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NVIDIA Linux GPU Benchmarks 2021

Various NVIDIA GPU benchmarks by Michael Larabel.

Automated Executive Summary

RTX 3080 had the most wins, coming in first place for 61% of the tests.

Based on the geometric mean of all complete results, the fastest (RTX 3090) was 3.427x the speed of the slowest (GTX 1080).

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

Ray Tracing In Vulkan (Resolution: 3840 x 2160 - Scene: Cornell Box + Lucy) at 31.466x
Ray Tracing In Vulkan (Resolution: 2560 x 1440 - Scene: Cornell Box + Lucy) at 30.611x
Ray Tracing In Vulkan (Resolution: 1920 x 1200 - Scene: Cornell Box + Lucy) at 30.431x
Ray Tracing In Vulkan (Resolution: 1920 x 1080 - Scene: Cornell Box + Lucy) at 30.14x
Ray Tracing In Vulkan (Resolution: 1920 x 1200 - Scene: Cornell Box) at 21.78x
Ray Tracing In Vulkan (Resolution: 3840 x 2160 - Scene: Cornell Box) at 21.668x
Ray Tracing In Vulkan (Resolution: 2560 x 1440 - Scene: Cornell Box) at 21.661x
Ray Tracing In Vulkan (Resolution: 1920 x 1080 - Scene: Cornell Box) at 21.544x
Ray Tracing In Vulkan (Resolution: 1920 x 1080 - Scene: Lucy In One Weekend) at 18.95x
Ray Tracing In Vulkan (Resolution: 3840 x 2160 - Scene: Lucy In One Weekend) at 18.866x.

Test Systems:

GTX 1080

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (3202 BIOS), Chipset: AMD Starship/Matisse, Memory: 32GB, Disk: 2000GB Corsair Force MP600 + 2000GB, Graphics: NVIDIA GeForce GTX 1080 8GB (1607/5005MHz), Audio: NVIDIA GP104 HD Audio, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.10, Kernel: 5.8.0-41-generic (x86_64), Desktop: GNOME Shell 3.38.2, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.39, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.136, Vulkan: 1.2.155, Compiler: GCC 10.2.0 + Clang 11.0.1-1~oibaf~g, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-gcn/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009
OpenCL Notes: GPU Compute Cores: 2560
Python Notes: Python 3.8.6
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

RTX 2060

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (3202 BIOS), Chipset: AMD Starship/Matisse, Memory: 32GB, Disk: 2000GB Corsair Force MP600 + 2000GB, Graphics: NVIDIA GeForce RTX 2060 6GB (1365/7000MHz), Audio: NVIDIA TU106 HD Audio, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.10, Kernel: 5.8.0-41-generic (x86_64), Desktop: GNOME Shell 3.38.2, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.39, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.136, Vulkan: 1.2.155, Compiler: GCC 10.2.0 + Clang 11.0.1-1~oibaf~g, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-gcn/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009
OpenCL Notes: GPU Compute Cores: 1920
Python Notes: Python 3.8.6
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

RTX 2060 SUPER

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (3202 BIOS), Chipset: AMD Starship/Matisse, Memory: 32GB, Disk: 2000GB Corsair Force MP600 + 2000GB, Graphics: NVIDIA GeForce RTX 2060 SUPER 8GB (390/405MHz), Audio: NVIDIA TU106 HD Audio, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.10, Kernel: 5.8.0-41-generic (x86_64), Desktop: GNOME Shell 3.38.2, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.39, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.136, Vulkan: 1.2.155, Compiler: GCC 10.2.0 + Clang 11.0.1-1~oibaf~g, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-gcn/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009
OpenCL Notes: GPU Compute Cores: 2176
Python Notes: Python 3.8.6
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

RTX 2070

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (3202 BIOS), Chipset: AMD Starship/Matisse, Memory: 32GB, Disk: 2000GB Corsair Force MP600 + 2000GB, Graphics: ASUS NVIDIA GeForce RTX 2070 8GB (1410/7000MHz), Audio: NVIDIA TU106 HD Audio, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.10, Kernel: 5.8.0-41-generic (x86_64), Desktop: GNOME Shell 3.38.2, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.39, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.136, Vulkan: 1.2.155, Compiler: GCC 10.2.0 + Clang 11.0.1-1~oibaf~g, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-gcn/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009
OpenCL Notes: GPU Compute Cores: 2304
Python Notes: Python 3.8.6
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

RTX 2070 SUPER

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (3202 BIOS), Chipset: AMD Starship/Matisse, Memory: 32GB, Disk: 2000GB Corsair Force MP600 + 2000GB, Graphics: NVIDIA GeForce RTX 2070 SUPER 8GB (1605/7000MHz), Audio: NVIDIA TU104 HD Audio, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.10, Kernel: 5.8.0-41-generic (x86_64), Desktop: GNOME Shell 3.38.2, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.39, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.136, Vulkan: 1.2.155, Compiler: GCC 10.2.0 + Clang 11.0.1-1~oibaf~g, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-gcn/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009
OpenCL Notes: GPU Compute Cores: 2560
Python Notes: Python 3.8.6
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

RTX 2080

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (3202 BIOS), Chipset: AMD Starship/Matisse, Memory: 32GB, Disk: 2000GB Corsair Force MP600 + 2000GB, Graphics: Zotac NVIDIA GeForce RTX 2080 8GB (1515/7000MHz), Audio: NVIDIA TU104 HD Audio, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.10, Kernel: 5.8.0-41-generic (x86_64), Desktop: GNOME Shell 3.38.2, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.39, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.136, Vulkan: 1.2.155, Compiler: GCC 10.2.0 + Clang 11.0.1-1~oibaf~g, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-gcn/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009
OpenCL Notes: GPU Compute Cores: 2944
Python Notes: Python 3.8.6
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

RTX 2080 SUPER

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (3202 BIOS), Chipset: AMD Starship/Matisse, Memory: 32GB, Disk: 2000GB Corsair Force MP600 + 2000GB, Graphics: NVIDIA GeForce RTX 2080 SUPER 8GB (1650/7750MHz), Audio: NVIDIA TU104 HD Audio, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.10, Kernel: 5.8.0-41-generic (x86_64), Desktop: GNOME Shell 3.38.2, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.39, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.136, Vulkan: 1.2.155, Compiler: GCC 10.2.0 + Clang 11.0.1-1~oibaf~g, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-gcn/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009
OpenCL Notes: GPU Compute Cores: 3072
Python Notes: Python 3.8.6
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

RTX 2080 Ti

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (3202 BIOS), Chipset: AMD Starship/Matisse, Memory: 32GB, Disk: 2000GB Corsair Force MP600 +

2000GB, Graphics: NVIDIA GeForce RTX 2080 Ti 11GB (1350/7000MHz), Audio: NVIDIA TU102 HD Audio, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.10, Kernel: 5.8.0-41-generic (x86_64), Desktop: GNOME Shell 3.38.2, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.39, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.136, Vulkan: 1.2.155, Compiler: GCC 10.2.0 + Clang 11.0.1-1~oibaf~g, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-gcn/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009
OpenCL Notes: GPU Compute Cores: 4352
Python Notes: Python 3.8.6
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

TITAN RTX

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (3202 BIOS), Chipset: AMD Starship/Matisse, Memory: 32GB, Disk: 2000GB Corsair Force MP600 + 2000GB, Graphics: NVIDIA TITAN RTX 24GB (390/405MHz), Audio: NVIDIA TU102 HD Audio, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.10, Kernel: 5.8.0-41-generic (x86_64), Desktop: GNOME Shell 3.38.2, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.39, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.136, Vulkan: 1.2.155, Compiler: GCC 10.2.0 + Clang 11.0.1-1~oibaf~g, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-gcn/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009
OpenCL Notes: GPU Compute Cores: 4608
Python Notes: Python 3.8.6
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

RTX 3060 Ti

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (3202 BIOS), Chipset: AMD Starship/Matisse, Memory: 32GB, Disk: 2000GB Corsair Force MP600 + 2000GB, Graphics: NVIDIA GeForce RTX 3060 Ti 8GB (375/5000MHz), Audio: NVIDIA Device 228b, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.10, Kernel: 5.8.0-41-generic (x86_64), Desktop: GNOME Shell 3.38.2, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.39, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.136, Vulkan: 1.2.155, Compiler: GCC 10.2.0 + Clang 11.0.1-1~oibaf~g, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug

--enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-gcn/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009
OpenCL Notes: GPU Compute Cores: 4864
Python Notes: Python 3.8.6
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

RTX 3080

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (3202 BIOS), Chipset: AMD Starship/Matisse, Memory: 32GB, Disk: 2000GB Corsair Force MP600 + 2000GB, Graphics: NVIDIA GeForce RTX 3080 10GB (1710/9501MHz), Audio: NVIDIA Device 1aef, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.10, Kernel: 5.8.0-41-generic (x86_64), Desktop: GNOME Shell 3.38.2, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.39, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.136, Vulkan: 1.2.155, Compiler: GCC 10.2.0 + Clang 11.0.1-1~oibaf~g, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-gcn/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009
OpenCL Notes: GPU Compute Cores: 8704
Python Notes: Python 3.8.6
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

RTX 3090

Processor: AMD Ryzen Threadripper 3960X 24-Core @ 3.80GHz (24 Cores / 48 Threads), Motherboard: ASRock TRX40 Creator v1 (P1.74A BIOS), Chipset: AMD Starship/Matisse, Memory: 64GB, Disk: 1000GB PNY CS3030 1TB SSD, Graphics: Zotac NVIDIA GeForce RTX 3090 24GB, Audio: NVIDIA Device 1aef, Monitor: E241-A1, Network: Aquantia AQC107 NBase-T/IEEE + Realtek RTL8125 2.5GbE + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.04, Kernel: 5.8.0-44-generic (x86_64), Desktop: GNOME Shell 3.36.4, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.39, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.136, Vulkan: 1.2.155, Compiler: GCC 9.3.0 + CUDA 11.1, File-System: ext4, Screen Resolution: 1920x1080

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEa/gcc-9-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq ondemand (Boost: Enabled) - CPU Microcode: 0x8301039
OpenCL Notes: GPU Compute Cores: 10496
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: conditional RSB filling + srbds: Not affected + tsx_async_abort: Not affected

NVIDIA Linux GPU Benchmarks 2021

	GTX 1080	RTX 2060	RTX 2060 SUPER	RTX 2070	RTX 2070 SUPER	RTX 2080	RTX 2080 SUPER	RTX 2080 Ti	TITAN RTX	RTX 3060 Ti	RTX 3080	RTX 3090
RedShift Demo (sec)	**749**	469	379	374	348	346	328	246	236	240	**164**	
Normalized	21.9%	34.97%	43.27%	43.85%	47.13%	47.4%	50%	66.67%	69.49%	68.33%	100%	
Standard Deviation	0.4%	0.2%	0.3%	0.5%	0.2%	0.4%		0.2%		0.4%		
VkFFT (Benchmark Score)	**22178**	23484	31000	30922	32063	32463	34719	42152	44769	35207	**56583**	40226
Normalized	39.2%	41.5%	54.79%	54.65%	56.67%	57.37%	61.36%	74.5%	79.12%	62.22%	100%	71.09%
Standard Deviation	0%	0%	0%	0.2%	0.7%	0%	0%	0.5%	0.2%	0.4%	0.1%	1.7%
OctaneBench - Total Score (Score)	**131.138381**	195.070769	241.445325	244.679189	261.261302	256.387918	262.843677	358.549904	383.258253	383.44601	**562.818641**	
Normalized	23.3%	34.66%	42.9%	43.47%	46.42%	45.55%	46.7%	63.71%	68.1%	68.13%	100%	
FAHBench (Ns/Day)	**150.9450**	184.1555	208.7075	206.0321	232.7775	236.8145	257.9896	307.2028	308.1555	235.6149	**321.9986**	
Normalized	46.88%	57.19%	64.82%	63.99%	72.29%	73.55%	80.12%	95.41%	95.7%	73.17%	100%	
Standard Deviation	0.2%	0.3%	0.4%	0.4%	0.6%	0.8%	0.4%	0.5%	0.4%	0.4%	0.3%	
Chaos Group V-RAY - NVIDIA CUDA GPU (vpaths)	**389**	473	492	480	785	730	742	926	936	1180	**1666**	
Normalized	23.35%	28.39%	29.53%	28.81%	47.12%	43.82%	44.54%	55.58%	56.18%	70.83%	100%	
Standard Deviation	0.3%	0.1%	0.1%		0.1%		0.1%	0.1%			0.1%	
Chaos Group V-RAY - NVIDIA RTX GPU (vrays)		**659**	733	713	977	892	905	1246	1295	1546	**2183**	
Normalized		30.19%	33.58%	32.66%	44.75%	40.86%	41.46%	57.08%	59.32%	70.82%	100%	
Standard Deviation		0.4%		0.2%		0.3%	0.2%		0%		0.5%	
IndigoBench - OpenCL GPU - Bedroom (M samples/s)	**4.436**	5.591	7.392	7.398	7.776	7.640	7.845	11.012	11.650	11.421	**17.650**	
Normalized	25.13%	31.68%	41.88%	41.92%	44.06%	43.29%	44.45%	62.39%	66.01%	64.71%	100%	
Standard Deviation	0.1%	0.1%	0.3%	0.2%	0.1%	0.1%	0%	0.2%	0.1%	0.3%	0.4%	
IndigoBench - OpenCL GPU - Supercar (M samples/s)	**13.900**	18.400	23.311	23.419	24.706	24.458	25.326	33.236	35.280	33.876	**46.405**	
Normalized	29.95%	39.65%	50.23%	50.47%	53.24%	52.71%	54.58%	71.62%	76.03%	73%	100%	
Standard Deviation	0%	0.2%	0%	0%	0.1%	0.1%	0.2%	0.1%	0.2%	0.2%	0.1%	
RealSR-NCNN - 4x - Yes (sec)	**110.233**	85.402	75.755	74.526	63.020	60.264	54.895	43.816	41.729	53.801	34.114	**32.163**
Normalized	29.18%	37.66%	42.46%	43.16%	51.04%	53.37%	58.59%	73.4%	77.08%	59.78%	94.28%	100%
Standard Deviation	0.2%	0.7%	0.7%	1.1%	0.8%	0.9%	0.5%	0.9%	0.9%	0.4%	0.4%	0.3%

Ray Tracing In Vulkan - 3840 x 2160 - Cornell Box (FPS)	**1.47529**	12.10101	14.1848	13.87085	16.7912	18.4929	20.3361	27.5750	28.8574	18.4933	**31.9668**	
Normalized	4.62%	37.85%	44.37%	43.39%	52.53%	57.85%	63.62%	86.26%	90.27%	57.85%	100%	
Standard Deviation	0%	14.2%	0%	16.5%	0%	0.5%	0%	0.1%	0.1%	0.1%	0%	
VkResample - 2x - Double (ms)	253.613	**344.554**	309.185	301.682	262.249	236.786	217.311	155.743	148.615	262.937	148.005	**128.244**
Normalized	50.57%	37.22%	41.48%	42.51%	48.9%	54.16%	59.01%	82.34%	86.29%	48.77%	86.65%	100%
Standard Deviation	0.1%	0.3%	0.1%	0.2%	0.4%	0.1%	0.4%	0.1%	0.1%	0.1%	0.1%	0.1%
Ray Tracing In Vulkan - 3840 x 2160 - Cornell Box + Lucy	**0.522516**	4.69217	5.97602	6.08705	6.77717	6.92702	7.14784	10.5369	11.1440	9.39923	**16.4413**	
Normalized	3.18%	28.54%	36.35%	37.02%	41.22%	42.13%	43.47%	64.09%	67.78%	57.17%	100%	
Standard Deviation	0%	0.5%	0.1%	0.1%	0.3%	0.1%	0.1%	0.1%	0.2%	0.2%	0.1%	
Ray Tracing In Vulkan - 3840 x 2160 - L.I.O.W (FPS)	**0.870950**	5.62478	6.87206	7.01641	7.93153	8.34534	8.82616	12.4673	13.0878	9.63553	**16.4312**	
Normalized	5.3%	34.23%	41.82%	42.7%	48.27%	50.79%	53.72%	75.88%	79.65%	58.64%	100%	
Standard Deviation	0%	0%	0.1%	0.1%	0%	0.1%	0.1%	0.1%	0.2%	0.4%	0.1%	
Ray Tracing In Vulkan - 2560 x 1440 - Cornell Box + Lucy	**1.10882**	9.77161	12.4373	12.7161	14.1030	14.3634	14.8708	21.8005	23.0031	19.5707	**33.9422**	
Normalized	3.27%	28.79%	36.64%	37.46%	41.55%	42.32%	43.81%	64.23%	67.77%	57.66%	100%	
Standard Deviation	0.4%	0.3%	0.3%	0.3%	0.1%	0.2%	0.1%	0.2%	0.1%	0.1%	0.1%	
Ray Tracing In Vulkan - 2560 x 1440 - L.I.O.W (FPS)	**1.78979**	11.1374	13.7568	13.9933	15.6550	16.3257	17.1498	24.3719	25.5978	19.5562	**33.0545**	
Normalized	5.41%	33.69%	41.62%	42.33%	47.36%	49.39%	51.88%	73.73%	77.44%	59.16%	100%	
Standard Deviation	0%	0%	0%	0.1%	0%	0.2%	0.1%	0.2%	0.1%	0.3%	0.1%	
Ray Tracing In Vulkan - 1920 x 1200 - L.I.O.W (FPS)	**2.63553**	16.2549	20.1725	20.5090	22.7902	23.5628	24.5890	35.0178	36.7819	29.2143	**48.6939**	
Normalized	5.41%	33.38%	41.43%	42.12%	46.8%	48.39%	50.5%	71.91%	75.54%	60%	100%	
Standard Deviation	0%	0.3%	0.1%	0.1%	0.1%	0%	0.1%	0.1%	0.2%	0.2%	0.1%	
Ray Tracing In Vulkan - 1920 x 1200 - Cornell Box + Lucy	**1.59142**	13.9785	17.8450	18.0821	20.0635	20.3702	21.1197	31.0242	32.6436	27.9662	**48.4290**	
Normalized	3.29%	28.86%	36.85%	37.34%	41.43%	42.06%	43.61%	64.06%	67.41%	57.75%	100%	
Standard Deviation	0.3%	0.3%	0.1%	0.3%	0.3%	0.1%	0.1%	0.2%	0.1%	0.1%	0.1%	

Ray Tracing In Vulkan - 1920 x 1080 - L.I.O.W (FPS)	**3.05130**	18.7946	23.3070	23.6611	26.2753	27.1444	28.4471	40.4178	42.4781	33.8326	**57.8223**
Normalized	5.28%	32.5%	40.31%	40.92%	45.44%	46.94%	49.2%	69.9%	73.46%	58.51%	100%
Standard Deviation	0%	0.4%	0.3%	0.1%	0.1%	0.2%	0.2%	0.1%	0.1%	0.2%	0.5%
Ray Tracing In Vulkan - 1920 x 1080 - Cornell Box + Lucy	**1.96057**	17.0458	21.8369	22.1751	24.5964	24.8550	25.7529	37.7862	39.9035	34.1786	**59.0920**
Normalized	3.32%	28.85%	36.95%	37.53%	41.62%	42.06%	43.58%	63.94%	67.53%	57.84%	100%
Standard Deviation	0%	0%	0.2%	0.1%	0.1%	0.4%	0.2%	0.3%	0.1%	0.2%	0.3%
Ray Tracing In Vulkan - 3840 x 2160 - P.I.O.W (FPS)	**1.46788**	8.12923	9.17886	9.33677	10.8262	12.0172	13.1467	17.6370	**18.4455**	10.0316	17.5512
Normalized	7.96%	44.07%	49.76%	50.62%	58.69%	65.15%	71.27%	95.62%	100%	54.39%	95.15%
Standard Deviation	0.3%	0.4%	0.2%	0%	0%	0%	0%	0.1%	0%	0%	0.1%
Ray Tracing In Vulkan - 3840 x 2160 - R.T.I.O.W (FPS)	**1.42723**	7.98707	8.99633	9.16797	10.6371	11.7571	12.8719	17.3073	**18.1051**	9.80246	17.1359
Normalized	7.88%	44.12%	49.69%	50.64%	58.75%	64.94%	71.1%	95.59%	100%	54.14%	94.65%
Standard Deviation	0.3%	0.4%	0%	0.4%	0.4%	0%	0%	0.1%	0.2%	0%	0%
Ray Tracing In Vulkan - 2560 x 1440 - P.I.O.W (FPS)	**3.08659**	17.1543	19.3343	19.6296	22.7453	25.1104	27.5123	36.7571	**38.4624**	21.0674	36.5362
Normalized	8.02%	44.6%	50.27%	51.04%	59.14%	65.29%	71.53%	95.57%	100%	54.77%	94.99%
Standard Deviation	0%	0.4%	0%	0.1%	0%	0%	0%	0.1%	0.1%	0%	0.1%
Ray Tracing In Vulkan - 2560 x 1440 - R.T.I.O.W (FPS)	**3.00195**	16.8579	18.9526	19.2381	22.2612	24.5924	26.9538	36.0794	**37.7246**	20.5886	35.6185
Normalized	7.96%	44.69%	50.24%	51%	59.01%	65.19%	71.45%	95.64%	100%	54.58%	94.42%
Standard Deviation	0%	0.4%	0%	0%	0%	0%	0%	0.1%	0%	0%	0%
Ray Tracing In Vulkan - 1920 x 1080 - P.I.O.W (FPS)	**5.39064**	30.0639	33.8886	34.4011	39.9825	44.0053	48.3452	64.4970	**67.1617**	36.8359	63.7969
Normalized	8.03%	44.76%	50.46%	51.22%	59.53%	65.52%	71.98%	96.03%	100%	54.85%	94.99%
Standard Deviation	0%	0.1%	0%	0%	0%	0%	0%	0.6%	0.3%	0%	0.3%
Ray Tracing In Vulkan - 1920 x 1200 - P.I.O.W (FPS)	**4.82227**	26.7578	30.1809	30.6556	35.4654	39.0657	43.0463	57.4290	**59.9530**	32.7530	57.1482
Normalized	8.04%	44.63%	50.34%	51.13%	59.16%	65.16%	71.8%	95.79%	100%	54.63%	95.32%
Standard Deviation	0%	0.4%	0%	0.1%	0%	0%	0%	0.1%	0%	0.2%	0.5%

Ray Tracing In Vulkan - 2560 x 1440 - Cornell Box (FPS)	**3.11507**	26.4615	29.8870	30.4928	35.2750	38.7120	42.8800	57.9535	60.1276	38.7543	**67.4759**
Normalized	4.62%	39.22%	44.29%	45.19%	52.28%	57.37%	63.55%	85.89%	89.11%	57.43%	100%
Standard Deviation	0%	0.2%	0.2%	0%	0%	0.5%	0%	0.1%	0.4%	0%	0.5%
Ray Tracing In Vulkan - 1920 x 1200 - R.T.I.O.W (FPS)	**4.68250**	26.1751	29.4861	29.9717	34.6587	38.2012	42.0649	56.2395	**58.7452**	31.9772	55.5417
Normalized	7.97%	44.56%	50.19%	51.02%	59%	65.03%	71.61%	95.73%	100%	54.43%	94.55%
Standard Deviation	0%	0.4%	0.1%	0%	0%	0%	0.1%	0.2%	0.2%	0%	0.1%
Ray Tracing In Vulkan - 1920 x 1080 - R.T.I.O.W (FPS)	**5.24630**	29.6042	33.2083	33.7982	39.1433	43.1016	47.5230	63.3046	**66.1316**	36.0726	62.7312
Normalized	7.93%	44.77%	50.22%	51.11%	59.19%	65.18%	71.86%	95.73%	100%	54.55%	94.86%
Standard Deviation	0%	0.4%	0%	0.5%	0%	0%	0%	0.4%	0.3%	0%	0.6%
Ray Tracing In Vulkan - 1920 x 1080 - Cornell Box (FPS)	**5.47352**	45.9973	52.1534	52.8109	61.7059	67.9307	75.2446	102.060	106.170	67.8041	**117.919**
Normalized	4.64%	39.01%	44.23%	44.79%	52.33%	57.61%	63.81%	86.55%	90.04%	57.5%	100%
Standard Deviation	0%	0.3%	0%	0%	0.3%	0.8%	0%	0.2%	0%	0.2%	0.1%
Ray Tracing In Vulkan - 1920 x 1200 - Cornell Box (FPS)	**4.46278**	37.8297	42.9372	43.6675	50.7312	55.2715	61.6809	84.0012	87.4715	55.3943	**97.1997**
Normalized	4.59%	38.92%	44.17%	44.93%	52.19%	56.86%	63.46%	86.42%	89.99%	56.99%	100%
Standard Deviation	0%	0.5%	0%	0.1%	0.1%	0.5%	0%	0.1%	0%	0%	0.1%
ParaView - Many Spheres - 3840 x 2160 (MiPolys / Sec)	4839	3815	**3749**	3833	4407	4877	5323	7297	**12084**	4458	7681
Normalized	40.04%	31.57%	31.02%	31.72%	36.47%	40.36%	44.05%	60.38%	100%	36.89%	63.56%
Standard Deviation	0.1%	0%	0.1%	0.2%	0.1%	0.2%	0.1%	0.2%	0.7%	0.1%	0.3%
ParaView - Many Spheres - 3840 x 2160 (Frames / Sec)	48.26	38.06	**37.39**	38.23	43.96	48.65	53.10	72.78	**120.53**	44.47	76.61
Normalized	40.04%	31.58%	31.02%	31.72%	36.47%	40.36%	44.06%	60.38%	100%	36.9%	63.56%
Standard Deviation	0.1%	0%	0.1%	0.2%	0.1%	0.2%	0%	0.2%	0.7%	0.1%	0.3%
ParaView - Many Spheres - 1920 x 1080 (MiPolys / Sec)	5087	3995	**3825**	3905	4499	5009	5446	7469	**13456**	4491	7841
Normalized	37.8%	29.69%	28.42%	29.02%	33.44%	37.23%	40.47%	55.51%	100%	33.37%	58.27%
Standard Deviation	0.3%	0.2%	0.4%	0.3%	0.4%	0.4%	0.5%	0.4%	0.9%	0%	0.4%

ParaView - Many Spheres - 1920 x 1080 (Frames / Sec)	50.74	39.85	**38.15**	38.95	44.88	49.97	54.32	74.50	**134.22**	44.79	78.21	
Normalized	37.8%	29.69%	28.42%	29.02%	33.44%	37.23%	40.47%	55.51%	100%	33.37%	58.27%	
Standard Deviation	0.3%	0.2%	0.4%	0.3%	0.4%	0.4%	0.5%	0.4%	0.9%	0%	0.4%	
ParaView - Wavelet Contour - 3840 x 2160 (MiPolys / Sec)	1824	**1730**	1860	1836	2299	2353	2616	3060	3208	2316	**3479**	
Normalized	52.44%	49.72%	53.46%	52.77%	66.1%	67.65%	75.2%	87.96%	92.2%	66.56%	100%	
Standard Deviation	1.9%	0.5%	1.2%	0.4%	0.9%	2.9%	2.4%	0.7%	3.8%	0.4%	3.2%	
ParaView - Wavelet Contour - 3840 x 2160 (Frames / Sec)	175.05	**165.97**	178.45	176.17	220.65	225.83	251.05	293.63	307.80	222.19	**333.82**	
Normalized	52.44%	49.72%	53.46%	52.77%	66.1%	67.65%	75.21%	87.96%	92.21%	66.56%	100%	
Standard Deviation	1.9%	0.5%	1.2%	0.4%	0.9%	2.9%	2.4%	0.7%	3.8%	0.4%	3.2%	
RealSR-NCNN - 4x - No (sec)	**15.657**	12.644	11.501	11.179	9.901	9.411	9.010	7.506	7.256	8.703	**6.250**	6.785
Normalized	39.92%	49.43%	54.34%	55.91%	63.12%	66.41%	69.37%	83.27%	86.14%	71.81%	100%	92.11%
Standard Deviation	0.8%	1.3%	2.3%	1.1%	0.7%	2.4%	10%	1.3%	2.4%	1%	1.2%	0.6%
ParaView - Wavelet Contour - 1920 x 1080 (MiPolys / Sec)	2783	**2707**	2863	2839	3691	3833	4226	4691	**5660**	3137	5374	
Normalized	49.16%	47.83%	50.57%	50.15%	65.21%	67.72%	74.65%	82.87%	100%	55.41%	94.93%	
Standard Deviation	1.2%	1.3%	0.9%	0.7%	0.5%	4.2%	1.5%	0.3%	0.6%	0.7%	1.2%	
ParaView - Wavelet Contour - 1920 x 1080 (Frames / Sec)	267.02	**259.79**	274.70	272.41	354.21	367.84	405.49	450.11	**543.16**	300.98	515.65	
Normalized	49.16%	47.83%	50.57%	50.15%	65.21%	67.72%	74.65%	82.87%	100%	55.41%	94.94%	
Standard Deviation	1.2%	1.3%	0.9%	0.7%	0.5%	4.2%	1.5%	0.3%	0.6%	0.7%	1.2%	
Betsy GPU Compressor - ETC1 - Highest (sec)	**9.262**	6.814	6.032	5.914	5.456	6.098	5.296	3.822	4.046	5.102	**3.328**	
Normalized	35.93%	48.84%	55.17%	56.27%	61%	54.58%	62.84%	87.07%	82.25%	65.23%	100%	
Standard Deviation	0.2%	1.6%	0.5%	0.9%	0.7%	2.9%	0.9%	2.5%	7.9%	5.7%	1.2%	
ParaView - Wavelet Volume - 3840 x 2160 (MiVoxels / Sec)	3126	**2504**	2847	2900	3288	3610	3853	4936	4836	3473	**5431**	
Normalized	57.56%	46.11%	52.43%	53.39%	60.55%	66.47%	70.96%	90.89%	89.05%	63.96%	100%	
Standard Deviation	0.8%	0.4%	0.2%	0.4%	0.4%	0.5%	0.6%	1%	6.5%	0.7%	0.7%	

ParaView - Wavelet Volume - 3840 x 2160 (Frames / Sec)	195.38	**156.50**	177.97	181.23	205.52	225.60	240.83	308.48	302.24	217.09	**339.42**	
Normalized	57.56%	46.11%	52.43%	53.39%	60.55%	66.47%	70.95%	90.88%	89.05%	63.96%	100%	
Standard Deviation	0.8%	0.4%	0.2%	0.4%	0.4%	0.5%	0.6%	1%	6.5%	0.7%	0.7%	
VkResample - 2x - Single (ms)	**29.865**	27.079	22.234	22.204	19.469	19.298	17.779	14.780	13.533	17.643	11.232	**9.344**
Normalized	31.29%	34.51%	42.03%	42.08%	47.99%	48.42%	52.56%	63.22%	69.05%	52.96%	83.19%	100%
Standard Deviation	0%	0.2%	0.2%	0.2%	0.1%	0.1%	0.3%	0.4%	0.3%	0.2%	0.3%	0.1%
NAMD CUDA - ATPase Simulation - 327,506 Atoms (days/ns)	**0.19282**	0.17213	0.15857	0.15679	0.14823	0.15074	0.14894	0.14084	0.14029	0.13664	**0.13291**	
Normalized	68.93%	77.21%	83.82%	84.77%	89.66%	88.17%	89.24%	94.37%	94.74%	97.27%	100%	
Standard Deviation	0.2%	0.9%	0.3%	0.5%	0.4%	0.7%	0.6%	0.1%	0.5%	0.5%	1.7%	
ParaView - Wavelet Volume - 1920 x 1080 (MiVoxels / Sec)	7296	**6284**	6828	6920	7715	8028	8552	9607	8346	7906	**10607**	
Normalized	68.78%	59.25%	64.37%	65.24%	72.74%	75.69%	80.63%	90.57%	78.69%	74.53%	100%	
Standard Deviation	0.8%	0.9%	0.7%	0.9%	0.5%	2.4%	0.3%	1.3%	9.9%	0.9%	0.6%	
ParaView - Wavelet Volume - 1920 x 1080 (Frames / Sec)	455.99	**392.77**	426.74	432.52	482.20	501.74	534.48	600.41	521.64	494.10	**662.92**	
Normalized	68.79%	59.25%	64.37%	65.24%	72.74%	75.69%	80.63%	90.57%	78.69%	74.53%	100%	
Standard Deviation	0.8%	0.9%	0.7%	0.9%	0.5%	2.4%	0.3%	1.3%	9.9%	0.9%	0.6%	
Betsy GPU Compressor - ETC2 RGB - Highest (sec)	**11.942**		8.394	8.342	7.330	7.407	6.831	5.008	5.043	6.851	**4.416**	
Normalized	36.98%		52.61%	52.94%	60.25%	59.62%	64.65%	88.18%	87.57%	64.46%	100%	
Standard Deviation	0.5%		0.2%	1.1%	0.3%	1.2%	0.1%	0.2%	6.2%	1.2%	0.4%	
Darktable - Boat - OpenCL (sec)	14.699	14.426	1.716	14.456	1.709	**14.793**	1.591	1.485	1.489	14.484	**1.282**	
Normalized	8.72%	8.89%	74.71%	8.87%	75.01%	8.67%	80.58%	86.33%	86.1%	8.85%	100%	
Standard Deviation	0.2%	0.2%	0.5%	0.3%	0.8%	0.2%	0.8%	1.2%	1.5%	0.4%	0.8%	
Hashcat - SHA-512 (H/s)	**863260000**	1050033333	1187933333	1213233333	1424200000	1531366667	1708433333	2239266667	2351766667	1412733333	2420400000	**6055700000**
Normalized	14.26%	17.34%	19.62%	20.03%	23.52%	25.29%	28.21%	36.98%	38.84%	23.33%	39.97%	100%
Standard Deviation	5%	0.2%	0.1%	0.2%	0.2%	0.1%	0.2%	0.1%	0.1%	0.1%	0.2%	0.3%
FinanceBench - Monte-Carlo OpenCL (ms)	**1834**	1060	752.413981	781.941650	816.009990	824.735677	843.452657	649.820658	558.330994	463.014658	**386.046997**	
Normalized	21.05%	36.42%	51.31%	49.37%	47.31%	46.81%	45.77%	59.41%	69.14%	83.38%	100%	
Standard Deviation	0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.2%	0.2%	0.2%	0.7%	0.5%	
Hashcat - MD5 (H/s)	**24018133333**	25916700000	29280266667	29942233333	35398166667	37693466667	42393033333	55298100000	58078533333	32937166667	56039666667	**94838581250**
Normalized	25.33%	27.33%	30.87%	31.57%	37.32%	39.74%	44.7%	58.31%	61.24%	34.73%	59.09%	100%
Standard Deviation	0.2%	0.1%	0.1%	0.1%	0.1%	0.3%	0.2%	0.1%	0.2%	0.1%	0.2%	33.3%

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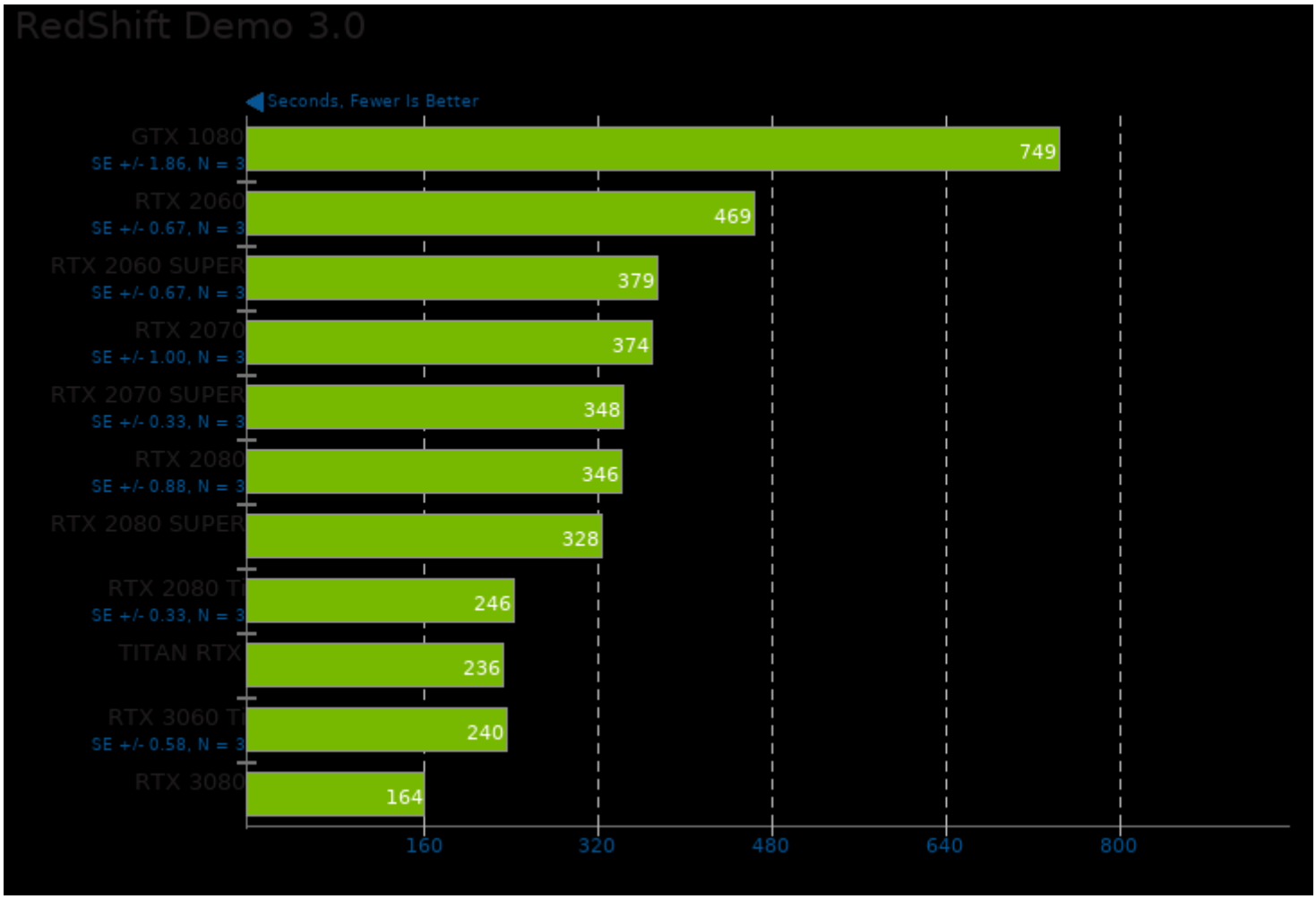
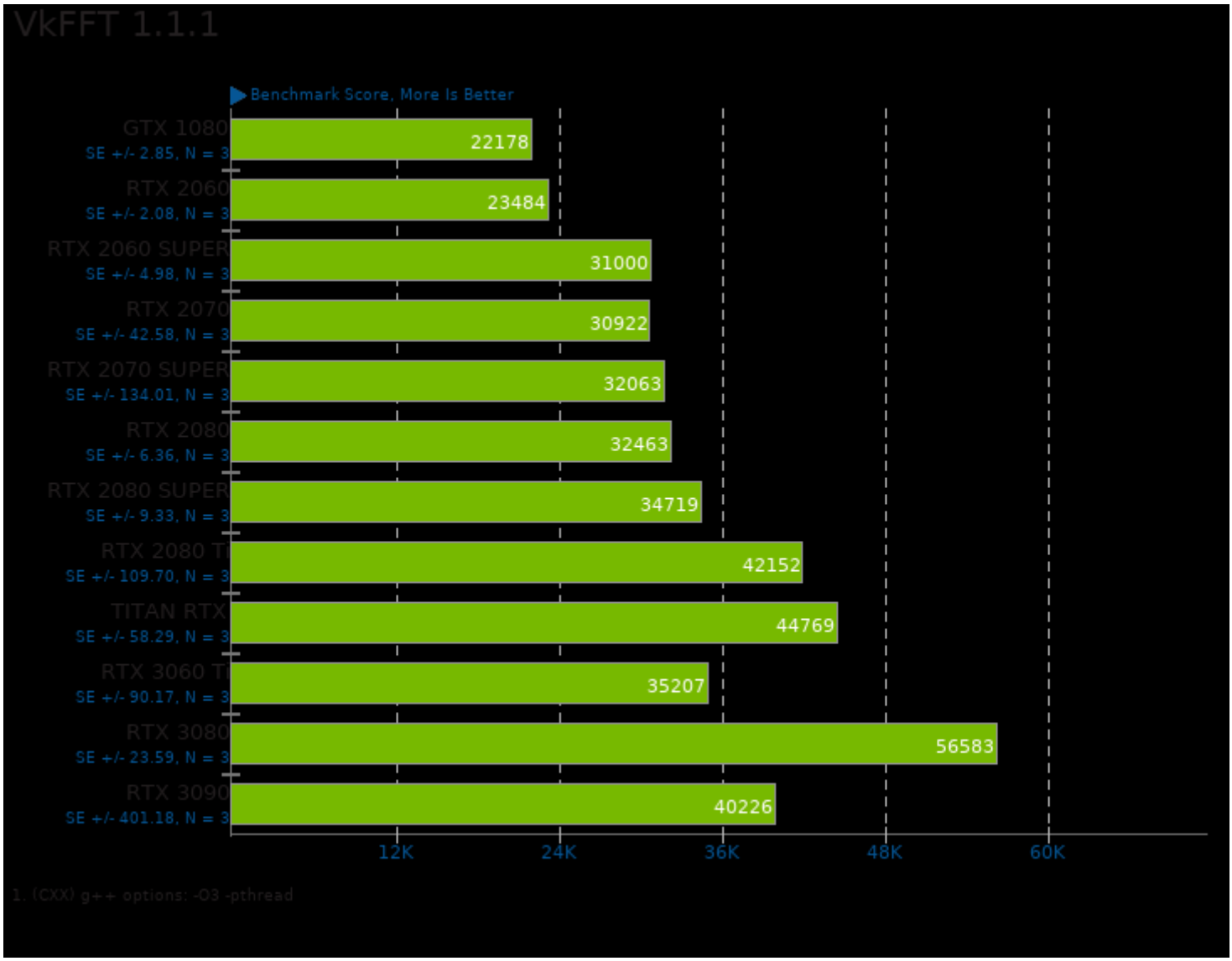
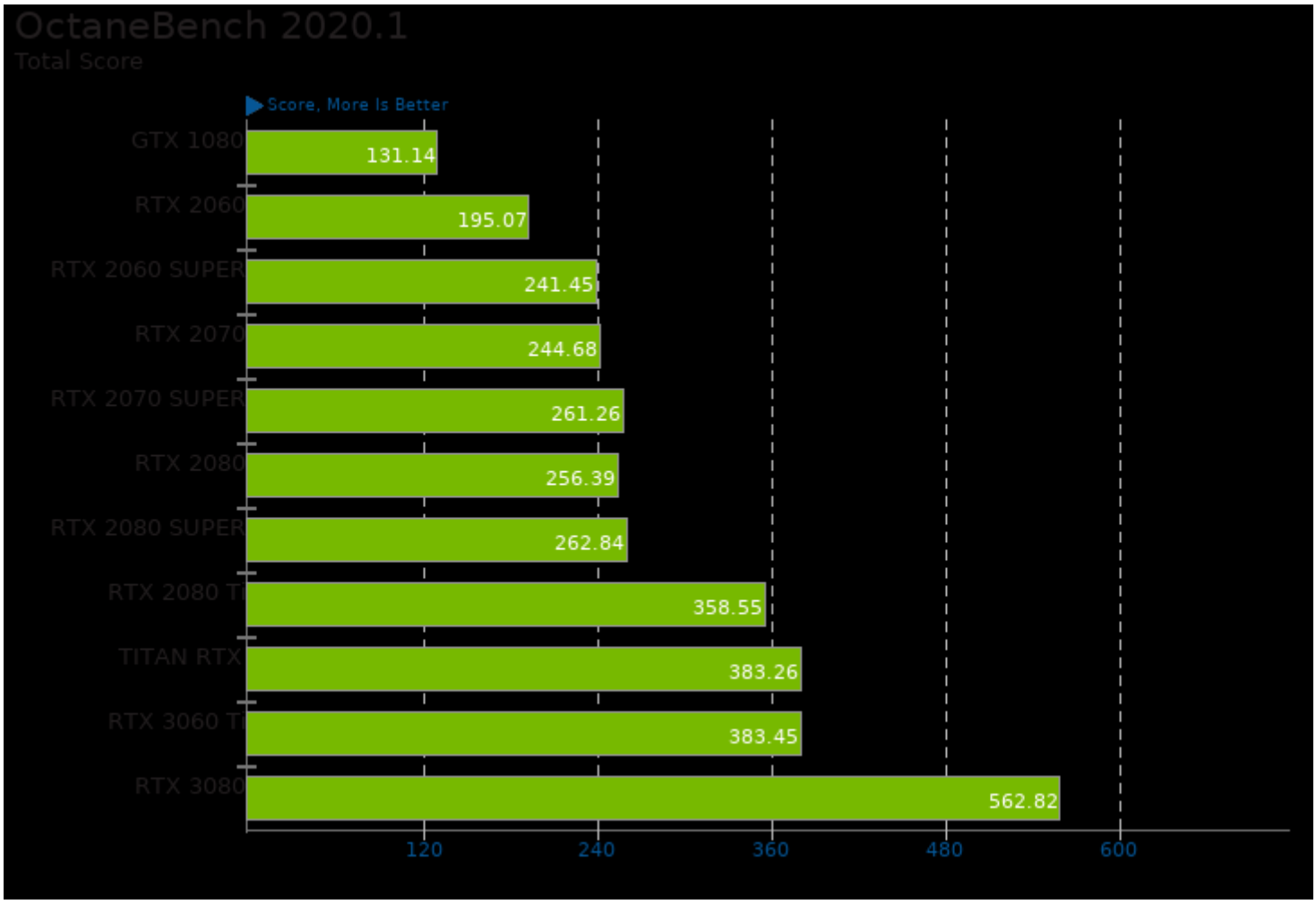
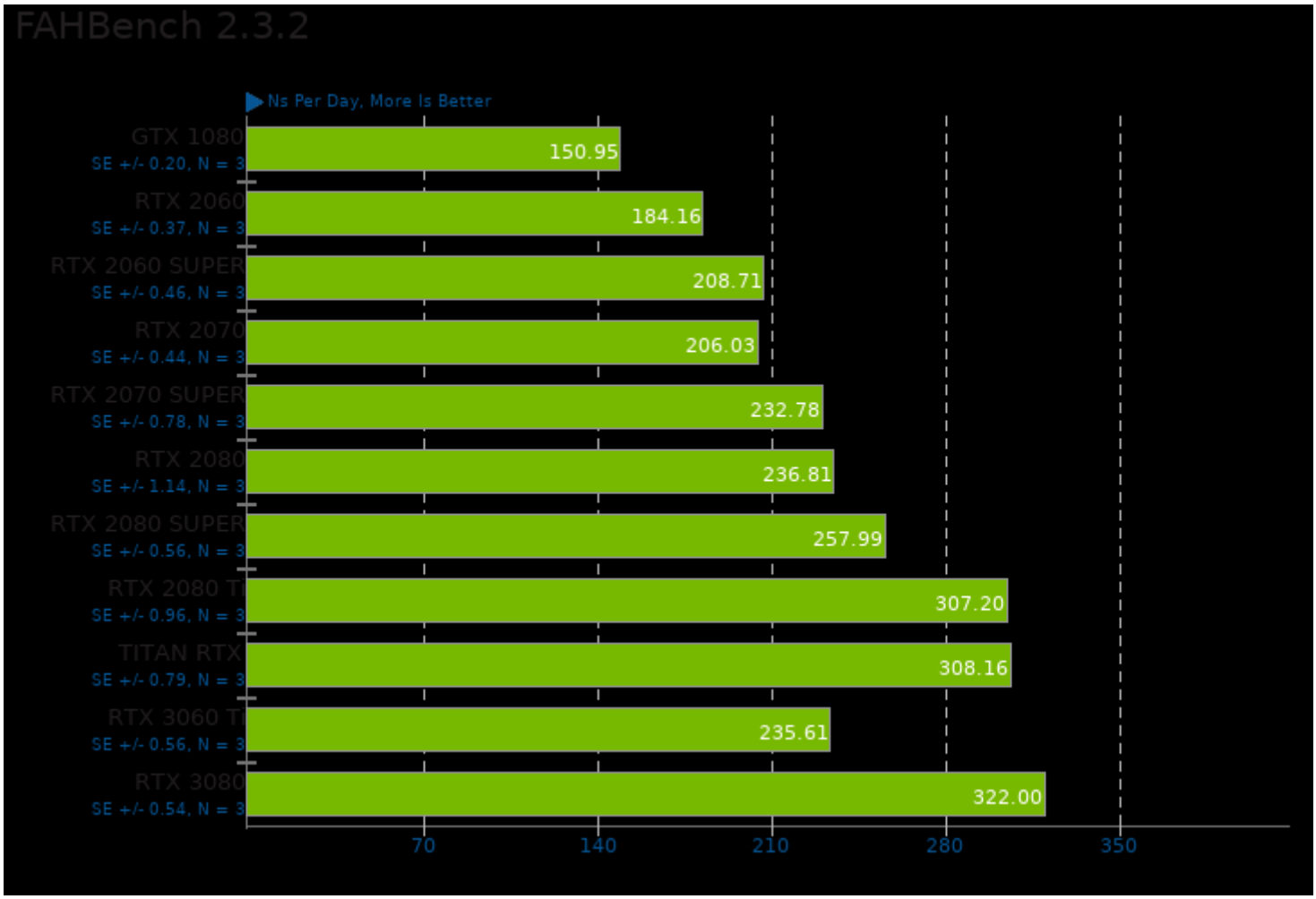
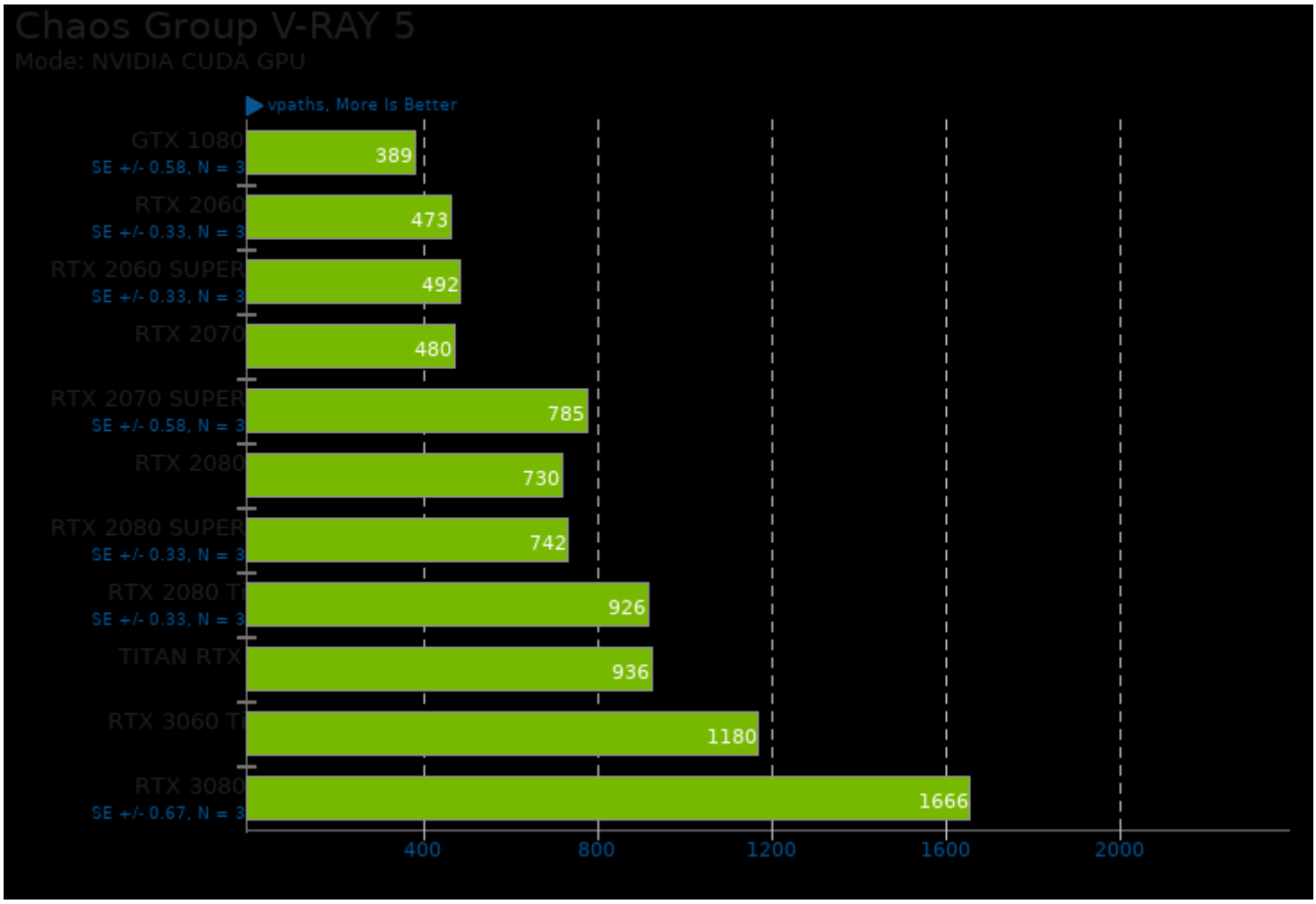
Hashcat - T.R.X (H/s)	**266267**	310833	351200	358367	426200	451667	520673	657067	687067	427233	721867	**1591300**
Normalized	16.73%	19.53%	22.07%	22.52%	26.78%	28.38%	32.72%	41.29%	43.18%	26.85%	45.36%	100%
Standard Deviation	0.4%	0.2%	0.1%	0.1%	0.1%	0.4%	3.2%	0.2%	0.4%	0.3%	0.1%	0.8%
Hashcat - SHA1 (H/s)	8278833333	**8251266667**	9341766667	9516000000	11121466667	11995200000	13420400000	17718433333	18608800000	11083266667	19098866667	**42680333333**
Normalized	19.4%	19.33%	21.89%	22.3%	26.06%	28.1%	31.44%	41.51%	43.6%	25.97%	44.75%	100%
Standard Deviation	0%	0.1%	0.1%	0.1%	0.2%	0.2%	0%	0.3%	0.2%	0.3%	0.2%	0.2%
Waifu2x-NCNN Vulkan - 2x - 3 - Yes (sec)	**6.368**	5.771	5.262	5.275	4.689	4.612	4.347	3.776	3.812	4.360	**3.439**	3.836
Normalized	54%	59.59%	65.36%	65.19%	73.34%	74.57%	79.11%	91.08%	90.22%	78.88%	100%	89.65%
Standard Deviation	2.3%	1.9%	2.2%	2.4%	0.6%	2.3%	0.8%	0.5%	2.4%	0.3%	0.3%	0.1%
Darktable - Server Room - OpenCL (sec)	5.889	5.765	0.723	5.776	0.776	**5.892**	0.756	0.710	0.723	5.808	**0.706**	
Normalized	11.99%	12.25%	97.65%	12.22%	90.98%	11.98%	93.39%	99.44%	97.65%	12.16%	100%	
Standard Deviation	0.3%	0.2%	0.5%	0.1%	0.8%	0.1%	1%	1.7%	5.8%	0.4%	0.2%	
Darktable - Masskrug - OpenCL (sec)	5.924	5.851	2.118	5.853	2.156	**6.031**	2.169	**2.084**	2.184	5.903	2.090	
Normalized	35.18%	35.62%	98.39%	35.61%	96.66%	34.55%	96.08%	100%	95.42%	35.3%	99.71%	
Standard Deviation	0.1%	0.3%	0.2%	0.1%	0.6%	0.6%	0.8%	0.5%	2.4%	0.2%	0.5%	
Hashcat - 7-Zip (H/s)	**364000**	442667	495567	503967	596367	625133	692500	894867	947467	588367	990567	**2166467**
Normalized	16.8%	20.43%	22.87%	23.26%	27.53%	28.85%	31.96%	41.31%	43.73%	27.16%	45.72%	100%
Standard Deviation	0.2%	0.2%	0.4%	0.1%	0.3%	0.4%	1.7%	0.4%	0.2%	0.6%	0.3%	0.5%
Darktable - Server Rack - OpenCL (sec)	0.185	0.190	0.097	0.182	0.097	**0.193**	0.097	0.096	0.105	0.191	**0.095**	
Normalized	51.35%	50%	97.94%	52.2%	97.94%	49.22%	97.94%	98.96%	90.48%	49.74%	100%	
Standard Deviation	1.1%	0.5%	1.2%	0.6%	1.8%	0.5%	1%	0.6%	7.5%	1.3%	0%	
FinanceBench - B.S.O (ms)	11.099	**19.832**	16.486333	16.097	12.804	12.161	10.610	9.226	8.757	12.957	**7.307**	
Normalized	65.83%	36.84%	44.32%	45.39%	57.07%	60.09%	68.87%	79.2%	83.44%	56.39%	100%	
Standard Deviation	2.3%	0.8%	2.1%	1%	1.1%	2.4%	2.4%	0.3%	0.1%	0.1%	0.3%	

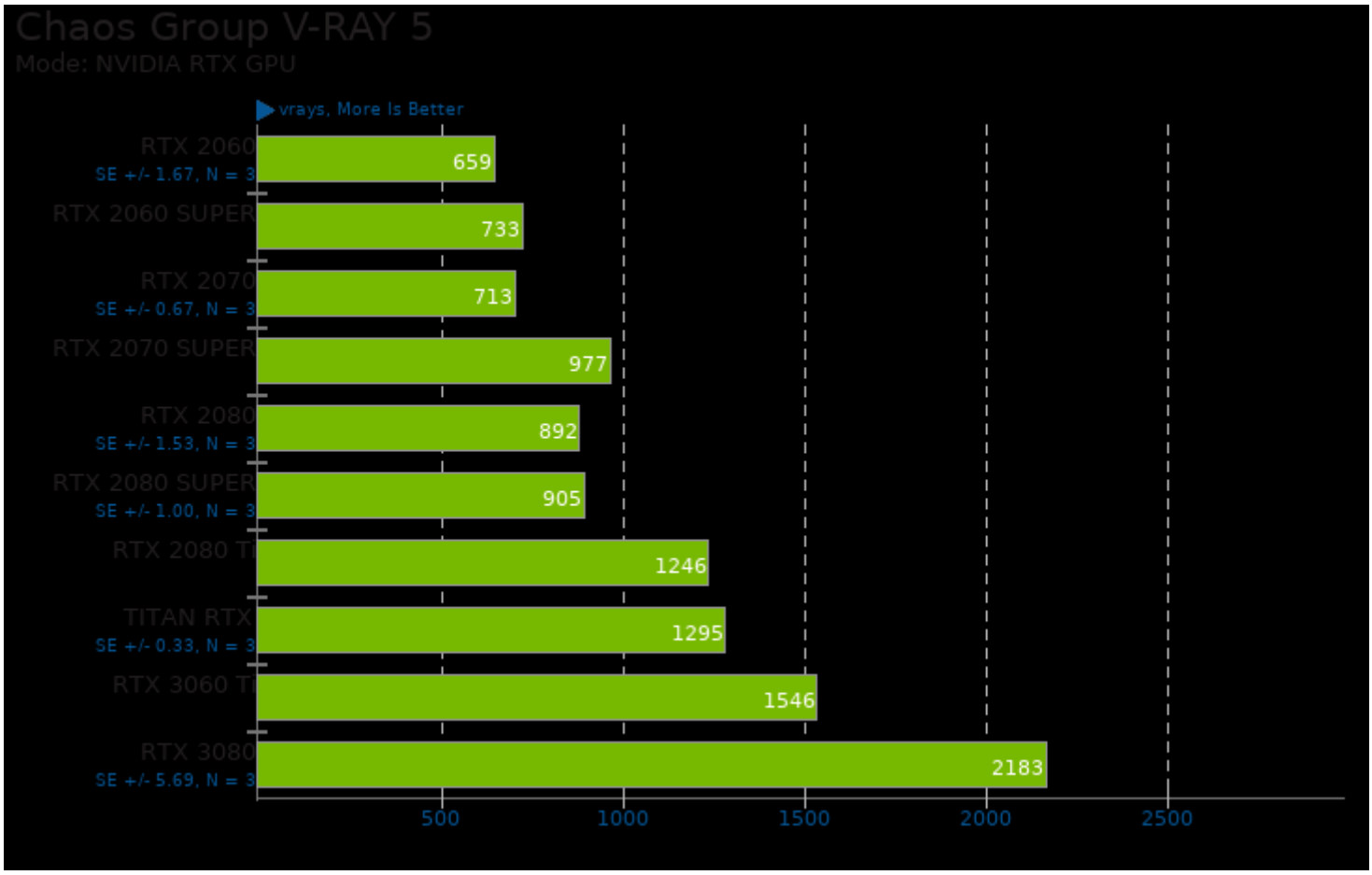

RedShift Demo 3.0
Seconds, Fewer Is Better
GTX 1080
SE +/- 1.86, N = 3
749
RTX 2060
SE +/- 0.67, N = 3
469
RTX 2060 SUPER
SE +/- 0.67, N = 3
379
RTX 2070
SE +/- 1.00, N = 3
374
RTX 2070 SUPER
SE +/- 0.33, N = 3
348
RTX 2080
SE +/- 0.88, N = 3
346
RTX 2080 SUPER
328
RTX 2080 Ti
SE +/- 0.33, N = 3
246
TITAN RTX
236
RTX 3060 Ti
SE +/- 0.58, N = 3
240
RTX 3080
164
160
320
480
640
800

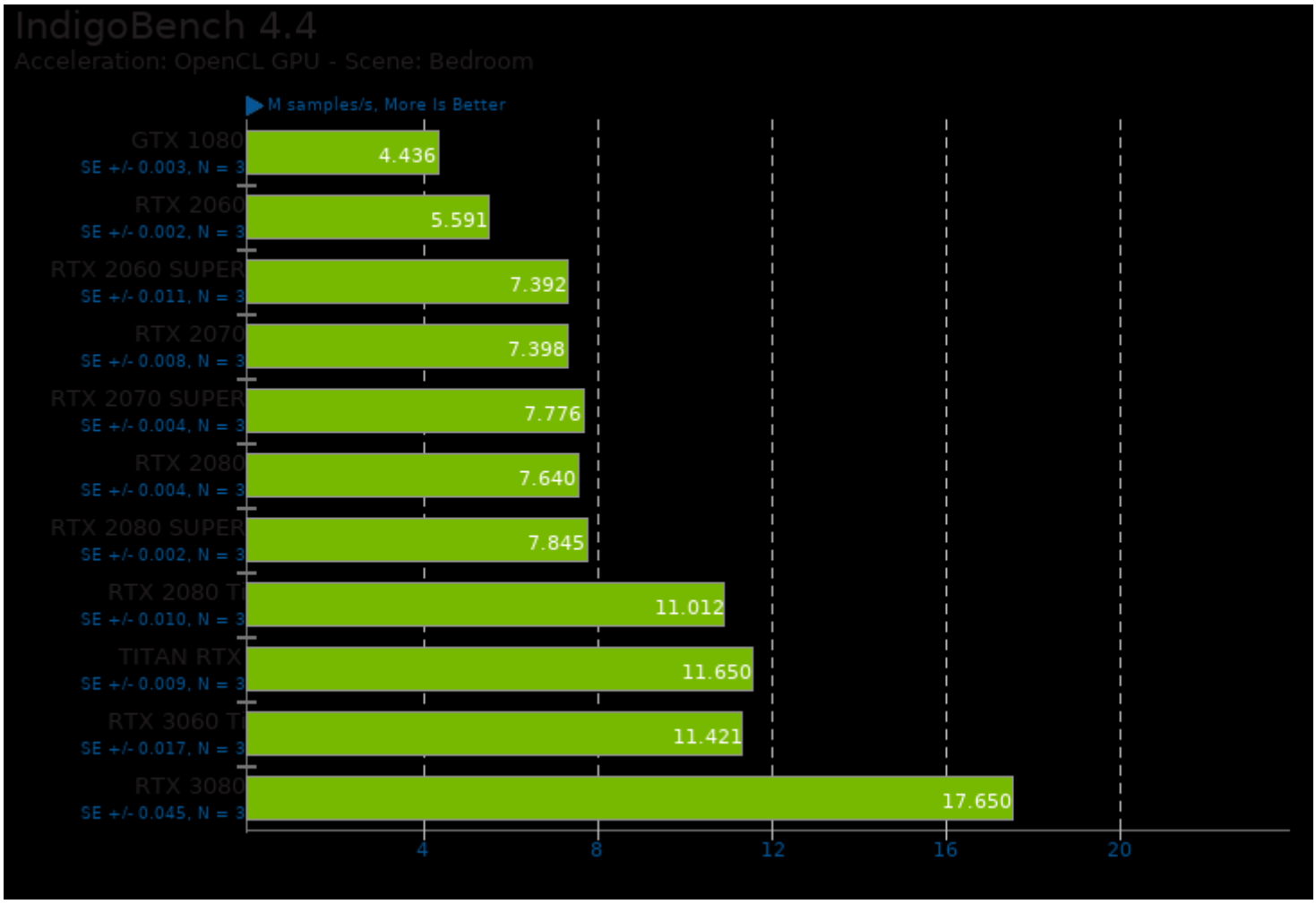

VkFFT 1.1.1
Benchmark Score, More Is Better
GTX 1080
SE +/- 2.85, N = 3
22178
RTX 2060
SE +/- 2.08, N = 3
23484
RTX 2060 SUPER
SE +/- 4.98, N = 3
31000
RTX 2070
SE +/- 42.58, N = 3
30922
RTX 2070 SUPER
SE +/- 134.01, N = 3
32063
RTX 2080
SE +/- 6.36, N = 3
32463
RTX 2080 SUPER
SE +/- 9.33, N = 3
34719
RTX 2080 Ti
SE +/- 109.70, N = 3
42152
TITAN RTX
SE +/- 58.29, N = 3
44769
RTX 3060 Ti
SE +/- 90.17, N = 3
35207
RTX 3080
SE +/- 23.59, N = 3
56583
RTX 3090
SE +/- 401.18, N = 3
40226
12K
24K
36K
48K
60K
1. (CXX) g++ options: -O3 -pthread

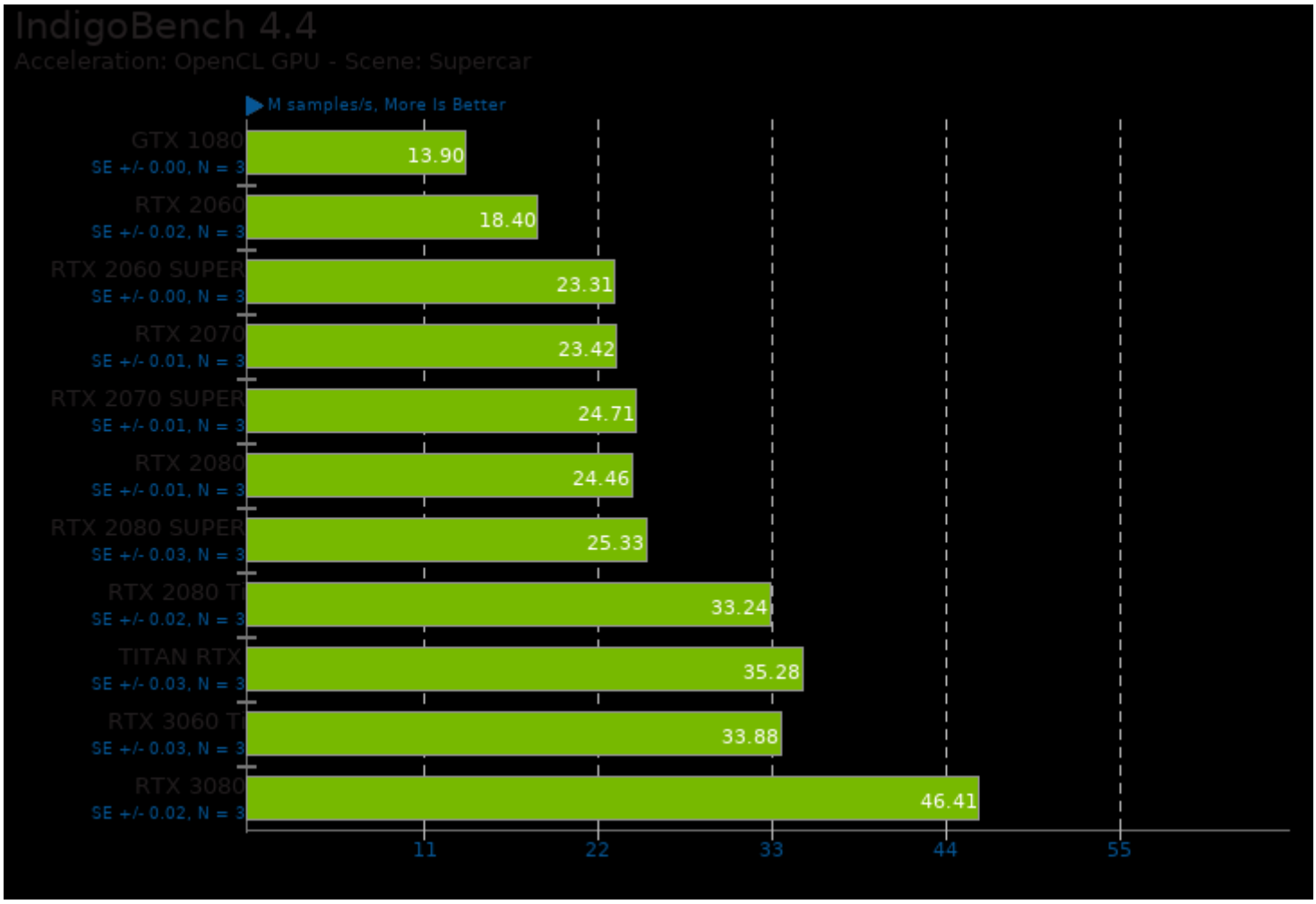

OctaneBench 2020.1
Total Score
Score, More Is Better
GTX 1080
131.14
RTX 2060
195.07
RTX 2060 SUPER
241.45
RTX 2070
244.68
RTX 2070 SUPER
261.26
RTX 2080
256.39
RTX 2080 SUPER
262.84
RTX 2080 Ti
358.55
TITAN RTX
383.26
RTX 3060 Ti
383.45
RTX 3080
562.82
120
240
360
480
600

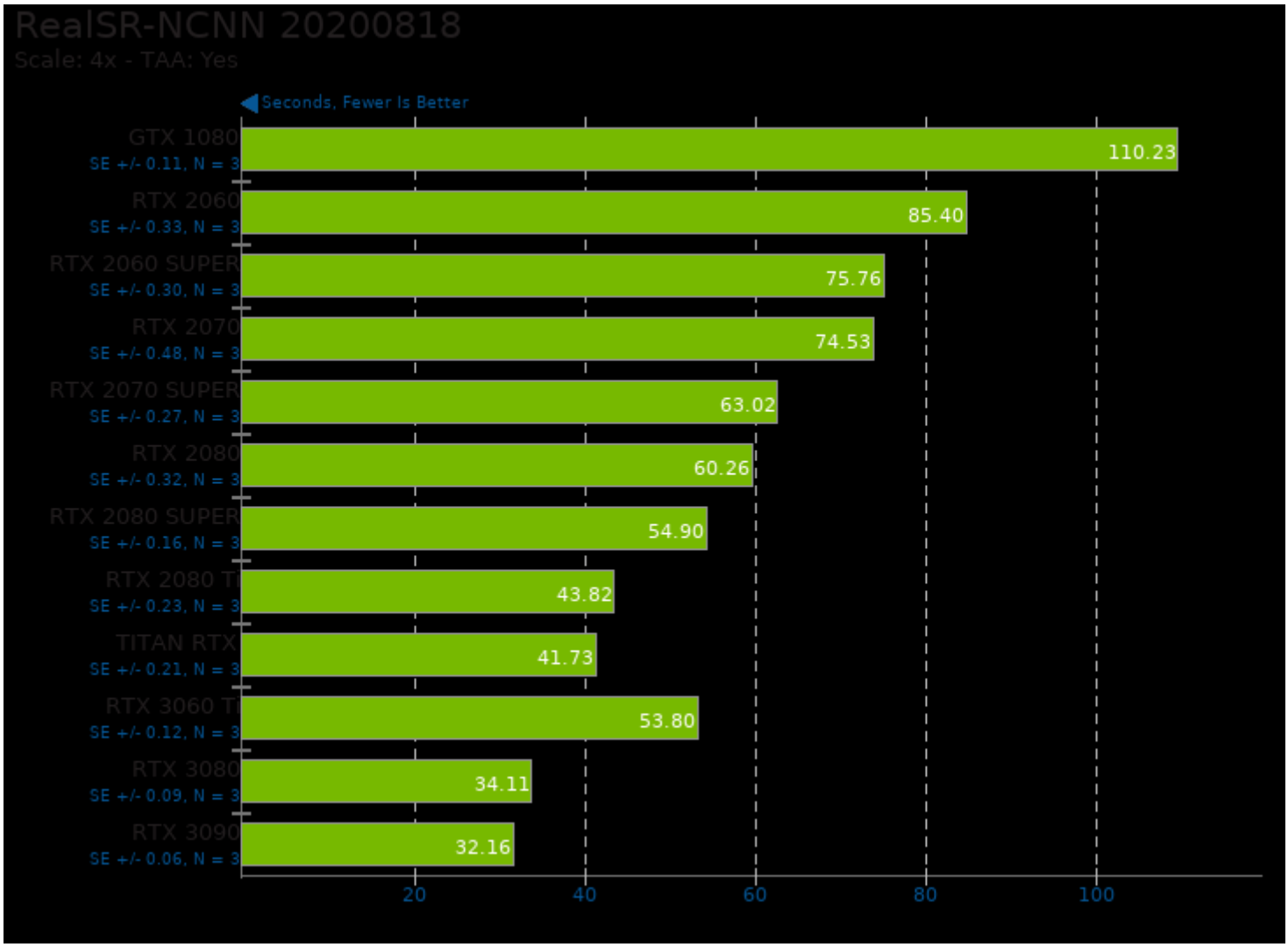

FAHBench 2.3.2
Ns Per Day, More Is Better
GTX 1080
SE +/- 0.20, N = 3
150.95
RTX 2060
SE +/- 0.37, N = 3
184.16
RTX 2060 SUPER
SE +/- 0.46, N = 3
208.71
RTX 2070
SE +/- 0.44, N = 3
206.03
RTX 2070 SUPER
SE +/- 0.78, N = 3
232.78
RTX 2080
SE +/- 1.14, N = 3
236.81
RTX 2080 SUPER
SE +/- 0.56, N = 3
257.99
RTX 2080 Ti
SE +/- 0.96, N = 3
307.20
TITAN RTX
SE +/- 0.79, N = 3
308.16
RTX 3060 Ti
SE +/- 0.56, N = 3
235.61
RTX 3080
SE +/- 0.54, N = 3
322.00
70
140
210
280
350

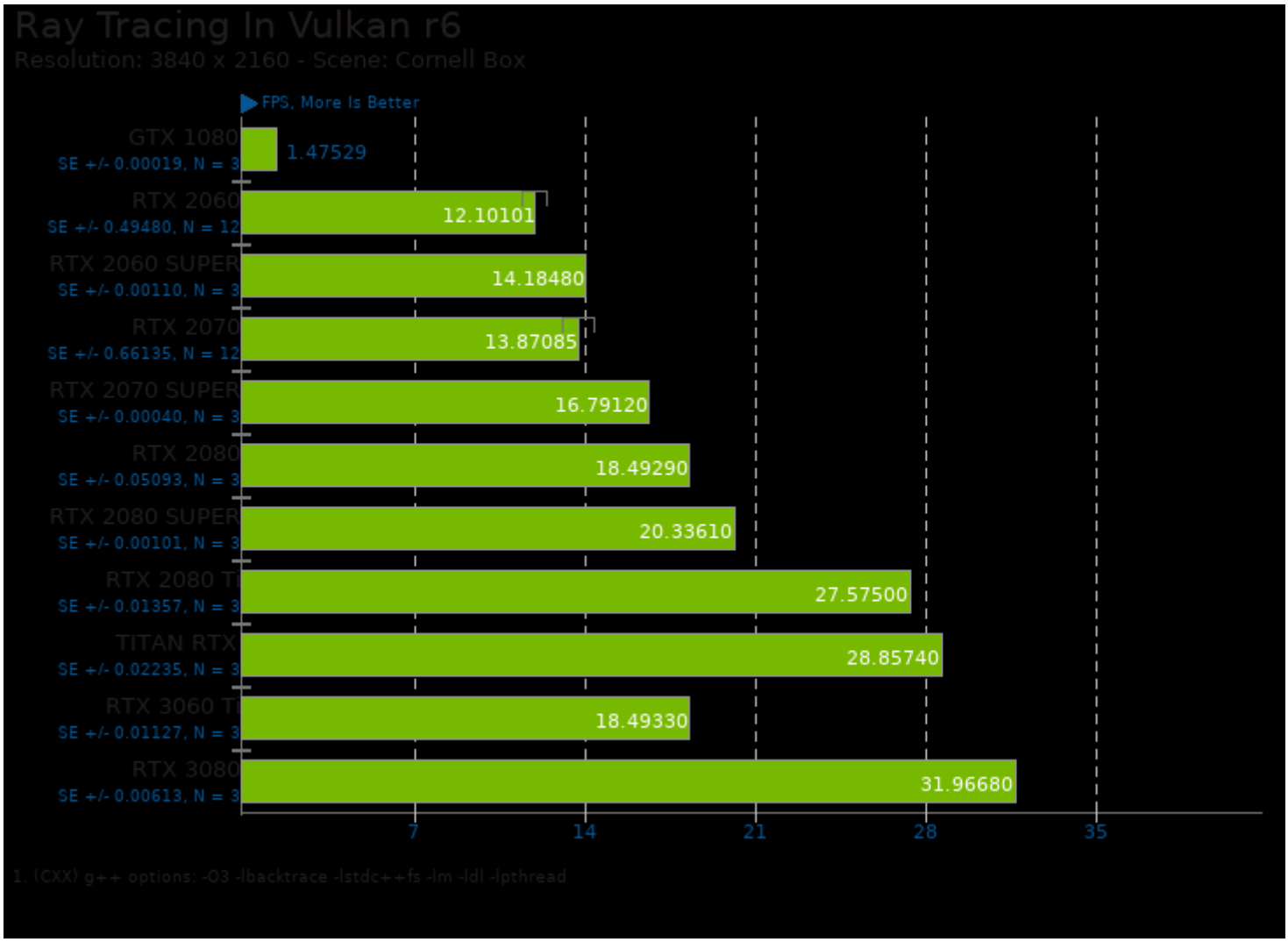

Chaos Group V-RAY 5
Mode: NVIDIA CUDA GPU
vpaths, More Is Better
GTX 1080
SE +/- 0.58, N = 3
389
RTX 2060
SE +/- 0.33, N = 3
473
RTX 2060 SUPER
SE +/- 0.33, N = 3
492
RTX 2070
480
RTX 2070 SUPER
SE +/- 0.58, N = 3
785
RTX 2080
730
RTX 2080 SUPER
SE +/- 0.33, N = 3
742
RTX 2080 Ti
SE +/- 0.33, N = 3
926
TITAN RTX
936
RTX 3060 Ti
1180
RTX 3080
SE +/- 0.67, N = 3
1666
400
800
1200
1600
2000

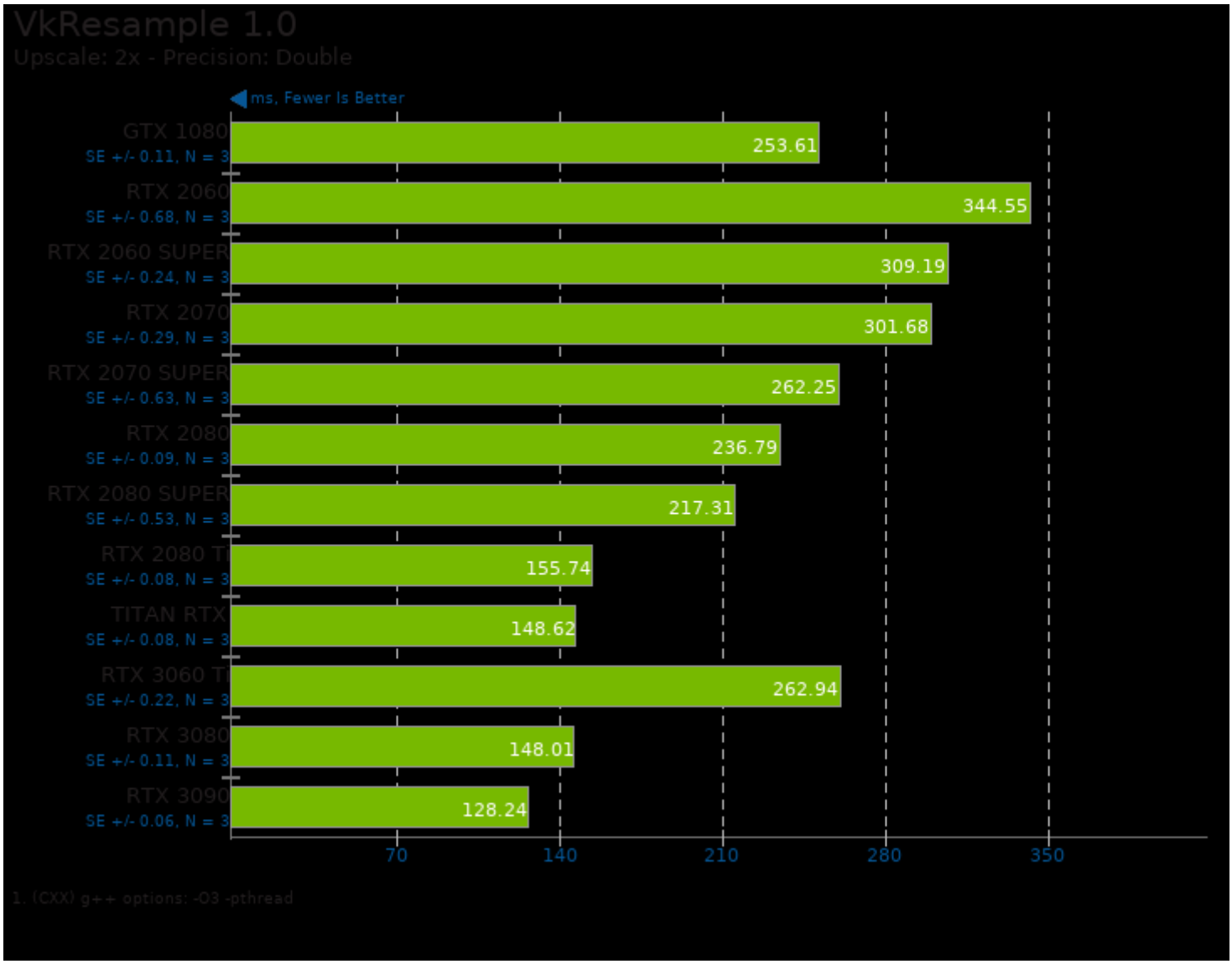

Chaos Group V-RAY 5
Mode: NVIDIA RTX GPU
vrays, More Is Better
RTX 2060
SE +/- 1.67, N = 3
659
RTX 2060 SUPER
733
RTX 2070
SE +/- 0.67, N = 3
713
RTX 2070 SUPER
977
RTX 2080
SE +/- 1.53, N = 3
892
RTX 2080 SUPER
SE +/- 1.00, N = 3
905
RTX 2080 Ti
1246
TITAN RTX
SE +/- 0.33, N = 3
1295
RTX 3060 Ti
1546
RTX 3080
SE +/- 5.69, N = 3
2183
500
1000
1500
2000
2500

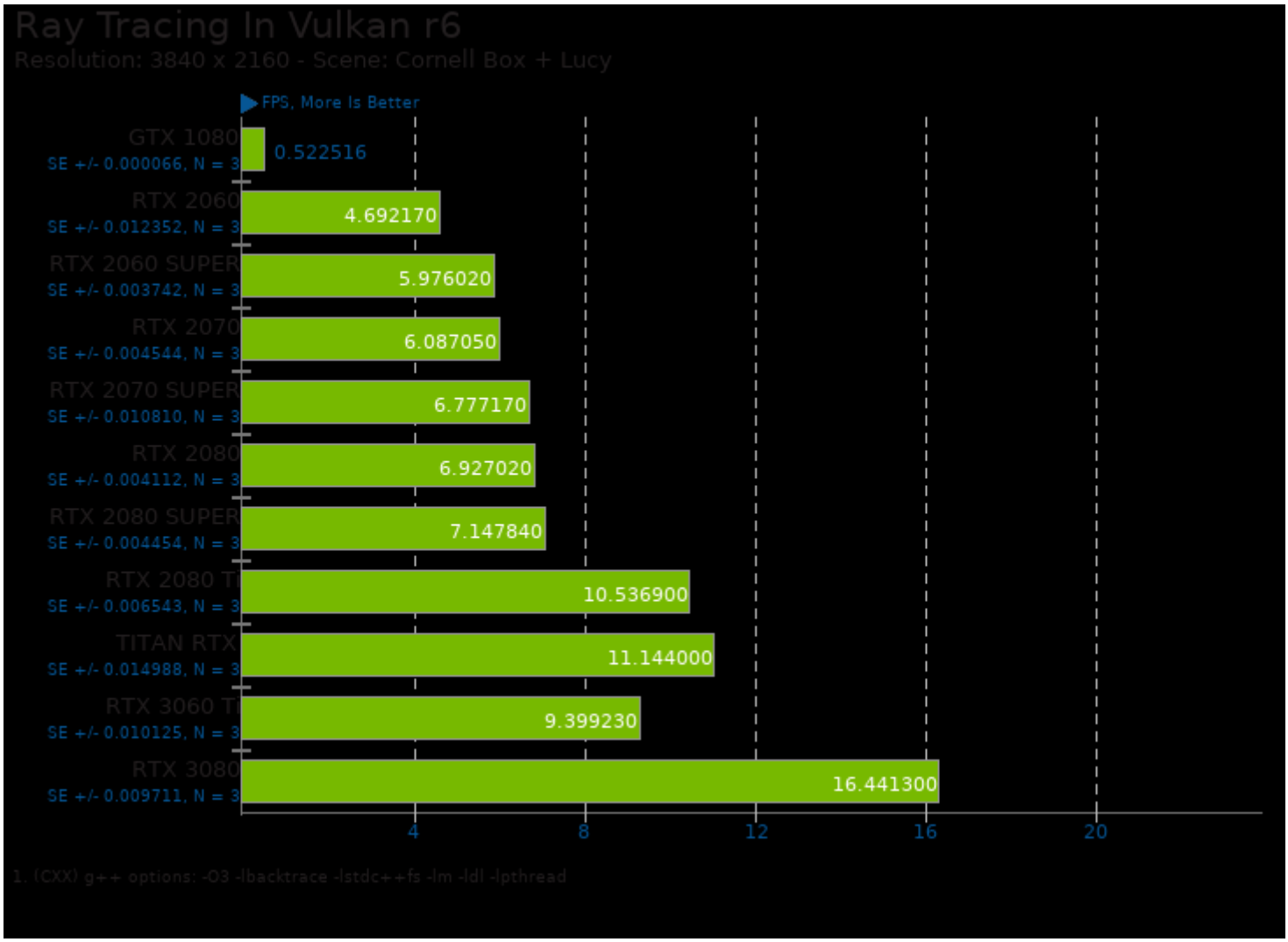

IndigoBench 4.4
Acceleration: OpenCL GPU - Scene: Bedroom
M samples/s, More Is Better
GTX 1080
SE +/- 0.003, N = 3
4.436
RTX 2060
SE +/- 0.002, N = 3
5.591
RTX 2060 SUPER
SE +/- 0.011, N = 3
7.392
RTX 2070
SE +/- 0.008, N = 3
7.398
RTX 2070 SUPER
SE +/- 0.004, N = 3
7.776
RTX 2080
SE +/- 0.004, N = 3
7.640
RTX 2080 SUPER
SE +/- 0.002, N = 3
7.845
RTX 2080 Ti
SE +/- 0.010, N = 3
11.012
TITAN RTX
SE +/- 0.009, N = 3
11.650
RTX 3060 Ti
SE +/- 0.017, N = 3
11.421
RTX 3080
SE +/- 0.045, N = 3
17.650
4
8
12
16
20

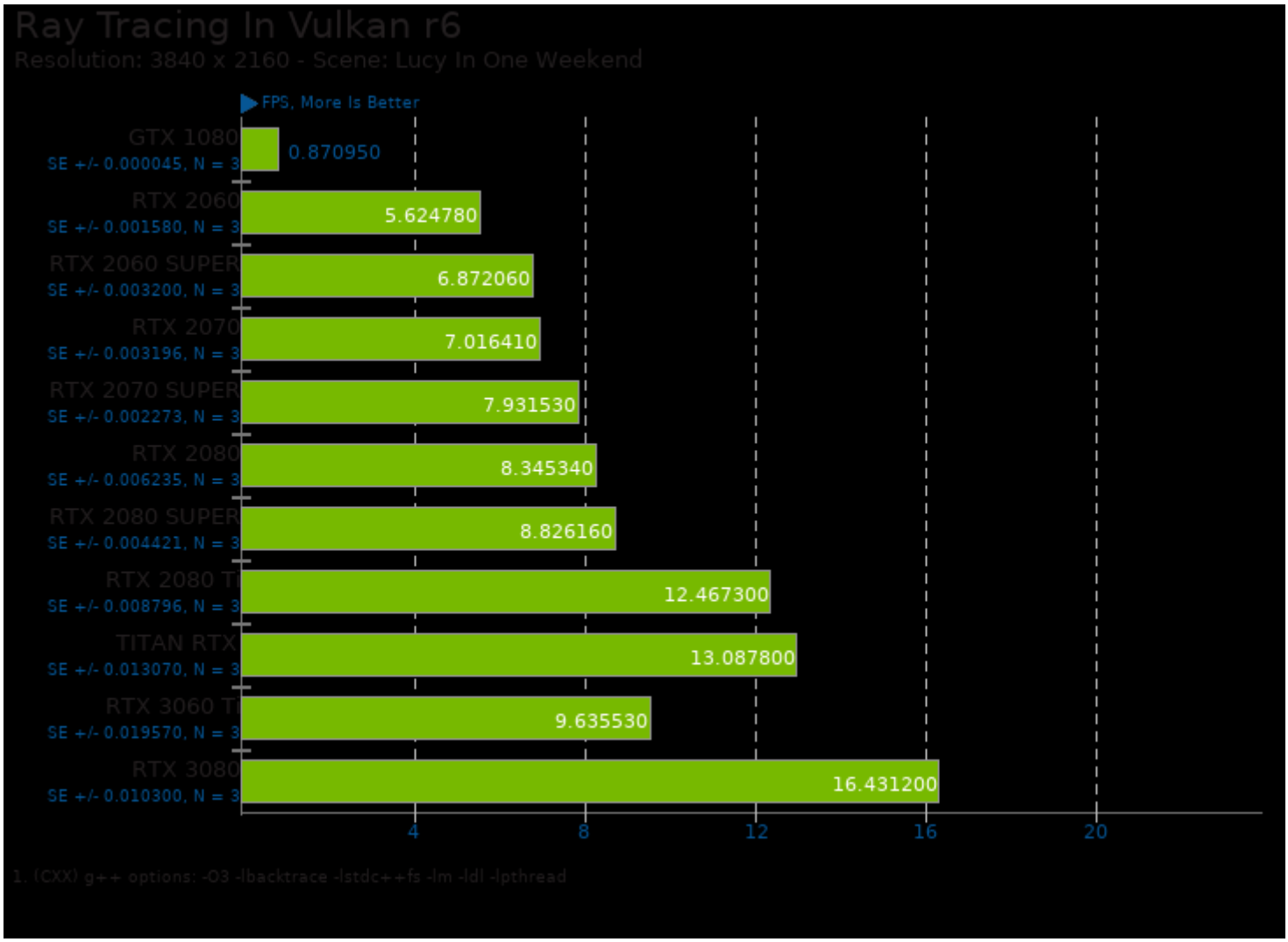

IndigoBench 4.4
Acceleration: OpenCL GPU - Scene: Supercar
M samples/s, More Is Better
GTX 1080
SE +/- 0.00, N = 3
13.90
RTX 2060
SE +/- 0.02, N = 3
18.40
RTX 2060 SUPER
SE +/- 0.00, N = 3
23.31
RTX 2070
SE +/- 0.01, N = 3
23.42
RTX 2070 SUPER
SE +/- 0.01, N = 3
24.71
RTX 2080
SE +/- 0.01, N = 3
24.46
RTX 2080 SUPER
SE +/- 0.03, N = 3
25.33
RTX 2080 Ti
SE +/- 0.02, N = 3
33.24
TITAN RTX
SE +/- 0.03, N = 3
35.28
RTX 3060 Ti
SE +/- 0.03, N = 3
33.88
RTX 3080
SE +/- 0.02, N = 3
46.41
11
22
33
44
55

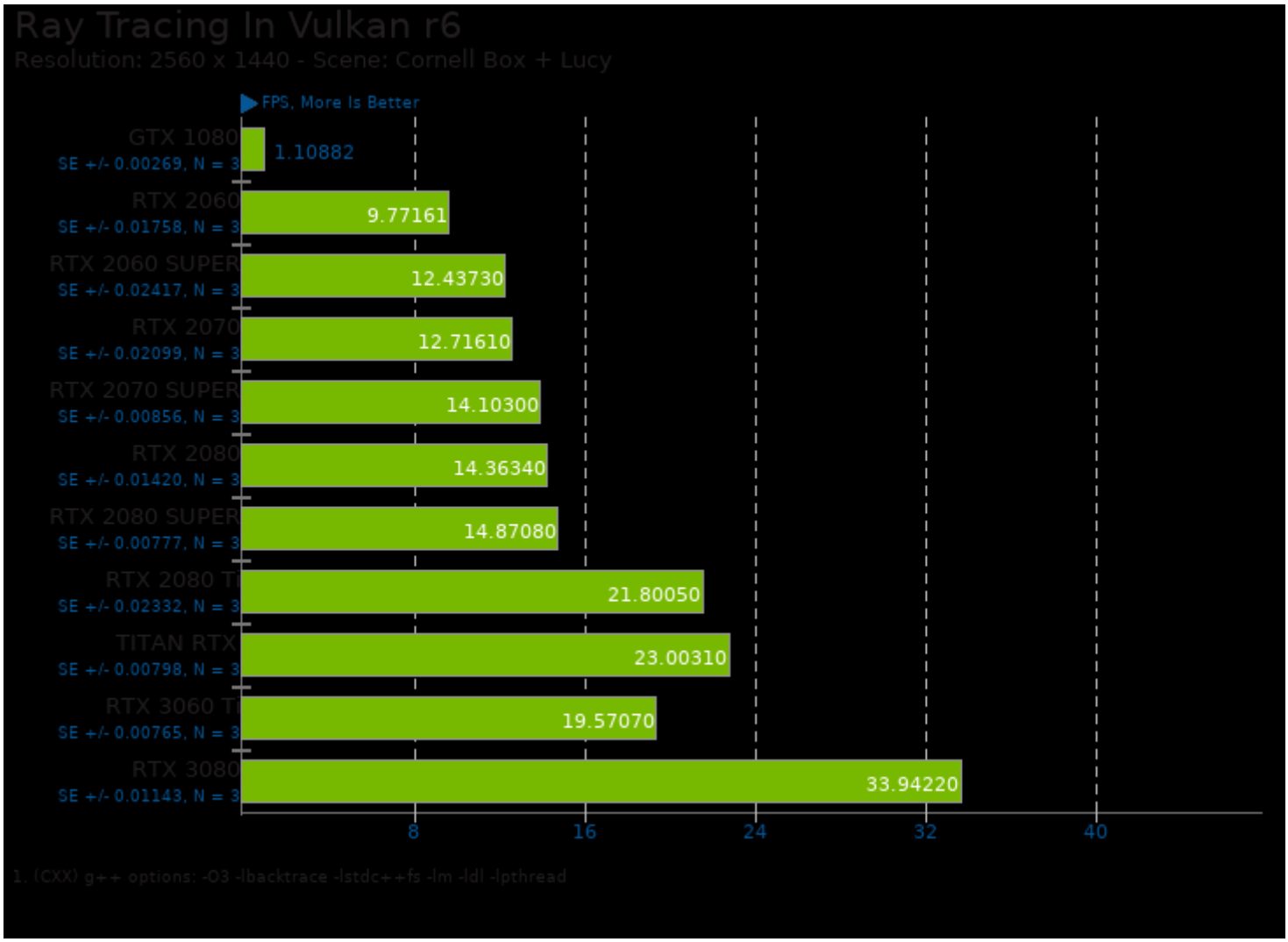

RealSR-NCNN 20200818
Scale: 4x - TAA: Yes
Seconds, Fewer Is Better
GTX 1080
SE +/- 0.11, N = 3
110.23
RTX 2060
SE +/- 0.33, N = 3
85.40
RTX 2060 SUPER
SE +/- 0.30, N = 3
75.76
RTX 2070
SE +/- 0.48, N = 3
74.53
RTX 2070 SUPER
SE +/- 0.27, N = 3
63.02
RTX 2080
SE +/- 0.32, N = 3
60.26
RTX 2080 SUPER
SE +/- 0.16, N = 3
54.90
RTX 2080 Ti
SE +/- 0.23, N = 3
43.82
TITAN RTX
SE +/- 0.21, N = 3
41.73
RTX 3060 Ti
SE +/- 0.12, N = 3
53.80
RTX 3080
SE +/- 0.09, N = 3
34.11
RTX 3090
SE +/- 0.06, N = 3
32.16
20
40
60
80
100

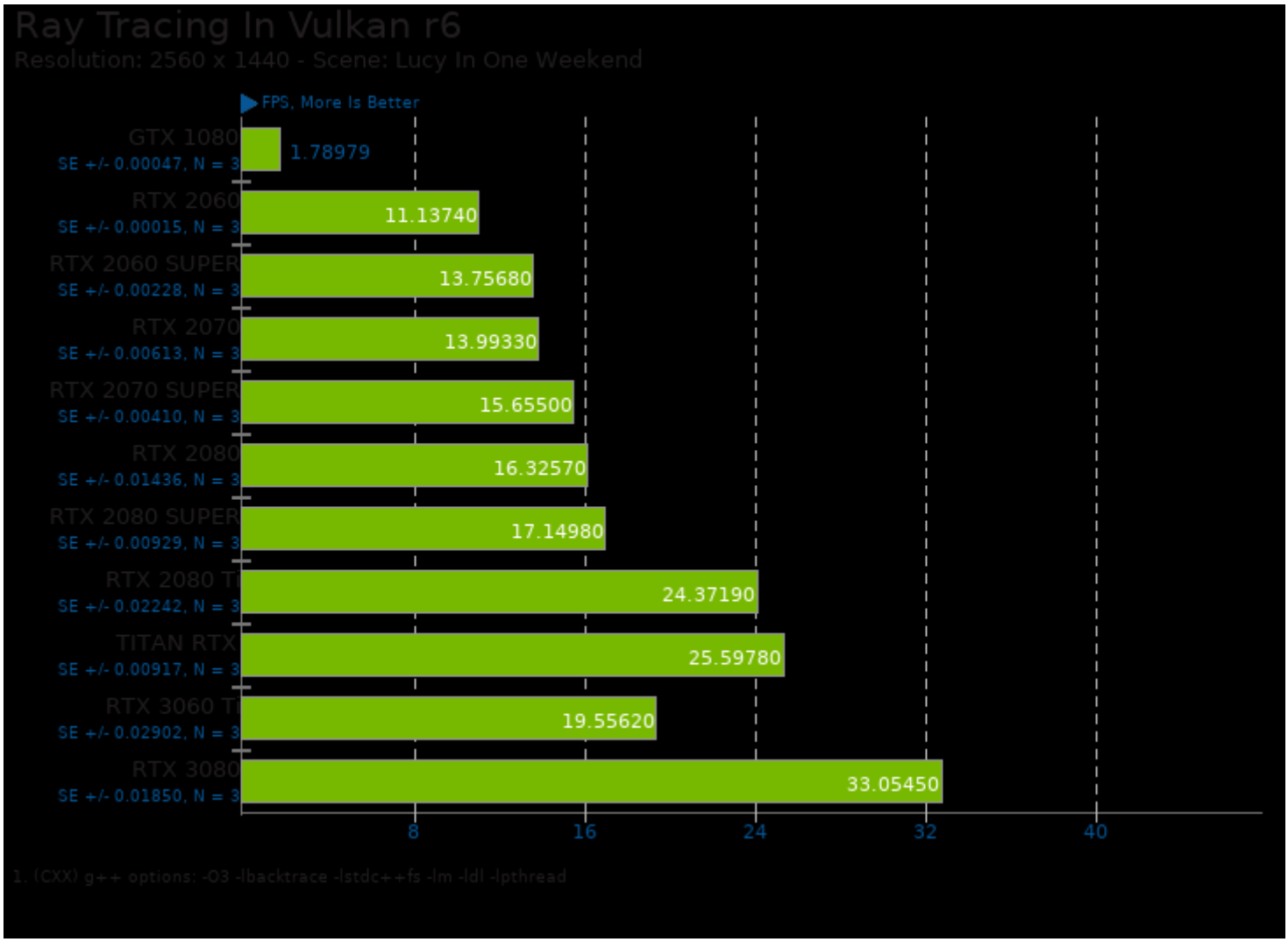

Ray Tracing In Vulkan r6
Resolution: 3840 x 2160 - Scene: Cornell Box
FPS, More Is Better
GTX 1080
SE +/- 0.00019, N = 3
1.47529
RTX 2060
SE +/- 0.49480, N = 12
12.10101
RTX 2060 SUPER
SE +/- 0.00110, N = 3
14.18480
RTX 2070
SE +/- 0.66135, N = 12
13.87085
RTX 2070 SUPER
SE +/- 0.00040, N = 3
16.79120
RTX 2080
SE +/- 0.05093, N = 3
18.49290
RTX 2080 SUPER
SE +/- 0.00101, N = 3
20.33610
RTX 2080 Ti
SE +/- 0.01357, N = 3
27.57500
TITAN RTX
SE +/- 0.02235, N = 3
28.85740
RTX 3060 Ti
SE +/- 0.01127, N = 3
18.49330
RTX 3080
SE +/- 0.00613, N = 3
31.96680
7
14
21
28
35
1. (CXX) g++ options: -O3 -lbacktrace -lstdc++fs -lm -ldl -lpthread

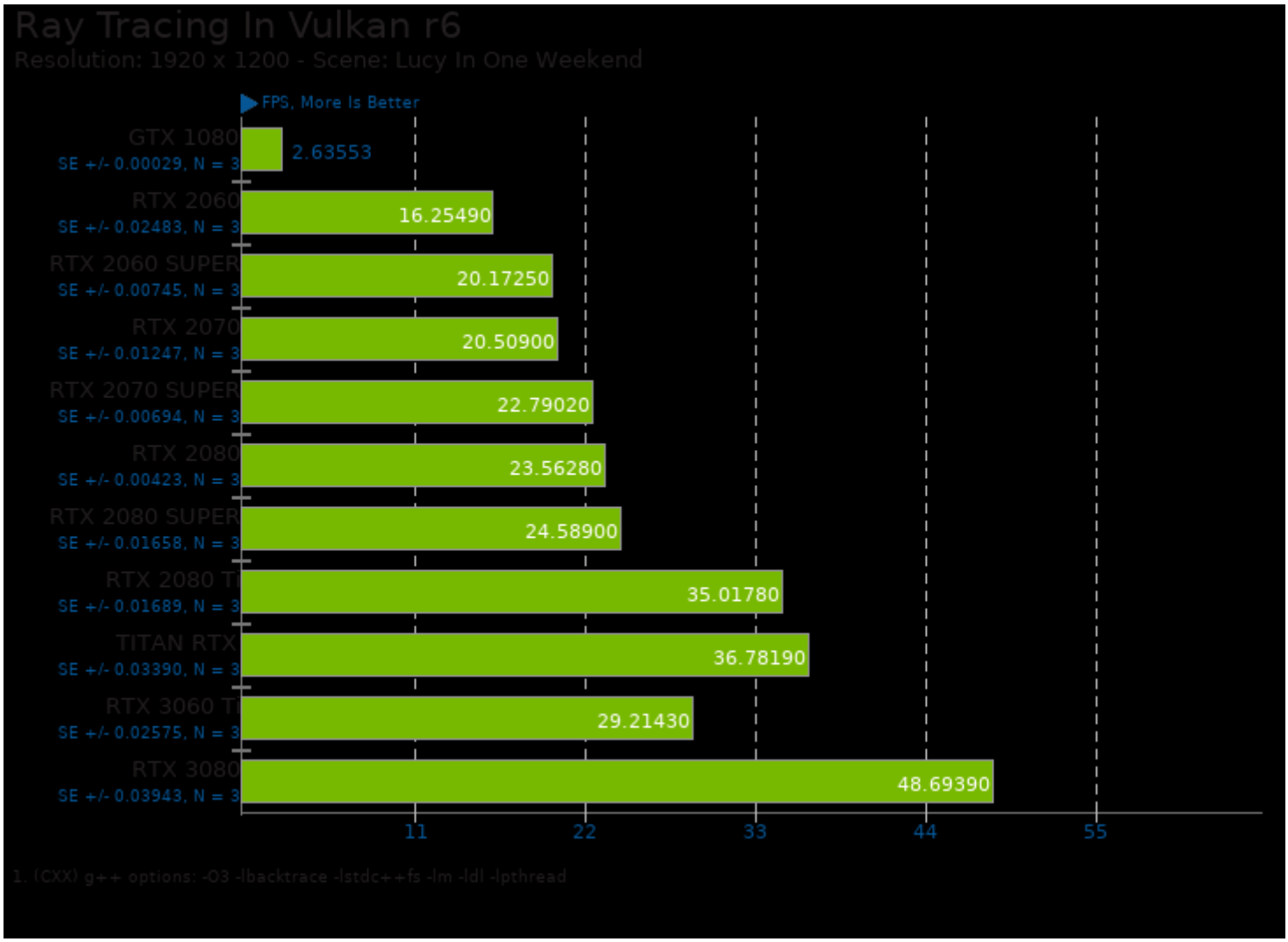

VkResample 1.0
Upscale: 2x - Precision: Double
ms, Fewer Is Better
GTX 1080
SE +/- 0.11, N = 3
253.61
RTX 2060
SE +/- 0.68, N = 3
344.55
RTX 2060 SUPER
SE +/- 0.24, N = 3
309.19
RTX 2070
SE +/- 0.29, N = 3
301.68
RTX 2070 SUPER
SE +/- 0.63, N = 3
262.25
RTX 2080
SE +/- 0.09, N = 3
236.79
RTX 2080 SUPER
SE +/- 0.53, N = 3
217.31
RTX 2080 Ti
SE +/- 0.08, N = 3
155.74
TITAN RTX
SE +/- 0.08, N = 3
148.62
RTX 3060 Ti
SE +/- 0.22, N = 3
262.94
RTX 3080
SE +/- 0.11, N = 3
148.01
RTX 3090
SE +/- 0.06, N = 3
128.24
70
140
210
280
350
1. (CXX) g++ options: -O3 -pthread

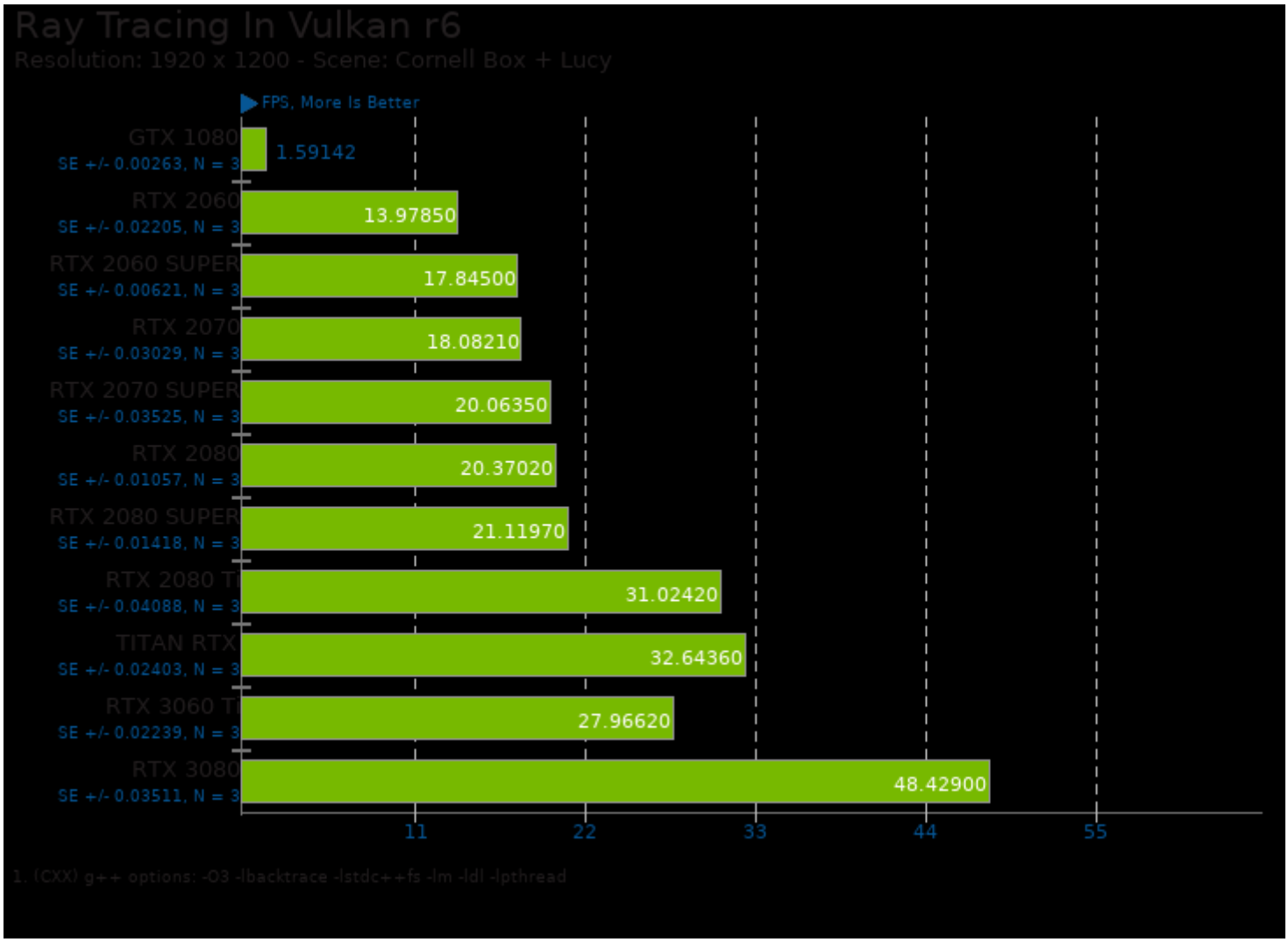

Ray Tracing In Vulkan r6
Resolution: 3840 x 2160 - Scene: Cornell Box + Lucy
FPS, More Is Better
GTX 1080
SE +/- 0.000066, N = 3
0.522516
RTX 2060
SE +/- 0.012352, N = 3
4.692170
RTX 2060 SUPER
SE +/- 0.003742, N = 3
5.976020
RTX 2070
SE +/- 0.004544, N = 3
6.087050
RTX 2070 SUPER
SE +/- 0.010810, N = 3
6.777170
RTX 2080
SE +/- 0.004112, N = 3
6.927020
RTX 2080 SUPER
SE +/- 0.004454, N = 3
7.147840
RTX 2080 Ti
SE +/- 0.006543, N = 3
10.536900
TITAN RTX
SE +/- 0.014988, N = 3
11.144000
RTX 3060 Ti
SE +/- 0.010125, N = 3
9.399230
RTX 3080
SE +/- 0.009711, N = 3
16.441300
4
8
12
16
20
1. (CXX) g++ options: -O3 -lbacktrace -lstdc++fs -lm -ldl -lpthread

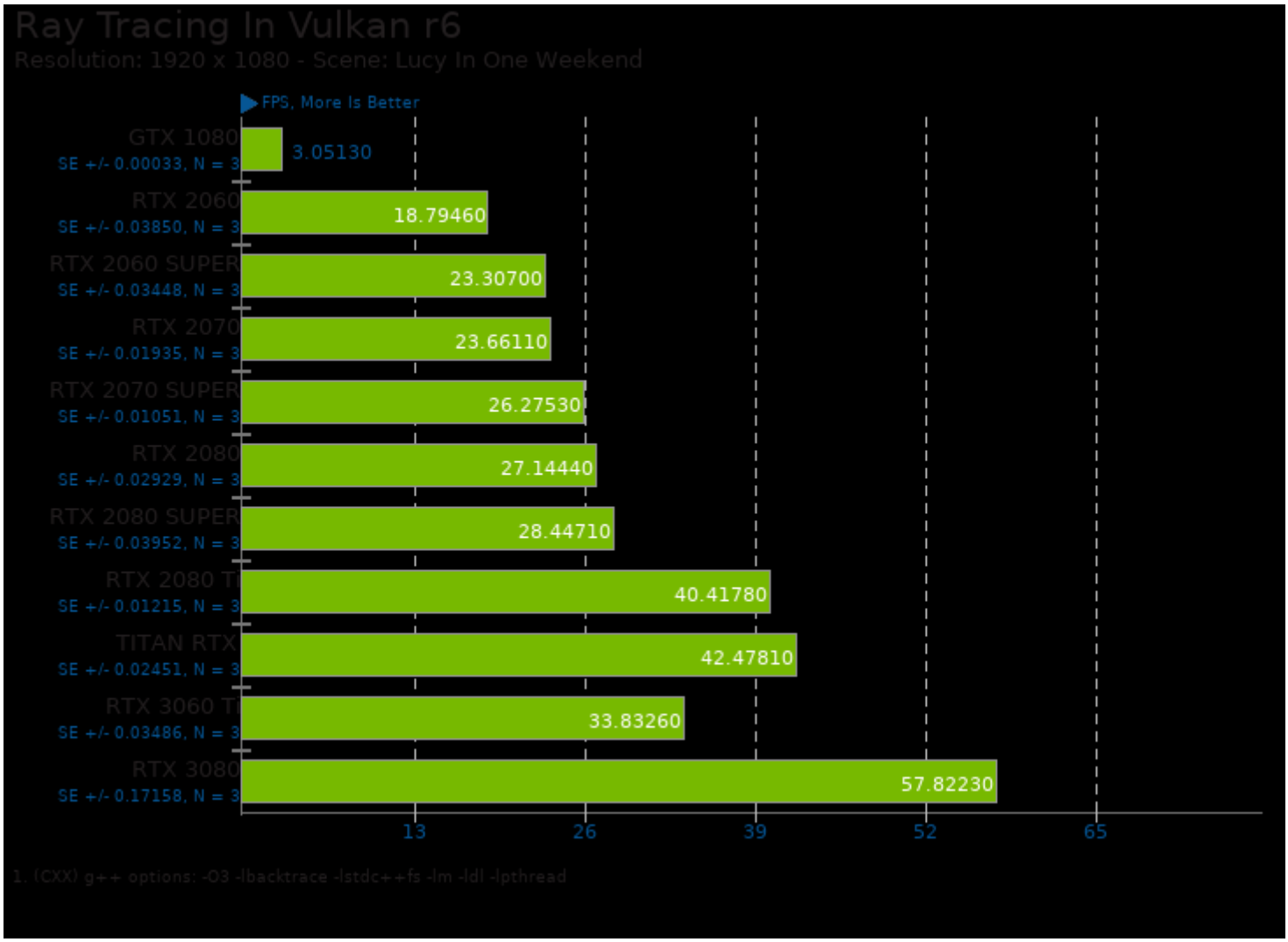

Ray Tracing In Vulkan r6
Resolution: 3840 x 2160 - Scene: Lucy In One Weekend
FPS, More Is Better
GTX 1080
SE +/- 0.000045, N = 3
0.870950
RTX 2060
SE +/- 0.001580, N = 3
5.624780
RTX 2060 SUPER
SE +/- 0.003200, N = 3
6.872060
RTX 2070
SE +/- 0.003196, N = 3
7.016410
RTX 2070 SUPER
SE +/- 0.002273, N = 3
7.931530
RTX 2080
SE +/- 0.006235, N = 3
8.345340
RTX 2080 SUPER
SE +/- 0.004421, N = 3
8.826160
RTX 2080 Ti
SE +/- 0.008796, N = 3
12.467300
TITAN RTX
SE +/- 0.013070, N = 3
13.087800
RTX 3060 Ti
SE +/- 0.019570, N = 3
9.635530
RTX 3080
SE +/- 0.010300, N = 3
16.431200
4
8
12
16
20
1. (CXX) g++ options: -O3 -lbacktrace -lstdc++fs -lm -ldl -lpthread

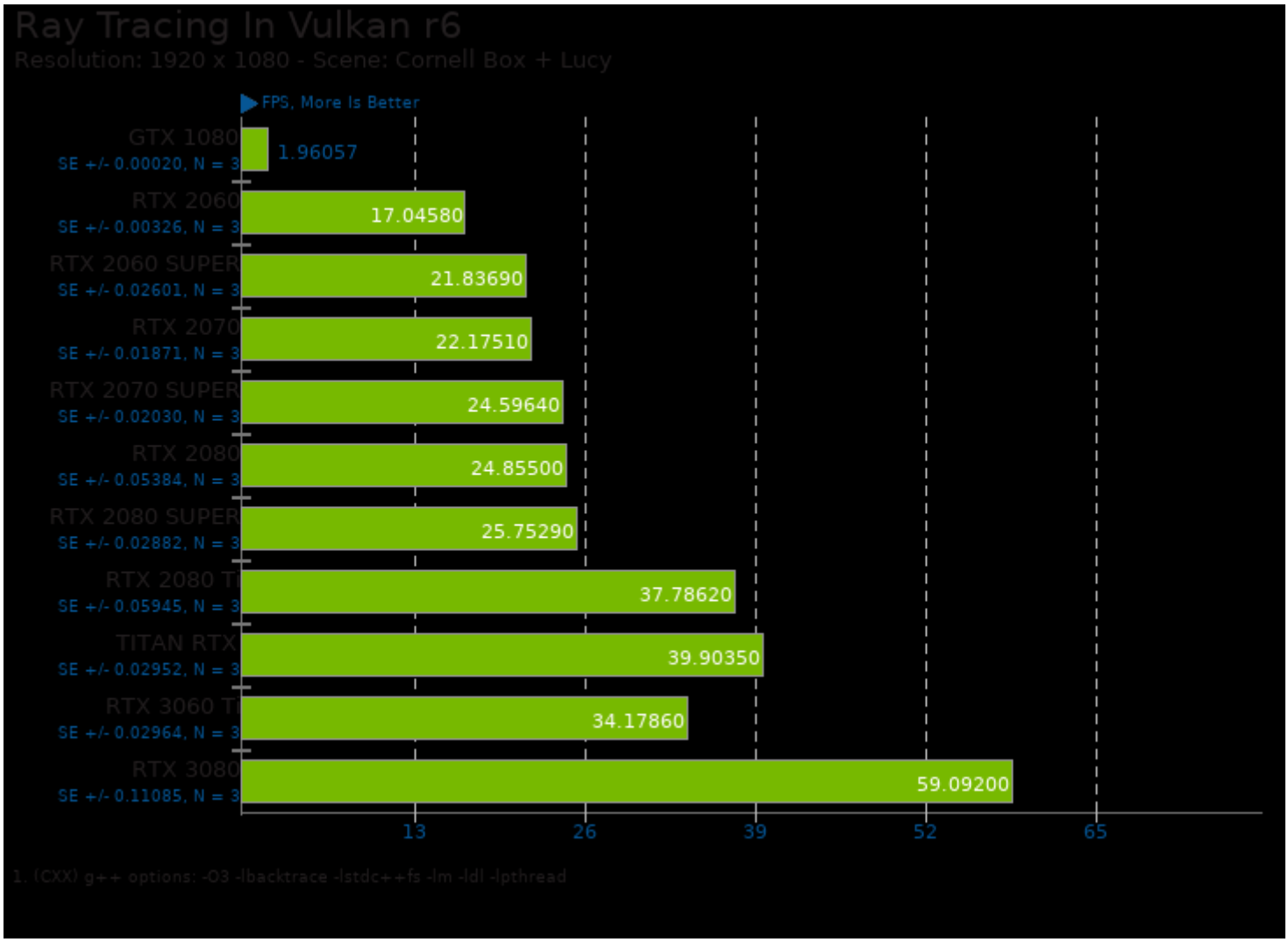

Ray Tracing In Vulkan r6
Resolution: 2560 x 1440 - Scene: Cornell Box + Lucy
FPS, More Is Better
GTX 1080
SE +/- 0.00269, N = 3
1.10882
RTX 2060
SE +/- 0.01758, N = 3
9.77161
RTX 2060 SUPER
SE +/- 0.02417, N = 3
12.43730
RTX 2070
SE +/- 0.02099, N = 3
12.71610
RTX 2070 SUPER
SE +/- 0.00856, N = 3
14.10300
RTX 2080
SE +/- 0.01420, N = 3
14.36340
RTX 2080 SUPER
SE +/- 0.00777, N = 3
14.87080
RTX 2080 Ti
SE +/- 0.02332, N = 3
21.80050
TITAN RTX
SE +/- 0.00798, N = 3
23.00310
RTX 3060 Ti
SE +/- 0.00765, N = 3
19.57070
RTX 3080
SE +/- 0.01143, N = 3
33.94220
8
16
24
32
40
1. (CXX) g++ options: -O3 -lbacktrace -lstdc++fs -lm -ldl -lpthread

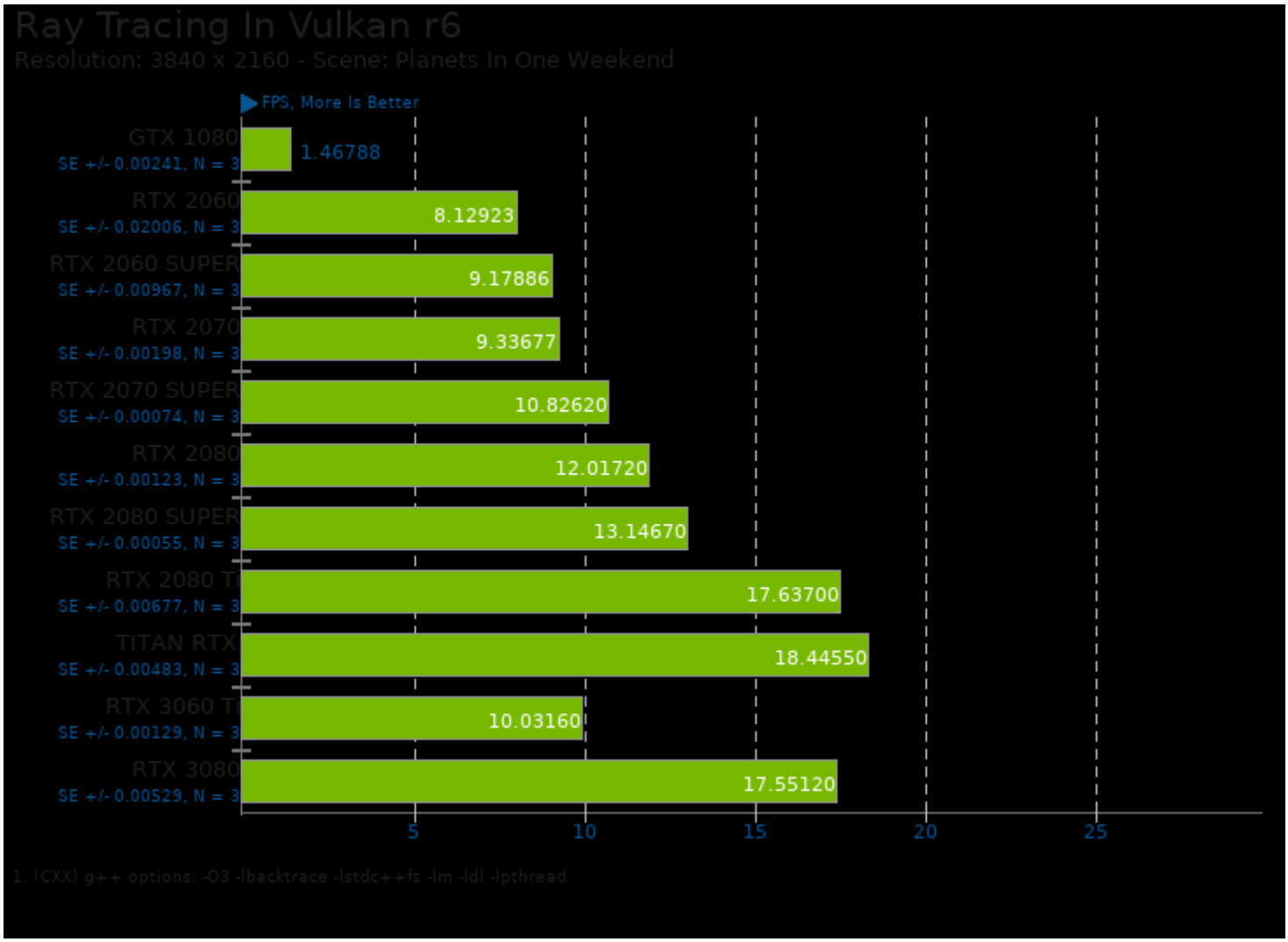

Ray Tracing In Vulkan r6
Resolution: 2560 x 1440 - Scene: Lucy In One Weekend
FPS, More Is Better
GTX 1080
SE +/- 0.00047, N = 3
1.78979
RTX 2060
SE +/- 0.00015, N = 3
11.13740
RTX 2060 SUPER
SE +/- 0.00228, N = 3
13.75680
RTX 2070
SE +/- 0.00613, N = 3
13.99330
RTX 2070 SUPER
SE +/- 0.00410, N = 3
15.65500
RTX 2080
SE +/- 0.01436, N = 3
16.32570
RTX 2080 SUPER
SE +/- 0.00929, N = 3
17.14980
RTX 2080 Ti
SE +/- 0.02242, N = 3
24.37190
TITAN RTX
SE +/- 0.00917, N = 3
25.59780
RTX 3060 Ti
SE +/- 0.02902, N = 3
19.55620
RTX 3080
SE +/- 0.01850, N = 3
33.05450
8
16
24
32
40
1. (CXX) g++ options: -O3 -lbacktrace -lstdc++fs -lm -ldl -lpthread

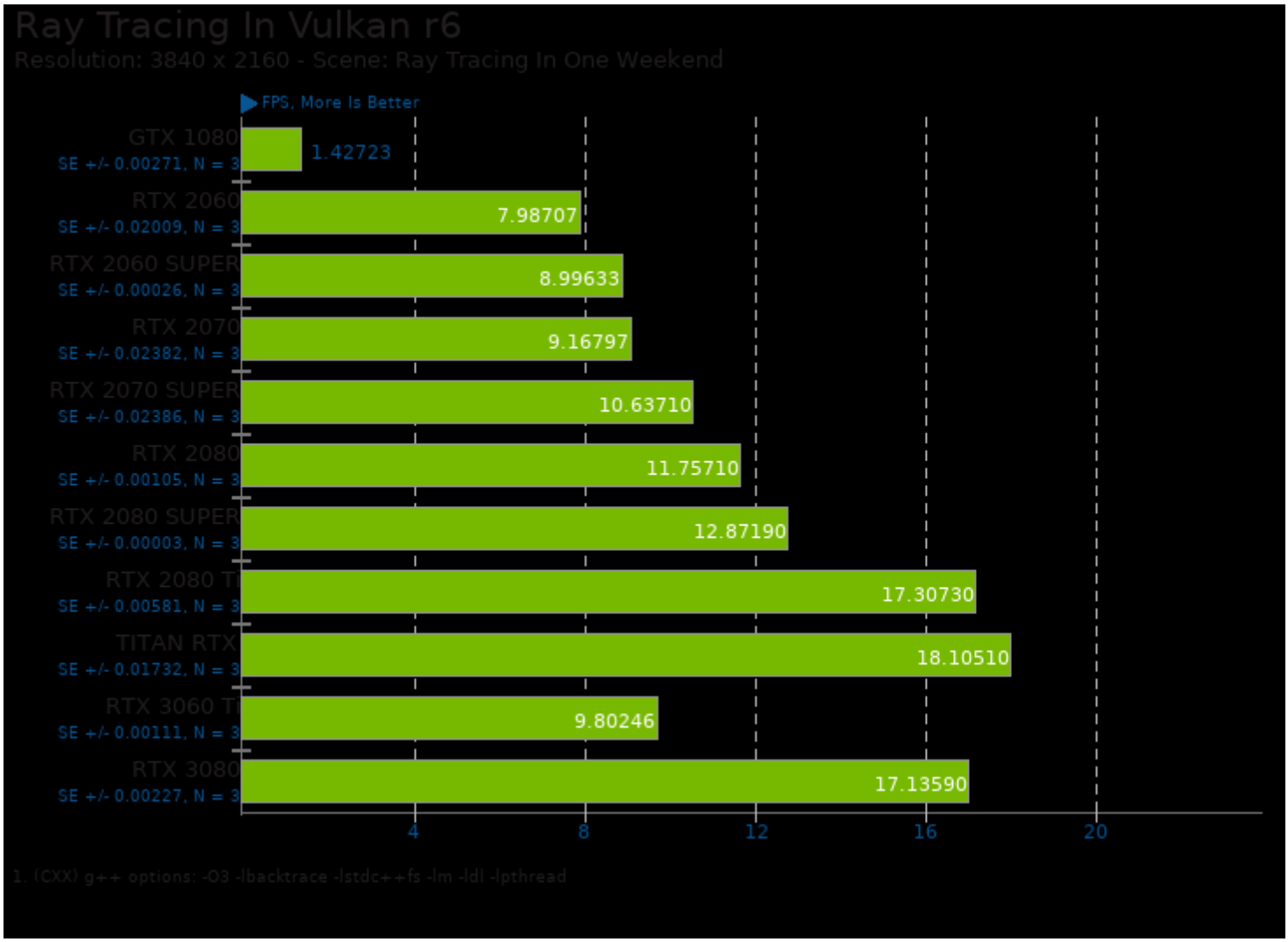

Ray Tracing In Vulkan r6
Resolution: 1920 x 1200 - Scene: Lucy In One Weekend
FPS, More Is Better
GTX 1080
SE +/- 0.00029, N = 3
2.63553
RTX 2060
SE +/- 0.02483, N = 3
16.25490
RTX 2060 SUPER
SE +/- 0.00745, N = 3
20.17250
RTX 2070
SE +/- 0.01247, N = 3
20.50900
RTX 2070 SUPER
SE +/- 0.00694, N = 3
22.79020
RTX 2080
SE +/- 0.00423, N = 3
23.56280
RTX 2080 SUPER
SE +/- 0.01658, N = 3
24.58900
RTX 2080 Ti
SE +/- 0.01689, N = 3
35.01780
TITAN RTX
SE +/- 0.03390, N = 3
36.78190
RTX 3060 Ti
SE +/- 0.02575, N = 3
29.21430
RTX 3080
SE +/- 0.03943, N = 3
48.69390
11
22
33
44
55
1. (CXX) g++ options: -O3 -lbacktrace -lstdc++fs -lm -ldl -lpthread

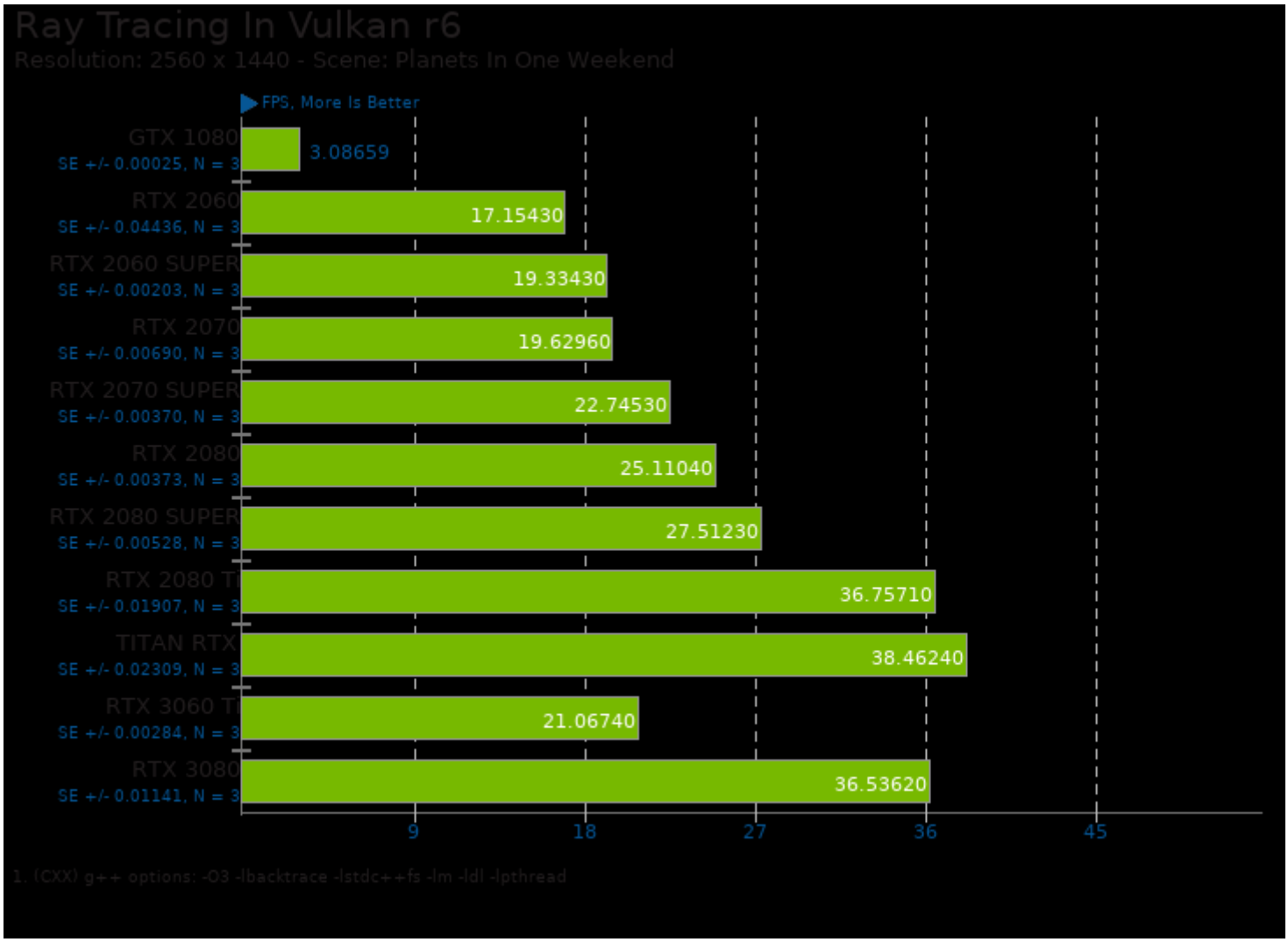

Ray Tracing In Vulkan r6
Resolution: 1920 x 1200 - Scene: Cornell Box + Lucy
FPS, More Is Better
GTX 1080
SE +/- 0.00263, N = 3
1.59142
RTX 2060
SE +/- 0.02205, N = 3
13.97850
RTX 2060 SUPER
SE +/- 0.00621, N = 3
17.84500
RTX 2070
SE +/- 0.03029, N = 3
18.08210
RTX 2070 SUPER
SE +/- 0.03525, N = 3
20.06350
RTX 2080
SE +/- 0.01057, N = 3
20.37020
RTX 2080 SUPER
SE +/- 0.01418, N = 3
21.11970
RTX 2080 Ti
SE +/- 0.04088, N = 3
31.02420
TITAN RTX
SE +/- 0.02403, N = 3
32.64360
RTX 3060 Ti
SE +/- 0.02239, N = 3
27.96620
RTX 3080
SE +/- 0.03511, N = 3
48.42900
11
22
33
44
55
1. (CXX) g++ options: -O3 -lbacktrace -lstdc++fs -lm -ldl -lpthread

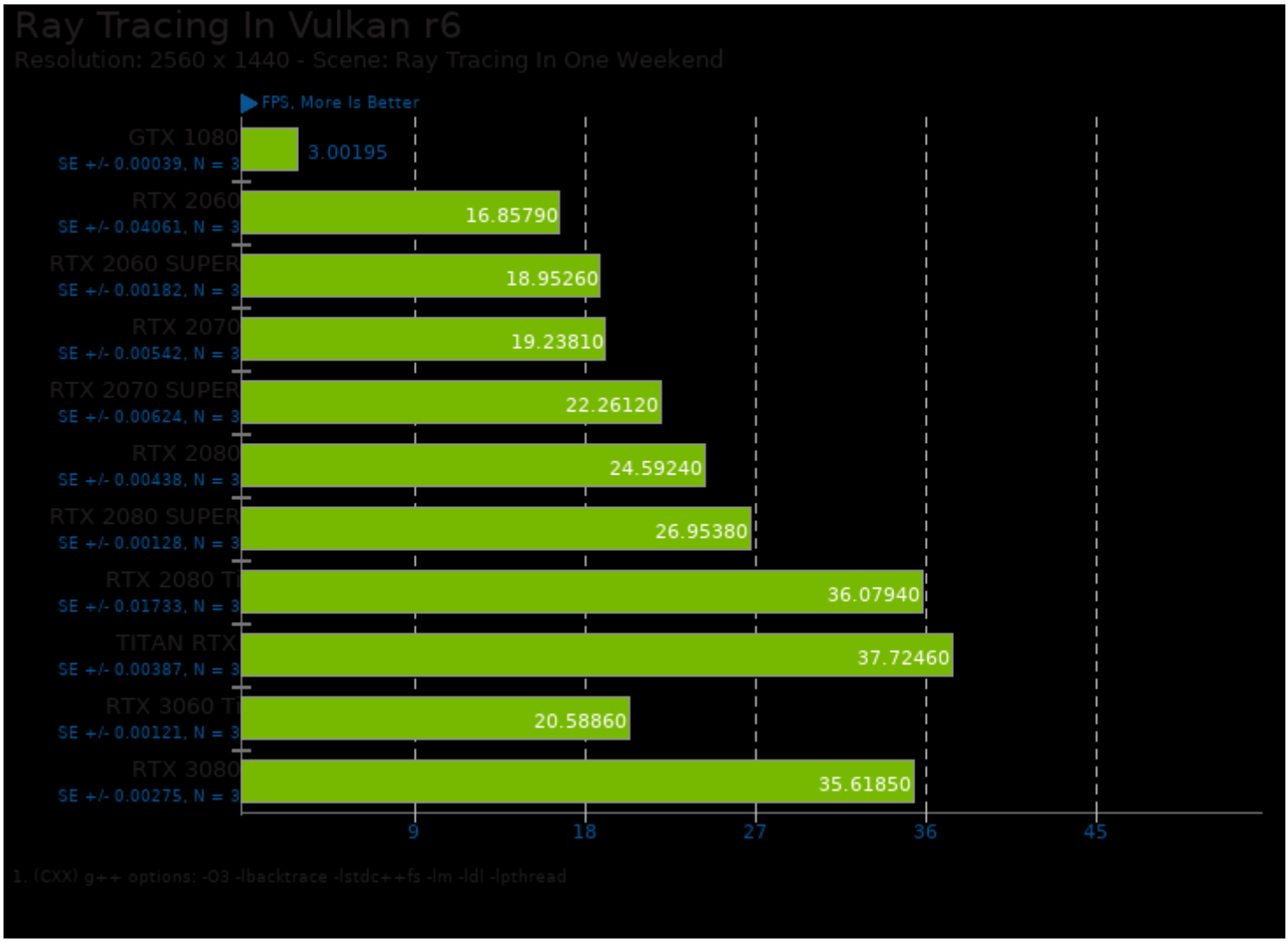

Ray Tracing In Vulkan r6
Resolution: 1920 x 1080 - Scene: Lucy In One Weekend
FPS, More Is Better
GTX 1080
SE +/- 0.00033, N = 3
3.05130
RTX 2060
SE +/- 0.03850, N = 3
18.79460
RTX 2060 SUPER
SE +/- 0.03448, N = 3
23.30700
RTX 2070
SE +/- 0.01935, N = 3
23.66110
RTX 2070 SUPER
SE +/- 0.01051, N = 3
26.27530
RTX 2080
SE +/- 0.02929, N = 3
27.14440
RTX 2080 SUPER
SE +/- 0.03952, N = 3
28.44710
RTX 2080 Ti
SE +/- 0.01215, N = 3
40.41780
TITAN RTX
SE +/- 0.02451, N = 3
42.47810
RTX 3060 Ti
SE +/- 0.03486, N = 3
33.83260
RTX 3080
SE +/- 0.17158, N = 3
57.82230
13
26
39
52
65
1. (CXX) g++ options: -O3 -lbacktrace -lstdc++fs -lm -ldl -lpthread

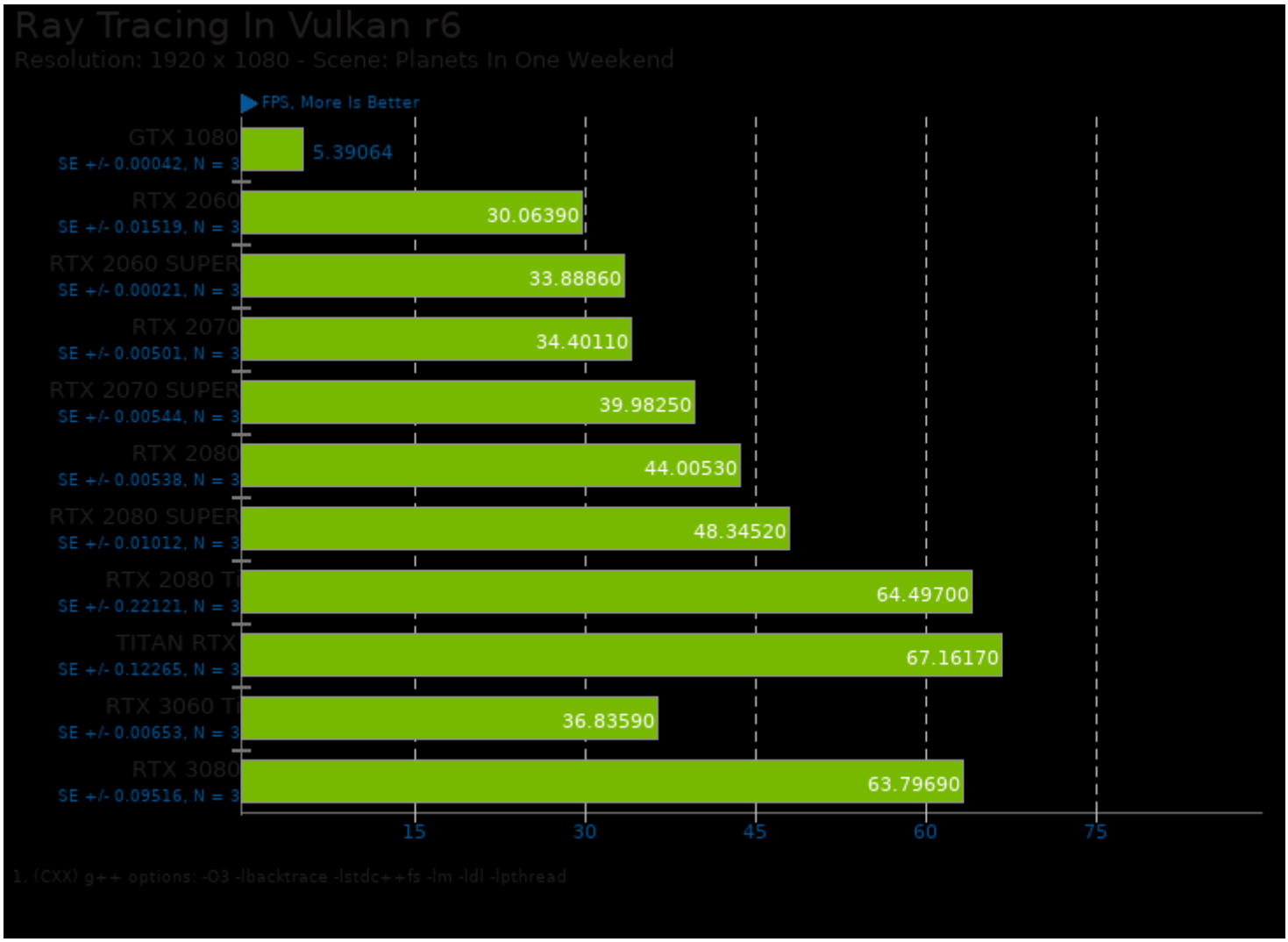

Ray Tracing In Vulkan r6
Resolution: 1920 x 1080 - Scene: Cornell Box + Lucy
FPS, More Is Better
GTX 1080
SE +/- 0.00020, N = 3
1.96057
RTX 2060
SE +/- 0.00326, N = 3
17.04580
RTX 2060 SUPER
SE +/- 0.02601, N = 3
21.83690
RTX 2070
SE +/- 0.01871, N = 3
22.17510
RTX 2070 SUPER
SE +/- 0.02030, N = 3
24.59640
RTX 2080
SE +/- 0.05384, N = 3
24.85500
RTX 2080 SUPER
SE +/- 0.02882, N = 3
25.75290
RTX 2080 Ti
SE +/- 0.05945, N = 3
37.78620
TITAN RTX
SE +/- 0.02952, N = 3
39.90350
RTX 3060 Ti
SE +/- 0.02964, N = 3
34.17860
RTX 3080
SE +/- 0.11085, N = 3
59.09200
13
26
39
52
65
1. (CXX) g++ options: -O3 -lbacktrace -lstdc++fs -lm -ldl -lpthread

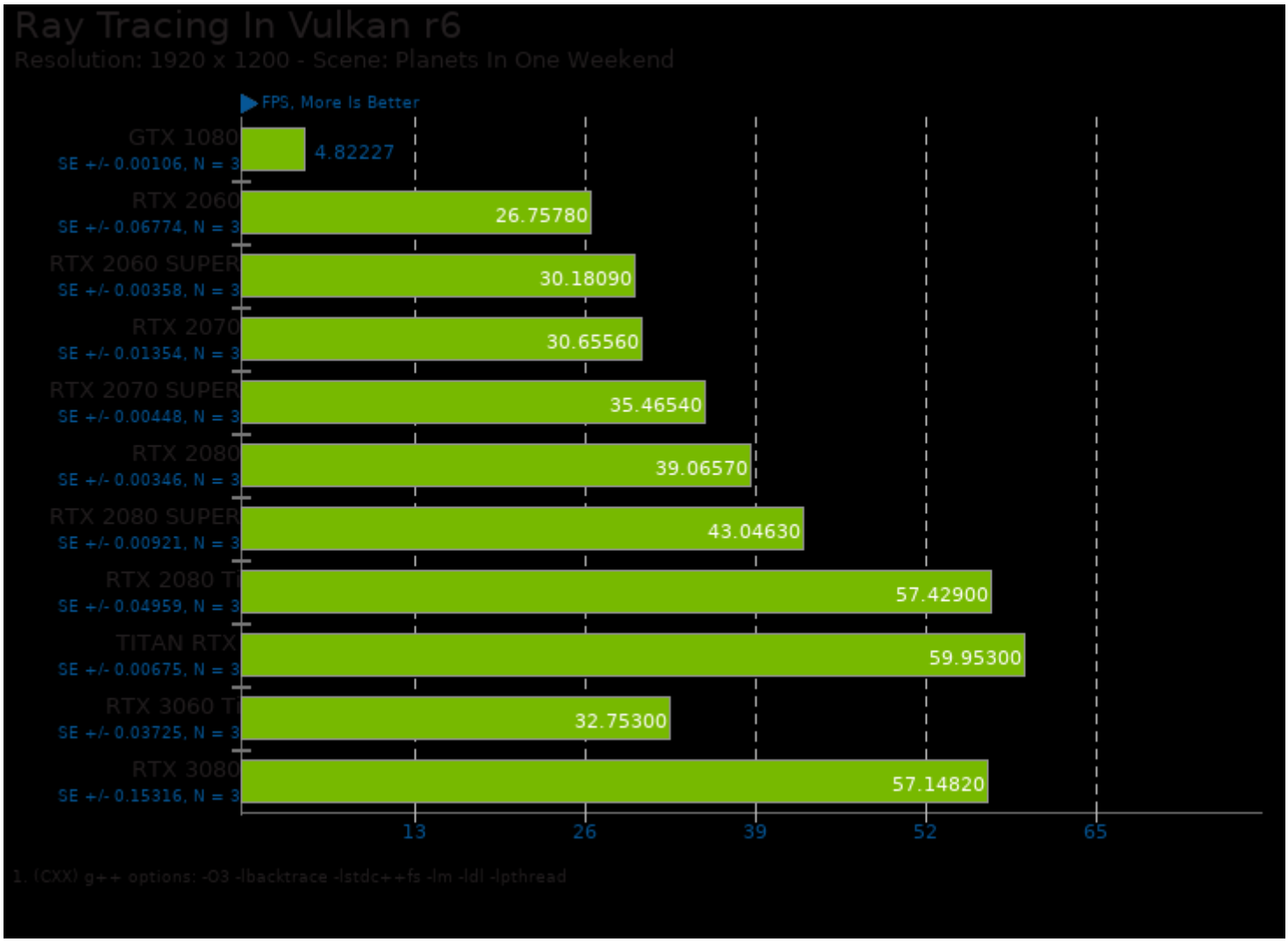

Ray Tracing In Vulkan r6
Resolution: 3840 x 2160 - Scene: Planets In One Weekend
FPS, More Is Better
GTX 1080
SE +/- 0.00241, N = 3
1.46788
RTX 2060
SE +/- 0.02006, N = 3
8.12923
RTX 2060 SUPER
SE +/- 0.00967, N = 3
9.17886
RTX 2070
SE +/- 0.00198, N = 3
9.33677
RTX 2070 SUPER
SE +/- 0.00074, N = 3
10.82620
RTX 2080
SE +/- 0.00123, N = 3
12.01720
RTX 2080 SUPER
SE +/- 0.00055, N = 3
13.14670
RTX 2080 Ti
SE +/- 0.00677, N = 3
17.63700
TITAN RTX
SE +/- 0.00483, N = 3
18.44550
RTX 3060 Ti
SE +/- 0.00129, N = 3
10.03160
RTX 3080
SE +/- 0.00529, N = 3
17.55120
5
10
15
20
25
1. (CXX) g++ options: -O3 -lbacktrace -lstdc++fs -lm -ldl -lpthread

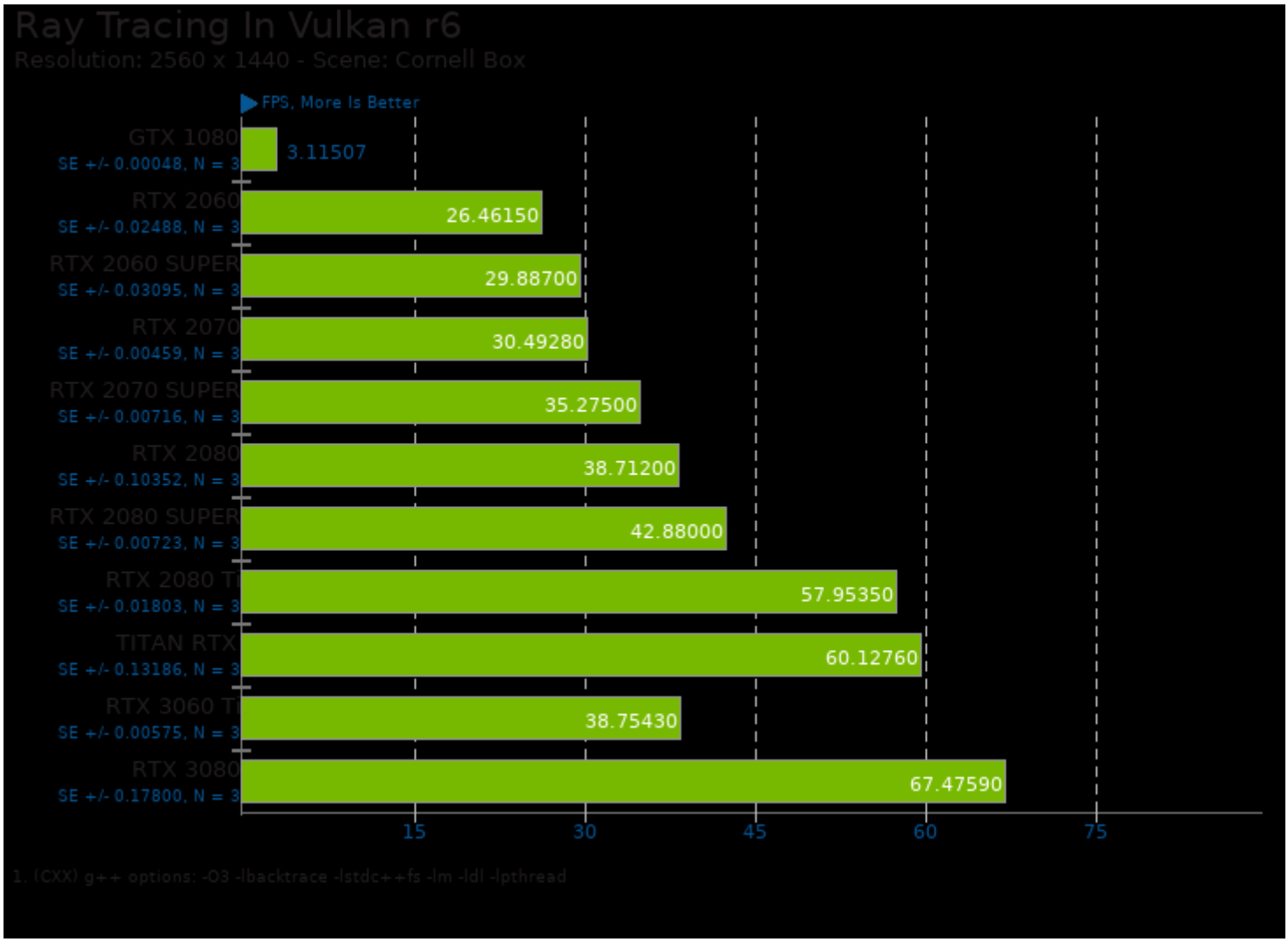

Ray Tracing In Vulkan r6
Resolution: 3840 x 2160 - Scene: Ray Tracing In One Weekend
FPS, More Is Better
GTX 1080
SE +/- 0.00271, N = 3
1.42723
RTX 2060
SE +/- 0.02009, N = 3
7.98707
RTX 2060 SUPER
SE +/- 0.00026, N = 3
8.99633
RTX 2070
SE +/- 0.02382, N = 3
9.16797
RTX 2070 SUPER
SE +/- 0.02386, N = 3
10.63710
RTX 2080
SE +/- 0.00105, N = 3
11.75710
RTX 2080 SUPER
SE +/- 0.00003, N = 3
12.87190
RTX 2080 Ti
SE +/- 0.00581, N = 3
17.30730
TITAN RTX
SE +/- 0.01732, N = 3
18.10510
RTX 3060 Ti
SE +/- 0.00111, N = 3
9.80246
RTX 3080
SE +/- 0.00227, N = 3
17.13590
4
8
12
16
20
1. (CXX) g++ options: -O3 -lbacktrace -lstdc++fs -lm -ldl -lpthread

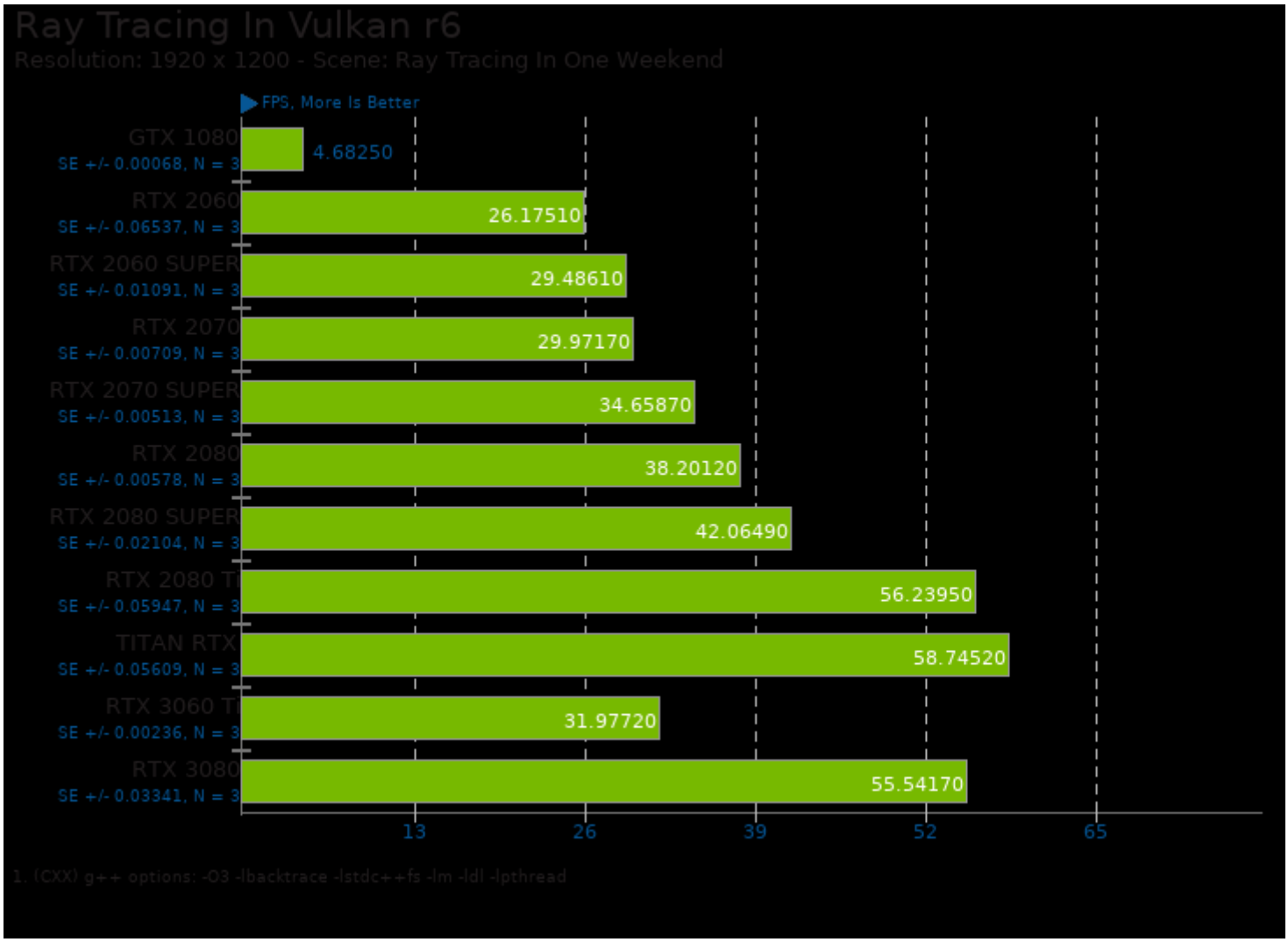

Ray Tracing In Vulkan r6
Resolution: 2560 x 1440 - Scene: Planets In One Weekend
FPS, More Is Better
GTX 1080
SE +/- 0.00025, N = 3
3.08659
RTX 2060
SE +/- 0.04436, N = 3
17.15430
RTX 2060 SUPER
SE +/- 0.00203, N = 3
19.33430
RTX 2070
SE +/- 0.00690, N = 3
19.62960
RTX 2070 SUPER
SE +/- 0.00370, N = 3
22.74530
RTX 2080
SE +/- 0.00373, N = 3
25.11040
RTX 2080 SUPER
SE +/- 0.00528, N = 3
27.51230
RTX 2080 Ti
SE +/- 0.01907, N = 3
36.75710
TITAN RTX
SE +/- 0.02309, N = 3
38.46240
RTX 3060 Ti
SE +/- 0.00284, N = 3
21.06740
RTX 3080
SE +/- 0.01141, N = 3
36.53620
9
18
27
36
45
1. (CXX) g++ options: -O3 -lbacktrace -lstdc++fs -lm -ldl -lpthread

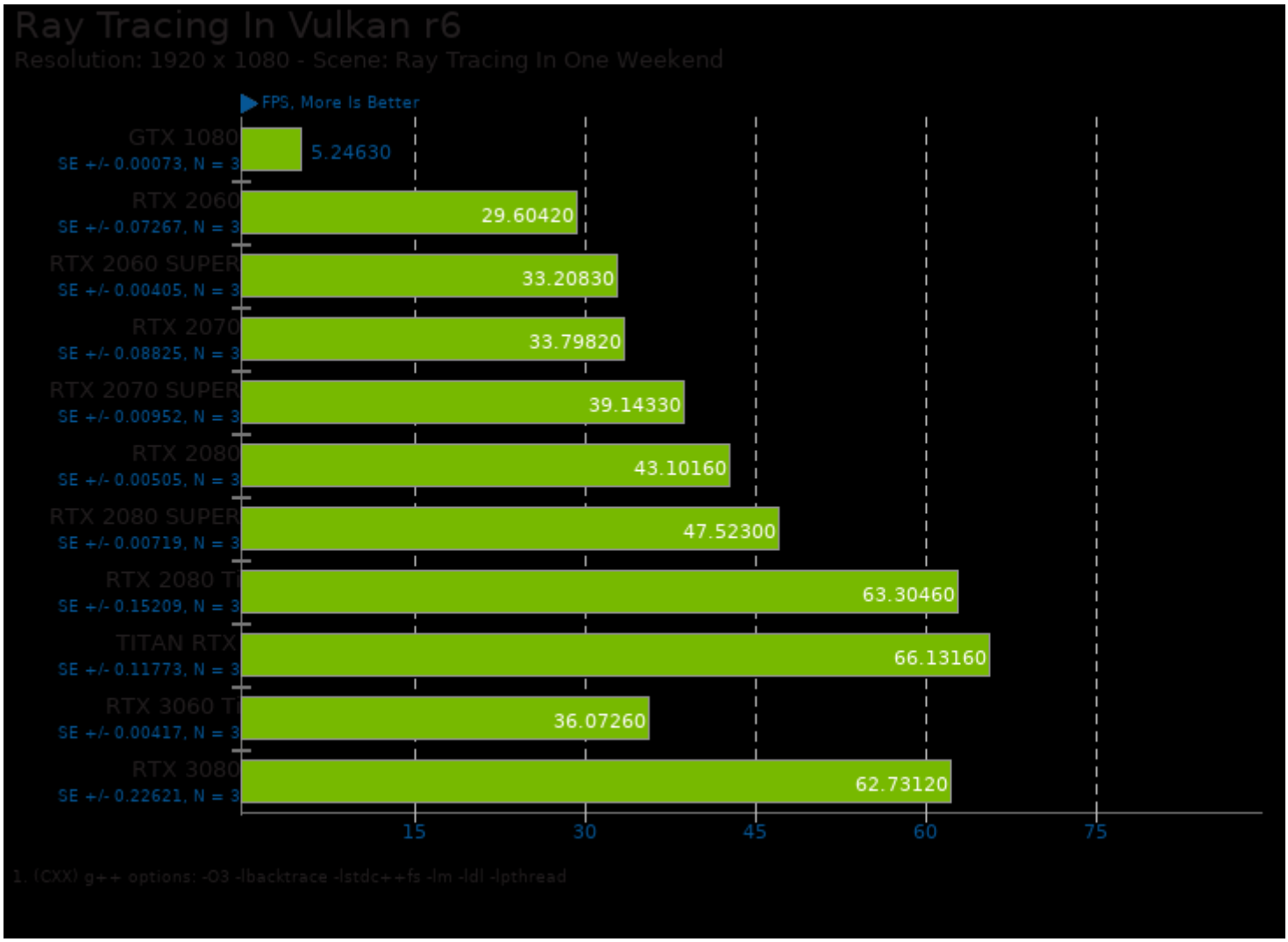

Ray Tracing In Vulkan r6
Resolution: 2560 x 1440 - Scene: Ray Tracing In One Weekend
FPS, More Is Better
GTX 1080
SE +/- 0.00039, N = 3
3.00195
RTX 2060
SE +/- 0.04061, N = 3
16.85790
RTX 2060 SUPER
SE +/- 0.00182, N = 3
18.95260
RTX 2070
SE +/- 0.00542, N = 3
19.23810
RTX 2070 SUPER
SE +/- 0.00624, N = 3
22.26120
RTX 2080
SE +/- 0.00438, N = 3
24.59240
RTX 2080 SUPER
SE +/- 0.00128, N = 3
26.95380
RTX 2080 Ti
SE +/- 0.01733, N = 3
36.07940
TITAN RTX
SE +/- 0.00387, N = 3
37.72460
RTX 3060 Ti
SE +/- 0.00121, N = 3
20.58860
RTX 3080
SE +/- 0.00275, N = 3
35.61850
9
18
27
36
45
1. (CXX) g++ options: -O3 -lbacktrace -lstdc++fs -lm -ldl -lpthread

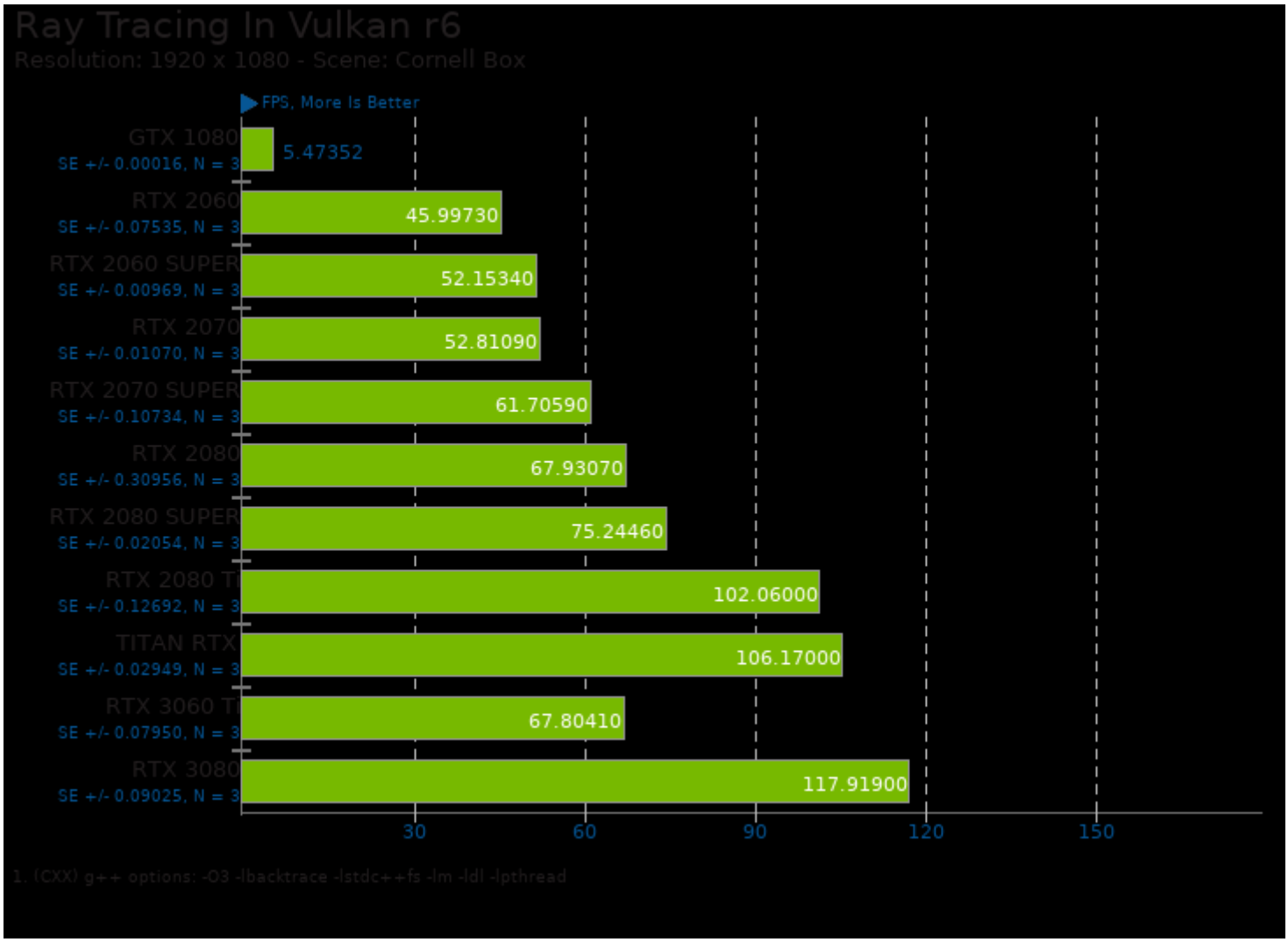

Ray Tracing In Vulkan r6
Resolution: 1920 x 1080 - Scene: Planets In One Weekend
FPS, More Is Better
GTX 1080
SE +/- 0.00042, N = 3
5.39064
RTX 2060
SE +/- 0.01519, N = 3
30.06390
RTX 2060 SUPER
SE +/- 0.00021, N = 3
33.88860
RTX 2070
SE +/- 0.00501, N = 3
34.40110
RTX 2070 SUPER
SE +/- 0.00544, N = 3
39.98250
RTX 2080
SE +/- 0.00538, N = 3
44.00530
RTX 2080 SUPER
SE +/- 0.01012, N = 3
48.34520
RTX 2080 Ti
SE +/- 0.22121, N = 3
64.49700
TITAN RTX
SE +/- 0.12265, N = 3
67.16170
RTX 3060 Ti
SE +/- 0.00653, N = 3
36.83590
RTX 3080
SE +/- 0.09516, N = 3
63.79690
15
30
45
60
75
1. (CXX) g++ options: -O3 -lbacktrace -lstdc++fs -lm -ldl -lpthread

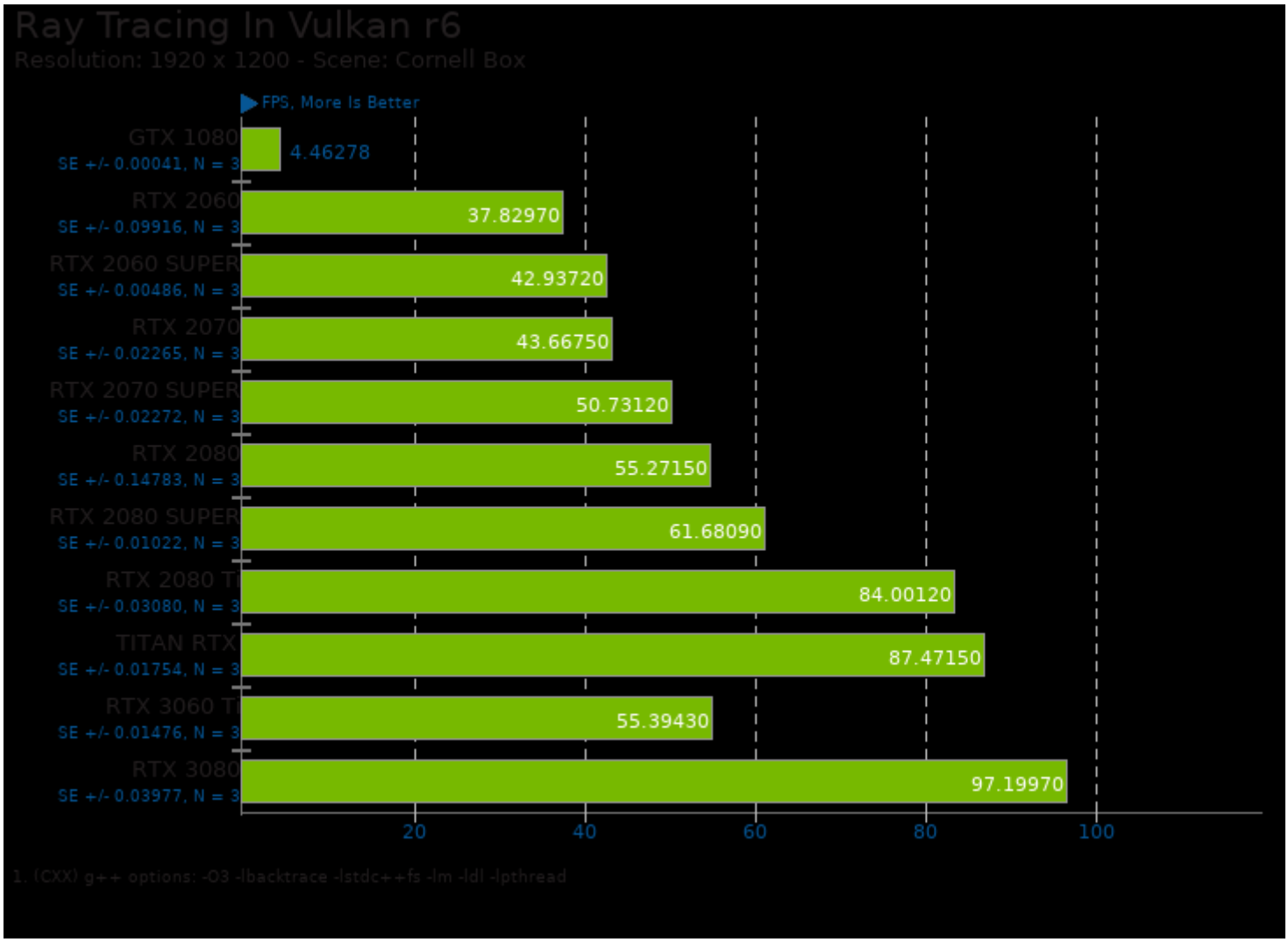

Ray Tracing In Vulkan r6
Resolution: 1920 x 1200 - Scene: Planets In One Weekend
FPS, More Is Better
GTX 1080
SE +/- 0.00106, N = 3
4.82227
RTX 2060
SE +/- 0.06774, N = 3
26.75780
RTX 2060 SUPER
SE +/- 0.00358, N = 3
30.18090
RTX 2070
SE +/- 0.01354, N = 3
30.65560
RTX 2070 SUPER
SE +/- 0.00448, N = 3
35.46540
RTX 2080
SE +/- 0.00346, N = 3
39.06570
RTX 2080 SUPER
SE +/- 0.00921, N = 3
43.04630
RTX 2080 Ti
SE +/- 0.04959, N = 3
57.42900
TITAN RTX
SE +/- 0.00675, N = 3
59.95300
RTX 3060 Ti
SE +/- 0.03725, N = 3
32.75300
RTX 3080
SE +/- 0.15316, N = 3
57.14820
13
26
39
52
65
1. (CXX) g++ options: -O3 -lbacktrace -lstdc++fs -lm -ldl -lpthread

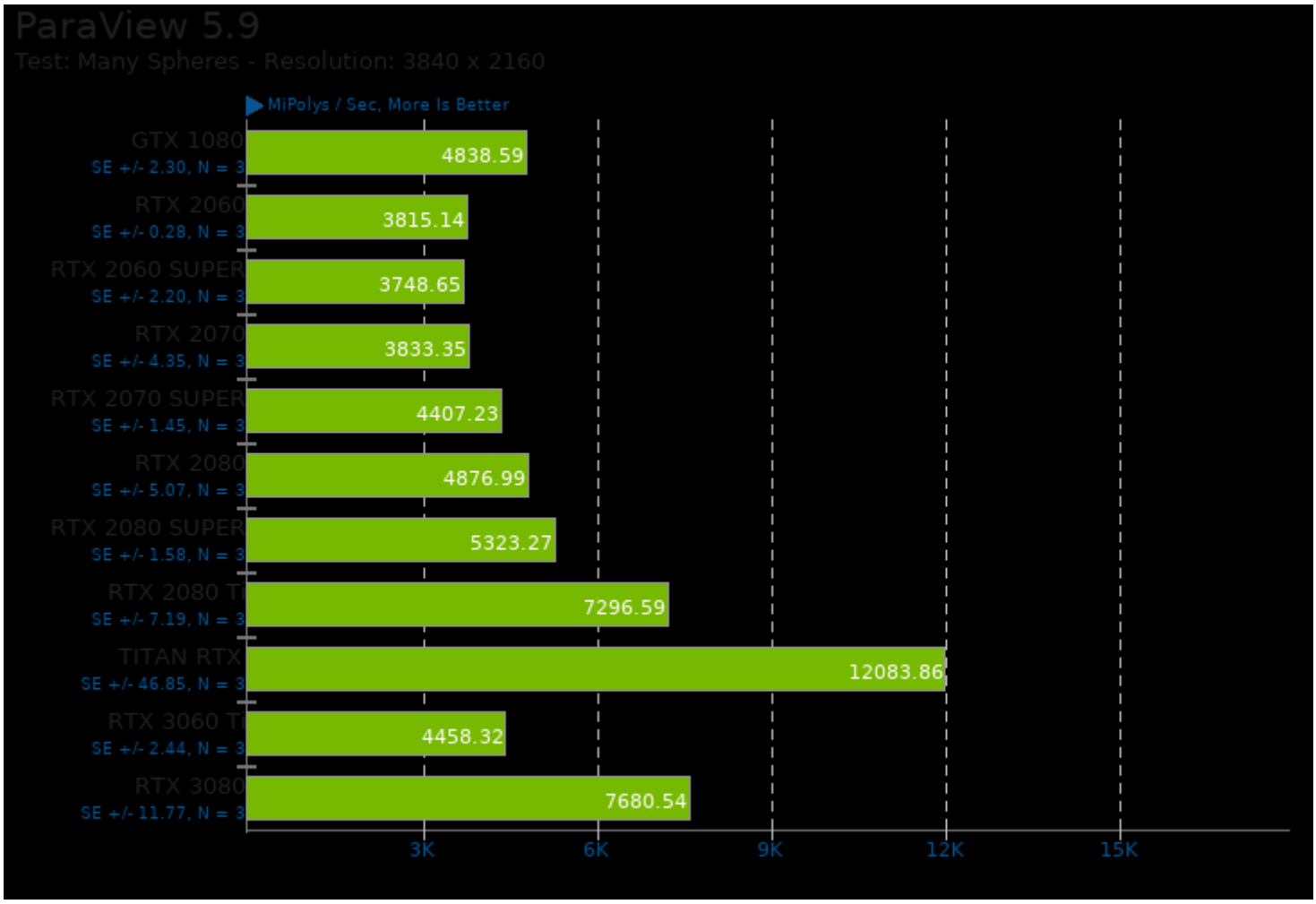

Ray Tracing In Vulkan r6
Resolution: 2560 x 1440 - Scene: Cornell Box
FPS, More Is Better
GTX 1080
SE +/- 0.00048, N = 3
3.11507
RTX 2060
SE +/- 0.02488, N = 3
26.46150
RTX 2060 SUPER
SE +/- 0.03095, N = 3
29.88700
RTX 2070
SE +/- 0.00459, N = 3
30.49280
RTX 2070 SUPER
SE +/- 0.00716, N = 3
35.27500
RTX 2080
SE +/- 0.10352, N = 3
38.71200
RTX 2080 SUPER
SE +/- 0.00723, N = 3
42.88000
RTX 2080 Ti
SE +/- 0.01803, N = 3
57.95350
TITAN RTX
SE +/- 0.13186, N = 3
60.12760
RTX 3060 Ti
SE +/- 0.00575, N = 3
38.75430
RTX 3080
SE +/- 0.17800, N = 3
67.47590
15
30
45
60
75
1. (CXX) g++ options: -O3 -lbacktrace -lstdc++fs -lm -ldl -lpthread

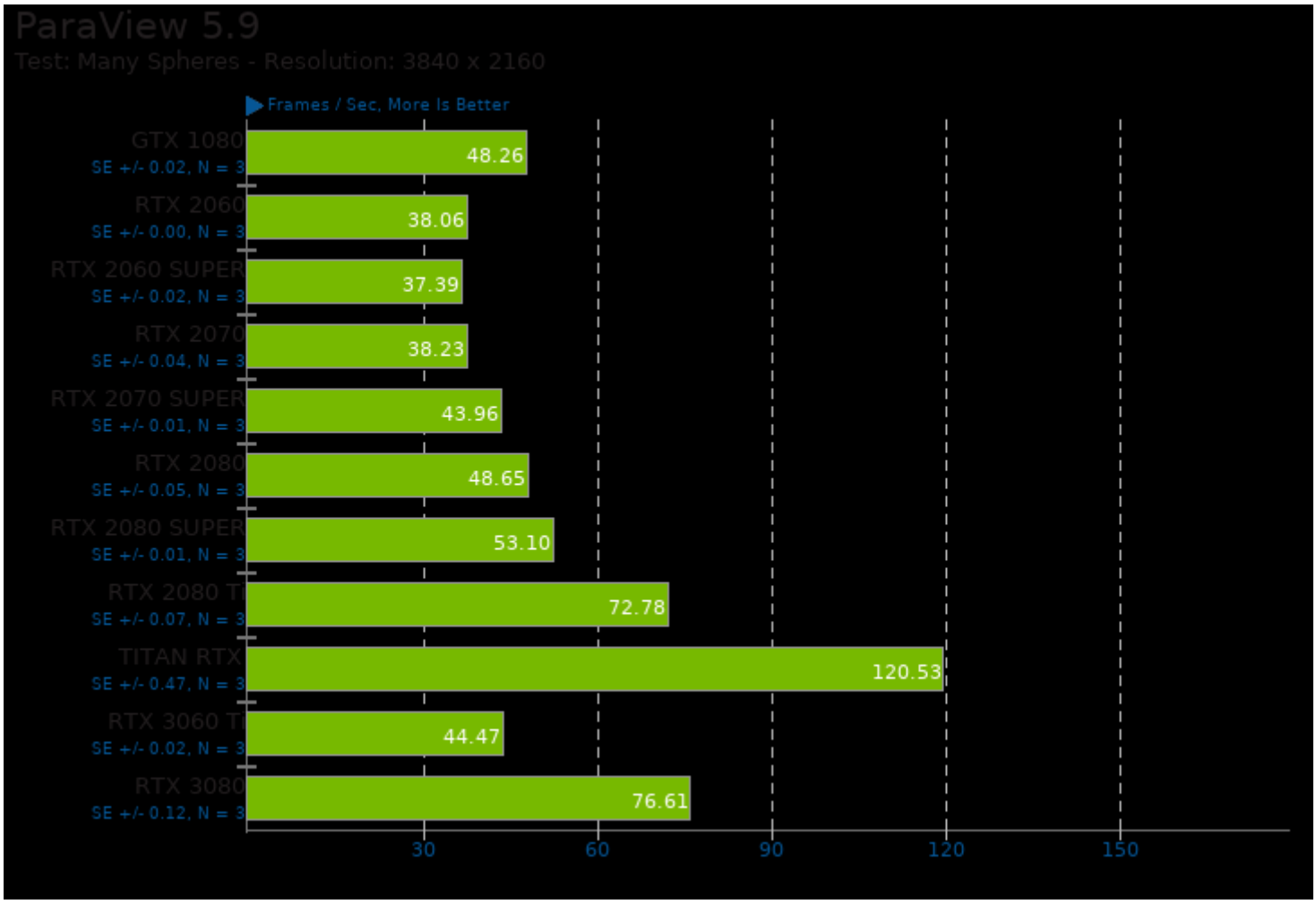

Ray Tracing In Vulkan r6
Resolution: 1920 x 1200 - Scene: Ray Tracing In One Weekend
FPS, More Is Better
GTX 1080
SE +/- 0.00068, N = 3
4.68250
RTX 2060
SE +/- 0.06537, N = 3
26.17510
RTX 2060 SUPER
SE +/- 0.01091, N = 3
29.48610
RTX 2070
SE +/- 0.00709, N = 3
29.97170
RTX 2070 SUPER
SE +/- 0.00513, N = 3
34.65870
RTX 2080
SE +/- 0.00578, N = 3
38.20120
RTX 2080 SUPER
SE +/- 0.02104, N = 3
42.06490
RTX 2080 Ti
SE +/- 0.05947, N = 3
56.23950
TITAN RTX
SE +/- 0.05609, N = 3
58.74520
RTX 3060 Ti
SE +/- 0.00236, N = 3
31.97720
RTX 3080
SE +/- 0.03341, N = 3
55.54170
13
26
39
52
65
1. (CXX) g++ options: -O3 -lbacktrace -lstdc++fs -lm -ldl -lpthread

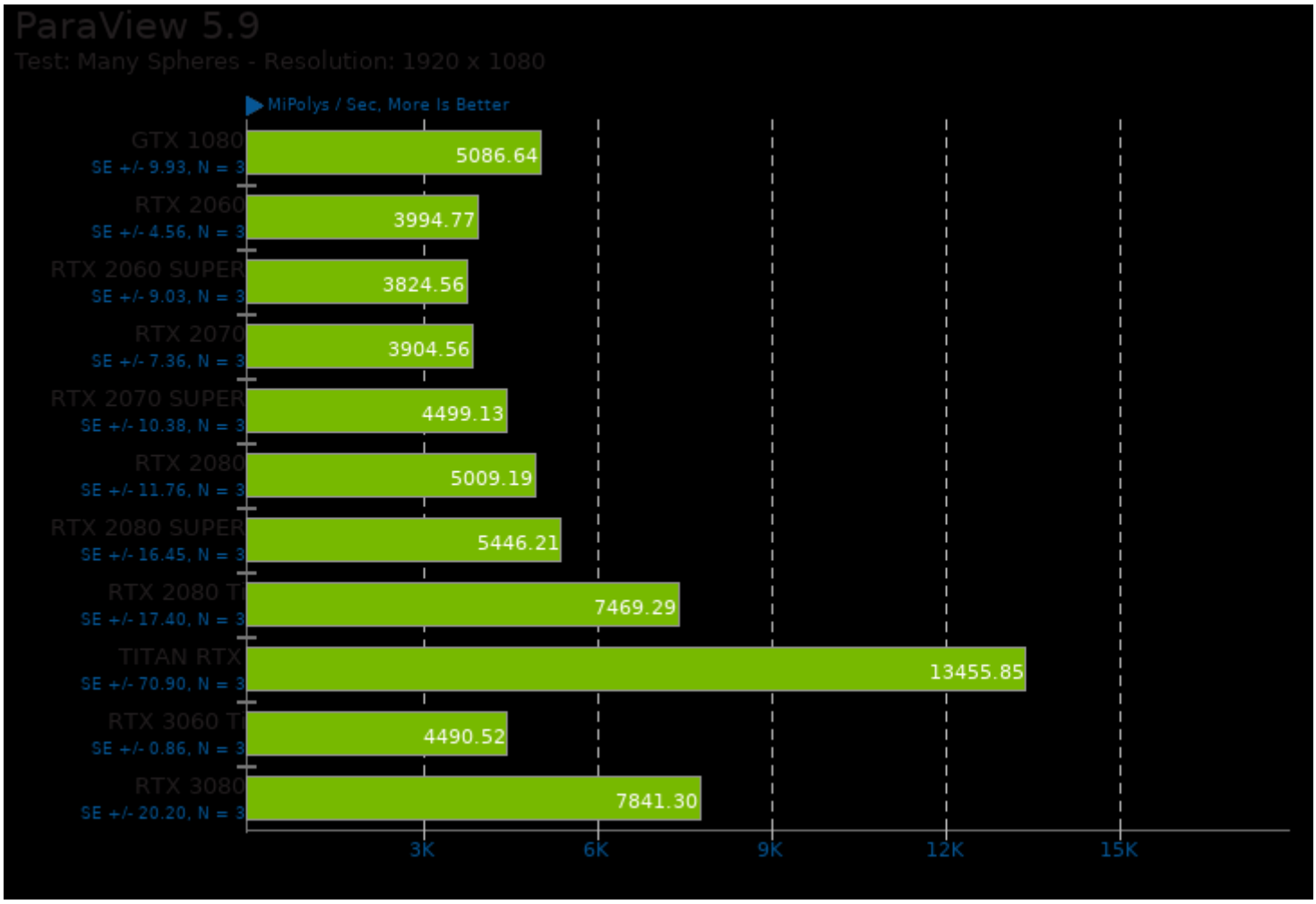

Ray Tracing In Vulkan r6
Resolution: 1920 x 1080 - Scene: Ray Tracing In One Weekend
FPS, More Is Better
GTX 1080
SE +/- 0.00073, N = 3
5.24630
RTX 2060
SE +/- 0.07267, N = 3
29.60420
RTX 2060 SUPER
SE +/- 0.00405, N = 3
33.20830
RTX 2070
SE +/- 0.08825, N = 3
33.79820
RTX 2070 SUPER
SE +/- 0.00952, N = 3
39.14330
RTX 2080
SE +/- 0.00505, N = 3
43.10160
RTX 2080 SUPER
SE +/- 0.00719, N = 3
47.52300
RTX 2080 Ti
SE +/- 0.15209, N = 3
63.30460
TITAN RTX
SE +/- 0.11773, N = 3
66.13160
RTX 3060 Ti
SE +/- 0.00417, N = 3
36.07260
RTX 3080
SE +/- 0.22621, N = 3
62.73120
15
30
45
60
75
1. (CXX) g++ options: -O3 -lbacktrace -lstdc++fs -lm -ldl -lpthread

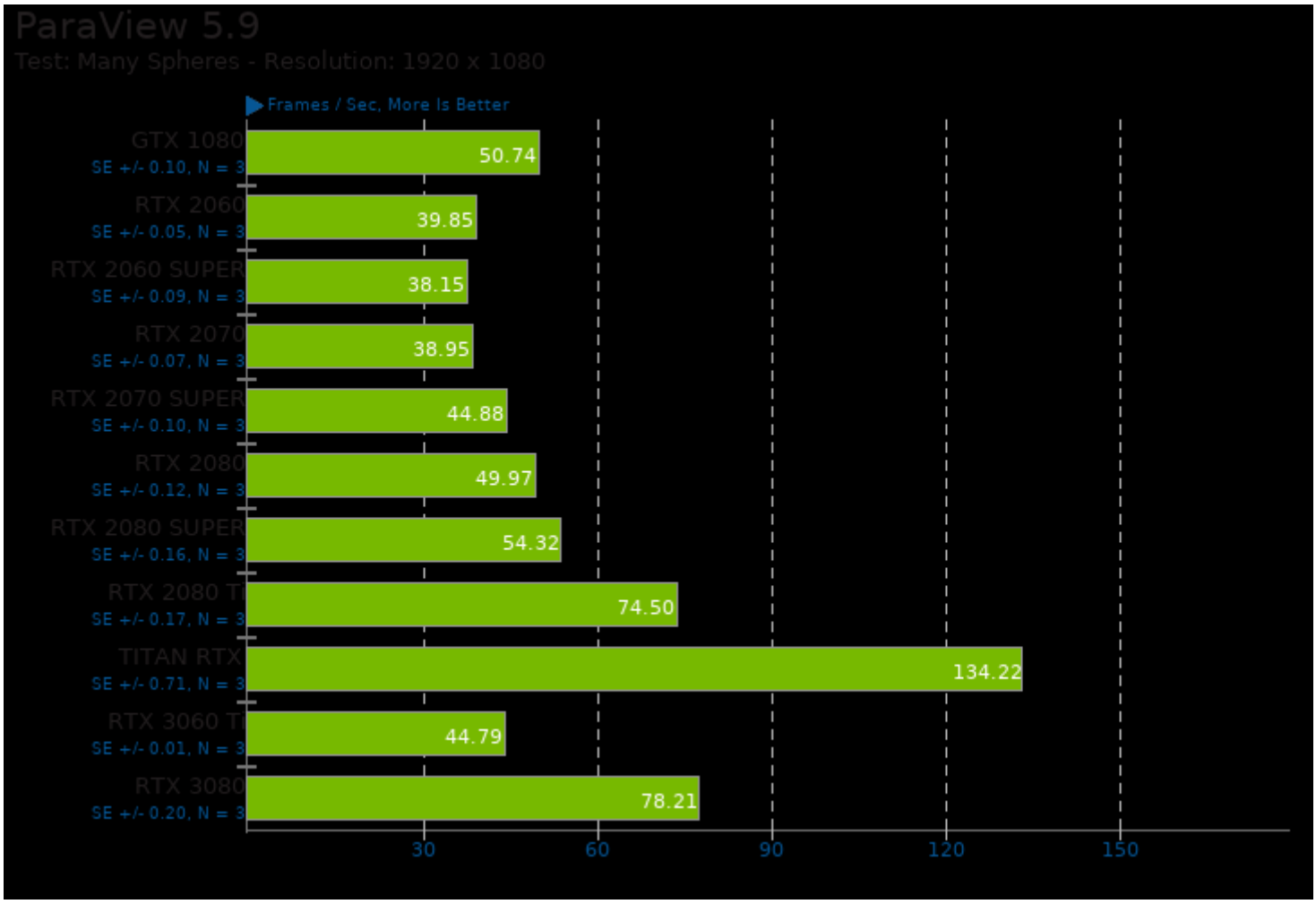

Ray Tracing In Vulkan r6
Resolution: 1920 x 1080 - Scene: Cornell Box
FPS, More Is Better
GTX 1080
SE +/- 0.00016, N = 3
5.47352
RTX 2060
SE +/- 0.07535, N = 3
45.99730
RTX 2060 SUPER
SE +/- 0.00969, N = 3
52.15340
RTX 2070
SE +/- 0.01070, N = 3
52.81090
RTX 2070 SUPER
SE +/- 0.10734, N = 3
61.70590
RTX 2080
SE +/- 0.30956, N = 3
67.93070
RTX 2080 SUPER
SE +/- 0.02054, N = 3
75.24460
RTX 2080 Ti
SE +/- 0.12692, N = 3
102.06000
TITAN RTX
SE +/- 0.02949, N = 3
106.17000
RTX 3060 Ti
SE +/- 0.07950, N = 3
67.80410
RTX 3080
SE +/- 0.09025, N = 3
117.91900
30
60
90
120
150
1. (CXX) g++ options: -O3 -lbacktrace -lstdc++fs -lm -ldl -lpthread

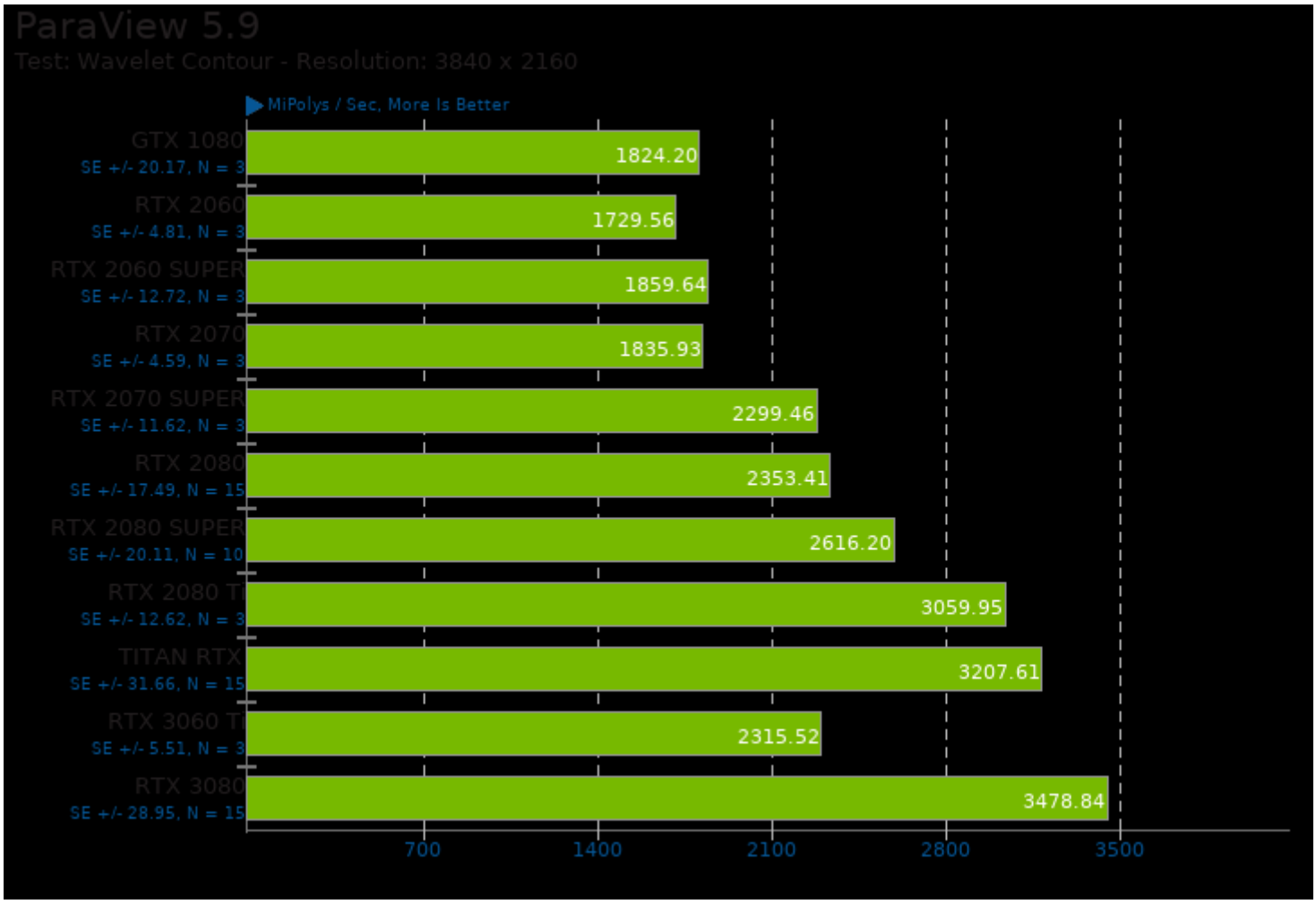

Ray Tracing In Vulkan r6
Resolution: 1920 x 1200 - Scene: Cornell Box
FPS, More Is Better
GTX 1080
SE +/- 0.00041, N = 3
4.46278
RTX 2060
SE +/- 0.09916, N = 3
37.82970
RTX 2060 SUPER
SE +/- 0.00486, N = 3
42.93720
RTX 2070
SE +/- 0.02265, N = 3
43.66750
RTX 2070 SUPER
SE +/- 0.02272, N = 3
50.73120
RTX 2080
SE +/- 0.14783, N = 3
55.27150
RTX 2080 SUPER
SE +/- 0.01022, N = 3
61.68090
RTX 2080 Ti
SE +/- 0.03080, N = 3
84.00120
TITAN RTX
SE +/- 0.01754, N = 3
87.47150
RTX 3060 Ti
SE +/- 0.01476, N = 3
55.39430
RTX 3080
SE +/- 0.03977, N = 3
97.19970
20
40
60
80
100
1. (CXX) g++ options: -O3 -lbacktrace -lstdc++fs -lm -ldl -lpthread

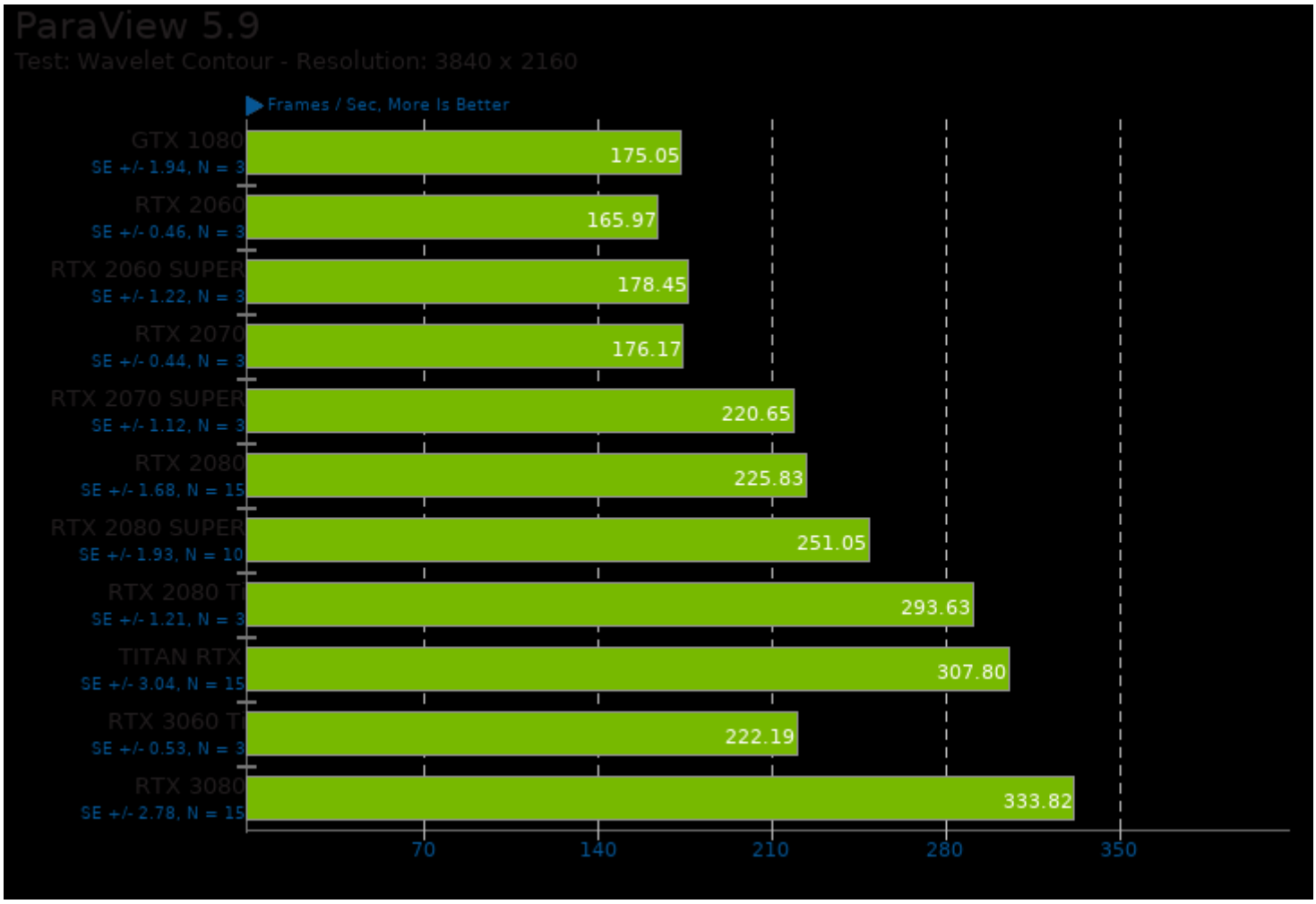

ParaView 5.9
Test: Many Spheres - Resolution: 3840 x 2160
MiPolys / Sec, More Is Better
GTX 1080
SE +/- 2.30, N = 3
4838.59
RTX 2060
SE +/- 0.28, N = 3
3815.14
RTX 2060 SUPER
SE +/- 2.20, N = 3
3748.65
RTX 2070
SE +/- 4.35, N = 3
3833.35
RTX 2070 SUPER
SE +/- 1.45, N = 3
4407.23
RTX 2080
SE +/- 5.07, N = 3
4876.99
RTX 2080 SUPER
SE +/- 1.58, N = 3
5323.27
RTX 2080 Ti
SE +/- 7.19, N = 3
7296.59
TITAN RTX
SE +/- 46.85, N = 3
12083.86
RTX 3060 Ti
SE +/- 2.44, N = 3
4458.32
RTX 3080
SE +/- 11.77, N = 3
7680.54
3K
6K
9K
12K
15K

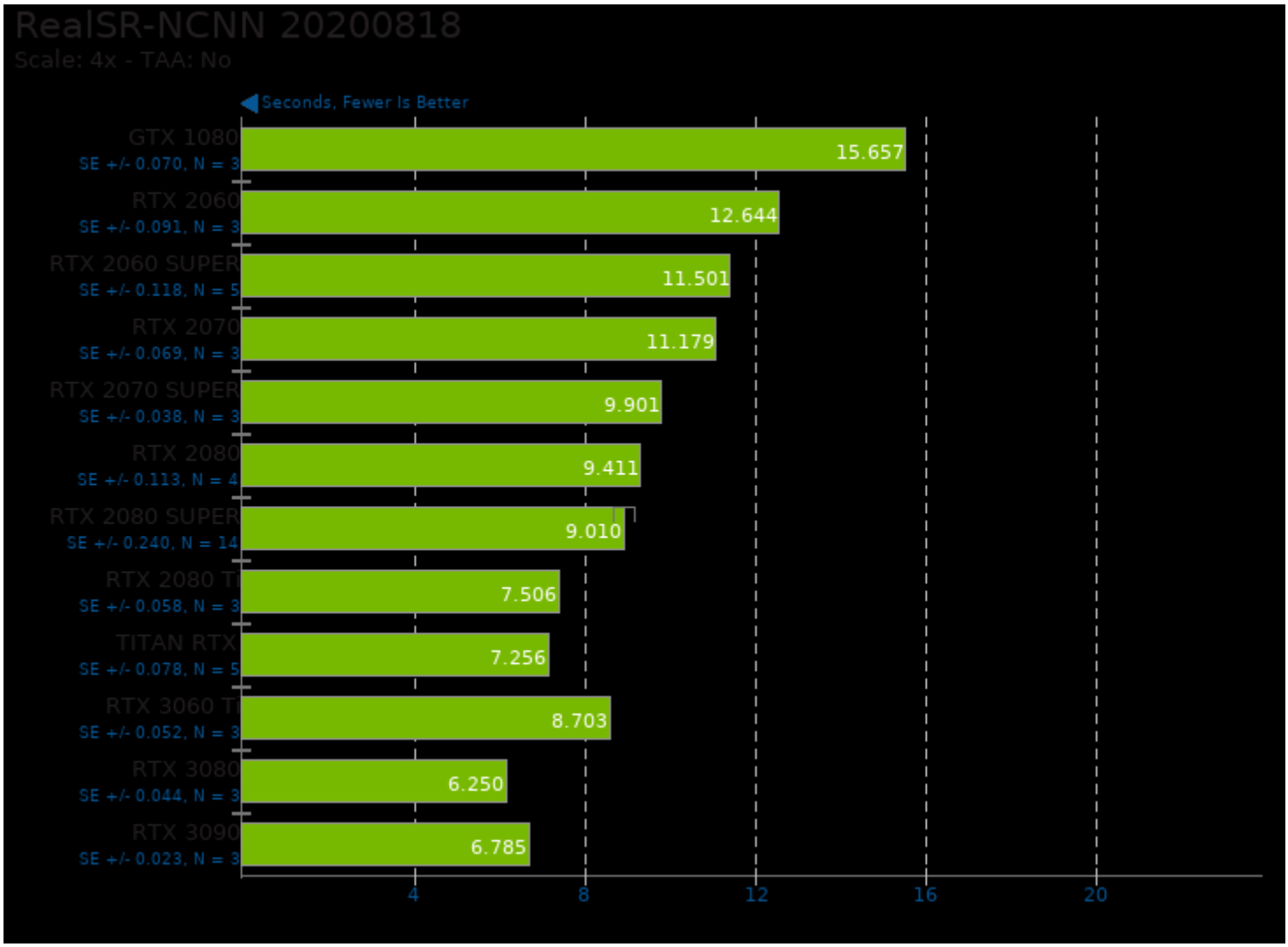

ParaView 5.9
Test: Many Spheres - Resolution: 3840 x 2160
Frames / Sec, More Is Better
GTX 1080
SE +/- 0.02, N = 3
48.26
RTX 2060
SE +/- 0.00, N = 3
38.06
RTX 2060 SUPER
SE +/- 0.02, N = 3
37.39
RTX 2070
SE +/- 0.04, N = 3
38.23
RTX 2070 SUPER
SE +/- 0.01, N = 3
43.96
RTX 2080
SE +/- 0.05, N = 3
48.65
RTX 2080 SUPER
SE +/- 0.01, N = 3
53.10
RTX 2080 Ti
SE +/- 0.07, N = 3
72.78
TITAN RTX
SE +/- 0.47, N = 3
120.53
RTX 3060 Ti
SE +/- 0.02, N = 3
44.47
RTX 3080
SE +/- 0.12, N = 3
76.61
30
60
90
120
150

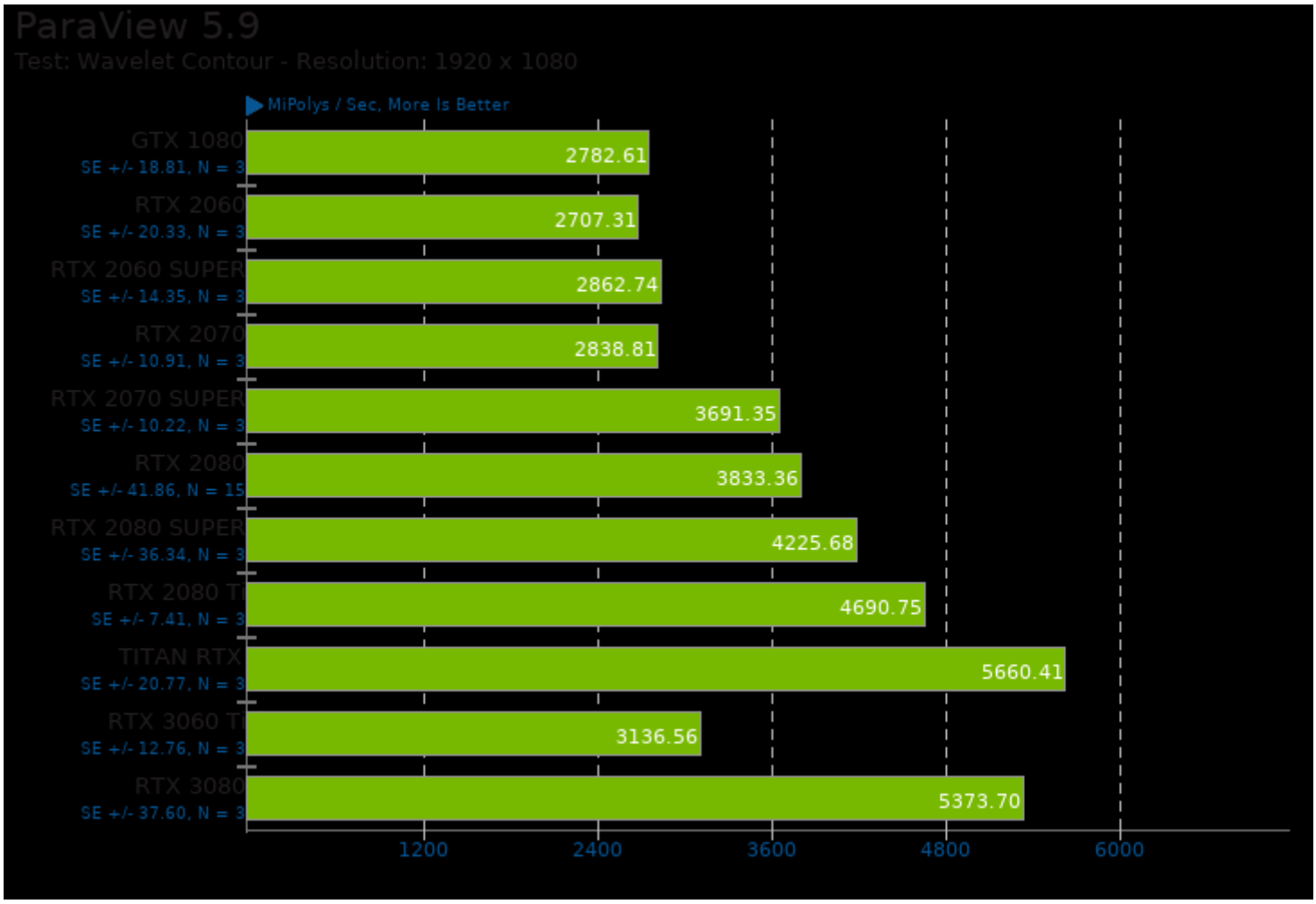

ParaView 5.9
Test: Many Spheres - Resolution: 1920 x 1080
MiPolys / Sec, More Is Better
GTX 1080
SE +/- 9.93, N = 3
5086.64
RTX 2060
SE +/- 4.56, N = 3
3994.77
RTX 2060 SUPER
SE +/- 9.03, N = 3
3824.56
RTX 2070
SE +/- 7.36, N = 3
3904.56
RTX 2070 SUPER
SE +/- 10.38, N = 3
4499.13
RTX 2080
SE +/- 11.76, N = 3
5009.19
RTX 2080 SUPER
SE +/- 16.45, N = 3
5446.21
RTX 2080 Ti
SE +/- 17.40, N = 3
7469.29
TITAN RTX
SE +/- 70.90, N = 3
13455.85
RTX 3060 Ti
SE +/- 0.86, N = 3
4490.52
RTX 3080
SE +/- 20.20, N = 3
7841.30
3K
6K
9K
12K
15K

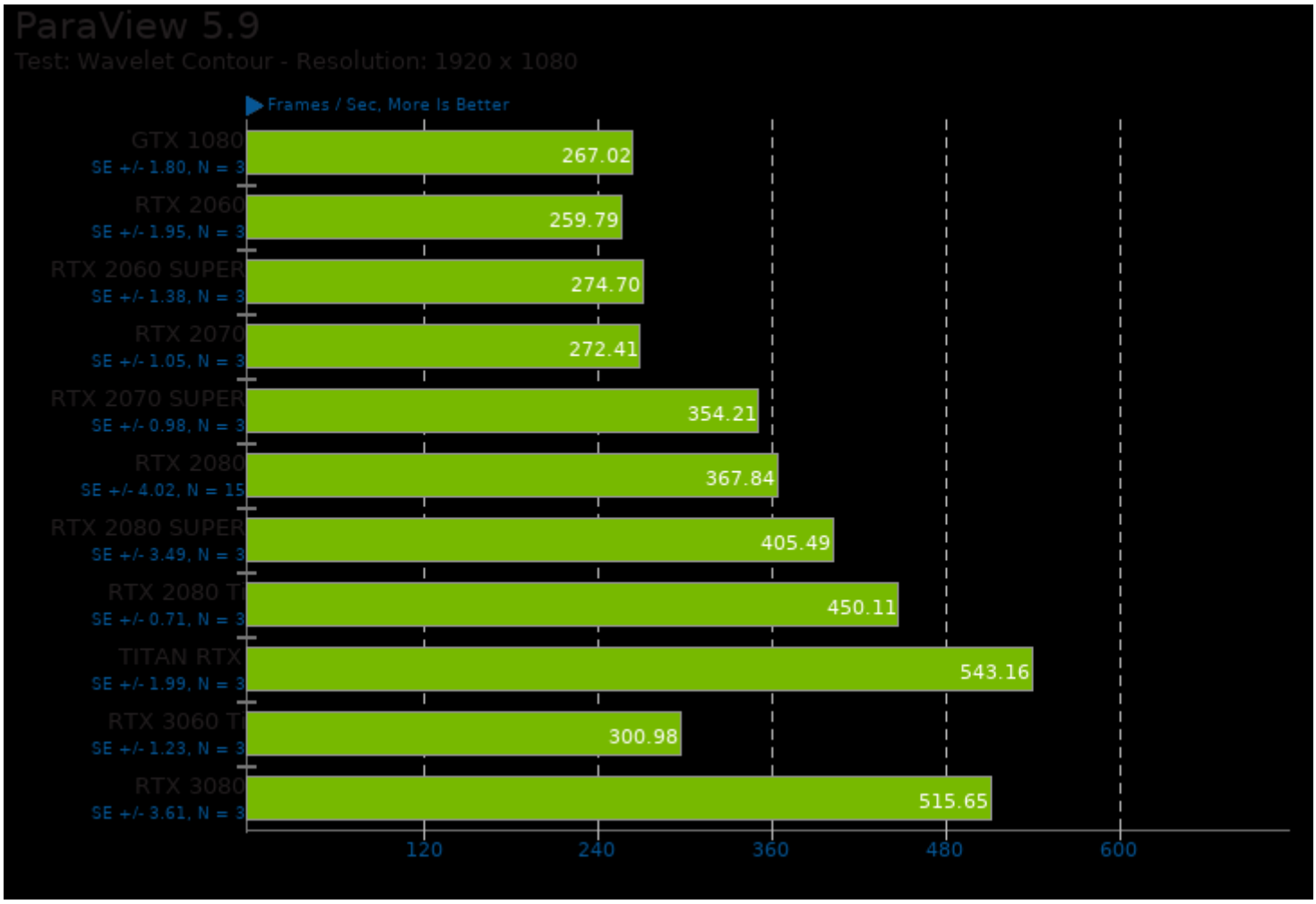

ParaView 5.9
Test: Many Spheres - Resolution: 1920 x 1080
Frames / Sec, More Is Better
GTX 1080
SE +/- 0.10, N = 3
50.74
RTX 2060
SE +/- 0.05, N = 3
39.85
RTX 2060 SUPER
SE +/- 0.09, N = 3
38.15
RTX 2070
SE +/- 0.07, N = 3
38.95
RTX 2070 SUPER
SE +/- 0.10, N = 3
44.88
RTX 2080
SE +/- 0.12, N = 3
49.97
RTX 2080 SUPER
SE +/- 0.16, N = 3
54.32
RTX 2080 Ti
SE +/- 0.17, N = 3
74.50
TITAN RTX
SE +/- 0.71, N = 3
134.22
RTX 3060 Ti
SE +/- 0.01, N = 3
44.79
RTX 3080
SE +/- 0.20, N = 3
78.21
30
60
90
120
150

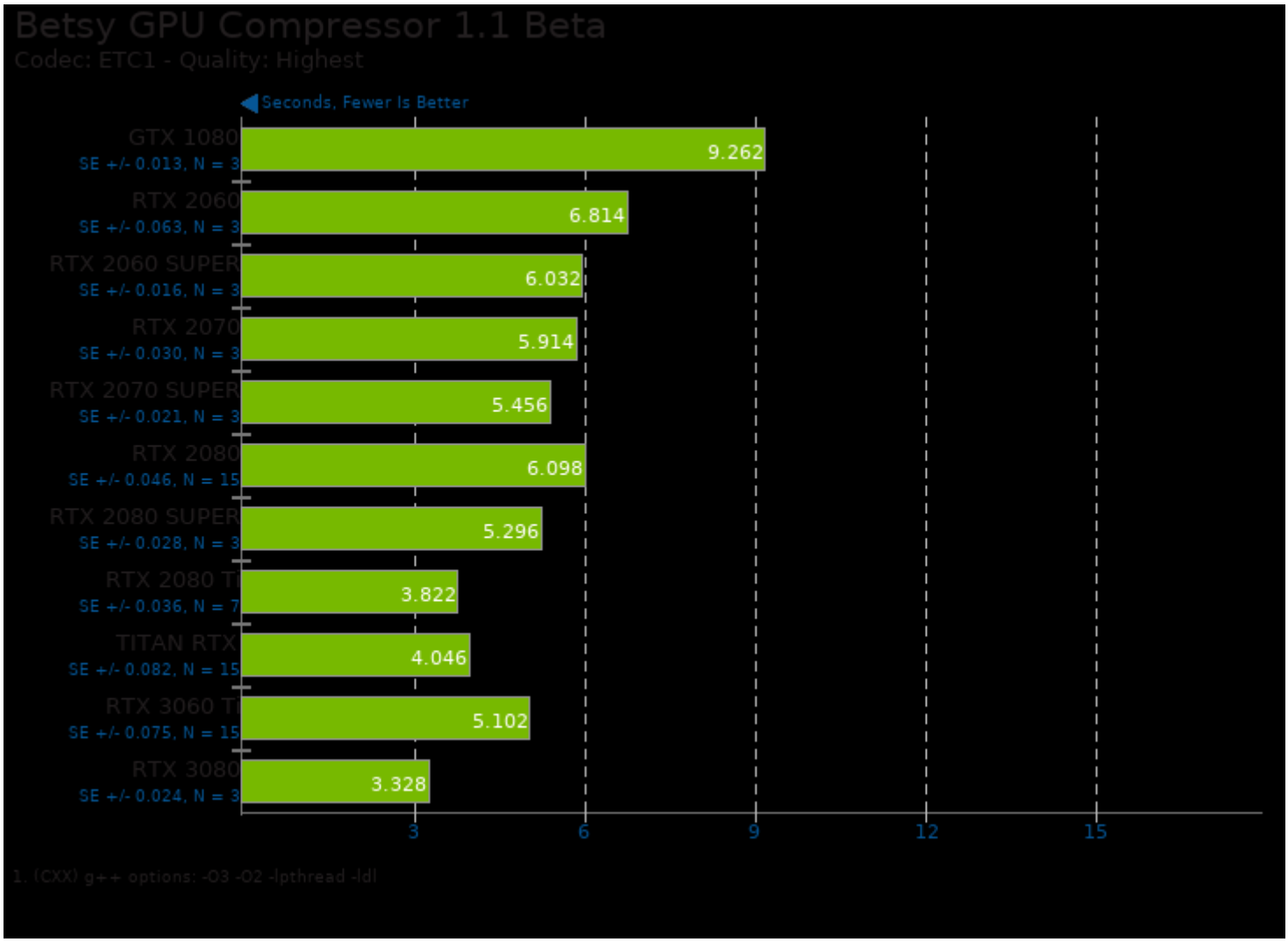

ParaView 5.9
Test: Wavelet Contour - Resolution: 3840 x 2160
MiPolys / Sec, More Is Better
GTX 1080
SE +/- 20.17, N = 3
1824.20
RTX 2060
SE +/- 4.81, N = 3
1729.56
RTX 2060 SUPER
SE +/- 12.72, N = 3
1859.64
RTX 2070
SE +/- 4.59, N = 3
1835.93
RTX 2070 SUPER
SE +/- 11.62, N = 3
2299.46
RTX 2080
SE +/- 17.49, N = 15
2353.41
RTX 2080 SUPER
SE +/- 20.11, N = 10
2616.20
RTX 2080 Ti
SE +/- 12.62, N = 3
3059.95
TITAN RTX
SE +/- 31.66, N = 15
3207.61
RTX 3060 Ti
SE +/- 5.51, N = 3
2315.52
RTX 3080
SE +/- 28.95, N = 15
3478.84
700
1400
2100
2800
3500

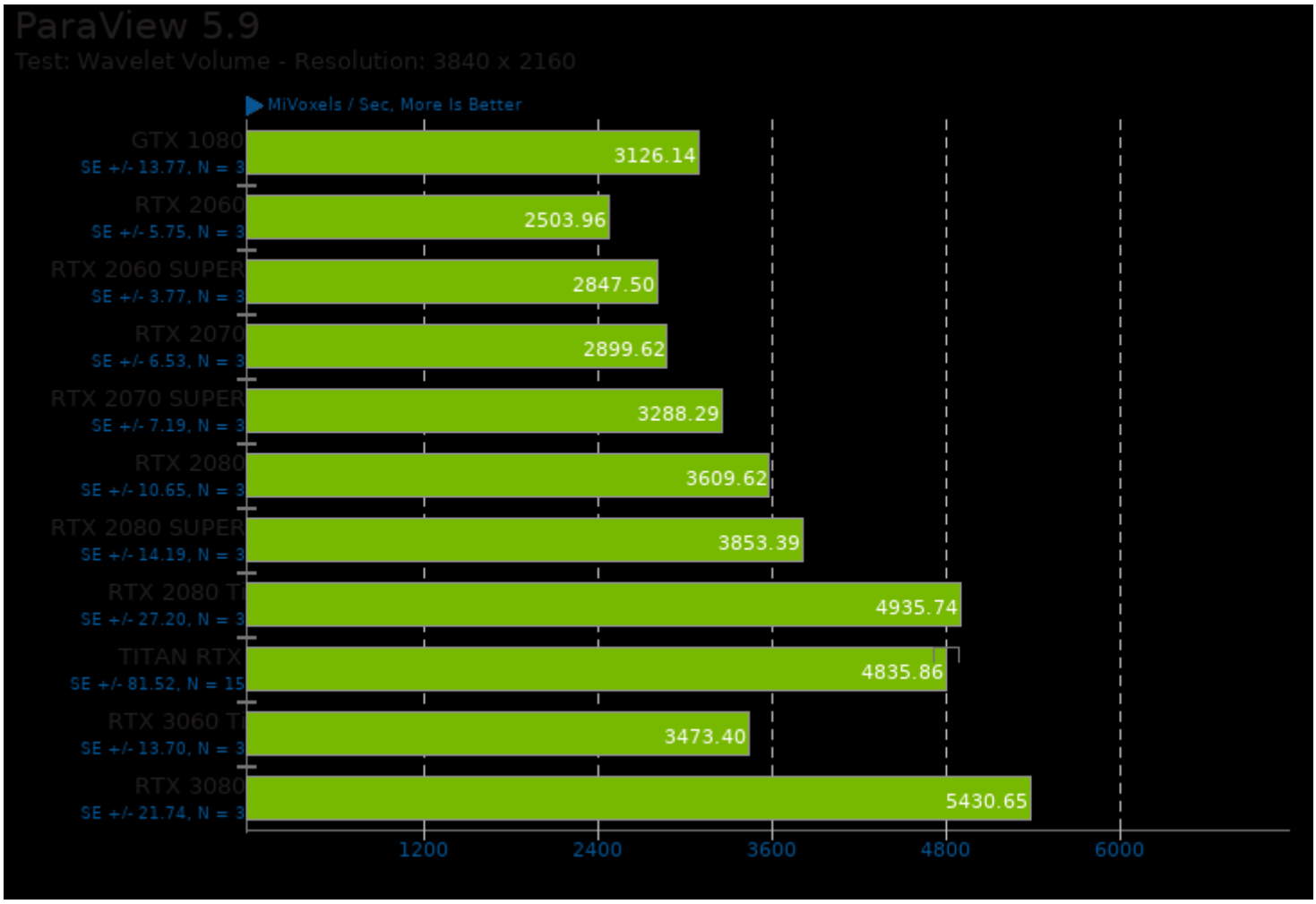

ParaView 5.9
Test: Wavelet Contour - Resolution: 3840 x 2160
Frames / Sec, More Is Better
GTX 1080
SE +/- 1.94, N = 3
175.05
RTX 2060
SE +/- 0.46, N = 3
165.97
RTX 2060 SUPER
SE +/- 1.22, N = 3
178.45
RTX 2070
SE +/- 0.44, N = 3
176.17
RTX 2070 SUPER
SE +/- 1.12, N = 3
220.65
RTX 2080
SE +/- 1.68, N = 15
225.83
RTX 2080 SUPER
SE +/- 1.93, N = 10
251.05
RTX 2080 Ti
SE +/- 1.21, N = 3
293.63
TITAN RTX
SE +/- 3.04, N = 15
307.80
RTX 3060 Ti
SE +/- 0.53, N = 3
222.19
RTX 3080
SE +/- 2.78, N = 15
333.82
70
140
210
280
350

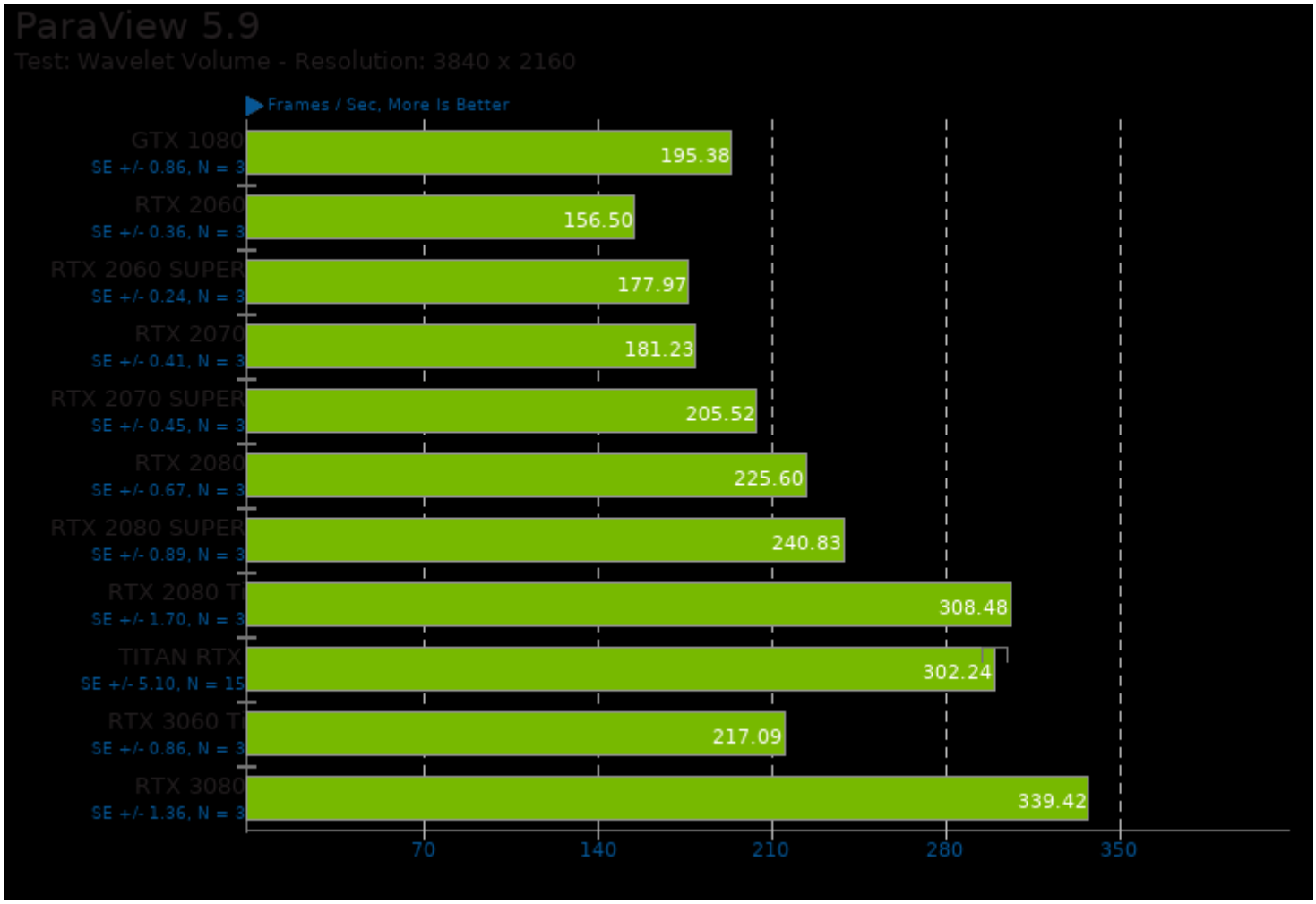

RealSR-NCNN 20200818
Scale: 4x - TAA: No
Seconds, Fewer Is Better
GTX 1080
SE +/- 0.070, N = 3
15.657
RTX 2060
SE +/- 0.091, N = 3
12.644
RTX 2060 SUPER
SE +/- 0.118, N = 5
11.501
RTX 2070
SE +/- 0.069, N = 3
11.179
RTX 2070 SUPER
SE +/- 0.038, N = 3
9.901
RTX 2080
SE +/- 0.113, N = 4
9.411
RTX 2080 SUPER
SE +/- 0.240, N = 14
9.010
RTX 2080 Ti
SE +/- 0.058, N = 3
7.506
TITAN RTX
SE +/- 0.078, N = 5
7.256
RTX 3060 Ti
SE +/- 0.052, N = 3
8.703
RTX 3080
SE +/- 0.044, N = 3
6.250
RTX 3090
SE +/- 0.023, N = 3
6.785
4
8
12
16
20

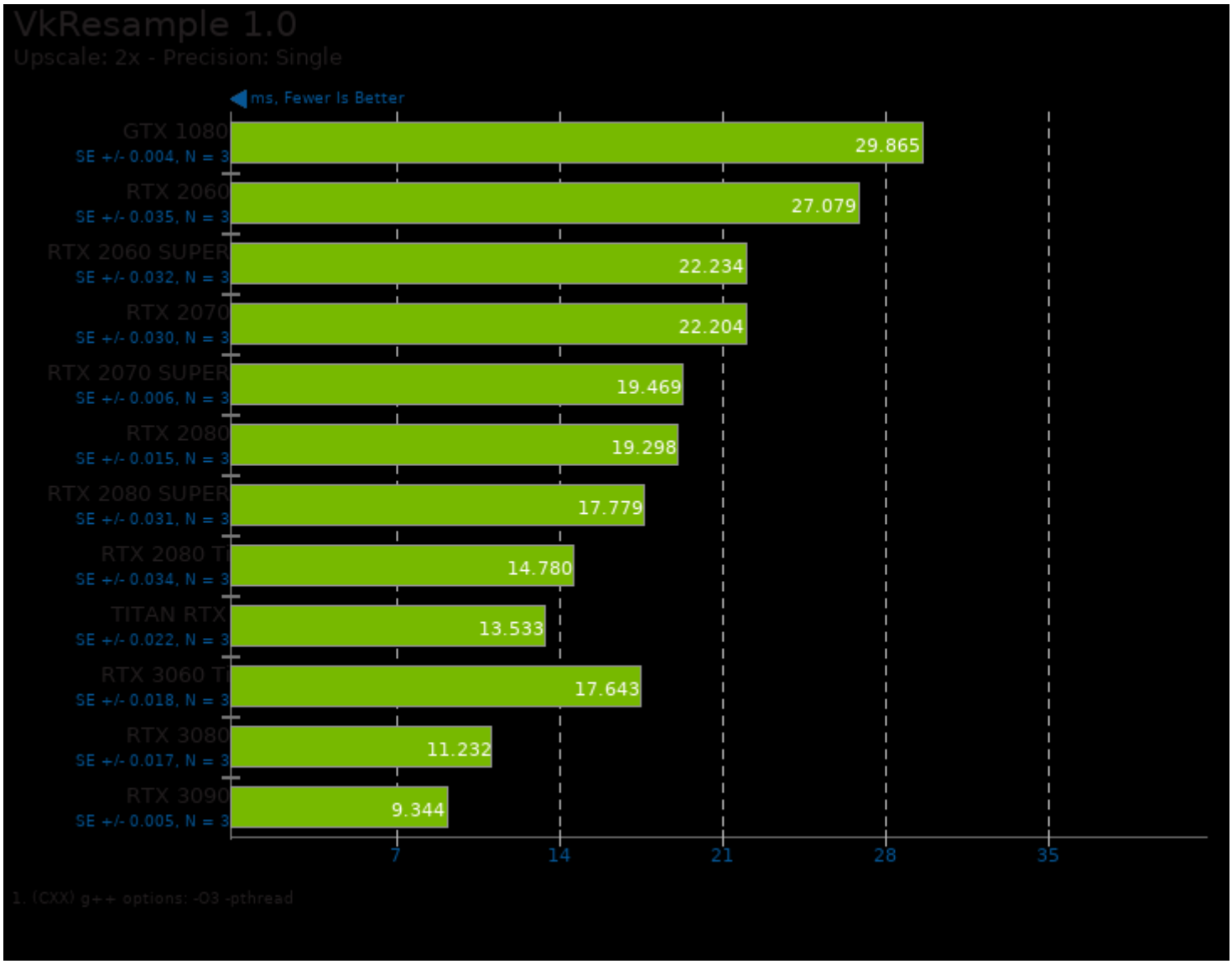

ParaView 5.9
Test: Wavelet Contour - Resolution: 1920 x 1080
MiPolys / Sec, More Is Better
GTX 1080
SE +/- 18.81, N = 3
2782.61
RTX 2060
SE +/- 20.33, N = 3
2707.31
RTX 2060 SUPER
SE +/- 14.35, N = 3
2862.74
RTX 2070
SE +/- 10.91, N = 3
2838.81
RTX 2070 SUPER
SE +/- 10.22, N = 3
3691.35
RTX 2080
SE +/- 41.86, N = 15
3833.36
RTX 2080 SUPER
SE +/- 36.34, N = 3
4225.68
RTX 2080 Ti
SE +/- 7.41, N = 3
4690.75
TITAN RTX
SE +/- 20.77, N = 3
5660.41
RTX 3060 Ti
SE +/- 12.76, N = 3
3136.56
RTX 3080
SE +/- 37.60, N = 3
5373.70
1200
2400
3600
4800
6000

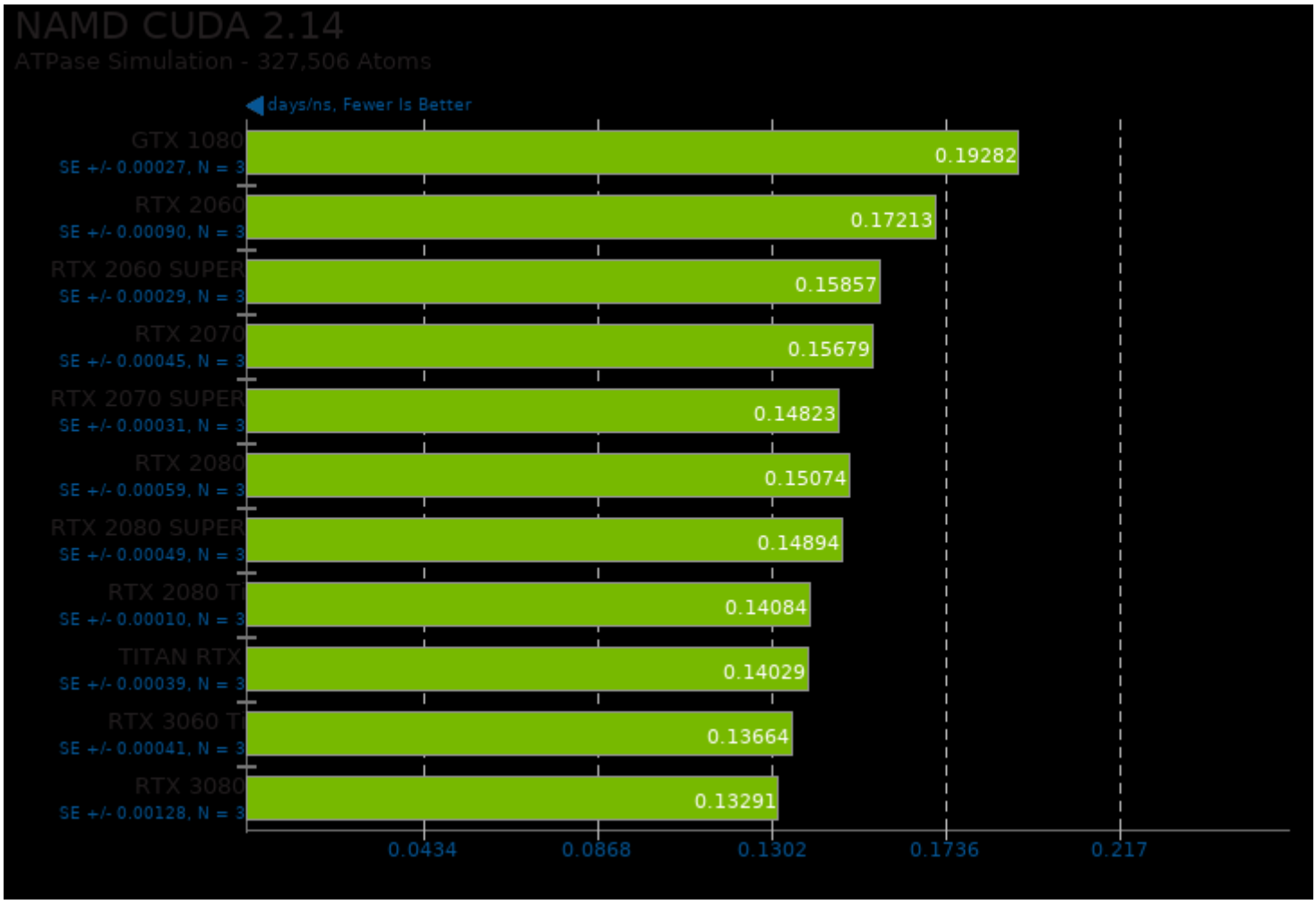

ParaView 5.9
Test: Wavelet Contour - Resolution: 1920 x 1080
Frames / Sec, More Is Better
GTX 1080
SE +/- 1.80, N = 3
267.02
RTX 2060
SE +/- 1.95, N = 3
259.79
RTX 2060 SUPER
SE +/- 1.38, N = 3
274.70
RTX 2070
SE +/- 1.05, N = 3
272.41
RTX 2070 SUPER
SE +/- 0.98, N = 3
354.21
RTX 2080
SE +/- 4.02, N = 15
367.84
RTX 2080 SUPER
SE +/- 3.49, N = 3
405.49
RTX 2080 Ti
SE +/- 0.71, N = 3
450.11
TITAN RTX
SE +/- 1.99, N = 3
543.16
RTX 3060 Ti
SE +/- 1.23, N = 3
300.98
RTX 3080
SE +/- 3.61, N = 3
515.65
120
240
360
480
600

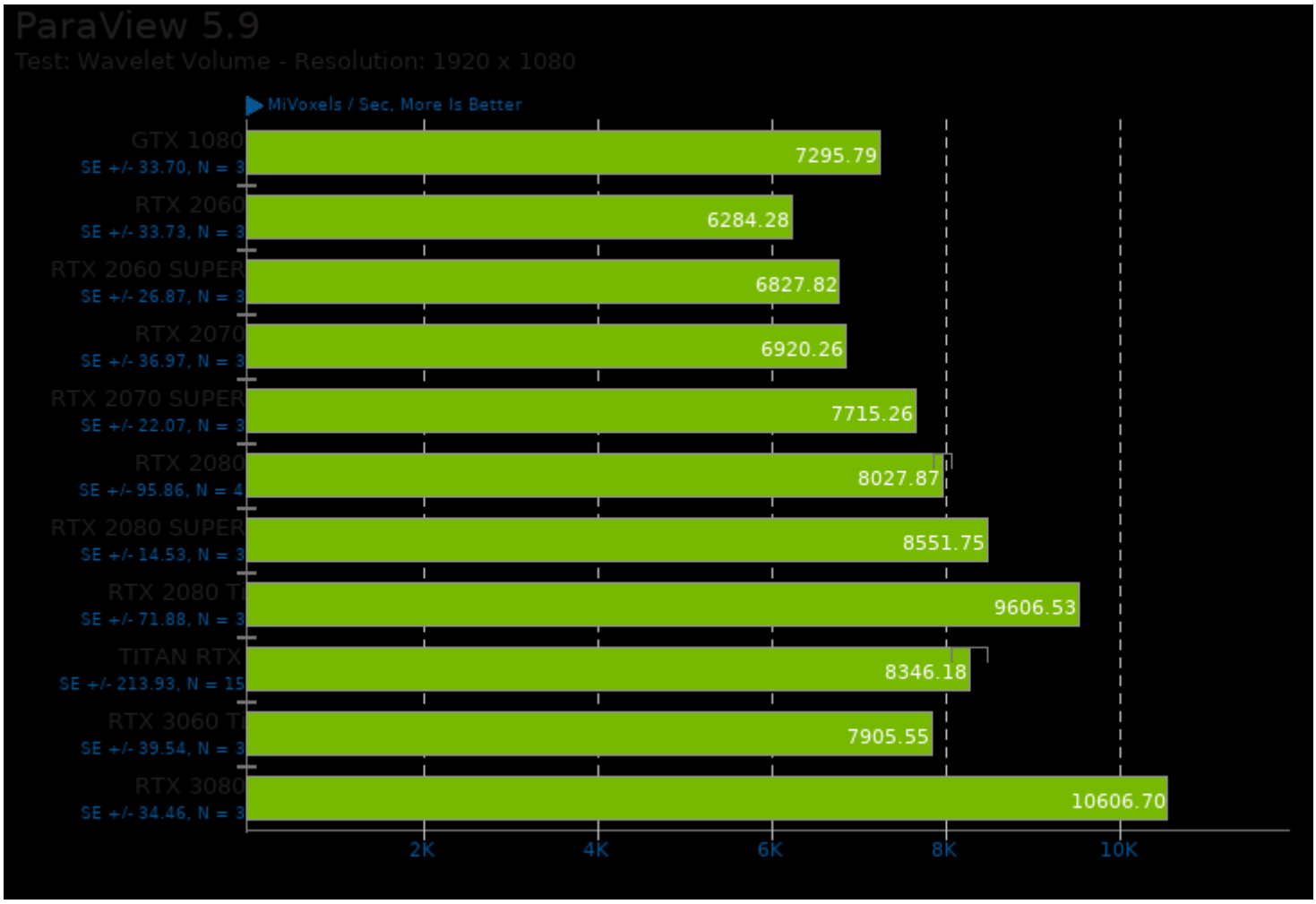

Betsy GPU Compressor 1.1 Beta
Codec: ETC1 - Quality: Highest
Seconds, Fewer Is Better
GTX 1080
SE +/- 0.013, N = 3
9.262
RTX 2060
SE +/- 0.063, N = 3
6.814
RTX 2060 SUPER
SE +/- 0.016, N = 3
6.032
RTX 2070
SE +/- 0.030, N = 3
5.914
RTX 2070 SUPER
SE +/- 0.021, N = 3
5.456
RTX 2080
SE +/- 0.046, N = 15
6.098
RTX 2080 SUPER
SE +/- 0.028, N = 3
5.296
RTX 2080 Ti
SE +/- 0.036, N = 7
3.822
TITAN RTX
SE +/- 0.082, N = 15
4.046
RTX 3060 Ti
SE +/- 0.075, N = 15
5.102
RTX 3080
SE +/- 0.024, N = 3
3.328
3
6
9
12
15
1. (CXX) g++ options: -O3 -O2 -lpthread -ldl

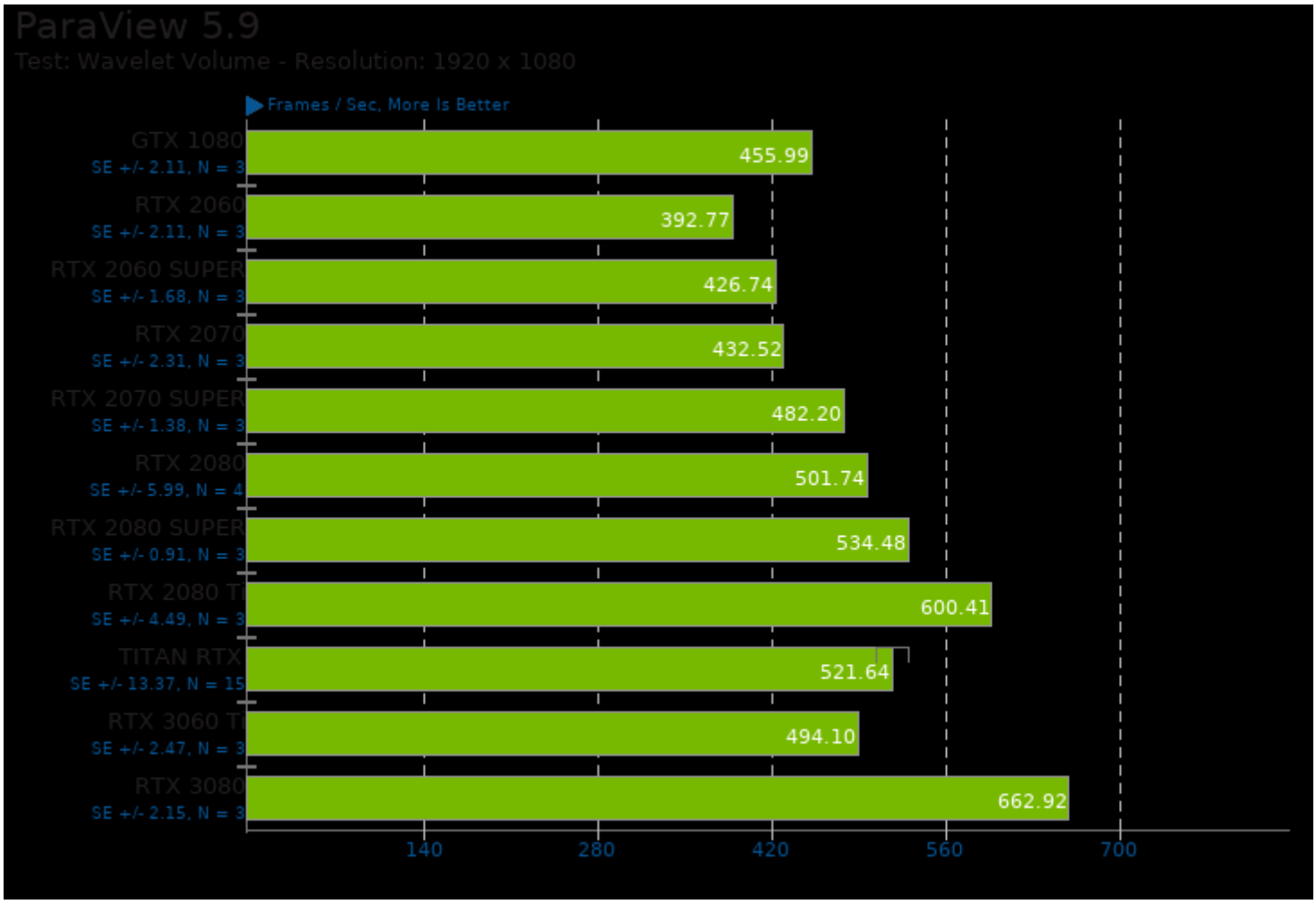

ParaView 5.9
Test: Wavelet Volume - Resolution: 3840 x 2160
MiVoxels / Sec, More Is Better
GTX 1080
SE +/- 13.77, N = 3
3126.14
RTX 2060
SE +/- 5.75, N = 3
2503.96
RTX 2060 SUPER
SE +/- 3.77, N = 3
2847.50
RTX 2070
SE +/- 6.53, N = 3
2899.62
RTX 2070 SUPER
SE +/- 7.19, N = 3
3288.29
RTX 2080
SE +/- 10.65, N = 3
3609.62
RTX 2080 SUPER
SE +/- 14.19, N = 3
3853.39
RTX 2080 Ti
SE +/- 27.20, N = 3
4935.74
TITAN RTX
SE +/- 81.52, N = 15
4835.86
RTX 3060 Ti
SE +/- 13.70, N = 3
3473.40
RTX 3080
SE +/- 21.74, N = 3
5430.65
1200
2400
3600
4800
6000

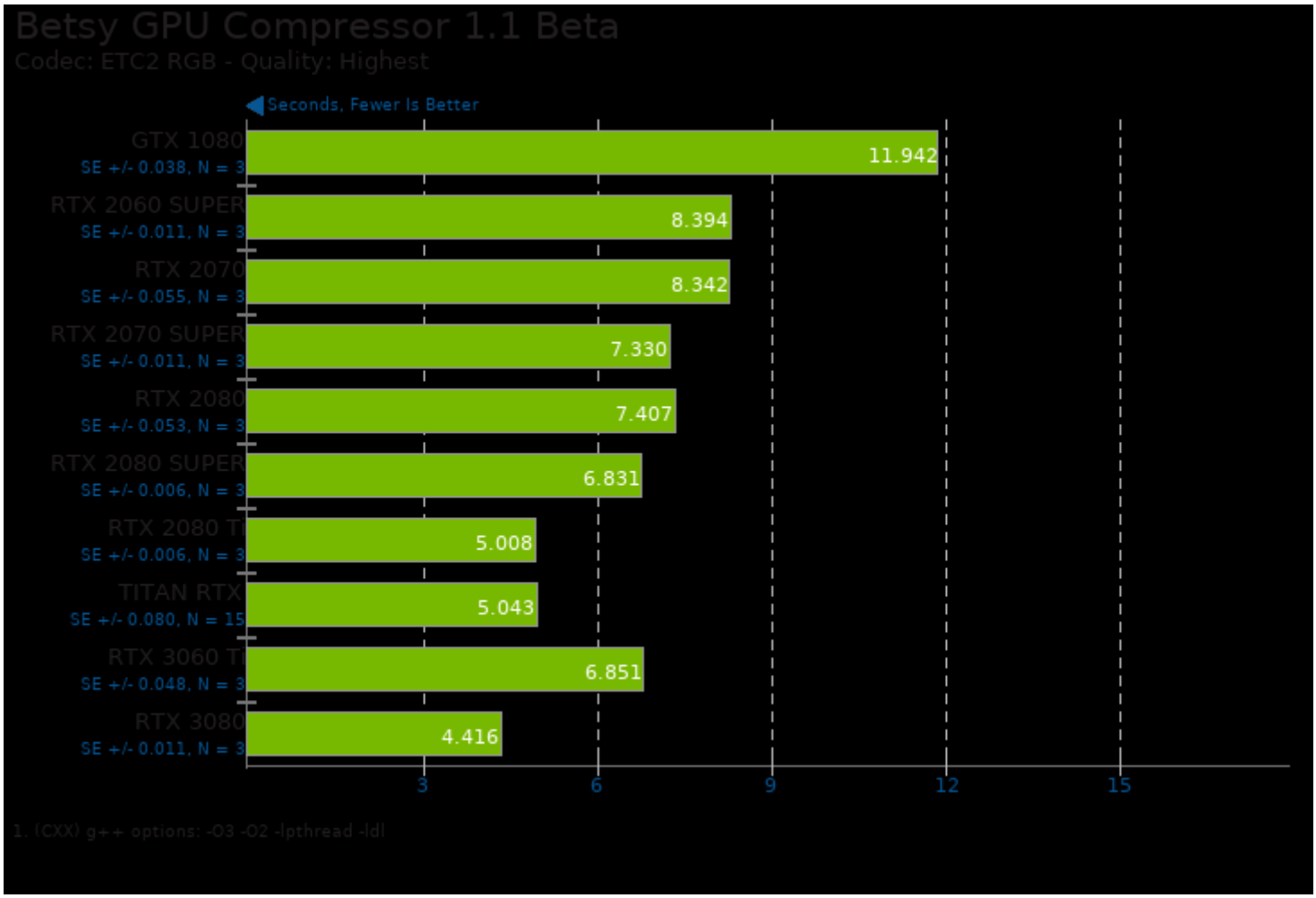

ParaView 5.9
Test: Wavelet Volume - Resolution: 3840 x 2160
Frames / Sec, More Is Better
GTX 1080
SE +/- 0.86, N = 3
195.38
RTX 2060
SE +/- 0.36, N = 3
156.50
RTX 2060 SUPER
SE +/- 0.24, N = 3
177.97
RTX 2070
SE +/- 0.41, N = 3
181.23
RTX 2070 SUPER
SE +/- 0.45, N = 3
205.52
RTX 2080
SE +/- 0.67, N = 3
225.60
RTX 2080 SUPER
SE +/- 0.89, N = 3
240.83
RTX 2080 Ti
SE +/- 1.70, N = 3
308.48
TITAN RTX
SE +/- 5.10, N = 15
302.24
RTX 3060 Ti
SE +/- 0.86, N = 3
217.09
RTX 3080
SE +/- 1.36, N = 3
339.42
70
140
210
280
350

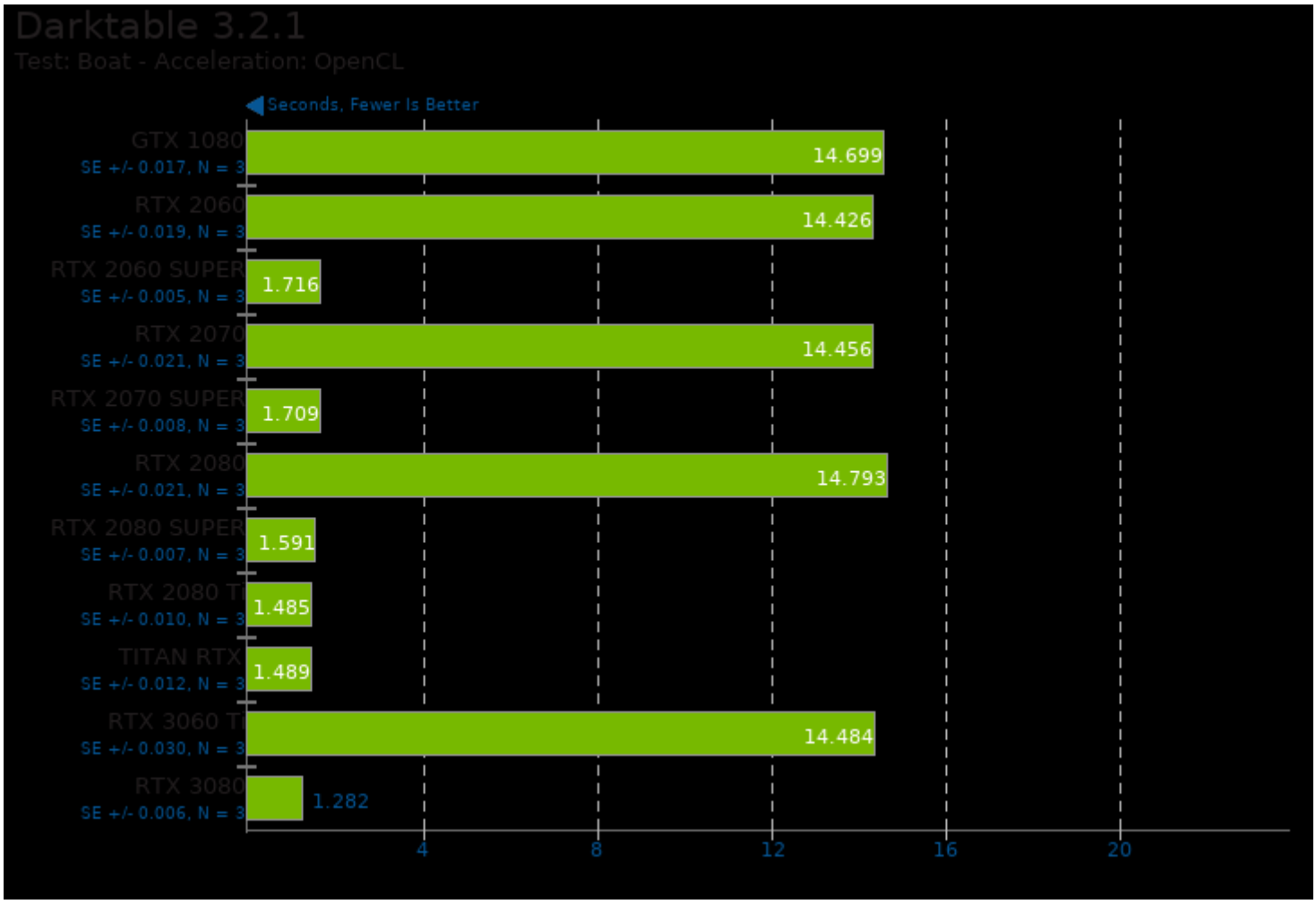

VkResample 1.0
Upscale: 2x - Precision: Single
ms, Fewer Is Better
GTX 1080
SE +/- 0.004, N = 3
29.865
RTX 2060
SE +/- 0.035, N = 3
27.079
RTX 2060 SUPER
SE +/- 0.032, N = 3
22.234
RTX 2070
SE +/- 0.030, N = 3
22.204
RTX 2070 SUPER
SE +/- 0.006, N = 3
19.469
RTX 2080
SE +/- 0.015, N = 3
19.298
RTX 2080 SUPER
SE +/- 0.031, N = 3
17.779
RTX 2080 Ti
SE +/- 0.034, N = 3
14.780
TITAN RTX
SE +/- 0.022, N = 3
13.533
RTX 3060 Ti
SE +/- 0.018, N = 3
17.643
RTX 3080
SE +/- 0.017, N = 3
11.232
RTX 3090
SE +/- 0.005, N = 3
9.344
7
14
21
28
35
1. (CXX) g++ options: -O3 -pthread

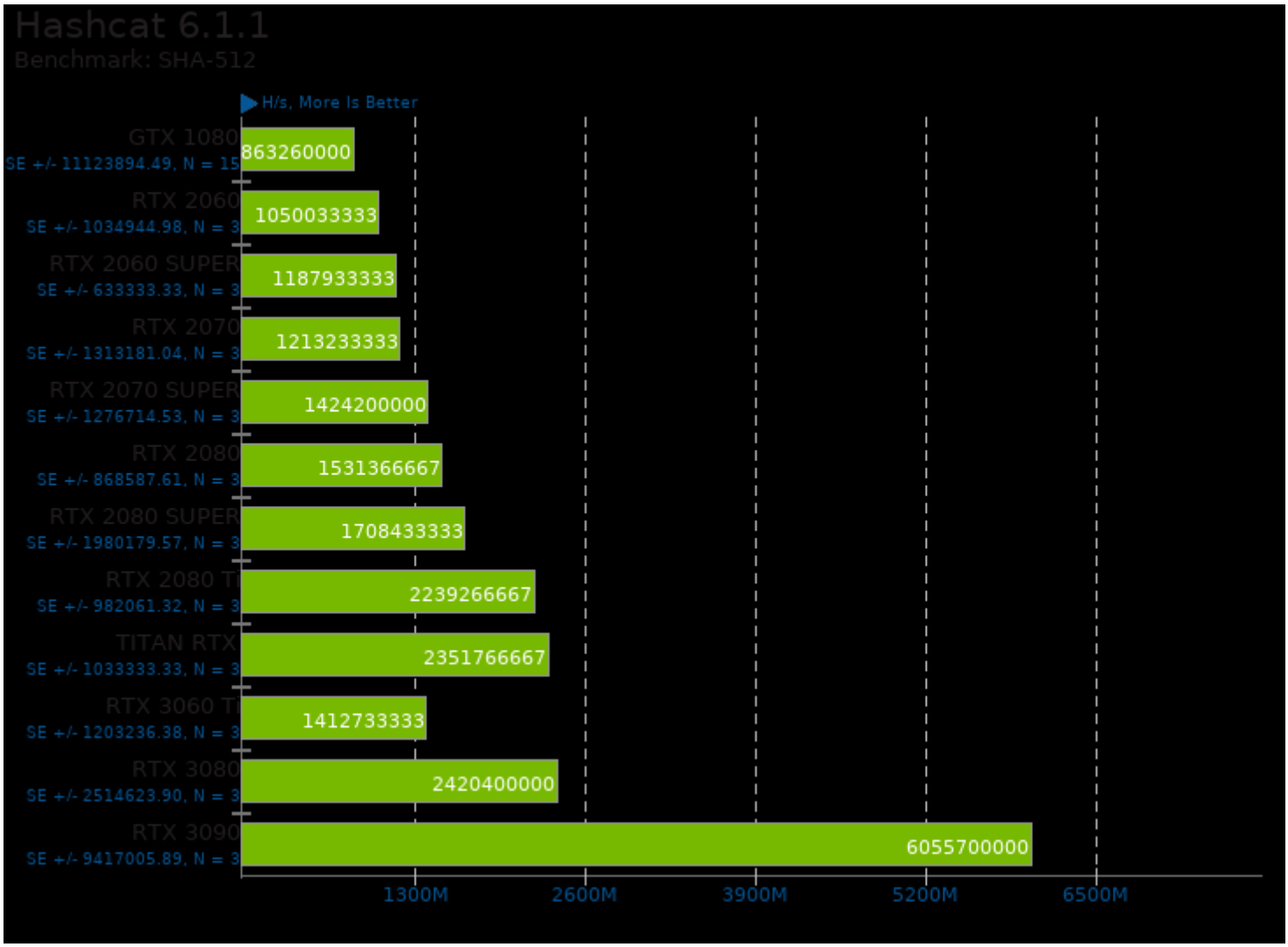

NAMD CUDA 2.14
ATPase Simulation - 327,506 Atoms
days/ns, Fewer Is Better
GTX 1080
SE +/- 0.00027, N = 3
0.19282
RTX 2060
SE +/- 0.00090, N = 3
0.17213
RTX 2060 SUPER
SE +/- 0.00029, N = 3
0.15857
RTX 2070
SE +/- 0.00045, N = 3
0.15679
RTX 2070 SUPER
SE +/- 0.00031, N = 3
0.14823
RTX 2080
SE +/- 0.00059, N = 3
0.15074
RTX 2080 SUPER
SE +/- 0.00049, N = 3
0.14894
RTX 2080 Ti
SE +/- 0.00010, N = 3
0.14084
TITAN RTX
SE +/- 0.00039, N = 3
0.14029
RTX 3060 Ti
SE +/- 0.00041, N = 3
0.13664
RTX 3080
SE +/- 0.00128, N = 3
0.13291
0.0434
0.0868
0.1302
0.1736
0.217

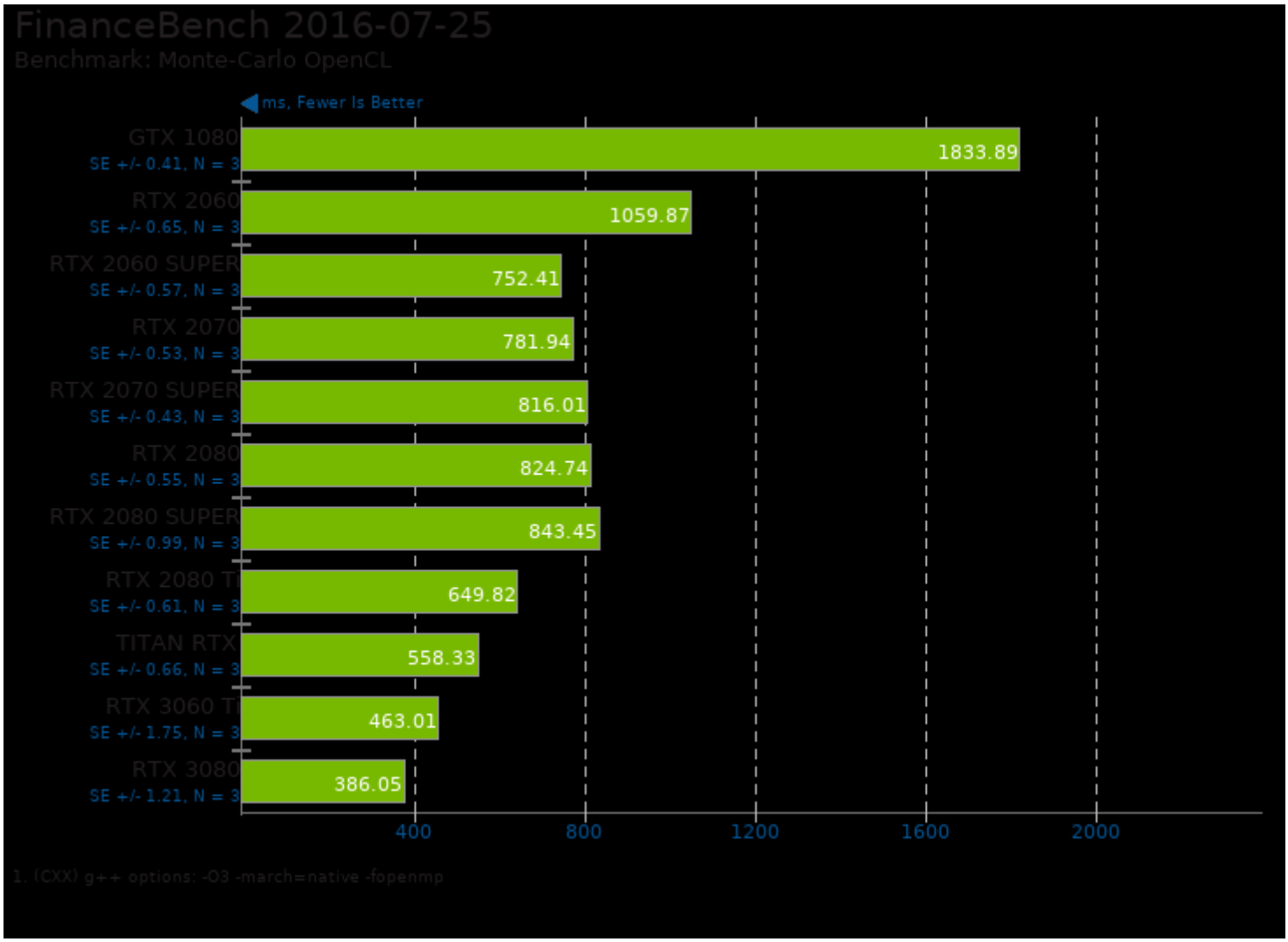

ParaView 5.9
Test: Wavelet Volume - Resolution: 1920 x 1080
MiVoxels / Sec, More Is Better
GTX 1080
SE +/- 33.70, N = 3
7295.79
RTX 2060
SE +/- 33.73, N = 3
6284.28
RTX 2060 SUPER
SE +/- 26.87, N = 3
6827.82
RTX 2070
SE +/- 36.97, N = 3
6920.26
RTX 2070 SUPER
SE +/- 22.07, N = 3
7715.26
RTX 2080
SE +/- 95.86, N = 4
8027.87
RTX 2080 SUPER
SE +/- 14.53, N = 3
8551.75
RTX 2080 Ti
SE +/- 71.88, N = 3
9606.53
TITAN RTX
SE +/- 213.93, N = 15
8346.18
RTX 3060 Ti
SE +/- 39.54, N = 3
7905.55
RTX 3080
SE +/- 34.46, N = 3
10606.70
2K
4K
6K
8K
10K

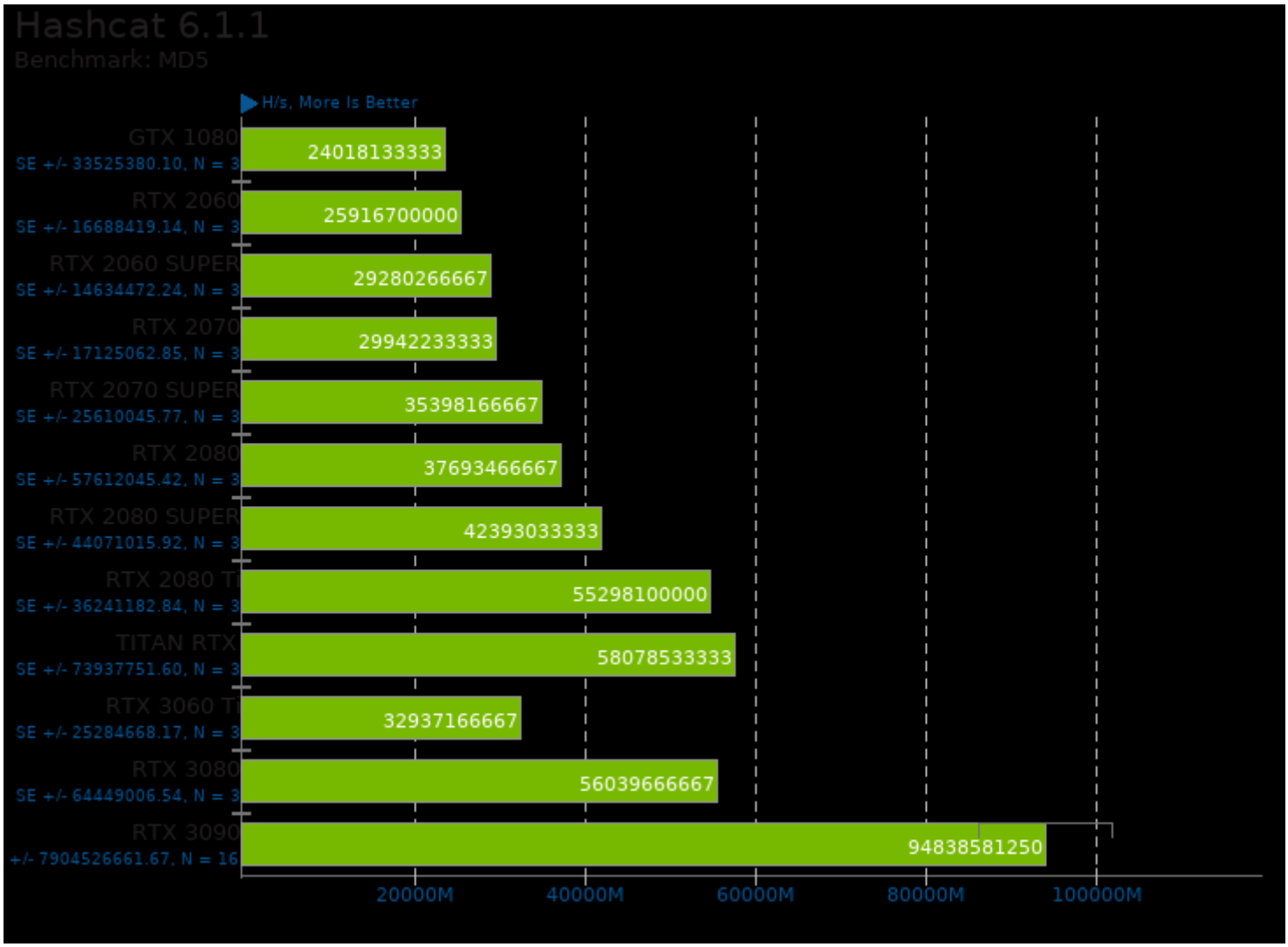

ParaView 5.9
Test: Wavelet Volume - Resolution: 1920 x 1080
Frames / Sec, More Is Better
GTX 1080
SE +/- 2.11, N = 3
455.99
RTX 2060
SE +/- 2.11, N = 3
392.77
RTX 2060 SUPER
SE +/- 1.68, N = 3
426.74
RTX 2070
SE +/- 2.31, N = 3
432.52
RTX 2070 SUPER
SE +/- 1.38, N = 3
482.20
RTX 2080
SE +/- 5.99, N = 4
501.74
RTX 2080 SUPER
SE +/- 0.91, N = 3
534.48
RTX 2080 Ti
SE +/- 4.49, N = 3
600.41
TITAN RTX
SE +/- 13.37, N = 15
521.64
RTX 3060 Ti
SE +/- 2.47, N = 3
494.10
RTX 3080
SE +/- 2.15, N = 3
662.92
140
280
420
560
700

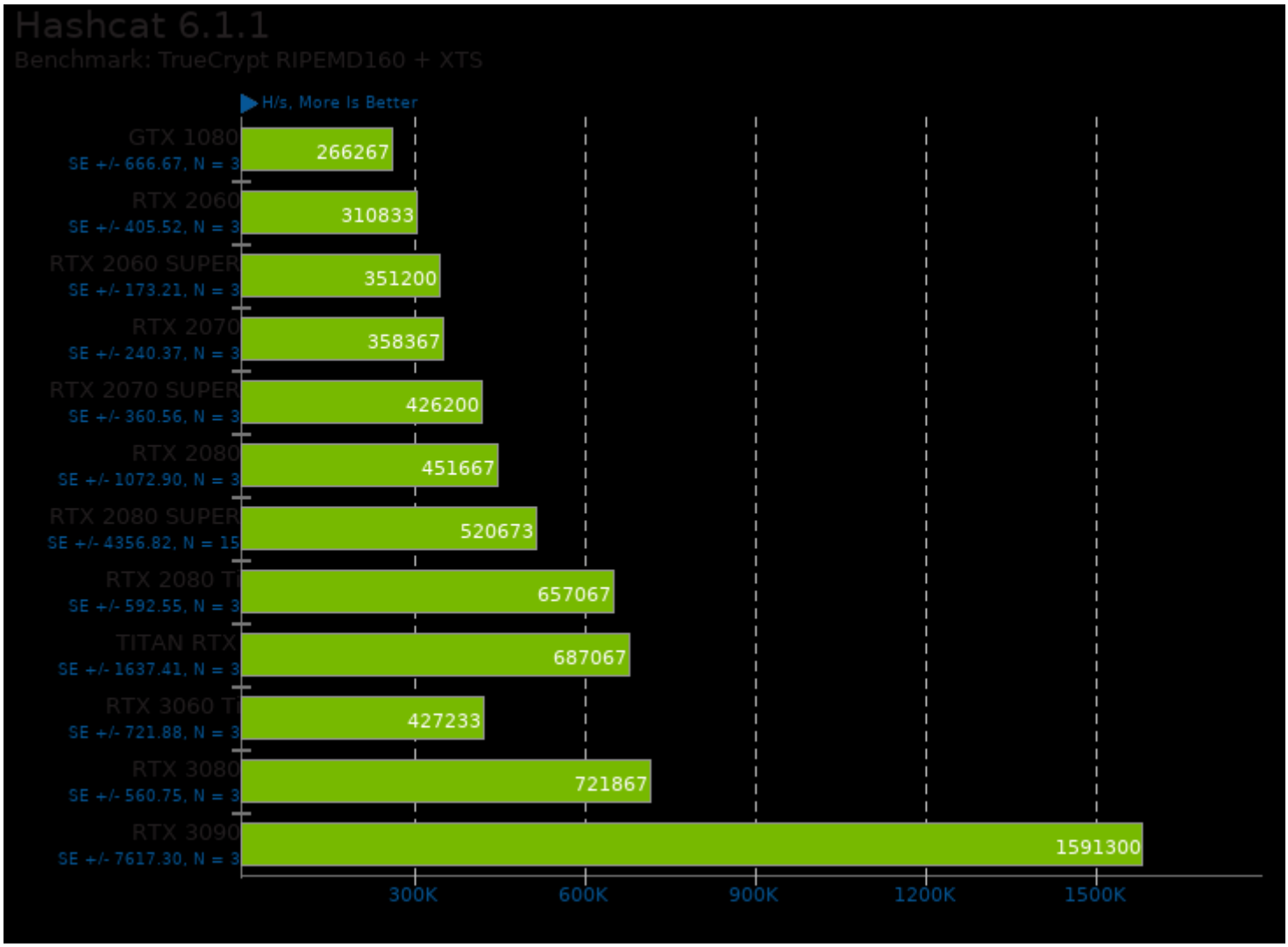

Betsy GPU Compressor 1.1 Beta
Codec: ETC2 RGB - Quality: Highest
Seconds, Fewer Is Better
GTX 1080
SE +/- 0.038, N = 3
11.942
RTX 2060 SUPER
SE +/- 0.011, N = 3
8.394
RTX 2070
SE +/- 0.055, N = 3
8.342
RTX 2070 SUPER
SE +/- 0.011, N = 3
7.330
RTX 2080
SE +/- 0.053, N = 3
7.407
RTX 2080 SUPER
SE +/- 0.006, N = 3
6.831
RTX 2080 Ti
SE +/- 0.006, N = 3
5.008
TITAN RTX
SE +/- 0.080, N = 15
5.043
RTX 3060 Ti
SE +/- 0.048, N = 3
6.851
RTX 3080
SE +/- 0.011, N = 3
4.416
3
6
9
12
15
1. (CXX) g++ options: -O3 -O2 -lpthread -ldl

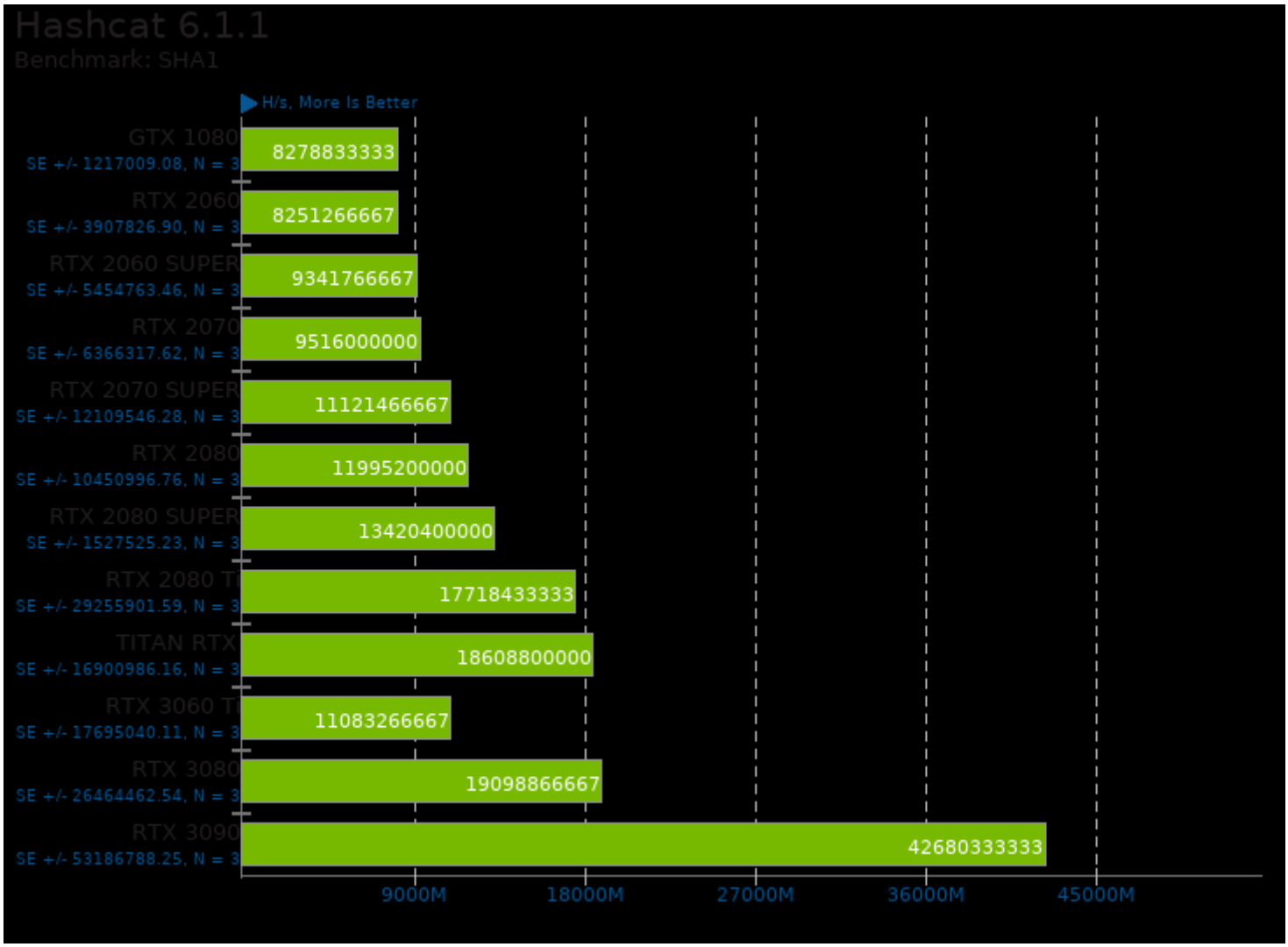

Darktable 3.2.1
Test: Boat - Acceleration: OpenCL
Seconds, Fewer Is Better
GTX 1080
SE +/- 0.017, N = 3
14.699
RTX 2060
SE +/- 0.019, N = 3
14.426
RTX 2060 SUPER
SE +/- 0.005, N = 3
1.716
RTX 2070
SE +/- 0.021, N = 3
14.456
RTX 2070 SUPER
SE +/- 0.008, N = 3
1.709
RTX 2080
SE +/- 0.021, N = 3
14.793
RTX 2080 SUPER
SE +/- 0.007, N = 3
1.591
RTX 2080 Ti
SE +/- 0.010, N = 3
1.485
TITAN RTX
SE +/- 0.012, N = 3
1.489
RTX 3060 Ti
SE +/- 0.030, N = 3
14.484
RTX 3080
SE +/- 0.006, N = 3
1.282
4
8
12
16
20

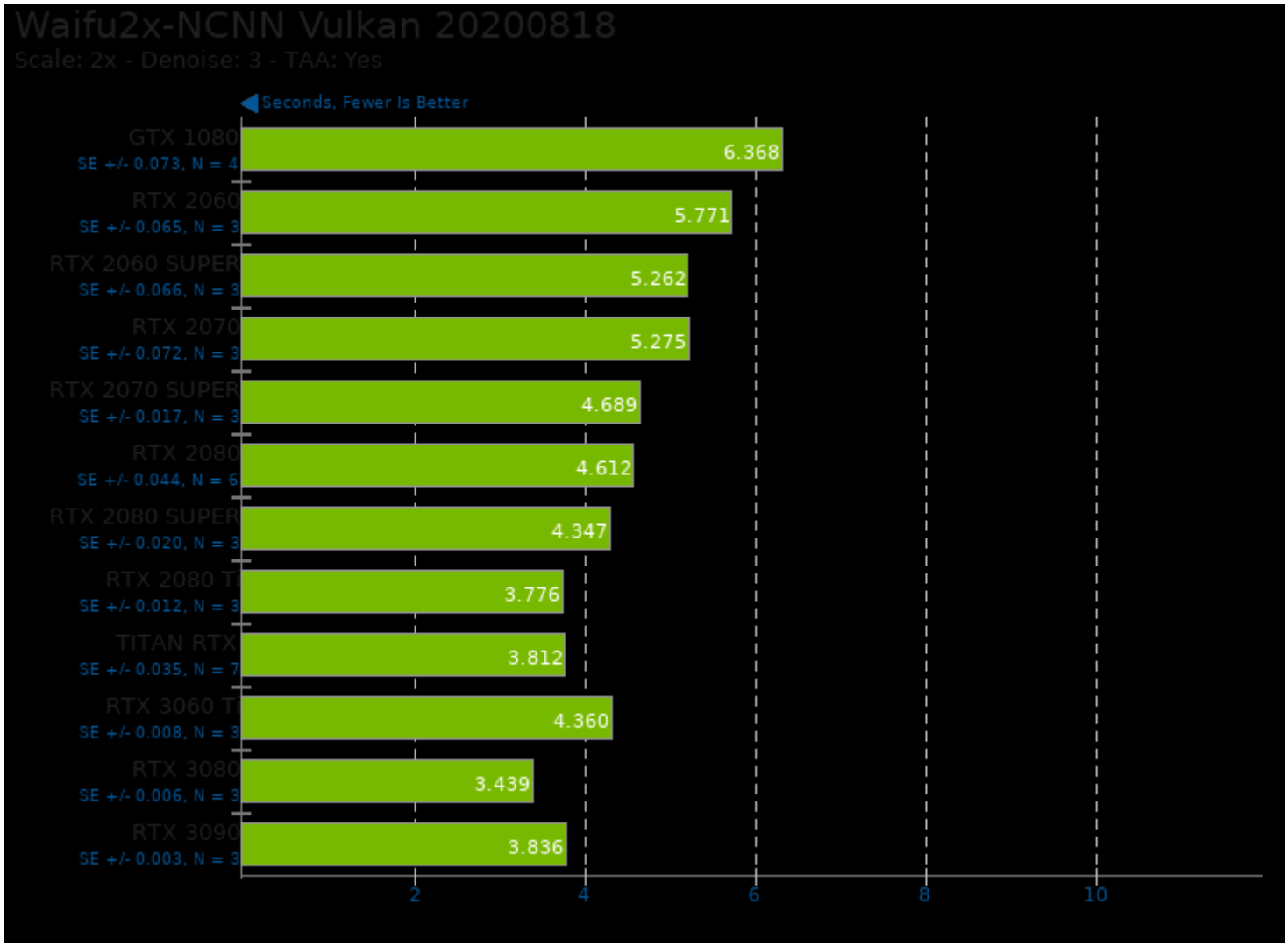

Hashcat 6.1.1
Benchmark: SHA-512
H/s, More Is Better
GTX 1080
SE +/- 11123894.49, N = 15
863260000
RTX 2060
SE +/- 1034944.98, N = 3
1050033333
RTX 2060 SUPER
SE +/- 633333.33, N = 3
1187933333
RTX 2070
SE +/- 1313181.04, N = 3
1213233333
RTX 2070 SUPER
SE +/- 1276714.53, N = 3
1424200000
RTX 2080
SE +/- 868587.61, N = 3
1531366667
RTX 2080 SUPER
SE +/- 1980179.57, N = 3
1708433333
RTX 2080 Ti
SE +/- 982061.32, N = 3
2239266667
TITAN RTX
SE +/- 1033333.33, N = 3
2351766667
RTX 3060 Ti
SE +/- 1203236.38, N = 3
1412733333
RTX 3080
SE +/- 2514623.90, N = 3
2420400000
RTX 3090
SE +/- 9417005.89, N = 3
6055700000
1300M
2600M
3900M
5200M
6500M

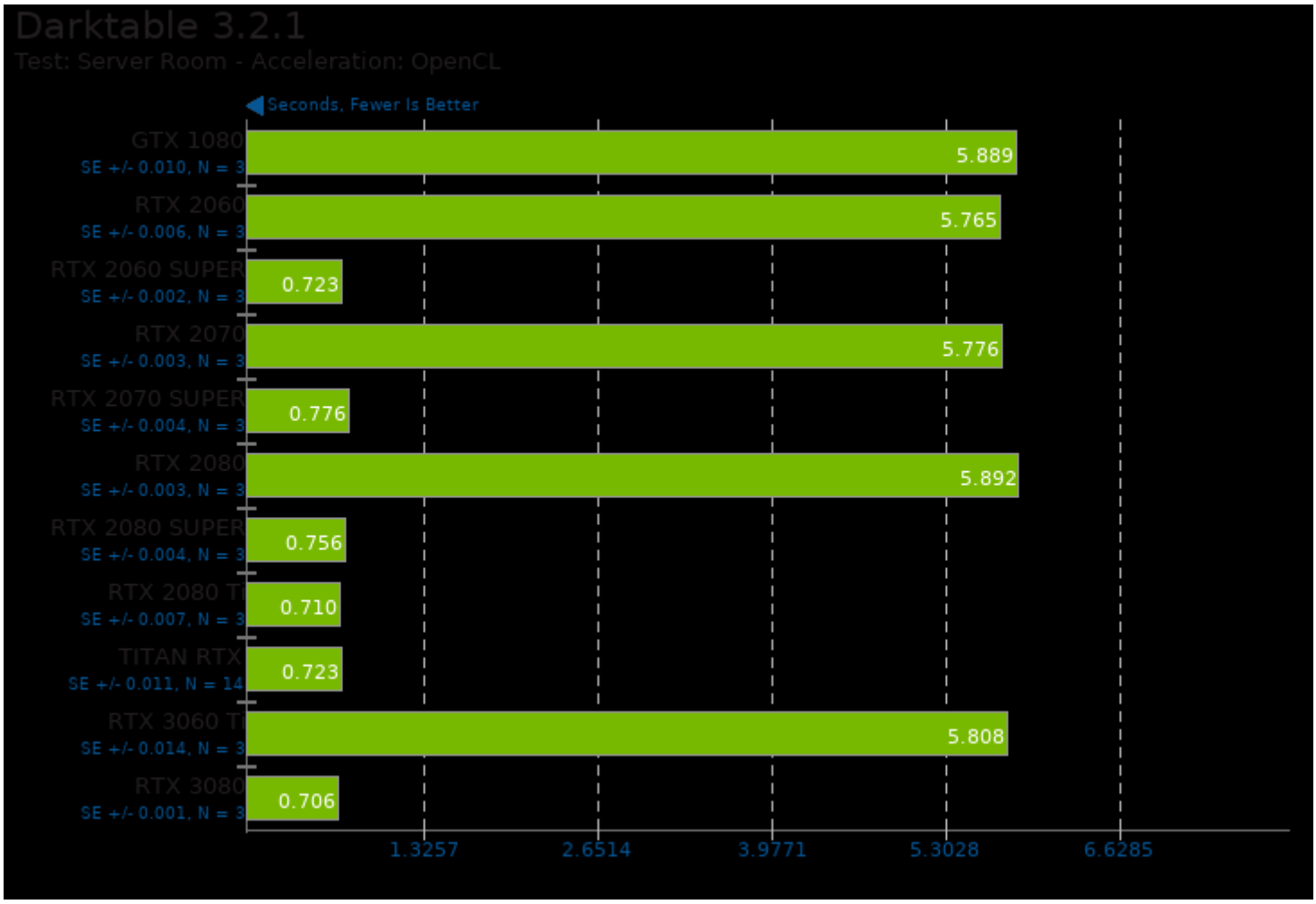

FinanceBench 2016-07-25
Benchmark: Monte-Carlo OpenCL
ms, Fewer Is Better
GTX 1080
SE +/- 0.41, N = 3
1833.89
RTX 2060
SE +/- 0.65, N = 3
1059.87
RTX 2060 SUPER
SE +/- 0.57, N = 3
752.41
RTX 2070
SE +/- 0.53, N = 3
781.94
RTX 2070 SUPER
SE +/- 0.43, N = 3
816.01
RTX 2080
SE +/- 0.55, N = 3
824.74
RTX 2080 SUPER
SE +/- 0.99, N = 3
843.45
RTX 2080 Ti
SE +/- 0.61, N = 3
649.82
TITAN RTX
SE +/- 0.66, N = 3
558.33
RTX 3060 Ti
SE +/- 1.75, N = 3
463.01
RTX 3080
SE +/- 1.21, N = 3
386.05
400
800
1200
1600
2000
1. (CXX) g++ options: -O3 -march=native -fopenmp

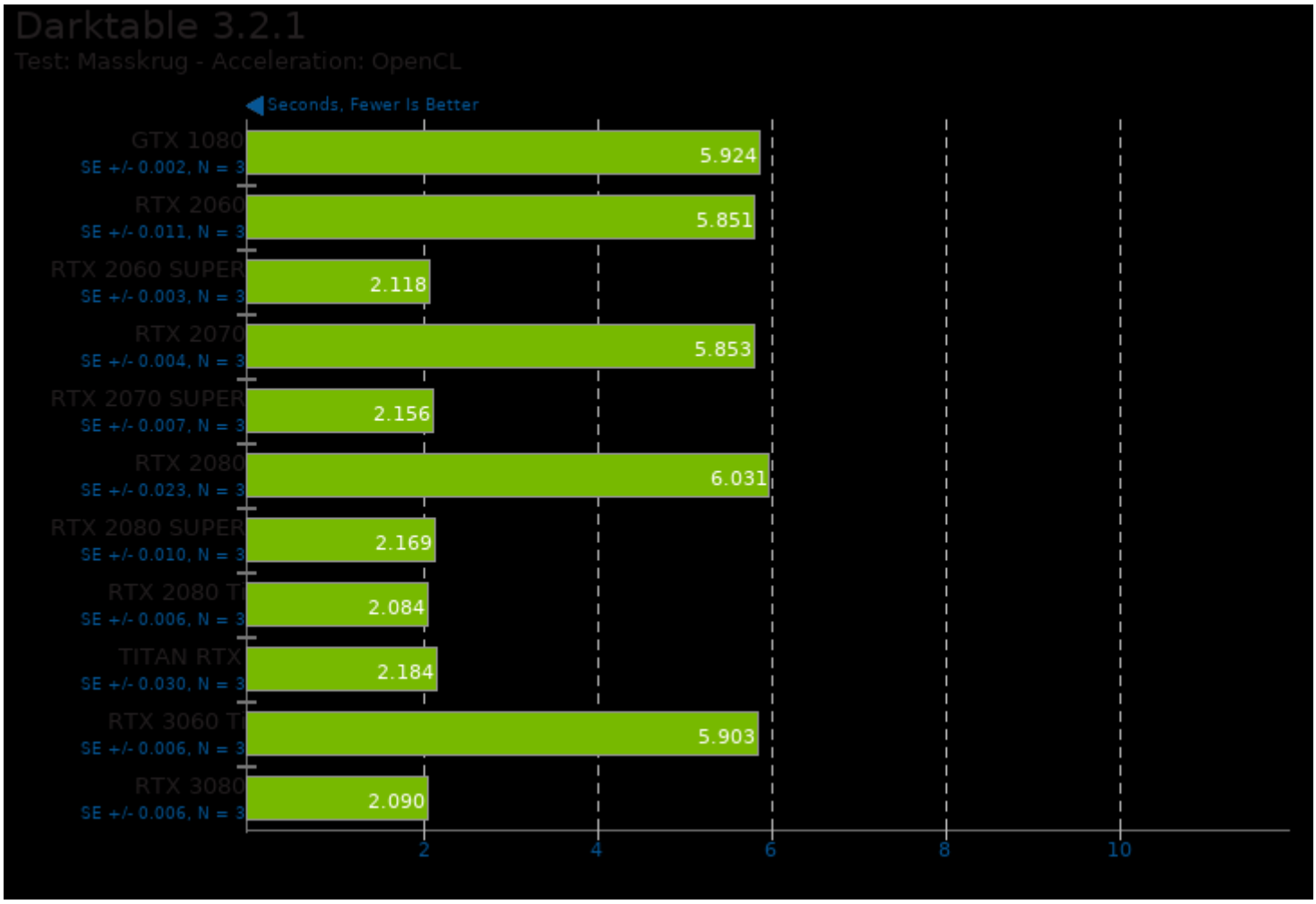

Hashcat 6.1.1
Benchmark: MD5
H/s, More Is Better
GTX 1080
SE +/- 33525380.10, N = 3
24018133333
RTX 2060
SE +/- 16688419.14, N = 3
25916700000
RTX 2060 SUPER
SE +/- 14634472.24, N = 3
29280266667
RTX 2070
SE +/- 17125062.85, N = 3
29942233333
RTX 2070 SUPER
SE +/- 25610045.77, N = 3
35398166667
RTX 2080
SE +/- 57612045.42, N = 3
37693466667
RTX 2080 SUPER
SE +/- 44071015.92, N = 3
42393033333
RTX 2080 Ti
SE +/- 36241182.84, N = 3
55298100000
TITAN RTX
SE +/- 73937751.60, N = 3
58078533333
RTX 3060 Ti
SE +/- 25284668.17, N = 3
32937166667
RTX 3080
SE +/- 64449006.54, N = 3
56039666667
RTX 3090
+/- 7904526661.67, N = 16
94838581250
20000M
40000M
60000M
80000M
100000M

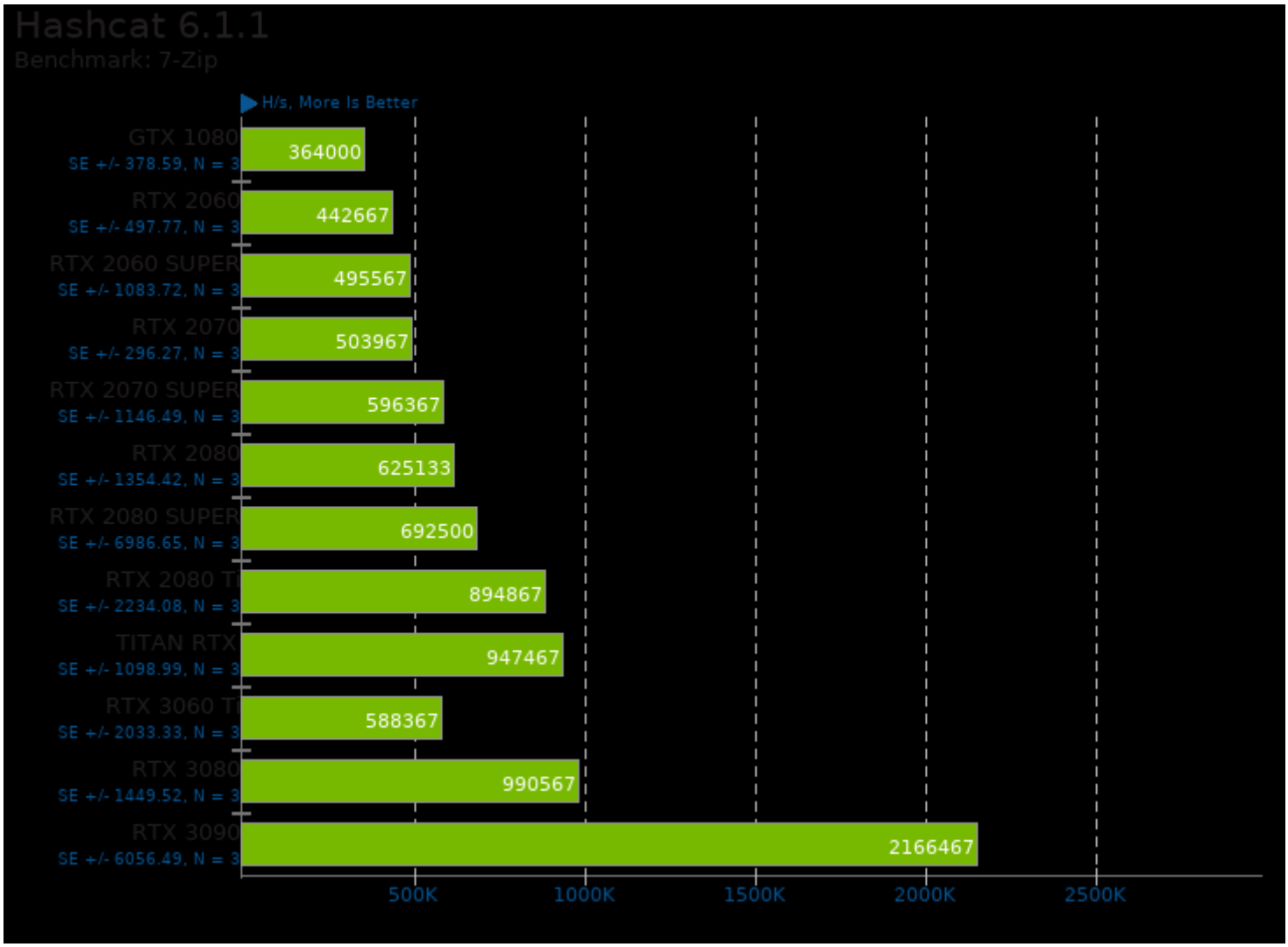

Hashcat 6.1.1
Benchmark: TrueCrypt RIPEMD160 + XTS
H/s, More Is Better
GTX 1080
SE +/- 666.67, N = 3
266267
RTX 2060
SE +/- 405.52, N = 3
310833
RTX 2060 SUPER
SE +/- 173.21, N = 3
351200
RTX 2070
SE +/- 240.37, N = 3
358367
RTX 2070 SUPER
SE +/- 360.56, N = 3
426200
RTX 2080
SE +/- 1072.90, N = 3
451667
RTX 2080 SUPER
SE +/- 4356.82, N = 15
520673
RTX 2080 Ti
SE +/- 592.55, N = 3
657067
TITAN RTX
SE +/- 1637.41, N = 3
687067
RTX 3060 Ti
SE +/- 721.88, N = 3
427233
RTX 3080
SE +/- 560.75, N = 3
721867
RTX 3090
SE +/- 7617.30, N = 3
1591300
300K
600K
900K
1200K
1500K

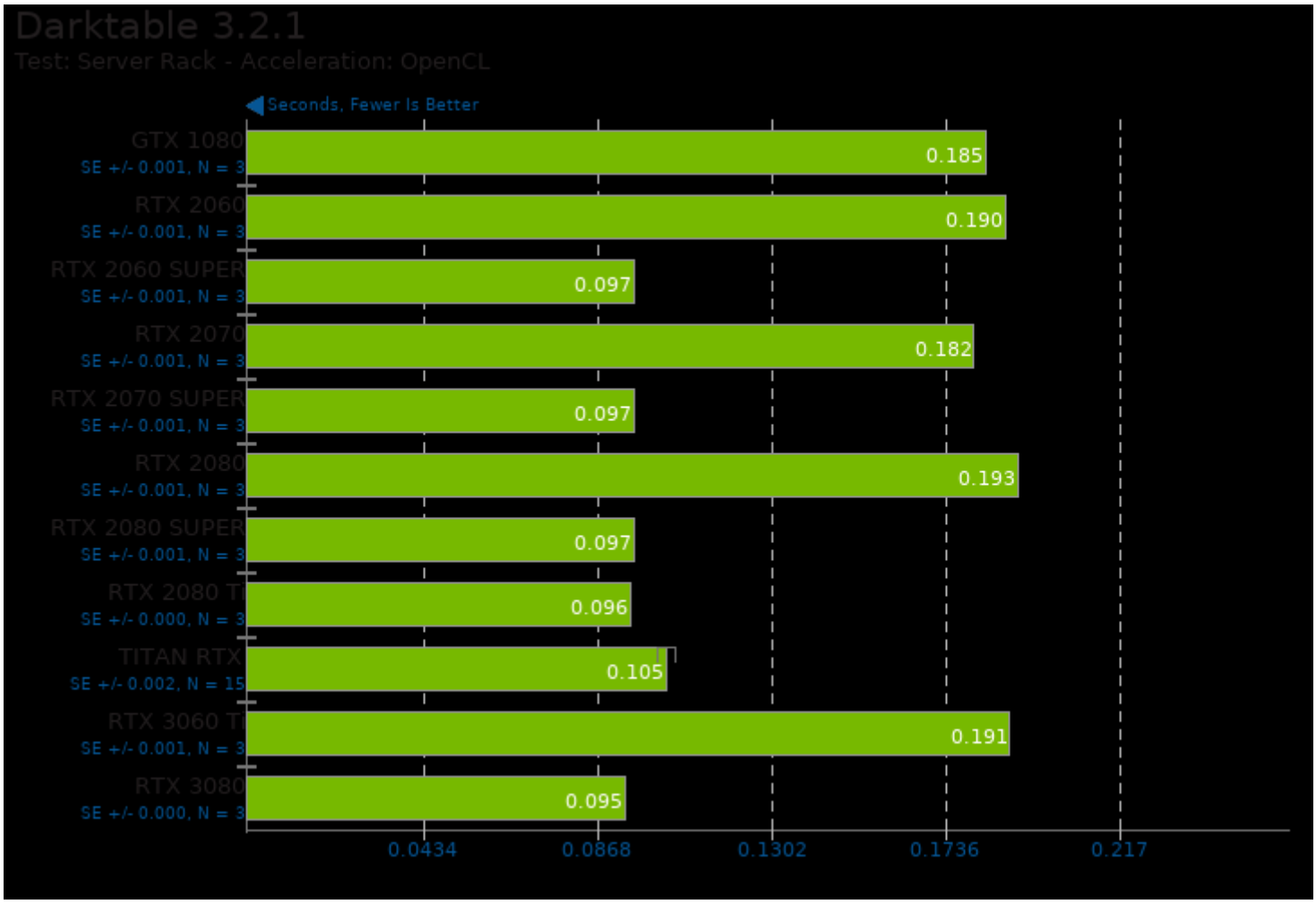

Hashcat 6.1.1
Benchmark: SHA1
H/s, More Is Better
GTX 1080
SE +/- 1217009.08, N = 3
8278833333
RTX 2060
SE +/- 3907826.90, N = 3
8251266667
RTX 2060 SUPER
SE +/- 5454763.46, N = 3
9341766667
RTX 2070
SE +/- 6366317.62, N = 3
9516000000
RTX 2070 SUPER
SE +/- 12109546.28, N = 3
11121466667
RTX 2080
SE +/- 10450996.76, N = 3
11995200000
RTX 2080 SUPER
SE +/- 1527525.23, N = 3
13420400000
RTX 2080 Ti
SE +/- 29255901.59, N = 3
17718433333
TITAN RTX
SE +/- 16900986.16, N = 3
18608800000
RTX 3060 Ti
SE +/- 17695040.11, N = 3
11083266667
RTX 3080
SE +/- 26464462.54, N = 3
19098866667
RTX 3090
SE +/- 53186788.25, N = 3
42680333333
9000M
18000M
27000M
36000M
45000M

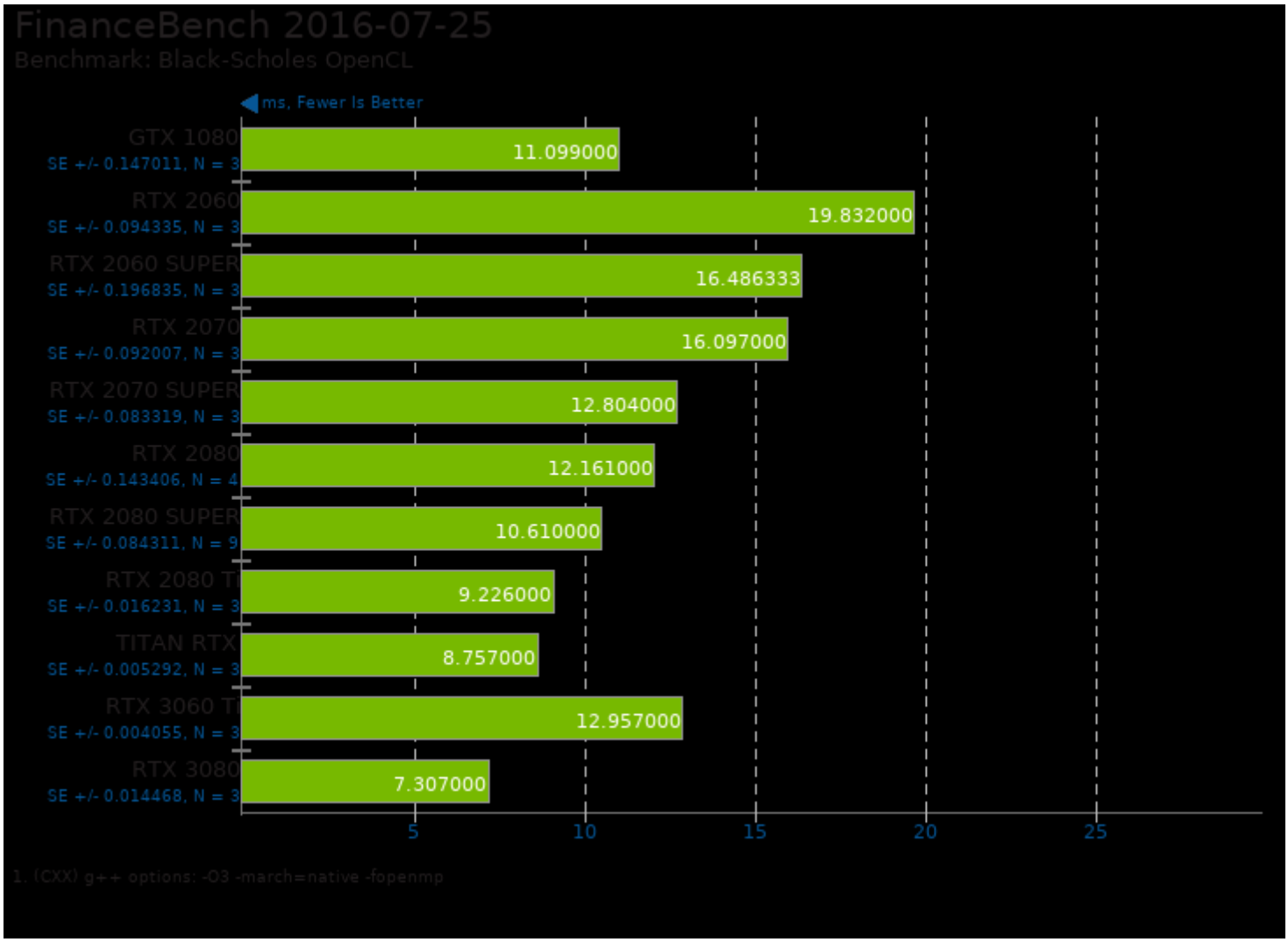

Waifu2x-NCNN Vulkan 20200818
Scale: 2x - Denoise: 3 - TAA: Yes
Seconds, Fewer Is Better
GTX 1080
SE +/- 0.073, N = 4
6.368
RTX 2060
SE +/- 0.065, N = 3
5.771
RTX 2060 SUPER
SE +/- 0.066, N = 3
5.262
RTX 2070
SE +/- 0.072, N = 3
5.275
RTX 2070 SUPER
SE +/- 0.017, N = 3
4.689
RTX 2080
SE +/- 0.044, N = 6
4.612
RTX 2080 SUPER
SE +/- 0.020, N = 3
4.347
RTX 2080 Ti
SE +/- 0.012, N = 3
3.776
TITAN RTX
SE +/- 0.035, N = 7
3.812
RTX 3060 Ti
SE +/- 0.008, N = 3
4.360
RTX 3080
SE +/- 0.006, N = 3
3.439
RTX 3090
SE +/- 0.003, N = 3
3.836
2
4
6
8
10


Darktable 3.2.1
Test: Server Room - Acceleration: OpenCL
Seconds, Fewer Is Better
GTX 1080
SE +/- 0.010, N = 3
5.889
RTX 2060
SE +/- 0.006, N = 3
5.765
RTX 2060 SUPER
SE +/- 0.002, N = 3
0.723
RTX 2070
SE +/- 0.003, N = 3
5.776
RTX 2070 SUPER
SE +/- 0.004, N = 3
0.776
RTX 2080
SE +/- 0.003, N = 3
5.892
RTX 2080 SUPER
SE +/- 0.004, N = 3
0.756
RTX 2080 Ti
SE +/- 0.007, N = 3
0.710
TITAN RTX
SE +/- 0.011, N = 14
0.723
RTX 3060 Ti
SE +/- 0.014, N = 3
5.808
RTX 3080
SE +/- 0.001, N = 3
0.706
1.3257
2.6514
3.9771
5.3028
6.6285

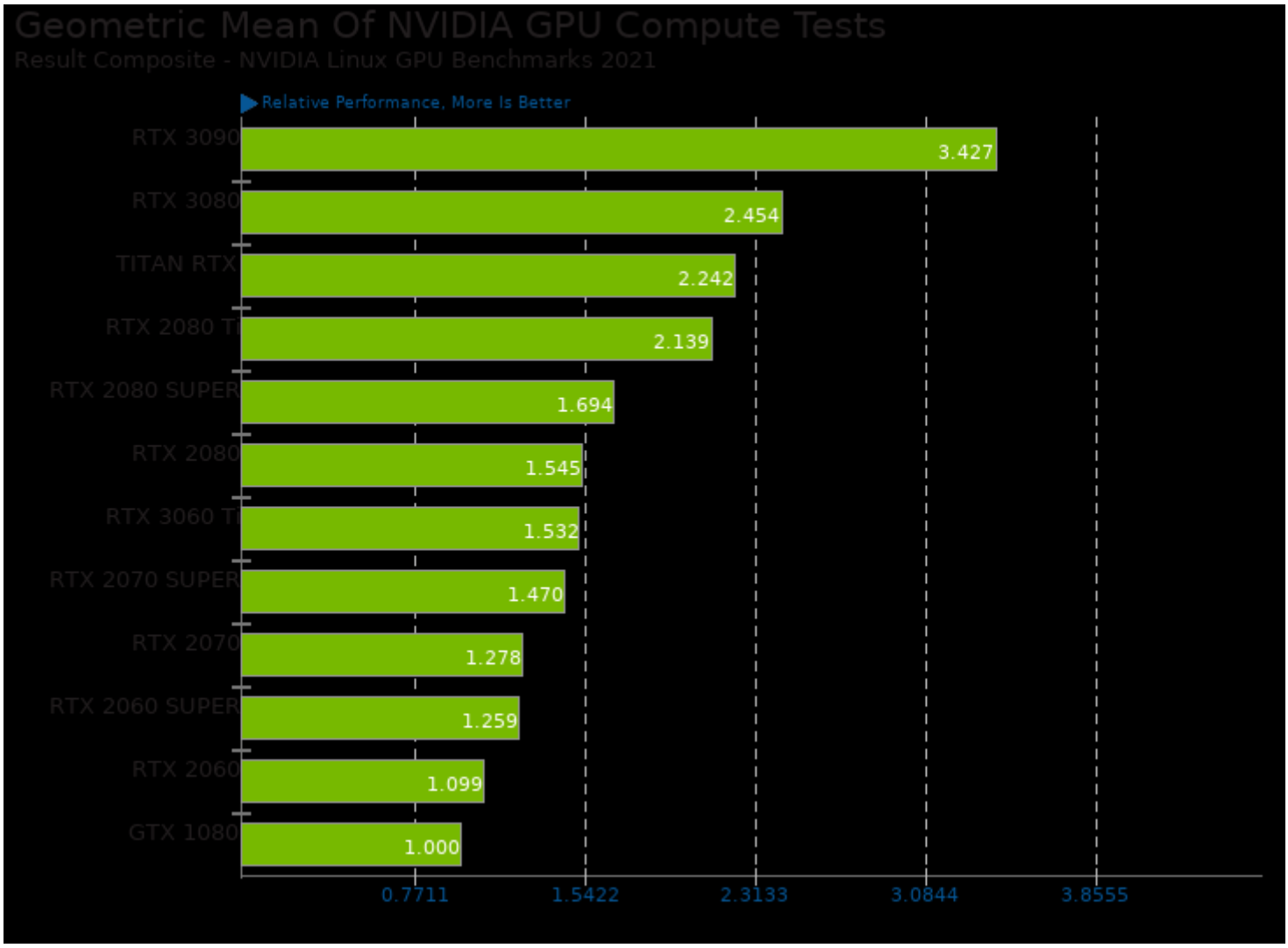

Darktable 3.2.1
Test: Masskrug - Acceleration: OpenCL
Seconds, Fewer Is Better
GTX 1080
SE +/- 0.002, N = 3
5.924
RTX 2060
SE +/- 0.011, N = 3
5.851
RTX 2060 SUPER
SE +/- 0.003, N = 3
2.118
RTX 2070
SE +/- 0.004, N = 3
5.853
RTX 2070 SUPER
SE +/- 0.007, N = 3
2.156
RTX 2080
SE +/- 0.023, N = 3
6.031
RTX 2080 SUPER
SE +/- 0.010, N = 3
2.169
RTX 2080 Ti
SE +/- 0.006, N = 3
2.084
TITAN RTX
SE +/- 0.030, N = 3
2.184
RTX 3060 Ti
SE +/- 0.006, N = 3
5.903
RTX 3080
SE +/- 0.006, N = 3
2.090
2
4
6
8
10


Hashcat 6.1.1
Benchmark: 7-Zip
H/s, More Is Better
GTX 1080
SE +/- 378.59, N = 3
364000
RTX 2060
SE +/- 497.77, N = 3
442667
RTX 2060 SUPER
SE +/- 1083.72, N = 3
495567
RTX 2070
SE +/- 296.27, N = 3
503967
RTX 2070 SUPER
SE +/- 1146.49, N = 3
596367
RTX 2080
SE +/- 1354.42, N = 3
625133
RTX 2080 SUPER
SE +/- 6986.65, N = 3
692500
RTX 2080 Ti
SE +/- 2234.08, N = 3
894867
TITAN RTX
SE +/- 1098.99, N = 3
947467
RTX 3060 Ti
SE +/- 2033.33, N = 3
588367
RTX 3080
SE +/- 1449.52, N = 3
990567
RTX 3090
SE +/- 6056.49, N = 3
2166467
500K
1000K
1500K
2000K
2500K

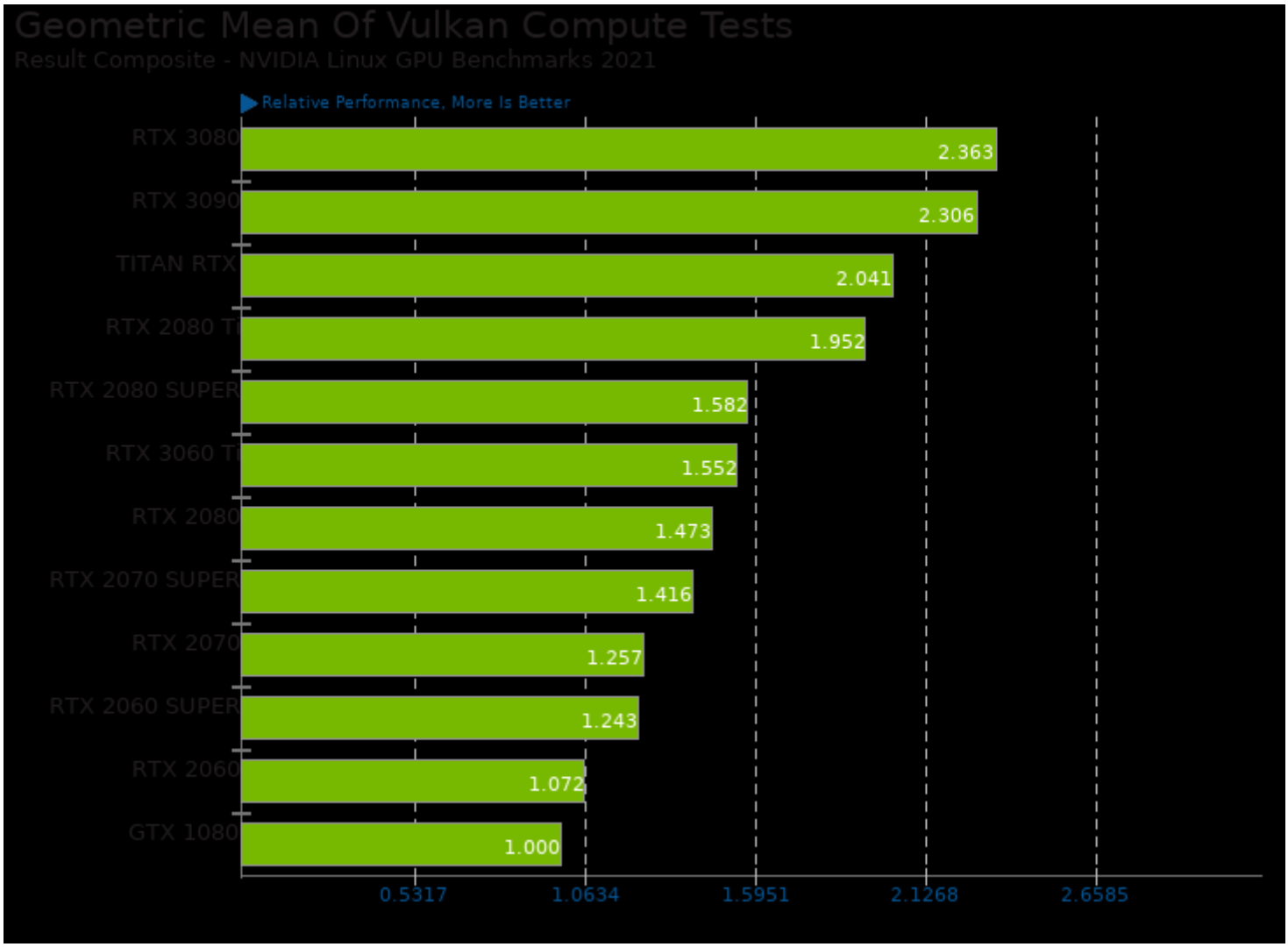

Darktable 3.2.1
Test: Server Rack - Acceleration: OpenCL
Seconds, Fewer Is Better
GTX 1080
SE +/- 0.001, N = 3
0.185
RTX 2060
SE +/- 0.001, N = 3
0.190
RTX 2060 SUPER
SE +/- 0.001, N = 3
0.097
RTX 2070
SE +/- 0.001, N = 3
0.182
RTX 2070 SUPER
SE +/- 0.001, N = 3
0.097
RTX 2080
SE +/- 0.001, N = 3
0.193
RTX 2080 SUPER
SE +/- 0.001, N = 3
0.097
RTX 2080 Ti
SE +/- 0.000, N = 3
0.096
TITAN RTX
SE +/- 0.002, N = 15
0.105
RTX 3060 Ti
SE +/- 0.001, N = 3
0.191
RTX 3080
SE +/- 0.000, N = 3
0.095
0.0434
0.0868
0.1302
0.1736
0.217


FinanceBench 2016-07-25
Benchmark: Black-Scholes OpenCL
ms, Fewer Is Better
GTX 1080
SE +/- 0.147011, N = 3
11.099000
RTX 2060
SE +/- 0.094335, N = 3
19.832000
RTX 2060 SUPER
SE +/- 0.196835, N = 3
16.486333
RTX 2070
SE +/- 0.092007, N = 3
16.097000
RTX 2070 SUPER
SE +/- 0.083319, N = 3
12.804000
RTX 2080
SE +/- 0.143406, N = 4
12.161000
RTX 2080 SUPER
SE +/- 0.084311, N = 9
10.610000
RTX 2080 Ti
SE +/- 0.016231, N = 3
9.226000
TITAN RTX
SE +/- 0.005292, N = 3
8.757000
RTX 3060 Ti
SE +/- 0.004055, N = 3
12.957000
RTX 3080
SE +/- 0.014468, N = 3
7.307000
5
10
15
20
25
1. (CXX) g++ options: -O3 -march=native -fopenmp

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



Geometric mean based upon tests: pts/hashcat, pts/fahbench, pts/namd-cuda, pts/octanebench, pts/financebench, pts/redshift, pts/indigobench, pts/v-ray, pts/vkfft, pts/vkresample, pts/realsr-ncnn, pts/waifu2x-ncnn and pts/betsy



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

This file was automatically generated via the Phoronix Test Suite benchmarking software on Thursday, 26 December 2024 21:46.