SPEC ACCEL™ ACC Result

IBM Corporation
(Test Sponsor: NVIDIA Corporation)

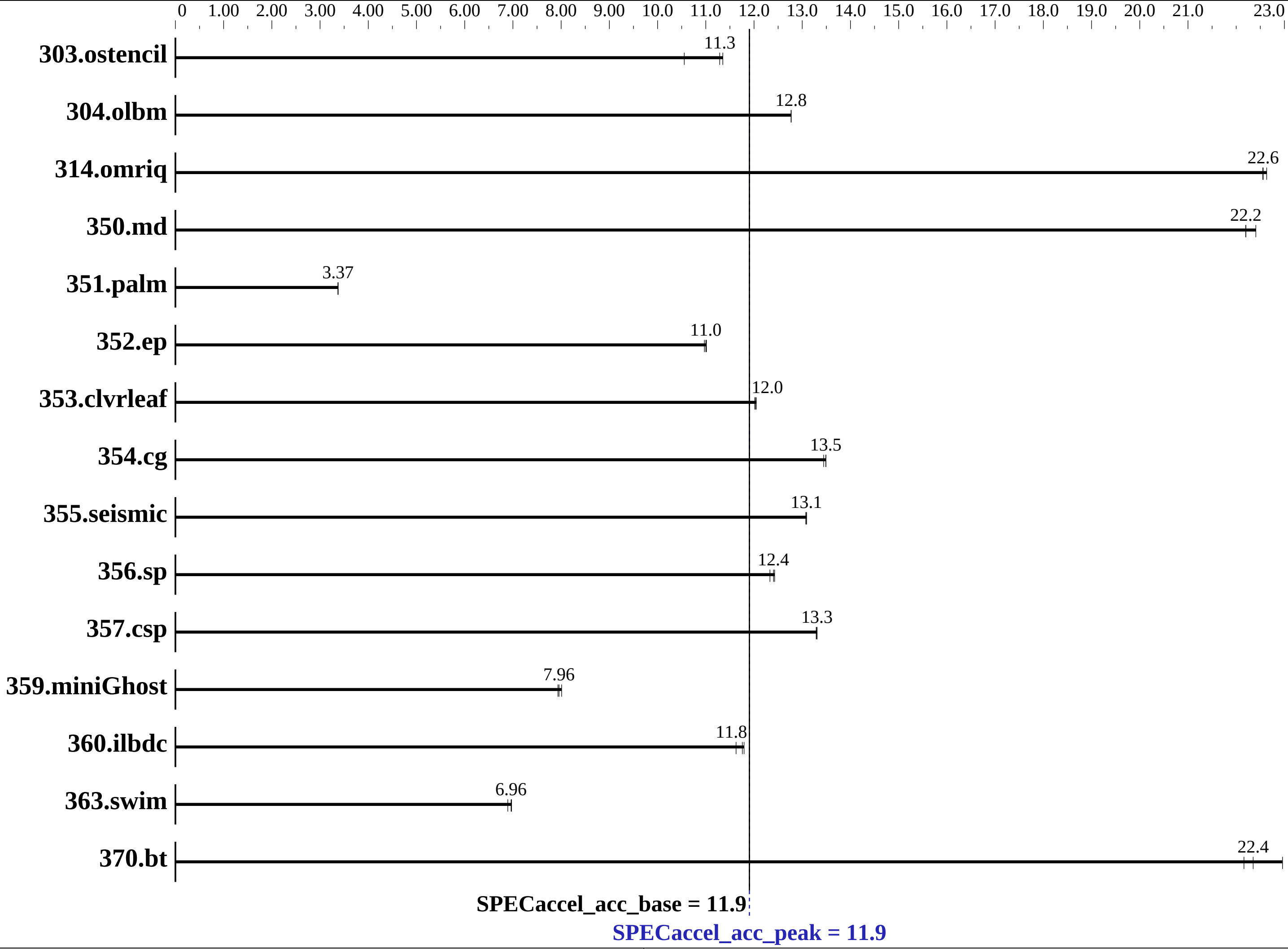
Tesla V100

IBM Power Systems AC922 for High Performance Computing (8335-GTH)

SPECaccel_acc_peak = 11.9

SPECaccel_acc_base = 11.9

ACCEL license:	019	**Test date:**	Aug-2018
Test sponsor:	NVIDIA Corporation	**Hardware Availability:**	May-2018
Tested by:	NVIDIA Corporation	**Software Availability:**	Aug-2018



Hardware

CPU Name:	POWER9, altivec supported
CPU Characteristics:	
CPU MHz:	3400
CPU MHz Maximum:	3800
FPU:	Integrated
CPU(s) enabled:	40 cores, 2 chips, 20 cores/chip, 4 threads/core
CPU(s) orderable:	1,2 chips
Primary Cache:	64 KB I + 64 KB D on chip per core
Secondary Cache:	512 KB I+D on chip per core
L3 Cache:	100 MB I+D on chip per chip shared NUCA / 20 cores
Other Cache:	None

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Accelerator

Accel Model Name:	Tesla V100-SXM2-16GB
Accel Vendor:	NVIDIA Corporation
Accel Name:	Tesla V100
Type of Accel:	GPU
Accel Connection:	NVLink
Does Accel Use ECC:	Yes
Accel Description:	See notes
Accel Driver:	NVIDIA UNIX ppc64le Kernel Module 396.26

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Hardware (Continued)

Memory: 128 GB (16 x 8 GB 1Rx4 PC4-2666V-R)
Disk Subsystem: 1 x 1TB 7200 RPM SATA HDD
Other Hardware: None

Software

Operating System: Red Hat Enterprise Linux Server release 7.5 (Maipo) 4.14.0-49.8.1.el7a.ibmnvidia.6.1.ppc64le
Compiler: PGI Professional Edition, Release 18.7
File System: xfs
System State: Run level 3 (multi-user)
Other Software: None

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
303.ostencil	**12.8**	**11.3**	12.8	11.4	13.7	10.6	**12.8**	**11.3**	12.8	11.4	13.7	10.6
304.olbm	35.6	12.8	35.6	12.8	**35.6**	**12.8**	35.6	12.8	35.6	12.8	**35.6**	**12.8**
314.omriq	**42.4**	**22.6**	42.4	22.6	42.2	22.6	**42.4**	**22.6**	42.4	22.6	42.2	22.6
350.md	11.2	22.4	11.4	22.2	**11.4**	**22.2**	11.2	22.4	11.4	22.2	**11.4**	**22.2**
351.palm	110	3.38	**110**	**3.37**	110	3.37	110	3.38	**110**	**3.37**	110	3.37
352.ep	**48.2**	**11.0**	48.1	11.0	48.3	11.0	**48.2**	**11.0**	48.1	11.0	48.3	11.0
353.clvrleaf	37.0	12.0	**37.0**	**12.0**	36.9	12.0	37.0	12.0	**37.0**	**12.0**	36.9	12.0
354.cg	**30.2**	**13.5**	30.2	13.5	30.3	13.4	**30.2**	**13.5**	30.2	13.5	30.3	13.4
355.seismic	28.3	13.1	**28.3**	**13.1**	28.3	13.1	28.3	13.1	**28.3**	**13.1**	28.3	13.1
356.sp	**22.2**	**12.4**	22.2	12.4	22.4	12.3	**22.2**	**12.4**	22.2	12.4	22.4	12.3
357.csp	20.3	13.3	20.3	13.3	**20.3**	**13.3**	20.3	13.3	20.3	13.3	**20.3**	**13.3**
359.miniGhost	46.5	7.93	**46.4**	**7.96**	46.1	8.01	46.5	7.93	**46.4**	**7.96**	46.1	8.01
360.ilbdc	31.6	11.6	31.1	11.8	**31.2**	**11.8**	31.6	11.6	31.1	11.8	**31.2**	**11.8**
363.swim	**33.0**	**6.96**	33.0	6.97	33.4	6.89	**33.0**	**6.96**	33.0	6.97	33.4	6.89
370.bt	**9.98**	**22.4**	9.71	23.0	10.1	22.2	**9.98**	**22.4**	9.71	23.0	10.1	22.2

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

Platform Notes

```
Sysinfo program /local/home/colgrove/SPECACCEL/Docs/sysinfo
$Rev: 6965 $ $Date:: 2015-04-21 #$ c05a7f14b1b1765e3fe1df68447e8a35
running on wsn1 Wed Aug  1 09:48:43 2018

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

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Platform Notes (Continued)

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

From /proc/cpuinfo
   clock : 3000.000000MHz
   clock : 3616.000000MHz
   machine : PowerNV 8335-GTC........
   model : 8335-GTC........
   platform : PowerNV
   revision : 2.2 (pvr 004e 1202)
   cpu : POWER9, altivec supported
*
* 0 "physical id" tags found.  Perhaps this is an older system,
* or a virtualized system.  Not attempting to guess how to
* count chips/cores for this system.
*
      160 "processors"
   cores, siblings (Caution: counting these is hw and system dependent.  The
   following excerpts from /proc/cpuinfo might not be reliable.  Use with
   caution.)

From /proc/meminfo
   MemTotal:       199796800 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

/usr/bin/lsb_release -d
   Red Hat Enterprise Linux Server release 7.5 (Maipo)

From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux Server"
      VERSION="7.5 (Maipo)"
      ID="rhel"
      ID_LIKE="fedora"
      VARIANT="Server"
      VARIANT_ID="server"
      VERSION_ID="7.5"
      PRETTY_NAME="Red Hat Enterprise Linux Server 7.5 (Maipo)"
   redhat-release: Red Hat Enterprise Linux Server release 7.5 (Maipo)
   system-release: Red Hat Enterprise Linux Server release 7.5 (Maipo)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:7.5:ga:server

uname -a:
   Linux wsn1 4.14.0-49.8.1.el7a.ibmnvidia.6.1.ppc64le #1 SMP Tue Jun 5 13:56:12
   -03 2018 ppc64le ppc64le ppc64le GNU/Linux

run-level 3 Jun 29 16:37

SPEC is set to: /local/home/colgrove/SPECACCEL
```

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Platform Notes (Continued)

```
   Filesystem                   Type  Size  Used Avail Use% Mounted on
   /dev/mapper/rhel_wsn1-root xfs   927G   95G  832G  11% /

 (End of data from sysinfo program)
 Information from pgaccelinfo
 CUDA Driver Version:           9020
 NVRM version:                  NVIDIA UNIX ppc64le Kernel Module  396.26
 Device Number:                 0
 Device Name:                   Tesla V100-SXM2-16GB
 Device Revision Number:        7.0
 Global Memory Size:            16911433728
 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:                   Yes
 Memory Clock Rate:             877 MHz
 Memory Bus Width:              4096 bits
 L2 Cache Size:                 6291456 bytes
 Max Threads Per SMP:           2048
 Async Engines:                 4
 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

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.

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General Notes (Continued)

```
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`

Fortran benchmarks:
`-fast -Mfprelaxed -acc -ta=tesla:cc70`

Benchmarks using both Fortran and C:

353.clvrleaf: `-fast -Mfprelaxed -acc -ta=tesla:cc70`

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

Peak Optimization Flags

C benchmarks:

303.ostencil: `basepeak = yes`

304.olbm: `basepeak = yes`

314.omriq: `basepeak = yes`

352.ep: `basepeak = yes`

354.cg: `basepeak = yes`

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Peak Optimization Flags (Continued)

357.csp: `basepeak = yes`

370.bt: `basepeak = yes`

Fortran benchmarks:

350.md: `basepeak = yes`

351.palm: `basepeak = yes`

355.seismic: `basepeak = yes`

356.sp: `basepeak = yes`

360.ilbdc: `basepeak = yes`

363.swim: `basepeak = yes`

Benchmarks using both Fortran and C:

353.clvrleaf: `basepeak = yes`

359.miniGhost: `basepeak = yes`

The flags files that were used to format this result can be browsed at
`https://www.spec.org/accel/flags/PGI-Platform-Multicore-OMP.html`
`https://www.spec.org/accel/flags/pgi2018_flags.html`

You can also download the XML flags sources by saving the following links:
`https://www.spec.org/accel/flags/PGI-Platform-Multicore-OMP.xml`
`https://www.spec.org/accel/flags/pgi2018_flags.xml`

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

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