SPECaccel®2023 Result

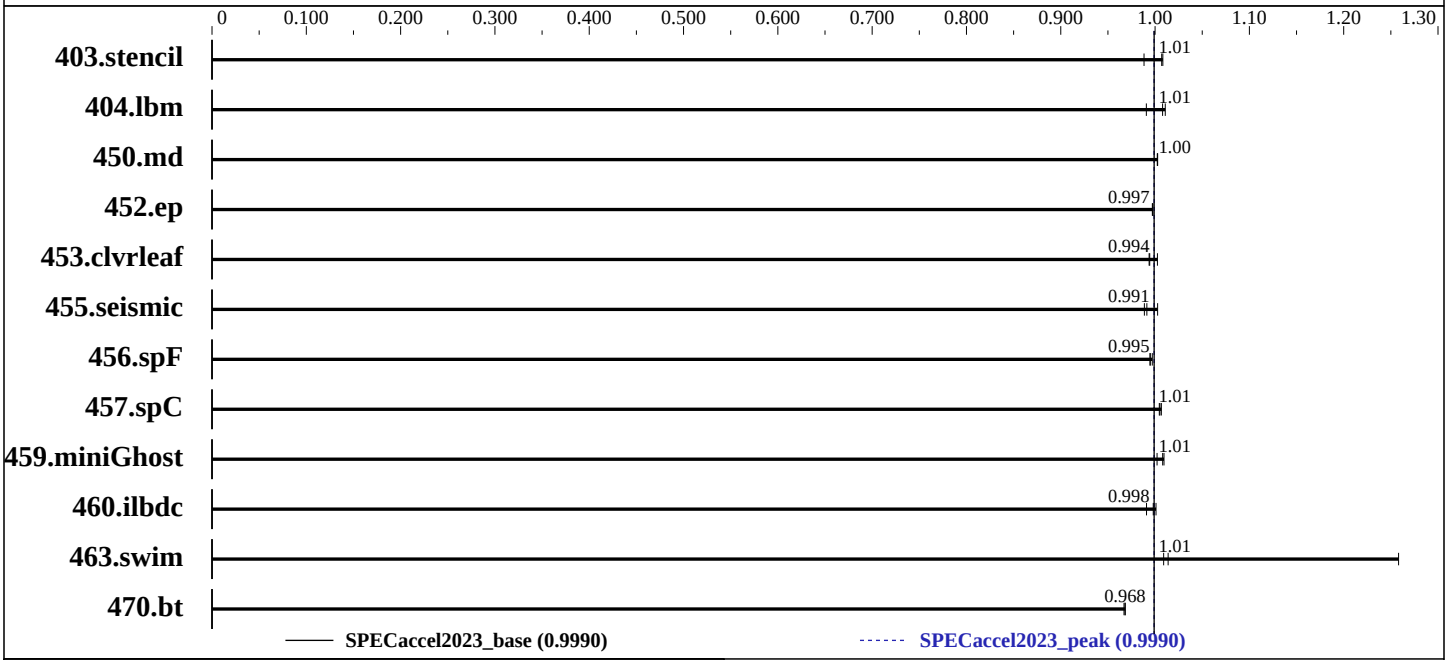
Copyright 2023 Standard Performance Evaluation Corporation

Supermicro
(Test Sponsor: NVIDIA Corporation)
Tesla V100-PCIE-16GB
SuperServer SYS-1029GQ-TRT

SPECaccel 2023_base = 0.9990
SPECaccel 2023_peak = 0.9990

accel2023 License: 9045
Test Sponsor: NVIDIA Corporation
Tested by: NVIDIA Corporation

Test Date: Oct-2023
Hardware Availability: Feb-2018
Software Availability: Oct-2023



Hardware

CPU Name:	Intel Xeon Gold 6148
Max MHz.:	3700
Nominal:	2400
Enabled:	40 cores, 2 chips, 2 threads/core
Orderable:	2 chips
Cache L1:	32 KB I + 32 KB D on chip per core
L2:	1 MB I+D on chip per core
L3:	28160 KB I+D on chip per chip
Other:	None
Memory:	384 GB (12 x 32 GB 2Rx4 PC4-2666V-R)
Storage:	440 GB SATA
Other:	None
Base Threads Run:	1
Min. Peak Threads:	1
Max. Peak Threads:	1

Accelerator

Accel Model Name:	Tesla V100
Accel Vendor:	NVIDIA
Accel Name:	Tesla V100-PCIE-16GB
Type of Accel:	GPU
Accel Connection:	PCIe 3.0 x 16
Does Accel Use ECC:	Yes
Accel Description:	See Notes
Accel Driver:	NVIDIA UNIX x86_64 Kernel Module 465.19.01

Software

OS:	Ubuntu 18.04.2 LTS 4.15.0-50-generic
Compiler:	C/Fortran: Version 23.9 of NVIDIA NVHPC SDK
Firmware:	American Megatrends Inc. 3.2 11/07/2019
File System:	ext4
System State:	Run level 5 (multi-user)
Other:	None
Base Parallel Model:	TGT
Base Threads Run:	1
Peak Parallel Models:	TGT

(Continued on next page)

Software (Continued)

Max. Peak Threads: 1
Min. Peak Threads: 1

Results Table

Benchmark	Base							Peak						
	Model	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Model	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
403.stencil	TGT	436	1.01	**437**	**1.01**	445	0.988	TGT	436	1.01	**437**	**1.01**	445	0.988
404.lbm	TGT	450	1.01	**451**	**1.01**	459	0.991	TGT	450	1.01	**451**	**1.01**	459	0.991
450.md	TGT	598	1.00	**599**	**1.00**	599	1.00	TGT	598	1.00	**599**	**1.00**	599	1.00
452.ep	TGT	416	0.997	416	0.998	**416**	**0.997**	TGT	416	0.997	416	0.998	**416**	**0.997**
453.clvrleaf	TGT	998	1.00	**1006**	**0.994**	1006	0.994	TGT	998	1.00	**1006**	**0.994**	1006	0.994
455.seismic	TGT	778	1.00	789	0.989	**787**	**0.991**	TGT	778	1.00	789	0.989	**787**	**0.991**
456.spF	TGT	476	0.997	**477**	**0.995**	478	0.995	TGT	476	0.997	**477**	**0.995**	478	0.995
457.spC	TGT	538	1.00	**537**	**1.01**	536	1.01	TGT	538	1.00	**537**	**1.01**	536	1.01
459.miniGhost	TGT	**585**	**1.01**	584	1.01	589	1.00	TGT	**585**	**1.01**	584	1.01	589	1.00
460.ilbdc	TGT	**556**	**0.998**	554	1.00	560	0.991	TGT	**556**	**0.998**	554	1.00	560	0.991
463.swim	TGT	**434**	**1.01**	350	1.26	436	1.01	TGT	**434**	**1.01**	350	1.26	436	1.01
470.bt	TGT	**1090**	**0.968**	1090	0.968	1091	0.967	TGT	**1090**	**0.968**	1090	0.968	1091	0.967

SPEC accel2023_base = 0.9990
SPEC accel2023_peak = 0.9990

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

Operating System Notes

```
Shell stacksize set to unlimited via "limit stacksize unlimited"
```

Platform Notes

```
Information from nvaccelinfo
CUDA Driver Version:           11030
NVRM version:                  NVIDIA UNIX x86_64 Kernel Module  465.19.01  Fri Mar 19 07:44:41 UTC 2021
Device Number:                 0
Device Name:                   NVIDIA Tesla V100-PCIE-16GB
Device Revision Number:        7.0
Global Memory Size:            16945512448
Number of Multiprocessors:     80
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
```

(Continued on next page)

Platform Notes (Continued)

```
 Texture Alignment:              512B
 Clock Rate:                     1380 MHz
 Execution Timeout:              No
 Integrated Device:              No
 Can Map Host Memory:            Yes
 Compute Mode:                   default
 Concurrent Kernels:             Yes
 ECC Enabled:                    Yes
 Memory Clock Rate:              877 MHz
 Memory Bus Width:               4096 bits
 L2 Cache Size:                  6291456 bytes
 Max Threads Per SMP:            2048
 Async Engines:                  7
 Unified Addressing:             Yes
 Managed Memory:                 Yes
 Concurrent Managed Memory:      Yes
 Preemption Supported:           Yes
 Cooperative Launch:             Yes
 Default Target:                 cc70

 Sysinfo program /local/home/mcolgrove/ACCELv2b/bin/sysinfo
 Rev: r6622 of 2021-04-07 b1a7d5f8f71be5aff70a755cad7211a0
 running on dev-sky5 Thu Oct 12 11:53:15 2023

 SUT (System Under Test) info as seen by some common utilities.
 For more information on this section, see
    https://www.spec.org/cpu2017/Docs/config.html#sysinfo

 From /proc/cpuinfo
    model name : Intel(R) Xeon(R) Gold 6148 CPU @ 2.40GHz
       2  "physical id"s (chips)
       80 "processors"
    cores, siblings (Caution: counting these is hw and system dependent. The following
    excerpts from /proc/cpuinfo might not be reliable.  Use with caution.)
       cpu cores : 20
       siblings  : 40
       physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
       physical 1: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28

 From lscpu from util-linux 2.31.1:
      Architecture:        x86_64
      CPU op-mode(s):      32-bit, 64-bit
      Byte Order:          Little Endian
      CPU(s):              80
      On-line CPU(s) list: 0-79
      Thread(s) per core:  2
      Core(s) per socket:  20
```

(Continued on next page)

Platform Notes (Continued)

```
      Socket(s):             2
      NUMA node(s):          2
      Vendor ID:             GenuineIntel
      CPU family:            6
      Model:                 85
      Model name:            Intel(R) Xeon(R) Gold 6148 CPU @ 2.40GHz
      Stepping:              4
      CPU MHz:               1000.909
      CPU max MHz:           2401.0000
      CPU min MHz:           1000.0000
      BogoMIPS:              4800.00
      Virtualization:        VT-x
      L1d cache:             32K
      L1i cache:             32K
      L2 cache:              1024K
      L3 cache:              28160K
      NUMA node0 CPU(s):     0-19,40-59
      NUMA node1 CPU(s):     20-39,60-79
      Flags:                 fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
      pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
      lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
      aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
      xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
      avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3
      invpcid_single pti intel_ppin ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority
      ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a
      avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
      xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
      dtherm ida arat pln pts pku ospke md_clear flush_l1d

  /proc/cpuinfo cache data
     cache size : 28160 KB

  Unable to get information from 'numactl --hardware'
  Please verify numactl installation.

  From /proc/meminfo
     MemTotal:       394882320 kB
     HugePages_Total:       0
     Hugepagesize:       2048 kB

  /sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has
     ondemand

  /usr/bin/lsb_release -d
     Ubuntu 18.04.2 LTS
```

(Continued on next page)

Platform Notes (Continued)

```
From /etc/*release* /etc/*version*
   debian_version: buster/sid
   os-release:
      NAME="Ubuntu"
      VERSION="18.04.2 LTS (Bionic Beaver)"
      ID=ubuntu
      ID_LIKE=debian
      PRETTY_NAME="Ubuntu 18.04.2 LTS"
      VERSION_ID="18.04"
      HOME_URL="https://www.ubuntu.com/"
      SUPPORT_URL="https://help.ubuntu.com/"

uname -a:
   Linux dev-sky5 4.15.0-50-generic #54-Ubuntu SMP Mon May 6 18:46:08 UTC 2019 x86_64
   x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit):                          No status reported
CVE-2018-3620 (L1 Terminal Fault):                       Mitigation: PTE Inversion; VMX:
                                                         conditional cache flushes, SMT
                                                         vulnerable
Microarchitectural Data Sampling:                       Mitigation: Clear CPU buffers; SMT
                                                         vulnerable
CVE-2017-5754 (Meltdown):                                Mitigation: PTI
CVE-2018-3639 (Speculative Store Bypass):                Mitigation: Speculative Store
                                                         Bypass disabled via prctl and
                                                         seccomp
CVE-2017-5753 (Spectre variant 1):                       Mitigation: __user pointer
                                                         sanitization
CVE-2017-5715 (Spectre variant 2):                       Mitigation: Full generic
                                                         retpoline, IBPB: conditional,
                                                        IBRS_FW, STIBP: conditional, RSB
                                                         filling
CVE-2020-0543 (Special Register Buffer Data Sampling): No status reported
CVE-2019-11135 (TSX Asynchronous Abort):                 No status reported

run-level 5 Oct 12 10:32

SPEC is set to: /local/home/mcolgrove/ACCELv2b
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda1      ext4  440G  281G  137G  68% /

From /sys/devices/virtual/dmi/id
    Vendor:         Supermicro
    Product:        SYS-1029GQ-TRT
    Product Family: SMC X11
```

(Continued on next page)

Platform Notes (Continued)

```
 Cannot run dmidecode; consider saying (as root)
    chmod +s /usr/sbin/dmidecode

 BIOS:
    BIOS Vendor:       American Megatrends Inc.
    BIOS Version:      3.2
    BIOS Date:         11/07/2019

 (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
C          | 457.spC(base)
------------------------------------------------------------------------------
/usr/lib/x86_64-linux-gnu/crt1.o: In function ‘_start’:
(.text+0x20): undefined reference to ‘main’
pgacclnk: child process exit status 1: /usr/bin/ld
nvc Rel Dev-r238684 64-bit target on x86-64 Linux -tp skylake-avx512
NVIDIA Compilers and Tools
Copyright (c) 2023, NVIDIA CORPORATION & AFFILIATES.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C          | 452.ep(base)
------------------------------------------------------------------------------
nvc Rel Dev-r238684 64-bit target on x86-64 Linux -tp skylake-avx512
NVIDIA Compilers and Tools
Copyright (c) 2023, NVIDIA CORPORATION & AFFILIATES.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C          | 403.stencil(base) 404.lbm(base) 470.bt(base)
------------------------------------------------------------------------------
nvc Rel Dev-r238691 64-bit target on x86-64 Linux -tp skylake-avx512
NVIDIA Compilers and Tools
Copyright (c) 2023, NVIDIA CORPORATION & AFFILIATES.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C          | 457.spC(base)
------------------------------------------------------------------------------
/usr/lib/x86_64-linux-gnu/crt1.o: In function ‘_start’:
(.text+0x20): undefined reference to ‘main’
pgacclnk: child process exit status 1: /usr/bin/ld
```

(Continued on next page)

Compiler Version Notes (Continued)

```
nvc Rel Dev-r238684 64-bit target on x86-64 Linux -tp skylake-avx512
NVIDIA Compilers and Tools
Copyright (c) 2023, NVIDIA CORPORATION & AFFILIATES.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C           | 452.ep(base)
------------------------------------------------------------------------------
nvc Rel Dev-r238684 64-bit target on x86-64 Linux -tp skylake-avx512
NVIDIA Compilers and Tools
Copyright (c) 2023, NVIDIA CORPORATION & AFFILIATES.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C           | 403.stencil(base) 404.lbm(base) 470.bt(base)
------------------------------------------------------------------------------
nvc Rel Dev-r238691 64-bit target on x86-64 Linux -tp skylake-avx512
NVIDIA Compilers and Tools
Copyright (c) 2023, NVIDIA CORPORATION & AFFILIATES.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C           | 457.spC(base)
------------------------------------------------------------------------------
/usr/lib/x86_64-linux-gnu/crt1.o: In function ‘_start’:
(.text+0x20): undefined reference to ‘main’
pgacclnk: child process exit status 1: /usr/bin/ld
nvc Rel Dev-r238684 64-bit target on x86-64 Linux -tp skylake-avx512
NVIDIA Compilers and Tools
Copyright (c) 2023, NVIDIA CORPORATION & AFFILIATES.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C           | 452.ep(base)
------------------------------------------------------------------------------
nvc Rel Dev-r238684 64-bit target on x86-64 Linux -tp skylake-avx512
NVIDIA Compilers and Tools
Copyright (c) 2023, NVIDIA CORPORATION & AFFILIATES.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C           | 403.stencil(base) 404.lbm(base) 470.bt(base)
------------------------------------------------------------------------------
nvc Rel Dev-r238691 64-bit target on x86-64 Linux -tp skylake-avx512
NVIDIA Compilers and Tools
Copyright (c) 2023, NVIDIA CORPORATION & AFFILIATES.  All rights reserved.
------------------------------------------------------------------------------
```

(Continued on next page)

Compiler Version Notes (Continued)

```
==============================================================================
Fortran    | 456.spF(base)
------------------------------------------------------------------------------
nvfortran Rel Dev-r238684 64-bit target on x86-64 Linux -tp skylake-avx512
NVIDIA Compilers and Tools
Copyright (c) 2023, NVIDIA CORPORATION & AFFILIATES.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
Fortran    | 450.md(base) 455.seismic(base) 460.ilbdc(base) 463.swim(base)
------------------------------------------------------------------------------
nvfortran Rel Dev-r238691 64-bit target on x86-64 Linux -tp skylake-avx512
NVIDIA Compilers and Tools
Copyright (c) 2023, NVIDIA CORPORATION & AFFILIATES.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
Fortran    | 456.spF(base)
------------------------------------------------------------------------------
nvfortran Rel Dev-r238684 64-bit target on x86-64 Linux -tp skylake-avx512
NVIDIA Compilers and Tools
Copyright (c) 2023, NVIDIA CORPORATION & AFFILIATES.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
Fortran    | 450.md(base) 455.seismic(base) 460.ilbdc(base) 463.swim(base)
------------------------------------------------------------------------------
nvfortran Rel Dev-r238691 64-bit target on x86-64 Linux -tp skylake-avx512
NVIDIA Compilers and Tools
Copyright (c) 2023, NVIDIA CORPORATION & AFFILIATES.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
Fortran, C | 453.clvrleaf(base) 459.miniGhost(base)
------------------------------------------------------------------------------
nvfortran Rel Dev-r238691 64-bit target on x86-64 Linux -tp skylake-avx512
NVIDIA Compilers and Tools
Copyright (c) 2023, NVIDIA CORPORATION & AFFILIATES.  All rights reserved.
nvc Rel Dev-r238691 64-bit target on x86-64 Linux -tp skylake-avx512
NVIDIA Compilers and Tools
Copyright (c) 2023, NVIDIA CORPORATION & AFFILIATES.  All rights reserved.
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
`nvc`

Fortran benchmarks:
`nvfortran`

Benchmarks using both Fortran and C:
`nvfortran nvc`

Base Portability Flags

403.stencil: `-DSPEC_NO_NOTHING`
457.spC: `-mcmodel=medium -Wl,--no-relax`

Base Optimization Flags

C benchmarks:
`-fast -mp=gpu`

Fortran benchmarks:
`-fast -mp=gpu`

Benchmarks using both Fortran and C:

453.clvrleaf: `-fast -mp=gpu`

459.miniGhost: `-Mnomain -fast -mp=gpu`

Peak Optimization Flags

C benchmarks:

403.stencil: `basepeak = yes`

404.lbm: `basepeak = yes`

452.ep: `basepeak = yes`

457.spC: `basepeak = yes`

(Continued on next page)

Peak Optimization Flags (Continued)

470.bt: `basepeak = yes`

Fortran benchmarks:

450.md: `basepeak = yes`

455.seismic: `basepeak = yes`

456.spF: `basepeak = yes`

460.ilbdc: `basepeak = yes`

463.swim: `basepeak = yes`

Benchmarks using both Fortran and C:

453.clvrleaf: `basepeak = yes`

459.miniGhost: `basepeak = yes`

The flags file that was used to format this result can be browsed at
`http://www.spec.org/accel2023/flags/nv2021_flags_v1.0.3.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/accel2023/flags/nv2021_flags_v1.0.3.xml`

SPECaccel is a registered 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 SPECaccel2023 v2.0.17 on 2023-10-12 14:53:15-0400.
Report generated on 2023-12-06 13:07:03 by accel2023 PS formatter v112.
Originally published on 2023-11-08.