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ARMv8 rev 0 testing with a Jetson-AGX and NVIDIA Tegra Xavier on Ubuntu 18.04 via the Phoronix Test Suite.

Test Systems:

emmc

USB3.0

USB2.0

Memory

stress-mg

cuda

SD

Processor: ARMv8 rev 0 @ 2.27GHz (8 Cores), Motherboard: Jetson-AGX, Memory: 16GB, Disk: 16GB USB Drive 3ME + 31GB HBG4a2, Graphics: NVIDIA Tegra Xavier, Monitor: ASUS VN248, Network: 2 x Intel I210

OS: Ubuntu 18.04, Kernel: 4.9.140-tegra (aarch64), Desktop: Unity 7.5.0, Display Server: X Server 1.19.6, Display Driver: NVIDIA 32.4.3, OpenGL: 4.6.0, Vulkan: 1.2.131, Compiler: GCC 7.5.0 + CUDA 10.2, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=aarch64-linux-gnu --disable-libquadmath --disable-libquadmath-support --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-fix-cortex-a53-843419 --enable-gnu-unique-object --enable-languages=c,ada,c++,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-plugin --enable-shared --enable-threads=posix --host=aarch64-linux-gnu --program-prefix=aarch64-linux-gnu- --target=aarch64-linux-gnu --with-default-libstdcxx-abi=new --with-gcc-major-version-only -v
Disk Notes: CFQ / data=ordered,relatime,rw
Processor Notes: Scaling Governor: tegra_cpufreq schedutil

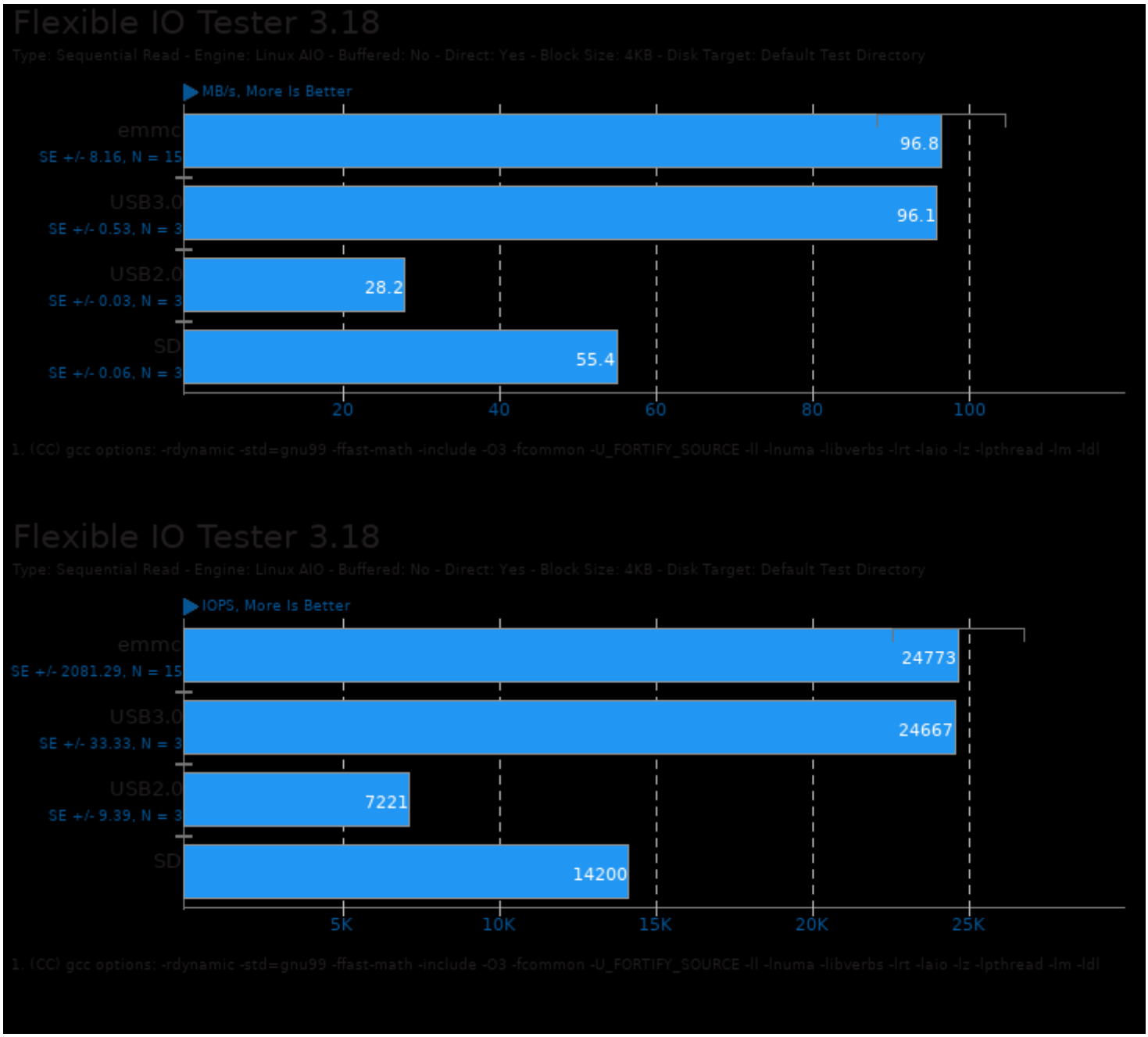
	emmc	USB3.0	USB2.0	Memory	stress-mg	cuda	SD
Flexible IO Tester - Seq Read - Linux AIO - No - Yes - 4KB (MB/s)	**96.8**	96.1	**28.2**				55.4
Normalized	100%	99.28%	29.13%				57.23%
Standard Deviation	32.6%	1%	0.2%				0.2%
Flexible IO Tester - Seq Read - Linux AIO - No - Yes - 4KB (IOPS)	**24773**	24667	**7221**				14200
Normalized	100%	99.57%	29.15%				57.32%
Standard Deviation	32.5%	0.2%	0.2%				
Flexible IO Tester - Seq Read - Linux AIO - No - Yes - 8MB (MB/s)	**309**	121	**52.7**				102
Normalized	100%	39.16%	17.06%				33.01%
Standard Deviation	0.3%		1.3%				
Flexible IO Tester - Seq Read - Linux AIO - No - Yes - 8MB (IOPS)	**35**	12	**3**				9
Normalized	100%	34.29%	8.57%				25.71%
Flexible IO Tester - Seq Write - Linux AIO - No - Yes - 4KB (MB/s)	**89.6**	25.0	24.8				**21.7**
Normalized	100%	27.9%	27.68%				24.22%
Standard Deviation	1.6%	0.5%	2.2%				1.6%
Flexible IO Tester - Seq Write - Linux AIO - No - Yes - 4KB (IOPS)	**23033**	6392	6346				**5541**
Normalized	100%	27.75%	27.55%				24.06%
Standard Deviation	0.9%	0.3%	2.2%				1.7%

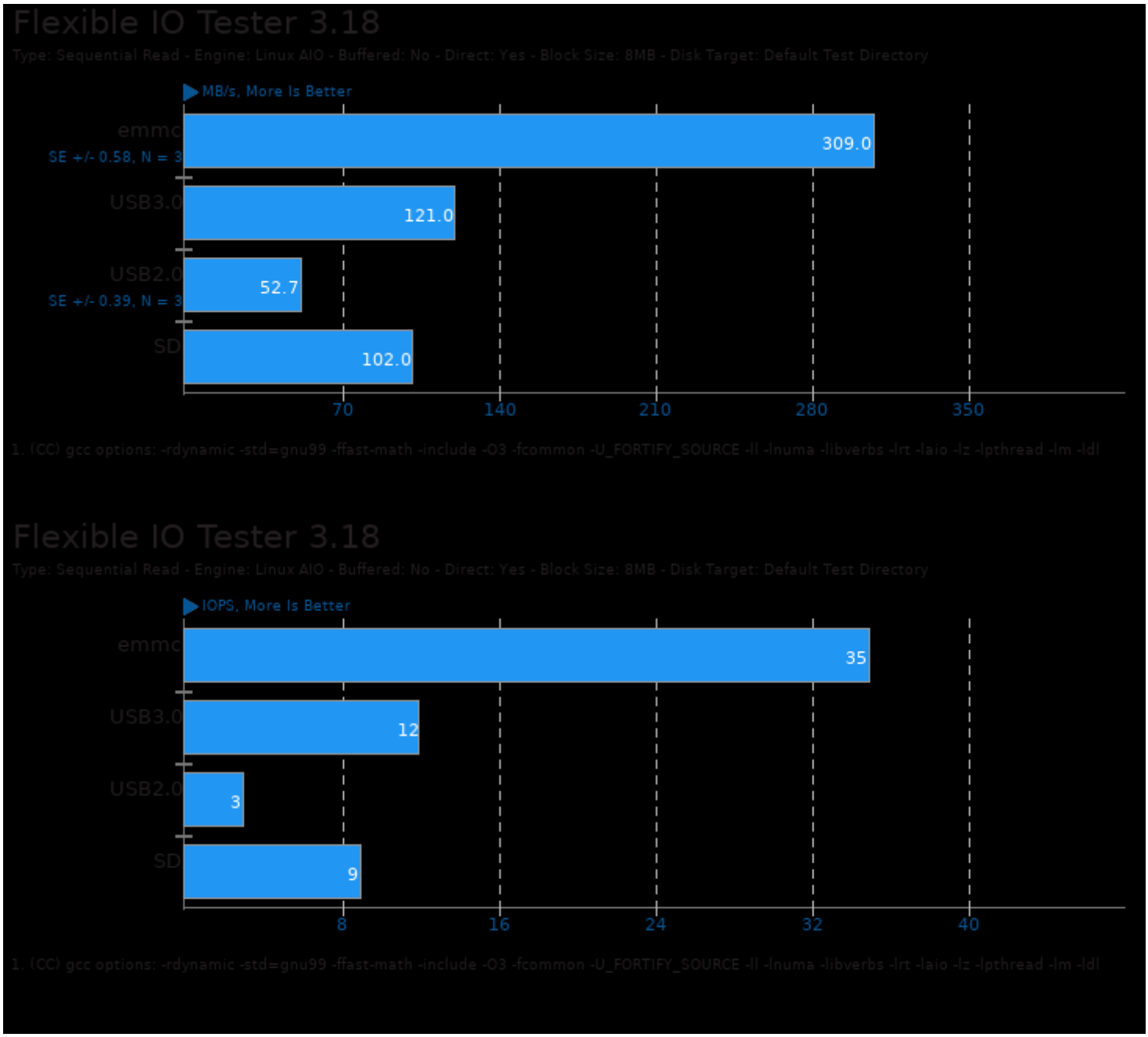
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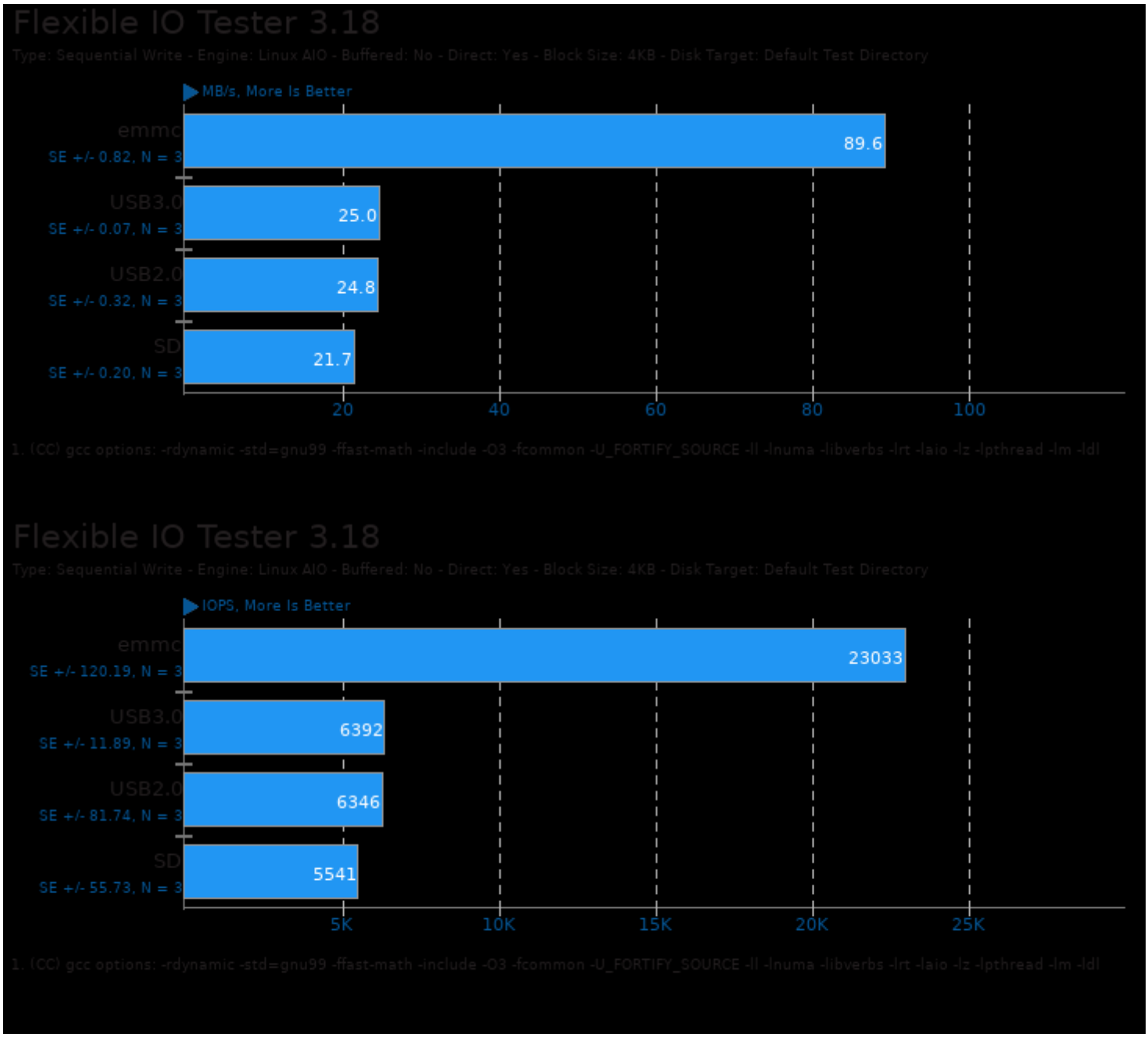
Flexible IO Tester - Seq Write - Linux AIO - No - Yes - 8MB (MB/s)	**136**	**39.5**	49.0			66.7
Normalized	100%	29.04%	36.03%			49.04%
Standard Deviation	1.5%	0.1%	1%			0.5%
Flexible IO Tester - Seq Write - Linux AIO - No - Yes - 8MB (IOPS)	**13**	**2**	3			5
Normalized	100%	15.38%	23.08%			38.46%
Standard Deviation	4.3%					
Stream - Copy (MB/s)				68727		
Standard Deviation				1%		
Stream - Scale (MB/s)				68556		
Standard Deviation				0.3%		
Stream - Triad (MB/s)				61860		
Standard Deviation				0.4%		
Stream - Add (MB/s)				61829		
Standard Deviation				0.1%		
Stress-NG - Crypto (Bogo Ops/s)					1192	
Standard Deviation					1.2%	
Stress-NG - Forking (Bogo Ops/s)					6531	
Standard Deviation					1.2%	
Stress-NG - CPU Stress (Bogo Ops/s)					820.43	
Standard Deviation					3.5%	
Stress-NG - Matrix Math (Bogo Ops/s)					12310	
Standard Deviation					0.2%	
Stress-NG - Vector Math (Bogo Ops/s)					49421	
Standard Deviation					1.3%	
Stress-NG - Memory Copying (Bogo Ops/s)					3277	
Standard Deviation					0.3%	
Stress-NG - G.C.S.F (Bogo Ops/s)					240875	
Standard Deviation					3.4%	
Stress-NG - G.Q.D.S (Bogo Ops/s)					47.56	
Standard Deviation					5.5%	
CUDA Mini-Nbody - Original ((NBody^2)/s)						54.503
Standard Deviation						0%
CUDA Mini-Nbody - Cache Blocking ((NBody^2)/s)						56.071
Standard Deviation						0%
CUDA Mini-Nbody - Loop Unrolling ((NBody^2)/s)						56.164
Standard Deviation						0%

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CUDA Mini-Nbody - SOA Data Layout ((NBody^2)/s)	55.797
Standard Deviation	0%
CUDA Mini-Nbody - F.D.T.Z ((NBody^2)/s)	55.608
Standard Deviation	0.6%

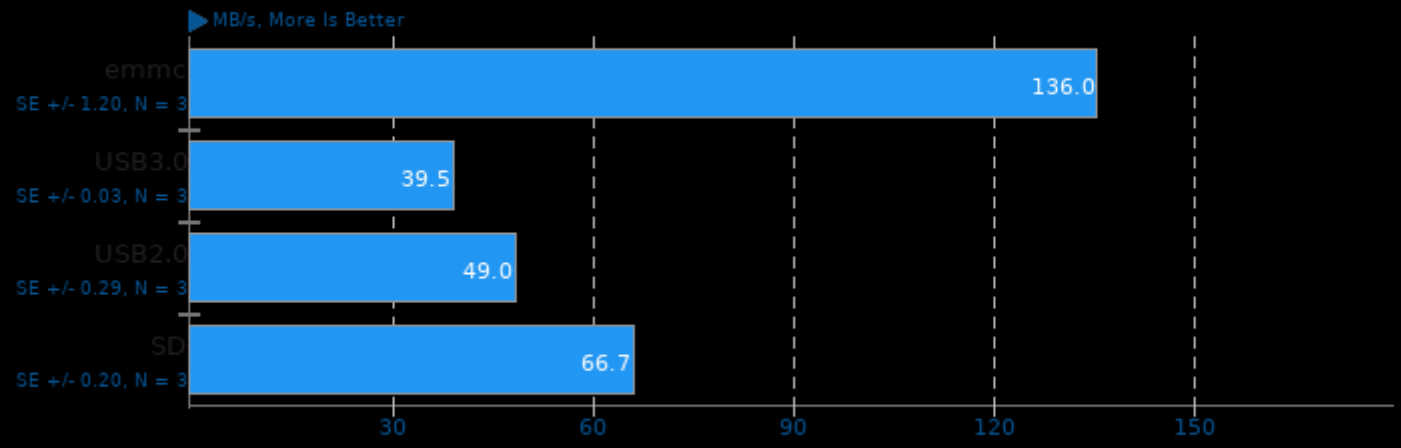

Flexible IO Tester 3.18
Type: Sequential Read - Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory
MB/s, More Is Better
emmc
SE +/- 8.16, N = 15
96.8
USB3.0
SE +/- 0.53, N = 3
96.1
USB2.0
SE +/- 0.03, N = 3
28.2
SD
SE +/- 0.06, N = 3
55.4
20
40
60
80
100
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -ll -lnuma -libverbs -lrt -laio -lz -lpthread -lm -ldl
Flexible IO Tester 3.18
Type: Sequential Read - Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory
IOPS, More Is Better
emmc
SE +/- 2081.29, N = 15
24773
USB3.0
SE +/- 33.33, N = 3
24667
USB2.0
SE +/- 9.39, N = 3
7221
SD
14200
5K
10K
15K
20K
25K
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -ll -lnuma -libverbs -lrt -laio -lz -lpthread -lm -ldl


Flexible IO Tester 3.18
Type: Sequential Read - Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 8MB - Disk Target: Default Test Directory
MB/s, More Is Better
emmc
SE +/- 0.58, N = 3
309.0
USB3.0
121.0
USB2.0
SE +/- 0.39, N = 3
52.7
SD
102.0
70
140
210
280
350
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -ll -lnuma -libverbs -lrt -laio -lz -lpthread -lm -ldl
Flexible IO Tester 3.18
Type: Sequential Read - Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 8MB - Disk Target: Default Test Directory
IOPS, More Is Better
emmc
35
USB3.0
12
USB2.0
3
SD
9
8
16
24
32
40
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -ll -lnuma -libverbs -lrt -laio -lz -lpthread -lm -ldl


Flexible IO Tester 3.18
Type: Sequential Write - Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory
MB/s, More Is Better
emmc
SE +/- 0.82, N = 3
89.6
USB3.0
SE +/- 0.07, N = 3
25.0
USB2.0
SE +/- 0.32, N = 3
24.8
SD
SE +/- 0.20, N = 3
21.7
20
40
60
80
100
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -ll -lnuma -libverbs -lrt -laio -lz -lpthread -lm -ldl
Flexible IO Tester 3.18
Type: Sequential Write - Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory
IOPS, More Is Better
emmc
SE +/- 120.19, N = 3
23033
USB3.0
SE +/- 11.89, N = 3
6392
USB2.0
SE +/- 81.74, N = 3
6346
SD
SE +/- 55.73, N = 3
5541
5K
10K
15K
20K
25K
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -ll -lnuma -libverbs -lrt -laio -lz -lpthread -lm -ldl

Flexible IO Tester 3.18

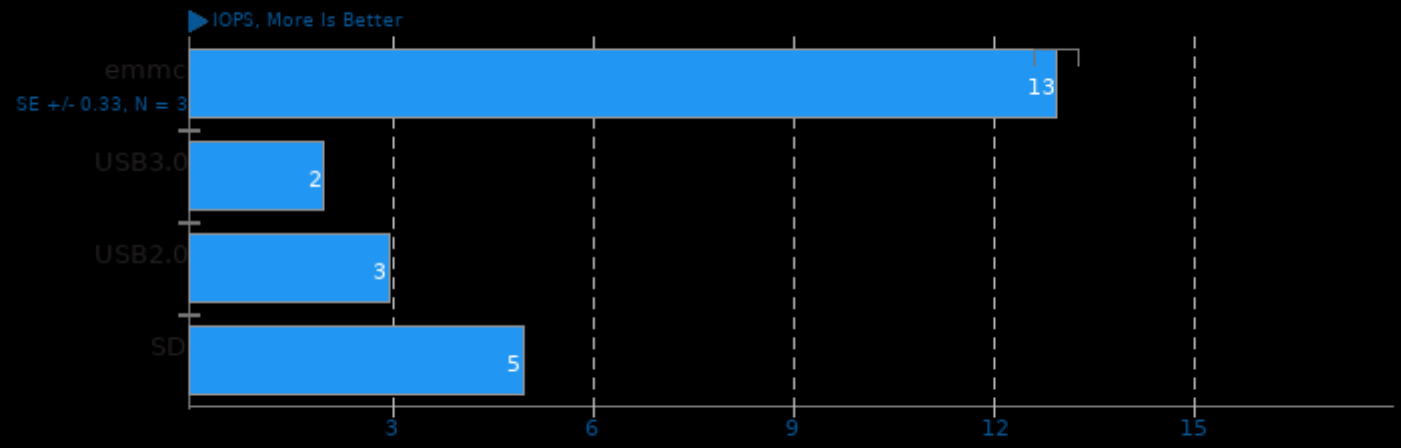
Type: Sequential Write - Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 8MB - Disk Target: Default Test Directory



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

Flexible IO Tester 3.18

Type: Sequential Write - Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 8MB - Disk Target: Default Test Directory



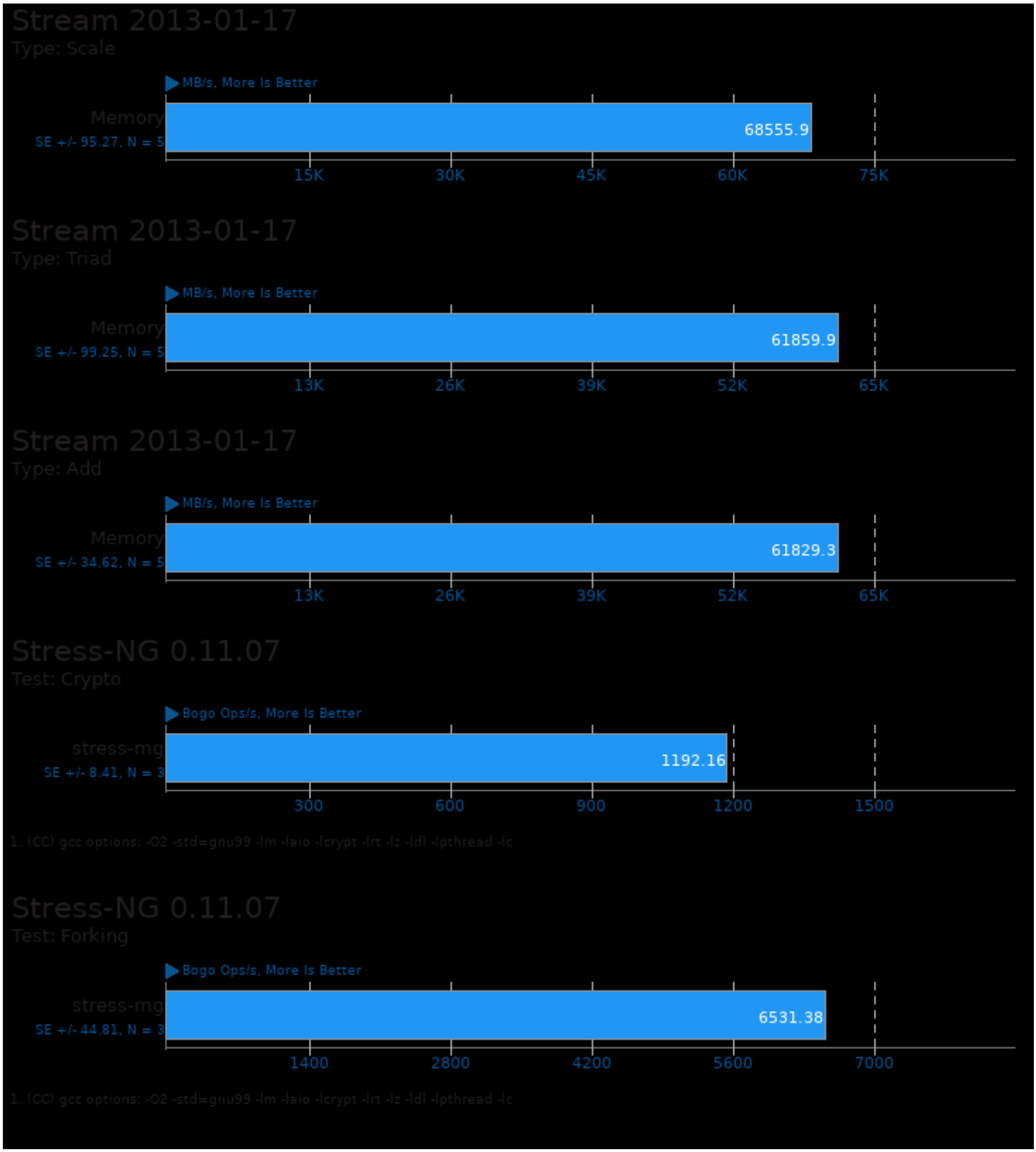
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -ll -lnuma -libverbs -lrt -laio -lz -lpthread -lm -ldl

Stream 2013-01-17

Type: Copy

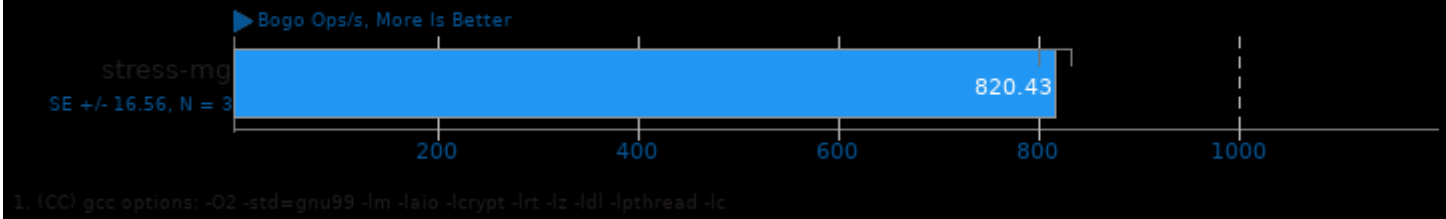


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Stream 2013-01-17
Type: Scale
MB/s, More Is Better
Memory
SE +/- 95.27, N = 5
68555.9
15K
30K
45K
60K
75K
Stream 2013-01-17
Type: Triad
MB/s, More Is Better
Memory
SE +/- 99.25, N = 5
61859.9
13K
26K
39K
52K
65K
Stream 2013-01-17
Type: Add
MB/s, More Is Better
Memory
SE +/- 34.62, N = 5
61829.3
13K
26K
39K
52K
65K
Stress-NG 0.11.07
Test: Crypto
Bogo Ops/s, More Is Better
stress-mg
SE +/- 8.41, N = 3
1192.16
300
600
900
1200
1500
1. (CC) gcc options: -O2 -std=gnu99 -lm -laio -lcrypt -lrt -lz -ldl -lpthread -lc
Stress-NG 0.11.07
Test: Forking
Bogo Ops/s, More Is Better
stress-mg
SE +/- 44.81, N = 3
6531.38
1400
2800
4200
5600
7000
1. (CC) gcc options: -O2 -std=gnu99 -lm -laio -lcrypt -lrt -lz -ldl -lpthread -lc

Stress-NG 0.11.07

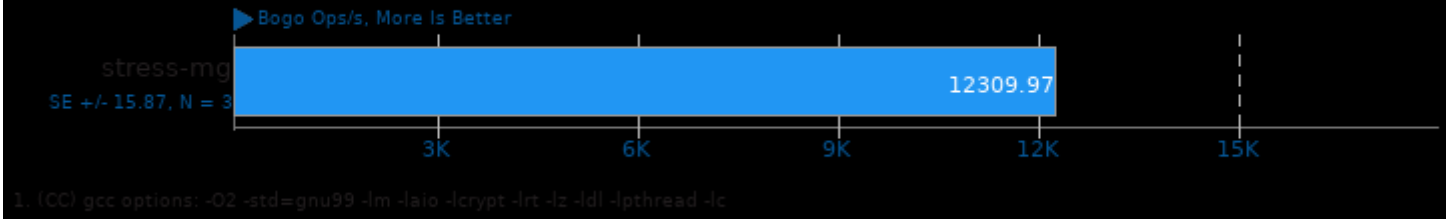
Test: CPU Stress



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

Stress-NG 0.11.07

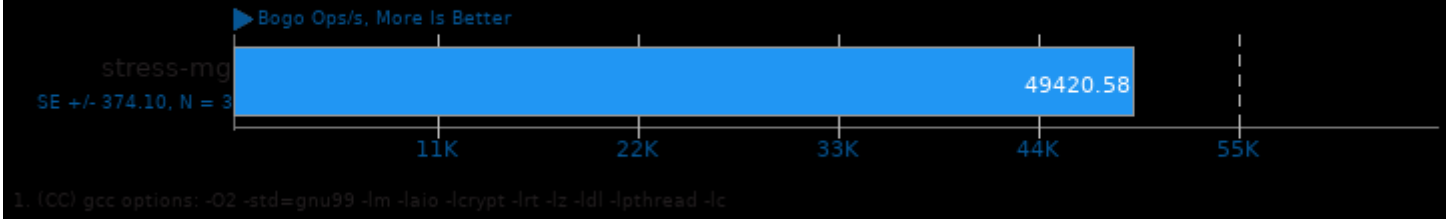
Test: Matrix Math



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

Stress-NG 0.11.07

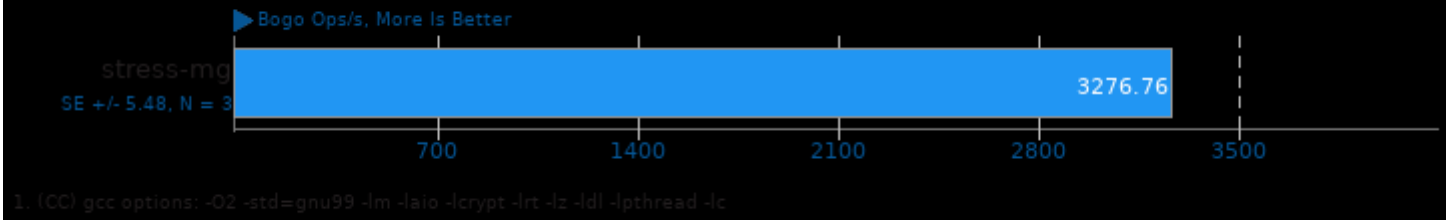
Test: Vector Math



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

Stress-NG 0.11.07

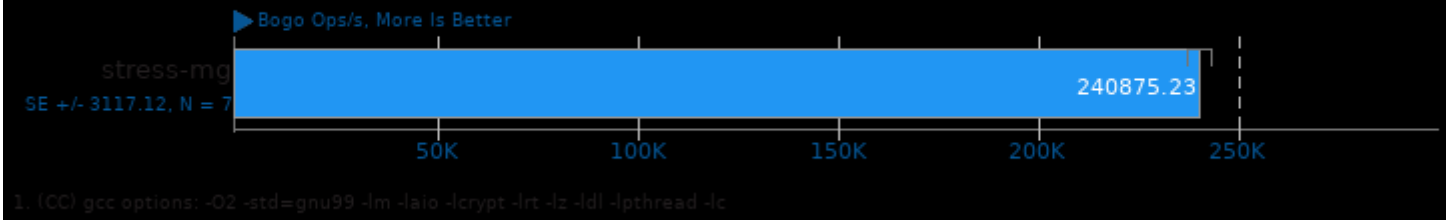
Test: Memory Copying



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

Stress-NG 0.11.07

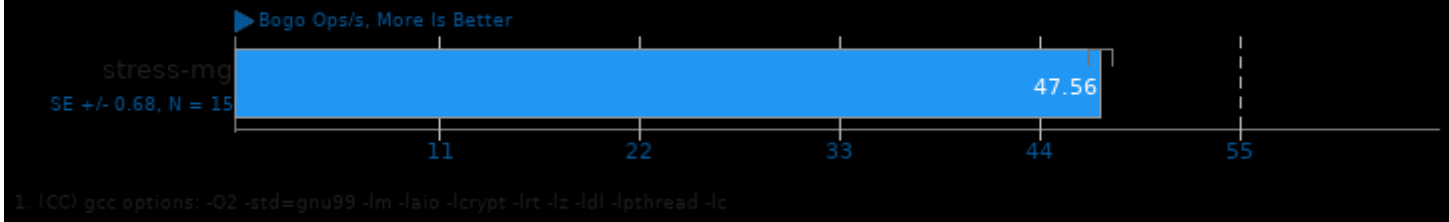
Test: Glibc C String Functions



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

Stress-NG 0.11.07

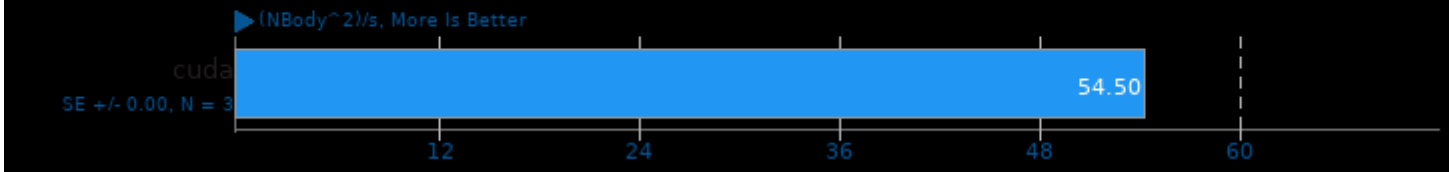
Test: Glibc Qsort Data Sorting



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

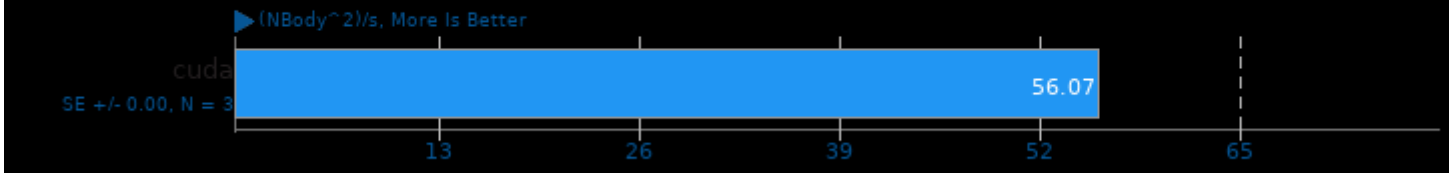
CUDA Mini-Nbody 2015-11-10

Test: Original



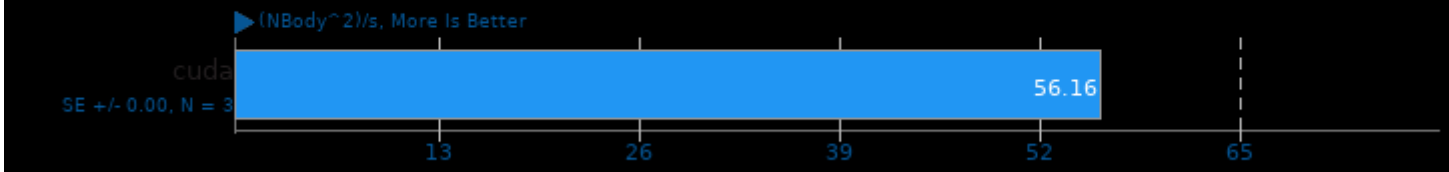
CUDA Mini-Nbody 2015-11-10

Test: Cache Blocking



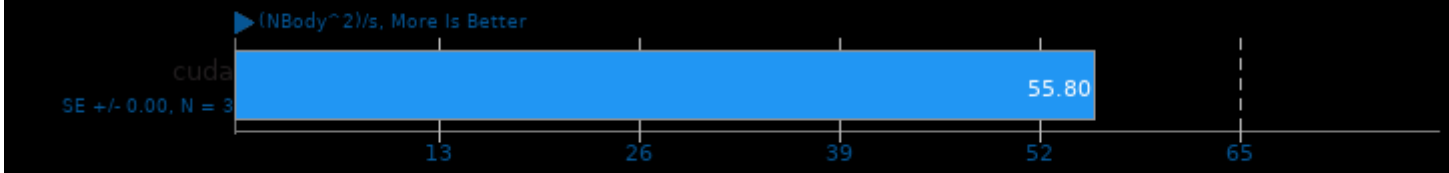
CUDA Mini-Nbody 2015-11-10

Test: Loop Unrolling



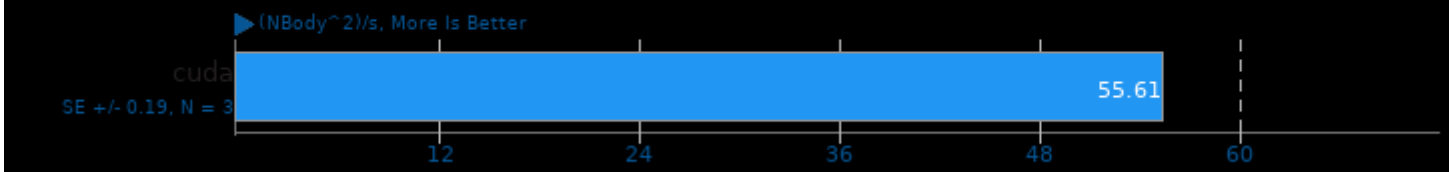
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Test: SOA Data Layout



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Test: Flush Denormals To Zero



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