# SPEC ACCEL™ ACC Result



Dell
(Test Sponsor: Indiana University)

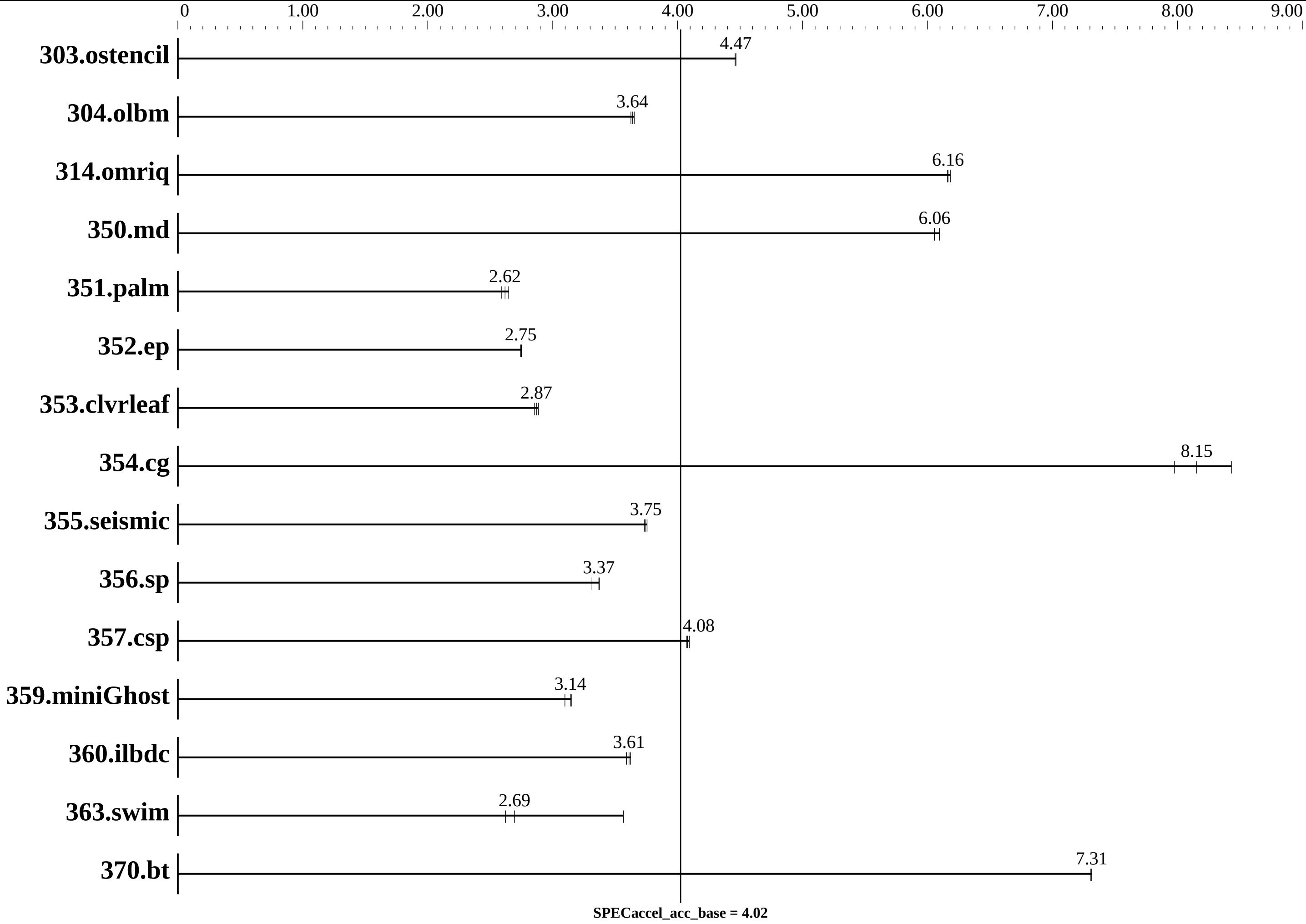
## Tesla V100X-4Q

PowerEdge C4140 Server (KVM virtual machine)

SPECaccel_acc_peak = Not Run

SPECaccel_acc_base = 4.02

| | | | |
|---|---|---|---|
| **ACCEL license:** | 3440A | **Test date:** | Jul-2019 |
| **Test sponsor:** | Indiana University | **Hardware Availability:** | May-2019 |
| **Tested by:** | Indiana University | **Software Availability:** | Apr-2019 |




### Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon Gold 6130 |
| CPU Characteristics: | Intel Turbo Boost on, SMT off. 2 of 32 cores allocated to KVM virtual machine. |
| 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 |

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### Accelerator

| | |
|---|---|
| Accel Model Name: | Tesla V100 |
| Accel Vendor: | NVIDIA Corporation |
| Accel Name: | Tesla V100X-4Q |
| Type of Accel: | GPU |
| Accel Connection: | PCIe |
| Does Accel Use ECC: | Yes |
| Accel Description: | a quarter of virtualized V100-SMX2-16GB with NVLink (Persistence Mode enabled) allocated to KVM virtual machine. |
| Accel Driver: | NVIDIA UNIX x86_64 Kernel Module 418.70 |

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## Hardware (Continued)

| | |
|---|---|
| L3 Cache: | 22 MB I+D on chip per chip |
| Other Cache: | None |
| Memory: | 256 GB (16 x 16 GB 2Rx8 PC4-2666V-R)<br>10 GB (10/256 GB Allocated for KVM) |
| Disk Subsystem: | None |
| Other Hardware: | None |

## Software

| | |
|---|---|
| Operating System: | VM:<br>CentOS Linux release 7.6.1810 (Core)<br>3.10.0-957.12.1.el7.x86_64<br>Host:<br>Red Hat Enterprise Linux Server release 7.6<br>(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: | KVM Version 2.12, CUDA 10.1 |

## Results Table

| | Base | | | | | | Peak | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Benchmark** | **Seconds** | **Ratio** | **Seconds** | **Ratio** | **Seconds** | **Ratio** | **Seconds** | **Ratio** | **Seconds** | **Ratio** | **Seconds** | **Ratio** |
| 303.ostencil | 32.5 | 4.47 | 32.5 | 4.46 | **32.5** | **4.47** | | | | | | |
| 304.olbm | **125** | **3.64** | 125 | 3.65 | 125 | 3.63 | | | | | | |
| 314.omriq | 155 | 6.16 | **155** | **6.16** | 155 | 6.18 | | | | | | |
| 350.md | 41.6 | 6.05 | 41.3 | 6.10 | **41.6** | **6.06** | | | | | | |
| 351.palm | 143 | 2.59 | 140 | 2.65 | **141** | **2.62** | | | | | | |
| 352.ep | 193 | 2.74 | **193** | **2.75** | 193 | 2.75 | | | | | | |
| 353.clvrleaf | 154 | 2.89 | **155** | **2.87** | 156 | 2.86 | | | | | | |
| 354.cg | **50.0** | **8.15** | 48.4 | 8.43 | 51.2 | 7.98 | | | | | | |
| 355.seismic | **98.8** | **3.75** | 99.1 | 3.73 | 98.5 | 3.76 | | | | | | |
| 356.sp | 81.8 | 3.37 | **81.9** | **3.37** | 83.3 | 3.31 | | | | | | |
| 357.csp | 66.3 | 4.07 | 66.0 | 4.09 | **66.2** | **4.08** | | | | | | |
| 359.miniGhost | 117 | 3.15 | **117** | **3.14** | 119 | 3.10 | | | | | | |
| 360.ilbdc | **102** | **3.61** | 101 | 3.62 | 102 | 3.59 | | | | | | |
| 363.swim | 64.5 | 3.57 | **85.3** | **2.69** | 87.7 | 2.62 | | | | | | |
| 370.bt | 30.5 | 7.32 | **30.5** | **7.31** | 30.5 | 7.31 | | | | | | |

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-1.2-4q/Docs/sysinfo
$Rev: 6965 $ $Date:: 2015-04-21 #$ c05a7f14b1b1765e3fe1df68447e8a35
running on v100x-4q.novalocal Thu Jul 11 03:04:21 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

From /proc/cpuinfo
   model name : Intel(R) Xeon(R) Gold 6130 CPU @ 2.10GHz
      2 "physical id"s (chips)
      2 "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 : 1
      siblings  : 1
      physical 0: cores 0
      physical 1: cores 0
   cache size : 16384 KB

From /proc/meminfo
   MemTotal:       11105732 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
   centos-release: CentOS Linux release 7.6.1810 (Core)
   centos-release-upstream: Derived from Red Hat Enterprise Linux 7.6 (Source)
   os-release:
      NAME="CentOS Linux"
      VERSION="7 (Core)"
      ID="centos"
      ID_LIKE="rhel fedora"
      VERSION_ID="7"
      PRETTY_NAME="CentOS Linux 7 (Core)"
      ANSI_COLOR="0;31"
      CPE_NAME="cpe:/o:centos:centos:7"
   redhat-release: CentOS Linux release 7.6.1810 (Core)
   system-release: CentOS Linux release 7.6.1810 (Core)
   system-release-cpe: cpe:/o:centos:centos:7

uname -a:
   Linux v100x-4q.novalocal 3.10.0-957.12.1.el7.x86_64 #1 SMP Mon Apr 29
   14:59:59 UTC 2019 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jul 9 12:18

SPEC is set to: /home/lijunj/junjie_benchmarks/spec/accel-1.2-4q
```

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## Platform Notes (Continued)

```
    Filesystem                                                   Type  Size
    Used Avail Use% Mounted on
    10.255.0.1:/volumes/_nogroup/24ec4401-f96d-40a5-99a5-e96f73257d2f nfs4  128G
    54G   75G  42% /home/lijunj
 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

Information from pgaccelinfo:
CUDA Driver Version:           10010
NVRM version:                  NVIDIA UNIX x86_64 Kernel Module  418.70
Device Number:                 0
Device Name:                   GRID V100X-4Q
Device Revision Number:        7.0
Global Memory Size:            4294967296
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:                 2
Unified Addressing:            Yes
Managed Memory:                No
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 host 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.

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.clvrleaf: `-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`



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

Tested with SPEC ACCEL v1.2.
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