



# SPECaccel<sup>®</sup>2023 Result

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Supercirc  
(Test Sponsor: NVIDIA Corporation)

**Tesla H100 PCIe 80GB  
120GQ-TNRT**

**SPECaccel2023\_base = 2.98**

**SPECaccel2023\_peak = 2.98**

accel2023 License: 9045

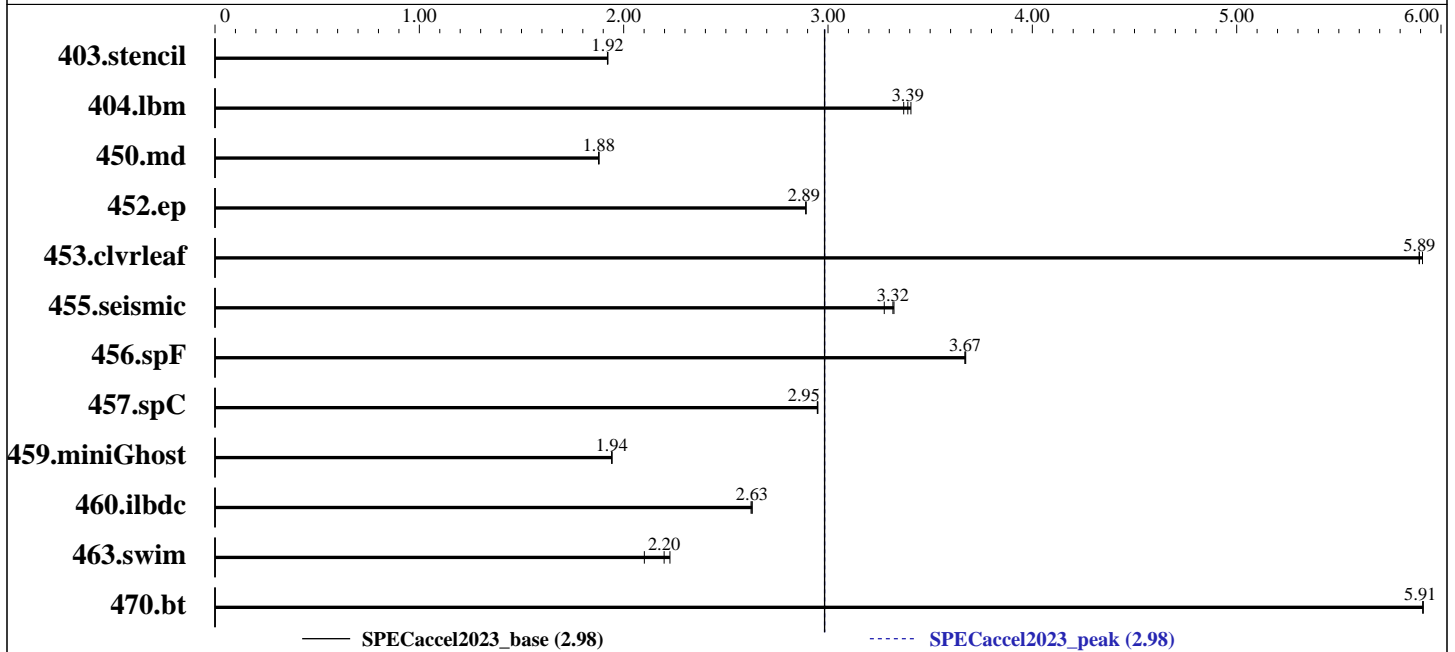
Test Sponsor: NVIDIA Corporation

Tested by: NVIDIA Corporation

Test Date: Oct-2023

Hardware Availability: Mar-2023

Software Availability: Nov-2023



## Hardware

CPU Name: Intel Xeon Gold 6338  
 Max MHz.: 3400  
 Nominal: 2000  
 Enabled: 64 cores, 2 chips, 2 threads/core  
 Orderable: 2 chips  
 Cache L1: 32 KB I + 48 KB D on chip per core  
 L2: 1280 KB I+D on chip per core  
 L3: 48 MB I+D on chip per chip  
 Other: None  
 Memory: 512 GB (16x 16GB, PC3200 CL3 DDR4)  
 Storage: 1TB SATA  
 Other: None  
 Base Threads Run: 1  
 Min. Peak Threads: 1  
 Max. Peak Threads: 1

## Accelerator

Accel Model Name: H100 PCIe 80GB  
 Accel Vendor: NVIDIA  
 Accel Name: Tesla H100 PCIe 80GB  
 Type of Accel: GPU  
 Accel Connection: PCIe 4.0 16x  
 Does Accel Use ECC: Yes  
 Accel Description: See Notes  
 Accel Driver: NVIDIA UNIX x86\_64 Kernel Module 525.60.13

## Software

OS: Rocky Linux release 8.8 (Green Obsidian)  
 4.18.0-477.15.1.el8\_8.x86\_64  
 Compiler: C/Fortran: Version 23.11 of NVHPC SDK  
 Firmware: 1.4a 10/11/2022  
 File System: xfs  
 System State: Run level 3 (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	229	1.92	229	1.92	<b>229</b>	<b>1.92</b>	LOP	229	1.92	229	1.92	<b>229</b>	<b>1.92</b>
404.lbm	LOP	<b>134</b>	<b>3.39</b>	134	3.41	135	3.37	LOP	<b>134</b>	<b>3.39</b>	134	3.41	135	3.37
450.md	LOP	320	1.88	<b>319</b>	<b>1.88</b>	319	1.88	LOP	320	1.88	<b>319</b>	<b>1.88</b>	319	1.88
452.ep	LOP	143	2.89	144	2.89	<b>144</b>	<b>2.89</b>	LOP	143	2.89	144	2.89	<b>144</b>	<b>2.89</b>
453.clvleaf	LOP	170	5.89	169	5.91	<b>170</b>	<b>5.89</b>	LOP	170	5.89	169	5.91	<b>170</b>	<b>5.89</b>
455.seismic	LOP	235	3.32	<b>235</b>	<b>3.32</b>	238	3.28	LOP	235	3.32	<b>235</b>	<b>3.32</b>	238	3.28
456.spF	LOP	129	3.67	129	3.67	<b>129</b>	<b>3.67</b>	LOP	129	3.67	129	3.67	<b>129</b>	<b>3.67</b>
457.spC	LOP	<b>183</b>	<b>2.95</b>	183	2.95	183	2.95	LOP	<b>183</b>	<b>2.95</b>	183	2.95	183	2.95
459.miniGhost	LOP	<b>304</b>	<b>1.94</b>	304	1.94	304	1.94	LOP	<b>304</b>	<b>1.94</b>	304	1.94	304	1.94
460.ilbdc	LOP	<b>211</b>	<b>2.63</b>	211	2.63	212	2.62	LOP	<b>211</b>	<b>2.63</b>	211	2.63	212	2.62
463.swim	LOP	<b>200</b>	<b>2.20</b>	198	2.23	209	2.10	LOP	<b>200</b>	<b>2.20</b>	198	2.23	209	2.10
470.bt	LOP	<b>178</b>	<b>5.91</b>	178	5.91	178	5.91	LOP	<b>178</b>	<b>5.91</b>	178	5.91	178	5.91

SPEC accel2023\_base = 2.98

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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:          12000
NVRM version:                 NVIDIA UNIX x86_64 Kernel Module  525.60.13  Wed Nov 30 06:39:21 UTC 2022
Device Number:                0
Device Name:                   NVIDIA H100 PCIe
Device Revision Number:        9.0
Global Memory Size:           85021163520
Number of Multiprocessors:     114
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

```

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## Platform Notes (Continued)

```

Maximum Memory Pitch:      2147483647B
Texture Alignment:         512B
Clock Rate:                1755 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:             52428800 bytes
Max Threads Per SMP:       2048
Async Engines:             3
Unified Addressing:        Yes
Managed Memory:           Yes
Concurrent Managed Memory: Yes
Preemption Supported:      Yes
Cooperative Launch:        Yes
Cluster Launch:            Yes
Unified Function Pointers:  Yes
Default Target:            cc90

```

Sysinfo program /local/home/mcolgrove/ACCELV2/bin/sysinfo  
 Rev: r6622 of 2021-04-07 bla7d5f8f71be5aff70a755cad7211a0  
 running on ice3 Fri Oct 20 17:48:42 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 6338 CPU @ 2.00GHz
 2 "physical id"s (chips)
 128 "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 : 32
  siblings  : 64
  physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
 25 26 27 28 29 30 31
  physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
 25 26 27 28 29 30 31

```

```

From lscpu from util-linux 2.32.1:
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit

```

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## Platform Notes (Continued)

```

Byte Order:           Little Endian
CPU(s):               128
On-line CPU(s) list: 0-127
Thread(s) per core:  2
Core(s) per socket:  32
Socket(s):            2
NUMA node(s):        2
Vendor ID:            GenuineIntel
CPU family:           6
Model:                106
Model name:           Intel(R) Xeon(R) Gold 6338 CPU @ 2.00GHz
Stepping:             6
CPU MHz:              3200.000
CPU max MHz:          3200.0000
CPU min MHz:          800.0000
BogoMIPS:             4000.00
Virtualization:       VT-x
L1d cache:            48K
L1i cache:            32K
L2 cache:             1280K
L3 cache:             49152K
NUMA node0 CPU(s):   0-31,64-95
NUMA node1 CPU(s):   32-63,96-127
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
aperfperf 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 invpcid_single ssbd
mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid ept_ad
fsgsbase tsc_adjust bmi1 avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq
rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha_ni avx512bw
avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
cqm_mbm_local split_lock_detect wbnoinvd dtherm ida arat pln pts avx512vbmi umip pku
ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg tme
avx512_vpopcntdq la57 rdpid fsrm md_clear pconfig flush_l1d arch_capabilities

```

```

/proc/cpuinfo cache data
cache size : 49152 KB

```

From numactl --hardware

WARNING: a numactl 'node' might or might not correspond to a physical chip.

available: 2 nodes (0-1)

```

node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
28 29 30 31 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88
89 90 91 92 93 94 95

```

node 0 size: 257616 MB

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## Platform Notes (Continued)

```

node 0 free: 126167 MB
node 1 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56
57 58 59 60 61 62 63 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112
113 114 115 116 117 118 119 120 121 122 123 124 125 126 127
node 1 size: 257985 MB
node 1 free: 227371 MB
node distances:
node 0 1
0: 10 20
1: 20 10

From /proc/meminfo
MemTotal:      527975808 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

/sbin/tuned-adm active
Current active profile: throughput-performance

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

/usr/bin/lsb_release -d
Rocky Linux release 8.8 (Green Obsidian)

From /etc/*release* /etc/*version*
centos-release: Rocky Linux release 8.8 (Green Obsidian)
os-release:
NAME="Rocky Linux"
VERSION="8.8 (Green Obsidian)"
ID="rocky"
ID_LIKE="rhel centos fedora"
VERSION_ID="8.8"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Rocky Linux 8.8 (Green Obsidian)"
ANSI_COLOR="0;32"
redhat-release: Rocky Linux release 8.8 (Green Obsidian)
rocky-release: Rocky Linux release 8.8 (Green Obsidian)
rocky-release-upstream: Derived from Red Hat Enterprise Linux 8.8
system-release: Rocky Linux release 8.8 (Green Obsidian)
system-release-cpe: cpe:/o:rocky:rocky:8:GA

uname -a:
Linux ice3 4.18.0-477.15.1.el8_8.x86_64 #1 SMP Wed Jun 28 15:04:18 UTC 2023 x86_64
x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

```

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## Platform Notes (Continued)

```

CVE-2018-12207 (iTLB Multihit):           Not affected
CVE-2018-3620 (L1 Terminal Fault):        Not affected
Microarchitectural Data Sampling:         Not affected
CVE-2017-5754 (Meltdown):                 Not affected
mmio_stale_data:                          Mitigation: Clear CPU buffers; SMT
                                           vulnerable
retbleed:                                  Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store
                                           Bypass disabled via prctl
CVE-2017-5753 (Spectre variant 1):        Mitigation: usercopy/swapgs
                                           barriers and __user pointer
                                           sanitization
CVE-2017-5715 (Spectre variant 2):        Mitigation: Enhanced IBRS, IBPB:
                                           conditional, RSB filling,
                                           PBRSE-eIBRS: SW sequence
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort):  Not affected

run-level 3 Sep 19 12:23

SPEC is set to: /local/home/mcolgrove/ACCELV2
Filesystem                Type      Size  Used Avail Use% Mounted on
/dev/mapper/rl_ice33-local xfs      930G  201G  729G  22% /local

From /sys/devices/virtual/dmi/id
Vendor:                    Supermicro
Product:                   SYS-120GQ-TNRT
Product Family:            SMC X12

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

BIOS:
  BIOS Vendor:              American Megatrends International, LLC.
  BIOS Version:             1.4a
  BIOS Date:                 10/11/2022

(End of data from sysinfo program)

```

## Compiler Version Notes

```

=====
C          | 457.spC(base)
=====
/usr/lib64/crt1.o: In function `__start':

```

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## Compiler Version Notes (Continued)

(.text+0x24): undefined reference to `main'  
pgacclnk: child process exit status 1: /usr/bin/ld  
nvc Rel Dev-r239283 64-bit target on x86-64 Linux -tp icelake-server  
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=====  
C | 403.stencil(base) 404.lbm(base) 452.ep(base) 470.bt(base)  
=====

nvc Rel Dev-r239283 64-bit target on x86-64 Linux -tp icelake-server  
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=====  
C | 457.spC(base)  
=====

/usr/lib64/crt1.o: In function `\_start':  
(.text+0x24): undefined reference to `main'  
pgacclnk: child process exit status 1: /usr/bin/ld  
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=====  
C | 403.stencil(base) 404.lbm(base) 452.ep(base) 470.bt(base)  
=====

nvc Rel Dev-r239283 64-bit target on x86-64 Linux -tp icelake-server  
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=====  
Fortran | 450.md(base) 455.seismic(base) 456.spF(base) 460.ilbdc(base)  
| 463.swim(base)  
=====

nvfortran Rel Dev-r239283 64-bit target on x86-64 Linux -tp icelake-server  
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=====  
Fortran, C | 453.clvrleaf(base) 459.miniGhost(base)  
=====

nvfortran Rel Dev-r239283 64-bit target on x86-64 Linux -tp icelake-server

(Continued on next page)



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nvc Rel Dev-r239283 64-bit target on x86-64 Linux -tp icelake-server

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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: -mcmmodel=medium -Wl,--no-relax

## Base Optimization Flags

C benchmarks:

-Ofast -mp=gpu -Mfprelaxed -Mstack\_arrays -static-nvidia

Fortran benchmarks:

-Ofast -mp=gpu -Mfprelaxed -Mstack\_arrays -static-nvidia

Benchmarks using both Fortran and C:

453.clvleaf: -Ofast -mp=gpu -Mfprelaxed -Mstack\_arrays -static-nvidia

459.miniGhost: -Mnomain -Ofast -mp=gpu -Mfprelaxed -Mstack\_arrays  
-static-nvidia





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## 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/nv2023\\_flags\\_v2.html](http://www.spec.org/accel2023/flags/nv2023_flags_v2.html)

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

[http://www.spec.org/accel2023/flags/nv2023\\_flags\\_v2.xml](http://www.spec.org/accel2023/flags/nv2023_flags_v2.xml)

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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

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