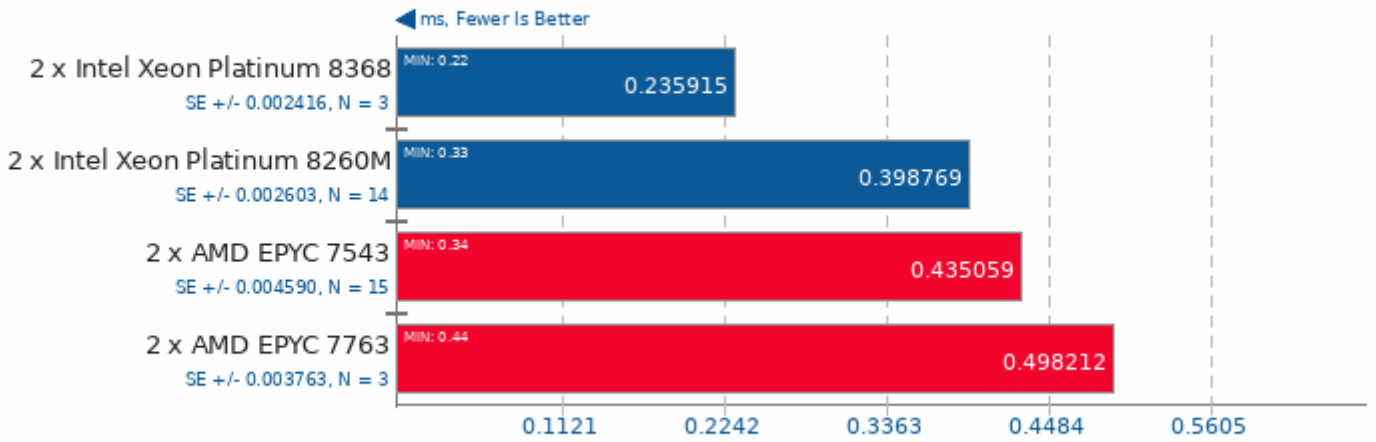
Harness: Recurrent Neural Network Inference - Data Type: u8s8f32 - Engine: CPU



1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -mssse4.1 -fPIC -pie -lpthread

oneDNN 2.0

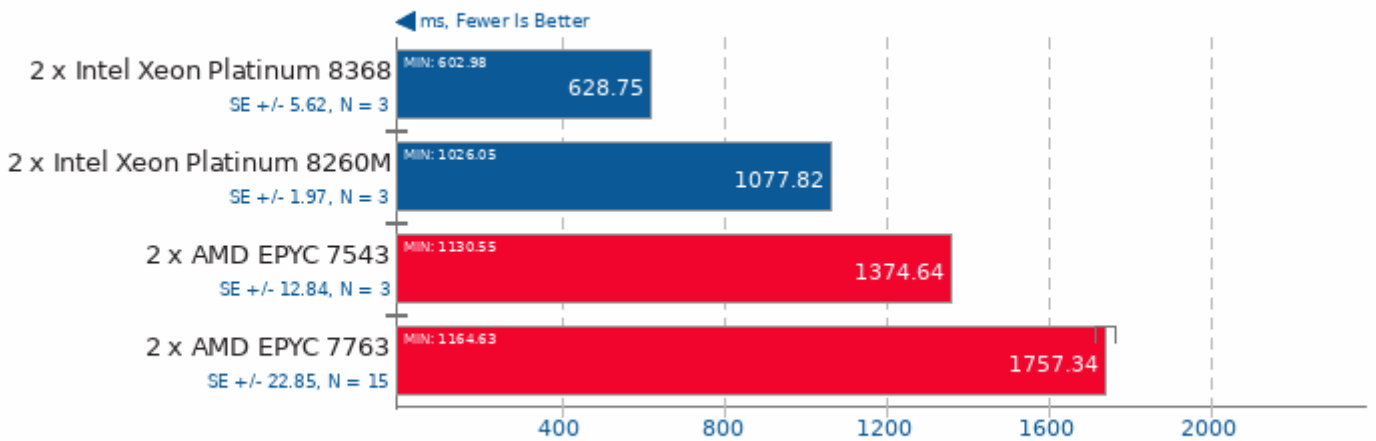
Harness: Matrix Multiply Batch Shapes Transformer - Data Type: f32 - Engine: CPU



1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -mssse4.1 -fPIC -pie -lpthread

oneDNN 2.0

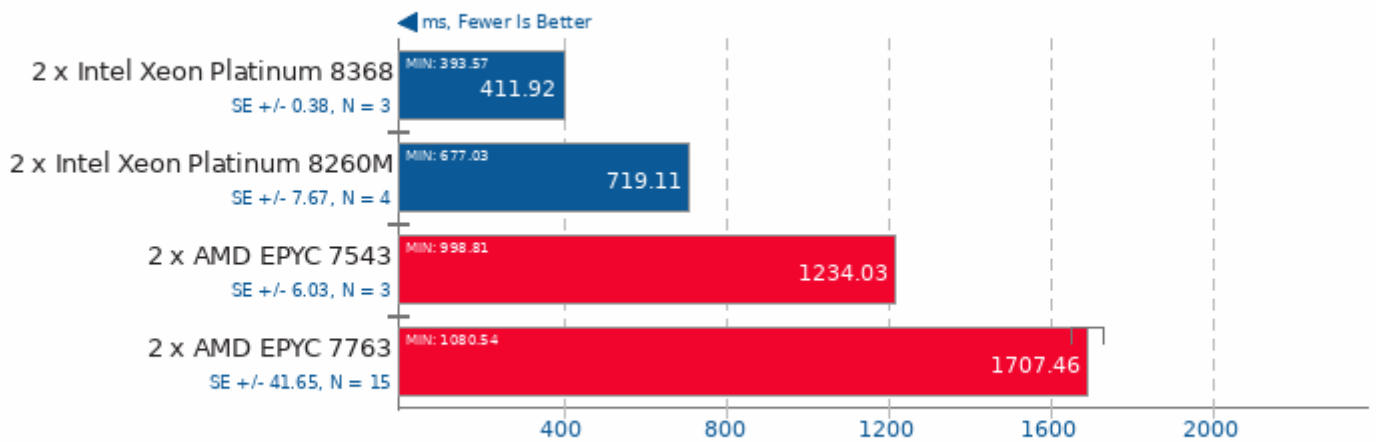
Harness: Recurrent Neural Network Training - Data Type: bf16bf16bf16 - Engine: CPU



1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -mssse4.1 -fPIC -pie -lpthread

oneDNN 2.0

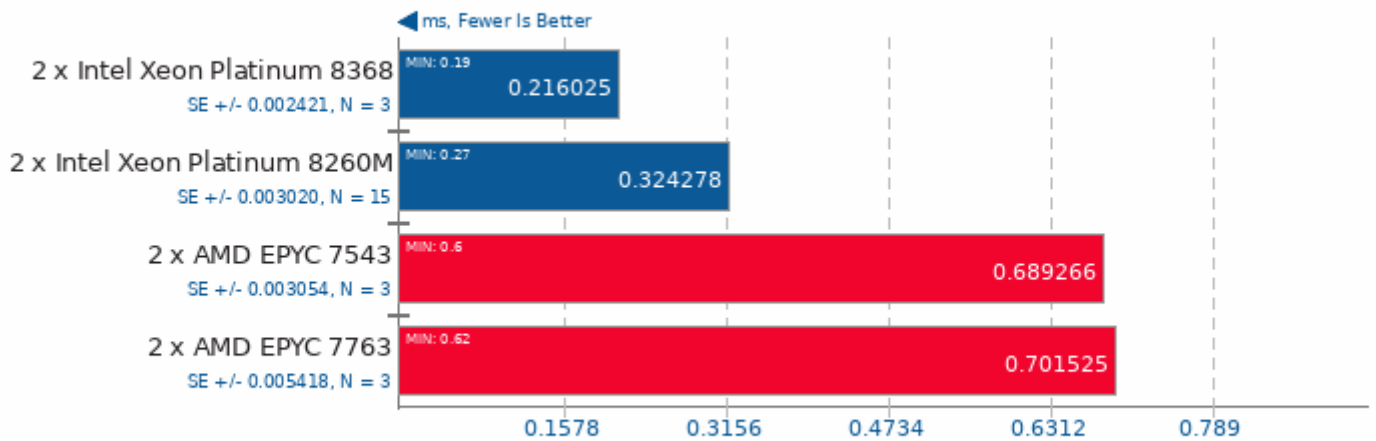
Harness: Recurrent Neural Network Inference - Data Type: bf16bf16bf16 - Engine: CPU



1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -mssse4.1 -fPIC -pie -lpthread

oneDNN 2.0

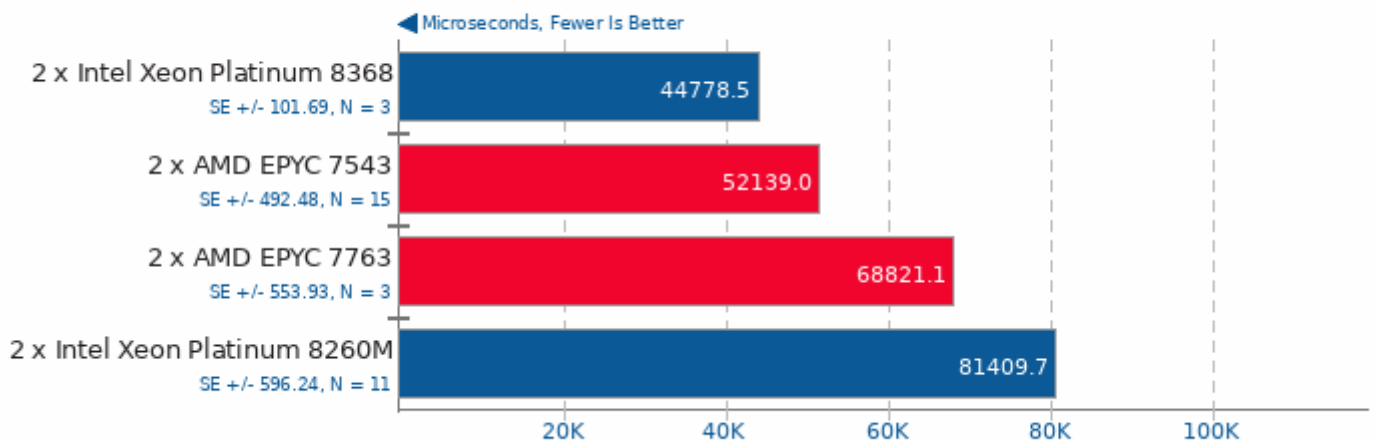
Harness: Matrix Multiply Batch Shapes Transformer - Data Type: u8s8f32 - Engine: CPU



1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -mssse4.1 -fPIC -pie -lpthread

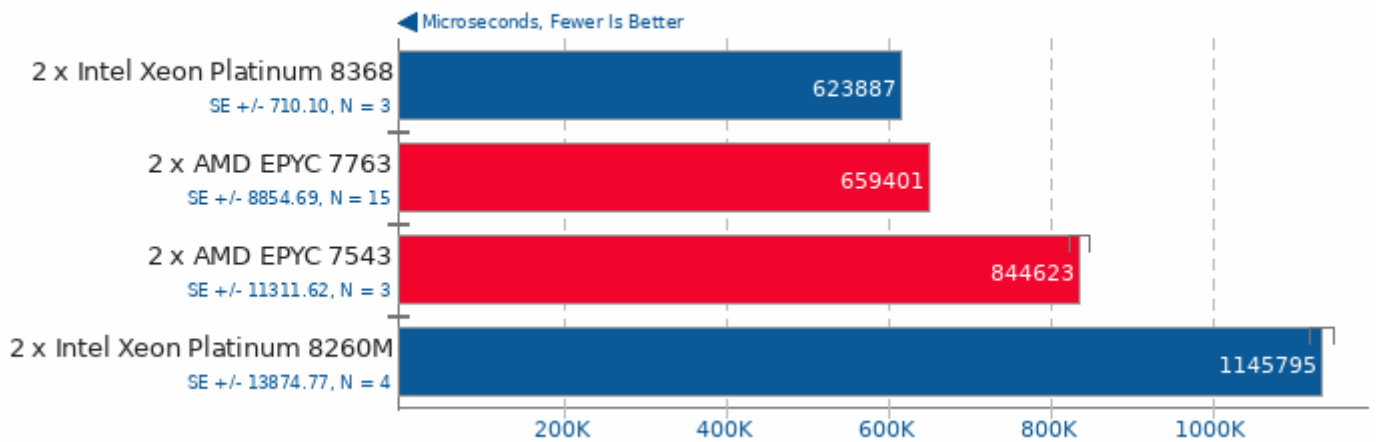
TensorFlow Lite 2020-08-23

Model: SqueezeNet



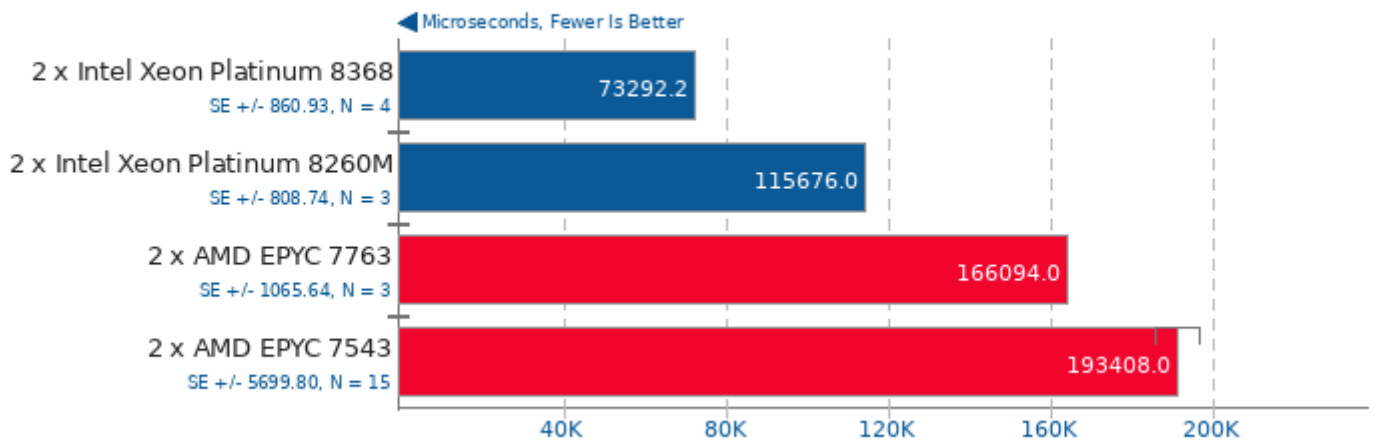
TensorFlow Lite 2020-08-23

Model: Inception V4



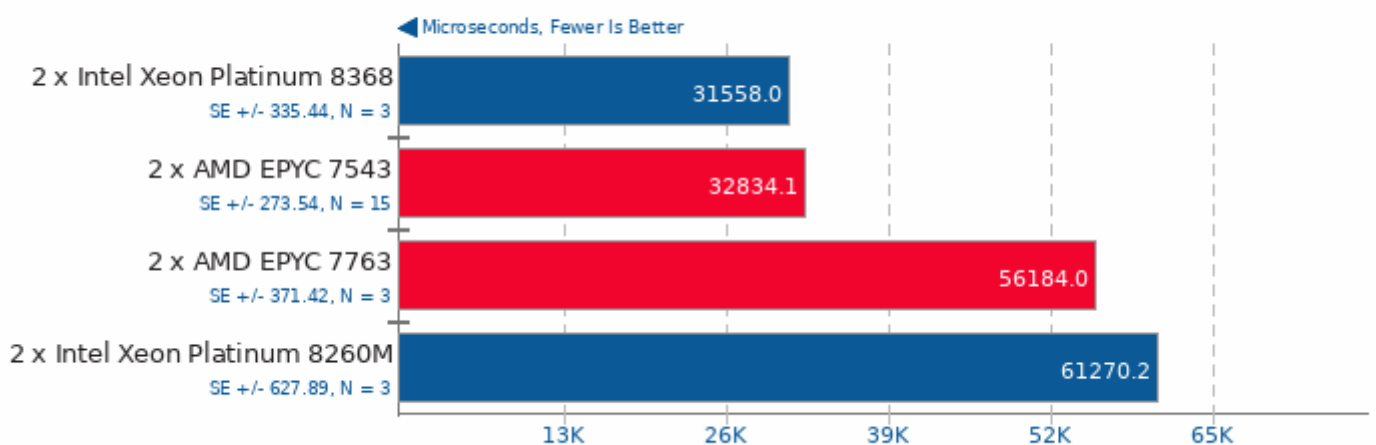
TensorFlow Lite 2020-08-23

Model: NASNet Mobile



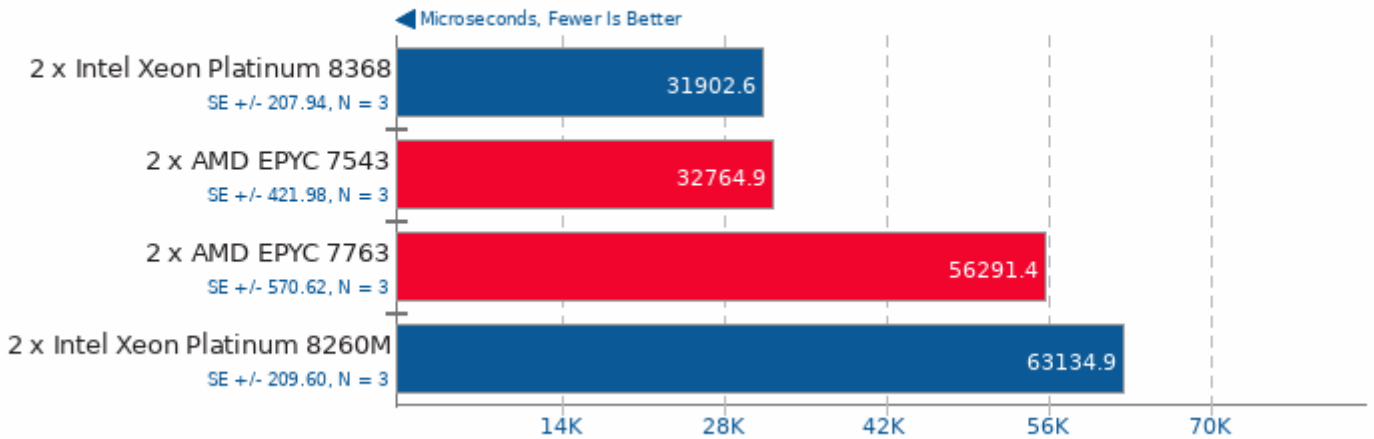
TensorFlow Lite 2020-08-23

Model: Mobilenet Float



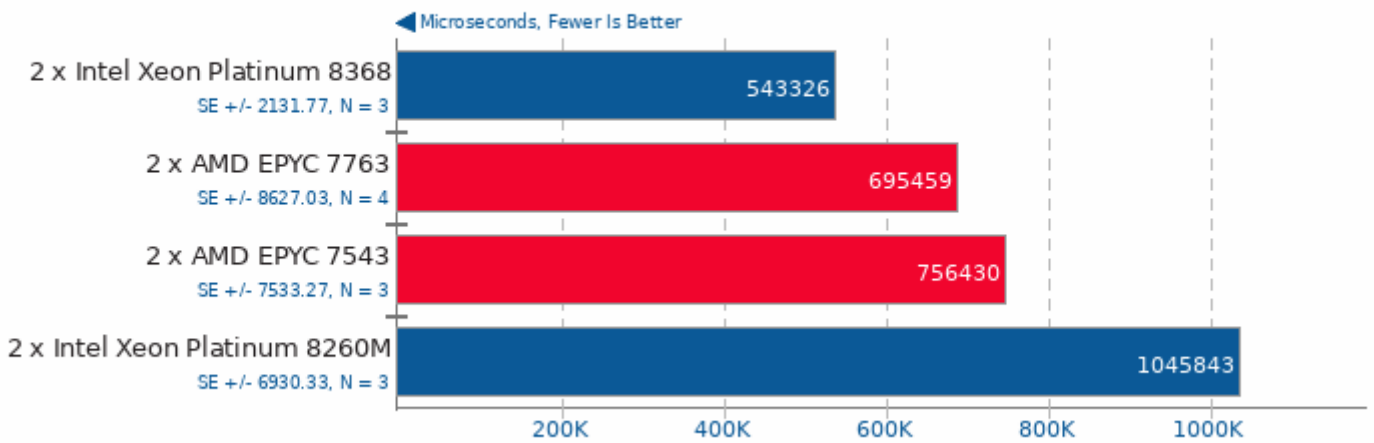
TensorFlow Lite 2020-08-23

Model: Mobilenet Quant



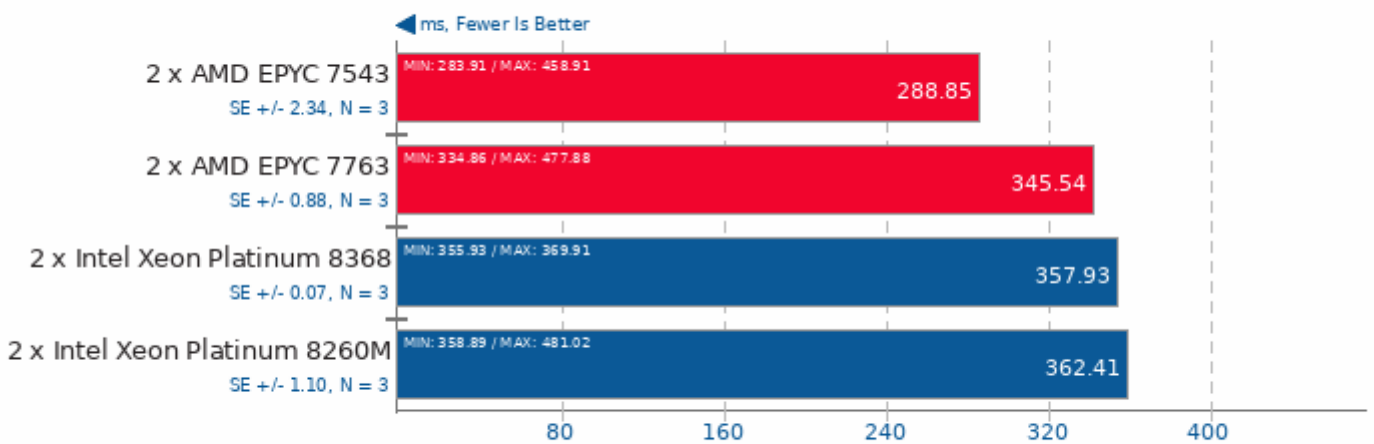
TensorFlow Lite 2020-08-23

Model: Inception ResNet V2



TNN 0.2.3

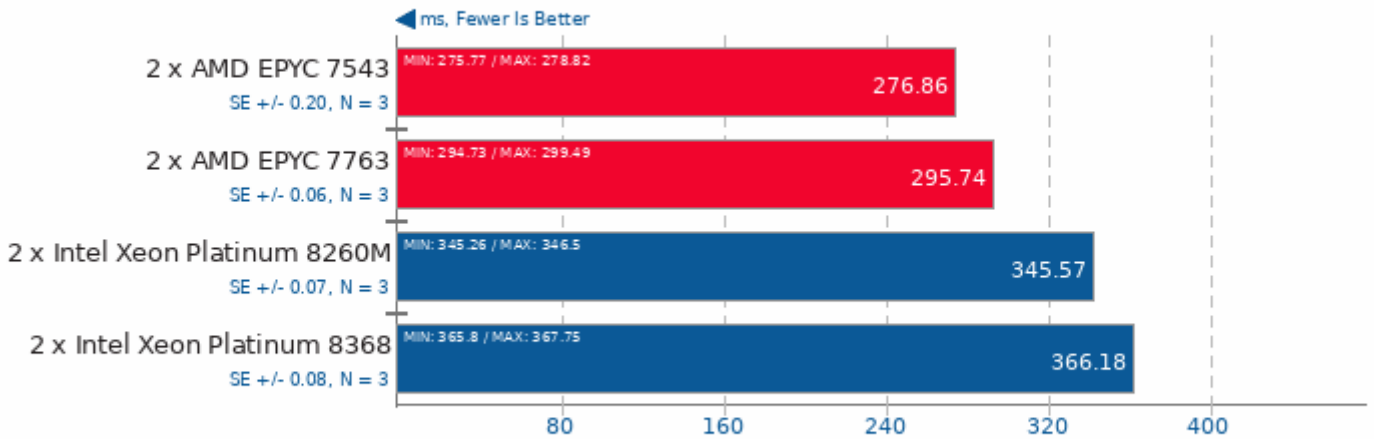
Target: CPU - Model: MobileNet v2



1. (CXX) g++ options: -fopenmp -pthread -fvisibility=hidden -O3 -rdynamic -ldl

TNN 0.2.3

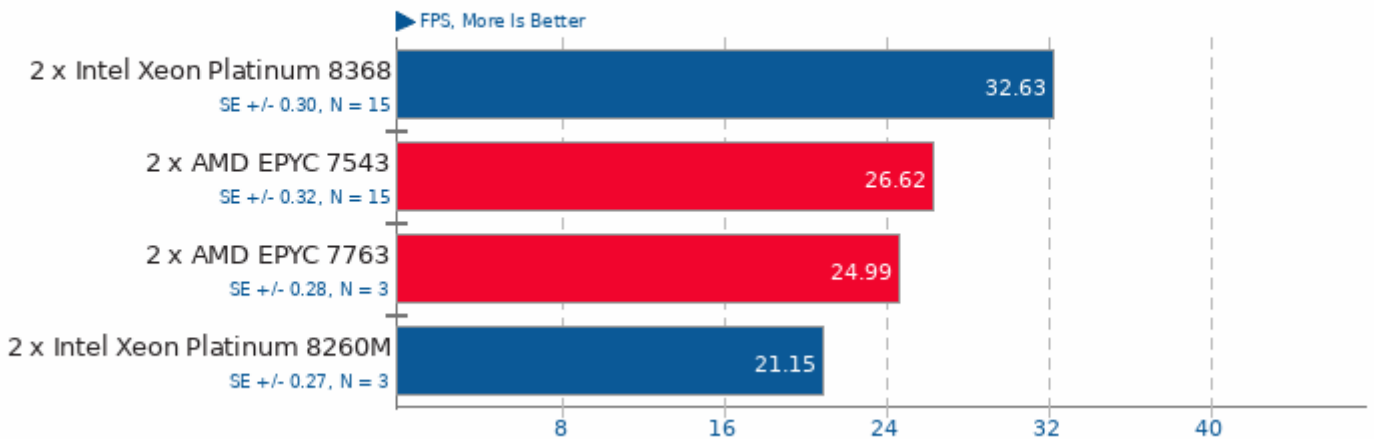
Target: CPU - Model: SqueezeNet v1.1



1. (CXX) g++ options: -fopenmp -pthread -fvisibility=hidden -O3 -rdynamic -ldl

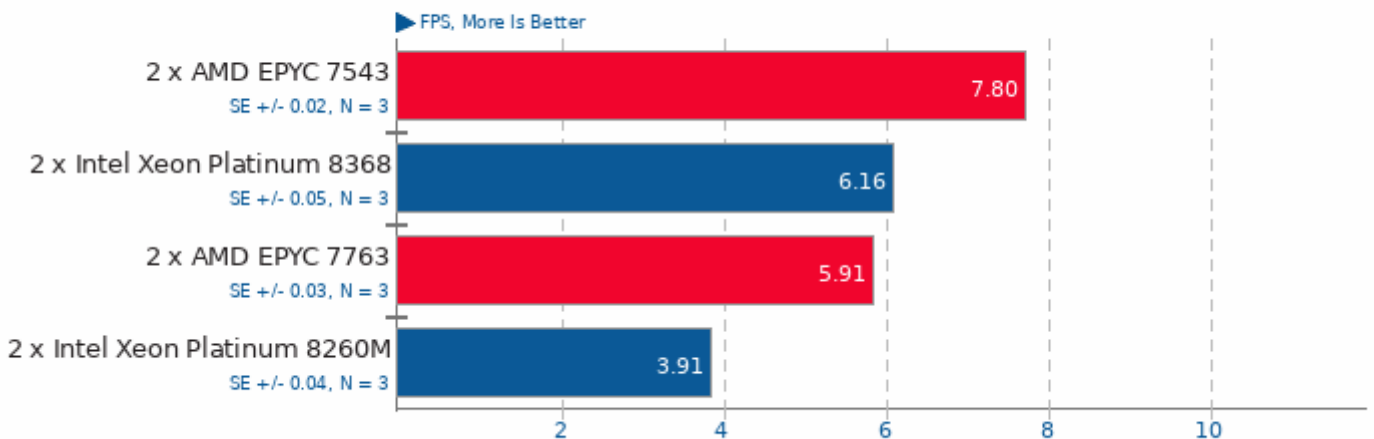
PlaidML

FP16: No - Mode: Inference - Network: VGG19 - Device: CPU



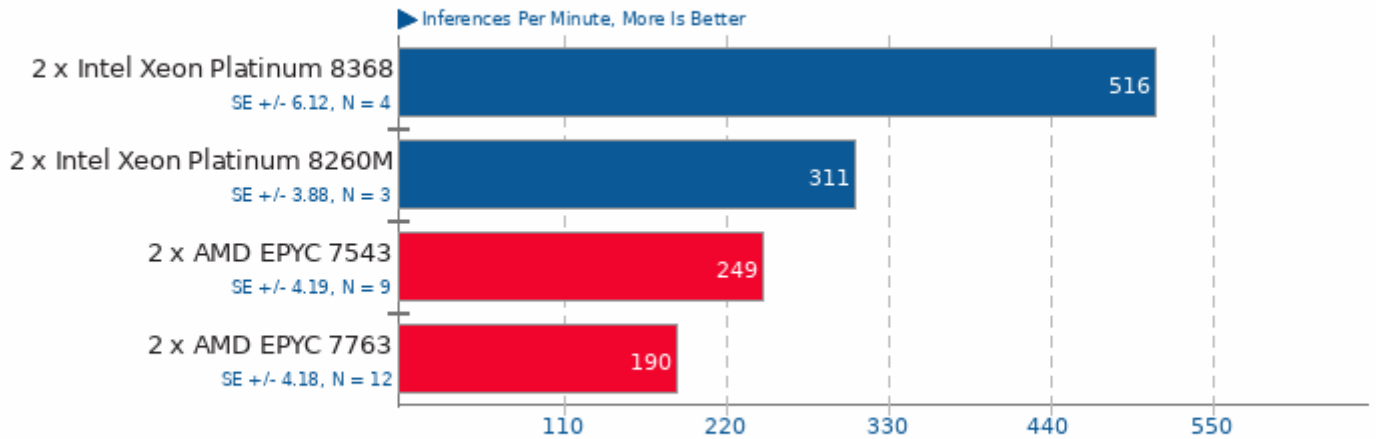
PlaidML

FP16: No - Mode: Inference - Network: ResNet 50 - Device: CPU



ONNX Runtime 1.6

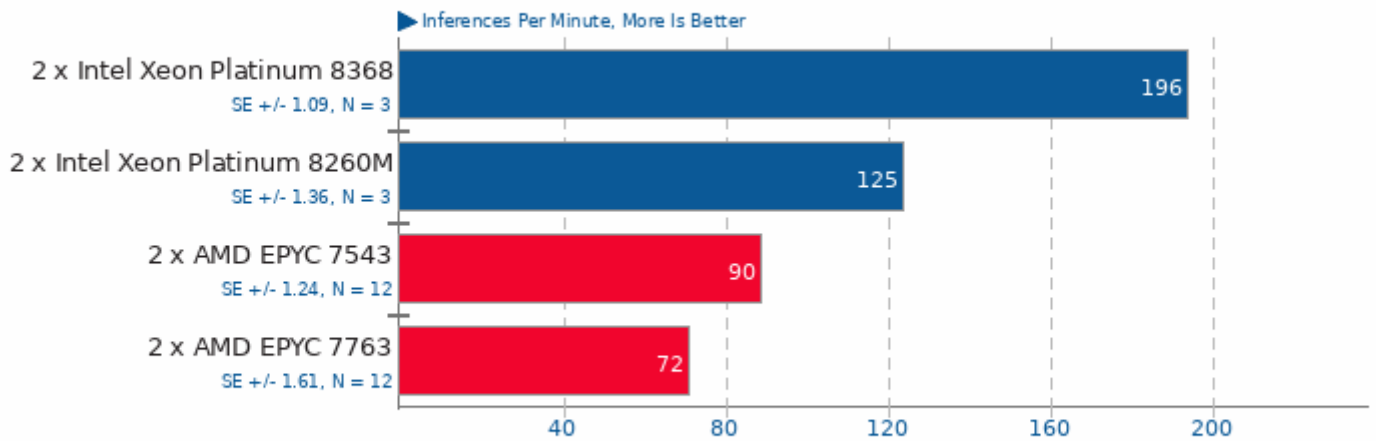
Model: yolov4 - Device: OpenMP CPU



1. (CXX) g++ options: -fopenmp -ffunction-sections -fdata-sections -O3 -ldl -lrt

ONNX Runtime 1.6

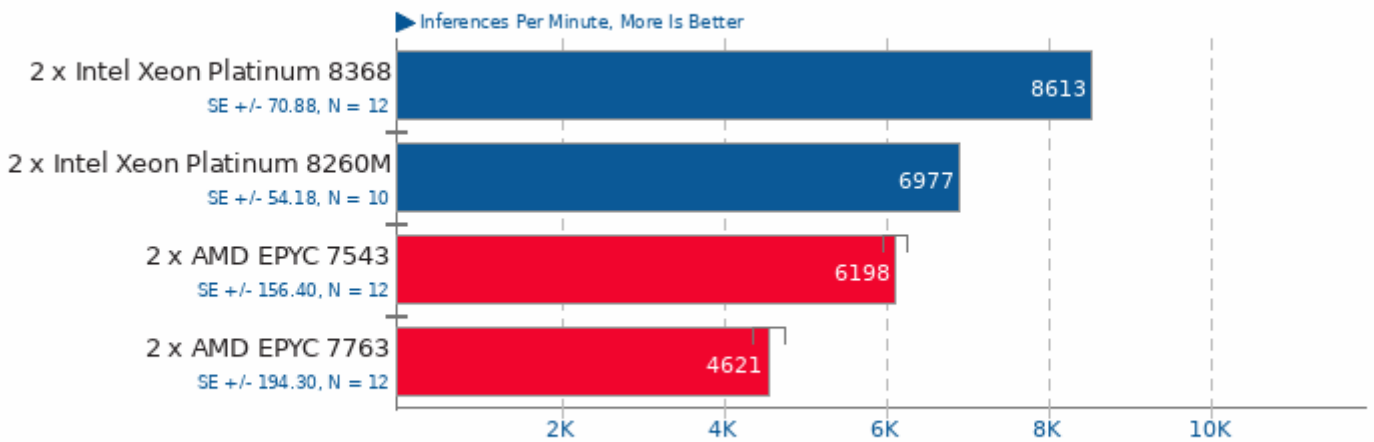
Model: fcn-resnet101-11 - Device: OpenMP CPU



1. (CXX) g++ options: -fopenmp -ffunction-sections -fdata-sections -O3 -ldl -lrt

ONNX Runtime 1.6

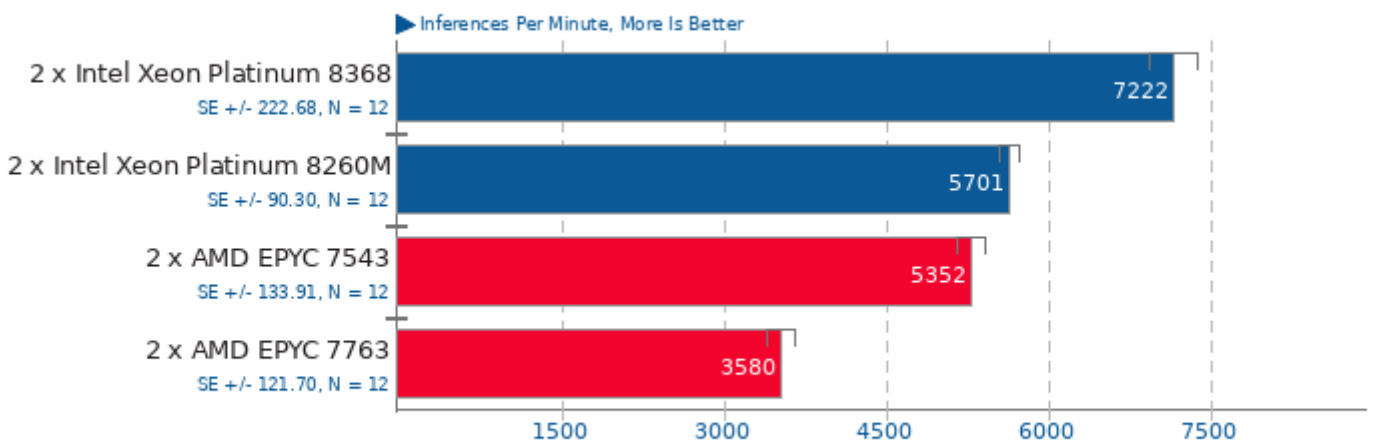
Model: shufflenet-v2-10 - Device: OpenMP CPU



1. (CXX) g++ options: -fopenmp -ffunction-sections -fdata-sections -O3 -ldl -lrt

ONNX Runtime 1.6

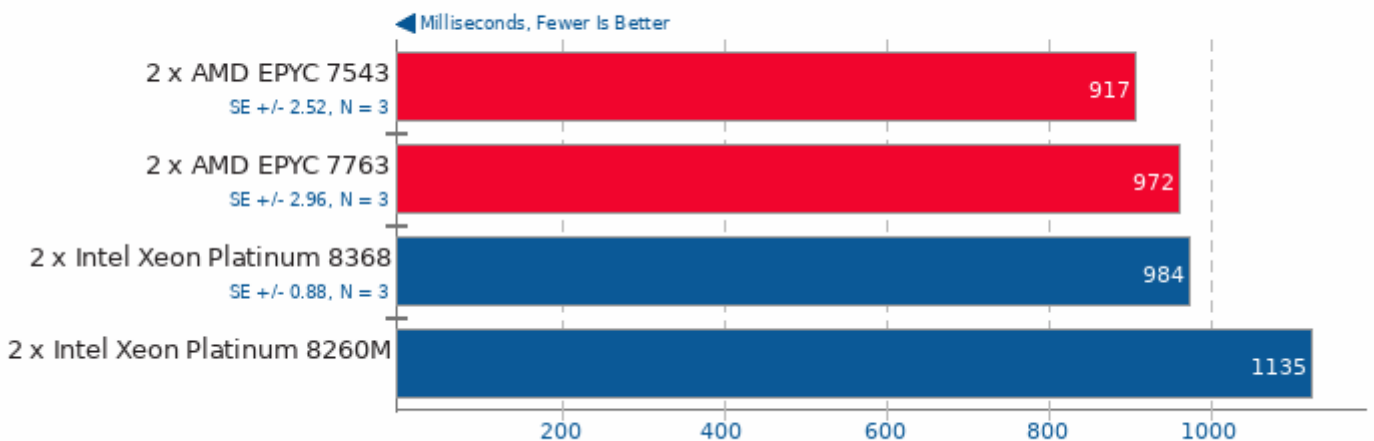
Model: super-resolution-10 - Device: OpenMP CPU



1. (CXX) g++ options: -fopenmp -ffunction-sections -fdata-sections -O3 -ldl -lrt

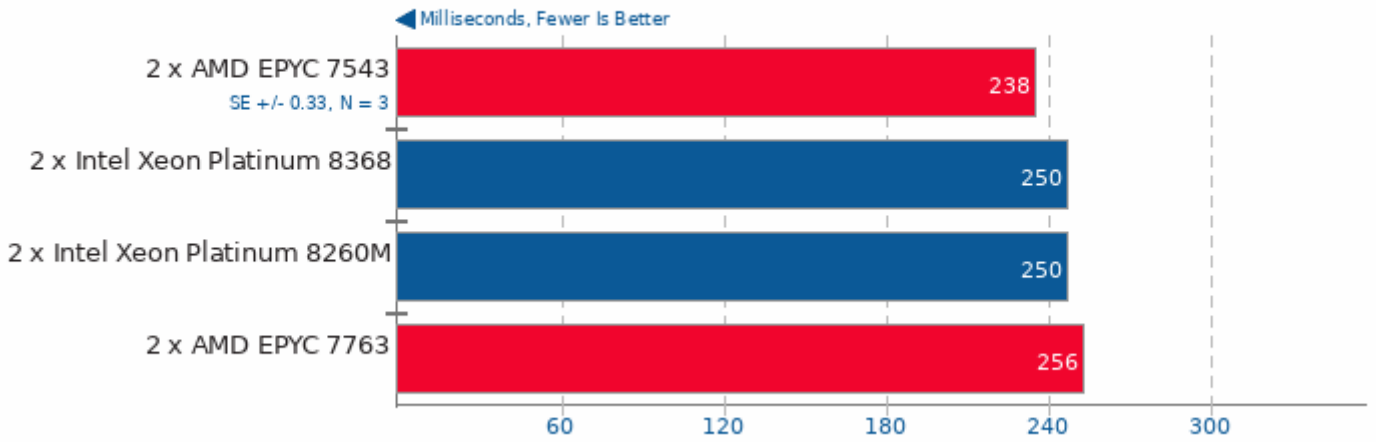
PyBench 2018-02-16

Total For Average Test Times



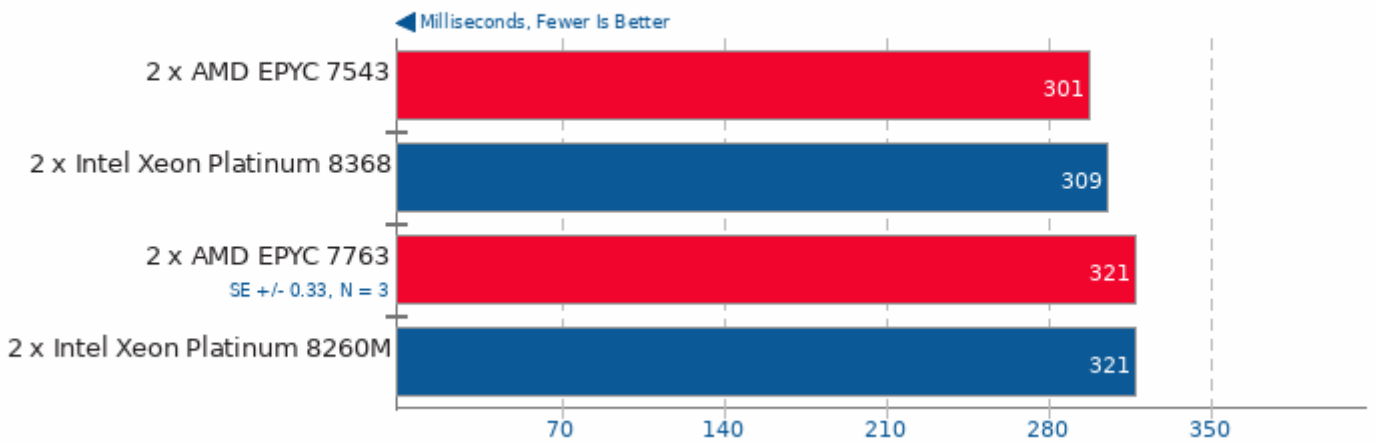
PyPerformance 1.0.0

Benchmark: go



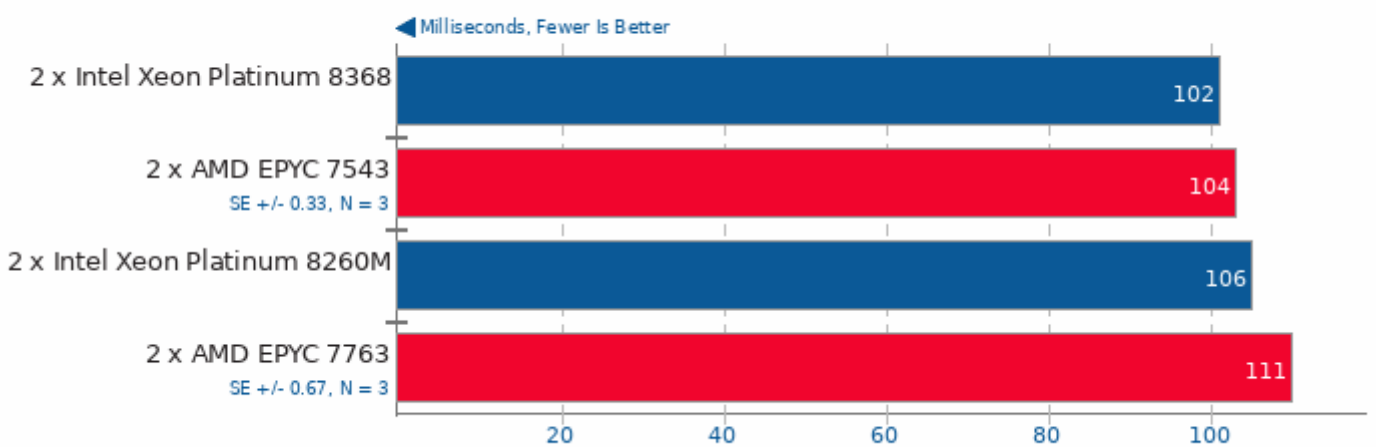
PyPerformance 1.0.0

Benchmark: 2to3



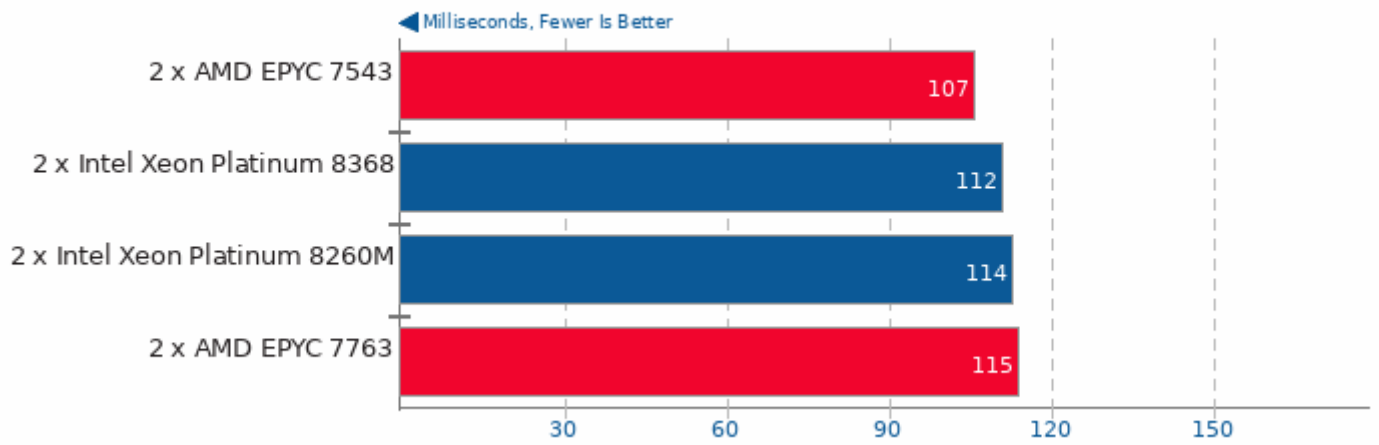
PyPerformance 1.0.0

Benchmark: chaos



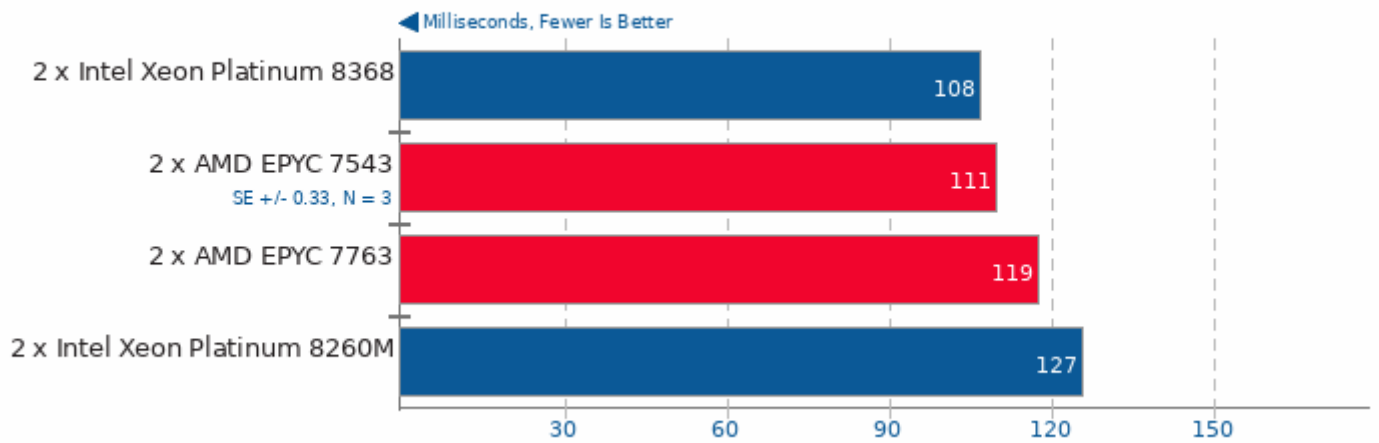
PyPerformance 1.0.0

Benchmark: float



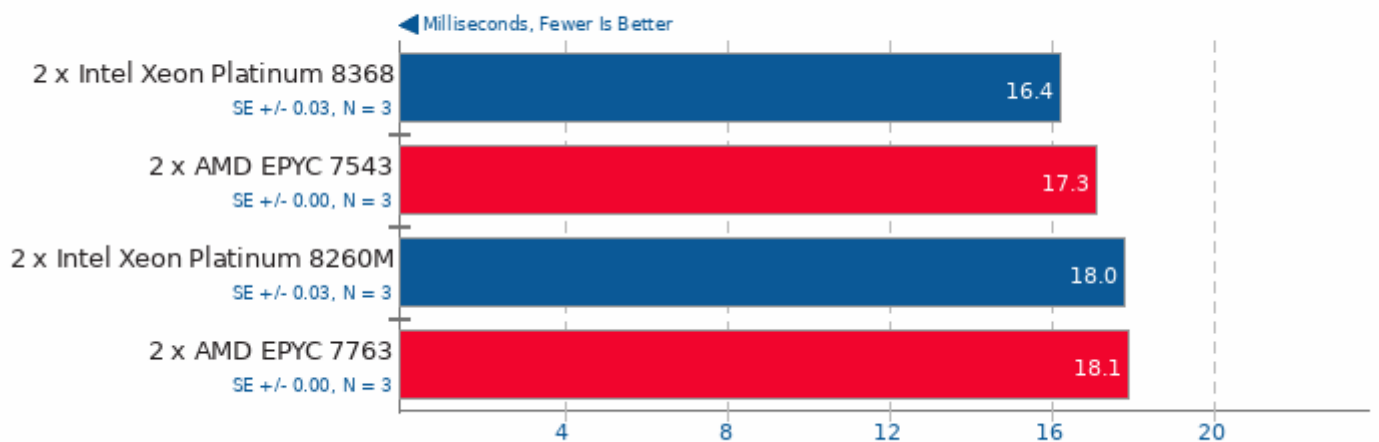
PyPerformance 1.0.0

Benchmark: nbody



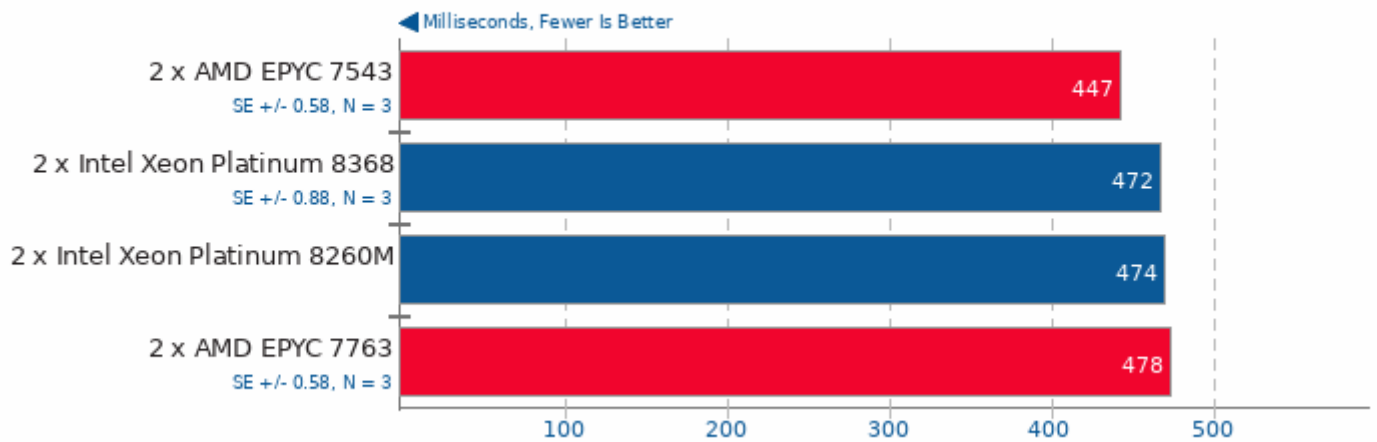
PyPerformance 1.0.0

Benchmark: pathlib



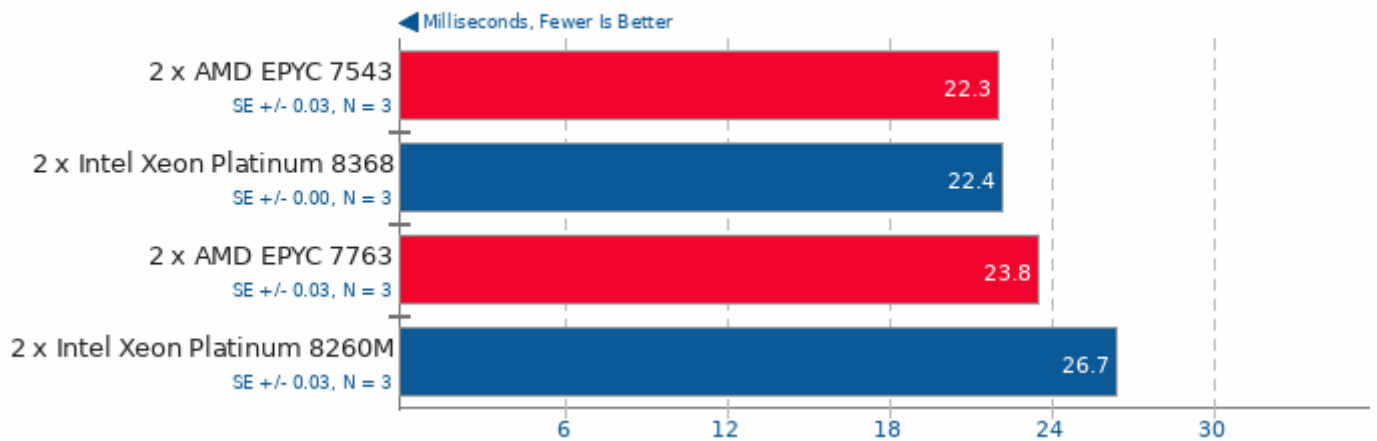
PyPerformance 1.0.0

Benchmark: raytrace



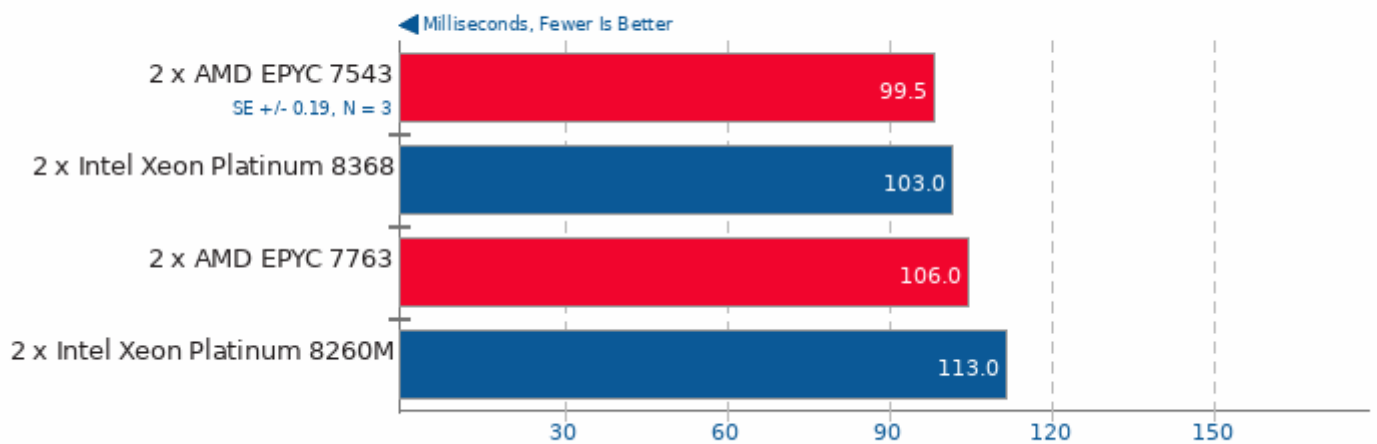
PyPerformance 1.0.0

Benchmark: json_loads



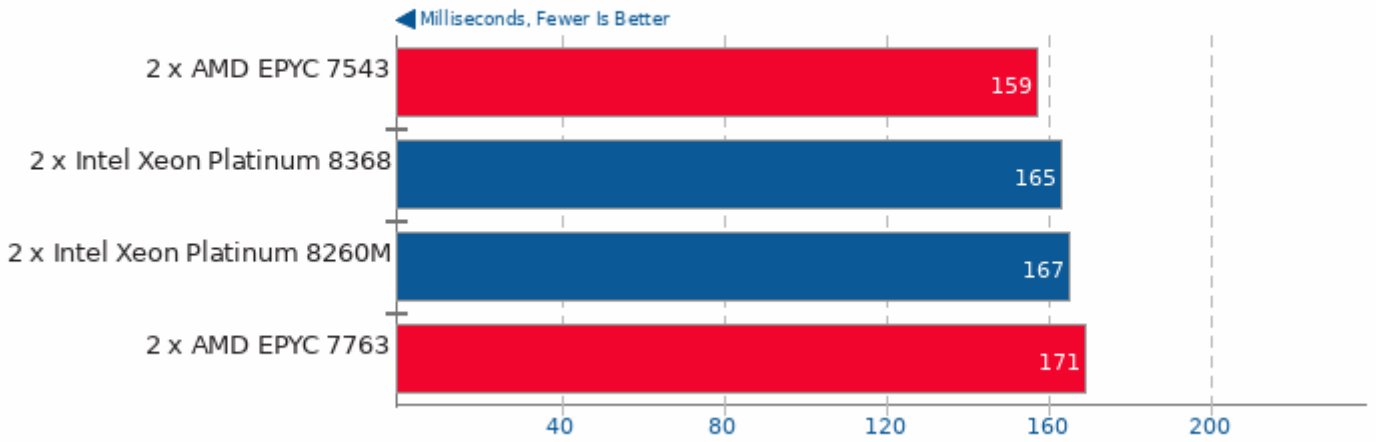
PyPerformance 1.0.0

Benchmark: crypto_pyaes



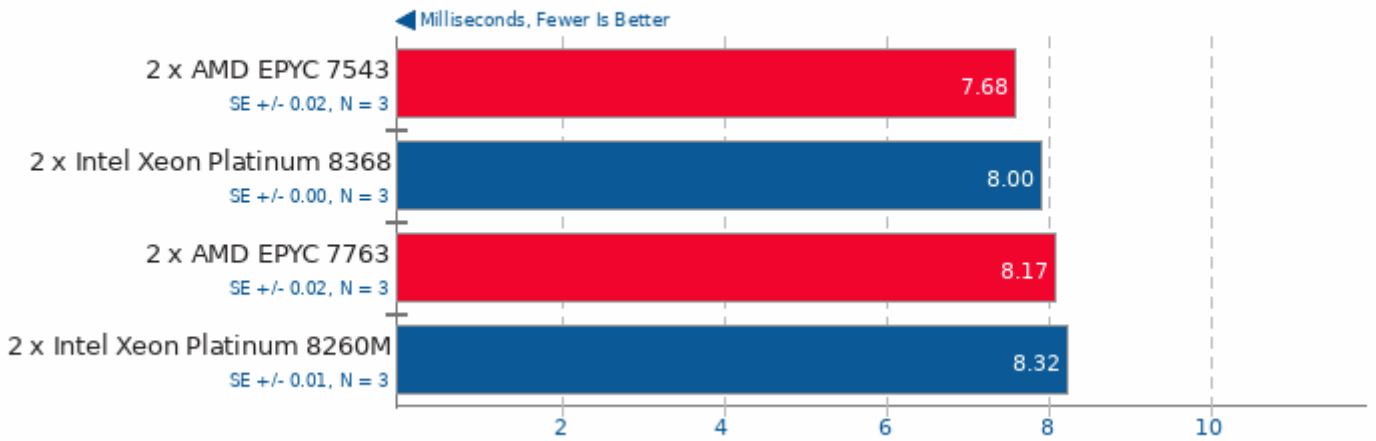
PyPerformance 1.0.0

Benchmark: regex_compile



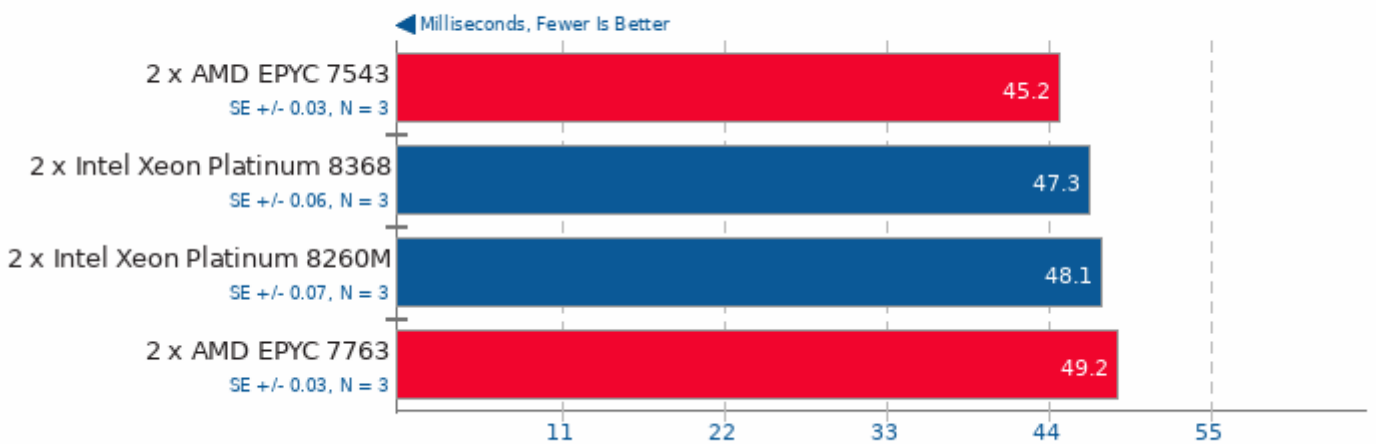
PyPerformance 1.0.0

Benchmark: python_startup



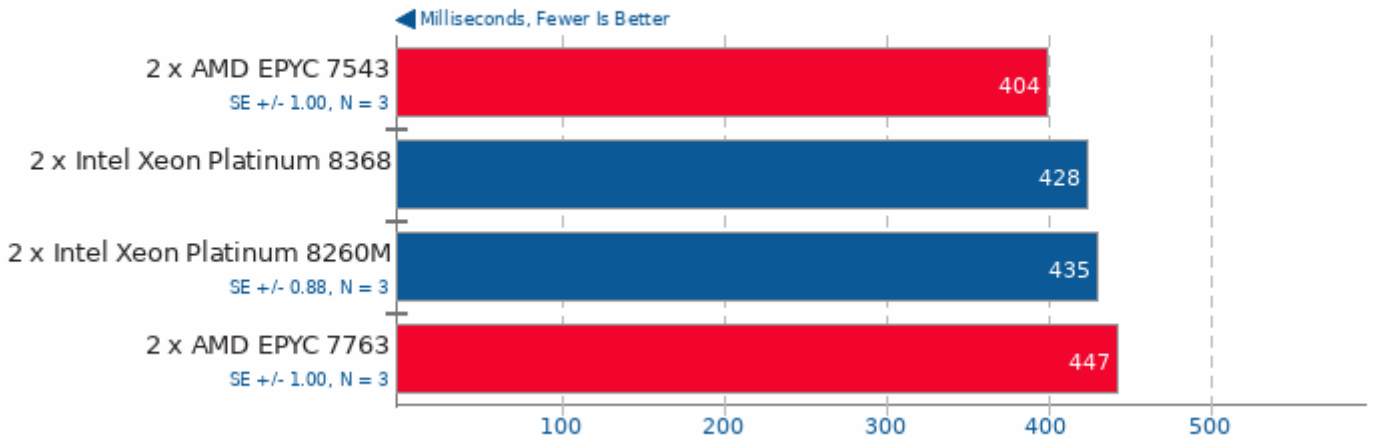
PyPerformance 1.0.0

Benchmark: django_template



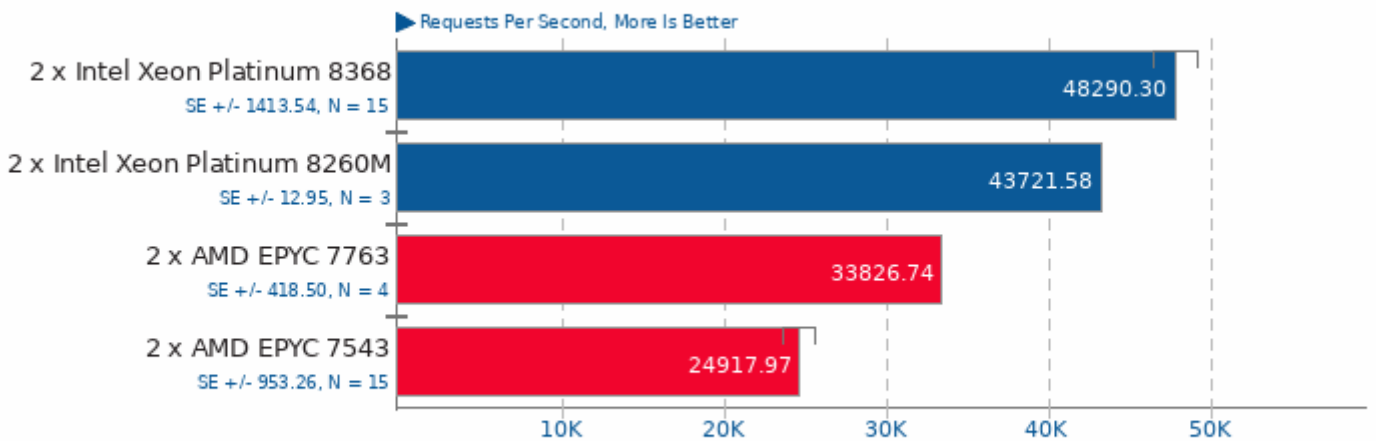
PyPerformance 1.0.0

Benchmark: pickle_pure_python



NGINX Benchmark 1.9.9

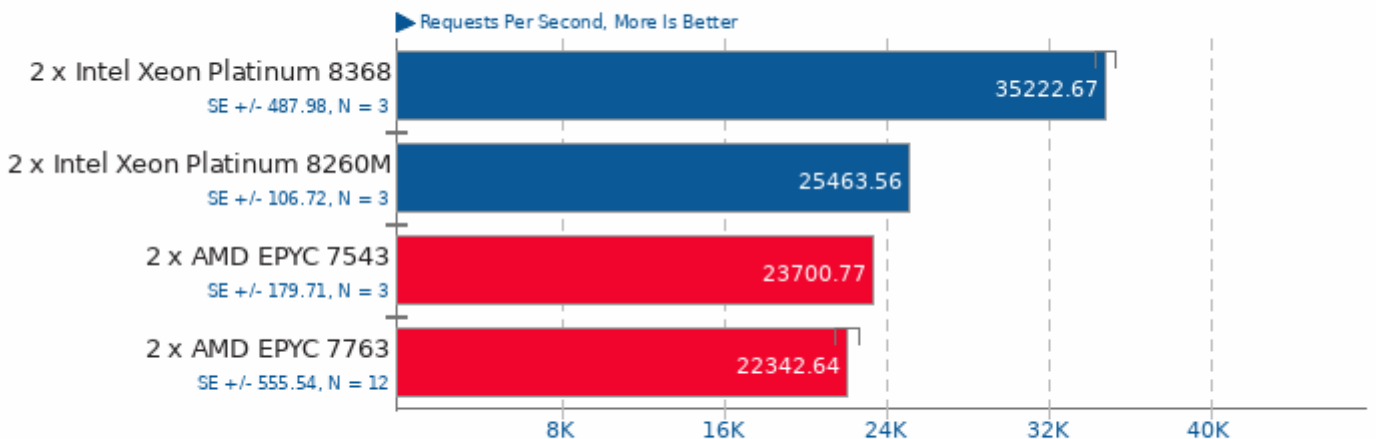
Static Web Page Serving



1. (CC) gcc options: -pthread -lcrypt -lcrypto -lz -O3 -march=native

Apache Benchmark 2.4.29

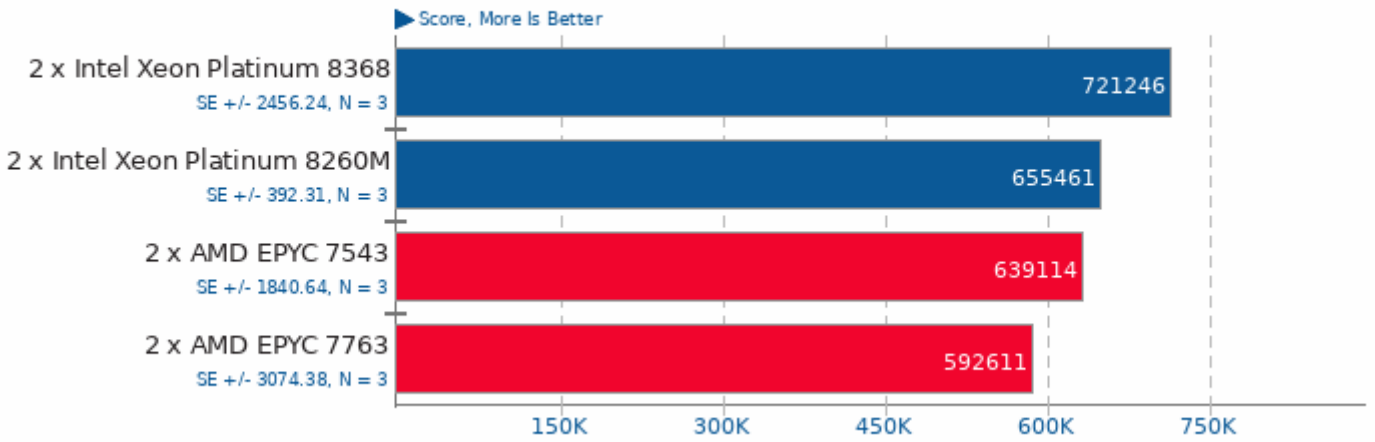
Static Web Page Serving



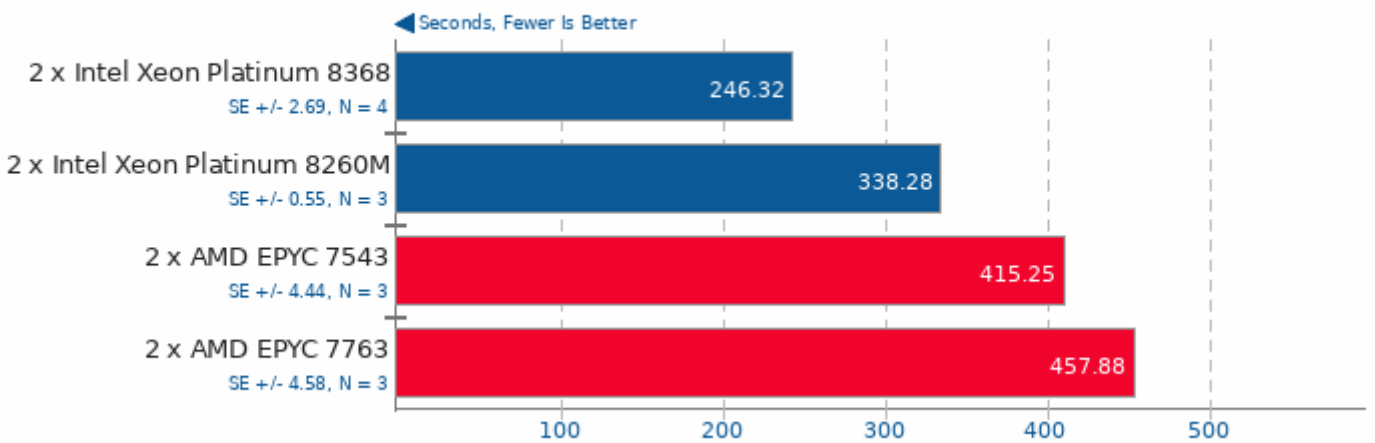
1. (CC) gcc options: -shared -fPIC -O2 -pthread

PHPBench 0.8.1

PHP Benchmark Suite



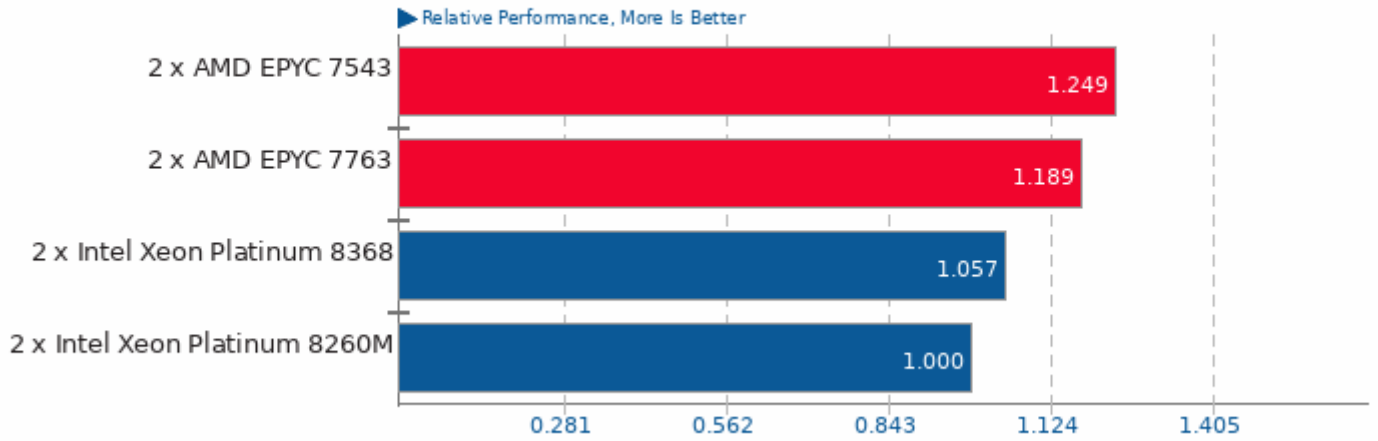
WireGuard + Linux Networking Stack Stress Test



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

Geometric Mean Of Audio Encoding Tests

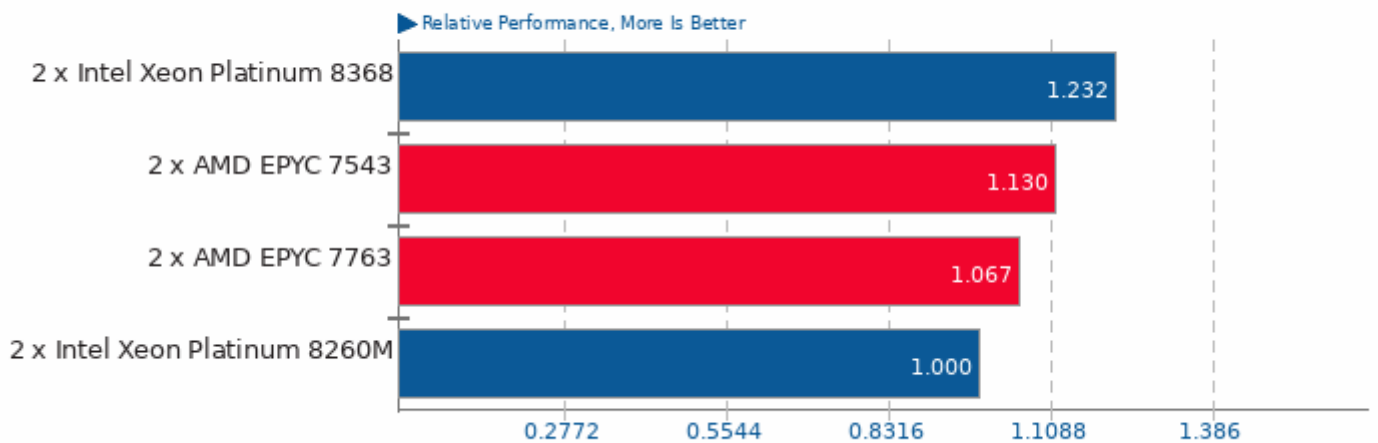
Result Composite



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

Geometric Mean Of Bioinformatics Tests

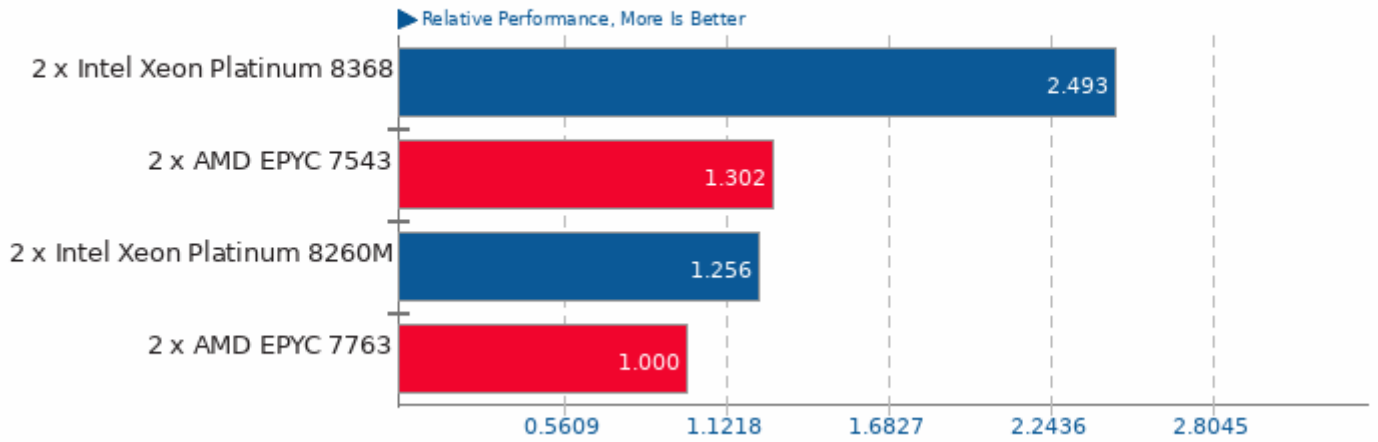
Result Composite



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

Geometric Mean Of C++ Boost Tests

Result Composite



Geometric mean based upon tests: pts/openfoam and pts/povray

Geometric Mean Of Timed Code Compilation Tests

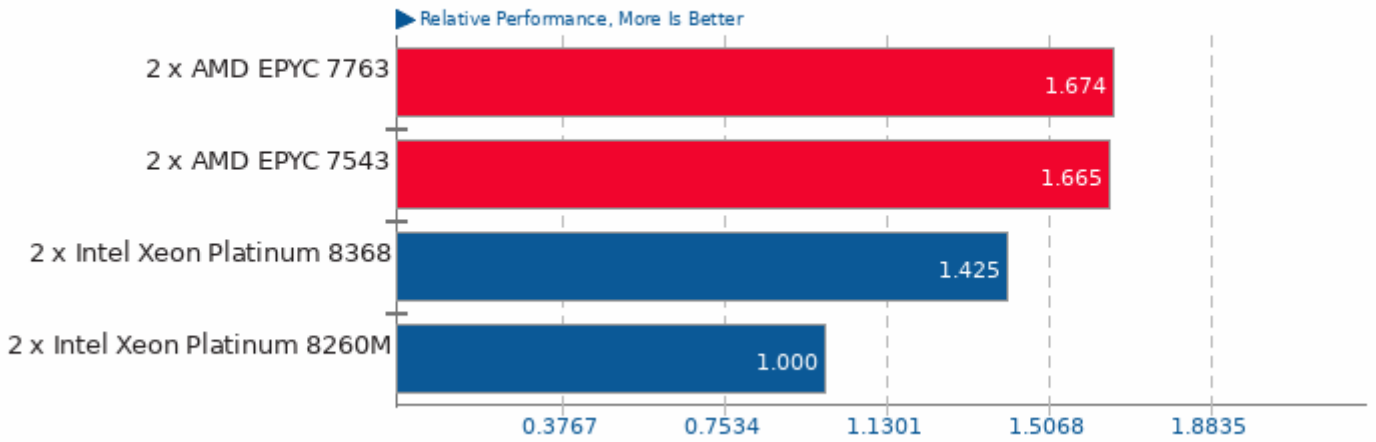
Result Composite



Geometric mean based upon tests: pts/build-linux-kernel, pts/build-gcc and pts/build-llvm

Geometric Mean Of Compression Tests

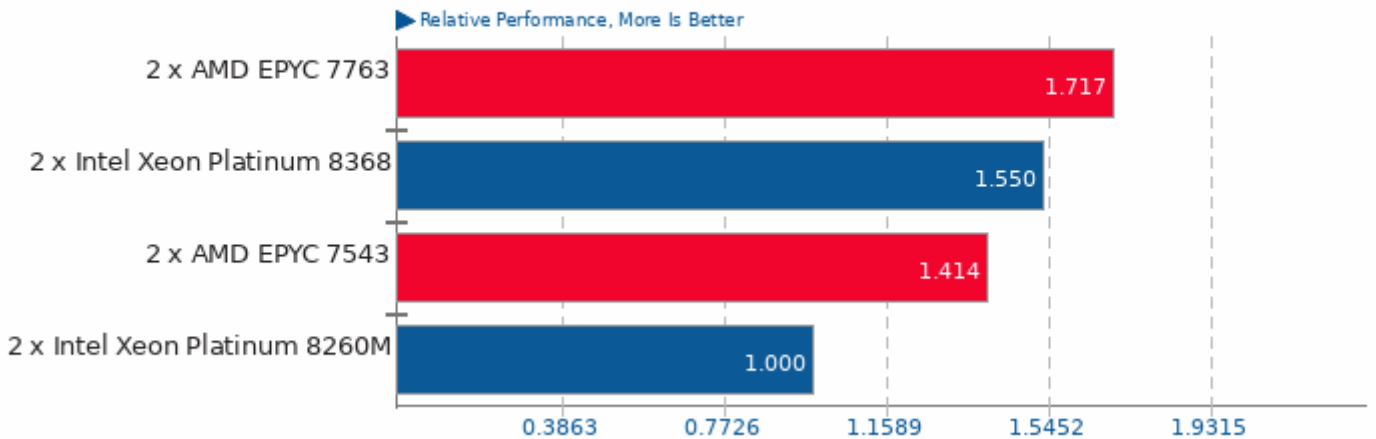
Result Composite



Geometric mean based upon tests: pts/compress-7zip, pts/compress-gzip and pts/compress-zstd

Geometric Mean Of CPU / Processor Suite Tests

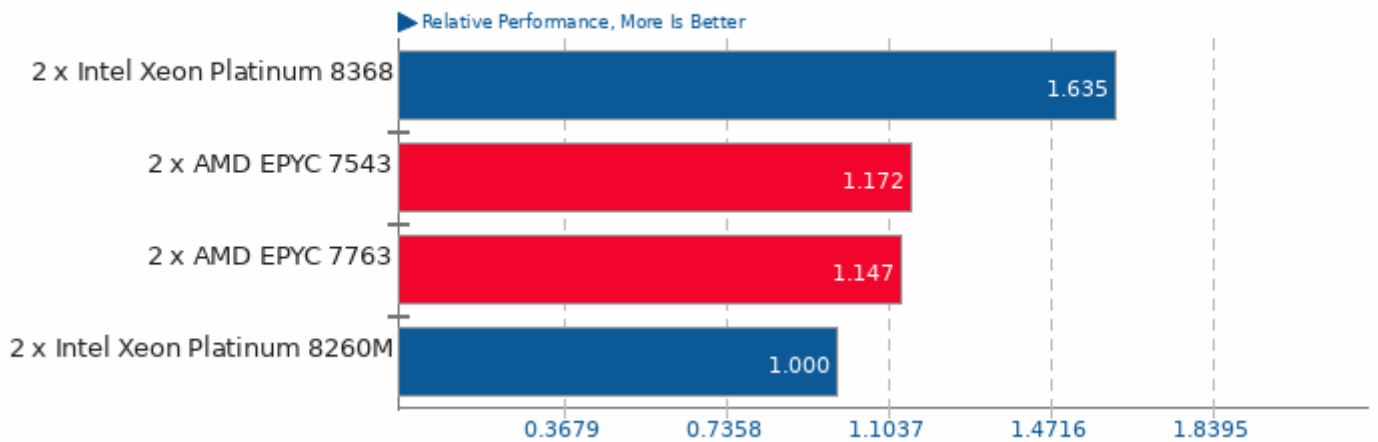
Result Composite



Geometric mean based upon tests: pts/rodinia, pts/namd, pts/x264, pts/x265, pts/compress-7zip, pts/blender, pts/build-linux-kernel, pts/build-gcc, pts/openssl, pts/ctx-clock, pts/sysbench and pts/povray

Geometric Mean Of Creator Workloads Tests

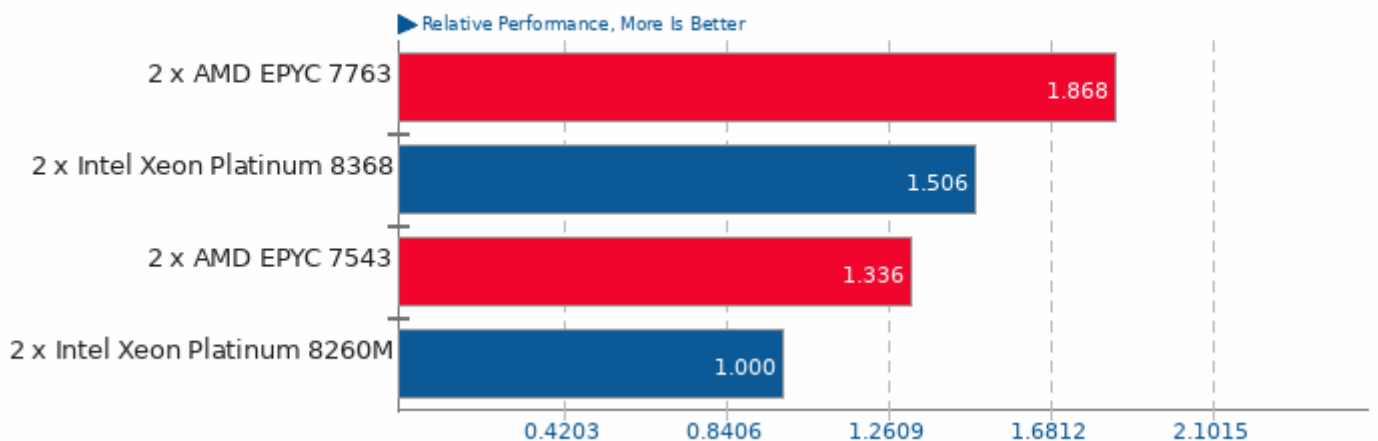
Result Composite



Geometric mean based upon tests: pts/ospray, pts/c-ray, pts/povray, pts/blender, pts/svt-vp9, pts/x264, pts/x265, pts/kvazaar, pts/dav1d, pts/encode-mp3, pts/encode-flac, pts/onednn and pts/ngspice

Geometric Mean Of Cryptography Tests

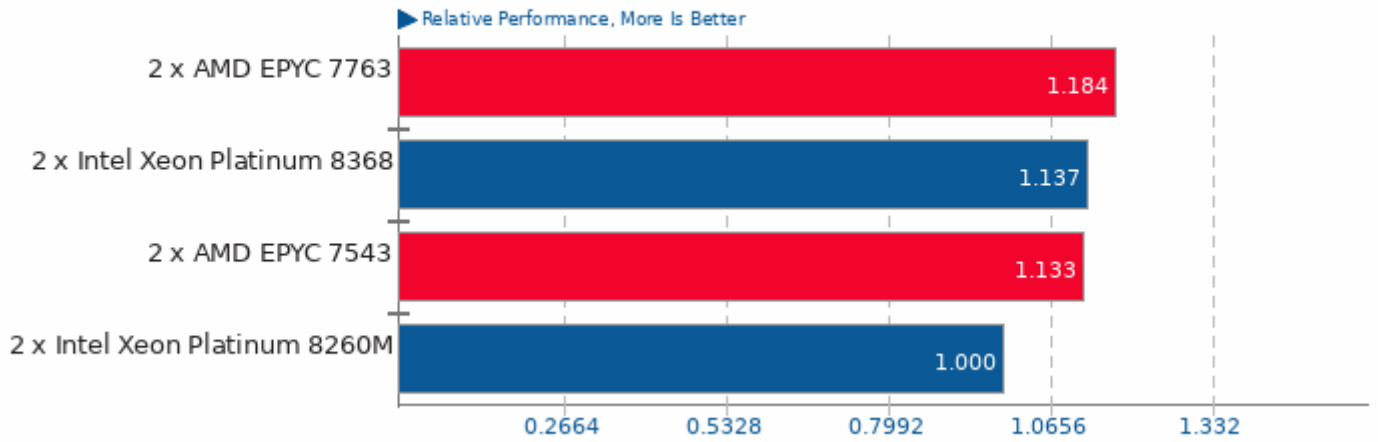
Result Composite



Geometric mean based upon tests: pts/gnupg, pts/openssl and pts/john-the-ripper

Geometric Mean Of Database Test Suite

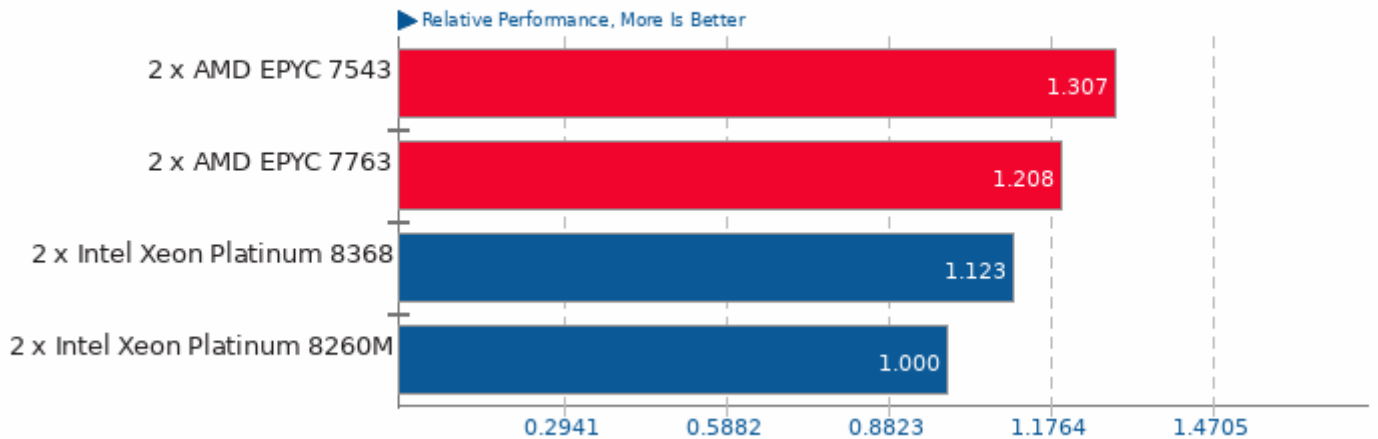
Result Composite



Geometric mean based upon tests: pts/sqlite-speedtest, pts/redis, pts/cassandra, pts/pgbench and pts/mysqslap

Geometric Mean Of Electronic Design Tests

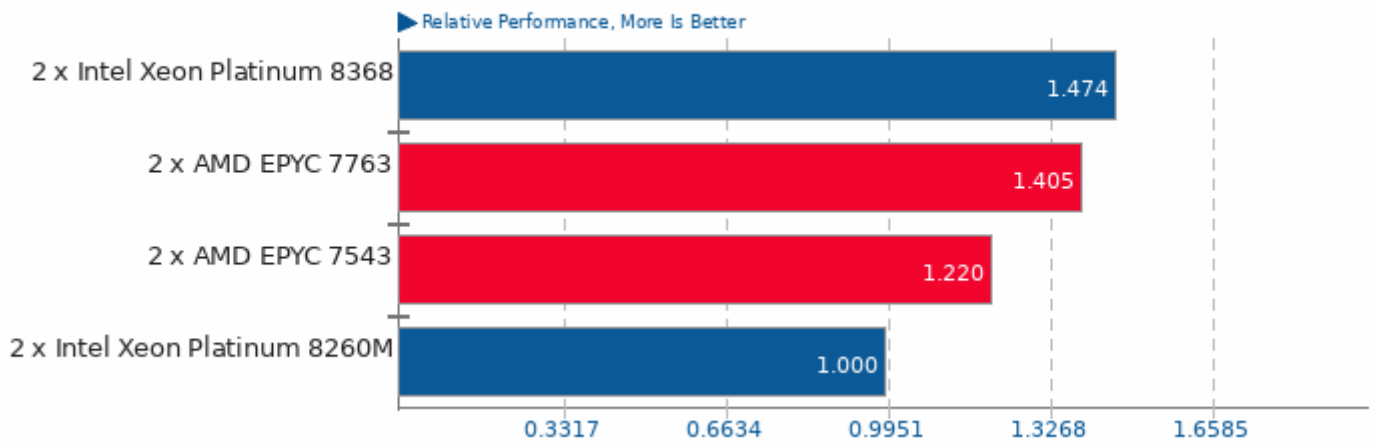
Result Composite



Geometric mean based upon tests: pts/ngspice

Geometric Mean Of Fortran Tests

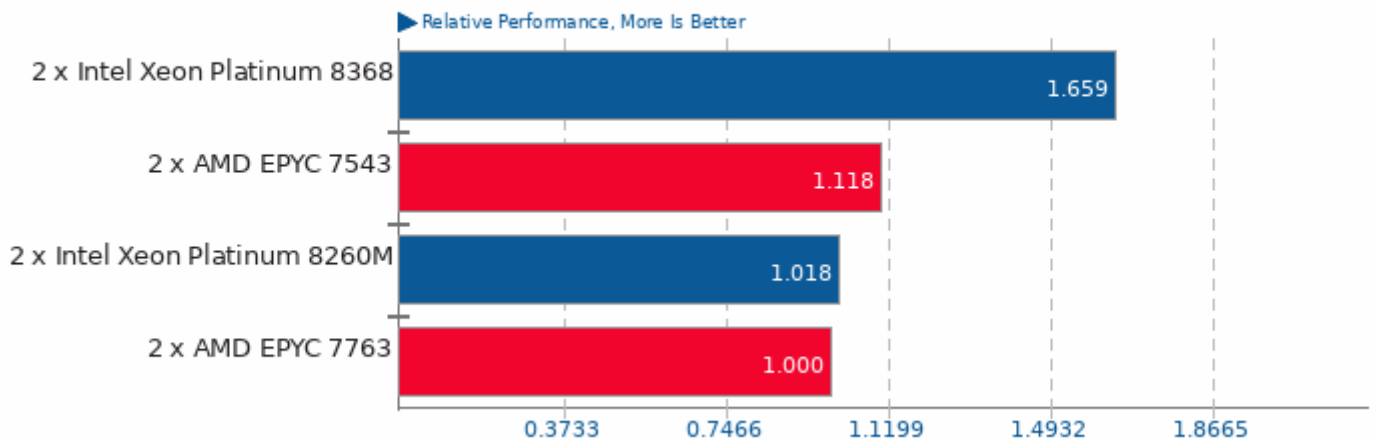
Result Composite



Geometric mean based upon tests: pts/npb, pts/dolfyn and pts/neat

Geometric Mean Of HPC - High Performance Computing Tests

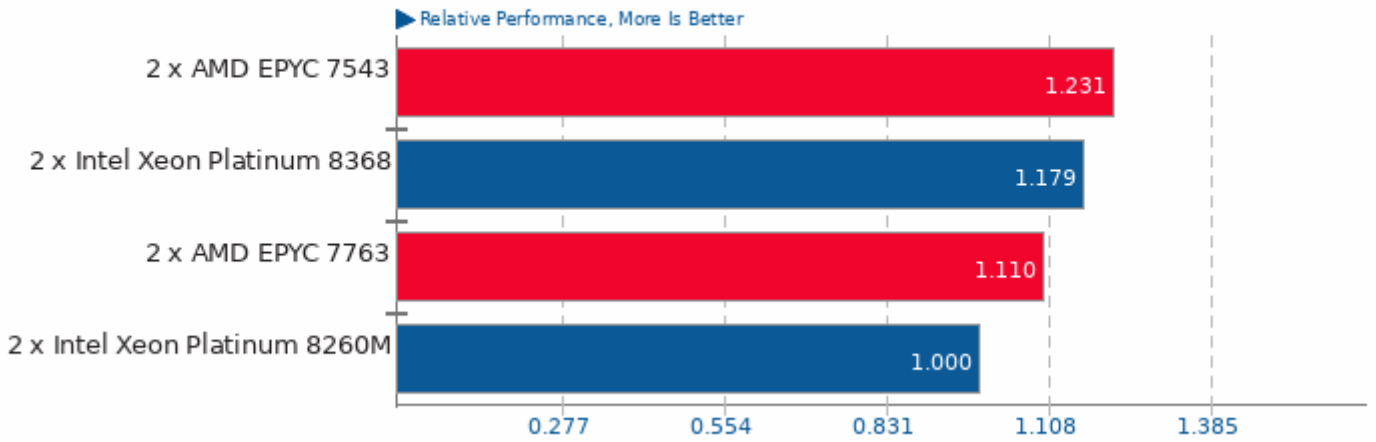
Result Composite



Geometric mean based upon tests: pts/npb, pts/rodinia, pts/neat, pts/mt-dgemm, pts/namd, pts/dolfyn, pts/pennant, pts/openfoam, pts/himeno, pts/mafft, pts/kripke, pts/tnn, pts/numpy, pts/tensorflow-lite, pts/onednn, pts/onnx and pts/plaidml

Geometric Mean Of Java Tests

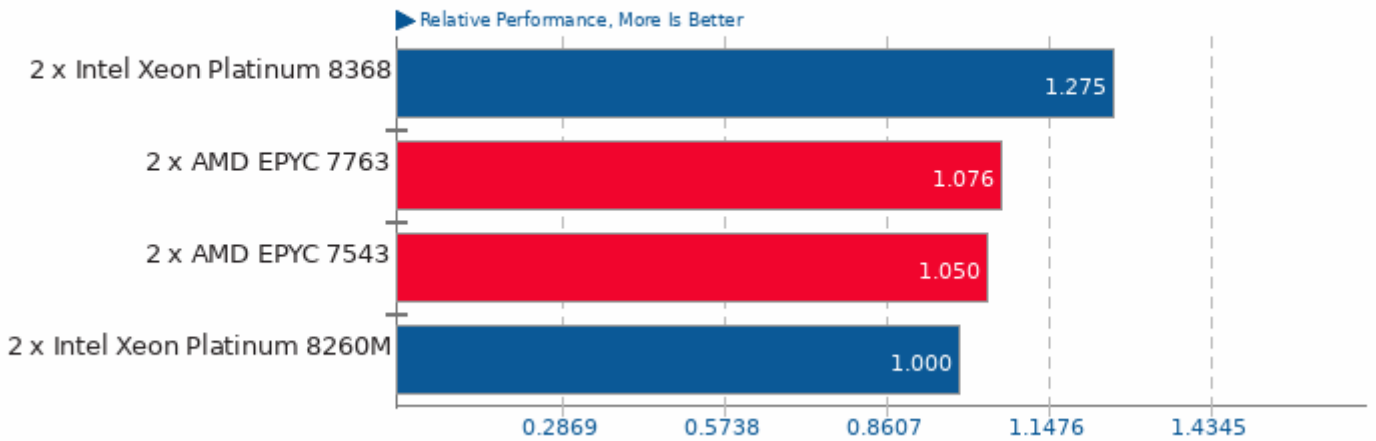
Result Composite



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

Geometric Mean Of Common Kernel Benchmarks Tests

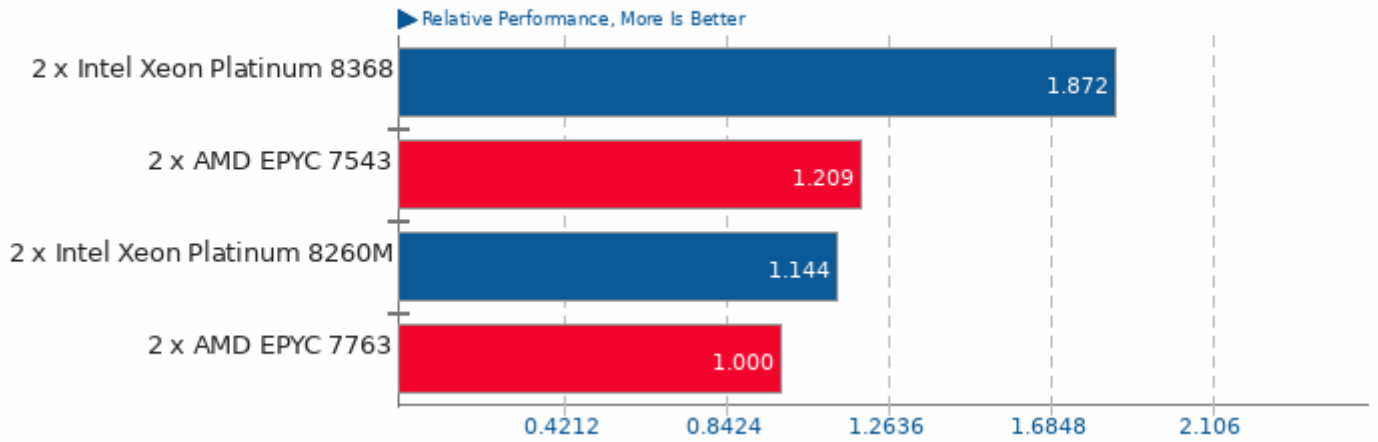
Result Composite



Geometric mean based upon tests: pts/apache, system/wireguard, pts/postmark, pts/sqlite-speedtest, pts/pgbench, pts/openssl, pts/ctx-clock and pts/osbench

Geometric Mean Of Machine Learning Tests

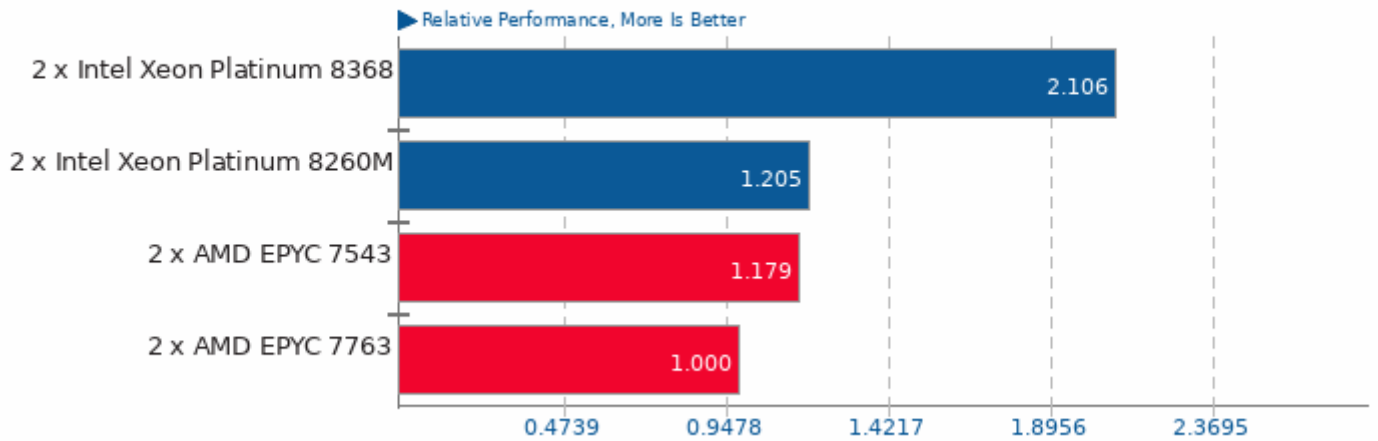
Result Composite



Geometric mean based upon tests: pts/tnn, pts/numpy, pts/tensorflow-lite, pts/onednn, pts/onnx and pts/plaidml

Geometric Mean Of Molecular Dynamics Tests

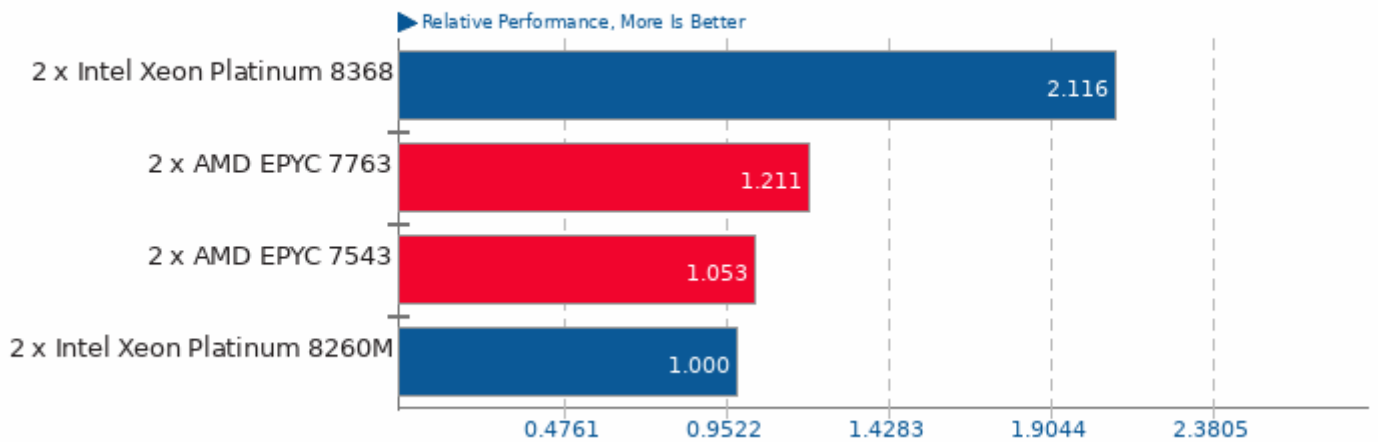
Result Composite



Geometric mean based upon tests: pts/namd, pts/dolfyn, pts/pennant and pts/openfoam

Geometric Mean Of MPI Benchmarks Tests

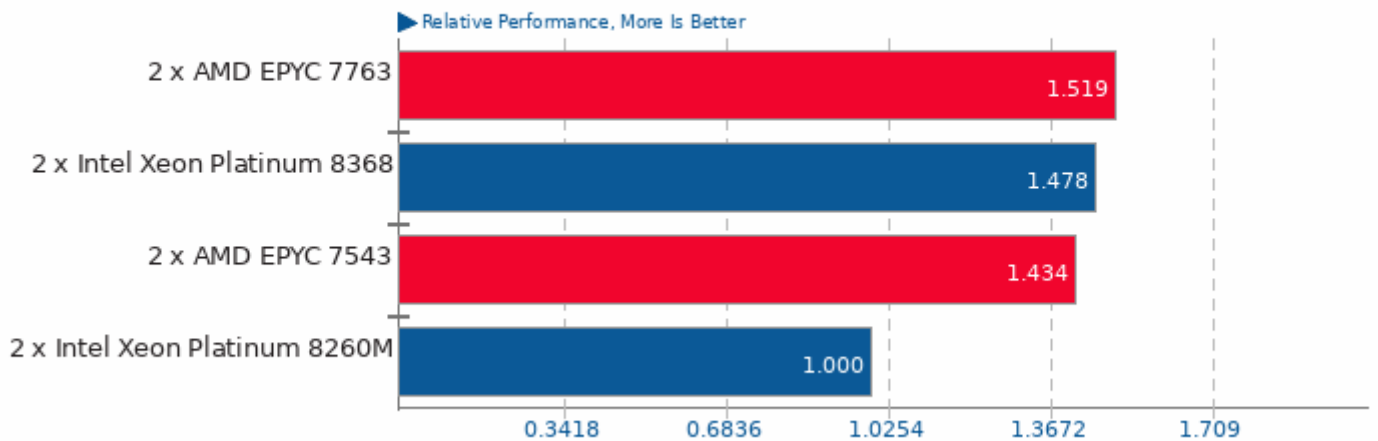
Result Composite



Geometric mean based upon tests: pts/pennant and pts/npb

Geometric Mean Of NVIDIA GPU Compute Tests

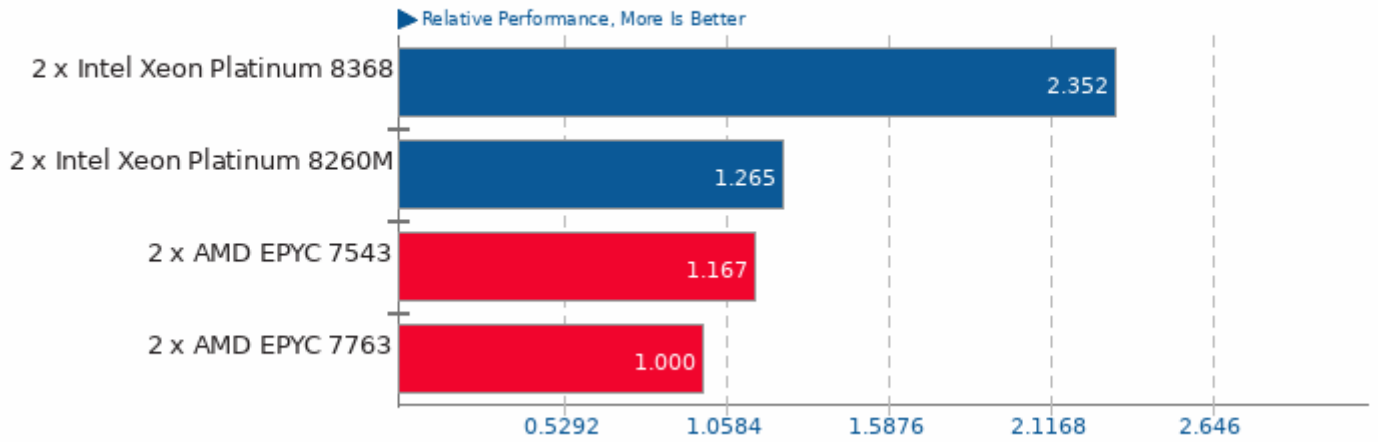
Result Composite



Geometric mean based upon tests: pts/rodinia, pts/financebench, pts/plaidml and pts/blender

Geometric Mean Of Intel oneAPI Tests

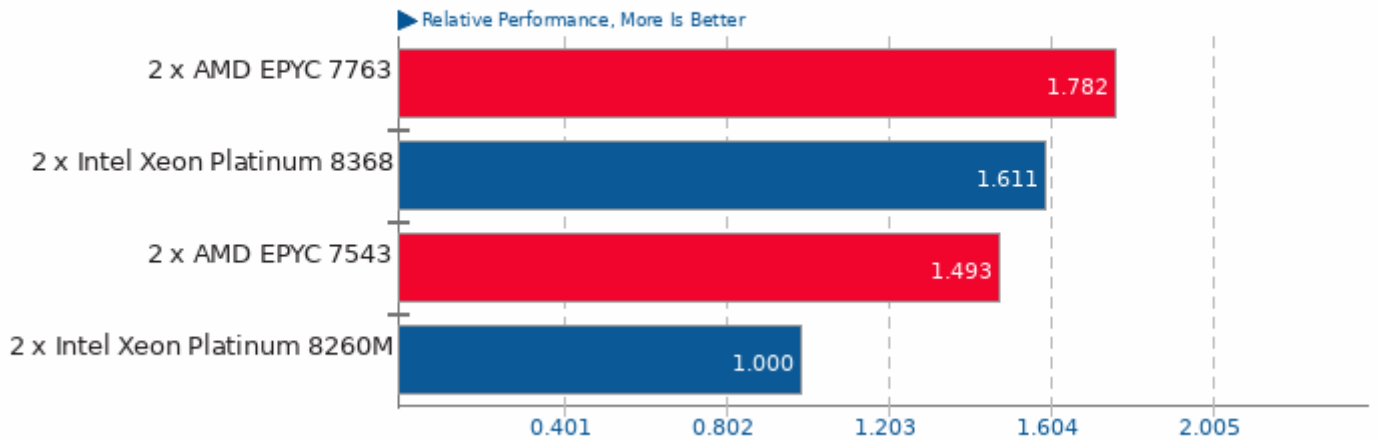
Result Composite



Geometric mean based upon tests: pts/onednn and pts/ospray

Geometric Mean Of OpenCL Tests

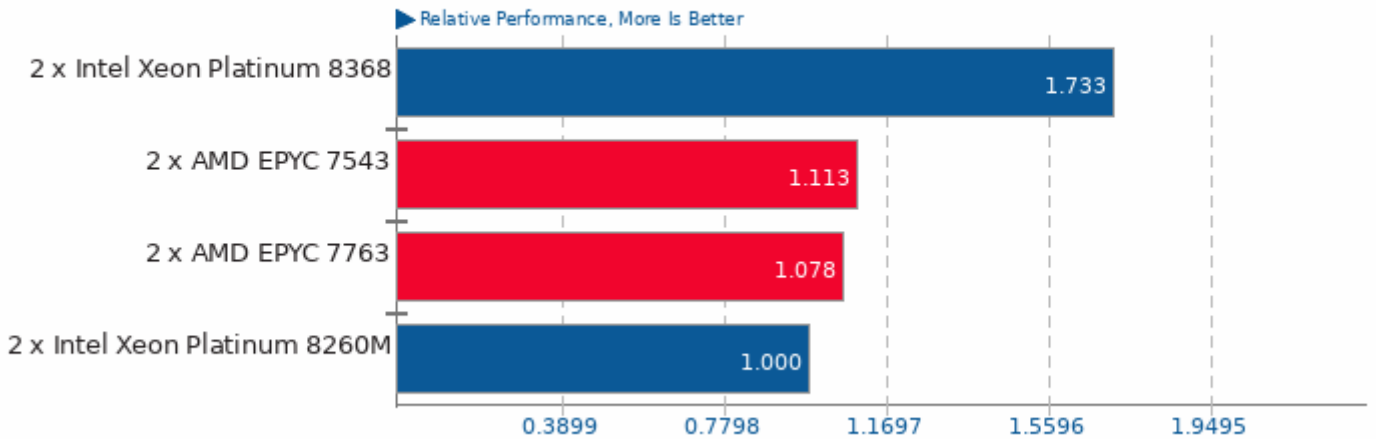
Result Composite



Geometric mean based upon tests: pts/rodinia and pts/blender

Geometric Mean Of OpenMPI Tests

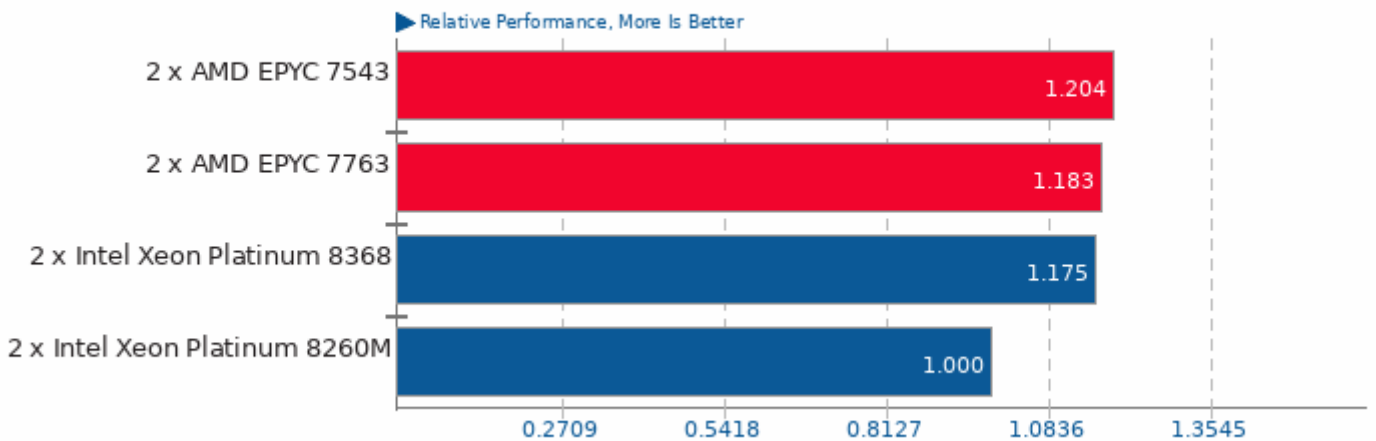
Result Composite



Geometric mean based upon tests: pts/npb, pts/rodinia, pts/pennant and pts/openfoam

Geometric Mean Of Programmer / Developer System Benchmarks Tests

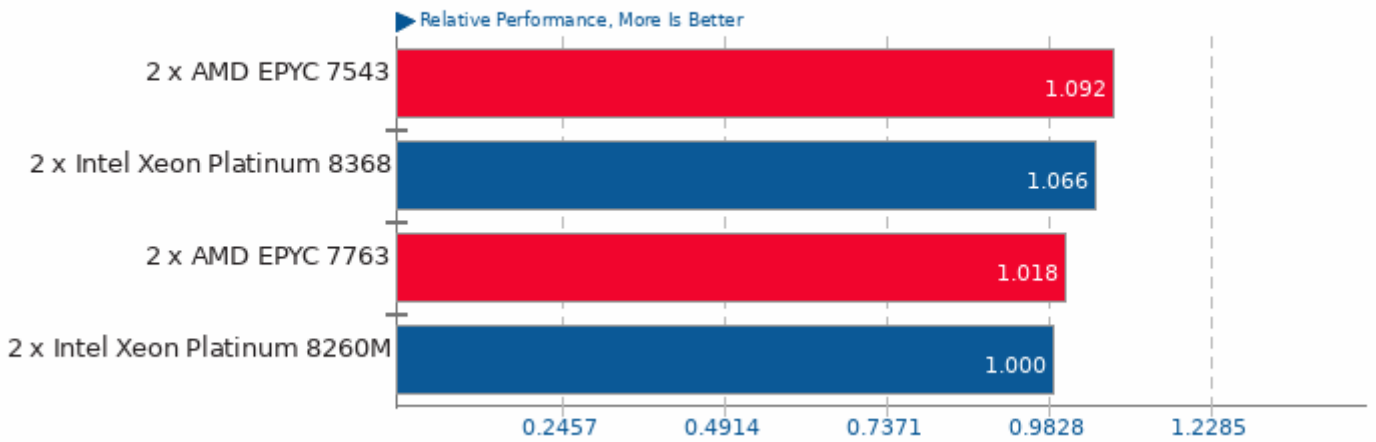
Result Composite



Geometric mean based upon tests: pts/sqlite-speedtest, pts/compress-zstd, pts/pyperformance, pts/pybench, pts/build-linux-kernel, pts/build-gcc, pts/build-llvm and pts/mt-dgemm

Geometric Mean Of Python Tests

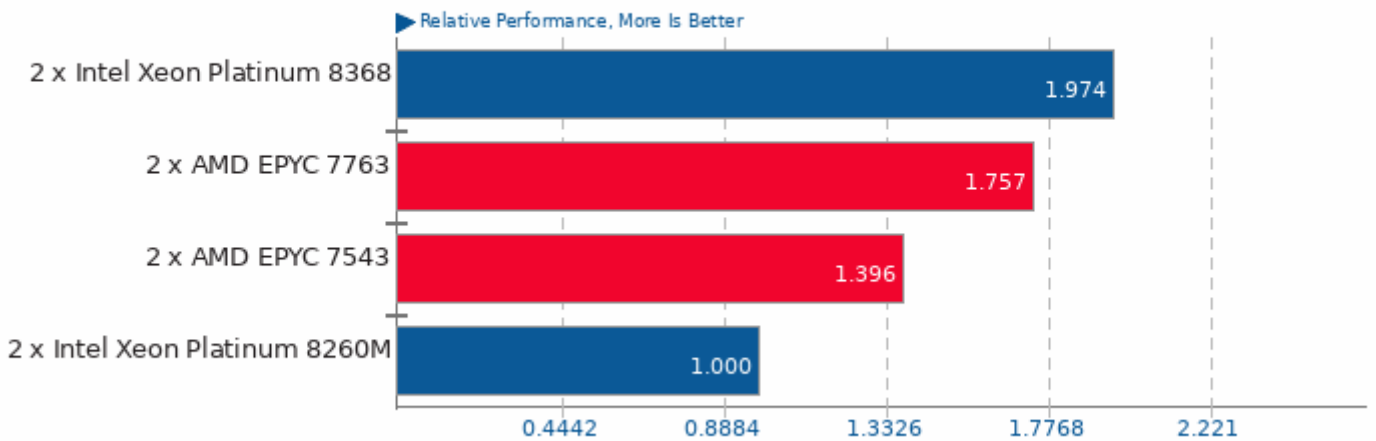
Result Composite



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

Geometric Mean Of Raytracing Tests

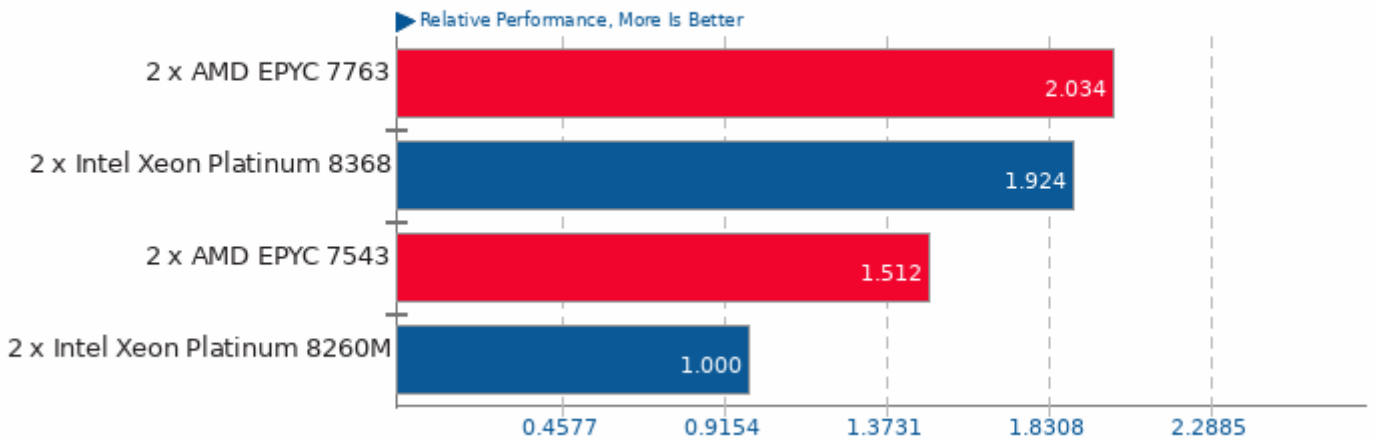
Result Composite



Geometric mean based upon tests: pts/ospray, pts/c-ray and pts/povray

Geometric Mean Of Renderers Tests

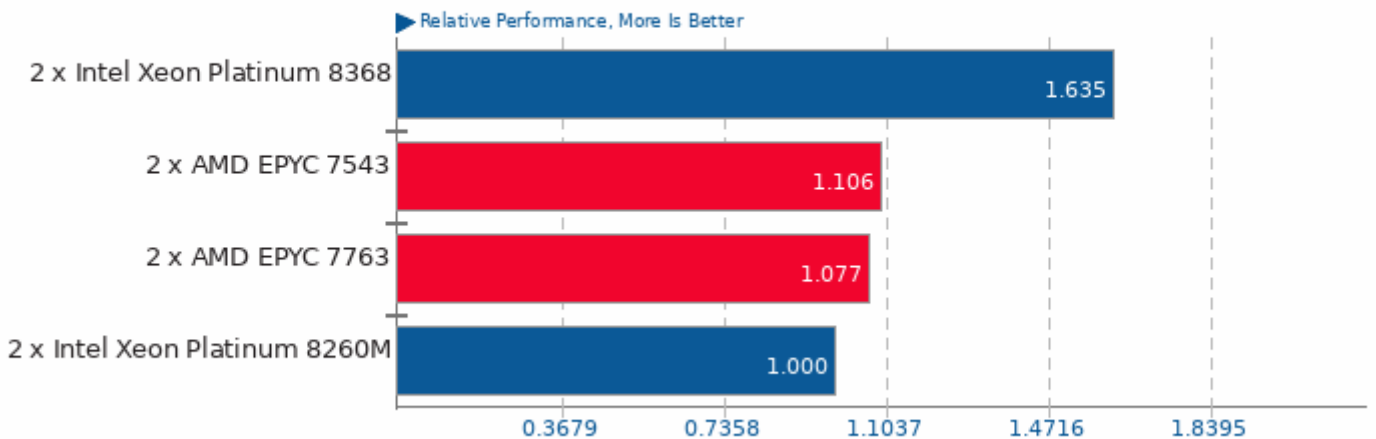
Result Composite



Geometric mean based upon tests: pts/ospray, pts/c-ray, pts/povray and pts/blender

Geometric Mean Of Scientific Computing Tests

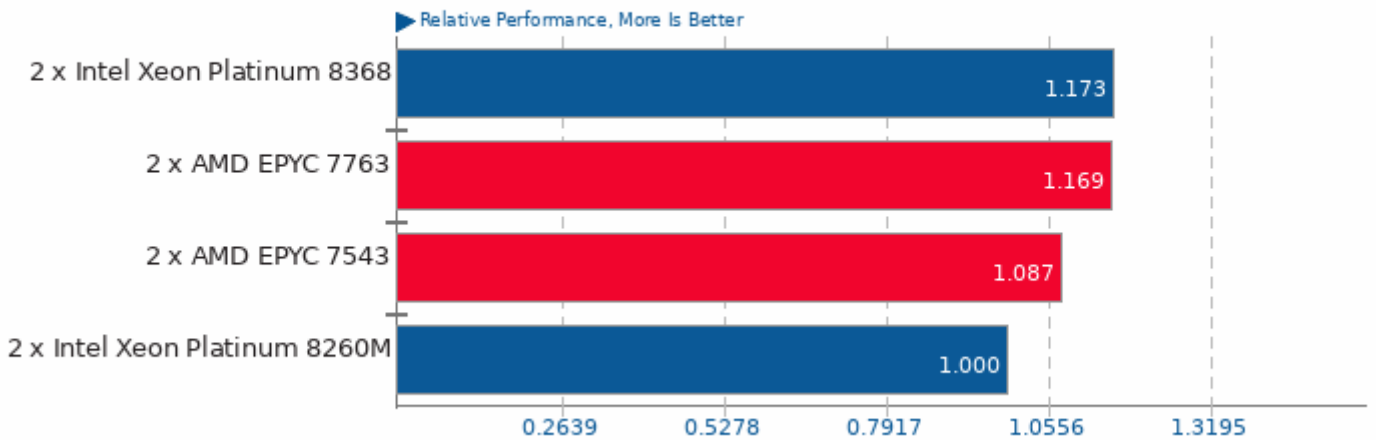
Result Composite



Geometric mean based upon tests: pts/neat, pts/mt-dgemm, pts/namd, pts/dolfyn, pts/pennant, pts/openfoam, pts/himeno, pts/mafft and pts/kripke

Geometric Mean Of Server Tests

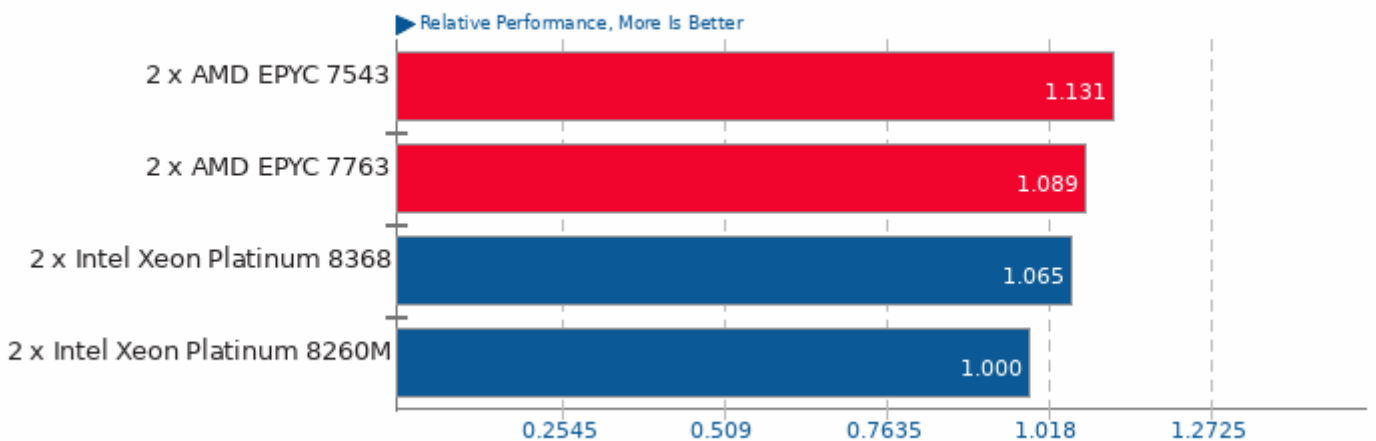
Result Composite



Geometric mean based upon tests: pts/apache, pts/nginx, pts/mysqlslap, pts/pgbench, pts/redis, pts/cassandra, pts/phpbench, pts/openssl and pts/sqlite-speedtest

Geometric Mean Of Single-Threaded Tests

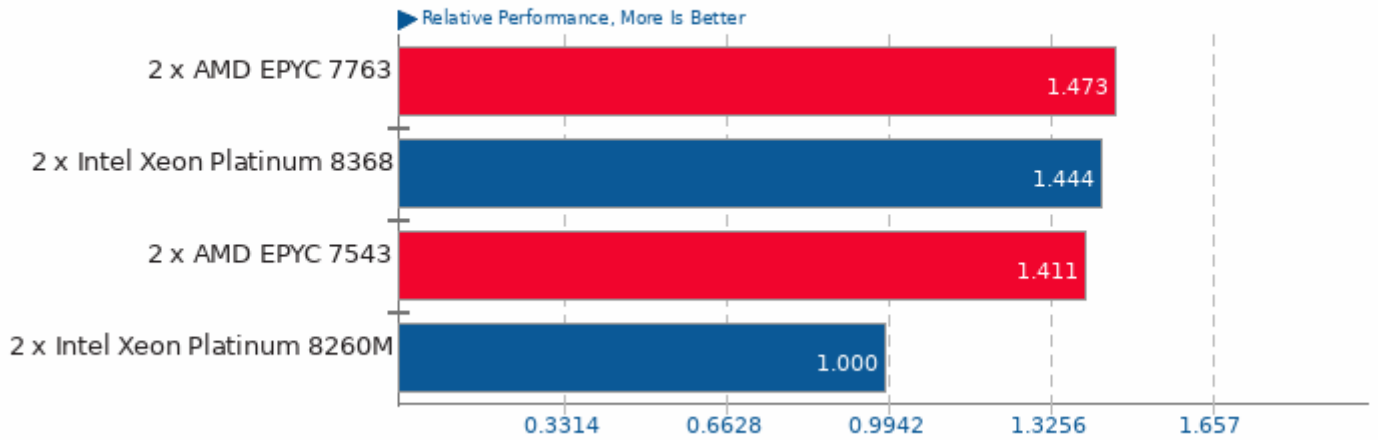
Result Composite



Geometric mean based upon tests: pts/java-scimark2, pts/byte, pts/cachebench, pts/numpy, pts/compress-gzip, pts/encode-flac, pts/encode-mp3, pts/gnupg, pts/redis, pts/pybench, pts/phpbench and pts/nginx

Geometric Mean Of Video Encoding Tests

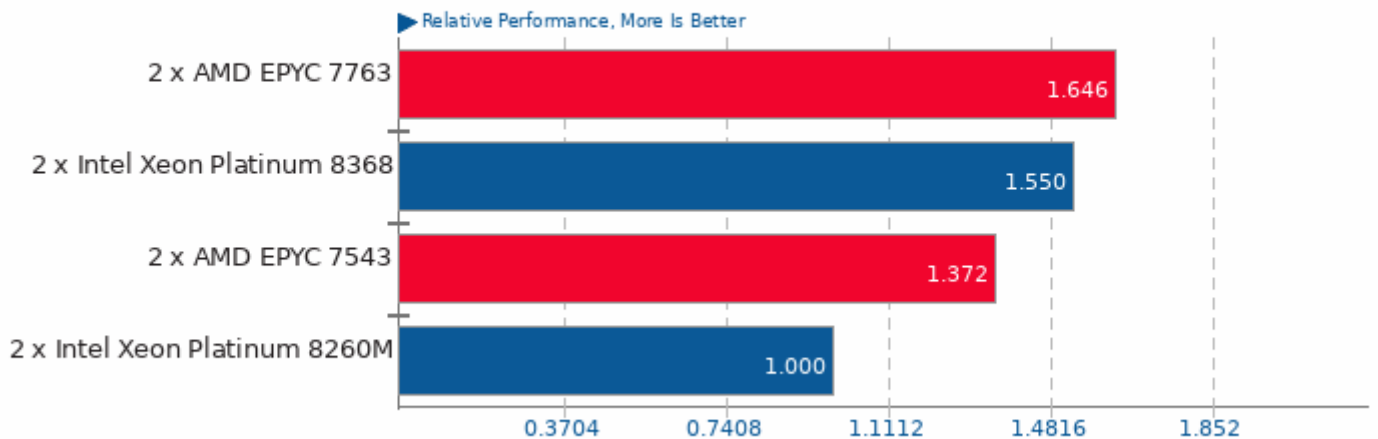
Result Composite



Geometric mean based upon tests: pts/svt-vp9, pts/x264, pts/x265, pts/kvazaar and pts/dav1d

Geometric Mean Of Common Workstation Benchmarks Tests

Result Composite



Geometric mean based upon tests: pts/blender, pts/rodinia, pts/himeno, pts/x265 and pts/sysbench

This file was automatically generated via the Phoronix Test Suite benchmarking software on Wednesday, 7 April 2021 03:27.