

Linux 4.14 File-System Benchmarks: Btrfs, EXT4, F2FS, XFS

Written by [Michael Larabel](#) in [Software](#) on 18 November 2017. **Page 1 of 3.** [Add A Comment](#)

Our latest Linux file-system benchmarking is looking at the performance of the mainline Btrfs, EXT4, F2FS, and XFS file-systems on the Linux 4.14 kernel compared to 4.13 and 4.12.

In looking to see how the file-system/disk performance has changed if at all under the newly released [Linux 4.14 kernel](#), I carried out some 4.12/4.13/4.14 benchmarks using Btrfs/EXT4/F2FS/XFS while freshly formatting the drive each time and using the default mount options.



If you are unfamiliar with the storage-related changes of Linux 4.14 or the kernel changes in general, see our [Linux 4.14 feature overview](#). Separately, we've also already tested [Btrfs Zstd compression comparison](#) as perhaps the most user-facing file-system change of 4.14. EXT4 in Linux 4.14 saw some scalability improvements meanwhile, F2FS saw some tuning to benefit Android, and Btrfs and XFS saw some fixes as well.

File-System	Linux 4.12				Linux 4.13				Linux 4.14			
	Btrfs	EXT4	F2FS	XFS	Btrfs	EXT4	F2FS	XFS	Btrfs	EXT4	F2FS	XFS
Processor	2 x Intel Xeon Gold 6138 @ 3.70GHz (40 Cores / 80 Threads)											
Motherboard	TYAN S7106											
Chipset	Intel Device 2020											
Memory	12 x \$192 MB DDR4-2666MHz Micron											
Disk	256GB Samsung SSD 850 + 2000GB Seagate ST2000DM006-2DM1 + 2 x 120GB TOSHIBA-TR150											
Graphics	ASPEED ASPEED Family											
Network	Intel I210 Gigabit Connection											
OS	Debian 9.2											
Kernel	4.12.0-041200-generic (x86_64)				4.13.0-041300-generic (x86_64)				4.14.0-041400-generic (x86_64)			
Desktop	GNOME Shell 3.22.3											
Compiler	GCC 6.3.0 20170516											
File-System	btrfs	ext4	f2fs	xfs	btrfs	ext4	f2fs	xfs	btrfs	ext4	f2fs	xfs
Screen Resolution	1024x768											
Compiler Details												
<pre>--build=x86_64-linux-gnu --disable-browser-plugin --disable-vtable-verify --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,ada,c++,java,go,d,fortran,objc,obj-c++ --enable-libbmx --enable-libstdc++-debug --enable-libstdc++-time=yes --enable-multilib --enable-multilib --enable-nls --enable-objc-gc=auto --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-arch-directory=amd64 --with-default-libstdc++-abi=new --with-multilib-list=m32,m64,mx32 --with-target-system-zlib --with-tune=generic -v</pre>												
Disk Details												
<pre>- Linux 4.12: Btrfs: CFQ / relatime,rw,space_cache,ssd,subvol=/,subvol=5 - Linux 4.12: EXT4: CFQ / data=ordered,relatime,rw - Linux 4.12: F2FS: CFQ / acl,active_logs=6,background_gc=on,extent_cache,flush_merge,inline_data,inline_dentry,inline_xattr,lazytime,mode=adaptive,no_head - Linux 4.12: XFS: CFQ / attr2,inode64,noquota,relatime,rw - Linux 4.13: Btrfs: CFQ / relatime,rw,space_cache,ssd,subvol=/,subvol=5 - Linux 4.13: EXT4: CFQ / data=ordered,relatime,rw - Linux 4.13: F2FS: CFQ / acl,active_logs=6,background_gc=on,extent_cache,flush_merge,inline_data,inline_dentry,inline_xattr,lazytime,mode=adaptive,no_head - Linux 4.13: XFS: CFQ / attr2,inode64,noquota,relatime,rw - Linux 4.14: Btrfs: CFQ / relatime,rw,space_cache,ssd,subvol=/,subvol=5 - Linux 4.14: EXT4: CFQ / data=ordered,relatime,rw - Linux 4.14: F2FS: CFQ / acl,active_logs=6,background_gc=on,extent_cache,flush_merge,inline_data,inline_dentry,inline_xattr,lazytime,mode=adaptive,no_head - Linux 4.14: XFS: CFQ / attr2,inode64,noquota,relatime,rw</pre>												
Processor Details												
- Scaling Governor: intel_pstate performance												

OpenBenchmarking.org

These Linux 4.14 storage tests were done using the dual Intel Xeon Gold Tyan 1U server. All the details outlined in the system table. A Toshiba TR-150 was used as the test drive while the OS drive was the Samsung 850 PRO SSD.

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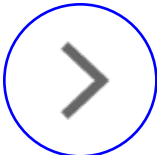
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