



www.phoronix-test-suite.com

pgbench-ext4-SATA

DB performance testing by FS: SATA attached variable rpm HD with ext4

Automated Executive Summary

DB performance by FS: Btrfs on 7200rpm SAS drive had the most wins, coming in first place for 44% of the tests.

Based on the geometric mean of all complete results, the fastest (DB performance by FS: USB3 attached SATA enclosure 7200rpm HD with BTRFS) was 2.059x the speed of the slowest (DB performance by FS: USB2 attached SATA enclosure 7200rpm HD with ext4). DB performance by FS: USB3 attached SATA enclosure 7200rpm HD with BTRFS compress:zlib was 0.928x the speed of DB performance by FS: USB3 attached SATA enclosure 7200rpm HD with BTRFS, DB performance by FS: Btrfs on 7200rpm SAS drive was 0.93x the speed of DB performance by FS: USB3 attached SATA enclosure 7200rpm HD with BTRFS compress:zlib, DB performance by FS: SATA variable rpm HD with ext4 was 0.678x the speed of DB performance by FS: Btrfs on 7200rpm SAS drive, DB performance by FS: USB2 attached SATA enclosure 7200rpm HD with ext4 was 0.831x the speed of DB performance by FS: SATA variable rpm HD with ext4.

The results with the greatest spread from best to worst included:

PostgreSQL pgbench (Scaling Factor: 1 - Clients: 100 - Mode: Read Only - Average Latency) at 1.2x

PostgreSQL pgbench (Scaling Factor: 1 - Clients: 100 - Mode: Read Only) at 1.199x

PostgreSQL pgbench (Scaling Factor: 1 - Clients: 50 - Mode: Read Only - Average Latency) at 1.138x

OS: Gentoo/Linux, Kernel: 5.6.0-1137-ayufan-ge57f05e7bf8f (aarch64), Compiler: GCC 11.1.0, File-System: ext4

```
Compiler Notes: --bindir=/usr/aarch64-unknown-linux-gnu/gcc-bin/11.1.0 --build=aarch64-unknown-linux-gnu
--datadir=/usr/share/gcc-data/aarch64-unknown-linux-gnu/11.1.0 --disable-esp --disable-fixed-point --disable-libada --disable-libssp --disable-libvtv --disable-multilib
--disable-systemtap --disable-valgrind-annotations --disable-vtable-verify --disable-werror --enable-_cxa_atexit --enable-checking=release --enable-clocale=gnu
--enable-default-pie --enable-default-ssp --enable-languages=c,c++,fortran --enable-libgomp --enable-libstdcxx-time --enable-lto --enable-nls --enable-obsolete
--enable-secureplt --enable-shared --enable-threads=posix --host=aarch64-unknown-linux-gnu --includedir=/usr/lib/gcc/aarch64-unknown-linux-gnu/11.1.0/include
--mandir=/usr/share/gcc-data/aarch64-unknown-linux-gnu/11.1.0/man --with-python-dir=/share/gcc-data/aarch64-unknown-linux-gnu/11.1.0/python --without-isl
--without-zstd
```

Processor Notes: Scaling Governor: cpufreq-dt schedutil

Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Vulnerable + spectre_v1: Mitigation of __user pointer sanitization + spectre_v2: Vulnerable + tsx_async_abort: Not affected

DB performance by FS: USB3 attached SATA enclosure 7200rpm HD with BTRFS

DB performance by FS: USB3 attached SATA enclosure 7200rpm HD with BTRFS compressed

Processor: ARMv8 Cortex-A72 @ 1.42GHz (6 Cores), Motherboard: Pine64 RockPro64 v2.1, Chipset: Fuzhou Rockchip RK3399, Memory: 4096MB, Disk: 4001GB HGST HDS5C4040AL + 8002GB HUH72808CLAR8000 + 4001GB + 2 x 8002GB 728080ALE600 + 31GB SD32G

OS: Gentoo/Linux, Kernel: 5.6.0-1137-ayufan-ge57f05e7bf8f (aarch64), Compiler: GCC 11.1.0, File-System: btrfs

```
Compiler Notes: --bindir=/usr/aarch64-unknown-linux-gnu/gcc-bin/11.1.0 --build=aarch64-unknown-linux-gnu
--datadir=/usr/share/gcc-data/aarch64-unknown-linux-gnu/11.1.0 --disable-esp --disable-fixed-point --disable-libada --disable-libssp --disable-libvtv --disable-multilib
--disable-systemtap --disable-valgrind-annotations --disable-vtable-verify --disable-werror --enable-_cxa_atexit --enable-checking=release --enable-clocale=gnu
--enable-default-pie --enable-default-ssp --enable-languages=c,c++,fortran --enable-libgomp --enable-libstdcxx-time --enable-lto --enable-nls --enable-obsolete
--enable-secureplt --enable-shared --enable-threads=posix --host=aarch64-unknown-linux-gnu --includedir=/usr/lib/gcc/aarch64-unknown-linux-gnu/11.1.0/include
--mandir=/usr/share/gcc-data/aarch64-unknown-linux-gnu/11.1.0/man --with-python-dir=/share/gcc-data/aarch64-unknown-linux-gnu/11.1.0/python --without-isl
--without-zstd
```

Processor Notes: Scaling Governor: cpufreq-dt schedutil

Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Vulnerable + spectre_v1: Mitigation of __user pointer sanitization + spectre_v2: Vulnerable + tsx_async_abort: Not affected

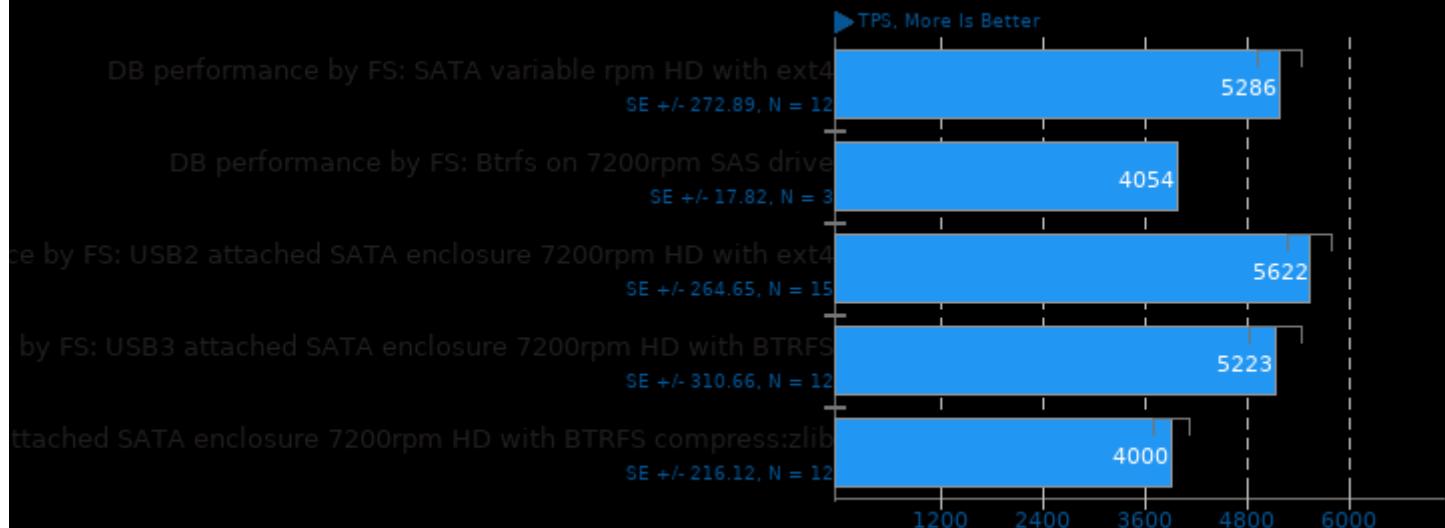
	DB performance by FS: SATA variable rpm HD with ext4	DB performance by FS: Btrfs on 7200rpm SAS drive	DB performance by FS: USB2 attached SATA enclosure	DB performance by FS: USB3 attached SATA enclosure	DB performance by FS: USB3 attached SATA enclosure
PostgreSQL pgbench - 1 - 1 - 5286	4054	5622	5223	4000	
Read Only (TPS)					
Normalized	94.02%	72.11%	100%	92.9%	71.15%
Standard Deviation	17.9%	0.8%	18.2%	20.6%	18.7%
PostgreSQL pgbench - 1 - 1 - 0.194	0.247	0.183	0.200	0.257	
Read Only - Average Latency					
Normalized	94.33%	74.09%	100%	91.5%	71.21%
Standard Deviation	15.9%	0.7%	17.2%	22.7%	16.8%
PostgreSQL pgbench - 1 - 1 - 92	31	240	69	59	
Read Write (TPS)					
Normalized	38.33%	12.92%	100%	28.75%	24.58%
Standard Deviation	0.5%	13.7%	40.2%	12.7%	14.8%

PostgreSQL pgbench - 100 - 50 - 405	2643	58	5233	9327
Read Only (TPS)				
Normalized	4.34%	28.34%	0.62%	56.11%
Standard Deviation	32.3%	104.4%	1.3%	86.2%
PostgreSQL pgbench - 100 - 50 - 130.745	31.995	861.414	29.753	5.371
Read Only - Average Latency				
Normalized	4.11%	16.79%	0.62%	18.05%
Standard Deviation	19.6%	90.7%	1.3%	110.2%
PostgreSQL pgbench - 1000 - 1 - 38	15		41	29
Read Only (TPS)				
Normalized	92.68%	36.59%	100%	70.73%
Standard Deviation	15.5%	65%	2.4%	20.9%
PostgreSQL pgbench - 1000 - 1 - 26.808	79.164		24.546	35.198
Read Only - Average Latency				
Normalized	91.56%	31.01%	100%	69.74%
Standard Deviation	16.1%	30.9%	2.3%	18.2%
PostgreSQL pgbench - 100 - 100	455	11077		
- Read Only (TPS)				
Normalized	4.11%	100%	32.34%	82.28%
Standard Deviation	25.1%	0.5%	123.1%	3.2%
PostgreSQL pgbench - 100 - 100	231.034	9.034		
- Read Only - Average Latency				
Normalized	3.91%	100%	6.43%	82.19%
Standard Deviation	21%	0.5%	90.6%	3%
PostgreSQL pgbench - 100 - 50 - 181	513	49	311	279
Read Write (TPS)				
Normalized	35.28%	100%	60.62%	54.39%
Standard Deviation	11%	7.3%	31.7%	20.7%
PostgreSQL pgbench - 100 - 50 - 278.676	98.101	1015	178.709	186.917
Read Write - Average Latency				
Normalized	35.2%	100%	54.89%	52.48%
Standard Deviation	10.9%	8.1%	37.6%	21%
PostgreSQL pgbench - 1000 - 1 - 16	13	21		11
Read Write (TPS)				
Normalized	76.19%	61.9%	100%	52.38%
Standard Deviation	32.7%	9%	7.4%	7.6%
PostgreSQL pgbench - 1000 - 1 - 66.228	76.699	48.883		87.963
Read Write - Average Latency				
Normalized	73.81%	63.73%	100%	55.57%
Standard Deviation	27%	9%	6.9%	7.5%
PostgreSQL pgbench - 1000 - 50	117	127	49	36
- Read Only (TPS)				
Normalized	92.13%	100%	38.58%	28.35%
Standard Deviation	10.2%	4.6%	14.4%	15.5%
PostgreSQL pgbench - 1000 - 50	431.577	394.256	1041	1423
- Read Only - Average Latency				
Normalized	91.35%	100%	37.89%	27.7%
Standard Deviation	9.3%	4.6%	15.7%	13.3%
PostgreSQL pgbench - 100 - 100	187	649	717	126
- Read Write (TPS)				
Normalized	26.08%	90.52%	100%	17.57%
Standard Deviation	14.3%	13.3%	16.5%	12.6%

PostgreSQL pgbench - 100 - 100	545.827	157.272	143.598	808.508
- Read Write - Average Latency				
Normalized	26.31%	91.31%		
Standard Deviation	16.2%	16.2%		
PostgreSQL pgbench - 1000 - 124				
100 - Read Only (TPS)		45	47	41
Normalized	100%	36.29%		
Standard Deviation	7.6%	8.7%		
PostgreSQL pgbench - 1000 - 814.103				
100 - Read Only - Average		2236	2161	2542
Latency (ms)				
Normalized	100%	36.41%	37.68%	32.03%
Standard Deviation	7.8%	8.2%	14.9%	19%
PostgreSQL pgbench - 1000 - 50				
- Read Write (TPS)		83	32	36
Normalized	80.72%	100%		
Standard Deviation	8.4%	6%		
PostgreSQL pgbench - 1000 - 50				
748.923		602.106	1720	1423
- Read Write - Average Latency				
Normalized	80.4%	100%	38.55%	43.37%
Standard Deviation	8.5%	5.8%	27.6%	18.8%
PostgreSQL pgbench - 1000 - 89				
100 - Read Write (TPS)		101	43	39
Normalized	88.12%	100%	42.57%	42.31%
Standard Deviation	2.2%	10.2%	1.3%	20.7%
PostgreSQL pgbench - 1000 - 1125				
100 - Read Write - Average		996.759	2319	2642
Latency (ms)				
Normalized	88.61%	100%	42.98%	38.61%
Standard Deviation	2.1%	10.8%	1.4%	16.5%

PostgreSQL pgbench 13.0

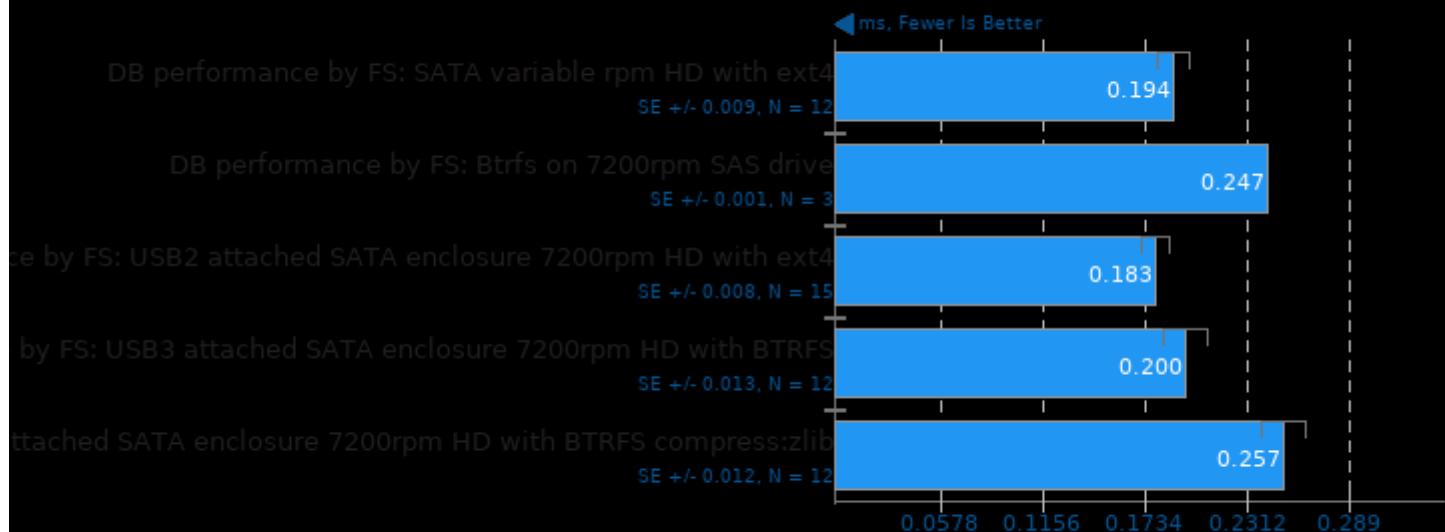
Scaling Factor: 1 - Clients: 1 - Mode: Read Only



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

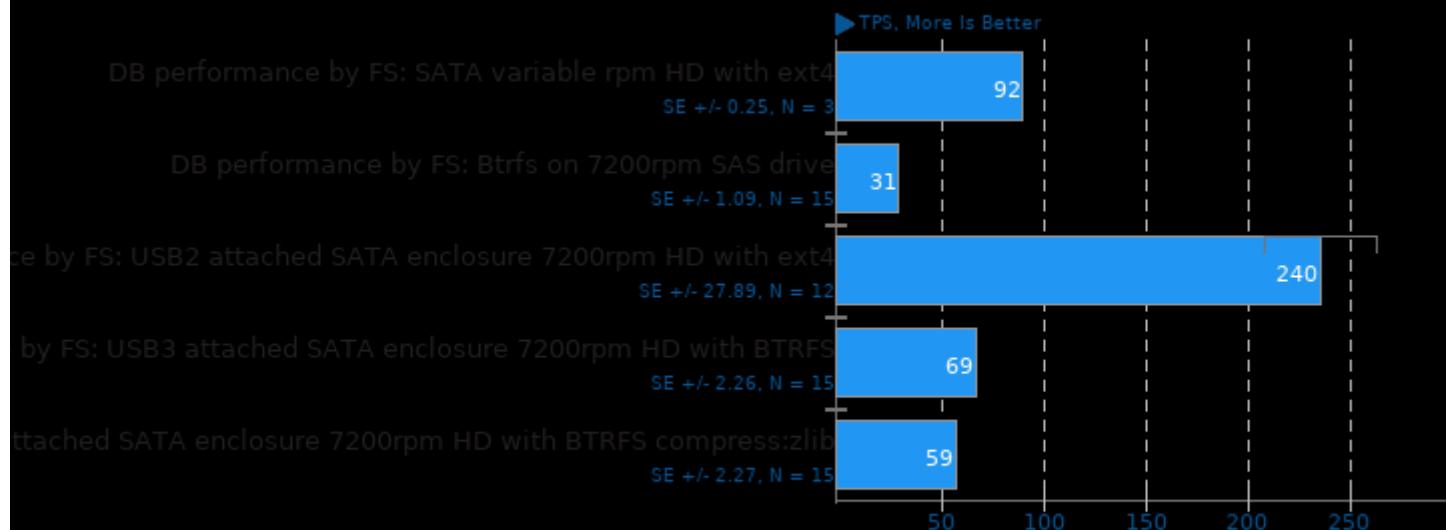
Scaling Factor: 1 - Clients: 1 - Mode: Read Only - Average Latency



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

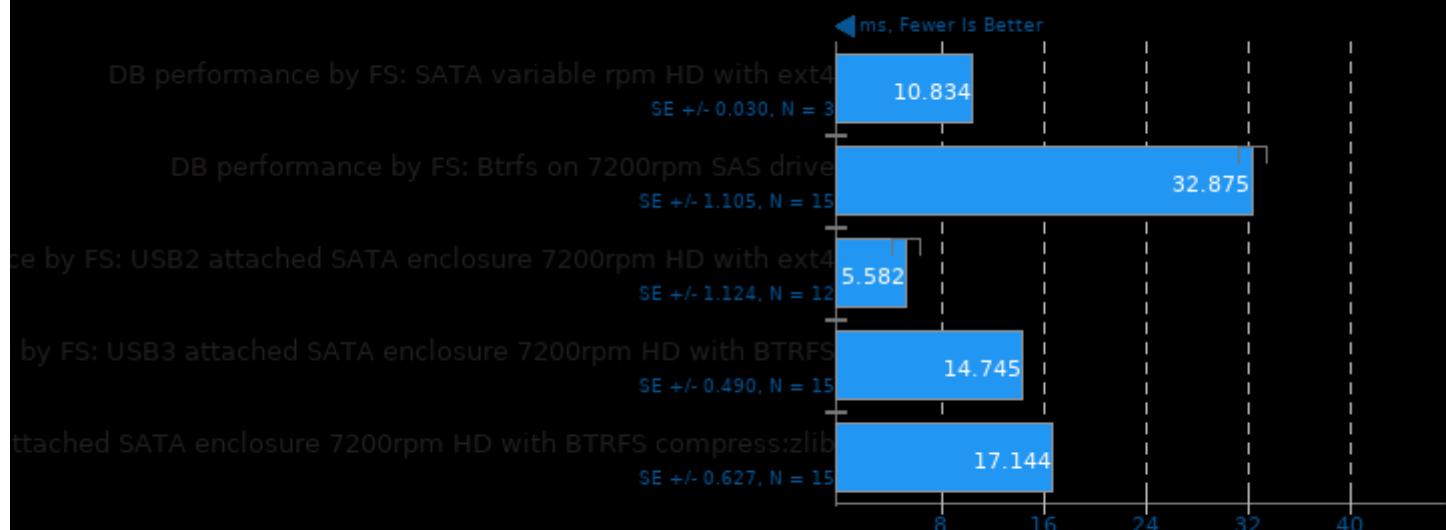
Scaling Factor: 1 - Clients: 1 - Mode: Read Write



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

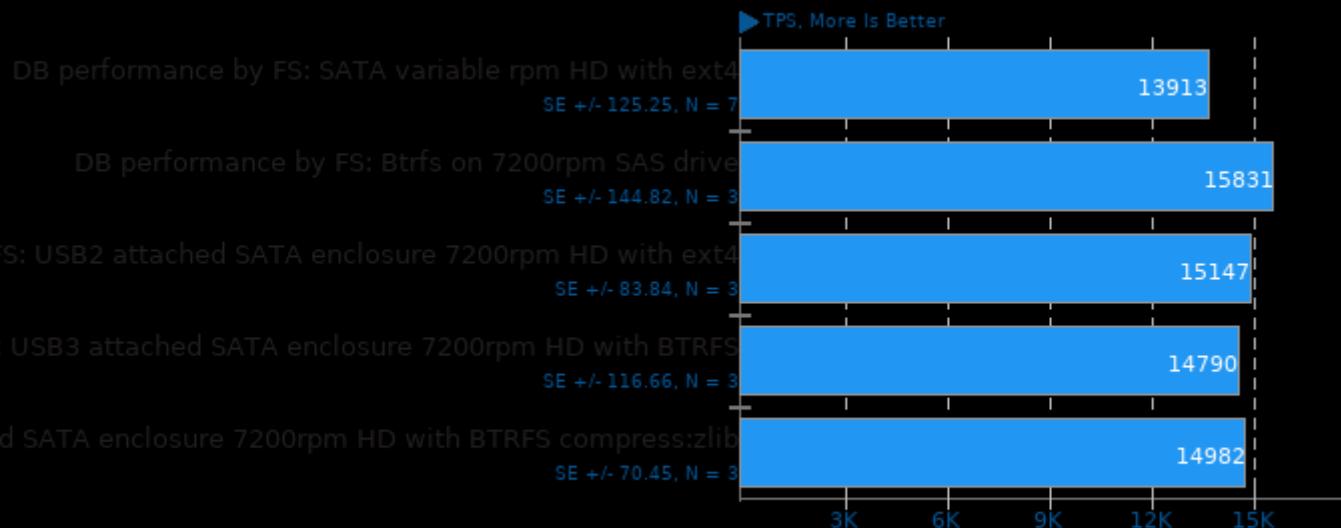
Scaling Factor: 1 - Clients: 1 - Mode: Read Write - Average Latency



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

Scaling Factor: 1 - Clients: 50 - Mode: Read Only



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

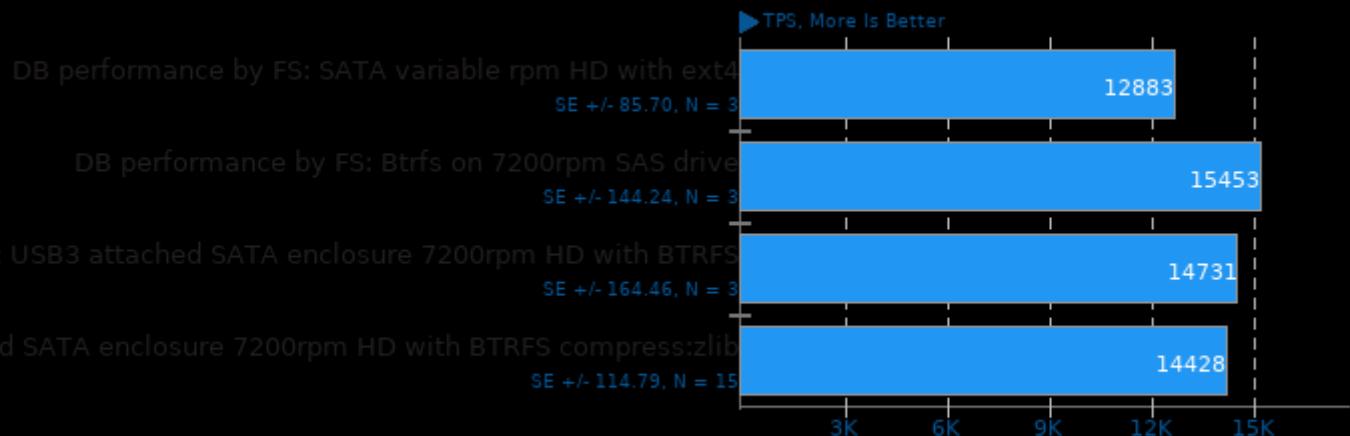
Scaling Factor: 1 - Clients: 50 - Mode: Read Only - Average Latency



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

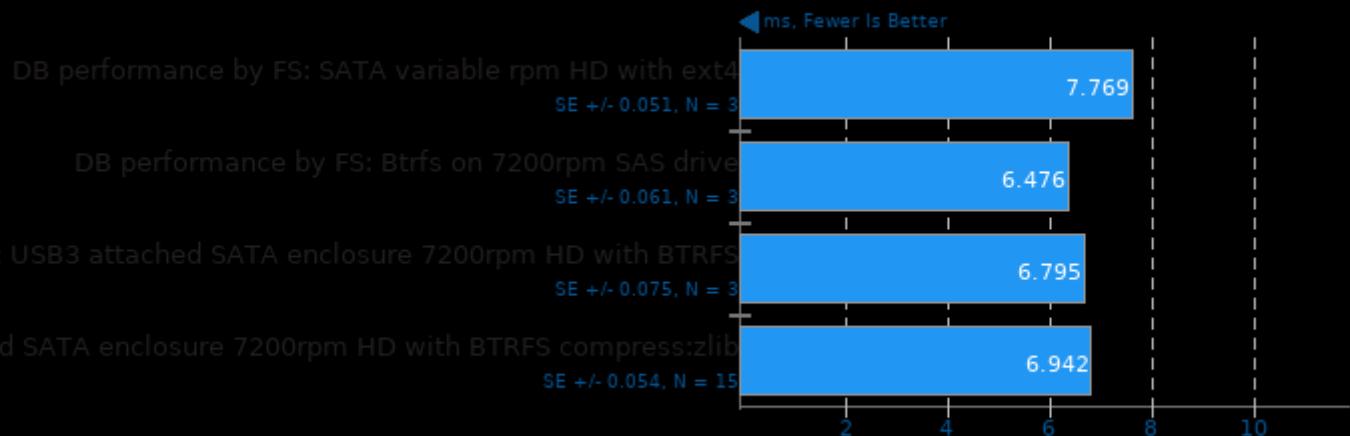
Scaling Factor: 1 - Clients: 100 - Mode: Read Only



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

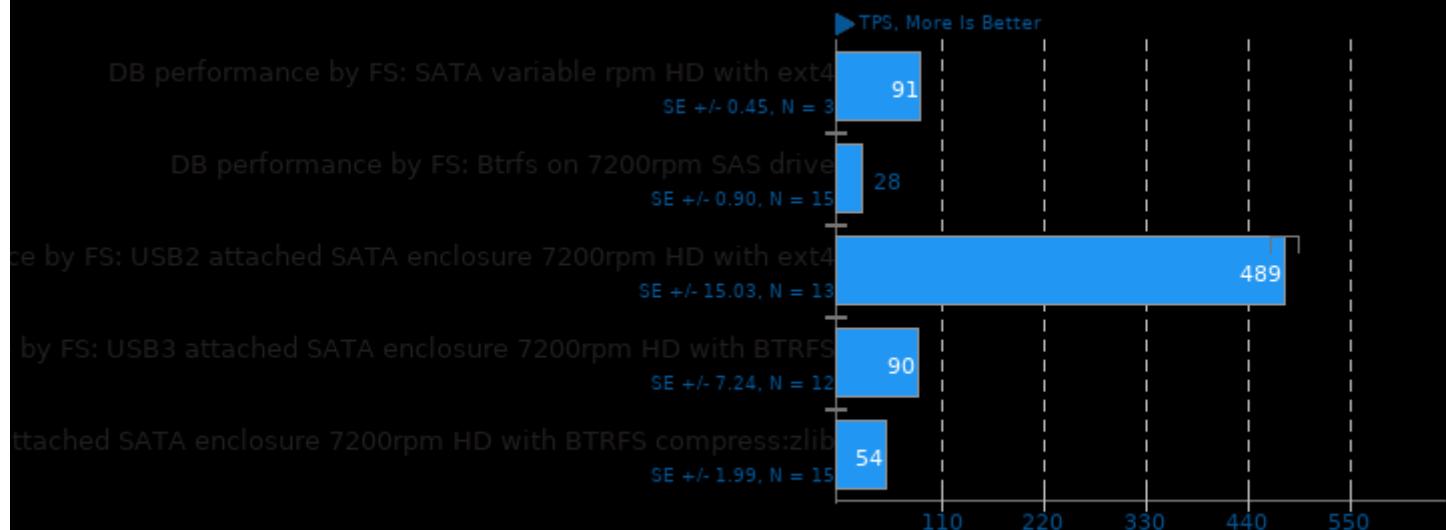
Scaling Factor: 1 - Clients: 100 - Mode: Read Only - Average Latency



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

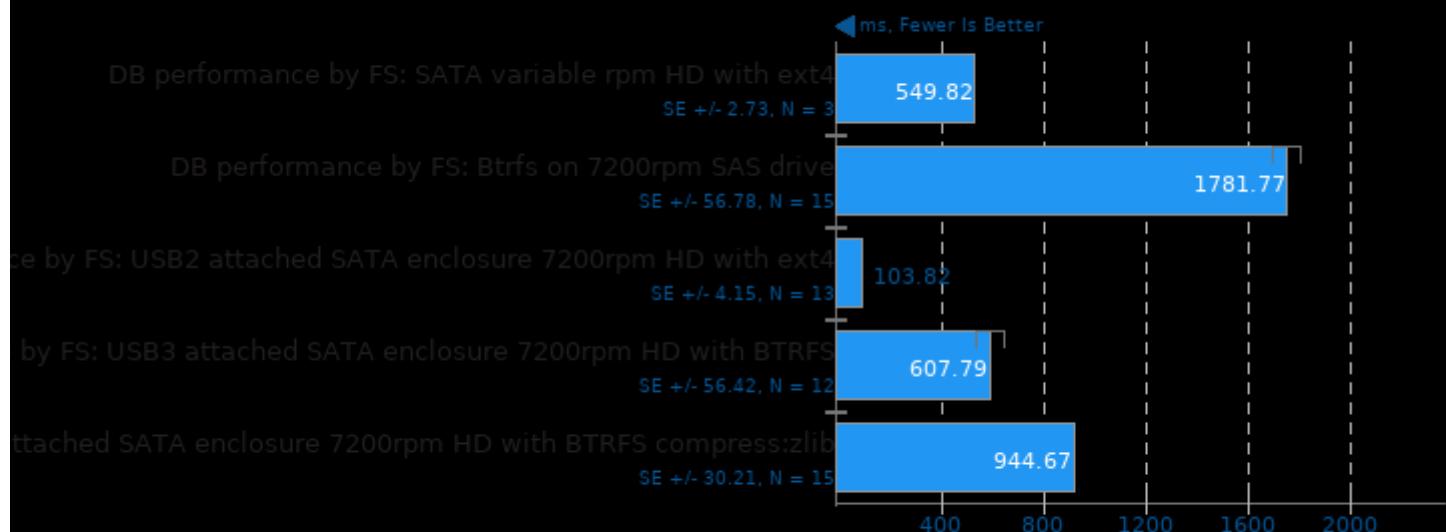
Scaling Factor: 1 - Clients: 50 - Mode: Read Write



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

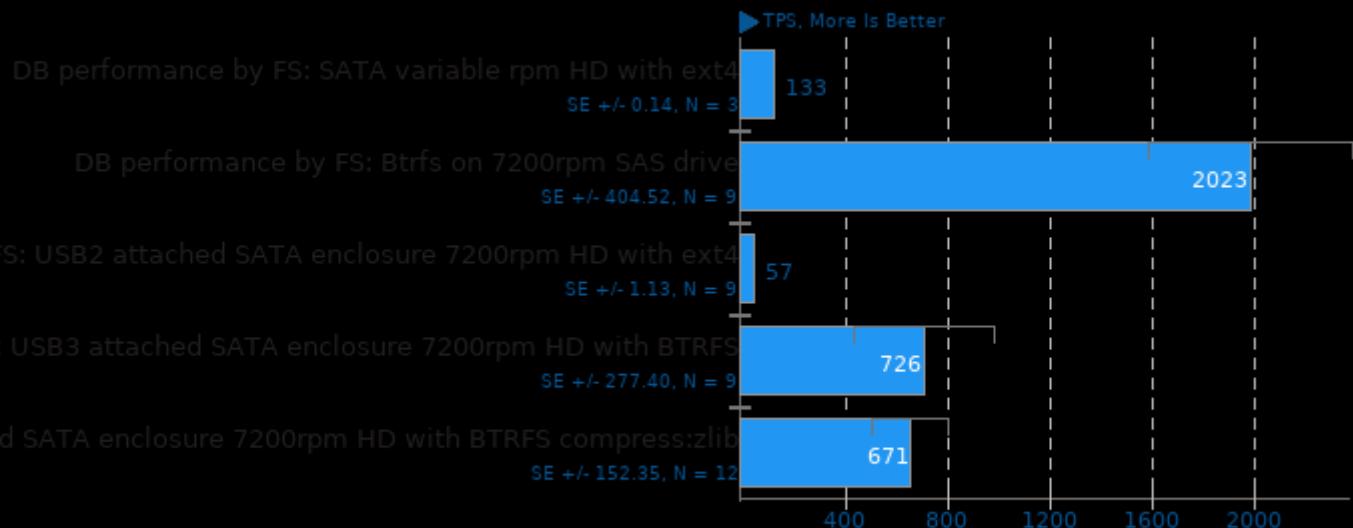
Scaling Factor: 1 - Clients: 50 - Mode: Read Write - Average Latency



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

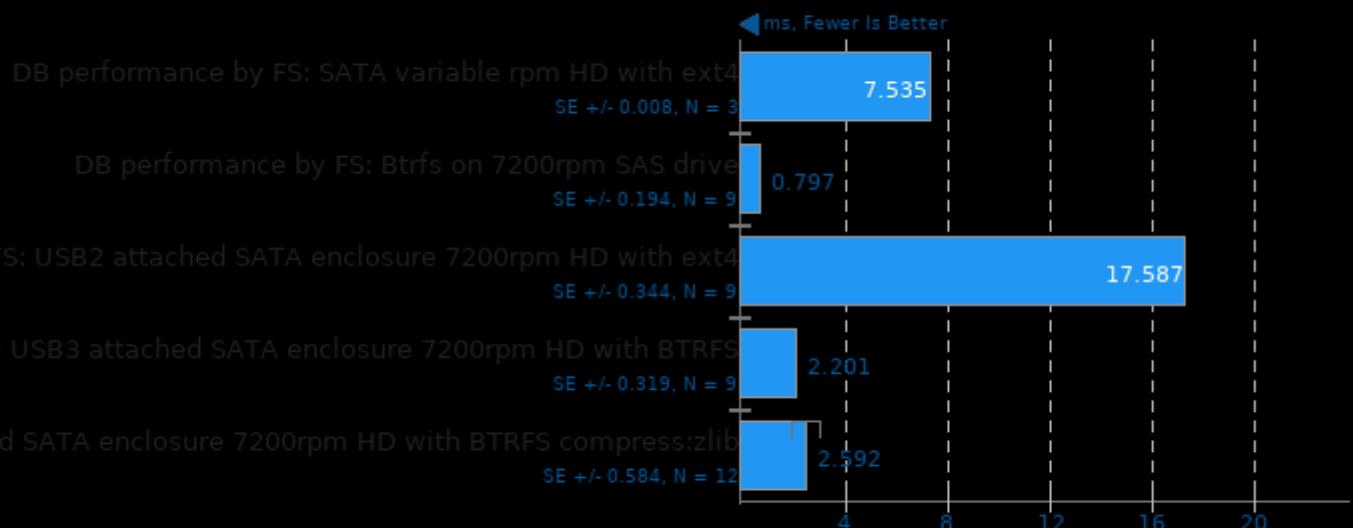
Scaling Factor: 100 - Clients: 1 - Mode: Read Only



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

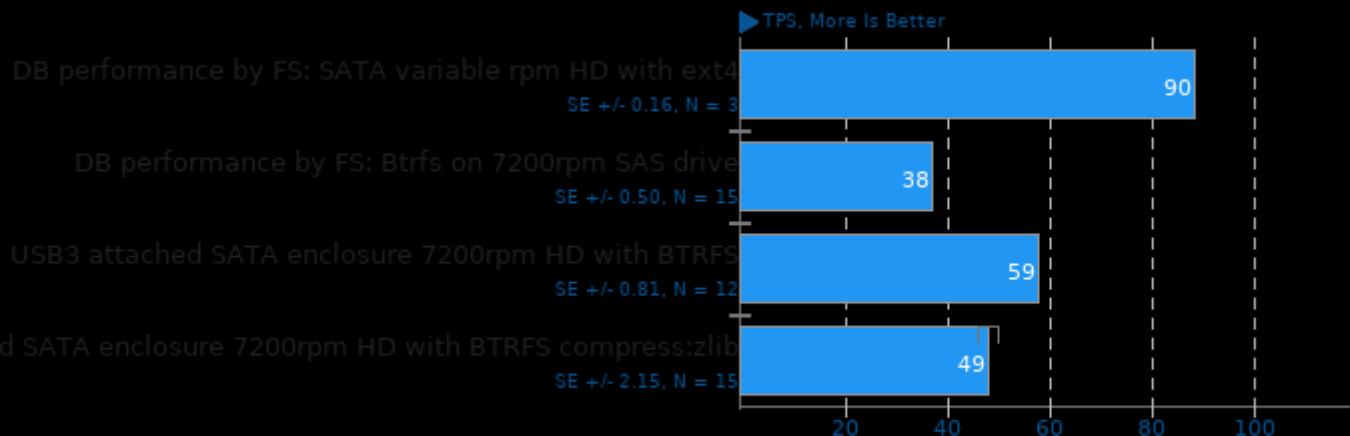
Scaling Factor: 100 - Clients: 1 - Mode: Read Only - Average Latency



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

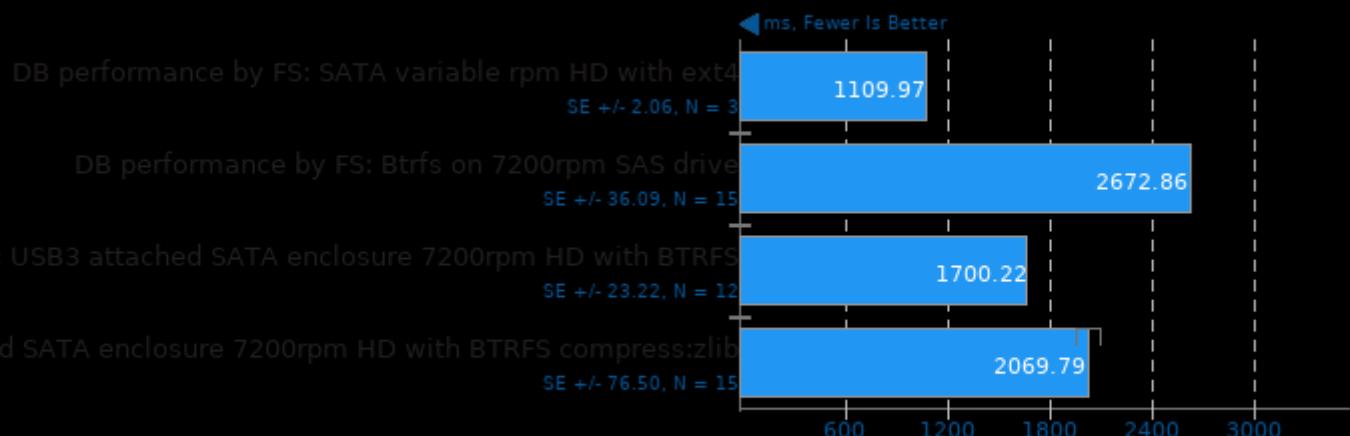
Scaling Factor: 1 - Clients: 100 - Mode: Read Write



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

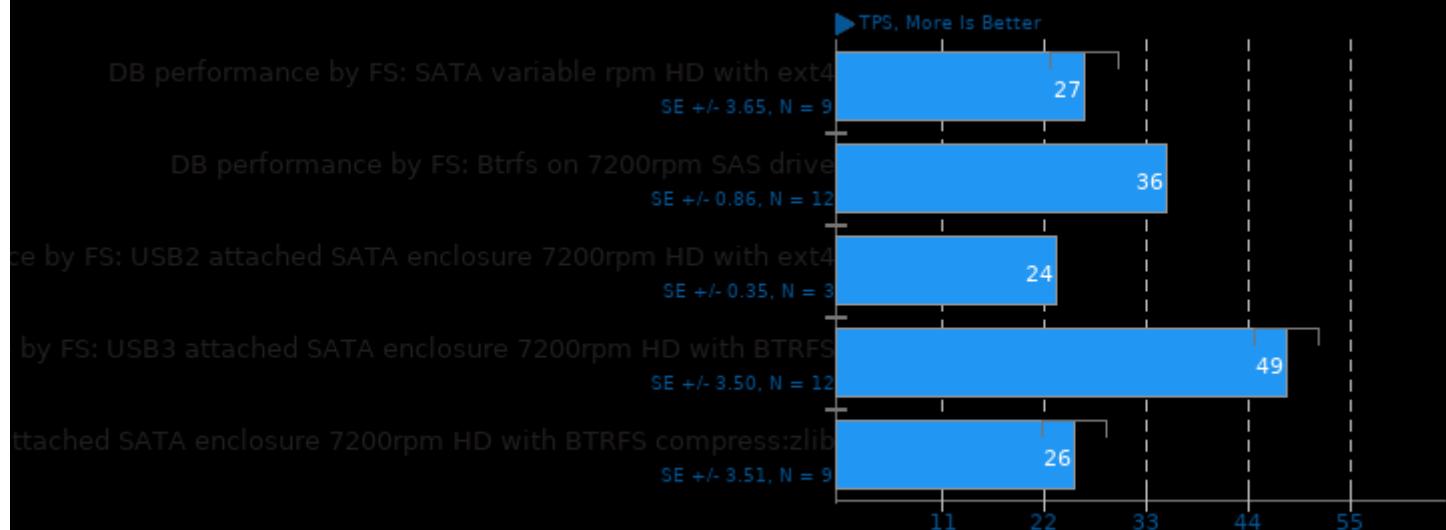
Scaling Factor: 1 - Clients: 100 - Mode: Read Write - Average Latency



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

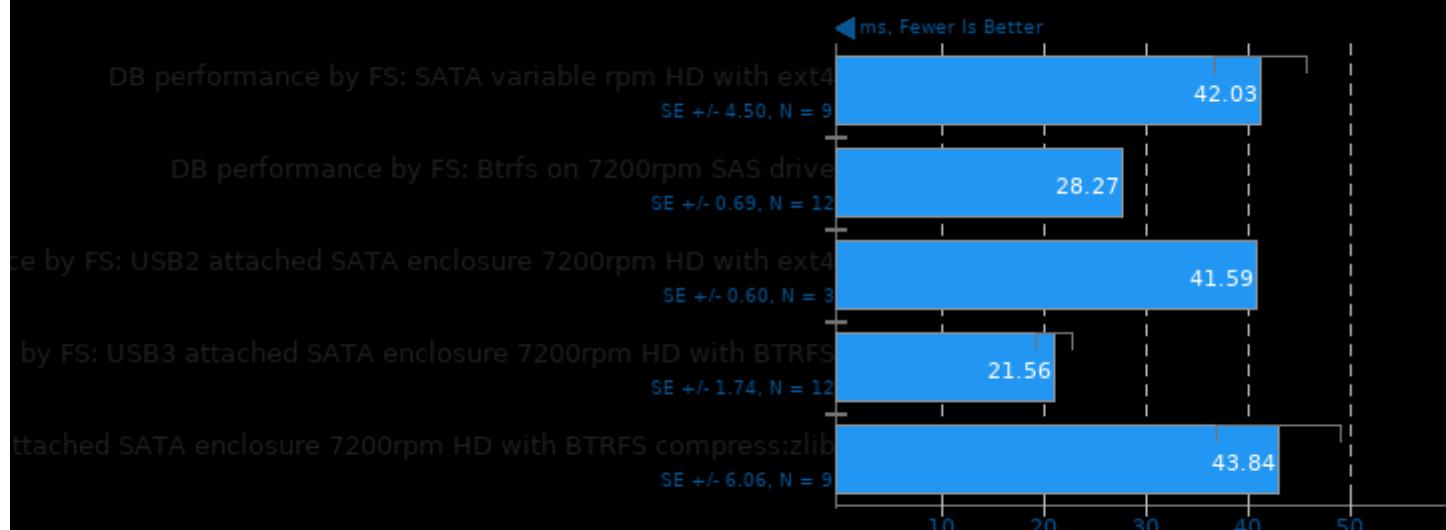
Scaling Factor: 100 - Clients: 1 - Mode: Read Write



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

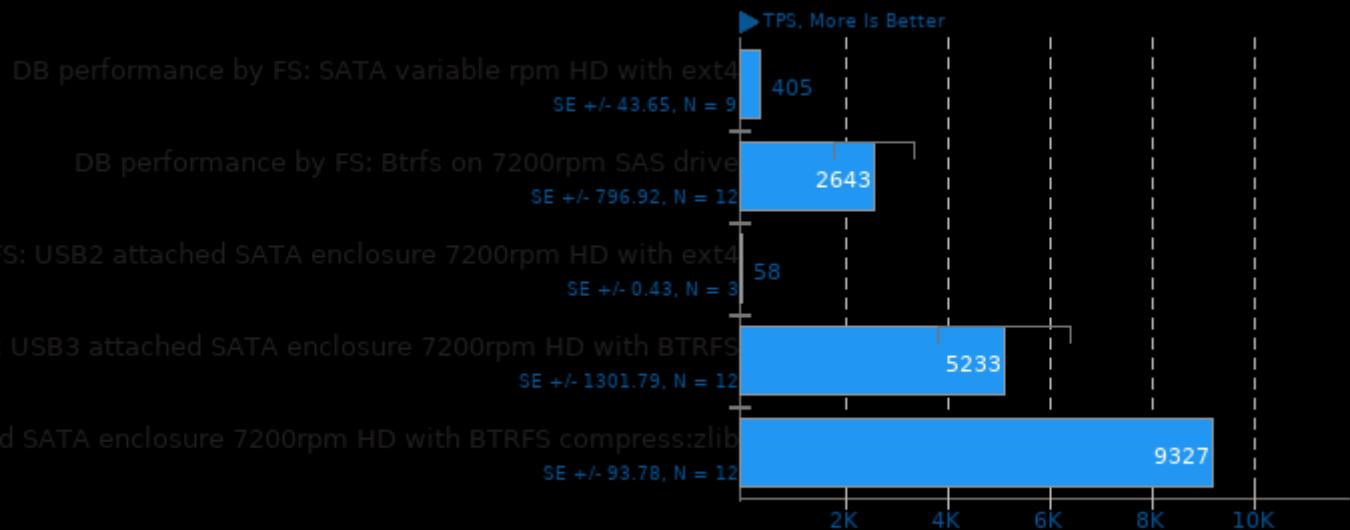
Scaling Factor: 100 - Clients: 1 - Mode: Read Write - Average Latency



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

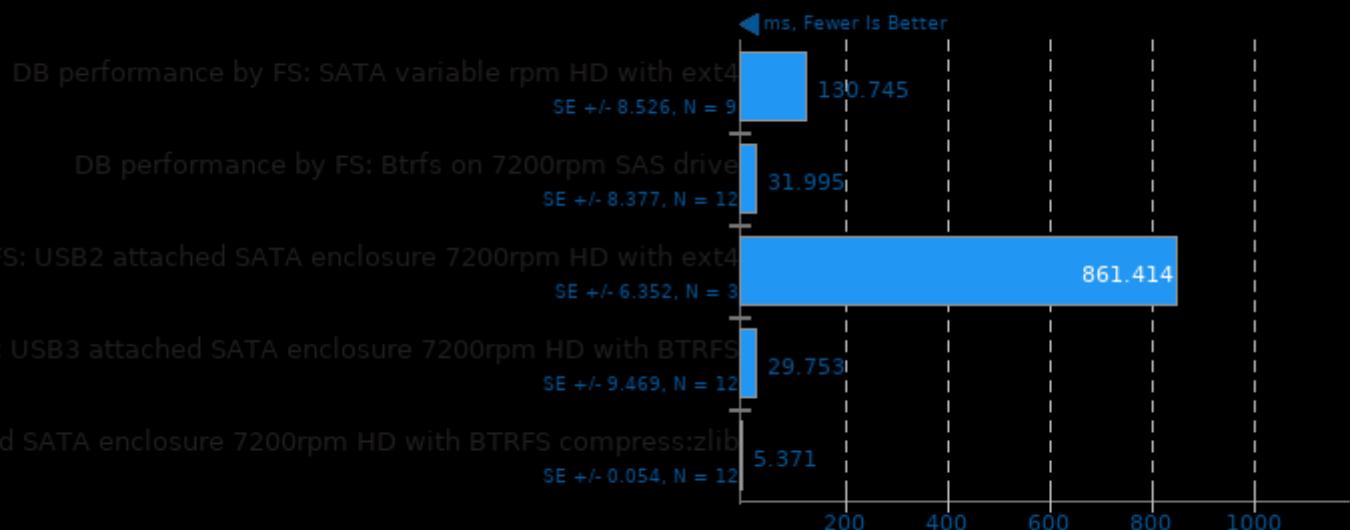
Scaling Factor: 100 - Clients: 50 - Mode: Read Only



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

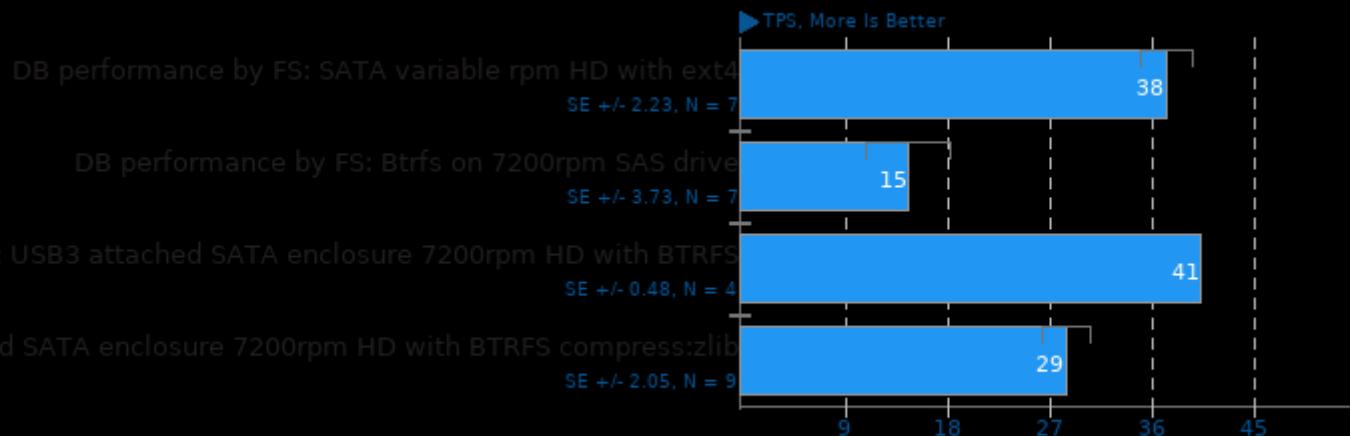
Scaling Factor: 100 - Clients: 50 - Mode: Read Only - Average Latency



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

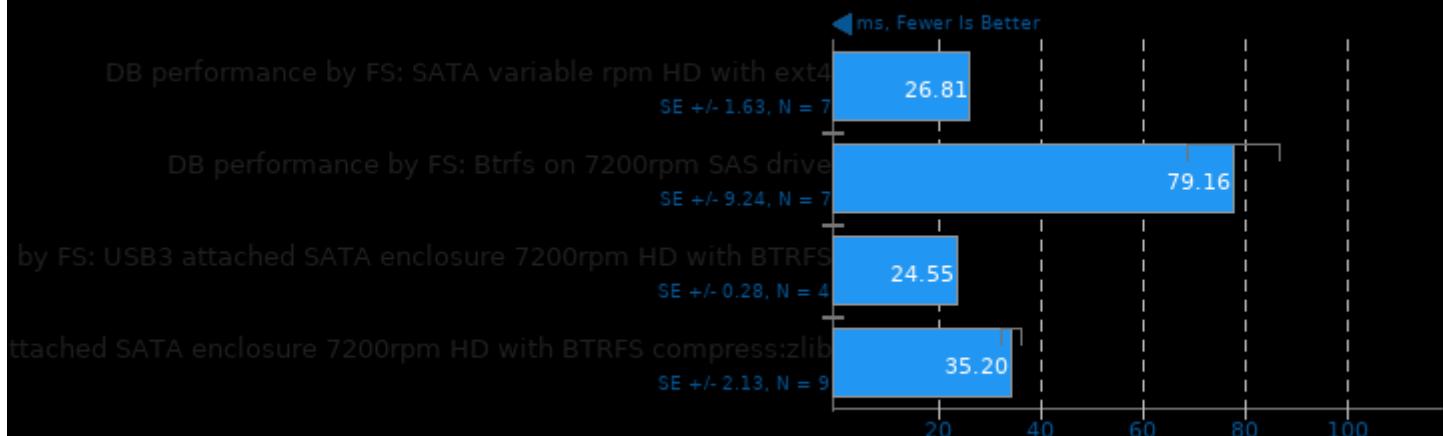
Scaling Factor: 1000 - Clients: 1 - Mode: Read Only



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

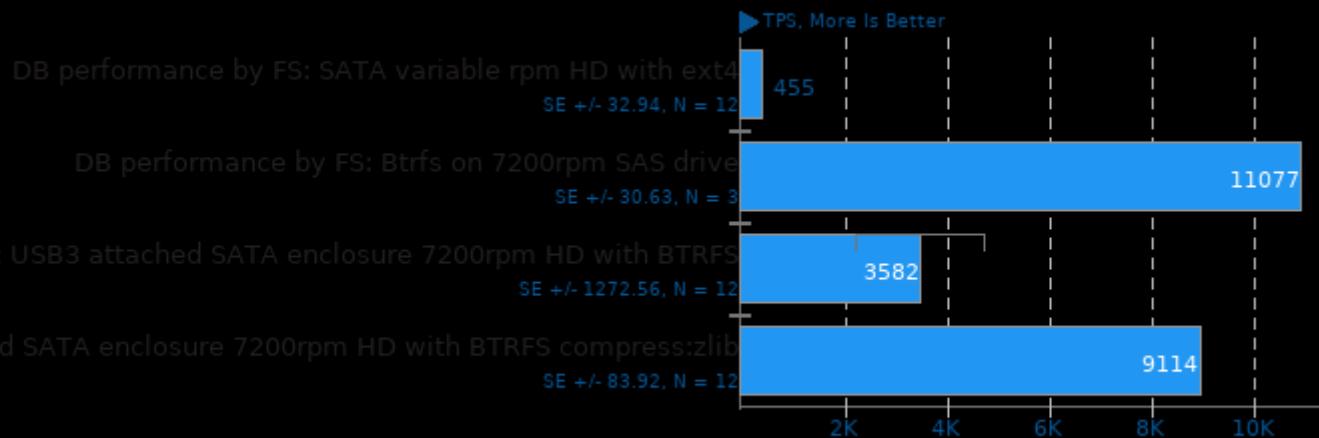
Scaling Factor: 1000 - Clients: 1 - Mode: Read Only - Average Latency



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

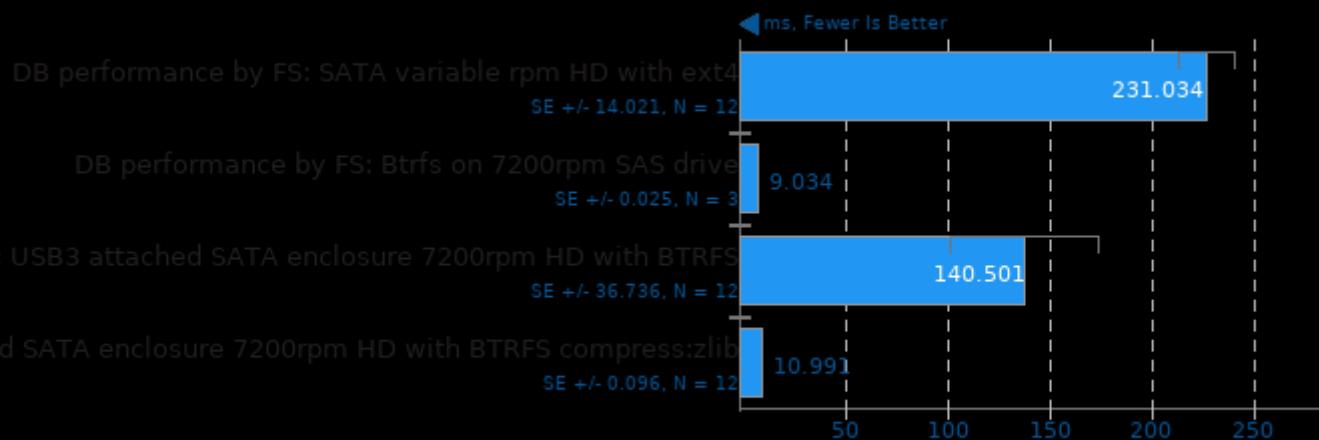
Scaling Factor: 100 - Clients: 100 - Mode: Read Only



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

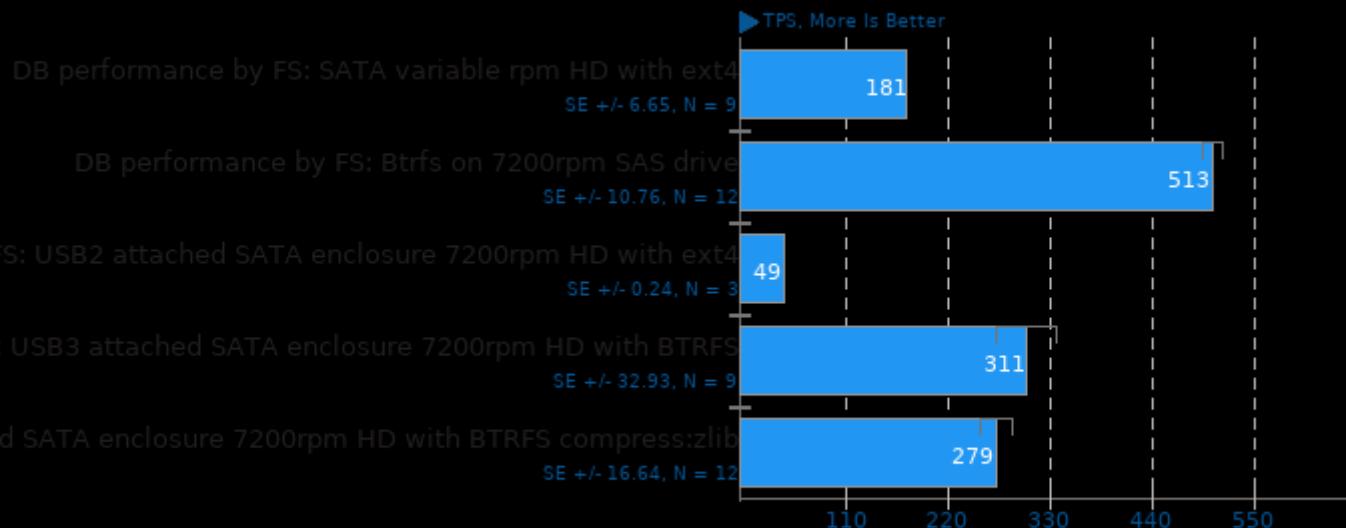
Scaling Factor: 100 - Clients: 100 - Mode: Read Only - Average Latency



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

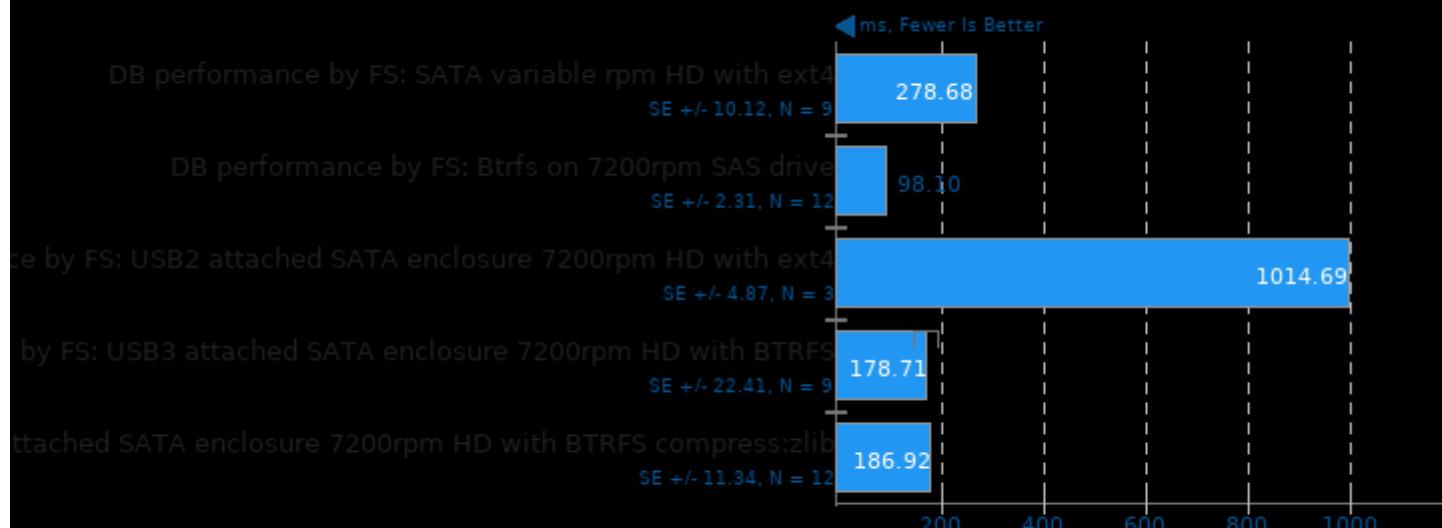
Scaling Factor: 100 - Clients: 50 - Mode: Read Write



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

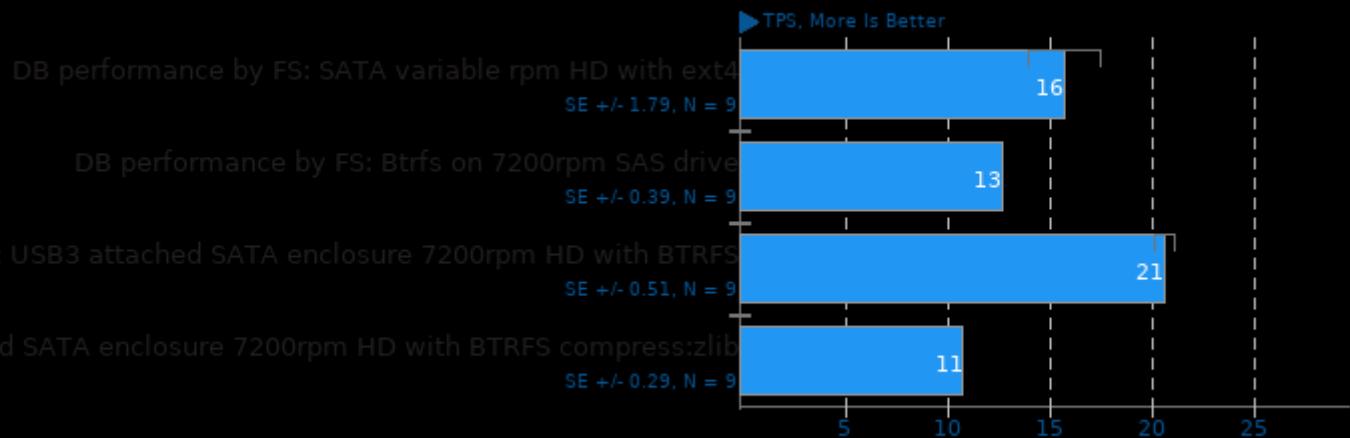
Scaling Factor: 100 - Clients: 50 - Mode: Read Write - Average Latency



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

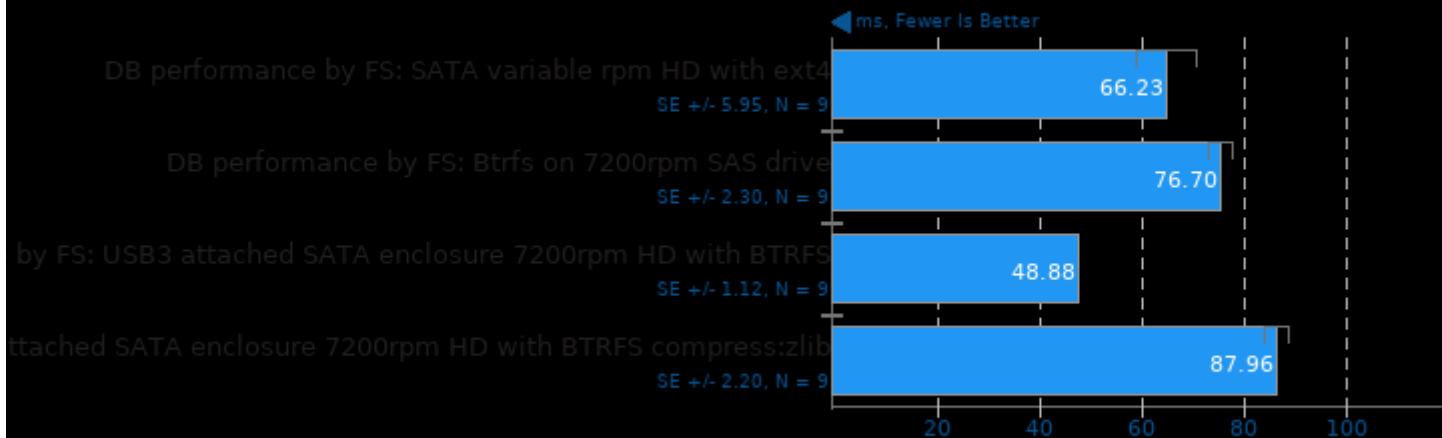
Scaling Factor: 1000 - Clients: 1 - Mode: Read Write



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

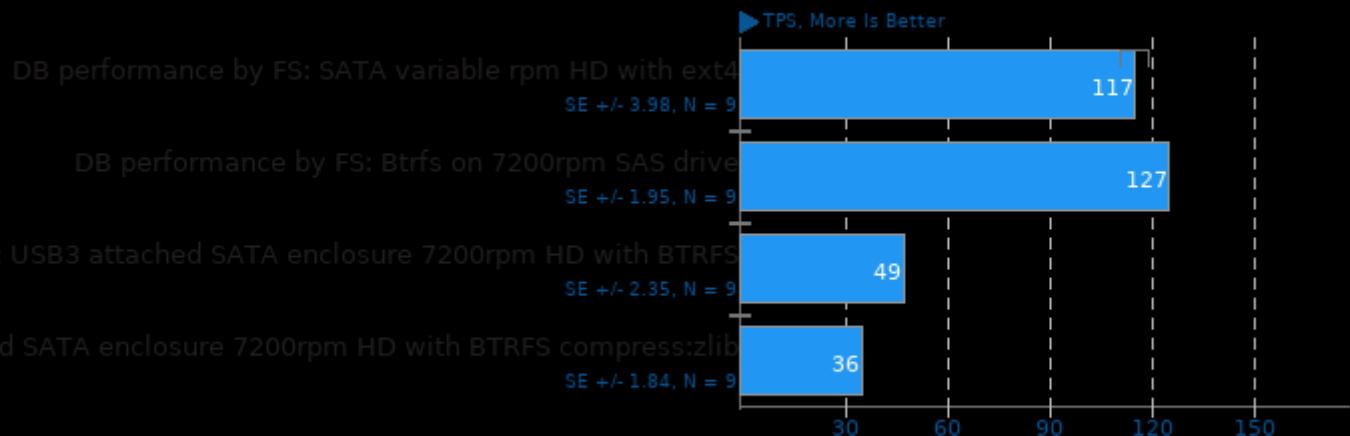
Scaling Factor: 1000 - Clients: 1 - Mode: Read Write - Average Latency



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

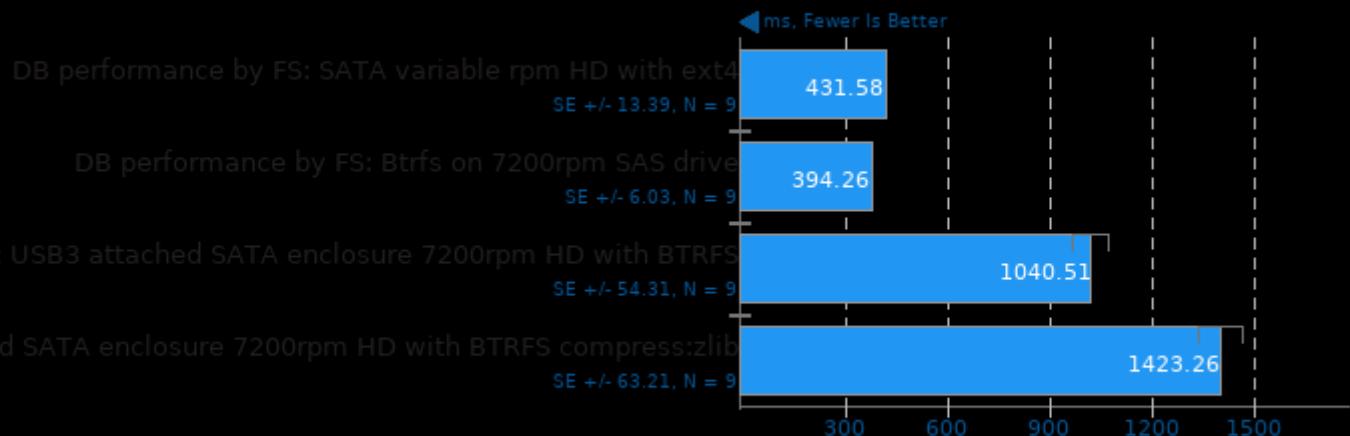
Scaling Factor: 1000 - Clients: 50 - Mode: Read Only



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

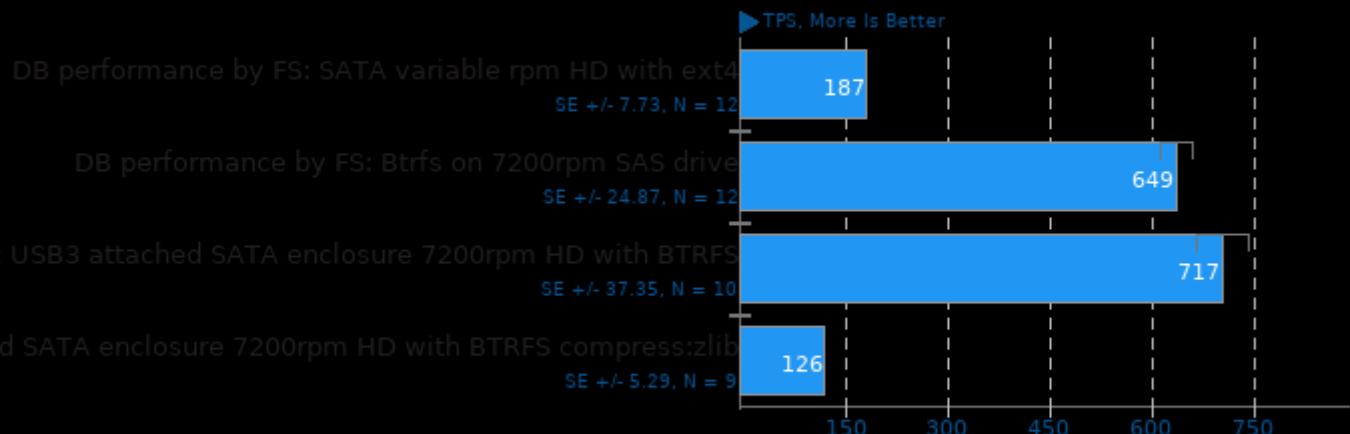
Scaling Factor: 1000 - Clients: 50 - Mode: Read Only - Average Latency



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

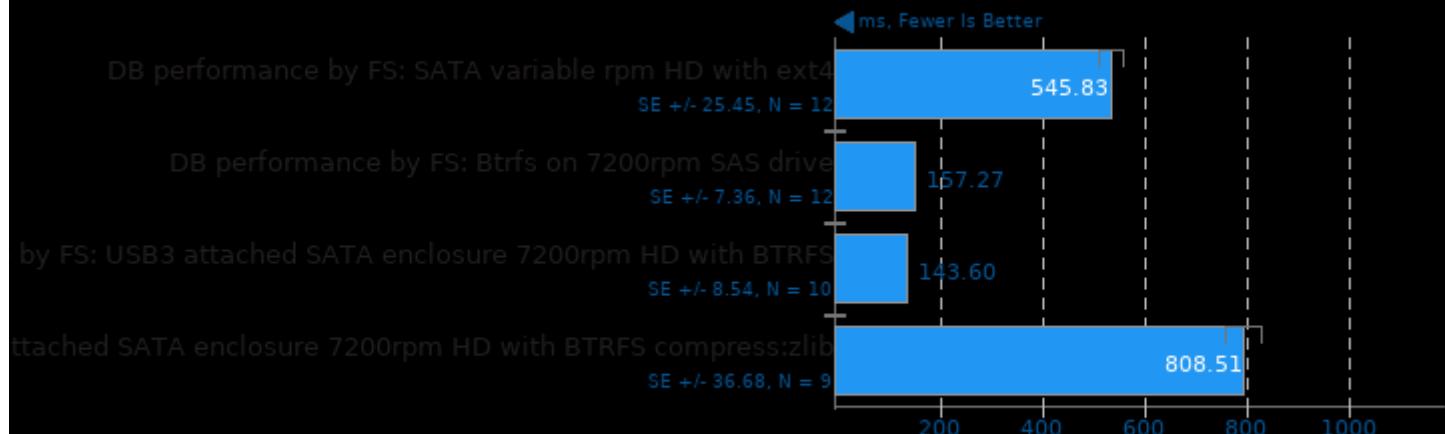
Scaling Factor: 100 - Clients: 100 - Mode: Read Write



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

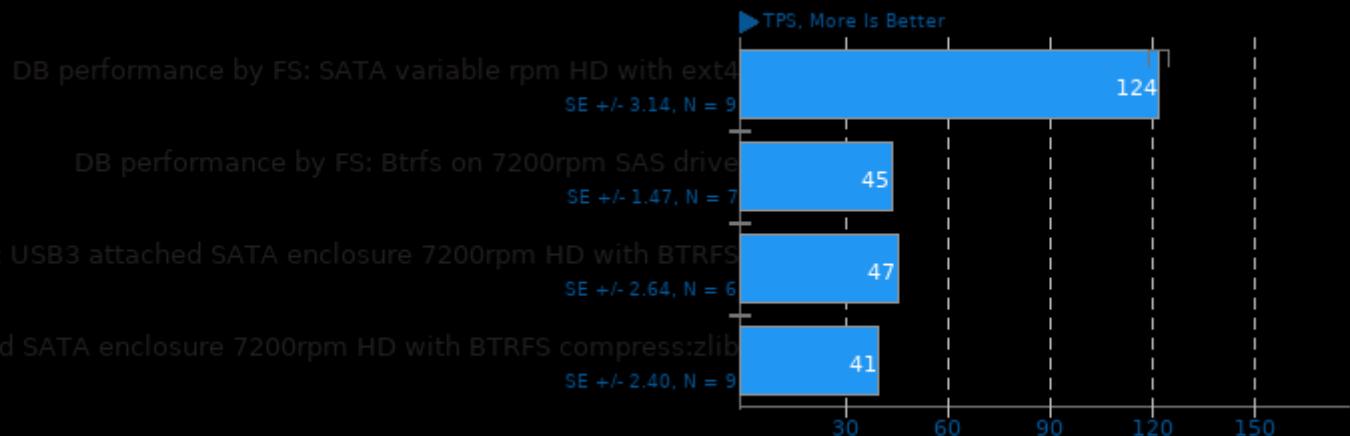
Scaling Factor: 100 - Clients: 100 - Mode: Read Write - Average Latency



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

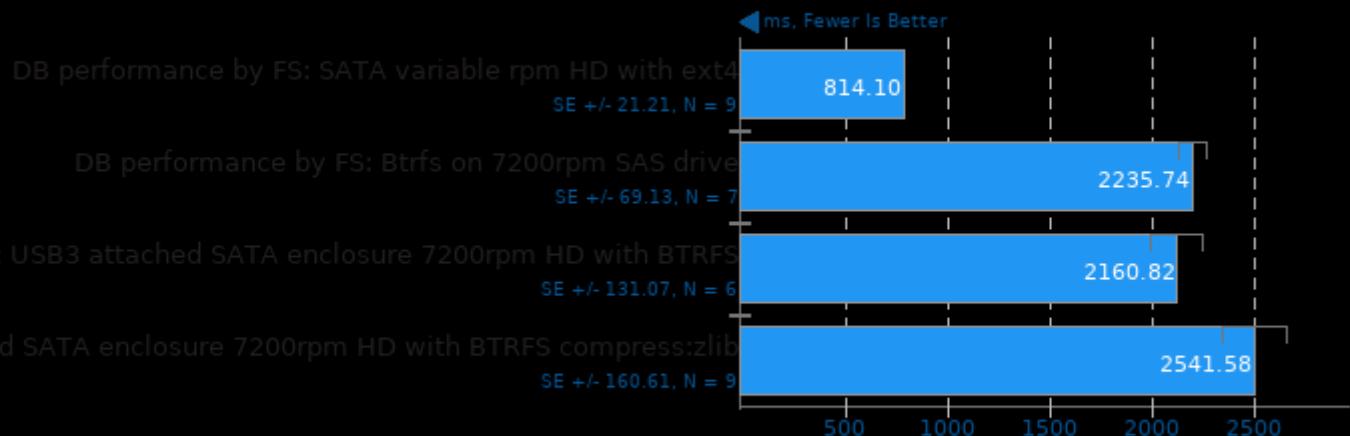
Scaling Factor: 1000 - Clients: 100 - Mode: Read Only



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

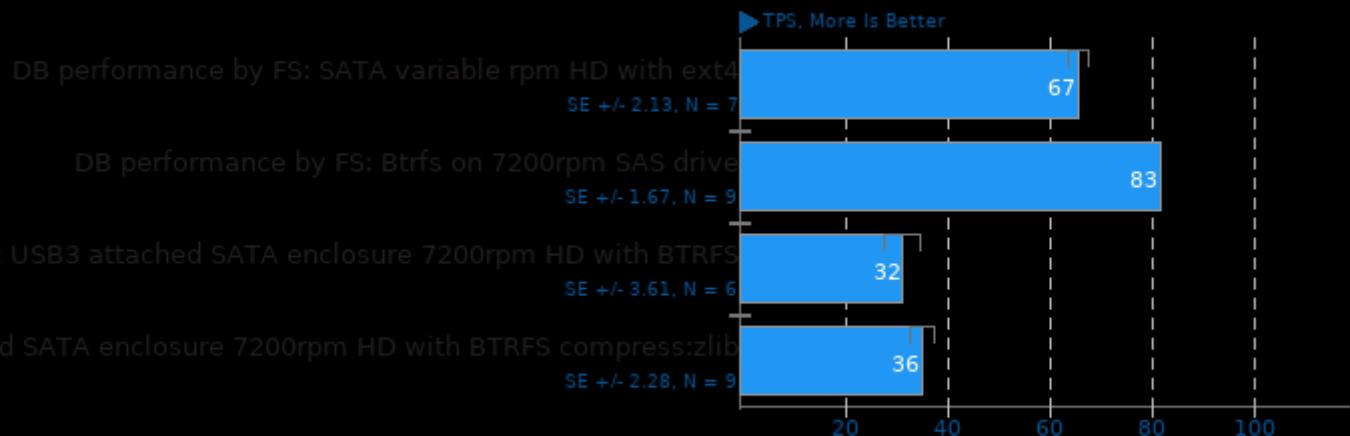
Scaling Factor: 1000 - Clients: 100 - Mode: Read Only - Average Latency



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

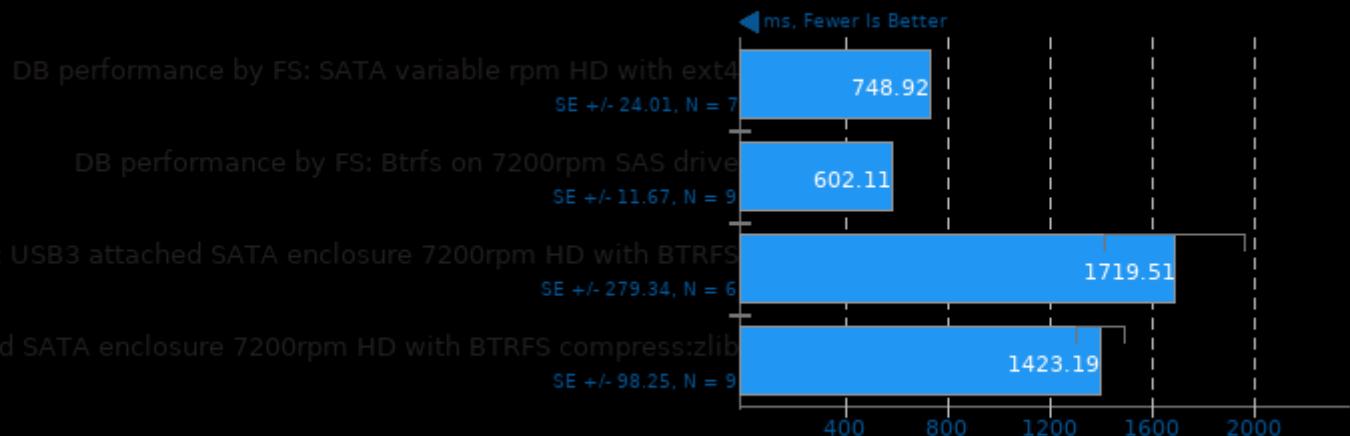
Scaling Factor: 1000 - Clients: 50 - Mode: Read Write



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

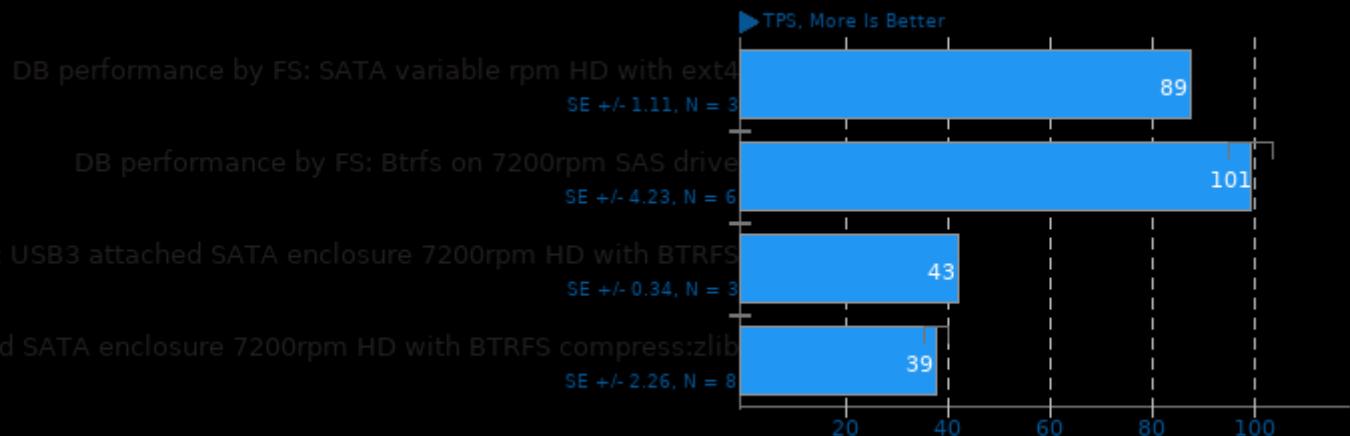
Scaling Factor: 1000 - Clients: 50 - Mode: Read Write - Average Latency



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

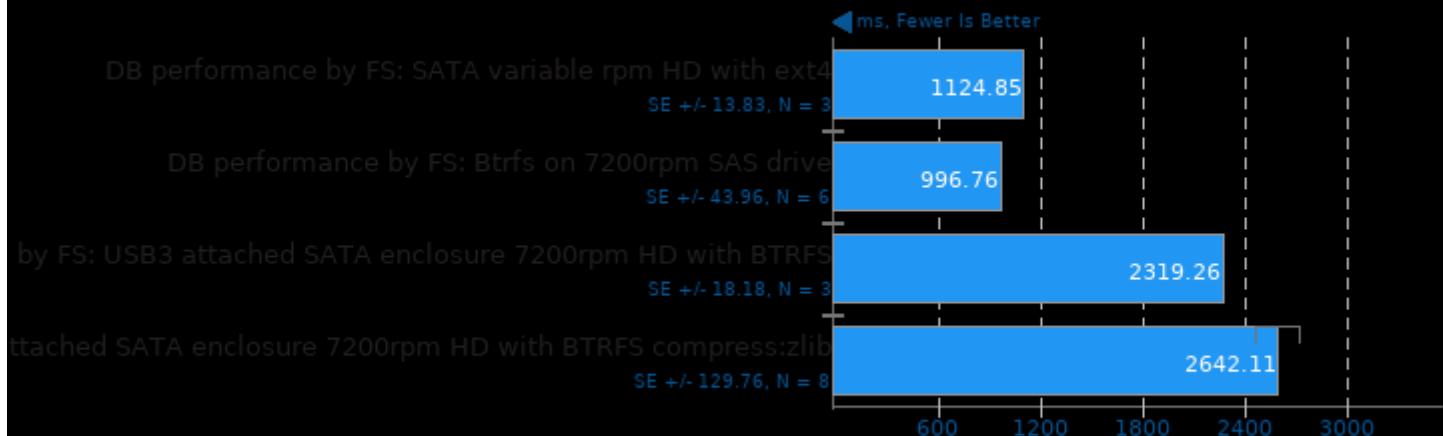
Scaling Factor: 1000 - Clients: 100 - Mode: Read Write



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

PostgreSQL pgbench 13.0

Scaling Factor: 1000 - Clients: 100 - Mode: Read Write - Average Latency



1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lpthread -lrt -ldl -lm

This file was automatically generated via the Phoronix Test Suite benchmarking software on Thursday, 28 March 2024 08:32.