



# SPEC ACCEL™ ACC Result

Copyright 2015-2019 Standard Performance Evaluation Corporation

Dell

(Test Sponsor: Indiana University)

## Tesla V100X-16Q

PowerEdge C4140 Server (KVM virtual machine)

SPECaccel\_acc\_peak = Not Run

SPECaccel\_acc\_base = 13.3

ACCEL license: 3440A

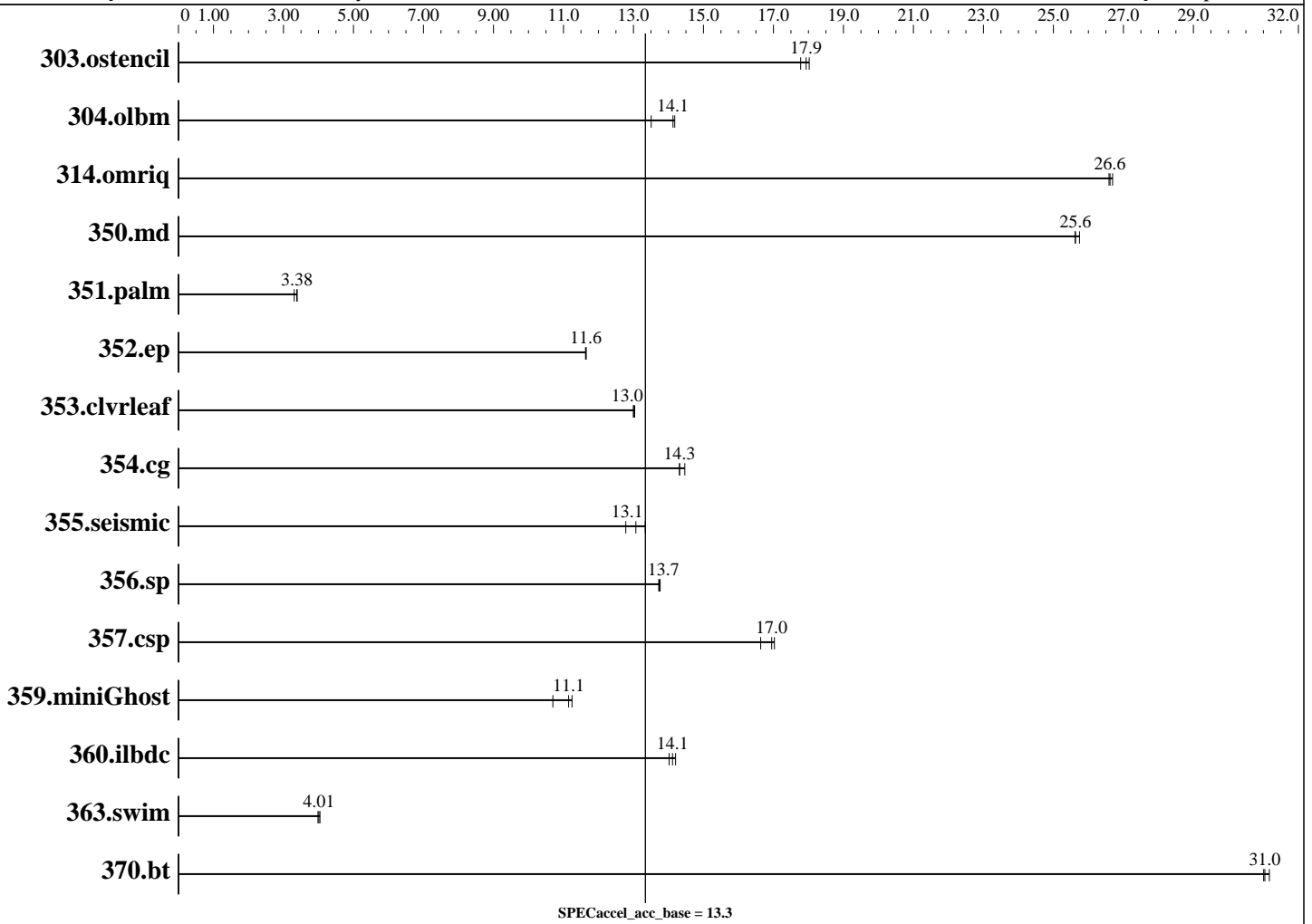
Test sponsor: Indiana University

Tested by: Indiana University

Test date: May-2019

Hardware Availability: May-2019

Software Availability: Apr-2019



### Hardware

CPU Name: Intel Xeon Gold 6130  
 CPU Characteristics: Intel Turbo Boost on, SMT off. 8 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  
 L3 Cache: 22 MB I+D on chip per chip

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### Accelerator

Accel Model Name: Tesla V100  
 Accel Vendor: NVIDIA Corporation  
 Accel Name: Tesla V100X-16Q  
 Type of Accel: GPU  
 Accel Connection: PCIe  
 Does Accel Use ECC: Yes  
 Accel Description: a full 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)

Other Cache: None  
Memory: 256 GB (16 x 16 GB 2Rx8 PC4-2666V-R)  
45 GB (45/256 GB Allocated for KVM)  
Disk Subsystem: None  
Other Hardware: None

### Software

Operating System: VM:  
CentOS Linux release 7.6.1810 (Core)  
3.10.0-957.12.1.el7.x86\_64  
Host:  
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 (ganesh) over 100Gbits/s Ethernet  
System State: Run level 3 (multi-user)  
Other Software: KVM Version 2.12, CUDA 10.1

## Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
303.ostencil	8.16	17.8	8.05	18.0	<b>8.09</b>	<b>17.9</b>						
304.olbm	33.7	13.5	<b>32.2</b>	<b>14.1</b>	32.1	14.2						
314.omriq	35.8	26.7	36.0	26.6	<b>35.9</b>	<b>26.6</b>						
350.md	9.79	25.7	<b>9.83</b>	<b>25.6</b>	9.84	25.6						
351.palm	109	3.39	<b>109</b>	<b>3.38</b>	112	3.31						
352.ep	45.6	11.6	45.5	11.7	<b>45.5</b>	<b>11.6</b>						
353.clrleaf	<b>34.2</b>	<b>13.0</b>	34.2	13.0	34.1	13.0						
354.cg	28.5	14.3	<b>28.5</b>	<b>14.3</b>	28.2	14.5						
355.seismic	<b>28.3</b>	<b>13.1</b>	27.7	13.3	29.0	12.8						
356.sp	20.1	13.7	20.1	13.8	<b>20.1</b>	<b>13.7</b>						
357.csp	<b>15.9</b>	<b>17.0</b>	15.9	17.0	16.2	16.6						
359.miniGhost	<b>33.1</b>	<b>11.1</b>	34.5	10.7	32.8	11.2						
360.ilbdc	25.8	14.2	26.2	14.0	<b>26.0</b>	<b>14.1</b>						
363.swim	<b>57.3</b>	<b>4.01</b>	57.7	3.99	56.9	4.04						
370.bt	7.19	31.0	<b>7.18</b>	<b>31.0</b>	7.15	31.2						

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



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### Platform Notes

\$Rev: 6965 \$ \$Date:: 2015-04-21 #\$ c05a7f14b1b1765e3fe1df68447e8a35  
running on v100x-16q.novalocal Thu May 30 17:09:13 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
 8 "physical id"s (chips)
 8 "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
physical 2: cores 0
physical 3: cores 0
physical 4: cores 0
physical 5: cores 0
physical 6: cores 0
physical 7: cores 0
cache size : 16384 KB
```

```
From /proc/meminfo
MemTotal: 47229476 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-16q.novalocal 3.10.0-957.12.1.el7.x86_64 #1 SMP Mon Apr 29
```

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### Platform Notes (Continued)

14:59:59 UTC 2019 x86\_64 x86\_64 x86\_64 GNU/Linux

run-level 3 May 3 18:31

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

Information from pgaccelinfo:

```

CUDA Driver Version:          10010
NVRM version:                 NVIDIA UNIX x86_64 Kernel Module  418.70
Device Number:                0
Device Name:                   GRID V100X-16Q
Device Revision Number:       7.0
Global Memory Size:           17179869184
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

```



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

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



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The flags file that was used to format this result can be browsed at  
[https://www.spec.org/accel/flags/pgi2019\\_flags.html](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](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](mailto:webmaster@spec.org).

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