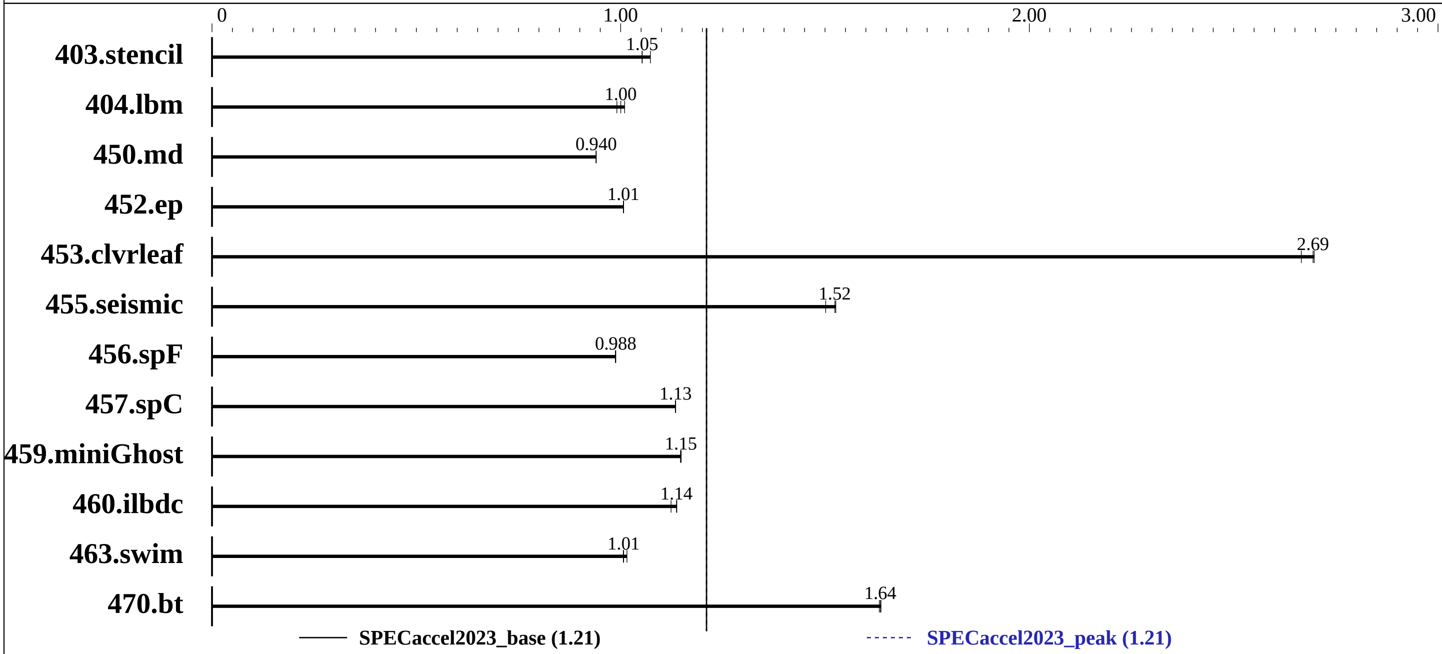
SPECaccel®2023 Result

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

SPECaccel2023_base = 1.21
SPECaccel2023_peak = 1.21

accel2023 License:	9045	**Test Date:**	Oct-2023
Test Sponsor:	NVIDIA Corporation	**Hardware Availability:**	Feb-2018
Tested by:	NVIDIA Corporation	**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:	LOP
Base Threads Run:	1
Peak Parallel Models:	LOP

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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	LOP	**418**	**1.05**	410	1.07	418	1.05	LOP	**418**	**1.05**	410	1.07	418	1.05
404.lbm	LOP	459	0.991	451	1.01	**455**	**1.00**	LOP	459	0.991	451	1.01	**455**	**1.00**
450.md	LOP	638	0.940	638	0.940	**638**	**0.940**	LOP	638	0.940	638	0.940	**638**	**0.940**
452.ep	LOP	412	1.01	412	1.01	**412**	**1.01**	LOP	412	1.01	412	1.01	**412**	**1.01**
453.clvrleaf	LOP	371	2.70	**371**	**2.69**	375	2.67	LOP	371	2.70	**371**	**2.69**	375	2.67
455.seismic	LOP	519	1.50	511	1.53	**512**	**1.52**	LOP	519	1.50	511	1.53	**512**	**1.52**
456.spF	LOP	**481**	**0.988**	481	0.988	481	0.987	LOP	**481**	**0.988**	481	0.988	481	0.987
457.spC	LOP	476	1.13	**476**	**1.13**	476	1.13	LOP	476	1.13	**476**	**1.13**	476	1.13
459.miniGhost	LOP	**514**	**1.15**	514	1.15	515	1.15	LOP	**514**	**1.15**	514	1.15	515	1.15
460.ilbdc	LOP	488	1.14	**488**	**1.14**	494	1.12	LOP	488	1.14	**488**	**1.14**	494	1.12
463.swim	LOP	**437**	**1.01**	433	1.02	437	1.01	LOP	**437**	**1.01**	433	1.02	437	1.01
470.bt	LOP	644	1.64	646	1.63	**645**	**1.64**	LOP	644	1.64	646	1.63	**645**	**1.64**

SPEC accel2023_base = 1.21
SPEC accel2023_peak = 1.21

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 Fri Oct 13 09:52:57 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:               1000.096
     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
```

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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
```

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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-r238755 64-bit target on x86-64 Linux -tp skylake-avx512
NVIDIA Compilers and Tools
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------------------------------------------------------------------------------

==============================================================================
C          | 403.stencil(base) 404.lbm(base) 452.ep(base) 470.bt(base)
------------------------------------------------------------------------------
nvc Rel Dev-r238755 64-bit target on x86-64 Linux -tp skylake-avx512
NVIDIA Compilers and Tools
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------------------------------------------------------------------------------

==============================================================================
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-r238755 64-bit target on x86-64 Linux -tp skylake-avx512
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------------------------------------------------------------------------------

==============================================================================
C          | 403.stencil(base) 404.lbm(base) 452.ep(base) 470.bt(base)
------------------------------------------------------------------------------
```

(Continued on next page)

Compiler Version Notes (Continued)

```
nvc Rel Dev-r238755 64-bit target on x86-64 Linux -tp skylake-avx512
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------------------------------------------------------------------------------

==============================================================================
Fortran    | 450.md(base) 455.seismic(base) 456.spF(base) 460.ilbdc(base)
           | 463.swim(base)
------------------------------------------------------------------------------
nvfortran Rel Dev-r238755 64-bit target on x86-64 Linux -tp skylake-avx512
NVIDIA Compilers and Tools
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------------------------------------------------------------------------------

==============================================================================
Fortran, C | 453.clvrleaf(base) 459.miniGhost(base)
------------------------------------------------------------------------------
nvfortran Rel Dev-r238755 64-bit target on x86-64 Linux -tp skylake-avx512
NVIDIA Compilers and Tools
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nvc Rel Dev-r238755 64-bit target on x86-64 Linux -tp skylake-avx512
NVIDIA Compilers and Tools
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------------------------------------------------------------------------------
```

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`

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

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

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