



SPEC ACCEL™ ACC Result

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Dell

(Test Sponsor: Indiana University)

Tesla V100-SMX2-16GB PowerEdge C4140 Server

SPECaccel_acc_peak = Not Run

SPECaccel_acc_base = 13.3

ACCEL license: 3440A

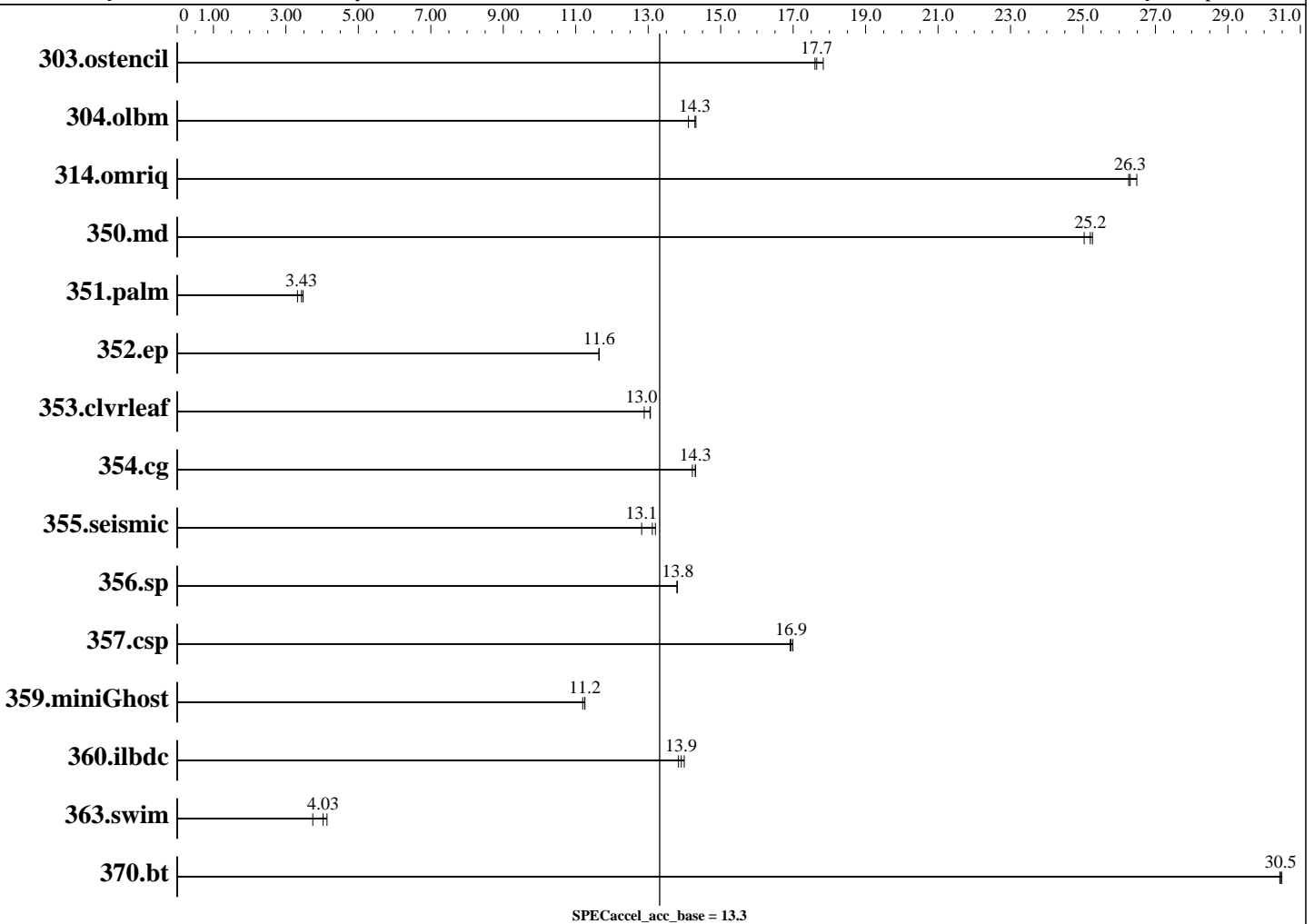
Test sponsor: Indiana University

Tested by: Indiana University

Test date: Aug-2019

Hardware Availability: May-2019

Software Availability: Apr-2019



Hardware

CPU Name: Intel Xeon Gold 6130
 CPU Characteristics: Intel Turbo Boost on, SMT off
 CPU MHz: 2100
 CPU MHz Maximum: 3700
 FPU: Integrated
 CPU(s) enabled: 32 cores, 2 chips, 16 cores/chip
 CPU(s) orderable: 1,2 chips
 Primary Cache: 32 KB I + 32 KB D on chip per core
 Secondary Cache: 1 MB I+D on chip per core
 L3 Cache: 22 MB I+D on chip per chip
 Other Cache: None

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Accelerator

Accel Model Name: Tesla V100
 Accel Vendor: NVIDIA Corporation
 Accel Name: Tesla V100-SMX2-16GB
 Type of Accel: GPU
 Accel Connection: PCIe
 Does Accel Use ECC: Yes
 Accel Description: V100-SMX2-16GB with NVLink (Persistence Mode enabled)
 Accel Driver: NVIDIA UNIX x86_64 Kernel Module 418.67



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Hardware (Continued)

Memory: 256 GB (16 x 16 GB 2Rx8 PC4-2666V-R)
Disk Subsystem: None
Other Hardware: None

Software

Operating System: Red Hat Enterprise Linux Server release 7.6 (Maipo) 3.10.0-957.21.3.el7.x86_64
Compiler: PGI Community Edition, Release 19.4
File System: cephfs nfsv4 (ganesha) over 100Gbits/s Ethernet
System State: Run level 3 (multi-user)
Other Software: CUDA 10.1

Results Table

| Benchmark | Base | | | | | | Peak | | | | | |
|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------|-------|---------|-------|---------|-------|
| | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 303.ostencil | <u>8.21</u> | <u>17.7</u> | 8.13 | 17.8 | 8.24 | 17.6 | | | | | | |
| 304.olbm | 32.2 | 14.1 | <u>31.8</u> | <u>14.3</u> | 31.8 | 14.3 | | | | | | |
| 314.omriq | 36.1 | 26.5 | 36.4 | 26.3 | <u>36.3</u> | <u>26.3</u> | | | | | | |
| 350.md | <u>10.0</u> | <u>25.2</u> | 9.98 | 25.3 | 10.1 | 25.0 | | | | | | |
| 351.palm | 106 | 3.48 | <u>108</u> | <u>3.43</u> | 111 | 3.32 | | | | | | |
| 352.ep | 45.5 | 11.6 | 45.5 | 11.6 | <u>45.5</u> | <u>11.6</u> | | | | | | |
| 353.clvleaf | 34.1 | 13.1 | <u>34.1</u> | <u>13.0</u> | 34.5 | 12.9 | | | | | | |
| 354.cg | 28.7 | 14.2 | 28.5 | 14.3 | <u>28.5</u> | <u>14.3</u> | | | | | | |
| 355.seismic | 28.0 | 13.2 | <u>28.2</u> | <u>13.1</u> | 28.9 | 12.8 | | | | | | |
| 356.sp | 20.0 | 13.8 | <u>20.0</u> | <u>13.8</u> | 20.0 | 13.8 | | | | | | |
| 357.csp | 16.0 | 16.9 | <u>15.9</u> | <u>16.9</u> | 15.9 | 17.0 | | | | | | |
| 359.miniGhost | 33.0 | 11.2 | 32.8 | 11.3 | <u>32.8</u> | <u>11.2</u> | | | | | | |
| 360.ilbdc | 26.5 | 13.8 | 26.2 | 14.0 | <u>26.4</u> | <u>13.9</u> | | | | | | |
| 363.swim | 55.6 | 4.13 | <u>57.1</u> | <u>4.03</u> | 61.5 | 3.74 | | | | | | |
| 370.bt | 7.33 | 30.4 | 7.31 | 30.5 | <u>7.32</u> | <u>30.5</u> | | | | | | |

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

Platform Notes

```
Sysinfo program /home/lijunj/junjie_benchmarks/spec/accel-1.2-bm/Docs/sysinfo
$Rev: 6965 $ $Date:: 2015-04-21 #$ c05a7f14b1b1765e3fe1df68447e8a35
running on r08g05 Wed Aug 7 02:05:24 2019
```

This section contains SUT (System Under Test) info as seen by some common utilities. To remove or add to this section, see:

<http://www.spec.org/accel/Docs/config.html#sysinfo>

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Platform Notes (Continued)

```

From /proc/cpuinfo
model name      : Intel(R) Xeon(R) Gold 6130 CPU @ 2.10GHz
 2 "physical id"s (chips)
 32 "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    : 16
  siblings     : 16
  physical 0   : cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  physical 1   : cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
cache size     : 22528 KB

```

```

From /proc/meminfo
MemTotal:      196261708 kB
HugePages_Total: 0
Hugepagesize:  2048 kB

```

```

From /etc/*release* /etc/*version*
os-release:
NAME="Red Hat Enterprise Linux Server"
VERSION="7.6 (Maipo)"
ID="rhel"
ID_LIKE="fedora"
VARIANT="Server"
VARIANT_ID="server"
VERSION_ID="7.6"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.6 (Maipo)"
redhat-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.6:ga:server

```

```

uname -a:
Linux r08g05 3.10.0-957.21.3.el7.x86_64 #1 SMP Fri Jun 14 02:54:29 EDT 2019
x86_64 x86_64 x86_64 GNU/Linux

```

run-level 3 Jul 15 10:51

```

SPEC is set to: /home/lijunj/junjie_benchmarks/spec/accel-1.2-bm
Filesystem                                     Type
Size Used Avail Use% Mounted on
172.16.129.177:/volumes/_nogroup/24ec4401-f96d-40a5-99a5-e96f73257d2f nfs4
128G 102G  27G  79% /mnt

```

Additional information from dmidecode:

Warning: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to

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Platform Notes (Continued)

hardware, firmware, and the "DMTF SMBIOS" standard.

Information from pgaccelinfo:

```

CUDA Driver Version:      10010
NVRM version:             NVIDIA UNIX x86_64 Kernel Module  418.67
Device Number:            0
Device Name:               Tesla V100-SXM2-16GB
Device Revision Number:   7.0
Global Memory Size:       16914055168
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
Texture Alignment:        512B
Clock Rate:                1530 MHz
Execution Timeout:        No
Integrated Device:        No
Can Map Host Memory:      Yes
Compute Mode:              default
Concurrent Kernels:       Yes
ECC Enabled:              No
Memory Clock Rate:        877 MHz
Memory Bus Width:         4096 bits
L2 Cache Size:            6291456 bytes
Max Threads Per SMP:      2048
Async Engines:            5
Unified Addressing:       Yes
Managed Memory:          Yes
Concurrent Managed Memory: Yes
Preemption Supported:     Yes
Cooperative Launch:       Yes
  Multi-Device:           Yes
PGI Default Target:       -ta=tesla:cc70

```

General Notes

Four V100-SMX2-16GB GPUs were installed on the system, three of them were idle while only one is active for running SPEC Accel.

CPUs and GPUs are connected via PCIe, while the four GPUs are connected through NVLink. The NVlink connection is not used in this test.

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General Notes (Continued)

Stacksize set to 'unlimited':
ulimit -s unlimited

Spectre & Meltdown:

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.

Base Compiler Invocation

C benchmarks:

pgcc

Fortran benchmarks:

pgfortran

Benchmarks using both Fortran and C:

pgcc pgfortran

Base Optimization Flags

C benchmarks:

-fast -Mfprelaxed -acc -ta=tesla:cc70 -ta=tesla:cuda10.1

Fortran benchmarks:

-fast -Mfprelaxed -acc -ta=tesla:cc70 -ta=tesla:cuda10.1

Benchmarks using both Fortran and C:

353.clvleaf: -fast -Mfprelaxed -acc -ta=tesla:cc70 -ta=tesla:cuda10.1

359.miniGhost: -fast -Mfprelaxed -acc -ta=tesla:cc70 -ta=tesla:cuda10.1
-Mnomain

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

https://www.spec.org/accel/flags/pgi2019_flags.html

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

https://www.spec.org/accel/flags/pgi2019_flags.xml



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

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