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Core i9 9900KS Intel Linux LKRG Testing

LKRG - Linux Kernel Runtime Guard benchmarks by Michael Larabel for a future article.

Automated Executive Summary

Linux 5.4 Ubuntu Build had the most wins, coming in first place for 74% of the tests.

Based on the geometric mean of all complete results, the fastest (Linux 5.4 Ubuntu Build) was 1.046x the speed of the slowest (LKRG Default).

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

Stress-NG (Test: Forking) at 5.592x
SQLite (Threads / Copies: 8) at 1.852x
PostMark (Disk Transaction Performance) at 1.247x
Timed GCC Compilation (Time To Compile) at 1.237x
Timed Apache Compilation (Time To Compile) at 1.205x
Inkscape (Operation: SVG Files To PNG) at 1.11x
Timed GDB GNU Debugger Compilation (Time To Compile) at 1.109x
Flexible IO Tester (Type: Random Write - Engine: IO_uring - Buffered: Yes - Direct: No - Block Size: 2MB - Disk Target: Default Test Directory) at 1.097x
Flexible IO Tester (Type: Random Write - Engine: IO_uring - Buffered: Yes - Direct: No - Block Size: 2MB - Disk Target:

Default Test Directory) at 1.097x
Flexible IO Tester (Type: Random Write - Engine: IO_uring - Buffered: Yes - Direct: No - Block Size: 4KB - Disk Target: Default Test Directory) at 1.067x.

Test Systems:

Linux 5.4 Ubuntu Build

LKRG Default

Processor: Intel Core i9-9900KS @ 5.00GHz (8 Cores / 16 Threads), Motherboard: ASUS PRIME Z390-A (1302 BIOS), Chipset: Intel Cannon Lake PCH, Memory: 16GB, Disk: Samsung SSD 970 EVO 250GB, Graphics: ASUS Intel UHD 630 3GB (1200MHz), Audio: Realtek ALC1220, Monitor: ASUS MG28U, Network: Intel I219-V

OS: Ubuntu 20.04, Kernel: 5.4.0-14-generic (x86_64), Desktop: GNOME Shell 3.34.3, Display Server: X Server 1.20.7, Display Driver: modesetting 1.20.7, OpenGL: 4.6 Mesa 20.0.0, Vulkan: 1.2.131, Compiler: GCC 9.2.1 20200220, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none,hsa --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-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 / errors=remount-ro,relatime,rw
Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0xca
Java Notes: OpenJDK Runtime Environment (build 11.0.6+10-post-Ubuntu-1ubuntu1)
Python Notes: + Python 3.8.2rc1
Security Notes: itlb_multihit: KVM: Vulnerable + l1tf: Not affected + mds: Not affected + meltdown: Not affected + 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 Enhanced IBRS IBPB: conditional RSB filling + tsx_async_abort: Mitigation of TSX disabled

	Linux 5.4 Ubuntu Build	LKRG Default
SQLite - 1 (sec)	**41.735**	**42.987**
Normalized	100%	97.09%
Standard Deviation	0.1%	0.6%
SQLite - 8 (sec)	**126.033**	**233.377**
Normalized	100%	54%
Standard Deviation	1.1%	1.1%
Flexible IO Tester - Rand Read - IO_uring - Yes - No - 2MB (MB/s)	**664**	**654**
Normalized	100%	98.49%
Standard Deviation	0.3%	0.8%
Flexible IO Tester - Rand Read - IO_uring - Yes - No - 2MB (IOPS)	**329**	**323**
Normalized	100%	98.18%
Standard Deviation	0.4%	0.8%

Flexible IO Tester - Rand Read - IO_uring - Yes - No - 4KB (MB/s)	491	491
Flexible IO Tester - Rand Read - IO_uring - Yes - No - 4KB (IOPS)	126000	126000
Flexible IO Tester - Rand Write - IO_uring - Yes - No - 2MB (MB/s)	**1522**	**1387**
Normalized	100%	91.13%
Standard Deviation	0.8%	1.3%
Flexible IO Tester - Rand Write - IO_uring - Yes - No - 2MB (IOPS)	**757**	**690**
Normalized	100%	91.15%
Standard Deviation	0.9%	1.2%
Flexible IO Tester - Rand Write - IO_uring - Yes - No - 4KB (MB/s)	**898**	**842**
Normalized	100%	93.76%
Standard Deviation	0.4%	0.9%
Flexible IO Tester - Rand Write - IO_uring - Yes - No - 4KB (IOPS)	**229667**	**215333**
Normalized	100%	93.76%
Standard Deviation	0.3%	0.7%
Flexible IO Tester - Seq Read - IO_uring - Yes - No - 2MB (MB/s)	**656**	**635**
Normalized	100%	96.8%
Standard Deviation	0.3%	0.6%
Flexible IO Tester - Seq Read - IO_uring - Yes - No - 2MB (IOPS)	**324**	**314**
Normalized	100%	96.91%
Standard Deviation	0.3%	0.6%
Flexible IO Tester - Seq Read - IO_uring - Yes - No - 4KB (MB/s)	**2267**	**2266**
Normalized	100%	99.96%
Standard Deviation	0.1%	0.7%
Flexible IO Tester - Seq Read - IO_uring - Yes - No - 4KB (IOPS)	**580333**	**580000**
Normalized	100%	99.94%
Standard Deviation	0.2%	0.6%
PostMark - D.T.P (TPS)	**8825**	**7076**
Normalized	100%	80.18%
Standard Deviation	2%	1.6%
t-test1 - 1 (sec)	**12.958**	**13.597**
Normalized	100%	95.3%
Standard Deviation	0.2%	1%
t-test1 - 2 (sec)	**4.514**	**4.764**
Normalized	100%	94.75%
Standard Deviation	0.7%	0.3%
pmbench - 1 - 100% Reads (us - Page Latency)	0.0241	0.0241
Standard Deviation	1.2%	0.6%
pmbench - 1 - 100% Writes (us - Page Latency)	**0.0267**	**0.0270**
Normalized	100%	98.89%
Standard Deviation	2.1%	0.6%
pmbench - 16 - 100% Reads (us - Page Latency)	**0.0358**	**0.0379**
Normalized	100%	94.46%
Standard Deviation	4.9%	1.2%

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pmbench - 16 - 100% Writes (us - Page Latency)	**0.0806**	**0.0837**
Normalized	100%	96.3%
Standard Deviation	0.9%	0.4%
pmbench - 1 - 8.R.2.W (us - Page Latency)	**0.0666**	**0.0664**
Normalized	99.7%	100%
Standard Deviation	0.2%	0.6%
pmbench - 16 - 8.R.2.W (us - Page Latency)	**0.0866**	**0.0879**
Normalized	100%	98.52%
Standard Deviation	0.8%	0.6%
Sockperf - Throughput (Messages/sec)	**531513**	**567697**
Normalized	93.63%	100%
Standard Deviation	6.9%	4.4%
Sockperf - Latency Ping Pong (usec)	**2.653**	**2.710**
Normalized	100%	97.9%
Standard Deviation	1.1%	1.9%
Sockperf - Latency Under Load (usec)	**19.569**	**18.289**
Normalized	93.46%	100%
Standard Deviation	12.8%	30.1%
Ethr - TCP - Latency - 1 (us)	**8.05917**	**8.232917**
Normalized	100%	97.89%
Standard Deviation	1.2%	2.1%
Ethr - HTTP - Bandwidth - 1 (Mbits/s)	**196086875230**	**196320580634**
Normalized	99.88%	100%
Standard Deviation	105.2%	104.4%
Ethr - TCP - Connections/s - 1 (Connections/sec)	**20190**	**18276**
Normalized	100%	90.52%
Standard Deviation	10.2%	12.8%
iPerf - 5201 - 10 Seconds - TCP - 1 (Mbits/s)	**72451**	**71743**
Normalized	100%	99.02%
Standard Deviation	2.5%	1.2%
iPerf - 5201 - 10 Seconds - UDP - 1 (Mbits/s)	1.05	1.05
Standard Deviation	0%	0%
iPerf - 5201 - 10 Seconds - TCP - 10 (Mbits/s)	**73447**	**74322**
Normalized	98.82%	100%
Standard Deviation	1.9%	1.6%
iPerf - 5201 - 10 Seconds - UDP - 10 (Mbits/s)	10.5	10.5
Standard Deviation	0%	0%
Java SciMark - Composite (Mflops)	**2770**	**2754**
Normalized	100%	99.42%
Standard Deviation	0.4%	0.9%
SVT-AV1 - Enc Mode 8 - 1080p (FPS)	**30.549**	**30.534**
Normalized	100%	99.95%
Standard Deviation	0.4%	0.4%
VP9 libvpx Encoding - Speed 5 (FPS)	**28.64**	**28.71**
Normalized	99.76%	100%
Standard Deviation	0.6%	0.2%
x264 - H.2.V.E (FPS)	**98.84**	**97.77**
Normalized	100%	98.92%
Standard Deviation	1.8%	1.5%
Coremark - CoreMark Size 666 - I.P.S (Iterations/Sec)	**397297**	**395375**
Normalized	100%	99.52%
Standard Deviation	1%	2.7%
Timed Apache Compilation - Time To Compile (sec)	**19.965**	**24.054**
Normalized	100%	83%
Standard Deviation	0.5%	0.5%

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Timed FFmpeg Compilation - Time To Compile (sec)	**58.030**	**59.592**
Normalized	100%	97.38%
Standard Deviation	2.1%	1.4%
Timed GCC Compilation - Time To Compile (sec)	**797.985**	**986.835**
Normalized	100%	80.86%
Standard Deviation	0.1%	0.4%
Timed GDB GNU Debugger Compilation - Time To Compile (sec)	**96.002**	**106.437**
Normalized	100%	90.2%
Standard Deviation	0.5%	0.6%
Timed ImageMagick Compilation - Time To Compile	**30.121**	**31.206**
Normalized	100%	96.52%
Standard Deviation	0.4%	0.6%
Timed Linux Kernel Compilation - Time To Compile	**84.622**	**89.135**
Normalized	100%	94.94%
Standard Deviation	0.9%	1.8%
Timed LLVM Compilation - Time To Compile (sec)	**435.829**	**434.97**
Normalized	99.8%	100%
Timed MPlayer Compilation - Time To Compile (sec)	**39.034**	**40.671**
Normalized	100%	95.98%
Standard Deviation	0.1%	0.1%
Timed PHP Compilation - Time To Compile (sec)	**57.133**	**60.866**
Normalized	100%	93.87%
Standard Deviation	0.3%	0.2%
Build2 - Time To Compile (sec)	**109.643**	**114.977**
Normalized	100%	95.36%
Standard Deviation	0.9%	0.2%
rays1bench - Large Scene (mrays/s)	**54.73**	**54.70**
Normalized	100%	99.95%
Standard Deviation	0.1%	0.1%
Numpy Benchmark (Score)	**447.85**	**447.62**
Normalized	100%	99.95%
Standard Deviation	0.3%	0.5%
DeepSpeech - CPU (sec)	**72.33269**	**72.28385**
Normalized	99.93%	100%
Standard Deviation	0.9%	1%
Tachyon - Total Time (sec)	**93.7215**	**93.8932**
Normalized	100%	99.82%
Standard Deviation	0.1%	0.1%
PostgreSQL pgbench - Buffer Test - Normal Load - Read Only (TPS)	**229031**	**227085**
Normalized	100%	99.15%
Standard Deviation	0.1%	0.2%
PostgreSQL pgbench - Buffer Test - Normal Load - Read Write (TPS)	**5536**	**5409**
Normalized	100%	97.71%
Standard Deviation	2.9%	2.4%
SQLite Speedtest - Timed Time - Size 1,000 (sec)	**48.061**	**48.816**
Normalized	100%	98.45%
Standard Deviation	0.3%	0.4%
Inkscape - SVG Files To PNG (sec)	**20.810**	**23.100**
Normalized	100%	90.09%
Standard Deviation	1.5%	1.2%
LibreOffice - 2.D.T.P (sec)	**6.613**	**6.652**
Normalized	100%	99.41%

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Standard Deviation	3.5%	2.5%
RawTherapee - T.B.T (sec)	59.348	59.629
Normalized	100%	99.53%
Standard Deviation	0.2%	0.1%
BenchmarkMutex - M.L.U.s (ns)	35.3	35.3
Standard Deviation	0.3%	0.3%
BenchmarkMutex - M.L.U.s.m (ns)	16	16
Stress-NG - Forking (Bogo Ops/s)	89525	16010
Normalized	100%	17.88%
Standard Deviation	0.9%	0.1%
Stress-NG - Semaphores (Bogo Ops/s)	5107309	5065052
Normalized	100%	99.17%
Standard Deviation	0.5%	3.6%
Stress-NG - Socket Activity (Bogo Ops/s)	7830	7644
Normalized	100%	97.61%
Standard Deviation	0.3%	0.3%
Stress-NG - Context Switching (Bogo Ops/s)	4003948	4093128
Normalized	97.82%	100%
Standard Deviation	1.9%	3%
Stress-NG - S.V.M.P (Bogo Ops/s)	12907903	13341083
Normalized	96.75%	100%
Standard Deviation	0.3%	0.2%
ctx_clock - C.S.T (Clocks)	157	160
Normalized	100%	98.13%
Standard Deviation	2.2%	0.7%
Blender - BMW27 - CPU-Only (sec)	169.16	169.09
Normalized	99.96%	100%
Standard Deviation	0.3%	0.5%
PyBench - T.F.A.T.T (Milliseconds)	858	857
Normalized	99.88%	100%
Standard Deviation		0.2%
PHPBench - P.B.S (Score)	827204	826284
Normalized	100%	99.89%
Standard Deviation	0.2%	0.4%
Selenium - Kraken - Firefox (ms)	764.5	756.3
Normalized	98.93%	100%
Standard Deviation	1.1%	0.7%
Selenium - StyleBench - Firefox (Runs / Minute)	108	110
Normalized	98.18%	100%
Standard Deviation	1.9%	0.5%
Selenium - Jetstream 2 - Firefox (Score)	102.970	105.887
Normalized	97.25%	100%
Standard Deviation	1.9%	1.1%
Selenium - Maze Solver - Firefox (sec)	5.4	5.4
Standard Deviation	1.1%	2.8%
Selenium - Speedometer - Firefox (Runs/min)	104.5	104
Normalized	100%	99.52%
Standard Deviation	0.4%	
Selenium - Kraken - Google Chrome (ms)	870.6	847.0
Normalized	97.29%	100%
Standard Deviation	2.9%	1.8%
Selenium - PSPDFKit WASM - Firefox (Score)	1191	1186
Normalized	99.58%	100%
Standard Deviation	0.8%	
Selenium - StyleBench - Google Chrome (Runs / Minute)	34.73	34.6

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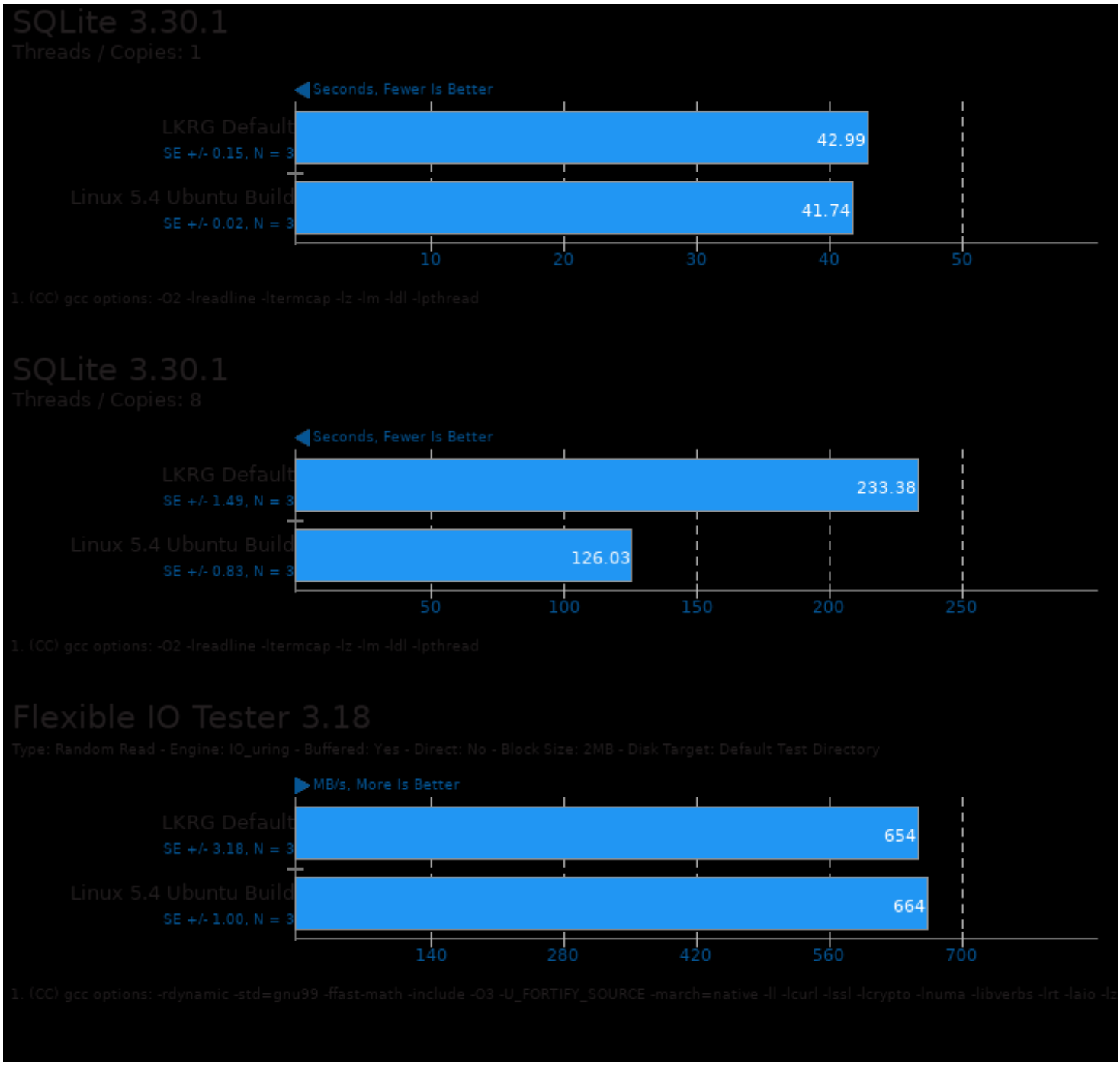
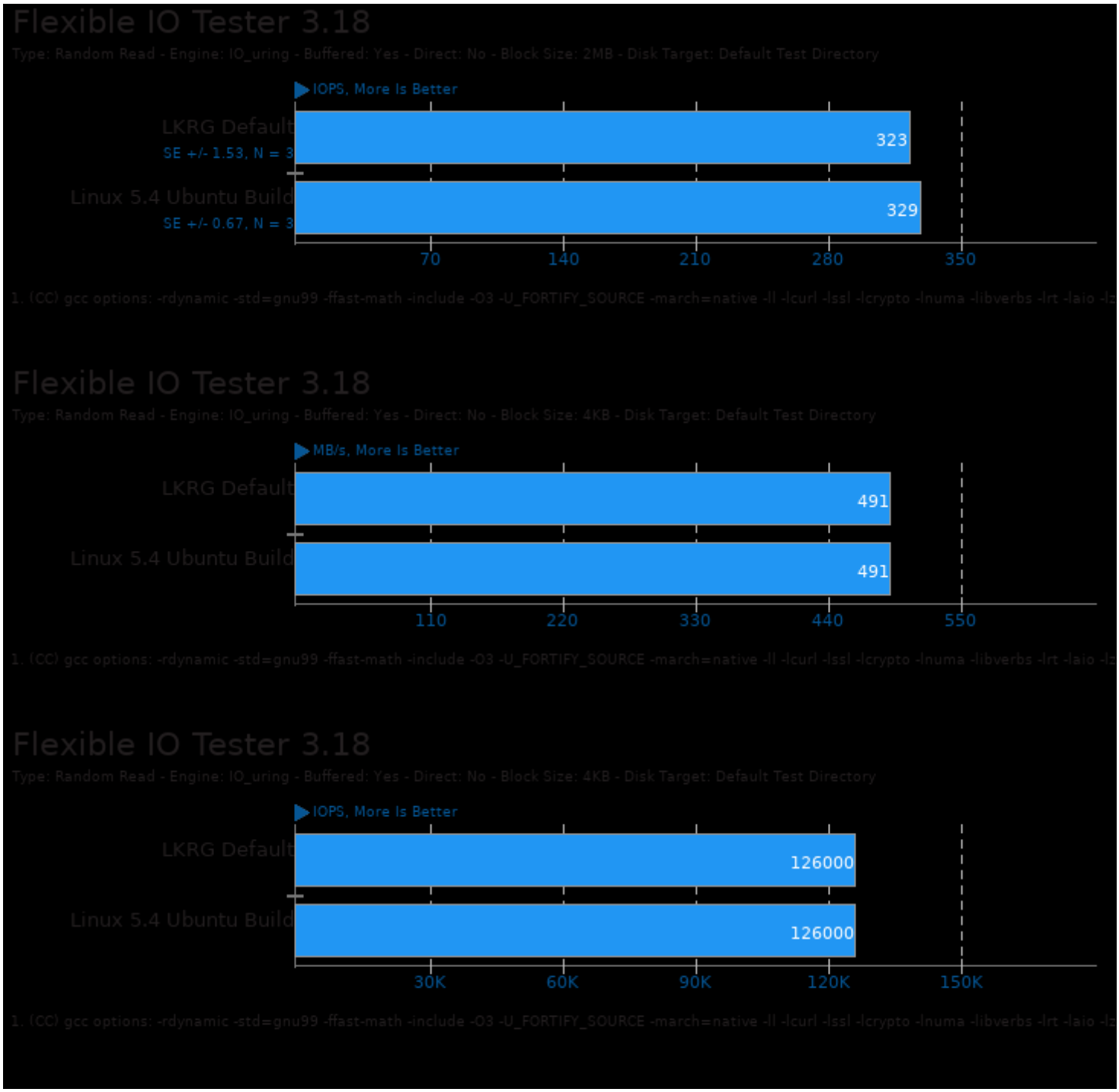
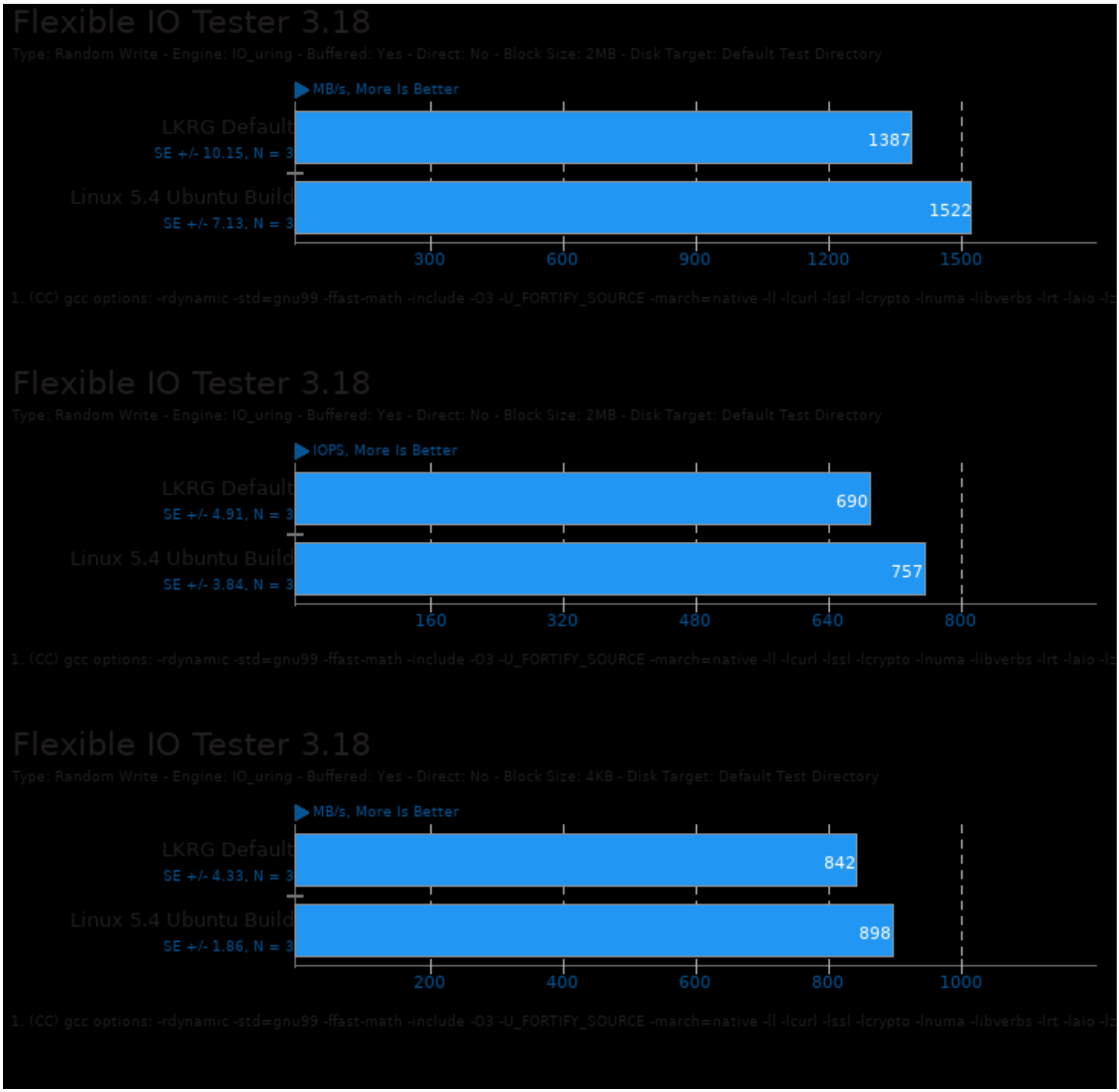
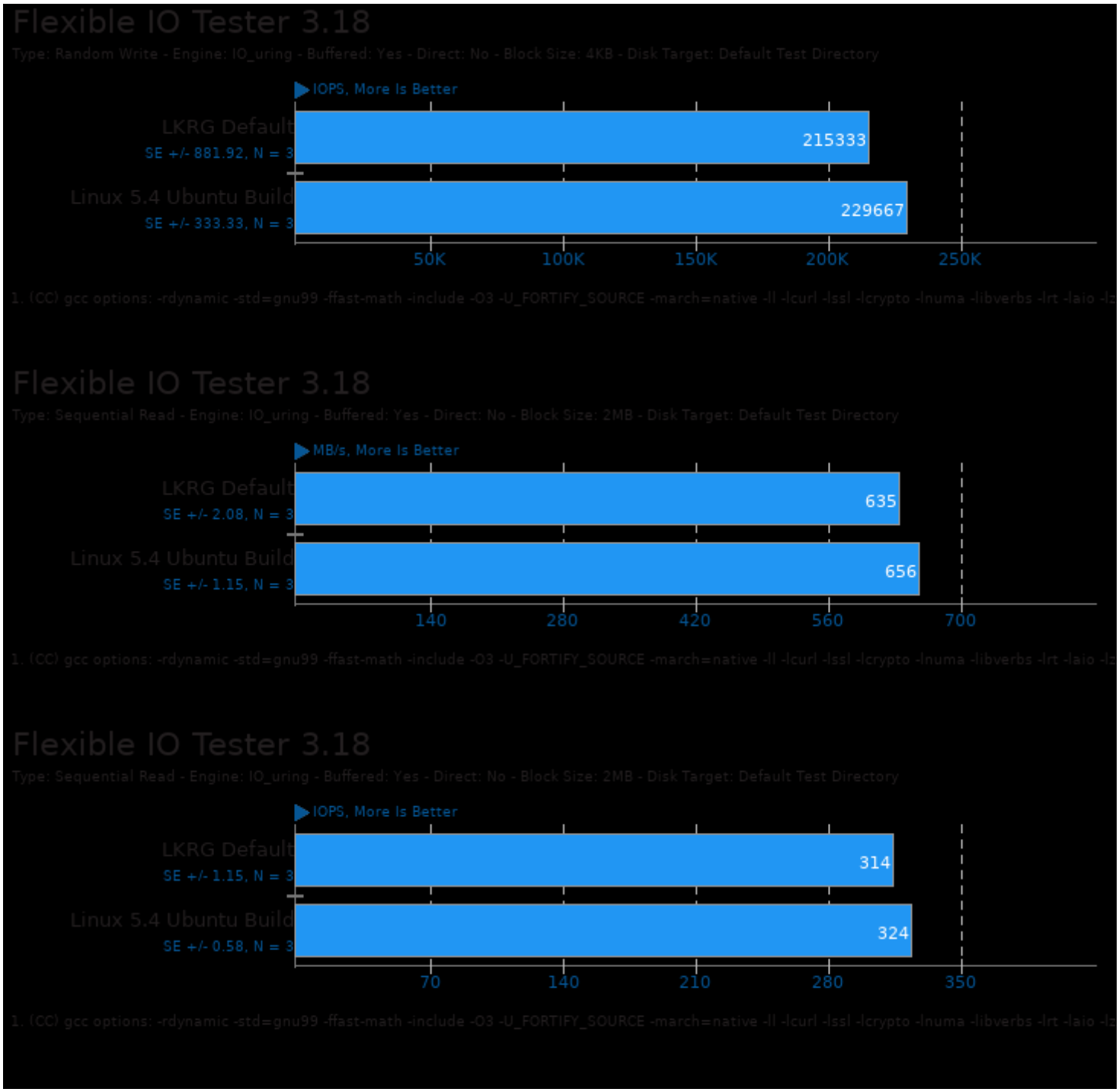
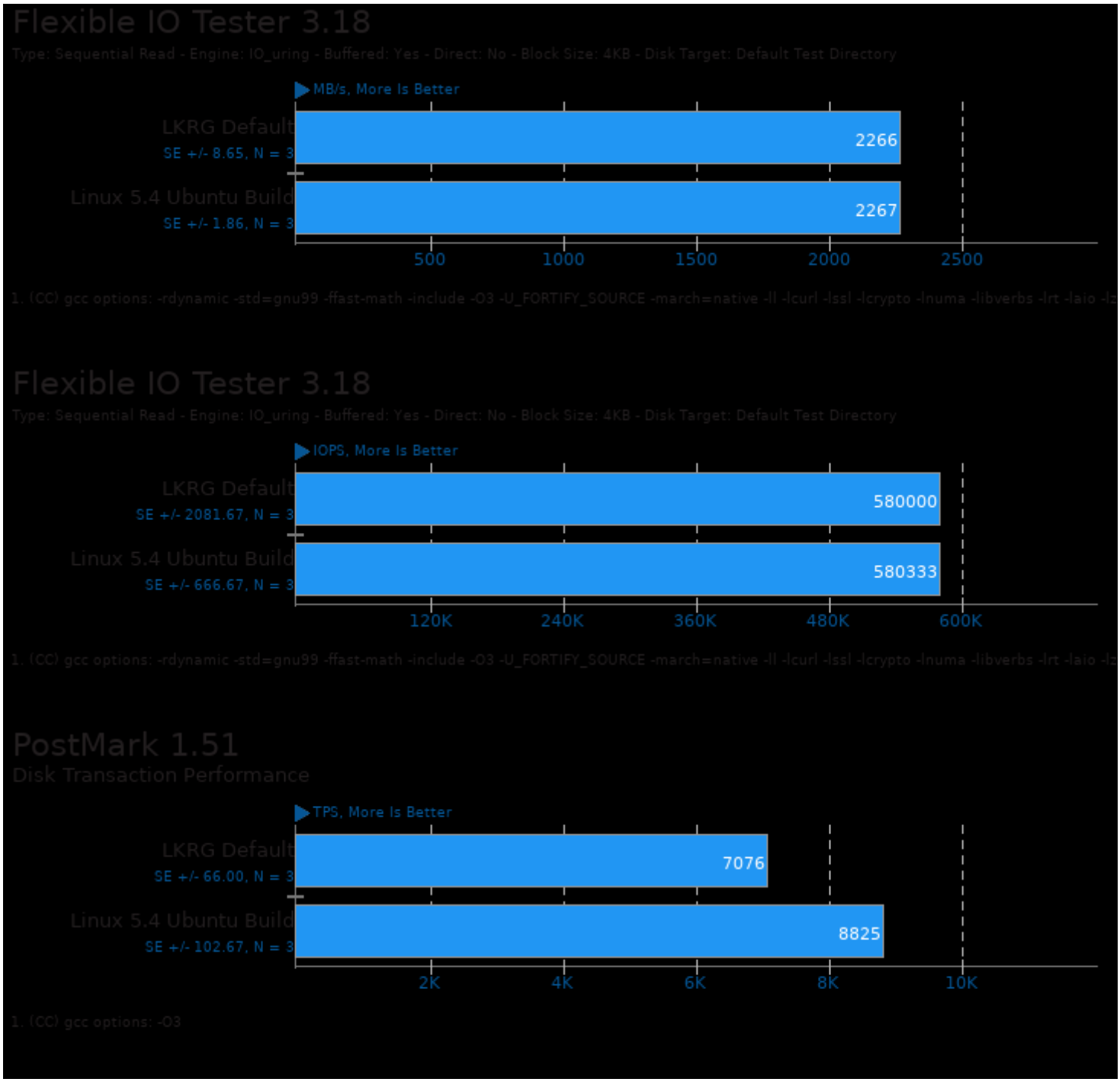
Normalized	100%	99.63%
Standard Deviation	0.5%	0%
Selenium - Jetstream 2 - Google Chrome (Score)	**136.096**	**134.621**
Normalized	100%	98.92%
Standard Deviation	0.9%	1.2%
Selenium - Maze Solver - Google Chrome (sec)	**4.9**	**4.8**
Normalized	97.96%	100%
Standard Deviation	1.2%	2.9%
Selenium - Speedometer - Google Chrome (Runs/min)	**130**	**132**
Normalized	98.48%	100%
Standard Deviation		0.9%
Selenium - PSPDFKit WASM - Google Chrome (Score)	**1567**	**1585**
Normalized	100%	98.86%
Standard Deviation	2.3%	0.8%
Selenium - W.i - Firefox (ms)	30.4	30.4
Standard Deviation	0.5%	0%
Selenium - W.c - Firefox (ms)	**438.7**	**439.5**
Normalized	100%	99.82%
Standard Deviation	0%	0.2%
Selenium - W.i - Google Chrome (ms)	**38.4815**	**39.8516**
Normalized	100%	96.56%
Standard Deviation	0.3%	2.8%
Selenium - W.c - Google Chrome (ms)	**372.9043**	**372.7315**
Normalized	99.95%	100%
Standard Deviation	0.4%	0.4%
Mlpack Benchmark - scikit_ica (sec)	**45.10**	**43.79**
Normalized	97.1%	100%
Standard Deviation	2.9%	0.5%
Mlpack Benchmark - scikit_qda (sec)	**63.72**	**62.42**
Normalized	97.96%	100%
Standard Deviation	1.5%	0.6%
Mlpack Benchmark - scikit_svm (sec)	**13.30**	**13.32**
Normalized	100%	99.85%
Standard Deviation	0.2%	0.3%
Mlpack Benchmark - scikit_linearridgeregression	**2.45**	**2.42**
Normalized	98.78%	100%
Standard Deviation	5%	5.5%
Sunflow Rendering System - G.I.I.S (sec)	**1.129**	**1.140**
Normalized	100%	99.04%
Standard Deviation	1.7%	1.6%


SQLite 3.30.1
Threads / Copies: 1
Seconds, Fewer Is Better
LKRG Default
SE +/- 0.15, N = 3
42.99
Linux 5.4 Ubuntu Build
SE +/- 0.02, N = 3
41.74
10
20
30
40
50
1. (CC) gcc options: -O2 -lreadline -ltermcap -lz -lm -ldl -lpthread
SQLite 3.30.1
Threads / Copies: 8
Seconds, Fewer Is Better
LKRG Default
SE +/- 1.49, N = 3
233.38
Linux 5.4 Ubuntu Build
SE +/- 0.83, N = 3
126.03
50
100
150
200
250
1. (CC) gcc options: -O2 -lreadline -ltermcap -lz -lm -ldl -lpthread
Flexible IO Tester 3.18
Type: Random Read - Engine: IO_uring - Buffered: Yes - Direct: No - Block Size: 2MB - Disk Target: Default Test Directory
MB/s, More Is Better
LKRG Default
SE +/- 3.18, N = 3
654
Linux 5.4 Ubuntu Build
SE +/- 1.00, N = 3
664
140
280
420
560
700
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lcurl -lssl -lcrypto -lnuma -libverbs -lrt -laio

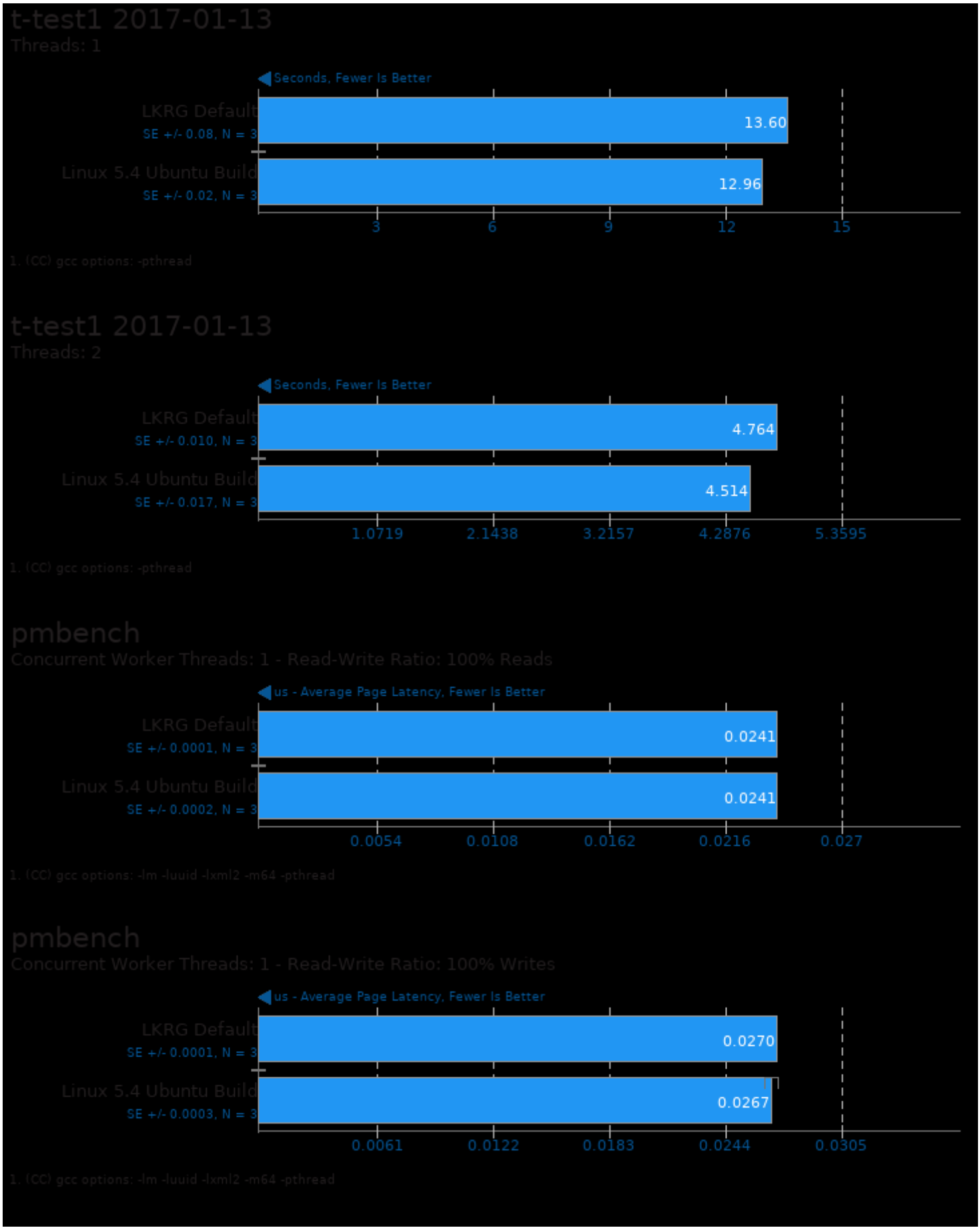

Flexible IO Tester 3.18
Type: Random Read - Engine: IO_uring - Buffered: Yes - Direct: No - Block Size: 2MB - Disk Target: Default Test Directory
IOPS, More Is Better
LKRG Default
SE +/- 1.53, N = 3
323
Linux 5.4 Ubuntu Build
SE +/- 0.67, N = 3
329
70
140
210
280
350
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lcurl -lssl -lcrypto -lnuma -libverbs -lrt -laio -l
Flexible IO Tester 3.18
Type: Random Read - Engine: IO_uring - Buffered: Yes - Direct: No - Block Size: 4KB - Disk Target: Default Test Directory
MB/s, More Is Better
LKRG Default
491
Linux 5.4 Ubuntu Build
491
110
220
330
440
550
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lcurl -lssl -lcrypto -lnuma -libverbs -lrt -laio -l
Flexible IO Tester 3.18
Type: Random Read - Engine: IO_uring - Buffered: Yes - Direct: No - Block Size: 4KB - Disk Target: Default Test Directory
IOPS, More Is Better
LKRG Default
126000
Linux 5.4 Ubuntu Build
126000
30K
60K
90K
120K
150K
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lcurl -lssl -lcrypto -lnuma -libverbs -lrt -laio -l

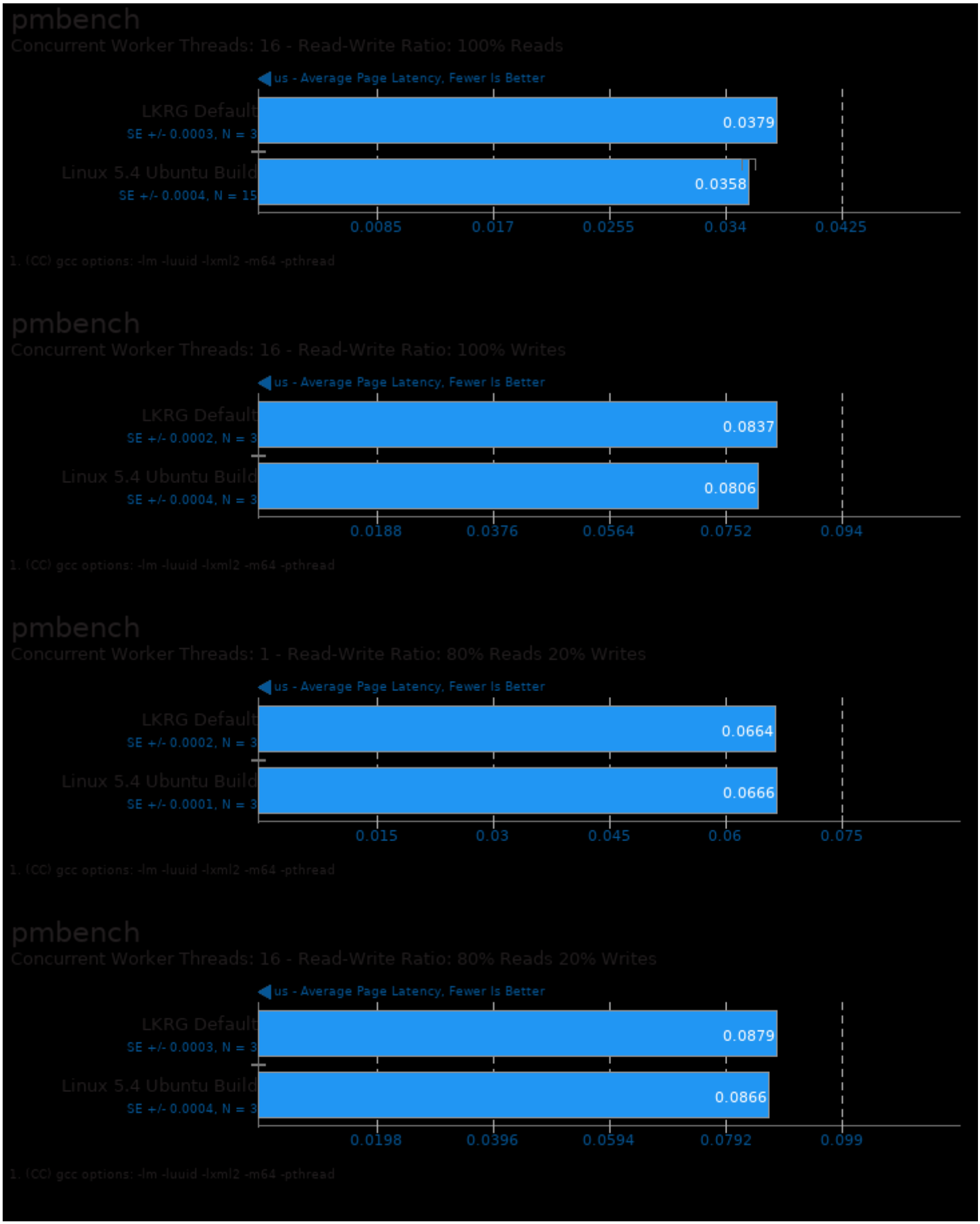

Flexible IO Tester 3.18
Type: Random Write - Engine: IO_uring - Buffered: Yes - Direct: No - Block Size: 2MB - Disk Target: Default Test Directory
MB/s, More Is Better
LKRG Default
SE +/- 10.15, N = 3
1387
Linux 5.4 Ubuntu Build
SE +/- 7.13, N = 3
1522
300
600
900
1200
1500
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lcurl -lssl -lcrypto -lnuma -libverbs -lrt -laio -l
Flexible IO Tester 3.18
Type: Random Write - Engine: IO_uring - Buffered: Yes - Direct: No - Block Size: 2MB - Disk Target: Default Test Directory
IOPS, More Is Better
LKRG Default
SE +/- 4.91, N = 3
690
Linux 5.4 Ubuntu Build
SE +/- 3.84, N = 3
757
160
320
480
640
800
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lcurl -lssl -lcrypto -lnuma -libverbs -lrt -laio -l
Flexible IO Tester 3.18
Type: Random Write - Engine: IO_uring - Buffered: Yes - Direct: No - Block Size: 4KB - Disk Target: Default Test Directory
MB/s, More Is Better
LKRG Default
SE +/- 4.33, N = 3
842
Linux 5.4 Ubuntu Build
SE +/- 1.86, N = 3
898
200
400
600
800
1000
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lcurl -lssl -lcrypto -lnuma -libverbs -lrt -laio -l


Flexible IO Tester 3.18
Type: Random Write - Engine: IO_uring - Buffered: Yes - Direct: No - Block Size: 4KB - Disk Target: Default Test Directory
IOPS, More Is Better
LKRG Default
SE +/- 881.92, N = 3
215333
Linux 5.4 Ubuntu Build
SE +/- 333.33, N = 3
229667
50K
100K
150K
200K
250K
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lcurl -lssl -lcrypto -lnuma -libverbs -lrt -laio -l
Flexible IO Tester 3.18
Type: Sequential Read - Engine: IO_uring - Buffered: Yes - Direct: No - Block Size: 2MB - Disk Target: Default Test Directory
MB/s, More Is Better
LKRG Default
SE +/- 2.08, N = 3
635
Linux 5.4 Ubuntu Build
SE +/- 1.15, N = 3
656
140
280
420
560
700
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lcurl -lssl -lcrypto -lnuma -libverbs -lrt -laio -l
Flexible IO Tester 3.18
Type: Sequential Read - Engine: IO_uring - Buffered: Yes - Direct: No - Block Size: 2MB - Disk Target: Default Test Directory
IOPS, More Is Better
LKRG Default
SE +/- 1.15, N = 3
314
Linux 5.4 Ubuntu Build
SE +/- 0.58, N = 3
324
70
140
210
280
350
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lcurl -lssl -lcrypto -lnuma -libverbs -lrt -laio -l


Flexible IO Tester 3.18
Type: Sequential Read - Engine: IO_uring - Buffered: Yes - Direct: No - Block Size: 4KB - Disk Target: Default Test Directory
MB/s, More Is Better
LKRG Default
SE +/- 8.65, N = 3
2266
Linux 5.4 Ubuntu Build
SE +/- 1.86, N = 3
2267
500
1000
1500
2000
2500
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lcurl -lssl -lcrypto -lnuma -libverbs -lrt -laio -l
Flexible IO Tester 3.18
Type: Sequential Read - Engine: IO_uring - Buffered: Yes - Direct: No - Block Size: 4KB - Disk Target: Default Test Directory
IOPS, More Is Better
LKRG Default
SE +/- 2081.67, N = 3
580000
Linux 5.4 Ubuntu Build
SE +/- 666.67, N = 3
580333
120K
240K
360K
480K
600K
1. (CC) gcc options: -rdynamic -std=gnu99 -ffast-math -include -O3 -U_FORTIFY_SOURCE -march=native -ll -lcurl -lssl -lcrypto -lnuma -libverbs -lrt -laio -l
PostMark 1.51
Disk Transaction Performance
TPS, More Is Better
LKRG Default
SE +/- 66.00, N = 3
7076
Linux 5.4 Ubuntu Build
SE +/- 102.67, N = 3
8825
2K
4K
6K
8K
10K
1. (CC) gcc options: -O3

Core i9 9900KS Intel Linux LKRG Testing

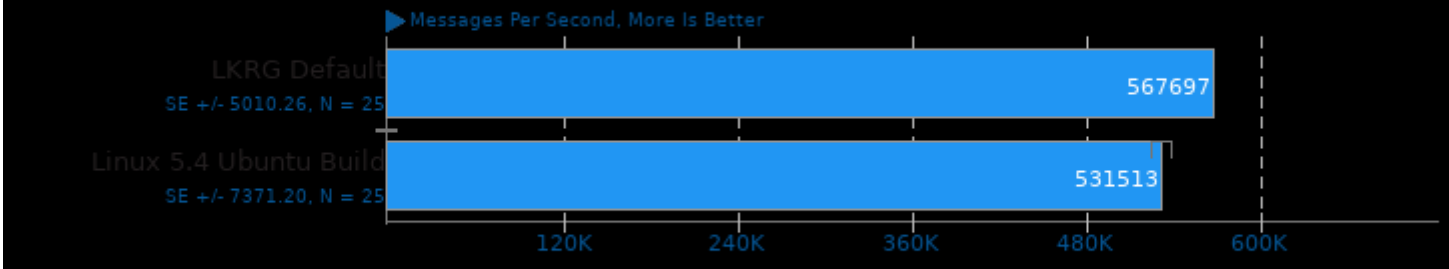



pmbench
Concurrent Worker Threads: 16 - Read-Write Ratio: 100% Reads
us - Average Page Latency, Fewer Is Better
LKRG Default
SE +/- 0.0003, N = 3
0.0379
Linux 5.4 Ubuntu Build
SE +/- 0.0004, N = 15
0.0358
0.0085
0.017
0.0255
0.034
0.0425
1. (CC) gcc options: -lm -luuid -lxml2 -m64 -pthread
pmbench
Concurrent Worker Threads: 16 - Read-Write Ratio: 100% Writes
us - Average Page Latency, Fewer Is Better
LKRG Default
SE +/- 0.0002, N = 3
0.0837
Linux 5.4 Ubuntu Build
SE +/- 0.0004, N = 3
0.0806
0.0188
0.0376
0.0564
0.0752
0.094
1. (CC) gcc options: -lm -luuid -lxml2 -m64 -pthread
pmbench
Concurrent Worker Threads: 1 - Read-Write Ratio: 80% Reads 20% Writes
us - Average Page Latency, Fewer Is Better
LKRG Default
SE +/- 0.0002, N = 3
0.0664
Linux 5.4 Ubuntu Build
SE +/- 0.0001, N = 3
0.0666
0.015
0.03
0.045
0.06
0.075
1. (CC) gcc options: -lm -luuid -lxml2 -m64 -pthread
pmbench
Concurrent Worker Threads: 16 - Read-Write Ratio: 80% Reads 20% Writes
us - Average Page Latency, Fewer Is Better
LKRG Default
SE +/- 0.0003, N = 3
0.0879
Linux 5.4 Ubuntu Build
SE +/- 0.0004, N = 3
0.0866
0.0198
0.0396
0.0594
0.0792
0.099
1. (CC) gcc options: -lm -luuid -lxml2 -m64 -pthread

Core i9 9900KS Intel Linux LKRG Testing

Sockperf 3.4

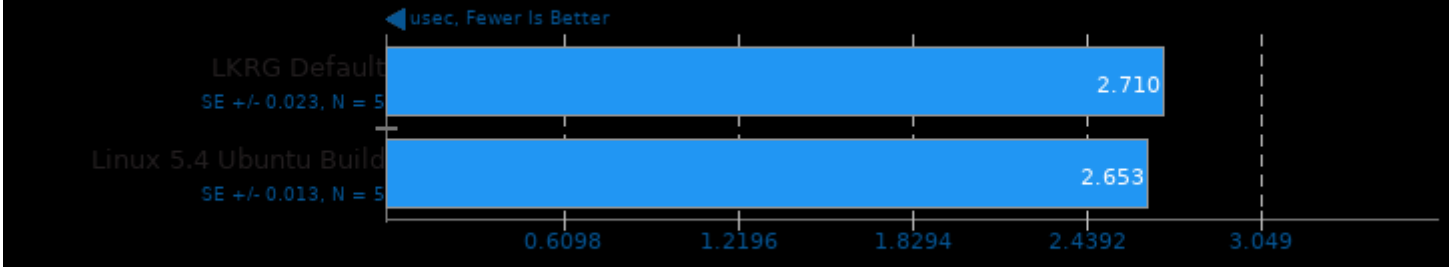
Test: Throughput



1. (CXX) g++ options: -param -O3 -rdynamic -ldl -lpthread

Sockperf 3.4

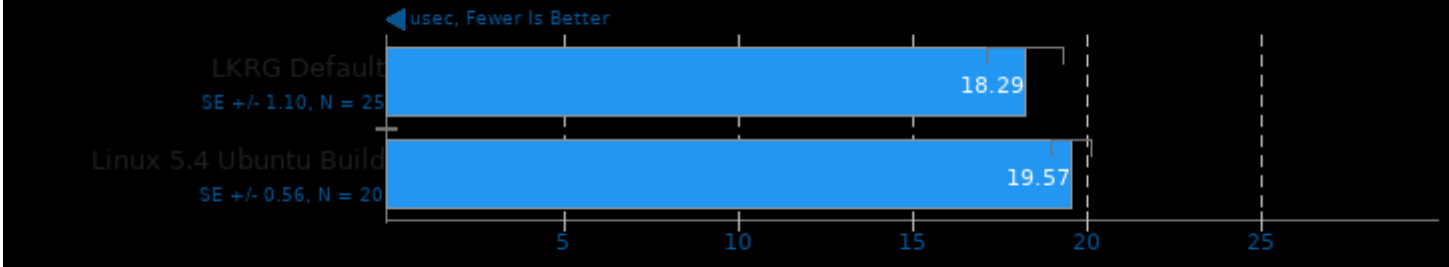
Test: Latency Ping Pong



1. (CXX) g++ options: -param -O3 -rdynamic -ldl -lpthread

Sockperf 3.4

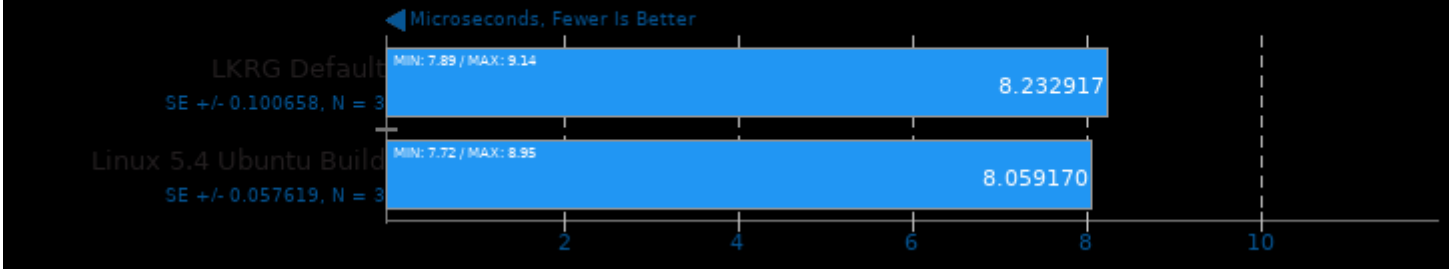
Test: Latency Under Load



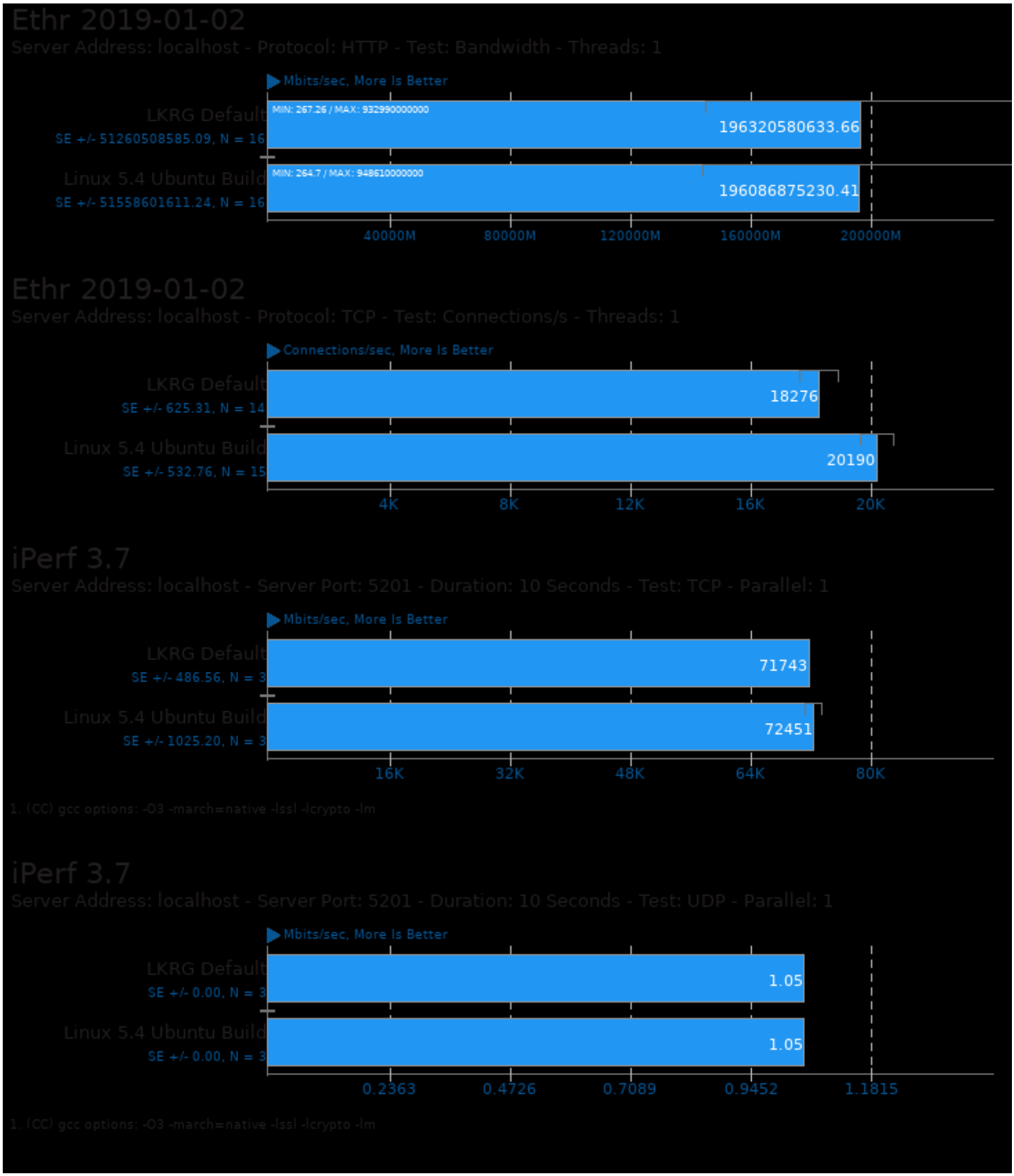
1. (CXX) g++ options: -param -O3 -rdynamic -ldl -lpthread

Ethr 2019-01-02

Server Address: localhost - Protocol: TCP - Test: Latency - Threads: 1

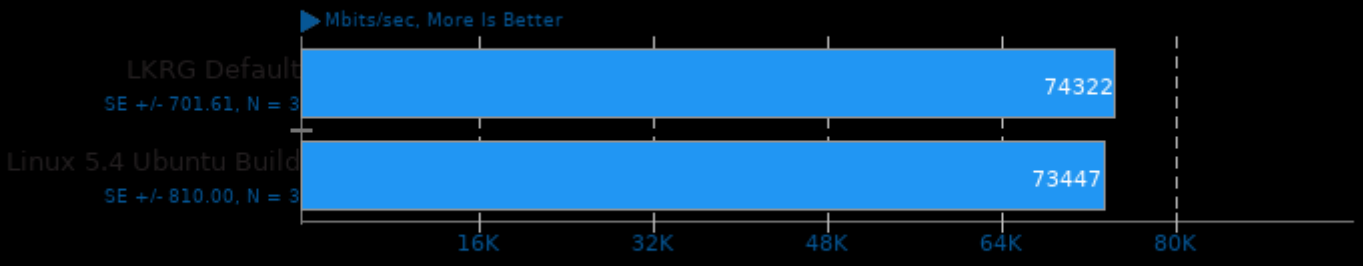


Core i9 9900KS Intel Linux LKRG Testing



iPerf 3.7

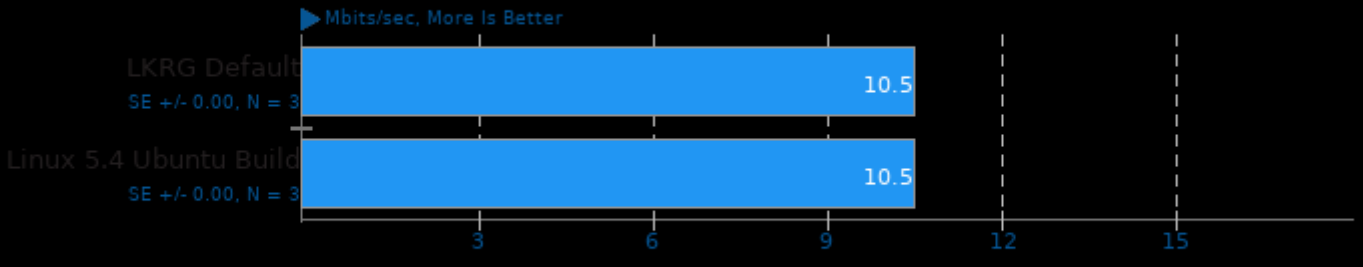
Server Address: localhost - Server Port: 5201 - Duration: 10 Seconds - Test: TCP - Parallel: 10



1. (CC) gcc options: -O3 -march=native -lssl -lcrypto -lm

iPerf 3.7

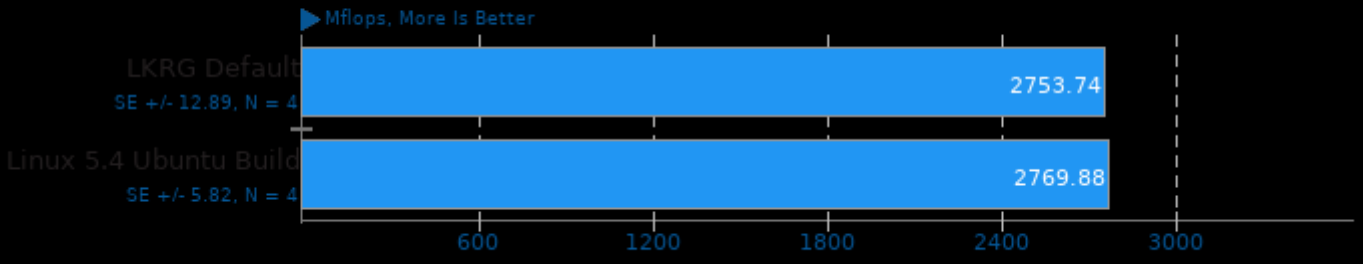
Server Address: localhost - Server Port: 5201 - Duration: 10 Seconds - Test: UDP - Parallel: 10



1. (CC) gcc options: -O3 -march=native -lssl -lcrypto -lm

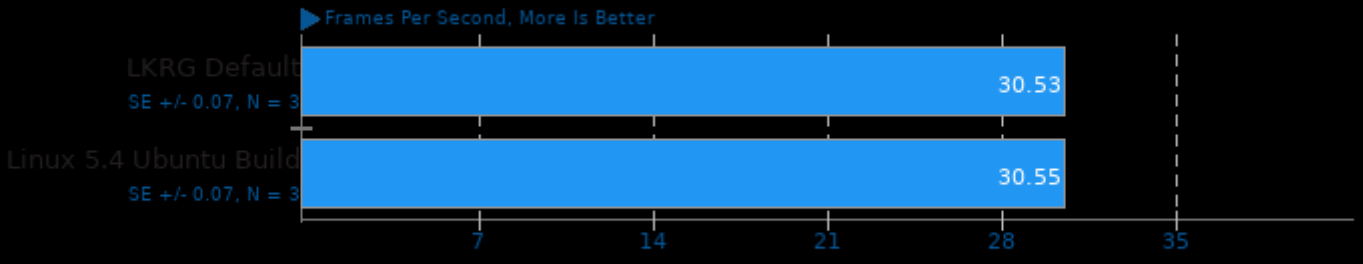
Java SciMark 2.0

Computational Test: Composite



SVT-AV1 0.8

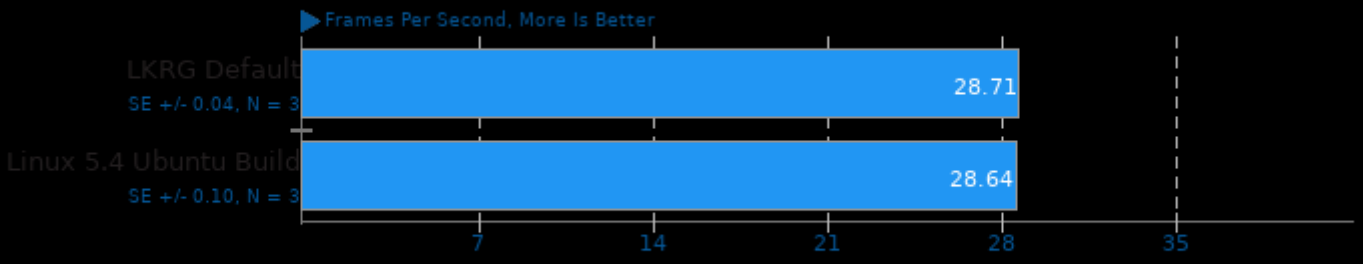
Encoder Mode: Enc Mode 8 - Input: 1080p



1. (CXX) g++ options: -fPIE -fPIC -pie

VP9 libvpx Encoding 1.8.2

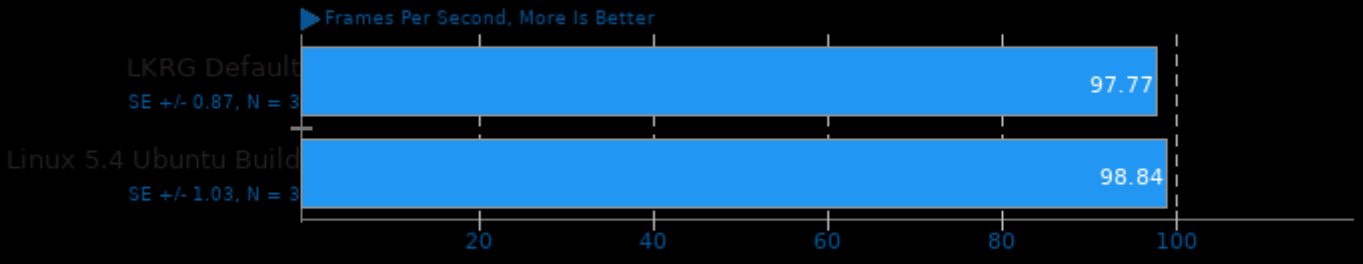
Speed: Speed 5



1. (CXX) g++ options: -m64 -lm -lpthread -O3 -fPIC -U_FORTIFY_SOURCE -std=c++11

x264 2019-12-17

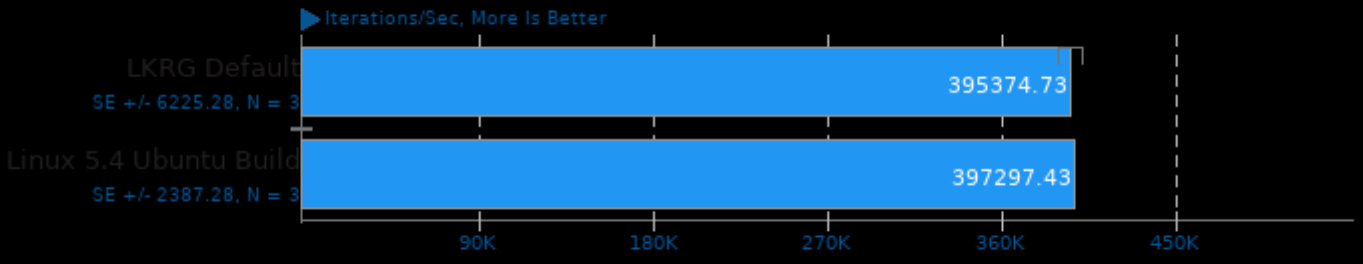
H.264 Video Encoding



1. (CC) gcc options: -ldl -lavformat -lavcodec -lavutil -lswscale -m64 -lm -lpthread -O3 -ffast-math -std=gnu99 -fPIC -fomit-frame-pointer -fno-tree-vectori

Coremark 1.0

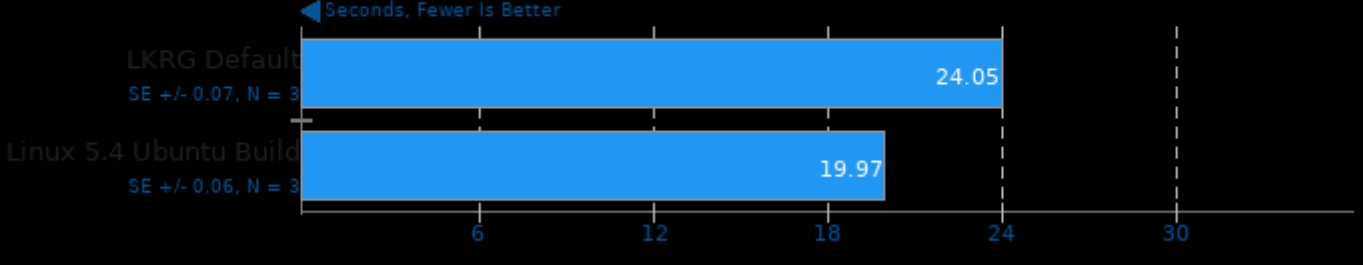
CoreMark Size 666 - Iterations Per Second



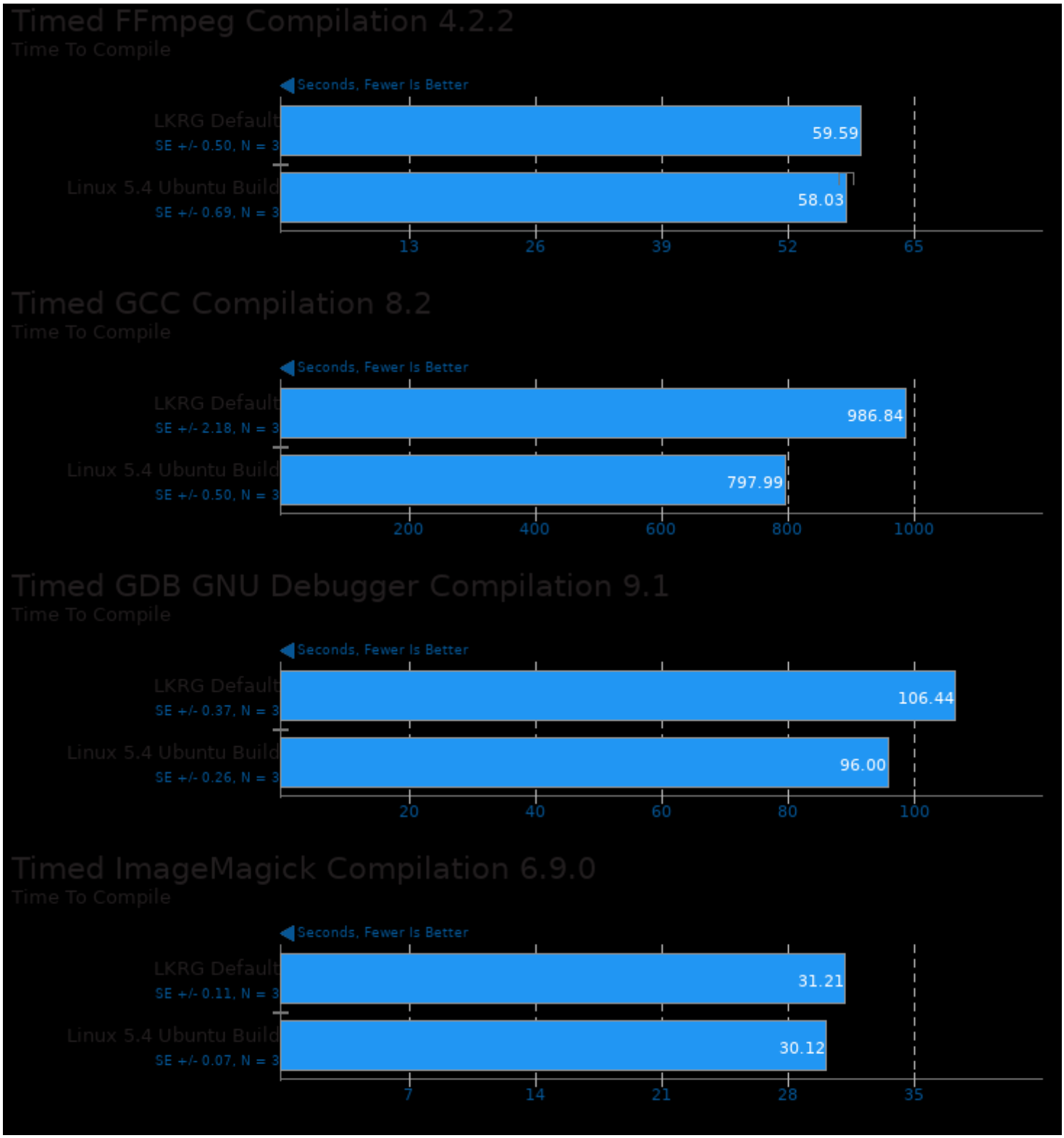
1. (CC) gcc options: -O2 -lrt" -lrt

Timed Apache Compilation 2.4.41

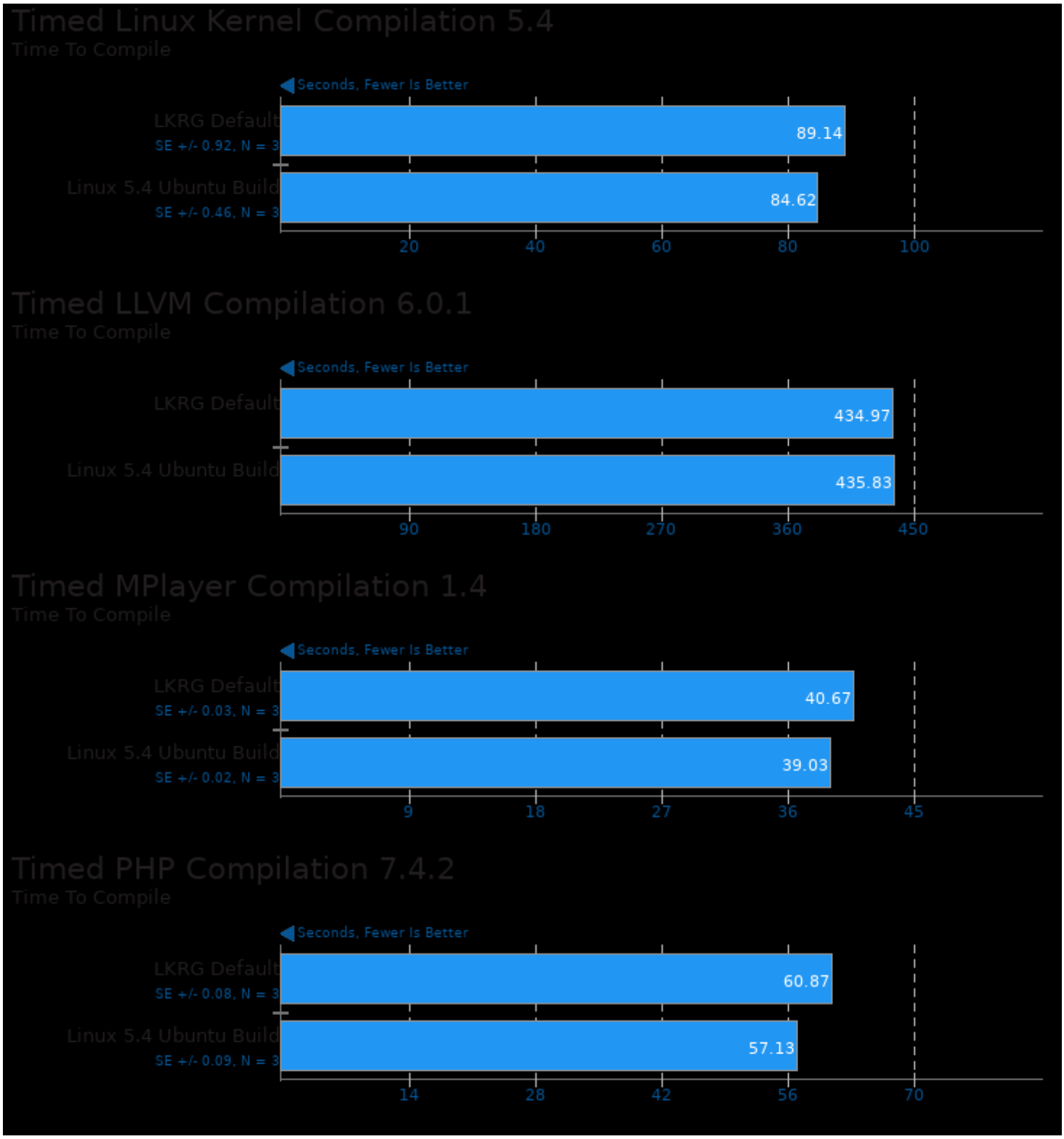
Time To Compile



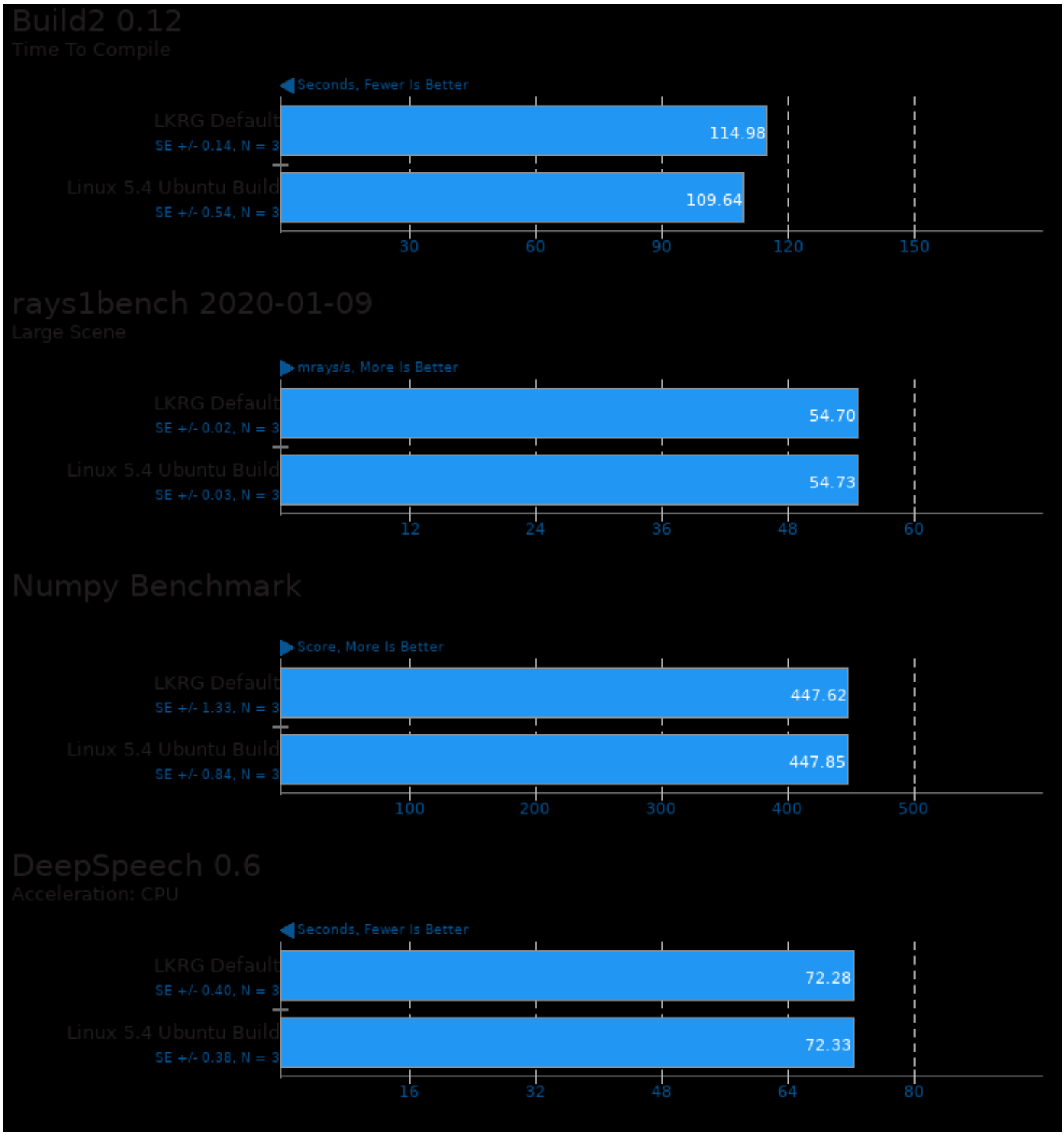
Core i9 9900KS Intel Linux LKRG Testing



Core i9 9900KS Intel Linux LKRG Testing

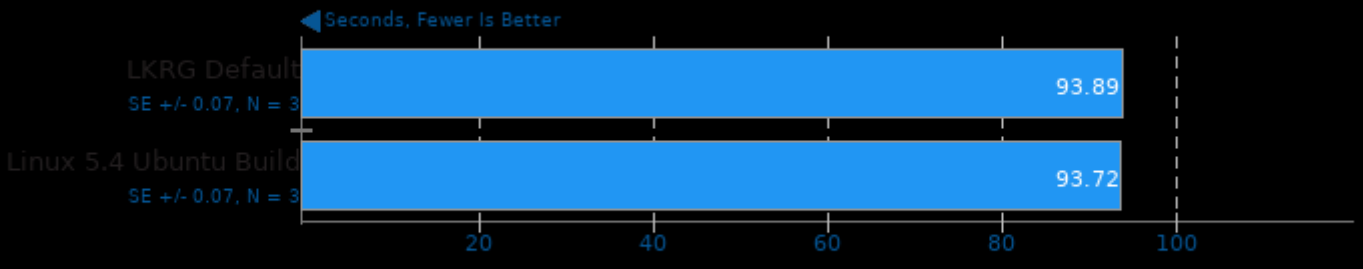


Core i9 9900KS Intel Linux LKRG Testing



Tachyon 0.99b6

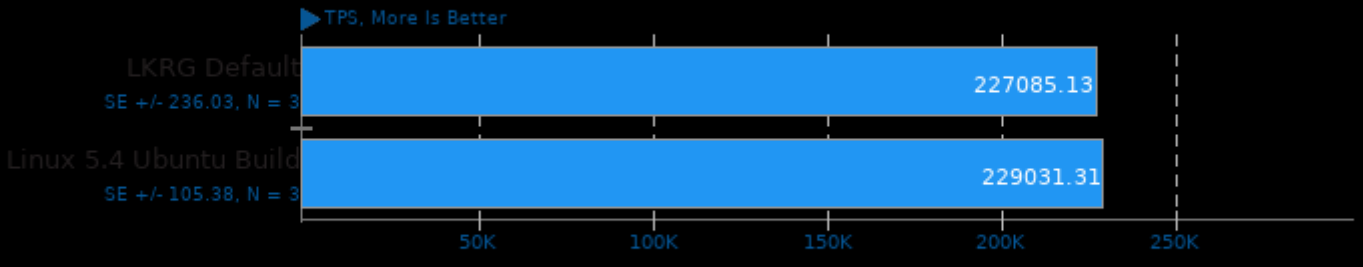
Total Time



1. (CC) gcc options: -m64 -O3 -fomit-frame-pointer -ffast-math -ltachyon -lm -lpthread

PostgreSQL pgbench 12.0

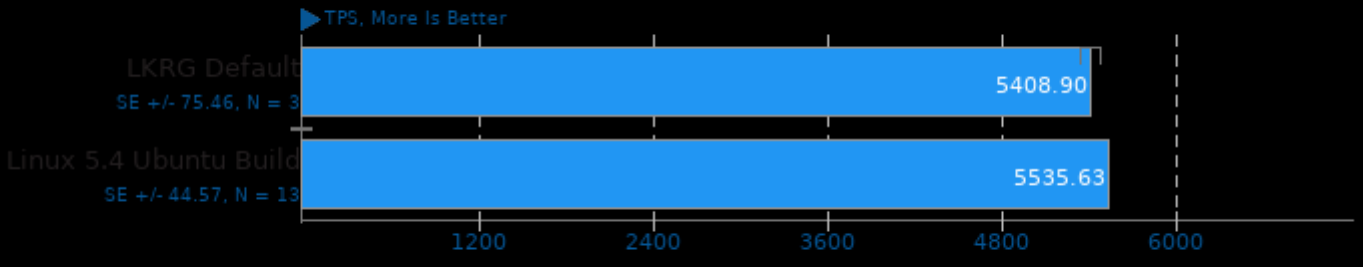
Scaling: Buffer Test - Test: Normal Load - Mode: Read Only



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

PostgreSQL pgbench 12.0

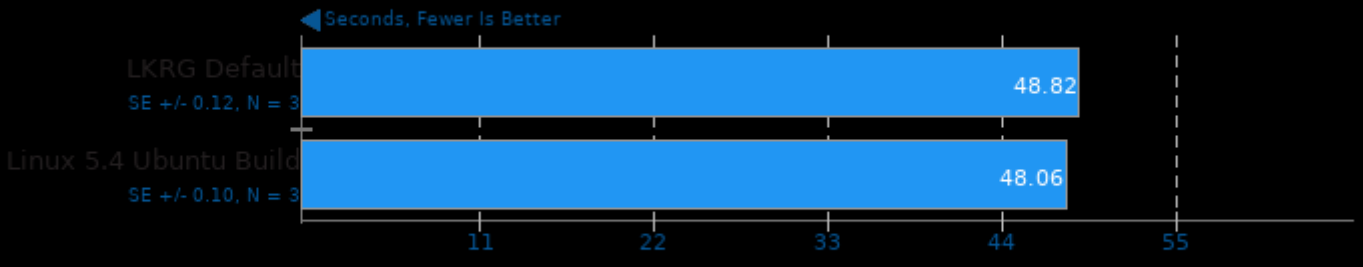
Scaling: Buffer Test - Test: Normal Load - Mode: Read Write



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

SQLite Speedtest 3.30

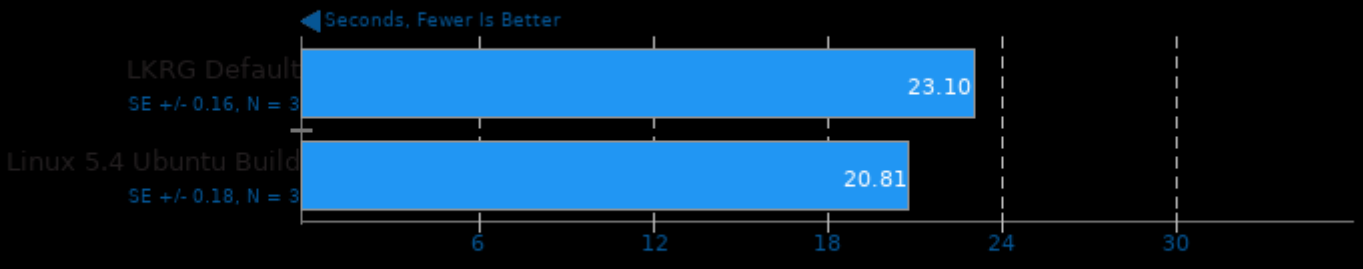
Timed Time - Size 1,000



1. (CC) gcc options: -O2 -ldl -lz -lpthread

Inkscape

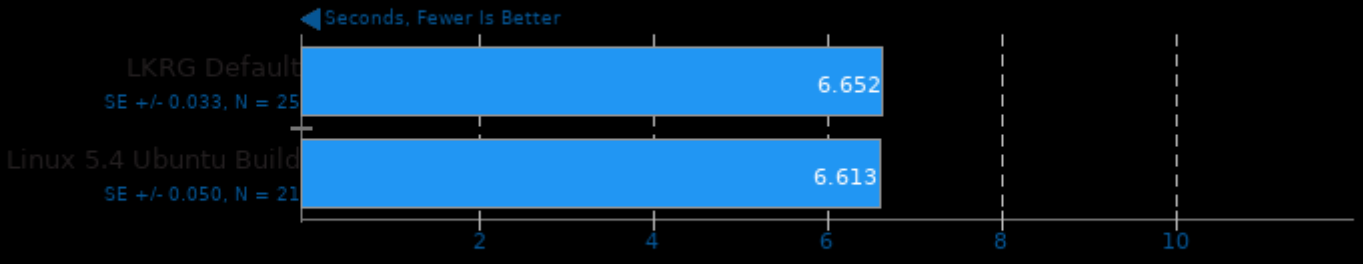
Operation: SVG Files To PNG



1. Inkscape 0.92.4 (5da689c313, 2019-01-14)

LibreOffice

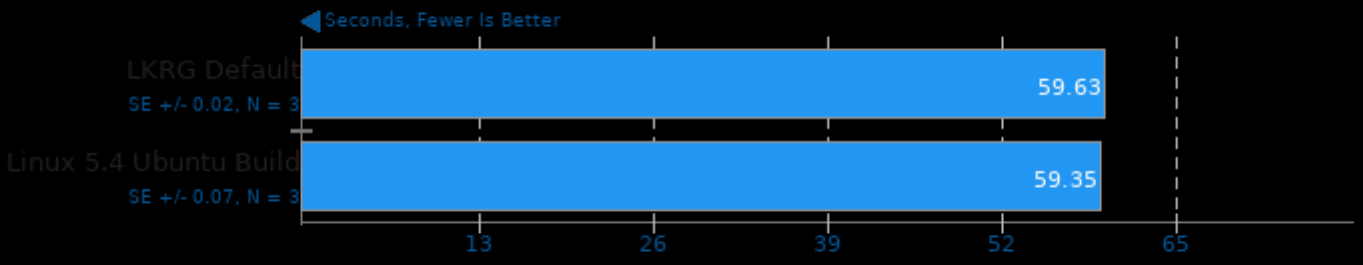
Test: 20 Documents To PDF



1. LibreOffice 6.4.0.3 40(Build:3)

RawTherapee

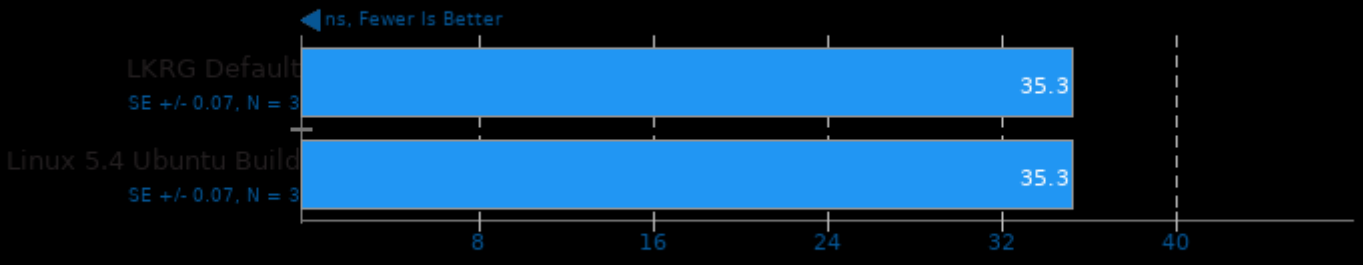
Total Benchmark Time



1. RawTherapee, version 5.8, command line.

BenchmarkMutex

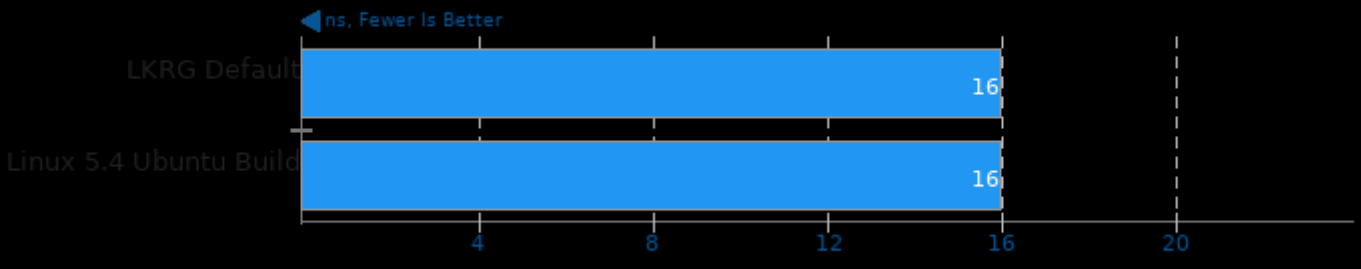
Benchmark: Mutex Lock Unlock spinlock



1. (CXX) g++ options: -std=c++17 -lbenchmark -pthread

BenchmarkMutex

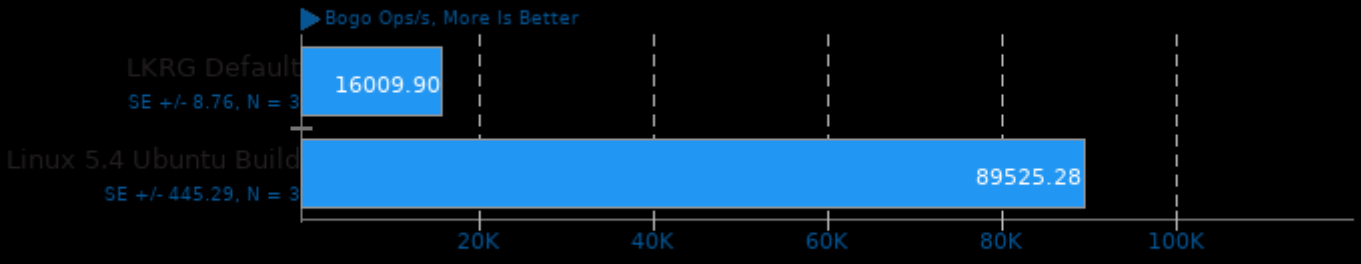
Benchmark: Mutex Lock Unlock std::mutex



1. (CXX) g++ options: -std=c++17 -lbenchmark -pthread

Stress-NG 0.07.26

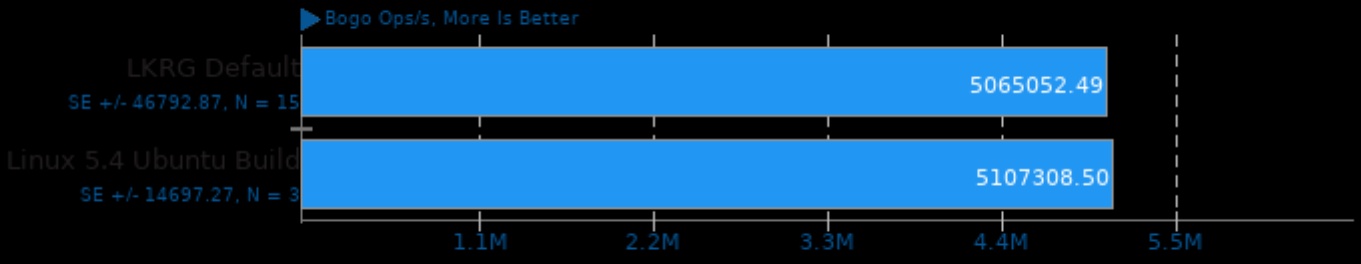
Test: Forking



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

Stress-NG 0.07.26

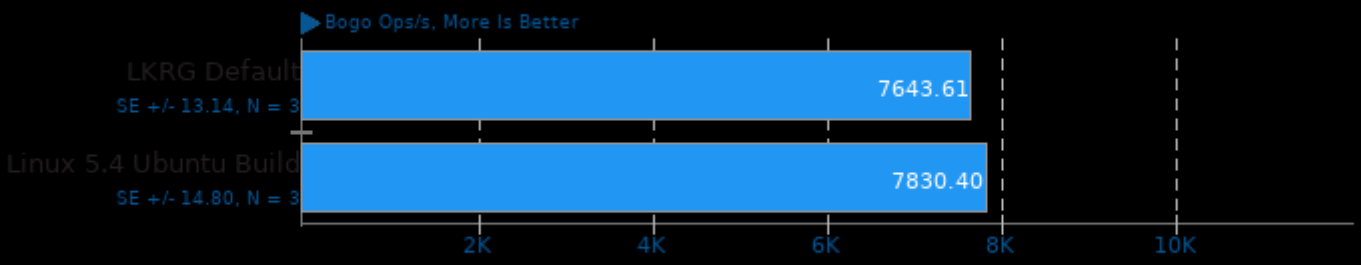
Test: Semaphores



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

Stress-NG 0.07.26

Test: Socket Activity

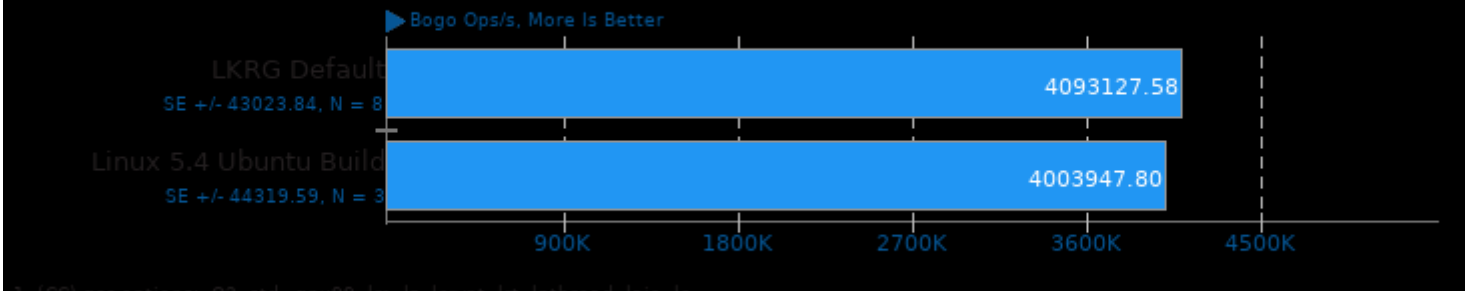


1. (CC) gcc options: -O2 -std=gnu99 -lm -lz -lcrypt -lrt -lpthread -laio -lc

Core i9 9900KS Intel Linux LKRG Testing

Stress-NG 0.07.26

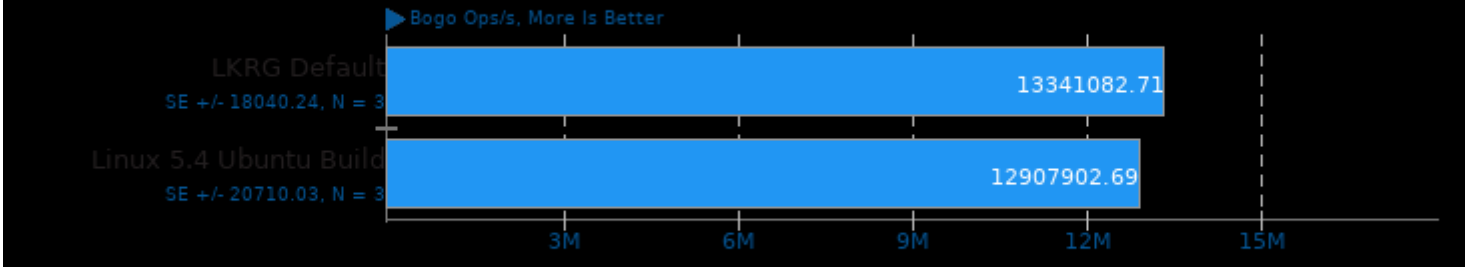
Test: Context Switching



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

Stress-NG 0.07.26

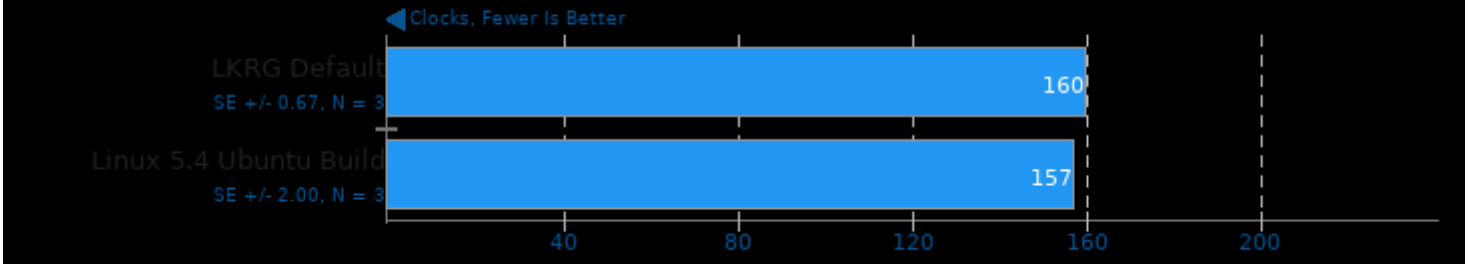
Test: System V Message Passing



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

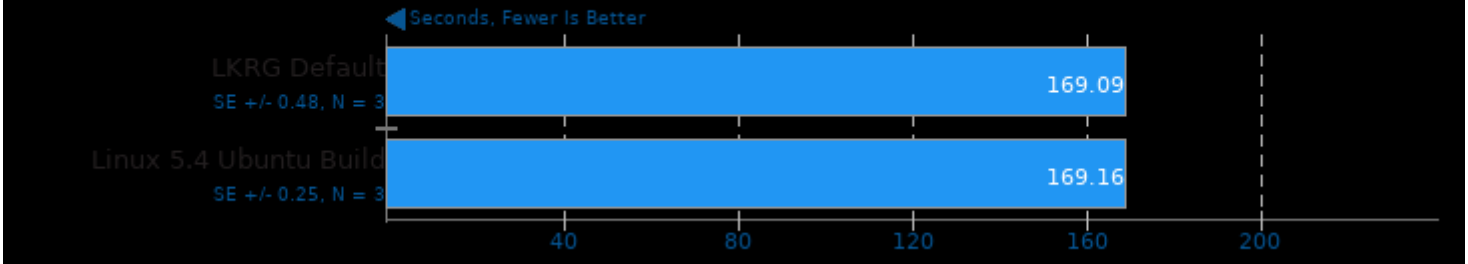
ctx_clock

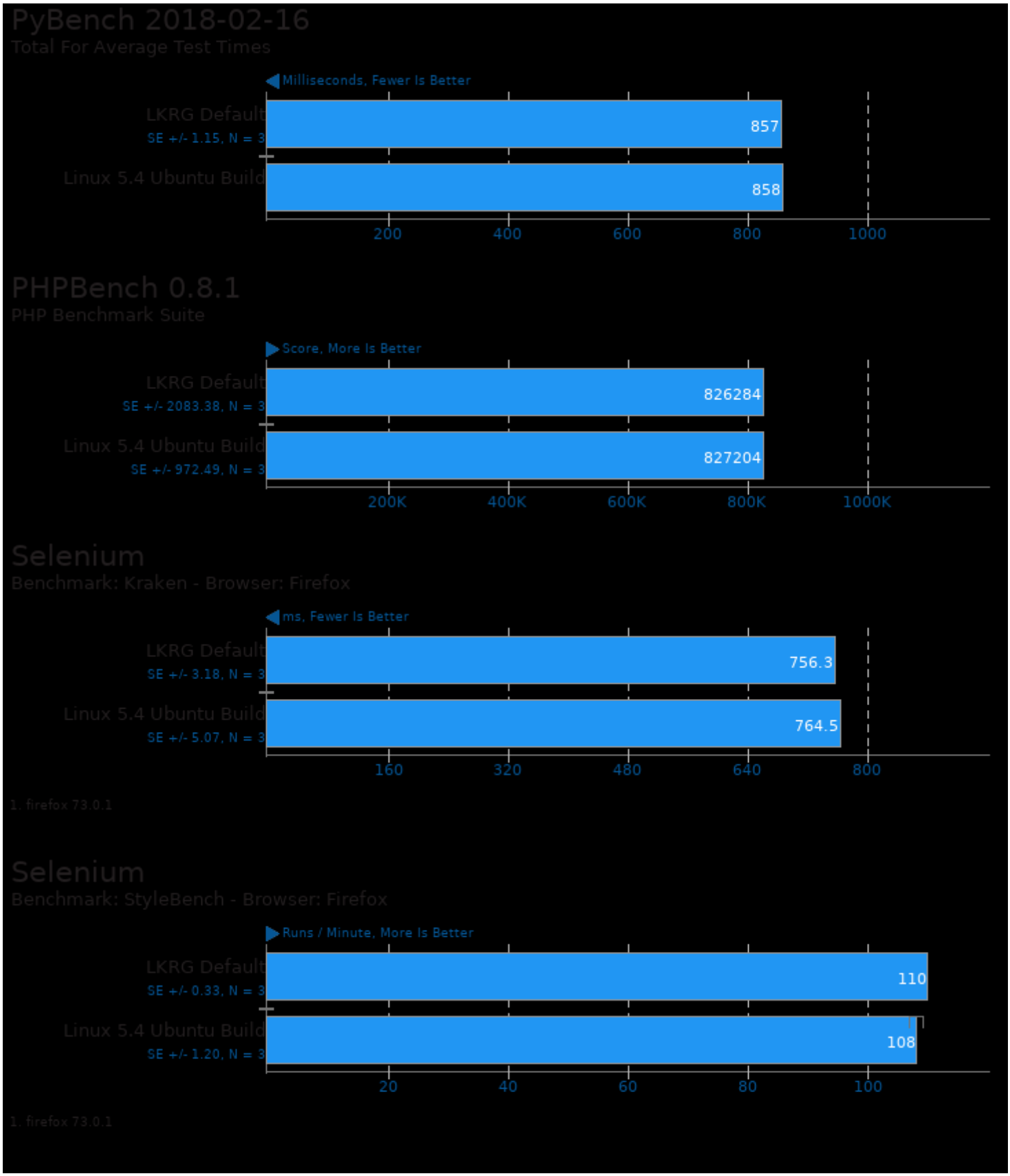
Context Switch Time



Blender 2.82

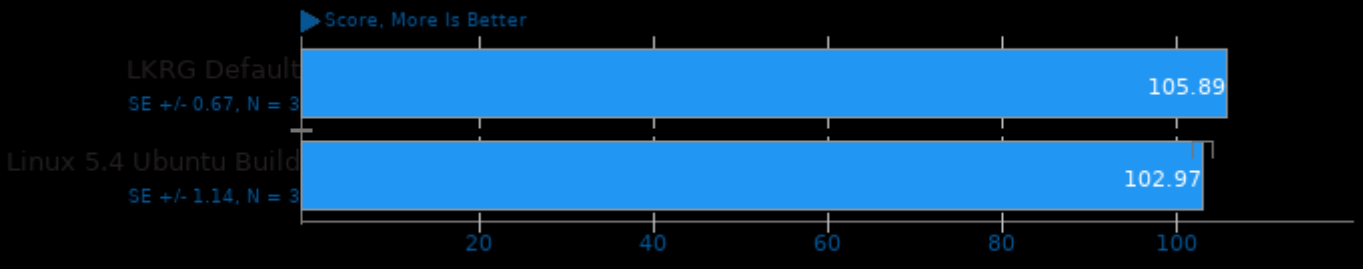
Blend File: BMW27 - Compute: CPU-Only




PyBench 2018-02-16
Total For Average Test Times
Milliseconds, Fewer Is Better
LKRG Default
SE +/- 1.15, N = 3
857
Linux 5.4 Ubuntu Build
858
200
400
600
800
1000
PHPBench 0.8.1
PHP Benchmark Suite
Score, More Is Better
LKRG Default
SE +/- 2083.38, N = 3
826284
Linux 5.4 Ubuntu Build
SE +/- 972.49, N = 3
827204
200K
400K
600K
800K
1000K
Selenium
Benchmark: Kraken - Browser: Firefox
ms, Fewer Is Better
LKRG Default
SE +/- 3.18, N = 3
756.3
Linux 5.4 Ubuntu Build
SE +/- 5.07, N = 3
764.5
160
320
480
640
800
1. firefox 73.0.1
Selenium
Benchmark: StyleBench - Browser: Firefox
Runs / Minute, More Is Better
LKRG Default
SE +/- 0.33, N = 3
110
Linux 5.4 Ubuntu Build
SE +/- 1.20, N = 3
108
20
40
60
80
100
1. firefox 73.0.1

Selenium

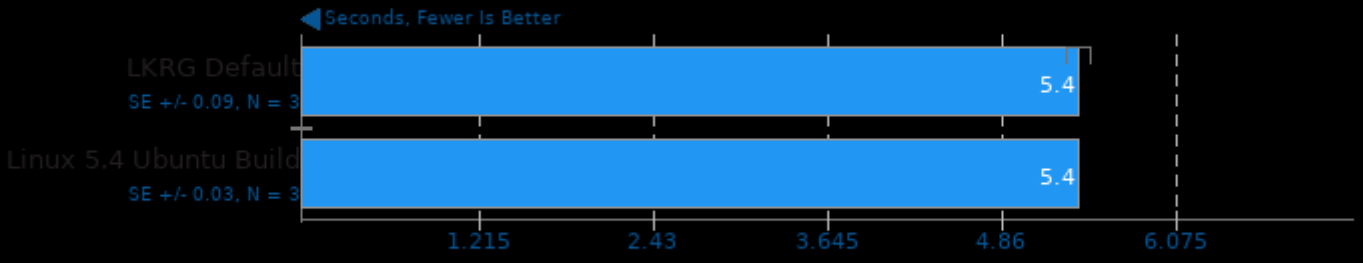
Benchmark: Jetstream 2 - Browser: Firefox



1. firefox 73.0.1

Selenium

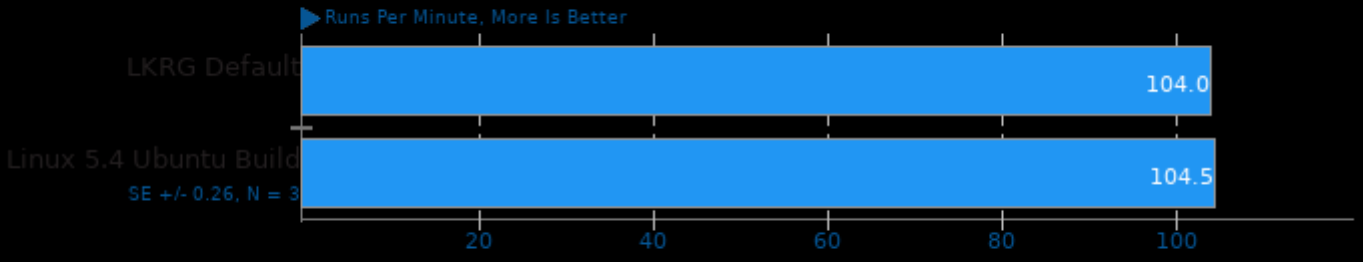
Benchmark: Maze Solver - Browser: Firefox



1. firefox 73.0.1

Selenium

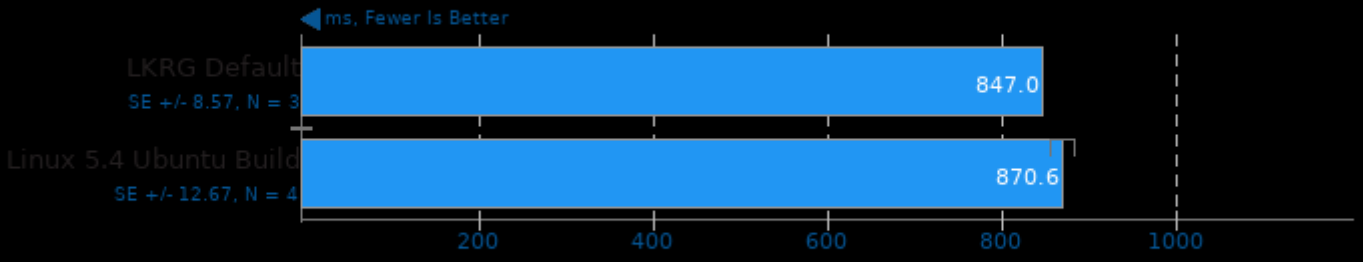
Benchmark: Speedometer - Browser: Firefox



1. firefox 73.0.1

Selenium

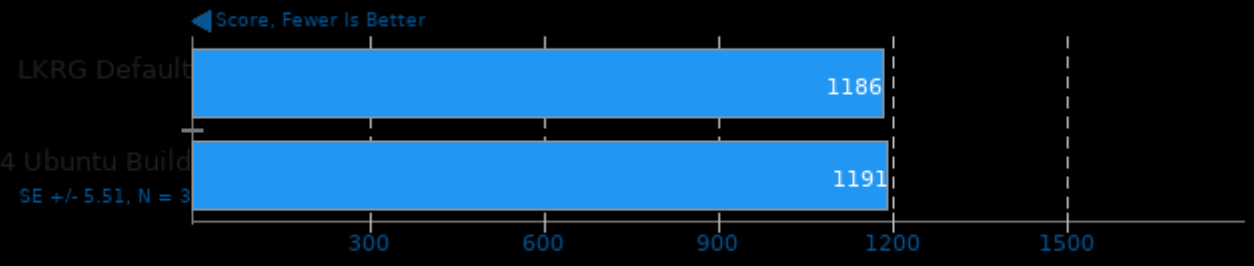
Benchmark: Kraken - Browser: Google Chrome



1. chrome 80.0.3987.122

Selenium

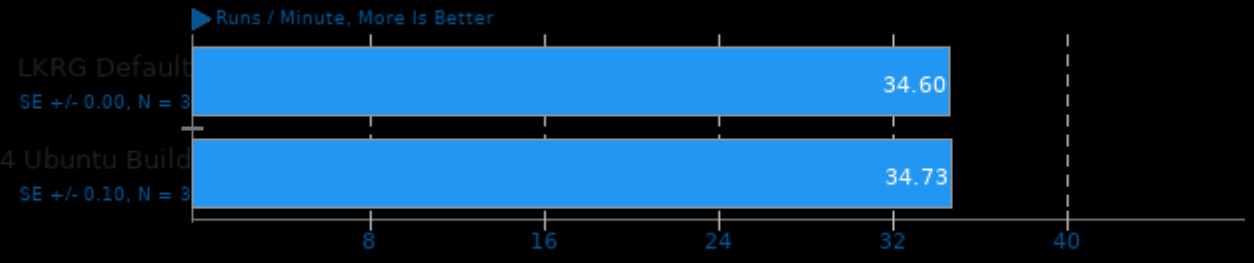
Benchmark: PSPDFKit WASM - Browser: Firefox



1. firefox 73.0.1

Selenium

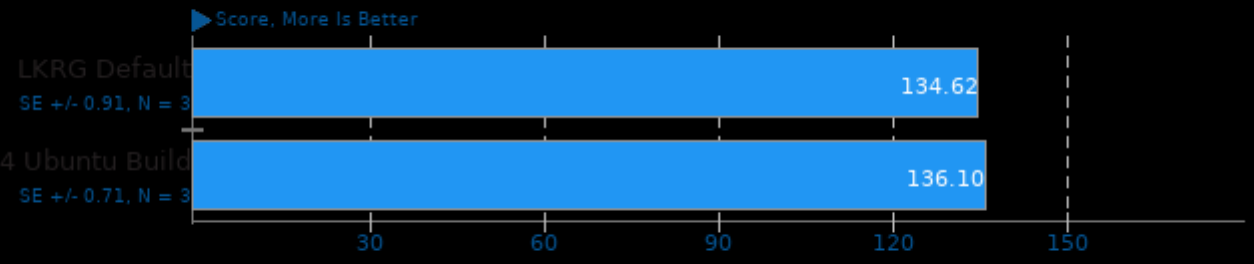
Benchmark: StyleBench - Browser: Google Chrome



1. chrome 80.0.3987.122

Selenium

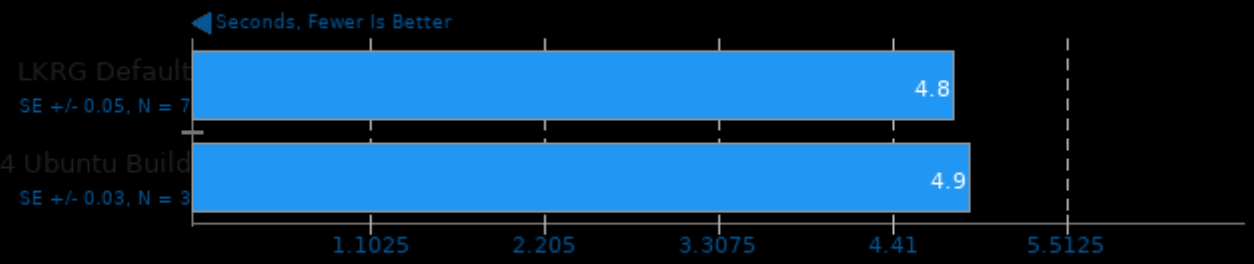
Benchmark: Jetstream 2 - Browser: Google Chrome



1. chrome 80.0.3987.122

Selenium

Benchmark: Maze Solver - Browser: Google Chrome

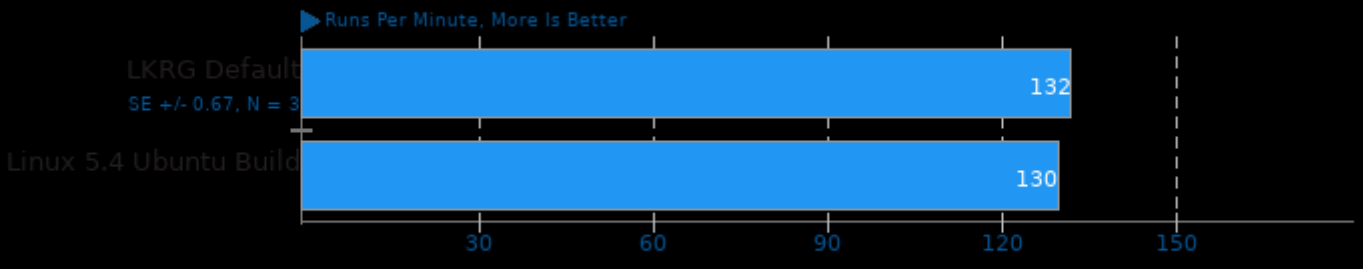


1. chrome 80.0.3987.122

Core i9 9900KS Intel Linux LKRG Testing

Selenium

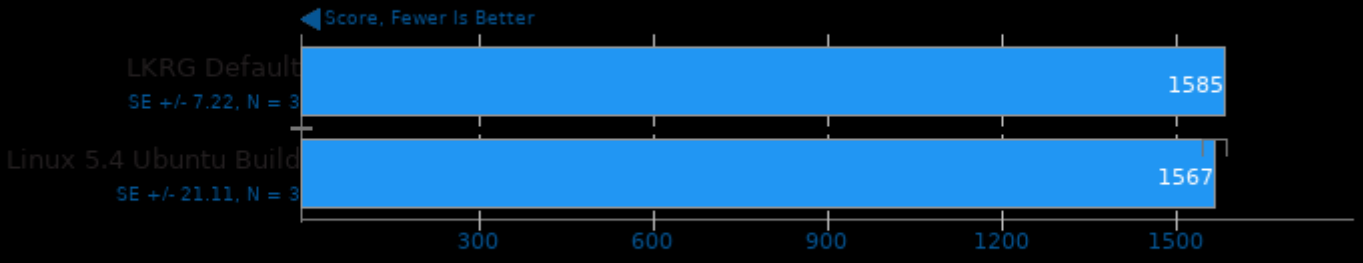
Benchmark: Speedometer - Browser: Google Chrome



1. chrome 80.0.3987.122

Selenium

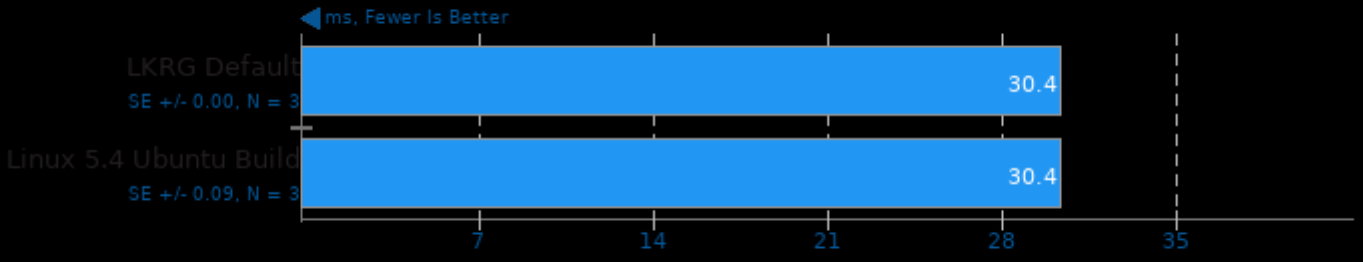
Benchmark: PSPDFKit WASM - Browser: Google Chrome



1. chrome 80.0.3987.122

Selenium

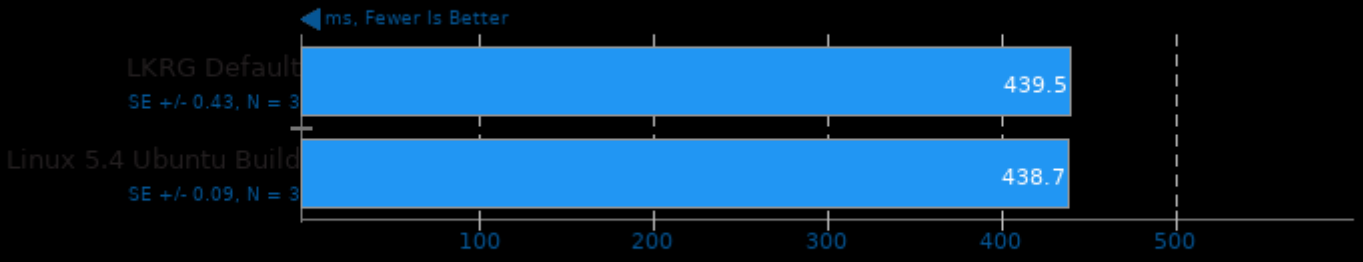
Benchmark: WASM imageConvolute - Browser: Firefox



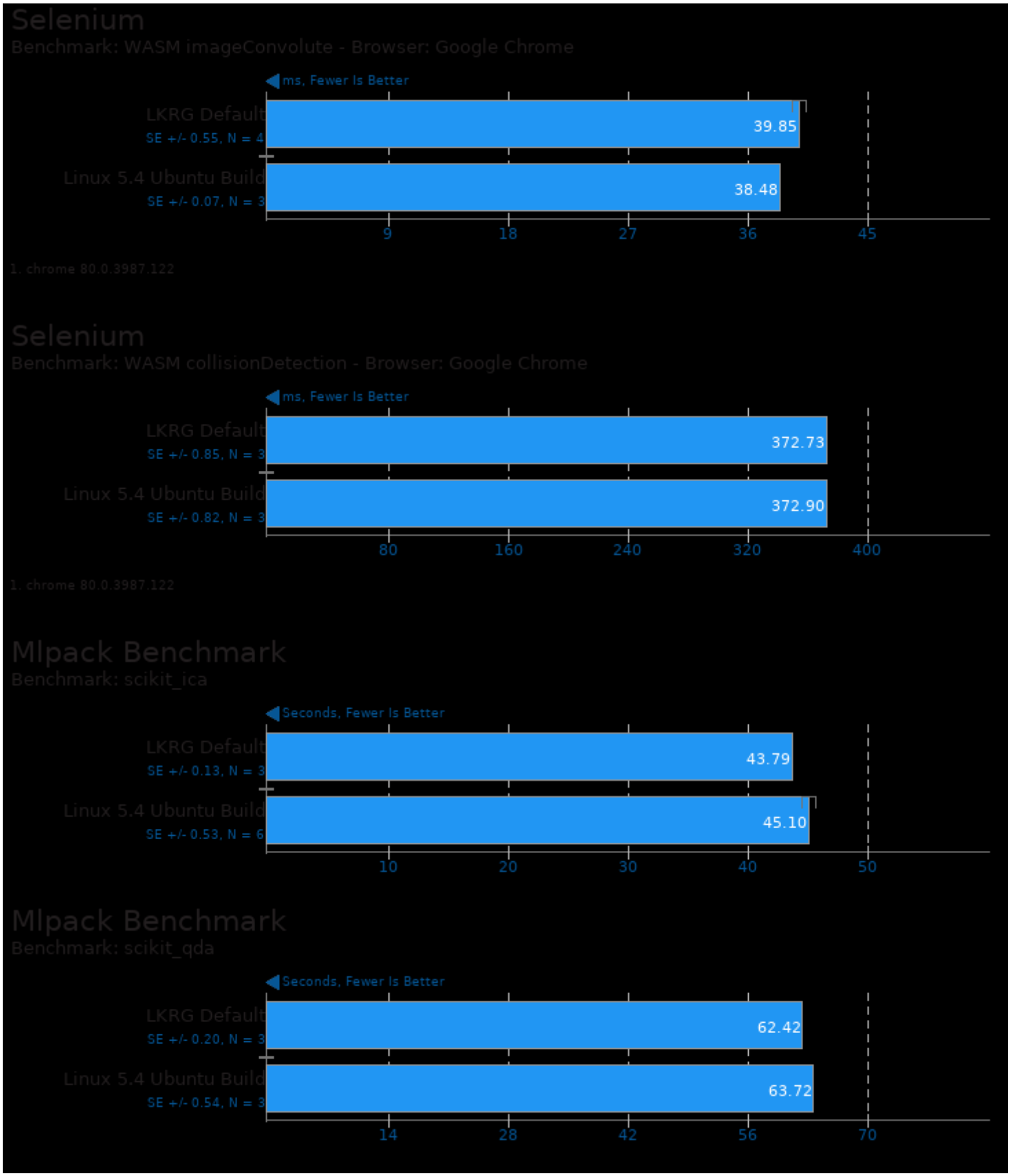
1. firefox 73.0.1

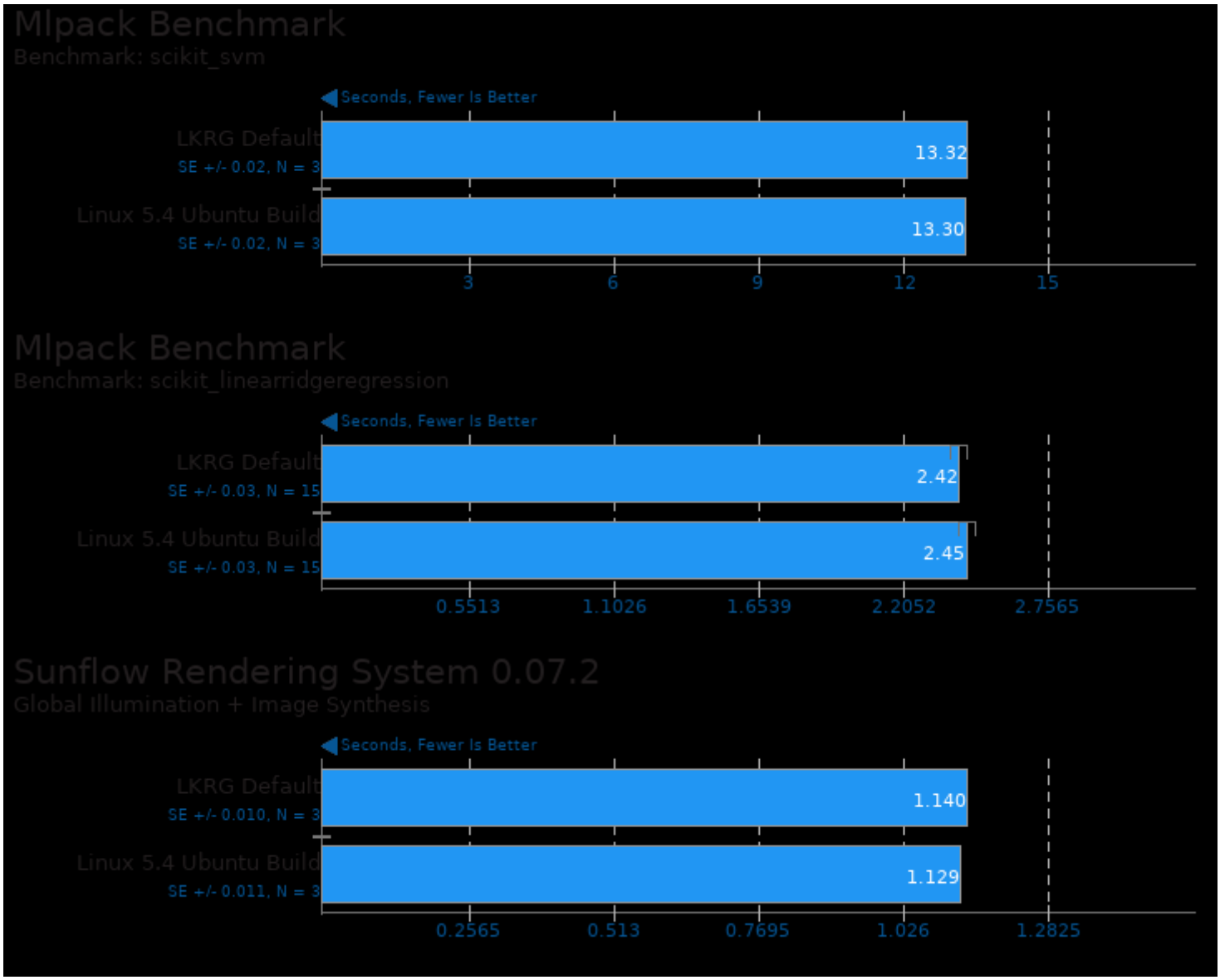
Selenium

Benchmark: WASM collisionDetection - Browser: Firefox

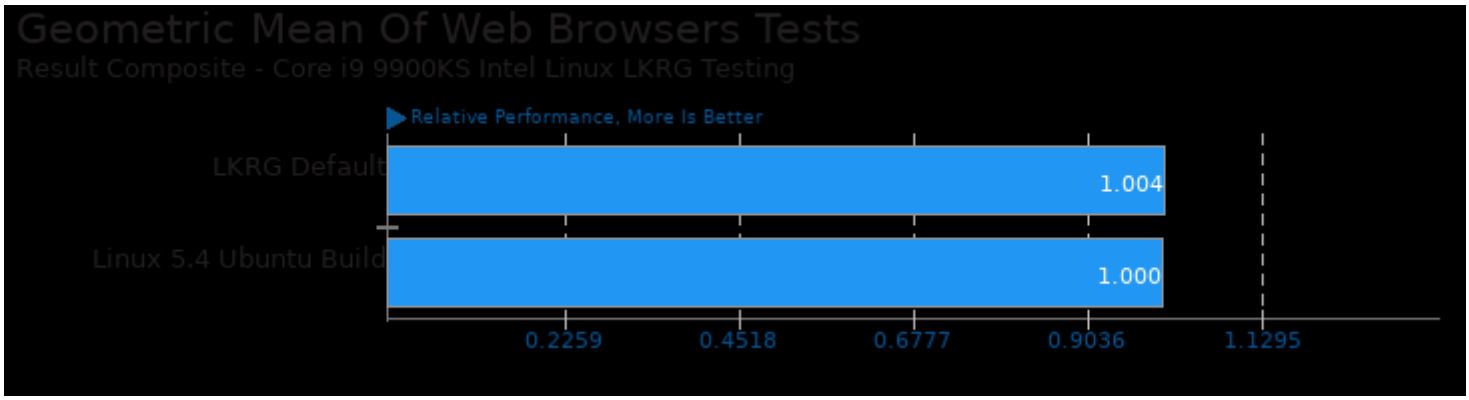


1. firefox 73.0.1

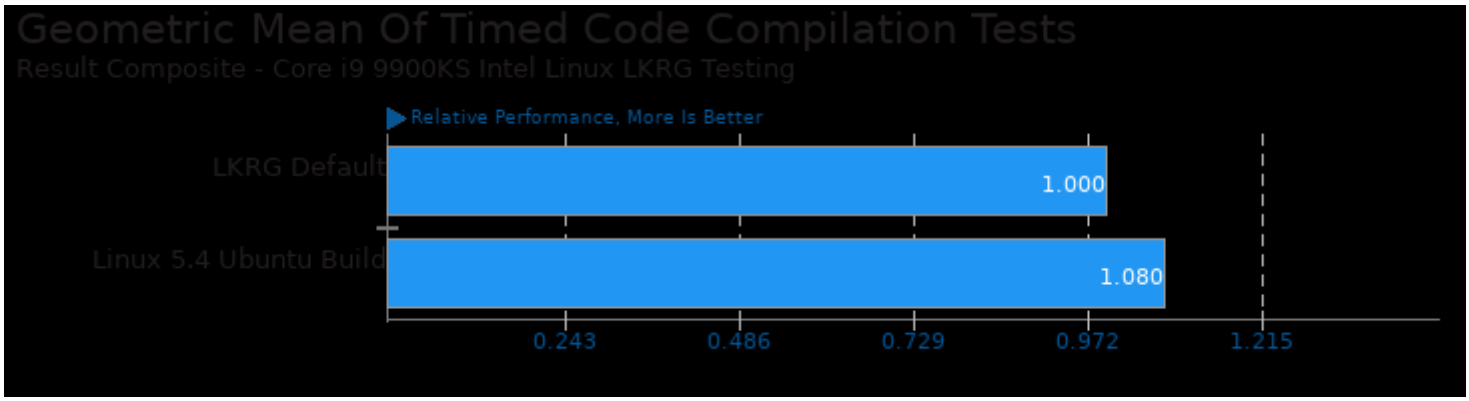

Selenium
Benchmark: WASM imageConvolute - Browser: Google Chrome
ms, Fewer Is Better
LKRG Default
SE +/- 0.55, N = 4
39.85
Linux 5.4 Ubuntu Build
SE +/- 0.07, N = 3
38.48
9
18
27
36
45
1: chrome 80.0.3987.122
Selenium
Benchmark: WASM collisionDetection - Browser: Google Chrome
ms, Fewer Is Better
LKRG Default
SE +/- 0.85, N = 3
372.73
Linux 5.4 Ubuntu Build
SE +/- 0.82, N = 3
372.90
80
160
240
320
400
1: chrome 80.0.3987.122
Mlpack Benchmark
Benchmark: scikit_ica
Seconds, Fewer Is Better
LKRG Default
SE +/- 0.13, N = 3
43.79
Linux 5.4 Ubuntu Build
SE +/- 0.53, N = 6
45.10
10
20
30
40
50
Mlpack Benchmark
Benchmark: scikit_qda
Seconds, Fewer Is Better
LKRG Default
SE +/- 0.20, N = 3
62.42
Linux 5.4 Ubuntu Build
SE +/- 0.54, N = 3
63.72
14
28
42
56
70


Mlpack Benchmark
Benchmark: scikit_svm
Seconds, Fewer Is Better
LKRG Default
SE +/- 0.02, N = 3
13.32
Linux 5.4 Ubuntu Build
SE +/- 0.02, N = 3
13.30
3
6
9
12
15
Mlpack Benchmark
Benchmark: scikit_linearridgeregression
Seconds, Fewer Is Better
LKRG Default
SE +/- 0.03, N = 15
2.42
Linux 5.4 Ubuntu Build
SE +/- 0.03, N = 15
2.45
0.5513
1.1026
1.6539
2.2052
2.7565
Sunflow Rendering System 0.07.2
Global Illumination + Image Synthesis
Seconds, Fewer Is Better
LKRG Default
SE +/- 0.010, N = 3
1.140
Linux 5.4 Ubuntu Build
SE +/- 0.011, N = 3
1.129
0.2565
0.513
0.7695
1.026
1.2825

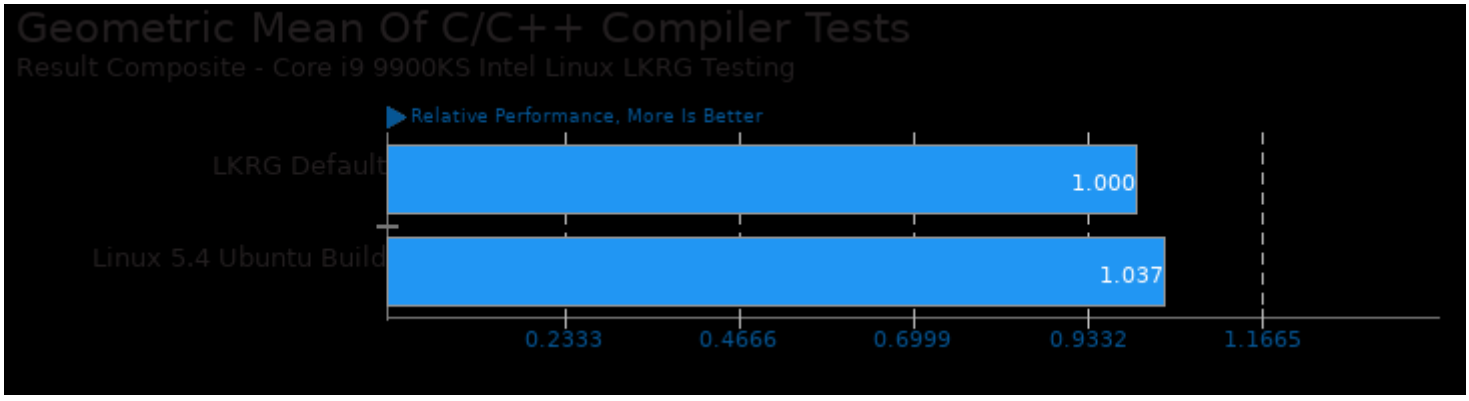
These geometric means are based upon test groupings / test suites for this result file.



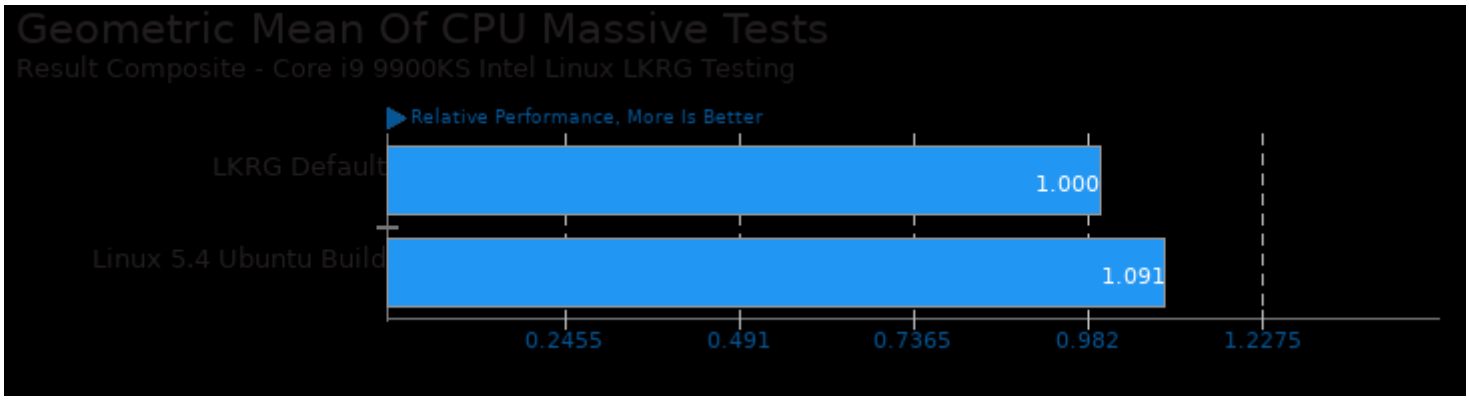
Geometric mean based upon tests: system/selenium



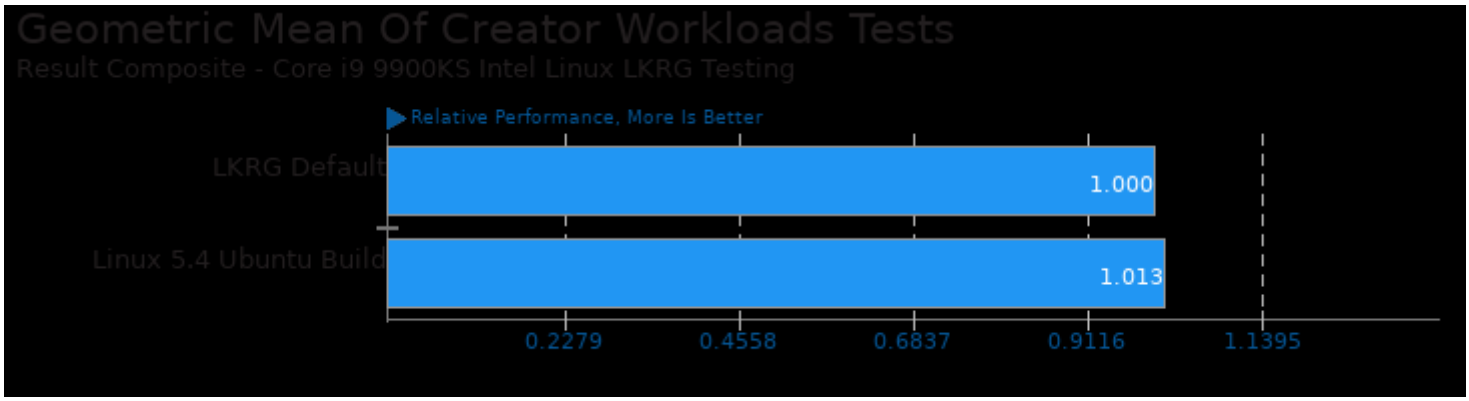
Geometric mean based upon tests: pts/build-apache, pts/build-php, pts/build-linux-kernel, pts/build-imagemagick, pts/build-gcc, pts/build-gdb, pts/build-llvm, pts/build-ffmpeg, pts/build-mplayer and pts/build2



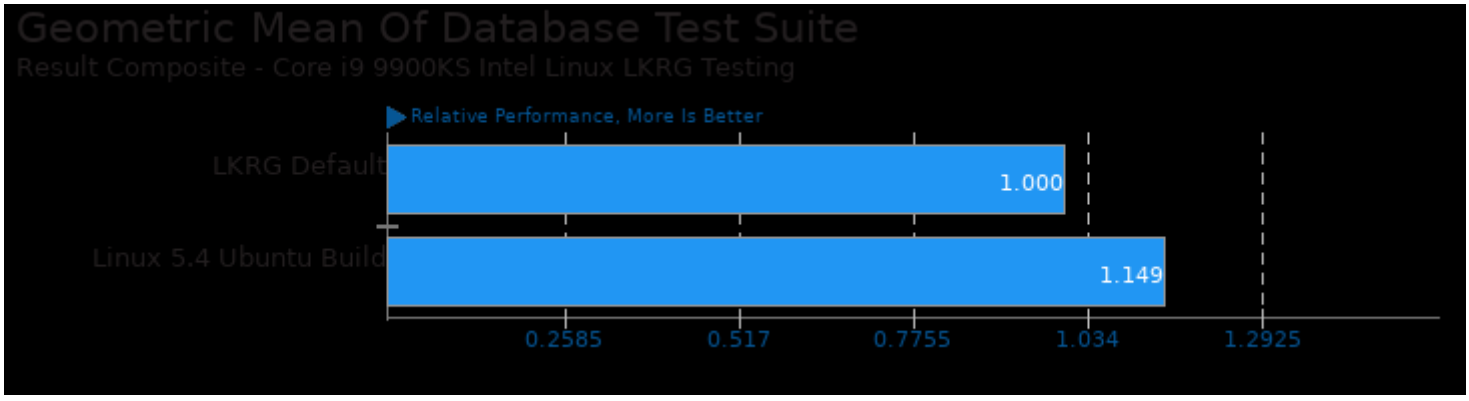
Geometric mean based upon tests: pts/vpxenc, pts/build-php, pts/build-imagemagick, pts/build-llvm, pts/pgbench, pts/sqlite-speedtest, pts/x264, pts/svt-av1, pts/build-gdb, pts/build-ffmpeg, pts/build-apache, pts/build-mplayer and pts/tachyon



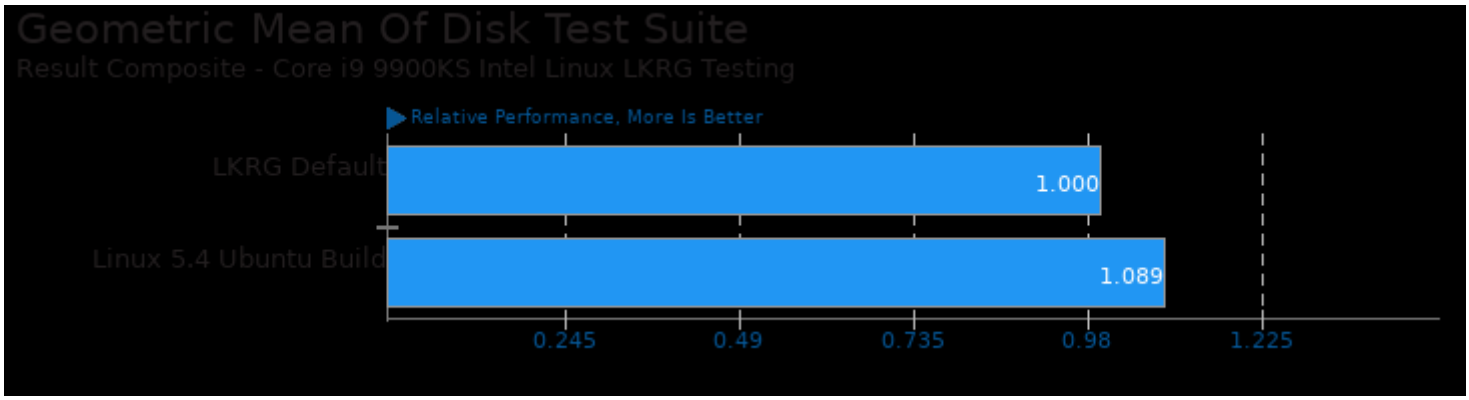
Geometric mean based upon tests: pts/build-apache, pts/build-gcc, pts/build-llvm, pts/build-linux-kernel, pts/build-php, pts/ctx-clock, pts/svt-av1, pts/vpxenc, pts/x264, pts/java-scimark2, pts/numpy, pts/pgbench, pts/phpbench, pts/sockperf, pts/stress-ng, pts/t-test1, pts/tachyon and pts/blender



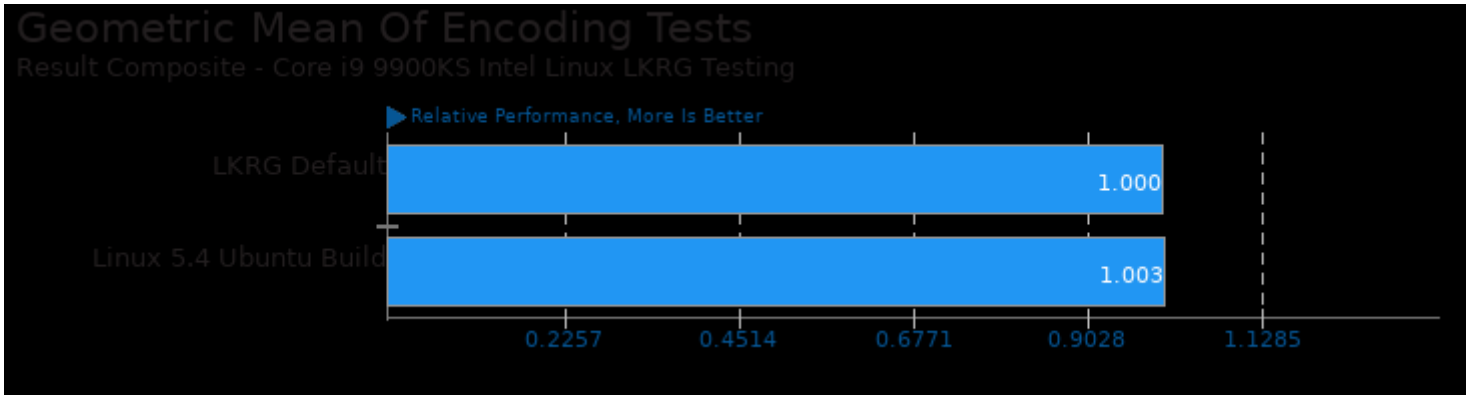
Geometric mean based upon tests: pts/tachyon, pts/rays1bench, pts/blender, pts/x264, pts/vpxenc, pts/svt-av1, system/inkscape, system/rawtherapee and pts/deepspeech



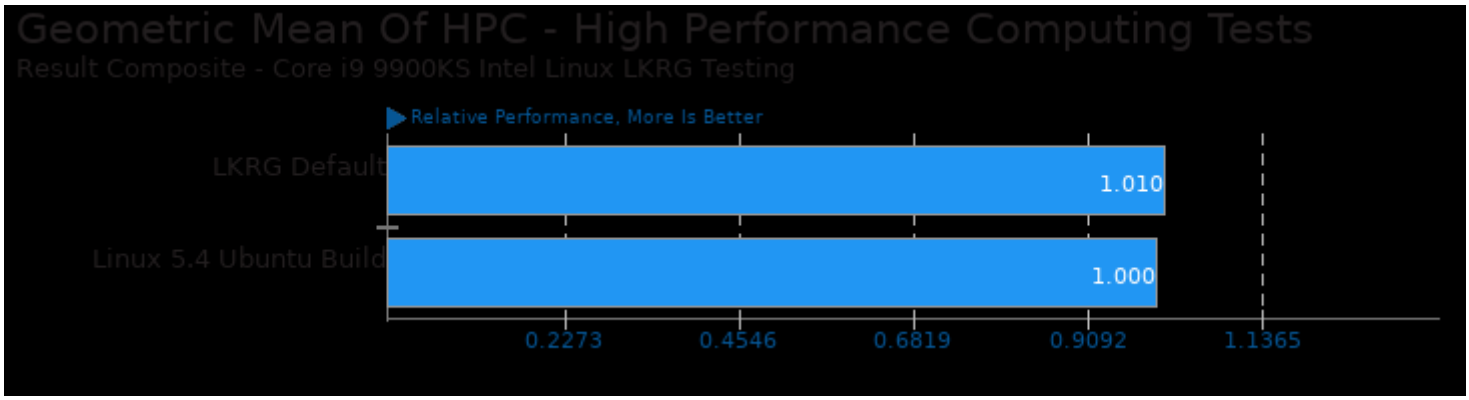
Geometric mean based upon tests: pts/sqlite, pts/sqlite-speedtest and pts/pgbench



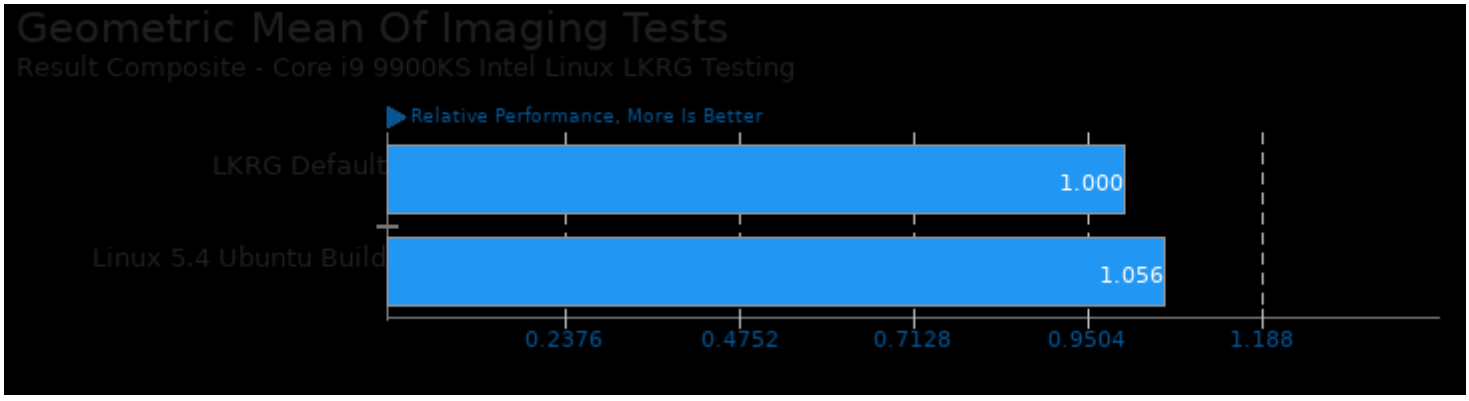
Geometric mean based upon tests: pts/sqlite, pts/postmark and pts/fio



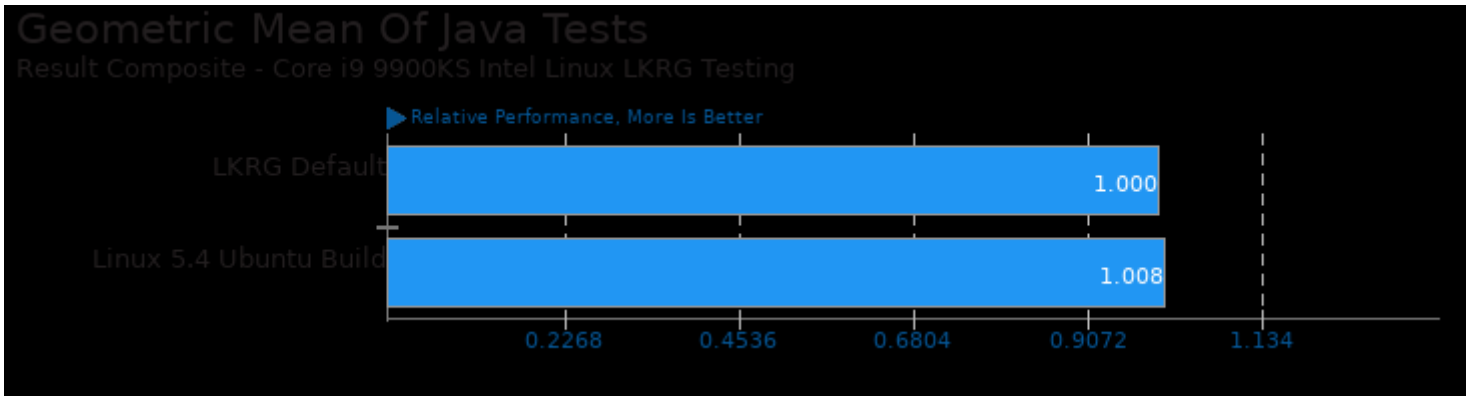
Geometric mean based upon tests: pts/x264, pts/vpxenc and pts/svt-av1



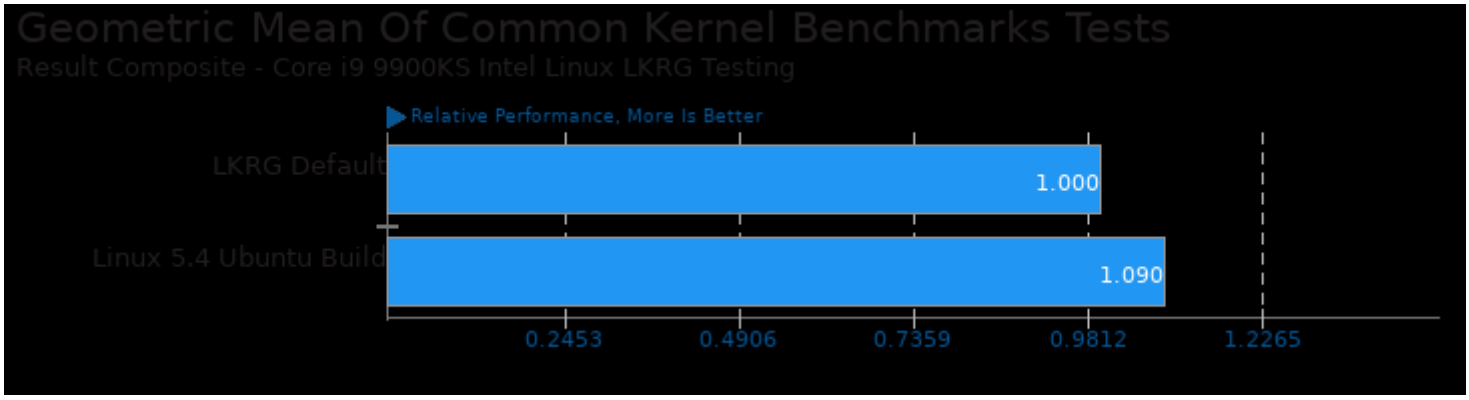
Geometric mean based upon tests: pts/numpy, pts/deepspeech and pts/mlpack



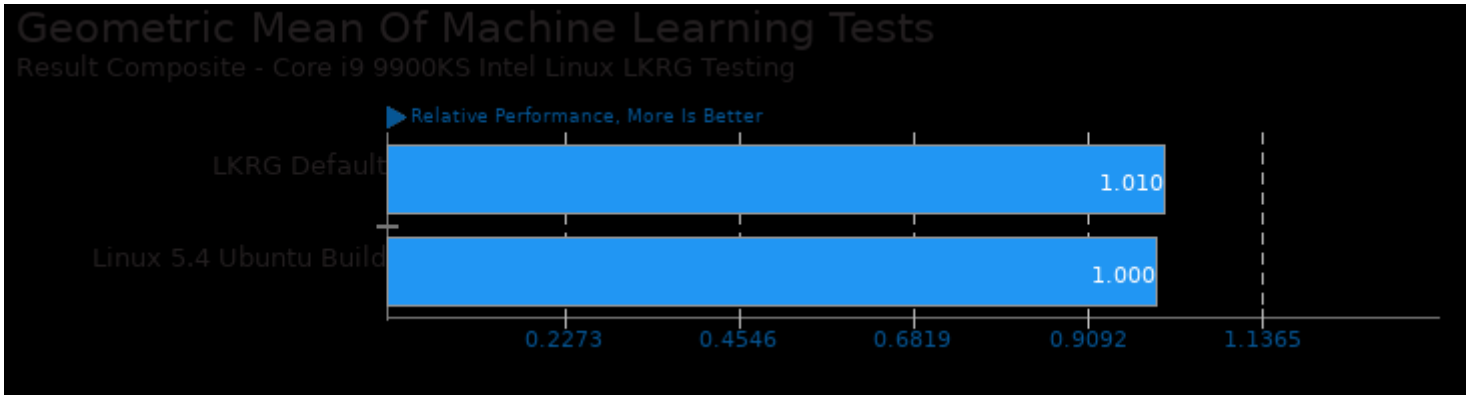
Geometric mean based upon tests: system/inkscape and system/rawtherapee



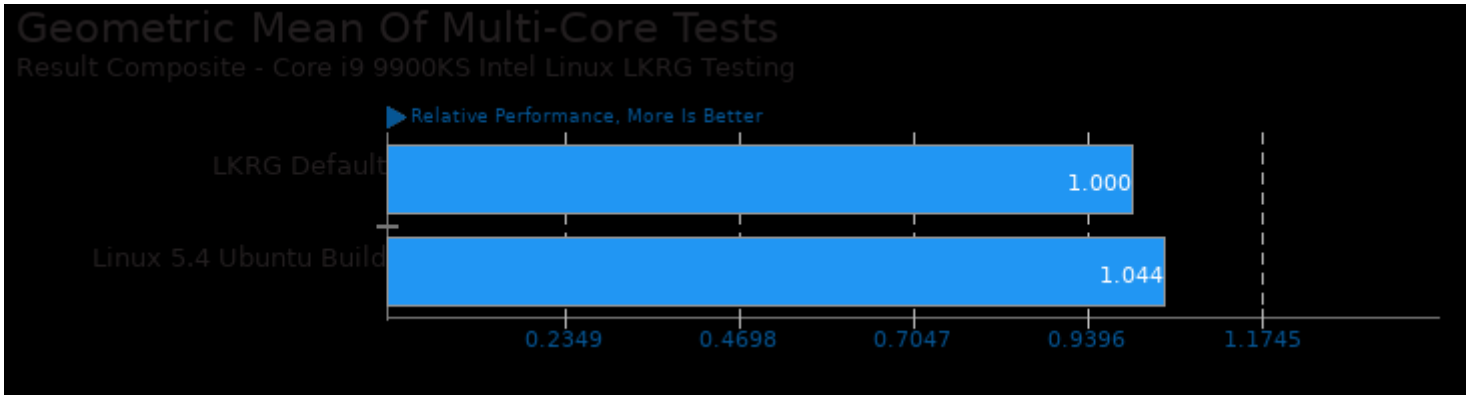
Geometric mean based upon tests: pts/sunflow and pts/java-scimark2



Geometric mean based upon tests: pts/postmark, pts/sqlite-speedtest, pts/pgbench, pts/pmbench, pts/t-test1, pts/ctx-clock, pts/mutex, pts/stress-ng, pts/ethr and pts/iperf

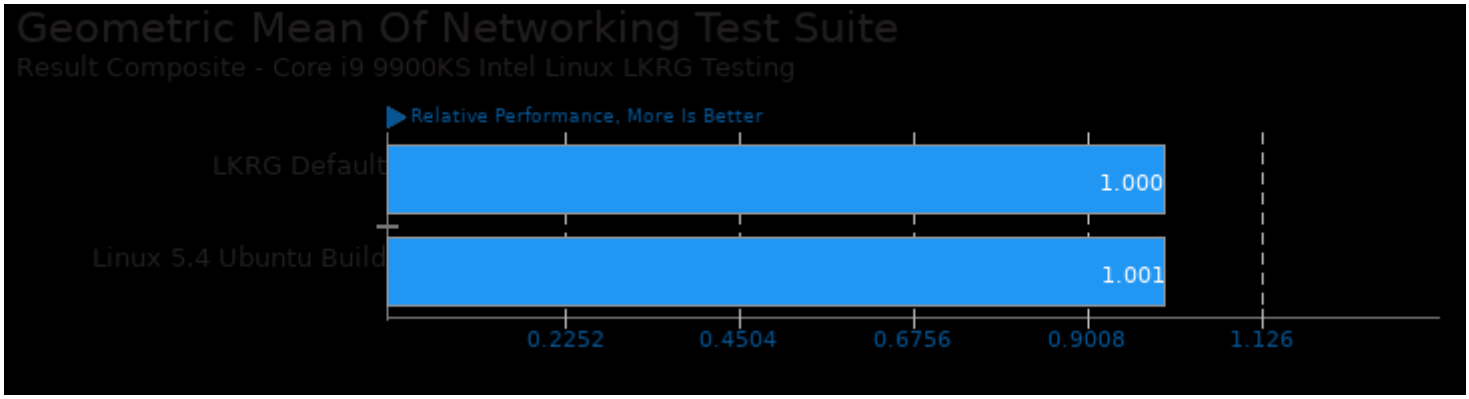


Geometric mean based upon tests: pts/numpy, pts/deepspeech and pts/mlpack

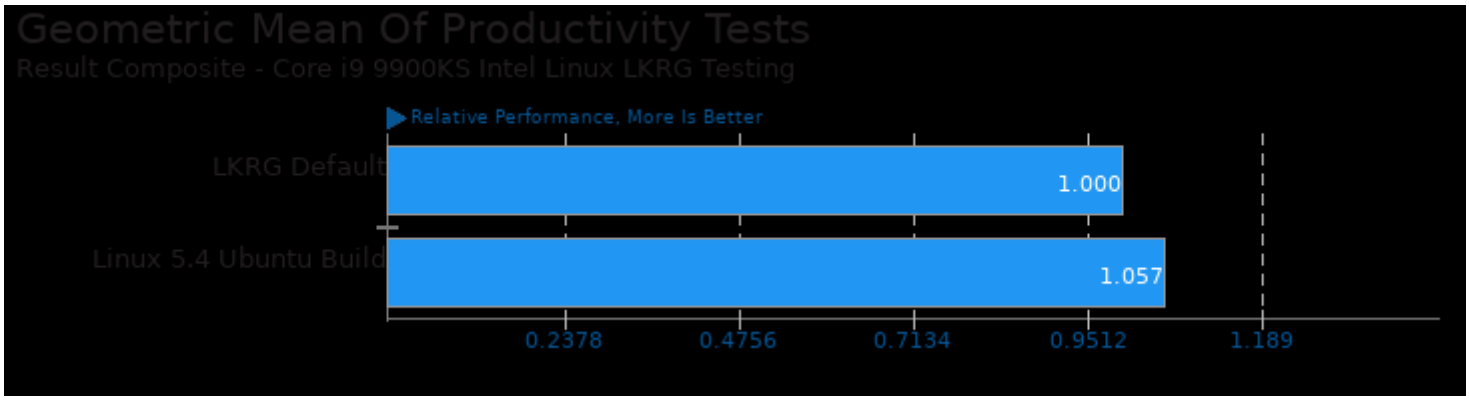


Core i9 9900KS Intel Linux LKRG Testing

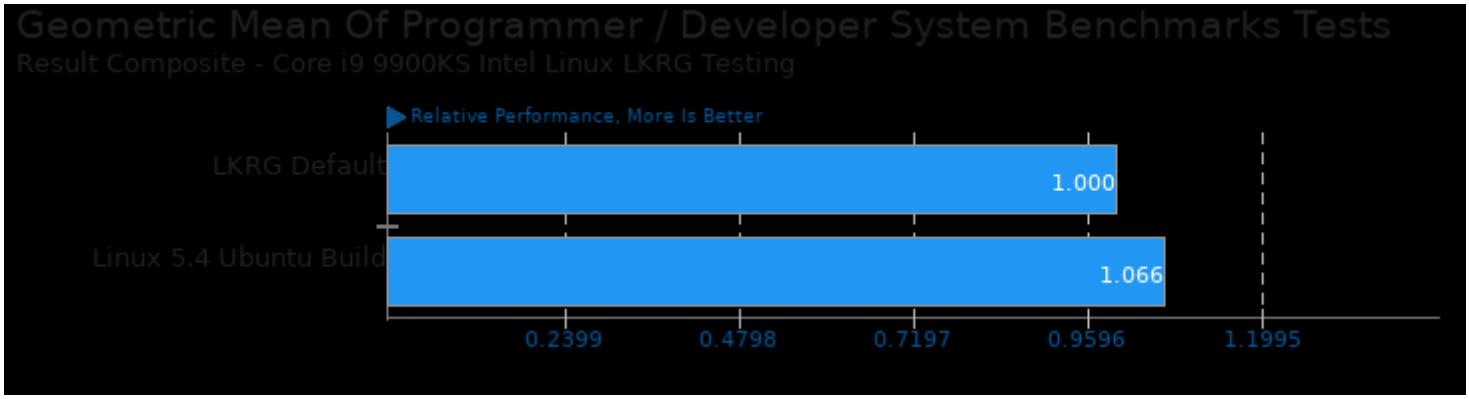
Geometric mean based upon tests: pts/blender, pts/tachyon, pts/rays1bench, pts/coremark, pts/x264, pts/vpxenc, pts/svt-av1, pts/build-apache, pts/build-php, pts/build-linux-kernel, pts/build-imagemagick, pts/build-gcc, pts/build-gdb, pts/build-llvm, pts/build-ffmpeg, pts/build-mplayer, pts/build2 and pts/pgbench



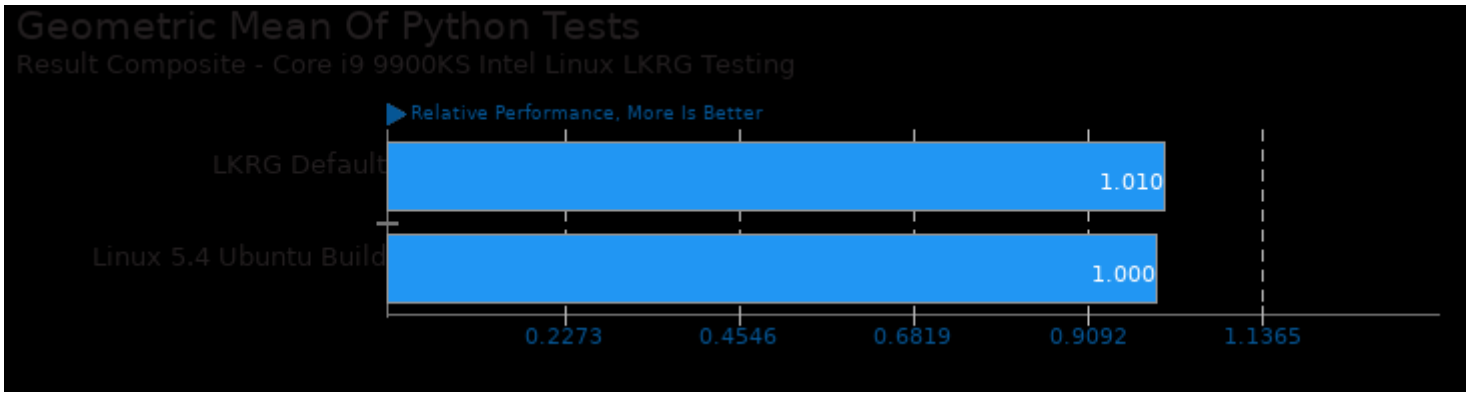
Geometric mean based upon tests: pts/sockperf, pts/ethr and pts/iperf



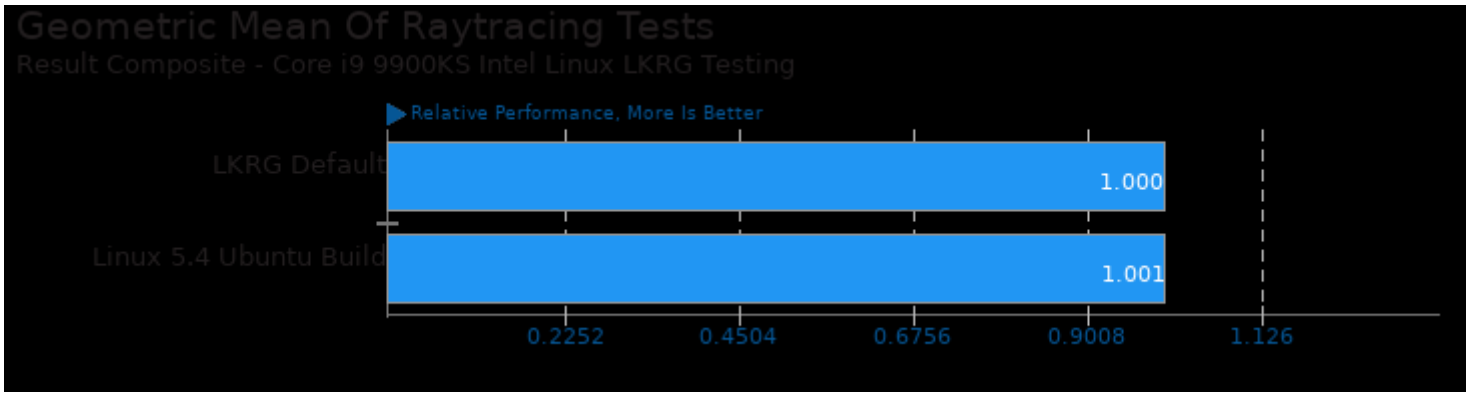
Geometric mean based upon tests: system/libreoffice and system/inkscape



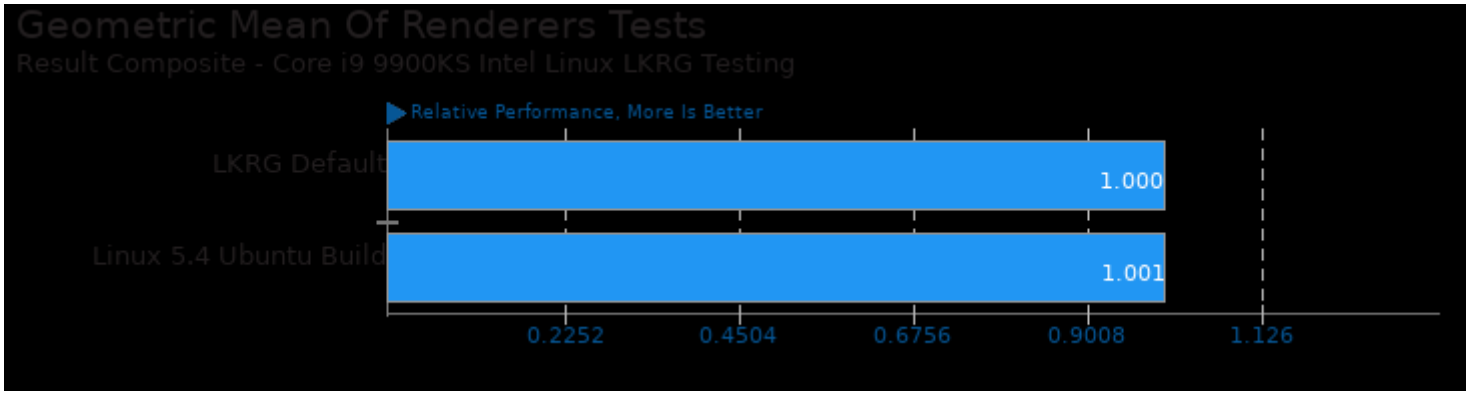
Geometric mean based upon tests: pts/sqlite-speedtest, pts/pybench, pts/build-apache, pts/build-php, pts/build-linux-kernel, pts/build-imagemagick, pts/build-gcc, pts/build-gdb, pts/build-llvm, pts/build-ffmpeg, pts/build-mplayer and pts/build2



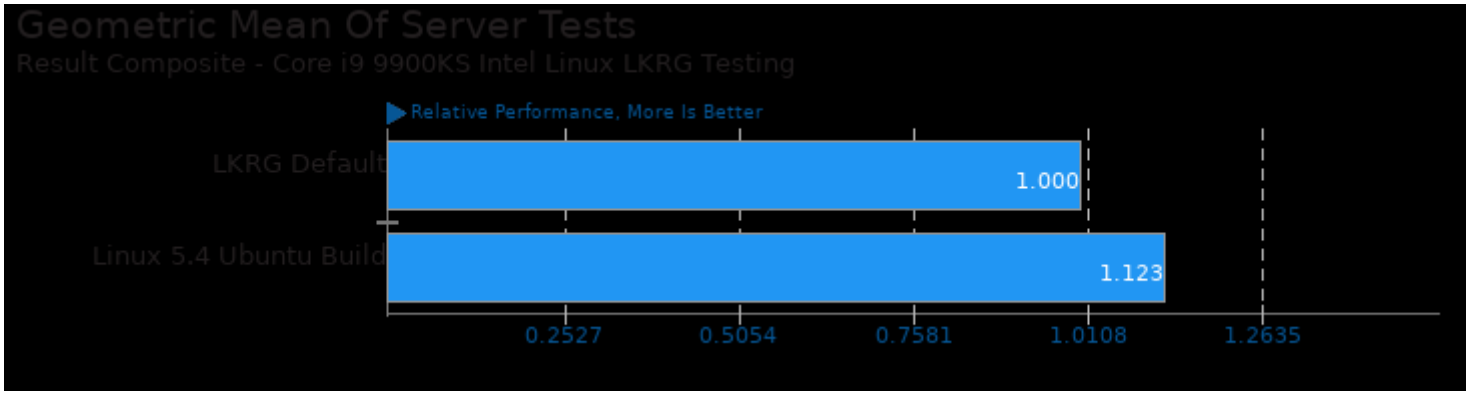
Geometric mean based upon tests: pts/pybench, pts/numpy and pts/mlpack



Geometric mean based upon tests: pts/tachyon and pts/rays1bench

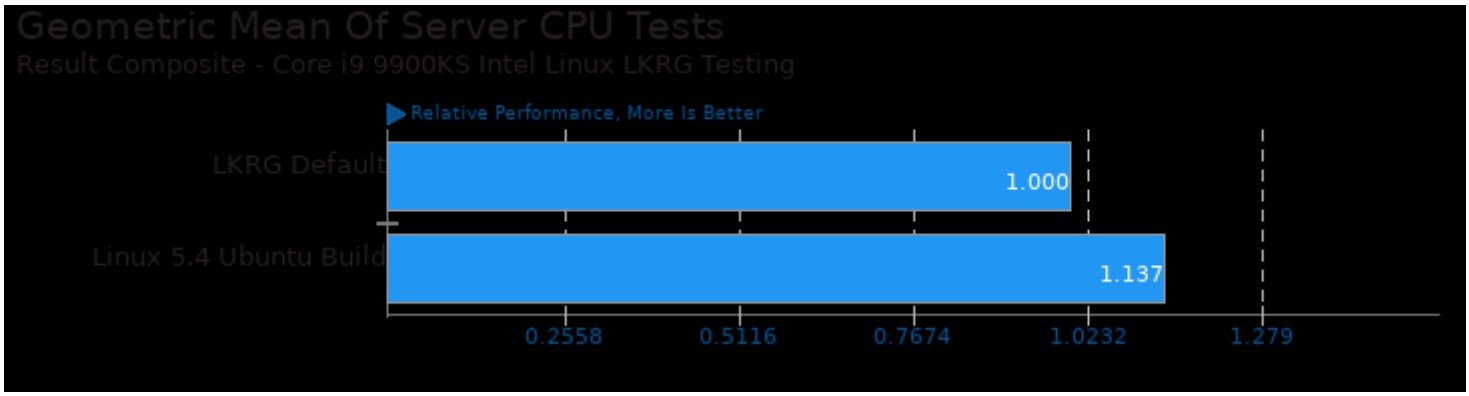


Geometric mean based upon tests: pts/tachyon, pts/rays1bench and pts/blender

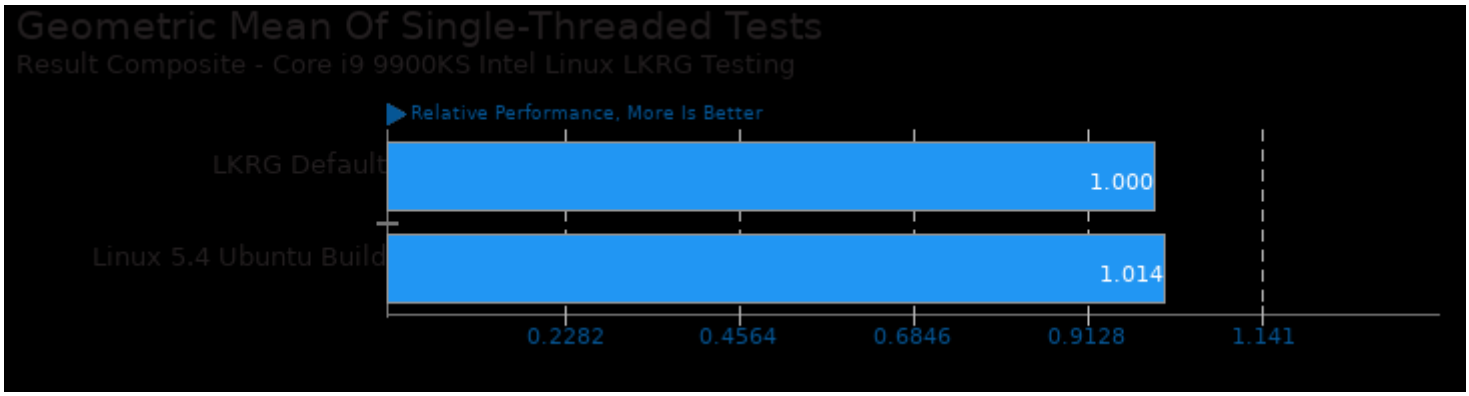


Geometric mean based upon tests: pts/pgbench, pts/phpbench, pts/sqlite and pts/sqlite-speedtest

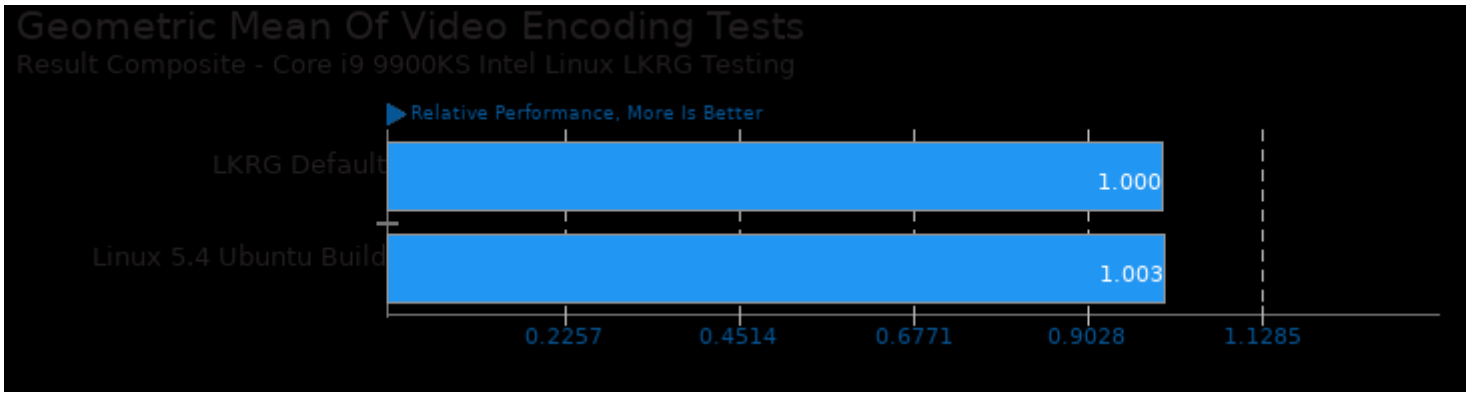
Core i9 9900KS Intel Linux LKRG Testing



Geometric mean based upon tests: pts/svt-av1, pts/x264, pts/build-gcc, pts/build-linux-kernel, pts/build-php, pts/build-llvm, pts/stress-ng, pts/ctx-clock, pts/blender, pts/pybench, pts/numpy and pts/phpbench



Geometric mean based upon tests: pts/java-scimark2, pts/numpy, pts/deepspeech, system/inkscape, pts/mutex, pts/pybench and pts/phpbench



Geometric mean based upon tests: pts/x264, pts/vpxenc and pts/svt-av1

This file was automatically generated via the Phoronix Test Suite benchmarking software on Thursday, 28 March 2024 17:07.