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AMD EPYC 7F72 2P Linux 5.11 Perf Governor

2 x AMD EPYC 7F72 24-Core testing looking at CPU freq invariance on 5.11 with patch. CPU power consumption monitoring via AMD_Energy interface at 1 second polling. Additional data with CPUFreq performance governor included.

Automated Executive Summary

CPUFreq Performance had the most wins, coming in first place for 48% of the tests.

Based on the geometric mean of all complete results, the fastest (CPUFreq Performance) was 1.04x the speed of the slowest (Linux 5.11 Git). Linux 5.11 Patched was 0.98x the speed of CPUFreq Performance and Linux 5.11 Git was 0.981x the speed of Linux 5.11 Patched.

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

Cpuminer-Opt (Algorithm: LBC, LBRY Credits) at 1.465x
dav1d (Video Input: Chimera 1080p 10-bit) at 1.393x
OSPray (Demo: Magnetic Reconnection - Renderer: Path Tracer) at 1.333x
x265 (Video Input: Bosphorus 1080p) at 1.307x
DaCapo Benchmark (Java Test: Tradebeans) at 1.275x
InfluxDB (Concurrent Streams: 4 - Batch Size: 10000 - Tags: 2,5000,1 - Points Per Series: 10000) at 1.184x
dav1d (Video Input: Summer Nature 4K) at 1.179x
LAMMPS Molecular Dynamics Simulator (Model: Rhodopsin Protein) at 1.166x

Timed GDB GNU Debugger Compilation (Time To Compile) at 1.145x
DaCapo Benchmark (Java Test: Tradesoap) at 1.119x.

Test Systems:

Linux 5.11 Git

Processor: 2 x AMD EPYC 7F72 24-Core @ 3.20GHz (48 Cores / 96 Threads), Motherboard: Supermicro H11DSi-NT v2.00 (2.1 BIOS), Chipset: AMD Starship/Matisse, Memory: 16 x 8192 MB DDR4-3200MT/s HMA81GR7CJR8N-XN, Disk: 1000GB Western Digital WD_BLACK SN850 1TB, Graphics: ASPEED, Network: 2 x Intel 10G X550T

OS: Ubuntu 20.10, Kernel: 5.11.0-051100rc4daily20210122-generic (x86_64) 20210121, Desktop: GNOME Shell 3.38.1, Display Server: X Server 1.20.9, Display Driver: modesetting 1.20.9, Compiler: GCC 10.2.0, 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-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-gcn/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Disk Notes: NONE / errors=remount-ro,relatime,rw / Block Size: 4096
Processor Notes: Scaling Governor: acpi-cpufreq schedutil (Boost: Enabled) - CPU Microcode: 0x8301034
Java Notes: OpenJDK Runtime Environment (build 11.0.9.1+1-Ubuntu-0ubuntu1.20.10)
Python Notes: Python 3.8.6
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/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + srbds: Not affected + tsx_async_abort: Not affected

Linux 5.11 Patched

Processor: 2 x AMD EPYC 7F72 24-Core @ 3.20GHz (48 Cores / 96 Threads), Motherboard: Supermicro H11DSi-NT v2.00 (2.1 BIOS), Chipset: AMD Starship/Matisse, Memory: 16 x 8192 MB DDR4-3200MT/s HMA81GR7CJR8N-XN, Disk: 1000GB Western Digital WD_BLACK SN850 1TB, Graphics: ASPEED, Monitor: VE228, Network: 2 x Intel 10G X550T

OS: Ubuntu 20.10, Kernel: 5.11.0-rc4-max-boost-inv-patch (x86_64) 20210121, Desktop: GNOME Shell 3.38.1, Display Server: X Server 1.20.9, Display Driver: modesetting 1.20.9, Compiler: GCC 10.2.0, 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-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-gcn/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Disk Notes: NONE / errors=remount-ro,relatime,rw / Block Size: 4096
Processor Notes: Scaling Governor: acpi-cpufreq schedutil (Boost: Enabled) - CPU Microcode: 0x8301034
Java Notes: OpenJDK Runtime Environment (build 11.0.9.1+1-Ubuntu-0ubuntu1.20.10)
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AMD EPYC 7F72 2P Linux 5.11 Perf Governor

CPUFreq Performance

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Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-gcn/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Disk Notes: NONE / errors=remount-ro,relatime,rw / Block Size: 4096
Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0x8301034
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	Linux 5.11 Git	Linux 5.11 Patched	CPUFreq
Algebraic Multi-Grid Benchmark (Figure Of Merit)	**1437771333**	**1448718333**	1444174667
Normalized	99.24%	100%	99.69%
Standard Deviation	0.3%	0.1%	0.5%
Algebraic Multi-Grid Benchmark (Figure Of Merit/Watt)	**4559172**	4631995	**4634187**
Normalized	98.38%	99.95%	100%
Timed Godot Game Engine Compilation - Time To Compile (sec)	**60.858**	59.177	**58.746**
Normalized	96.53%	99.27%	100%
Standard Deviation	0.3%	0.5%	0.8%
Timed GDB GNU Debugger Compilation - Time To Compile (sec)	**97.641**	92.916	**85.277**
Normalized	87.34%	91.78%	100%
Standard Deviation	0.7%	0.8%	0.3%
Timed Linux Kernel Compilation - Time To Compile (sec)	**25.923**	25.752	**25.414**
Normalized	98.04%	98.69%	100%
Standard Deviation	2.3%	2.4%	2.4%
Timed LLVM Compilation - Time To Compile (sec)	**210.347**	208.786	**208.043**
Normalized	98.9%	99.64%	100%
Standard Deviation	1.1%	0.7%	2.3%
Cpuminer-Opt - Q.S.2.P (kH/s)	297502	**296995**	**420231**
Normalized	70.79%	70.67%	100%
Standard Deviation	2.4%	6.2%	15.7%
Cpuminer-Opt - Q.S.2.P (kH/s/Watt)	2373	**2358**	**2899**

Normalized	81.87%	81.35%	100%
Cpuminer-Opt - x25x (kH/s)	**1524**	**1542**	1538
Normalized	98.86%	100%	99.72%
Standard Deviation	5.4%	4.5%	2.5%
Cpuminer-Opt - x25x (kH/s/Watt)	**6.04**	**6.08**	**6.04**
Normalized	99.34%	100%	99.34%
Cpuminer-Opt - Garlicoin (kH/s)	**9937**	9950	**9964**
Normalized	99.73%	99.85%	100%
Standard Deviation	3.3%	3.9%	5.8%
Cpuminer-Opt - Garlicoin (kH/s/Watt)	**61.06**	59.91	**57.99**
Normalized	100%	98.12%	94.97%
Cpuminer-Opt - Skeincoin (kH/s)	**363784**	364017	**522948**
Normalized	69.56%	69.61%	100%
Standard Deviation	3.8%	5.3%	6.4%
Cpuminer-Opt - Skeincoin (kH/s/Watt)	2899	**2898**	**3626**
Normalized	79.96%	79.92%	100%
Cpuminer-Opt - LBC, LBRY Credits (kH/s)	**132477**	139037	**194087**
Normalized	68.26%	71.64%	100%
Standard Deviation	1.4%	1.7%	0.8%
Cpuminer-Opt - LBC, LBRY Credits	**1053**	1092	**1315**
Normalized	80.03%	82.98%	100%
Cython Benchmark - N-Queens (sec)	**26.950**	**26.604**	26.895
Normalized	98.72%	100%	98.92%
Standard Deviation	1%	1.4%	0.4%
dav1d - Summer Nature 4K (FPS)	**308.29**	317.45	**363.33**
Normalized	84.85%	87.37%	100%
Standard Deviation	1%	0.3%	3.8%
dav1d - Summer Nature 4K (FPS/Watt)	1.77	**1.72**	**1.84**
Normalized	96.2%	93.48%	100%
dav1d - C.1.1.b (FPS)	**130.61**	133.37	**181.95**
Normalized	71.78%	73.3%	100%
Standard Deviation	0.3%	0.2%	0.2%
dav1d - C.1.1.b (FPS/Watt)	**0.91**	0.92	**1.21**
Normalized	75.21%	76.03%	100%
Etcpak - ETC1 (Mpx/s)	**266.315**	**267.587**	267.136
Normalized	99.52%	100%	99.83%
Standard Deviation	0.2%	0.2%	0.2%
Etcpak - ETC1 (Mpx/s/Watt)	**2.07**	2.10	**2.11**
Normalized	98.1%	99.53%	100%
Etcpak - ETC1 + Dithering (Mpx/s)	**244.793**	**245.595**	245.453
Normalized	99.67%	100%	99.94%
Standard Deviation	0.1%	0.1%	0.1%
Etcpak - ETC1 + Dithering (Mpx/s/Watt)	**1.89**	1.91	**1.93**
Normalized	97.93%	98.96%	100%
Etcpak - ETC2 (Mpx/s)	**155.182**	**155.798**	155.783
Normalized	99.6%	100%	99.99%
Standard Deviation	0.1%	0%	0%
Etcpak - ETC2 (Mpx/s/Watt)	**1.19**	1.21	**1.22**
Normalized	97.54%	99.18%	100%
FinanceBench - Bonds OpenMP (ms)	**57601**	56769	**56094**
Normalized	97.38%	98.81%	100%
Standard Deviation	2.2%	1.8%	1.1%
FinanceBench - Repo OpenMP (ms)	**40124**	**39407**	39948
Normalized	98.21%	100%	98.64%
Standard Deviation	1.4%	1.7%	2%

Gcrypt Library (sec)	**233.825**	**232.542**	232.760
Normalized	99.45%	100%	99.91%
Standard Deviation	0.6%	0.6%	0.5%
GnuPG - 2.7.S.F.E (sec)	**77.302**	77.179	**77.022**
Normalized	99.64%	99.8%	100%
Standard Deviation	0.5%	0.5%	1%
IOR - 2MB (MB/s)	505.19	**475.25**	**517.33**
Normalized	97.65%	91.87%	100%
Standard Deviation	0.6%	0.8%	1.8%
IOR - 2MB (MB/s/Watt)	2.56	**2.43**	**2.64**
Normalized	96.97%	92.05%	100%
IOR - 8MB (MB/s)	531.09	**520.72**	**539.63**
Normalized	98.42%	96.5%	100%
Standard Deviation	0.7%	0.9%	1.9%
IOR - 8MB (MB/s/Watt)	2.50	**2.49**	**2.55**
Normalized	98.04%	97.65%	100%
LAMMPS Molecular Dynamics Simulator - Rhodopsin Protein (ns/day)	**21.129**	23.787	**24.639**
Normalized	85.75%	96.54%	100%
Standard Deviation	4.1%	2.4%	3%
LAMMPS Molecular Dynamics Simulator - Rhodopsin Protein (ns/day/Watt)	**0.12**	0.13	**0.14**
Normalized	85.71%	92.86%	100%
LAMMPS Molecular Dynamics Simulator - 20k Atoms (ns/day)	**24.993**	25.077	**25.116**
Normalized	99.51%	99.84%	100%
Standard Deviation	0.6%	0.3%	0.2%
LAMMPS Molecular Dynamics Simulator - 20k Atoms (ns/day/Watt)	0.06	0.06	0.06
LULESH (z/s)	19576	**19771**	**19335**
Normalized	99.01%	100%	97.79%
Standard Deviation	0.8%	1.9%	2.1%
LULESH (z/s/Watt)	79.61	**80.77**	**78.80**
Normalized	98.56%	100%	97.56%
NAS Parallel Benchmarks - EP.C (Mop/s)	**3789**	3841	**3857**
Normalized	98.23%	99.59%	100%
Standard Deviation	0.9%	0.4%	0.3%
NAS Parallel Benchmarks - EP.C	**17.43**	17.62	**17.84**
Normalized	97.7%	98.77%	100%
NAS Parallel Benchmarks - EP.D (Mop/s)	**3855**	3863	**3867**
Normalized	99.67%	99.9%	100%
Standard Deviation	0.4%	0.1%	0.1%
NAS Parallel Benchmarks - EP.D	10.25	**10.24**	**10.29**
Normalized	99.61%	99.51%	100%
NAS Parallel Benchmarks - LU.C (Mop/s)	**147444**	**154377**	153771
Normalized	95.51%	100%	99.61%
Standard Deviation	4.7%	0.7%	0.2%
NAS Parallel Benchmarks - LU.C	**440.23**	**469.62**	466.44
Normalized	93.74%	100%	99.32%
ONNX Runtime - yolov4 - OpenMP CPU (Inferences/min)	**175**	181	**185**
Normalized	94.59%	97.84%	100%
Standard Deviation	3.2%	1.8%	2.5%

ONNX Runtime - yolov4 - OpenMP CPU (Inferences/min/Watt)	**0.67**	0.69	**0.70**
Normalized	95.71%	98.57%	100%
ONNX Runtime - super-resolution-10 - OpenMP CPU (Inferences/min)	**4393**	4210	**4190**
Normalized	100%	95.83%	95.38%
Standard Deviation	5.3%	1.8%	5.6%
ONNX Runtime - super-resolution-10 - OpenMP CPU (Inferences/min/Watt)	**15.72**	**15.26**	15.49
Normalized	100%	97.07%	98.54%
OpenFOAM - Motorbike 30M (sec)	**18.71**	18.30	**18.29**
Normalized	97.76%	99.95%	100%
Standard Deviation	1.3%	0.8%	0.9%
OpenFOAM - Motorbike 60M (sec)	**129.67**	**128.28**	128.81
Normalized	98.93%	100%	99.59%
Standard Deviation	0.1%	0.1%	0.1%
Quantum ESPRESSO - AUSURF112 (sec)	1217	**1171**	**1249**
Normalized	96.18%	100%	93.75%
Standard Deviation	1.6%	2.1%	4.6%
QMCPACK - simple-H2O (Execution Time - sec)	**31.177**	29.281	**28.971**
Normalized	92.92%	98.94%	100%
Standard Deviation	6.6%	0.5%	0.4%
QuantLib (MFLOPS)	**2150**	**2157**	2156
Normalized	99.66%	100%	99.96%
Standard Deviation	1.1%	0.7%	1.3%
QuantLib (MFLOPS/Watt)	**16.11**	16.34	**16.49**
Normalized	97.7%	99.09%	100%
rav1e - 10 (FPS)	**2.902**	3.054	**3.177**
Normalized	91.34%	96.13%	100%
Standard Deviation	1%	0.5%	1%
rav1e - 10 (FPS/Watt)	0.02	0.02	0.02
rav1e - 6 (FPS)	**1.370**	1.408	**1.446**
Normalized	94.74%	97.37%	100%
Standard Deviation	0.3%	0.4%	0.1%
rav1e - 6 (FPS/Watt)	0.01	0.01	0.01
rav1e - 5 (FPS)	**1.045**	1.068	**1.095**
Normalized	95.43%	97.53%	100%
Standard Deviation	0.2%	0.1%	0.5%
rav1e - 5 (FPS/Watt)	0.01	0.01	0.01
rav1e - 1 (FPS)	**0.368**	0.372	**0.375**
Normalized	98.13%	99.2%	100%
Standard Deviation	1%	0.5%	0%
Redis - SET (Reqs/sec)	**1380890**	1427348	**1454741**
Normalized	94.92%	98.12%	100%
Standard Deviation	2.9%	3.6%	2.5%
Redis - SET (Reqs/sec/Watt)	**11016**	11501	**11684**
Normalized	94.28%	98.43%	100%
Redis - GET (Reqs/sec)	**1689203**	1711622	**1782756**
Normalized	94.75%	96.01%	100%
Standard Deviation	0.8%	2.5%	6.3%
Redis - GET (Reqs/sec/Watt)	**13515**	13846	**14376**
Normalized	94.01%	96.31%	100%

Redis - LPUSH (Reqs/sec)	1220974	**1217219**	**1251006**
Normalized	97.6%	97.3%	100%
Standard Deviation	1.6%	2%	1.6%
Redis - LPUSH (Reqs/sec/Watt)	**9715**	9780	**10016**
Normalized	96.99%	97.64%	100%
Redis - SADD (Reqs/sec)	**1539146**	**1611164**	1610485
Normalized	95.53%	100%	99.96%
Standard Deviation	1.8%	1.9%	4.3%
Redis - SADD (Reqs/sec/Watt)	**12421**	**13036**	12967
Normalized	95.28%	100%	99.47%
RELION - Basic - CPU (sec)	**349.852**	**348.294**	348.338
Normalized	99.55%	100%	99.99%
Standard Deviation	2.5%	2.6%	2.7%
Google SynthMark - VoiceMark_100 (Voices)	**712.252**	**714.914**	714.181
Normalized	99.63%	100%	99.9%
Standard Deviation	0.3%	0%	0.3%
Google SynthMark - VoiceMark_100 (Voices/Watt)	**5.50**	5.54	**5.57**
Normalized	98.74%	99.46%	100%
TNN - CPU - MobileNet v2 (ms)	**303.449**	**289.764**	297.132
Normalized	95.49%	100%	97.52%
Standard Deviation	2.2%	1.7%	0%
TNN - CPU - SqueezeNet v1.1 (ms)	**274.944**	274.869	**274.097**
Normalized	99.69%	99.72%	100%
Standard Deviation	0.2%	0.4%	0%
AI Benchmark Alpha - D.I.S (Score)	**1697**	1720	**1775**
Normalized	95.61%	96.9%	100%
AI Benchmark Alpha - D.T.S (Score)	**1059**	1067	**1133**
Normalized	93.47%	94.17%	100%
AI Benchmark Alpha - Device AI Score	**2756**	2787	**2908**
Normalized	94.77%	95.84%	100%
AI Benchmark Alpha - Device AI Score (Score/Watt)	12.95	**12.98**	**11.59**
Normalized	99.77%	100%	89.29%
ASKAP - tConvolve MPI - Gridding (Million Grid Points/sec)	**7426**	**7454**	7442
Normalized	99.63%	100%	99.84%
Standard Deviation	0.1%	0.1%	0.2%
ASKAP - tConvolve MPI - Degridding (Million Grid Points/sec)	11870	**11944**	**11493**
Normalized	99.38%	100%	96.22%
Standard Deviation	0.1%	0.1%	2.1%
ASKAP - tConvolve MPI - Degridding (Million Grid Points/sec/Watt)	36.17	**40.51**	**33.50**
Normalized	89.29%	100%	82.7%
asmFish - 1.H.M.2.D (Nodes/s)	**117310985**	**117632955**	117370871
Normalized	99.73%	100%	99.78%
Standard Deviation	1.3%	0.5%	2.4%
asmFish - 1.H.M.2.D (Nodes/s/Watt)	251757	**259519**	**251626**
Normalized	97.01%	100%	96.96%
ASTC Encoder - Thorough (sec)	**5.69**	**5.65**	5.67
Normalized	99.3%	100%	99.65%
Standard Deviation	0.1%	0.2%	0.2%

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ASTC Encoder - Exhaustive (sec)	**41.17**	**40.97**	41.07
Normalized	99.51%	100%	99.76%
Standard Deviation	0.1%	0.1%	0.2%
Blender - Barbershop - CPU-Only (sec)	**158.64**	**156.83**	158.07
Normalized	98.86%	100%	99.22%
Standard Deviation	0.1%	0.1%	1%
BlogBench - Read (Final Score)	**1084405**	**1103118**	1086347
Normalized	98.3%	100%	98.48%
Standard Deviation	3%	0.3%	2.2%
BlogBench - Read (Final Score/Watt)	**4600**	**4753**	4639
Normalized	96.78%	100%	97.61%
BRL-CAD - V.P.M (VGR Performance Metric)	**638971**	636521	**635725**
Normalized	100%	99.62%	99.49%
BRL-CAD - V.P.M (VGR Performance Metric/Watt)	1356	**1370**	**1355**
Normalized	99.01%	100%	98.95%
Build2 - Time To Compile (sec)	**68.141**	**67.322**	67.334
Normalized	98.8%	100%	99.98%
Standard Deviation	1.7%	1.3%	0.8%
BYTE Unix Benchmark - Dhrystone 2 (LPS)	**38181644**	38319340	**38656226**
Normalized	98.77%	99.13%	100%
Standard Deviation	1.9%	1.5%	2.2%
BYTE Unix Benchmark - Dhrystone 2 (LPS/Watt)	**301516**	306193	**307169**
Normalized	98.16%	99.68%	100%
Zstd Compression - 3 (MB/s)	8205	**8271**	**7770**
Normalized	99.21%	100%	93.95%
Standard Deviation	0.6%	1.4%	28.9%
Zstd Compression - 3 (MB/s/Watt)	53.45	**54.88**	**50.56**
Normalized	97.39%	100%	92.13%
LZ4 Compression - 1 - Compression Speed (MB/s)	**9623**	**9757**	9652
Normalized	98.62%	100%	98.92%
Standard Deviation	1.7%	0.3%	1.3%
LZ4 Compression - 1 - D.S (MB/s)	**11334**	11305	**11151**
Normalized	100%	99.74%	98.38%
Standard Deviation	0.7%	0.4%	1.7%
LZ4 Compression - 1 - D.S (MB/s/Watt)	**81.09**	81.34	**81.46**
Normalized	99.55%	99.85%	100%
LZ4 Compression - 3 - Compression Speed (MB/s)	**49.43**	**48.95**	49.29
Normalized	100%	99.03%	99.72%
Standard Deviation	2.3%	0.4%	2.3%
LZ4 Compression - 3 - D.S (MB/s)	**10405**	**10666**	10410
Normalized	97.55%	100%	97.6%
Standard Deviation	0.7%	1%	1.3%
LZ4 Compression - 3 - D.S (MB/s/Watt)	**77.28**	**80.07**	79.05
Normalized	96.52%	100%	98.73%
LZ4 Compression - 9 - Compression Speed (MB/s)	**47.63**	47.76	**48.02**
Normalized	99.19%	99.46%	100%
Standard Deviation	0.1%	0.5%	0.9%
LZ4 Compression - 9 - D.S (MB/s)	**10488**	10490	**10555**
Normalized	99.36%	99.38%	100%

Standard Deviation	2.9%	0.5%	1.6%
LZ4 Compression - 9 - D.S (MB/s/Watt)	78.48	78.46	80.12
Normalized	97.95%	97.93%	100%
DaCapo Benchmark - H2 (msec)	5310	5217	4570
Normalized	86.06%	87.6%	100%
Standard Deviation	3.1%	6.3%	6.9%
DaCapo Benchmark - Jython (msec)	4897	4778	4740
Normalized	96.79%	99.2%	100%
Standard Deviation	2.5%	2.3%	1.1%
DaCapo Benchmark - Tradebeans (msec)	5954	5591	4671
Normalized	78.45%	83.54%	100%
Standard Deviation	3.8%	5.3%	5%
DaCapo Benchmark - Tradesoap (msec)	5170	5148	4621
Normalized	89.38%	89.76%	100%
Standard Deviation	1.7%	2.4%	2.1%
Dolfyn - C.F.D (sec)	18.718	18.652	18.635
Normalized	99.56%	99.91%	100%
Standard Deviation	0.1%	0.3%	0.3%
OSPray - M.R - SciVis (FPS)	32.26	32.62	32.80
Normalized	98.35%	99.45%	100%
Standard Deviation	0%	1.7%	1.8%
OSPray - M.R - SciVis (FPS/Watt)	0.10	0.11	0.10
Normalized	90.91%	100%	90.91%
OSPray - M.R - Path Tracer (FPS)	250	250	333.33
Normalized	75%	75%	100%
Standard Deviation			0%
OSPray - M.R - Path Tracer (FPS/Watt)	1.61	1.65	1.99
Normalized	80.9%	82.91%	100%
OSPray - XFrog Forest - SciVis (FPS)	11.11	11.19	11.19
Normalized	99.29%	100%	100%
Standard Deviation	0%	0.6%	0.6%
OSPray - XFrog Forest - SciVis (FPS/Watt)	0.03	0.03	0.03
OSPray - XFrog Forest - Path Tracer (FPS)	5.91	5.95	5.95
Normalized	99.33%	100%	100%
Standard Deviation	0.3%	0%	0%
OSPray - XFrog Forest - Path Tracer (FPS/Watt)	0.01	0.01	0.01
OSPray - NASA Streamlines - SciVis (FPS)	71.43	71.43	71.43
Standard Deviation	0%	0%	0%
OSPray - NASA Streamlines - SciVis (FPS/Watt)	0.29	0.30	0.30
Normalized	96.67%	100%	100%
OSPray - NASA Streamlines - Path Tracer (FPS)	16.39	16.39	16.39
Standard Deviation	0%	0%	0%
OSPray - NASA Streamlines - Path Tracer (FPS/Watt)	0.05	0.05	0.05
OSPray - San Miguel - SciVis (FPS)	52.63	54.97	55.56
Normalized	94.73%	98.94%	100%
Standard Deviation	0%	2.4%	0%
OSPray - San Miguel - SciVis (FPS/Watt)	0.30	0.32	0.33
Normalized	90.91%	96.97%	100%
OSPray - San Miguel - Path Tracer (FPS)	4.30	4.32	4.33
Normalized	99.31%	99.77%	100%

Standard Deviation	0.2%	0.2%	0%
OSPray - San Miguel - Path Tracer	0.01	0.01	0.01
POV-Ray - Trace Time (sec)	11.485	11.305	11.427
Normalized	98.43%	100%	98.93%
Standard Deviation	0.9%	1%	0.2%
YafaRay - T.T.F.S.S (sec)	84.739	87.143	87.331
Normalized	100%	97.24%	97.03%
Standard Deviation	0.8%	3.8%	3.1%
FFTE - N.2.3.C.F.R (MFLOPS)	174206	178738	180038
Normalized	96.76%	99.28%	100%
Standard Deviation	3.6%	3.8%	3.5%
FFTE - N.2.3.C.F.R (MFLOPS/Watt)	638.23	656.40	664.85
Normalized	96%	98.73%	100%
FFTW - Float + SSE - 2D FFT Size 4096 (Mflops)	18468	17015	17335
Normalized	100%	92.13%	93.87%
Standard Deviation	0.2%	2.2%	3.5%
FFTW - Float + SSE - 2D FFT Size 4096 (Mflops/Watt)	138.49	127.83	131.21
Normalized	100%	92.3%	94.74%
CLOMP - Static OMP Speedup (Speedup)	43.9	47.8	47.4
Normalized	91.84%	100%	99.16%
Standard Deviation	2.4%	1.7%	2%
CLOMP - Static OMP Speedup	0.29	0.31	0.31
Normalized	93.55%	100%	100%
GPAW - Carbon Nanotube (sec)	60.702	59.851	59.757
Normalized	98.44%	99.84%	100%
Standard Deviation	0.5%	1.1%	0.9%
GROMACS - Water Benchmark (Ns/Day)	5.239	5.261	5.255
Normalized	99.58%	100%	99.89%
Standard Deviation	1.3%	0.7%	0.7%
GROMACS - Water Benchmark (Ns/Day/Watt)	0.01	0.01	0.01
NAMD - ATPase Simulation - 327,506 Atoms (days/ns)	0.45451	0.44472	0.44469
Normalized	97.84%	99.99%	100%
Standard Deviation	1.2%	0%	0.3%
Himeno Benchmark - P.P.S (MFLOPS)	4234	4287	4136
Normalized	98.76%	100%	96.47%
Standard Deviation	2.3%	1%	1.1%
Himeno Benchmark - P.P.S (MFLOPS/Watt)	31.72	31.94	31.13
Normalized	99.31%	100%	97.46%
Hierarchical INTegration - FLOAT (QUIPs)	322702844	323144417	322775284
Normalized	99.86%	100%	99.89%
Standard Deviation	0.1%	0.1%	0.1%
Hierarchical INTegration - FLOAT	2518731	2496421	2527557
Normalized	99.65%	98.77%	100%
High Performance Conjugate Gradient (GFLOP/s)	30.2415	30.8262	30.9260
Normalized	97.79%	99.68%	100%
Standard Deviation	0.7%	0.7%	0.1%
High Performance Conjugate Gradient (GFLOP/s/Watt)	0.08	0.08	0.09
Normalized	88.89%	88.89%	100%

John The Ripper - MD5 (Real C/S)	**4550333**	4612308	**4762000**
Normalized	95.56%	96.86%	100%
Standard Deviation	1.9%	4.2%	0.3%
John The Ripper - MD5 (Real C/S/Watt)	**10023**	10085	**10378**
Normalized	96.58%	97.17%	100%
John The Ripper - Blowfish (Real C/S)	**70824**	**72636**	71757
Normalized	97.51%	100%	98.79%
Standard Deviation	0.8%	0.2%	1.2%
John The Ripper - Blowfish (Real C/S/Watt)	**182.56**	**185.47**	183.88
Normalized	98.43%	100%	99.14%
KeyDB (Ops/sec)	302894	**294214**	**303171**
Normalized	99.91%	97.05%	100%
Standard Deviation	5.4%	4%	6.6%
KeyDB (Ops/sec/Watt)	**1930**	1865	**1762**
Normalized	100%	96.66%	91.29%
InfluxDB - 4 - 10000 - 2,5000,1 - 10000	**807463**	812194	**956189**
Normalized	84.45%	84.94%	100%
Standard Deviation	0.5%	0.3%	0.4%
InfluxDB - 4 - 10000 - 2,5000,1 - 10000 (val/sec/Watt)	**5060**	**4857**	4964
Normalized	100%	95.99%	98.09%
InfluxDB - 64 - 10000 - 2,5000,1 - 10000 (val/sec)	**1231991**	1256112	**1360163**
Normalized	90.58%	92.35%	100%
Standard Deviation	0.9%	0.4%	1.2%
InfluxDB - 64 - 10000 - 2,5000,1 - 10000 (val/sec/Watt)	**6781**	6672	**6626**
Normalized	100%	98.39%	97.71%
LeelaChessZero - BLAS (Nodes/s)	4106	**4061**	**4147**
Normalized	99.01%	97.93%	100%
Standard Deviation	2.1%	3.7%	0.7%
LeelaChessZero - BLAS (Nodes/s/Watt)	**9.69**	**9.72**	**9.72**
Normalized	99.69%	100%	100%
LeelaChessZero - Eigen (Nodes/s)	**4284**	4433	**4450**
Normalized	96.27%	99.62%	100%
Standard Deviation	2.3%	1.4%	1%
LeelaChessZero - Eigen (Nodes/s/Watt)	**10.08**	**10.45**	10.39
Normalized	96.46%	100%	99.43%
LuxCoreRender - DLSC (M samples/sec)	7.81	**7.80**	**7.89**
Normalized	98.99%	98.86%	100%
Standard Deviation	0.8%	2.2%	2%
LuxCoreRender - DLSC (M	0.02	0.02	0.02
LuxCoreRender - R.C.a.P (M samples/sec)	**8.72**	**8.76**	**8.76**
Normalized	99.54%	100%	100%
Standard Deviation	2.4%	1.8%	0.9%
LuxCoreRender - R.C.a.P (M	0.02	0.02	0.02
oneDNN - C.B.S.A - f32 - CPU (ms)	**0.914198**	**0.863782**	0.867545
Normalized	94.49%	100%	99.57%
Standard Deviation	1.8%	0.5%	0.5%
oneDNN - D.B.s - f32 - CPU (ms)	**2.40549**	2.33290	**2.30467**
Normalized	95.81%	98.79%	100%
Standard Deviation	2.4%	1.2%	4.3%
oneDNN - IP Shapes 1D - f32 - CPU (ms)	**1.62088**	**1.55447**	1.57963
Normalized	95.9%	100%	98.41%

Standard Deviation	1.9%	1.7%	1.7%
oneDNN - IP Shapes 3D - f32 - CPU (ms)	**0.881348**	0.849248	**0.813628**
Normalized	92.32%	95.81%	100%
Standard Deviation	1.3%	1.1%	1.5%
oneDNN - M.M.B.S.T - f32 - CPU (ms)	**0.547674**	0.521968	**0.514604**
Normalized	93.96%	98.59%	100%
Standard Deviation	1.8%	1.8%	2.3%
oneDNN - R.N.N.T - f32 - CPU (ms)	**1317**	**1123**	1247
Normalized	85.27%	100%	90.05%
Standard Deviation	7.7%	0.5%	11%
Timed MrBayes Analysis - P.P.A (sec)	**82.650**	**82.042**	82.261
Normalized	99.26%	100%	99.73%
Standard Deviation	0.2%	0.6%	0.6%
Nebular Empirical Analysis Tool (sec)	**27.067**	**24.633**	25.037
Normalized	91.01%	100%	98.39%
Standard Deviation	3.8%	7.8%	9.3%
Numpy Benchmark (Score)	323.93	**323.00**	**324.48**
Normalized	99.83%	99.54%	100%
Standard Deviation	0.9%	0.1%	0.1%
Numpy Benchmark (Score/Watt)	**2.42**	2.43	**2.46**
Normalized	98.37%	98.78%	100%
Intel Open Image Denoise - Memorial (Images / Sec)	**28.09**	**28.39**	28.33
Normalized	98.94%	100%	99.79%
Standard Deviation	0.8%	0.3%	1.4%
Intel Open Image Denoise - Memorial (Images / Sec/Watt)	0.08	0.08	0.08
PlaidML - No - Inference - ResNet 50 - CPU (FPS)	4.65	**4.63**	**4.66**
Normalized	99.79%	99.36%	100%
Standard Deviation	0.8%	1%	1.5%
PlaidML - No - Inference - ResNet 50 - CPU (FPS/Watt)	0.03	0.03	0.03
PlaidML - No - Inference - VGG16 - CPU	**25.12**	**25.42**	25.22
Normalized	98.82%	100%	99.21%
Standard Deviation	3.4%	4.6%	3.6%
PlaidML - No - Inference - VGG16 - CPU (FPS/Watt)	0.09	0.09	0.09
PlaidML - No - Inference - VGG19 - CPU	**22.09**	**22.49**	22.43
Normalized	98.22%	100%	99.73%
Standard Deviation	3.5%	2.7%	3.5%
PlaidML - No - Inference - VGG19 - CPU (FPS/Watt)	0.08	0.08	0.08
Primesieve - 1.P.N.G (sec)	**4.540**	4.535	**4.489**
Normalized	98.88%	98.99%	100%
Standard Deviation	0.8%	1%	0.5%
TTSIOD 3D Renderer - P.R.W.S.S.M (FPS)	**627.208**	655.225	**665.448**
Normalized	94.25%	98.46%	100%
Standard Deviation	5.6%	0.9%	3.4%
TTSIOD 3D Renderer - P.R.W.S.S.M (FPS/Watt)	**2.59**	2.70	**2.74**
Normalized	94.53%	98.54%	100%
Rodinia - OpenMP CFD Solver (sec)	**9.255**	8.882	**8.510**

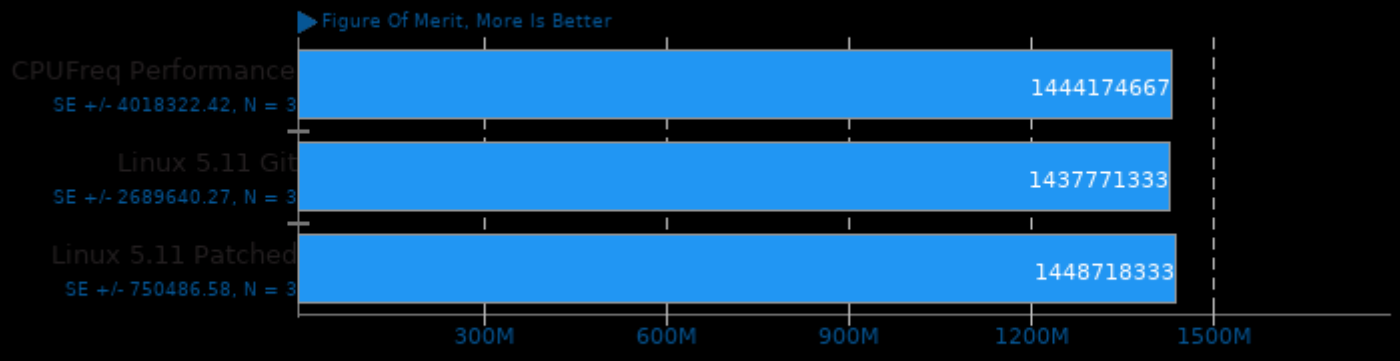
Normalized	91.95%	95.81%	100%
Standard Deviation	6.2%	6.2%	1.4%
Rodinia - OpenMP LavaMD (sec)	**52.794**	**52.092**	52.360
Normalized	98.67%	100%	99.49%
Standard Deviation	0.2%	0.4%	0%
Rodinia - OpenMP Leukocyte (sec)	**53.862**	52.684	**51.290**
Normalized	95.22%	97.35%	100%
Standard Deviation	1.1%	2.3%	0.6%
Rodinia - O.S (sec)	**11.209**	**10.338**	10.432
Normalized	92.23%	100%	99.1%
Standard Deviation	7.4%	0.7%	0.8%
Rodinia - OpenMP HotSpot3D (sec)	**97.942**	**96.603**	96.885
Normalized	98.63%	100%	99.71%
Standard Deviation	0.4%	1%	1%
simdjson - PartialTweets (GB/s)	**0.62**	**0.63**	**0.63**
Normalized	98.41%	100%	100%
Standard Deviation	0.9%	0%	0%
simdjson - LargeRand (GB/s)	**0.37**	**0.36**	**0.37**
Normalized	100%	97.3%	100%
Standard Deviation	0%	1.6%	0%
simdjson - Kostya (GB/s)	0.57	0.57	0.57
Standard Deviation	1%	0%	1%
simdjson - DistinctUserID (GB/s)	0.65	0.65	0.65
Standard Deviation	0.9%	0%	0.9%
simdjson - DistinctUserID (GB/s/Watt)	0.00	0.01	0.01
SQLite Speedtest - Timed Time - Size 1,000 (sec)	70.160	**70.540**	**69.883**
Normalized	99.61%	99.07%	100%
Standard Deviation	0.2%	0.3%	0.5%
Stockfish - Total Time (Nodes/s)	**97945089**	97042601	**96082114**
Normalized	100%	99.08%	98.1%
Standard Deviation	2%	1.4%	2.4%
Stockfish - Total Time (Nodes/s/Watt)	**223085**	220990	**218753**
Normalized	100%	99.06%	98.06%
SVT-AV1 - Enc Mode 8 - 1080p (FPS)	**68.229**	68.231	**68.465**
Normalized	99.66%	99.66%	100%
Standard Deviation	6.7%	6%	3.7%
SVT-AV1 - Enc Mode 8 - 1080p (FPS/Watt)	0.33	0.33	0.33
SVT-AV1 - Enc Mode 4 - 1080p (FPS)	**7.663**	7.648	**7.488**
Normalized	100%	99.8%	97.72%
Standard Deviation	1.3%	0.7%	0.8%
SVT-AV1 - Enc Mode 4 - 1080p (FPS/Watt)	0.03	0.03	0.03
SVT-AV1 - Enc Mode 0 - 1080p (FPS)	**0.092**	**0.091**	**0.091**
Normalized	100%	98.91%	98.91%
Standard Deviation	1.3%	2.4%	0.6%
SVT-VP9 - V.Q.O - Bosphorus 1080p (FPS)	311.85	**323.81**	**309.61**
Normalized	96.31%	100%	95.61%
Standard Deviation	20.1%	5%	19.1%
SVT-VP9 - V.Q.O - Bosphorus 1080p (FPS/Watt)	1.70	**1.74**	**1.68**
Normalized	97.7%	100%	96.55%
SVT-VP9 - P.S.O - Bosphorus 1080p (FPS)	**381.08**	371.48	**363.18**
Normalized	100%	97.48%	95.3%
Standard Deviation	1.7%	1.4%	1.5%

SVT-VP9 - P.S.O - Bosphorus 1080p (FPS/Watt)	**2.16**	2.11	**2.07**
Normalized	100%	97.69%	95.83%
SVT-VP9 - VMAF Optimized - Bosphorus 1080p (FPS)	**369.01**	364.81	**346.71**
Normalized	100%	98.86%	93.96%
Standard Deviation	1%	0.8%	2.9%
SVT-VP9 - VMAF Optimized - Bosphorus 1080p (FPS/Watt)	**2.09**	2.08	**1.97**
Normalized	100%	99.52%	94.26%
Swet - Average (Operations/sec)	**685888863**	**687480262**	686132109
Normalized	99.77%	100%	99.8%
Standard Deviation	1.3%	0.4%	0.9%
Swet - Average (Operations/sec/Watt)	**5364162**	5408273	**5450164**
Normalized	98.42%	99.23%	100%
Tachyon - Total Time (sec)	**17.9375**	18.0565	**18.2004**
Normalized	100%	99.34%	98.56%
Standard Deviation	0.5%	0.6%	1.4%
TensorFlow Lite - Mobilenet Float (us)	**46659**	**39524**	39982
Normalized	84.71%	100%	98.85%
Standard Deviation	9.5%	1.7%	2%
TensorFlow Lite - Mobilenet Quant (us)	**45084**	**41034**	41180
Normalized	91.02%	100%	99.65%
Standard Deviation	6.5%	2.4%	0.9%
TensorFlow Lite - NASNet Mobile (us)	**189771**	134044	**132844**
Normalized	70%	99.1%	100%
Standard Deviation	15%	6.9%	6.3%
TensorFlow Lite - SqueezeNet (us)	**65193**	62195	**61347**
Normalized	94.1%	98.64%	100%
Standard Deviation	1.8%	2.6%	2.3%
TensorFlow Lite - I.R.V (us)	**765726**	**736285**	737993
Normalized	96.16%	100%	99.77%
Standard Deviation	1%	2.4%	0.5%
TensorFlow Lite - Inception V4 (us)	**894640**	**810750**	818887
Normalized	90.62%	100%	99.01%
Standard Deviation	0.5%	0.2%	1%
TSCP - A.C.P (Nodes/s)	1115133	**1114562**	**1116255**
Normalized	99.9%	99.85%	100%
Standard Deviation	0.3%	0.2%	0.2%
TSCP - A.C.P (Nodes/s/Watt)	**8954**	8993	**9017**
Normalized	99.31%	99.73%	100%
Tungsten Renderer - Hair (sec)	**6.60054**	6.69036	**6.69505**
Normalized	100%	98.66%	98.59%
Standard Deviation	2.2%	0.5%	2.2%
Tungsten Renderer - Water Caustic (sec)	**21.3253**	21.3329	**21.4652**
Normalized	100%	99.96%	99.35%
Standard Deviation	2%	3.8%	2.1%
Tungsten Renderer - Volumetric Caustic	5.30105	**5.26235**	**5.31183**
Normalized	99.27%	100%	99.07%
Standard Deviation	0.6%	1.8%	2.5%
Chaos Group V-RAY - CPU (Ksamples)	54803	**53460**	**55014**
Normalized	99.62%	97.18%	100%
Standard Deviation	1.6%	6.9%	1.6%
Chaos Group V-RAY - CPU (Ksamples/Watt)	130.07	**127.59**	**130.65**

AMD EPYC 7F72 2P Linux 5.11 Perf Governor

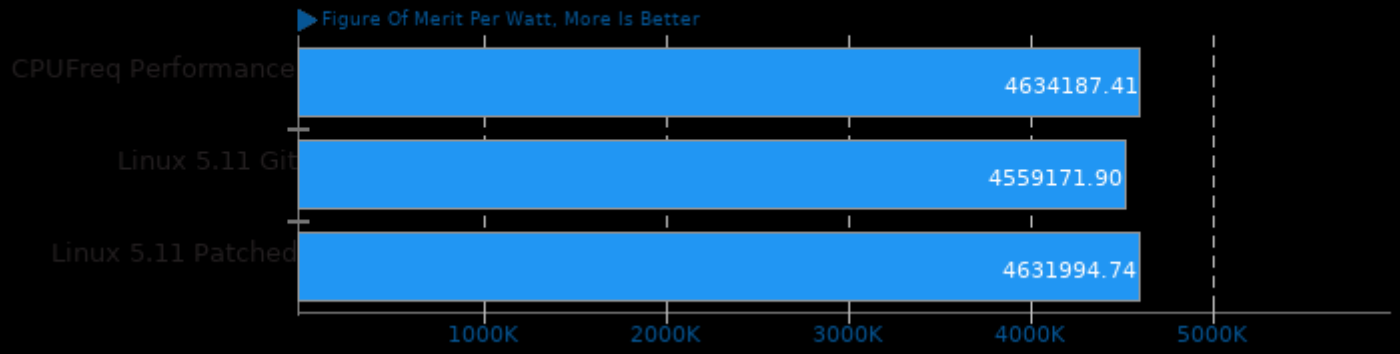
Normalized	99.56%	97.66%	100%
x265 - Bosphorus 1080p (FPS)	**47.66**	49.45	**62.29**
Normalized	76.51%	79.39%	100%
Standard Deviation	2.3%	2.1%	4.6%
x265 - Bosphorus 1080p (FPS/Watt)	0.30	**0.29**	**0.31**
Normalized	96.77%	93.55%	100%
x265 - Bosphorus 4K (FPS)	**18.63**	19.74	**20.75**
Normalized	89.78%	95.13%	100%
Standard Deviation	1%	1.2%	0.7%
x265 - Bosphorus 4K (FPS/Watt)	0.08	0.08	0.08

Algebraic Multi-Grid Benchmark 1.2



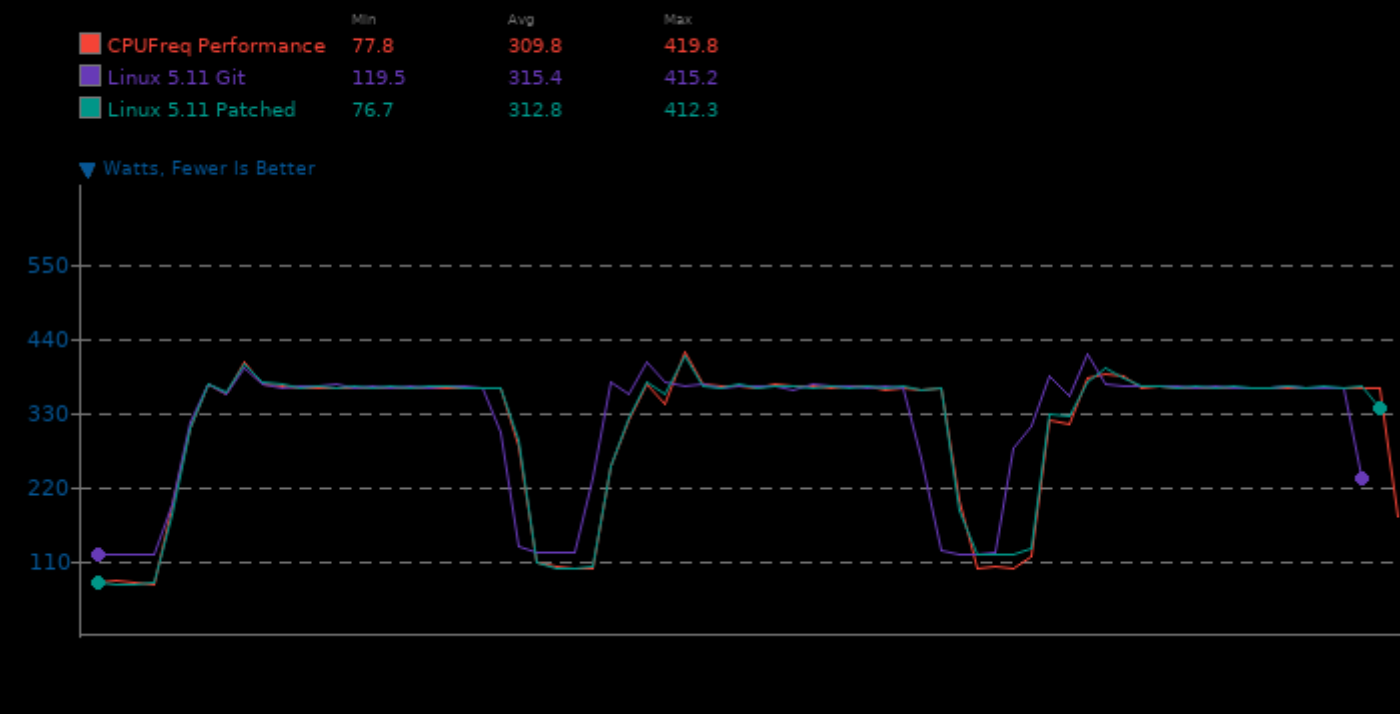
1. (CC) gcc options: -lparcsr_ls -lparcsr_mv -lseq_mv -lIJ_mv -lkrylov -lHYPRE_utilities -lm -fopenmp -pthread -lmpi

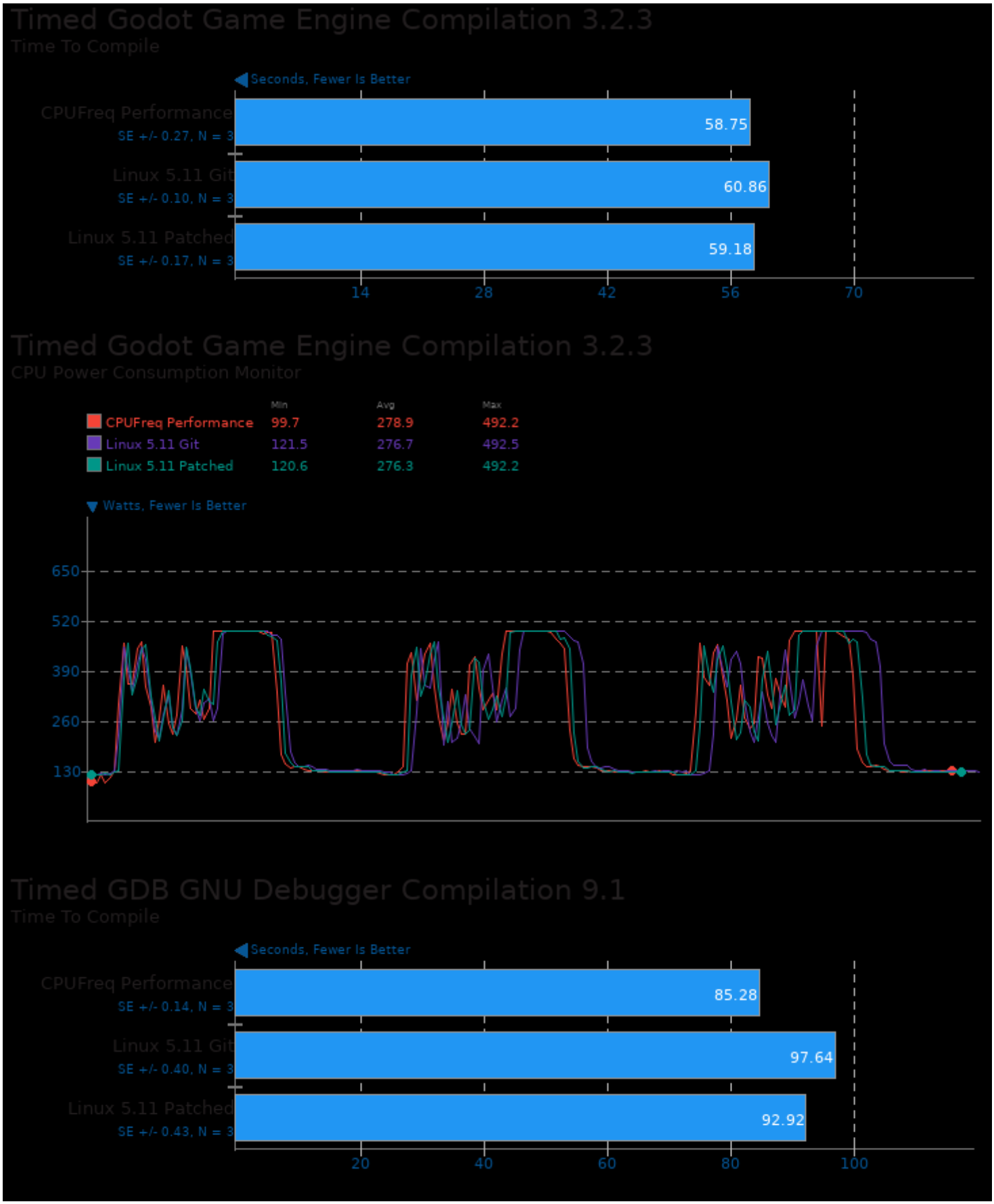
Algebraic Multi-Grid Benchmark 1.2

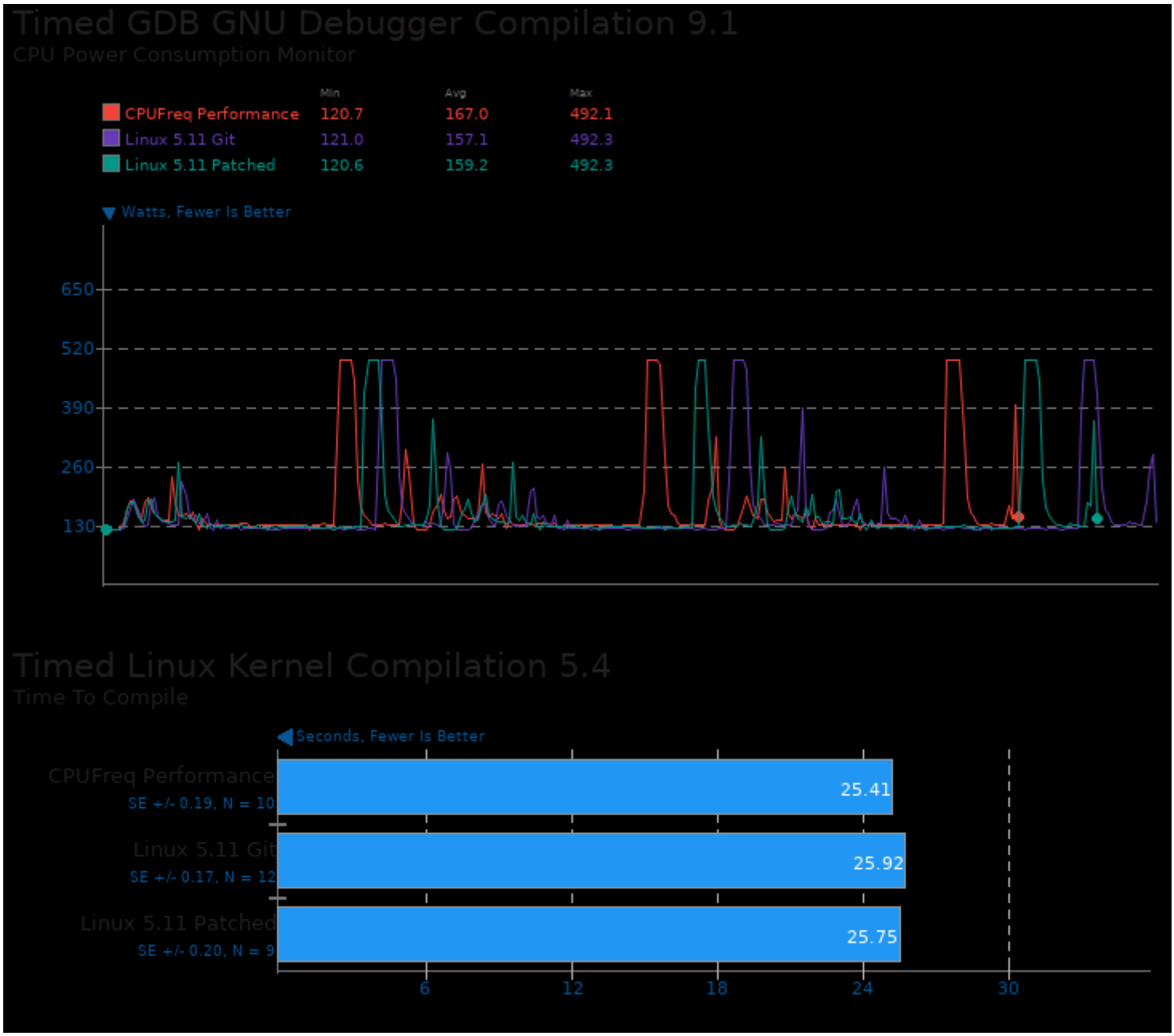


Algebraic Multi-Grid Benchmark 1.2

CPU Power Consumption Monitor



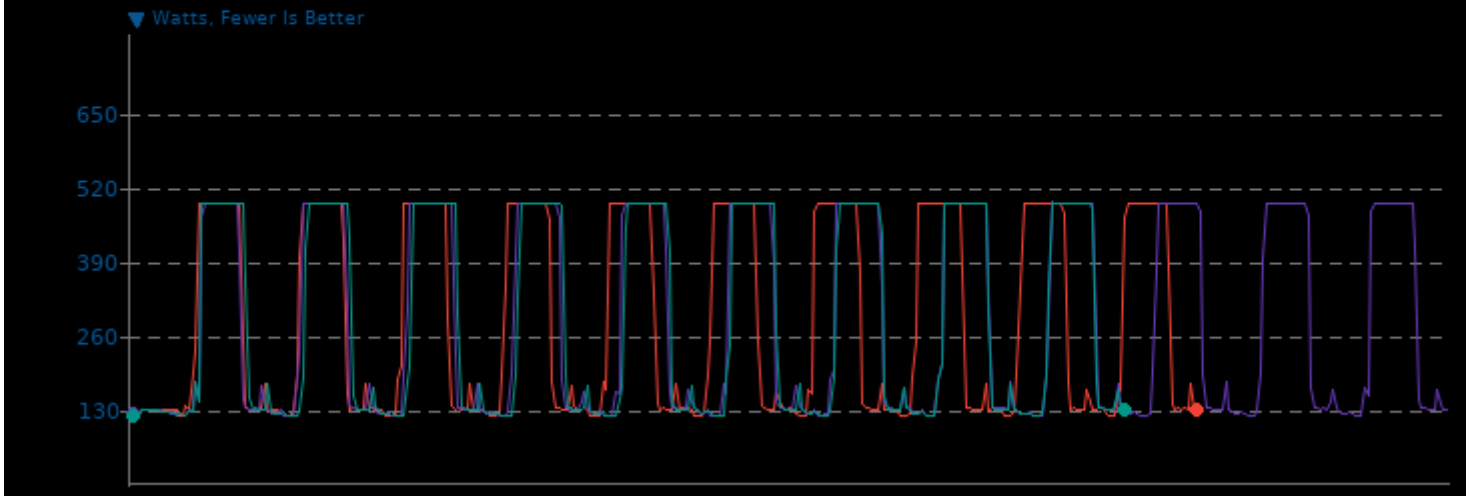

Timed Godot Game Engine Compilation 3.2.3
Time To Compile
Seconds, Fewer Is Better
CPUFreq Performance
SE +/- 0.27, N = 3
58.75
Linux 5.11 Git
SE +/- 0.10, N = 3
60.86
Linux 5.11 Patched
SE +/- 0.17, N = 3
59.18
14
28
42
56
70
Timed Godot Game Engine Compilation 3.2.3
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 99.7 278.9 492.2
Linux 5.11 Git 121.5 276.7 492.5
Linux 5.11 Patched 120.6 276.3 492.2
Watts, Fewer Is Better
650
520
390
260
130
Timed GDB GNU Debugger Compilation 9.1
Time To Compile
Seconds, Fewer Is Better
CPUFreq Performance
SE +/- 0.14, N = 3
85.28
Linux 5.11 Git
SE +/- 0.40, N = 3
97.64
Linux 5.11 Patched
SE +/- 0.43, N = 3
92.92
20
40
60
80
100


Timed GDB GNU Debugger Compilation 9.1
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.7 167.0 492.1
Linux 5.11 Git 121.0 157.1 492.3
Linux 5.11 Patched 120.6 159.2 492.3
Watts, Fewer Is Better
650
520
390
260
130
Timed Linux Kernel Compilation 5.4
Time To Compile
Seconds, Fewer Is Better
CPUFreq Performance
SE +/- 0.19, N = 10
25.41
Linux 5.11 Git
SE +/- 0.17, N = 12
25.92
Linux 5.11 Patched
SE +/- 0.20, N = 9
25.75
6
12
18
24
30

Timed Linux Kernel Compilation 5.4

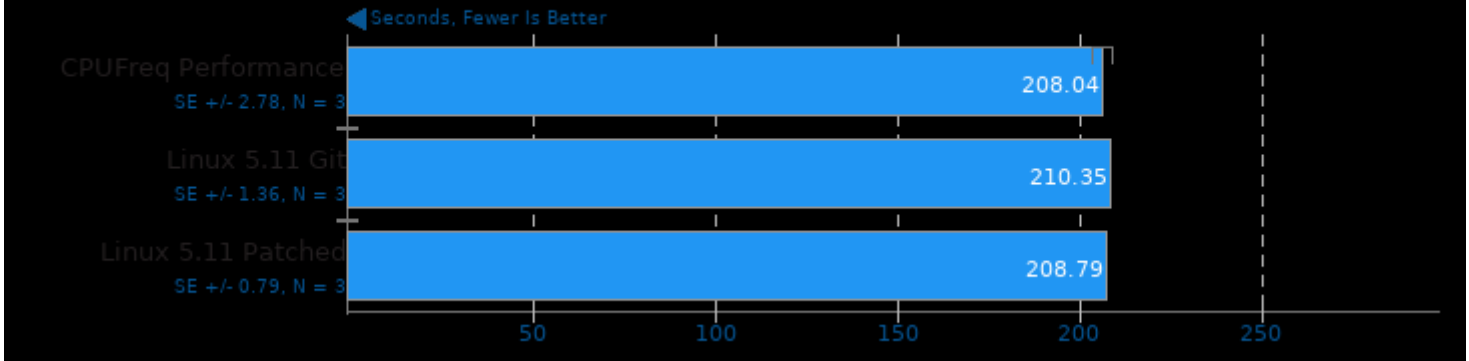
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	120.3	290.5	492.2
Linux 5.11 Git	121.2	285.2	492.8
Linux 5.11 Patched	120.0	284.2	492.3



Timed LLVM Compilation 10.0

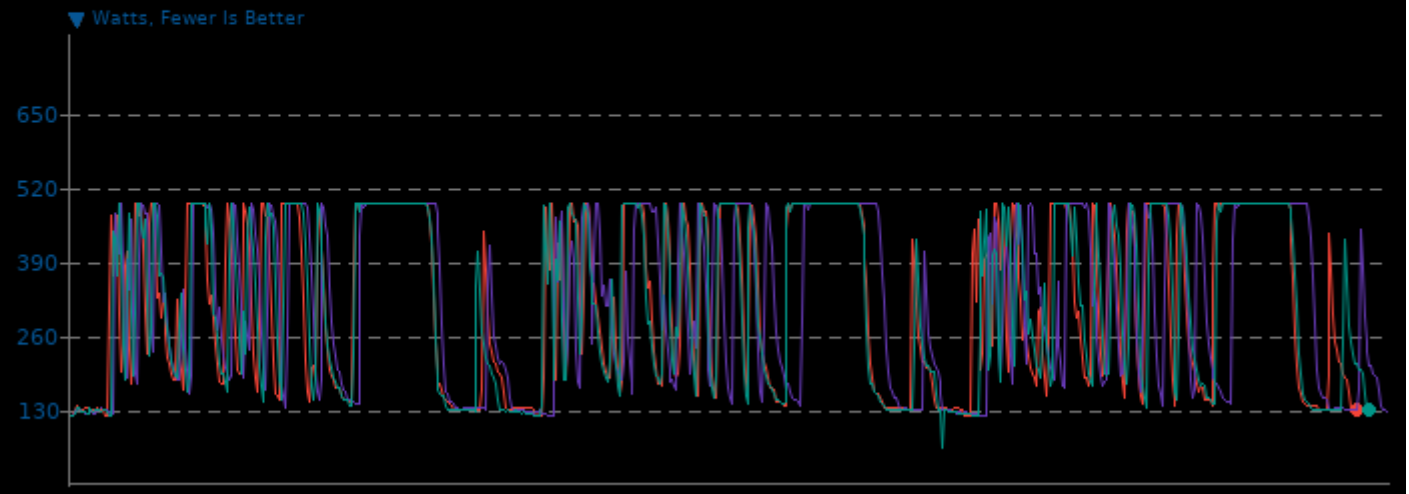
Time To Compile



Timed LLVM Compilation 10.0

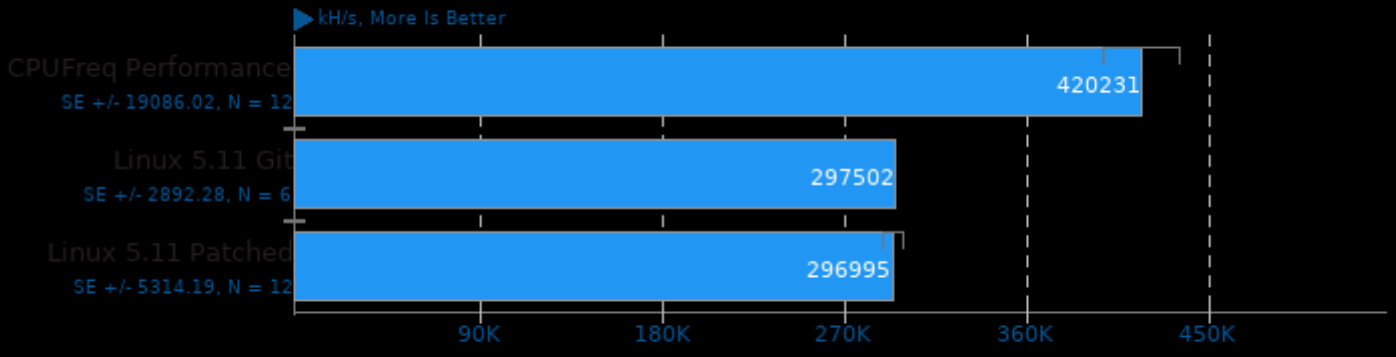
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	121.1	322.9	492.3
Linux 5.11 Git	121.4	319.1	492.3
Linux 5.11 Patched	64.9	318.0	492.4



Cpuminer-Opt 3.15.5

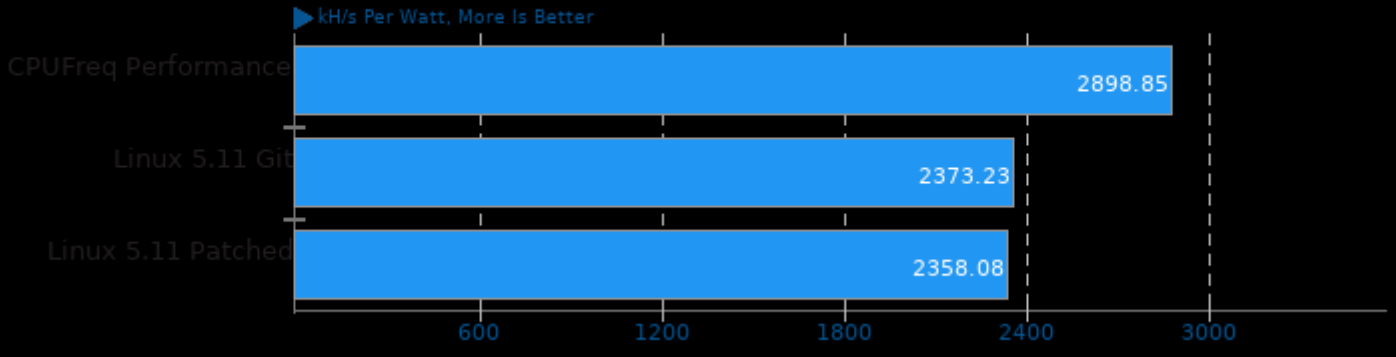
Algorithm: Quad SHA-256, Pyrite

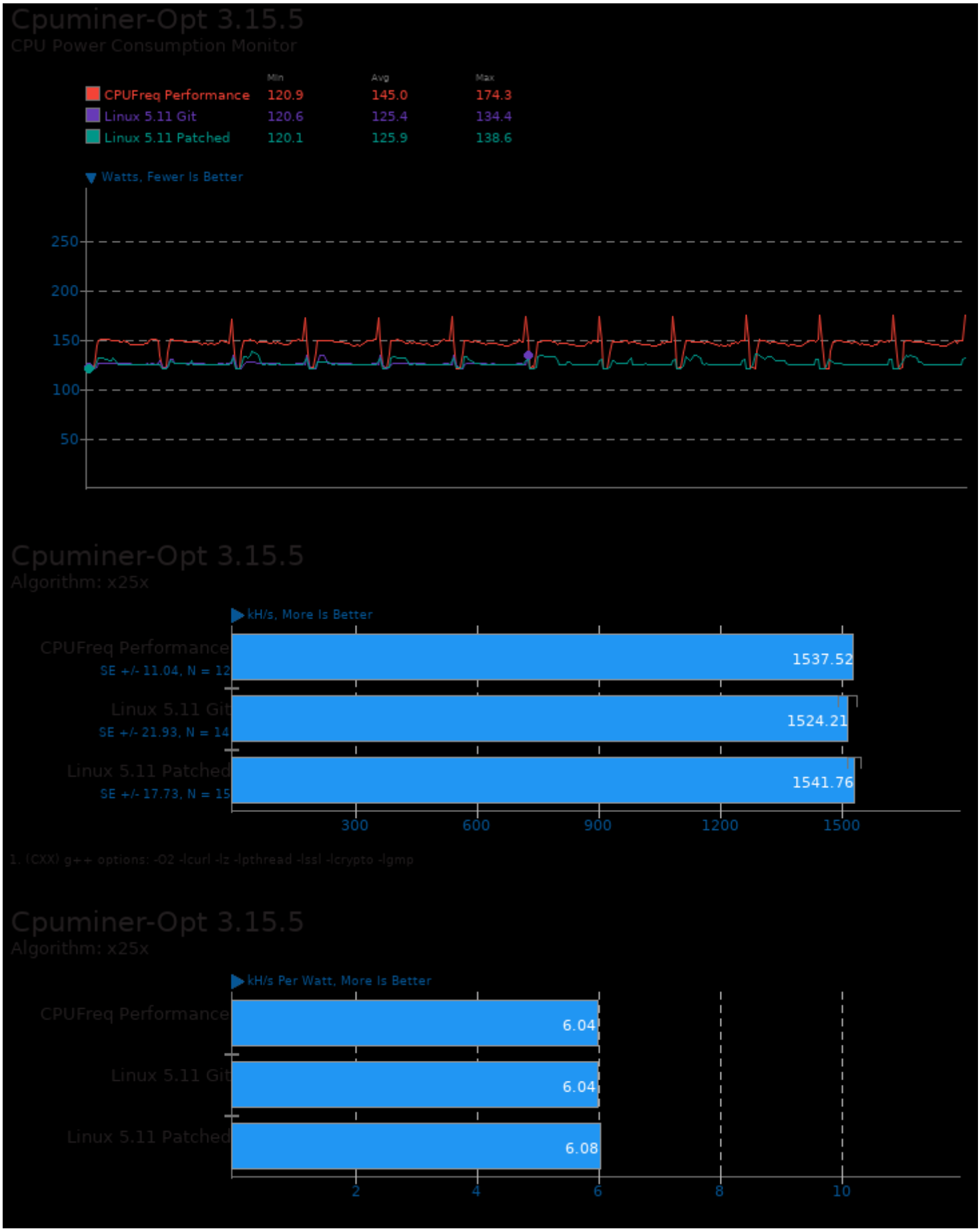


1. (CXX) g++ options: -O2 -lcurl -lz -lpthread -lssl -lcrypto -lgmp

Cpuminer-Opt 3.15.5

Algorithm: Quad SHA-256, Pyrite

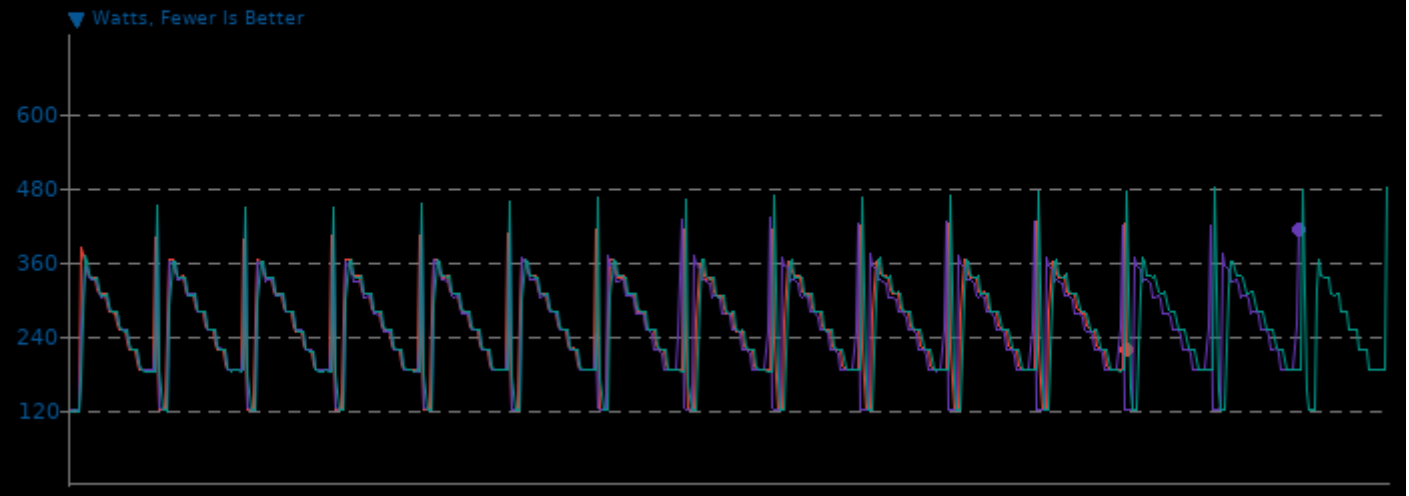



Cpuminer-Opt 3.15.5
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.9 145.0 174.3
Linux 5.11 Git 120.6 125.4 134.4
Linux 5.11 Patched 120.1 125.9 138.6
Watts, Fewer Is Better
250
200
150
100
50
Cpuminer-Opt 3.15.5
Algorithm: x25x
kH/s, More Is Better
CPUFreq Performance
SE +/- 11.04, N = 12
1537.52
Linux 5.11 Git
SE +/- 21.93, N = 14
1524.21
Linux 5.11 Patched
SE +/- 17.73, N = 15
1541.76
300
600
900
1200
1500
1. (CXX) g++ options: -O2 -lcurl -lz -lpthread -lssl -lcrypto -lgmp
Cpuminer-Opt 3.15.5
Algorithm: x25x
kH/s Per Watt, More Is Better
CPUFreq Performance
6.04
Linux 5.11 Git
6.04
Linux 5.11 Patched
6.08
2
4
6
8
10

Cpuminer-Opt 3.15.5

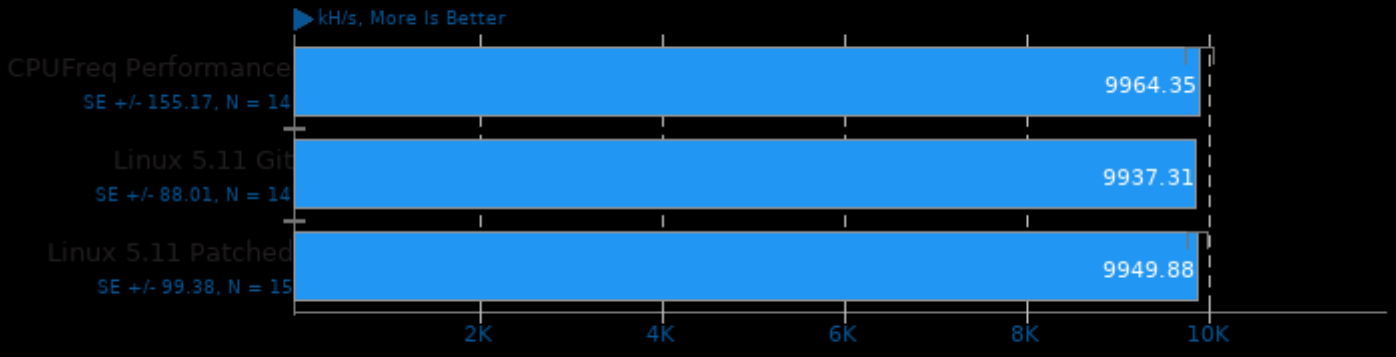
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	120.5	254.4	424.5
Linux 5.11 Git	120.6	252.3	443.7
Linux 5.11 Patched	119.9	253.8	480.5



Cpuminer-Opt 3.15.5

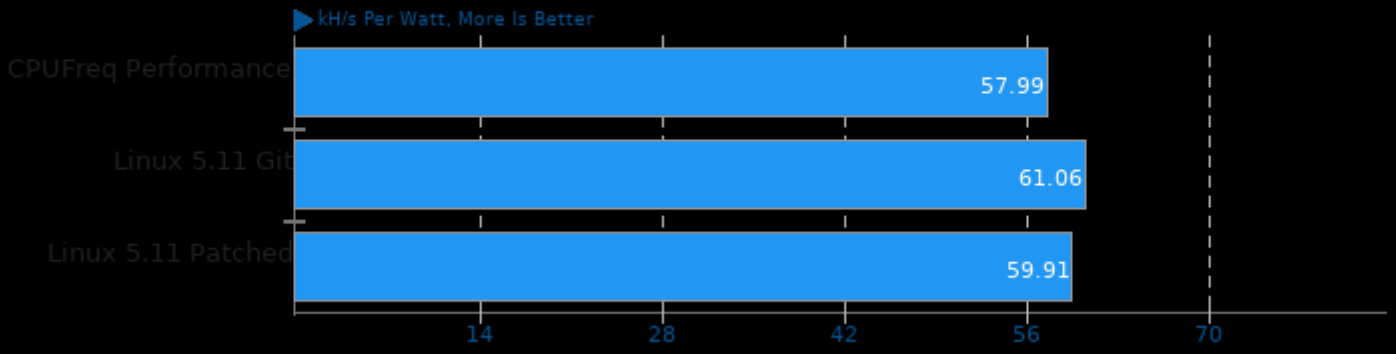
Algorithm: Garlicoin

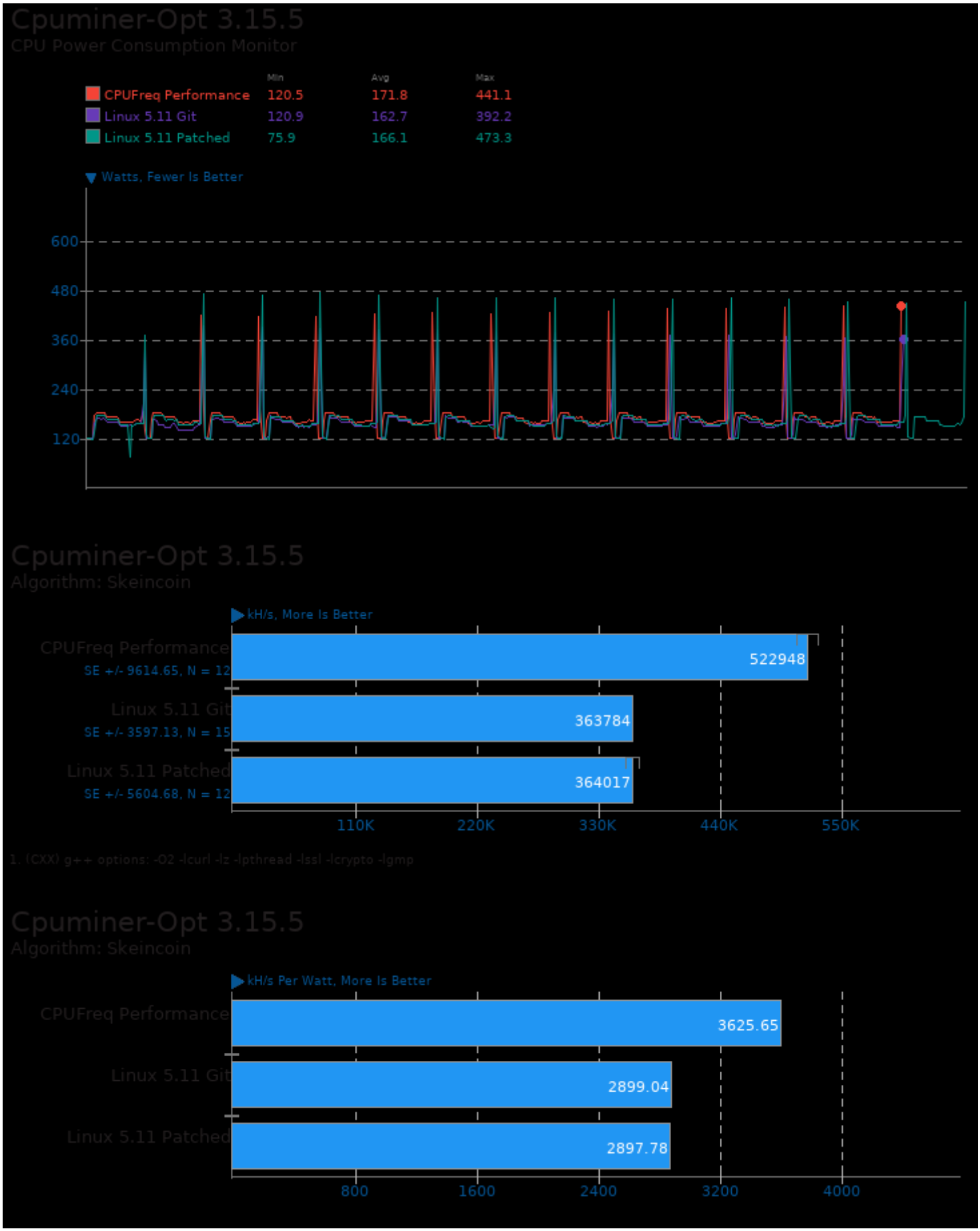


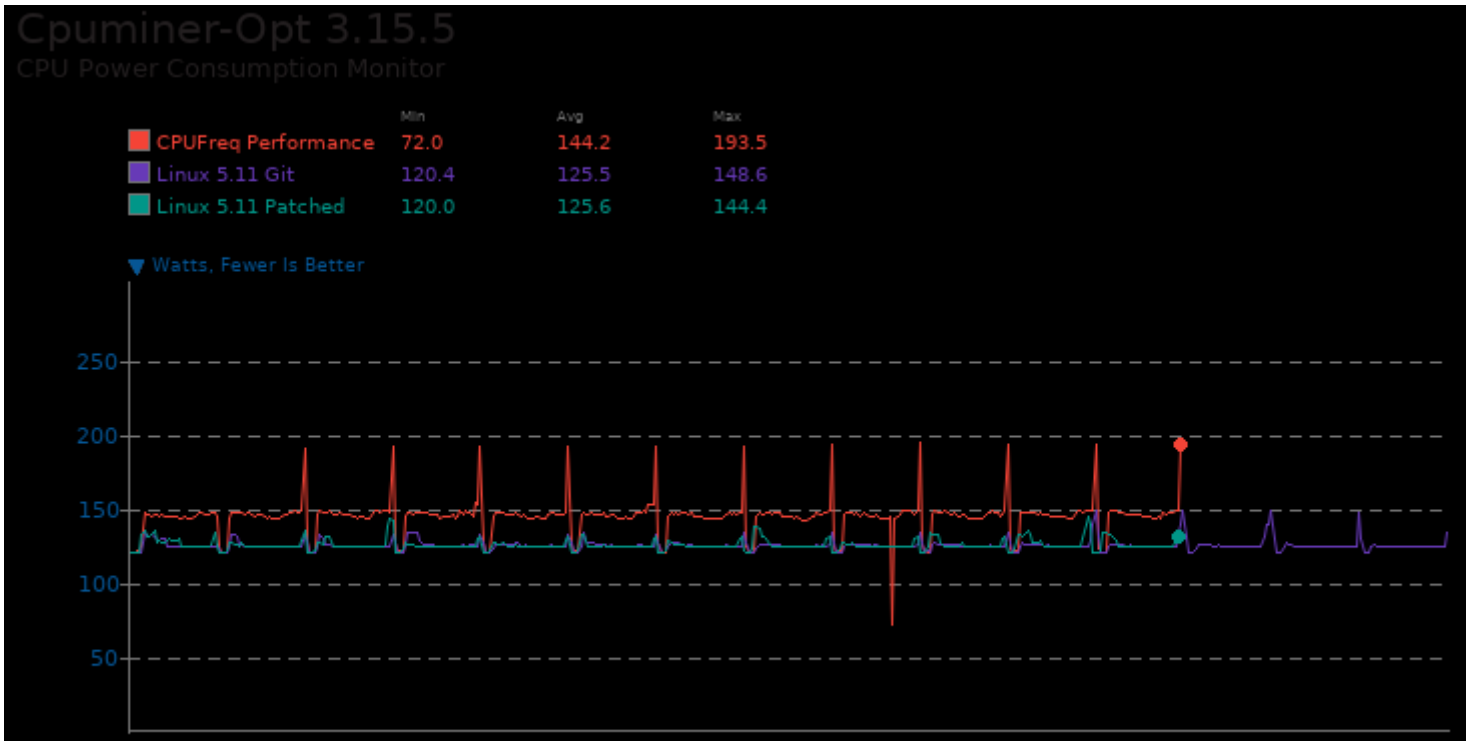
1. (CXX) g++ options: -O2 -lcurl -lz -lpthread -lssl -lcrypto -lgmp

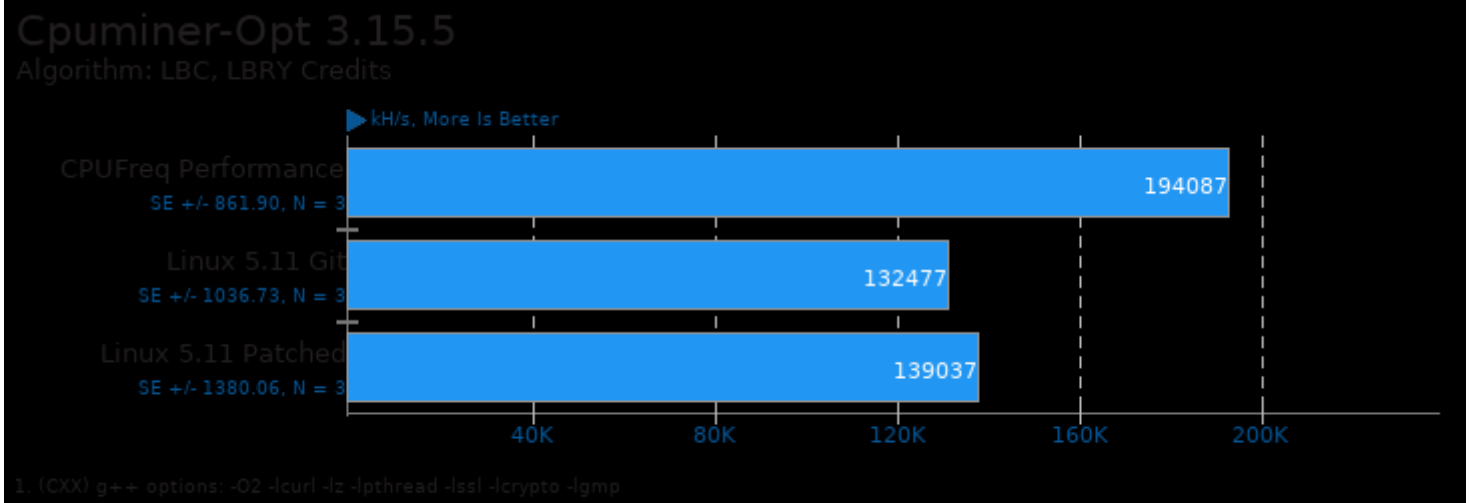
Cpuminer-Opt 3.15.5

Algorithm: Garlicoin

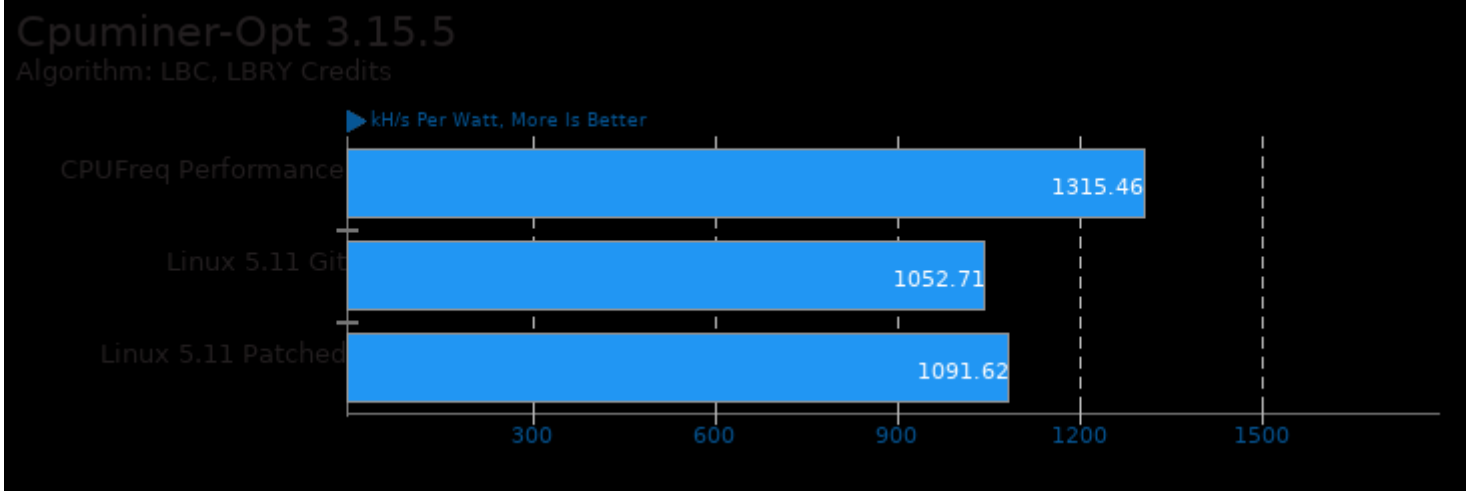


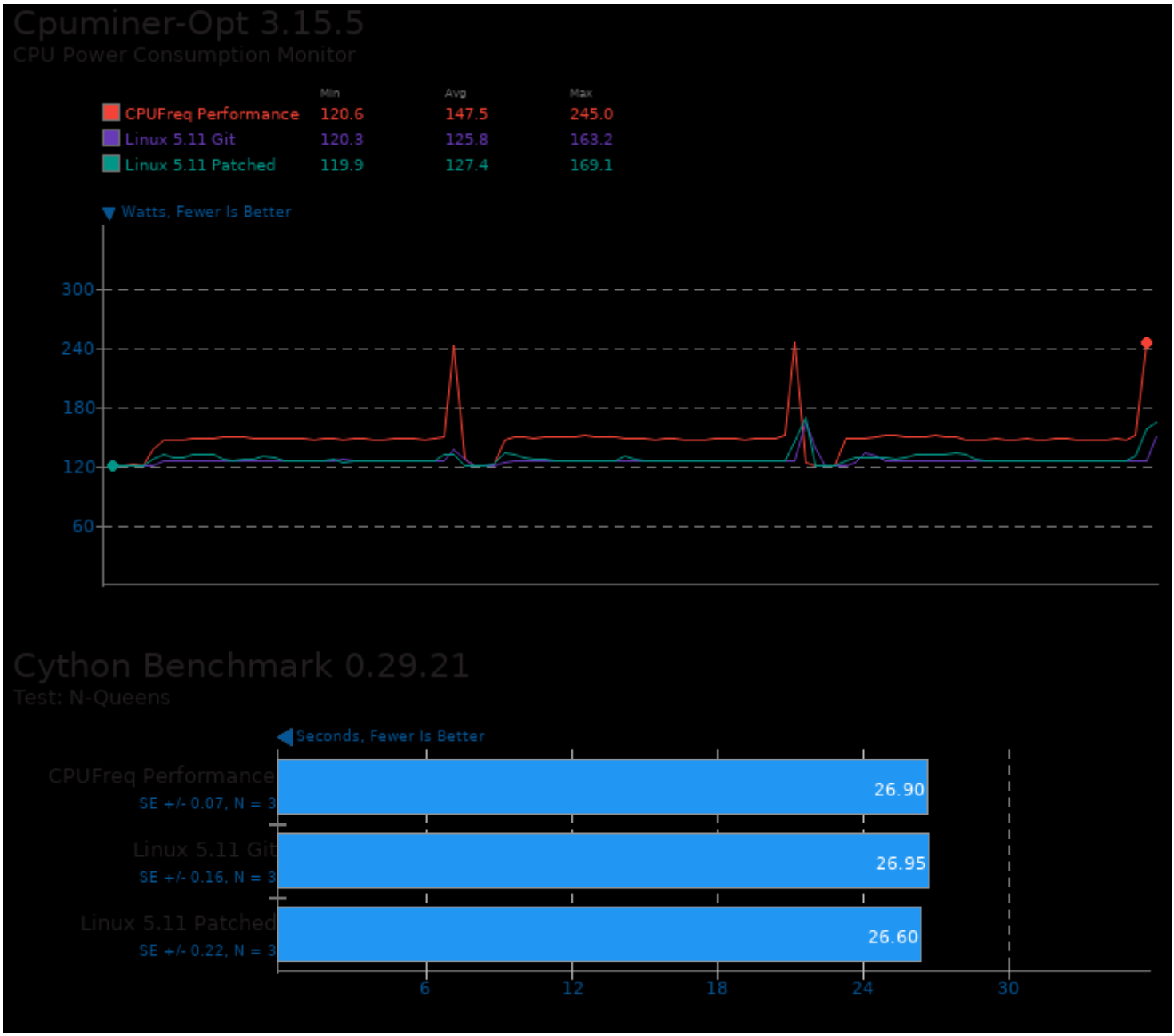

Cpuminer-Opt 3.15.5
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.5 171.8 441.1
Linux 5.11 Git 120.9 162.7 392.2
Linux 5.11 Patched 75.9 166.1 473.3
Watts, Fewer Is Better
600
480
360
240
120
Cpuminer-Opt 3.15.5
Algorithm: Skeincoin
kH/s, More Is Better
CPUFreq Performance
SE +/- 9614.65, N = 12
522948
Linux 5.11 Git
SE +/- 3597.13, N = 15
363784
Linux 5.11 Patched
SE +/- 5604.68, N = 12
364017
110K
220K
330K
440K
550K
1. (CXX) g++ options: -O2 -lcurl -lz -lpthread -lssl -lcrypto -lgmp
Cpuminer-Opt 3.15.5
Algorithm: Skeincoin
kH/s Per Watt, More Is Better
CPUFreq Performance
3625.65
Linux 5.11 Git
2899.04
Linux 5.11 Patched
2897.78
800
1600
2400
3200
4000





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

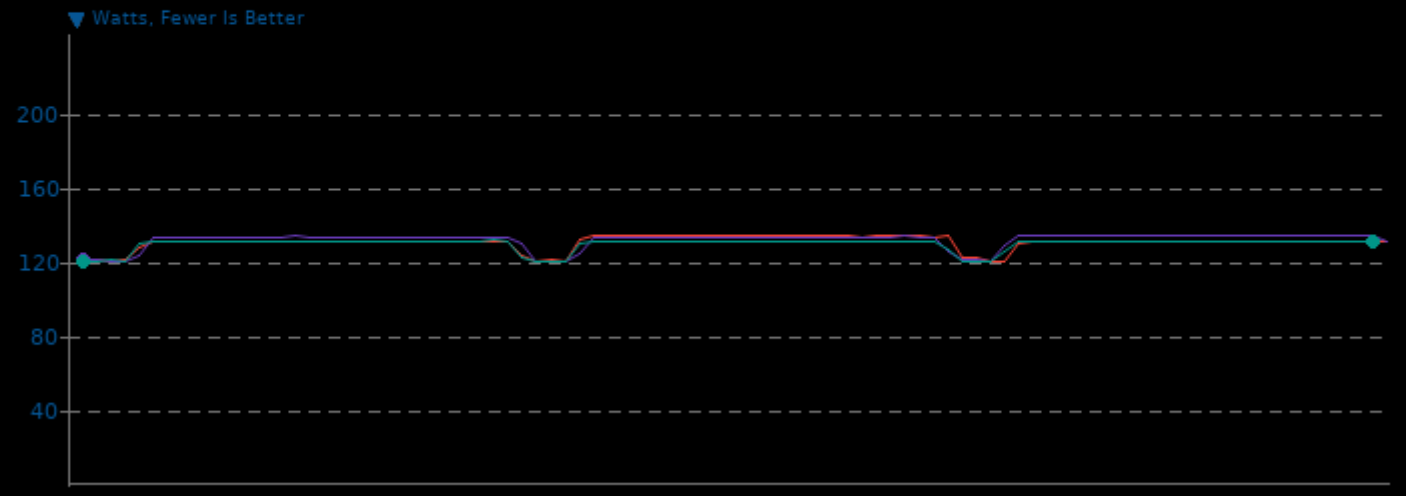



Cpuminer-Opt 3.15.5
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.6 147.5 245.0
Linux 5.11 Git 120.3 125.8 163.2
Linux 5.11 Patched 119.9 127.4 169.1
Watts, Fewer Is Better
300
240
180
120
60
Cython Benchmark 0.29.21
Test: N-Queens
Seconds, Fewer Is Better
CPUFreq Performance
SE +/- 0.07, N = 3
26.90
Linux 5.11 Git
SE +/- 0.16, N = 3
26.95
Linux 5.11 Patched
SE +/- 0.22, N = 3
26.60
6
12
18
24
30

Cython Benchmark 0.29.21

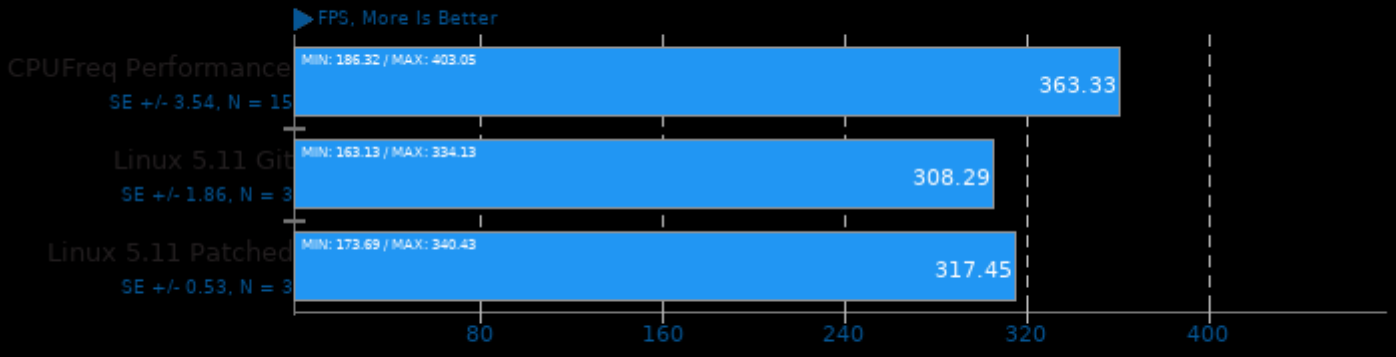
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	120.3	130.1	133.8
Linux 5.11 Git	120.4	131.5	134.1
Linux 5.11 Patched	119.9	129.5	131.5



dav1d 0.8.1

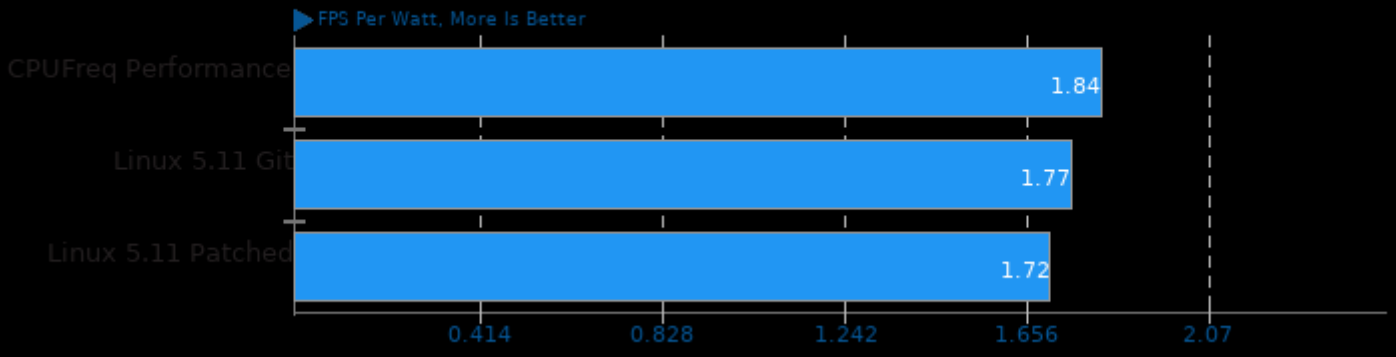
Video Input: Summer Nature 4K

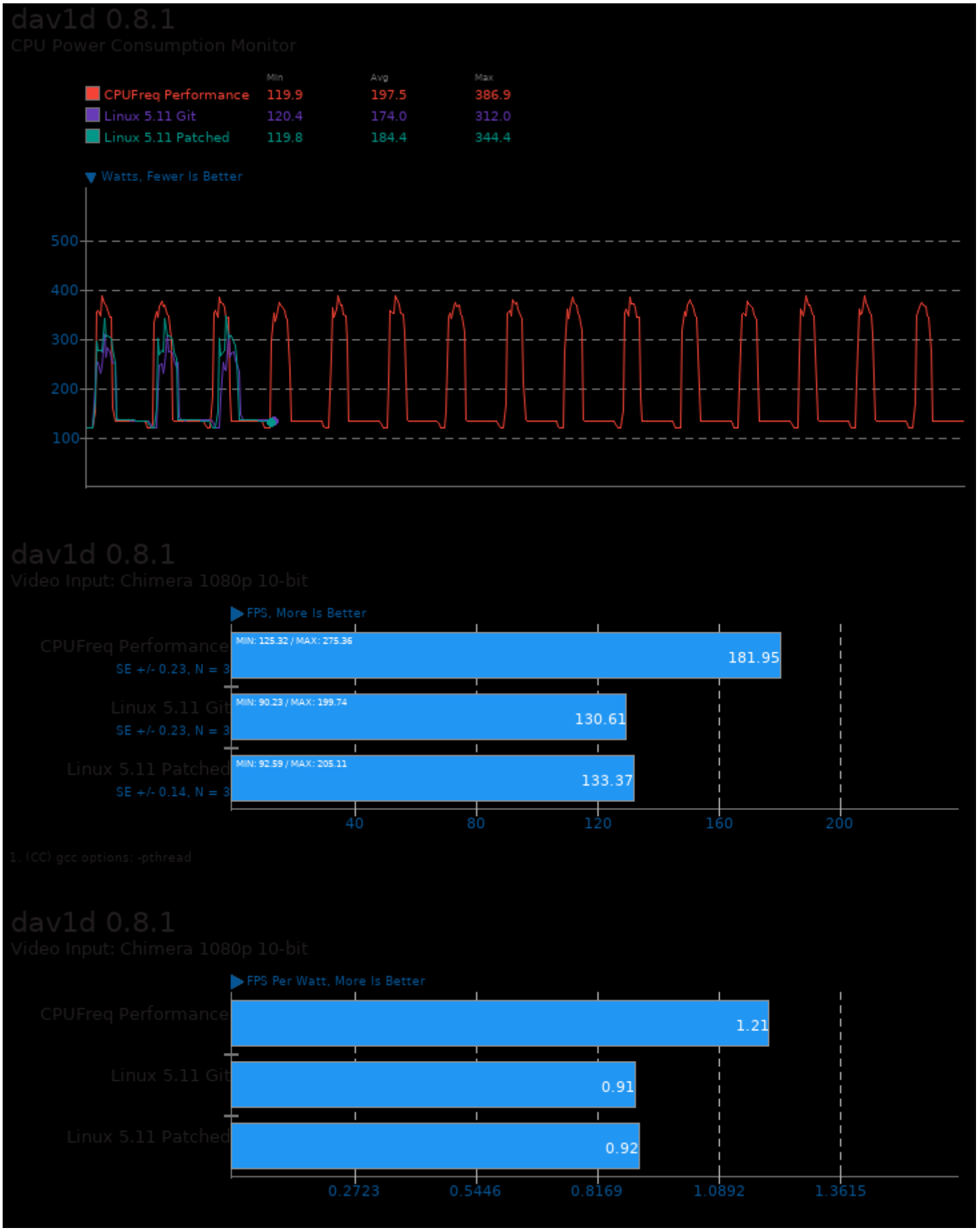


1. (CC) gcc options: -pthread

dav1d 0.8.1

Video Input: Summer Nature 4K



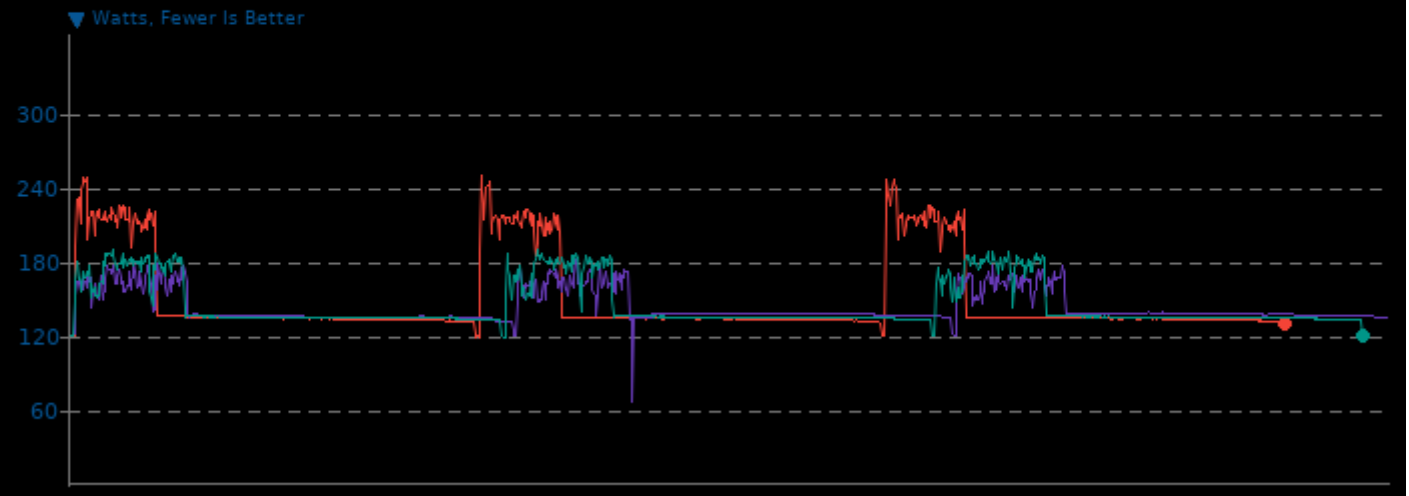

dav1d 0.8.1
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 119.9 197.5 386.9
Linux 5.11 Git 120.4 174.0 312.0
Linux 5.11 Patched 119.8 184.4 344.4
Watts, Fewer Is Better
500
400
300
200
100
dav1d 0.8.1
Video Input: Chimera 1080p 10-bit
FPS, More Is Better
CPUFreq Performance
SE +/- 0.23, N = 3
MIN: 125.32 / MAX: 275.36
181.95
Linux 5.11 Git
SE +/- 0.23, N = 3
MIN: 90.23 / MAX: 199.74
130.61
Linux 5.11 Patched
SE +/- 0.14, N = 3
MIN: 92.59 / MAX: 205.11
133.37
40
80
120
160
200
1. (CC) gcc options: -pthread
dav1d 0.8.1
Video Input: Chimera 1080p 10-bit
FPS Per Watt, More Is Better
CPUFreq Performance
1.21
Linux 5.11 Git
0.91
Linux 5.11 Patched
0.92
0.2723
0.5446
0.8169
1.0892
1.3615

AMD EPYC 7F72 2P Linux 5.11 Perf Governor

dav1d 0.8.1

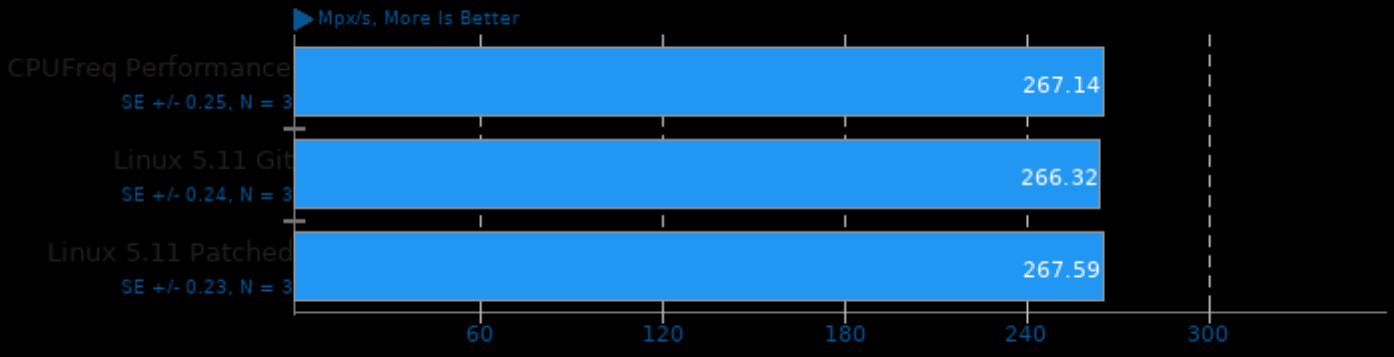
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	119.6	150.2	248.8
Linux 5.11 Git	67.4	143.3	181.4
Linux 5.11 Patched	119.7	144.8	190.2



Etcpak 0.7

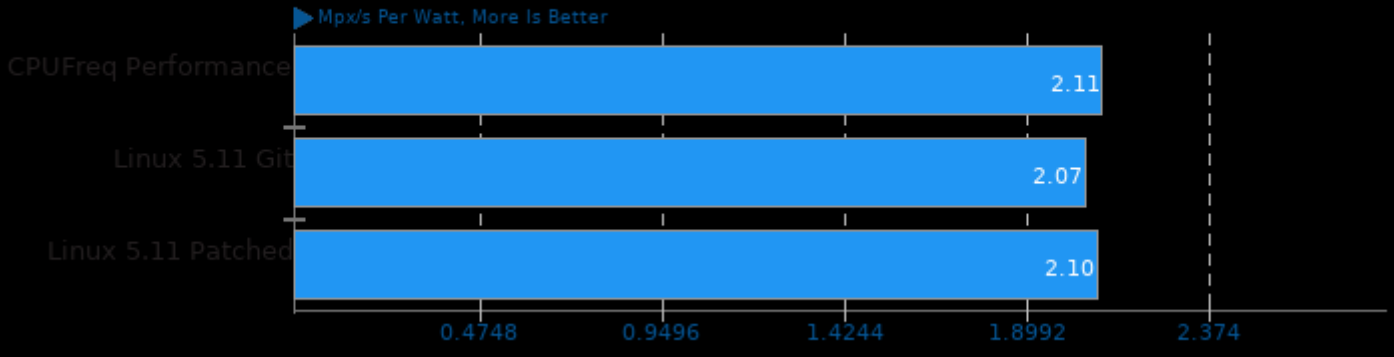
Configuration: ETC1



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

Etcpak 0.7

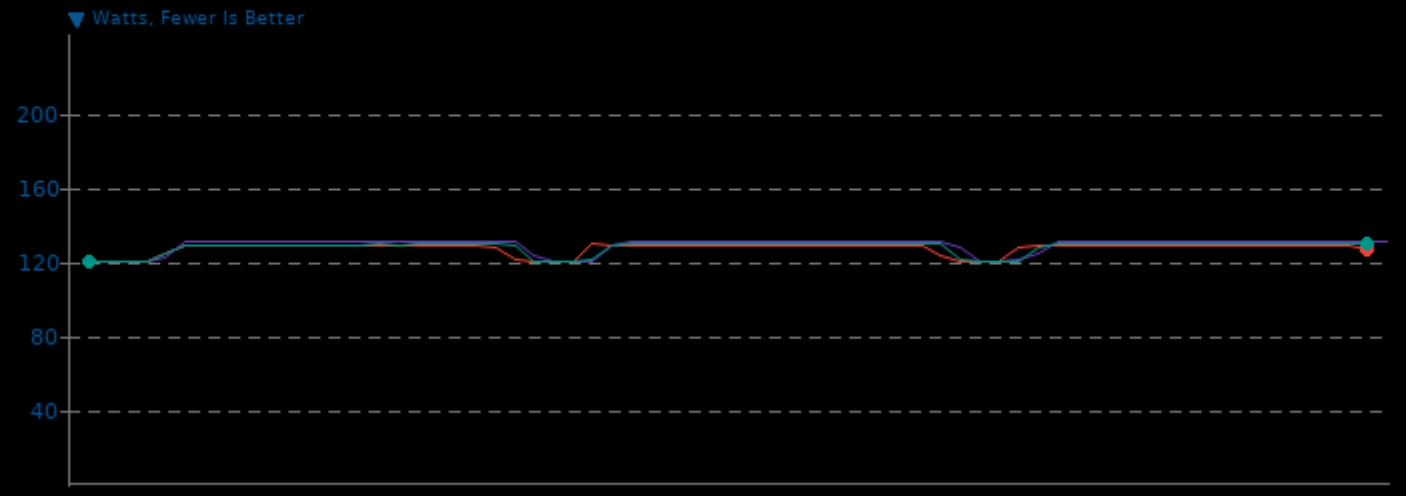
Configuration: ETC1



Etcpak 0.7

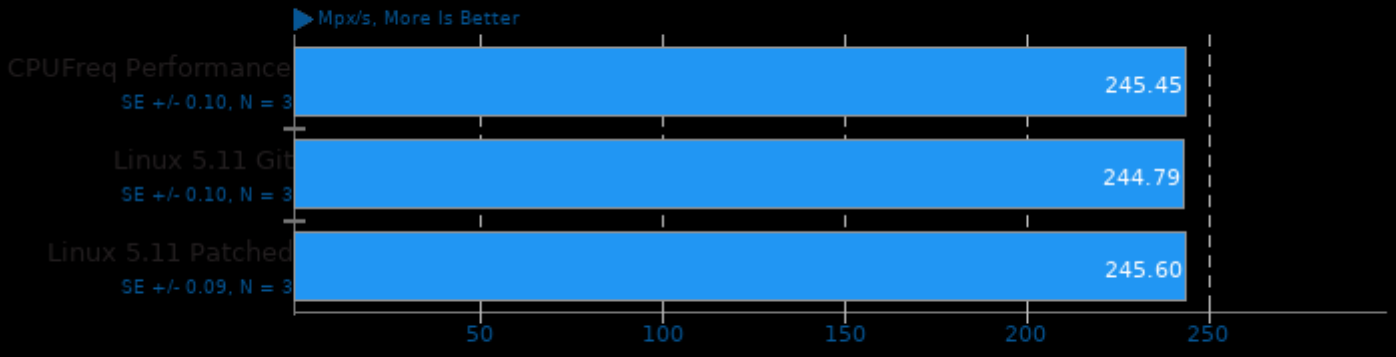
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	119.7	126.8	129.3
Linux 5.11 Git	120.2	128.8	131.0
Linux 5.11 Patched	119.5	127.5	129.7



Etcpak 0.7

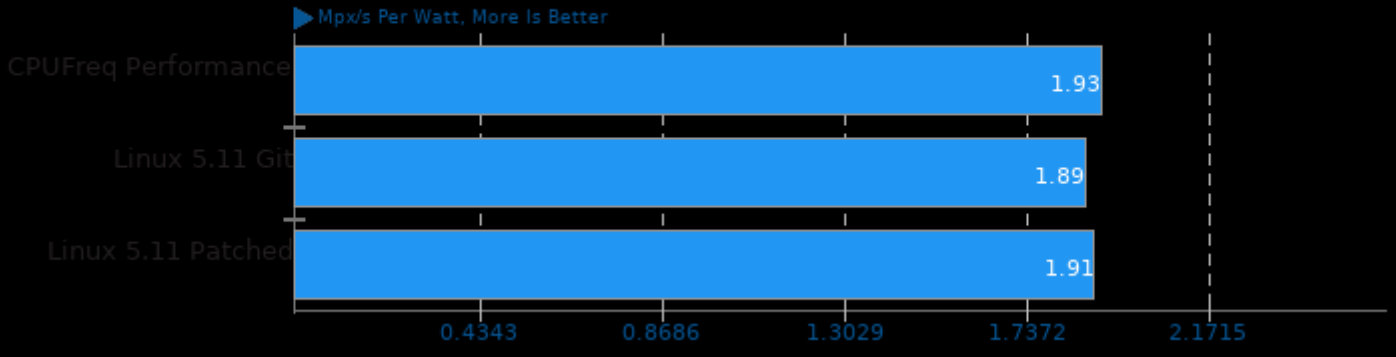
Configuration: ETC1 + Dithering



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

Etcpak 0.7

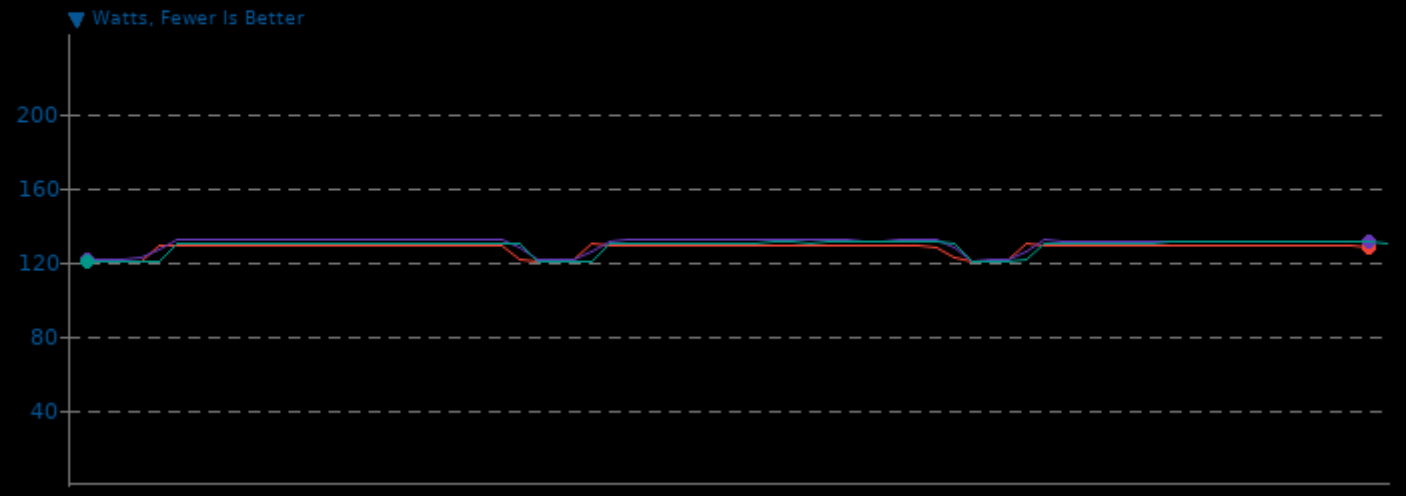
Configuration: ETC1 + Dithering



Etcpak 0.7

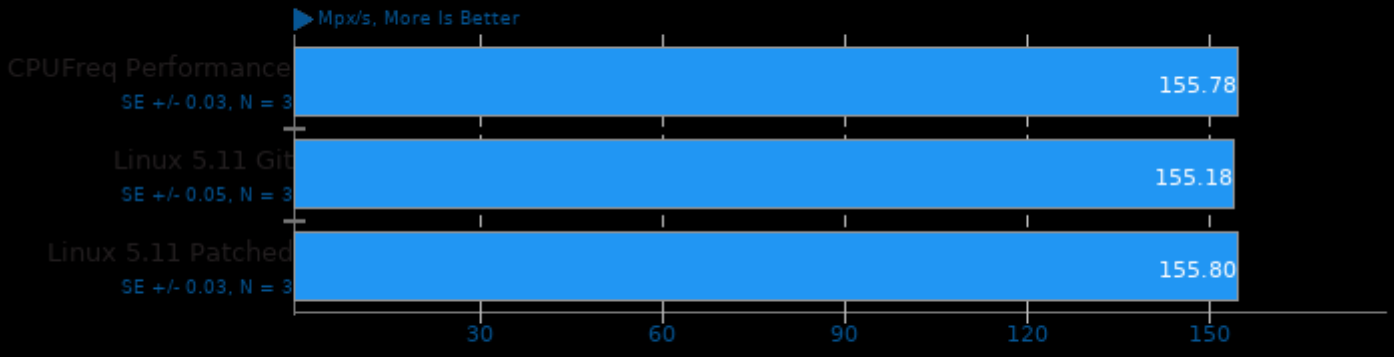
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	119.8	127.0	129.7
Linux 5.11 Git	120.5	129.5	132.0
Linux 5.11 Patched	119.6	128.2	130.3



Etcpak 0.7

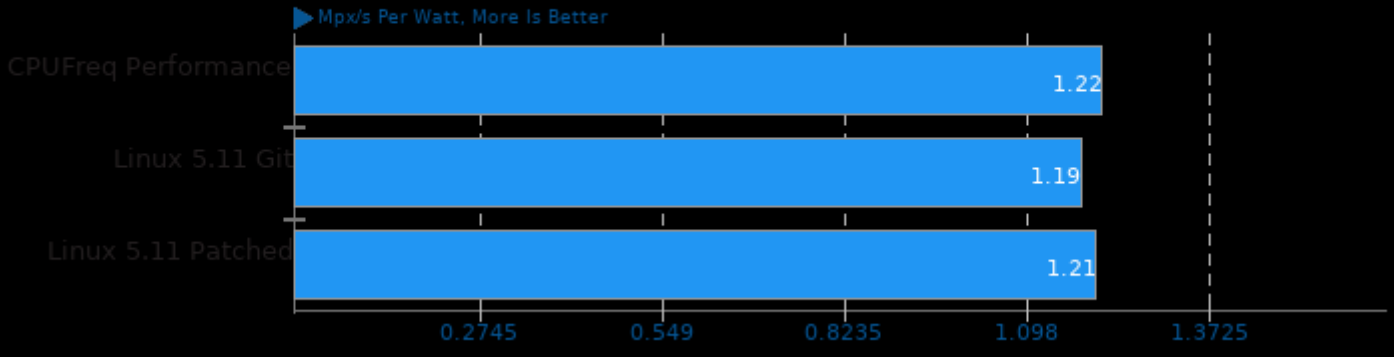
Configuration: ETC2

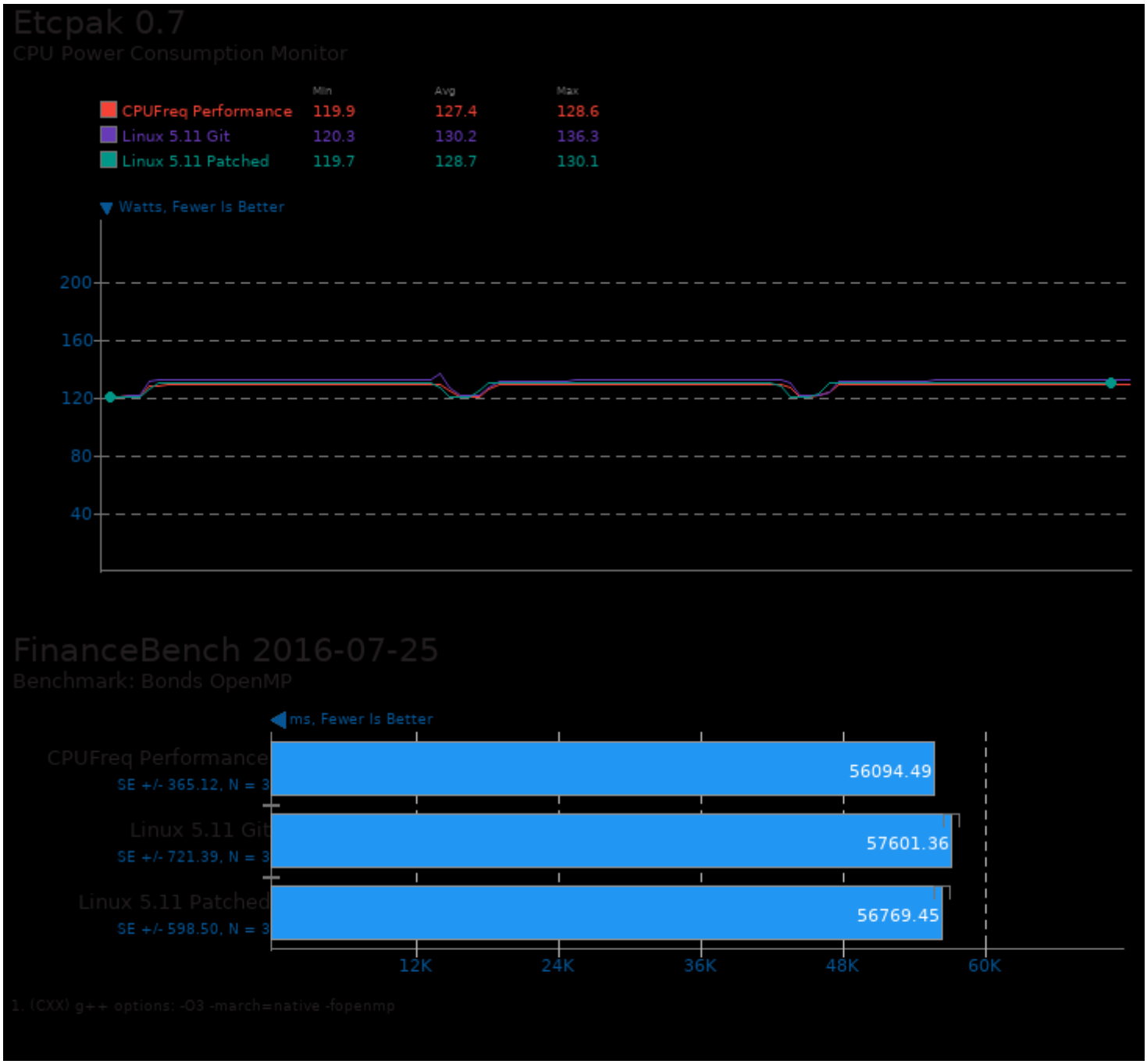


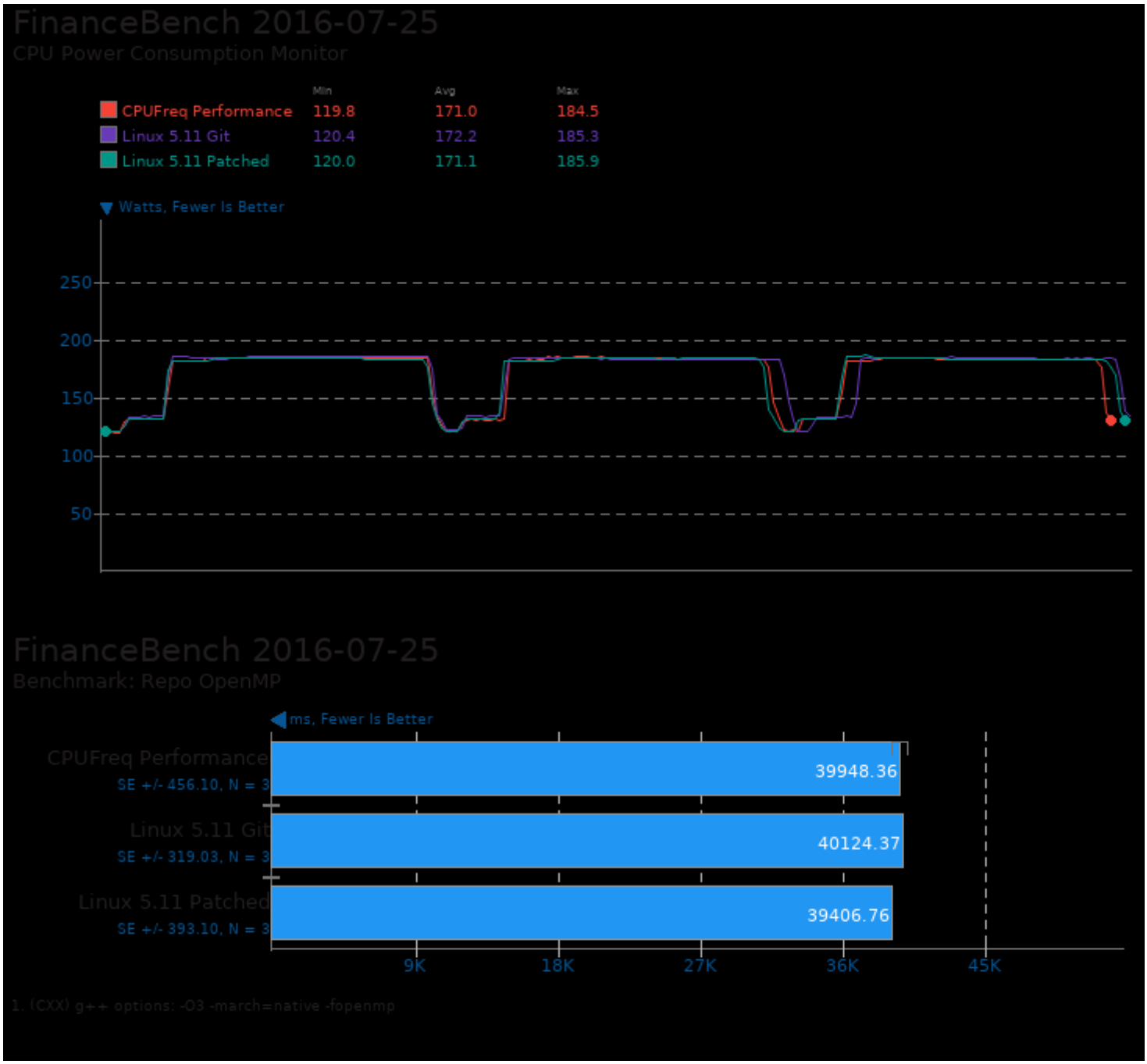
1. (CXX) g++ options: -O3 -march=native -std=c++11 -lpthread

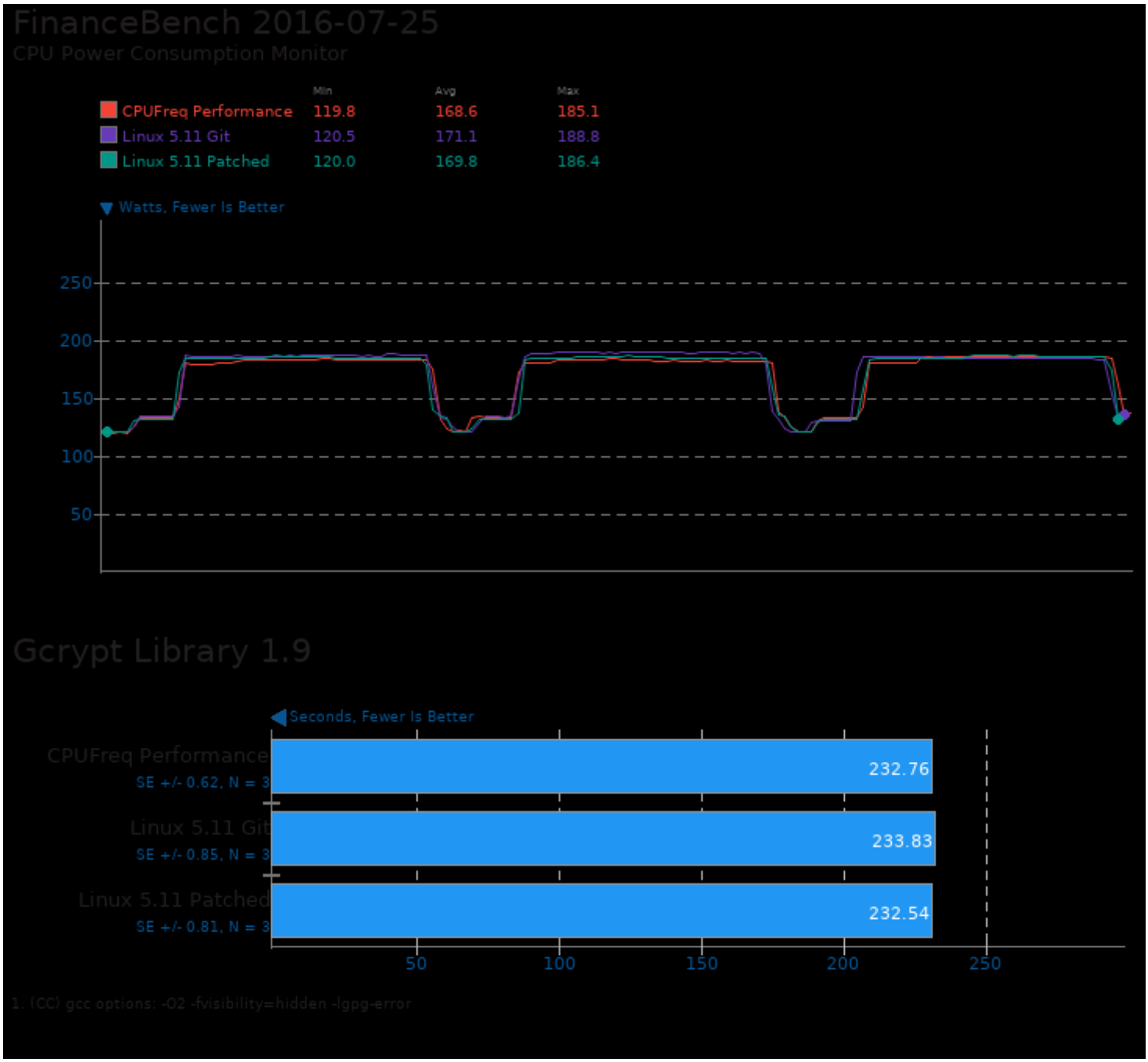
Etcpak 0.7

Configuration: ETC2

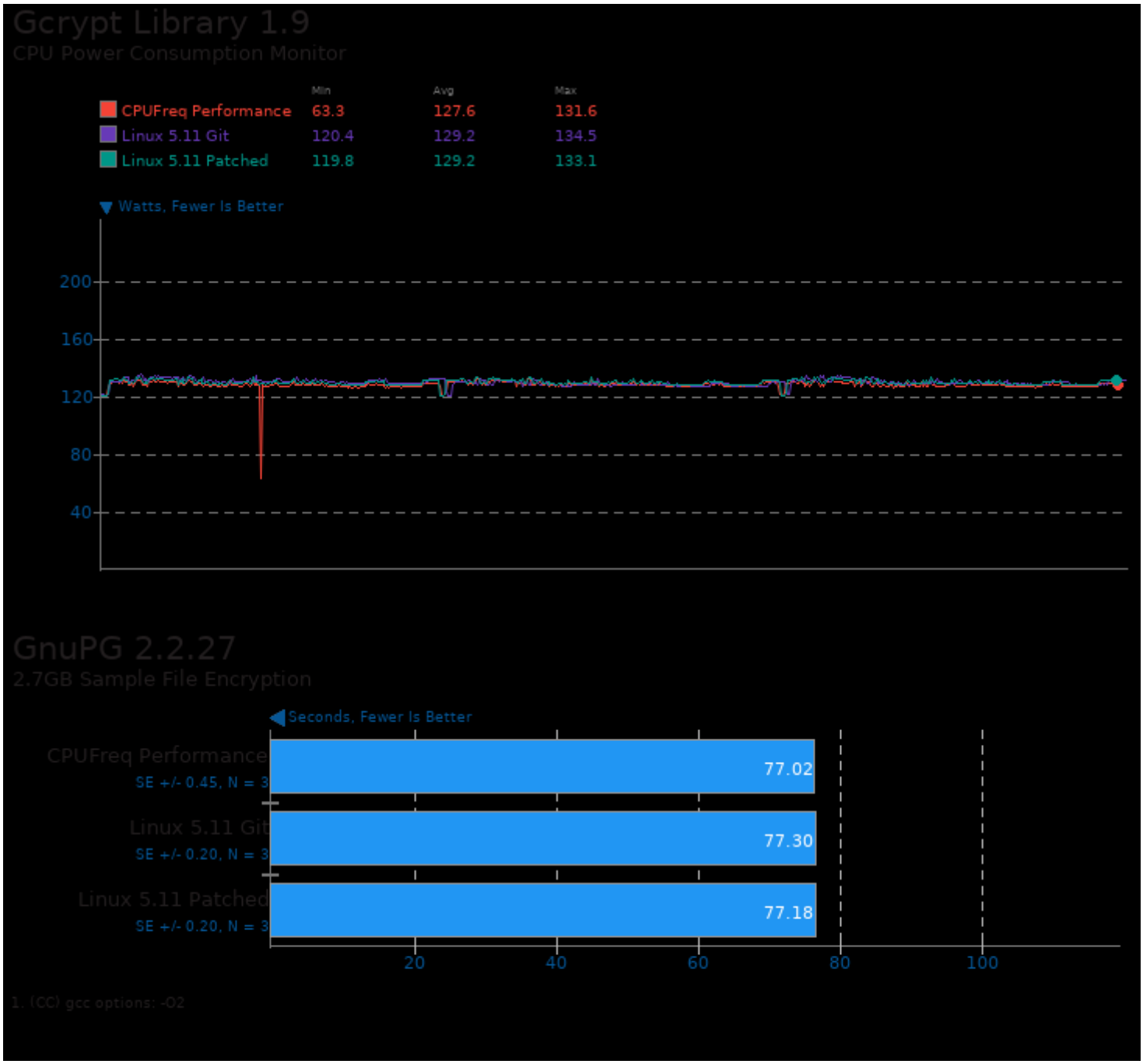



Etcpak 0.7
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 119.9 127.4 128.6
Linux 5.11 Git 120.3 130.2 136.3
Linux 5.11 Patched 119.7 128.7 130.1
Watts, Fewer Is Better
200
160
120
80
40
FinanceBench 2016-07-25
Benchmark: Bonds OpenMP
ms, Fewer Is Better
CPUFreq Performance
SE +/- 365.12, N = 3
56094.49
Linux 5.11 Git
SE +/- 721.39, N = 3
57601.36
Linux 5.11 Patched
SE +/- 598.50, N = 3
56769.45
12K
24K
36K
48K
60K
1. (CXX) g++ options: -O3 -march=native -fopenmp


FinanceBench 2016-07-25
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 119.8 171.0 184.5
Linux 5.11 Git 120.4 172.2 185.3
Linux 5.11 Patched 120.0 171.1 185.9
Watts, Fewer Is Better
250
200
150
100
50
FinanceBench 2016-07-25
Benchmark: Repo OpenMP
ms, Fewer Is Better
CPUFreq Performance
SE +/- 456.10, N = 3
39948.36
Linux 5.11 Git
SE +/- 319.03, N = 3
40124.37
Linux 5.11 Patched
SE +/- 393.10, N = 3
39406.76
9K
18K
27K
36K
45K
1. (CXX) g++ options: -O3 -march=native -fopenmp


FinanceBench 2016-07-25
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 119.8 168.6 185.1
Linux 5.11 Git 120.5 171.1 188.8
Linux 5.11 Patched 120.0 169.8 186.4
Watts, Fewer Is Better
250
200
150
100
50
Gcrypt Library 1.9
Seconds, Fewer Is Better
CPUFreq Performance
SE +/- 0.62, N = 3
232.76
Linux 5.11 Git
SE +/- 0.85, N = 3
233.83
Linux 5.11 Patched
SE +/- 0.81, N = 3
232.54
50
100
150
200
250
1. (CC) gcc options: -O2 -fvisibility=hidden -lgpg-error

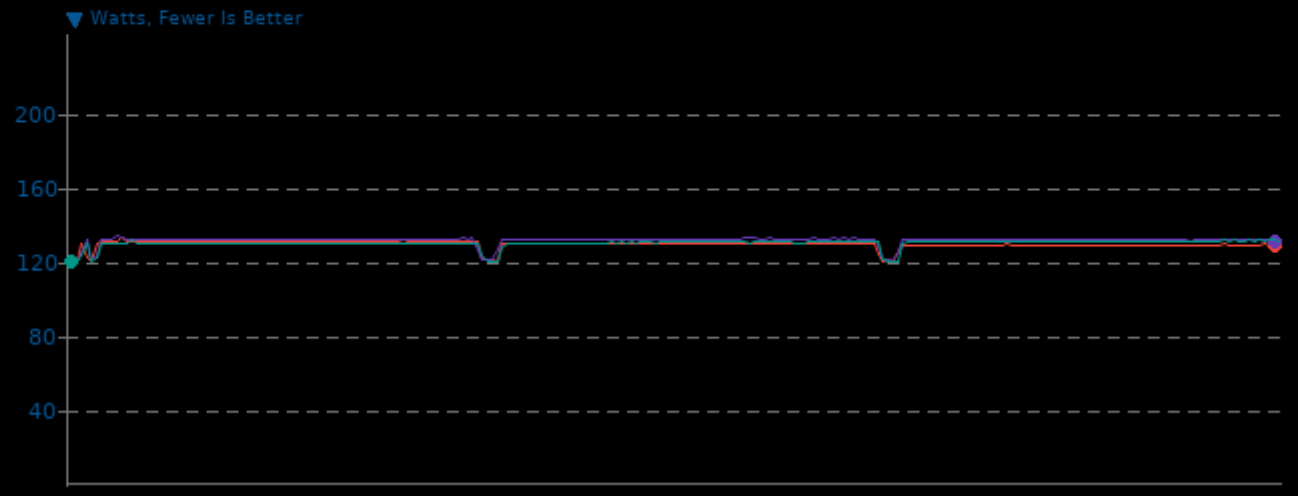
AMD EPYC 7F72 2P Linux 5.11 Perf Governor



GnuPG 2.2.27

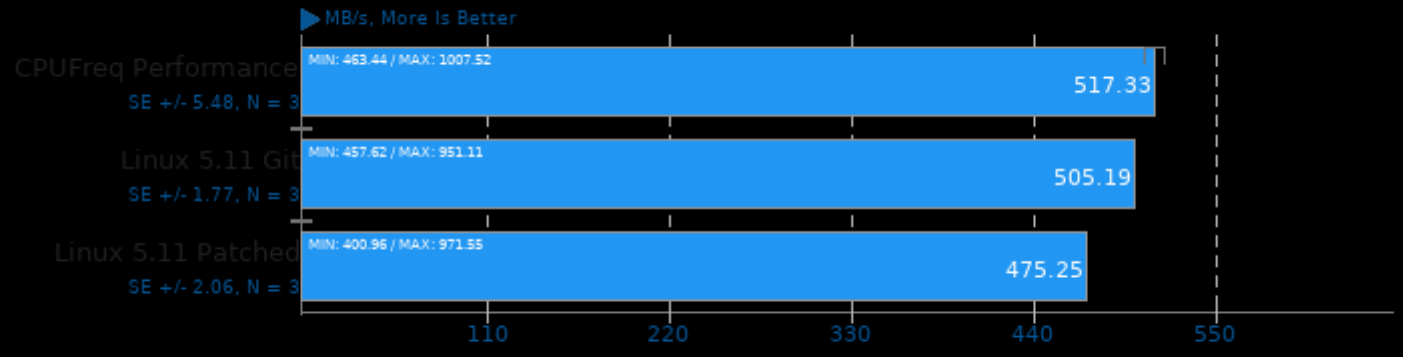
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	119.8	129.3	132.4
Linux 5.11 Git	120.4	131.3	133.6
Linux 5.11 Patched	119.9	129.8	131.4



IOR 3.3.0

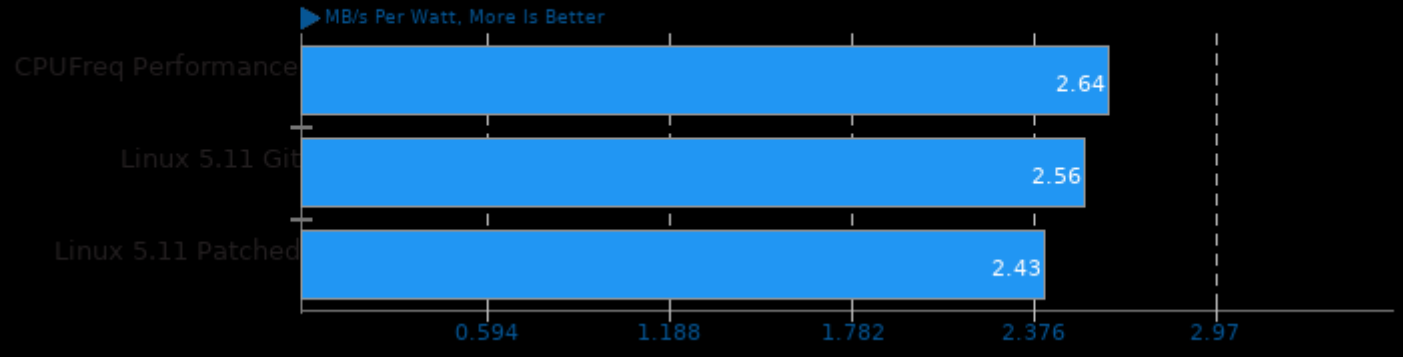
Block Size: 2MB - Disk Target: Default Test Directory

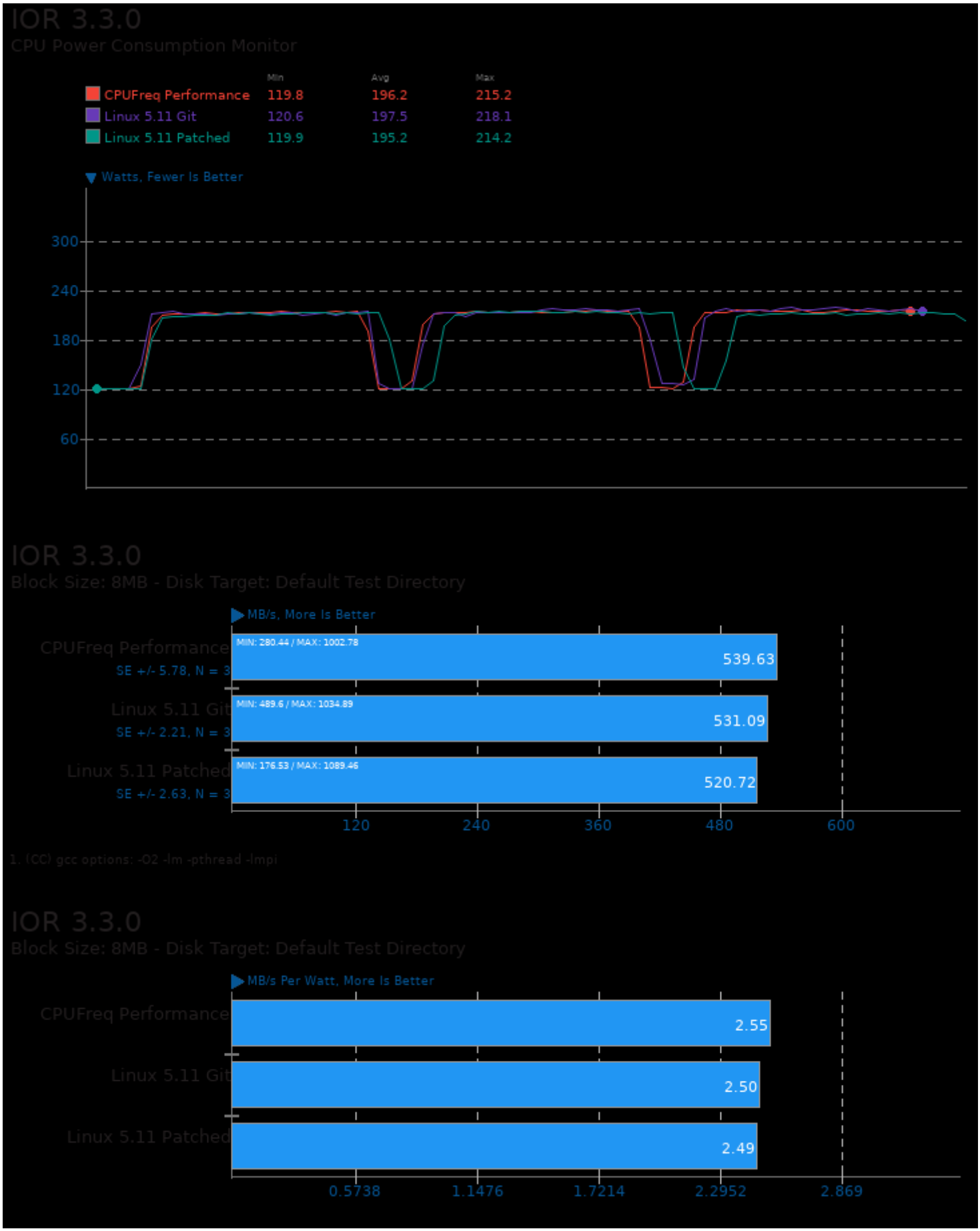


1. (CC) gcc options: -O2 -lm -pthread -lmpi

IOR 3.3.0

Block Size: 2MB - Disk Target: Default Test Directory




IOR 3.3.0
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 119.8 196.2 215.2
Linux 5.11 Git 120.6 197.5 218.1
Linux 5.11 Patched 119.9 195.2 214.2
Watts, Fewer Is Better
300
240
180
120
60
IOR 3.3.0
Block Size: 8MB - Disk Target: Default Test Directory
MB/s, More Is Better
CPUFreq Performance
SE +/- 5.78, N = 3
MIN: 280.44 / MAX: 1002.78
539.63
Linux 5.11 Git
SE +/- 2.21, N = 3
MIN: 489.6 / MAX: 1034.89
531.09
Linux 5.11 Patched
SE +/- 2.63, N = 3
MIN: 176.53 / MAX: 1089.46
520.72
120
240
360
480
600
1. (CC) gcc options: -O2 -lm -pthread -lmpi
IOR 3.3.0
Block Size: 8MB - Disk Target: Default Test Directory
MB/s Per Watt, More Is Better
CPUFreq Performance
2.55
Linux 5.11 Git
2.50
Linux 5.11 Patched
2.49
0.5738
1.1476
1.7214
2.2952
2.869

IOR 3.3.0

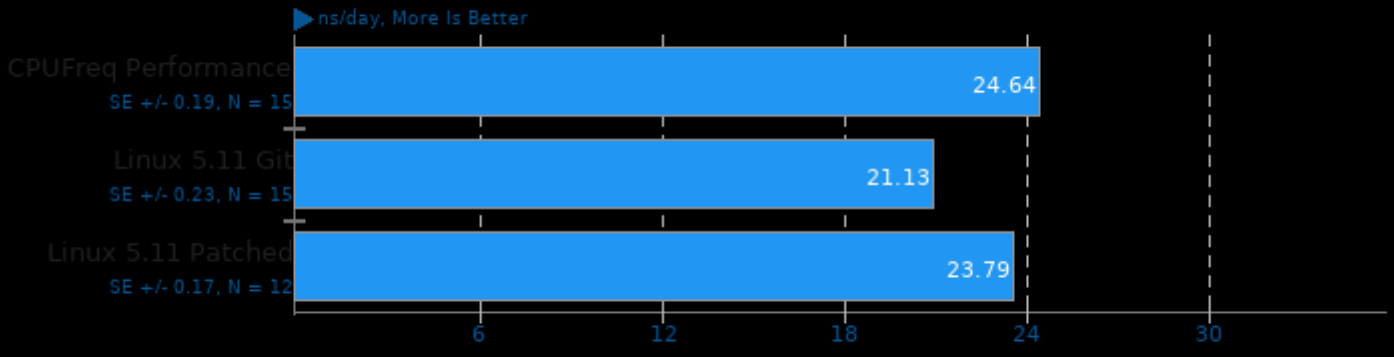
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	120.4	211.4	225.0
Linux 5.11 Git	121.2	212.4	225.0
Linux 5.11 Patched	120.5	209.5	223.9



LAMMPS Molecular Dynamics Simulator 29Oct2020

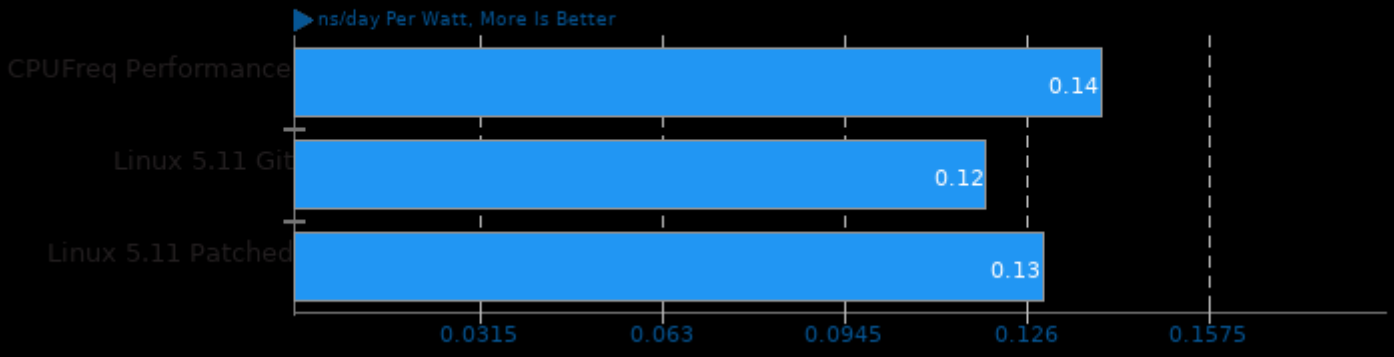
Model: Rhodopsin Protein



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

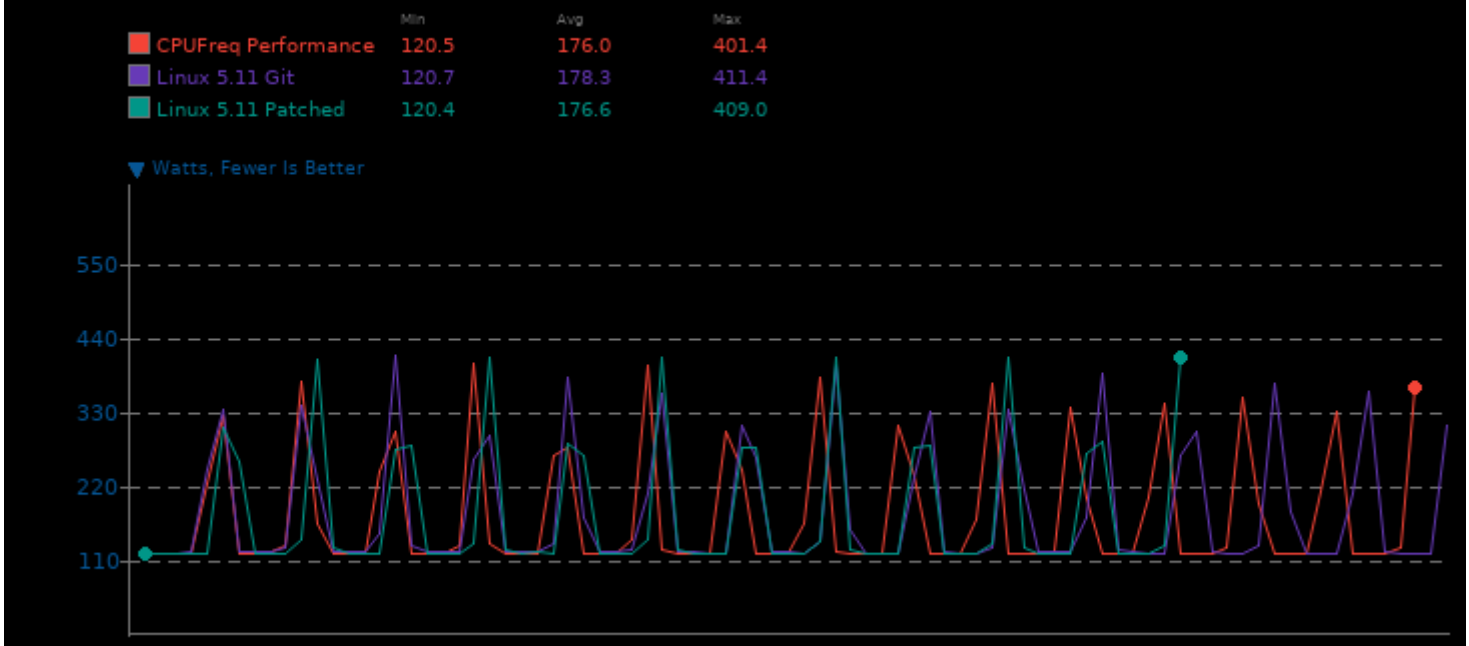
LAMMPS Molecular Dynamics Simulator 29Oct2020

Model: Rhodopsin Protein



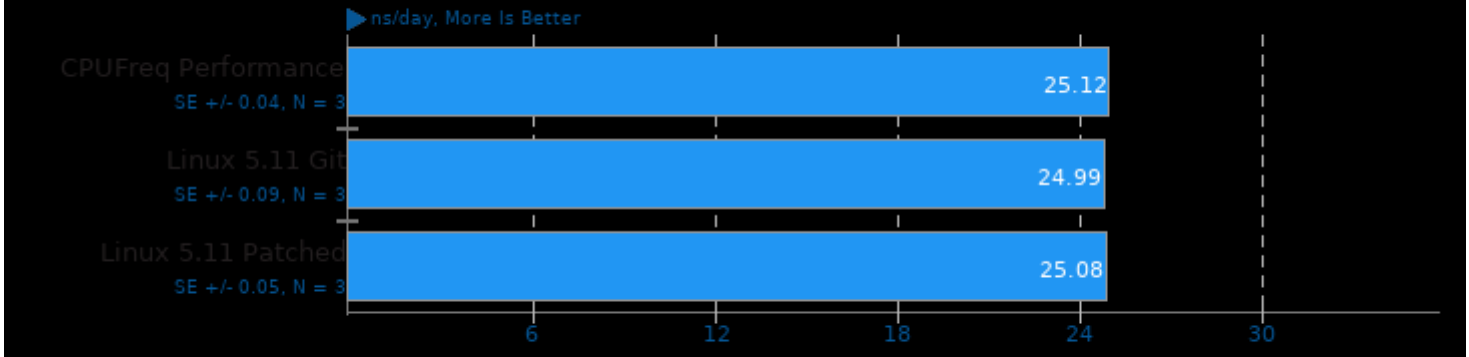
LAMMPS Molecular Dynamics Simulator 29Oct2020

CPU Power Consumption Monitor



LAMMPS Molecular Dynamics Simulator 29Oct2020

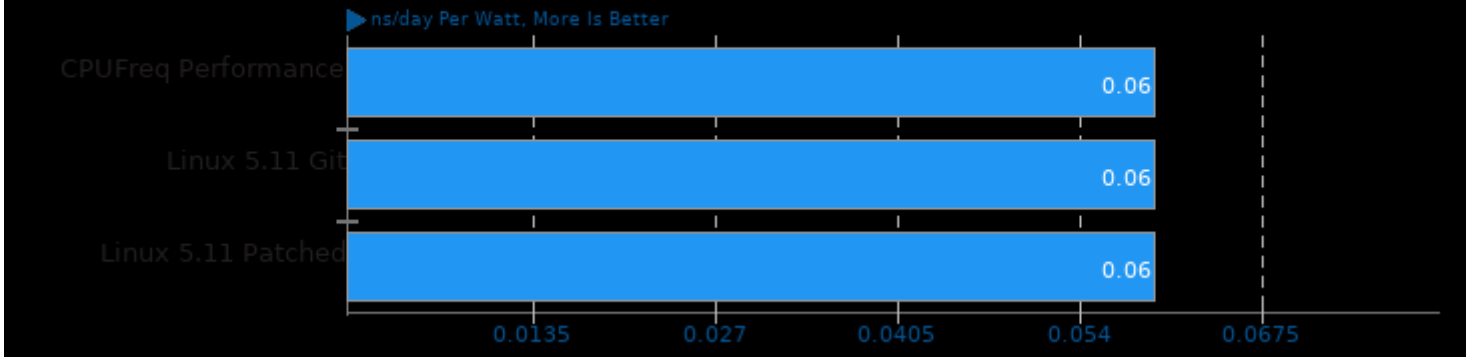
Model: 20k Atoms



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

LAMMPS Molecular Dynamics Simulator 29Oct2020

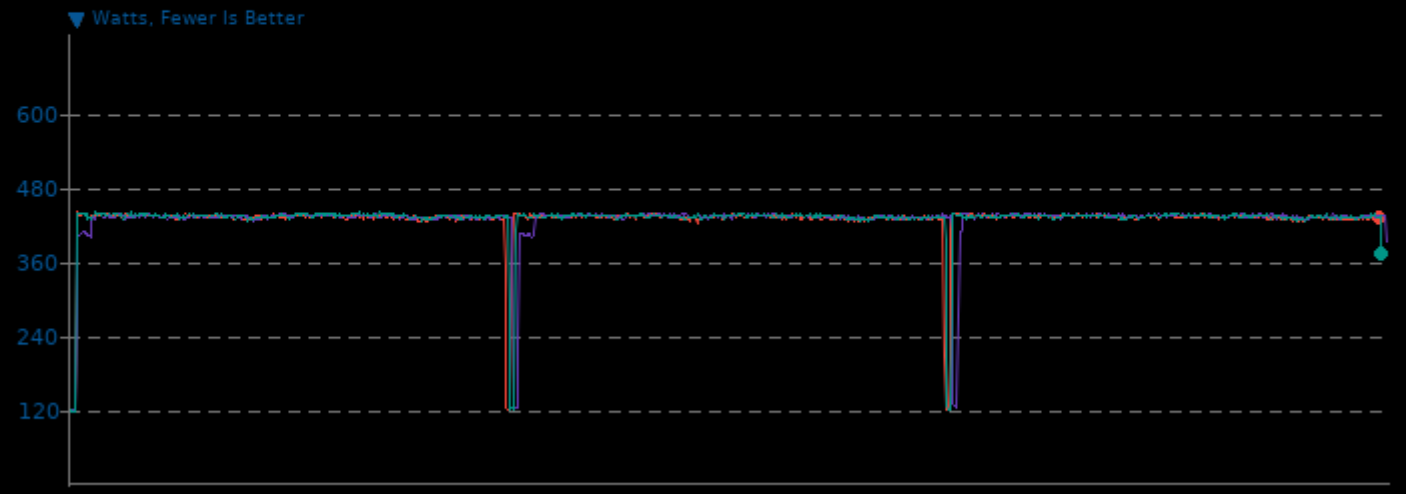
Model: 20k Atoms



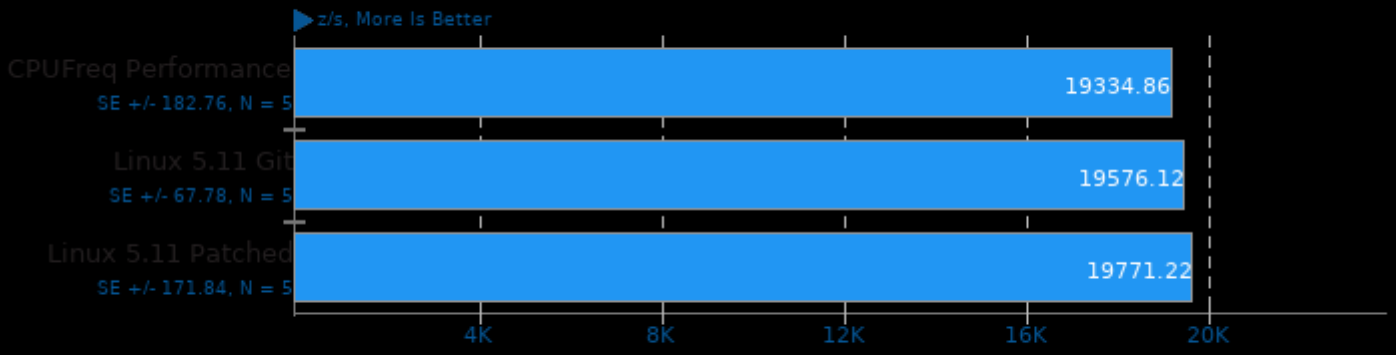
LAMMPS Molecular Dynamics Simulator 29Oct2020

CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	120.0	427.6	439.3
Linux 5.11 Git	120.4	427.7	438.6
Linux 5.11 Patched	119.9	428.6	441.7

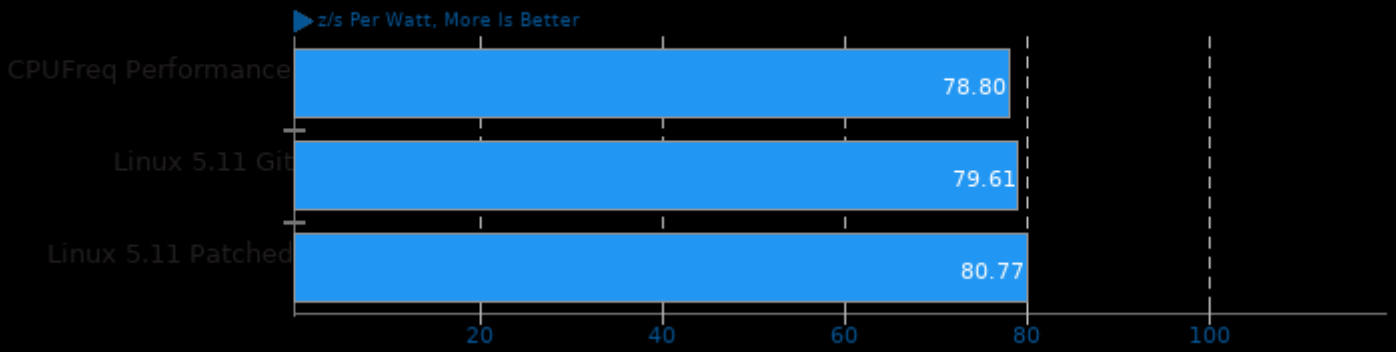


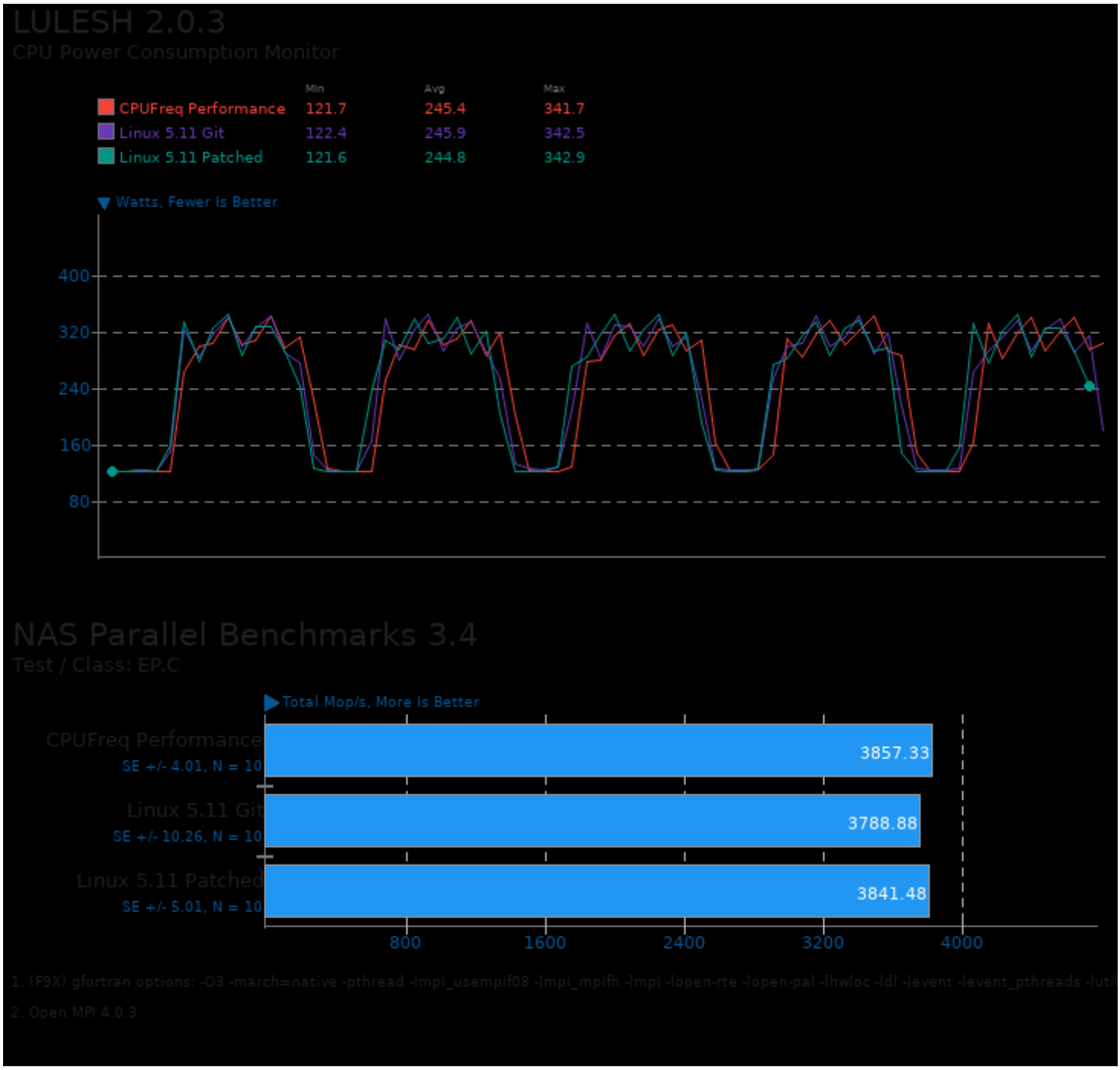
LULESH 2.0.3

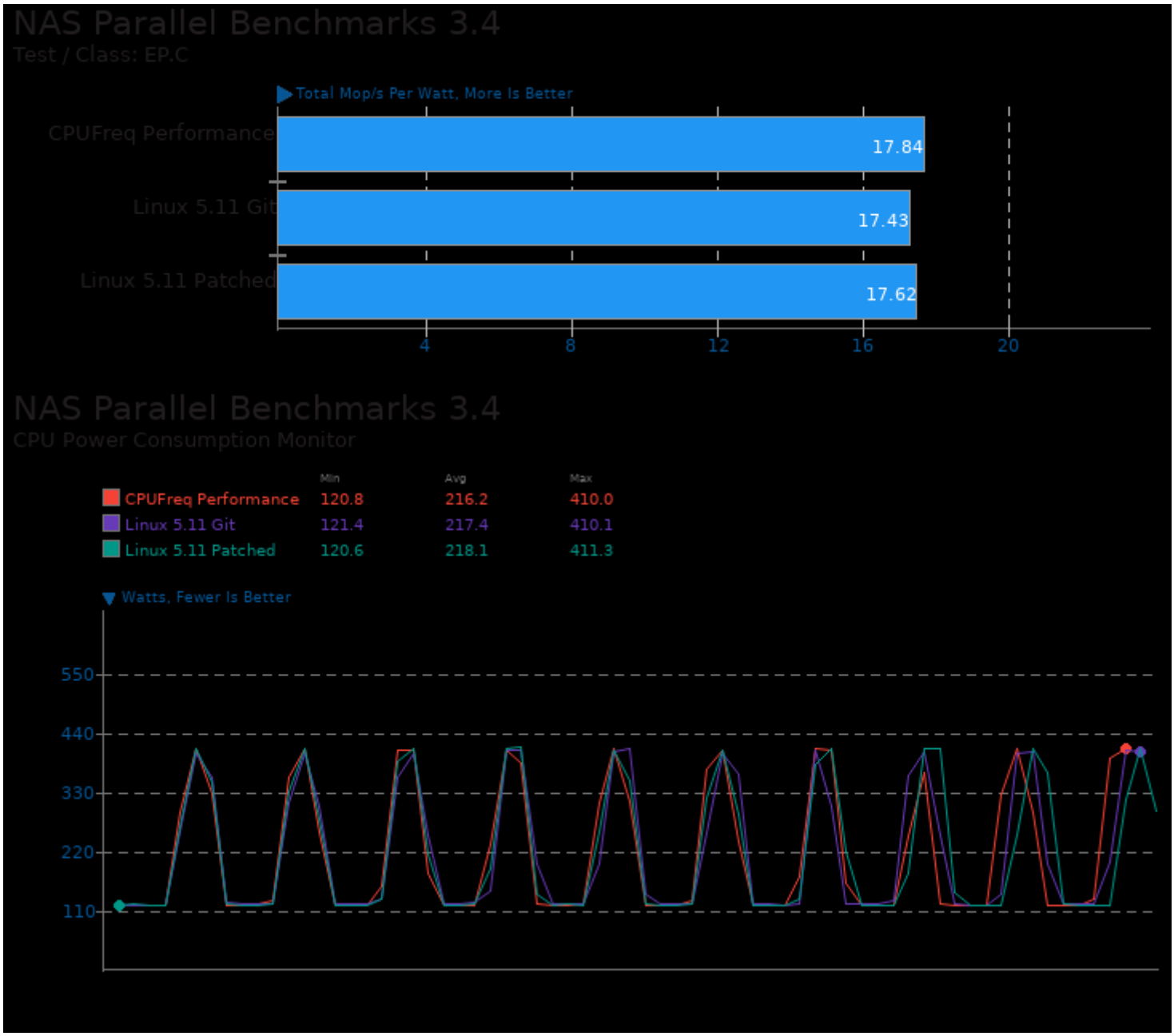


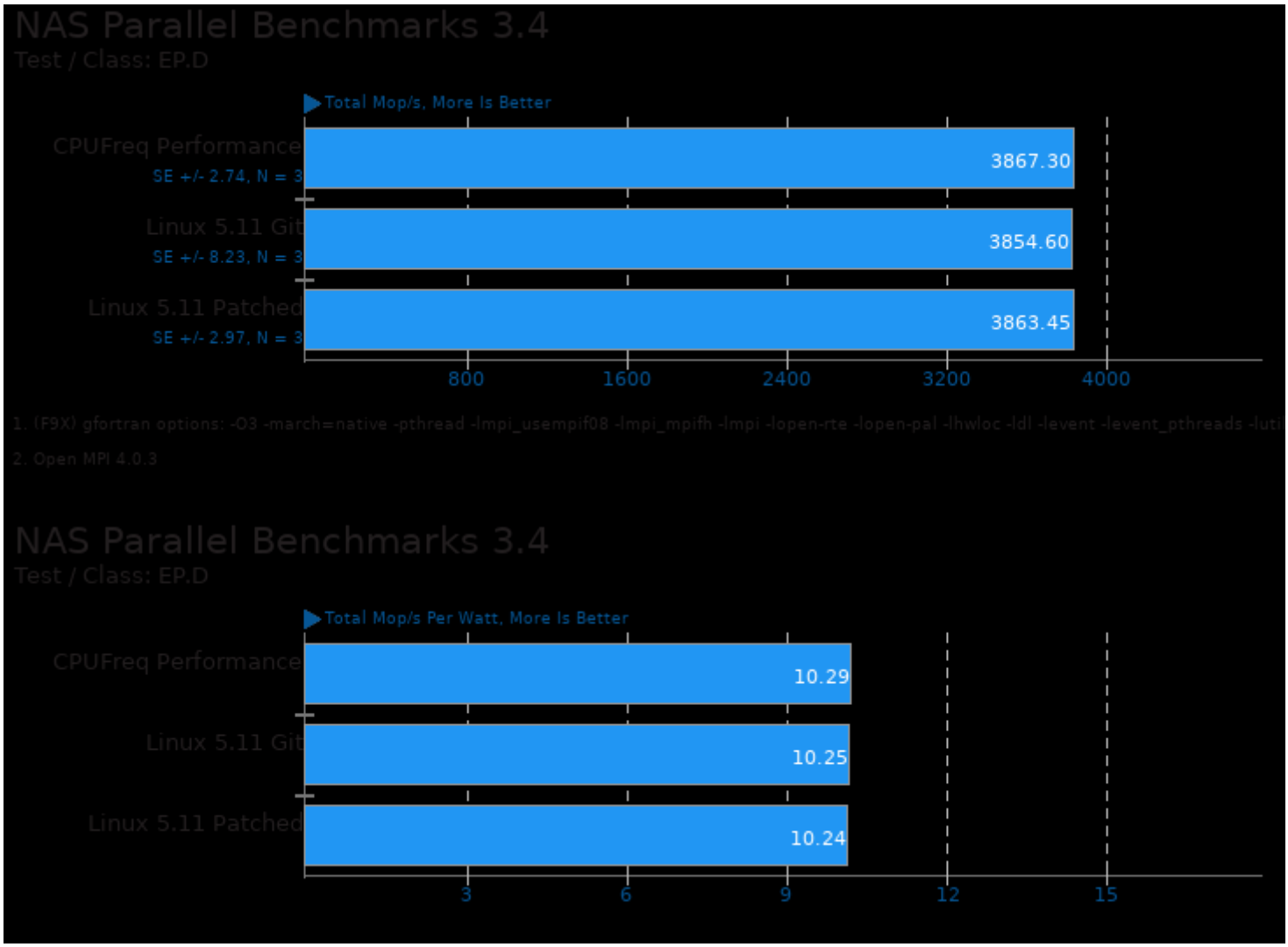
1. (CXX) g++ options: -O3 -fopenmp -lm -pthread -lmpi_cxx -lmpi

LULESH 2.0.3

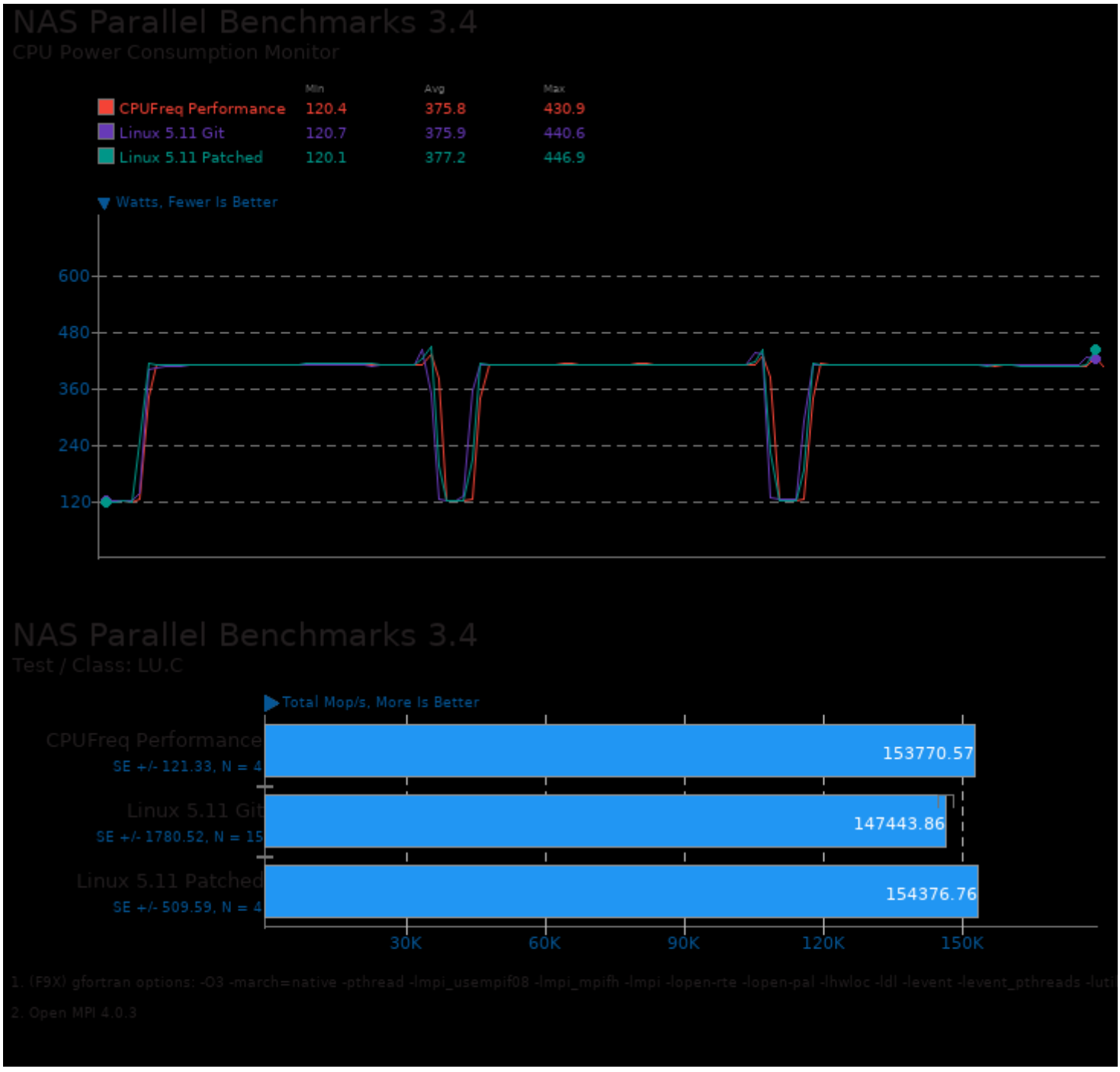



LULESH 2.0.3
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 121.7 245.4 341.7
Linux 5.11 Git 122.4 245.9 342.5
Linux 5.11 Patched 121.6 244.8 342.9
Watts, Fewer Is Better
400
320
240
160
80
NAS Parallel Benchmarks 3.4
Test / Class: EP.C
Total Mop/s, More Is Better
CPUFreq Performance
SE +/- 4.01, N = 10
3857.33
Linux 5.11 Git
SE +/- 10.26, N = 10
3788.88
Linux 5.11 Patched
SE +/- 5.01, N = 10
3841.48
800
1600
2400
3200
4000
1. (F9X) gfortran options: -O3 -march=native -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi -lopen-rte -lopen-pal -lhwloc -ldl -levent -levent_pthreads -luti
2. Open MPI 4.0.3


NAS Parallel Benchmarks 3.4
Test / Class: EP.C
Total Mop/s Per Watt, More Is Better
CPUFreq Performance
Linux 5.11 Git
Linux 5.11 Patched
17.84
17.43
17.62
4
8
12
16
20
NAS Parallel Benchmarks 3.4
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.8 216.2 410.0
Linux 5.11 Git 121.4 217.4 410.1
Linux 5.11 Patched 120.6 218.1 411.3
Watts, Fewer Is Better
550
440
330
220
110

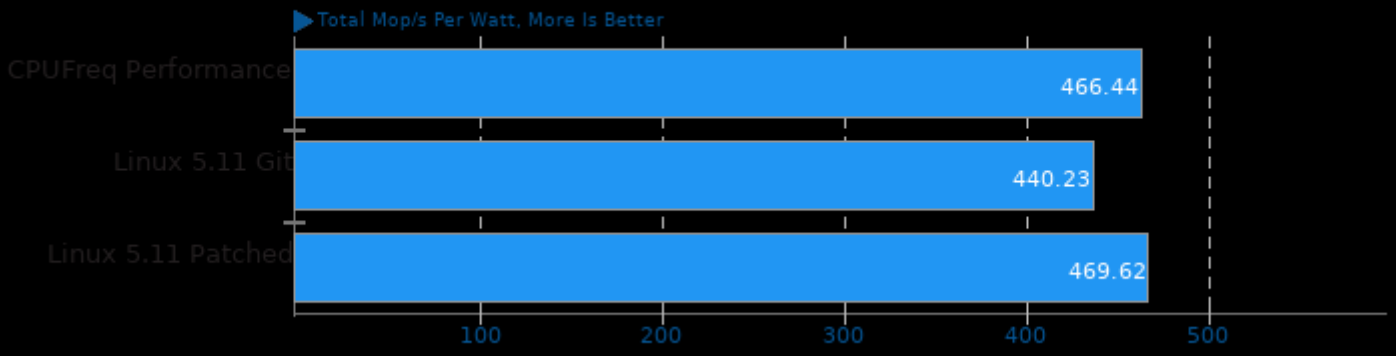

NAS Parallel Benchmarks 3.4
Test / Class: EP.D
Total Mop/s, More Is Better
CPUFreq Performance
SE +/- 2.74, N = 3
3867.30
Linux 5.11 Git
SE +/- 8.23, N = 3
3854.60
Linux 5.11 Patched
SE +/- 2.97, N = 3
3863.45
800
1600
2400
3200
4000
1. (F9X) gfortran options: -O3 -march=native -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi -lopen-rte -lopen-pal -lhwloc -ldl -levent -levent_pthreads -luti
2. Open MPI 4.0.3

NAS Parallel Benchmarks 3.4
Test / Class: EP.D
Total Mop/s Per Watt, More Is Better
CPUFreq Performance
10.29
Linux 5.11 Git
10.25
Linux 5.11 Patched
10.24
3
6
9
12
15


NAS Parallel Benchmarks 3.4
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.4 375.8 430.9
Linux 5.11 Git 120.7 375.9 440.6
Linux 5.11 Patched 120.1 377.2 446.9
Watts, Fewer Is Better
600
480
360
240
120
NAS Parallel Benchmarks 3.4
Test / Class: LU.C
Total Mop/s, More Is Better
CPUFreq Performance
SE +/- 121.33, N = 4
153770.57
Linux 5.11 Git
SE +/- 1780.52, N = 15
147443.86
Linux 5.11 Patched
SE +/- 509.59, N = 4
154376.76
30K
60K
90K
120K
150K
1. (F9X) gfortran options: -O3 -march=native -pthread -lmpi_usempif08 -lmpi_mpifh -lmpi -lopen-rte -lopen-pal -lhwloc -ldl -levent -levent_pthreads -luti
2. Open MPI 4.0.3

NAS Parallel Benchmarks 3.4

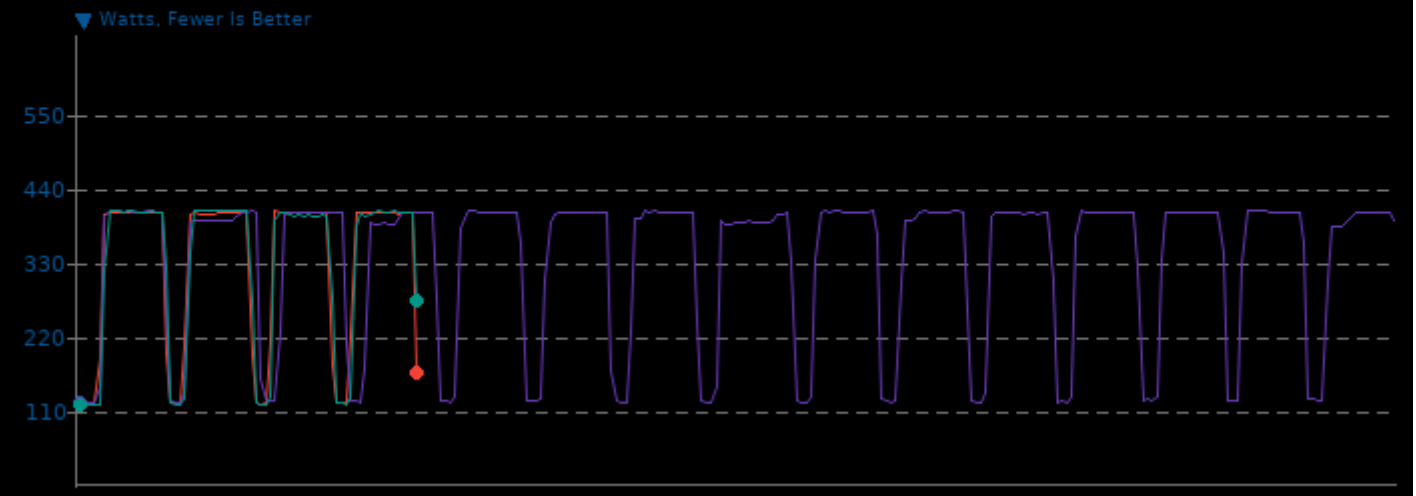
Test / Class: LU.C



NAS Parallel Benchmarks 3.4

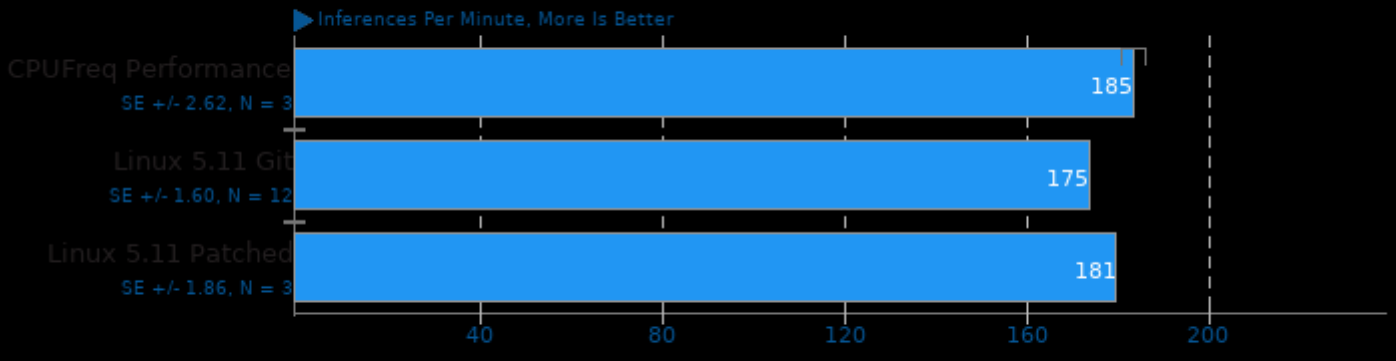
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	121.1	329.7	405.5
Linux 5.11 Git	122.6	334.9	407.9
Linux 5.11 Patched	121.0	328.7	407.9



ONNX Runtime 1.6

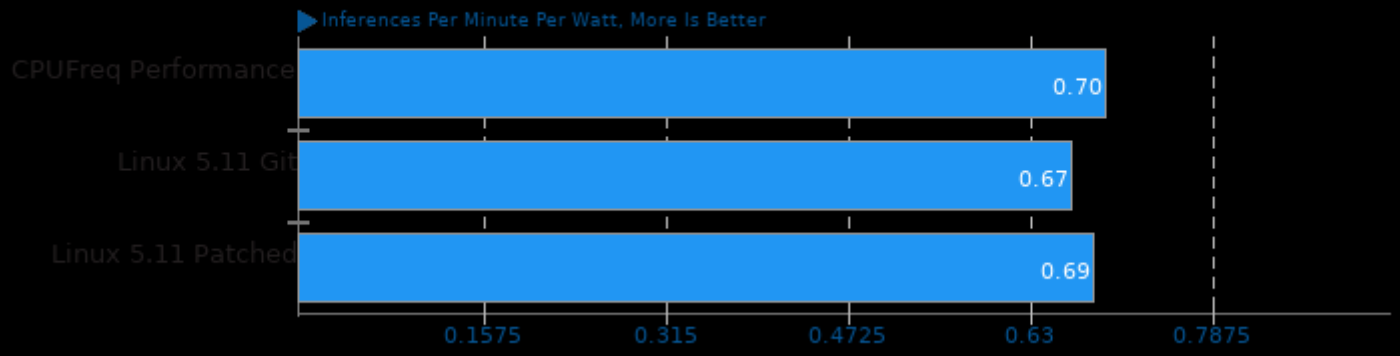
Model: yolov4 - Device: OpenMP CPU



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

ONNX Runtime 1.6

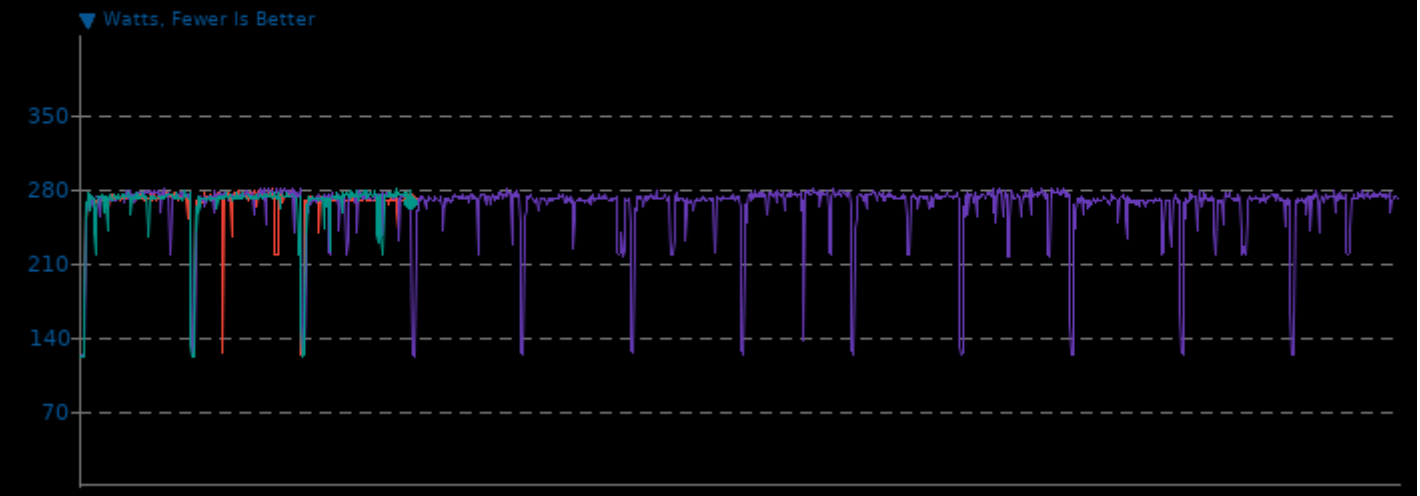
Model: yolov4 - Device: OpenMP CPU



ONNX Runtime 1.6

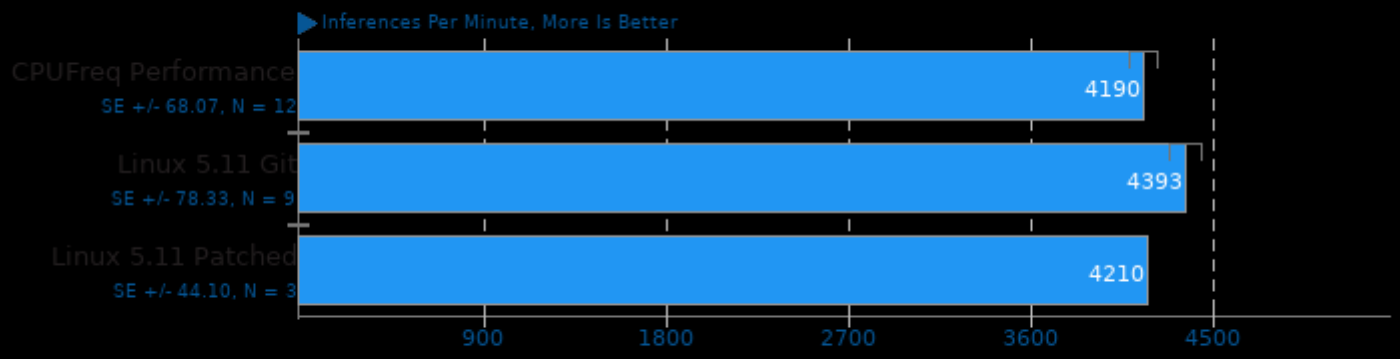
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	121.3	263.5	278.7
Linux 5.11 Git	122.5	262.9	279.9
Linux 5.11 Patched	121.1	263.9	279.9

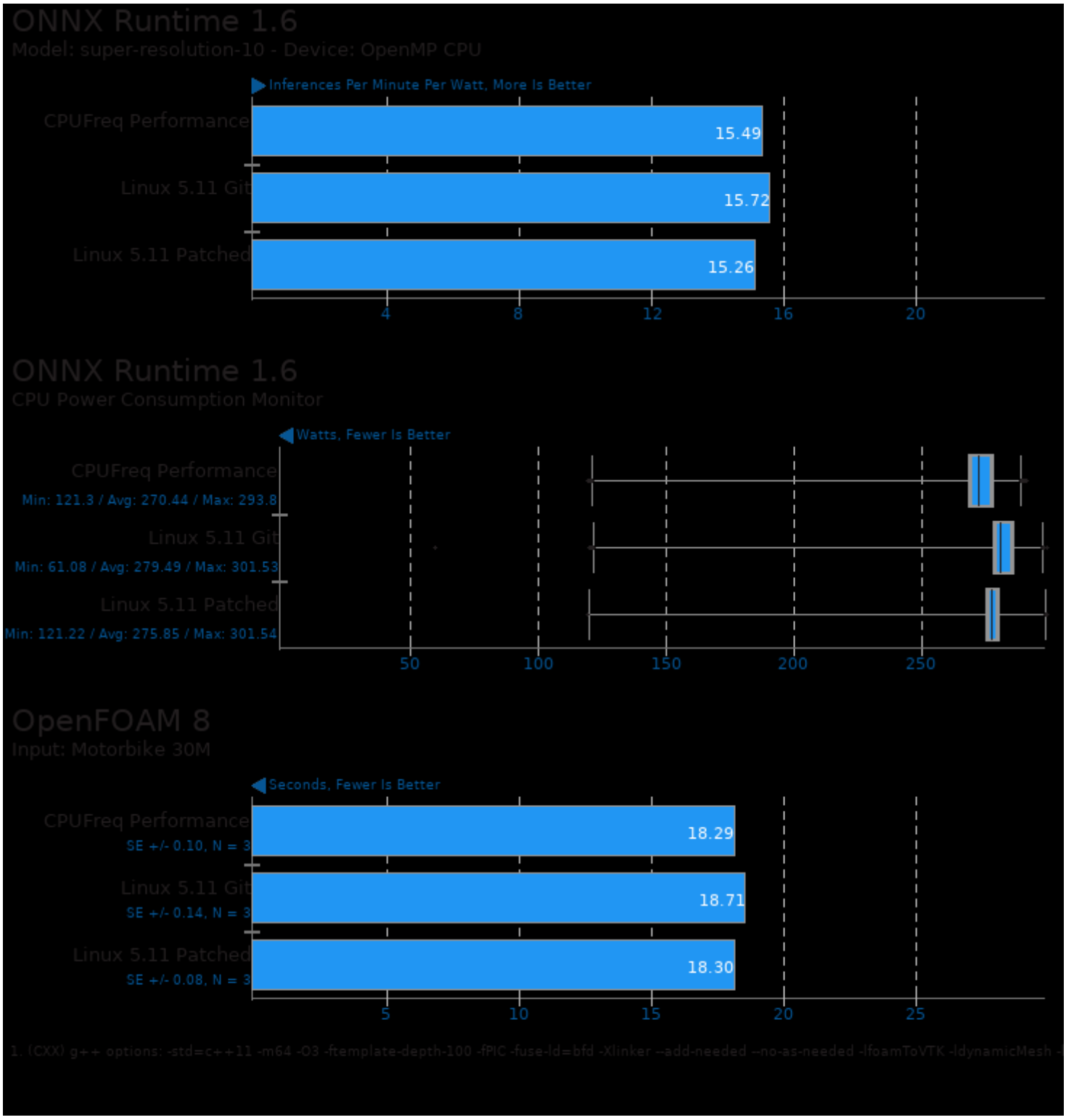


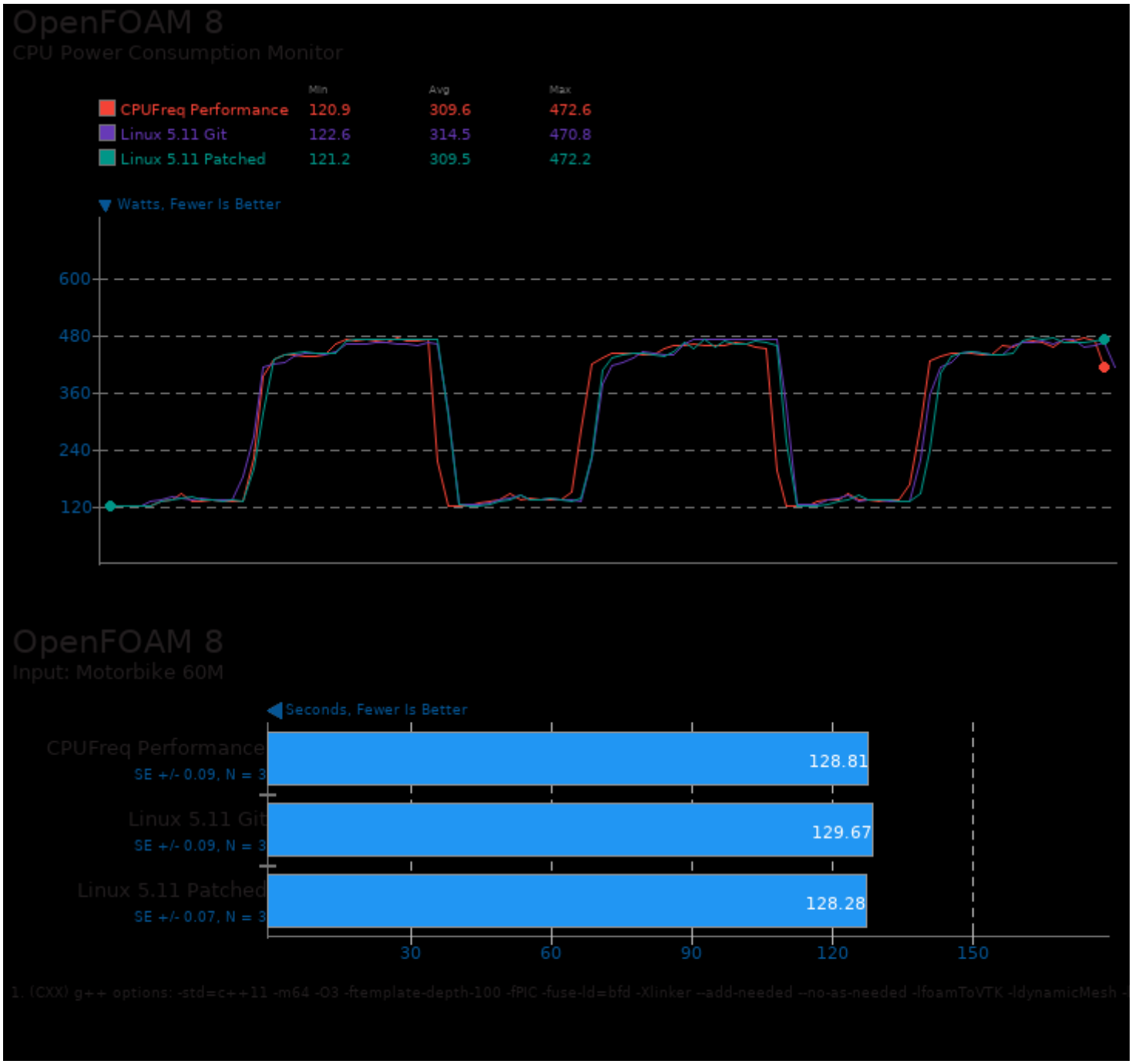
ONNX Runtime 1.6

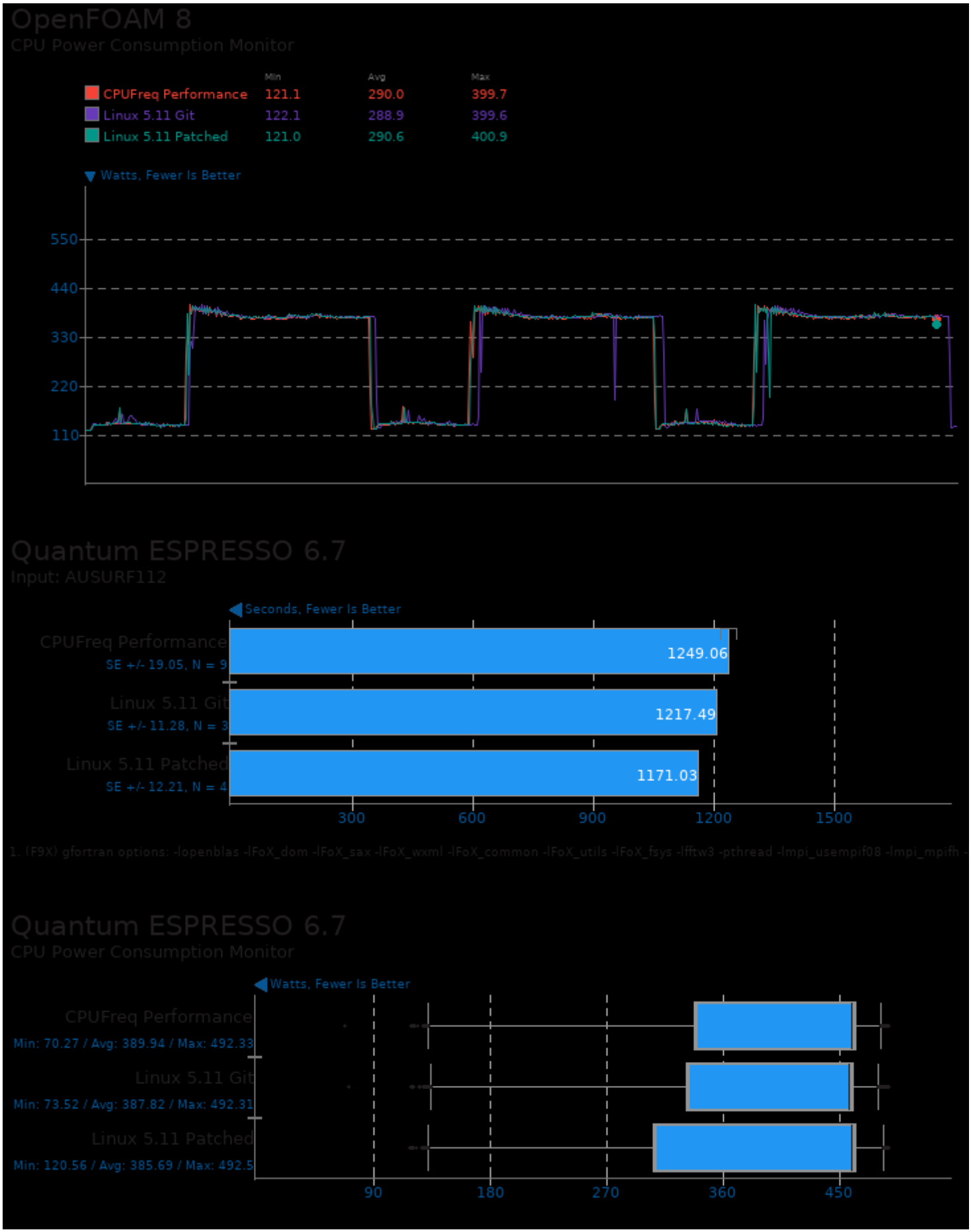
Model: super-resolution-10 - Device: OpenMP CPU

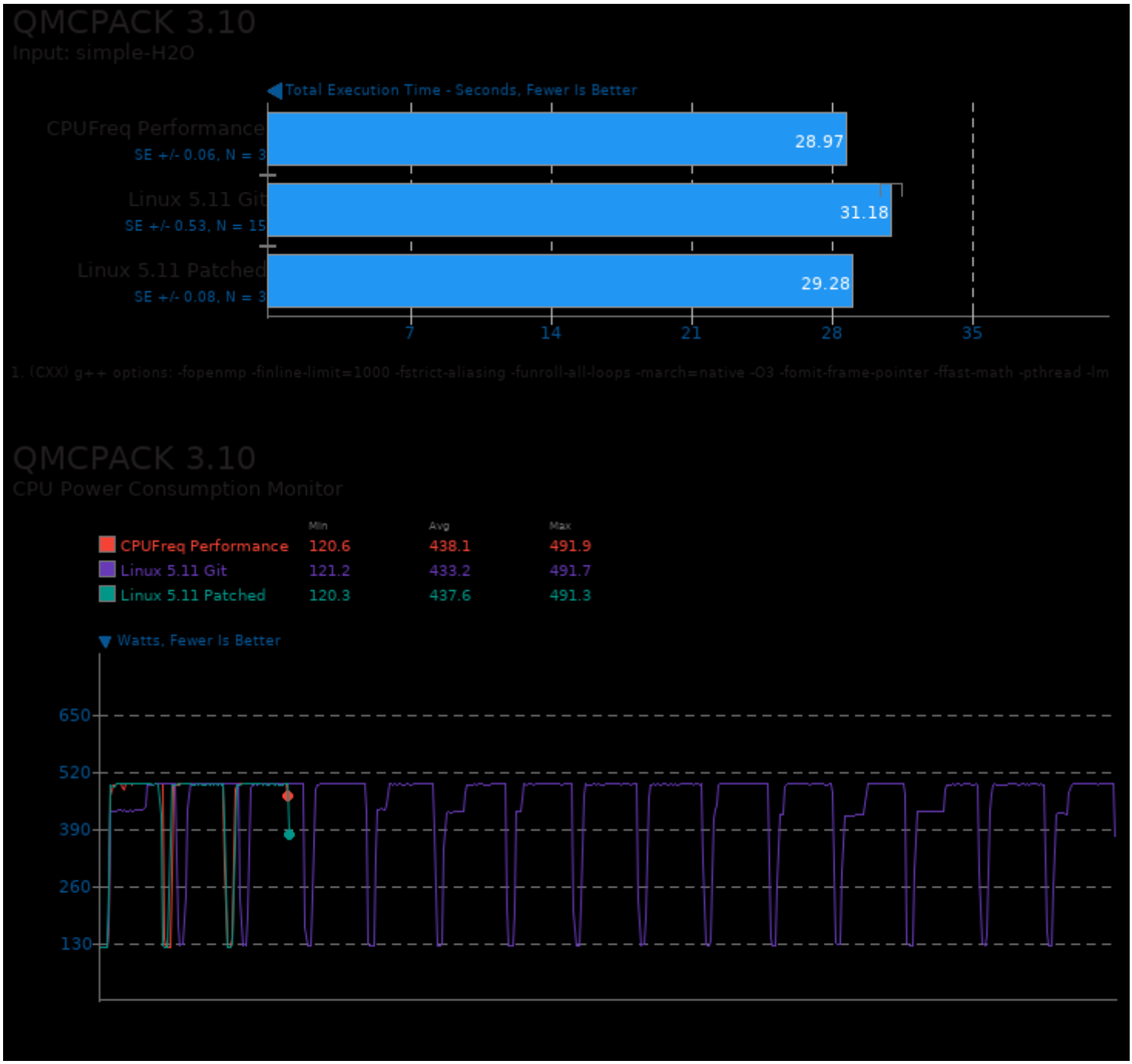


1. (CXX) g++ options: -fopenmp -ffunction-sections -fdata-sections -O3 -ldl -lrt

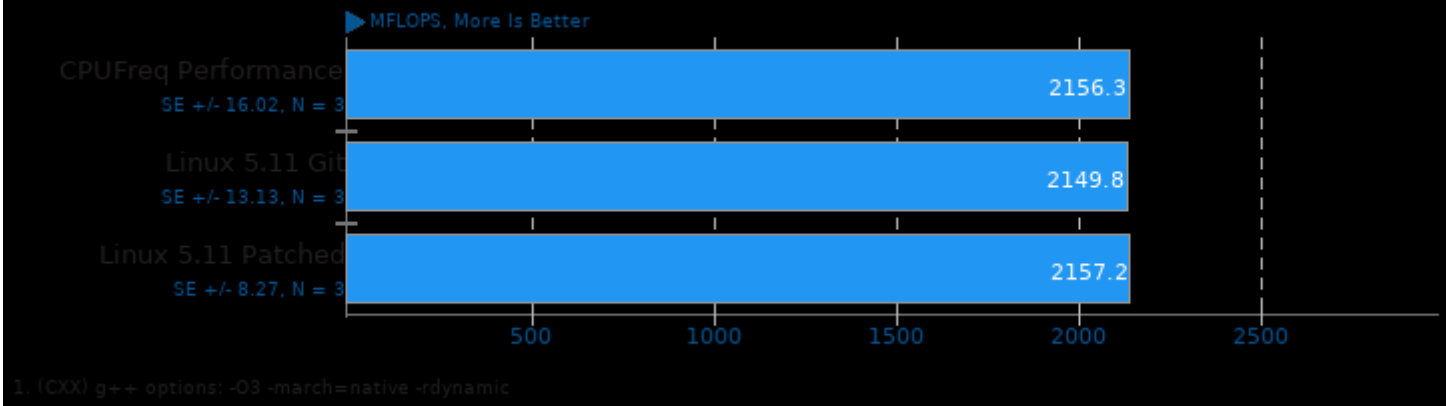

ONNX Runtime 1.6
Model: super-resolution-10 - Device: OpenMP CPU
Inferences Per Minute Per Watt, More Is Better
CPUFreq Performance
15.49
Linux 5.11 Git
15.72
Linux 5.11 Patched
15.26
4
8
12
16
20
ONNX Runtime 1.6
CPU Power Consumption Monitor
Watts, Fewer Is Better
CPUFreq Performance
Min: 121.3 / Avg: 270.44 / Max: 293.8
Linux 5.11 Git
Min: 61.08 / Avg: 279.49 / Max: 301.53
Linux 5.11 Patched
Min: 121.22 / Avg: 275.85 / Max: 301.54
50
100
150
200
250
OpenFOAM 8
Input: Motorbike 30M
Seconds, Fewer Is Better
CPUFreq Performance
SE +/- 0.10, N = 3
18.29
Linux 5.11 Git
SE +/- 0.14, N = 3
18.71
Linux 5.11 Patched
SE +/- 0.08, N = 3
18.30
5
10
15
20
25
1. (CXX) g++ options: -std=c++11 -m64 -O3 -ftemplate-depth-100 -fPIC -fuse-ld=bfd -Xlinker --add-needed --no-as-needed -lfoamToVTK -ldynamicMesh


OpenFOAM 8
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.9 309.6 472.6
Linux 5.11 Git 122.6 314.5 470.8
Linux 5.11 Patched 121.2 309.5 472.2
Watts, Fewer Is Better
600
480
360
240
120
OpenFOAM 8
Input: Motorbike 60M
Seconds, Fewer Is Better
CPUFreq Performance
SE +/- 0.09, N = 3
128.81
Linux 5.11 Git
SE +/- 0.09, N = 3
129.67
Linux 5.11 Patched
SE +/- 0.07, N = 3
128.28
30
60
90
120
150
1. (CXX) g++ options: -std=c++11 -m64 -O3 -ftemplate-depth-100 -fPIC -fuse-ld=bfd -Xlinker --add-needed --no-as-needed -lfoamToVTK -ldynamicMesh


OpenFOAM 8
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 121.1 290.0 399.7
Linux 5.11 Git 122.1 288.9 399.6
Linux 5.11 Patched 121.0 290.6 400.9
Watts, Fewer Is Better
550
440
330
220
110
Quantum ESPRESSO 6.7
Input: AUSURF112
Seconds, Fewer Is Better
CPUFreq Performance
SE +/- 19.05, N = 9
1249.06
Linux 5.11 Git
SE +/- 11.28, N = 3
1217.49
Linux 5.11 Patched
SE +/- 12.21, N = 4
1171.03
300
600
900
1200
1500
1. (F9X) gfortran options: -lopenblas -lFoX_dom -lFoX_sax -lFoX_wxml -lFoX_common -lFoX_utils -lFoX_fsys -lfftw3 -pthread -lmpi_usempif08 -lmpi_mpifh
Quantum ESPRESSO 6.7
CPU Power Consumption Monitor
Watts, Fewer Is Better
CPUFreq Performance
Min: 70.27 / Avg: 389.94 / Max: 492.33
Linux 5.11 Git
Min: 73.52 / Avg: 387.82 / Max: 492.31
Linux 5.11 Patched
Min: 120.56 / Avg: 385.69 / Max: 492.5
90
180
270
360
450

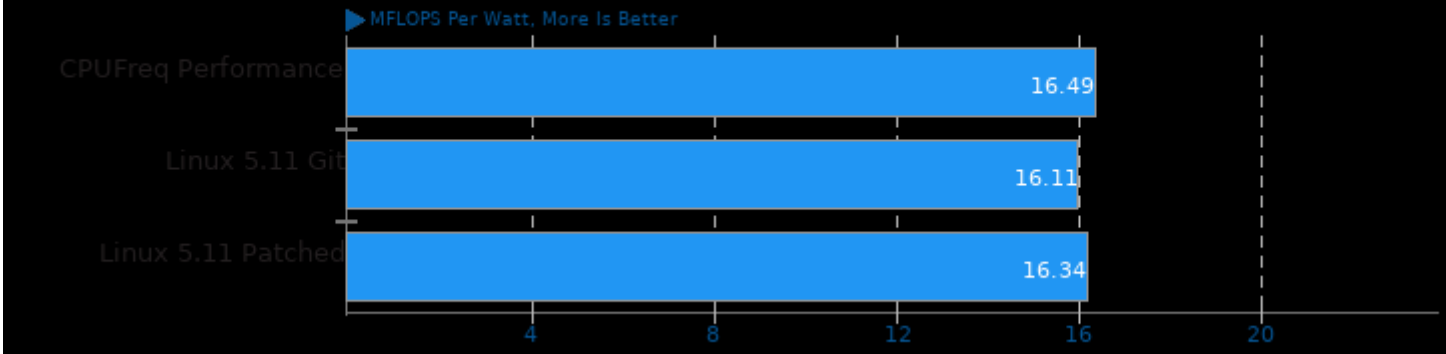

QMCPACK 3.10
Input: simple-H2O
Total Execution Time - Seconds, Fewer Is Better
CPUFreq Performance
SE +/- 0.06, N = 3
28.97
Linux 5.11 Git
SE +/- 0.53, N = 15
31.18
Linux 5.11 Patched
SE +/- 0.08, N = 3
29.28
7
14
21
28
35
1. (CXX) g++ options: -fopenmp -finline-limit=1000 -fstrict-aliasing -funroll-all-loops -march=native -O3 -fomit-frame-pointer -ffast-math -pthread -lm
QMCPACK 3.10
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.6 438.1 491.9
Linux 5.11 Git 121.2 433.2 491.7
Linux 5.11 Patched 120.3 437.6 491.3
Watts, Fewer Is Better
650
520
390
260
130

QuantLib 1.21



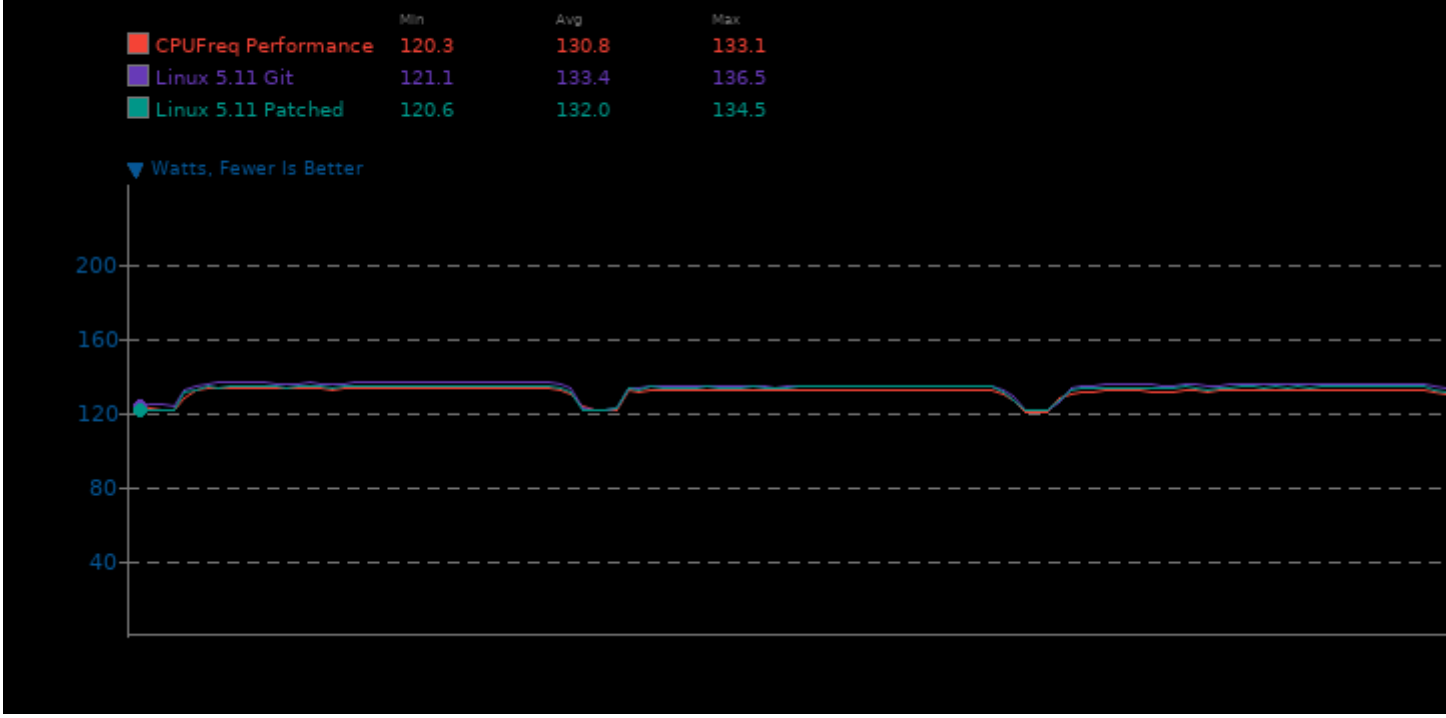
1. (CXX) g++ options: -O3 -march=native -rdynamic

QuantLib 1.21

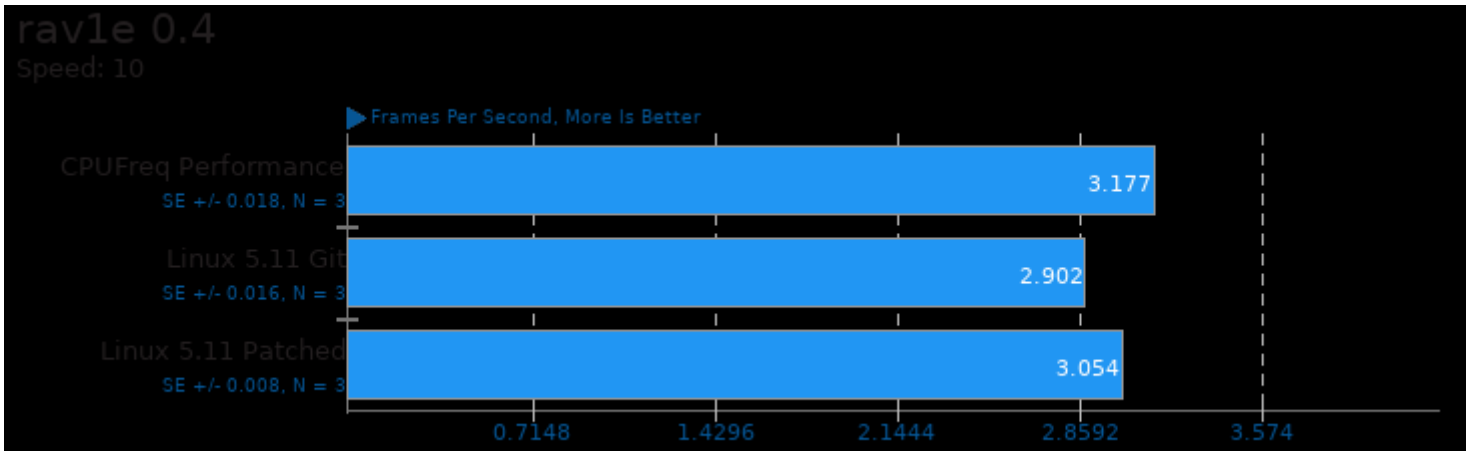


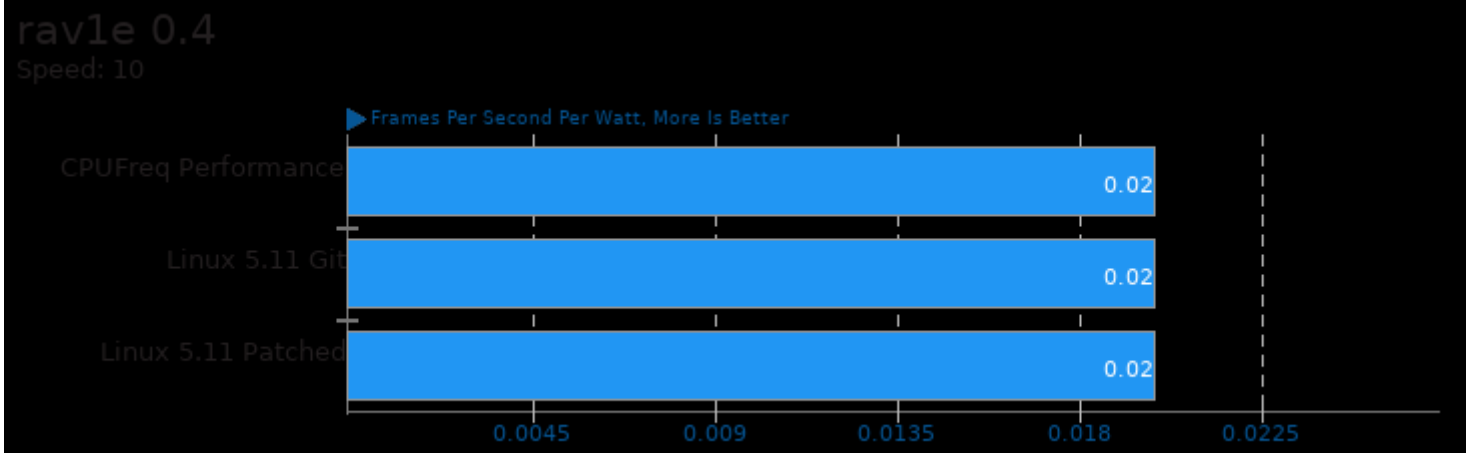
QuantLib 1.21

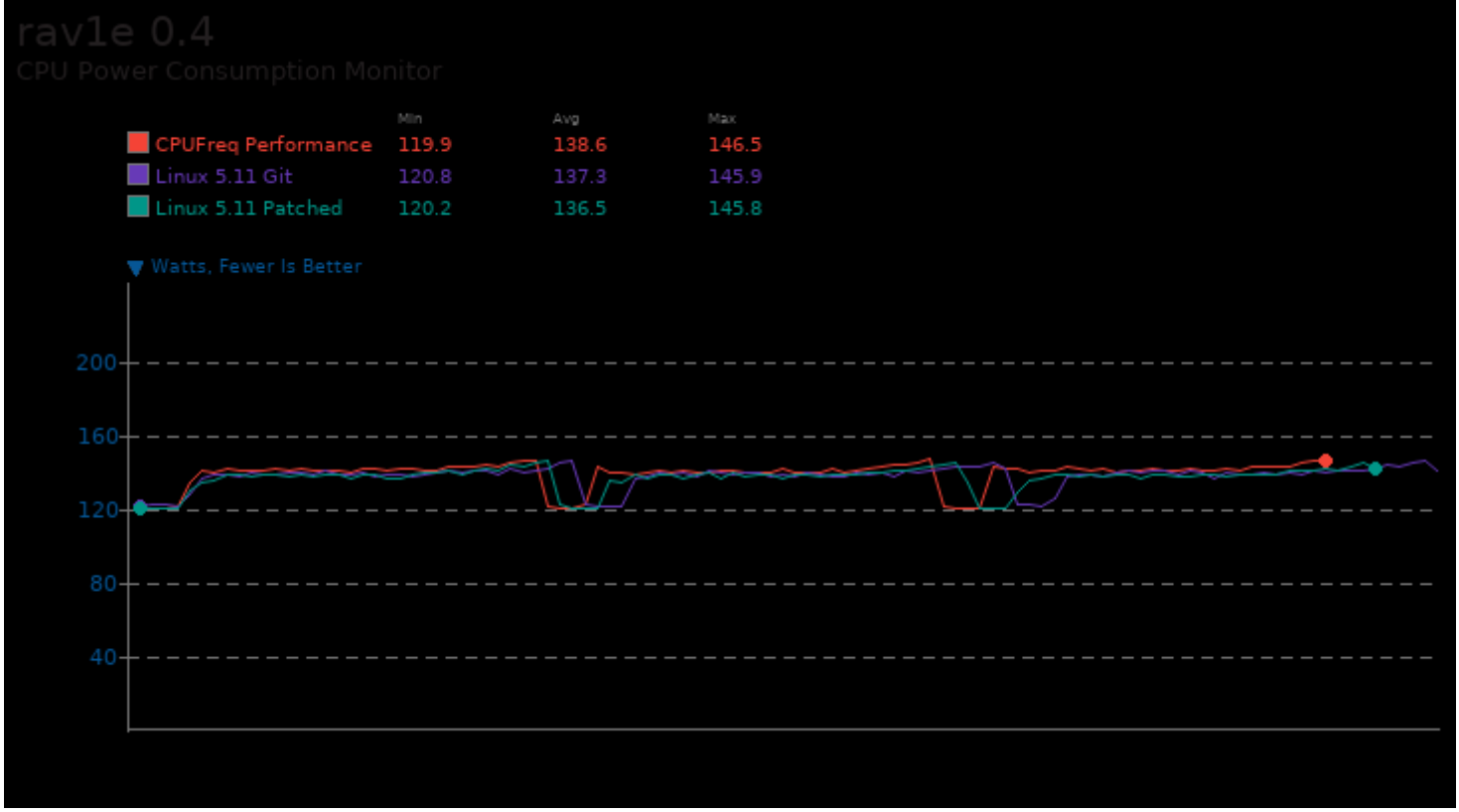
CPU Power Consumption Monitor

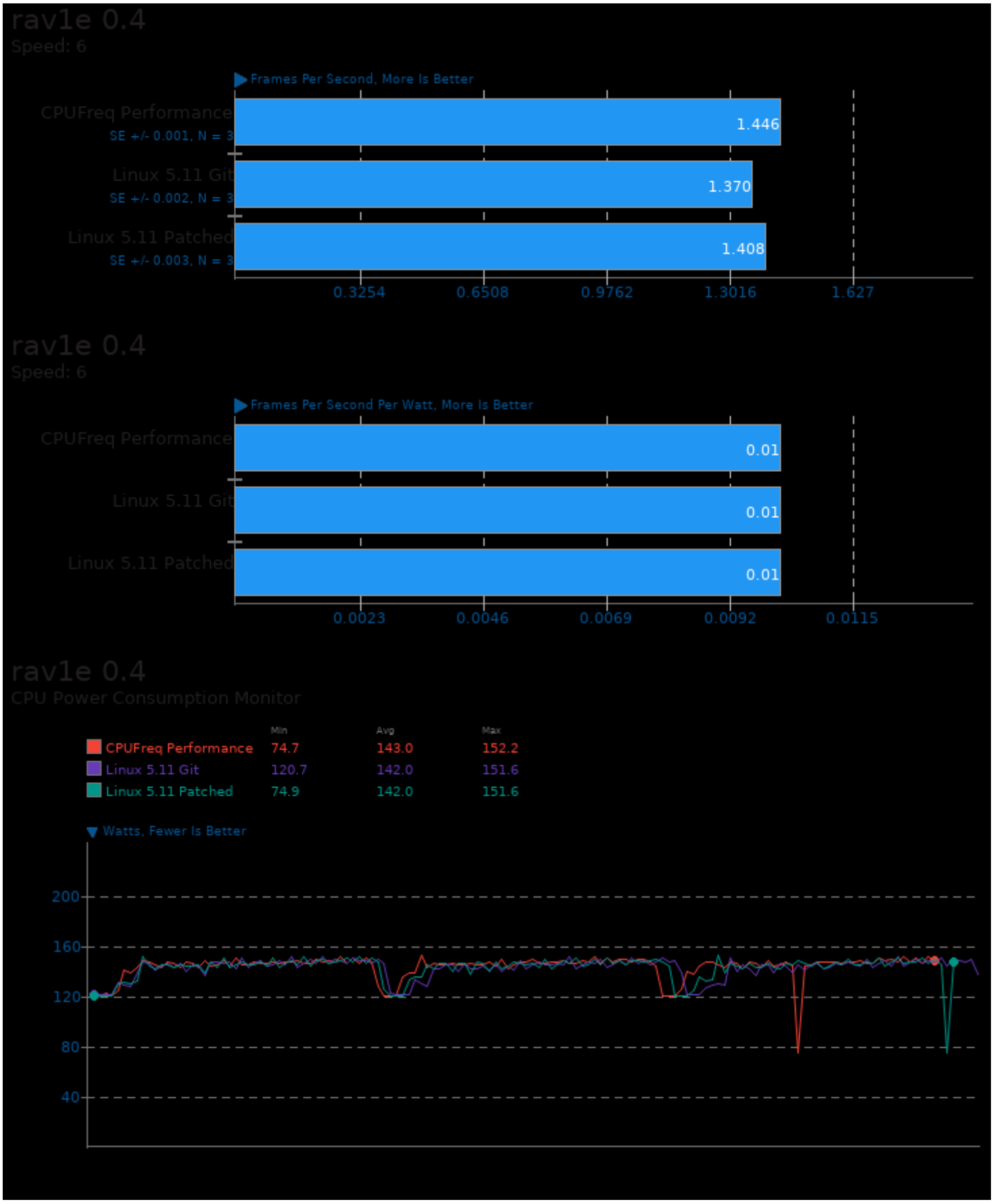


AMD EPYC 7F72 2P Linux 5.11 Perf Governor

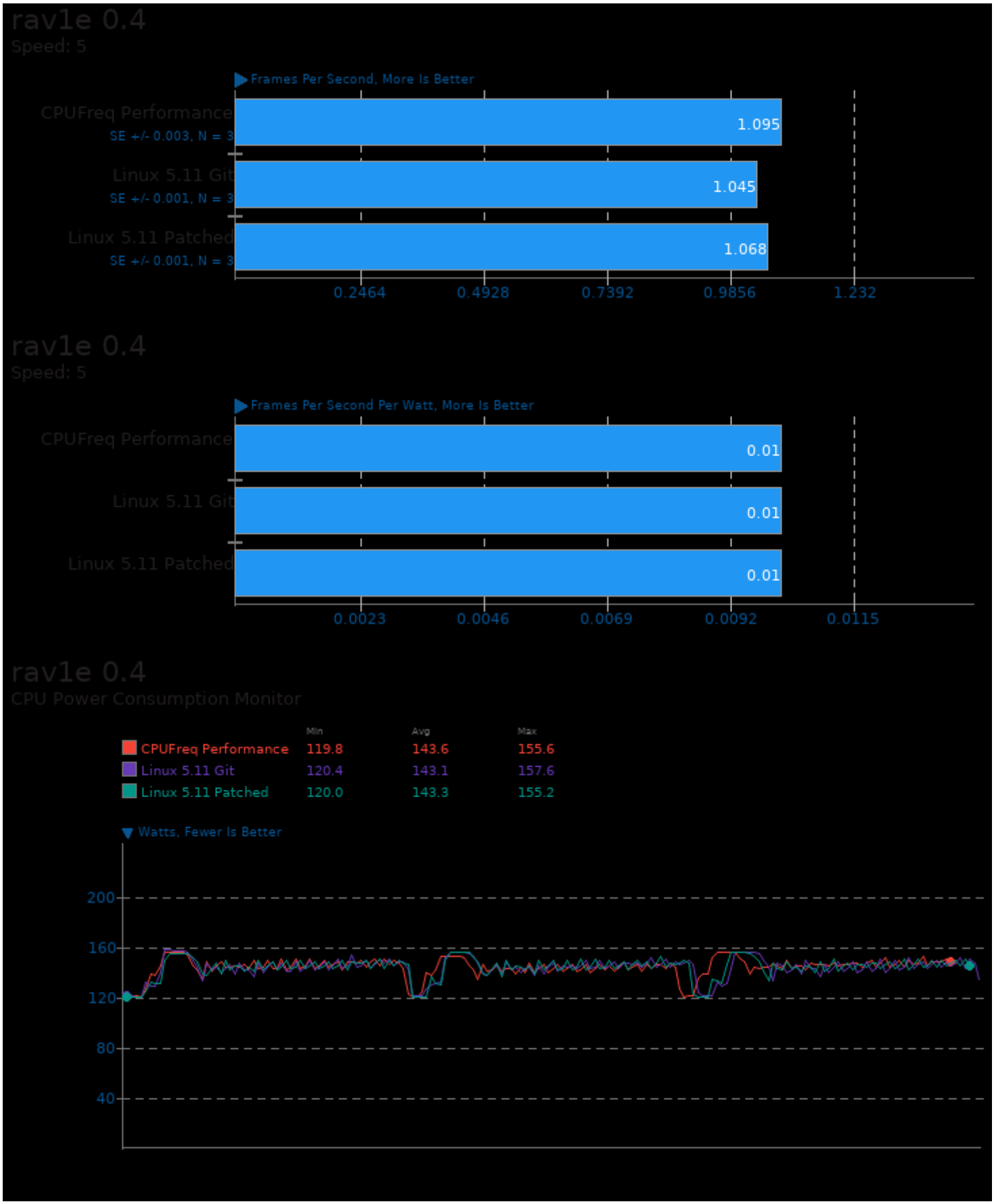


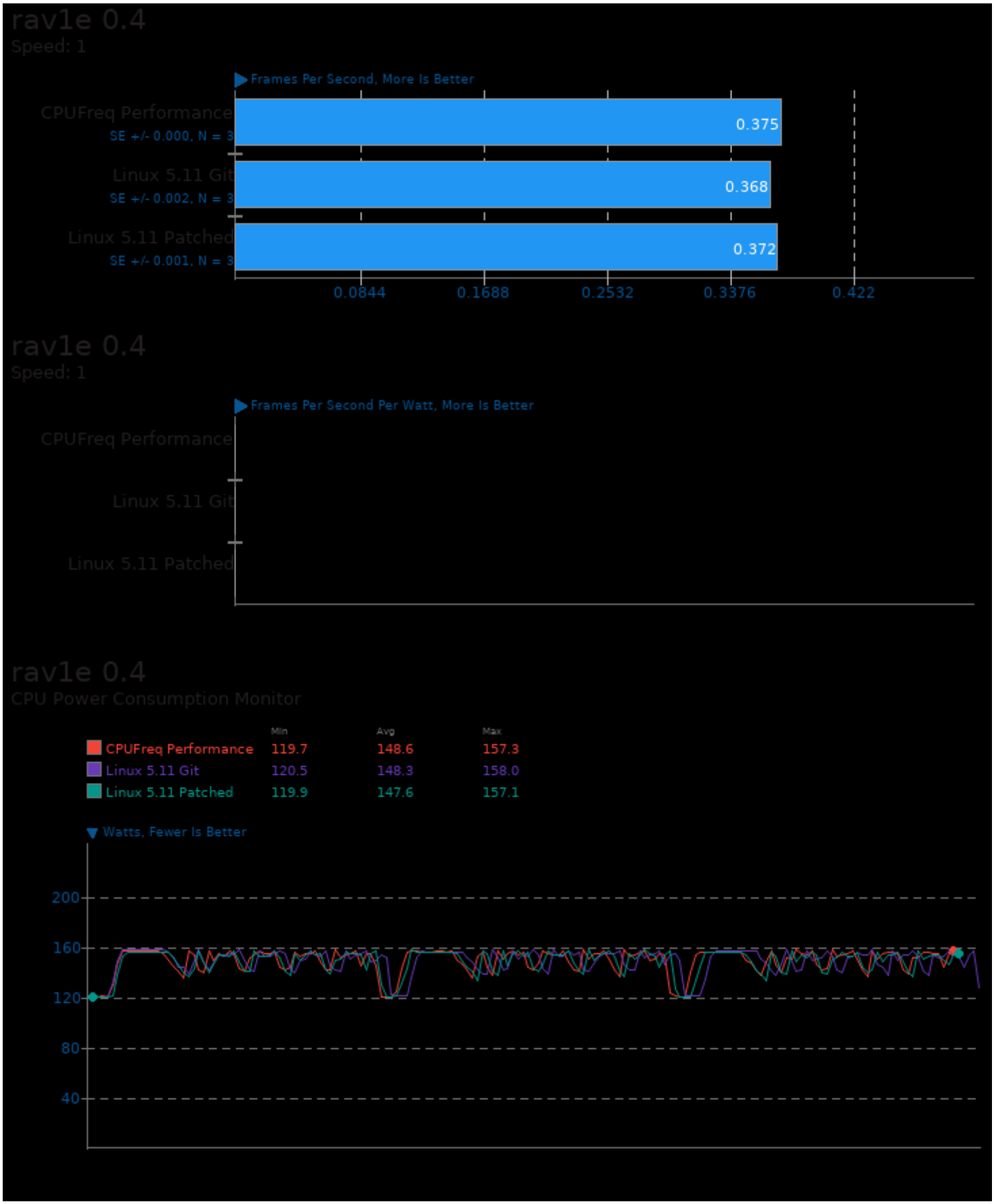





rav1e 0.4
Speed: 6
Frames Per Second, More Is Better
CPUFreq Performance
SE +/- 0.001, N = 3
1.446
Linux 5.11 Git
SE +/- 0.002, N = 3
1.370
Linux 5.11 Patched
SE +/- 0.003, N = 3
1.408
0.3254
0.6508
0.9762
1.3016
1.627
rav1e 0.4
Speed: 6
Frames Per Second Per Watt, More Is Better
CPUFreq Performance
0.01
Linux 5.11 Git
0.01
Linux 5.11 Patched
0.01
0.0023
0.0046
0.0069
0.0092
0.0115
rav1e 0.4
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 74.7 143.0 152.2
Linux 5.11 Git 120.7 142.0 151.6
Linux 5.11 Patched 74.9 142.0 151.6
Watts, Fewer Is Better
200
160
120
80
40

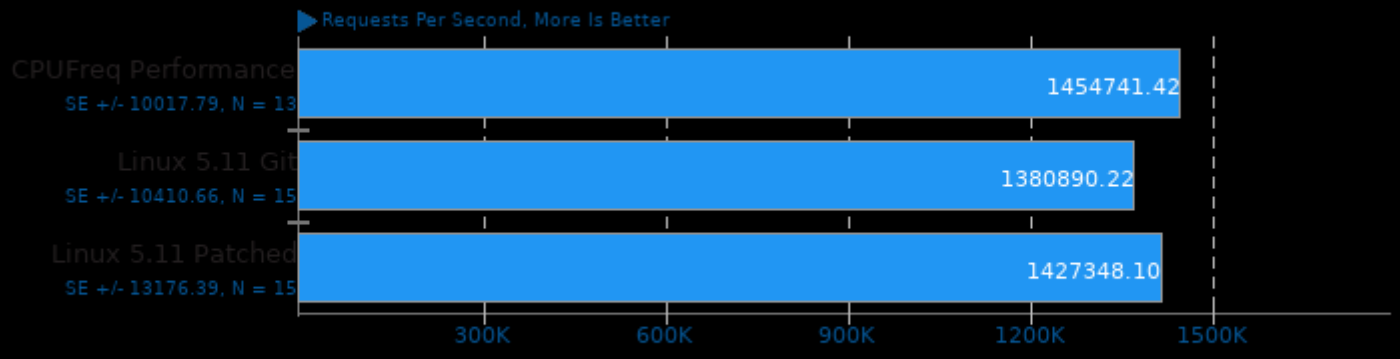
AMD EPYC 7F72 2P Linux 5.11 Perf Governor




rav1e 0.4
Speed: 1
Frames Per Second, More Is Better
CPUFreq Performance
SE +/- 0.000, N = 3
0.375
Linux 5.11 Git
SE +/- 0.002, N = 3
0.368
Linux 5.11 Patched
SE +/- 0.001, N = 3
0.372
0.0844
0.1688
0.2532
0.3376
0.422
rav1e 0.4
Speed: 1
Frames Per Second Per Watt, More Is Better
CPUFreq Performance
Linux 5.11 Git
Linux 5.11 Patched
rav1e 0.4
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 119.7 148.6 157.3
Linux 5.11 Git 120.5 148.3 158.0
Linux 5.11 Patched 119.9 147.6 157.1
Watts, Fewer Is Better
200
160
120
80
40

Redis 6.0.9

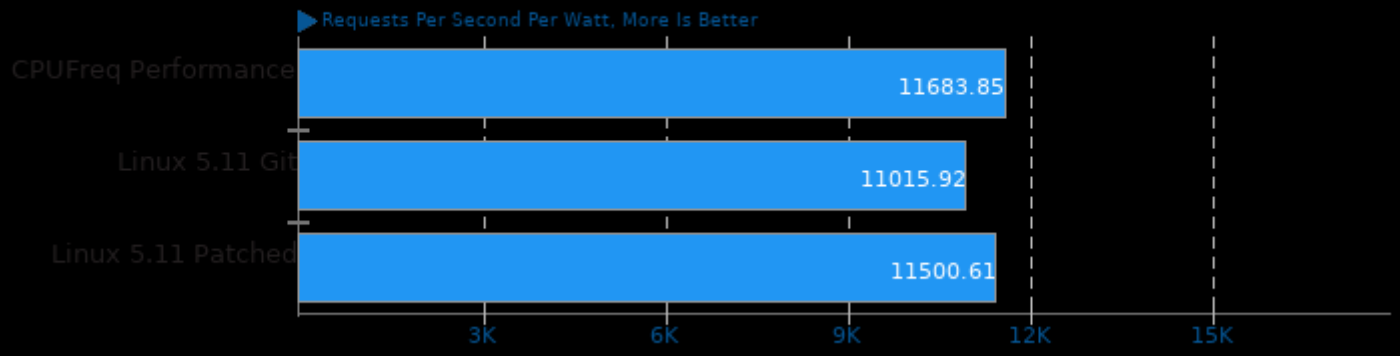
Test: SET



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

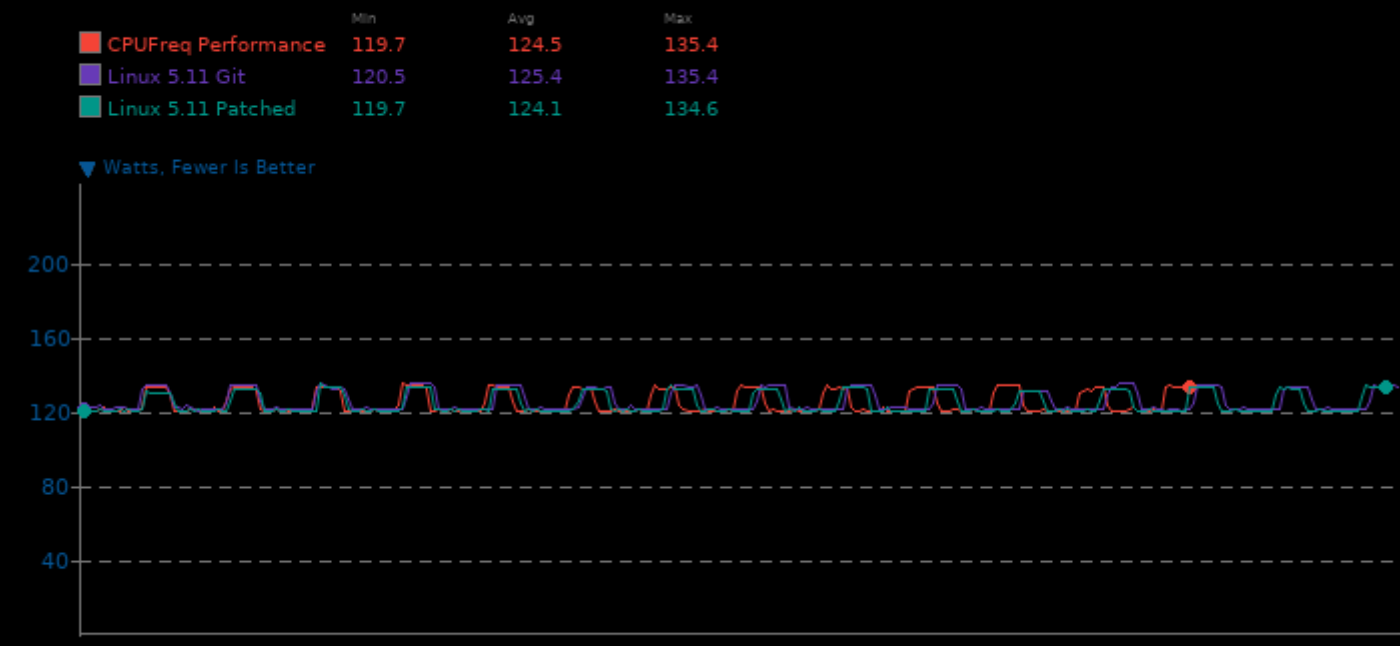
Redis 6.0.9

Test: SET



Redis 6.0.9

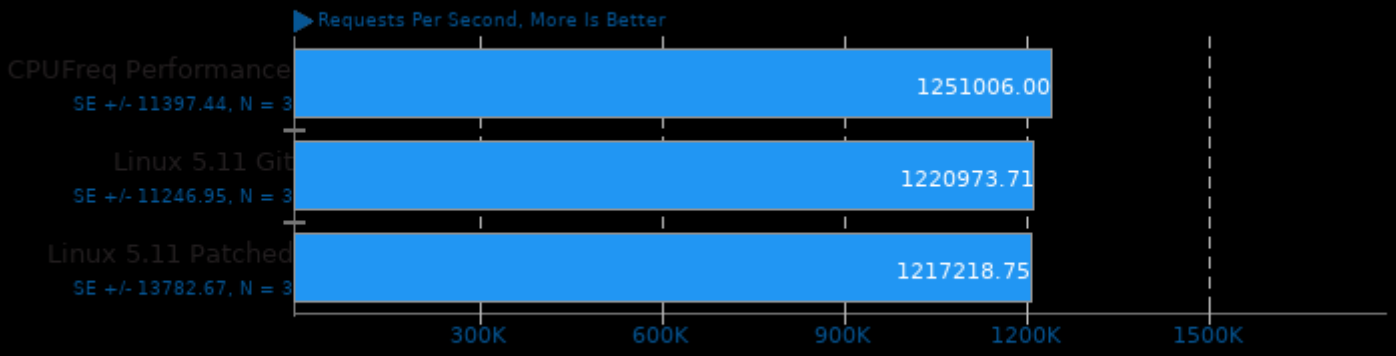
CPU Power Consumption Monitor




Redis 6.0.9
Test: GET
Requests Per Second, More Is Better
CPUFreq Performance
SE +/- 32510.57, N = 12
1782755.97
Linux 5.11 Git
SE +/- 6519.22, N = 4
1689203.10
Linux 5.11 Patched
SE +/- 12716.89, N = 11
1711621.52
400K
800K
1200K
1600K
2000K
1. (CXX) g++ options: -MM -MT -g3 -fvisibility=hidden -O3
Redis 6.0.9
Test: GET
Requests Per Second Per Watt, More Is Better
CPUFreq Performance
14375.86
Linux 5.11 Git
13515.17
Linux 5.11 Patched
13846.04
3K
6K
9K
12K
15K
Redis 6.0.9
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 119.8 124.0 135.9
Linux 5.11 Git 120.6 125.0 135.5
Linux 5.11 Patched 119.7 123.6 133.0
Watts, Fewer Is Better
200
160
120
80
40

Redis 6.0.9

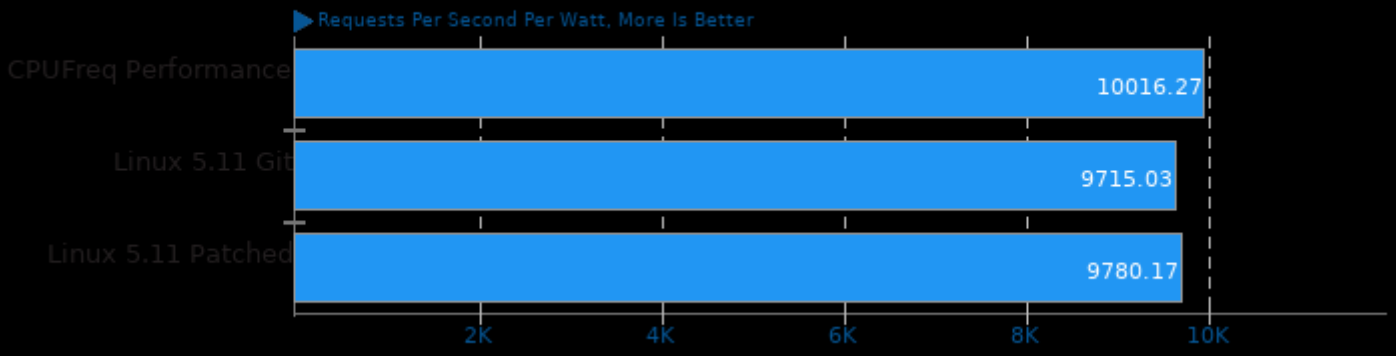
Test: LPUSH



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

Redis 6.0.9

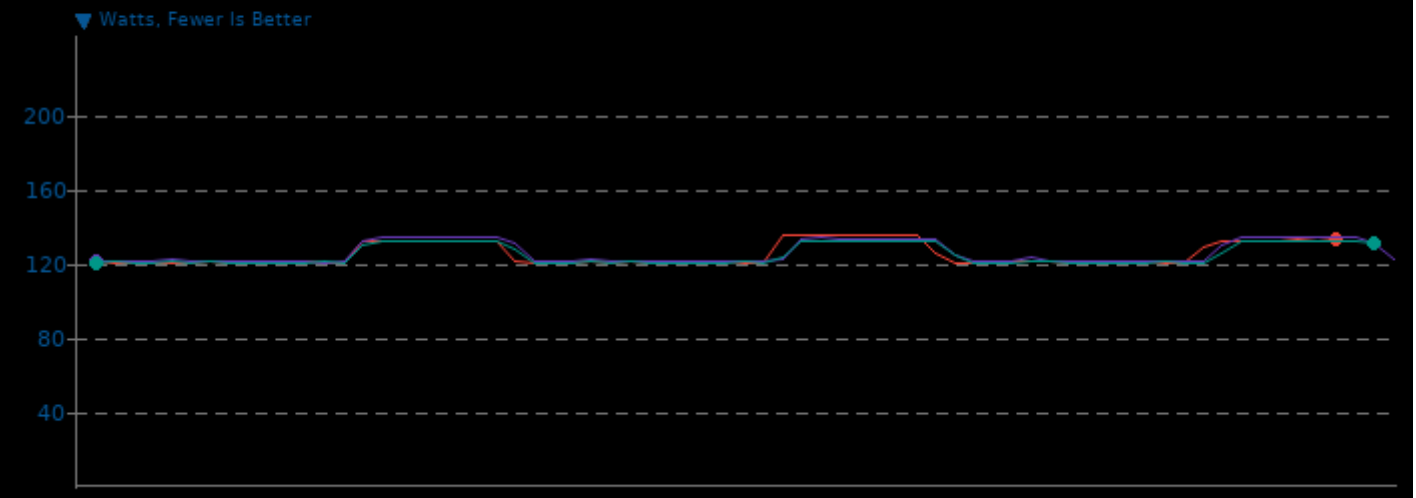
Test: LPUSH



Redis 6.0.9

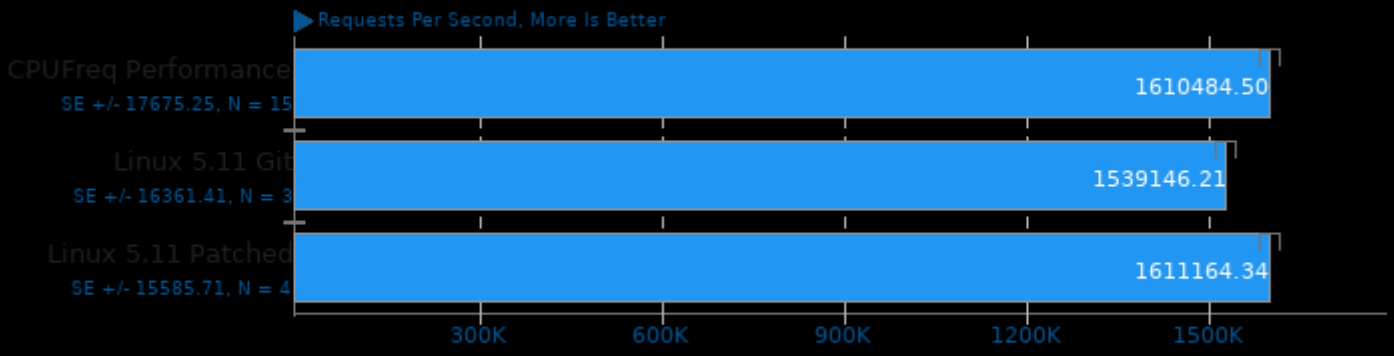
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	119.8	124.9	134.8
Linux 5.11 Git	120.5	125.7	134.2
Linux 5.11 Patched	119.7	124.5	132.3



Redis 6.0.9

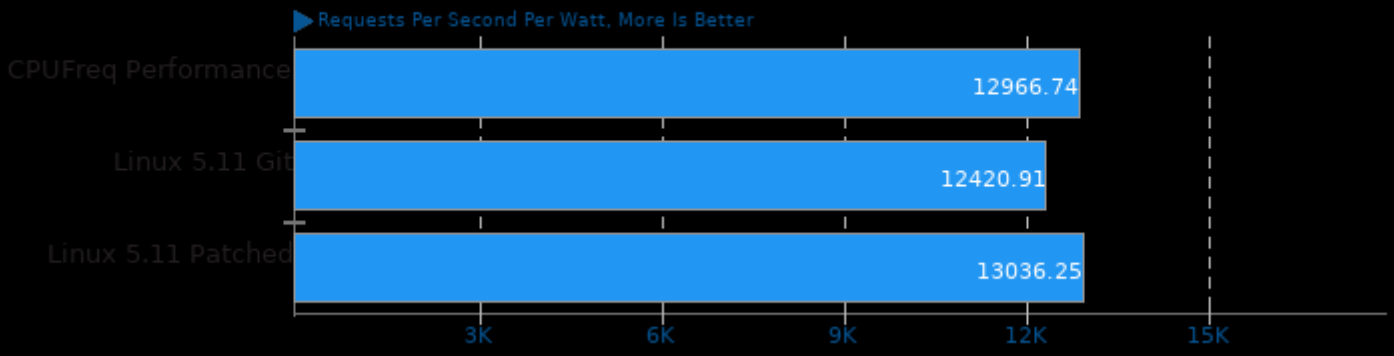
Test: SADD



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

Redis 6.0.9

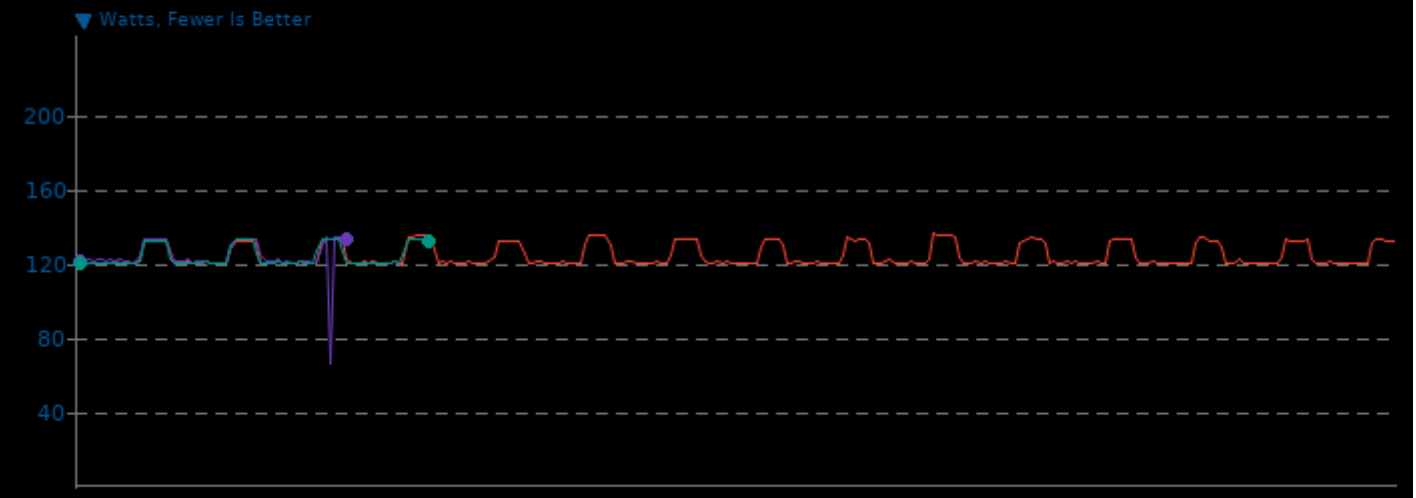
Test: SADD

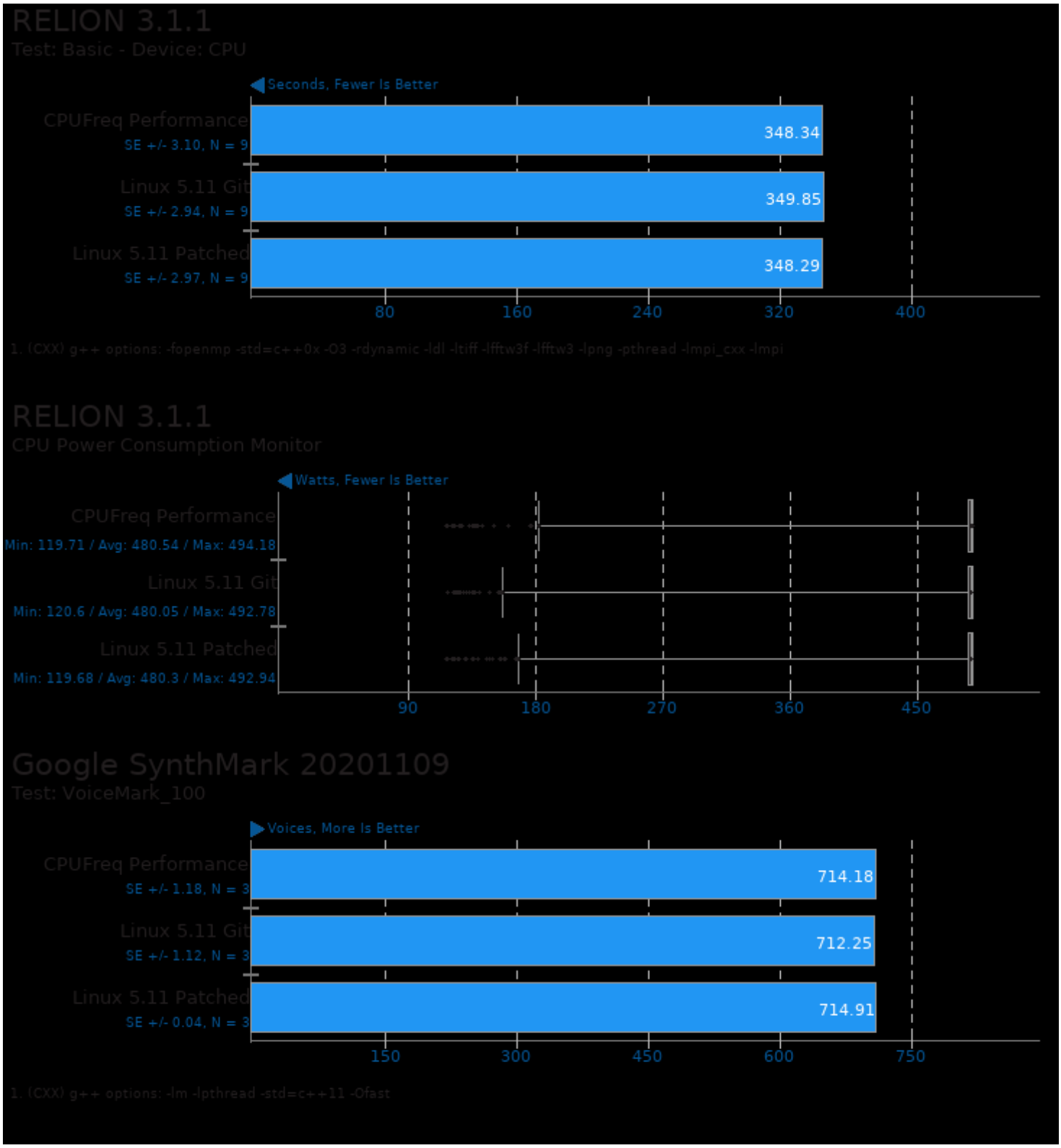


Redis 6.0.9

CPU Power Consumption Monitor

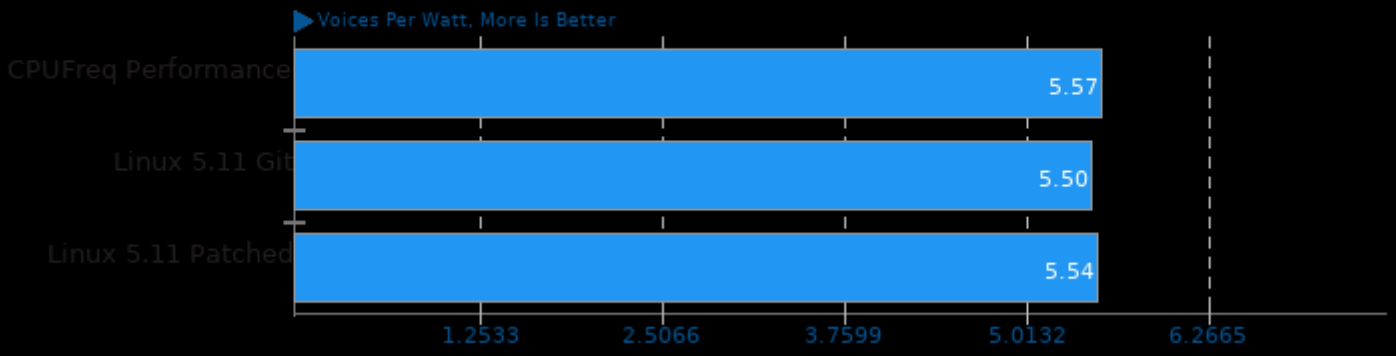
	Min	Avg	Max
CPUFreq Performance	119.7	124.2	136.0
Linux 5.11 Git	66.7	123.9	133.7
Linux 5.11 Patched	119.6	123.6	132.8




RELION 3.1.1
Test: Basic - Device: CPU
Seconds, Fewer Is Better
CPUFreq Performance
SE +/- 3.10, N = 9
348.34
Linux 5.11 Git
SE +/- 2.94, N = 9
349.85
Linux 5.11 Patched
SE +/- 2.97, N = 9
348.29
80
160
240
320
400
1. (CXX) g++ options: -fopenmp -std=c++0x -O3 -rdynamic -ldl -ltiff -lfftw3f -lfftw3 -lpng -pthread -lmpi_cxx -lmpi
RELION 3.1.1
CPU Power Consumption Monitor
Watts, Fewer Is Better
CPUFreq Performance
Min: 119.71 / Avg: 480.54 / Max: 494.18
Linux 5.11 Git
Min: 120.6 / Avg: 480.05 / Max: 492.78
Linux 5.11 Patched
Min: 119.68 / Avg: 480.3 / Max: 492.94
90
180
270
360
450
Google SynthMark 20201109
Test: VoiceMark_100
Voices, More Is Better
CPUFreq Performance
SE +/- 1.18, N = 3
714.18
Linux 5.11 Git
SE +/- 1.12, N = 3
712.25
Linux 5.11 Patched
SE +/- 0.04, N = 3
714.91
150
300
450
600
750
1. (CXX) g++ options: -lm -lpthread -std=c++11 -Ofast

Google SynthMark 20201109

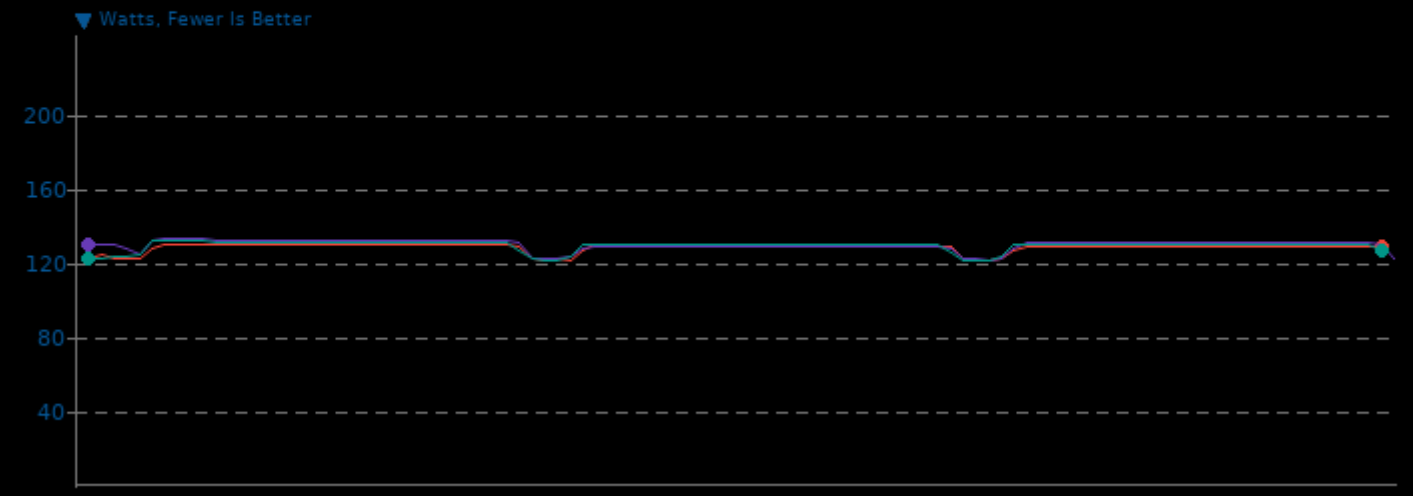
Test: VoiceMark_100



Google SynthMark 20201109

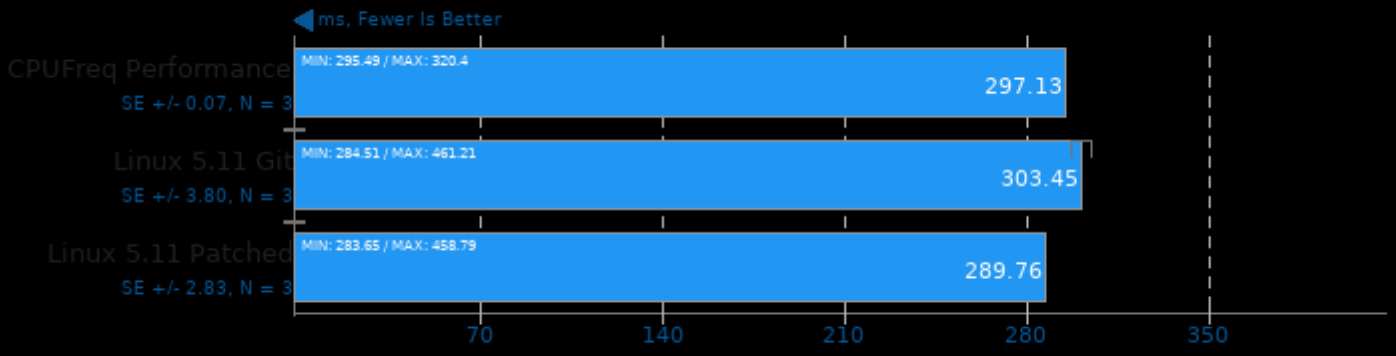
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	121.0	128.2	130.1
Linux 5.11 Git	121.5	129.5	133.1
Linux 5.11 Patched	120.8	129.0	131.4

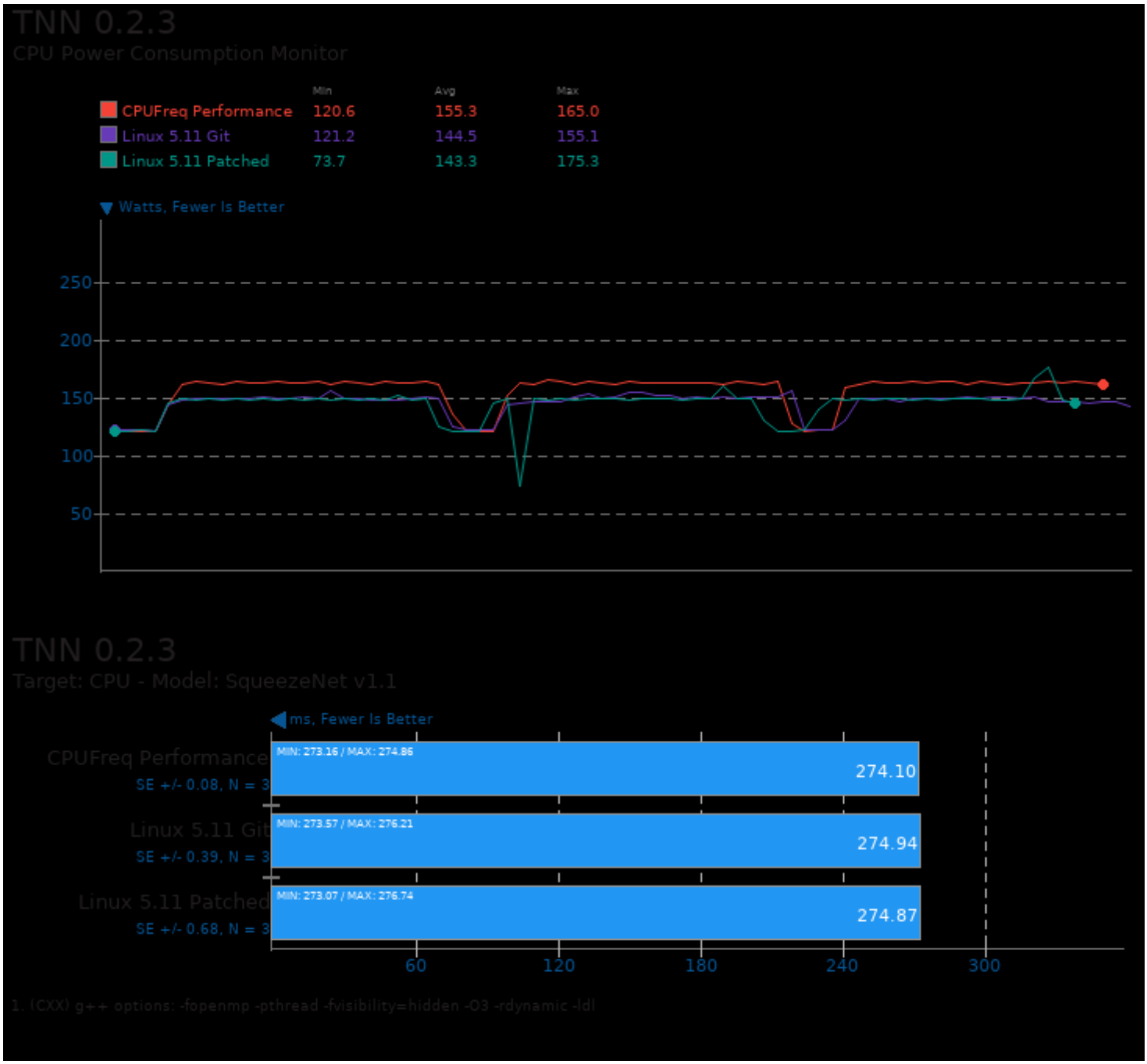


TNN 0.2.3

Target: CPU - Model: MobileNet v2



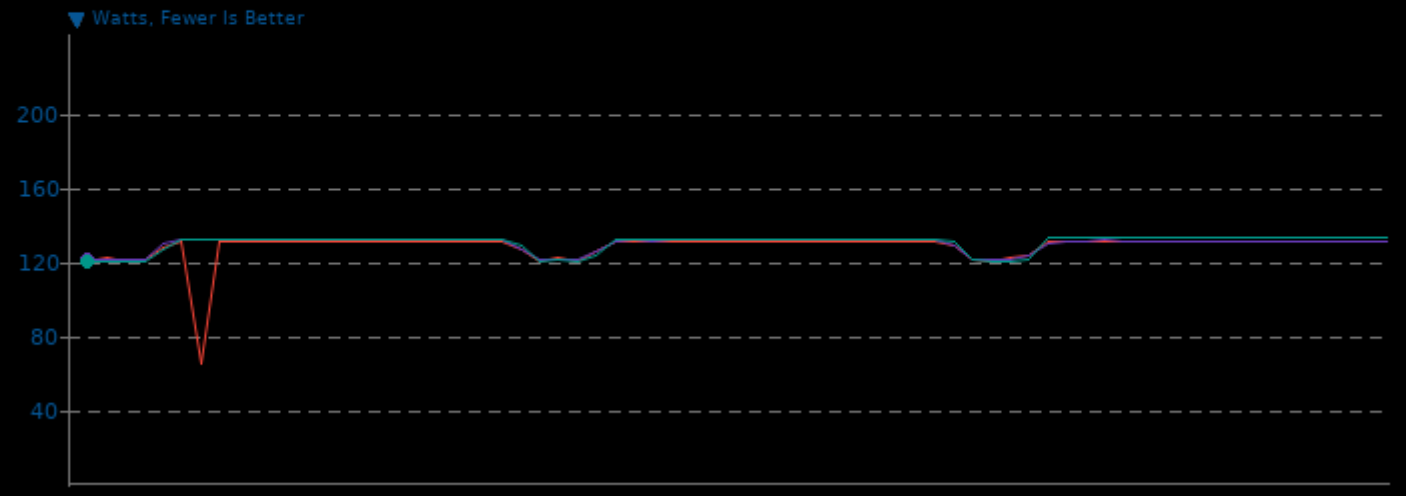
1. (CXX) g++ options: -fopenmp -pthread -fvisibility=hidden -O3 -rdynamic -ldl


TNN 0.2.3
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.6 155.3 165.0
Linux 5.11 Git 121.2 144.5 155.1
Linux 5.11 Patched 73.7 143.3 175.3
Watts, Fewer Is Better
250
200
150
100
50
TNN 0.2.3
Target: CPU - Model: SqueezeNet v1.1
ms, Fewer Is Better
CPUFreq Performance
SE +/- 0.08, N = 3
MIN: 273.16 / MAX: 274.86
274.10
Linux 5.11 Git
SE +/- 0.39, N = 3
MIN: 273.57 / MAX: 276.21
274.94
Linux 5.11 Patched
SE +/- 0.68, N = 3
MIN: 273.07 / MAX: 276.74
274.87
60
120
180
240
300
1. (CXX) g++ options: -fopenmp -pthread -fvisibility=hidden -O3 -rdynamic -ldl

TNN 0.2.3

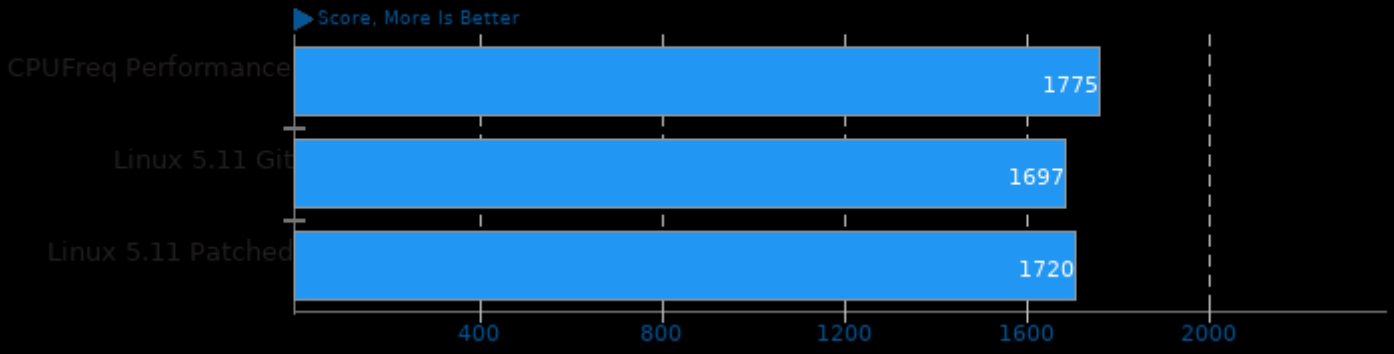
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	65.3	127.9	130.9
Linux 5.11 Git	120.9	129.5	132.2
Linux 5.11 Patched	120.3	129.8	132.8



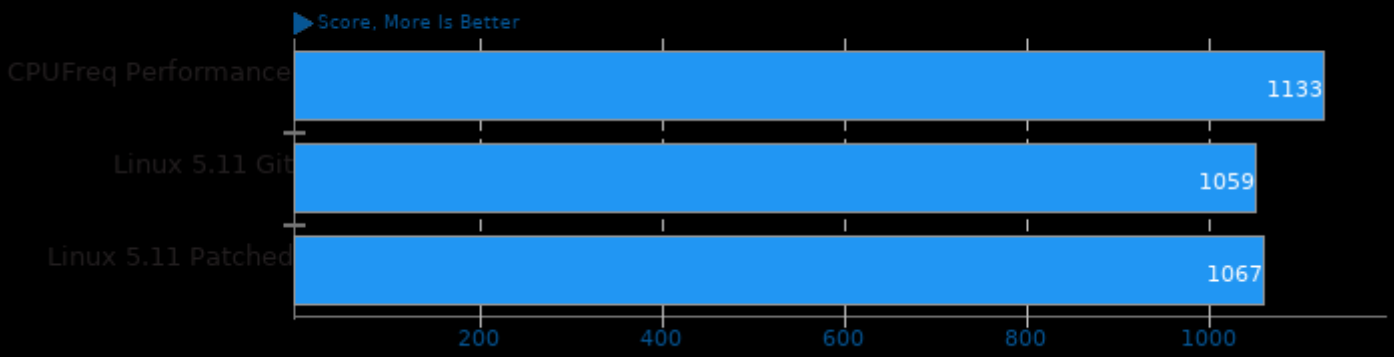
AI Benchmark Alpha 0.1.2

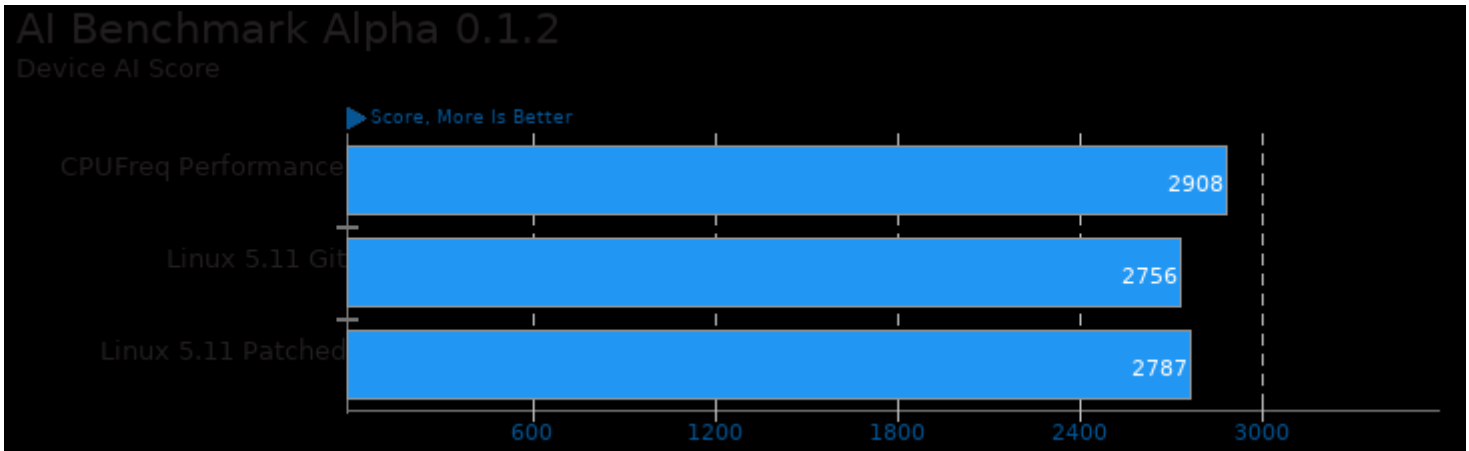
Device Inference Score

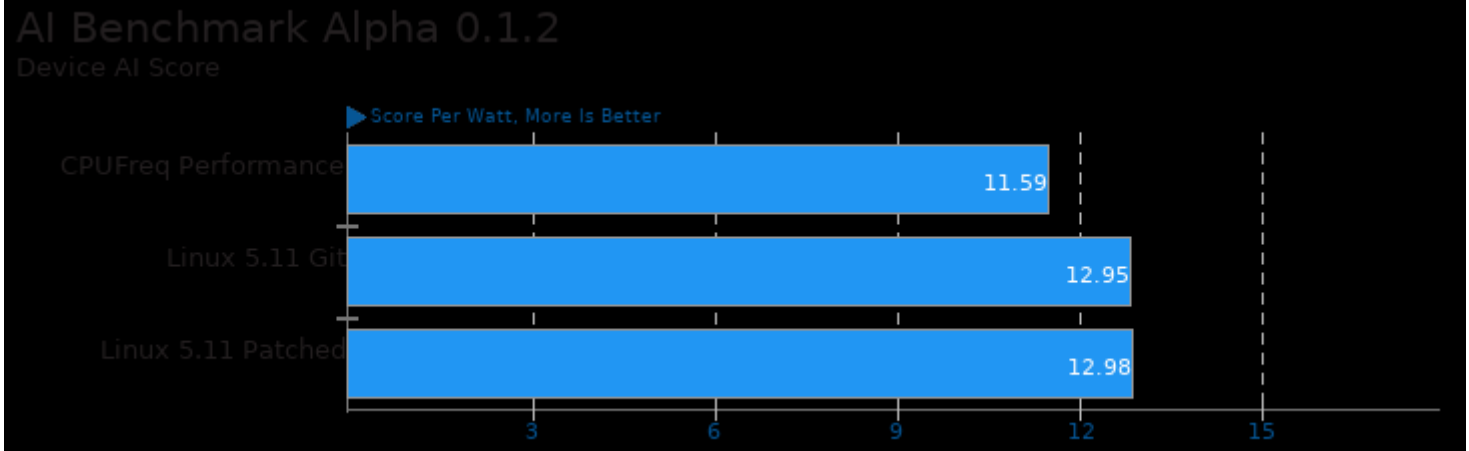


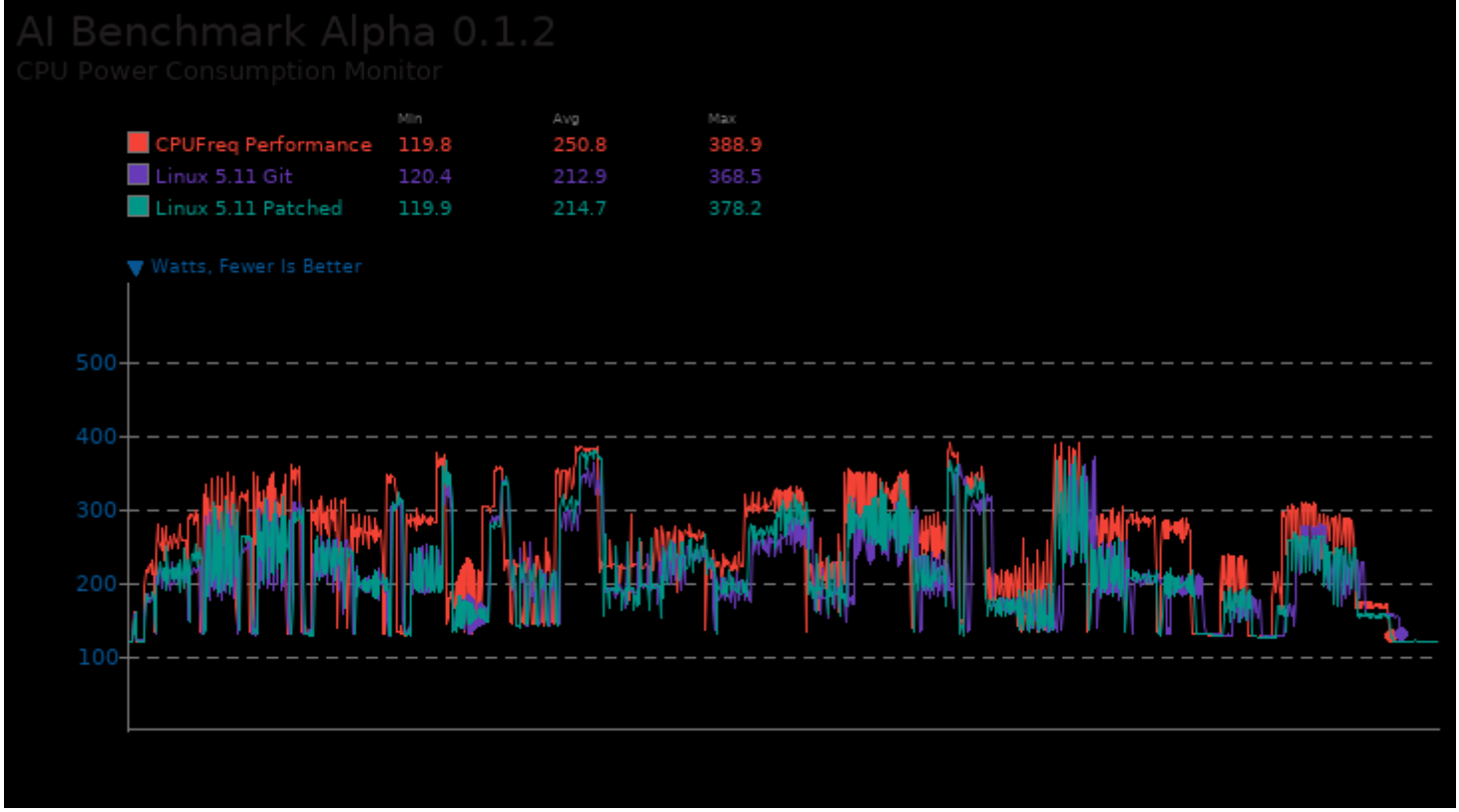
AI Benchmark Alpha 0.1.2

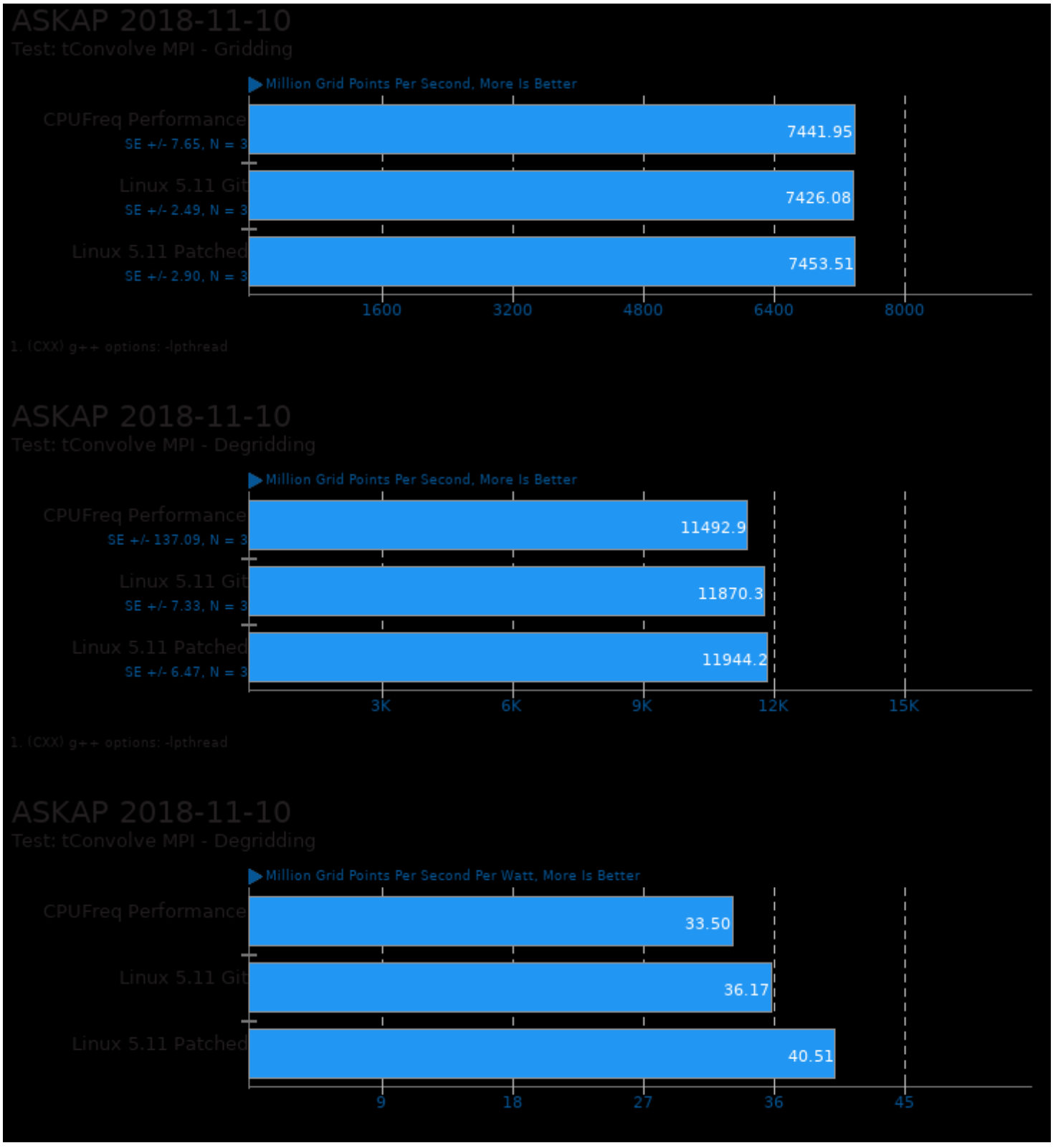
Device Training Score

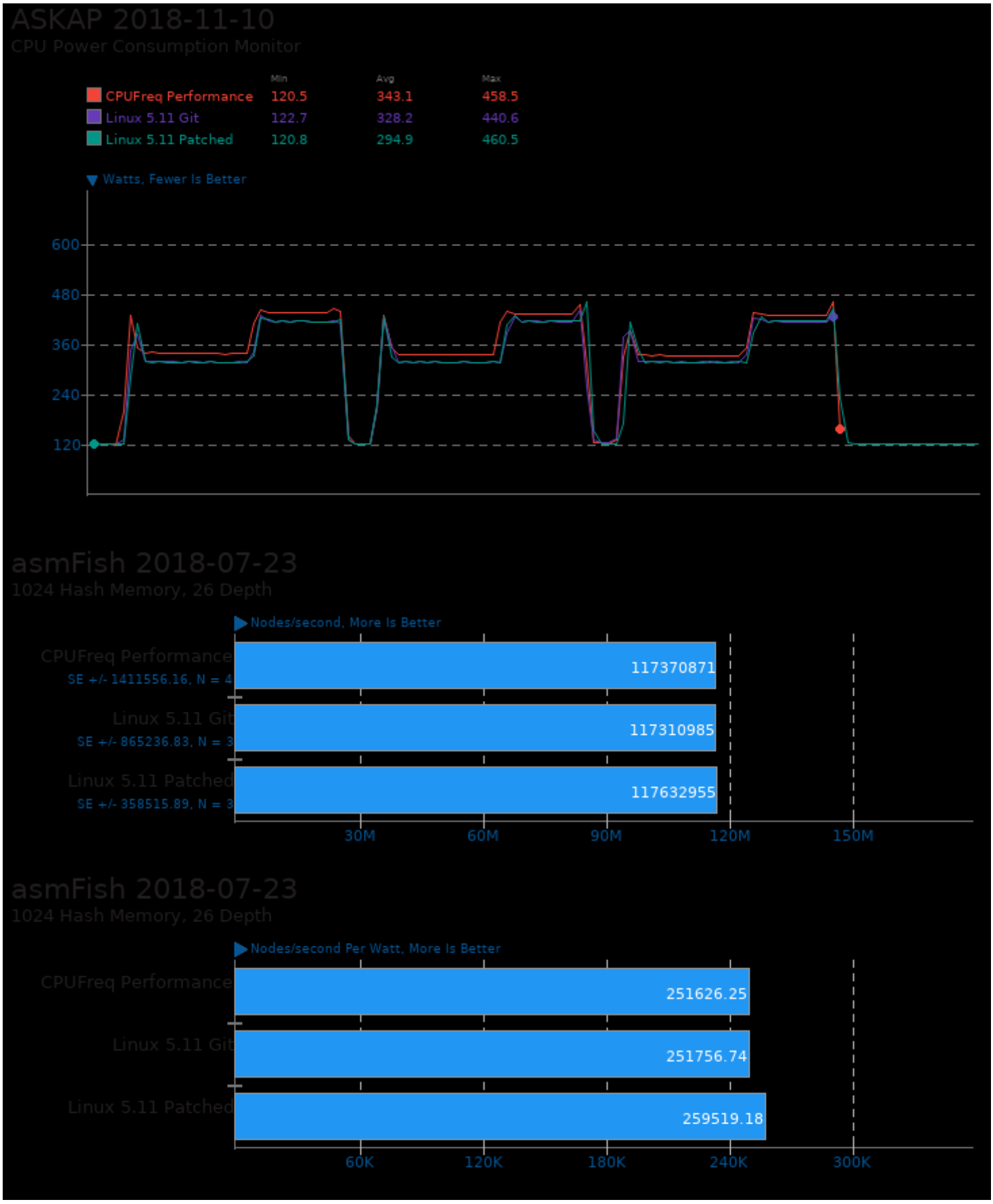


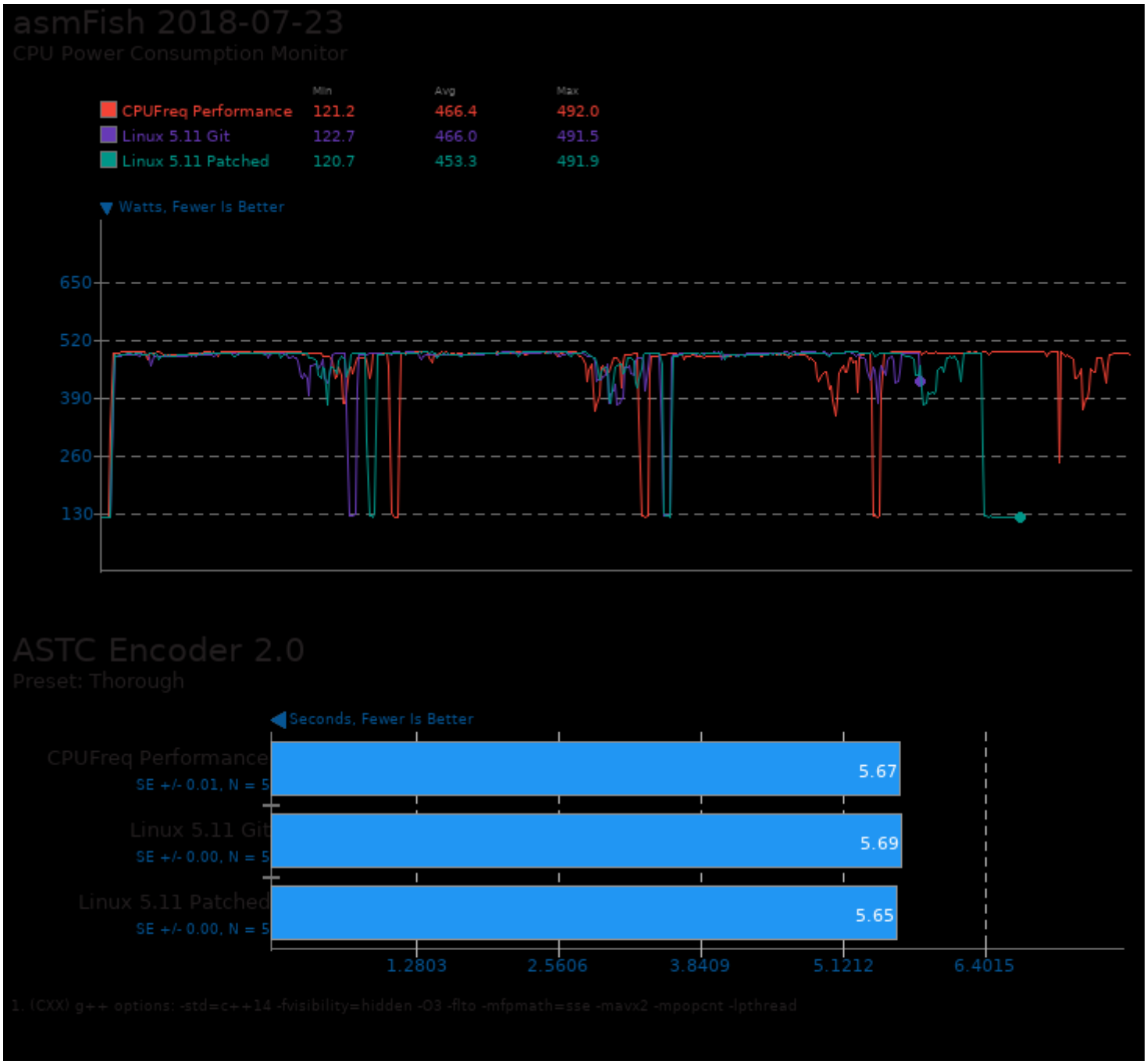

AI Benchmark Alpha 0.1.2
Device AI Score
Score, More Is Better
CPUFreq Performance
Linux 5.11 Git
Linux 5.11 Patched
2908
2756
2787
600
1200
1800
2400
3000

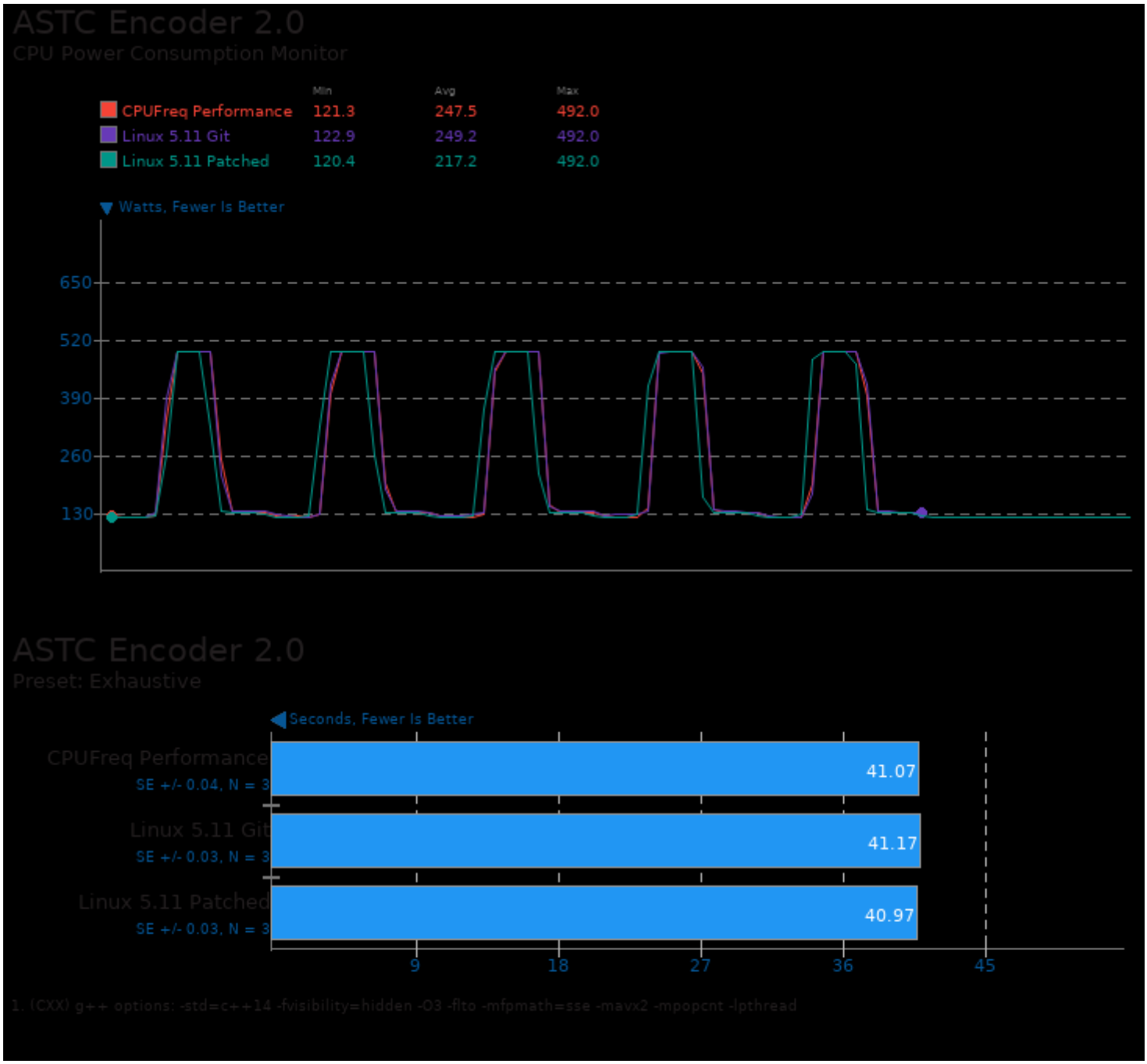

AI Benchmark Alpha 0.1.2
Device AI Score
Score Per Watt, More Is Better
CPUFreq Performance
Linux 5.11 Git
Linux 5.11 Patched
11.59
12.95
12.98
3
6
9
12
15

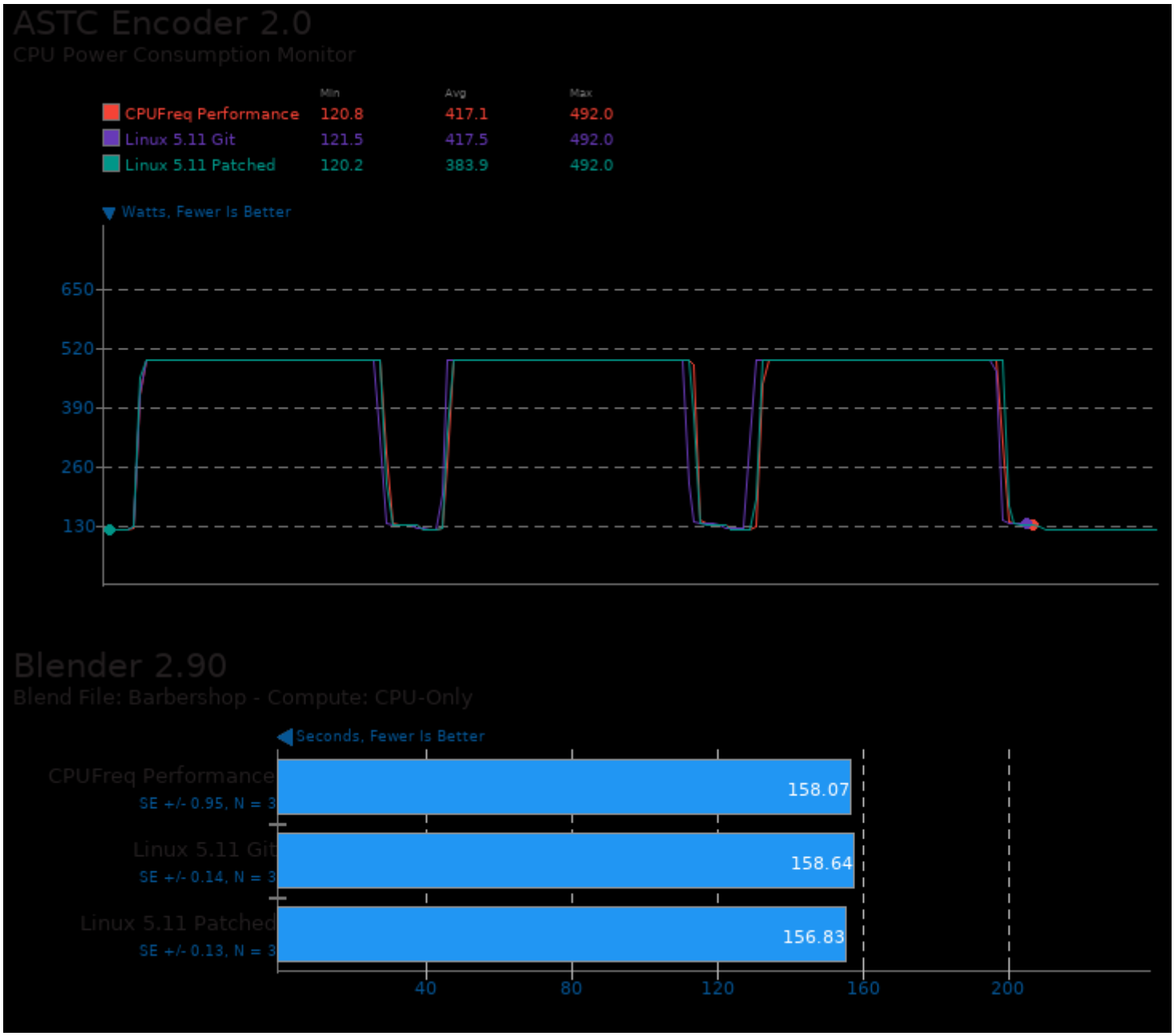

AI Benchmark Alpha 0.1.2
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 119.8 250.8 388.9
Linux 5.11 Git 120.4 212.9 368.5
Linux 5.11 Patched 119.9 214.7 378.2
Watts, Fewer Is Better
500
400
300
200
100


ASKAP 2018-11-10
Test: tConvolve MPI - Gridding
Million Grid Points Per Second, More Is Better
CPUFreq Performance
SE +/- 7.65, N = 3
7441.95
Linux 5.11 Git
SE +/- 2.49, N = 3
7426.08
Linux 5.11 Patched
SE +/- 2.90, N = 3
7453.51
1600
3200
4800
6400
8000
1. (CXX) g++ options: -lpthread
ASKAP 2018-11-10
Test: tConvolve MPI - Degridding
Million Grid Points Per Second, More Is Better
CPUFreq Performance
SE +/- 137.09, N = 3
11492.9
Linux 5.11 Git
SE +/- 7.33, N = 3
11870.3
Linux 5.11 Patched
SE +/- 6.47, N = 3
11944.2
3K
6K
9K
12K
15K
1. (CXX) g++ options: -lpthread
ASKAP 2018-11-10
Test: tConvolve MPI - Degridding
Million Grid Points Per Second Per Watt, More Is Better
CPUFreq Performance
33.50
Linux 5.11 Git
36.17
Linux 5.11 Patched
40.51
9
18
27
36
45


ASKAP 2018-11-10
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.5 343.1 458.5
Linux 5.11 Git 122.7 328.2 440.6
Linux 5.11 Patched 120.8 294.9 460.5
Watts, Fewer Is Better
600
480
360
240
120
asmFish 2018-07-23
1024 Hash Memory, 26 Depth
Nodes/second, More Is Better
CPUFreq Performance
SE +/- 1411556.16, N = 4
117370871
Linux 5.11 Git
SE +/- 865236.83, N = 3
117310985
Linux 5.11 Patched
SE +/- 358515.89, N = 3
117632955
30M
60M
90M
120M
150M
asmFish 2018-07-23
1024 Hash Memory, 26 Depth
Nodes/second Per Watt, More Is Better
CPUFreq Performance
251626.25
Linux 5.11 Git
251756.74
Linux 5.11 Patched
259519.18
60K
120K
180K
240K
300K


asmFish 2018-07-23
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 121.2 466.4 492.0
Linux 5.11 Git 122.7 466.0 491.5
Linux 5.11 Patched 120.7 453.3 491.9
Watts, Fewer Is Better
650
520
390
260
130
ASTC Encoder 2.0
Preset: Thorough
Seconds, Fewer Is Better
CPUFreq Performance
SE +/- 0.01, N = 5
5.67
Linux 5.11 Git
SE +/- 0.00, N = 5
5.69
Linux 5.11 Patched
SE +/- 0.00, N = 5
5.65
1.2803
2.5606
3.8409
5.1212
6.4015
1. (CXX) g++ options: -std=c++14 -fvisibility=hidden -O3 -flto -mfpmath=sse -mavx2 -mpopcnt -lpthread


ASTC Encoder 2.0
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 121.3 247.5 492.0
Linux 5.11 Git 122.9 249.2 492.0
Linux 5.11 Patched 120.4 217.2 492.0
Watts, Fewer Is Better
650
520
390
260
130
ASTC Encoder 2.0
Preset: Exhaustive
Seconds, Fewer Is Better
CPUFreq Performance
SE +/- 0.04, N = 3
41.07
Linux 5.11 Git
SE +/- 0.03, N = 3
41.17
Linux 5.11 Patched
SE +/- 0.03, N = 3
40.97
9
18
27
36
45
1. (CXX) g++ options: -std=c++14 -fvisibility=hidden -O3 -flto -mfpmath=sse -mavx2 -mpopcnt -lpthread


ASTC Encoder 2.0
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.8 417.1 492.0
Linux 5.11 Git 121.5 417.5 492.0
Linux 5.11 Patched 120.2 383.9 492.0
Watts, Fewer Is Better
650
520
390
260
130
Blender 2.90
Blend File: Barbershop - Compute: CPU-Only
Seconds, Fewer Is Better
CPUFreq Performance
SE +/- 0.95, N = 3
158.07
Linux 5.11 Git
SE +/- 0.14, N = 3
158.64
Linux 5.11 Patched
SE +/- 0.13, N = 3
156.83
40
80
120
160
200

Blender 2.90

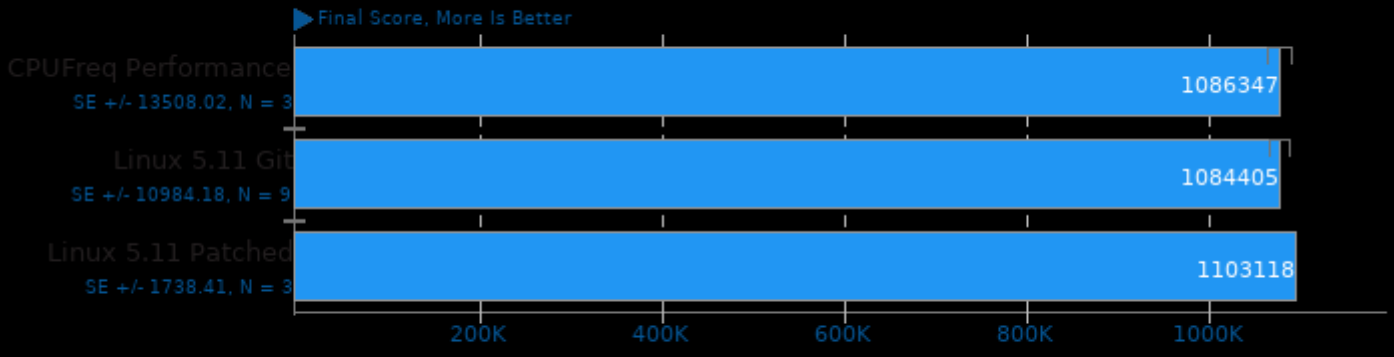
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	121.2	434.6	494.0
Linux 5.11 Git	122.2	434.4	492.5
Linux 5.11 Patched	120.6	423.5	492.3



BlogBench 1.1

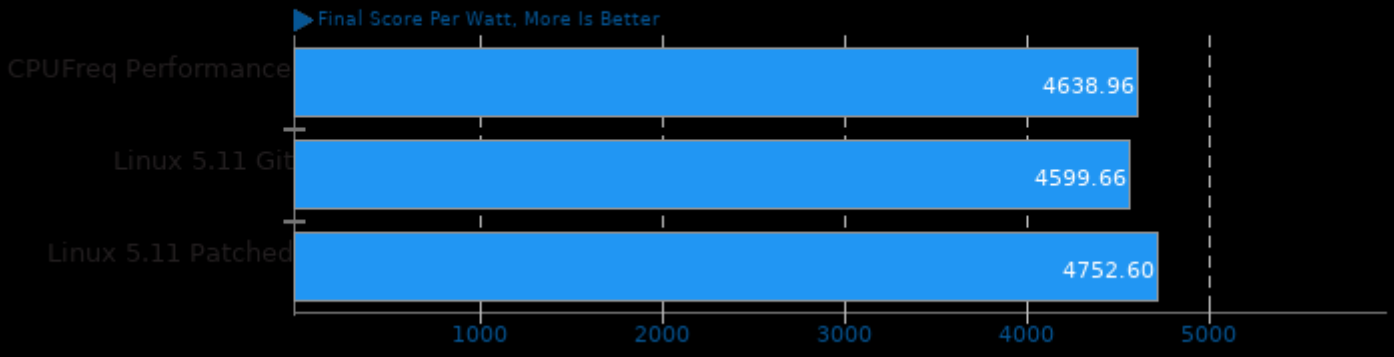
Test: Read



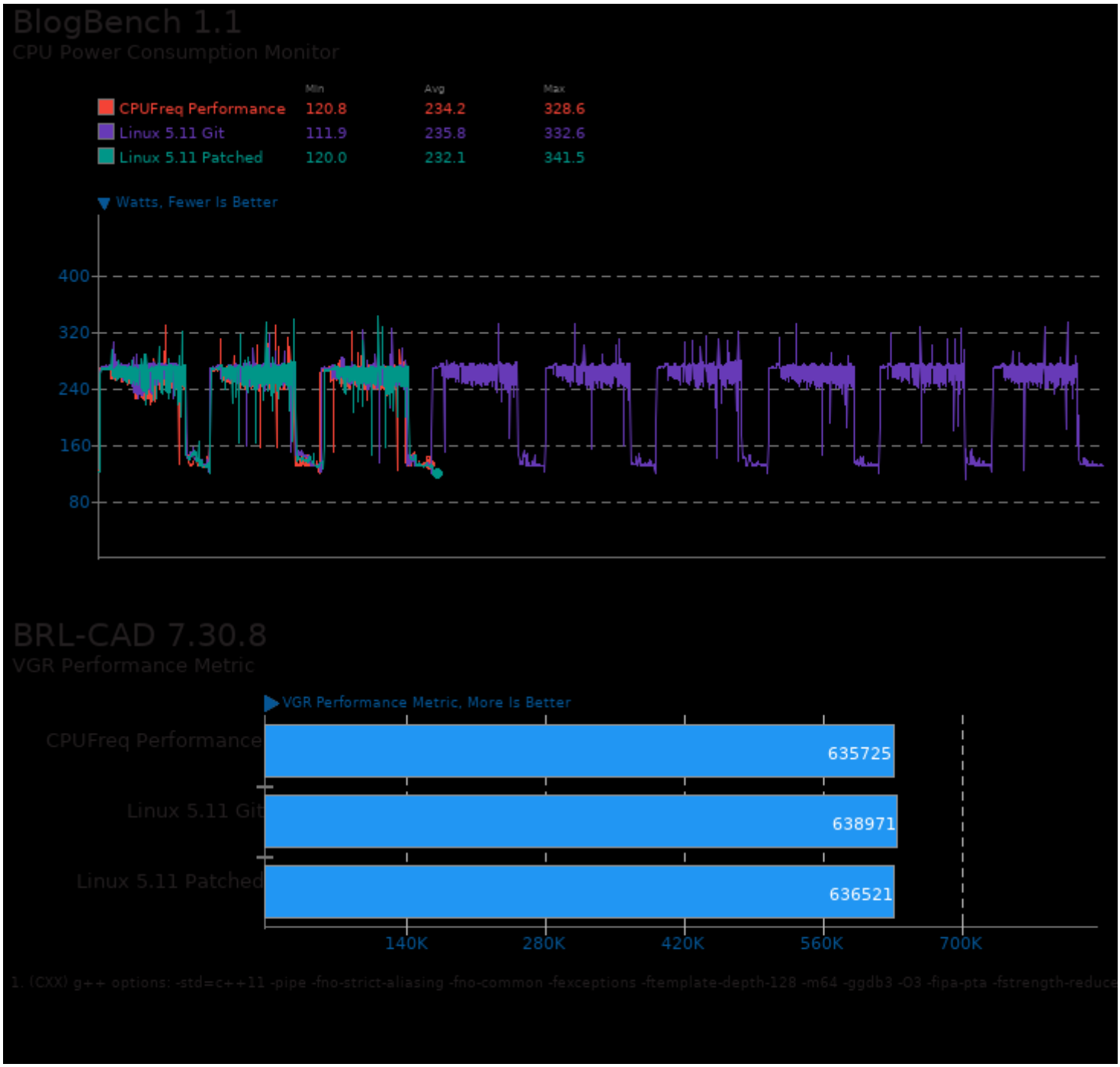
1. (CC) gcc options: -O2 -pthread

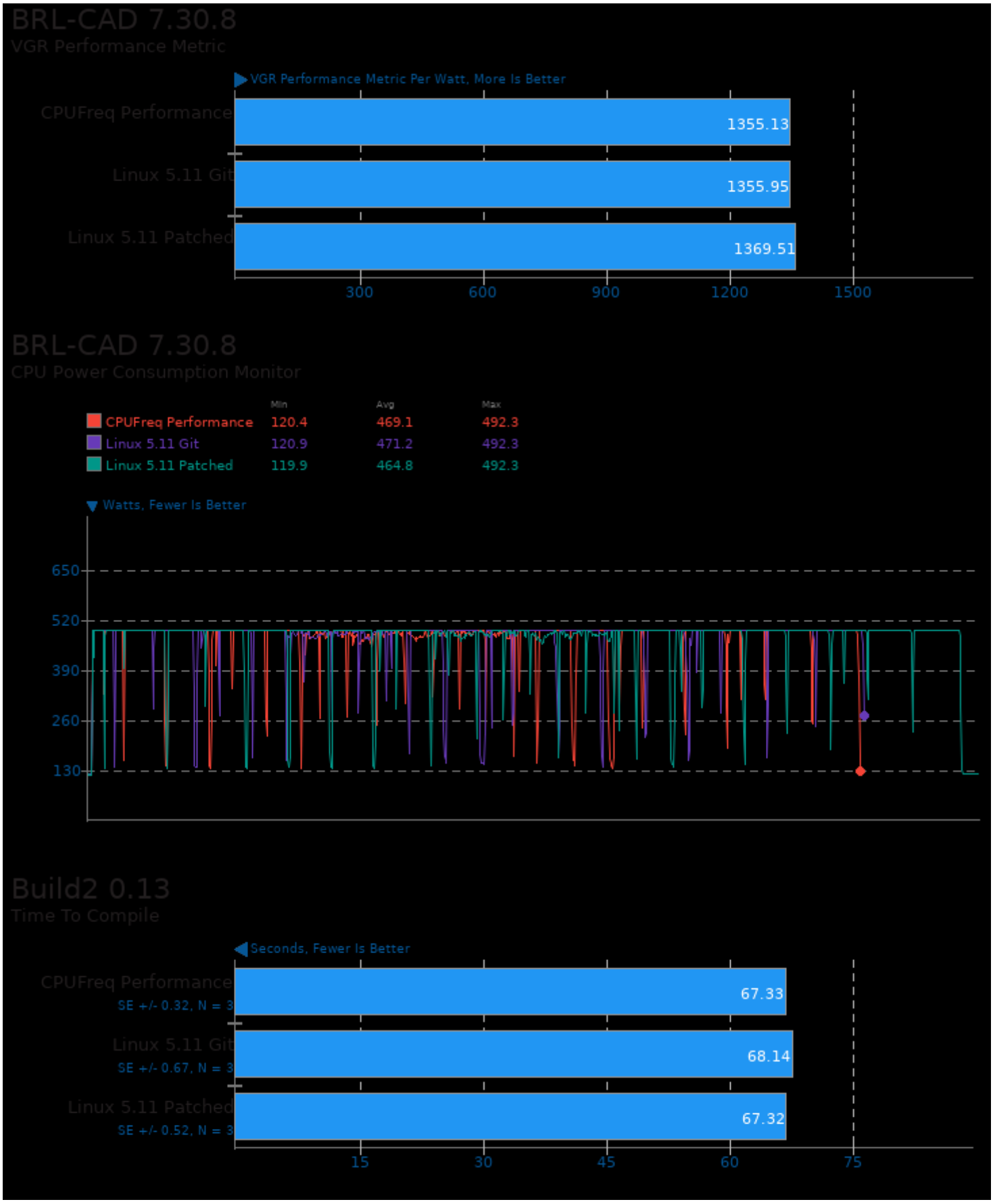
BlogBench 1.1

Test: Read



AMD EPYC 7F72 2P Linux 5.11 Perf Governor



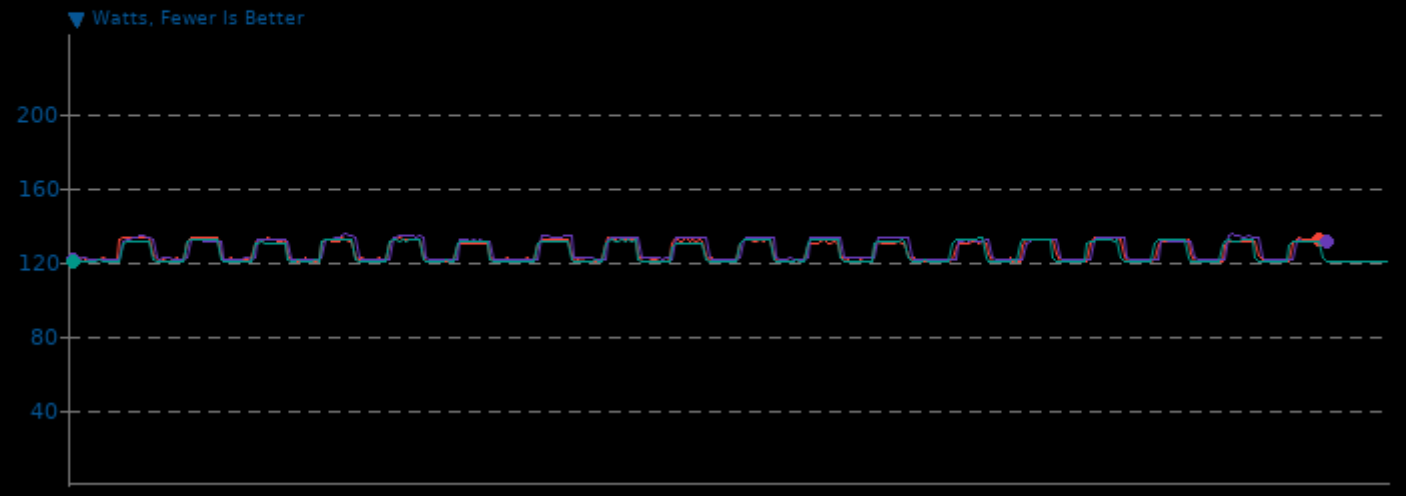

BRL-CAD 7.30.8
VGR Performance Metric
VGR Performance Metric Per Watt, More Is Better
CPUFreq Performance
Linux 5.11 Git
Linux 5.11 Patched
1355.13
1355.95
1369.51
300
600
900
1200
1500
BRL-CAD 7.30.8
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.4 469.1 492.3
Linux 5.11 Git 120.9 471.2 492.3
Linux 5.11 Patched 119.9 464.8 492.3
Watts, Fewer Is Better
650
520
390
260
130
Build2 0.13
Time To Compile
Seconds, Fewer Is Better
CPUFreq Performance
SE +/- 0.32, N = 3
Linux 5.11 Git
SE +/- 0.67, N = 3
Linux 5.11 Patched
SE +/- 0.52, N = 3
67.33
68.14
67.32
15
30
45
60
75


Build2 0.13
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.9 256.5 506.4
Linux 5.11 Git 121.7 254.7 492.2
Linux 5.11 Patched 120.4 244.2 493.2
Watts, Fewer Is Better
650
520
390
260
130
BYTE Unix Benchmark 3.6
Computational Test: Dhrystone 2
LPS, More Is Better
CPUFreq Performance
SE +/- 498492.56, N = 3
38656226.3
Linux 5.11 Git
SE +/- 411547.50, N = 3
38181643.6
Linux 5.11 Patched
SE +/- 341040.65, N = 3
38319339.8
8M
16M
24M
32M
40M
BYTE Unix Benchmark 3.6
Computational Test: Dhrystone 2
LPS Per Watt, More Is Better
CPUFreq Performance
307169.01
Linux 5.11 Git
301515.82
Linux 5.11 Patched
306193.49
70K
140K
210K
280K
350K

BYTE Unix Benchmark 3.6

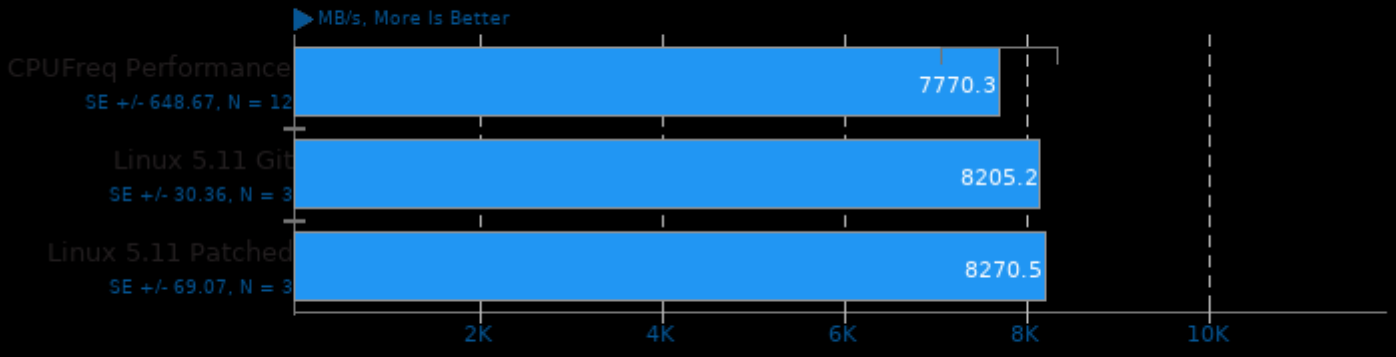
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	120.0	125.8	133.3
Linux 5.11 Git	120.7	126.6	134.9
Linux 5.11 Patched	119.7	125.1	132.4



Zstd Compression 1.4.5

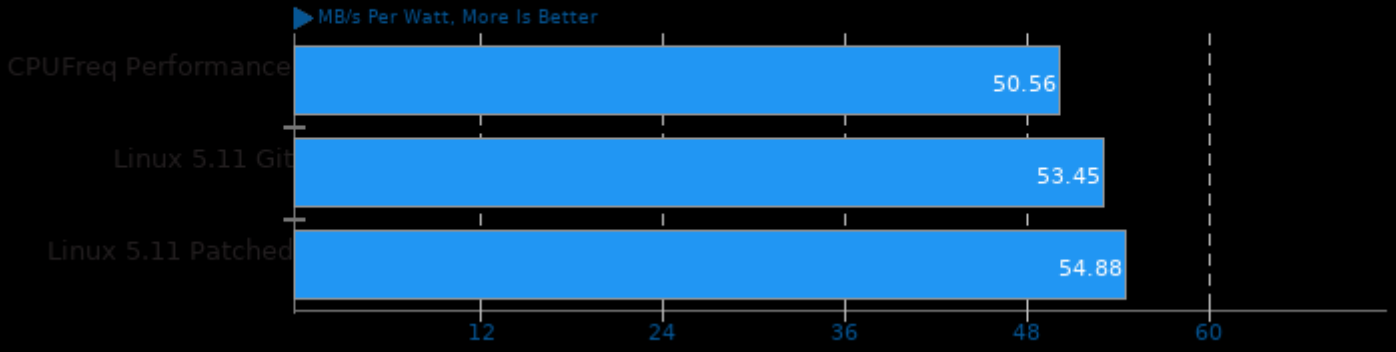
Compression Level: 3

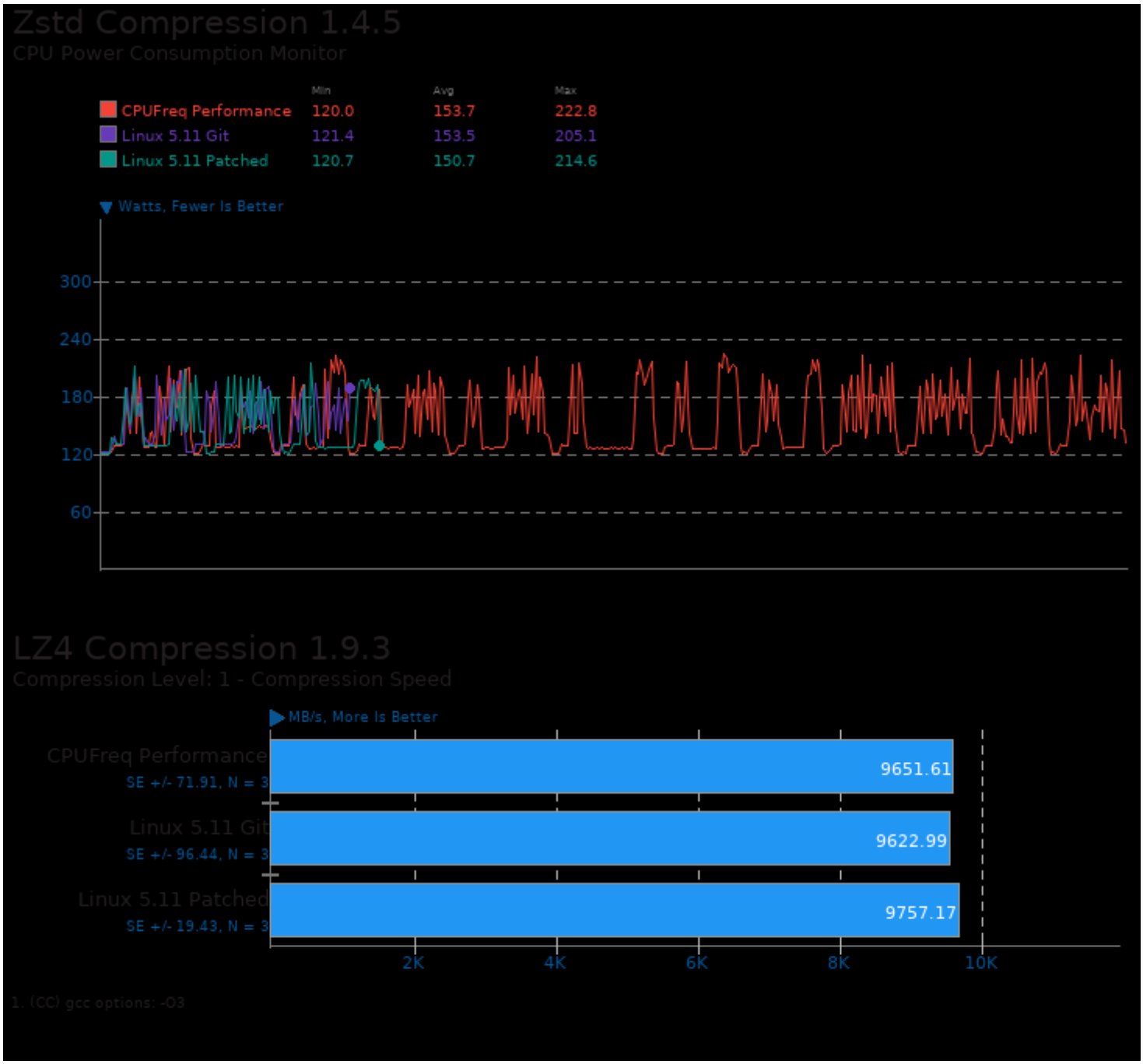


1. (CC) gcc options: -O3 -pthread -lz -llzma

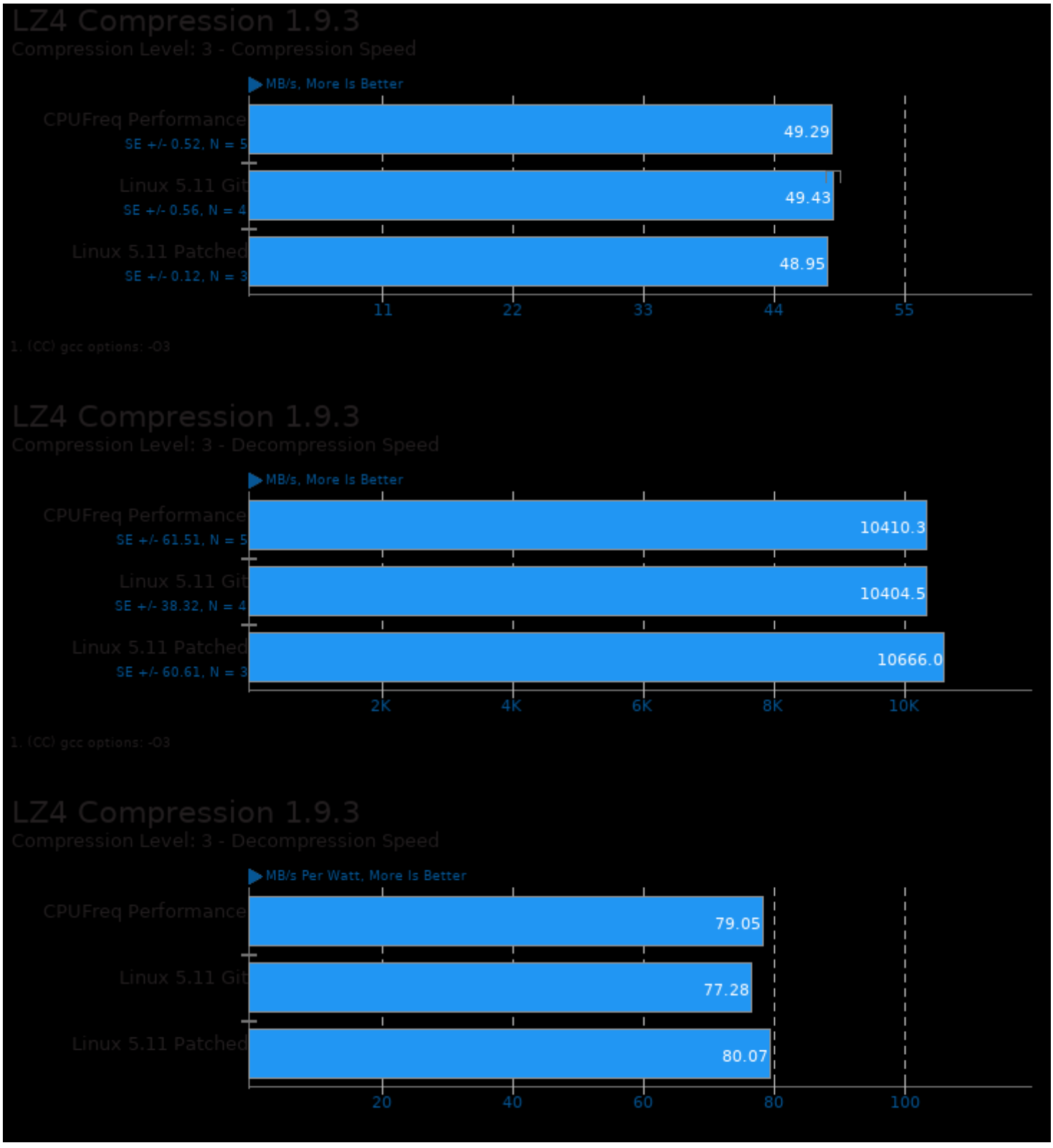
Zstd Compression 1.4.5

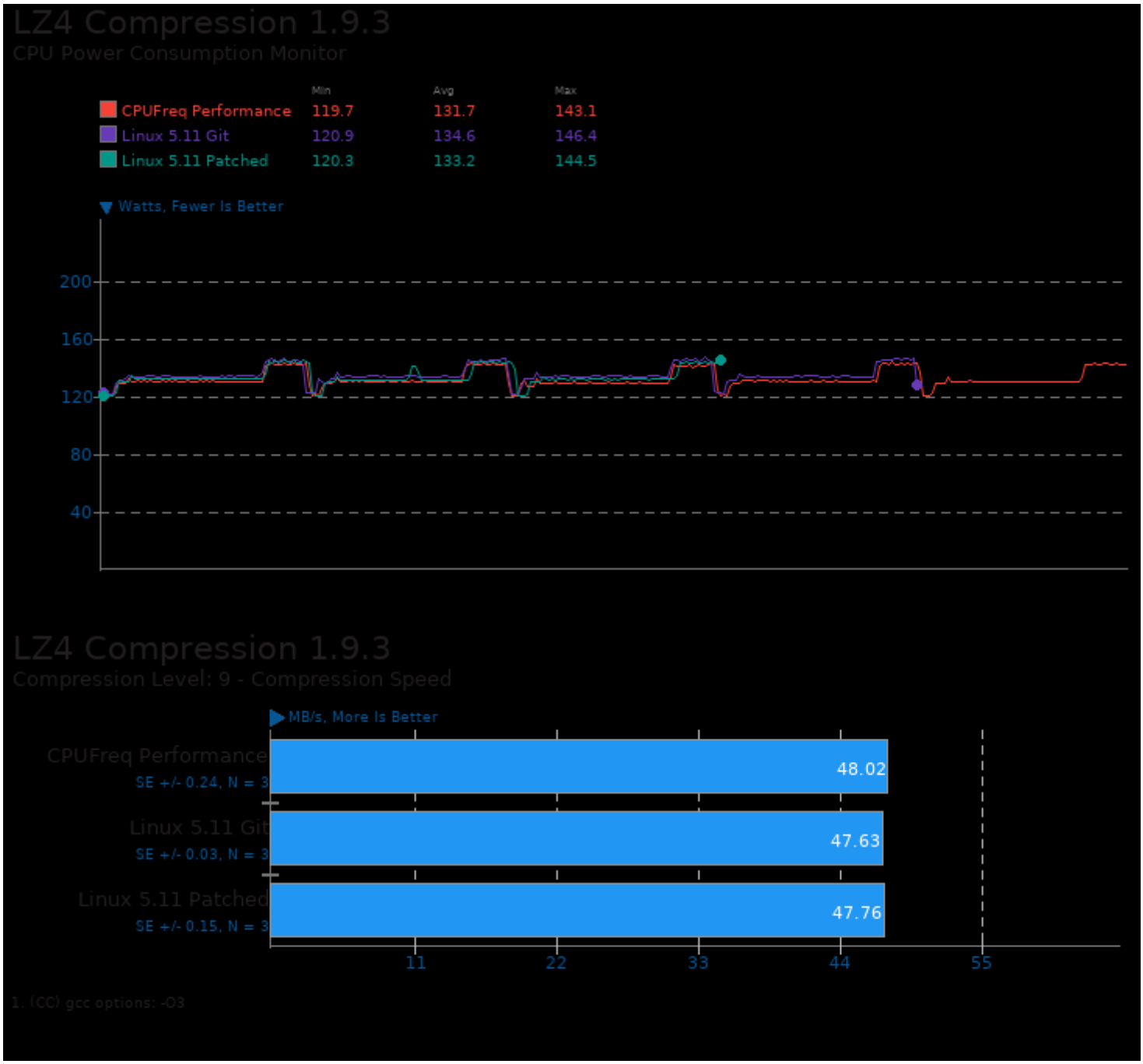
Compression Level: 3

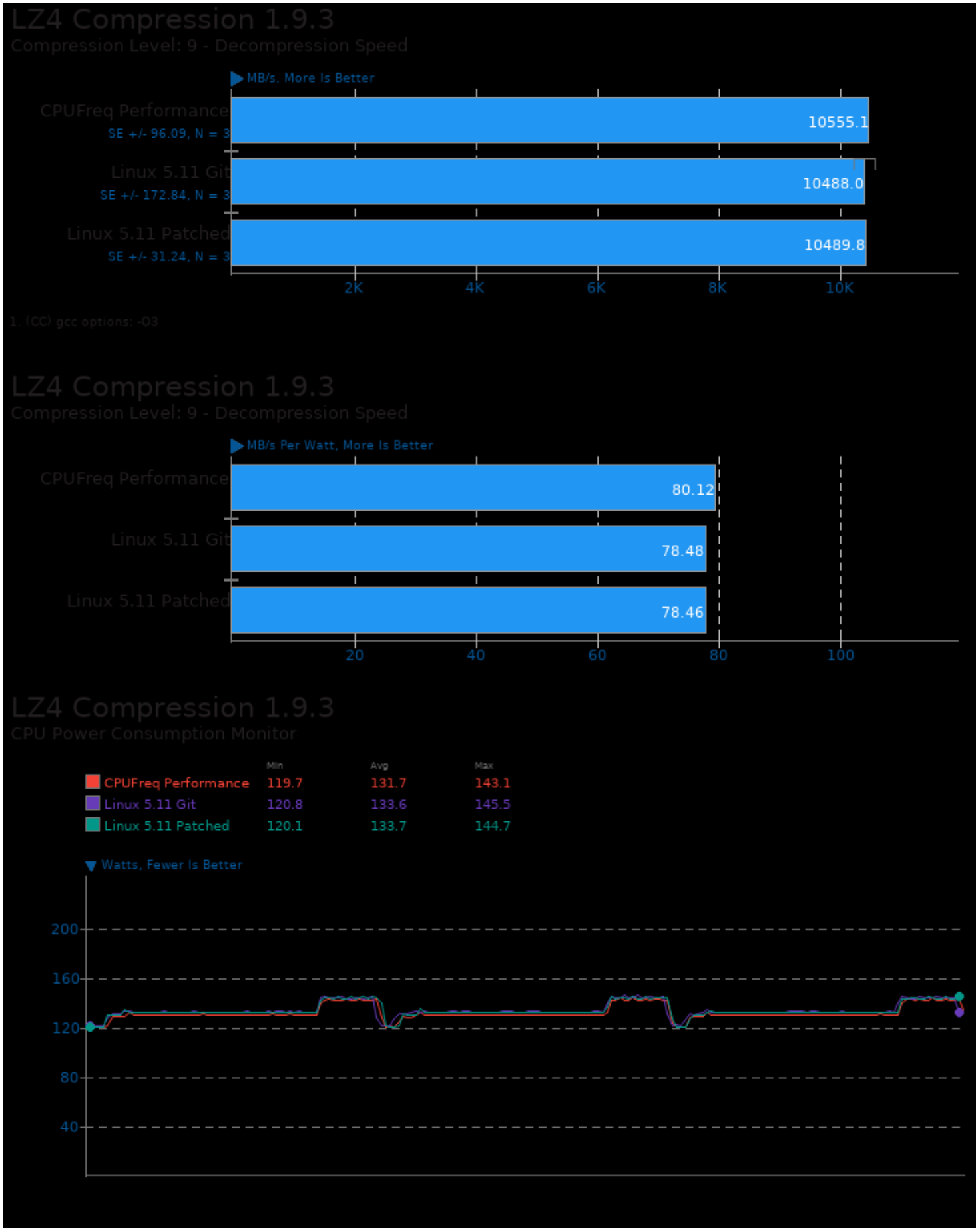


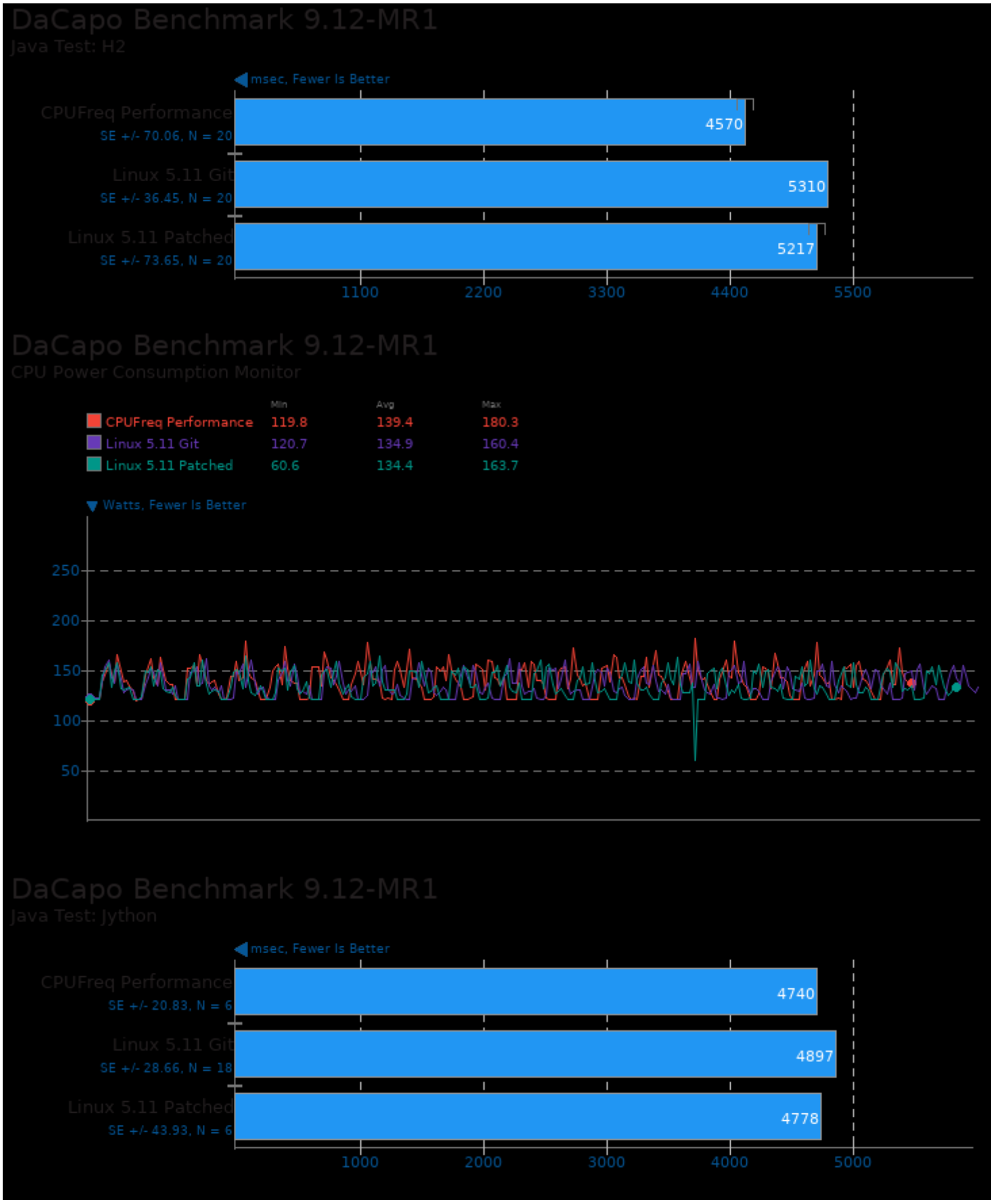

Zstd Compression 1.4.5
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.0 153.7 222.8
Linux 5.11 Git 121.4 153.5 205.1
Linux 5.11 Patched 120.7 150.7 214.6
Watts, Fewer Is Better
300
240
180
120
60
LZ4 Compression 1.9.3
Compression Level: 1 - Compression Speed
MB/s, More Is Better
CPUFreq Performance
SE +/- 71.91, N = 3
9651.61
Linux 5.11 Git
SE +/- 96.44, N = 3
9622.99
Linux 5.11 Patched
SE +/- 19.43, N = 3
9757.17
2K
4K
6K
8K
10K
1. (CC) gcc options: -O3

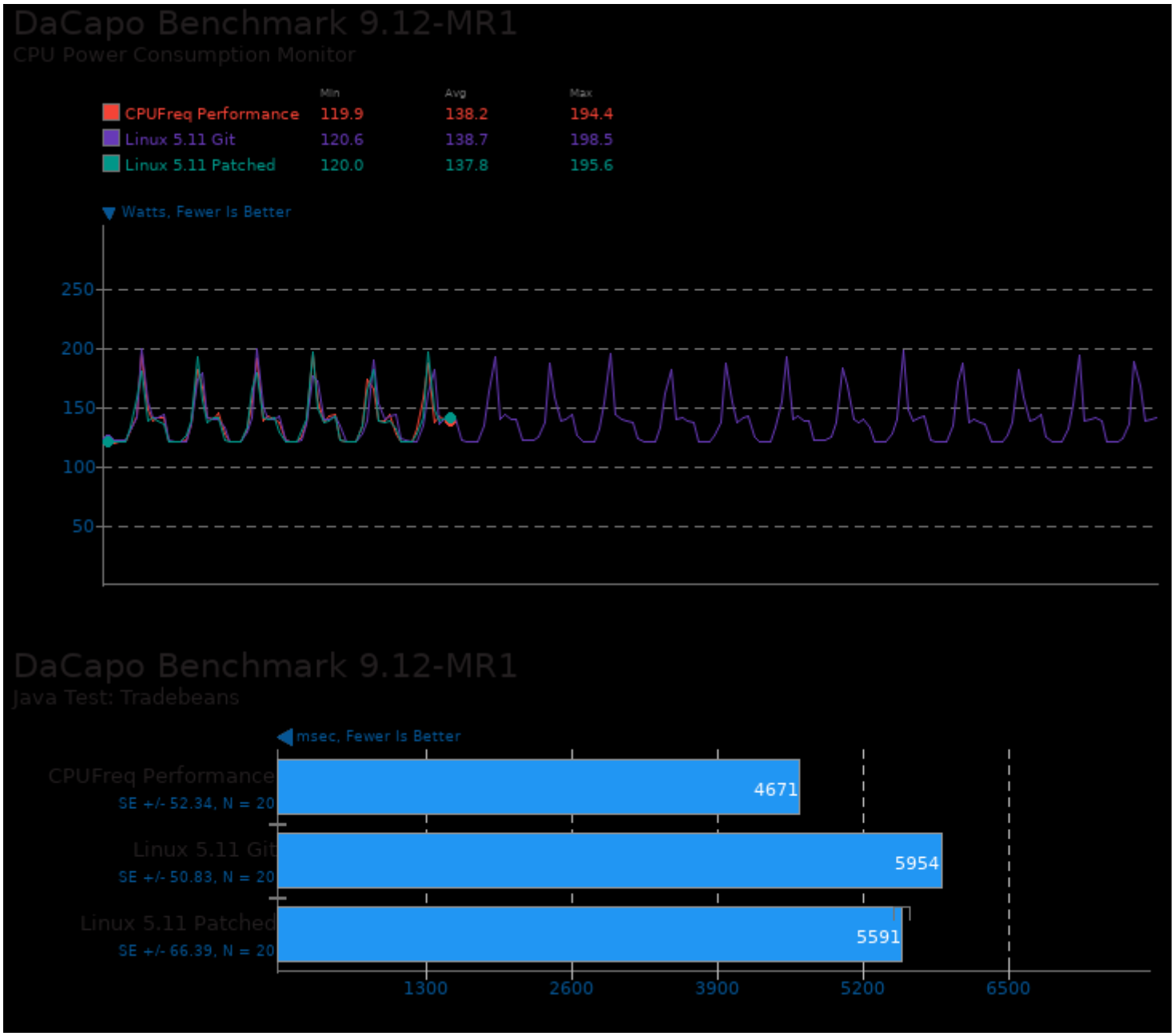

LZ4 Compression 1.9.3
Compression Level: 1 - Decompression Speed
MB/s, More Is Better
CPUFreq Performance
SE +/- 110.98, N = 3
11150.6
Linux 5.11 Git
SE +/- 46.17, N = 3
11334.0
Linux 5.11 Patched
SE +/- 25.21, N = 3
11305.0
2K
4K
6K
8K
10K
1. (CC) gcc options: -O3
LZ4 Compression 1.9.3
Compression Level: 1 - Decompression Speed
MB/s Per Watt, More Is Better
CPUFreq Performance
81.46
Linux 5.11 Git
81.09
Linux 5.11 Patched
81.34
20
40
60
80
100
LZ4 Compression 1.9.3
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 71.1 136.9 143.9
Linux 5.11 Git 121.6 139.8 146.0
Linux 5.11 Patched 120.7 139.0 145.1
Watts, Fewer Is Better
200
160
120
80
40

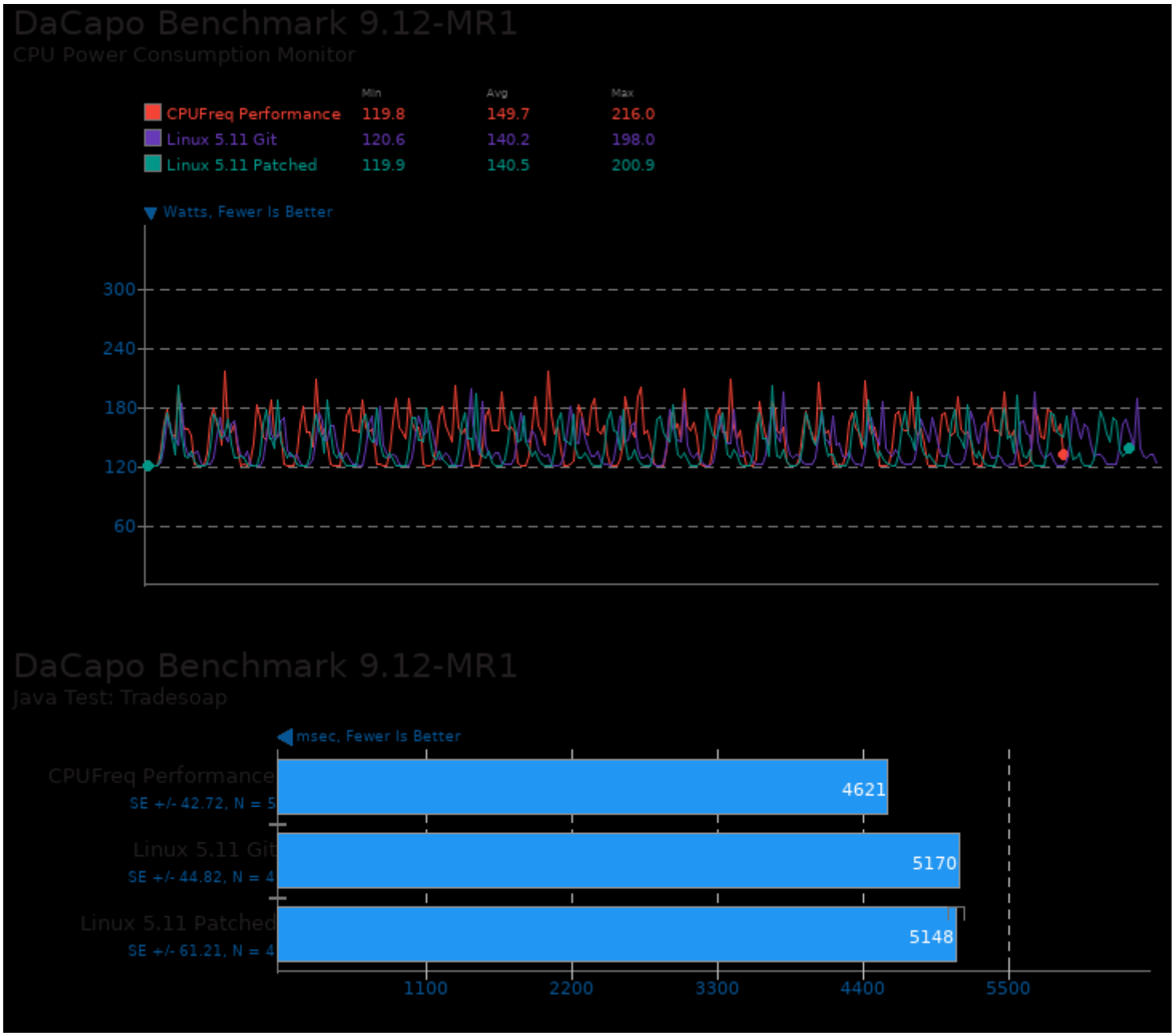

LZ4 Compression 1.9.3
Compression Level: 3 - Compression Speed
MB/s, More Is Better
CPUFreq Performance
SE +/- 0.52, N = 5
49.29
Linux 5.11 Git
SE +/- 0.56, N = 4
49.43
Linux 5.11 Patched
SE +/- 0.12, N = 3
48.95
11
22
33
44
55
1. (CC) gcc options: -O3
LZ4 Compression 1.9.3
Compression Level: 3 - Decompression Speed
MB/s, More Is Better
CPUFreq Performance
SE +/- 61.51, N = 5
10410.3
Linux 5.11 Git
SE +/- 38.32, N = 4
10404.5
Linux 5.11 Patched
SE +/- 60.61, N = 3
10666.0
2K
4K
6K
8K
10K
1. (CC) gcc options: -O3
LZ4 Compression 1.9.3
Compression Level: 3 - Decompression Speed
MB/s Per Watt, More Is Better
CPUFreq Performance
79.05
Linux 5.11 Git
77.28
Linux 5.11 Patched
80.07
20
40
60
80
100


LZ4 Compression 1.9.3
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 119.7 131.7 143.1
Linux 5.11 Git 120.9 134.6 146.4
Linux 5.11 Patched 120.3 133.2 144.5
Watts, Fewer Is Better
200
160
120
80
40
LZ4 Compression 1.9.3
Compression Level: 9 - Compression Speed
MB/s, More Is Better
CPUFreq Performance
SE +/- 0.24, N = 3
48.02
Linux 5.11 Git
SE +/- 0.03, N = 3
47.63
Linux 5.11 Patched
SE +/- 0.15, N = 3
47.76
11
22
33
44
55
1. (CC) gcc options: -O3


LZ4 Compression 1.9.3
Compression Level: 9 - Decompression Speed
MB/s, More Is Better
CPUFreq Performance
SE +/- 96.09, N = 3
10555.1
Linux 5.11 Git
SE +/- 172.84, N = 3
10488.0
Linux 5.11 Patched
SE +/- 31.24, N = 3
10489.8
2K
4K
6K
8K
10K
1. (CC) gcc options: -O3
LZ4 Compression 1.9.3
Compression Level: 9 - Decompression Speed
MB/s Per Watt, More Is Better
CPUFreq Performance
80.12
Linux 5.11 Git
78.48
Linux 5.11 Patched
78.46
20
40
60
80
100
LZ4 Compression 1.9.3
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 119.7 131.7 143.1
Linux 5.11 Git 120.8 133.6 145.5
Linux 5.11 Patched 120.1 133.7 144.7
Watts, Fewer Is Better
200
160
120
80
40


DaCapo Benchmark 9.12-MR1
Java Test: H2
msec, Fewer Is Better
CPUFreq Performance
SE +/- 70.06, N = 20
4570
Linux 5.11 Git
SE +/- 36.45, N = 20
5310
Linux 5.11 Patched
SE +/- 73.65, N = 20
5217
1100
2200
3300
4400
5500
DaCapo Benchmark 9.12-MR1
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 119.8 139.4 180.3
Linux 5.11 Git 120.7 134.9 160.4
Linux 5.11 Patched 60.6 134.4 163.7
Watts, Fewer Is Better
250
200
150
100
50
DaCapo Benchmark 9.12-MR1
Java Test: Jython
msec, Fewer Is Better
CPUFreq Performance
SE +/- 20.83, N = 6
4740
Linux 5.11 Git
SE +/- 28.66, N = 18
4897
Linux 5.11 Patched
SE +/- 43.93, N = 6
4778
1000
2000
3000
4000
5000


DaCapo Benchmark 9.12-MR1
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 119.9 138.2 194.4
Linux 5.11 Git 120.6 138.7 198.5
Linux 5.11 Patched 120.0 137.8 195.6
Watts, Fewer Is Better
250
200
150
100
50
DaCapo Benchmark 9.12-MR1
Java Test: Tradebeans
msec, Fewer Is Better
CPUFreq Performance
SE +/- 52.34, N = 20
4671
Linux 5.11 Git
SE +/- 50.83, N = 20
5954
Linux 5.11 Patched
SE +/- 66.39, N = 20
5591
1300
2600
3900
5200
6500


DaCapo Benchmark 9.12-MR1
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 119.8 149.7 216.0
Linux 5.11 Git 120.6 140.2 198.0
Linux 5.11 Patched 119.9 140.5 200.9
Watts, Fewer Is Better
300
240
180
120
60
DaCapo Benchmark 9.12-MR1
Java Test: Tradesoap
msec, Fewer Is Better
CPUFreq Performance
SE +/- 42.72, N = 5
4621
Linux 5.11 Git
SE +/- 44.82, N = 4
5170
Linux 5.11 Patched
SE +/- 61.21, N = 4
5148
1100
2200
3300
4400
5500

AMD EPYC 7F72 2P Linux 5.11 Perf Governor

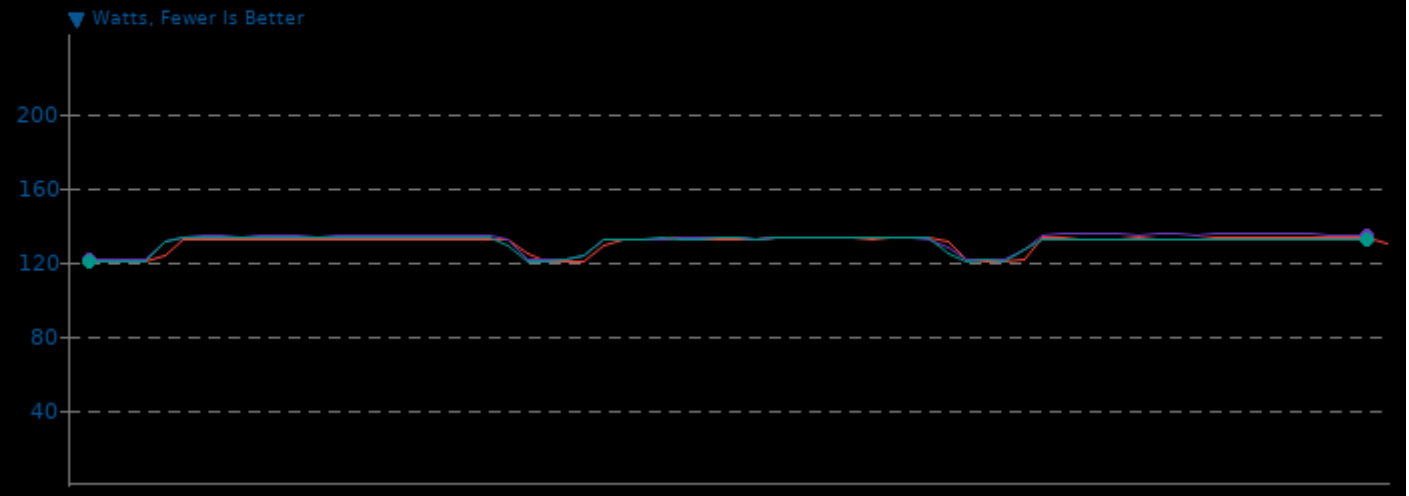


AMD EPYC 7F72 2P Linux 5.11 Perf Governor

Dolfyn 0.527

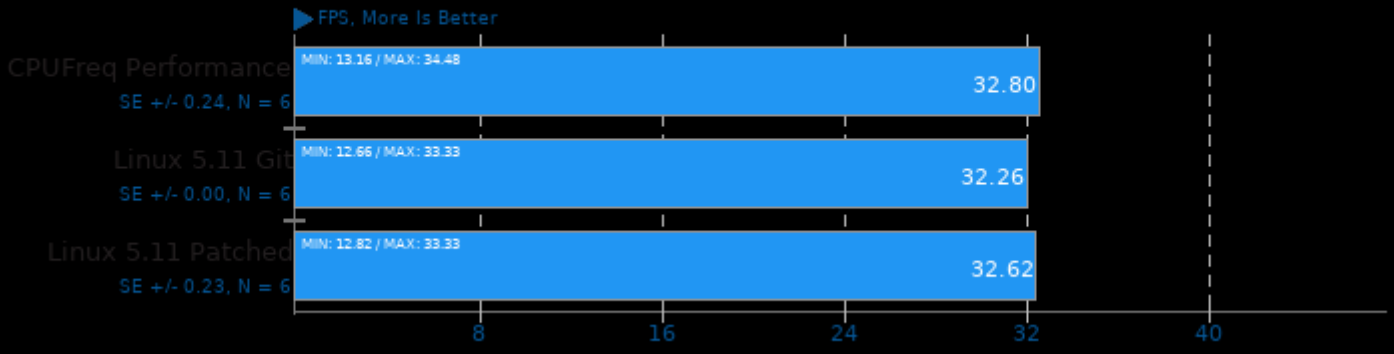
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	119.9	129.9	132.6
Linux 5.11 Git	120.7	131.3	135.0
Linux 5.11 Patched	119.8	130.2	133.2



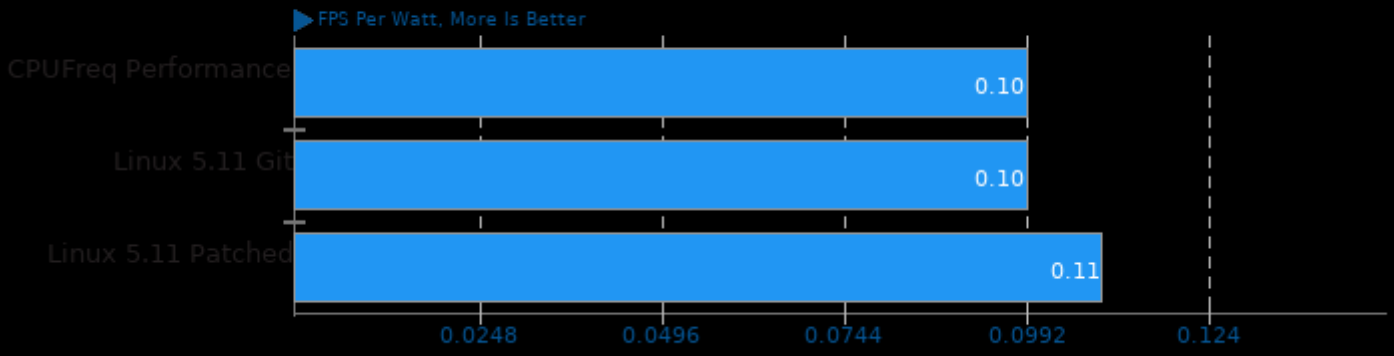
OSPray 1.8.5

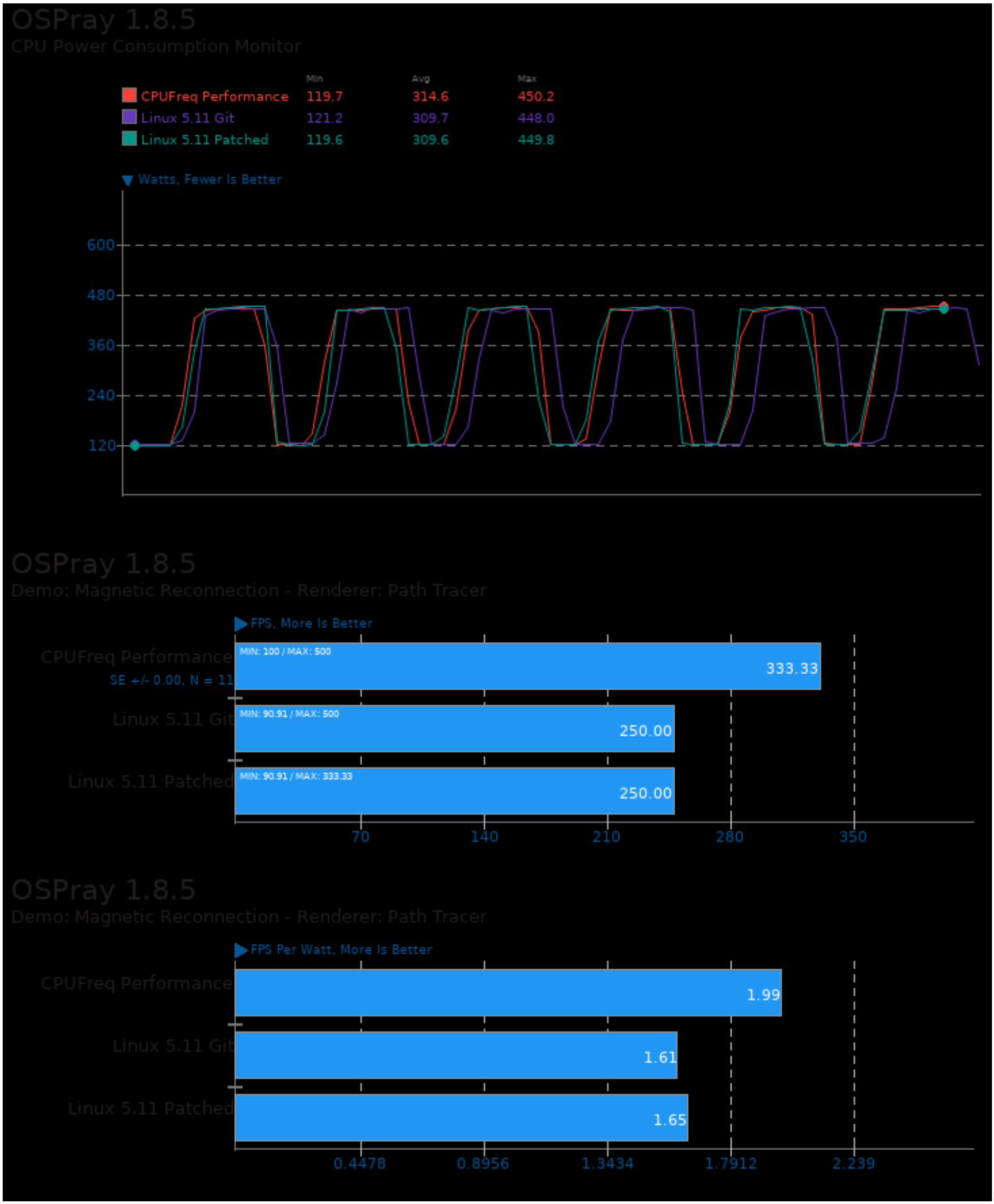
Demo: Magnetic Reconnection - Renderer: SciVis

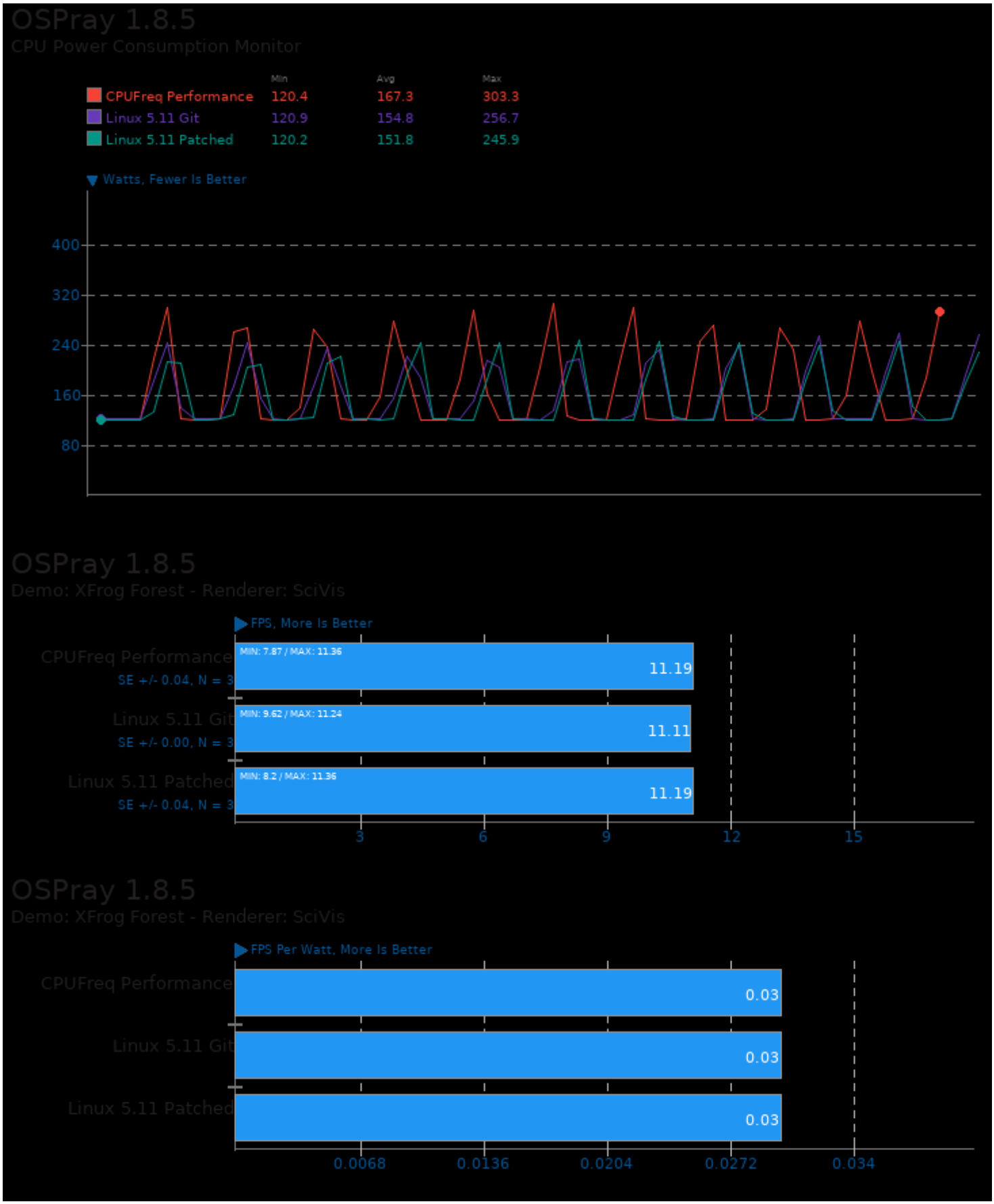


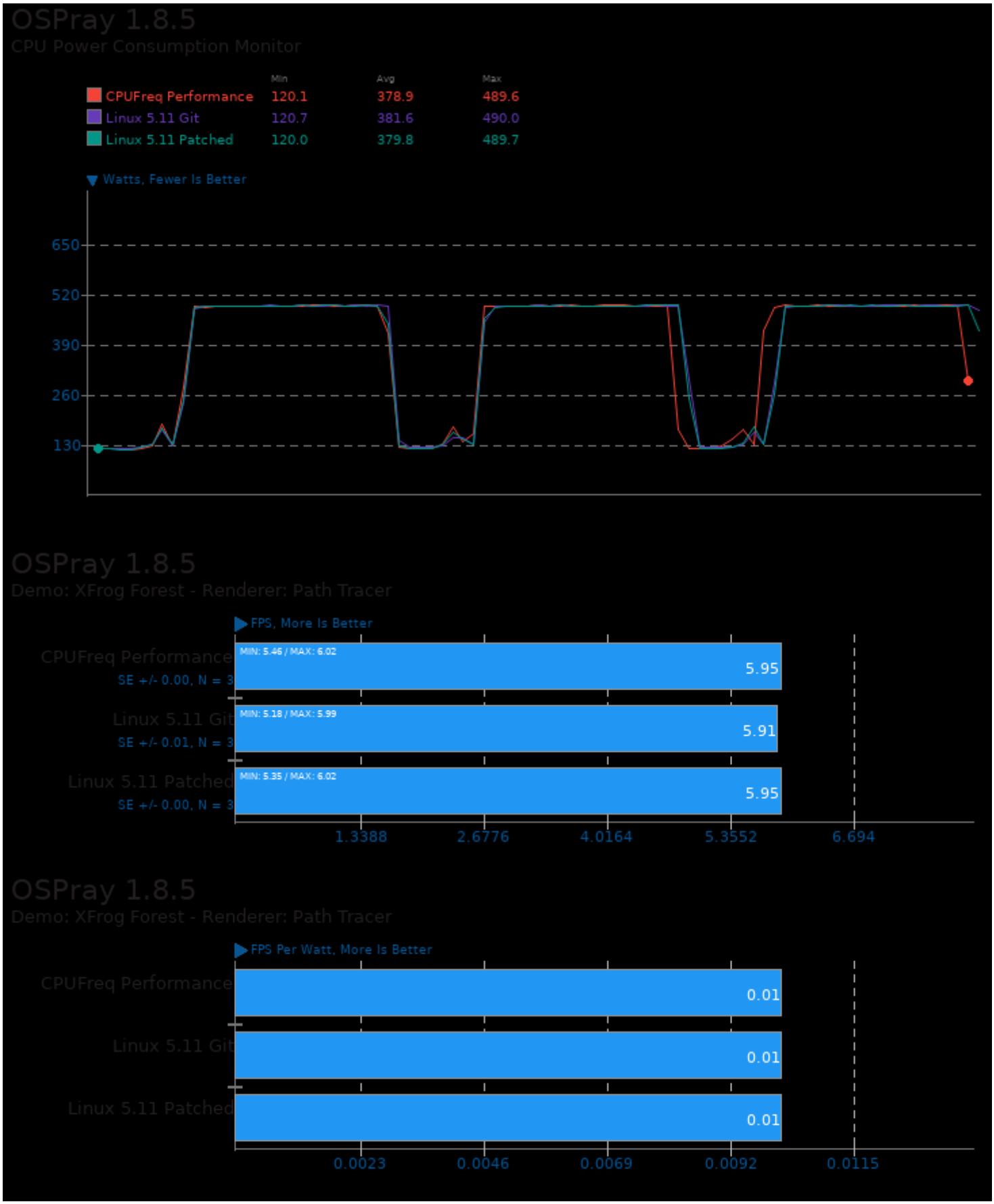
OSPray 1.8.5

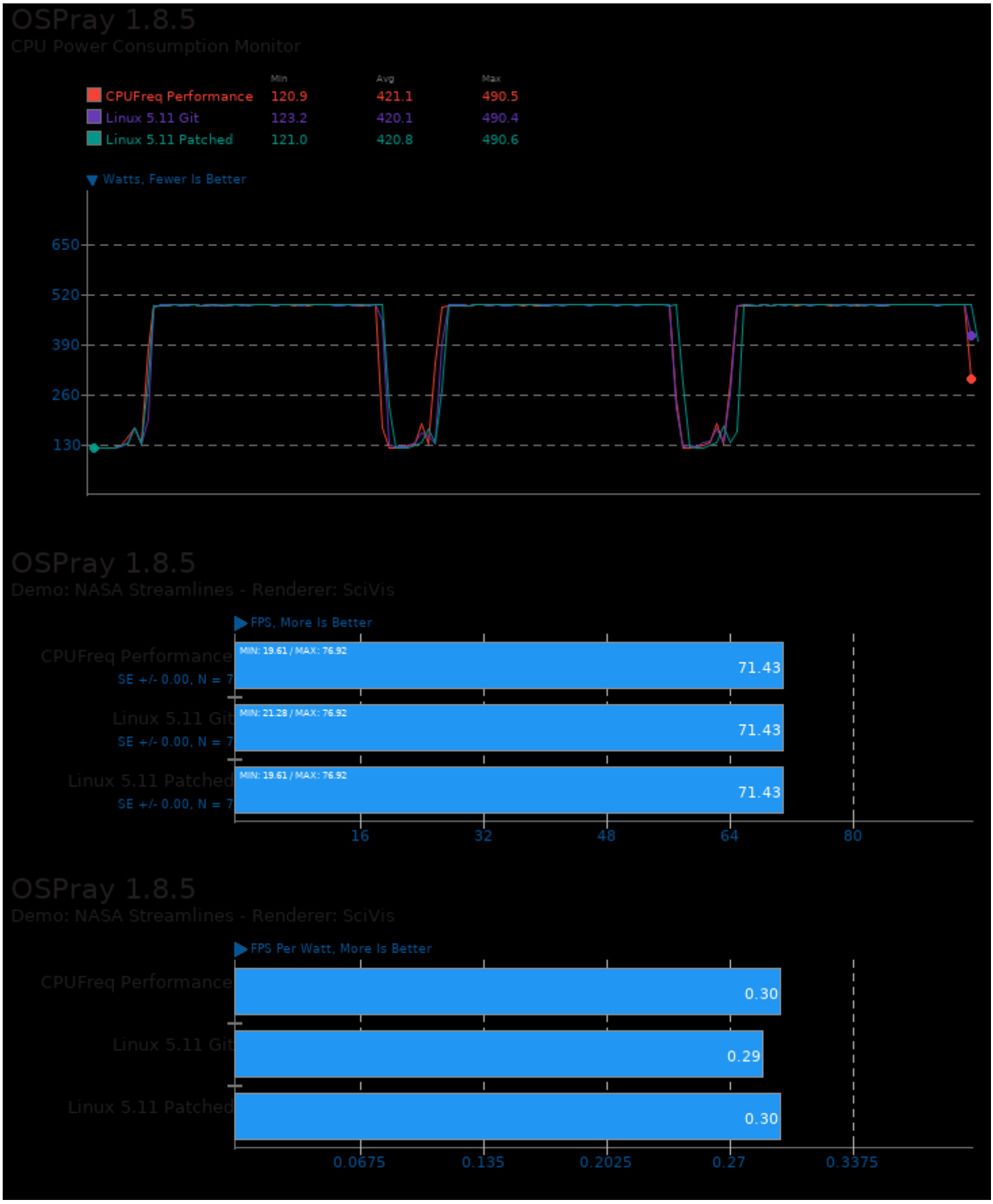
Demo: Magnetic Reconnection - Renderer: SciVis

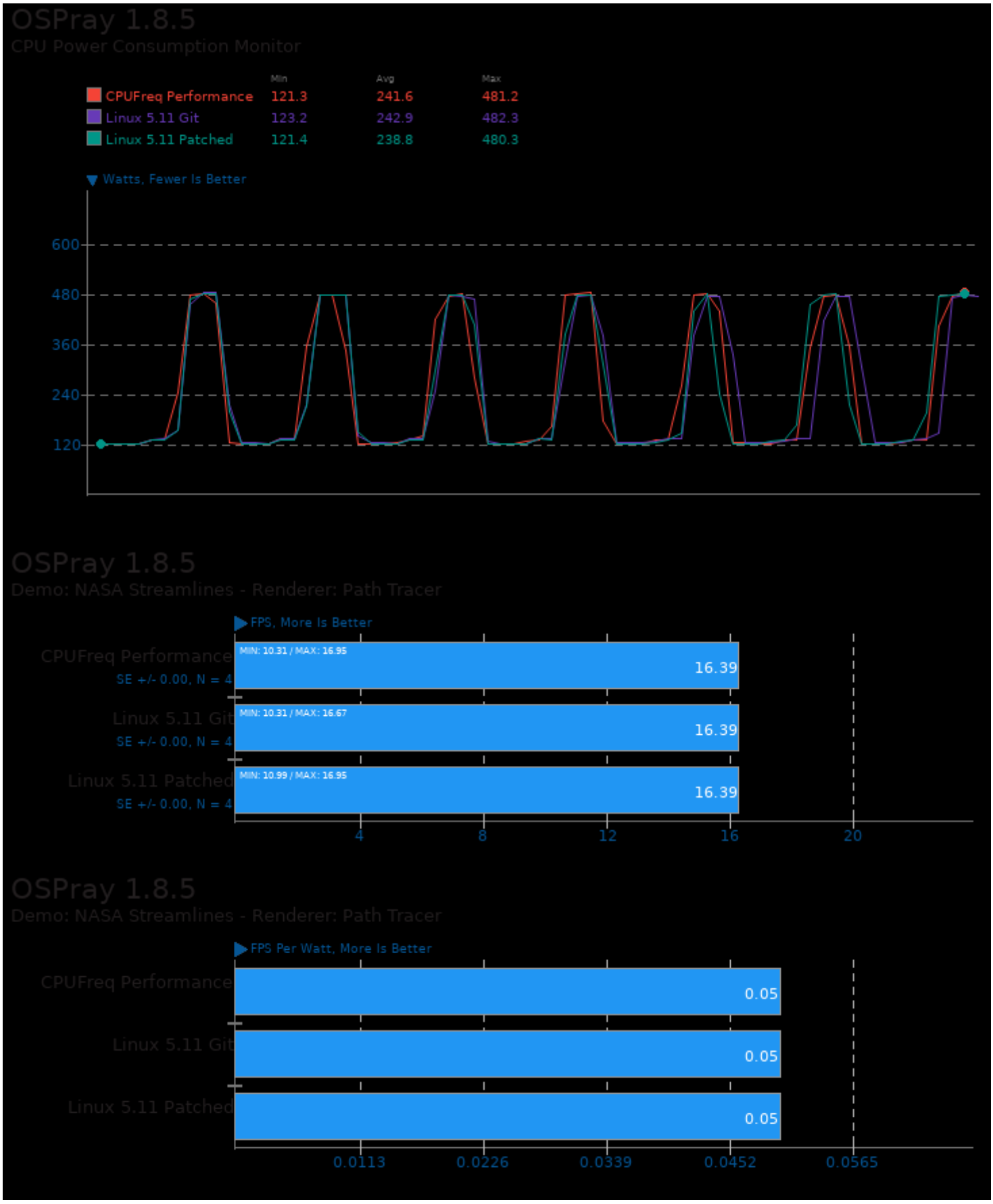


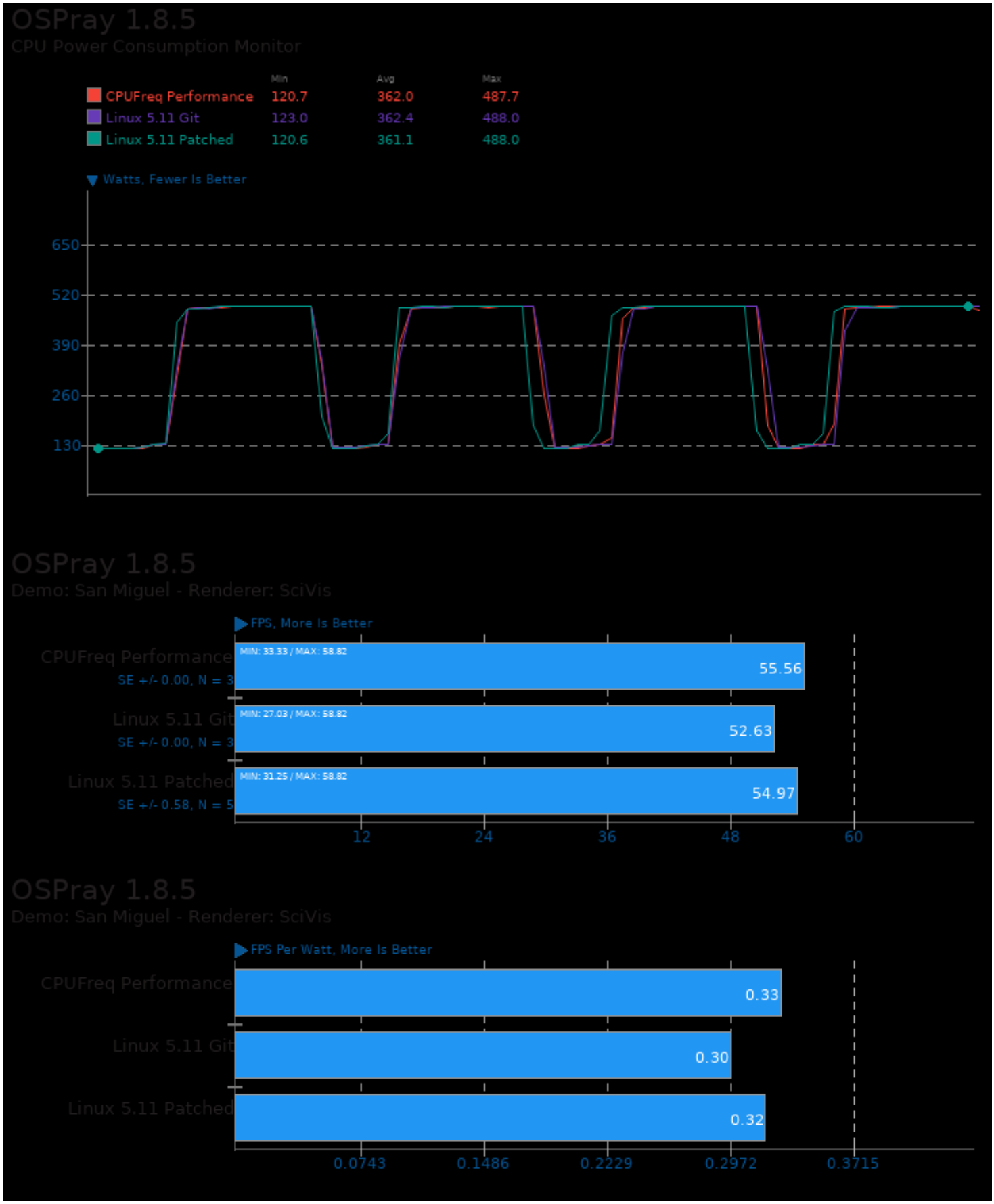

OSPray 1.8.5
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 119.7 314.6 450.2
Linux 5.11 Git 121.2 309.7 448.0
Linux 5.11 Patched 119.6 309.6 449.8
Watts, Fewer Is Better
600
480
360
240
120
OSPray 1.8.5
Demo: Magnetic Reconnection - Renderer: Path Tracer
FPS, More Is Better
CPUFreq Performance
SE +/- 0.00, N = 11
MIN: 100 / MAX: 500
333.33
Linux 5.11 Git
MIN: 90.91 / MAX: 500
250.00
Linux 5.11 Patched
MIN: 90.91 / MAX: 333.33
250.00
70
140
210
280
350
OSPray 1.8.5
Demo: Magnetic Reconnection - Renderer: Path Tracer
FPS Per Watt, More Is Better
CPUFreq Performance
1.99
Linux 5.11 Git
1.61
Linux 5.11 Patched
1.65
0.4478
0.8956
1.3434
1.7912
2.239

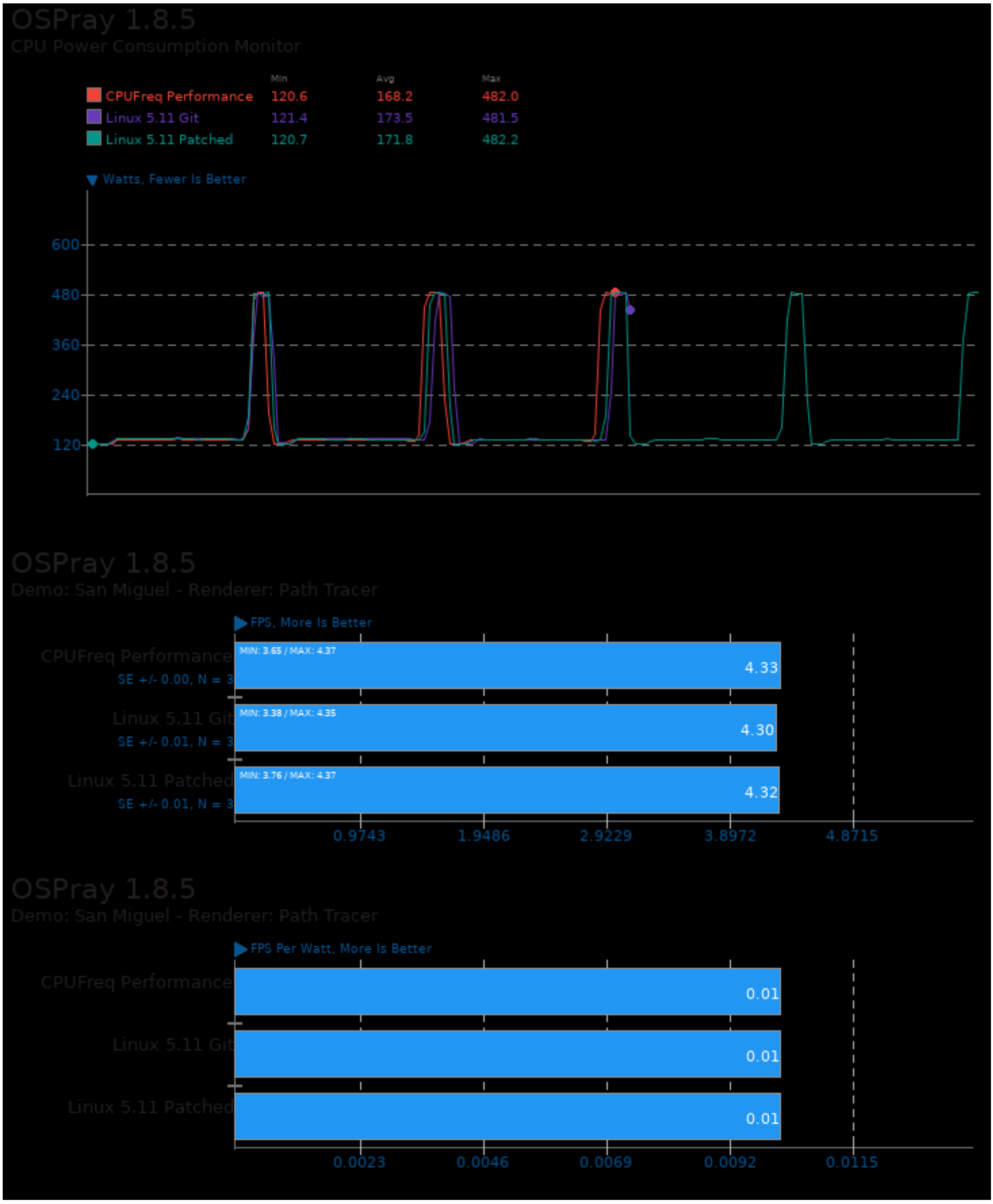

OSPray 1.8.5
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.4 167.3 303.3
Linux 5.11 Git 120.9 154.8 256.7
Linux 5.11 Patched 120.2 151.8 245.9
Watts, Fewer Is Better
400
320
240
160
80
OSPray 1.8.5
Demo: XFrog Forest - Renderer: SciVis
FPS, More Is Better
CPUFreq Performance
SE +/- 0.04, N = 3
MIN: 7.87 / MAX: 11.36
11.19
Linux 5.11 Git
SE +/- 0.00, N = 3
MIN: 9.62 / MAX: 11.24
11.11
Linux 5.11 Patched
SE +/- 0.04, N = 3
MIN: 8.2 / MAX: 11.36
11.19
3
6
9
12
15
OSPray 1.8.5
Demo: XFrog Forest - Renderer: SciVis
FPS Per Watt, More Is Better
CPUFreq Performance
0.03
Linux 5.11 Git
0.03
Linux 5.11 Patched
0.03
0.0068
0.0136
0.0204
0.0272
0.034

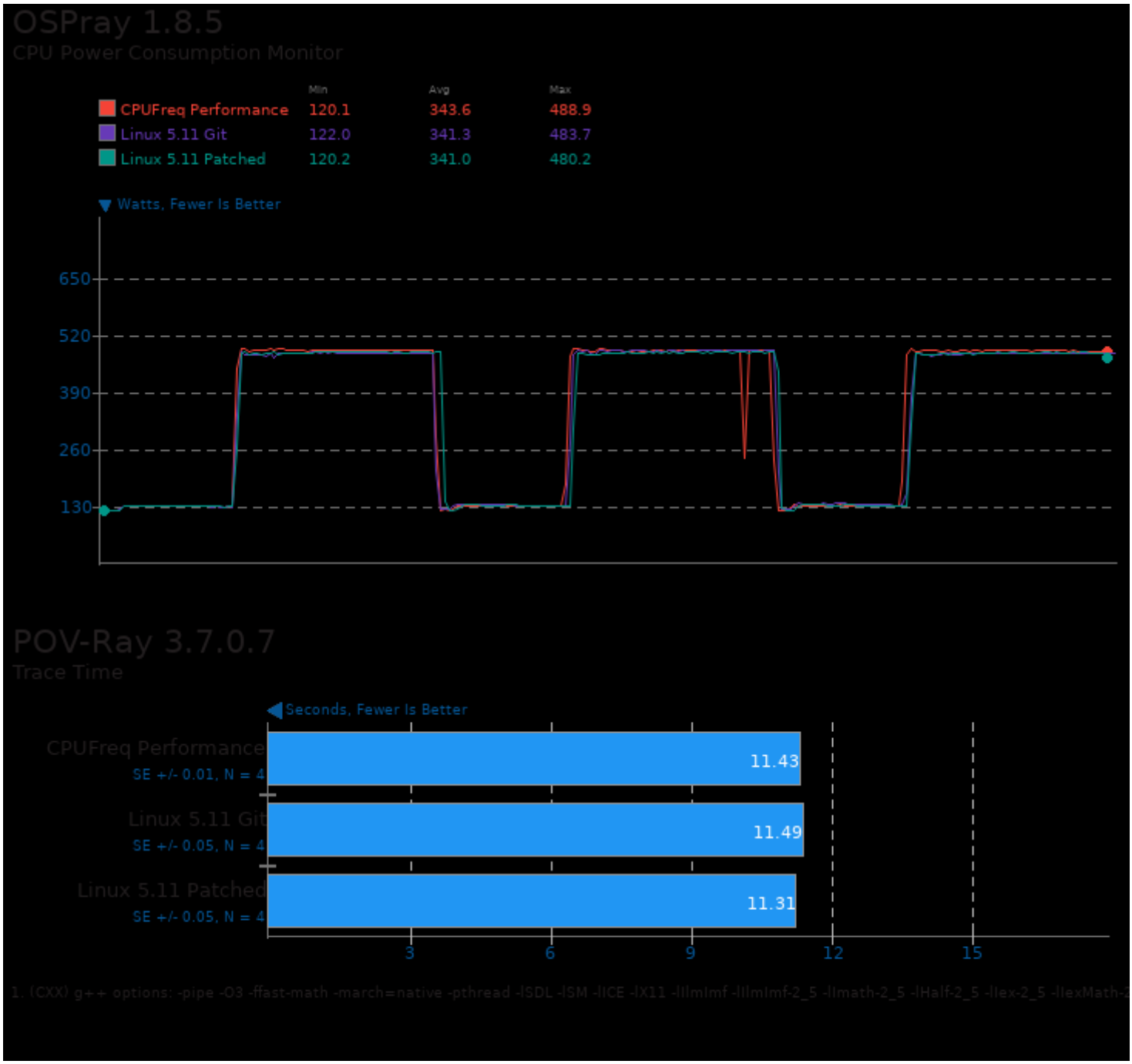

OSPray 1.8.5
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.1 378.9 489.6
Linux 5.11 Git 120.7 381.6 490.0
Linux 5.11 Patched 120.0 379.8 489.7
Watts, Fewer Is Better
650
520
390
260
130
OSPray 1.8.5
Demo: XFrog Forest - Renderer: Path Tracer
FPS, More Is Better
CPUFreq Performance
SE +/- 0.00, N = 3
MIN: 5.46 / MAX: 6.02
5.95
Linux 5.11 Git
SE +/- 0.01, N = 3
MIN: 5.18 / MAX: 5.99
5.91
Linux 5.11 Patched
SE +/- 0.00, N = 3
MIN: 5.35 / MAX: 6.02
5.95
1.3388
2.6776
4.0164
5.3552
6.694
OSPray 1.8.5
Demo: XFrog Forest - Renderer: Path Tracer
FPS Per Watt, More Is Better
CPUFreq Performance
0.01
Linux 5.11 Git
0.01
Linux 5.11 Patched
0.01
0.0023
0.0046
0.0069
0.0092
0.0115


OSPray 1.8.5
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.9 421.1 490.5
Linux 5.11 Git 123.2 420.1 490.4
Linux 5.11 Patched 121.0 420.8 490.6
Watts, Fewer Is Better
650
520
390
260
130
OSPray 1.8.5
Demo: NASA Streamlines - Renderer: SciVis
FPS, More Is Better
CPUFreq Performance
SE +/- 0.00, N = 7
MIN: 19.61 / MAX: 76.92
71.43
Linux 5.11 Git
SE +/- 0.00, N = 7
MIN: 21.28 / MAX: 76.92
71.43
Linux 5.11 Patched
SE +/- 0.00, N = 7
MIN: 19.61 / MAX: 76.92
71.43
16
32
48
64
80
OSPray 1.8.5
Demo: NASA Streamlines - Renderer: SciVis
FPS Per Watt, More Is Better
CPUFreq Performance
0.30
Linux 5.11 Git
0.29
Linux 5.11 Patched
0.30
0.0675
0.135
0.2025
0.27
0.3375


OSPray 1.8.5
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 121.3 241.6 481.2
Linux 5.11 Git 123.2 242.9 482.3
Linux 5.11 Patched 121.4 238.8 480.3
Watts, Fewer Is Better
600
480
360
240
120
OSPray 1.8.5
Demo: NASA Streamlines - Renderer: Path Tracer
FPS, More Is Better
CPUFreq Performance
SE +/- 0.00, N = 4
MIN: 10.31 / MAX: 16.95
16.39
Linux 5.11 Git
SE +/- 0.00, N = 4
MIN: 10.31 / MAX: 16.67
16.39
Linux 5.11 Patched
SE +/- 0.00, N = 4
MIN: 10.99 / MAX: 16.95
16.39
4
8
12
16
20
OSPray 1.8.5
Demo: NASA Streamlines - Renderer: Path Tracer
FPS Per Watt, More Is Better
CPUFreq Performance
0.05
Linux 5.11 Git
0.05
Linux 5.11 Patched
0.05
0.0113
0.0226
0.0339
0.0452
0.0565


OSPray 1.8.5
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.7 362.0 487.7
Linux 5.11 Git 123.0 362.4 488.0
Linux 5.11 Patched 120.6 361.1 488.0
Watts, Fewer Is Better
650
520
390
260
130
OSPray 1.8.5
Demo: San Miguel - Renderer: SciVis
FPS, More Is Better
CPUFreq Performance
SE +/- 0.00, N = 3
MIN: 33.33 / MAX: 58.82
55.56
Linux 5.11 Git
SE +/- 0.00, N = 3
MIN: 27.03 / MAX: 58.82
52.63
Linux 5.11 Patched
SE +/- 0.58, N = 5
MIN: 31.25 / MAX: 58.82
54.97
12
24
36
48
60
OSPray 1.8.5
Demo: San Miguel - Renderer: SciVis
FPS Per Watt, More Is Better
CPUFreq Performance
0.33
Linux 5.11 Git
0.30
Linux 5.11 Patched
0.32
0.0743
0.1486
0.2229
0.2972
0.3715

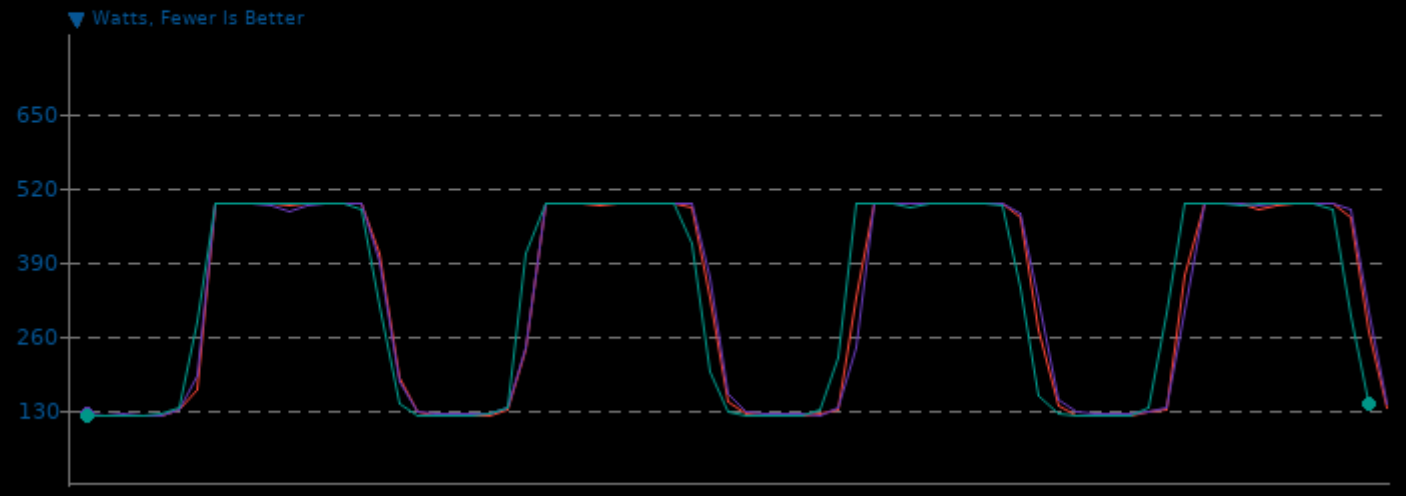

OSPray 1.8.5
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.6 168.2 482.0
Linux 5.11 Git 121.4 173.5 481.5
Linux 5.11 Patched 120.7 171.8 482.2
Watts, Fewer Is Better
600
480
360
240
120
OSPray 1.8.5
Demo: San Miguel - Renderer: Path Tracer
FPS, More Is Better
CPUFreq Performance
SE +/- 0.00, N = 3
MIN: 3.65 / MAX: 4.37
4.33
Linux 5.11 Git
SE +/- 0.01, N = 3
MIN: 3.38 / MAX: 4.35
4.30
Linux 5.11 Patched
SE +/- 0.01, N = 3
MIN: 3.76 / MAX: 4.37
4.32
0.9743
1.9486
2.9229
3.8972
4.8715
OSPray 1.8.5
Demo: San Miguel - Renderer: Path Tracer
FPS Per Watt, More Is Better
CPUFreq Performance
0.01
Linux 5.11 Git
0.01
Linux 5.11 Patched
0.01
0.0023
0.0046
0.0069
0.0092
0.0115


OSPray 1.8.5
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.1 343.6 488.9
Linux 5.11 Git 122.0 341.3 483.7
Linux 5.11 Patched 120.2 341.0 480.2
Watts, Fewer Is Better
650
520
390
260
130
POV-Ray 3.7.0.7
Trace Time
Seconds, Fewer Is Better
CPUFreq Performance
SE +/- 0.01, N = 4
11.43
Linux 5.11 Git
SE +/- 0.05, N = 4
11.49
Linux 5.11 Patched
SE +/- 0.05, N = 4
11.31
3
6
9
12
15

POV-Ray 3.7.0.7

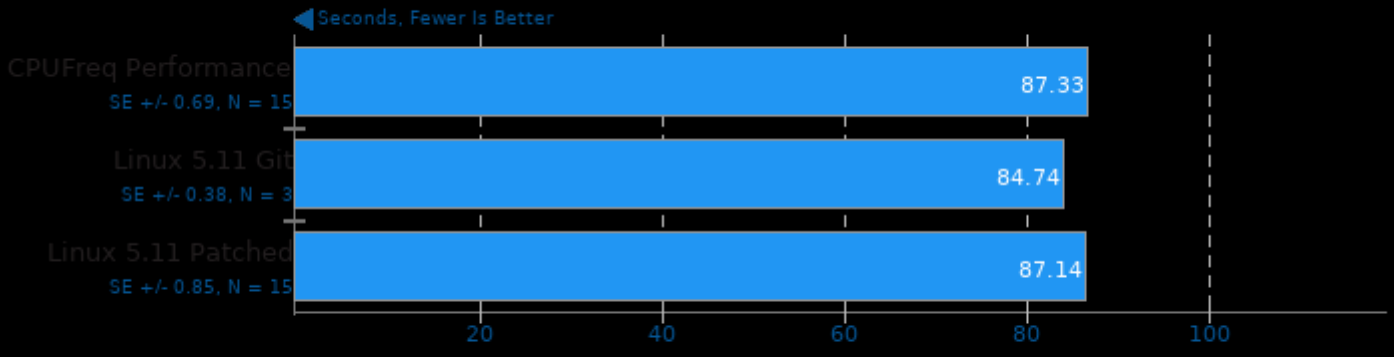
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	121.6	327.6	492.1
Linux 5.11 Git	123.4	328.8	492.1
Linux 5.11 Patched	121.5	329.6	492.1



YafaRay 3.4.1

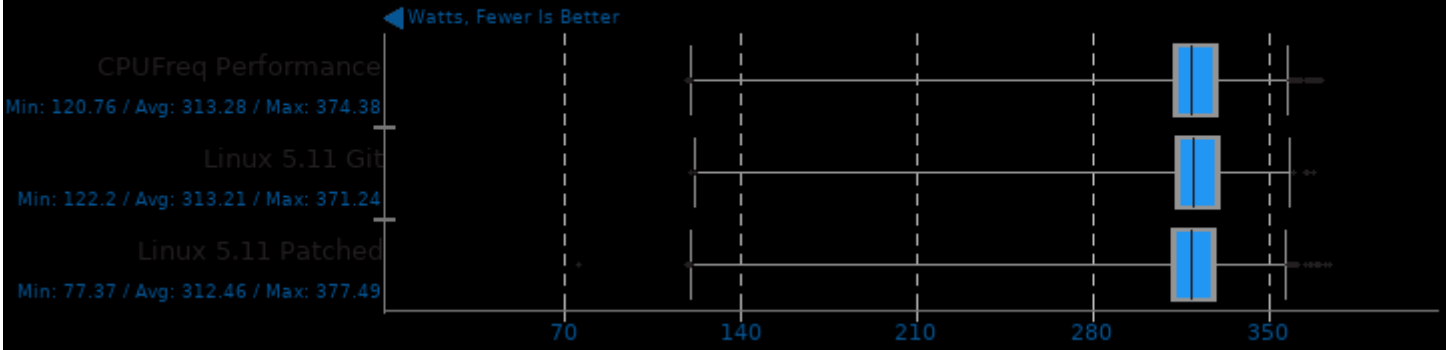
Total Time For Sample Scene



1. (CXX) g++ options: -std=c++11 -O3 -ffast-math -rdynamic -ldl -lImath -lIlmImf -lIex -lHalf -lz -lIlmThread -lxml2 -lfreetype -lpthread

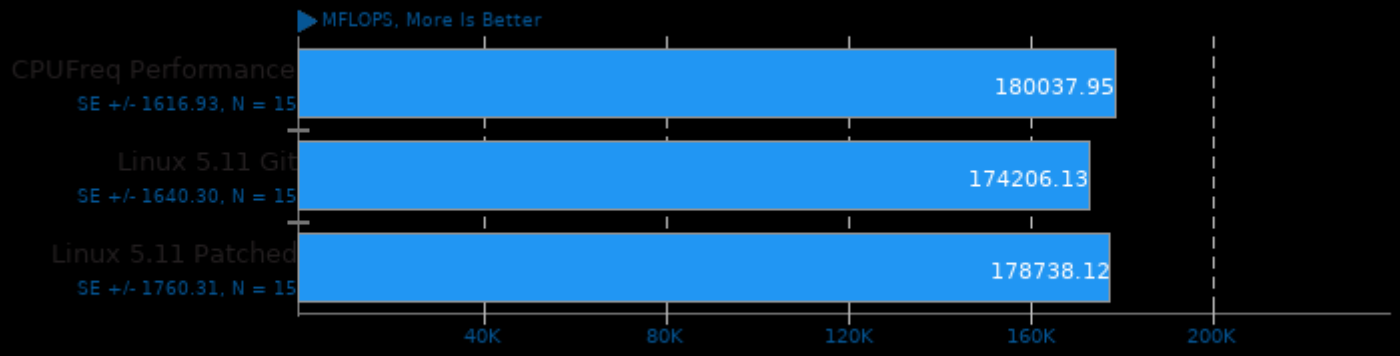
YafaRay 3.4.1

CPU Power Consumption Monitor



FFTE 7.0

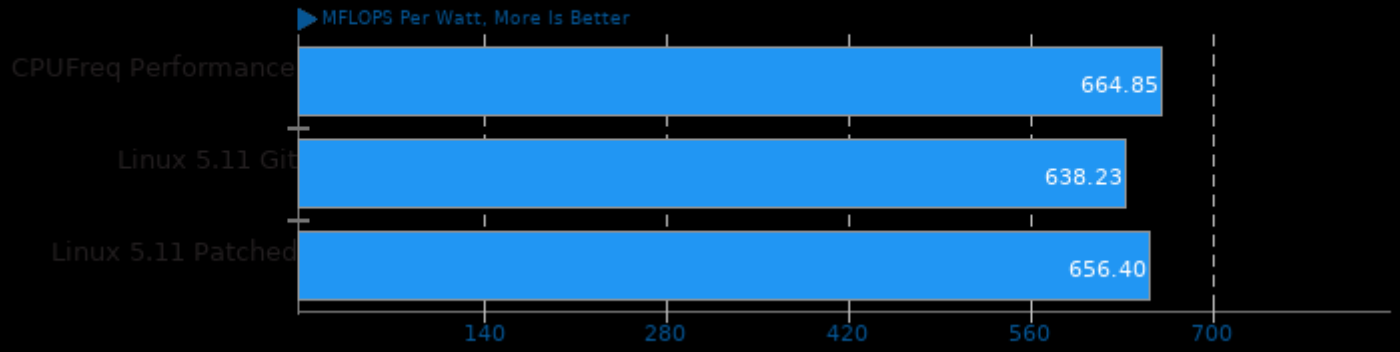
N=256, 3D Complex FFT Routine



1. (F9X) gfortran options: -O3 -fomit-frame-pointer -fopenmp

FFTE 7.0

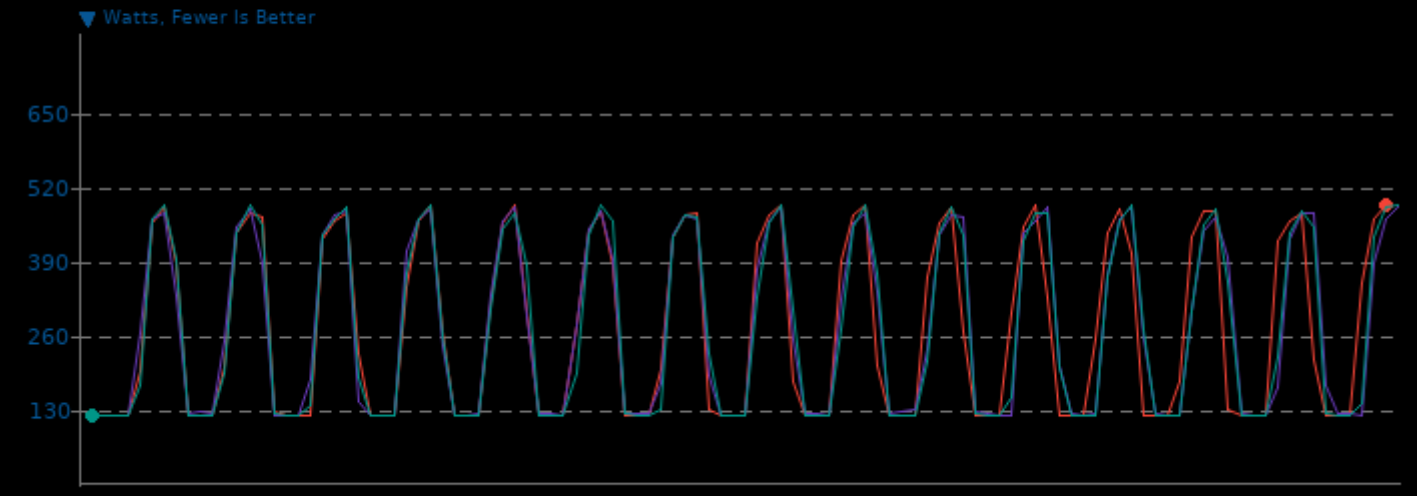
N=256, 3D Complex FFT Routine

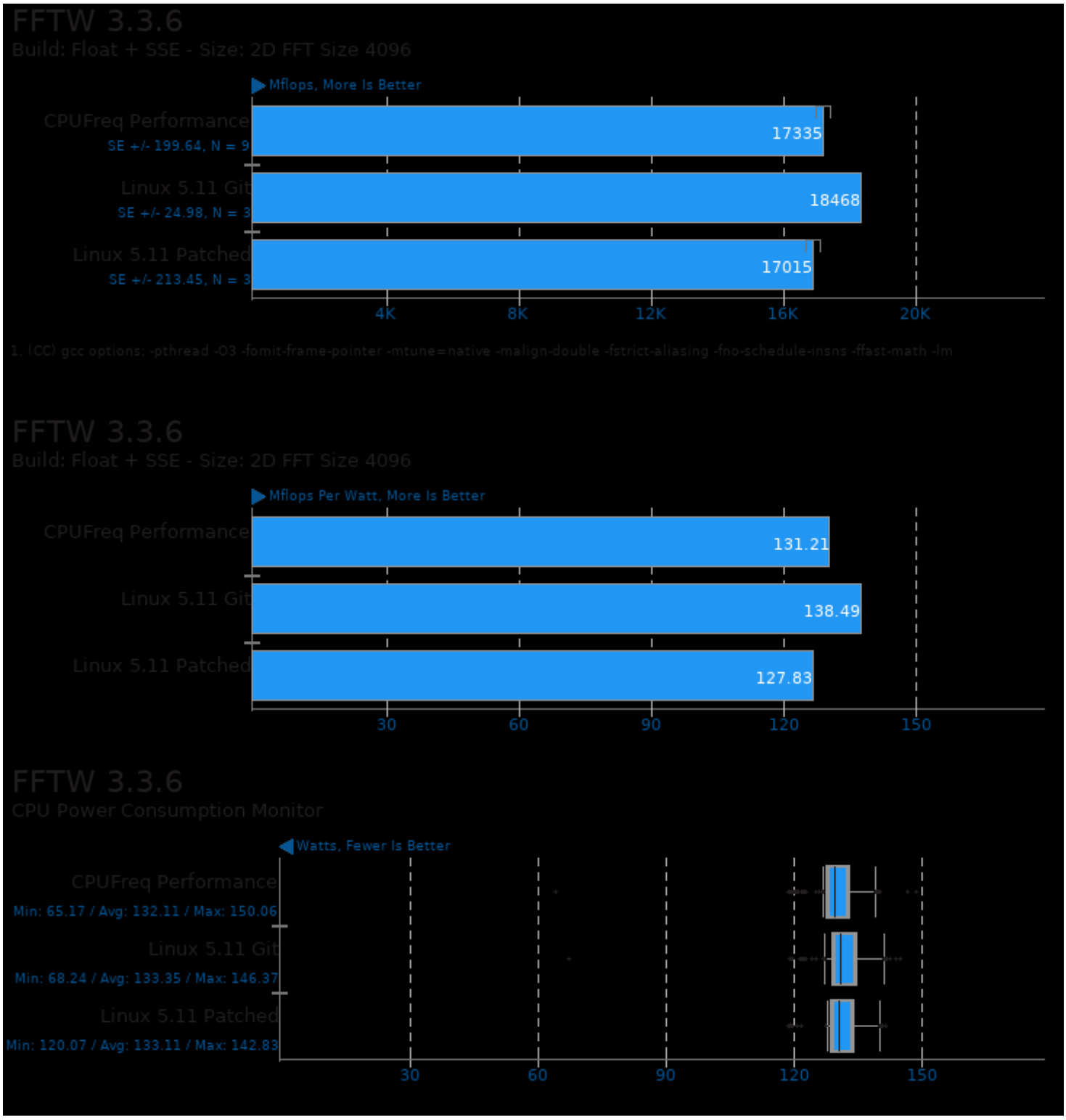


FFTE 7.0

CPU Power Consumption Monitor

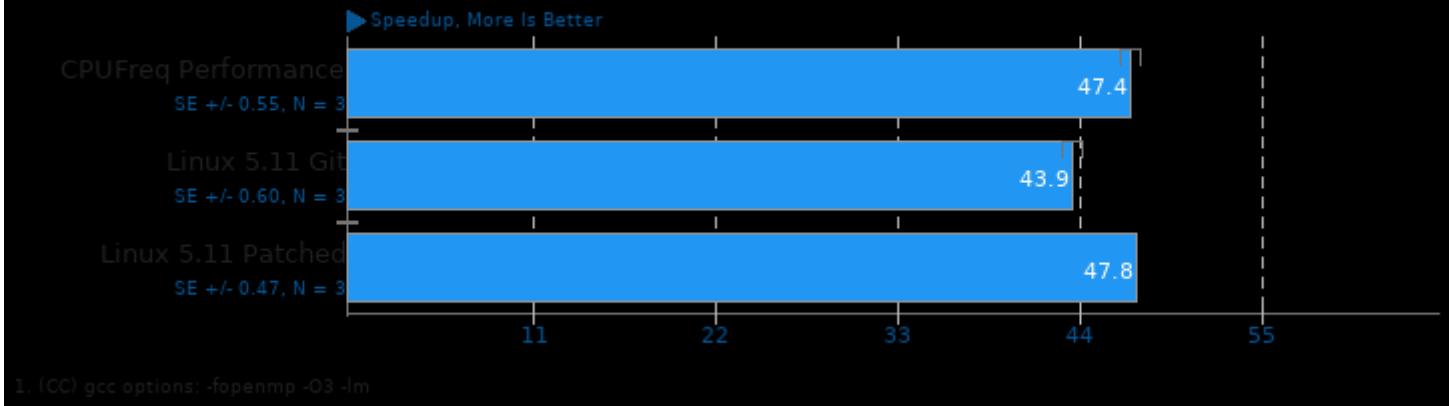
	Min	Avg	Max
CPUFreq Performance	121.3	270.8	488.6
Linux 5.11 Git	122.2	273.0	485.1
Linux 5.11 Patched	121.3	272.3	488.9




FFTW 3.3.6
Build: Float + SSE - Size: 2D FFT Size 4096
Mflops, More Is Better
CPUFreq Performance
SE +/- 199.64, N = 9
17335
Linux 5.11 Git
SE +/- 24.98, N = 3
18468
Linux 5.11 Patched
SE +/- 213.45, N = 3
17015
4K
8K
12K
16K
20K
1. (CC) gcc options: -pthread -O3 -fomit-frame-pointer -mtune=native -malign-double -fstrict-aliasing -fno-schedule-insns -ffast-math -lm
FFTW 3.3.6
Build: Float + SSE - Size: 2D FFT Size 4096
Mflops Per Watt, More Is Better
CPUFreq Performance
131.21
Linux 5.11 Git
138.49
Linux 5.11 Patched
127.83
30
60
90
120
150
FFTW 3.3.6
CPU Power Consumption Monitor
Watts, Fewer Is Better
CPUFreq Performance
Min: 65.17 / Avg: 132.11 / Max: 150.06
Linux 5.11 Git
Min: 68.24 / Avg: 133.35 / Max: 146.37
Linux 5.11 Patched
Min: 120.07 / Avg: 133.11 / Max: 142.83
30
60
90
120
150

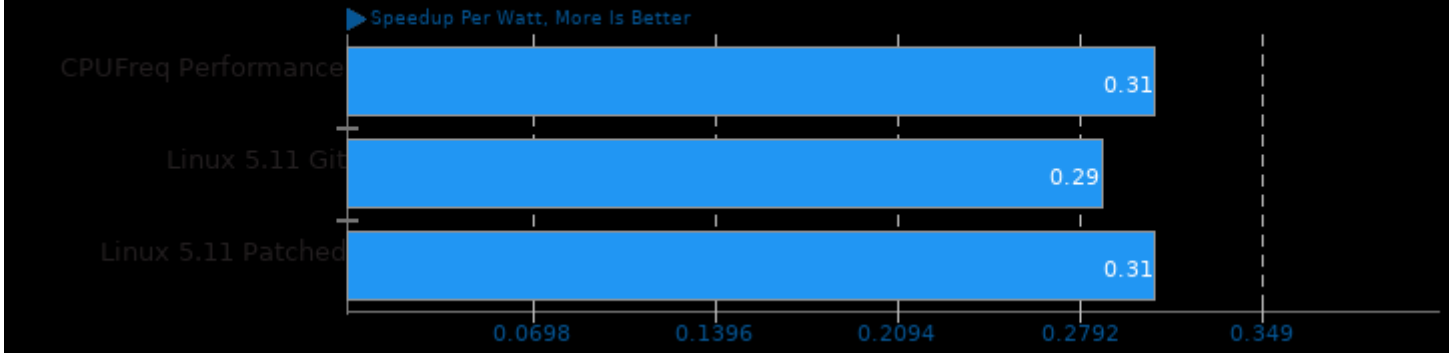
AMD EPYC 7F72 2P Linux 5.11 Perf Governor

CLOMP 1.2
Static OMP Speedup



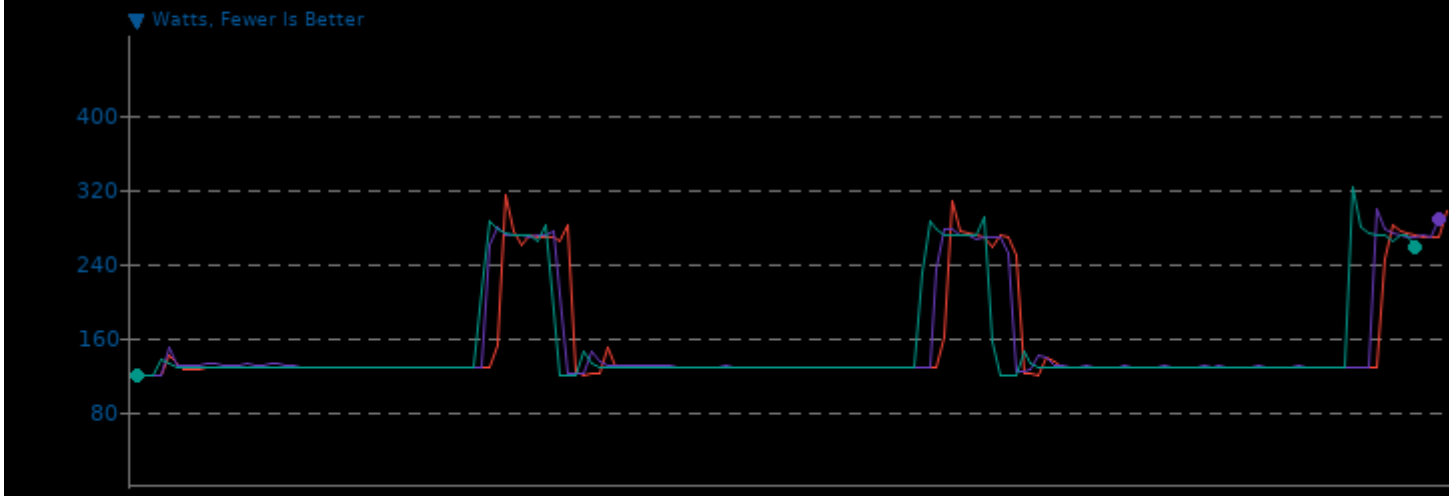
1. (CC) gcc options: -fopenmp -O3 -lm

CLOMP 1.2
Static OMP Speedup

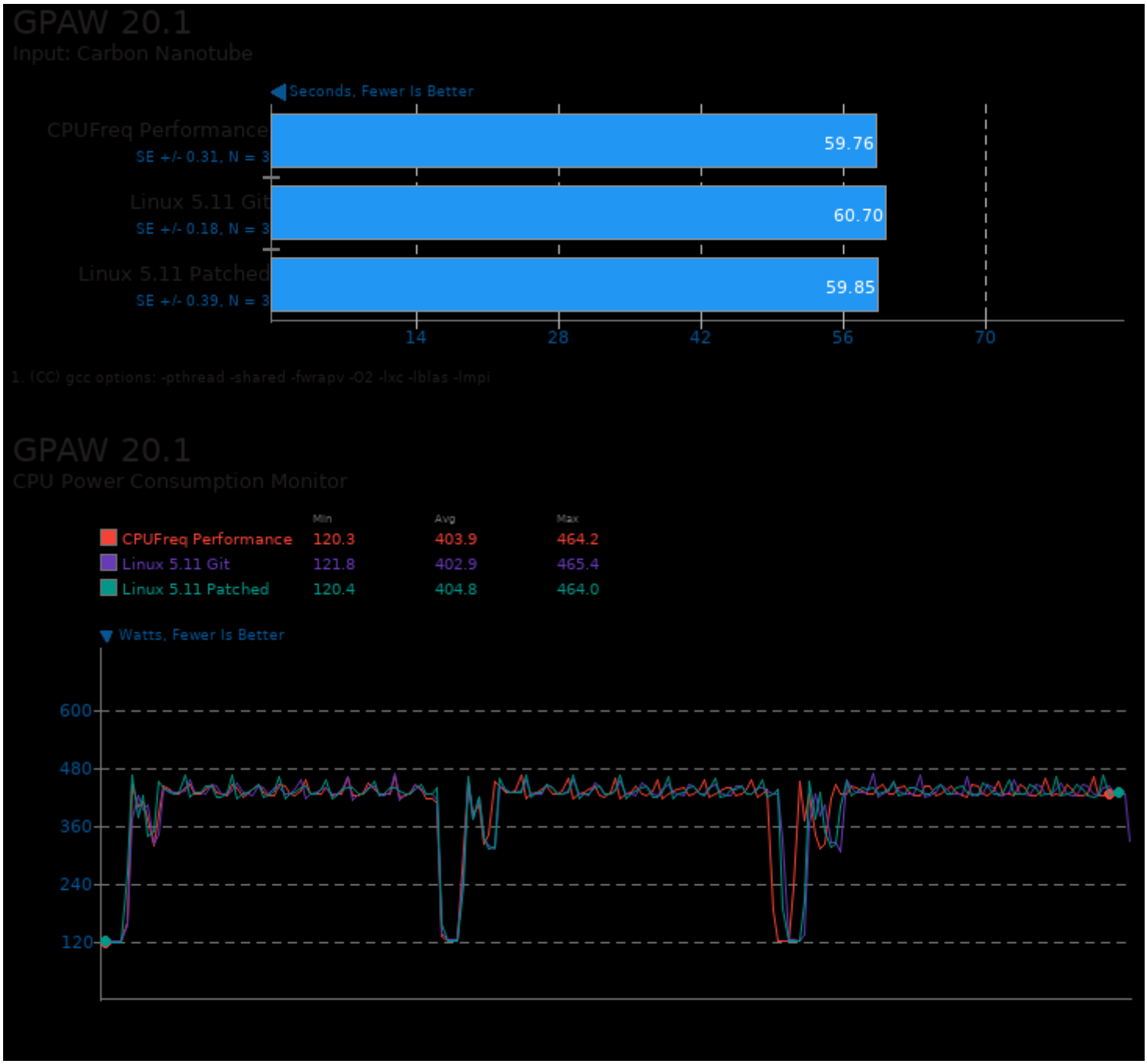


CLOMP 1.2
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	119.9	151.3	312.5
Linux 5.11 Git	120.4	153.4	298.4
Linux 5.11 Patched	119.9	152.6	321.5



AMD EPYC 7F72 2P Linux 5.11 Perf Governor

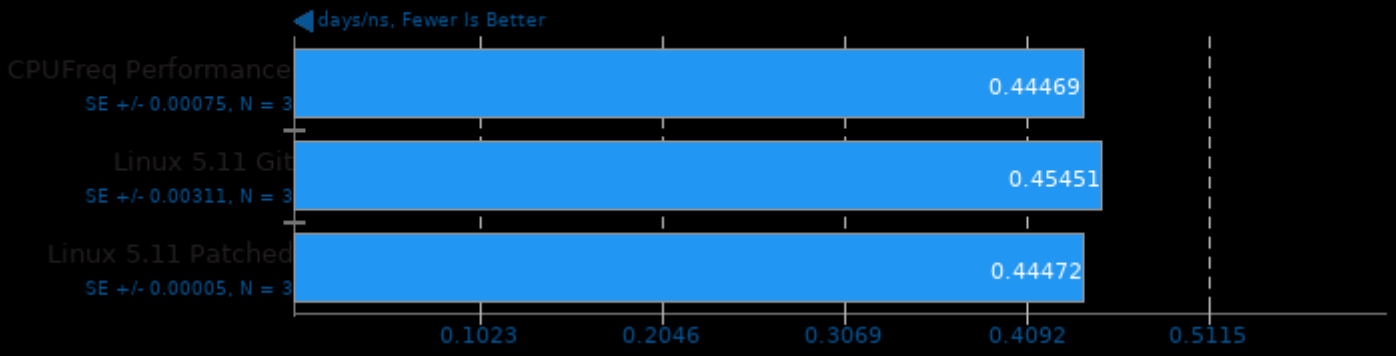


AMD EPYC 7F72 2P Linux 5.11 Perf Governor



NAMD 2.14

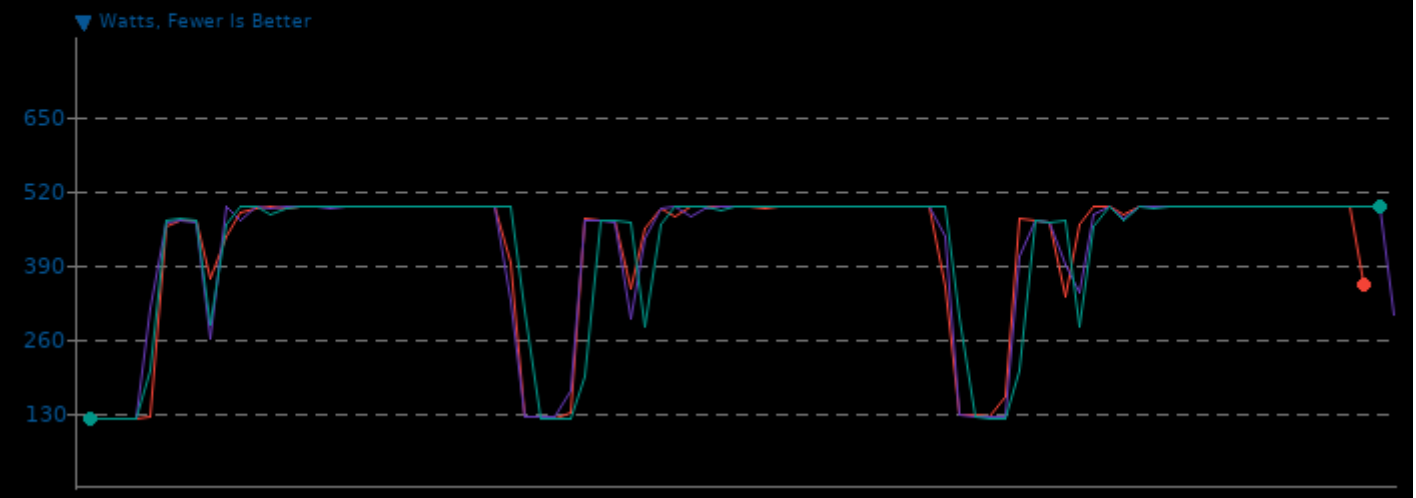
ATPase Simulation - 327,506 Atoms



NAMD 2.14

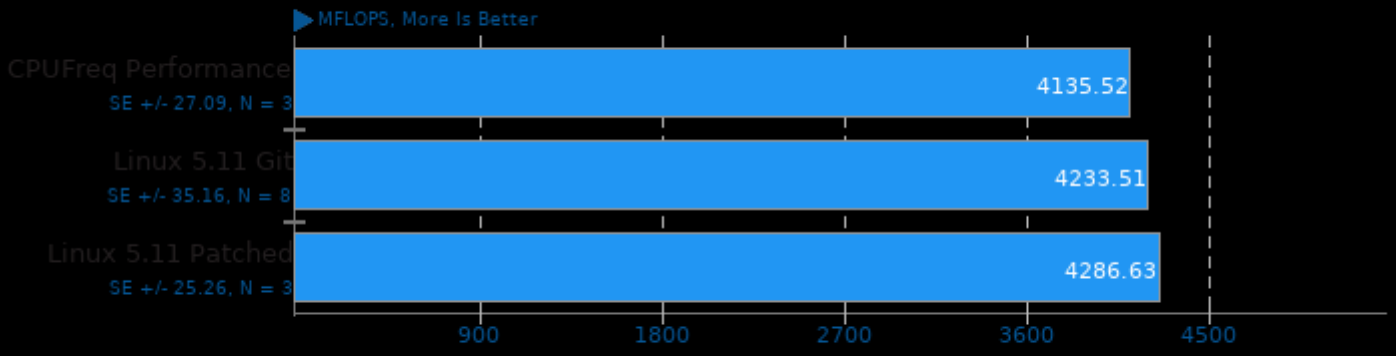
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	122.0	422.4	492.1
Linux 5.11 Git	122.0	422.5	492.2
Linux 5.11 Patched	121.6	423.2	492.1



Himeno Benchmark 3.0

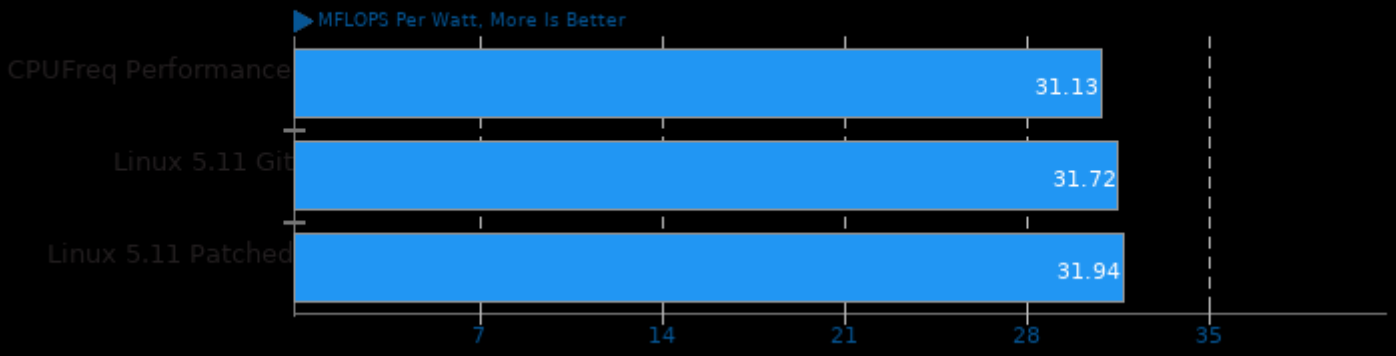
Poisson Pressure Solver



1. (CC) gcc options: -O3 -mavx2

Himeno Benchmark 3.0

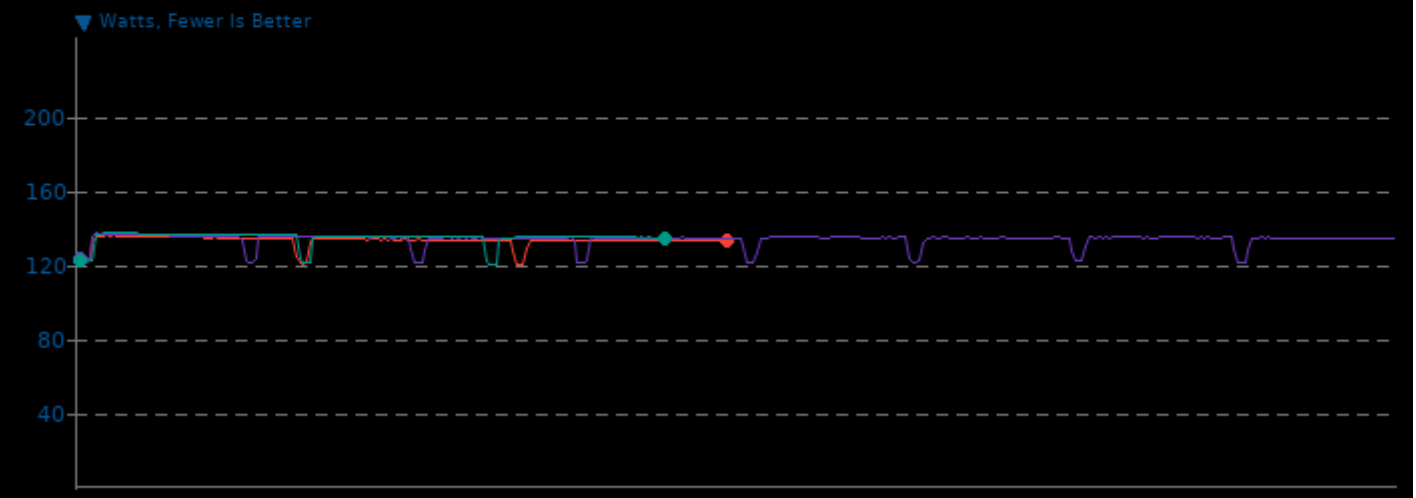
Poisson Pressure Solver



Himeno Benchmark 3.0

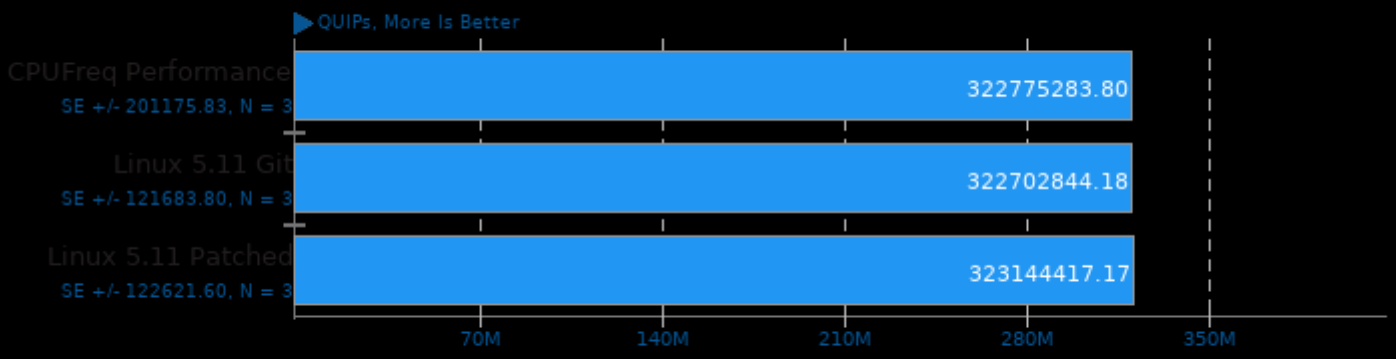
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	120.2	132.8	135.7
Linux 5.11 Git	120.9	133.5	136.7
Linux 5.11 Patched	120.4	134.2	136.7



Hierarchical INTegration 1.0

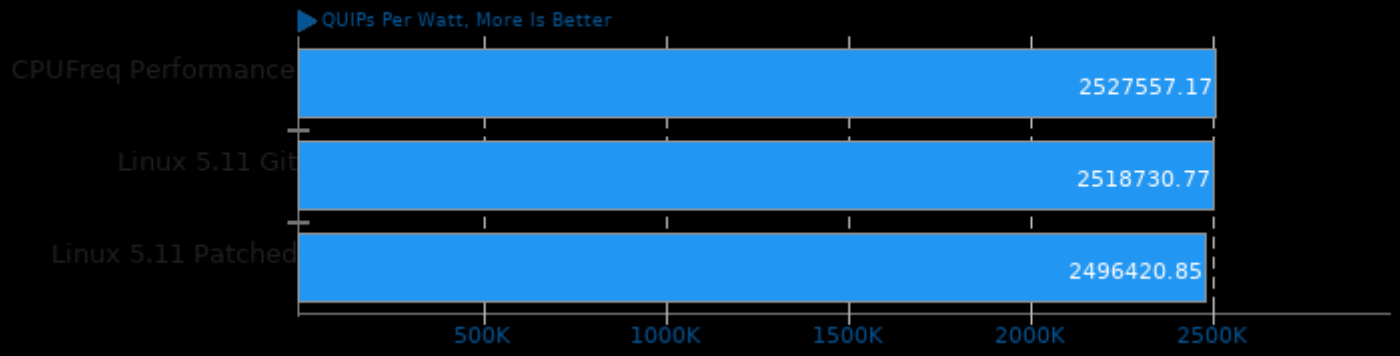
Test: FLOAT



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

Hierarchical INTegration 1.0

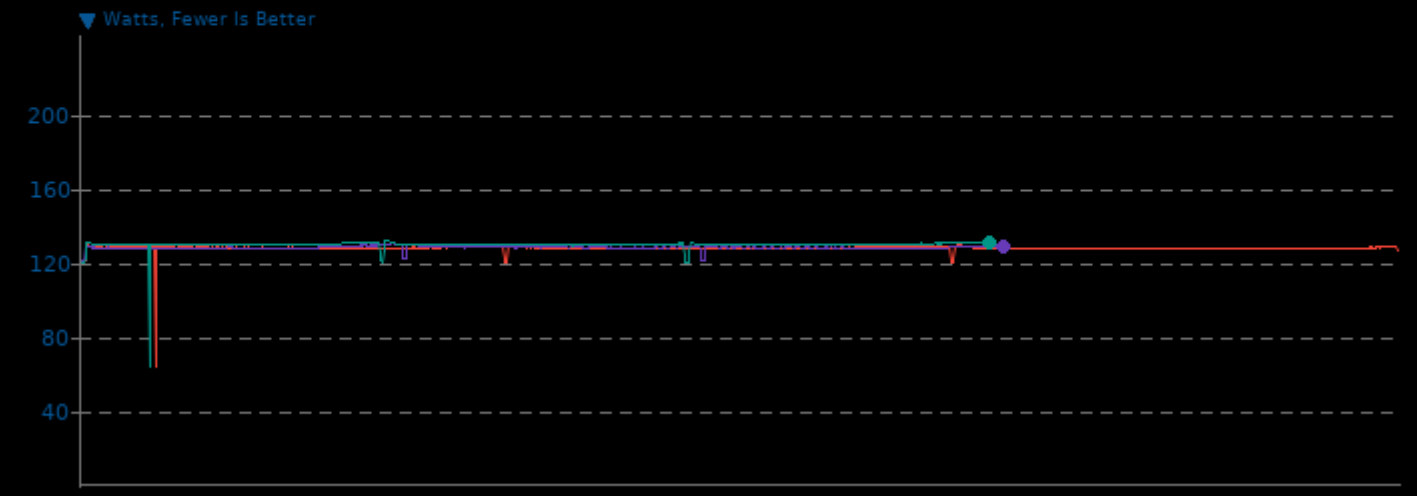
Test: FLOAT



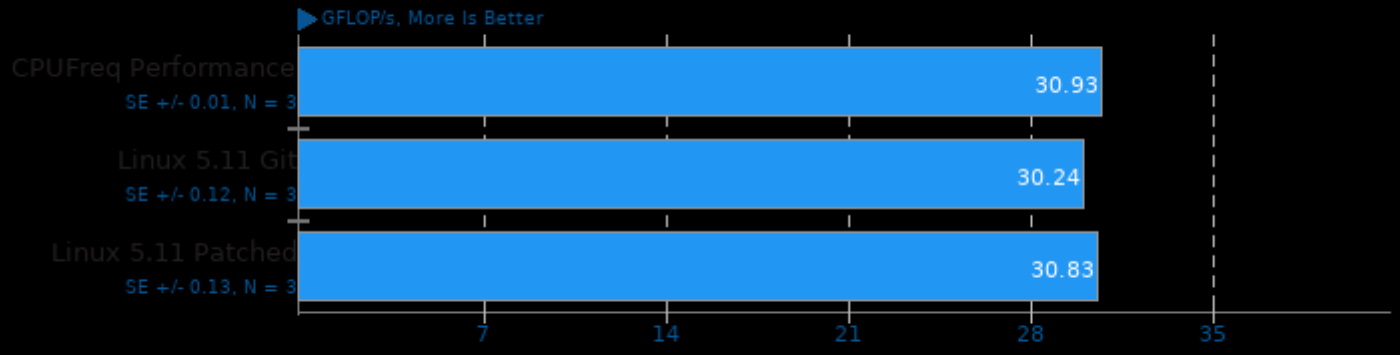
Hierarchical INTegration 1.0

CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	64.2	127.7	129.4
Linux 5.11 Git	120.5	128.1	130.2
Linux 5.11 Patched	64.8	129.4	131.6

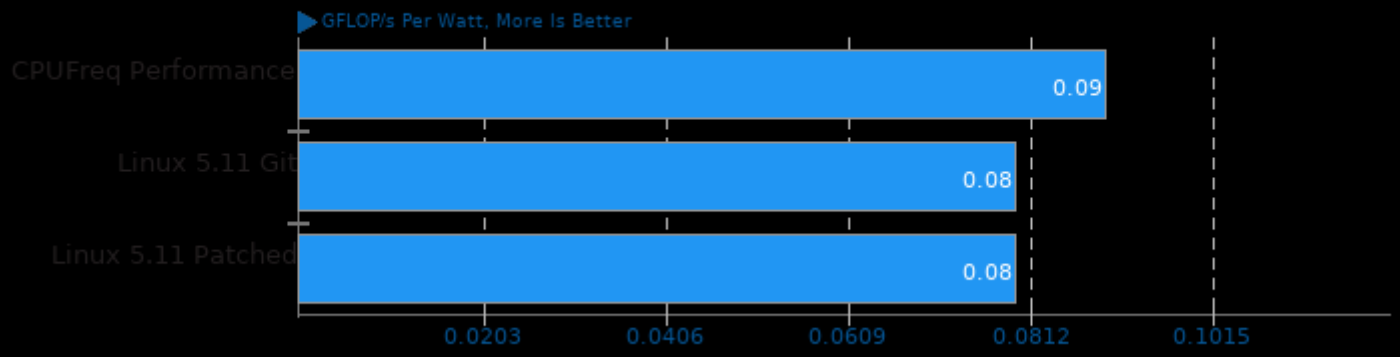


High Performance Conjugate Gradient 3.1



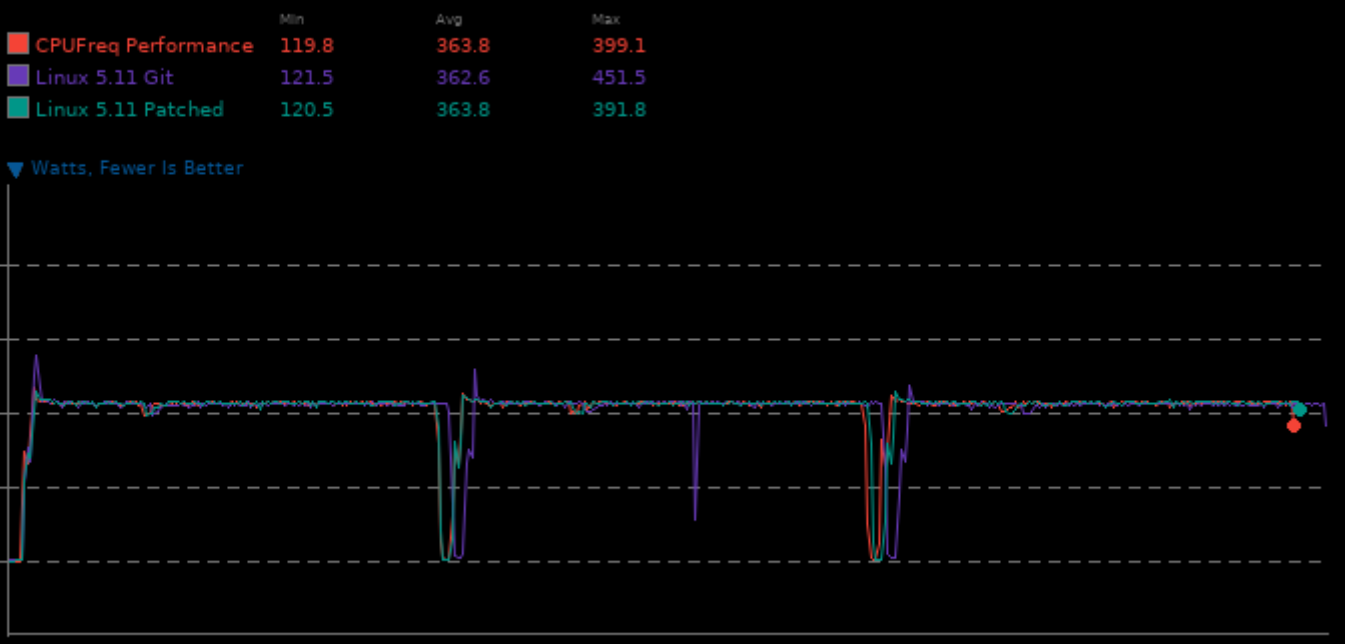
1. (CXX) g++ options: -O3 -ffast-math -ftree-vectorize -pthread -lmpi_cxx -lmpi

High Performance Conjugate Gradient 3.1



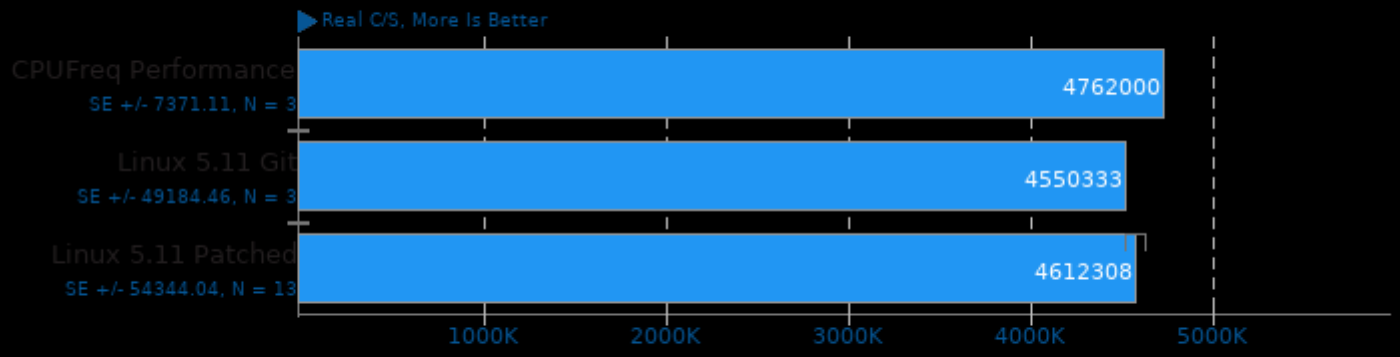
High Performance Conjugate Gradient 3.1

CPU Power Consumption Monitor



John The Ripper 1.9.0-jumbo-1

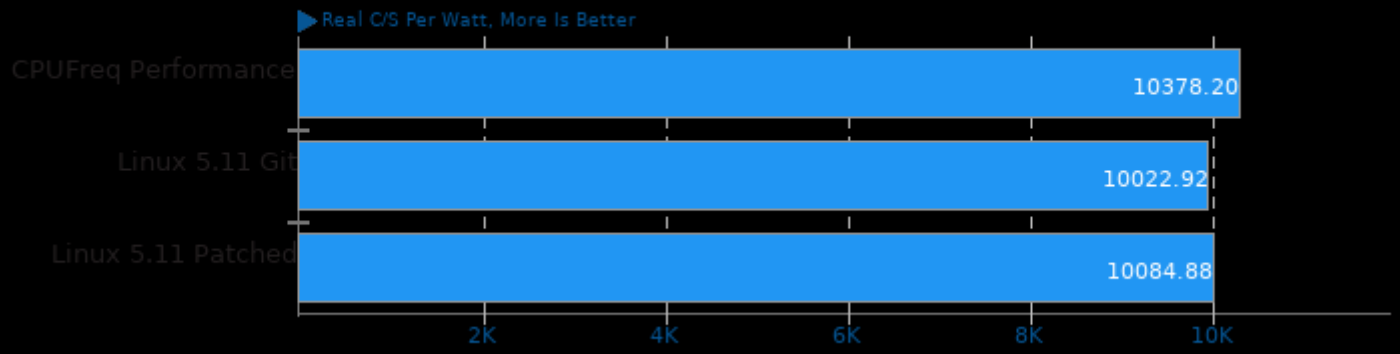
Test: MD5



1. (CC) gcc options: -m64 -lssl -lcrypto -fopenmp -lgmp -pthread -lm -lz -ldl -lcrypt -lbz2

John The Ripper 1.9.0-jumbo-1

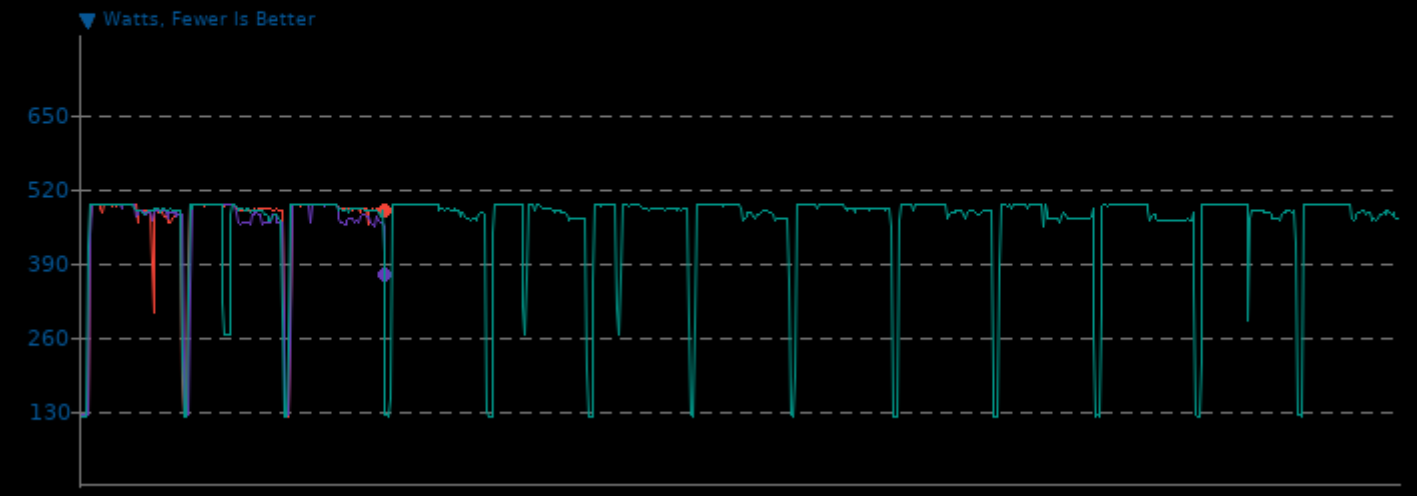
Test: MD5



John The Ripper 1.9.0-jumbo-1

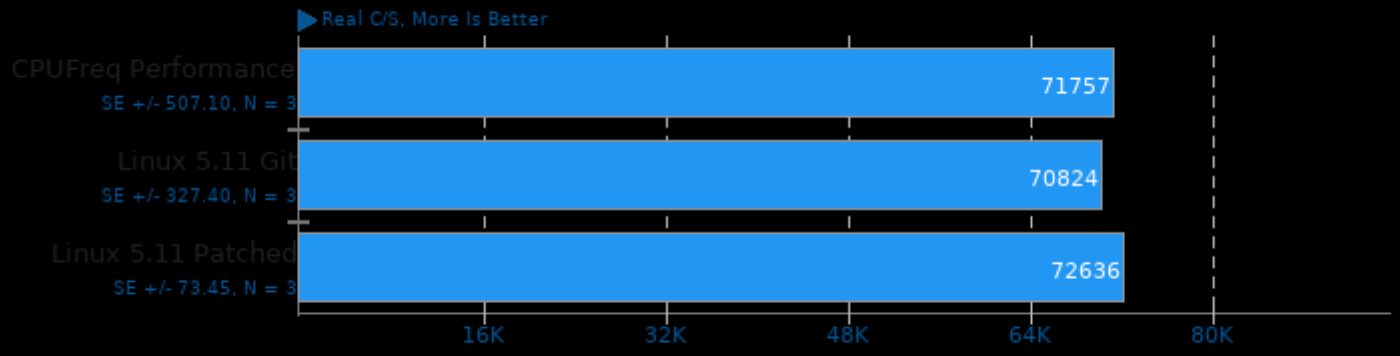
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	122.4	458.8	492.1
Linux 5.11 Git	124.0	454.0	492.0
Linux 5.11 Patched	122.0	457.3	492.3



John The Ripper 1.9.0-jumbo-1

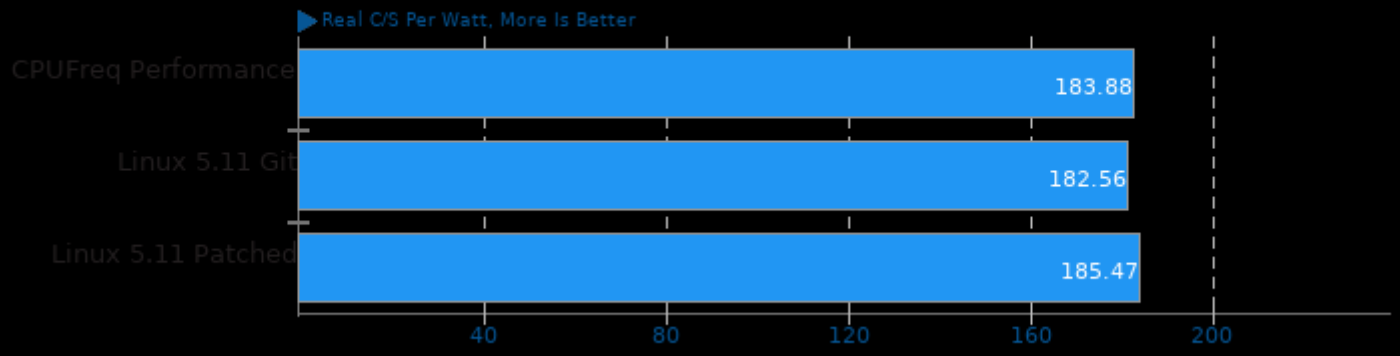
Test: Blowfish



1. (CC) gcc options: -m64 -lssl -lcrypto -fopenmp -lgmp -pthread -lm -lz -ldl -lcrypt -lbz2

John The Ripper 1.9.0-jumbo-1

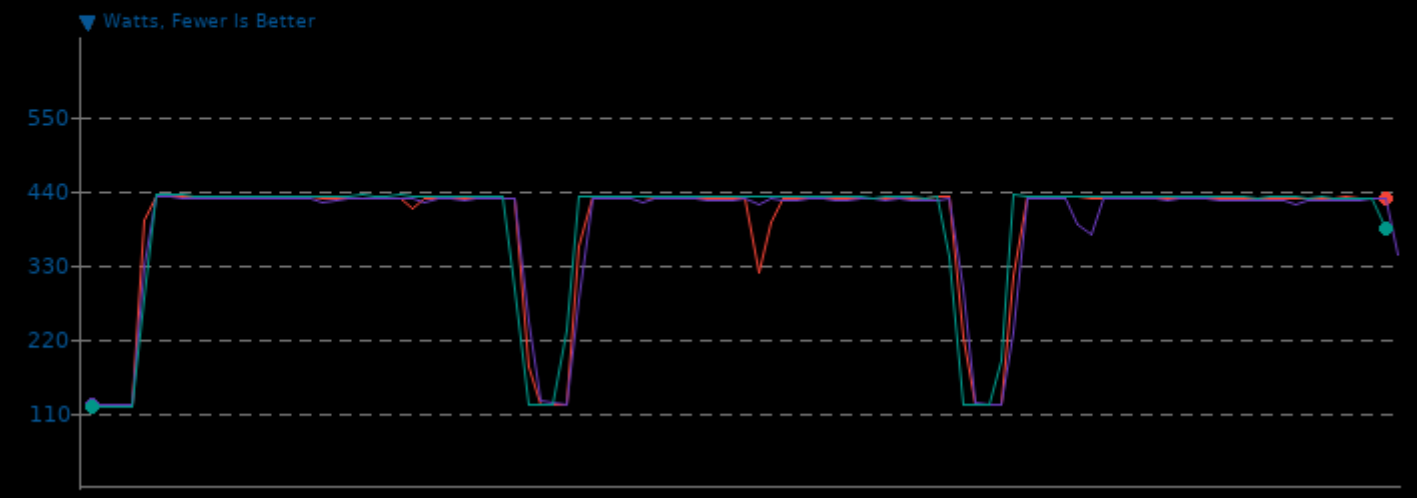
Test: Blowfish



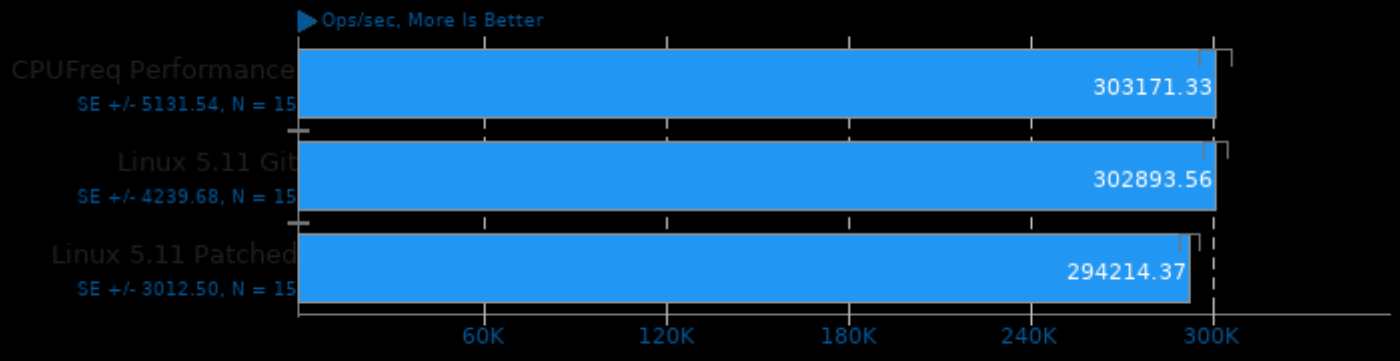
John The Ripper 1.9.0-jumbo-1

CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	122.1	390.2	430.6
Linux 5.11 Git	124.1	387.9	430.3
Linux 5.11 Patched	121.5	391.6	433.0

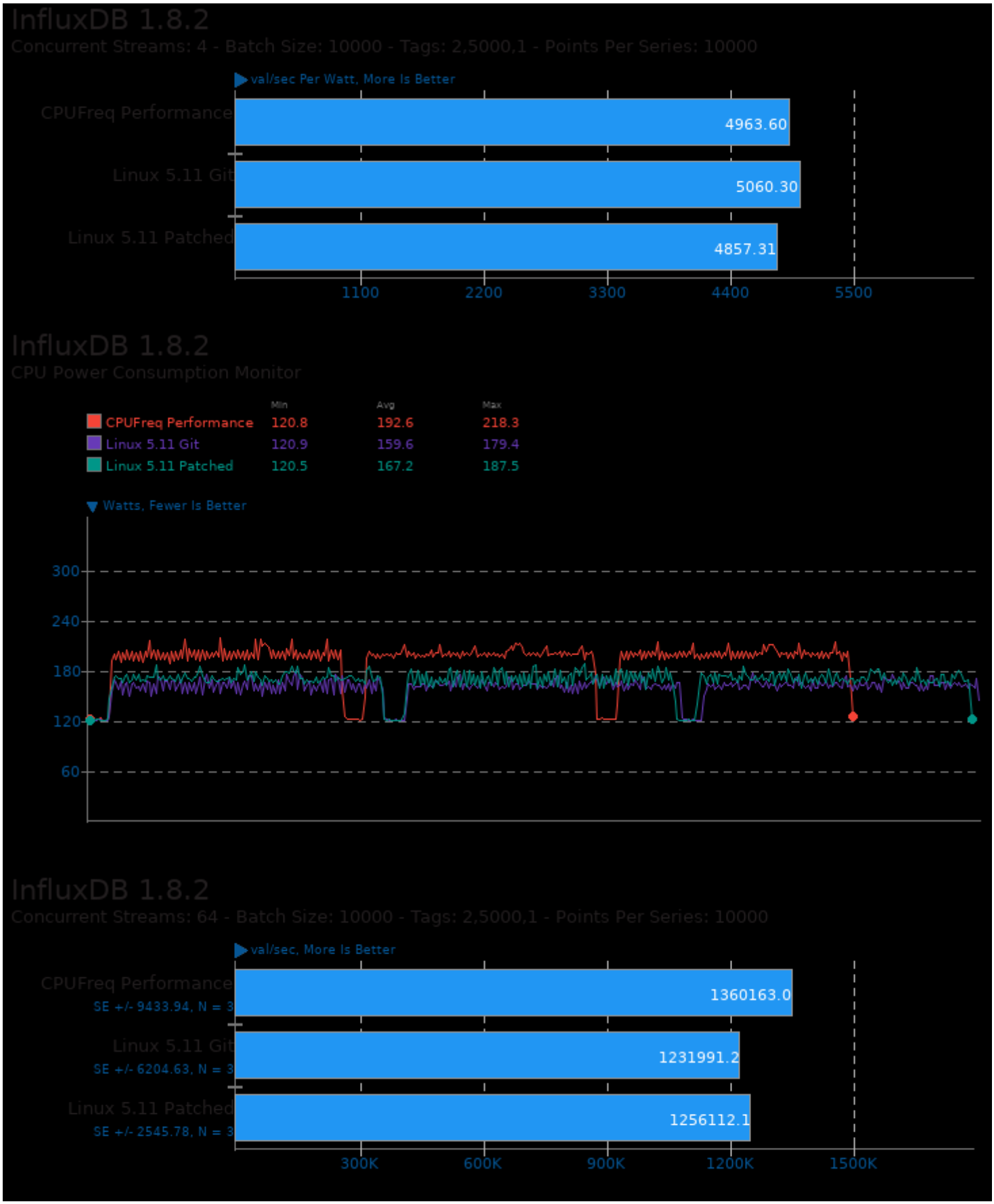


KeyDB 6.0.16



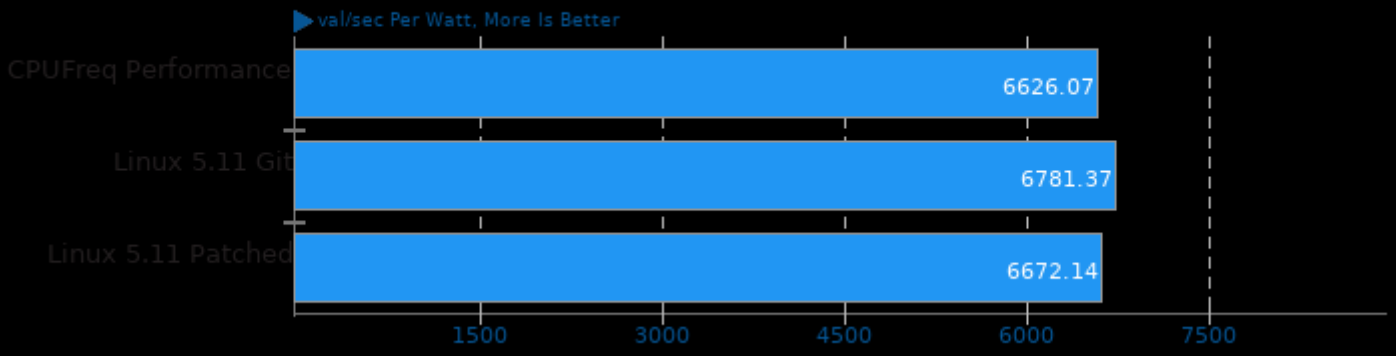
1. (CXX) g++ options: -O2 -levent_openssl -levent -lcrypto -lssl -lpthread -lz -lpcre


KeyDB 6.0.16
Ops/sec Per Watt, More Is Better
CPUFreq Performance
1761.51
Linux 5.11 Git
1929.56
Linux 5.11 Patched
1865.16
400
800
1200
1600
2000
KeyDB 6.0.16
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 60.8 172.1 190.1
Linux 5.11 Git 120.8 157.0 179.4
Linux 5.11 Patched 64.4 157.7 178.6
Watts, Fewer Is Better
250
200
150
100
50
InfluxDB 1.8.2
Concurrent Streams: 4 - Batch Size: 10000 - Tags: 2,5000,1 - Points Per Series: 10000
val/sec, More Is Better
CPUFreq Performance
SE +/- 2401.68, N = 3
956189.4
Linux 5.11 Git
SE +/- 2183.04, N = 3
807463.1
Linux 5.11 Patched
SE +/- 1525.09, N = 3
812193.6
200K
400K
600K
800K
1000K


InfluxDB 1.8.2
Concurrent Streams: 4 - Batch Size: 10000 - Tags: 2,5000,1 - Points Per Series: 10000
val/sec Per Watt, More Is Better
CPUFreq Performance
4963.60
Linux 5.11 Git
5060.30
Linux 5.11 Patched
4857.31
1100
2200
3300
4400
5500
InfluxDB 1.8.2
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.8 192.6 218.3
Linux 5.11 Git 120.9 159.6 179.4
Linux 5.11 Patched 120.5 167.2 187.5
Watts, Fewer Is Better
300
240
180
120
60
InfluxDB 1.8.2
Concurrent Streams: 64 - Batch Size: 10000 - Tags: 2,5000,1 - Points Per Series: 10000
val/sec, More Is Better
CPUFreq Performance
SE +/- 9433.94, N = 3
1360163.0
Linux 5.11 Git
SE +/- 6204.63, N = 3
1231991.2
Linux 5.11 Patched
SE +/- 2545.78, N = 3
1256112.1
300K
600K
900K
1200K
1500K

InfluxDB 1.8.2

Concurrent Streams: 64 - Batch Size: 10000 - Tags: 2,5000,1 - Points Per Series: 10000



InfluxDB 1.8.2

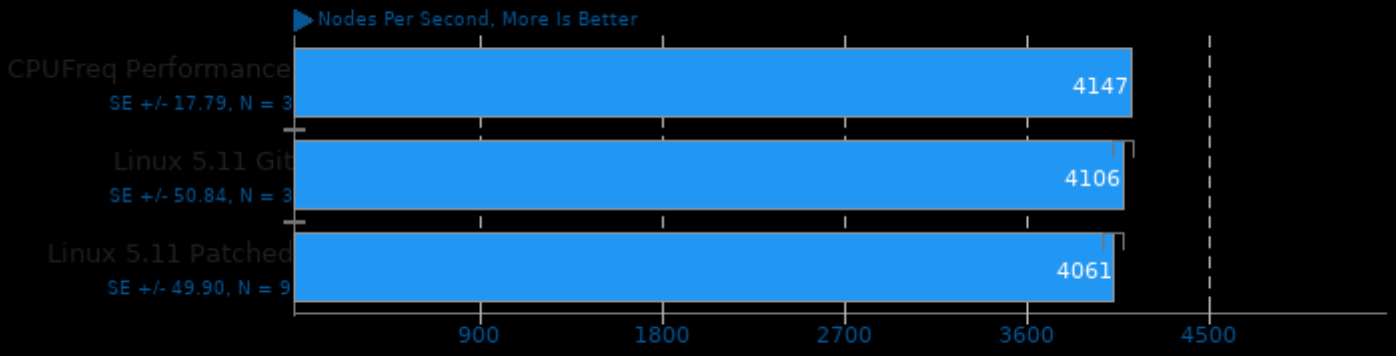
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	120.9	205.3	232.0
Linux 5.11 Git	120.9	181.7	213.6
Linux 5.11 Patched	120.3	188.3	217.2



LeelaChessZero 0.26

Backend: BLAS

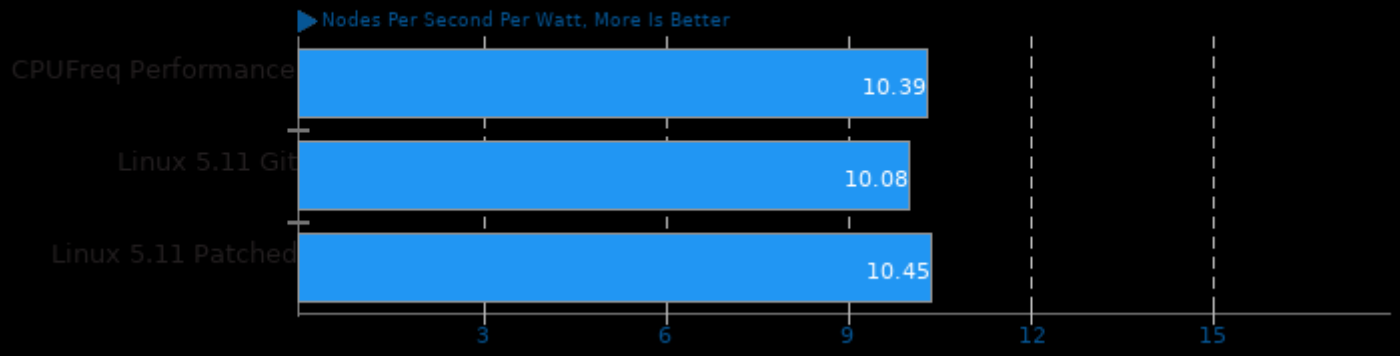


1. (CXX) g++ options: -flto -pthread


LeelaChessZero 0.26
Backend: BLAS
Nodes Per Second Per Watt, More Is Better
CPUFreq Performance
9.72
Linux 5.11 Git
9.69
Linux 5.11 Patched
9.72
3
6
9
12
15
LeelaChessZero 0.26
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 121.0 426.6 492.4
Linux 5.11 Git 120.8 423.8 492.3
Linux 5.11 Patched 120.4 417.7 492.3
Watts, Fewer Is Better
650
520
390
260
130
LeelaChessZero 0.26
Backend: Eigen
Nodes Per Second, More Is Better
CPUFreq Performance
SE +/- 26.71, N = 3
4450
Linux 5.11 Git
SE +/- 49.20, N = 4
4284
Linux 5.11 Patched
SE +/- 36.23, N = 3
4433
1000
2000
3000
4000
5000
1. (CXX) g++ options: -flto -pthread

LeelaChessZero 0.26

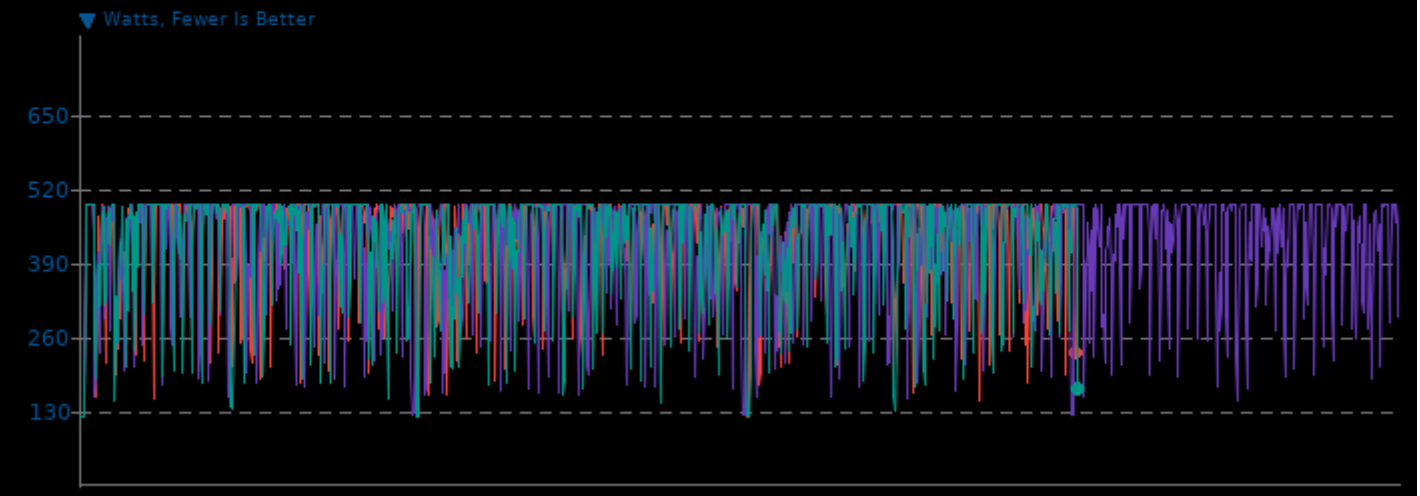
Backend: Eigen



LeelaChessZero 0.26

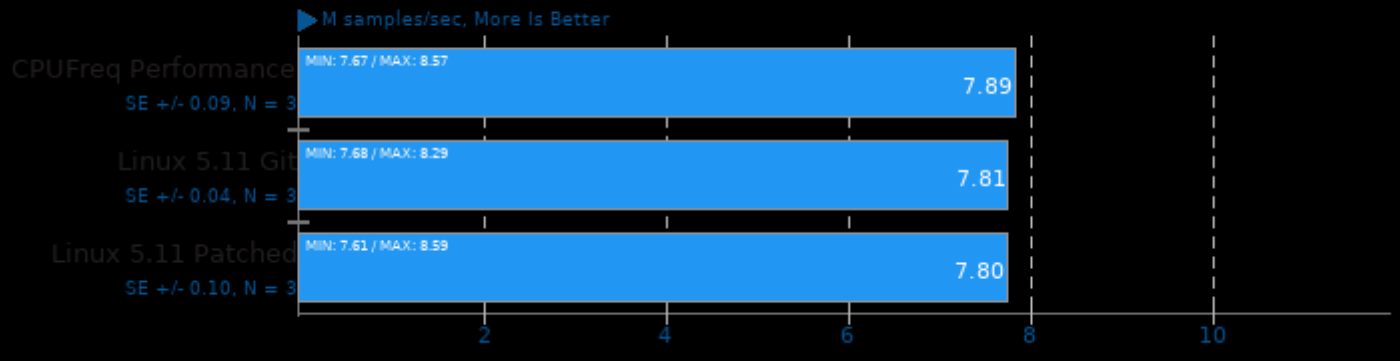
CPU Power Consumption Monitor

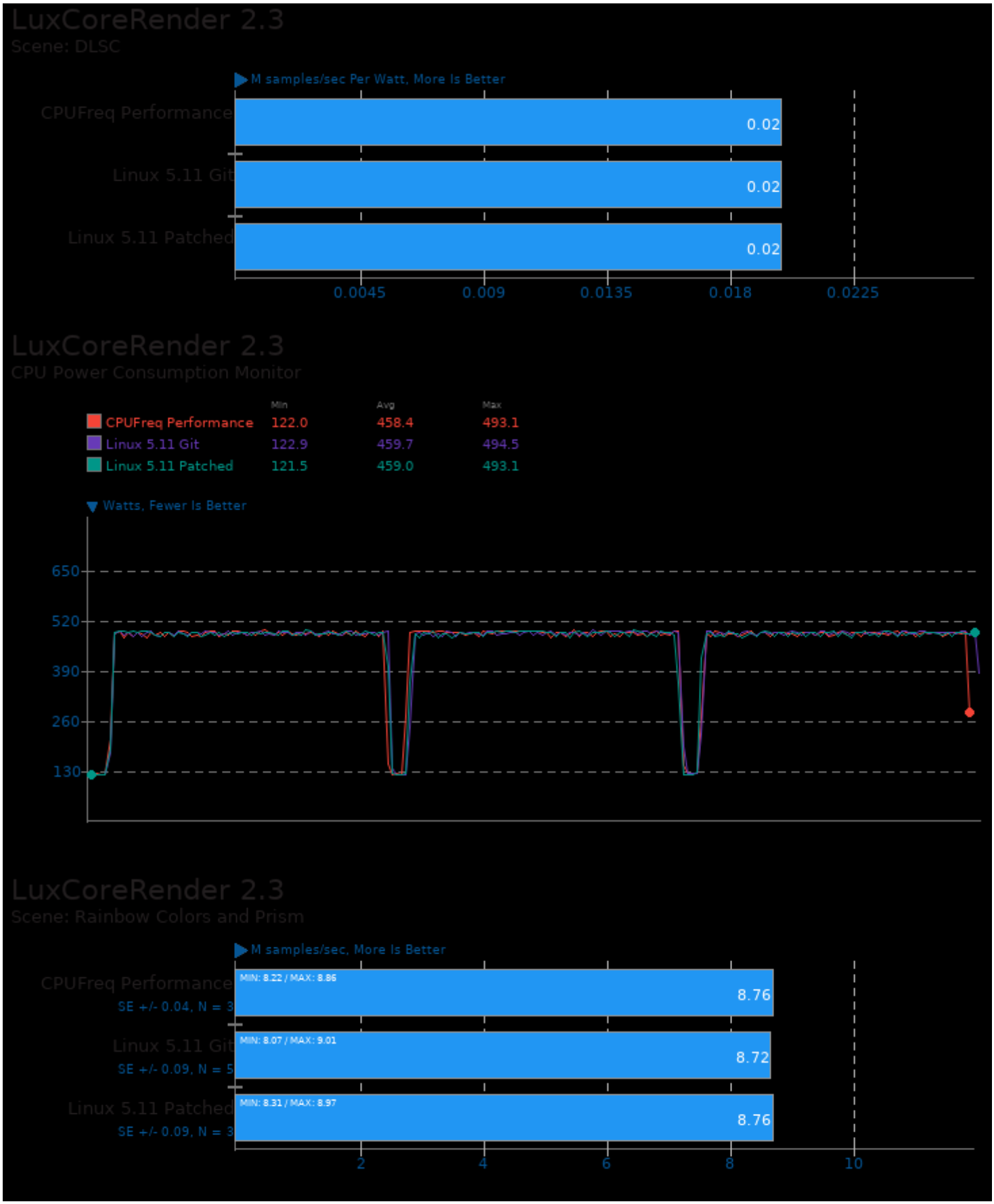
	Min	Avg	Max
CPUFreq Performance	121.9	428.4	492.3
Linux 5.11 Git	122.0	425.0	492.3
Linux 5.11 Patched	121.4	424.2	492.4

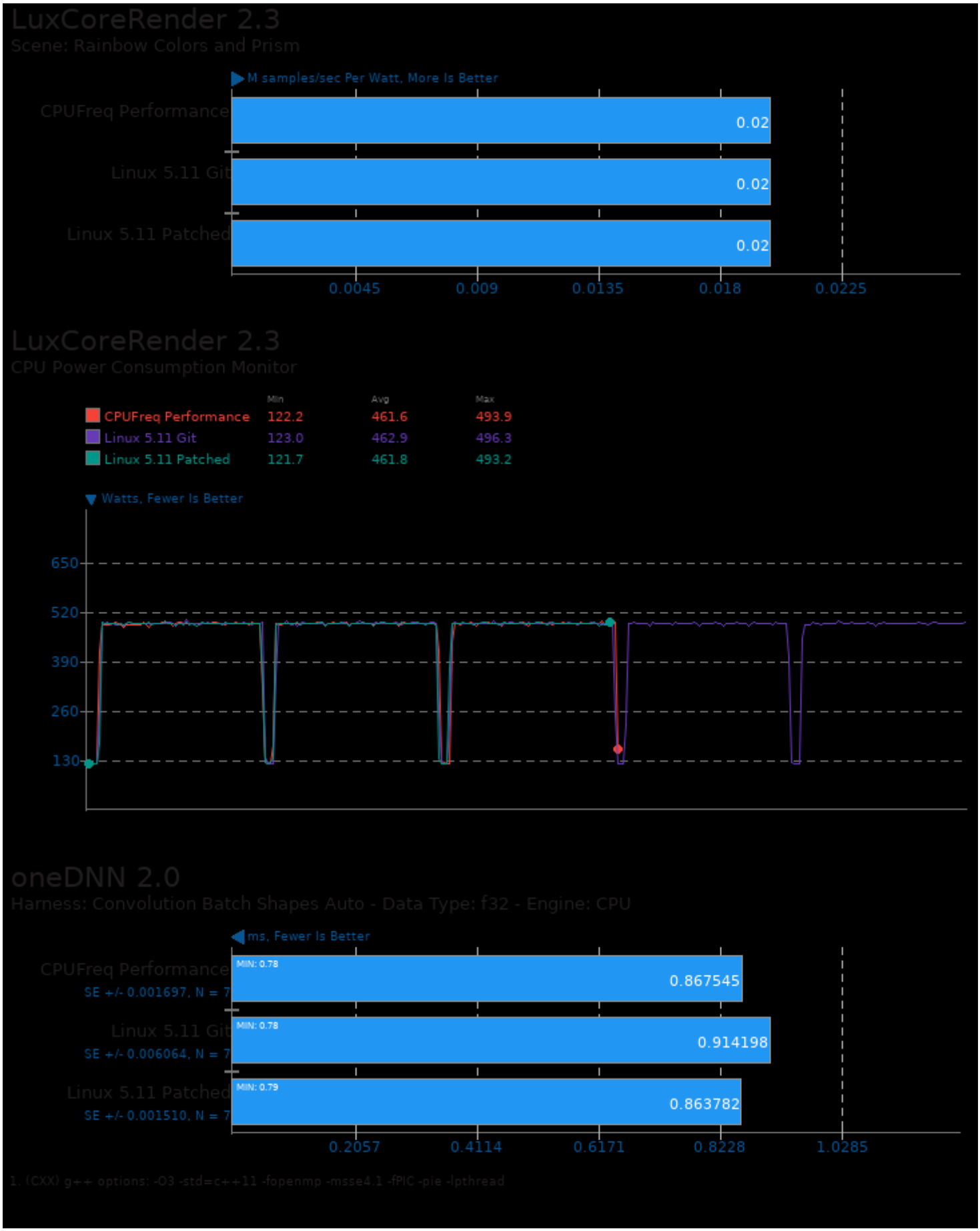


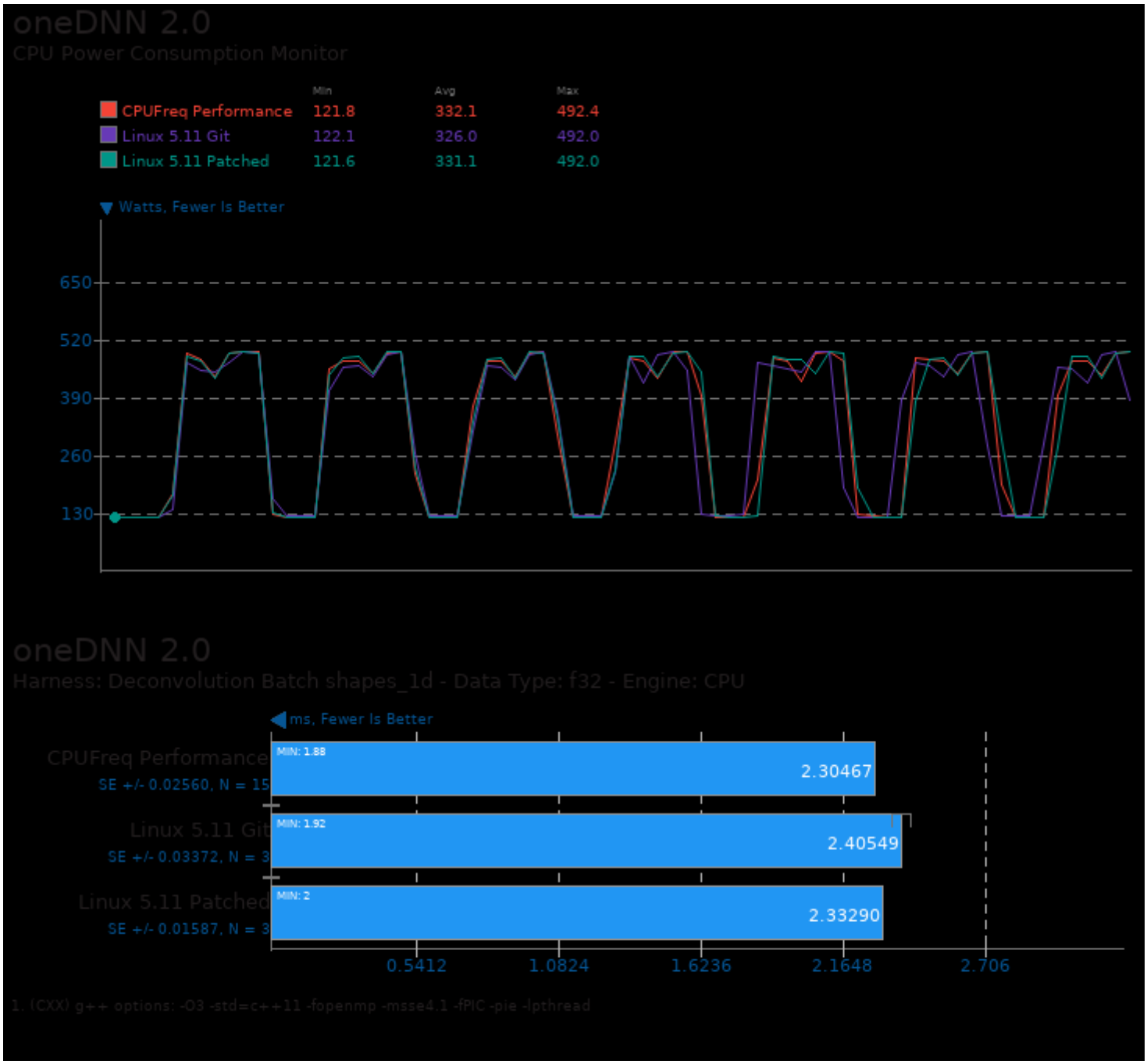
LuxCoreRender 2.3

Scene: DLSC



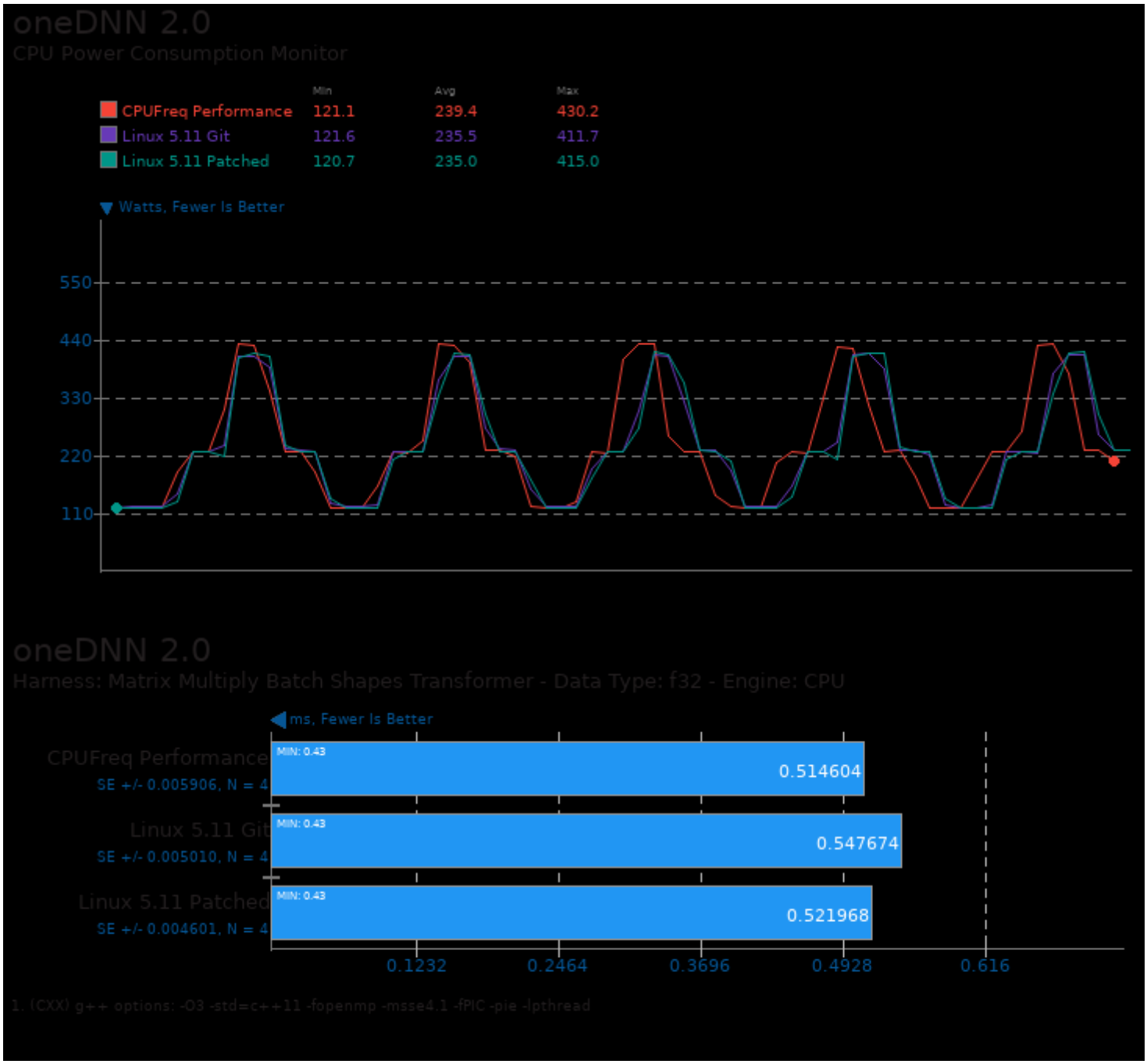

LuxCoreRender 2.3
Scene: DLSC
M samples/sec Per Watt, More Is Better
CPUFreq Performance
Linux 5.11 Git
Linux 5.11 Patched
0.02
0.02
0.02
0.0045
0.009
0.0135
0.018
0.0225
LuxCoreRender 2.3
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 122.0 458.4 493.1
Linux 5.11 Git 122.9 459.7 494.5
Linux 5.11 Patched 121.5 459.0 493.1
Watts, Fewer Is Better
650
520
390
260
130
LuxCoreRender 2.3
Scene: Rainbow Colors and Prism
M samples/sec, More Is Better
CPUFreq Performance
SE +/- 0.04, N = 3
MIN: 8.22 / MAX: 8.86
8.76
Linux 5.11 Git
SE +/- 0.09, N = 5
MIN: 8.07 / MAX: 9.01
8.72
Linux 5.11 Patched
SE +/- 0.09, N = 3
MIN: 8.31 / MAX: 8.97
8.76
2
4
6
8
10

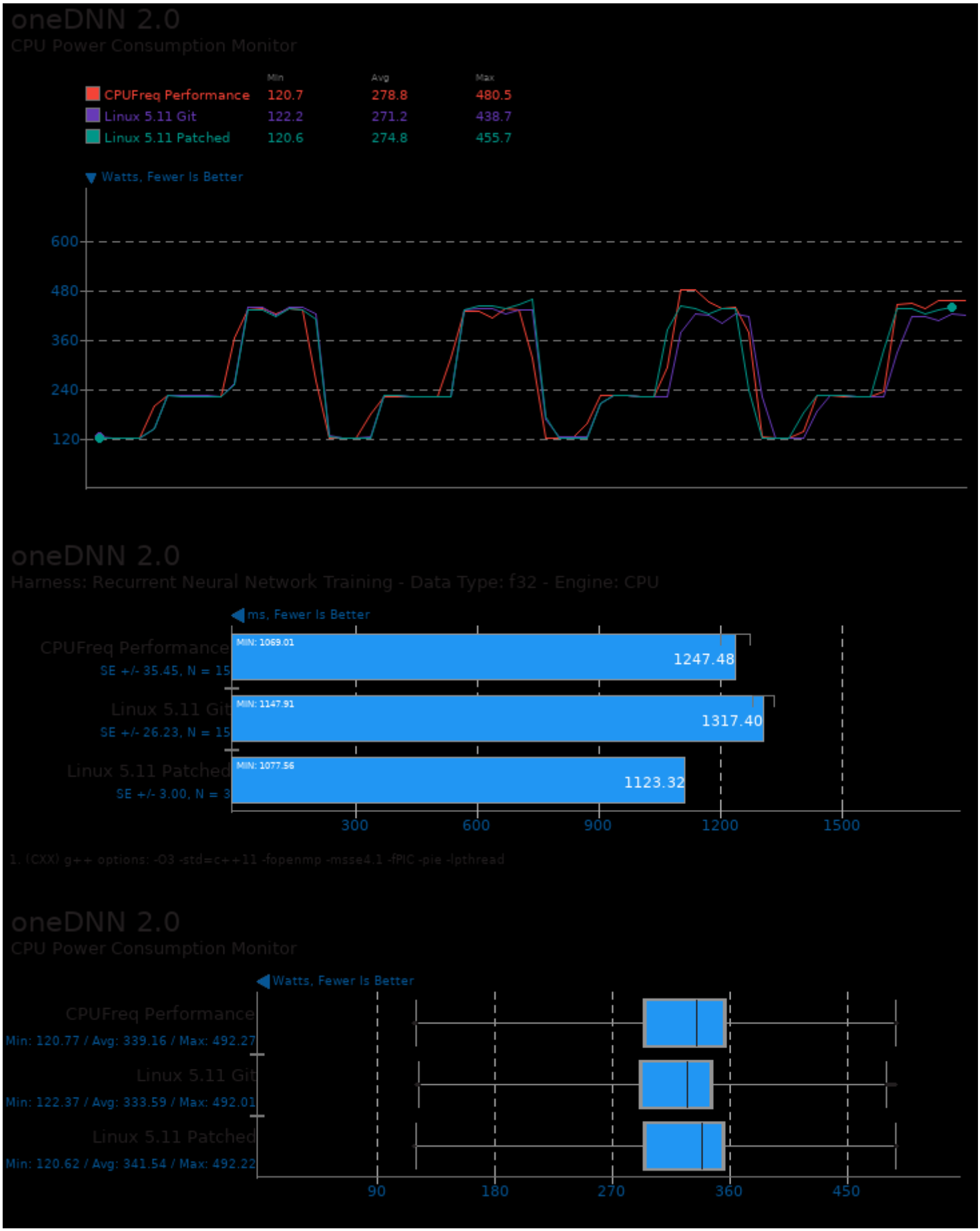

LuxCoreRender 2.3
Scene: Rainbow Colors and Prism
M samples/sec Per Watt, More Is Better
CPUFreq Performance
Linux 5.11 Git
Linux 5.11 Patched
0.02
0.02
0.02
0.0045
0.009
0.0135
0.018
0.0225
LuxCoreRender 2.3
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 122.2 461.6 493.9
Linux 5.11 Git 123.0 462.9 496.3
Linux 5.11 Patched 121.7 461.8 493.2
Watts, Fewer Is Better
650
520
390
260
130
oneDNN 2.0
Harness: Convolution Batch Shapes Auto - Data Type: f32 - Engine: CPU
ms, Fewer Is Better
CPUFreq Performance
SE +/- 0.001697, N = 7
MIN: 0.78
0.867545
Linux 5.11 Git
SE +/- 0.006064, N = 7
MIN: 0.78
0.914198
Linux 5.11 Patched
SE +/- 0.001510, N = 7
MIN: 0.79
0.863782
0.2057
0.4114
0.6171
0.8228
1.0285
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread

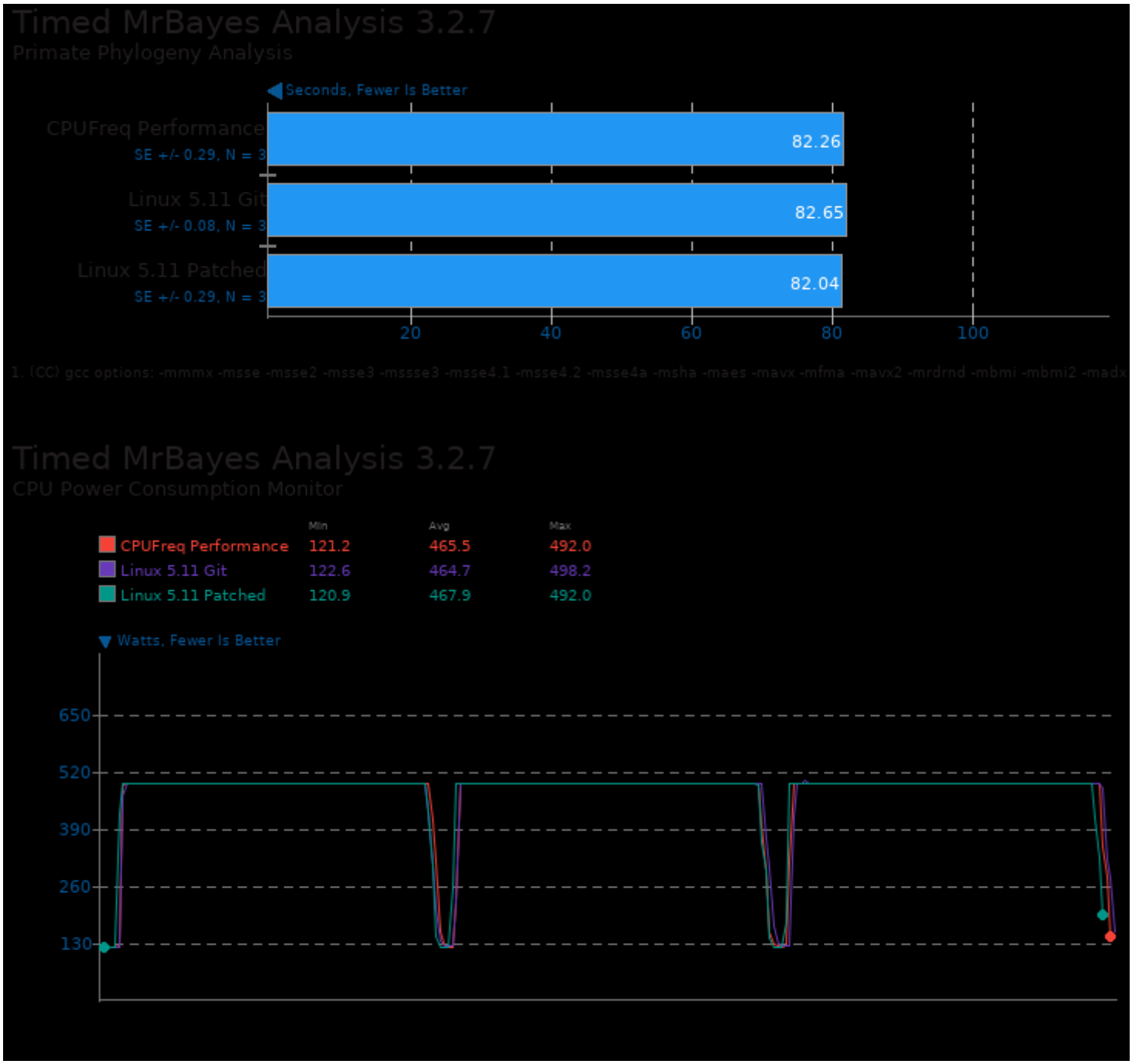

oneDNN 2.0
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 121.8 332.1 492.4
Linux 5.11 Git 122.1 326.0 492.0
Linux 5.11 Patched 121.6 331.1 492.0
Watts, Fewer Is Better
650
520
390
260
130
oneDNN 2.0
Harness: Deconvolution Batch shapes_1d - Data Type: f32 - Engine: CPU
ms, Fewer Is Better
CPUFreq Performance
SE +/- 0.02560, N = 15
MIN: 1.88
2.30467
Linux 5.11 Git
SE +/- 0.03372, N = 3
MIN: 1.92
2.40549
Linux 5.11 Patched
SE +/- 0.01587, N = 3
MIN: 2
2.33290
0.5412
1.0824
1.6236
2.1648
2.706
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread

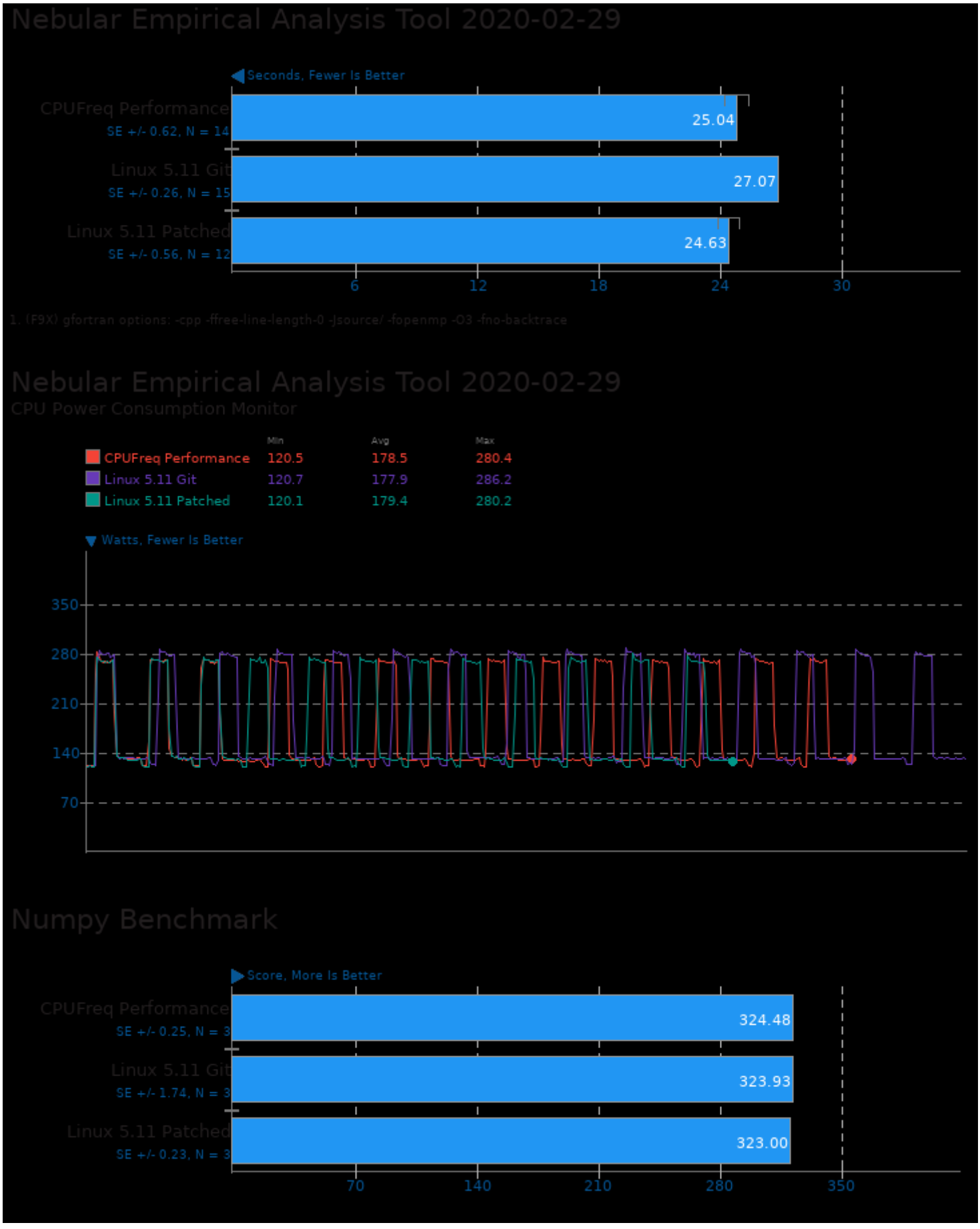

oneDNN 2.0
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 121.0 284.2 491.8
Linux 5.11 Git 123.1 282.9 453.8
Linux 5.11 Patched 120.8 285.6 468.7
Watts, Fewer Is Better
650
520
390
260
130
oneDNN 2.0
Harness: IP Shapes 1D - Data Type: f32 - Engine: CPU
ms, Fewer Is Better
CPUFreq Performance
SE +/- 0.01359, N = 4
MIN: 1.31
1.57963
Linux 5.11 Git
SE +/- 0.01518, N = 4
MIN: 1.31
1.62088
Linux 5.11 Patched
SE +/- 0.01340, N = 4
MIN: 1.29
1.55447
0.3647
0.7294
1.0941
1.4588
1.8235
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread


oneDNN 2.0
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 121.0 280.4 481.1
Linux 5.11 Git 122.4 278.1 477.0
Linux 5.11 Patched 120.5 279.6 482.7
Watts, Fewer Is Better
600
480
360
240
120
oneDNN 2.0
Harness: IP Shapes 3D - Data Type: f32 - Engine: CPU
ms, Fewer Is Better
CPUFreq Performance
SE +/- 0.005456, N = 5
MIN: 0.69
0.813628
Linux 5.11 Git
SE +/- 0.005127, N = 5
MIN: 0.71
0.881348
Linux 5.11 Patched
SE +/- 0.004000, N = 5
MIN: 0.73
0.849248
0.1983
0.3966
0.5949
0.7932
0.9915
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread

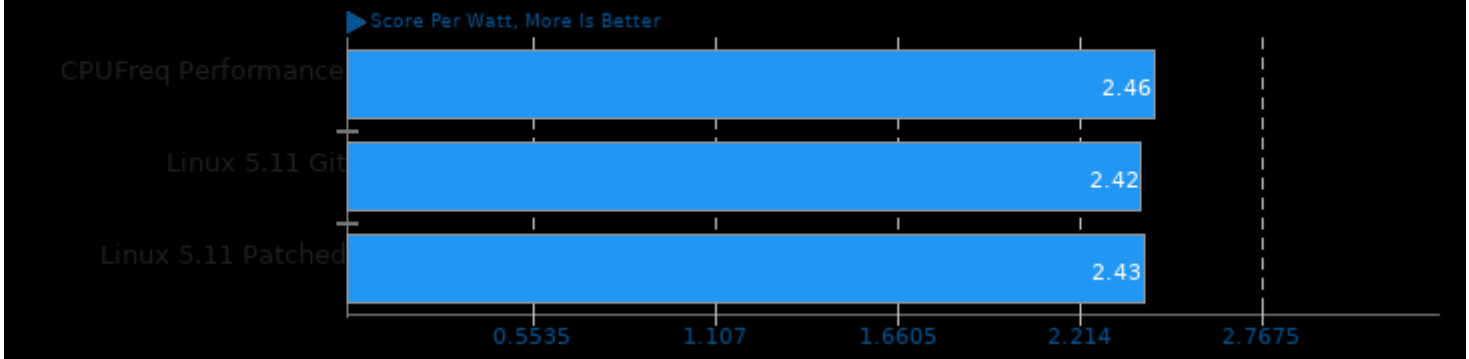

oneDNN 2.0
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 121.1 239.4 430.2
Linux 5.11 Git 121.6 235.5 411.7
Linux 5.11 Patched 120.7 235.0 415.0
Watts, Fewer Is Better
550
440
330
220
110
oneDNN 2.0
Harness: Matrix Multiply Batch Shapes Transformer - Data Type: f32 - Engine: CPU
ms, Fewer Is Better
CPUFreq Performance
SE +/- 0.005906, N = 4
MIN: 0.43
0.514604
Linux 5.11 Git
SE +/- 0.005010, N = 4
MIN: 0.43
0.547674
Linux 5.11 Patched
SE +/- 0.004601, N = 4
MIN: 0.43
0.521968
0.1232
0.2464
0.3696
0.4928
0.616
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread


oneDNN 2.0
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.7 278.8 480.5
Linux 5.11 Git 122.2 271.2 438.7
Linux 5.11 Patched 120.6 274.8 455.7
Watts, Fewer Is Better
600
480
360
240
120
oneDNN 2.0
Harness: Recurrent Neural Network Training - Data Type: f32 - Engine: CPU
ms, Fewer Is Better
CPUFreq Performance
SE +/- 35.45, N = 15
MIN: 1069.01
1247.48
Linux 5.11 Git
SE +/- 26.23, N = 15
MIN: 1147.91
1317.40
Linux 5.11 Patched
SE +/- 3.00, N = 3
MIN: 1077.56
1123.32
300
600
900
1200
1500
1. (CXX) g++ options: -O3 -std=c++11 -fopenmp -msse4.1 -fPIC -pie -lpthread
oneDNN 2.0
CPU Power Consumption Monitor
Watts, Fewer Is Better
CPUFreq Performance
Min: 120.77 / Avg: 339.16 / Max: 492.27
Linux 5.11 Git
Min: 122.37 / Avg: 333.59 / Max: 492.01
Linux 5.11 Patched
Min: 120.62 / Avg: 341.54 / Max: 492.22
90
180
270
360
450


Timed MrBayes Analysis 3.2.7
Primate Phylogeny Analysis
Seconds, Fewer Is Better
CPUFreq Performance
SE +/- 0.29, N = 3
82.26
Linux 5.11 Git
SE +/- 0.08, N = 3
82.65
Linux 5.11 Patched
SE +/- 0.29, N = 3
82.04
20
40
60
80
100
1. (CC) gcc options: -mmmx -msse -msse2 -msse3 -mssse3 -msse4.1 -msse4.2 -msse4a -msha -maes -mavx -mfma -mavx2 -mrdrnd -mbmi -mbmi2 -madx
Timed MrBayes Analysis 3.2.7
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 121.2 465.5 492.0
Linux 5.11 Git 122.6 464.7 498.2
Linux 5.11 Patched 120.9 467.9 492.0
Watts, Fewer Is Better
650
520
390
260
130


Nebular Empirical Analysis Tool 2020-02-29
Seconds, Fewer Is Better
CPUFreq Performance
SE +/- 0.62, N = 14
25.04
Linux 5.11 Git
SE +/- 0.26, N = 15
27.07
Linux 5.11 Patched
SE +/- 0.56, N = 12
24.63
6
12
18
24
30
1. (F9X) gfortran options: -cpp -ffree-line-length-0 -Jsource/ -fopenmp -O3 -fno-backtrace
Nebular Empirical Analysis Tool 2020-02-29
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.5 178.5 280.4
Linux 5.11 Git 120.7 177.9 286.2
Linux 5.11 Patched 120.1 179.4 280.2
Watts, Fewer Is Better
350
280
210
140
70
Numpy Benchmark
Score, More Is Better
CPUFreq Performance
SE +/- 0.25, N = 3
324.48
Linux 5.11 Git
SE +/- 1.74, N = 3
323.93
Linux 5.11 Patched
SE +/- 0.23, N = 3
323.00
70
140
210
280
350

Numpy Benchmark



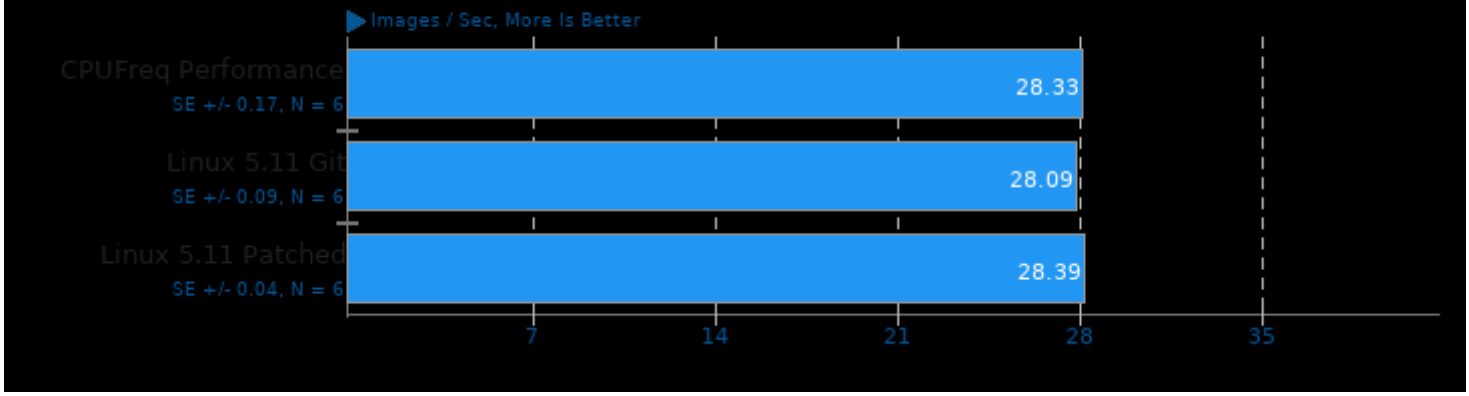
Numpy Benchmark

CPU Power Consumption Monitor



Intel Open Image Denoise 1.2.0

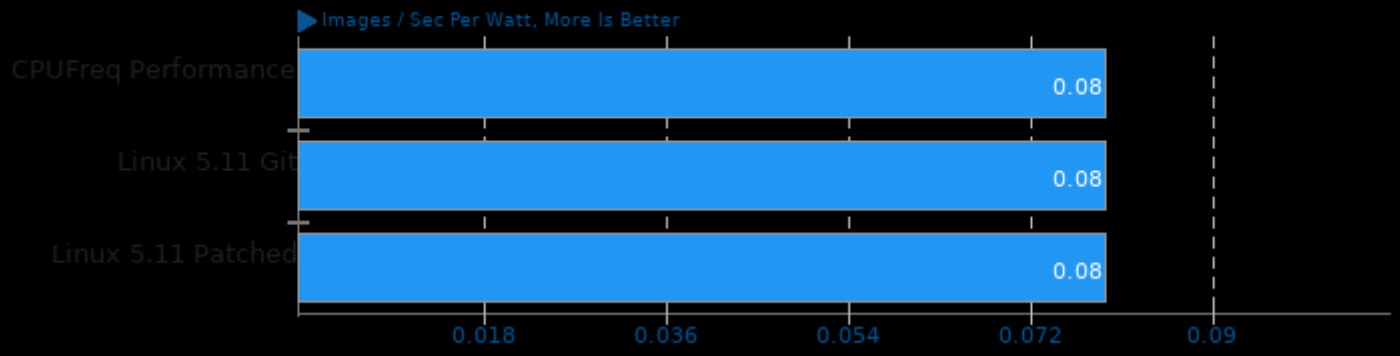
Scene: Memorial



AMD EPYC 7F72 2P Linux 5.11 Perf Governor

Intel Open Image Denoise 1.2.0

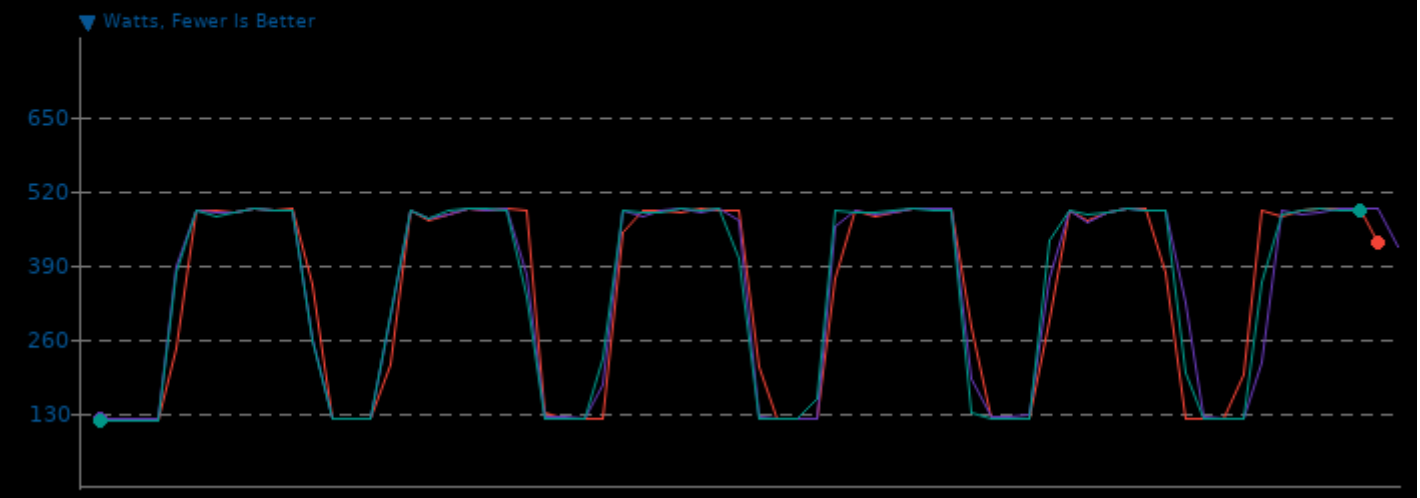
Scene: Memorial



Intel Open Image Denoise 1.2.0

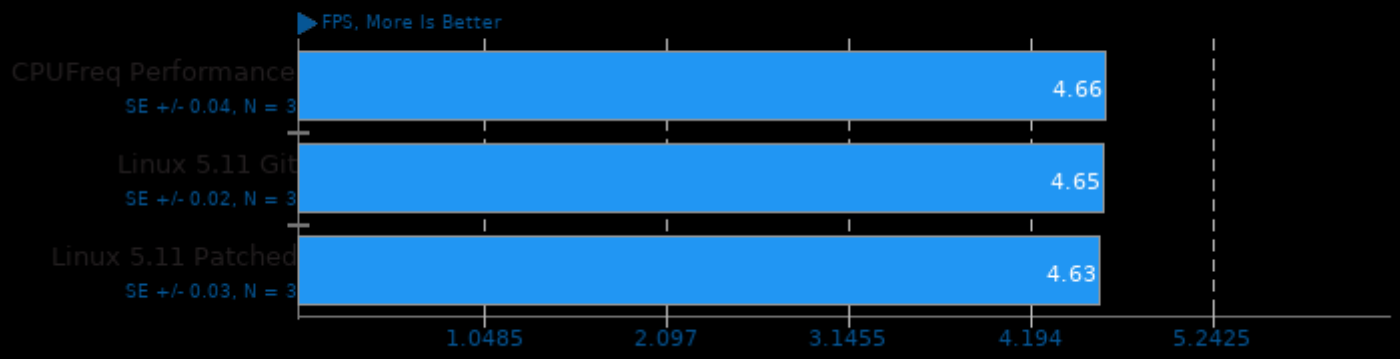
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	119.8	346.7	488.3
Linux 5.11 Git	120.5	349.8	488.6
Linux 5.11 Patched	119.8	346.7	488.6

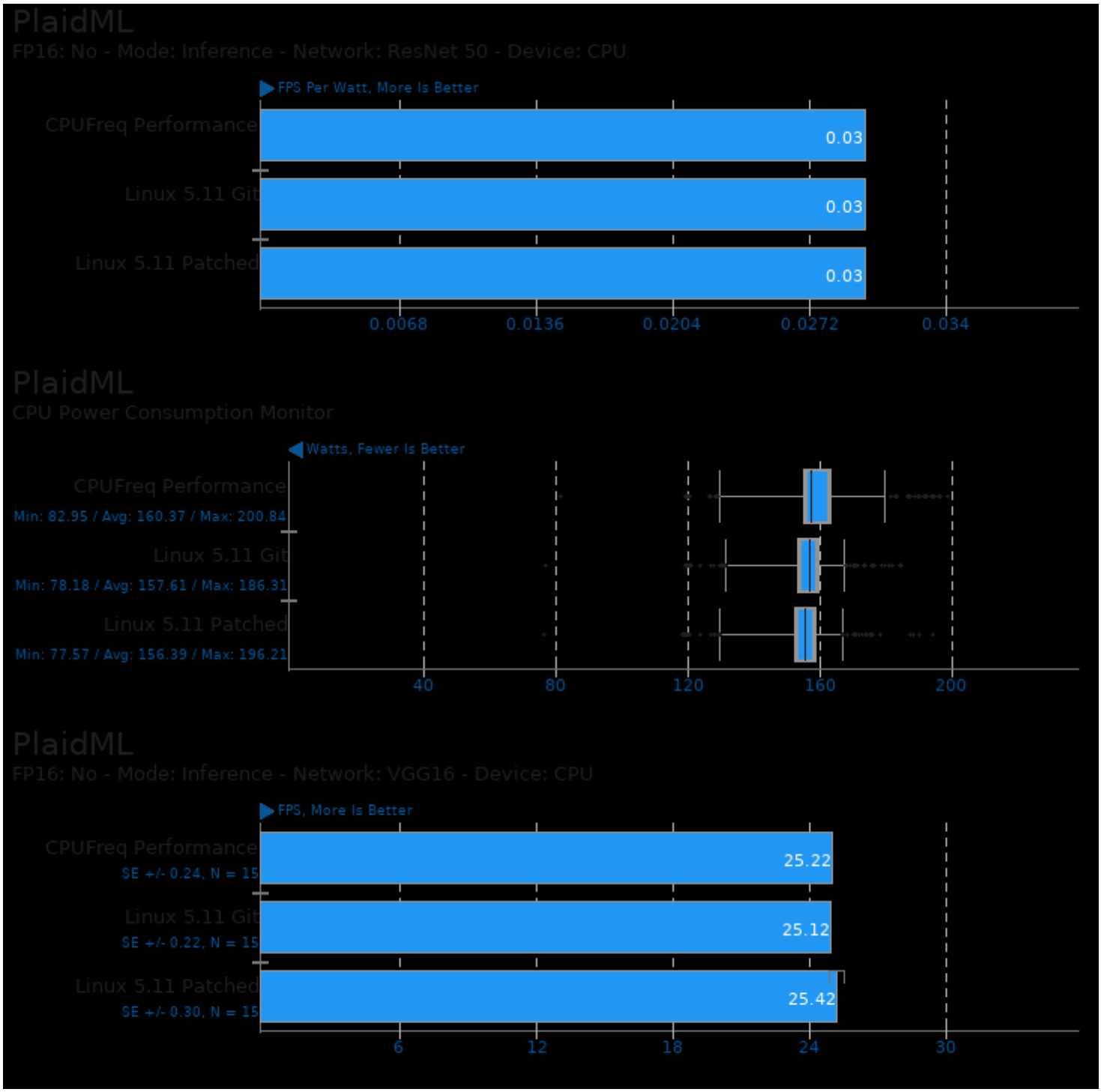


PlaidML

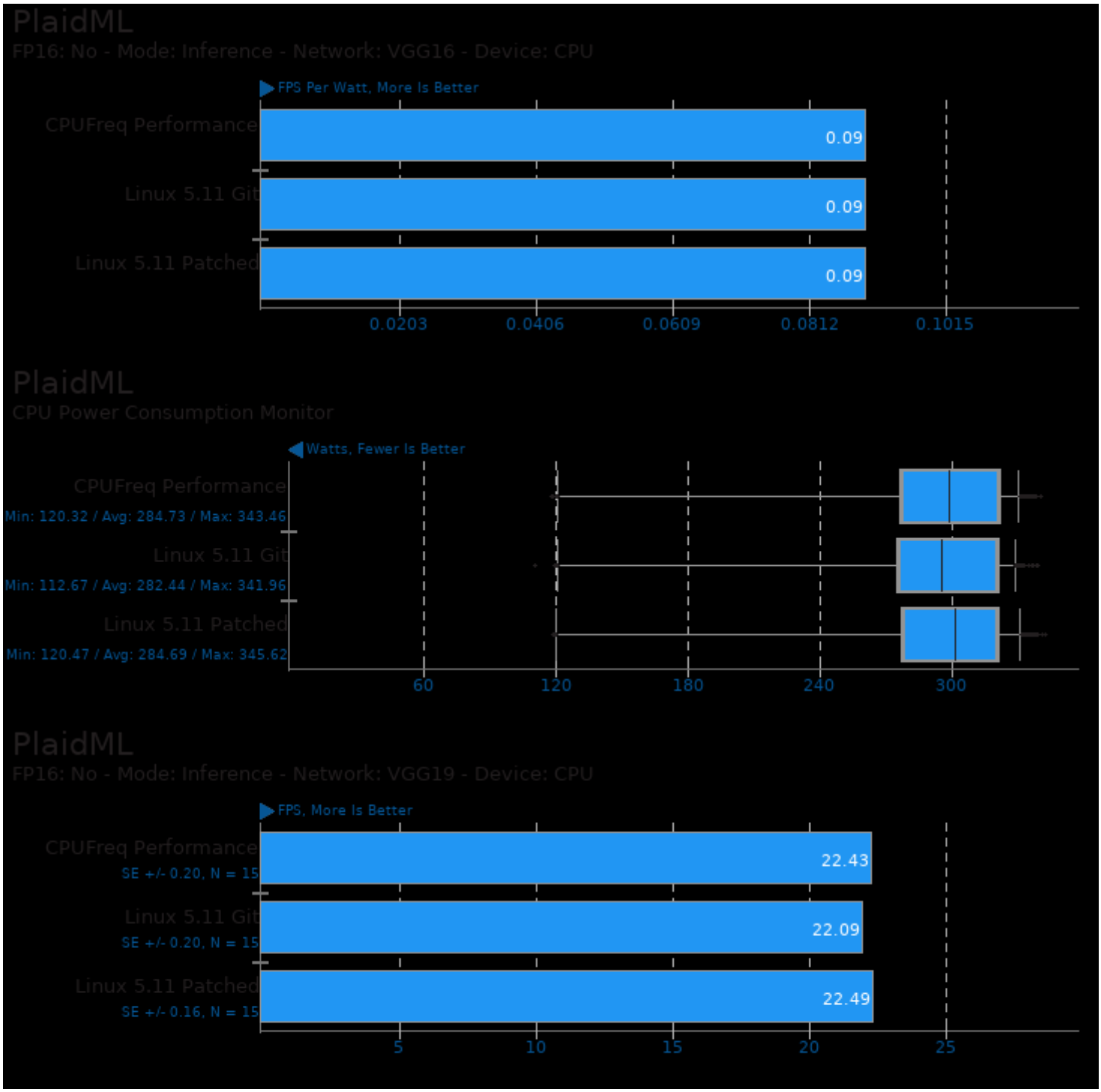
FP16: No - Mode: Inference - Network: ResNet 50 - Device: CPU



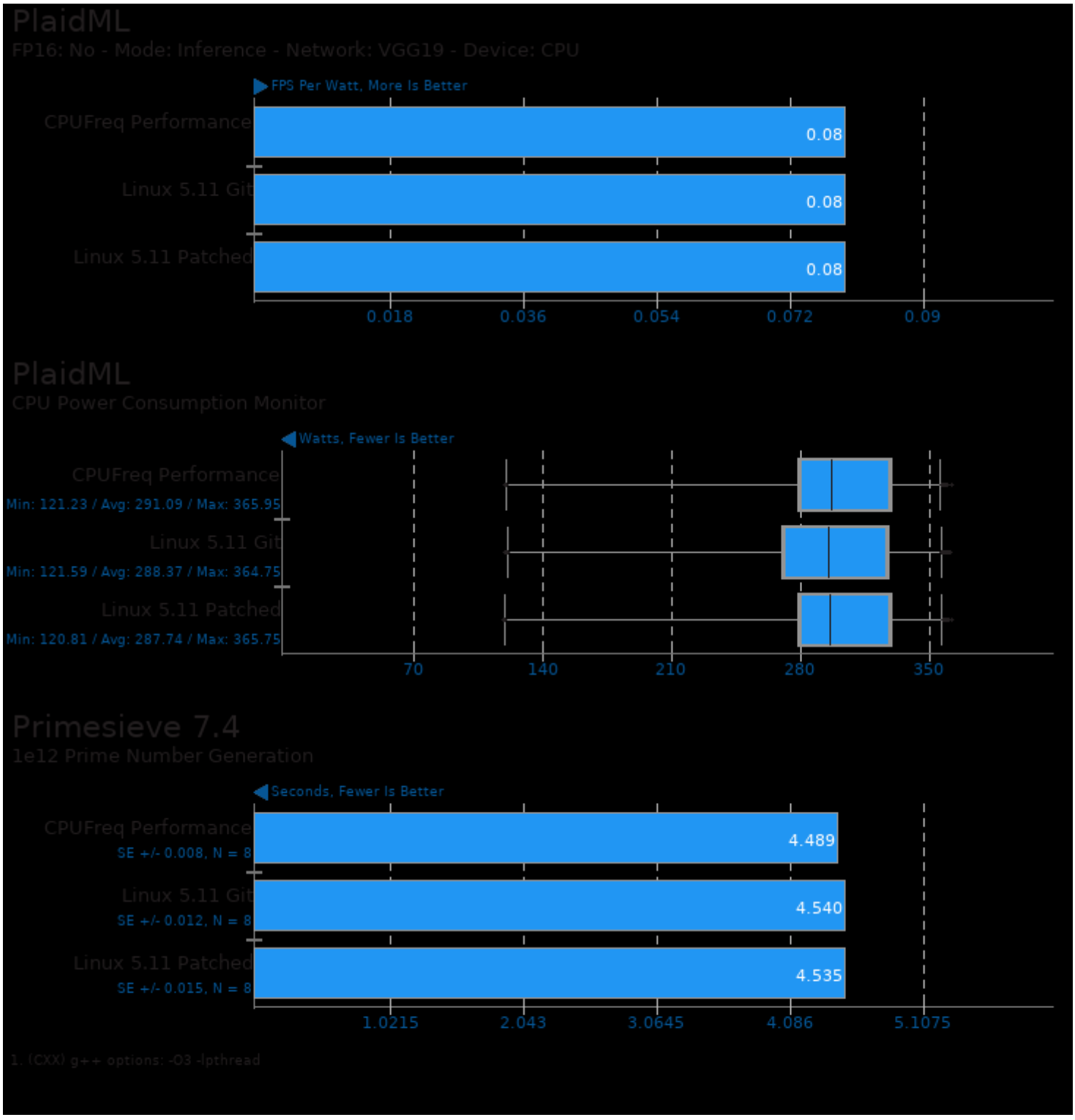
AMD EPYC 7F72 2P Linux 5.11 Perf Governor



AMD EPYC 7F72 2P Linux 5.11 Perf Governor



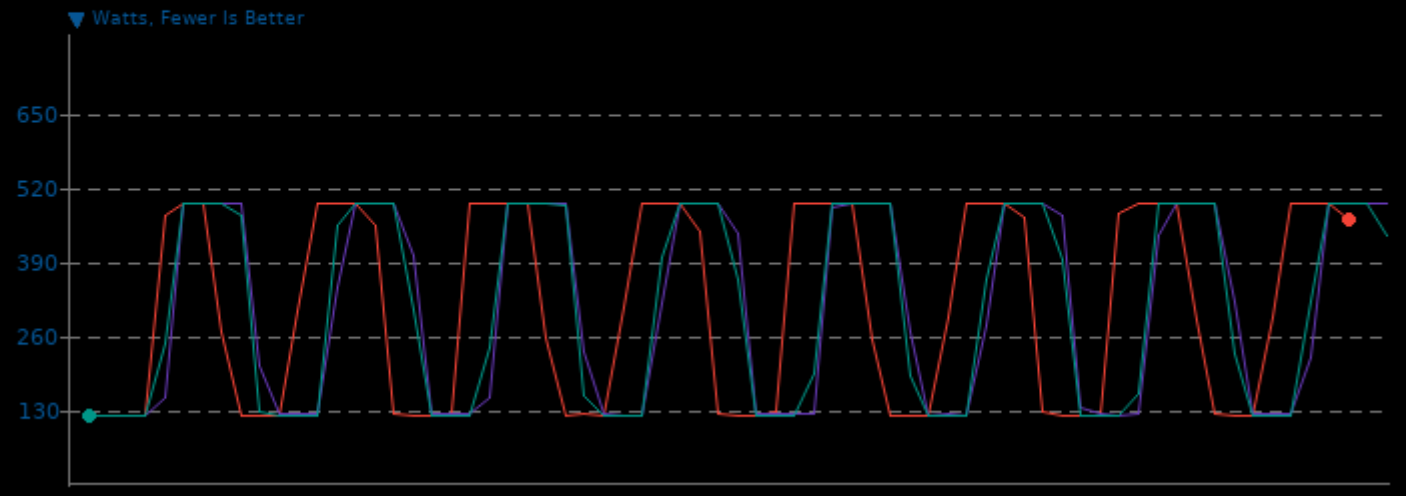
AMD EPYC 7F72 2P Linux 5.11 Perf Governor



Primesieve 7.4

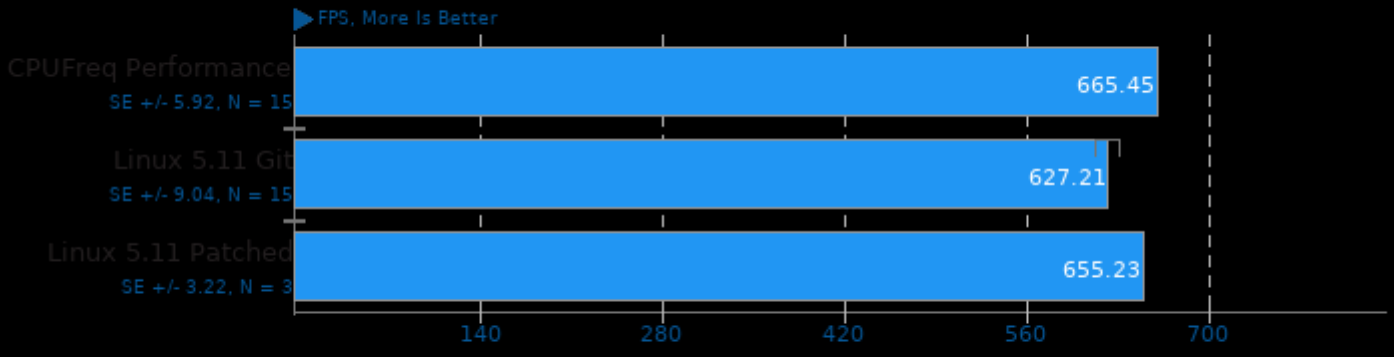
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	121.3	310.0	492.0
Linux 5.11 Git	122.8	309.7	492.2
Linux 5.11 Patched	121.0	309.6	492.0



TTSIOD 3D Renderer 2.3b

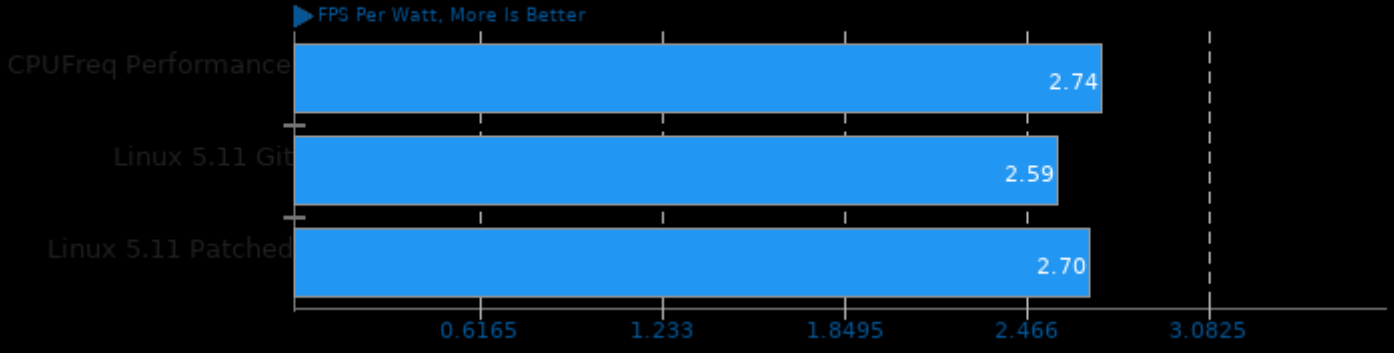
Phong Rendering With Soft-Shadow Mapping

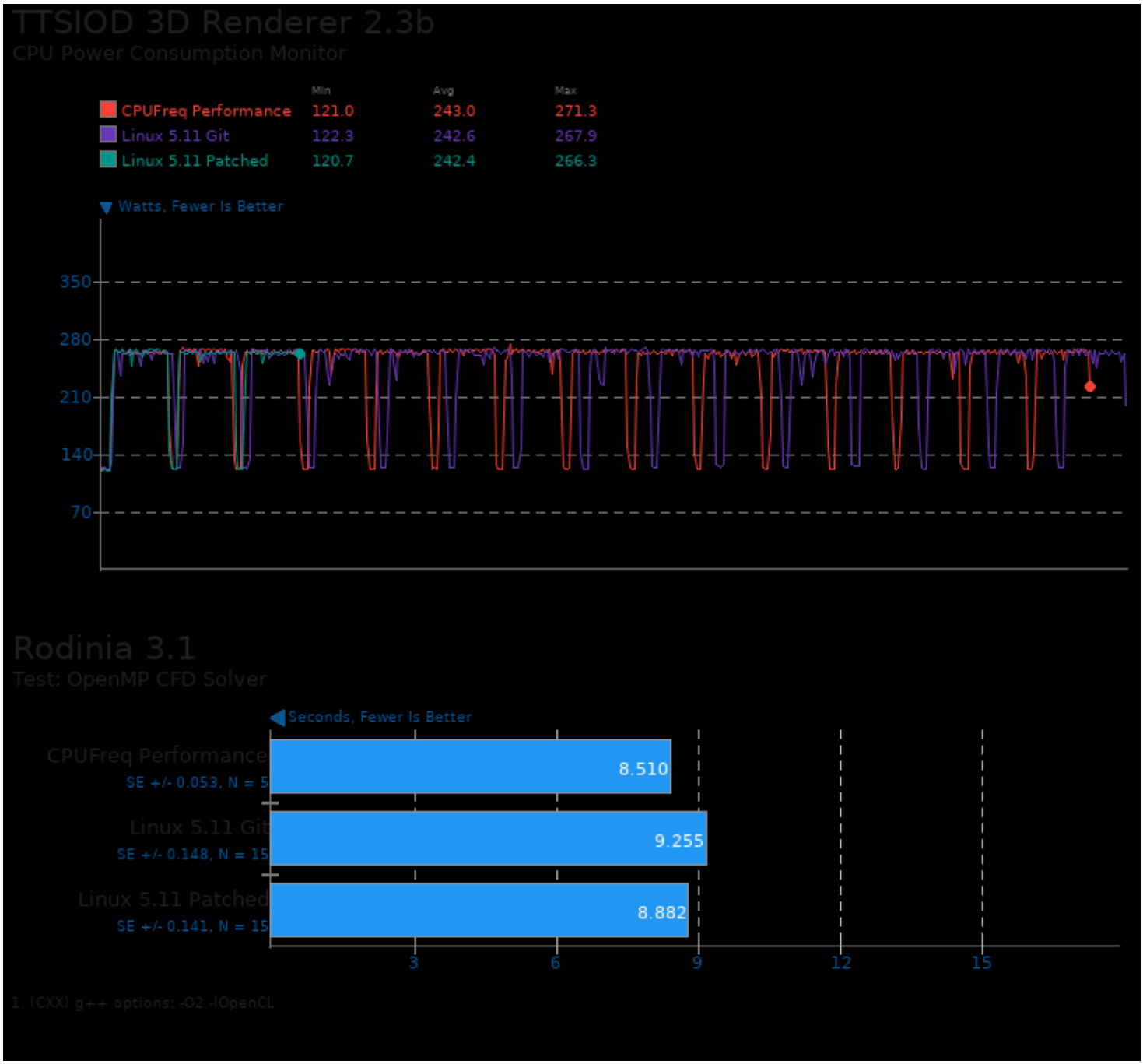


1. (CXX) g++ options: -O3 -fomit-frame-pointer -ffast-math -mtune=native -flto -msse -mrecip -mfpmath=sse -msse2 -mssse3 -lSDL -fopenmp -fwhole-pr

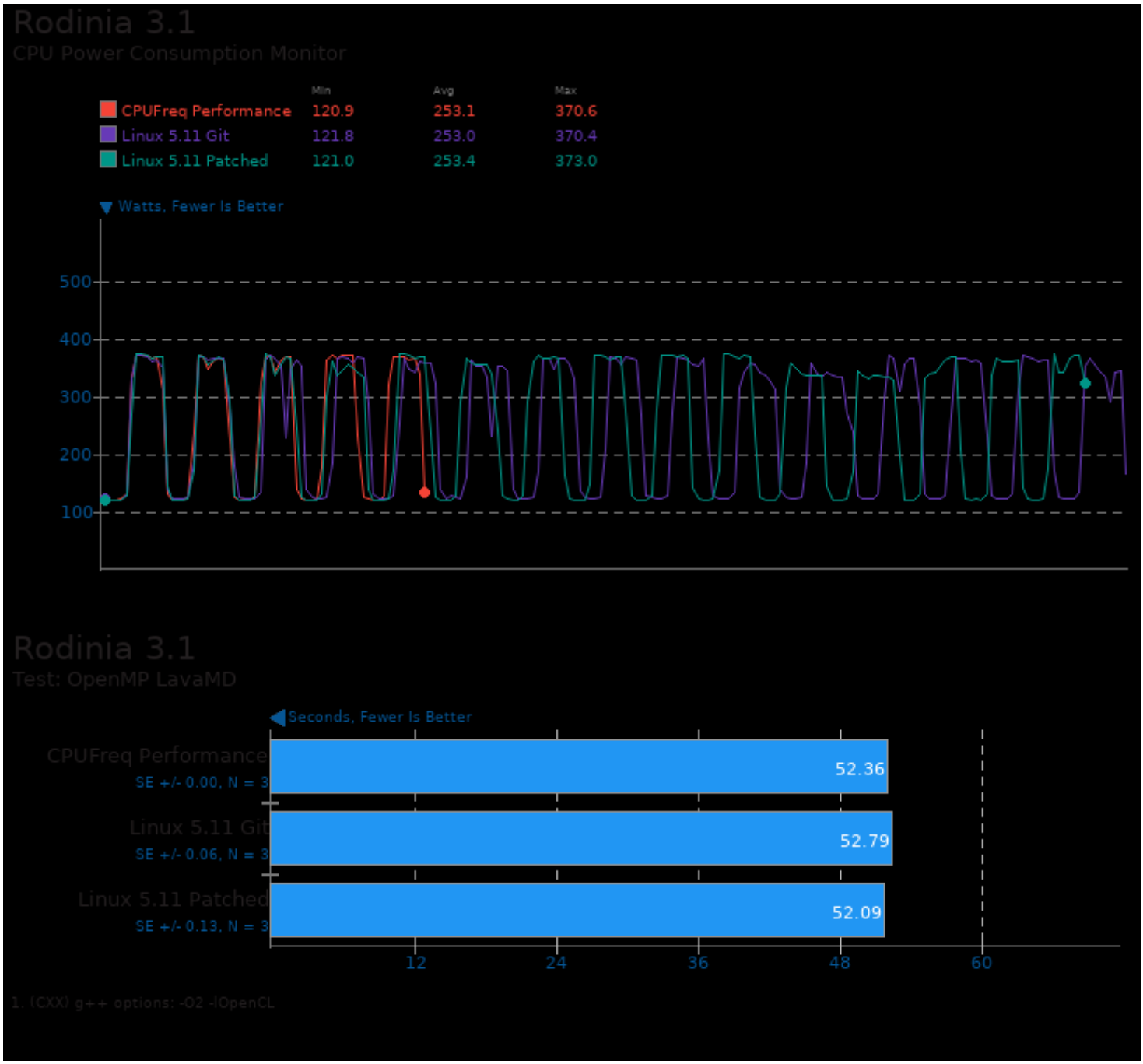
TTSIOD 3D Renderer 2.3b

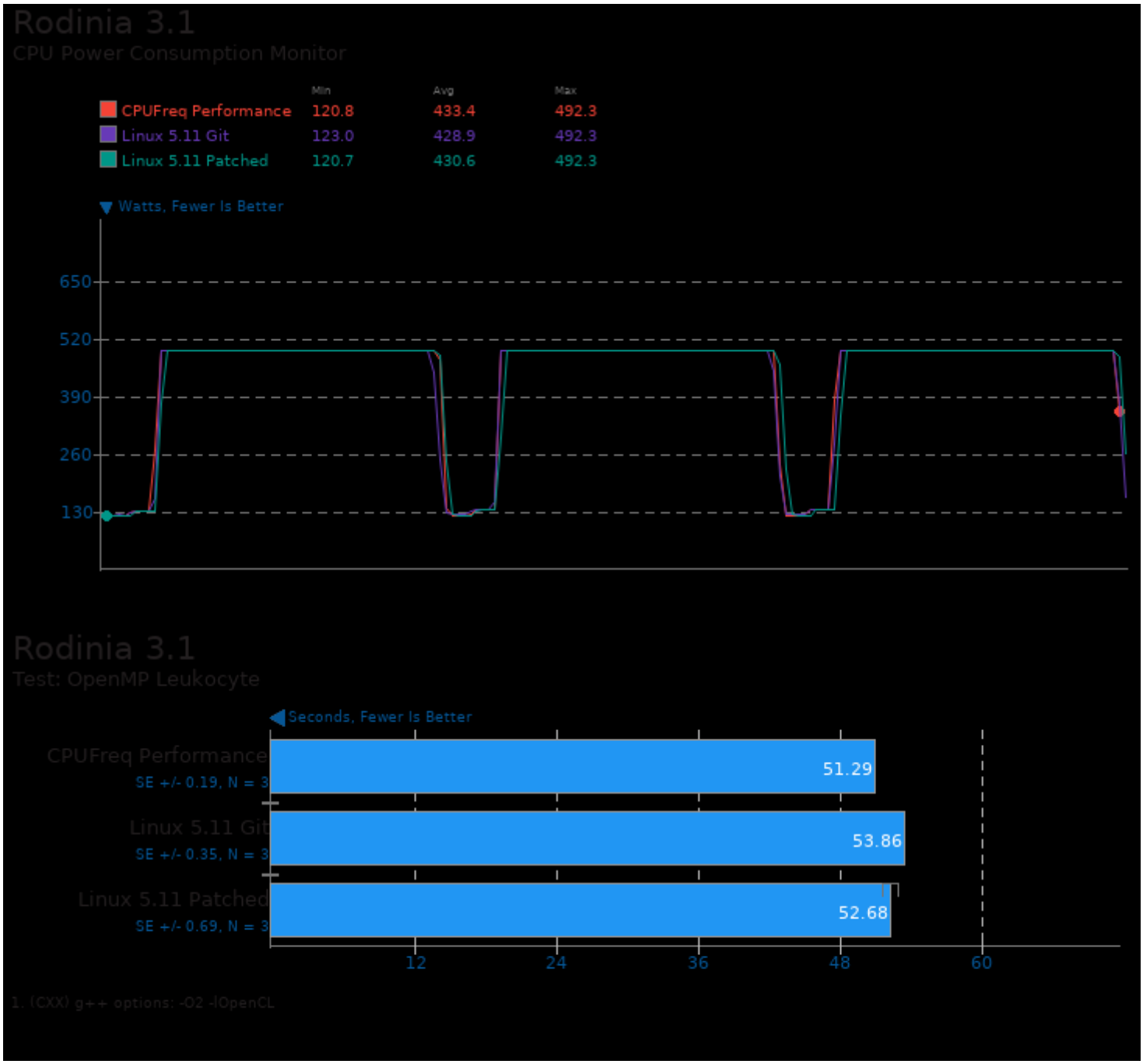
Phong Rendering With Soft-Shadow Mapping

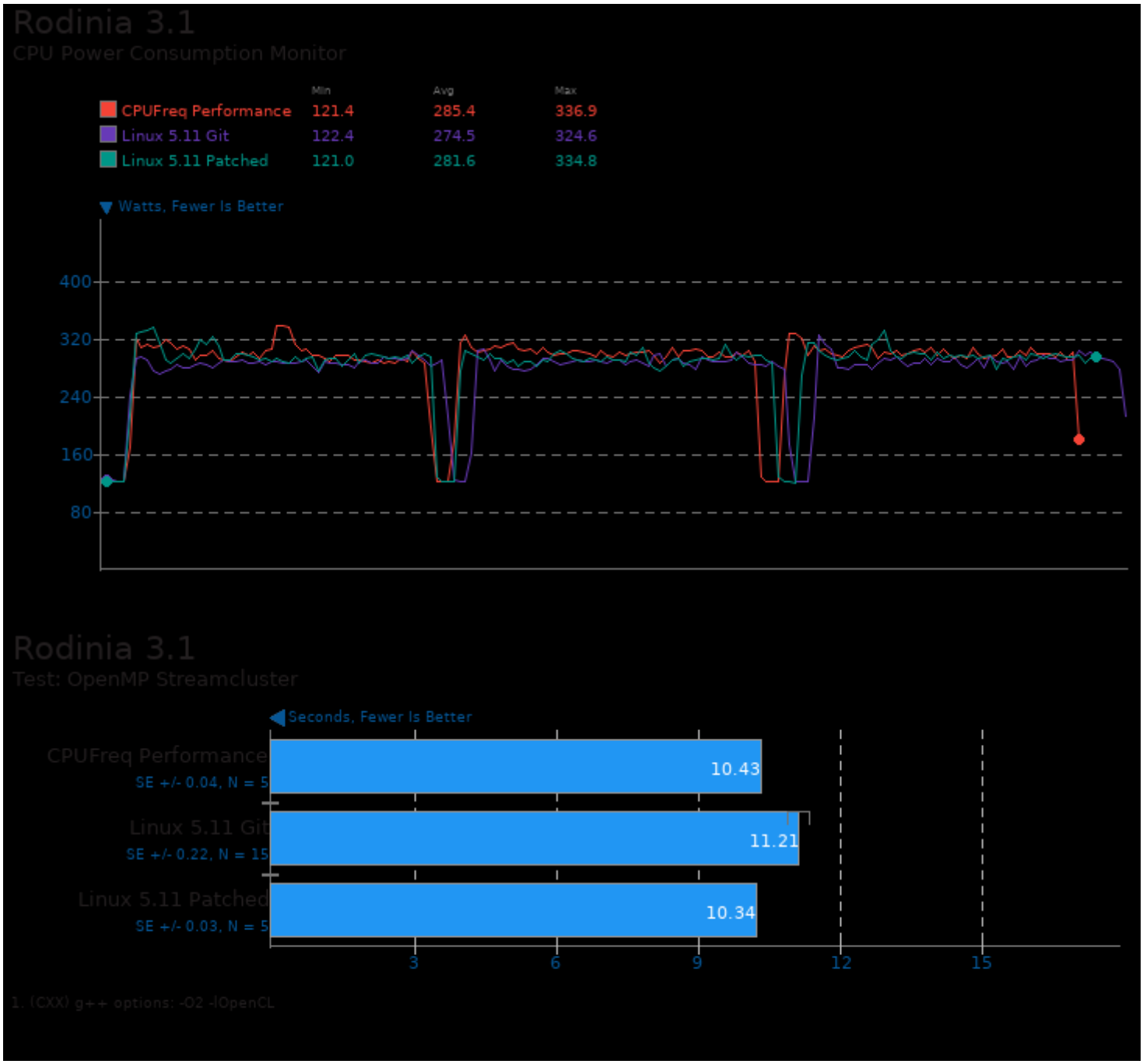


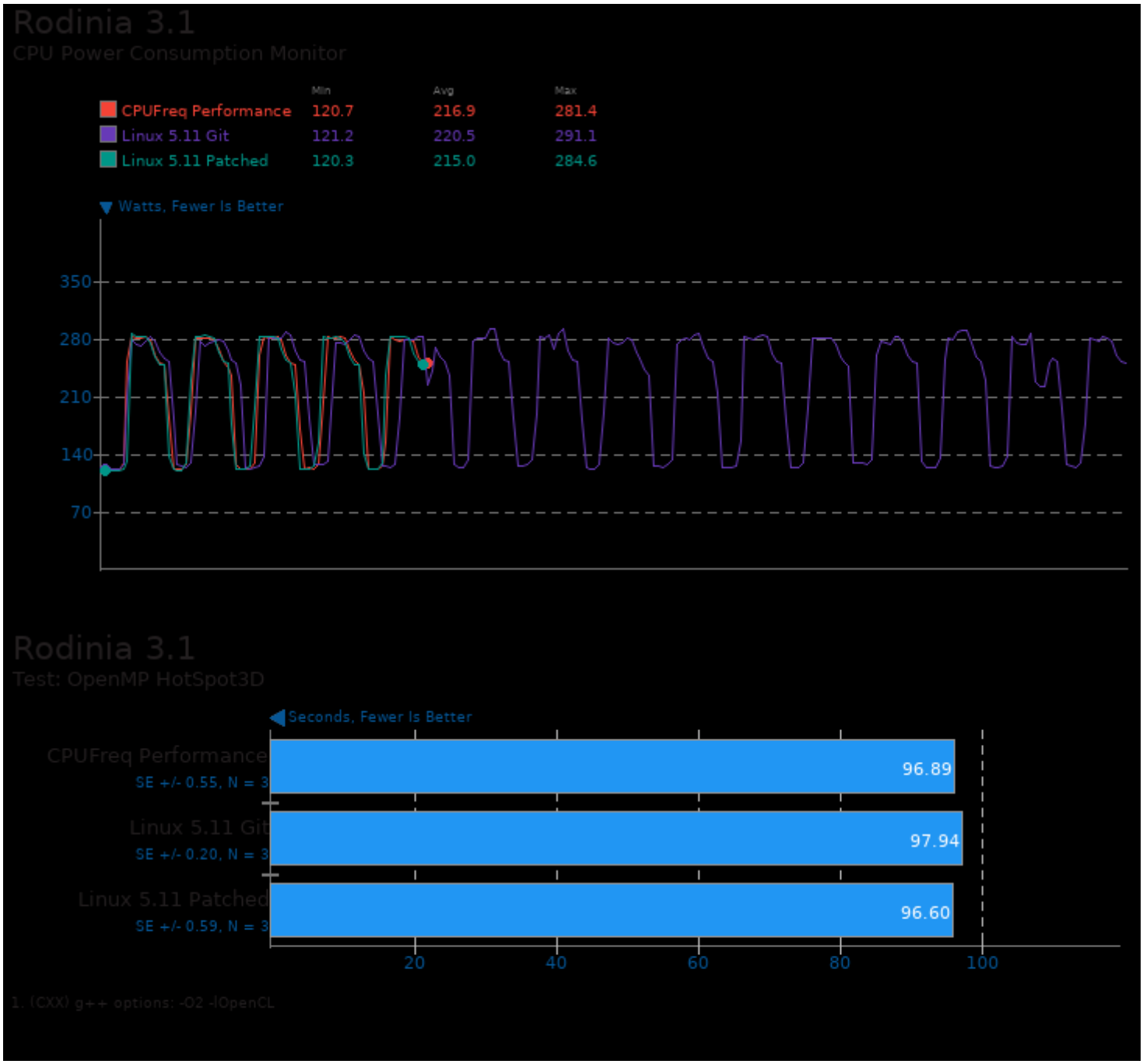

TTSIOD 3D Renderer 2.3b
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 121.0 243.0 271.3
Linux 5.11 Git 122.3 242.6 267.9
Linux 5.11 Patched 120.7 242.4 266.3
Watts, Fewer Is Better
350
280
210
140
70
Rodinia 3.1
Test: OpenMP CFD Solver
Seconds, Fewer Is Better
CPUFreq Performance
SE +/- 0.053, N = 5
8.510
Linux 5.11 Git
SE +/- 0.148, N = 15
9.255
Linux 5.11 Patched
SE +/- 0.141, N = 15
8.882
3
6
9
12
15
1. (CXX) g++ options: -O2 -lOpenCL

AMD EPYC 7F72 2P Linux 5.11 Perf Governor




Rodinia 3.1
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.8 433.4 492.3
Linux 5.11 Git 123.0 428.9 492.3
Linux 5.11 Patched 120.7 430.6 492.3
Watts, Fewer Is Better
650
520
390
260
130
Rodinia 3.1
Test: OpenMP Leukocyte
Seconds, Fewer Is Better
CPUFreq Performance
SE +/- 0.19, N = 3
51.29
Linux 5.11 Git
SE +/- 0.35, N = 3
53.86
Linux 5.11 Patched
SE +/- 0.69, N = 3
52.68
12
24
36
48
60
1. (CXX) g++ options: -O2 -lOpenCL

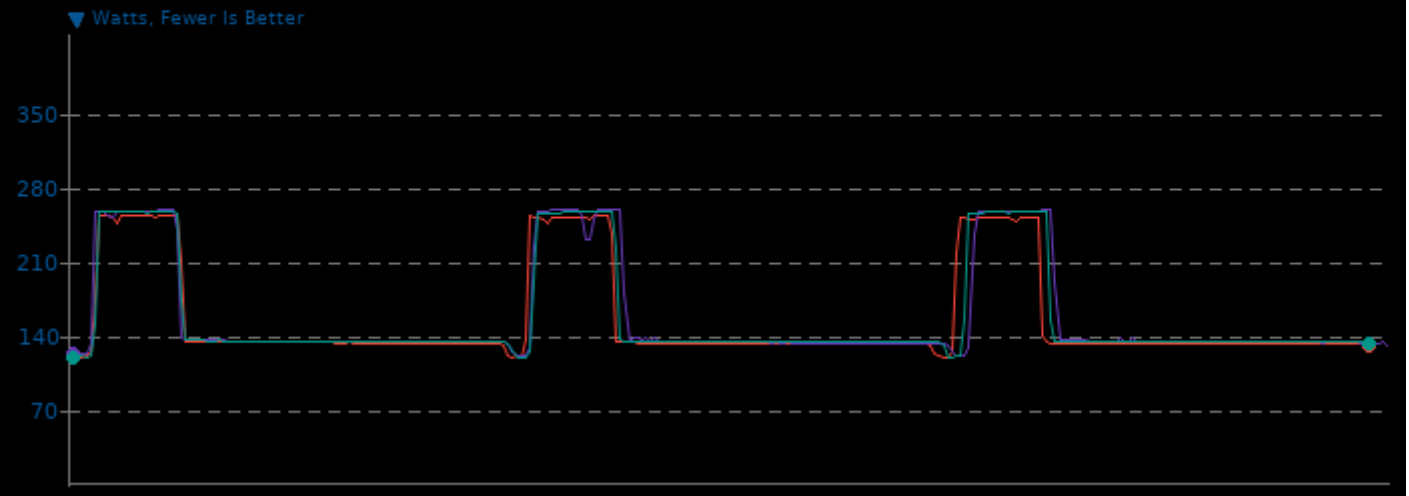

Rodinia 3.1
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 121.4 285.4 336.9
Linux 5.11 Git 122.4 274.5 324.6
Linux 5.11 Patched 121.0 281.6 334.8
Watts, Fewer Is Better
400
320
240
160
80
Rodinia 3.1
Test: OpenMP Streamcluster
Seconds, Fewer Is Better
CPUFreq Performance
SE +/- 0.04, N = 5
10.43
Linux 5.11 Git
SE +/- 0.22, N = 15
11.21
Linux 5.11 Patched
SE +/- 0.03, N = 5
10.34
3
6
9
12
15
1. (CXX) g++ options: -O2 -lOpenCL


Rodinia 3.1
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.7 216.9 281.4
Linux 5.11 Git 121.2 220.5 291.1
Linux 5.11 Patched 120.3 215.0 284.6
Watts, Fewer Is Better
350
280
210
140
70
Rodinia 3.1
Test: OpenMP HotSpot3D
Seconds, Fewer Is Better
CPUFreq Performance
SE +/- 0.55, N = 3
96.89
Linux 5.11 Git
SE +/- 0.20, N = 3
97.94
Linux 5.11 Patched
SE +/- 0.59, N = 3
96.60
20
40
60
80
100
1. (CXX) g++ options: -O2 -lOpenCL

Rodinia 3.1

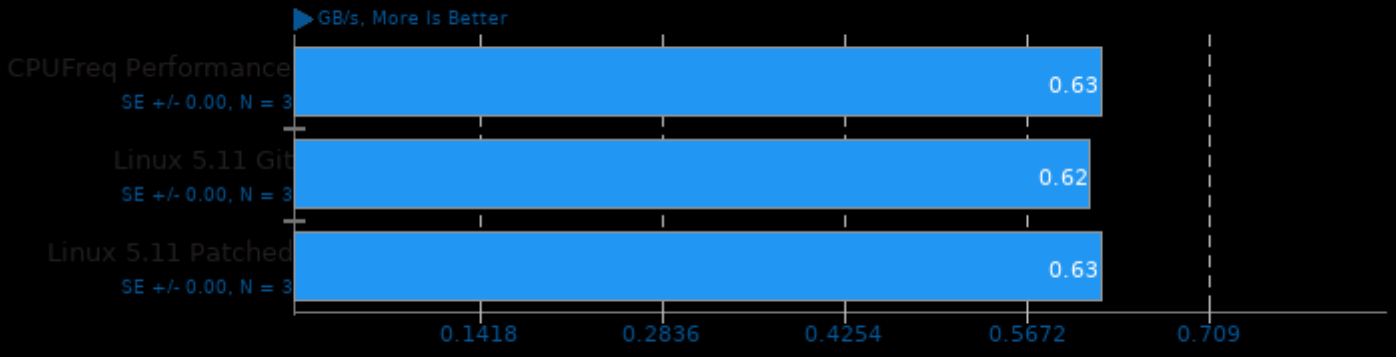
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	119.8	156.2	253.4
Linux 5.11 Git	122.1	158.2	258.8
Linux 5.11 Patched	120.1	157.6	257.7



simdjson 0.7.1

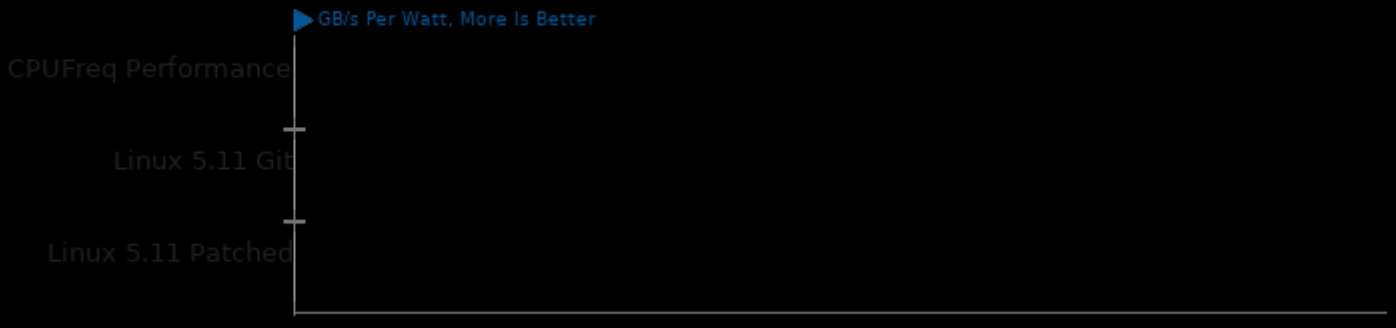
Throughput Test: PartialTweets

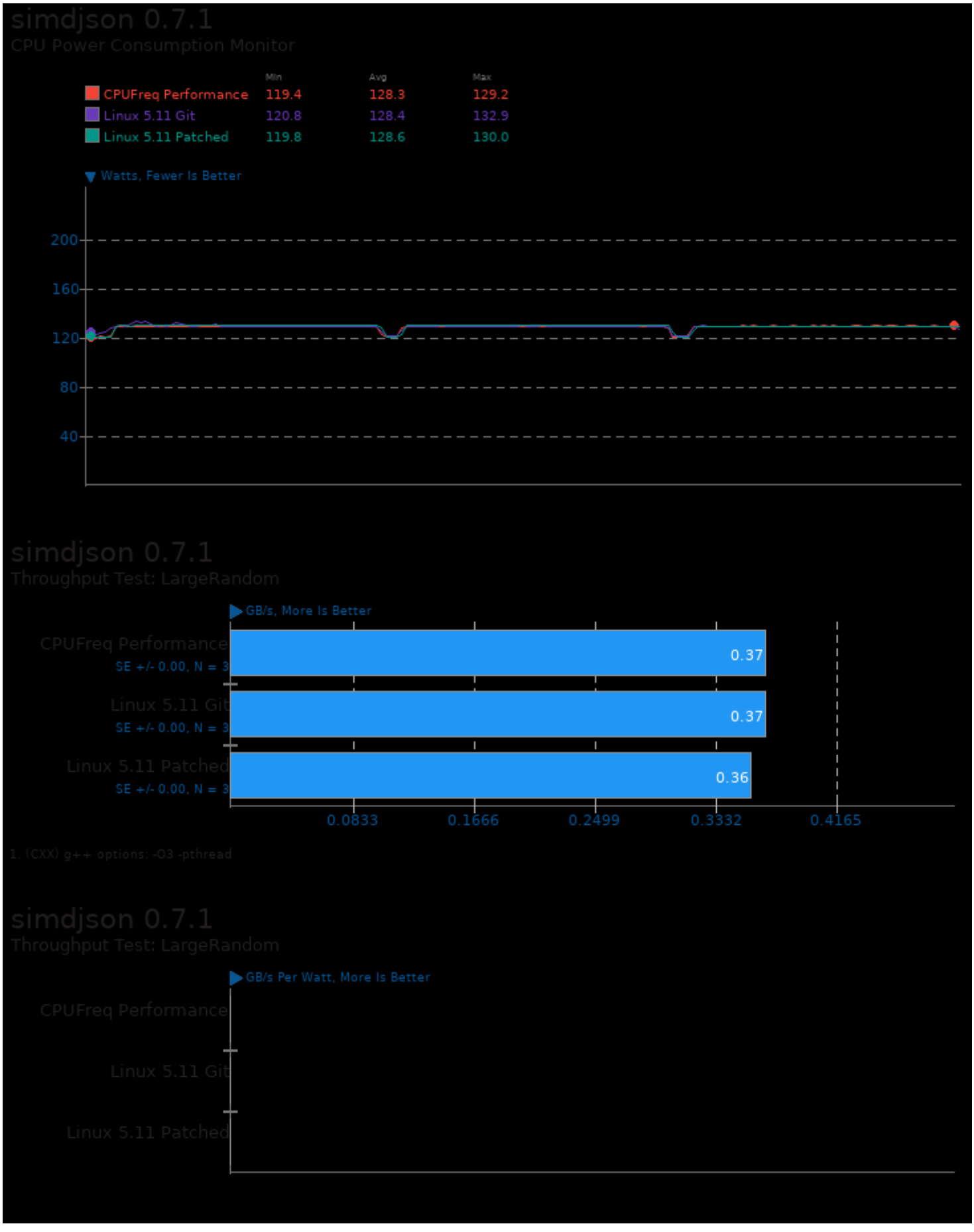


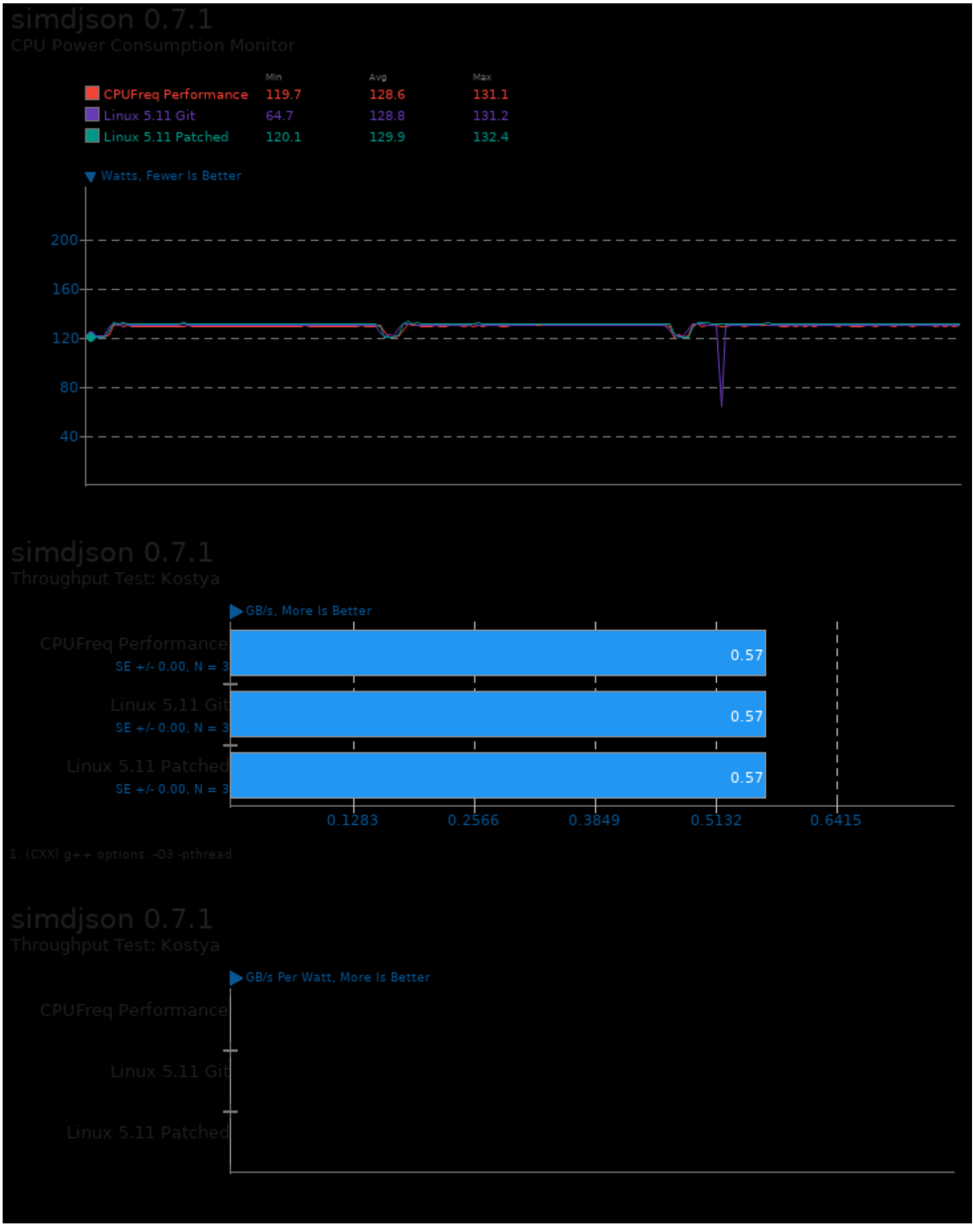
1. (CXX) g++ options: -O3 -pthread

simdjson 0.7.1

Throughput Test: PartialTweets



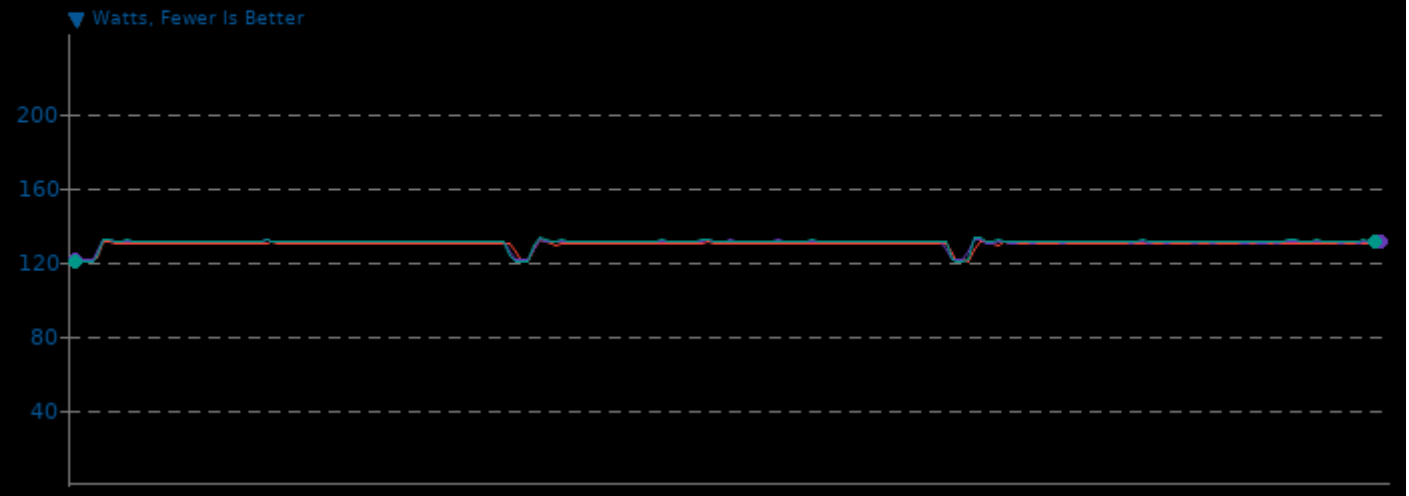

simdjson 0.7.1
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 119.4 128.3 129.2
Linux 5.11 Git 120.8 128.4 132.9
Linux 5.11 Patched 119.8 128.6 130.0
Watts, Fewer Is Better
200
160
120
80
40
simdjson 0.7.1
Throughput Test: LargeRandom
GB/s, More Is Better
CPUFreq Performance
SE +/- 0.00, N = 3
0.37
Linux 5.11 Git
SE +/- 0.00, N = 3
0.37
Linux 5.11 Patched
SE +/- 0.00, N = 3
0.36
0.0833
0.1666
0.2499
0.3332
0.4165
1. (CXX) g++ options: -O3 -pthread
simdjson 0.7.1
Throughput Test: LargeRandom
GB/s Per Watt, More Is Better
CPUFreq Performance
Linux 5.11 Git
Linux 5.11 Patched


simdjson 0.7.1
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 119.7 128.6 131.1
Linux 5.11 Git 64.7 128.8 131.2
Linux 5.11 Patched 120.1 129.9 132.4
Watts, Fewer Is Better
200
160
120
80
40
simdjson 0.7.1
Throughput Test: Kostya
GB/s, More Is Better
CPUFreq Performance
SE +/- 0.00, N = 3
0.57
Linux 5.11 Git
SE +/- 0.00, N = 3
0.57
Linux 5.11 Patched
SE +/- 0.00, N = 3
0.57
0.1283
0.2566
0.3849
0.5132
0.6415
1. (CXX) g++ options: -O3 -pthread
simdjson 0.7.1
Throughput Test: Kostya
GB/s Per Watt, More Is Better
CPUFreq Performance
Linux 5.11 Git
Linux 5.11 Patched

simdjson 0.7.1

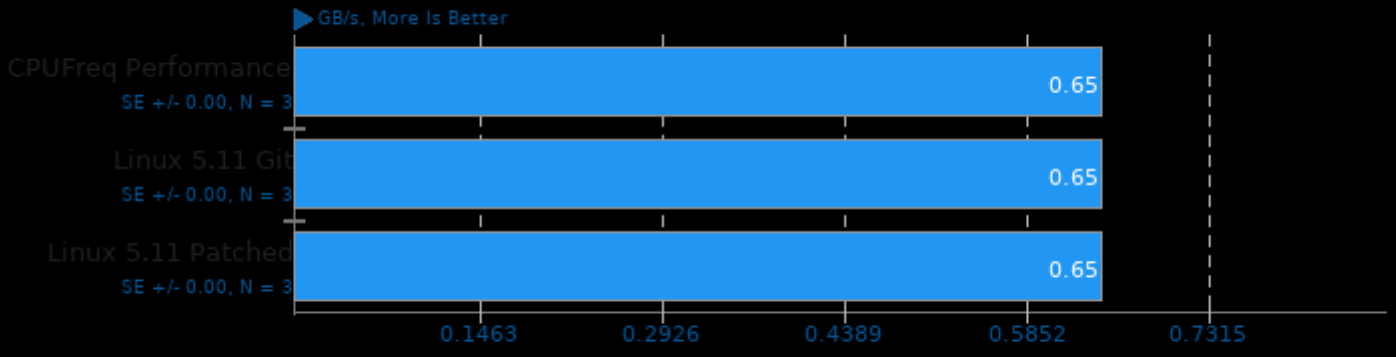
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	119.8	128.9	131.5
Linux 5.11 Git	120.9	130.0	132.1
Linux 5.11 Patched	119.9	130.5	132.8



simdjson 0.7.1

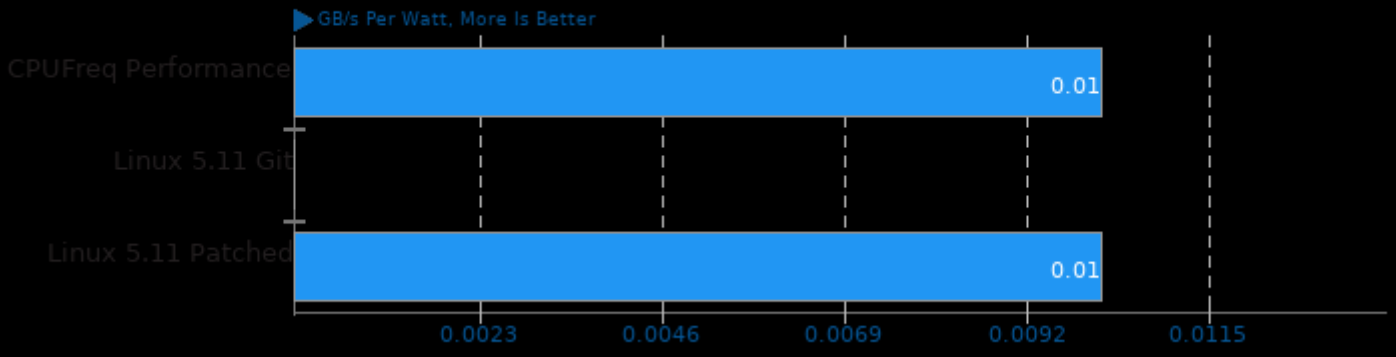
Throughput Test: DistinctUserID



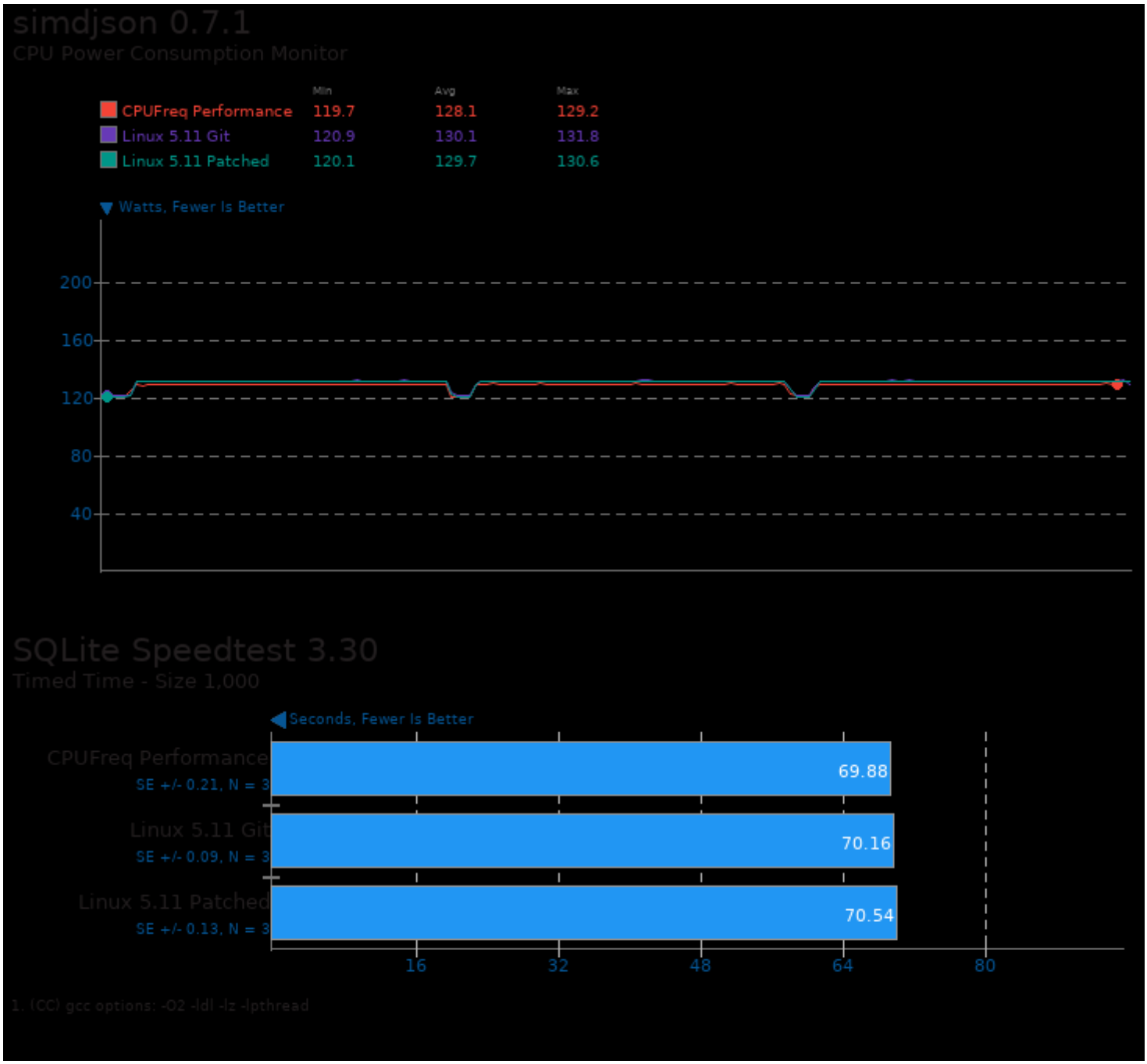
1. (CXX) g++ options: -O3 -pthread

simdjson 0.7.1

Throughput Test: DistinctUserID



AMD EPYC 7F72 2P Linux 5.11 Perf Governor

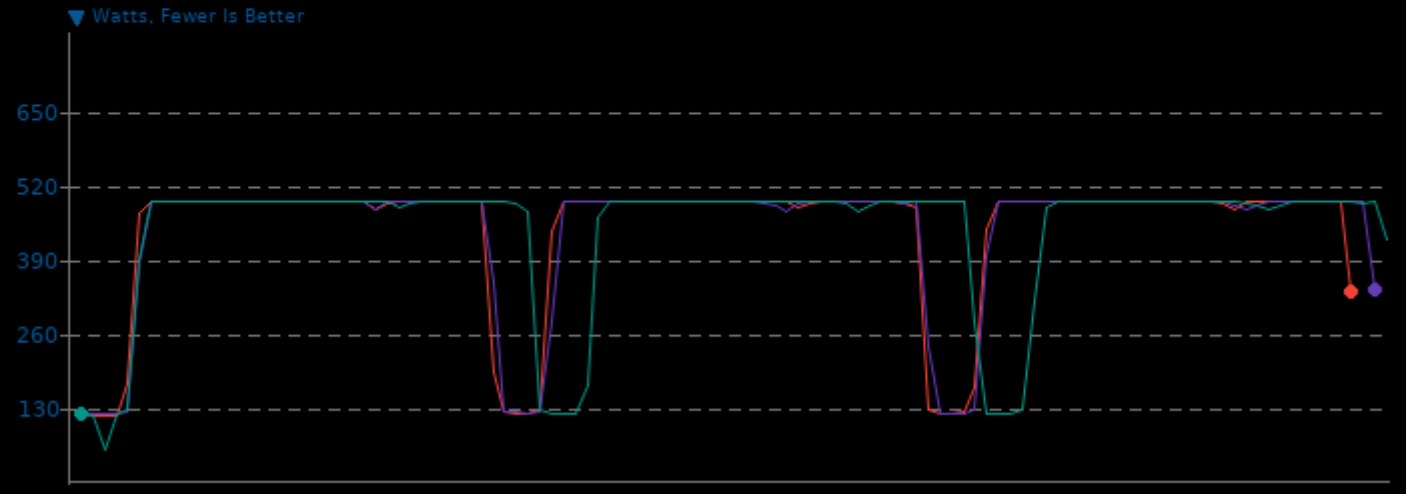



SQLite Speedtest 3.30
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 119.8 129.6 131.3
Linux 5.11 Git 120.8 131.3 132.6
Linux 5.11 Patched 120.2 131.3 133.3
Watts, Fewer Is Better
200
160
120
80
40
Stockfish 12
Total Time
Nodes Per Second, More Is Better
CPUFreq Performance
SE +/- 1344259.09, N = 3
96082114
Linux 5.11 Git
SE +/- 1123146.37, N = 3
97945089
Linux 5.11 Patched
SE +/- 769788.53, N = 3
97042601
20M
40M
60M
80M
100M
1. (CXX) g++ options: -m64 -lpthread -fno-exceptions -std=c++17 -pedantic -O3 -msse -msse3 -mpopcnt -msse4.1 -mssse3 -msse2 -flto -flto=jobserver
Stockfish 12
Total Time
Nodes Per Second Per Watt, More Is Better
CPUFreq Performance
218753.45
Linux 5.11 Git
223084.50
Linux 5.11 Patched
220989.94
50K
100K
150K
200K
250K

Stockfish 12

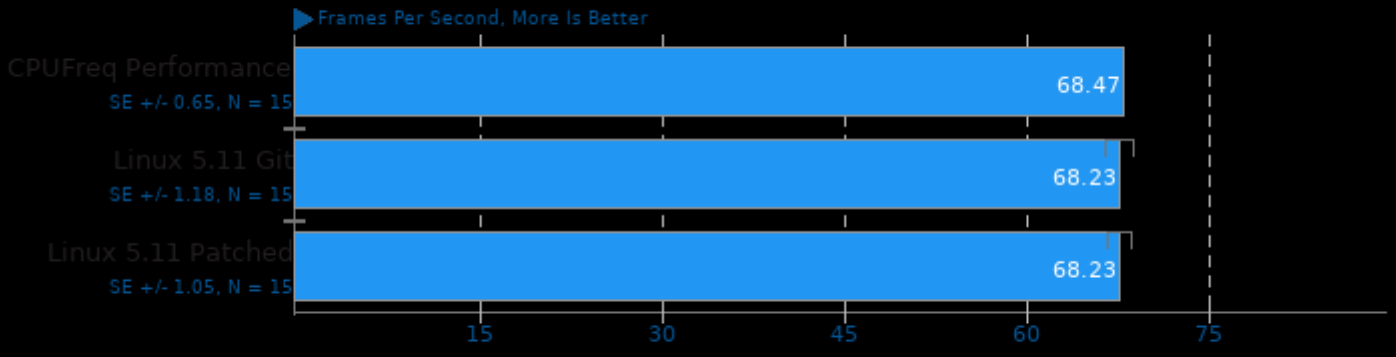
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	119.9	439.2	492.3
Linux 5.11 Git	120.6	439.0	492.1
Linux 5.11 Patched	60.1	439.1	492.3



SVT-AV1 0.8

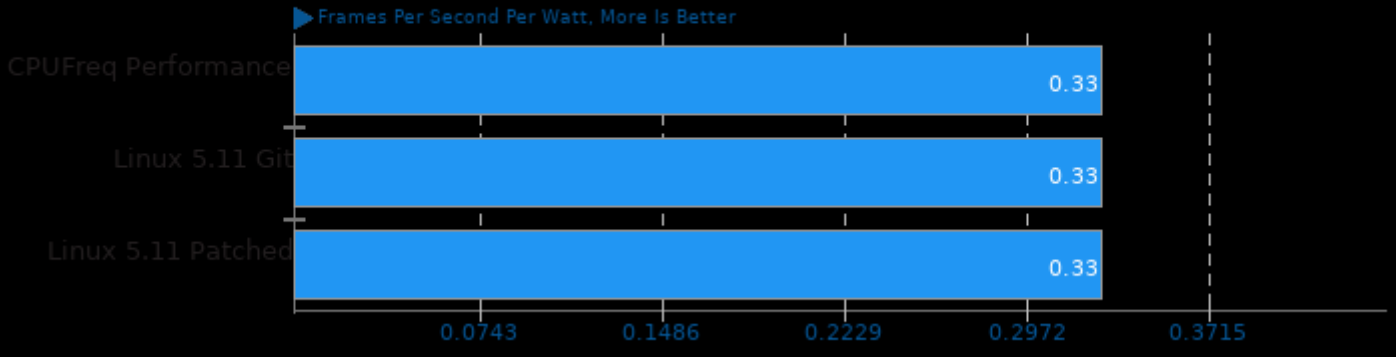
Encoder Mode: Enc Mode 8 - Input: 1080p



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

SVT-AV1 0.8

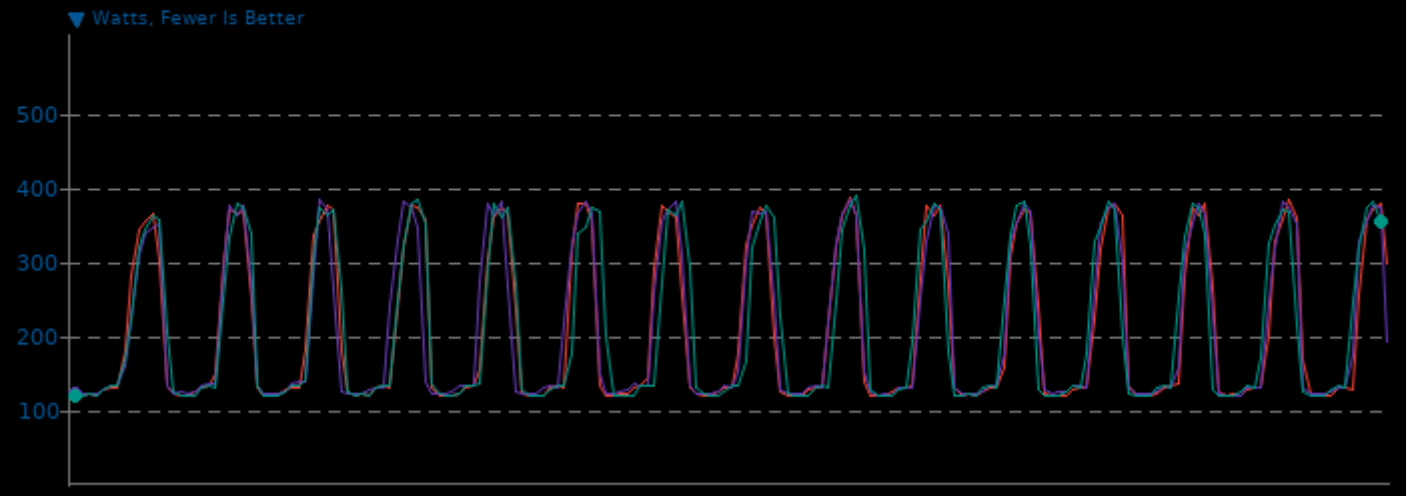
Encoder Mode: Enc Mode 8 - Input: 1080p



SVT-AV1 0.8

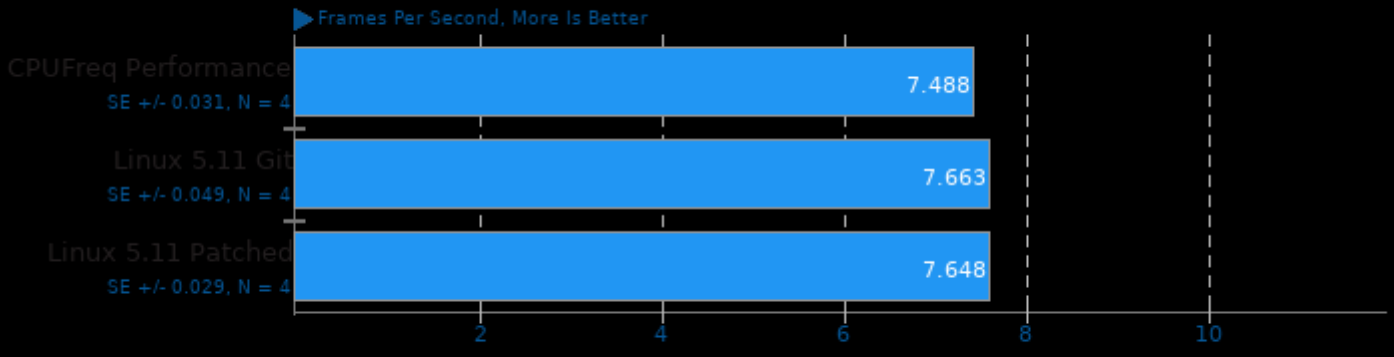
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	120.4	207.6	386.1
Linux 5.11 Git	121.4	207.9	382.6
Linux 5.11 Patched	120.4	209.8	388.0



SVT-AV1 0.8

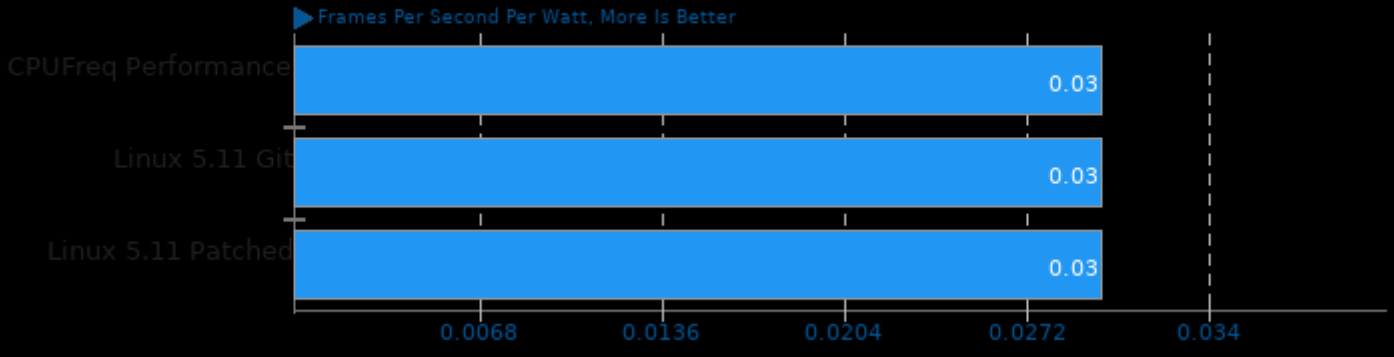
Encoder Mode: Enc Mode 4 - Input: 1080p



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

SVT-AV1 0.8

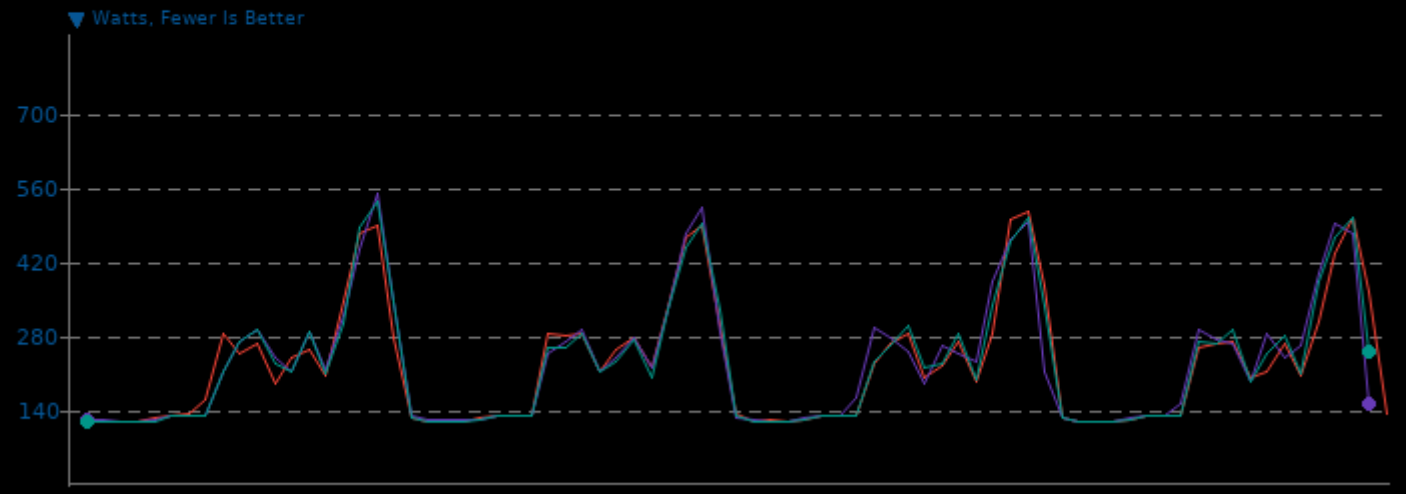
Encoder Mode: Enc Mode 4 - Input: 1080p



SVT-AV1 0.8

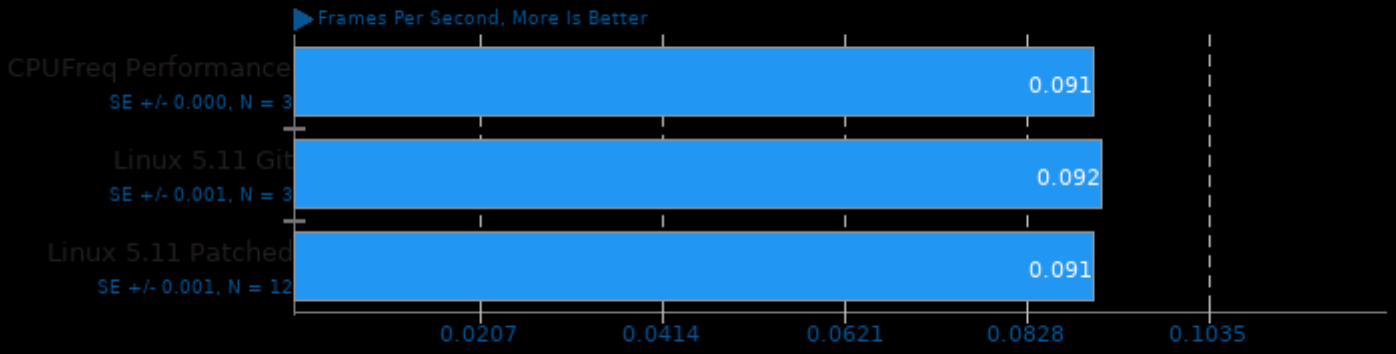
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	120.0	227.7	514.1
Linux 5.11 Git	121.1	230.3	548.3
Linux 5.11 Patched	119.9	229.6	530.7



SVT-AV1 0.8

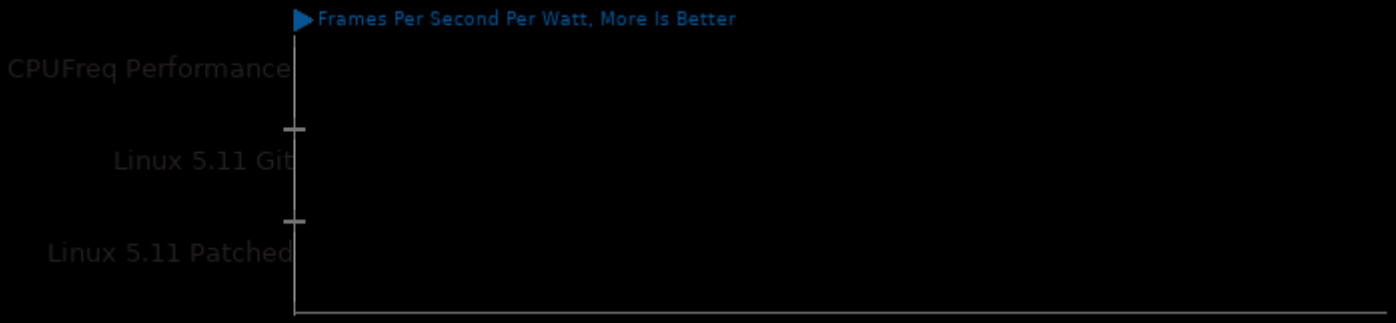
Encoder Mode: Enc Mode 0 - Input: 1080p



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

SVT-AV1 0.8

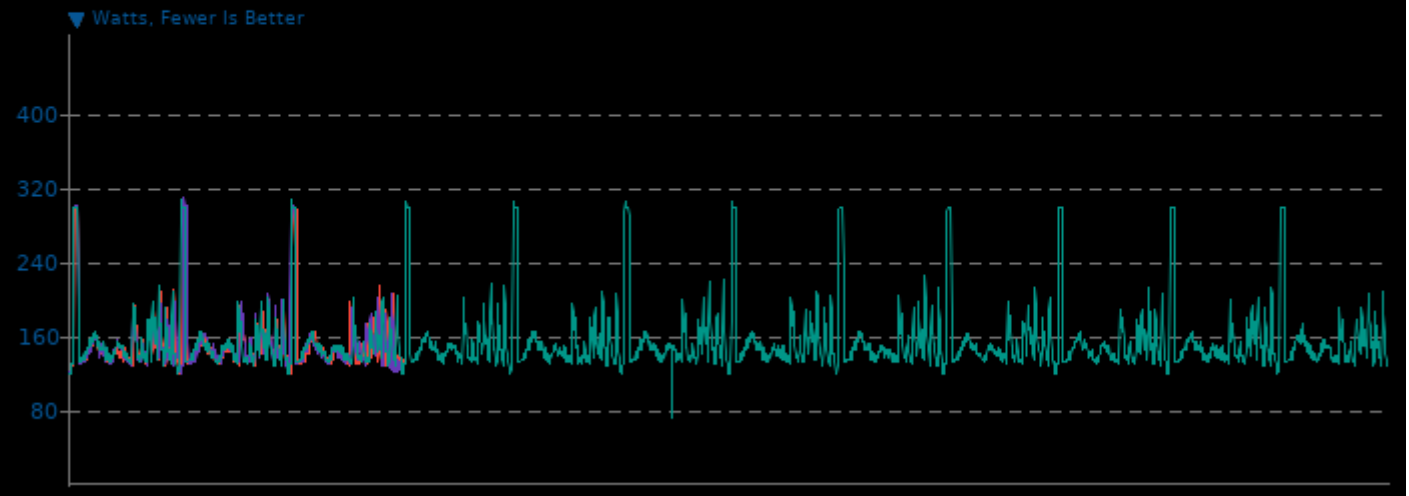
Encoder Mode: Enc Mode 0 - Input: 1080p



SVT-AV1 0.8

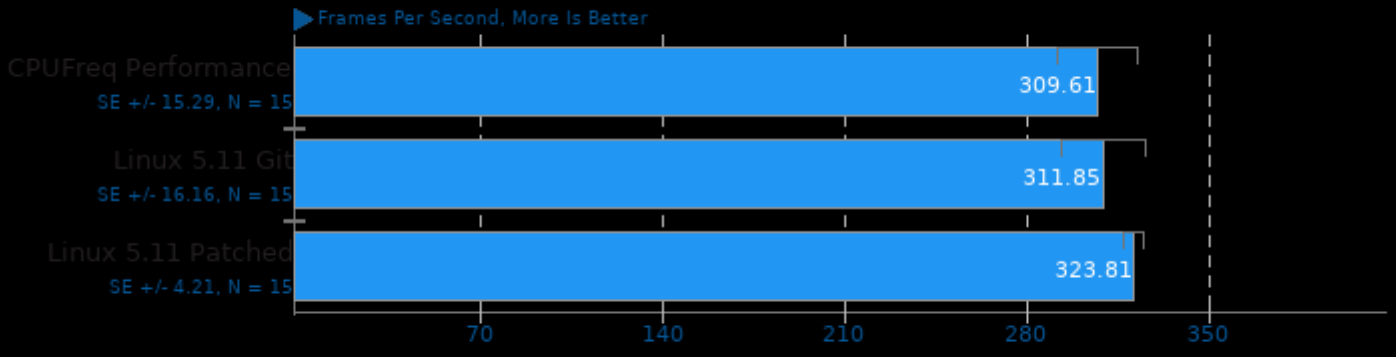
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	119.7	152.9	301.3
Linux 5.11 Git	120.7	154.1	307.6
Linux 5.11 Patched	73.8	154.7	305.6



SVT-VP9 0.1

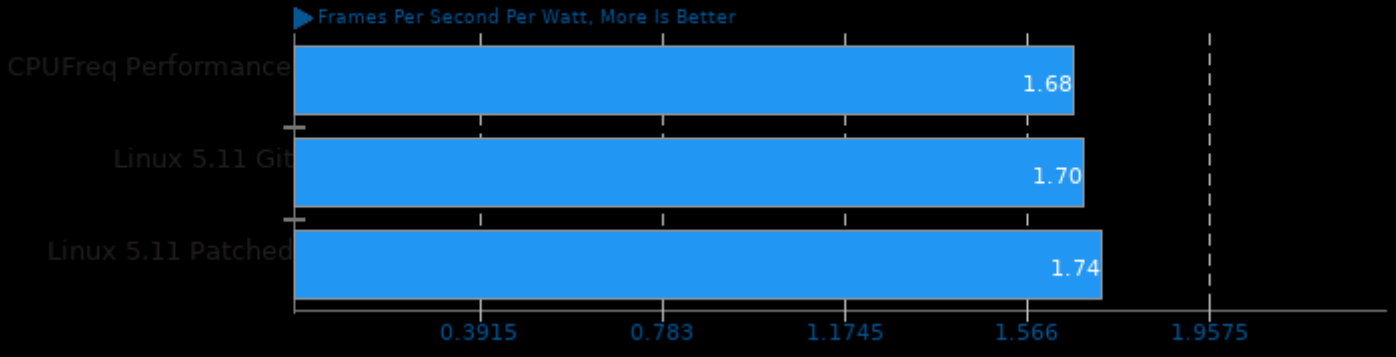
Tuning: Visual Quality Optimized - Input: Bosphorus 1080p



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

SVT-VP9 0.1

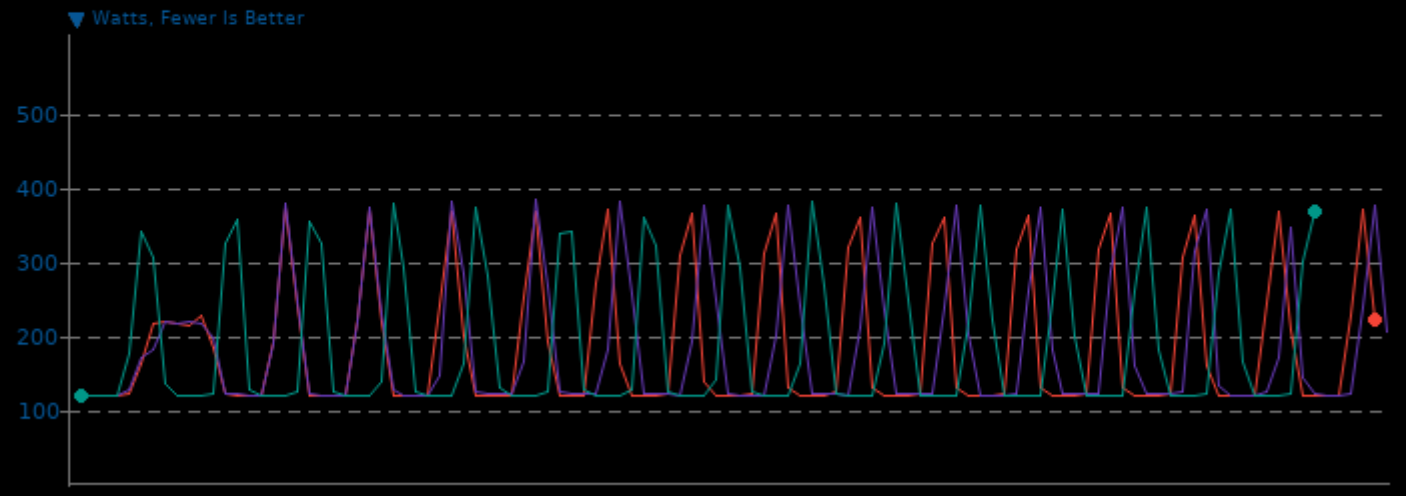
Tuning: Visual Quality Optimized - Input: Bosphorus 1080p



SVT-VP9 0.1

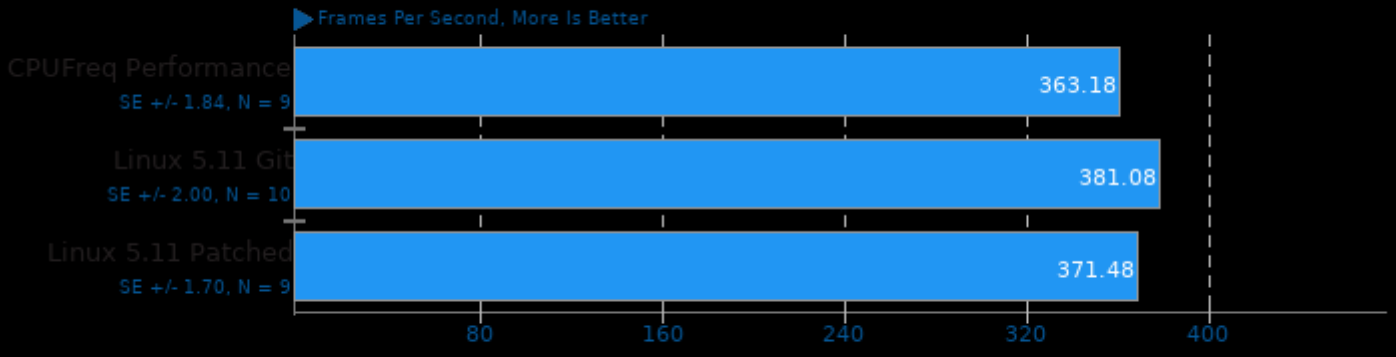
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	119.5	184.0	372.3
Linux 5.11 Git	120.1	183.5	382.5
Linux 5.11 Patched	119.4	185.8	379.1



SVT-VP9 0.1

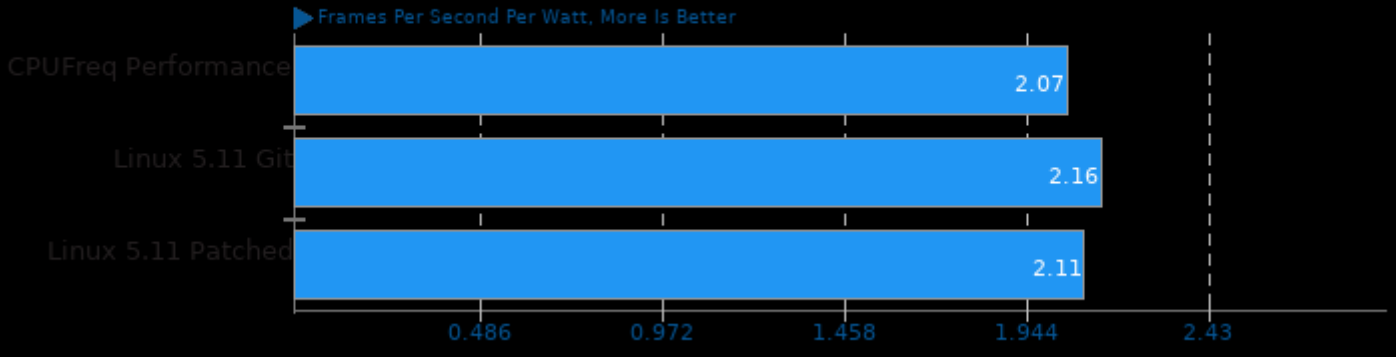
Tuning: PSNR/SSIM Optimized - Input: Bosphorus 1080p

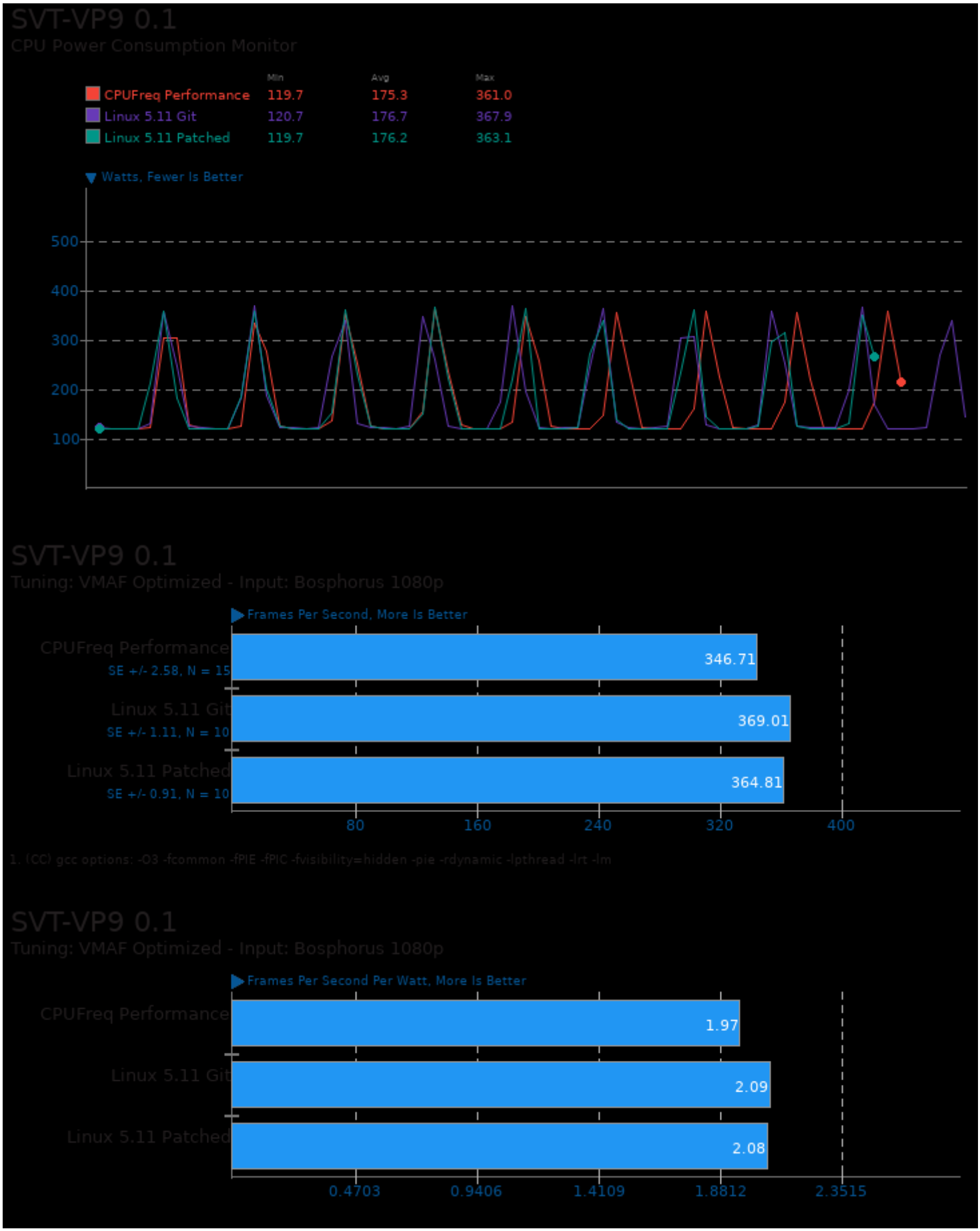


1. (CC) gcc options: -O3 -fcommon -fPIE -fPIC -fvisibility=hidden -pie -rdynamic -lpthread -lrt -lm

SVT-VP9 0.1

Tuning: PSNR/SSIM Optimized - Input: Bosphorus 1080p

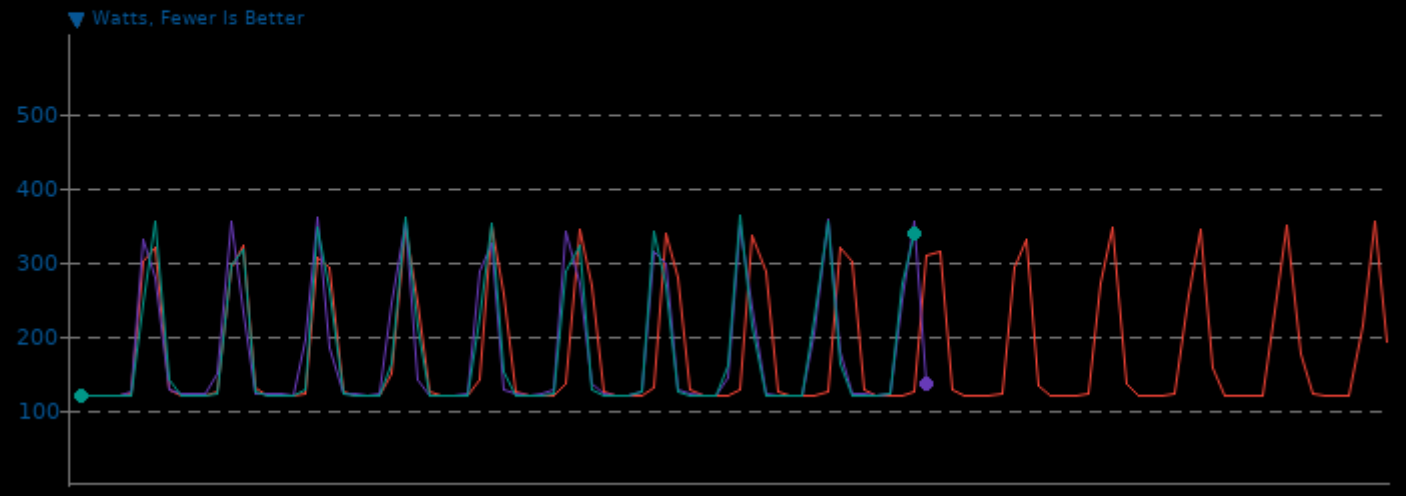



SVT-VP9 0.1
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 119.7 175.3 361.0
Linux 5.11 Git 120.7 176.7 367.9
Linux 5.11 Patched 119.7 176.2 363.1
Watts, Fewer Is Better
500
400
300
200
100
SVT-VP9 0.1
Tuning: VMAF Optimized - Input: Bosphorus 1080p
Frames Per Second, More Is Better
CPUFreq Performance
SE +/- 2.58, N = 15
346.71
Linux 5.11 Git
SE +/- 1.11, N = 10
369.01
Linux 5.11 Patched
SE +/- 0.91, N = 10
364.81
80
160
240
320
400
1. (CC) gcc options: -O3 -fcommon -fPIE -fPIC -fvisibility=hidden -pie -rdynamic -lpthread -lrt -lm
SVT-VP9 0.1
Tuning: VMAF Optimized - Input: Bosphorus 1080p
Frames Per Second Per Watt, More Is Better
CPUFreq Performance
1.97
Linux 5.11 Git
2.09
Linux 5.11 Patched
2.08
0.4703
0.9406
1.4109
1.8812
2.3515

SVT-VP9 0.1

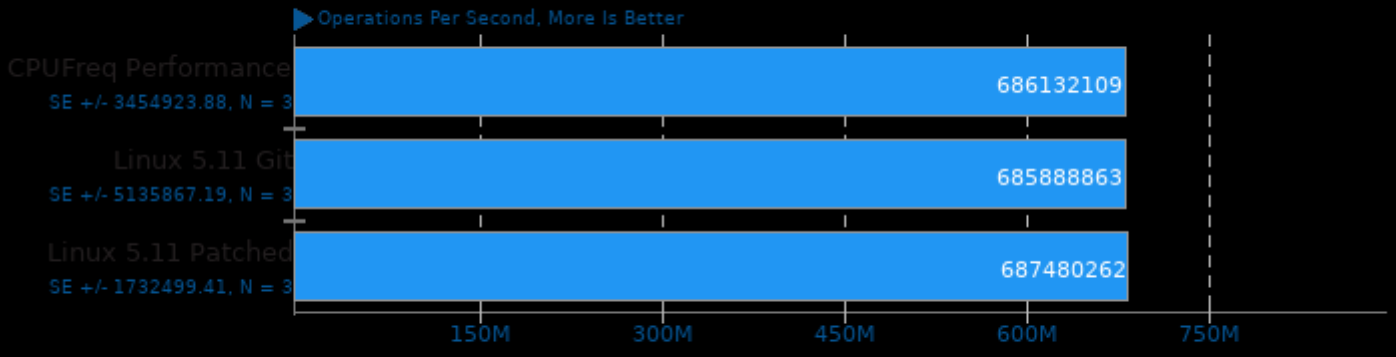
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	119.9	175.7	352.5
Linux 5.11 Git	120.8	176.2	359.2
Linux 5.11 Patched	119.8	175.7	360.6



Swet 1.5.16

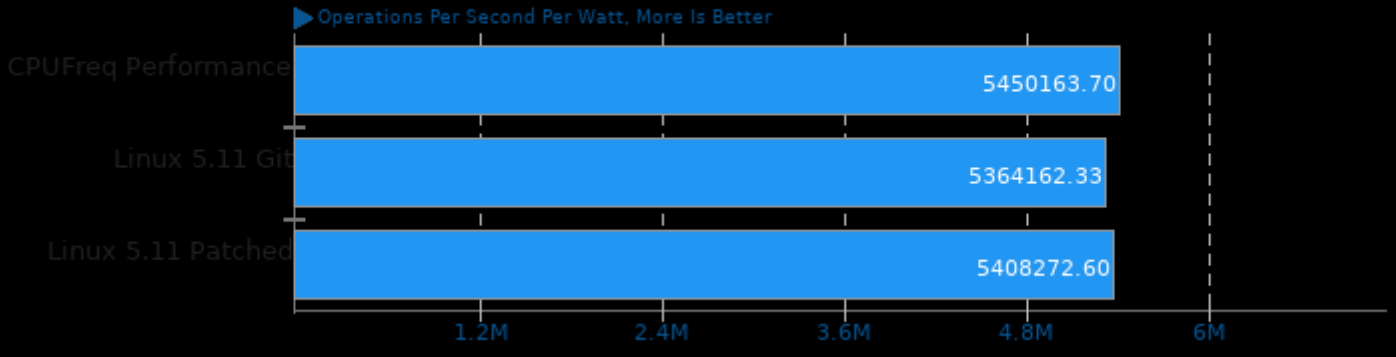
Average

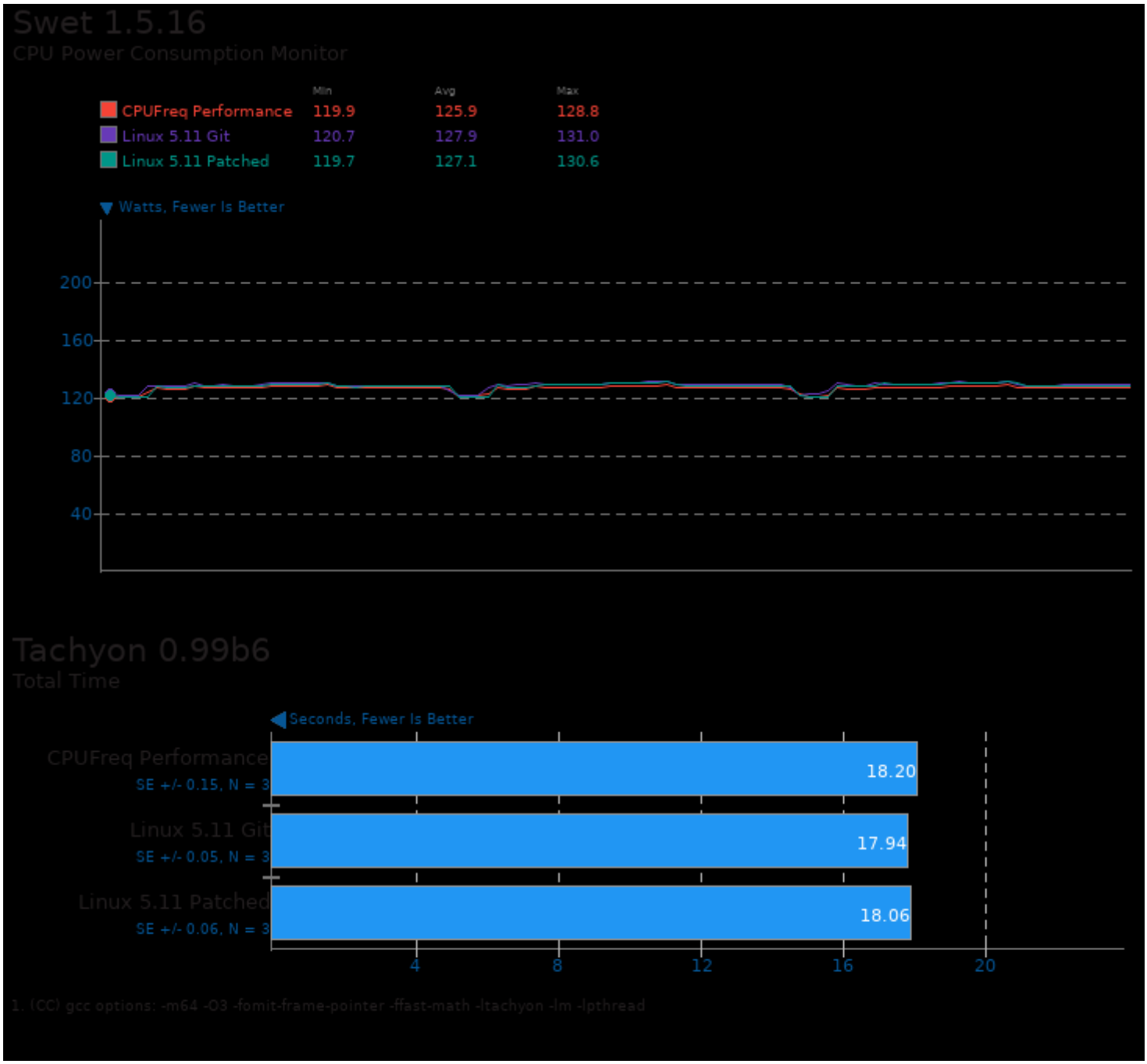


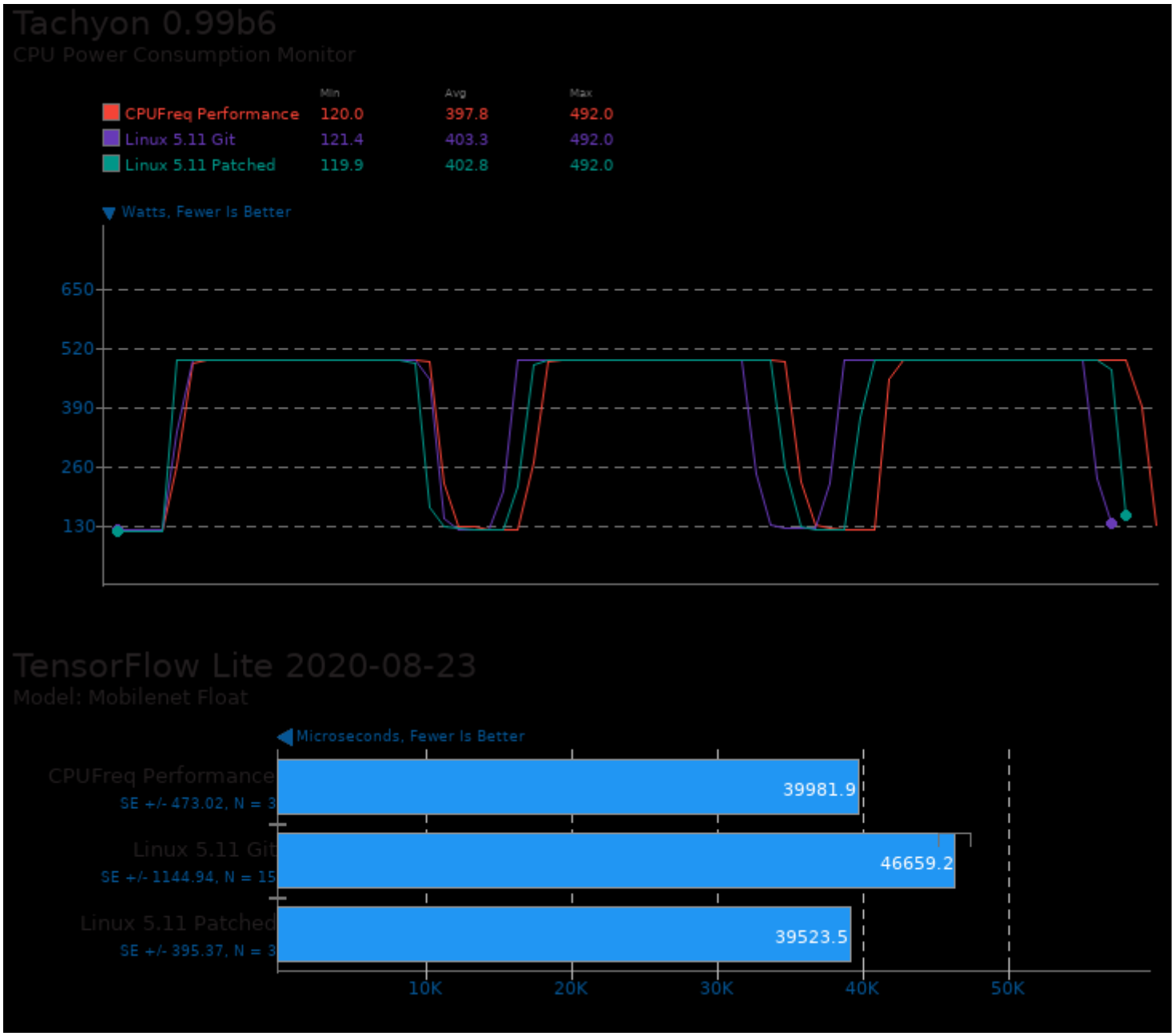
1. (CC) gcc options: -lm -lpthread -lcurses -lrt

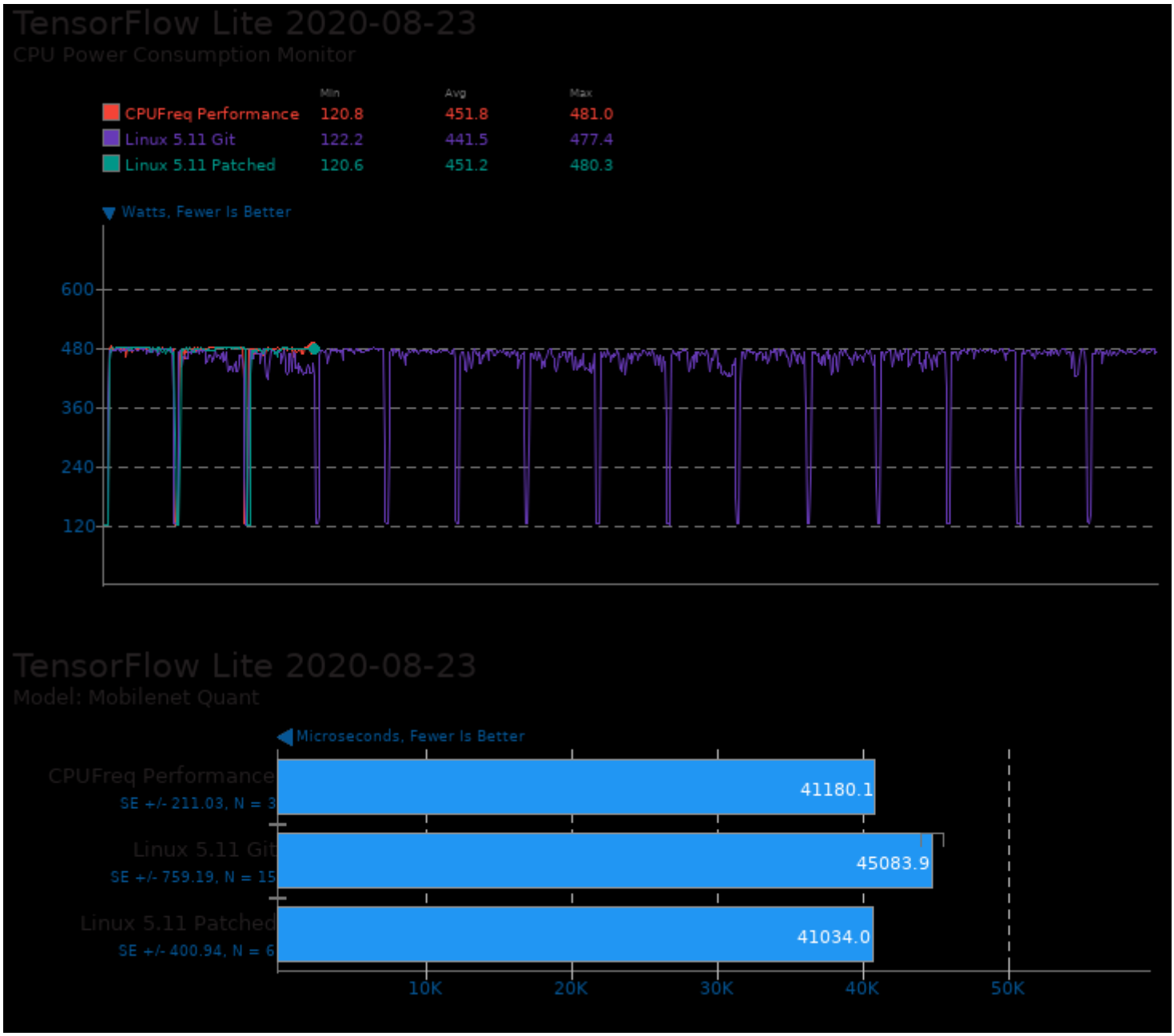
Swet 1.5.16

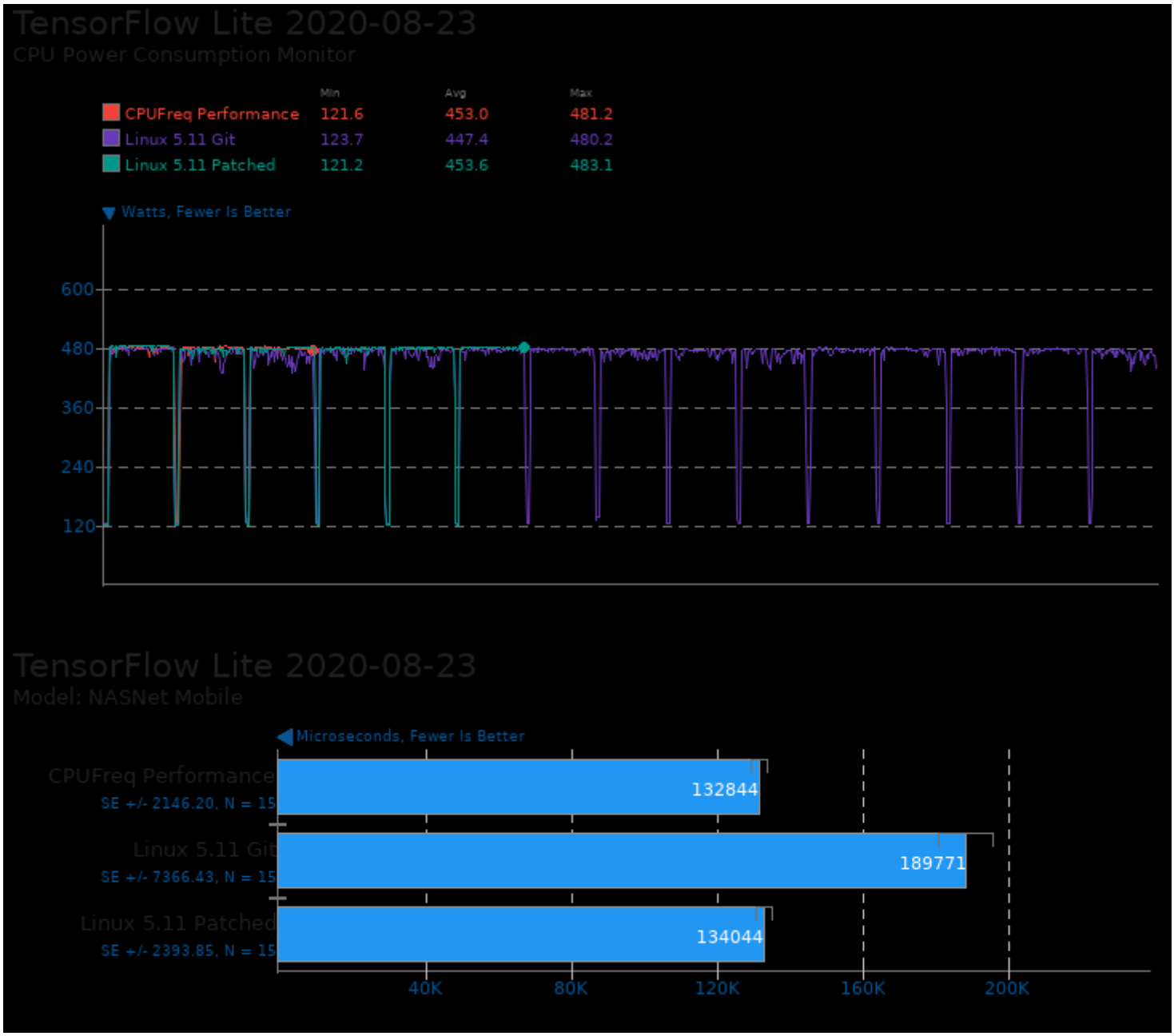
Average

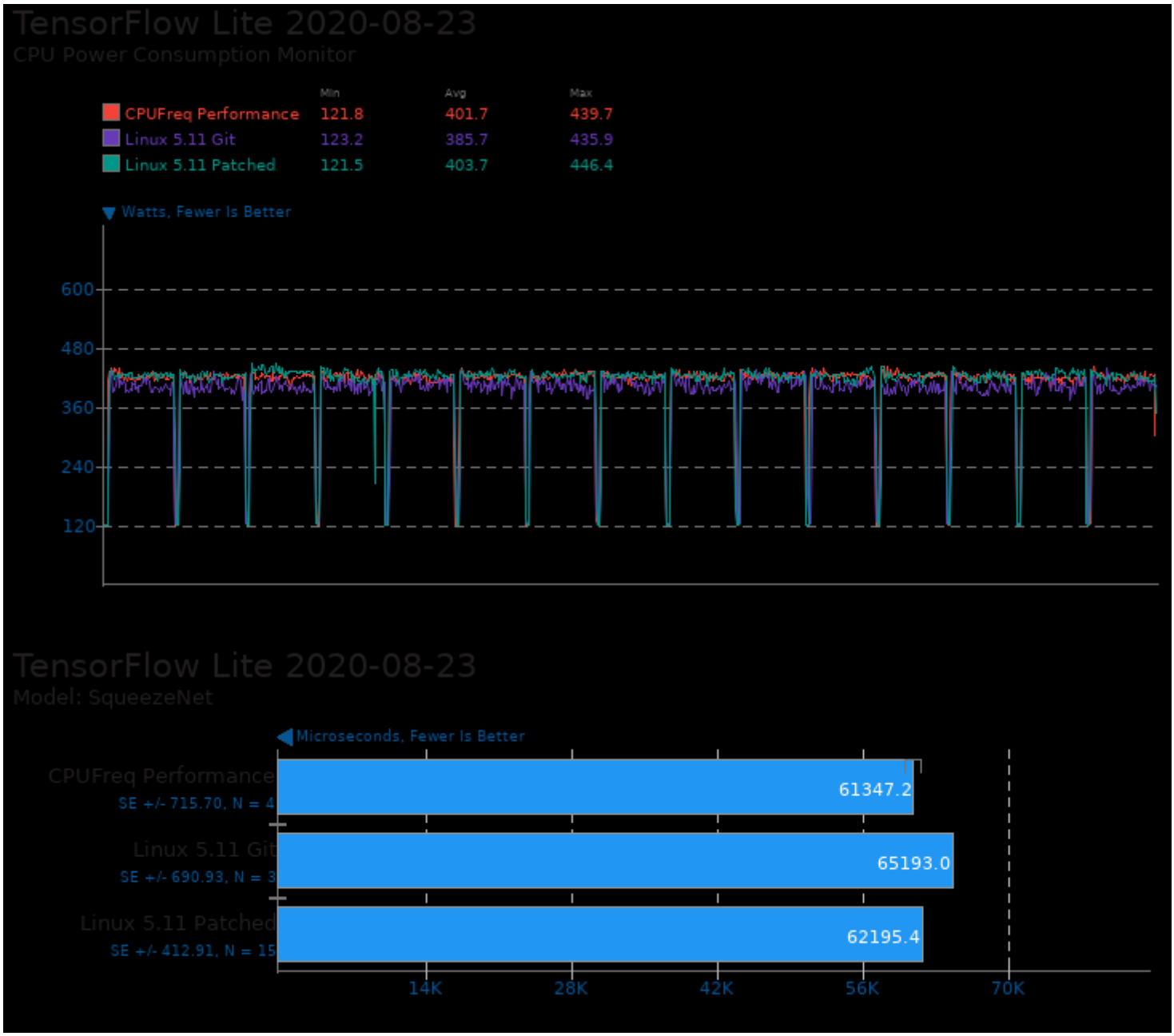


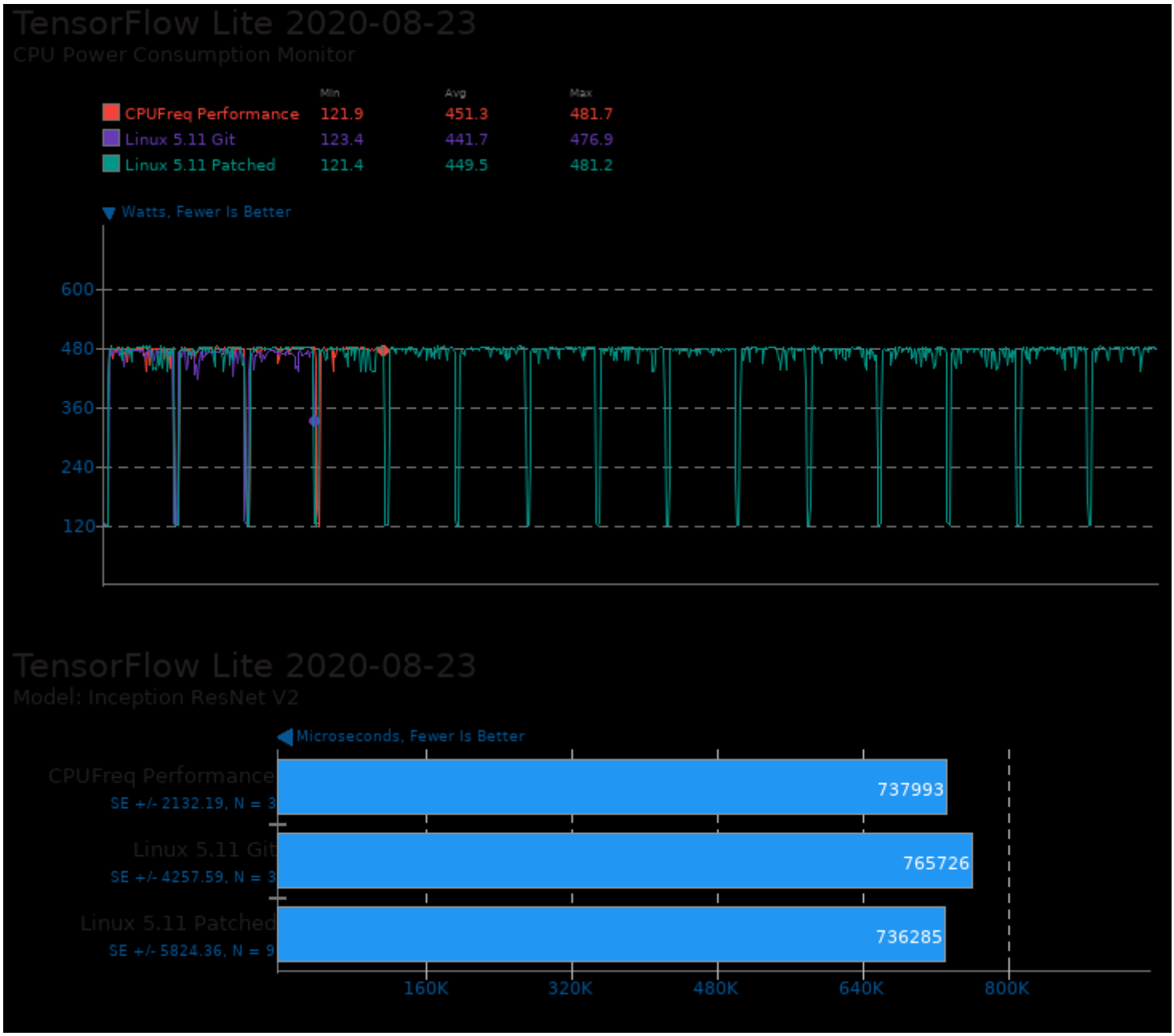

Swet 1.5.16
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 119.9 125.9 128.8
Linux 5.11 Git 120.7 127.9 131.0
Linux 5.11 Patched 119.7 127.1 130.6
Watts, Fewer Is Better
200
160
120
80
40
Tachyon 0.99b6
Total Time
Seconds, Fewer Is Better
CPUFreq Performance
SE +/- 0.15, N = 3
18.20
Linux 5.11 Git
SE +/- 0.05, N = 3
17.94
Linux 5.11 Patched
SE +/- 0.06, N = 3
18.06
4
8
12
16
20
1. (CC) gcc options: -m64 -O3 -fomit-frame-pointer -ffast-math -ltachyon -lm -lpthread

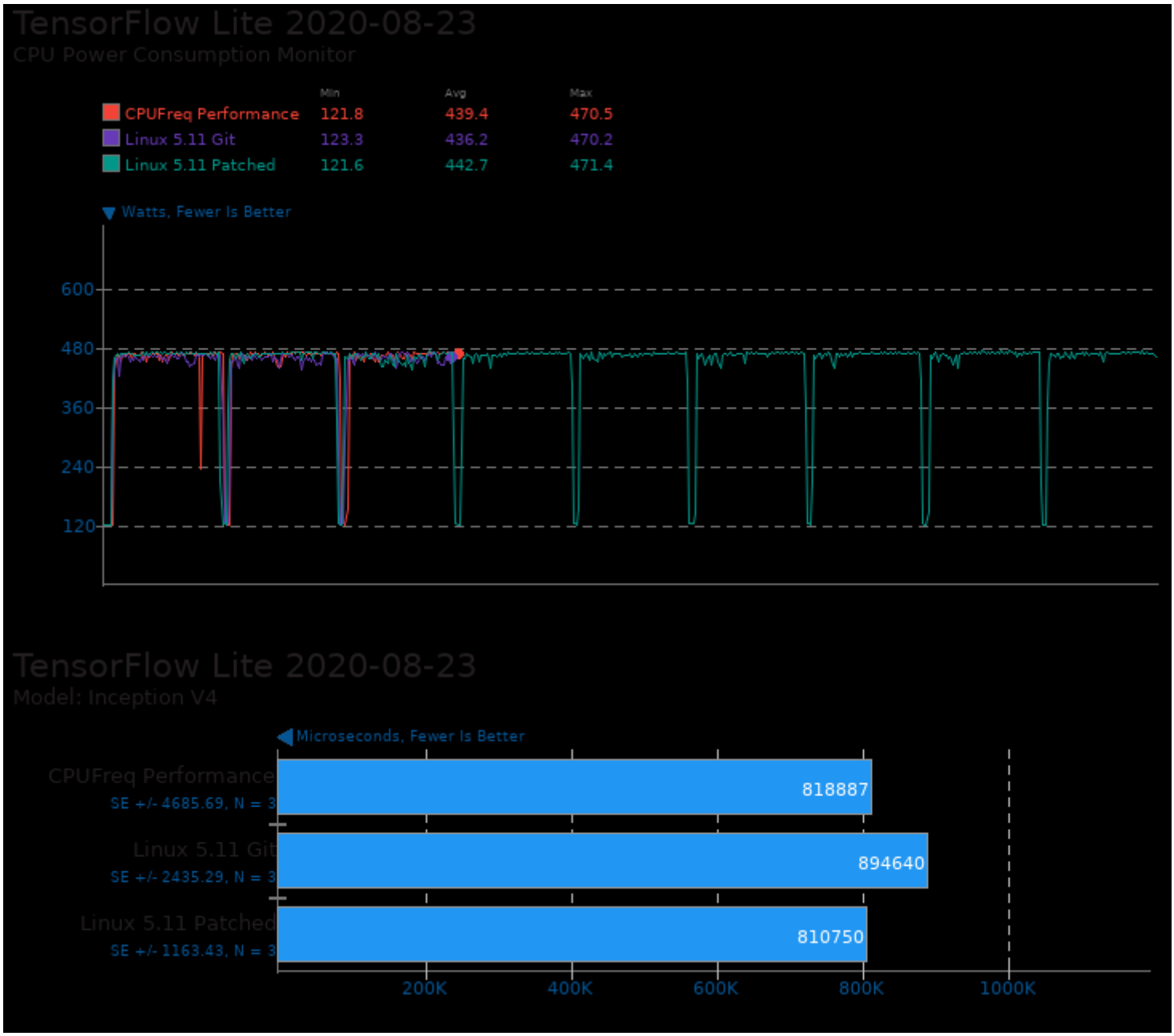

Tachyon 0.99b6
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.0 397.8 492.0
Linux 5.11 Git 121.4 403.3 492.0
Linux 5.11 Patched 119.9 402.8 492.0
Watts, Fewer Is Better
650
520
390
260
130
TensorFlow Lite 2020-08-23
Model: Mobilenet Float
Microseconds, Fewer Is Better
CPUFreq Performance
SE +/- 473.02, N = 3
39981.9
Linux 5.11 Git
SE +/- 1144.94, N = 15
46659.2
Linux 5.11 Patched
SE +/- 395.37, N = 3
39523.5
10K
20K
30K
40K
50K


TensorFlow Lite 2020-08-23
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.8 451.8 481.0
Linux 5.11 Git 122.2 441.5 477.4
Linux 5.11 Patched 120.6 451.2 480.3
Watts, Fewer Is Better
600
480
360
240
120
TensorFlow Lite 2020-08-23
Model: Mobilenet Quant
Microseconds, Fewer Is Better
CPUFreq Performance
SE +/- 211.03, N = 3
41180.1
Linux 5.11 Git
SE +/- 759.19, N = 15
45083.9
Linux 5.11 Patched
SE +/- 400.94, N = 6
41034.0
10K
20K
30K
40K
50K


TensorFlow Lite 2020-08-23
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 121.6 453.0 481.2
Linux 5.11 Git 123.7 447.4 480.2
Linux 5.11 Patched 121.2 453.6 483.1
Watts, Fewer Is Better
600
480
360
240
120
TensorFlow Lite 2020-08-23
Model: NASNet Mobile
Microseconds, Fewer Is Better
CPUFreq Performance
SE +/- 2146.20, N = 15
132844
Linux 5.11 Git
SE +/- 7366.43, N = 15
189771
Linux 5.11 Patched
SE +/- 2393.85, N = 15
134044
40K
80K
120K
160K
200K


TensorFlow Lite 2020-08-23
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 121.8 401.7 439.7
Linux 5.11 Git 123.2 385.7 435.9
Linux 5.11 Patched 121.5 403.7 446.4
Watts, Fewer Is Better
600
480
360
240
120
TensorFlow Lite 2020-08-23
Model: SqueezeNet
Microseconds, Fewer Is Better
CPUFreq Performance
SE +/- 715.70, N = 4
61347.2
Linux 5.11 Git
SE +/- 690.93, N = 3
65193.0
Linux 5.11 Patched
SE +/- 412.91, N = 15
62195.4
14K
28K
42K
56K
70K

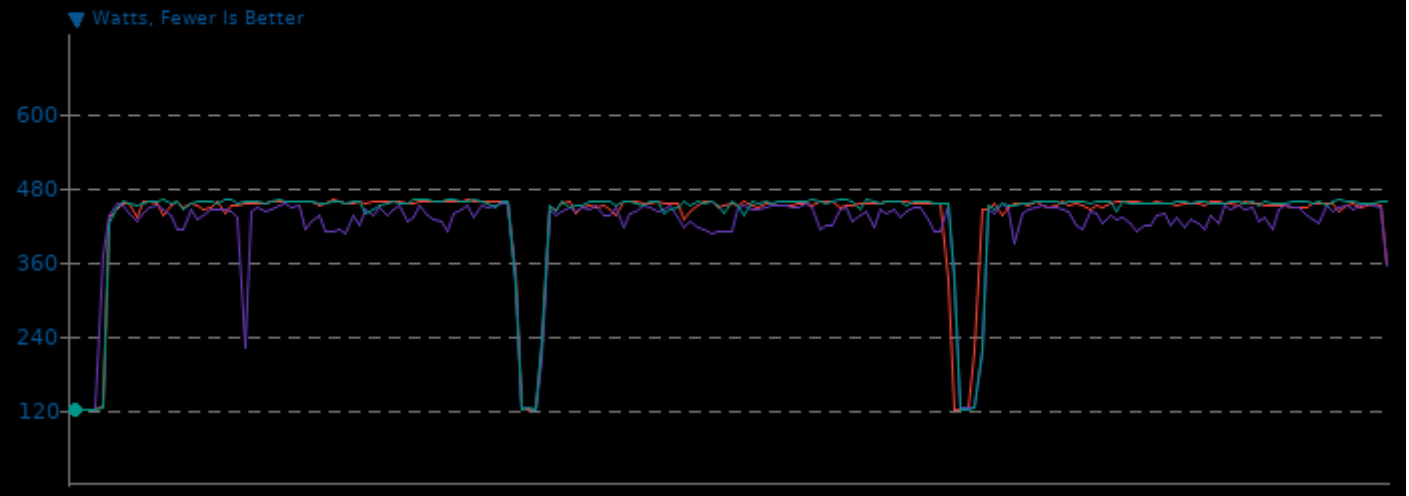

TensorFlow Lite 2020-08-23
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 121.9 451.3 481.7
Linux 5.11 Git 123.4 441.7 476.9
Linux 5.11 Patched 121.4 449.5 481.2
Watts, Fewer Is Better
600
480
360
240
120
TensorFlow Lite 2020-08-23
Model: Inception ResNet V2
Microseconds, Fewer Is Better
CPUFreq Performance
SE +/- 2132.19, N = 3
737993
Linux 5.11 Git
SE +/- 4257.59, N = 3
765726
Linux 5.11 Patched
SE +/- 5824.36, N = 9
736285
160K
320K
480K
640K
800K


TensorFlow Lite 2020-08-23
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 121.8 439.4 470.5
Linux 5.11 Git 123.3 436.2 470.2
Linux 5.11 Patched 121.6 442.7 471.4
Watts, Fewer Is Better
600
480
360
240
120
TensorFlow Lite 2020-08-23
Model: Inception V4
Microseconds, Fewer Is Better
CPUFreq Performance
SE +/- 4685.69, N = 3
818887
Linux 5.11 Git
SE +/- 2435.29, N = 3
894640
Linux 5.11 Patched
SE +/- 1163.43, N = 3
810750
200K
400K
600K
800K
1000K

TensorFlow Lite 2020-08-23

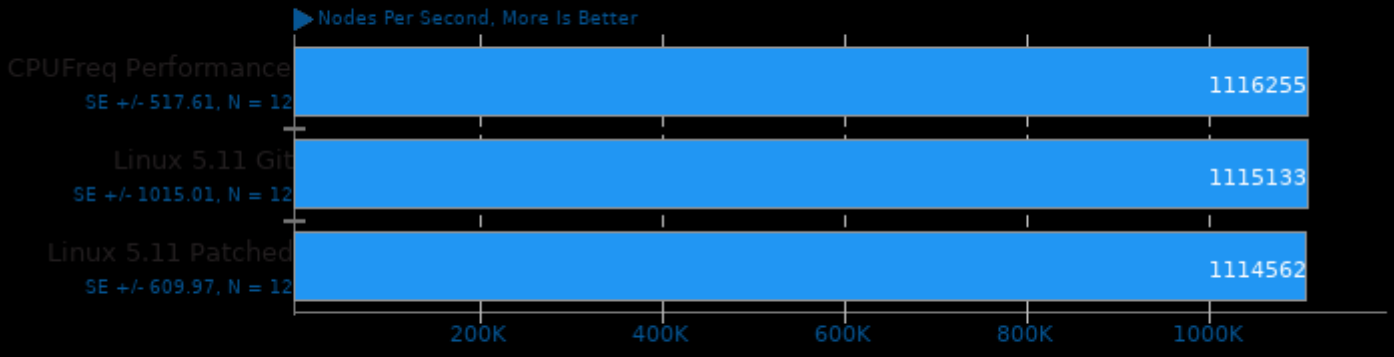
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	121.7	429.0	458.6
Linux 5.11 Git	122.2	414.2	453.9
Linux 5.11 Patched	121.5	431.6	460.9



TSCP 1.81

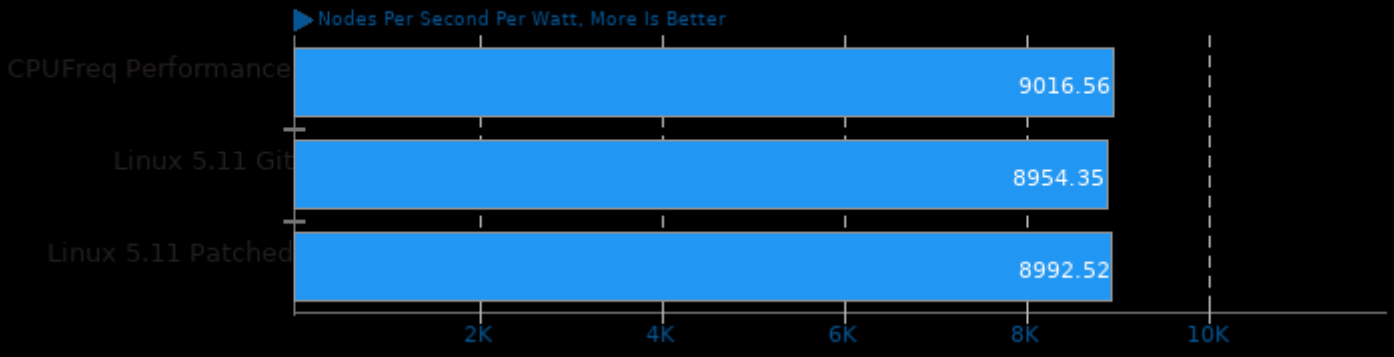
AI Chess Performance

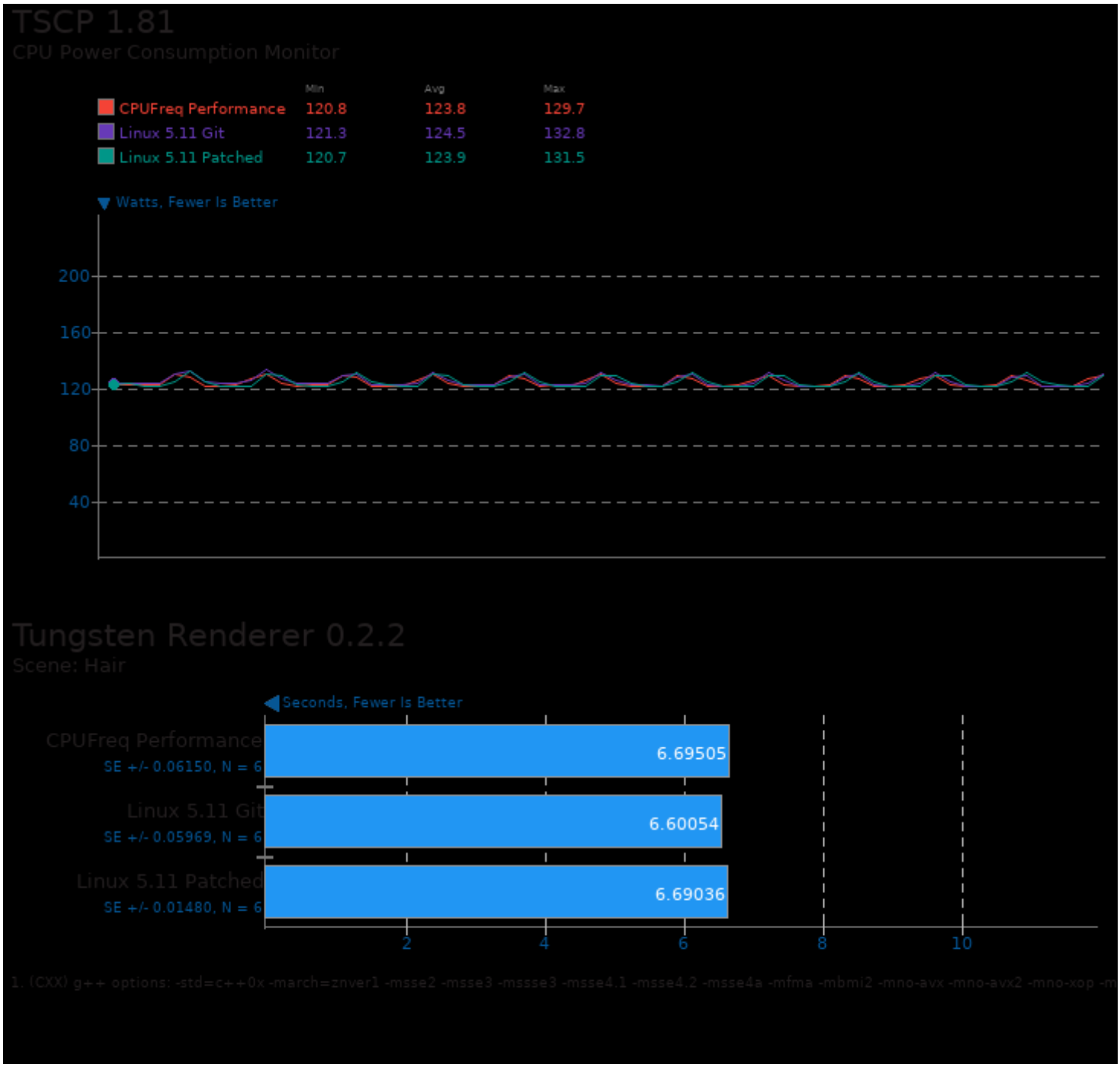


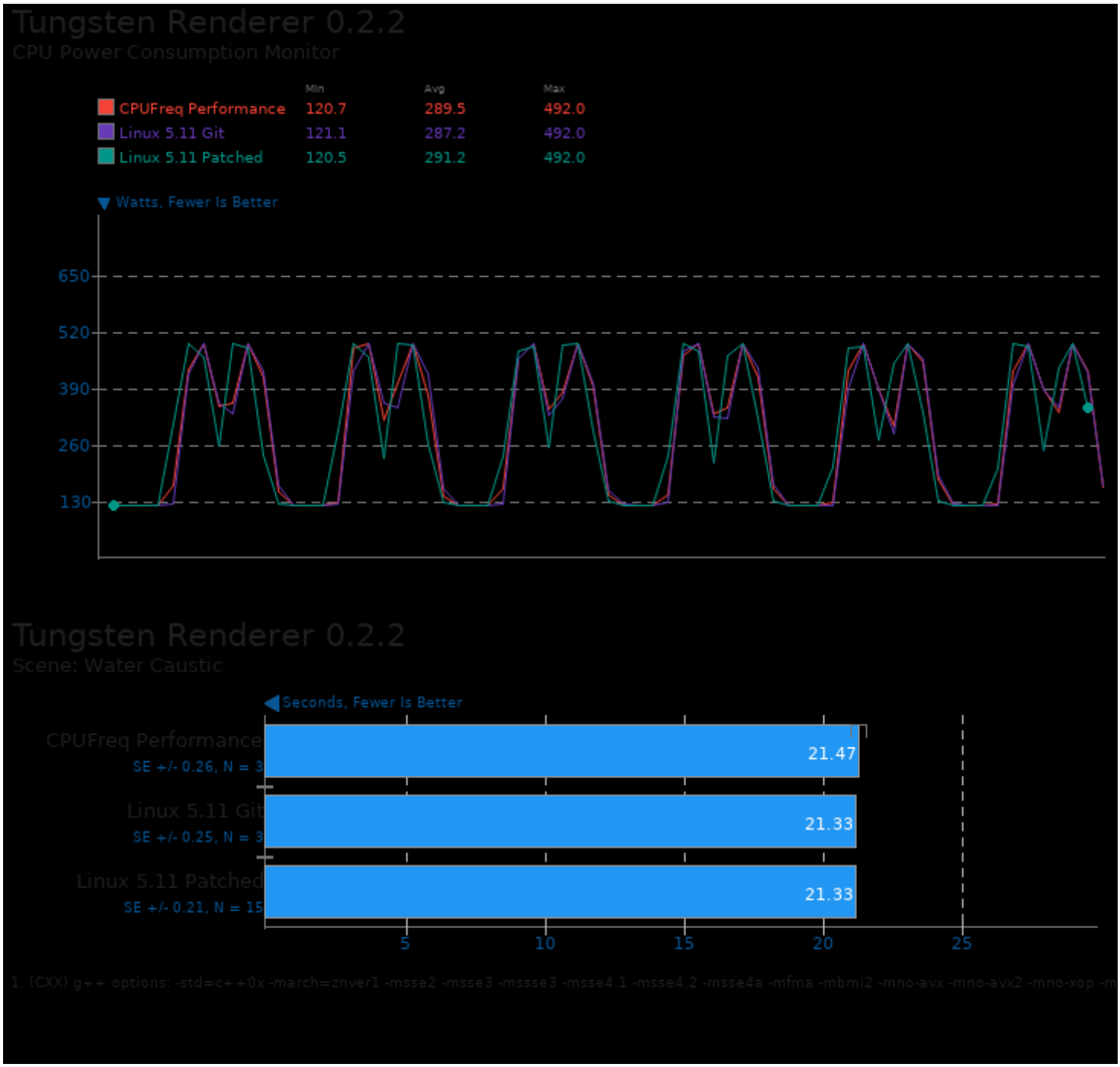
1. (CC) gcc options: -O3 -march=native

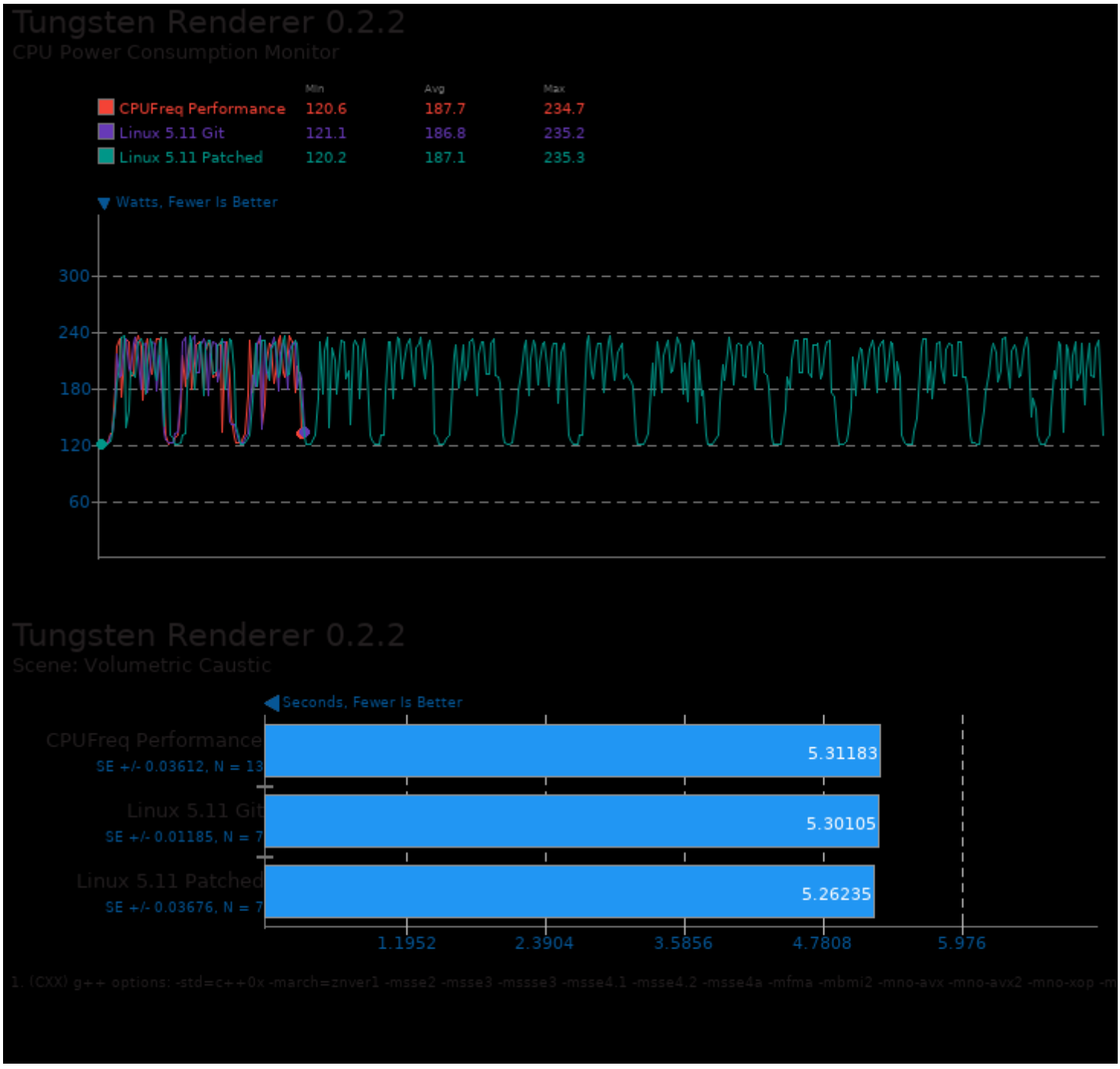
TSCP 1.81

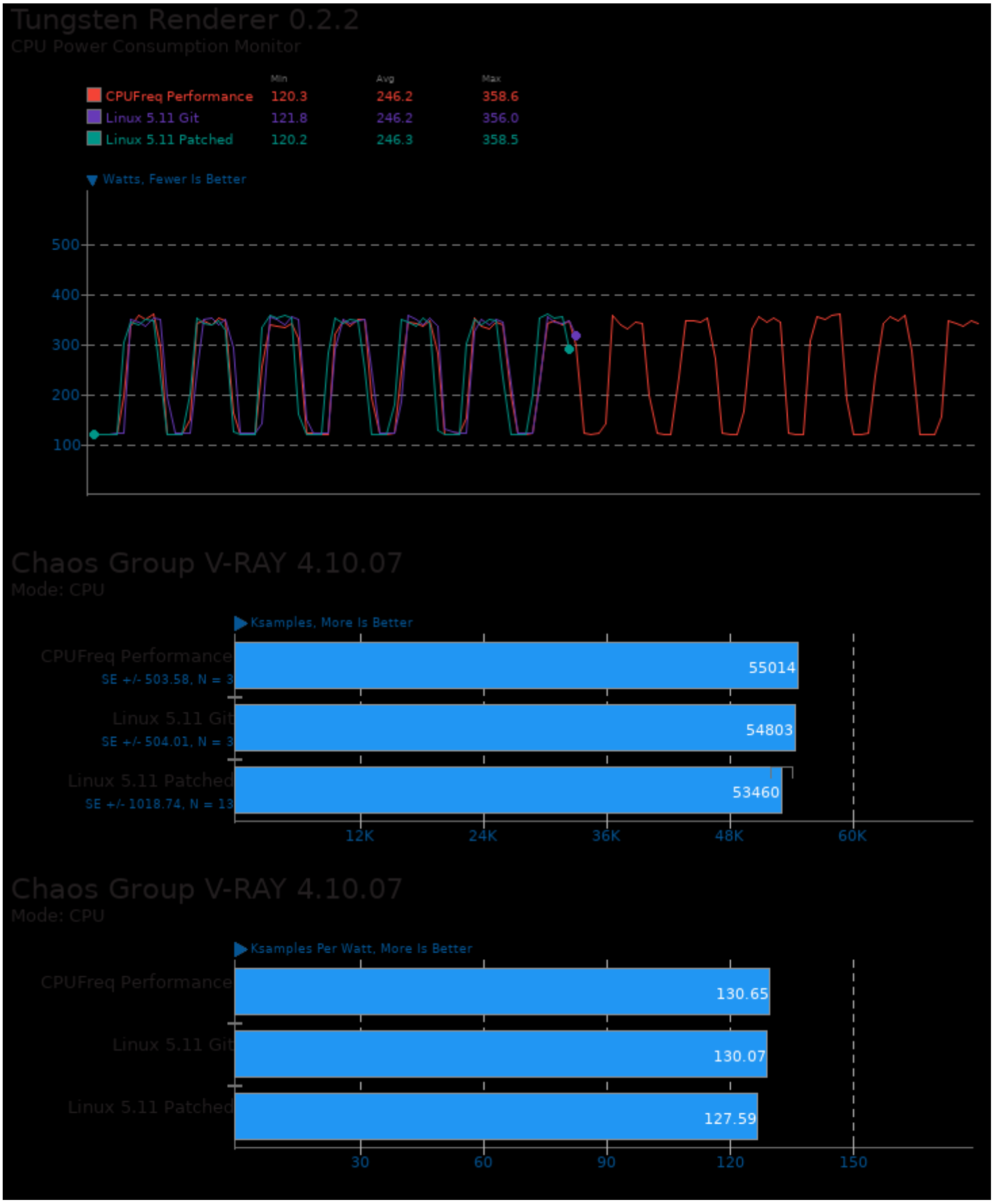
AI Chess Performance




TSCP 1.81
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.8 123.8 129.7
Linux 5.11 Git 121.3 124.5 132.8
Linux 5.11 Patched 120.7 123.9 131.5
Watts, Fewer Is Better
200
160
120
80
40
Tungsten Renderer 0.2.2
Scene: Hair
Seconds, Fewer Is Better
CPUFreq Performance
SE +/- 0.06150, N = 6
6.69505
Linux 5.11 Git
SE +/- 0.05969, N = 6
6.60054
Linux 5.11 Patched
SE +/- 0.01480, N = 6
6.69036
2
4
6
8
10
1. (CXX) g++ options: -std=c++0x -march=znver1 -msse2 -msse3 -mssse3 -msse4.1 -msse4.2 -msse4a -mfma -mbmi2 -mno-avx -mno-avx2 -mno-xop -m


Tungsten Renderer 0.2.2
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.7 289.5 492.0
Linux 5.11 Git 121.1 287.2 492.0
Linux 5.11 Patched 120.5 291.2 492.0
Watts, Fewer Is Better
650
520
390
260
130
Tungsten Renderer 0.2.2
Scene: Water Caustic
Seconds, Fewer Is Better
CPUFreq Performance
SE +/- 0.26, N = 3
21.47
Linux 5.11 Git
SE +/- 0.25, N = 3
21.33
Linux 5.11 Patched
SE +/- 0.21, N = 15
21.33
5
10
15
20
25
1. (CXX) g++ options: -std=c++0x -march=znver1 -msse2 -msse3 -mssse3 -msse4.1 -msse4.2 -msse4a -mfma -mbmi2 -mno-avx -mno-avx2 -mno-xop

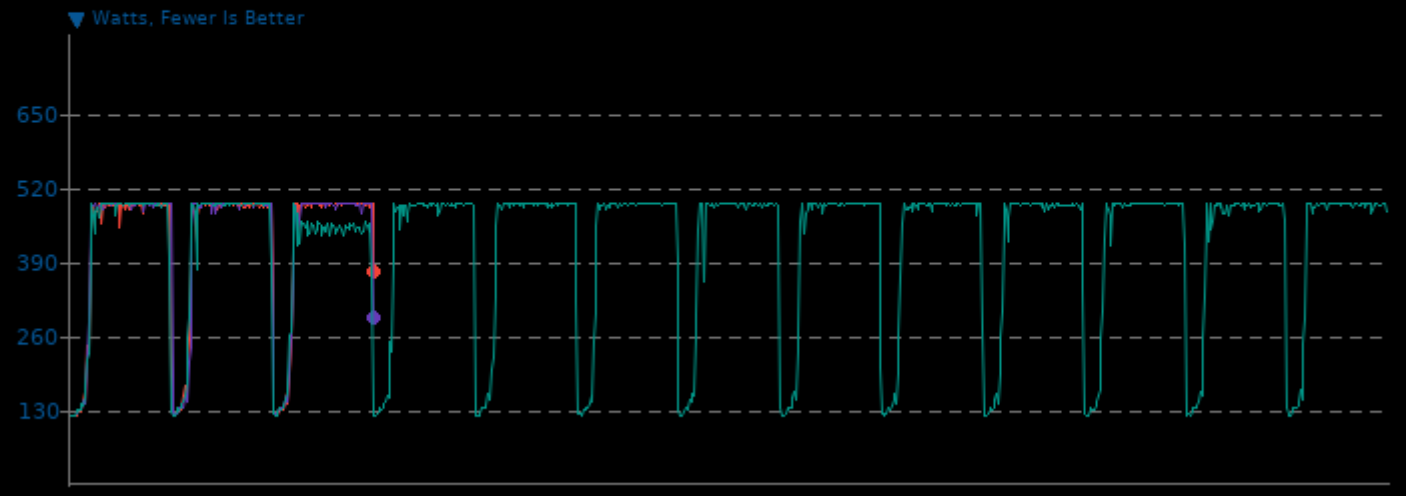

Tungsten Renderer 0.2.2
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.6 187.7 234.7
Linux 5.11 Git 121.1 186.8 235.2
Linux 5.11 Patched 120.2 187.1 235.3
Watts, Fewer Is Better
300
240
180
120
60
Tungsten Renderer 0.2.2
Scene: Volumetric Caustic
Seconds, Fewer Is Better
CPUFreq Performance
SE +/- 0.03612, N = 13
5.31183
Linux 5.11 Git
SE +/- 0.01185, N = 7
5.30105
Linux 5.11 Patched
SE +/- 0.03676, N = 7
5.26235
1.1952
2.3904
3.5856
4.7808
5.976
1. (CXX) g++ options: -std=c++0x -march=znver1 -msse2 -msse3 -mssse3 -msse4.1 -msse4.2 -msse4a -mfma -mbmi2 -mno-avx -mno-avx2 -mno-xop -m


Tungsten Renderer 0.2.2
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.3 246.2 358.6
Linux 5.11 Git 121.8 246.2 356.0
Linux 5.11 Patched 120.2 246.3 358.5
Watts, Fewer Is Better
500
400
300
200
100
Chaos Group V-RAY 4.10.07
Mode: CPU
Ksamples, More Is Better
CPUFreq Performance
SE +/- 503.58, N = 3
55014
Linux 5.11 Git
SE +/- 504.01, N = 3
54803
Linux 5.11 Patched
SE +/- 1018.74, N = 13
53460
12K
24K
36K
48K
60K
Chaos Group V-RAY 4.10.07
Mode: CPU
Ksamples Per Watt, More Is Better
CPUFreq Performance
130.65
Linux 5.11 Git
130.07
Linux 5.11 Patched
127.59
30
60
90
120
150

Chaos Group V-RAY 4.10.07

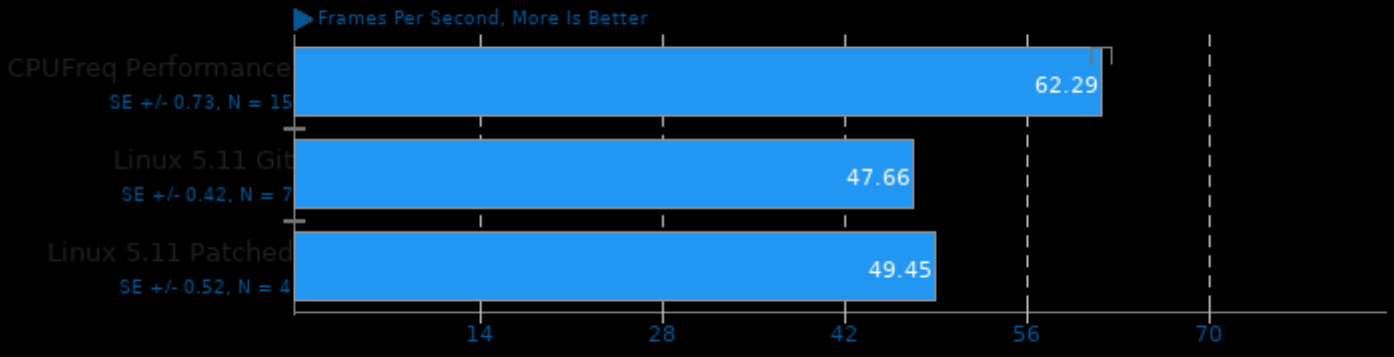
CPU Power Consumption Monitor

	Min	Avg	Max
CPUFreq Performance	120.8	421.1	492.1
Linux 5.11 Git	121.5	421.3	492.0
Linux 5.11 Patched	120.3	419.0	492.2



x265 3.4

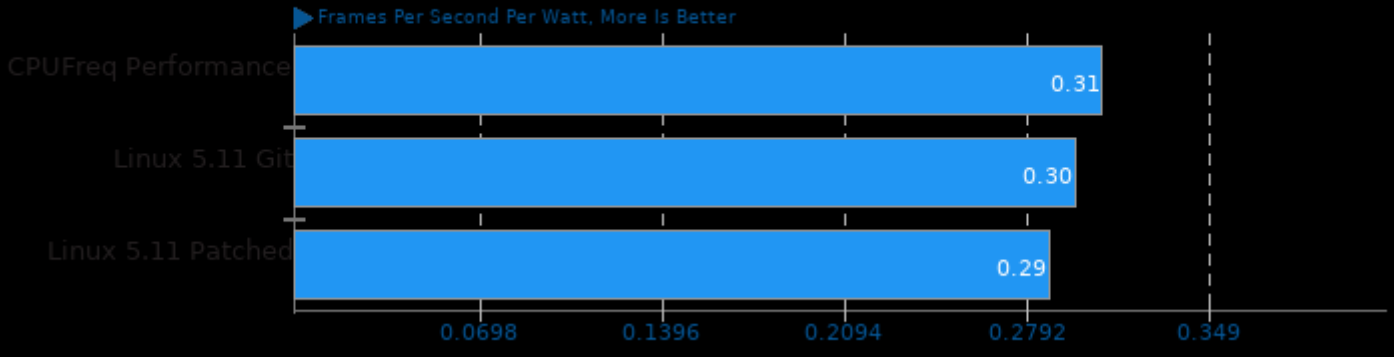
Video Input: Bosphorus 1080p

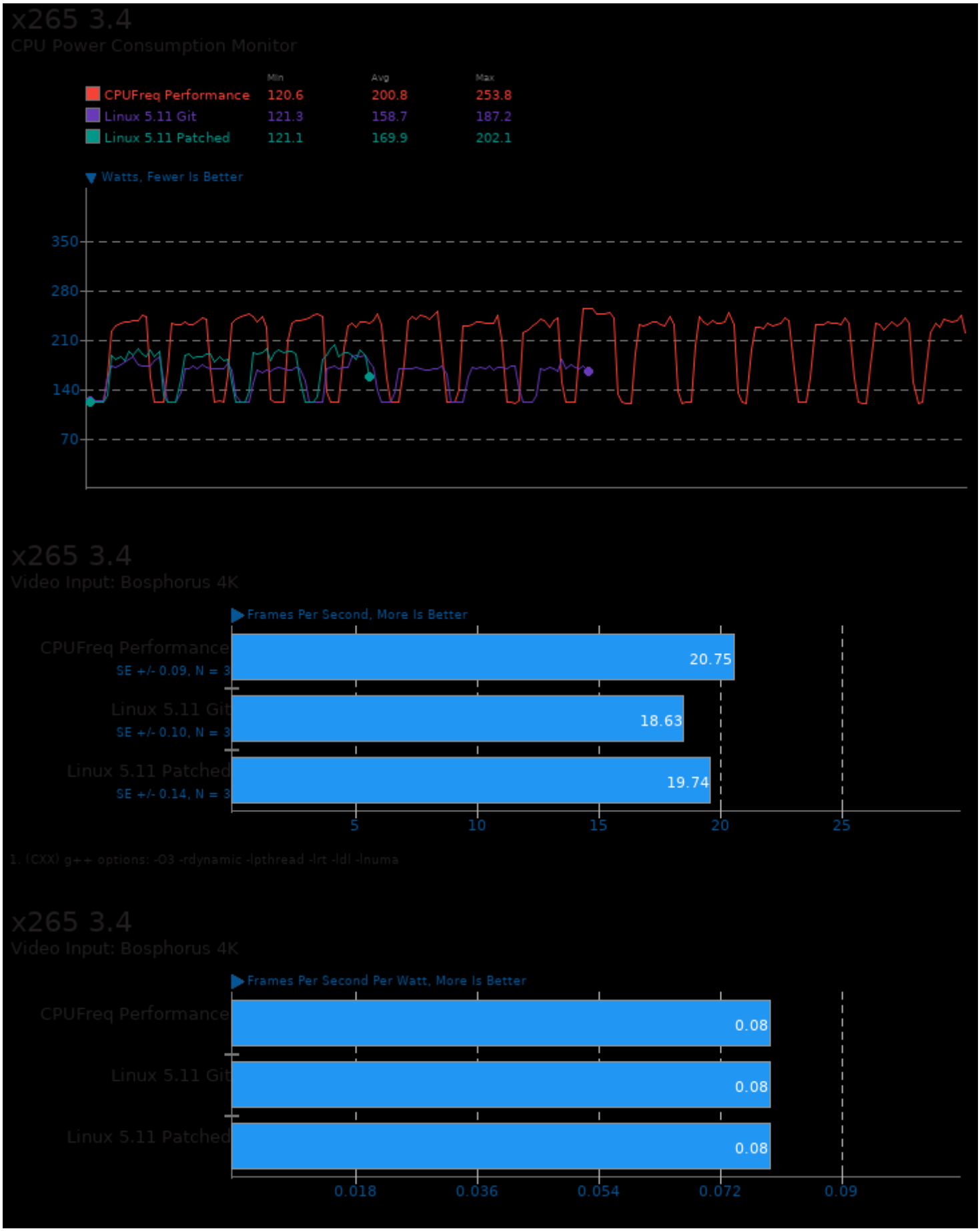


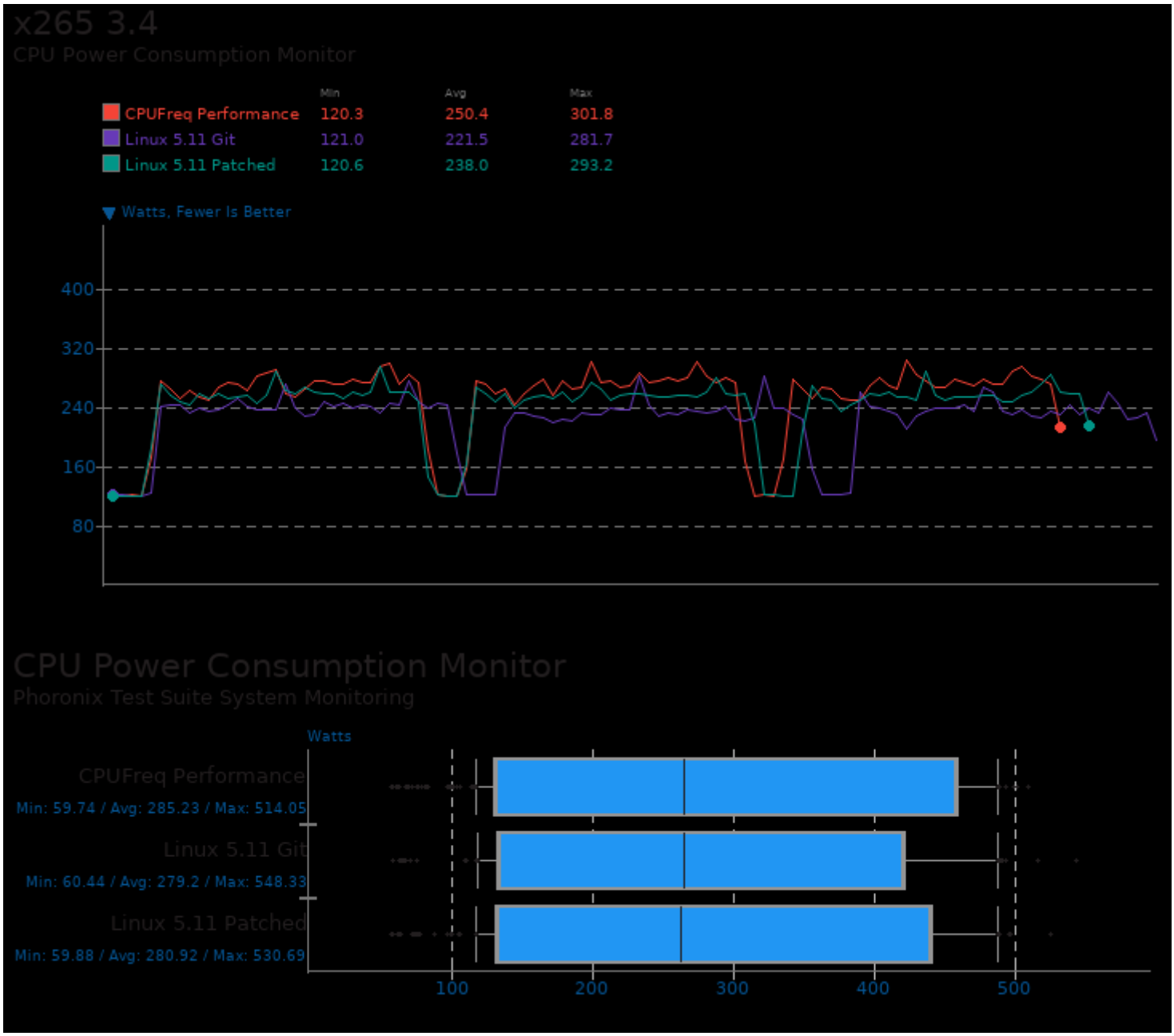
1. (CXX) g++ options: -O3 -rdynamic -lpthread -lrt -ldl -lnuma

x265 3.4

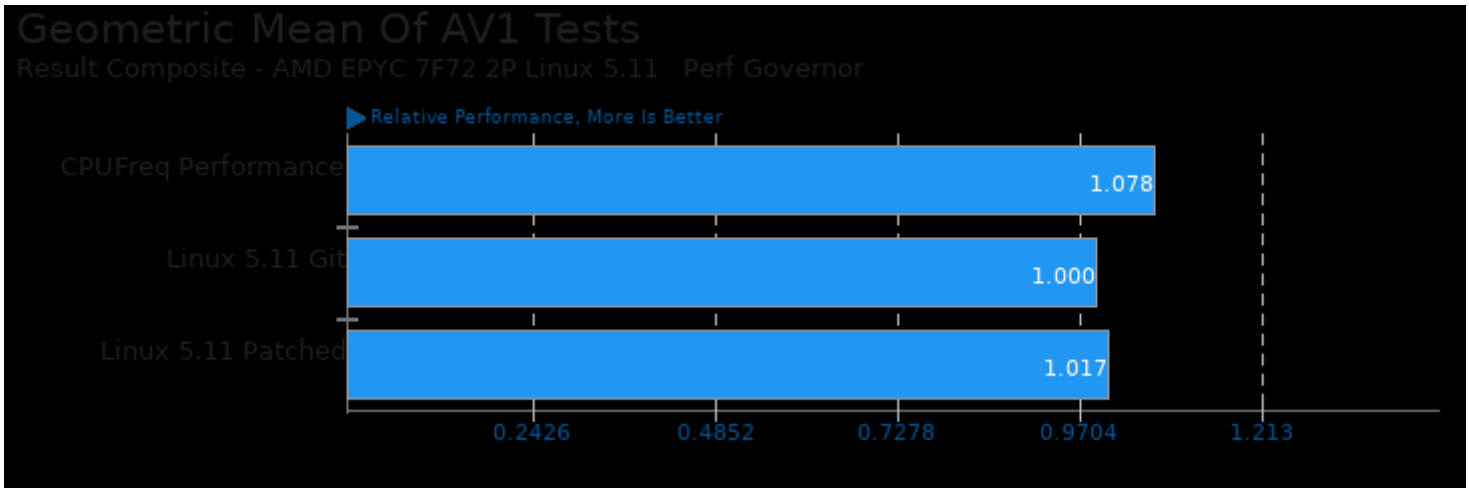
Video Input: Bosphorus 1080p



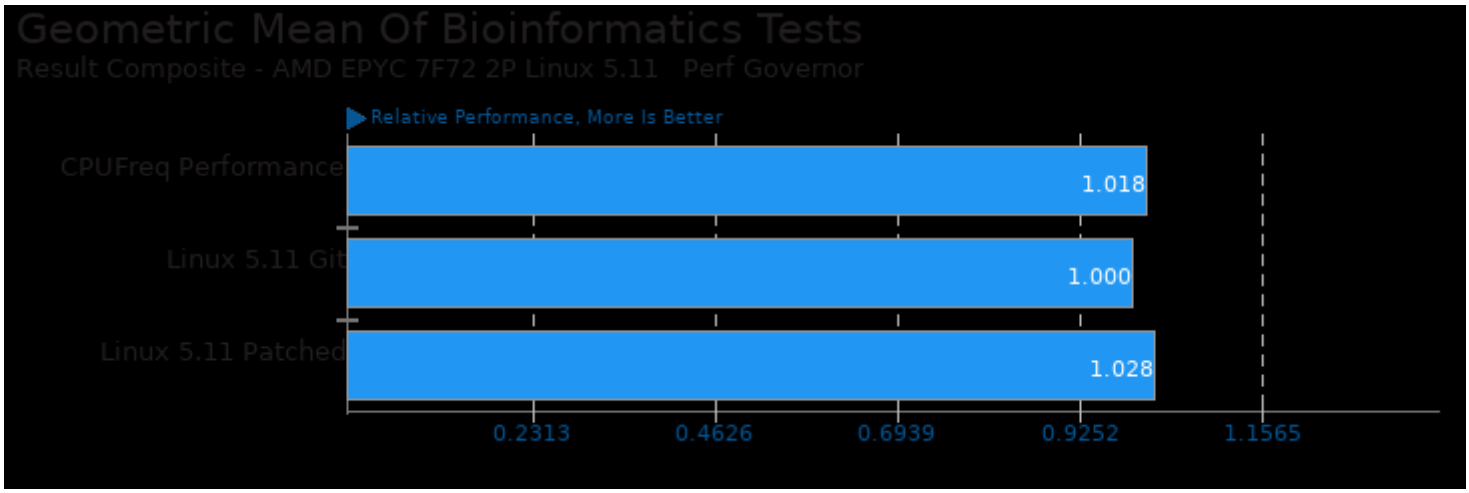

x265 3.4
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.6 200.8 253.8
Linux 5.11 Git 121.3 158.7 187.2
Linux 5.11 Patched 121.1 169.9 202.1
Watts, Fewer Is Better
350
280
210
140
70
x265 3.4
Video Input: Bosphorus 4K
Frames Per Second, More Is Better
CPUFreq Performance
SE +/- 0.09, N = 3
20.75
Linux 5.11 Git
SE +/- 0.10, N = 3
18.63
Linux 5.11 Patched
SE +/- 0.14, N = 3
19.74
5
10
15
20
25
1. (CXX) g++ options: -O3 -rdynamic -lpthread -lrt -ldl -lnuma
x265 3.4
Video Input: Bosphorus 4K
Frames Per Second Per Watt, More Is Better
CPUFreq Performance
0.08
Linux 5.11 Git
0.08
Linux 5.11 Patched
0.08
0.018
0.036
0.054
0.072
0.09


x265 3.4
CPU Power Consumption Monitor
Min
Avg
Max
CPUFreq Performance 120.3 250.4 301.8
Linux 5.11 Git 121.0 221.5 281.7
Linux 5.11 Patched 120.6 238.0 293.2
Watts, Fewer Is Better
400
320
240
160
80
CPU Power Consumption Monitor
Phoronix Test Suite System Monitoring
Watts
CPUFreq Performance
Min: 59.74 / Avg: 285.23 / Max: 514.05
Linux 5.11 Git
Min: 60.44 / Avg: 279.2 / Max: 548.33
Linux 5.11 Patched
Min: 59.88 / Avg: 280.92 / Max: 530.69
100
200
300
400
500

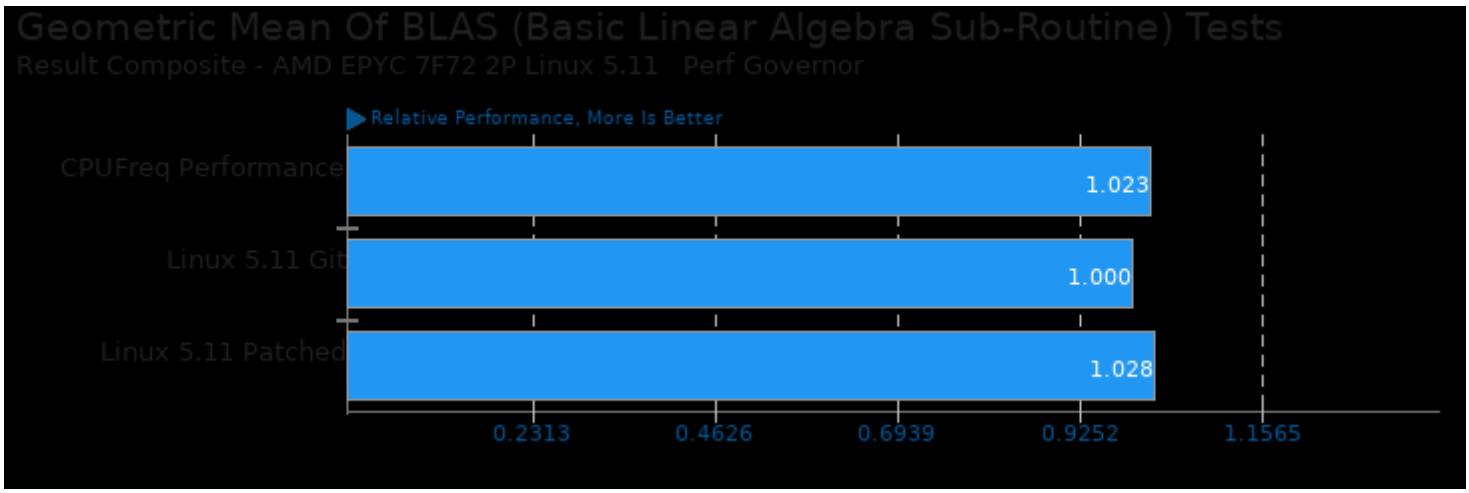
These geometric means are based upon test groupings / test suites for this result file.



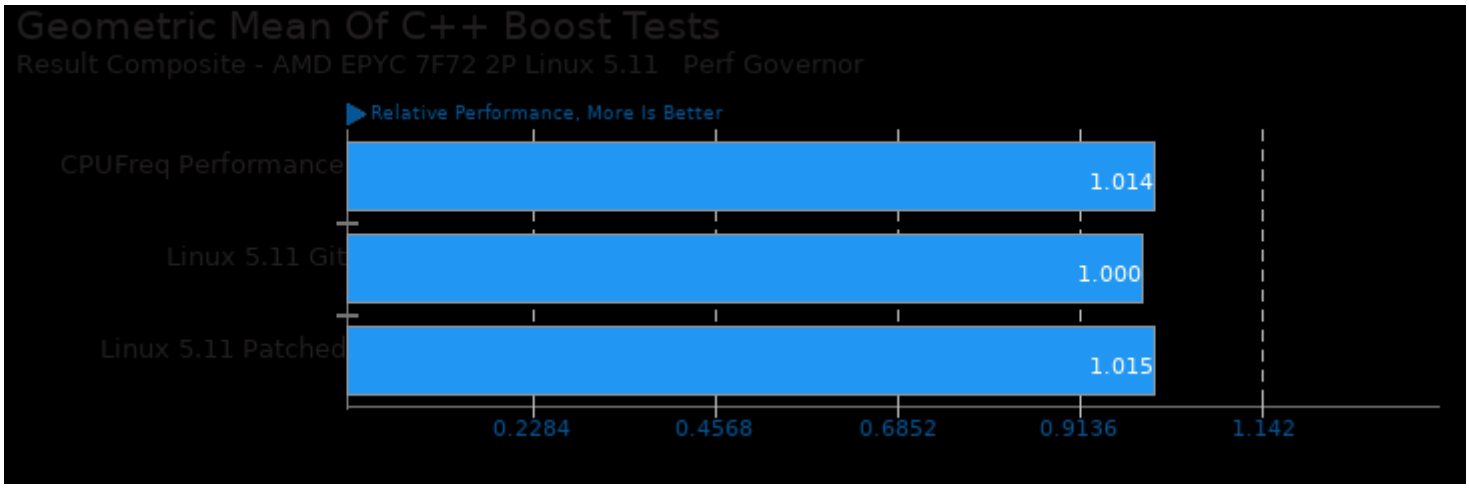
Geometric mean based upon tests: pts/dav1d, pts/svt-av1 and pts/rav1e



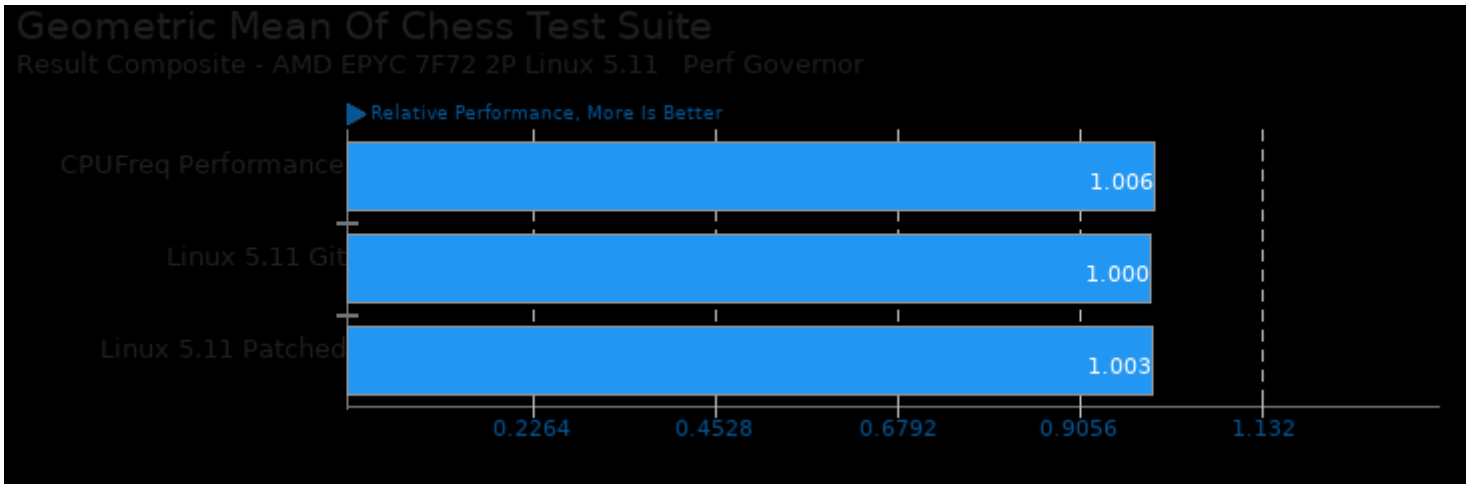
Geometric mean based upon tests: pts/himeno, pts/mrbayes and pts/qmcpack



Geometric mean based upon tests: pts/qe, pts/qmcpack, pts/gpaw and pts/lczero



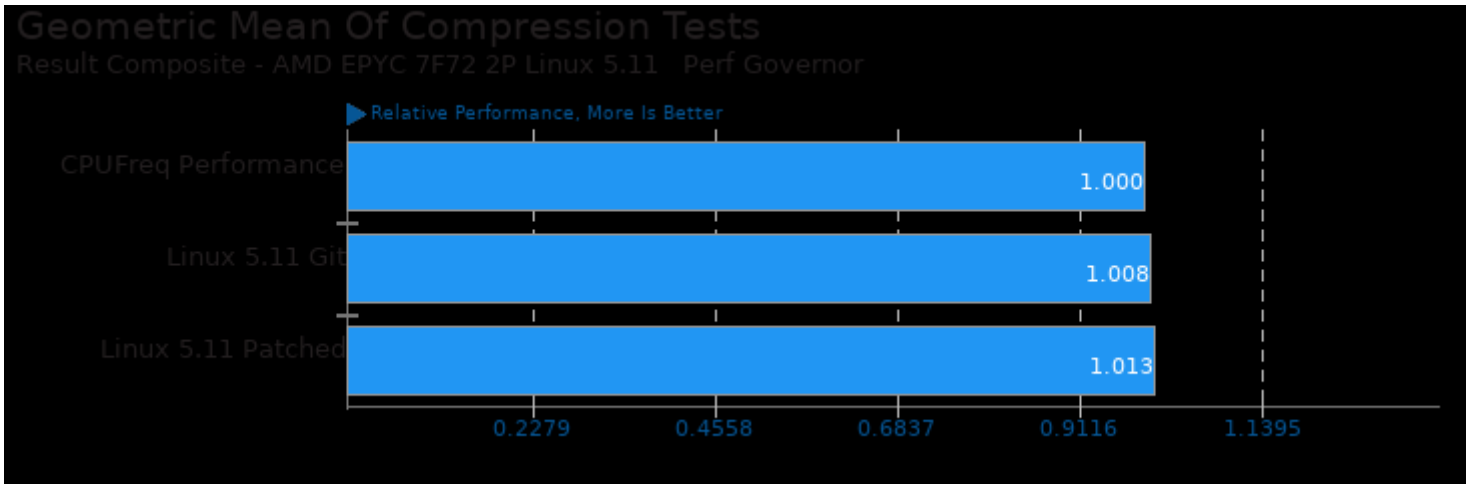
Geometric mean based upon tests: pts/openfoam, pts/qmcpack, pts/quantlib, pts/povray and pts/yafaray



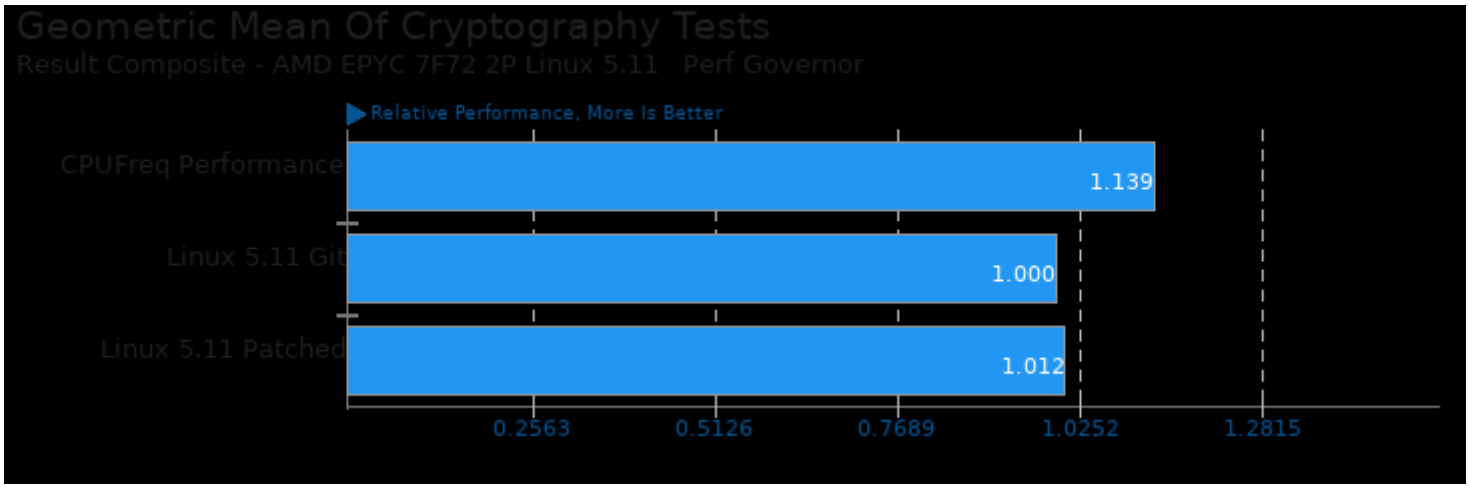
Geometric mean based upon tests: pts/tscp, pts/lczero, pts/stockfish and pts/asmfish



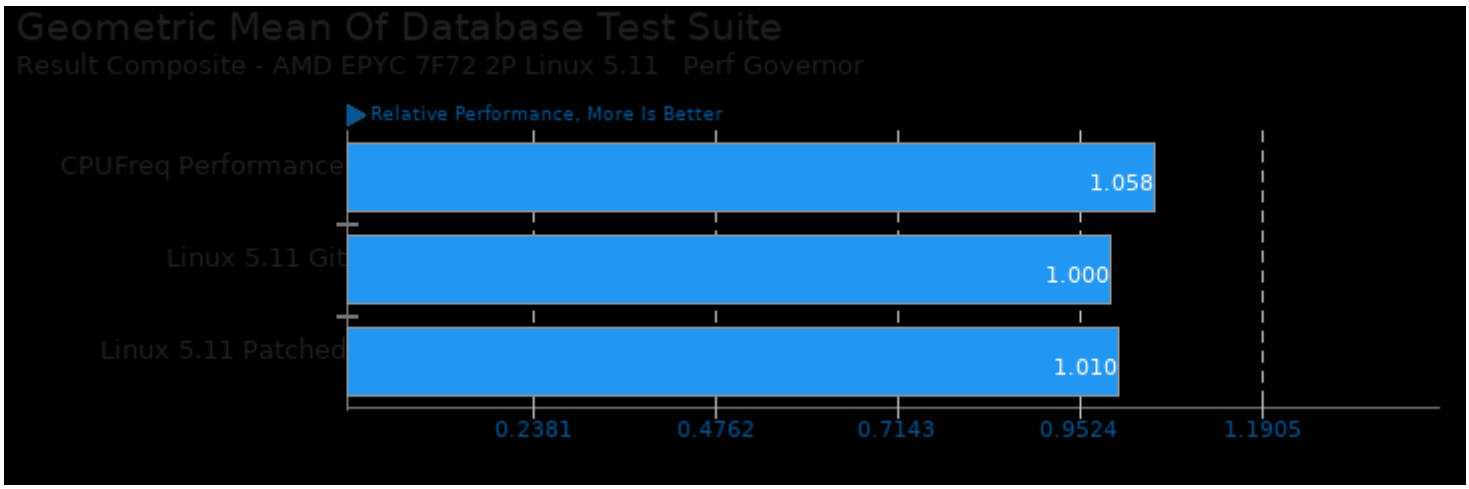
Geometric mean based upon tests: pts/build-linux-kernel, pts/build-gdb, pts/build-llvm, pts/build2 and pts/build-godot



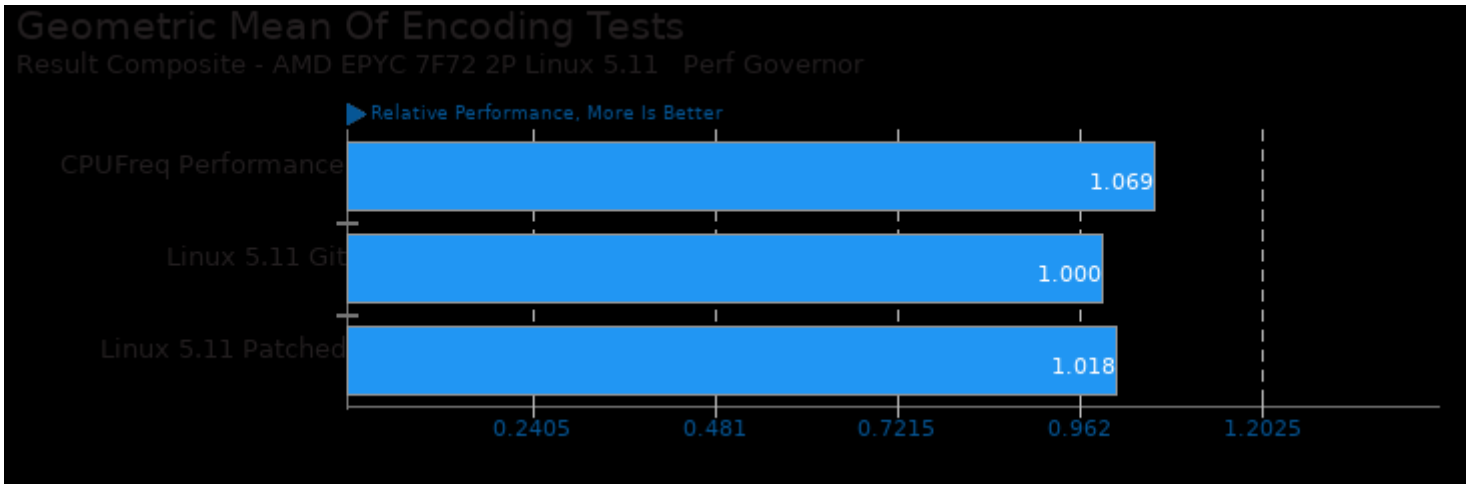
Geometric mean based upon tests: pts/compress-zstd and pts/compress-lz4



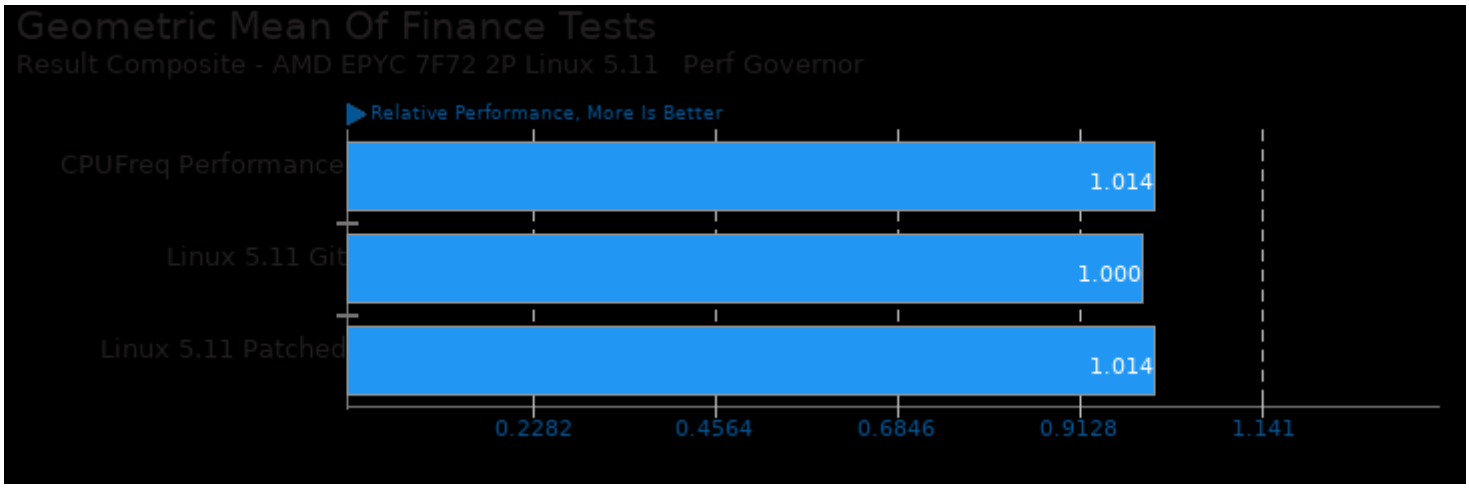
Geometric mean based upon tests: pts/gnupg, pts/gcrypt, pts/john-the-ripper and pts/cpuminer-opt



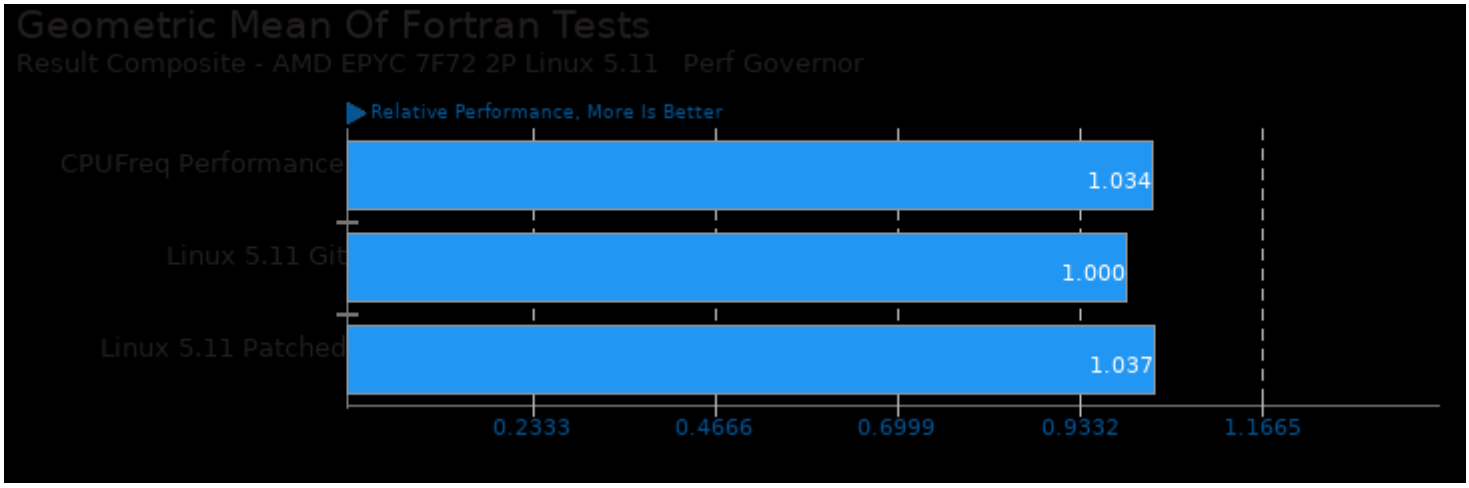
Geometric mean based upon tests: pts/sqlite-speedtest, pts/redis, pts/keydb and pts/influxdb



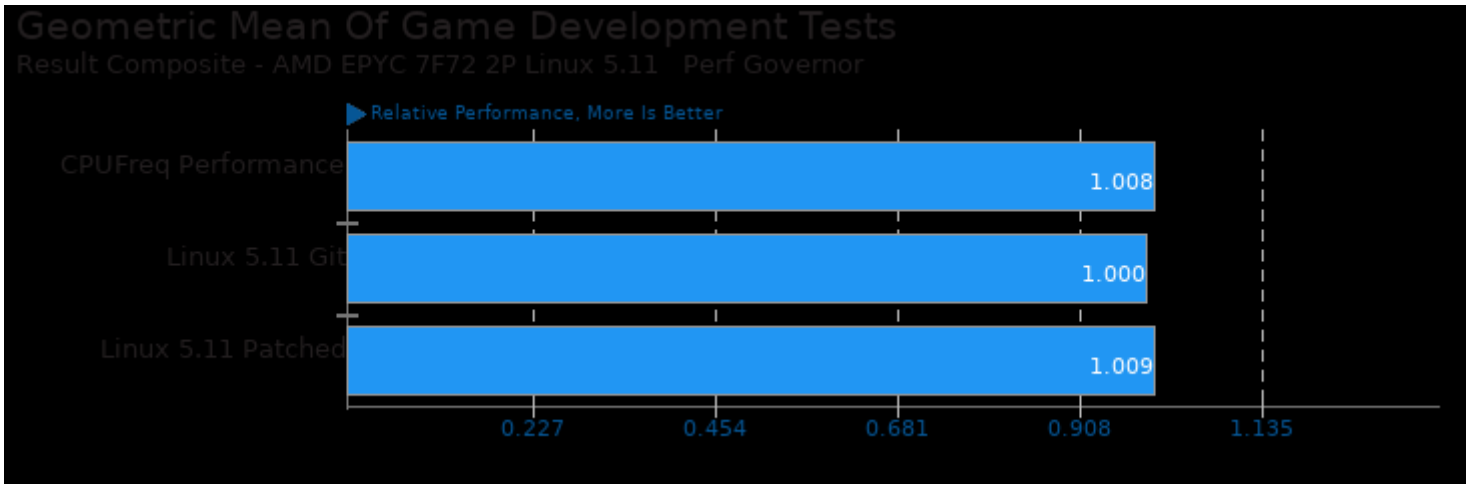
Geometric mean based upon tests: pts/svt-vp9, pts/x265, pts/dav1d, pts/svt-av1 and pts/rav1e



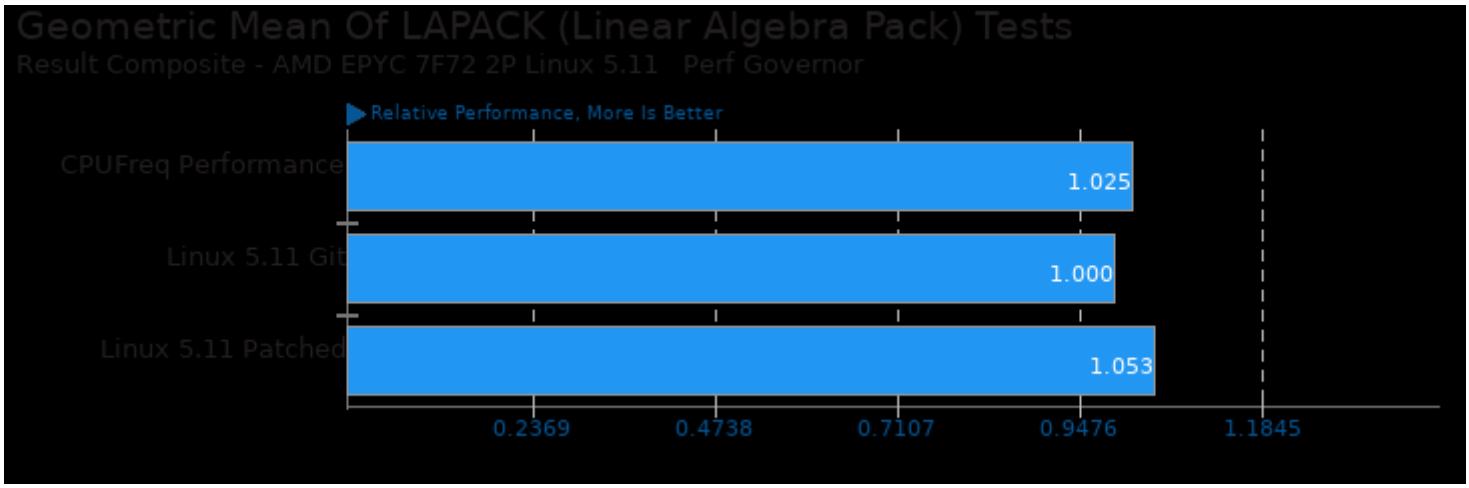
Geometric mean based upon tests: pts/financebench and pts/quantlib



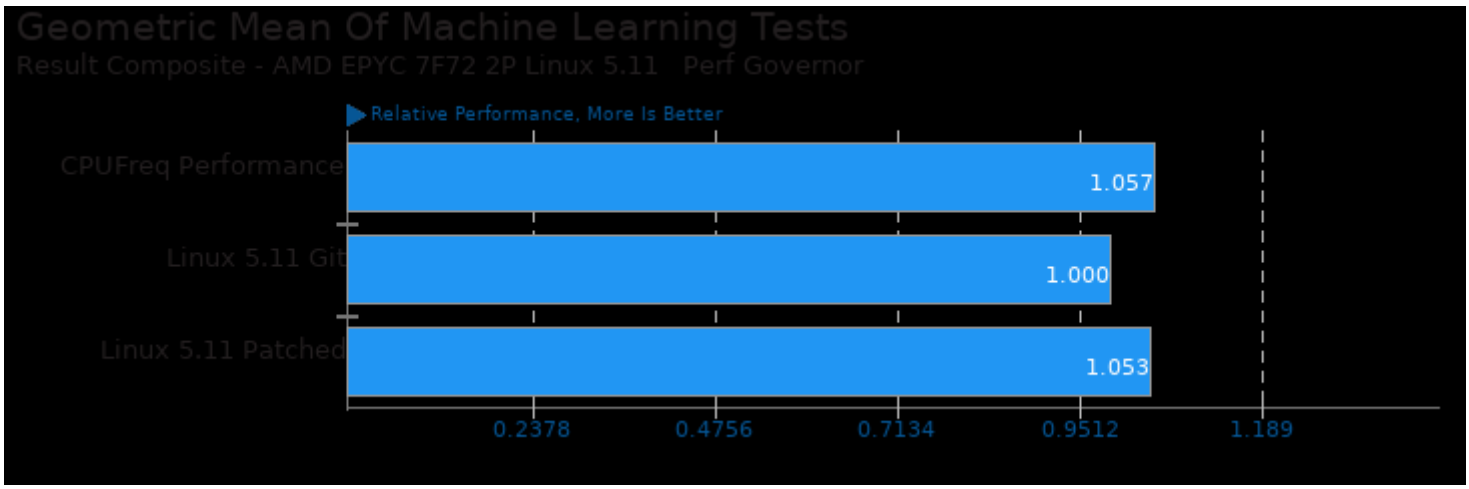
Geometric mean based upon tests: pts/lammps, pts/npb, pts/qe, pts/dolfyn, pts/ffte, pts/hpcg and pts/neat



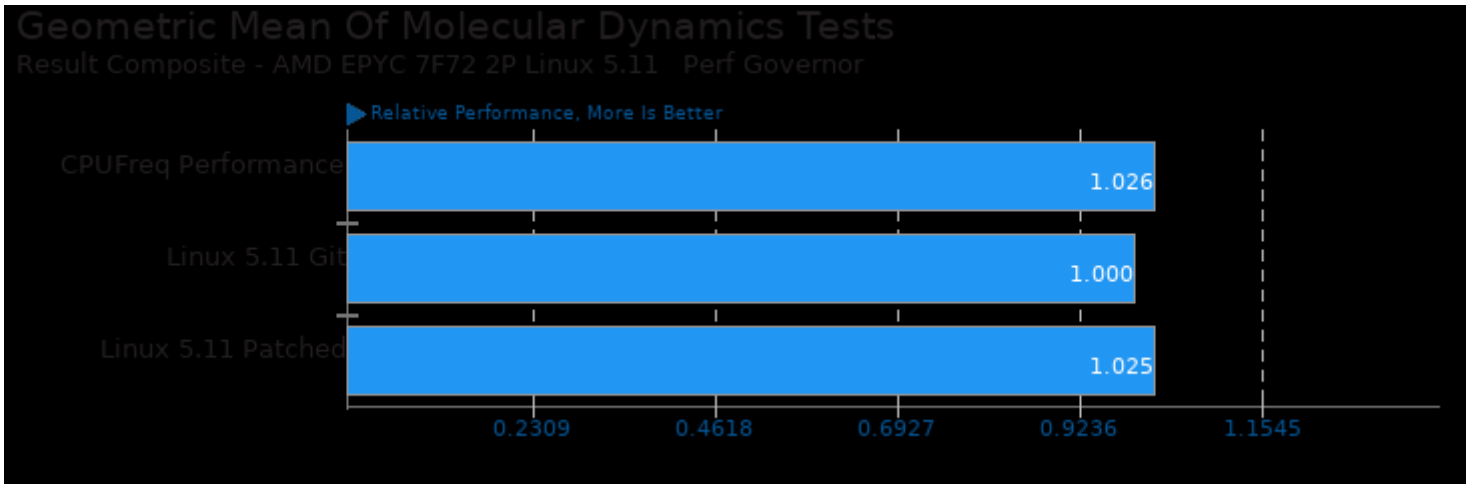
Geometric mean based upon tests: pts/astcenc, pts/etcpak, pts/build-godot, pts/blender and pts/oidn



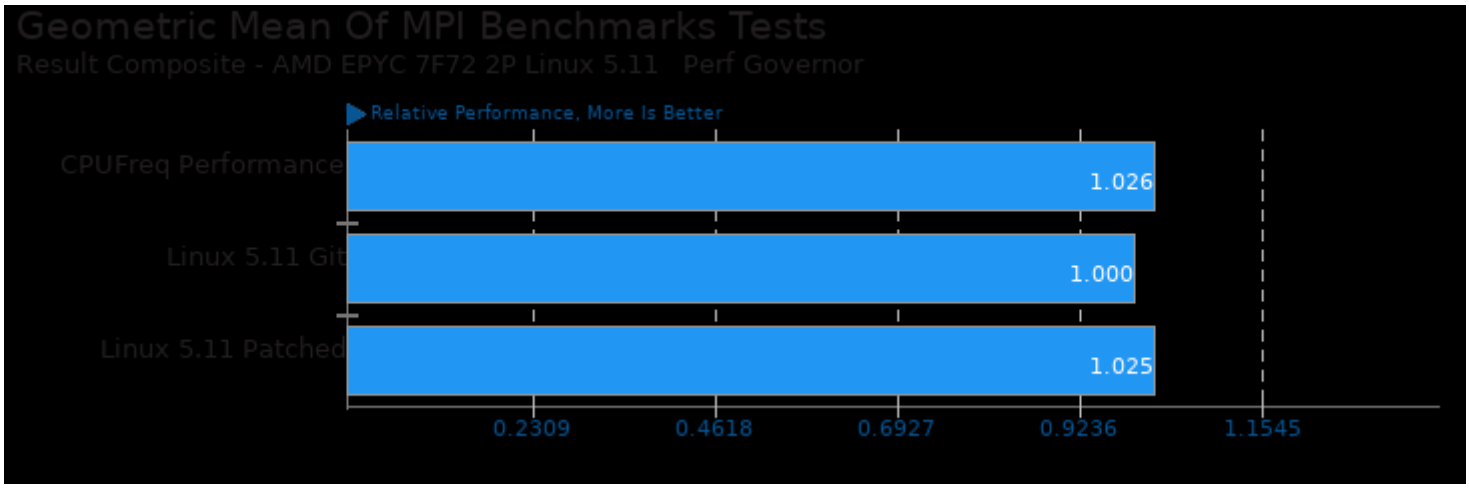
Geometric mean based upon tests: pts/qe and pts/qmcpack



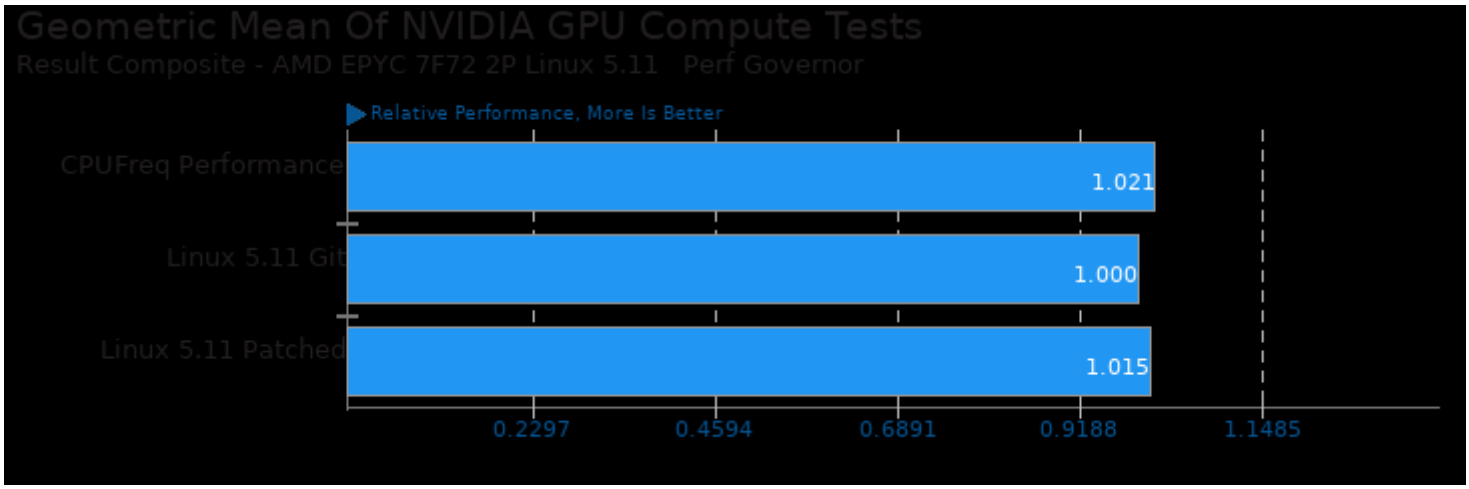
Geometric mean based upon tests: pts/tnn, pts/numpy, pts/ai-benchmark, pts/tensorflow-lite, pts/onednn, pts/onnx, pts/plaidml and pts/lczero



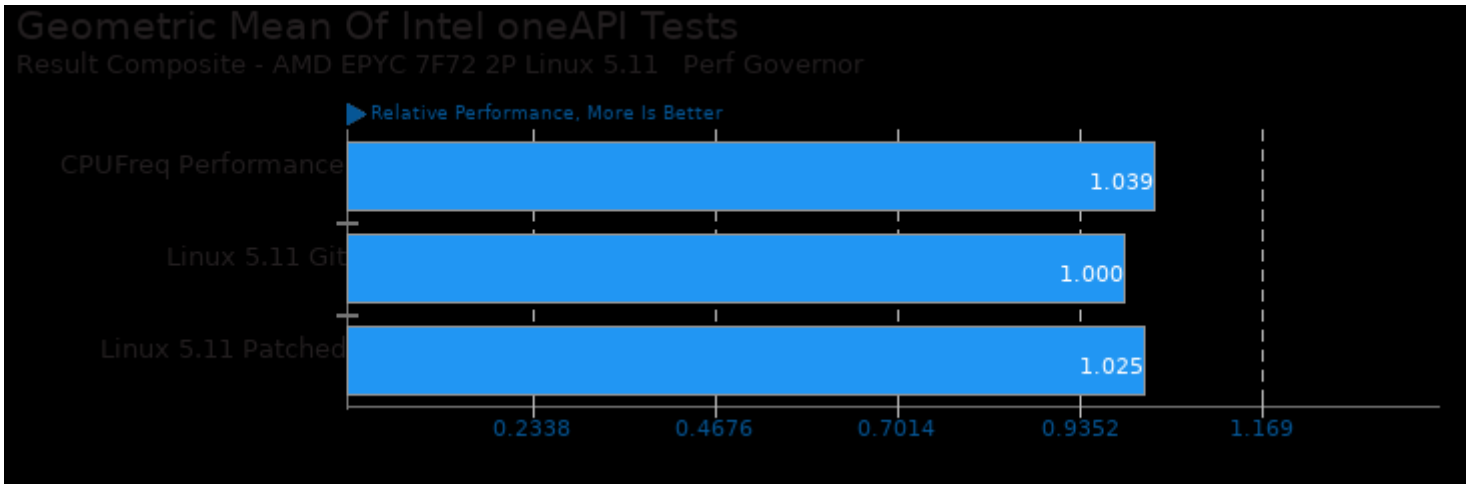
Geometric mean based upon tests: pts/namd, pts/gromacs, pts/dolfyn, pts/lammps, pts/lulesh and pts/openfoam



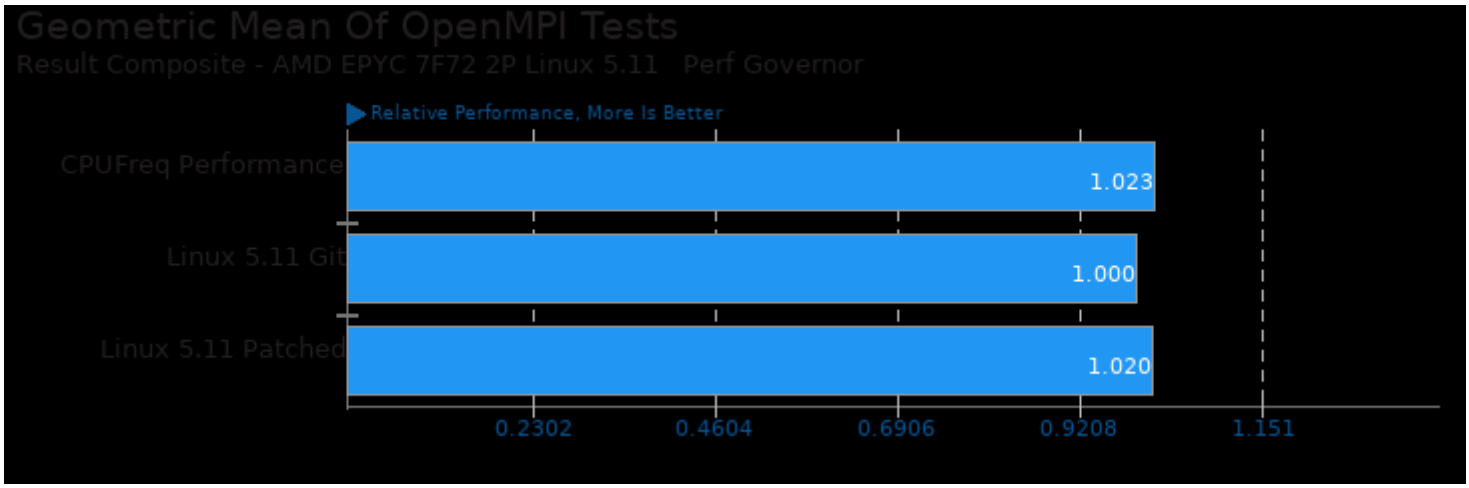
Geometric mean based upon tests: pts/askap, pts/lammps, pts/gpaw, pts/gromacs, pts/qmcpack, pts/hpcg, pts/mrbayes and pts/npb



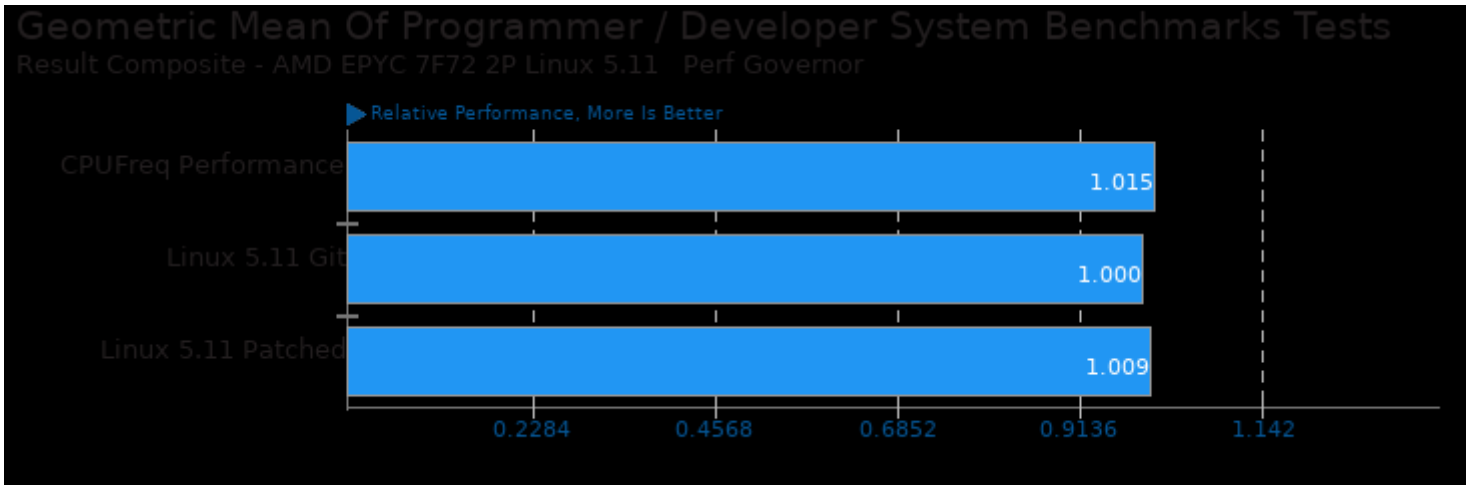
Geometric mean based upon tests: pts/gromacs, pts/luxcorerender, pts/rodinia, pts/financebench, pts/plaidml, pts/lczero, pts/v-ray and pts/blender



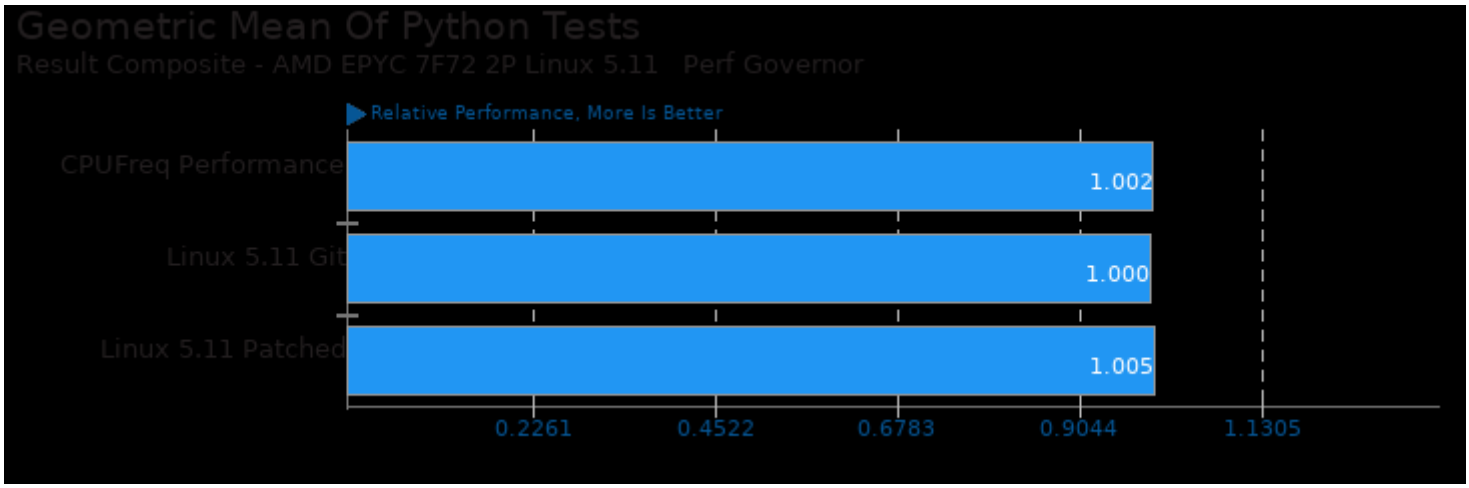
Geometric mean based upon tests: pts/onednn, pts/oidn, pts/ospray and pts/tungsten



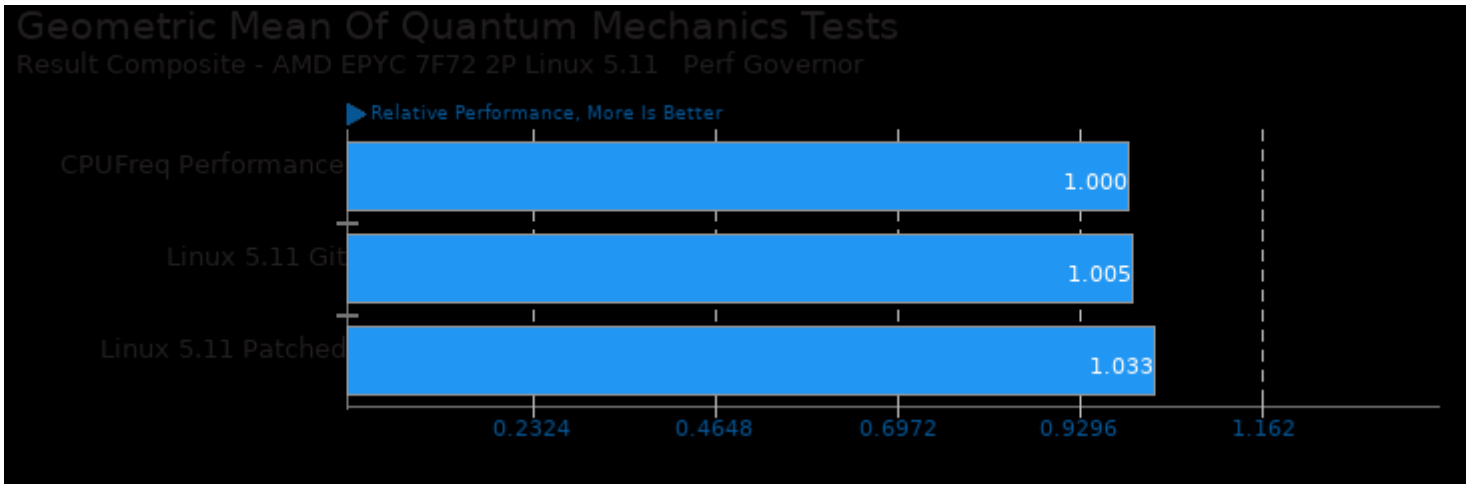
Geometric mean based upon tests: pts/amg, pts/ior, pts/lammps, pts/lulesh, pts/npb, pts/openfoam, pts/qe, pts/qmcpack, pts/relion, pts/askap, pts/gpaw, pts/gromacs, pts/hpcg, pts/mrbayes and pts/rodinia



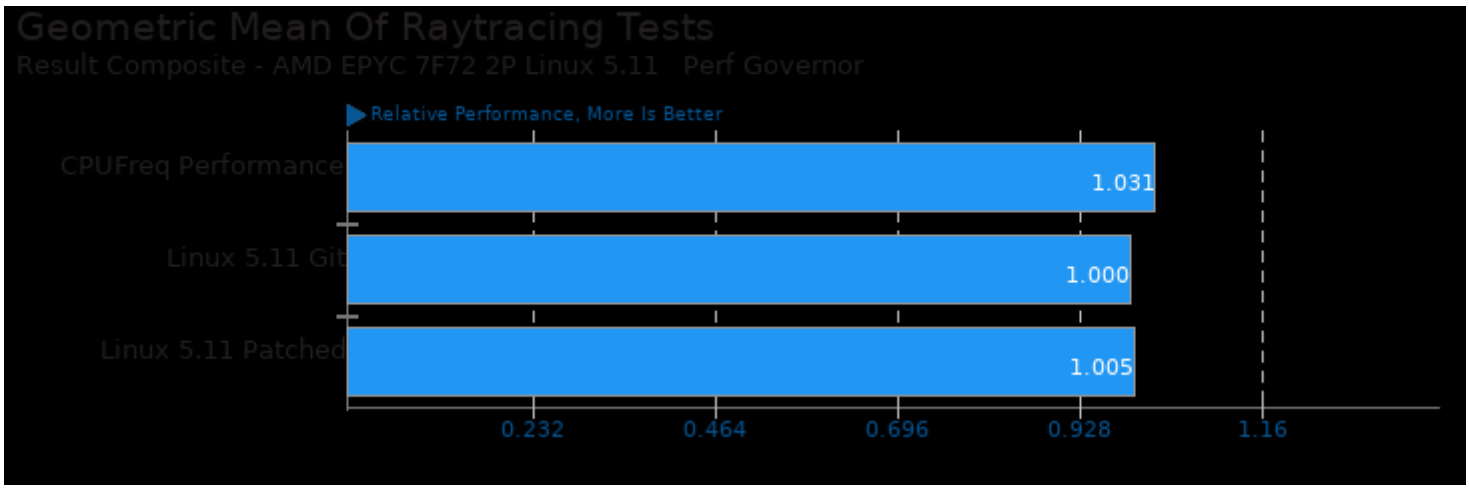
Geometric mean based upon tests: pts/simdjson, pts/sqlite-speedtest, pts/compress-zstd, pts/build-linux-kernel, pts/build-gdb, pts/build-llvm, pts/build2, pts/build-godot and pts/amg



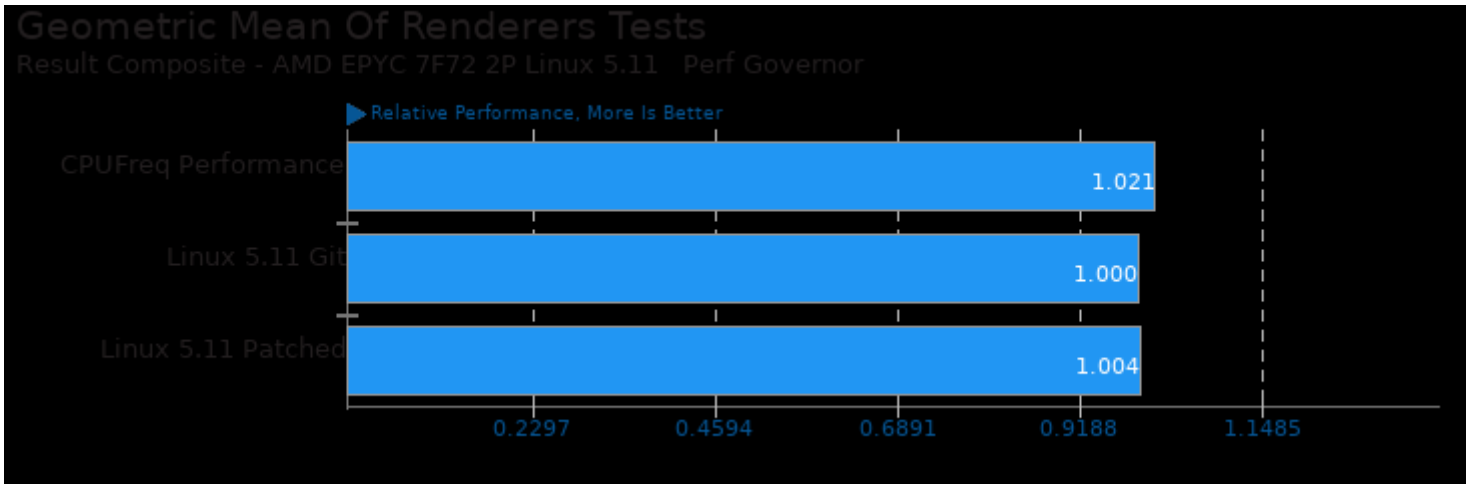
Geometric mean based upon tests: pts/cython-bench and pts/numpy



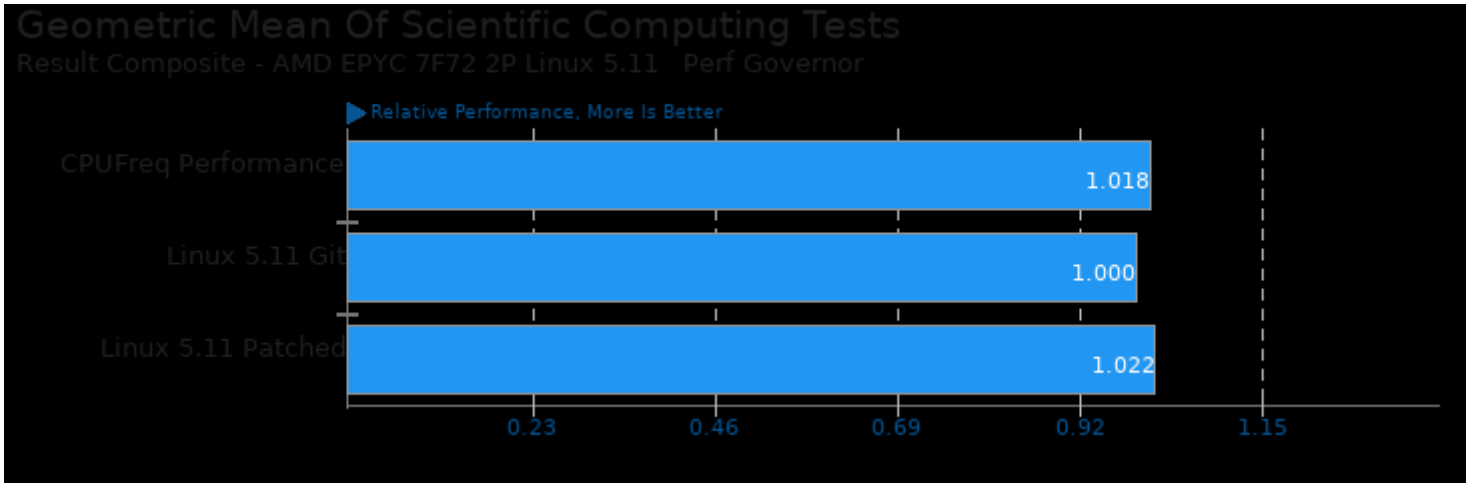
Geometric mean based upon tests: pts/gpaw and pts/qe



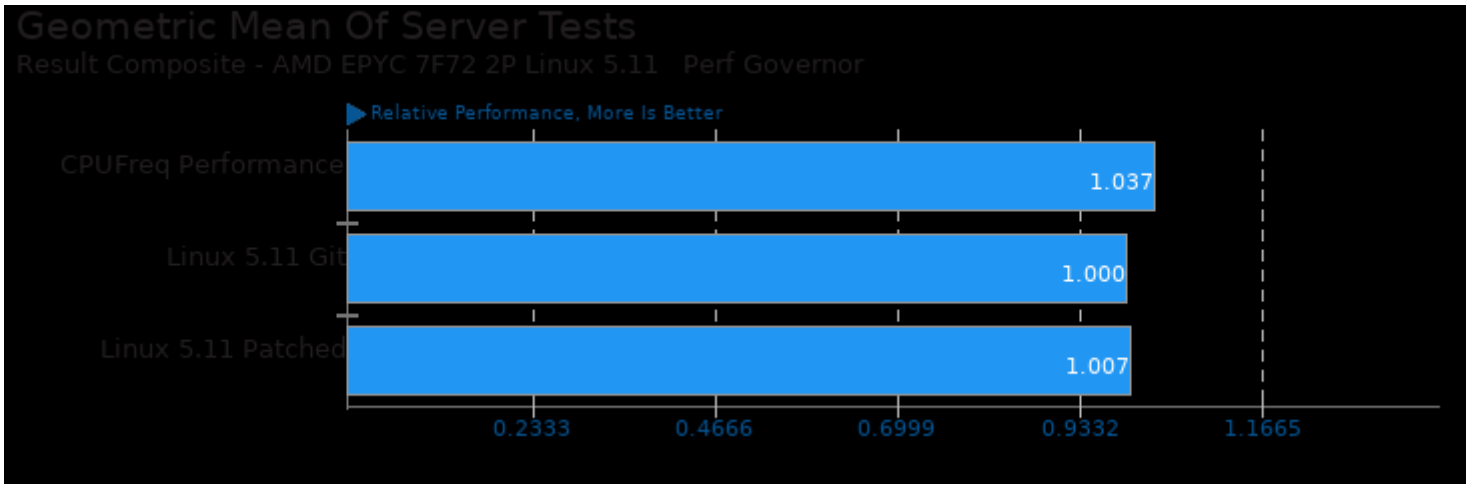
Geometric mean based upon tests: pts/ospray, pts/tachyon, pts/povray and pts/yafaray



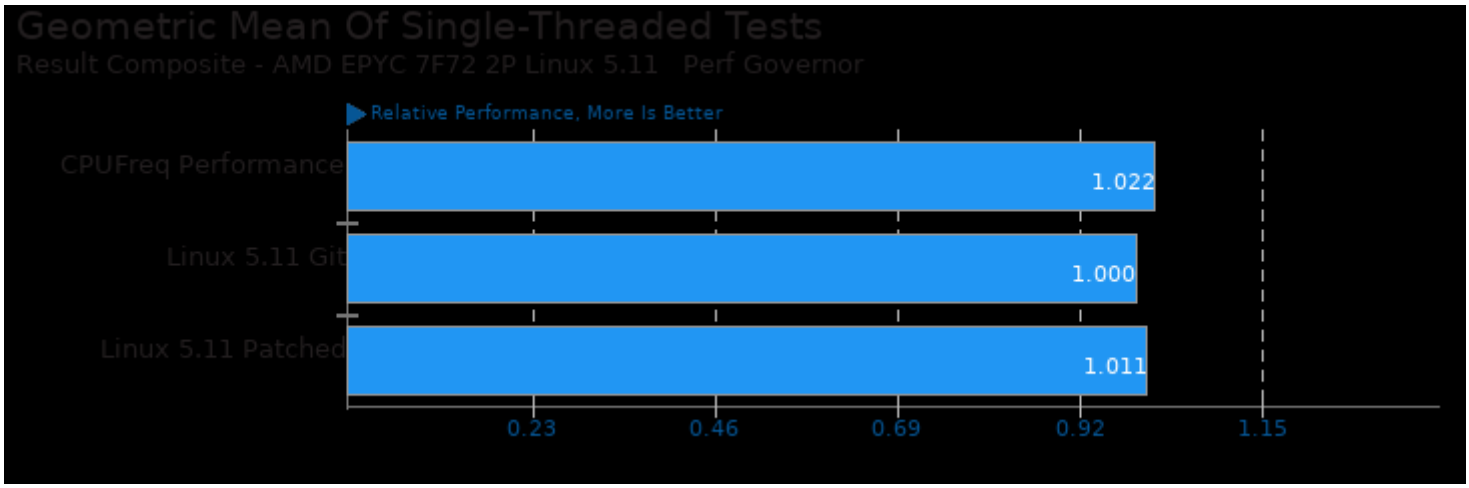
Geometric mean based upon tests: pts/ospray, pts/tachyon, pts/povray, pts/yafaray, pts/blender, pts/tungsten, pts/luxcorerender, pts/ttsiod-renderer and pts/v-ray



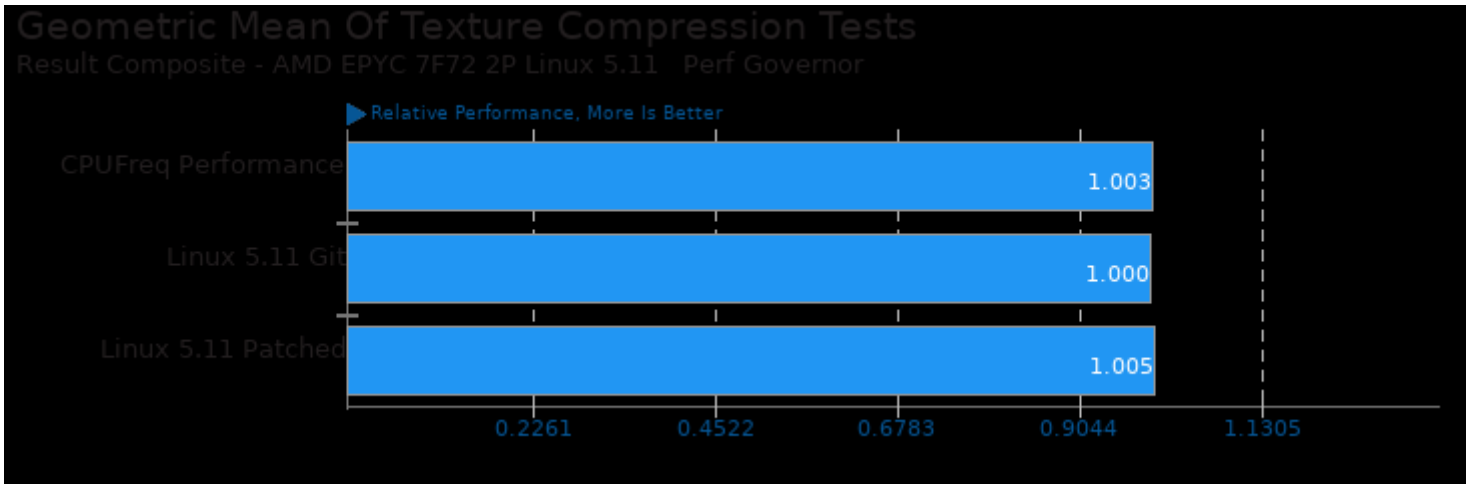
Geometric mean based upon tests: pts/ffte, pts/fftw, pts/neat, pts/amg, pts/namd, pts/gromacs, pts/dolfyn, pts/lammps, pts/lulesh, pts/openfoam, pts/himeno, pts/mrbayes, pts/qmcpack, pts/gpaw and pts/qe



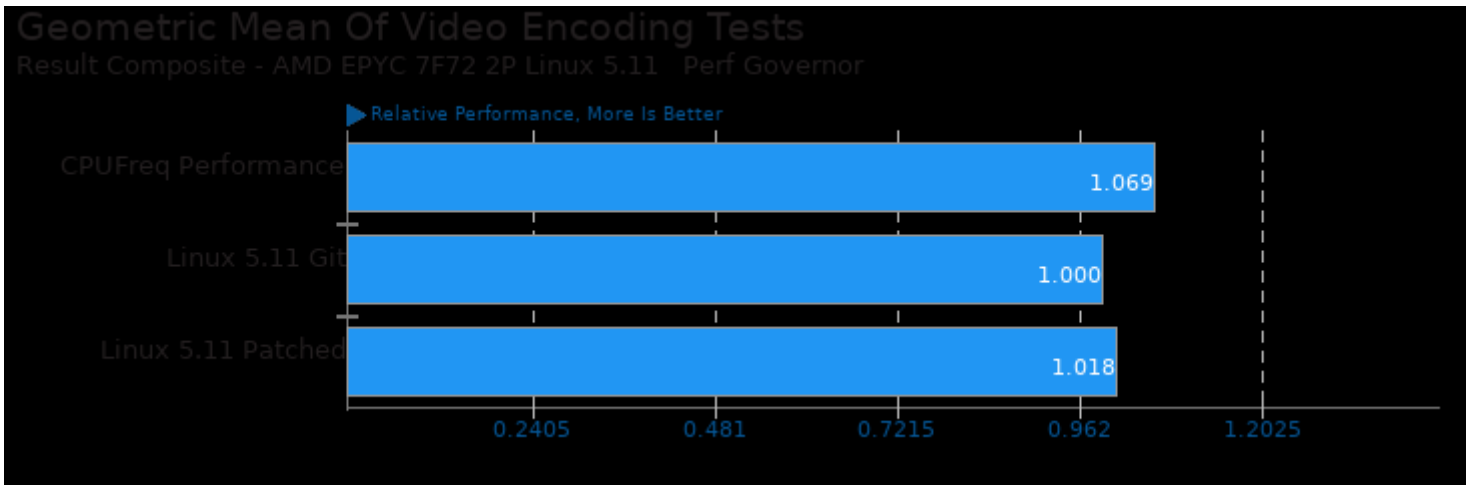
Geometric mean based upon tests: pts/blogbench, pts/redis, pts/keydb, pts/simdjson, pts/sqlite-speedtest and pts/influxdb



Geometric mean based upon tests: pts/byte, pts/swet, pts/numpy, pts/gnupg, pts/redis and pts/hint



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



Geometric mean based upon tests: pts/svt-vp9, pts/x265, pts/dav1d, pts/svt-av1 and pts/rav1e

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

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