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Low-End EOY2019 Ubuntu Linux CPU Comparison

Willow6C32GB-2

Automated Executive Summary

Core i3 8100 had the most wins, coming in first place for 31% of the tests.

Based on the geometric mean of all complete results, the fastest (Ryzen 5 2400G) was 27.834x the speed of the slowest (Willow6C).

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

Intel Open Image Denoise (Scene: Memorial) at 605.244x
OSPray (Demo: Magnetic Reconnection - Renderer: SciVis) at 132.759x
ctx_clock (Context Switch Time) at 109.572x
Core-Latency (Average Latency Between CPU Cores) at 7.731x
DeepSpeech (Acceleration: CPU) at 4.598x
GraphicsMagick (Operation: Sharpen) at 4.133x
NeatBench (Acceleration: CPU) at 3.834x
Embree (Binary: Pathtracer - Model: Asian Dragon) at 3.697x
Selenium (Benchmark: PSPDFKit WASM - Browser: Firefox) at 3.68x
Embree (Binary: Pathtracer ISPC - Model: Asian Dragon) at 3.543x.

Test Systems:

Athlon 200GE

Processor: AMD Athlon 200GE @ 3.20GHz (2 Cores / 4 Threads), Motherboard: ASUS PRIME B350M-E (5220 BIOS), Chipset: AMD Raven/Raven2, Memory: 8192MB, Disk: 525GB 2115, Graphics: ASUS AMD Radeon Vega / Mobile 2GB (1000/1067MHz), Audio: AMD Raven/Raven2/Fenghuang, Monitor: DELL S2409W, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 19.10, Kernel: 5.3.0-24-generic (x86_64), Desktop: GNOME Shell 3.34.1, Display Server: X Server 1.20.5, Display Driver: modesetting 1.20.5, OpenGL: 4.5 Mesa 19.2.1 (LLVM 9.0.0), Compiler: GCC 9.2.1 20191008, File-System: ext4, Screen Resolution: 1920x1080

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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq ondemand - CPU Microcode: 0x8101016
Java Notes: OpenJDK Runtime Environment (build 11.0.5+10-post-Ubuntu-0ubuntu1.1)
Python Notes: Python 2.7.17 + Python 3.7.5
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 STIBP: disabled RSB filling + tsx_async_abort: Not affected

Athlon 3000G

Processor: AMD Athlon 3000G @ 3.50GHz (2 Cores / 4 Threads), Motherboard: ASUS PRIME B350M-E (5220 BIOS), Chipset: AMD Raven/Raven2, Memory: 8192MB, Disk: 525GB 2115, Graphics: ASUS AMD Picasso 2GB (1100MHz), Audio: AMD Raven/Raven2/Fenghuang, Monitor: DELL S2409W, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 19.10, Kernel: 5.3.0-24-generic (x86_64), Desktop: GNOME Shell 3.34.1, Display Server: X Server 1.20.5, Display Driver: modesetting 1.20.5, OpenGL: 4.5 Mesa 19.2.1 (LLVM 9.0.0), Compiler: GCC 9.2.1 20191008, File-System: ext4, Screen Resolution: 1920x1080

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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq ondemand - CPU Microcode: 0x8108109
Java Notes: OpenJDK Runtime Environment (build 11.0.5+10-post-Ubuntu-0ubuntu1.1)
Python Notes: Python 2.7.17 + Python 3.7.5
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 STIBP: disabled RSB filling + tsx_async_abort: Not affected

A10-7850K

Processor: AMD A10-7850K APU @ 3.70GHz (2 Cores / 4 Threads), Motherboard: Gigabyte F2A88XM-D3H (F5 BIOS), Chipset: AMD 15h, Memory: 8192MB, Disk: 120GB KINGSTON SV300S3 + 525GB 2115, Graphics: AMD Radeon R7 1GB, Audio: AMD Kaveri HDMI/DP, Monitor: VA2431, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 19.10, Kernel: 5.3.0-24-generic (x86_64), Desktop: GNOME Shell 3.34.1, Display Server: X Server 1.20.5, Display Driver: modesetting 1.20.5, OpenGL: 4.5 Mesa 19.2.1 (LLVM 9.0.0), Compiler: GCC 9.2.1 20191008, File-System: ext4, Screen Resolution: 1920x1080

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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch

--enable-multilib --enable-nls --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq ondemand - CPU Microcode: 0x6003103
Java Notes: OpenJDK Runtime Environment (build 11.0.5+10-post-Ubuntu-0ubuntu1.1)
Python Notes: Python 2.7.17 + Python 3.7.5
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 STIBP: disabled RSB filling + tsx_async_abort: Not affected

Ryzen 3 1200

Processor: AMD Ryzen 3 1200 @ 3.10GHz (4 Cores), Motherboard: MSI B350M GAMING PRO (MS-7A39) v1.0 (2.90 BIOS), Chipset: AMD 17h, Memory: 8192MB, Disk: 525GB 2115 + 120GB ADATA SU700, Graphics: AMD FirePro V3800 512MB, Audio: AMD Redwood HDMI Audio, Monitor: VA2431, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 19.10, Kernel: 5.3.0-24-generic (x86_64), Desktop: GNOME Shell 3.34.1, Display Server: X Server 1.20.5, Display Driver: modesetting 1.20.5, OpenGL: 3.3 Mesa 19.2.1 (LLVM 9.0.0), Compiler: GCC 9.2.1 20191008, File-System: ext4, Screen Resolution: 1920x1080

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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq ondemand - CPU Microcode: 0x8001129
Java Notes: OpenJDK Runtime Environment (build 11.0.5+10-post-Ubuntu-0ubuntu1.1)
Python Notes: Python 2.7.17 + Python 3.7.5
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 STIBP: disabled RSB filling + tsx_async_abort: Not affected

Ryzen 3 2200G

Processor: AMD Ryzen 3 2200G @ 3.50GHz (4 Cores), Motherboard: ASUS PRIME B350M-E (5220 BIOS), Chipset: AMD Raven/Raven2, Memory: 8192MB, Disk: 14GB INTEL MEMPEK1W016GA + 525GB 2115, Graphics: ASUS AMD Radeon Vega / Mobile 2GB (1100/1600MHz), Audio: AMD Raven/Raven2/Fenghuang, Monitor: DELL S2409W, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 19.10, Kernel: 5.3.0-24-generic (x86_64), Desktop: GNOME Shell 3.34.1, Display Server: X Server 1.20.5, Display Driver: modesetting 1.20.5, OpenGL: 4.5 Mesa 19.2.1 (LLVM 9.0.0), Compiler: GCC 9.2.1 20191008, File-System: ext4, Screen Resolution: 1920x1080

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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq ondemand - CPU Microcode: 0x8101016
Java Notes: OpenJDK Runtime Environment (build 11.0.5+10-post-Ubuntu-0ubuntu1.1)
Python Notes: Python 2.7.17 + Python 3.7.5
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 STIBP: disabled RSB filling + tsx_async_abort: Not affected

Ryzen 5 2400G

Processor: AMD Ryzen 5 2400G @ 3.60GHz (4 Cores / 8 Threads), Motherboard: MSI B350M GAMING PRO (MS-7A39) v1.0 (2.NM BIOS), Chipset: AMD Raven/Raven2, Memory: 8192MB, Disk: 120GB Force MP500 + 525GB 2115, Graphics: MSI AMD Radeon Vega / Mobile 2GB (1250/1600MHz), Audio: AMD Raven/Raven2/Fenghuang, Monitor: DELL S2409W, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 19.10, Kernel: 5.3.0-24-generic (x86_64), Desktop: GNOME Shell 3.34.1, Display Server: X Server 1.20.5, Display Driver: modesetting 1.20.5, OpenGL: 4.5 Mesa 19.2.1 (LLVM 9.0.0), Compiler: GCC 9.2.1 20191008, File-System: ext4, Screen Resolution: 1920x1080

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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq ondemand - CPU Microcode: 0x8101016
Java Notes: OpenJDK Runtime Environment (build 11.0.5+10-post-Ubuntu-0ubuntu1.1)
Python Notes: Python 2.7.17 + Python 3.7.5
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 STIBP: disabled RSB filling + tsx_async_abort: Not affected

Core i3 4130

Processor: Intel Core i3-4130 @ 3.40GHz (2 Cores / 4 Threads), Motherboard: Intel DH87RL (RLH8710H.86A.0332.2018.1026.1448 BIOS), Chipset: Intel 4th Gen Core DRAM, Memory: 8192MB, Disk: 128GB TOSHIBA THNSNH12 + 525GB 2115, Graphics: Intel Haswell 2GB (1150MHz), Audio: Intel Xeon E3-1200 v3/4th, Monitor: VA2431, Network: Intel I217-V

OS: Ubuntu 19.10, Kernel: 5.3.0-24-generic (x86_64), Desktop: GNOME Shell 3.34.1, Display Server: X Server 1.20.5, Display Driver: modesetting 1.20.5, OpenGL: 4.5 Mesa 19.2.1, Compiler: GCC 9.2.1 20191008, File-System: ext4, Screen Resolution: 1920x1080

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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0x27
Java Notes: OpenJDK Runtime Environment (build 11.0.5+10-post-Ubuntu-0ubuntu1.1)
Python Notes: Python 2.7.17 + Python 3.7.5
Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + l1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT vulnerable + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Mitigation of PTI + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + tsx_async_abort: Not affected

Core i3 7100

Processor: Intel Core i3-7100 @ 3.90GHz (2 Cores / 4 Threads), Motherboard: Gigabyte B250M-DS3H-CF (F9 BIOS), Chipset: Intel Xeon E3-1200 v6/7th + B250, Memory: 8192MB, Disk: 250GB Western Digital WDS250G1B0A + 525GB 2115, Graphics: Gigabyte Intel HD 630 3GB (1100MHz), Audio: Realtek ALC887-VD, Monitor: VA2431, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 19.10, Kernel: 5.3.0-24-generic (x86_64), Desktop: GNOME Shell 3.34.1, Display Server: X Server 1.20.5, Display Driver: modesetting 1.20.5, OpenGL: 4.5 Mesa 19.2.1, Compiler: GCC 9.2.1 20191008, File-System: ext4, Screen Resolution: 1920x1080

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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0xca
Java Notes: OpenJDK Runtime Environment (build 11.0.5+10-post-Ubuntu-0ubuntu1.1)
Python Notes: Python 2.7.17 + Python 3.7.5
Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + l1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT vulnerable + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Mitigation of PTI + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + tsx_async_abort: Not affected

Core i3 8100

Processor: Intel Core i3-8100 @ 3.60GHz (4 Cores), Motherboard: ASRock Z370M-ITX/ac (P4.10 BIOS), Chipset: Intel 8th Gen Core 4-core Desktop, Memory: 8192MB, Disk: 60GB DREVO X1 SSD + 525GB 2115, Graphics: Intel UHD 630 3GB (1100MHz), Audio: Realtek ALC892, Monitor: VA2431, Network: Intel I219-V + Intel I211 + Intel Dual Band-AC 3168NGW

OS: Ubuntu 19.10, Kernel: 5.3.0-24-generic (x86_64), Desktop: GNOME Shell 3.34.1, Display Server: X Server 1.20.5, Display Driver: modesetting 1.20.5, OpenGL: 4.5 Mesa 19.2.1, Compiler: GCC 9.2.1 20191008, File-System: ext4, Screen Resolution: 1920x1080

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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0xca
Java Notes: OpenJDK Runtime Environment (build 11.0.5+10-post-Ubuntu-0ubuntu1.1)
Python Notes: Python 2.7.17 + Python 3.7.5
Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + l1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT disabled + mds: Mitigation of Clear buffers; SMT disabled + meltdown: Mitigation of PTI + 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 generic retpoline IBPB: conditional IBRS_FW STIBP: disabled RSB filling + tsx_async_abort: Not affected

Core i5 4670

Processor: Intel Core i5-4670 @ 3.80GHz (4 Cores), Motherboard: MSI B85M-P33 (MS-7817) v1.0 (V4.9 BIOS), Chipset: Intel 4th Gen Core DRAM, Memory: 8192MB, Disk: 63GB SanDisk SDSSDP06 + 525GB 2115, Graphics: MSI Intel Haswell Desktop 2GB (1200MHz), Audio: Intel Xeon E3-1200 v3/4th, Monitor: VA2431, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 19.10, Kernel: 5.3.0-24-generic (x86_64), Desktop: GNOME Shell 3.34.1, Display Server: X Server 1.20.5, Display Driver: modesetting 1.20.5, OpenGL: 4.5 Mesa 19.2.1, Compiler: GCC 9.2.1 20191008, File-System: ext4, Screen Resolution: 1920x1080

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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0x27
Java Notes: OpenJDK Runtime Environment (build 11.0.5+10-post-Ubuntu-0ubuntu1.1)
Python Notes: Python 2.7.17 + Python 3.7.5
Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + l1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT disabled + mds: Mitigation of Clear buffers; SMT disabled + meltdown: Mitigation of PTI + 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 generic retpoline IBPB: conditional IBRS_FW STIBP: disabled RSB filling + tsx_async_abort: Not affected

Pentium G4400

Processor: Intel Pentium G4400 @ 3.30GHz (2 Cores), Motherboard: MSI B150M MORTAR (MS-7972) v2.0 (C.40 BIOS), Chipset: Intel Xeon E3-1200 v5/E3-1500, Memory: 8192MB, Disk: 120GB Samsung SSD 850 + 525GB 2115, Graphics: MSI Intel HD 510 3GB (1000MHz), Audio: Realtek ALC892, Monitor: VA2431, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 19.10, Kernel: 5.3.0-24-generic (x86_64), Desktop: GNOME Shell 3.34.1, Display Server: X Server 1.20.5, Display Driver: modesetting 1.20.5, OpenGL: 4.5 Mesa 19.2.1, Compiler: GCC 9.2.1 20191008, File-System: ext4, Screen Resolution: 1920x1080

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++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch

--enable-multilib --enable-nls --enable-offload-targets=nvptx-none,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0xd6
Java Notes: OpenJDK Runtime Environment (build 11.0.5+10-post-Ubuntu-0ubuntu1.1)
Python Notes: Python 2.7.17 + Python 3.7.5
Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + l1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT disabled + mds: Mitigation of Clear buffers; SMT disabled + meltdown: Mitigation of PTI + 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 generic retpoline IBPB: conditional IBRS_FW STIBP: disabled RSB filling + tsx_async_abort: Not affected

DellOptiplex3060Micro

Processor: Intel Core i5-8500T @ 3.50GHz (6 Cores), Motherboard: Dell 03KWTV, Chipset: Intel Cannon Lake PCH Shared SRAM, Memory: 8192MB, Disk: 240GB Western Digital WDS240G2G0A- + 3001GB EZRZ-00Z5HB0, Graphics: Intel Device 3e92, Audio: Realtek ALC3234, Network: Realtek RTL8111/8168/8411 + Intel Wireless-AC 9260

OS: Ubuntu 18.04, Kernel: 5.0.0-37-generic (x86_64), Desktop: GNOME Shell 3.28.4, OpenGL: 4.5 Mesa 19.0.8, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --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
System Notes: Python 2.7.17.

Willow6C

Willow6C-2

Processor: 16 x Intel Core (Haswell IBRS) (16 Cores), Motherboard: Red Hat KVM (0.5.1 BIOS), Memory: 32768MB, Disk: 3938GB, Graphics: qxldrmfb, Audio: QEMU Generic

OS: Clear Linux OS 29390, Kernel: 3.10.0-957.12.2.el7.x86_64 (x86_64), Compiler: GCC 9.1.1 20190512 gcc-9-branch@271104 + Clang 8.0.0 + LLVM 8.0.0, File-System: overlayfs, Screen Resolution: 1024x768, System Layer: container-other

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
Python Notes: Python 3.7.3
Security Notes: KPTI + Load fences __user pointer sanitization + Full retpoline IBPB + SSB disabled via prctl and seccomp + PTE Inversion

Low-End EOY2019 Ubuntu Linux CPU Comparison

Phoronix Test Suite

	Athlon 200GE	Athlon 3000G	A10-7850K	Ryzen 3 1200	Ryzen 3 2200G	Ryzen 5 2400G	Core i3 4130	Core i3 7100	Core i3 8100	Core i5 4670	Pentium G4400	DellOptiplex x3060 Micro	Willow w6C	Willow w6C-2
Java SciMark - Composite (Mflops)	1969	2168	1323	2131	2298	2288	1925	2165	2007	2155	1893	2014		
Normalized	85.68%	94.33%	57.57%	92.7%	100%	99.53%	83.77%	94.2%	87.33%	93.79%	82.38%	87.63%		
Standard Deviation	1.6%	0.8%	0.6%	0.3%	0.3%	3.8%	0.4%	0.4%	0.5%	0.4%	0.5%	2%		
GraphicsMagick - Sharpen (Iterations/min	26	28	21	48	54	56	22	18	32	46	15	62	49	52
Normalized	41.94%	45.16%	33.87%	77.42%	87.1%	90.32%	35.48%	29.03%	51.61%	74.19%	24.19%	100%	79.03%	83.87%
Standard Deviation			2.9%			1%						0%		
GraphicsMagick - Resizing (Iterations/min	201	221	151	364	375	370	136	213	386	312	178	468	254	287
Normalized	42.95%	47.22%	32.26%	77.78%	80.13%	79.06%	29.06%	45.51%	82.48%	66.67%	38.03%	100%	54.27%	61.32%
Standard Deviation	0.3%		0.8%		0.8%	0.8%	0.7%		1.1%	0.2%	1.3%	0.6%	0.6%	0.8%
dav1d - S.N.1 (FPS)	116.38	125.42	98.72	144.58	162.96	211.42	99.39	154.76	203.60	174.80	90.50			168.08
Normalized	55.05%	59.32%	46.69%	68.39%	77.08%	100%	47.01%	73.2%	96.3%	82.68%	42.81%			79.5%
Standard Deviation	0.1%	0.1%	0.5%	0.1%	1.7%	0.7%	0.9%	0.1%	0.1%	1.2%	0.2%			0.5%
OSPray - M.R - SciVis (FPS)	1.48	1.61	1.39	2.46	2.72	3.33	2.16	3.83	5.34	4.01	1.16	154		4.59
Normalized	0.96%	1.05%	0.9%	1.6%	1.77%	2.16%	1.4%	2.49%	3.47%	2.6%	0.75%	100%		2.98%
Standard Deviation	0.2%	0.1%	2.2%	0.1%	0.4%	0.8%	0.3%	0.2%	0.3%	0.2%	0.6%	0%		0%
Embree - Pathtracer - Asian Dragon (FPS)	2.0968	2.2503	1.7347	2.9690	3.3545	4.9405	1.8928	2.8692	3.6984	3.3897	1.3363	4.52		4.09
Normalized	42.44%	45.55%	35.11%	60.1%	67.9%	100%	38.31%	58.08%	74.86%	68.61%	27.05%	91.49%		82.79%
Standard Deviation	0.2%	0.2%	0.9%	0.2%	0.2%	0.2%	0.3%	0.1%	0.2%	0.2%	0.1%	0.2%		0.1%
Embree - Pathtracer ISPC - Asian Dragon (FPS)	2.0049	2.1626	1.6460	2.8838	3.2661	4.7071	2.1358	3.4536	4.4093	3.9679	1.3661	4.47		4.84
Normalized	41.42%	44.68%	34.01%	59.58%	67.48%	97.25%	44.13%	71.36%	91.1%	81.98%	28.23%	92.36%		100%
Standard Deviation	0%	0.2%	0.3%	0.2%	0.1%	0%	0.6%	0.1%	0.2%	0.1%	0%	1%		0.5%
SVT-VP9 - VMAF Optimized - Bosphorus 1080p (FPS)	33.96	36.36		56.31	59.85	65.76	26.41	52.74	81.76	65.18		72.63		51.21
Normalized	41.54%	44.47%		68.87%	73.2%	80.43%	32.3%	64.51%	100%	79.72%		88.83%		62.63%
Standard Deviation	1.6%	2.4%		2.8%	2.9%	2.8%	1.1%	2.8%	3.6%	2.9%		4%		1.8%
x264 - H.2.V.E (FPS)	17.12	18.75	15.00	23.53	25.84	34.48	14.80	23.06	30.43	28.35	16.82	43.83		33.58
Normalized	39.06%	42.78%	34.22%	53.68%	58.96%	78.67%	33.77%	52.61%	69.43%	64.68%	38.38%	100%		76.61%
Standard Deviation	2.7%	2.6%	1.8%	2.9%	2.6%	2.9%	1.8%	2.9%	2.9%	3%	2.9%	4.9%		0.9%

Low-End EOY2019 Ubuntu Linux CPU Comparison

Intel Open Image Denoise - Memorial	0.88	0.96	**0.45**	1.58	1.55	1.60	1.50	1.95	3.56	3.26	0.46	**272.36**	3.66
Normalized	0.32%	0.35%	0.17%	0.58%	0.57%	0.59%	0.55%	0.72%	1.31%	1.2%	0.17%	100%	1.34%
Standard Deviation	0.1%	0.2%	0.6%	0.1%	0.5%	0.3%	0.2%	0%	0.1%	0.3%	0%	0.7%	3.3%
Coremark - CoreMark Size 666 - I.P.S (Iterations/Sec	63466	69326	64352	86731	103162	**147021**	66640	77272	108962	96602	**50596**	142897	125924
Normalized	43.17%	47.15%	43.77%	58.99%	70.17%	100%	45.33%	52.56%	74.11%	65.71%	34.41%	97.19%	85.65%
Standard Deviation	0.1%	0.1%	0.3%	0.4%	0.4%	0.1%	0.2%	0.8%	0.1%	0.9%	0.1%	0.2%	0.6%
Himeno Benchmark - P.P.S (MFLOPS)	3587	3844	**2128**	3834	4177	**4364**	2231	3158	3002	3155	2757	2915	2883
Normalized	82.2%	88.08%	48.76%	87.86%	95.71%	100%	51.12%	72.36%	68.79%	72.3%	63.18%	66.8%	66.06%
Standard Deviation	1.8%	2.5%	0.1%	1.8%	0.5%	2%	1.3%	0.2%	0.3%	0.2%	0%	0.3%	0.8%
7-Zip Compression - C.S.T (MIPS)	9394	10127	8800	14379	16670	19415	8857	12598	16708	16227	**7661**	**19956**	19335
Normalized	47.07%	50.75%	44.1%	72.05%	83.53%	97.29%	44.38%	63.13%	83.72%	81.31%	38.39%	100%	96.89%
Standard Deviation	1.9%	1.1%	1.1%	1.6%	0.4%	0.2%	1.5%	0.4%	0.3%	0.3%	0.5%	1%	0.6%
Timed Linux Kernel Compilation - Time To Compile (sec)	379	349	406	250	231	**179**	**549**	316	211	226	461	183	467
Normalized	47.23%	51.29%	44.09%	71.6%	77.49%	100%	32.6%	56.65%	84.83%	79.2%	38.83%	97.81%	38.33%
Standard Deviation	0.4%	0.4%	0.3%	0.7%	0.9%	0.2%	0.5%	0.4%	0.8%	0.5%	0.3%	0.8%	24.5%
Build2 - Time To Compile (sec)	511	472	506	320	300	255	**719**	406	266	288	572	**226**	335
Normalized	44.23%	47.88%	44.66%	70.63%	75.33%	88.63%	31.43%	55.67%	84.96%	78.47%	39.51%	100%	67.46%
Standard Deviation	0%	0.3%	0.2%	0.2%	0.2%		0.3%	0.2%	0.4%	0.4%	0.1%	0.2%	1%
Zstd Compression - C.u.1.0.3.s.i.i.	86.302	82.201	65.160	51.976	50.217	41.525	**98.554**	58.556	**40.689**	44.410	81.064	60.69	44.01
Normalized	47.15%	49.5%	62.44%	78.28%	81.03%	97.99%	41.29%	69.49%	100%	91.62%	50.19%	67.04%	92.45%
Standard Deviation	0.4%	0.3%	0.1%	0.2%	0.2%	21.7%	2.8%	0.2%	0.2%	0.4%	0.3%	0.1%	0.7%
DeepSpeech - CPU (sec)	83.217	79.716	**306.28**	74.323	67.895	74.794	197.11	67.349	**66.617**	97.381		97.29	159.69
Normalized	80.05%	83.57%	21.75%	89.63%	98.12%	89.07%	33.8%	98.91%	100%	68.41%		68.47%	41.72%
Standard Deviation	0.9%	0.7%	0.5%	1.3%	1.1%	0.9%	0.3%	2.5%	1.9%	1%		1.4%	0.9%

Low-End EOY2019 Ubuntu Linux CPU Comparison

FLAC Audio Encoding - WAV To FLAC (sec)	12.801	11.872	**20.867**	11.531	10.912	10.772	12.974	**9.932**	11.162	11.163	12.580	11.49	12.83
Normalized	77.59%	83.66%	47.6%	86.13%	91.02%	92.2%	76.55%	100%	88.98%	88.97%	78.95%	86.44%	77.41%
Standard Deviation	1.4%	1.9%	0.2%	0.4%	0.7%	1.2%	1.8%	0.5%	0.7%	1.2%	1.9%	3%	3.3%
LAME MP3 Encoding - WAV To MP3 (sec)	10.972	9.880	**14.156**	9.987	9.290	**8.863**	11.115	9.270	9.971	9.869	10.882	10.48	13.09
Normalized	80.78%	89.71%	62.61%	88.75%	95.4%	100%	79.74%	95.61%	88.89%	89.81%	81.45%	84.57%	67.71%
Standard Deviation	1.4%	0.5%	0.3%	0.1%	0.1%	0.4%	0.2%	0%	0.1%	0.1%	0%	0.1%	1.6%
Perl Benchmarks - Pod2html	0.1884 6585	0.1738 6731	**0.2275 3557**	0.1765 5118	0.1633 6353	0.1540 5877	0.1732 1866	**0.1253 1321**	0.1352 1119	0.1288 6029	0.1525 0590	0.1441 2552	0.1598 5520
Normalized	66.49%	72.07%	55.07%	70.98%	76.71%	81.34%	72.34%	100%	92.68%	97.25%	82.17%	86.95%	78.39%
Standard Deviation	1%	1.5%	0.5%	1.2%	0.8%	0.9%	1.9%	0.2%	0.4%	1%	0.9%	1.3%	1.8%
Perl Benchmarks - Interpreter (sec)	0.0014 0873	0.0012 0668	0.0021 6237	0.0015 7415	0.0017 1832	0.0017 0840	0.0017 2385	**0.0010 6513**	0.0010 9191	0.0012 3535	0.0012 5764	0.0028 4606	**0.0032 7379**
Normalized	75.61%	88.27%	49.26%	67.66%	61.99%	62.35%	61.79%	100%	97.55%	86.22%	84.69%	37.42%	32.54%
Standard Deviation	0.7%	0.7%	1.7%	2.1%	1.4%	0.8%	1%	0.4%	1.3%	1.5%	0.2%	3%	11.2%
Radiance Benchmark - SMP Parallel (sec)	442	410	**646**	310	**253**	256	558	372	257	263	557	303	334
Normalized	57.24%	61.71%	39.16%	81.61%	100%	98.83%	45.34%	68.01%	98.44%	96.2%	45.42%	83.5%	75.75%
R Benchmark (sec)	0.3270	0.3012	**0.4615**	0.2293	0.2141	0.2220	0.4073	0.2184	**0.1777**	0.1997	0.3867		
Normalized	54.34%	59%	38.5%	77.5%	83%	80.05%	43.63%	81.36%	100%	88.98%	45.95%		
Standard Deviation	0.5%	0.4%	1%	0.6%	0.7%	0.5%	0.6%	0.2%	0.4%	0.4%	0.2%		
Sudokut - Total Time	19.384	17.816	21.348	18.527	17.314	15.950	15.811	**11.195**	12.101	12.131	13.097	12.45	**22.08**
Normalized	57.75%	62.84%	52.44%	60.43%	64.66%	70.19%	70.81%	100%	92.51%	92.28%	85.48%	89.92%	50.7%
Standard Deviation	0.3%	0.1%	0.4%	0.3%	0.3%	0.1%	0.3%	0.3%	0.2%	0.1%	0.2%	0%	1.5%
Core-Latency - A.L.B.C.C	80.892 925	79.349 475	**303.75 0375**	302.22 175	82.588 3	74.02	207.10 545	73.849 275	113.09 325	136.22 9	106.30 7	147.69	**39.29**
Normalized	48.57%	49.52%	12.93%	13%	47.57%	53.08%	18.97%	53.2%	34.74%	28.84%	36.96%	26.6%	100%
Cryptsetup - PBKDF2-sha512 (Iterations/sec	**11387 87**	12871 30	11531 42	12699 76	13617 87	14449 85	13145 54	**15976 28**	14761 75	14727 19	11938 24		
Normalized	71.28%	80.57%	72.18%	79.49%	85.24%	90.45%	82.28%	100%	92.4%	92.18%	74.72%		
Standard Deviation	4.1%	0.3%	0.5%	0.1%	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%		

Low-End EOY2019 Ubuntu Linux CPU Comparison

Cryptsetup - PBKDF2-whirlpool (Iterations/sec	504858	555784	**361748**	546704	587111	620466	512667	**680011**	631672	575508	571121		582356
Normalized	74.24%	81.73%	53.2%	80.4%	86.34%	91.24%	75.39%	100%	92.89%	84.63%	83.99%		85.64%
Standard	2.1%	0.2%	0.4%	0.2%	0.3%	0.4%	0.1%	0.1%			0.2%		7.1%
libjpeg-turbo tjbench - D.T (Megapixels/sec)	134	147	**119**	145	156	165	151	**176**	162	173	134	157	141
Normalized	76.14%	83.52%	67.61%	82.39%	88.64%	93.75%	85.8%	100%	92.05%	98.3%	76.14%	89.2%	80.11%
Standard	0.6%	0.4%	0.2%	0.2%	0.4%	0%	0.3%	0%	0.1%	0.5%	0.5%	0.3%	1.5%
SQLite Speedtest - Timed Time - Size 1,000 (sec)	93.845	86.131	**136.021**	86.187	81.589	77.553	129.917	**76.275**	77.440	79.816	97.630	84.36	126.18
Normalized	81.28%	88.56%	56.08%	88.5%	93.49%	98.35%	58.71%	100%	98.5%	95.56%	78.13%	90.42%	60.45%
Standard	0.5%	0.6%	0.1%	0.1%	0.9%	2.4%	0.2%	0.3%	0.5%	0.2%	0.4%	0.6%	0.9%
Darktable - Boat - CPU-only	36.365	33.986	64.980	23.389	23.879	25.597	**73.628**	35.655	**22.788**	30.025	43.147		
Normalized	62.66%	67.05%	35.07%	97.43%	95.43%	89.03%	30.95%	63.91%	100%	75.9%	52.81%		
Standard	0.2%	0.1%	0.6%	0.5%	3%	0.1%	0.2%	0%	0%	0.1%	0.1%		
Darktable - Masskrug - CPU-only	34.342	31.773	**50.970**	22.981	22.716	**19.495**	45.407	30.085	19.884	23.102	40.819		
Normalized	56.77%	61.36%	38.25%	84.83%	85.82%	100%	42.93%	64.8%	98.04%	84.39%	47.76%		
Standard	0%	0.1%	1%	0.3%	0.6%	0.3%	2.1%	0.1%	0.1%	0.2%	0.1%		
Darktable - Server Room - CPU-only	29.452	27.114	45.621	18.289	18.907	17.501	**46.023**	25.841	**16.656**	20.420	34.364		
Normalized	56.55%	61.43%	36.51%	91.07%	88.09%	95.17%	36.19%	64.46%	100%	81.57%	48.47%		
Standard	0.1%	0.2%	0.3%	0.4%	0.6%	0.4%	2%	0.2%	0.2%	0.3%	0.3%		
GIMP - resize (sec)	14.792	13.589	**18.899**	12.990	11.084	**10.094**	17.747	12.716	10.670	10.742	15.637		
Normalized	68.24%	74.28%	53.41%	77.71%	91.07%	100%	56.88%	79.38%	94.6%	93.97%	64.55%		
Standard	1.6%	2.5%	1.9%	2.2%	2.5%	19.6%	1.5%	3%	2.7%	2.2%	1.9%		
GIMP - rotate (sec)	18.070	16.721	**26.633**	17.712	15.641	15.254	22.434	**14.807**	15.471	15.669	17.956		
Normalized	81.94%	88.55%	55.6%	83.6%	94.67%	97.07%	66%	100%	95.71%	94.5%	82.46%		
Standard	0.1%	0.3%	0.4%	0.3%	0.2%	0.3%	0.1%	0.4%	0.1%	0.2%	0.2%		
GIMP - auto-levels (sec)	22.028	20.440	**32.403**	20.555	18.081	17.763	27.420	18.238	**16.911**	17.773	22.447		
Normalized	76.77%	82.73%	52.19%	82.27%	93.53%	95.2%	61.67%	92.72%	100%	95.15%	75.34%		
Standard Deviation	0.7%	0.4%	0.6%	0.2%	1.3%	2%	0.2%	1%	0.2%	0.1%	0.2%		

Low-End EOY2019 Ubuntu Linux CPU Comparison

GIMP - unsharp-mask (sec)	24.438	22.627	**34.048**	22.071	19.252	19.844	32.299	21.115	**18.761**	19.787	26.986		
Normalized	76.77%	82.91%	55.1%	85%	97.45%	94.54%	58.09%	88.85%	100%	94.81%	69.52%		
Standard Deviation	0.2%	0.3%	0.6%	1.5%	1.2%	0.8%	1.5%	1.6%	0.4%	1.7%	0.2%		
LibreOffice - 2.D.T.P (sec)	11.158	10.222	**15.229**	10.359	9.513	9.081	12.460	8.800	9.122	**8.744**	10.291	11.51	
Normalized	78.37%	85.54%	57.42%	84.41%	91.92%	96.29%	70.18%	99.36%	95.86%	100%	84.97%	75.97%	
Standard Deviation	2.9%	3.3%	2.7%	3.1%	3.4%	3.6%	2.9%	5.8%	4.6%	3.7%	4%	9.4%	
GNU Octave Benchmark (sec)	18.065	17.017	29.325	14.964	**13.457**	14.512	**37.768**	18.262	14.379	17.577	17.258		
Normalized	74.49%	79.08%	45.89%	89.93%	100%	92.73%	35.63%	73.69%	93.59%	76.56%	77.98%		
Standard Deviation	1.7%	0.6%	0.4%	1.4%	0.6%	0.8%	1%	0.7%	1.2%	0.6%	1%		
ctx_clock - C.S.T (Clocks)	224	210	429	186	210	**180**	1337	1267	1269	1125	1431	845	**19723**
Normalized	80.36%	85.71%	41.96%	96.77%	85.71%	100%	13.46%	14.21%	14.18%	16%	12.58%	21.3%	0.91%
Standard Deviation							0.2%	0.1%	0.2%	0.2%	0.1%	0.7%	
PyBench - T.F.A.T.T (Milliseconds)	1466	1330	1870	1353	1254	1191	1344	**1103**	1192	1202	1323	1288	**1891**
Normalized	75.24%	82.93%	58.98%	81.52%	87.96%	92.61%	82.07%	100%	92.53%	91.76%	83.37%	85.64%	58.33%
Standard Deviation	0.9%		0.2%	0.2%	0.2%	0.3%	0.6%	0.4%	0.4%	0.1%	0.4%	0.2%	0.1%
NeatBench - CPU (FPS)	3.35	3.52	2.56	6.44	6.07	5.55	**2.05**	4.57	**7.86**	5.61	3.05		
Normalized	42.62%	44.78%	32.57%	81.93%	77.23%	70.61%	26.08%	58.14%	100%	71.37%	38.8%		
Standard Deviation	0.9%	1.8%	0.6%	1.1%	0.6%	1.4%	1.3%	2.7%	1.5%	0.1%	0.2%		
PHPBench - P.B.S (Score)	41595	45481	**36579**	45154	48235	51323	55223	**63533**	58562	61753	53146	53978	56180
	8	3	**9**	4	6	2	3	**3**	0	0	2	5	1
Normalized	65.47%	71.59%	57.58%	71.07%	75.92%	80.78%	86.92%	100%	92.18%	97.2%	83.65%	84.96%	88.43%
Standard Deviation	2%	2.2%	0.8%	0.4%	0.5%	0.6%	0.1%	0.1%	0.3%	0.3%	0.3%	1.2%	0.4%
Selenium - ARES-6 - Firefox (ms)	79.74	72.72	**118.21**	76.18	67.57	65.65	98.90	67.31	**58.47**	61.54	65.75	65.32	
Normalized	73.33%	80.4%	49.46%	76.75%	86.53%	89.06%	59.12%	86.87%	100%	95.01%	88.93%	89.51%	
Standard Deviation	1.3%	1.2%	0.7%	0.9%	1.5%	0.4%	0.6%	0.3%	0.7%	0.5%	1.4%	0.5%	
Selenium - Jetstream - Firefox	136.88	147.17	**89.872**	143.26	160.91	**168.96**	115.17	161.92	168.86	167.60	146.19		
Normalized	81.01%	87.1%	53.19%	84.79%	95.24%	100%	68.16%	95.83%	99.94%	99.2%	86.52%		
Standard Deviation	0.5%	0.2%	0.3%	0.3%	0.5%	0.6%	0.3%	0.1%	0.1%	0.4%	0.5%		
Selenium - StyleBench - Firefox (Runs / Minute)	47.3	50.3	**35.5**	49.2	54.5	65.3	40.1	64.9	**74.8**	69.2	42.7	72.70	
Normalized	63.24%	67.25%	47.46%	65.78%	72.86%	87.3%	53.61%	86.76%	100%	92.51%	57.09%	97.19%	
Standard Deviation	0.9%	0.3%	0.5%	0.8%	0.2%	0.6%	1.2%	0.2%	0.2%	0.7%	0.5%	0.9%	

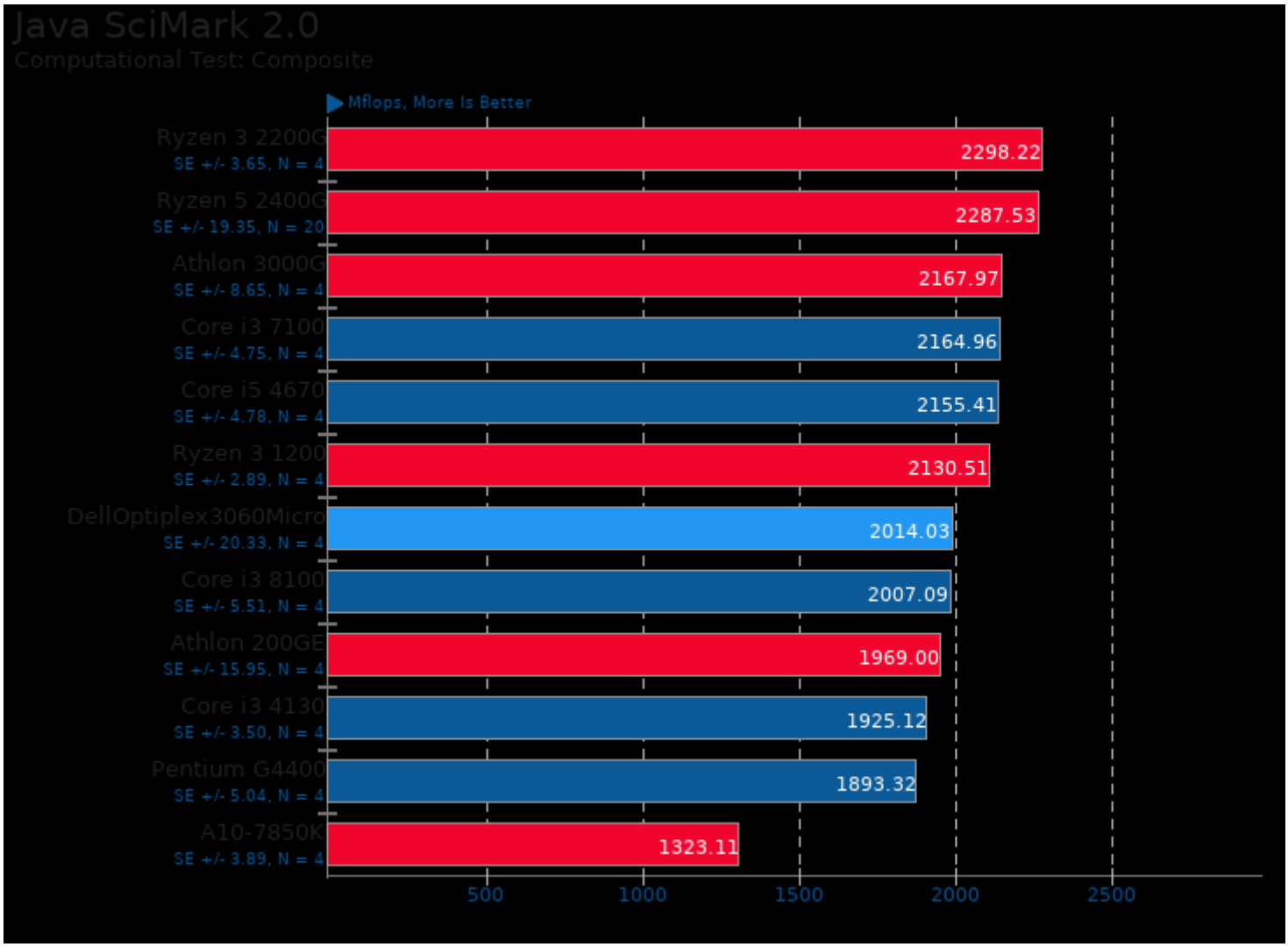
Low-End EOY2019 Ubuntu Linux CPU Comparison

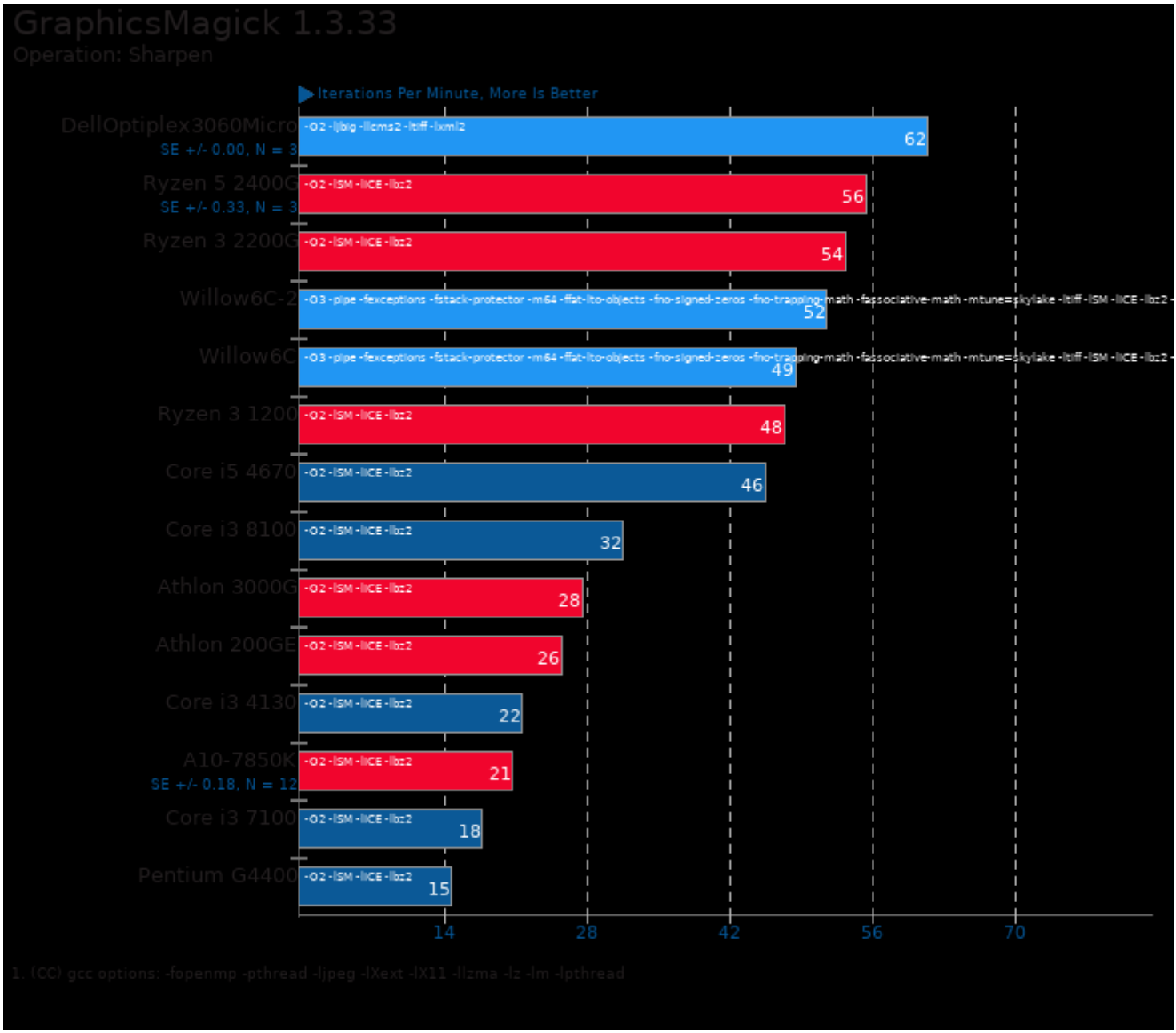
Selenium - Speedometer - Firefox (Runs/min)	49.74	53.9	39.0	53.1	60.8	62.6	**38.0**	64.5	**75.58**	71.8	60.73	68.90
Normalized	65.81%	71.32%	51.6%	70.26%	80.44%	82.83%	50.28%	85.34%	100%	95%	80.35%	91.16%
Standard Deviation	0.7%	0.4%	1.5%	0.7%	0.3%	0.2%	0.8%	0%	0.6%	0.1%	0.3%	0%
Selenium - ARES-6 - Google Chrome (ms)	35.23	32.86	**47.91**	30.44	26.57	27.59	42.40	33.05	**23.25**	23.32	31.57	
Normalized	65.99%	70.75%	48.53%	76.38%	87.5%	84.27%	54.83%	70.35%	100%	99.7%	73.65%	
Standard Deviation	2.2%	1.9%	0.6%	0.5%	0.1%	1%	1.1%	0.4%	0.5%	0.9%	1.1%	
Selenium - PSPDFKit WASM - Firefox	2449	2241	2926	2145	1888	1876	2897	1839	**1660**	1777	**6109**	1882
Normalized	67.78%	74.07%	56.73%	77.39%	87.92%	88.49%	57.3%	90.27%	100%	93.42%	27.17%	88.2%
Standard Deviation	1.5%	0.7%	0.5%	0.2%	0.6%	0.8%	0.6%	0.8%	0.6%	0.6%	1.7%	0.6%
Selenium - Jetstream - Google Chrome (Score)	138.21	151.32	**96.759**	149.76	169.44	170.19	116.97	145.82	179.65	**186.96**	150.36	
Normalized	73.92%	80.94%	51.75%	80.1%	90.63%	91.03%	62.56%	78%	96.09%	100%	80.42%	
Standard Deviation	0.5%	0.5%	0.2%	0.2%	0.1%	0.7%	0.3%	0.2%	0.5%	0.2%	0.9%	
Selenium - StyleBench - Google Chrome (Runs / Minute)	21.62	23.51	**16.26**	23.75	26.16	26.7	19.2	27.51	28.26	**28.75**	25.71	
Normalized	75.2%	81.77%	56.56%	82.61%	90.99%	92.87%	66.78%	95.69%	98.3%	100%	89.43%	
Standard Deviation	0.5%	0.4%	0.5%	0.4%	0.5%	0.4%	0.5%	0.1%	0.7%	1.1%	0.5%	
Selenium - Speedometer - Google Chrome (Runs/min)	69.87	75.8	55.0	78.39	87.77	87.88	**53.92**	80.0	**101**	97.93	81.8	
Normalized	69.18%	75.05%	54.46%	77.61%	86.9%	87.01%	53.39%	79.21%	100%	96.96%	80.99%	
Standard Deviation	0.4%	0.6%	0.2%	0.4%	0.6%	0.5%	0.5%	0.6%		1.6%	0.7%	
Selenium - PSPDFKit WASM - Google Chrome (Score)	3058	2795	**3443**	2450	2190	2274		3040	**2124**	2186	3176	
Normalized	69.46%	75.99%	61.69%	86.69%	96.99%	93.4%		69.87%	100%	97.16%	66.88%	
Standard Deviation	1%	1.3%	0.5%	0.7%	0.5%	1.3%		0.6%	1%	0.9%	2.9%	

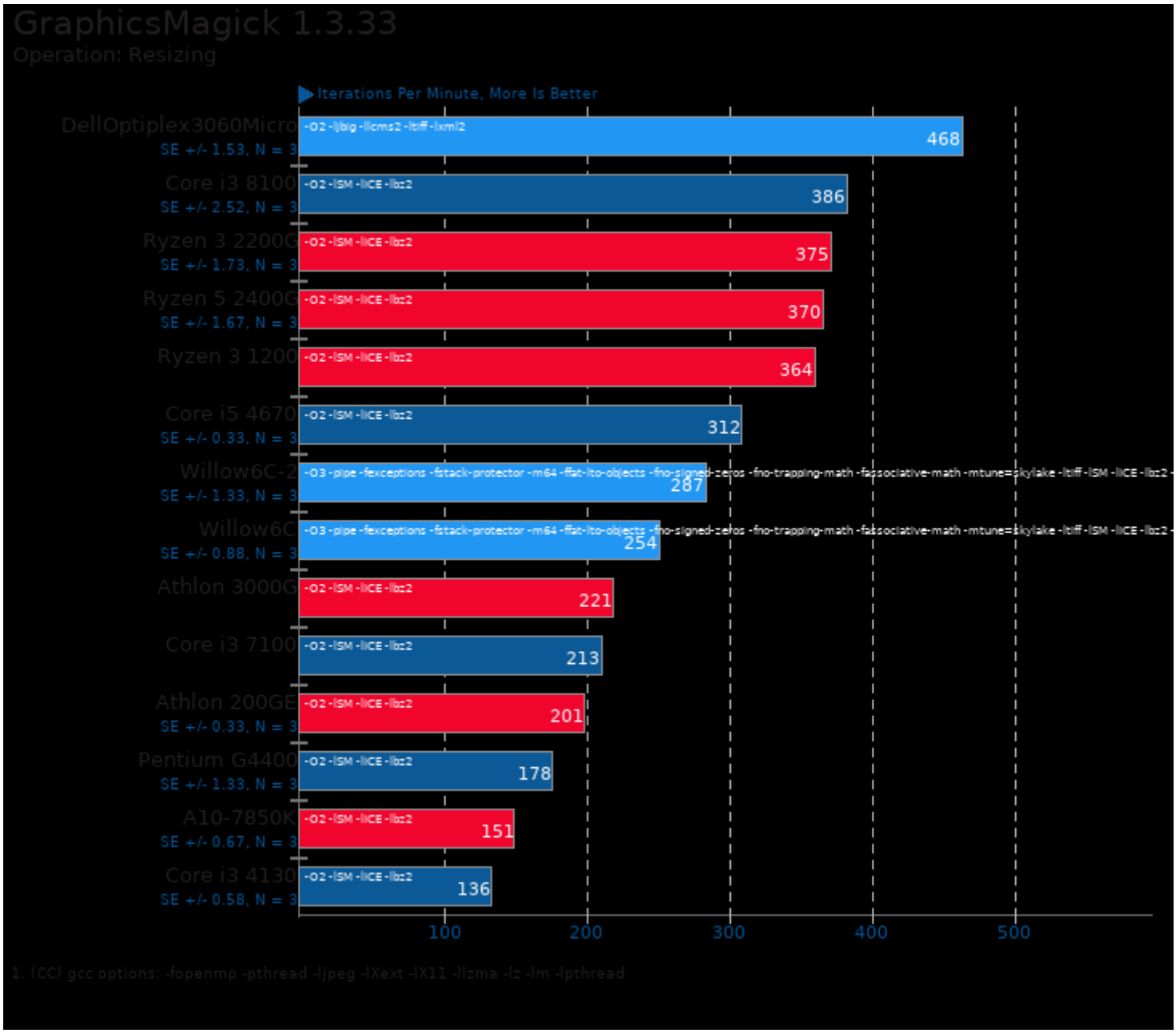
Low-End EOY2019 Ubuntu Linux CPU Comparison

Tesseract OCR - T.T.O.7.I (sec)	35.333	32.623	46.932	34.801	29.123	28.256	38.126	28.537	28.339	28.001	58.053	
Normalized	79.25%	85.83%	59.66%	80.46%	96.15%	99.1%	73.44%	98.12%	98.81%	100%	48.23%	
Standard	0.1%	0.2%	0.2%	0.3%	0.2%	0.2%	0.3%	0.3%	0.4%	0%	0.1%	
Cryptsetup - PBKDF2-whirlpool (Iterations/sec	507646	553827	363584	548037	587552	621931	512667		630407	574669	571534	588306
Normalized	80.53%	87.85%	57.67%	86.93%	93.2%	98.66%	81.32%		100%	91.16%	90.66%	93.32%
Standard	0.4%	0.3%	0.1%	0.2%	0.4%		0.1%		0.1%	0.3%	0.1%	5%
Cryptsetup - PBKDF2-sha512 (Iterations/sec												768281
Normalized												99.18%
Standard												6.2%
GNU Octave Benchmark (sec)												15.11
Standard Deviation												3.4%

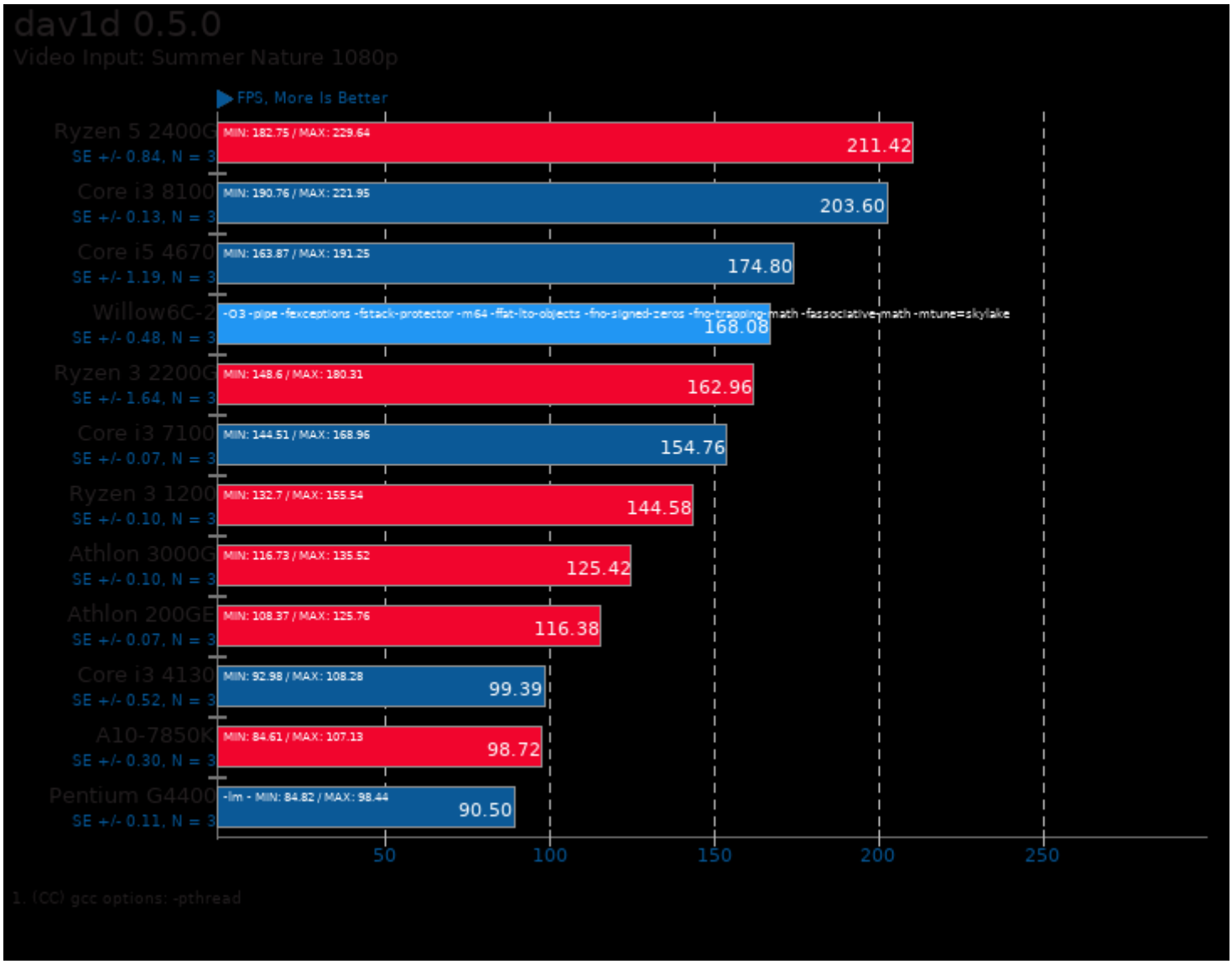
Low-End EOY2019 Ubuntu Linux CPU Comparison



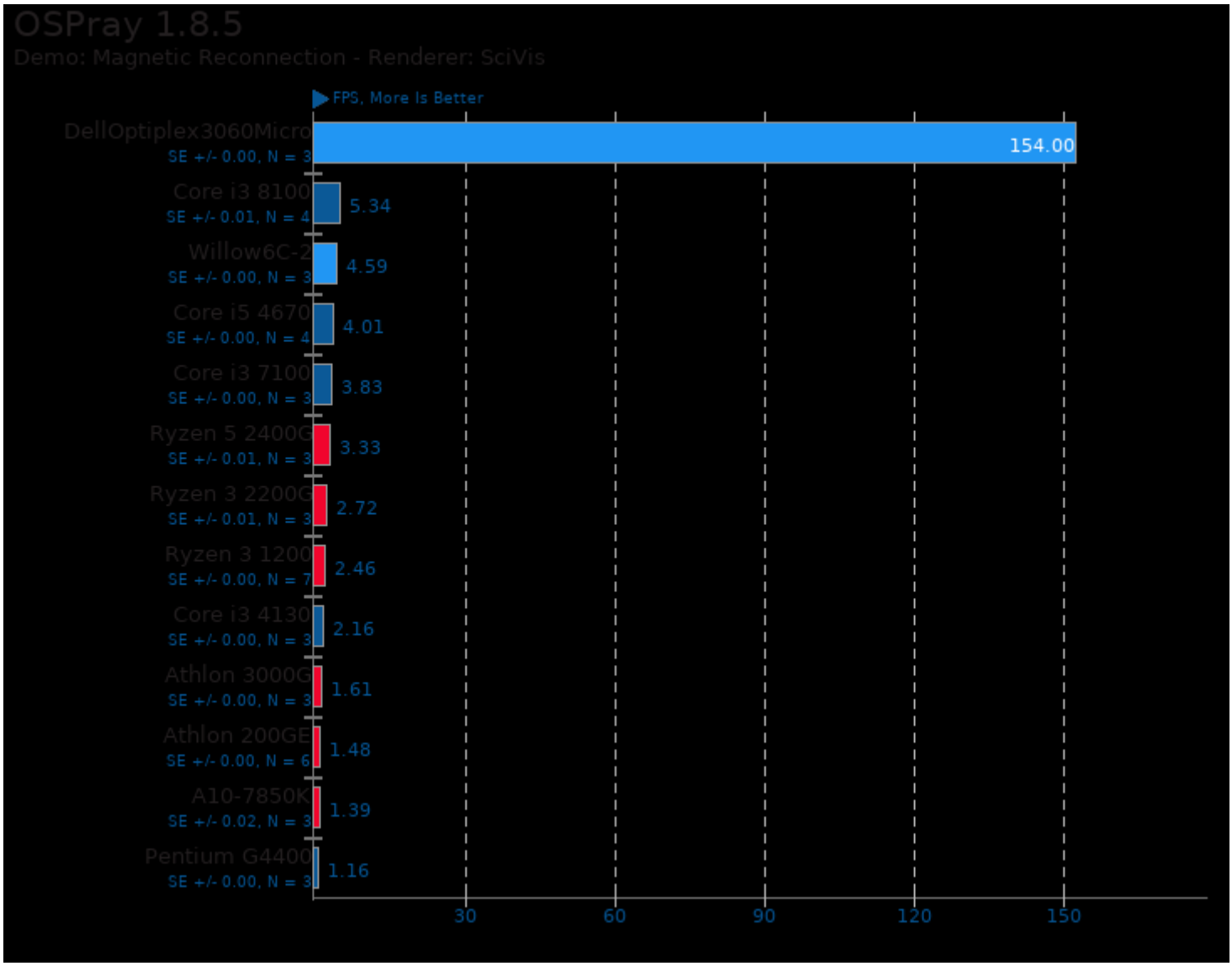

GraphicsMagick 1.3.33
Operation: Sharpen
Iterations Per Minute, More Is Better
DellOptiplex3060Micro
SE +/- 0.00, N = 3
-O2 -ljpeg -llcms2 -ltiff -lxml2
62
Ryzen 5 2400G
SE +/- 0.33, N = 3
-O2 -lSM -lICE -lbz2
56
Ryzen 3 2200G
-O2 -lSM -lICE -lbz2
54
Willow6C-2
-O3 -pipe -fexceptions -fstack-protector -m64 -ffat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -ltiff -lSM -lICE -lbz2
52
Willow6C
-O3 -pipe -fexceptions -fstack-protector -m64 -ffat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -ltiff -lSM -lICE -lbz2
49
Ryzen 3 1200
-O2 -lSM -lICE -lbz2
48
Core i5 4670
-O2 -lSM -lICE -lbz2
46
Core i3 8100
-O2 -lSM -lICE -lbz2
32
Athlon 3000G
-O2 -lSM -lICE -lbz2
28
Athlon 200GE
-O2 -lSM -lICE -lbz2
26
Core i3 4130
-O2 -lSM -lICE -lbz2
22
A10-7850K
SE +/- 0.18, N = 12
-O2 -lSM -lICE -lbz2
21
Core i3 7100
-O2 -lSM -lICE -lbz2
18
Pentium G4400
-O2 -lSM -lICE -lbz2
15
14
28
42
56
70
1. (CC) gcc options: -fopenmp -pthread -ljpeg -lXext -lX11 -llzma -lz -lm -lpthread


GraphicsMagick 1.3.33
Operation: Resizing
Iterations Per Minute, More Is Better
DellOptiplex3060Micro
SE +/- 1.53, N = 3
-O2 -ljpeg -llcms2 -ltiff -lxml2
468
Core i3 8100
SE +/- 2.52, N = 3
-O2 -lSM -lICE -lbz2
386
Ryzen 3 2200G
SE +/- 1.73, N = 3
-O2 -lSM -lICE -lbz2
375
Ryzen 5 2400G
SE +/- 1.67, N = 3
-O2 -lSM -lICE -lbz2
370
Ryzen 3 1200
-O2 -lSM -lICE -lbz2
364
Core i5 4670
SE +/- 0.33, N = 3
-O2 -lSM -lICE -lbz2
312
Willow6C-2
SE +/- 1.33, N = 3
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -ltiff -lSM -lICE -lbz2
287
Willow6C
SE +/- 0.88, N = 3
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -ltiff -lSM -lICE -lbz2
254
Athlon 3000G
-O2 -lSM -lICE -lbz2
221
Core i3 7100
-O2 -lSM -lICE -lbz2
213
Athlon 200GE
SE +/- 0.33, N = 3
-O2 -lSM -lICE -lbz2
201
Pentium G4400
SE +/- 1.33, N = 3
-O2 -lSM -lICE -lbz2
178
A10-7850K
SE +/- 0.67, N = 3
-O2 -lSM -lICE -lbz2
151
Core i3 4130
SE +/- 0.58, N = 3
-O2 -lSM -lICE -lbz2
136
100
200
300
400
500
1. (CC) gcc options: -fopenmp -pthread -ljpeg -lXext -lX11 -llzma -lz -lm -lpthread

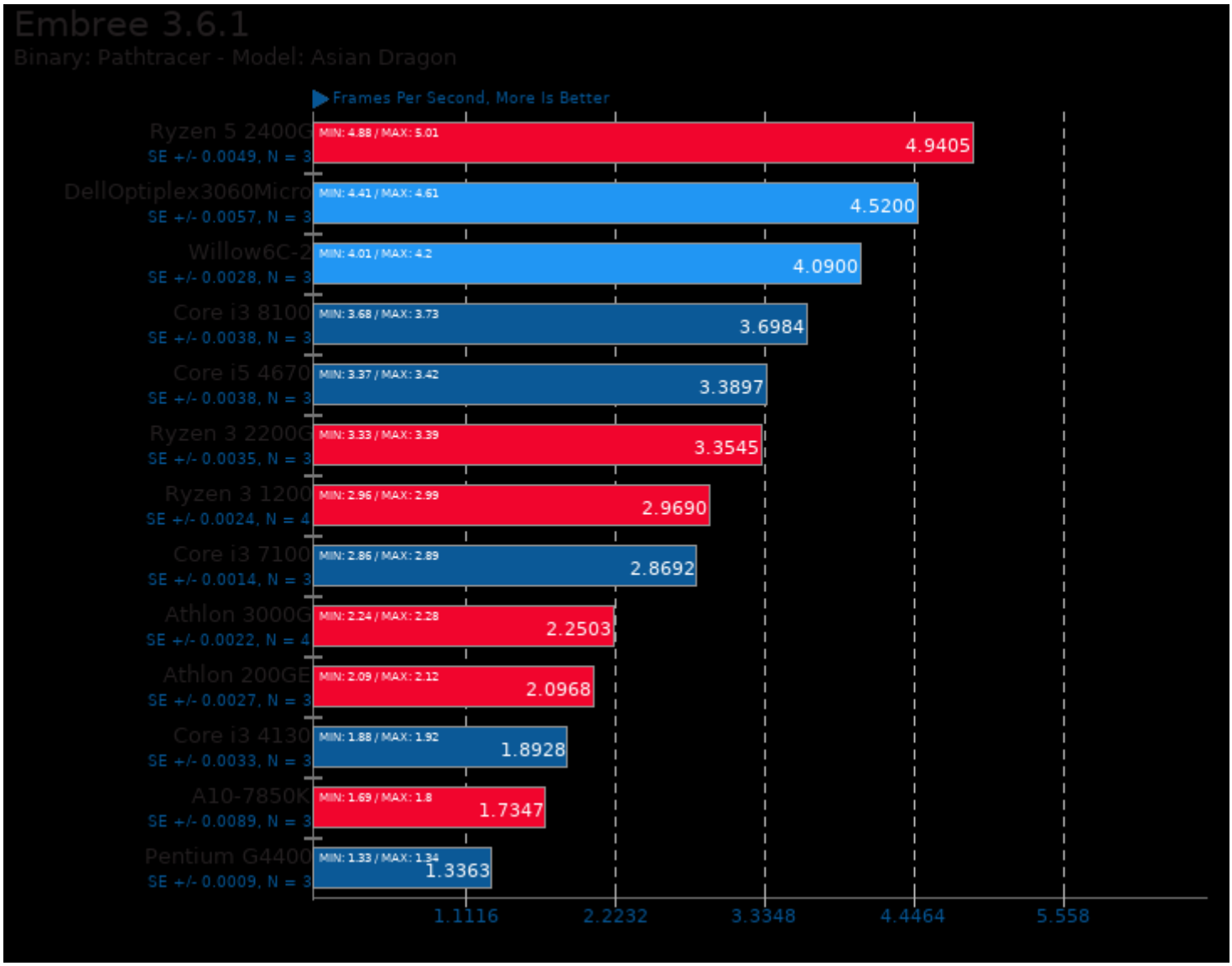
Low-End EOY2019 Ubuntu Linux CPU Comparison

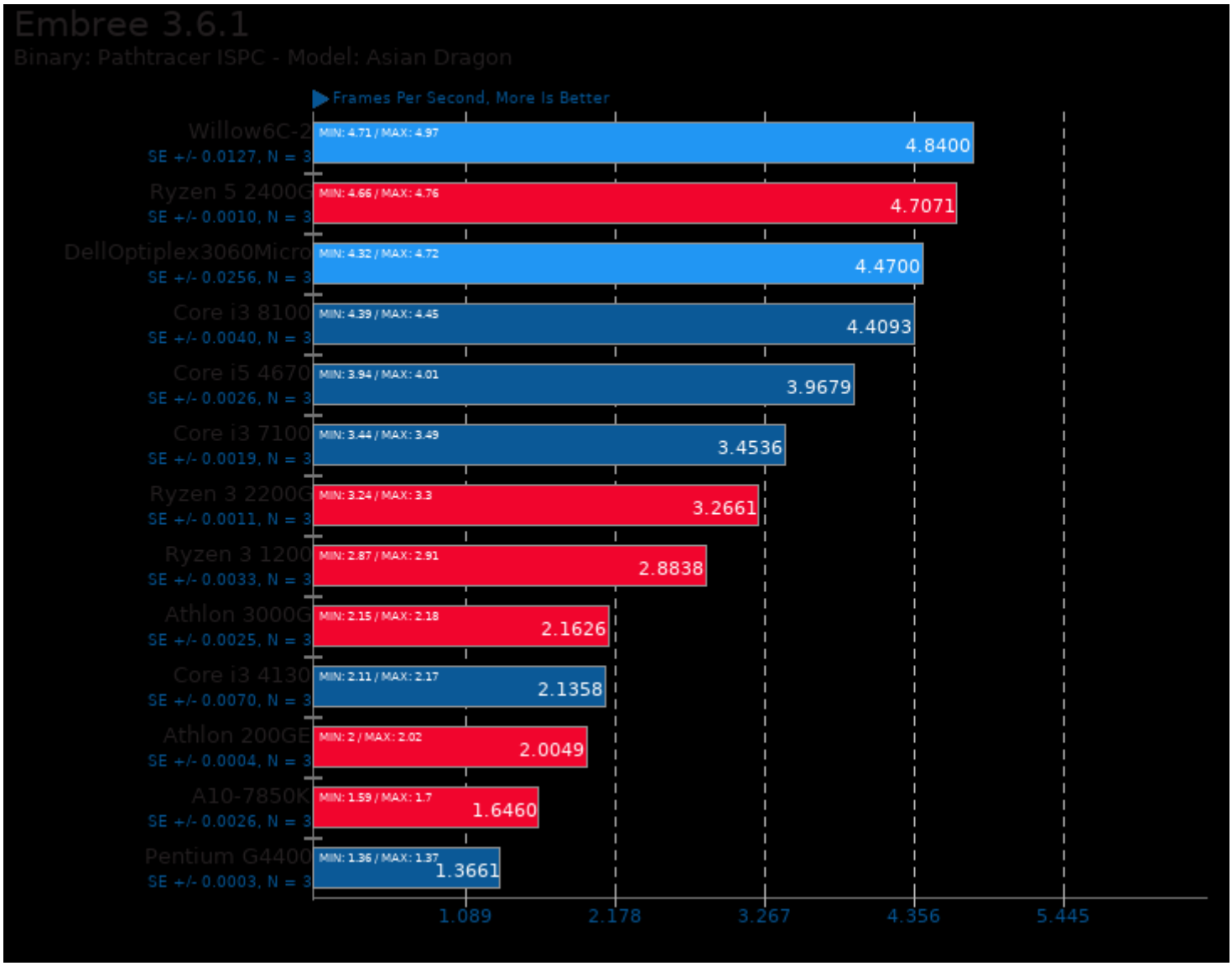


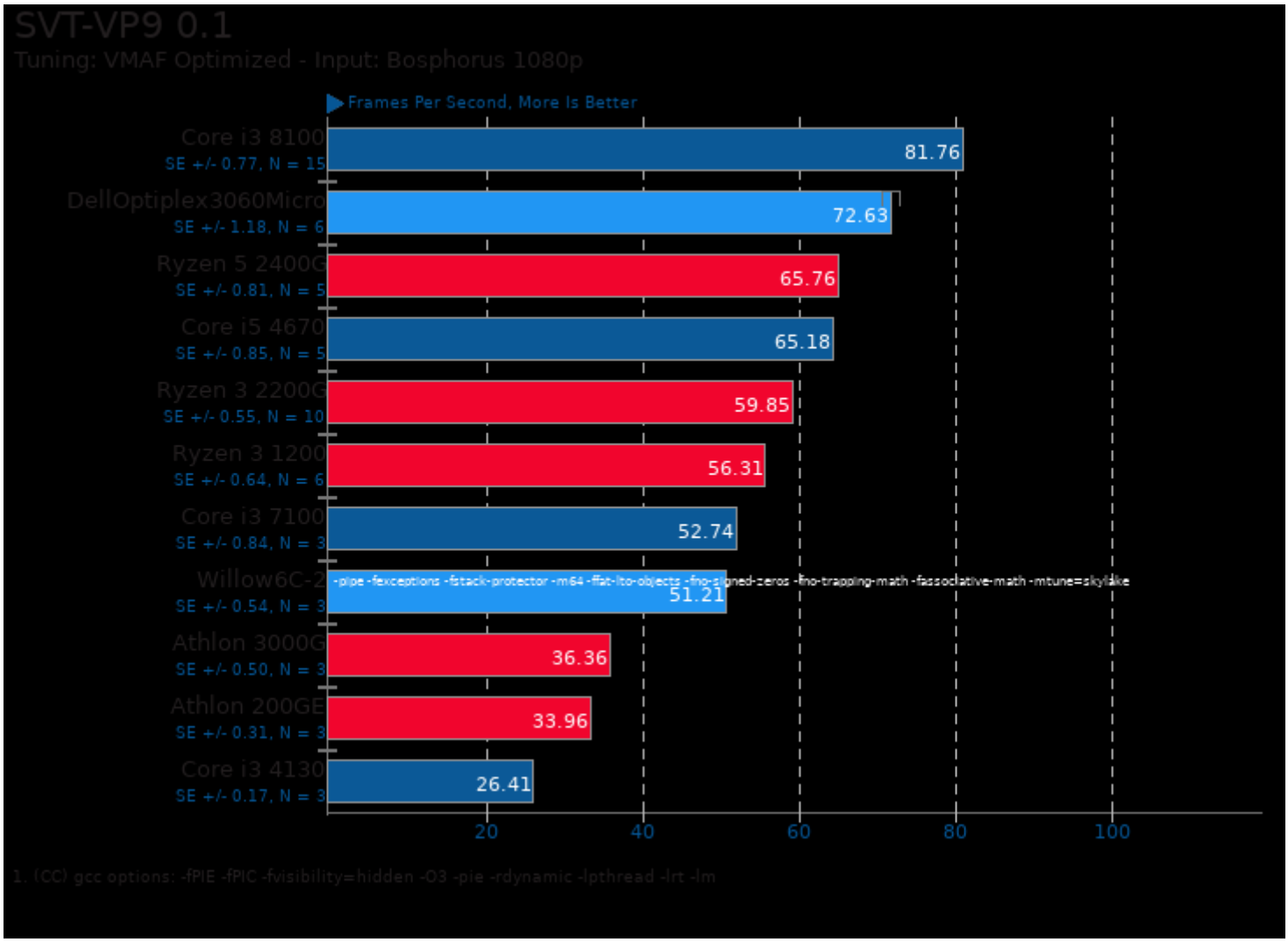
Low-End EOY2019 Ubuntu Linux CPU Comparison

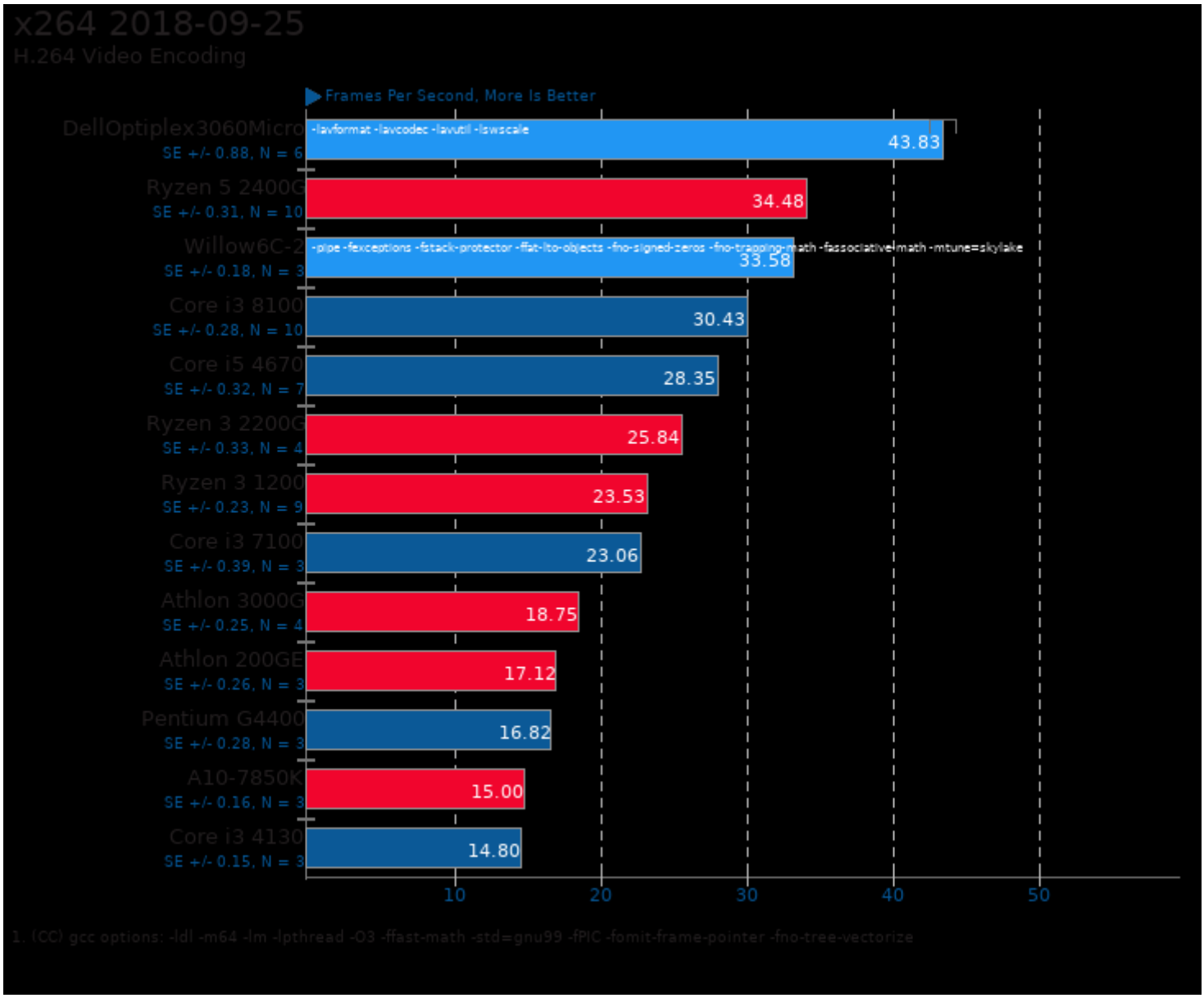


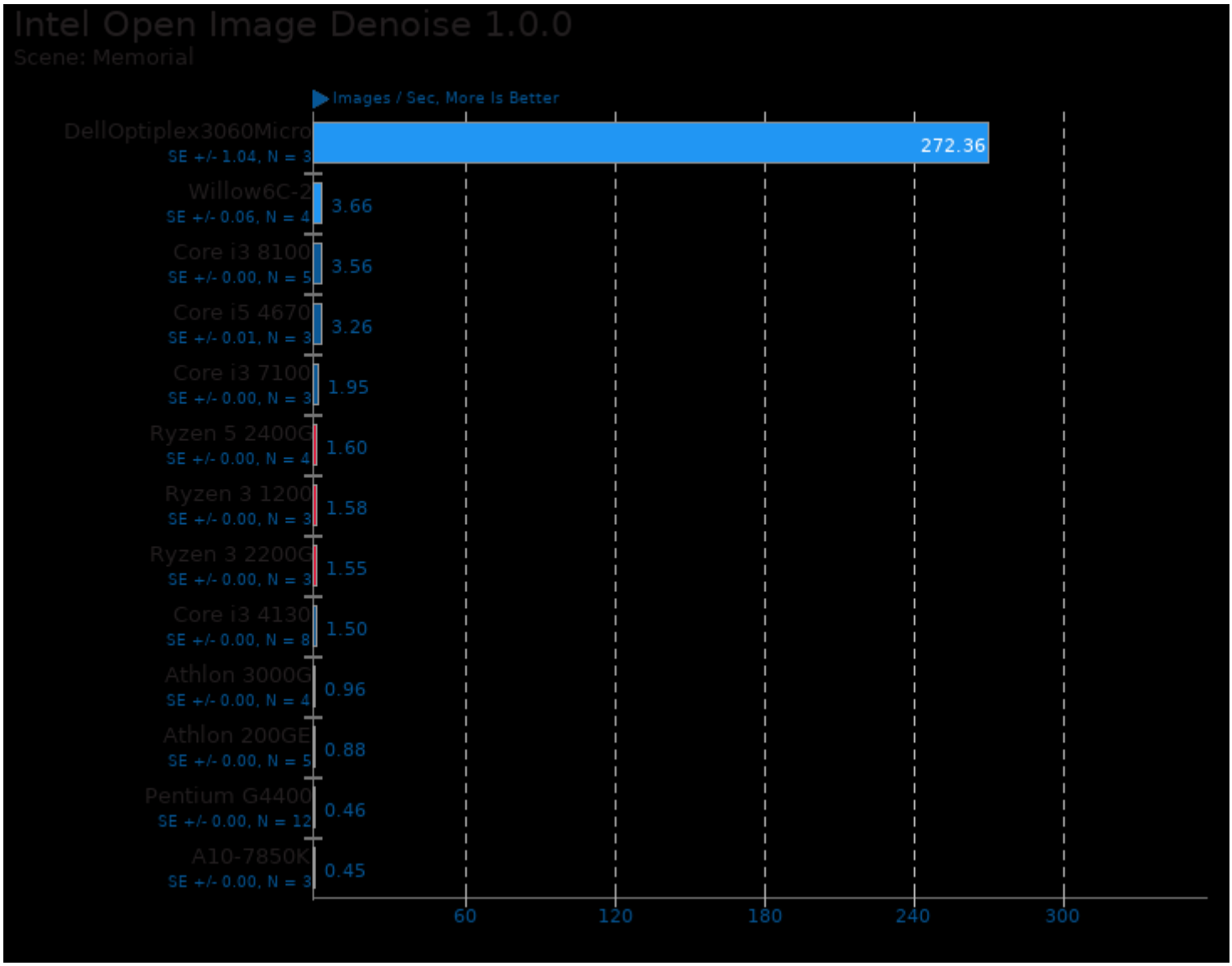
Low-End EOY2019 Ubuntu Linux CPU Comparison

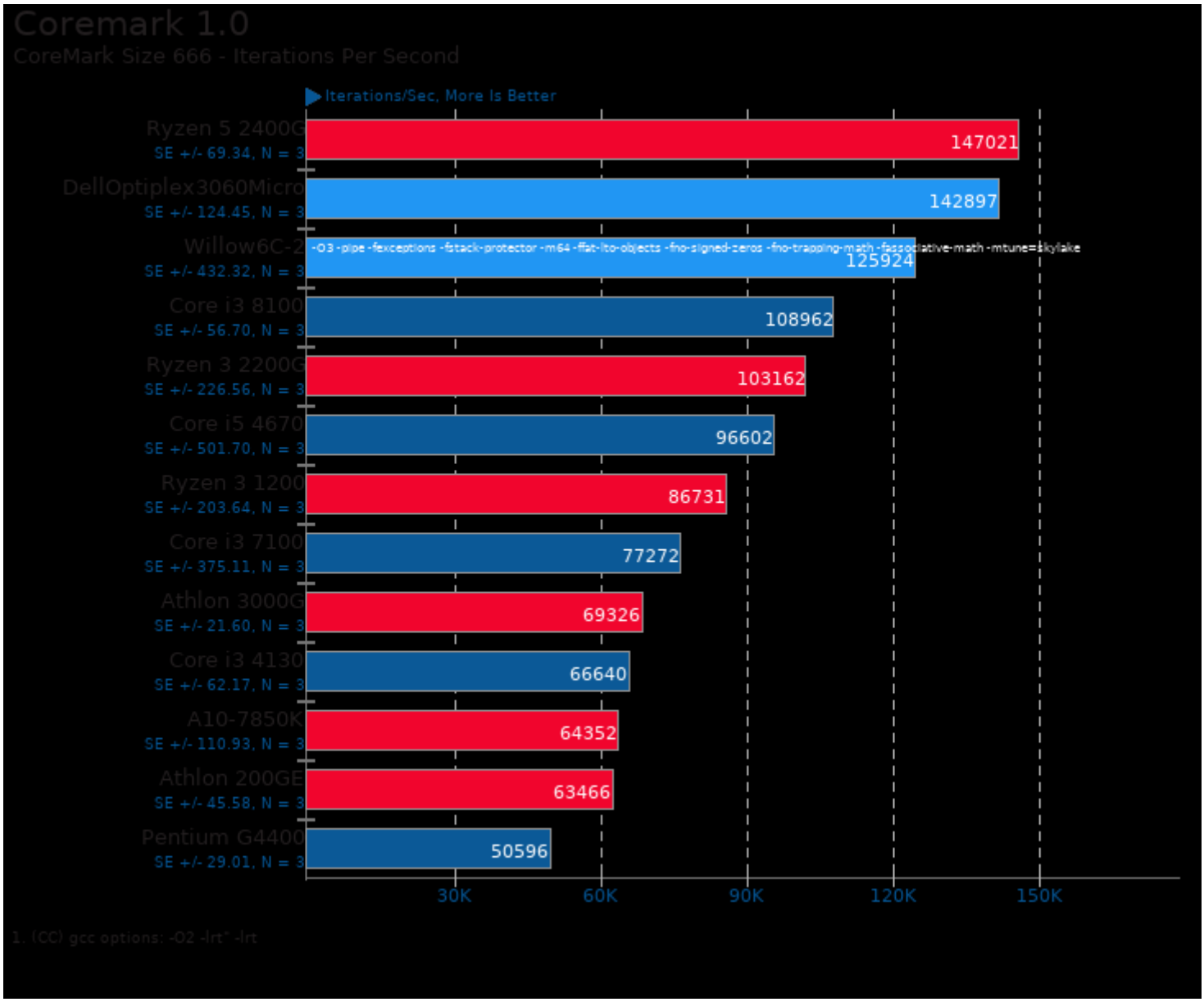


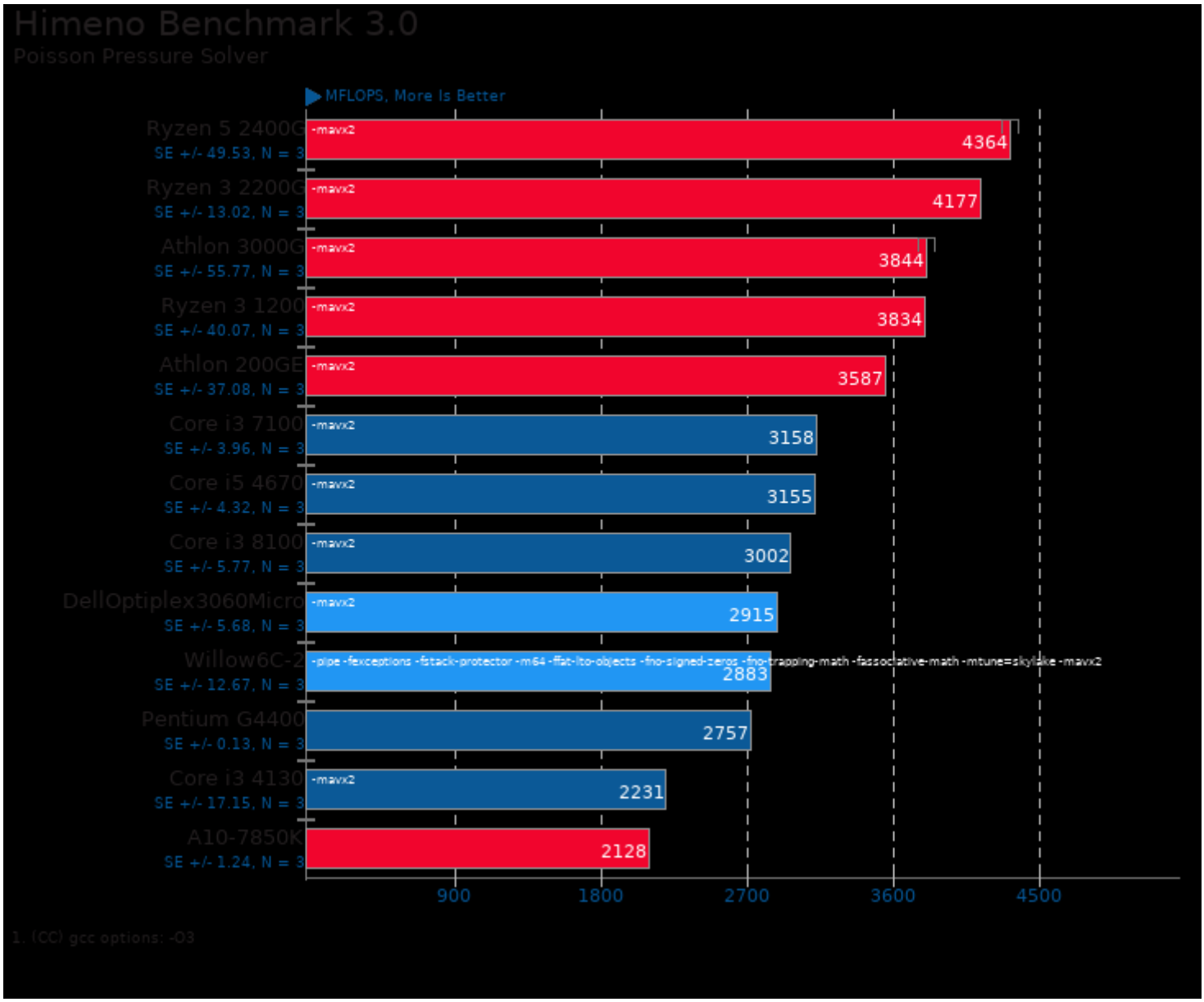

Embree 3.6.1
Binary: Pathtracer ISPC - Model: Asian Dragon
Frames Per Second, More Is Better
Willow6C-2
SE +/- 0.0127, N = 3
MIN: 4.71 / MAX: 4.97
4.8400
Ryzen 5 2400G
SE +/- 0.0010, N = 3
MIN: 4.66 / MAX: 4.76
4.7071
DellOptiplex3060Micro
SE +/- 0.0256, N = 3
MIN: 4.32 / MAX: 4.72
4.4700
Core i3 8100
SE +/- 0.0040, N = 3
MIN: 4.39 / MAX: 4.45
4.4093
Core i5 4670
SE +/- 0.0026, N = 3
MIN: 3.94 / MAX: 4.01
3.9679
Core i3 7100
SE +/- 0.0019, N = 3
MIN: 3.44 / MAX: 3.49
3.4536
Ryzen 3 2200G
SE +/- 0.0011, N = 3
MIN: 3.24 / MAX: 3.3
3.2661
Ryzen 3 1200
SE +/- 0.0033, N = 3
MIN: 2.87 / MAX: 2.91
2.8838
Athlon 3000G
SE +/- 0.0025, N = 3
MIN: 2.15 / MAX: 2.18
2.1626
Core i3 4130
SE +/- 0.0070, N = 3
MIN: 2.11 / MAX: 2.17
2.1358
Athlon 200GE
SE +/- 0.0004, N = 3
MIN: 2 / MAX: 2.02
2.0049
A10-7850K
SE +/- 0.0026, N = 3
MIN: 1.59 / MAX: 1.7
1.6460
Pentium G4400
SE +/- 0.0003, N = 3
MIN: 1.36 / MAX: 1.37
1.3661
1.089
2.178
3.267
4.356
5.445


SVT-VP9 0.1
Tuning: VMAF Optimized - Input: Bosphorus 1080p
Frames Per Second, More Is Better
Core i3 8100
SE +/- 0.77, N = 15
81.76
DellOptiplex3060Micro
SE +/- 1.18, N = 6
72.63
Ryzen 5 2400G
SE +/- 0.81, N = 5
65.76
Core i5 4670
SE +/- 0.85, N = 5
65.18
Ryzen 3 2200G
SE +/- 0.55, N = 10
59.85
Ryzen 3 1200
SE +/- 0.64, N = 6
56.31
Core i3 7100
SE +/- 0.84, N = 3
52.74
Willow6C-2
SE +/- 0.54, N = 3
51.21
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
Athlon 3000G
SE +/- 0.50, N = 3
36.36
Athlon 200GE
SE +/- 0.31, N = 3
33.96
Core i3 4130
SE +/- 0.17, N = 3
26.41
20
40
60
80
100
1. (CC) gcc options: -fPIE -fPIC -fvisibility=hidden -O3 -pie -rdynamic -lpthread -lrt -lm

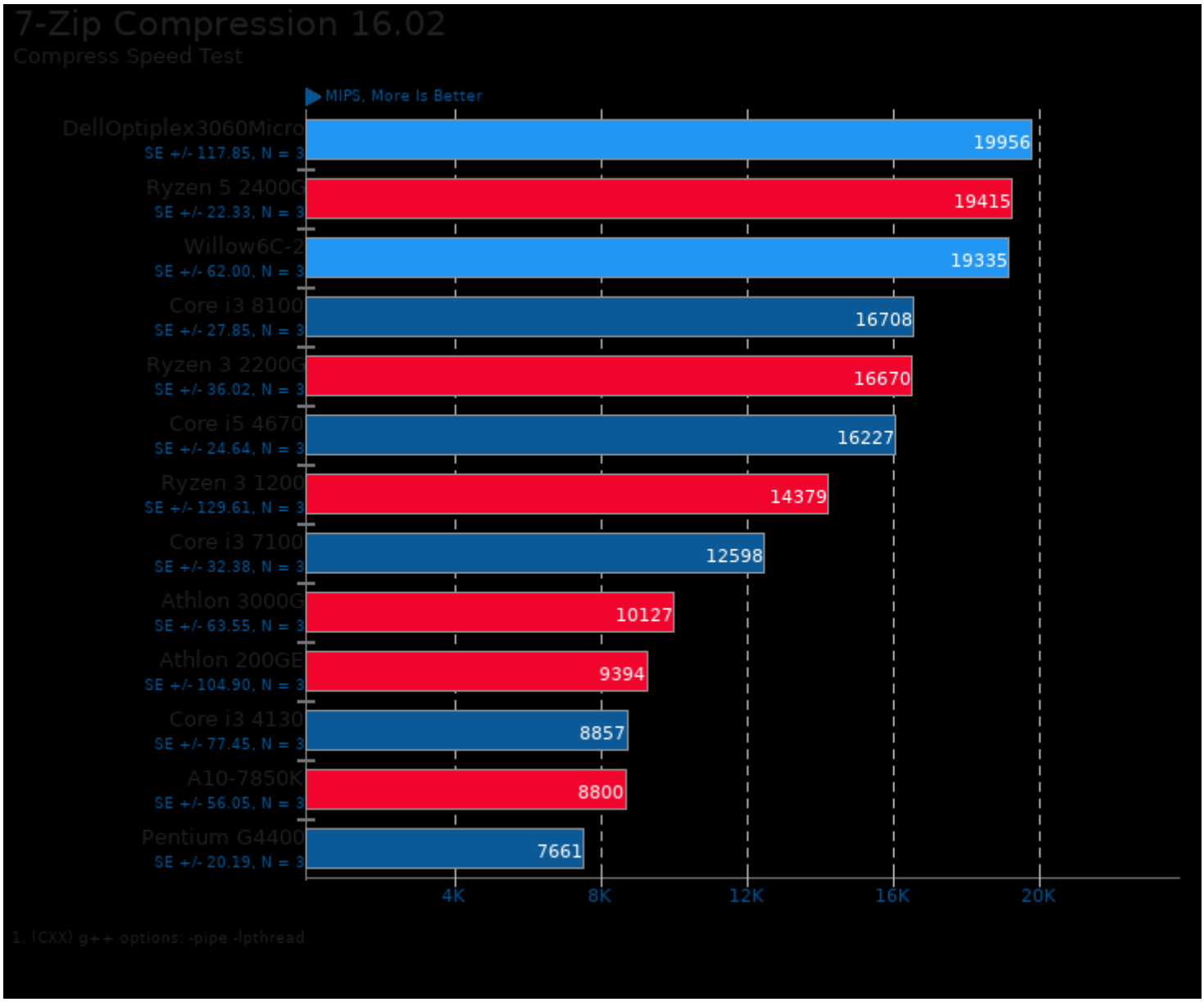

x264 2018-09-25
H.264 Video Encoding
Frames Per Second, More Is Better
DellOptiplex3060Micro
SE +/- 0.88, N = 6
-lavformat -lavcodec -lavutil -lswscale
43.83
Ryzen 5 2400G
SE +/- 0.31, N = 10
34.48
Willow6C-2
SE +/- 0.18, N = 3
-pipe -fexceptions -fstack-protector -ffat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
33.58
Core i3 8100
SE +/- 0.28, N = 10
30.43
Core i5 4670
SE +/- 0.32, N = 7
28.35
Ryzen 3 2200G
SE +/- 0.33, N = 4
25.84
Ryzen 3 1200
SE +/- 0.23, N = 9
23.53
Core i3 7100
SE +/- 0.39, N = 3
23.06
Athlon 3000G
SE +/- 0.25, N = 4
18.75
Athlon 200GE
SE +/- 0.26, N = 3
17.12
Pentium G4400
SE +/- 0.28, N = 3
16.82
A10-7850K
SE +/- 0.16, N = 3
15.00
Core i3 4130
SE +/- 0.15, N = 3
14.80
10
20
30
40
50
1. (CC) gcc options: -ldl -m64 -lm -lpthread -O3 -ffast-math -std=gnu99 -fPIC -fomit-frame-pointer -fno-tree-vectorize


Intel Open Image Denoise 1.0.0
Scene: Memorial
Images / Sec, More Is Better
DellOptiplex3060Micro
SE +/- 1.04, N = 3
272.36
Willow6C-2
SE +/- 0.06, N = 4
3.66
Core i3 8100
SE +/- 0.00, N = 5
3.56
Core i5 4670
SE +/- 0.01, N = 3
3.26
Core i3 7100
SE +/- 0.00, N = 3
1.95
Ryzen 5 2400G
SE +/- 0.00, N = 4
1.60
Ryzen 3 1200
SE +/- 0.00, N = 3
1.58
Ryzen 3 2200G
SE +/- 0.00, N = 3
1.55
Core i3 4130
SE +/- 0.00, N = 8
1.50
Athlon 3000G
SE +/- 0.00, N = 4
0.96
Athlon 200GE
SE +/- 0.00, N = 5
0.88
Pentium G4400
SE +/- 0.00, N = 12
0.46
A10-7850K
SE +/- 0.00, N = 3
0.45
60
120
180
240
300

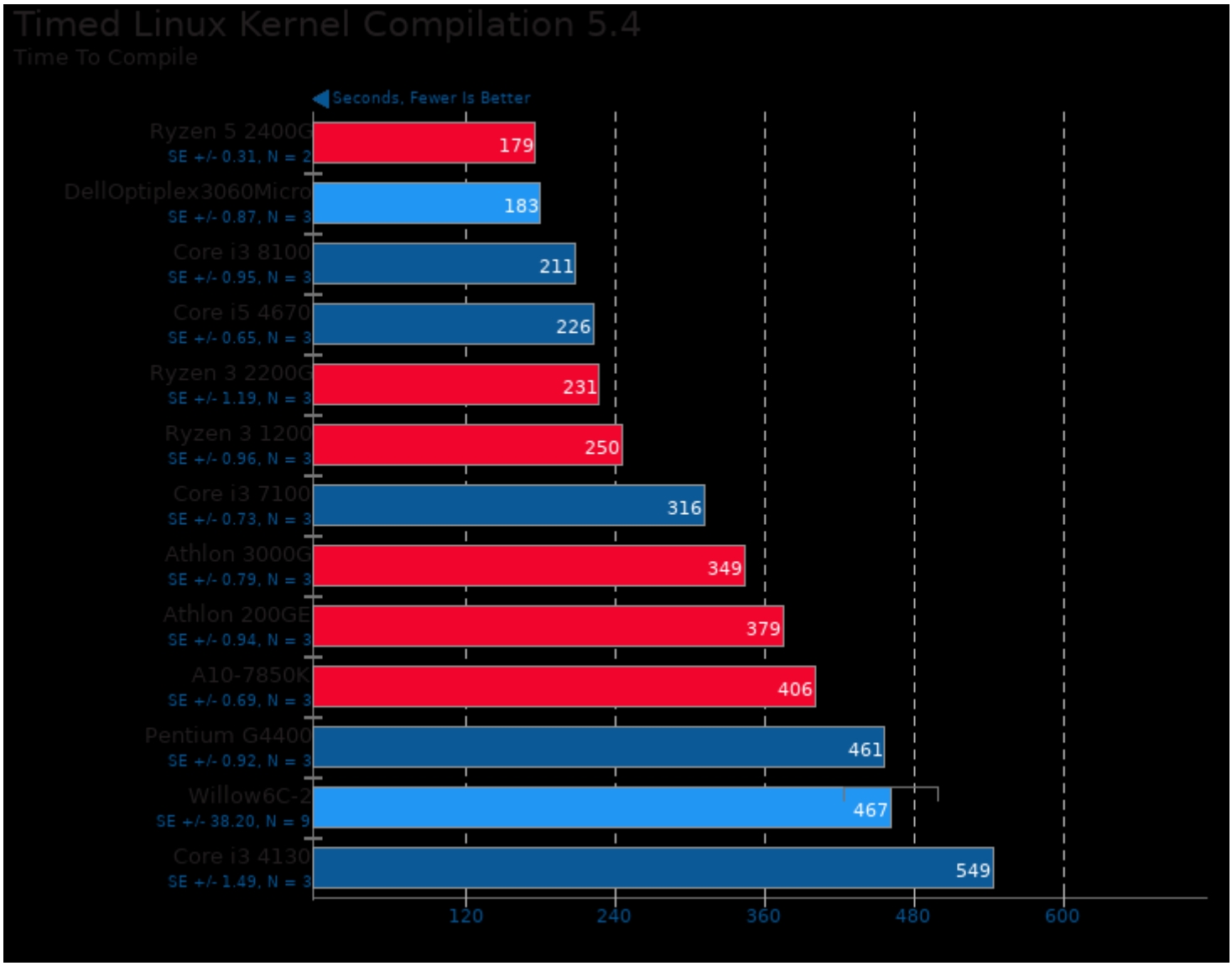

Coremark 1.0
CoreMark Size 666 - Iterations Per Second
Iterations/Sec, More Is Better
Ryzen 5 2400G
SE +/- 69.34, N = 3
147021
DellOptiplex3060Micro
SE +/- 124.45, N = 3
142897
Willow6C-2
SE +/- 432.32, N = 3
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
125924
Core i3 8100
SE +/- 56.70, N = 3
108962
Ryzen 3 2200G
SE +/- 226.56, N = 3
103162
Core i5 4670
SE +/- 501.70, N = 3
96602
Ryzen 3 1200
SE +/- 203.64, N = 3
86731
Core i3 7100
SE +/- 375.11, N = 3
77272
Athlon 3000G
SE +/- 21.60, N = 3
69326
Core i3 4130
SE +/- 62.17, N = 3
66640
A10-7850K
SE +/- 110.93, N = 3
64352
Athlon 200GE
SE +/- 45.58, N = 3
63466
Pentium G4400
SE +/- 29.01, N = 3
50596
30K
60K
90K
120K
150K
1. (CC) gcc options: -O2 -lrt -lrt


Himeno Benchmark 3.0
Poisson Pressure Solver
MFLOPS, More Is Better
Ryzen 5 2400G
SE +/- 49.53, N = 3
-mavx2
4364
Ryzen 3 2200G
SE +/- 13.02, N = 3
-mavx2
4177
Athlon 3000G
SE +/- 55.77, N = 3
-mavx2
3844
Ryzen 3 1200
SE +/- 40.07, N = 3
-mavx2
3834
Athlon 200GE
SE +/- 37.08, N = 3
-mavx2
3587
Core i3 7100
SE +/- 3.96, N = 3
-mavx2
3158
Core i5 4670
SE +/- 4.32, N = 3
-mavx2
3155
Core i3 8100
SE +/- 5.77, N = 3
-mavx2
3002
DellOptiplex3060Micro
SE +/- 5.68, N = 3
-mavx2
2915
Willow6C-2
SE +/- 12.67, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -mavx2
2883
Pentium G4400
SE +/- 0.13, N = 3
2757
Core i3 4130
SE +/- 17.15, N = 3
-mavx2
2231
A10-7850K
SE +/- 1.24, N = 3
2128
900
1800
2700
3600
4500
1. (CC) gcc options: -O3

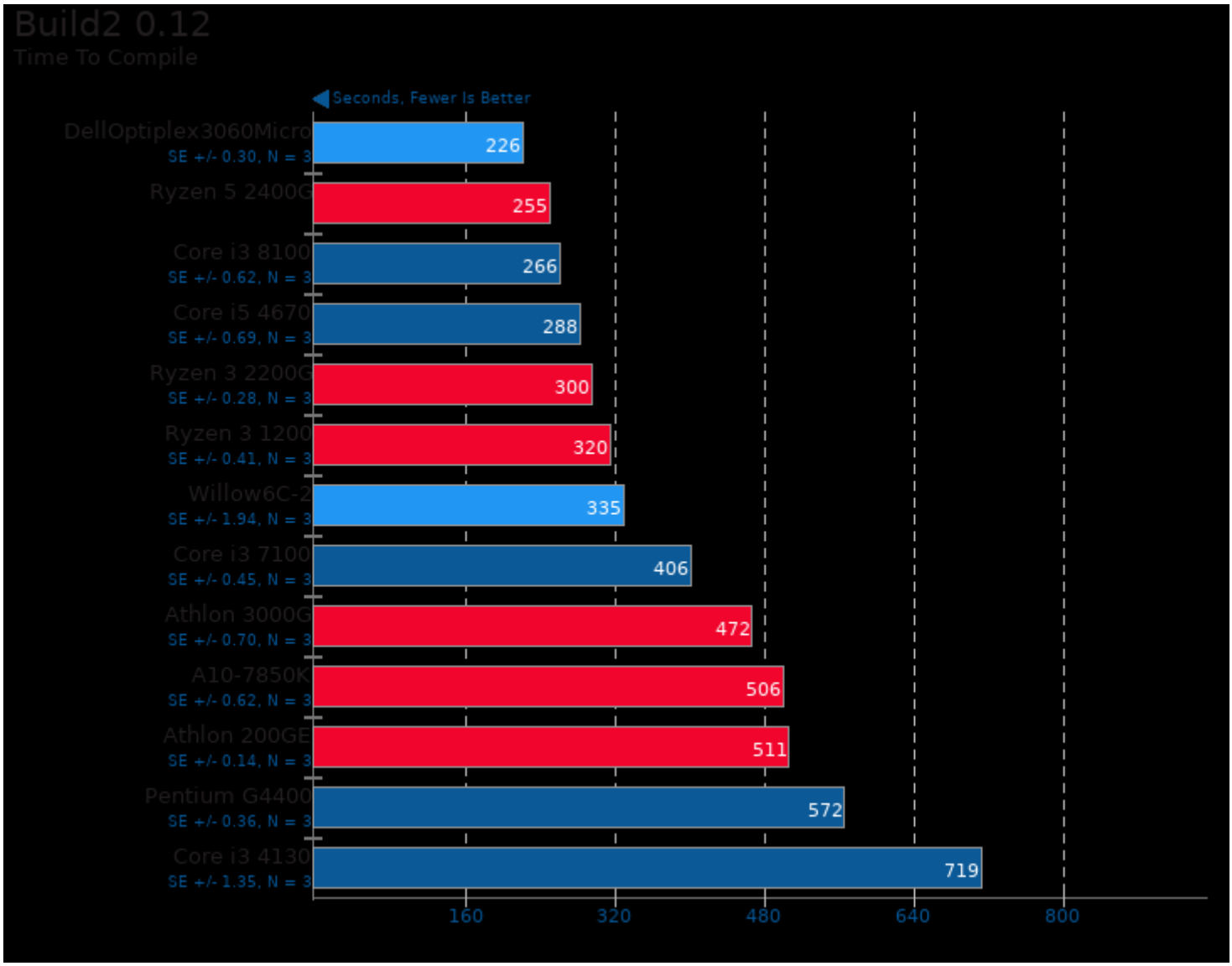
Low-End EOY2019 Ubuntu Linux CPU Comparison

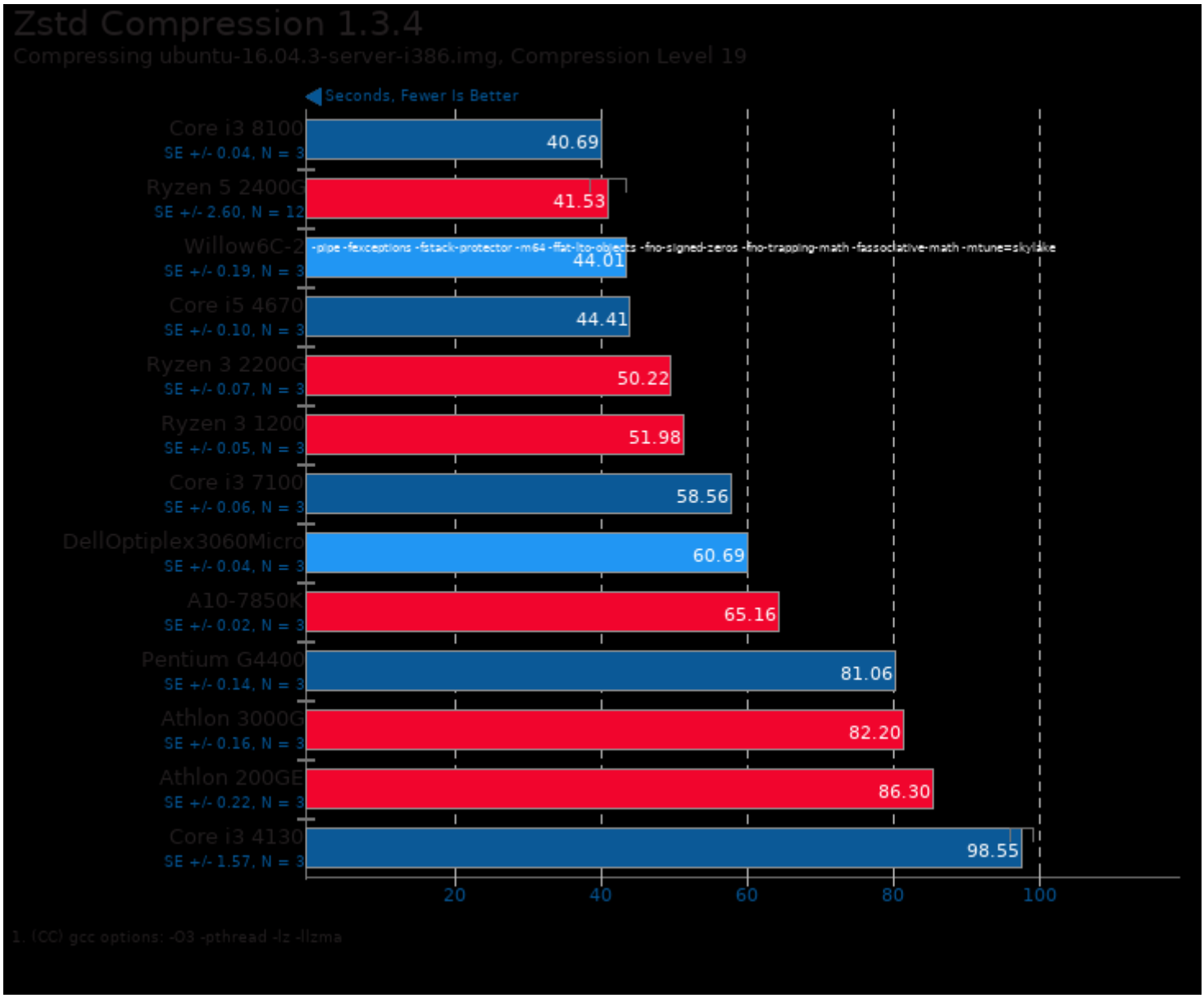


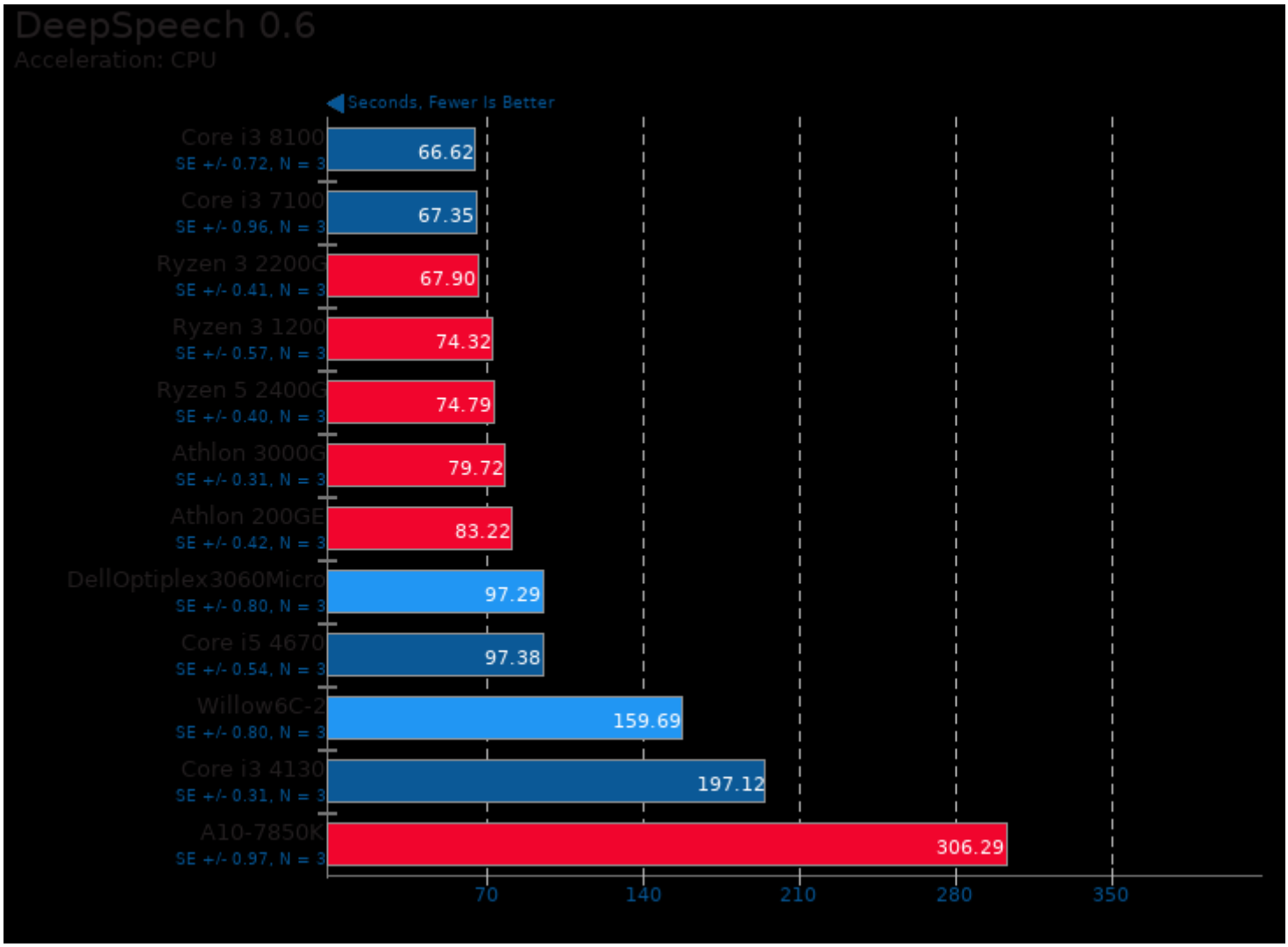
Low-End EOY2019 Ubuntu Linux CPU Comparison

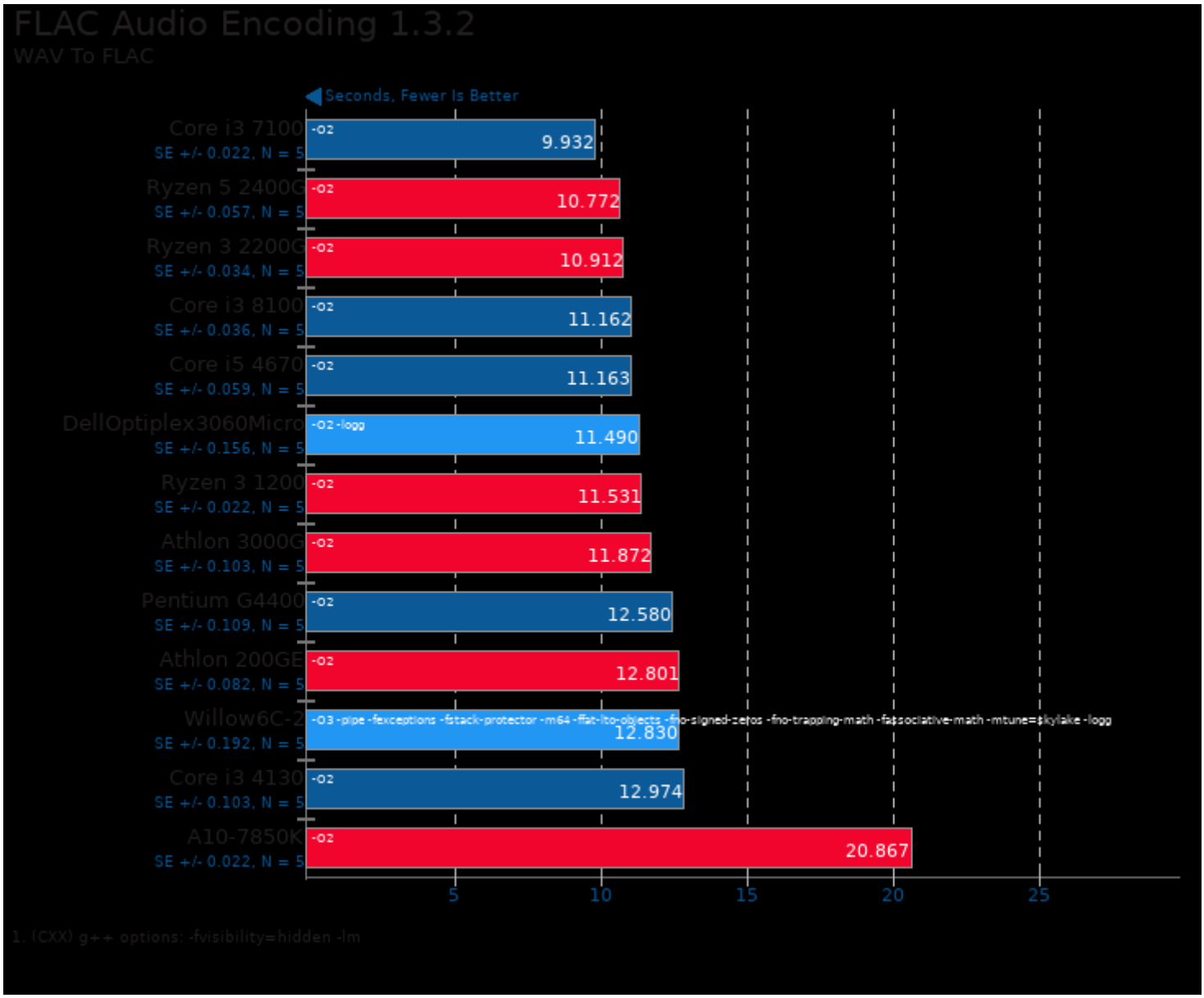


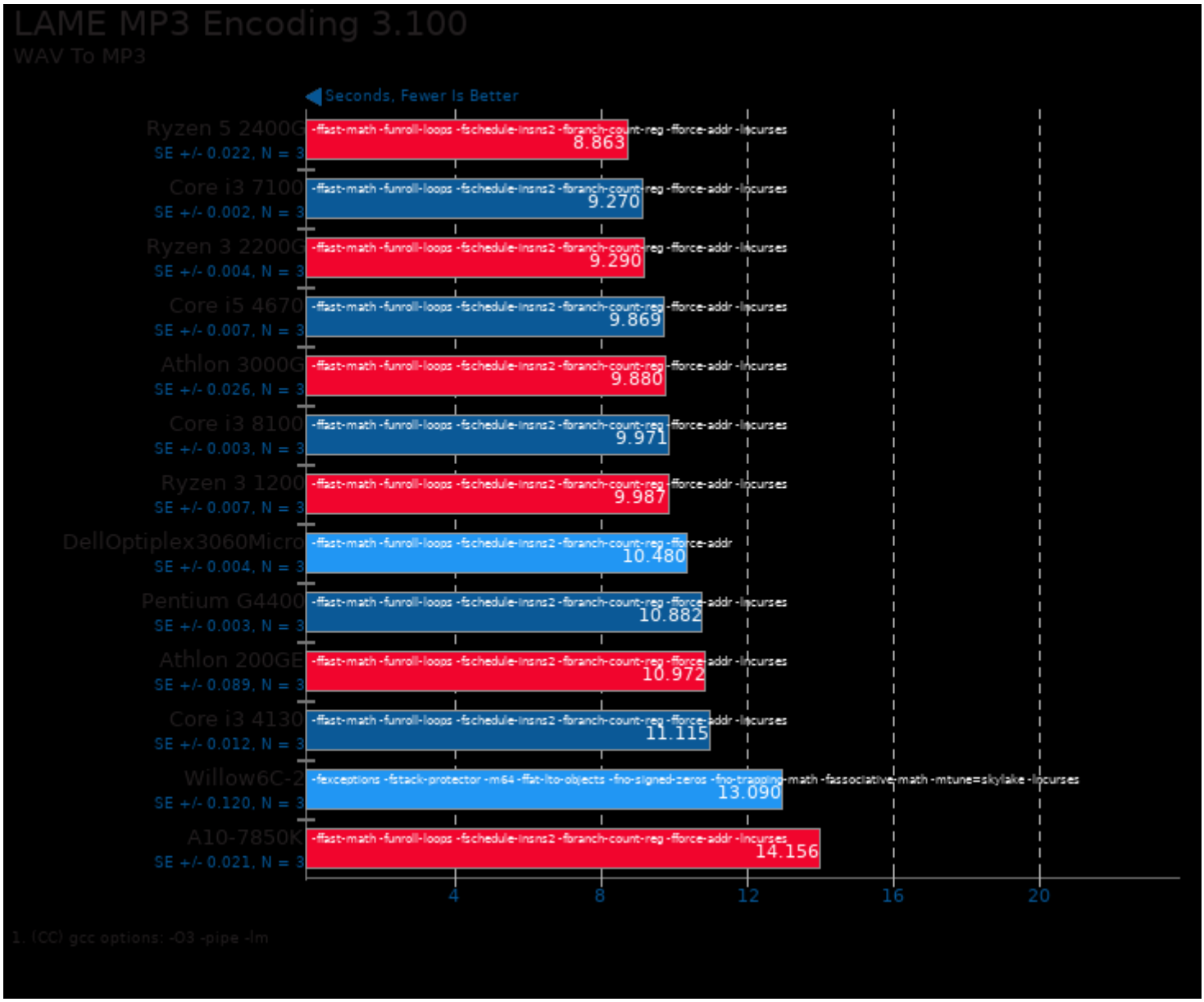
Low-End EOY2019 Ubuntu Linux CPU Comparison

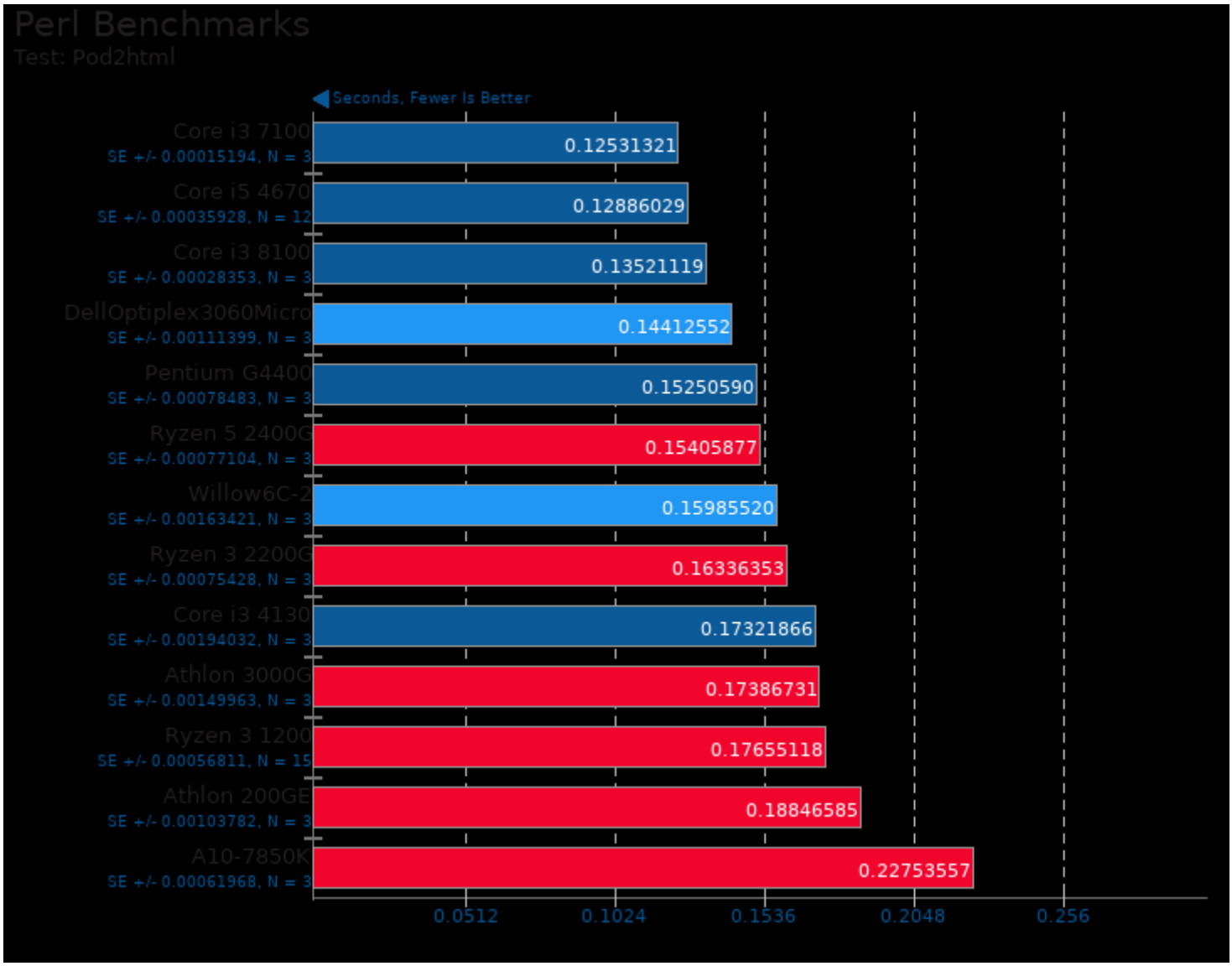



Zstd Compression 1.3.4
Compressing ubuntu-16.04.3-server-i386.img, Compression Level 19
Seconds, Fewer Is Better
Core i3 8100
SE +/- 0.04, N = 3
40.69
Ryzen 5 2400G
SE +/- 2.60, N = 12
41.53
Willow6C-2
SE +/- 0.19, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
44.01
Core i5 4670
SE +/- 0.10, N = 3
44.41
Ryzen 3 2200G
SE +/- 0.07, N = 3
50.22
Ryzen 3 1200
SE +/- 0.05, N = 3
51.98
Core i3 7100
SE +/- 0.06, N = 3
58.56
DellOptiplex3060Micro
SE +/- 0.04, N = 3
60.69
A10-7850K
SE +/- 0.02, N = 3
65.16
Pentium G4400
SE +/- 0.14, N = 3
81.06
Athlon 3000G
SE +/- 0.16, N = 3
82.20
Athlon 200GE
SE +/- 0.22, N = 3
86.30
Core i3 4130
SE +/- 1.57, N = 3
98.55
20
40
60
80
100
1. (CC) gcc options: -O3 -pthread -lz -llzma

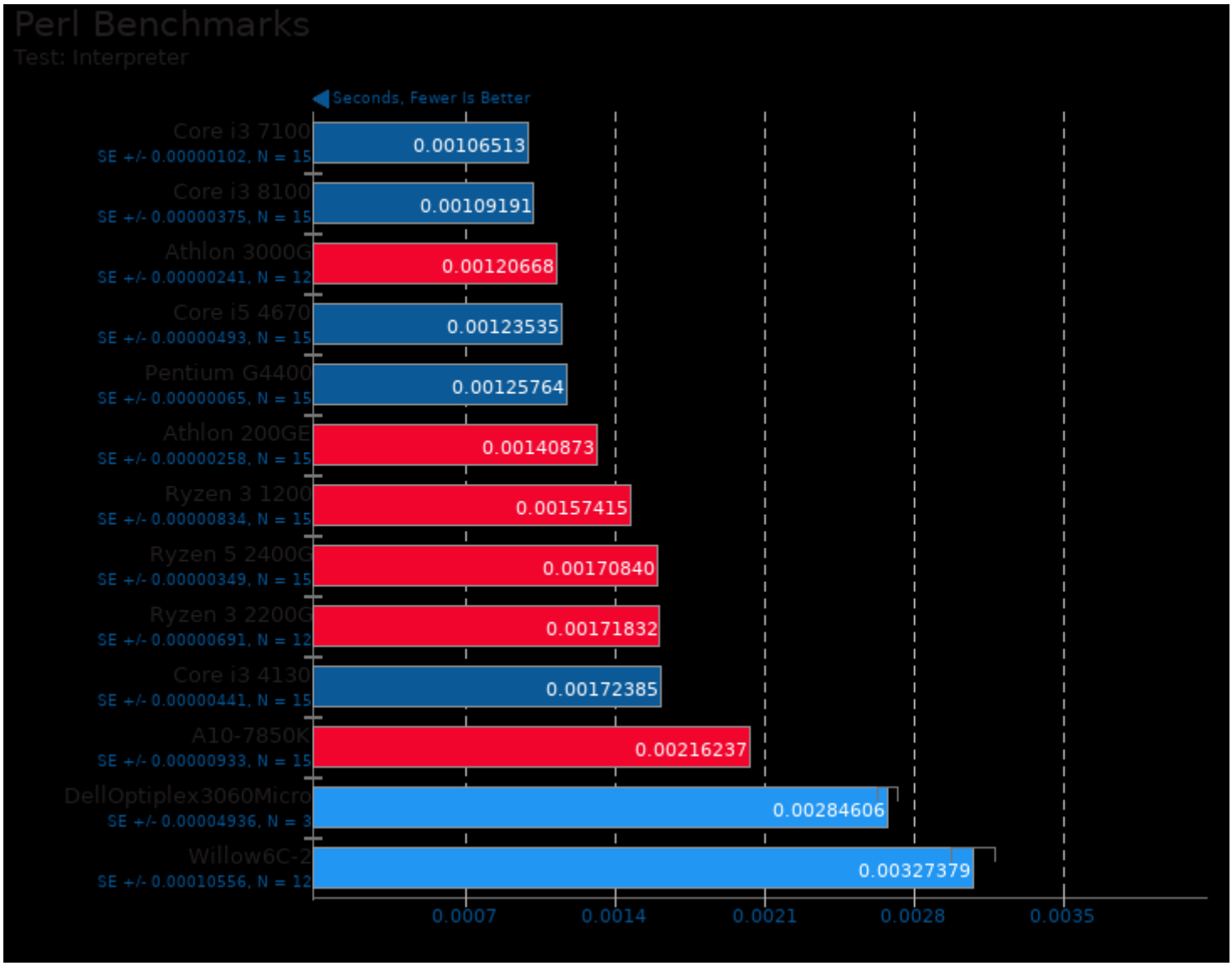

DeepSpeech 0.6
Acceleration: CPU
Seconds, Fewer Is Better
Core i3 8100
SE +/- 0.72, N = 3
66.62
Core i3 7100
SE +/- 0.96, N = 3
67.35
Ryzen 3 2200G
SE +/- 0.41, N = 3
67.90
Ryzen 3 1200
SE +/- 0.57, N = 3
74.32
Ryzen 5 2400G
SE +/- 0.40, N = 3
74.79
Athlon 3000G
SE +/- 0.31, N = 3
79.72
Athlon 200GE
SE +/- 0.42, N = 3
83.22
DellOptiplex3060Micro
SE +/- 0.80, N = 3
97.29
Core i5 4670
SE +/- 0.54, N = 3
97.38
Willow6C-2
SE +/- 0.80, N = 3
159.69
Core i3 4130
SE +/- 0.31, N = 3
197.12
A10-7850K
SE +/- 0.97, N = 3
306.29
70
140
210
280
350

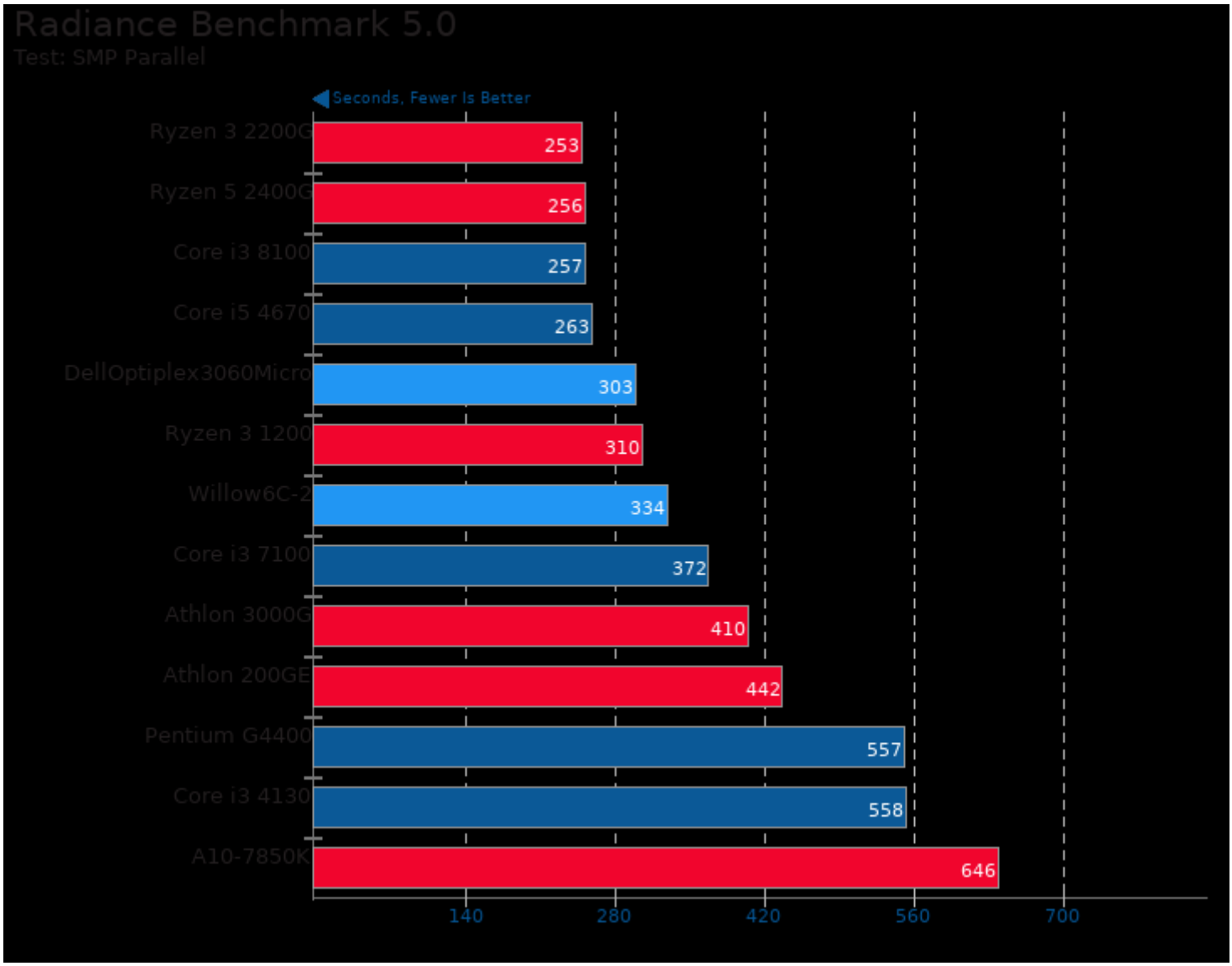

FLAC Audio Encoding 1.3.2
WAV To FLAC
Seconds, Fewer Is Better
Core i3 7100
SE +/- 0.022, N = 5
-O2
9.932
Ryzen 5 2400G
SE +/- 0.057, N = 5
-O2
10.772
Ryzen 3 2200G
SE +/- 0.034, N = 5
-O2
10.912
Core i3 8100
SE +/- 0.036, N = 5
-O2
11.162
Core i5 4670
SE +/- 0.059, N = 5
-O2
11.163
DellOptiplex3060Micro
SE +/- 0.156, N = 5
-O2 -logg
11.490
Ryzen 3 1200
SE +/- 0.022, N = 5
-O2
11.531
Athlon 3000G
SE +/- 0.103, N = 5
-O2
11.872
Pentium G4400
SE +/- 0.109, N = 5
-O2
12.580
Athlon 200GE
SE +/- 0.082, N = 5
-O2
12.801
Willow6C-2
SE +/- 0.192, N = 5
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -logg
12.830
Core i3 4130
SE +/- 0.103, N = 5
-O2
12.974
A10-7850K
SE +/- 0.022, N = 5
-O2
20.867
5
10
15
20
25
1. (CXX) g++ options: -fvisibility=hidden -lm


LAME MP3 Encoding 3.100
WAV To MP3
Seconds, Fewer Is Better
Ryzen 5 2400G
SE +/- 0.022, N = 3
-ffast-math -funroll-loops -fschedule-insns2 -fbranch-count-reg -fforce-addr -lncurses
8.863
Core i3 7100
SE +/- 0.002, N = 3
-ffast-math -funroll-loops -fschedule-insns2 -fbranch-count-reg -fforce-addr -lncurses
9.270
Ryzen 3 2200G
SE +/- 0.004, N = 3
-ffast-math -funroll-loops -fschedule-insns2 -fbranch-count-reg -fforce-addr -lncurses
9.290
Core i5 4670
SE +/- 0.007, N = 3
-ffast-math -funroll-loops -fschedule-insns2 -fbranch-count-reg -fforce-addr -lncurses
9.869
Athlon 3000G
SE +/- 0.026, N = 3
-ffast-math -funroll-loops -fschedule-insns2 -fbranch-count-reg -fforce-addr -lncurses
9.880
Core i3 8100
SE +/- 0.003, N = 3
-ffast-math -funroll-loops -fschedule-insns2 -fbranch-count-reg -fforce-addr -lncurses
9.971
Ryzen 3 1200
SE +/- 0.007, N = 3
-ffast-math -funroll-loops -fschedule-insns2 -fbranch-count-reg -fforce-addr -lncurses
9.987
DellOptiplex3060Micro
SE +/- 0.004, N = 3
-ffast-math -funroll-loops -fschedule-insns2 -fbranch-count-reg -fforce-addr
10.480
Pentium G4400
SE +/- 0.003, N = 3
-ffast-math -funroll-loops -fschedule-insns2 -fbranch-count-reg -fforce-addr -lncurses
10.882
Athlon 200GE
SE +/- 0.089, N = 3
-ffast-math -funroll-loops -fschedule-insns2 -fbranch-count-reg -fforce-addr -lncurses
10.972
Core i3 4130
SE +/- 0.012, N = 3
-ffast-math -funroll-loops -fschedule-insns2 -fbranch-count-reg -fforce-addr -lncurses
11.115
Willow6C-2
SE +/- 0.120, N = 3
-fexceptions -fstack-protector -m64 -ffat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake -lncurses
13.090
A10-7850K
SE +/- 0.021, N = 3
-ffast-math -funroll-loops -fschedule-insns2 -fbranch-count-reg -fforce-addr -lncurses
14.156
4
8
12
16
20
1. (CC) gcc options: -O3 -pipe -lm

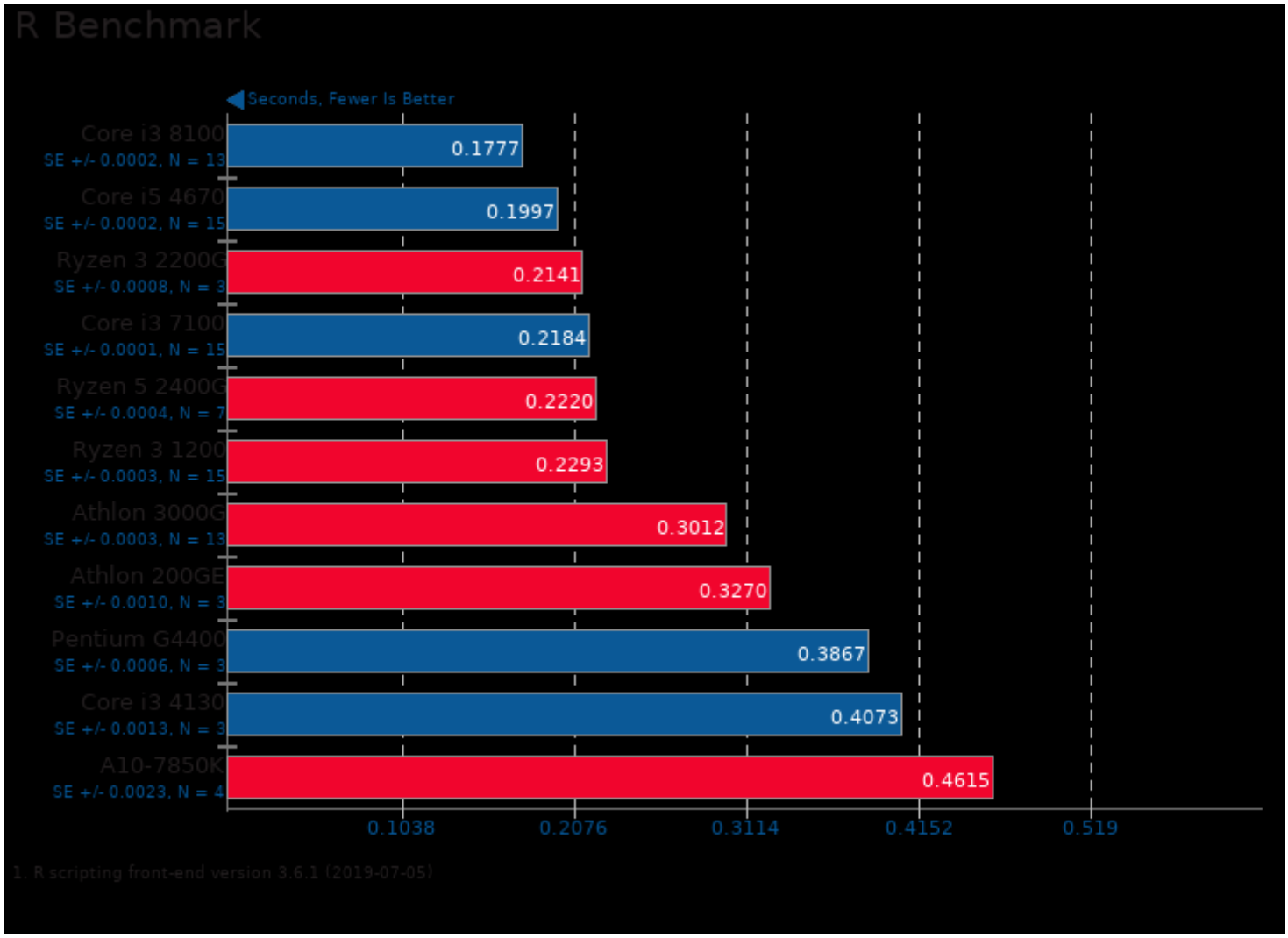

Perl Benchmarks
Test: Pod2html
Seconds, Fewer Is Better
Core i3 7100
SE +/- 0.00015194, N = 3
0.12531321
Core i5 4670
SE +/- 0.00035928, N = 12
0.12886029
Core i3 8100
SE +/- 0.00028353, N = 3
0.13521119
DellOptiplex3060Micro
SE +/- 0.00111399, N = 3
0.14412552
Pentium G4400
SE +/- 0.00078483, N = 3
0.15250590
Ryzen 5 2400G
SE +/- 0.00077104, N = 3
0.15405877
Willow6C-2
SE +/- 0.00163421, N = 3
0.15985520
Ryzen 3 2200G
SE +/- 0.00075428, N = 3
0.16336353
Core i3 4130
SE +/- 0.00194032, N = 3
0.17321866
Athlon 3000G
SE +/- 0.00149963, N = 3
0.17386731
Ryzen 3 1200
SE +/- 0.00056811, N = 15
0.17655118
Athlon 200GE
SE +/- 0.00103782, N = 3
0.18846585
A10-7850K
SE +/- 0.00061968, N = 3
0.22753557
0.0512
0.1024
0.1536
0.2048
0.256

Low-End EOY2019 Ubuntu Linux CPU Comparison

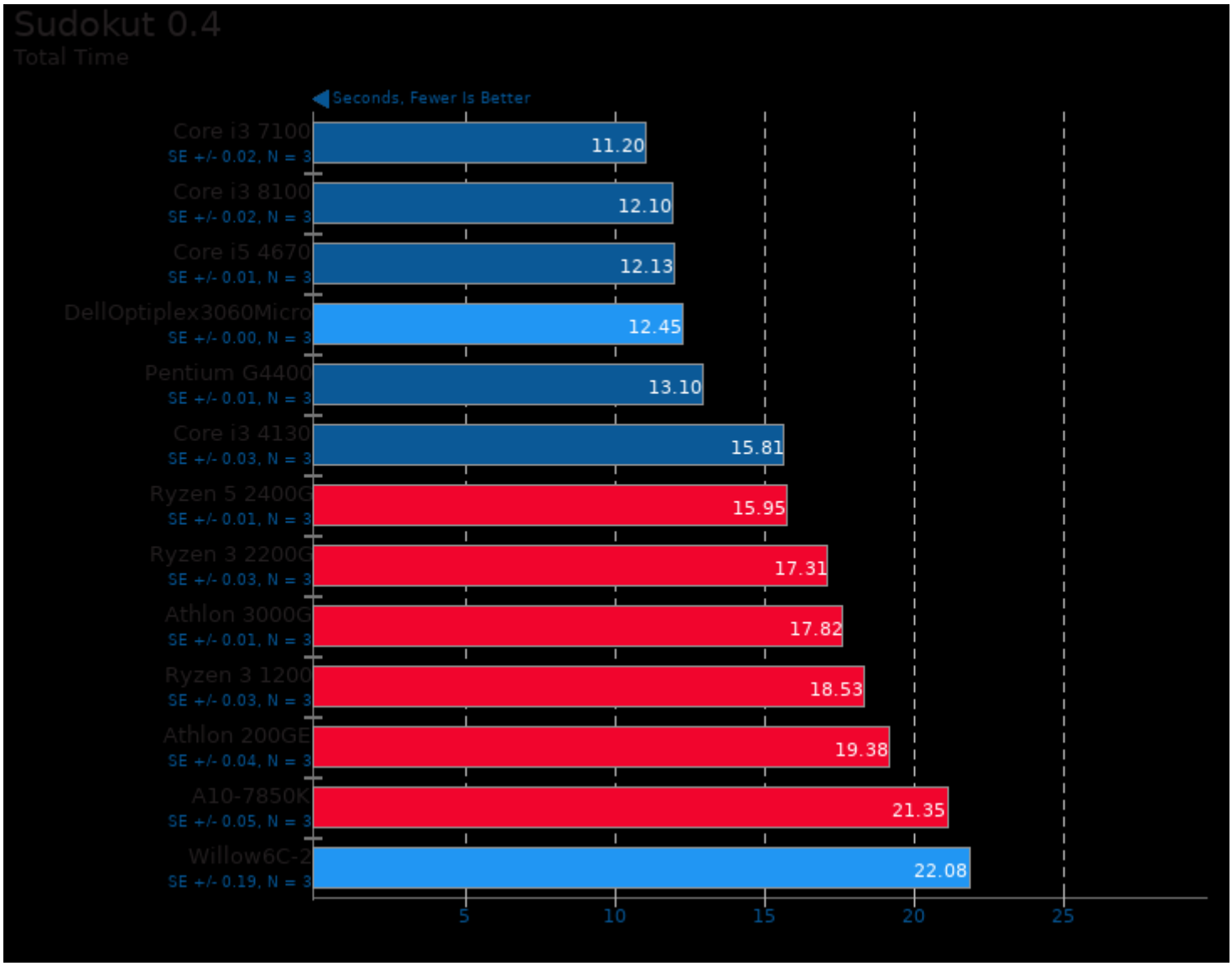



Radiance Benchmark 5.0
Test: SMP Parallel
Seconds, Fewer Is Better
Ryzen 3 2200G
253
Ryzen 5 2400G
256
Core i3 8100
257
Core i5 4670
263
DellOptiplex3060Micro
303
Ryzen 3 1200
310
Willow6C-2
334
Core i3 7100
372
Athlon 3000G
410
Athlon 200GE
442
Pentium G4400
557
Core i3 4130
558
A10-7850K
646
140
280
420
560
700

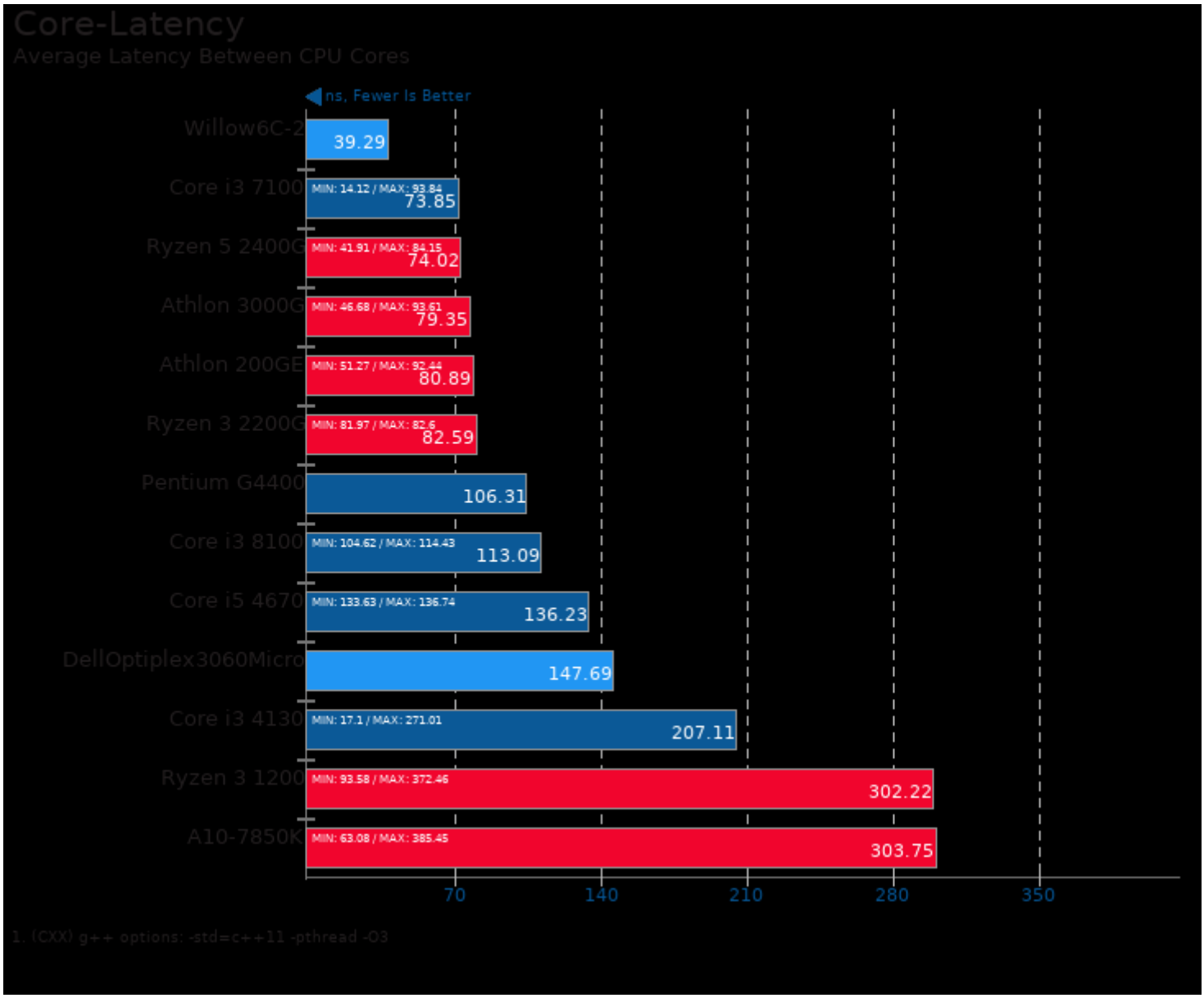
Low-End EOY2019 Ubuntu Linux CPU Comparison



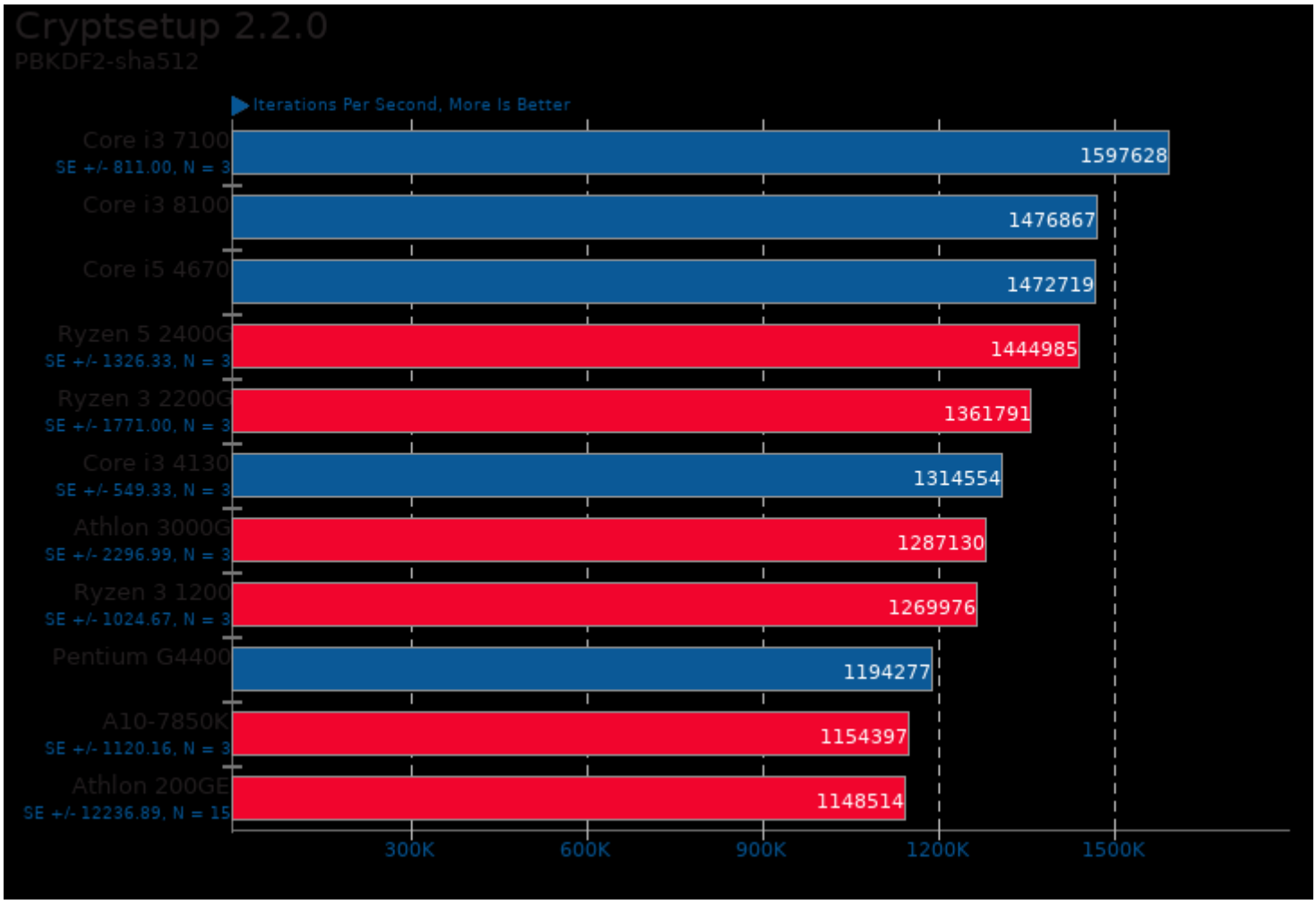
Low-End EOY2019 Ubuntu Linux CPU Comparison



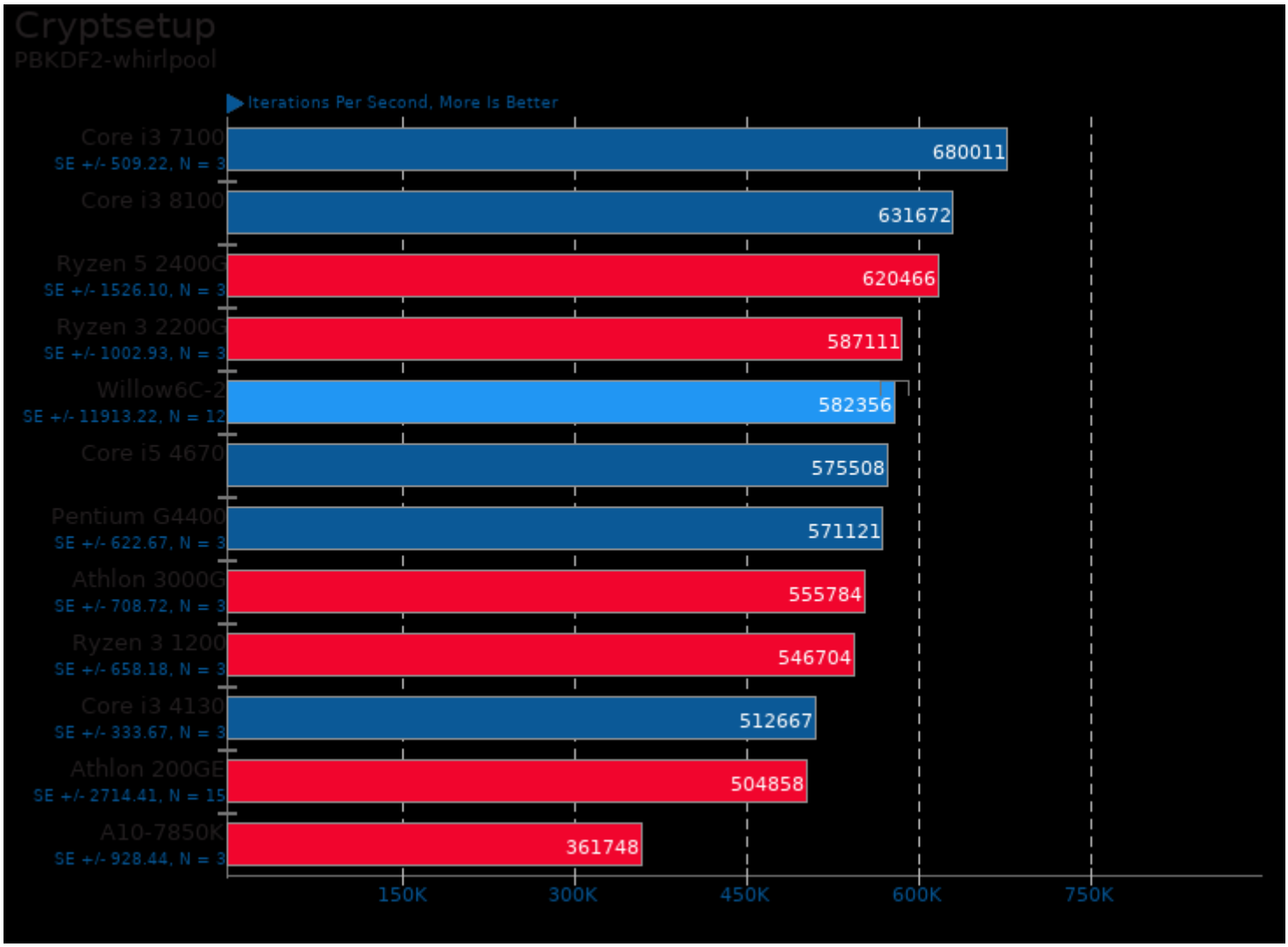
Low-End EOY2019 Ubuntu Linux CPU Comparison

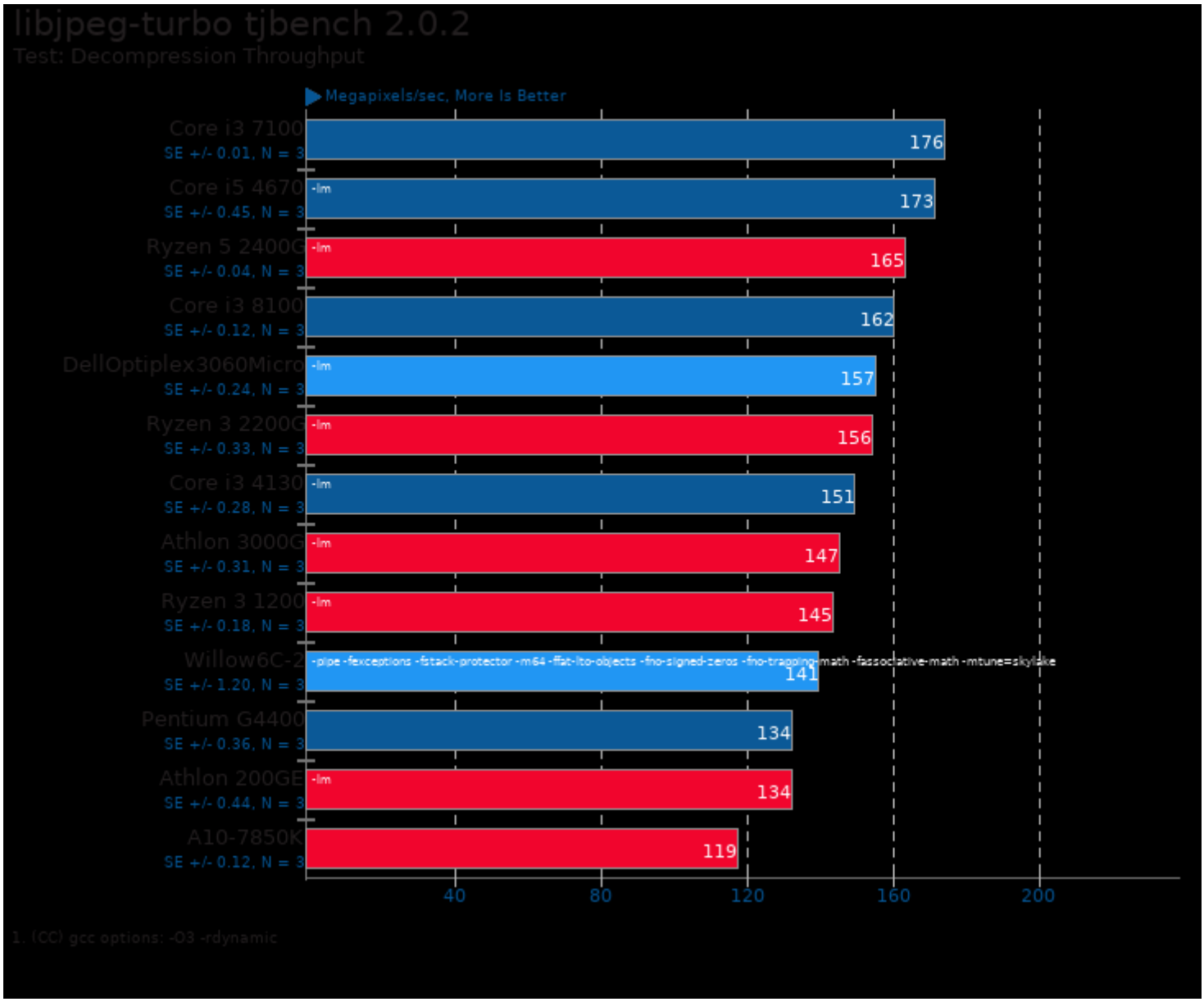


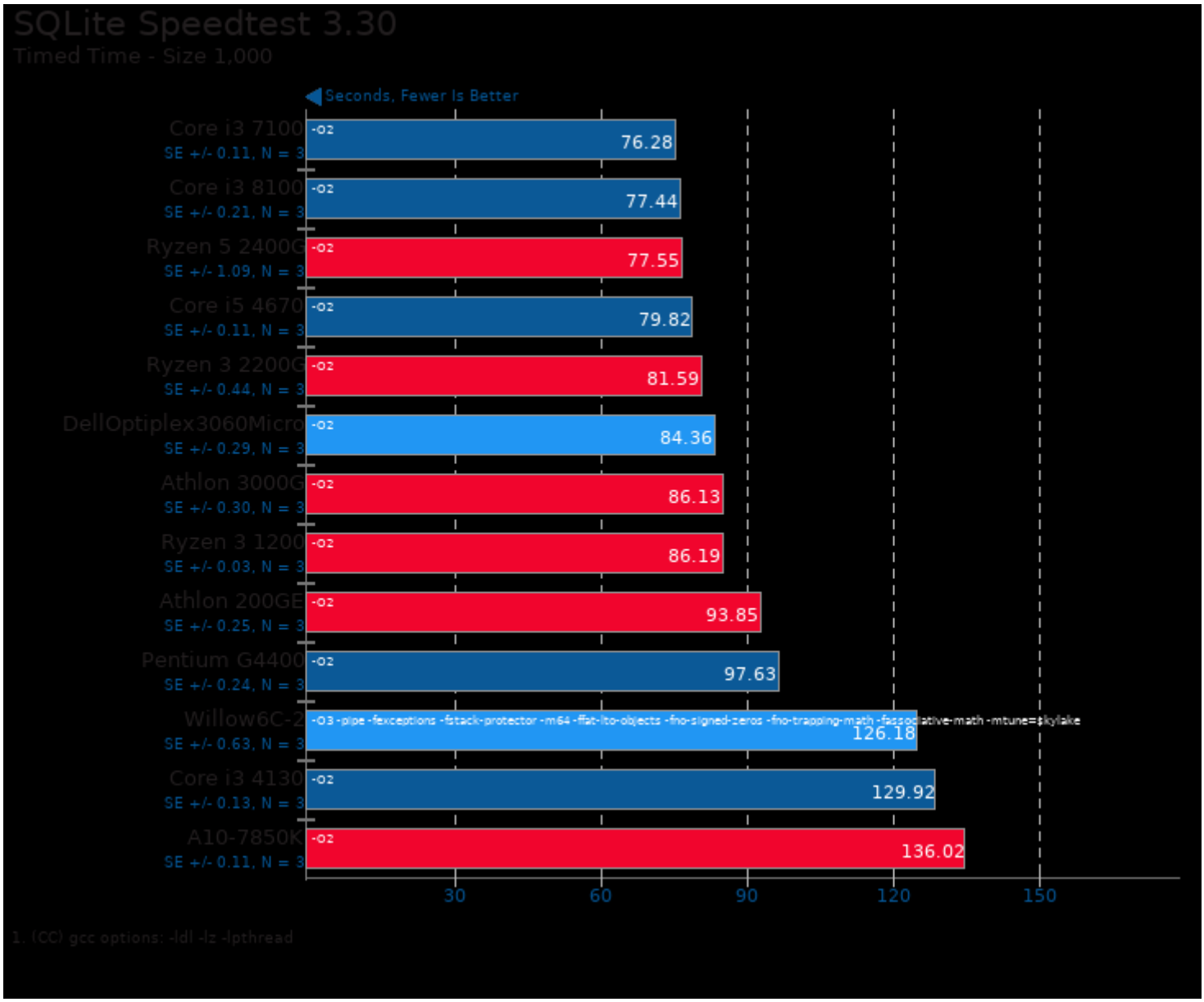
Low-End EOY2019 Ubuntu Linux CPU Comparison



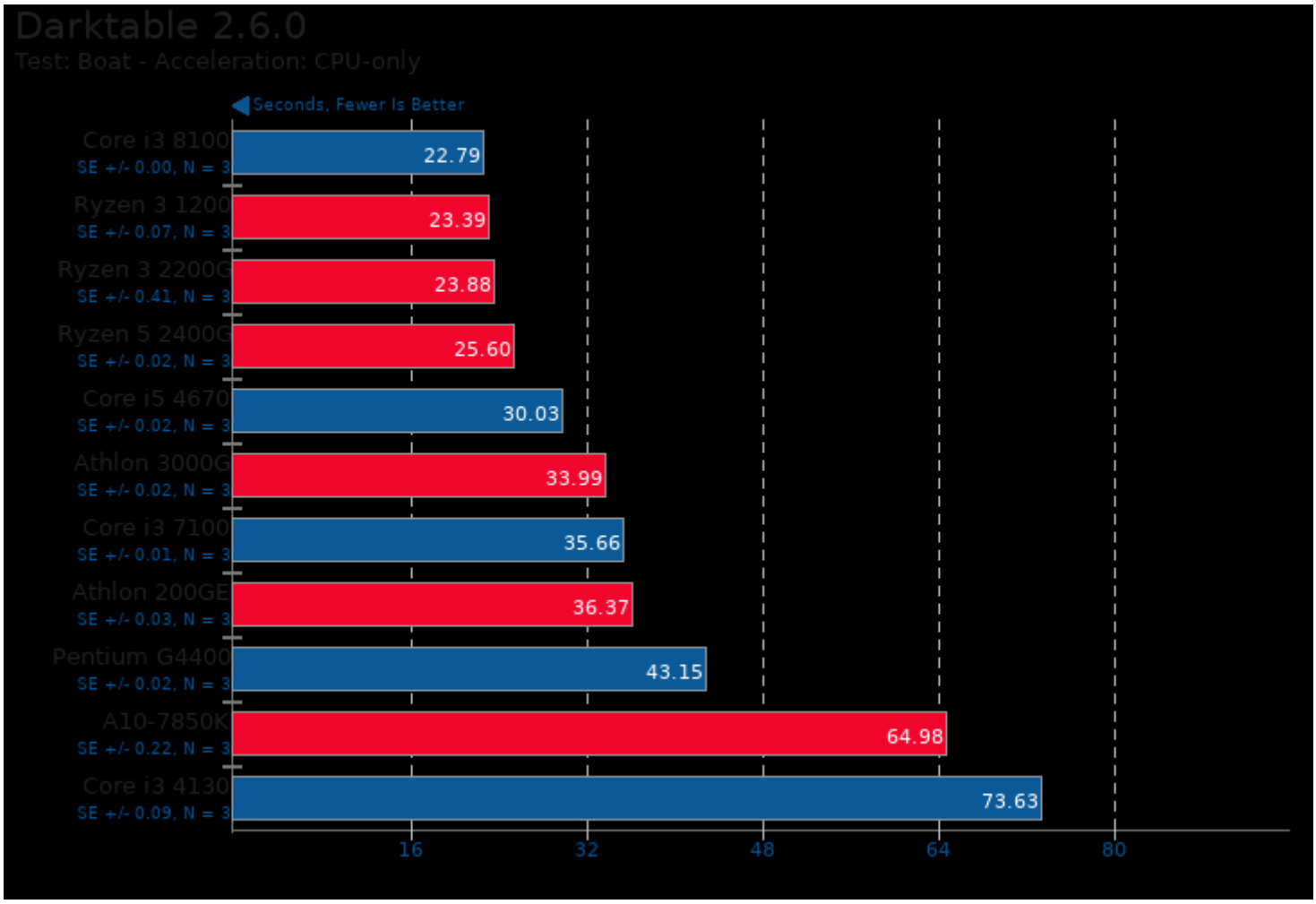
Low-End EOY2019 Ubuntu Linux CPU Comparison



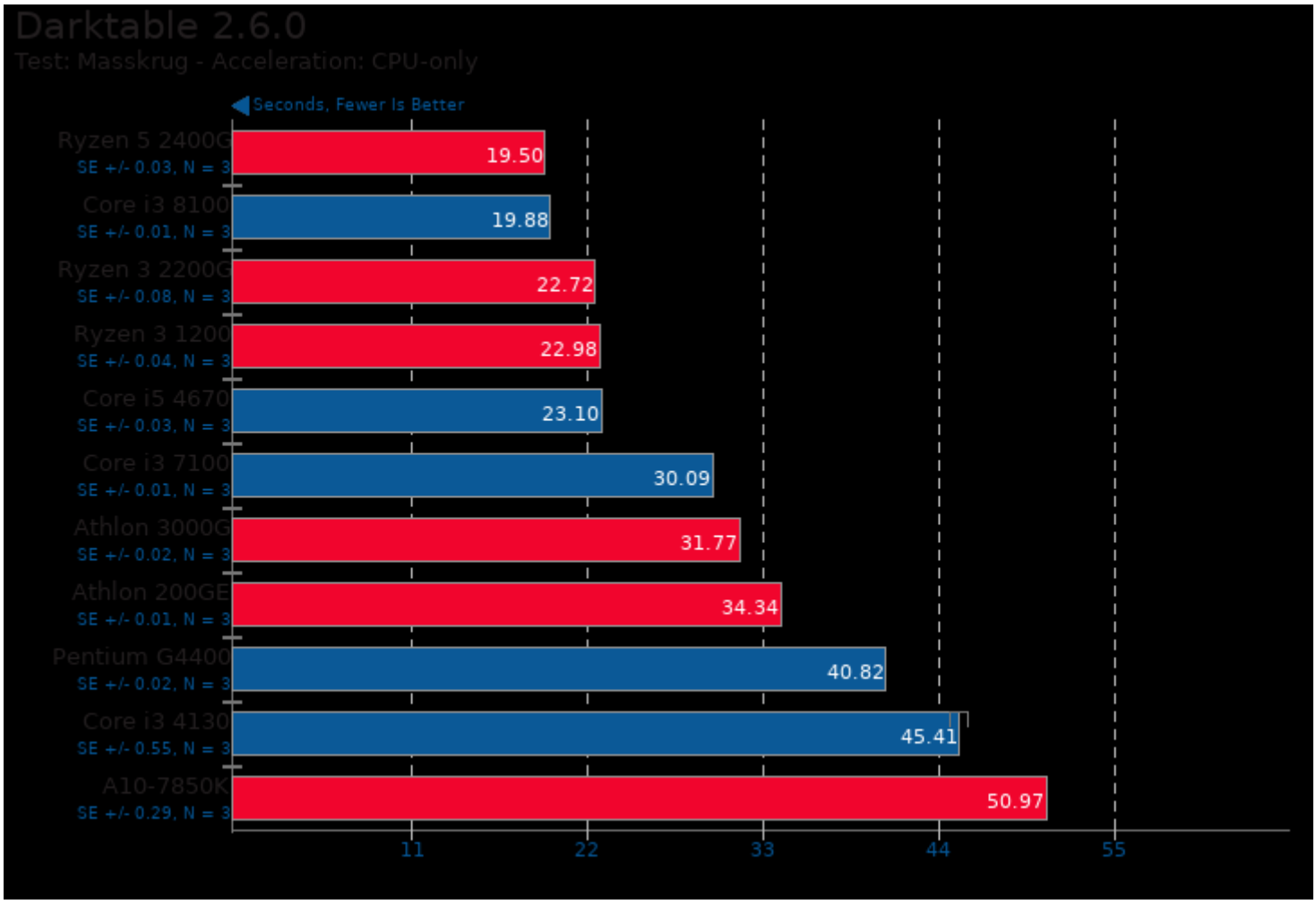

libjpeg-turbo tjbench 2.0.2
Test: Decompression Throughput
Megapixels/sec, More Is Better
Core i3 7100
SE +/- 0.01, N = 3
176
Core i5 4670
SE +/- 0.45, N = 3
-lm
173
Ryzen 5 2400G
SE +/- 0.04, N = 3
-lm
165
Core i3 8100
SE +/- 0.12, N = 3
162
DellOptiplex3060Micro
SE +/- 0.24, N = 3
-lm
157
Ryzen 3 2200G
SE +/- 0.33, N = 3
-lm
156
Core i3 4130
SE +/- 0.28, N = 3
-lm
151
Athlon 3000G
SE +/- 0.31, N = 3
-lm
147
Ryzen 3 1200
SE +/- 0.18, N = 3
-lm
145
Willow6C-2
SE +/- 1.20, N = 3
-pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
141
Pentium G4400
SE +/- 0.36, N = 3
134
Athlon 200GE
SE +/- 0.44, N = 3
-lm
134
A10-7850K
SE +/- 0.12, N = 3
119
40
80
120
160
200
1. (CC) gcc options: -O3 -rdynamic


SQLite Speedtest 3.30
Timed Time - Size 1,000
Seconds, Fewer Is Better
Core i3 7100
SE +/- 0.11, N = 3
-O2
76.28
Core i3 8100
SE +/- 0.21, N = 3
-O2
77.44
Ryzen 5 2400G
SE +/- 1.09, N = 3
-O2
77.55
Core i5 4670
SE +/- 0.11, N = 3
-O2
79.82
Ryzen 3 2200G
SE +/- 0.44, N = 3
-O2
81.59
DellOptiplex3060Micro
SE +/- 0.29, N = 3
-O2
84.36
Athlon 3000G
SE +/- 0.30, N = 3
-O2
86.13
Ryzen 3 1200
SE +/- 0.03, N = 3
-O2
86.19
Athlon 200GE
SE +/- 0.25, N = 3
-O2
93.85
Pentium G4400
SE +/- 0.24, N = 3
-O2
97.63
Willow6C-2
SE +/- 0.63, N = 3
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
126.18
Core i3 4130
SE +/- 0.13, N = 3
-O2
129.92
A10-7850K
SE +/- 0.11, N = 3
-O2
136.02
30
60
90
120
150
1. (CC) gcc options: -ldl -lz -lpthread

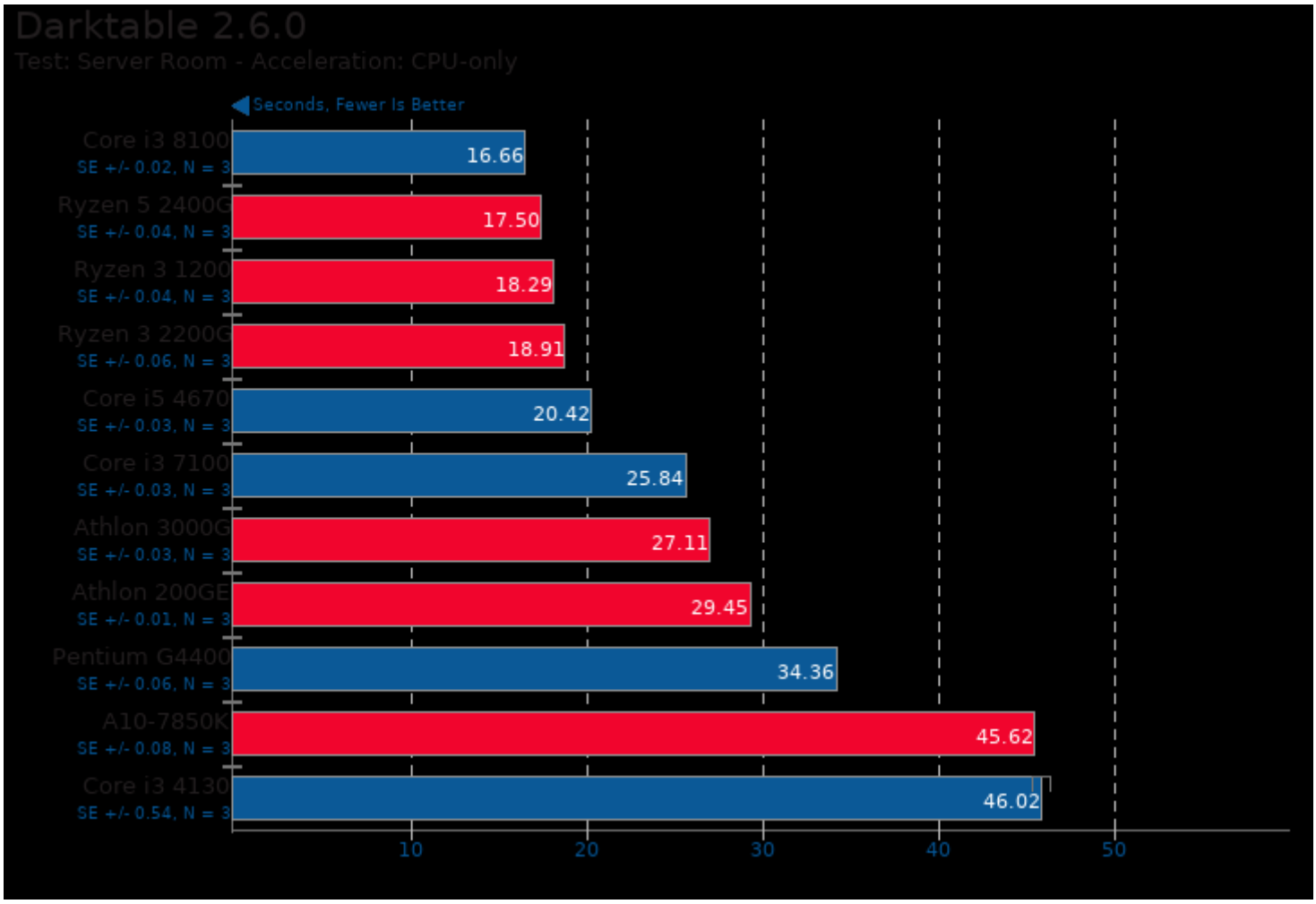
Low-End EOY2019 Ubuntu Linux CPU Comparison



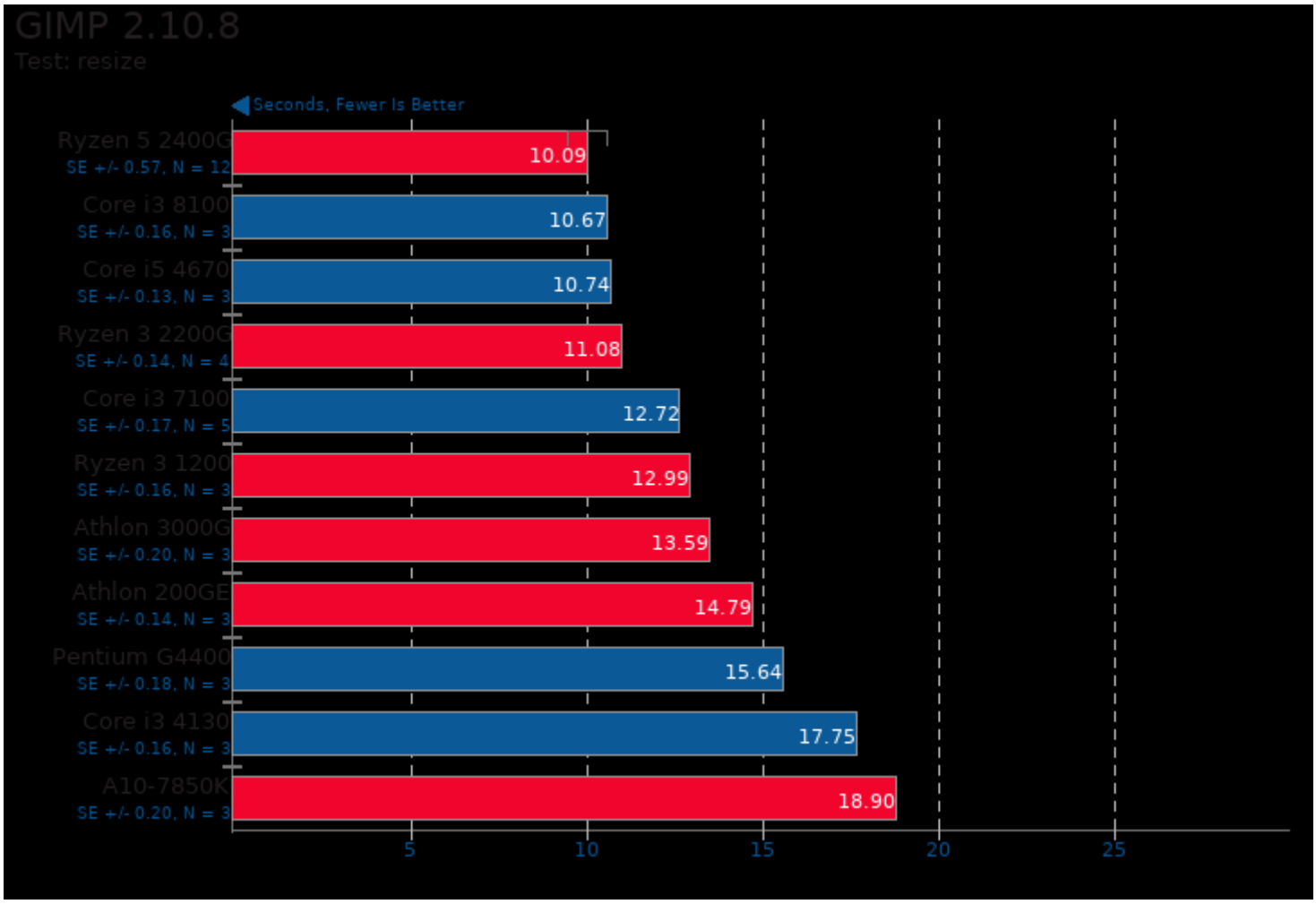
Low-End EOY2019 Ubuntu Linux CPU Comparison



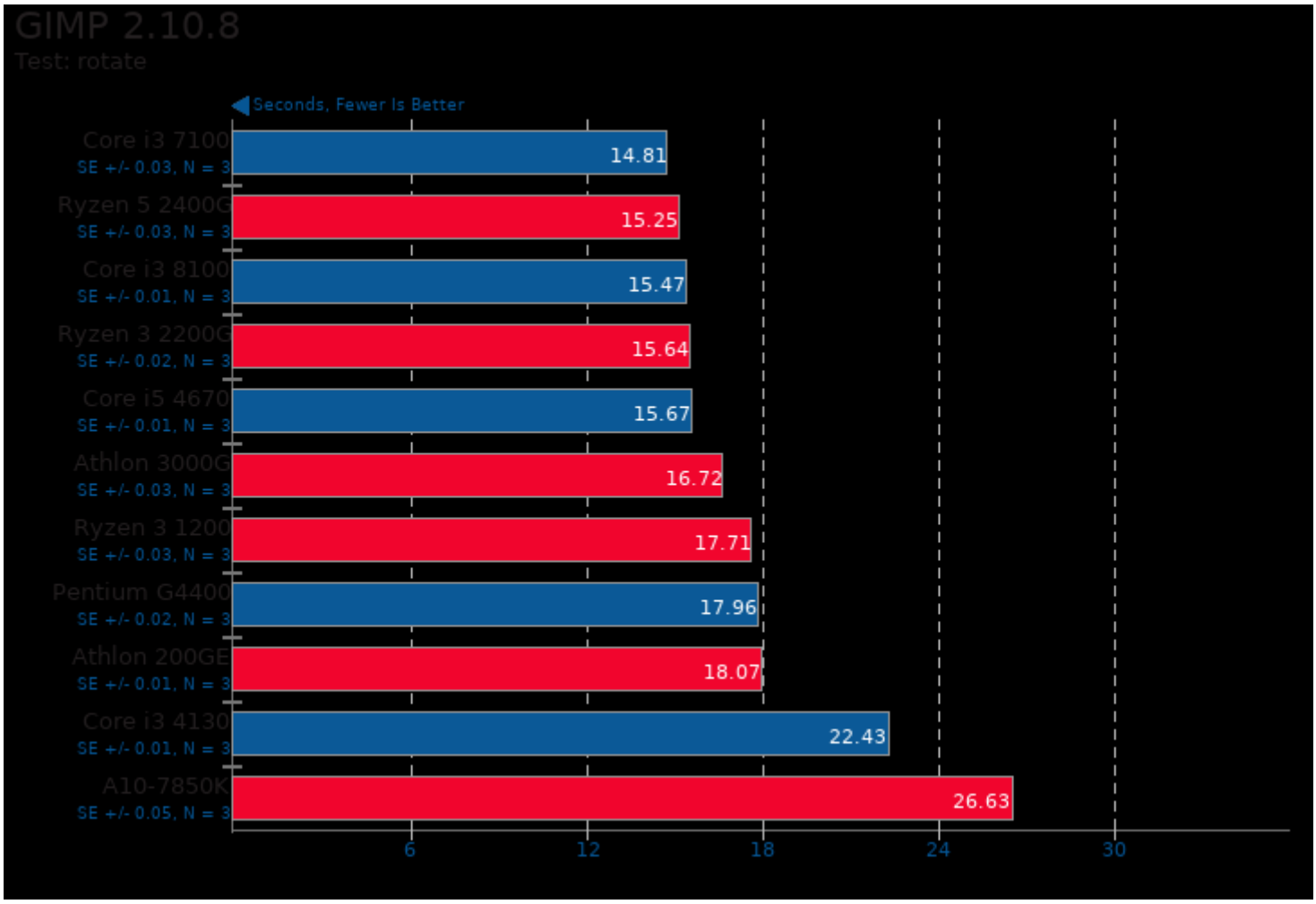
Low-End EOY2019 Ubuntu Linux CPU Comparison



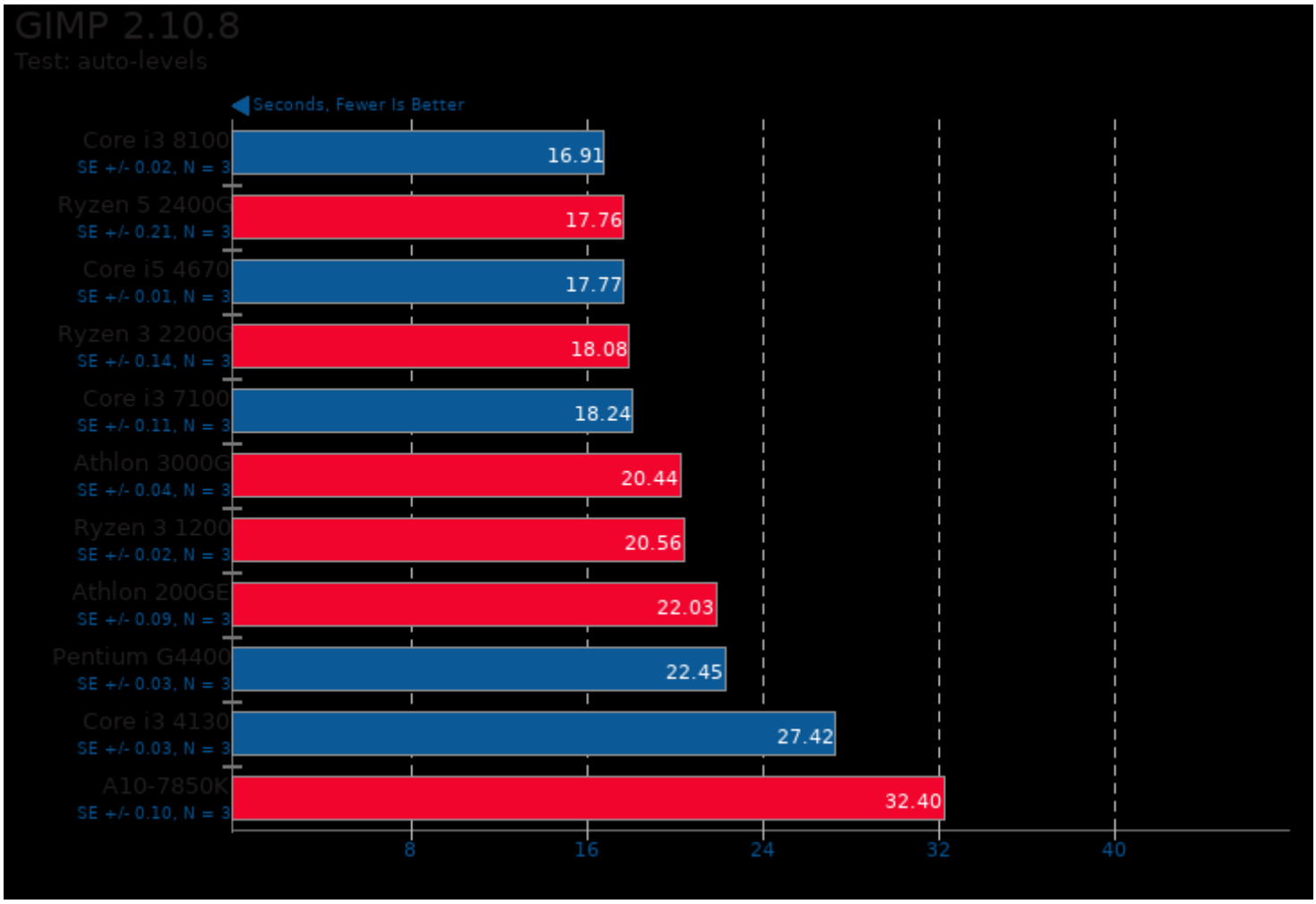
Low-End EOY2019 Ubuntu Linux CPU Comparison



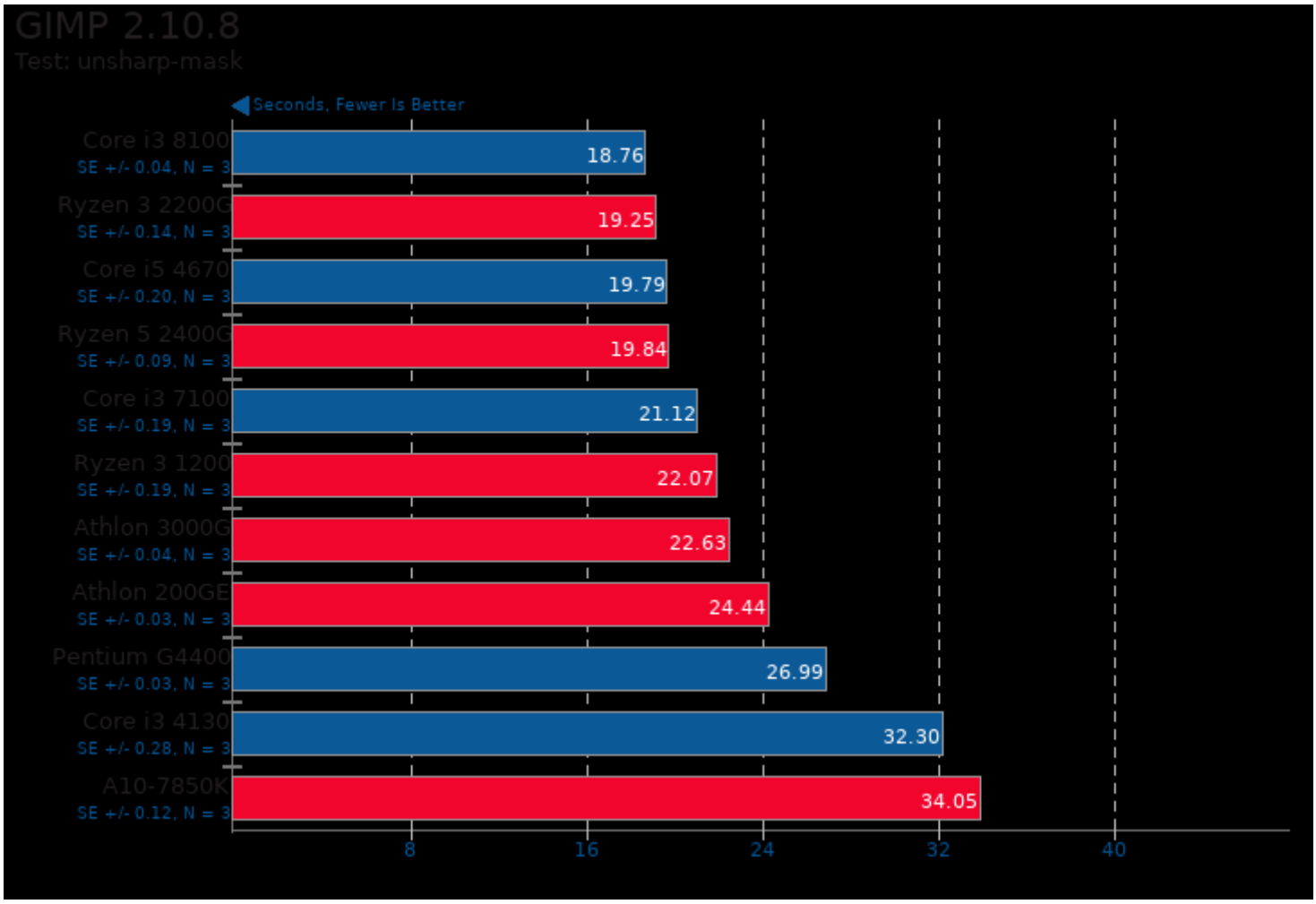
Low-End EOY2019 Ubuntu Linux CPU Comparison



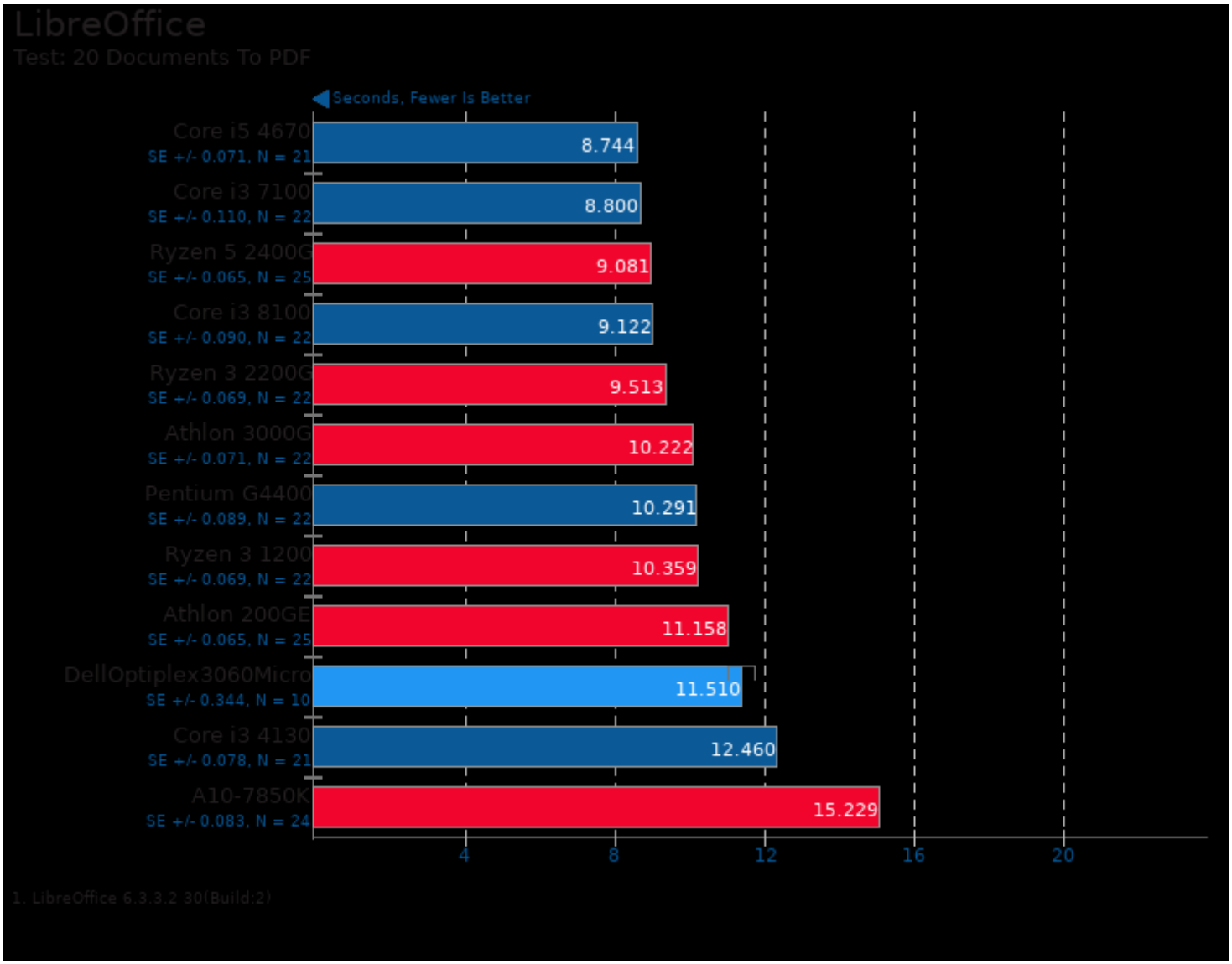
Low-End EOY2019 Ubuntu Linux CPU Comparison



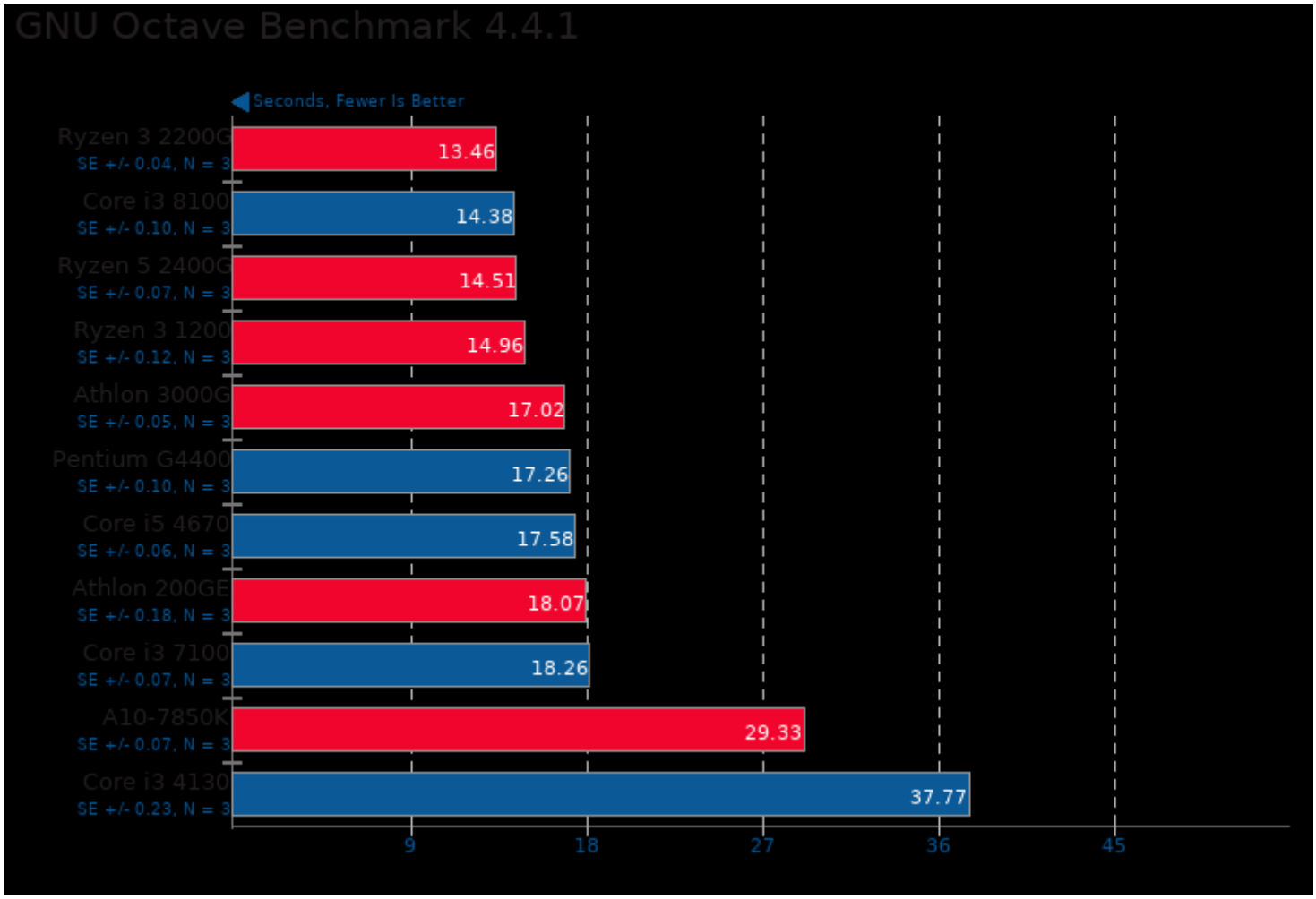
Low-End EOY2019 Ubuntu Linux CPU Comparison

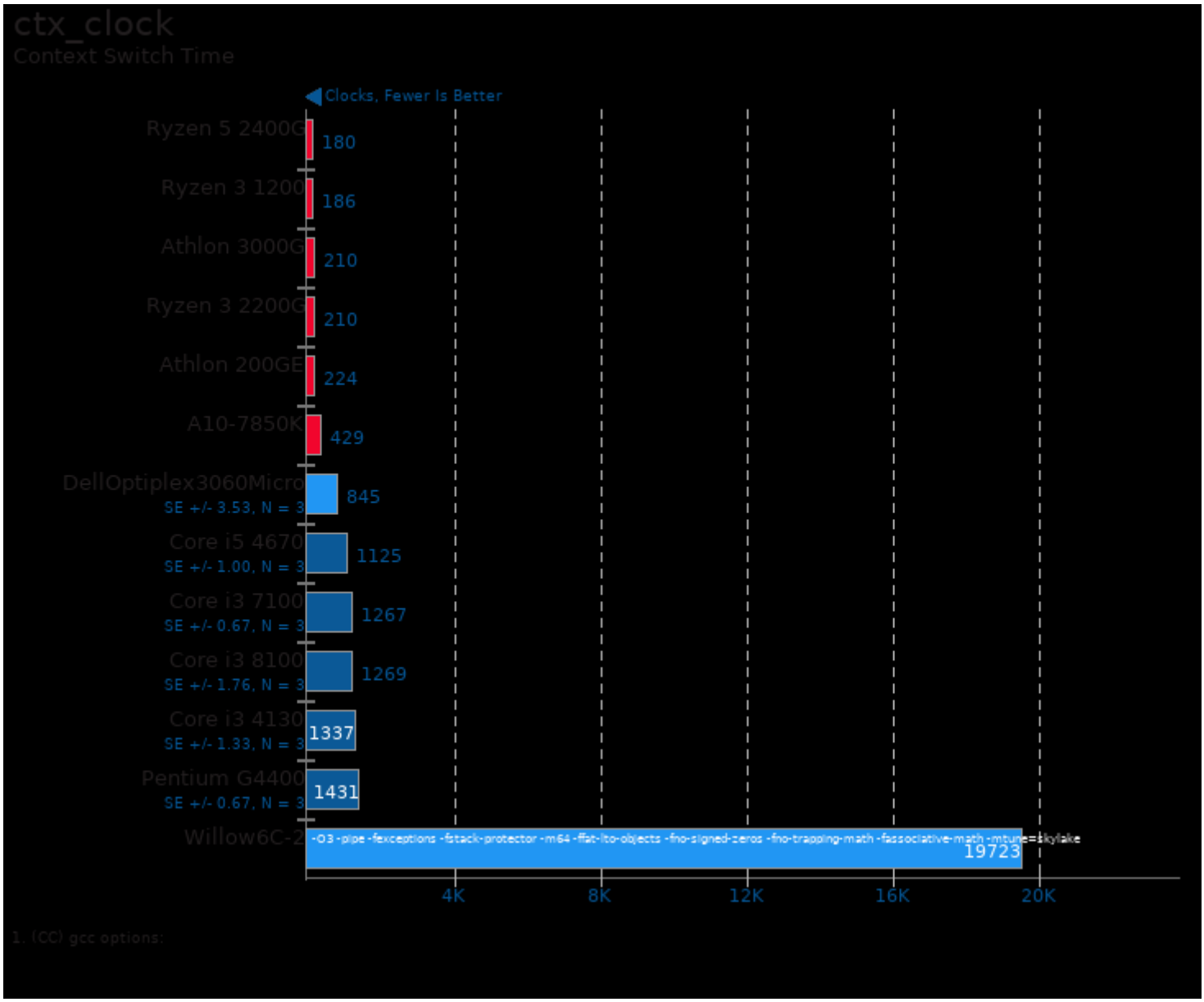


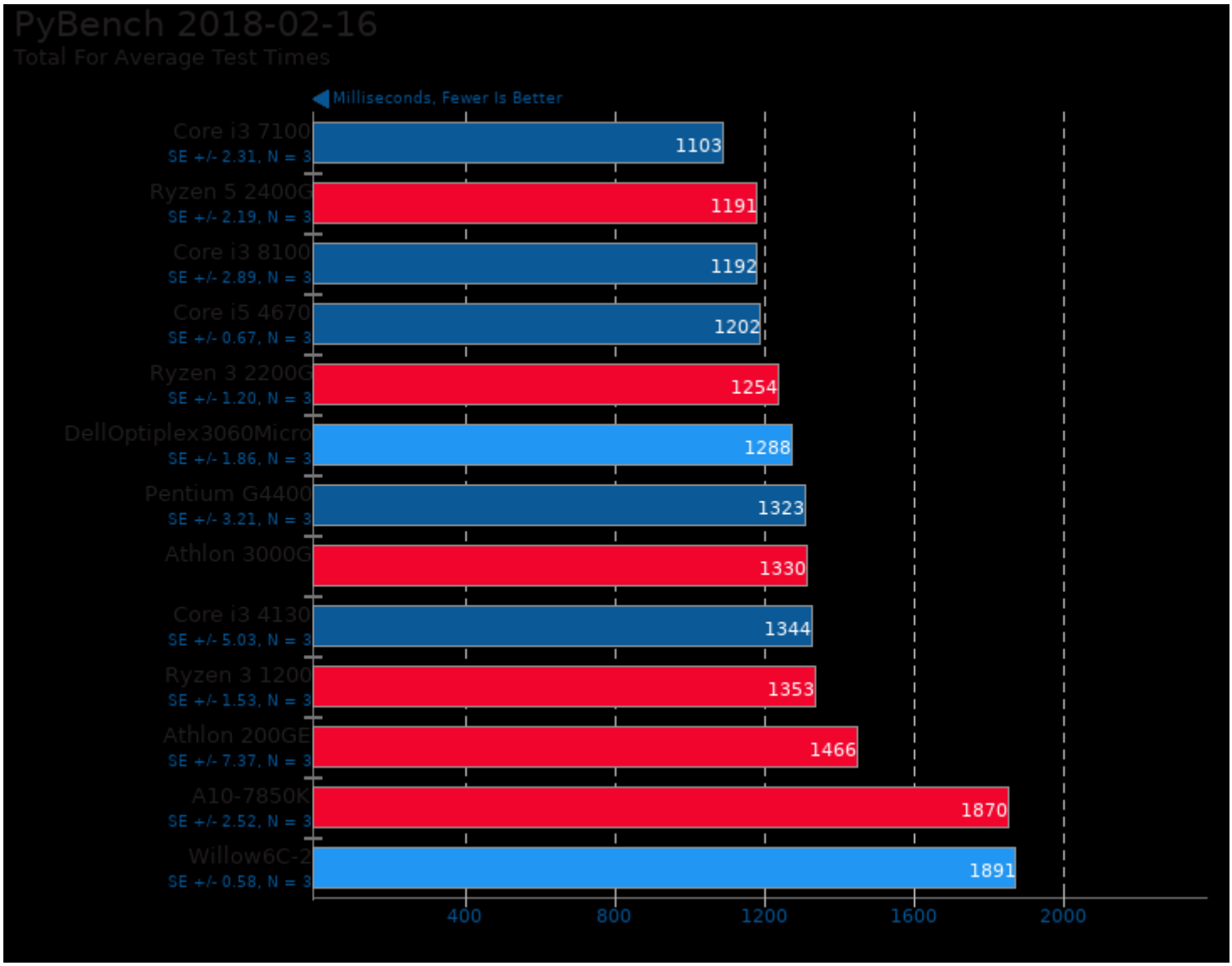
Low-End EOY2019 Ubuntu Linux CPU Comparison



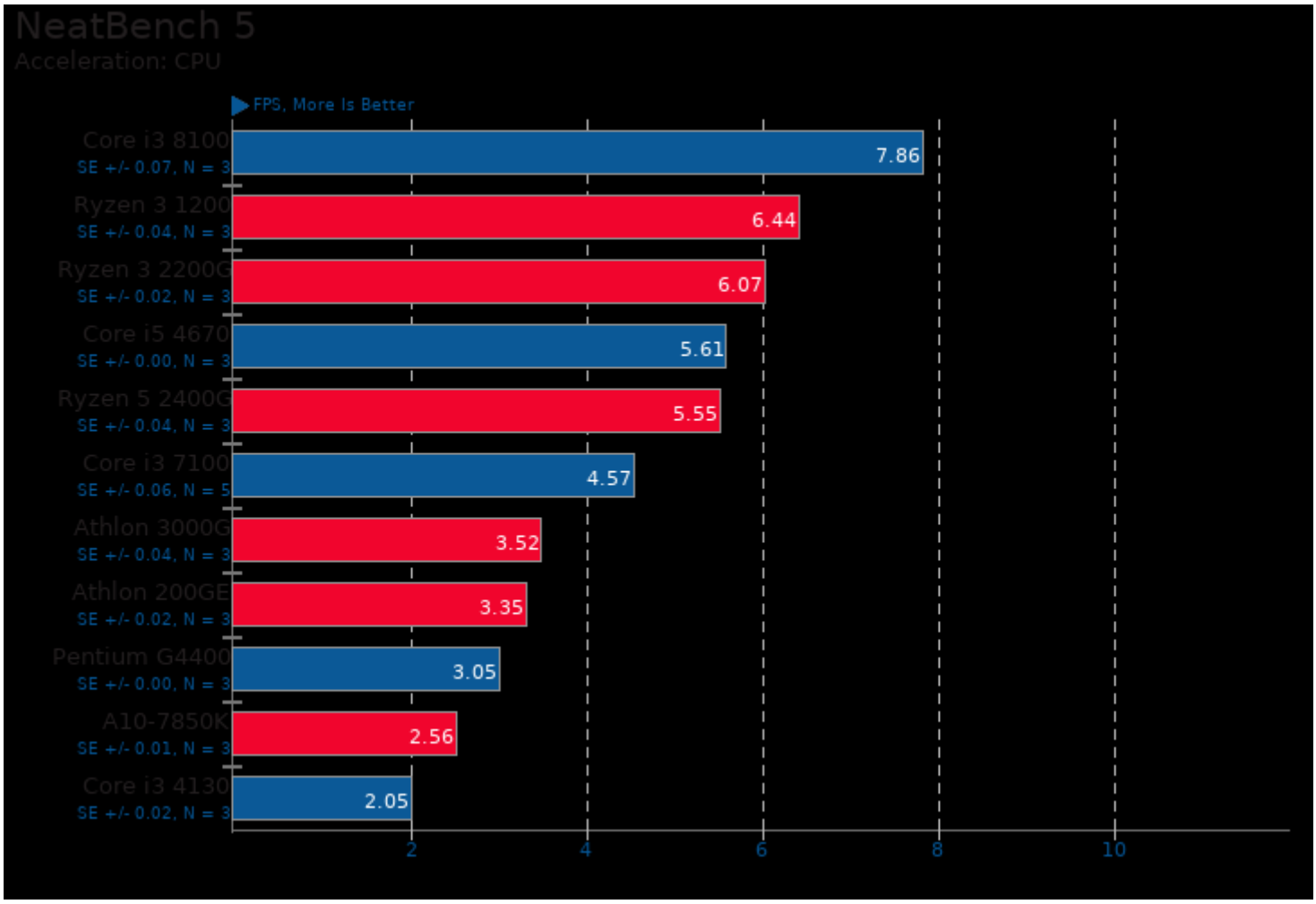
Low-End EOY2019 Ubuntu Linux CPU Comparison



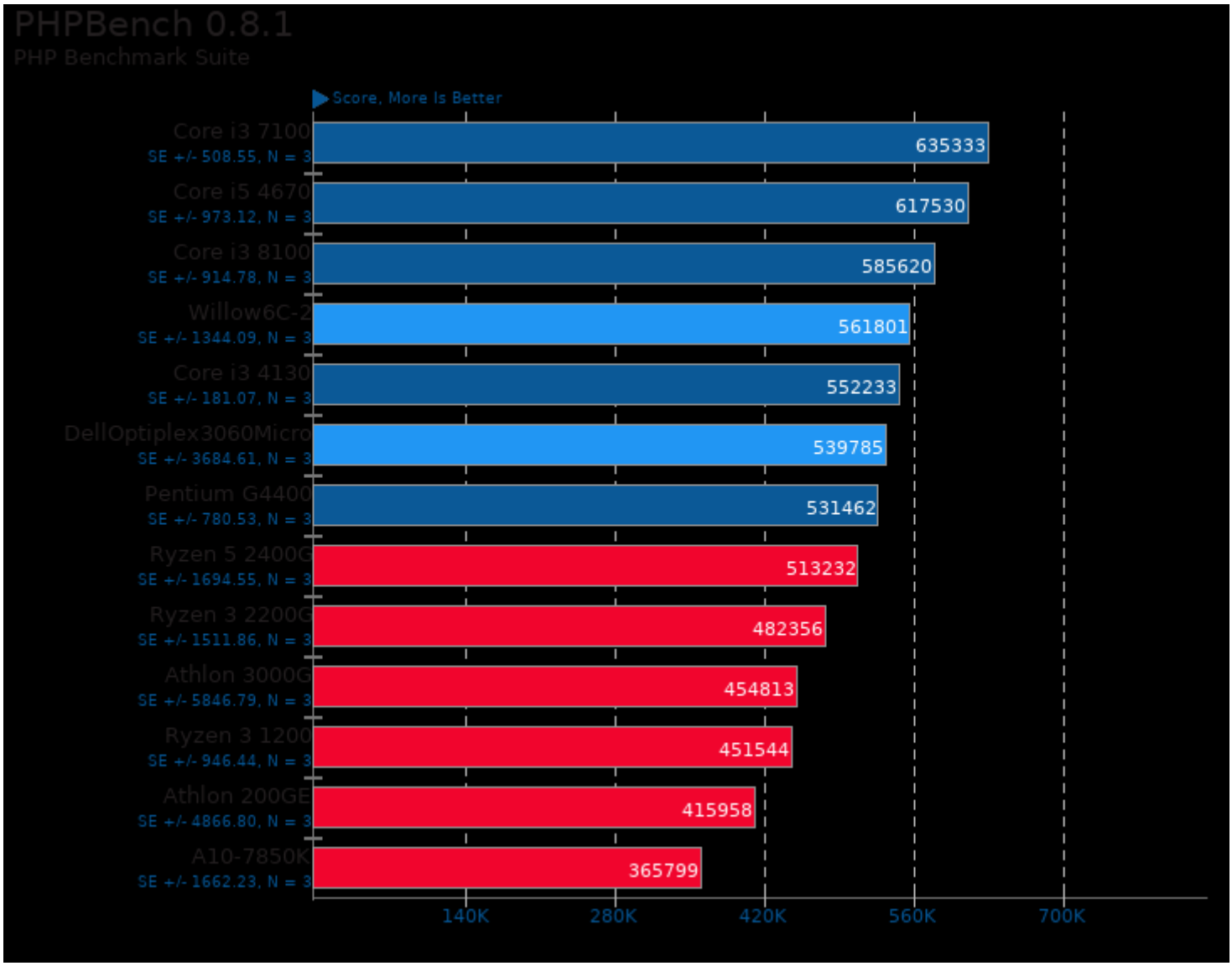

ctx_clock
Context Switch Time
Clocks, Fewer Is Better
Ryzen 5 2400G
180
Ryzen 3 1200
186
Athlon 3000G
210
Ryzen 3 2200G
210
Athlon 200GE
224
A10-7850K
429
DellOptiplex3060Micro
SE +/- 3.53, N = 3
845
Core i5 4670
SE +/- 1.00, N = 3
1125
Core i3 7100
SE +/- 0.67, N = 3
1267
Core i3 8100
SE +/- 1.76, N = 3
1269
Core i3 4130
SE +/- 1.33, N = 3
1337
Pentium G4400
SE +/- 0.67, N = 3
1431
Willow6C-2
-O3 -pipe -fexceptions -fstack-protector -m64 -flat-lto-objects -fno-signed-zeros -fno-trapping-math -fassociative-math -mtune=skylake
19723
4K
8K
12K
16K
20K
1. (CC) gcc options:

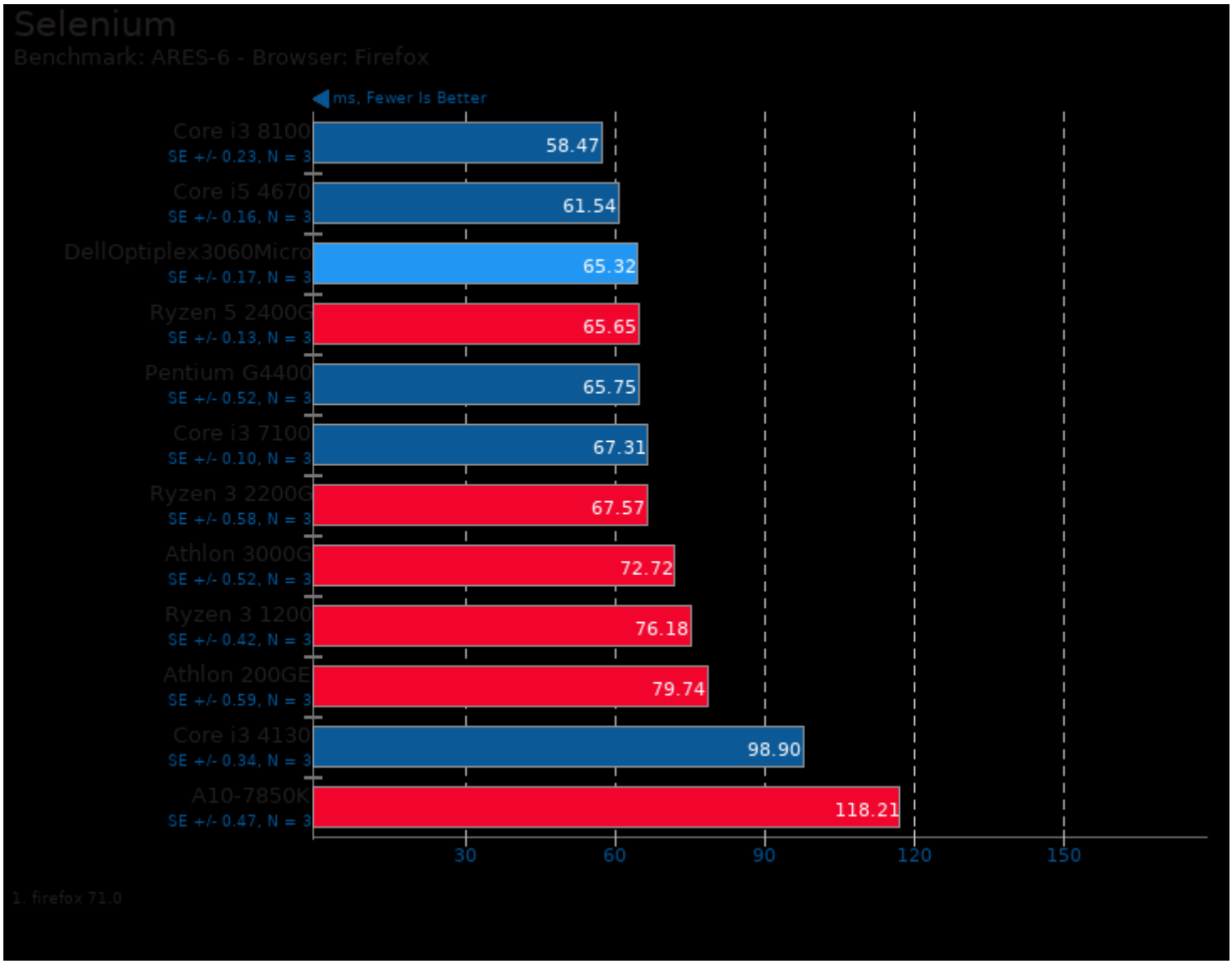

PyBench 2018-02-16
Total For Average Test Times
Milliseconds, Fewer Is Better
Core i3 7100
SE +/- 2.31, N = 3
1103
Ryzen 5 2400G
SE +/- 2.19, N = 3
1191
Core i3 8100
SE +/- 2.89, N = 3
1192
Core i5 4670
SE +/- 0.67, N = 3
1202
Ryzen 3 2200G
SE +/- 1.20, N = 3
1254
DellOptiplex3060Micro
SE +/- 1.86, N = 3
1288
Pentium G4400
SE +/- 3.21, N = 3
1323
Athlon 3000G
1330
Core i3 4130
SE +/- 5.03, N = 3
1344
Ryzen 3 1200
SE +/- 1.53, N = 3
1353
Athlon 200GE
SE +/- 7.37, N = 3
1466
A10-7850K
SE +/- 2.52, N = 3
1870
Willow6C-2
SE +/- 0.58, N = 3
1891
400
800
1200
1600
2000

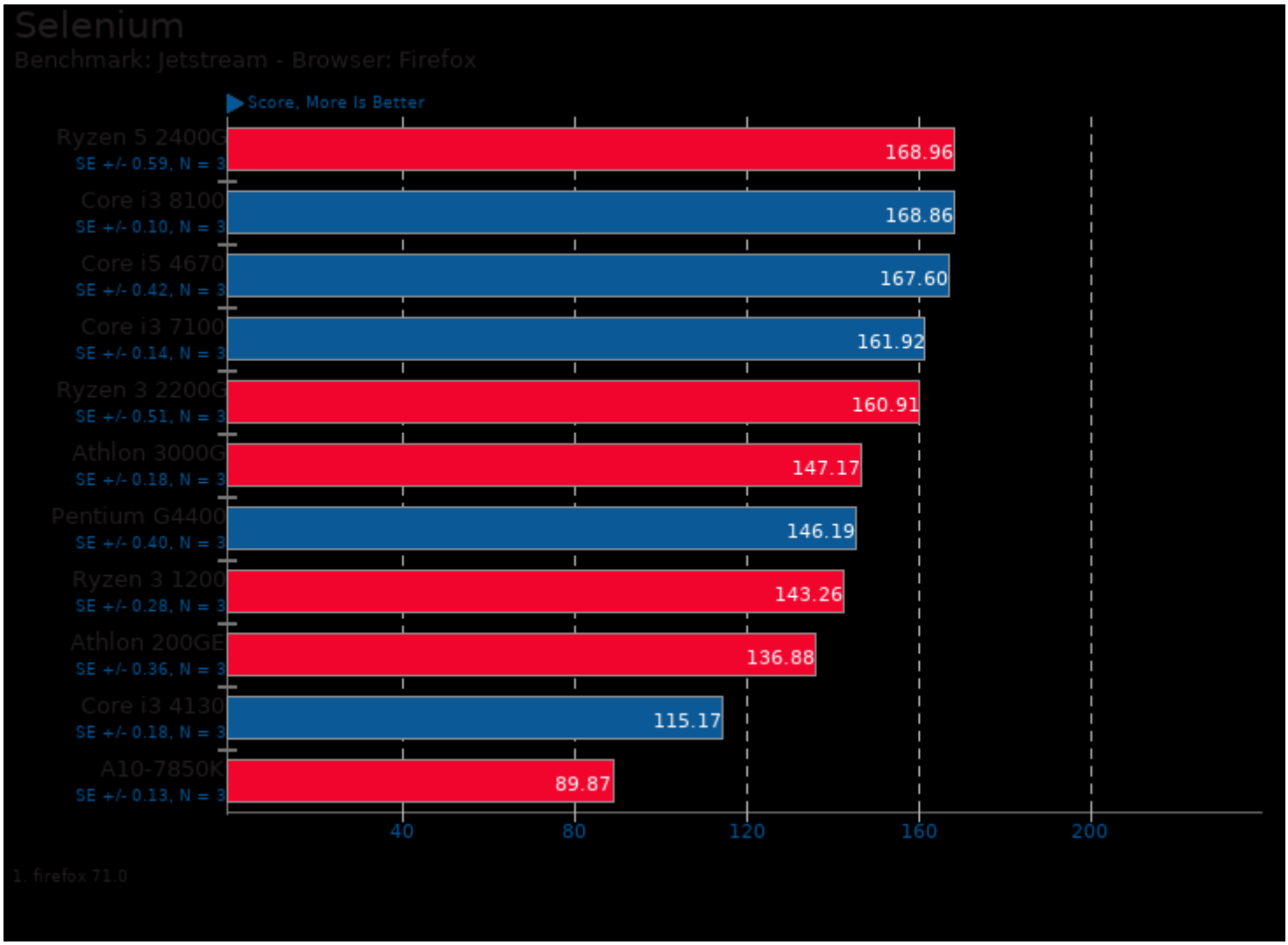
Low-End EOY2019 Ubuntu Linux CPU Comparison

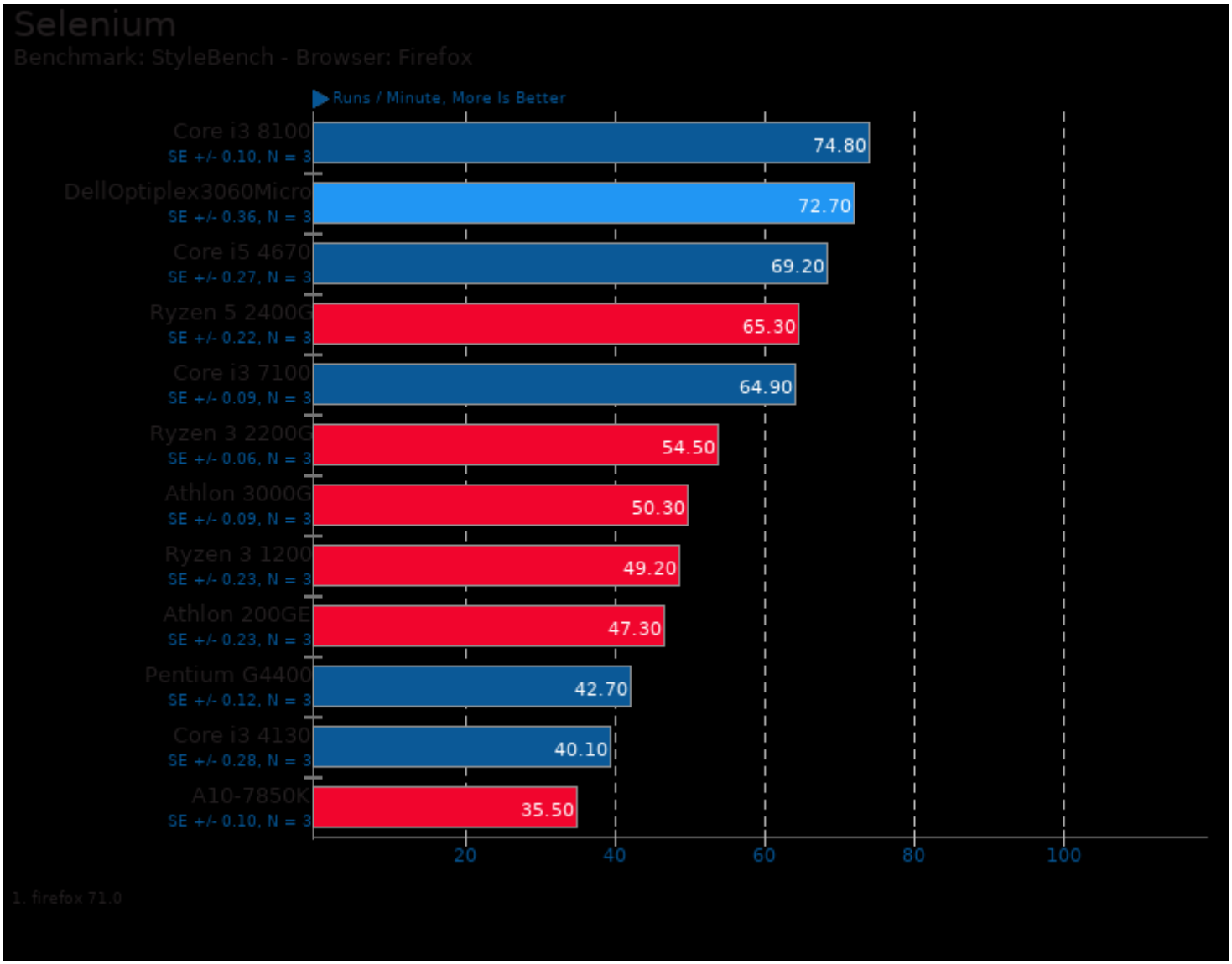


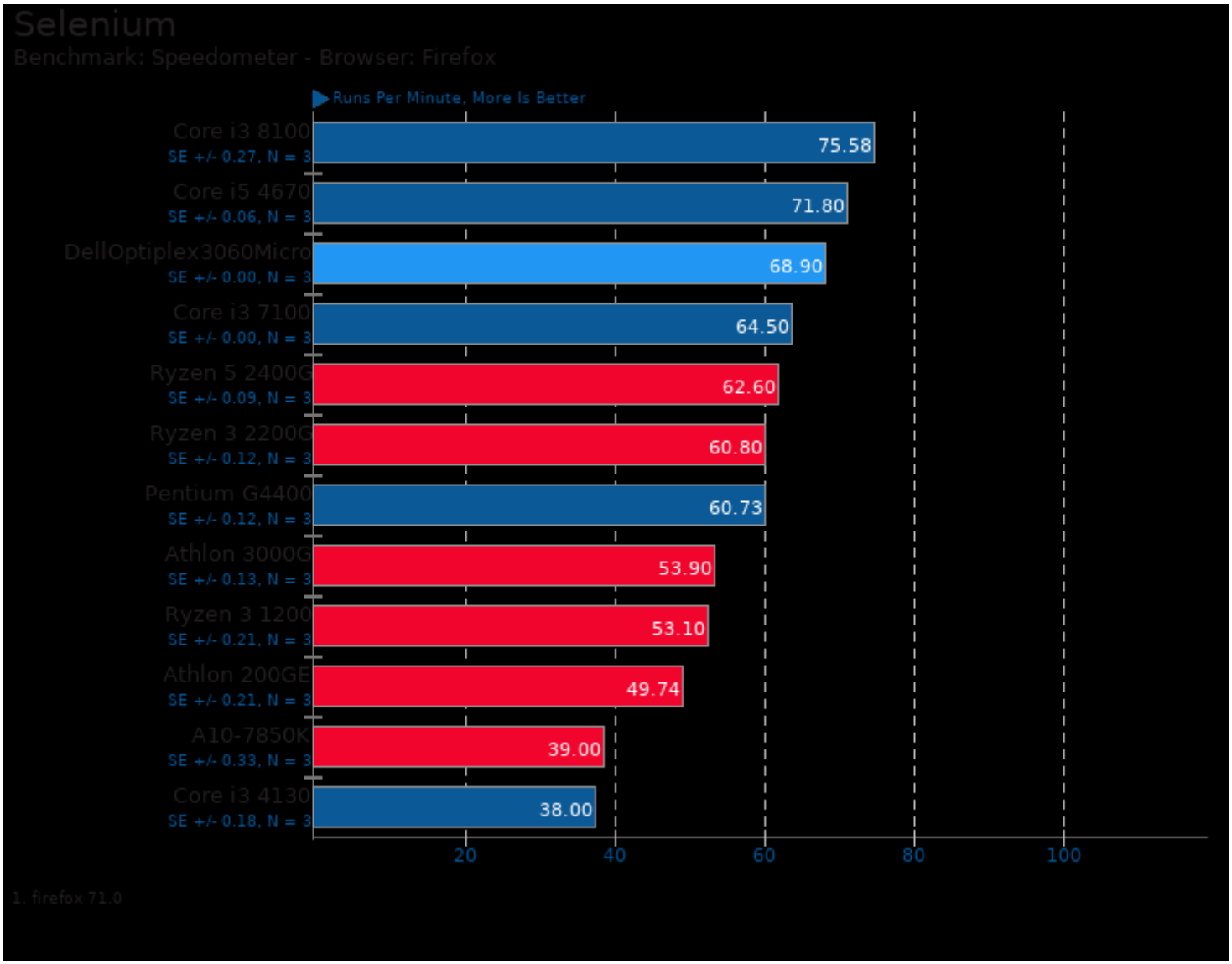
Low-End EOY2019 Ubuntu Linux CPU Comparison



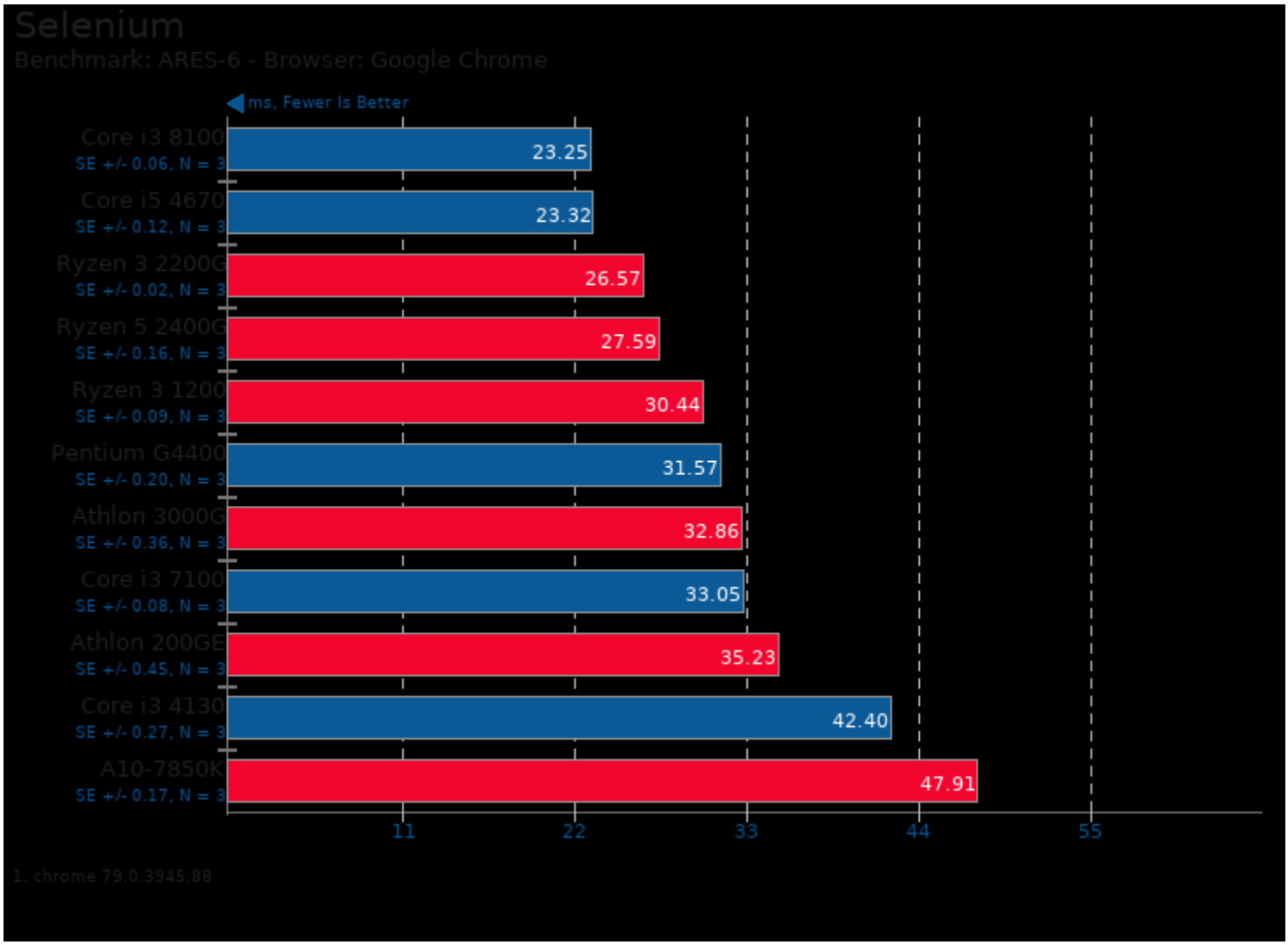

Selenium
Benchmark: ARES-6 - Browser: Firefox
ms, Fewer Is Better
Core i3 8100
SE +/- 0.23, N = 3
58.47
Core i5 4670
SE +/- 0.16, N = 3
61.54
DellOptiplex3060Micro
SE +/- 0.17, N = 3
65.32
Ryzen 5 2400G
SE +/- 0.13, N = 3
65.65
Pentium G4400
SE +/- 0.52, N = 3
65.75
Core i3 7100
SE +/- 0.10, N = 3
67.31
Ryzen 3 2200G
SE +/- 0.58, N = 3
67.57
Athlon 3000G
SE +/- 0.52, N = 3
72.72
Ryzen 3 1200
SE +/- 0.42, N = 3
76.18
Athlon 200GE
SE +/- 0.59, N = 3
79.74
Core i3 4130
SE +/- 0.34, N = 3
98.90
A10-7850K
SE +/- 0.47, N = 3
118.21
30
60
90
120
150
1. firefox 71.0

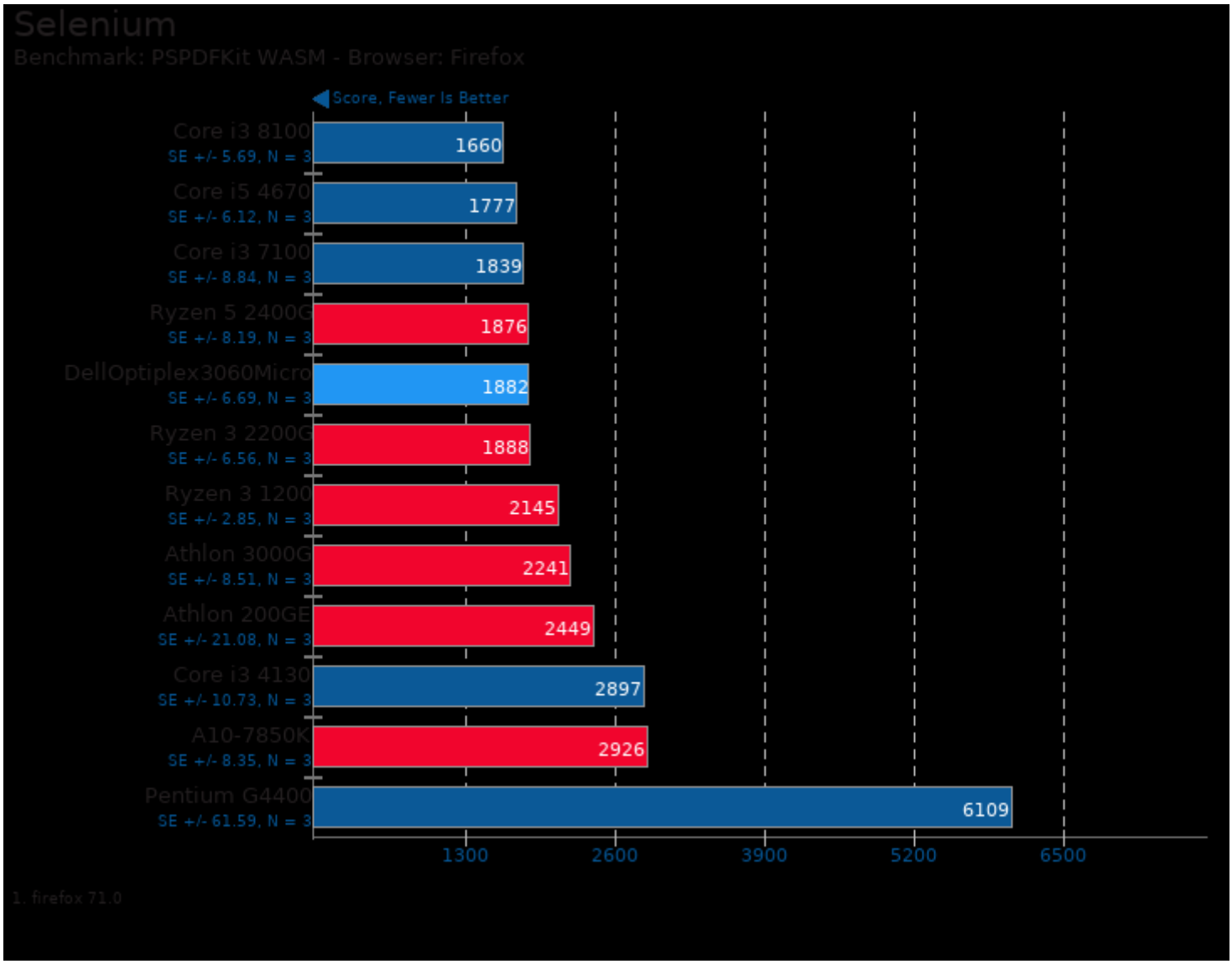

Selenium
Benchmark: Jetstream - Browser: Firefox
Score, More Is Better
Ryzen 5 2400G
SE +/- 0.59, N = 3
168.96
Core i3 8100
SE +/- 0.10, N = 3
168.86
Core i5 4670
SE +/- 0.42, N = 3
167.60
Core i3 7100
SE +/- 0.14, N = 3
161.92
Ryzen 3 2200G
SE +/- 0.51, N = 3
160.91
Athlon 3000G
SE +/- 0.18, N = 3
147.17
Pentium G4400
SE +/- 0.40, N = 3
146.19
Ryzen 3 1200
SE +/- 0.28, N = 3
143.26
Athlon 200GE
SE +/- 0.36, N = 3
136.88
Core i3 4130
SE +/- 0.18, N = 3
115.17
A10-7850K
SE +/- 0.13, N = 3
89.87
40
80
120
160
200
1. firefox 71.0

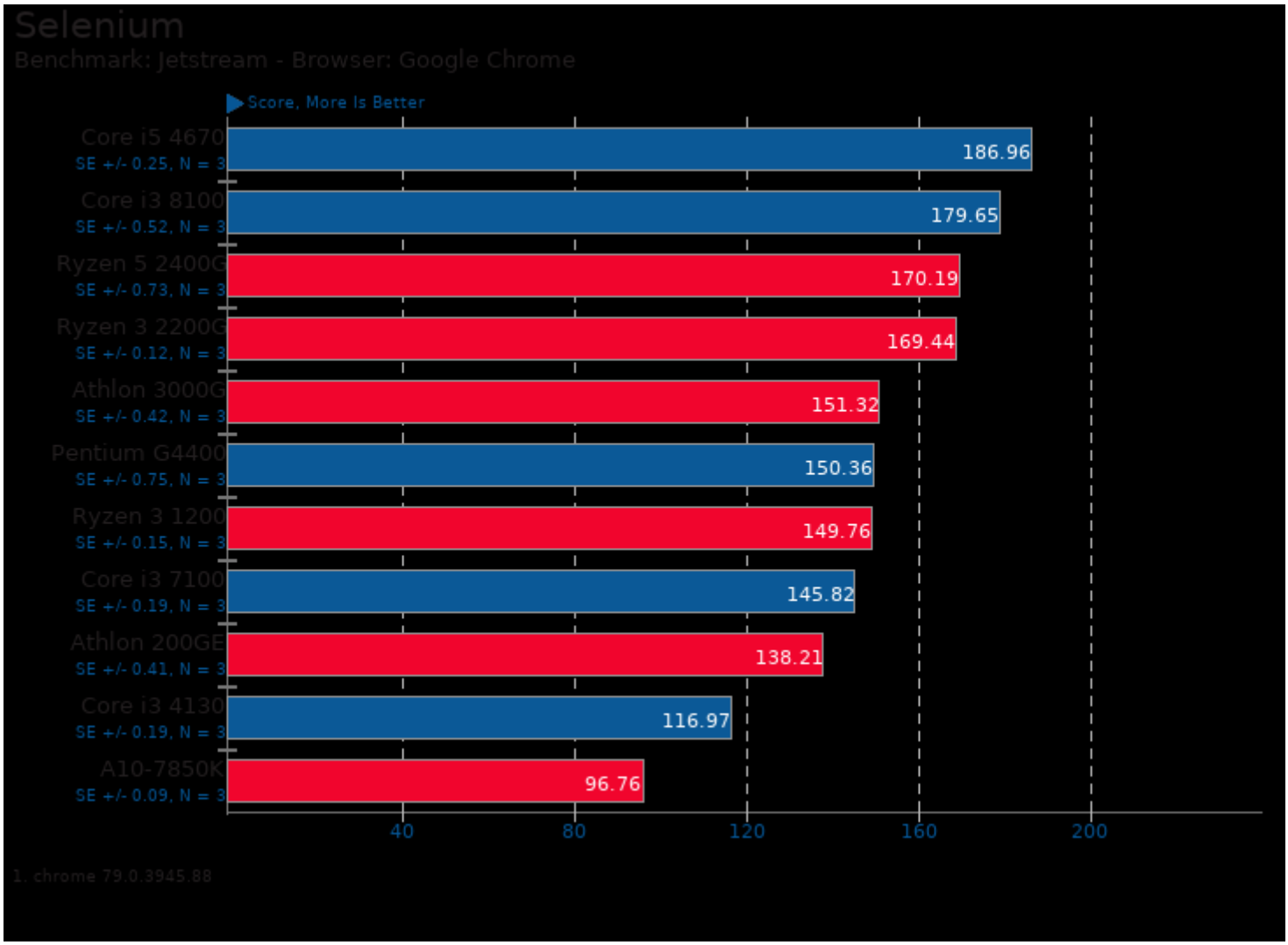

Selenium
Benchmark: StyleBench - Browser: Firefox
Runs / Minute, More Is Better
Core i3 8100
SE +/- 0.10, N = 3
74.80
DellOptiplex3060Micro
SE +/- 0.36, N = 3
72.70
Core i5 4670
SE +/- 0.27, N = 3
69.20
Ryzen 5 2400G
SE +/- 0.22, N = 3
65.30
Core i3 7100
SE +/- 0.09, N = 3
64.90
Ryzen 3 2200G
SE +/- 0.06, N = 3
54.50
Athlon 3000G
SE +/- 0.09, N = 3
50.30
Ryzen 3 1200
SE +/- 0.23, N = 3
49.20
Athlon 200GE
SE +/- 0.23, N = 3
47.30
Pentium G4400
SE +/- 0.12, N = 3
42.70
Core i3 4130
SE +/- 0.28, N = 3
40.10
A10-7850K
SE +/- 0.10, N = 3
35.50
20
40
60
80
100
1. firefox 71.0

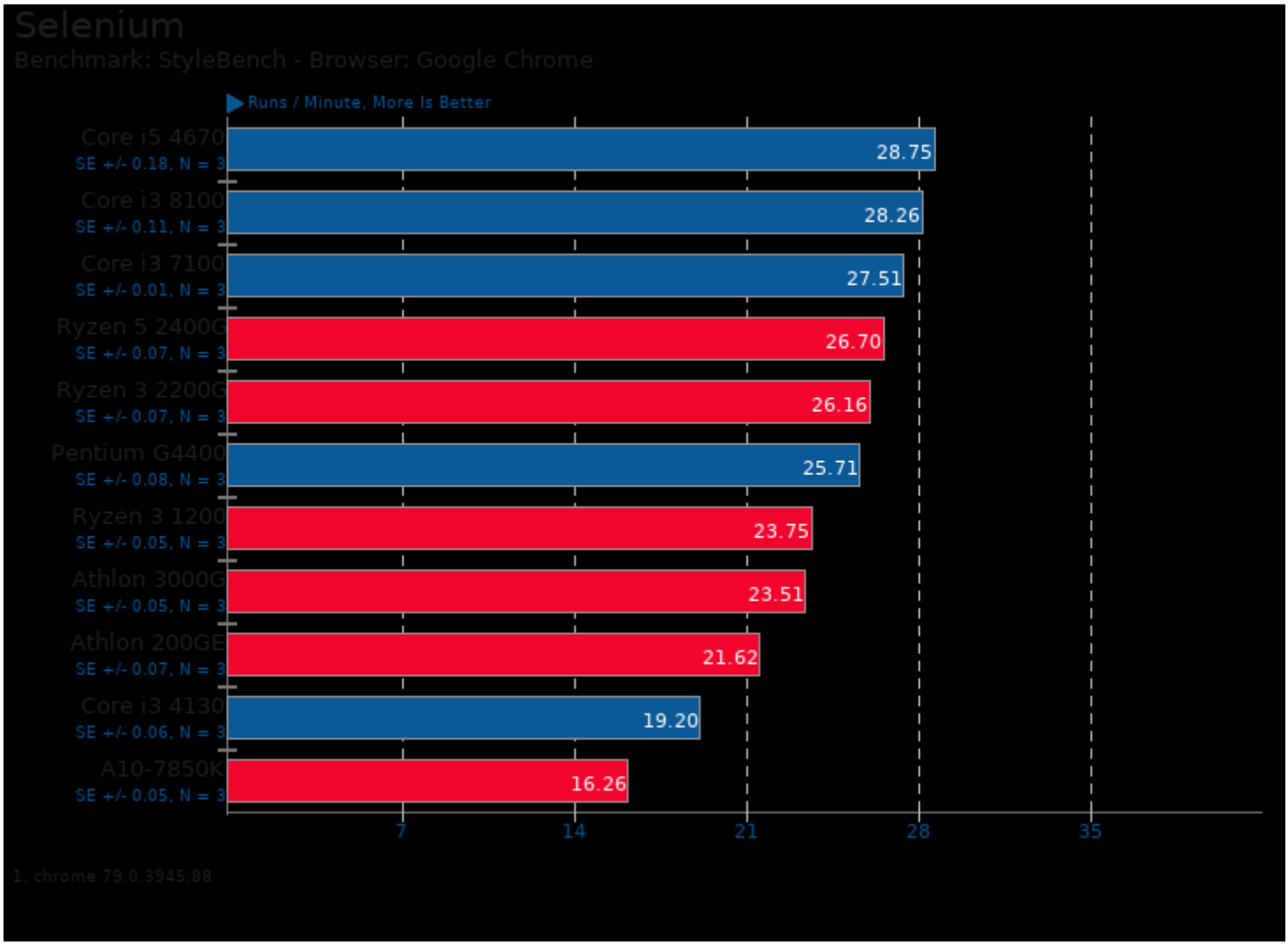

Selenium
Benchmark: Speedometer - Browser: Firefox
Runs Per Minute, More Is Better
Core i3 8100
SE +/- 0.27, N = 3
75.58
Core i5 4670
SE +/- 0.06, N = 3
71.80
DellOptiplex3060Micro
SE +/- 0.00, N = 3
68.90
Core i3 7100
SE +/- 0.00, N = 3
64.50
Ryzen 5 2400G
SE +/- 0.09, N = 3
62.60
Ryzen 3 2200G
SE +/- 0.12, N = 3
60.80
Pentium G4400
SE +/- 0.12, N = 3
60.73
Athlon 3000G
SE +/- 0.13, N = 3
53.90
Ryzen 3 1200
SE +/- 0.21, N = 3
53.10
Athlon 200GE
SE +/- 0.21, N = 3
49.74
A10-7850K
SE +/- 0.33, N = 3
39.00
Core i3 4130
SE +/- 0.18, N = 3
38.00
20
40
60
80
100
1. firefox 71.0

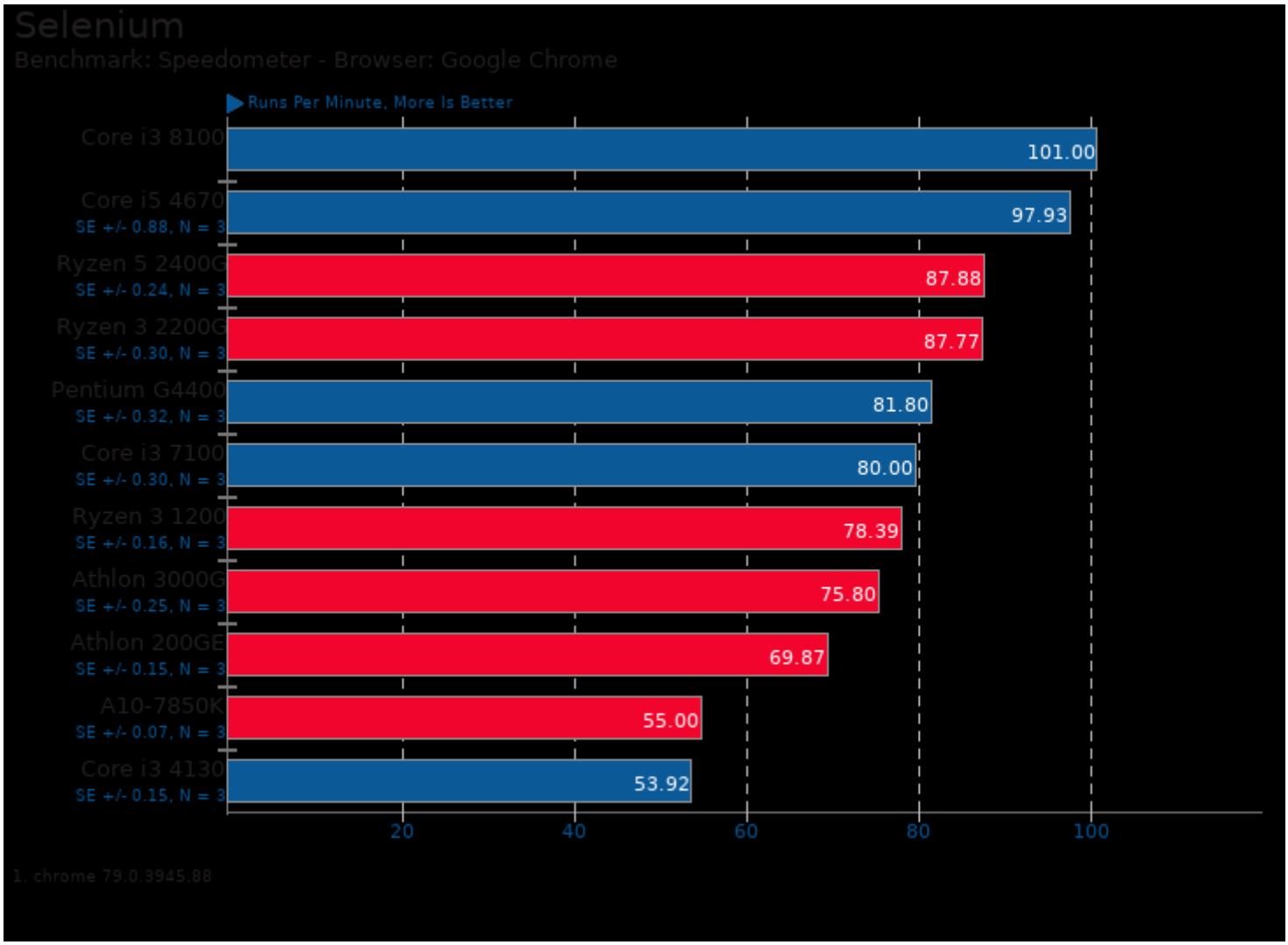
Low-End EOY2019 Ubuntu Linux CPU Comparison

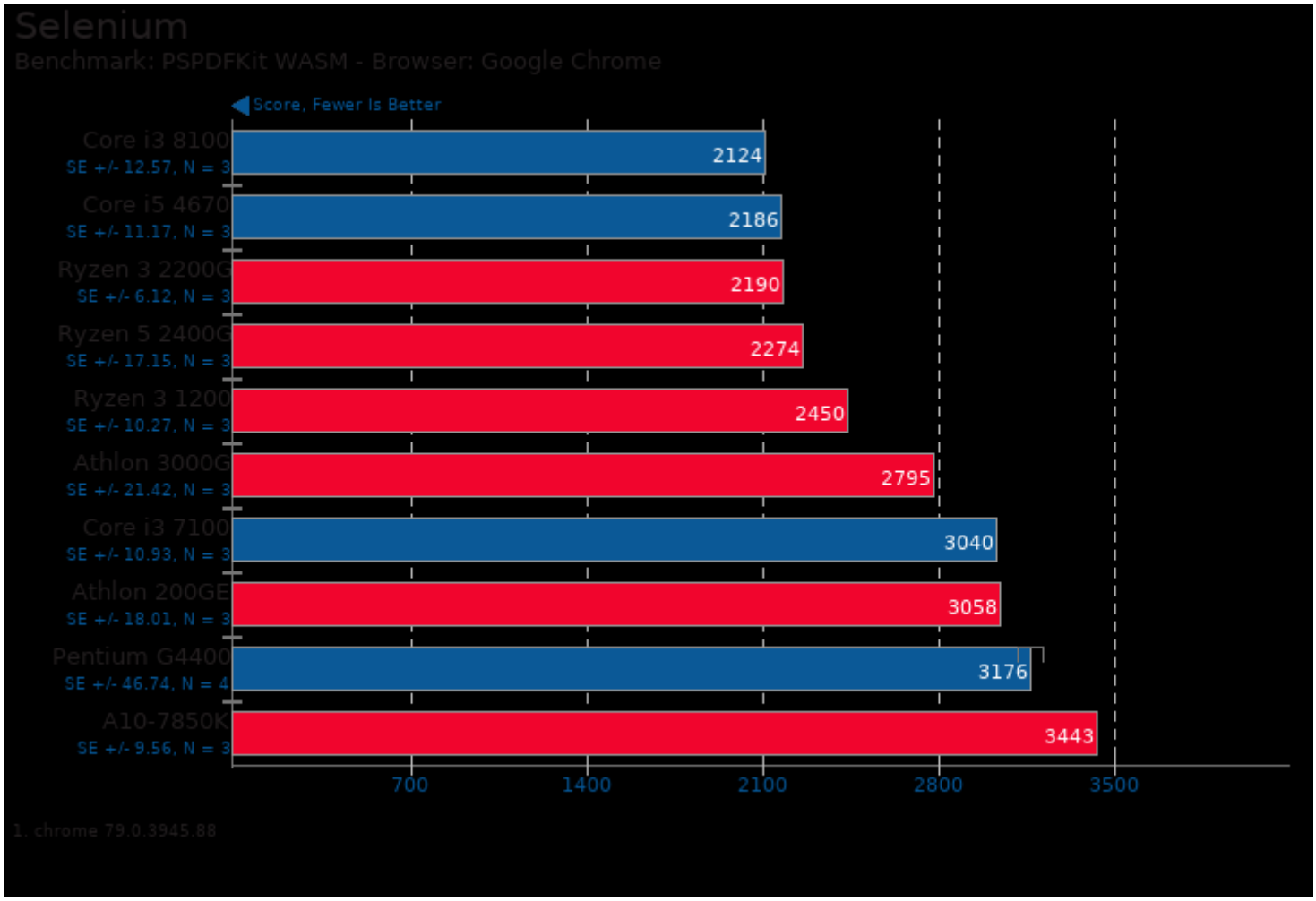



Selenium
Benchmark: PSPDFKit WASM - Browser: Firefox
Score, Fewer Is Better
Core i3 8100
SE +/- 5.69, N = 3
1660
Core i5 4670
SE +/- 6.12, N = 3
1777
Core i3 7100
SE +/- 8.84, N = 3
1839
Ryzen 5 2400G
SE +/- 8.19, N = 3
1876
DellOptiplex3060Micro
SE +/- 6.69, N = 3
1882
Ryzen 3 2200G
SE +/- 6.56, N = 3
1888
Ryzen 3 1200
SE +/- 2.85, N = 3
2145
Athlon 3000G
SE +/- 8.51, N = 3
2241
Athlon 200GE
SE +/- 21.08, N = 3
2449
Core i3 4130
SE +/- 10.73, N = 3
2897
A10-7850K
SE +/- 8.35, N = 3
2926
Pentium G4400
SE +/- 61.59, N = 3
6109
1300
2600
3900
5200
6500
1. firefox 71.0

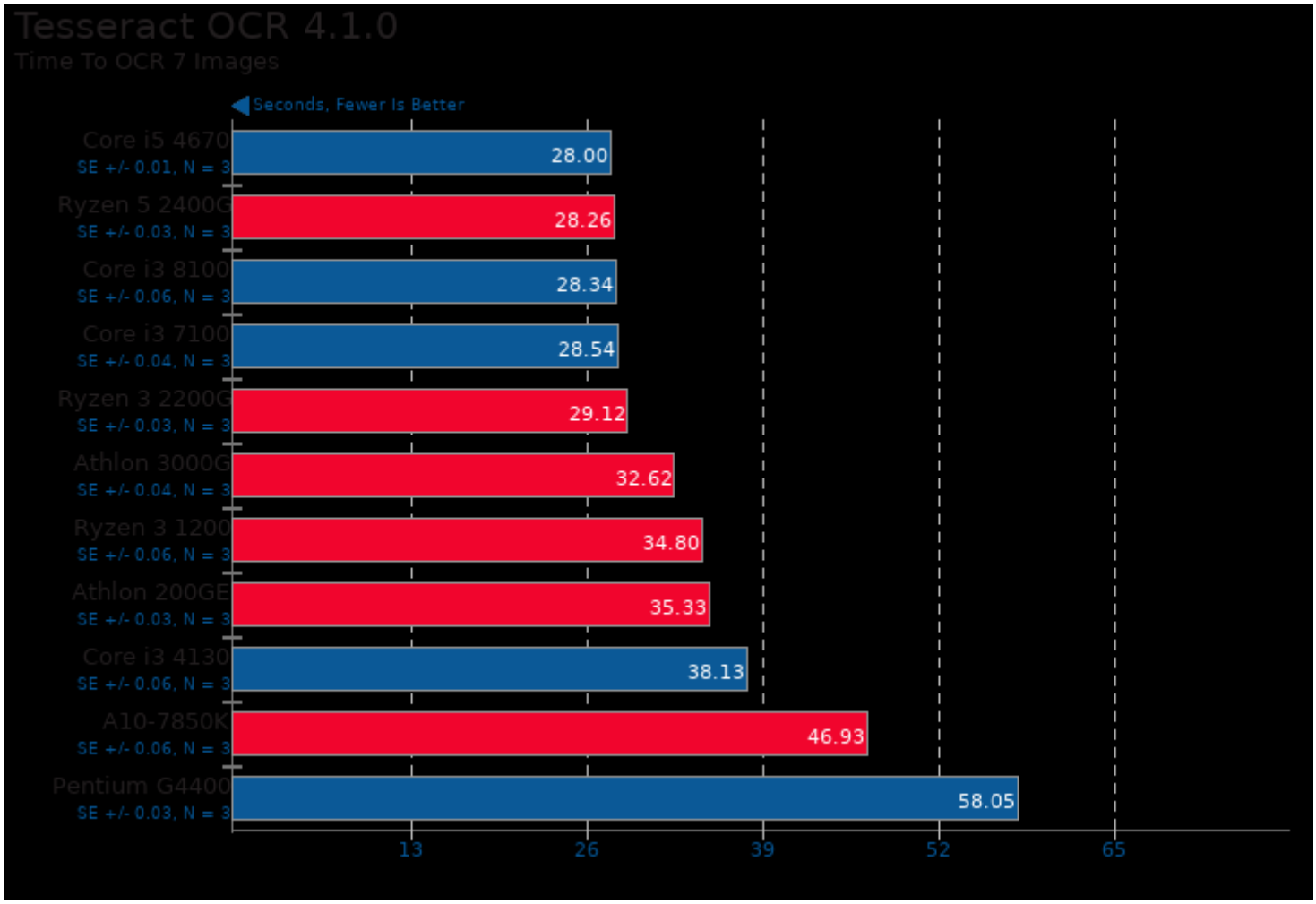

Selenium
Benchmark: Jetstream - Browser: Google Chrome
Score, More Is Better
Core i5 4670
SE +/- 0.25, N = 3
186.96
Core i3 8100
SE +/- 0.52, N = 3
179.65
Ryzen 5 2400G
SE +/- 0.73, N = 3
170.19
Ryzen 3 2200G
SE +/- 0.12, N = 3
169.44
Athlon 3000G
SE +/- 0.42, N = 3
151.32
Pentium G4400
SE +/- 0.75, N = 3
150.36
Ryzen 3 1200
SE +/- 0.15, N = 3
149.76
Core i3 7100
SE +/- 0.19, N = 3
145.82
Athlon 200GE
SE +/- 0.41, N = 3
138.21
Core i3 4130
SE +/- 0.19, N = 3
116.97
A10-7850K
SE +/- 0.09, N = 3
96.76
40
80
120
160
200
1. chrome 79.0.3945.88


Selenium
Benchmark: StyleBench - Browser: Google Chrome
Runs / Minute, More Is Better
Core i5 4670
SE +/- 0.18, N = 3
28.75
Core i3 8100
SE +/- 0.11, N = 3
28.26
Core i3 7100
SE +/- 0.01, N = 3
27.51
Ryzen 5 2400G
SE +/- 0.07, N = 3
26.70
Ryzen 3 2200G
SE +/- 0.07, N = 3
26.16
Pentium G4400
SE +/- 0.08, N = 3
25.71
Ryzen 3 1200
SE +/- 0.05, N = 3
23.75
Athlon 3000G
SE +/- 0.05, N = 3
23.51
Athlon 200GE
SE +/- 0.07, N = 3
21.62
Core i3 4130
SE +/- 0.06, N = 3
19.20
A10-7850K
SE +/- 0.05, N = 3
16.26
7
14
21
28
35
1. chrome 79.0.3945.88

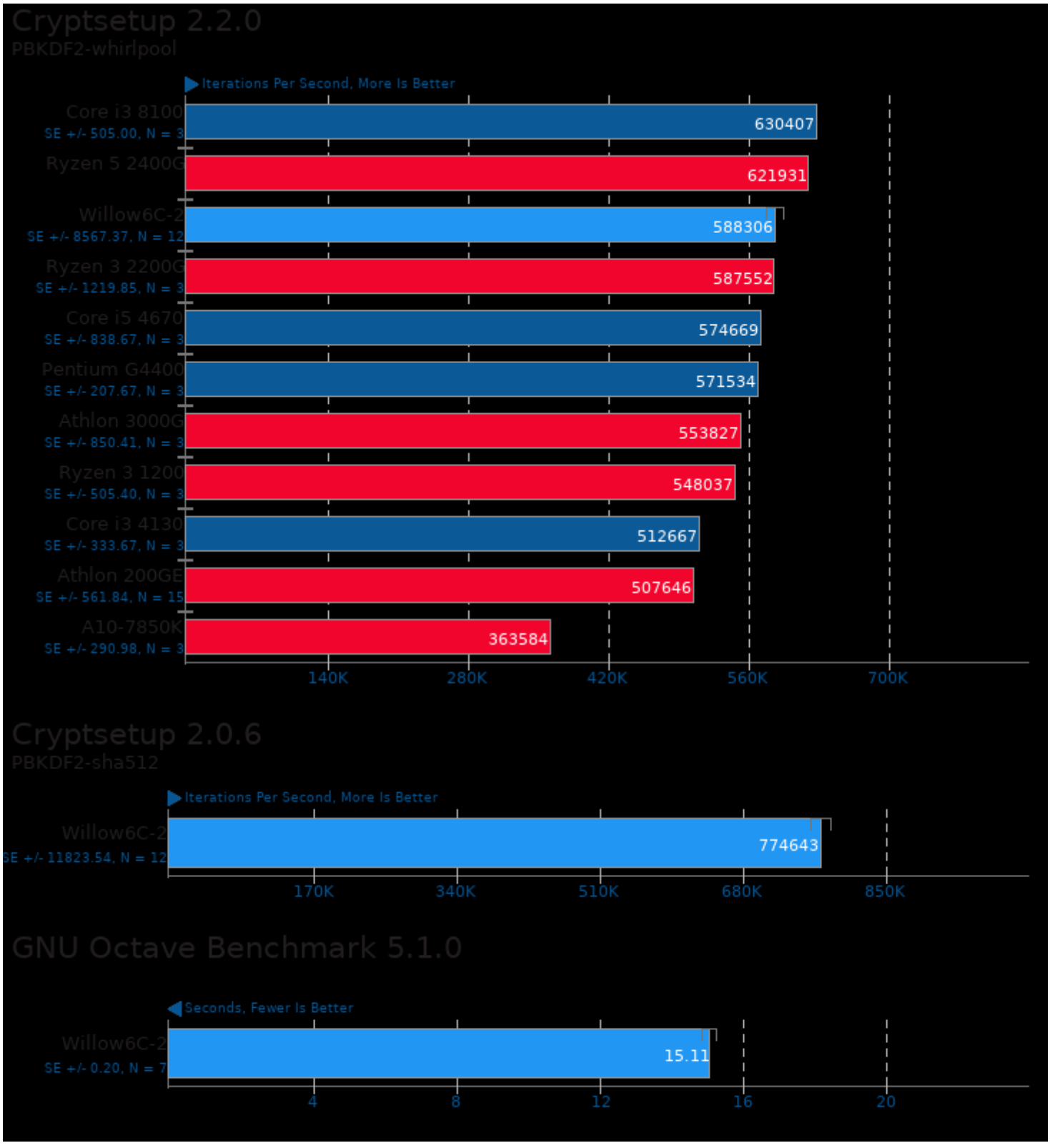

Selenium
Benchmark: Speedometer - Browser: Google Chrome
Runs Per Minute, More Is Better
Core i3 8100
101.00
Core i5 4670
SE +/- 0.88, N = 3
97.93
Ryzen 5 2400G
SE +/- 0.24, N = 3
87.88
Ryzen 3 2200G
SE +/- 0.30, N = 3
87.77
Pentium G4400
SE +/- 0.32, N = 3
81.80
Core i3 7100
SE +/- 0.30, N = 3
80.00
Ryzen 3 1200
SE +/- 0.16, N = 3
78.39
Athlon 3000G
SE +/- 0.25, N = 3
75.80
Athlon 200GE
SE +/- 0.15, N = 3
69.87
A10-7850K
SE +/- 0.07, N = 3
55.00
Core i3 4130
SE +/- 0.15, N = 3
53.92
20
40
60
80
100
1. chrome 79.0.3945.88


Selenium
Benchmark: PSPDFKit WASM - Browser: Google Chrome
Score, Fewer Is Better
Core i3 8100
SE +/- 12.57, N = 3
2124
Core i5 4670
SE +/- 11.17, N = 3
2186
Ryzen 3 2200G
SE +/- 6.12, N = 3
2190
Ryzen 5 2400G
SE +/- 17.15, N = 3
2274
Ryzen 3 1200
SE +/- 10.27, N = 3
2450
Athlon 3000G
SE +/- 21.42, N = 3
2795
Core i3 7100
SE +/- 10.93, N = 3
3040
Athlon 200GE
SE +/- 18.01, N = 3
3058
Pentium G4400
SE +/- 46.74, N = 4
3176
A10-7850K
SE +/- 9.56, N = 3
3443
700
1400
2100
2800
3500
1. chrome 79.0.3945.88

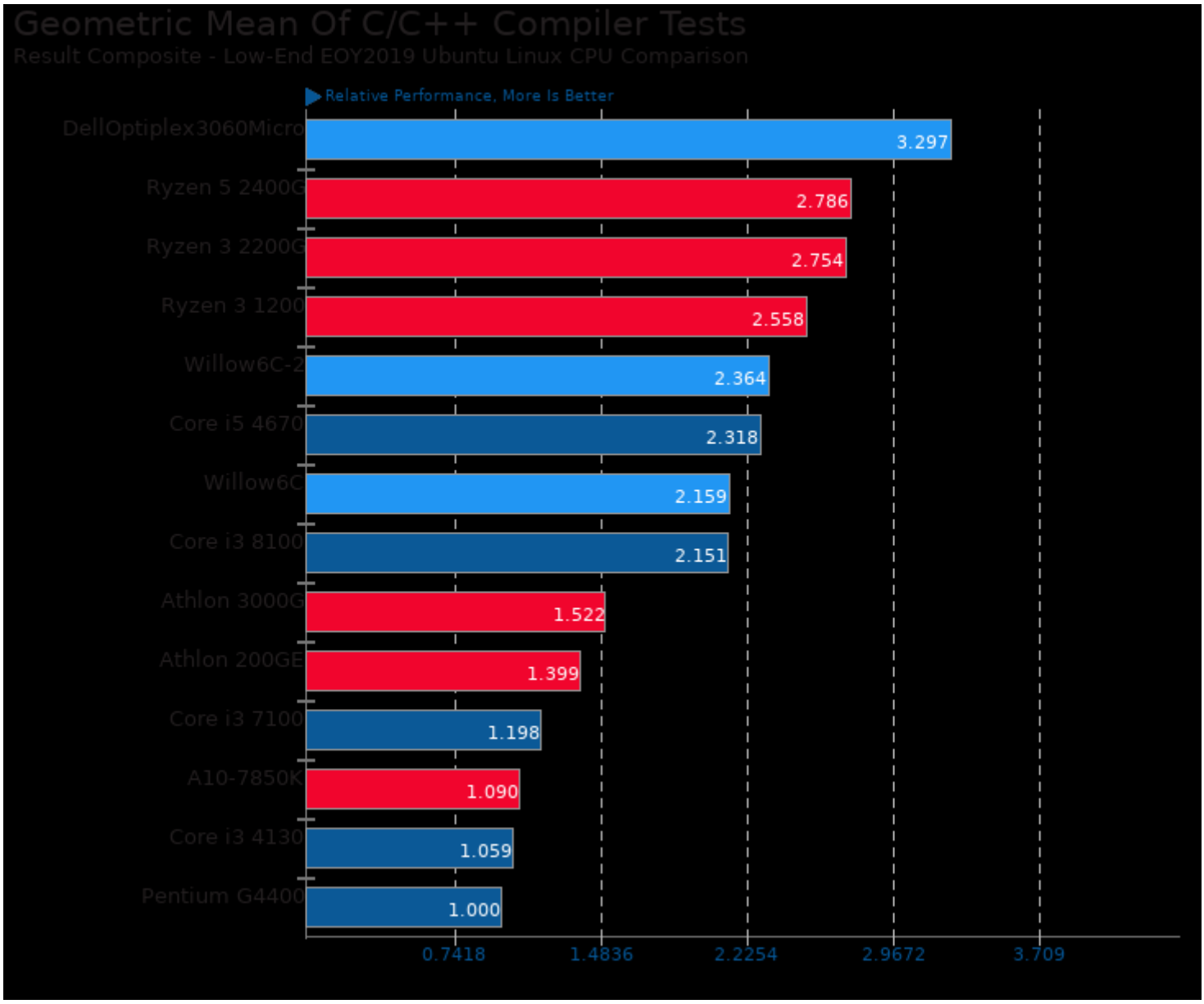
Low-End EOY2019 Ubuntu Linux CPU Comparison



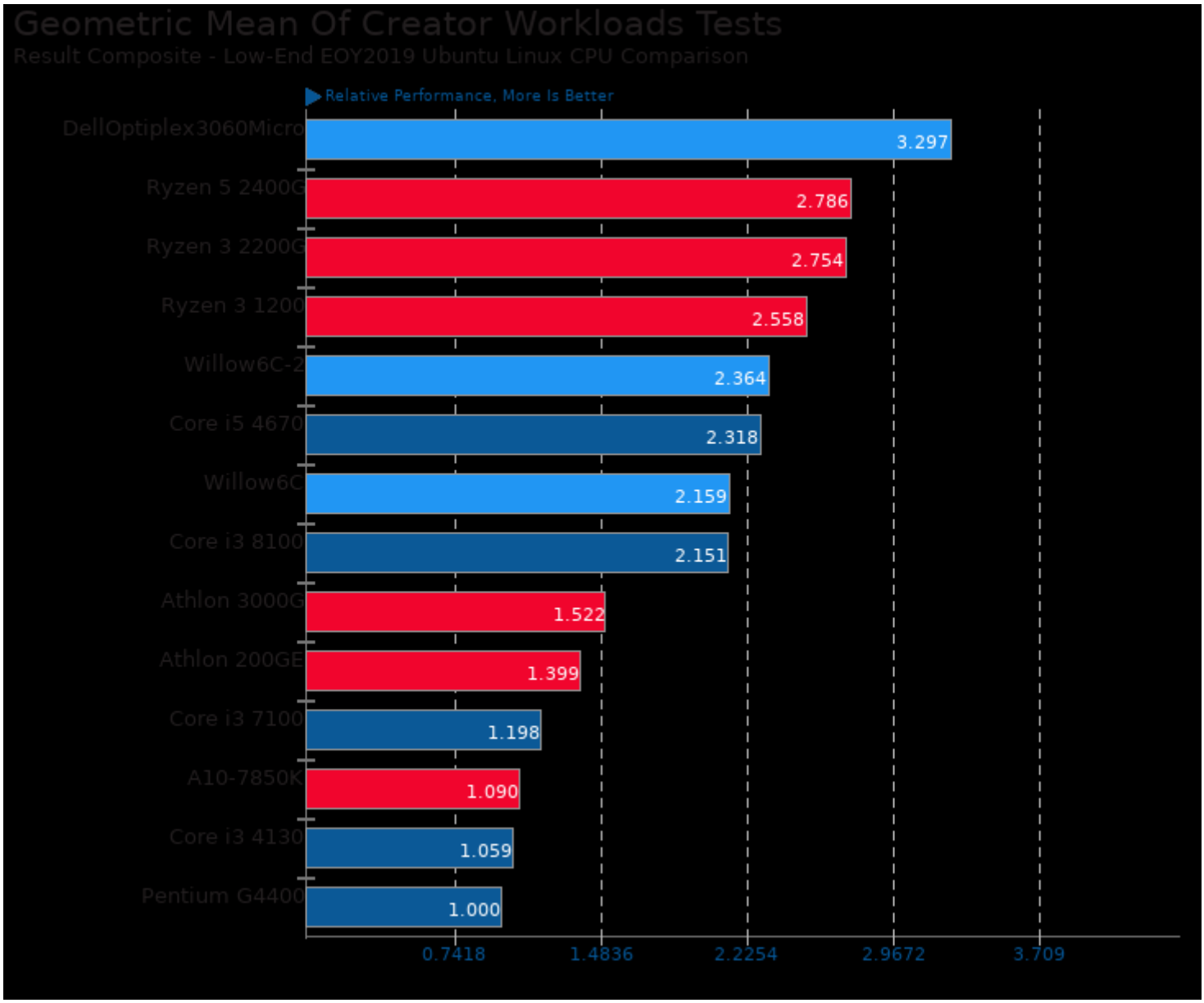
Low-End EOY2019 Ubuntu Linux CPU Comparison



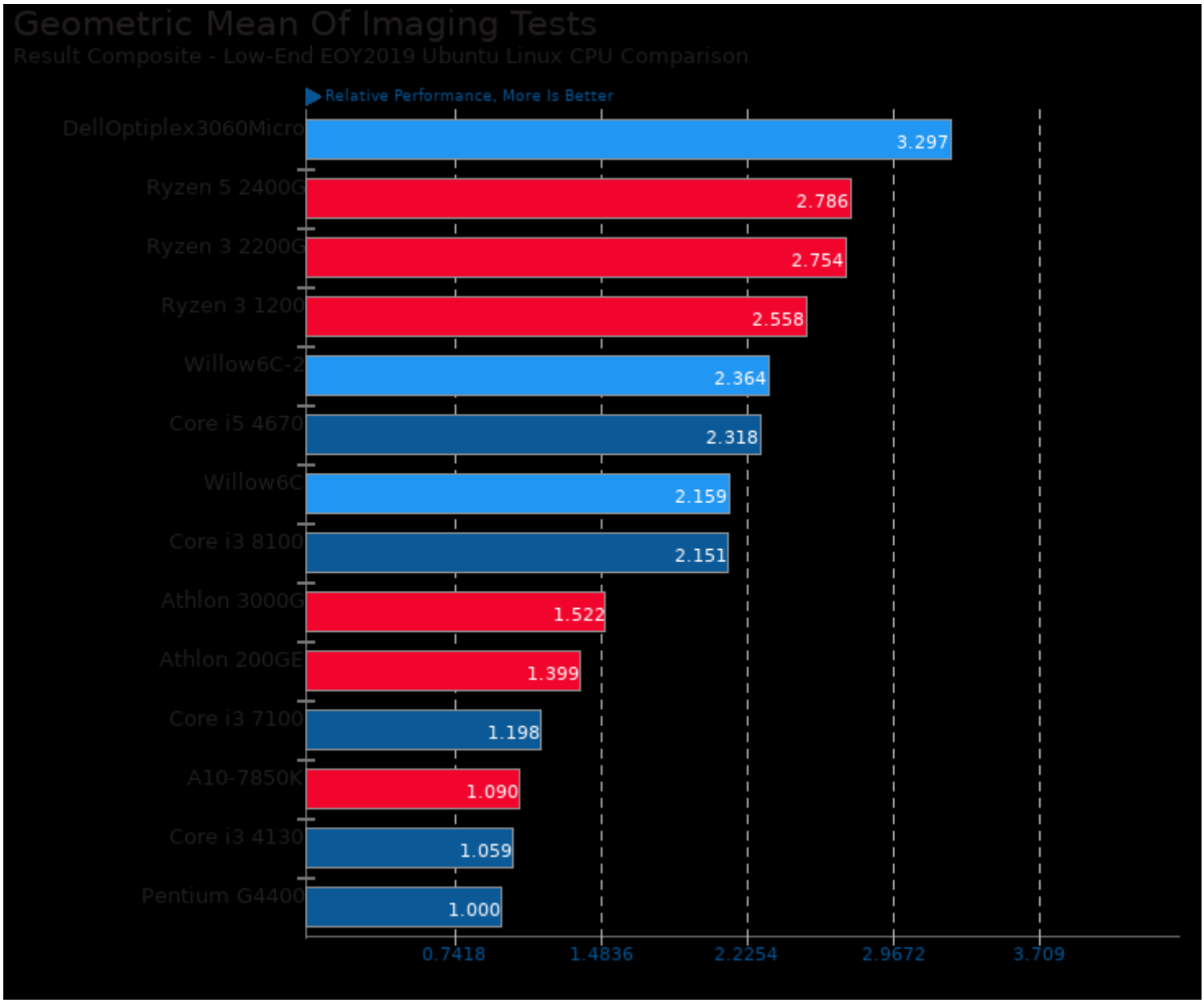
These geometric means are based upon test groupings / test suites for this result file.



Geometric mean based upon tests: pts/graphics-magick, pts/himeno, pts/compress-7zip, pts/encode-mp3, pts/encode-flac, pts/sqlite-speedtest, pts/dav1d, pts/x264, pts/compress-zstd and pts/svt-vp9

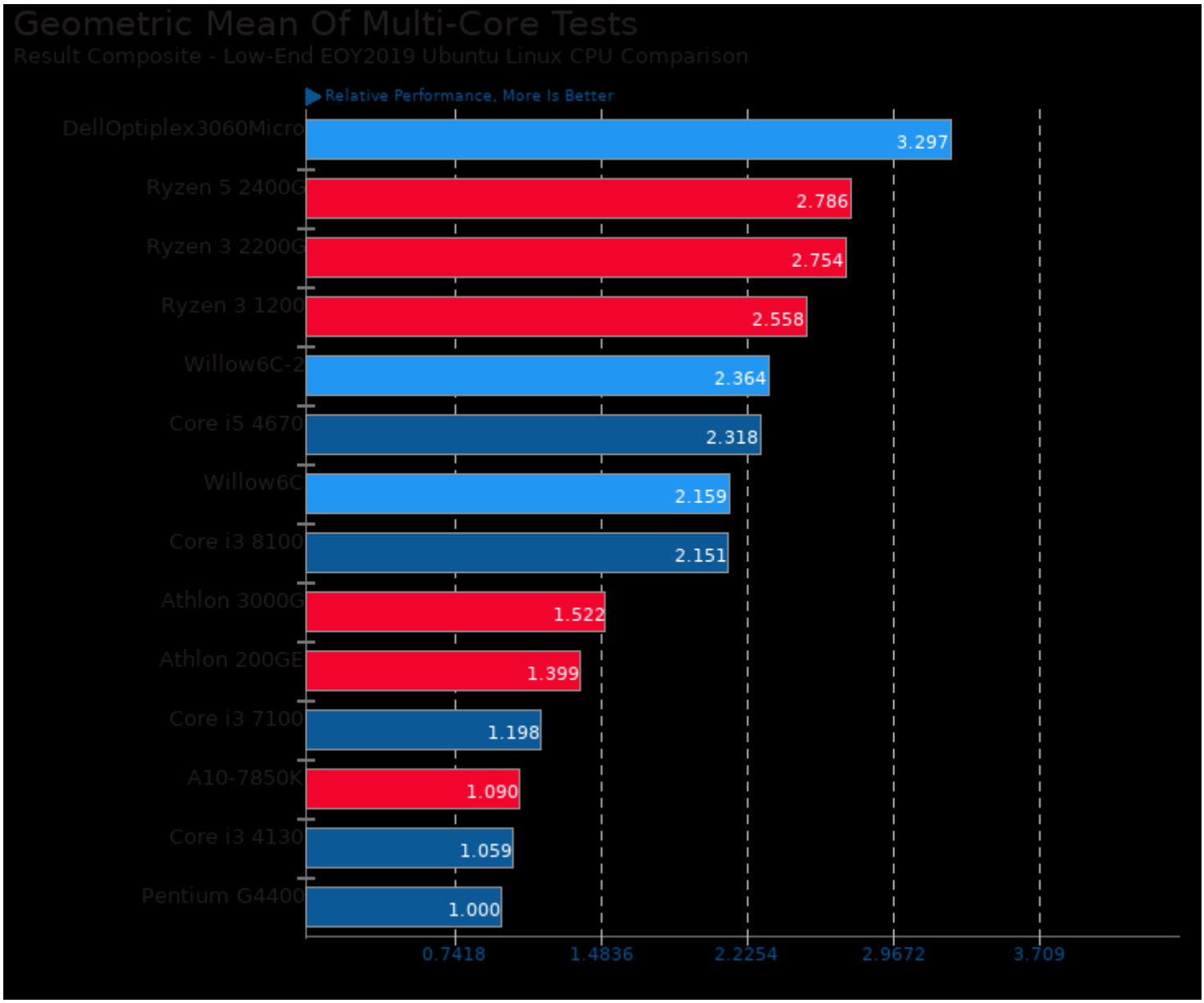


Geometric mean based upon tests: pts/ospray, pts/radiance, system/tesseract-ocr, pts/svt-vp9, pts/x264, pts/dav1d, pts/encode-mp3, pts/encode-flac, pts/graphics-magick, pts/tjbench, system/gimp, system/darktable, pts/embree, pts/oidn, pts/neatbench and pts/deepspeech



Geometric mean based upon tests: pts/graphics-magick, pts/tjbench, system/gimp and system/darktable

Low-End EOY2019 Ubuntu Linux CPU Comparison



Geometric mean based upon tests: pts/ospray, pts/coremark, pts/svt-vp9, pts/x264, pts/dav1d, pts/graphics-magick, pts/compress-7zip, pts/compress-zstd, pts/build-linux-kernel, pts/build2, pts/radiance, pts/embree, pts/oidn and pts/neatbench

This file was automatically generated via the Phoronix Test Suite benchmarking software on Friday, 29 March 2024 05:10.