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OpenCL CUDA NVIDIA GPGPU Linux Tests

Running pts/shoc-1.0.0, pts/askap-1.0.0, pts/cuda-mini-nbody-1.0.0, pts/juliagpu-1.3.0, pts/mandelbulbgpu-1.3.0 via the Phoronix Test Suite.

Automated Executive Summary

GeForce GTX Titan Xp Oct-Swappiness 100 had the most wins, coming in first place for 44% of the tests.

Based on the geometric mean of all complete results, the fastest (GeForce GTX Titan Xp Oct-Off) was 5.886x the speed of the slowest (GeForce GTX 750).

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

SHOC Scalable HeterOgeneous Computing (Target: CUDA - Benchmark: MD5 Hash) at 14.824x
SHOC Scalable HeterOgeneous Computing (Target: OpenCL - Benchmark: MD5 Hash) at 14.776x
CUDA Mini-Nbody (Test: Flush Denormals To Zero) at 9.087x
CUDA Mini-Nbody (Test: SOA Data Layout) at 8.978x
CUDA Mini-Nbody (Test: Original) at 8.935x
CUDA Mini-Nbody (Test: Cache Blocking) at 8.636x
CUDA Mini-Nbody (Test: Loop Unrolling) at 7.508x
SHOC Scalable HeterOgeneous Computing (Target: OpenCL - Benchmark: Texture Read Bandwidth) at 5.199x
SHOC Scalable HeterOgeneous Computing (Target: OpenCL - Benchmark: FFT SP) at 5.125x

ASKAP tConvolveCuda (Processing: Degridding) at 4.88x.

Test Systems:

GeForce GTX 950

Processor: Intel Core i5-6600K @ 3.50GHz (4 Cores), Motherboard: MSI Z170A GAMING PRO (MS-7984) v1.0, Chipset: Intel Device 191f, Memory: 16384MB, Disk: 256GB TS256GSSD370S, Graphics: eVGA NVIDIA GeForce GTX 950 2048MB (135/405MHz), Audio: Intel Device a170, Network: Intel Device 15b8

OS: Ubuntu 14.04, Kernel: 3.19.0-33-generic (x86_64), Desktop: Unity 7.2.5, Display Server: X Server 1.17.1, Display Driver: NVIDIA 352.39, OpenGL: 4.3.0, Compiler: GCC 4.8.4 + Clang 3.4-1ubuntu3 + CUDA 7.5, File-System: ext4, Screen Resolution: 3840x2160

Compiler Notes: --build=x86_64-linux-gnu --disable-browser-plugin --disable-libmudflap --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-arch-directory=amd64 --with-multilib-list=m32,m64,mx32 --with-tune=generic -v
Processor Notes: Scaling Governor: acpi-cpufreq performance
OpenCL Notes: GPU Compute Cores: 768
System Notes: GPU Compute Cores: 768.

GeForce GTX 980 Ti

Processor: Intel Core i5-6600K @ 3.50GHz (4 Cores), Motherboard: MSI Z170A GAMING PRO (MS-7984) v1.0, Chipset: Intel Device 191f, Memory: 16384MB, Disk: 256GB TS256GSSD370S, Graphics: NVIDIA GeForce GTX 980 Ti 6144MB (999/3505MHz), Audio: Intel Device a170, Network: Intel Device 15b8

OS: Ubuntu 14.04, Kernel: 3.19.0-33-generic (x86_64), Desktop: Unity 7.2.5, Display Server: X Server 1.17.1, Display Driver: NVIDIA 352.39, OpenGL: 4.3.0, Compiler: GCC 4.8.4 + Clang 3.4-1ubuntu3 + CUDA 7.5, File-System: ext4, Screen Resolution: 3840x2160

Compiler Notes: --build=x86_64-linux-gnu --disable-browser-plugin --disable-libmudflap --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-arch-directory=amd64 --with-multilib-list=m32,m64,mx32 --with-tune=generic -v
Processor Notes: Scaling Governor: acpi-cpufreq performance
OpenCL Notes: GPU Compute Cores: 2816
System Notes: GPU Compute Cores: 2816.

GeForce GTX 970

Processor: Intel Core i5-6600K @ 3.50GHz (4 Cores), Motherboard: MSI Z170A GAMING PRO (MS-7984) v1.0, Chipset: Intel Device 191f, Memory: 16384MB, Disk: 256GB TS256GSSD370S, Graphics: eVGA NVIDIA GeForce GTX 970 4096MB (1163/3505MHz), Audio: Intel Device a170, Network: Intel Device 15b8

OS: Ubuntu 14.04, Kernel: 3.19.0-33-generic (x86_64), Desktop: Unity 7.2.5, Display Server: X Server 1.17.1, Display Driver: NVIDIA 352.39, OpenGL: 4.3.0, Compiler: GCC 4.8.4 + Clang 3.4-1ubuntu3 + CUDA 7.5, File-System: ext4, Screen Resolution: 3840x2160

Compiler Notes: --build=x86_64-linux-gnu --disable-browser-plugin --disable-libmudflap --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug

--enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-arch-directory=amd64 --with-multilib-list=m32,m64,mx32 --with-tune=generic -v
Processor Notes: Scaling Governor: acpi-cpufreq performance
OpenCL Notes: GPU Compute Cores: 1664
System Notes: GPU Compute Cores: 1664.

GeForce GTX 980

Processor: Intel Core i5-6600K @ 3.50GHz (4 Cores), Motherboard: MSI Z170A GAMING PRO (MS-7984) v1.0, Chipset: Intel Device 191f, Memory: 16384MB, Disk: 256GB TS256GSSD370S, Graphics: NVIDIA GeForce GTX 980 4096MB (1126/3505MHz), Audio: Intel Device a170, Network: Intel Device 15b8

OS: Ubuntu 14.04, Kernel: 3.19.0-33-generic (x86_64), Desktop: Unity 7.2.5, Display Server: X Server 1.17.1, Display Driver: NVIDIA 352.39, OpenGL: 4.3.0, Compiler: GCC 4.8.4 + Clang 3.4-1ubuntu3 + CUDA 7.5, File-System: ext4, Screen Resolution: 3840x2160

Compiler Notes: --build=x86_64-linux-gnu --disable-browser-plugin --disable-libmudflap --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-arch-directory=amd64 --with-multilib-list=m32,m64,mx32 --with-tune=generic -v
Processor Notes: Scaling Governor: acpi-cpufreq performance
OpenCL Notes: GPU Compute Cores: 2048
System Notes: GPU Compute Cores: 2048.

GeForce GTX 960

Processor: Intel Core i5-6600K @ 3.50GHz (4 Cores), Motherboard: MSI Z170A GAMING PRO (MS-7984) v1.0, Chipset: Intel Device 191f, Memory: 16384MB, Disk: 256GB TS256GSSD370S, Graphics: eVGA NVIDIA GeForce GTX 960 2048MB (1277/3505MHz), Audio: Intel Device a170, Network: Intel Device 15b8

OS: Ubuntu 14.04, Kernel: 3.19.0-33-generic (x86_64), Desktop: Unity 7.2.5, Display Server: X Server 1.17.1, Display Driver: NVIDIA 352.39, OpenGL: 4.3.0, Compiler: GCC 4.8.4 + Clang 3.4-1ubuntu3 + CUDA 7.5, File-System: ext4, Screen Resolution: 3840x2160

Compiler Notes: --build=x86_64-linux-gnu --disable-browser-plugin --disable-libmudflap --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-arch-directory=amd64 --with-multilib-list=m32,m64,mx32 --with-tune=generic -v
Processor Notes: Scaling Governor: acpi-cpufreq performance
OpenCL Notes: GPU Compute Cores: 1024
System Notes: GPU Compute Cores: 1024.

GeForce GTX TITAN X

Processor: Intel Core i5-6600K @ 3.50GHz (4 Cores), Motherboard: MSI Z170A GAMING PRO (MS-7984) v1.0, Chipset: Intel Device 191f, Memory: 16384MB, Disk: 256GB TS256GSSD370S, Graphics: NVIDIA GeForce GTX TITAN X 12288MB (1001/3505MHz), Audio: Intel Device a170, Network: Intel Device 15b8

OS: Ubuntu 14.04, Kernel: 3.19.0-33-generic (x86_64), Desktop: Unity 7.2.5, Display Server: X Server 1.17.1, Display Driver: NVIDIA 352.39, OpenGL: 4.3.0, Compiler: GCC 4.8.4 + Clang 3.4-1ubuntu3 + CUDA 7.5, File-System: ext4, Screen Resolution: 3840x2160

Compiler Notes: --build=x86_64-linux-gnu --disable-browser-plugin --disable-libmudflap --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-arch-directory=amd64 --with-multilib-list=m32,m64,mx32 --with-tune=generic -v
Processor Notes: Scaling Governor: acpi-cpufreq performance
OpenCL Notes: GPU Compute Cores: 3072
System Notes: GPU Compute Cores: 3072.

GeForce GTX 780 Ti

Processor: Intel Core i5-6600K @ 3.50GHz (4 Cores), Motherboard: MSI Z170A GAMING PRO (MS-7984) v1.0, Chipset: Intel Device 191f, Memory: 16384MB, Disk: 256GB TS256GSSD370S, Graphics: NVIDIA GeForce GTX 780 Ti 3072MB (875/3500MHz), Audio: Intel Device a170, Network: Intel Device 15b8

OS: Ubuntu 14.04, Kernel: 3.19.0-33-generic (x86_64), Desktop: Unity 7.2.5, Display Server: X Server 1.17.1, Display Driver: NVIDIA 352.39, OpenGL: 4.3.0, Compiler: GCC 4.8.4 + Clang 3.4-1ubuntu3 + CUDA 7.5, File-System: ext4, Screen Resolution: 3840x2160

Compiler Notes: --build=x86_64-linux-gnu --disable-browser-plugin --disable-libmudflap --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-arch-directory=amd64 --with-multilib-list=m32,m64,mx32 --with-tune=generic -v
Processor Notes: Scaling Governor: acpi-cpufreq performance
OpenCL Notes: GPU Compute Cores: 2880
System Notes: GPU Compute Cores: 2880.

GeForce GTX 680

Processor: Intel Core i5-6600K @ 3.50GHz (4 Cores), Motherboard: MSI Z170A GAMING PRO (MS-7984) v1.0, Chipset: Intel Device 191f, Memory: 16384MB, Disk: 256GB TS256GSSD370S, Graphics: NVIDIA GeForce GTX 680 2048MB (1006/3004MHz), Audio: Intel Device a170, Network: Intel Device 15b8

OS: Ubuntu 14.04, Kernel: 3.19.0-33-generic (x86_64), Desktop: Unity 7.2.5, Display Server: X Server 1.17.1, Display Driver: NVIDIA 352.39, OpenGL: 4.3.0, Compiler: GCC 4.8.4 + Clang 3.4-1ubuntu3 + CUDA 7.5, File-System: ext4, Screen Resolution: 3840x2160

Compiler Notes: --build=x86_64-linux-gnu --disable-browser-plugin --disable-libmudflap --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-arch-directory=amd64 --with-multilib-list=m32,m64,mx32 --with-tune=generic -v
Processor Notes: Scaling Governor: acpi-cpufreq performance
OpenCL Notes: GPU Compute Cores: 1536
System Notes: GPU Compute Cores: 1536.

GeForce GTX 750

Processor: Intel Core i5-6600K @ 3.50GHz (4 Cores), Motherboard: MSI Z170A GAMING PRO (MS-7984) v1.0, Chipset: Intel Device 191f, Memory: 16384MB, Disk: 256GB TS256GSSD370S, Graphics: eVGA NVIDIA GeForce GTX 750 1024MB (1019/2505MHz), Audio: Intel Device a170, Network: Intel Device 15b8

OS: Ubuntu 14.04, Kernel: 3.19.0-33-generic (x86_64), Desktop: Unity 7.2.5, Display Server: X Server 1.17.1, Display Driver: NVIDIA 352.39, OpenGL: 4.3.0, Compiler: GCC 4.8.4 + Clang 3.4-1ubuntu3 + CUDA 7.5, File-System: ext4, Screen Resolution: 3840x2160

Compiler Notes: --build=x86_64-linux-gnu --disable-browser-plugin --disable-libmudflap --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-arch-directory=amd64 --with-multilib-list=m32,m64,mx32 --with-tune=generic -v
Processor Notes: Scaling Governor: acpi-cpufreq performance
OpenCL Notes: GPU Compute Cores: 512
System Notes: GPU Compute Cores: 512.

GeForce GTX 760

Processor: Intel Core i5-6600K @ 3.50GHz (4 Cores), Motherboard: MSI Z170A GAMING PRO (MS-7984) v1.0, Chipset: Intel Device 191f, Memory: 16384MB, Disk: 256GB TS256GSSD370S, Graphics: NVIDIA GeForce GTX 760 2048MB (980/3004MHz), Audio: Intel Device a170, Network: Intel Device 15b8

OS: Ubuntu 14.04, Kernel: 3.19.0-33-generic (x86_64), Desktop: Unity 7.2.5, Display Server: X Server 1.17.1, Display Driver: NVIDIA 352.39, OpenGL: 4.3.0, Compiler: GCC 4.8.4 + Clang 3.4-1ubuntu3 + CUDA 7.5, File-System: ext4, Screen Resolution: 3840x2160

Compiler Notes: --build=x86_64-linux-gnu --disable-browser-plugin --disable-libmudflap --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-arch-directory=amd64 --with-multilib-list=m32,m64,mx32 --with-tune=generic -v
Processor Notes: Scaling Governor: acpi-cpufreq performance
OpenCL Notes: GPU Compute Cores: 1152
System Notes: GPU Compute Cores: 1152.

GeForce GTX Titan Xp Oct-Off

Processor: Intel Core i9-7920X @ 4.40GHz (24 Cores), Motherboard: ASUS WS X299 SAGE, Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 64512MB, Disk: 10001GB Western Digital WD101KRYZ-01, Graphics: TITAN Xp 12288MB (139/405MHz), Audio: Realtek ALC1220, Network: Intel Connection

OS: Ubuntu 18.04, Kernel: 4.15.0-42-generic (x86_64), Desktop: GNOME Shell 3.28.3, Display Driver: NVIDIA 410.48, OpenGL: 4.6.0, Compiler: CUDA 9.1, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --enable-libmpx --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: intel_pstate powersave
OpenCL Notes: GPU Compute Cores: 3840
System Notes: GPU Compute Cores: 3840.

GeForce GTX Titan Xp Oct-Swappiness 100

Processor: Intel Core i9-7920X @ 4.40GHz (24 Cores), Motherboard: ASUS WS X299 SAGE, Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 64512MB, Disk: 10001GB Western Digital WD101KRYZ-01, Graphics: TITAN Xp 12288MB (1468/5702MHz), Audio: Realtek ALC1220, Network: Intel Connection

OS: Ubuntu 18.04, Kernel: 4.15.0-42-generic (x86_64), Desktop: GNOME Shell 3.28.3, Display Driver: NVIDIA 410.48, OpenGL: 4.6.0, Compiler: CUDA 9.1, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++ --enable-libmpx --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: intel_pstate powersave
OpenCL Notes: GPU Compute Cores: 3840
System Notes: GPU Compute Cores: 3840.

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	GeForce GTX 950	GeForce GTX 980 Ti	GeForce GTX 970	GeForce GTX 980	GeForce GTX 960	GeForce GTX TITAN X	GeForce GTX 780 Ti	GeForce GTX 680	GeForce GTX 750	GeForce GTX 760	GeForce GTX Titan Xp Oct-Off	GeForce GTX Titan Xp Oct-Swappines
ASKAP tConvolveCuda - Gridding (Million Grid Points/sec)	3399	8321	5325	6051	**3145**	8459					13465	**13546**
Normalized	25.09%	61.42%	39.31%	44.67%	23.22%	62.44%					99.4%	100%
Standard Deviation	0.7%	0%	0%	0%	0.7%	3.1%					6.1%	3%
ASKAP tConvolveCuda - Degridding (Million Grid Points/sec)	5706	17381	9509	11094	**5290**	17381					**25819**	25012
Normalized	22.1%	67.32%	36.83%	42.97%	20.49%	67.32%					100%	96.87%
Standard Deviation	1.2%	3.7%	0%	0%	1.1%	3.7%					5.4%	5.6%
CUDA Mini-Nbody -	105.30	34.58	54.32	45.38	82.01	32.37	61.03		**180.66**		20.40	**20.22**
Normalized	19.2%	58.47%	37.22%	44.56%	24.66%	62.47%	33.13%		11.19%		99.12%	100%
Standard Deviation	0.4%	2.8%	0.4%	0.4%	0.9%	1.9%	1.4%		0%		1%	0.9%
CUDA Mini-Nbody - Cache Blocking	49.89	19.77	28.53	25.13	37.08	18.65	29.99		**98.19**		11.49	**11.37**
Normalized	22.79%	57.51%	39.85%	45.24%	30.66%	60.97%	37.91%		11.58%		98.96%	100%
Standard Deviation	0.1%	1.8%	0%	0.4%	0.1%	0.9%	1.6%		0%		0.5%	0.3%
CUDA Mini-Nbody - Loop Unrolling	47.54	18.46	26.42	23.88	35.35	17.59	27.05		**89.34**		12.02	**11.90**
Normalized	25.03%	64.46%	45.04%	49.83%	33.66%	67.65%	43.99%		13.32%		99%	100%
Standard Deviation	0.1%	1.4%	0.1%	1.5%	0.2%	2.5%	0.3%		0.1%		1.5%	0.4%
CUDA Mini-Nbody - SOA Data Layout	108.50	40.94	55.87	50.15	79.97	37.43	54.39		**199.95**		22.34	**22.27**
Normalized	20.53%	54.4%	39.86%	44.41%	27.85%	59.5%	40.95%		11.14%		99.69%	100%
Standard Deviation	0%	0.5%	0.2%	0.7%	0.2%	0.9%	0.5%		0%		0.7%	0.4%
CUDA Mini-Nbody -	108.48	40.85	55.80	49.53	79.84	37.37	53.26		**199.83**		**21.99**	22.22
Normalized	20.27%	53.83%	39.41%	44.4%	27.54%	58.84%	41.29%		11%		100%	98.96%
Standard Deviation	0%	0.4%	0.2%	0.6%	0%	0.4%	0.3%		0%		0.9%	0.2%
JuliaGPU - GPU (Samples/sec)	649136 83	127978 050	104144 917	113830 604	800420 42	136037 921	788397 70	480747 89	**361368 74**	383106 51	149218 673	**149335 524**
Normalized	43.47%	85.7%	69.74%	76.22%	53.6%	91.1%	52.79%	32.19%	24.2%	25.65%	99.92%	100%
Standard Deviation	0.2%	0.6%	0.1%	0.3%	0.3%	0.4%	0.6%	0.2%	0.1%	0.1%	0.4%	0.6%
LuxMark - GPU - Hotel (Score)	769	1855	1346	1492	897	**1906**	992	577		**463**		
Normalized	40.35%	97.32%	70.62%	78.28%	47.06%	100%	52.05%	30.27%		24.29%		
Standard Deviation	0%	0%	0%	0.1%	0.1%	0%	0%	0.6%		0.1%		

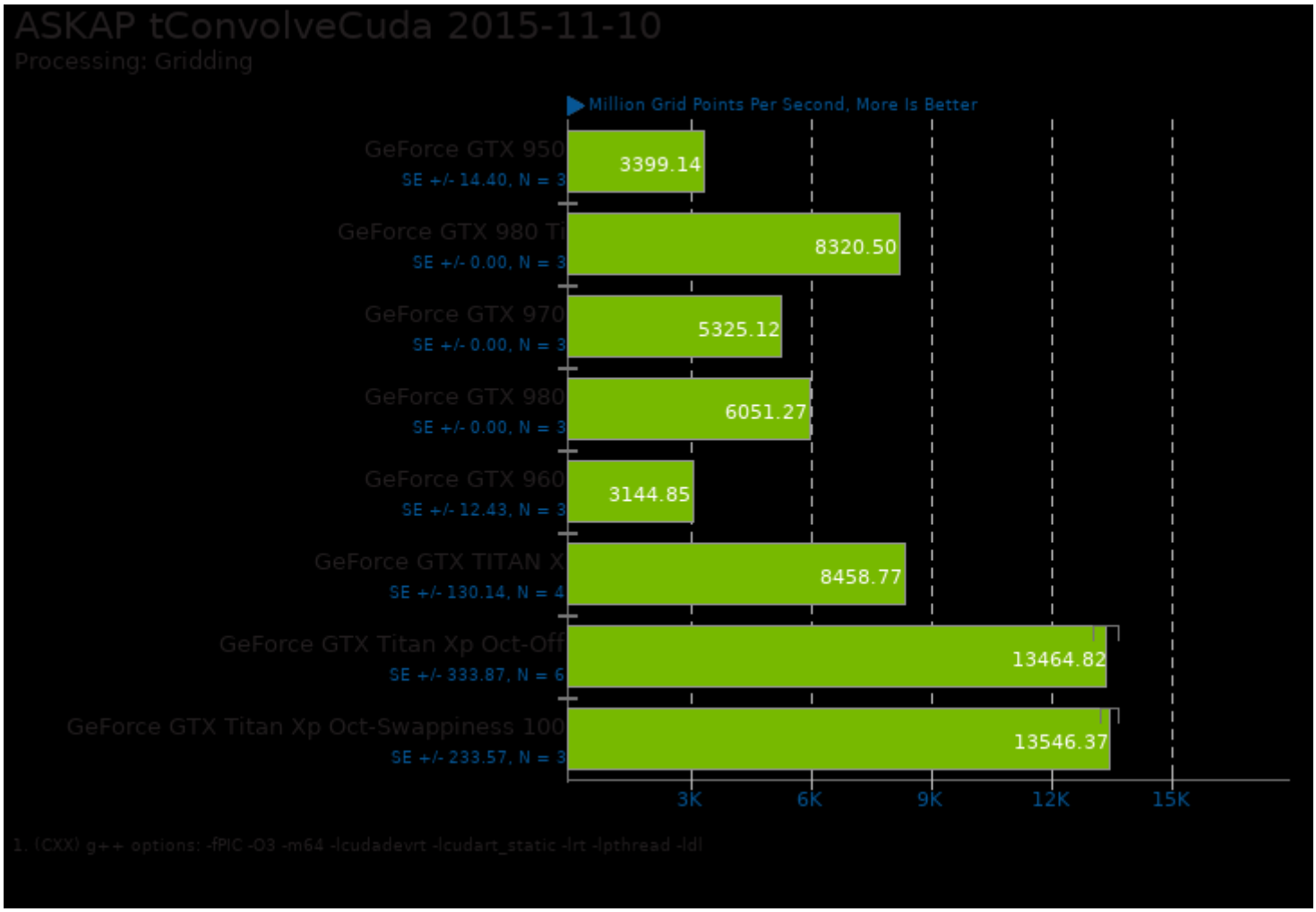
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LuxMark - GPU - Microphone (Score)	2423	6268	4458	4776	2460	**6360**	4302	2127		**1941**		
Normalized	38.1%	98.55%	70.09%	75.09%	38.68%	100%	67.64%	33.44%		30.52%		
Standard Deviation	0.3%	0.5%	0.3%	0%	0.1%	0.1%	0.5%	0.2%		0.1%		
LuxMark - GPU - Luxball HDR (Score)	5313	13802	9737	10713	5474	**14081**	9639	4554	**3491**	4253		
Normalized	37.73%	98.02%	69.15%	76.08%	38.88%	100%	68.45%	32.34%	24.79%	30.2%		
Standard Deviation	0.5%	0.6%	0.4%	0%	0%	0.1%	0.6%	0.5%	0.6%	0.1%		
MandelbulbGPU - GPU (Samples/sec)	371560 71	716567 09	588113 17	636165 59	449533 99	756147 74	474000 02	316365 13	**200602 76**	253921 39	**877136 32**	869212 86
Normalized	42.36%	81.69%	67.05%	72.53%	51.25%	86.21%	54.04%	36.07%	22.87%	28.95%	100%	99.1%
Standard Deviation	0.1%	0.4%	0.3%	0.4%	0.3%	0.4%	0.2%	0.2%	0.1%	0.2%	0.4%	1.9%
SHOC Scalable HeterOgeneous Computing - CUDA - FFT SP (GFLOPS)	172.28	311.46	263.14	289.63	212.43	324.09			**113.64**		**458.71**	450.23
Normalized	37.56%	67.9%	57.37%	63.14%	46.31%	70.65%			24.77%		100%	98.15%
Standard Deviation	0.5%	0.2%	1.6%	1.8%	1.2%	0.6%			1.1%		0.4%	1.5%
SHOC Scalable HeterOgeneous Computing - CUDA - MD5 Hash (GHash/s)	2.36	6.81	4.79	5.70	3.38	7.42			**1.08**		**16.01**	**16.01**
Normalized	14.74%	42.54%	29.92%	35.6%	21.11%	46.35%			6.75%		100%	100%
Standard Deviation	0.2%	0%	0.1%	0%	0.1%	0%			0%		0%	0%
SHOC Scalable HeterOgeneous Computing - OpenCL - FFT SP (GFLOPS)	63.22	170.36	117.23	140.12	62.78	173.89	126.71	74.97	**54.69**	78.44	**280.29**	279.72
Normalized	22.56%	60.78%	41.82%	49.99%	22.4%	62.04%	45.21%	26.75%	19.51%	27.99%	100%	99.8%
Standard Deviation	0.2%	0.7%	0.8%	1.6%	3.3%	0.2%	0.3%	2%	0.3%	0.7%	1.1%	1.1%
SHOC Scalable HeterOgeneous Computing - OpenCL - MD5 Hash (GHash/s)	2.34	6.79	4.77	5.68	3.36	7.41	3.78	1.91	**1.07**	1.40	**15.81**	**15.81**
Normalized	14.8%	42.95%	30.17%	35.93%	21.25%	46.87%	23.91%	12.08%	6.77%	8.86%	100%	100%
Standard Deviation	0.1%	0.1%	0%	0%	0.1%	0.1%	0.1%	0.1%	0%	0%	0.1%	0.1%

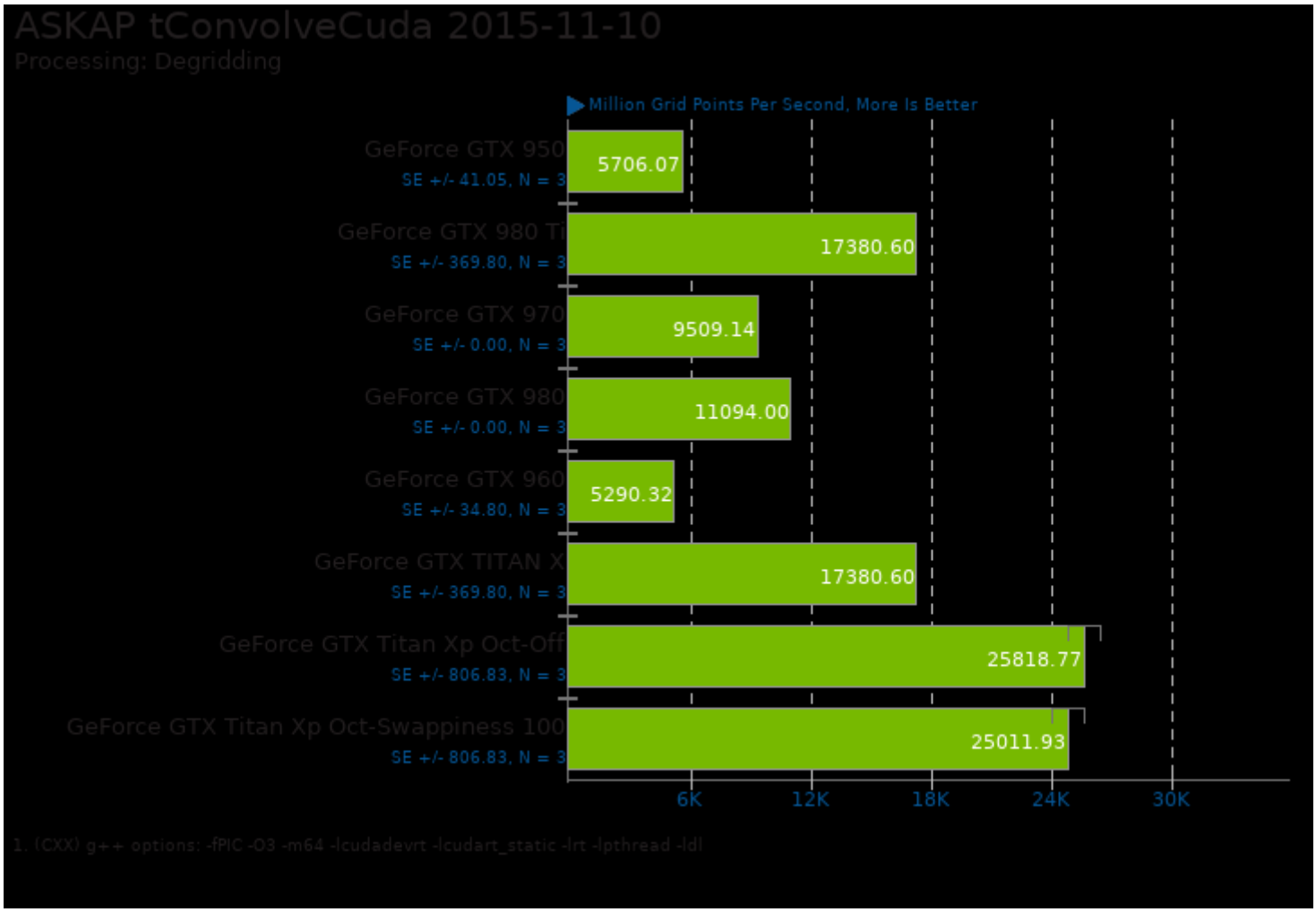
OpenCL CUDA NVIDIA GPGPU Linux Tests

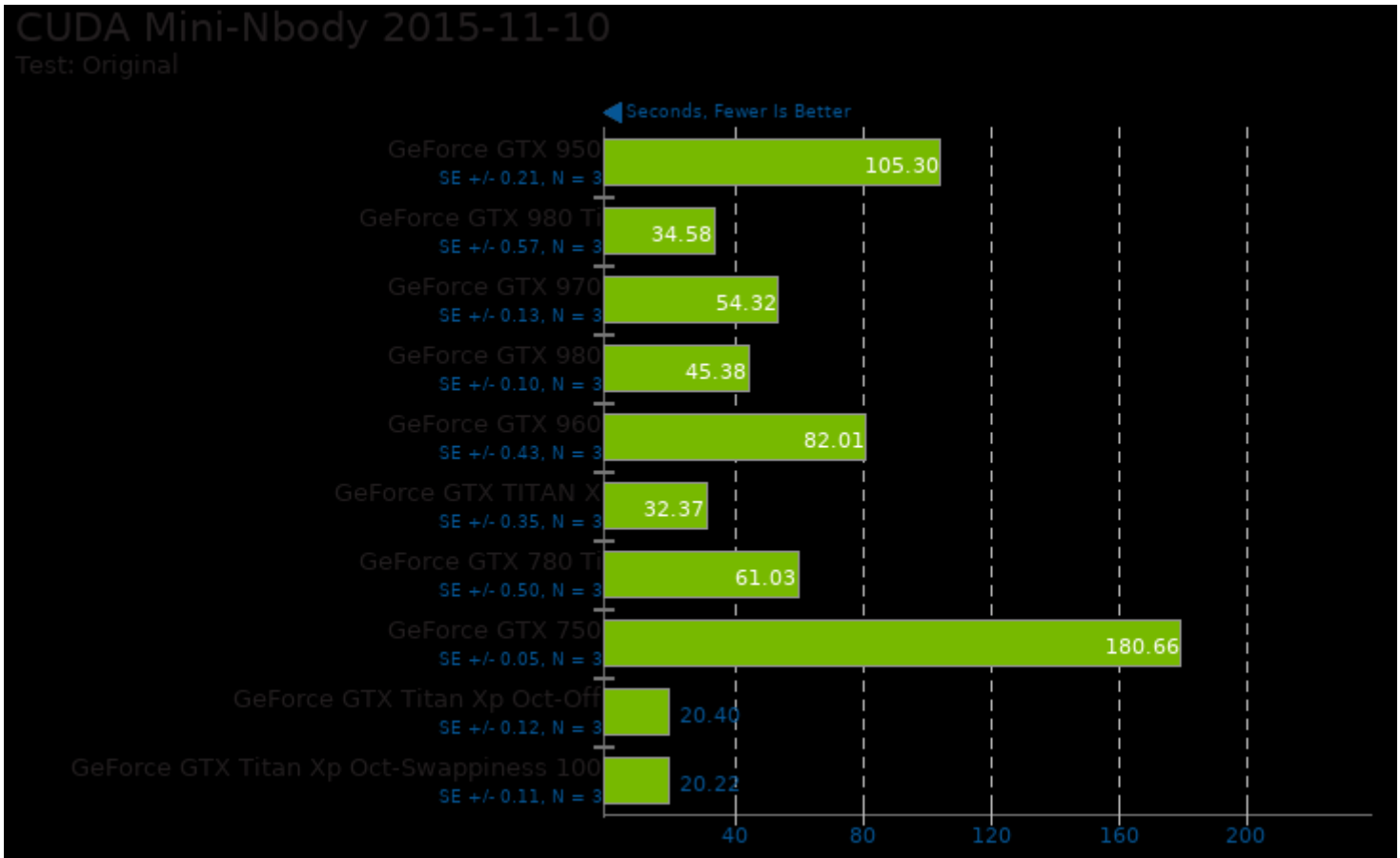
SHOC Scalable HeterOgeneous Computing - CUDA - T.R.B (GB/s)	326.23	348.92	325.16	336.48	351.31	356.52			**158.42**		623.58	**635.35**
Normalized	51.35%	54.92%	51.18%	52.96%	55.29%	56.11%			24.93%		98.15%	100%
Standard Deviation	0.4%	0.6%	0.1%	0.6%	0.1%	0.1%			0.5%		3.2%	0.6%
SHOC Scalable HeterOgeneous Computing - OpenCL - T.R.B (GB/s)	239.19	345.55	283.36	332.60	269.98	354.09	286.62	242.16	**121.14**	170.26	626.12	**629.83**
Normalized	37.98%	54.86%	44.99%	52.81%	42.87%	56.22%	45.51%	38.45%	19.23%	27.03%	99.41%	100%
Standard Deviation	0.5%	0.1%	0%	0.1%	0.4%	0.8%	0%	0.7%	0.3%	0.3%	0.4%	0.2%

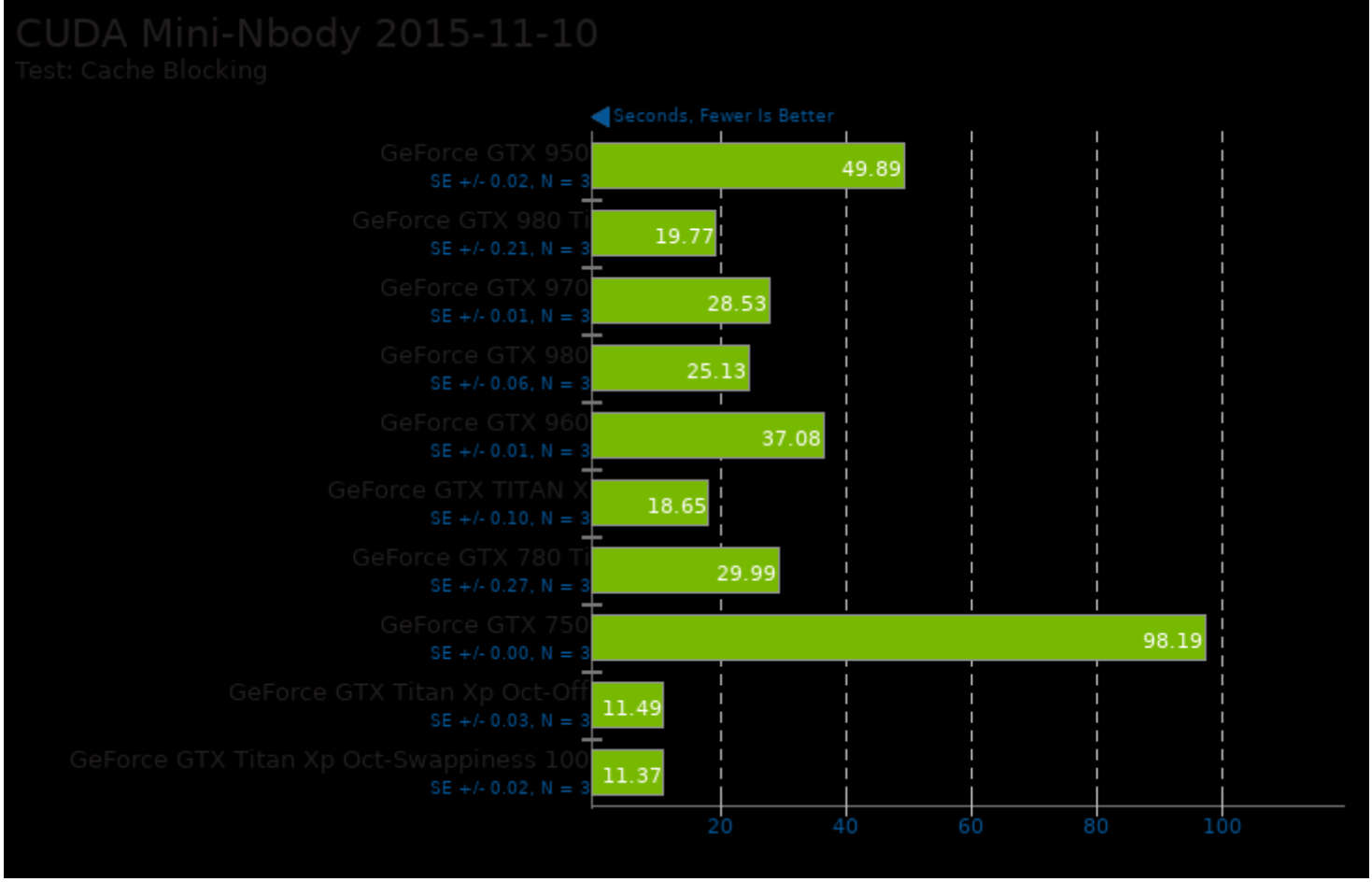
OpenCL CUDA NVIDIA GPGPU Linux Tests

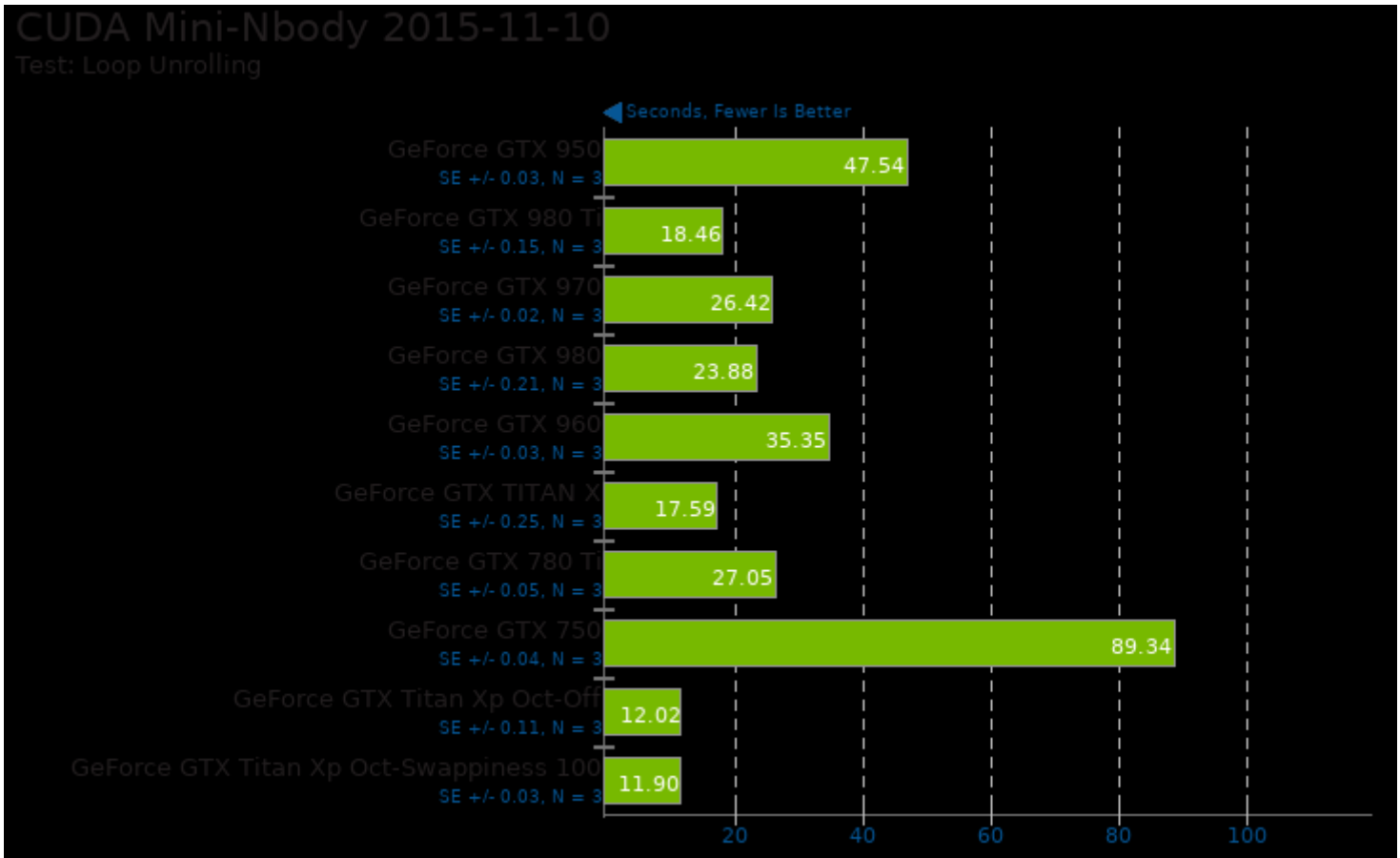


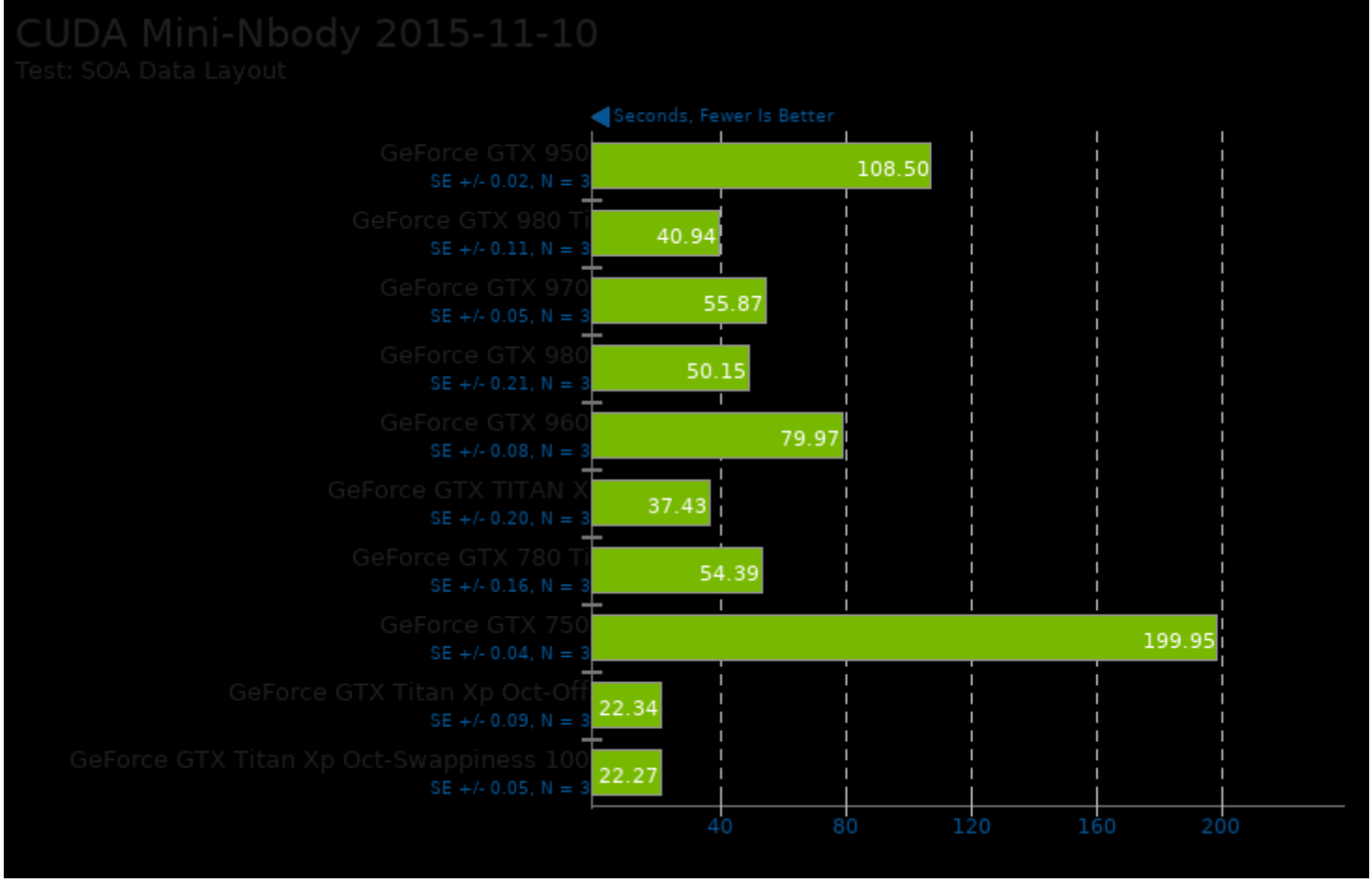
OpenCL CUDA NVIDIA GPGPU Linux Tests

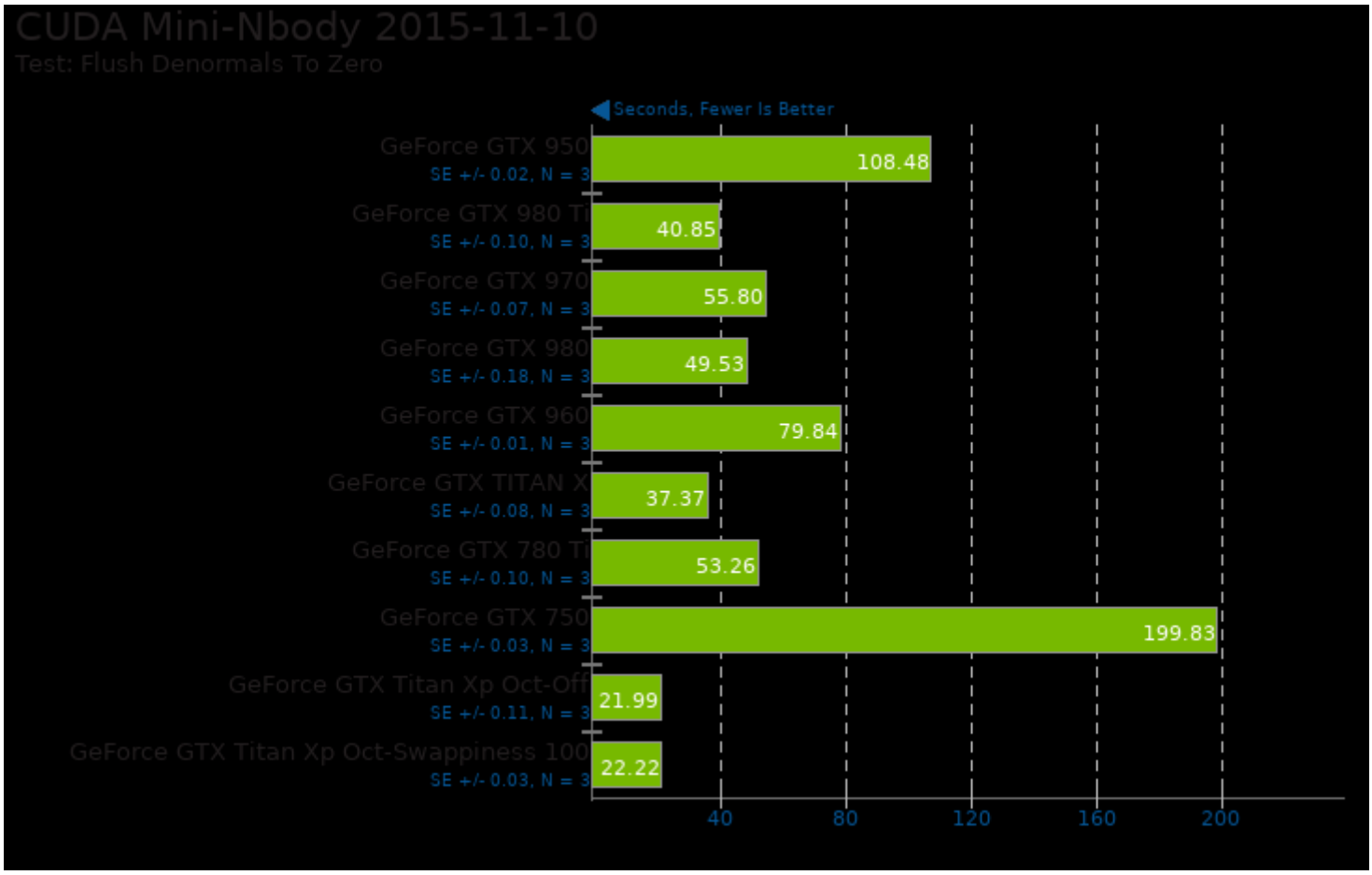



CUDA Mini-Nbody 2015-11-10
Test: Original
Seconds, Fewer Is Better
GeForce GTX 950
SE +/- 0.21, N = 3
105.30
GeForce GTX 980 Ti
SE +/- 0.57, N = 3
34.58
GeForce GTX 970
SE +/- 0.13, N = 3
54.32
GeForce GTX 980
SE +/- 0.10, N = 3
45.38
GeForce GTX 960
SE +/- 0.43, N = 3
82.01
GeForce GTX TITAN X
SE +/- 0.35, N = 3
32.37
GeForce GTX 780 Ti
SE +/- 0.50, N = 3
61.03
GeForce GTX 750
SE +/- 0.05, N = 3
180.66
GeForce GTX Titan Xp Oct-Off
SE +/- 0.12, N = 3
20.40
GeForce GTX Titan Xp Oct-Swappiness 100
SE +/- 0.11, N = 3
20.22
40
80
120
160
200

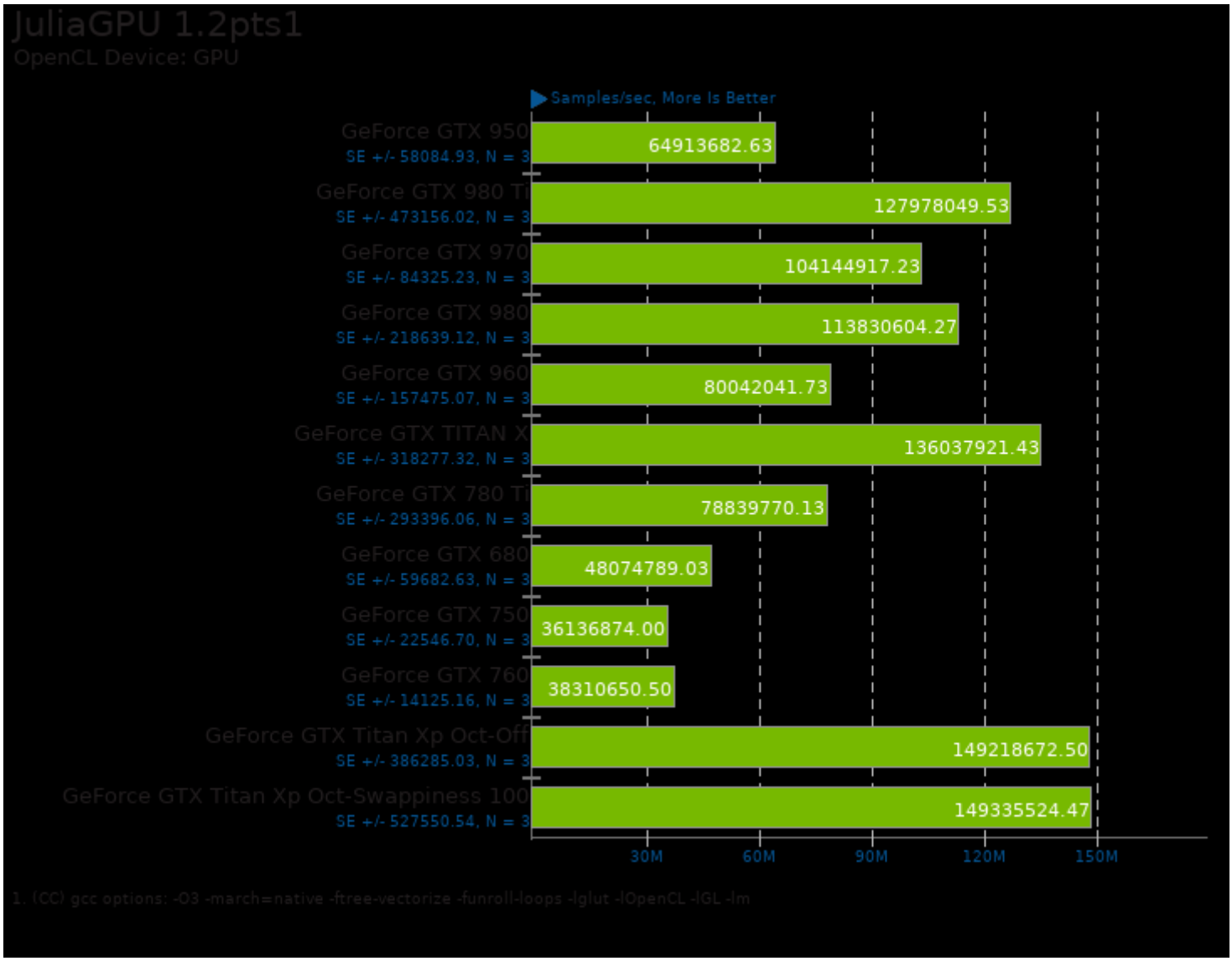

CUDA Mini-Nbody 2015-11-10
Test: Cache Blocking
Seconds, Fewer Is Better
GeForce GTX 950
SE +/- 0.02, N = 3
49.89
GeForce GTX 980 Ti
SE +/- 0.21, N = 3
19.77
GeForce GTX 970
SE +/- 0.01, N = 3
28.53
GeForce GTX 980
SE +/- 0.06, N = 3
25.13
GeForce GTX 960
SE +/- 0.01, N = 3
37.08
GeForce GTX TITAN X
SE +/- 0.10, N = 3
18.65
GeForce GTX 780 Ti
SE +/- 0.27, N = 3
29.99
GeForce GTX 750
SE +/- 0.00, N = 3
98.19
GeForce GTX Titan Xp Oct-Off
SE +/- 0.03, N = 3
11.49
GeForce GTX Titan Xp Oct-Swappiness 100
SE +/- 0.02, N = 3
11.37
20
40
60
80
100


CUDA Mini-Nbody 2015-11-10
Test: Loop Unrolling
Seconds, Fewer Is Better
GeForce GTX 950
SE +/- 0.03, N = 3
47.54
GeForce GTX 980 Ti
SE +/- 0.15, N = 3
18.46
GeForce GTX 970
SE +/- 0.02, N = 3
26.42
GeForce GTX 980
SE +/- 0.21, N = 3
23.88
GeForce GTX 960
SE +/- 0.03, N = 3
35.35
GeForce GTX TITAN X
SE +/- 0.25, N = 3
17.59
GeForce GTX 780 Ti
SE +/- 0.05, N = 3
27.05
GeForce GTX 750
SE +/- 0.04, N = 3
89.34
GeForce GTX Titan Xp Oct-Off
SE +/- 0.11, N = 3
12.02
GeForce GTX Titan Xp Oct-Swappiness 100
SE +/- 0.03, N = 3
11.90
20
40
60
80
100

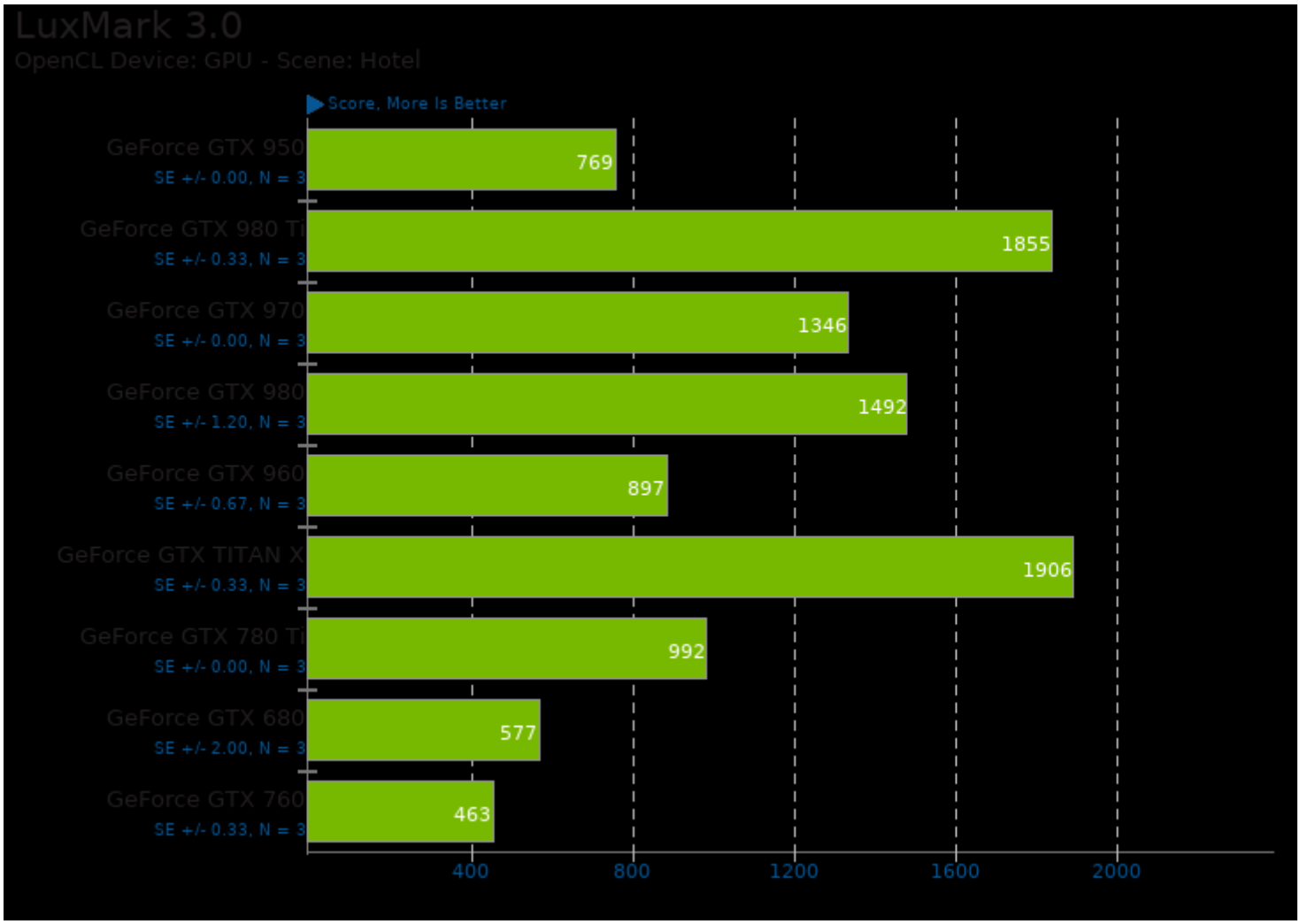

CUDA Mini-Nbody 2015-11-10
Test: SOA Data Layout
Seconds, Fewer Is Better
GeForce GTX 950
SE +/- 0.02, N = 3
108.50
GeForce GTX 980 Ti
SE +/- 0.11, N = 3
40.94
GeForce GTX 970
SE +/- 0.05, N = 3
55.87
GeForce GTX 980
SE +/- 0.21, N = 3
50.15
GeForce GTX 960
SE +/- 0.08, N = 3
79.97
GeForce GTX TITAN X
SE +/- 0.20, N = 3
37.43
GeForce GTX 780 Ti
SE +/- 0.16, N = 3
54.39
GeForce GTX 750
SE +/- 0.04, N = 3
199.95
GeForce GTX Titan Xp Oct-Off
SE +/- 0.09, N = 3
22.34
GeForce GTX Titan Xp Oct-Swappiness 100
SE +/- 0.05, N = 3
22.27
40
80
120
160
200


CUDA Mini-Nbody 2015-11-10
Test: Flush Denormals To Zero
Seconds, Fewer Is Better
GeForce GTX 950
SE +/- 0.02, N = 3
108.48
GeForce GTX 980 Ti
SE +/- 0.10, N = 3
40.85
GeForce GTX 970
SE +/- 0.07, N = 3
55.80
GeForce GTX 980
SE +/- 0.18, N = 3
49.53
GeForce GTX 960
SE +/- 0.01, N = 3
79.84
GeForce GTX TITAN X
SE +/- 0.08, N = 3
37.37
GeForce GTX 780 Ti
SE +/- 0.10, N = 3
53.26
GeForce GTX 750
SE +/- 0.03, N = 3
199.83
GeForce GTX Titan Xp Oct-Off
SE +/- 0.11, N = 3
21.99
GeForce GTX Titan Xp Oct-Swappiness 100
SE +/- 0.03, N = 3
22.22
40
80
120
160
200

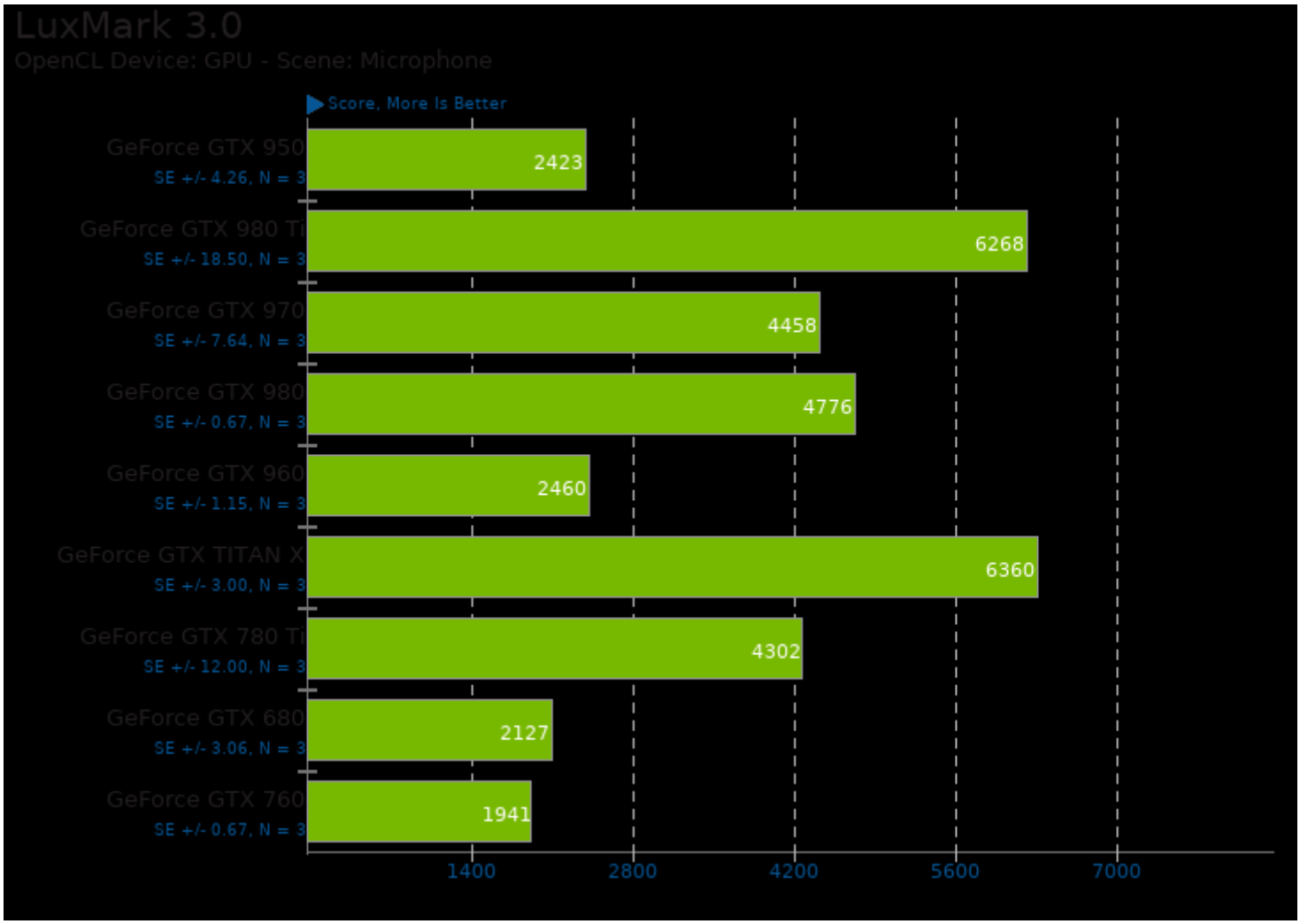
OpenCL CUDA NVIDIA GPGPU Linux Tests



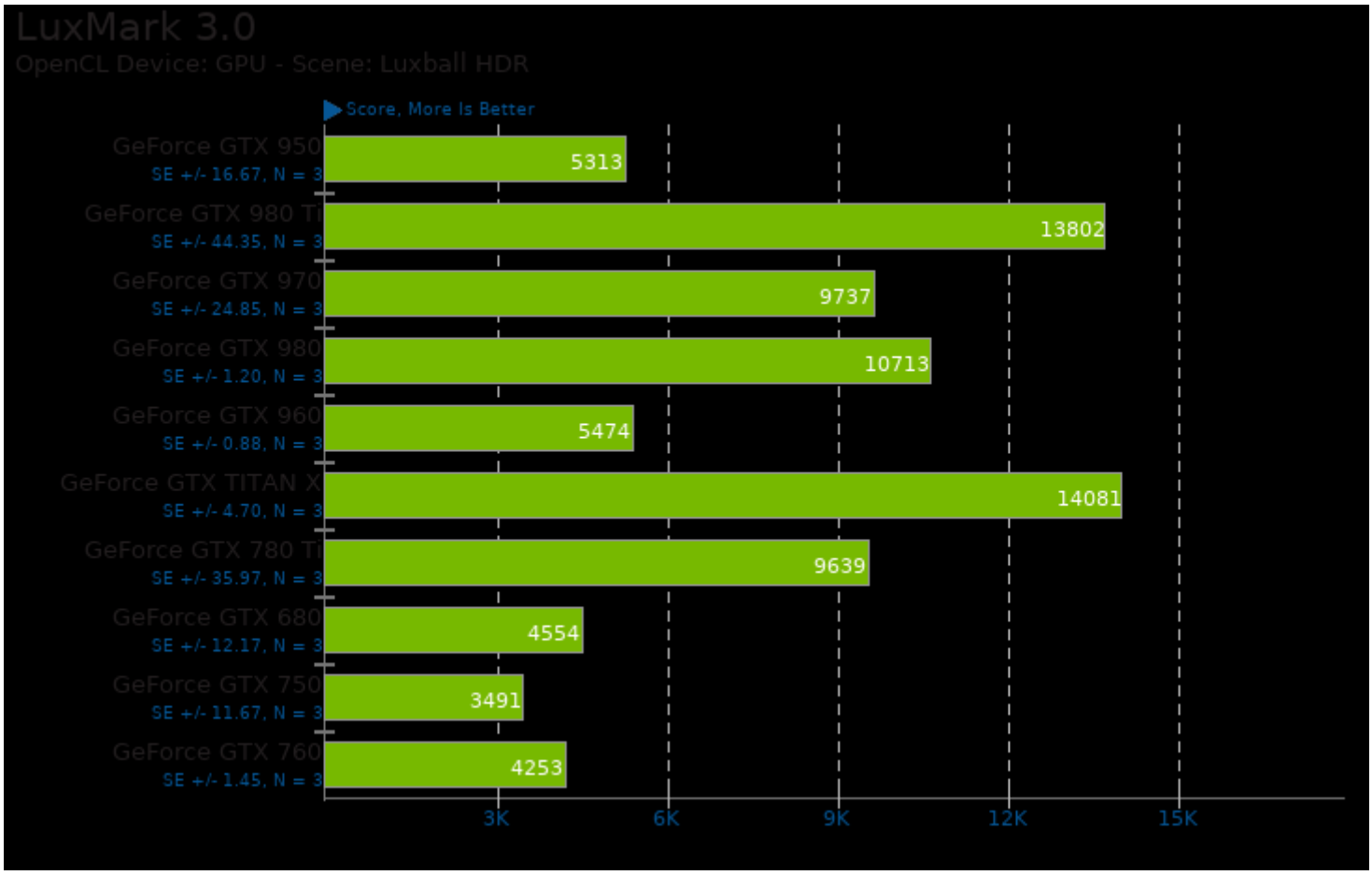
OpenCL CUDA NVIDIA GPGPU Linux Tests

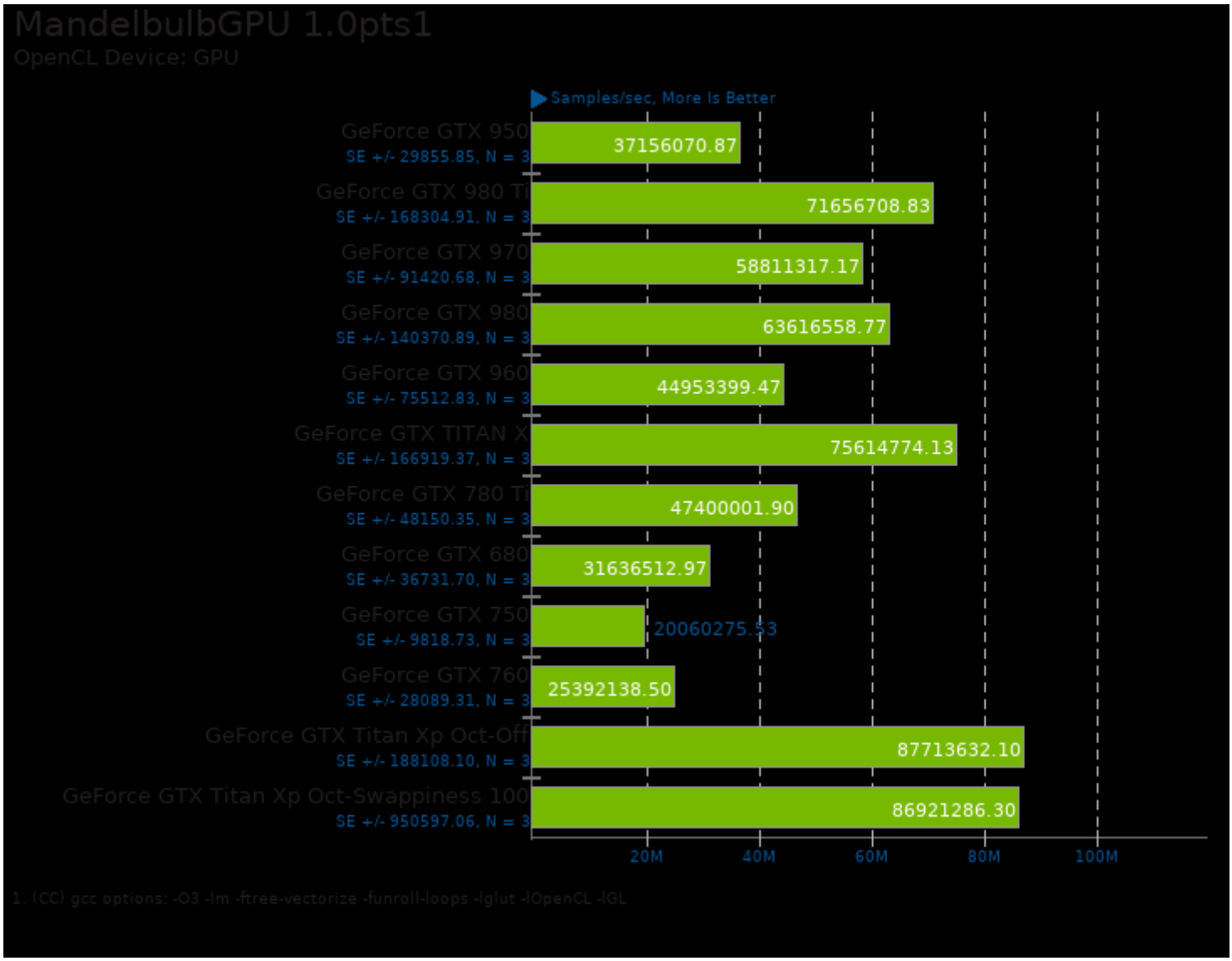


OpenCL CUDA NVIDIA GPGPU Linux Tests

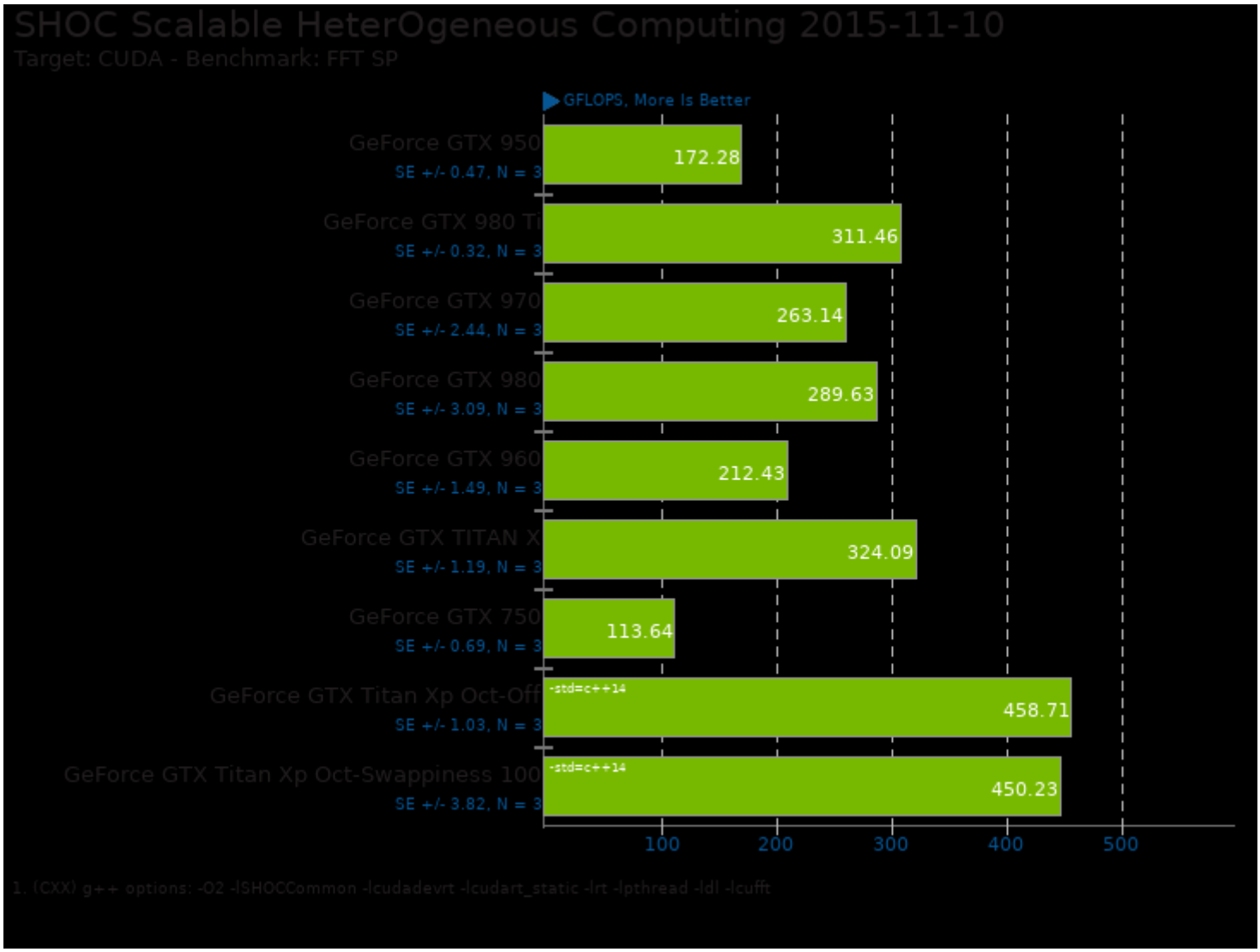


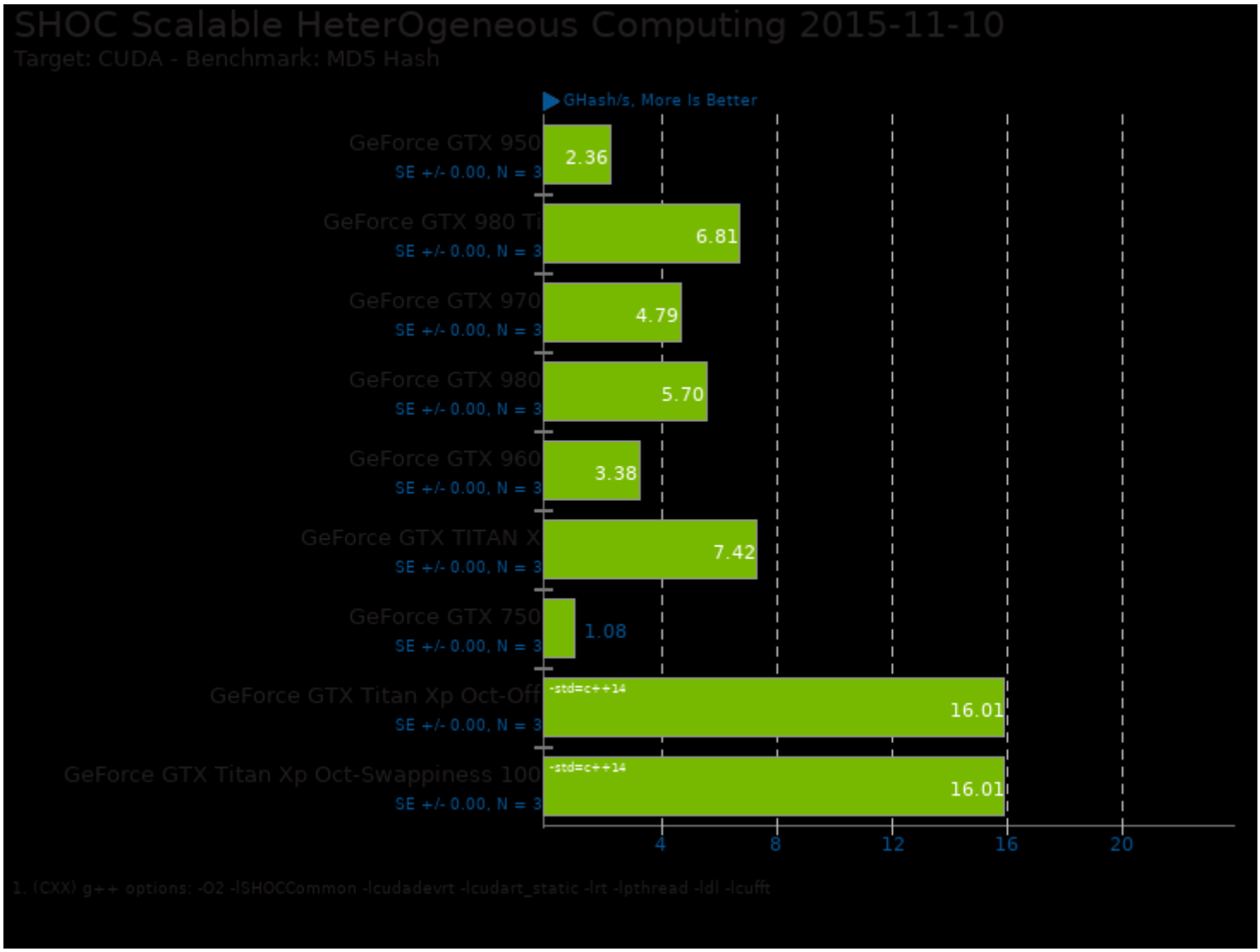
OpenCL CUDA NVIDIA GPGPU Linux Tests

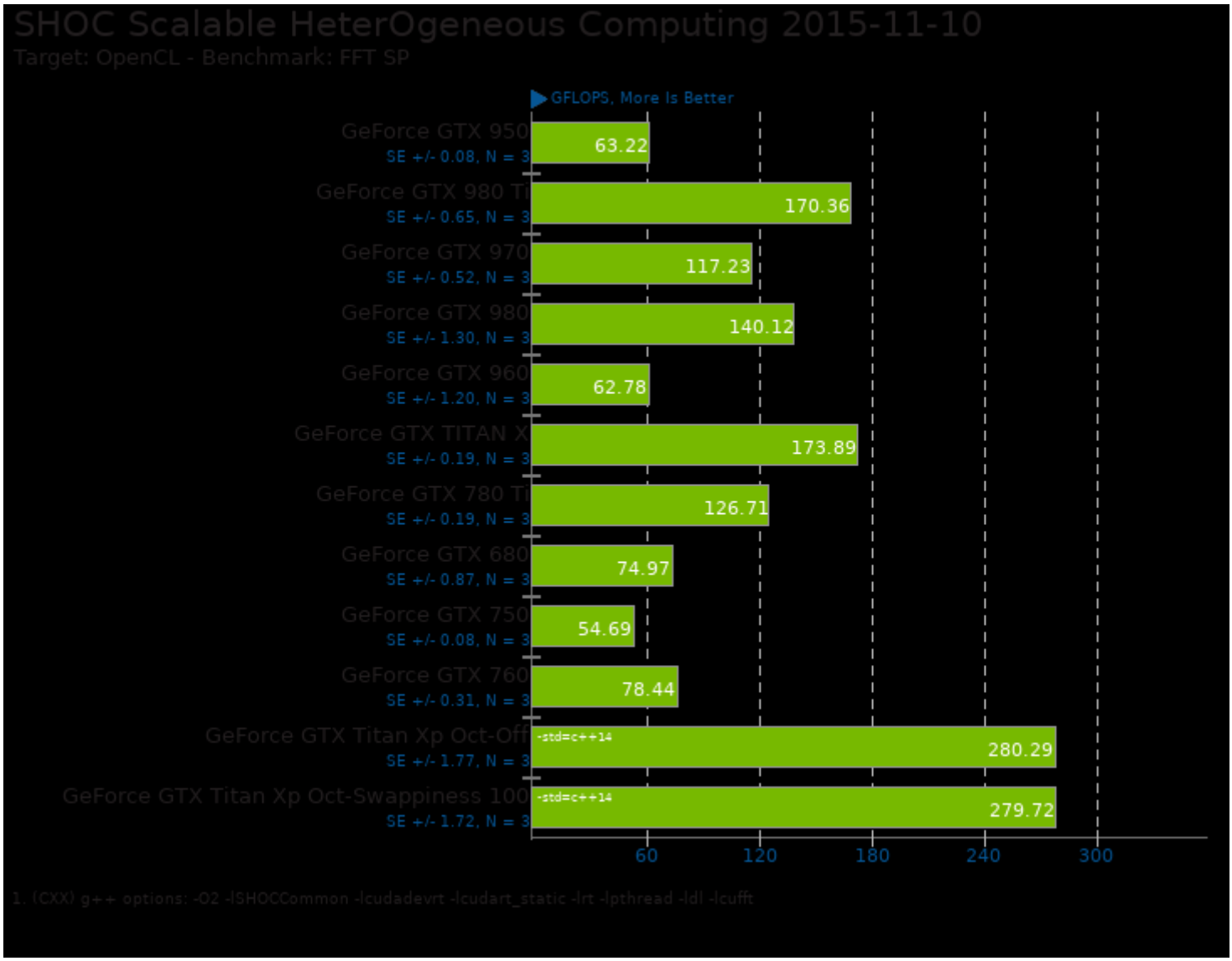


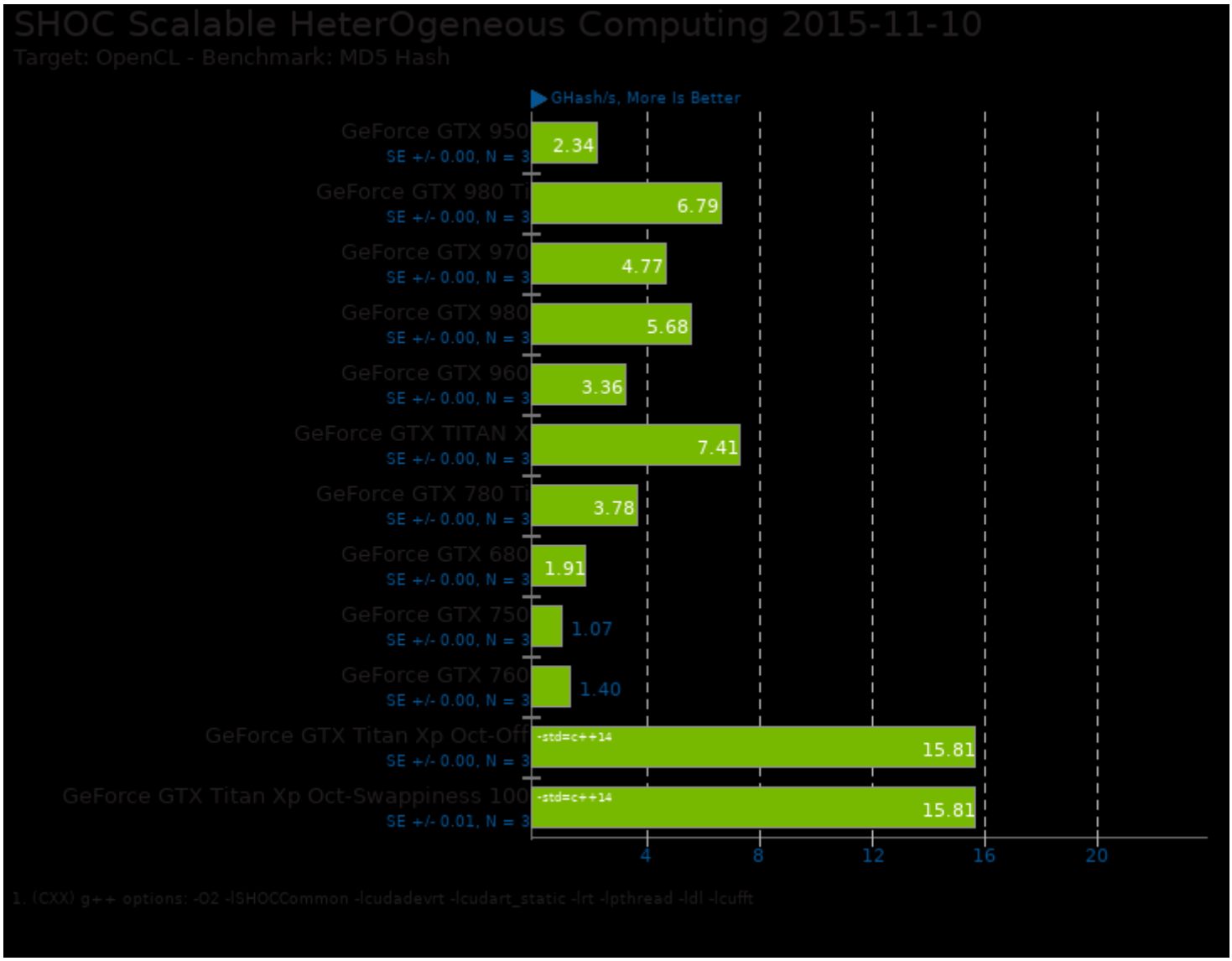

MandelbulbGPU 1.0pts1
OpenCL Device: GPU
Samples/sec, More Is Better
GeForce GTX 950
SE +/- 29855.85, N = 3
37156070.87
GeForce GTX 980 Ti
SE +/- 168304.91, N = 3
71656708.83
GeForce GTX 970
SE +/- 91420.68, N = 3
58811317.17
GeForce GTX 980
SE +/- 140370.89, N = 3
63616558.77
GeForce GTX 960
SE +/- 75512.83, N = 3
44953399.47
GeForce GTX TITAN X
SE +/- 166919.37, N = 3
75614774.13
GeForce GTX 780 Ti
SE +/- 48150.35, N = 3
47400001.90
GeForce GTX 680
SE +/- 36731.70, N = 3
31636512.97
GeForce GTX 750
SE +/- 9818.73, N = 3
20060275.53
GeForce GTX 760
SE +/- 28089.31, N = 3
25392138.50
GeForce GTX Titan Xp Oct-Off
SE +/- 188108.10, N = 3
87713632.10
GeForce GTX Titan Xp Oct-Swappiness 100
SE +/- 950597.06, N = 3
86921286.30
20M
40M
60M
80M
100M
1. (CC) gcc options: -O3 -lm -ftree-vectorize -funroll-loops -lglut -lOpenCL -lGL

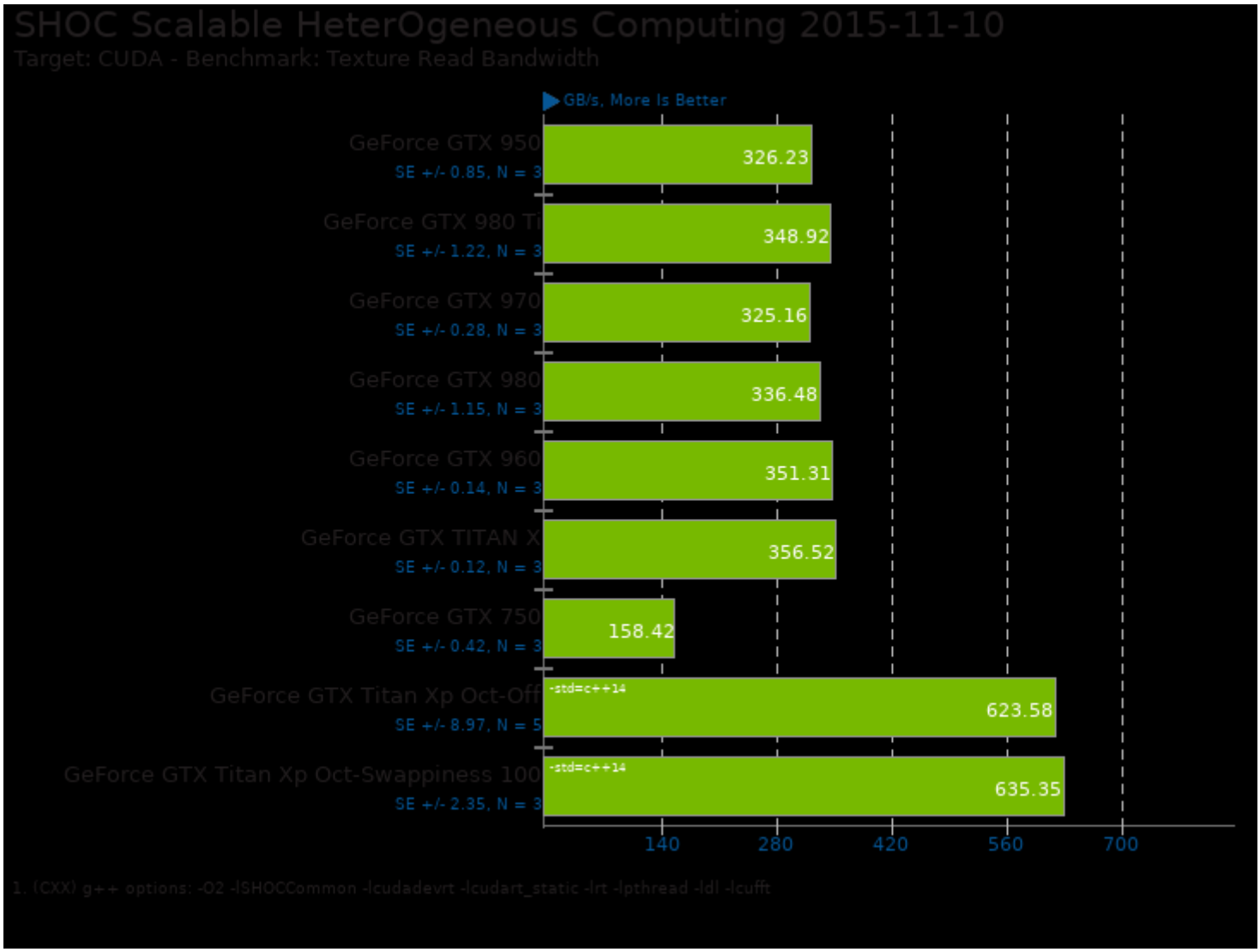
OpenCL CUDA NVIDIA GPGPU Linux Tests

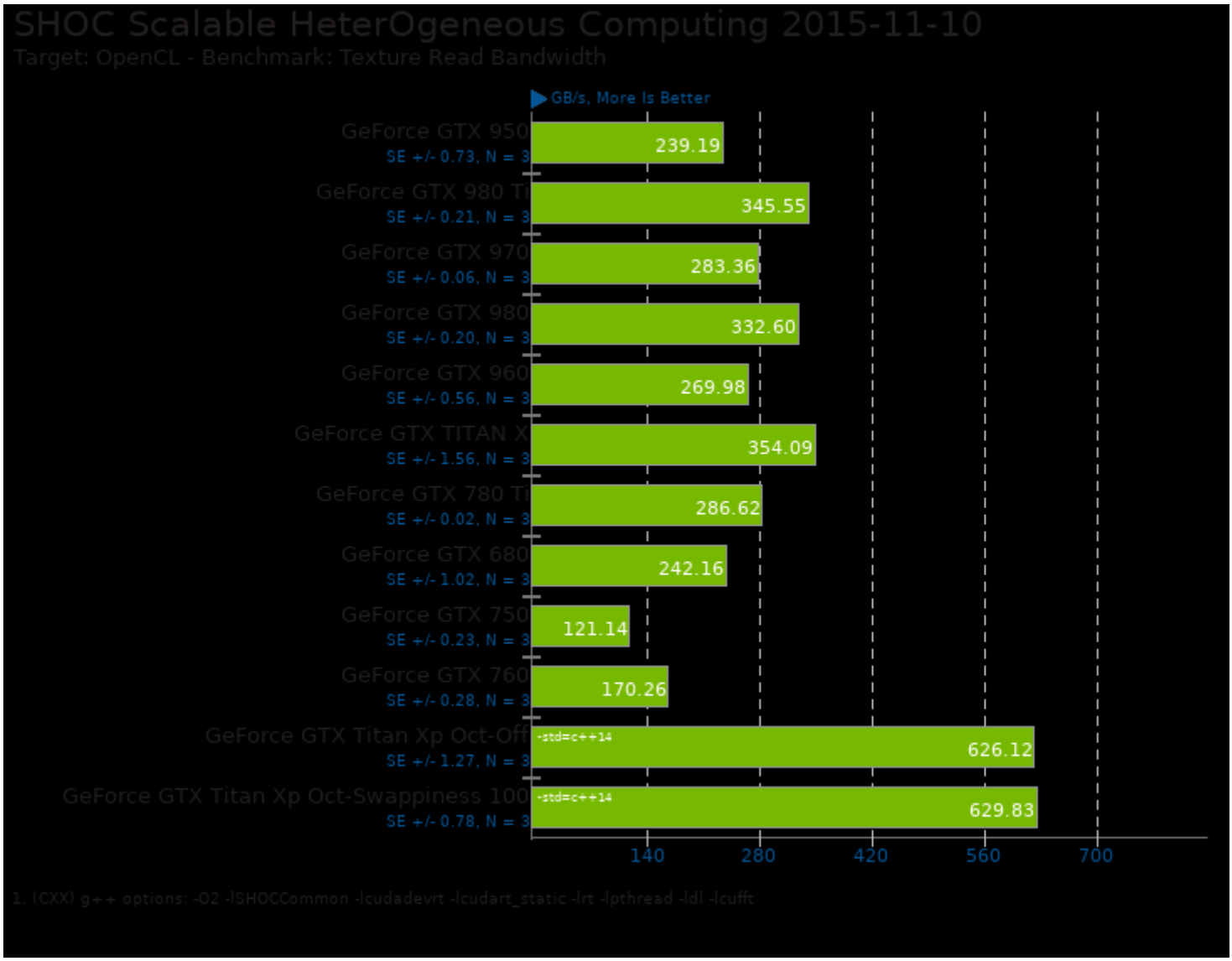



SHOC Scalable HeterOgeneous Computing 2015-11-10
Target: CUDA - Benchmark: MD5 Hash
GHash/s, More Is Better
GeForce GTX 950
SE +/- 0.00, N = 3
2.36
GeForce GTX 980 Ti
SE +/- 0.00, N = 3
6.81
GeForce GTX 970
SE +/- 0.00, N = 3
4.79
GeForce GTX 980
SE +/- 0.00, N = 3
5.70
GeForce GTX 960
SE +/- 0.00, N = 3
3.38
GeForce GTX TITAN X
SE +/- 0.00, N = 3
7.42
GeForce GTX 750
SE +/- 0.00, N = 3
1.08
GeForce GTX Titan Xp Oct-Off
SE +/- 0.00, N = 3
-std=c++14
16.01
GeForce GTX Titan Xp Oct-Swappiness 100
SE +/- 0.00, N = 3
-std=c++14
16.01
4
8
12
16
20
1. (CXX) g++ options: -O2 -lSHOCCommon -lcudadevrt -lcudart_static -lrt -lpthread -ldl -lcufft

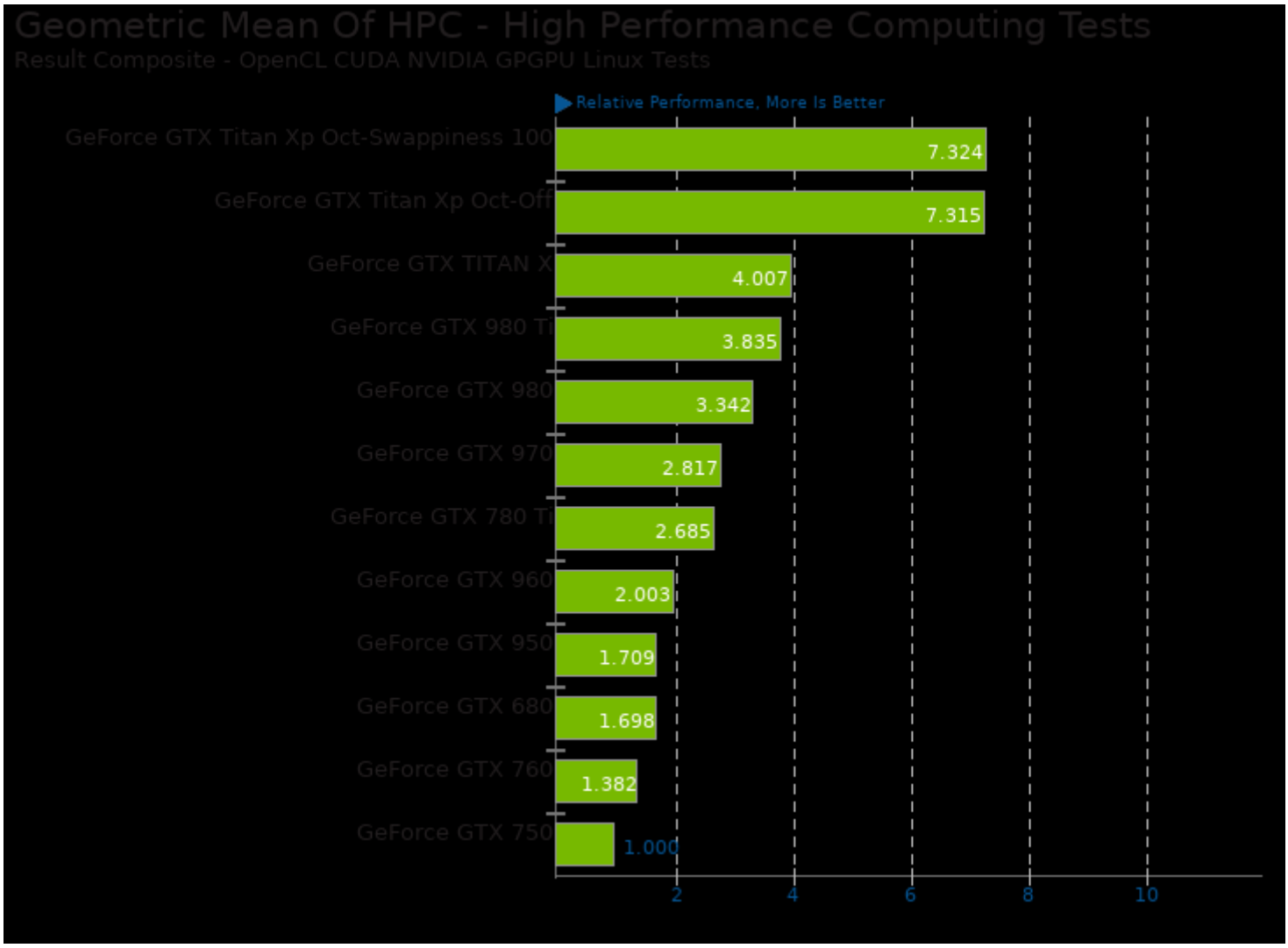

SHOC Scalable HeterOgeneous Computing 2015-11-10
Target: OpenCL - Benchmark: FFT SP
GFLOPS, More Is Better
GeForce GTX 950
SE +/- 0.08, N = 3
63.22
GeForce GTX 980 Ti
SE +/- 0.65, N = 3
170.36
GeForce GTX 970
SE +/- 0.52, N = 3
117.23
GeForce GTX 980
SE +/- 1.30, N = 3
140.12
GeForce GTX 960
SE +/- 1.20, N = 3
62.78
GeForce GTX TITAN X
SE +/- 0.19, N = 3
173.89
GeForce GTX 780 Ti
SE +/- 0.19, N = 3
126.71
GeForce GTX 680
SE +/- 0.87, N = 3
74.97
GeForce GTX 750
SE +/- 0.08, N = 3
54.69
GeForce GTX 760
SE +/- 0.31, N = 3
78.44
GeForce GTX Titan Xp Oct-Off
-std=c++14
SE +/- 1.77, N = 3
280.29
GeForce GTX Titan Xp Oct-Swappiness 100
-std=c++14
SE +/- 1.72, N = 3
279.72
60
120
180
240
300
1. (CXX) g++ options: -O2 -lSHOCCommon -lcudadevrt -lcudart_static -lrt -lpthread -ldl -lcufft


SHOC Scalable HeterOgeneous Computing 2015-11-10
Target: OpenCL - Benchmark: MD5 Hash
GHash/s, More Is Better
GeForce GTX 950
SE +/- 0.00, N = 3
2.34
GeForce GTX 980 Ti
SE +/- 0.00, N = 3
6.79
GeForce GTX 970
SE +/- 0.00, N = 3
4.77
GeForce GTX 980
SE +/- 0.00, N = 3
5.68
GeForce GTX 960
SE +/- 0.00, N = 3
3.36
GeForce GTX TITAN X
SE +/- 0.00, N = 3
7.41
GeForce GTX 780 Ti
SE +/- 0.00, N = 3
3.78
GeForce GTX 680
SE +/- 0.00, N = 3
1.91
GeForce GTX 750
SE +/- 0.00, N = 3
1.07
GeForce GTX 760
SE +/- 0.00, N = 3
1.40
GeForce GTX Titan Xp Oct-Off
SE +/- 0.00, N = 3
-std=c++14
15.81
GeForce GTX Titan Xp Oct-Swappiness 100
SE +/- 0.01, N = 3
-std=c++14
15.81
4
8
12
16
20
1. (CXX) g++ options: -O2 -lSHOCCommon -lcudadevrt -lcudart_static -lrt -lpthread -ldl -lcufft

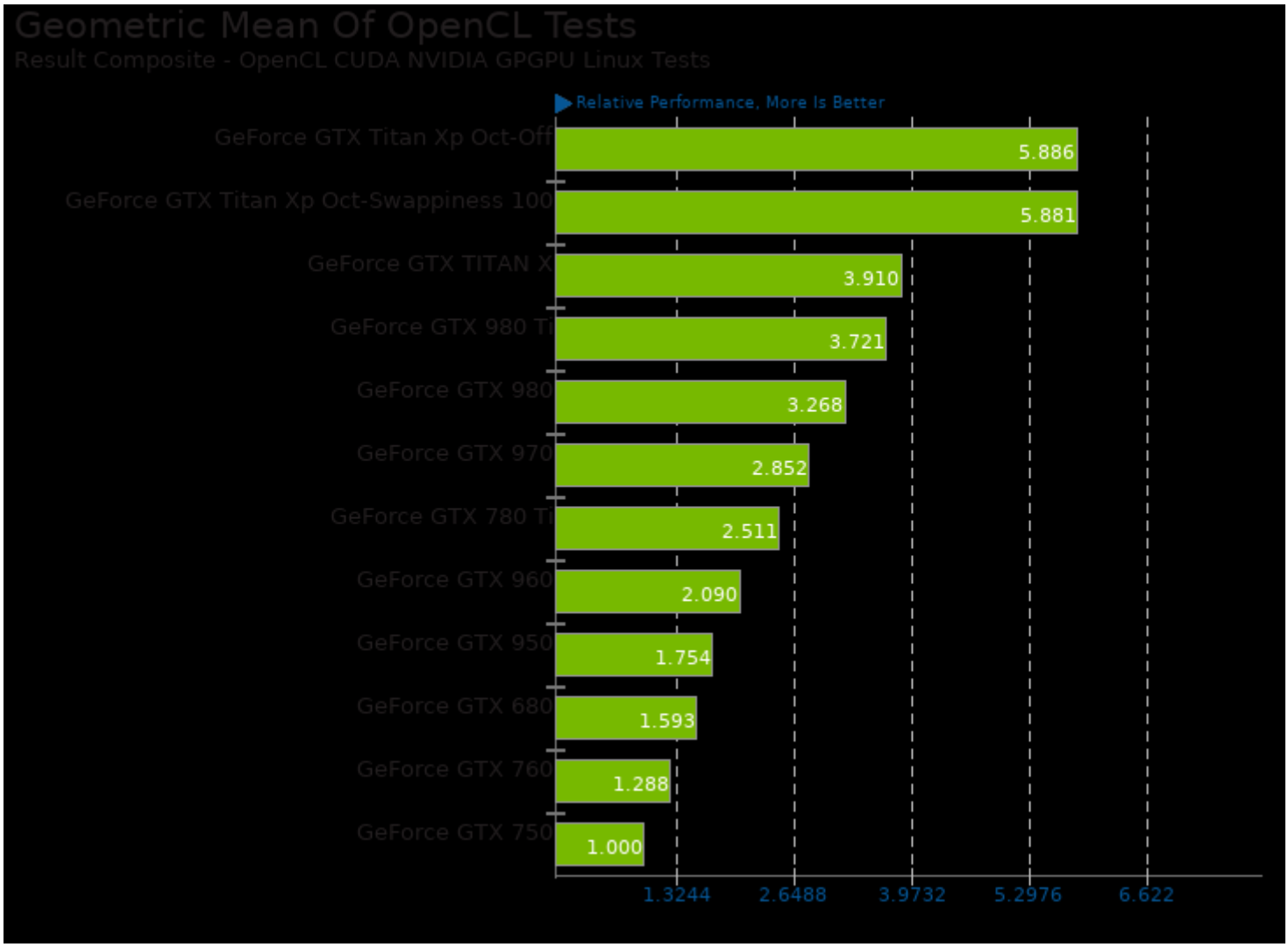

SHOC Scalable HeterOgeneous Computing 2015-11-10
Target: CUDA - Benchmark: Texture Read Bandwidth
GB/s, More Is Better
GeForce GTX 950
SE +/- 0.85, N = 3
326.23
GeForce GTX 980 Ti
SE +/- 1.22, N = 3
348.92
GeForce GTX 970
SE +/- 0.28, N = 3
325.16
GeForce GTX 980
SE +/- 1.15, N = 3
336.48
GeForce GTX 960
SE +/- 0.14, N = 3
351.31
GeForce GTX TITAN X
SE +/- 0.12, N = 3
356.52
GeForce GTX 750
SE +/- 0.42, N = 3
158.42
GeForce GTX Titan Xp Oct-Off
SE +/- 8.97, N = 5
-std=c++14
623.58
GeForce GTX Titan Xp Oct-Swappiness 100
SE +/- 2.35, N = 3
-std=c++14
635.35
140
280
420
560
700
1. (CXX) g++ options: -O2 -lSHOCCommon -lcudadevrt -lcudart_static -lrt -lpthread -ldl -lcufft


SHOC Scalable HeterOgeneous Computing 2015-11-10
Target: OpenCL - Benchmark: Texture Read Bandwidth
GB/s, More Is Better
GeForce GTX 950
SE +/- 0.73, N = 3
239.19
GeForce GTX 980 Ti
SE +/- 0.21, N = 3
345.55
GeForce GTX 970
SE +/- 0.06, N = 3
283.36
GeForce GTX 980
SE +/- 0.20, N = 3
332.60
GeForce GTX 960
SE +/- 0.56, N = 3
269.98
GeForce GTX TITAN X
SE +/- 1.56, N = 3
354.09
GeForce GTX 780 Ti
SE +/- 0.02, N = 3
286.62
GeForce GTX 680
SE +/- 1.02, N = 3
242.16
GeForce GTX 750
SE +/- 0.23, N = 3
121.14
GeForce GTX 760
SE +/- 0.28, N = 3
170.26
GeForce GTX Titan Xp Oct-Off
SE +/- 1.27, N = 3
-std=c++14
626.12
GeForce GTX Titan Xp Oct-Swappiness 100
SE +/- 0.78, N = 3
-std=c++14
629.83
140
280
420
560
700
1. (CXX) g++ options: -O2 -lSHOCCommon -lcudadevrt -lcudart_static -lrt -lpthread -ldl -lcufft

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



Geometric mean based upon tests: pts/askap and pts/shoc



Geometric mean based upon tests: pts/juliagpu, pts/mandelbulbgpu, pts/luxmark and pts/shoc

This file was automatically generated via the Phoronix Test Suite benchmarking software on Thursday, 28 March 2024 12:57.