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disk.test

Intel Core i7-7820X testing with a Supermicro C9X299-PG300F v1.01 (2.4 BIOS) and ASPEED on Ubuntu 22.04 via the Phoronix Test Suite.

Test Systems:

disk.test

Processor: Intel Core i7-7820X @ 4.50GHz (8 Cores / 16 Threads), Motherboard: Supermicro C9X299-PG300F v1.01 (2.4 BIOS), Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 4 x 8 GB DDR4-2133MT/s F4-2400C15-8GVR, Disk: 500GB Corsair Force MP600, Graphics: ASPEED, Audio: Realtek ALC1220, Monitor: DELL P2011H, Network: Aquantia AQC107 NBase-T/IEEE + Intel I210

OS: Ubuntu 22.04, Kernel: 5.15.0-56-generic (x86_64), Vulkan: 1.2.204, Compiler: GCC 11.3.0, File-System: ext4, Screen Resolution: 1600x900

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-bootstrap --enable-cet --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

disk.test

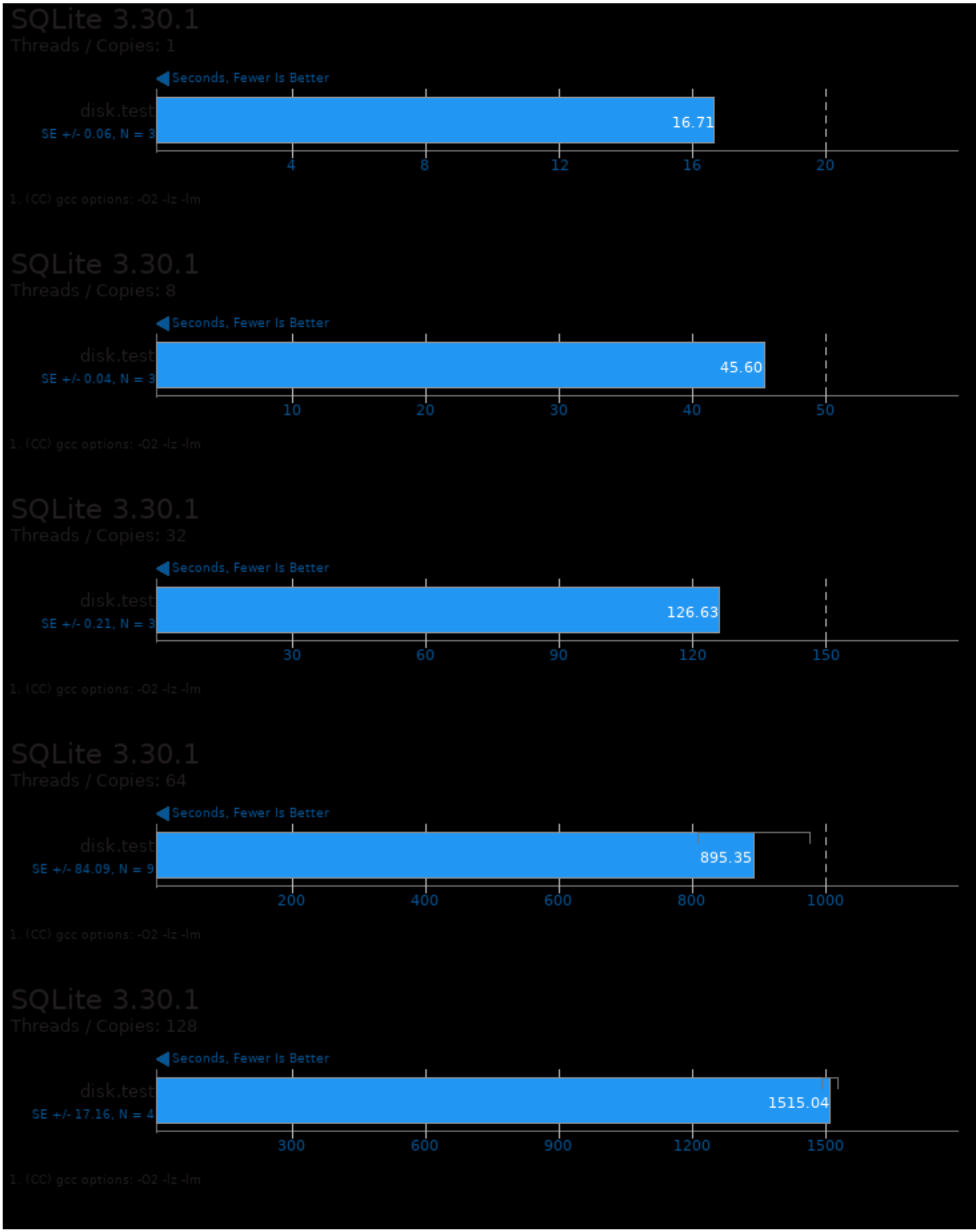
--enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-link-serialization=2 --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-11-xKiWfi/gcc-11-11.3.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-11-xKiWfi/gcc-11-11.3.0/debian/tmp-gcn/usr --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-build-config=bootstrap-lto-lean --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 / relatime,rw / Block Size: 4096
Processor Notes: Scaling Governor: intel_cpufreq schedutil - CPU Microcode: 0x2006e05
Python Notes: Python 3.10.6
Security Notes: itlb_multihit: KVM: Mitigation of VMX disabled + l1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT vulnerable + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Mitigation of PTI + mmio_stale_data: Mitigation of Clear buffers; SMT vulnerable + retbleed: Mitigation of IBRS + 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 IBRS IBPB: conditional RSB filling PBRSB-eIBRS: Not affected + srbds: Not affected + tsx_async_abort: Mitigation of Clear buffers; SMT vulnerable

	disk.test
SQLite - 1 (sec)	16.711
Standard Deviation	0.6%
SQLite - 8 (sec)	45.595
Standard Deviation	0.1%
SQLite - 32 (sec)	126.625
Standard Deviation	0.3%
SQLite - 64 (sec)	895.350
Standard Deviation	28.2%
SQLite - 128 (sec)	1515
Standard Deviation	2.3%
Flexible IO Tester - Rand Read - Linux AIO - No - Yes - 2MB (MB/s)	2963
Standard Deviation	0.6%
Flexible IO Tester - Rand Read - Linux AIO - No - Yes - 2MB (IOPS)	1478
Standard Deviation	0.6%
Flexible IO Tester - Rand Read - Linux AIO - No - Yes - 4KB (MB/s)	1126
Standard Deviation	0.8%
Flexible IO Tester - Rand Read - Linux AIO - No - Yes - 4KB (IOPS)	288000
Standard Deviation	0.9%
Flexible IO Tester - Rand Write - Linux AIO - No - Yes - 2MB (MB/s)	1144
Standard Deviation	73.7%
Flexible IO Tester - Rand Write - Linux AIO - No - Yes - 2MB (IOPS)	569
Standard Deviation	74.2%
Flexible IO Tester - Rand Write - Linux AIO - No - Yes - 4KB (MB/s)	792
Standard Deviation	38.1%
Flexible IO Tester - Rand Write - Linux AIO - No - Yes - 4KB (IOPS)	202833
Standard Deviation	38%
Flexible IO Tester - Seq Read - Linux AIO - No - Yes - 2MB (MB/s)	2900
Standard Deviation	0.6%
Flexible IO Tester - Seq Read - Linux AIO - No - Yes - 2MB (IOPS)	1446
Standard Deviation	0.6%
Flexible IO Tester - Seq Read - Linux AIO - No - Yes - 4KB (MB/s)	1097
Standard Deviation	1.6%
Flexible IO Tester - Seq Read - Linux AIO - No - Yes - 4KB (IOPS)	281000
Standard Deviation	1.6%
Flexible IO Tester - Seq Write - Linux AIO - No - Yes - 2MB (MB/s)	977
Standard Deviation	86.9%
Flexible IO Tester - Seq Write - Linux AIO - No - Yes - 2MB (IOPS)	485
Standard Deviation	87.5%
Flexible IO Tester - Seq Write - Linux AIO - No - Yes - 4KB (MB/s)	413

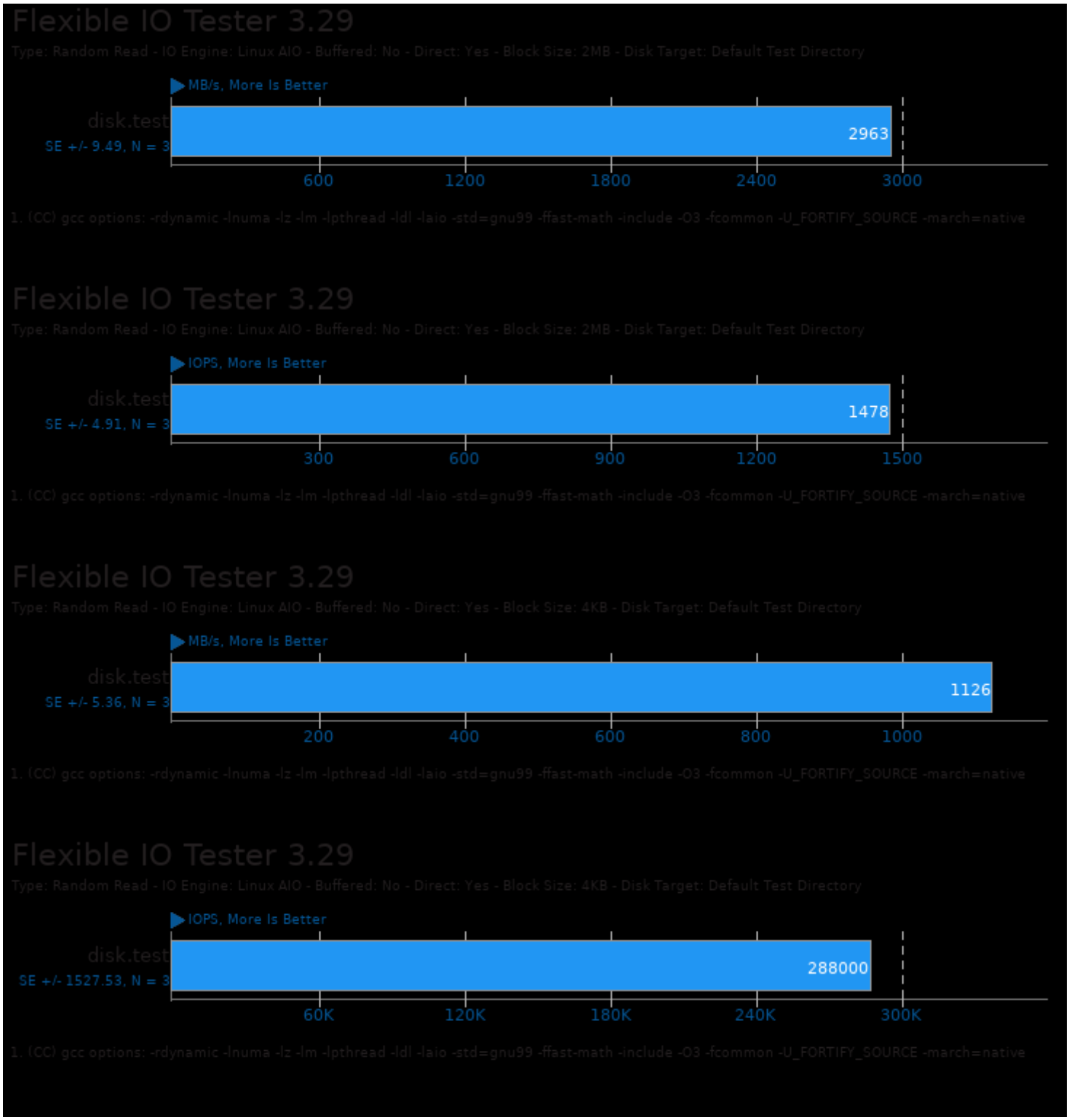
disk.test

Standard Deviation	27.9%
Flexible IO Tester - Seq Write - Linux AIO - No - Yes - 4KB (IOPS)	105642
Standard Deviation	27.9%
FS-Mark - 1.F.1.S (Files/s)	278.3
Standard Deviation	29.1%
FS-Mark - 5.F.1.S.4.T (Files/s)	261.4
Standard Deviation	1.2%
FS-Mark - 4.F.3.S.D.1.S (Files/s)	357.1
Standard Deviation	10.5%
FS-Mark - 1.F.1.S.N.S.F (Files/s)	1849
Standard Deviation	2.3%
Dbench - 12 Clients (MB/s)	542.465
Standard Deviation	21.6%
Dbench - 1 Clients (MB/s)	69.0185
Standard Deviation	0.1%
IOR - 2MB - / (MB/s)	1129
Standard Deviation	6.7%
IOR - 4MB - / (MB/s)	1119
Standard Deviation	8.7%
IOR - 8MB - / (MB/s)	719.50
Standard Deviation	0.8%
IOR - 16MB - / (MB/s)	773.51
Standard Deviation	5.8%
IOR - 32MB - / (MB/s)	463.85
Standard Deviation	20.4%
IOR - 64MB - / (MB/s)	364.70
Standard Deviation	7.1%
IOR - 256MB - / (MB/s)	403.30
Standard Deviation	3.4%
IOR - 512MB - / (MB/s)	439.57
Standard Deviation	0.2%
IOR - 1024MB - / (MB/s)	434.15
Standard Deviation	1.1%
IOR - 2MB (MB/s)	1135
Standard Deviation	1.9%
IOR - 4MB (MB/s)	1115
Standard Deviation	2.5%
IOR - 8MB (MB/s)	723.90
Standard Deviation	6%
IOR - 16MB (MB/s)	778.61
Standard Deviation	4.7%
IOR - 32MB (MB/s)	352.62
Standard Deviation	13.8%
IOR - 64MB (MB/s)	306.14
Standard Deviation	10%
IOR - 256MB (MB/s)	424.58
Standard Deviation	1.8%
IOR - 512MB (MB/s)	436.25
Standard Deviation	1.4%
IOR - 1024MB (MB/s)	434.35
Standard Deviation	0.6%
PostMark - D.T.P (TPS)	4573
Standard Deviation	1.1%

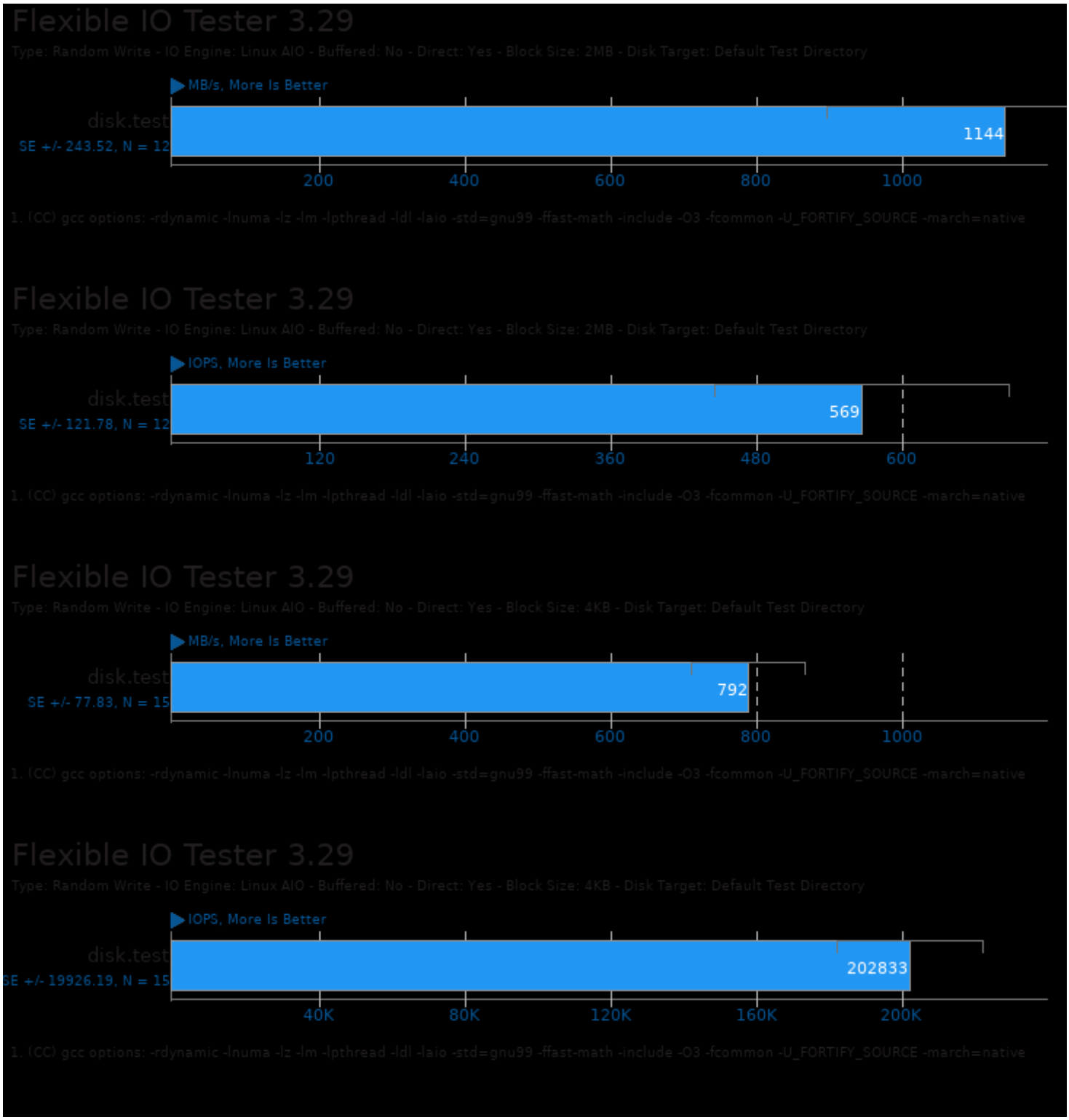
disk.test


SQLite 3.30.1
Threads / Copies: 1
Seconds, Fewer Is Better
disk.test
SE +/- 0.06, N = 3
16.71
4
8
12
16
20
1. (CC) gcc options: -O2 -lz -lm
SQLite 3.30.1
Threads / Copies: 8
Seconds, Fewer Is Better
disk.test
SE +/- 0.04, N = 3
45.60
10
20
30
40
50
1. (CC) gcc options: -O2 -lz -lm
SQLite 3.30.1
Threads / Copies: 32
Seconds, Fewer Is Better
disk.test
SE +/- 0.21, N = 3
126.63
30
60
90
120
150
1. (CC) gcc options: -O2 -lz -lm
SQLite 3.30.1
Threads / Copies: 64
Seconds, Fewer Is Better
disk.test
SE +/- 84.09, N = 9
895.35
200
400
600
800
1000
1. (CC) gcc options: -O2 -lz -lm
SQLite 3.30.1
Threads / Copies: 128
Seconds, Fewer Is Better
disk.test
SE +/- 17.16, N = 4
1515.04
300
600
900
1200
1500
1. (CC) gcc options: -O2 -lz -lm

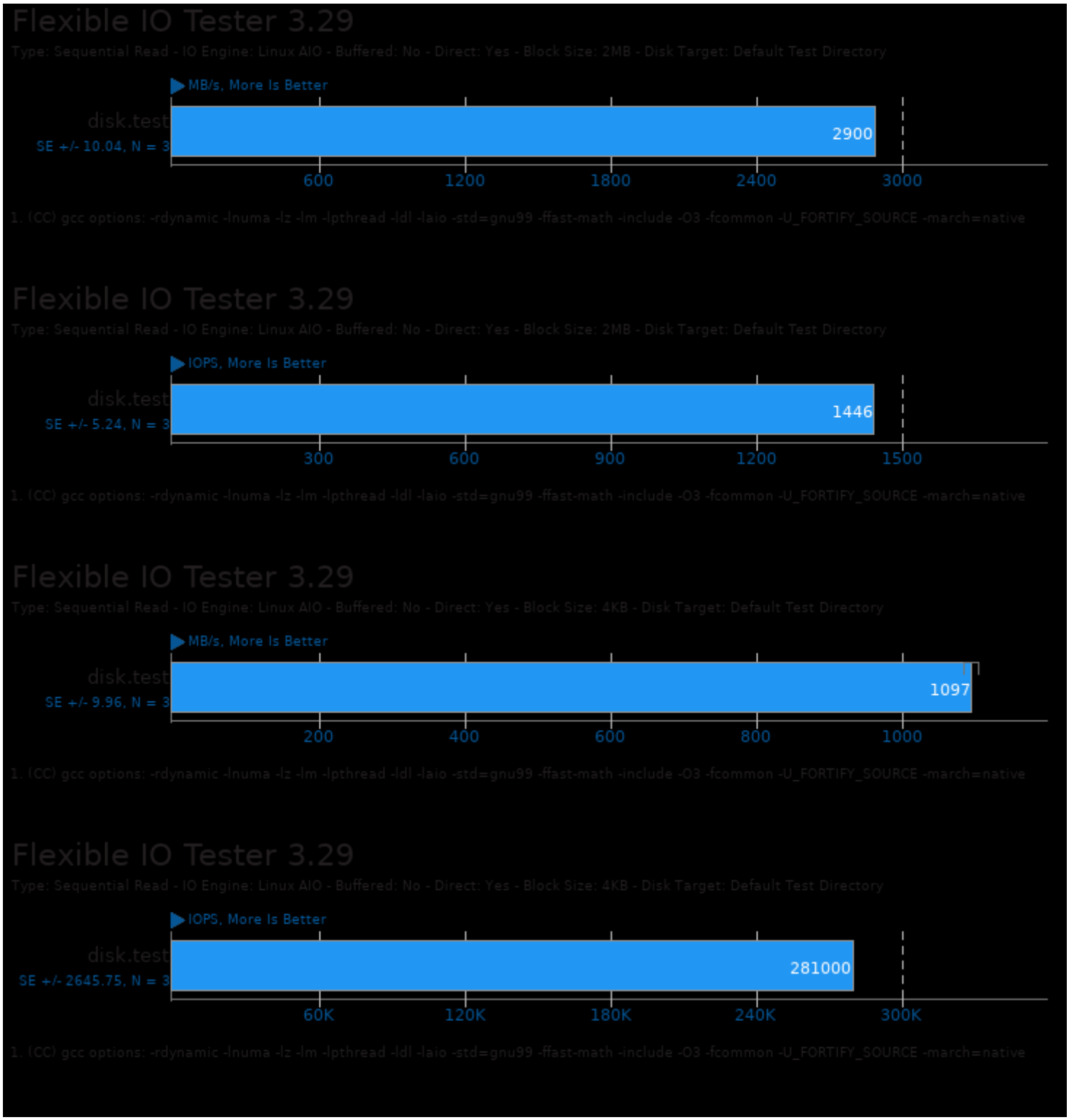
disk.test


Flexible IO Tester 3.29
Type: Random Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory
MB/s, More Is Better
disk.test
SE +/- 9.49, N = 3
2963
600
1200
1800
2400
3000
1. (CC) gcc options: -rdynamic -lnuma -lz -lm -lpthread -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -march=native
Flexible IO Tester 3.29
Type: Random Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory
IOPS, More Is Better
disk.test
SE +/- 4.91, N = 3
1478
300
600
900
1200
1500
1. (CC) gcc options: -rdynamic -lnuma -lz -lm -lpthread -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -march=native
Flexible IO Tester 3.29
Type: Random Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory
MB/s, More Is Better
disk.test
SE +/- 5.36, N = 3
1126
200
400
600
800
1000
1. (CC) gcc options: -rdynamic -lnuma -lz -lm -lpthread -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -march=native
Flexible IO Tester 3.29
Type: Random Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory
IOPS, More Is Better
disk.test
SE +/- 1527.53, N = 3
288000
60K
120K
180K
240K
300K
1. (CC) gcc options: -rdynamic -lnuma -lz -lm -lpthread -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -march=native

disk.test

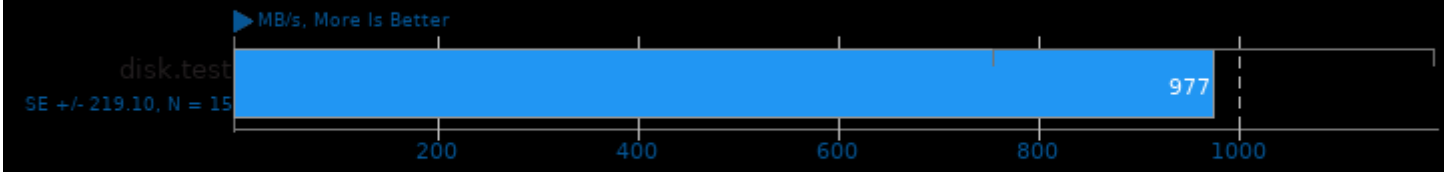

Flexible IO Tester 3.29
Type: Random Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory
MB/s, More Is Better
disk.test
SE +/- 243.52, N = 12
1144
200
400
600
800
1000
1. (CC) gcc options: -rdynamic -lnuma -lz -lm -lpthread -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -march=native
Flexible IO Tester 3.29
Type: Random Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory
IOPS, More Is Better
disk.test
SE +/- 121.78, N = 12
569
120
240
360
480
600
1. (CC) gcc options: -rdynamic -lnuma -lz -lm -lpthread -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -march=native
Flexible IO Tester 3.29
Type: Random Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory
MB/s, More Is Better
disk.test
SE +/- 77.83, N = 15
792
200
400
600
800
1000
1. (CC) gcc options: -rdynamic -lnuma -lz -lm -lpthread -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -march=native
Flexible IO Tester 3.29
Type: Random Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory
IOPS, More Is Better
disk.test
SE +/- 19926.19, N = 15
202833
40K
80K
120K
160K
200K
1. (CC) gcc options: -rdynamic -lnuma -lz -lm -lpthread -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -march=native

disk.test


Flexible IO Tester 3.29
Type: Sequential Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory
MB/s, More Is Better
disk.test
SE +/- 10.04, N = 3
2900
600
1200
1800
2400
3000
1. (CC) gcc options: -rdynamic -lnuma -lz -lm -lpthread -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -march=native
Flexible IO Tester 3.29
Type: Sequential Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory
IOPS, More Is Better
disk.test
SE +/- 5.24, N = 3
1446
300
600
900
1200
1500
1. (CC) gcc options: -rdynamic -lnuma -lz -lm -lpthread -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -march=native
Flexible IO Tester 3.29
Type: Sequential Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory
MB/s, More Is Better
disk.test
SE +/- 9.96, N = 3
1097
200
400
600
800
1000
1. (CC) gcc options: -rdynamic -lnuma -lz -lm -lpthread -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -march=native
Flexible IO Tester 3.29
Type: Sequential Read - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory
IOPS, More Is Better
disk.test
SE +/- 2645.75, N = 3
281000
60K
120K
180K
240K
300K
1. (CC) gcc options: -rdynamic -lnuma -lz -lm -lpthread -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -march=native

Flexible IO Tester 3.29

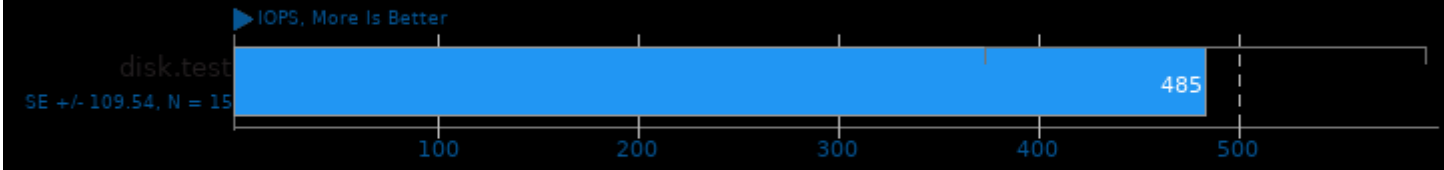
Type: Sequential Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory



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

Flexible IO Tester 3.29

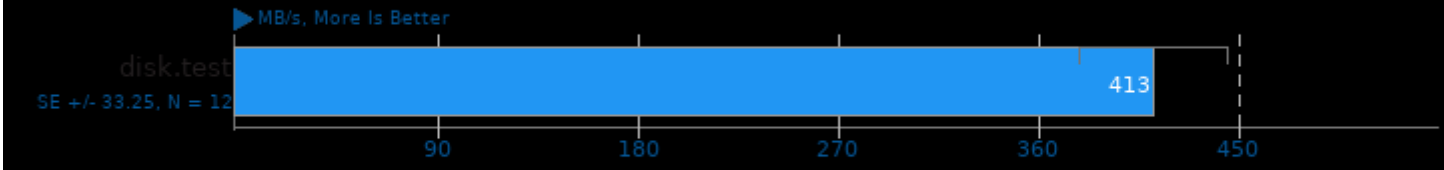
Type: Sequential Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 2MB - Disk Target: Default Test Directory



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

Flexible IO Tester 3.29

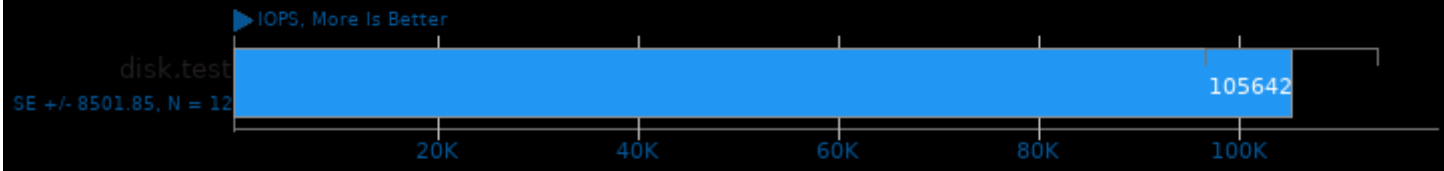
Type: Sequential Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory



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

Flexible IO Tester 3.29

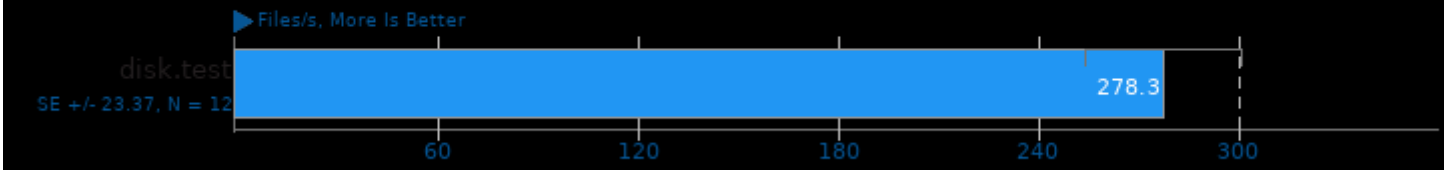
Type: Sequential Write - IO Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory



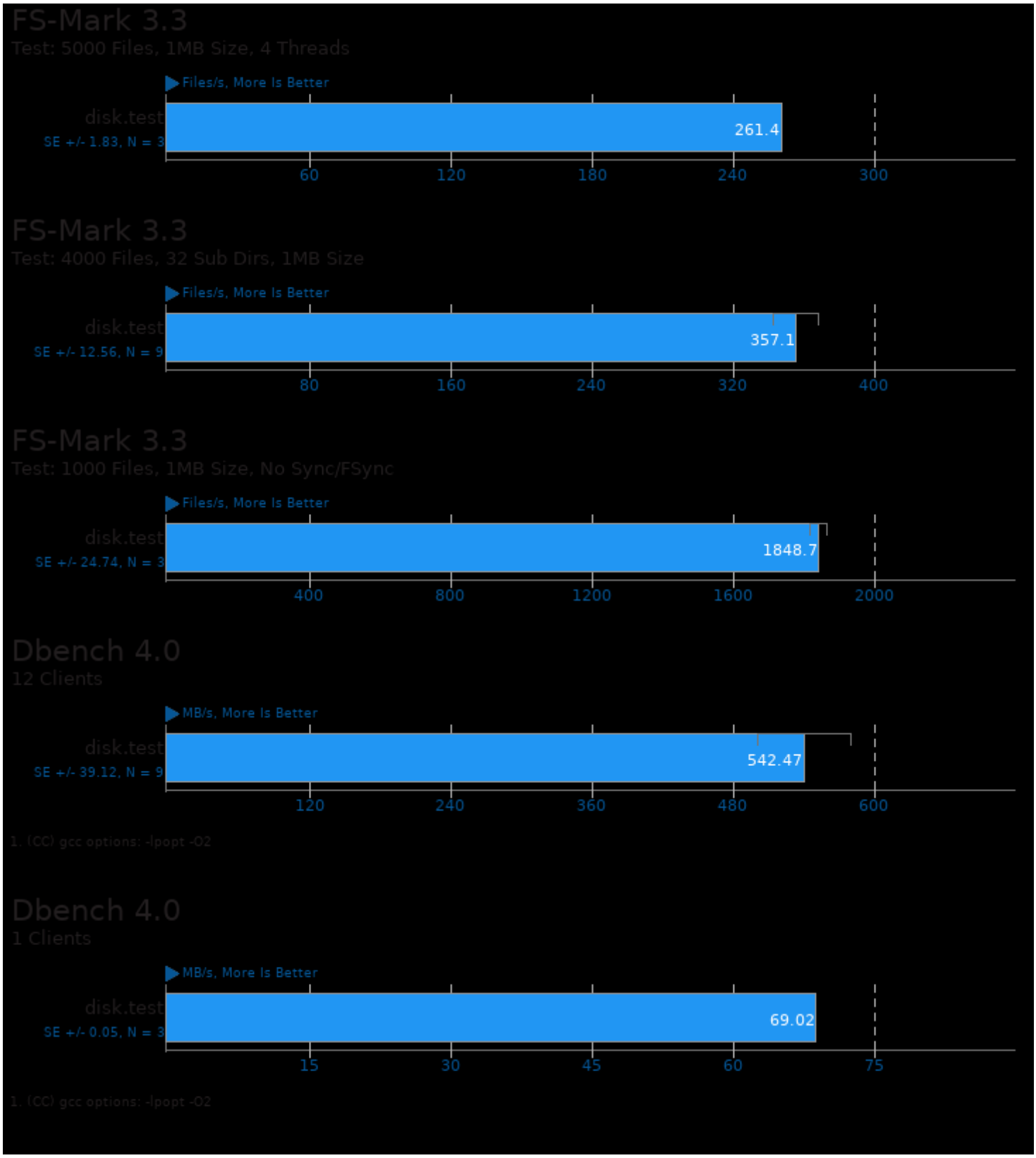
1. (CC) gcc options: -rdynamic -lnuma -lz -lm -lpthread -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE -march=native

FS-Mark 3.3

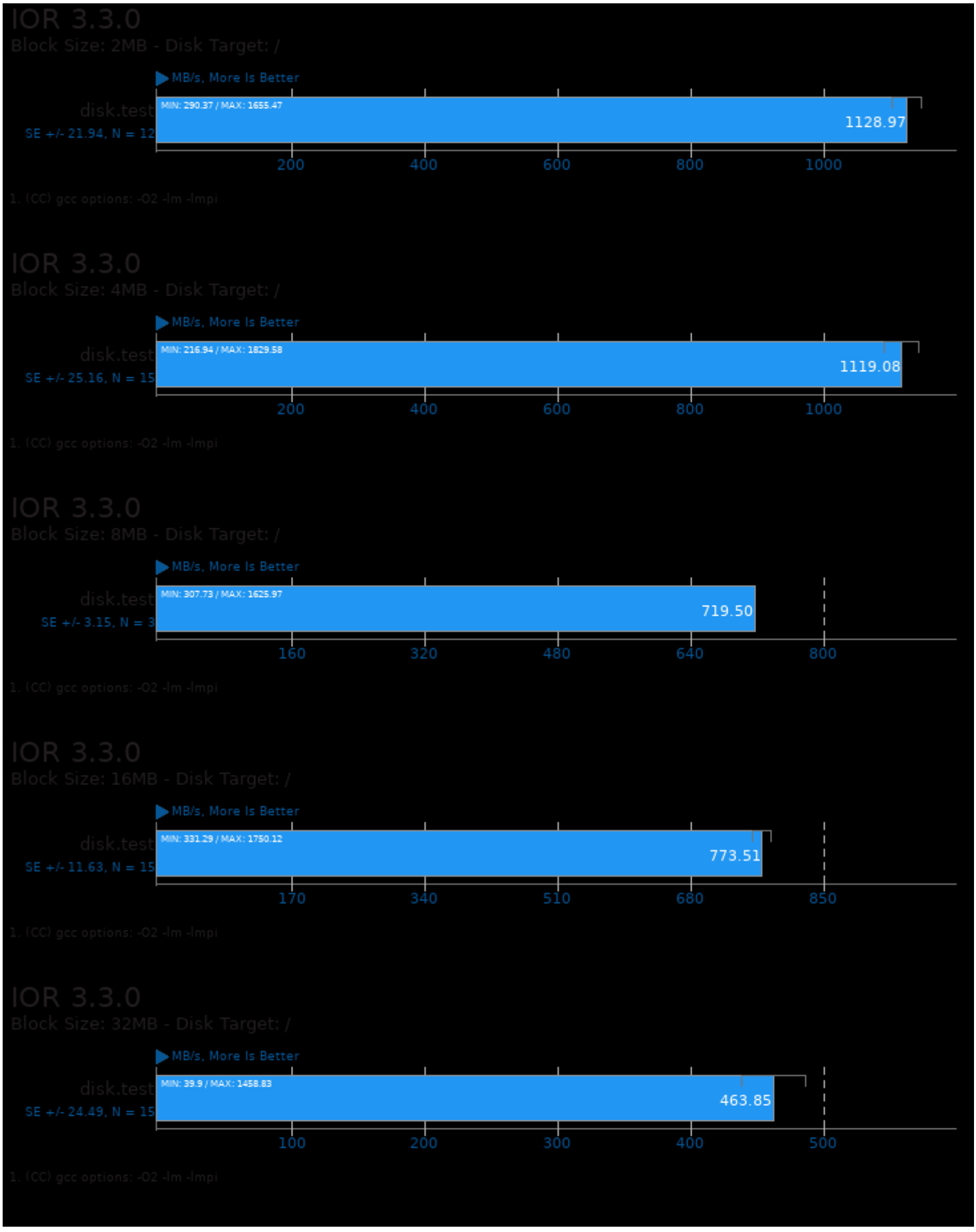
Test: 1000 Files, 1MB Size



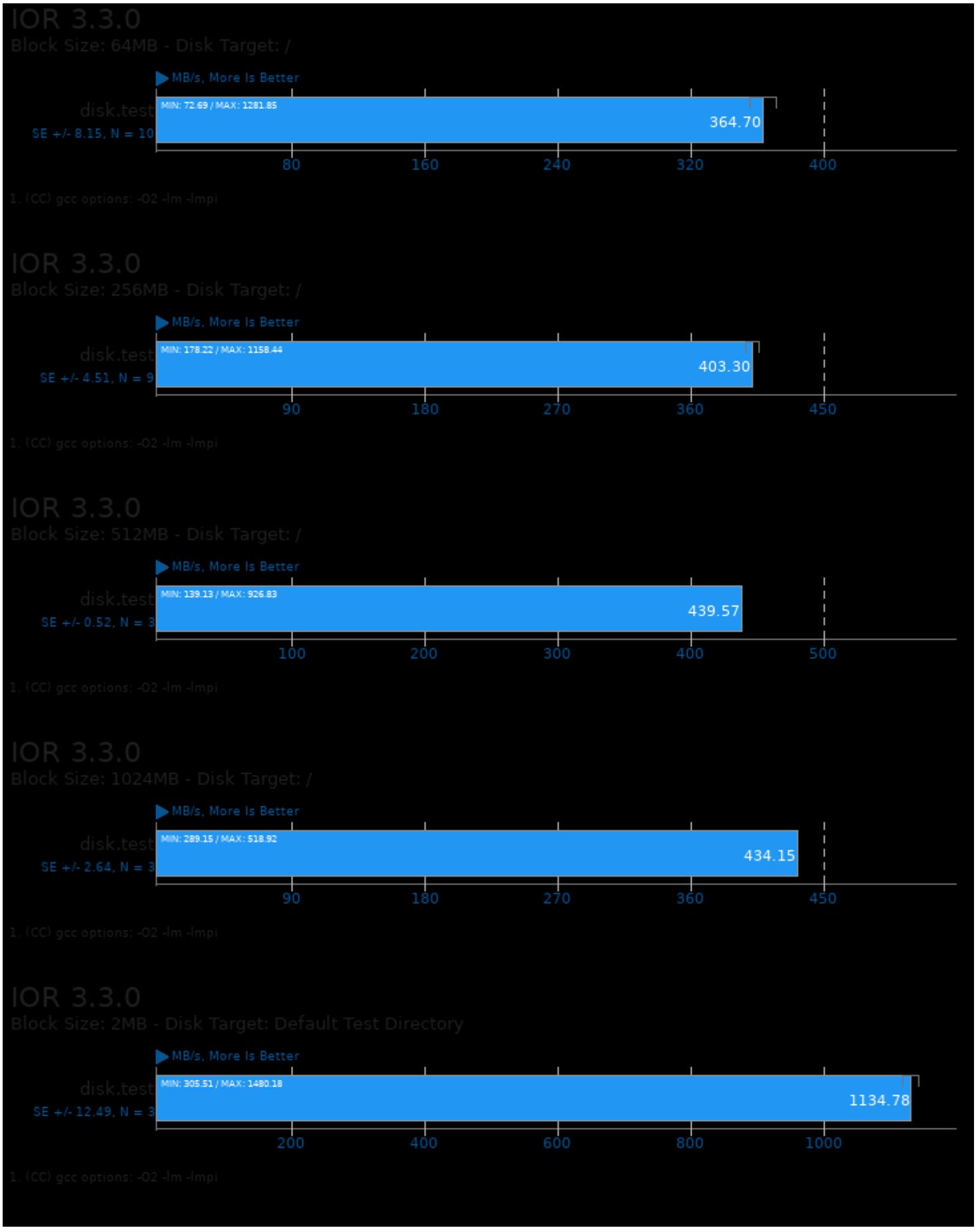
disk.test


FS-Mark 3.3
Test: 5000 Files, 1MB Size, 4 Threads
Files/s, More Is Better
disk.test
SE +/- 1.83, N = 3
261.4
60
120
180
240
300
FS-Mark 3.3
Test: 4000 Files, 32 Sub Dirs, 1MB Size
Files/s, More Is Better
disk.test
SE +/- 12.56, N = 9
357.1
80
160
240
320
400
FS-Mark 3.3
Test: 1000 Files, 1MB Size, No Sync/FSync
Files/s, More Is Better
disk.test
SE +/- 24.74, N = 3
1848.7
400
800
1200
1600
2000
Dbench 4.0
12 Clients
MB/s, More Is Better
disk.test
SE +/- 39.12, N = 9
542.47
120
240
360
480
600
1. (CC) gcc options: -lpopt -O2
Dbench 4.0
1 Clients
MB/s, More Is Better
disk.test
SE +/- 0.05, N = 3
69.02
15
30
45
60
75
1. (CC) gcc options: -lpopt -O2

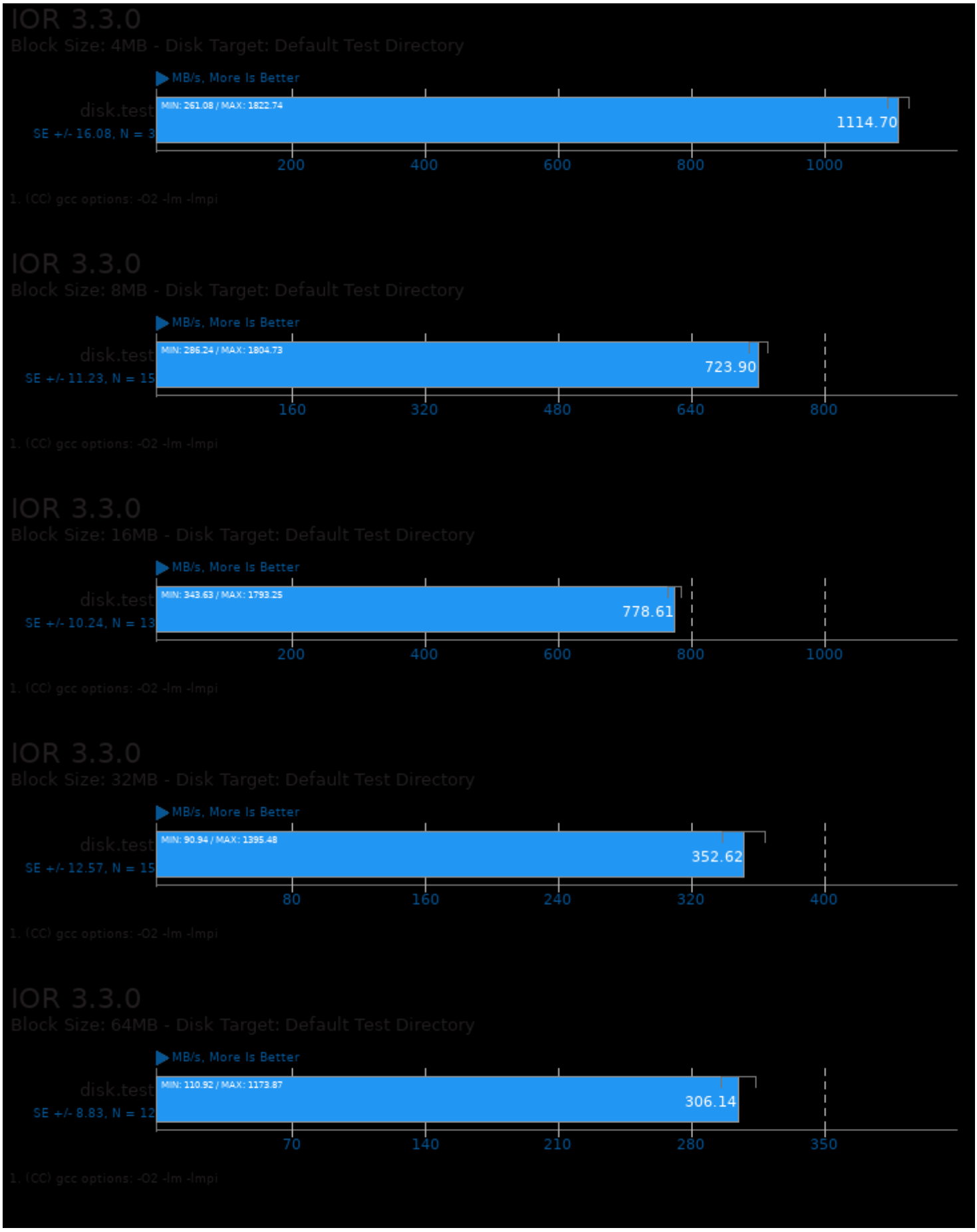
disk.test


IOR 3.3.0
Block Size: 2MB - Disk Target: /
MB/s, More Is Better
disk.test
MIN: 290.37 / MAX: 1655.47
1128.97
SE +/- 21.94, N = 12
200
400
600
800
1000
1. (CC) gcc options: -O2 -lm -lmpi
IOR 3.3.0
Block Size: 4MB - Disk Target: /
MB/s, More Is Better
disk.test
MIN: 216.94 / MAX: 1829.58
1119.08
SE +/- 25.16, N = 15
200
400
600
800
1000
1. (CC) gcc options: -O2 -lm -lmpi
IOR 3.3.0
Block Size: 8MB - Disk Target: /
MB/s, More Is Better
disk.test
MIN: 307.73 / MAX: 1625.97
719.50
SE +/- 3.15, N = 3
160
320
480
640
800
1. (CC) gcc options: -O2 -lm -lmpi
IOR 3.3.0
Block Size: 16MB - Disk Target: /
MB/s, More Is Better
disk.test
MIN: 331.29 / MAX: 1750.12
773.51
SE +/- 11.63, N = 15
170
340
510
680
850
1. (CC) gcc options: -O2 -lm -lmpi
IOR 3.3.0
Block Size: 32MB - Disk Target: /
MB/s, More Is Better
disk.test
MIN: 39.9 / MAX: 1458.83
463.85
SE +/- 24.49, N = 15
100
200
300
400
500
1. (CC) gcc options: -O2 -lm -lmpi

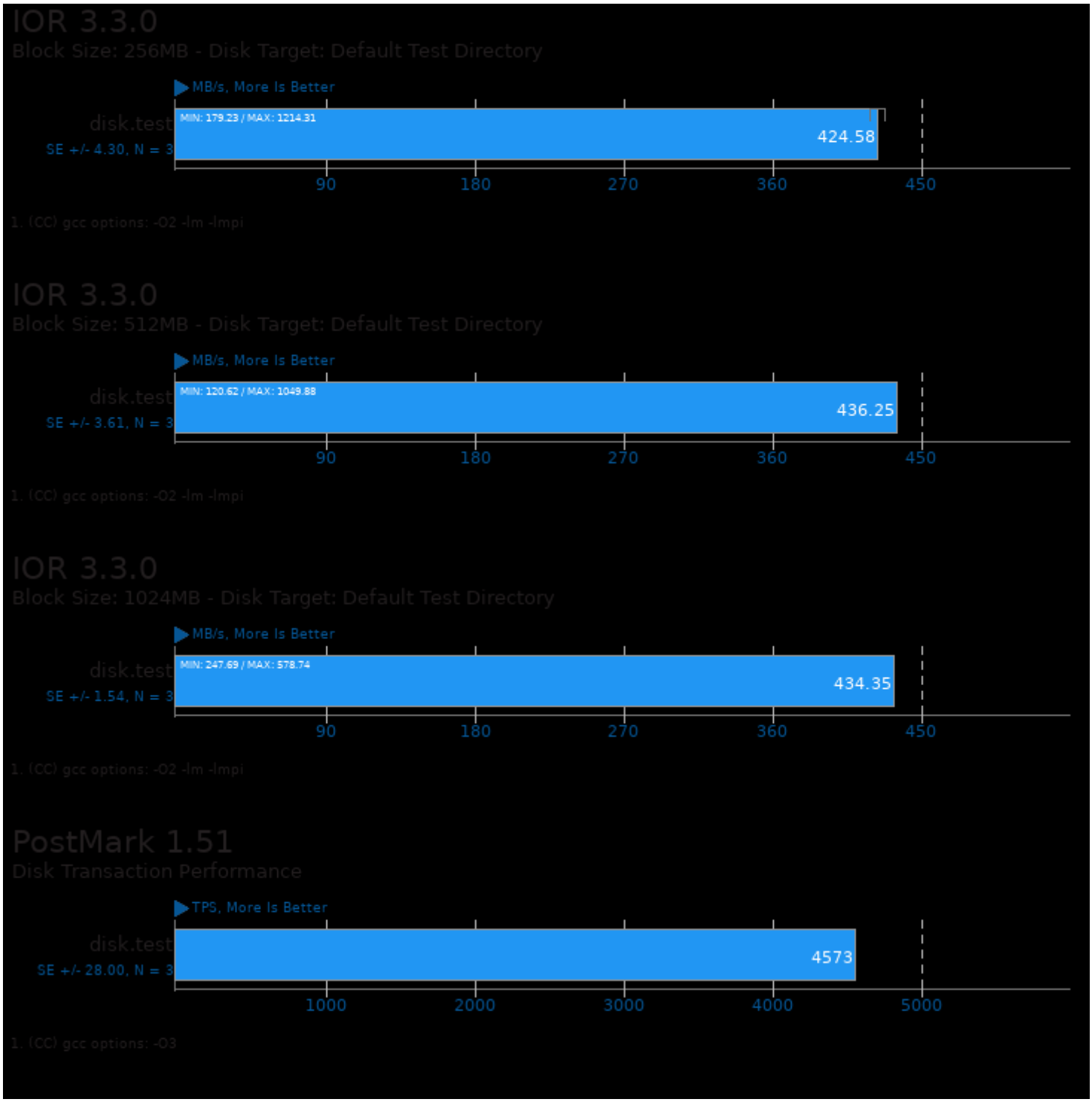
disk.test


IOR 3.3.0
Block Size: 64MB - Disk Target: /
MB/s, More Is Better
disk.test
MIN: 72.69 / MAX: 1281.85
364.70
SE +/- 8.15, N = 10
80
160
240
320
400
1. (CC) gcc options: -O2 -lm -lmpi
IOR 3.3.0
Block Size: 256MB - Disk Target: /
MB/s, More Is Better
disk.test
MIN: 178.22 / MAX: 1158.44
403.30
SE +/- 4.51, N = 9
90
180
270
360
450
1. (CC) gcc options: -O2 -lm -lmpi
IOR 3.3.0
Block Size: 512MB - Disk Target: /
MB/s, More Is Better
disk.test
MIN: 139.13 / MAX: 926.83
439.57
SE +/- 0.52, N = 3
100
200
300
400
500
1. (CC) gcc options: -O2 -lm -lmpi
IOR 3.3.0
Block Size: 1024MB - Disk Target: /
MB/s, More Is Better
disk.test
MIN: 289.15 / MAX: 518.92
434.15
SE +/- 2.64, N = 3
90
180
270
360
450
1. (CC) gcc options: -O2 -lm -lmpi
IOR 3.3.0
Block Size: 2MB - Disk Target: Default Test Directory
MB/s, More Is Better
disk.test
MIN: 305.51 / MAX: 1480.18
1134.78
SE +/- 12.49, N = 3
200
400
600
800
1000
1. (CC) gcc options: -O2 -lm -lmpi

disk.test


IOR 3.3.0
Block Size: 4MB - Disk Target: Default Test Directory
MB/s, More Is Better
disk.test
MIN: 261.08 / MAX: 1822.74
1114.70
SE +/- 16.08, N = 3
200
400
600
800
1000
1. (CC) gcc options: -O2 -lm -lmpi
IOR 3.3.0
Block Size: 8MB - Disk Target: Default Test Directory
MB/s, More Is Better
disk.test
MIN: 286.24 / MAX: 1804.73
723.90
SE +/- 11.23, N = 15
160
320
480
640
800
1. (CC) gcc options: -O2 -lm -lmpi
IOR 3.3.0
Block Size: 16MB - Disk Target: Default Test Directory
MB/s, More Is Better
disk.test
MIN: 343.63 / MAX: 1793.25
778.61
SE +/- 10.24, N = 13
200
400
600
800
1000
1. (CC) gcc options: -O2 -lm -lmpi
IOR 3.3.0
Block Size: 32MB - Disk Target: Default Test Directory
MB/s, More Is Better
disk.test
MIN: 90.94 / MAX: 1395.48
352.62
SE +/- 12.57, N = 15
80
160
240
320
400
1. (CC) gcc options: -O2 -lm -lmpi
IOR 3.3.0
Block Size: 64MB - Disk Target: Default Test Directory
MB/s, More Is Better
disk.test
MIN: 110.92 / MAX: 1173.87
306.14
SE +/- 8.83, N = 12
70
140
210
280
350
1. (CC) gcc options: -O2 -lm -lmpi

disk.test



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