



SPEChpc™ 2021 Small Result

Copyright 2021-2023 Standard Performance Evaluation Corporation

NVIDIA Corporation

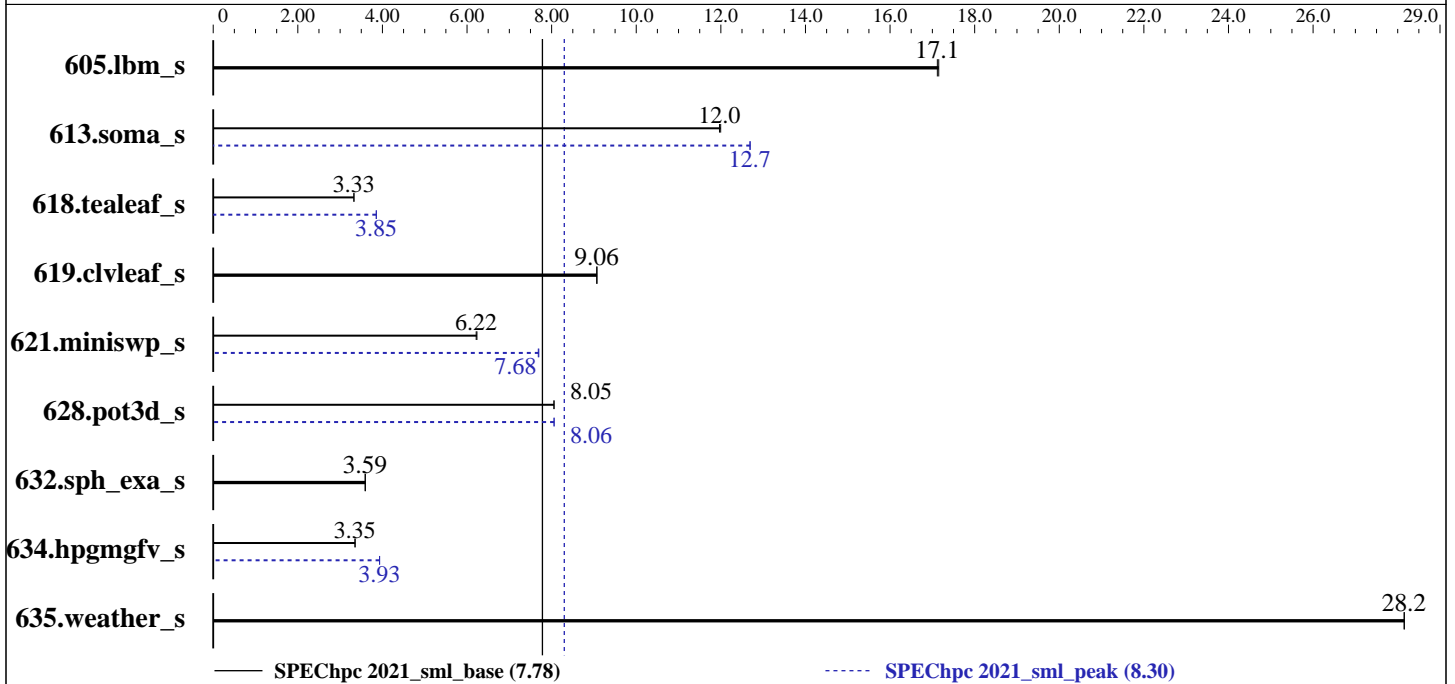
SPEChpc 2021_sml_base = 7.78

SPEChpc 2021_sml_peak = 8.30

DGX A100 (AMD EPYC 7742, Tesla A100-SXM-80GB)

hpc2021 License: 019
Test Sponsor: NVIDIA Corporation
Tested by: NVIDIA Corporation

Test Date: Sep-2021
Hardware Availability: Jul-2020
Software Availability: Sep-2021



Results Table

Benchmark	Base								Peak									
	Model	Ranks	Thrds/Rnk	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Model	Ranks	Thrds/Rnk	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
605.lbm_s	ACC	8	1	<u>90.5</u>	<u>17.1</u>	90.4	17.2			ACC	8	1	<u>90.5</u>	<u>17.1</u>	90.4	17.2		
613.soma_s	ACC	8	1	133	12.0	<u>134</u>	<u>12.0</u>			ACC	8	1	<u>126</u>	<u>12.7</u>	126	12.7		
618.tealeaf_s	ACC	8	1	616	<u>3.33</u>	616	3.33			ACC	8	1	<u>532</u>	<u>3.85</u>	532	3.86		
619.clvleaf_s	ACC	8	1	182	9.07	<u>182</u>	<u>9.06</u>			ACC	8	1	182	9.07	<u>182</u>	<u>9.06</u>		
621.miniswp_s	ACC	8	1	176	6.23	<u>177</u>	<u>6.22</u>			ACC	8	1	143	7.70	<u>143</u>	<u>7.68</u>		
628.pot3d_s	ACC	8	1	208	8.06	<u>208</u>	<u>8.05</u>			ACC	8	1	208	8.06	<u>208</u>	<u>8.06</u>		
632.sph_exa_s	ACC	8	1	639	3.60	<u>641</u>	<u>3.59</u>			ACC	8	1	639	3.60	<u>641</u>	<u>3.59</u>		
634.hpgmgfv_s	ACC	8	1	291	3.36	<u>291</u>	<u>3.35</u>			ACC	8	1	248	3.93	<u>248</u>	<u>3.93</u>		
635.weather_s	ACC	8	1	92.3	28.2	<u>92.4</u>	<u>28.2</u>			ACC	8	1	92.3	28.2	<u>92.4</u>	<u>28.2</u>		

SPEChpc 2021_sml_base = 7.78

SPEChpc 2021_sml_peak = 8.30

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.



SPEChpc™ 2021 Small Result

Copyright 2021-2023 Standard Performance Evaluation Corporation

NVIDIA Corporation

SPEChpc 2021_sml_base = 7.78

DGX A100 (AMD EPYC 7742, Tesla A100-SXM-80GB)

SPEChpc 2021_sml_peak = 8.30

hpc2021 License: 019
Test Sponsor: NVIDIA Corporation
Tested by: NVIDIA Corporation

Test Date: Sep-2021
Hardware Availability: Jul-2020
Software Availability: Sep-2021

Hardware Summary

Type of System: SMP
Compute Node: DGX A100
Interconnect: None
Compute Nodes Used: 1
Total Chips: 2
Total Cores: 128
Total Threads: 256
Total Memory: 2 TB
Max. Peak Threads: 1

Software Summary

Compiler: C/C++/Fortran: Version 21.9 of NVIDIA HPC SDK for Linux
MPI Library: OpenMPI Version 4.0.5
Other MPI Info: None
Other Software: None
Base Parallel Model: ACC
Base Ranks Run: 8
Base Threads Run: 1
Peak Parallel Models: ACC
Minimum Peak Ranks: 8
Maximum Peak Ranks: 8
Max. Peak Threads: 1
Min. Peak Threads: 1

Node Description: DGX A100

Hardware

Number of nodes: 1
Uses of the node: compute
Vendor: NVIDIA Corporation
Model: DGX A100
CPU Name: AMD EPYC 7742
CPU(s) orderable: 2 chips
Chips enabled: 2
Cores enabled: 128
Cores per chip: 64
Threads per core: 2
CPU Characteristics: Turbo Boost up to 3400MHz
CPU MHz: 2250
Primary Cache: 32 KB I + 32 KB D on chip per core
Secondary Cache: 512 KB I+D on chip per core
L3 Cache: 256 MB I+D on chip per chip
16 MB shared / 4 cores
Other Cache: None
Memory: 2 TB (32 x 64 GB 2Rx8 PC4-3200AA-R)
Disk Subsystem: OS: 2TB U.2 NVMe SSD drive
Internal Storage: 30TB (8x 3.84TB U.2 NVMe SSD drives)
Other Hardware: None
Accel Count: 8
Accel Model: Tesla A100-SXM-80GB
Accel Vendor: NVIDIA Corporation
Accel Type: GPU
Accel Connection: NVLINK 3.0, NVSWITCH 2.0 600GB/s
Accel ECC enabled: Yes
Accel Description: See Notes
Adapter: None
Number of Adapters: 0
Slot Type: None

Software

Accelerator Driver: NVIDIA UNIX x86_64 Kernel Module 470.57.02
Adapter: None
Adapter Driver: None
Adapter Firmware: None
Operating System: Ubuntu 20.04
4.12.14-94.41-default
Local File System: xfs
Shared File System: None
System State: Run level 3 (multi-user)
Other Software: None

(Continued on next page)



SPEChpc™ 2021 Small Result

Copyright 2021-2023 Standard Performance Evaluation Corporation

NVIDIA Corporation

SPEChpc 2021_sml_base = 7.78

DGX A100 (AMD EPYC 7742, Tesla A100-SXM-80GB)

SPEChpc 2021_sml_peak = 8.30

hpc2021 License: 019
Test Sponsor: NVIDIA Corporation
Tested by: NVIDIA Corporation

Test Date: Sep-2021
Hardware Availability: Jul-2020
Software Availability: Sep-2021

Node Description: DGX A100

Hardware (Continued)

Data Rate: None
Ports Used: 0
Interconnect Type: None

Interconnect Description: None

Hardware

Vendor: N/A
Model: N/A
Switch Model: N/A
Number of Switches: 0
Number of Ports: 0
Data Rate: 0
Firmware: 0
Topology: N/A
Primary Use: N/A

Software

: --

Compiler Invocation Notes

Binaries built and run within a NVHPC SDK 21.9 CUDA 11.4 Ubuntu 20.04
Container available from NVIDIA's NGC Catalog:
<https://ngc.nvidia.com/catalog/containers/nvidia:nvhpc>

Submit Notes

The config file option 'submit' was used.

MPI startup command:

mpirun command was used to start MPI jobs.

Individual Ranks were bound to the CPU cores on the same NUMA node as the GPU using 'numactl' within the following "bindACC.pl" perl script:

---- Start bindACC.pl -----

```
my %core_map = (  
    0=>48, 1=>56, 2=>16, 3=>24, 4=>112, 5=>120, 6=>80, 7=>88  
);  
my %mem_map = (  
    0=>3, 1=>3, 2=>1, 3=>1, 4=>7, 5=>7, 6=>5, 7=>5,  
);  
my $rank = $ENV{OMPI_COMM_WORLD_LOCAL_RANK};  
my $mrank = $rank % 8;  
my $cplus = int($rank/8);
```

(Continued on next page)



SPEChpc™ 2021 Small Result

Copyright 2021-2023 Standard Performance Evaluation Corporation

NVIDIA Corporation

SPEChpc 2021_sml_base = 7.78

DGX A100 (AMD EPYC 7742, Tesla A100-SXM-80GB)

SPEChpc 2021_sml_peak = 8.30

hpc2021 License: 019
Test Sponsor: NVIDIA Corporation
Tested by: NVIDIA Corporation

Test Date: Sep-2021
Hardware Availability: Jul-2020
Software Availability: Sep-2021

Submit Notes (Continued)

```
my $score = $score_map{$mrank} + $cplus;
my $mem = $mem_map{$mrank};
my $cmd = "numactl -C $score -m $mem ";
while (my $arg = shift) {
    $cmd .= "$arg ";
}
system($cmd);
---- End bindACC.pl -----
```

Platform Notes

```
Detailed A100 Information from nvaccelinfo
CUDA Driver Version: 11040
NVRM version: NVIDIA UNIX x86_64 Kernel Module 470.57.02
Device Number: 0
Device Name: NVIDIA A100-SXM-80GB
Device Revision Number: 8.0
Global Memory Size: 85198045184
Number of Multiprocessors: 108
Concurrent Copy and Execution: Yes
Total Constant Memory: 65536
Total Shared Memory per Block: 49152
Registers per Block: 65536
Warp Size: 32
Maximum Threads per Block: 1024
Maximum Block Dimensions: 1024, 1024, 64
Maximum Grid Dimensions: 2147483647 x 65535 x 65535
Maximum Memory Pitch: 2147483647B
Texture Alignment: 512B
Clock Rate: 1410 MHz
Execution Timeout: No
Integrated Device: No
Can Map Host Memory: Yes
Compute Mode: default
Concurrent Kernels: Yes
ECC Enabled: Yes
Memory Clock Rate: 1593 MHz
Memory Bus Width: 5120 bits
L2 Cache Size: 41943040 bytes
Max Threads Per SMP: 2048
Async Engines: 3
Unified Addressing: Yes
Managed Memory: Yes
Concurrent Managed Memory: Yes
Preemption Supported: Yes
```

(Continued on next page)



SPEChpc™ 2021 Small Result

Copyright 2021-2023 Standard Performance Evaluation Corporation

NVIDIA Corporation

SPEChpc 2021_sml_base = 7.78

DGX A100 (AMD EPYC 7742, Tesla A100-SXM-80GB)

SPEChpc 2021_sml_peak = 8.30

hpc2021 License: 019
Test Sponsor: NVIDIA Corporation
Tested by: NVIDIA Corporation

Test Date: Sep-2021
Hardware Availability: Jul-2020
Software Availability: Sep-2021

Platform Notes (Continued)

Cooperative Launch: Yes
Multi-Device: Yes
Default Target: cc80

Compiler Version Notes

=====
CC 605.lbm_s(base, peak) 613.soma_s(base, peak) 618.tealeaf_s(base, peak)
621.miniswp_s(base, peak) 634.hpgmgfv_s(base, peak)
=====

nvc 21.9-0 64-bit target on x86-64 Linux -tp zen
NVIDIA Compilers and Tools
Copyright (c) 2021, NVIDIA CORPORATION & AFFILIATES. All rights reserved.
=====

=====
CXXC 632.sph_exa_s(base, peak)
=====

nvc++ 21.9-0 64-bit target on x86-64 Linux -tp zen
NVIDIA Compilers and Tools
Copyright (c) 2021, NVIDIA CORPORATION & AFFILIATES. All rights reserved.
=====

=====
FC 619.clvleaf_s(base, peak) 628.pot3d_s(base, peak) 635.weather_s(base,
peak)
=====

nvfortran 21.9-0 64-bit target on x86-64 Linux -tp zen
NVIDIA Compilers and Tools
Copyright (c) 2021, NVIDIA CORPORATION & AFFILIATES. All rights reserved.
=====

Base Compiler Invocation

C benchmarks:
mpicc

C++ benchmarks:
mpicxx

Fortran benchmarks:
mpif90



SPEChpc™ 2021 Small Result

Copyright 2021-2023 Standard Performance Evaluation Corporation

NVIDIA Corporation

SPEChpc 2021_sml_base = 7.78

DGX A100 (AMD EPYC 7742, Tesla A100-SXM-80GB)

SPEChpc 2021_sml_peak = 8.30

hpc2021 License: 019
Test Sponsor: NVIDIA Corporation
Tested by: NVIDIA Corporation

Test Date: Sep-2021
Hardware Availability: Jul-2020
Software Availability: Sep-2021

Base Portability Flags

621.miniswp_s: -DUSE_KBA -DUSE_ACCELDIR
632.sph_exa_s: -DSPEC_USE_LT_IN_KERNELS --c++17

Base Optimization Flags

C benchmarks:
-Mfprelaxed -Mnouniform -Mstack_arrays -fast -acc=gpu

C++ benchmarks:
-Mfprelaxed -Mnouniform -Mstack_arrays -fast -acc=gpu

Fortran benchmarks:
-Mfprelaxed -Mnouniform -Mstack_arrays -fast -acc=gpu

Base Other Flags

C benchmarks:
-w

C++ benchmarks:
-w

Fortran benchmarks:
-w

Peak Compiler Invocation

C benchmarks:
mpicc

C++ benchmarks:
mpicxx

Fortran benchmarks:
mpif90



SPEChpc™ 2021 Small Result

Copyright 2021-2023 Standard Performance Evaluation Corporation

NVIDIA Corporation

SPEChpc 2021_sml_base = 7.78

DGX A100 (AMD EPYC 7742, Tesla A100-SXM-80GB)

SPEChpc 2021_sml_peak = 8.30

hpc2021 License: 019
Test Sponsor: NVIDIA Corporation
Tested by: NVIDIA Corporation

Test Date: Sep-2021
Hardware Availability: Jul-2020
Software Availability: Sep-2021

Peak Portability Flags

621.miniswp_s: -DUSE_KBA -DUSE_ACCELDIR
632.sph_exa_s: -DSPEC_USE_LT_IN_KERNELS --c++17

Peak Optimization Flags

C benchmarks:

605.lbm_s: basepeak = yes

613.soma_s: -fast -O3 -acc=gpu -gpu=pinned

618.tealeaf_s: -fast -Msafeptr -acc=gpu

621.miniswp_s: -Mfprelaxed -Mnouniform -Mstack_arrays -fast -acc=gpu
-gpu=pinned

634.hpgmgfv_s: -fast -acc=gpu -gpu=pinned -static-nvidia

C++ benchmarks:

632.sph_exa_s: basepeak = yes

Fortran benchmarks:

619.clvleaf_s: basepeak = yes

628.pot3d_s: -Mstack_arrays -fast -acc=gpu

635.weather_s: basepeak = yes

Peak Other Flags

C benchmarks:

-w

C++ benchmarks:

-w

Fortran benchmarks:

-w



SPEChpc™ 2021 Small Result

Copyright 2021-2023 Standard Performance Evaluation Corporation

NVIDIA Corporation

SPEChpc 2021_sml_base = 7.78

DGX A100 (AMD EPYC 7742, Tesla A100-SXM-80GB)

SPEChpc 2021_sml_peak = 8.30

hpc2021 License: 019

Test Sponsor: NVIDIA Corporation

Tested by: NVIDIA Corporation

Test Date: Sep-2021

Hardware Availability: Jul-2020

Software Availability: Sep-2021

The flags file that was used to format this result can be browsed at

http://www.spec.org/hpc2021/flags/nv2021_flags_v1.0.3.html

You can also download the XML flags source by saving the following link:

http://www.spec.org/hpc2021/flags/nv2021_flags_v1.0.3.xml

SPEChpc is a trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEChpc2021 v1.0.2 on 2021-09-13 22:48:33-0400.

Report generated on 2023-08-25 18:58:35 by hpc2021 PDF formatter v1.0.3.

Originally published on 2021-10-20.