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Kubuntu Focus 18.04

Intel Core i7-9750H testing with a Notebook P95_96_97Ex Rx (1.07.13MIN29 BIOS) and NVIDIA GeForce RTX 2060 6GB on Ubuntu 21.04 via the Phoronix Test Suite.

Automated Executive Summary

Kubuntu 20.10 had the most wins, coming in first place for 30% of the tests.

Based on the geometric mean of all complete results, the fastest (Kubuntu 20.10) was 1.019x the speed of the slowest (Kubuntu 20.04). Kubuntu 18.04 was 0.996x the speed of Kubuntu 20.10, Kubuntu 21.04 Dev was 0.994x the speed of Kubuntu 18.04, Kubuntu 20.04 was 0.991x the speed of Kubuntu 21.04 Dev.

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

GLmark2 (Resolution: 1920 x 1080) at 4.129x

Build2 (Time To Compile) at 1.445x

GEGL (Operation: Scale) at 1.273x

GEGL (Operation: Crop) at 1.139x

WebP2 Image Encode (Encode Settings: Quality 100, Compression Effort 5) at 1.135x

Darktable (Test: Boat - Acceleration: CPU-only) at 1.133x

ASTC Encoder (Preset: Thorough) at 1.12x

G'MIC (Test: 2D Function Plotting, 1000 Times) at 1.116x

RawTherapee (*Total Benchmark Time*) at 1.112x
SVT-AV1 (*Encoder Mode: Enc Mode 8 - Input: 1080p*) at 1.11x.

Test Systems:

Kubuntu 18.04

Processor: Intel Core i7-9750H @ 4.50GHz (6 Cores / 12 Threads), Motherboard: Notebook P95_96_97Ex Rx (1.07.13MIN29 BIOS), Chipset: Intel Cannon Lake PCH, Memory: 32GB, Disk: 1000GB Samsung SSD 970 EVO Plus 1TB, Graphics: NVIDIA GeForce RTX 2060 6GB (960/7000MHz), Audio: Realtek ALC1220, Network: Realtek RTL8111/8168/8411 + Intel-AC 9560

OS: Ubuntu 18.04, Kernel: 5.4.0-65-generic (x86_64), Desktop: KDE Plasma 5.12.9, Display Server: X Server 1.20.8, Display Driver: NVIDIA 450.102.04, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.0.228, Vulkan: 1.2.133, Compiler: GCC 7.5.0 + CUDA 10.0, File-System: ext4, Screen Resolution: 1920x1080

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-bootstrap --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++ --enable-libmpx --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none --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 --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0xde - Thermald 1.7
OpenCL Notes: GPU Compute Cores: 1920
Python Notes: Python 2.7.17 + Python 3.6.9
Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + I1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT vulnerable + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Mitigation of PTI + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + srbs: Mitigation of Microcode + tsx_async_abort: Not affected

Kubuntu 20.04

Processor: Intel Core i7-9750H @ 4.50GHz (6 Cores / 12 Threads), Motherboard: Notebook P95_96_97Ex Rx (1.07.13MIN29 BIOS), Chipset: Intel Cannon Lake PCH, Memory: 32GB, Disk: 1000GB Samsung SSD 970 EVO Plus 1TB, Graphics: NVIDIA GeForce RTX 2060 6GB (825/810MHz), Audio: Realtek ALC1220, Network: Realtek RTL8111/8168/8411 + Intel-AC 9560

OS: Ubuntu 20.04, Kernel: 5.8.0-41-generic (x86_64), Desktop: KDE Plasma 5.18.5, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.32.03, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.109, Vulkan: 1.2.145, Compiler: GCC 9.3.0 + CUDA 10.1, File-System: ext4, Screen Resolution: 1920x1080

Kernel Notes: Transparent Huge Pages: madvise
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=/build/gcc-9-HskZEA/gcc-9-9.3.0/debian/tmp-nvptx/usr,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
Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0xde - Thermald 1.9.1
OpenCL Notes: GPU Compute Cores: 1920
Python Notes: Python 2.7.18 + Python 3.8.5
Security Notes: itlb_multihit: KVM: Mitigation of VMX disabled + I1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT vulnerable + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Mitigation of PTI + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + srbs: Mitigation of Microcode + tsx_async_abort: Not affected

Kubuntu 20.10

Processor: Intel Core i7-9750H @ 4.50GHz (6 Cores / 12 Threads), Motherboard: Notebook P95_96_97Ex Rx (1.07.13MIN29 BIOS), Chipset: Intel Cannon Lake PCH, Memory: 32GB, Disk: 1000GB Samsung SSD 970 EVO Plus 1TB, Graphics: NVIDIA GeForce RTX 2060 6GB (960/7000MHz), Audio: Realtek ALC1220, Network: Realtek RTL8111/8168/8411 + Intel-AC 9560

OS: Ubuntu 20.10, Kernel: 5.8.0-41-generic (x86_64), Desktop: KDE Plasma 5.19.5, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.32.03, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.109, Vulkan: 1.2.145, Compiler: GCC 10.2.0 + CUDA 10.1, File-System: ext4, Screen Resolution: 1920x1080

Kernel Notes: Transparent Huge Pages: madvise
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++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-nvptx/usr,amdgn-amdhsa=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-gcn/usr,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

Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0xde - Thermald 2.3

OpenCL Notes: GPU Compute Cores: 1920

Python Notes: Python 2.7.18 + Python 3.8.6

Security Notes: itlb_multihit: KVM: Mitigation of VMX disabled + I1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT vulnerable + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Mitigation of PTI + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + srbd: Mitigation of Microcode + tsx_async_abort: Not affected

Kubuntu 21.04 Dev

Processor: Intel Core i7-9750H @ 4.50GHz (6 Cores / 12 Threads), Motherboard: Notebook P95_96_97Ex Rx (1.07.13MIN29 BIOS), Chipset: Intel Cannon Lake PCH, Memory: 32GB, Disk: 1000GB Samsung SSD 970 EVO Plus 1TB, Graphics: NVIDIA GeForce RTX 2060 6GB (1920/7000MHz), Audio: Realtek ALC1220, Network: Realtek RTL8111/8168/8411 + Intel-AC 9560

OS: Ubuntu 21.04, Kernel: 5.8.0-41-generic (x86_64), Desktop: KDE Plasma 5.20.90, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.32.03, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.109, Vulkan: 1.2.145, Compiler: GCC 10.2.1 20210110 + CUDA 10.1, File-System: ext4, Screen Resolution: 1920x1080

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-bootstrap --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 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-link-mutex --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-8sWNas/gcc-10-10.2.1/debian/tmp-nvptx/usr,amdgn-amdhsa=/build/gcc-10-8sWNas/gcc-10-10.2.1/debian/tmp-gcn/usr,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-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

Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0xde - Thermald 2.4.1

OpenCL Notes: GPU Compute Cores: 1920

Python Notes: Python 2.7.18 + Python 3.9.1+

Security Notes: itlb_multihit: KVM: Mitigation of VMX disabled + I1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT vulnerable + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Mitigation of PTI + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + srbd: Mitigation of Microcode + tsx_async_abort: Not affected

Blender - Barbershop - NVIDIA OptiX	1858	1875	1871	1873
(sec)				
Normalized	100%	99.11%	99.34%	99.21%
Standard Deviation	0.2%	0.1%	0.1%	0.2%
Selenium - MotionMark - Firefox	158.94	158.96	157.49	157.28
Normalized	99.99%	100%	99.08%	98.94%
Standard Deviation	9.6%	10.4%	6.3%	12%
WebP2 Image Encode - Q.9.C.E.7	920.493	972.604	949.221	951.266
Normalized	100%	94.64%	96.97%	96.77%
Standard Deviation	0.2%	0.2%	0.6%	0.3%
Appleseed - Emily (sec)	869.306684	871.124963	872.69659	866.703363
Normalized	99.7%	99.49%	99.31%	100%
YafaRay - T.T.F.S.S (sec)	334.288	327.359	320.601	
Normalized	95.91%	97.94%	100%	
Standard Deviation	0.8%	3.7%	0.1%	
WebP2 Image Encode - Q.7.C.E.7	505.108	532.887	515.458	516.063
Normalized	100%	94.79%	97.99%	97.88%
Standard Deviation	0.1%	0.6%	0.2%	0.3%
ASTC Encoder - Exhaustive (sec)	499.82	518.88	515.49	515.08
Normalized	100%	96.33%	96.96%	97.04%
Standard Deviation	0.2%	0.4%	0.1%	0.2%
RedShift Demo (sec)	490	495	493	494
Normalized	100%	98.99%	99.39%	99.19%
Standard Deviation		0.1%		0.1%
Appleseed - Disney Material (sec)	534.82731	542.04675	542.448589	531.861041
Normalized	99.45%	98.12%	98.05%	100%
G'MIC - 2.F.P.1.T (sec)	116.024	114.664	116.654	104.566
Normalized	90.12%	91.19%	89.64%	100%
Standard Deviation	0.8%	3.5%	3.4%	0.6%
Appleseed - Material Tester (sec)	492.636365	500.912477	494.594857	487.671955
Normalized	98.99%	97.36%	98.6%	100%
Selenium - Jetstream 2 - Firefox	69.195	69.835	69.201	71.481
Normalized	96.8%	97.7%	96.81%	100%
Standard Deviation	0.6%	1.9%	2.4%	1.4%
OpenFOAM - Motorbike 30M (sec)	276.49	303.46	303.90	302.29
Normalized	100%	91.11%	90.98%	91.47%
Standard Deviation	0.1%	0.1%	0.4%	0.1%
GROMACS - Water Benchmark	0.595	0.583	0.579	0.580
(Ns/Day)				
Normalized	100%	97.98%	97.31%	97.48%
Standard Deviation	0.2%	0.4%	0.5%	0.8%
Build2 - Time To Compile (sec)	201.336	239.013	290.928	263.280
Normalized	100%	84.24%	69.2%	76.47%
Standard Deviation	0.8%	0.4%	0.2%	0.2%
Selenium - ARES-6 - Firefox (ms)	59.03	59.28	59.25	58.67
Normalized	99.39%	98.97%	99.02%	100%
Standard Deviation	0.4%	0.3%	1.2%	0.5%
LuxCoreRender OpenCL - LuxCore Benchmark (M samples/sec)	2.53	2.55	2.61	2.63
Normalized	96.2%	96.96%	99.24%	100%
Standard Deviation	7.4%	8%	0.8%	0.4%
LuxCoreRender OpenCL - Food (M samples/sec)	1.03	1.06	1.09	1.09
Normalized	94.5%	97.25%	100%	100%

Standard Deviation	10.3%	10.7%	0.5%	0.5%
NAMD - ATPase Simulation - 327,506	3.58034	3.57506	3.67104	3.66448
Atoms (days/ns)				
Normalized	99.85%	100%	97.39%	97.56%
Standard Deviation	0.1%	0.5%	0.3%	0.2%
TensorFlow Lite - I.R.V (us)	5317610	5388070	5326567	5306953
Normalized	99.8%	98.49%	99.63%	100%
Standard Deviation	0.5%	0.6%	0.4%	1.2%
TensorFlow Lite - Inception V4 (us)	5876820	5948167	5883677	5886227
Normalized	100%	98.8%	99.88%	99.84%
Standard Deviation	0.5%	0.8%	0.5%	0.6%
LuxCoreRender OpenCL - DLSC (M samples/sec)	3.05	3.04	3.12	3.12
Normalized	97.76%	97.44%	100%	100%
Standard Deviation	7.8%	8.1%	0.2%	0.2%
Mobile Neural Network - inception-v3	59.976	62.314	58.697	58.832
(ms)				
Normalized	97.87%	94.2%	100%	99.77%
Standard Deviation	0.7%	0.5%	0.2%	0.7%
Mobile Neural Network - mobilenet-v1-1.0 (ms)	4.903	5.792	5.620	5.611
Normalized	100%	84.65%	87.24%	87.38%
Standard Deviation	7.2%	0.7%	0.4%	0.1%
Mobile Neural Network - MobileNetV2_224 (ms)	4.600	4.575	4.408	4.471
Normalized	95.83%	96.35%	100%	98.59%
Standard Deviation	0.4%	1.9%	0.1%	0.4%
Mobile Neural Network - resnet-v2-50	52.933	56.877	52.693	52.797
(ms)				
Normalized	99.55%	92.64%	100%	99.8%
Standard Deviation	1.8%	0.4%	0.7%	0.3%
Mobile Neural Network - SqueezeNetV1.0 (ms)	8.370	8.295	8.181	8.128
Normalized	97.11%	97.99%	99.35%	100%
Standard Deviation	1.2%	0.4%	1.1%	0.4%
OctaneBench - Total Score (Score)	180.680218	179.875022	181.008119	180.825539
Normalized	99.82%	99.37%	100%	99.9%
Embree - Pathtracer - Crown (FPS)	5.3310	5.2722	5.3952	5.3604
Normalized	98.81%	97.72%	100%	99.35%
Standard Deviation	1.8%	1.7%	2.4%	2.4%
Chaos Group V-RAY - CPU	7079	6870	7122	7138
Normalized	99.17%	96.25%	99.78%	100%
Standard Deviation	2.8%		2.1%	2.2%
Blender - BMW27 - NVIDIA Optix (sec)	42.76	41.68	37.99	38.08
Normalized	88.84%	91.15%	100%	99.76%
Standard Deviation	34%	33.8%	0.1%	0.1%
GLmark2 - 1920 x 1080 (Score)	6329	6263	6330	1533
Normalized	99.98%	98.94%	100%	24.22%
RealSR-NCNN - 4x - Yes (sec)	109.832	110.252	109.945	109.873
Normalized	100%	99.62%	99.9%	99.96%
Standard Deviation	0.3%	0.4%	0.3%	0.6%

LuxCoreRender - R.C.a.P (M samples/sec)	0.82	0.86	0.87
Normalized	98.85%	94.25%	98.85%
Standard Deviation	1.8%	2.5%	1.8%
Embree - Pathtracer ISPC - Crown (FPS)	6.0393	6.1454	6.1501
Normalized	99.2%	98.2%	99.92%
Standard Deviation	0.9%	1.3%	0.8%
OCRMypdf - P.6.P.P.D (sec)	56.454		
Standard Deviation	2.4%		
NCNN - CPU - regnety_400m (ms)	19.18	18.90	17.35
Normalized	90.46%	91.8%	98.69%
Standard Deviation	4%	1.3%	9.2%
NCNN - CPU - squeezenet_ssd (ms)	26.58	27.55	27.88
Normalized	100%	96.48%	98.55%
Standard Deviation	1.6%	2.8%	0.5%
NCNN - CPU - yolov4-tiny (ms)	37.36	37.52	37.86
Normalized	98.66%	98.24%	97.36%
Standard Deviation	1.8%	4.1%	3%
NCNN - CPU - resnet50 (ms)	42.75	41.12	41.74
Normalized	96.19%	100%	98.51%
Standard Deviation	1.1%	0.6%	0.1%
NCNN - CPU - alexnet (ms)	17.60	17.08	16.95
Normalized	96.14%	99.06%	99.82%
Standard Deviation	2.7%	0.1%	2%
NCNN - CPU - resnet18 (ms)	21.24	20.73	20.04
Normalized	94.35%	96.67%	100%
Standard Deviation	1.3%	0.2%	2.5%
NCNN - CPU - vgg16 (ms)	77.65	72.94	71.89
Normalized	92.58%	98.56%	100%
Standard Deviation	1.6%	0.5%	0.2%
NCNN - CPU - googlenet (ms)	21.36	21.27	19.72
Normalized	92.32%	92.71%	100%
Standard Deviation	1.6%	1.2%	11.5%
NCNN - CPU - blazeface (ms)	2.75	2.71	2.55
Normalized	92.73%	94.1%	100%
Standard Deviation	12.5%	4.7%	12.8%
NCNN - CPU - efficientnet-b0 (ms)	10.24	9.70	9.03
Normalized	88.18%	93.09%	100%
Standard Deviation	3.5%	1.6%	10.1%
NCNN - CPU - mnasnet (ms)	5.90	6.19	5.86
Normalized	99.32%	94.67%	100%
Standard Deviation	11.4%	1%	16.1%
NCNN - CPU - shufflenet-v2 (ms)	8.81	8.74	8.08
Normalized	91.71%	92.45%	100%
Standard Deviation	16.8%	5.4%	15.6%
NCNN - CPU-v3-v3 - mobilenet-v3 (ms)	5.91	6.75	5.57
Normalized	87.31%	76.44%	92.64%
Standard Deviation	14.3%	3.5%	12.6%
NCNN - CPU-v2-v2 - mobilenet-v2 (ms)	6.34	6.46	5.97
Normalized	94.16%	92.41%	100%
Standard Deviation	0.7%	14.5%	1%
NCNN - CPU - mobilenet (ms)	26.35	25.42	25.77
Normalized	96.47%	100%	98.64%
Standard Deviation	0.1%	0.8%	0.3%

NCNN - Vulkan GPU - regnety_400m	18.37 (ms)	18.28	17.85	17.63
	Normalized Standard Deviation	95.97% 9.4%	96.44% 0.4%	98.77% 12%
NCNN - Vulkan GPU - squeezeNet_ssD	27.12 (ms)	26.98	26.99	27.01
	Normalized Standard Deviation	99.48% 2.1%	100% 0.5%	99.96% 0.1%
NCNN - Vulkan GPU - yolov4-tiny (ms)	38.06	37.60	36.92	36.66
	Normalized Standard Deviation	96.32% 2.7%	97.5% 1.9%	99.3% 0.7%
NCNN - Vulkan GPU - resnet50 (ms)	42.95	41.02	41.78	41.38
	Normalized Standard Deviation	95.51% 0.8%	100% 0.6%	98.18% 0.3%
NCNN - Vulkan GPU - alexnet (ms)	18.11	16.37	16.68	15.95
	Normalized Standard Deviation	88.07% 3.8%	97.43% 2.7%	95.62% 9.8%
NCNN - Vulkan GPU - resnet18 (ms)	21.10	21.21	19.76	19.22
	Normalized Standard Deviation	91.09% 3.7%	90.62% 0.4%	97.27% 10.3%
NCNN - Vulkan GPU - vgg16 (ms)	79.53	73.36	72.14	73.17
	Normalized Standard Deviation	90.71% 1.6%	98.34% 1%	100% 0.8%
NCNN - Vulkan GPU - googlenet (ms)	20.53	21.21	19.70	19.72
	Normalized Standard Deviation	95.96% 7.9%	92.88% 0.1%	100% 11.4%
NCNN - Vulkan GPU - blazeface (ms)	2.43	2.77	2.56	2.46
	Normalized Standard Deviation	100% 13.1%	87.73% 0.2%	94.92% 12.4%
NCNN - Vulkan GPU - efficientnet-b0	9.50	9.88	9.06	9.36
	Normalized Standard Deviation	95.37% 9.6%	91.7% 3.6%	100% 10.5%
NCNN - Vulkan GPU - mnasnet (ms)	5.73	6.68	6.08	5.70
	Normalized Standard Deviation	99.48% 10.5%	85.33% 6.6%	93.75% 18.3%
NCNN - Vulkan GPU - shufflenet-v2	8.92	8.52	7.84	8.36
	Normalized Standard Deviation	87.89% 12.7%	92.02% 8.1%	100% 12.9%
NCNN - Vulkan GPU-v3-v3 - mobilenet-v3 (ms)	5.55	5.16	5.10	5.41
	Normalized Standard Deviation	91.89% 8.2%	98.84% 8.5%	100% 5.5%
NCNN - Vulkan GPU-v2-v2 - mobilenet-v2 (ms)	6.27	5.88	5.97	5.99
	Normalized Standard Deviation	93.78% 1.2%	100% 0.8%	98.49% 1.4%
NCNN - Vulkan GPU - mobilenet (ms)	26.48	25.22	25.88	25.42
	Normalized Standard Deviation	95.24% 0.2%	100% 0.2%	97.45% 0.4%
RawTherapee - T.B.T (sec)	75.491	83.487	83.922	82.859
	Normalized Standard Deviation	100% 2.4%	90.42% 1.8%	89.95% 0.8%
OCRMyPDF - P.6.P.P.D (sec)			35.355	35.259

	Normalized		99.73%	100%
	Standard Deviation		4.8%	2.5%
Darktable - Boat - CPU-only (sec)	16.297			
	Standard Deviation	2.5%		
LuxCoreRender - DLSC (M	0.81	0.79	0.80	0.81
	Normalized	100%	97.53%	98.77%
	Standard Deviation	2.5%	2.2%	1.3%
x265 - Bosphorus 4K (FPS)	8.46	8.25	8.53	8.41
	Normalized	99.18%	96.72%	100%
	Standard Deviation	1.6%	2.1%	1.1%
Hugin - P.P.A.S.T (sec)	64.064	58.680	59.411	58.999
	Normalized	91.6%	100%	98.77%
	Standard Deviation	0.4%	1.1%	2.3%
ASTC Encoder - Thorough (sec)	59.19	66.30	63.50	63.26
	Normalized	100%	89.28%	93.21%
	Standard Deviation	1.1%	1.4%	0.9%
IndigoBench - OpenCL GPU - Bedroom (M samples/s)	5.413	5.408	5.425	5.407
	Normalized	99.78%	99.69%	100%
	Standard Deviation	0.4%	0.1%	0.2%
SVT-AV1 - Enc Mode 8 - 1080p (FPS)	15.322	13.800	14.051	14.165
	Normalized	100%	90.07%	91.7%
	Standard Deviation	2.5%	2.7%	2.1%
IndigoBench - OpenCL GPU - Supercar (M samples/s)	17.555	17.650	17.648	17.636
	Normalized	99.46%	100%	99.99%
	Standard Deviation	0.5%	0.1%	0.1%
SQLite Speedtest - Timed Time - Size 1,000 (sec)	64.357	63.339	61.600	62.749
	Normalized	95.72%	97.25%	100%
	Standard Deviation	0.2%	0.2%	0.3%
IndigoBench - CPU - Bedroom (M samples/s)	0.835	0.843	0.844	0.844
	Normalized	98.93%	99.88%	100%
	Standard Deviation	0.6%	0.1%	0.3%
IndigoBench - CPU - Supercar (M samples/s)	1.884	1.877	1.894	1.894
	Normalized	99.47%	99.1%	100%
	Standard Deviation	1%	0.2%	0.3%
DeepSpeech - CPU (sec)	75.92544	74.14969	73.73832	74.21593
	Normalized	97.12%	99.45%	100%
	Standard Deviation	0.9%	1.1%	1%
Selenium - StyleBench - Firefox (Runs / Minute)	92.6	92.6	92.3	92.2
	Normalized	100%	100%	99.68%
	Standard Deviation	0.7%	0.6%	0.8%
TensorFlow Lite - SqueezeNet (us)	397217	413923	397433	397125
	Normalized	99.98%	95.94%	99.92%
	Standard Deviation	1.2%	0.5%	1.4%
TensorFlow Lite - Mobilenet Quant	279323	286470	279621	277899
	Normalized	99.49%	97.01%	99.38%
	Standard Deviation	1%	1.1%	1%
TensorFlow Lite - Mobilenet Float (us)	275401	277078	275014	273776
	Normalized	99.41%	98.81%	99.55%

	Standard Deviation	1.4%	1.4%	2.2%
TensorFlow Lite - NASNet Mobile (us)	347299	349195	346734	347106
	Normalized	99.84%	99.3%	99.89%
	Standard Deviation	1.3%	1%	1.4%
x265 - Bosphorus 1080p (FPS)	36.67	36.57	36.78	37.02
	Normalized	99.05%	98.78%	100%
	Standard Deviation	2.1%	1.1%	2.4%
GEGL - Color Enhance (sec)	56.140	59.009	54.660	55.509
	Normalized	97.36%	92.63%	98.47%
	Standard Deviation	0.4%	1.3%	0.7%
rav1e - 10 (FPS)	3.406	3.309	3.321	3.506
	Normalized	97.15%	94.38%	100%
	Standard Deviation	0.6%	2.1%	1.7%
LuxCoreRender OpenCL - R.C.a.P (M samples/sec)	7.64	7.69	7.90	7.92
	Normalized	96.46%	97.1%	100%
	Standard Deviation	10.3%	10.3%	0.9%
Git - T.T.C.C.G.C (sec)	50.174	49.631	50.197	49.953
	Normalized	98.92%	100%	99.36%
	Standard Deviation	0.4%	0.8%	0.7%
OCRMyPDF - P.6.P.P.D (sec)		48.671		
	Standard Deviation		2.4%	
eSpeak-NG Speech Engine - T.T.S.S (sec)	27.464	27.048	27.641	29.690
	Normalized	98.49%	100%	91.1%
	Standard Deviation	2.4%	0.8%	0.4%
WebP2 Image Encode - Q.1.C.E.5	25.659	29.129	28.691	28.604
	Normalized	100%	88.09%	89.7%
	Standard Deviation	2.3%	2.1%	2.4%
Selenium - PSPDFKit WASM - Firefox (Score)	3362	3353	3369	3355
	Normalized	99.73%	100%	99.94%
	Standard Deviation	0.2%	0.6%	0.4%
GEGL - Rotate 90 Degrees (sec)	39.126	40.627	39.255	39.688
	Normalized	100%	96.31%	98.58%
	Standard Deviation	0.4%	1.1%	0.4%
Selenium - Kraken - Firefox (ms)	1386	1365	1374	1327
	Normalized	95.71%	97.22%	100%
	Standard Deviation	0.1%	0.6%	0.4%
Darktable - Boat - CPU-only (sec)		9.326	9.009	8.228
	Normalized		88.23%	100%
	Standard Deviation		3.4%	0.8%
WebP2 Image Encode - Default (sec)	6.649	8.340	7.676	7.413
	Normalized	100%	79.72%	89.69%
	Standard Deviation	2.1%	6.7%	5%
Google SynthMark - VoiceMark_100 (Voices)	651.922	695.733	696.996	685.582
	Normalized	93.53%	99.82%	98.36%
	Standard Deviation	1.8%	0.4%	0.7%
GEGL - Reflect (sec)	29.428	30.121	29.009	29.246
	Normalized	98.58%	96.31%	99.19%
	Standard Deviation	0.3%	0.3%	0.6%

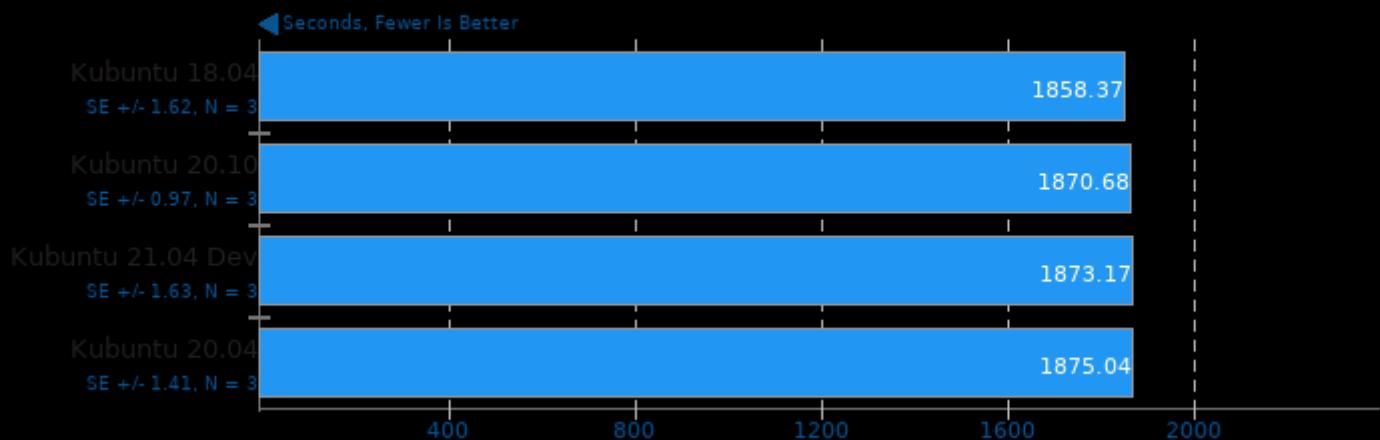
Monkey Audio Encoding - WAV To APE (sec)	11.303	11.854	11.714
Normalized	99.93%	95.35%	96.49%
Standard Deviation	2%	1%	2.1%
EtcPak - ETC2 (Mpx/s)	188.063	189.461	186.234
Normalized	99.26%	99.77%	98.3%
Standard Deviation	0.3%	0.3%	1.2%
WavPack Audio Encoding - WAV To WavPack (sec)	14.681	14.578	14.783
Normalized	99.3%	97.52%	98.61%
Standard Deviation	0.1%	1.5%	0.2%
TNN - CPU - MobileNet v2 (ms)	319.661	332.516	318.708
Normalized	99.7%	98.33%	100%
Standard Deviation	0.4%	0.3%	0.3%
TNN - CPU - SqueezeNet v1.1 (ms)	299.470	302.418	302.118
Normalized	100%	99.4%	99.12%
Standard Deviation	0.1%	0.2%	0.3%
Darktable - Masskrug - CPU-only (sec)	7.255	6.749	6.706
Normalized	92.43%	99.36%	100%
Standard Deviation	5.3%	0.9%	0.2%
GIMP - unsharp-mask (sec)	18.267		
Standard Deviation	0.2%		
WebP Image Encode - Q.1.L (Encode Time - sec)	17.414	17.102	17.255
Normalized	98.21%	100%	98.24%
Standard Deviation	0.7%	0.7%	0.3%
RealSR-NCNN - 4x - No (sec)	16.493	16.605	16.568
Normalized	100%	99.33%	99.55%
Standard Deviation	0.6%	0.4%	0.4%
Darktable - Server Room - CPU-only (sec)	5.834	5.144	5.105
Normalized	87.5%	99.24%	100%
Standard Deviation	8%	1.1%	0.3%
EtcPak - ETC1 (Mpx/s)	319.828	325.035	335.746
Normalized	94.32%	95.85%	100%
Standard Deviation	0%	1.5%	2.2%
EtcPak - ETC1 + Dithering (Mpx/s)	299.548	318.528	318.787
Normalized	93.61%	99.54%	99.62%
Standard Deviation	1.7%	0%	0.8%
GIMP - unsharp-mask (sec)			15.199
Normalized			99.63%
Standard Deviation			0.3%
GIMP - auto-levels (sec)	15.165		
Standard Deviation	0.4%		
GIMP - unsharp-mask (sec)	14.865	14.952	
Normalized	100%	99.42%	
Standard Deviation	0.6%	0.3%	
GIMP - rotate (sec)	14.602		
Standard Deviation	0.4%		
Opus Codec Encoding - WAV To Opus Encode (sec)	8.772	8.610	8.540
Normalized	97.36%	99.19%	100%
Standard Deviation	1.3%	0.3%	0.6%
libavif avifenc - 8 (sec)	6.635	7.066	6.702

	Normalized	100%	93.9%	99.48%	99%
	Standard Deviation	0.6%	7.8%	1.5%	0.4%
libavif avifenc - 10 (sec)	6.194	6.445	6.186	6.216	
	Normalized	99.87%	95.98%	100%	99.52%
	Standard Deviation	0.3%	6.5%	0.5%	0.2%
GIMP - auto-levels (sec)				12.704	
	Normalized				99.95%
	Standard Deviation				0.1%
GIMP - auto-levels (sec)		12.170	12.552		
	Normalized				99.3%
	Standard Deviation				0.4%
GIMP - rotate (sec)				12.378	
	Normalized				99.3%
	Standard Deviation				0.4%
GIMP - rotate (sec)		11.869	12.081		
	Normalized				98.25%
	Standard Deviation				0.2%
WebP Image Encode - Q.1.H.C	7.571	7.193	7.263	7.357	
(Encode Time - sec)					
	Normalized	95.01%	100%	99.04%	97.77%
	Standard Deviation	1.5%	2.4%	2.4%	1.4%
GIMP - resize (sec)				8.912	
	Normalized				99.73%
	Standard Deviation				0.8%
GIMP - resize (sec)		8.505	8.853		
	Normalized				96.07%
	Standard Deviation				0.7%
Darktable - Masskrug - CPU-only (sec)	7.822				
	Standard Deviation	1%			
GEGL - Crop (sec)	7.004	7.822	7.818	7.977	
	Normalized	100%	89.54%	89.59%	87.8%
	Standard Deviation	0.8%	1.9%	0.6%	0.4%
GIMP - resize (sec)	7.644				
	Standard Deviation	0.6%			
Waifu2x-NCNN Vulkan - 2x - 3 - Yes	6.893	7.089	7.085	7.122	
(sec)					
	Normalized	100%	97.24%	97.29%	96.78%
	Standard Deviation	0.6%	0%	0.8%	0.7%
Darktable - Server Room - CPU-only	5.376				
(sec)					
	Standard Deviation	0.3%			
Darktable - Masskrug - OpenCL (sec)	5.252				
	Standard Deviation	0.3%			
Darktable - Masskrug - OpenCL (sec)		4.376	4.370	4.353	
	Normalized				100%
	Standard Deviation				0.1%
GEGL - Scale (sec)	4.407	5.437	5.571	5.611	
	Normalized				78.54%
	Standard Deviation				0.5%
Darktable - Boat - OpenCL (sec)	2.532				
	Standard Deviation	0.7%			
Darktable - Boat - OpenCL (sec)		2.560	2.572	2.561	
	Normalized				99.96%
	Standard Deviation				0.4%

Darktable - Server Rack - CPU-only	0.247	0.229	0.244
(sec)			
Normalized	92.71%	100%	93.85%
Standard Deviation	10.5%	0.3%	10.7%
Darktable - Server Room - OpenCL	0.988	0.987	1.006
Normalized	99.9%	100%	98.11%
Standard Deviation	1.4%	2.4%	2.2%
WebP Image Encode - Quality 100	2.387	2.447	2.376
(Encode Time - sec)			
Normalized	99.54%	100%	97.9%
Standard Deviation	0.1%	2.1%	2.3%
Waifu2x-NCNN Vulkan - 2x - 3 - No	2.078	2.068	2.081
Normalized	99.52%	99.76%	99.38%
Standard Deviation	0.7%	0.9%	1%
Darktable - Server Room - OpenCL	0.934		
Standard Deviation	1.8%		
WebP Image Encode - Default	1.548	1.566	1.486
(Encode Time - sec)			
Normalized	95.99%	100%	98.61%
Standard Deviation	1%	0.3%	0.2%
Darktable - Server Rack - OpenCL	0.157	0.157	0.160
Normalized	100%	98.74%	98.13%
Standard Deviation	0.4%	1.8%	0.6%
Darktable - Server Rack - OpenCL	0.133		
Standard Deviation	0.8%		
Darktable - Server Rack - CPU-only	0.216		
(sec)			
Standard Deviation	0.3%		

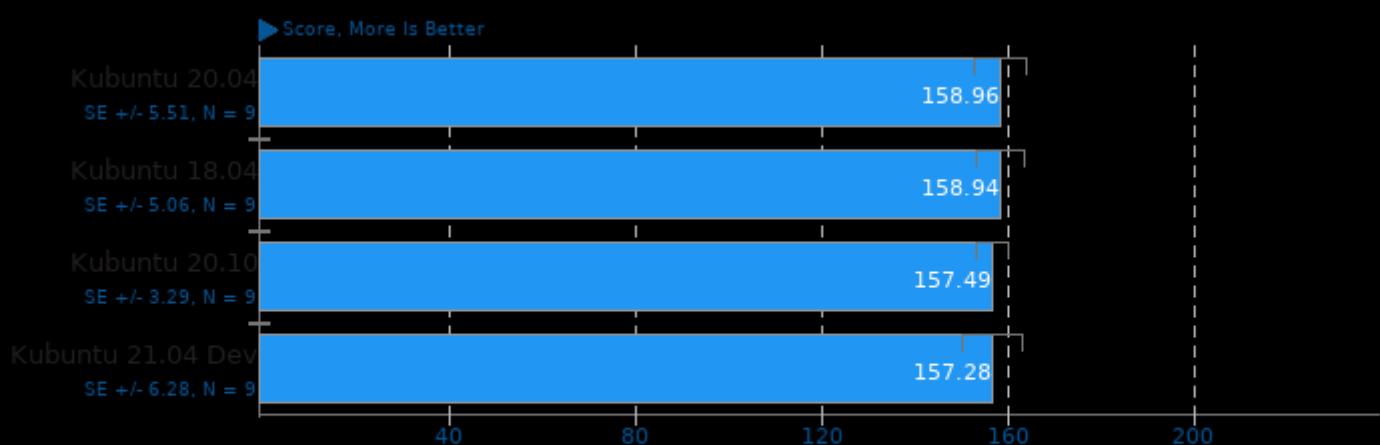
Blender 2.90

Blend File: Barbershop - Compute: NVIDIA OptiX



Selenium

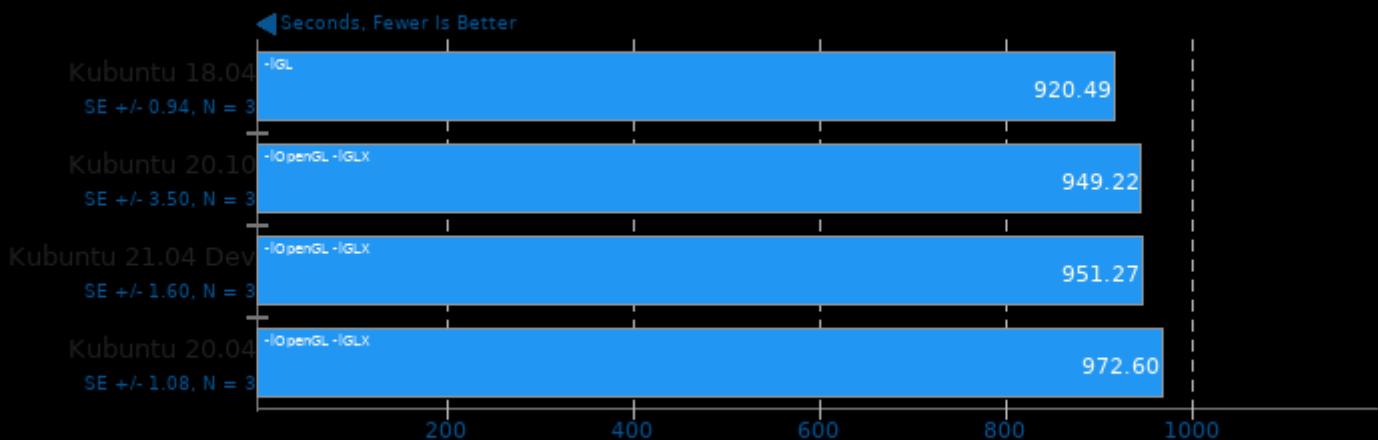
Benchmark: MotionMark - Browser: Firefox



1. Kubuntu 20.04: firefox 84.0.2
2. Kubuntu 18.04: firefox 84.0.2
3. Kubuntu 20.10: firefox 84.0.2
4. Kubuntu 21.04 Dev: firefox 85.0

WebP2 Image Encode 20210126

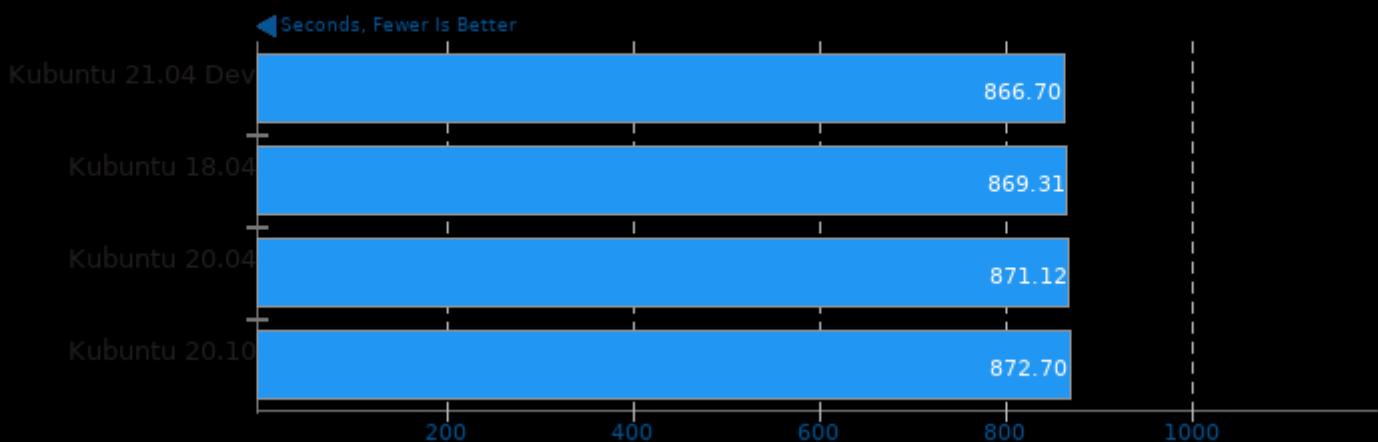
Encode Settings: Quality 95, Compression Effort 7



1. (CXX) g++ options: -msse4.2 -fno-rtti -O3 -rdynamic -lGLU -lglut -lXmu -Xi -lpthread -ljpeg

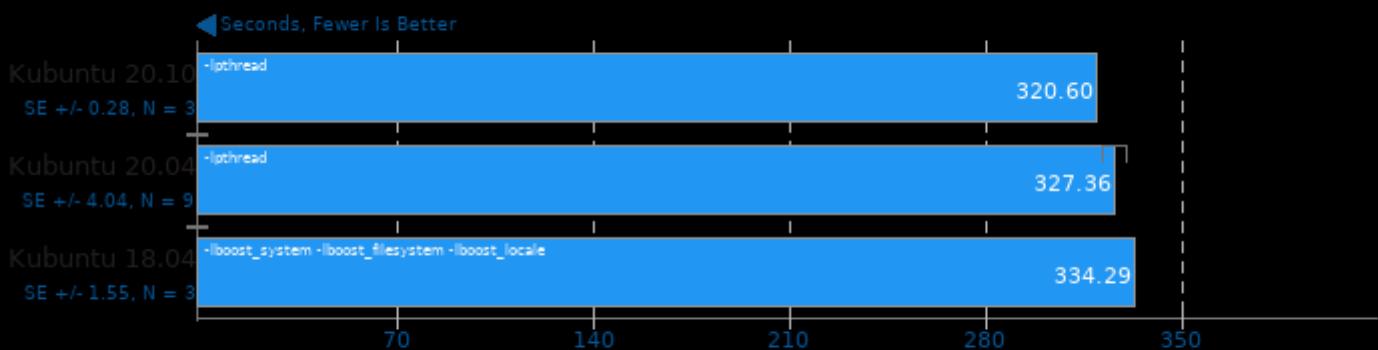
Appleseed 2.0 Beta

Scene: Emily



YafaRay 3.4.1

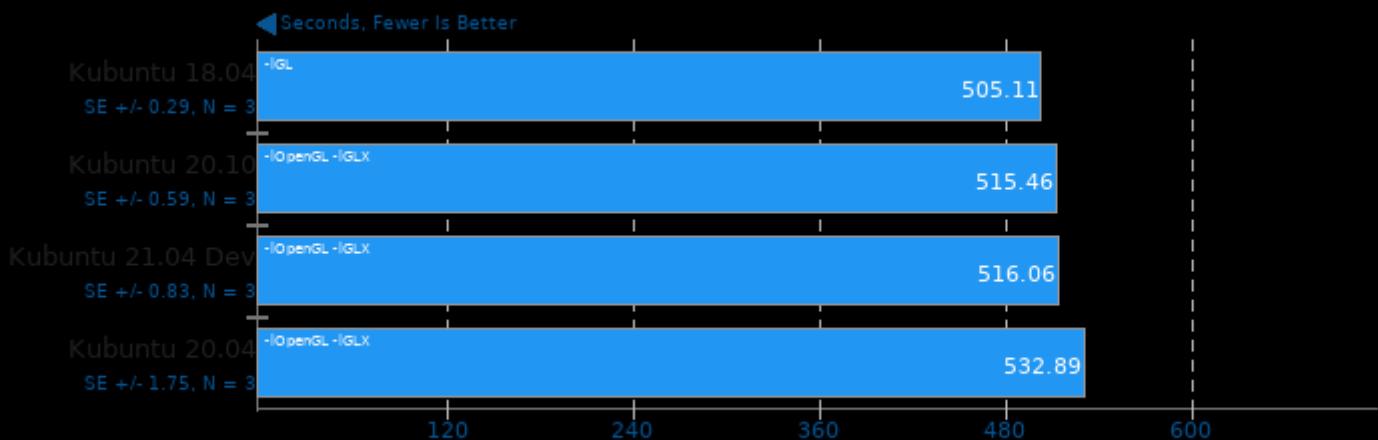
Total Time For Sample Scene



1. (CXX) g++ options: -std=c++11 -O3 -ffast-math -rdynamic -ldl -lilmath -llmImf -llex -lHalf -lz -llmThread -lxml2 -lfreetype

WebP2 Image Encode 20210126

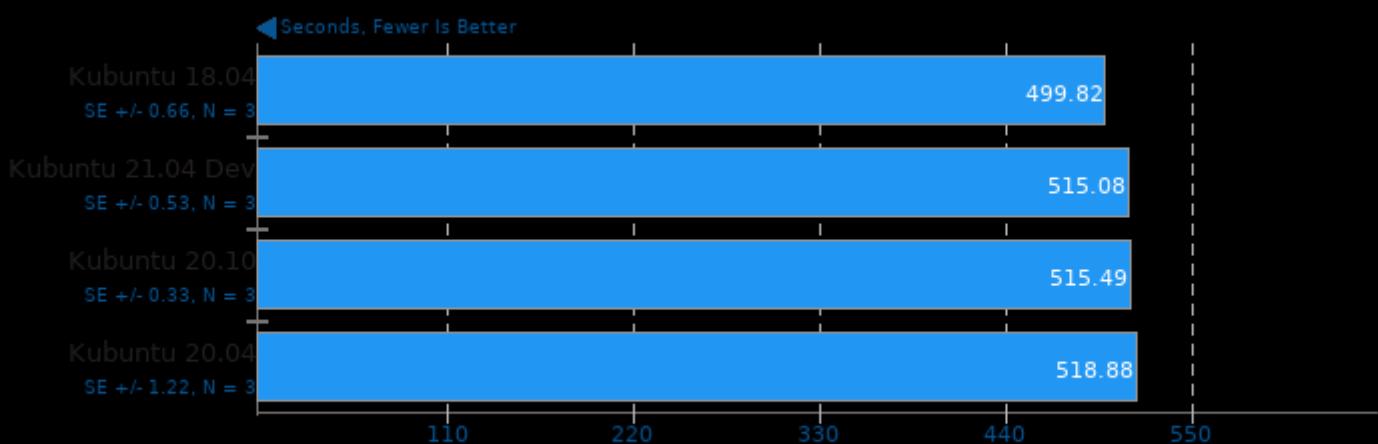
Encode Settings: Quality 75, Compression Effort 7



1. (CXX) g++ options: -msse4.2 -fno-rtti -O3 -rdynamic -IGLU -lglut -lXmu -Xi -lpthread -ljpeg

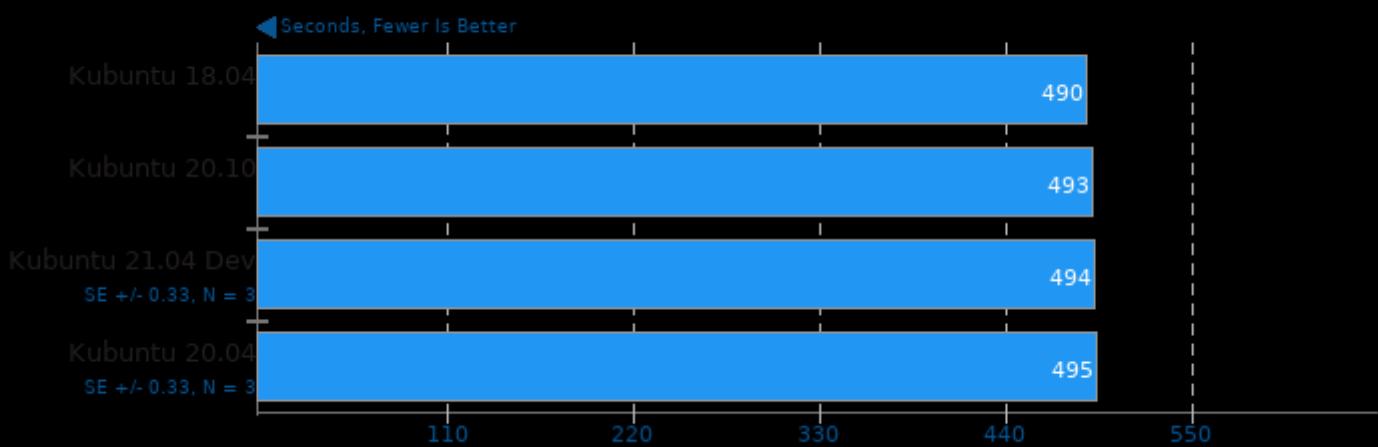
ASTC Encoder 2.0

Preset: Exhaustive



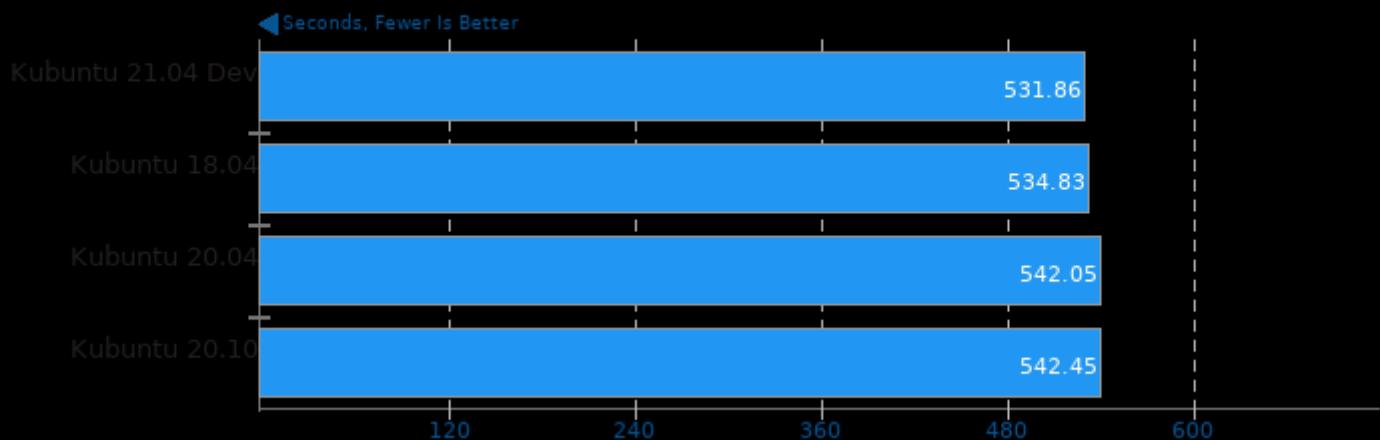
1. (CXX) g++ options: -std=c++14 -fvisibility=hidden -O3 -fno-math-errno -mfpmath=sse -mavx2 -mpopcnt -lpthread

RedShift Demo 3.0



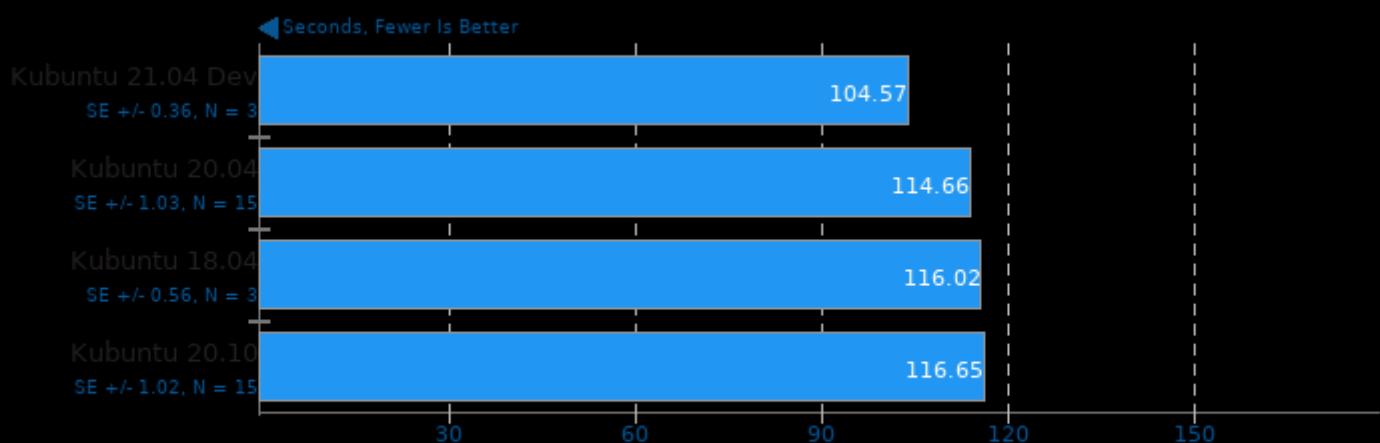
Appleseed 2.0 Beta

Scene: Disney Material



G'MIC

Test: 2D Function Plotting, 1000 Times



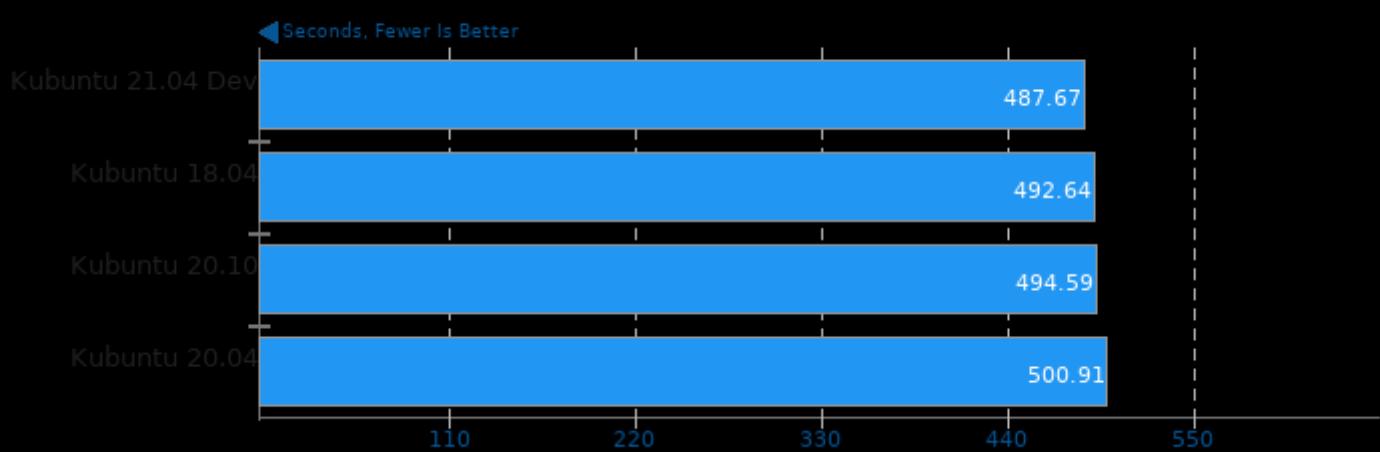
1. Kubuntu 20.04; Version 2.4.5, Copyright (c) 2008-2019, David Tschumperle.

2. Kubuntu 18.04; Version 2.8.4

3. Kubuntu 20.10; Version 2.4.5, Copyright (c) 2008-2019, David Tschumperle.

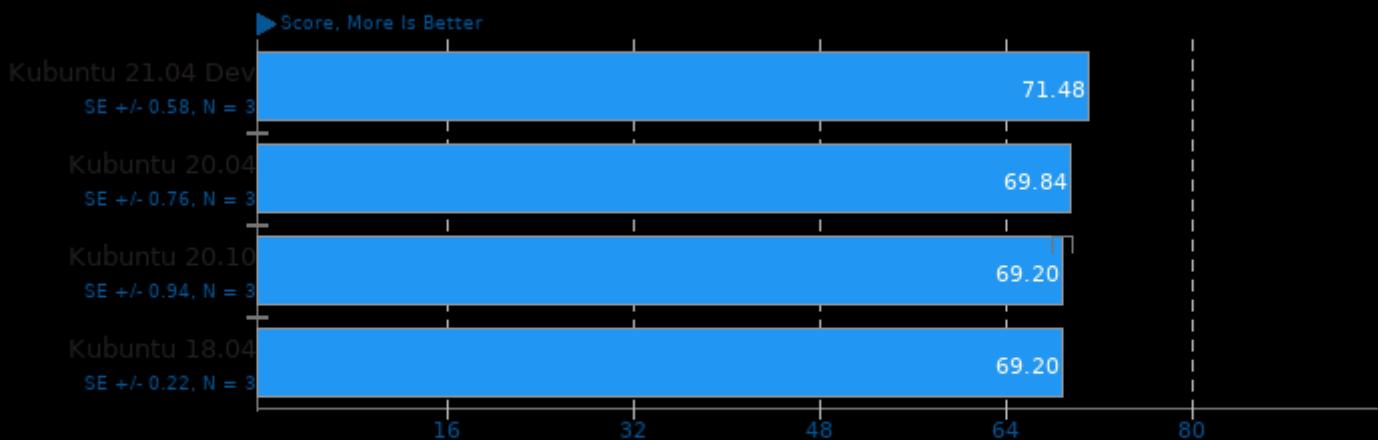
Appleseed 2.0 Beta

Scene: Material Tester



Selenium

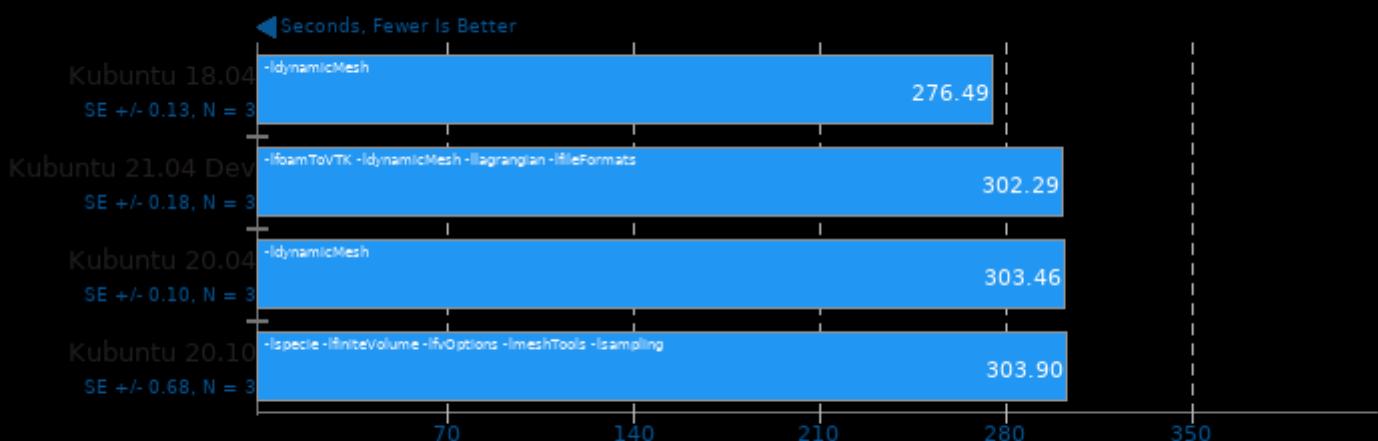
Benchmark: Jetstream 2 - Browser: Firefox



1. Kubuntu 21.04 Dev; firefox 85.0
2. Kubuntu 20.04; firefox 84.0.2
3. Kubuntu 20.10; firefox 84.0.2
4. Kubuntu 18.04; firefox 84.0.2

OpenFOAM 8

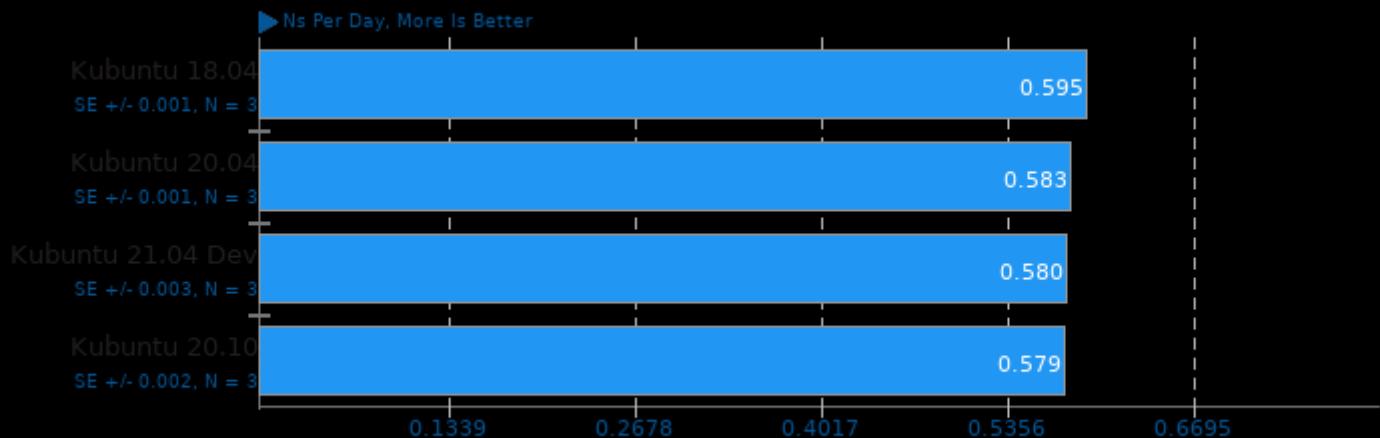
Input: Motorbike 30M



1. (CXX) g++ options: -std=c++11 -m64 -O3 -ftemplate-depth=100 -fPIC -fuse-lld=bfd -Xlinker --add-needed --no-as-needed -lgenericPatchFields -lOpenFOAM

GROMACS 2020.3

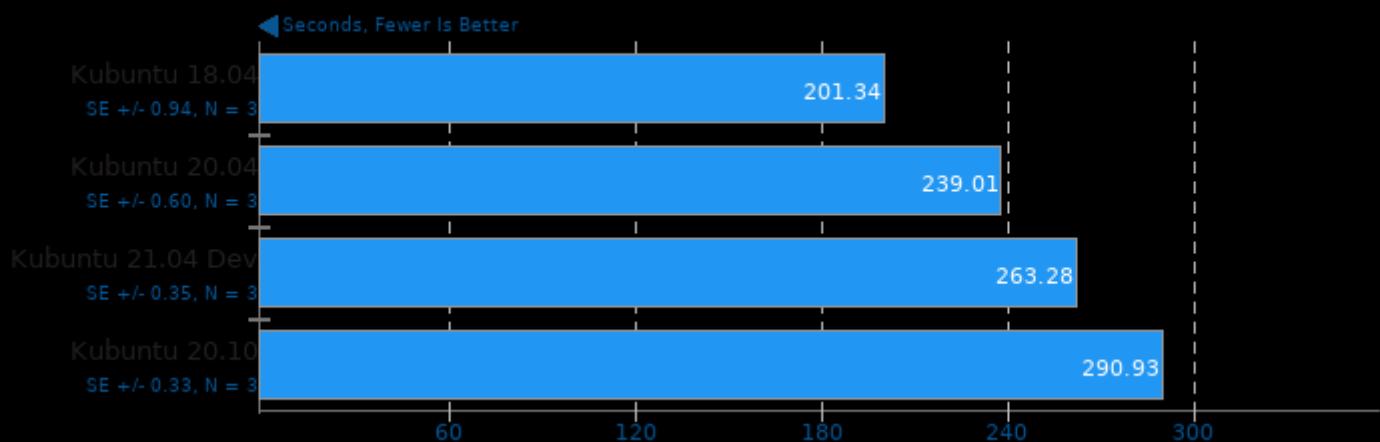
Water Benchmark



1. (CXX) g++ options: -O3 -pthread -lrt -lpthread -lm

Build2 0.13

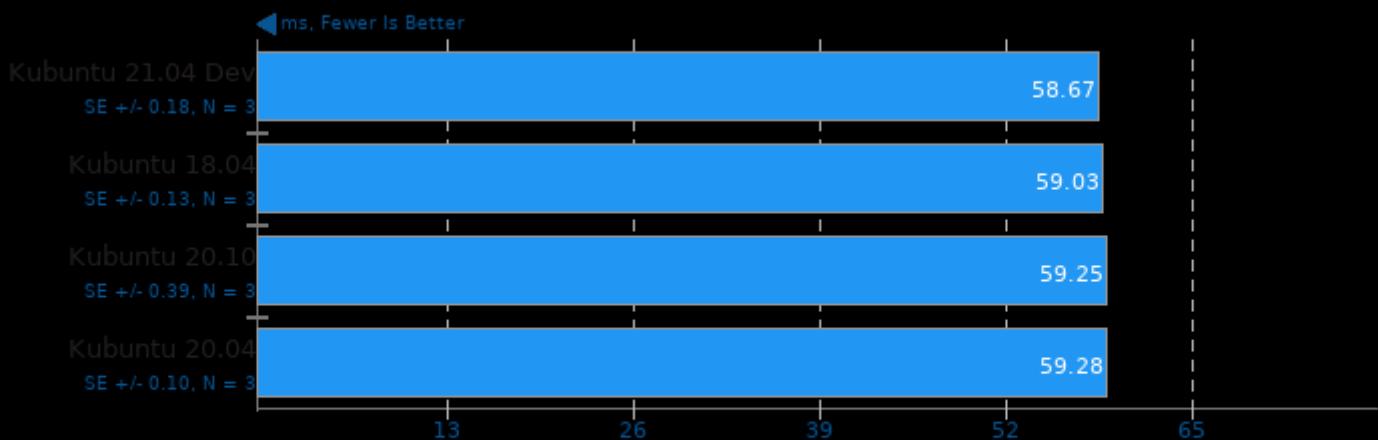
Time To Compile



Kubuntu Focus 18.04

Selenium

Benchmark: ARES-6 - Browser: Firefox



1. Kubuntu 21.04 Dev; firefox 85.0

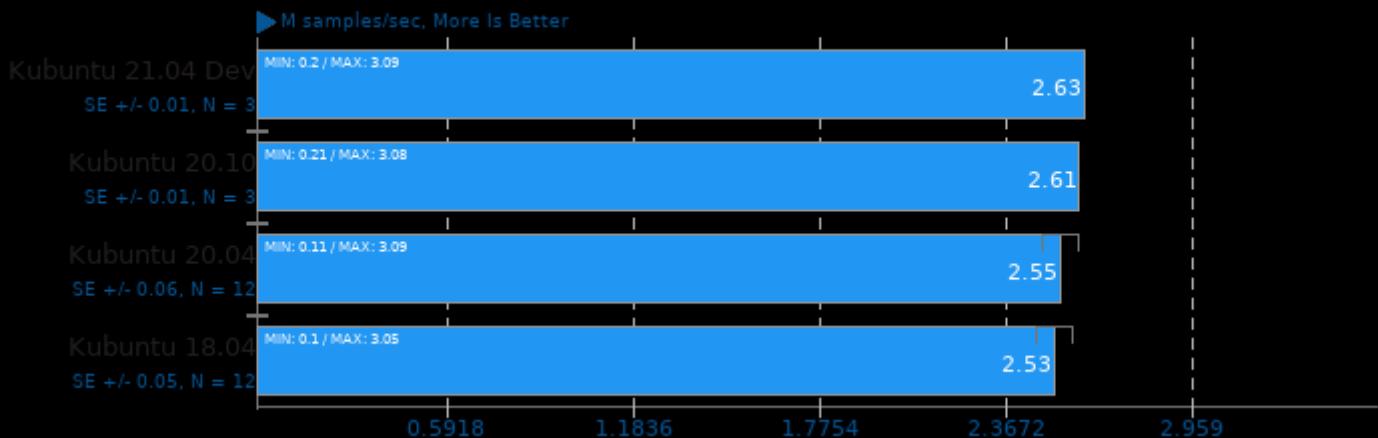
2. Kubuntu 18.04; firefox 84.0.2

3. Kubuntu 20.10; firefox 84.0.2

4. Kubuntu 20.04; firefox 84.0.2

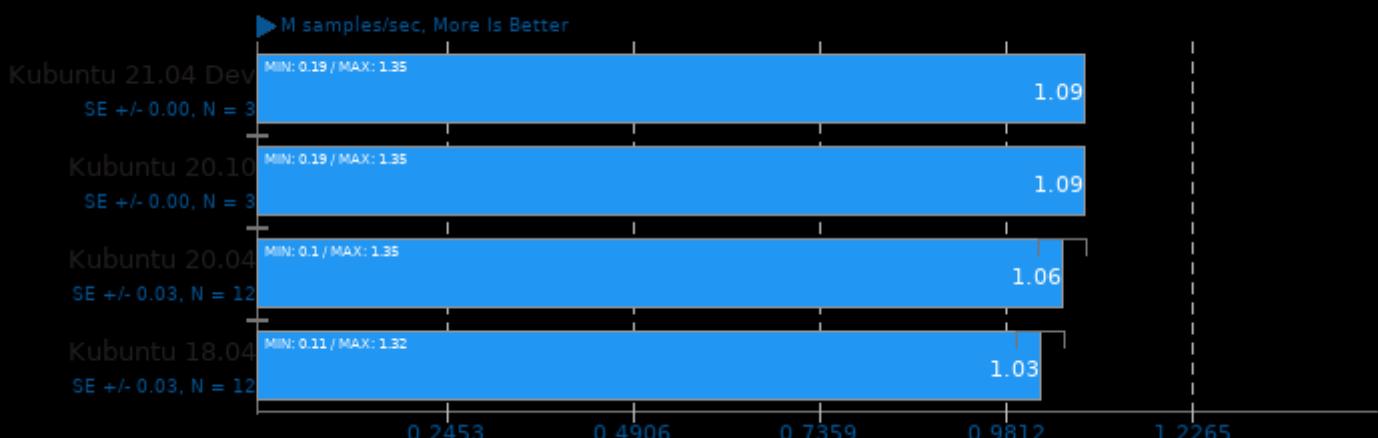
LuxCoreRender OpenCL 2.3

Scene: LuxCore Benchmark



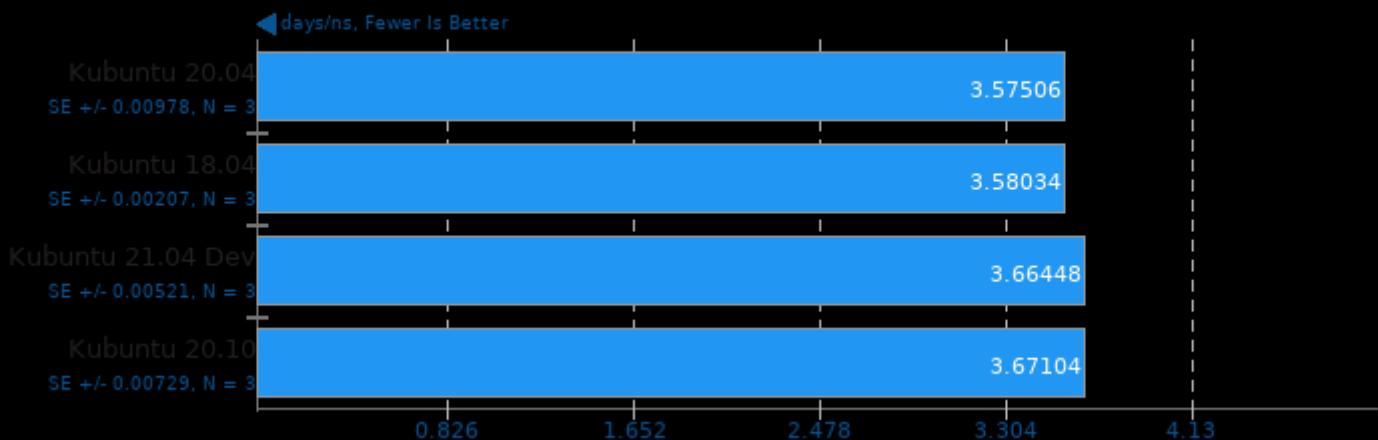
LuxCoreRender OpenCL 2.3

Scene: Food



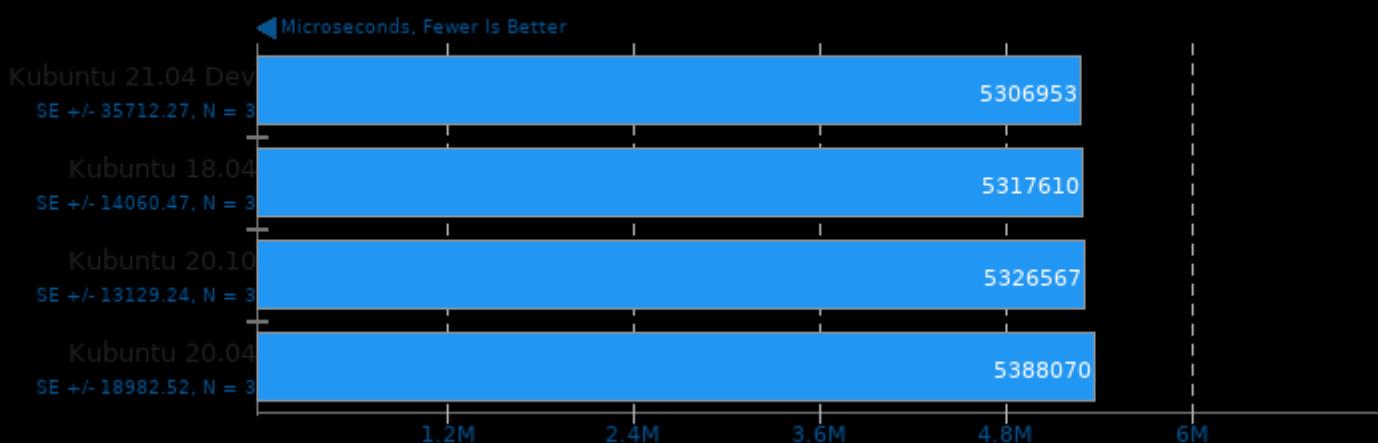
NAMD 2.14

ATPase Simulation - 327,506 Atoms



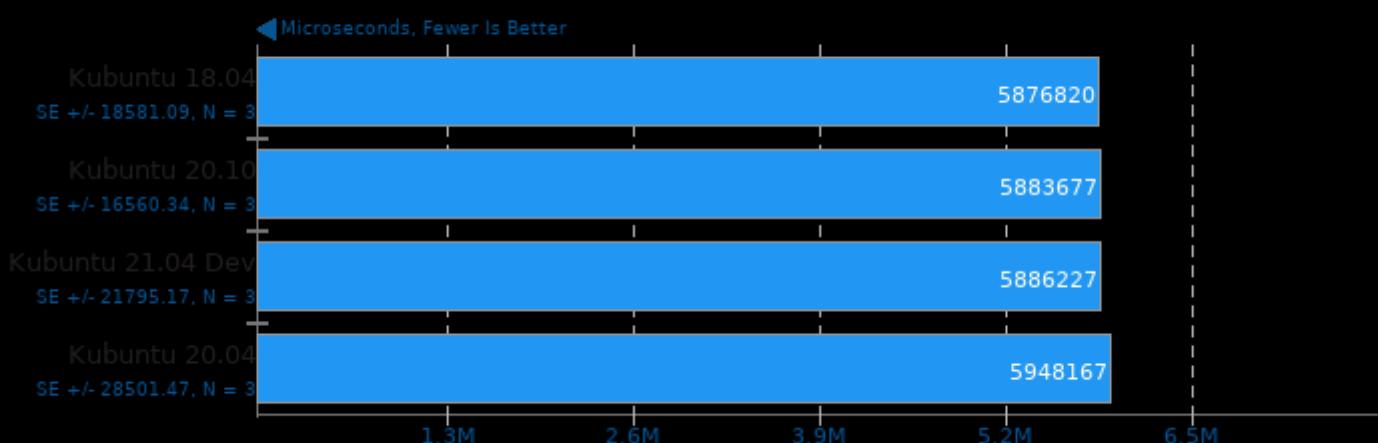
TensorFlow Lite 2020-08-23

Model: Inception ResNet V2



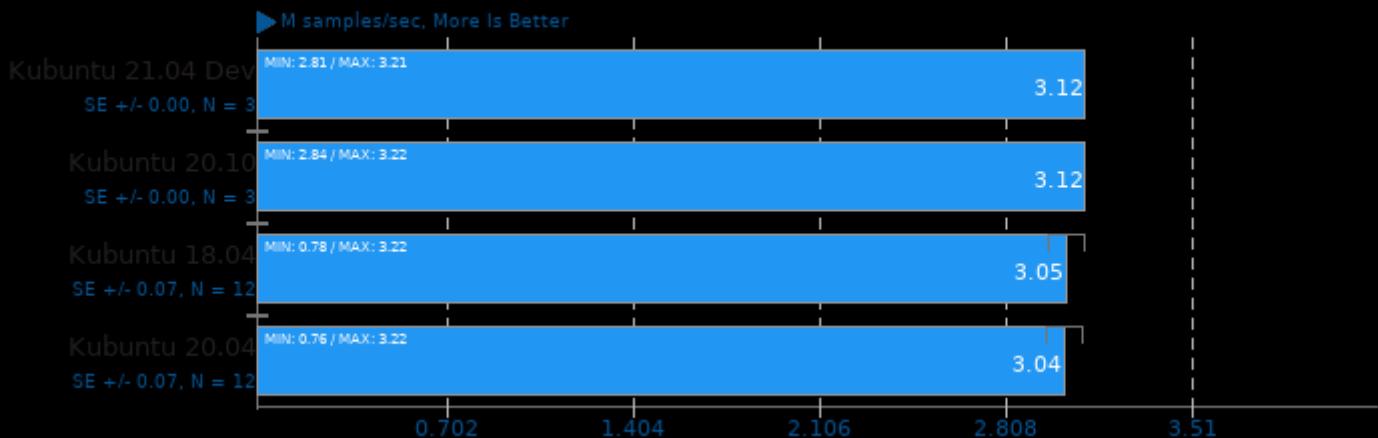
TensorFlow Lite 2020-08-23

Model: Inception V4



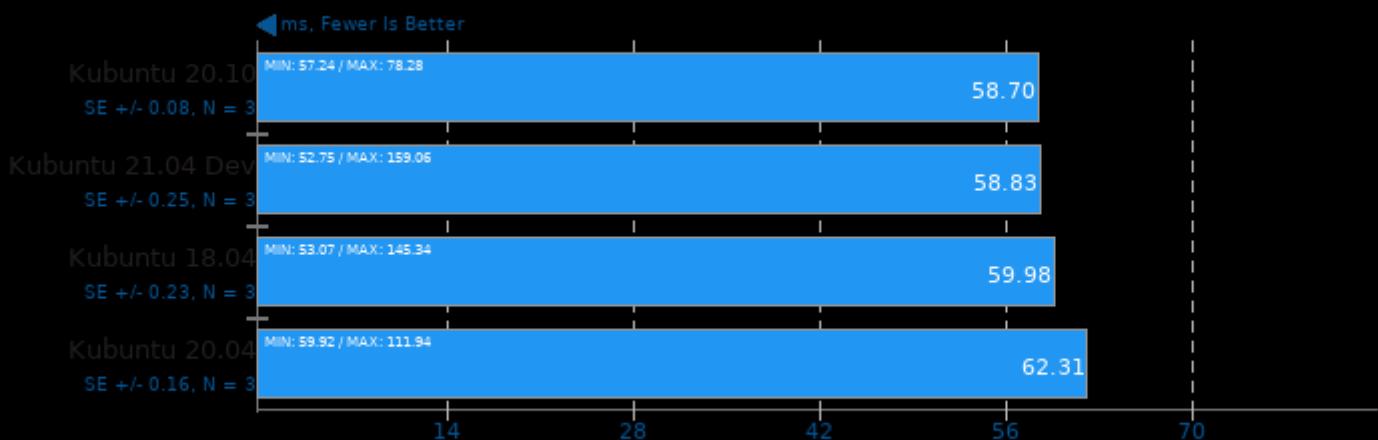
LuxCoreRender OpenCL 2.3

Scene: DLSC



Mobile Neural Network 1.1.1

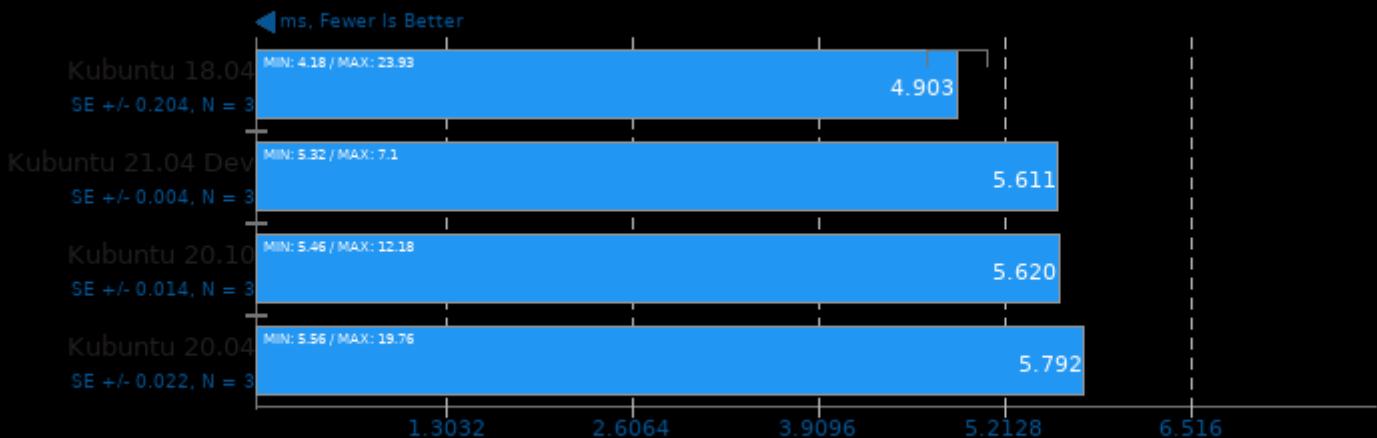
Model: inception-v3



1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fno-threadsafe-statics

Mobile Neural Network 1.1.1

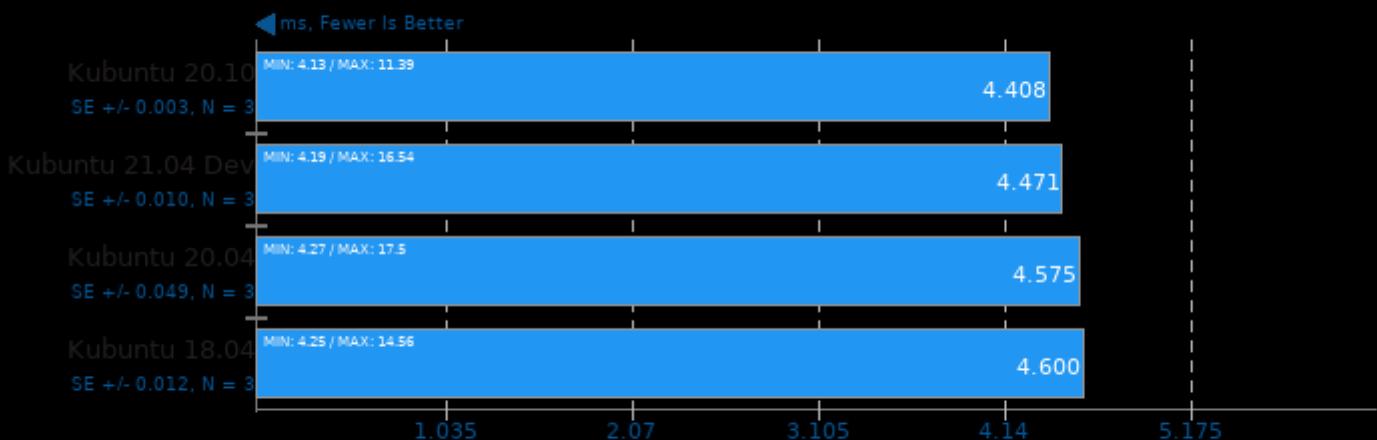
Model: mobilenet-v1-1.0



```
1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fno
```

Mobile Neural Network 1.1.1

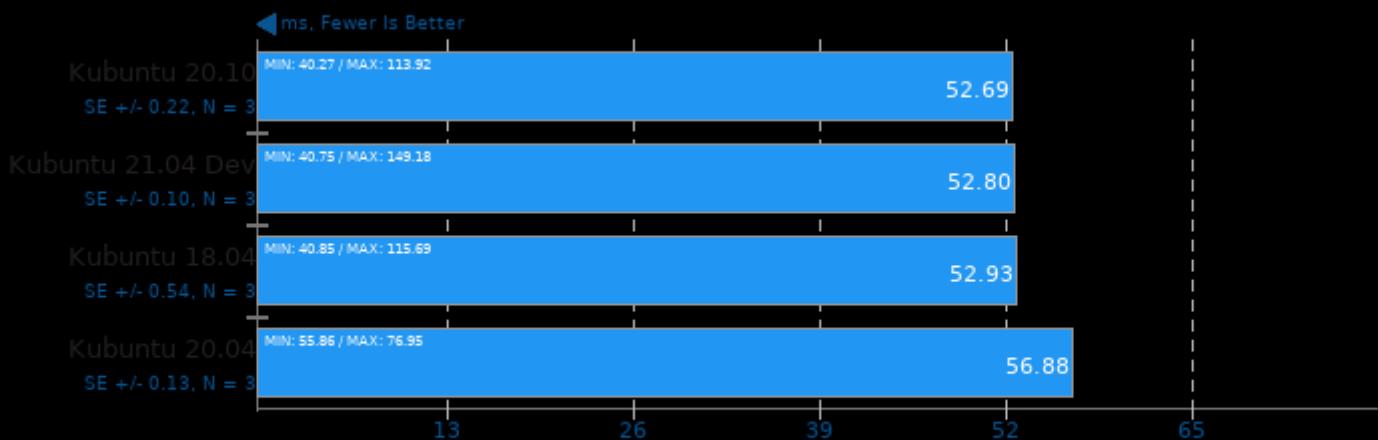
Model: MobileNetV2_224



```
1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fno
```

Mobile Neural Network 1.1.1

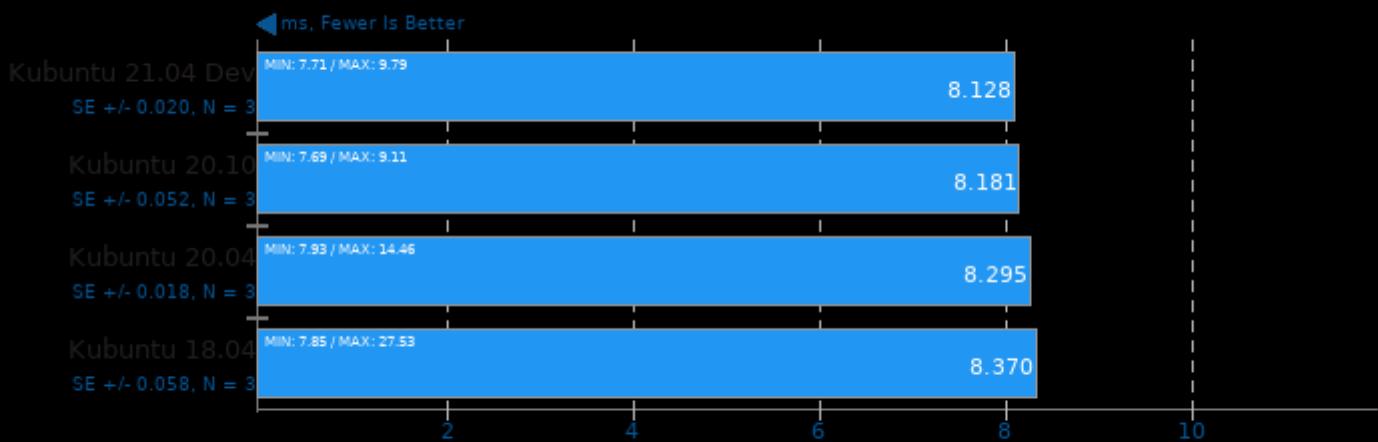
Model: resnet-v2-50



```
1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fno
```

Mobile Neural Network 1.1.1

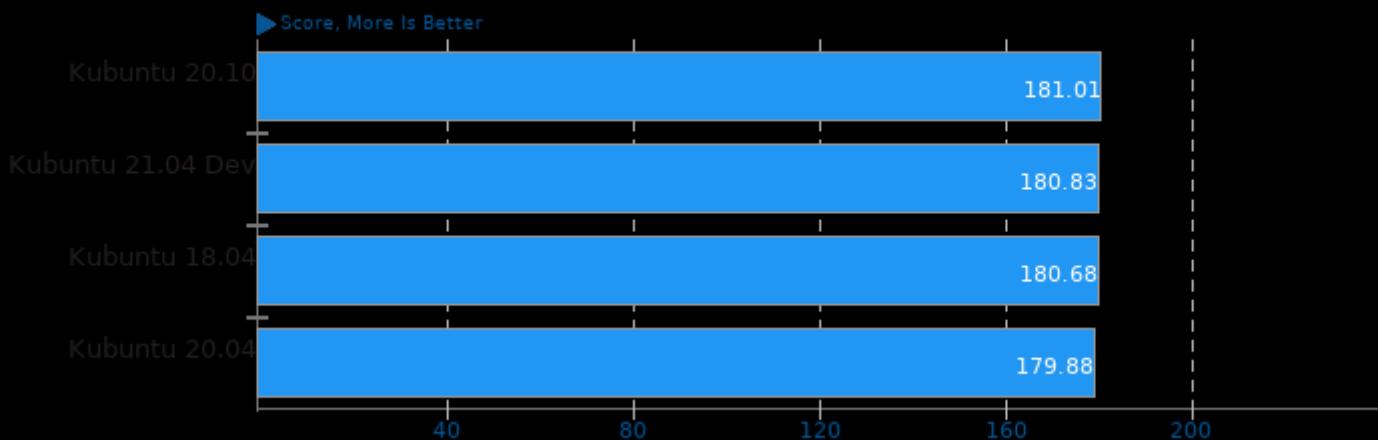
Model: SqueezeNetV1.0



```
1. (CXX) g++ options: -std=c++11 -O3 -fvisibility=hidden -fomit-frame-pointer -fstrict-aliasing -ffunction-sections -fdata-sections -ffast-math -fno-rtti -fno
```

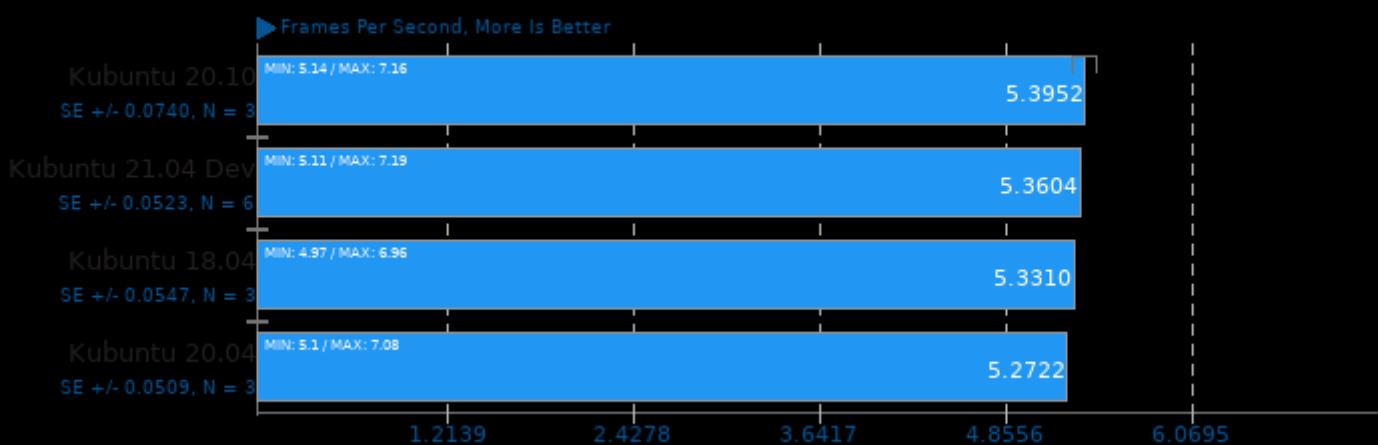
OctaneBench 2020.1

Total Score



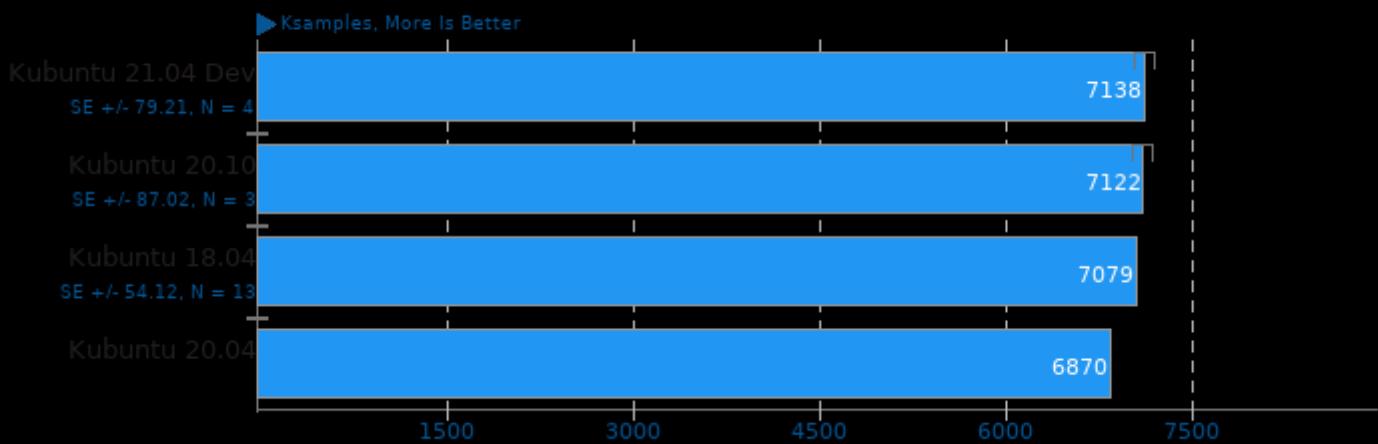
Embree 3.9.0

Binary: Pathtracer - Model: Crown



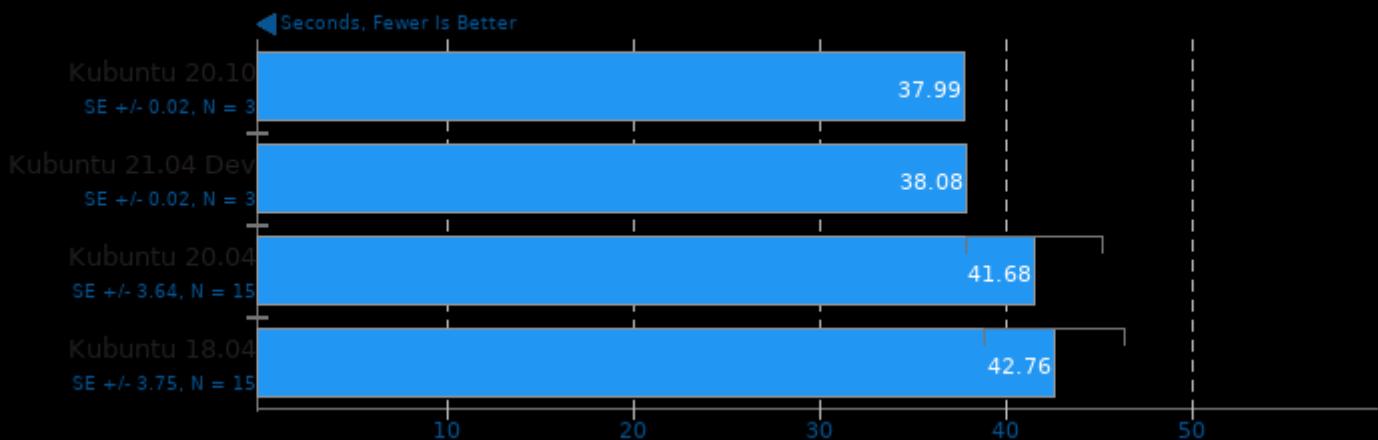
Chaos Group V-RAY 4.10.07

Mode: CPU



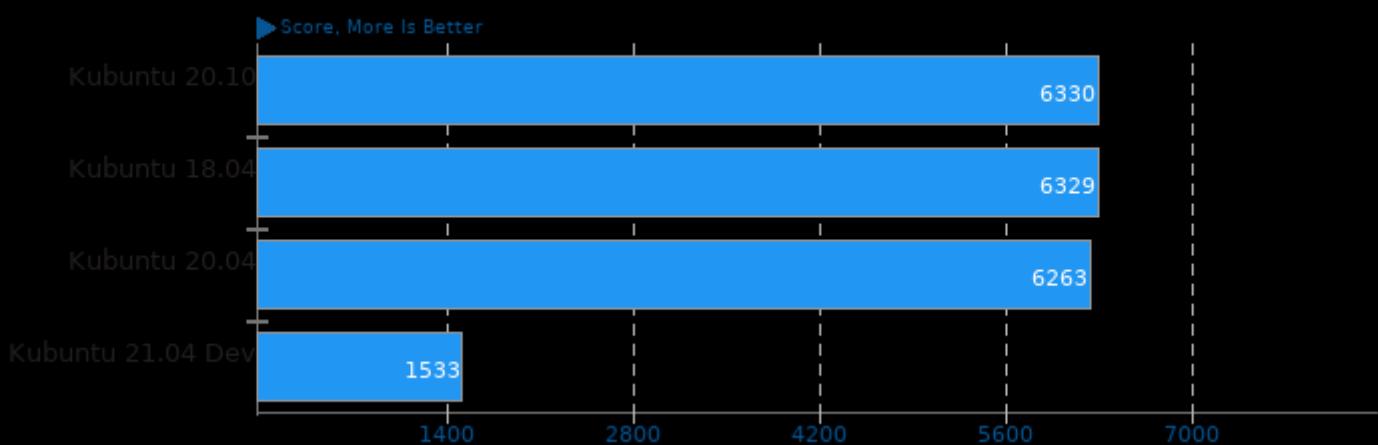
Blender 2.90

Blend File: BMW27 - Compute: NVIDIA OptiX



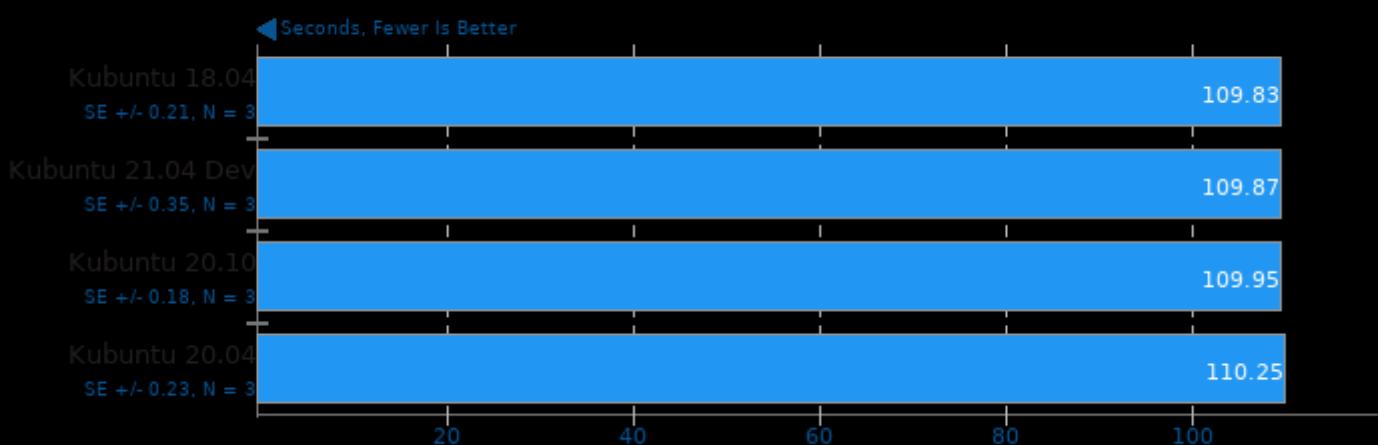
GLmark2 2020.04

Resolution: 1920 x 1080



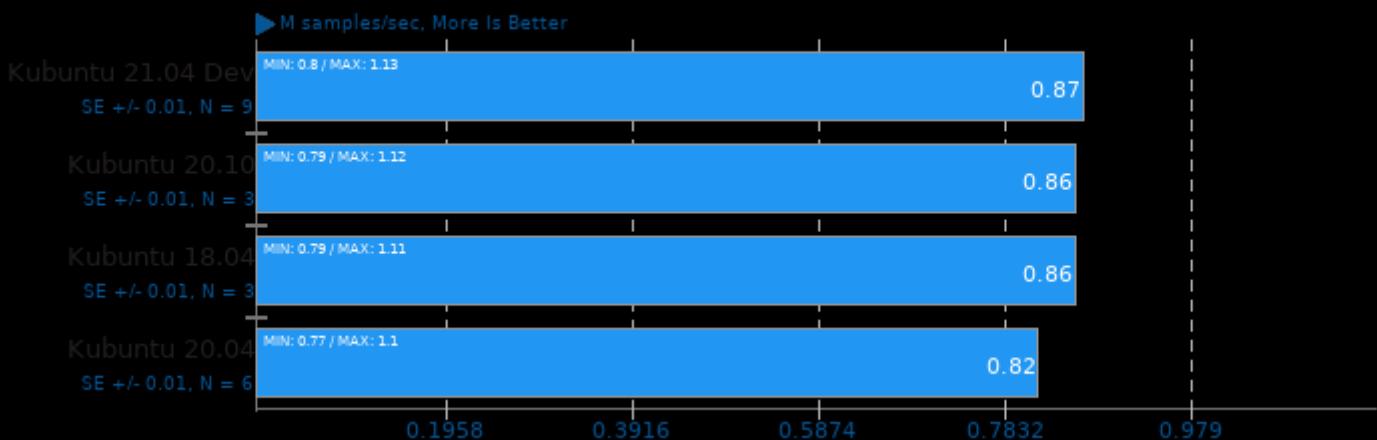
RealSR-NCNN 20200818

Scale: 4x - TAA: Yes



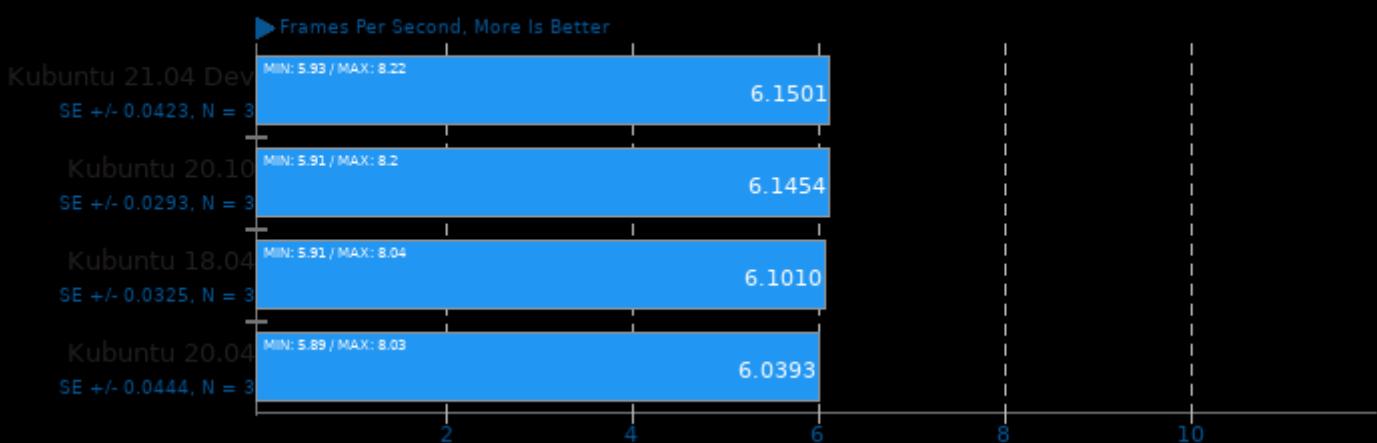
LuxCoreRender 2.3

Scene: Rainbow Colors and Prism



Embree 3.9.0

Binary: Pathtracer ISPC - Model: Crown



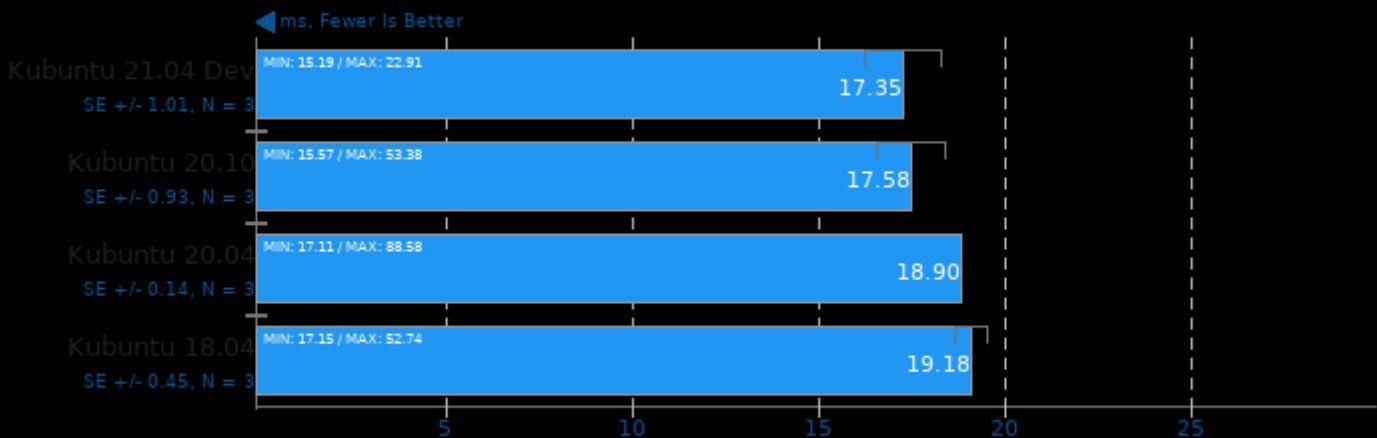
OCRMypdf 6.1.2

Processing 60 Page PDF Document



NCNN 20201218

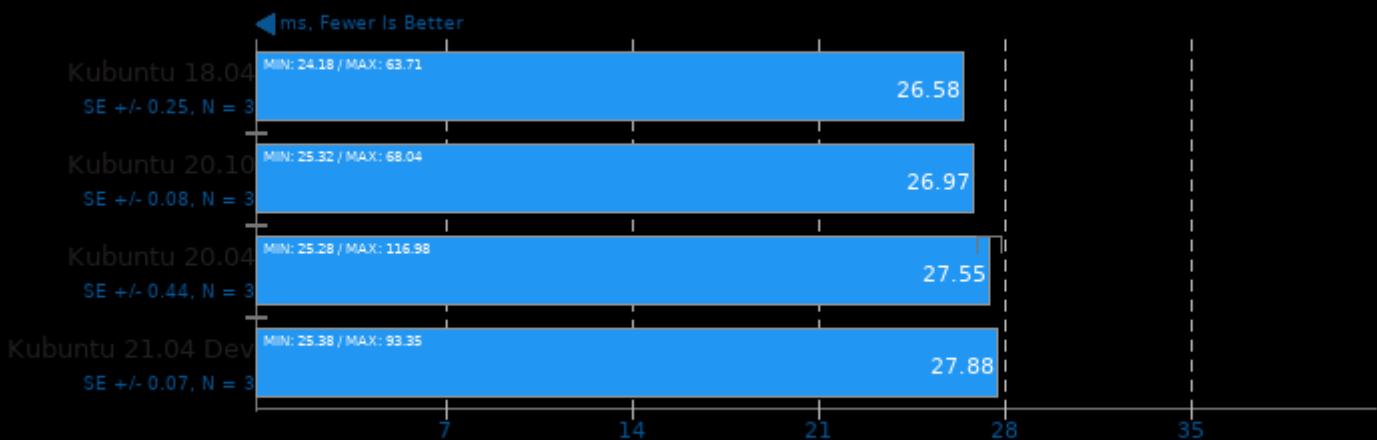
Target: CPU - Model: regnety_400m



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

NCNN 20201218

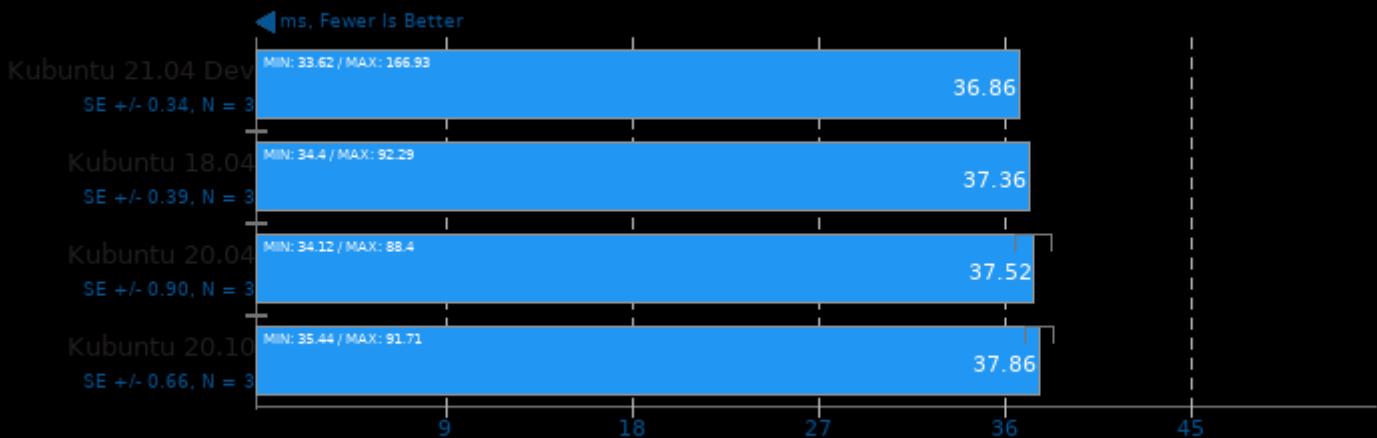
Target: CPU - Model: squeezeenet_ssd



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

NCNN 20201218

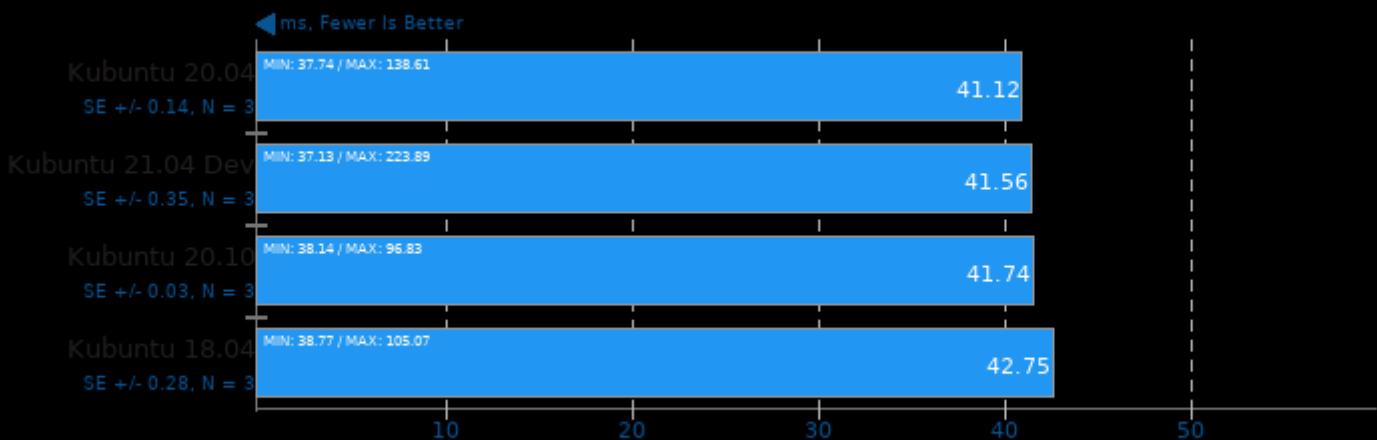
Target: CPU - Model: yolov4-tiny



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

NCNN 20201218

Target: CPU - Model: resnet50

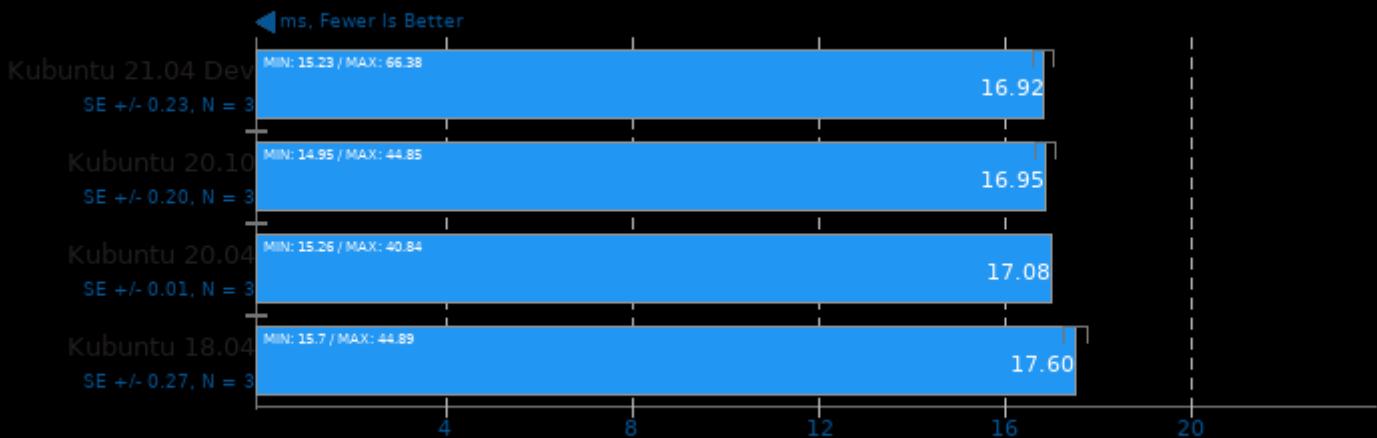


1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread

Kubuntu Focus 18.04

NCNN 20201218

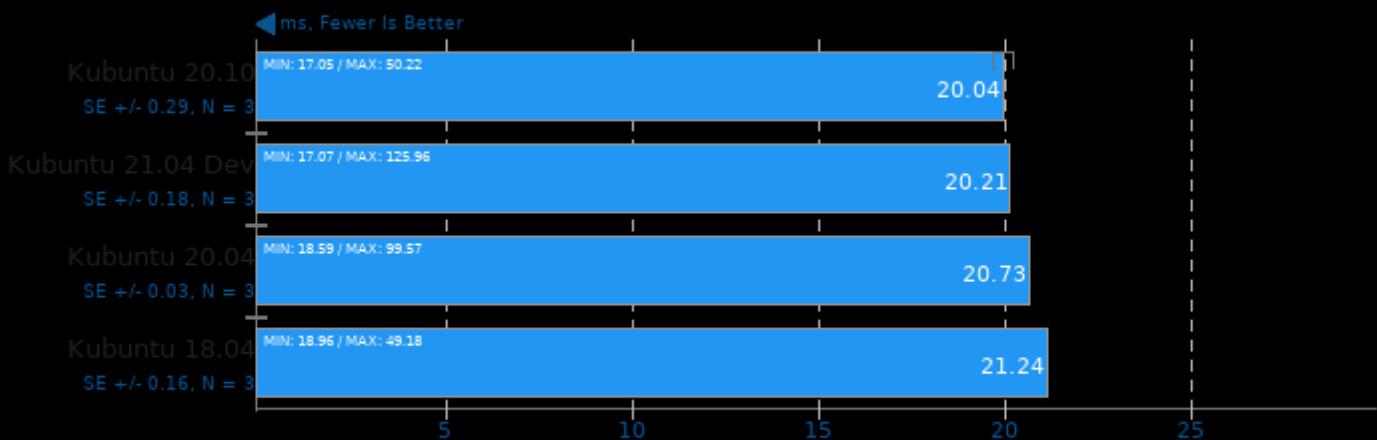
Target: CPU - Model: alexnet



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

NCNN 20201218

Target: CPU - Model: resnet18

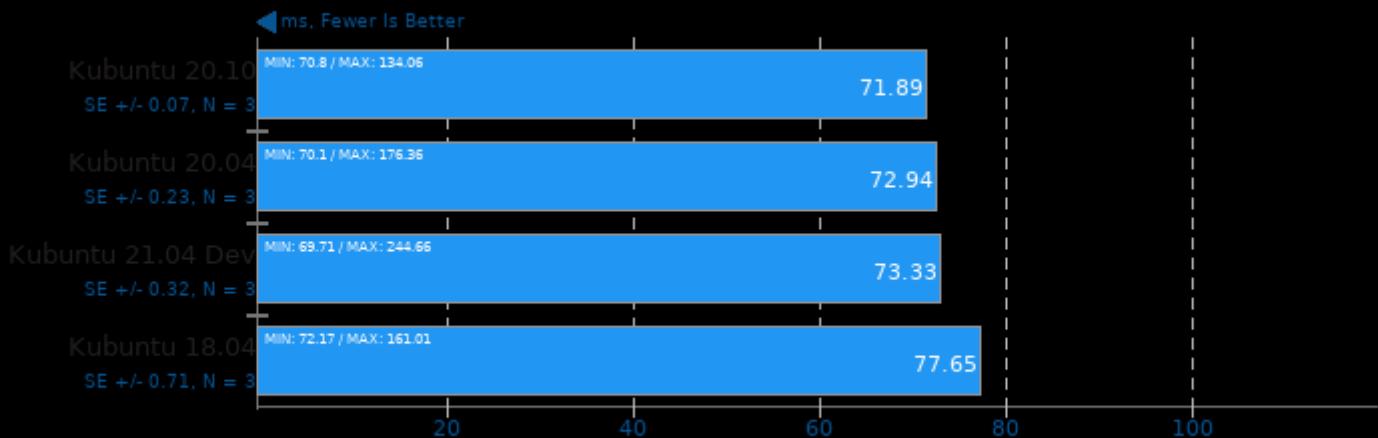


1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread

Kubuntu Focus 18.04

NCNN 20201218

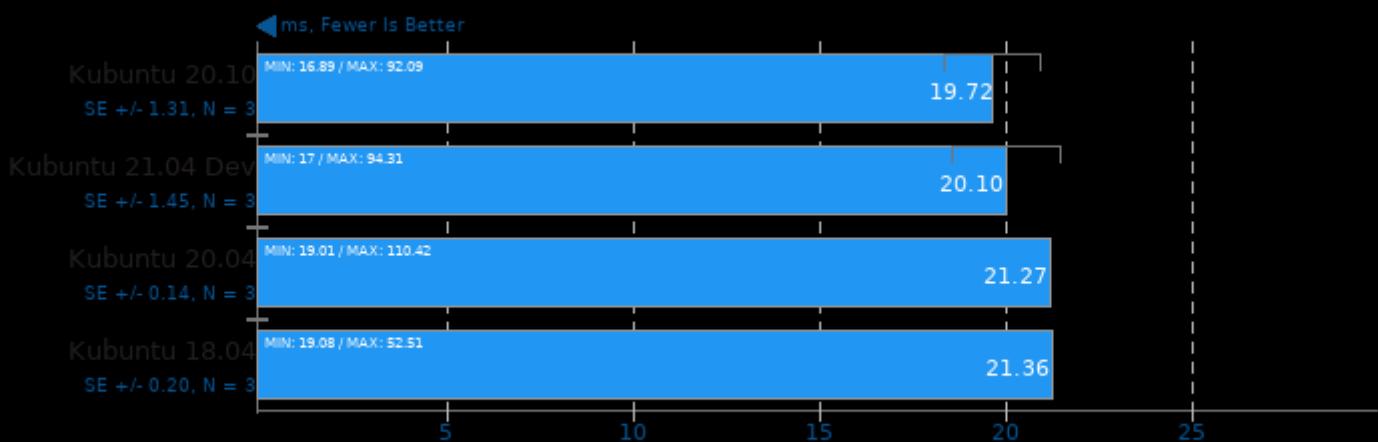
Target: CPU - Model: vgg16



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

NCNN 20201218

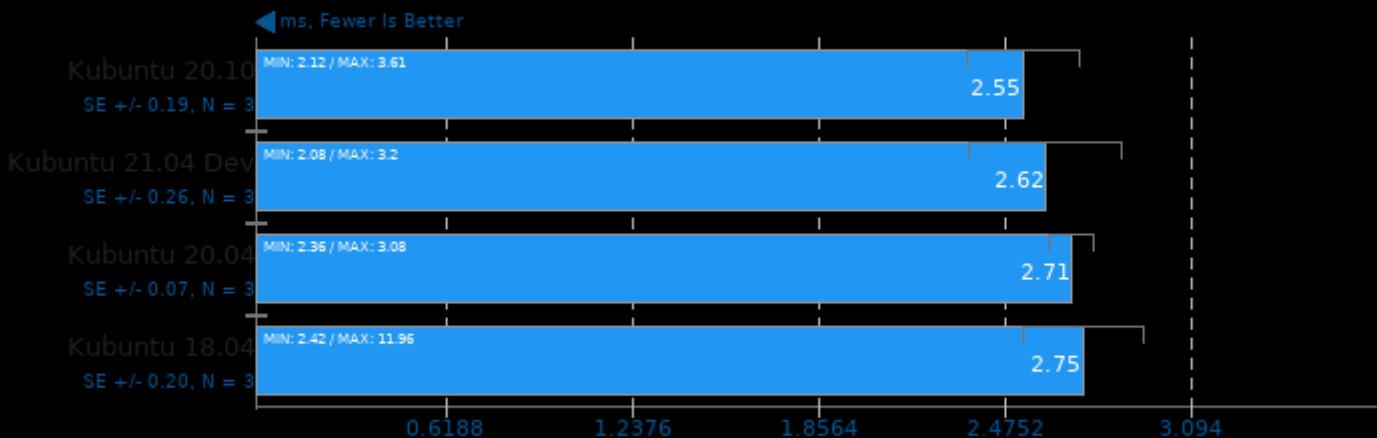
Target: CPU - Model: googlenet



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

NCNN 20201218

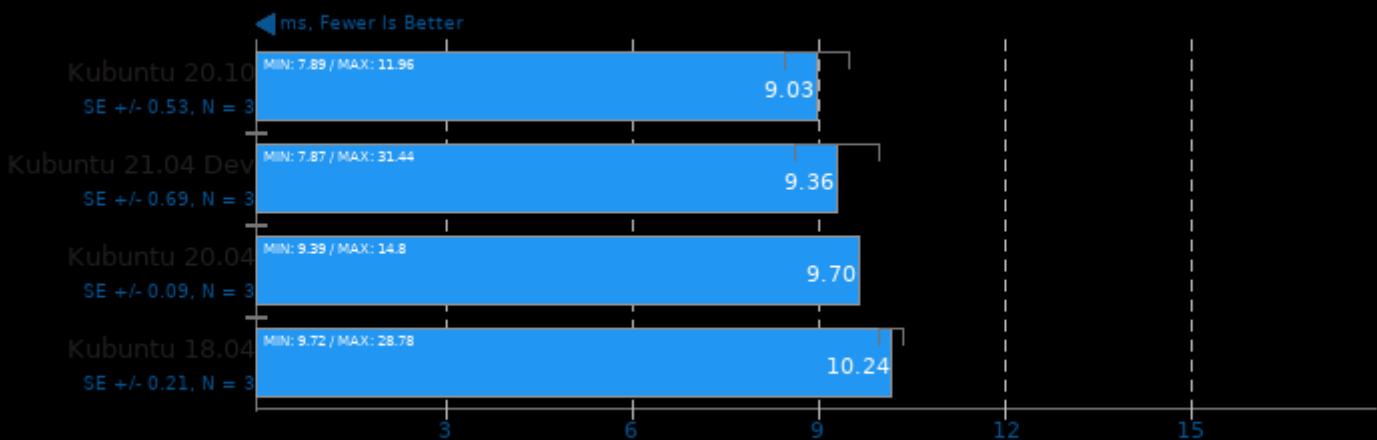
Target: CPU - Model: blazeface



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

NCNN 20201218

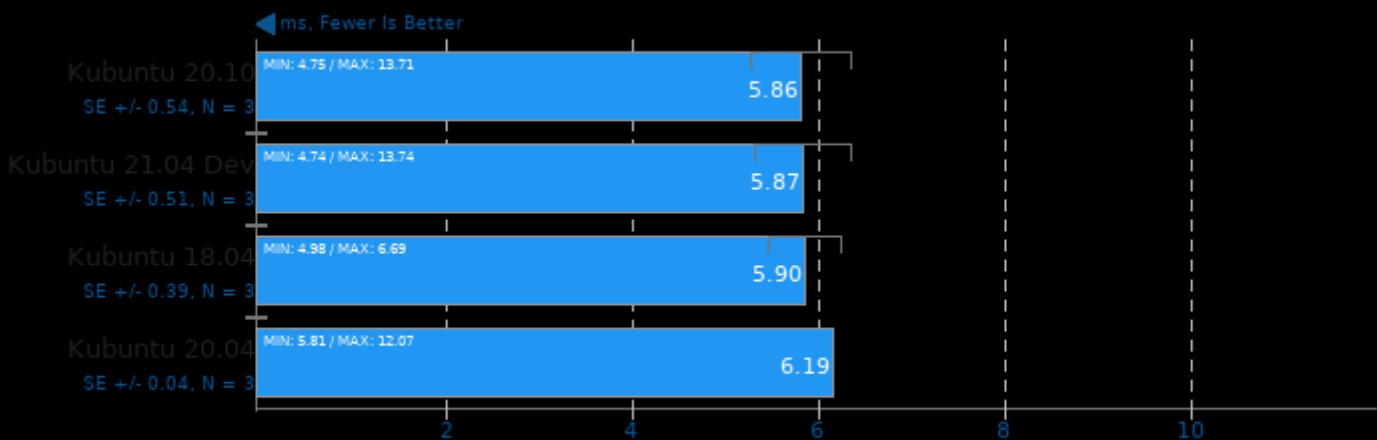
Target: CPU - Model: efficientnet-b0



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

NCNN 20201218

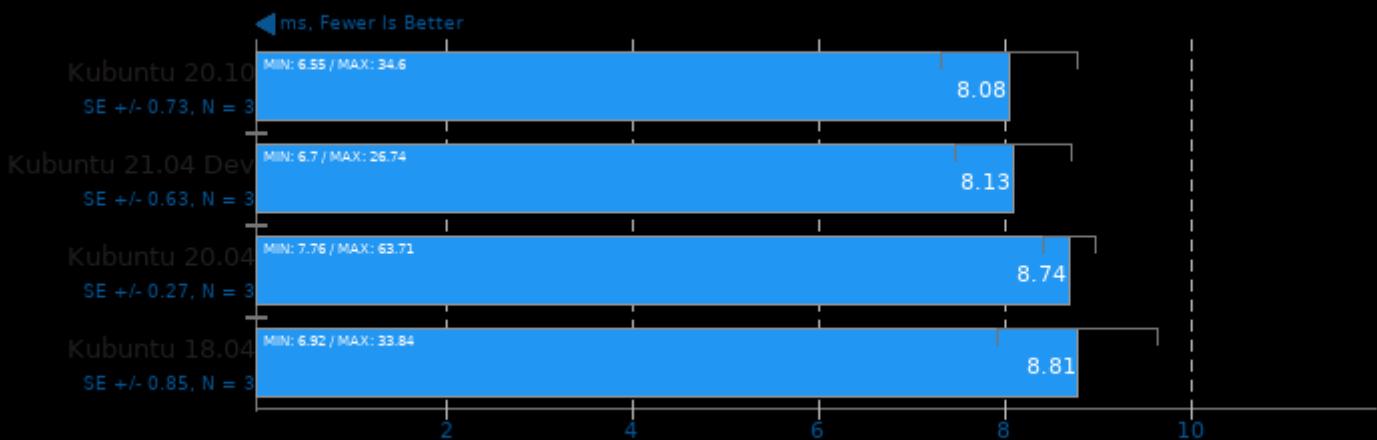
Target: CPU - Model: mnasnet



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

NCNN 20201218

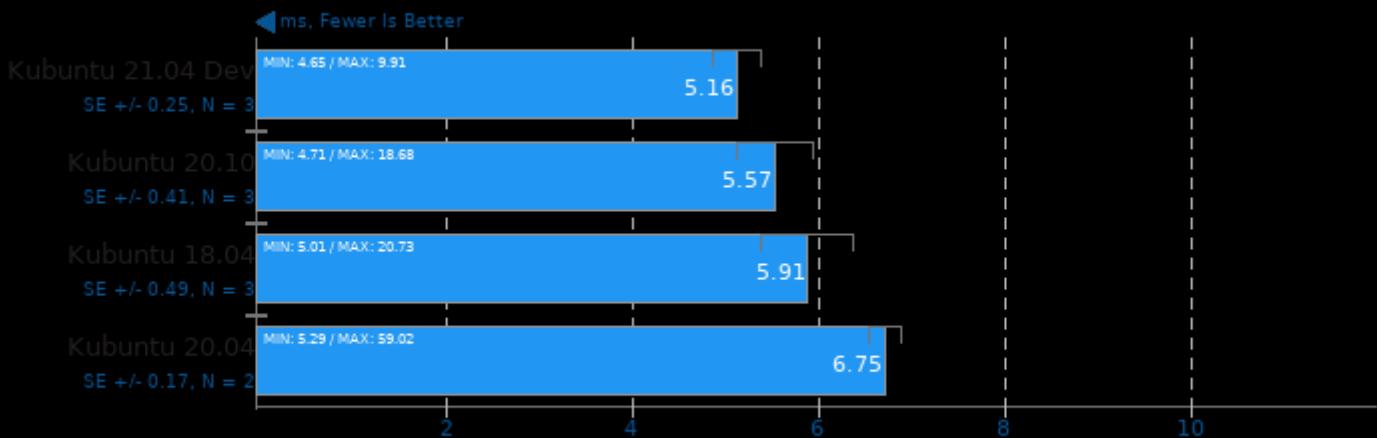
Target: CPU - Model: shufflenet-v2



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

NCNN 20201218

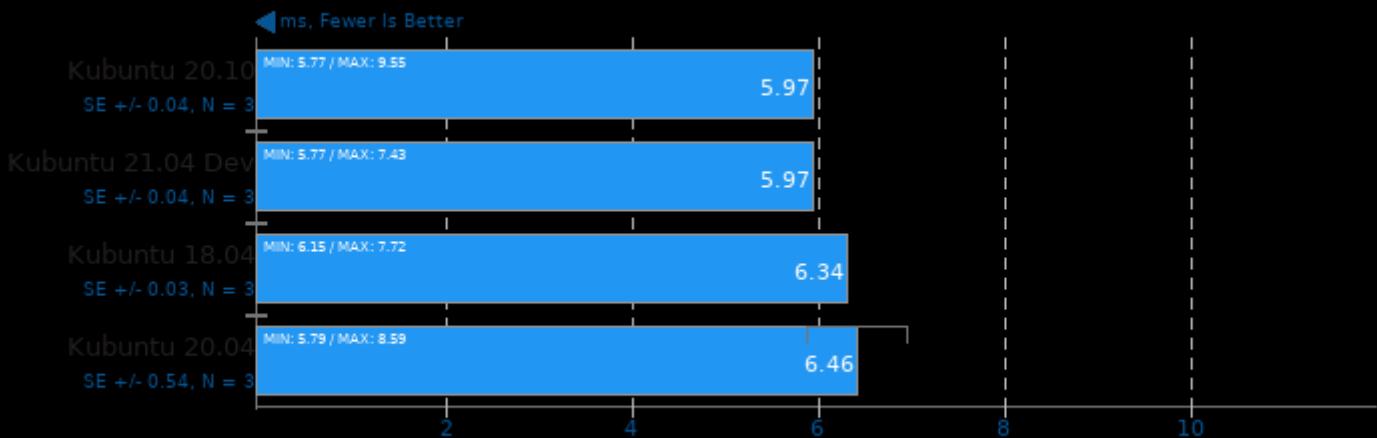
Target: CPU-v3-v3 - Model: mobilenet-v3



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

NCNN 20201218

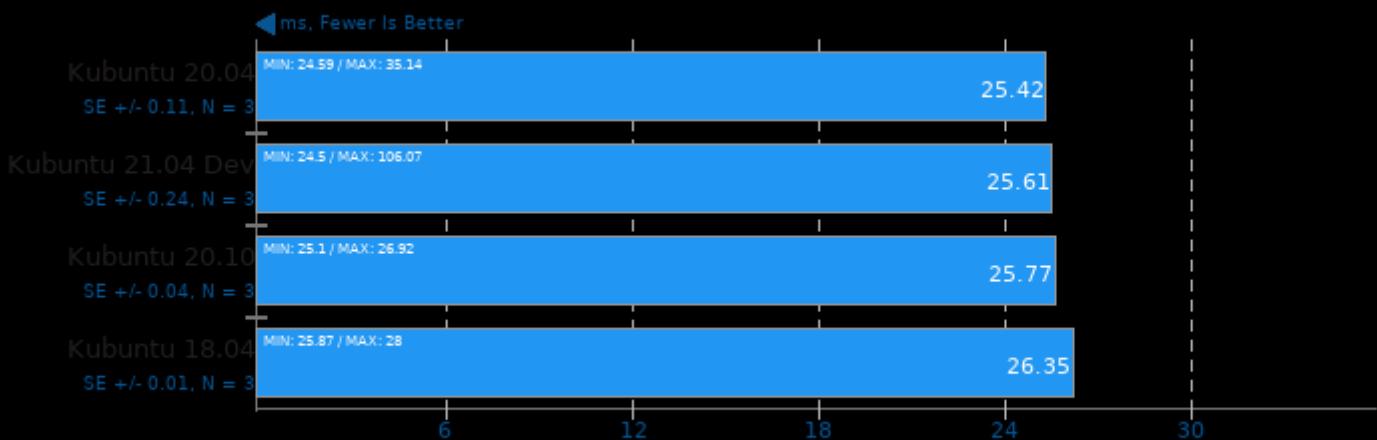
Target: CPU-v2-v2 - Model: mobilenet-v2



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

NCNN 20201218

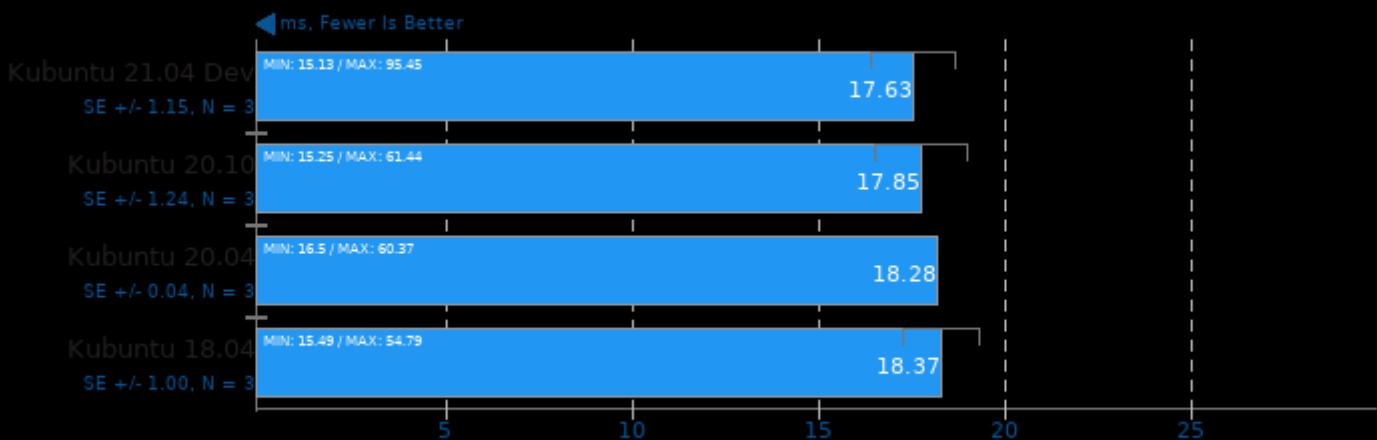
Target: CPU - Model: mobilenet



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

NCNN 20201218

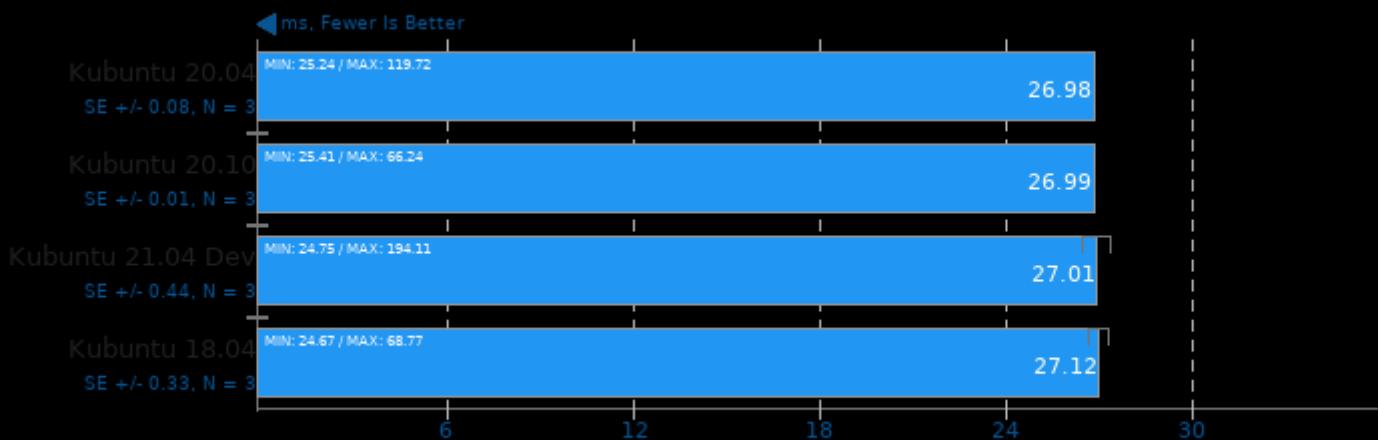
Target: Vulkan GPU - Model: regnety_400m



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

NCNN 20201218

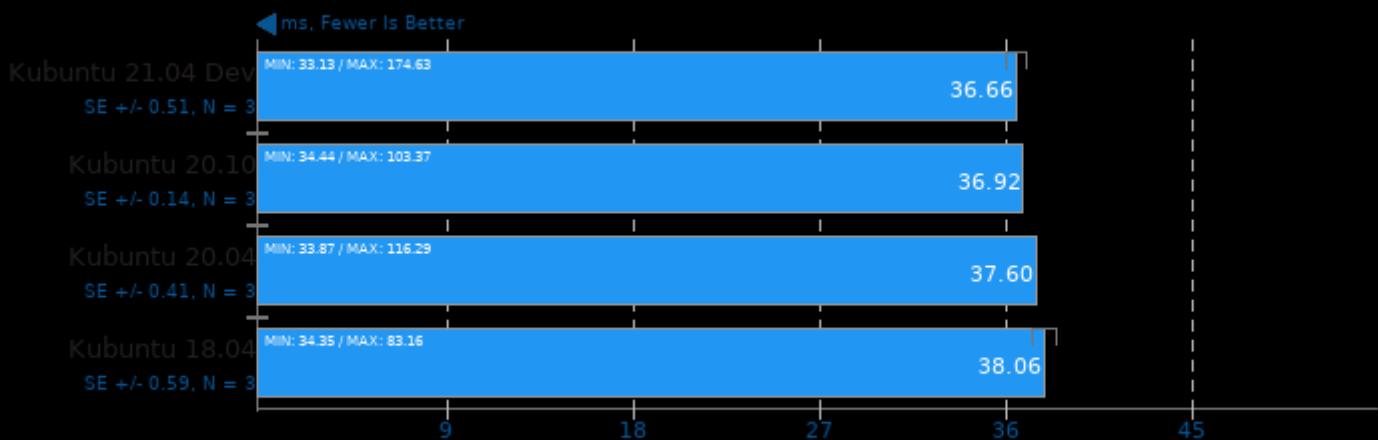
Target: Vulkan GPU - Model: squeezenet_ssd



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

NCNN 20201218

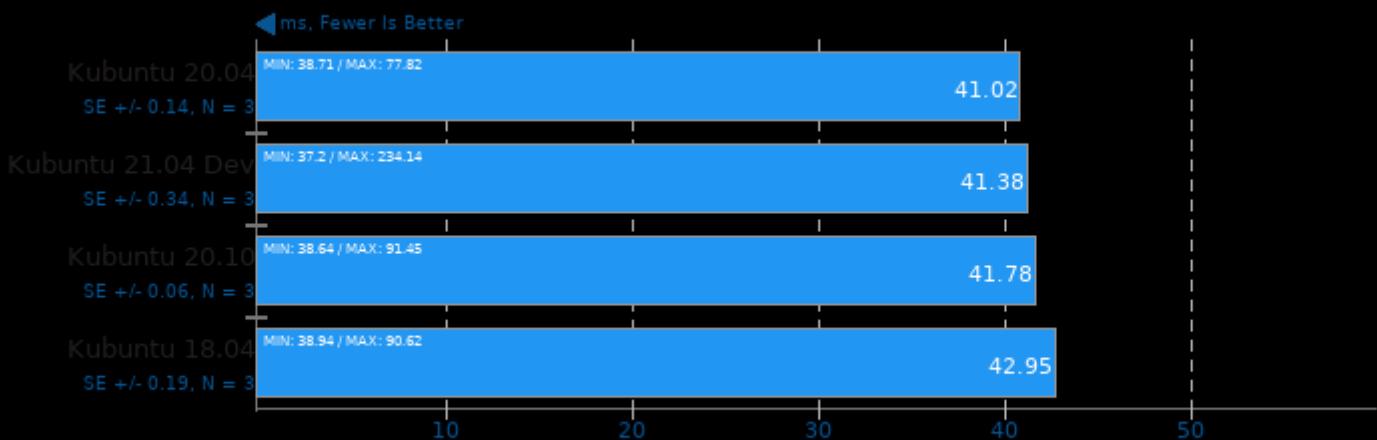
Target: Vulkan GPU - Model: yolov4-tiny



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

NCNN 20201218

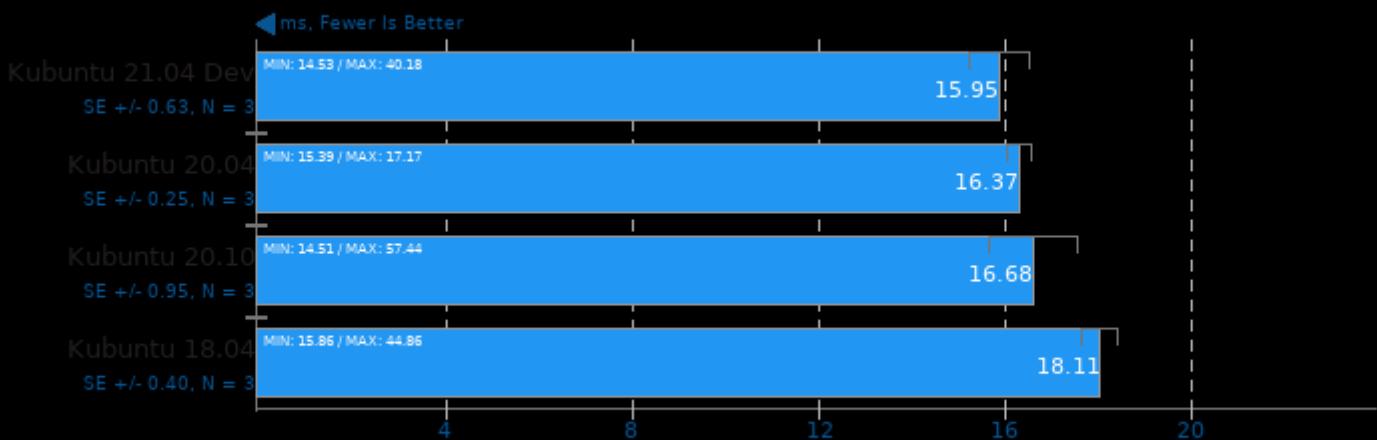
Target: Vulkan GPU - Model: resnet50



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

NCNN 20201218

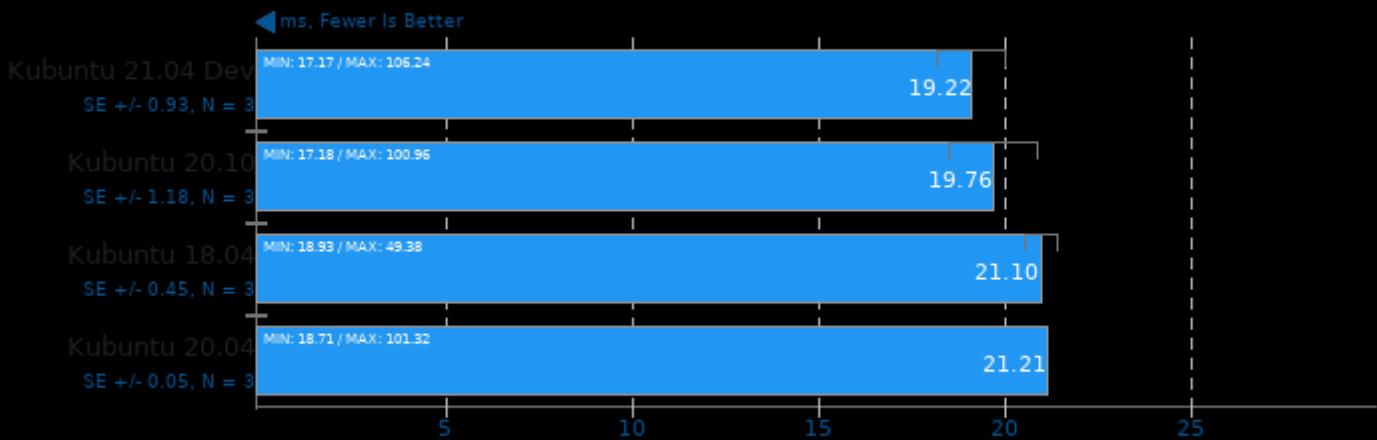
Target: Vulkan GPU - Model: alexnet



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

NCNN 20201218

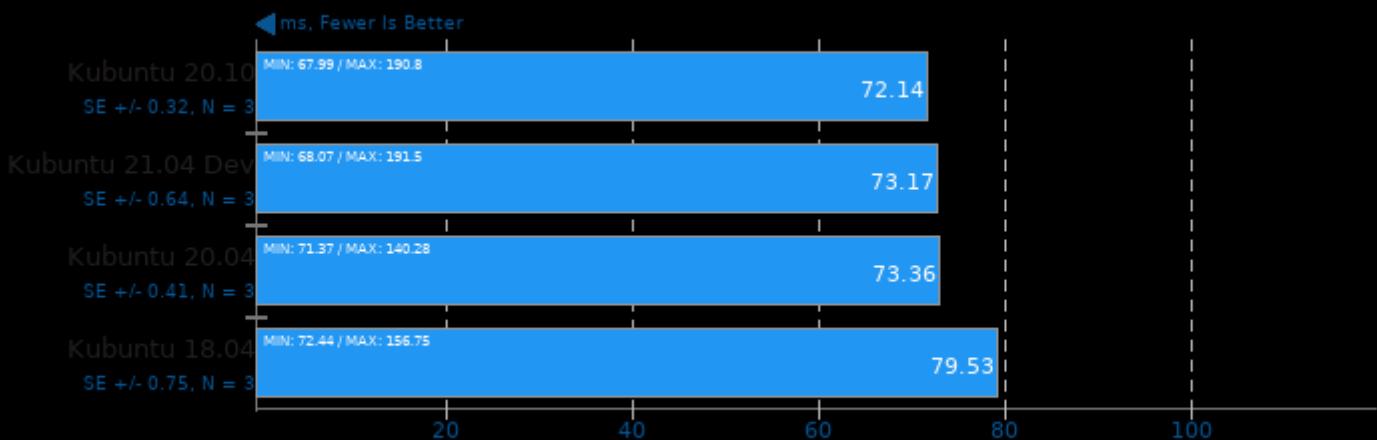
Target: Vulkan GPU - Model: resnet18



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

NCNN 20201218

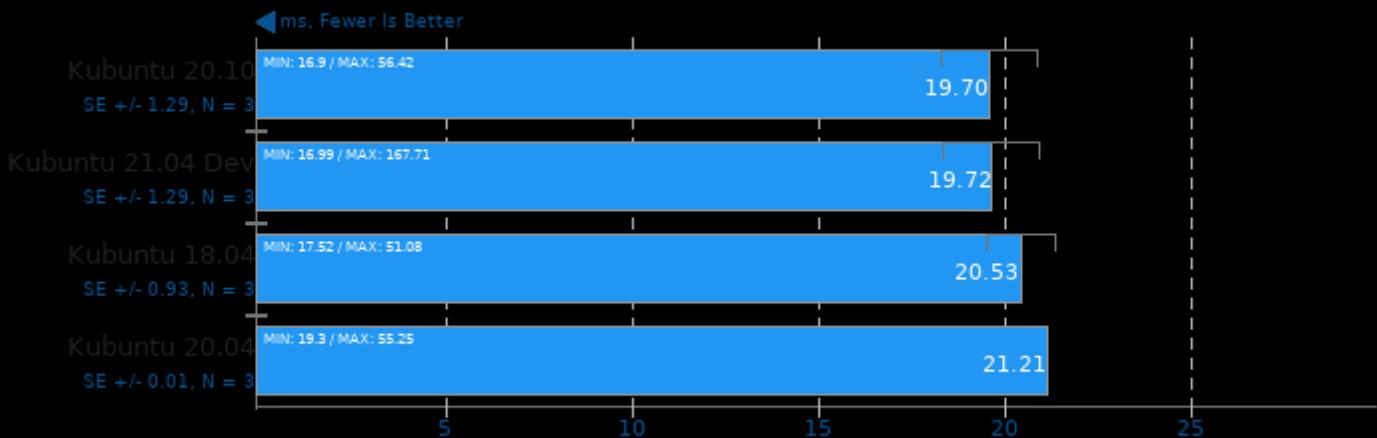
Target: Vulkan GPU - Model: vgg16



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

NCNN 20201218

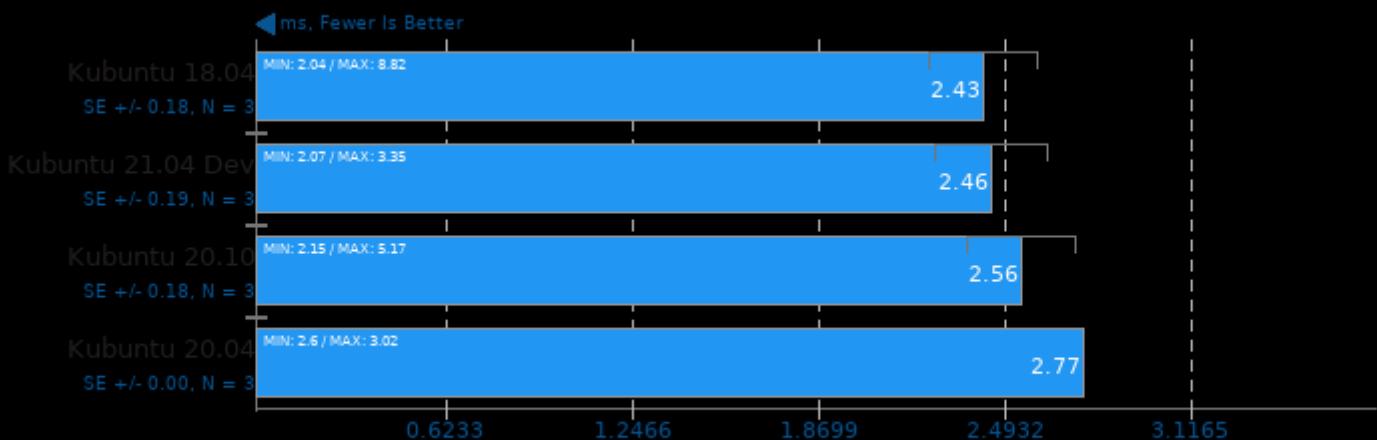
Target: Vulkan GPU - Model: googlenet



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

NCNN 20201218

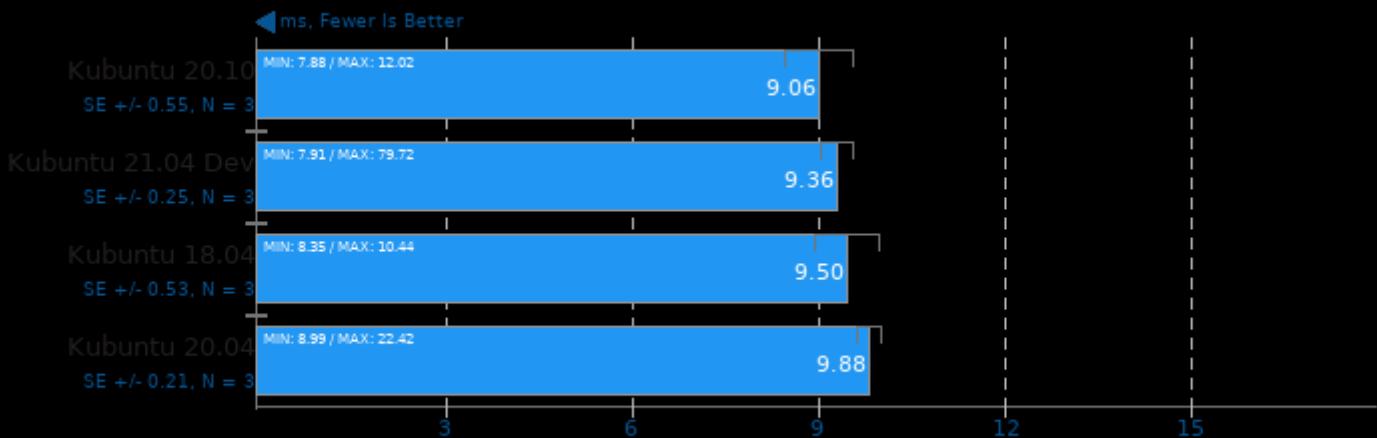
Target: Vulkan GPU - Model: blazeface



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

NCNN 20201218

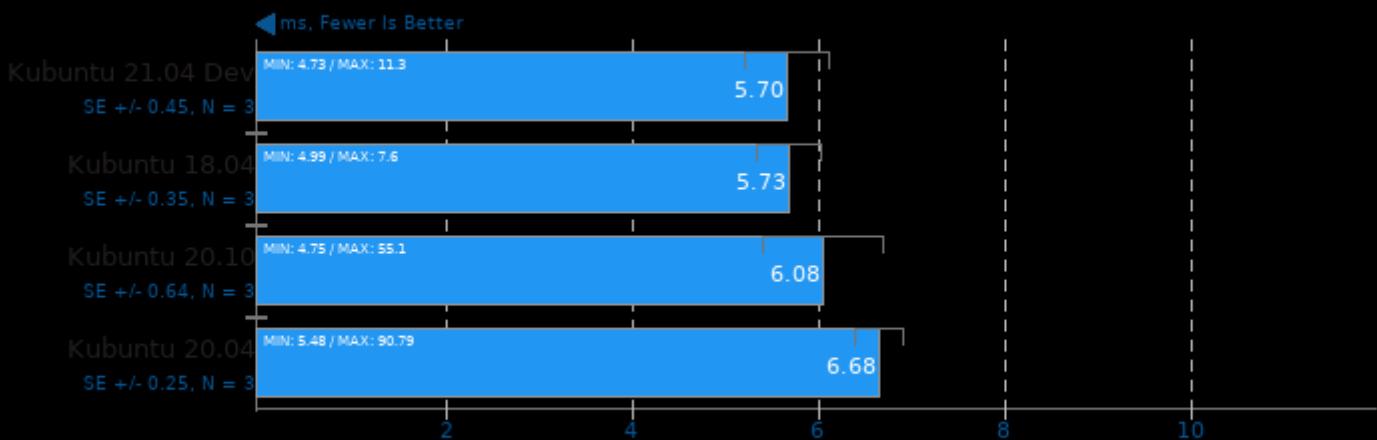
Target: Vulkan GPU - Model: efficientnet-b0



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

NCNN 20201218

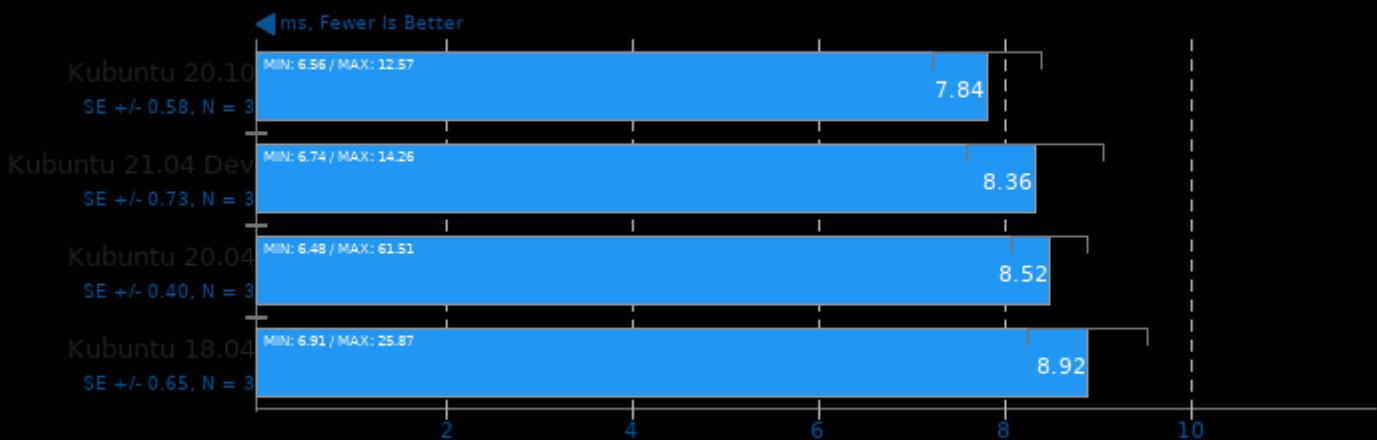
Target: Vulkan GPU - Model: mnasnet



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

NCNN 20201218

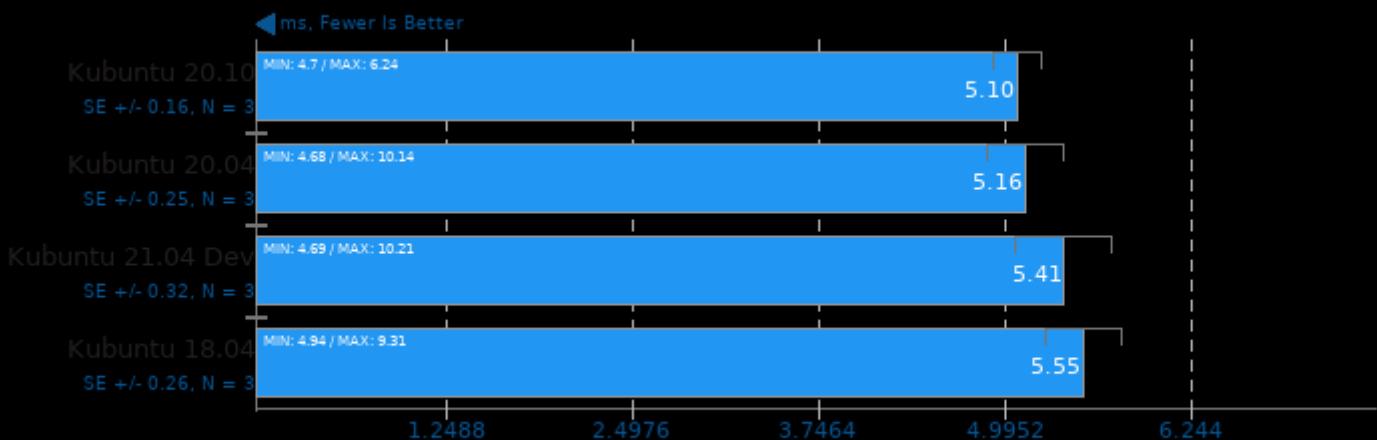
Target: Vulkan GPU - Model: shufflenet-v2



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

NCNN 20201218

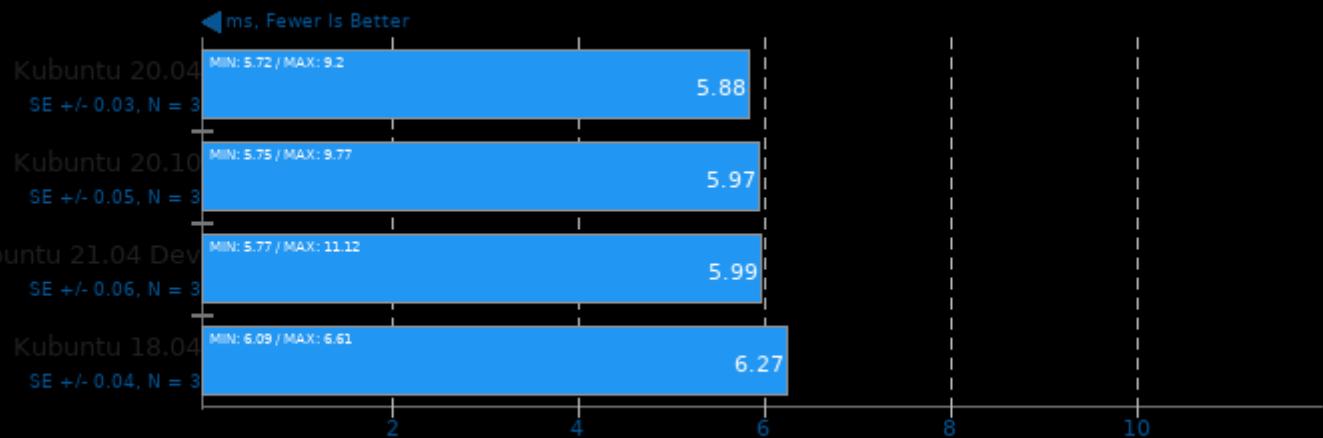
Target: Vulkan GPU-v3-v3 - Model: mobilenet-v3



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

NCNN 20201218

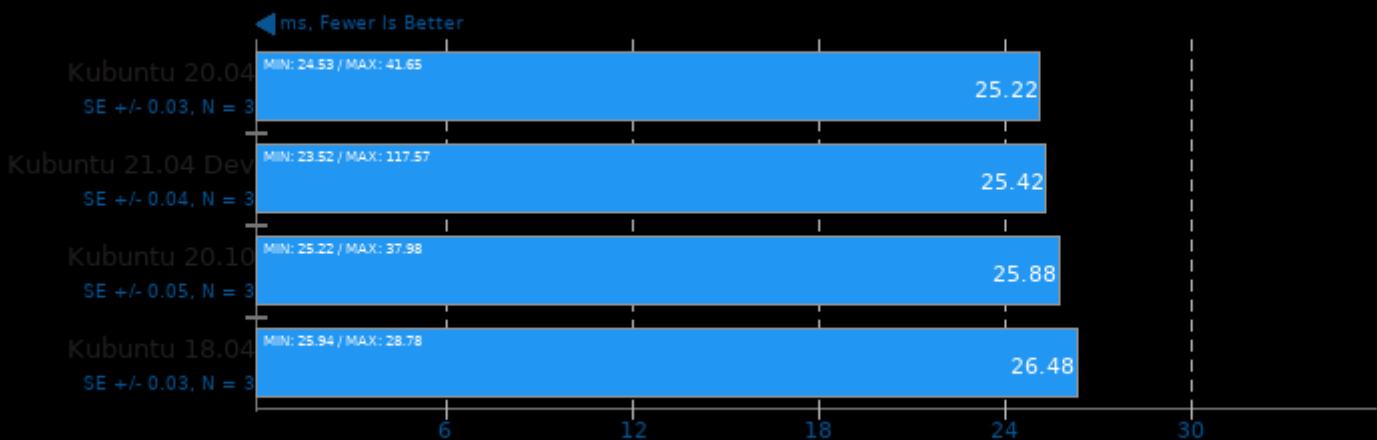
Target: Vulkan GPU-v2-v2 - Model: mobilenet-v2



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

NCNN 20201218

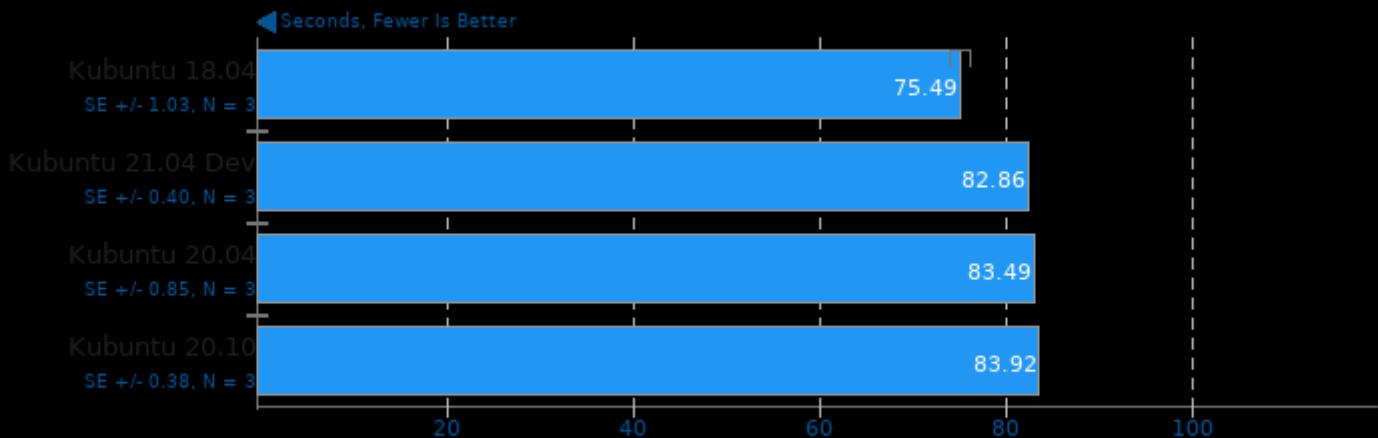
Target: Vulkan GPU - Model: mobilenet



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

RawTherapee

Total Benchmark Time



1. Kubuntu 18.04: RawTherapee, version 5.3, command line
An advanced, cross-platform program for developing raw photos.

Website: <http://www.rawtherapee.com/>

Documentation: <http://rawpedia.rawtherapee.com/>

Forum: <https://discuss.pixls.us/c/software/rawtherapee>

Code and bug reports: <https://github.com/Beep6581/RawTherapee>

Symbols:

<Chevrons> indicate parameters you can change.

[Square brackets] mean the parameter is optional.

The pipe symbol | indicates a choice of one or the other.

The dash symbol - denotes a range of possible values from one to the other.

Usage:

rawtherapee-cli -c <dir>|<files> Convert files in batch with default parameters.

rawtherapee-cli <other options> -c <dir>|<files> Convert files in batch with your own settings.

Options:

rawtherapee-cli[-o <output>]-O <output> [-q] [-a] [-s|-S] [-p <one.pp3> [-p <two.pp3> ...]] [-d] [-j[1-100]] [-js<1-3>] [-b<8|16>] [-t[z]] [-n]] [-Y]

-c <files> Specify one or more input files or directory.

When specifying directories, RawTherapee will look for images files that comply with the selected extensions (see also '-a').

-c must be the last option.

-o <file>|<dir> Set output file or folder.

Saves output.pkt file alongside input file if o is not specified.

2. Kubuntu 21.04 Dev, RawTherapee, version 5.3, command line

3. Kubuntu 20.04, RawTherapee, version 5.3, command line

4. Kubuntu 20.10, RawTherapee, version 5.3, command line

-q Quick-start mode. Does not load cached files to speedup start time.

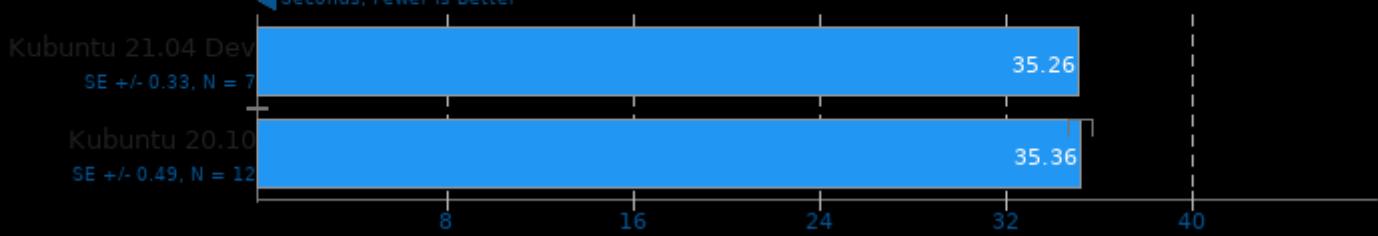
-a Process all supported image file types when specifying a folder, even those not currently selected in Preferences > File Browser > Parsed Extensions.

-s Use the existing sidecar file to build the processing parameters,

e.g. for photo.raw there should be a photo.raw.pp3 file in the same folder.

OCRMypdf 10.3.1+dfsg

Processing 60 Page PDF Document



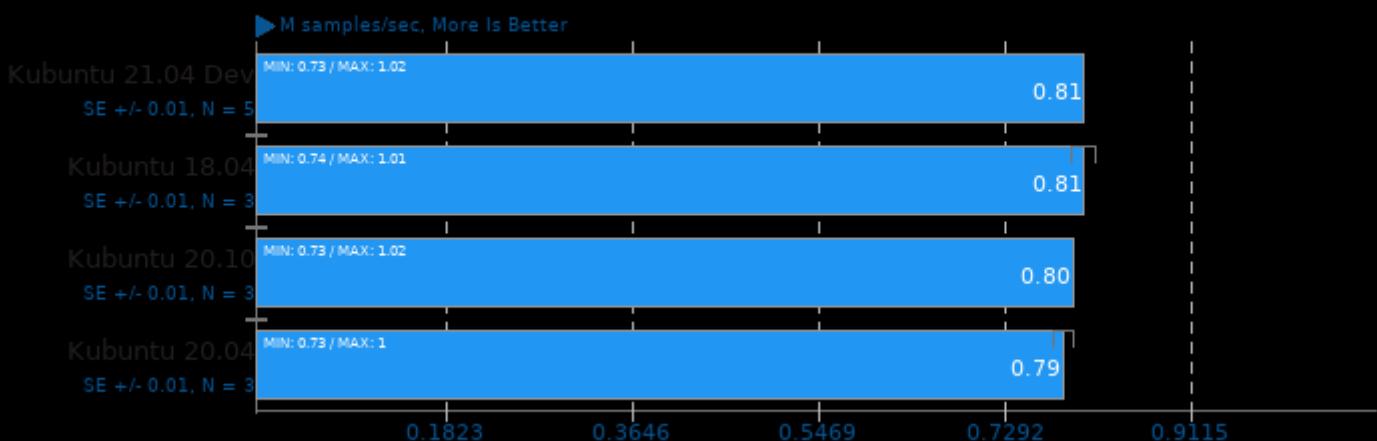
Darktable 2.4.2

Test: Boat - Acceleration: CPU-only



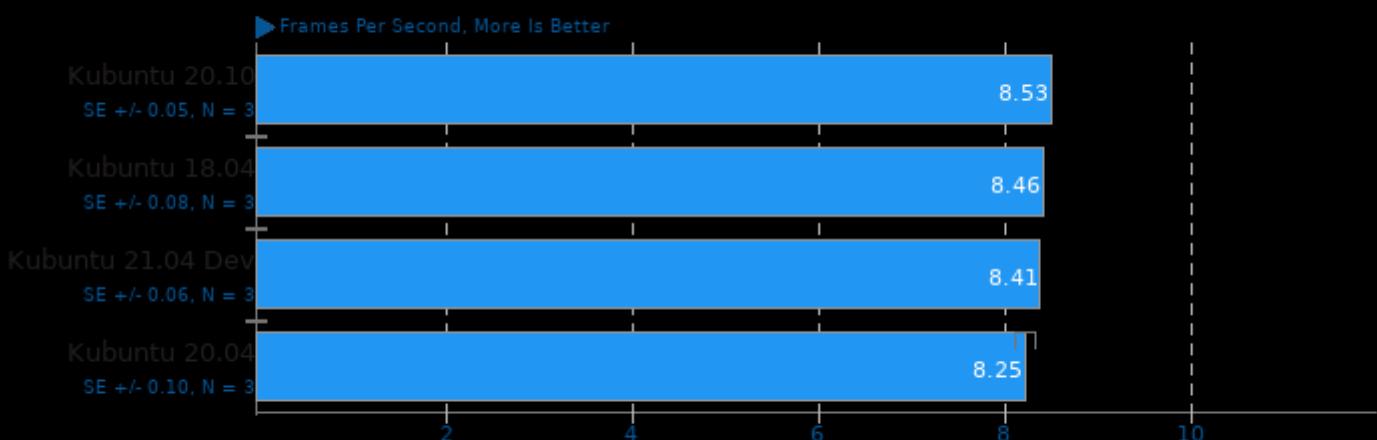
LuxCoreRender 2.3

Scene: DLSC



x265 3.4

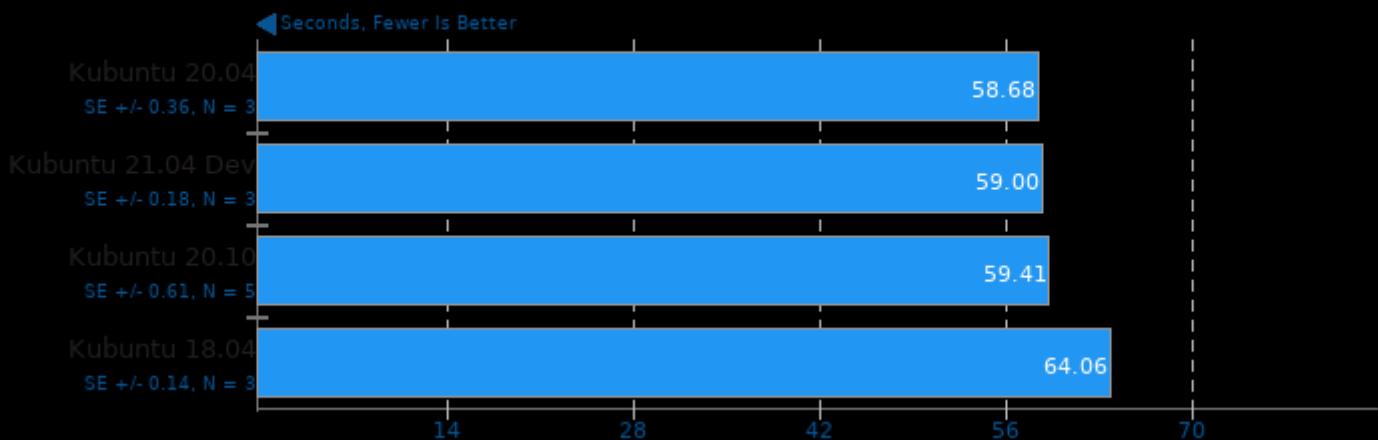
Video Input: Bosphorus 4K



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

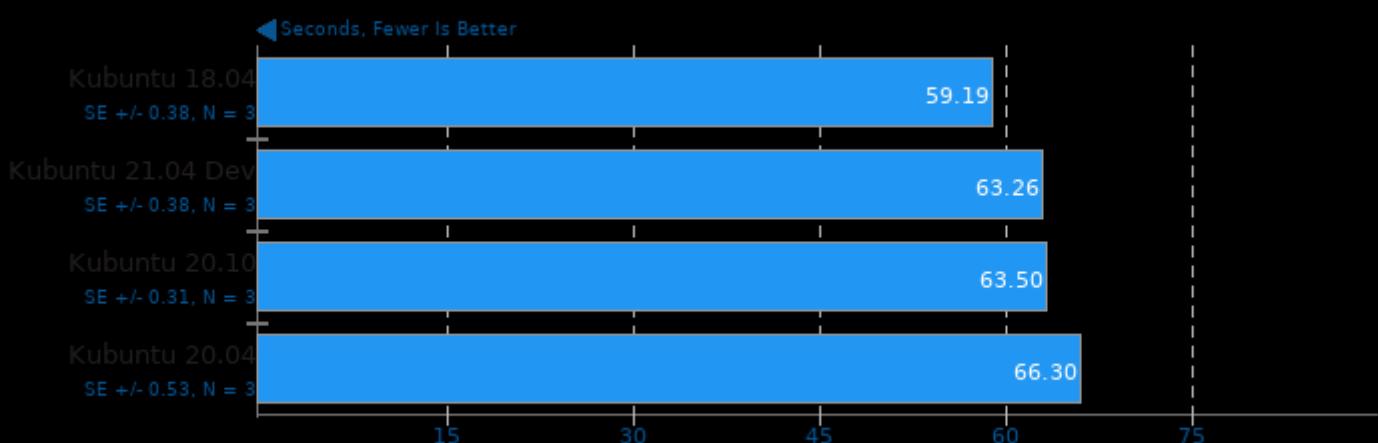
Hugin

Panorama Photo Assistant + Stitching Time



ASTC Encoder 2.0

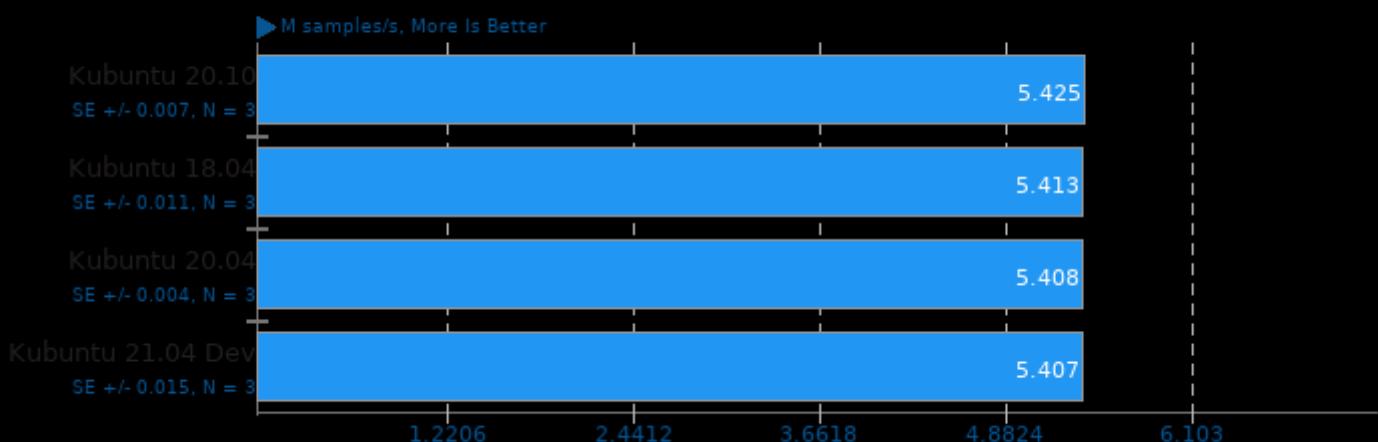
Preset: Thorough



1. (CXX) g++ options: -std=c++14 -fvisibility=hidden -O3 -fno-math-errno -mavx2 -mpopcnt -lpthread

IndigoBench 4.4

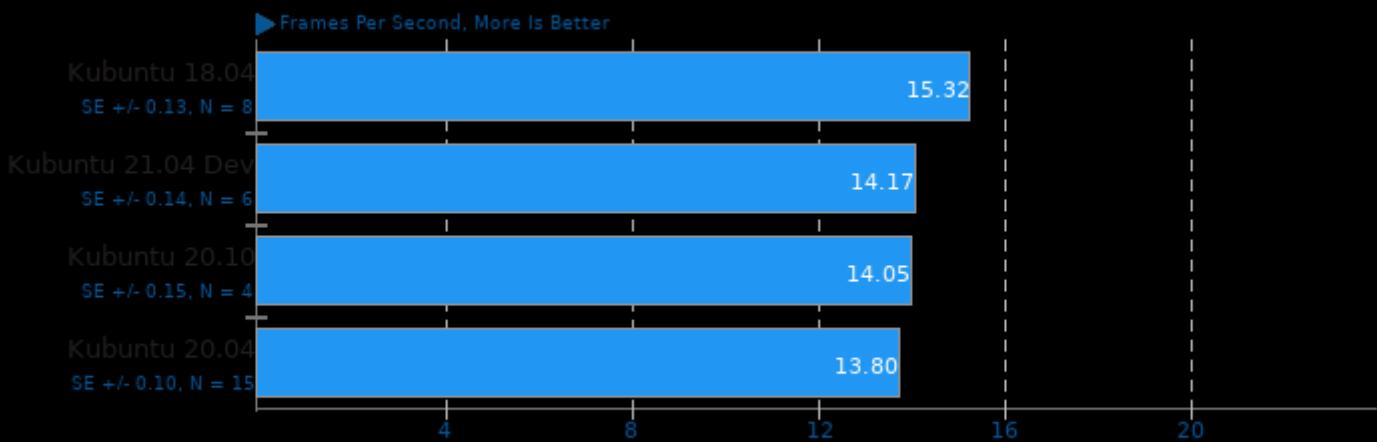
Acceleration: OpenCL GPU - Scene: Bedroom



Kubuntu Focus 18.04

SVT-AV1 0.8

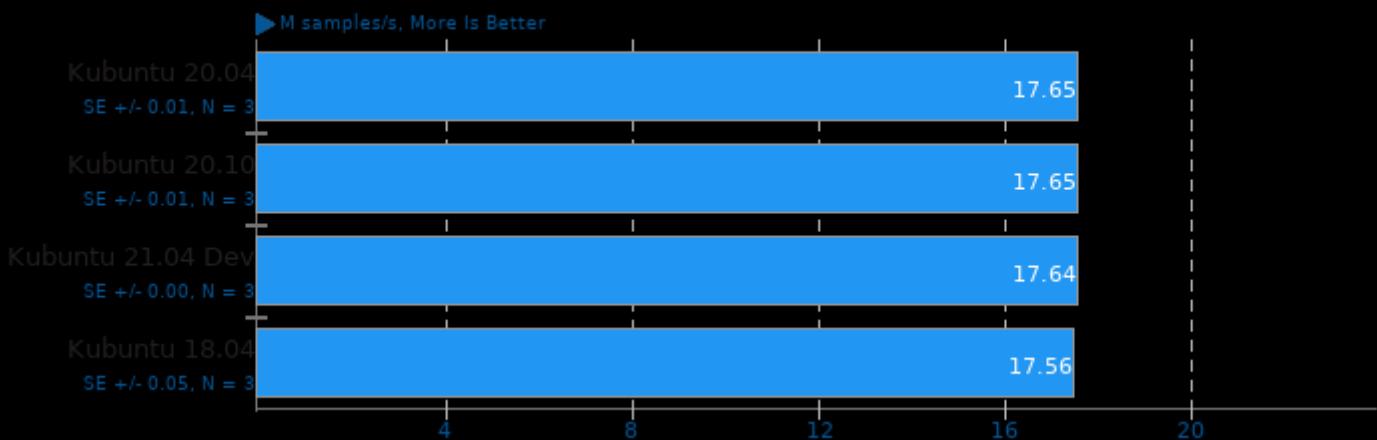
Encoder Mode: Enc Mode 8 - Input: 1080p



1. (CXX) g++ options: -O3 -fcommon -fPIE -fPIC -pie

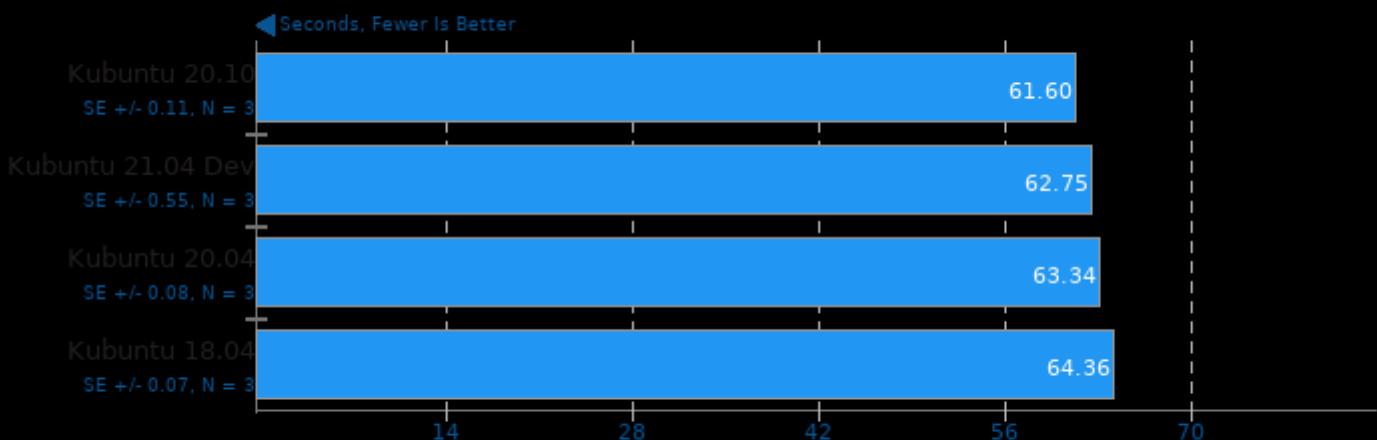
IndigoBench 4.4

Acceleration: OpenCL GPU - Scene: Supercar



SQLite Speedtest 3.30

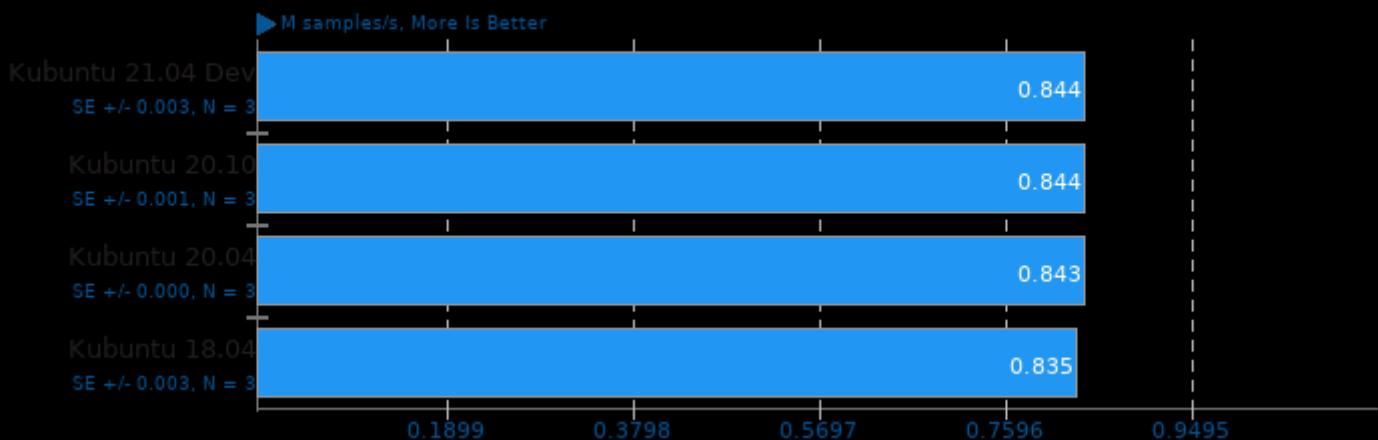
Timed Time - Size 1,000



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

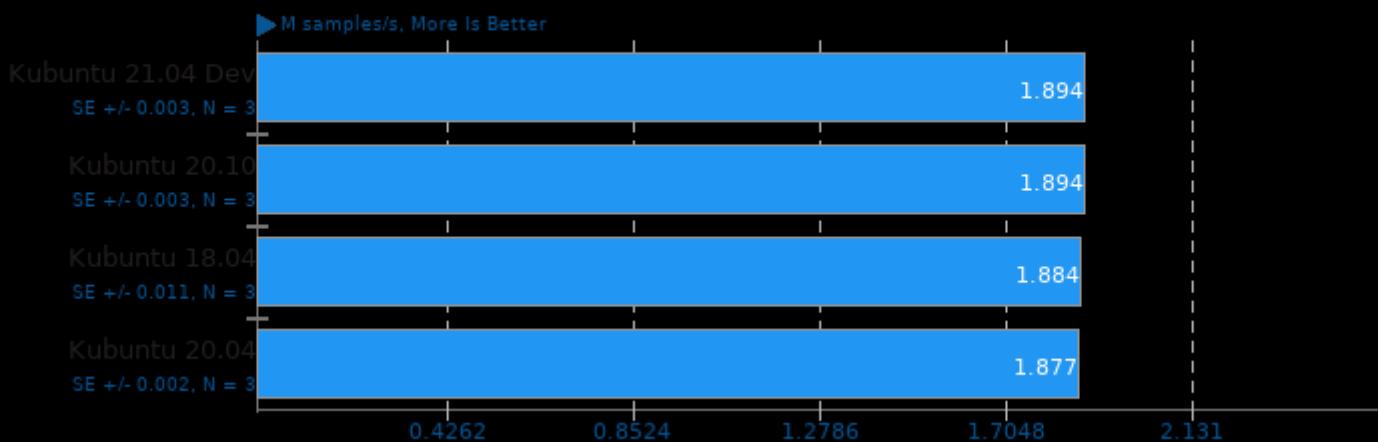
IndigoBench 4.4

Acceleration: CPU - Scene: Bedroom



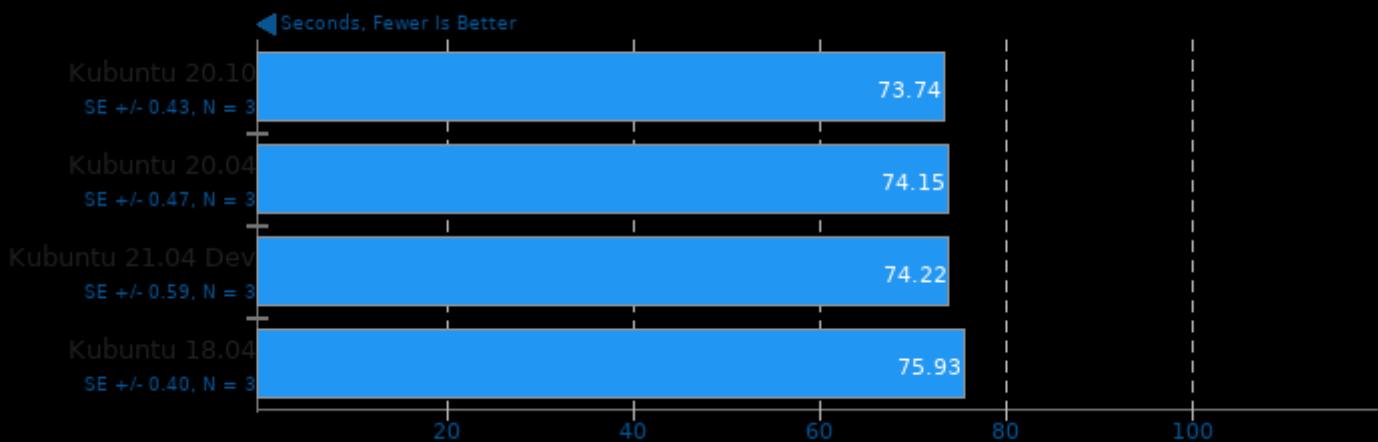
IndigoBench 4.4

Acceleration: CPU - Scene: Supercar



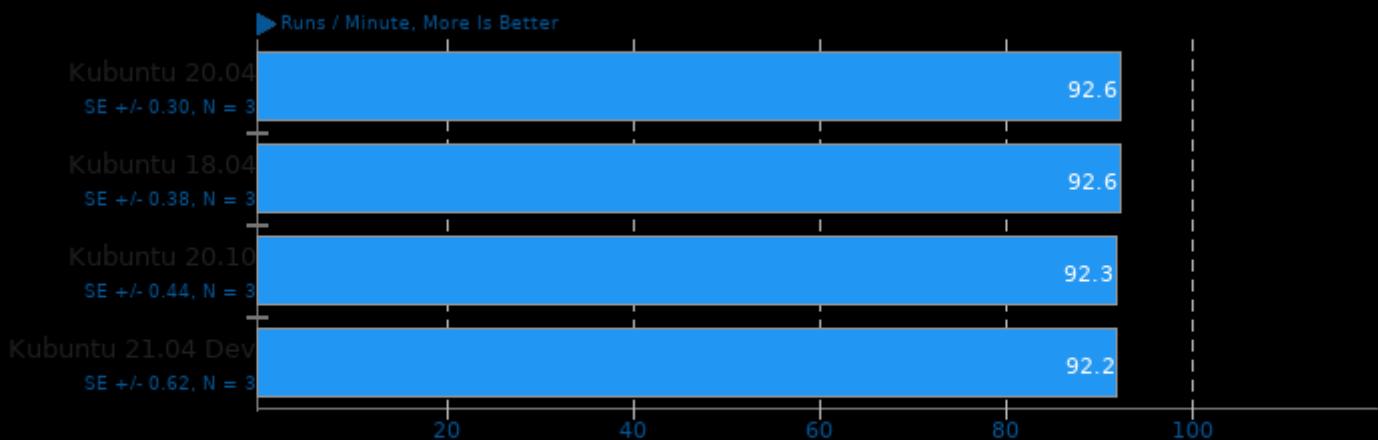
DeepSpeech 0.6

Acceleration: CPU



Selenium

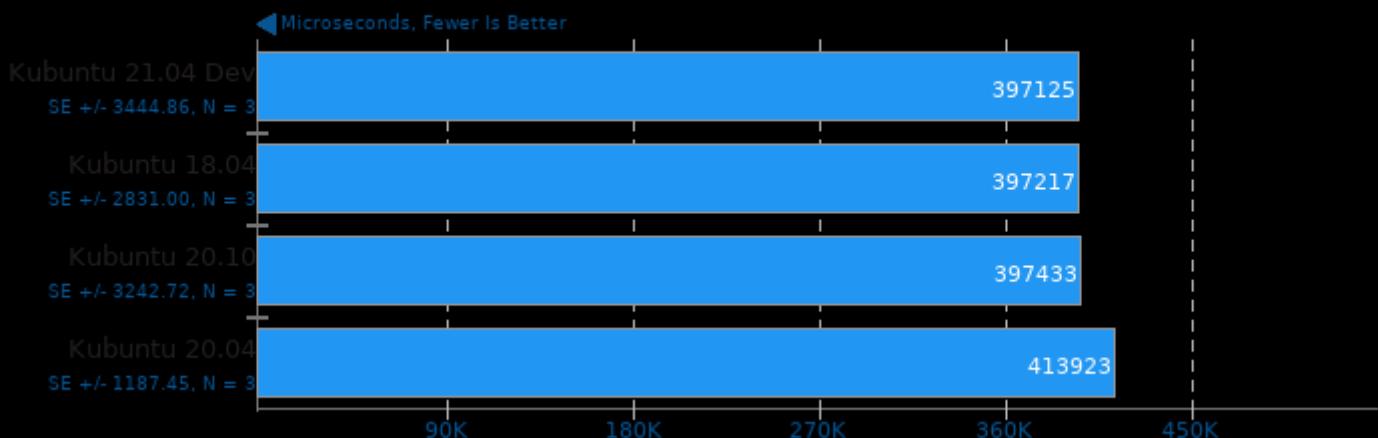
Benchmark: StyleBench - Browser: Firefox



1. Kubuntu 20.04; firefox 84.0.2
2. Kubuntu 18.04; firefox 84.0.2
3. Kubuntu 20.10; firefox 84.0.2
4. Kubuntu 21.04 Dev; firefox 85.0

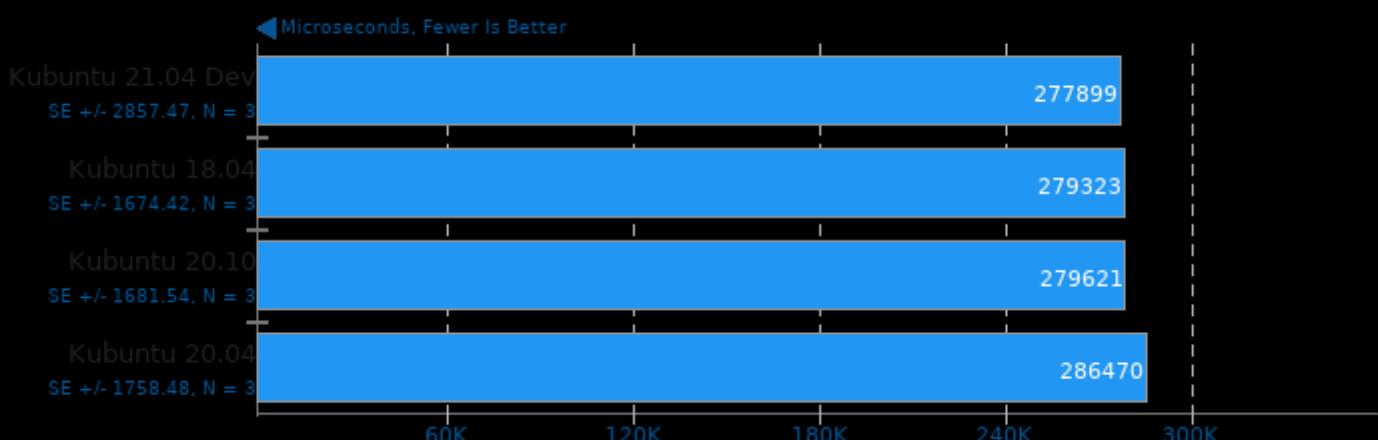
TensorFlow Lite 2020-08-23

Model: SqueezeNet



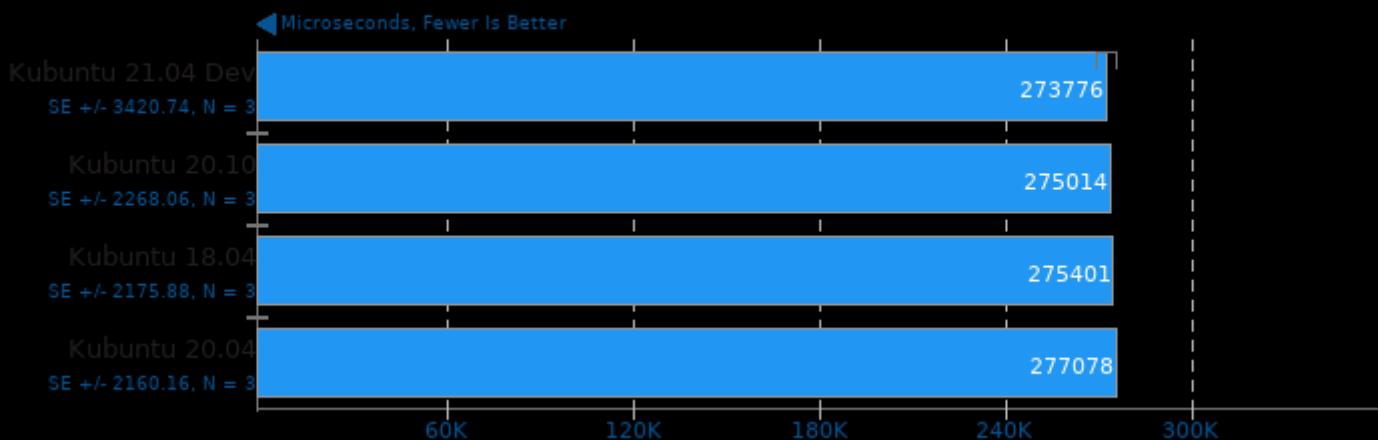
TensorFlow Lite 2020-08-23

Model: Mobilenet Quant



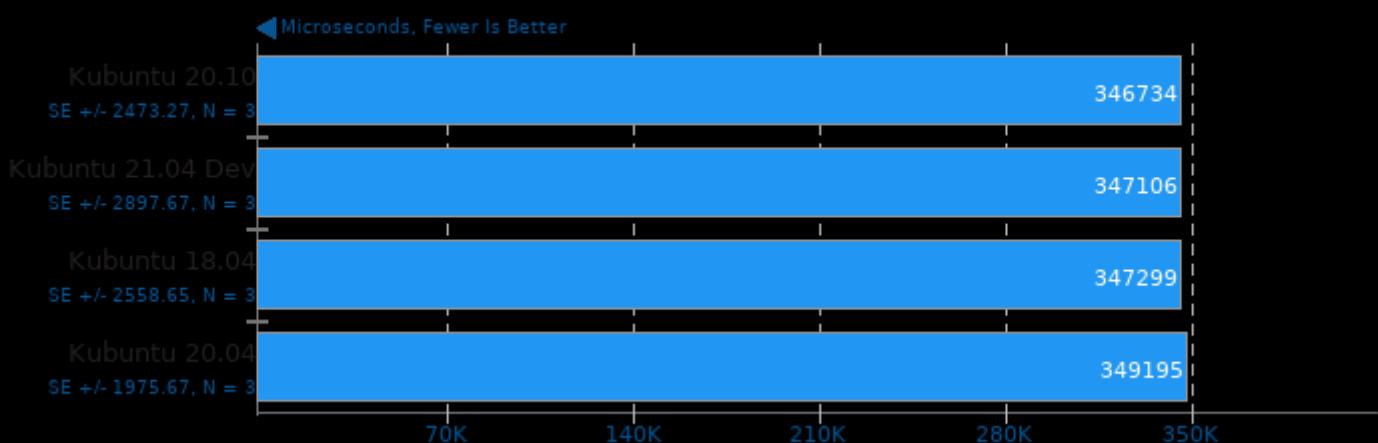
TensorFlow Lite 2020-08-23

Model: Mobilenet Float



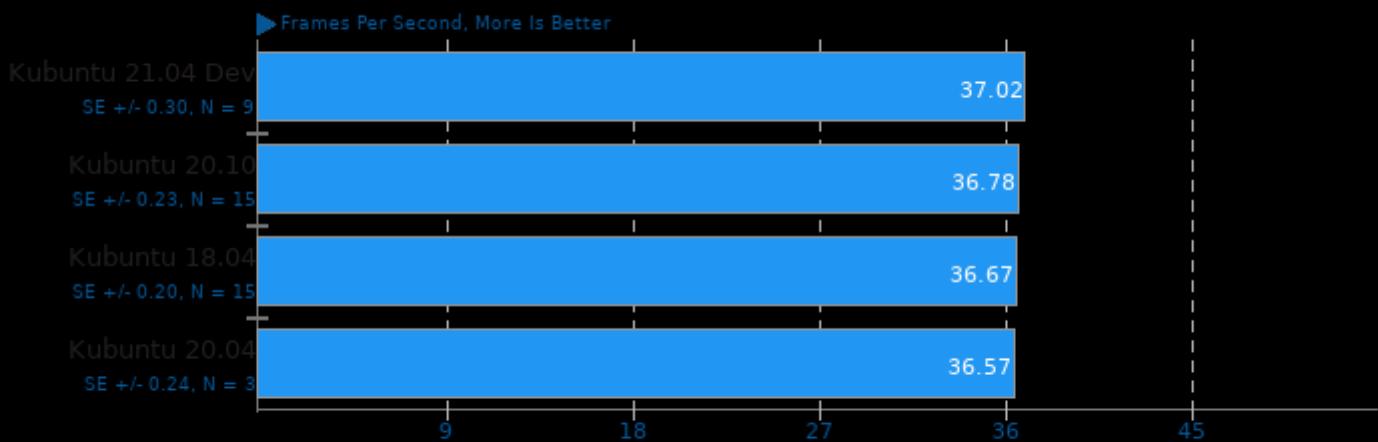
TensorFlow Lite 2020-08-23

Model: NASNet Mobile



x265 3.4

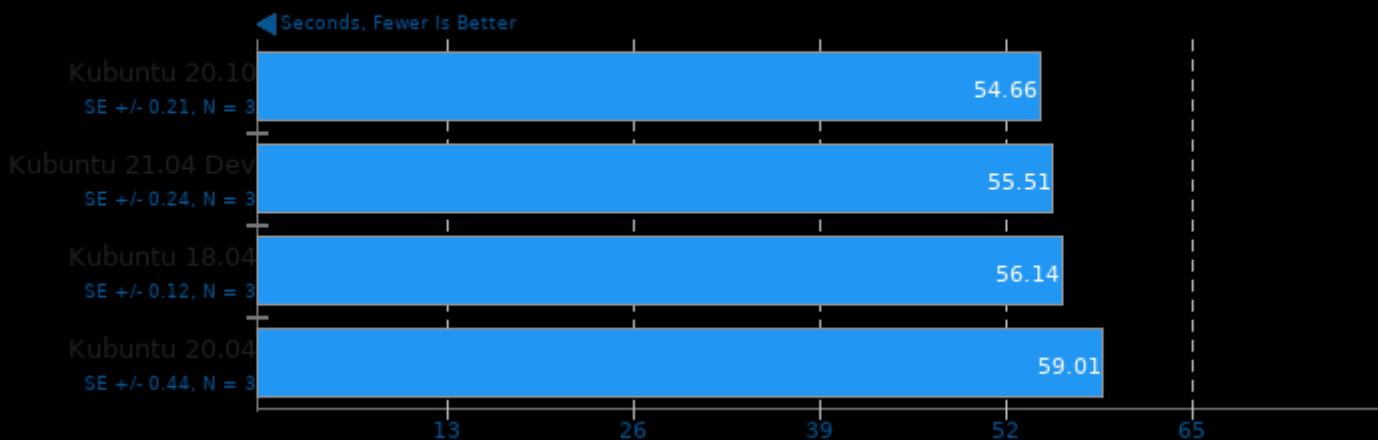
Video Input: Bosphorus 1080p



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

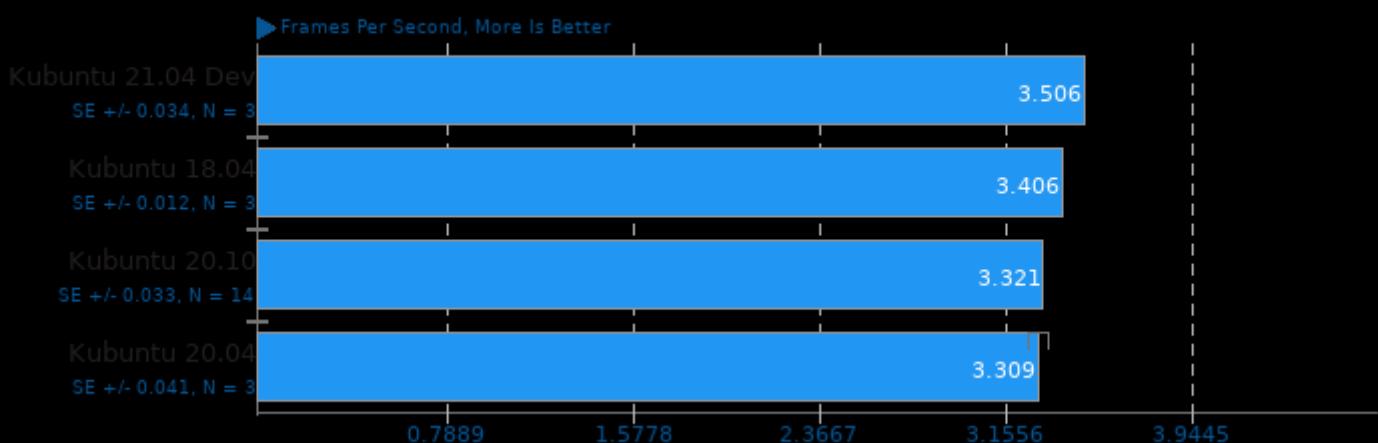
GEGL

Operation: Color Enhance



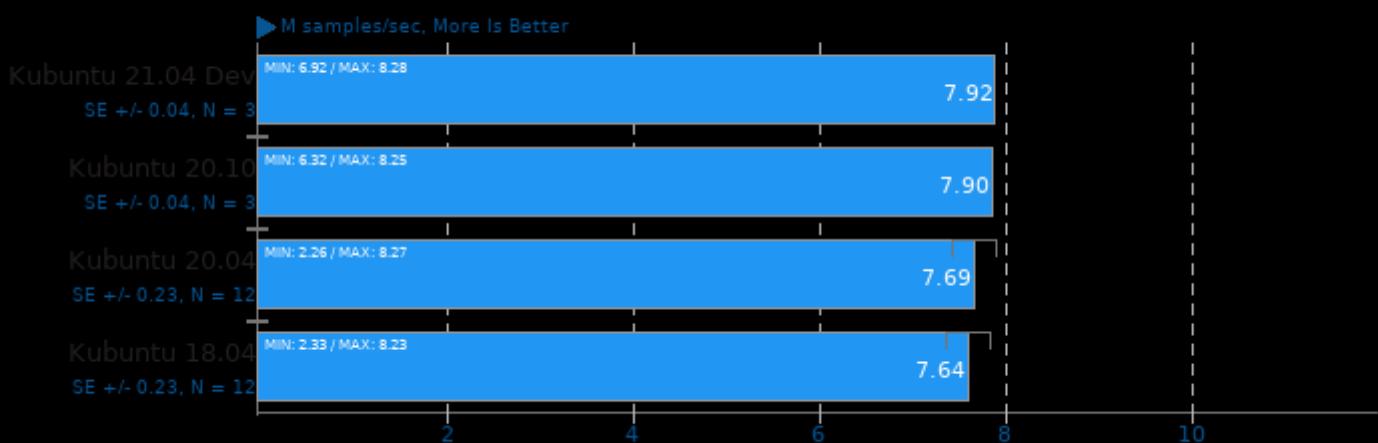
rav1e 0.4

Speed: 10



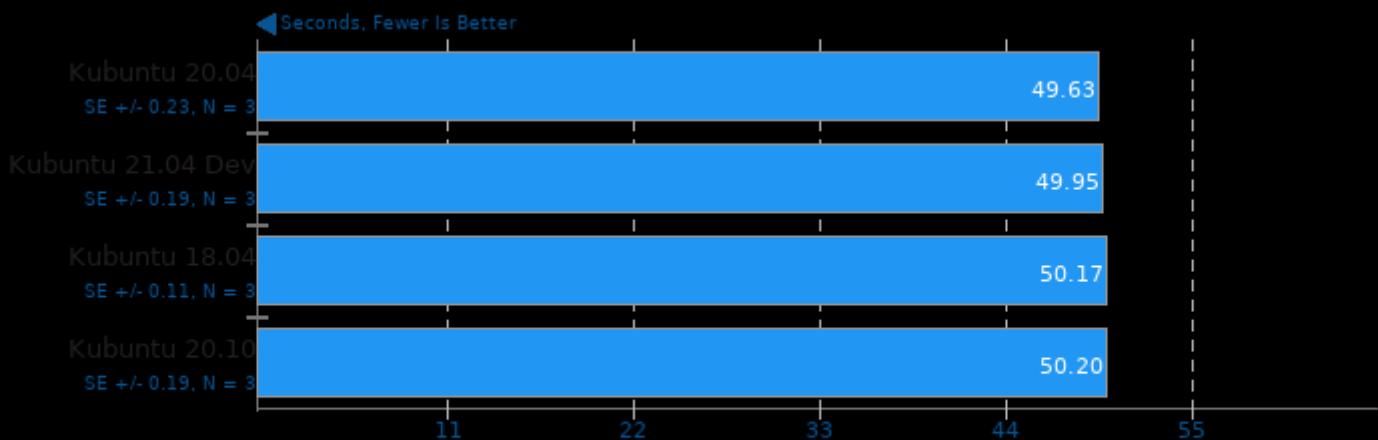
LuxCoreRender OpenCL 2.3

Scene: Rainbow Colors and Prism



Git

Time To Complete Common Git Commands



1. Kubuntu 20.04; git version 2.25.1

2. Kubuntu 21.04 Dev; git version 2.29.2

3. Kubuntu 18.04; git version 2.17.1

4. Kubuntu 20.10; git version 2.27.0

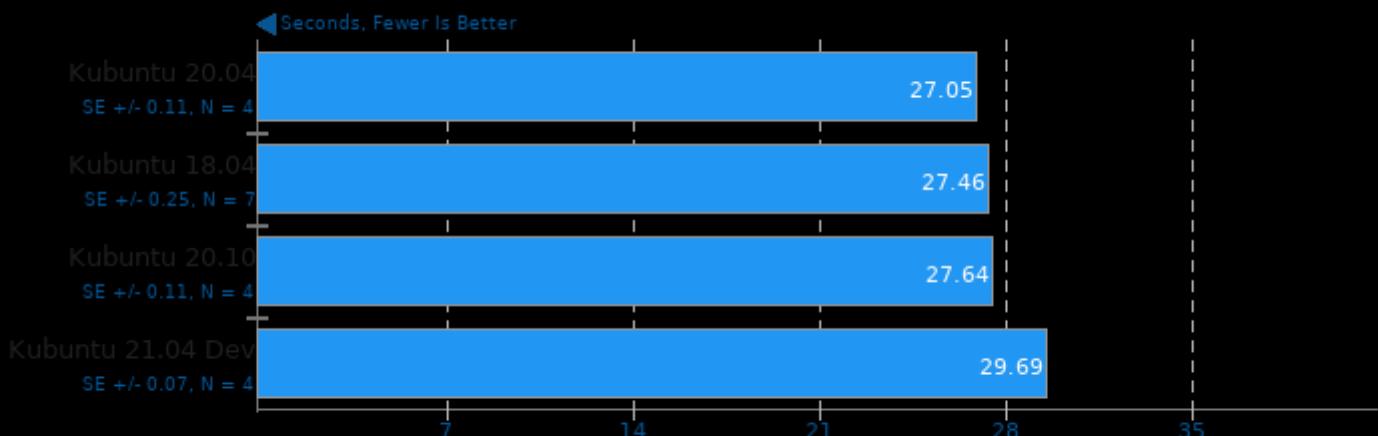
OCRMyPDF 9.6.0+dfsg

Processing 60 Page PDF Document



eSpeak-NG Speech Engine 20200907

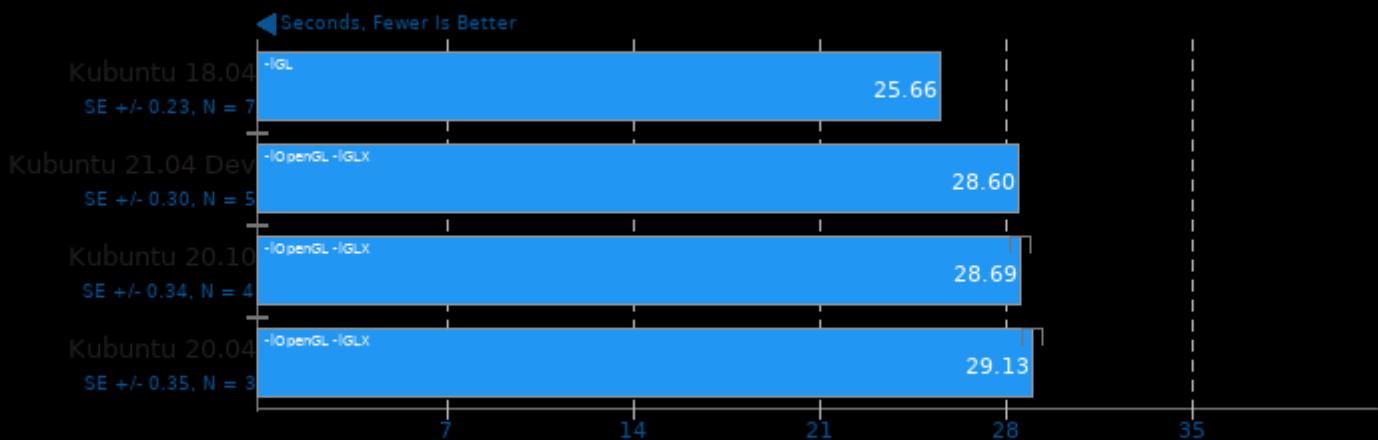
Text-To-Speech Synthesis



1. (CC) gcc options: -O2 -std=c99

WebP2 Image Encode 20210126

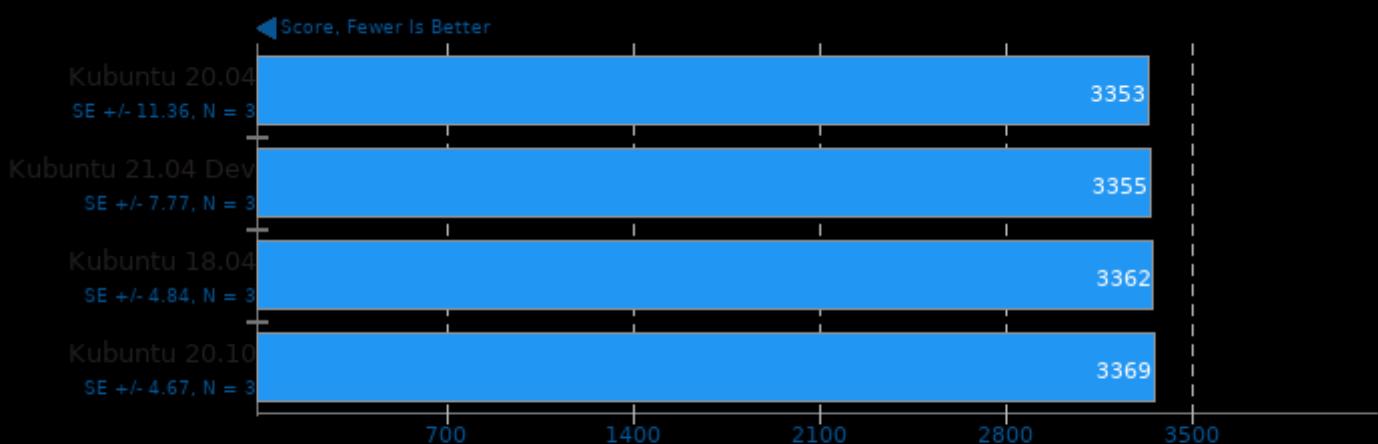
Encode Settings: Quality 100, Compression Effort 5



1. (CXX) g++ options: -msse4.2 -fno-rtti -O3 -rdynamic -IGLU -lglut -lXmu -Xi -lpthread -ljpeg

Selenium

Benchmark: PSPDFKit WASM - Browser: Firefox

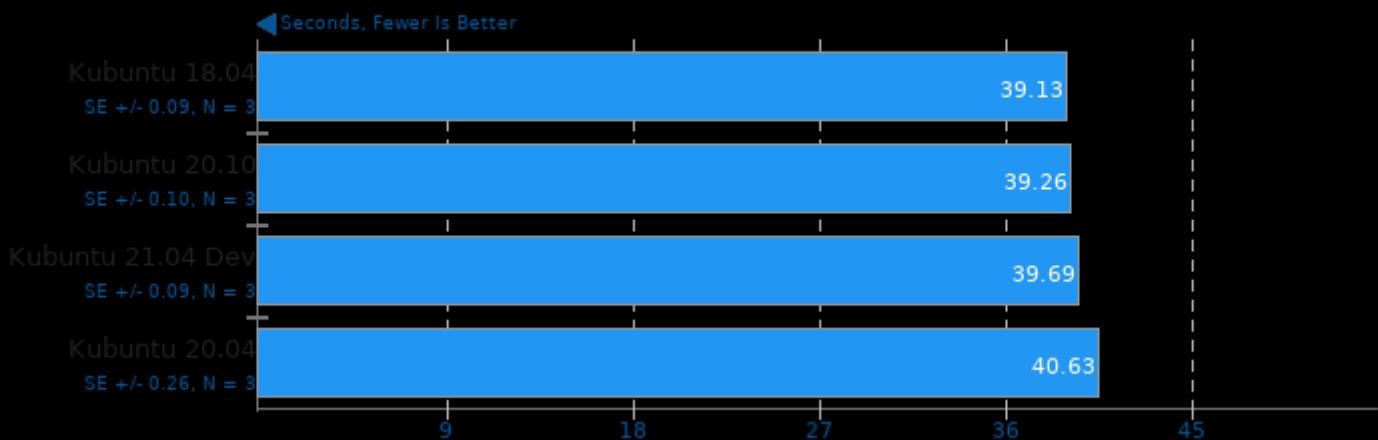


1. Kubuntu 20.04: firefox 84.0.2
 2. Kubuntu 21.04 Dev: firefox 85.0
 3. Kubuntu 18.04: firefox 84.0.2
 4. Kubuntu 20.10: firefox 84.0.2

Kubuntu Focus 18.04

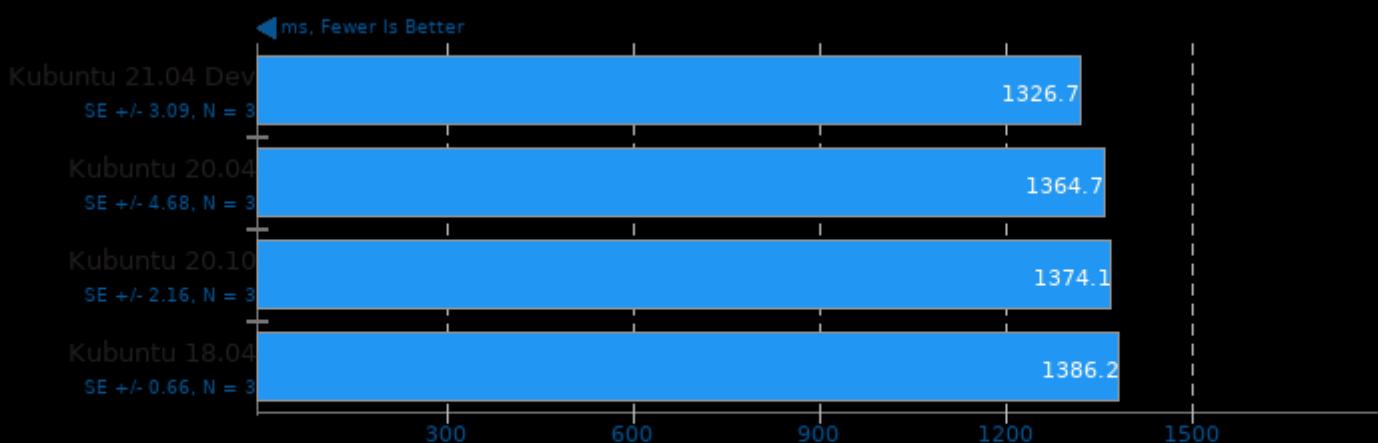
GEGL

Operation: Rotate 90 Degrees



Selenium

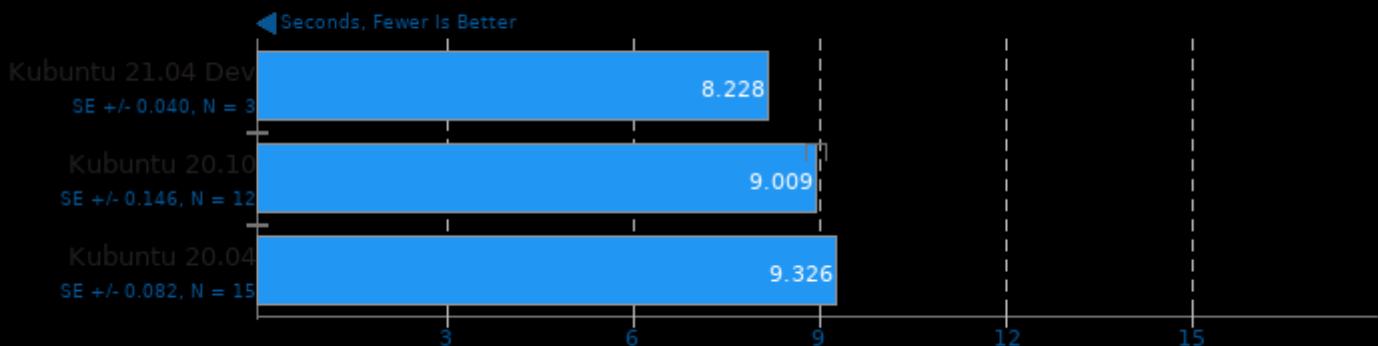
Benchmark: Kraken - Browser: Firefox



1. Kubuntu 21.04 Dev: firefox 85.0
2. Kubuntu 20.04: firefox 84.0.2
3. Kubuntu 20.10: firefox 84.0.2
4. Kubuntu 18.04: firefox 84.0.2

Darktable 3.4.0

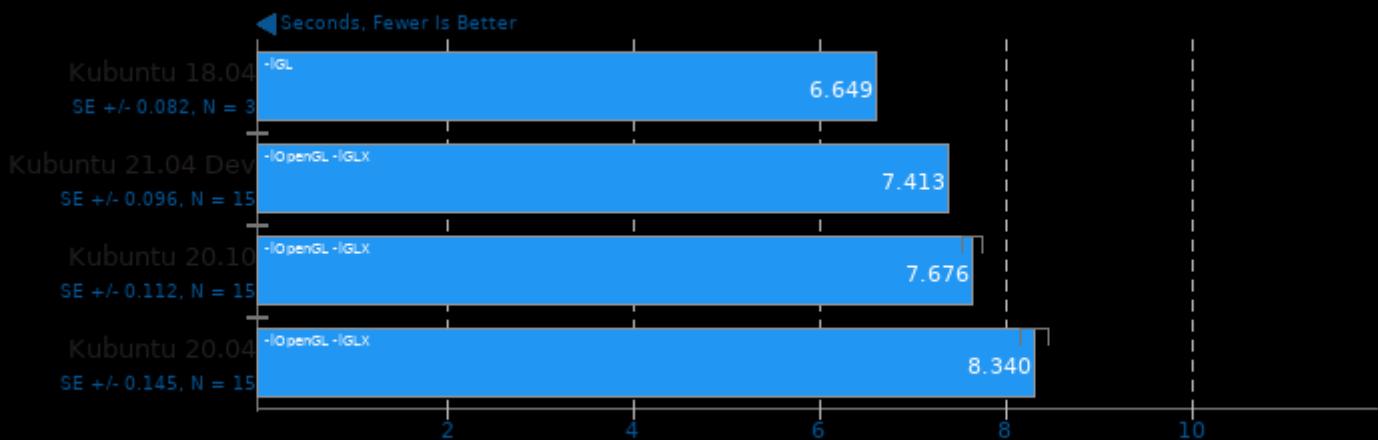
Test: Boat - Acceleration: CPU-only



Kubuntu Focus 18.04

WebP2 Image Encode 20210126

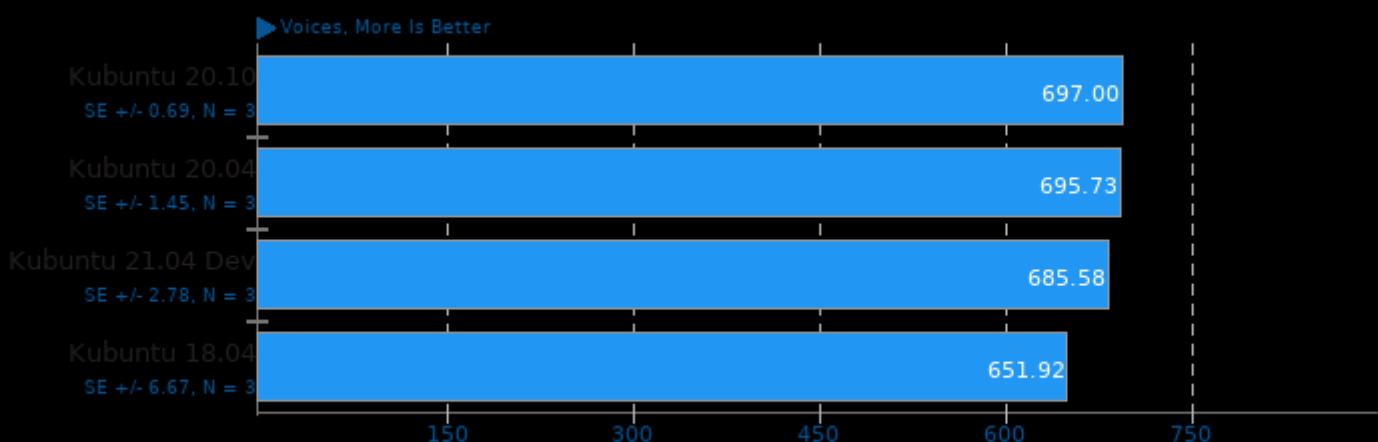
Encode Settings: Default



1. (CXX) g++ options: -msse4.2 -fno-rtti -O3 -rdynamic -lGLU -lglut -lXmu -Xi -lpthread -ljpeg

Google SynthMark 20201109

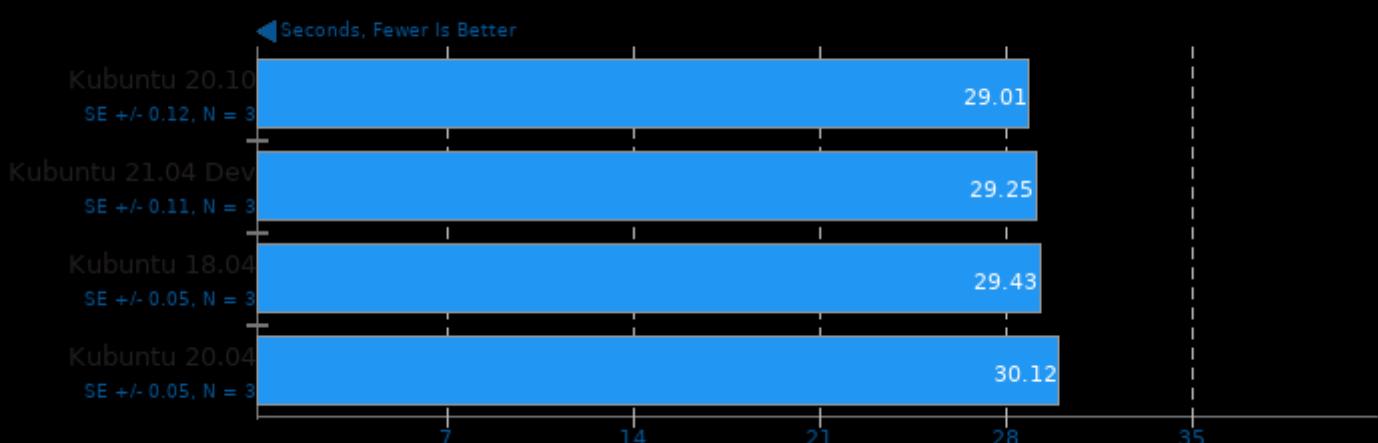
Test: VoiceMark_100



1. (CXX) g++ options: -lm -lpthread -std=c++11 -Ofast

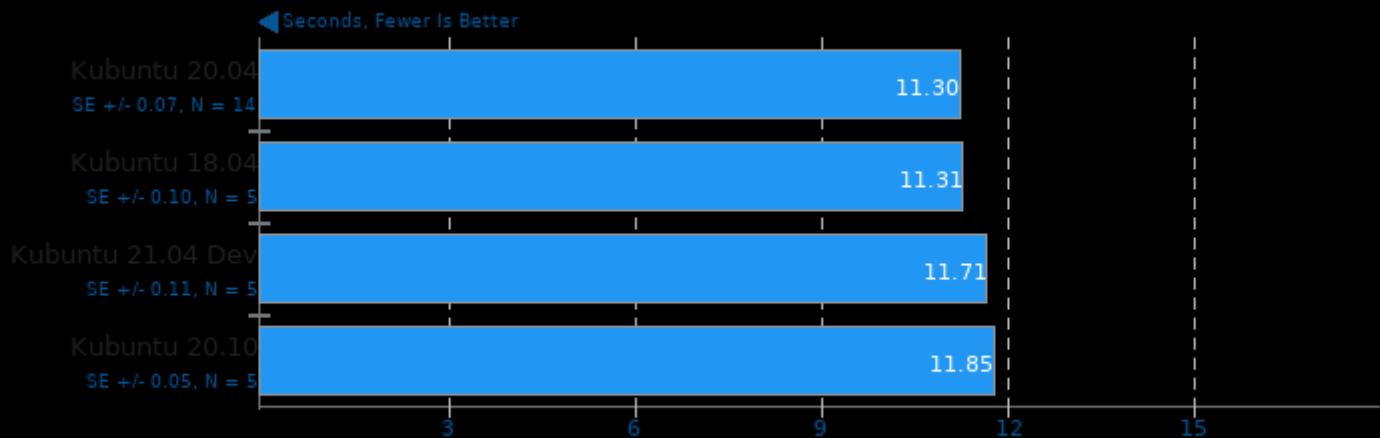
GEGL

Operation: Reflect



Monkey Audio Encoding 3.99.6

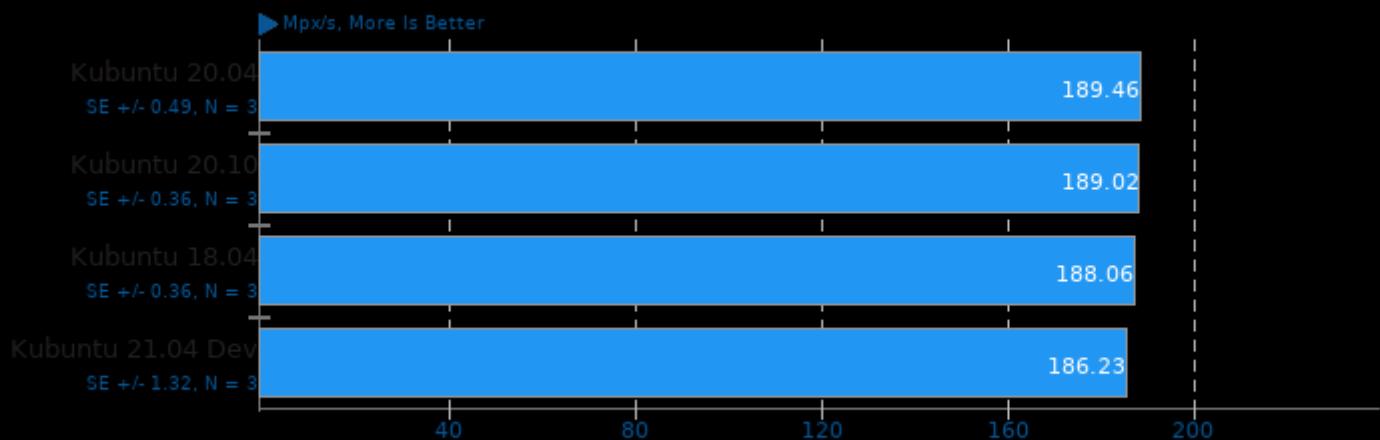
WAV To APE



1. (CXX) g++ options: -O3 -pedantic -rdynamic -lrt

EtcPak 0.7

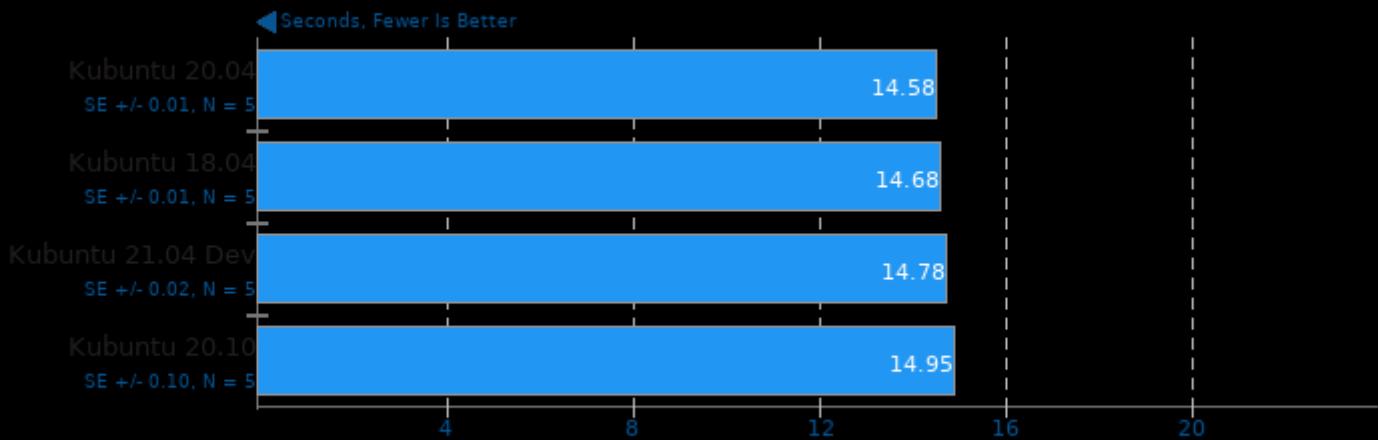
Configuration: ETC2



1. (CXX) g++ options: -O3 -march=native -std=c++11 -lpthread

WavPack Audio Encoding 5.3

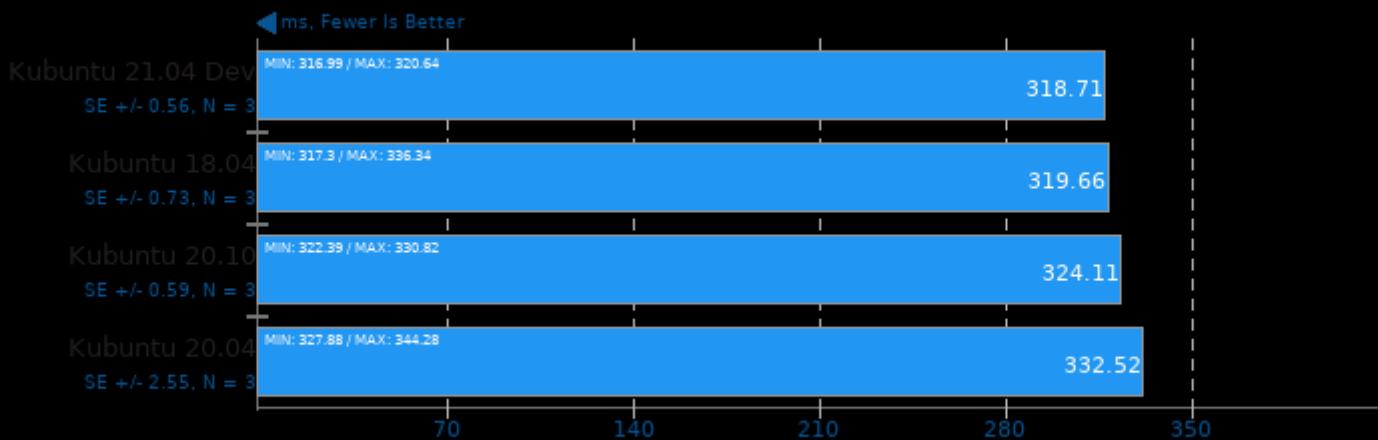
WAV To WavPack



1. (CXX) g++ options: -rdynamic

TNN 0.2.3

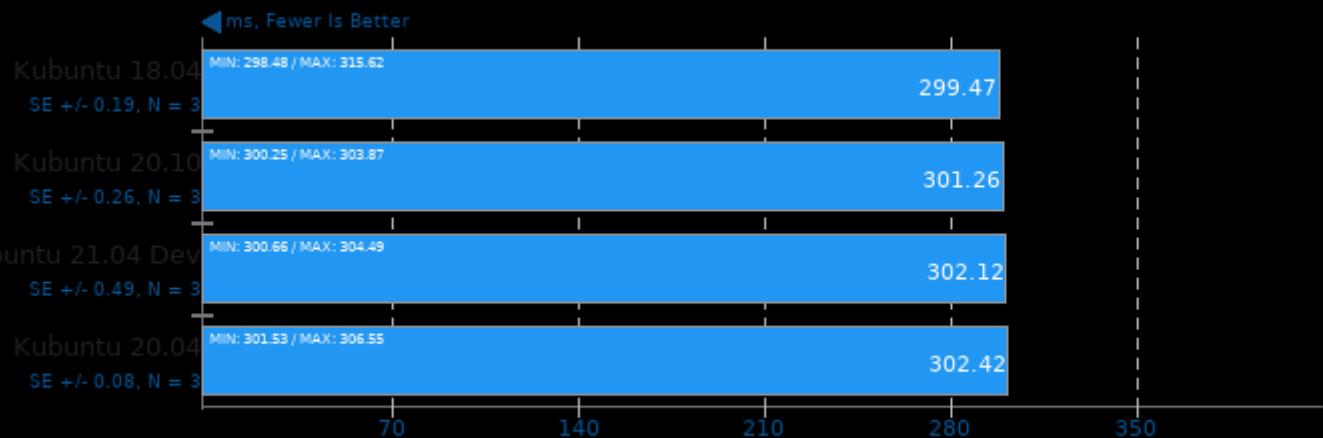
Target: CPU - Model: MobileNet v2



1. (CXX) g++ options: -fopenmp -pthread -fvisibility=hidden -O3 -rdynamic -ldl

TNN 0.2.3

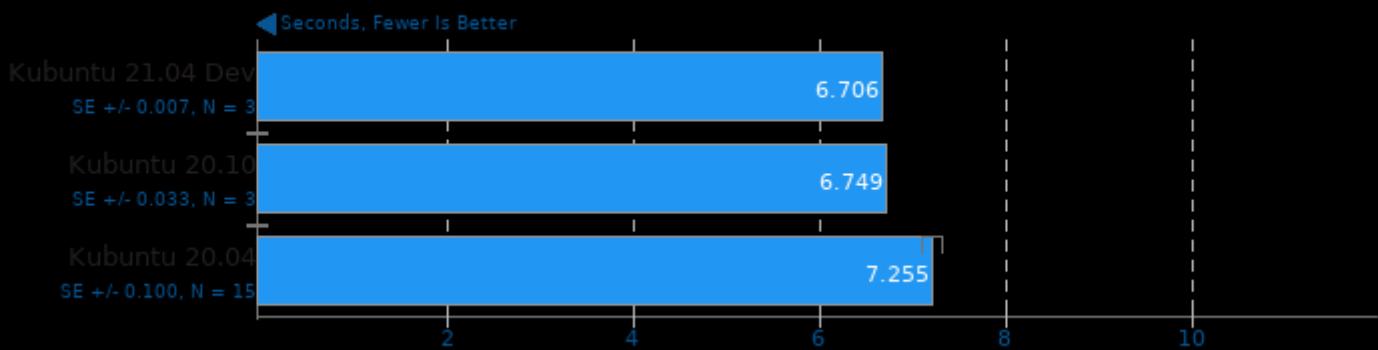
Target: CPU - Model: SqueezeNet v1.1



1. (CXX) g++ options: -fopenmp -pthread -fvisibility=hidden -O3 -rdynamic -ldl

Darktable 3.4.0

Test: Masskrug - Acceleration: CPU-only



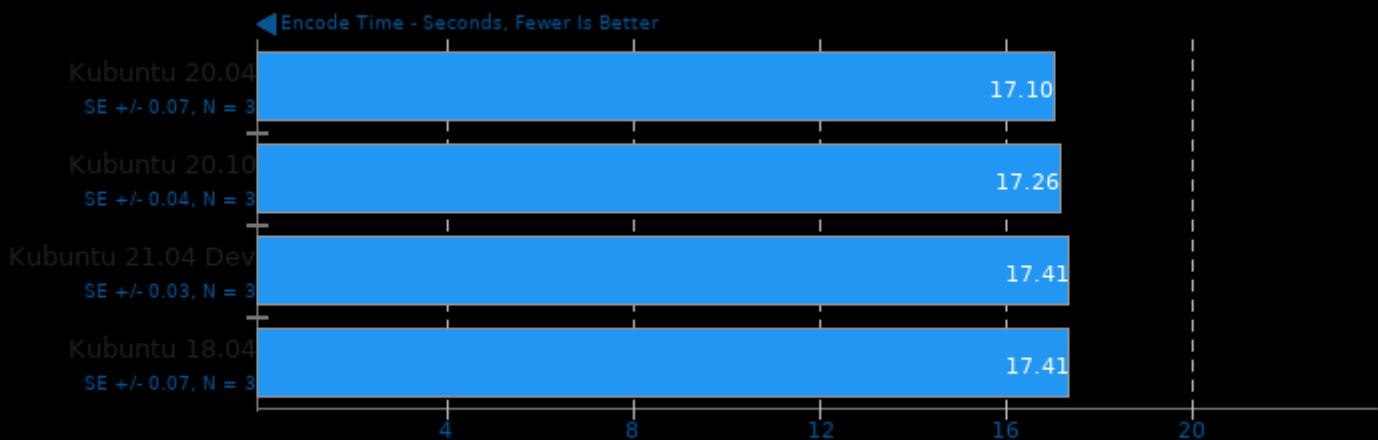
GIMP 2.10.14

Test: unsharp-mask



WebP Image Encode 1.1

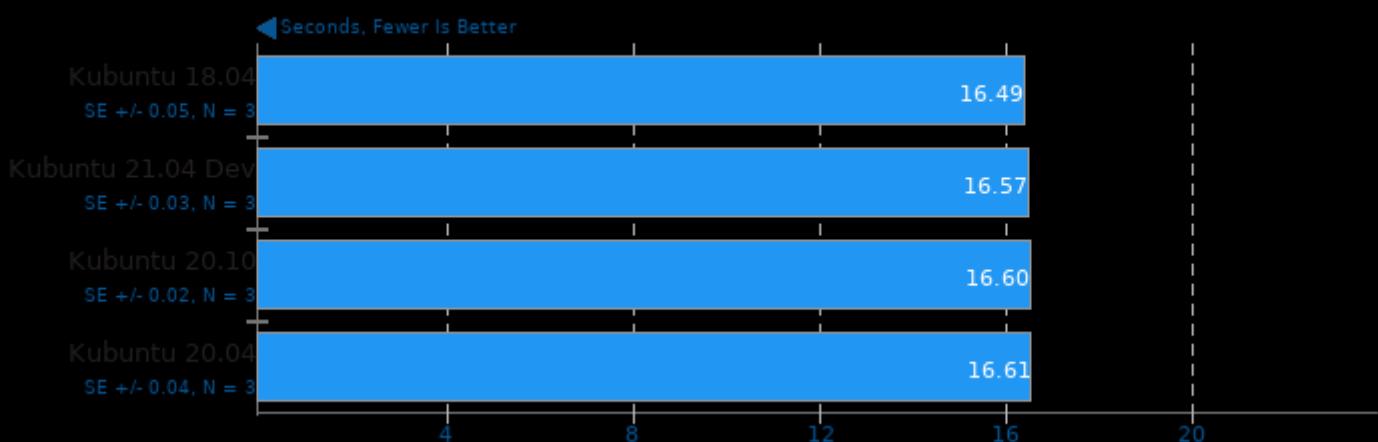
Encode Settings: Quality 100, Lossless



1. (CC) gcc options: -fvisibility=hidden -O2 -pthread -lm -ljpeg -lpng16 -ltiff

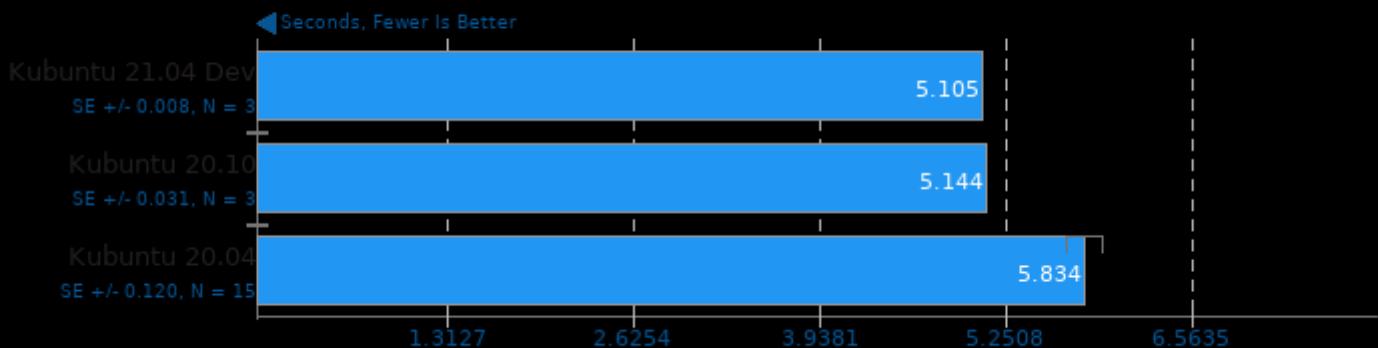
RealSR-NCNN 20200818

Scale: 4x - TAA: No



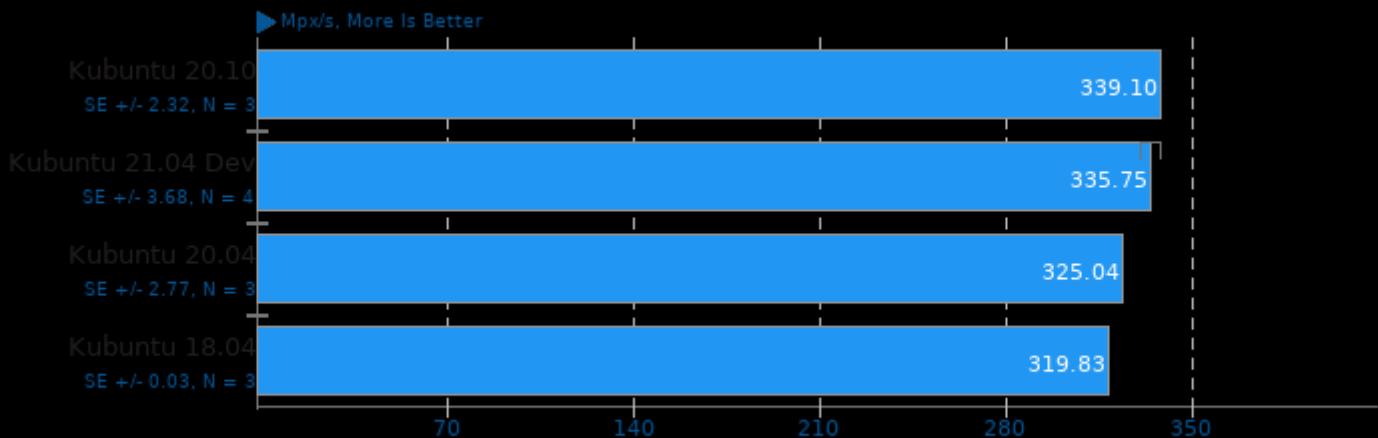
Darktable 3.4.0

Test: Server Room - Acceleration: CPU-only



EtcPak 0.7

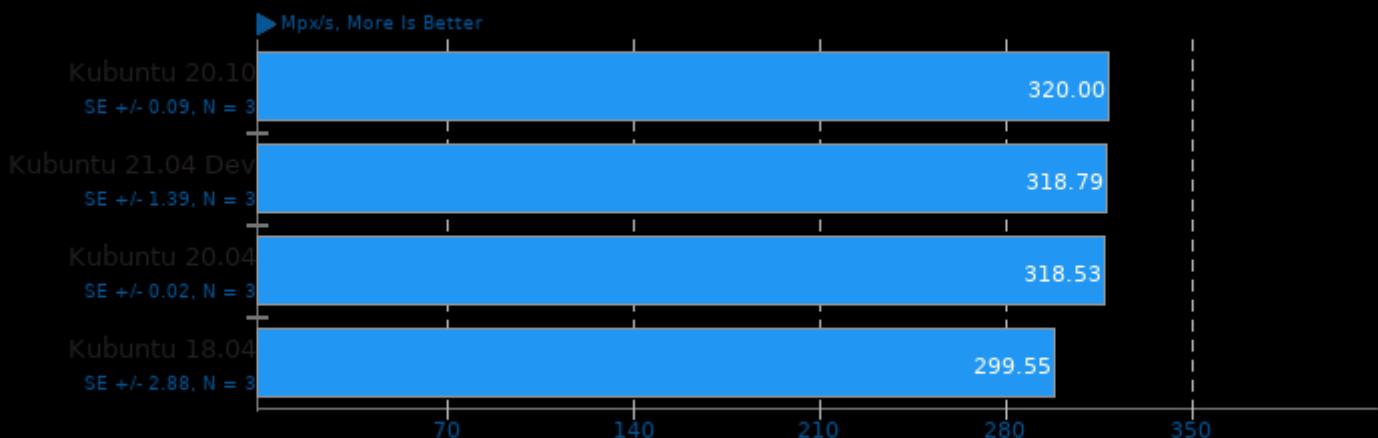
Configuration: ETC1



1. (CXX) g++ options: -O3 -march=native -std=c++11 -lpthread

EtcPak 0.7

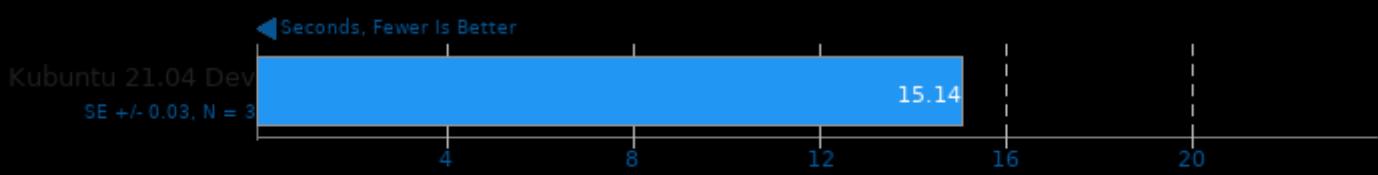
Configuration: ETC1 + Dithering



1. (CXX) g++ options: -O3 -march=native -std=c++11 -lpthread

GIMP 2.10.22

Test: unsharp-mask

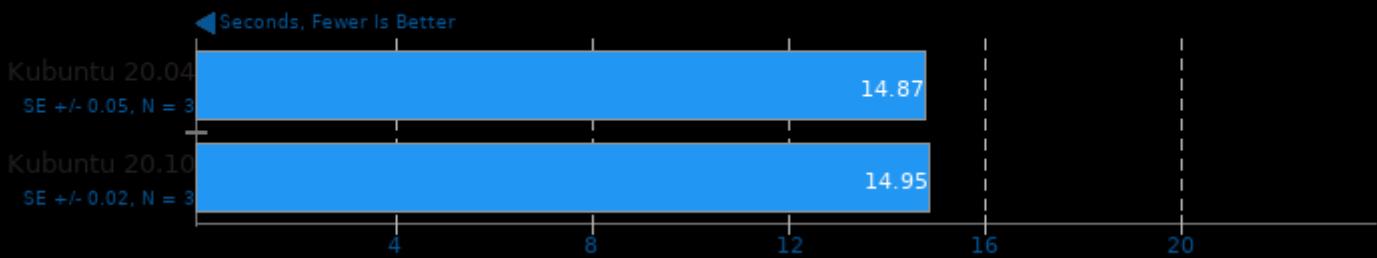


GIMP 2.10.14

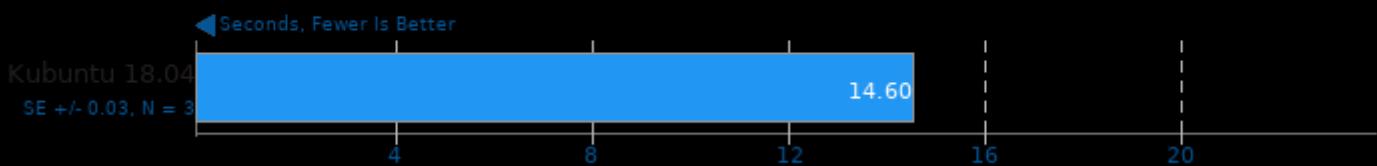
Test: auto-levels

**GIMP 2.10.18**

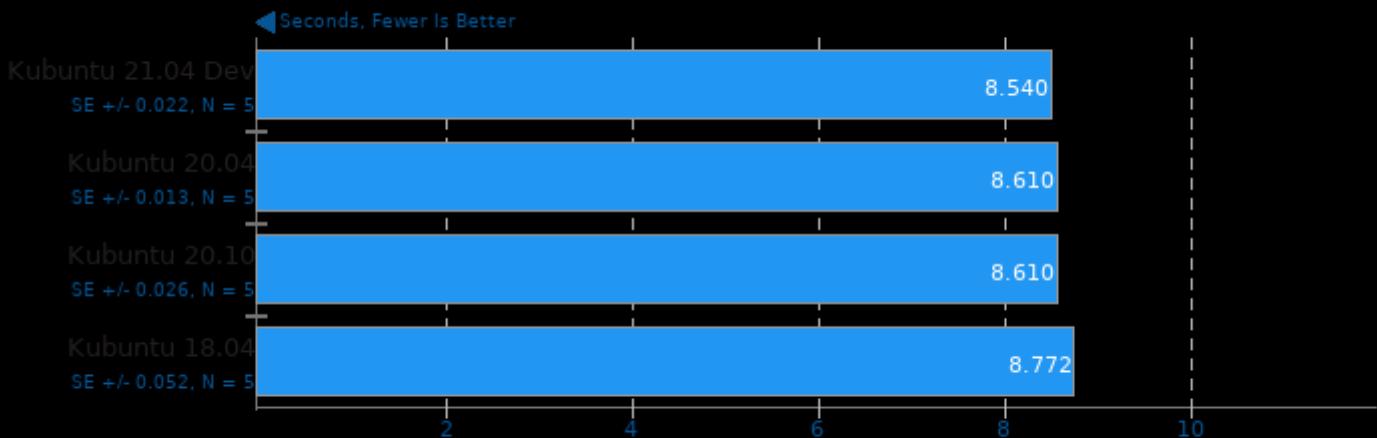
Test: unsharp-mask

**GIMP 2.10.14**

Test: rotate

**Opus Codec Encoding 1.3.1**

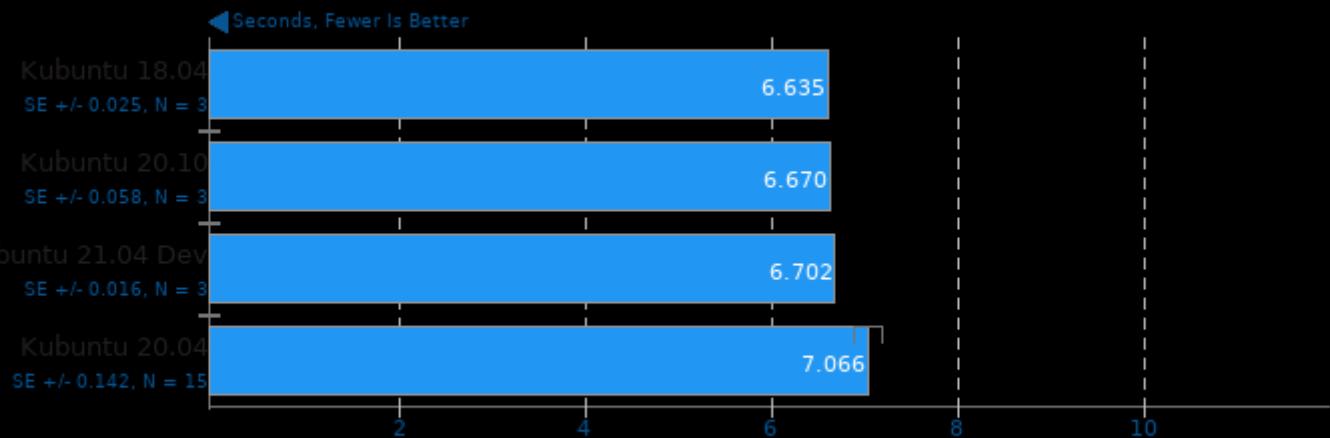
WAV To Opus Encode



1. (CXX) g++ options: -fvisibility=hidden -logg -lm

libavif avifenc 0.7.3

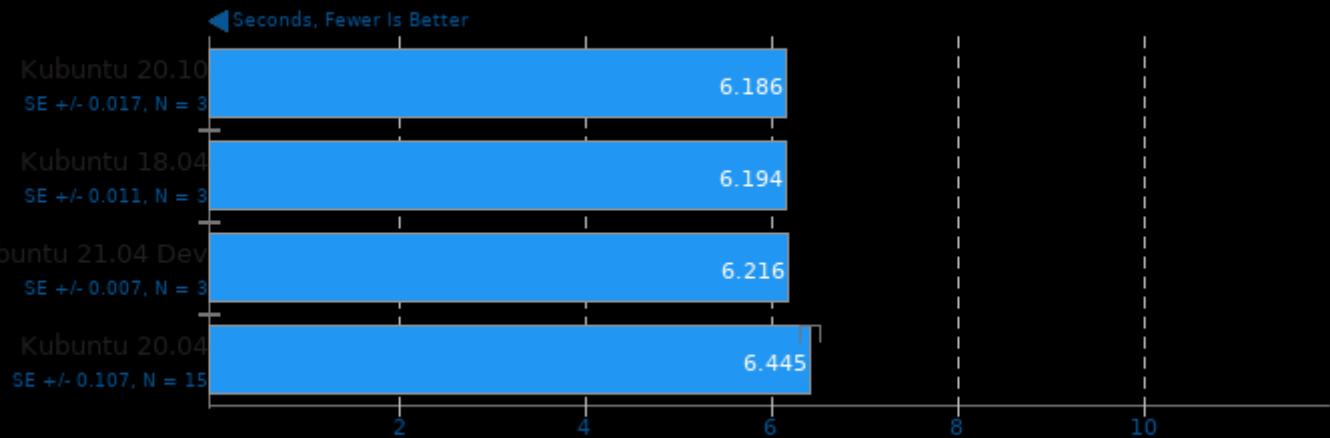
Encoder Speed: 8



1. (CXX) g++ options: -O3 -fPIC

libavif avifenc 0.7.3

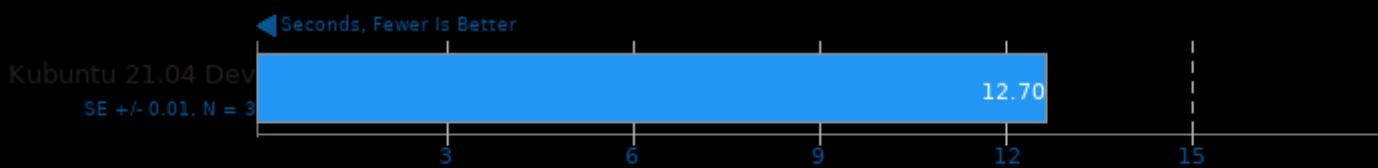
Encoder Speed: 10



1. (CXX) g++ options: -O3 -fPIC

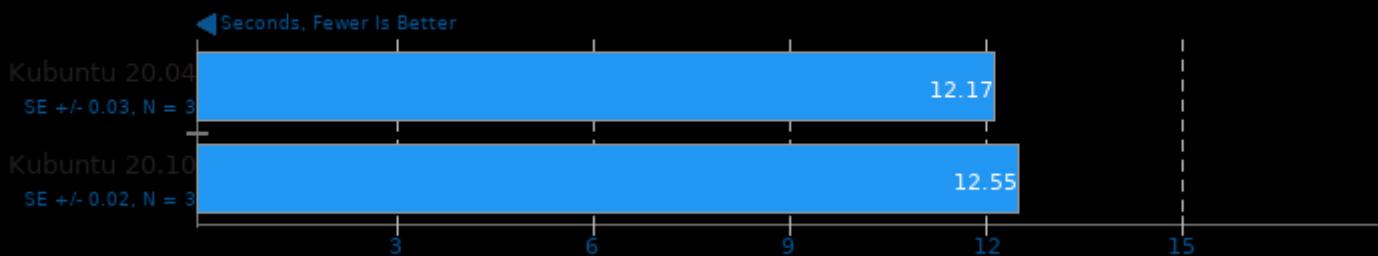
GIMP 2.10.22

Test: auto-levels



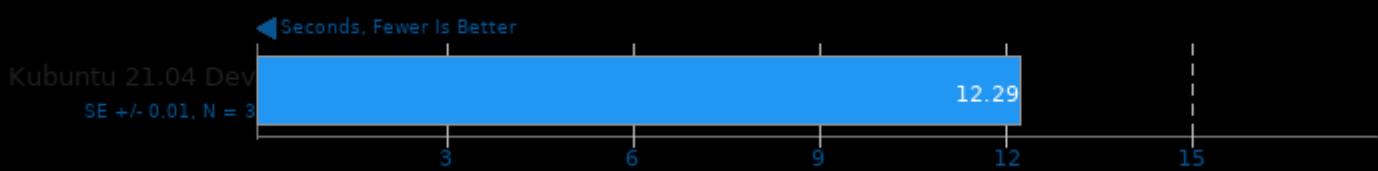
GIMP 2.10.18

Test: auto-levels



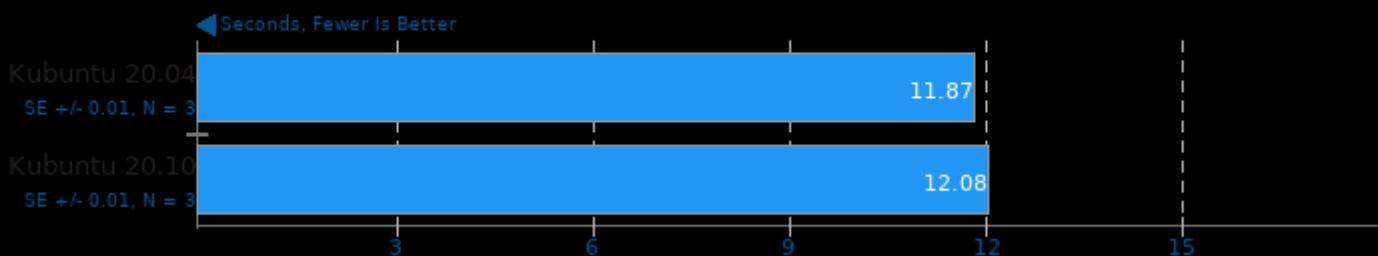
GIMP 2.10.22

Test: rotate



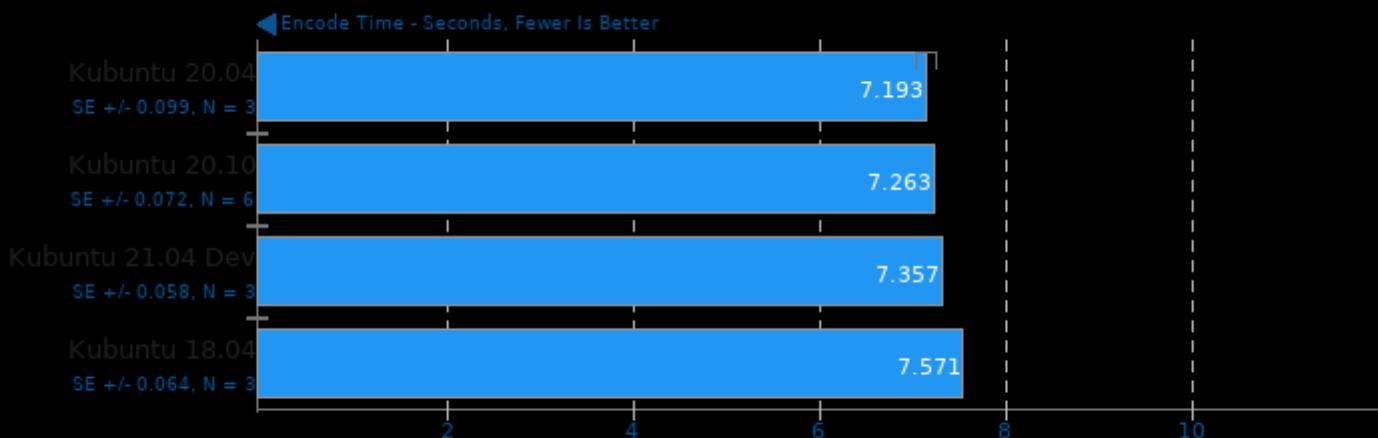
GIMP 2.10.18

Test: rotate



WebP Image Encode 1.1

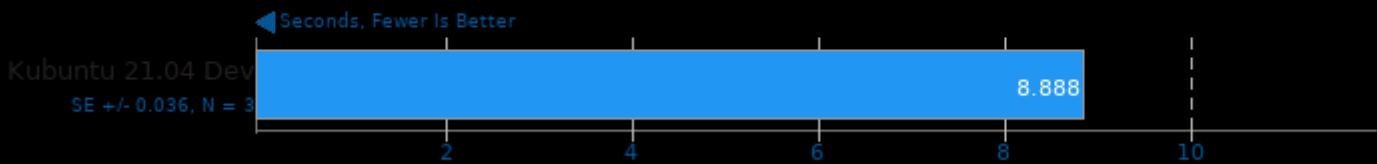
Encode Settings: Quality 100, Highest Compression



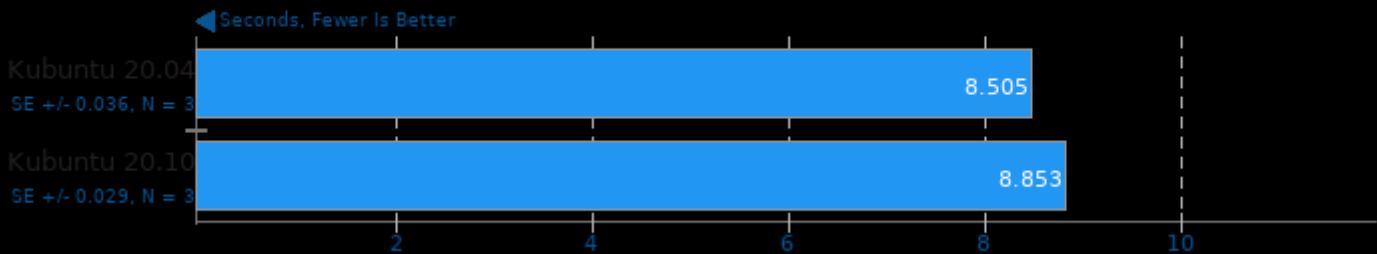
1. (CC) gcc options: -fvisibility=hidden -O2 -pthread -lm -ljpeg -lpng16 -ltiff

GIMP 2.10.22

Test: resize

**GIMP 2.10.18**

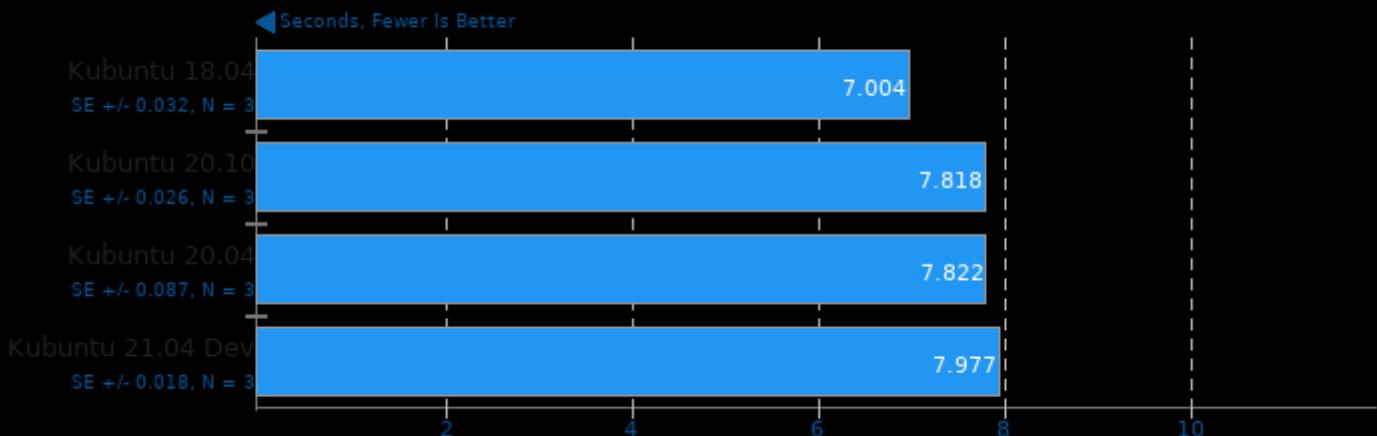
Test: resize

**Darktable 2.4.2**

Test: Masskrug - Acceleration: CPU-only

**GEGL**

Operation: Crop

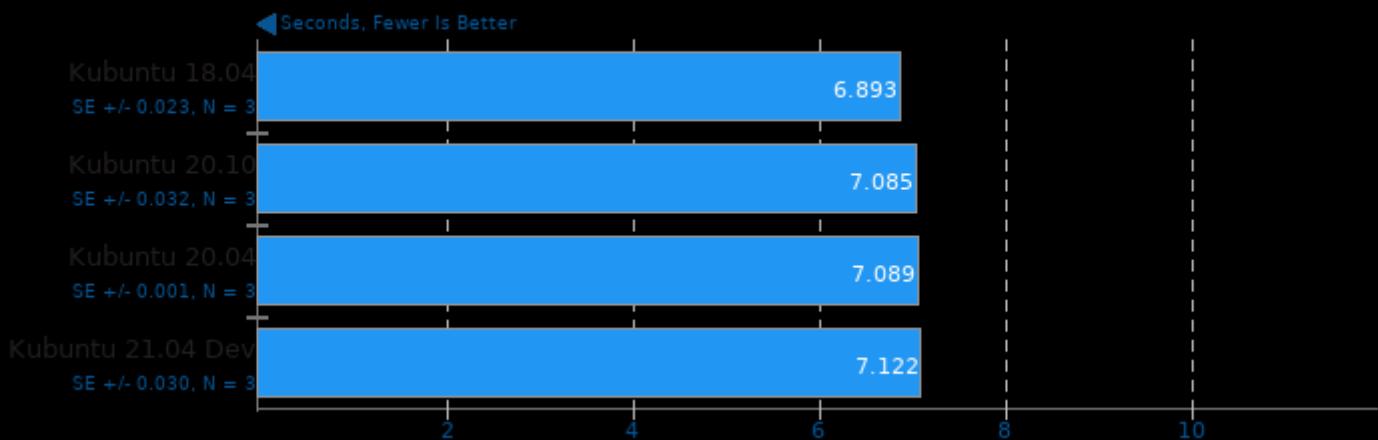
**GIMP 2.10.14**

Test: resize

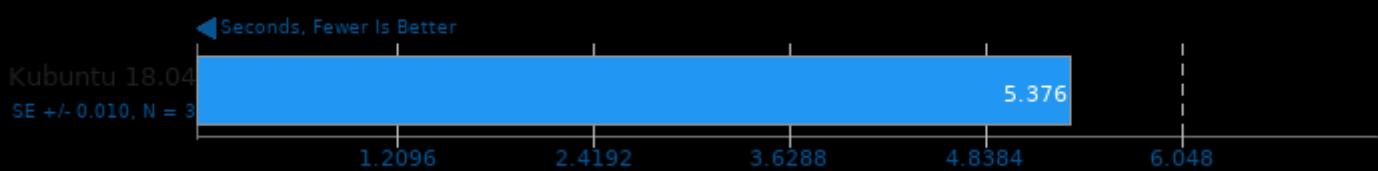


Waifu2x-NCNN Vulkan 20200818

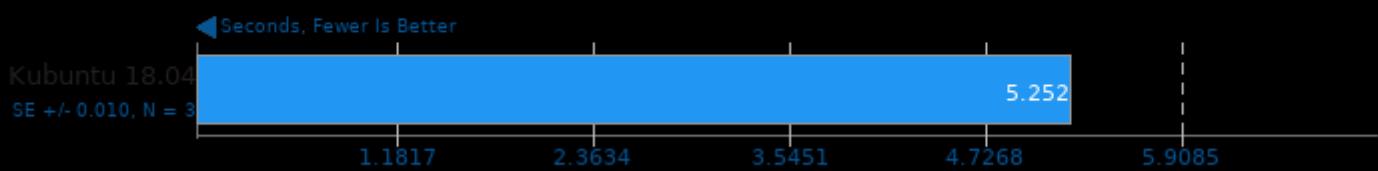
Scale: 2x - Denoise: 3 - TAA: Yes

**Darktable 2.4.2**

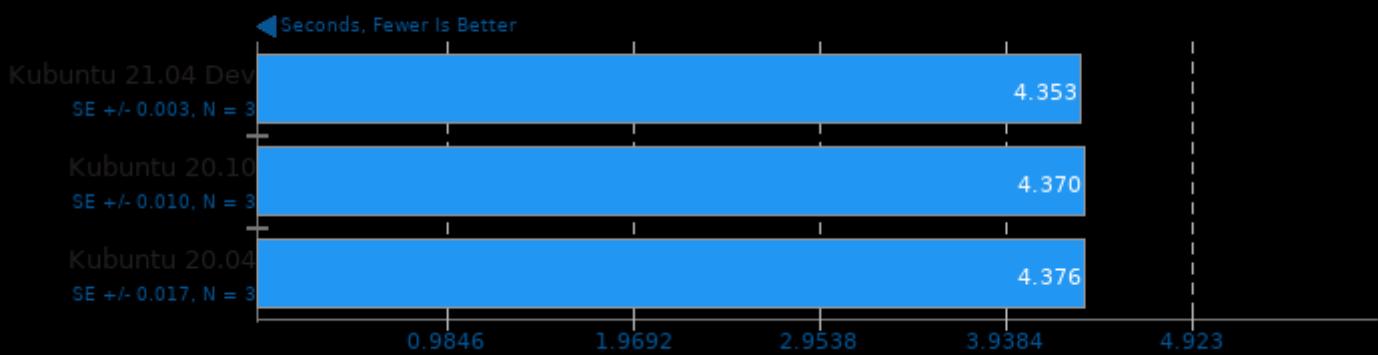
Test: Server Room - Acceleration: CPU-only

**Darktable 2.4.2**

Test: Masskrug - Acceleration: OpenCL

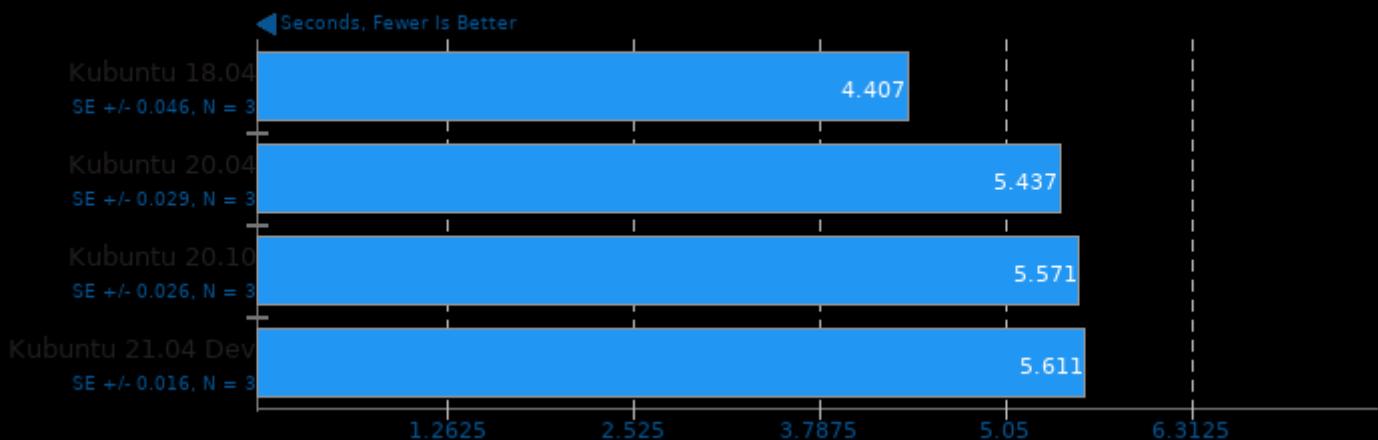
**Darktable 3.4.0**

Test: Masskrug - Acceleration: OpenCL



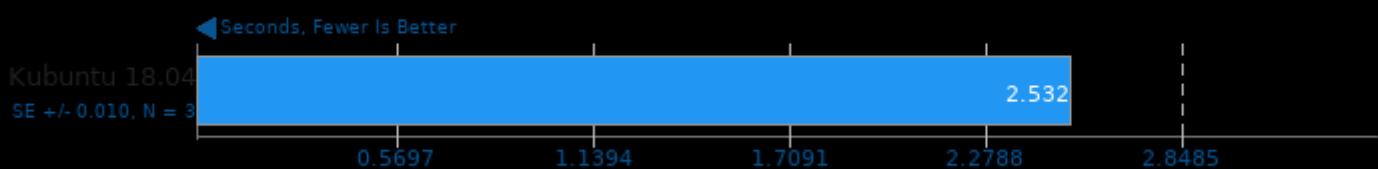
GEGL

Operation: Scale



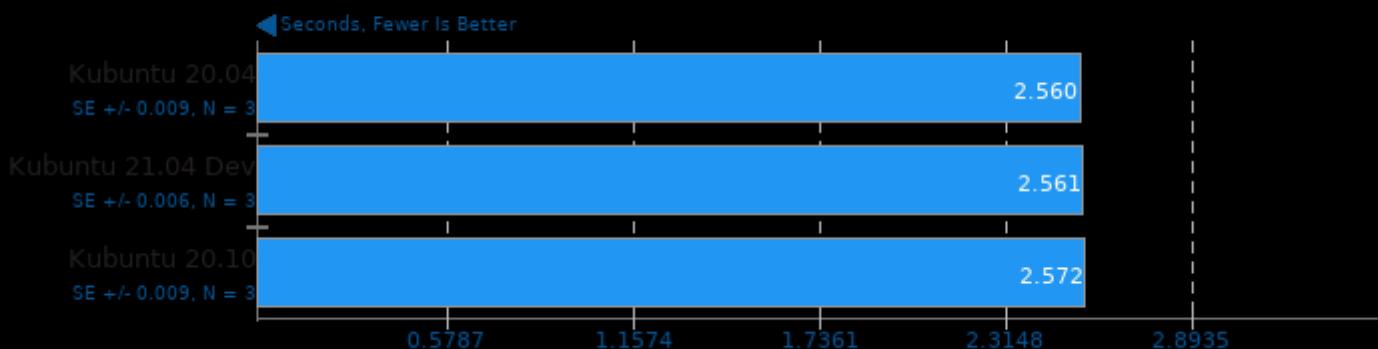
Darktable 2.4.2

Test: Boat - Acceleration: OpenCL



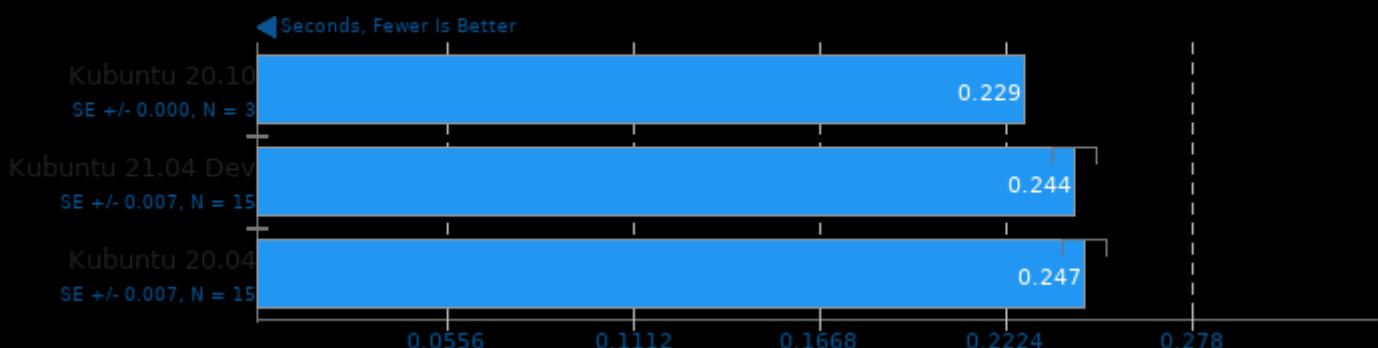
Darktable 3.4.0

Test: Boat - Acceleration: OpenCL



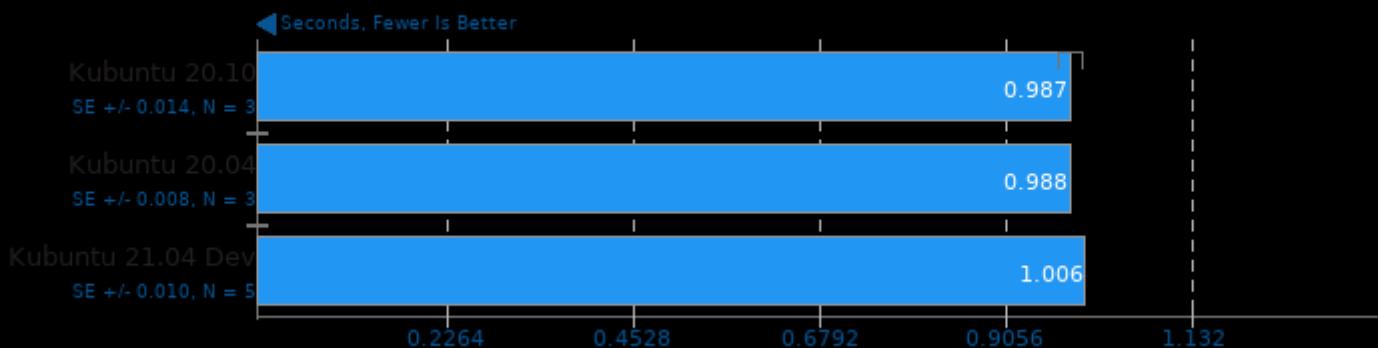
Darktable 3.4.0

Test: Server Rack - Acceleration: CPU-only



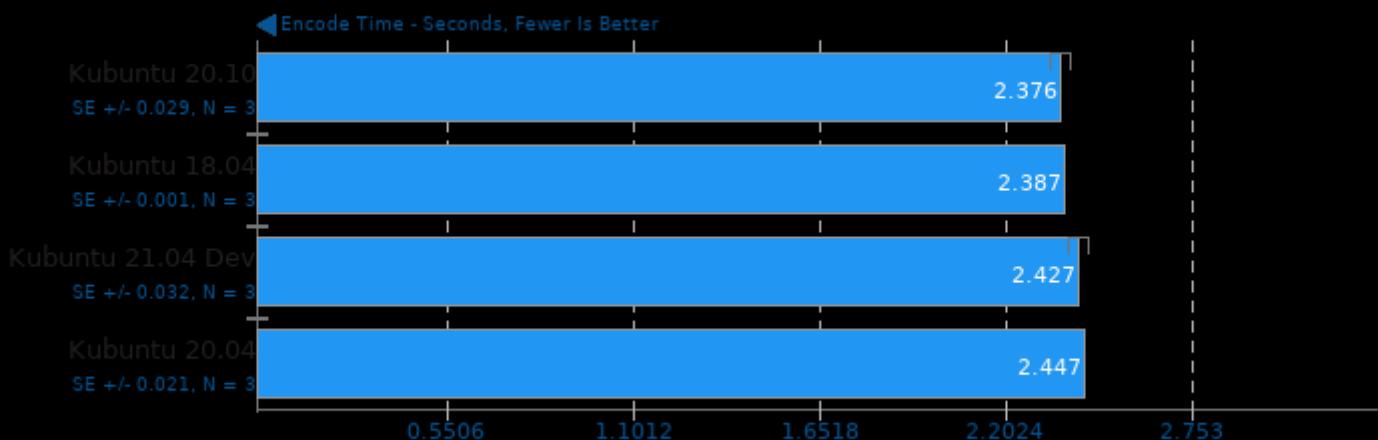
Darktable 3.4.0

Test: Server Room - Acceleration: OpenCL



WebP Image Encode 1.1

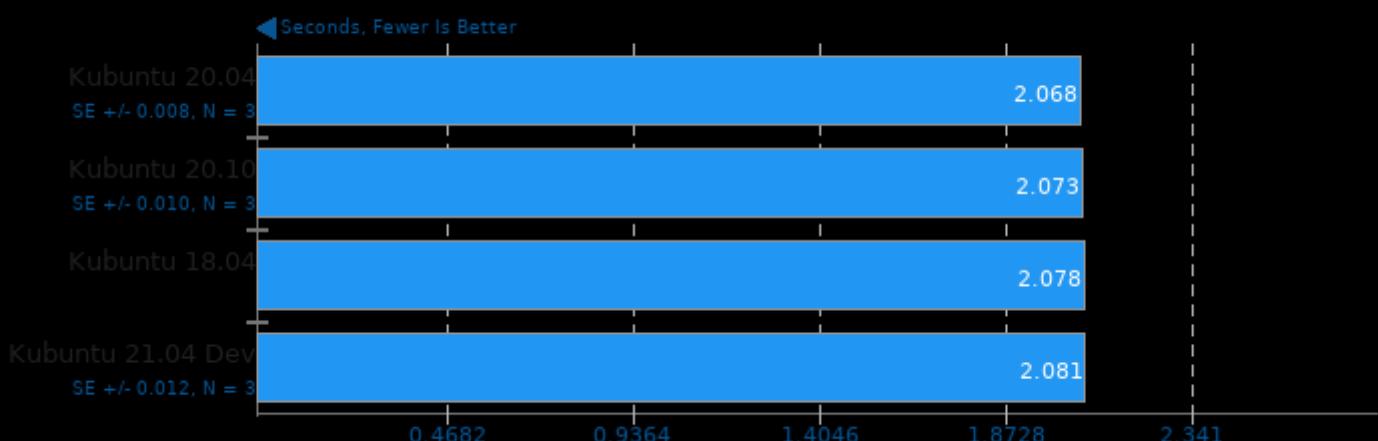
Encode Settings: Quality 100



1. (CC) gcc options: -fvisibility=hidden -O2 -pthread -lm -ljpeg -lpng16 -ltiff

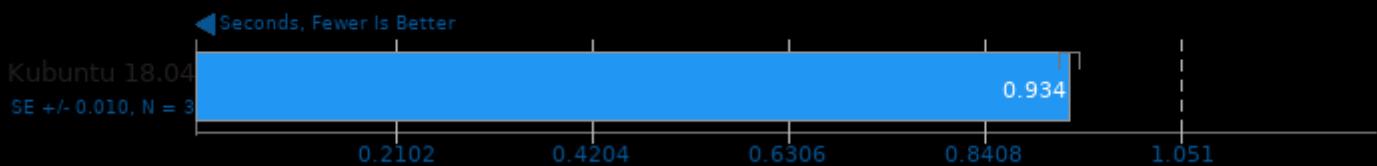
Waifu2x-NCNN Vulkan 20200818

Scale: 2x - Denoise: 3 - TAA: No



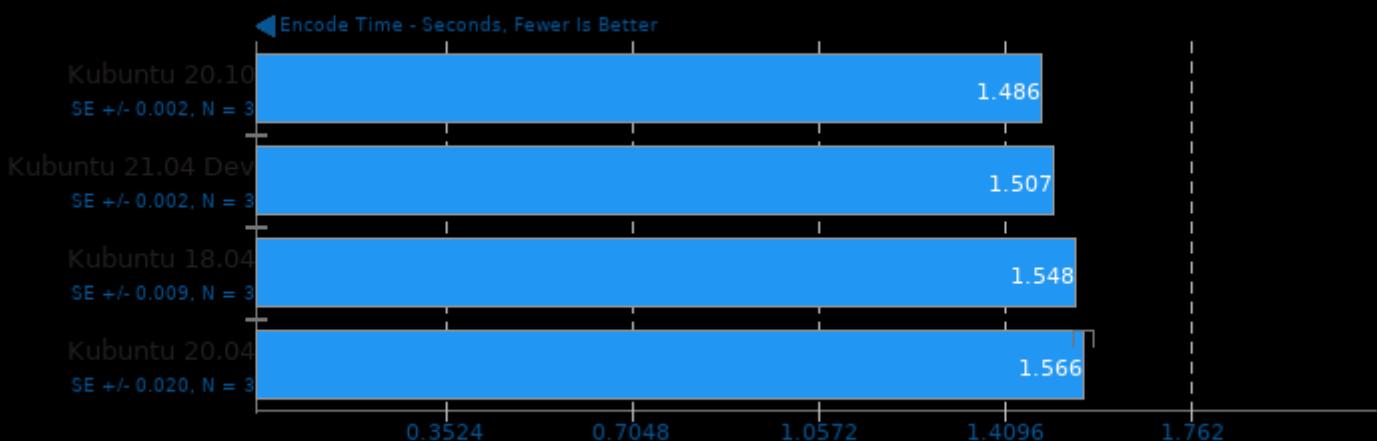
Darktable 2.4.2

Test: Server Room - Acceleration: OpenCL



WebP Image Encode 1.1

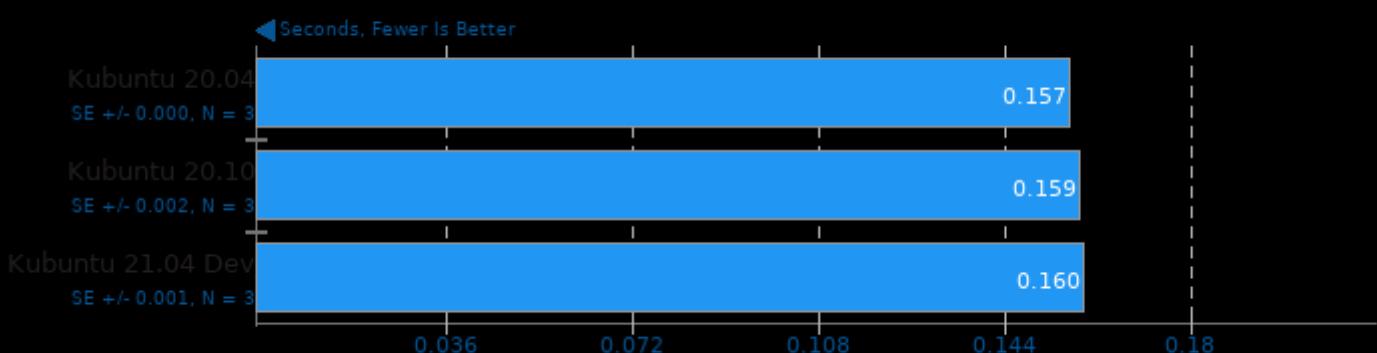
Encode Settings: Default



1. (CC) gcc options: -fvisibility=hidden -O2 -pthread -lm -ljpeg -lpng16 -ltiff

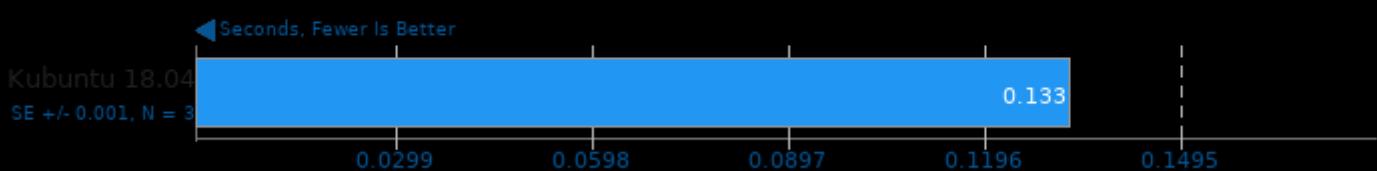
Darktable 3.4.0

Test: Server Rack - Acceleration: OpenCL



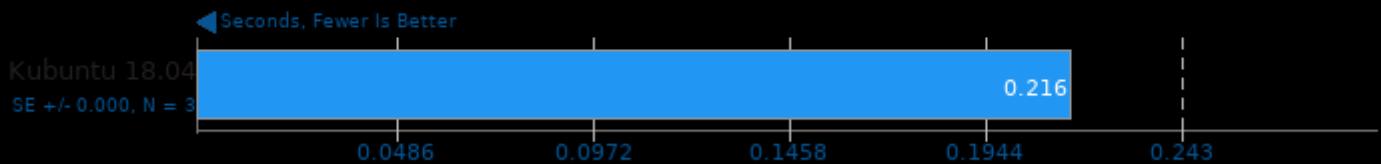
Darktable 2.4.2

Test: Server Rack - Acceleration: OpenCL

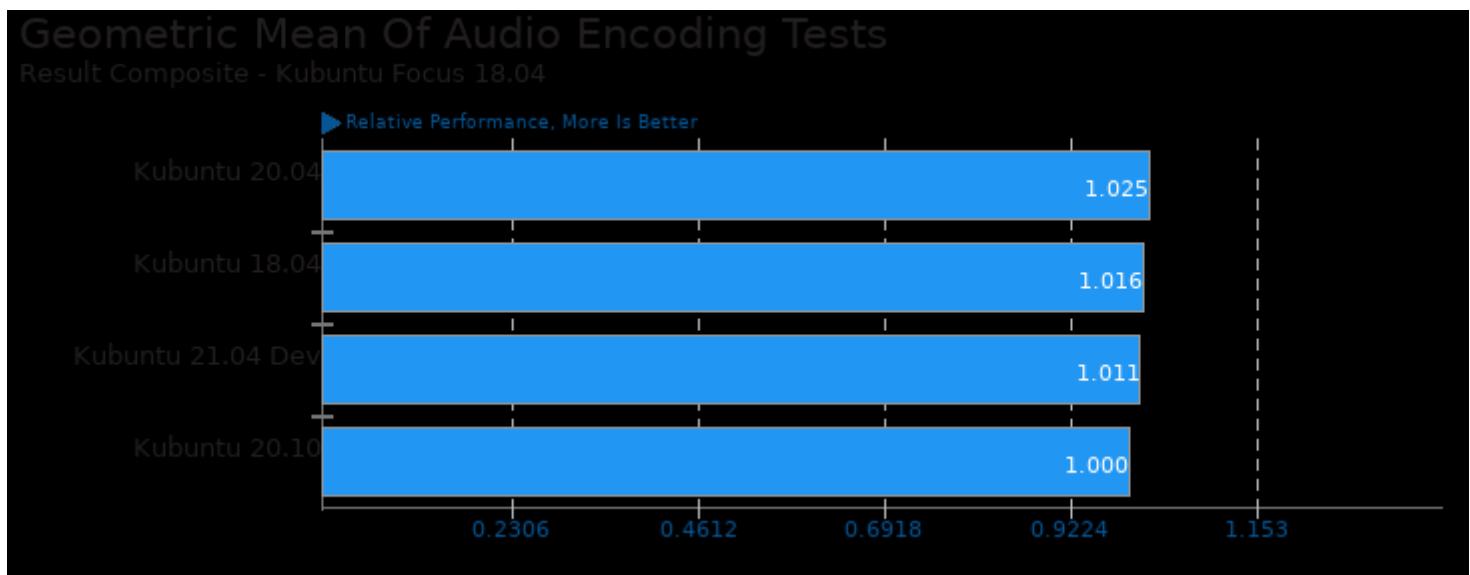


Darktable 2.4.2

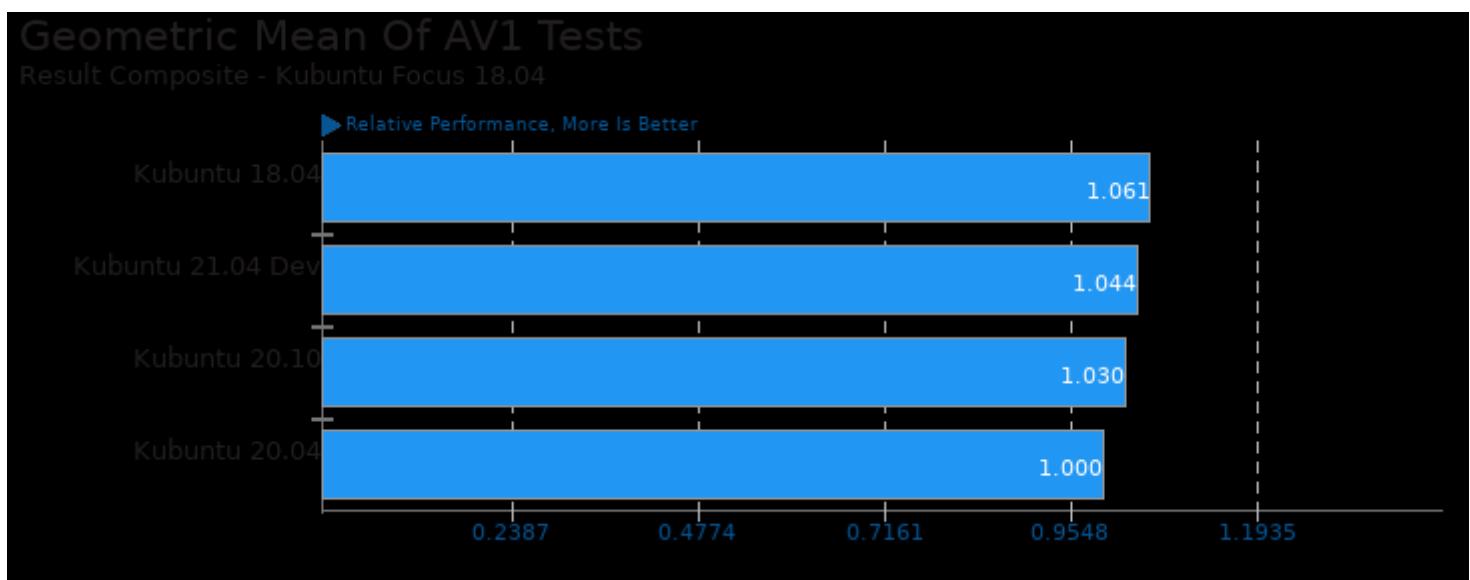
Test: Server Rack - Acceleration: CPU-only



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



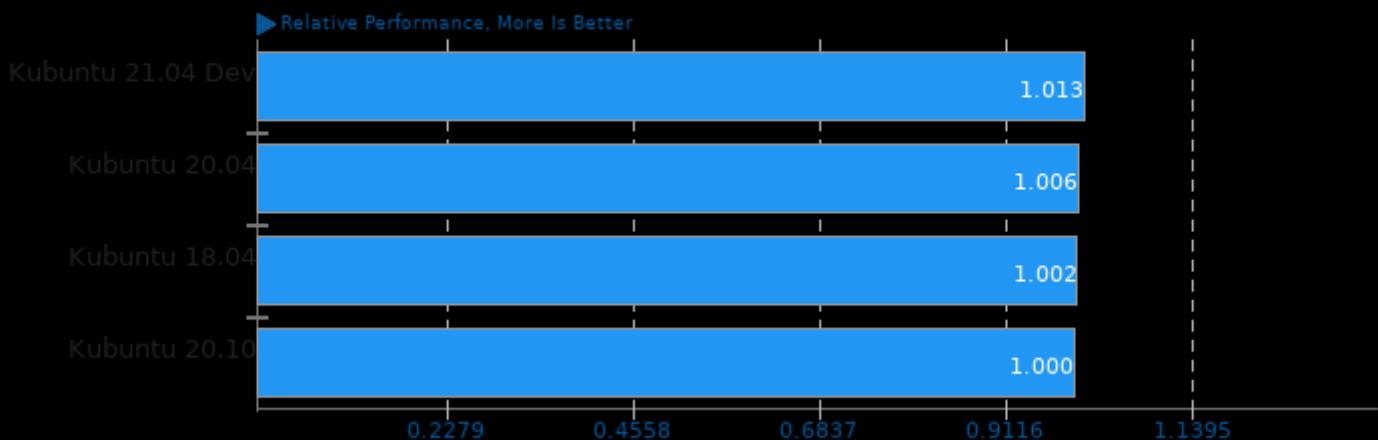
Geometric mean based upon tests: pts/encode-ape, pts/encode-wavpack and pts/encode-opus



Geometric mean based upon tests: pts/svt-av1, pts/rav1e and pts/avifenc

Geometric Mean Of Web Browsers Tests

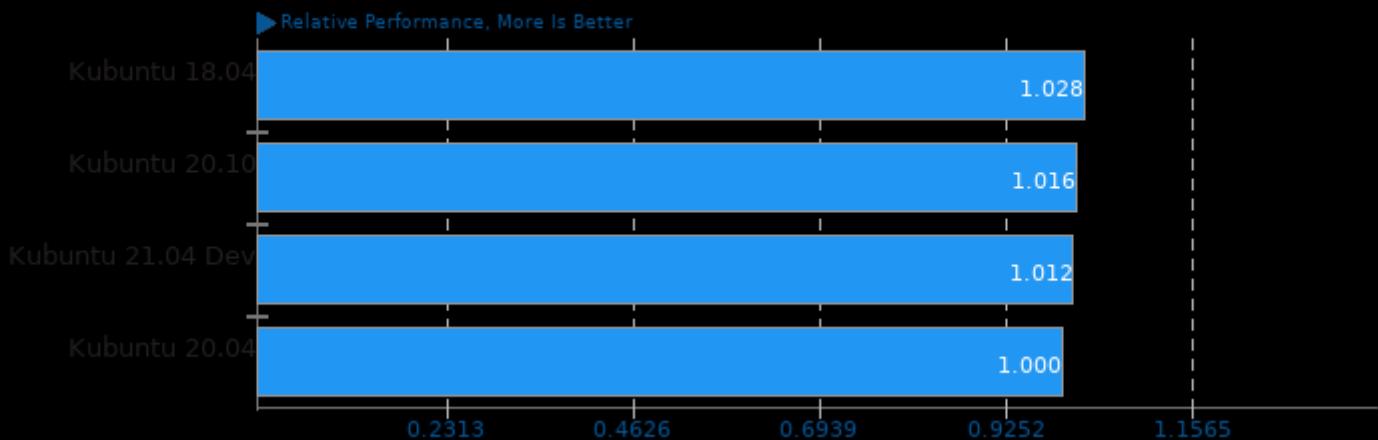
Result Composite - Kubuntu Focus 18.04



Geometric mean based upon tests: system/selenium

Geometric Mean Of C/C++ Compiler Tests

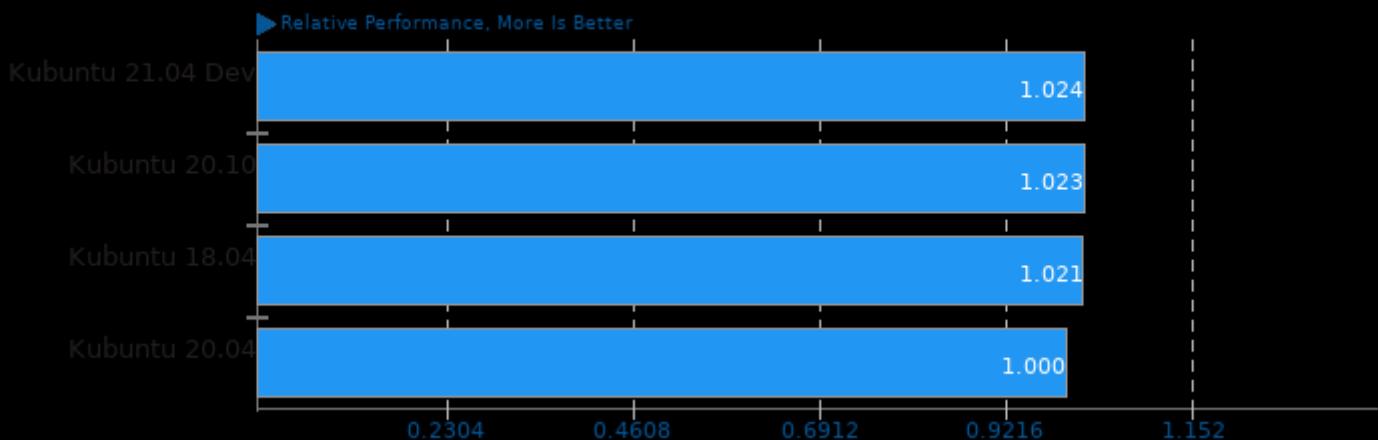
Result Composite - Kubuntu Focus 18.04



Geometric mean based upon tests: pts/sqlite-speedtest, pts/x265, pts/svt-av1 and pts/gromacs

Geometric Mean Of CPU Massive Tests

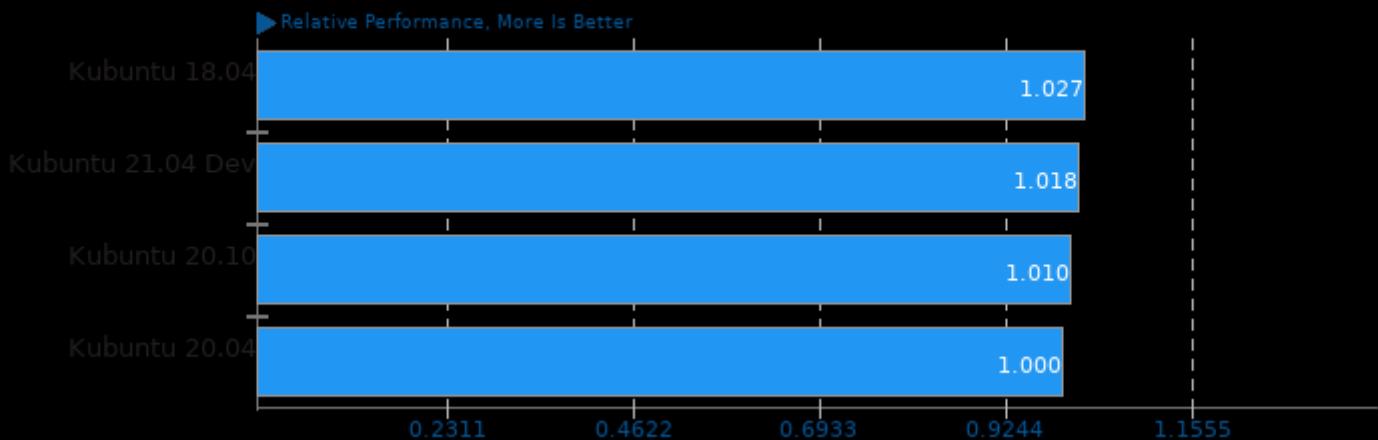
Result Composite - Kubuntu Focus 18.04



Geometric mean based upon tests: pts/svt-av1, pts/x265, pts/namd, pts/v-ray, pts/blender and system/darktable

Geometric Mean Of Encoding Tests

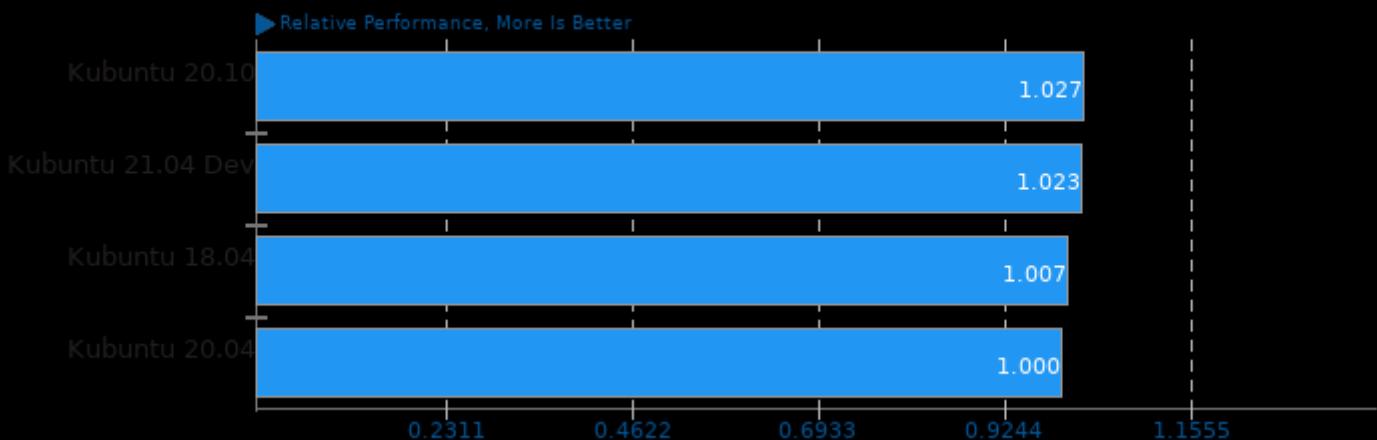
Result Composite - Kubuntu Focus 18.04



Geometric mean based upon tests: pts/encode-ape, pts/encode-wavpack, pts/encode-opus, pts/x265, pts/svt-av1, pts/rav1e and pts/avifenc

Geometric Mean Of Game Development Tests

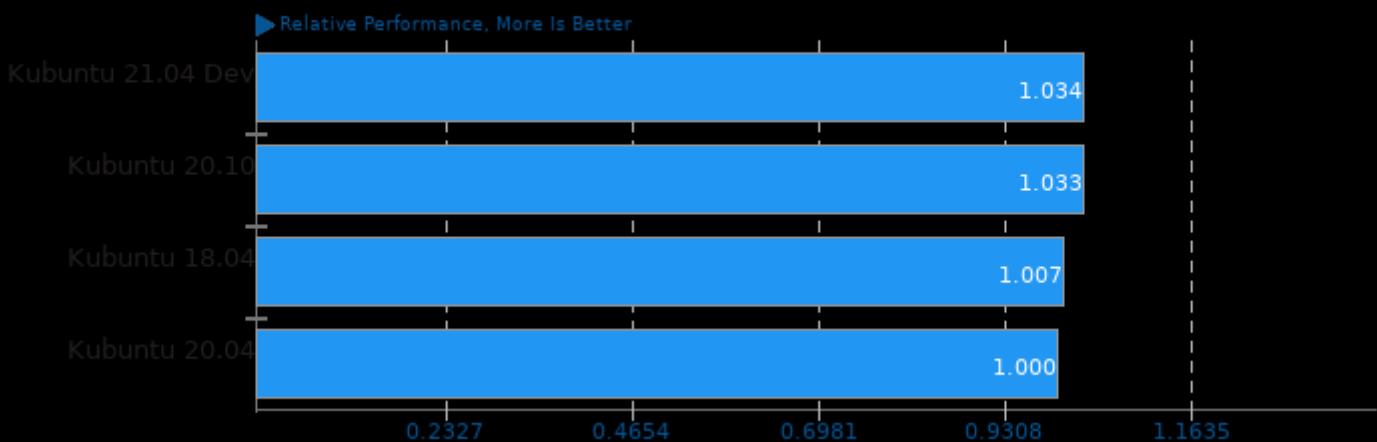
Result Composite - Kubuntu Focus 18.04



Geometric mean based upon tests: pts/astcenc, pts/etc_pak and pts/blender

Geometric Mean Of HPC - High Performance Computing Tests

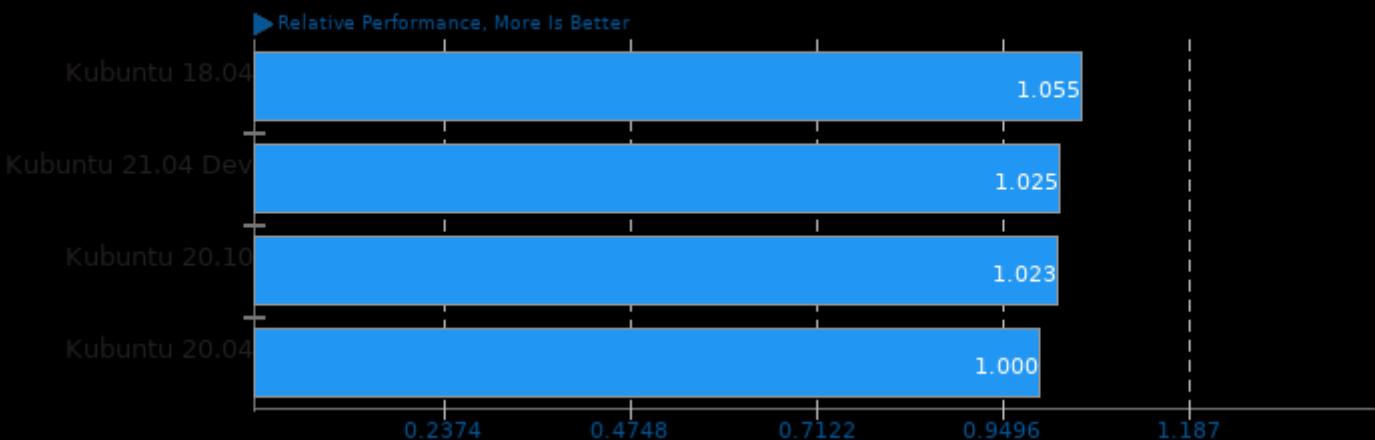
Result Composite - Kubuntu Focus 18.04



Geometric mean based upon tests: pts/namd, pts/gromacs, pts/openfoam, pts/mnn, pts/ncnn, pts/tnn, pts/deepspeech and pts/tensorflow-lite

Geometric Mean Of Imaging Tests

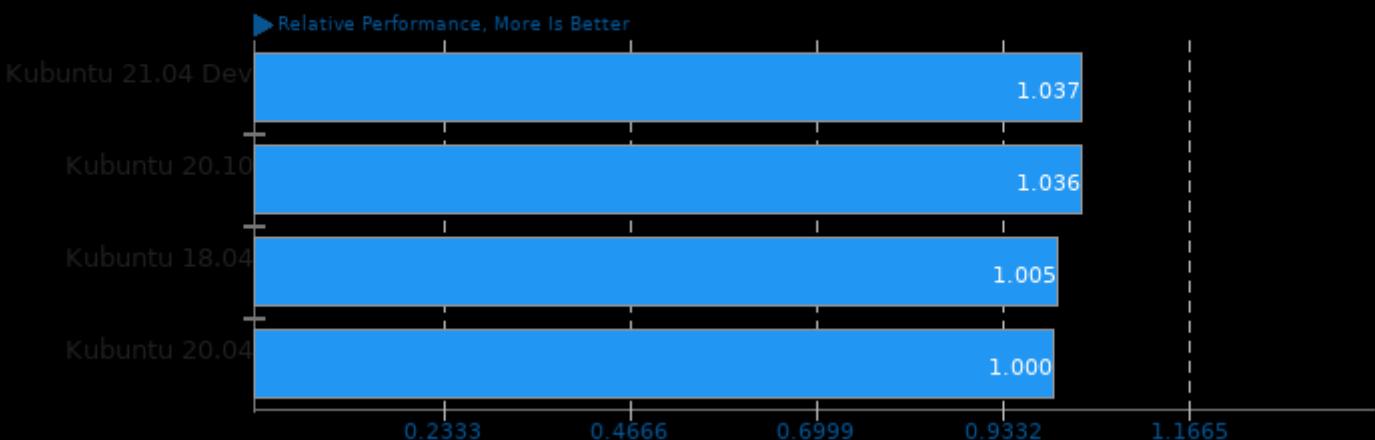
Result Composite - Kubuntu Focus 18.04



Geometric mean based upon tests: system/gmic, pts/webp, pts/webp2, system/rawtherapee, system/gimp, system/hugin, system/darktable, system/gegl and pts/avifenc

Geometric Mean Of Machine Learning Tests

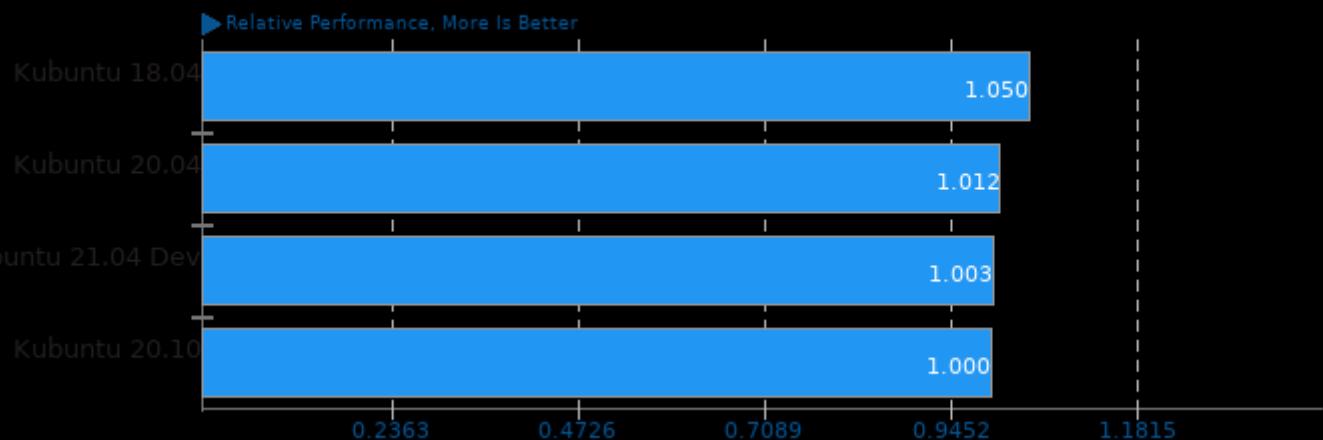
Result Composite - Kubuntu Focus 18.04



Geometric mean based upon tests: pts/mnn, pts/ncnn, pts/tnn, pts/deepspeech and pts/tensorflow-lite

Geometric Mean Of Molecular Dynamics Tests

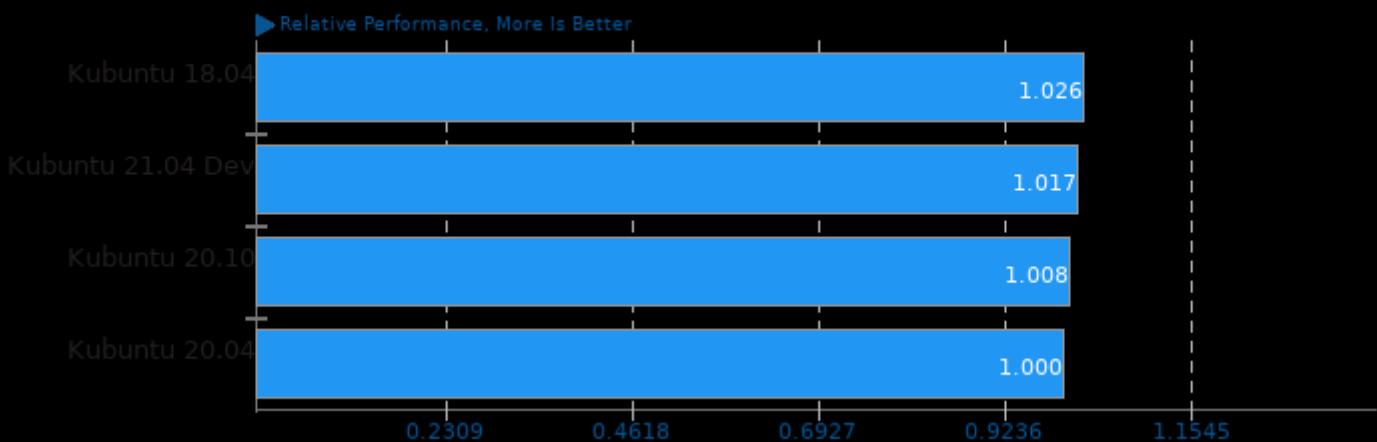
Result Composite - Kubuntu Focus 18.04



Geometric mean based upon tests: pts/namd, pts/gromacs and pts/openfoam

Geometric Mean Of Multi-Core Tests

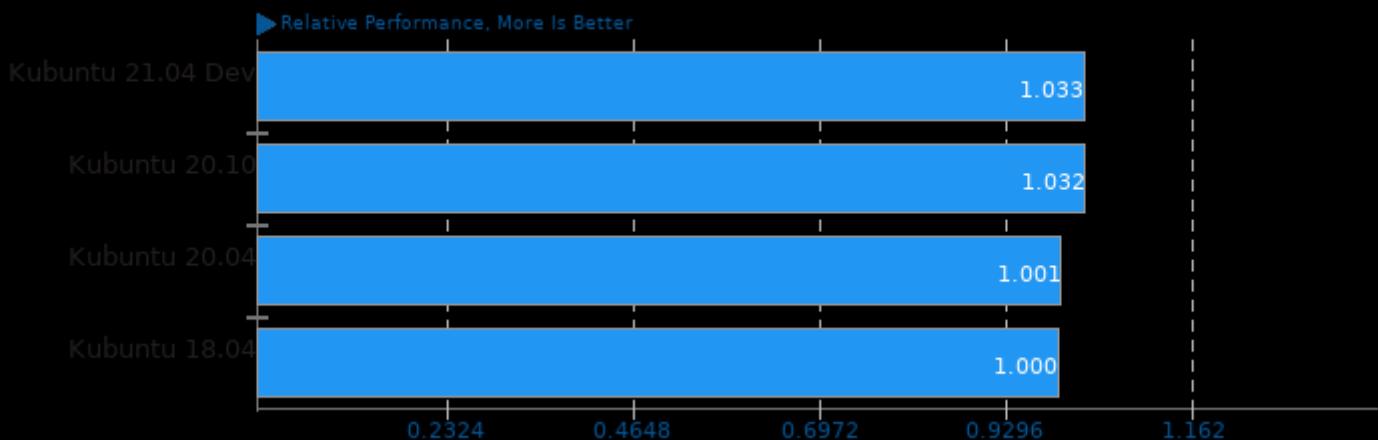
Result Composite - Kubuntu Focus 18.04



Geometric mean based upon tests: pts/blender, pts/yafaray, pts/x265, pts/svt-av1, pts/rav1e, pts/avifenc, pts/namd, pts/gromacs, pts/build2, pts/appleseed, pts/luxcorerender, pts/v-ray, pts/indigobench and pts/embree

Geometric Mean Of NVIDIA GPU Compute Tests

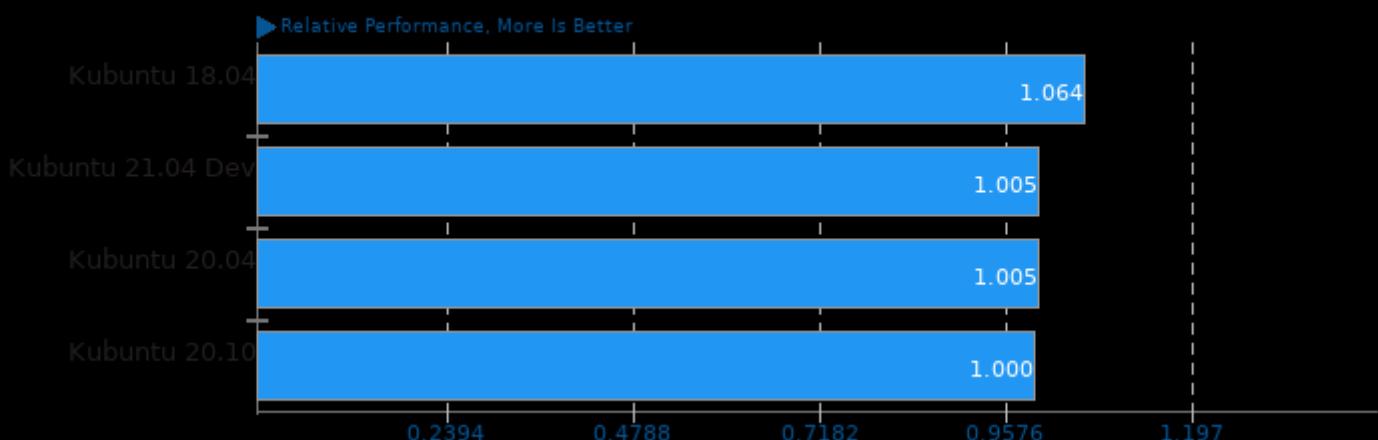
Result Composite - Kubuntu Focus 18.04



Geometric mean based upon tests: pts/gromacs, pts/octanebench, pts/luxcorerender, pts/redshift, pts/indigobench, pts/v-ray, pts/blender, pts/ncnn, pts/realsr-ncnn and pts/waifu2x-ncnn

Geometric Mean Of OpenMPI Tests

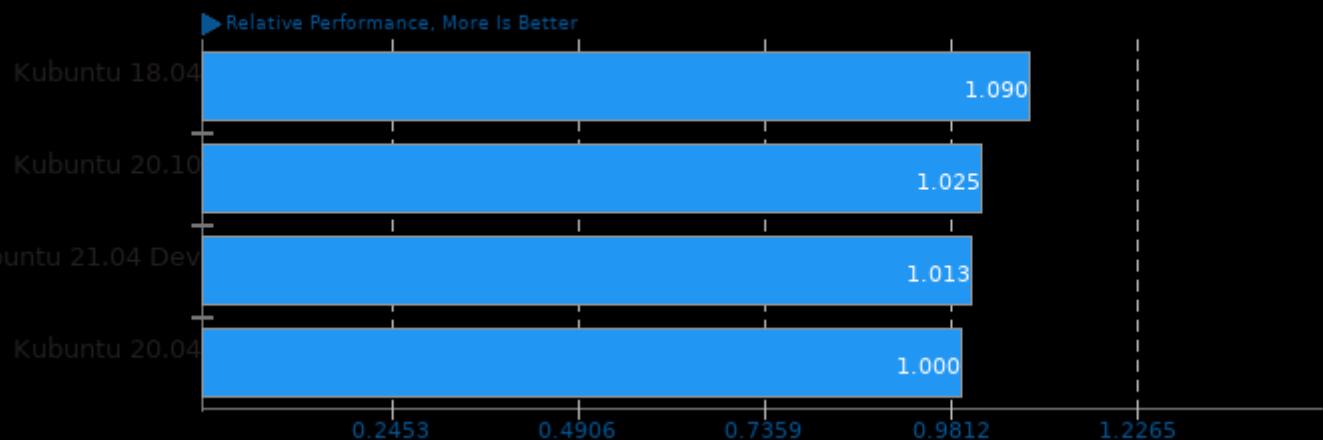
Result Composite - Kubuntu Focus 18.04



Geometric mean based upon tests: pts/openfoam and pts/gromacs

Geometric Mean Of Productivity Tests

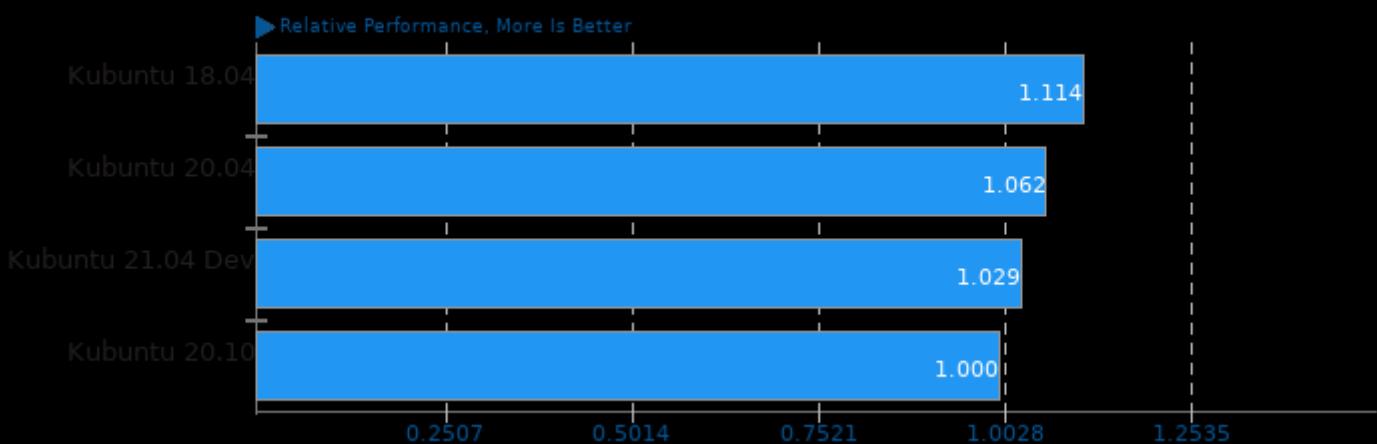
Result Composite - Kubuntu Focus 18.04



Geometric mean based upon tests: system/gimp and system/gegl

Geometric Mean Of Programmer / Developer System Benchmarks Tests

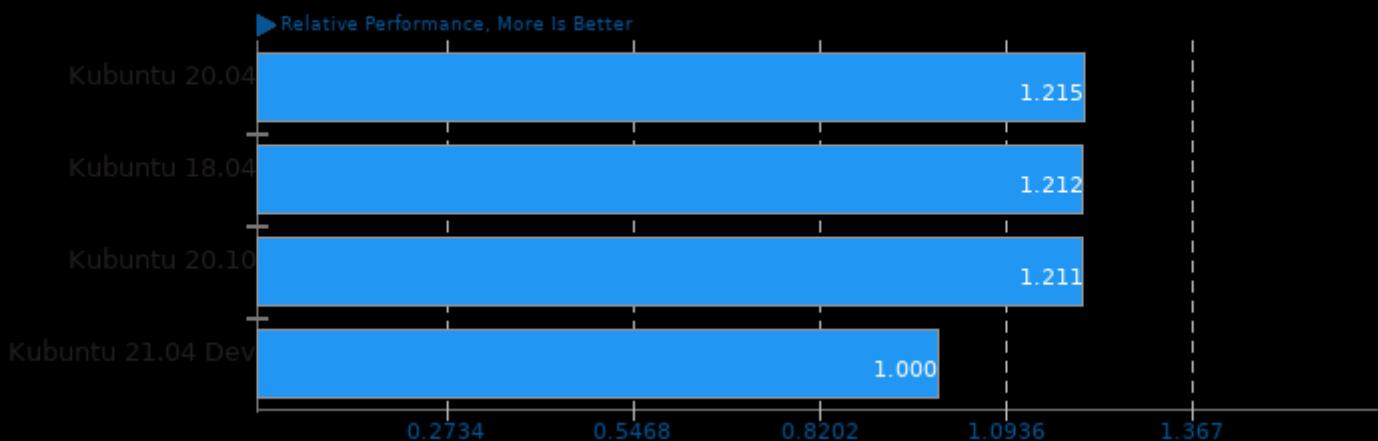
Result Composite - Kubuntu Focus 18.04



Geometric mean based upon tests: pts/sqlite-speedtest, pts/git and pts/build2

Geometric Mean Of Python Tests

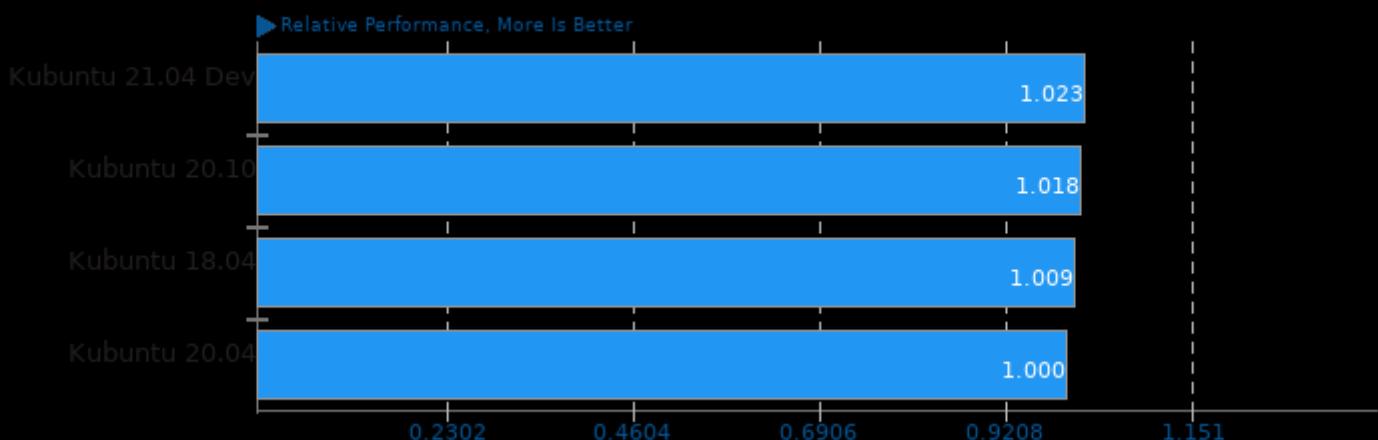
Result Composite - Kubuntu Focus 18.04



Geometric mean based upon tests: system/selenium, pts/yafaray, pts/glmark2 and system/ocrmypdf

Geometric Mean Of Renderers Tests

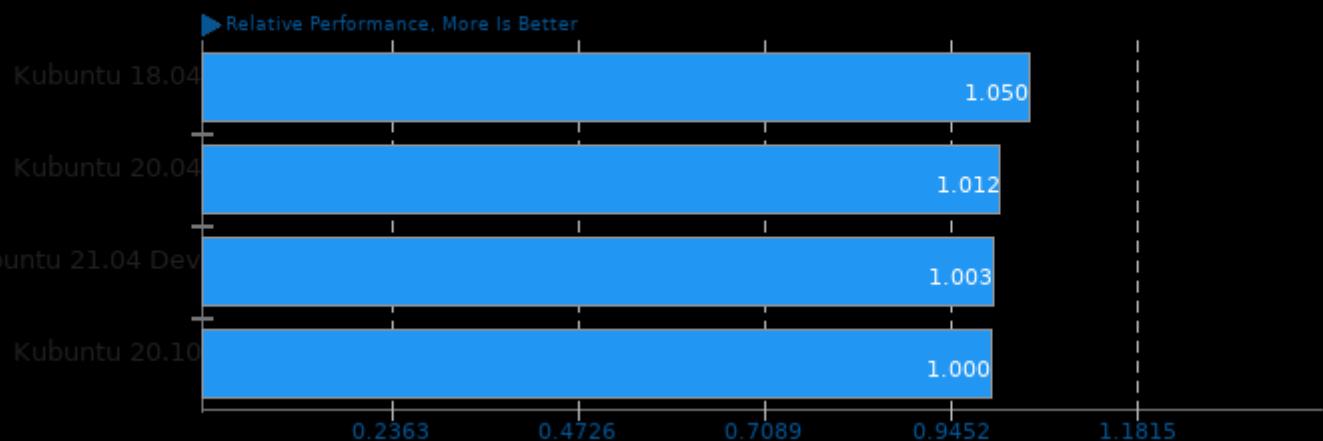
Result Composite - Kubuntu Focus 18.04



Geometric mean based upon tests: pts/yafaray, pts/blender, pts/appleseed, pts/luxcorerender, pts/v-ray and pts/indigobench

Geometric Mean Of Scientific Computing Tests

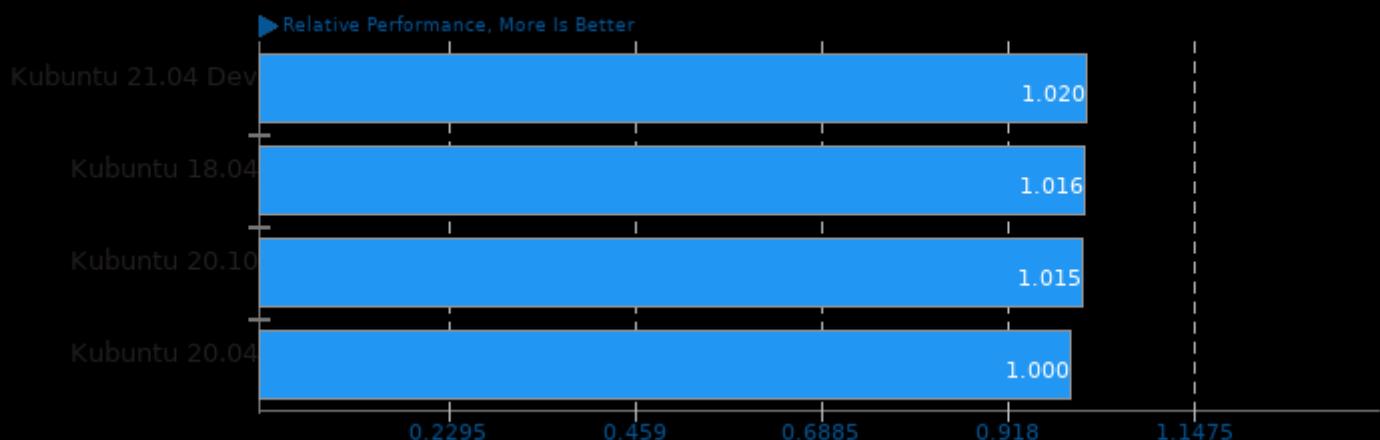
Result Composite - Kubuntu Focus 18.04



Geometric mean based upon tests: pts/namd, pts/gromacs and pts/openfoam

Geometric Mean Of Server CPU Tests

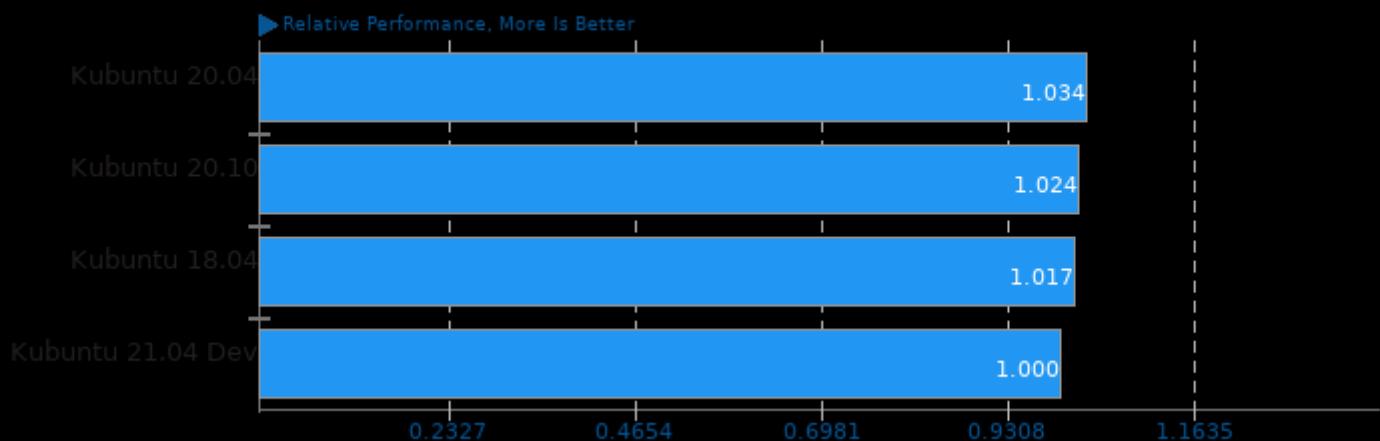
Result Composite - Kubuntu Focus 18.04



Geometric mean based upon tests: pts/namd, pts/svt-av1, pts/x265, system/gimp, pts/blender and pts/appleseed

Geometric Mean Of Single-Threaded Tests

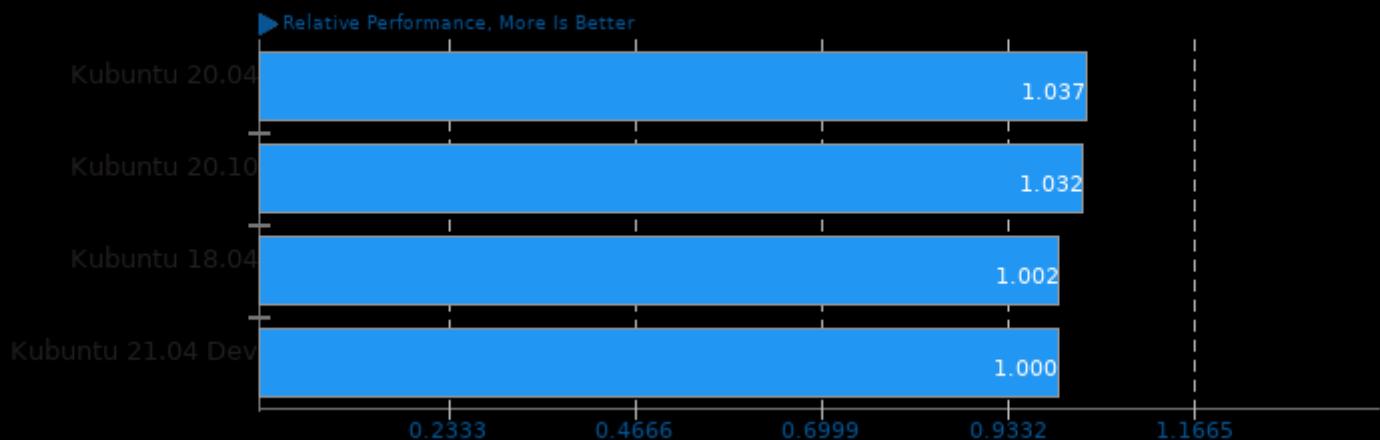
Result Composite - Kubuntu Focus 18.04



Geometric mean based upon tests: pts/deepspeech, pts/espeak and pts/git

Geometric Mean Of Speech Tests

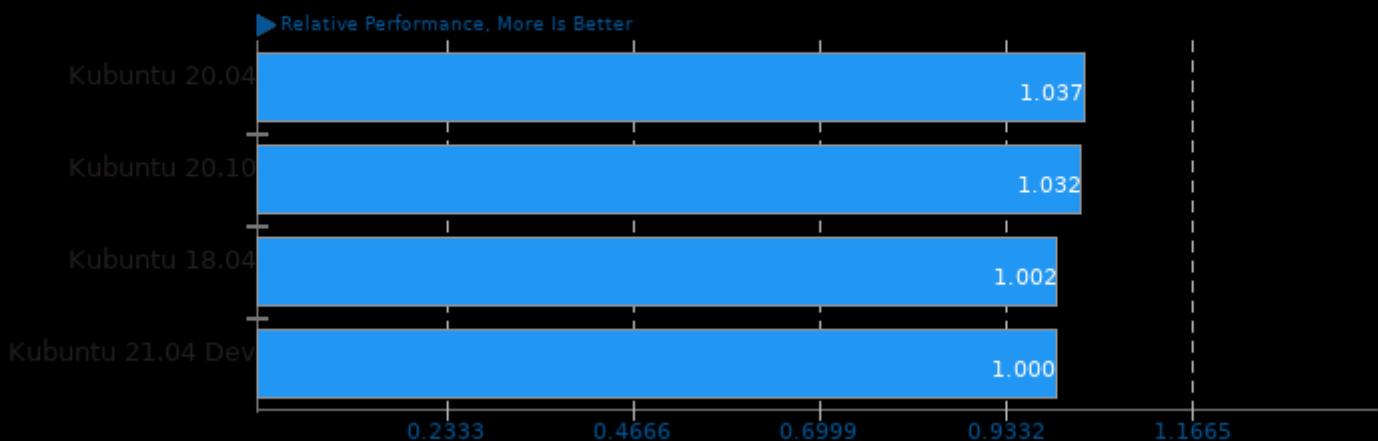
Result Composite - Kubuntu Focus 18.04



Geometric mean based upon tests: pts/espeak, pts/deepspeech and pts/synthmark

Geometric Mean Of Telephony Tests

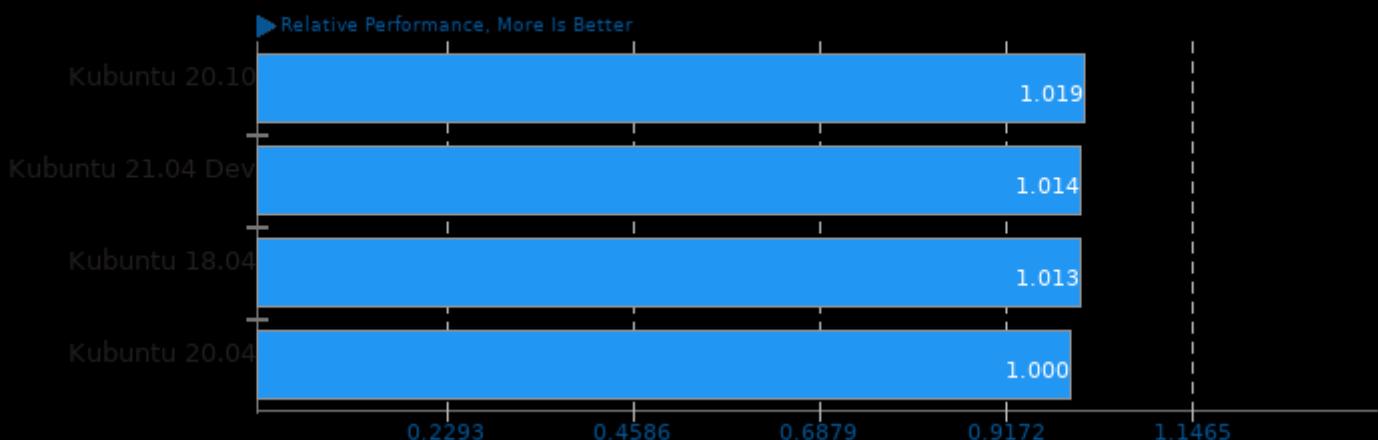
Result Composite - Kubuntu Focus 18.04



Geometric mean based upon tests: pts/espeak, pts/deepspeech and pts/synthmark

Geometric Mean Of Texture Compression Tests

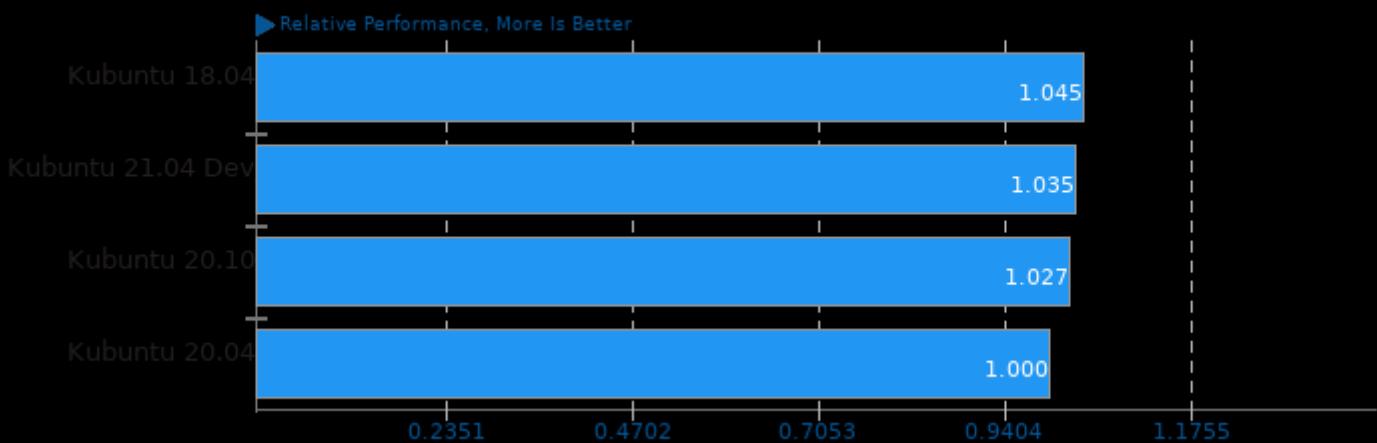
Result Composite - Kubuntu Focus 18.04



Geometric mean based upon tests: pts/astcenc and pts/etcpack

Geometric Mean Of Video Encoding Tests

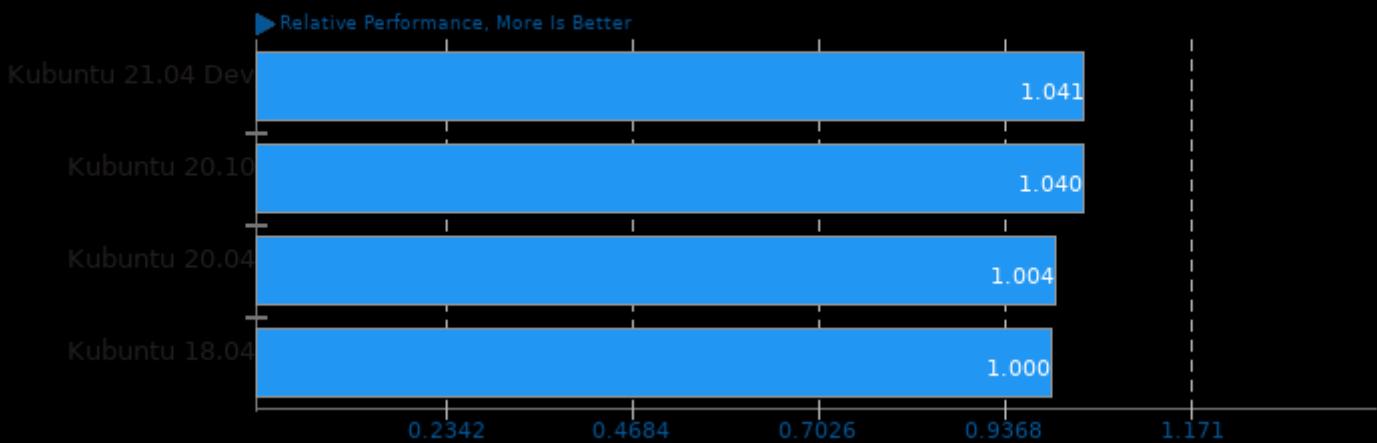
Result Composite - Kubuntu Focus 18.04



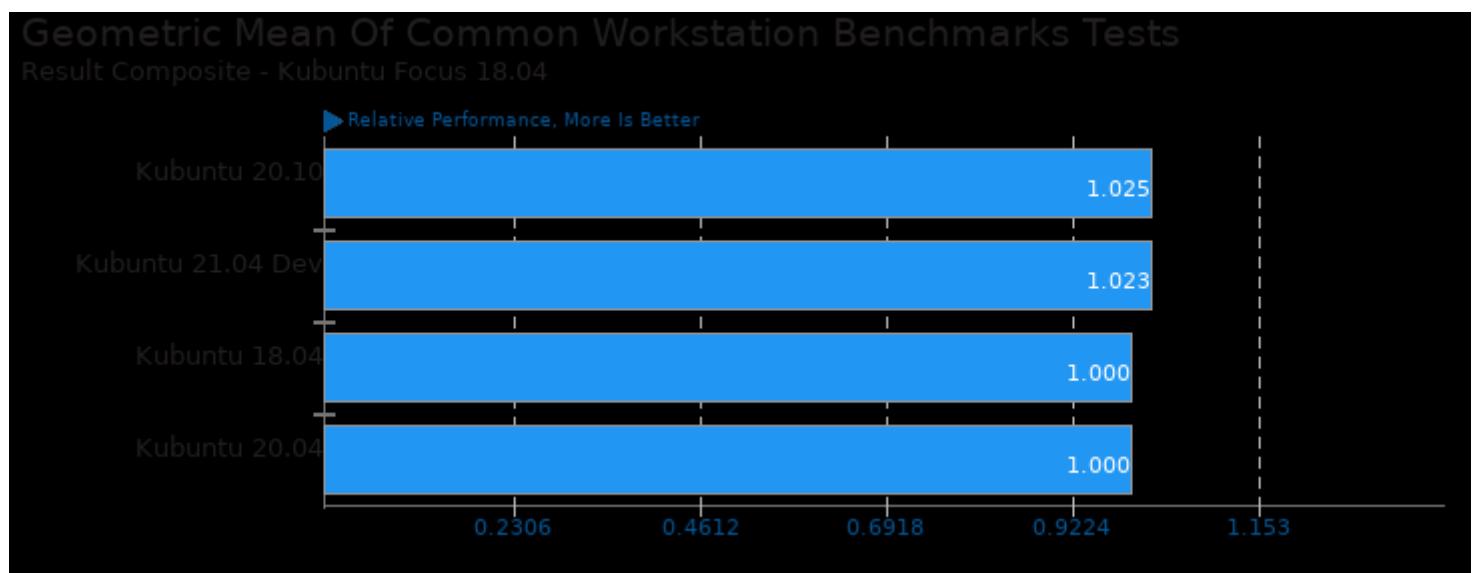
Geometric mean based upon tests: pts/x265, pts/svt-av1, pts/rav1e and pts/avifenc

Geometric Mean Of Vulkan Compute Tests

Result Composite - Kubuntu Focus 18.04



Geometric mean based upon tests: pts/ncnn, pts/realsr-ncnn and pts/waifu2x-ncnn



Geometric mean based upon tests: pts/blender, pts/x265 and pts/git

This file was automatically generated via the Phoronix Test Suite benchmarking software on Friday, 29 March 2024 06:22.