



SPEC ACCEL™ OMP Result

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Intel

(Test Sponsor: Technische Universitaet Dresden)

Intel Xeon Phi 7210

Intel Server System LADMP00AP Family (Xeon Phi 7210, 1.3 GHz, 64 cores, 4 threads)

SPECaccel_omp_peak = 6.08

SPECaccel_omp_base = 4.39

ACCEL license: 37A

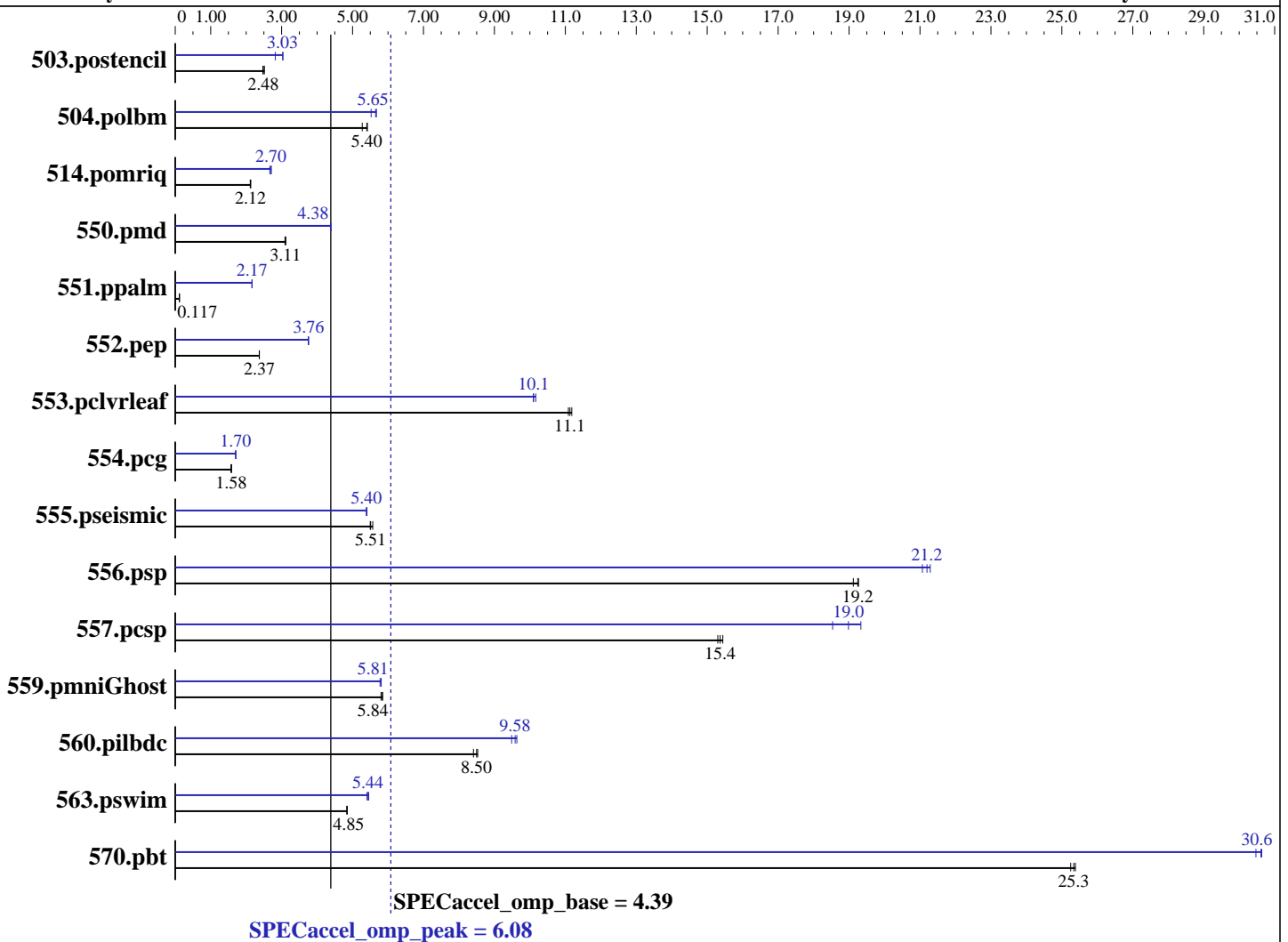
Test sponsor: Technische Universitaet Dresden

Tested by: Technische Universitaet Dresden

Test date: Jul-2017

Hardware Availability: Jun-2016

Software Availability: Dec-2016



Hardware

CPU Name: Intel Xeon Phi 7210
 CPU Characteristics: Intel Turbo Boost 2 Technology up to 1.50 GHz
 CPU MHz: 1300
 CPU MHz Maximum: 1500
 FPU: None
 CPU(s) enabled: 64 cores, 1 chip, 64 cores/chip, 4 threads/core
 CPU(s) orderable: 1 chip
 Primary Cache: 32 KB I + 32 KB D on chip per core
 Secondary Cache: 1 MB I+D on chip per 2 cores
 L3 Cache: 16 GB I+D on chip per chip
 Other Cache: None

Continued on next page

Accelerator

Accel Model Name: Xeon Phi 7210
 Accel Vendor: Intel
 Accel Name: Intel Xeon Phi 7210
 Type of Accel: CPU
 Accel Connection: N/A
 Does Accel Use ECC: yes
 Accel Description: Intel Xeon Phi 7210, SMT ON, Turbo ON
 Cluster Mode: Quadrant, Memory Mode: Cache
 Accel Driver:



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Hardware (Continued)

Memory: 96 GB (6 x 16 GB 2Rx4 PC4-2400T-R, running at 1066 MHz)
Disk Subsystem: 275 GB INTEL SSDSC2BB30
Other Hardware: --

Software

Operating System: CentOS Linux release 7.3 3.10.0-514.21.2.el7.x86_64
Compiler: Intel Compiler C/C++/Fortran Version 17.0.1 20161005
File System: ext4
System State: Run level 3 (user-level)
Other Software: FFTW 3.3.6pl1

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.postencil	<u>43.9</u>	<u>2.48</u>	44.1	2.47	43.3	2.51	35.9	3.04	38.6	2.82	<u>36.0</u>	<u>3.03</u>
504.polbm	23.1	5.27	<u>22.6</u>	<u>5.40</u>	22.5	5.42	<u>21.6</u>	<u>5.65</u>	22.1	5.52	21.5	5.67
514.pomriq	294	2.11	<u>293</u>	<u>2.12</u>	291	2.13	233	2.67	230	2.70	<u>230</u>	<u>2.70</u>
550.pmd	77.9	3.09	<u>77.5</u>	<u>3.11</u>	77.4	3.12	<u>55.0</u>	<u>4.38</u>	55.1	4.38	54.9	4.39
551.ppalm	4660	0.117	<u>4654</u>	<u>0.117</u>	4645	0.117	<u>251</u>	<u>2.17</u>	251	2.17	252	2.16
552.pep	<u>97.4</u>	<u>2.37</u>	97.4	2.37	97.5	2.37	61.6	3.75	61.4	3.76	<u>61.5</u>	<u>3.76</u>
553.pclvrleaf	<u>103</u>	<u>11.1</u>	102	11.2	103	11.1	113	10.1	113	10.2	<u>113</u>	<u>10.1</u>
554.pcg	210	1.59	<u>211</u>	<u>1.58</u>	212	1.57	195	1.71	<u>195</u>	<u>1.70</u>	195	1.70
555.pseismic	50.6	5.57	<u>51.2</u>	<u>5.51</u>	51.3	5.50	52.2	5.41	<u>52.3</u>	<u>5.40</u>	52.3	5.39
556.psp	<u>42.5</u>	<u>19.2</u>	42.5	19.3	42.8	19.1	38.8	21.1	38.4	21.3	<u>38.6</u>	<u>21.2</u>
557.pcsp	56.1	15.3	55.6	15.4	<u>55.9</u>	<u>15.4</u>	46.3	18.5	44.4	19.3	<u>45.3</u>	<u>19.0</u>
559.pmniGhost	<u>68.0</u>	<u>5.84</u>	67.9	5.85	68.4	5.80	<u>68.4</u>	<u>5.81</u>	68.3	5.81	68.7	5.78
560.pilbdc	76.6	8.53	<u>76.8</u>	<u>8.50</u>	77.7	8.41	<u>68.1</u>	<u>9.58</u>	67.8	9.63	68.8	9.49
563.pswim	<u>32.8</u>	<u>4.85</u>	32.9	4.83	32.8	4.85	29.4	5.41	29.1	5.46	<u>29.2</u>	<u>5.44</u>
570.pbt	<u>30.8</u>	<u>25.3</u>	30.7	25.4	30.9	25.2	25.5	30.6	<u>25.5</u>	<u>30.6</u>	25.6	30.5

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

Submit Notes

The config file option 'submit' was used.
submit = numactl -p 0 \$command



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Platform Notes

Sysinfo program /tmp/spec-accel/1.2/Docs/sysinfo
\$Rev: 6965 \$ \$Date:: 2015-04-21 #\$ c05a7f14b1b1765e3feldf68447e8a35
running on tauruskn128.taurus.hrsk.tu-dresden.de Mon Jul 24 10:45:36 2017

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 Phi(TM) CPU 7210 @ 1.30GHz
 1 "physical id"s (chips)
 256 "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      : 64
  siblings       : 256
  physical 0:    cores 0 1 2 3 6 7 10 11 12 13 14 15 18 19 20 21 22 23 24 25 26
                27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51
                52 53 56 57 58 59 60 61 62 63 64 65 68 69 70 71 72 73
  cache size     : 1024 KB
```

From /proc/meminfo

```
MemTotal:      98707216 kB
HugePages_Total: 0
Hugepagesize:   2048 kB
```

/usr/bin/lsb_release -d

```
CentOS Linux release 7.3.1611 (Core)
```

From /etc/*release* /etc/*version*

```
centos-release: CentOS Linux release 7.3.1611 (Core)
centos-release-upstream: Derived from Red Hat Enterprise Linux 7.3 (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 7.3.1611 (Core)
system-release: CentOS Linux release 7.3.1611 (Core)
system-release-cpe: cpe:/o:centos:centos:7
```

uname -a:

```
Linux tauruskn128.taurus.hrsk.tu-dresden.de 3.10.0-514.21.2.el7.x86_64 #1 SMP
Tue Jun 20 12:24:47 UTC 2017 x86_64 x86_64 x86_64 GNU/Linux
```

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Platform Notes (Continued)

run-level 3 Jun 30 13:46

SPEC is set to: /tmp/spec-accel/1.2

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sda1	ext4	275G	6.5G	255G	3%	/

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

(End of data from sysinfo program)

General Notes

Used Environment Variables:

ENV_KMP_AFFINITY=compact,0 - assign OpenMP Threads continously
ENV_OMP_NUM_THREADS=128 - limits number of Threads to be started to 128
ENV_KMP_HW_SUBSET=1S,64C,2T - control Thread distribution accross sockets, cores and hw threads
ENV_FORT_BUFFERED=true - enables buffered I/O for Fortran
ENV_OMP_DYNAMIC - Enable or disable the dynamic adjustment of the number of threads within a team. If undefined, dynamic adjustment is disabled by default.
ENV_KMP_LIBRARY - Selects the OpenMP runtime library throughput. The options for the variable value are: serial, turnaround, or throughput indicating the execution mode.
ENV_KMP_BLOCKTIME - Sets the time, in milliseconds, that a thread should wait, after completing the execution of a parallel region, before sleeping.

Base Compiler Invocation

C benchmarks:

icc

Fortran benchmarks:

ifort

Benchmarks using both Fortran and C:

icc ifort

Base Portability Flags

503.postencil: -DSPEC_USE_INNER_SIMD
504.polbm: -DSPEC_USE_INNER_SIMD
514.pomriq: -DSPEC_USE_INNER_SIMD

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Base Portability Flags (Continued)

```

550.pmd: -DSPEC_USE_INNER_SIMD -80
551.ppalm: -DSPEC_USE_INNER_SIMD
552.pep: -DSPEC_USE_INNER_SIMD
553.pclvrleaf: -DSPEC_USE_INNER_SIMD
554.pcg: -DSPEC_USE_INNER_SIMD
555.pseismic: -DSPEC_USE_INNER_SIMD
556.psp: -DSPEC_USE_INNER_SIMD
557.pcsp: -DSPEC_USE_INNER_SIMD
559.pmniGhost: -DSPEC_USE_INNER_SIMD -nofor_main
560.pilbdc: -DSPEC_USE_INNER_SIMD
563.pswim: -DSPEC_USE_INNER_SIMD
570.pbt: -DSPEC_USE_INNER_SIMD

```

Base Optimization Flags

C benchmarks:

-O3 -g -qopenmp -xMIC-AVX512 -qopenmp-offload=host

Fortran benchmarks:

-O3 -g -qopenmp -xMIC-AVX512 -qopenmp-offload=host

Benchmarks using both Fortran and C:

-O3 -g -qopenmp -xMIC-AVX512 -qopenmp-offload=host

Peak Compiler Invocation

C benchmarks:

icc

Fortran benchmarks:

ifort

Benchmarks using both Fortran and C:

icc ifort

Peak Portability Flags

```

503.postencil: -DSPEC_USE_INNER_SIMD
504.polbm: -DSPEC_USE_INNER_SIMD
514.pomriq: -DSPEC_USE_INNER_SIMD
550.pmd: -DSPEC_USE_INNER_SIMD -80

```

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Peak Portability Flags (Continued)

```

551.ppalm: -DSPEC_USE_INNER_SIMD -DSPEC_HOST_FFTW3
552.pep: -DSPEC_USE_INNER_SIMD
553.pclvrleaf: -DSPEC_USE_INNER_SIMD
554.pcg: -DSPEC_USE_INNER_SIMD
555.pseismic: -DSPEC_USE_INNER_SIMD
556.psp: -DSPEC_USE_INNER_SIMD
557.pcsp: -DSPEC_USE_INNER_SIMD
559.pmniGhost: -DSPEC_USE_INNER_SIMD -nofor_main
560.pilbdc: -DSPEC_USE_INNER_SIMD
563.pswim: -DSPEC_USE_INNER_SIMD
570.pbt: -DSPEC_USE_INNER_SIMD

```

Peak Optimization Flags

C benchmarks:

```

503.postencil: -O3 -xCORE-AVX2 -g -qopenmp -qopenmp-offload=host
-qopt-prefetch=3
504.polbm: -O3 -xMIC-AVX512 -g -qopenmp -qopenmp-offload=host
-qopt-prefetch=5
514.pomriq: -O3 -xMIC-AVX512 -g -qopenmp -qopenmp-offload=host
-qopt-prefetch=2
552.pep: -O3 -xMIC-AVX512 -g -qopenmp -qopenmp-offload=host
-qopt-streaming-stores always
554.pcg: -O3 -xCORE-AVX2 -g -qopenmp -qopenmp-offload=host
-qopt-prefetch=2 -qopt-streaming-stores always
557.pcsp: Same as 504.polbm
570.pbt: -O3 -xMIC-AVX512 -g -qopenmp -qopenmp-offload=host

```

Fortran benchmarks:

```

550.pmd: -O3 -xMIC-AVX512 -g -qopenmp -qopenmp-offload=host
-qopt-prefetch=3 -no-prec-div -fimf-precision=low
551.ppalm: -O3 -xMIC-AVX512 -g -qopenmp -qopenmp-offload=host
-no-prec-sqrt
-I/sw/taurus/libraries/fftw/3.3.6p11-gcc5.3-intelmpi5.1/include
-L/sw/taurus/libraries/fftw/3.3.6p11-gcc5.3-intelmpi5.1/lib

```

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Peak Optimization Flags (Continued)

555.pseismic: -O3 -xMIC-AVX512 -g -qopenmp -qopenmp-offload=host

556.psp: -O3 -xMIC-AVX512 -g -qopenmp -qopenmp-offload=host
-qopt-prefetch=2

560.pilbdc: -O3 -xMIC-AVX512 -g -qopenmp -qopenmp-offload=host
-qopt-prefetch=3

563.pswim: Same as 555.pseismic

Benchmarks using both Fortran and C:

553.pclvrleaf: -O3 -xMIC-AVX512 -g -qopenmp -qopenmp-offload=host
-qopt-streaming-stores always

559.pmniGhost: -O3 -xMIC-AVX512 -g -qopenmp -qopenmp-offload=host
-qopt-prefetch=3 -qopt-streaming-stores always

Peak Other Flags

Fortran benchmarks:

551.ppalm: -lfftw3

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

<https://www.spec.org/accel/flags/icc2015-openmp.html>

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

<https://www.spec.org/accel/flags/icc2015-openmp.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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