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SRE - R&D - FX optimization results

Global results and impact on the system

Test Systems:

default-config-12cpus

Processor: 2 x Intel Xeon Gold 6136 @ 3.70GHz (24 Cores), Motherboard: Lenovo-[7X02CTO1WW] v07 (-[IVE142E-2.30] BIOS), Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 193536MB, Disk: 599GB RAID 930-16i-4GB + 959GB RAID 930-16i-4GB, Graphics: Matrox MGA G200e [Pilot], Network: 4 x Intel X722 for 1GbE + 2 x Intel X710 for 10GbE SFP+

OS: Ubuntu 18.04, Kernel: 5.3.0-40-generic (x86_64), Compiler: GCC 7.4.0, 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: MQ-DEADLINE / relatime,rw,stripe=64
Processor Notes: Scaling Governor: intel_pstate performance - CPU Microcode: 0x2000064
Python Notes: Python 2.7.17 + Python 3.6.9
Security Notes: itlb_multihit: KVM: Vulnerable + l1tf: Mitigation of PTE Inversion + mds: Mitigation of Clear buffers; SMT disabled + meltdown: Mitigation of PTI + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW RSB filling + tsx_async_abort: Mitigation of Clear buffers; SMT disabled

kernelgeneric-optimized-12cpus-node1

Processor: 2 x Intel Xeon Gold 6136 (24 Cores), Motherboard: Lenovo-[7X02CTO1WW] v07 (-[IVE142E-2.30] BIOS), Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 193536MB, Disk: 599GB RAID 930-16i-4GB + 959GB RAID 930-16i-4GB, Graphics: Matrox MGA G200e [Pilot], Network: 4 x Intel X722 for 1GbE + 2 x Intel X710 for 10GbE SFP+

OS: Ubuntu 18.04, Kernel: 5.3.0-40-generic (x86_64), Compiler: GCC 7.4.0, 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: MQ-DEADLINE / relatime,rw,stripe=64
Processor Notes: CPU Microcode: 0x2000064
Python Notes: Python 2.7.17 + Python 3.6.9
Security Notes: itlb_multihit: KVM: Vulnerable + l1tf: Mitigation of PTE Inversion + mds: Mitigation of Clear buffers; SMT disabled + meltdown: Mitigation of PTI + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW RSB filling + tsx_async_abort: Mitigation of Clear buffers; SMT disabled

kernel-ll-optimized-12cpus-node1

Processor: 2 x Intel Xeon Gold 6136 (24 Cores), Motherboard: Lenovo-[7X02CTO1WW] v07 (-[IVE142E-2.30] BIOS), Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 193536MB, Disk: 599GB RAID 930-16i-4GB + 959GB RAID 930-16i-4GB, Graphics: Matrox MGA G200e [Pilot], Network: 4 x Intel X722 for 1GbE + 2 x Intel X710 for 10GbE SFP+

OS: Ubuntu 18.04, Kernel: 5.3.0-40-lowlatency (x86_64), Compiler: GCC 7.4.0, 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: MQ-DEADLINE / relatime,rw,stripe=64
Processor Notes: CPU Microcode: 0x2000064

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Python Notes: Python 2.7.17 + Python 3.6.9
Security Notes: itlb_multihit: KVM: Vulnerable + l1tf: Mitigation of PTE Inversion + mds: Mitigation of Clear buffers; SMT disabled + meltdown: Mitigation of PTI + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW RSB filling + tsx_async_abort: Mitigation of Clear buffers; SMT disabled

	default-config-12cpus	kernelgeneric-optimized-12cpus-node1	kernel-ll-optimized-12cpus-node1
SQLite - T.S.I (sec)	**2.092**	3.341	**3.638**
Normalized	100%	62.62%	57.5%
Standard Deviation		3%	0.2%
Flexible IO Tester - Random Read - Linux AIO - No - Yes - 2MB - D.T.D (MB/s)	299	**298**	**6767**
Normalized	4.42%	4.4%	100%
Standard Deviation	0.4%	0.5%	0.8%
Flexible IO Tester - Random Read - Linux AIO - No - Yes - 2MB - D.T.D (IOPS)	146	**145**	**3380**
Normalized	4.32%	4.29%	100%
Standard Deviation		0.7%	0.8%
Flexible IO Tester - Random Read - Linux AIO - No - Yes - 4KB - D.T.D (MB/s)	7.722	**7.718**	**217**
Normalized	3.56%	3.56%	100%
Standard Deviation	0.5%	1%	0.7%
Flexible IO Tester - Random Read - Linux AIO - No - Yes - 4KB - D.T.D (IOPS)	1927	**1926**	**55267**
Normalized	3.49%	3.48%	100%
Standard Deviation	0.5%	1%	0.5%
Flexible IO Tester - Random Write - Linux AIO - No - Yes - 2MB - D.T.D (MB/s)	**6563**	**6600**	**6600**
Normalized	99.44%	100%	100%
Standard Deviation	0.5%		0%
Flexible IO Tester - Random Write - Linux AIO - No - Yes - 2MB - D.T.D (IOPS)	**3278**	**3296**	**3296**
Normalized	99.45%	100%	100%
Standard Deviation	0.5%		0%
Flexible IO Tester - Random Write - Linux AIO - No - Yes - 4KB - D.T.D (MB/s)	**549**	**207**	211
Normalized	100%	37.7%	38.43%
Standard Deviation	0.6%	2.8%	0.5%
Flexible IO Tester - Random Write - Linux AIO - No - Yes - 4KB - D.T.D (IOPS)	**140667**	**52900**	54100
Normalized	100%	37.61%	38.46%
Standard Deviation	0.4%	2.8%	0.6%
Flexible IO Tester - Sequential Read - Linux AIO - No - Yes - 2MB - D.T.D (MB/s)	**6805**	**6741**	6801
Normalized	100%	99.06%	99.94%
Standard Deviation	0.4%	2.1%	0.4%
Flexible IO Tester - Sequential Read - Linux AIO - No - Yes - 2MB - D.T.D (IOPS)	**3399**	**3367**	3397
Normalized	100%	99.06%	99.94%
Standard Deviation	0.5%	2.1%	0.4%

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Flexible IO Tester - Sequential Read - Linux AIO - No - Yes - 4KB - D.T.D (MB/s)	**537**	**214**	218
Normalized	100%	39.85%	40.6%
Standard Deviation	0.7%	1.2%	1%
Flexible IO Tester - Sequential Read - Linux AIO - No - Yes - 4KB - D.T.D (IOPS)	**137333**	**54667**	55500
Normalized	100%	39.81%	40.41%
Standard Deviation	0.8%	1.2%	1.3%
Flexible IO Tester - Sequential Write - Linux AIO - No - Yes - 2MB - D.T.D (MB/s)	**6599**	**6519**	6564
Normalized	100%	98.79%	99.47%
Standard Deviation	0%	2.1%	0.5%
Flexible IO Tester - Sequential Write - Linux AIO - No - Yes - 2MB - D.T.D (IOPS)	**3296**	**3256**	3278
Normalized	100%	98.79%	99.45%
Standard Deviation		2.1%	0.5%
Flexible IO Tester - Sequential Write - Linux AIO - No - Yes - 4KB - D.T.D (MB/s)	**609**	**203**	210
Normalized	100%	33.33%	34.48%
Standard Deviation	0.8%	2.7%	0.5%
Flexible IO Tester - Sequential Write - Linux AIO - No - Yes - 4KB - D.T.D (IOPS)	**156333**	**52100**	53767
Normalized	100%	33.33%	34.39%
Standard Deviation	0.7%	2.8%	0.4%
FS-Mark - 1.F.1.S (Files/s)	244.3	**249.8**	**236.8**
Normalized	97.8%	100%	94.8%
Standard Deviation	13.6%	20.1%	1.8%
FS-Mark - 5.F.1.S.4.T (Files/s)	**214.4**	207.4	**204.8**
Normalized	100%	96.74%	95.52%
Standard Deviation	3%	2.9%	0.9%
FS-Mark - 4.F.3.S.D.1.S (Files/s)	**261.7**	**203.6**	251.0
Normalized	100%	77.8%	95.91%
Standard Deviation	6.5%	1%	12.2%
FS-Mark - 1.F.1.S.N.S.F (Files/s)	**1601**	**1059**	1061
Normalized	100%	66.17%	66.27%
Standard Deviation	0.1%	0.1%	0.1%
Dbench - 12 Clients (MB/s)	**5427**	2096	**2018**
Normalized	100%	38.62%	37.19%
Standard Deviation	0.3%	0.9%	1.3%
Dbench - 1 Clients (MB/s)	**880.382**	**304.548**	304.694
Normalized	100%	34.59%	34.61%
Standard Deviation	0.1%	0%	0%
Compile Bench - Compile (MB/s)	**1526**	1465	**1436**
Normalized	100%	95.98%	94.12%
Standard Deviation	5.1%	10%	9%
Compile Bench - Initial Create (MB/s)	**467.43**	**429.98**	434.72
Normalized	100%	91.99%	93%
Standard Deviation	1.4%	5.7%	1.2%
Compile Bench - Read Compiled Tree (MB/s)	**2330**	2292	**2229**
Normalized	100%	98.37%	95.67%
Standard Deviation	0.5%	0.5%	0.5%
PostMark - D.T.P (TPS)	4658	**4687**	**4545**
Normalized	99.38%	100%	96.97%
Standard Deviation	1.1%	1.1%	

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RAMspeed SMP - Add - Integer (MB/s)	**19262**	19131	**18933**
Normalized	100%	99.32%	98.29%
RAMspeed SMP - Copy - Integer (MB/s)	**16220**	16089	**15963**
Normalized	100%	99.19%	98.42%
RAMspeed SMP - Scale - Integer (MB/s)	**17617**	17534	**17357**
Normalized	100%	99.53%	98.52%
RAMspeed SMP - Triad - Integer (MB/s)	**19693**	19559	**19520**
Normalized	100%	99.32%	99.12%
RAMspeed SMP - Average - Integer (MB/s)	**18214**	18086	**17947**
Normalized	100%	99.3%	98.54%
RAMspeed SMP - Add - Floating Point (MB/s)	**19173**	19048	**18951**
Normalized	100%	99.35%	98.85%
RAMspeed SMP - Copy - Floating Point	**16216**	16079	**15971**
Normalized	100%	99.15%	98.49%
RAMspeed SMP - Scale - Floating Point	**16117**	16016	**15876**
Normalized	100%	99.38%	98.51%
RAMspeed SMP - Triad - Floating Point	**18640**	18527	**18367**
Normalized	100%	99.4%	98.54%
RAMspeed SMP - Average - Floating Point (MB/s)	**17543**	17418	**17276**
Normalized	100%	99.29%	98.48%
Stream - Copy (MB/s)	87818	**88032**	**87651**
Normalized	99.76%	100%	99.57%
Standard Deviation	0.1%	0.1%	0%
Stream - Scale (MB/s)	**63685**	63678	**63360**
Normalized	100%	99.99%	99.49%
Standard Deviation	0%	0.1%	0%
Stream - Triad (MB/s)	74487	**74524**	**74201**
Normalized	99.95%	100%	99.57%
Standard Deviation	0%	0.1%	0%
Stream - Add (MB/s)	**74535**	74507	**74296**
Normalized	100%	99.96%	99.68%
Standard Deviation	0%	0.1%	0%
Tinymembench - Standard Memcpy (MB/s)	5510	**5561**	**5462**
Normalized	99.09%	100%	98.22%
Standard Deviation	0%	0%	0.4%
Tinymembench - Standard Memset (MB/s)	8445	**8714**	**8405**
Normalized	96.91%	100%	96.45%
Standard Deviation	0.4%	0.2%	0.8%
MBW - Memory Copy - 1024 MiB (MiB/s)	**4765**	**4904**	4819
Normalized	97.16%	100%	98.27%
Standard Deviation	0%	0%	0.4%
MBW - M.C.F.B.S - 1024 MiB (MiB/s)	**4898**	**4940**	4937
Normalized	99.14%	100%	99.94%
Standard Deviation	0.3%	0%	0.4%
t-test1 - 1 (sec)	**29.000**	28.601	**21.944**
Normalized	75.67%	76.72%	100%
Standard Deviation	1%	0.5%	0.1%
t-test1 - 2 (sec)	**8.916**	8.740	**7.591**
Normalized	85.14%	86.85%	100%
Standard Deviation	0.1%	0.1%	0.6%
pmbench - 1 - 100% Writes (us - Average Page Latency)	0.0461	0.0461	0.0461
Standard Deviation	2.8%	3%	1.9%

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Timed MAFFT Alignment - M.S.A (sec)	**2.495**	2.638	**2.688**
Normalized	100%	94.58%	92.82%
Standard Deviation	2.9%	3.9%	4.6%
CacheBench - Read Cache (MB/s)	**3042**	3038	**3012**
Normalized	100%	99.86%	98.99%
Standard Deviation	0%	0%	0%
CacheBench - Write Cache (MB/s)	**25479**	25441	**25223**
Normalized	100%	99.85%	99%
Standard Deviation	0%	0%	0%
x264 - H.2.V.E (FPS)	78.33	**78.30**	**78.58**
Normalized	99.68%	99.64%	100%
Standard Deviation	19.5%	19.3%	14.4%
7-Zip Compression - C.S.T (MIPS)	**50353**	**48776**	48941
Normalized	100%	96.87%	97.2%
Standard Deviation	0.7%	2.7%	3%
Timed Linux Kernel Compilation - Time To Compile (sec)	80.800	**80.074**	**81.154**
Normalized	99.1%	100%	98.67%
Standard Deviation	2.8%	1.2%	0.6%
C-Ray - Total Time - 4.1.R.P.P (sec)	**73.413**	75.096	**75.141**
Normalized	100%	97.76%	97.7%
Standard Deviation	0.1%	1.3%	0.6%
Parallel BZIP2 Compression - 2.F.C (sec)	4.700	**4.696**	**4.745**
Normalized	99.91%	100%	98.97%
Standard Deviation	11.5%	11.8%	11.8%
LAME MP3 Encoding - WAV To MP3 (sec)	**10.935**	10.936	**11.041**
Normalized	100%	99.99%	99.04%
Standard Deviation	0.7%	0.5%	0.5%
Hackbench - 1 - Thread (sec)	**5.162**	**4.071**	4.295
Normalized	78.86%	100%	94.78%
Standard Deviation	0.6%	2.1%	1.3%
Hackbench - 4 - Thread (sec)	**21.292**	**14.650**	15.049
Normalized	68.81%	100%	97.35%
Standard Deviation	7.2%	0.7%	0.2%
Hackbench - 1 - Process (sec)	**5.169**	**4.044**	4.225
Normalized	78.24%	100%	95.72%
Standard Deviation	0.4%	1.4%	1.2%
Hackbench - 16 - Thread (sec)	**74.688**	**59.794**	61.532
Normalized	80.06%	100%	97.18%
Standard Deviation	3.3%	0.4%	0.7%
Hackbench - 4 - Process (sec)	**20.837**	**14.439**	14.927
Normalized	69.3%	100%	96.73%
Standard Deviation	1.1%	0.3%	0.8%
Hackbench - 16 - Process (sec)	**67.355**	**58.879**	60.997
Normalized	87.42%	100%	96.53%
Standard Deviation	7%	0.7%	0.6%
OpenSSL - R.4.b.P (Signs/sec)	**3147**	3116	**3073**
Normalized	100%	99.03%	97.66%
Standard Deviation	0.7%	1.7%	0.9%
Stress-NG - Forking (Bogo Ops/s)	58910	**61582**	**57836**
Normalized	95.66%	100%	93.92%
Standard Deviation	0.5%	1.2%	2.4%
Stress-NG - Semaphores (Bogo Ops/s)	3668356	**3732646**	**3644383**
Normalized	98.28%	100%	97.64%
Standard Deviation	0.5%	0.9%	0.7%

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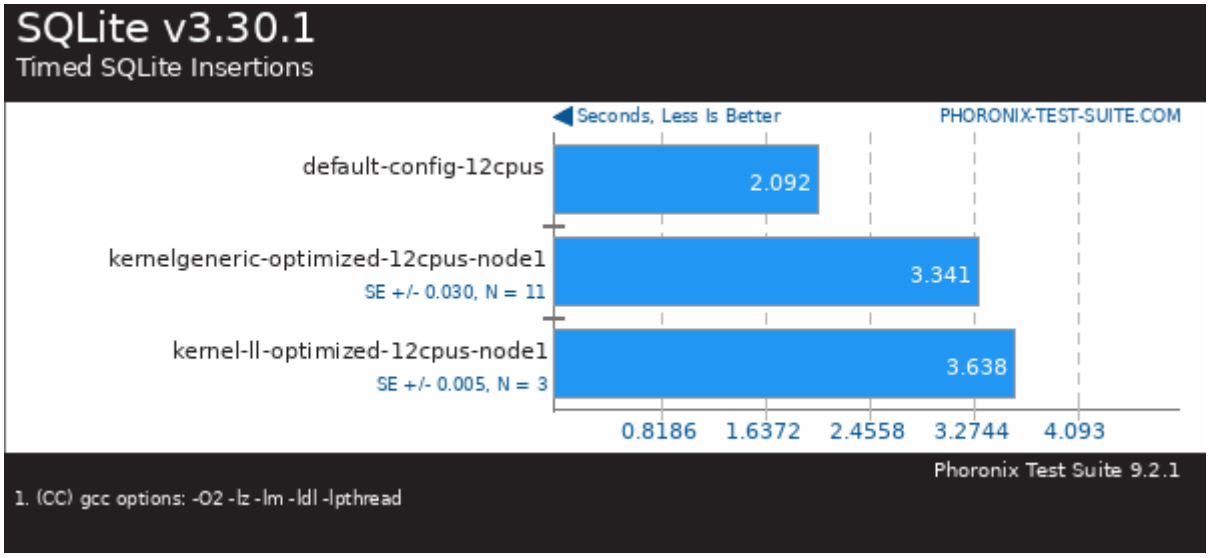
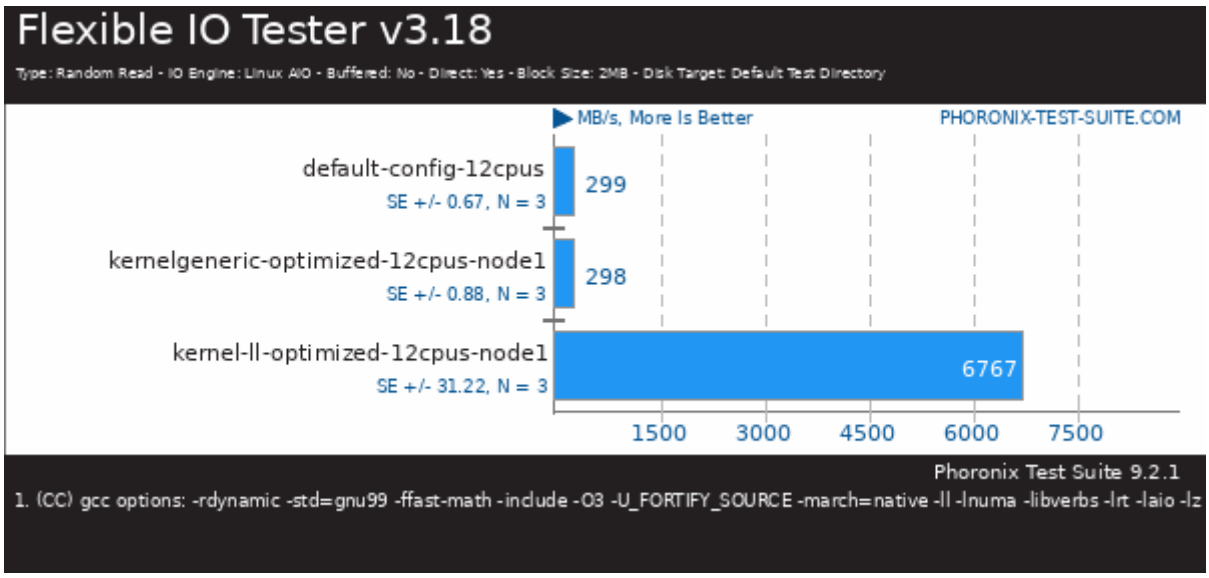
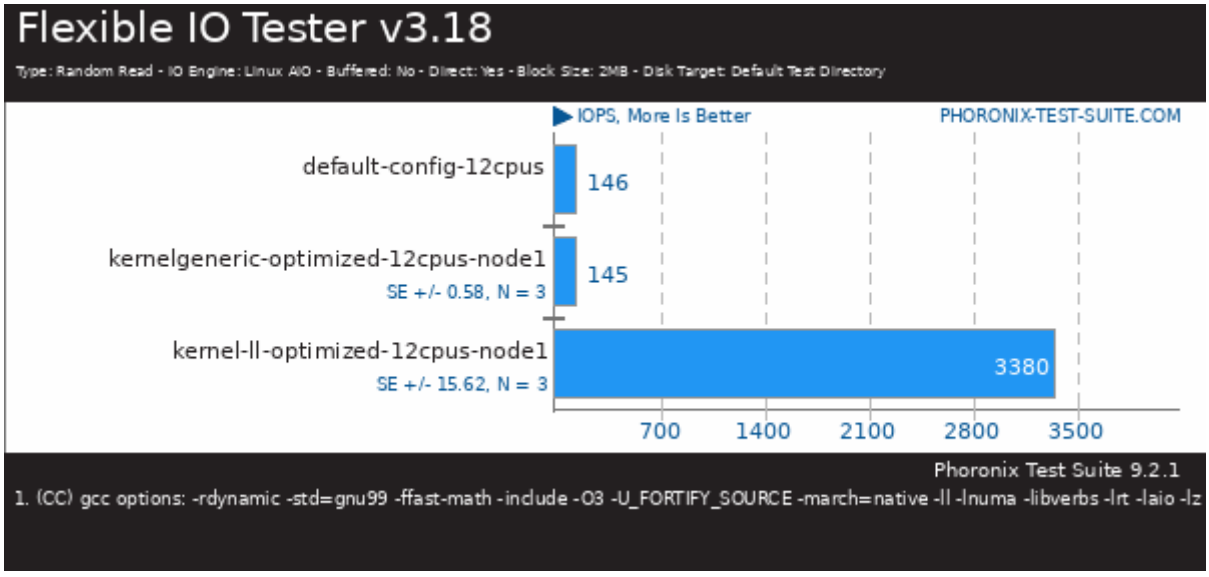
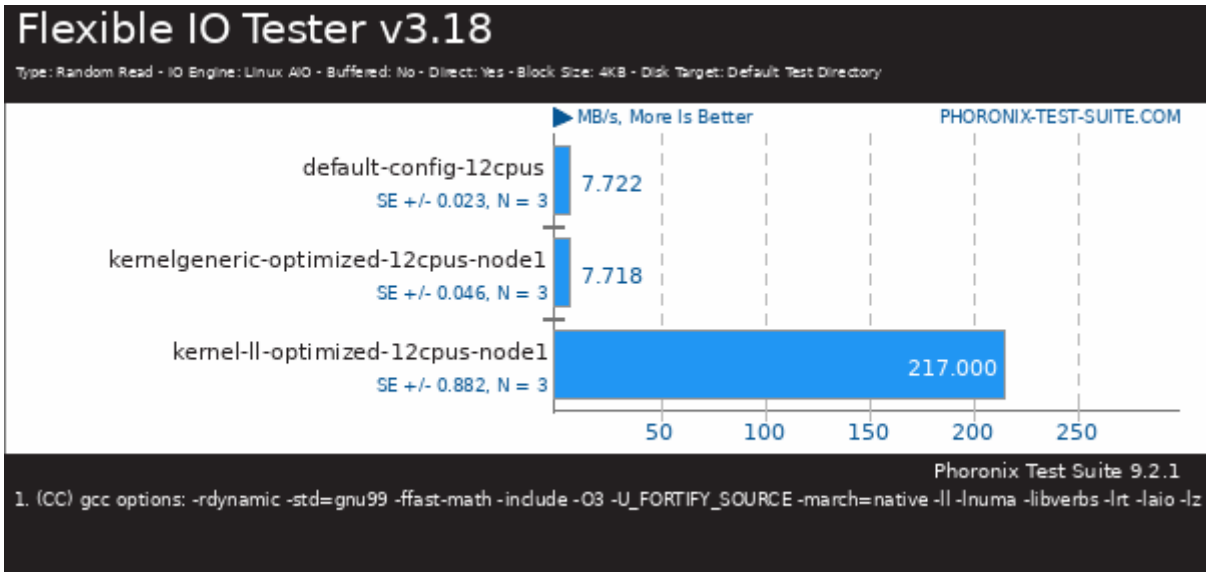
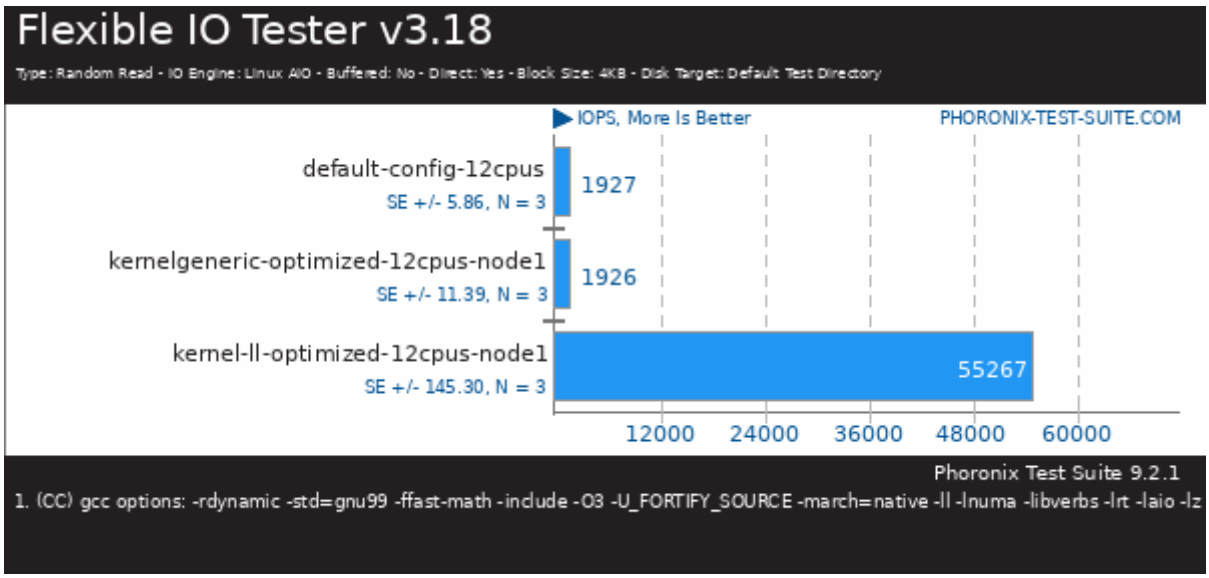
Stress-NG - Memory Copying (Bogo Ops/s)	**6512**	**7458**	7397
Normalized	87.32%	100%	99.18%
Standard Deviation	0.4%	0.6%	0.7%
Stress-NG - Socket Activity (Bogo Ops/s)	**3758**	3577	**3491**
Normalized	100%	95.19%	92.9%
Standard Deviation	3%	3.2%	0%
Stress-NG - Context Switching (Bogo Ops/s)	**2714805**	881212	**819048**
Normalized	100%	32.46%	30.17%
Standard Deviation	2.5%	1.2%	0.1%
Stress-NG - S.V.M.P (Bogo Ops/s)	**3791068**	**6036373**	5219944
Normalized	62.8%	100%	86.47%
Standard Deviation	6.8%	4.6%	2.7%
Apache Benchmark - S.W.P.S (Reqs/sec)	**25224**	**9716**	13172
Normalized	100%	38.52%	52.22%
Standard Deviation	0.1%	0.1%	0.8%
OSBench - Create Files (us/Event)	**17.759204**	19.028204	**19.198538**
Normalized	100%	93.33%	92.5%
Standard Deviation	0.4%	0.2%	0.3%
OSBench - Create Threads (us/Event)	**15.896161**	22.826989	**24.213791**
Normalized	100%	69.64%	65.65%
Standard Deviation	0.5%	2.7%	2.4%
OSBench - Launch Programs (us/Event)	**37.573179**	43.929418	**45.576095**
Normalized	100%	85.53%	82.44%
Standard Deviation	0.3%	0.9%	0.9%
OSBench - Create Processes (us/Event)	**31.030178**	38.876534	**40.817261**
Normalized	100%	79.82%	76.02%
Standard Deviation	2.8%	1.4%	1.2%
OSBench - Memory Allocations (Ns/Event)	**102.871736**	104.697069	**105.192661**
Normalized	100%	98.26%	97.79%
Standard Deviation	0.1%	0.2%	0.1%
Schbench - 8 - 4 (usec, 99.9th Latency Percentile)	**34304**	59797	**60399**
Normalized	100%	57.37%	56.8%
Standard Deviation	2.8%	0.5%	4.9%

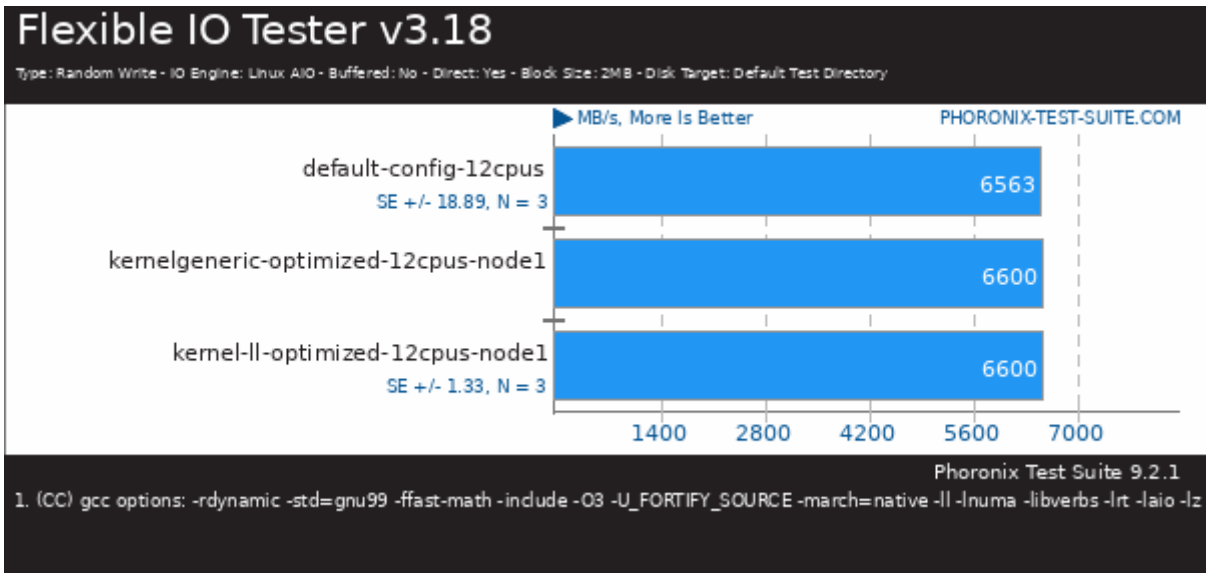

SQLite v3.30.1
Timed SQLite Insertions
Seconds, Less Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
2.092
kernelgeneric-optimized-12cpus-node1
SE +/- 0.030, N = 11
3.341
kernel-ll-optimized-12cpus-node1
SE +/- 0.005, N = 3
3.638
0.8186
1.6372
2.4558
3.2744
4.093
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -O2 -lz -lm -ldl -lpthread

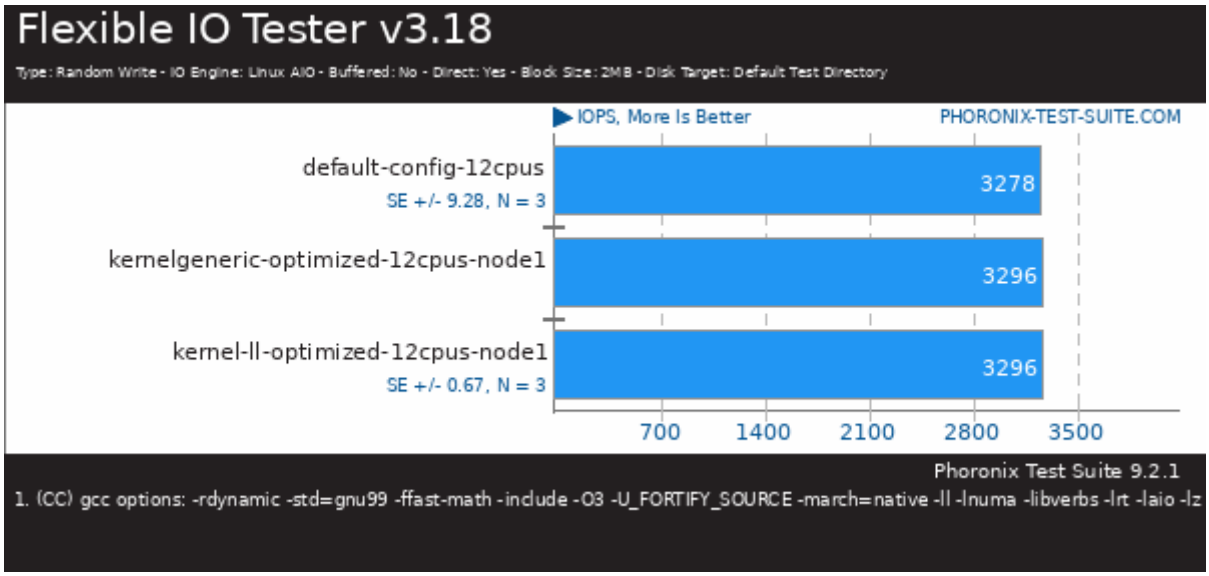

Flexible IO Tester v3.18
Type: Random Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory
MB/s, More Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
SE +/- 0.67, N = 3
299
kernelgeneric-optimized-12cpus-node1
SE +/- 0.88, N = 3
298
kernel-ll-optimized-12cpus-node1
SE +/- 31.22, N = 3
6767
1500
3000
4500
6000
7500
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lnuma -libverbs -lrt -laio -lz

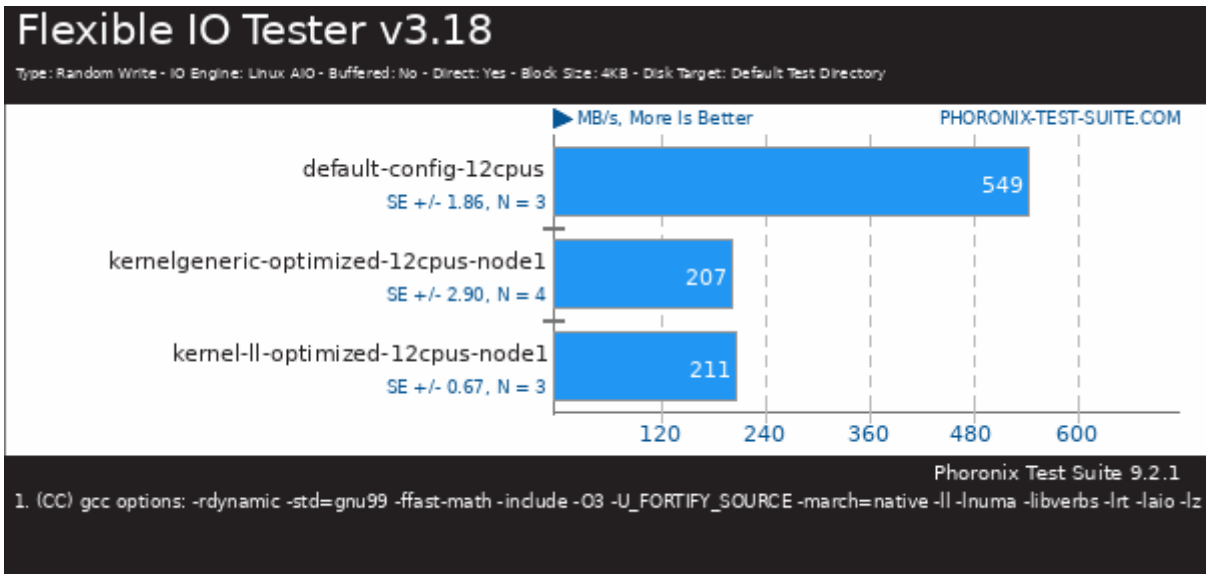

Flexible IO Tester v3.18
Type: Random Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory
IOPS, More Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
146
kernelgeneric-optimized-12cpus-node1
SE +/- 0.58, N = 3
145
kernel-ll-optimized-12cpus-node1
SE +/- 15.62, N = 3
3380
700
1400
2100
2800
3500
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lnuma -libverbs -lrt -laio -lz

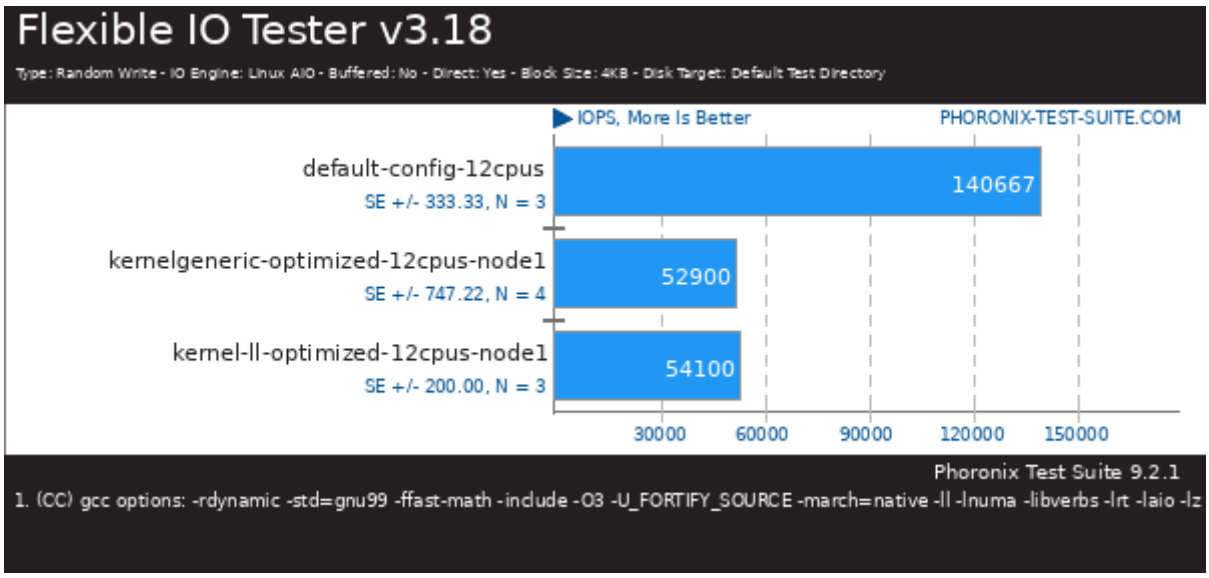

Flexible IO Tester v3.18
Type: Random Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory
MB/s, More Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
SE +/- 0.023, N = 3
7.722
kernelgeneric-optimized-12cpus-node1
SE +/- 0.046, N = 3
7.718
kernel-ll-optimized-12cpus-node1
SE +/- 0.882, N = 3
217.000
50
100
150
200
250
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lnuma -libverbs -lrt -laio -lz

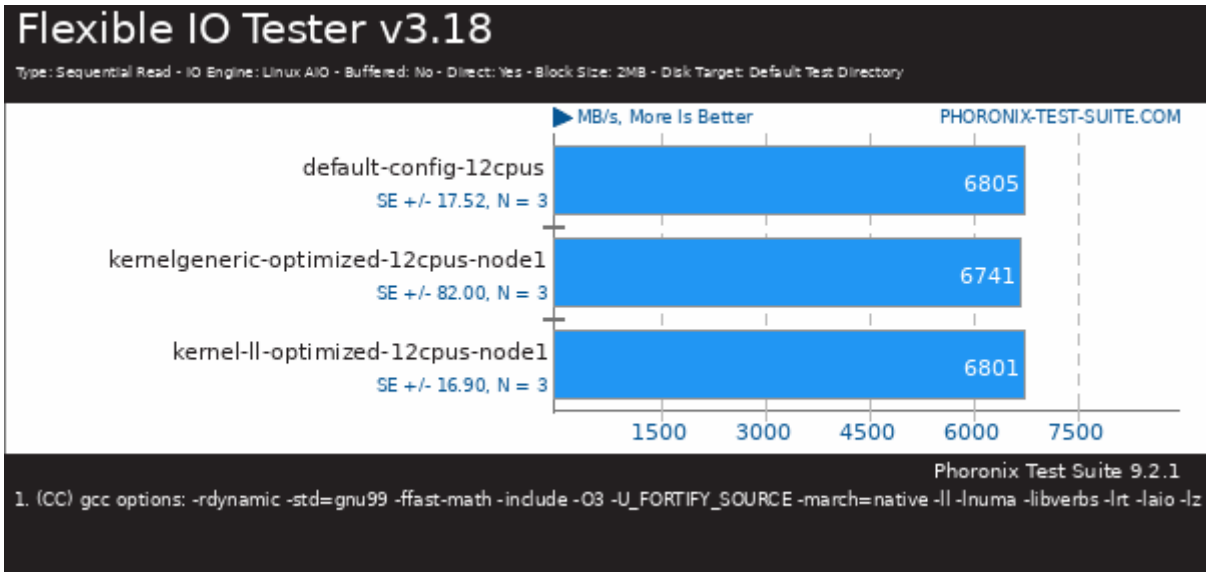

Flexible IO Tester v3.18
Type: Random Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory
IOPS, More Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
SE +/- 5.86, N = 3
1927
kernelgeneric-optimized-12cpus-node1
SE +/- 11.39, N = 3
1926
kernel-ll-optimized-12cpus-node1
SE +/- 145.30, N = 3
55267
12000
24000
36000
48000
60000
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lnuma -libverbs -lrt -laio -lz

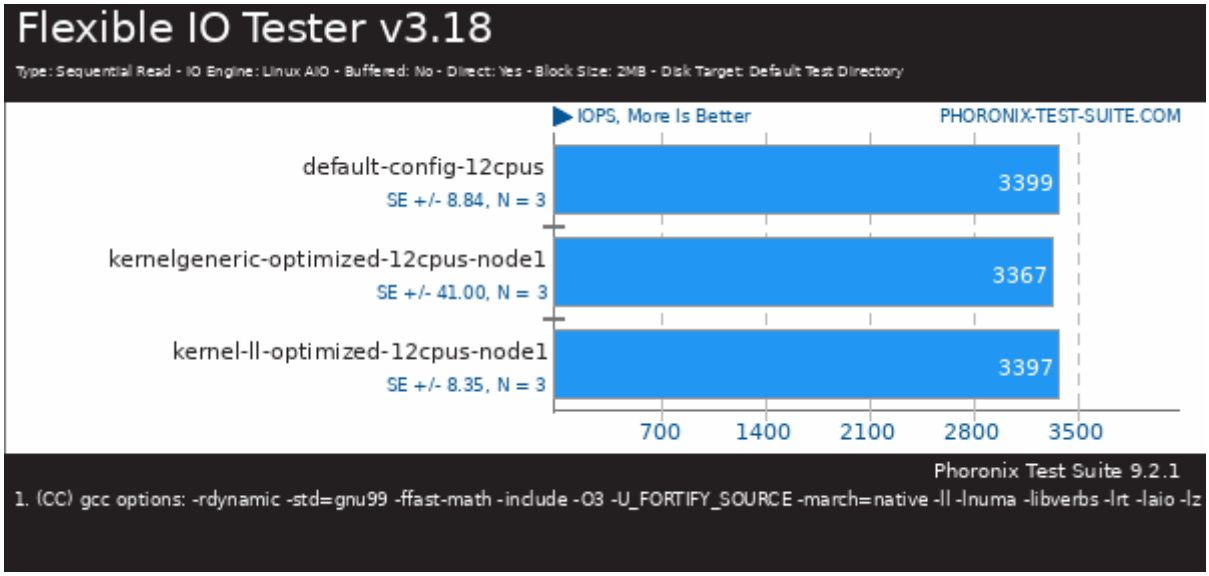

Flexible IO Tester v3.18
Type: Random Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory
MB/s, More Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
SE +/- 18.89, N = 3
6563
kernelgeneric-optimized-12cpus-node1
6600
kernel-ll-optimized-12cpus-node1
SE +/- 1.33, N = 3
6600
1400
2800
4200
5600
7000
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lnuma -libverbs -lrt -laio -lz

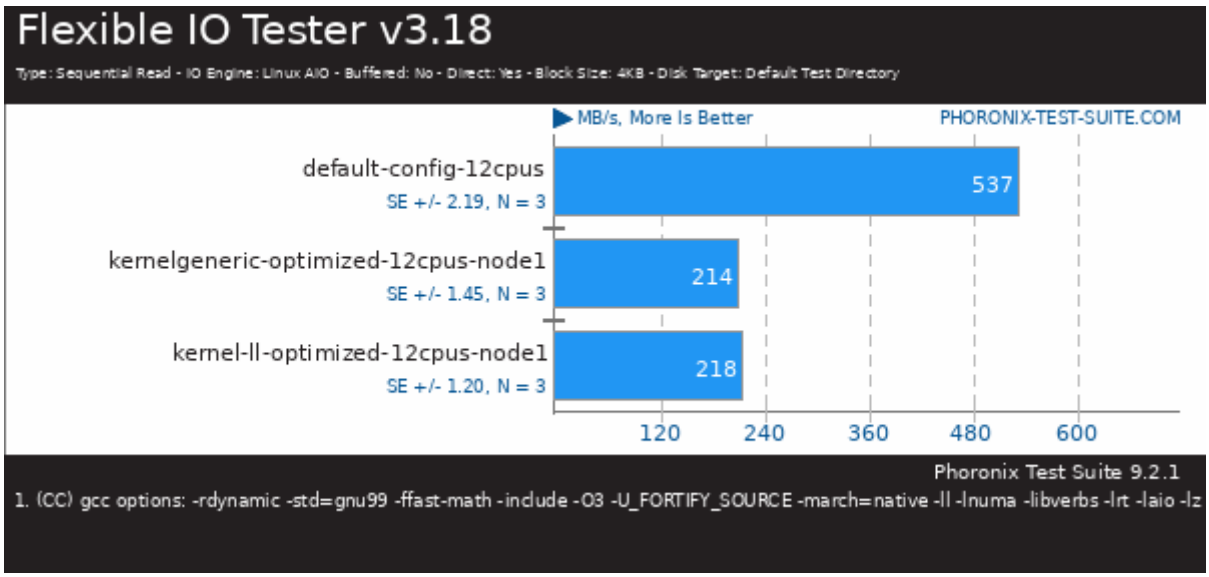

Flexible IO Tester v3.18
Type: Random Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory
IOPS, More Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
SE +/- 9.28, N = 3
3278
kernelgeneric-optimized-12cpus-node1
3296
kernel-ll-optimized-12cpus-node1
SE +/- 0.67, N = 3
3296
700
1400
2100
2800
3500
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lnuma -libverbs -lrt -laio -lz

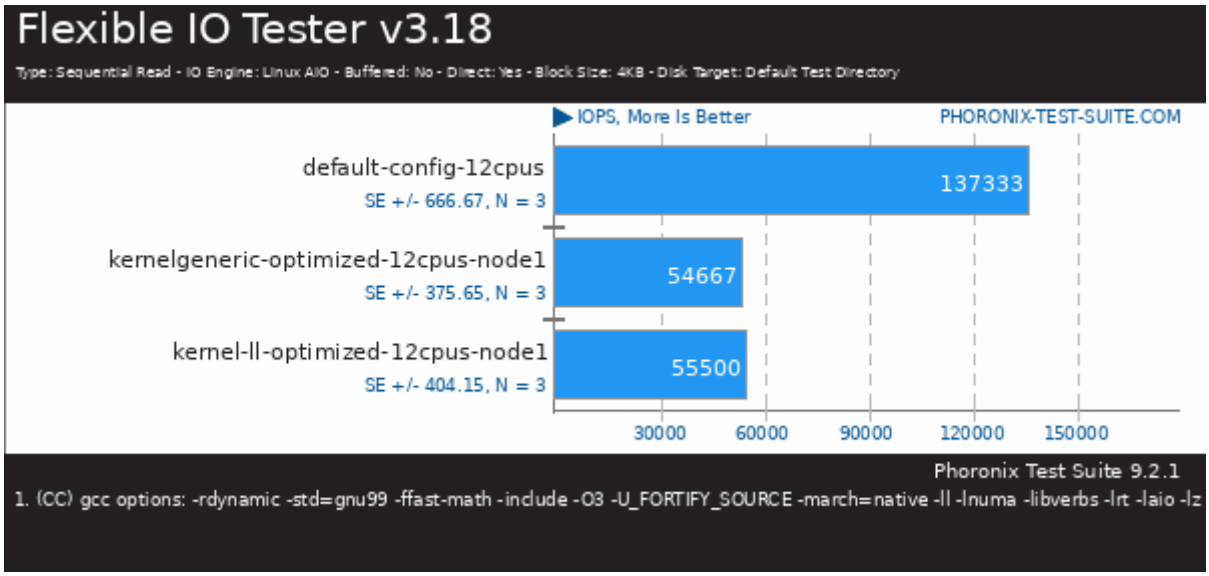

Flexible IO Tester v3.18
Type: Random Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory
MB/s, More Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
SE +/- 1.86, N = 3
549
kernelgeneric-optimized-12cpus-node1
SE +/- 2.90, N = 4
207
kernel-ll-optimized-12cpus-node1
SE +/- 0.67, N = 3
211
120
240
360
480
600
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lnuma -libverbs -lrt -laio -lz

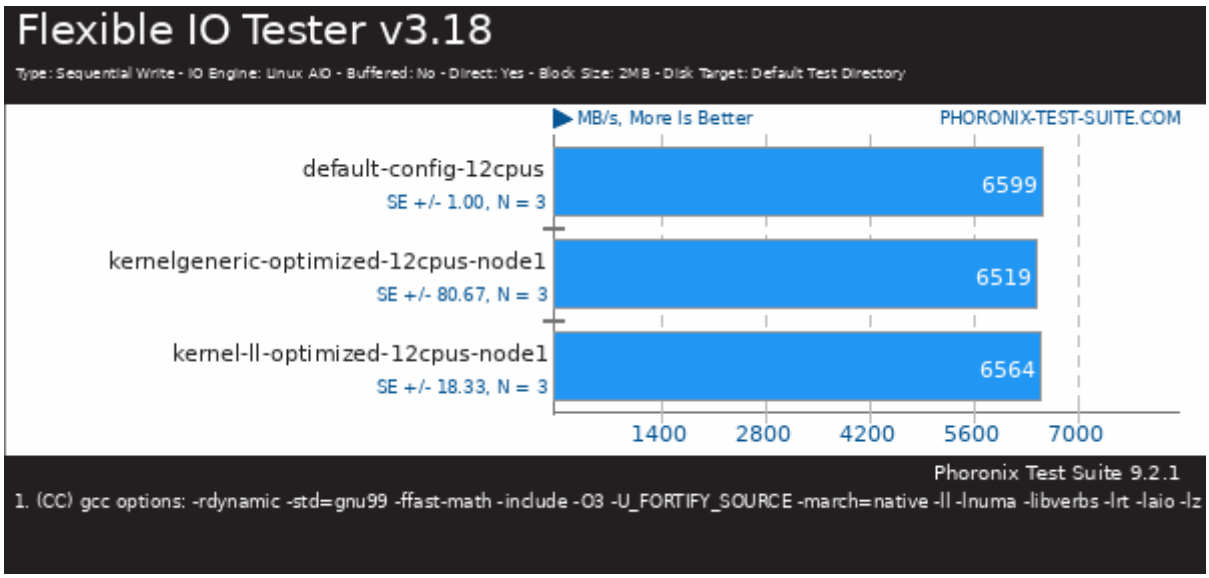

Flexible IO Tester v3.18
Type: Random Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory
IOPS, More Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
SE +/- 333.33, N = 3
140667
kernelgeneric-optimized-12cpus-node1
SE +/- 747.22, N = 4
52900
kernel-ll-optimized-12cpus-node1
SE +/- 200.00, N = 3
54100
30000
60000
90000
120000
150000
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lnuma -libverbs -lrt -laio -lz

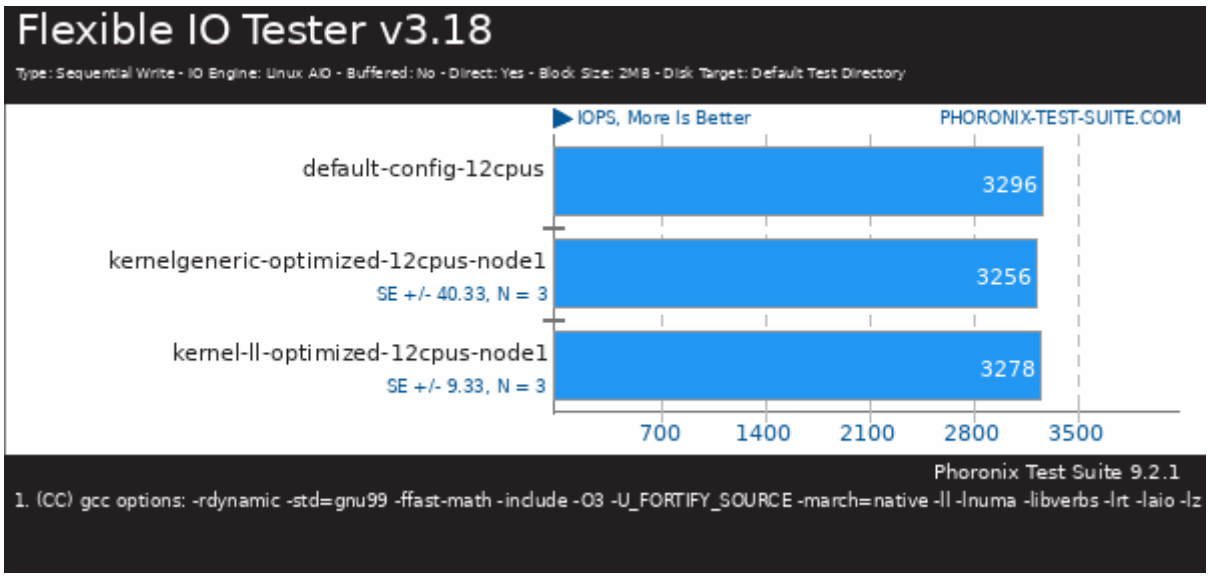

Flexible IO Tester v3.18
Type: Sequential Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory
MB/s, More Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
SE +/- 17.52, N = 3
6805
kernelgeneric-optimized-12cpus-node1
SE +/- 82.00, N = 3
6741
kernel-ll-optimized-12cpus-node1
SE +/- 16.90, N = 3
6801
1500
3000
4500
6000
7500
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lnuma -libverbs -lrt -laio -lz


Flexible IO Tester v3.18
Type: Sequential Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory
IOPS, More Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
SE +/- 8.84, N = 3
3399
kernelgeneric-optimized-12cpus-node1
SE +/- 41.00, N = 3
3367
kernel-ll-optimized-12cpus-node1
SE +/- 8.35, N = 3
3397
700
1400
2100
2800
3500
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lnuma -libverbs -lrt -laio -lz


Flexible IO Tester v3.18
Type: Sequential Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory
MB/s, More Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
SE +/- 2.19, N = 3
537
kernelgeneric-optimized-12cpus-node1
SE +/- 1.45, N = 3
214
kernel-ll-optimized-12cpus-node1
SE +/- 1.20, N = 3
218
120
240
360
480
600
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lnuma -libverbs -lrt -laio -lz

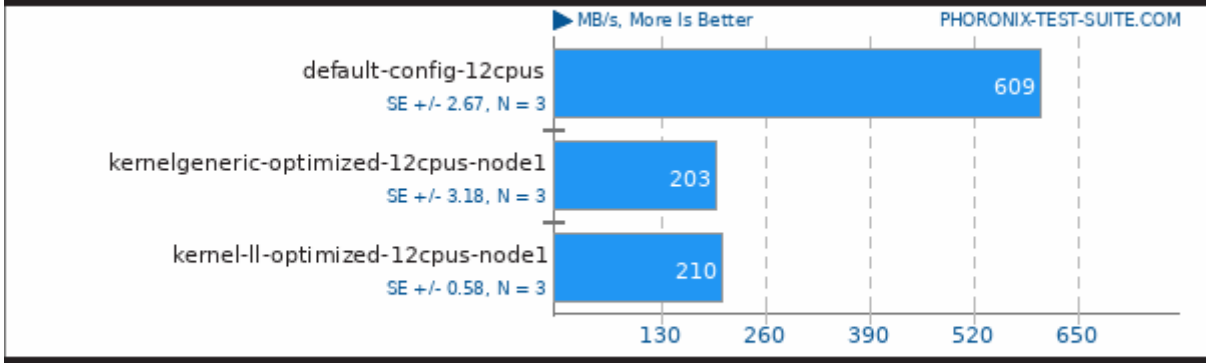

Flexible IO Tester v3.18
Type: Sequential Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory
IOPS, More Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
SE +/- 666.67, N = 3
137333
kernelgeneric-optimized-12cpus-node1
SE +/- 375.65, N = 3
54667
kernel-ll-optimized-12cpus-node1
SE +/- 404.15, N = 3
55500
30000
60000
90000
120000
150000
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lnuma -libverbs -lrt -laio -lz


Flexible IO Tester v3.18
Type: Sequential Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory
MB/s, More Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
SE +/- 1.00, N = 3
6599
kernelgeneric-optimized-12cpus-node1
SE +/- 80.67, N = 3
6519
kernel-ll-optimized-12cpus-node1
SE +/- 18.33, N = 3
6564
1400
2800
4200
5600
7000
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lnuma -libverbs -lrt -laio -lz


Flexible IO Tester v3.18
Type: Sequential Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory
IOPS, More Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
3296
kernelgeneric-optimized-12cpus-node1
SE +/- 40.33, N = 3
3256
kernel-ll-optimized-12cpus-node1
SE +/- 9.33, N = 3
3278
700
1400
2100
2800
3500
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lnuma -libverbs -lrt -laio -lz

Flexible IO Tester v3.18

Type: Sequential Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory

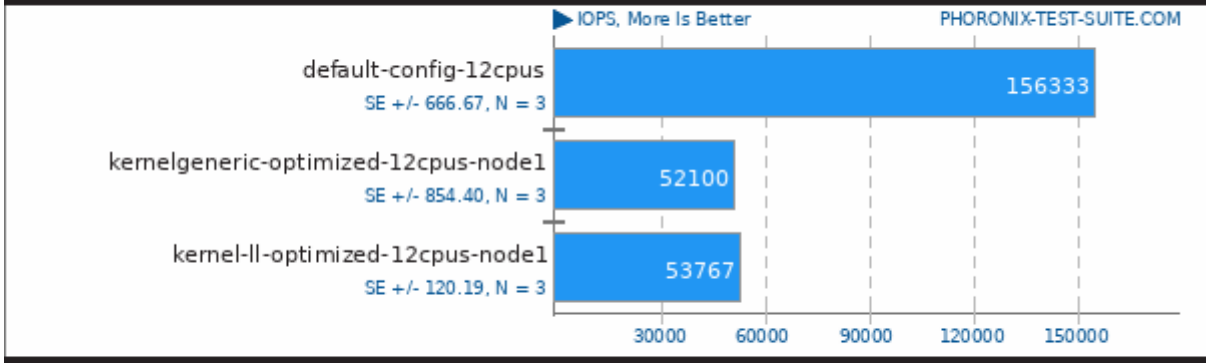


Phoronix Test Suite 9.2.1

1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lnuma -libverbs -lrt -laio -lz

Flexible IO Tester v3.18

Type: Sequential Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory

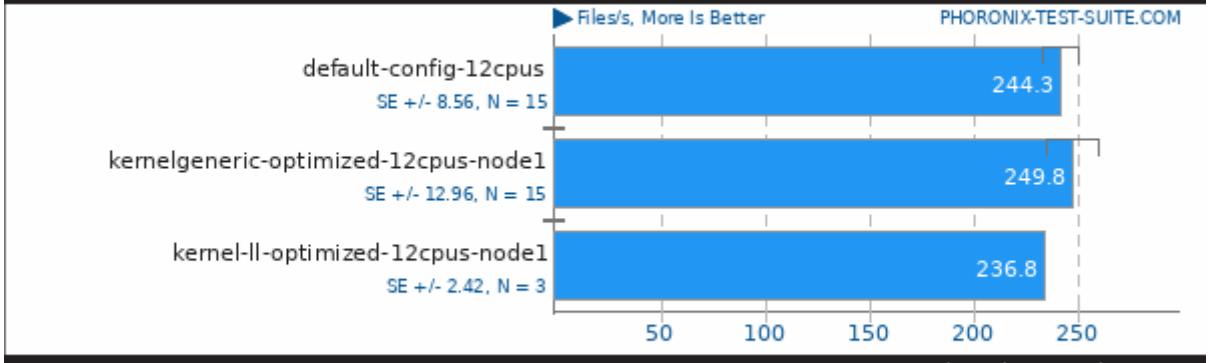


Phoronix Test Suite 9.2.1

1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lnuma -libverbs -lrt -laio -lz

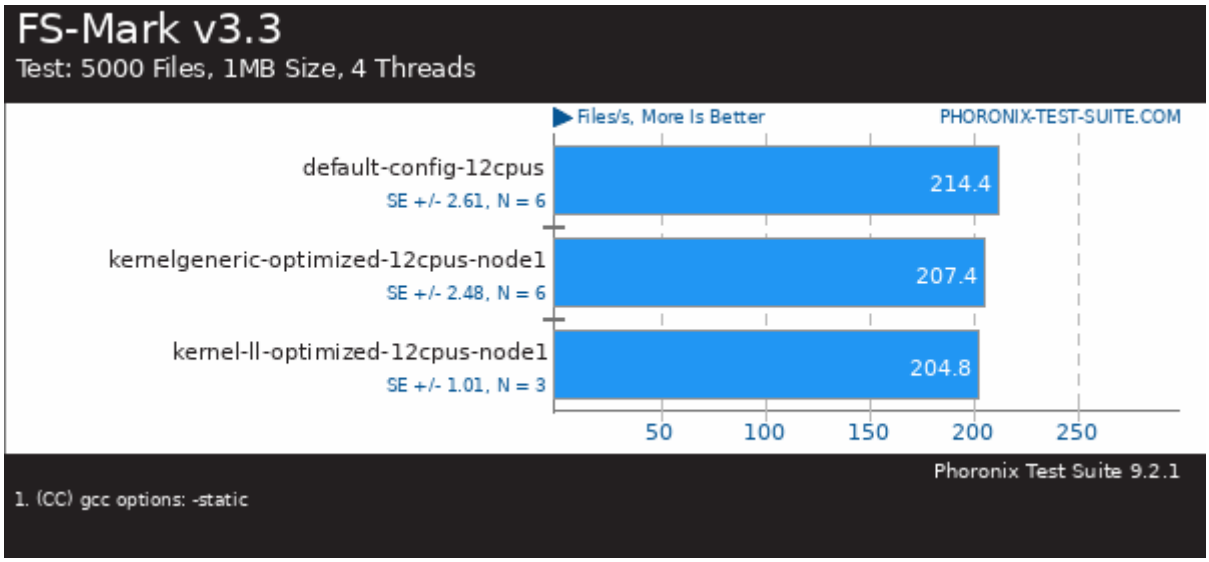
FS-Mark v3.3

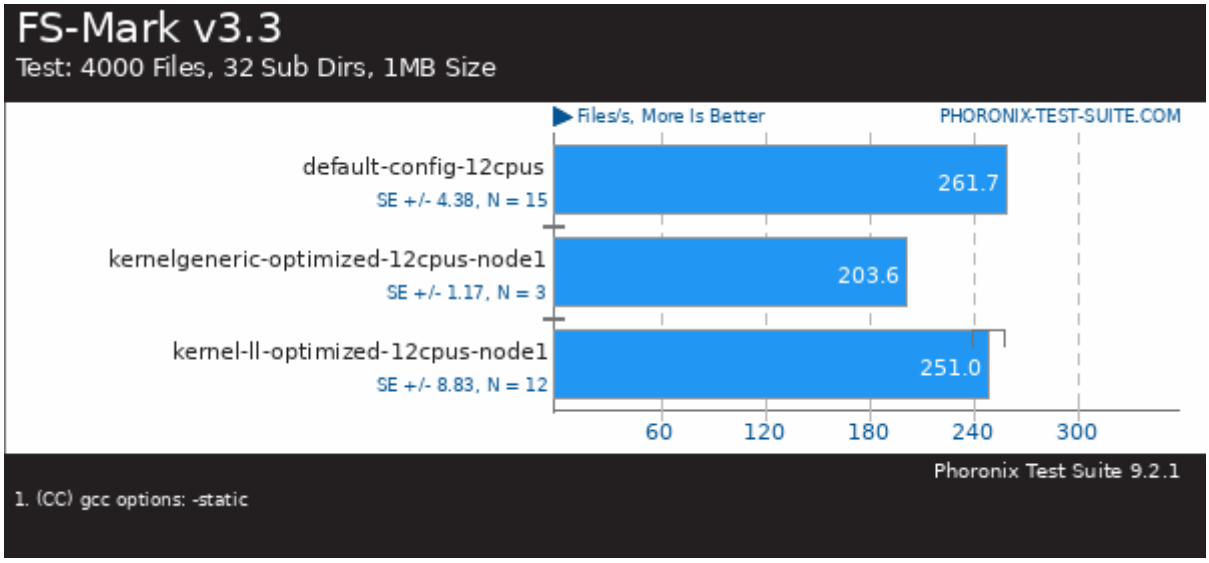
Test: 1000 Files, 1MB Size

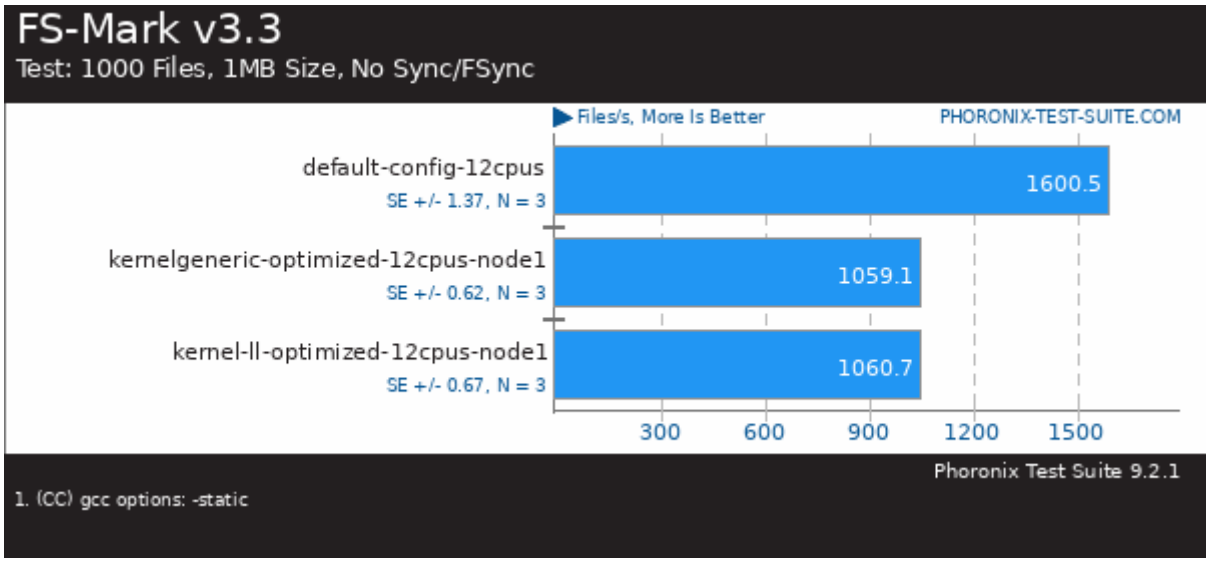


Phoronix Test Suite 9.2.1

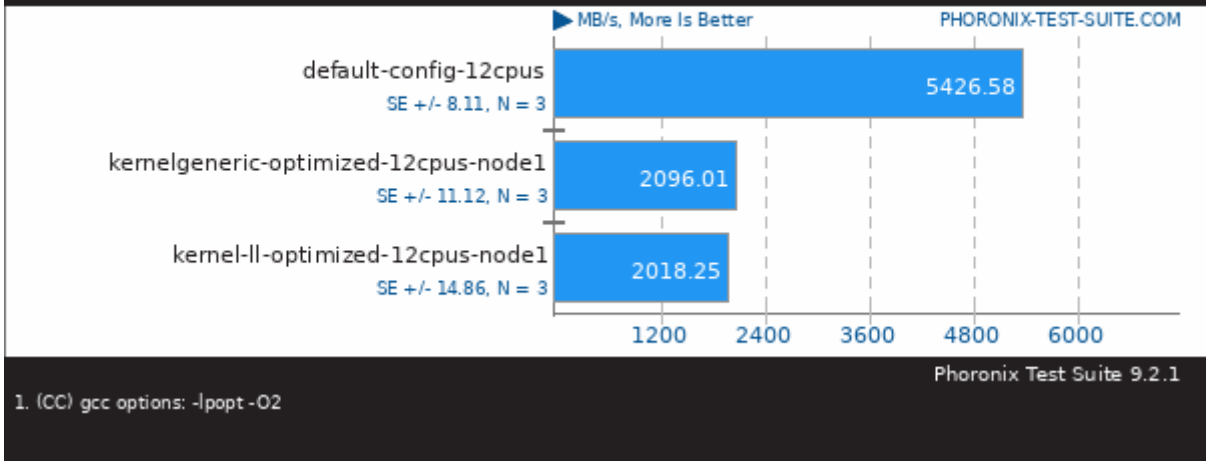
1. (CC) gcc options: -static


FS-Mark v3.3
Test: 5000 Files, 1MB Size, 4 Threads
Files/s, More Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
SE +/- 2.61, N = 6
214.4
kernelgeneric-optimized-12cpus-node1
SE +/- 2.48, N = 6
207.4
kernel-ll-optimized-12cpus-node1
SE +/- 1.01, N = 3
204.8
50
100
150
200
250
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -static


FS-Mark v3.3
Test: 4000 Files, 32 Sub Dirs, 1MB Size
Files/s, More Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
SE +/- 4.38, N = 15
261.7
kernelgeneric-optimized-12cpus-node1
SE +/- 1.17, N = 3
203.6
kernel-ll-optimized-12cpus-node1
SE +/- 8.83, N = 12
251.0
60
120
180
240
300
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -static

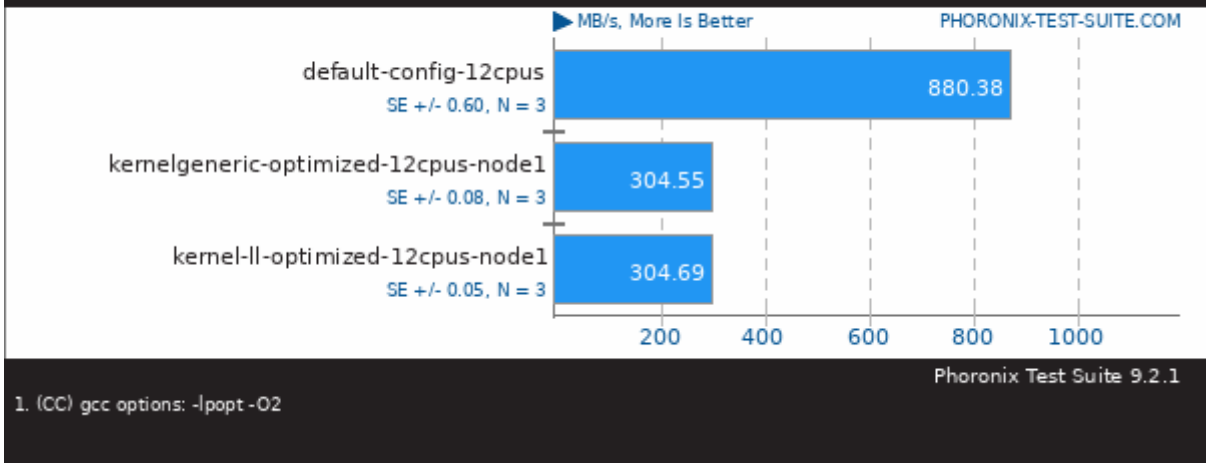

FS-Mark v3.3
Test: 1000 Files, 1MB Size, No Sync/FSync
Files/s, More Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
SE +/- 1.37, N = 3
1600.5
kernelgeneric-optimized-12cpus-node1
SE +/- 0.62, N = 3
1059.1
kernel-ll-optimized-12cpus-node1
SE +/- 0.67, N = 3
1060.7
300
600
900
1200
1500
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -static

Dbench v4.0
12 Clients



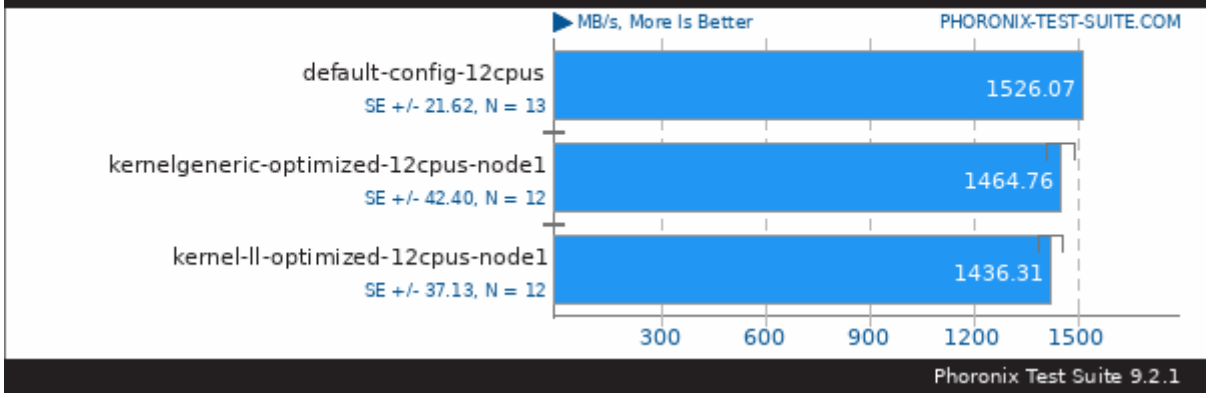
1. (CC) gcc options: -lpopt -O2

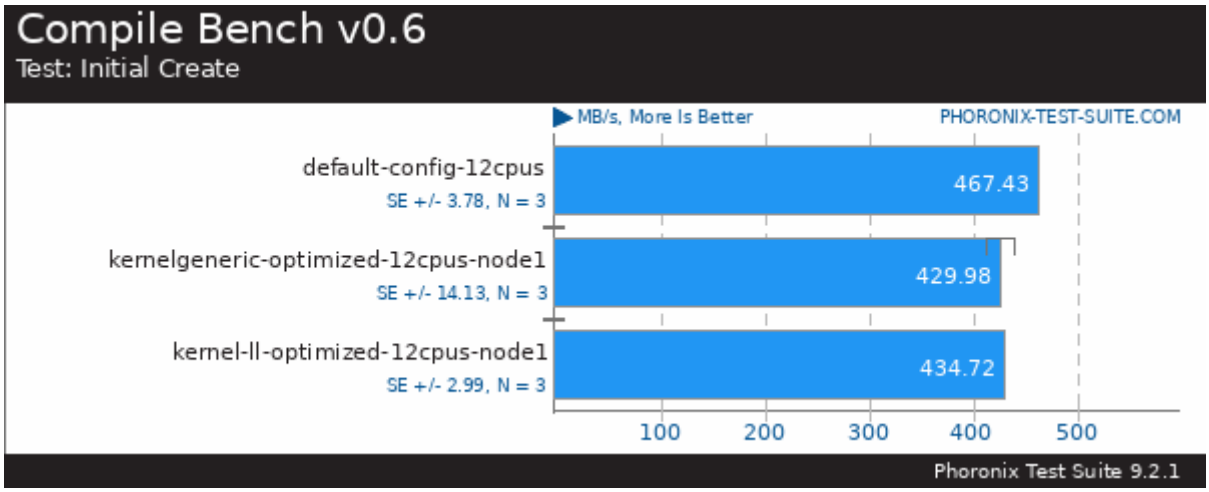
Dbench v4.0
1 Clients

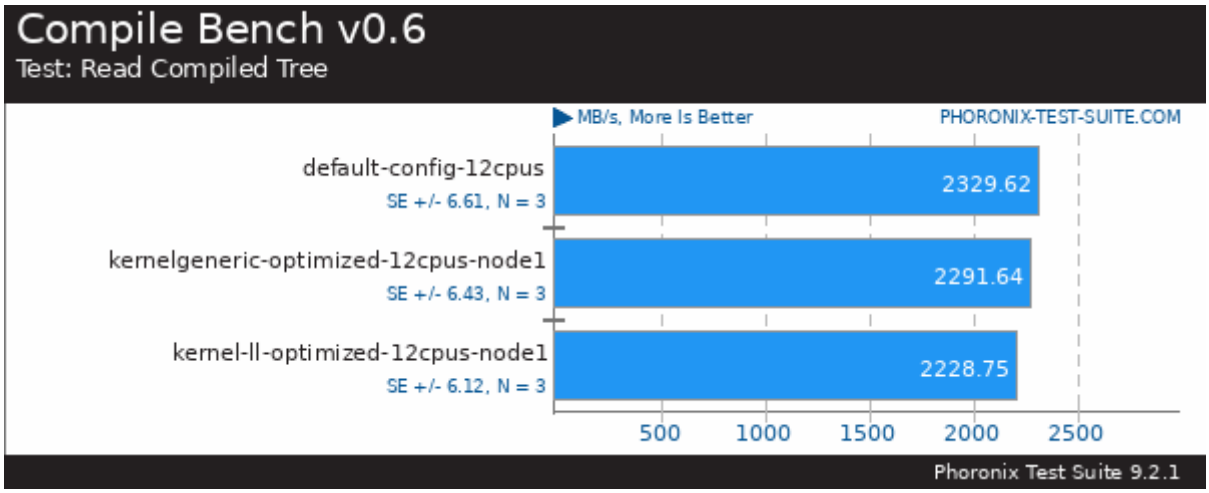


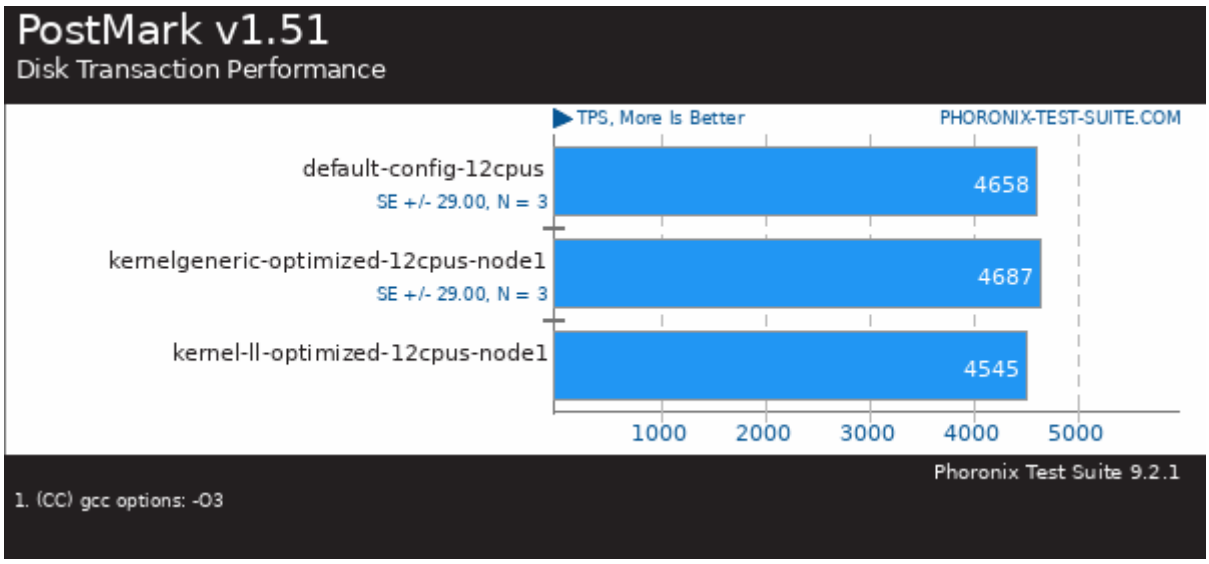
1. (CC) gcc options: -lpopt -O2

Compile Bench v0.6
Test: Compile



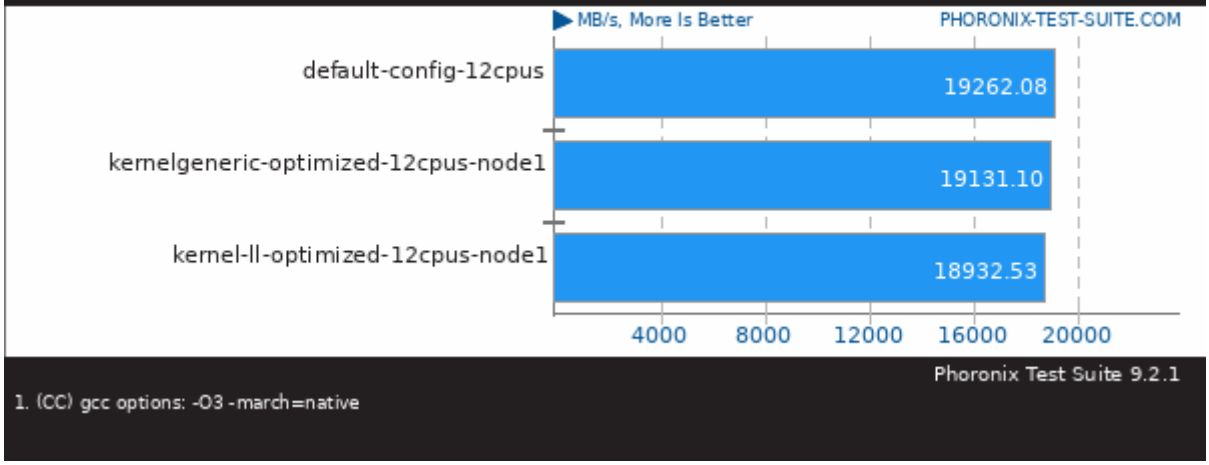

Compile Bench v0.6
Test: Initial Create
MB/s, More Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
SE +/- 3.78, N = 3
467.43
kernelgeneric-optimized-12cpus-node1
SE +/- 14.13, N = 3
429.98
kernel-ll-optimized-12cpus-node1
SE +/- 2.99, N = 3
434.72
100
200
300
400
500
Phoronix Test Suite 9.2.1


Compile Bench v0.6
Test: Read Compiled Tree
MB/s, More Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
SE +/- 6.61, N = 3
2329.62
kernelgeneric-optimized-12cpus-node1
SE +/- 6.43, N = 3
2291.64
kernel-ll-optimized-12cpus-node1
SE +/- 6.12, N = 3
2228.75
500
1000
1500
2000
2500
Phoronix Test Suite 9.2.1


PostMark v1.51
Disk Transaction Performance
TPS, More Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
SE +/- 29.00, N = 3
4658
kernelgeneric-optimized-12cpus-node1
SE +/- 29.00, N = 3
4687
kernel-ll-optimized-12cpus-node1
4545
1000
2000
3000
4000
5000
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -O3

RAMspeed SMP v3.5.0

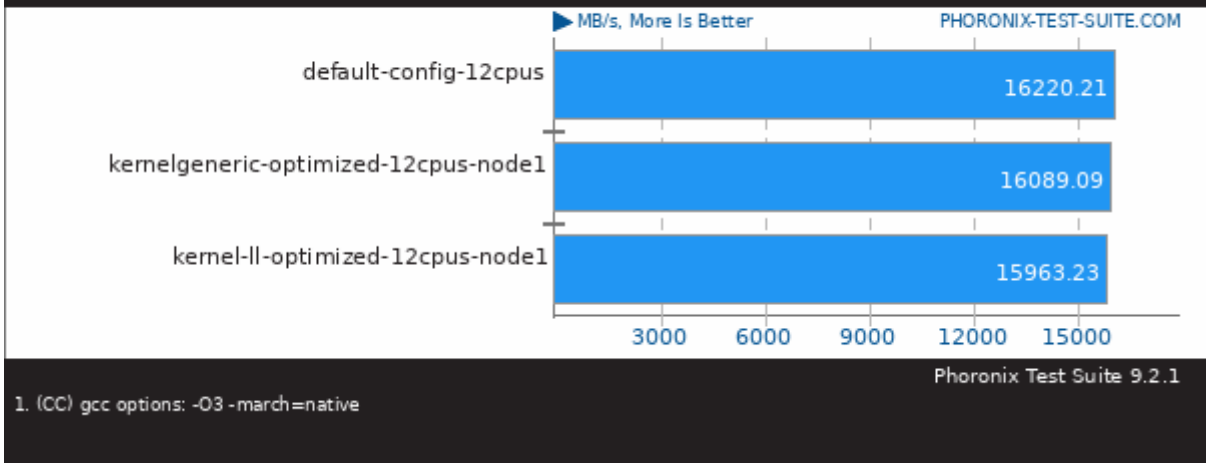
Type: Add - Benchmark: Integer



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

RAMspeed SMP v3.5.0

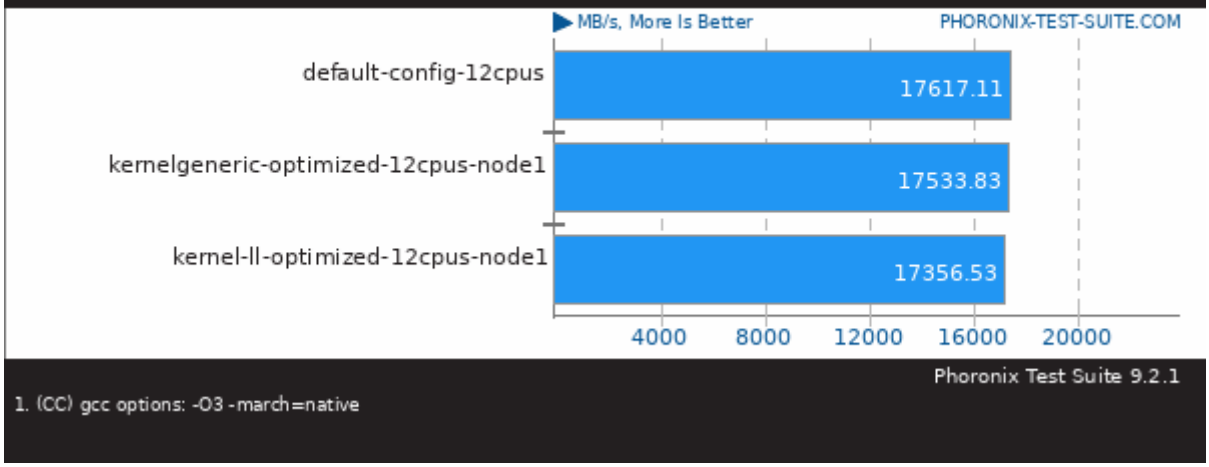
Type: Copy - Benchmark: Integer



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

RAMspeed SMP v3.5.0

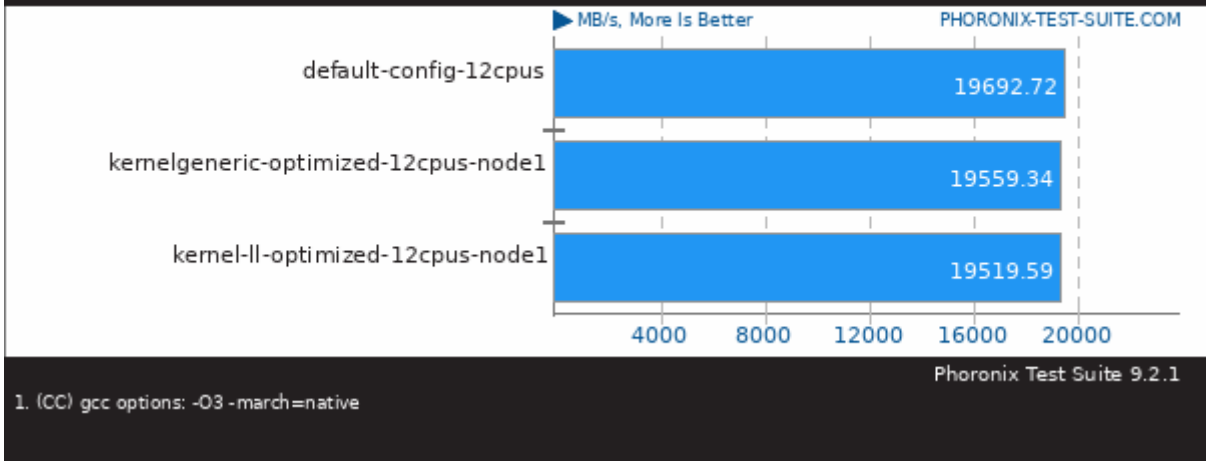
Type: Scale - Benchmark: Integer



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

RAMspeed SMP v3.5.0

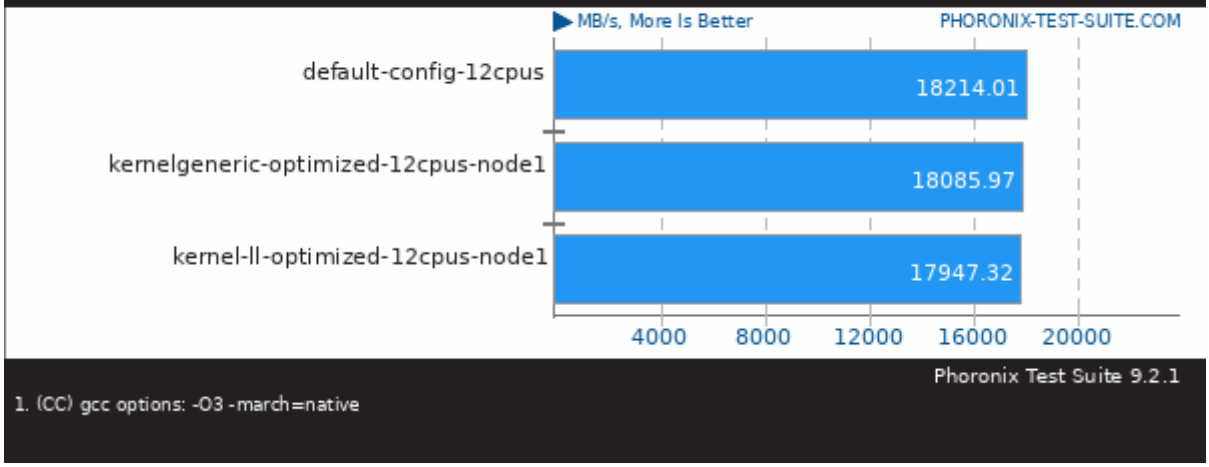
Type: Triad - Benchmark: Integer



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

RAMspeed SMP v3.5.0

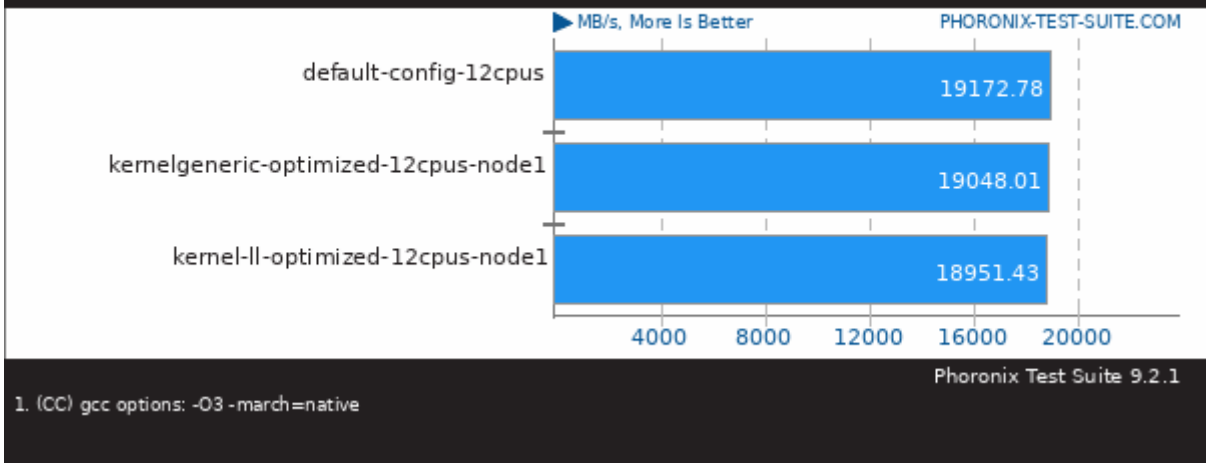
Type: Average - Benchmark: Integer



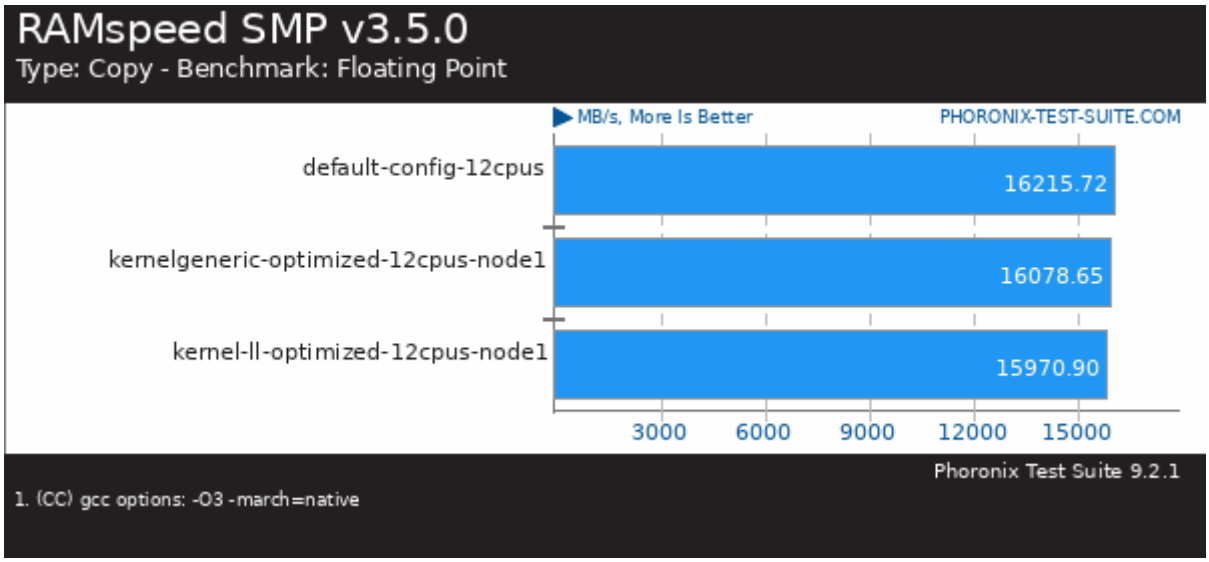
1. (CC) gcc options: -O3 -march=native

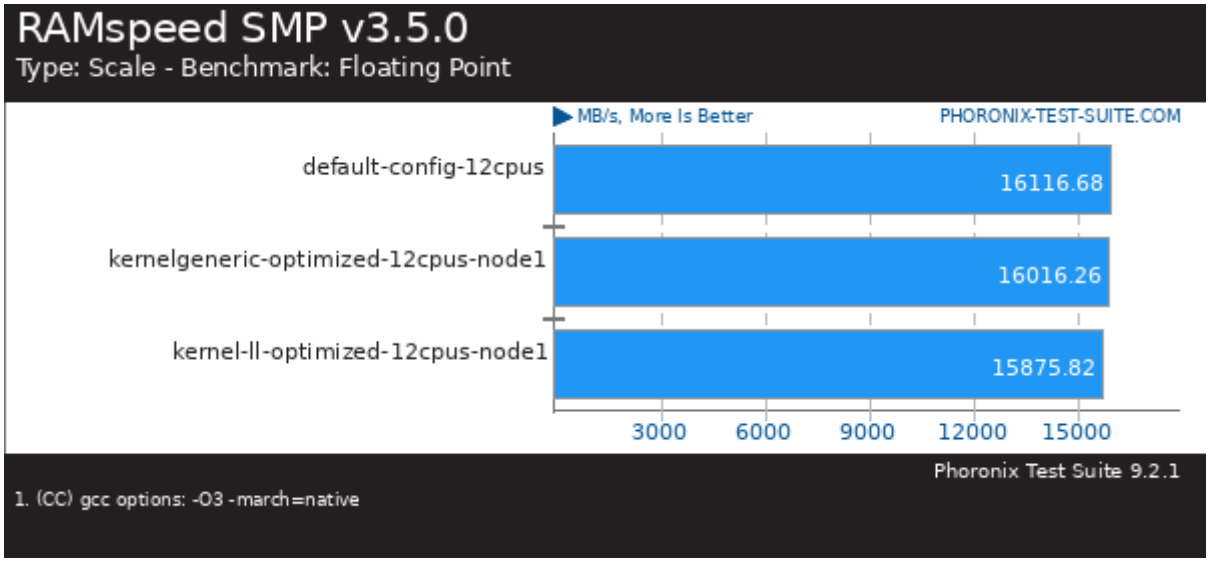
RAMspeed SMP v3.5.0

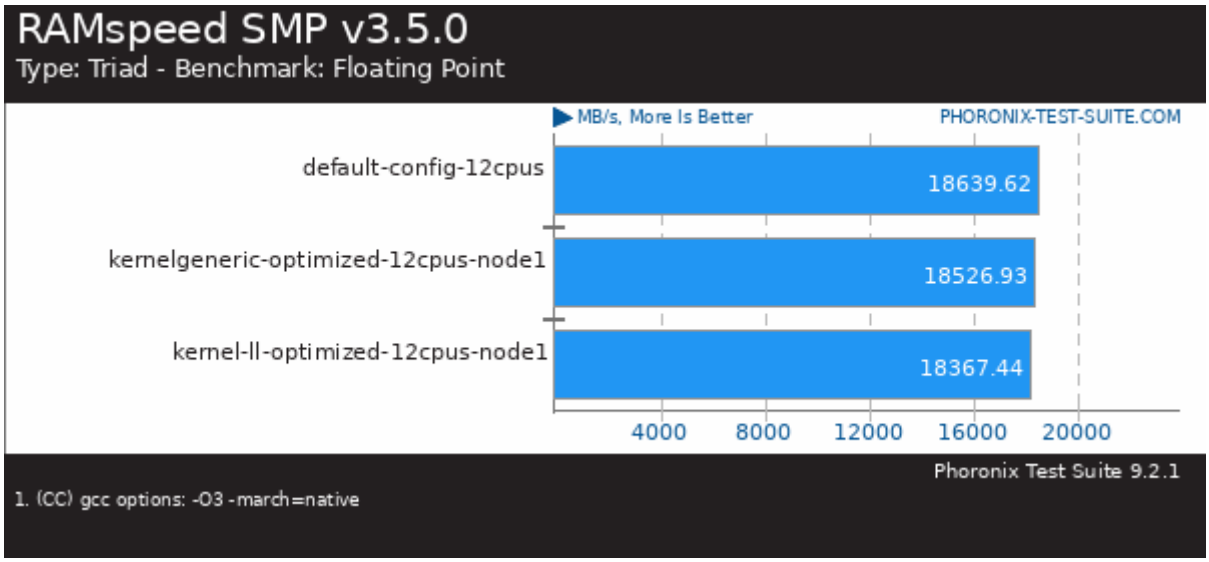
Type: Add - Benchmark: Floating Point



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

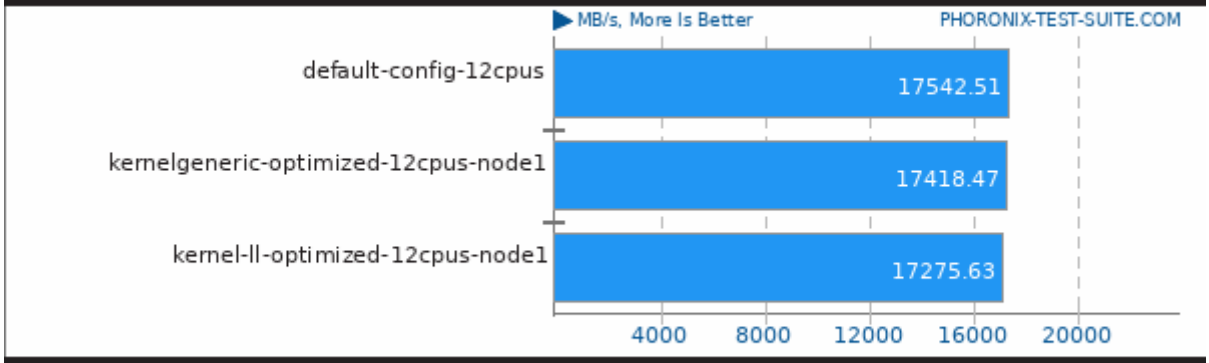

RAMspeed SMP v3.5.0
Type: Copy - Benchmark: Floating Point
MB/s, More Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
16215.72
kernelgeneric-optimized-12cpus-node1
16078.65
kernel-ll-optimized-12cpus-node1
15970.90
3000
6000
9000
12000
15000
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -O3 -march=native


RAMspeed SMP v3.5.0
Type: Scale - Benchmark: Floating Point
MB/s, More Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
16116.68
kernelgeneric-optimized-12cpus-node1
16016.26
kernel-ll-optimized-12cpus-node1
15875.82
3000
6000
9000
12000
15000
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -O3 -march=native


RAMspeed SMP v3.5.0
Type: Triad - Benchmark: Floating Point
MB/s, More Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
18639.62
kernelgeneric-optimized-12cpus-node1
18526.93
kernel-ll-optimized-12cpus-node1
18367.44
4000
8000
12000
16000
20000
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -O3 -march=native

RAMspeed SMP v3.5.0

Type: Average - Benchmark: Floating Point

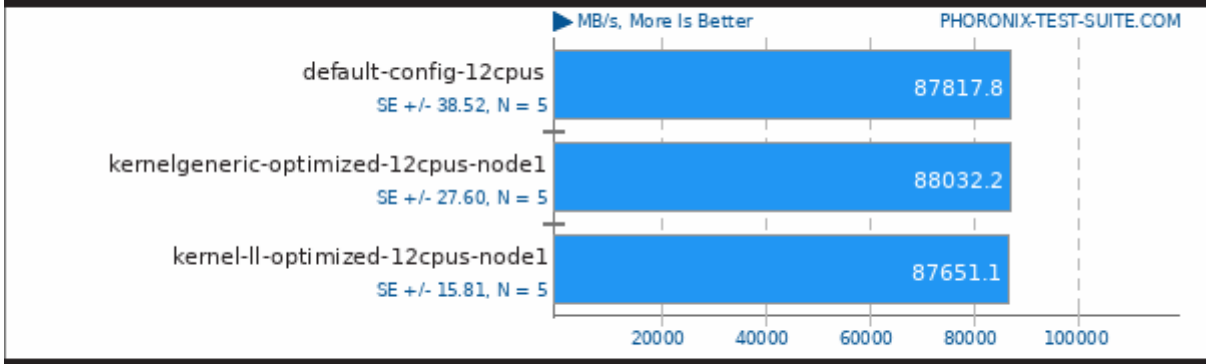


Phoronix Test Suite 9.2.1

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

Stream v2013-01-17

Type: Copy

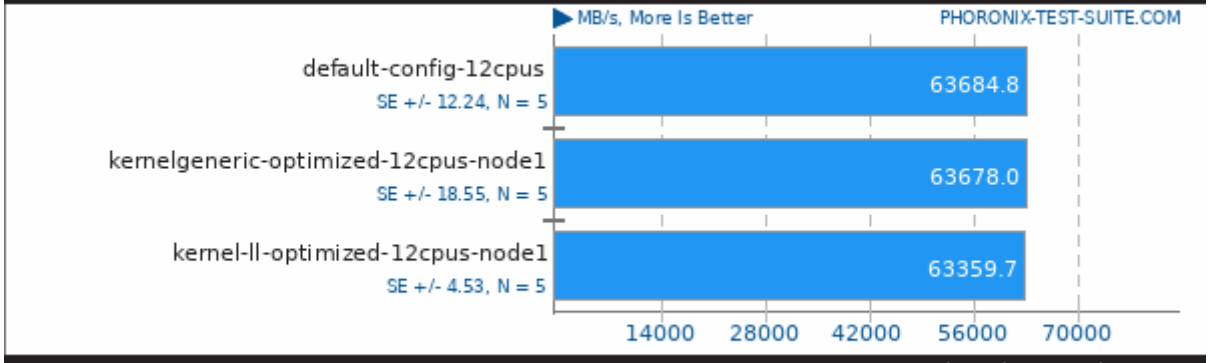


Phoronix Test Suite 9.2.1

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

Stream v2013-01-17

Type: Scale

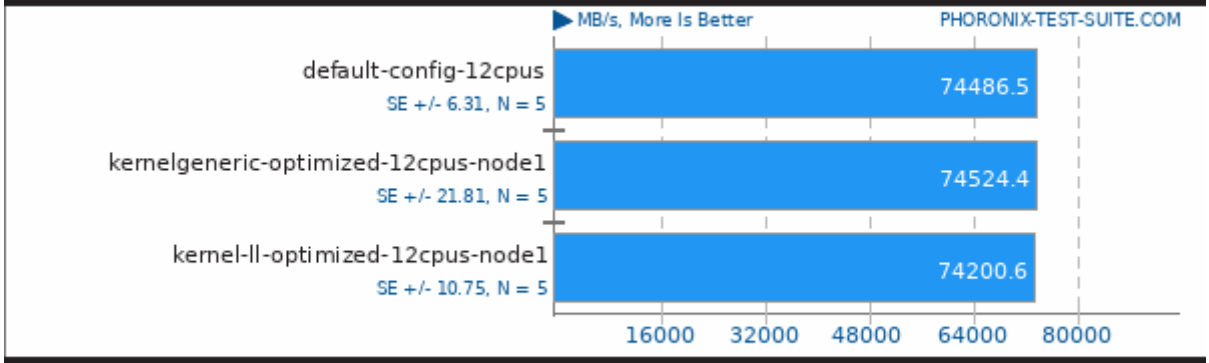


Phoronix Test Suite 9.2.1

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

Stream v2013-01-17

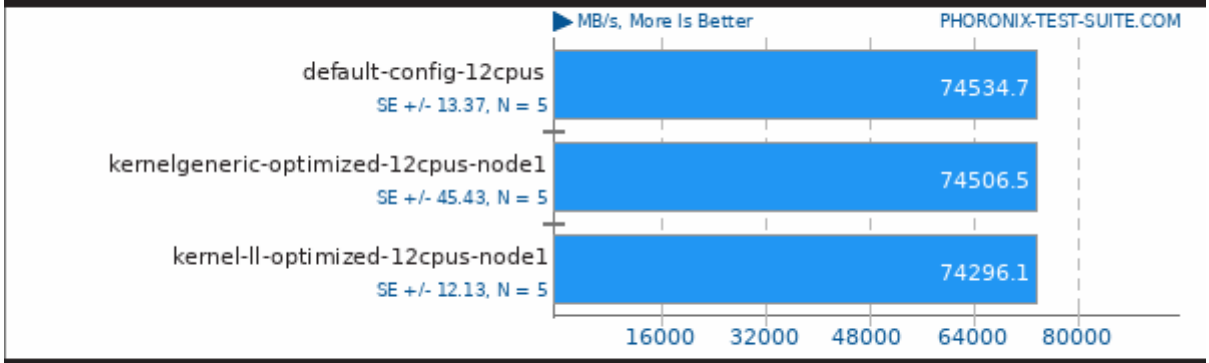
Type: Triad



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

Stream v2013-01-17

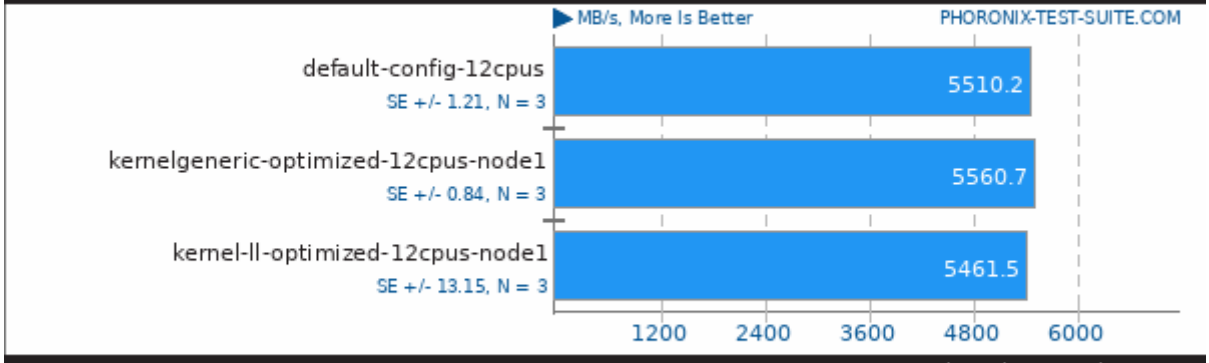
Type: Add



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

Tinymembench v2018-05-28

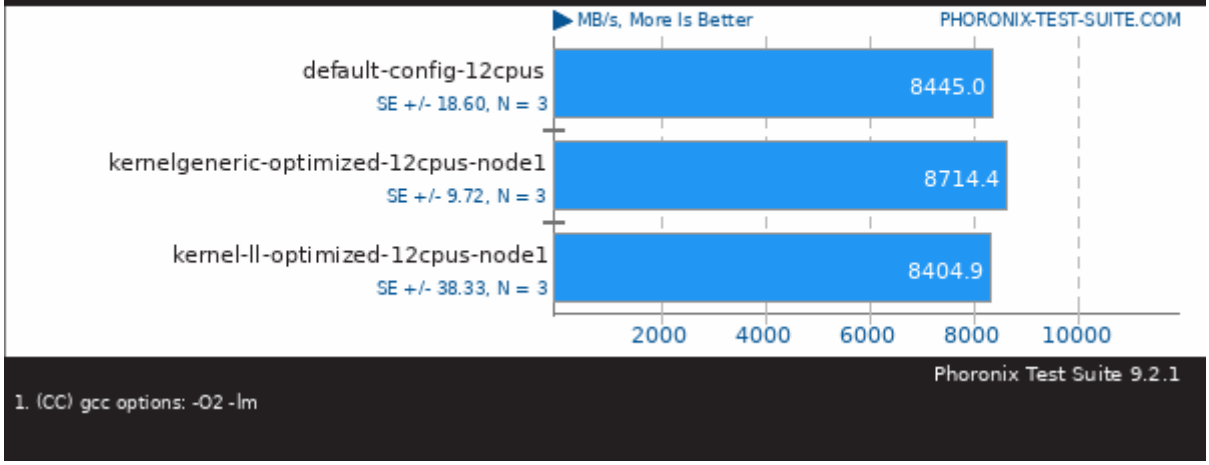
Standard Memcpy



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

Tinymembench v2018-05-28

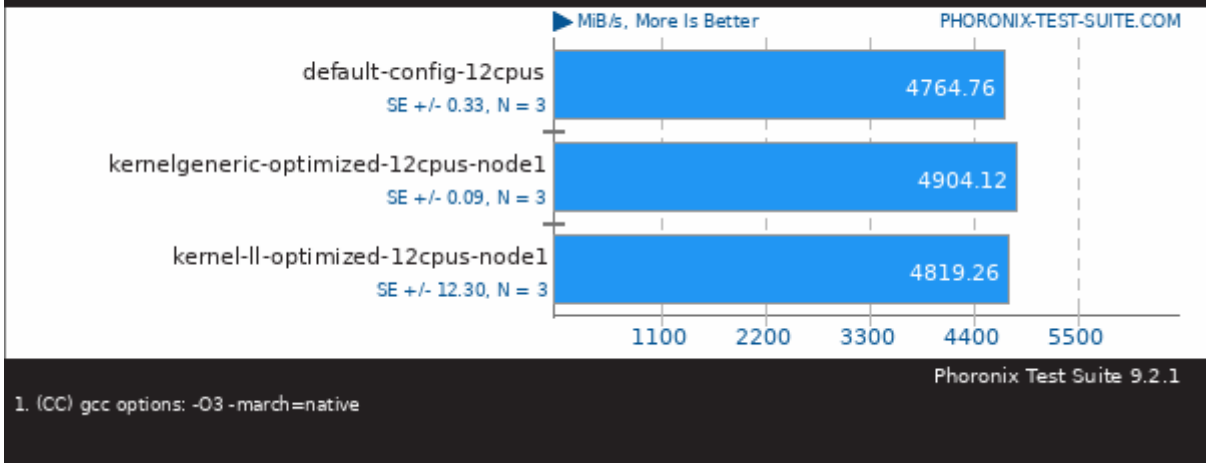
Standard Memset



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

MBW v2018-09-08

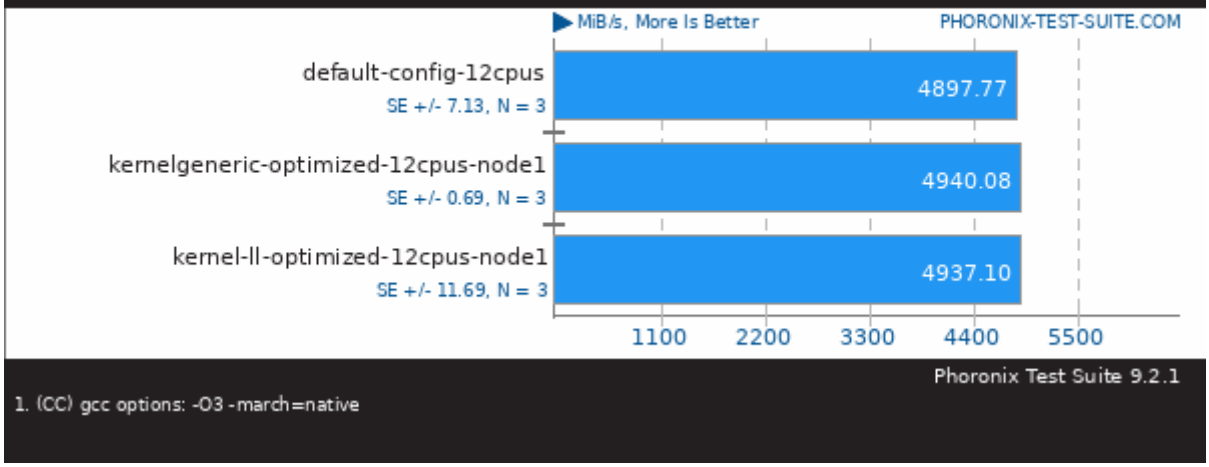
Test: Memory Copy - Array Size: 1024 MiB



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

MBW v2018-09-08

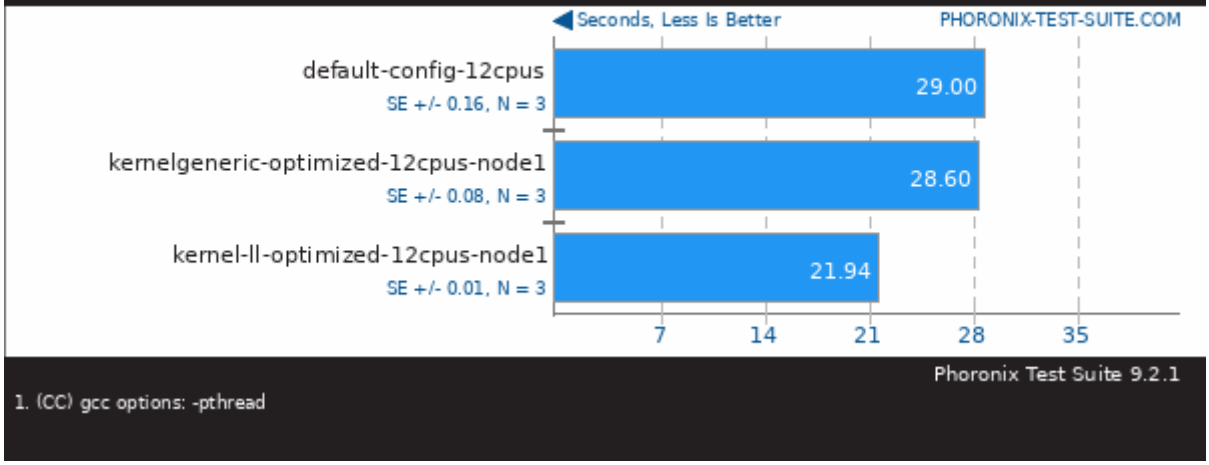
Test: Memory Copy, Fixed Block Size - Array Size: 1024 MiB



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

t-test1 v2017-01-13

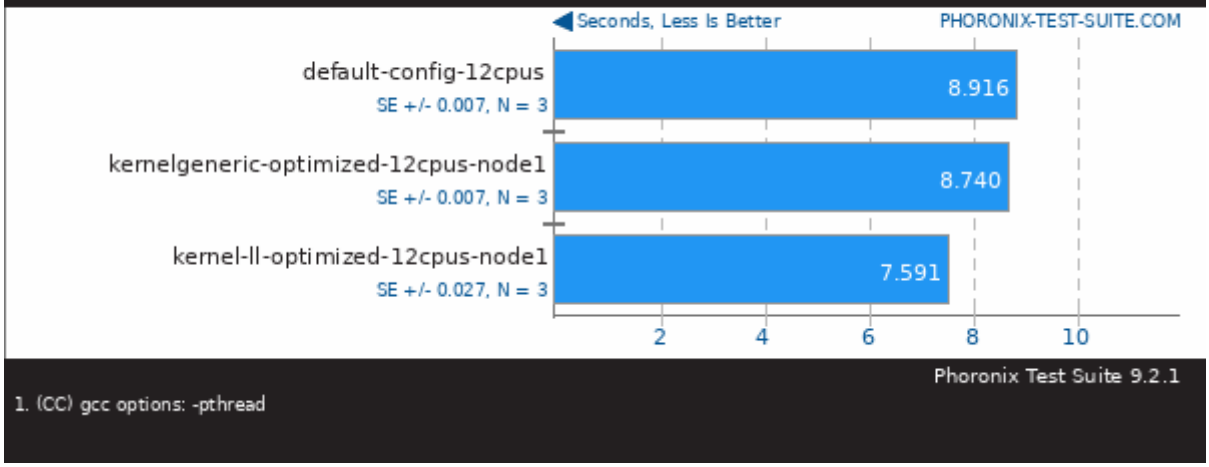
Threads: 1



1. (CC) gcc options: -pthread

t-test1 v2017-01-13

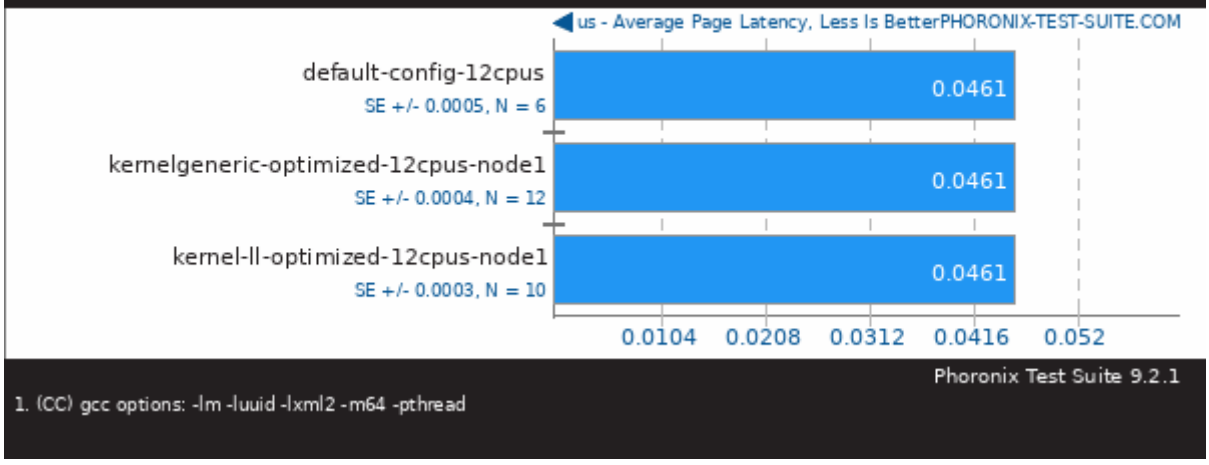
Threads: 2



1. (CC) gcc options: -pthread

pmbench

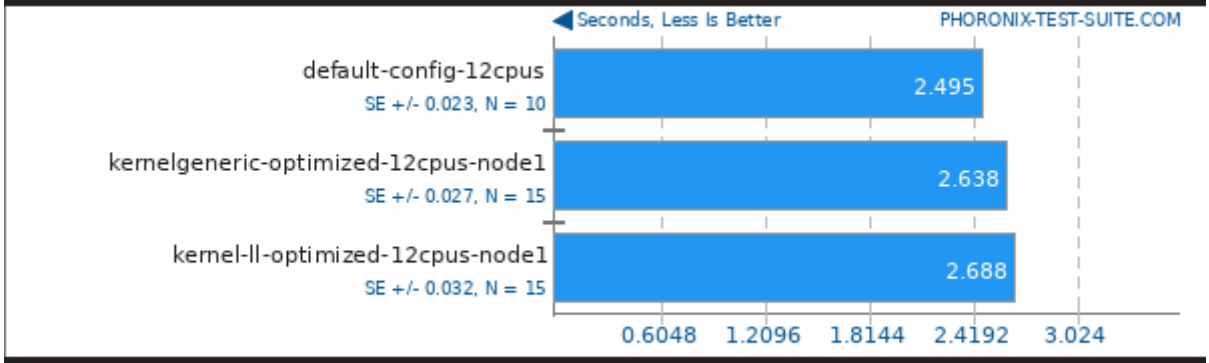
Concurrent Worker Threads: 1 - Read-Write Ratio: 100% Writes



1. (CC) gcc options: -lm -luuid -lxml2 -m64 -pthread

Timed MAFFT Alignment v7.392

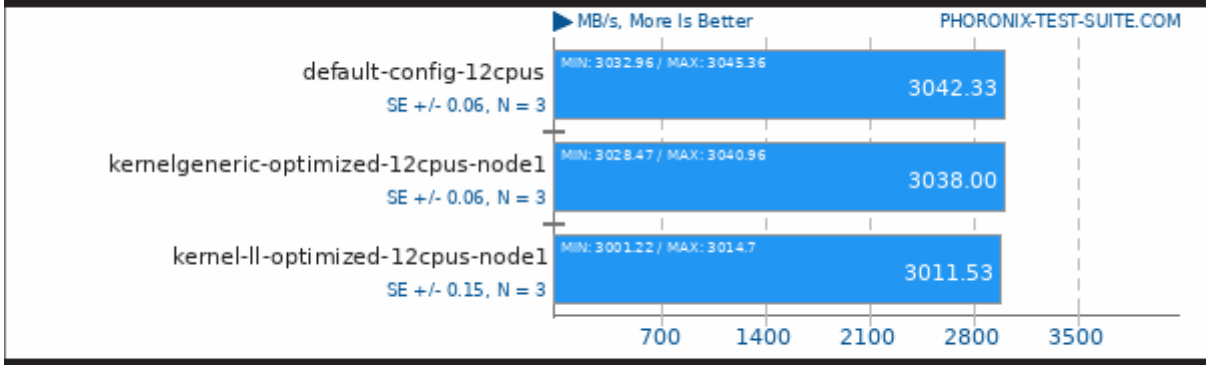
Multiple Sequence Alignment



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

CacheBench

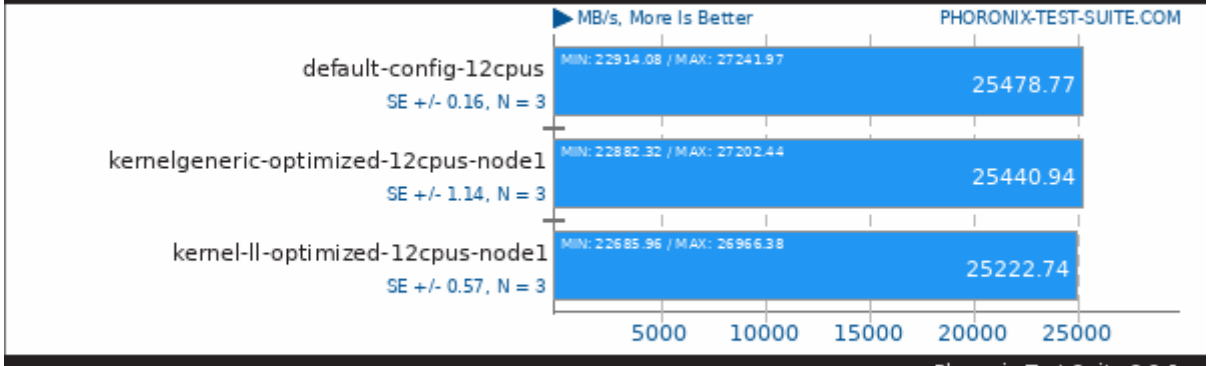
Read Cache



1. (CC) gcc options: -lrt

CacheBench

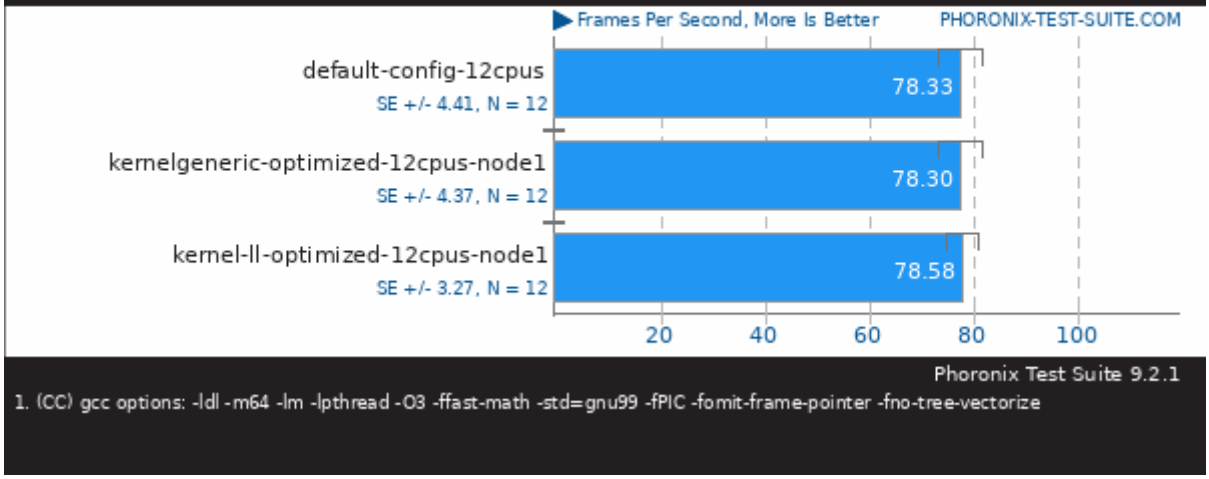
Write Cache



1. (CC) gcc options: -lrt

x264 v2019-12-17

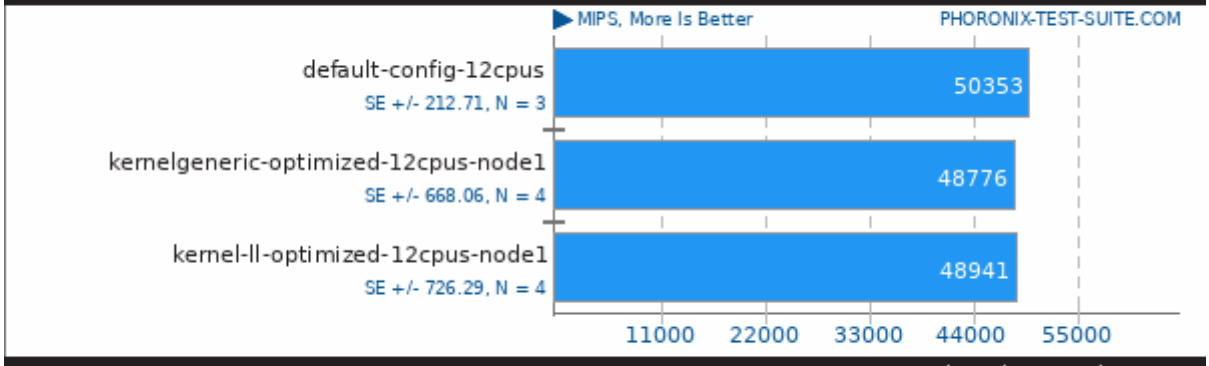
H.264 Video Encoding



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

7-Zip Compression v16.02

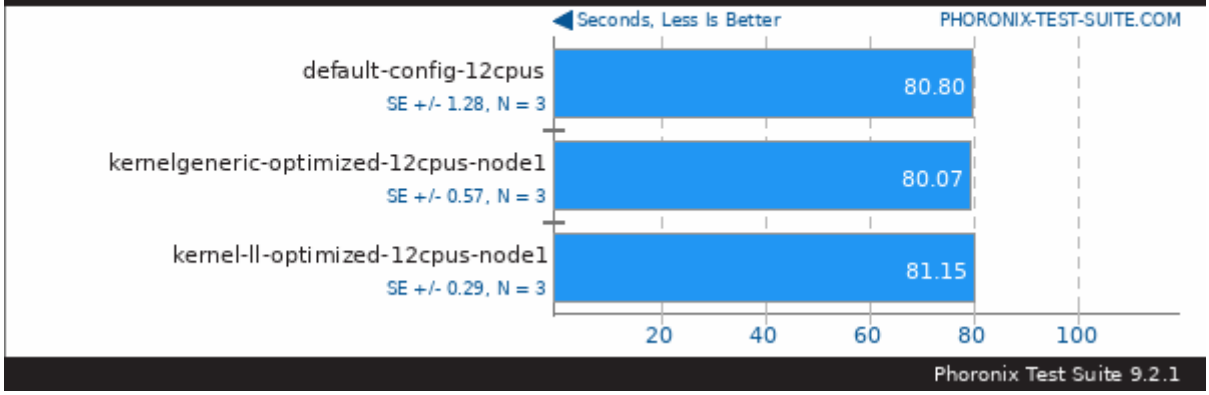
Compress Speed Test



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

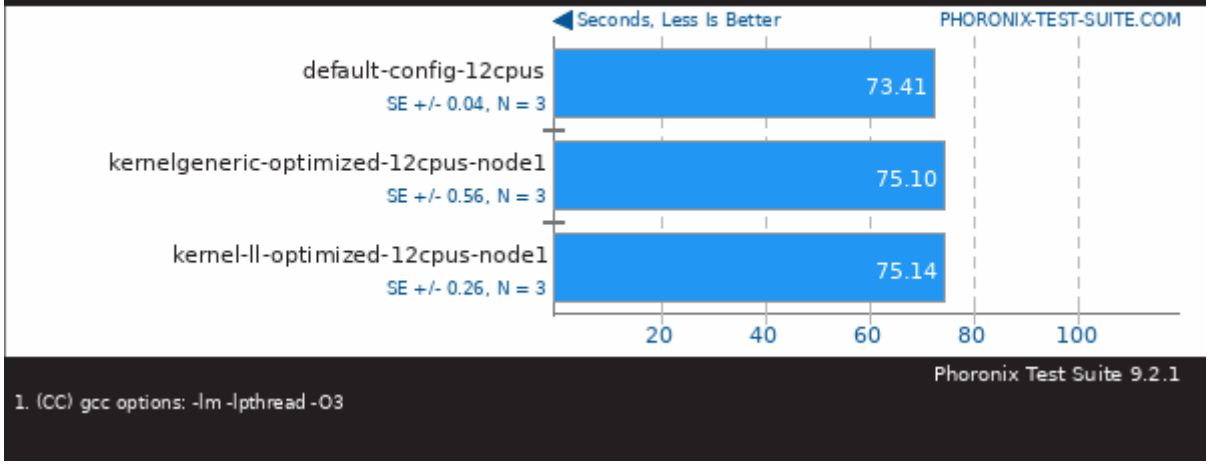
Timed Linux Kernel Compilation v5.4

Time To Compile



C-Ray v1.1

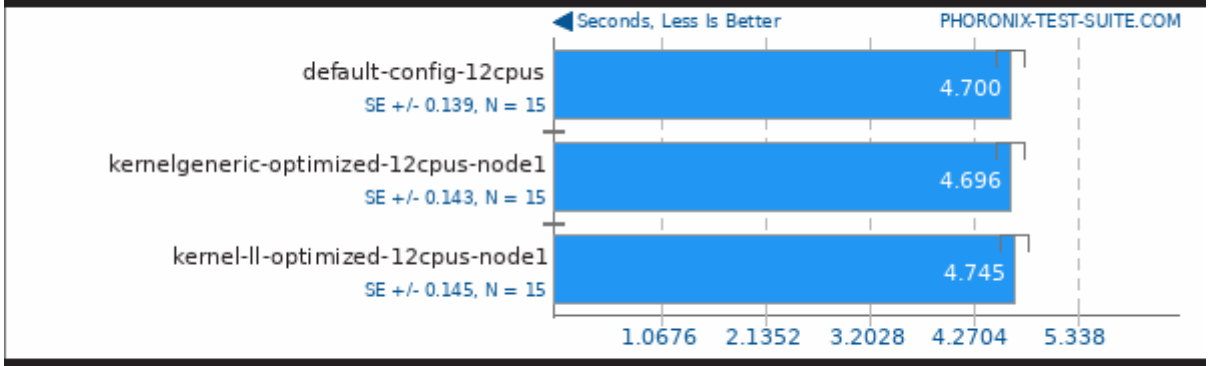
Total Time - 4K, 16 Rays Per Pixel



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

Parallel BZIP2 Compression v1.1.12

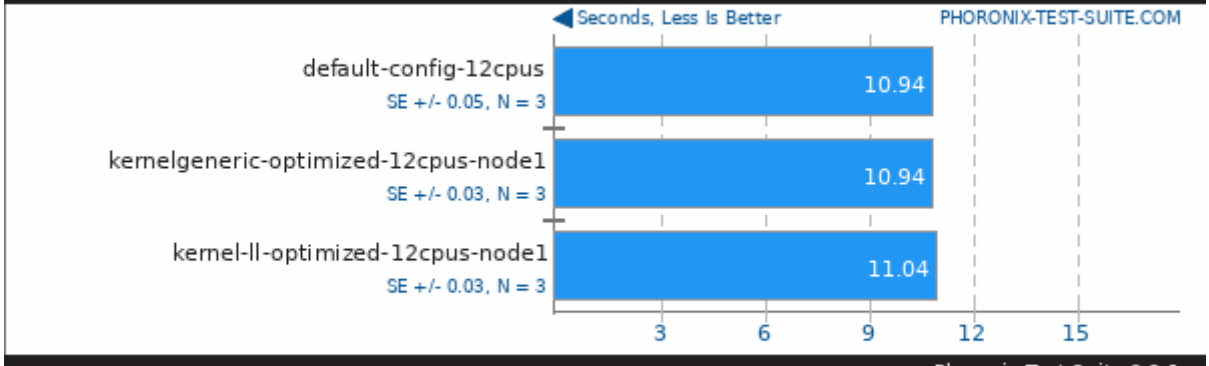
256MB File Compression



1. (CXX) g++ options: -O2 -pthread -lbz2 -lpthread

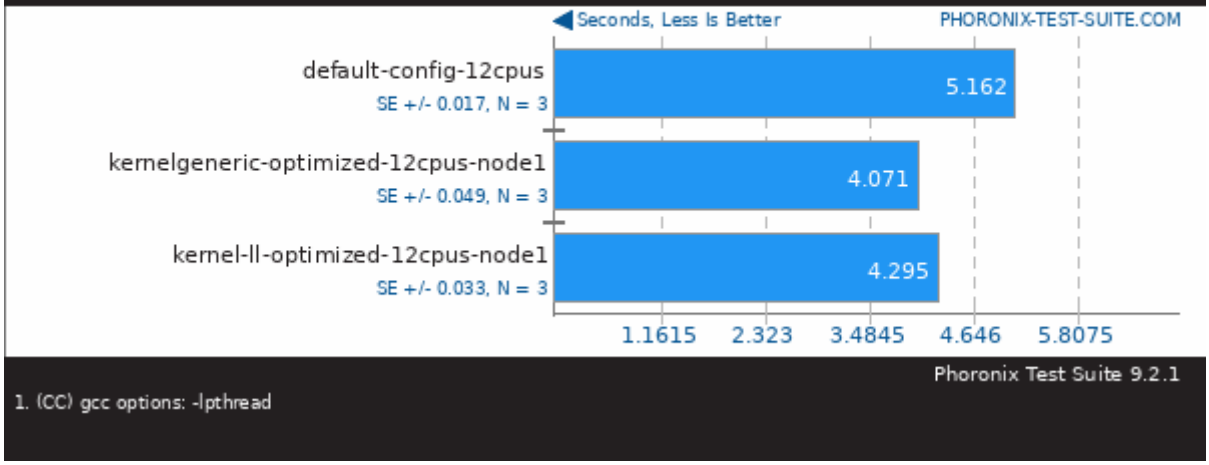
LAME MP3 Encoding v3.100

WAV To MP3



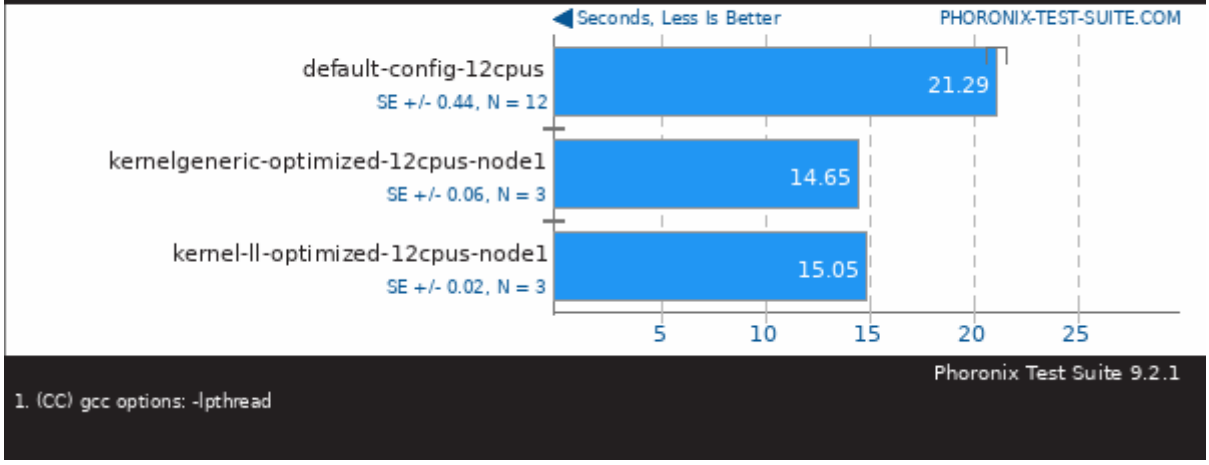
1. (CC) gcc options: -O3 -ffast-math -funroll-loops -fschedule-insns2 -fbranch-count-reg -fforce-addr -pipe -lncurses -lm

Hackbench
Count: 1 - Type: Thread



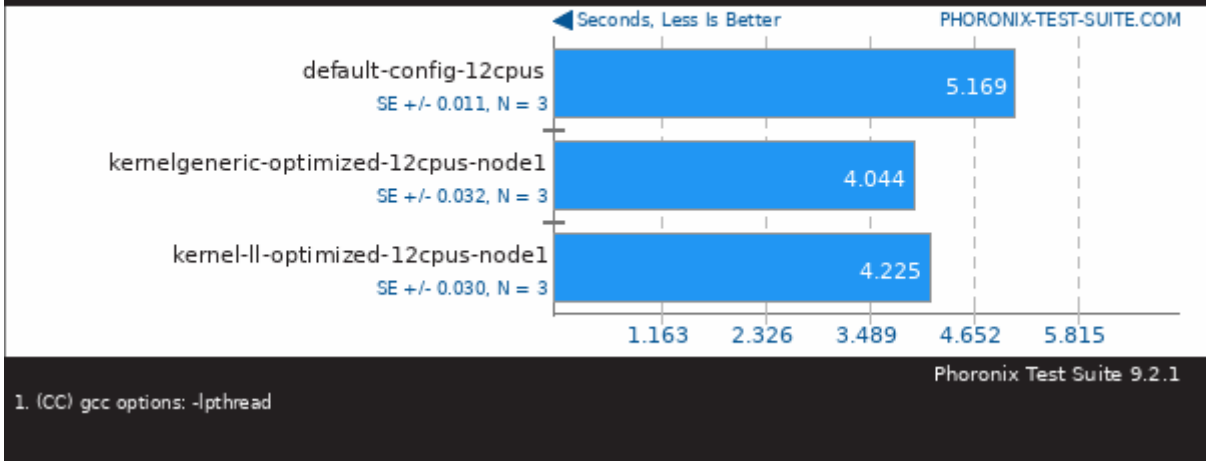
1. (CC) gcc options: -lpthread

Hackbench
Count: 4 - Type: Thread

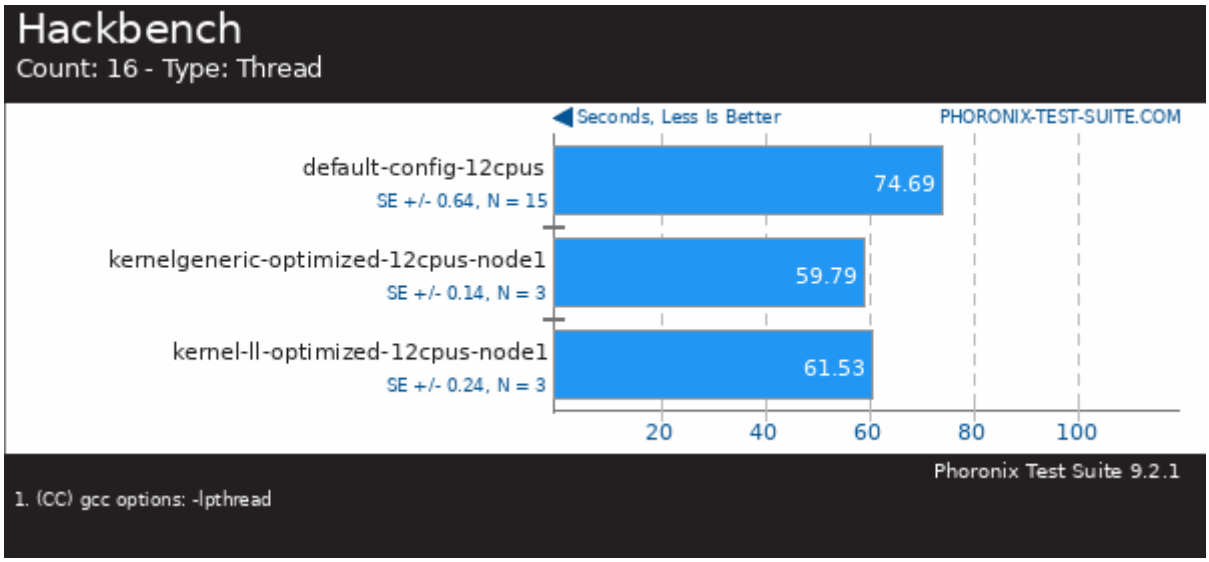


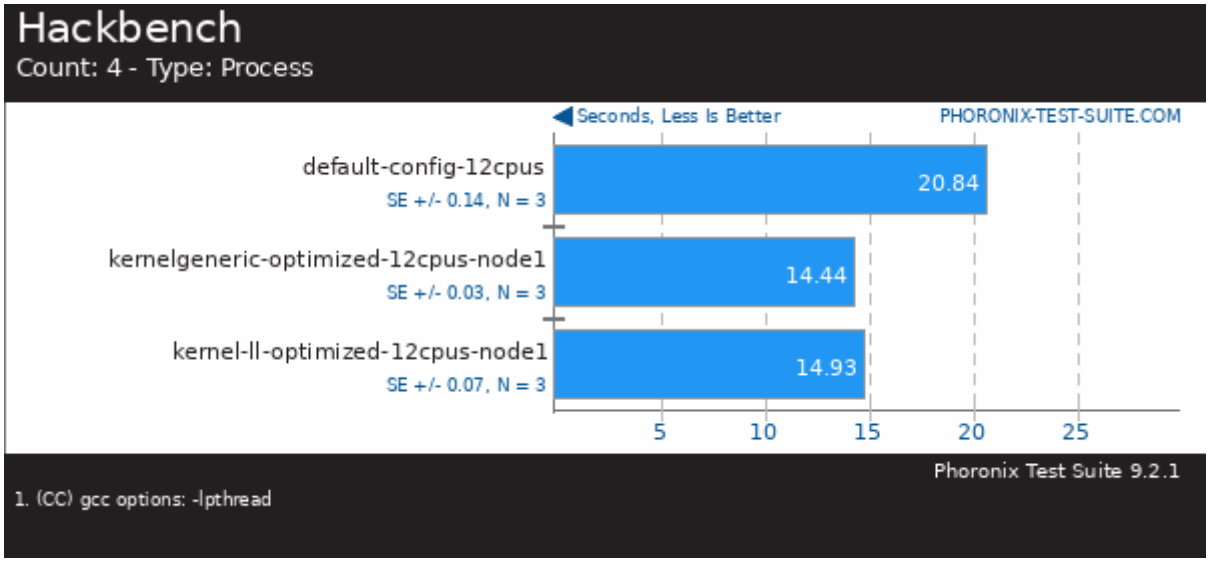
1. (CC) gcc options: -lpthread

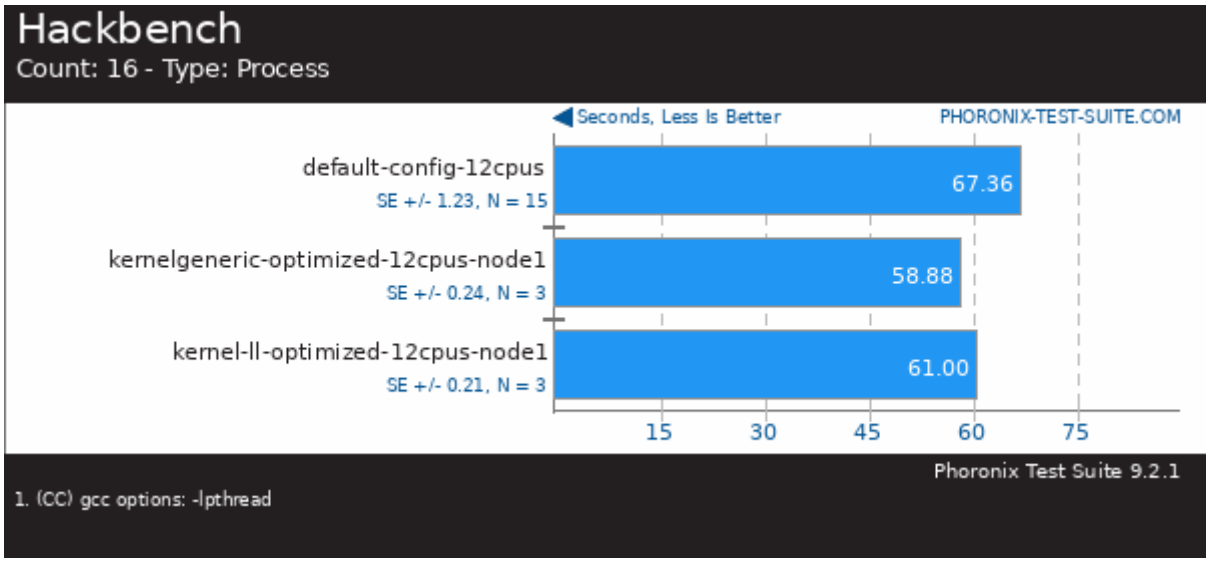
Hackbench
Count: 1 - Type: Process



1. (CC) gcc options: -lpthread

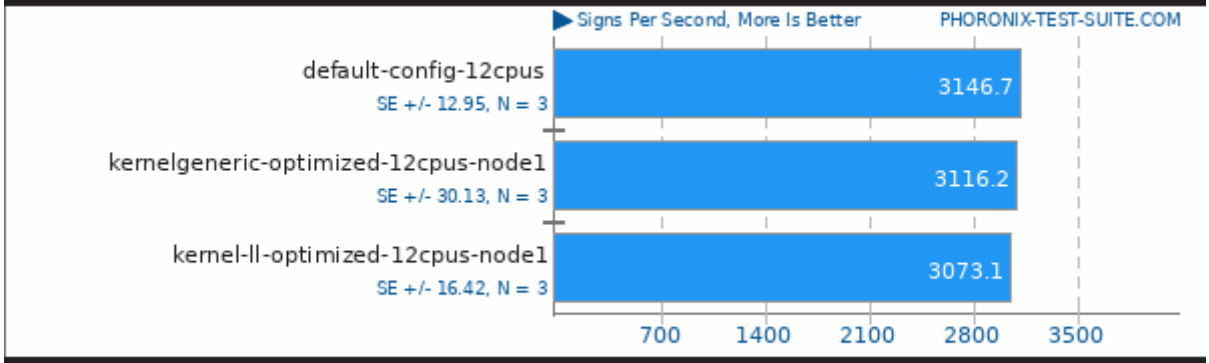

Hackbench
Count: 16 - Type: Thread
Seconds, Less Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
SE +/- 0.64, N = 15
74.69
kernelgeneric-optimized-12cpus-node1
SE +/- 0.14, N = 3
59.79
kernel-ll-optimized-12cpus-node1
SE +/- 0.24, N = 3
61.53
20
40
60
80
100
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -lpthread


Hackbench
Count: 4 - Type: Process
Seconds, Less Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
SE +/- 0.14, N = 3
20.84
kernelgeneric-optimized-12cpus-node1
SE +/- 0.03, N = 3
14.44
kernel-ll-optimized-12cpus-node1
SE +/- 0.07, N = 3
14.93
5
10
15
20
25
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -lpthread


Hackbench
Count: 16 - Type: Process
Seconds, Less Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
SE +/- 1.23, N = 15
67.36
kernelgeneric-optimized-12cpus-node1
SE +/- 0.24, N = 3
58.88
kernel-ll-optimized-12cpus-node1
SE +/- 0.21, N = 3
61.00
15
30
45
60
75
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -lpthread

OpenSSL v1.1.1

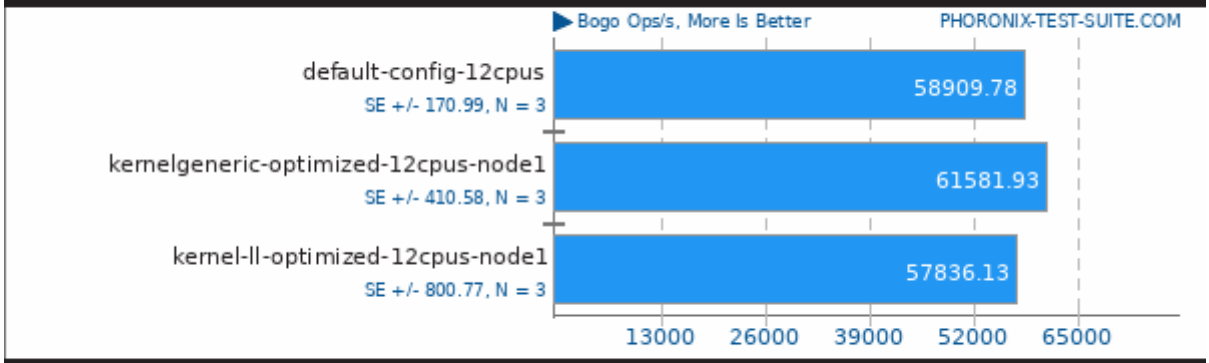
RSA 4096-bit Performance



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

Stress-NG v0.07.26

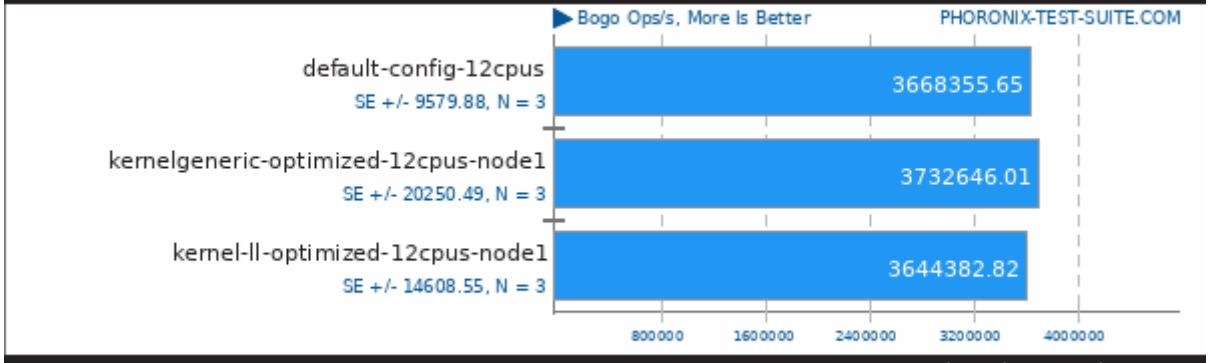
Test: Forking



1. (CC) gcc options: -O2 -std=gnu99 -lm -lz -lcrypt -lrt -lpthread -laio -lc

Stress-NG v0.07.26

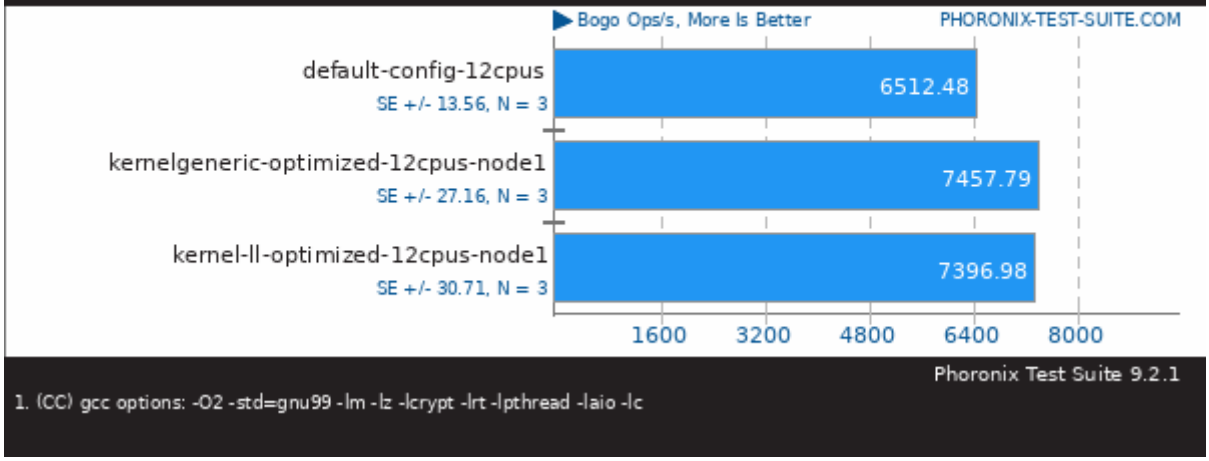
Test: Semaphores



1. (CC) gcc options: -O2 -std=gnu99 -lm -lz -lcrypt -lrt -lpthread -laio -lc

Stress-NG v0.07.26

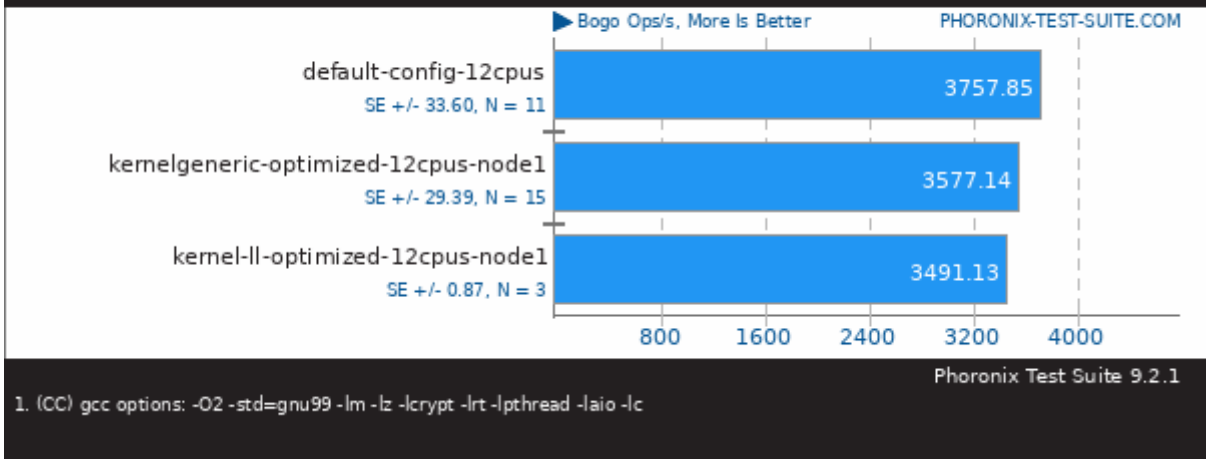
Test: Memory Copying



1. (CC) gcc options: -O2 -std=gnu99 -lm -lz -lcrypt -lrt -lpthread -laio -lc

Stress-NG v0.07.26

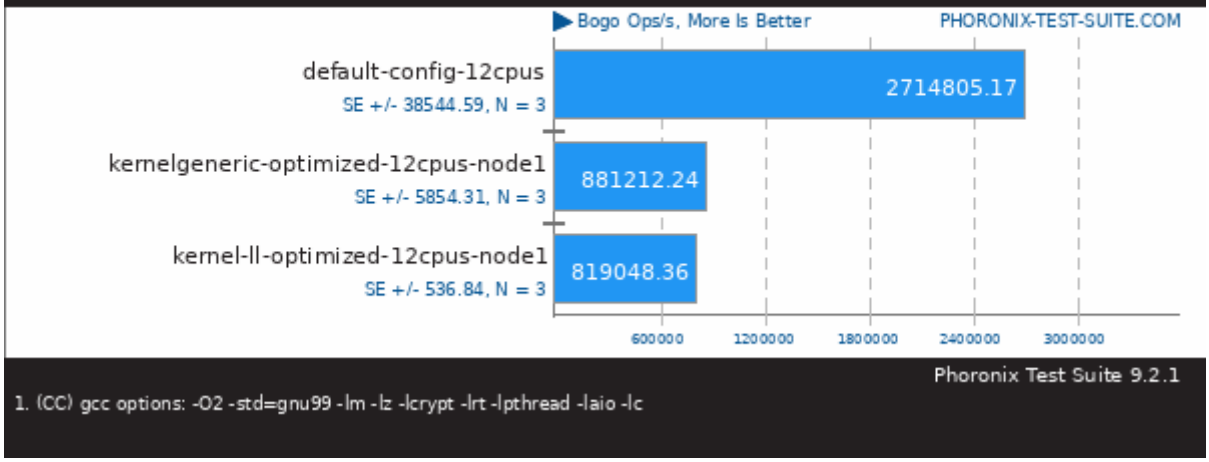
Test: Socket Activity



1. (CC) gcc options: -O2 -std=gnu99 -lm -lz -lcrypt -lrt -lpthread -laio -lc

Stress-NG v0.07.26

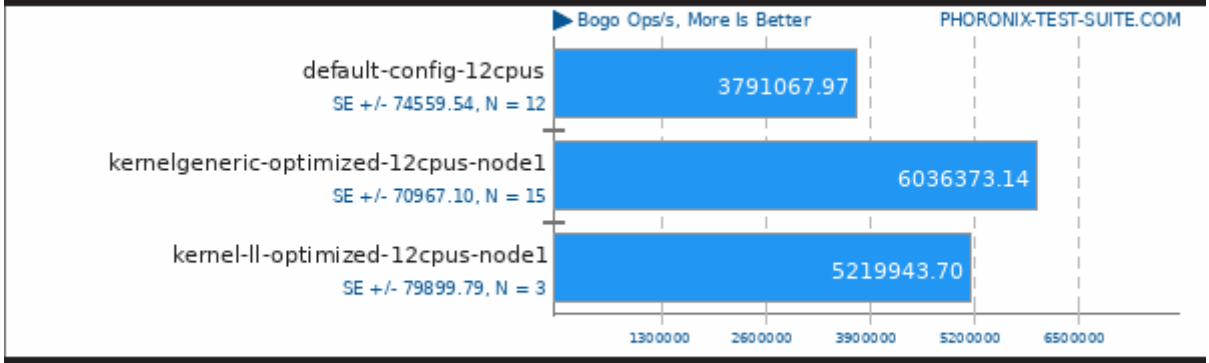
Test: Context Switching



1. (CC) gcc options: -O2 -std=gnu99 -lm -lz -lcrypt -lrt -lpthread -laio -lc

Stress-NG v0.07.26

Test: System V Message Passing

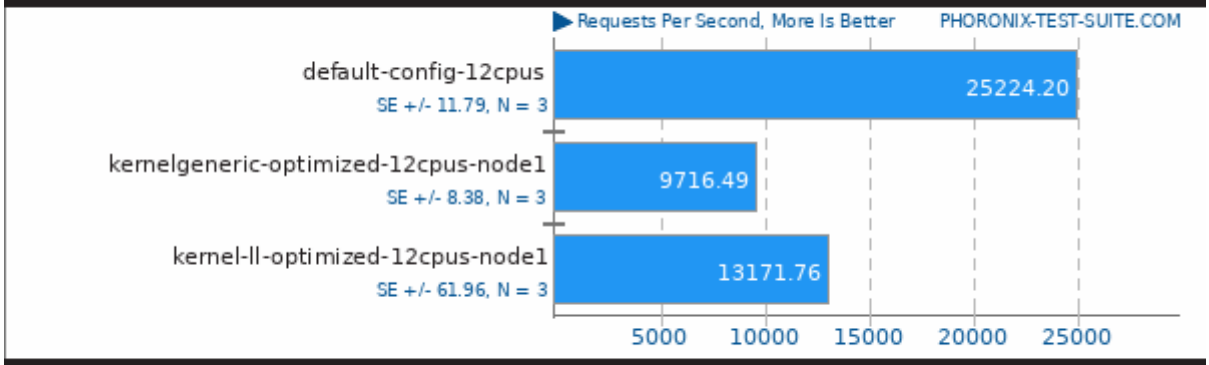


Phoronix Test Suite 9.2.1

1. (CC) gcc options: -O2 -std=gnu99 -lm -lz -lcrypt -lrt -lpthread -laio -lc

Apache Benchmark v2.4.29

Static Web Page Serving

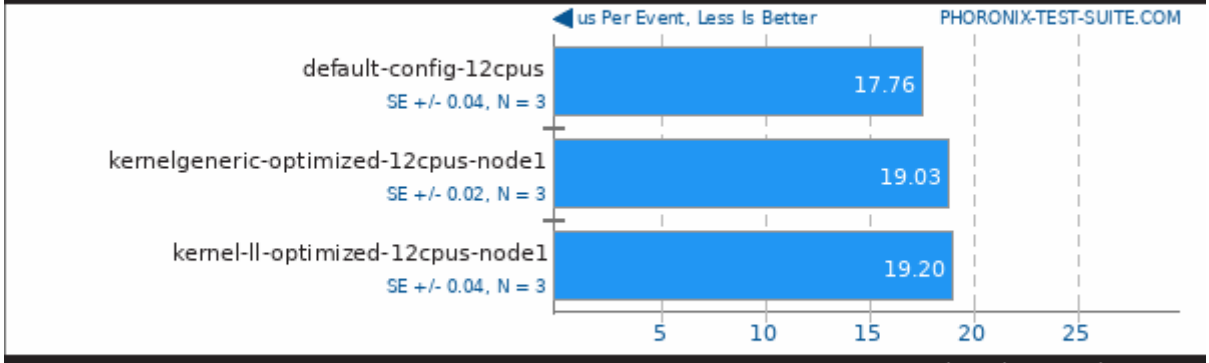


Phoronix Test Suite 9.2.1

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

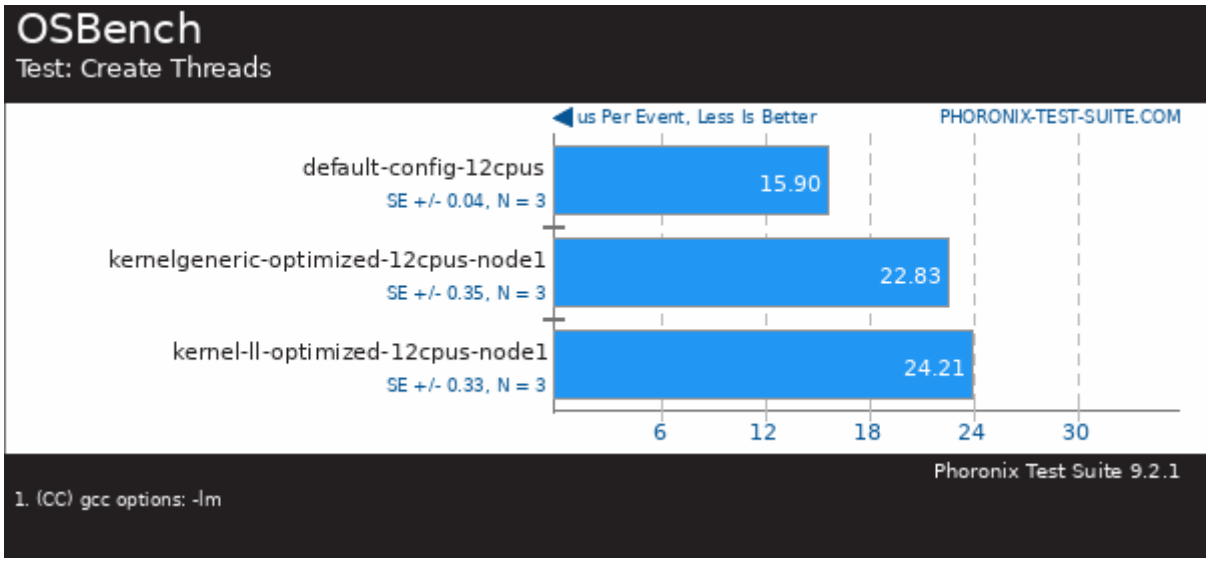
OSBench

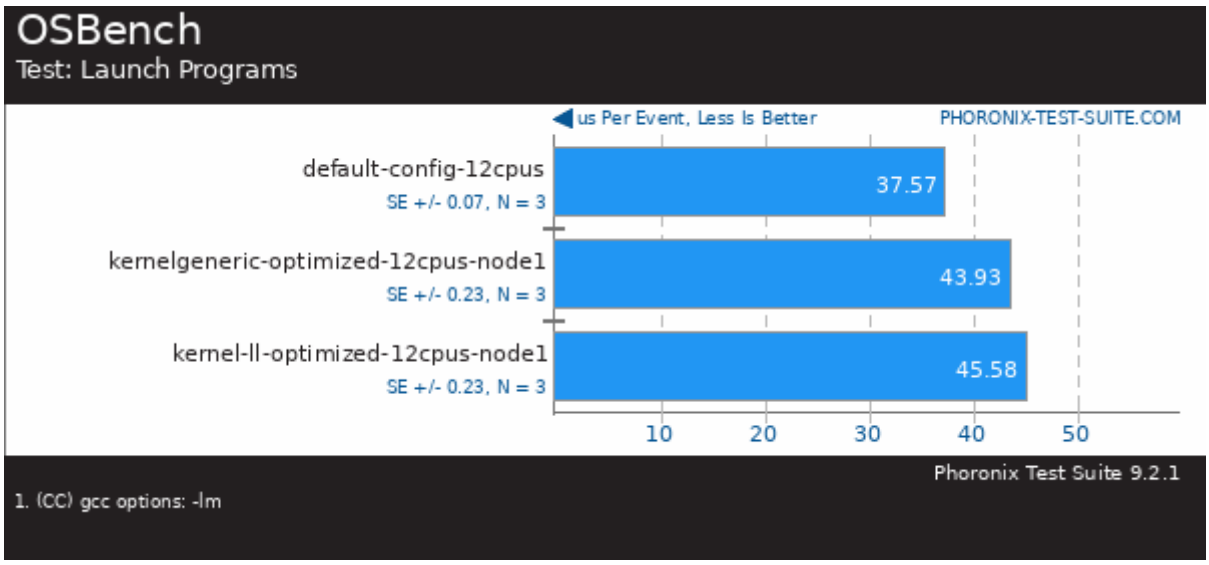
Test: Create Files

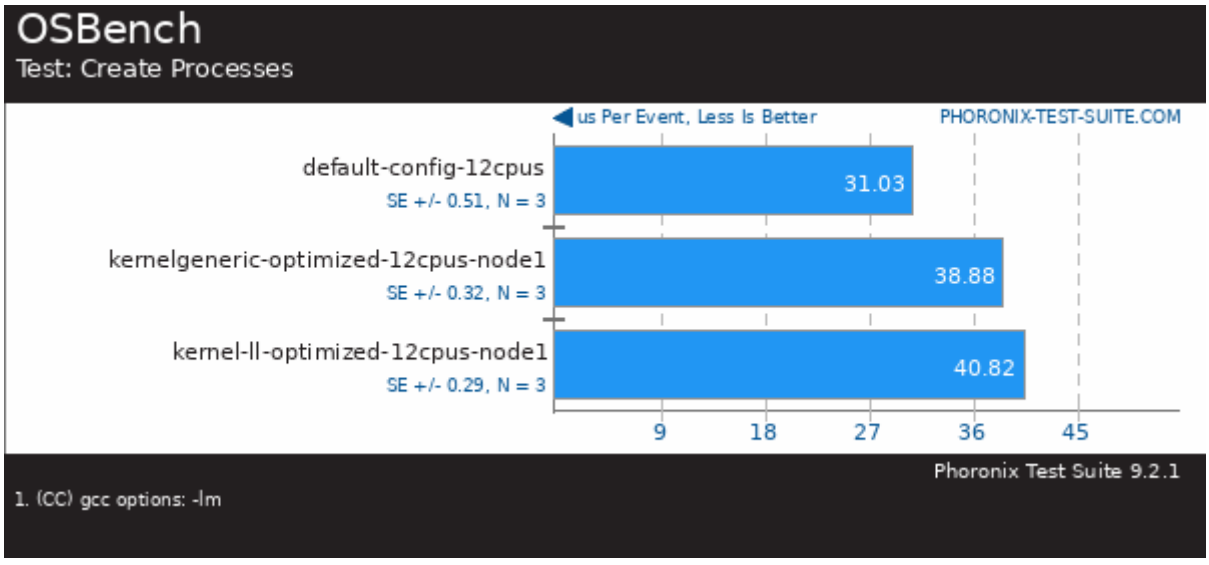


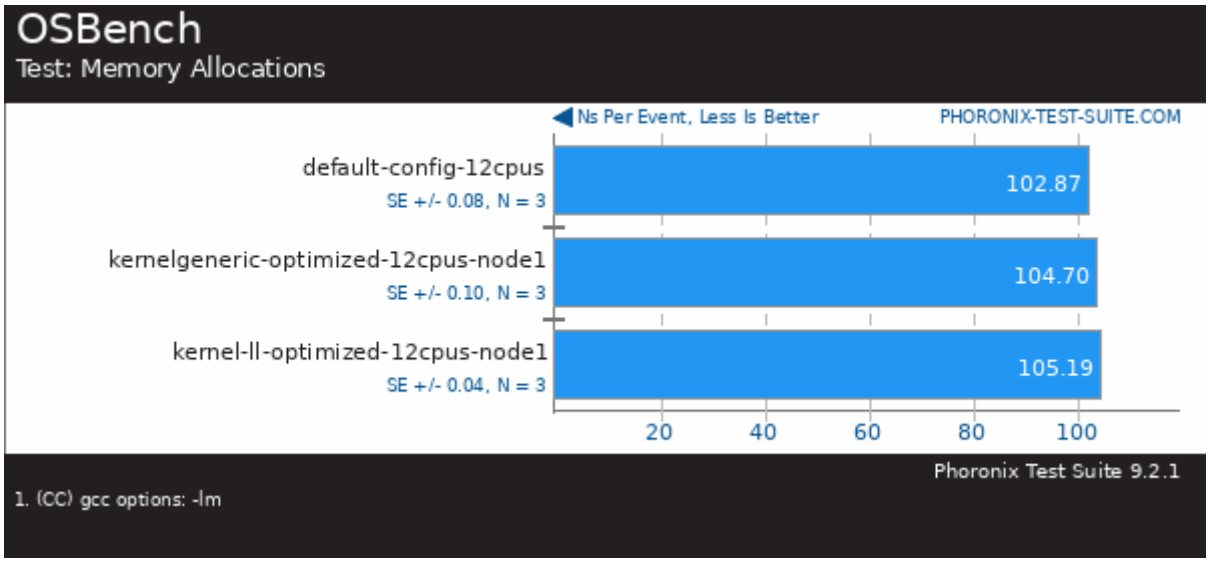
Phoronix Test Suite 9.2.1

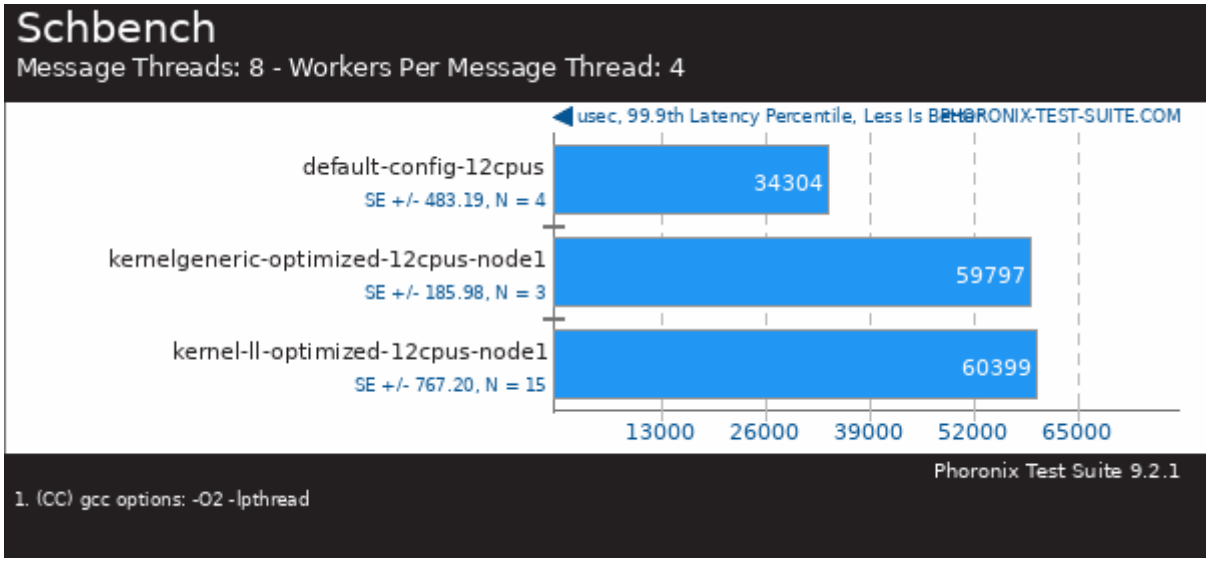
1. (CC) gcc options: -lm


OSBench
Test: Create Threads
us Per Event, Less Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
SE +/- 0.04, N = 3
15.90
kernelgeneric-optimized-12cpus-node1
SE +/- 0.35, N = 3
22.83
kernel-ll-optimized-12cpus-node1
SE +/- 0.33, N = 3
24.21
6
12
18
24
30
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -lm


OSBench
Test: Launch Programs
us Per Event, Less Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
SE +/- 0.07, N = 3
37.57
kernelgeneric-optimized-12cpus-node1
SE +/- 0.23, N = 3
43.93
kernel-ll-optimized-12cpus-node1
SE +/- 0.23, N = 3
45.58
10
20
30
40
50
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -lm


OSBench
Test: Create Processes
us Per Event, Less Is Better
PHORONIX-TEST-SUITE.COM
default-config-12cpus
SE +/- 0.51, N = 3
31.03
kernelgeneric-optimized-12cpus-node1
SE +/- 0.32, N = 3
38.88
kernel-ll-optimized-12cpus-node1
SE +/- 0.29, N = 3
40.82
9
18
27
36
45
Phoronix Test Suite 9.2.1
1. (CC) gcc options: -lm





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