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Linux 3.12 File-System Test Preview

EXT4 and F2FS file-system preview benchmarks from the Linux 3.11 and Linux 3.12 kernels. Benchmarks by Michael Larabel for a future article on Phoronix.com.

Automated Executive Summary

Linux 3.11: F2FS had the most wins, coming in first place for 37% of the tests.

Based on the geometric mean of all complete results, the fastest (Linux 3.12 20130910: EXT4) was 1.042x the speed of the slowest (Linux 3.11: EXT4). Linux 3.12 20130910: F2FS was 0.983x the speed of Linux 3.11: F2FS, Linux 3.11: EXT4 was 0.986x the speed of Linux 3.12 20130910: F2FS, Linux 3.12 20130910: EXT4 was 1.042x the speed of Linux 3.11: EXT4.

Test Systems:

Linux 3.11: F2FS

Processor: Intel Core i7-4900MQ @ 2.80GHz (8 Cores), Motherboard: System76 Gazelle Professional, Chipset: Intel

Xeon E3-1200 v3/4th, Memory: 8192MB, Disk: 120GB INTEL SSDSC2CW12, Graphics: Intel 4th Gen Core IGP (1300MHz), Audio: Intel Haswell HDMI, Network: Realtek RTL8111/8168/8411 + Intel Centrino Advanced-N 6235

OS: Ubuntu 13.10, Kernel: 3.11.0-031100-generic (x86_64), Desktop: Unity 7.1.0, Display Server: Unity-System-Compositor 0.0.1 + X Server 1.14.2.901 (1.14.3 RC 1), Display Driver: intel 2.21.14, OpenGL: 3.1 Mesa 9.2.0, Compiler: GCC 4.8, File-System: F2FS, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-browser-plugin --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-arch-directory=amd64 --with-ecj-jar=/usr/share/java/eclipse-ecj.jar --with-java-home=/usr/lib/jvm/java-1.5.0-gcj-4.8-amd64/jre --with-jvm-jar-dir=/usr/lib/jvm-exports/java-1.5.0-gcj-4.8-amd64 --with-jvm-root-dir=/usr/lib/jvm/java-1.5.0-gcj-4.8-amd64 --with-multilib-list=m32,m64,mx32 --with-tune=generic -v
Disk Notes: DEADLINE / acl,active_logs=6,background_gc=on,relatime,rw,user_xattr
System Notes: Disk Scheduler: DEADLINE. Python 2.7.5+.

Linux 3.12 20130910: F2FS

Processor: Intel Core i7-4900MQ @ 2.80GHz (8 Cores), Motherboard: System76 Gazelle Professional, Chipset: Intel Xeon E3-1200 v3/4th, Memory: 8192MB, Disk: 120GB INTEL SSDSC2CW12, Graphics: Intel 4th Gen Core IGP (1300MHz), Audio: Intel Haswell HDMI, Network: Realtek RTL8111/8168/8411 + Intel Centrino Advanced-N 6235

OS: Ubuntu 13.10, Kernel: 3.11.0-999-generic (x86_64), Desktop: Unity 7.1.0, Display Server: Unity-System-Compositor 0.0.1 + X Server 1.14.2.901 (1.14.3 RC 1), Display Driver: intel 2.21.14, OpenGL: 3.1 Mesa 9.2.0, Compiler: GCC 4.8, File-System: F2FS, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-browser-plugin --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-arch-directory=amd64 --with-ecj-jar=/usr/share/java/eclipse-ecj.jar --with-java-home=/usr/lib/jvm/java-1.5.0-gcj-4.8-amd64/jre --with-jvm-jar-dir=/usr/lib/jvm-exports/java-1.5.0-gcj-4.8-amd64 --with-jvm-root-dir=/usr/lib/jvm/java-1.5.0-gcj-4.8-amd64 --with-multilib-list=m32,m64,mx32 --with-tune=generic -v
Disk Notes: DEADLINE / acl,active_logs=6,background_gc=on,relatime,rw,user_xattr
System Notes: Disk Scheduler: DEADLINE. Python 2.7.5+.

Linux 3.11: EXT4

Processor: Intel Core i7-4900MQ @ 2.80GHz (8 Cores), Motherboard: System76 Gazelle Professional, Chipset: Intel Xeon E3-1200 v3/4th, Memory: 8192MB, Disk: 120GB INTEL SSDSC2CW12, Graphics: Intel 4th Gen Core IGP (1300MHz), Audio: Intel Haswell HDMI, Network: Realtek RTL8111/8168/8411 + Intel Centrino Advanced-N 6235

OS: Ubuntu 13.10, Kernel: 3.11.0-031100-generic (x86_64), Desktop: Unity 7.1.0, Display Server: Unity-System-Compositor 0.0.1 + X Server 1.14.2.901 (1.14.3 RC 1), Display Driver: intel 2.21.14, OpenGL: 3.1 Mesa 9.2.0, Compiler: GCC 4.8, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-browser-plugin --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-arch-directory=amd64 --with-ecj-jar=/usr/share/java/eclipse-ecj.jar --with-java-home=/usr/lib/jvm/java-1.5.0-gcj-4.8-amd64/jre --with-jvm-jar-dir=/usr/lib/jvm-exports/java-1.5.0-gcj-4.8-amd64 --with-jvm-root-dir=/usr/lib/jvm/java-1.5.0-gcj-4.8-amd64 --with-multilib-list=m32,m64,mx32 --with-tune=generic -v
Disk Notes: DEADLINE / data=ordered,relatime,rw
System Notes: Disk Scheduler: DEADLINE. Python 2.7.5+.

Linux 3.12 20130910: EXT4

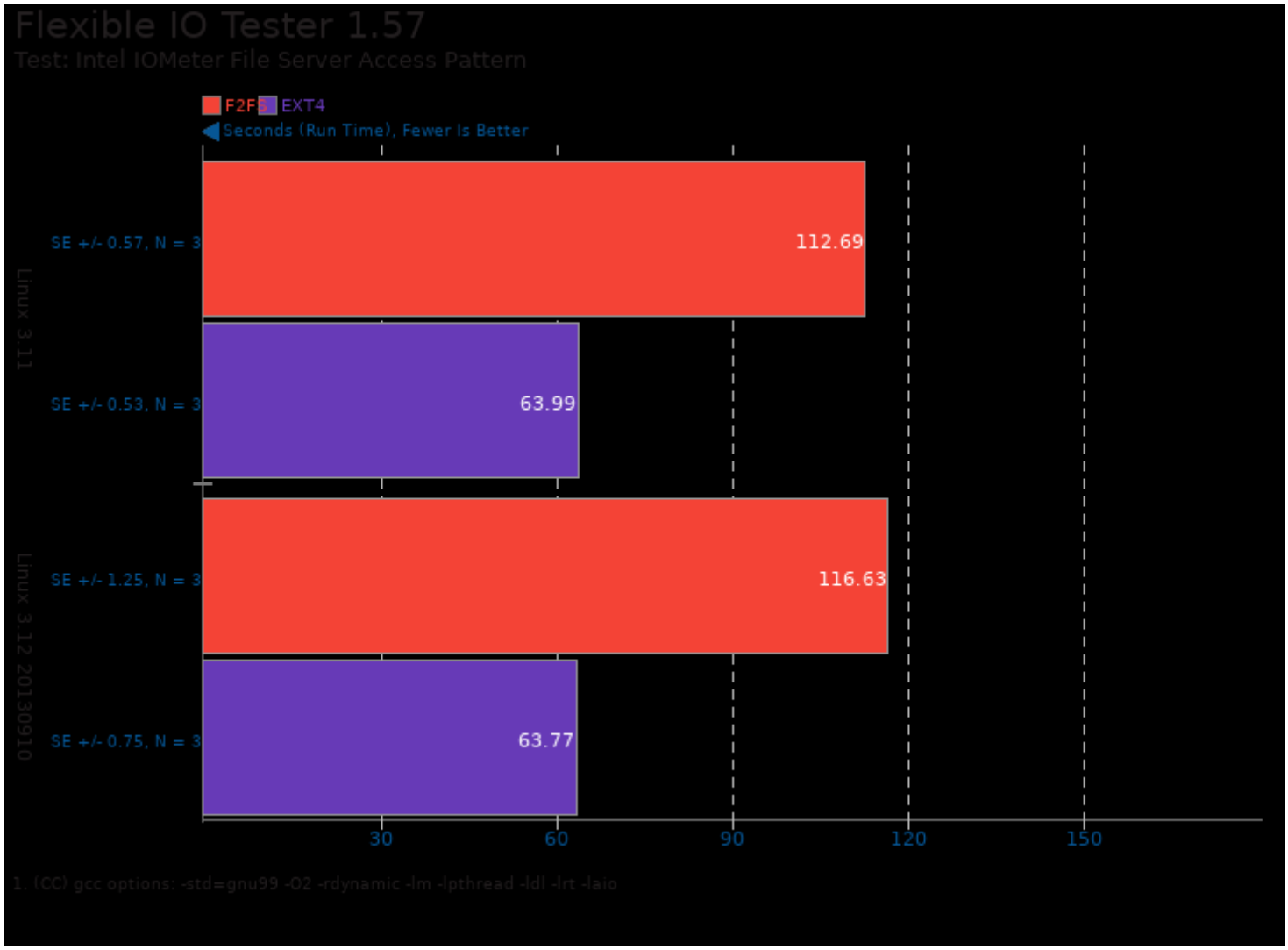
Processor: Intel Core i7-4900MQ @ 2.80GHz (8 Cores), Motherboard: System76 Gazelle Professional, Chipset: Intel Xeon E3-1200 v3/4th, Memory: 8192MB, Disk: 120GB INTEL SSDSC2CW12, Graphics: Intel 4th Gen Core IGP (1300MHz), Audio: Intel Haswell HDMI, Network: Realtek RTL8111/8168/8411 + Intel Centrino Advanced-N 6235

Linux 3.12 File-System Test Preview

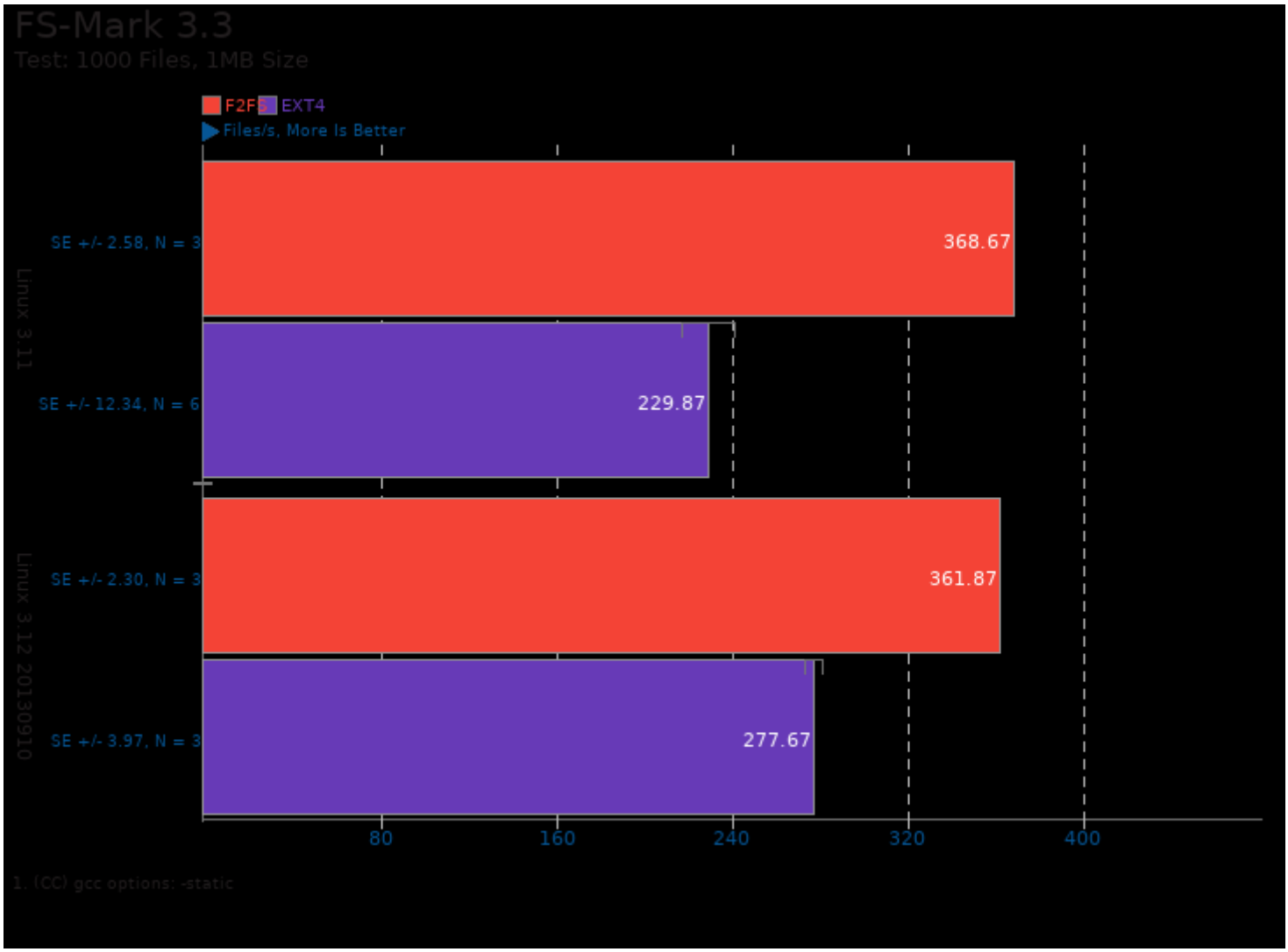
OS: Ubuntu 13.10, Kernel: 3.11.0-999-generic (x86_64), Desktop: Unity 7.1.0, Display Server: Unity-System-Compositor 0.0.1 + X Server 1.14.2.901 (1.14.3 RC 1), Display Driver: intel 2.21.14, OpenGL: 3.1 Mesa 9.2.0, Compiler: GCC 4.8, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-browser-plugin --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-arch-directory=amd64 --with-ecj-jar=/usr/share/java/eclipse-ecj.jar --with-java-home=/usr/lib/jvm/java-1.5.0-gcj-4.8-amd64/jre --with-jvm-jar-dir=/usr/lib/jvm-exports/java-1.5.0-gcj-4.8-amd64 --with-jvm-root-dir=/usr/lib/jvm/java-1.5.0-gcj-4.8-amd64 --with-multilib-list=m32,m64,mx32 --with-tune=generic -v
Disk Notes: DEADLINE / data=ordered,relatime,rw
System Notes: Disk Scheduler: DEADLINE. Python 2.7.5+.

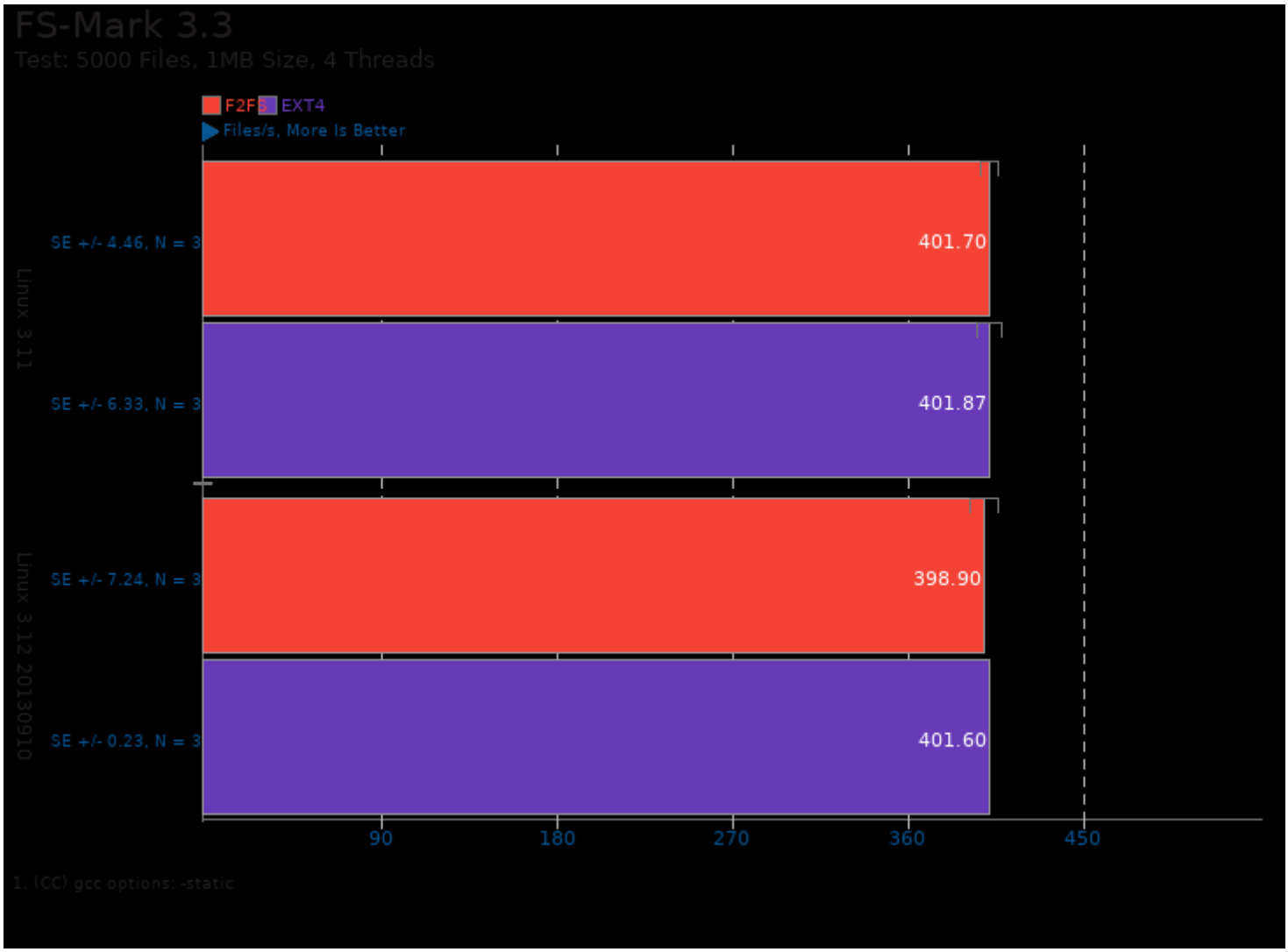
	Linux 3.11: F2FS	Linux 3.12 20130910: F2FS	Linux 3.11: EXT4	Linux 3.12 20130910: EXT4
Flexible IO Tester - I.I.F.S.A.P (sec (Run Time))	112.69	**116.63**	63.99	**63.77**
Normalized	56.59%	54.68%	99.66%	100%
Standard Deviation	0.9%	1.9%	1.4%	2%
FS-Mark - 1.F.1.S (Files/s)	**368.67**	361.87	**229.87**	277.67
Normalized	100%	98.16%	62.35%	75.32%
Standard Deviation	1.2%	1.1%	13.1%	2.5%
FS-Mark - 5.F.1.S.4.T (Files/s)	401.70	**398.90**	**401.87**	401.60
Normalized	99.96%	99.26%	100%	99.93%
Standard Deviation	1.9%	3.1%	2.7%	0.1%
FS-Mark - 4.F.3.S.D.1.S (Files/s)	**367.27**	358.47	**246.40**	275.93
Normalized	100%	97.6%	67.09%	75.13%
Standard Deviation	1.2%	0.9%	8.3%	0.7%
Dbench - 1 (MB/s)	**627.68**	622.91	**320.67**	327.04
Normalized	100%	99.24%	51.09%	52.1%
Standard Deviation	0.2%	0.4%	0.1%	0.2%
IOzone - 64Kb - 8GB - Write Performance (MB/s)	**486.55**	487.72	**488.33**	488.26
Normalized	99.64%	99.88%	100%	99.99%
Standard Deviation	0%	0.1%	0%	0.1%
Compile Bench - Compile (MB/s)	443.67	**435.24**	**600.56**	592.73
Normalized	73.88%	72.47%	100%	98.7%
Standard Deviation	0.3%	0.7%	0.5%	0.1%
Compile Bench - Initial Create (MB/s)	235.80	**228.87**	358.02	**365.09**
Normalized	64.59%	62.69%	98.06%	100%
Standard Deviation	0.7%	1.3%	3.3%	1.5%


Flexible IO Tester 1.57
Test: Intel IOMeter File Server Access Pattern
F2FS
EXT4
Seconds (Run Time), Fewer Is Better
SE +/- 0.57, N = 3
112.69
SE +/- 0.53, N = 3
63.99
SE +/- 1.25, N = 3
116.63
SE +/- 0.75, N = 3
63.77
Linux 3.11
Linux 3.12 20130910
30
60
90
120
150
1. (CC) gcc options: -std=gnu99 -O2 -rdynamic -lm -lpthread -ldl -lrt -laio

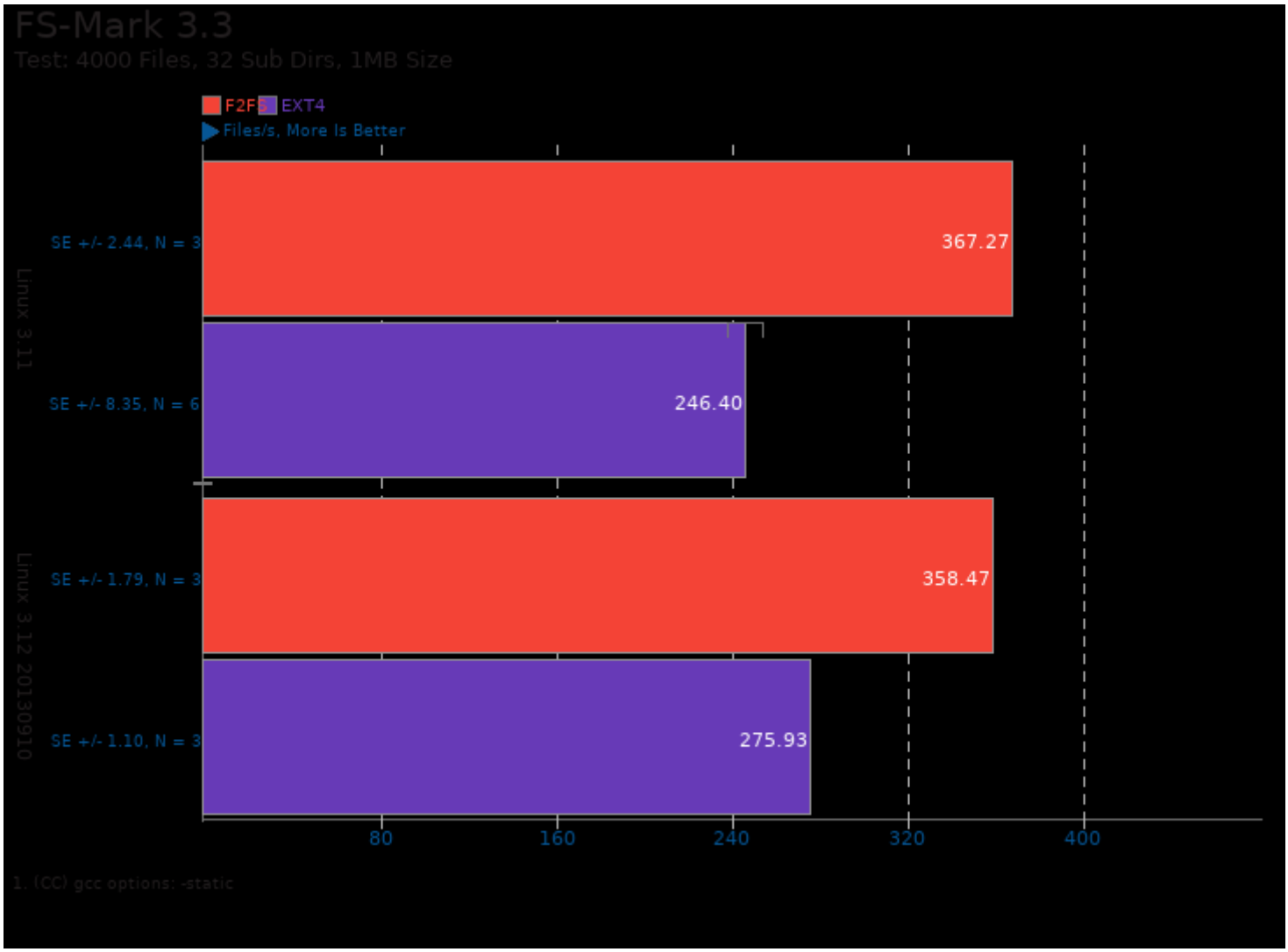
Linux 3.12 File-System Test Preview



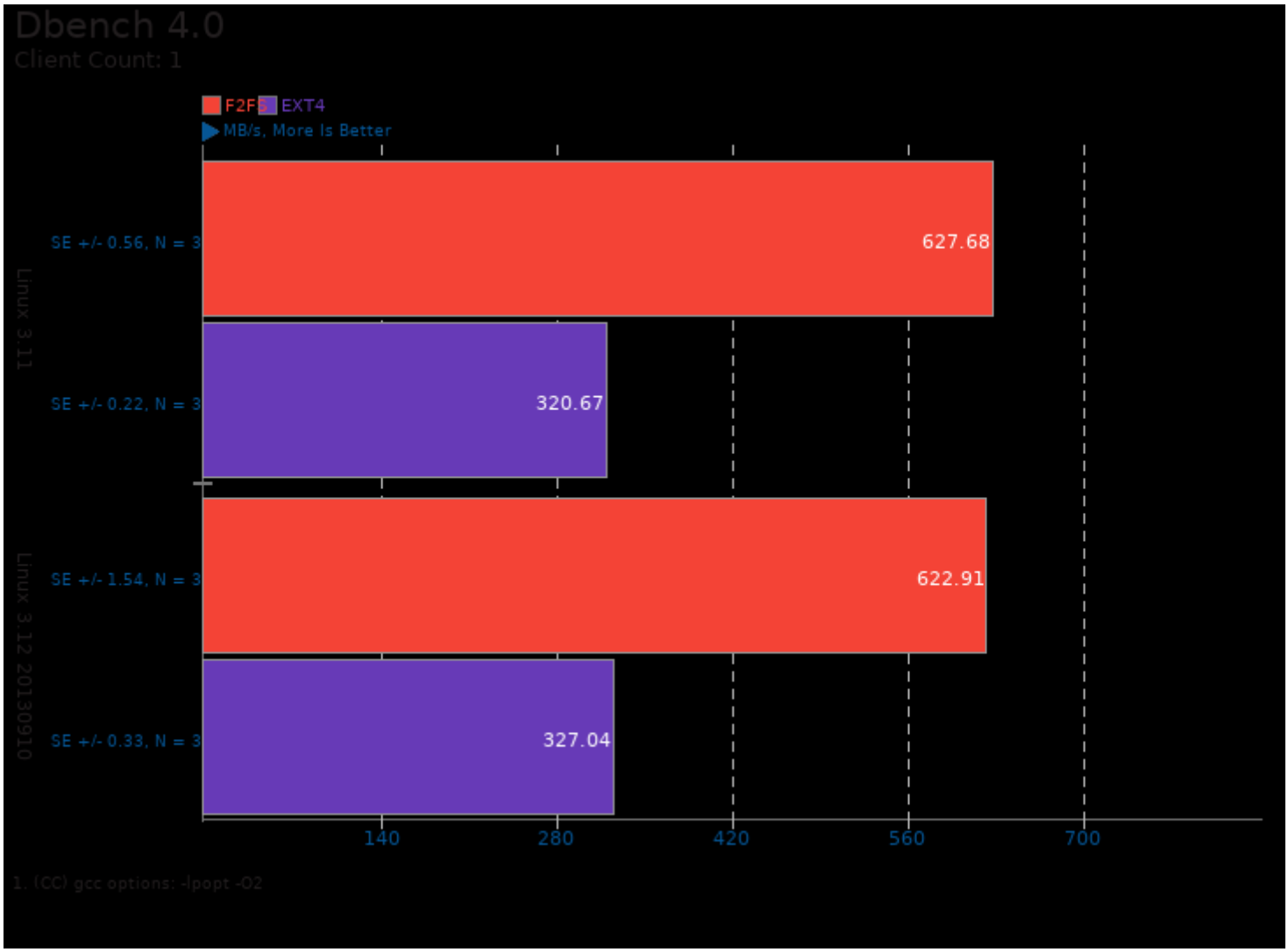
Linux 3.12 File-System Test Preview



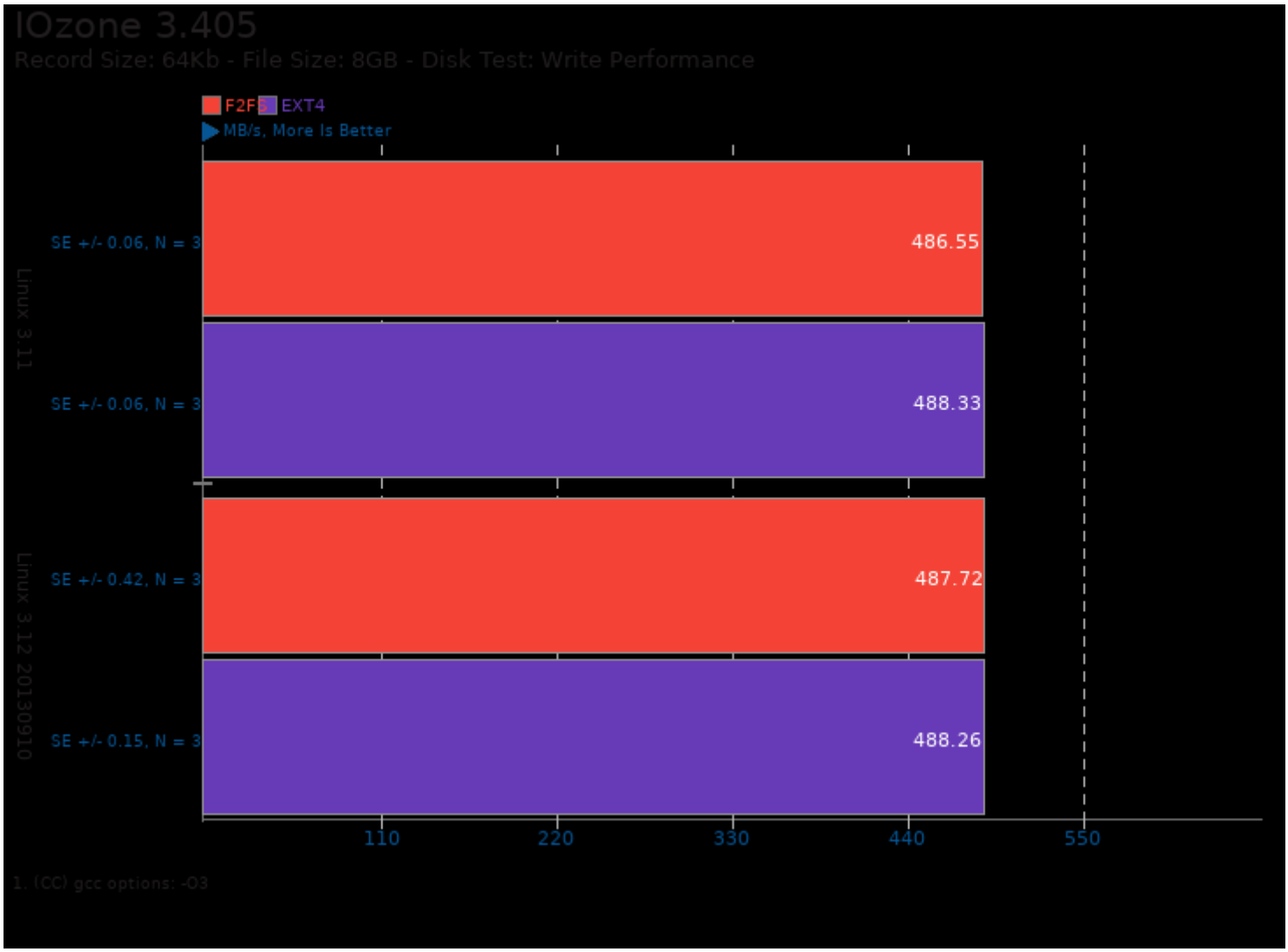
Linux 3.12 File-System Test Preview



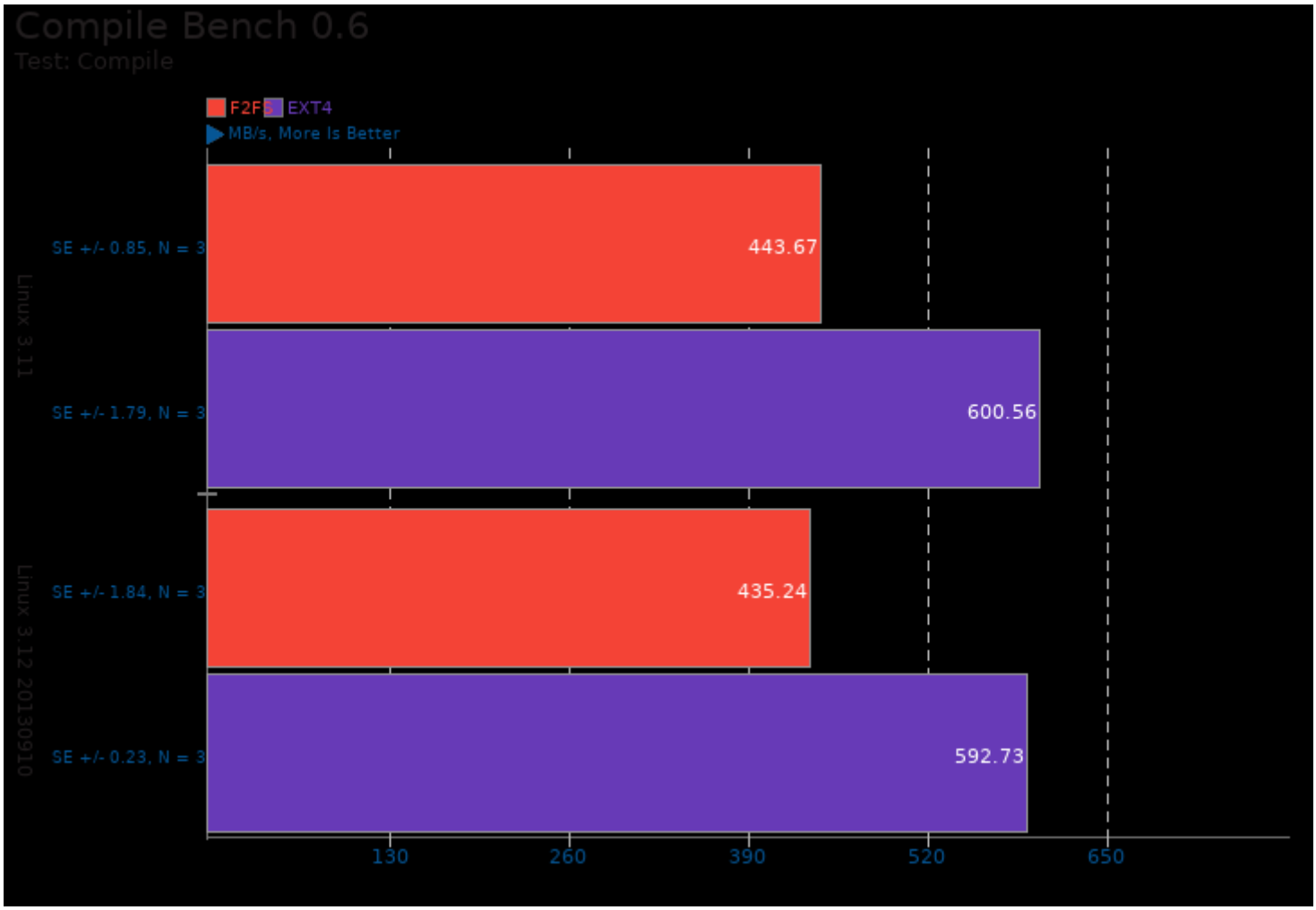
Linux 3.12 File-System Test Preview

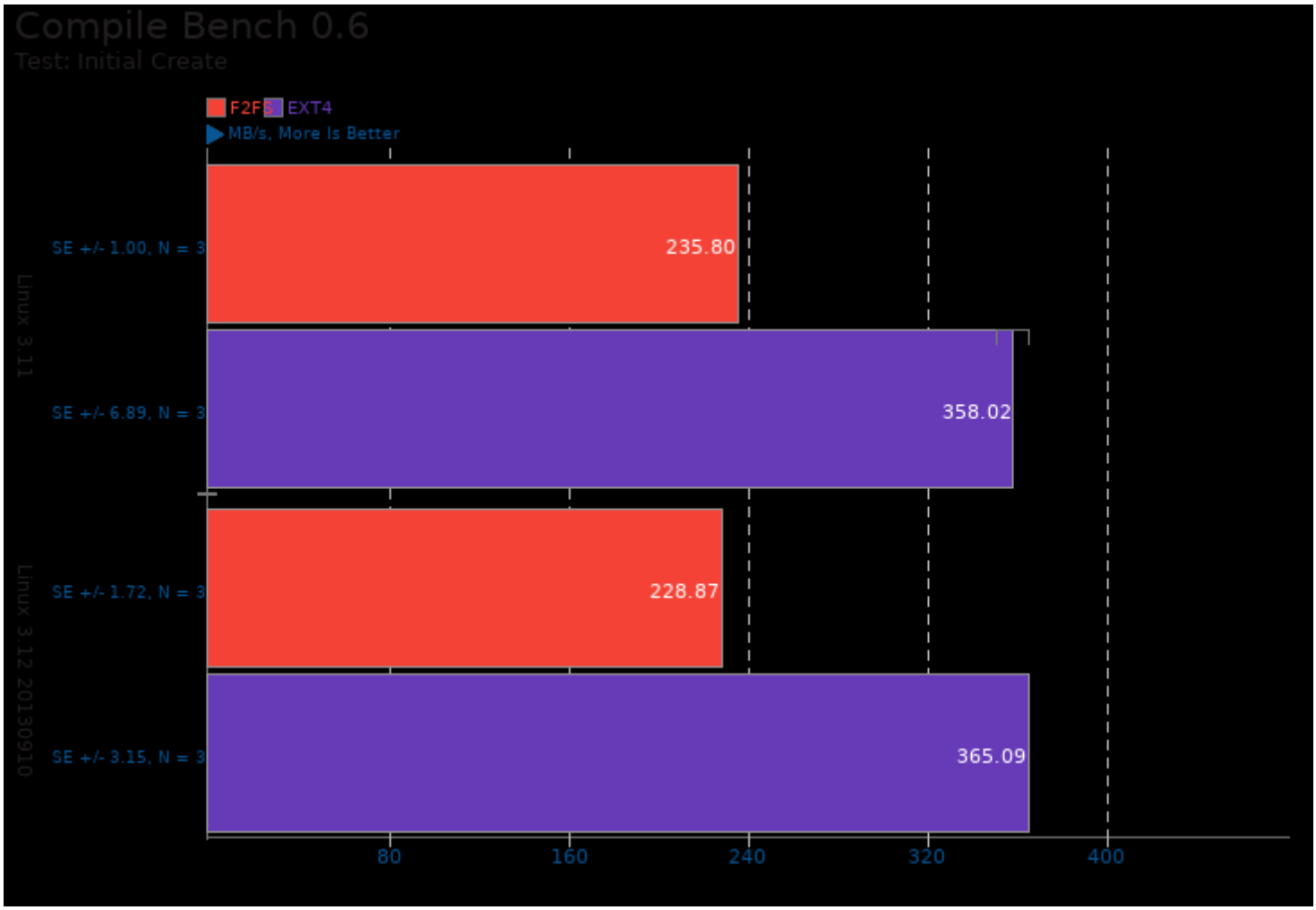


Linux 3.12 File-System Test Preview



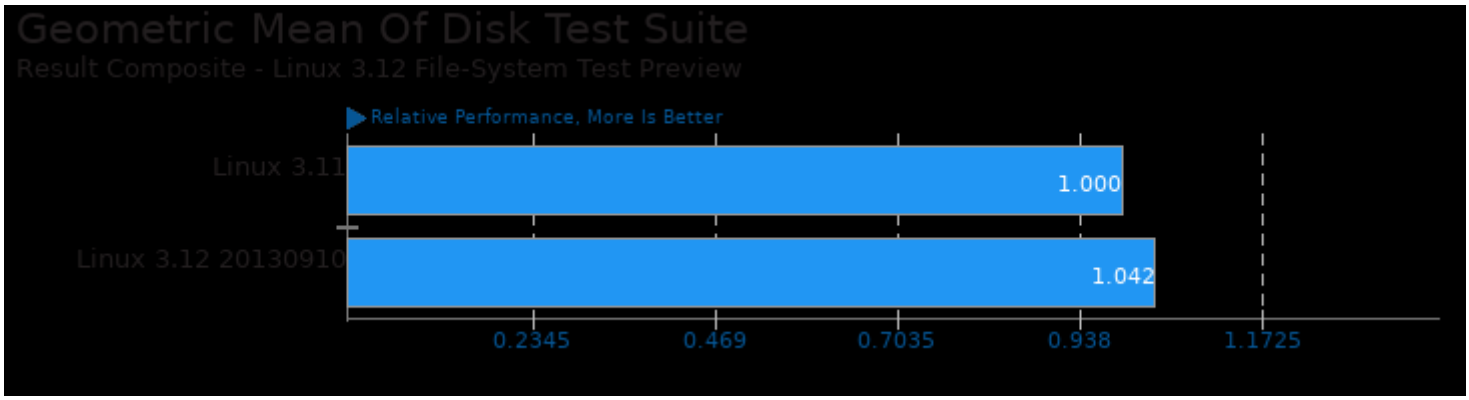
Linux 3.12 File-System Test Preview




Compile Bench 0.6
Test: Initial Create
F2FS
EXT4
MB/s, More Is Better
SE +/- 1.00, N = 3
235.80
SE +/- 6.89, N = 3
358.02
SE +/- 1.72, N = 3
228.87
SE +/- 3.15, N = 3
365.09
Linux 3.11
Linux 3.12 20130910
80
160
240
320
400

Linux 3.12 File-System Test Preview

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



Geometric mean based upon tests: pts/fs-mark, pts/compilebench, pts/iozone, pts/dbench and pts/fio

This file was automatically generated via the Phoronix Test Suite benchmarking software on Thursday, 28 March 2024 21:26.