



## Ubuntu 21.10 EPYC Milan

AMD EPYC 74F3 24-Core testing with a ASRock Rack ROME2D16-2T (P3.10 BIOS) and ASPEED on Ubuntu 21.10 via the Phoronix Test Suite.

### Automated Executive Summary

*Ubuntu 21.10 + Linux 5.15 had the most wins, coming in first place for 70% of the tests.*

*Based on the geometric mean of all complete results, the fastest (Ubuntu 21.10 + Linux 5.15) was 1.015x the speed of the slowest (Ubuntu 21.10).*

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

*Stress-NG (Test: IO\_uring) at 4.228x*

*Stress-NG (Test: System V Message Passing) at 1.48x*

*Stress-NG (Test: Socket Activity) at 1.289x*

*PostgreSQL pgbench (Scaling Factor: 100 - Clients: 250 - Mode: Read Write - Average Latency) at 1.27x*

*PostgreSQL pgbench (Scaling Factor: 100 - Clients: 250 - Mode: Read Write) at 1.27x*

*PostgreSQL pgbench (Scaling Factor: 100 - Clients: 500 - Mode: Read Write) at 1.203x*

*PostgreSQL pgbench (Scaling Factor: 100 - Clients: 500 - Mode: Read Write - Average Latency) at 1.203x*

*Stress-NG (Test: Context Switching) at 1.163x*

*nginx (Concurrent Requests: 20) at 1.146x*

Stress-NG (Test: MMAP) at 1.143x.

## Test Systems:

### Ubuntu 21.10

Processor: AMD EPYC 74F3 24-Core @ 3.20GHz (24 Cores / 48 Threads), Motherboard: ASRockRack ROME2D16-2T (P3.10 BIOS), Chipset: AMD Starship/Matisse, Memory: 64GB, Disk: 1000GB Western Digital WD\_BLACK SN850 1TB, Graphics: ASPEED, Audio: AMD Starship/Matisse, Monitor: VE228, Network: 2 x Intel 10G X550T

OS: Ubuntu 21.10, Kernel: 5.13.0-16-generic (x86\_64), Desktop: GNOME Shell 40.5, Display Server: X Server, Vulkan: 1.1.182, Compiler: GCC 11.2.0, 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-cet --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-serialization=2 --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-11-ZPT0kp/gcc-11-11.2.0/debian/tmp-nvptx/usr,amdgc-amdhsa=/build/gcc-11-ZPT0kp/gcc-11-11.2.0/debian/tmp-gcn/usr --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: acpi-cpufreq schedutil (Boost: Enabled) - CPU Microcode: 0xa001114

Java Notes: OpenJDK Runtime Environment (build 11.0.12+7-Ubuntu-0ubuntu3)

Python Notes: Python 3.9.7

Security Notes: itlb\_multihit: Not affected + 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/swaps barriers and \_\_user pointer sanitization + spectre\_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS\_FW STIBP: always-on RSB filling + srbds: Not affected + tsx\_async\_abort: Not affected

### Ubuntu 21.10 + Linux 5.15

Processor: AMD EPYC 74F3 24-Core @ 3.20GHz (24 Cores / 48 Threads), Motherboard: ASRockRack ROME2D16-2T (P3.10 BIOS), Chipset: AMD Starship/Matisse, Memory: 64GB, Disk: 1000GB Western Digital WD\_BLACK SN850 1TB, Graphics: ASPEED, Audio: AMD Starship/Matisse, Monitor: VE228, Network: 2 x Intel 10G X550T

OS: Ubuntu 21.10, Kernel: 5.15.0-051500rc5daily20211011-generic (x86\_64) 20211010, Desktop: GNOME Shell 40.5, Display Server: X Server, Vulkan: 1.1.182, Compiler: GCC 11.2.0, 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-cet --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-serialization=2 --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-11-ZPT0kp/gcc-11-11.2.0/debian/tmp-nvptx/usr,amdgc-amdhsa=/build/gcc-11-ZPT0kp/gcc-11-11.2.0/debian/tmp-gcn/usr --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: acpi-cpufreq schedutil (Boost: Enabled) - CPU Microcode: 0xa001114

Java Notes: OpenJDK Runtime Environment (build 11.0.12+7-Ubuntu-0ubuntu3)

Python Notes: Python 3.9.7

Security Notes: itlb\_multihit: Not affected + 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/swaps barriers and \_\_user pointer sanitization + spectre\_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS\_FW STIBP: always-on RSB filling + srbds: Not affected + tsx\_async\_abort: Not affected

	Ubuntu 21.10	Ubuntu 21.10 + Linux 5.15
<b>LeelaChessZero - BLAS (Nodes/s)</b>	<b>1457</b>	<b>1340</b>
Normalized	100%	91.97%
Standard Deviation	1.4%	3.2%
<b>LAMMPS Molecular Dynamics Simulator - 20k Atoms (ns/day)</b>	<b>16.874</b>	<b>17.002</b>
Normalized	99.25%	100%
Standard Deviation	0.4%	0.3%
<b>PostgreSQL pgbench - 1000 - 500 - Read Write - Average Latency (ms)</b>	<b>15.886</b>	<b>24.174</b>
Normalized	100%	65.72%
Standard Deviation	9.6%	1.7%
<b>PostgreSQL pgbench - 1000 - 500 - Read Write (TPS)</b>	<b>31750</b>	<b>20688</b>
Normalized	100%	65.16%
Standard Deviation	10%	1.7%
<b>PostgreSQL pgbench - 1000 - 250 - Read Write - Average Latency (ms)</b>	<b>6.349</b>	<b>9.444</b>
Normalized	100%	67.23%
Standard Deviation	13.9%	1.1%
<b>PostgreSQL pgbench - 1000 - 250 - Read Write (TPS)</b>	<b>40117</b>	<b>26474</b>
Normalized	100%	65.99%
Standard Deviation	14.5%	1.1%
<b>ONNX Runtime - bert squad-10 - OpenMP CPU (Inferences/min)</b>	<b>648</b>	<b>751</b>
Normalized	86.28%	100%
Standard Deviation	4.7%	9.2%
<b>ONNX Runtime - super-resolution-10 - OpenMP CPU (Inferences/min)</b>	<b>5056</b>	<b>5914</b>
Normalized	85.49%	100%
Standard Deviation	3.3%	10%
<b>Mobile Neural Network - inception-v3 (ms)</b>	<b>26.608</b>	<b>26.381</b>
Normalized	99.15%	100%
Standard Deviation	4.9%	4.3%
<b>Mobile Neural Network - mobilenet-v1-1.0 (ms)</b>	<b>2.718</b>	<b>2.694</b>
Normalized	99.12%	100%
Standard Deviation	3.5%	2.9%
<b>Mobile Neural Network - MobileNetV2_224 (ms)</b>	<b>3.837</b>	<b>3.604</b>
Normalized	93.93%	100%
Standard Deviation	3.2%	3.3%
<b>Mobile Neural Network - SqueezeNetV1.0 (ms)</b>	<b>6.249</b>	<b>5.962</b>
Normalized	95.41%	100%
Standard Deviation	3.4%	2.8%
<b>Mobile Neural Network - resnet-v2-50 (ms)</b>	<b>20.711</b>	<b>21.021</b>
Normalized	100%	98.53%
Standard Deviation	7.9%	6.9%
<b>Mobile Neural Network - squeezenetv1.1 (ms)</b>	<b>4.726</b>	<b>4.441</b>
Normalized	93.97%	100%
Standard Deviation	4.4%	4.5%
<b>Mobile Neural Network - mobilenetV3 (ms)</b>	<b>2.375</b>	<b>2.370</b>
Normalized	99.79%	100%
Standard Deviation	6%	5.3%
<b>Timed LLVM Compilation - Unix Makefiles (sec)</b>	<b>274.264</b>	<b>275.492</b>
Normalized	100%	99.55%
Standard Deviation	2.4%	2.3%

<b>Rodinia - OpenMP HotSpot3D (sec)</b>	<b>79.403</b>	<b>80.312</b>
Normalized	100%	98.87%
Standard Deviation	6.3%	6.7%
<b>nginx - 1 (Reqs/sec)</b>	<b>52710</b>	<b>52530</b>
Normalized	100%	99.66%
Standard Deviation	2.5%	2.8%
<b>LeelaChessZero - Eigen (Nodes/s)</b>	<b>1330</b>	<b>1306</b>
Normalized	100%	98.2%
Standard Deviation	1.6%	0.8%
<b>MariaDB - 512 (Queries/sec)</b>	<b>703</b>	<b>647</b>
Normalized	100%	92.03%
Standard Deviation	0.5%	1.7%
<b>JPEG XL libjxl - PNG - 8 (MP/s)</b>	<b>0.96</b>	<b>0.98</b>
Normalized	97.96%	100%
Standard Deviation	0%	0%
<b>OpenFOAM - Motorbike 60M (sec)</b>	<b>243.11</b>	<b>239.68</b>
Normalized	98.59%	100%
Standard Deviation	0.3%	0.2%
<b>SecureMark - SecureMark-TLS (marks)</b>	<b>269688</b>	<b>272310</b>
Normalized	99.04%	100%
Standard Deviation	1.1%	0.2%
<b>Timed LLVM Compilation - Ninja (sec)</b>	<b>235.750</b>	<b>234.950</b>
Normalized	99.66%	100%
Standard Deviation	0.4%	0.2%
<b>Blender - Barbershop - CPU-Only (sec)</b>	<b>229.14</b>	<b>227.94</b>
Normalized	99.48%	100%
Standard Deviation	0.4%	0.4%
<b>PlaidML - No - Inference - ResNet 50 - CPU (FPS)</b>	<b>10.10</b>	<b>10.29</b>
Normalized	98.15%	100%
Standard Deviation	1.5%	0.4%
<b>PostgreSQL pgbench - 1000 - 250 - Read Only - Average Latency (ms)</b>	<b>0.409</b>	<b>0.403</b>
Normalized	98.53%	100%
Standard Deviation	0.5%	0.2%
<b>PostgreSQL pgbench - 1000 - 250 - Read Only (TPS)</b>	<b>611633</b>	<b>620425</b>
Normalized	98.58%	100%
Standard Deviation	0.5%	0.2%
<b>BRL-CAD - V.P.M (VGR Performance Metric)</b>	<b>349508</b>	<b>349004</b>
Normalized	100%	99.86%
<b>PostgreSQL pgbench - 1000 - 500 - Read Only - Average Latency (ms)</b>	<b>0.782</b>	<b>0.800</b>
Normalized	100%	97.75%
Standard Deviation	0.3%	0.5%
<b>PostgreSQL pgbench - 1000 - 500 - Read Only (TPS)</b>	<b>639361</b>	<b>624794</b>
Normalized	100%	97.72%
Standard Deviation	0.3%	0.4%
<b>TNN - CPU - DenseNet (ms)</b>	<b>2850</b>	<b>2838</b>
Normalized	99.55%	100%
Standard Deviation	0%	0%
<b>PostgreSQL pgbench - 100 - 250 - Read Write - Average Latency (ms)</b>	<b>4.683</b>	<b>5.949</b>
Normalized	100%	78.72%
Standard Deviation	2%	2.4%
<b>PostgreSQL pgbench - 100 - 250 - Read Write (TPS)</b>	<b>53398</b>	<b>42046</b>
Normalized	100%	78.74%

	Standard Deviation	2.1%	2.4%
<b>OpenSSL - SHA256 (byte/s)</b>		<b>36164270263</b>	<b>36289852270</b>
	Normalized	99.65%	100%
	Standard Deviation	0.4%	0.3%
<b>Cpuminer-Opt - Ringcoin (kH/s)</b>		<b>3390</b>	<b>3379</b>
	Normalized	100%	99.66%
	Standard Deviation	5.3%	4.4%
<b>Cpuminer-Opt - Myriad-Groestl (kH/s)</b>		<b>12315</b>	<b>12437</b>
	Normalized	99.02%	100%
	Standard Deviation	3.2%	3.1%
<b>Timed Node.js Compilation - Time To Compile (sec)</b>		<b>153.714</b>	<b>153.044</b>
	Normalized	99.56%	100%
	Standard Deviation	0.2%	0.2%
<b>Stress-NG - CPU Cache (Bogo Ops/s)</b>		<b>105.97</b>	<b>105.96</b>
	Normalized	100%	99.99%
	Standard Deviation	5.6%	5.8%
<b>PostgreSQL pgbench - 100 - 500 - Read Write - Average Latency (ms)</b>		<b>10.772</b>	<b>12.958</b>
	Normalized	100%	83.13%
	Standard Deviation	2%	1.9%
<b>PostgreSQL pgbench - 100 - 500 - Read Write (TPS)</b>		<b>46430</b>	<b>38594</b>
	Normalized	100%	83.12%
	Standard Deviation	1.9%	1.9%
<b>PostgreSQL pgbench - 100 - 250 - Read Only - Average Latency (ms)</b>		<b>0.338</b>	<b>0.334</b>
	Normalized	98.82%	100%
	Standard Deviation	0.7%	0.3%
<b>PostgreSQL pgbench - 100 - 250 - Read Only (TPS)</b>		<b>739400</b>	<b>748263</b>
	Normalized	98.82%	100%
	Standard Deviation	0.6%	0.3%
<b>PostgreSQL pgbench - 100 - 500 - Read Only - Average Latency (ms)</b>		<b>0.675</b>	<b>0.639</b>
	Normalized	94.67%	100%
	Standard Deviation	1.8%	0.9%
<b>PostgreSQL pgbench - 100 - 500 - Read Only (TPS)</b>		<b>740296</b>	<b>782876</b>
	Normalized	94.56%	100%
	Standard Deviation	1.8%	0.8%
<b>Apache Cassandra - Writes (Op/s)</b>		<b>230318</b>	<b>231554</b>
	Normalized	99.47%	100%
	Standard Deviation	0.7%	0.8%
<b>ONNX Runtime - fcn-resnet101-11 - OpenMP CPU (Inferences/min)</b>		<b>167</b>	<b>171</b>
	Normalized	97.66%	100%
	Standard Deviation	0.6%	1%
<b>ONNX Runtime - yolov4 - OpenMP CPU</b>		<b>428</b>	<b>436</b>
	Normalized	98.17%	100%
	Standard Deviation	0.2%	0.8%
<b>ONNX Runtime - shufflenet-v2-10 - OpenMP CPU (Inferences/min)</b>		<b>17156</b>	<b>17704</b>
	Normalized	96.9%	100%
	Standard Deviation	0.7%	0.3%
<b>AOM AV1 - Speed 6 Two-Pass - Bosphorus 4K (FPS)</b>		<b>7.30</b>	<b>7.35</b>
	Normalized	99.32%	100%
	Standard Deviation	2.1%	0.5%

JPEG XL libjxl - PNG - 7 (MP/s)	<b>9.36</b>	<b>9.74</b>
Normalized	96.1%	100%
Standard Deviation	0.1%	0.1%
Appleseed - Emily (sec)	<b>162.672185</b>	<b>163.068268</b>
Normalized	100%	99.76%
Cpuminer-Opt - Blake-2 S (kH/s)	<b>1335178</b>	<b>1292525</b>
Normalized	100%	96.81%
Standard Deviation	2.4%	3.7%
PlaidML - No - Inference - VGG19 - CPU (FPS)	<b>22.20</b>	<b>23.92</b>
Normalized	92.81%	100%
Standard Deviation	0.9%	2.2%
Appleseed - Material Tester (sec)	<b>147.897295</b>	<b>147.981773</b>
Normalized	100%	99.94%
Apache HTTP Server - 1000 (Reqs/sec)	<b>128081</b>	<b>135459</b>
Normalized	94.55%	100%
Standard Deviation	0%	0.3%
Apache HTTP Server - 500 (Reqs/sec)	<b>128307</b>	<b>134587</b>
Normalized	95.33%	100%
Standard Deviation	0.4%	0.4%
nginx - 100 (Reqs/sec)	<b>178551</b>	<b>202016</b>
Normalized	88.38%	100%
Standard Deviation	0.4%	0.4%
nginx - 200 (Reqs/sec)	<b>180032</b>	<b>202847</b>
Normalized	88.75%	100%
Standard Deviation	0.1%	0.2%
nginx - 1000 (Reqs/sec)	<b>178901</b>	<b>200086</b>
Normalized	89.41%	100%
Standard Deviation	0.2%	0.2%
nginx - 500 (Reqs/sec)	<b>180524</b>	<b>203361</b>
Normalized	88.77%	100%
Standard Deviation	0.2%	0.2%
Apache HTTP Server - 1 (Reqs/sec)	<b>6320</b>	<b>6117</b>
Normalized	100%	96.79%
Standard Deviation	1.5%	1.6%
Apache HTTP Server - 200 (Reqs/sec)	<b>133795</b>	<b>141088</b>
Normalized	94.83%	100%
Standard Deviation	0.9%	1.4%
nginx - 20 (Reqs/sec)	<b>192582</b>	<b>220753</b>
Normalized	87.24%	100%
Standard Deviation	0.2%	0.4%
Apache HTTP Server - 100 (Reqs/sec)	<b>110031</b>	<b>120148</b>
Normalized	91.58%	100%
Standard Deviation	0.4%	0.7%
Apache HTTP Server - 20 (Reqs/sec)	<b>67346</b>	<b>76762</b>
Normalized	87.73%	100%
Standard Deviation	0.3%	1.3%
Sysbench - CPU (Events/sec)	<b>114580</b>	<b>114562</b>
Normalized	100%	99.98%
Standard Deviation	0%	0%
OSPray - San Miguel - Path Tracer (FPS)	<b>3.11</b>	<b>3.10</b>
Normalized	100%	99.68%
Standard Deviation	0%	0.2%
PlaidML - No - Inference - VGG16 - CPU (FPS)	<b>27.13</b>	<b>28.99</b>
Normalized	93.58%	100%
Standard Deviation	0.6%	1.4%

Rodinia - OpenMP LavaMD (sec)	<b>85.062</b>	<b>84.099</b>
Normalized	98.87%	100%
Standard Deviation	0.1%	0.1%
VP9 libvpx Encoding - Speed 0 - Bosphorus 4K (FPS)	<b>7.46</b>	<b>7.42</b>
Normalized	100%	99.46%
Standard Deviation	0.4%	1.8%
oneDNN - R.N.N.T - f32 - CPU (ms)	<b>1429</b>	<b>1413</b>
Normalized	98.86%	100%
Standard Deviation	0.1%	0.1%
oneDNN - R.N.N.I - f32 - CPU (ms)	<b>777.262</b>	<b>766.690</b>
Normalized	98.64%	100%
Standard Deviation	0.5%	0.3%
Redis - SET (Reqs/sec)	<b>2148023</b>	<b>2195898</b>
Normalized	97.82%	100%
Standard Deviation	8.3%	6.9%
Chaos Group V-RAY - CPU (vsamples)	<b>27825</b>	<b>28305</b>
Normalized	98.3%	100%
Standard Deviation	2.2%	1.6%
Stockfish - Total Time (Nodes/s)	<b>75631071</b>	<b>75304369</b>
Normalized	100%	99.57%
Standard Deviation	1.6%	2.8%
simdjson - PartialTweets (GB/s)	<b>4.17</b>	<b>4.18</b>
Normalized	99.76%	100%
Standard Deviation	0.3%	0%
simdjson - DistinctUserID (GB/s)	<b>4.93</b>	<b>4.94</b>
Normalized	99.8%	100%
Standard Deviation	0.1%	0.2%
LuxCoreRender - Orange Juice - CPU (M samples/sec)	<b>7.05</b>	<b>7.09</b>
Normalized	99.44%	100%
Standard Deviation	0.2%	0.4%
LuxCoreRender - Danish Mood - CPU (M samples/sec)	<b>3.61</b>	<b>3.69</b>
Normalized	97.83%	100%
Standard Deviation	0.4%	2%
TensorFlow Lite - Inception V4 (us)	<b>1224573</b>	<b>1217903</b>
Normalized	99.46%	100%
Standard Deviation	0.2%	0.3%
LuxCoreRender - LuxCore Benchmark - CPU (M samples/sec)	<b>3.94</b>	<b>3.99</b>
Normalized	98.75%	100%
Standard Deviation	0.4%	0.4%
TensorFlow Lite - I.R.V (us)	<b>1080320</b>	<b>1076140</b>
Normalized	99.61%	100%
Standard Deviation	0.1%	0.1%
LuxCoreRender - R.C.a.P - CPU (M samples/sec)	<b>14.11</b>	<b>14.10</b>
Normalized	100%	99.93%
Standard Deviation	3.6%	11.8%
NCNN - CPU - regnety_400m (ms)	<b>14.94</b>	<b>14.50</b>
Normalized	97.05%	100%
Standard Deviation	2.1%	0.5%
NCNN - CPU - squeezeNet_ssd (ms)	<b>16.17</b>	<b>15.69</b>
Normalized	97.03%	100%
Standard Deviation	1.2%	1.3%
NCNN - CPU - yolov4-tiny (ms)	<b>21.12</b>	<b>20.15</b>
Normalized	95.41%	100%
Standard Deviation	2.9%	5.3%

<b>NCNN - CPU - resnet50 (ms)</b>	<b>16.43</b>	<b>15.45</b>
Normalized	94.04%	100%
Standard Deviation	3.3%	2.7%
<b>NCNN - CPU - alexnet (ms)</b>	<b>5.56</b>	<b>4.98</b>
Normalized	89.57%	100%
Standard Deviation	1.4%	8.7%
<b>NCNN - CPU - resnet18 (ms)</b>	<b>9.26</b>	<b>8.74</b>
Normalized	94.38%	100%
Standard Deviation	0.9%	4.3%
<b>NCNN - CPU - vgg16 (ms)</b>	<b>25.51</b>	<b>24.70</b>
Normalized	96.82%	100%
Standard Deviation	1.1%	4%
<b>NCNN - CPU - googlenet (ms)</b>	<b>13.03</b>	<b>12.48</b>
Normalized	95.78%	100%
Standard Deviation	4.7%	4.8%
<b>NCNN - CPU - blazeface (ms)</b>	<b>2.97</b>	<b>2.74</b>
Normalized	92.26%	100%
Standard Deviation	6.9%	1.3%
<b>NCNN - CPU - efficientnet-b0 (ms)</b>	<b>7.07</b>	<b>6.81</b>
Normalized	96.32%	100%
Standard Deviation	1.6%	0.1%
<b>NCNN - CPU - mnasnet (ms)</b>	<b>5.13</b>	<b>5.01</b>
Normalized	97.66%	100%
Standard Deviation	0.9%	0.8%
<b>NCNN - CPU - shufflenet-v2 (ms)</b>	<b>6.21</b>	<b>6.13</b>
Normalized	98.71%	100%
Standard Deviation	0.7%	0.4%
<b>NCNN - CPU-v3-v3 - mobilenet-v3 (ms)</b>	<b>5.66</b>	<b>5.31</b>
Normalized	93.82%	100%
Standard Deviation	5%	0.6%
<b>NCNN - CPU-v2-v2 - mobilenet-v2 (ms)</b>	<b>5.73</b>	<b>5.61</b>
Normalized	97.91%	100%
Standard Deviation	0.6%	0.7%
<b>NCNN - CPU - mobilenet (ms)</b>	<b>13.59</b>	<b>12.84</b>
Normalized	94.48%	100%
Standard Deviation	1.5%	2.4%
<b>LuxCoreRender - DLSC - CPU (M samples/sec)</b>	<b>4.74</b>	<b>4.77</b>
Normalized	99.37%	100%
Standard Deviation	0.7%	0.5%
<b>TensorFlow Lite - NASNet Mobile (us)</b>	<b>89415</b>	<b>86693</b>
Normalized	96.96%	100%
Standard Deviation	0.6%	0.6%
<b>TensorFlow Lite - SqueezeNet (us)</b>	<b>82511</b>	<b>81889</b>
Normalized	99.25%	100%
Standard Deviation	0.1%	0.3%
<b>TensorFlow Lite - Mobilenet Quant (us)</b>	<b>59852</b>	<b>58918</b>
Normalized	98.44%	100%
Standard Deviation	0%	0.6%
<b>TensorFlow Lite - Mobilenet Float (us)</b>	<b>55376</b>	<b>54956</b>
Normalized	99.24%	100%
Standard Deviation	0.3%	0.3%
<b>Blender - BMW27 - CPU-Only (sec)</b>	<b>59.79</b>	<b>59.91</b>
Normalized	100%	99.8%
Standard Deviation	0.1%	0.3%
<b>Facebook RocksDB - Update Rand (Op/s)</b>	<b>727767</b>	<b>741343</b>

	Normalized	98.17%	100%
	Standard Deviation	0.7%	0.6%
Facebook RocksDB - Rand Fill (Op/s)		<b>777421</b>	<b>772468</b>
	Normalized	100%	99.36%
	Standard Deviation	1%	1.6%
Facebook RocksDB - R.R.W.R (Op/s)		<b>2687791</b>	<b>2748440</b>
	Normalized	97.79%	100%
	Standard Deviation	1%	1%
OpenSSL - RSA4096 (verify/s)		<b>425838</b>	<b>426053</b>
	Normalized	99.95%	100%
	Standard Deviation	0%	0%
OpenSSL - RSA4096 (sign/s)		<b>6520</b>	<b>6529</b>
	Normalized	99.86%	100%
	Standard Deviation	0.1%	0%
GROMACS - MPI CPU - water_GMX50_bare (Ns/Day)		<b>3.259</b>	<b>3.297</b>
	Normalized	98.85%	100%
	Standard Deviation	0.6%	0%
Timed Godot Game Engine Compilation - Time To Compile (sec)		<b>56.360</b>	<b>56.081</b>
	Normalized	99.5%	100%
	Standard Deviation	0.4%	0.4%
Xmrig - Monero - 1M (H/s)		<b>18218</b>	<b>18333</b>
	Normalized	99.37%	100%
	Standard Deviation	0.2%	0.4%
simdjson - Kostya (GB/s)		3.21	3.21
	Standard Deviation	0.2%	0%
Xmrig - Wownero - 1M (H/s)		<b>19060</b>	<b>19139</b>
	Normalized	99.59%	100%
	Standard Deviation	0.1%	0.1%
simdjson - LargeRand (GB/s)		1.11	1.11
	Standard Deviation	0%	0.5%
Stress-NG - IO_uring (Bogo Ops/s)		<b>116668</b>	<b>493316</b>
	Normalized	23.65%	100%
	Standard Deviation	2.3%	2.5%
libavif avifenc - 0 (sec)		<b>45.120</b>	<b>45.073</b>
	Normalized	99.9%	100%
	Standard Deviation	0.1%	0.5%
NAMD - ATPase Simulation - 327,506 Atoms (days/ns)		<b>0.77725</b>	<b>0.77730</b>
	Normalized	100%	99.99%
	Standard Deviation	0.2%	0.5%
Rodinia - OpenMP Leukocyte (sec)		<b>44.601</b>	<b>44.354</b>
	Normalized	99.45%	100%
	Standard Deviation	0.4%	0.9%
NAS Parallel Benchmarks - SP.C (Mop/s)		<b>35556</b>	<b>36600</b>
	Normalized	97.15%	100%
	Standard Deviation	0.1%	0.1%
Timed Linux Kernel Compilation - Time To Compile		<b>36.731</b>	<b>36.466</b>
	Normalized	99.28%	100%
	Standard Deviation	1.8%	2.1%
Intel Open Image Denoise - RT.Idr_alb_nrm.3840x2160 (Images / Sec)		<b>0.86</b>	<b>0.85</b>
	Normalized	100%	98.84%
	Standard Deviation	0.1%	0.1%
VP9 libvpx Encoding - Speed 5 - Bosphorus 4K (FPS)		<b>17.51</b>	<b>16.97</b>
	Normalized	100%	96.92%

	Standard Deviation	1.5%	0.7%
<b>7-Zip Compression - C.S.T (MIPS)</b>		<b>172117</b>	<b>175165</b>
	Normalized	98.26%	100%
	Standard Deviation	0.4%	0.2%
<b>OpenFOAM - Motorbike 30M (sec)</b>		<b>24.22</b>	<b>24.21</b>
	Normalized	99.96%	100%
	Standard Deviation	0.5%	0.4%
<b>SVT-AV1 - Preset 8 - Bosphorus 4K (FPS)</b>		<b>19.707</b>	<b>19.488</b>
	Normalized	100%	98.89%
	Standard Deviation	1.1%	0.9%
<b>Cpuminer-Opt - Garlicoin (kH/s)</b>		<b>1977</b>	<b>1927</b>
	Normalized	100%	97.48%
	Standard Deviation	0.8%	2.3%
<b>Cpuminer-Opt - x25x (kH/s)</b>		<b>768.20</b>	<b>773.60</b>
	Normalized	99.3%	100%
	Standard Deviation	1.1%	0.8%
<b>Cpuminer-Opt - T.S.2.O (kH/s)</b>		<b>506553</b>	<b>508047</b>
	Normalized	99.71%	100%
	Standard Deviation	0.2%	0.6%
<b>Cpuminer-Opt - Q.S.2.P (kH/s)</b>		<b>214267</b>	<b>213690</b>
	Normalized	100%	99.73%
	Standard Deviation	0%	0.2%
<b>Cpuminer-Opt - Skeincoin (kH/s)</b>		<b>208510</b>	<b>209400</b>
	Normalized	99.57%	100%
	Standard Deviation	1.1%	0.7%
<b>Cpuminer-Opt - LBC, LBRY Credits (kH/s)</b>		<b>69070</b>	<b>69163</b>
	Normalized	99.87%	100%
	Standard Deviation	0.4%	0.7%
<b>Cpuminer-Opt - Deepcoin (kH/s)</b>		<b>23600</b>	<b>23450</b>
	Normalized	100%	99.36%
	Standard Deviation	1.3%	0.2%
<b>Xcompact3d Incompact3d - i.i.1.C.P.D (sec)</b>		<b>30.3851414</b>	<b>29.8944200</b>
	Normalized	98.38%	100%
	Standard Deviation	0.9%	1.1%
<b>Cpuminer-Opt - Magi (kH/s)</b>		<b>1221</b>	<b>1224</b>
	Normalized	99.81%	100%
	Standard Deviation	0.2%	0.3%
<b>Stress-NG - NUMA (Bogo Ops/s)</b>		<b>573.20</b>	<b>584.46</b>
	Normalized	98.07%	100%
	Standard Deviation	0.7%	0.3%
<b>Stress-NG - MMAP (Bogo Ops/s)</b>		<b>550.07</b>	<b>481.35</b>
	Normalized	100%	87.51%
	Standard Deviation	0.2%	0.4%
<b>Stress-NG - Malloc (Bogo Ops/s)</b>		<b>619879642</b>	<b>622292053</b>
	Normalized	99.61%	100%
	Standard Deviation	0.1%	0.1%
<b>Stress-NG - Context Switching (Bogo Ops/s)</b>		<b>11961807</b>	<b>13907201</b>
	Normalized	86.01%	100%
	Standard Deviation	1.5%	0.3%
<b>Stress-NG - Crypto (Bogo Ops/s)</b>		<b>6538</b>	<b>6540</b>
	Normalized	99.97%	100%
	Standard Deviation	0%	0%
<b>Stress-NG - S.V.M.P (Bogo Ops/s)</b>		<b>6620370</b>	<b>9796819</b>
	Normalized	67.58%	100%
	Standard Deviation	0.1%	0.1%

<b>Stress-NG - Memory Copying (Bogo Ops/s)</b>	<b>8095</b>	<b>8142</b>
Normalized	99.42%	100%
Standard Deviation	0.1%	0.1%
<b>Stress-NG - Vector Math (Bogo Ops/s)</b>	<b>142582</b>	<b>142691</b>
Normalized	99.92%	100%
Standard Deviation	0%	0%
<b>Stress-NG - CPU Stress (Bogo Ops/s)</b>	<b>69409</b>	<b>69941</b>
Normalized	99.24%	100%
Standard Deviation	0.2%	0%
<b>Stress-NG - Socket Activity (Bogo Ops/s)</b>	<b>14982</b>	<b>19319</b>
Normalized	77.55%	100%
Standard Deviation	0.2%	0.6%
<b>Stress-NG - SENDFILE (Bogo Ops/s)</b>	<b>532284</b>	<b>521315</b>
Normalized	100%	97.94%
Standard Deviation	0%	0.2%
<b>Stress-NG - Forking (Bogo Ops/s)</b>	<b>69855</b>	<b>73799</b>
Normalized	94.66%	100%
Standard Deviation	0.3%	0.7%
<b>Stress-NG - MEMFD (Bogo Ops/s)</b>	<b>1046</b>	<b>1130</b>
Normalized	92.58%	100%
Standard Deviation	0.4%	0.1%
<b>Stress-NG - G.Q.D.S (Bogo Ops/s)</b>	<b>348.09</b>	<b>347.75</b>
Normalized	100%	99.9%
Standard Deviation	0%	0.1%
<b>Stress-NG - Matrix Math (Bogo Ops/s)</b>	<b>102692</b>	<b>105286</b>
Normalized	97.54%	100%
Standard Deviation	0.8%	0.1%
<b>Stress-NG - G.C.S.F (Bogo Ops/s)</b>	<b>3684070</b>	<b>3705740</b>
Normalized	99.42%	100%
Standard Deviation	1.1%	0.1%
<b>Stress-NG - Atomic (Bogo Ops/s)</b>	<b>196373</b>	<b>197808</b>
Normalized	99.27%	100%
Standard Deviation	0.2%	0.1%
<b>Stress-NG - Semaphores (Bogo Ops/s)</b>	<b>3625859</b>	<b>3635712</b>
Normalized	99.73%	100%
Standard Deviation	0.7%	0.2%
<b>Google SynthMark - VoiceMark_100 (Voices)</b>	<b>814.640</b>	<b>816.310</b>
Normalized	99.8%	100%
Standard Deviation	0.4%	0.1%
<b>libavif avifenc - 6, Lossless (sec)</b>	<b>28.860</b>	<b>28.358</b>
Normalized	98.26%	100%
Standard Deviation	1.1%	0.7%
<b>ASTC Encoder - Exhaustive (sec)</b>	<b>24.0608</b>	<b>24.0457</b>
Normalized	99.94%	100%
Standard Deviation	0%	0%
<b>OSPray - San Miguel - SciVis (FPS)</b>	37.51	37.51
Standard Deviation	2.2%	2.2%
<b>NAS Parallel Benchmarks - IS.D (Mop/s)</b>	<b>1994</b>	<b>2013</b>
Normalized	99.04%	100%
Standard Deviation	0.6%	0.3%
<b>NAS Parallel Benchmarks - LU.C (Mop/s)</b>	<b>82765</b>	<b>84921</b>
Normalized	97.46%	100%
Standard Deviation	0.6%	0.2%
<b>libavif avifenc - 2 (sec)</b>	<b>25.023</b>	<b>24.518</b>
Normalized	97.98%	100%

	Standard Deviation	1%	0.2%
<b>x265 - Bosphorus 4K (FPS)</b>		<b>26.36</b>	<b>26.58</b>
	Normalized	99.17%	100%
	Standard Deviation	0.7%	1.4%
<b>Embree - Pathtracer ISPC - Crown (FPS)</b>		<b>28.4922</b>	<b>28.2755</b>
	Normalized	100%	99.24%
	Standard Deviation	0.3%	0.2%
<b>OSPray - NASA Streamlines - Path Tracer (FPS)</b>		<b>10.53</b>	<b>10.53</b>
	Standard Deviation	0%	0%
<b>TTSIOD 3D Renderer - P.R.W.S.S.M (FPS)</b>		<b>969.494</b>	<b>957.387</b>
	Normalized	100%	98.75%
	Standard Deviation	0.1%	2.5%
<b>Natron - Spaceship (FPS)</b>		<b>5.1</b>	<b>5.1</b>
	Standard Deviation	2.3%	0%
<b>Embree - Pathtracer - Crown (FPS)</b>		<b>30.7634</b>	<b>30.9509</b>
	Normalized	99.39%	100%
	Standard Deviation	0.3%	0.8%
<b>Embree - Pathtracer ISPC - Asian Dragon (FPS)</b>		<b>31.4647</b>	<b>31.4044</b>
	Normalized	100%	99.81%
	Standard Deviation	0.3%	1.1%
<b>AOM AV1 - Speed 8 Realtime - Bosphorus 4K (FPS)</b>		<b>31.28</b>	<b>30.96</b>
	Normalized	100%	98.98%
	Standard Deviation	0.2%	0.7%
<b>TNN - CPU - MobileNet v2 (ms)</b>		<b>282.131</b>	<b>280.338</b>
	Normalized	99.36%	100%
	Standard Deviation	1.1%	0.6%
<b>Rodinia - O.S (sec)</b>		<b>6.558</b>	<b>6.695</b>
	Normalized	100%	97.95%
	Standard Deviation	5.1%	0.8%
<b>Embree - Pathtracer - Asian Dragon (FPS)</b>		<b>34.1566</b>	<b>34.3835</b>
	Normalized	99.34%	100%
	Standard Deviation	0.8%	0.1%
<b>JPEG XL libjxl - PNG - 5 (MP/s)</b>		<b>72.00</b>	<b>74.92</b>
	Normalized	96.1%	100%
	Standard Deviation	0.4%	0.1%
<b>TNN - CPU - SqueezeNet v1.1 (ms)</b>		<b>251.852</b>	<b>251.443</b>
	Normalized	99.84%	100%
	Standard Deviation	0.1%	0%
<b>JPEG XL libjxl - JPEG - 5 (MP/s)</b>		<b>74.55</b>	<b>79.04</b>
	Normalized	94.32%	100%
	Standard Deviation	0.4%	1%
<b>JPEG XL libjxl - JPEG - 7 (MP/s)</b>		<b>73.99</b>	<b>79.20</b>
	Normalized	93.42%	100%
	Standard Deviation	0.4%	0.5%
<b>Redis - GET (Reqs/sec)</b>		<b>2684890</b>	<b>2472941</b>
	Normalized	100%	92.11%
	Standard Deviation	0.6%	1.3%
<b>AOM AV1 - Speed 9 Realtime - Bosphorus 4K (FPS)</b>		<b>46.80</b>	<b>46.73</b>
	Normalized	100%	99.85%
	Standard Deviation	0.5%	0.7%
<b>x265 - Bosphorus 1080p (FPS)</b>		<b>54.72</b>	<b>55.20</b>
	Normalized	99.13%	100%
	Standard Deviation	2.3%	2.1%
<b>NAS Parallel Benchmarks - FT.C (Mop/s)</b>		<b>42915</b>	<b>43591</b>
	Normalized	98.45%	100%

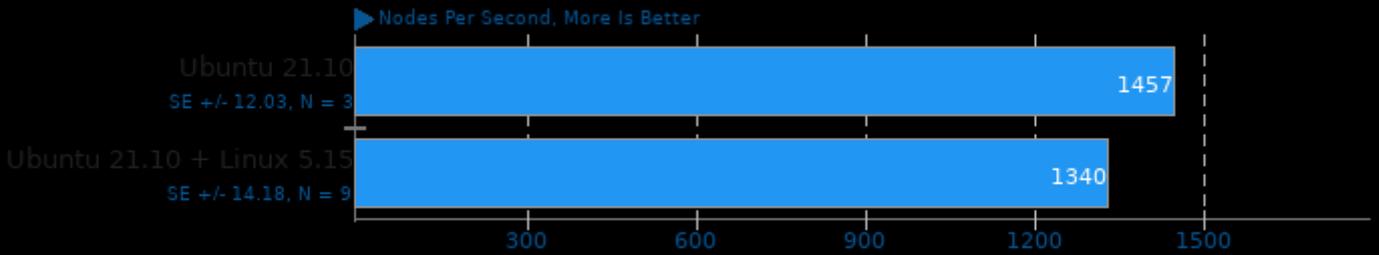
	Standard Deviation	0.5%	0.1%
<b>OSPray - NASA Streamlines - SciVis (FPS)</b>		<b>50.53</b>	<b>52.11</b>
	Normalized	96.97%	100%
	Standard Deviation	2.3%	2.3%
<b>JPEG XL libjxl - JPEG - 8 (MP/s)</b>		<b>28.94</b>	<b>29.99</b>
	Normalized	96.5%	100%
	Standard Deviation	1.2%	0.9%
<b>Sysbench - RAM / Memory (MiB/sec)</b>		<b>10278</b>	<b>10250</b>
	Normalized	100%	99.72%
	Standard Deviation	0.2%	0.5%
<b>Rodinia - OpenMP CFD Solver (sec)</b>		<b>9.541</b>	<b>9.701</b>
	Normalized	100%	98.35%
	Standard Deviation	0.6%	0.6%
<b>libavif avifenc - 6 (sec)</b>		<b>9.722</b>	<b>9.418</b>
	Normalized	96.87%	100%
	Standard Deviation	0.3%	0.4%
<b>SVT-VP9 - VMAF Optimized - Bosphorus 1080p (FPS)</b>		<b>446.62</b>	<b>444.46</b>
	Normalized	100%	99.52%
	Standard Deviation	2.7%	4.3%
<b>OSPray - M.R - SciVis (FPS)</b>		<b>28.57</b>	<b>28.57</b>
	Standard Deviation	0%	0%
<b>Xcompact3d Incompact3d - i.i.1.C.P.D (sec)</b>		<b>6.90810013</b>	<b>6.55719979</b>
	Normalized	94.92%	100%
	Standard Deviation	0.6%	1.4%
<b>ASTC Encoder - Thorough (sec)</b>		<b>6.5677</b>	<b>6.5450</b>
	Normalized	99.65%	100%
	Standard Deviation	0.2%	0.1%
<b>NAS Parallel Benchmarks - CG.C (Mop/s)</b>		<b>24114</b>	<b>25960</b>
	Normalized	92.89%	100%
	Standard Deviation	1.1%	1.6%
<b>NAS Parallel Benchmarks - SP.B (Mop/s)</b>		<b>63598</b>	<b>65351</b>
	Normalized	97.32%	100%
	Standard Deviation	0.3%	0.4%
<b>libavif avifenc - 10, Lossless (sec)</b>		<b>5.730</b>	<b>5.390</b>
	Normalized	94.07%	100%
	Standard Deviation	0.5%	0.5%
<b>LAMMPS Molecular Dynamics Simulator - Rhodopsin Protein (ns/day)</b>		<b>16.350</b>	<b>15.905</b>
	Normalized	100%	97.28%
	Standard Deviation	3.7%	0.5%
<b>SVT-HEVC - 7 - Bosphorus 1080p (FPS)</b>		<b>281.48</b>	<b>283.51</b>
	Normalized	99.28%	100%
	Standard Deviation	2.4%	2.4%
<b>TNN - CPU - SqueezeNet v2 (ms)</b>		<b>62.609</b>	<b>61.875</b>
	Normalized	98.83%	100%
	Standard Deviation	1.8%	0.3%
<b>NAS Parallel Benchmarks - MG.C (Mop/s)</b>		<b>50333</b>	<b>52548</b>
	Normalized	95.78%	100%
	Standard Deviation	0.1%	0.2%
<b>libavif avifenc - 10 (sec)</b>		<b>3.497</b>	<b>3.197</b>
	Normalized	91.42%	100%
	Standard Deviation	0.2%	0.4%
<b>SVT-HEVC - 10 - Bosphorus 1080p (FPS)</b>		<b>553.02</b>	<b>556.42</b>
	Normalized	99.39%	100%
	Standard Deviation	0.8%	0.2%

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<b>OSPray - M.R - Path Tracer (FPS)</b>	500	500
<b>Standard Deviation</b>	0%	0%

### LeelaChessZero 0.28

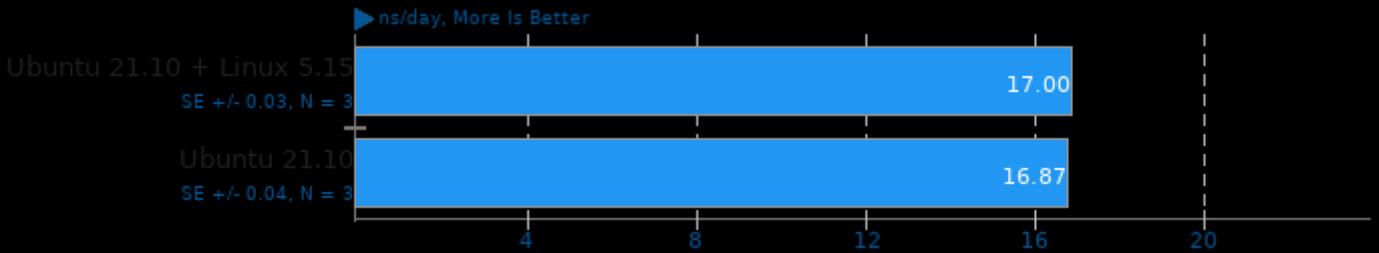
Backend: BLAS



1. (CXX) g++ options: -fno -pthread

### LAMMPS Molecular Dynamics Simulator 29Oct2020

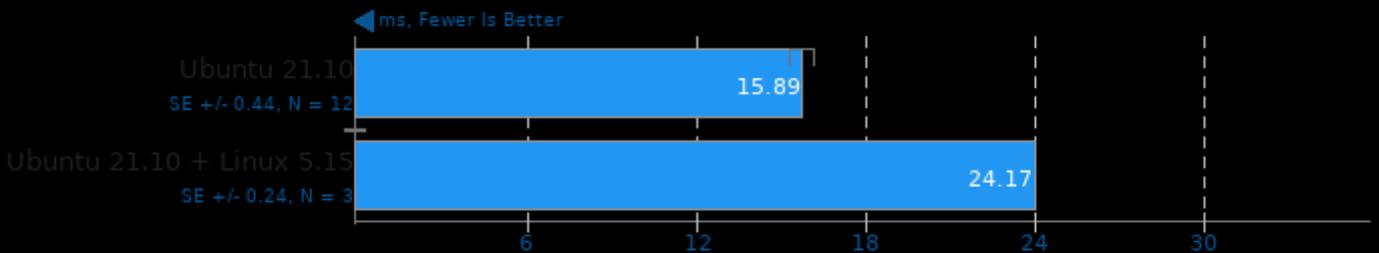
Model: 20k Atoms



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

### PostgreSQL pgbench 14.0

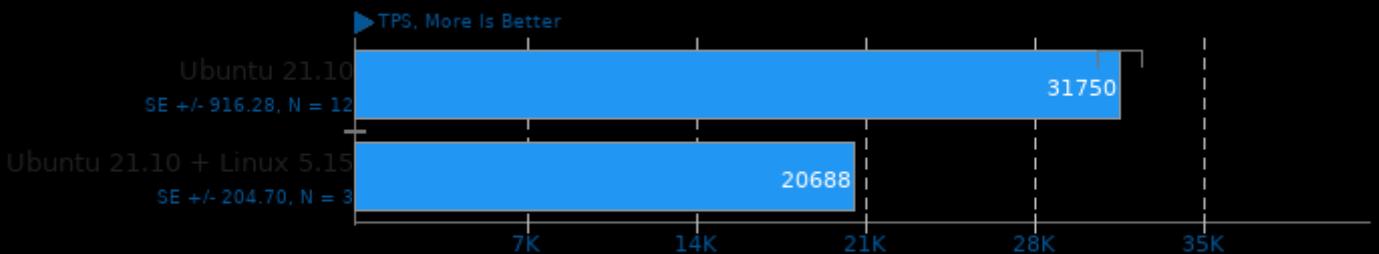
Scaling Factor: 1000 - Clients: 500 - Mode: Read Write - Average Latency



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

### PostgreSQL pgbench 14.0

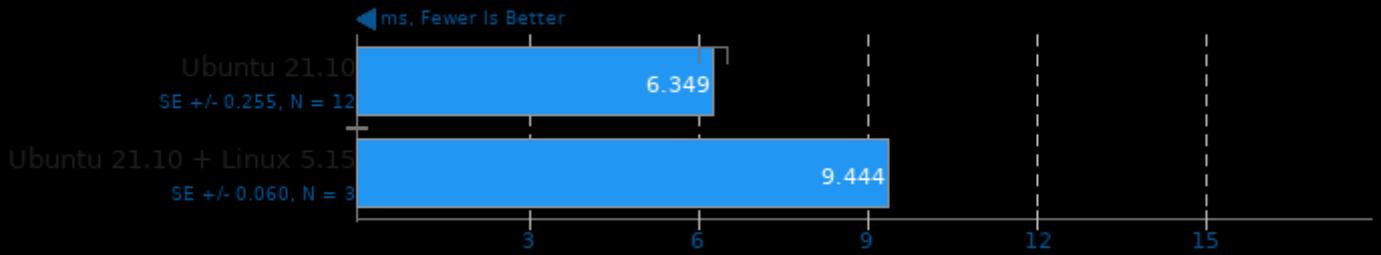
Scaling Factor: 1000 - Clients: 500 - Mode: Read Write



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

## PostgreSQL pgbench 14.0

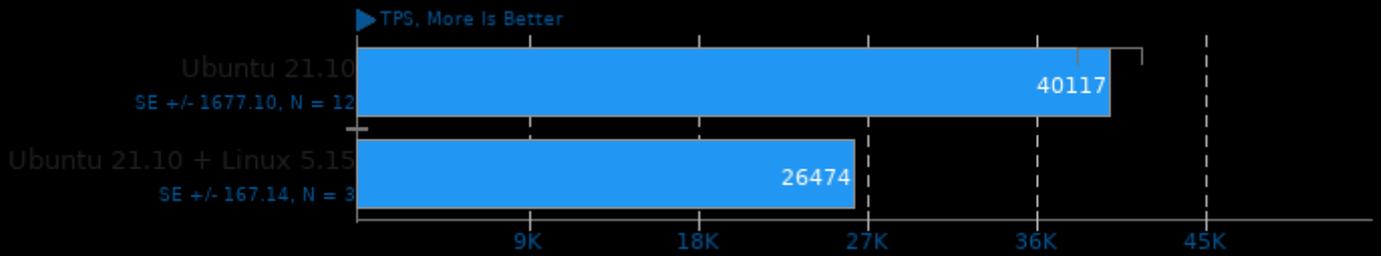
Scaling Factor: 1000 - Clients: 250 - Mode: Read Write - Average Latency



1. (GCC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lm

## PostgreSQL pgbench 14.0

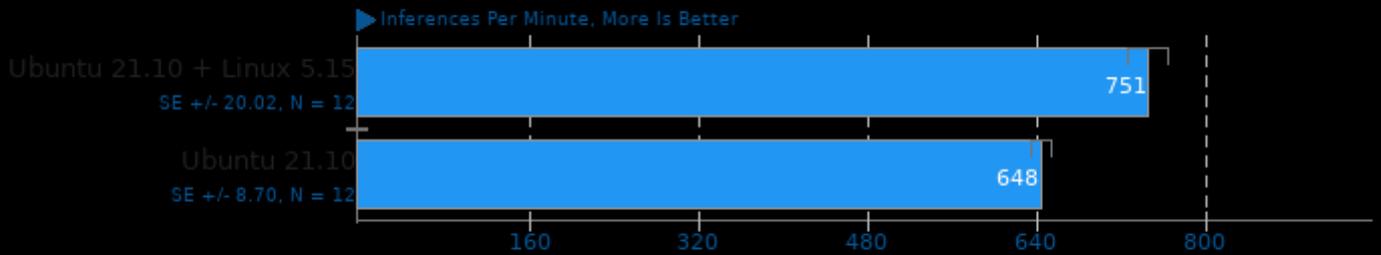
Scaling Factor: 1000 - Clients: 250 - Mode: Read Write



1. (GCC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lm

## ONNX Runtime 1.8.2

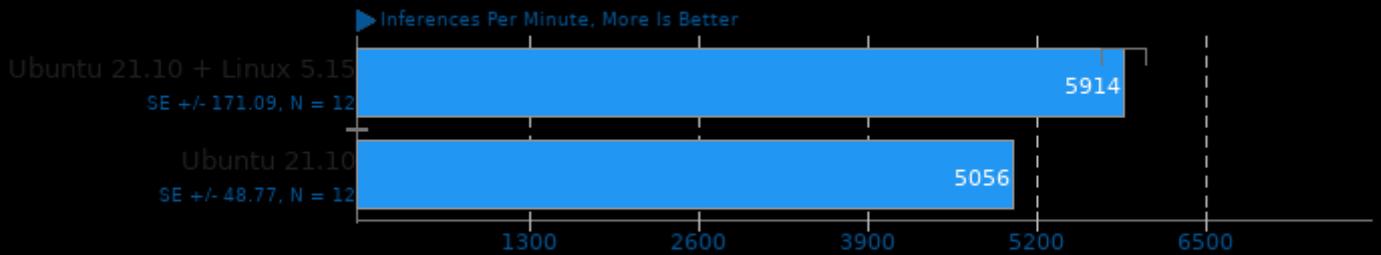
Model: bert-squad-10 - Device: OpenMP CPU



1. (CXX) g++ options: -fopenmp -function-sections -fdata-sections -O3 -ldl -lrt

## ONNX Runtime 1.8.2

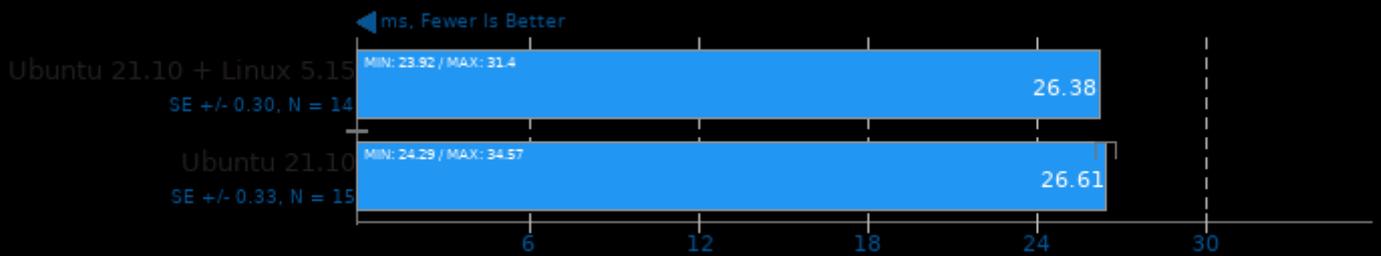
Model: super-resolution-10 - Device: OpenMP CPU



1. (CXX) g++ options: -fopenmp -function-sections -fdata-sections -O3 -ldl -lrt

### Mobile Neural Network 1.2

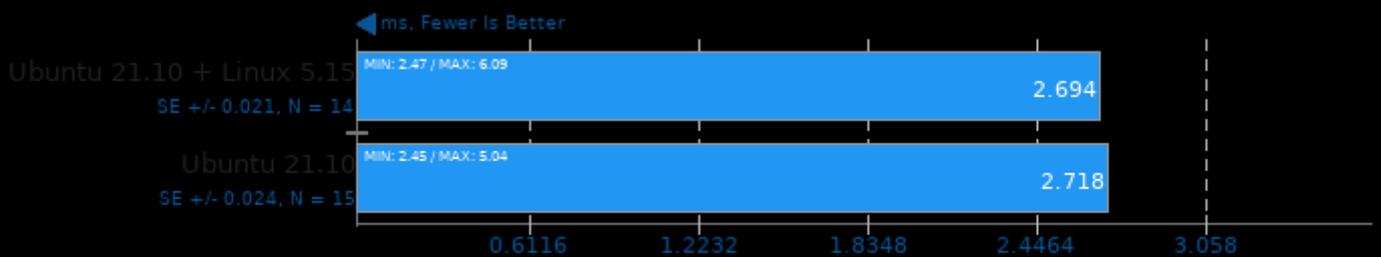
Model: inception-v3



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

### Mobile Neural Network 1.2

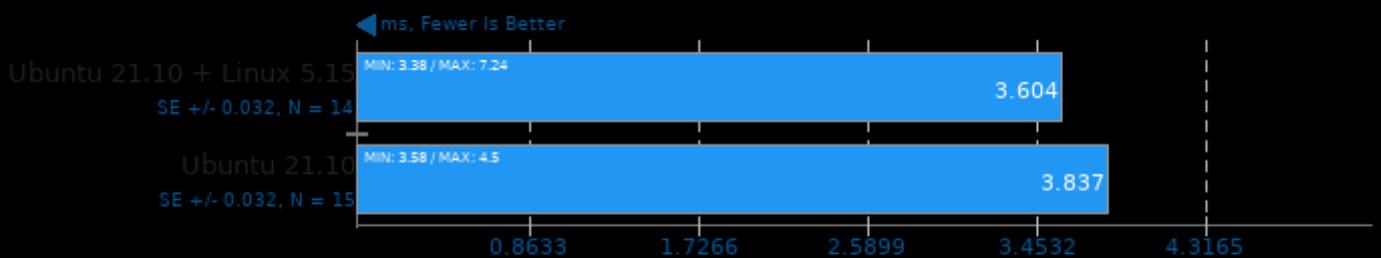
Model: mobilenet-v1-1.0



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 1.2

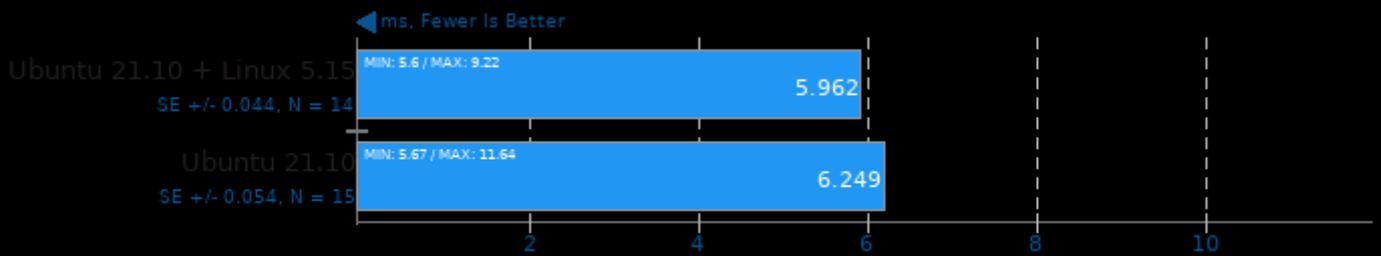
Model: MobileNetV2\_224



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 1.2

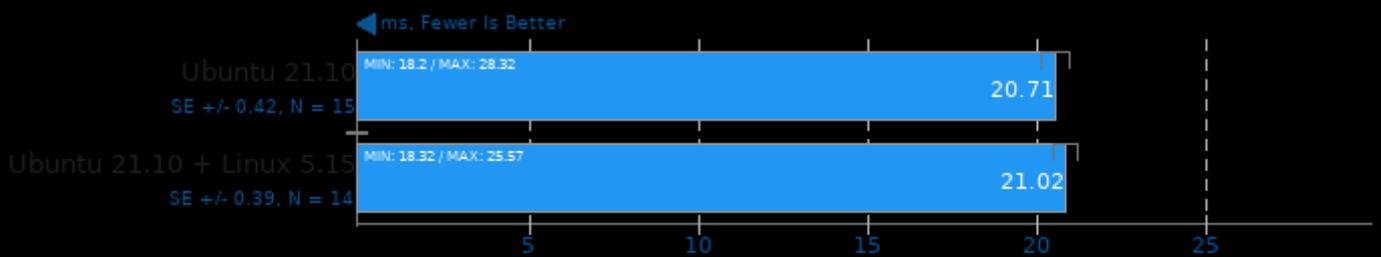
Model: SqueezeNetV1.0



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

## Mobile Neural Network 1.2

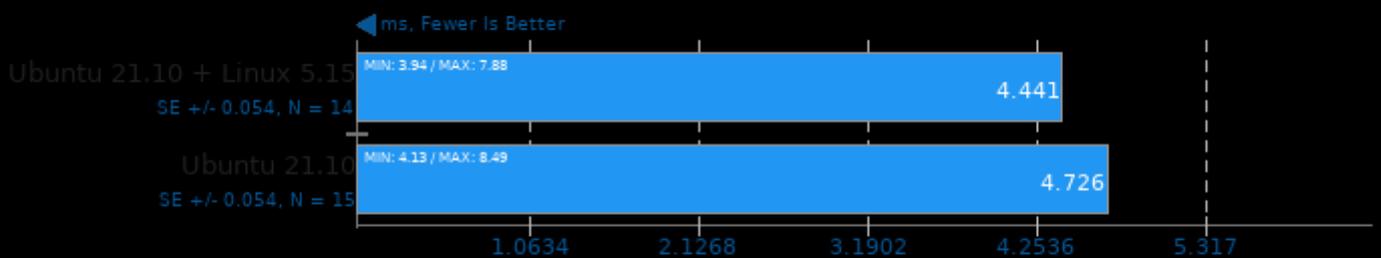
Model: resnet-v2-50



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 1.2

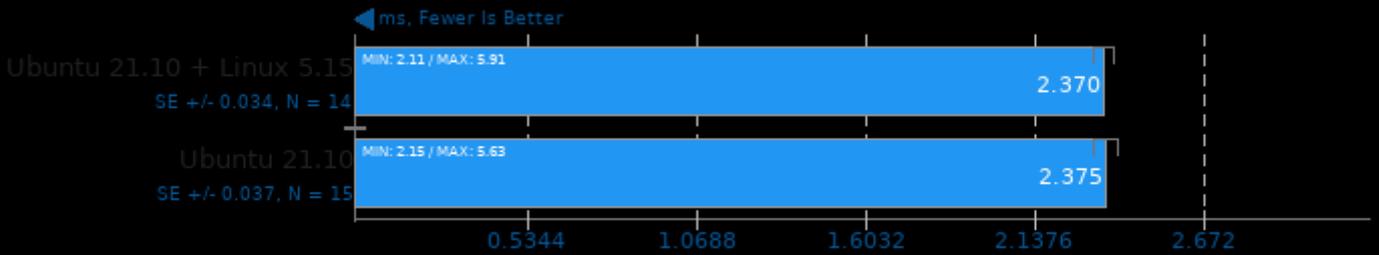
Model: squeezenetv1.1



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 1.2

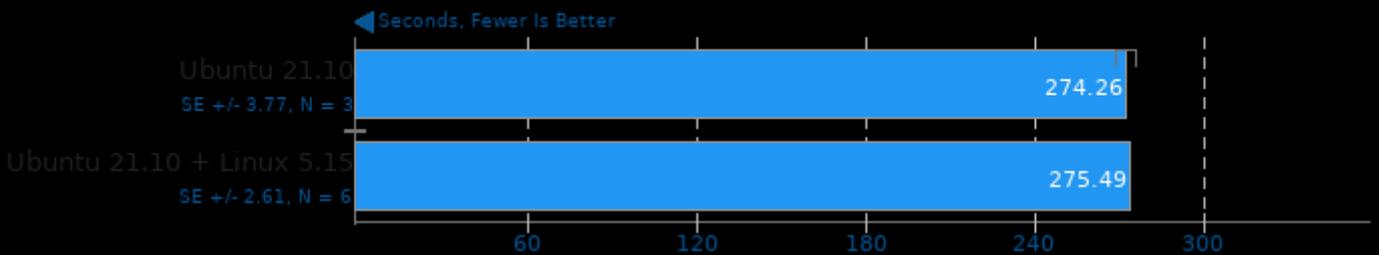
Model: mobilenetV3



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

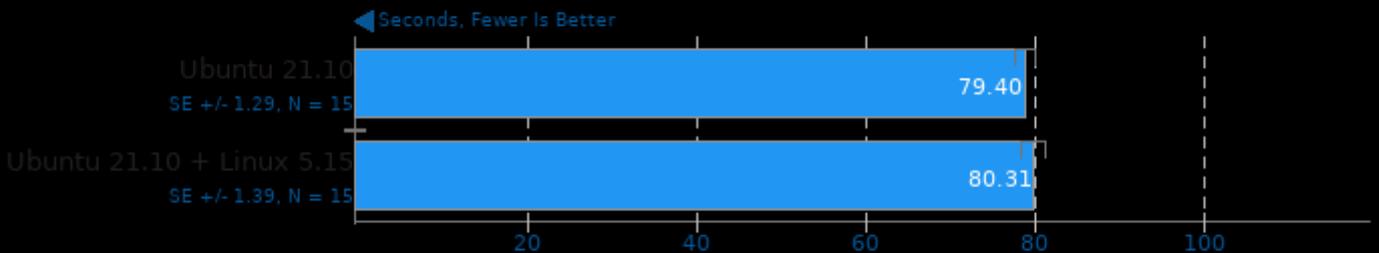
## Timed LLVM Compilation 13.0

Build System: Unix Makefiles



## Rodinia 3.1

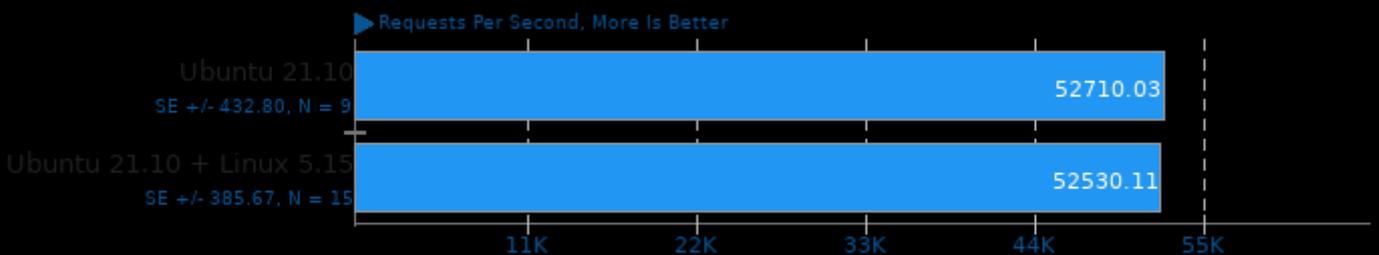
Test: OpenMP HotSpot3D



1. (CXX) g++ options: -O2 -fOpenCL

## nginx 1.21.1

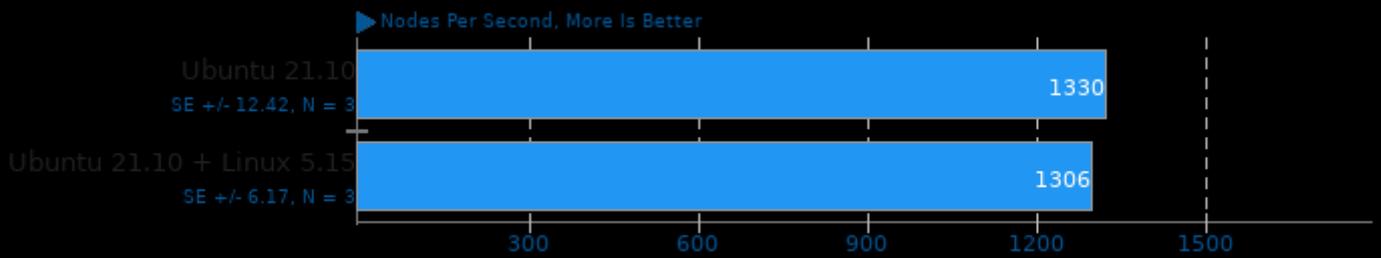
Concurrent Requests: 1



1. (CC) gcc options: -jcrypt -lz -O3 -march=native

## LeelaChessZero 0.28

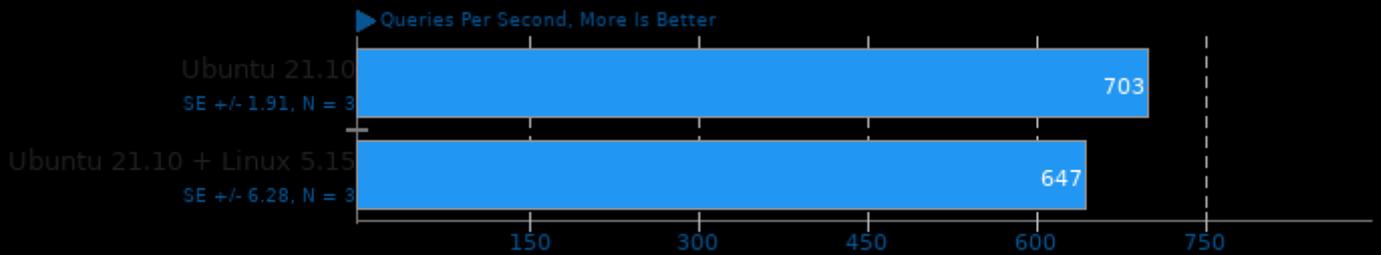
Backend: Eigen



1. (CXX) g++ options: -fno -pthread

## MariaDB 10.6.4

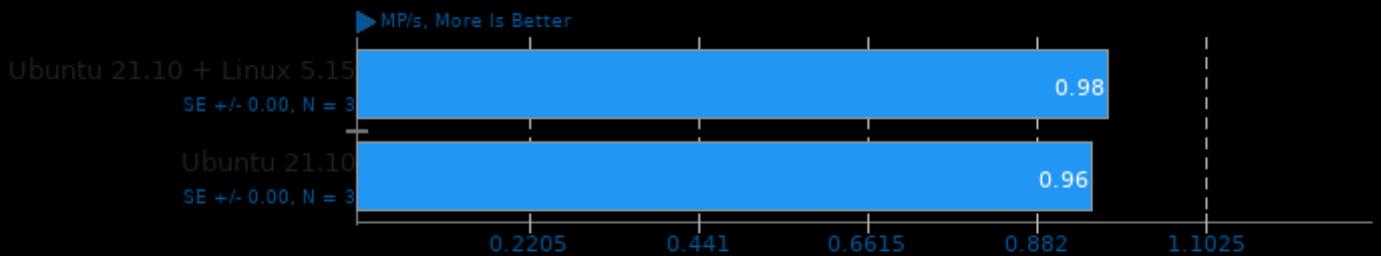
Clients: 512



1. (CXX) g++ options: -pie -fPIC -fstack-protector -O3 -lzma -lbz2 -lsnappy -lnuma -lpcr2-8 -lcrypt -laio -lz -lm -lssl -lcrypto -lpthread -ldl

## JPEG XL libjxl 0.5

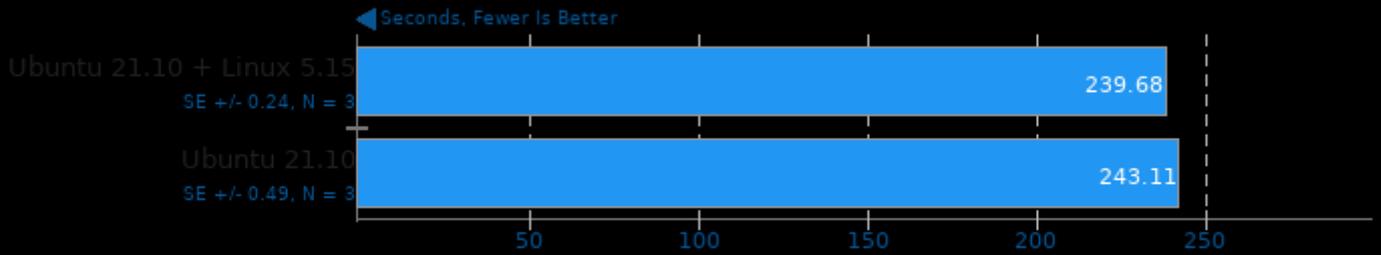
Input: PNG - Encode Speed: 8



1. (CXX) g++ options: -funwind-tables -O3 -O2 -fPIE -pie

## OpenFOAM 8

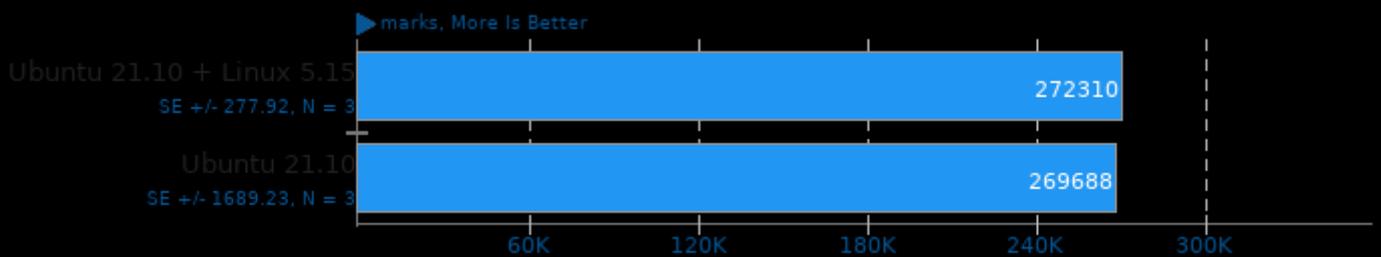
Input: Motorbike 60M



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

## SecureMark 1.0.4

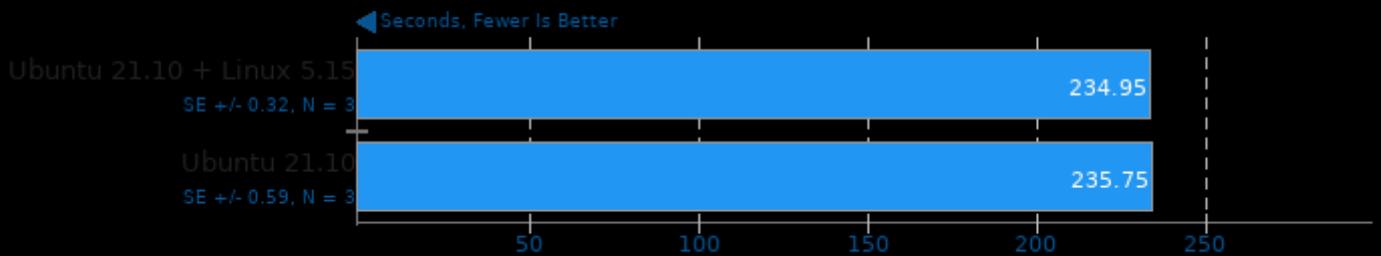
Benchmark: SecureMark-TLS



1. (CC) gcc options: -pedantic -O3

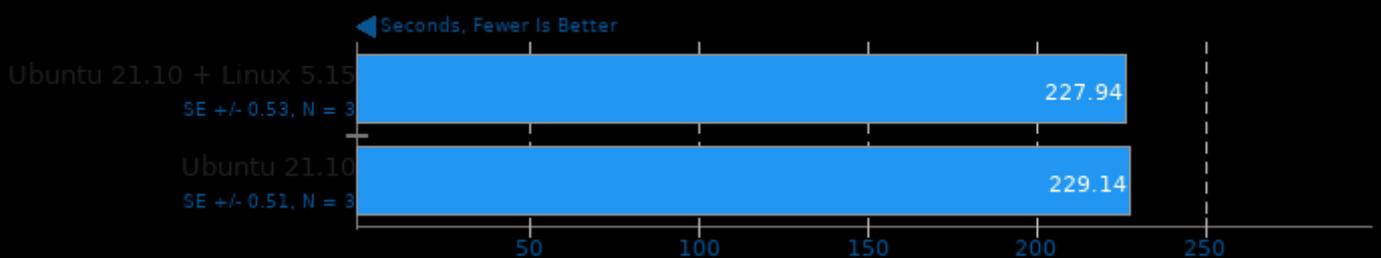
## Timed LLVM Compilation 13.0

Build System: Ninja



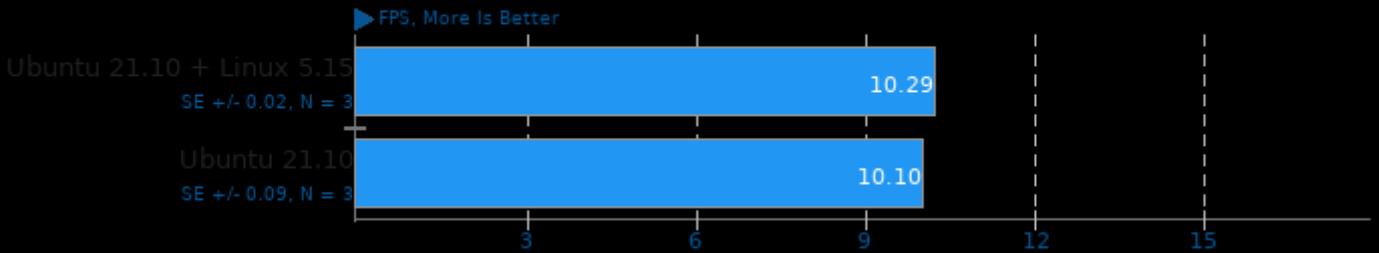
## Blender 2.92

Blend File: Barbershop - Compute: CPU-Only



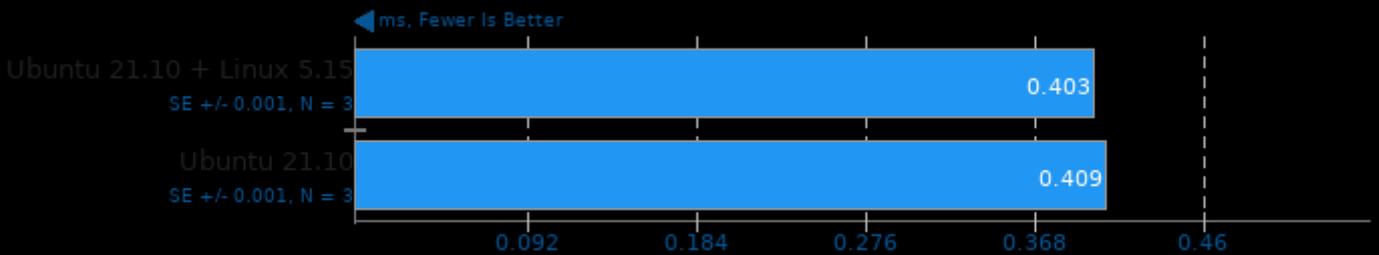
### PlaidML

FP16: No - Mode: Inference - Network: ResNet 50 - Device: CPU



### PostgreSQL pgbench 14.0

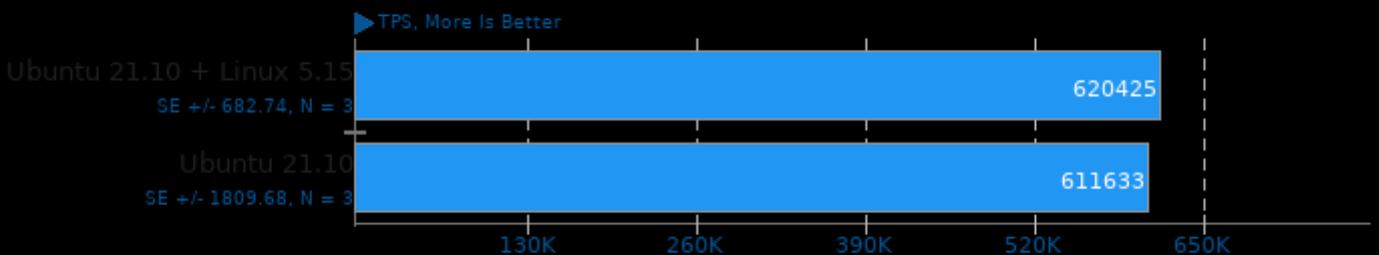
Scaling Factor: 1000 - Clients: 250 - Mode: Read Only - Average Latency



1. (GCC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lm

### PostgreSQL pgbench 14.0

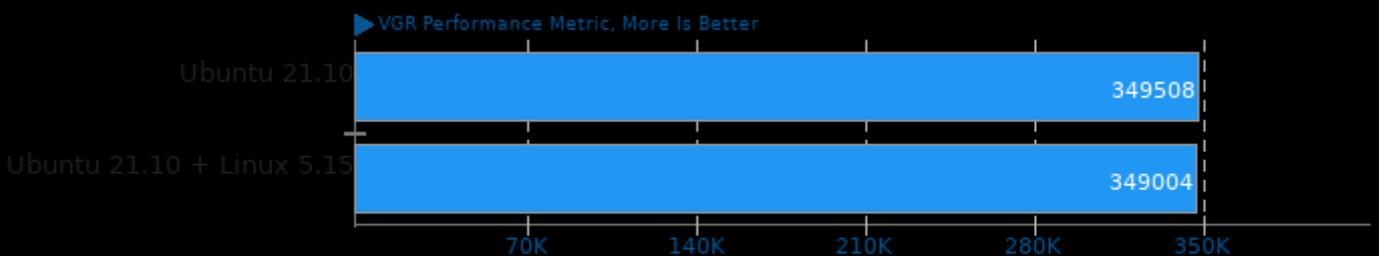
Scaling Factor: 1000 - Clients: 250 - Mode: Read Only



1. (GCC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lm

### BRL-CAD 7.32.2

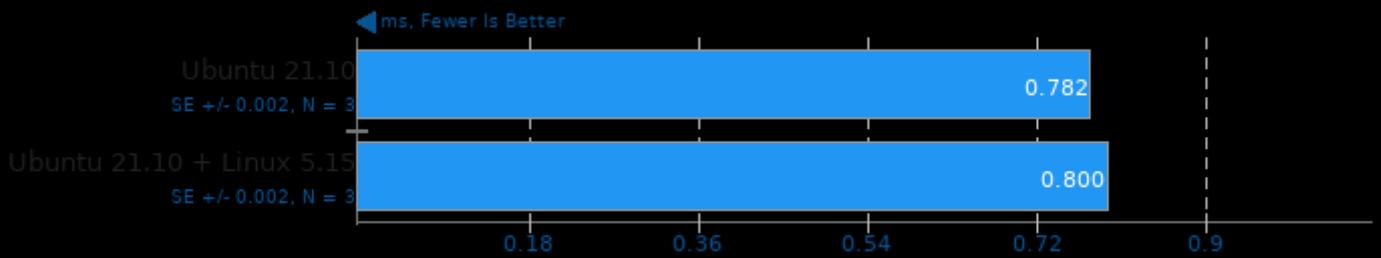
VGR Performance Metric



1. (CXX) g++ options: -std=c++11 -pipe -fvisibility=hidden -fno-strict-aliasing -fno-common -fexceptions -ftemplate-depth-128 -m64 -ggdb3 -O3 -fipa-pt

## PostgreSQL pgbench 14.0

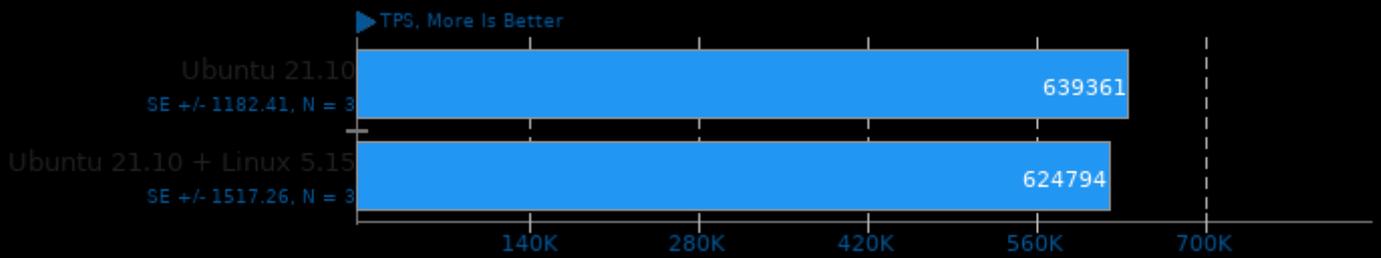
Scaling Factor: 1000 - Clients: 500 - Mode: Read Only - Average Latency



1. (GCC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lm

## PostgreSQL pgbench 14.0

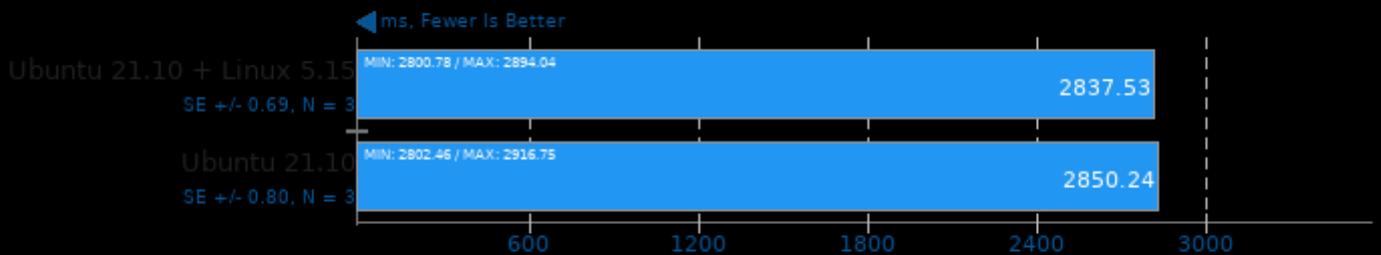
Scaling Factor: 1000 - Clients: 500 - Mode: Read Only



1. (GCC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lm

## TNN 0.3

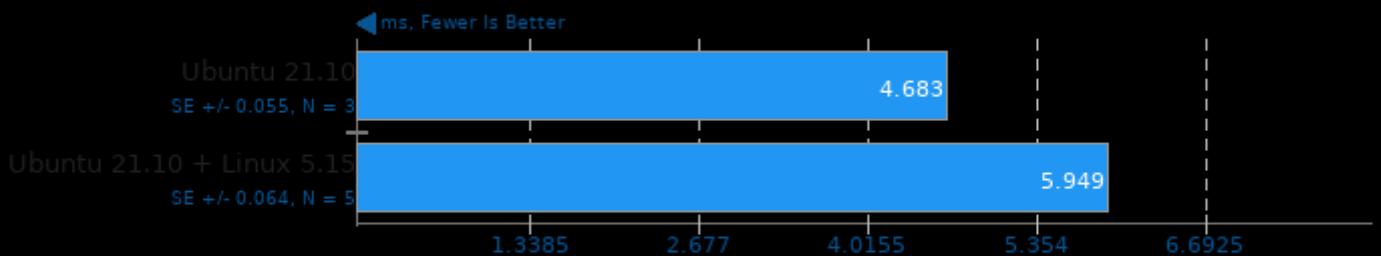
Target: CPU - Model: DenseNet



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

## PostgreSQL pgbench 14.0

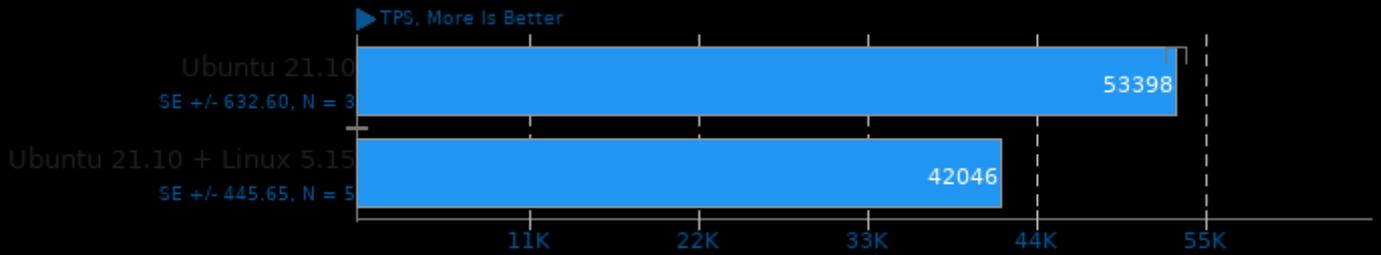
Scaling Factor: 100 - Clients: 250 - Mode: Read Write - Average Latency



1. (GCC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lm

## PostgreSQL pgbench 14.0

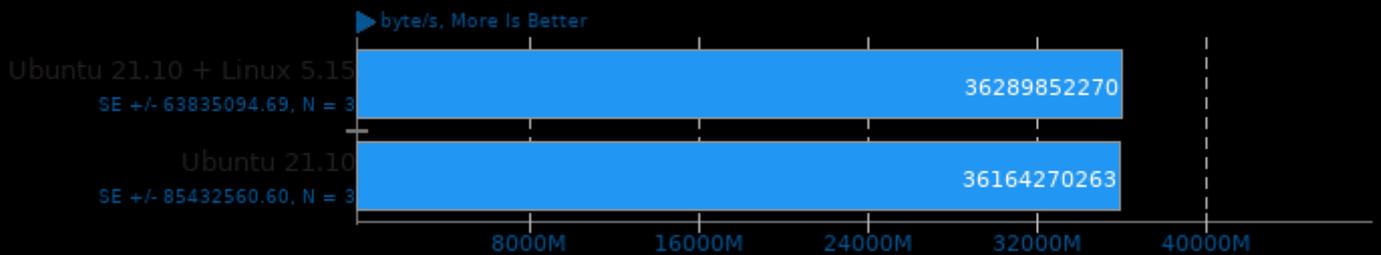
Scaling Factor: 100 - Clients: 250 - Mode: Read Write



1. (GCC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lm

## OpenSSL 3.0

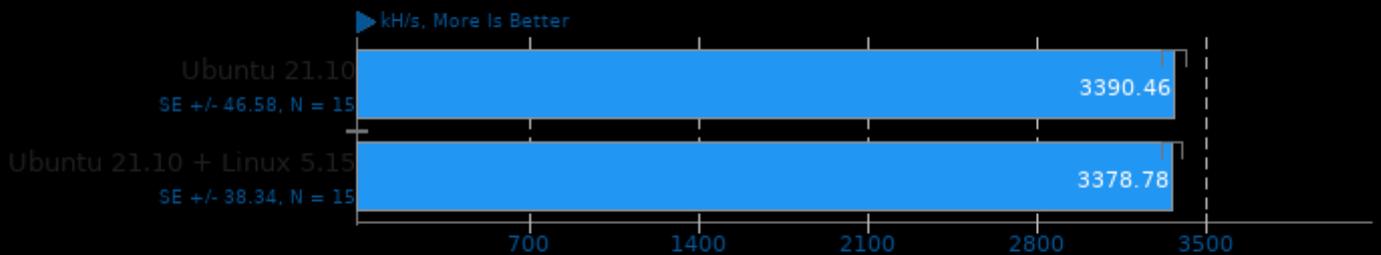
Algorithm: SHA256



1. (GCC) gcc options: -pthread -m64 -O3 -lssl -lcrypto -ldl

## Cpuminer-Opt 3.18

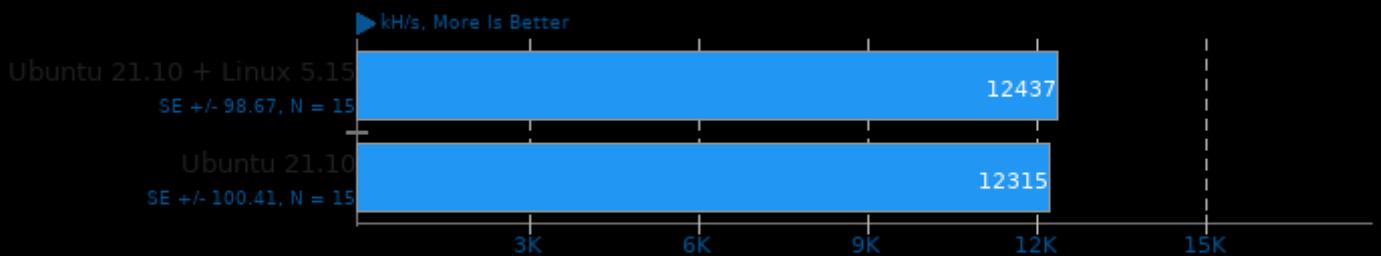
Algorithm: Ringcoin



1. (CXX) g++ options: -O2 -lcurl -lz -lpthread -lssl -lcrypto -lgmp

## Cpuminer-Opt 3.18

Algorithm: Myriad-Groestl

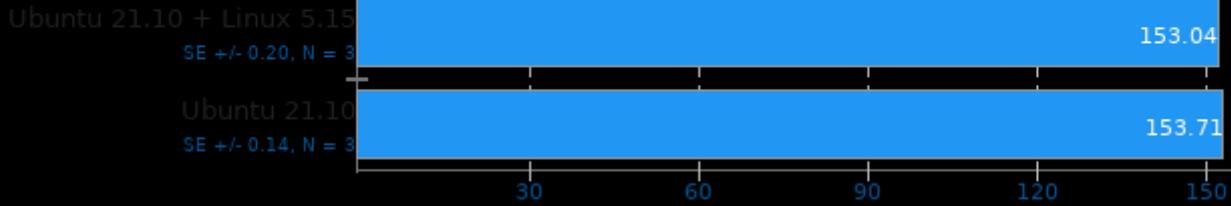


1. (CXX) g++ options: -O2 -lcurl -lz -lpthread -lssl -lcrypto -lgmp

### Timed Node.js Compilation 15.11

Time To Compile

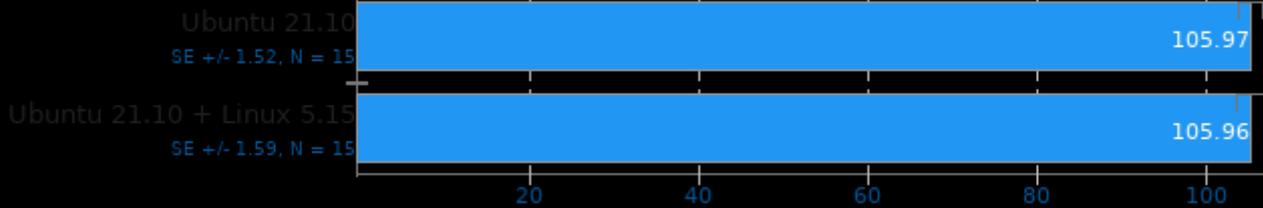
← Seconds, Fewer Is Better



### Stress-NG 0.13.02

Test: CPU Cache

▶ Bogo Ops/s, More Is Better

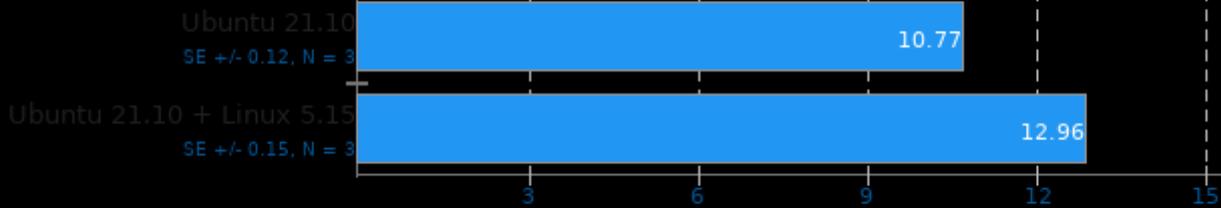


1. (CC) gcc options: -O2 -std=gnu99 -lm -laio -lcrypt -lrt -lz -ldl -pthread -lc -latomic

### PostgreSQL pgbench 14.0

Scaling Factor: 100 - Clients: 500 - Mode: Read Write - Average Latency

← ms, Fewer Is Better

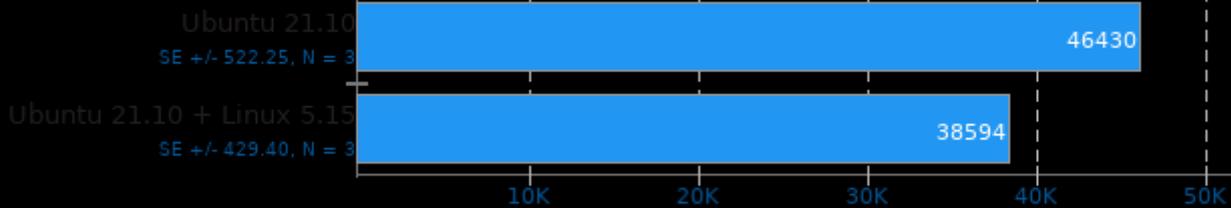


1. (CC) gcc options: -fno-strict-aliasing -fwrapv -O2 -lpgcommon -lpgport -lpq -lm

### PostgreSQL pgbench 14.0

Scaling Factor: 100 - Clients: 500 - Mode: Read Write

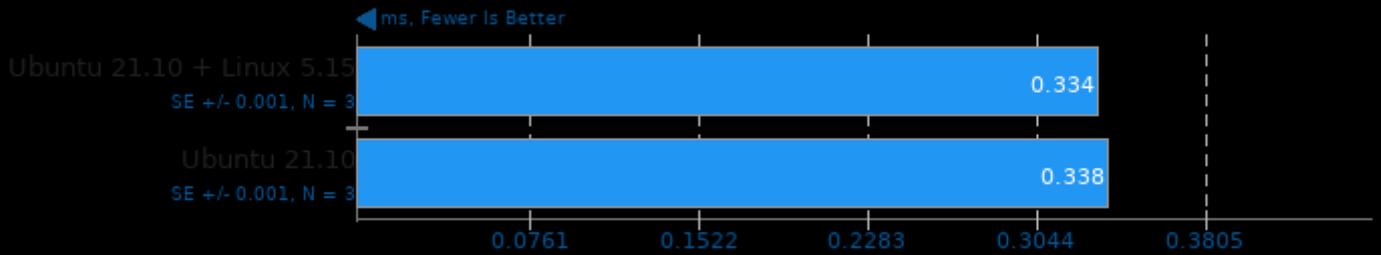
▶ TPS, More Is Better



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

## PostgreSQL pgbench 14.0

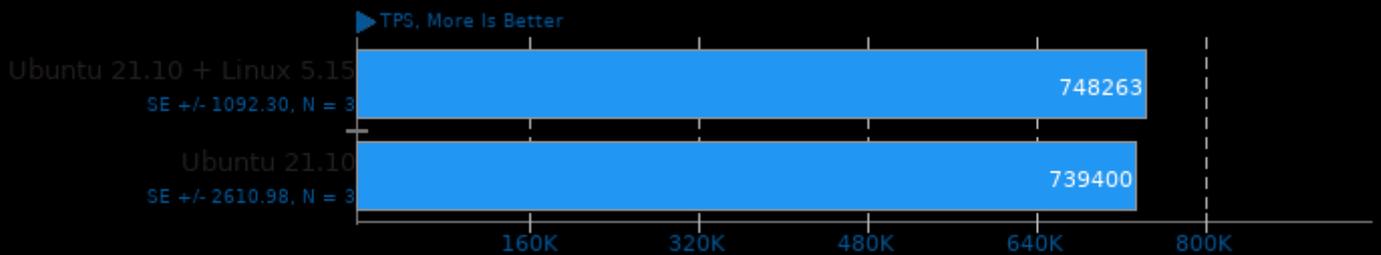
Scaling Factor: 100 - Clients: 250 - Mode: Read Only - Average Latency



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

## PostgreSQL pgbench 14.0

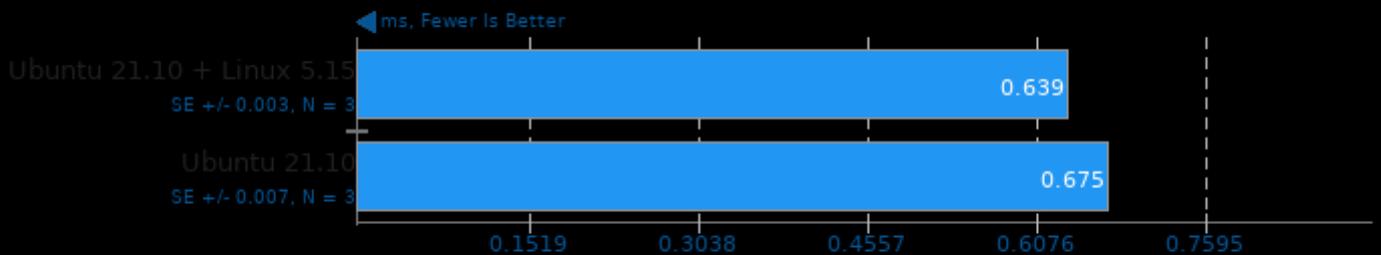
Scaling Factor: 100 - Clients: 250 - Mode: Read Only



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

## PostgreSQL pgbench 14.0

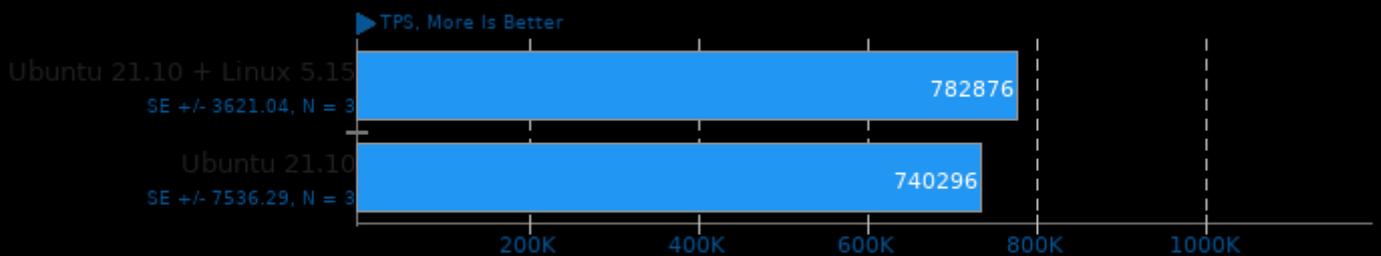
Scaling Factor: 100 - Clients: 500 - Mode: Read Only - Average Latency



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

## PostgreSQL pgbench 14.0

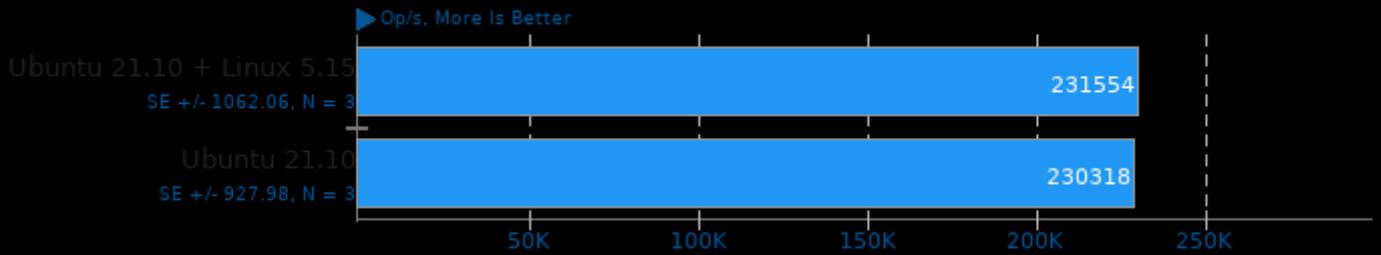
Scaling Factor: 100 - Clients: 500 - Mode: Read Only



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

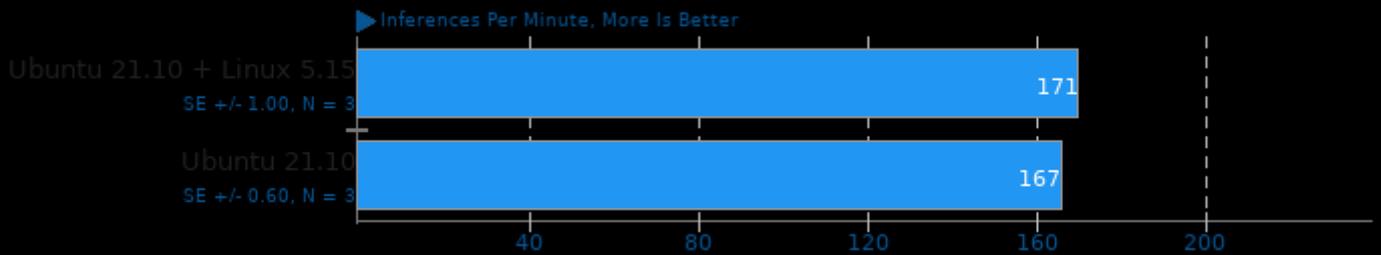
## Apache Cassandra 4.0

Test: Writes



## ONNX Runtime 1.8.2

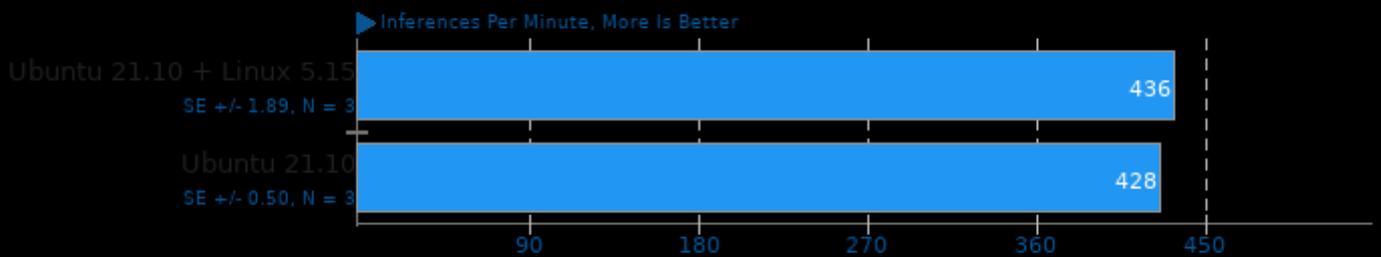
Model: fcn-resnet101-11 - Device: OpenMP CPU



1. (CXX) g++ options: -fopenmp -function-sections -fdata-sections -O3 -ldl -lrt

## ONNX Runtime 1.8.2

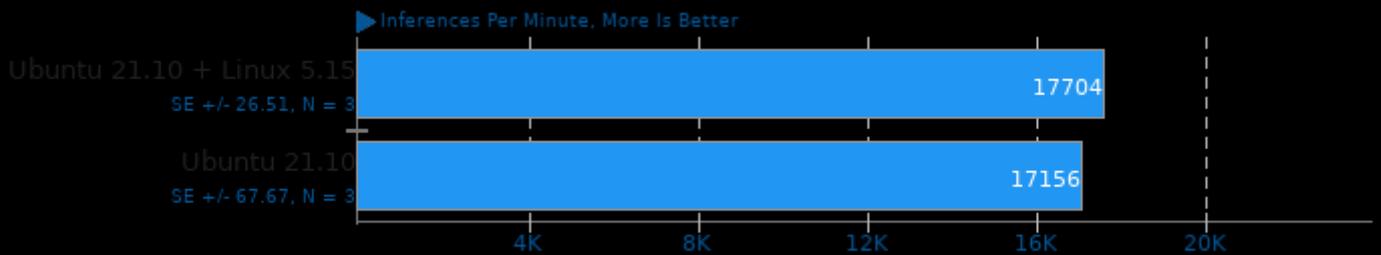
Model: yolov4 - Device: OpenMP CPU



1. (CXX) g++ options: -fopenmp -function-sections -fdata-sections -O3 -ldl -lrt

## ONNX Runtime 1.8.2

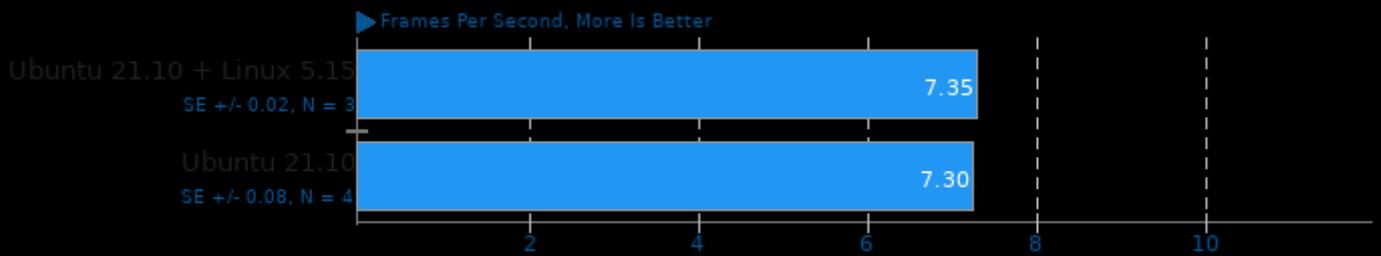
Model: shufflenet-v2-10 - Device: OpenMP CPU



1. (CXX) g++ options: -fopenmp -function-sections -fdata-sections -O3 -ldl -lrt

### AOM AV1 3.1

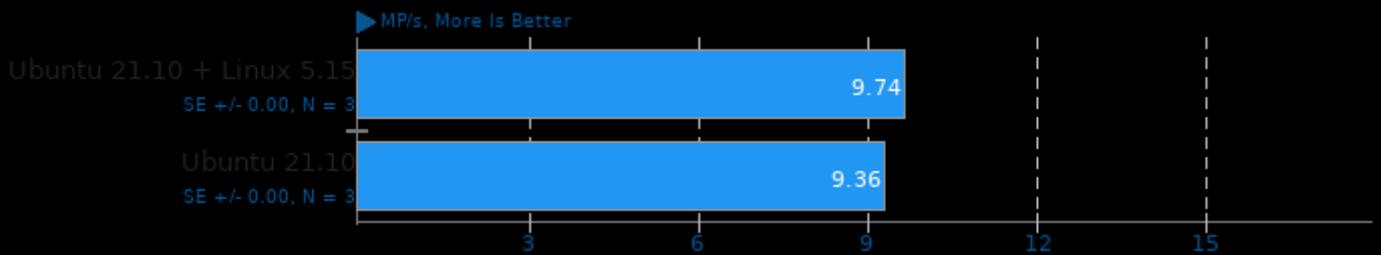
Encoder Mode: Speed 6 Two-Pass - Input: Bosphorus 4K



1. (CXX) g++ options: -O3 -std=c++11 -U\_FORTIFY\_SOURCE -lm

### JPEG XL libjxl 0.5

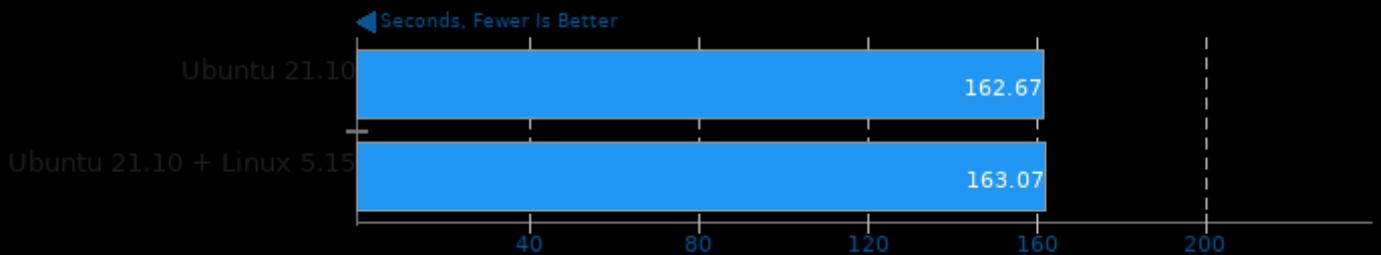
Input: PNG - Encode Speed: 7



1. (CXX) g++ options: -funwind-tables -O3 -O2 -fPIE -pie

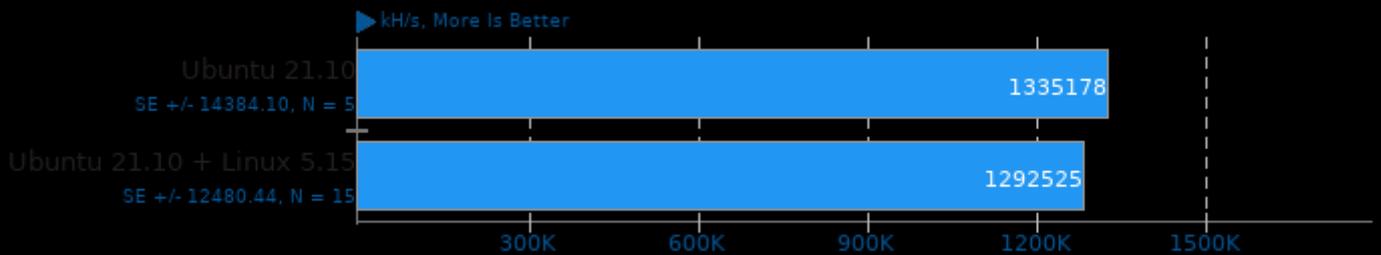
### Appleseed 2.0 Beta

Scene: Emily



### Cpuminer-Opt 3.18

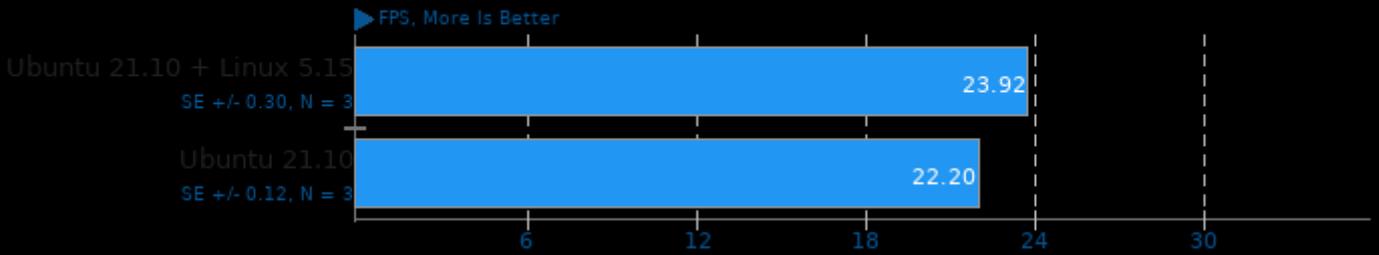
Algorithm: Blake-2 S



1. (CXX) g++ options: -O2 -lcurl -lz -pthread -lssl -lcrypto -lgmp

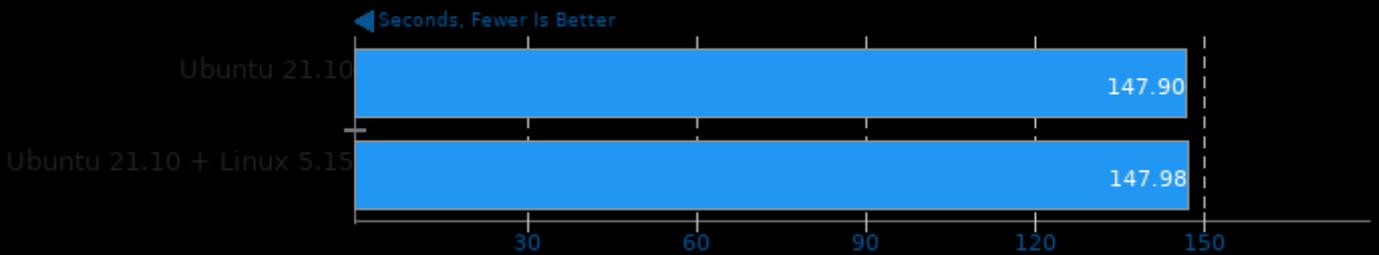
## PlaidML

FP16: No - Mode: Inference - Network: VGG19 - Device: CPU



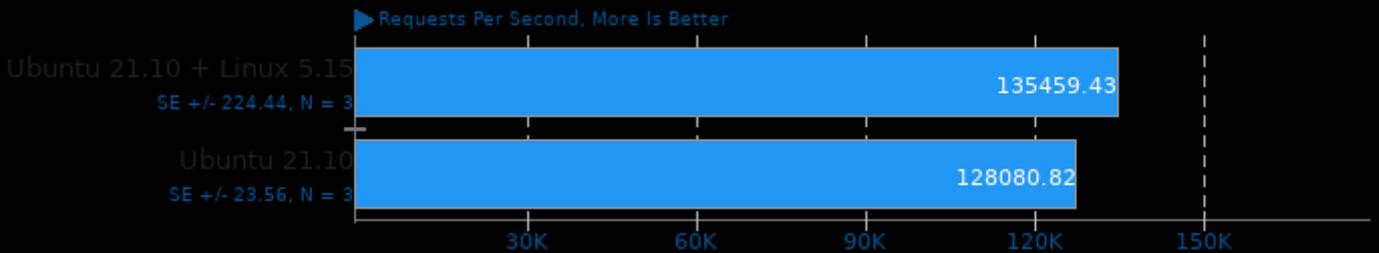
## Appleseed 2.0 Beta

Scene: Material Tester



## Apache HTTP Server 2.4.48

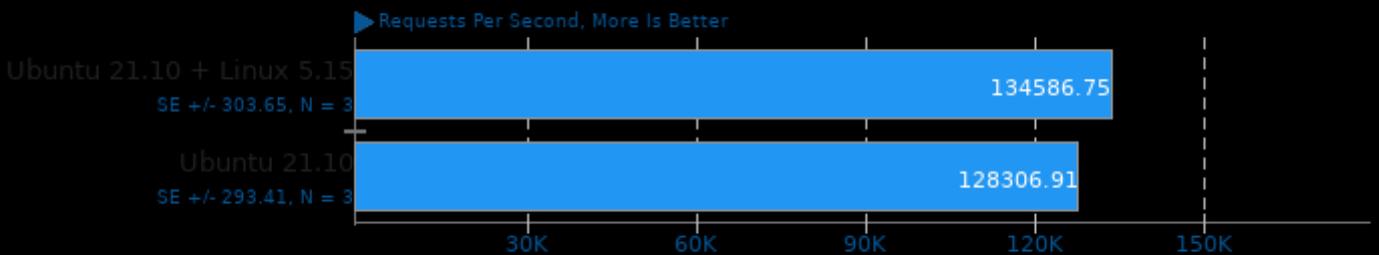
Concurrent Requests: 1000



1. (CC) gcc options: -shared -fPIC -O2

## Apache HTTP Server 2.4.48

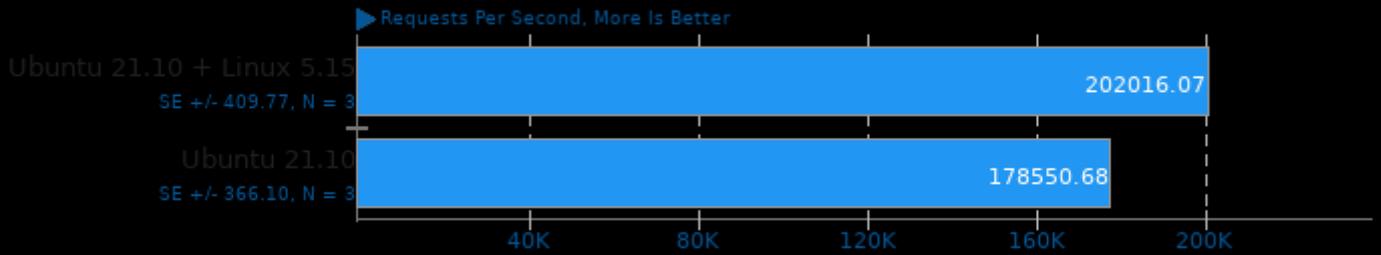
Concurrent Requests: 500



1. (CC) gcc options: -shared -fPIC -O2

## nginx 1.21.1

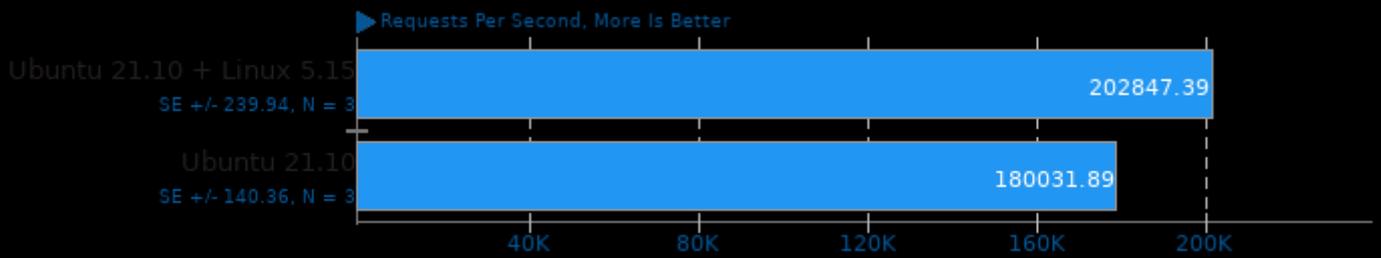
Concurrent Requests: 100



1. (CC) gcc options: -lcrypt -lz -O3 -march=native

## nginx 1.21.1

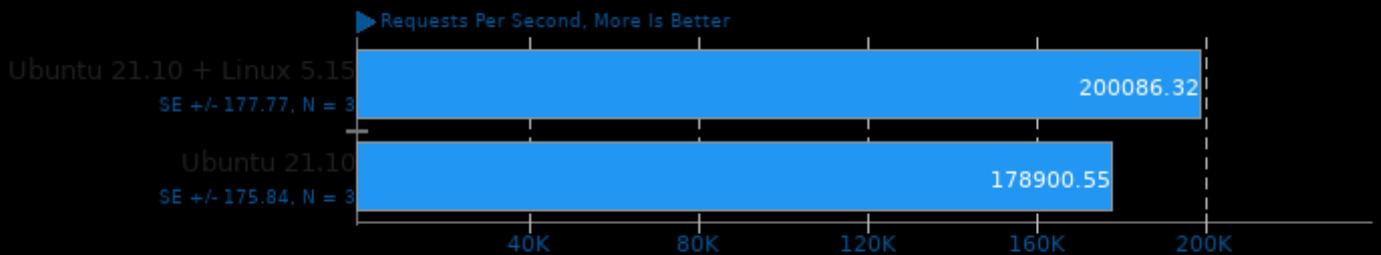
Concurrent Requests: 200



1. (CC) gcc options: -lcrypt -lz -O3 -march=native

## nginx 1.21.1

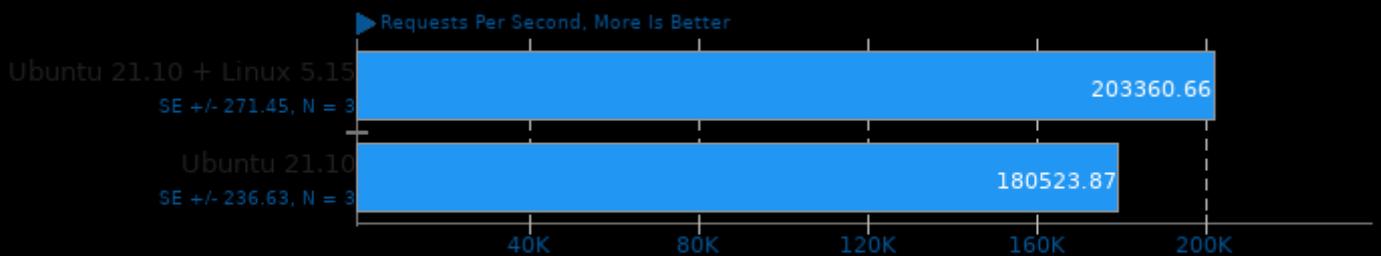
Concurrent Requests: 1000



1. (CC) gcc options: -lcrypt -lz -O3 -march=native

## nginx 1.21.1

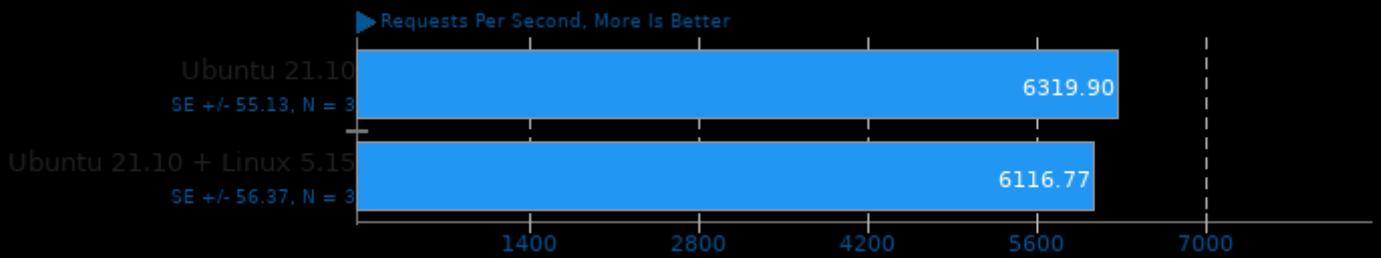
Concurrent Requests: 500



1. (CC) gcc options: -lcrypt -lz -O3 -march=native

### Apache HTTP Server 2.4.48

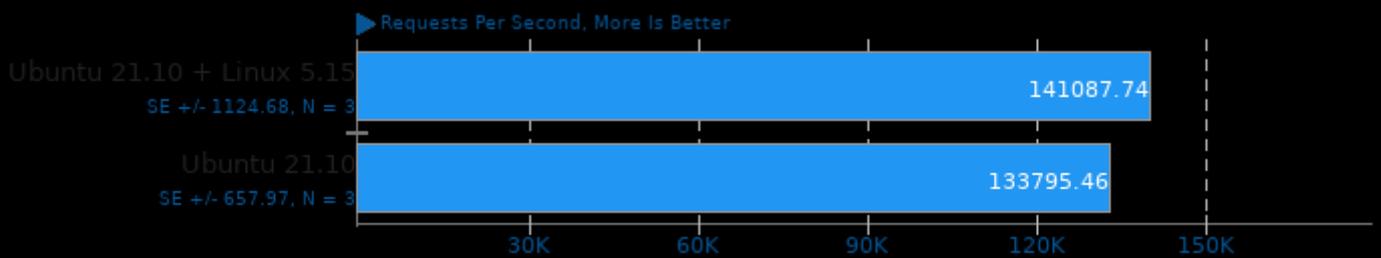
Concurrent Requests: 1



1. (CC) gcc options: -shared -fPIC -O2

### Apache HTTP Server 2.4.48

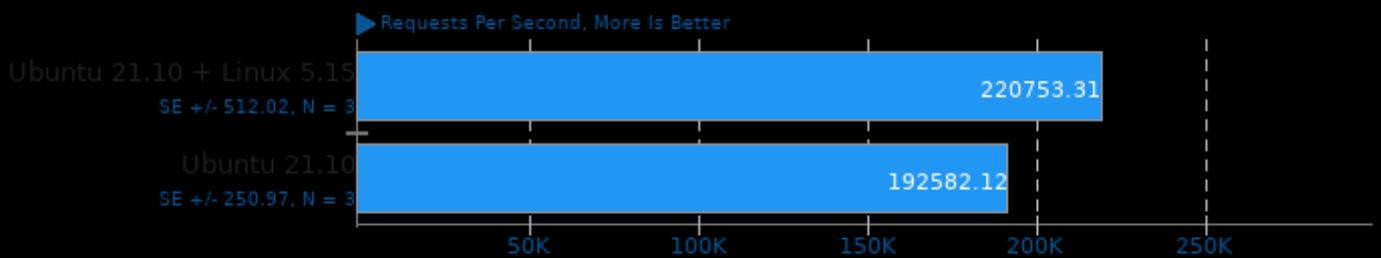
Concurrent Requests: 200



1. (CC) gcc options: -shared -fPIC -O2

### nginx 1.21.1

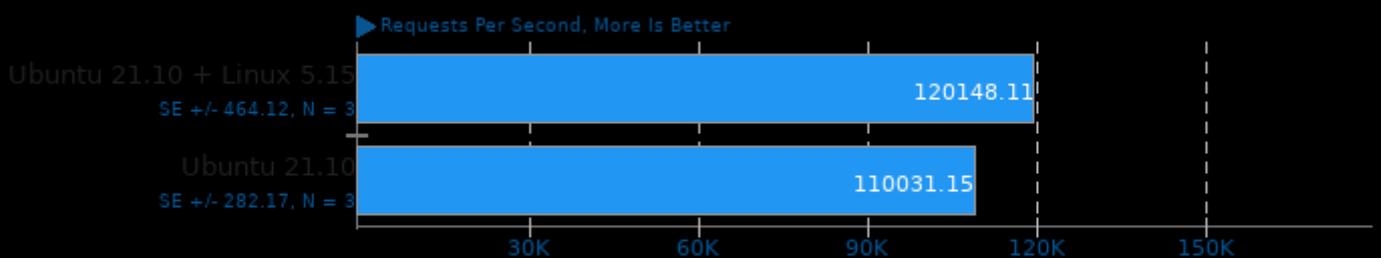
Concurrent Requests: 20



1. (CC) gcc options: -lcrypt -lz -O3 -march=native

### Apache HTTP Server 2.4.48

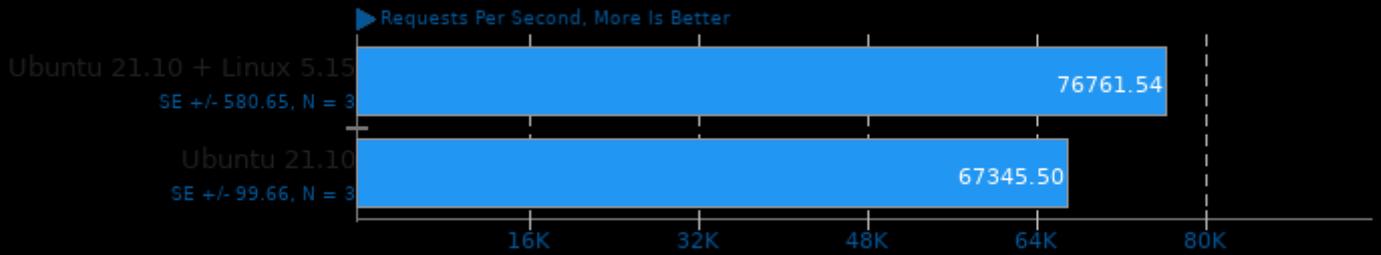
Concurrent Requests: 100



1. (CC) gcc options: -shared -fPIC -O2

## Apache HTTP Server 2.4.48

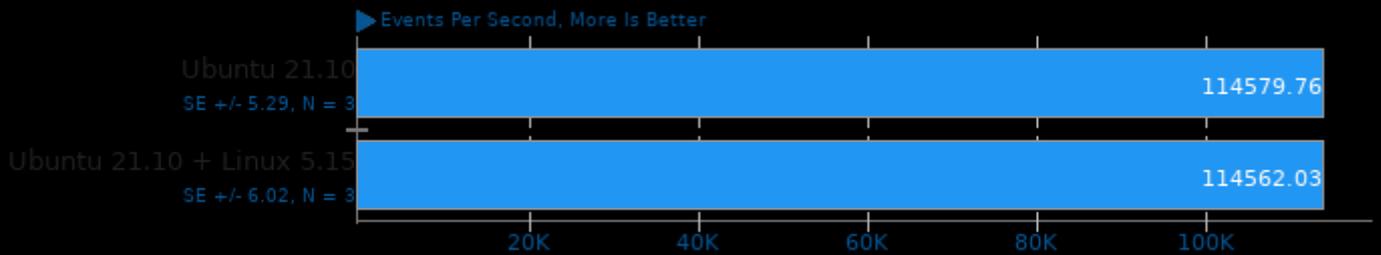
Concurrent Requests: 20



1. (CC) gcc options: -shared -fPIC -O2

## Sysbench 1.0.20

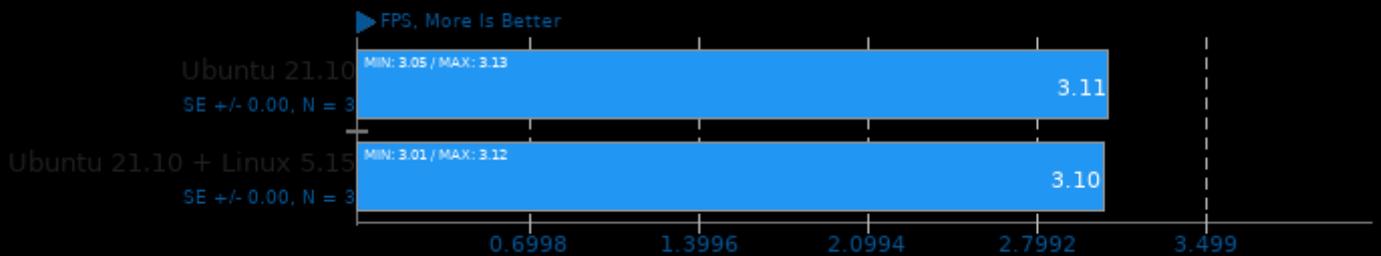
Test: CPU



1. (CC) gcc options: -O2 -funroll-loops -rdynamic -ldl -laio -lm

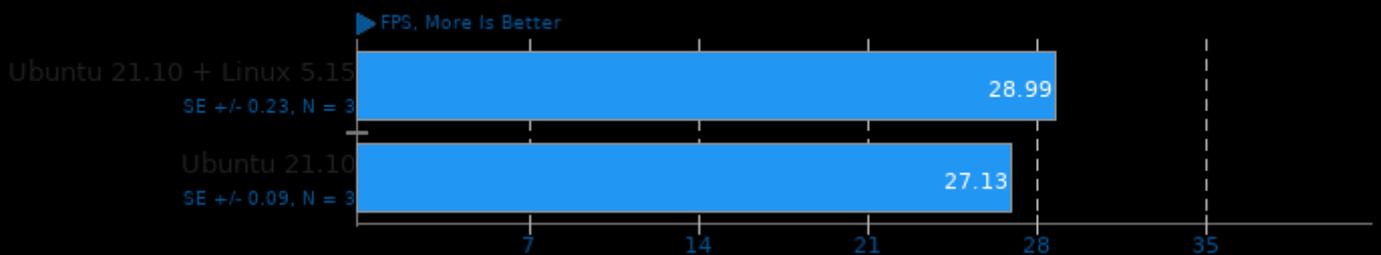
## OSPray 1.8.5

Demo: San Miguel - Renderer: Path Tracer



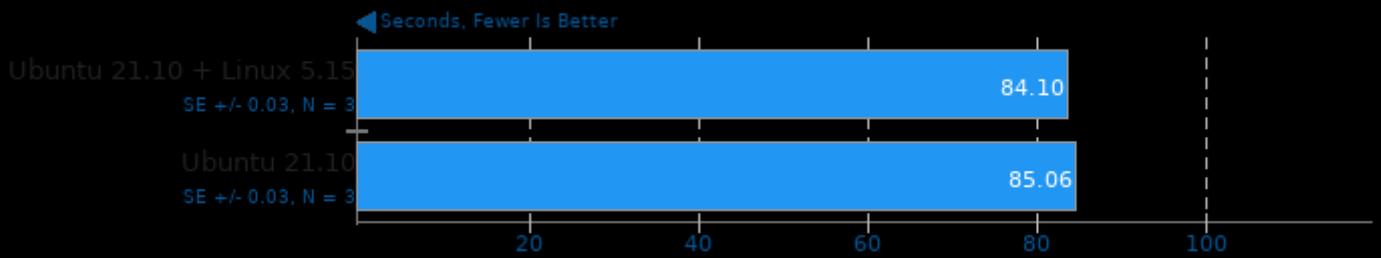
## PlaidML

FP16: No - Mode: Inference - Network: VGG16 - Device: CPU



## Rodinia 3.1

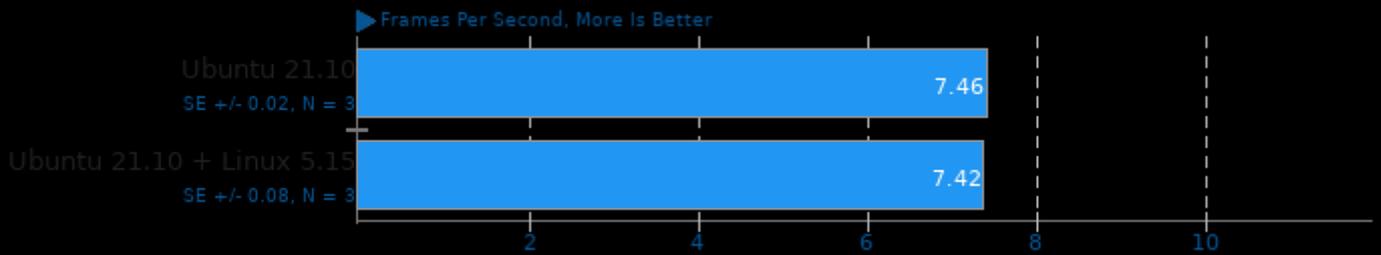
Test: OpenMP LavaMD



1. (CXX) g++ options: -O2 -fOpenCL

## VP9 libvpx Encoding 1.10.0

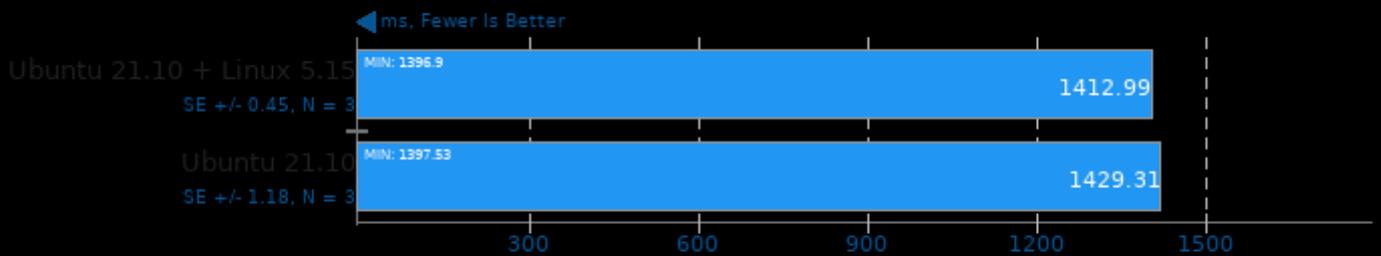
Speed: Speed 0 - Input: Bosphorus 4K



1. (CXX) g++ options: -m64 -lm -pthread -O3 -fPIC -U\_FORTIFY\_SOURCE -std=gnu++11

## oneDNN 2.1.2

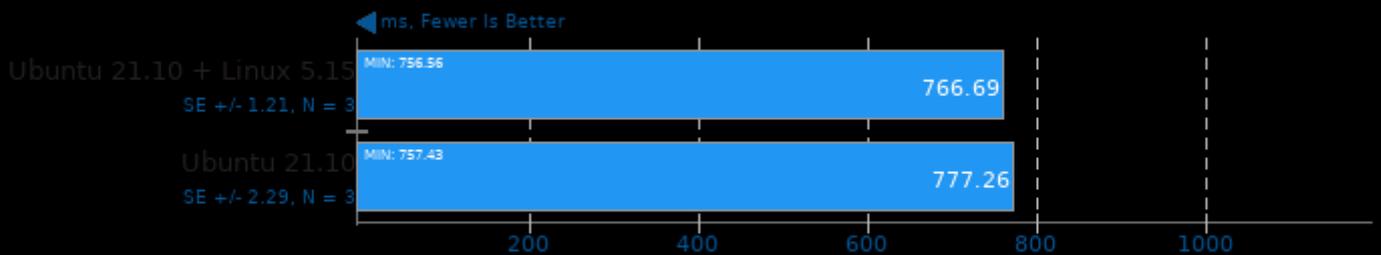
Harness: Recurrent Neural Network Training - Data Type: f32 - Engine: CPU



1. (CXX) g++ options: -O3 -march=native -std=c++11 -fopenmp -msse4.1 -fPIC -pie -ldl -pthread

## oneDNN 2.1.2

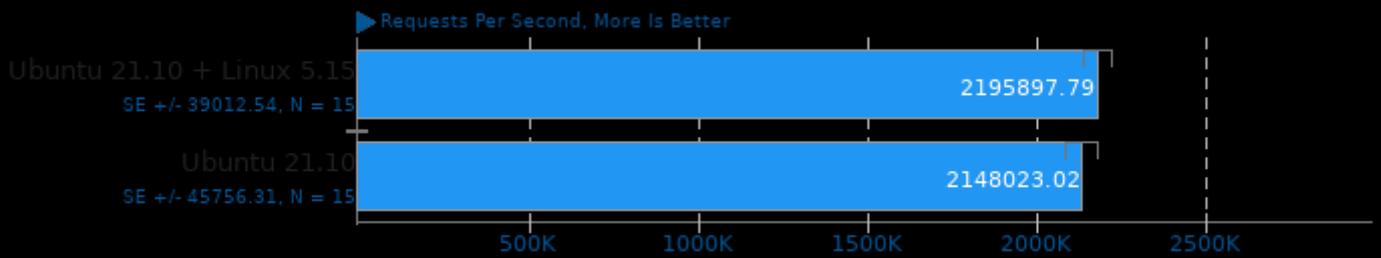
Harness: Recurrent Neural Network Inference - Data Type: f32 - Engine: CPU



1. (CXX) g++ options: -O3 -march=native -std=c++11 -fopenmp -msse4.1 -fPIC -pie -ldl -pthread

### Redis 6.0.9

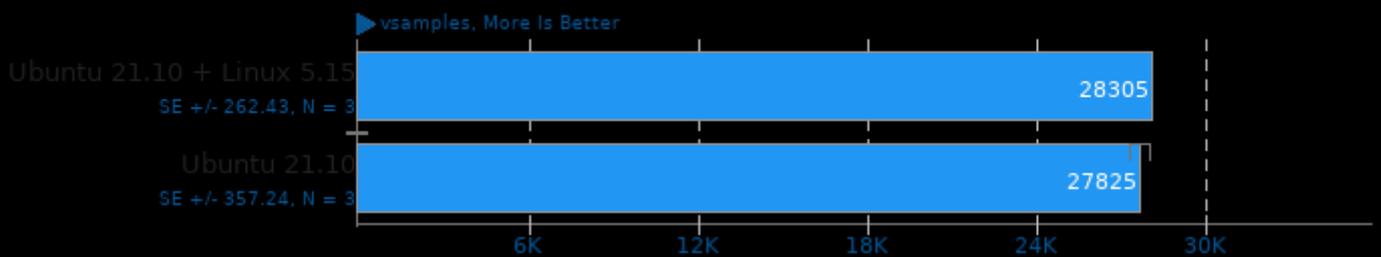
Test: SET



1. (CXX) g++ options: -MM -MT -g3 -fvisibility=hidden -O3

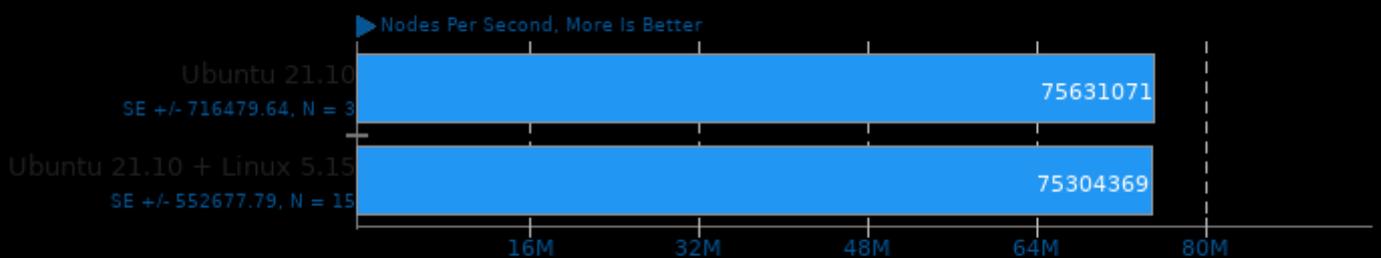
### Chaos Group V-RAY 5

Mode: CPU



### Stockfish 13

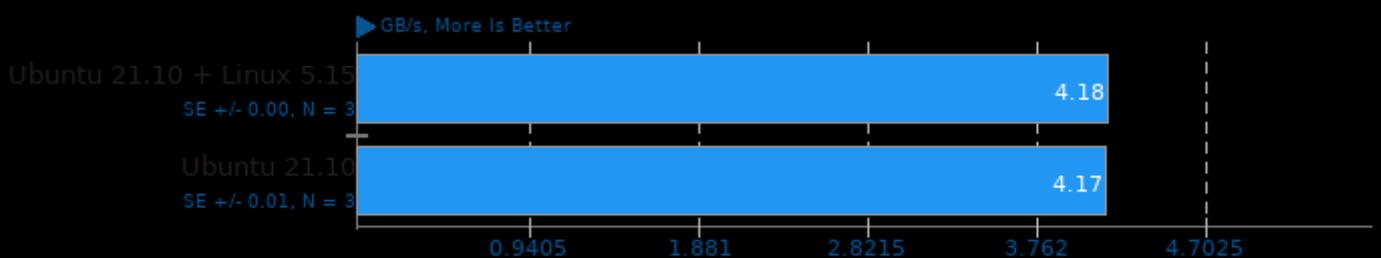
Total Time



1. (CXX) g++ options: -lgcov -m64 -pthread -fno-exceptions -std=c++17 -fprofile-use -fno-peel-loops -fno-tracer -pedantic -O3 -msse -msse3 -mpopcnt

### simdjson 1.0

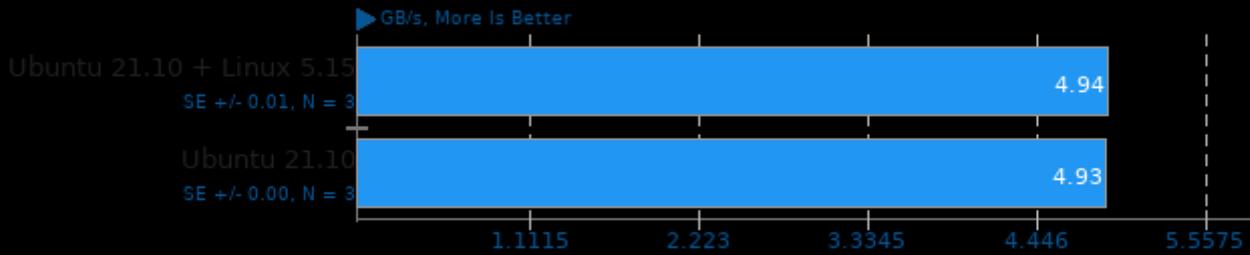
Throughput Test: PartialTweets



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

## simdjson 1.0

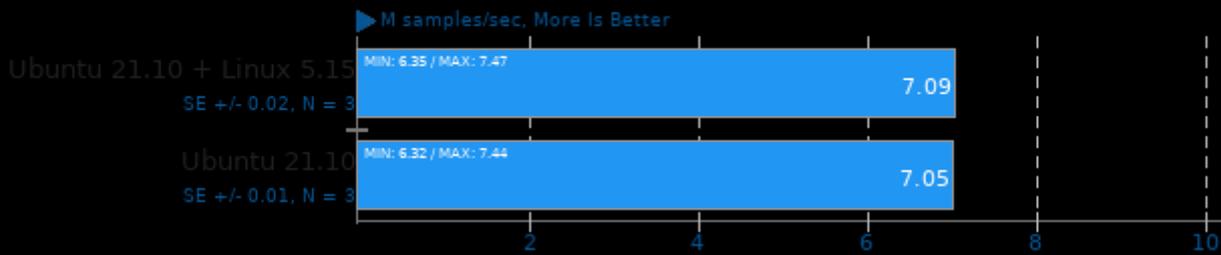
Throughput Test: DistinctUserID



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

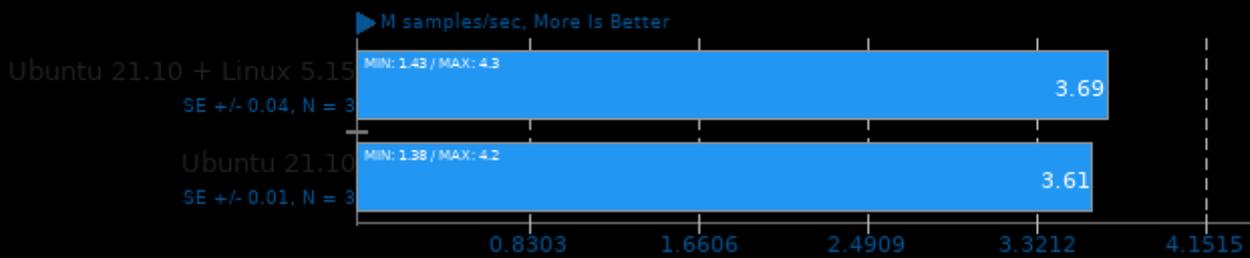
## LuxCoreRender 2.5

Scene: Orange Juice - Acceleration: CPU



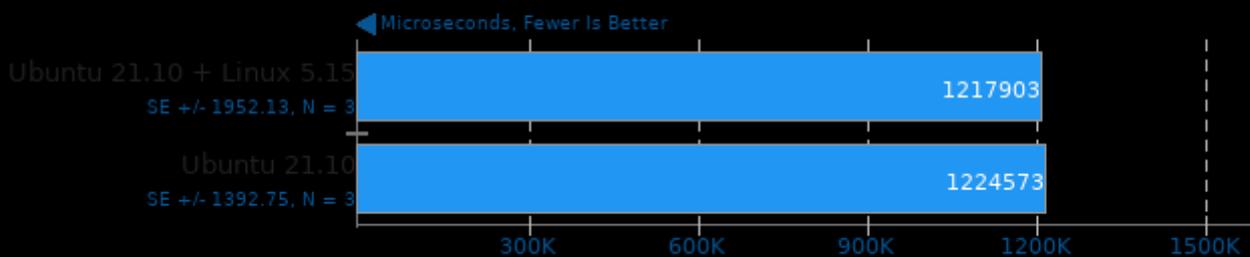
## LuxCoreRender 2.5

Scene: Danish Mood - Acceleration: CPU



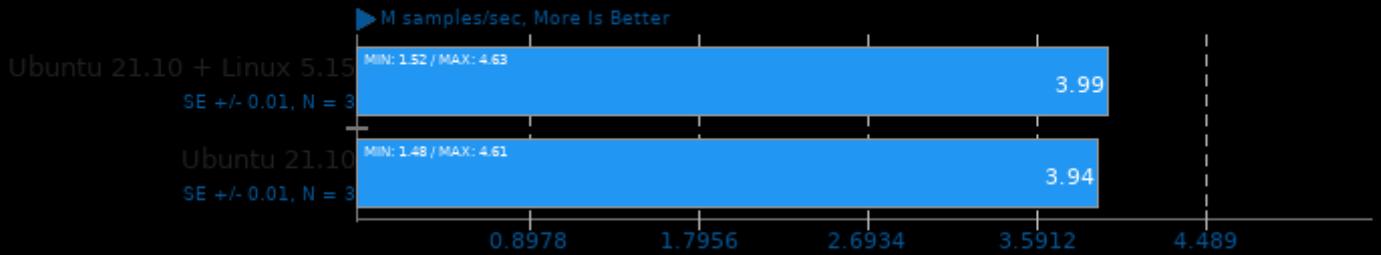
## TensorFlow Lite 2020-08-23

Model: Inception V4



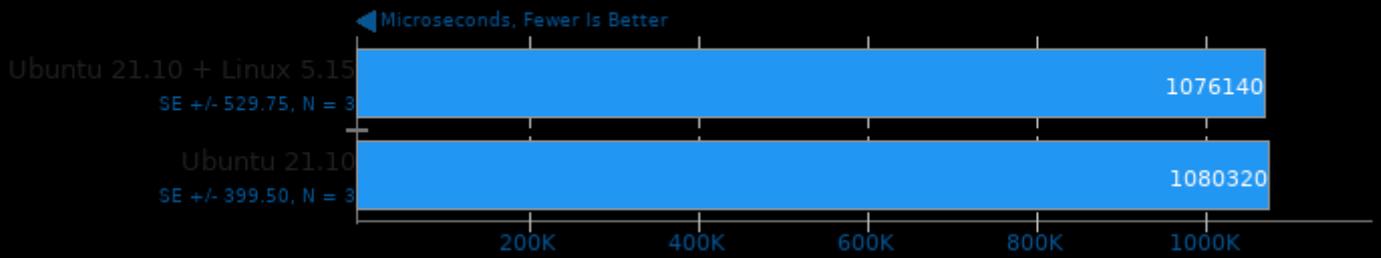
### LuxCoreRender 2.5

Scene: LuxCore Benchmark - Acceleration: CPU



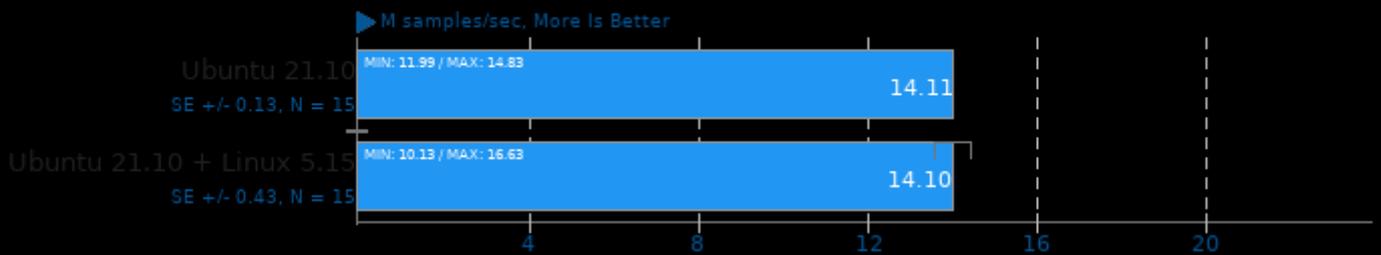
### TensorFlow Lite 2020-08-23

Model: Inception ResNet V2



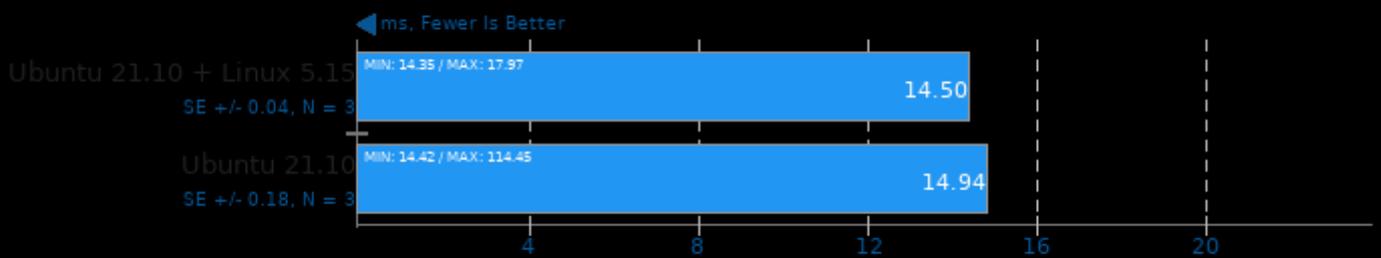
### LuxCoreRender 2.5

Scene: Rainbow Colors and Prism - Acceleration: CPU



### NCNN 20210720

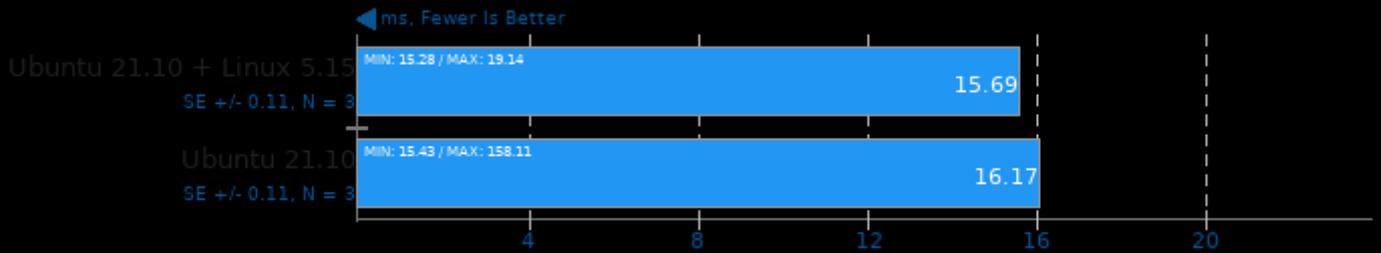
Target: CPU - Model: regnety\_400m



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

### NCNN 20210720

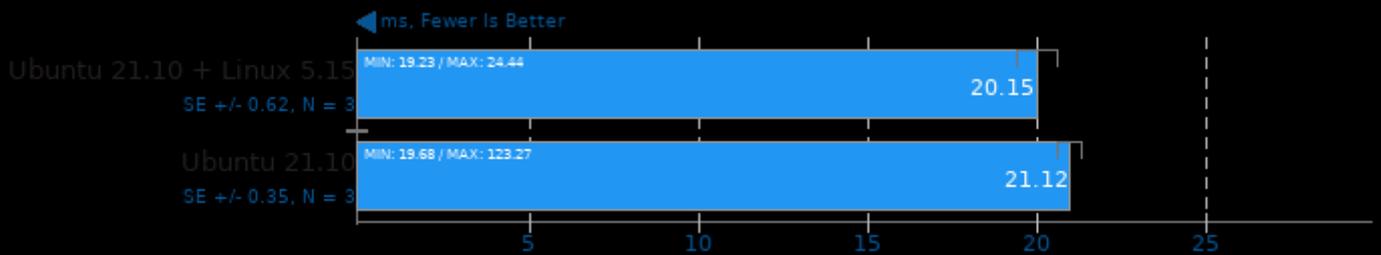
Target: CPU - Model: squeezenet\_ssd



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

### NCNN 20210720

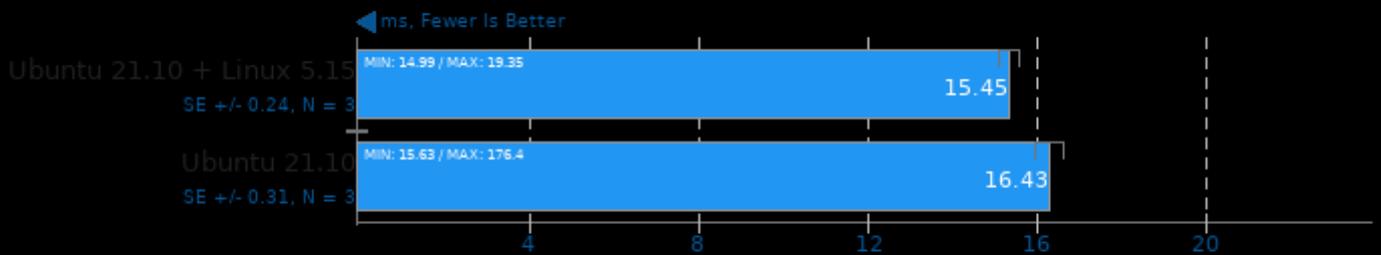
Target: CPU - Model: yolov4-tiny



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

### NCNN 20210720

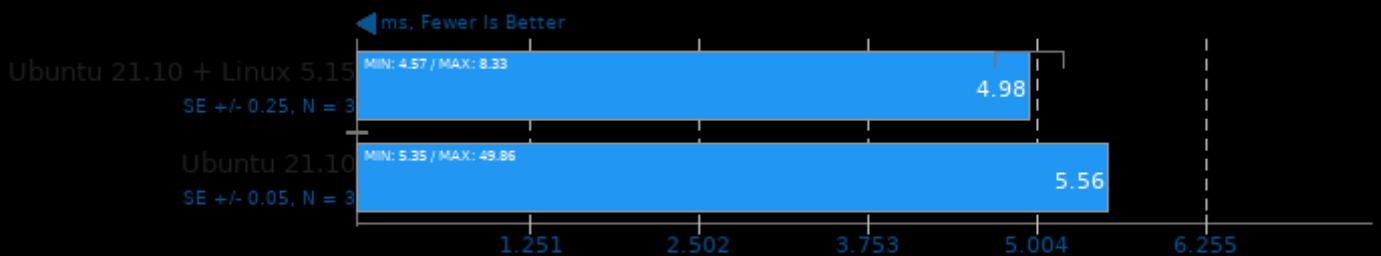
Target: CPU - Model: resnet50



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

### NCNN 20210720

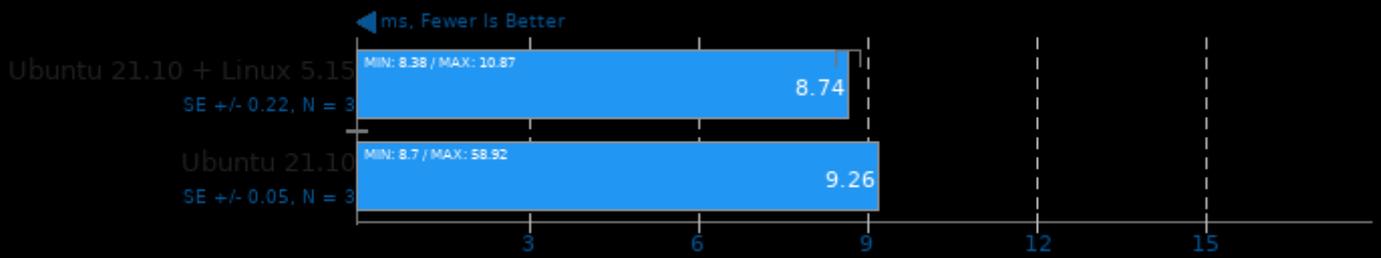
Target: CPU - Model: alexnet



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

### NCNN 20210720

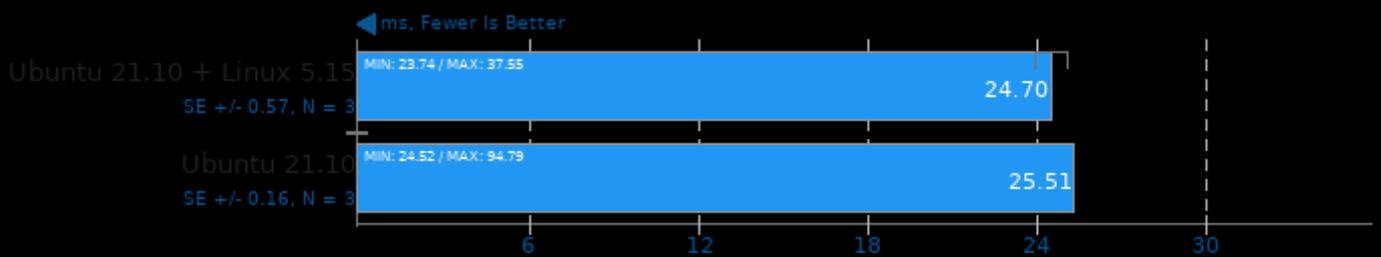
Target: CPU - Model: resnet18



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

### NCNN 20210720

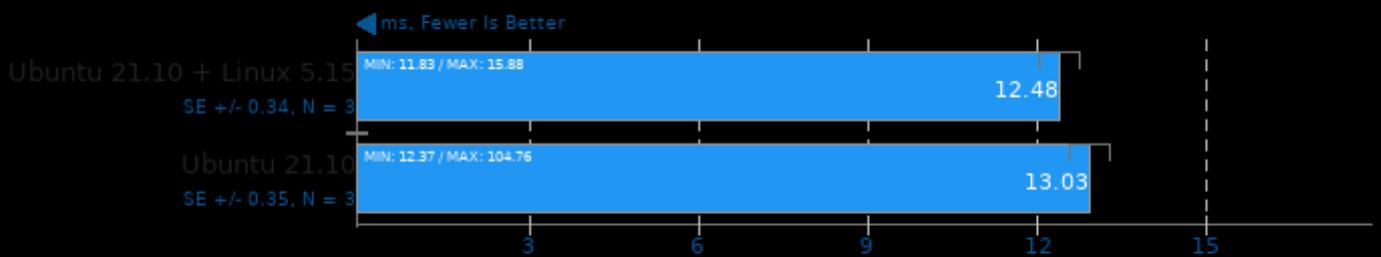
Target: CPU - Model: vgg16



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

### NCNN 20210720

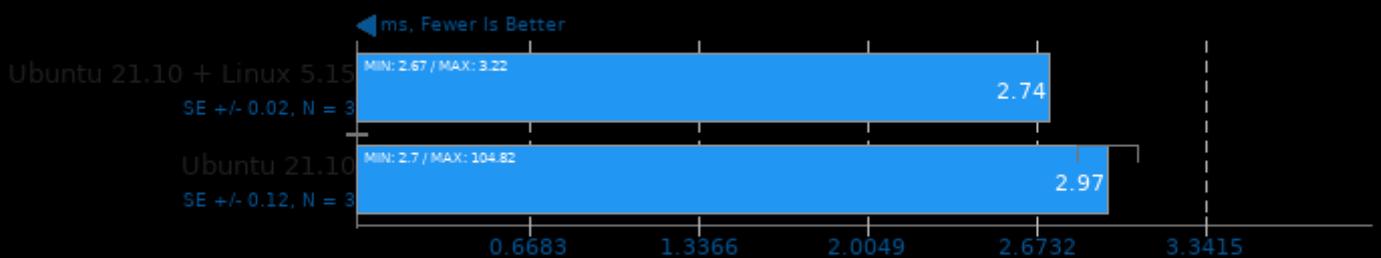
Target: CPU - Model: googlenet



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

### NCNN 20210720

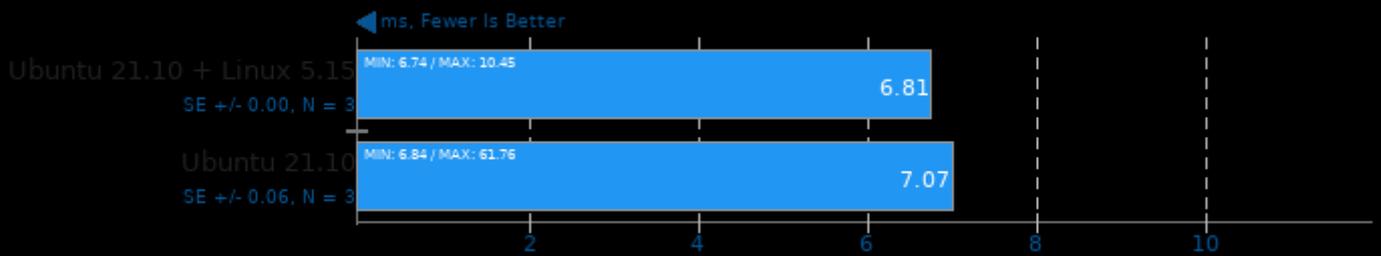
Target: CPU - Model: blazeface



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

### NCNN 20210720

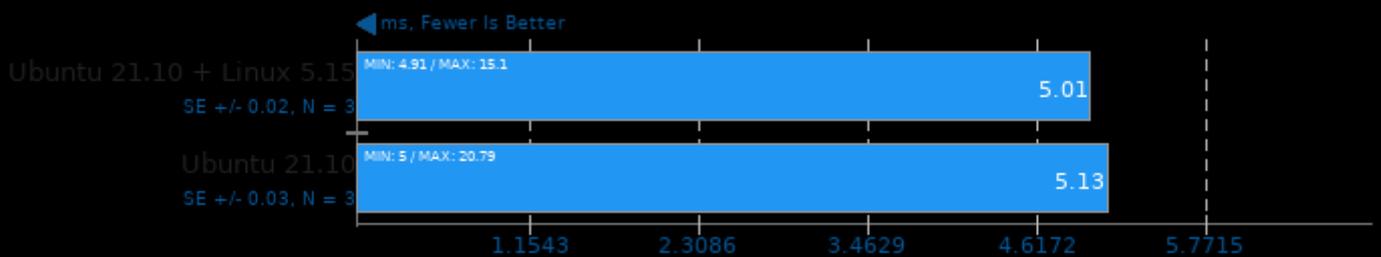
Target: CPU - Model: efficientnet-b0



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

### NCNN 20210720

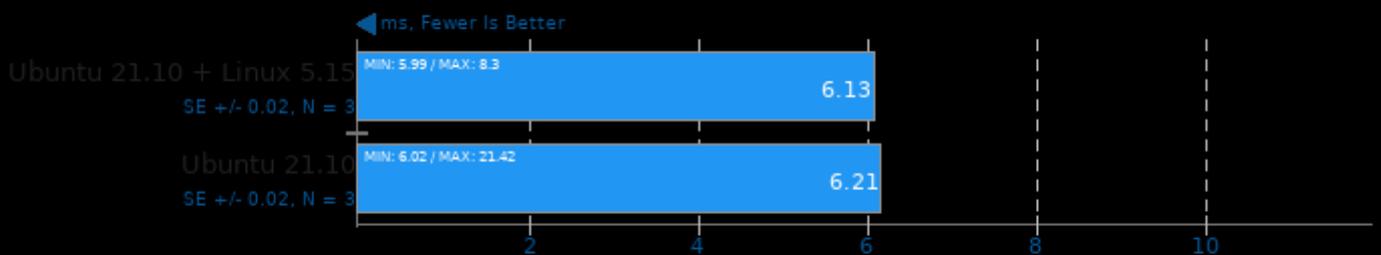
Target: CPU - Model: mnasnet



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

### NCNN 20210720

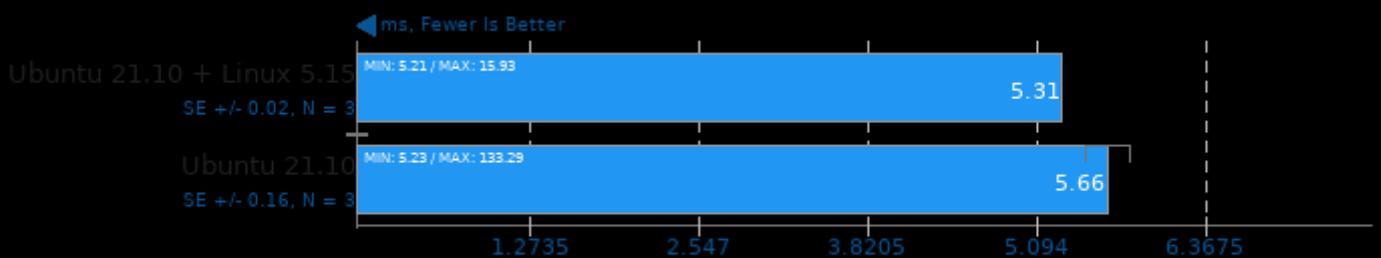
Target: CPU - Model: shufflenet-v2



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

### NCNN 20210720

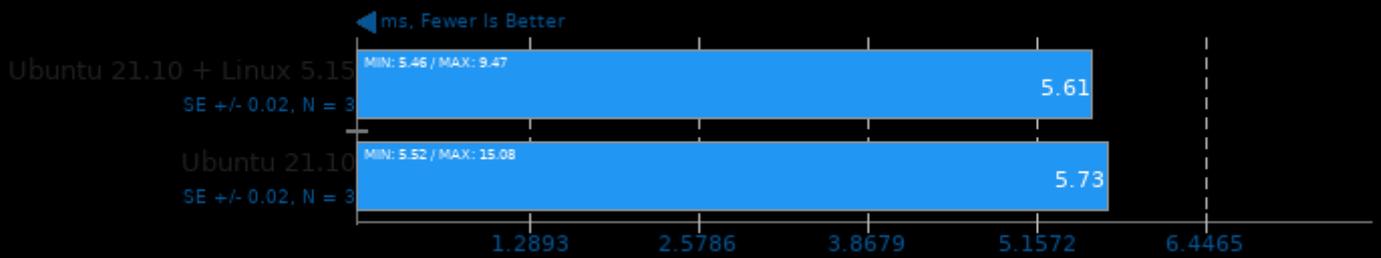
Target: CPU-v3-v3 - Model: mobilenet-v3



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

### NCNN 20210720

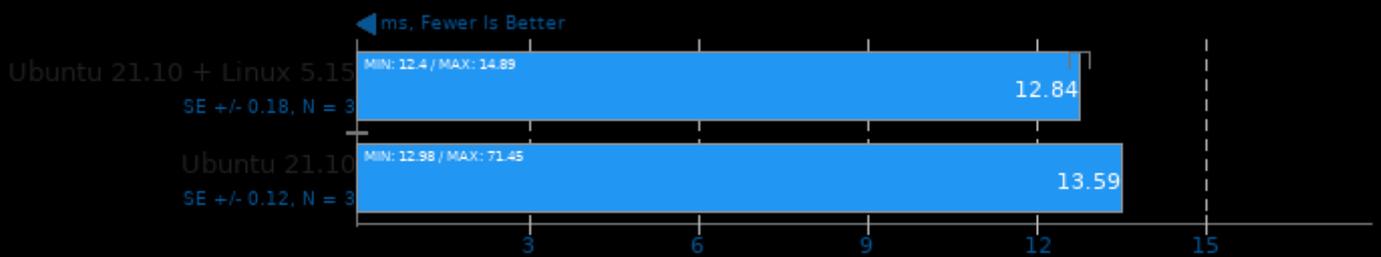
Target: CPU-v2-v2 - Model: mobilenet-v2



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

### NCNN 20210720

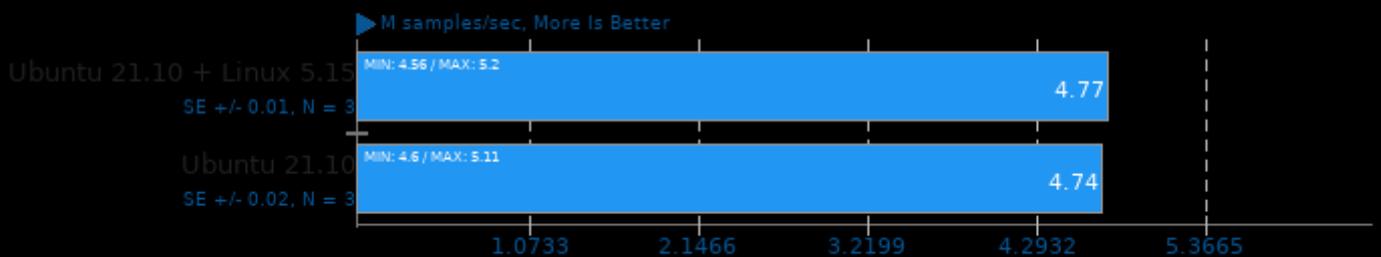
Target: CPU - Model: mobilenet



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

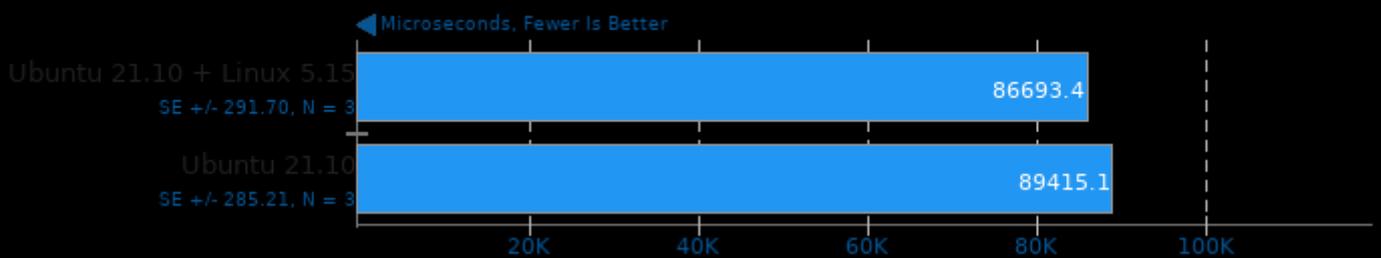
### LuxCoreRender 2.5

Scene: DLSC - Acceleration: CPU



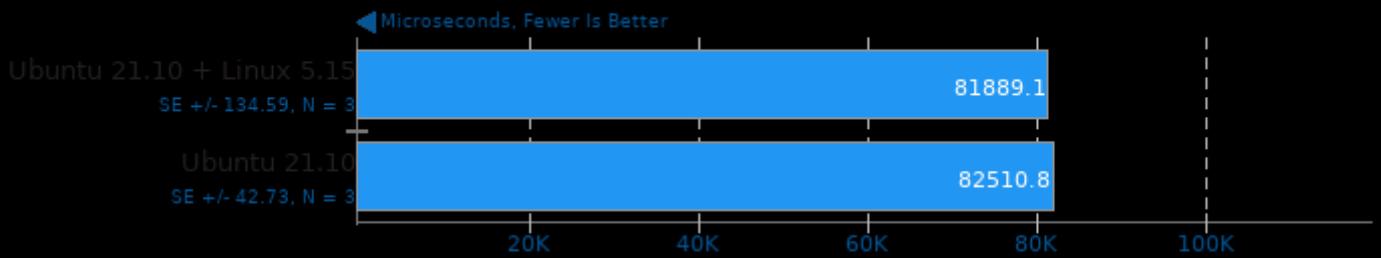
### TensorFlow Lite 2020-08-23

Model: NASNet Mobile



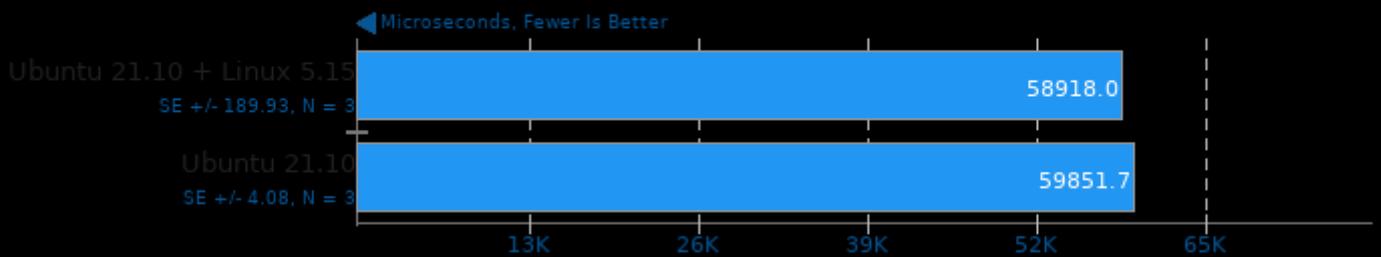
### TensorFlow Lite 2020-08-23

Model: SqueezeNet



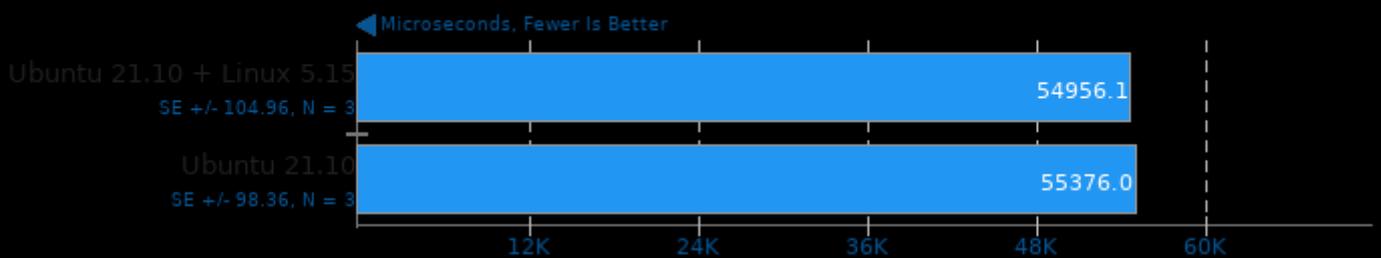
### TensorFlow Lite 2020-08-23

Model: Mobilenet Quant



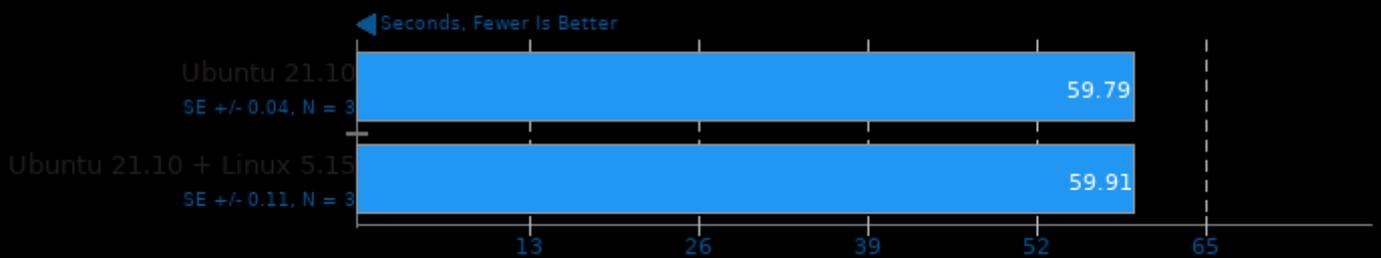
### TensorFlow Lite 2020-08-23

Model: Mobilenet Float



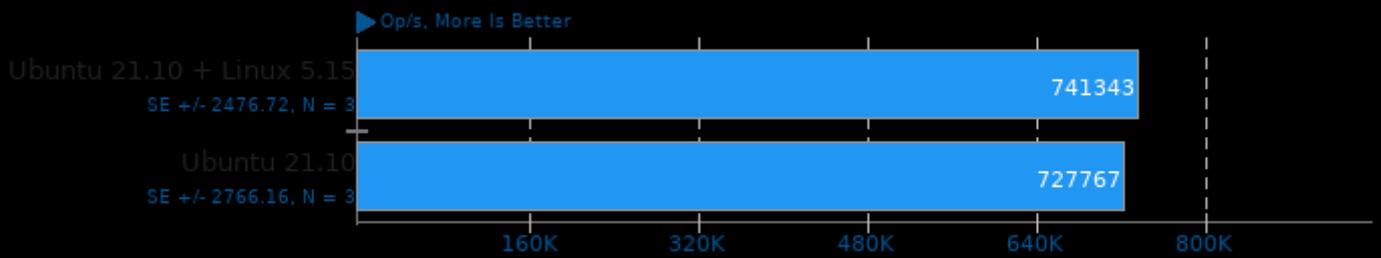
### Blender 2.92

Blend File: BMW27 - Compute: CPU-Only



### Facebook RocksDB 6.22.1

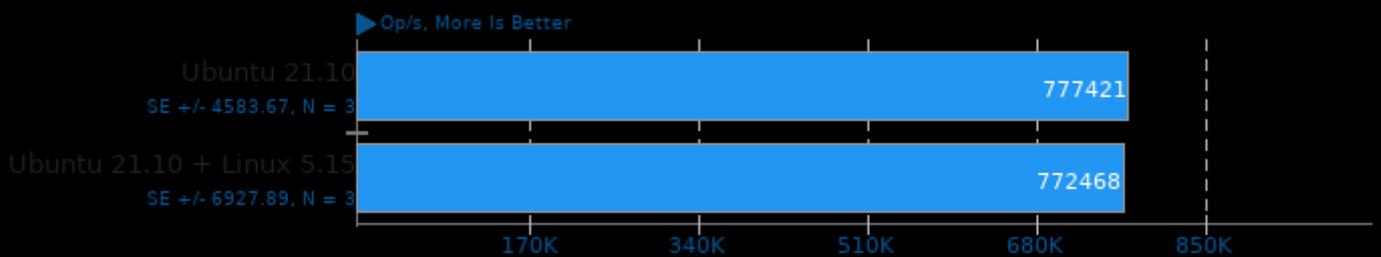
Test: Update Random



1. (CXX) g++ options: -O3 -march=native -pthread -fno-builtin-memcmp -fno-rtti -lpthread

### Facebook RocksDB 6.22.1

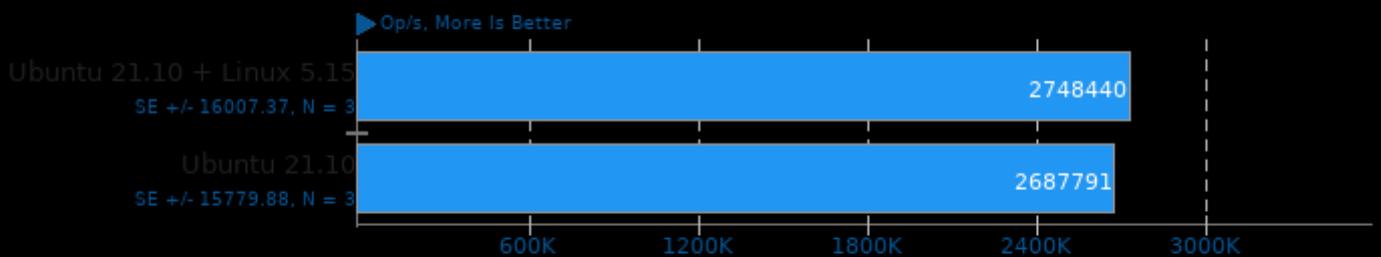
Test: Random Fill



1. (CXX) g++ options: -O3 -march=native -pthread -fno-builtin-memcmp -fno-rtti -lpthread

### Facebook RocksDB 6.22.1

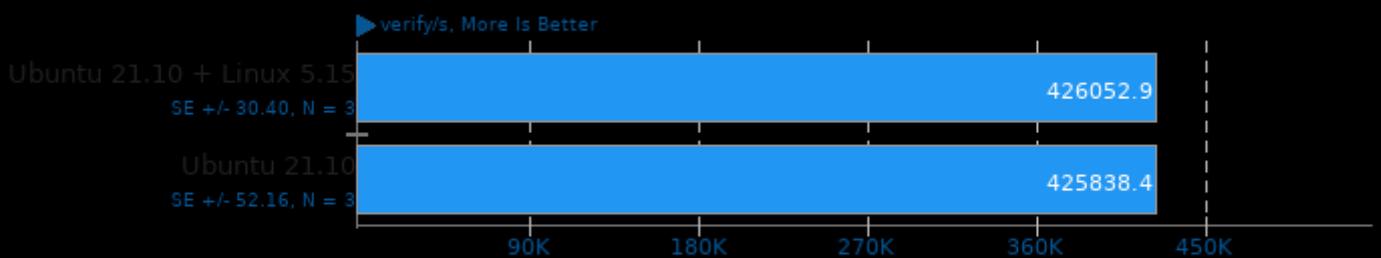
Test: Read Random Write Random



1. (CXX) g++ options: -O3 -march=native -pthread -fno-builtin-memcmp -fno-rtti -lpthread

### OpenSSL 3.0

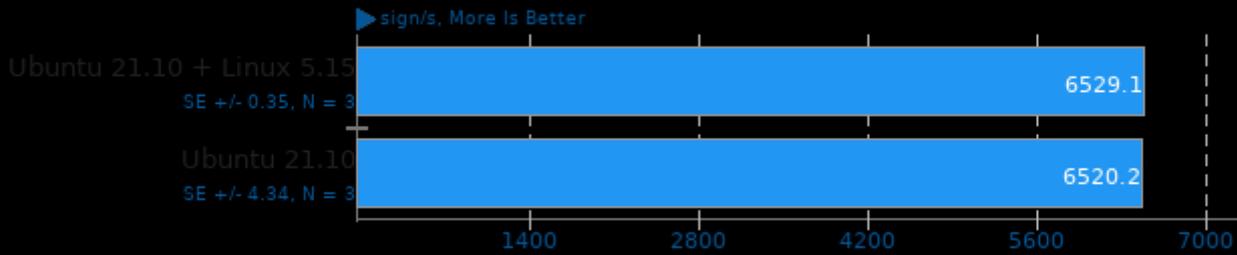
Algorithm: RSA4096



1. (CC) gcc options: -pthread -m64 -O3 -lssl -lcrypto -ldl

### OpenSSL 3.0

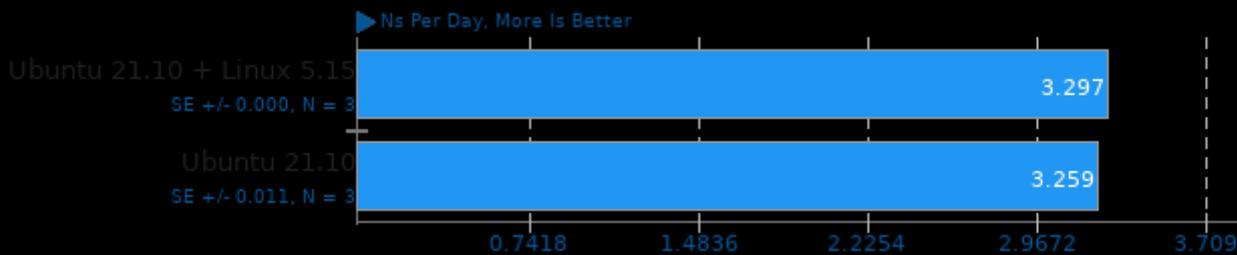
Algorithm: RSA4096



1. (GCC) gcc options: -pthread -m64 -O3 -lssl -lcrypto -ldl

### GROMACS 2021.2

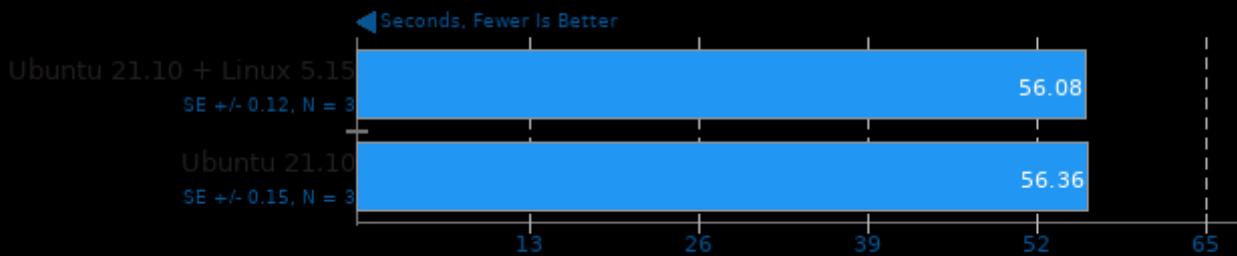
Implementation: MPI CPU - Input: water\_GMX50\_bare



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

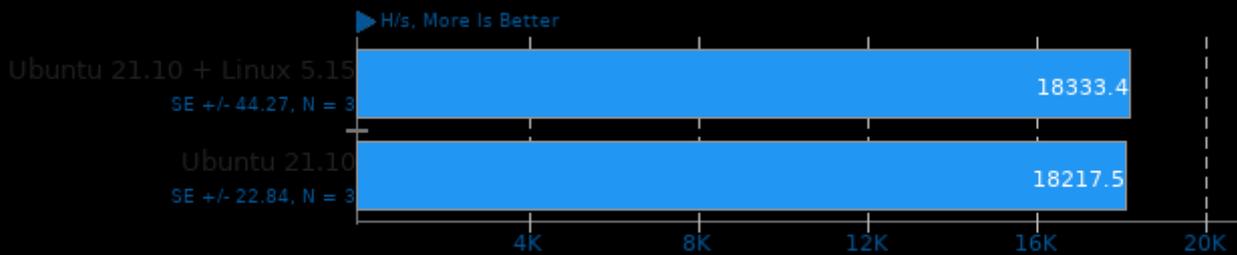
### Timed Godot Game Engine Compilation 3.2.3

Time To Compile



### Xmrig 6.12.1

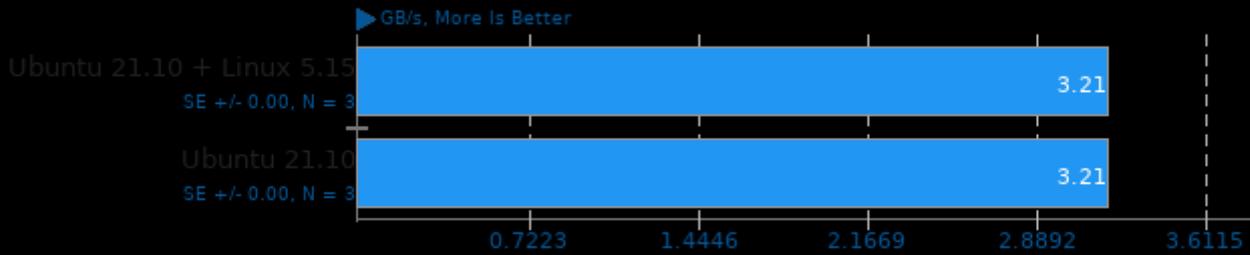
Variant: Monero - Hash Count: 1M



1. (CXX) g++ options: -fexceptions -fno-rtti -maes -O3 -Ofast -static-libgcc -static-libstdc++ -rdynamic -lssl -lcrypto -luv -lpthread -lrt -ldl -lhwloc

## simdjson 1.0

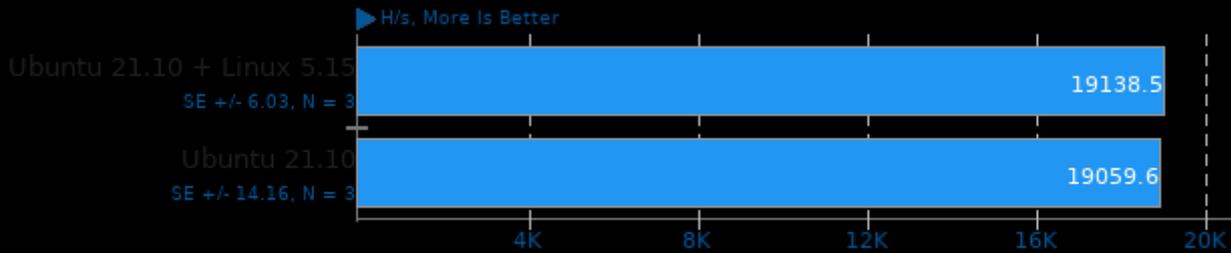
Throughput Test: Kostya



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

## Xmrig 6.12.1

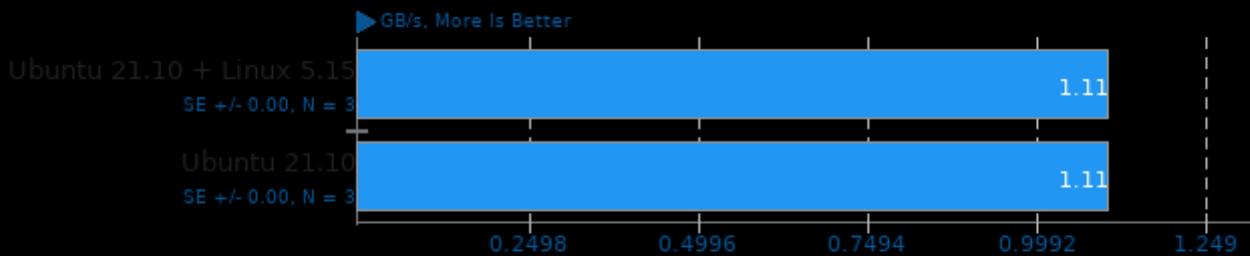
Variant: Wownero - Hash Count: 1M



1. (CXX) g++ options: -fexceptions -fno-rtti -maes -O3 -Ofast -static-libgcc -static-libstdc++ -rdynamic -lssl -lcrypto -luv -lpthread -lrt -ldl -lhwloc

## simdjson 1.0

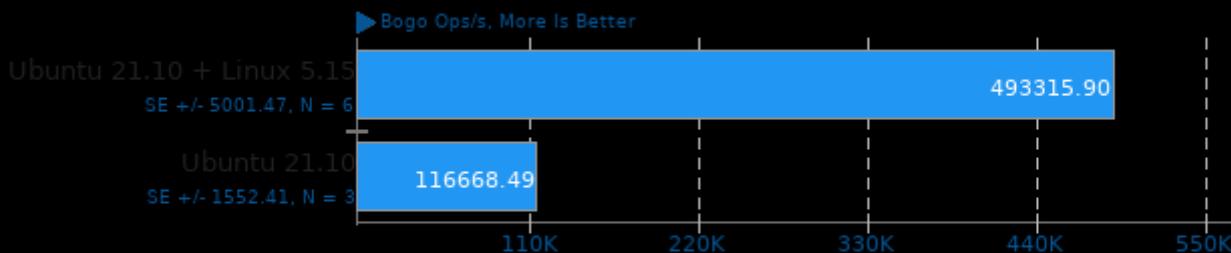
Throughput Test: LargeRandom



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

## Stress-NG 0.13.02

Test: IO\_uring

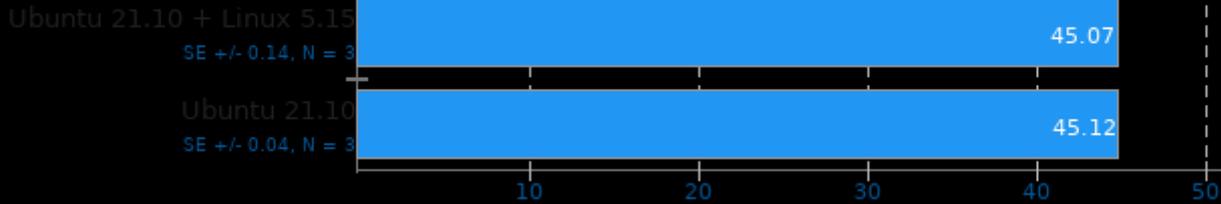


1. (CC) gcc options: -O2 -std=gnu99 -lm -laio -lcrypt -lrt -lz -ldl -pthread -lc -latomic

### libavif avifenc 0.9.0

Encoder Speed: 0

← Seconds, Fewer Is Better

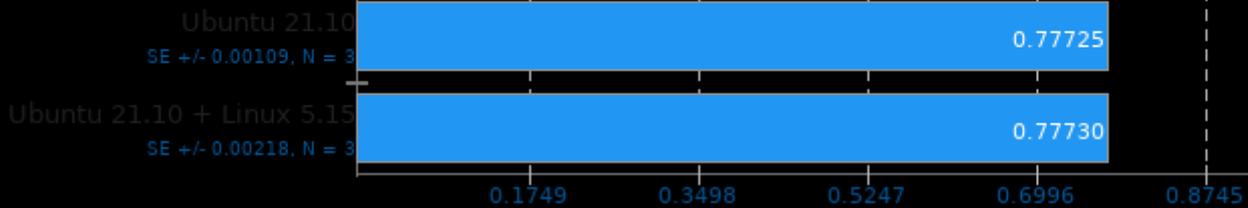


1. (CXX) g++ options: -O3 -fPIC -lm

### NAMD 2.14

ATPase Simulation - 327,506 Atoms

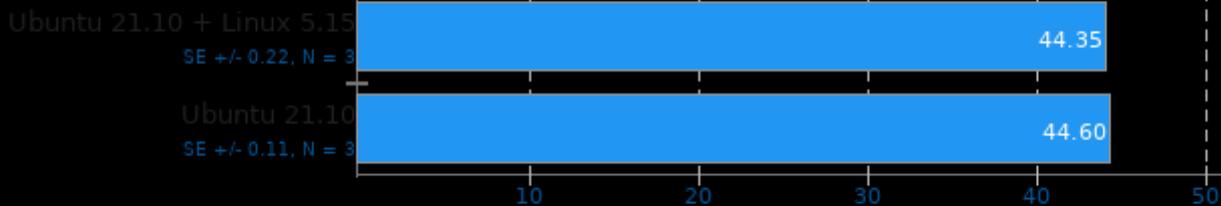
← days/ns, Fewer Is Better



### Rodinia 3.1

Test: OpenMP Leukocyte

← Seconds, Fewer Is Better

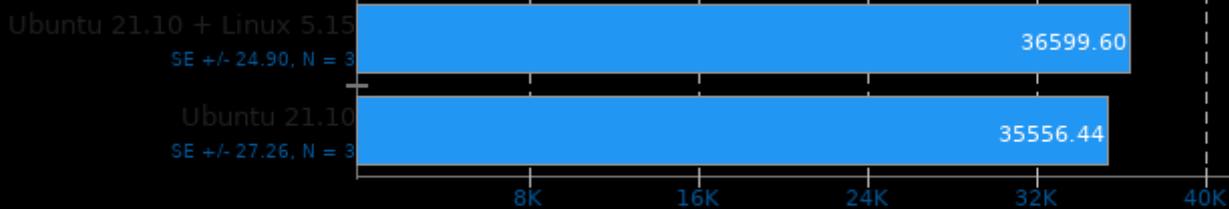


1. (CXX) g++ options: -O2 -lOpenCL

### NAS Parallel Benchmarks 3.4

Test / Class: SP.C

▶ Total Mop/s, More Is Better

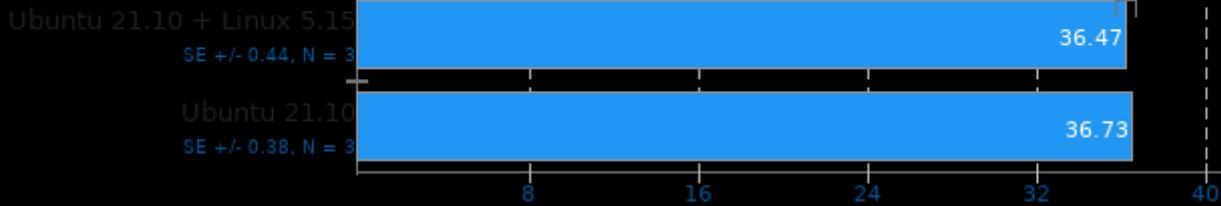


1. (F9X) gfortran options: -O3 -march=native -lmpi\_usempif08 -lmpi\_mpi fh -lmpi -lopen-rte -lopen-pal -lhwloc -levent\_core -levent\_pthreads -lm -lz  
2. Open MPI 4.1.0

## Timed Linux Kernel Compilation 5.14

Time To Compile

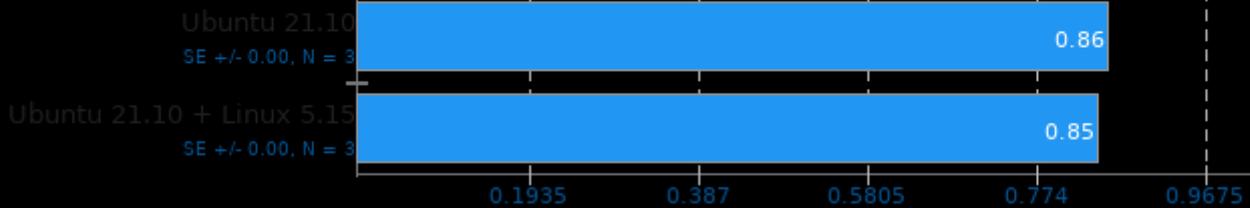
Seconds, Fewer Is Better



## Intel Open Image Denoise 1.4.0

Run: RT.ldr\_alb\_nrm.3840x2160

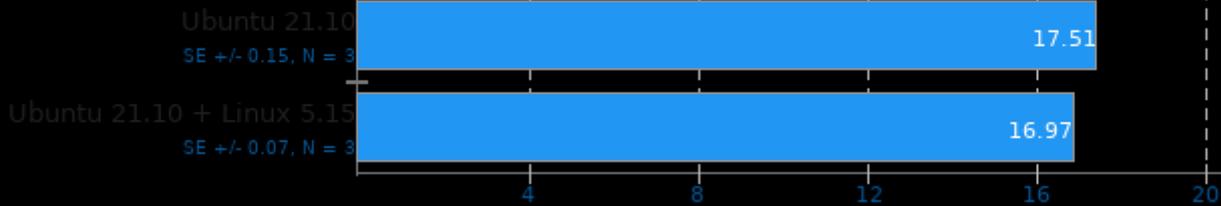
Images / Sec, More Is Better



## VP9 libvpx Encoding 1.10.0

Speed: Speed 5 - Input: Bosphorus 4K

Frames Per Second, More Is Better

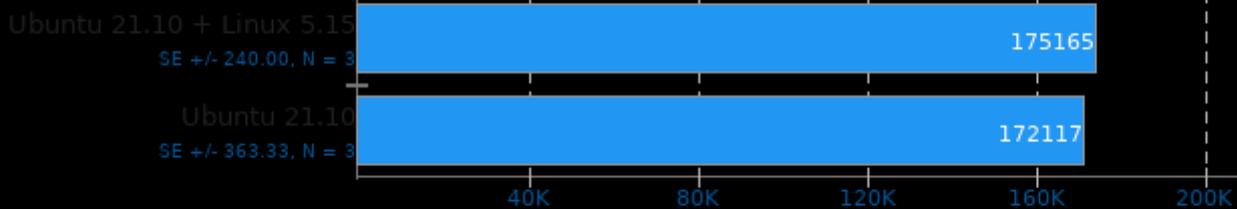


1. (CXX) g++ options: -m64 -lm -pthread -O3 -fPIC -U\_FORTIFY\_SOURCE -std=gnu++11

## 7-Zip Compression 16.02

Compress Speed Test

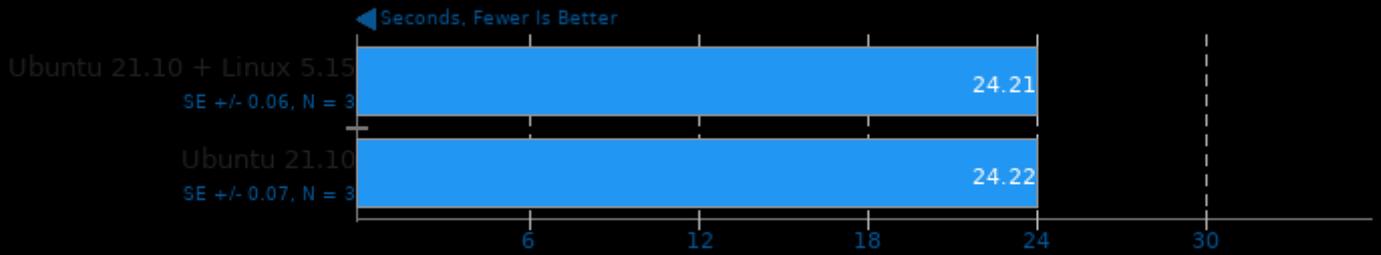
MIPS, More Is Better



1. (CXX) g++ options: -pipe -pthread

## OpenFOAM 8

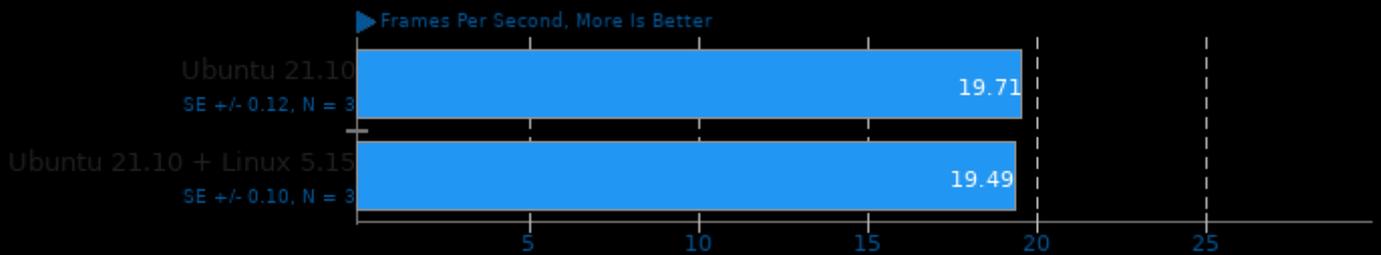
Input: Motorbike 30M



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

## SVT-AV1 0.8.7

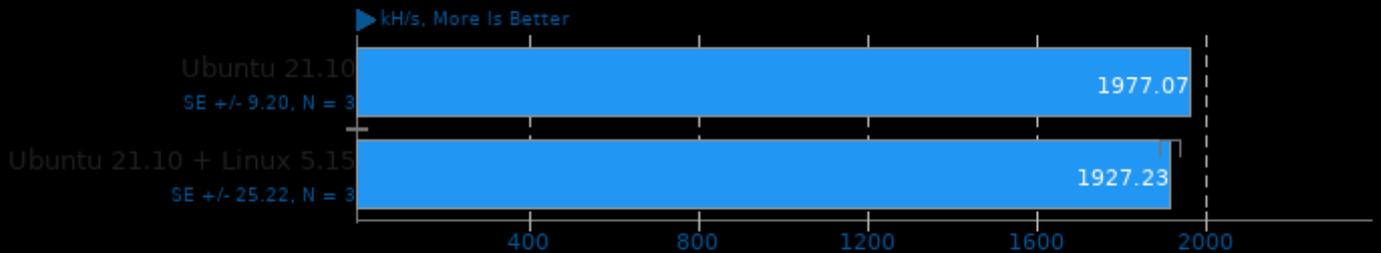
Encoder Mode: Preset 8 - Input: Bosphorus 4K



1. (CXX) g++ options: -mno-avx -mavx2 -mavx512f -mavx512bw -mavx512dq -pie

## Cpuminer-Opt 3.18

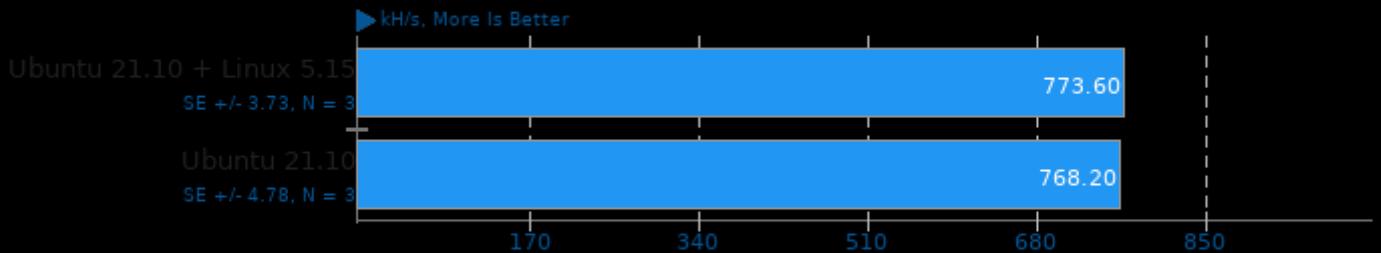
Algorithm: Garlicoin



1. (CXX) g++ options: -O2 -lcurl -lz -lpthread -lssl -lcrypto -lgmp

## Cpuminer-Opt 3.18

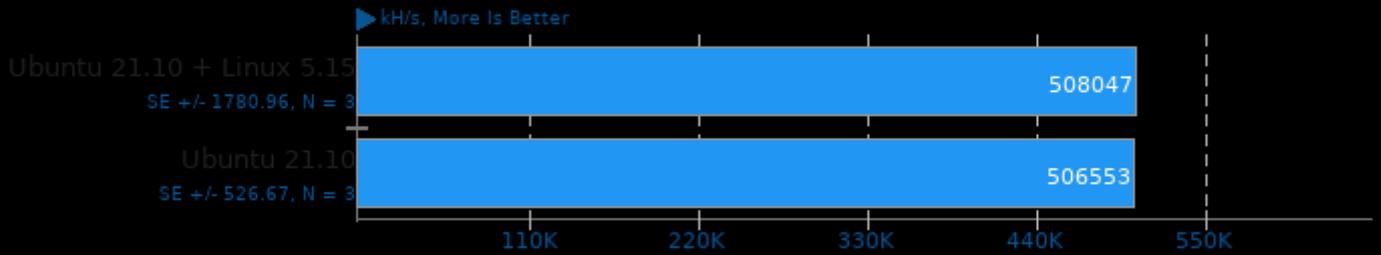
Algorithm: x25x



1. (CXX) g++ options: -O2 -lcurl -lz -lpthread -lssl -lcrypto -lgmp

### Cpuminer-Opt 3.18

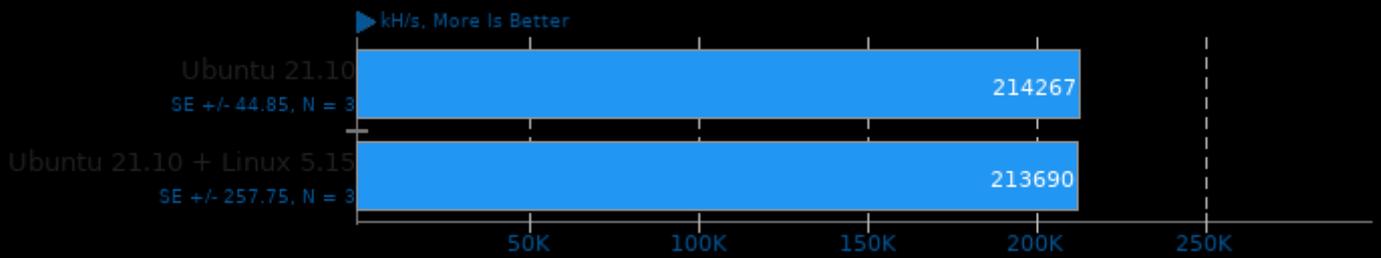
Algorithm: Triple SHA-256, Onecoin



1. (CXX) g++ options: -O2 -lcurl -lz -lpthread -lssl -lcrypto -lgmp

### Cpuminer-Opt 3.18

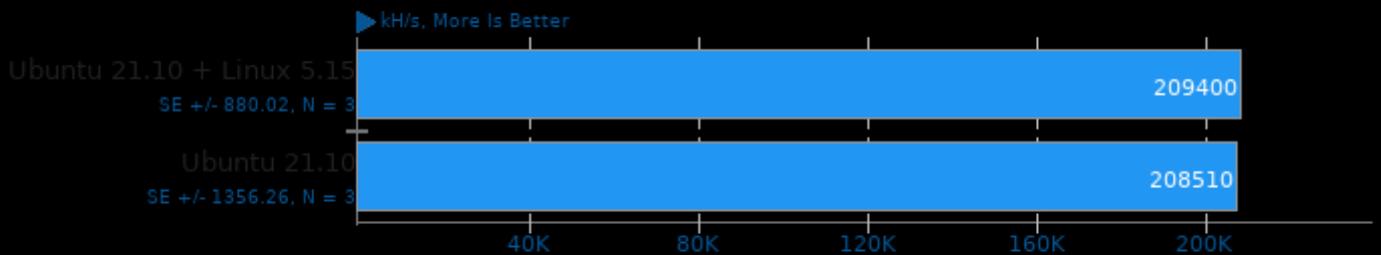
Algorithm: Quad SHA-256, Pyrite



1. (CXX) g++ options: -O2 -lcurl -lz -lpthread -lssl -lcrypto -lgmp

### Cpuminer-Opt 3.18

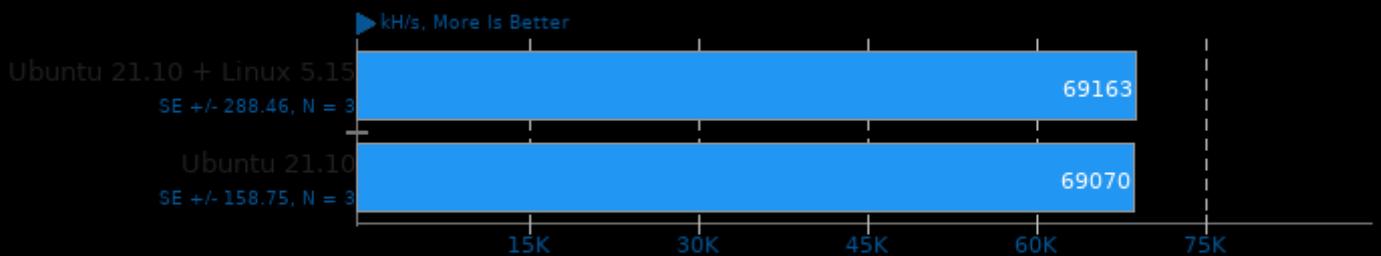
Algorithm: Skeincoin



1. (CXX) g++ options: -O2 -lcurl -lz -lpthread -lssl -lcrypto -lgmp

### Cpuminer-Opt 3.18

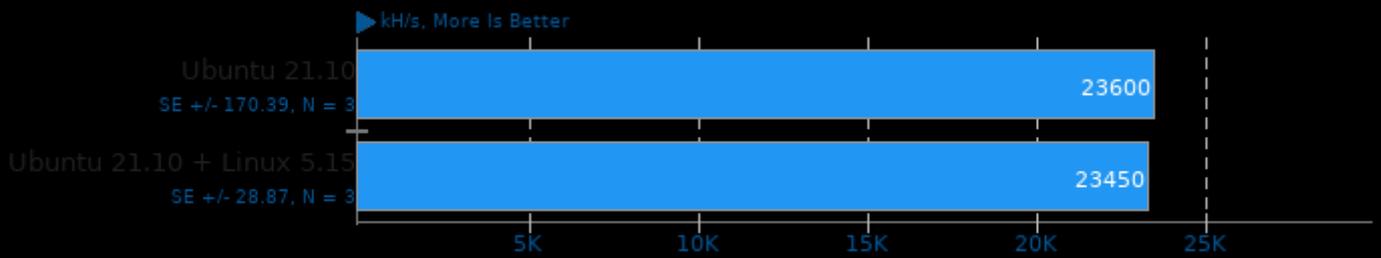
Algorithm: LBC, LBRY Credits



1. (CXX) g++ options: -O2 -lcurl -lz -lpthread -lssl -lcrypto -lgmp

## Cpuminer-Opt 3.18

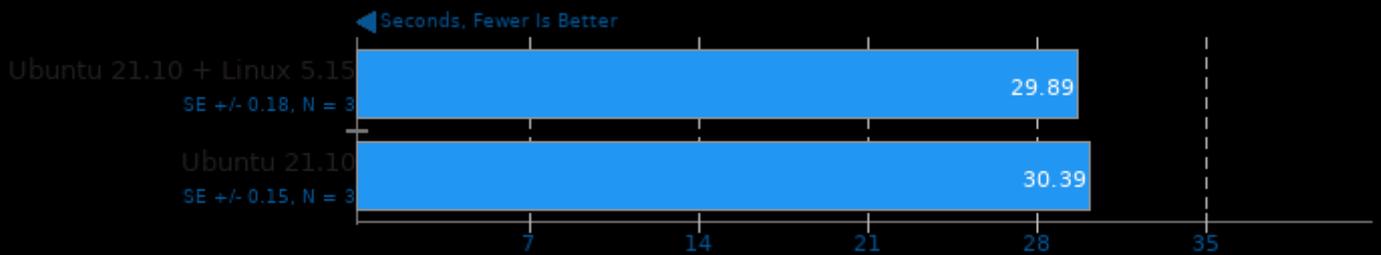
Algorithm: Deepcoin



1. (CXX) g++ options: -O2 -fcurl -lz -lpthread -lssl -lcrypto -lgmp

## Xcompact3d Incompact3d 2021-03-11

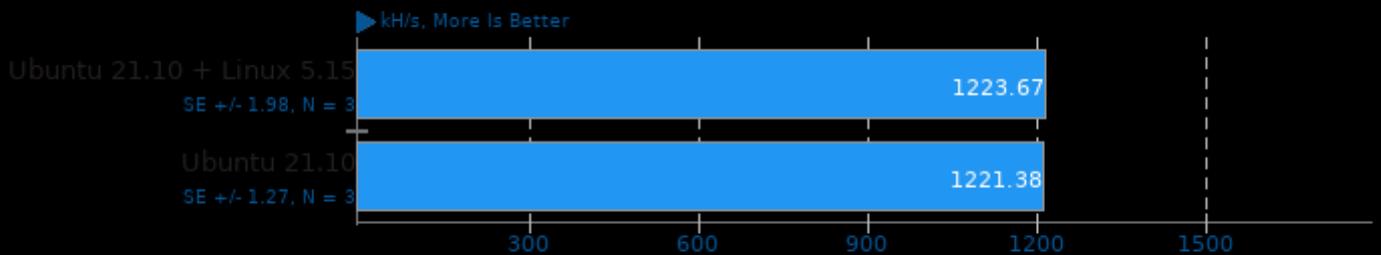
Input: input.i3d 193 Cells Per Direction



1. (F9X) gfortran options: -cpp -O2 -funroll-loops -floop-optimize -fcray-pointer -fbacktrace -fmpi\_usempif08 -fmpi\_mpih -fmpi -fopen-rte -fopen-pal -fhw

## Cpuminer-Opt 3.18

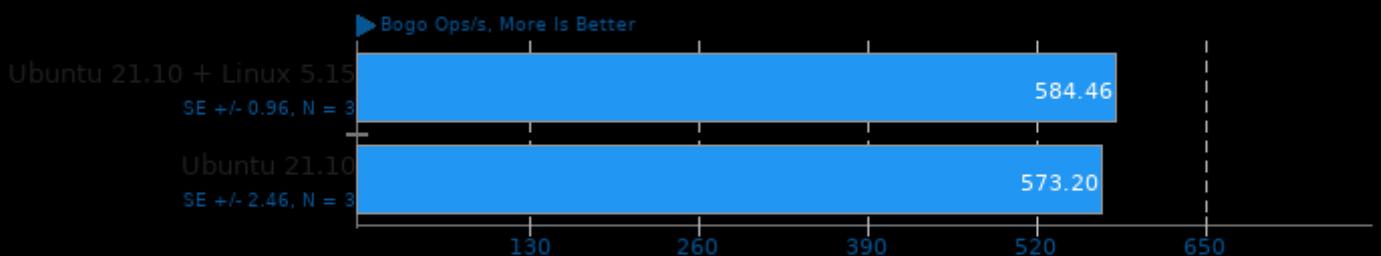
Algorithm: Magi



1. (CXX) g++ options: -O2 -fcurl -lz -lpthread -lssl -lcrypto -lgmp

## Stress-NG 0.13.02

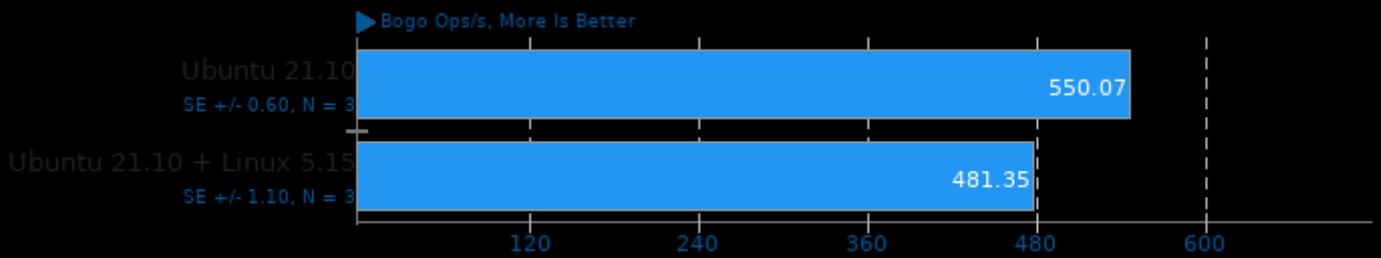
Test: NUMA



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

## Stress-NG 0.13.02

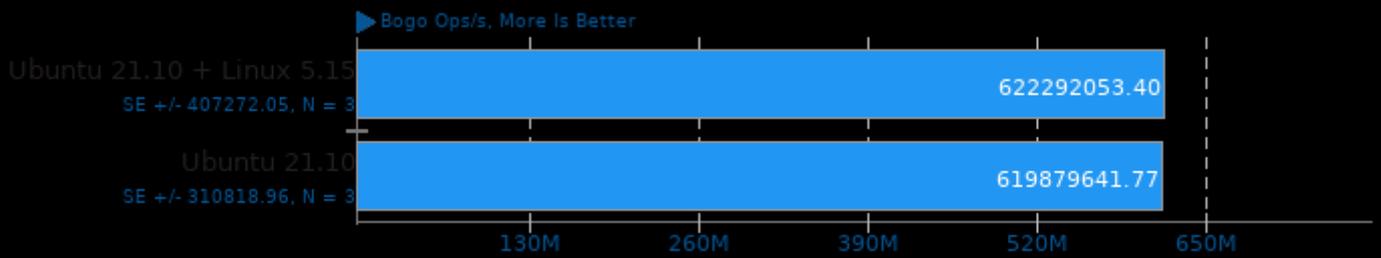
Test: MMAP



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

## Stress-NG 0.13.02

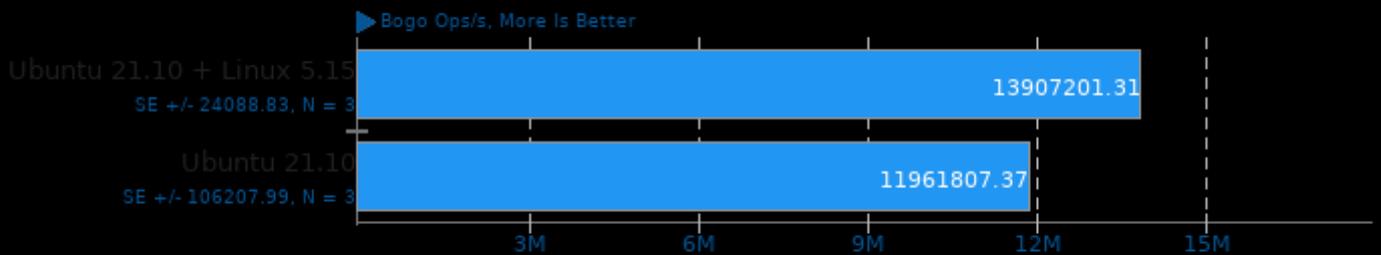
Test: Malloc



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

## Stress-NG 0.13.02

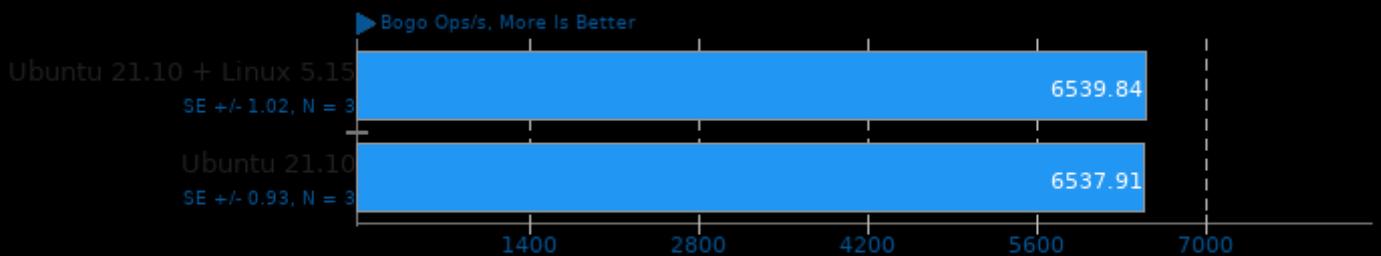
Test: Context Switching



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

## Stress-NG 0.13.02

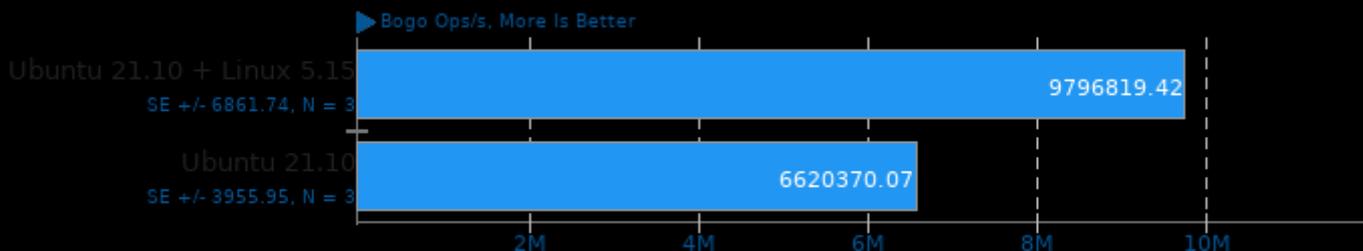
Test: Crypto



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

## Stress-NG 0.13.02

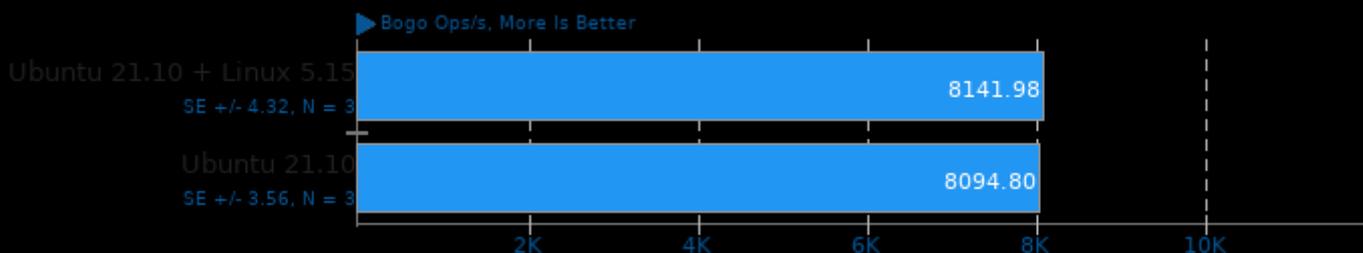
Test: System V Message Passing



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

## Stress-NG 0.13.02

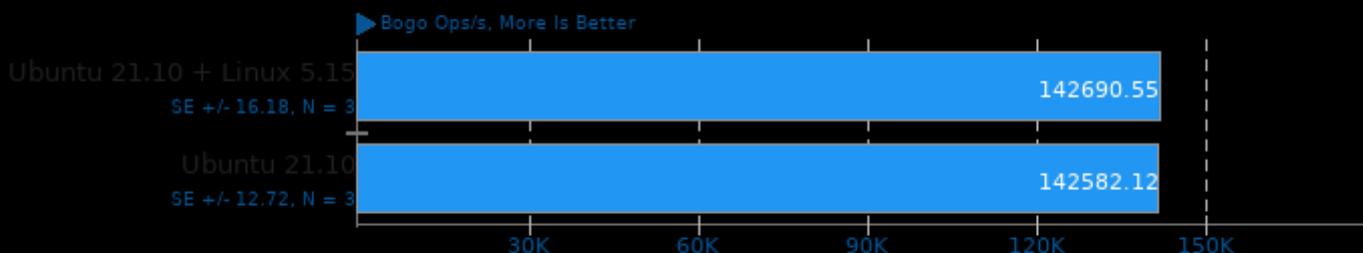
Test: Memory Copying



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

## Stress-NG 0.13.02

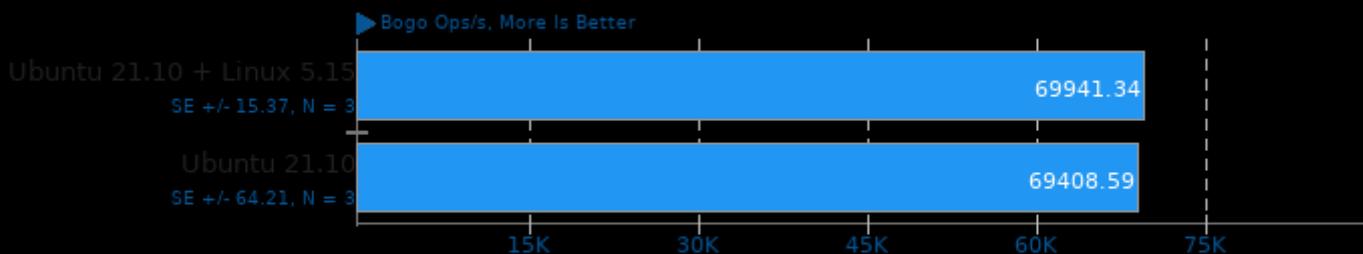
Test: Vector Math



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

## Stress-NG 0.13.02

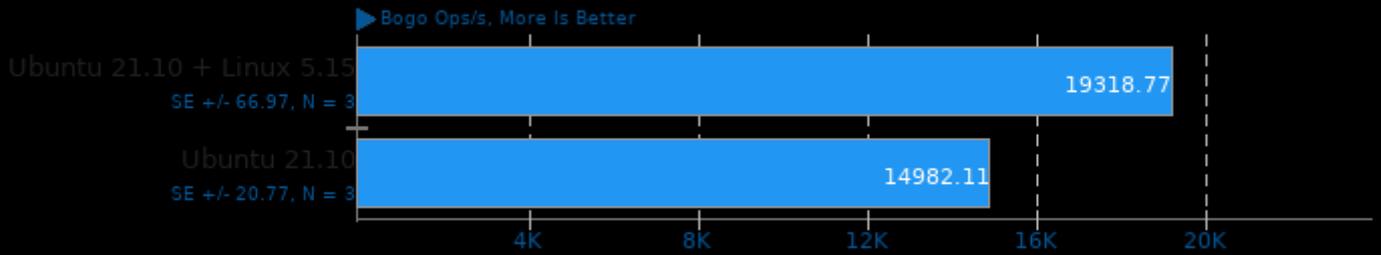
Test: CPU Stress



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

## Stress-NG 0.13.02

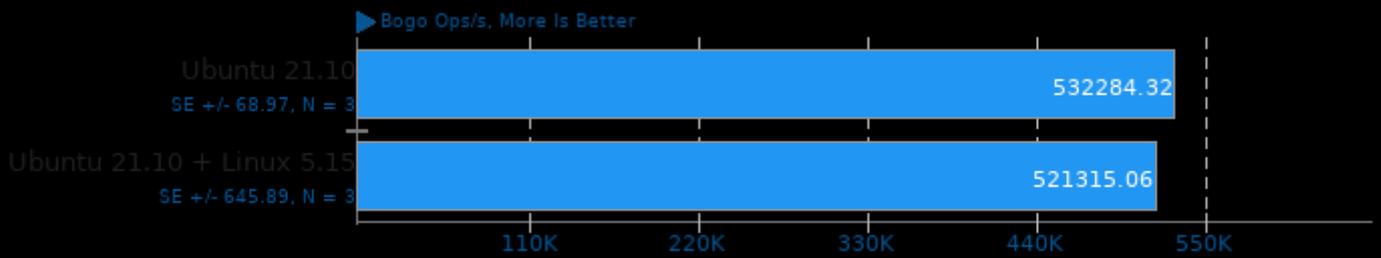
Test: Socket Activity



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

## Stress-NG 0.13.02

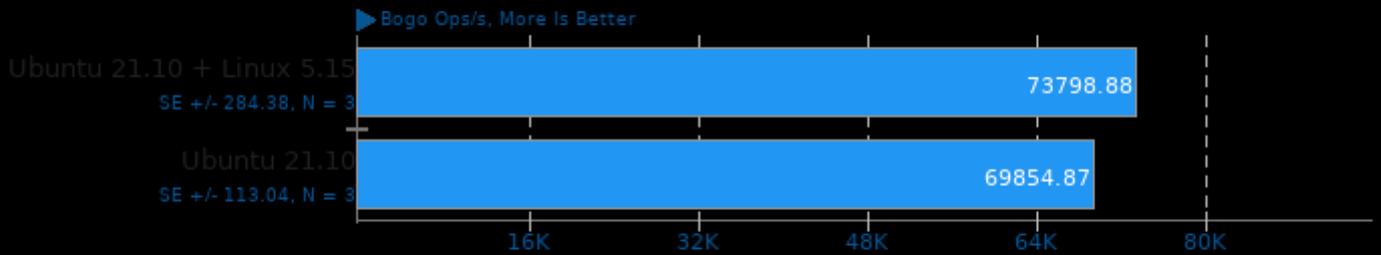
Test: SENDFILE



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

## Stress-NG 0.13.02

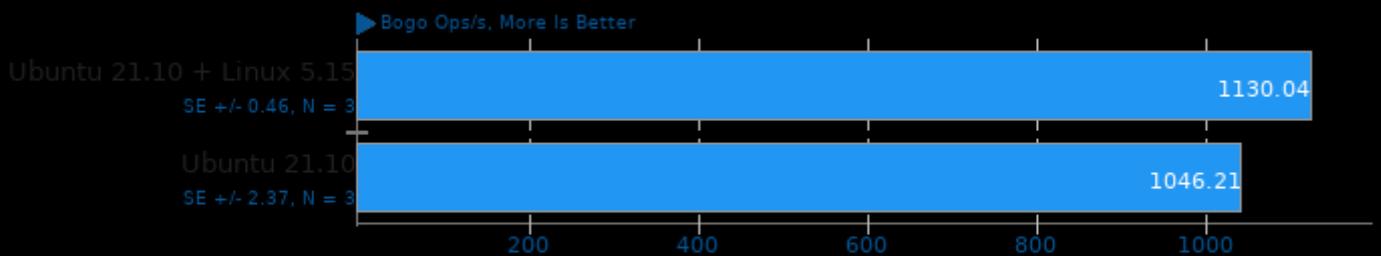
Test: Forking



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

## Stress-NG 0.13.02

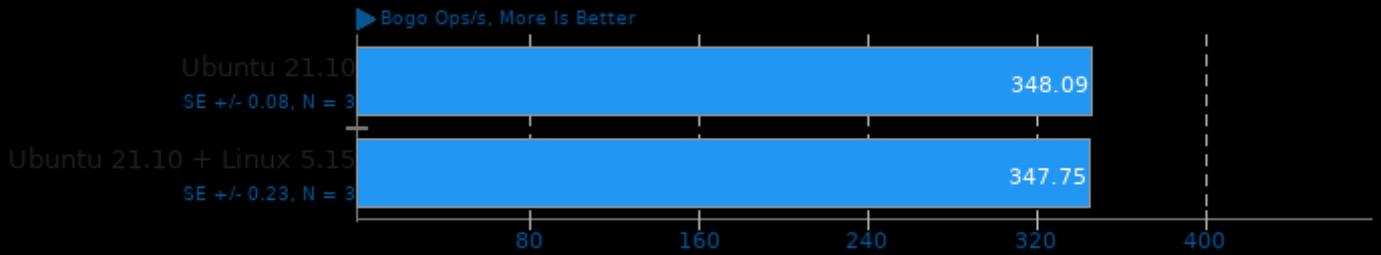
Test: MEMFD



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

### Stress-NG 0.13.02

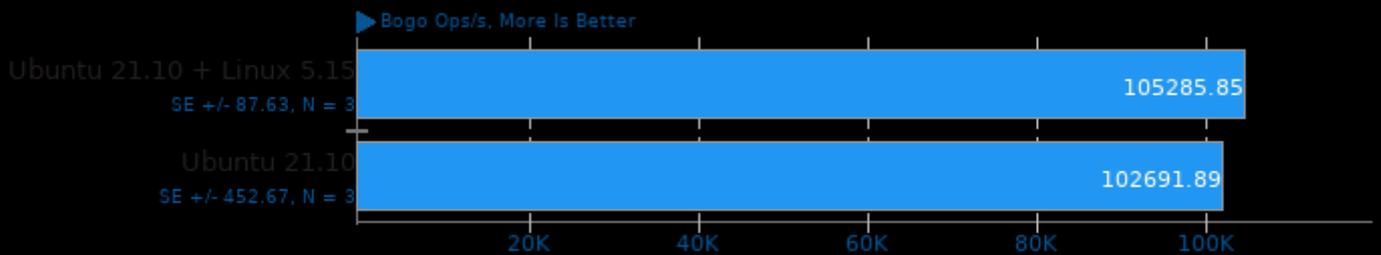
Test: Glibc Qsort Data Sorting



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

### Stress-NG 0.13.02

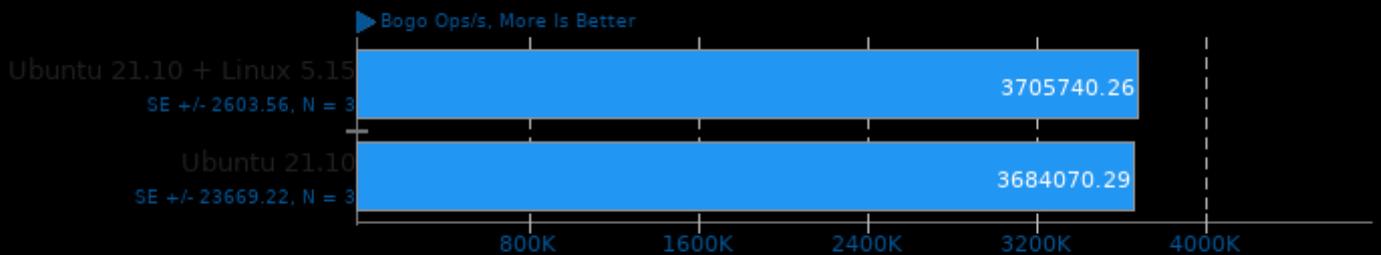
Test: Matrix Math



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

### Stress-NG 0.13.02

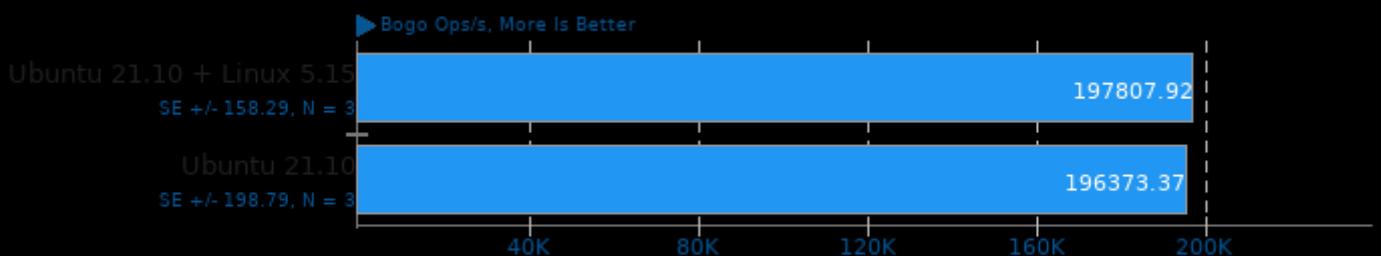
Test: Glibc C String Functions



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

### Stress-NG 0.13.02

Test: Atomic

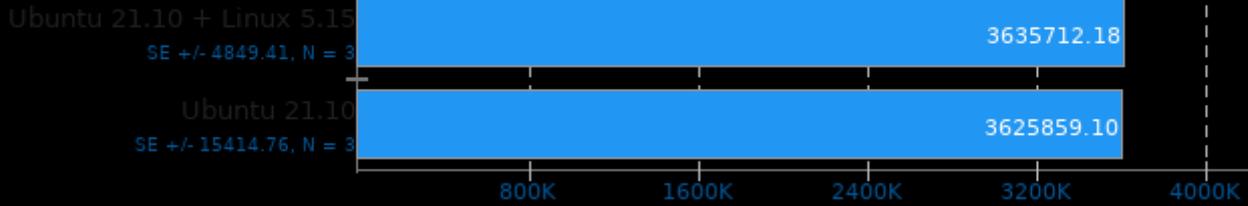


1. (CC) gcc options: -O2 -std=gnu99 -lm -laio -lcrypt -lrt -lz -ldl -pthread -lc -latomic

## Stress-NG 0.13.02

Test: Semaphores

► Bogo Ops/s, More Is Better

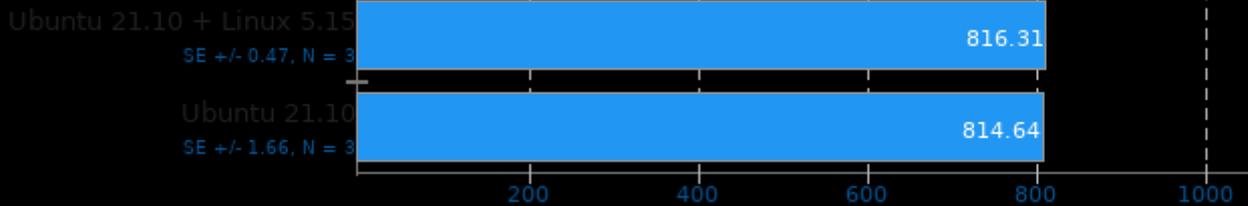


1. (ICC) gcc options: -O2 -std=gnu99 -lm -lao -lcrypt -lrt -lz -ldl -pthread -lc -latomic

## Google SynthMark 20201109

Test: VoiceMark\_100

► Voices, More Is Better

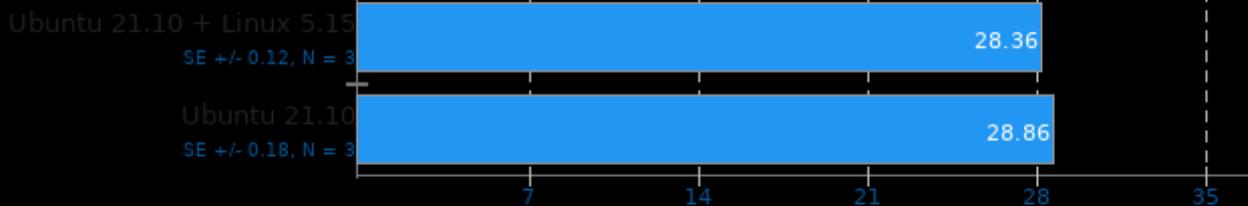


1. (CXX) g++ options: -lm -lpthread -std=c++11 -Ofast

## libavif avifenc 0.9.0

Encoder Speed: 6, Lossless

◄ Seconds, Fewer Is Better

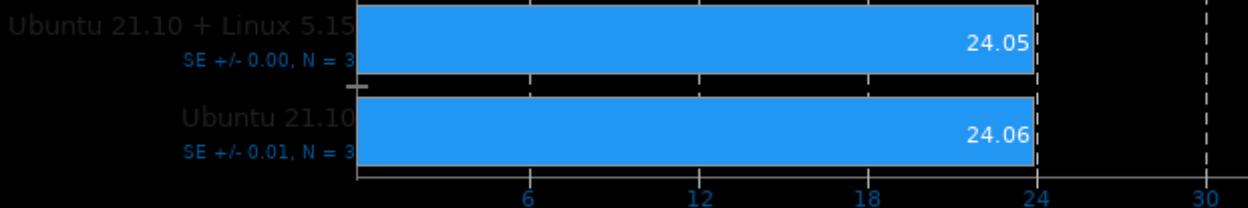


1. (CXX) g++ options: -O3 -fPIC -lm

## ASTC Encoder 3.2

Preset: Exhaustive

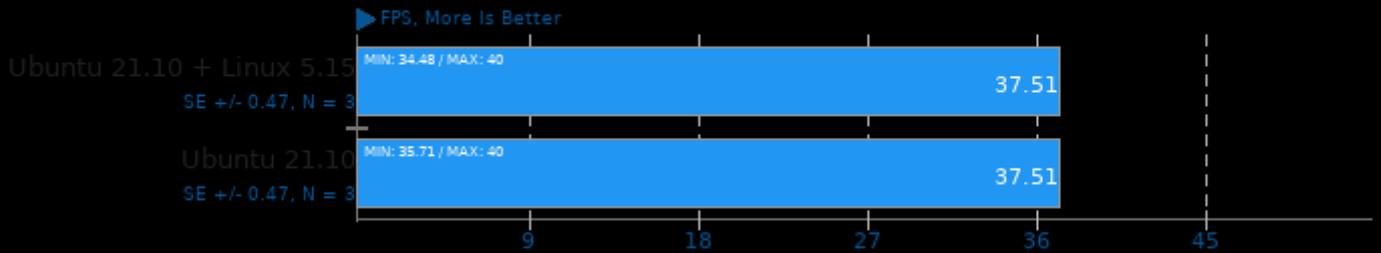
◄ Seconds, Fewer Is Better



1. (CXX) g++ options: -O3 -fno -pthread

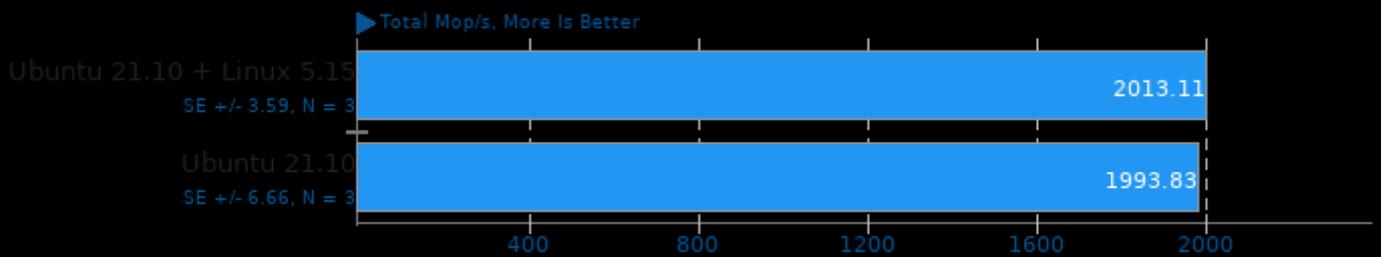
## OSPray 1.8.5

Demo: San Miguel - Renderer: SciVis



## NAS Parallel Benchmarks 3.4

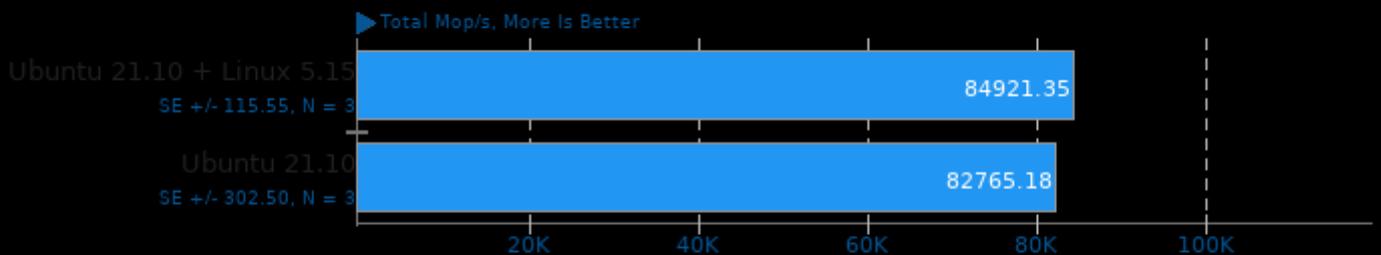
Test / Class: IS.D



1. (F9X) gfortran options: -O3 -march=native -lmpi\_usempif08 -lmpi\_mpifh -lmpi -lopen-rte -lopen-pal -lhwloc -levent\_core -levent\_pthreads -lm -lz  
2. Open MPI 4.1.0

## NAS Parallel Benchmarks 3.4

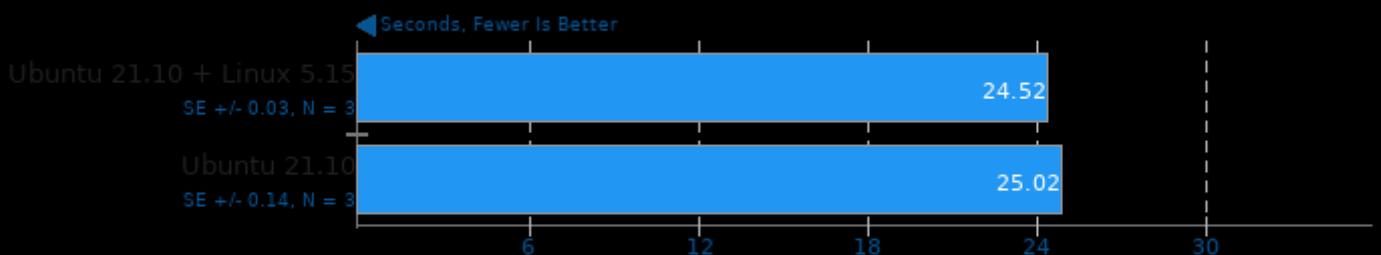
Test / Class: LU.C



1. (F9X) gfortran options: -O3 -march=native -lmpi\_usempif08 -lmpi\_mpifh -lmpi -lopen-rte -lopen-pal -lhwloc -levent\_core -levent\_pthreads -lm -lz  
2. Open MPI 4.1.0

## libavif avifenc 0.9.0

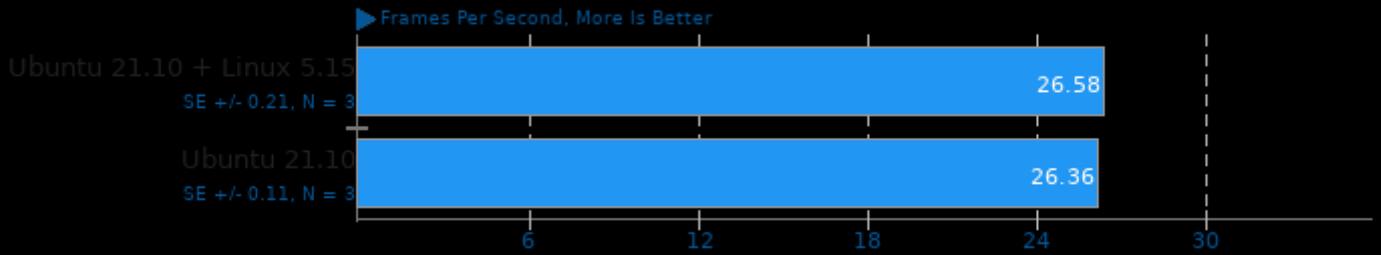
Encoder Speed: 2



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

### x265 3.4

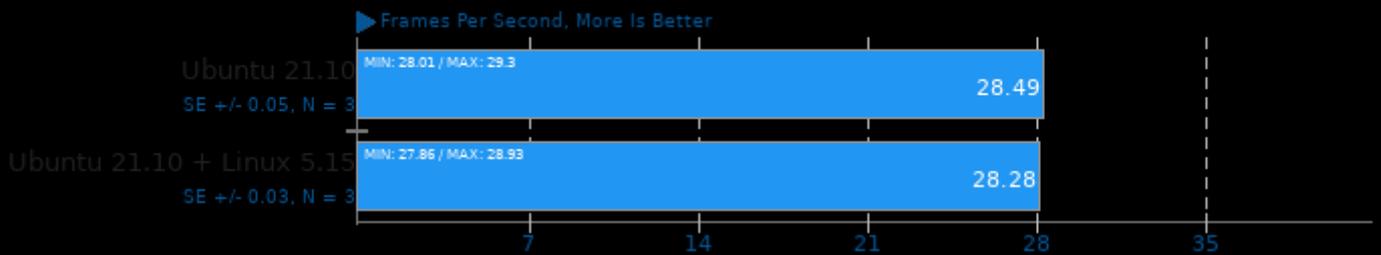
Video Input: Bosphorus 4K



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

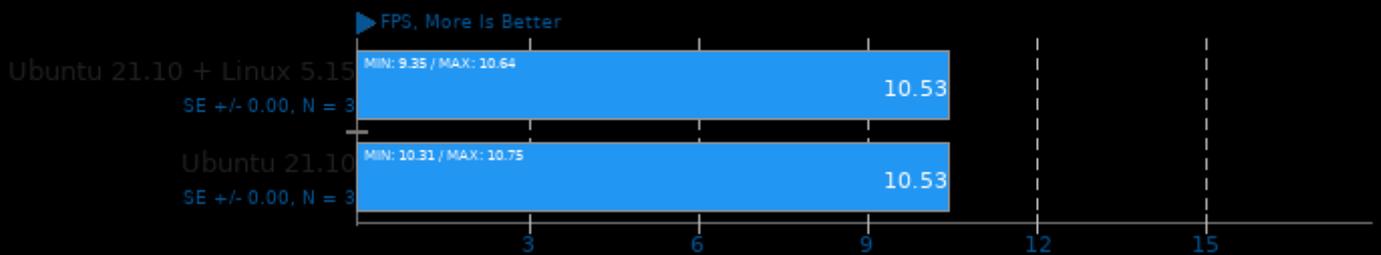
### Embree 3.13

Binary: Pathtracer ISPC - Model: Crown



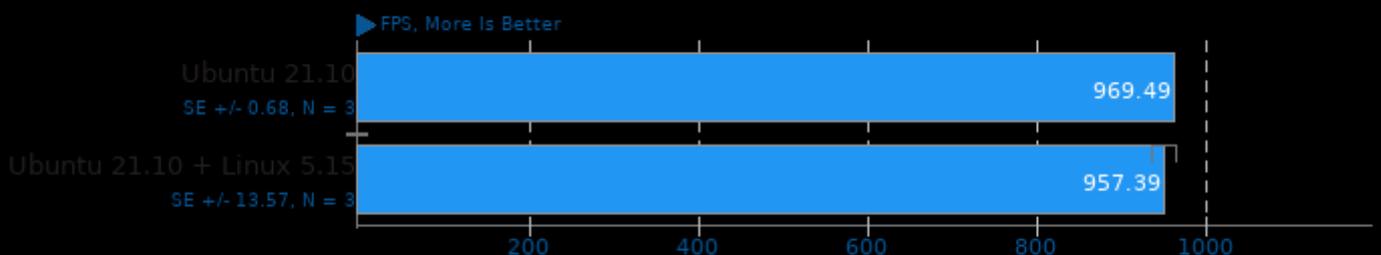
### OSPray 1.8.5

Demo: NASA Streamlines - Renderer: Path Tracer



### TTSIOD 3D Renderer 2.3b

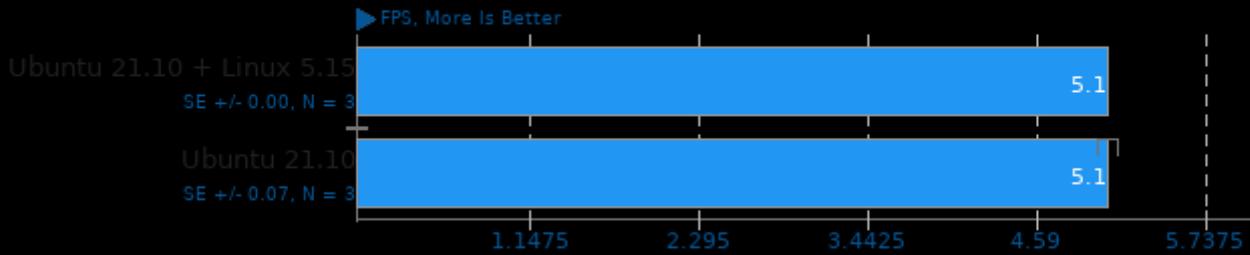
Phong Rendering With Soft-Shadow Mapping



1. (CXX) g++ options: -O3 -fomit-frame-pointer -ffast-math -mtune=native -fno -msse -mrecip -mfpmath=sse -msse2 -msse3 -fsdl -fopenmp -fwhole-pr

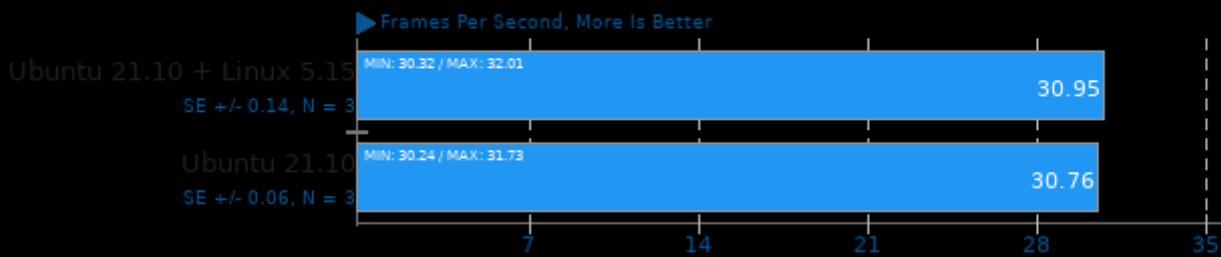
### Natron 2.4

Input: Spaceship



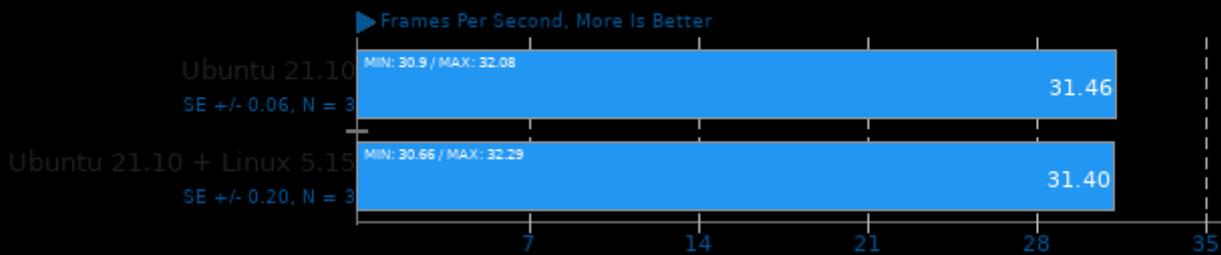
### Embree 3.13

Binary: Pathtracer - Model: Crown



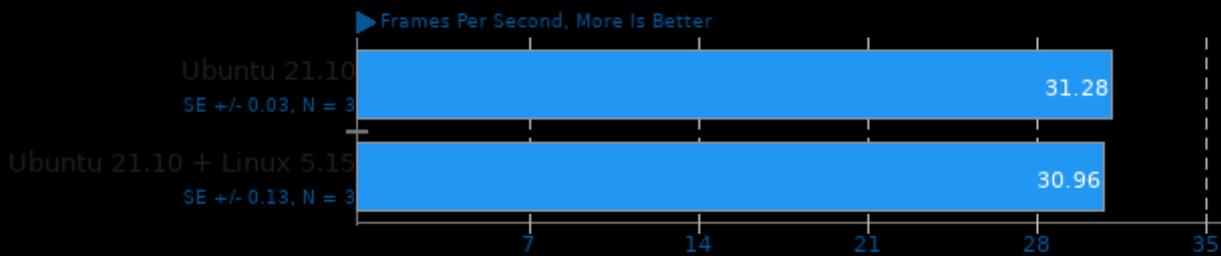
### Embree 3.13

Binary: Pathtracer ISPC - Model: Asian Dragon



### AOM AV1 3.1

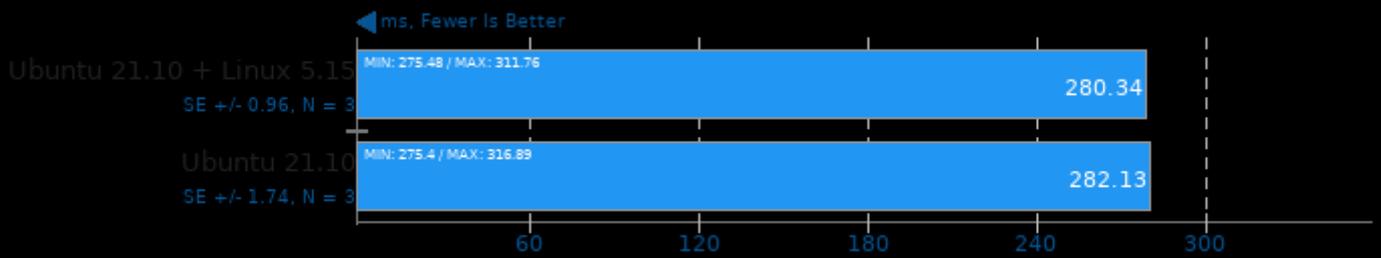
Encoder Mode: Speed 8 Realtime - Input: Bosphorus 4K



1. (CXX) g++ options: -O3 -std=c++11 -U\_FORTIFY\_SOURCE -lm

## TNN 0.3

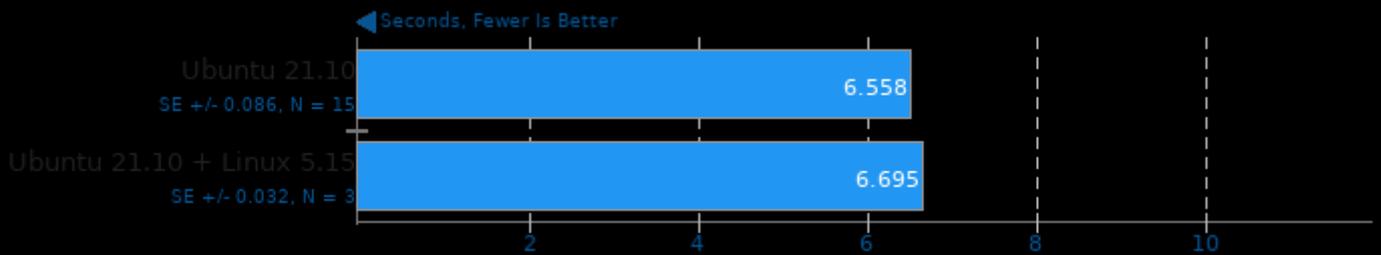
Target: CPU - Model: MobileNet v2



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

## Rodinia 3.1

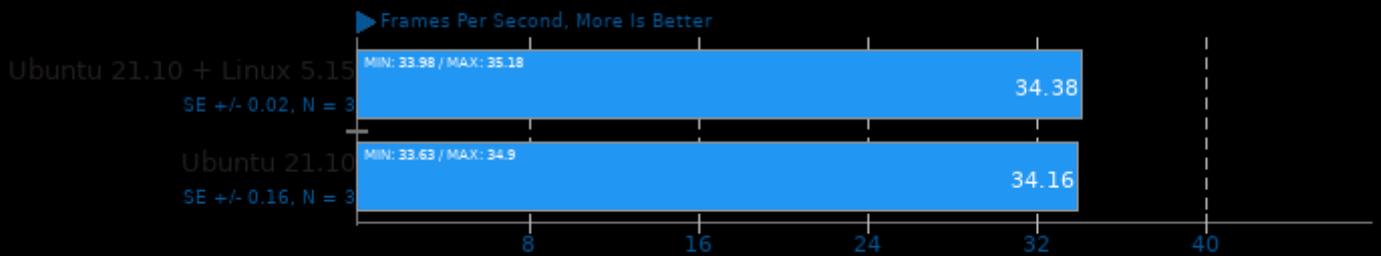
Test: OpenMP Streamcluster



1. (CXX) g++ options: -O2 -lOpenCL

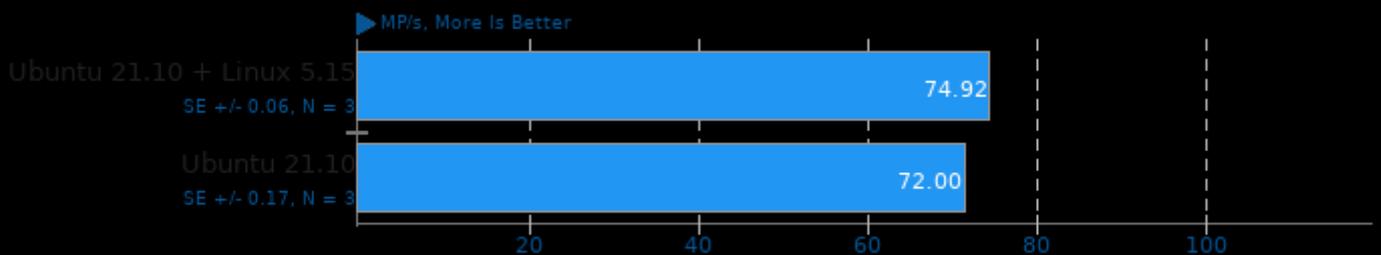
## Embree 3.13

Binary: Pathtracer - Model: Asian Dragon



## JPEG XL libjxl 0.5

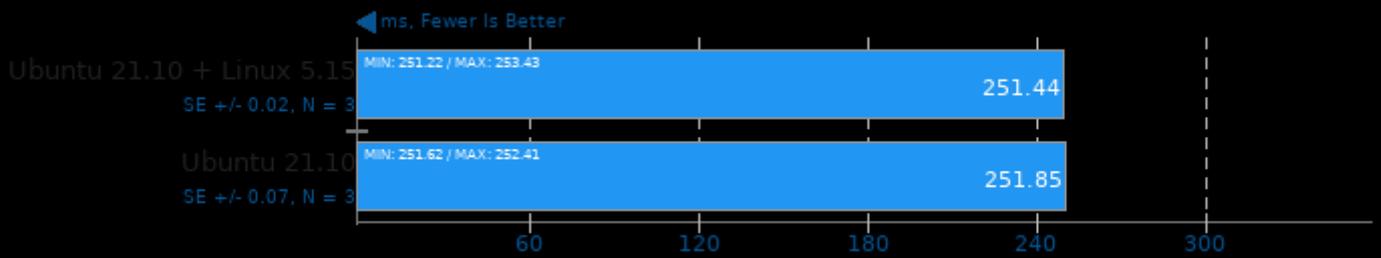
Input: PNG - Encode Speed: 5



1. (CXX) g++ options: -funwind-tables -O3 -O2 -fPIE -pie

## TNN 0.3

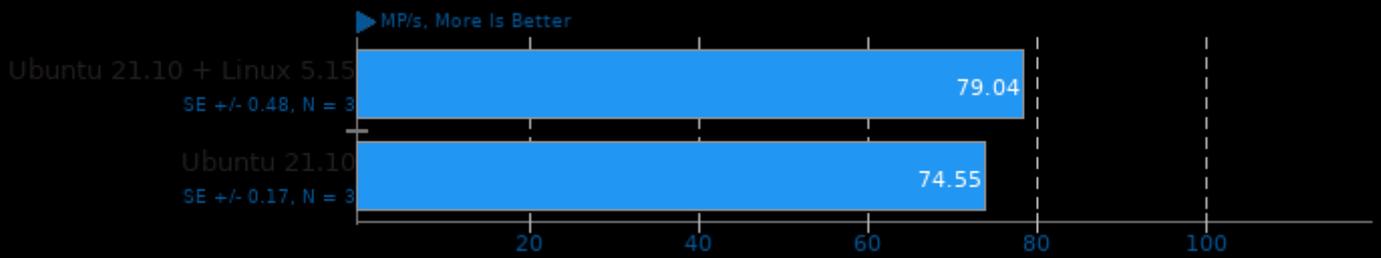
Target: CPU - Model: SqueezeNet v1.1



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

## JPEG XL libjxl 0.5

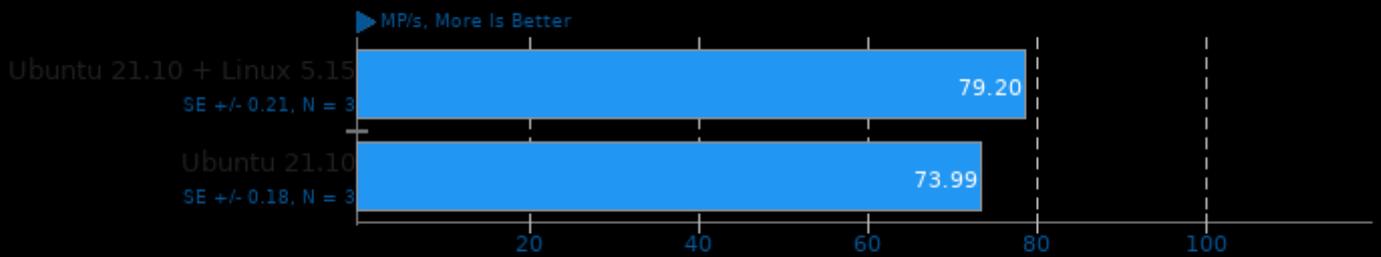
Input: JPEG - Encode Speed: 5



1. (CXX) g++ options: -funwind-tables -O3 -O2 -fPIE -pie

## JPEG XL libjxl 0.5

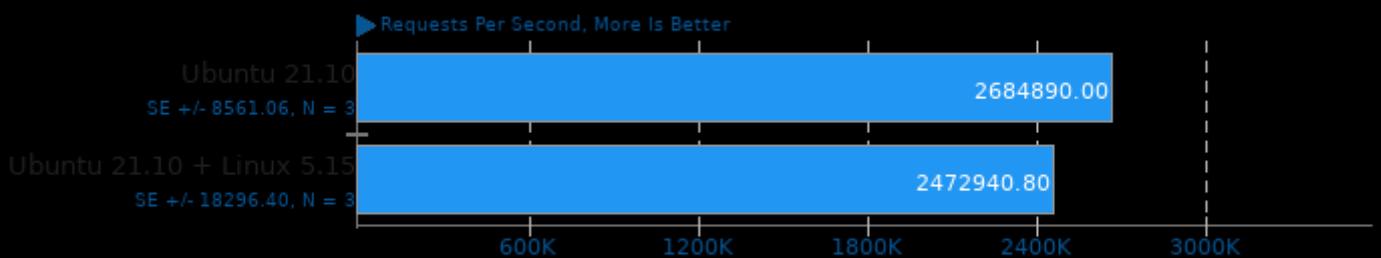
Input: JPEG - Encode Speed: 7



1. (CXX) g++ options: -funwind-tables -O3 -O2 -fPIE -pie

## Redis 6.0.9

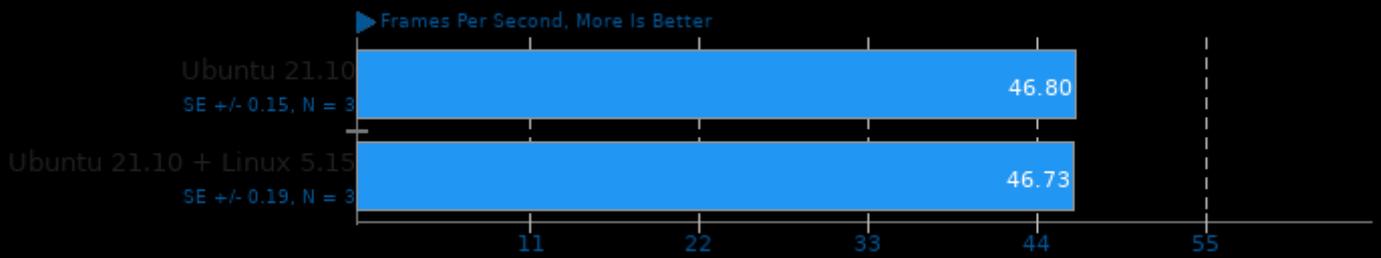
Test: GET



1. (CXX) g++ options: -MM -MT -g3 -fvisibility=hidden -O3

### AOM AV1 3.1

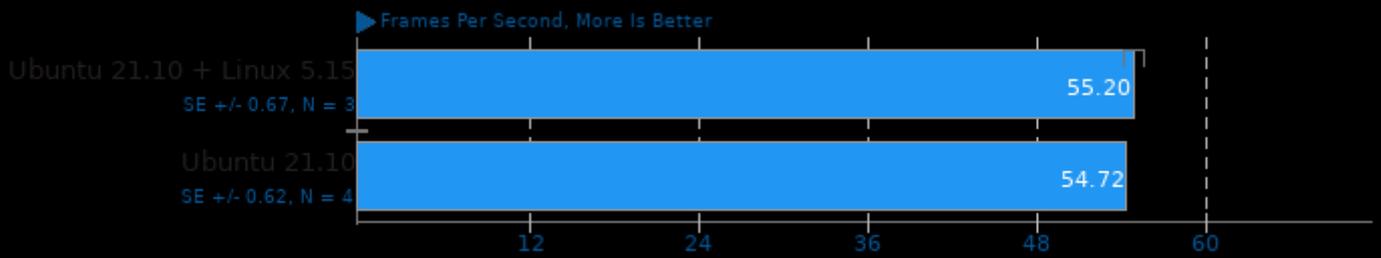
Encoder Mode: Speed 9 Realtime - Input: Bosphorus 4K



1. (CXX) g++ options: -O3 -std=c++11 -U\_FORTIFY\_SOURCE -lm

### x265 3.4

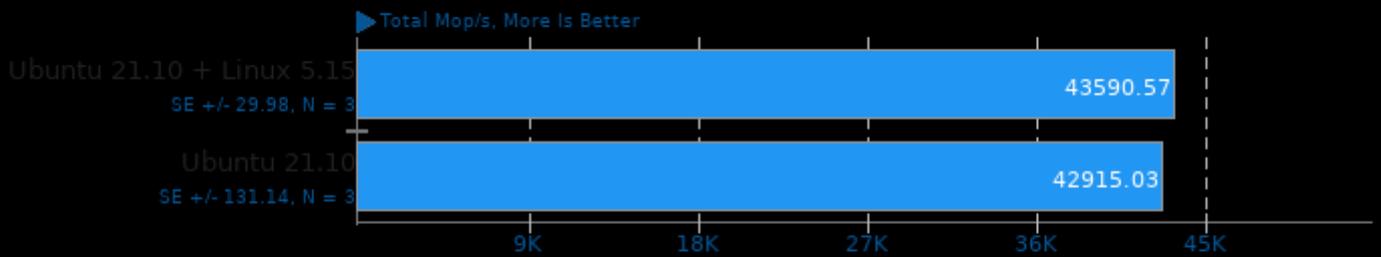
Video Input: Bosphorus 1080p



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

### NAS Parallel Benchmarks 3.4

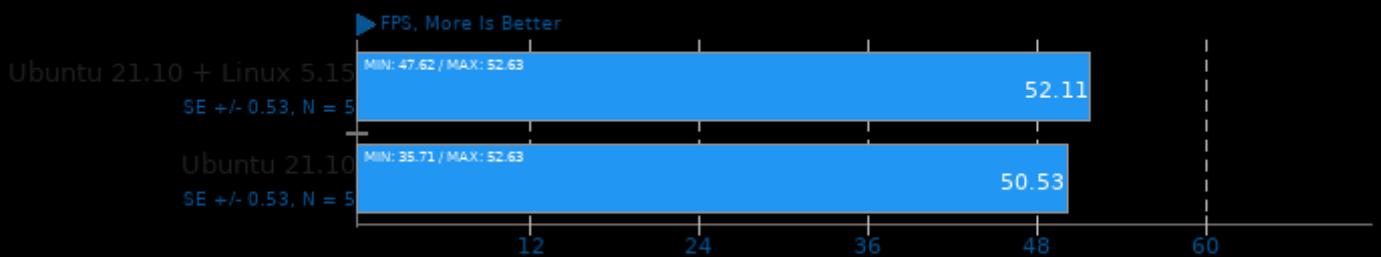
Test / Class: FT.C



1. (F9X) gfortran options: -O3 -march=native -lmpi\_usempif08 -lmpi\_mpi fh -lmpi -lopen-rt -lopen-pal -lhwloc -levent\_core -levent\_pthreads -lm -lz  
2. Open MPI 4.1.0

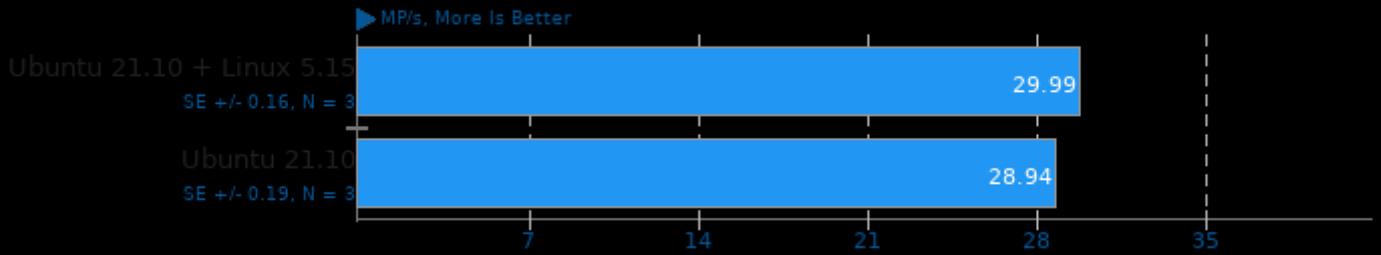
### OSPray 1.8.5

Demo: NASA Streamlines - Renderer: SciVis



## JPEG XL libjxl 0.5

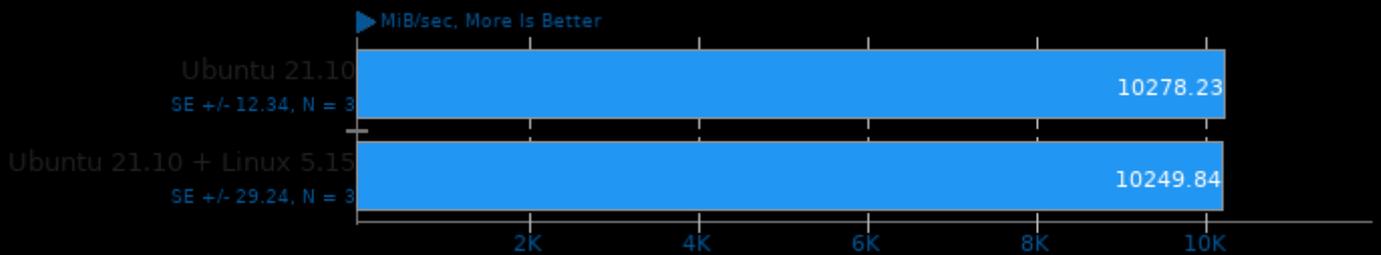
Input: JPEG - Encode Speed: 8



1. (CXX) g++ options: -funwind-tables -O3 -O2 -fPIE -pie

## Sysbench 1.0.20

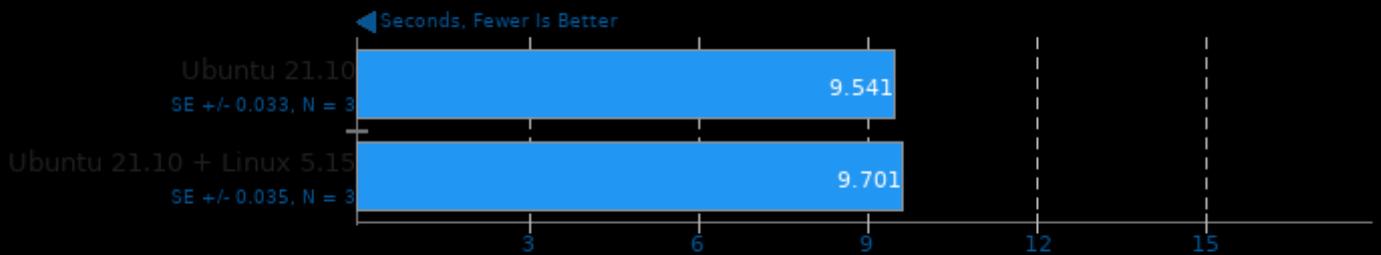
Test: RAM / Memory



1. (CC) gcc options: -O2 -funroll-loops -rdynamic -ldl -laio -lm

## Rodinia 3.1

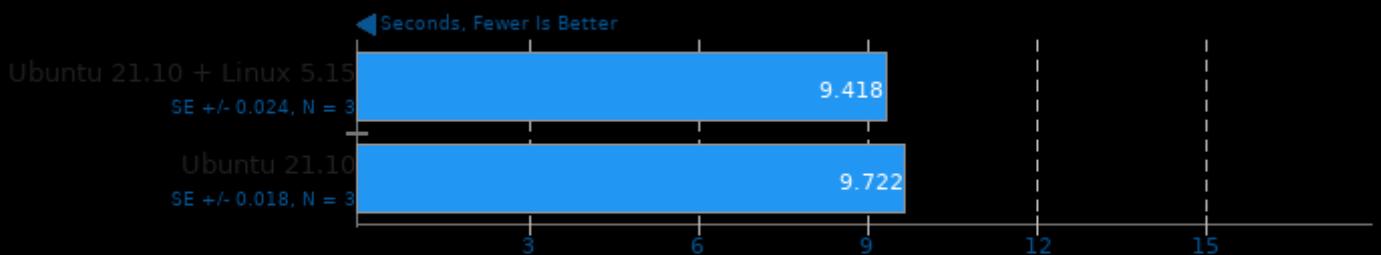
Test: OpenMP CFD Solver



1. (CXX) g++ options: -O2 -lOpenCL

## libavif avifenc 0.9.0

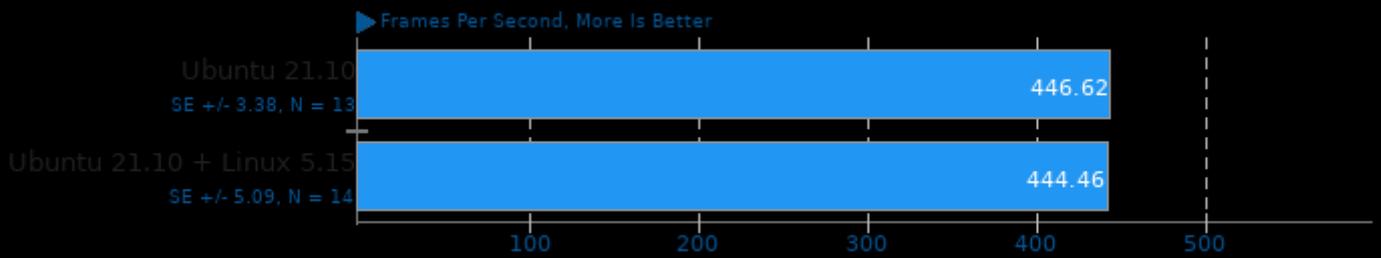
Encoder Speed: 6



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

### SVT-VP9 0.3

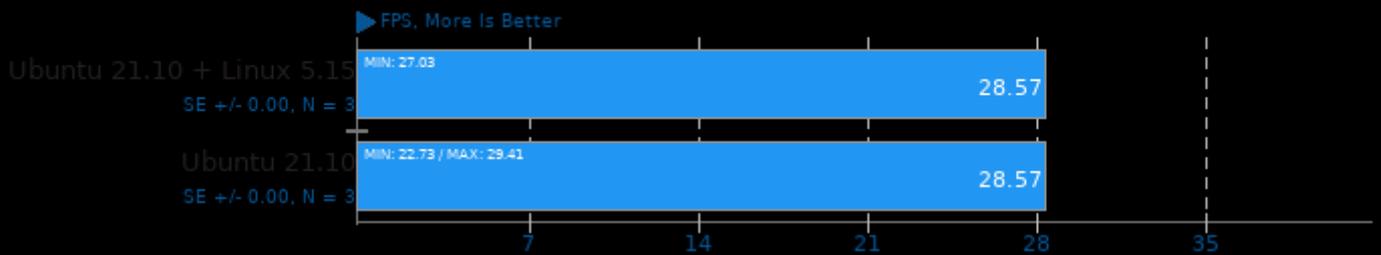
Tuning: VMAF Optimized - Input: Bosphorus 1080p



1. (C) gcc options: -O3 -fcommon -fPIE -fPIC -fvisibility=hidden -pie -rdynamic -pthread -lrt -lm

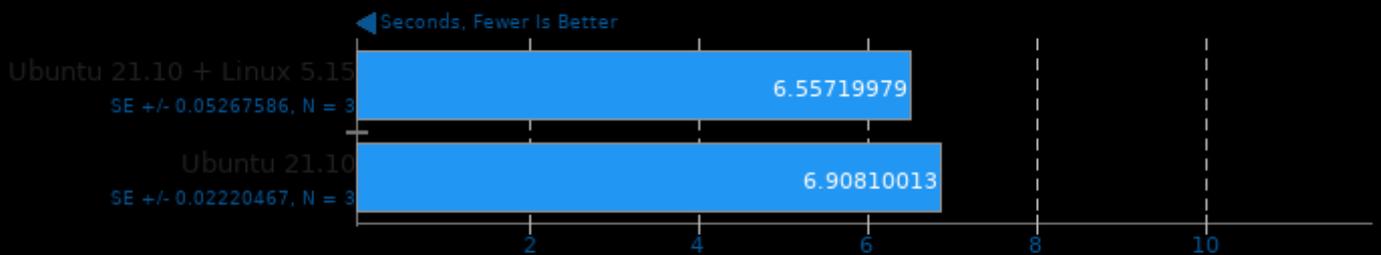
### OSPray 1.8.5

Demo: Magnetic Reconnection - Renderer: SciVis



### Xcompact3d Incompact3d 2021-03-11

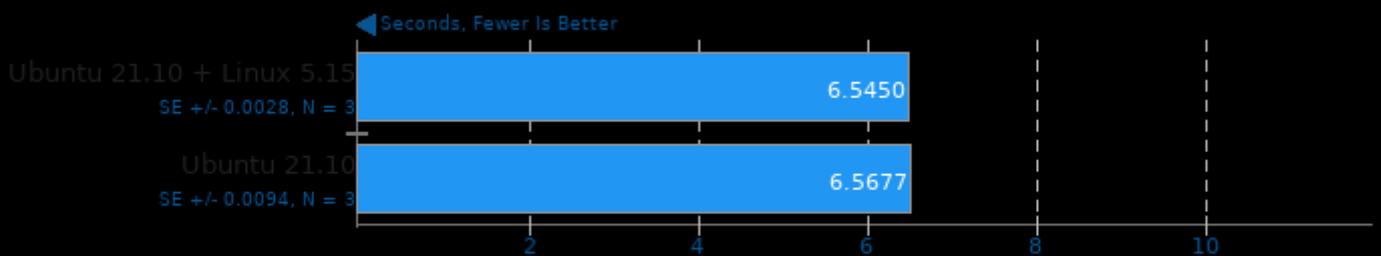
Input: input.i3d 129 Cells Per Direction



1. (F9X) gfortran options: -cpp -O2 -funroll-loops -floop-optimize -fcray-pointer -fbacktrace -lmpi\_usempif08 -lmpi\_mpifh -lmpi -lopen-rte -lopen-pal -hwloc

### ASTC Encoder 3.2

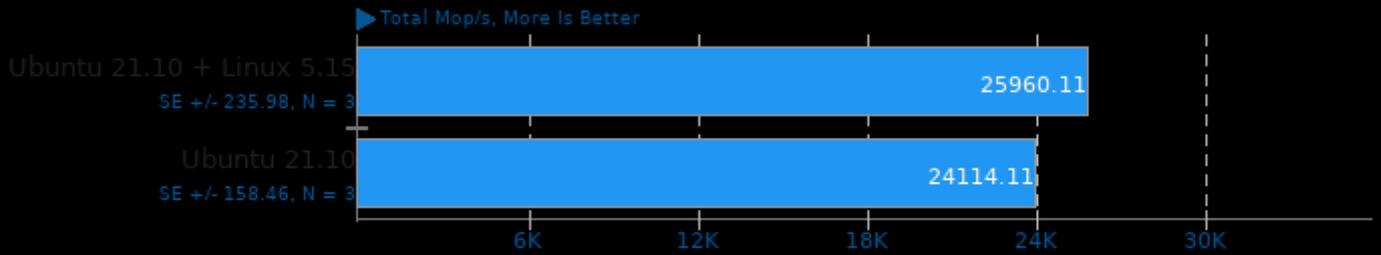
Preset: Thorough



1. (CXX) g++ options: -O3 -fno -pthread

## NAS Parallel Benchmarks 3.4

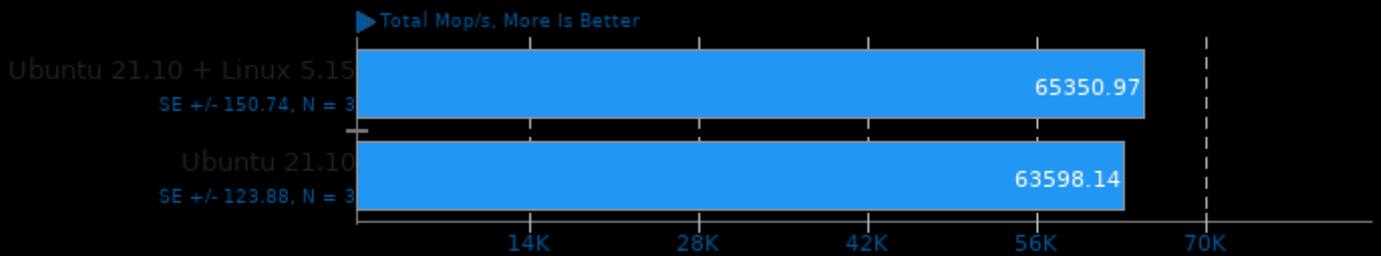
Test / Class: CG.C



1. (F9X) gfortran options: -O3 -march=native -lmpi\_usempif08 -lmpi\_mpi fh -lmpi -lopen-rte -lopen-pal -lhwloc -levent\_core -levent\_threads -lm -lz  
2. Open MPI 4.1.0

## NAS Parallel Benchmarks 3.4

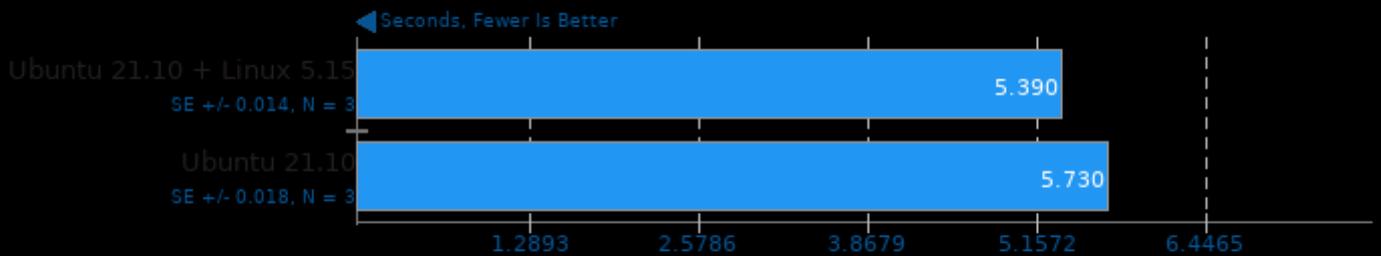
Test / Class: SP.B



1. (F9X) gfortran options: -O3 -march=native -lmpi\_usempif08 -lmpi\_mpi fh -lmpi -lopen-rte -lopen-pal -lhwloc -levent\_core -levent\_threads -lm -lz  
2. Open MPI 4.1.0

## libavif avifenc 0.9.0

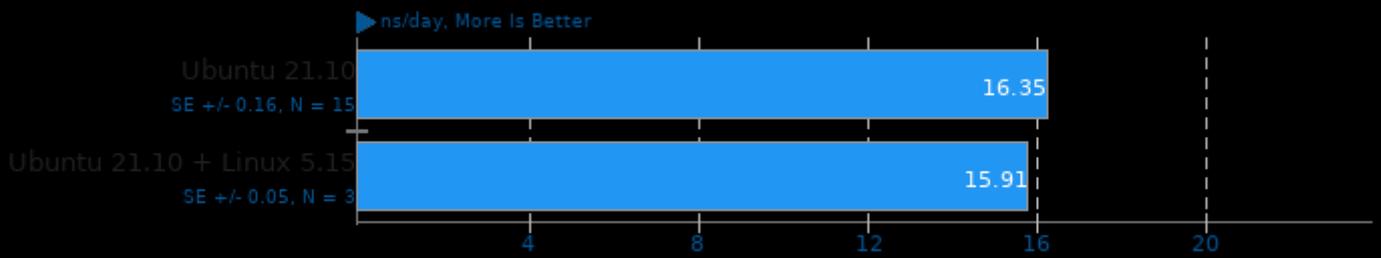
Encoder Speed: 10, Lossless



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

## LAMMPS Molecular Dynamics Simulator 29Oct2020

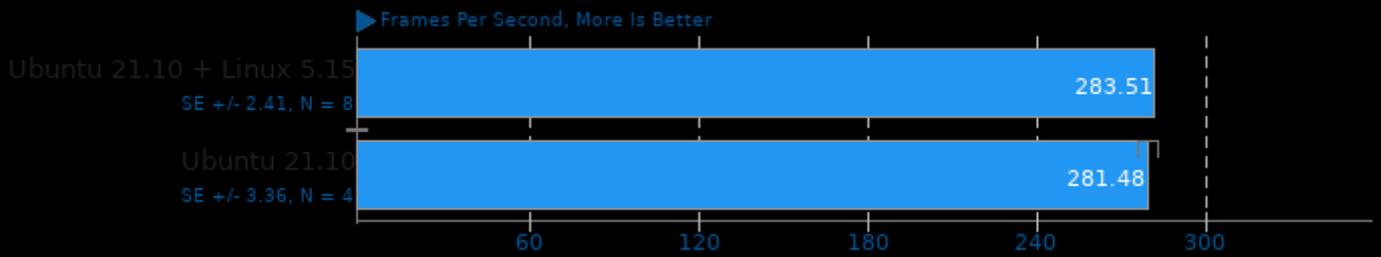
Model: Rhodopsin Protein



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

## SVT-HEVC 1.5.0

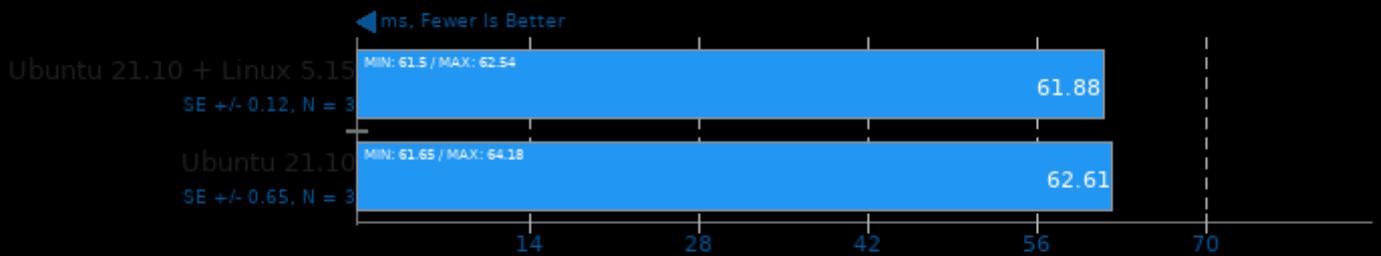
Tuning: 7 - Input: Bosphorus 1080p



1. (C) gcc options: -fPIE -fPIC -O3 -O2 -pie -rdynamic -pthread -lrt

## TNN 0.3

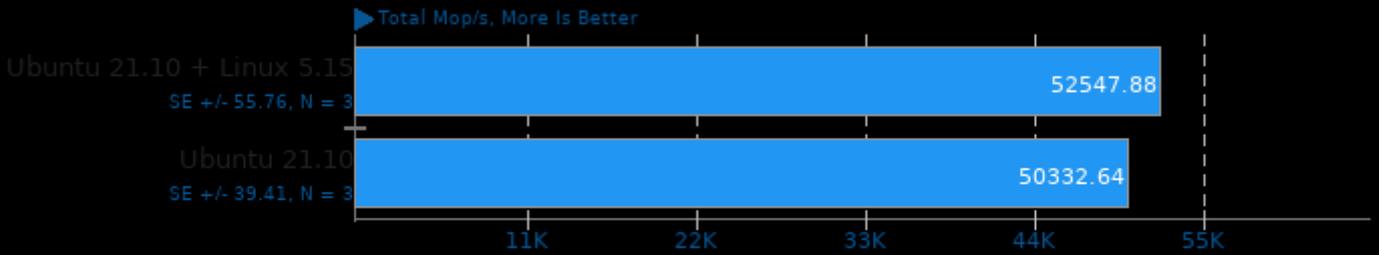
Target: CPU - Model: SqueezeNet v2



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

## NAS Parallel Benchmarks 3.4

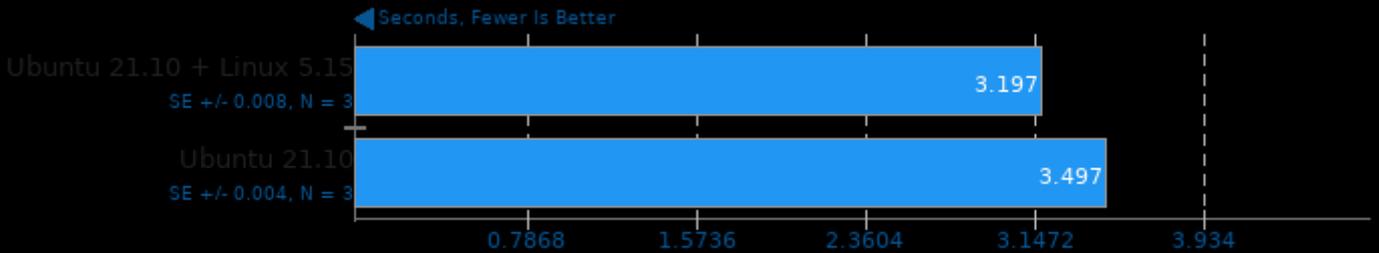
Test / Class: MG.C



1. (F9X) gfortran options: -O3 -march=native -lmpi\_usempif08 -lmpi\_mpi fh -lmpi -lopen-rte -lopen-pal -lhwloc -levent\_core -levent\_threads -lm -lz  
2. Open MPI 4.1.0

## libavif avifenc 0.9.0

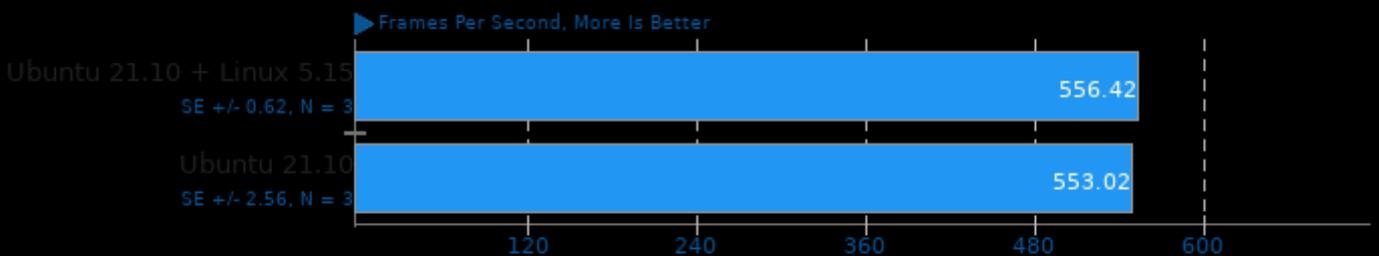
Encoder Speed: 10



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

## SVT-HEVC 1.5.0

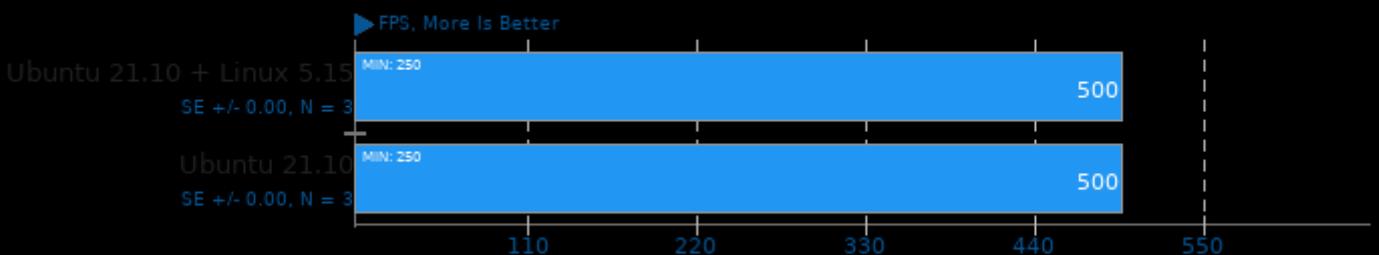
Tuning: 10 - Input: Bosphorus 1080p



1. (CC) gcc options: -fPIE -fPIC -O3 -O2 -pie -rdynamic -pthread -lrt

## OSPray 1.8.5

Demo: Magnetic Reconnection - Renderer: Path Tracer



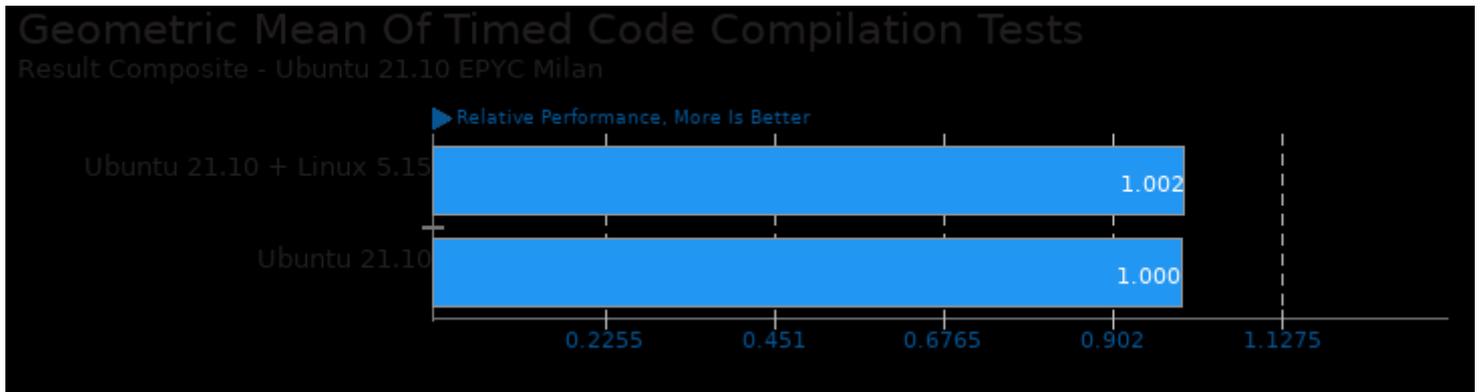
These geometric means are based upon test groupings / test suites for this result file.



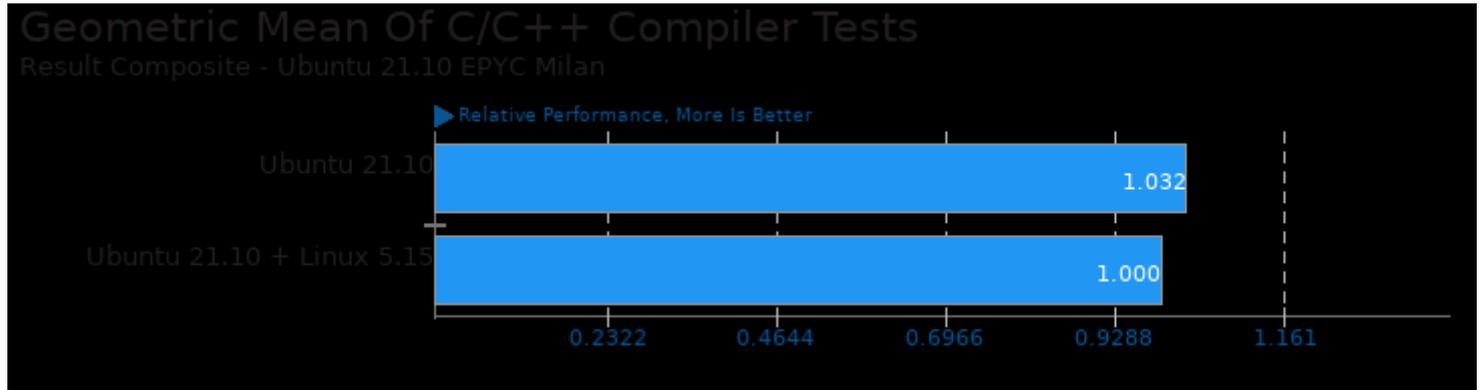
Geometric mean based upon tests: pts/aom-av1, pts/svt-av1 and pts/avifenc



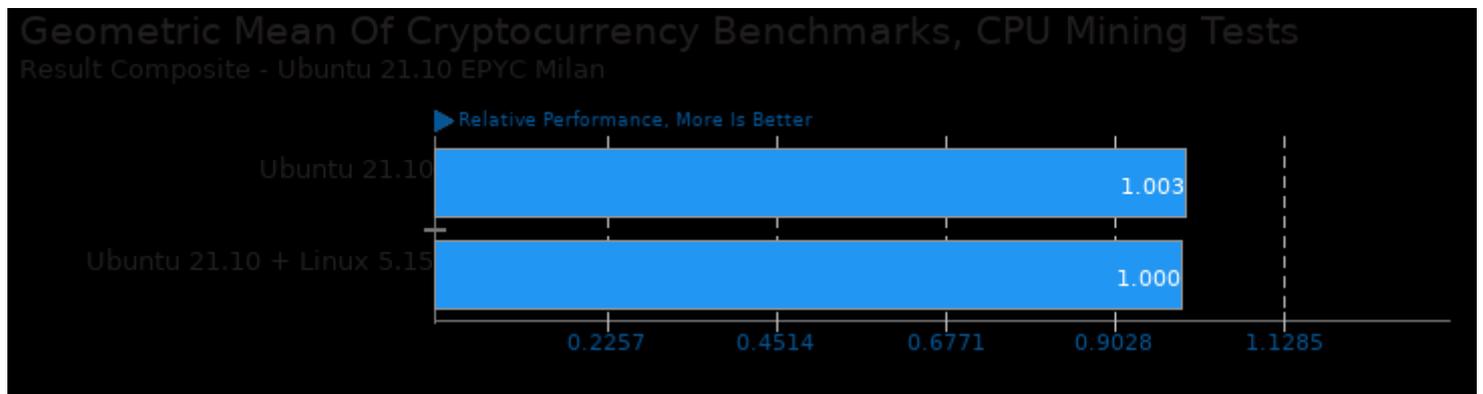
Geometric mean based upon tests: pts/lczero and pts/stockfish



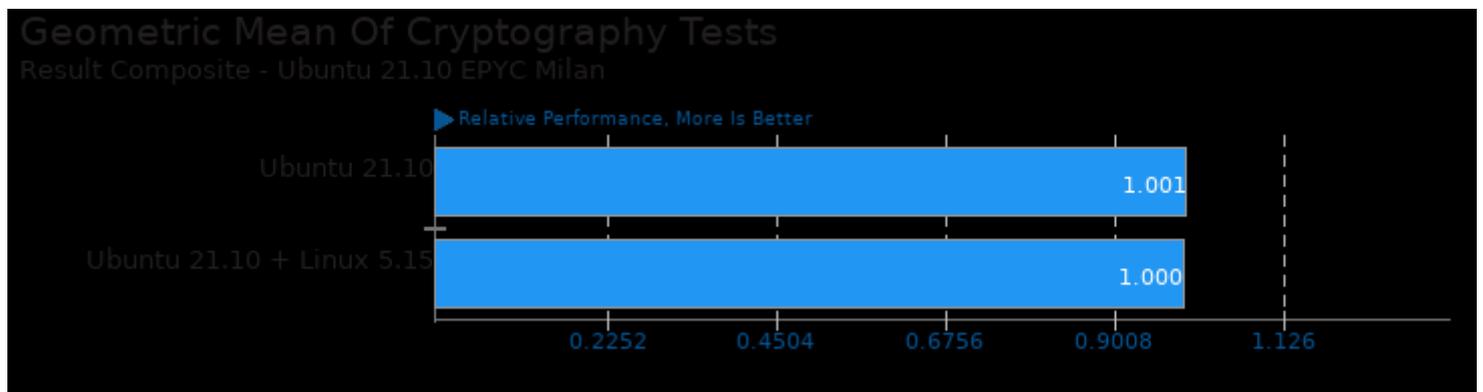
Geometric mean based upon tests: pts/build-linux-kernel, pts/build-llvm, pts/build-godot and pts/build-nodejs



Geometric mean based upon tests: pts/vpxenc, pts/stockfish, pts/build-llvm, pts/compress-7zip, pts/pgbench, pts/apache, pts/x265, pts/openssl, pts/nginx, pts/lammps, pts/aom-av1, pts/svt-av1, pts/svt-vp9 and pts/gromacs



Geometric mean based upon tests: pts/cpuminer-opt and pts/xmrig



Geometric mean based upon tests: pts/openssl, pts/securemark, pts/cpuminer-opt and pts/xmrig



Geometric mean based upon tests: pts/redis, pts/rocksdb, pts/cassandra, pts/pgbench and pts/mysqlslap



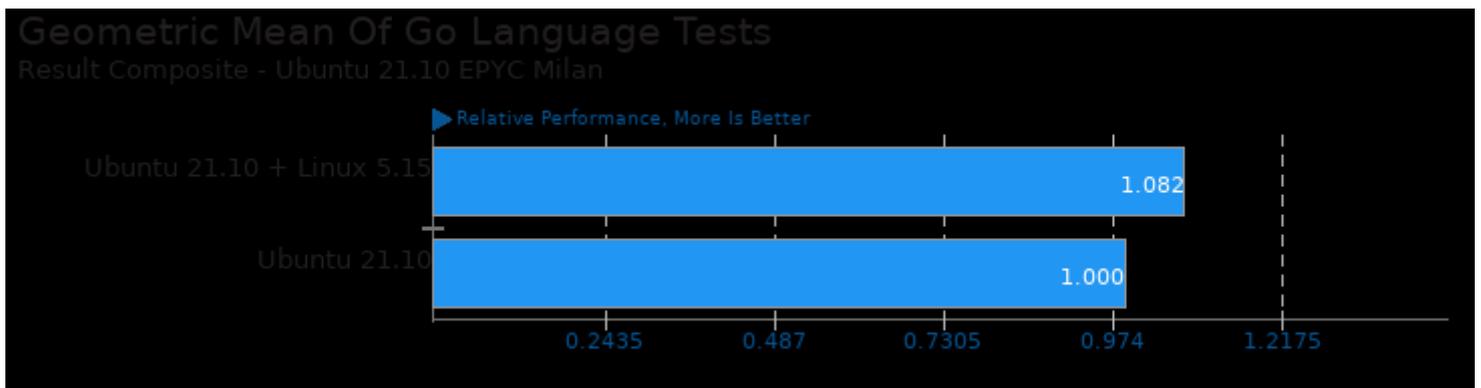
Geometric mean based upon tests: pts/svt-vp9, pts/svt-hevc, pts/x265, pts/vpxenc, pts/aom-av1, pts/svt-av1 and pts/avifenc



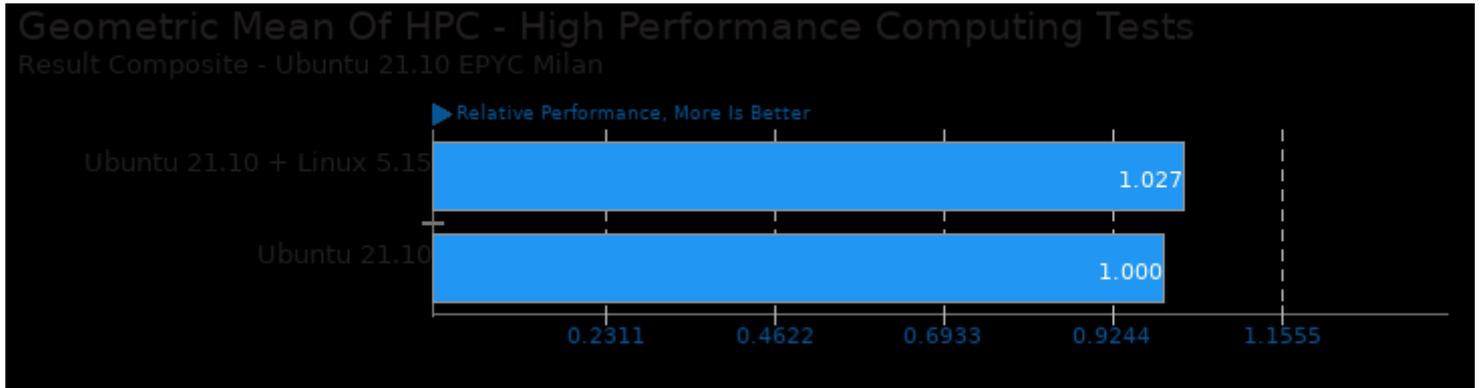
Geometric mean based upon tests: pts/lammps, pts/npb and pts/incompact3d



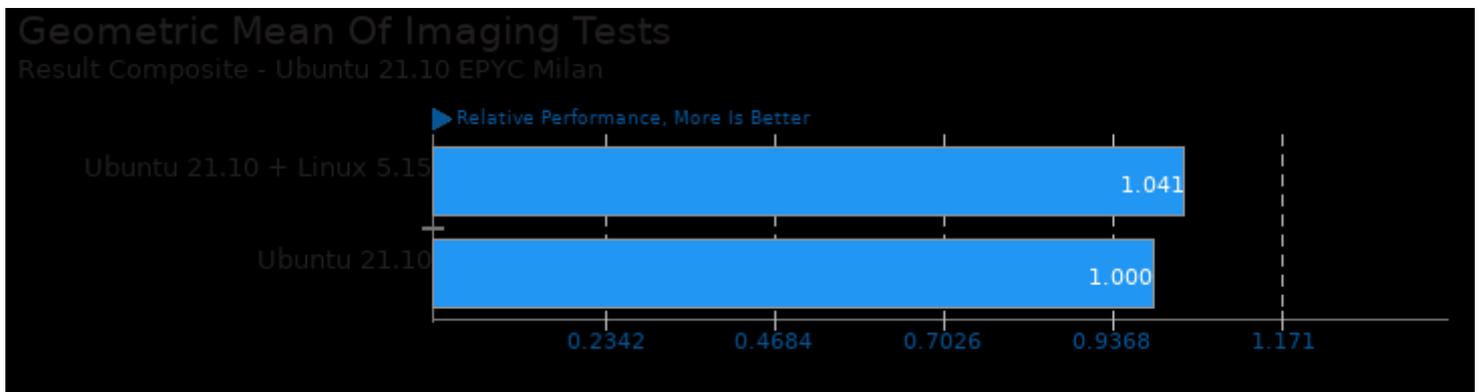
Geometric mean based upon tests: pts/astcenc, pts/build-godot, pts/blender and pts/oidn



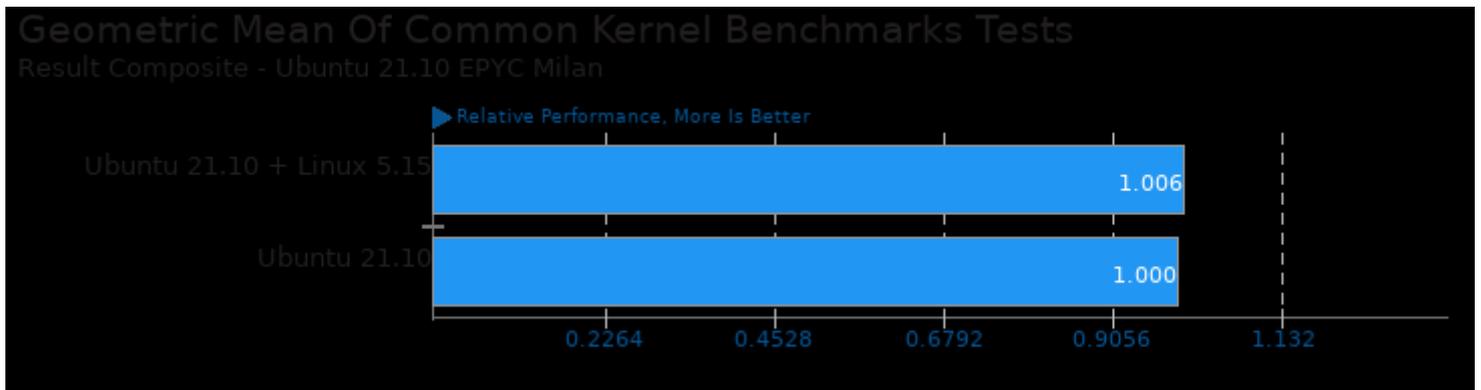
Geometric mean based upon tests: pts/nginx and pts/apache



Geometric mean based upon tests: pts/npb, pts/rodinia, pts/parboil, pts/namd, pts/gromacs, pts/lammps, pts/incompact3d, pts/openfoam, pts/mnn, pts/ncnn, pts/tnn, pts/tensorflow-lite, pts/onednn, pts/onnx, pts/plaidml and pts/lczero



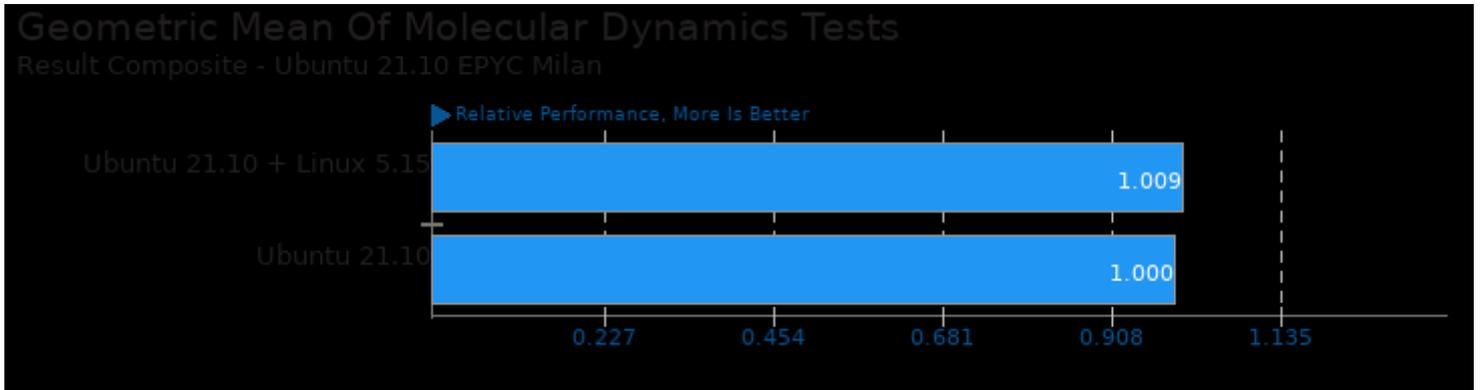
Geometric mean based upon tests: pts/jpegxl and pts/avifenc



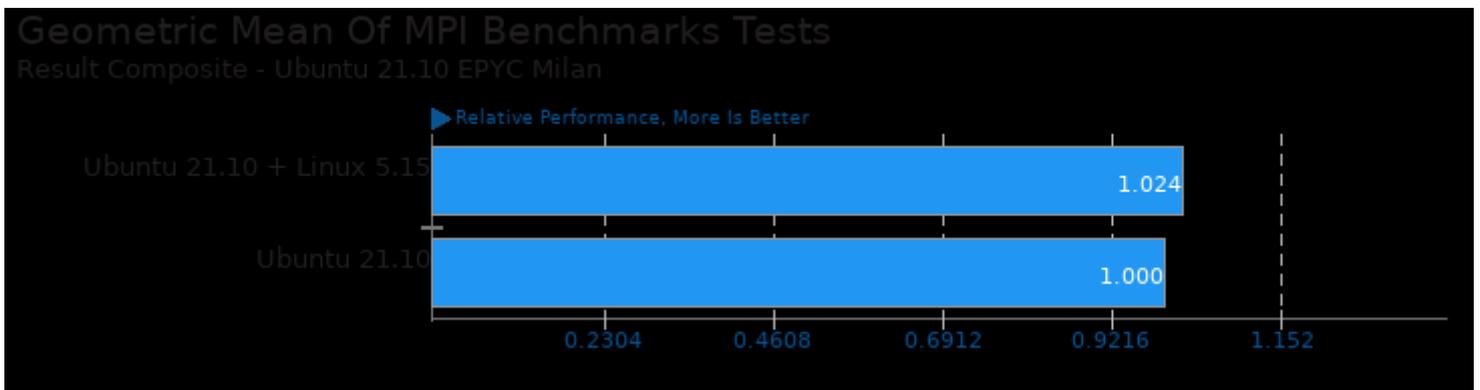
Geometric mean based upon tests: pts/apache, pts/pgbench, pts/openssl, pts/stress-ng and pts/rocksdb



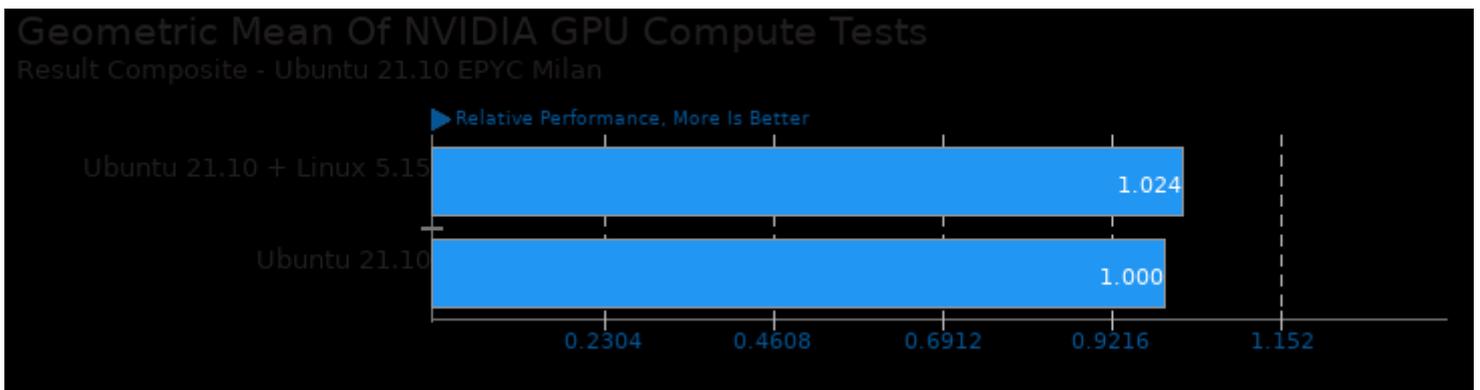
Geometric mean based upon tests: pts/mnn, pts/ncnn, pts/tnn, pts/tensorflow-lite, pts/onednn, pts/onnx, pts/plaidml and pts/lczero



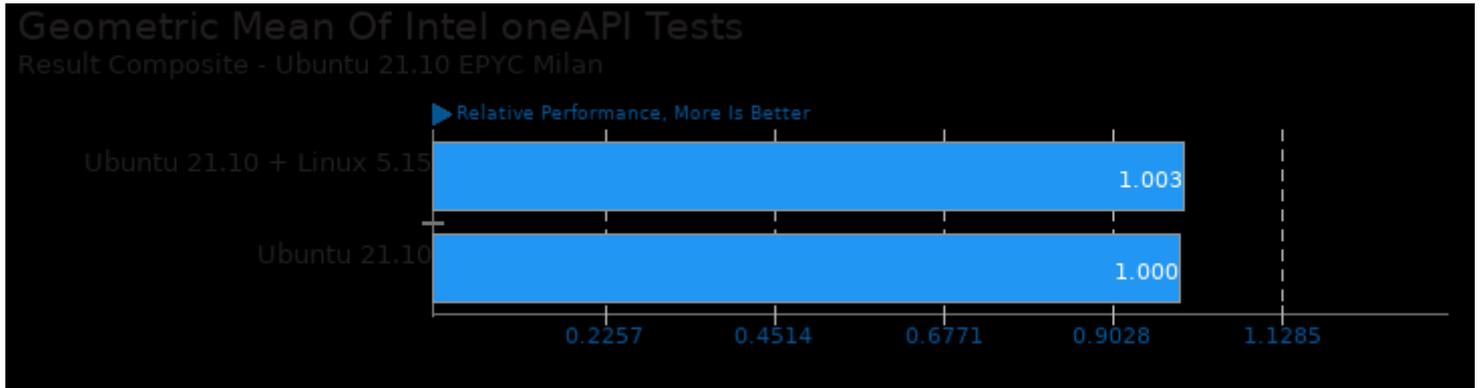
Geometric mean based upon tests: pts/namd, pts/gromacs, pts/lammps, pts/incompact3d and pts/openfoam



Geometric mean based upon tests: pts/lammps, pts/incompact3d, pts/gromacs and pts/npb



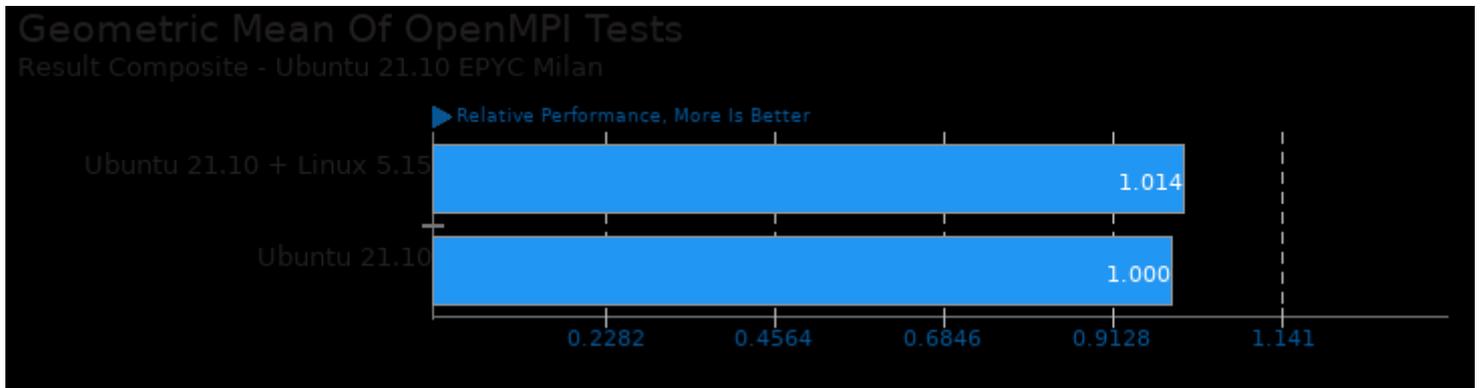
Geometric mean based upon tests: pts/gromacs, pts/luxcorerender, pts/rodinia, pts/plaidml, pts/lczero, pts/v-ray, pts/blender and pts/ncnn



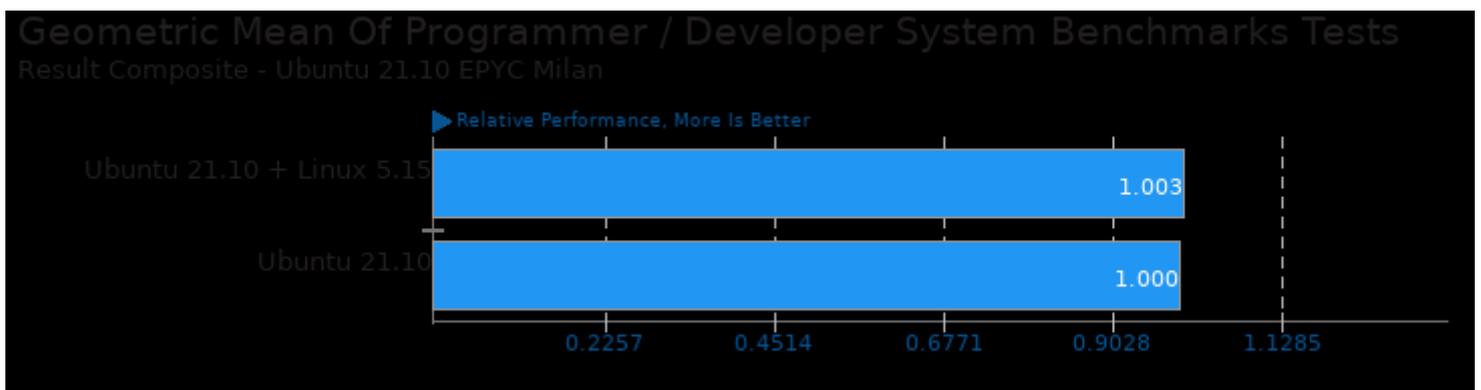
Geometric mean based upon tests: pts/embree, pts/onednn, pts/oidn and pts/ospray



Geometric mean based upon tests: pts/rodinia and pts/parboil



Geometric mean based upon tests: pts/lammps, pts/rodinia, pts/openfoam, pts/gromacs, pts/npb, pts/incompact3d and pts/parboil



Geometric mean based upon tests: pts/simdjson, pts/build-linux-kernel, pts/build-llvm, pts/build-godot and

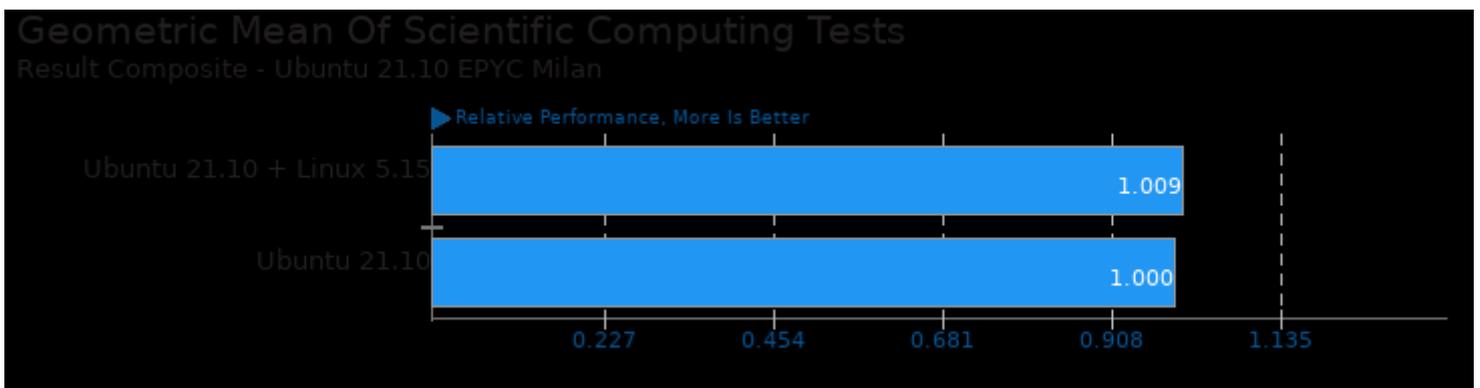
pts/build-nodejs



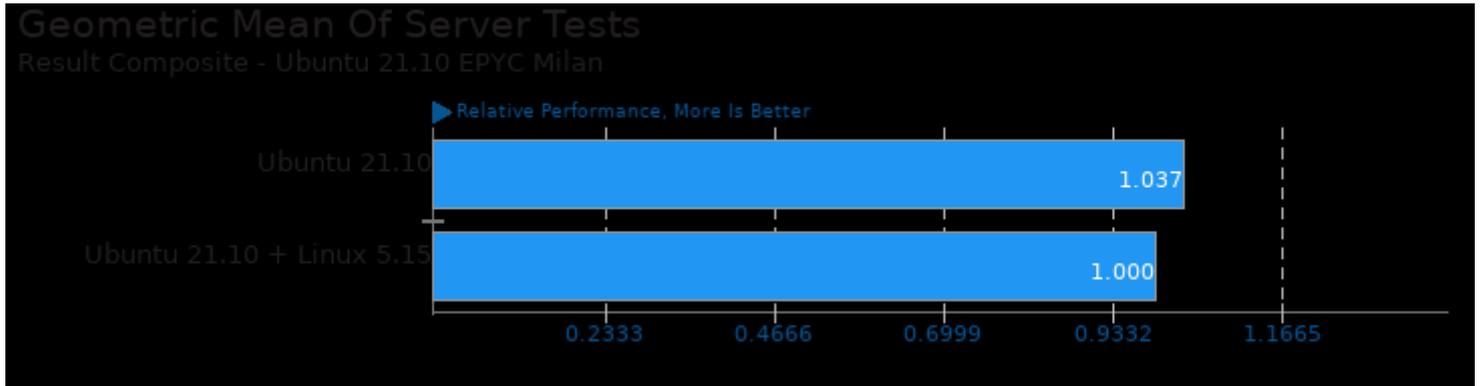
Geometric mean based upon tests: pts/onnx, pts/build-llvm, pts/plaidml, pts/build-nodejs, pts/build-godot and pts/parboil



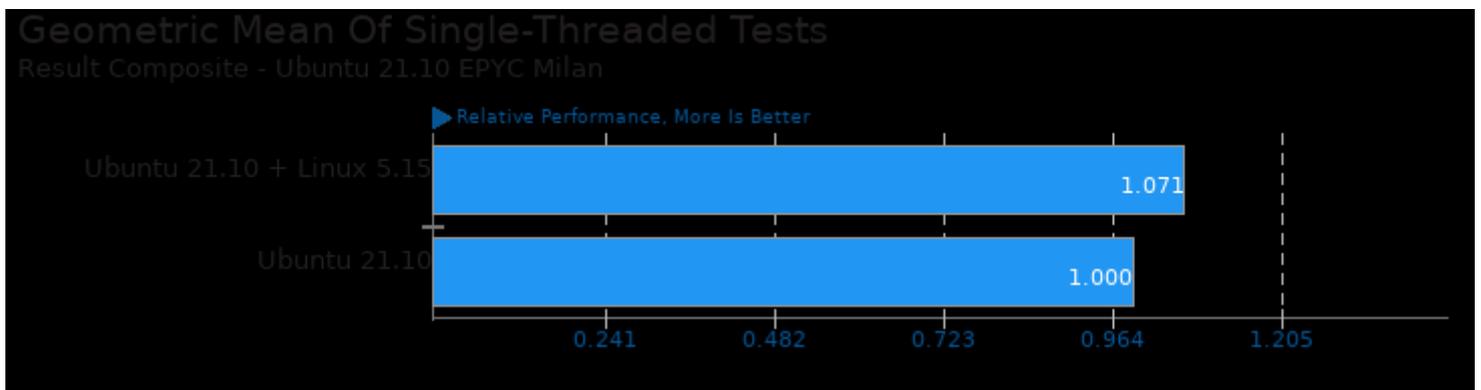
Geometric mean based upon tests: pts/ospray, pts/blender, pts/appleseed, pts/luxcorerender, pts/ttsiod-renderer, pts/v-ray and pts/natron



Geometric mean based upon tests: pts/namd, pts/gromacs, pts/lammps, pts/incompact3d and pts/openfoam



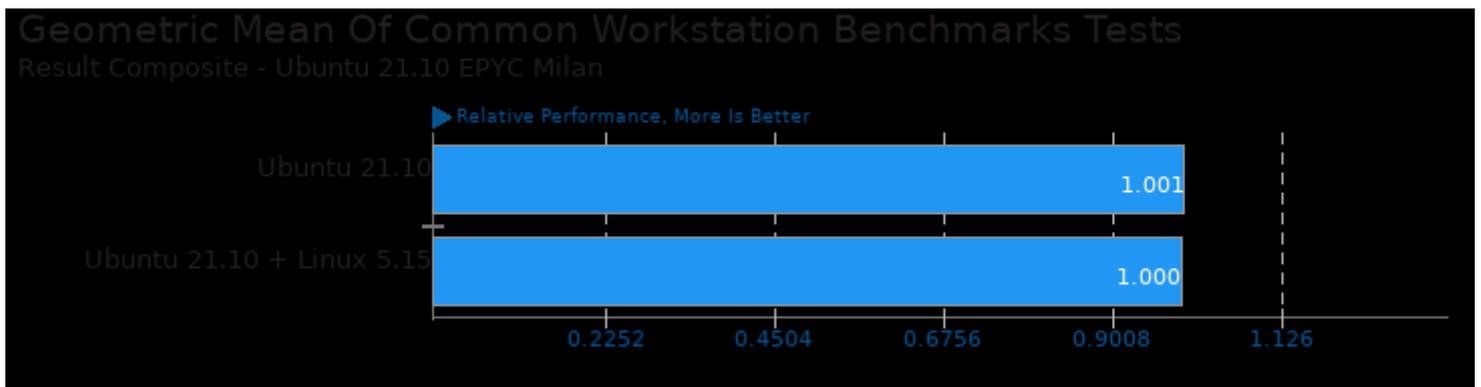
Geometric mean based upon tests: pts/apache, pts/nginx, pts/mysqslap, pts/pgbench, pts/redis, pts/cassandra, pts/rocksdb, pts/openssl and pts/simdjson



Geometric mean based upon tests: pts/redis and pts/nginx



Geometric mean based upon tests: pts/svt-vp9, pts/svt-hevc, pts/x265, pts/vpxenc, pts/aom-av1, pts/svt-av1 and pts/avifenc



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Geometric mean based upon tests: pts/blender, pts/rodinia, pts/parboil, pts/brl-cad, pts/x265 and pts/sysbench

*This file was automatically generated via the Phoronix Test Suite benchmarking software on Thursday, 28 March 2024 22:36.*