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Ubuntu 19.04 vs. Clear Linux vs. openSUSE - CompuLab

Intel Xeon E-2288G testing for a future article by Michael Larabel.

Automated Executive Summary

Clear Linux 30970 had the most wins, coming in first place for 57% of the tests.

Based on the geometric mean of all complete results, the fastest (Clear Linux 30970) was 1.459x the speed of the slowest (openSUSE Tumbleweed). Ubuntu 19.04 was 0.72x the speed of Clear Linux 30970 and openSUSE Tumbleweed was 0.951x the speed of Ubuntu 19.04.

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

Systemd Total Boot Time (Test: Loader) at 55.958x
Systemd Total Boot Time (Test: Userspace) at 43.321x
Systemd Total Boot Time (Test: Total) at 16.085x
Blender (System Power Consumption Monitor) at 8.257x
NeatBench (System Power Consumption Monitor) at 8.22x
Go Benchmarks (System Power Consumption Monitor) at 8.095x
Go Benchmarks (System Power Consumption Monitor) at 8.004x
Timed Linux Kernel Compilation (System Power Consumption Monitor) at 7.722x
dav1d (System Power Consumption Monitor) at 7.706x

Go Benchmarks (System Power Consumption Monitor) at 7.592x.

Test Systems:

Ubuntu 19.04

Processor: Intel Xeon E-2288G @ 5.00GHz (8 Cores / 16 Threads), Motherboard: Compulab SBC-ATCFL v1.2 (ATOP3.PRD.0.29.2 BIOS), Chipset: Intel Cannon Lake PCH, Memory: 64512MB, Disk: Samsung SSD 970 EVO Plus 250GB, Graphics: NVIDIA Quadro RTX 4000 8GB, Audio: Realtek ALC1150, Monitor: ASUS VP28U, Network: Intel I219-LM + Intel I210

OS: Ubuntu 19.04, Kernel: 5.0.0-27-generic (x86_64), Desktop: GNOME Shell 3.32.2, Display Server: X Server 1.20.4, Display Driver: NVIDIA 435.21, OpenGL: 4.6.0, Compiler: GCC 8.3.0, File-System: ext4, Screen Resolution: 3840x2160

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --enable-libmpx --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: intel_pstate powersave
OpenCL Notes: GPU Compute Cores: 2304
Java Notes: OpenJDK Runtime Environment (build 11.0.4+11-post-Ubuntu-1ubuntu219.04)
Python Notes: Python 2.7.16 + Python 3.7.3
Security Notes: l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Enhanced IBRS IBPB: conditional RSB filling

Clear Linux 30970

Processor: Intel Xeon E-2288G @ 5.00GHz (8 Cores / 16 Threads), Motherboard: Compulab SBC-ATCFL v1.2 (ATOP3.PRD.0.29.2 BIOS), Chipset: Intel Device a36f, Memory: 64512MB, Disk: Samsung SSD 970 EVO Plus 250GB, Graphics: NVIDIA Quadro RTX 4000 8GB, Audio: Realtek ALC1150, Monitor: ASUS VP28U, Network: Intel I219-LM + Intel I210

OS: Clear Linux OS 30970, Kernel: 5.2.13-832.native (x86_64), Desktop: GNOME Shell 3.32.2, Display Server: X Server 1.20.5, Display Driver: NVIDIA 435.21, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 10.1.0, Vulkan: 1.1.109, Compiler: GCC 9.2.1 20190908 gcc-9-branch@275492 + Clang 8.0.0 + LLVM 8.0.0, File-System: ext4, Screen Resolution: 3840x2160

Environment Notes: CFFLAGS=-g-O3-feliminate-unused-debug-types-pipe-Wall-Wp-D_FORTIFY_SOURCE=2-fexceptions-fstack-protector--param=ssp-buffer-size=32-m64-fasynchronous-unwind-tables-Wp-D_REENTRANT-ftree-loop-distribute-patterns-Wl-z-Wl now-Wl-z-Wl relro-malign-data=abi-fno-semantic-interposition-ftree-vectorize-ftree-loop-vectorize-Wl-sort-common-Wl--enable-new-dtags
FFLAGS=-g-O3-feliminate-unused-debug-types-pipe-Wall-Wp-D_FORTIFY_SOURCE=2-fexceptions-fstack-protector--param=ssp-buffer-size=32-m64-fasynchronous-unwind-tables-Wp-D_REENTRANT-ftree-loop-distribute-patterns-Wl-z-Wl
relro-malign-data=abi-fno-semantic-interposition-ftree-vectorize-ftree-loop-vectorize-Wl--enable-new-dtags
CXXFLAGS=-g-O3-feliminate-unused-debug-types-pipe-Wall-Wp-D_FORTIFY_SOURCE=2-fexceptions-fstack-protector--param=ssp-buffer-size=32-Wformat-Wformat-security-m64-fasynchronous-unwind-tables-Wp-D_REENTRANT-ftree-loop-distribute-patterns-Wl-z-Wl
relro-fno-semantic-interposition-ffat-lto-objects-fno-signed-zeros-fno-trapping-math-fassociative-math-Wl-sort-common-Wl--enable-new-dtags-mtune=skylake-fvisibility-inlines-hidden-Wl--enable-new-dtags
CFLAGS=-g-O3-feliminate-unused-debug-types-pipe-Wall-Wp-D_FORTIFY_SOURCE=2-fexceptions-fstack-protector--param=ssp-buffer-size=32-Wformat-Wformat-security-m64-fasynchronous-unwind-tables-Wp-D_REENTRANT-ftree-loop-distribute-patterns-Wl-z-Wl
relro-fno-semantic-interposition-ffat-lto-objects-fno-signed-zeros-fno-trapping-math-fassociative-math-Wl-sort-common-Wl--enable-new-dtags-mtune=skylake
THEANO_FLAGS=floatX=float32 openmp=true gcc.cxxflags="-ftree-vectorize-mavx"
Compiler Notes: --build=x86_64-generic-linux --disable-libmpx --disable-libunwind-exceptions --disable-multiarch --disable-vtable-verify --disable-werror --enable-__cxa_atexit --enable-bootstrap --enable-cet --enable-clocale=gnu --enable-default-pie --enable-gnu-indirect-function --enable-languages=c,c++,fortran,go --enable-ld=default --enable-libstdcxx-pch --enable-lto --enable-multilib --enable-plugin --enable-shared --enable-threads=posix --exec-prefix=/usr --includedir=/usr/include --target=x86_64-generic-linux --with-arch=westmere --with-gcc-major-version-only --with-glibc-version=2.19 --with-gnu-ld --with-isl --with-ppl=yes --with-tune=haswell

Processor Notes: Scaling Governor: intel_pstate performance
OpenCL Notes: GPU Compute Cores: 2304
Java Notes: OpenJDK Runtime Environment (build 1.8.0-u222-ga-b00)
Python Notes: Python 3.7.4
Security Notes: l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Enhanced IBRS IBPB: conditional RSB filling

openSUSE Tumbleweed

Processor: Intel Xeon E-2288G @ 5.00GHz (8 Cores / 16 Threads), Motherboard: Compulab SBC-ATCFL v1.2 (ATOP3.PRD.0.29.2 BIOS), Chipset: Intel Cannon Lake PCH, Memory: 64512MB, Disk: Samsung SSD 970 EVO Plus 250GB, Graphics: NVIDIA Quadro RTX 4000 8GB, Audio: Realtek ALC1150, Monitor: ASUS VP28U, Network: Intel I219-LM + Intel I210

OS: openSUSE Tumbleweed 20190909, Kernel: 5.2.11-1-default (x86_64), Desktop: KDE Plasma 5.16.5, Display Server: X Server 1.20.5, Display Driver: NVIDIA 435.21, OpenGL: 4.6.0, Compiler: GCC 9.2.1 20190820 [gcc-9-branch revision 274748], File-System: btrfs, Screen Resolution: 3840x2160

Compiler Notes: --build=x86_64-suse-linux --disable-cet --disable-libcc1 --disable-libssp --disable-libstdcxx-pch --disable-libvtv --disable-werror --enable-gnu-indirect-function --enable-languages=c,c++,objc,fortran,obj-c++,ada,go,d --enable-libphobos --enable-libstdcxx-allocator=new --enable-link-mutex --enable-linux-futex --enable-multilib --enable-offload-targets=hsa,nvptx-none=/usr/nvptx-none, --enable-plugin --enable-ssp --enable-version-specific-runtime-libs --host=x86_64-suse-linux --mandir=/usr/share/man --with-arch-32=x86-64 --with-build-config=bootstrap-lto-lean --with-gcc-major-version-only --with-slibdir=/lib64 --with-tune=generic --without-cuda-driver --without-system-libunwind
Processor Notes: Scaling Governor: intel_pstate powersave
OpenCL Notes: GPU Compute Cores: 2304
Java Notes: OpenJDK Runtime Environment (build 11.0.4+11-suse-1.1-x8664)
Python Notes: Python 2.7.16 + Python 3.7.3
Security Notes: l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Enhanced IBRS IBPB: conditional RSB filling

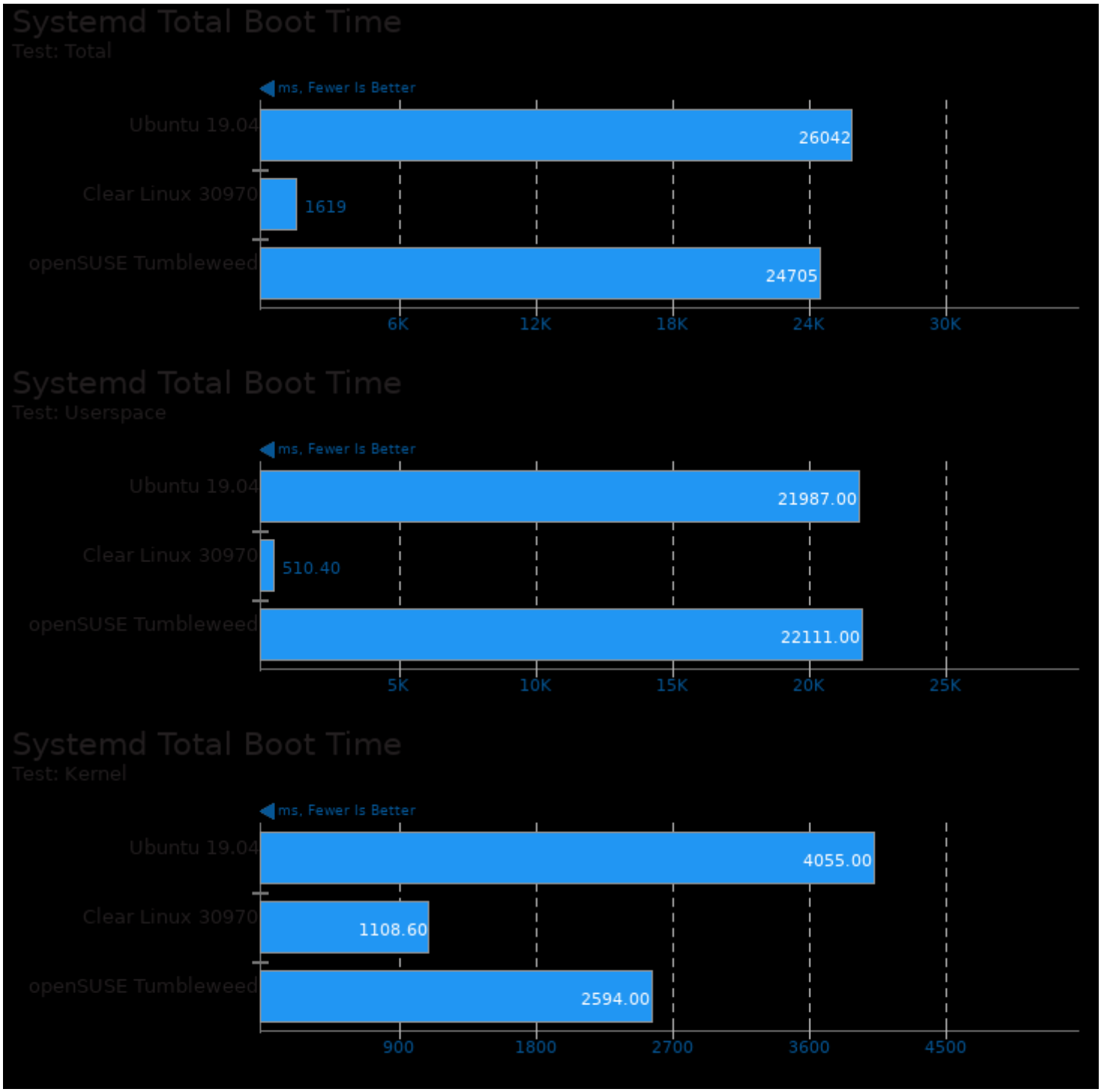
	Ubuntu 19.04	Clear Linux 30970	openSUSE Tumbleweed
Systemd Total Boot Time - Total (ms)	**26042**	**1619**	24705
Normalized	6.22%	100%	6.55%
Systemd Total Boot Time - Userspace (ms)	21987	**510.40**	**22111**
Normalized	2.32%	100%	2.31%
Systemd Total Boot Time - Kernel (ms)	**4055**	**1109**	2594
Normalized	27.34%	100%	42.74%
Systemd Total Boot Time - Loader (ms)	844	**147.20**	**8237**
Normalized	17.44%	100%	1.79%
Systemd Total Boot Time - Firmware (ms)	**5665**	5769	**9732**
Normalized	100%	98.2%	58.21%
SVT-VP9 - 1.8.b.Y.T.V.V.E (FPS)	**166.10**	**177.83**	173.95
Normalized	93.4%	100%	97.82%
Standard Deviation	1.2%	0.4%	0.1%
SVT-VP9 - 1.8.b.Y.T.V.V.E (FPS/Watt)	**2.08**	3.53	**4.35**
Normalized	47.82%	81.15%	100%
x265 - H.2.1.V.E (FPS)	**55.33**	59.19	**60.81**
Normalized	90.99%	97.34%	100%
Standard Deviation	1.2%	1.7%	0.9%
x265 - H.2.1.V.E (FPS/Watt)	**0.58**	**0.46**	**0.58**
Normalized	100%	79.31%	100%
glibc bench - pthread_once (nanoseconds)	**1.35**	**1.34**	**1.35**
Normalized	99.26%	100%	99.26%

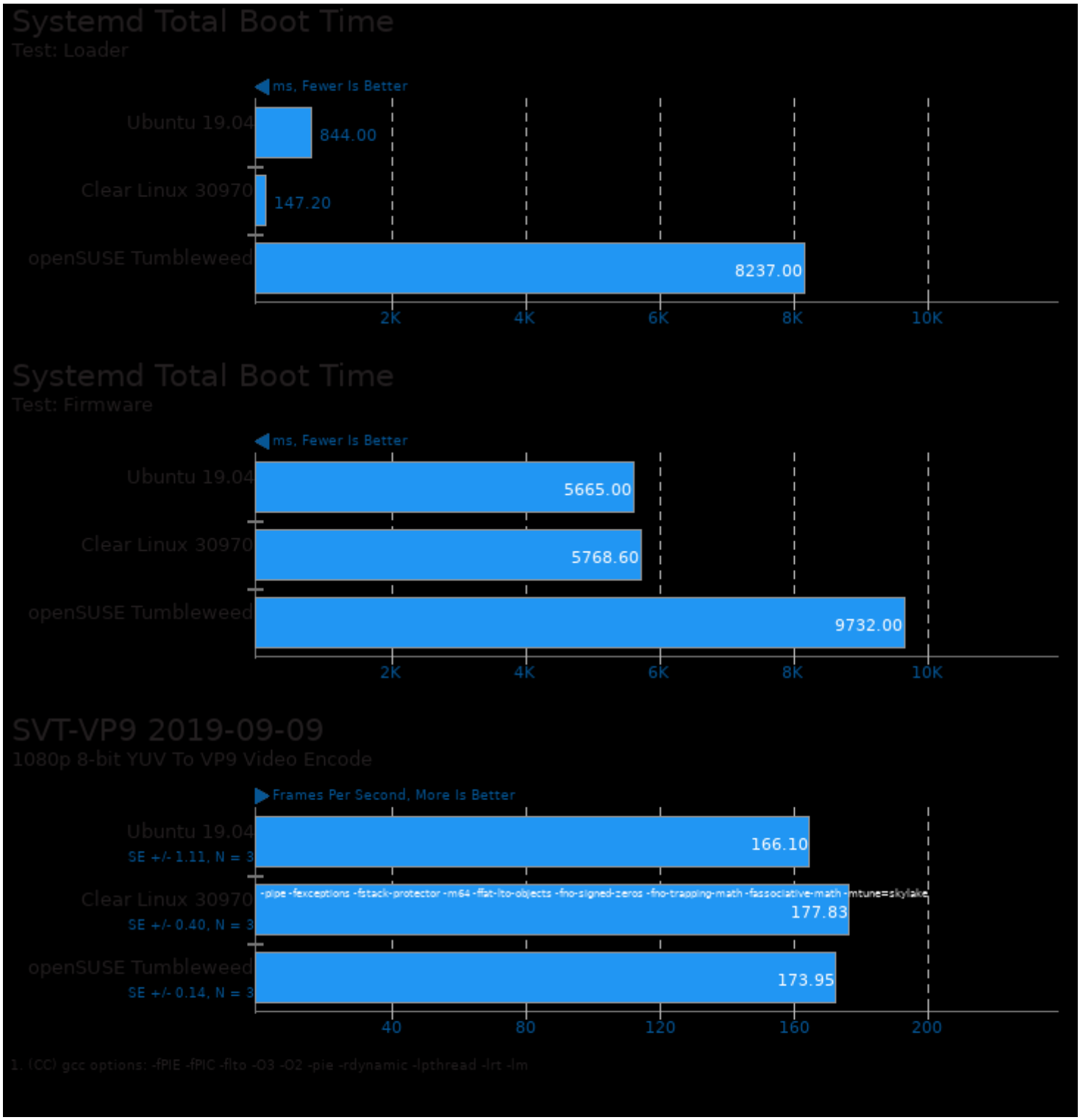
Standard Deviation	0.2%	0.1%	0.1%
glibc bench - asinh (nanoseconds)	8.17	7.49	8.09
Normalized	91.68%	100%	92.58%
Standard Deviation	0.3%	0.2%	0.1%
glibc bench - atanh (nanoseconds)	10.01	8.75	9.83
Normalized	87.41%	100%	89.01%
Standard Deviation	0.3%	0.2%	0%
glibc bench - sincos (nanoseconds)	12.60	9.73	12.55
Normalized	77.22%	100%	77.53%
Standard Deviation	0.1%	0%	1.6%
glibc bench - sinh (nanoseconds)	6.87	6.18	6.80
Normalized	89.96%	100%	90.88%
Standard Deviation	0.1%	0.1%	0%
glibc bench - modf (nanoseconds)	1.74	1.65	1.58
Normalized	90.8%	95.76%	100%
Standard Deviation	0.1%	0.8%	0.1%
glibc bench - exp (nanoseconds)	4.39	4.03	4.14
Normalized	91.8%	100%	97.34%
Standard Deviation	0.1%	0%	0.4%
glibc bench - log2 (nanoseconds)	6.33	4.41	6.18
Normalized	69.67%	100%	71.36%
Standard Deviation	0.2%	0%	0.3%
PyBench - T.F.A.T.T (Milliseconds)	807	811	1015
Normalized	100%	99.51%	79.51%
Standard Deviation	0.2%	0.4%	0.7%
Blender - Barbershop - CPU-Only (sec)	763.70	730.96	766.30
Normalized	95.71%	100%	95.39%
Standard Deviation	0.5%	0.2%	0.7%
PHPBench - P.B.S (Score)	801138	1115509	695398
Normalized	71.82%	100%	62.34%
Standard Deviation	0.4%	1.3%	0.4%
PHPBench - P.B.S (Score/Watt)	13533	22258	9799
Normalized	60.8%	100%	44.02%
NeatBench - CPU (FPS)	10.23	10.82	10.80
Normalized	94.55%	100%	99.82%
Standard Deviation	42.7%	46%	45.9%
NeatBench - CPU (FPS/Watt)	0.10	0.09	0.08
Normalized	100%	90%	80%
Appleseed - Disney Material (sec)	270.70	265.98	264.76
Normalized	97.81%	99.54%	100%
Selenium - ARES-6 - Firefox (ms)	44.98	39.74	38.64
Normalized	85.9%	97.23%	100%
Standard Deviation	2.1%	0.7%	1.1%
libjpeg-turbo tjbench - D.T (Megapixels/sec)	236.48	227.95	229.72
Normalized	100%	96.39%	97.14%
Standard Deviation	0.6%	0.1%	0.3%
libjpeg-turbo tjbench - D.T (Megapixels/sec/Watt)	5.33	5.44	4.58
Normalized	97.98%	100%	84.19%
Timed LLVM Compilation - Time To Compile (sec)	406.06	725.32	408.41
Normalized	100%	55.98%	99.42%

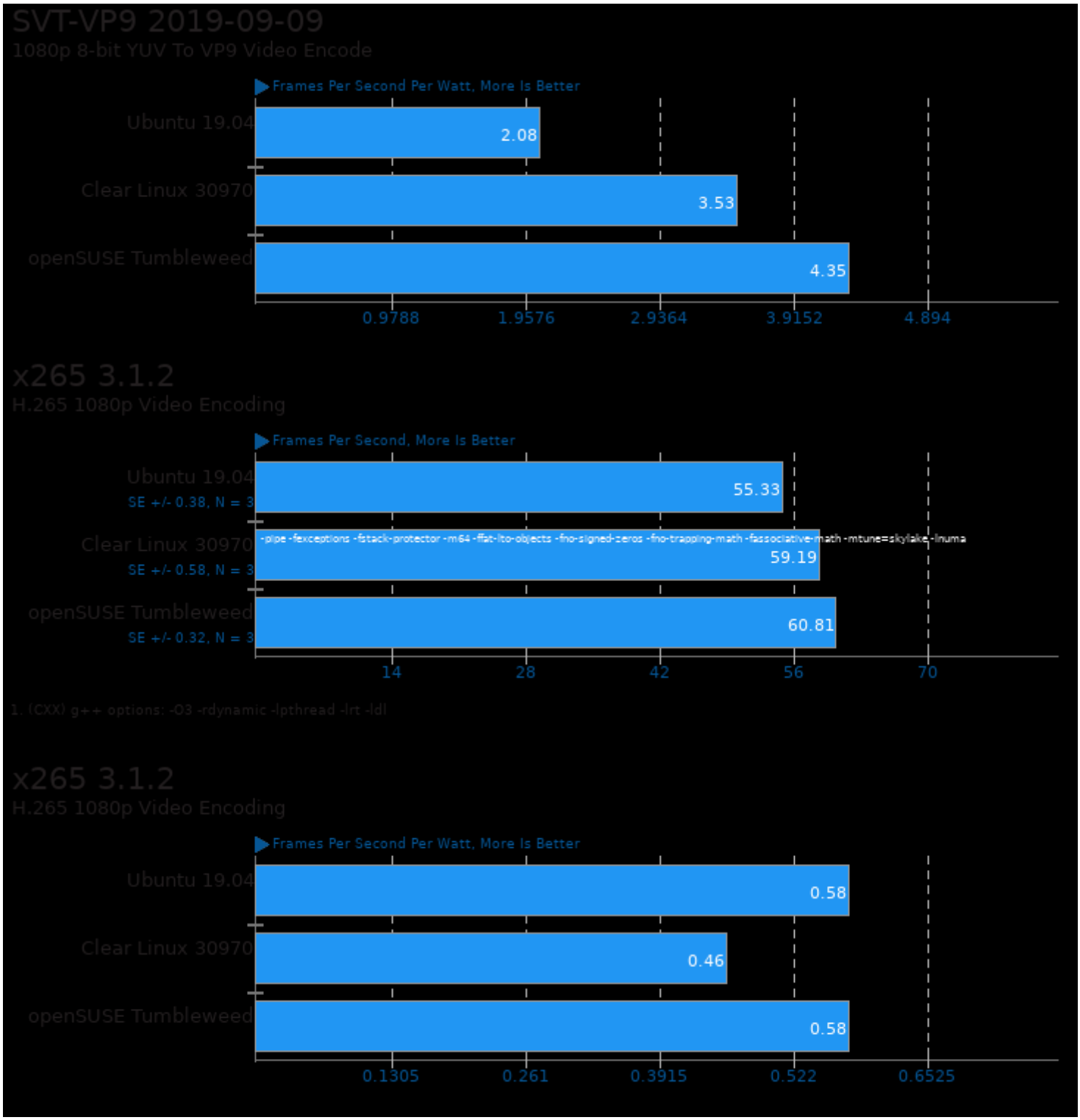
Timed Linux Kernel Compilation - Time To Compile (sec)	**70.63**	**70.69**	
Normalized	100%	99.92%	
Standard Deviation	1.5%	1%	
GROMACS - Water Benchmark (Ns/Day)	**0.84**		**0.19**
Normalized	100%		22.62%
Standard Deviation	0.2%		0%
GROMACS - Water Benchmark (Ns/Day/Watt)	**0.01**		**0.00**
Normalized	100%		0%
dav1d - S.N.1 (sec)	**8.56**	8.02	**7.92**
Normalized	92.52%	98.75%	100%
Standard Deviation	1.6%	1.1%	0.2%
dav1d - Summer Nature 4K (sec)	**28.92**	**27.23**	28.23
Normalized	94.16%	100%	96.46%
Standard Deviation	0.4%	1.7%	1.8%
Go Benchmarks - build (ns/op)	**11283917194**	15265077035	**15270207321**
Normalized	100%	73.92%	73.89%
Standard Deviation	2.3%	1.5%	0.4%
Go Benchmarks - http (ns/op)	**4489**	**3817**	4049
Normalized	85.03%	100%	94.27%
Standard Deviation	0.1%	2.9%	3.3%
Go Benchmarks - json (ns/op)	**6256397**	**4452466**	5341135
Normalized	71.17%	100%	83.36%
Standard Deviation	0.3%	2.9%	2.8%
Go Benchmarks - garbage (ns/op)	**1272569**	**1031623**	1139098
Normalized	81.07%	100%	90.56%
Standard Deviation	0.5%	0.3%	2.9%
DaCapo Benchmark - H2 (msec)	2859	**2750**	**2875**
Normalized	96.19%	100%	95.65%
Standard Deviation	7.1%	2.9%	6.2%
DaCapo Benchmark - Jython (msec)	**3665**	**3253**	3622
Normalized	88.76%	100%	89.81%
Standard Deviation	2.3%	2.2%	3.3%
DaCapo Benchmark - Tradebeans (msec)	**2776**	**2396**	
Normalized	86.31%	100%	
Standard Deviation	5%	1.4%	
DaCapo Benchmark - Tradesoap (msec)	**4392**	**3182**	
Normalized	72.45%	100%	
Standard Deviation	2.7%	2.6%	
Renaissance - A.U.C.T (ms)	**9583**	8862	**8584**
Normalized	89.58%	96.87%	100%
Standard Deviation	2%	3.4%	1.5%
Renaissance - Savina Reactors.IO (ms)	**15288**	**13054**	13521
Normalized	85.39%	100%	96.54%
Standard Deviation	3%	2.9%	1.2%
Renaissance - Apache Spark ALS (ms)	**4374**	**3653**	
Normalized	83.52%	100%	
Standard Deviation	1.8%	1.4%	
Renaissance - Apache Spark Bayes (ms)	**4620**	**8060**	
Normalized	100%	57.32%	
Standard Deviation	2.1%	1.3%	
Renaissance - A.S.P (ms)	**16449**	**18325**	
Normalized	100%	89.76%	
Standard Deviation	0.9%	1.1%	
Renaissance - I.M.D.S (ms)	**4804**	**4362**	4448

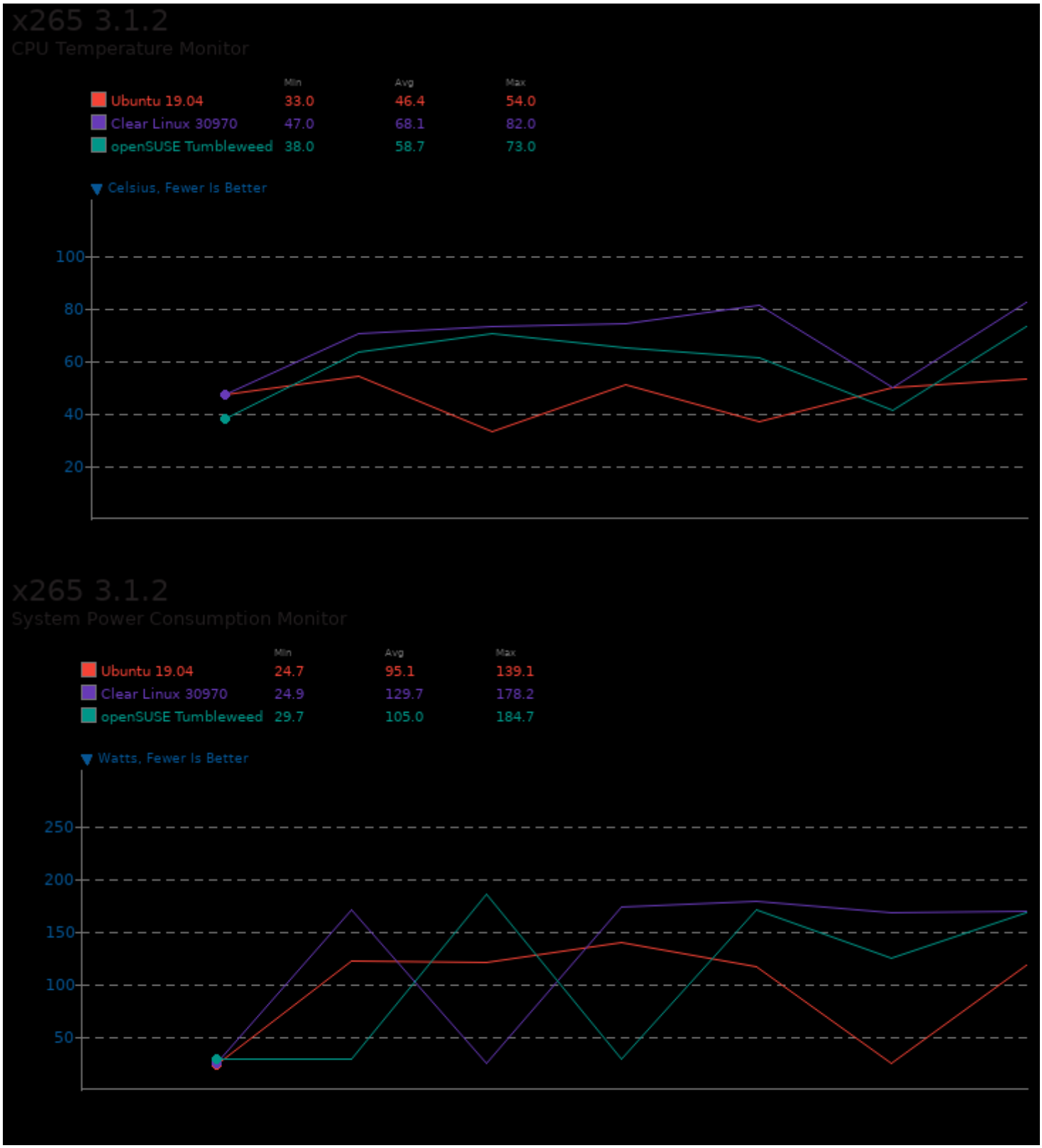
Normalized	90.79%	100%	98.06%
Standard Deviation	3%	2.3%	4.6%
GIMP - unsharp-mask (sec)	14.93		
Standard Deviation	0.6%		
GIMP - resize (sec)	6.84		
Standard Deviation	1.5%		
GIMP - rotate (sec)	11.35		
Standard Deviation	0.1%		
GIMP - auto-levels (sec)	12.68		
Standard Deviation	0.4%		
Darktable - Boat - CPU-only (sec)	14.04		
Standard Deviation	0.2%		
Darktable - Masskrug - CPU-only (sec)	6.29		
Standard Deviation	0.1%		
Darktable - Server Room - CPU-only (sec)	4.27		
Standard Deviation	0.1%		
Darktable - Server Rack - CPU-only (sec)	0.18		
Standard Deviation	1%		
Perl Benchmarks - Pod2html (sec)	**0.09515564**	**0.08586473**	0.09508150
Normalized	90.24%	100%	90.31%
Standard Deviation	0.3%	0.5%	0.6%
Perl Benchmarks - Interpreter (sec)	**0.00076571**	0.00079730	**0.00085798**
Normalized	100%	96.04%	89.25%
Standard Deviation	8.5%	0.8%	50.2%
GIMP - unsharp-mask (sec)		**13.24**	**14.05**
Normalized		100%	94.23%
Standard Deviation		0.6%	0.3%
GIMP - resize (sec)		**12.25**	**9.64**
Normalized		78.69%	100%
Standard Deviation		0.7%	0.2%
GIMP - rotate (sec)		**10.43**	**11.84**
Normalized		100%	88.09%
Standard Deviation		0.6%	0.7%
GIMP - auto-levels (sec)		**14.30**	**11.93**
Normalized		83.43%	100%
Standard Deviation		0.6%	0.2%
Darktable - Boat - CPU-only (sec)		13.69	
Standard Deviation		0.5%	
Darktable - Masskrug - CPU-only (sec)		5.46	
Standard Deviation		0.5%	
Darktable - Server Room - CPU-only (sec)		4.10	
Standard Deviation		0.4%	
Darktable - Server Rack - CPU-only (sec)		0.15	
Standard Deviation		0.4%	
Meta Performance Per Watt - P.P.W (Performance/Watt)		**492.4461**	**123.0273**
Normalized		100%	24.98%
Darktable - Boat - CPU-only (sec)			**13.80**
Normalized			100%
Standard Deviation			0.1%
Darktable - Masskrug - CPU-only (sec)			**6.15**
Normalized			100%
Standard Deviation			0.1%
Darktable - Server Room - CPU-only (sec)			**4.14**

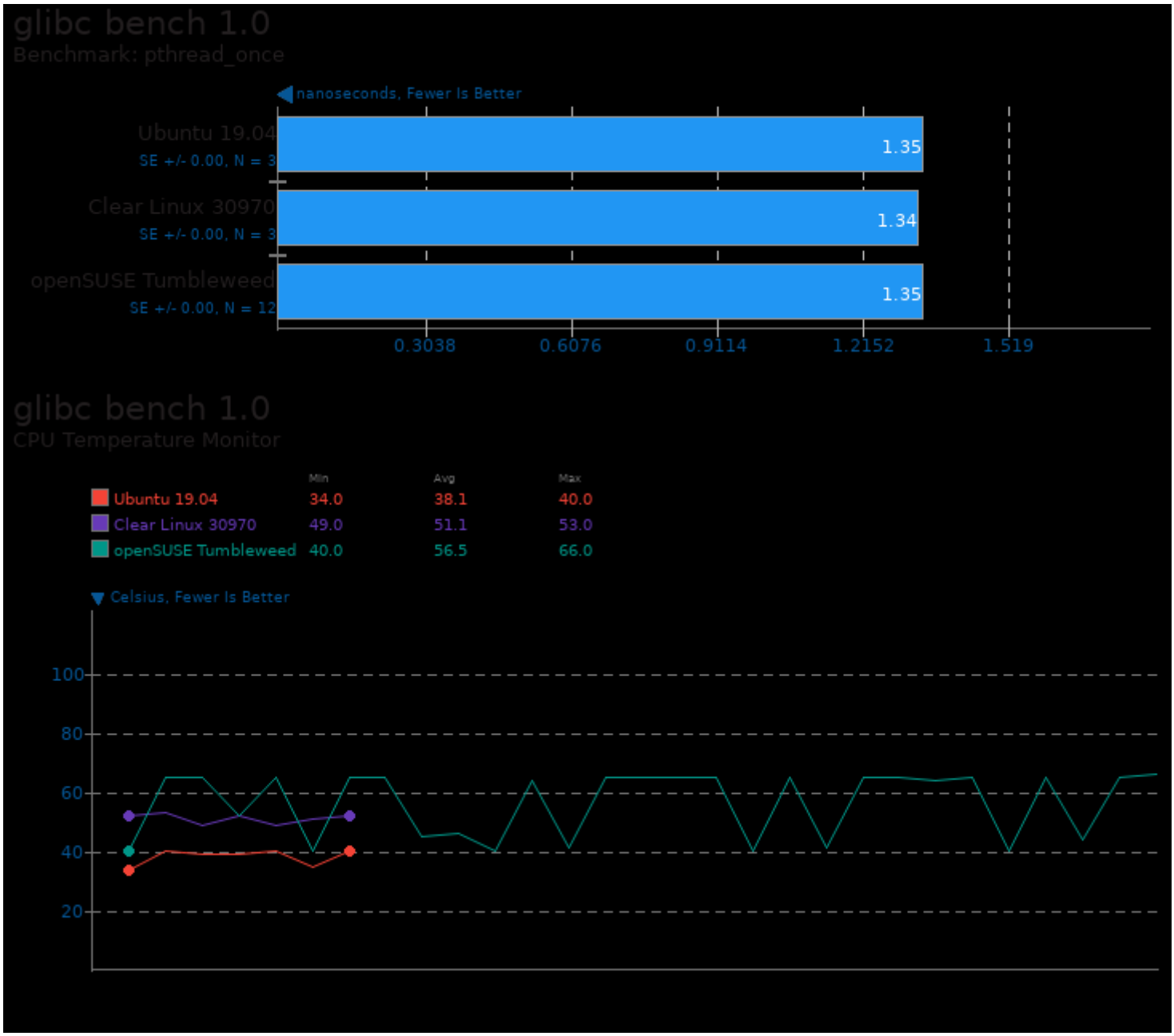
Normalized	100%
Standard Deviation	0.3%
Darktable - Server Rack - CPU-only (sec)	0.17
Standard Deviation	0.6%

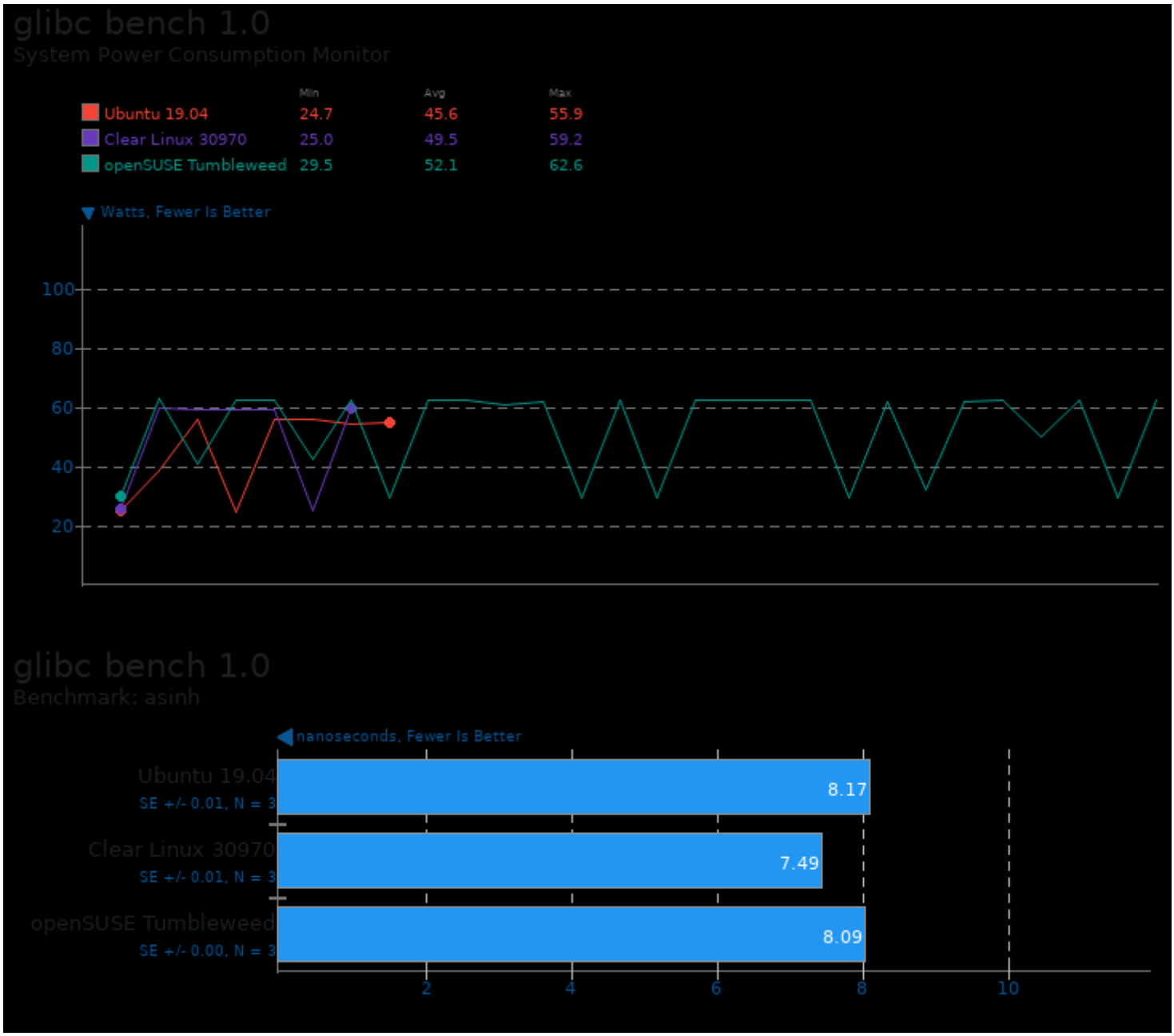

Systemd Total Boot Time
Test: Total
ms, Fewer Is Better
Ubuntu 19.04
26042
Clear Linux 30970
1619
openSUSE Tumbleweed
24705
6K
12K
18K
24K
30K
Systemd Total Boot Time
Test: Userspace
ms, Fewer Is Better
Ubuntu 19.04
21987.00
Clear Linux 30970
510.40
openSUSE Tumbleweed
22111.00
5K
10K
15K
20K
25K
Systemd Total Boot Time
Test: Kernel
ms, Fewer Is Better
Ubuntu 19.04
4055.00
Clear Linux 30970
1108.60
openSUSE Tumbleweed
2594.00
900
1800
2700
3600
4500

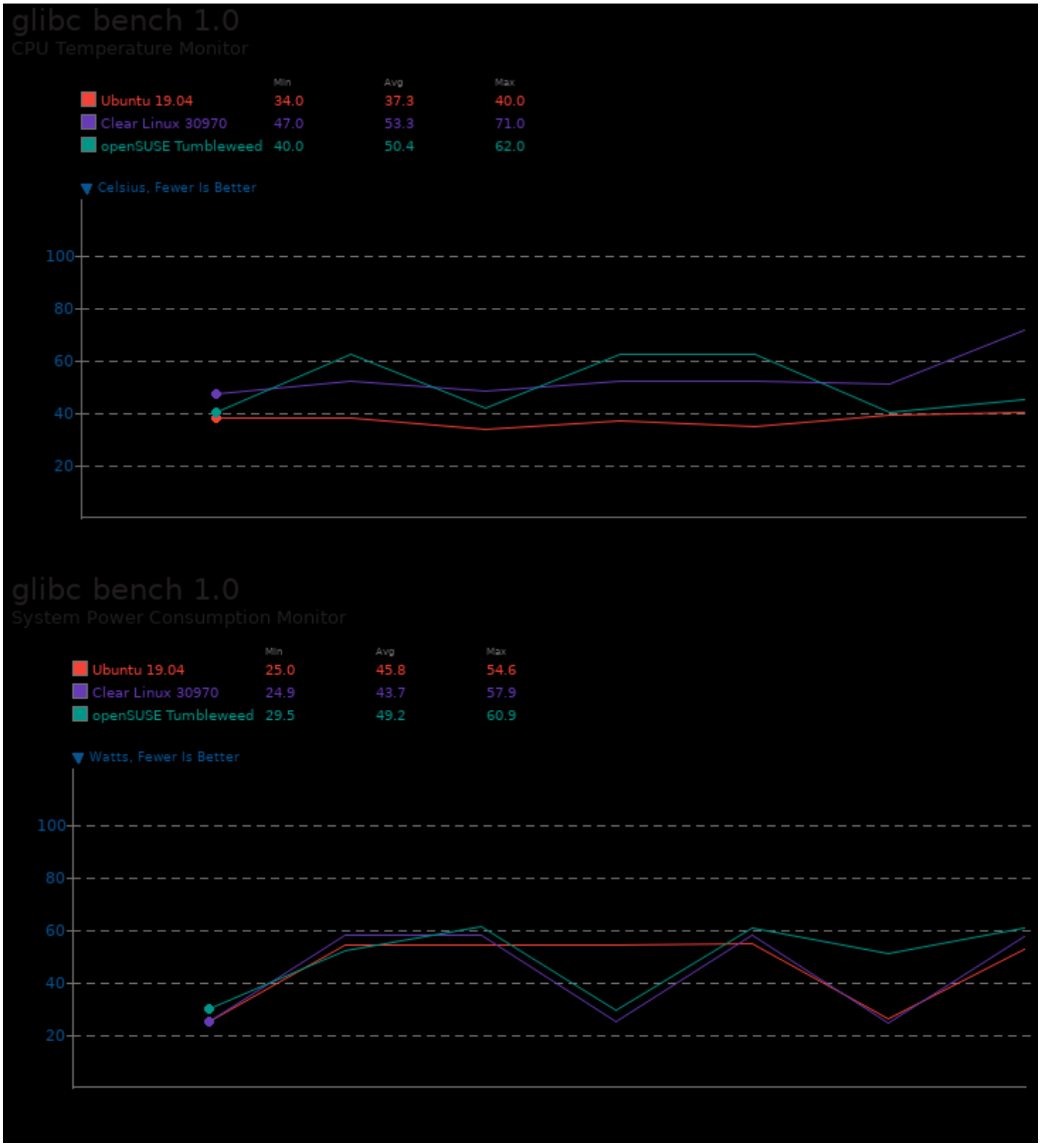

Systemd Total Boot Time
Test: Loader
ms, Fewer Is Better
Ubuntu 19.04
844.00
Clear Linux 30970
147.20
openSUSE Tumbleweed
8237.00
2K
4K
6K
8K
10K
Systemd Total Boot Time
Test: Firmware
ms, Fewer Is Better
Ubuntu 19.04
5665.00
Clear Linux 30970
5768.60
openSUSE Tumbleweed
9732.00
2K
4K
6K
8K
10K
SVT-VP9 2019-09-09
1080p 8-bit YUV To VP9 Video Encode
Frames Per Second, More Is Better
Ubuntu 19.04
SE +/- 1.11, N = 3
166.10
Clear Linux 30970
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
SE +/- 0.40, N = 3
177.83
openSUSE Tumbleweed
SE +/- 0.14, N = 3
173.95
40
80
120
160
200
1. (CC) gcc options: -fPIE -fPIC -flto -O3 -O2 -pie -rdynamic -lpthread -lrt -lm

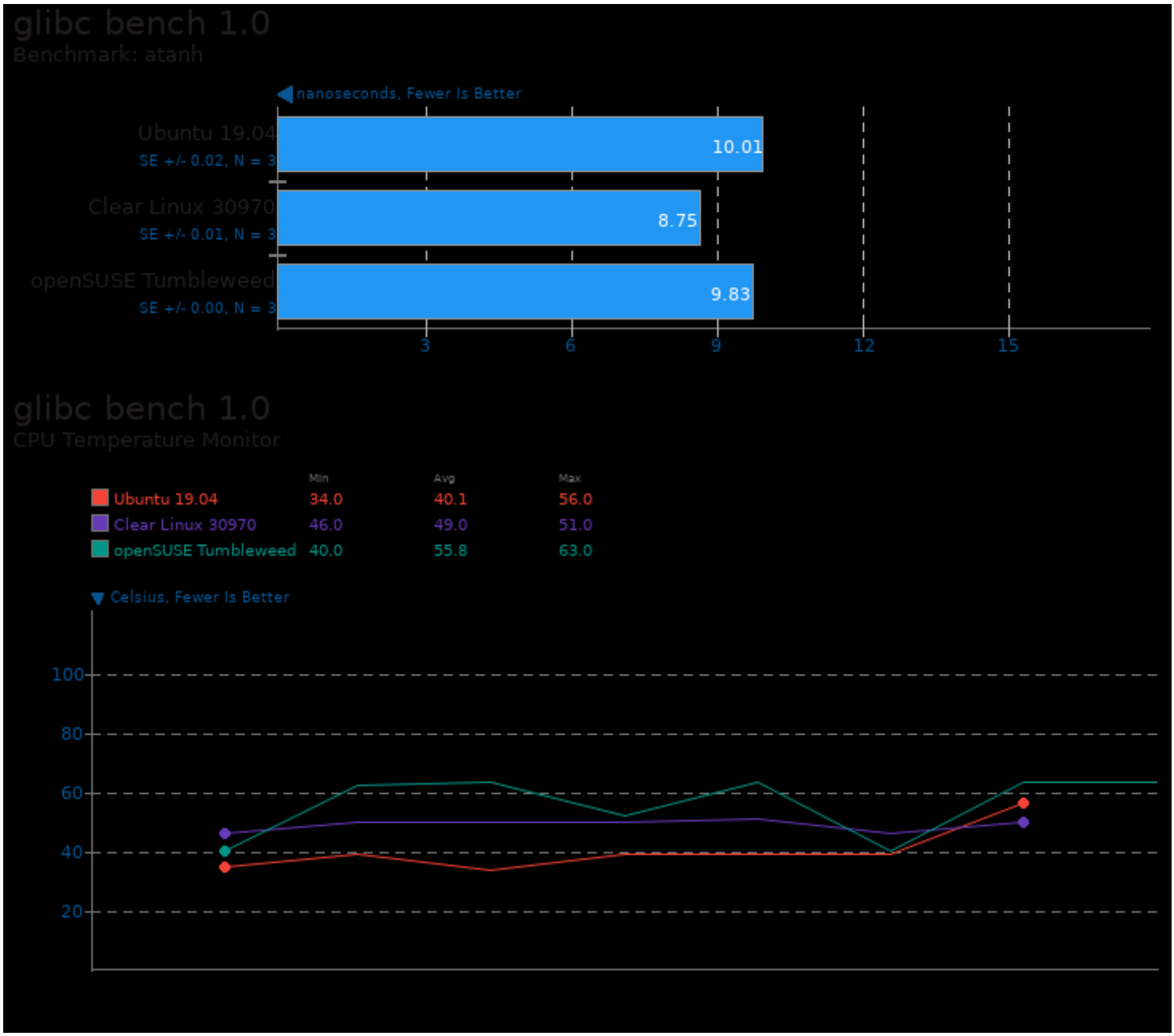

SVT-VP9 2019-09-09
1080p 8-bit YUV To VP9 Video Encode
Frames Per Second Per Watt, More Is Better
Ubuntu 19.04
2.08
Clear Linux 30970
3.53
openSUSE Tumbleweed
4.35
0.9788
1.9576
2.9364
3.9152
4.894
x265 3.1.2
H.265 1080p Video Encoding
Frames Per Second, More Is Better
Ubuntu 19.04
SE +/- 0.38, N = 3
55.33
Clear Linux 30970
SE +/- 0.58, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -fnuma
59.19
openSUSE Tumbleweed
SE +/- 0.32, N = 3
60.81
14
28
42
56
70
1. (CXX) g++ options: -O3 -rdynamic -lpthread -lrt -ldl
x265 3.1.2
H.265 1080p Video Encoding
Frames Per Second Per Watt, More Is Better
Ubuntu 19.04
0.58
Clear Linux 30970
0.46
openSUSE Tumbleweed
0.58
0.1305
0.261
0.3915
0.522
0.6525

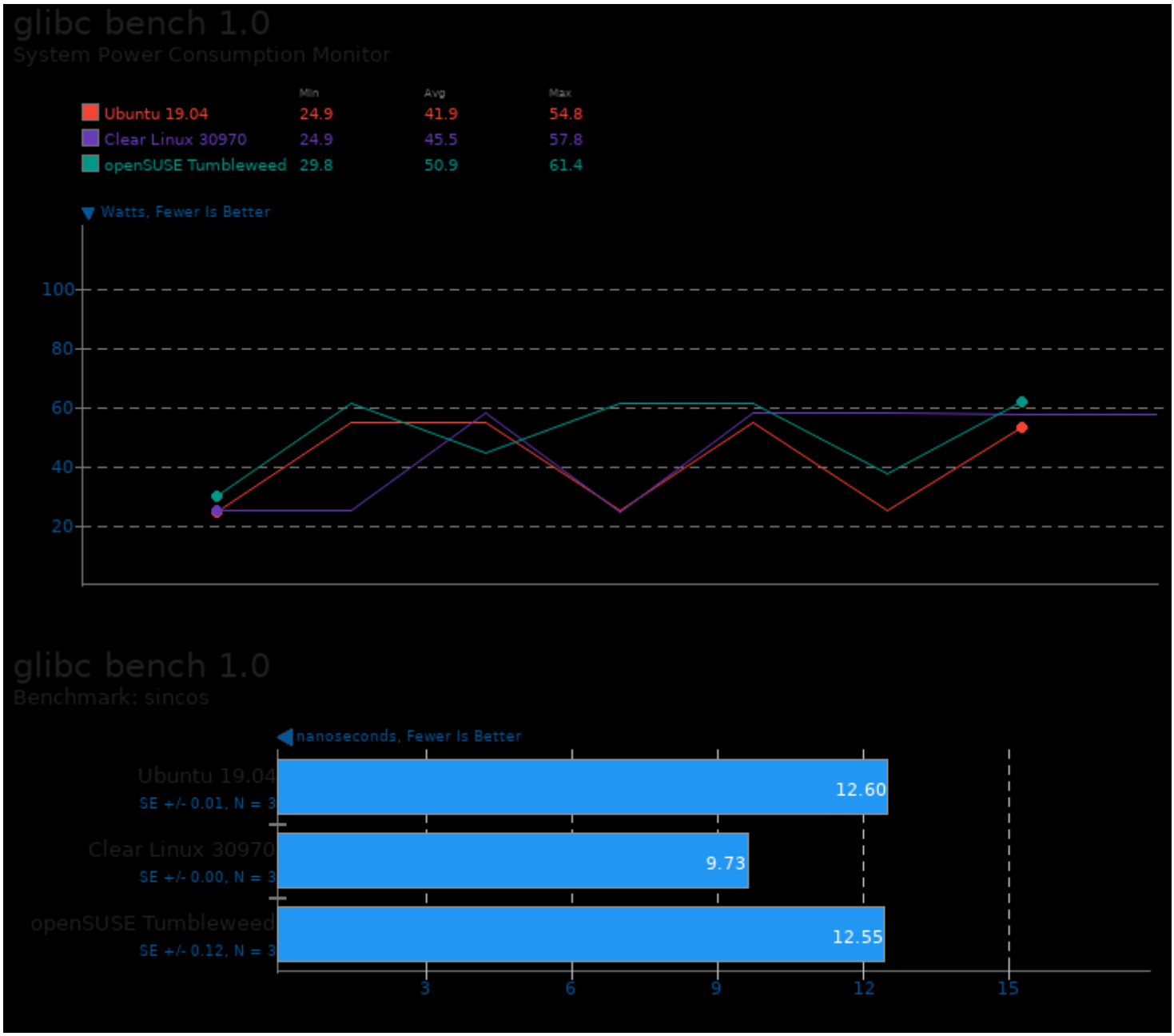

x265 3.1.2
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 33.0 46.4 54.0
Clear Linux 30970 47.0 68.1 82.0
openSUSE Tumbleweed 38.0 58.7 73.0
Celsius, Fewer Is Better
100
80
60
40
20
x265 3.1.2
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04 24.7 95.1 139.1
Clear Linux 30970 24.9 129.7 178.2
openSUSE Tumbleweed 29.7 105.0 184.7
Watts, Fewer Is Better
250
200
150
100
50

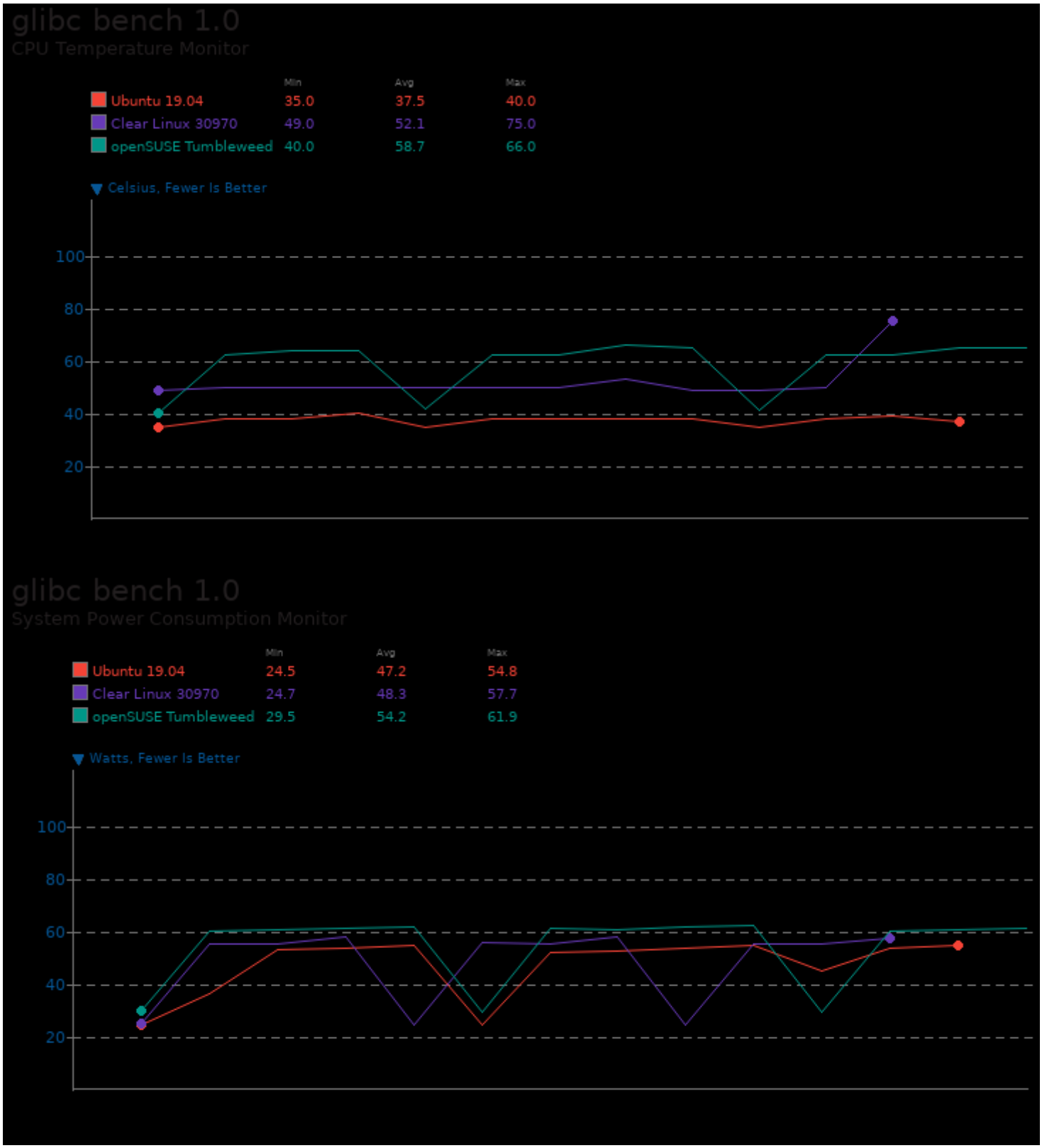

glibc bench 1.0
Benchmark: pthread_once
nanoseconds, Fewer Is Better
Ubuntu 19.04
SE +/- 0.00, N = 3
1.35
Clear Linux 30970
SE +/- 0.00, N = 3
1.34
openSUSE Tumbleweed
SE +/- 0.00, N = 12
1.35
0.3038
0.6076
0.9114
1.2152
1.519
glibc bench 1.0
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 34.0 38.1 40.0
Clear Linux 30970 49.0 51.1 53.0
openSUSE Tumbleweed 40.0 56.5 66.0
Celsius, Fewer Is Better
100
80
60
40
20


glibc bench 1.0
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04 24.7 45.6 55.9
Clear Linux 30970 25.0 49.5 59.2
openSUSE Tumbleweed 29.5 52.1 62.6
Watts, Fewer Is Better
100
80
60
40
20
glibc bench 1.0
Benchmark: asinh
nanoseconds, Fewer Is Better
Ubuntu 19.04
SE +/- 0.01, N = 3
8.17
Clear Linux 30970
SE +/- 0.01, N = 3
7.49
openSUSE Tumbleweed
SE +/- 0.00, N = 3
8.09
2
4
6
8
10

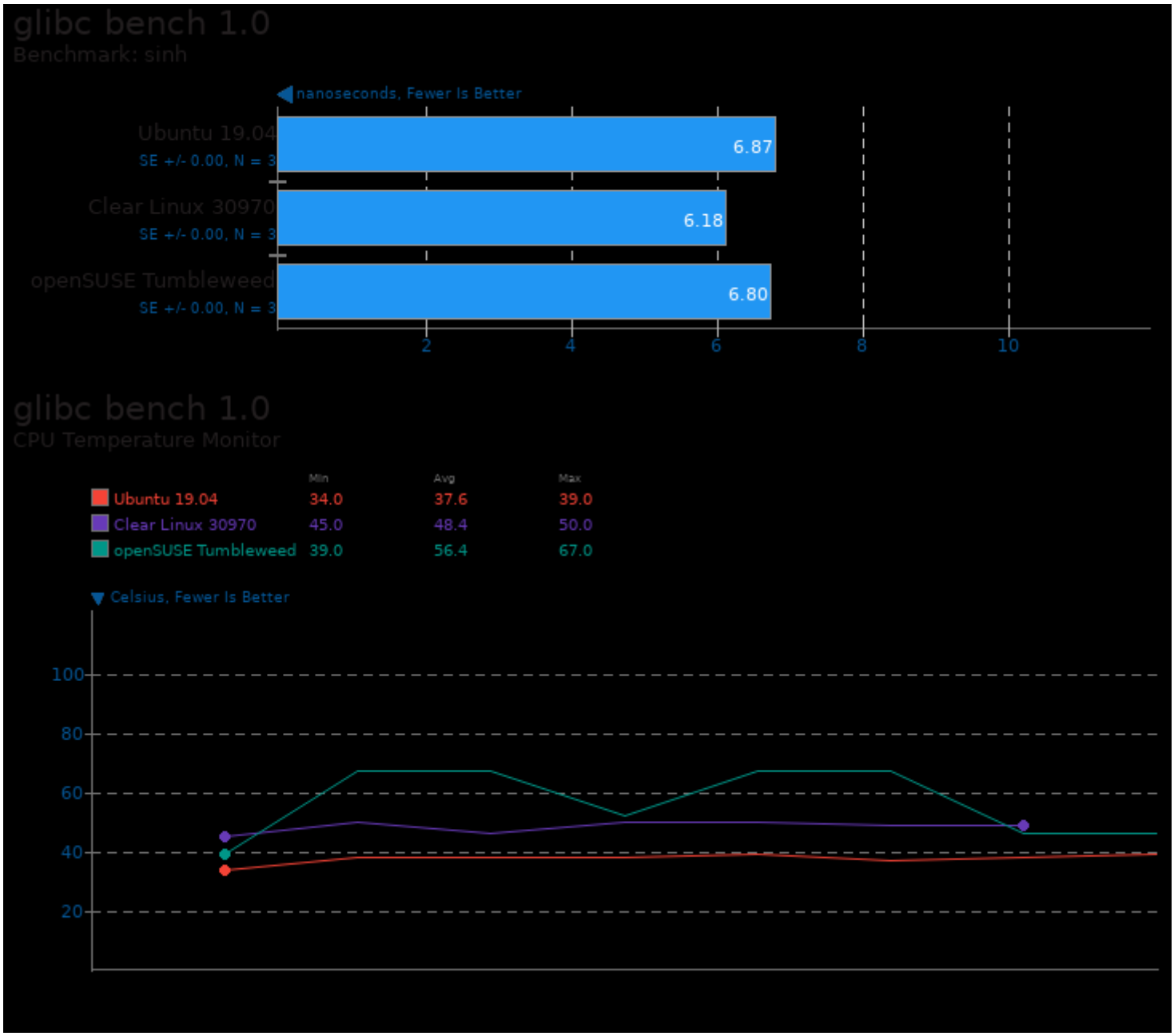

glibc bench 1.0
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04
34.0
37.3
40.0
Clear Linux 30970
47.0
53.3
71.0
openSUSE Tumbleweed
40.0
50.4
62.0
Celsius, Fewer Is Better
100
80
60
40
20
glibc bench 1.0
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04
25.0
45.8
54.6
Clear Linux 30970
24.9
43.7
57.9
openSUSE Tumbleweed
29.5
49.2
60.9
Watts, Fewer Is Better
100
80
60
40
20

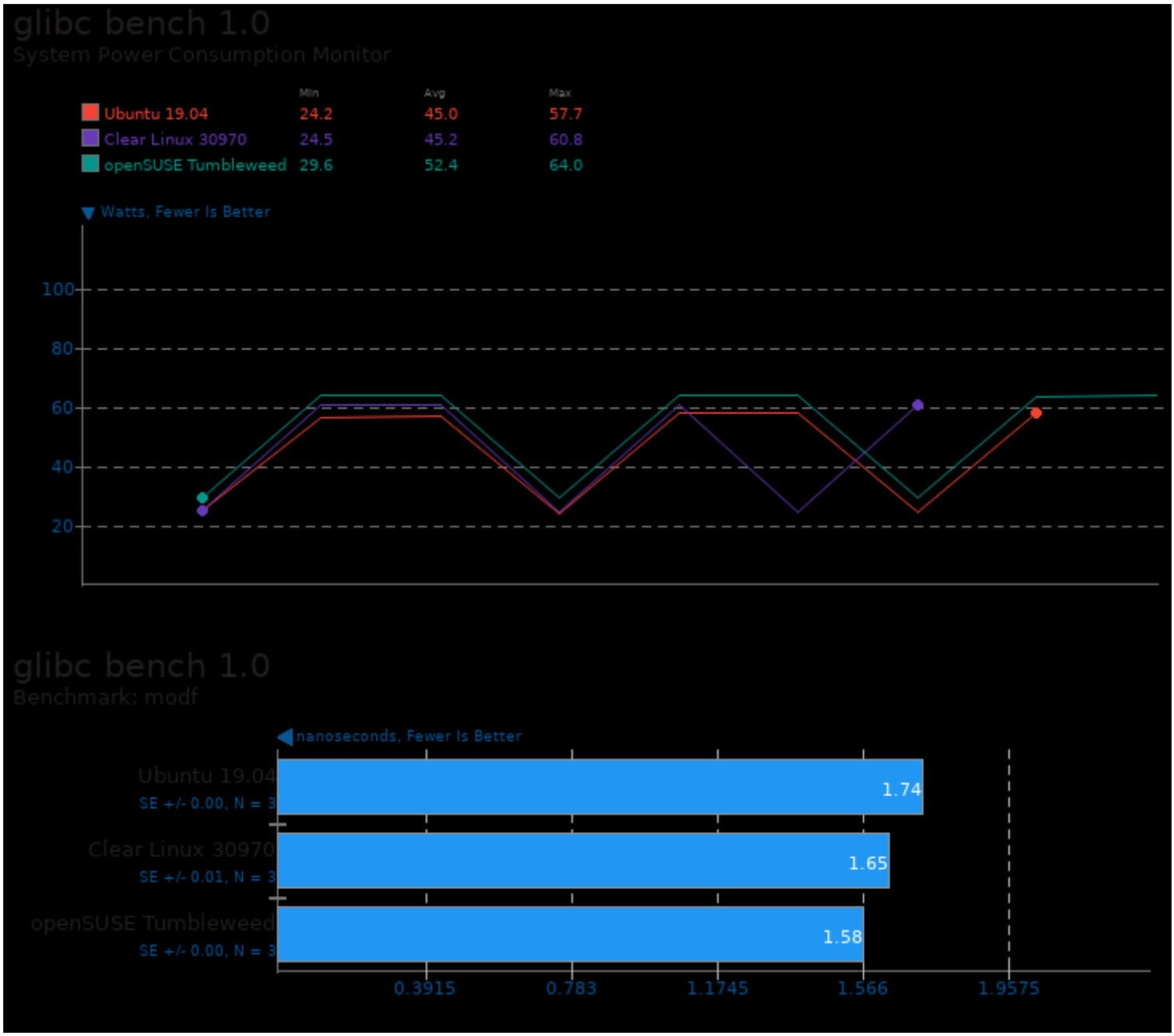

glibc bench 1.0
Benchmark: atanh
nanoseconds, Fewer Is Better
Ubuntu 19.04
SE +/- 0.02, N = 3
10.01
Clear Linux 30970
SE +/- 0.01, N = 3
8.75
openSUSE Tumbleweed
SE +/- 0.00, N = 3
9.83
3
6
9
12
15
glibc bench 1.0
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 34.0 40.1 56.0
Clear Linux 30970 46.0 49.0 51.0
openSUSE Tumbleweed 40.0 55.8 63.0
Celsius, Fewer Is Better
100
80
60
40
20

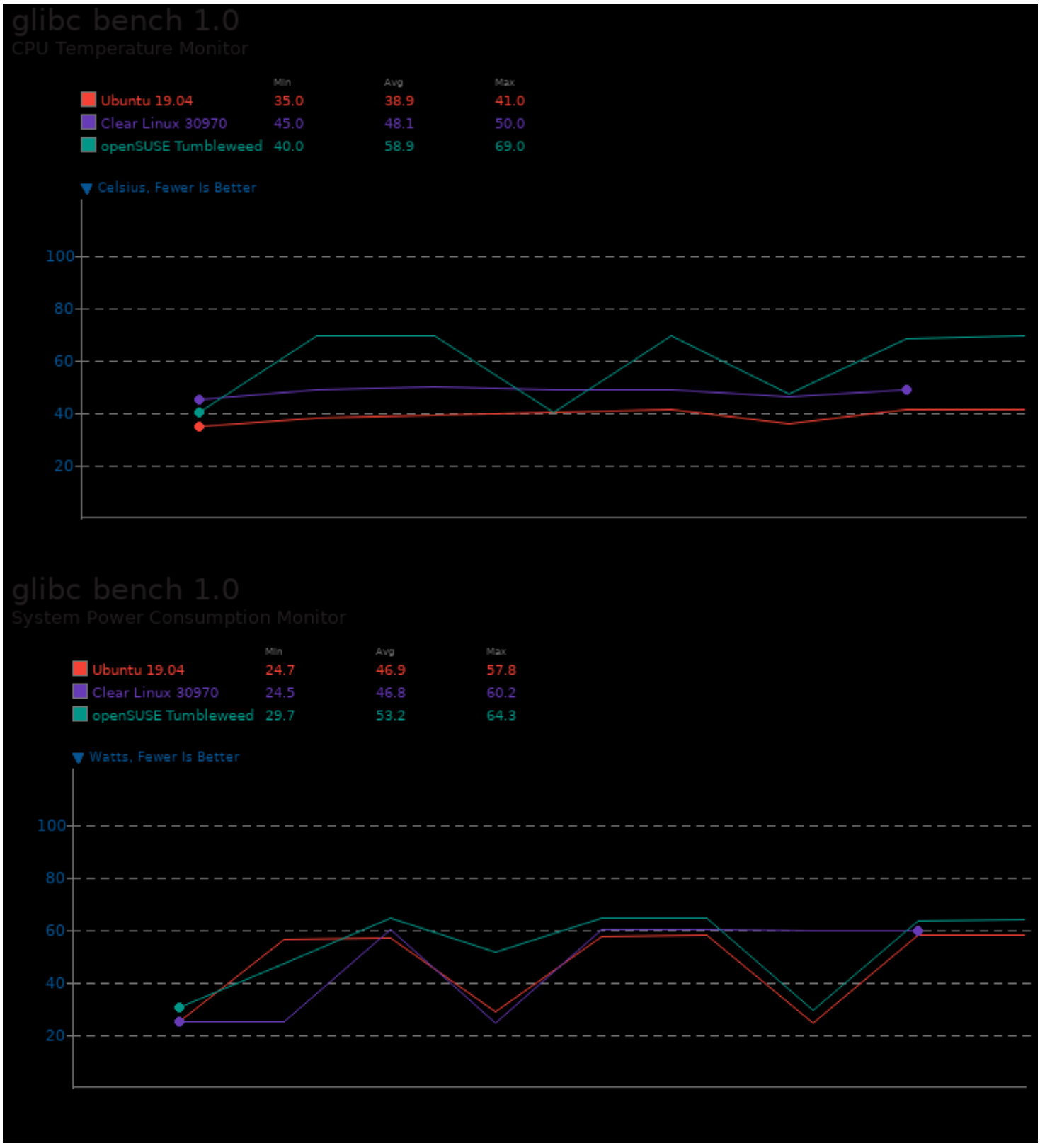

glibc bench 1.0
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04 24.9 41.9 54.8
Clear Linux 30970 24.9 45.5 57.8
openSUSE Tumbleweed 29.8 50.9 61.4
Watts, Fewer Is Better
100
80
60
40
20
glibc bench 1.0
Benchmark: sincos
nanoseconds, Fewer Is Better
Ubuntu 19.04
SE +/- 0.01, N = 3
12.60
Clear Linux 30970
SE +/- 0.00, N = 3
9.73
openSUSE Tumbleweed
SE +/- 0.12, N = 3
12.55
3
6
9
12
15

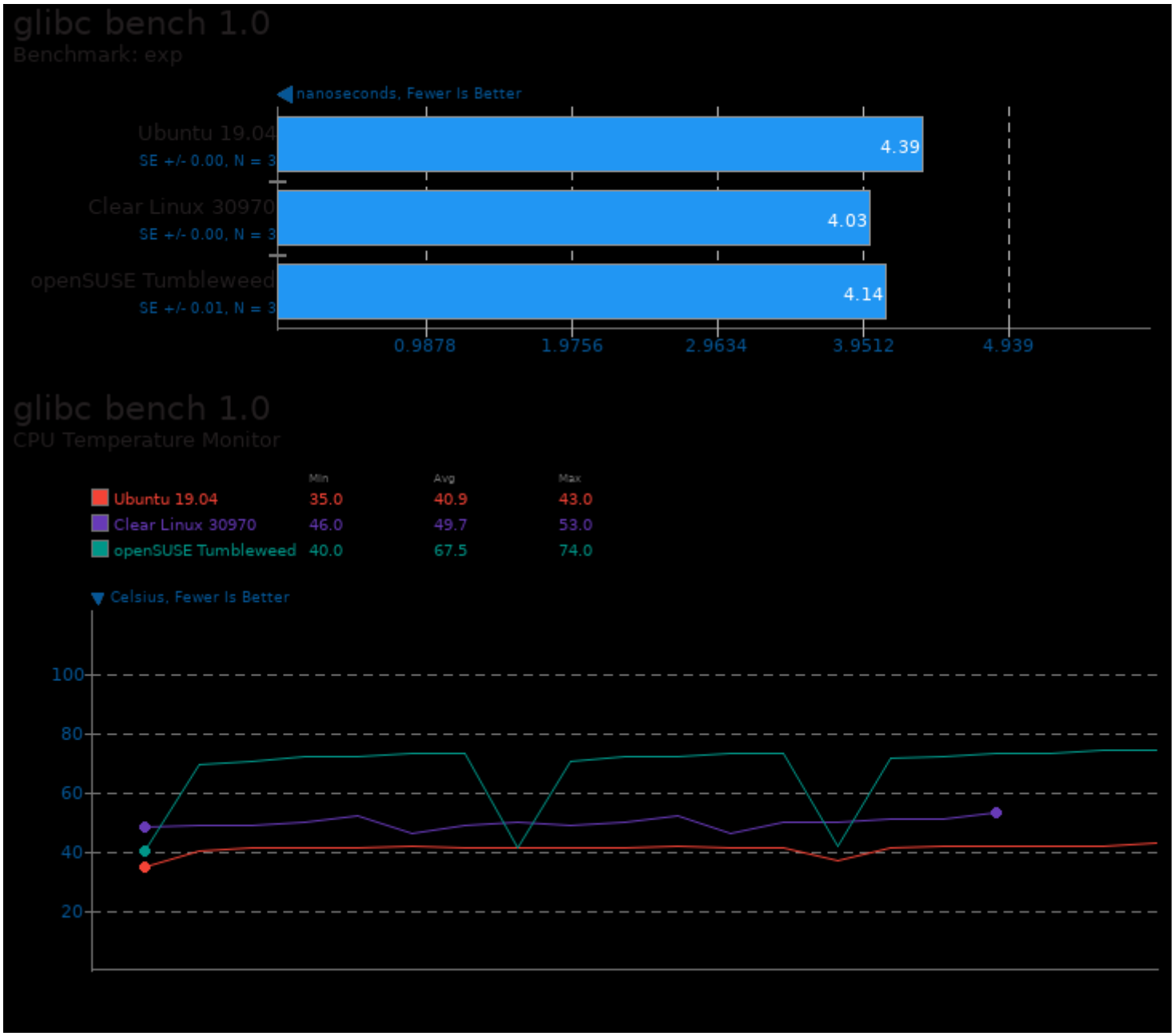

glibc bench 1.0
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 35.0 37.5 40.0
Clear Linux 30970 49.0 52.1 75.0
openSUSE Tumbleweed 40.0 58.7 66.0
Celsius, Fewer Is Better
100
80
60
40
20

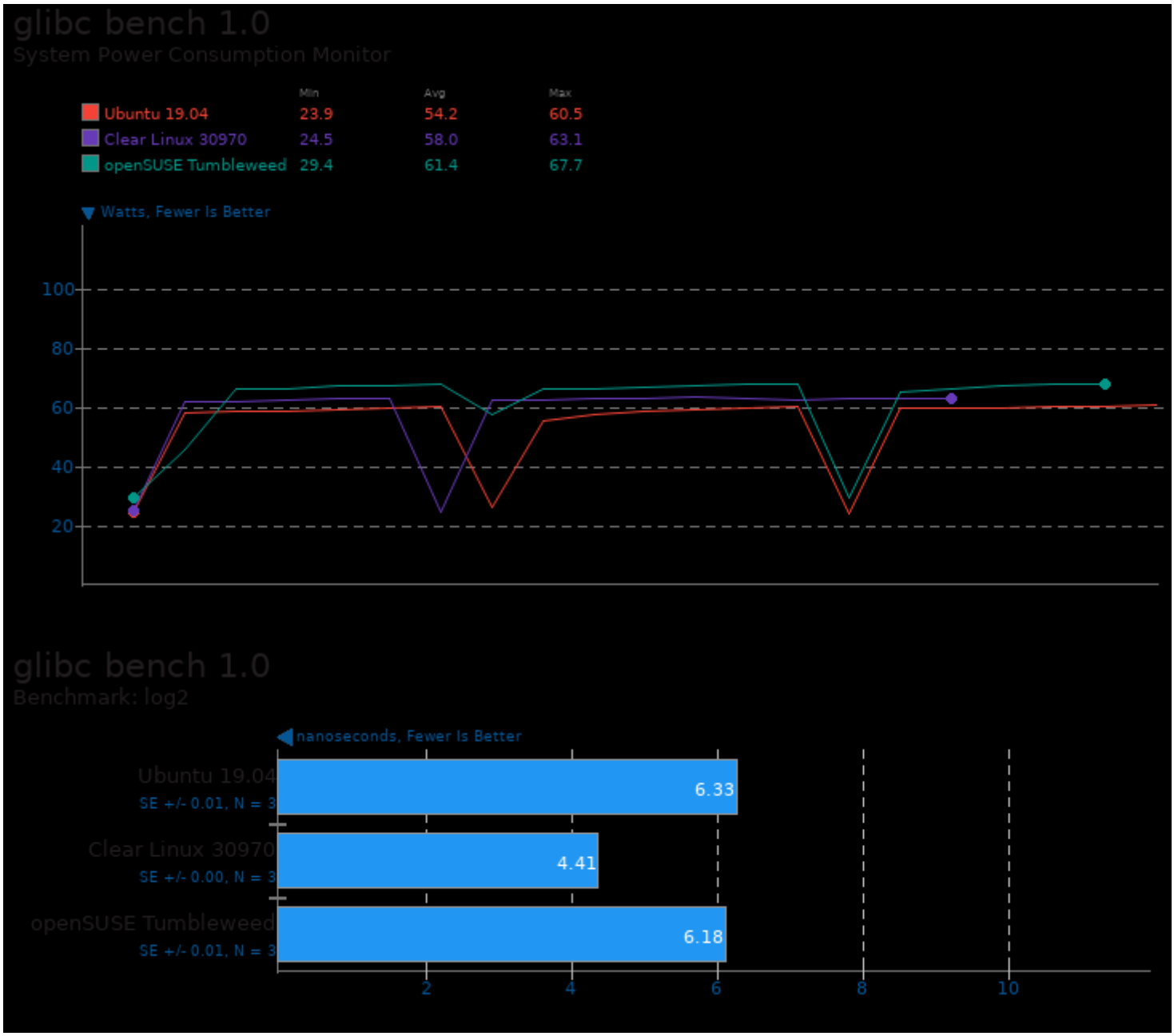
glibc bench 1.0
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04 24.5 47.2 54.8
Clear Linux 30970 24.7 48.3 57.7
openSUSE Tumbleweed 29.5 54.2 61.9
Watts, Fewer Is Better
100
80
60
40
20

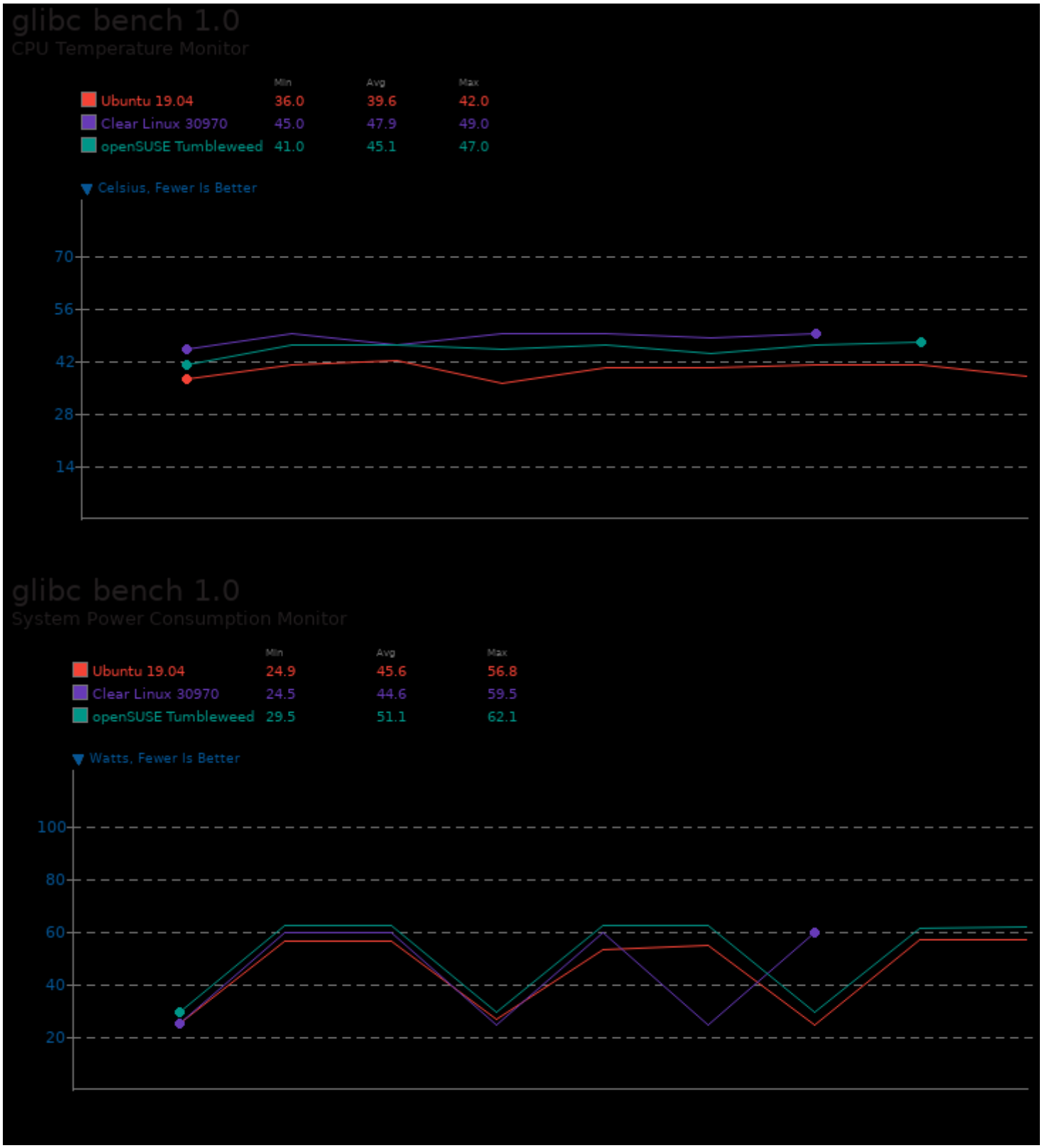

glibc bench 1.0
Benchmark: sinh
nanoseconds, Fewer Is Better
Ubuntu 19.04
SE +/- 0.00, N = 3
6.87
Clear Linux 30970
SE +/- 0.00, N = 3
6.18
openSUSE Tumbleweed
SE +/- 0.00, N = 3
6.80
2
4
6
8
10
glibc bench 1.0
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 34.0 37.6 39.0
Clear Linux 30970 45.0 48.4 50.0
openSUSE Tumbleweed 39.0 56.4 67.0
Celsius, Fewer Is Better
100
80
60
40
20

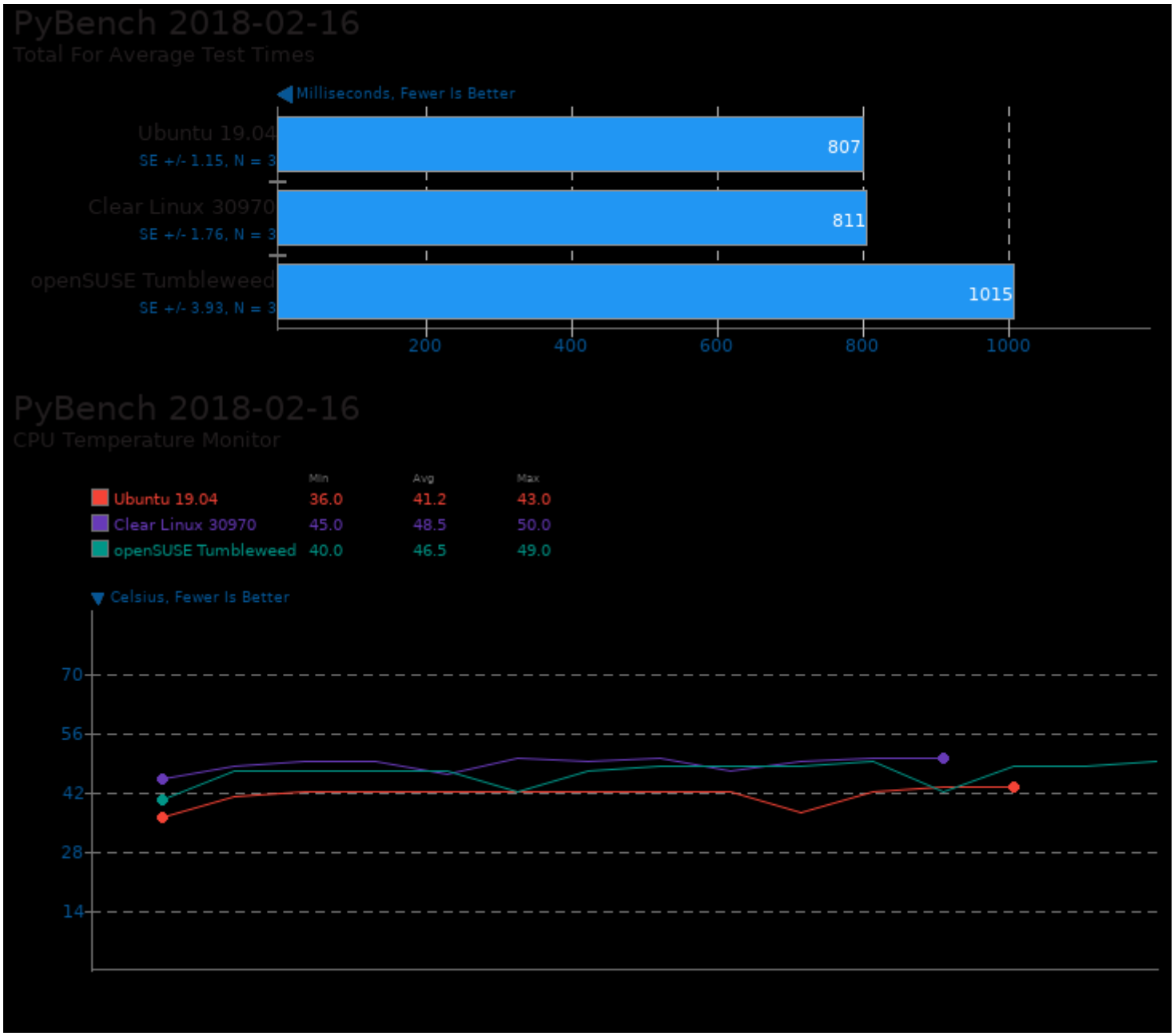

glibc bench 1.0
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04 24.2 45.0 57.7
Clear Linux 30970 24.5 45.2 60.8
openSUSE Tumbleweed 29.6 52.4 64.0
Watts, Fewer Is Better
100
80
60
40
20
glibc bench 1.0
Benchmark: modf
nanoseconds, Fewer Is Better
Ubuntu 19.04
SE +/- 0.00, N = 3
1.74
Clear Linux 30970
SE +/- 0.01, N = 3
1.65
openSUSE Tumbleweed
SE +/- 0.00, N = 3
1.58
0.3915
0.783
1.1745
1.566
1.9575

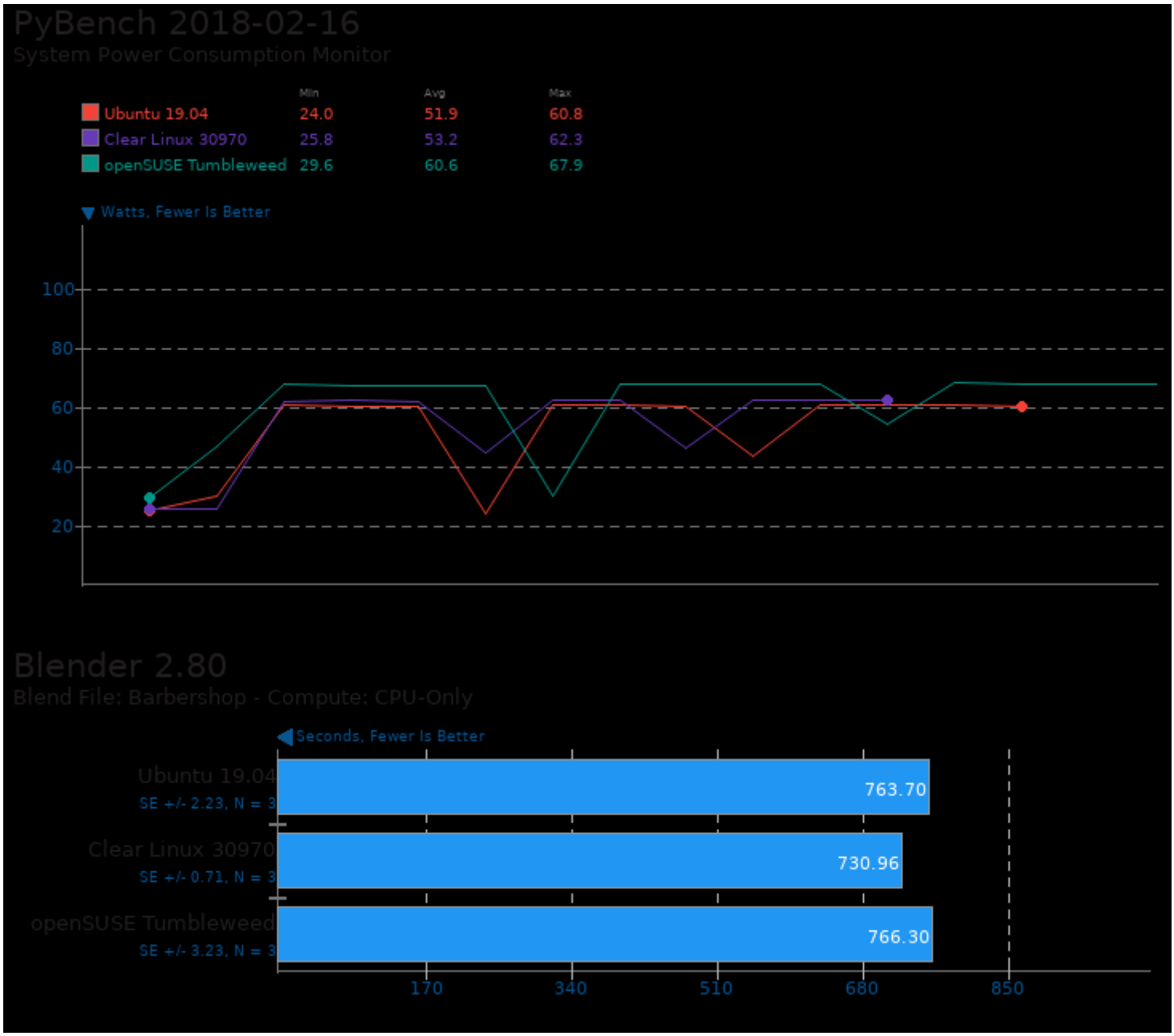

glibc bench 1.0
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 35.0 38.9 41.0
Clear Linux 30970 45.0 48.1 50.0
openSUSE Tumbleweed 40.0 58.9 69.0
Celsius, Fewer Is Better
100
80
60
40
20
glibc bench 1.0
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04 24.7 46.9 57.8
Clear Linux 30970 24.5 46.8 60.2
openSUSE Tumbleweed 29.7 53.2 64.3
Watts, Fewer Is Better
100
80
60
40
20

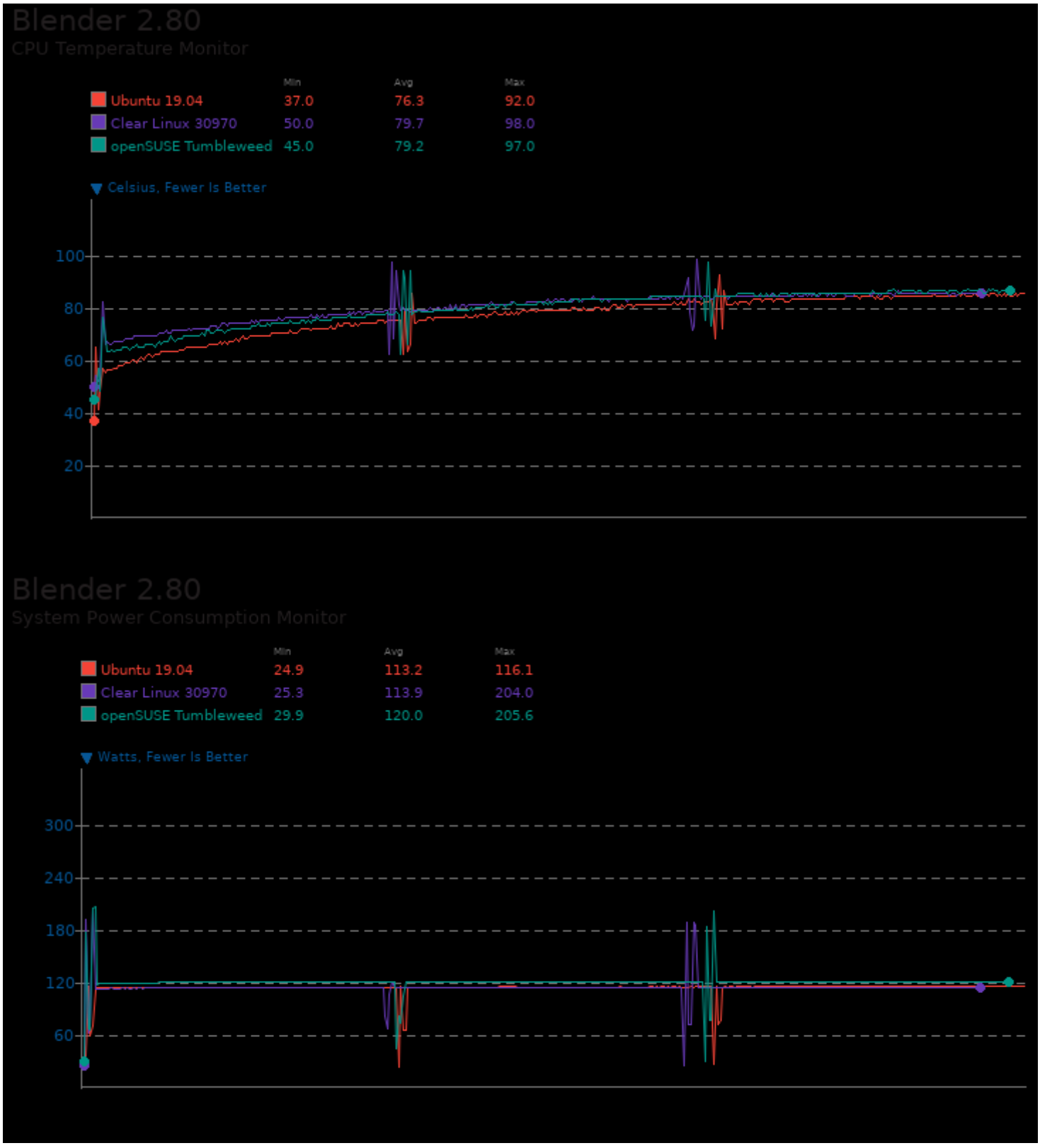

glibc bench 1.0
Benchmark: exp
nanoseconds, Fewer Is Better
Ubuntu 19.04
SE +/- 0.00, N = 3
4.39
Clear Linux 30970
SE +/- 0.00, N = 3
4.03
openSUSE Tumbleweed
SE +/- 0.01, N = 3
4.14
0.9878
1.9756
2.9634
3.9512
4.939
glibc bench 1.0
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 35.0 40.9 43.0
Clear Linux 30970 46.0 49.7 53.0
openSUSE Tumbleweed 40.0 67.5 74.0
Celsius, Fewer Is Better
100
80
60
40
20

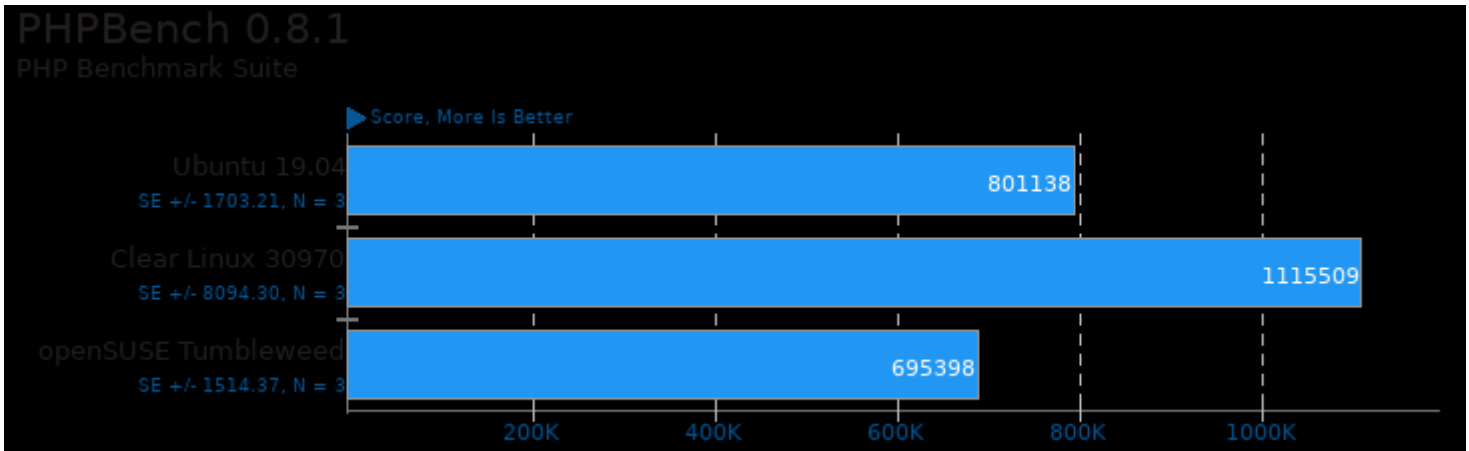

glibc bench 1.0
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04 23.9 54.2 60.5
Clear Linux 30970 24.5 58.0 63.1
openSUSE Tumbleweed 29.4 61.4 67.7
Watts, Fewer Is Better
100
80
60
40
20
glibc bench 1.0
Benchmark: log2
nanoseconds, Fewer Is Better
Ubuntu 19.04
SE +/- 0.01, N = 3
6.33
Clear Linux 30970
SE +/- 0.00, N = 3
4.41
openSUSE Tumbleweed
SE +/- 0.01, N = 3
6.18
2
4
6
8
10

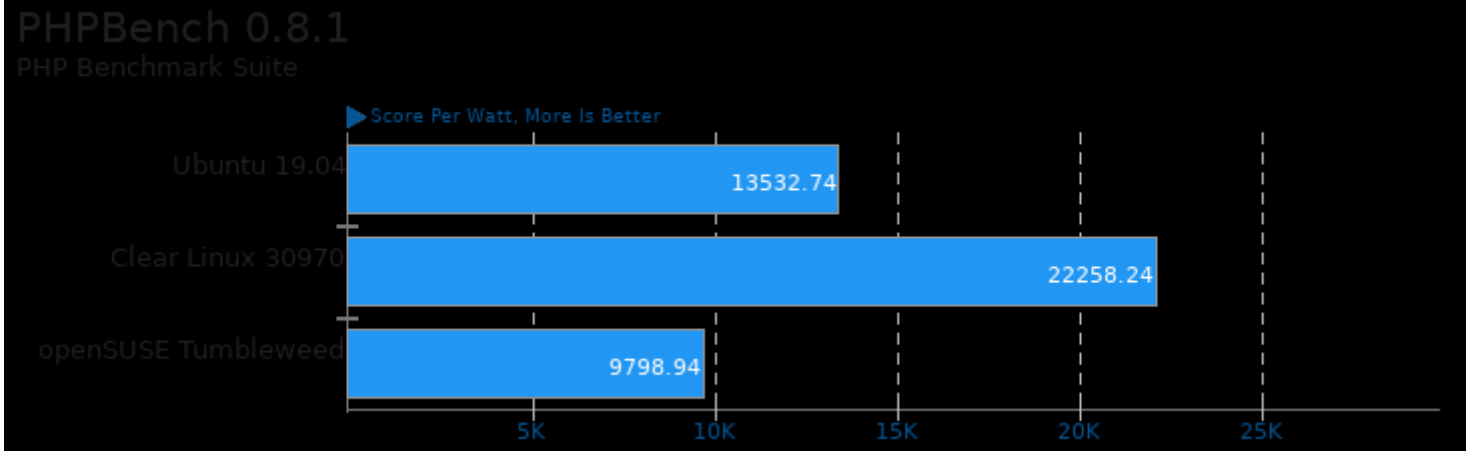

glibc bench 1.0
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 36.0 39.6 42.0
Clear Linux 30970 45.0 47.9 49.0
openSUSE Tumbleweed 41.0 45.1 47.0
Celsius, Fewer Is Better
70
56
42
28
14
glibc bench 1.0
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04 24.9 45.6 56.8
Clear Linux 30970 24.5 44.6 59.5
openSUSE Tumbleweed 29.5 51.1 62.1
Watts, Fewer Is Better
100
80
60
40
20

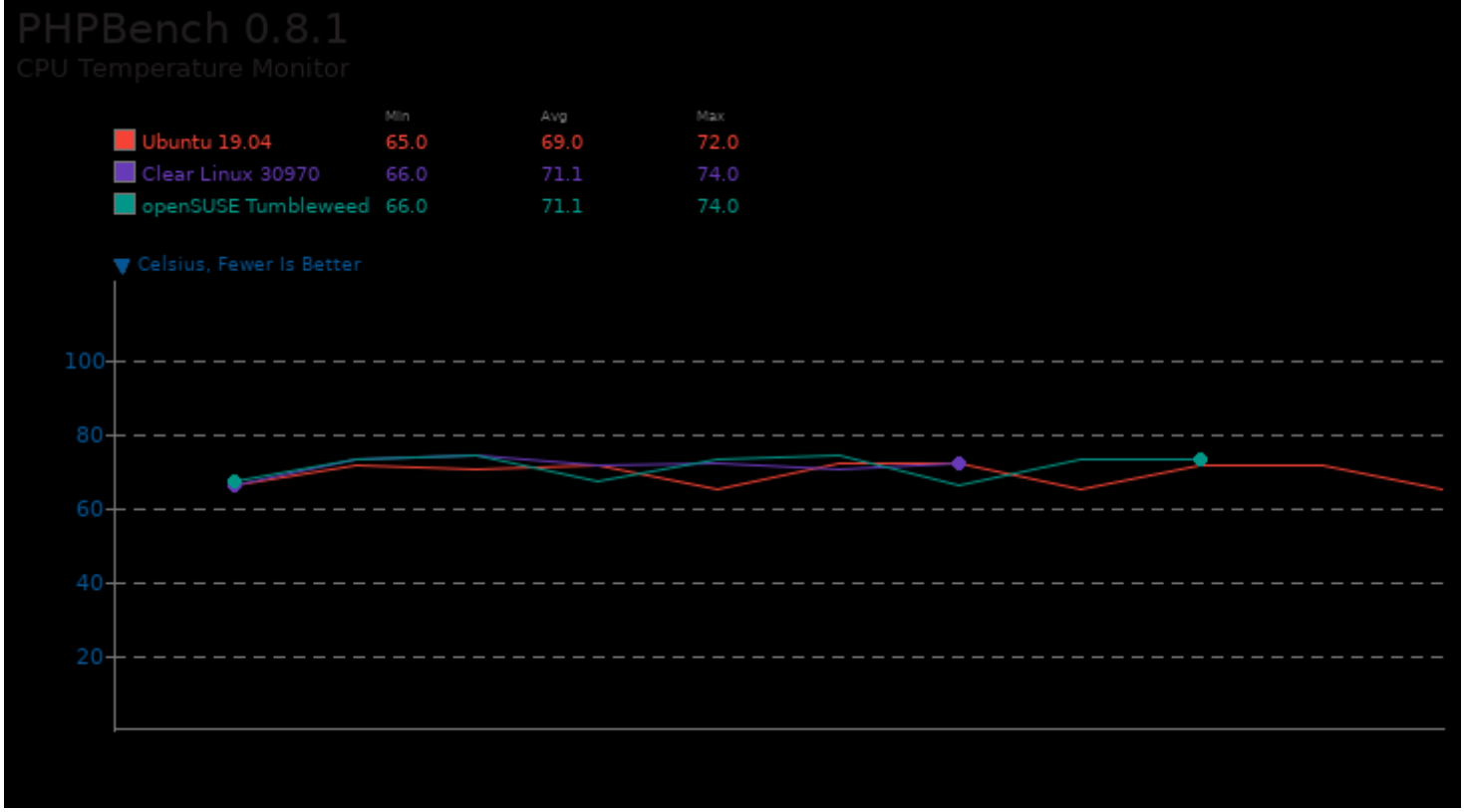

PyBench 2018-02-16
Total For Average Test Times
Milliseconds, Fewer Is Better
Ubuntu 19.04
SE +/- 1.15, N = 3
807
Clear Linux 30970
SE +/- 1.76, N = 3
811
openSUSE Tumbleweed
SE +/- 3.93, N = 3
1015
200
400
600
800
1000
PyBench 2018-02-16
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 36.0 41.2 43.0
Clear Linux 30970 45.0 48.5 50.0
openSUSE Tumbleweed 40.0 46.5 49.0
Celsius, Fewer Is Better
70
56
42
28
14

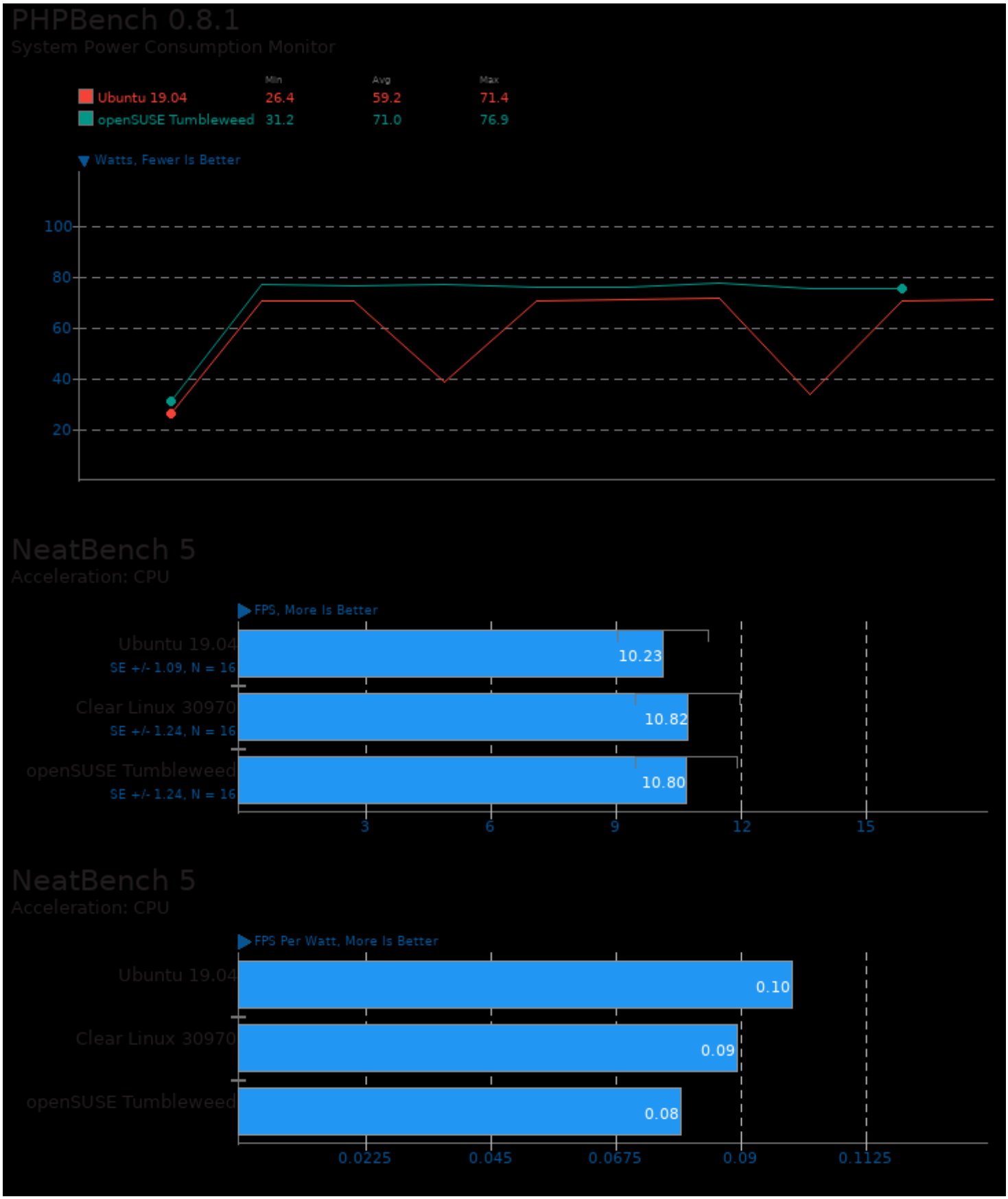

PyBench 2018-02-16
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04 24.0 51.9 60.8
Clear Linux 30970 25.8 53.2 62.3
openSUSE Tumbleweed 29.6 60.6 67.9
Watts, Fewer Is Better
100
80
60
40
20
Blender 2.80
Blend File: Barbershop - Compute: CPU-Only
Seconds, Fewer Is Better
Ubuntu 19.04
SE +/- 2.23, N = 3
763.70
Clear Linux 30970
SE +/- 0.71, N = 3
730.96
openSUSE Tumbleweed
SE +/- 3.23, N = 3
766.30
170
340
510
680
850

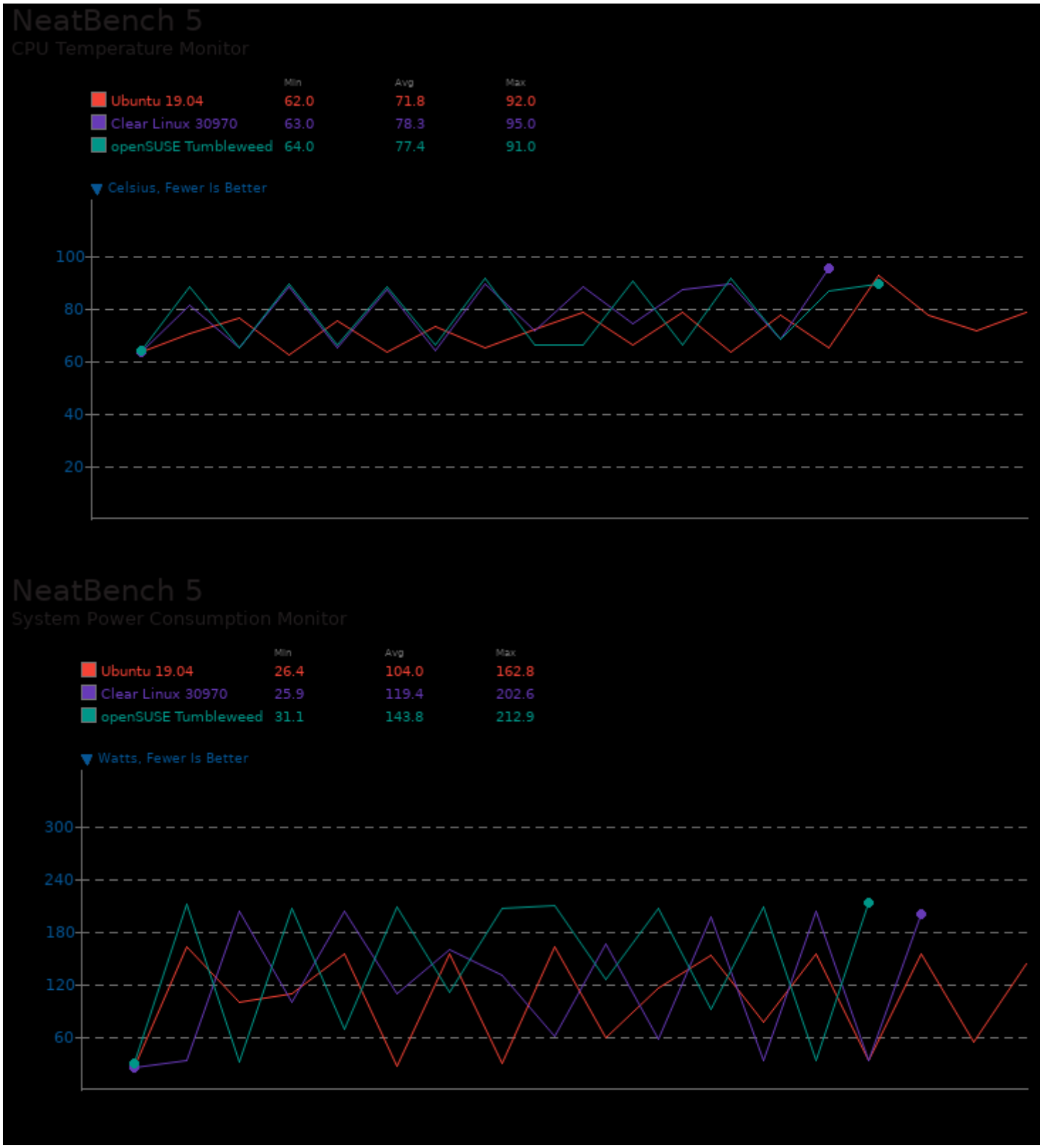

Blender 2.80
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 37.0 76.3 92.0
Clear Linux 30970 50.0 79.7 98.0
openSUSE Tumbleweed 45.0 79.2 97.0
Celsius, Fewer Is Better
100
80
60
40
20
Blender 2.80
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04 24.9 113.2 116.1
Clear Linux 30970 25.3 113.9 204.0
openSUSE Tumbleweed 29.9 120.0 205.6
Watts, Fewer Is Better
300
240
180
120
60

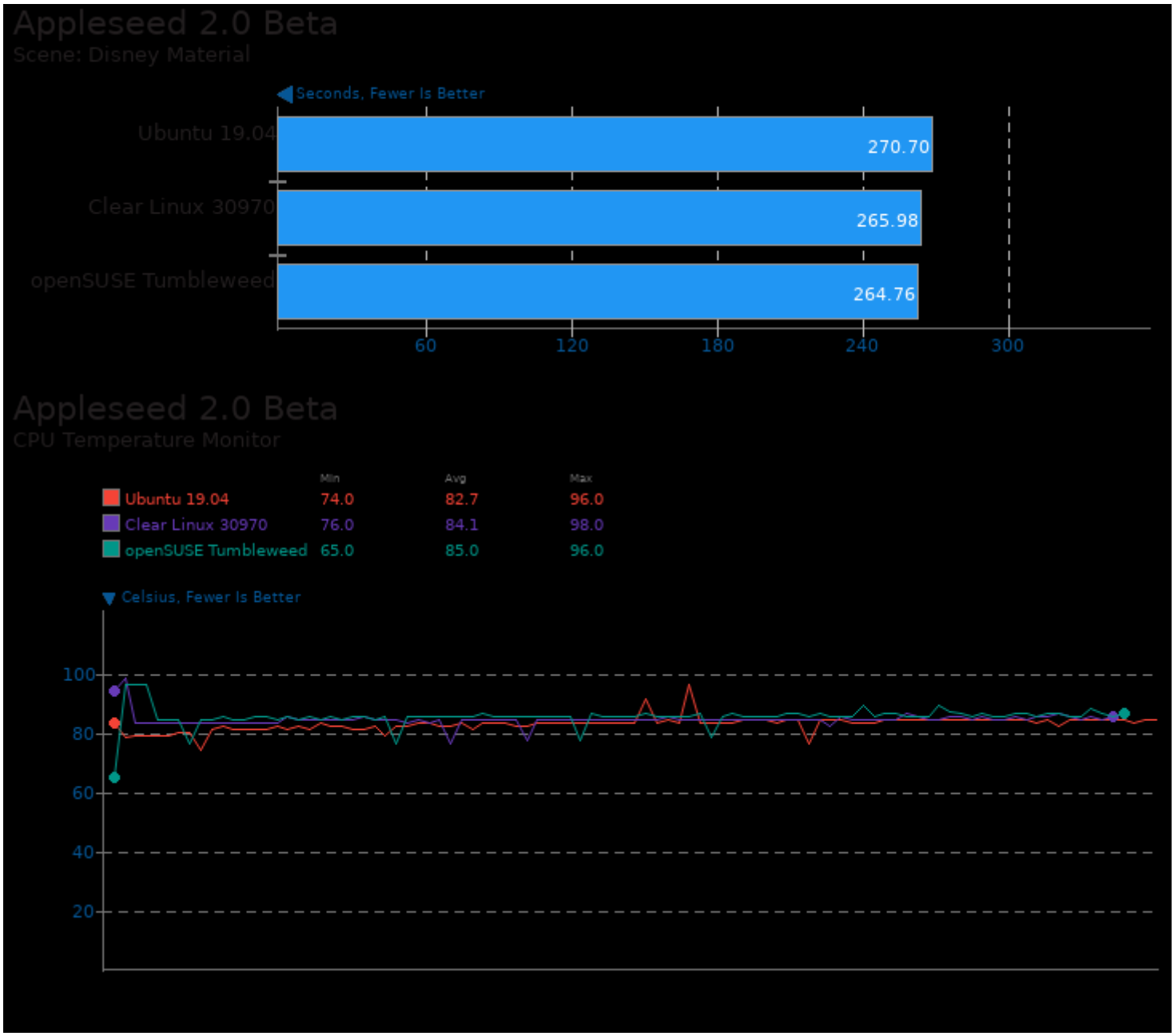

PHPBench 0.8.1
PHP Benchmark Suite
Score, More Is Better
Ubuntu 19.04
SE +/- 1703.21, N = 3
801138
Clear Linux 30970
SE +/- 8094.30, N = 3
1115509
openSUSE Tumbleweed
SE +/- 1514.37, N = 3
695398
200K
400K
600K
800K
1000K

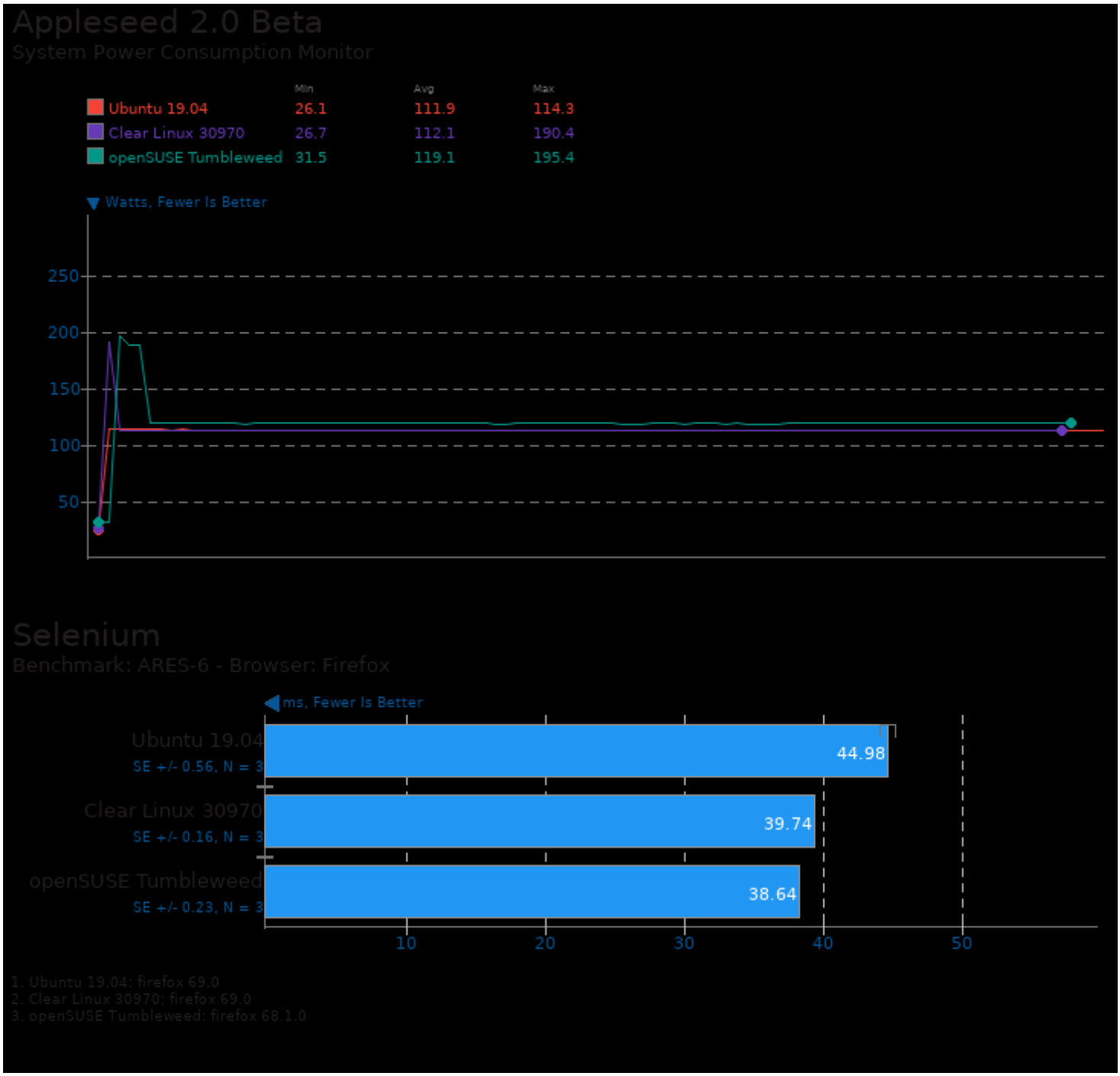

PHPBench 0.8.1
PHP Benchmark Suite
Score Per Watt, More Is Better
Ubuntu 19.04
13532.74
Clear Linux 30970
22258.24
openSUSE Tumbleweed
9798.94
5K
10K
15K
20K
25K

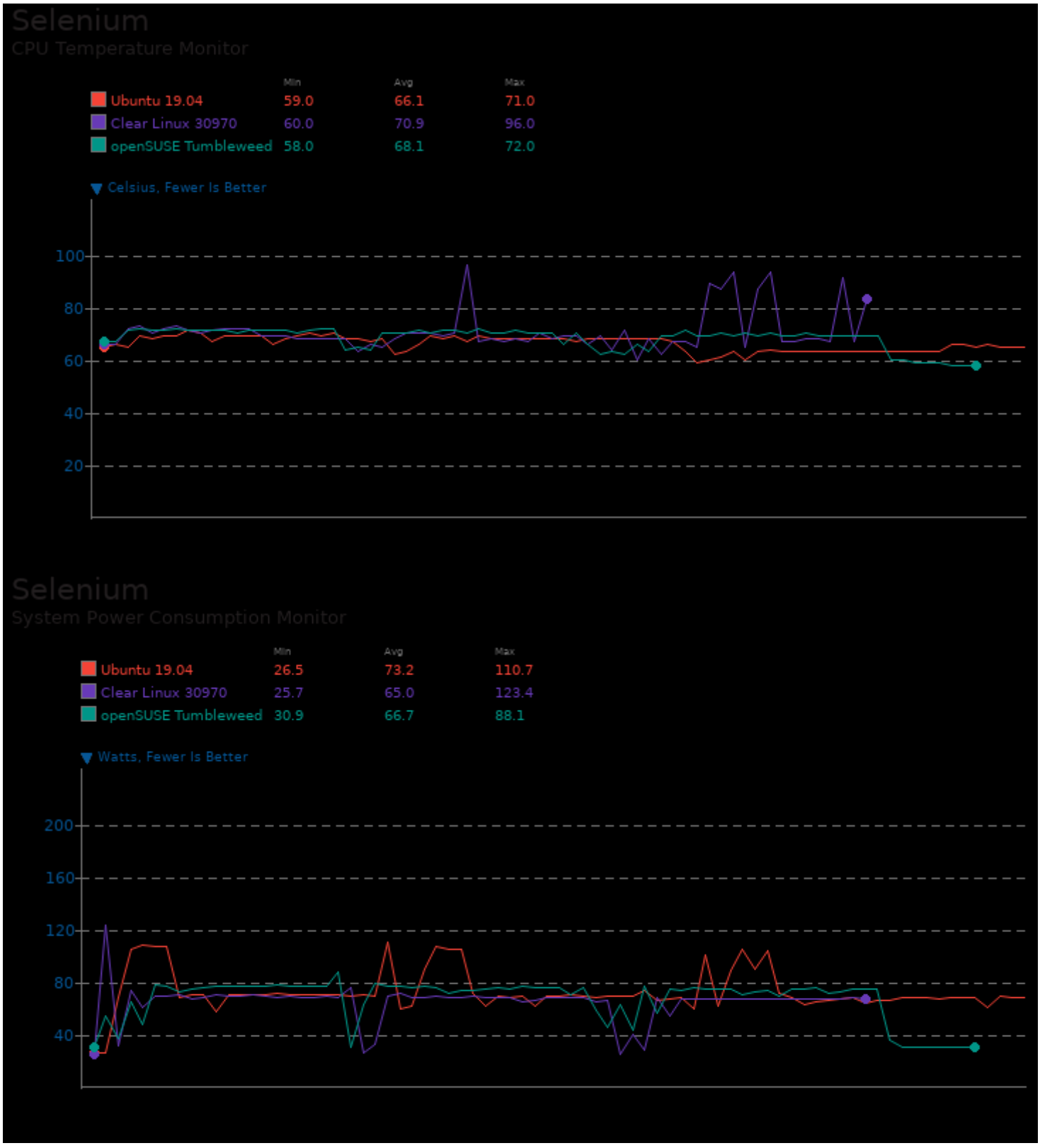

PHPBench 0.8.1
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 65.0 69.0 72.0
Clear Linux 30970 66.0 71.1 74.0
openSUSE Tumbleweed 66.0 71.1 74.0
Celsius, Fewer Is Better
100
80
60
40
20

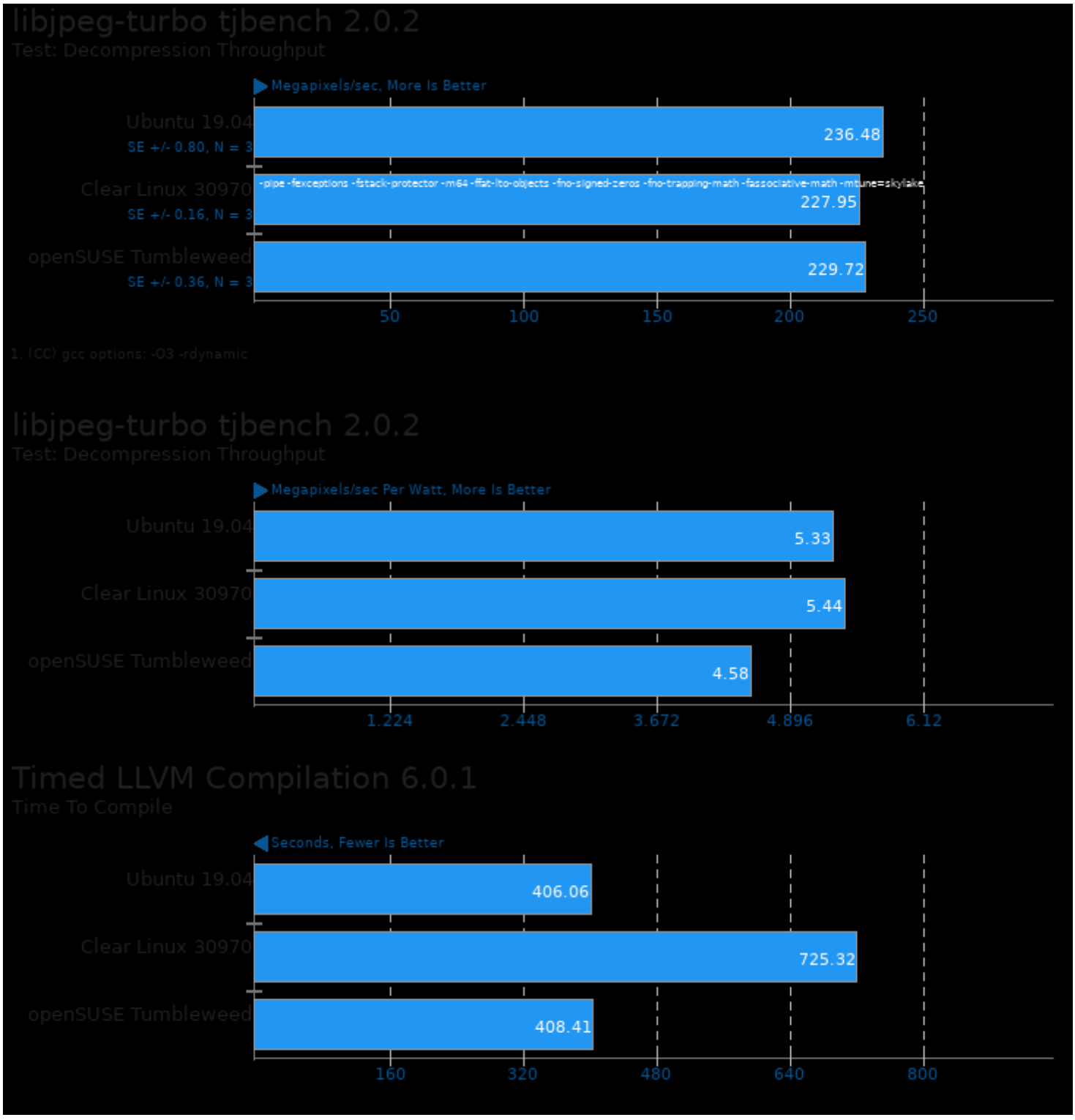

PHPBench 0.8.1
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04
26.4
59.2
71.4
openSUSE Tumbleweed
31.2
71.0
76.9
Watts, Fewer Is Better
100
80
60
40
20
NeatBench 5
Acceleration: CPU
FPS, More Is Better
Ubuntu 19.04
SE +/- 1.09, N = 16
10.23
Clear Linux 30970
SE +/- 1.24, N = 16
10.82
openSUSE Tumbleweed
SE +/- 1.24, N = 16
10.80
3
6
9
12
15
NeatBench 5
Acceleration: CPU
FPS Per Watt, More Is Better
Ubuntu 19.04
0.10
Clear Linux 30970
0.09
openSUSE Tumbleweed
0.08
0.0225
0.045
0.0675
0.09
0.1125

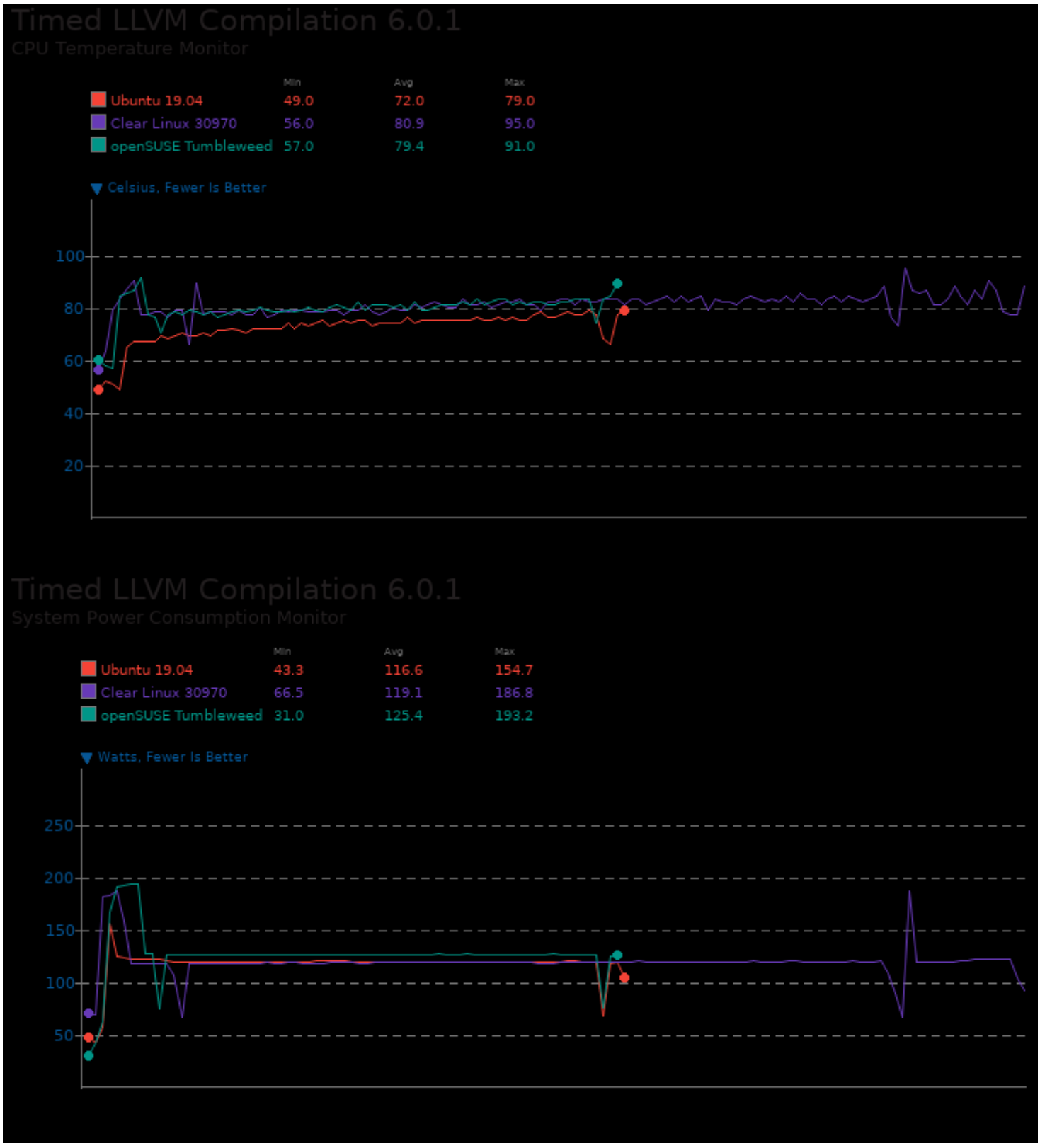

NeatBench 5
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 62.0 71.8 92.0
Clear Linux 30970 63.0 78.3 95.0
openSUSE Tumbleweed 64.0 77.4 91.0
Celsius, Fewer Is Better
100
80
60
40
20
NeatBench 5
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04 26.4 104.0 162.8
Clear Linux 30970 25.9 119.4 202.6
openSUSE Tumbleweed 31.1 143.8 212.9
Watts, Fewer Is Better
300
240
180
120
60

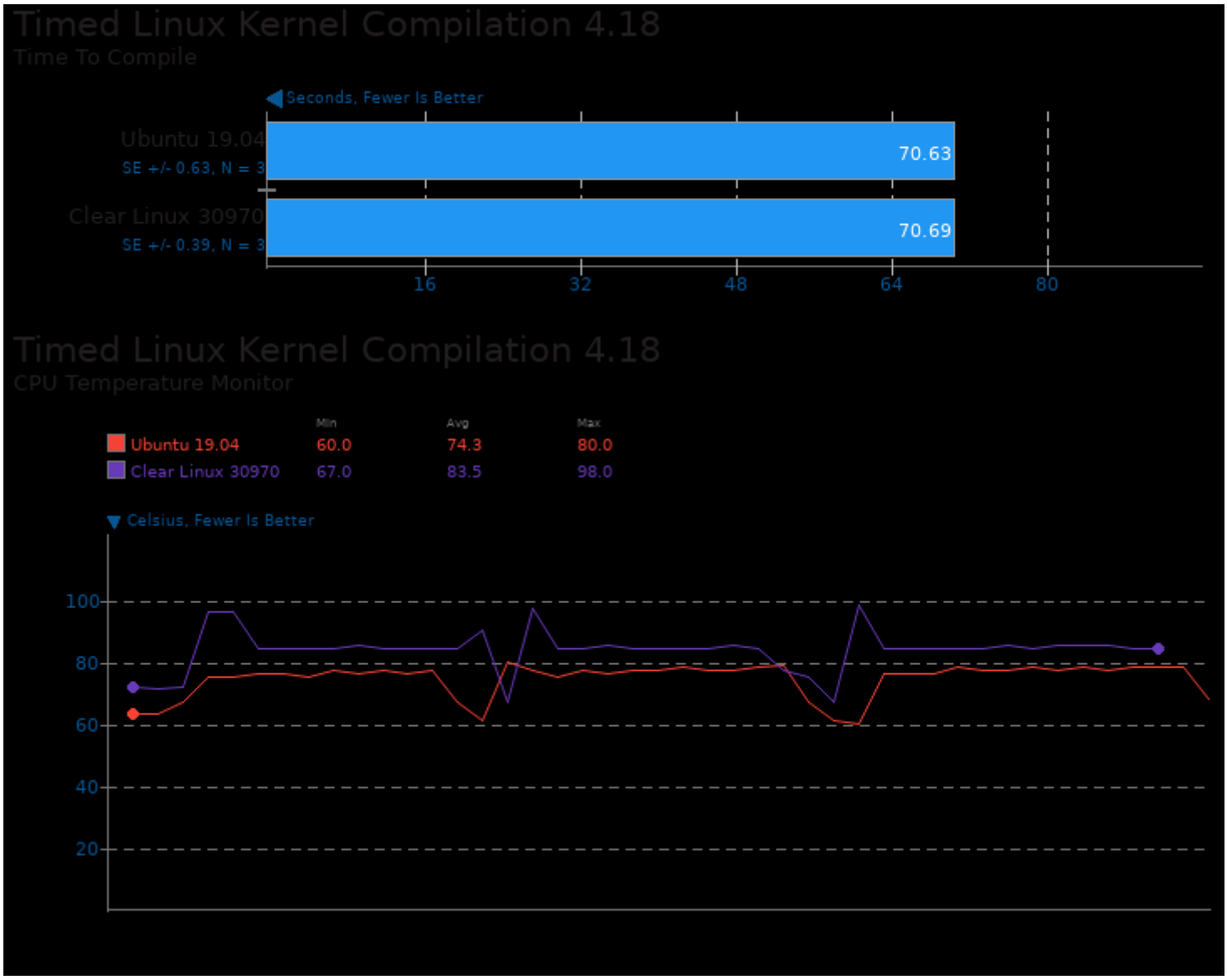

Appleseed 2.0 Beta
Scene: Disney Material
Seconds, Fewer Is Better
Ubuntu 19.04
Clear Linux 30970
openSUSE Tumbleweed
270.70
265.98
264.76
60
120
180
240
300
Appleseed 2.0 Beta
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 74.0 82.7 96.0
Clear Linux 30970 76.0 84.1 98.0
openSUSE Tumbleweed 65.0 85.0 96.0
Celsius, Fewer Is Better
100
80
60
40
20


Appleseed 2.0 Beta
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04 26.1 111.9 114.3
Clear Linux 30970 26.7 112.1 190.4
openSUSE Tumbleweed 31.5 119.1 195.4
Watts, Fewer Is Better
250
200
150
100
50
Selenium
Benchmark: ARES-6 - Browser: Firefox
ms, Fewer Is Better
Ubuntu 19.04
SE +/- 0.56, N = 3
44.98
Clear Linux 30970
SE +/- 0.16, N = 3
39.74
openSUSE Tumbleweed
SE +/- 0.23, N = 3
38.64
10
20
30
40
50
1. Ubuntu 19.04: firefox 69.0
2. Clear Linux 30970: firefox 69.0
3. openSUSE Tumbleweed: firefox 68.1.0


Selenium
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 59.0 66.1 71.0
Clear Linux 30970 60.0 70.9 96.0
openSUSE Tumbleweed 58.0 68.1 72.0
Celsius, Fewer Is Better
100
80
60
40
20
Selenium
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04 26.5 73.2 110.7
Clear Linux 30970 25.7 65.0 123.4
openSUSE Tumbleweed 30.9 66.7 88.1
Watts, Fewer Is Better
200
160
120
80
40


libjpeg-turbo tjbench 2.0.2
Test: Decompression Throughput
Megapixels/sec, More Is Better
Ubuntu 19.04
SE +/- 0.80, N = 3
236.48
Clear Linux 30970
SE +/- 0.16, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
227.95
openSUSE Tumbleweed
SE +/- 0.36, N = 3
229.72
50
100
150
200
250
1. (CC) gcc options: -O3 -rdynamic
libjpeg-turbo tjbench 2.0.2
Test: Decompression Throughput
Megapixels/sec Per Watt, More Is Better
Ubuntu 19.04
5.33
Clear Linux 30970
5.44
openSUSE Tumbleweed
4.58
1.224
2.448
3.672
4.896
6.12
Timed LLVM Compilation 6.0.1
Time To Compile
Seconds, Fewer Is Better
Ubuntu 19.04
406.06
Clear Linux 30970
725.32
openSUSE Tumbleweed
408.41
160
320
480
640
800

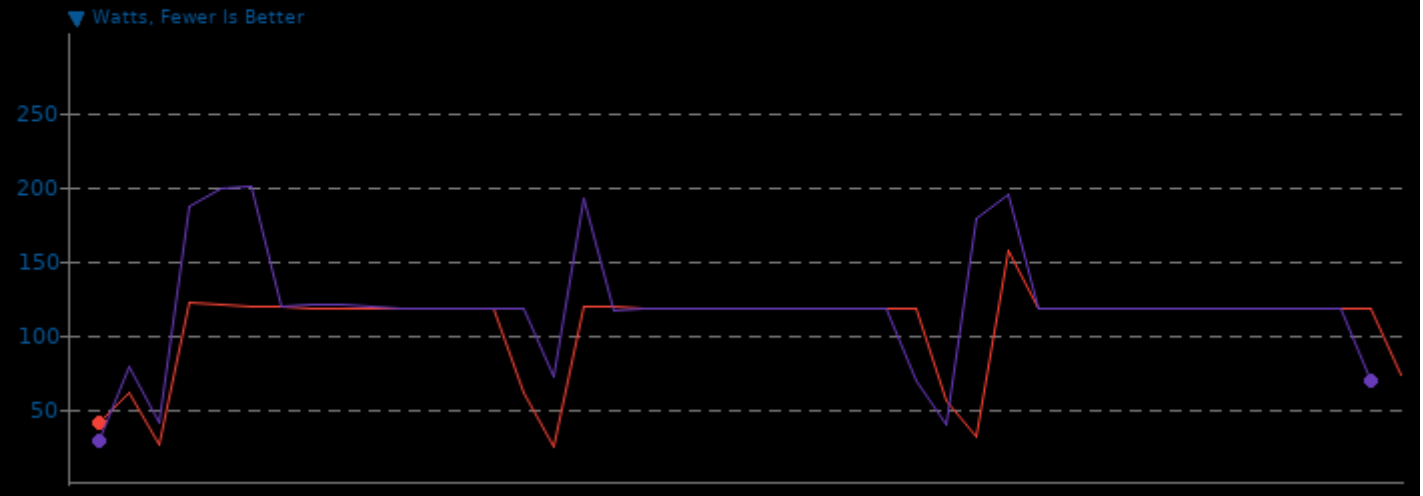

Timed LLVM Compilation 6.0.1
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 49.0 72.0 79.0
Clear Linux 30970 56.0 80.9 95.0
openSUSE Tumbleweed 57.0 79.4 91.0
Celsius, Fewer Is Better
100
80
60
40
20
Timed LLVM Compilation 6.0.1
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04 43.3 116.6 154.7
Clear Linux 30970 66.5 119.1 186.8
openSUSE Tumbleweed 31.0 125.4 193.2
Watts, Fewer Is Better
250
200
150
100
50


Timed Linux Kernel Compilation 4.18
Time To Compile
Seconds, Fewer Is Better
Ubuntu 19.04
SE +/- 0.63, N = 3
70.63
Clear Linux 30970
SE +/- 0.39, N = 3
70.69
16
32
48
64
80
Timed Linux Kernel Compilation 4.18
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04
60.0
74.3
80.0
Clear Linux 30970
67.0
83.5
98.0
Celsius, Fewer Is Better
100
80
60
40
20

Timed Linux Kernel Compilation 4.18

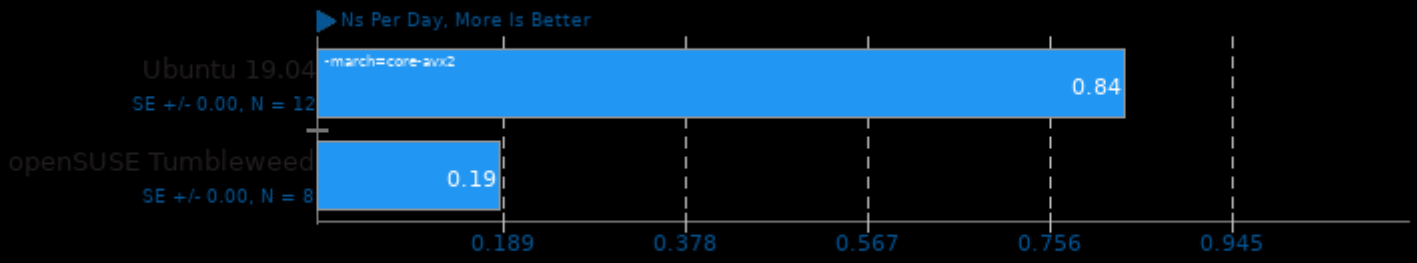
System Power Consumption Monitor

	Min	Avg	Max
Ubuntu 19.04	25.9	106.3	156.7
Clear Linux 30970	29.7	118.5	200.0



GROMACS 2018.3

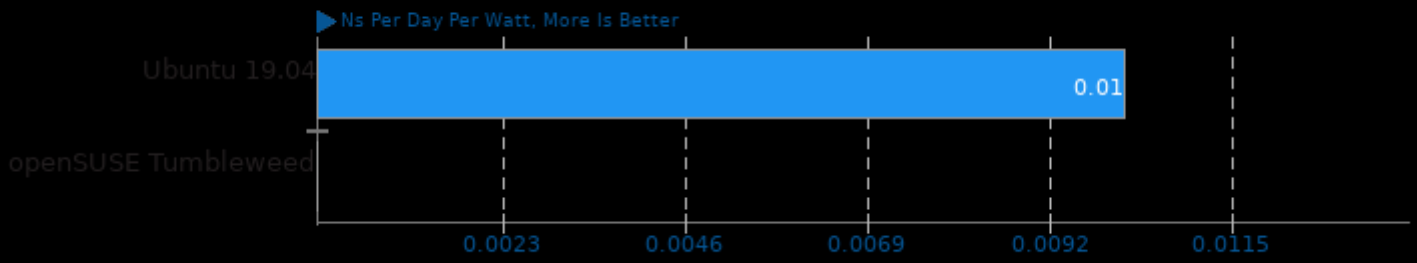
Water Benchmark

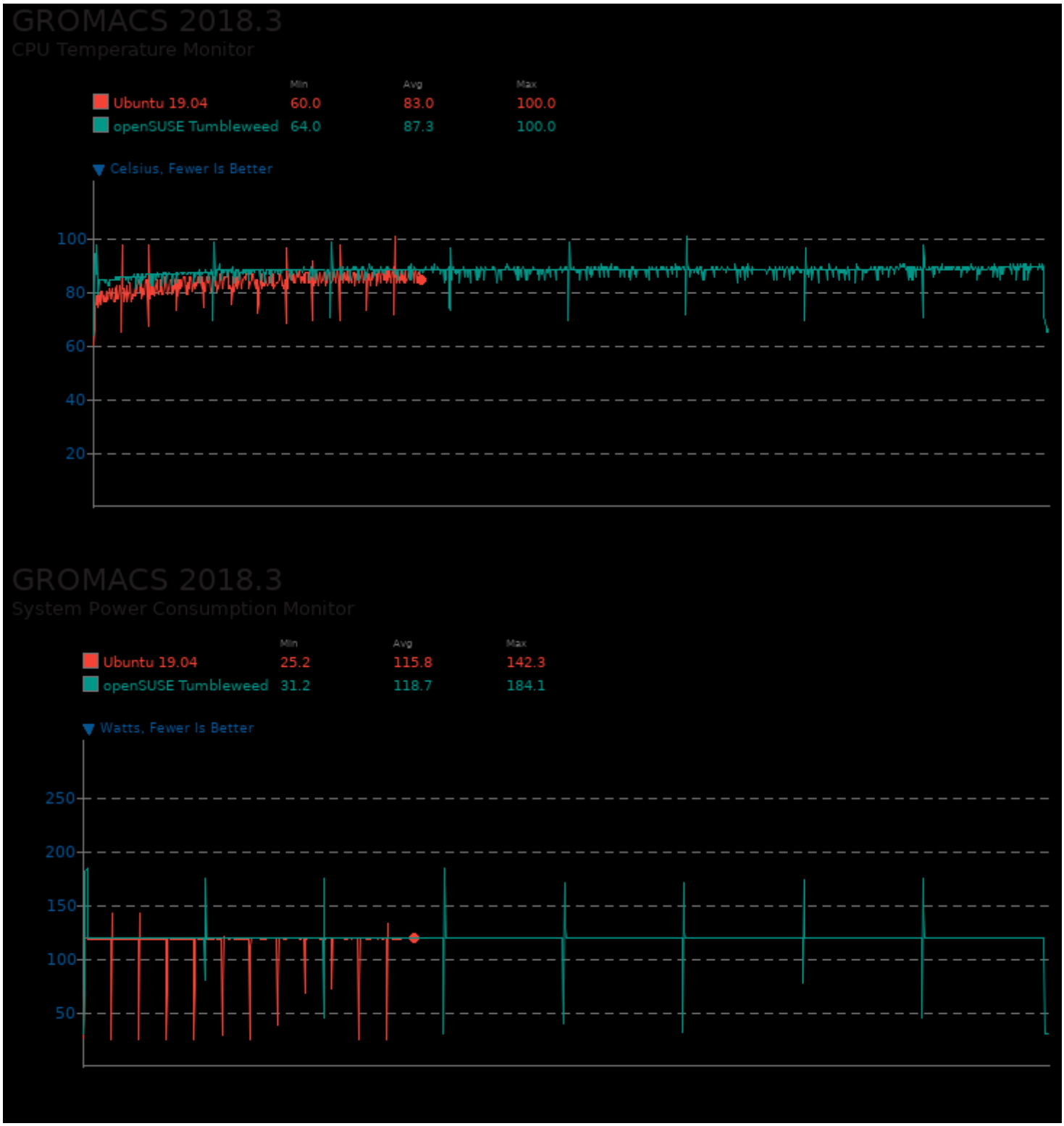


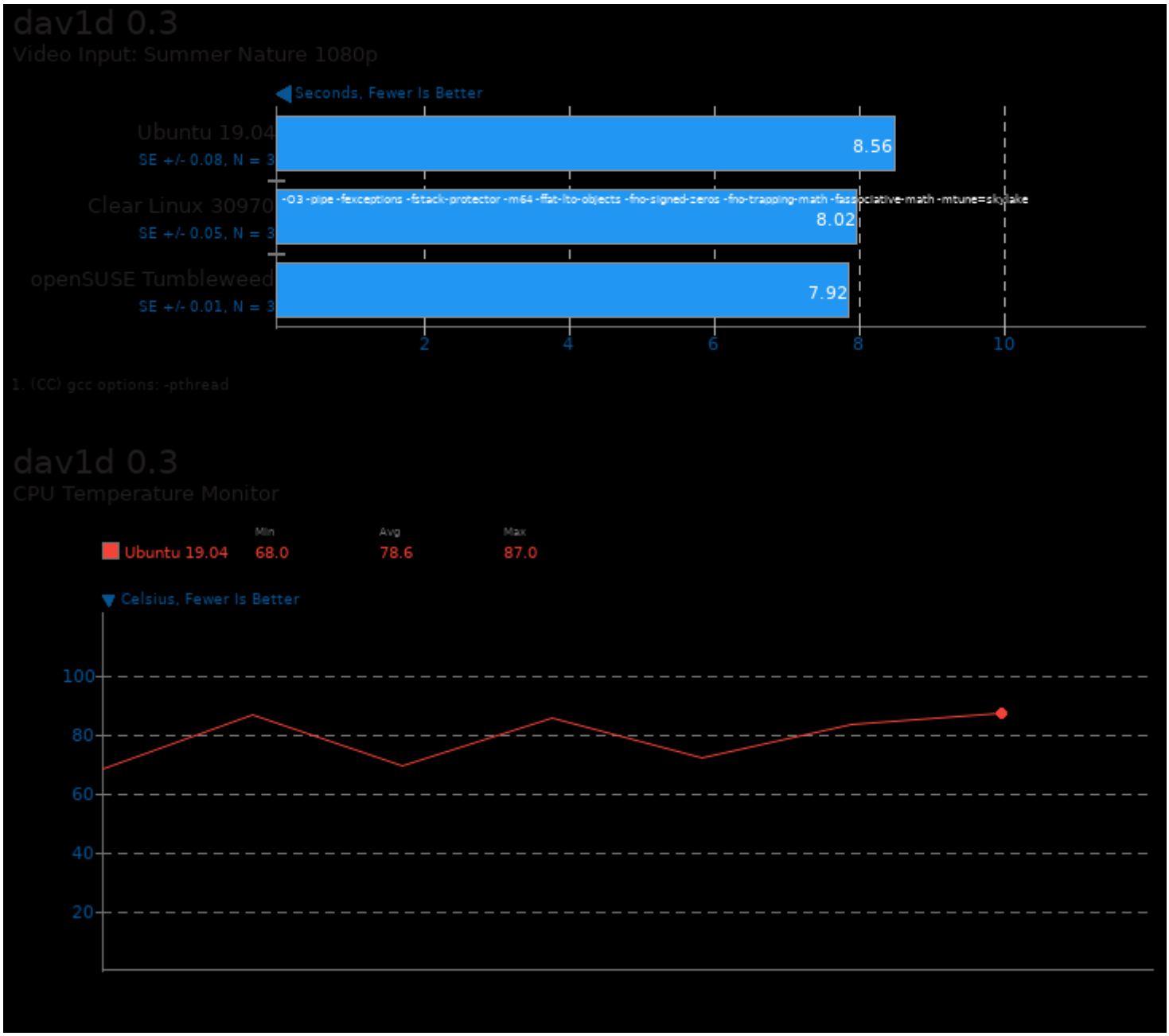
1. (CXX) g++ options: -std=c++11 -O3 -funroll-all-loops -fopenmp -lrt -lpthread -lm

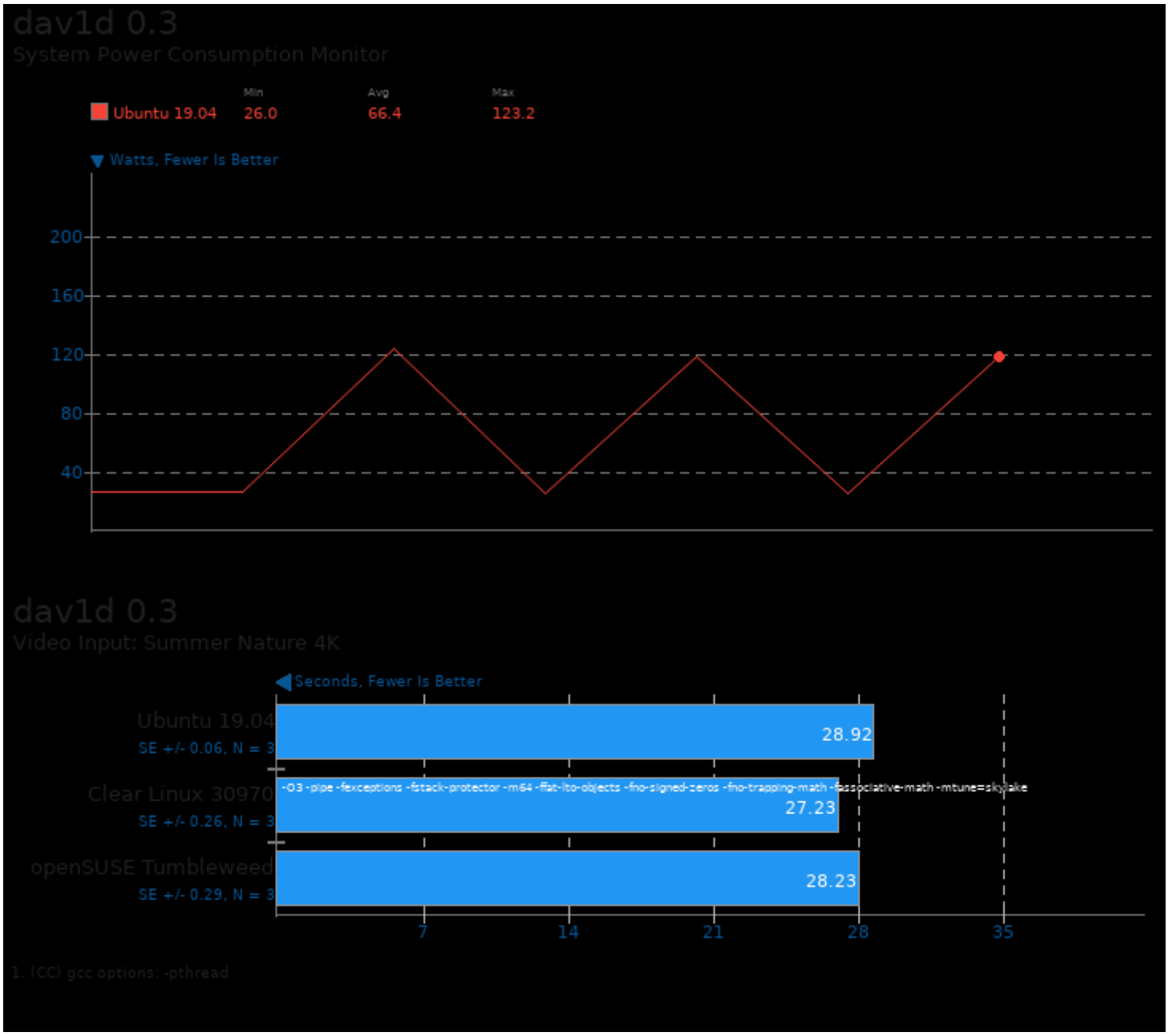
GROMACS 2018.3

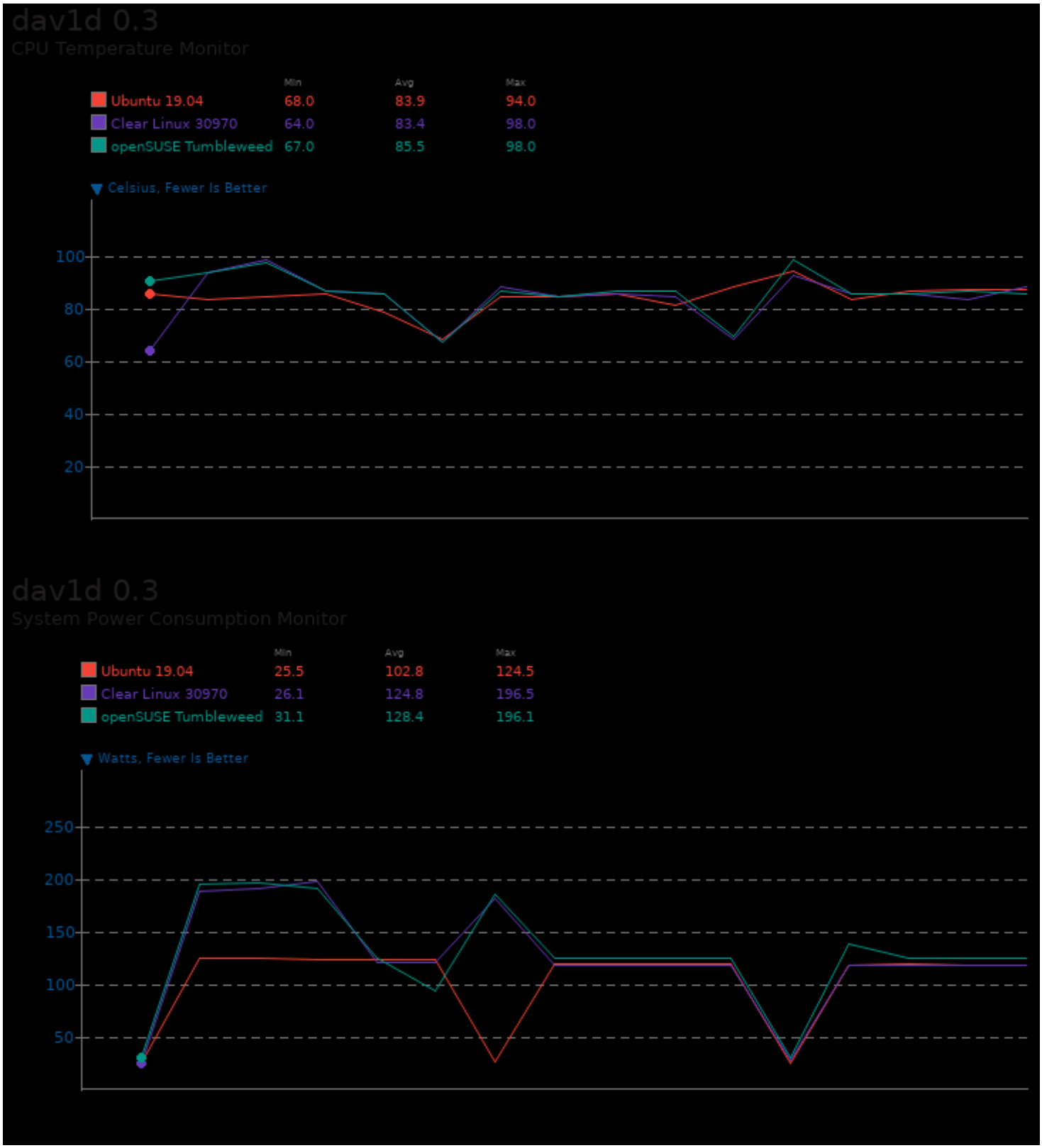
Water Benchmark

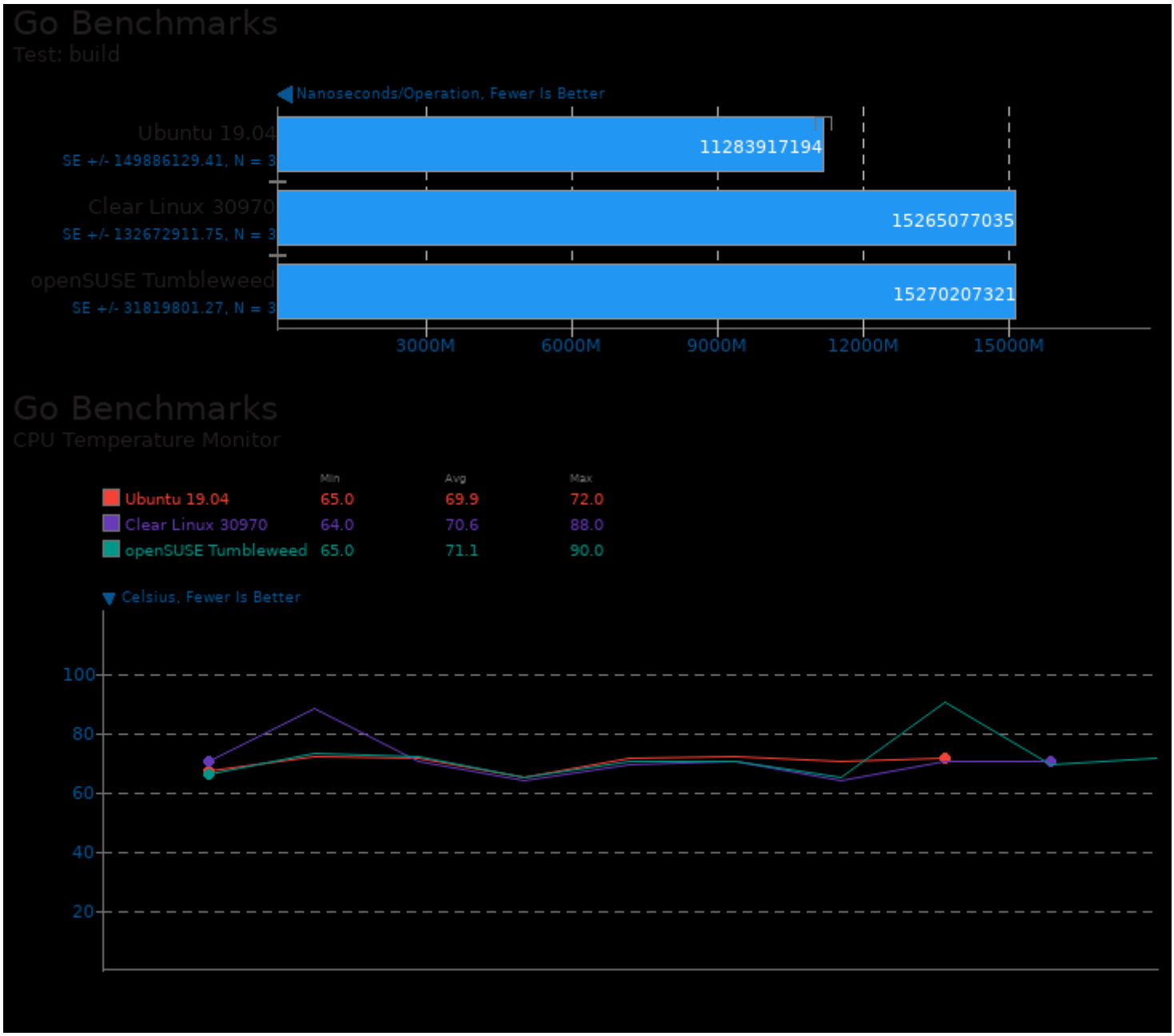



GROMACS 2018.3
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04
60.0
83.0
100.0
openSUSE Tumbleweed
64.0
87.3
100.0
Celsius, Fewer Is Better
100
80
60
40
20
GROMACS 2018.3
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04
25.2
115.8
142.3
openSUSE Tumbleweed
31.2
118.7
184.1
Watts, Fewer Is Better
250
200
150
100
50

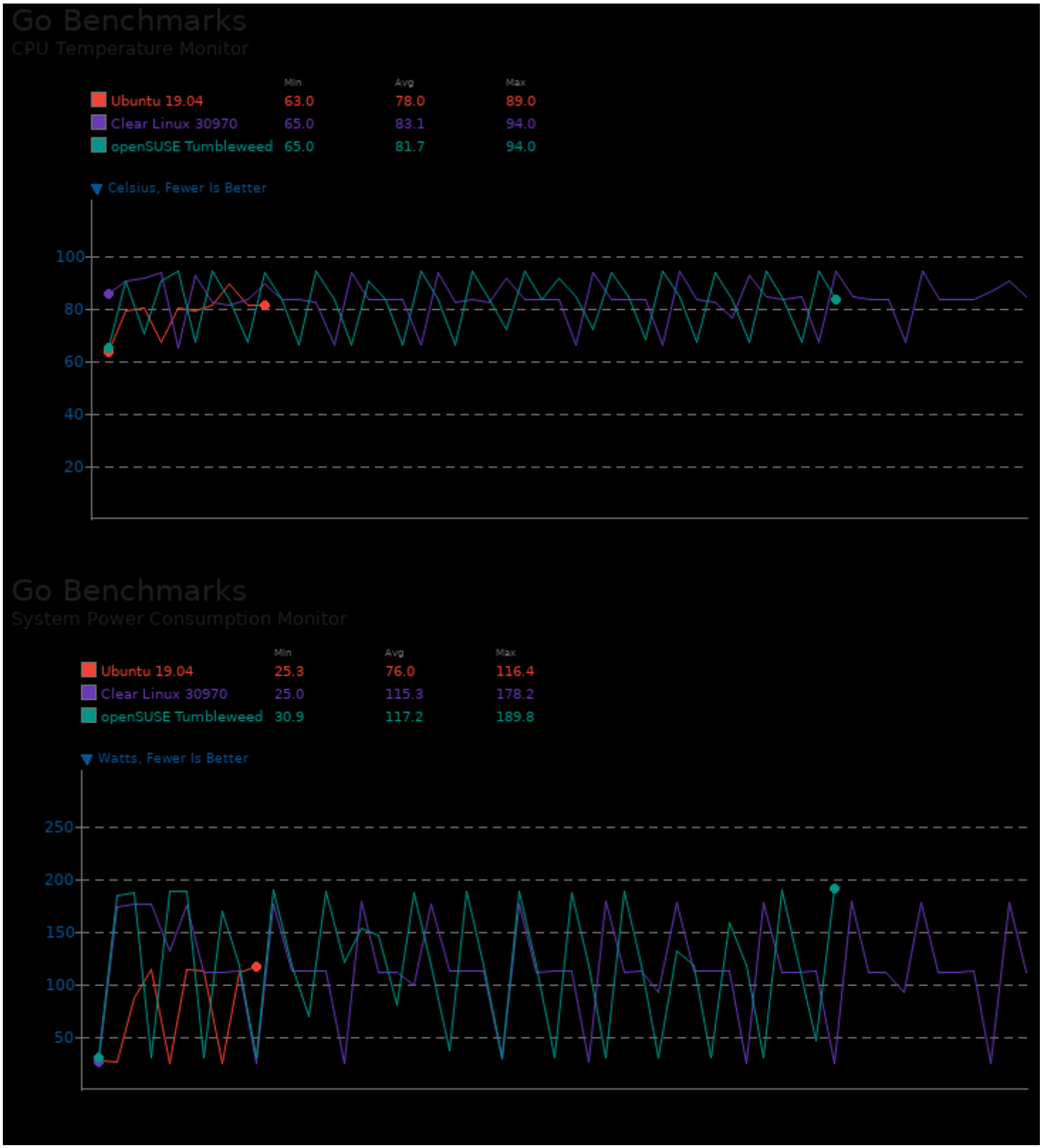

dav1d 0.3
Video Input: Summer Nature 1080p
Seconds, Fewer Is Better
Ubuntu 19.04
SE +/- 0.08, N = 3
8.56
Clear Linux 30970
SE +/- 0.05, N = 3
-O3 -pipe -fexceptions -fstack-protector -m64 -ffat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
8.02
openSUSE Tumbleweed
SE +/- 0.01, N = 3
7.92
2
4
6
8
10
1. (CC) gcc options: -pthread
dav1d 0.3
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04
68.0
78.6
87.0
Celsius, Fewer Is Better
100
80
60
40
20

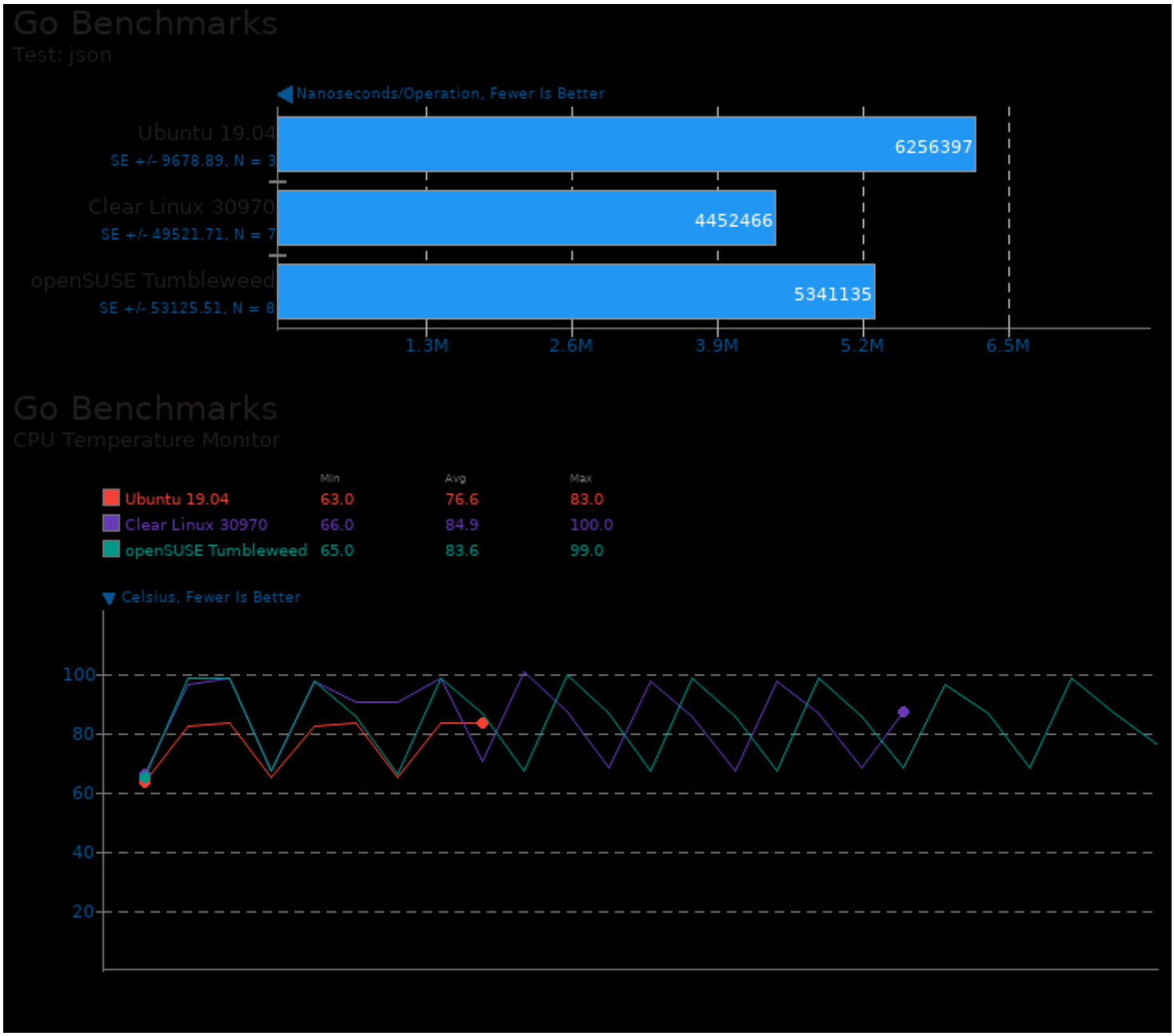

dav1d 0.3
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04
26.0
66.4
123.2
Watts, Fewer Is Better
200
160
120
80
40
dav1d 0.3
Video Input: Summer Nature 4K
Seconds, Fewer Is Better
Ubuntu 19.04
SE +/- 0.06, N = 3
28.92
Clear Linux 30970
SE +/- 0.26, N = 3
27.23
openSUSE Tumbleweed
SE +/- 0.29, N = 3
28.23
7
14
21
28
35
1. (CC) gcc options: -pthread

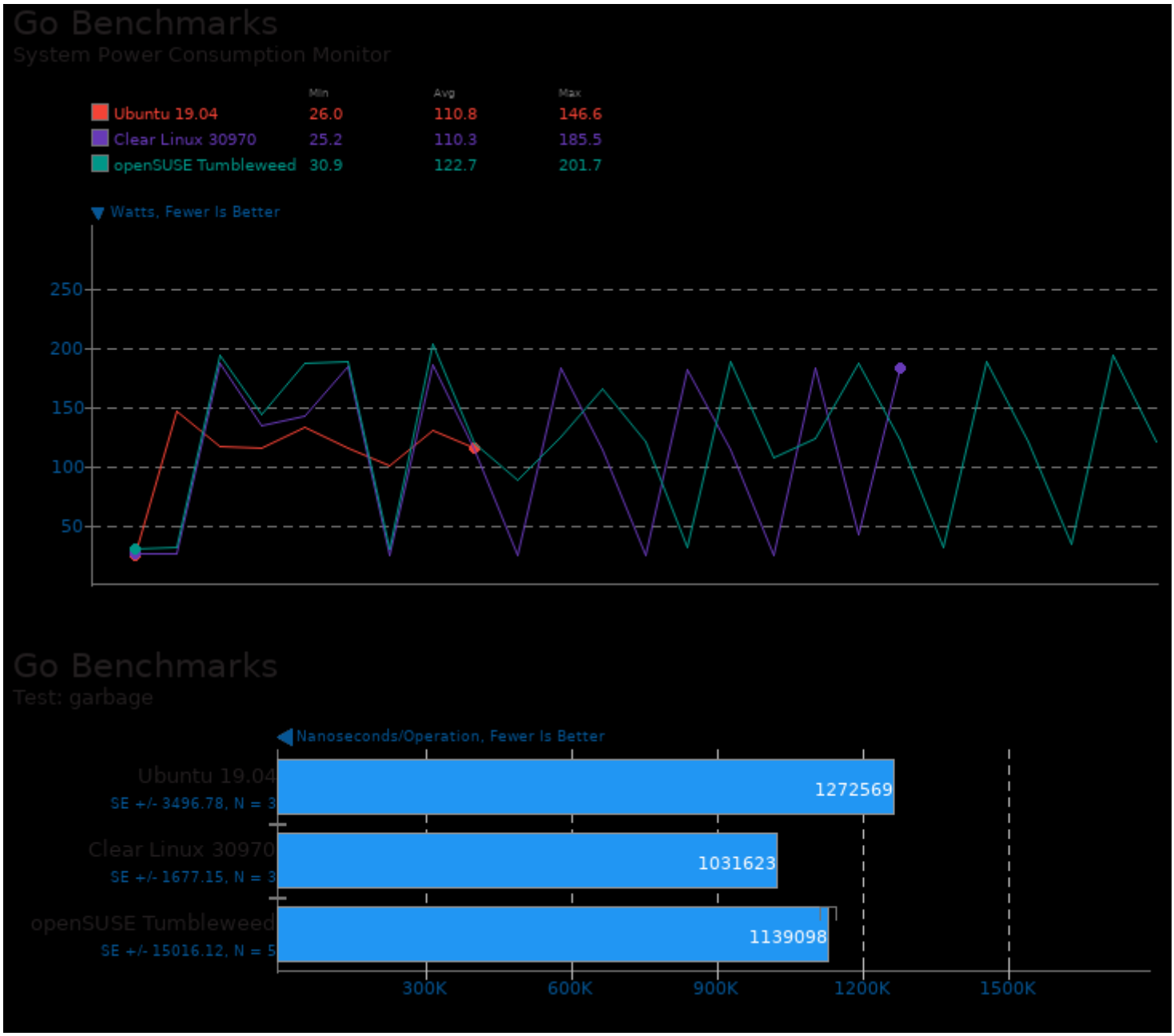

dav1d 0.3
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 68.0 83.9 94.0
Clear Linux 30970 64.0 83.4 98.0
openSUSE Tumbleweed 67.0 85.5 98.0
Celsius, Fewer Is Better
100
80
60
40
20
dav1d 0.3
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04 25.5 102.8 124.5
Clear Linux 30970 26.1 124.8 196.5
openSUSE Tumbleweed 31.1 128.4 196.1
Watts, Fewer Is Better
250
200
150
100
50

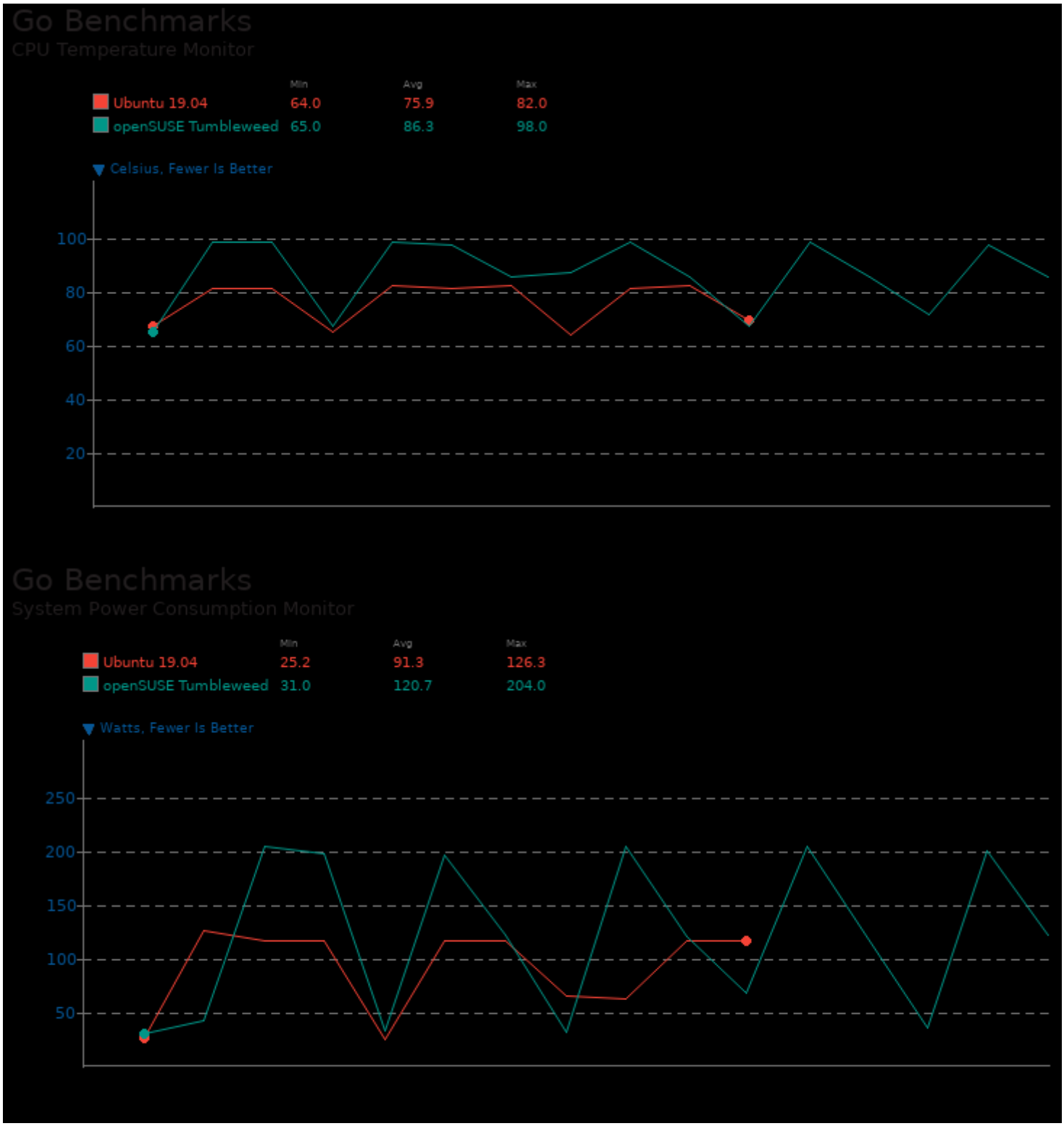

Go Benchmarks
Test: build
Nanoseconds/Operation, Fewer Is Better
Ubuntu 19.04
SE +/- 149886129.41, N = 3
11283917194
Clear Linux 30970
SE +/- 132672911.75, N = 3
15265077035
openSUSE Tumbleweed
SE +/- 31819801.27, N = 3
15270207321
3000M
6000M
9000M
12000M
15000M
Go Benchmarks
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 65.0 69.9 72.0
Clear Linux 30970 64.0 70.6 88.0
openSUSE Tumbleweed 65.0 71.1 90.0
Celsius, Fewer Is Better
100
80
60
40
20

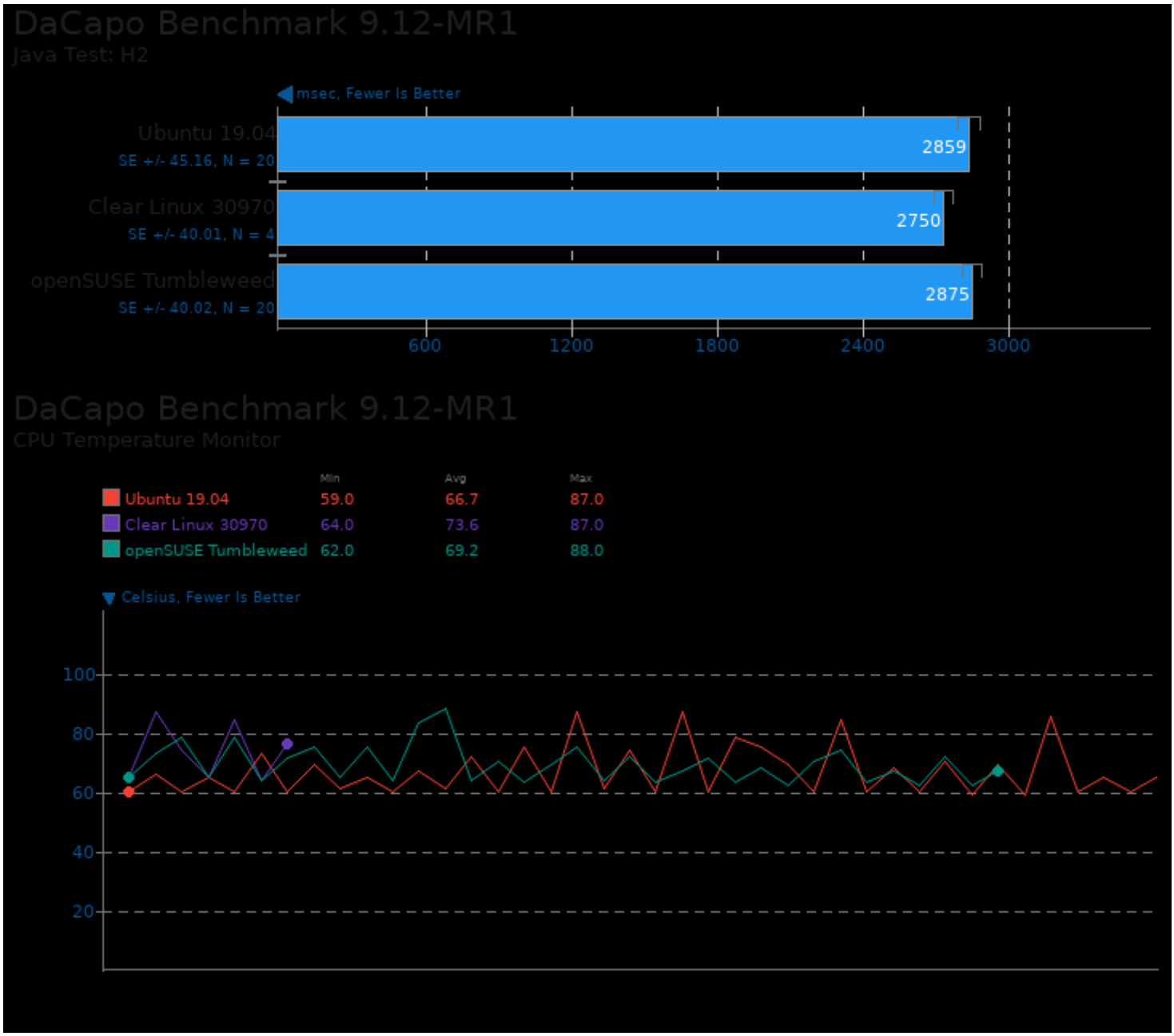

Go Benchmarks
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04
26.0
57.7
71.7
Clear Linux 30970
26.1
62.0
69.7
openSUSE Tumbleweed
31.1
64.0
74.5
Watts, Fewer Is Better
100
80
60
40
20
Go Benchmarks
Test: http
Nanoseconds/Operation, Fewer Is Better
Ubuntu 19.04
SE +/- 3.28, N = 3
4489
Clear Linux 30970
SE +/- 32.48, N = 12
3817
openSUSE Tumbleweed
SE +/- 34.94, N = 15
4049
1000
2000
3000
4000
5000


Go Benchmarks
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 63.0 78.0 89.0
Clear Linux 30970 65.0 83.1 94.0
openSUSE Tumbleweed 65.0 81.7 94.0
Celsius, Fewer Is Better
100
80
60
40
20
Go Benchmarks
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04 25.3 76.0 116.4
Clear Linux 30970 25.0 115.3 178.2
openSUSE Tumbleweed 30.9 117.2 189.8
Watts, Fewer Is Better
250
200
150
100
50

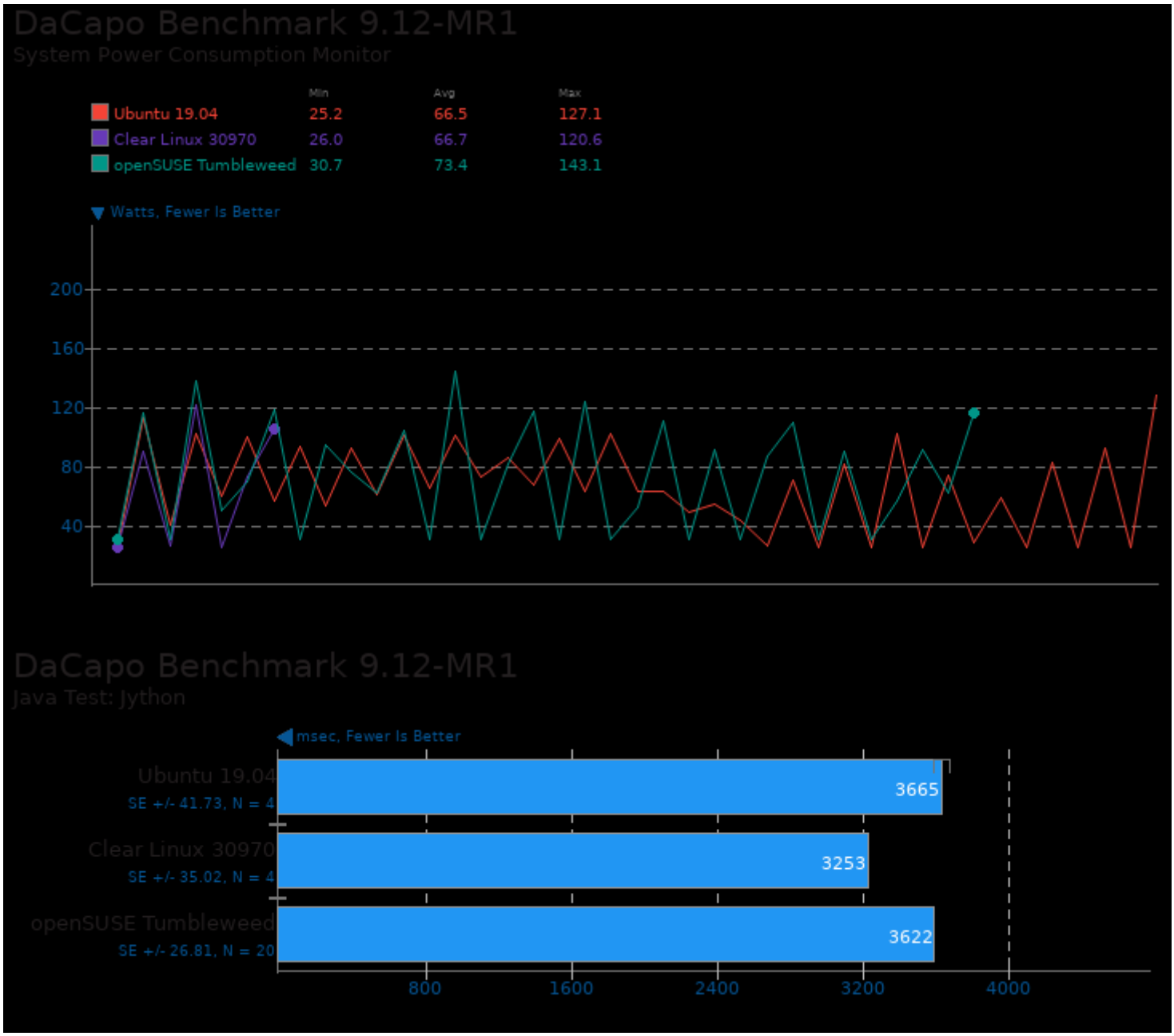

Go Benchmarks
Test: json
Nanoseconds/Operation, Fewer Is Better
Ubuntu 19.04
SE +/- 9678.89, N = 3
6256397
Clear Linux 30970
SE +/- 49521.71, N = 7
4452466
openSUSE Tumbleweed
SE +/- 53125.51, N = 8
5341135
1.3M
2.6M
3.9M
5.2M
6.5M
Go Benchmarks
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 63.0 76.6 83.0
Clear Linux 30970 66.0 84.9 100.0
openSUSE Tumbleweed 65.0 83.6 99.0
Celsius, Fewer Is Better
100
80
60
40
20

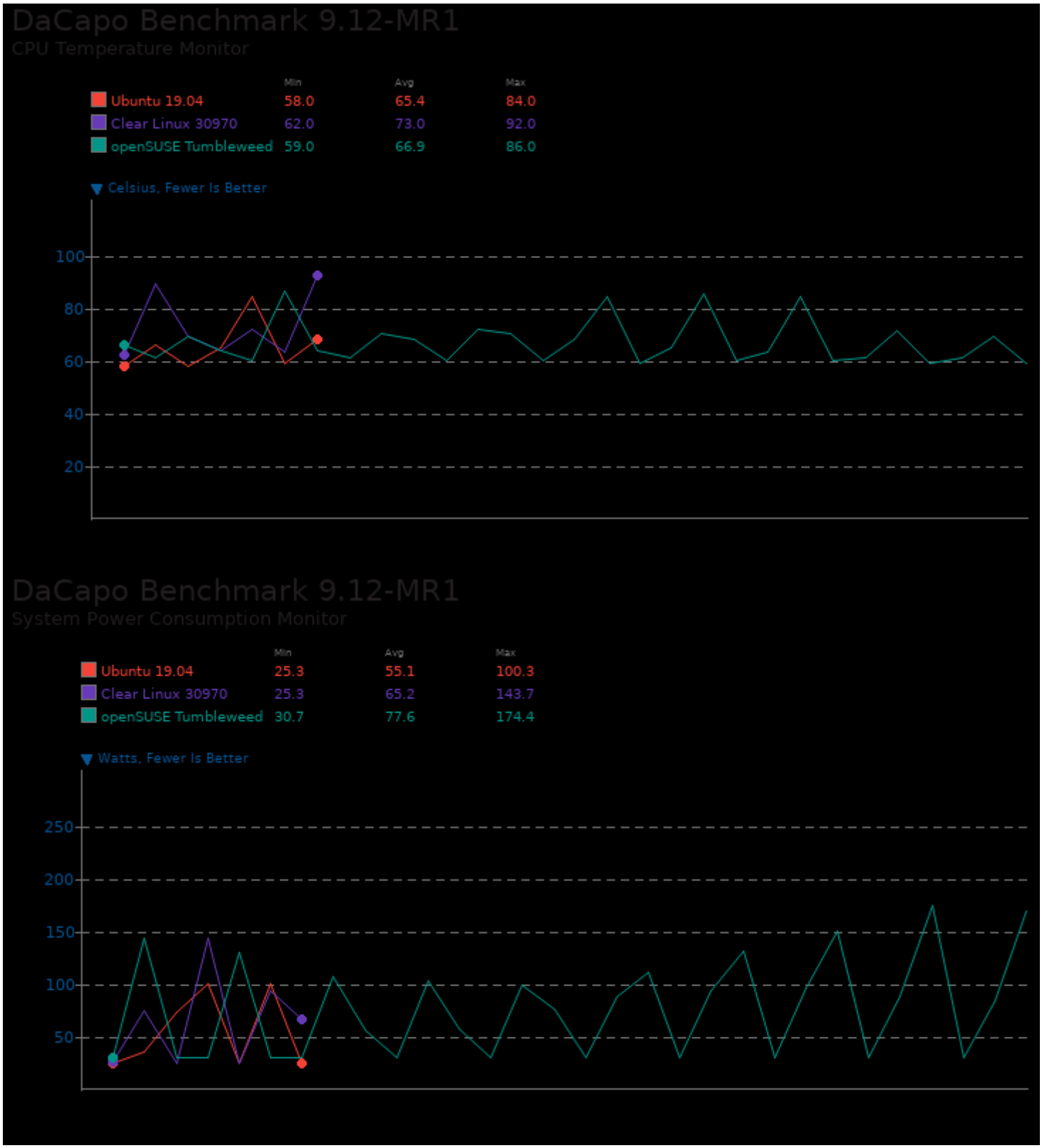

Go Benchmarks
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04 26.0 110.8 146.6
Clear Linux 30970 25.2 110.3 185.5
openSUSE Tumbleweed 30.9 122.7 201.7
Watts, Fewer Is Better
250
200
150
100
50
Go Benchmarks
Test: garbage
Nanoseconds/Operation, Fewer Is Better
Ubuntu 19.04
SE +/- 3496.78, N = 3
1272569
Clear Linux 30970
SE +/- 1677.15, N = 3
1031623
openSUSE Tumbleweed
SE +/- 15016.12, N = 5
1139098
300K
600K
900K
1200K
1500K

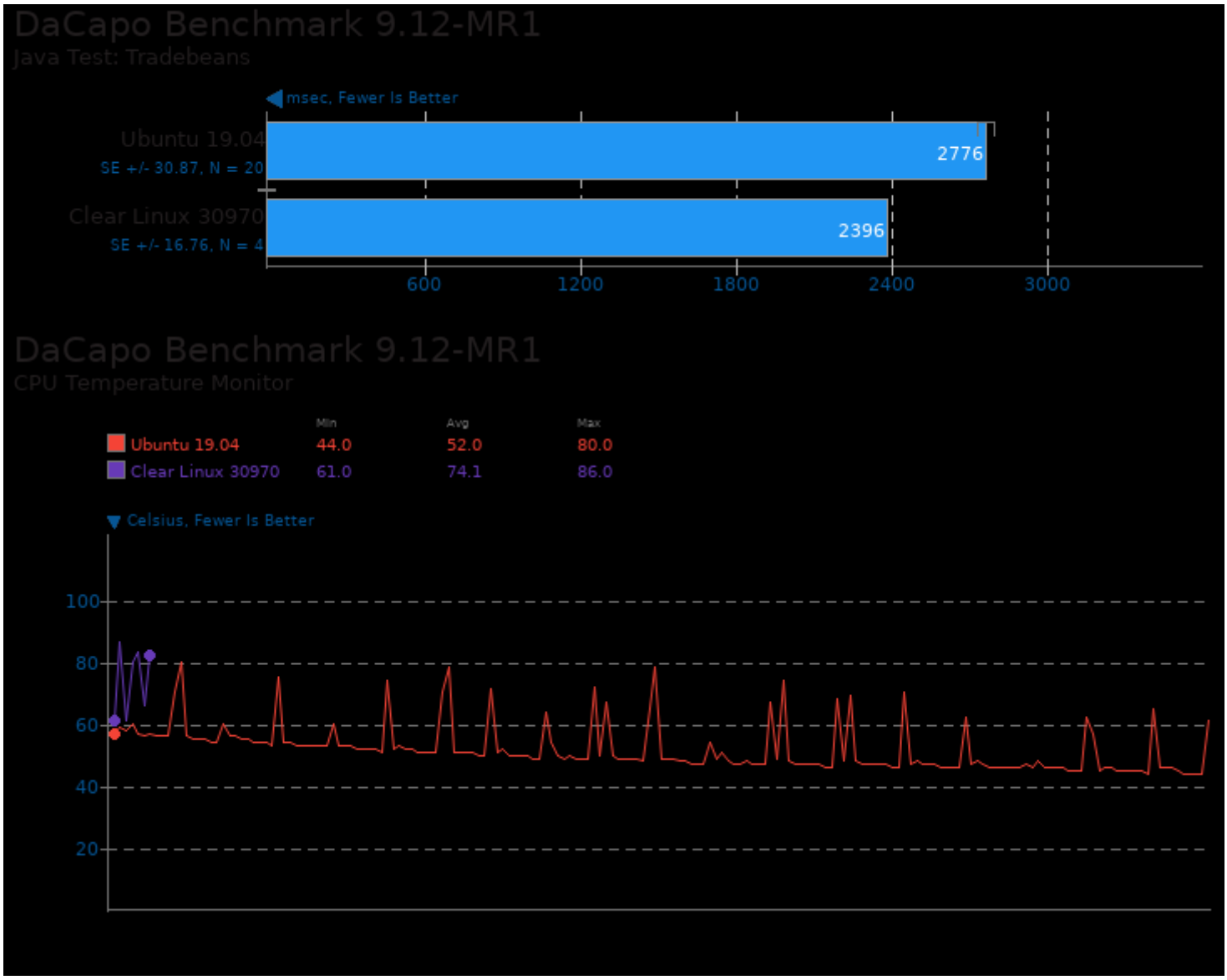

Go Benchmarks
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 64.0 75.9 82.0
openSUSE Tumbleweed 65.0 86.3 98.0
Celsius, Fewer Is Better
100
80
60
40
20
Go Benchmarks
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04 25.2 91.3 126.3
openSUSE Tumbleweed 31.0 120.7 204.0
Watts, Fewer Is Better
250
200
150
100
50

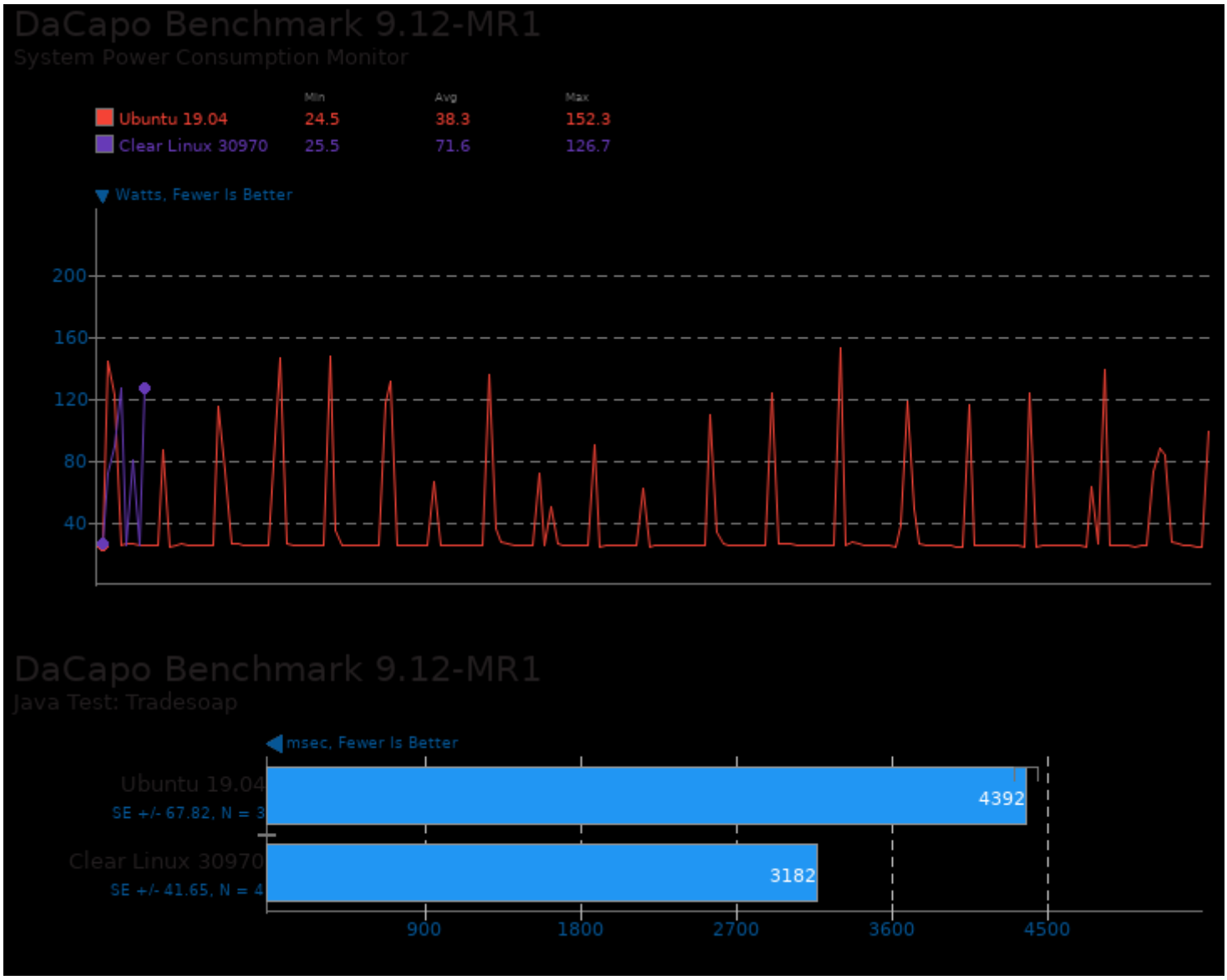

DaCapo Benchmark 9.12-MR1
Java Test: H2
msec, Fewer Is Better
Ubuntu 19.04
SE +/- 45.16, N = 20
2859
Clear Linux 30970
SE +/- 40.01, N = 4
2750
openSUSE Tumbleweed
SE +/- 40.02, N = 20
2875
600
1200
1800
2400
3000

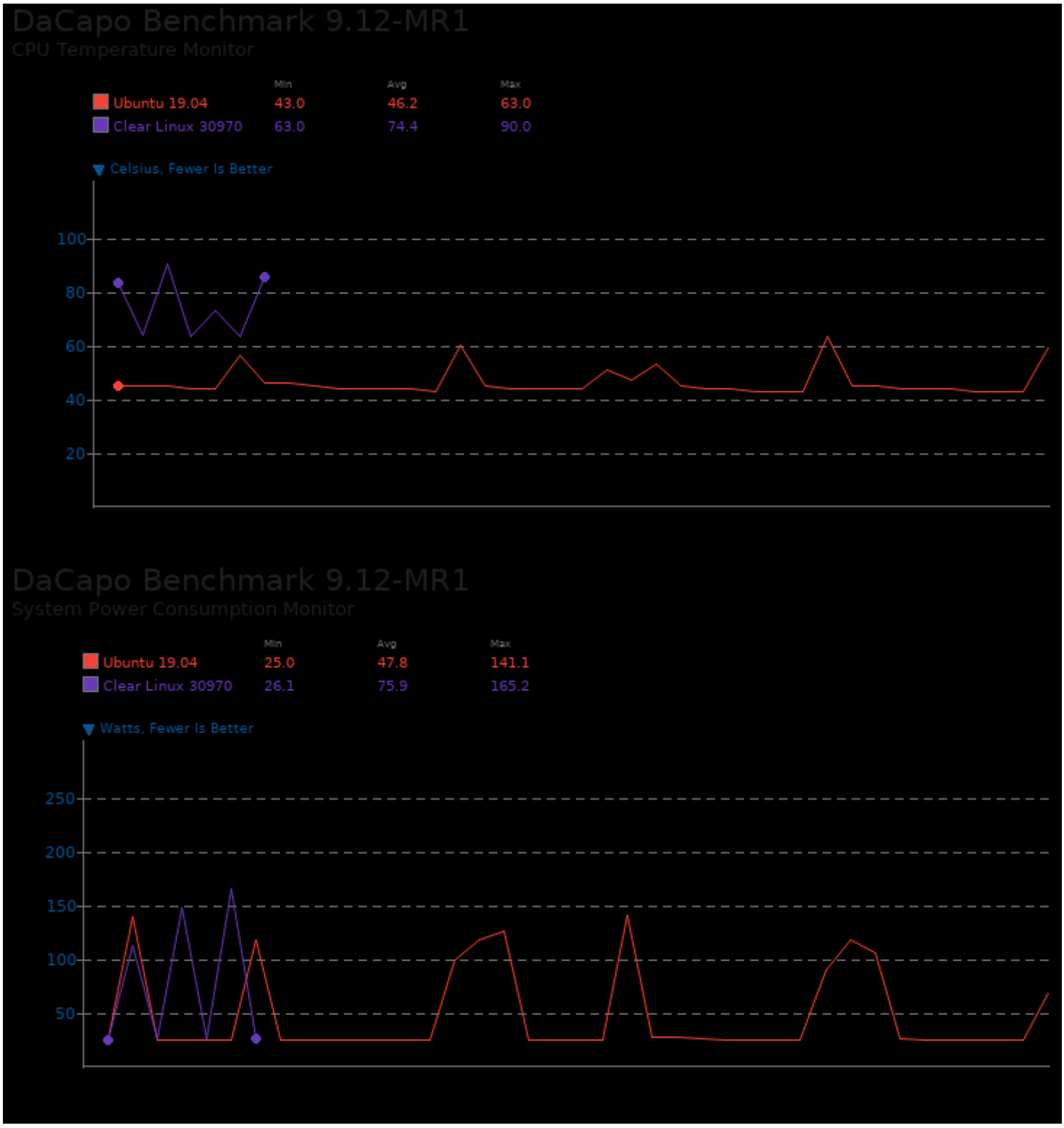
DaCapo Benchmark 9.12-MR1
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 59.0 66.7 87.0
Clear Linux 30970 64.0 73.6 87.0
openSUSE Tumbleweed 62.0 69.2 88.0
Celsius, Fewer Is Better
100
80
60
40
20

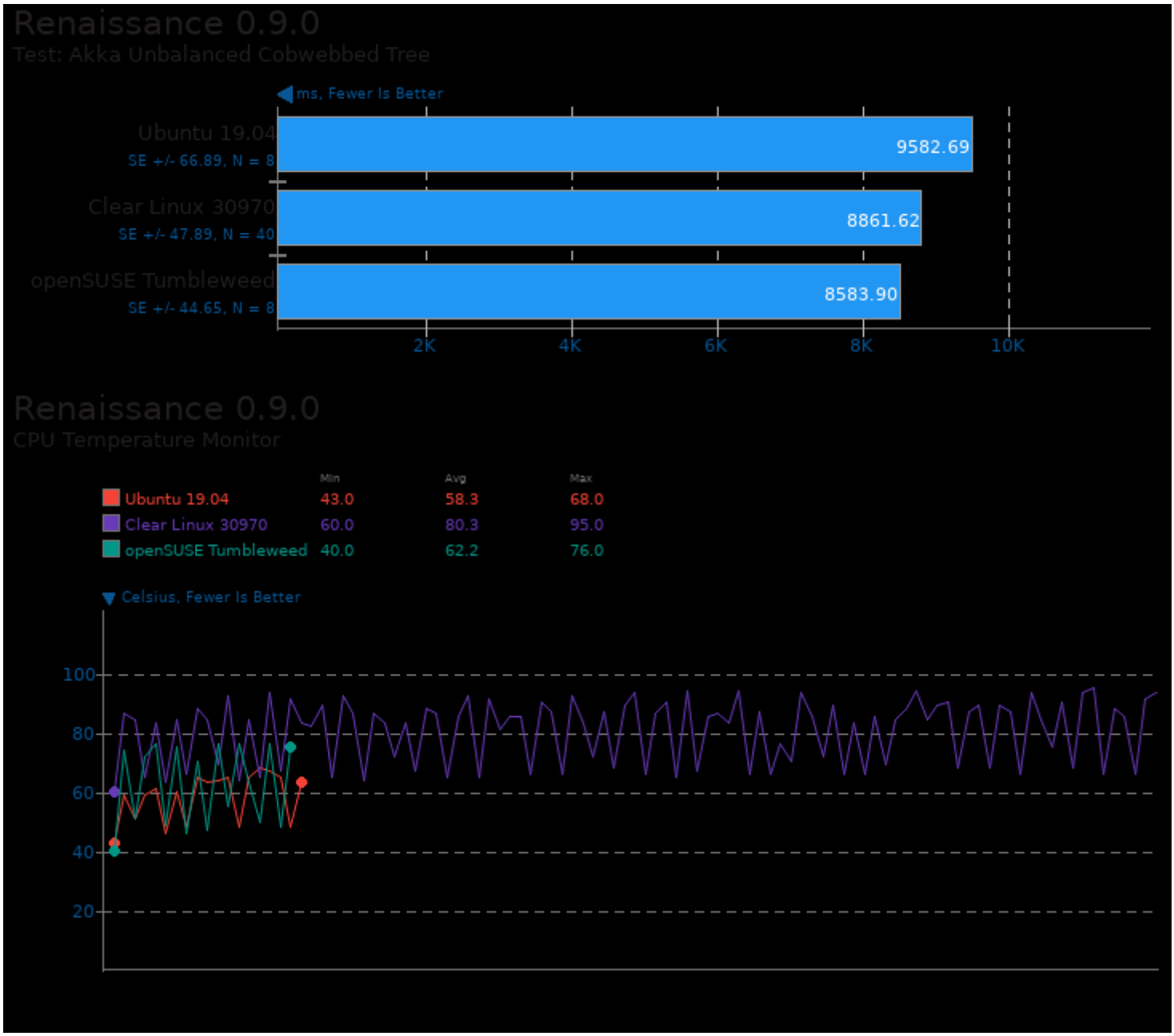

DaCapo Benchmark 9.12-MR1
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04
25.2
66.5
127.1
Clear Linux 30970
26.0
66.7
120.6
openSUSE Tumbleweed
30.7
73.4
143.1
Watts, Fewer Is Better
200
160
120
80
40
DaCapo Benchmark 9.12-MR1
Java Test: Jython
msec, Fewer Is Better
Ubuntu 19.04
SE +/- 41.73, N = 4
3665
Clear Linux 30970
SE +/- 35.02, N = 4
3253
openSUSE Tumbleweed
SE +/- 26.81, N = 20
3622
800
1600
2400
3200
4000

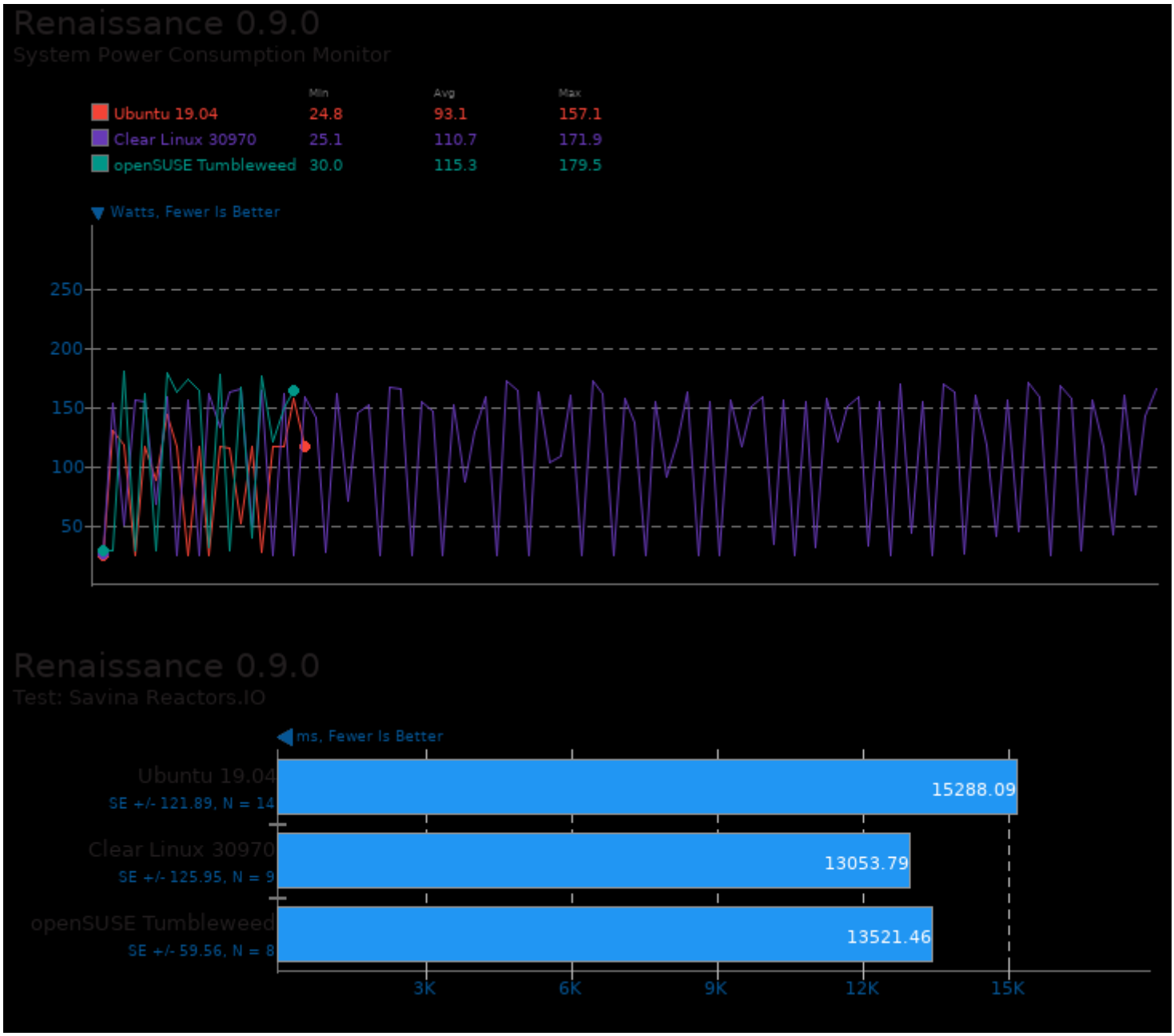

DaCapo Benchmark 9.12-MR1
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 58.0 65.4 84.0
Clear Linux 30970 62.0 73.0 92.0
openSUSE Tumbleweed 59.0 66.9 86.0
Celsius, Fewer Is Better
100
80
60
40
20
DaCapo Benchmark 9.12-MR1
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04 25.3 55.1 100.3
Clear Linux 30970 25.3 65.2 143.7
openSUSE Tumbleweed 30.7 77.6 174.4
Watts, Fewer Is Better
250
200
150
100
50

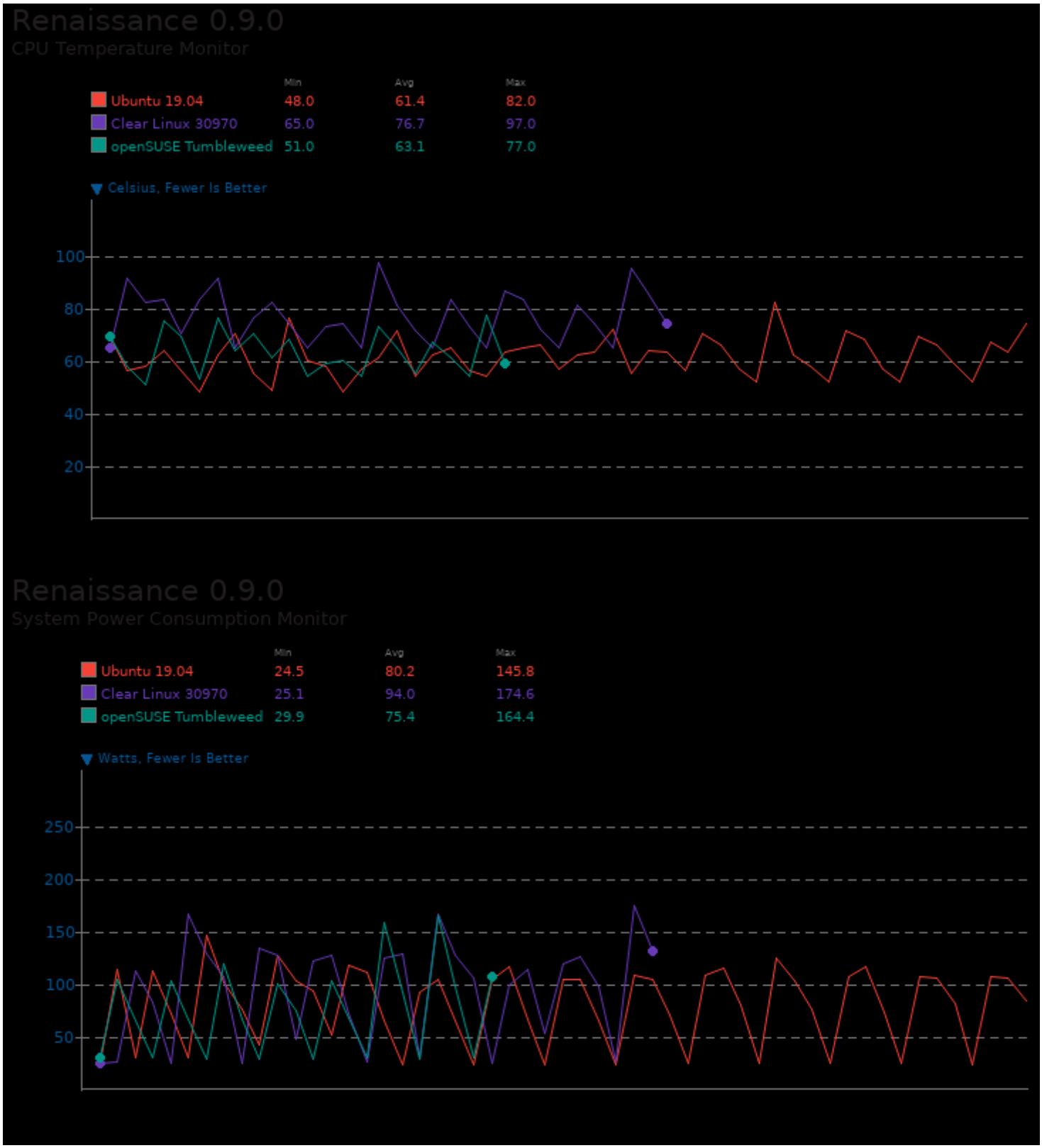

DaCapo Benchmark 9.12-MR1
Java Test: Tradebeans
msec, Fewer Is Better
Ubuntu 19.04
SE +/- 30.87, N = 20
2776
Clear Linux 30970
SE +/- 16.76, N = 4
2396
600
1200
1800
2400
3000
DaCapo Benchmark 9.12-MR1
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04
44.0
52.0
80.0
Clear Linux 30970
61.0
74.1
86.0
Celsius, Fewer Is Better
100
80
60
40
20

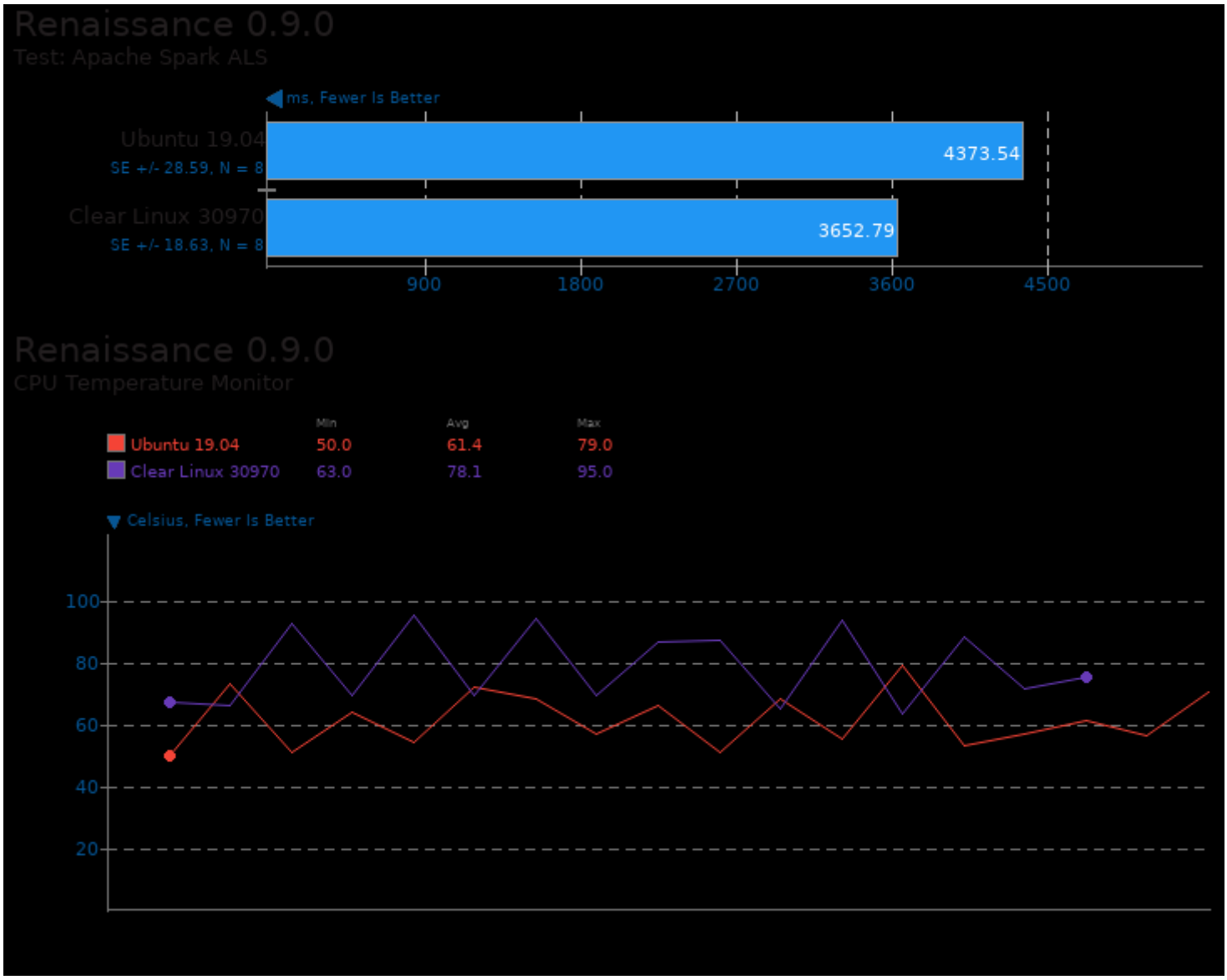

DaCapo Benchmark 9.12-MR1
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04
24.5
38.3
152.3
Clear Linux 30970
25.5
71.6
126.7
Watts, Fewer Is Better
200
160
120
80
40
DaCapo Benchmark 9.12-MR1
Java Test: Tradesoap
msec, Fewer Is Better
Ubuntu 19.04
SE +/- 67.82, N = 3
4392
Clear Linux 30970
SE +/- 41.65, N = 4
3182
900
1800
2700
3600
4500

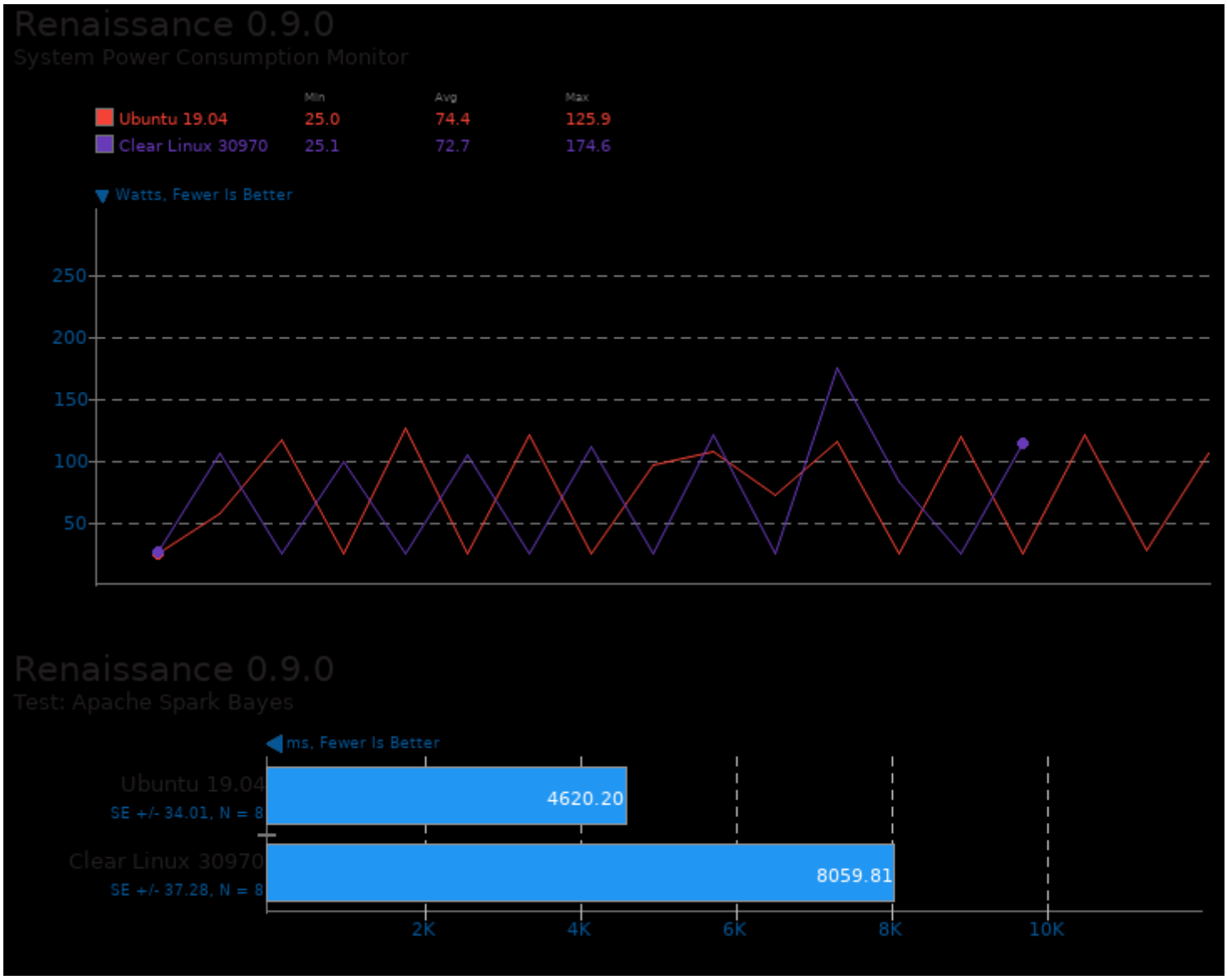

DaCapo Benchmark 9.12-MR1
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04
43.0
46.2
63.0
Clear Linux 30970
63.0
74.4
90.0
Celsius, Fewer Is Better
100
80
60
40
20
DaCapo Benchmark 9.12-MR1
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04
25.0
47.8
141.1
Clear Linux 30970
26.1
75.9
165.2
Watts, Fewer Is Better
250
200
150
100
50

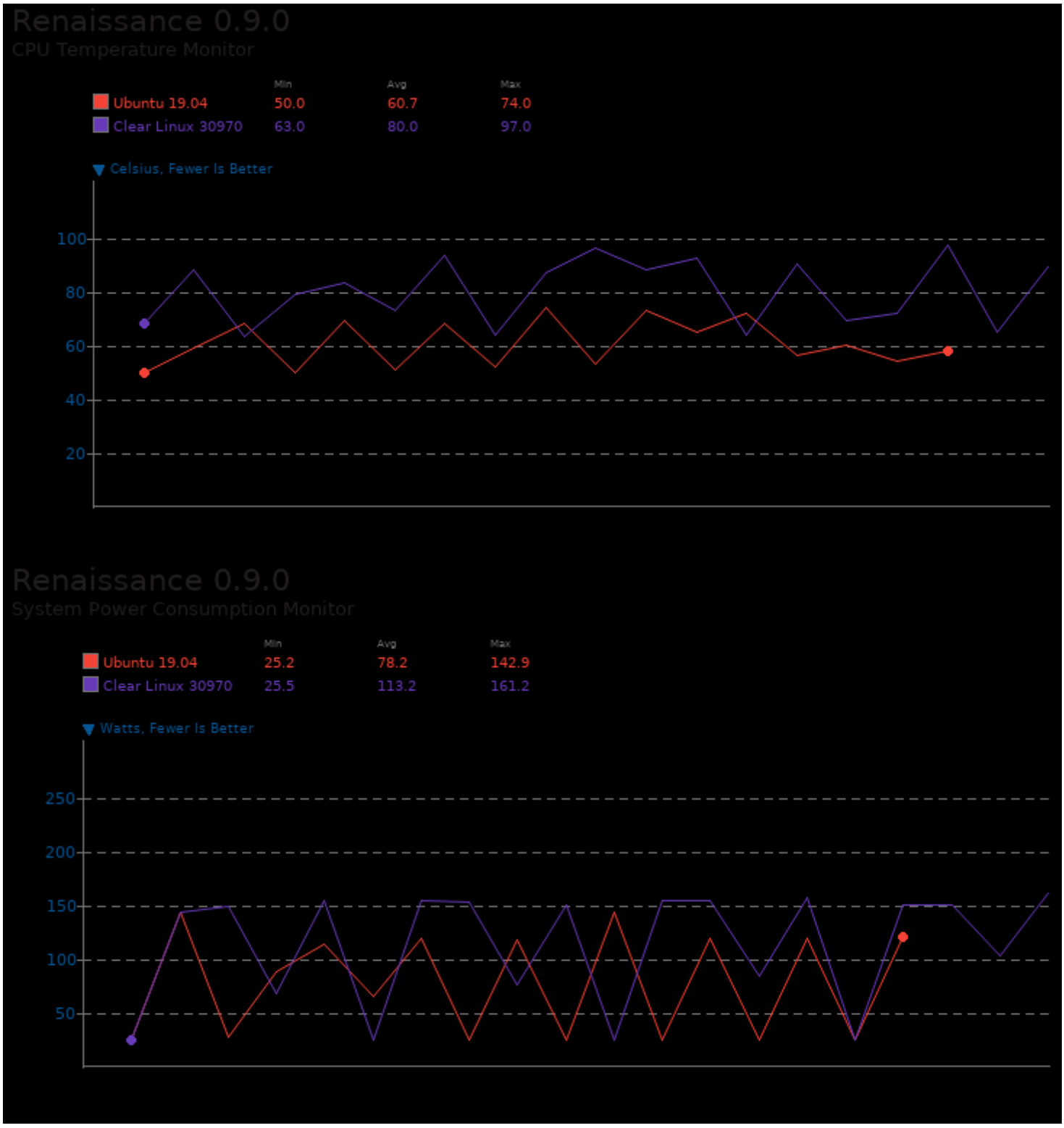

Renaissance 0.9.0
Test: Akka Unbalanced Cobwebbed Tree
ms, Fewer Is Better
Ubuntu 19.04
SE +/- 66.89, N = 8
9582.69
Clear Linux 30970
SE +/- 47.89, N = 40
8861.62
openSUSE Tumbleweed
SE +/- 44.65, N = 8
8583.90
2K
4K
6K
8K
10K
Renaissance 0.9.0
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 43.0 58.3 68.0
Clear Linux 30970 60.0 80.3 95.0
openSUSE Tumbleweed 40.0 62.2 76.0
Celsius, Fewer Is Better
100
80
60
40
20

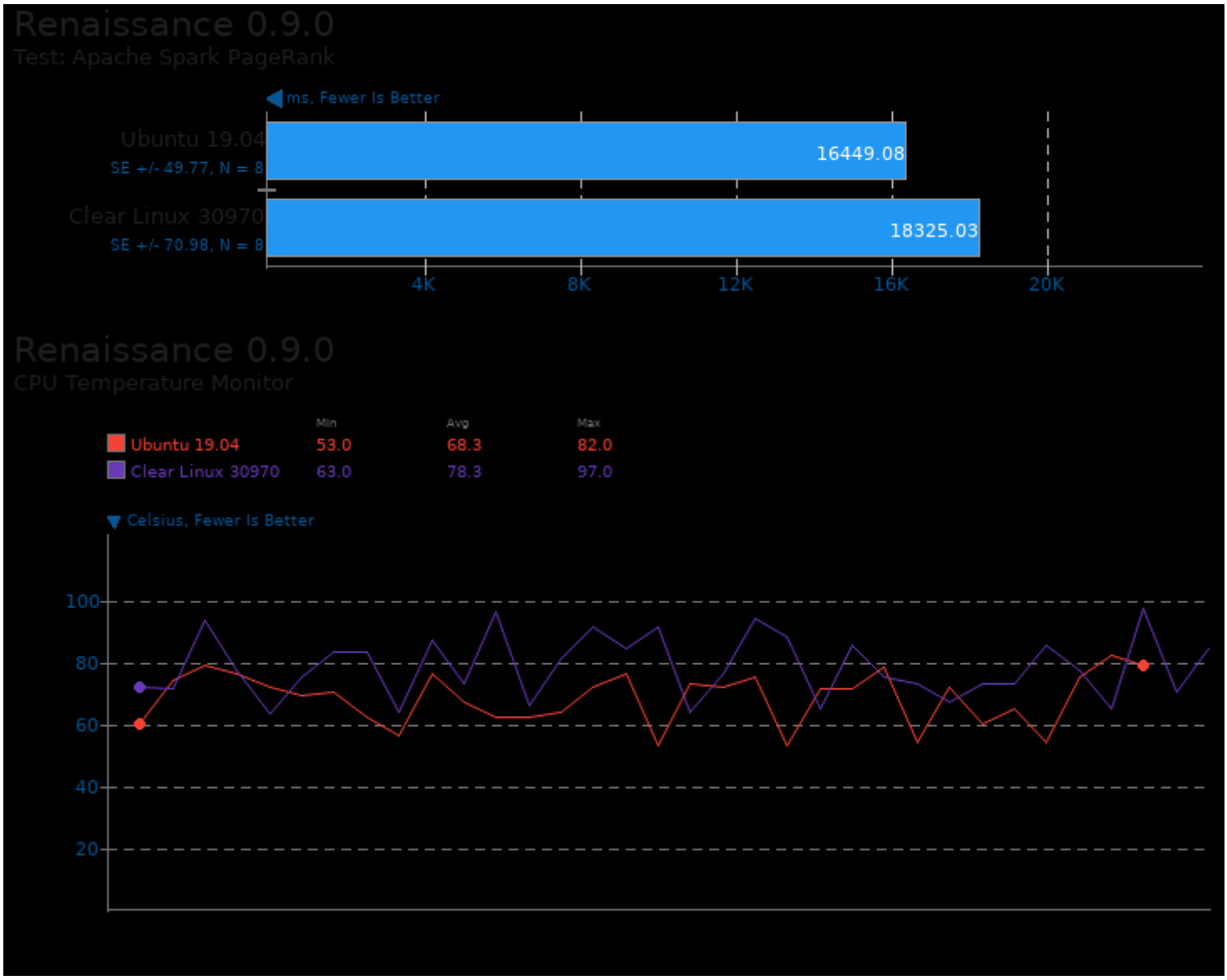

Renaissance 0.9.0
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04
24.8
93.1
157.1
Clear Linux 30970
25.1
110.7
171.9
openSUSE Tumbleweed
30.0
115.3
179.5
Watts, Fewer Is Better
250
200
150
100
50
Renaissance 0.9.0
Test: Savina Reactors.IO
ms, Fewer Is Better
Ubuntu 19.04
SE +/- 121.89, N = 14
15288.09
Clear Linux 30970
SE +/- 125.95, N = 9
13053.79
openSUSE Tumbleweed
SE +/- 59.56, N = 8
13521.46
3K
6K
9K
12K
15K


Renaissance 0.9.0
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 48.0 61.4 82.0
Clear Linux 30970 65.0 76.7 97.0
openSUSE Tumbleweed 51.0 63.1 77.0
Celsius, Fewer Is Better
100
80
60
40
20
Renaissance 0.9.0
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04 24.5 80.2 145.8
Clear Linux 30970 25.1 94.0 174.6
openSUSE Tumbleweed 29.9 75.4 164.4
Watts, Fewer Is Better
250
200
150
100
50

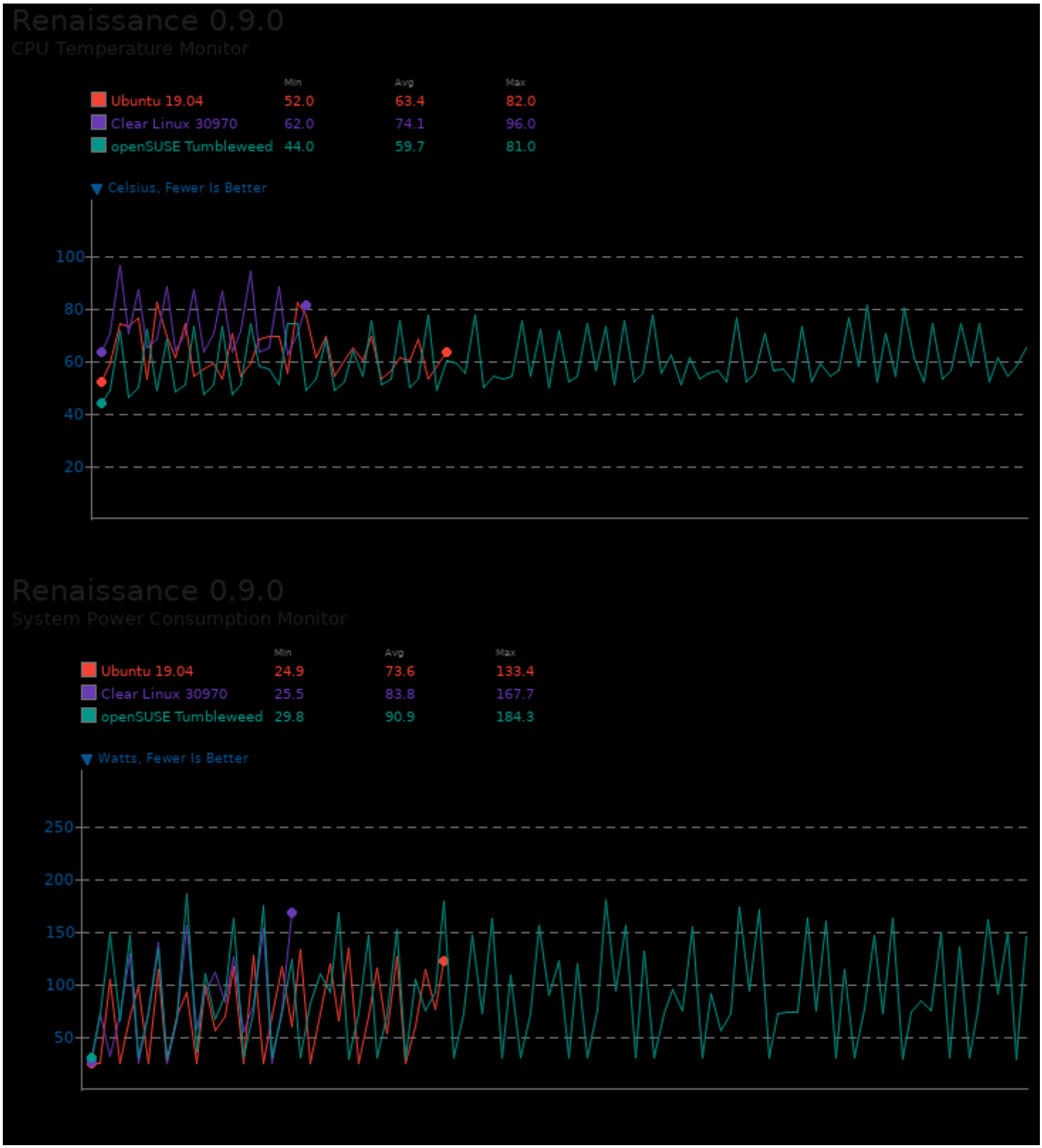

Renaissance 0.9.0
Test: Apache Spark ALS
ms, Fewer Is Better
Ubuntu 19.04
SE +/- 28.59, N = 8
4373.54
Clear Linux 30970
SE +/- 18.63, N = 8
3652.79
900
1800
2700
3600
4500
Renaissance 0.9.0
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04
50.0
61.4
79.0
Clear Linux 30970
63.0
78.1
95.0
Celsius, Fewer Is Better
100
80
60
40
20

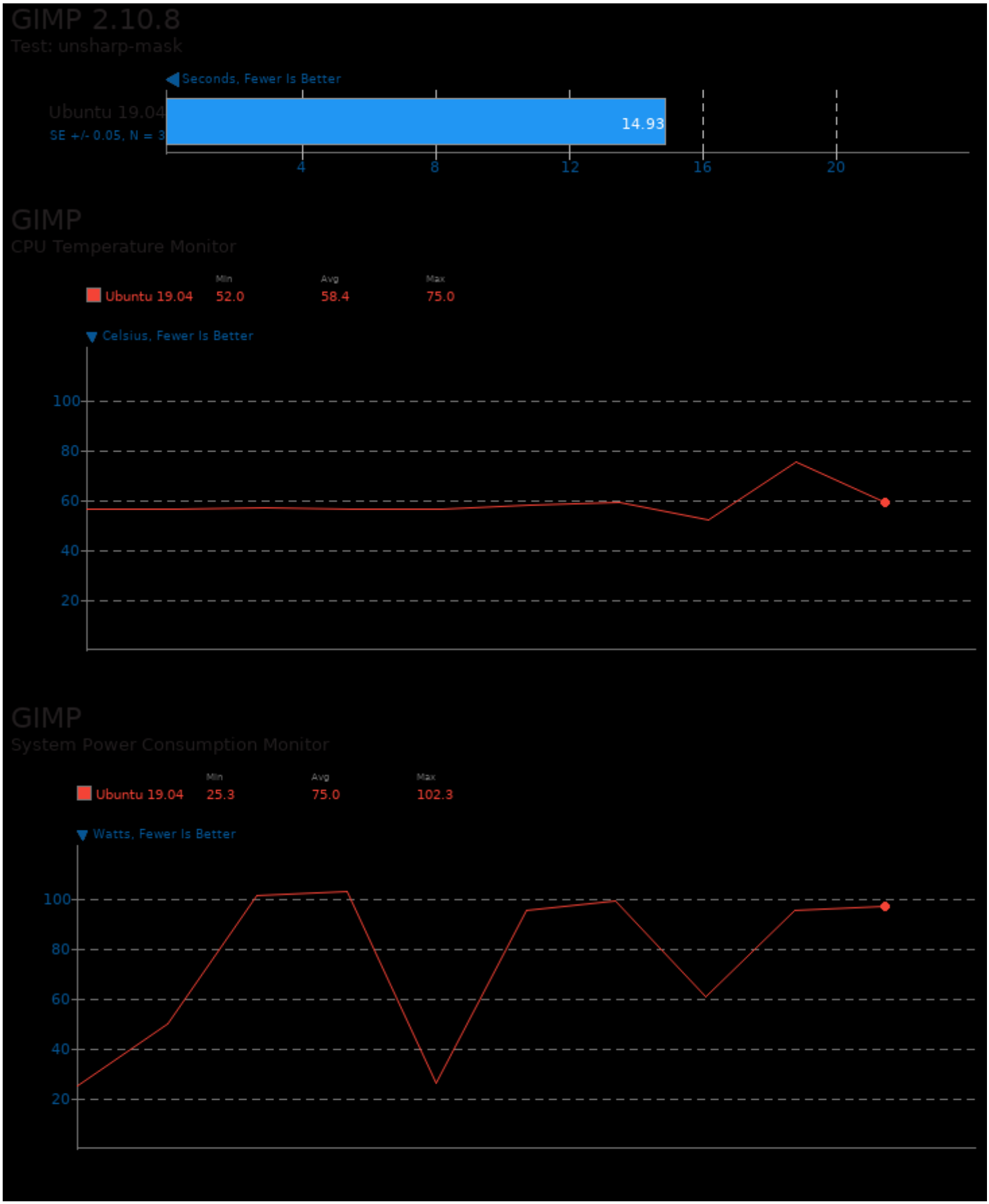

Renaissance 0.9.0
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04
25.0
74.4
125.9
Clear Linux 30970
25.1
72.7
174.6
Watts, Fewer Is Better
250
200
150
100
50
Renaissance 0.9.0
Test: Apache Spark Bayes
ms, Fewer Is Better
Ubuntu 19.04
SE +/- 34.01, N = 8
4620.20
Clear Linux 30970
SE +/- 37.28, N = 8
8059.81
2K
4K
6K
8K
10K

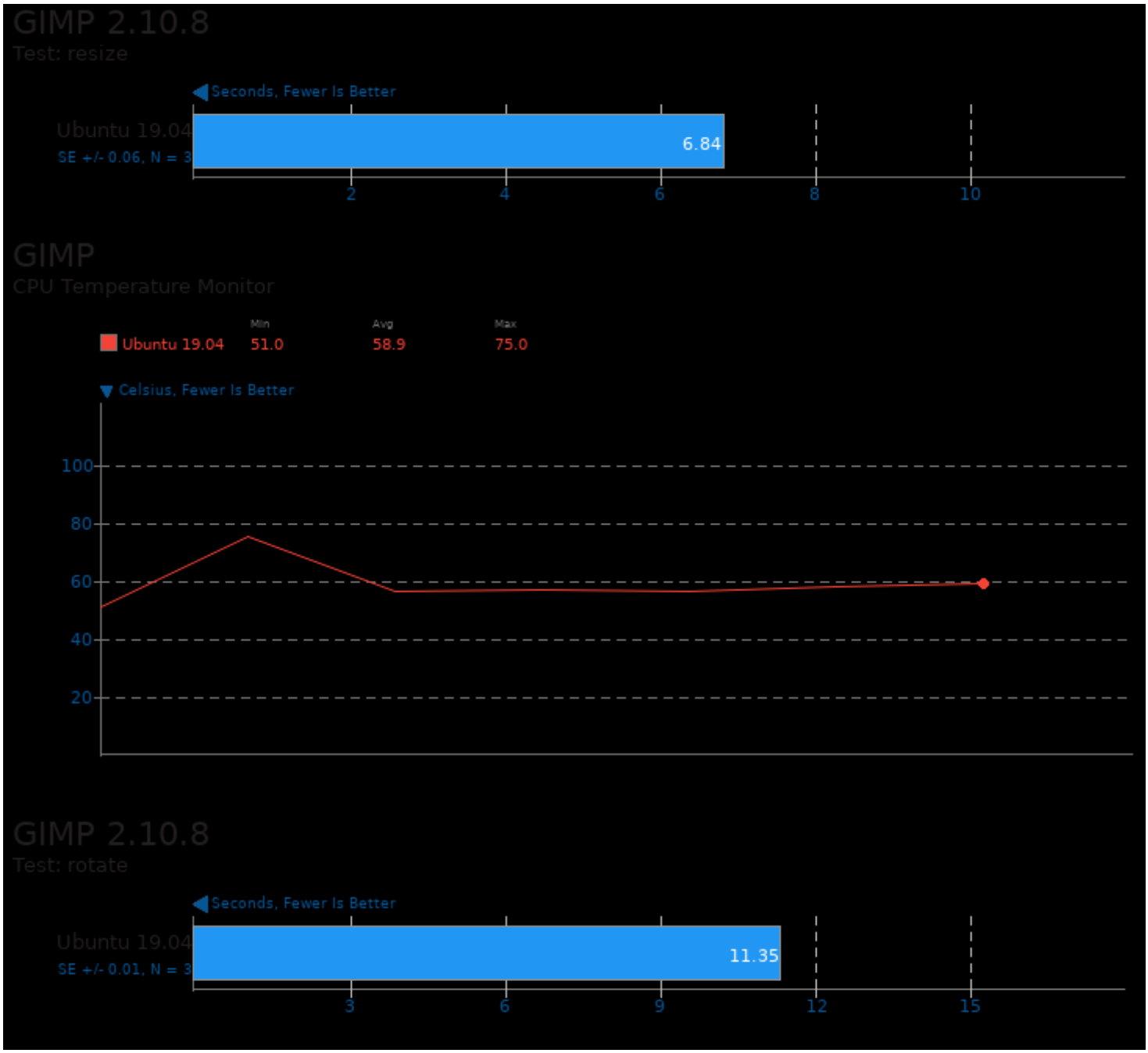

Renaissance 0.9.0
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04
50.0
60.7
74.0
Clear Linux 30970
63.0
80.0
97.0
Celsius, Fewer Is Better
100
80
60
40
20
Renaissance 0.9.0
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04
25.2
78.2
142.9
Clear Linux 30970
25.5
113.2
161.2
Watts, Fewer Is Better
250
200
150
100
50

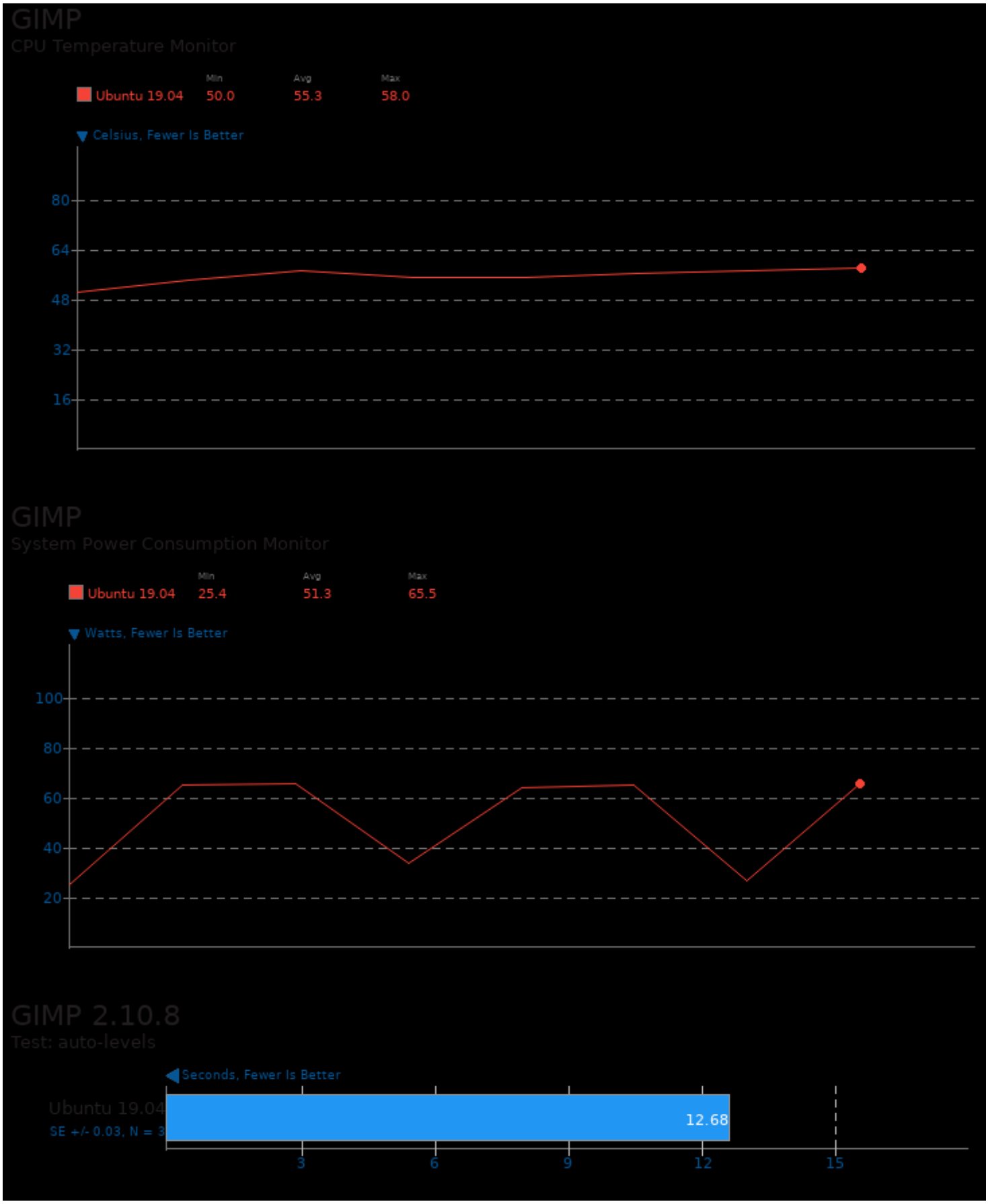

Renaissance 0.9.0
Test: Apache Spark PageRank
ms, Fewer Is Better
Ubuntu 19.04
SE +/- 49.77, N = 8
16449.08
Clear Linux 30970
SE +/- 70.98, N = 8
18325.03
4K
8K
12K
16K
20K
Renaissance 0.9.0
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04
53.0
68.3
82.0
Clear Linux 30970
63.0
78.3
97.0
Celsius, Fewer Is Better
100
80
60
40
20

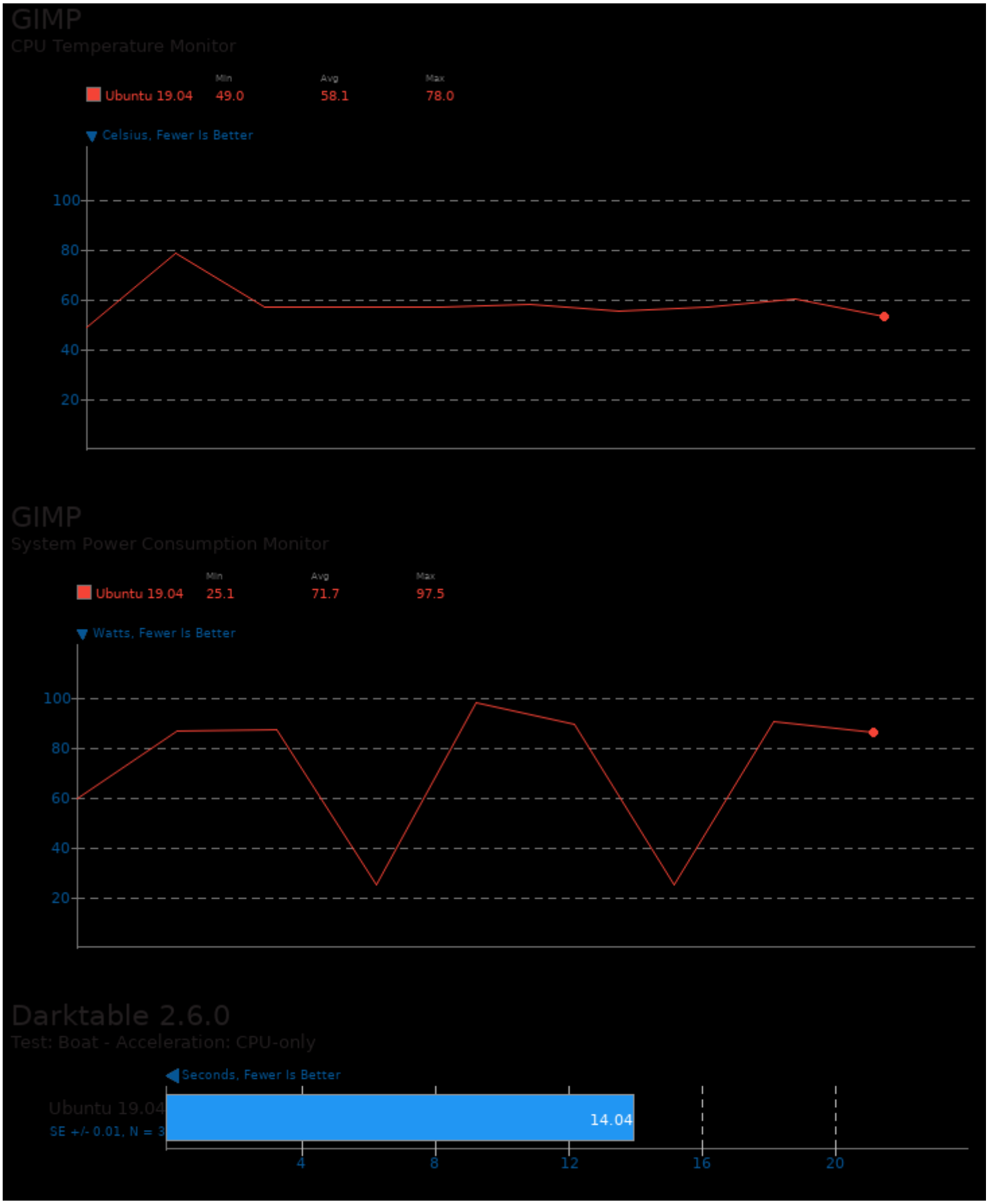

Renaissance 0.9.0
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04
24.5
90.6
138.7
Clear Linux 30970
25.5
97.9
138.8
Watts, Fewer Is Better
200
160
120
80
40
Renaissance 0.9.0
Test: In-Memory Database Shootout
ms, Fewer Is Better
Ubuntu 19.04
SE +/- 37.01, N = 15
4804.38
Clear Linux 30970
SE +/- 36.07, N = 8
4361.75
openSUSE Tumbleweed
SE +/- 32.64, N = 40
4448.10
1000
2000
3000
4000
5000

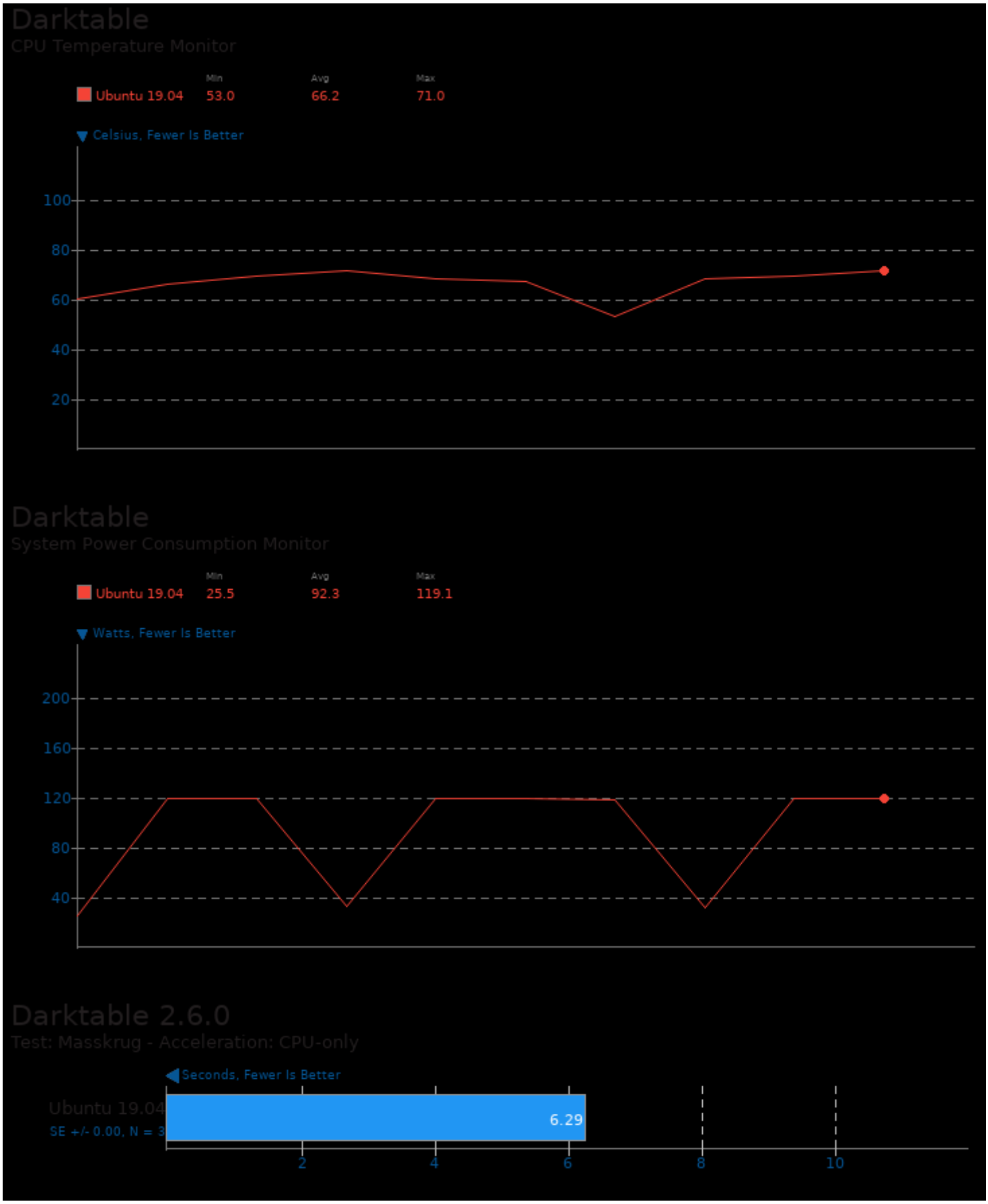

Renaissance 0.9.0
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 52.0 63.4 82.0
Clear Linux 30970 62.0 74.1 96.0
openSUSE Tumbleweed 44.0 59.7 81.0
Celsius, Fewer Is Better
100
80
60
40
20
Renaissance 0.9.0
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04 24.9 73.6 133.4
Clear Linux 30970 25.5 83.8 167.7
openSUSE Tumbleweed 29.8 90.9 184.3
Watts, Fewer Is Better
250
200
150
100
50


GIMP 2.10.8
Test: unsharp-mask
Seconds, Fewer Is Better
Ubuntu 19.04
SE +/- 0.05, N = 3
14.93
4
8
12
16
20
GIMP
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04
52.0
58.4
75.0
Celsius, Fewer Is Better
100
80
60
40
20
GIMP
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04
25.3
75.0
102.3
Watts, Fewer Is Better
100
80
60
40
20


GIMP 2.10.8
Test: resize
Seconds, Fewer Is Better
Ubuntu 19.04
SE +/- 0.06, N = 3
6.84
2
4
6
8
10
GIMP
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04
51.0
58.9
75.0
Celsius, Fewer Is Better
100
80
60
40
20
GIMP 2.10.8
Test: rotate
Seconds, Fewer Is Better
Ubuntu 19.04
SE +/- 0.01, N = 3
11.35
3
6
9
12
15

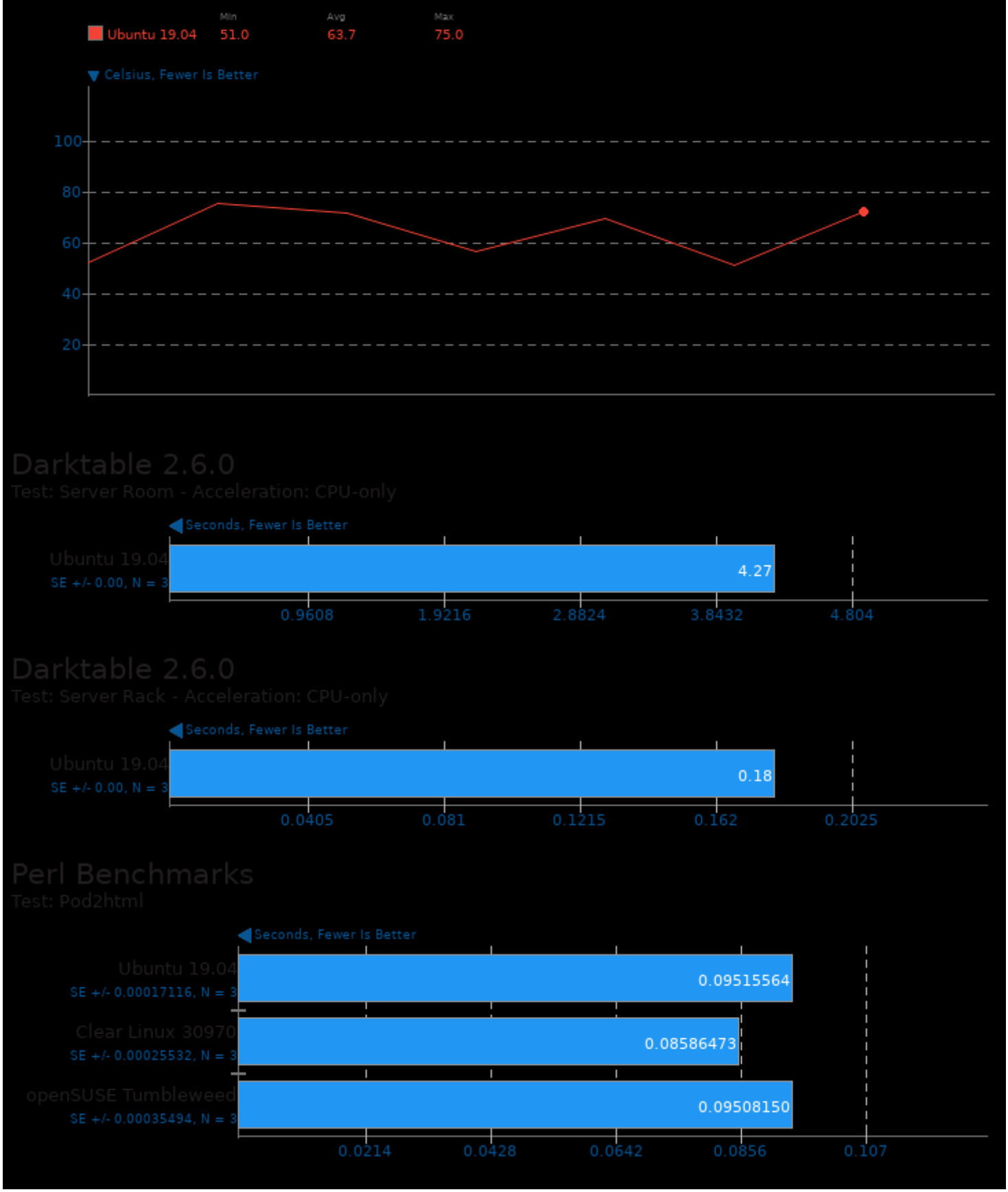

GIMP
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04
50.0
55.3
58.0
Celsius, Fewer Is Better
80
64
48
32
16
GIMP
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04
25.4
51.3
65.5
Watts, Fewer Is Better
100
80
60
40
20
GIMP 2.10.8
Test: auto-levels
Seconds, Fewer Is Better
Ubuntu 19.04
SE +/- 0.03, N = 3
12.68
3
6
9
12
15


GIMP
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04
49.0
58.1
78.0
Celsius, Fewer Is Better
100
80
60
40
20
GIMP
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04
25.1
71.7
97.5
Watts, Fewer Is Better
100
80
60
40
20
Darktable 2.6.0
Test: Boat - Acceleration: CPU-only
Seconds, Fewer Is Better
Ubuntu 19.04
SE +/- 0.01, N = 3
14.04
4
8
12
16
20


Darktable
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04
53.0
66.2
71.0
Celsius, Fewer Is Better
100
80
60
40
20
Darktable
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04
25.5
92.3
119.1
Watts, Fewer Is Better
200
160
120
80
40
Darktable 2.6.0
Test: Masskrug - Acceleration: CPU-only
Seconds, Fewer Is Better
Ubuntu 19.04
SE +/- 0.00, N = 3
6.29
2
4
6
8
10

Darktable

CPU Temperature Monitor



Darktable 2.6.0

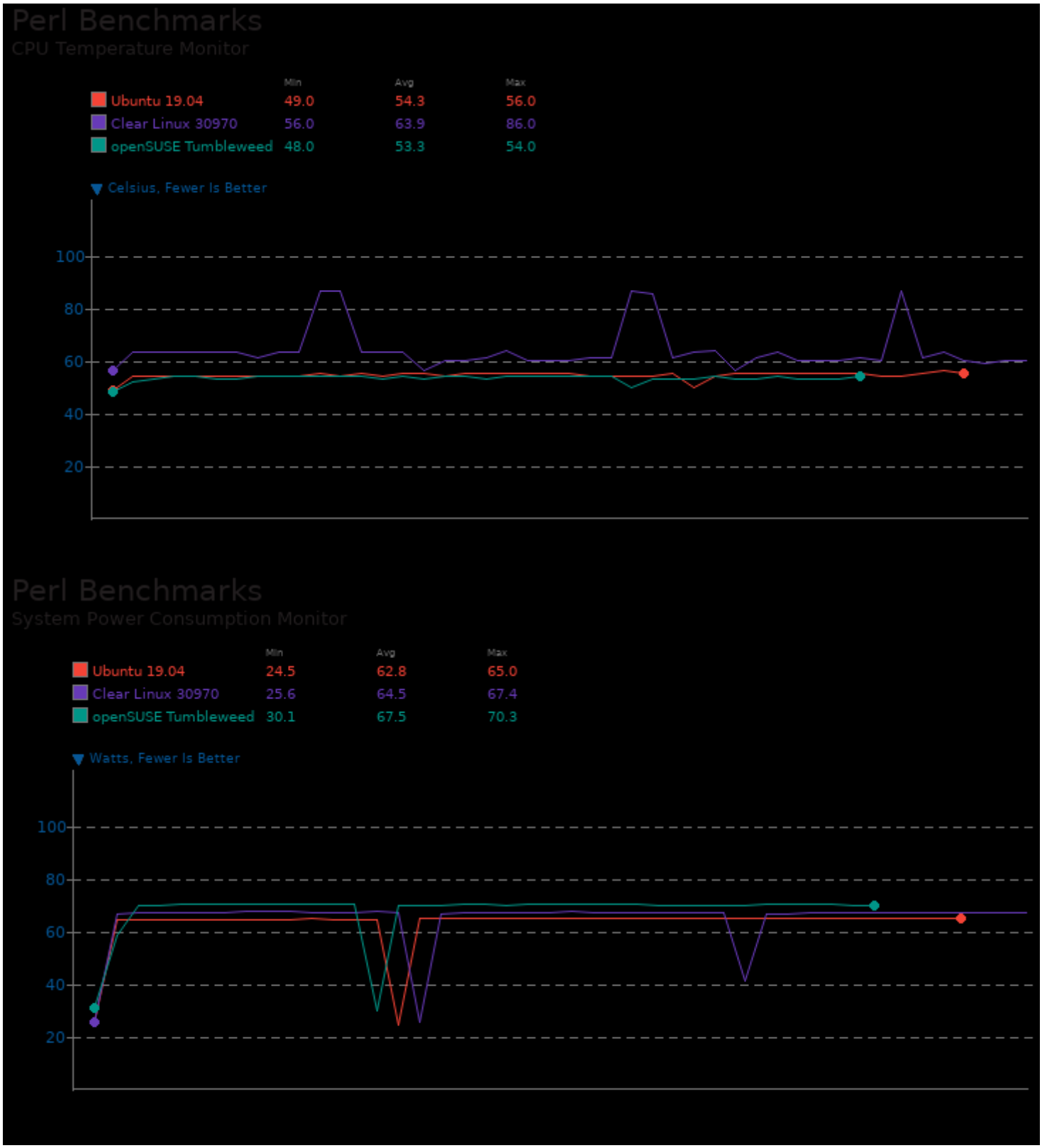
Test: Server Room - Acceleration: CPU-only

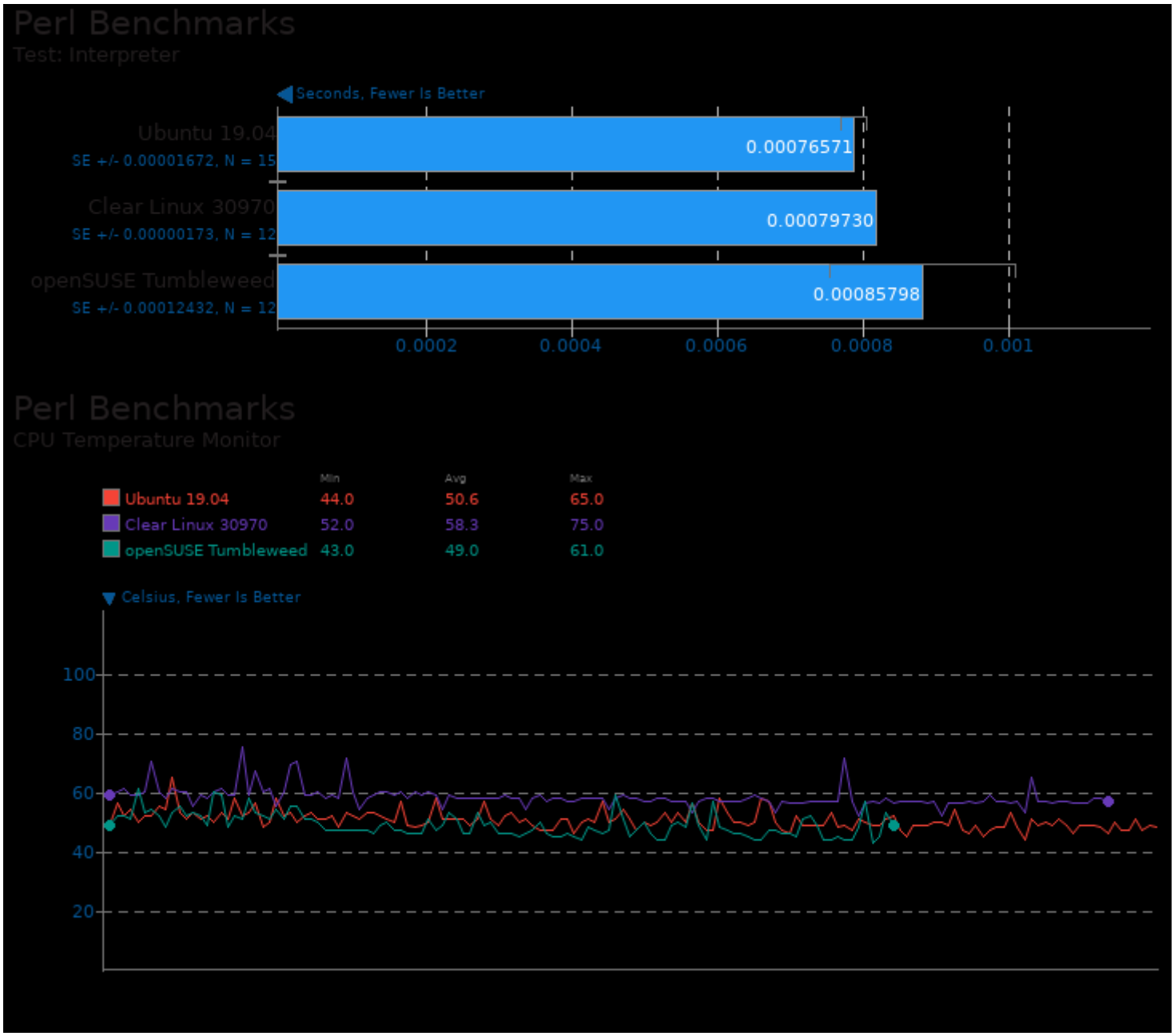
Darktable 2.6.0

Test: Server Rack - Acceleration: CPU-only

Perl Benchmarks

Test: Pod2html


Perl Benchmarks
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 49.0 54.3 56.0
Clear Linux 30970 56.0 63.9 86.0
openSUSE Tumbleweed 48.0 53.3 54.0
Celsius, Fewer Is Better
100
80
60
40
20
Perl Benchmarks
System Power Consumption Monitor
Min
Avg
Max
Ubuntu 19.04 24.5 62.8 65.0
Clear Linux 30970 25.6 64.5 67.4
openSUSE Tumbleweed 30.1 67.5 70.3
Watts, Fewer Is Better
100
80
60
40
20


Perl Benchmarks
Test: Interpreter
Seconds, Fewer Is Better
Ubuntu 19.04
SE +/- 0.00001672, N = 15
0.00076571
Clear Linux 30970
SE +/- 0.00000173, N = 12
0.00079730
openSUSE Tumbleweed
SE +/- 0.00012432, N = 12
0.00085798
0.0002
0.0004
0.0006
0.0008
0.001
Perl Benchmarks
CPU Temperature Monitor
Min
Avg
Max
Ubuntu 19.04 44.0 50.6 65.0
Clear Linux 30970 52.0 58.3 75.0
openSUSE Tumbleweed 43.0 49.0 61.0
Celsius, Fewer Is Better
100
80
60
40
20

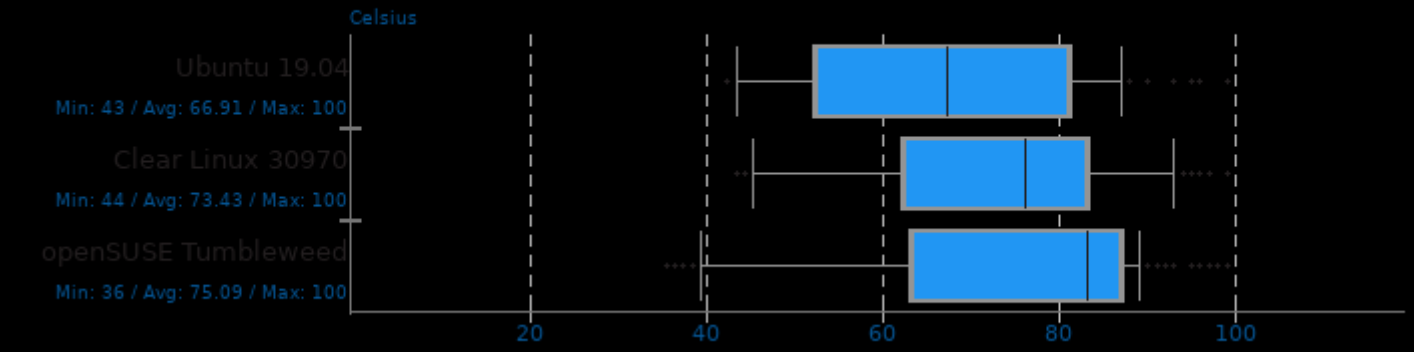
Perl Benchmarks

System Power Consumption Monitor

	Min	Avg	Max
Ubuntu 19.04	24.2	47.9	60.6
Clear Linux 30970	24.6	59.3	62.8
openSUSE Tumbleweed	29.9	49.1	65.4

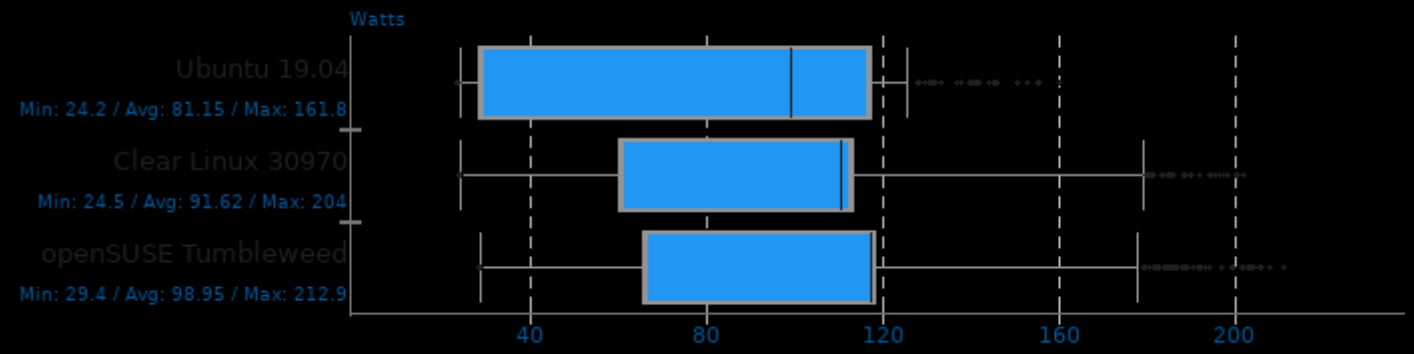
CPU Temperature Monitor

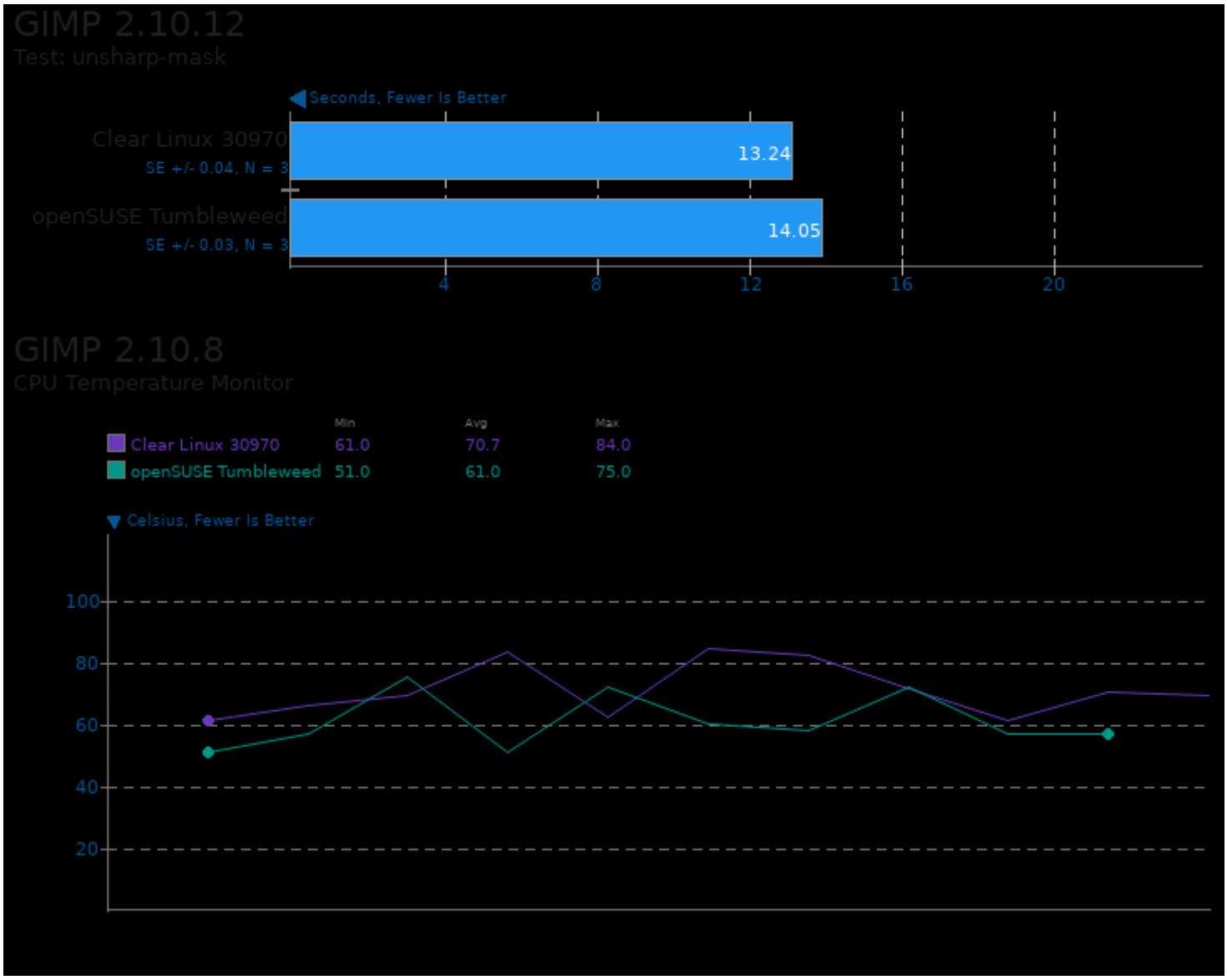
Phoronix Test Suite System Monitoring

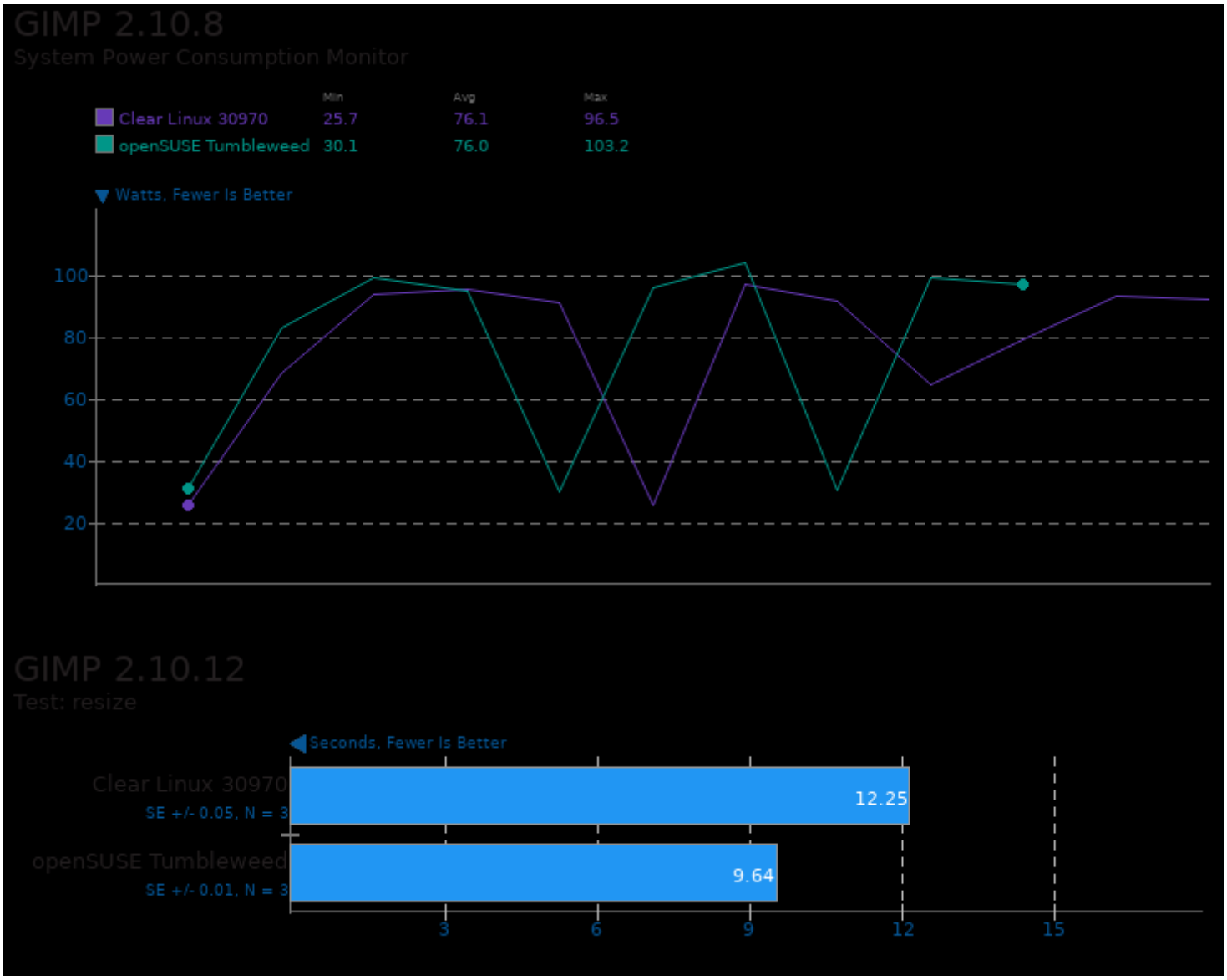


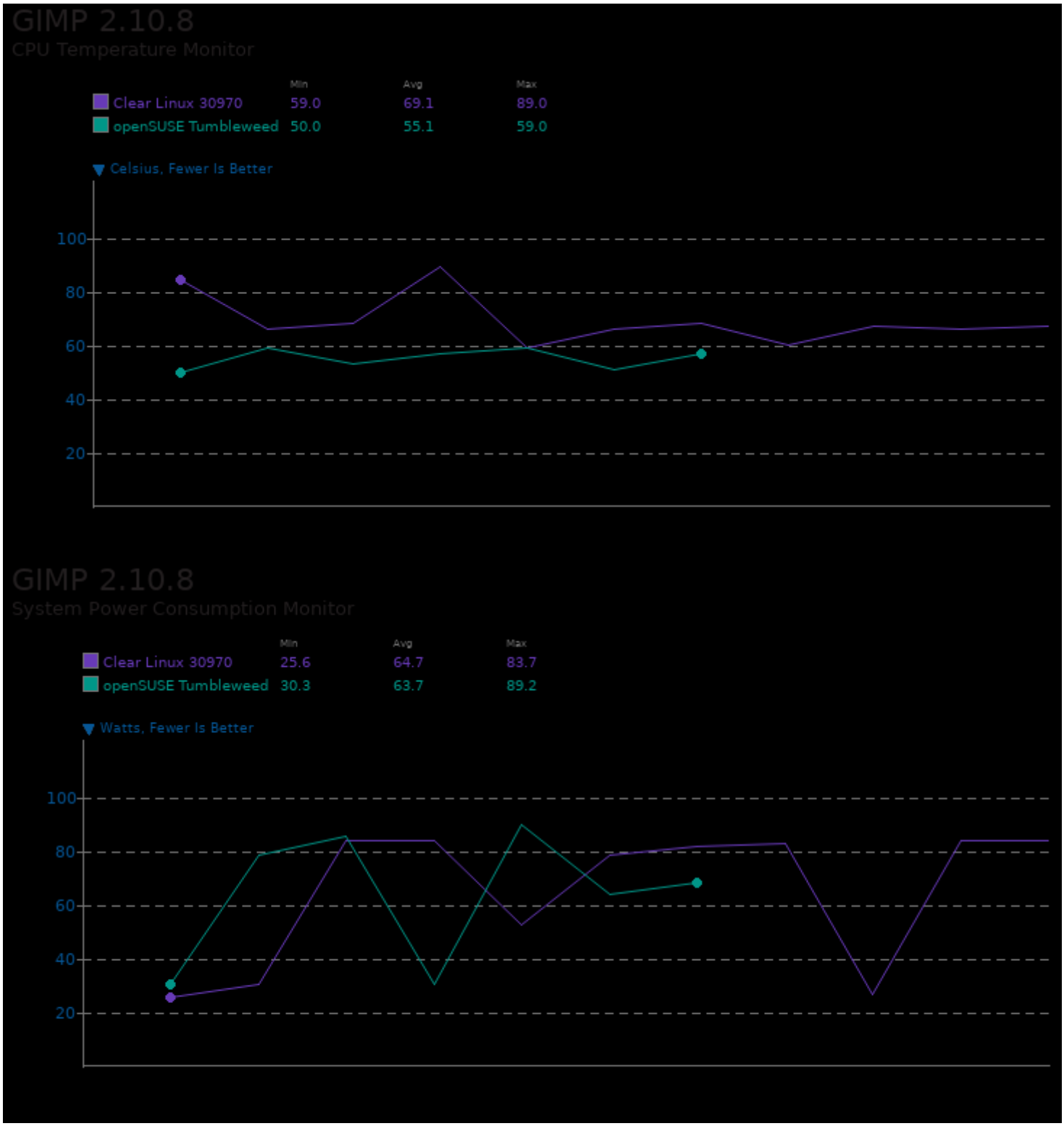
System Power Consumption Monitor

Phoronix Test Suite System Monitoring

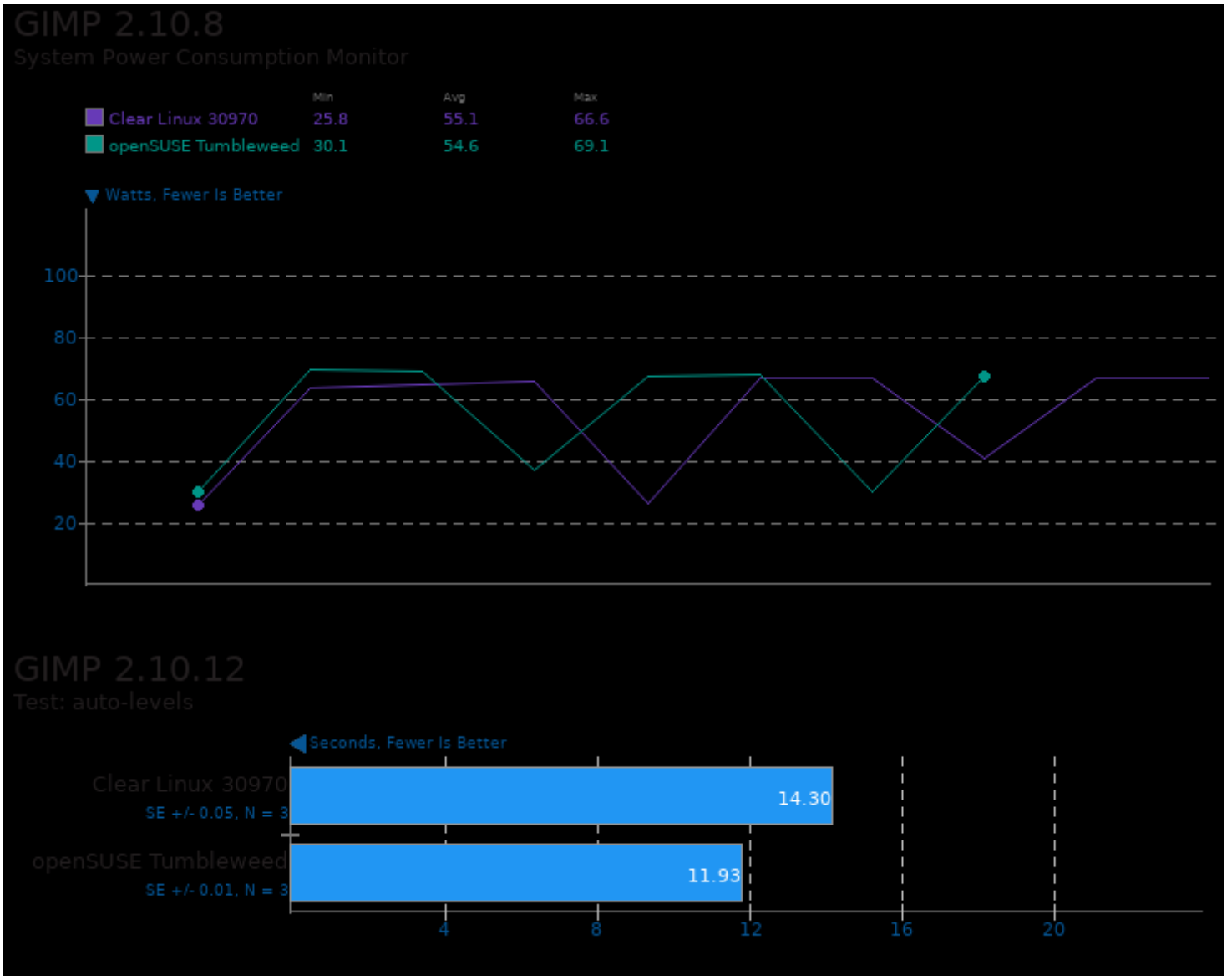


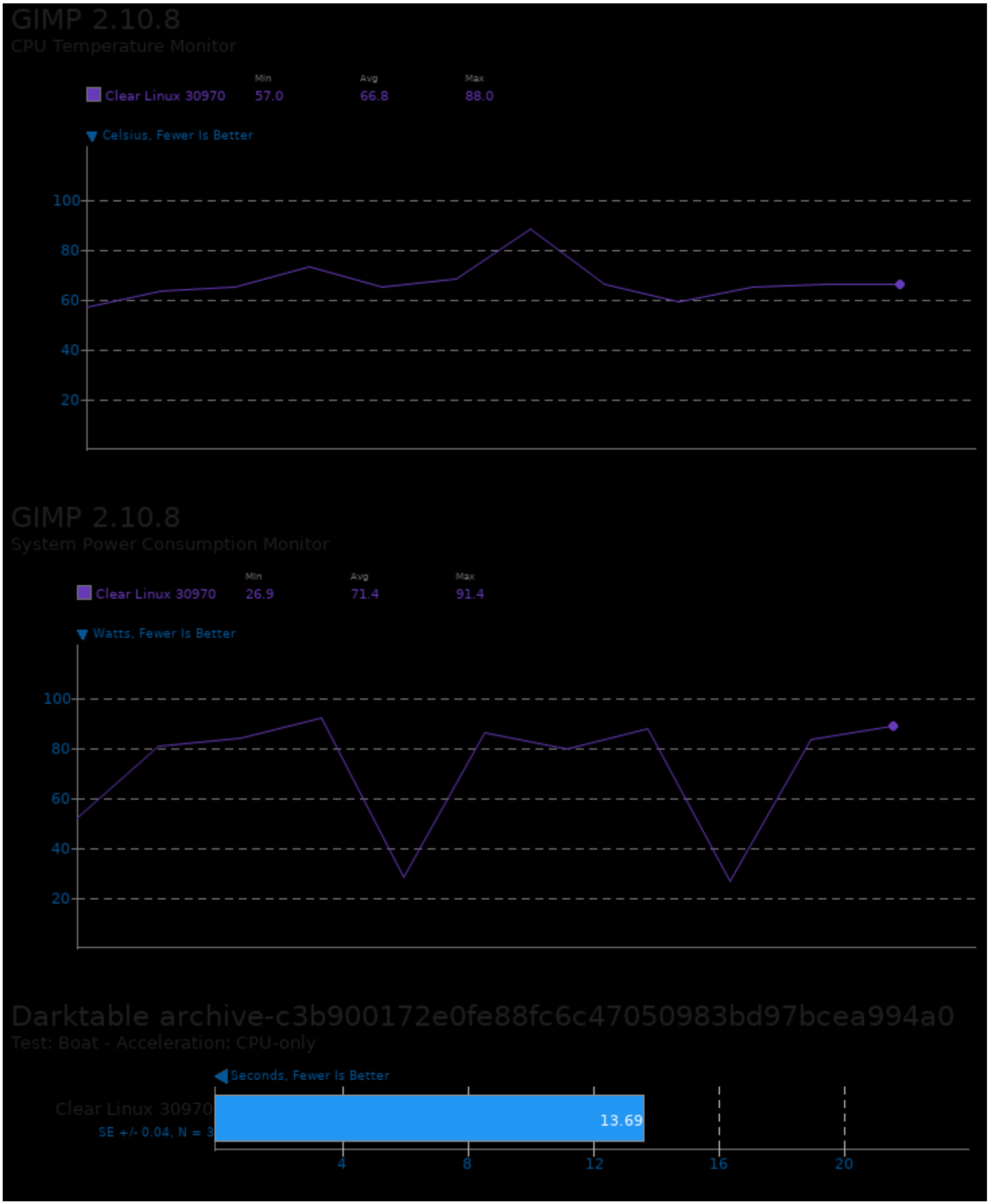

GIMP 2.10.12
Test: unsharp-mask
Seconds, Fewer Is Better
Clear Linux 30970
SE +/- 0.04, N = 3
13.24
openSUSE Tumbleweed
SE +/- 0.03, N = 3
14.05
4
8
12
16
20
GIMP 2.10.8
CPU Temperature Monitor
Min
Avg
Max
Clear Linux 30970 61.0 70.7 84.0
openSUSE Tumbleweed 51.0 61.0 75.0
Celsius, Fewer Is Better
100
80
60
40
20


GIMP 2.10.8
System Power Consumption Monitor
Min
Avg
Max
Clear Linux 30970
25.7
76.1
96.5
openSUSE Tumbleweed
30.1
76.0
103.2
Watts, Fewer Is Better
100
80
60
40
20
GIMP 2.10.12
Test: resize
Seconds, Fewer Is Better
Clear Linux 30970
SE +/- 0.05, N = 3
12.25
openSUSE Tumbleweed
SE +/- 0.01, N = 3
9.64
3
6
9
12
15


GIMP 2.10.8
CPU Temperature Monitor
Min
Avg
Max
Clear Linux 30970 59.0 69.1 89.0
openSUSE Tumbleweed 50.0 55.1 59.0
Celsius, Fewer Is Better
100
80
60
40
20
GIMP 2.10.8
System Power Consumption Monitor
Min
Avg
Max
Clear Linux 30970 25.6 64.7 83.7
openSUSE Tumbleweed 30.3 63.7 89.2
Watts, Fewer Is Better
100
80
60
40
20

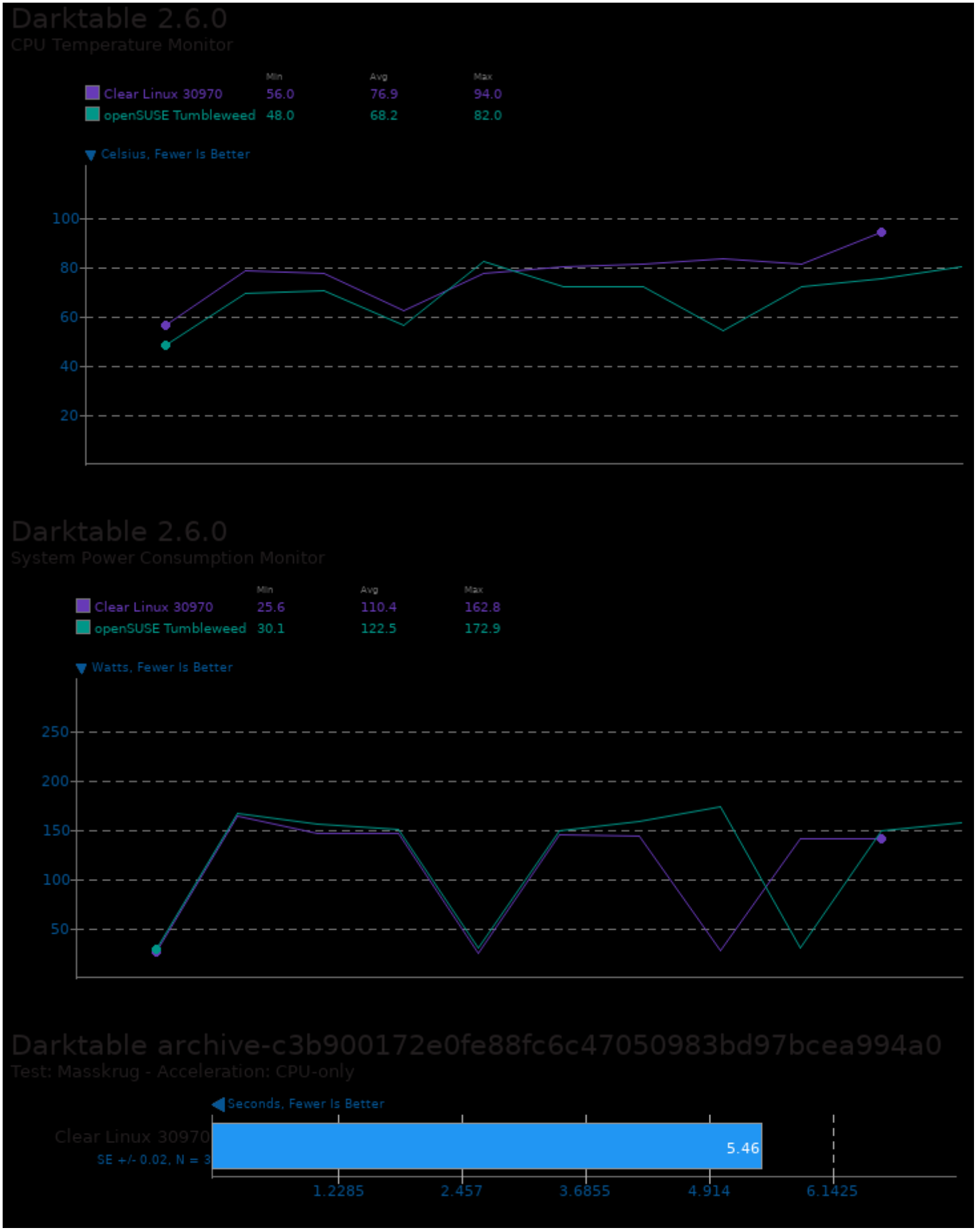

GIMP 2.10.12
Test: rotate
Seconds, Fewer Is Better
Clear Linux 30970
SE +/- 0.04, N = 3
10.43
openSUSE Tumbleweed
SE +/- 0.05, N = 3
11.84
3
6
9
12
15
GIMP 2.10.8
CPU Temperature Monitor
Min
Avg
Max
Clear Linux 30970 58.0 68.6 90.0
openSUSE Tumbleweed 50.0 54.1 66.0
Celsius, Fewer Is Better
100
80
60
40
20


GIMP 2.10.8
System Power Consumption Monitor
Min
Avg
Max
Clear Linux 30970
25.8
55.1
66.6
openSUSE Tumbleweed
30.1
54.6
69.1
Watts, Fewer Is Better
100
80
60
40
20
GIMP 2.10.12
Test: auto-levels
Seconds, Fewer Is Better
Clear Linux 30970
SE +/- 0.05, N = 3
14.30
openSUSE Tumbleweed
SE +/- 0.01, N = 3
11.93
4
8
12
16
20


GIMP 2.10.8
CPU Temperature Monitor
Min
Avg
Max
Clear Linux 30970
57.0
66.8
88.0
Celsius, Fewer Is Better
100
80
60
40
20
GIMP 2.10.8
System Power Consumption Monitor
Min
Avg
Max
Clear Linux 30970
26.9
71.4
91.4
Watts, Fewer Is Better
100
80
60
40
20
Darktable archive-c3b900172e0fe88fc6c47050983bd97bcea994a0
Test: Boat - Acceleration: CPU-only
Seconds, Fewer Is Better
Clear Linux 30970
SE +/- 0.04, N = 3
13.69
4
8
12
16
20

Darktable 2.6.0

CPU Temperature Monitor



Darktable 2.6.0

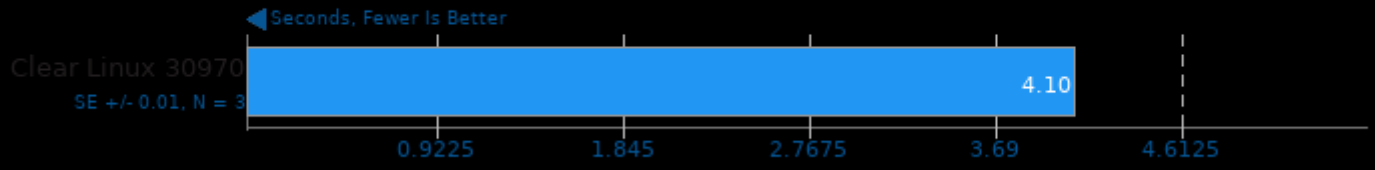
System Power Consumption Monitor

Darktable archive-c3b900172e0fe88fc6c47050983bd97bcea994a0

Test: Masskrug - Acceleration: CPU-only

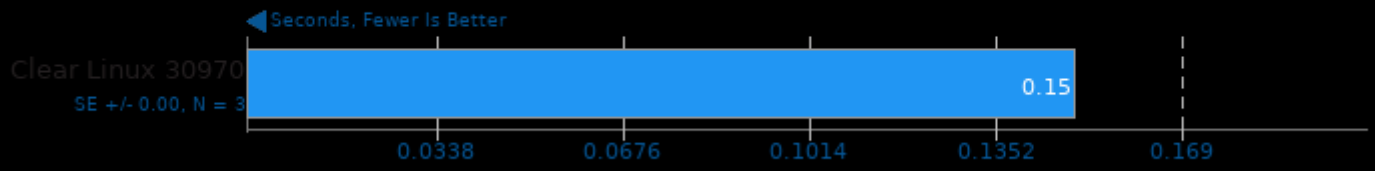
Darktable archive-c3b900172e0fe88fc6c47050983bd97bcea994a0

Test: Server Room - Acceleration: CPU-only



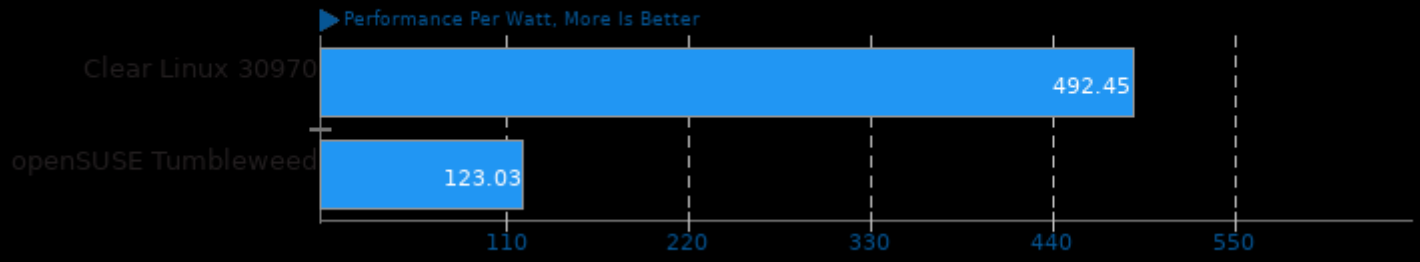
Darktable archive-c3b900172e0fe88fc6c47050983bd97bcea994a0

Test: Server Rack - Acceleration: CPU-only



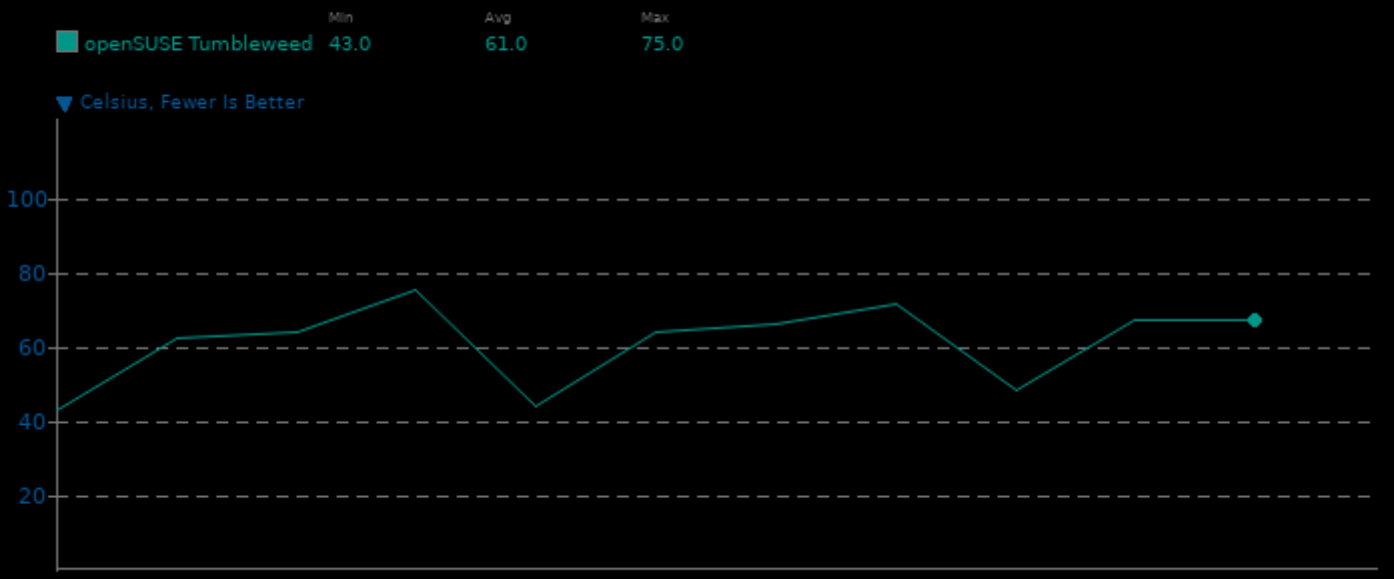
Meta Performance Per Watt

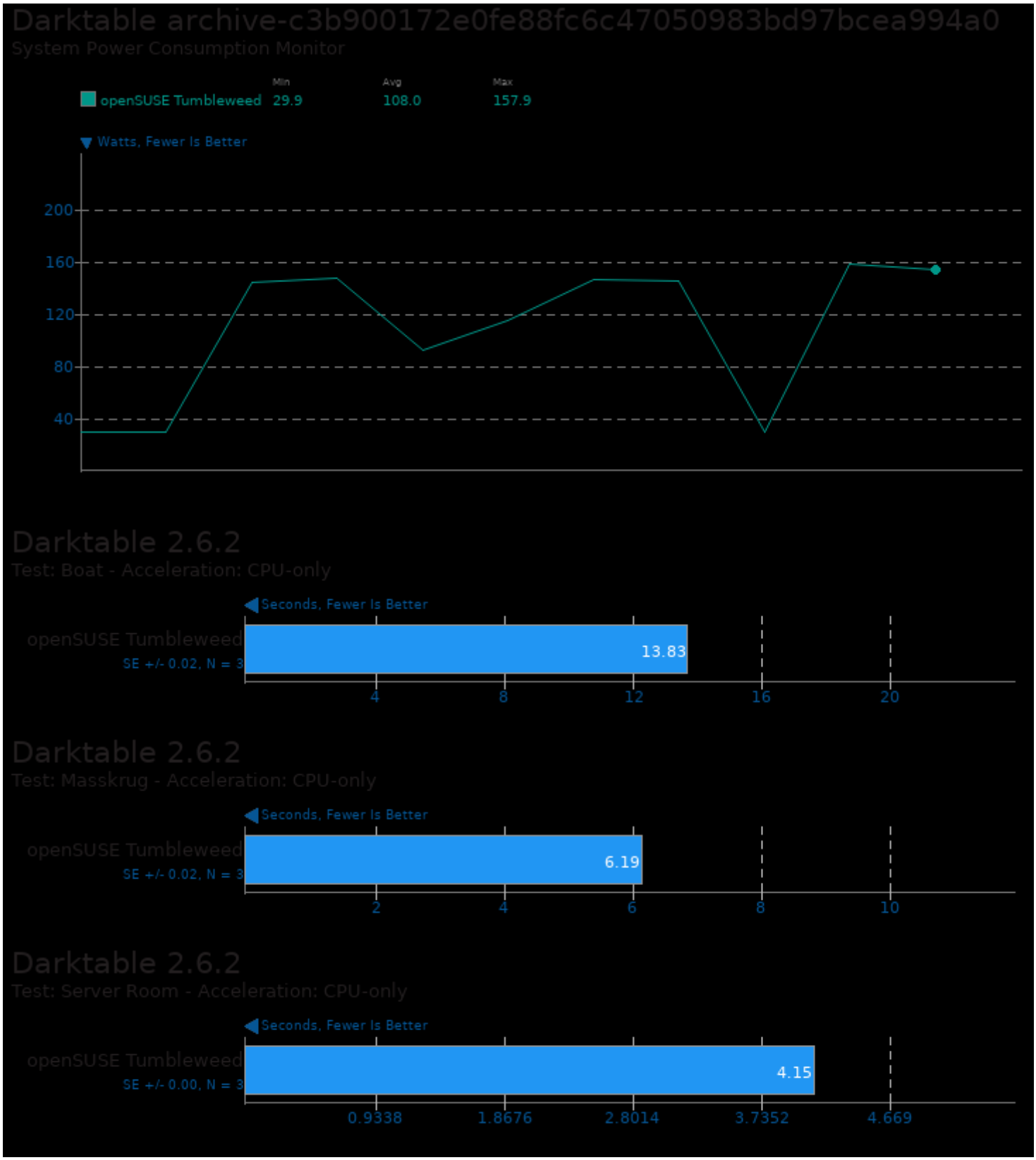
Performance Per Watt

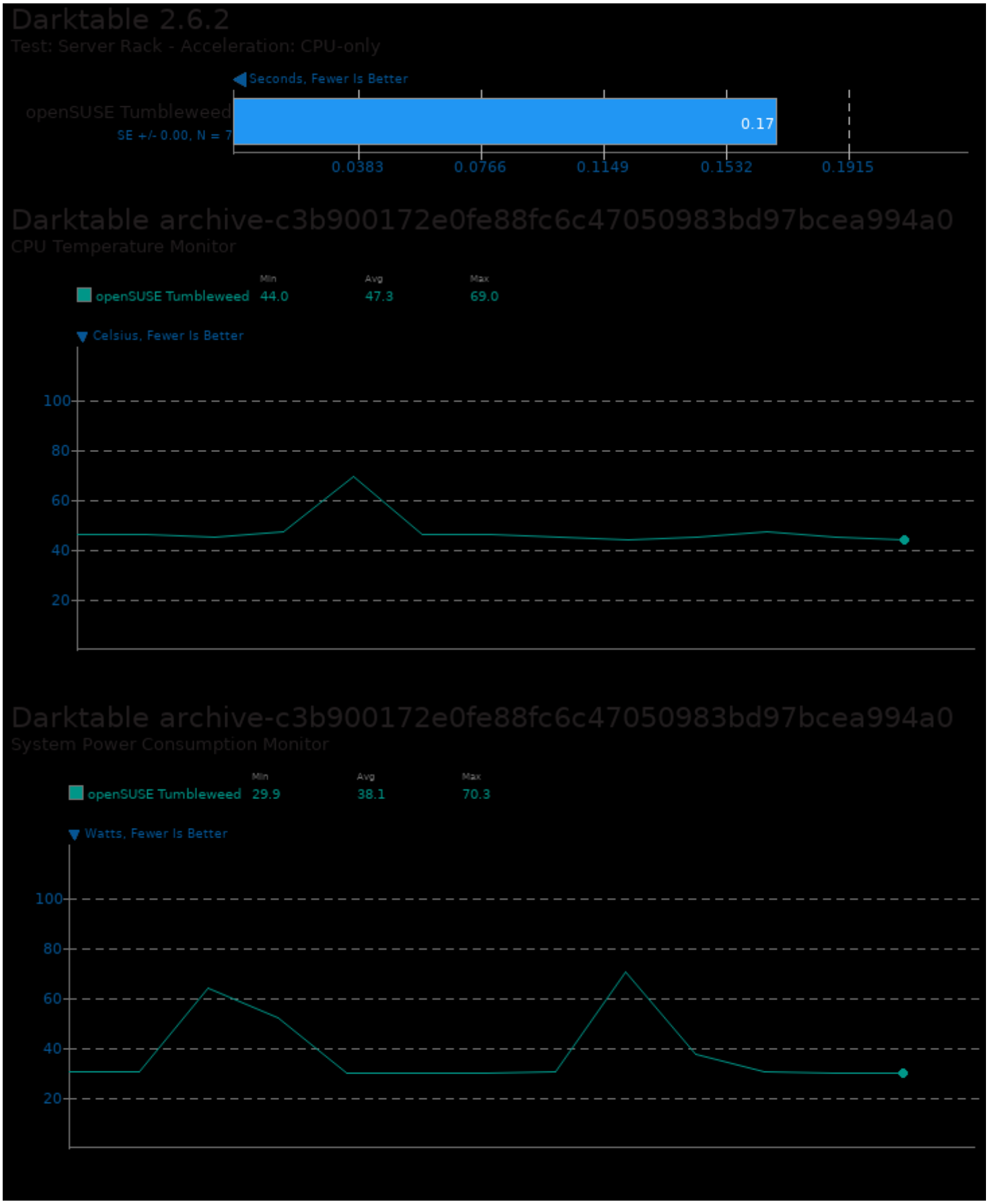


Darktable archive-c3b900172e0fe88fc6c47050983bd97bcea994a0

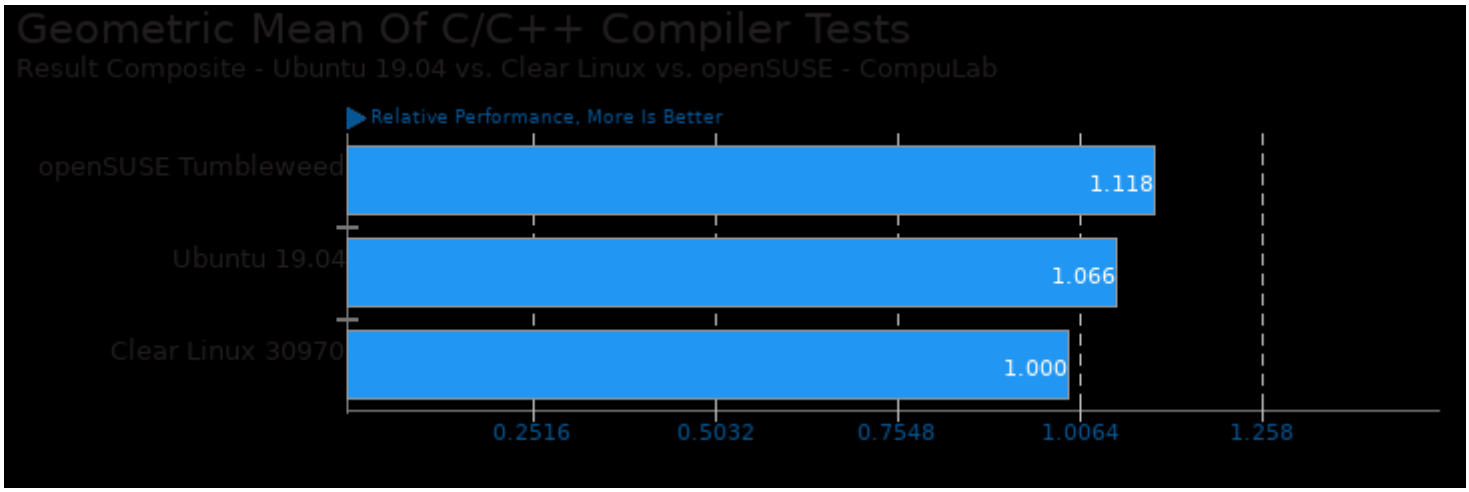
CPU Temperature Monitor



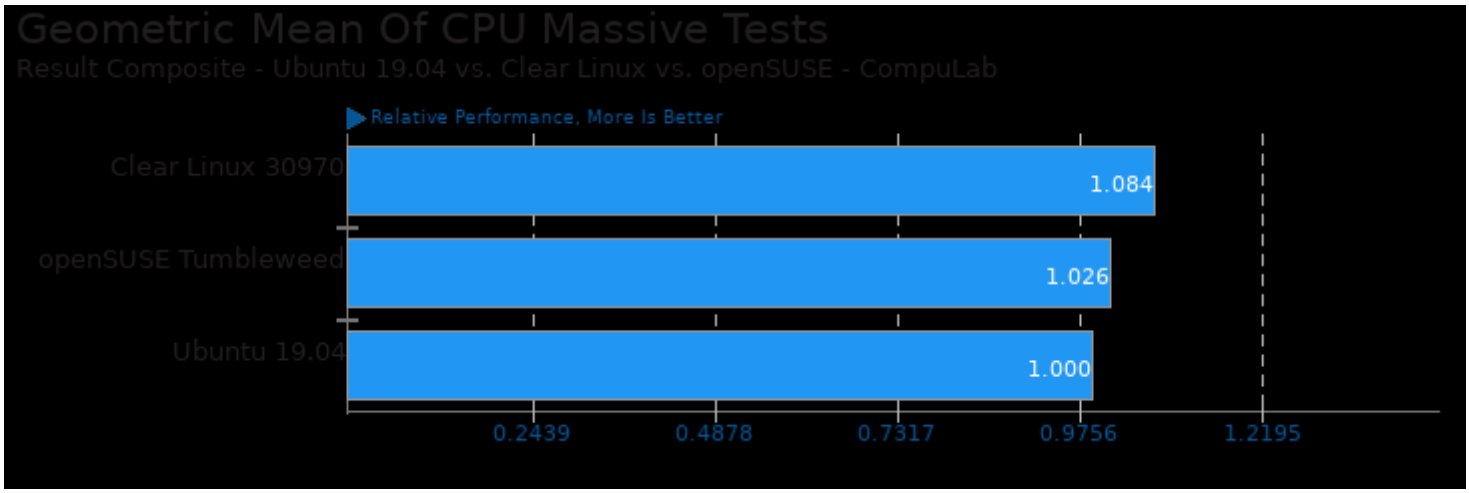

Darktable archive-c3b900172e0fe88fc6c47050983bd97bcea994a0
System Power Consumption Monitor
Min
Avg
Max
openSUSE Tumbleweed
29.9
108.0
157.9
Watts, Fewer Is Better
200
160
120
80
40
Darktable 2.6.2
Test: Boat - Acceleration: CPU-only
Seconds, Fewer Is Better
openSUSE Tumbleweed
SE +/- 0.02, N = 3
13.83
4
8
12
16
20
Darktable 2.6.2
Test: Masskrug - Acceleration: CPU-only
Seconds, Fewer Is Better
openSUSE Tumbleweed
SE +/- 0.02, N = 3
6.19
2
4
6
8
10
Darktable 2.6.2
Test: Server Room - Acceleration: CPU-only
Seconds, Fewer Is Better
openSUSE Tumbleweed
SE +/- 0.00, N = 3
4.15
0.9338
1.8676
2.8014
3.7352
4.669


Darktable 2.6.2
Test: Server Rack - Acceleration: CPU-only
Seconds, Fewer Is Better
openSUSE Tumbleweed
SE +/- 0.00, N = 7
0.17
0.0383
0.0766
0.1149
0.1532
0.1915
Darktable archive-c3b900172e0fe88fc6c47050983bd97bcea994a0
CPU Temperature Monitor
Min
Avg
Max
openSUSE Tumbleweed 44.0 47.3 69.0
Celsius, Fewer Is Better
100
80
60
40
20
Darktable archive-c3b900172e0fe88fc6c47050983bd97bcea994a0
System Power Consumption Monitor
Min
Avg
Max
openSUSE Tumbleweed 29.9 38.1 70.3
Watts, Fewer Is Better
100
80
60
40
20

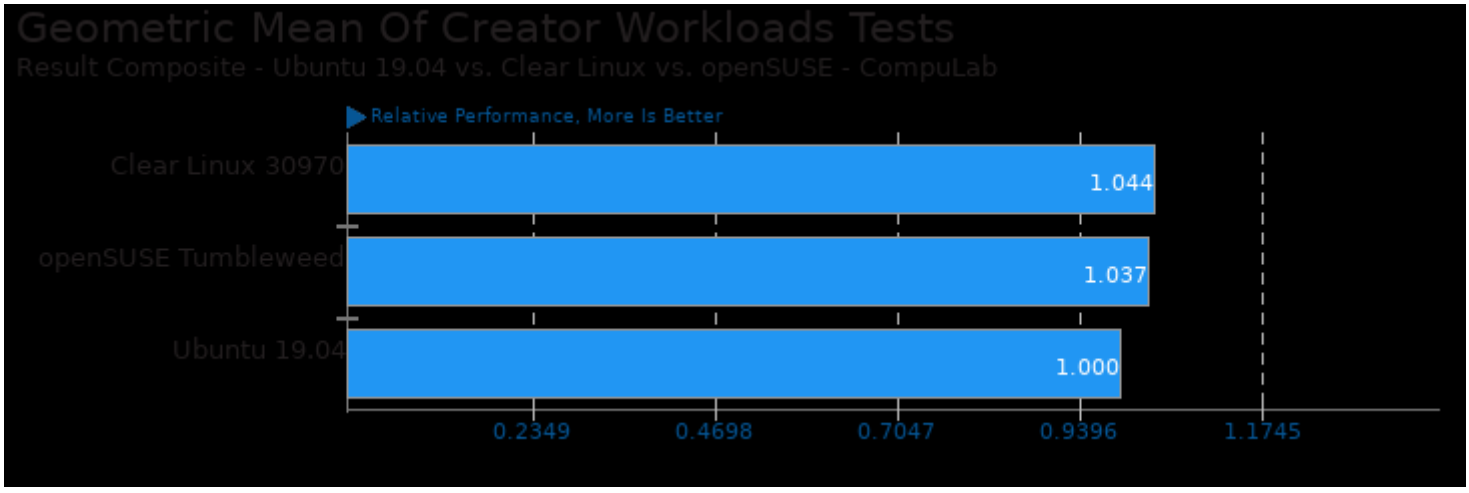
These geometric means are based upon test groupings / test suites for this result file.



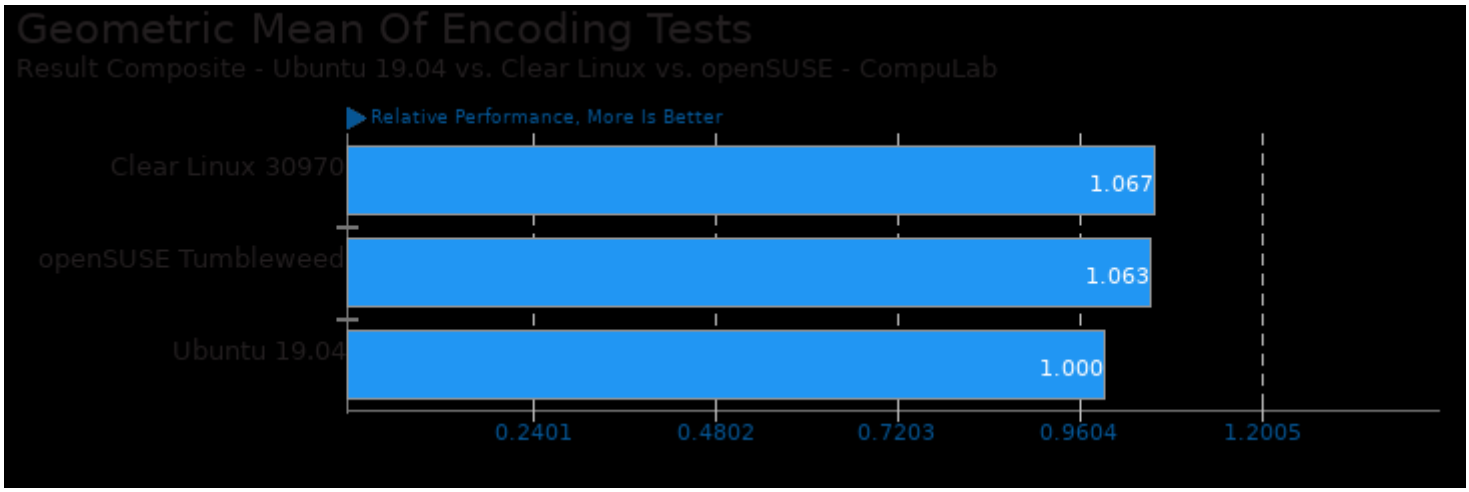
Geometric mean based upon tests: pts/build-llvm, pts/dav1d, pts/x265, pts/svt-vp9 and pts/gromacs



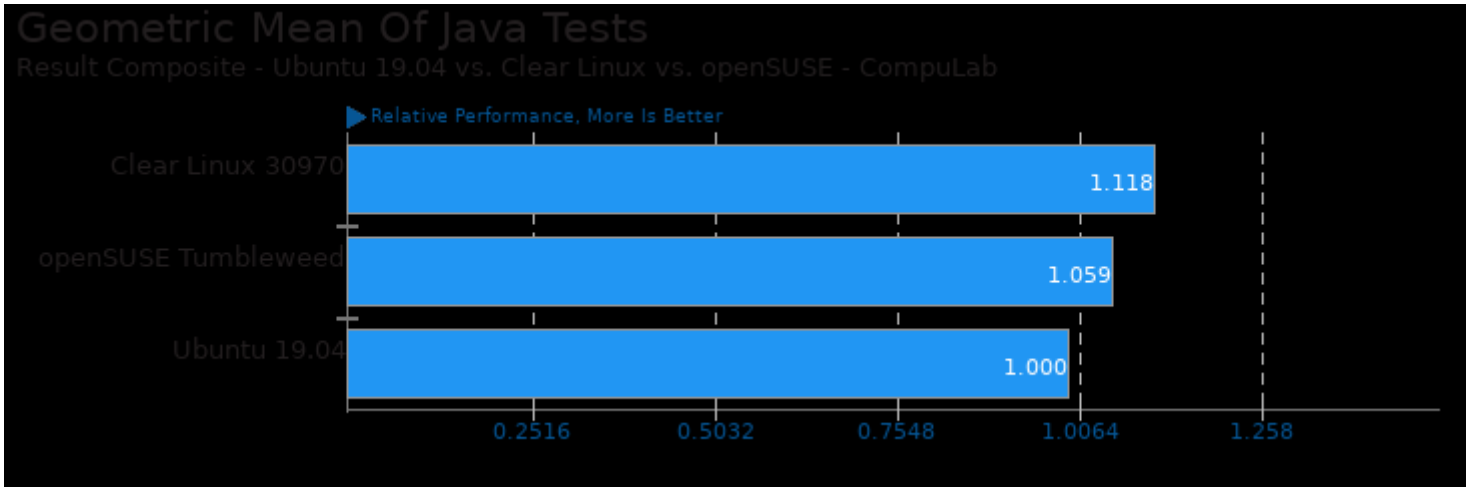
Geometric mean based upon tests: pts/build-llvm, pts/build-linux-kernel, pts/dacapobench, pts/dav1d, pts/svt-vp9, pts/x265, pts/glibc-bench, pts/go-benchmark, pts/phpbench, pts/blender, system/darktable, pts/tjbench and pts/renaissance



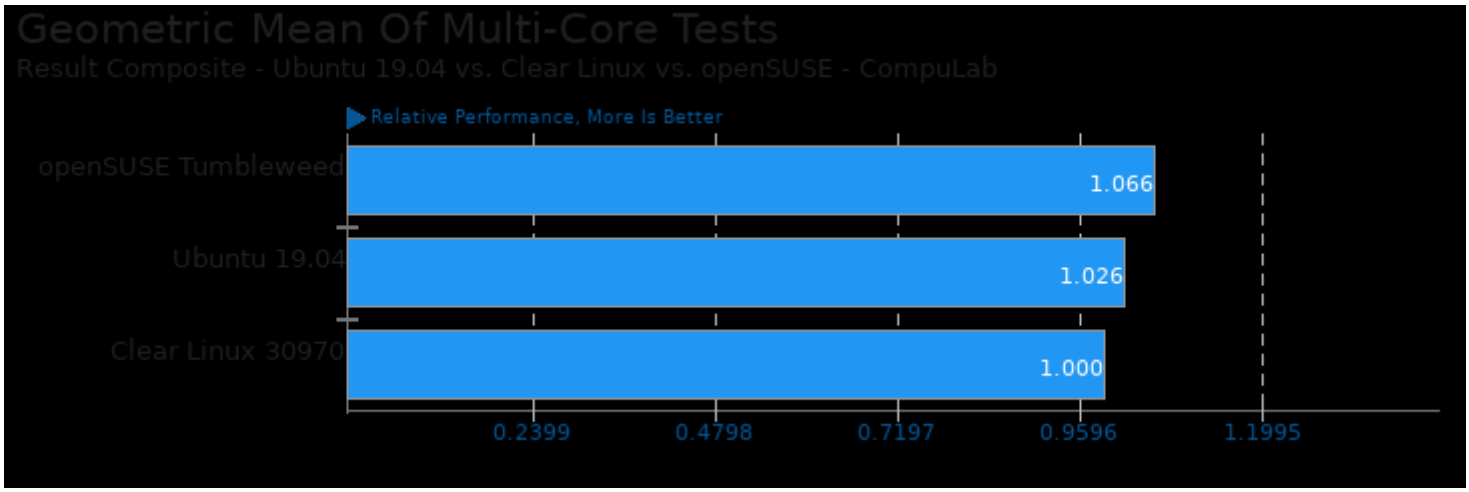
Geometric mean based upon tests: pts/blender, pts/appleseed, pts/svt-vp9, pts/x265, pts/dav1d, pts/tjbench, system/gimp, system/darktable and pts/neatbench



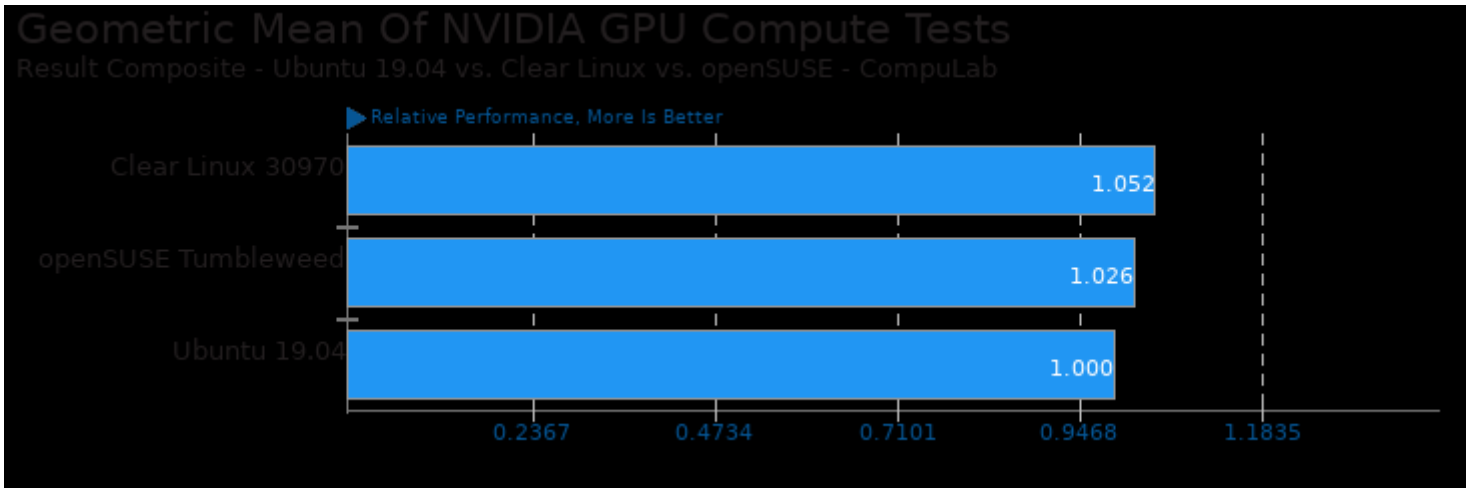
Geometric mean based upon tests: pts/svt-vp9, pts/x265 and pts/dav1d



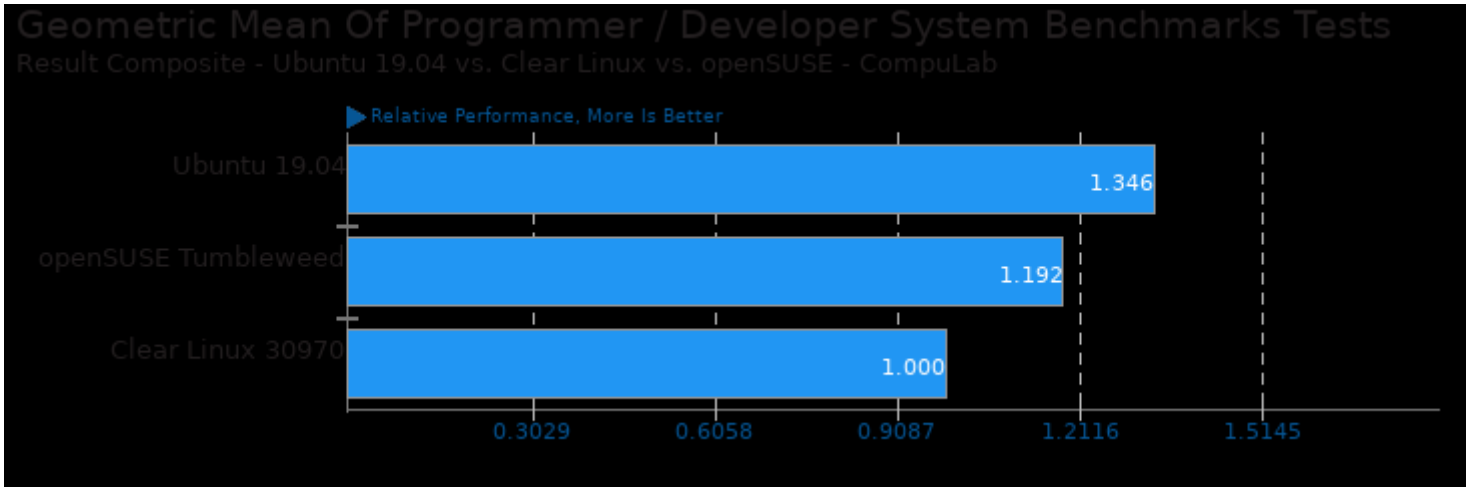
Geometric mean based upon tests: pts/dacapobench and pts/renaissance



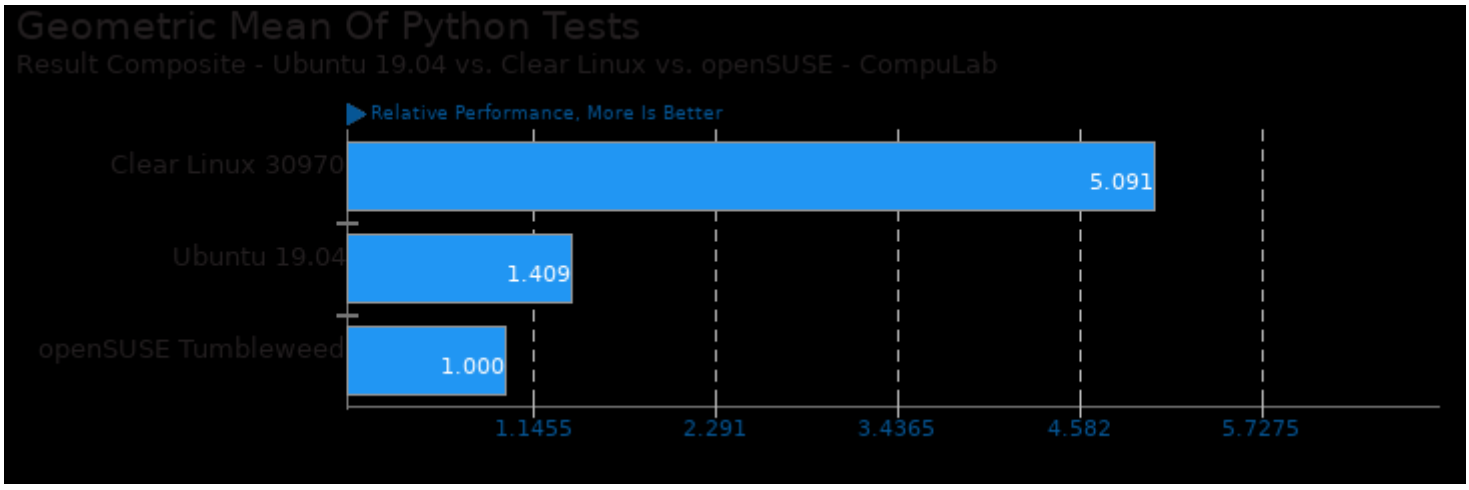
Geometric mean based upon tests: pts/blender, pts/svt-vp9, pts/x265, pts/dav1d, pts/gromacs, pts/build-linux-kernel, pts/build-llvm, pts/appleseed and pts/neatbench



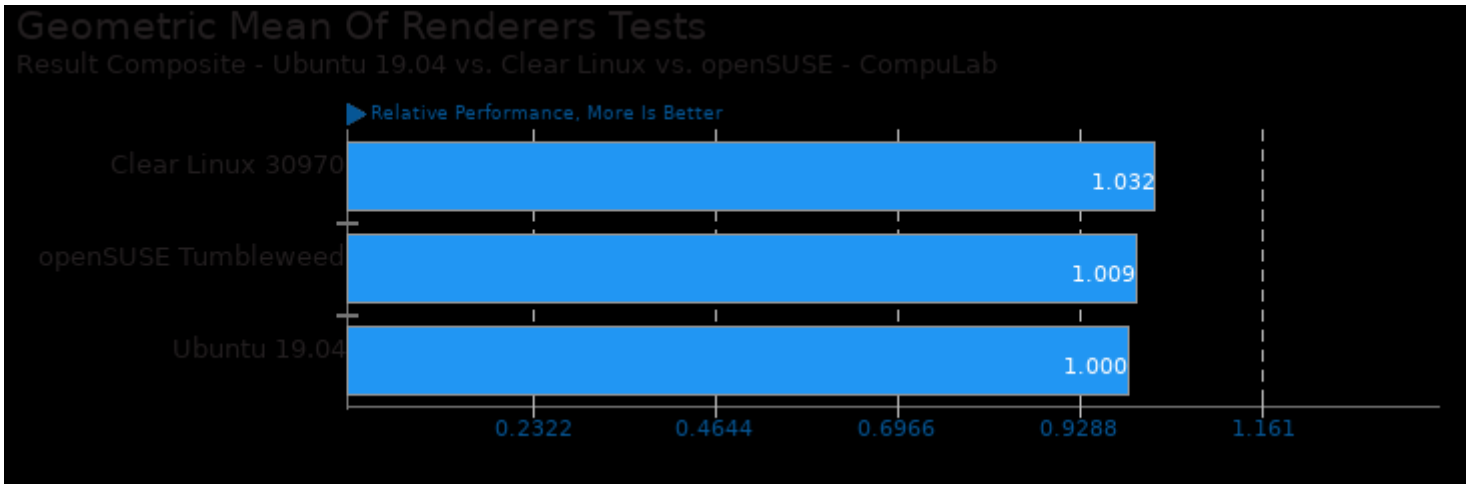
Geometric mean based upon tests: pts/gromacs, pts/neatbench and pts/blender



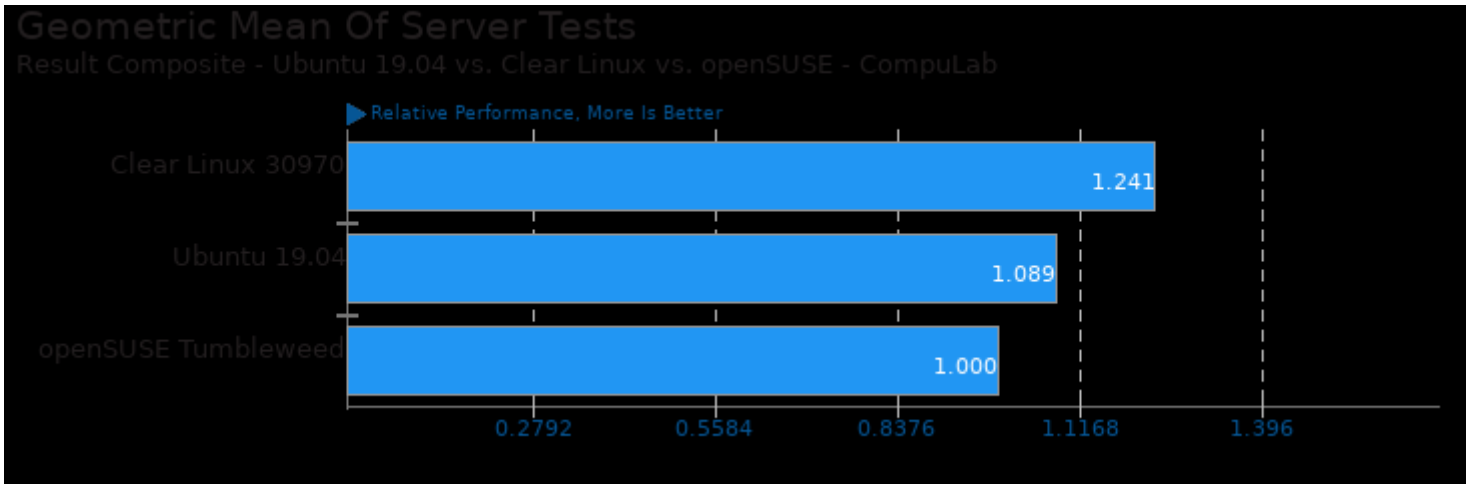
Geometric mean based upon tests: pts/pybench, pts/build-linux-kernel and pts/build-llvm



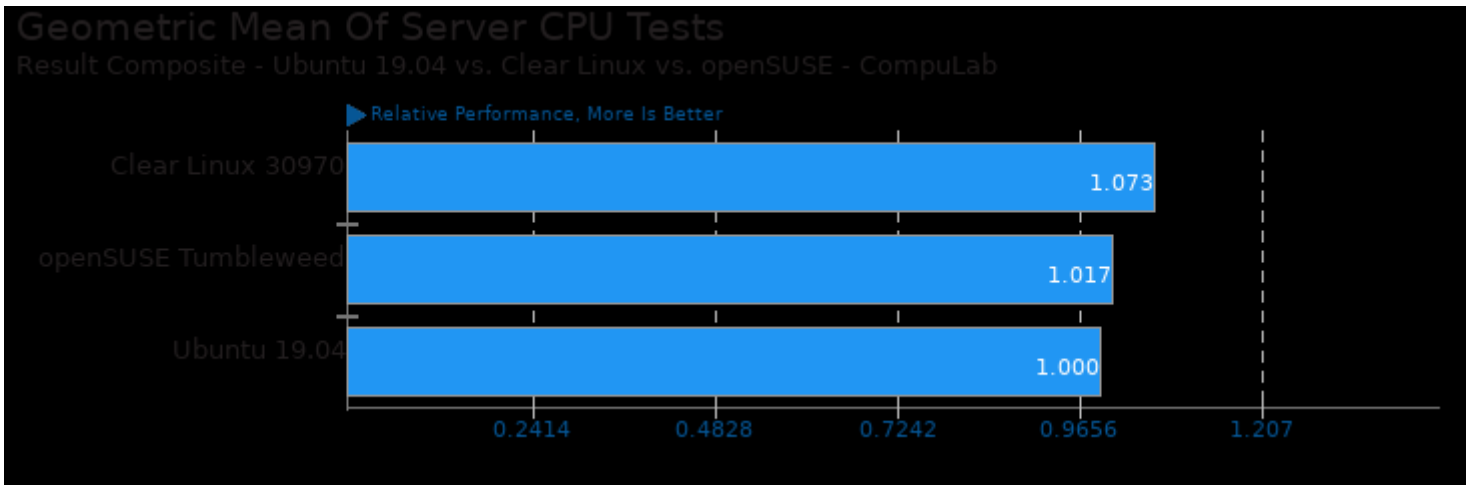
Geometric mean based upon tests: pts/systemd-boot-total, pts/pybench and pts/build-llvm



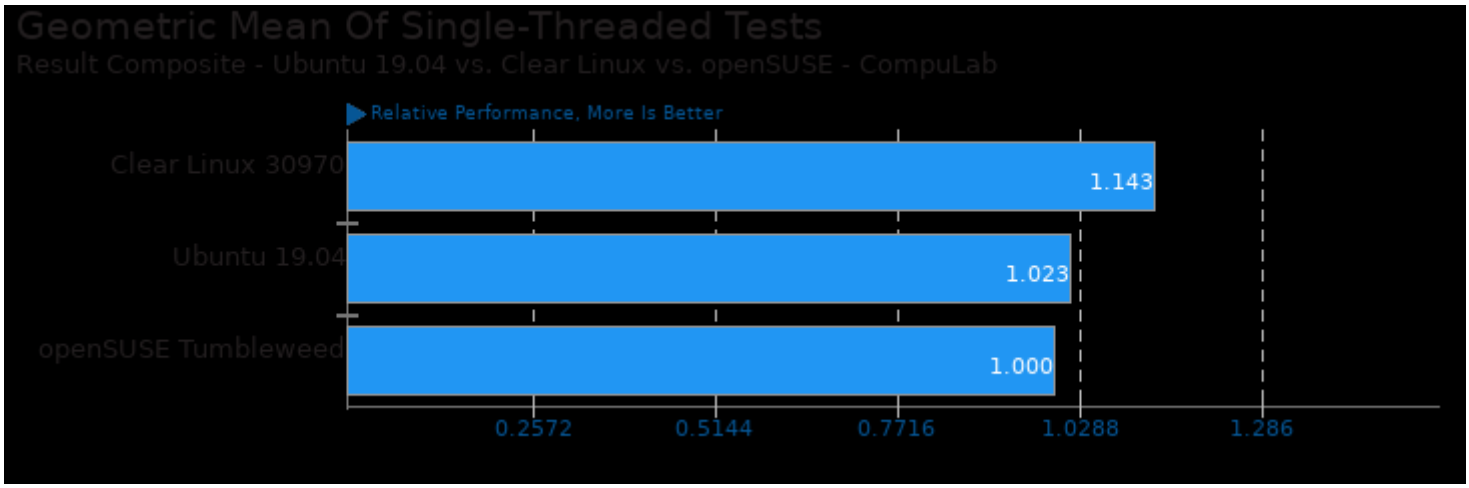
Geometric mean based upon tests: pts/blender and pts/appleseed



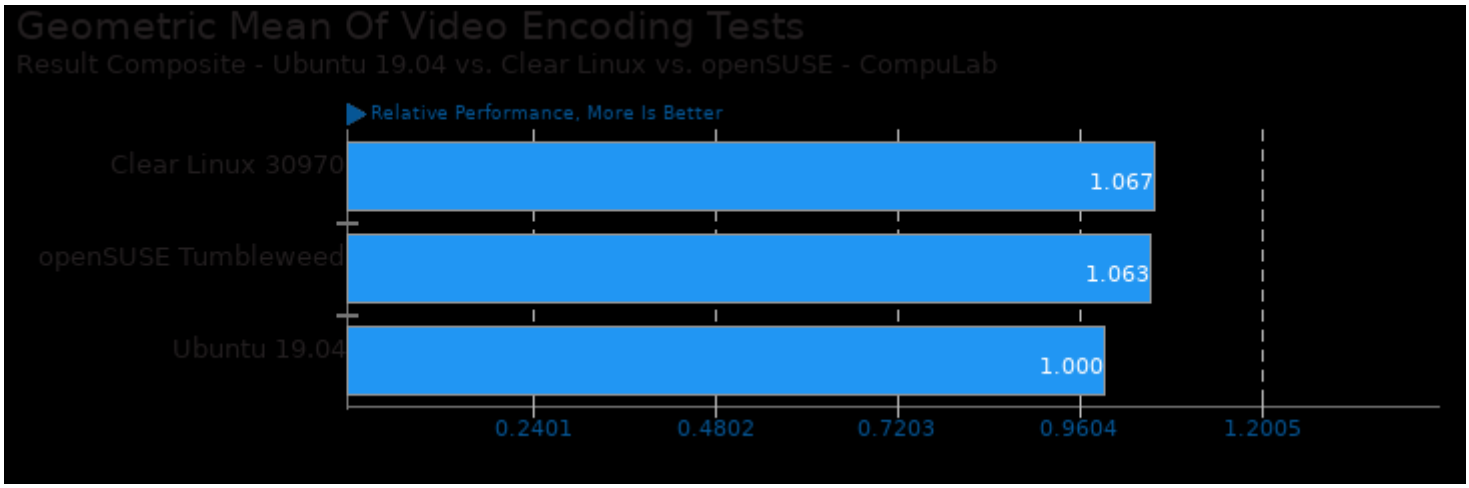
Geometric mean based upon tests: pts/phpbench and pts/perl-benchmark



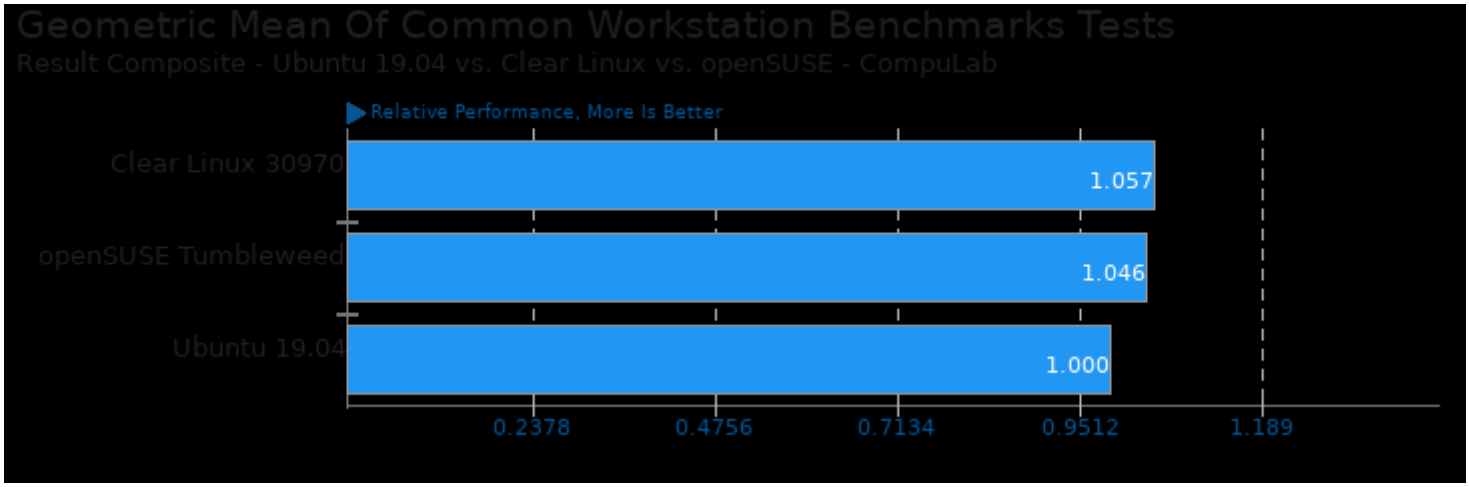
Geometric mean based upon tests: pts/dacapobench, pts/renaissance, pts/svt-vp9, pts/x265, pts/dav1d, pts/build-linux-kernel, pts/build-llvm, pts/glibc-bench, pts/tjbench, system/gimp, pts/blender, pts/appleseed, pts/pybench and pts/phpbench



Geometric mean based upon tests: pts/perl-benchmark, pts/glibc-bench, pts/tjbench, pts/pybench and pts/phpbench



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



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

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