



SPEC ACCEL™ ACC Result

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IBM Corporation
(Test Sponsor: NVIDIA Corporation)

Tesla V100

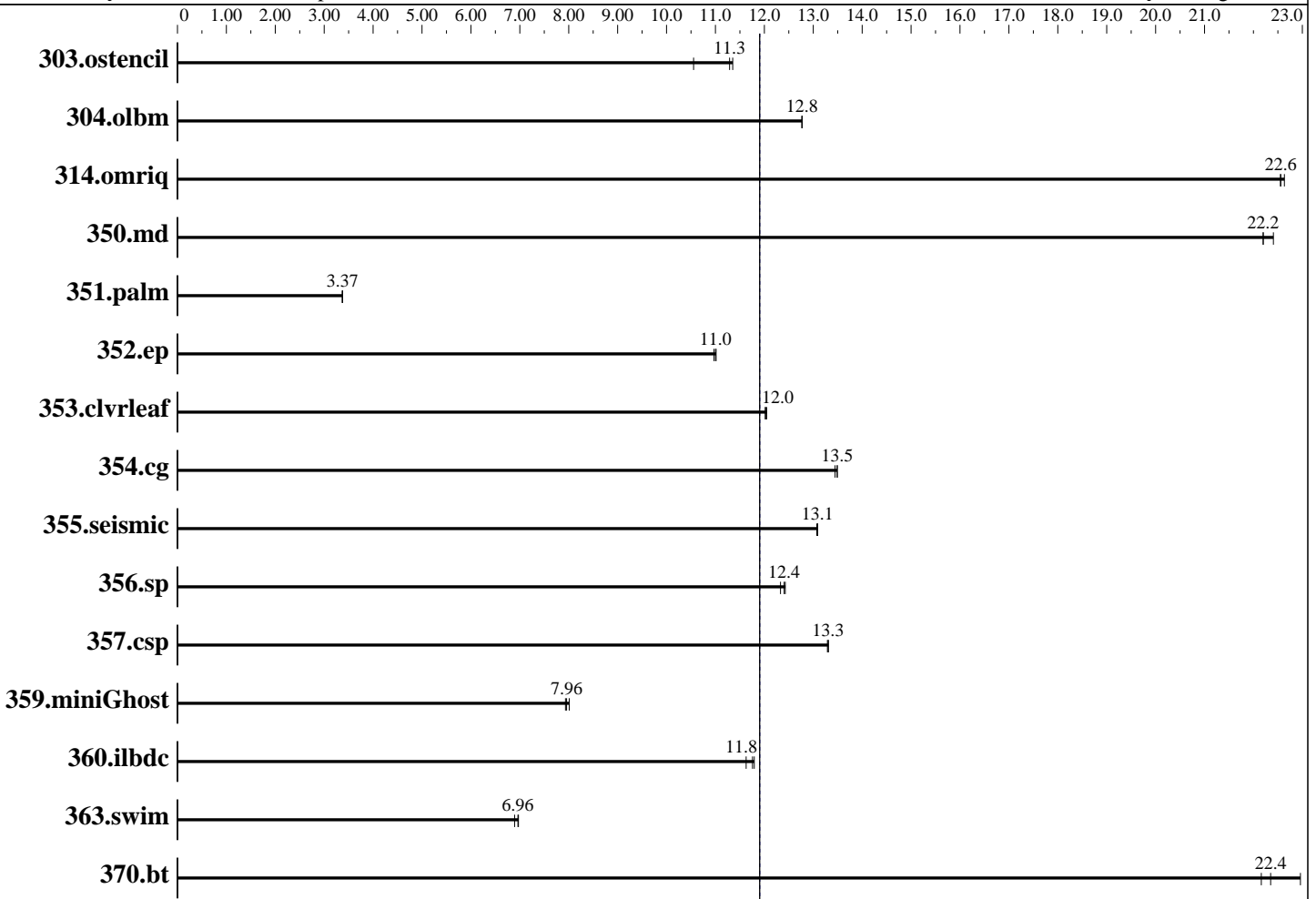
IBM Power Systems AC922 for High Performance Computing (8335-GTH)

SPECaccel_acc_peak = 11.9

SPECaccel_acc_base = 11.9

ACCEL license: 019
Test sponsor: NVIDIA Corporation
Tested by: NVIDIA Corporation

Test date: Aug-2018
Hardware Availability: May-2018
Software Availability: Aug-2018



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

Continued on next page



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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.ibmvidia.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.civrleaf: -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

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For other inquiries, please contact webmaster@spec.org.

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