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OpenCL MiniTest

Intel Core i9-9900K testing with a ASRock Z390 Pro4 (P4.70 BIOS) and Sapphire AMD Radeon R9 290/390 on ManjaroLinux 21.3.6 via the Phoronix Test Suite.

Automated Executive Summary

Sapphire Radeon R9 290X 4GB w/lib had the most wins, coming in first place for 89% of the tests.

Based on the geometric mean of all complete results, the fastest (Sapphire Radeon R9 290X 4GB w/lib) was 1.03x the speed of the slowest (Sapphire Radeon R9 290X 4GB).

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

ViennaCL (Test: OpenCL BLAS - dGEMM-NT) at 1.103x
LeelaChessZero (Backend: OpenCL) at 1.102x
clpeak (OpenCL Test: Single-Precision Float) at 1.058x
clpeak (OpenCL Test: Double-Precision Double) at 1.051x
ViennaCL (Test: OpenCL BLAS - dGEMM-NN) at 1.048x
ViennaCL (Test: OpenCL BLAS - sCOPY) at 1.041x
ViennaCL (Test: OpenCL BLAS - dGEMV-N) at 1.039x
clpeak (OpenCL Test: Kernel Latency) at 1.037x
ViennaCL (Test: OpenCL BLAS - dGEMV-T) at 1.033x

Xsbench OpenCL at 1.029x.

Test Systems:

Sapphire Radeon R9 290X 4GB

Processor: Intel Core i9-9900K @ 5.00GHz (8 Cores / 16 Threads), Motherboard: ASRock Z390 Pro4 (P4.70 BIOS), Chipset: Intel Cannon Lake PCH, Memory: 32GB, Disk: 1024GB ADATA SX8100NP, Graphics: Sapphire AMD Radeon R9 290/390 (1200MHz), Audio: Realtek ALC892, Monitor: 32S305, Network: Intel I219-V

OS: ManjaroLinux 21.3.6, Kernel: 5.15.57-2-MANJARO (x86_64), Desktop: GNOME Shell 42.3.1, Display Server: X Server, OpenCL: OpenCL 2.1 AMD-APP (3188.4), Vulkan: 1.3.211, Compiler: GCC 12.1.0 + Clang 14.0.6 + LLVM 14.0.6, File-System: ext4, Screen Resolution: 1920x1080

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --disable-libssp --disable-libstdcxx-pch --disable-werror --enable-__cxa_atexit --enable-bootstrap --enable-cet=auto --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-default-ssp --enable-gnu-indirect-function --enable-gnu-unique-object --enable-languages=c,c++,ada,fortran,go,lto,objc,obj-c++,d --enable-libstdcxx-backtrace --enable-link-serialization=1 --enable-lto --enable-multilib --enable-plugin --enable-shared --enable-threads=posix --mandir=/usr/share/man --with-build-config=bootstrap-lto --with-linker-hash-style=gnu
Processor Notes: Scaling Governor: intel_pstate powersave (EPP: performance) - CPU Microcode: 0xf0
Security Notes: itlb_multihit: KVM: Mitigation of VMX disabled + l1tf: Not affected + mds: Not affected + meltdown: Not affected + mmio_stale_data: Mitigation of Clear buffers; SMT vulnerable + retbleed: Mitigation of Enhanced IBRS + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Vulnerable: eIBRS with unprivileged eBPF + srbds: Mitigation of Microcode + tsx_async_abort: Mitigation of TSX disabled

Sapphire Radeon R9 290X 4GB w/lib

Processor: Intel Core i9-9900K @ 5.00GHz (8 Cores / 16 Threads), Motherboard: ASRock Z390 Pro4 (P4.70 BIOS), Chipset: Intel Cannon Lake PCH, Memory: 32GB, Disk: 1024GB ADATA SX8100NP, Graphics: Sapphire AMD Radeon R9 290/390 (1200MHz), Audio: Realtek ALC892, Monitor: 32S305, Network: Intel I219-V

OS: ManjaroLinux 21.3.6, Kernel: 5.15.57-2-MANJARO (x86_64), Desktop: GNOME Shell 42.3.1, Display Server: X Server, OpenGL: 4.6 Mesa 22.1.4 (LLVM 14.0.6 DRM 3.42), OpenCL: OpenCL 2.1 AMD-APP (3188.4), Vulkan: 1.3.211, Compiler: GCC 12.1.0 + Clang 14.0.6 + LLVM 14.0.6, File-System: ext4, Screen Resolution: 1920x1080

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --disable-libssp --disable-libstdcxx-pch --disable-werror --enable-__cxa_atexit --enable-bootstrap --enable-cet=auto --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-default-ssp --enable-gnu-indirect-function --enable-gnu-unique-object --enable-languages=c,c++,ada,fortran,go,lto,objc,obj-c++,d --enable-libstdcxx-backtrace --enable-link-serialization=1 --enable-lto --enable-multilib --enable-plugin --enable-shared --enable-threads=posix --mandir=/usr/share/man --with-build-config=bootstrap-lto --with-linker-hash-style=gnu
Processor Notes: Scaling Governor: intel_pstate powersave (EPP: performance) - CPU Microcode: 0xf0
Security Notes: itlb_multihit: KVM: Mitigation of VMX disabled + l1tf: Not affected + mds: Not affected + meltdown: Not affected + mmio_stale_data: Mitigation of Clear buffers; SMT vulnerable + retbleed: Mitigation of Enhanced IBRS + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Vulnerable: eIBRS with unprivileged eBPF + srbds: Mitigation of Microcode + tsx_async_abort: Mitigation of TSX disabled

OpenCL MiniTest

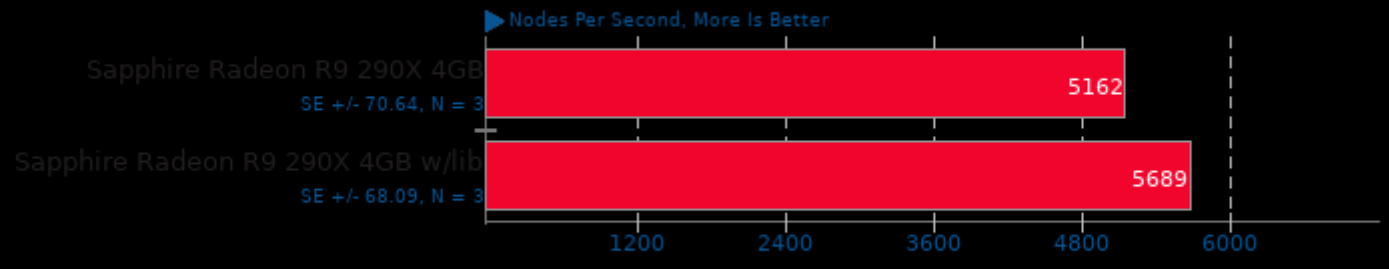
	Sapphire Radeon R9 290X 4GB	Sapphire Radeon R9 290X 4GB w/lib
LeelaChessZero - OpenCL (Nodes/s)	5162	5689
Normalized	90.74%	100%
Standard Deviation	2.4%	2.1%
ViennaCL - OpenCL BLAS - dGEMM-TT (GFLOPs/s)	451	452
Normalized	99.78%	100%
Standard Deviation	0.5%	0.1%
ViennaCL - OpenCL BLAS - dGEMM-TN (GFLOPs/s)	390	401
Normalized	97.26%	100%
Standard Deviation	0.1%	0.3%
ViennaCL - OpenCL BLAS - dGEMM-NT (GFLOPs/s)	378	417
Normalized	90.65%	100%
Standard Deviation	0.5%	0%
ViennaCL - OpenCL BLAS - dGEMM-NN (GFLOPs/s)	457	479
Normalized	95.41%	100%
Standard Deviation	0%	0.2%
ViennaCL - OpenCL BLAS - dGEMV-T (GB/s)	121	125
Normalized	96.8%	100%
Standard Deviation	1.3%	2.9%
ViennaCL - OpenCL BLAS - dGEMV-N (GB/s)	43.8	45.5
Normalized	96.26%	100%
Standard Deviation	0.6%	0.2%
ViennaCL - OpenCL BLAS - dDOT (GB/s)	187	188
Normalized	99.47%	100%
Standard Deviation	1.7%	0.5%
ViennaCL - OpenCL BLAS - dAXPY (GB/s)	208	214
Normalized	97.2%	100%
Standard Deviation	0.5%	0.5%
ViennaCL - OpenCL BLAS - dCOPY (GB/s)	175	179
Normalized	97.77%	100%
Standard Deviation	0.7%	1.1%
ViennaCL - OpenCL BLAS - sDOT (GB/s)	116	119
Normalized	97.48%	100%
Standard Deviation	0.9%	1.3%
ViennaCL - OpenCL BLAS - sAXPY (GB/s)	157	161
Normalized	97.52%	100%
Standard Deviation	0.4%	1%
ViennaCL - OpenCL BLAS - sCOPY (GB/s)	121	126
Normalized	96.03%	100%
Standard Deviation	1%	0.5%
clpeak - D.P.D (GFLOPS)	632.17	664.14
Normalized	95.19%	100%
Standard Deviation	0%	0%
SmallPT GPU - GPU - Caustic3 (Samples/sec)		1659539791
Standard Deviation		0%
SmallPT GPU - GPU - Cornell (Samples/sec)		1659539657
Standard Deviation		0%
SmallPT GPU - GPU - Complex (Samples/sec)		1659539532
Standard Deviation		0%
clpeak - I.C.I (GIOPS)	1679	1678
Normalized	100%	99.9%
Standard Deviation	0%	0.1%
Xsbench OpenCL (Lookups/s)	85317597	87831037
Normalized	97.14%	100%

OpenCL MiniTest

Standard Deviation	0.1%	0%
clpeak - T.B.e (GBPS)	**40.12**	**40.77**
Normalized	98.41%	100%
Standard Deviation	0.4%	0.9%
clpeak - T.B.e (GBPS)	**16.64**	**16.61**
Normalized	100%	99.82%
Standard Deviation	1.1%	1%
cl-mem - Copy (GB/s)	**249.7**	**254.8**
Normalized	98%	100%
Standard Deviation	0.3%	0.5%
cl-mem - Write (GB/s)	**192.2**	**196.8**
Normalized	97.66%	100%
Standard Deviation	0.5%	0.4%
cl-mem - Read (GB/s)	**251.6**	**251.8**
Normalized	99.92%	100%
Standard Deviation	1.8%	1.2%
clpeak - G.M.B (GBPS)	**269.59**	**276.80**
Normalized	97.4%	100%
Standard Deviation	0.1%	0%
clpeak - S.P.F (GFLOPS)	**4962**	**5250**
Normalized	94.5%	100%
Standard Deviation	0%	0%
clpeak - Kernel Latency (us)	**22.12**	**21.34**
Normalized	96.47%	100%
Standard Deviation	0.7%	0.8%
NeatBench - GPU (FPS)	200	200
Standard Deviation	0%	0%

LeelaChessZero 0.28

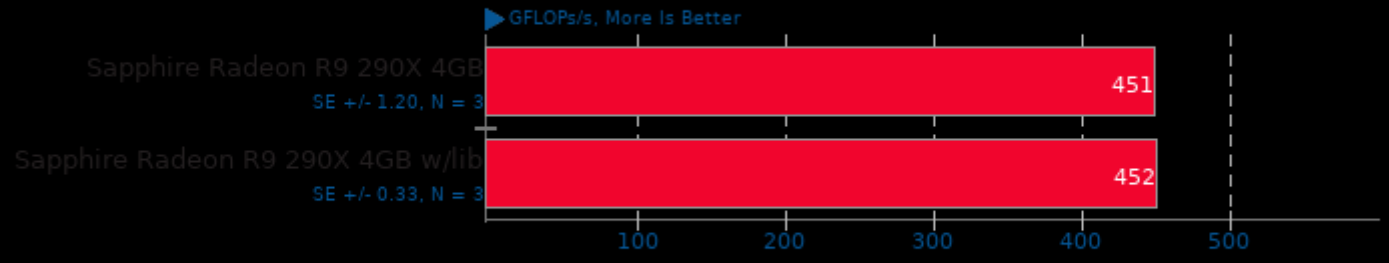
Backend: OpenCL



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

ViennaCL 1.7.1

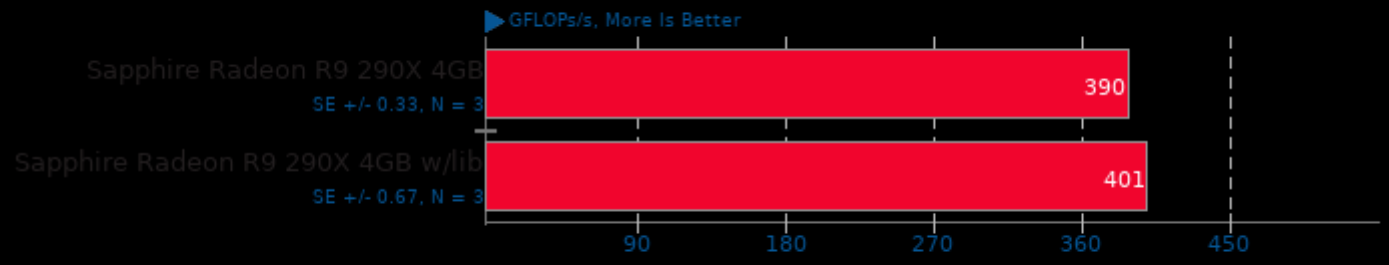
Test: OpenCL BLAS - dGEMM-TT



1. (CXX) g++ options: -fopenmp -O3 -rdynamic -lOpenCL

ViennaCL 1.7.1

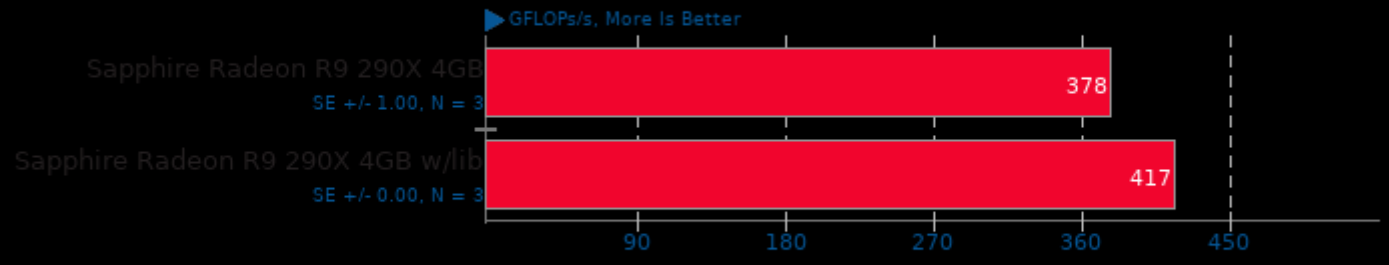
Test: OpenCL BLAS - dGEMM-TN



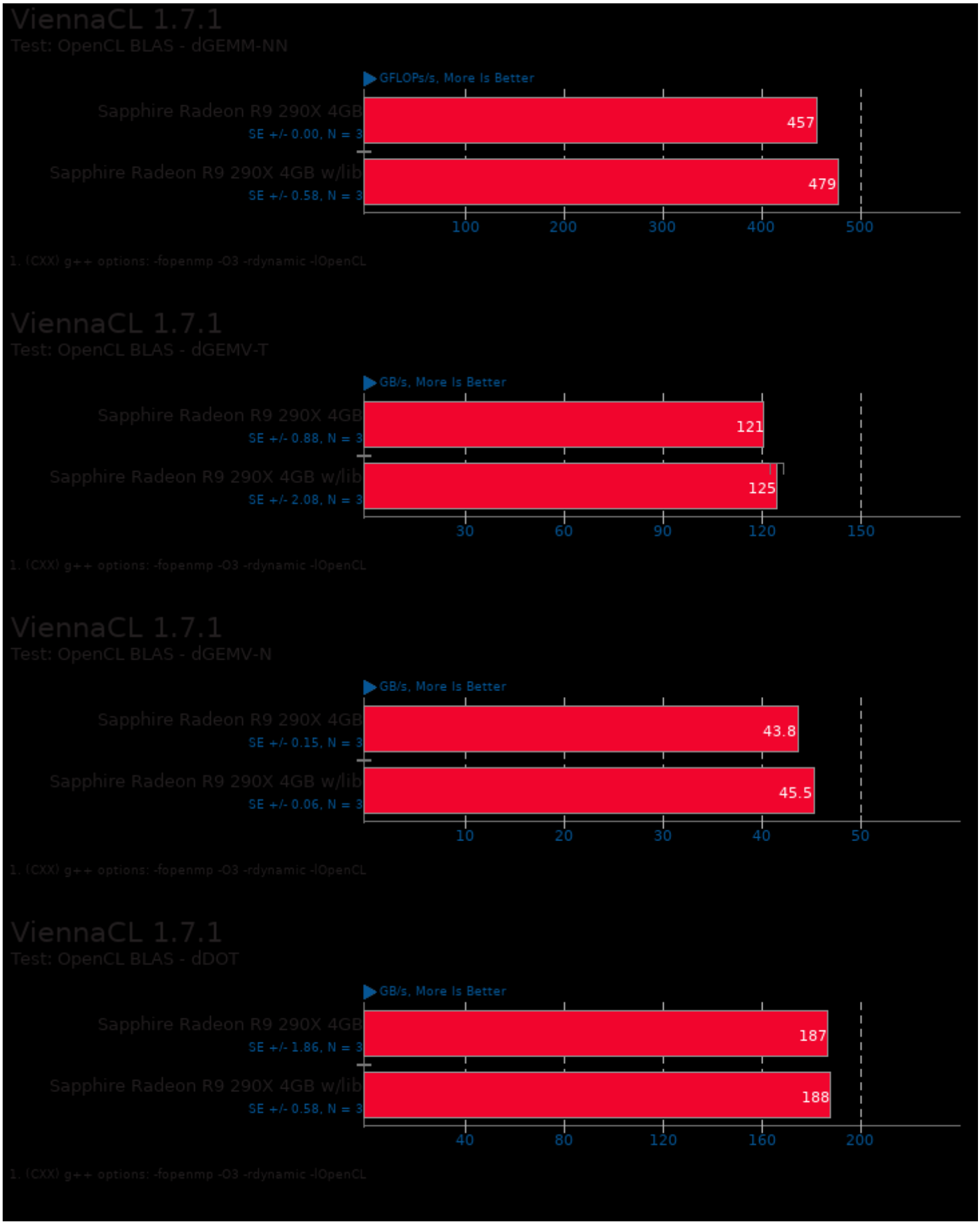
1. (CXX) g++ options: -fopenmp -O3 -rdynamic -lOpenCL

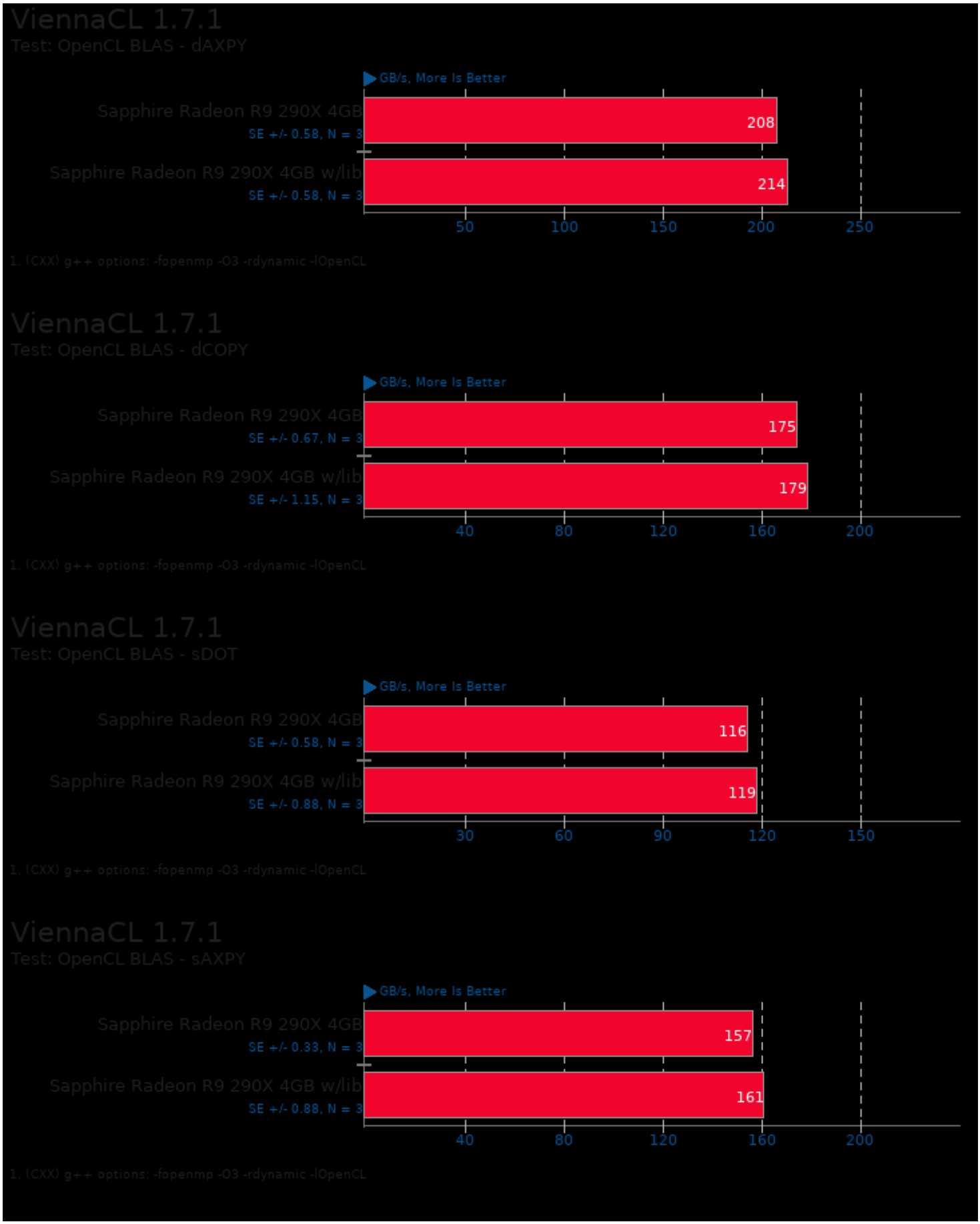
ViennaCL 1.7.1

Test: OpenCL BLAS - dGEMM-NT



1. (CXX) g++ options: -fopenmp -O3 -rdynamic -lOpenCL

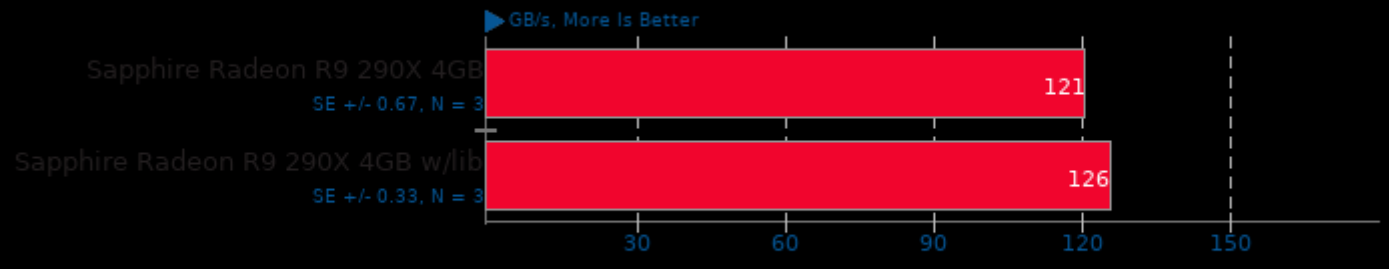

ViennaCL 1.7.1
Test: OpenCL BLAS - dGEMM-NN
GFLOPs/s, More Is Better
Sapphire Radeon R9 290X 4GB
SE +/- 0.00, N = 3
457
Sapphire Radeon R9 290X 4GB w/lib
SE +/- 0.58, N = 3
479
100
200
300
400
500
1. (CXX) g++ options: -fopenmp -O3 -rdynamic -lOpenCL
ViennaCL 1.7.1
Test: OpenCL BLAS - dGEMV-T
GB/s, More Is Better
Sapphire Radeon R9 290X 4GB
SE +/- 0.88, N = 3
121
Sapphire Radeon R9 290X 4GB w/lib
SE +/- 2.08, N = 3
125
30
60
90
120
150
1. (CXX) g++ options: -fopenmp -O3 -rdynamic -lOpenCL
ViennaCL 1.7.1
Test: OpenCL BLAS - dGEMV-N
GB/s, More Is Better
Sapphire Radeon R9 290X 4GB
SE +/- 0.15, N = 3
43.8
Sapphire Radeon R9 290X 4GB w/lib
SE +/- 0.06, N = 3
45.5
10
20
30
40
50
1. (CXX) g++ options: -fopenmp -O3 -rdynamic -lOpenCL
ViennaCL 1.7.1
Test: OpenCL BLAS - dDOT
GB/s, More Is Better
Sapphire Radeon R9 290X 4GB
SE +/- 1.86, N = 3
187
Sapphire Radeon R9 290X 4GB w/lib
SE +/- 0.58, N = 3
188
40
80
120
160
200
1. (CXX) g++ options: -fopenmp -O3 -rdynamic -lOpenCL


ViennaCL 1.7.1
Test: OpenCL BLAS - dAXPY
GB/s, More Is Better
Sapphire Radeon R9 290X 4GB
SE +/- 0.58, N = 3
208
Sapphire Radeon R9 290X 4GB w/lib
SE +/- 0.58, N = 3
214
50
100
150
200
250
1. (CXX) g++ options: -fopenmp -O3 -rdynamic -lOpenCL
ViennaCL 1.7.1
Test: OpenCL BLAS - dCOPY
GB/s, More Is Better
Sapphire Radeon R9 290X 4GB
SE +/- 0.67, N = 3
175
Sapphire Radeon R9 290X 4GB w/lib
SE +/- 1.15, N = 3
179
40
80
120
160
200
1. (CXX) g++ options: -fopenmp -O3 -rdynamic -lOpenCL
ViennaCL 1.7.1
Test: OpenCL BLAS - sDOT
GB/s, More Is Better
Sapphire Radeon R9 290X 4GB
SE +/- 0.58, N = 3
116
Sapphire Radeon R9 290X 4GB w/lib
SE +/- 0.88, N = 3
119
30
60
90
120
150
1. (CXX) g++ options: -fopenmp -O3 -rdynamic -lOpenCL
ViennaCL 1.7.1
Test: OpenCL BLAS - sAXPY
GB/s, More Is Better
Sapphire Radeon R9 290X 4GB
SE +/- 0.33, N = 3
157
Sapphire Radeon R9 290X 4GB w/lib
SE +/- 0.88, N = 3
161
40
80
120
160
200
1. (CXX) g++ options: -fopenmp -O3 -rdynamic -lOpenCL

OpenCL MiniTest

ViennaCL 1.7.1

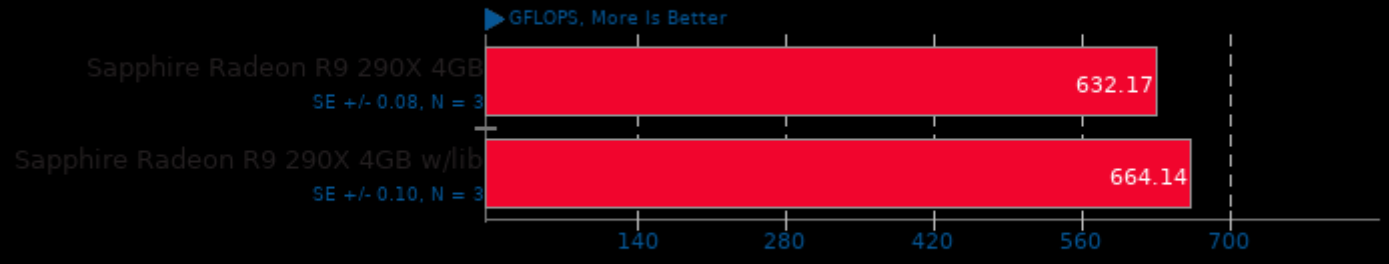
Test: OpenCL BLAS - sCOPY



1. (CXX) g++ options: -fopenmp -O3 -rdynamic -lOpenCL

clpeak

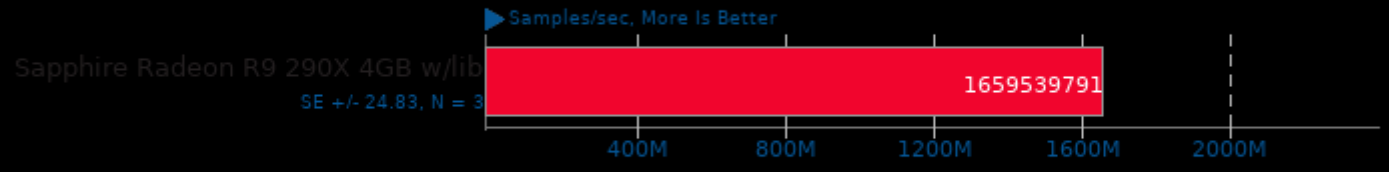
OpenCL Test: Double-Precision Double



1. (CXX) g++ options: -O3 -rdynamic -lOpenCL

SmallPT GPU 1.6pts1

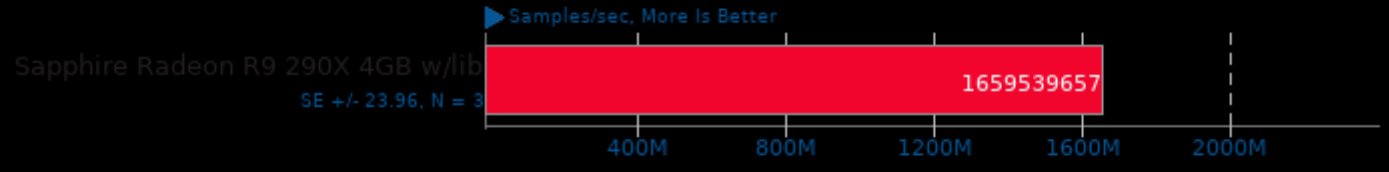
OpenCL Device: GPU - Scene: Caustic3



1. (CC) gcc options: -O3 -lm -ftree-vectorize -funroll-loops -lglut -lOpenCL -lGL

SmallPT GPU 1.6pts1

OpenCL Device: GPU - Scene: Cornell

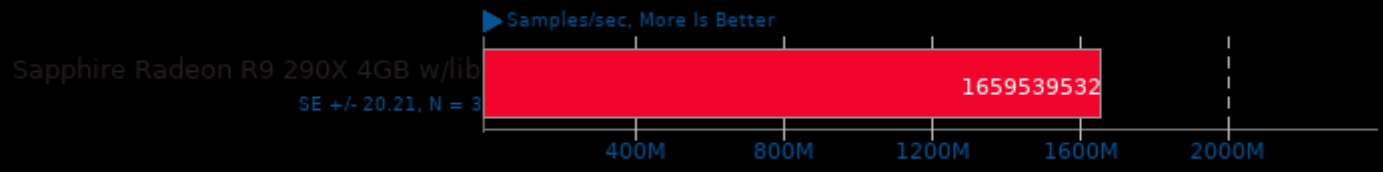


1. (CC) gcc options: -O3 -lm -ftree-vectorize -funroll-loops -lglut -lOpenCL -lGL

OpenCL MiniTest

SmallPT GPU 1.6pts1

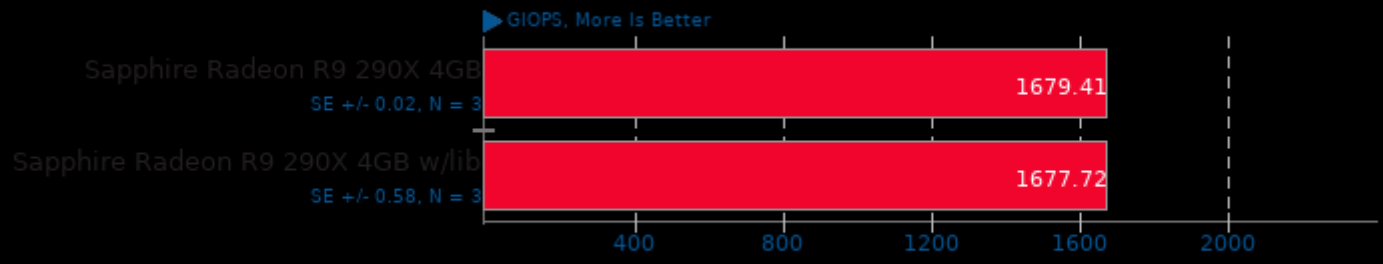
OpenCL Device: GPU - Scene: Complex



1. (CC) gcc options: -O3 -lm -ftree-vectorize -funroll-loops -lglut -lOpenCL -lGL

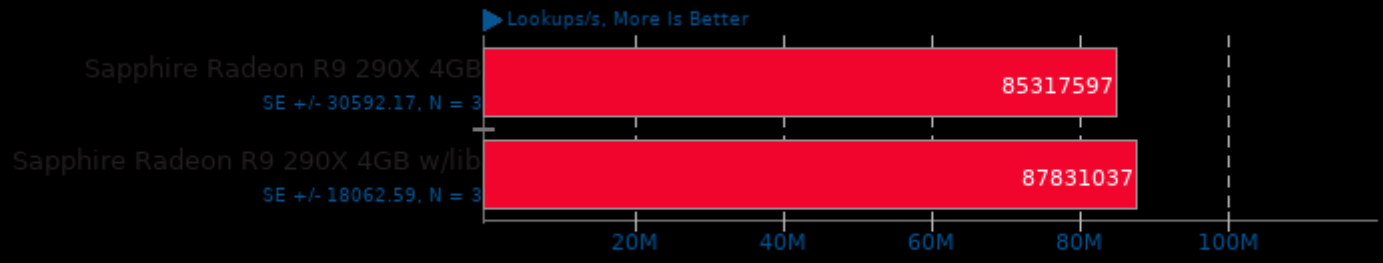
clpeak

OpenCL Test: Integer Compute INT



1. (CXX) g++ options: -O3 -rdynamic -lOpenCL

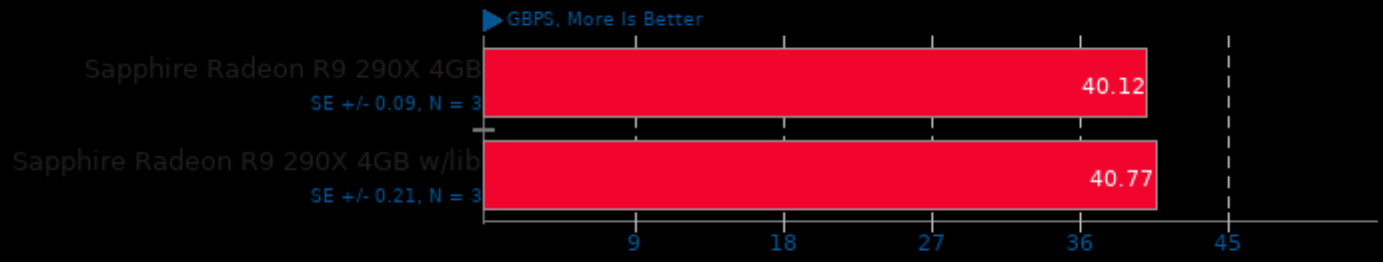
Xsbench OpenCL 2017-07-06



1. (CC) gcc options: -std=gnu99 -fopenmp -O3 -lm -lOpenCL

clpeak

OpenCL Test: Transfer Bandwidth enqueueWriteBuffer

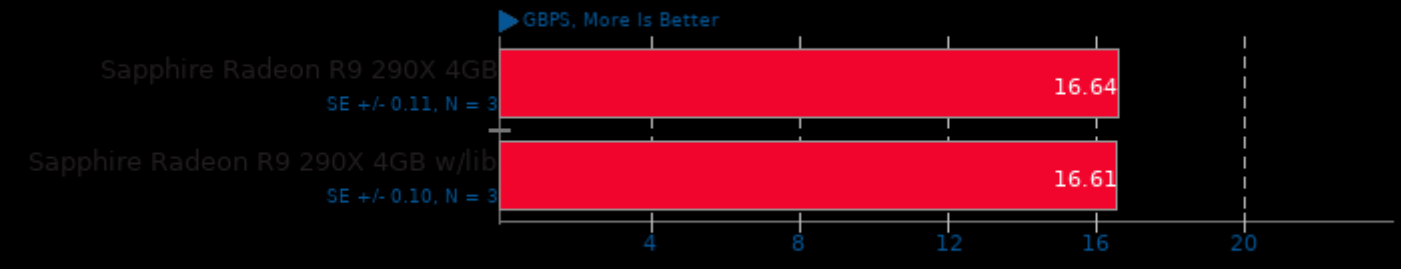


1. (CXX) g++ options: -O3 -rdynamic -lOpenCL

OpenCL MiniTest

clpeak

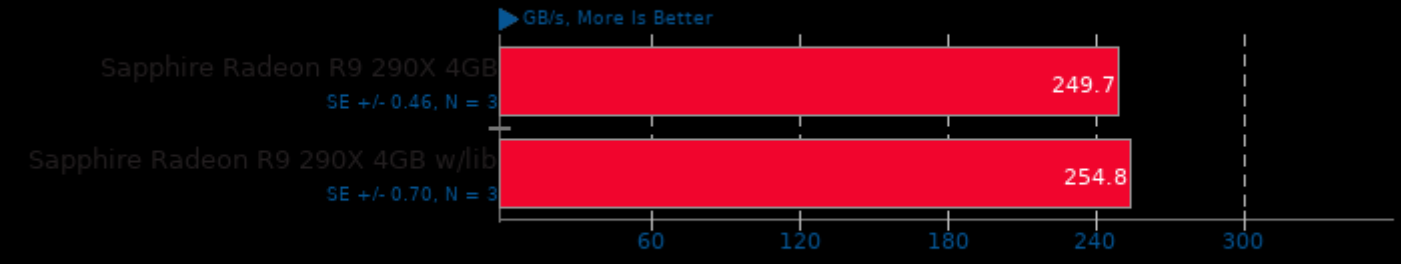
OpenCL Test: Transfer Bandwidth enqueueReadBuffer



1. (CXX) g++ options: -O3 -rdynamic -lOpenCL

cl-mem 2017-01-13

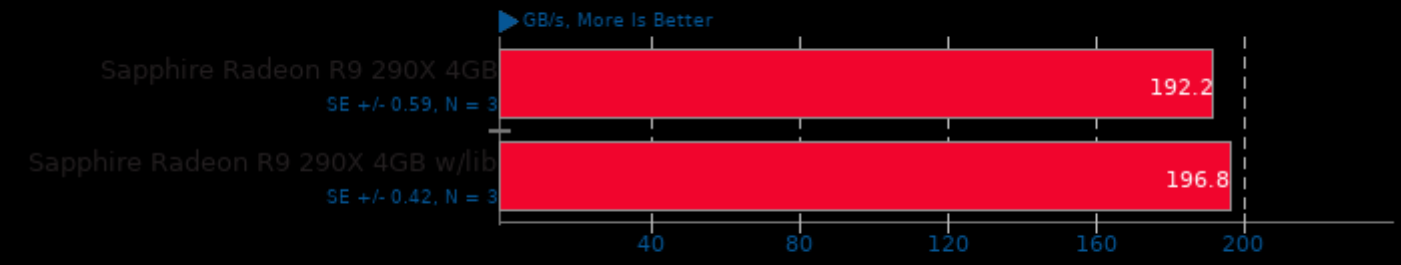
Benchmark: Copy



1. (CC) gcc options: -O2 -flto -lOpenCL

cl-mem 2017-01-13

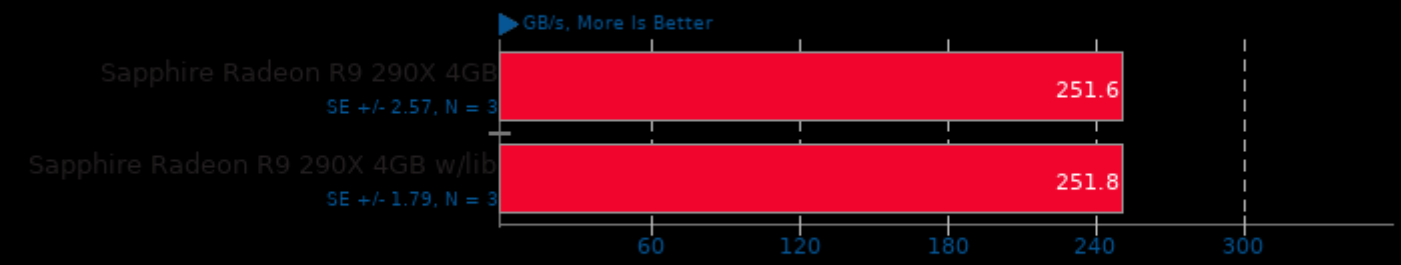
Benchmark: Write



1. (CC) gcc options: -O2 -flto -lOpenCL

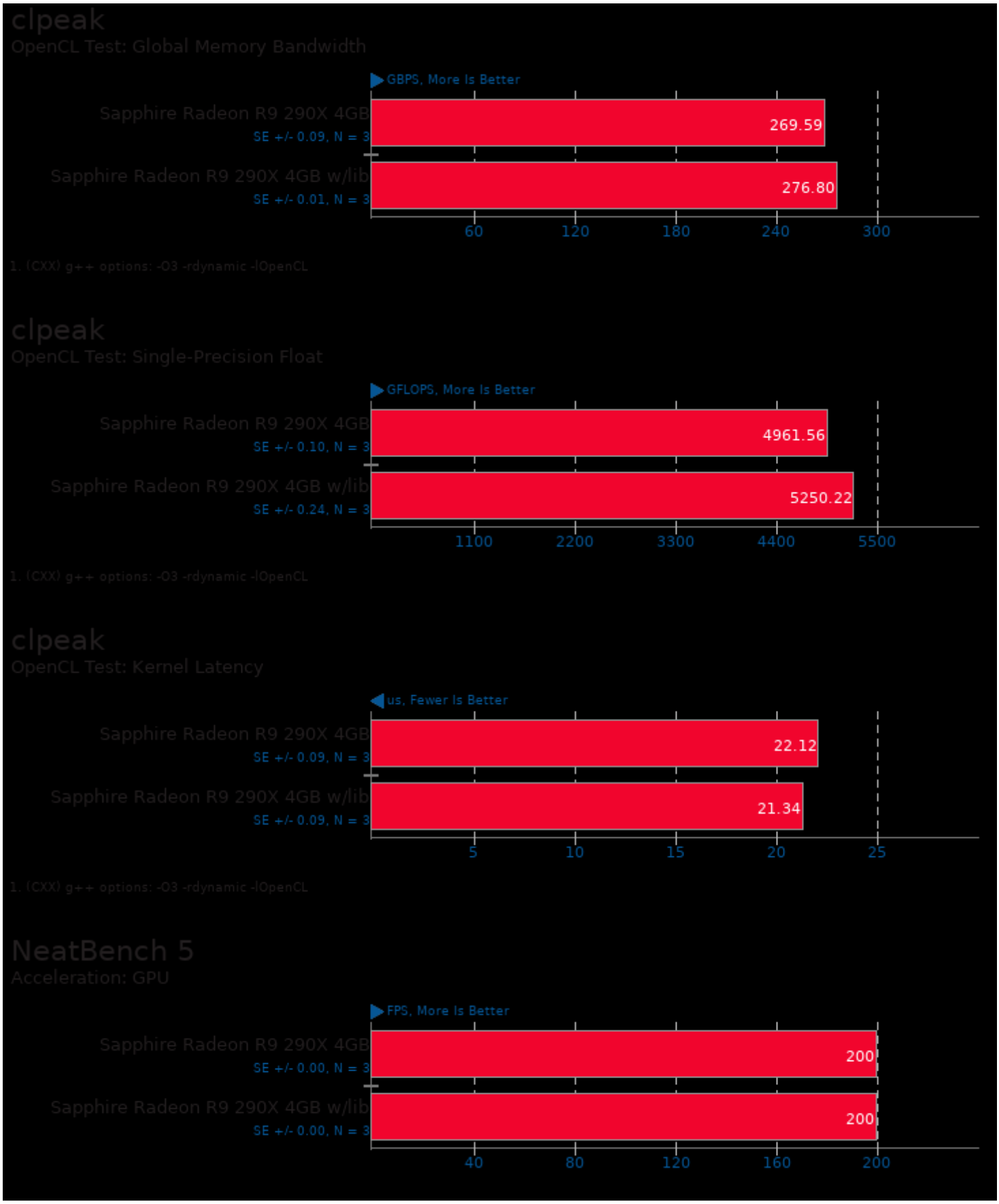
cl-mem 2017-01-13

Benchmark: Read



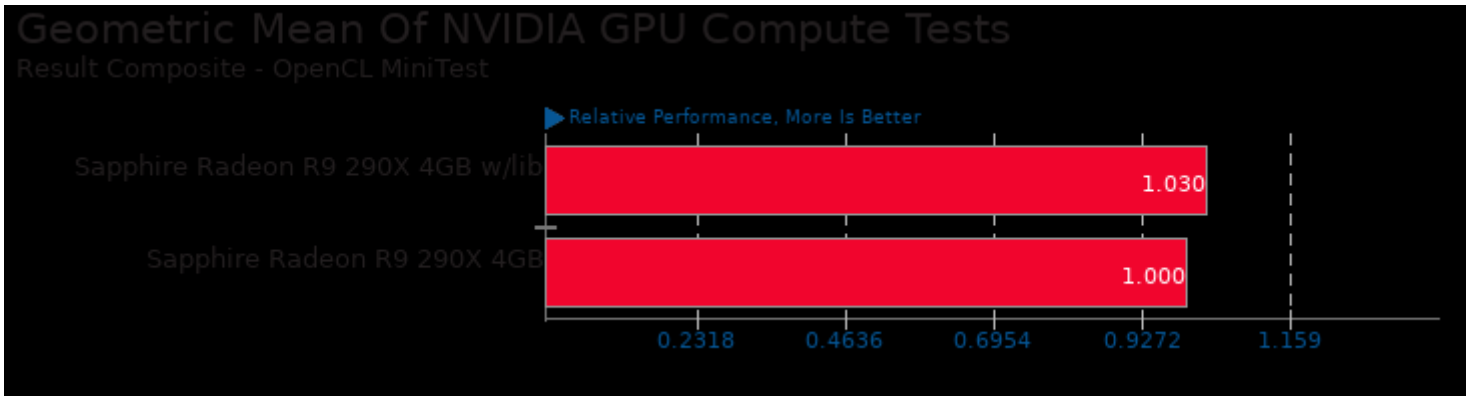
1. (CC) gcc options: -O2 -flto -lOpenCL

OpenCL MiniTest



OpenCL MiniTest

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



Geometric mean based upon tests: pts/clpeak, pts/neatbench, pts/lczero, pts/cl-mem and pts/viennacl



Geometric mean based upon tests: pts/smallpt-gpu, pts/cl-mem, pts/clpeak, pts/xsbench-cl and pts/viennacl

This file was automatically generated via the Phoronix Test Suite benchmarking software on Thursday, 28 March 2024 16:46.