SPEC ACCEL™ OMP Result

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Intel

(Test Sponsor: Technische Universitaet Dresden)

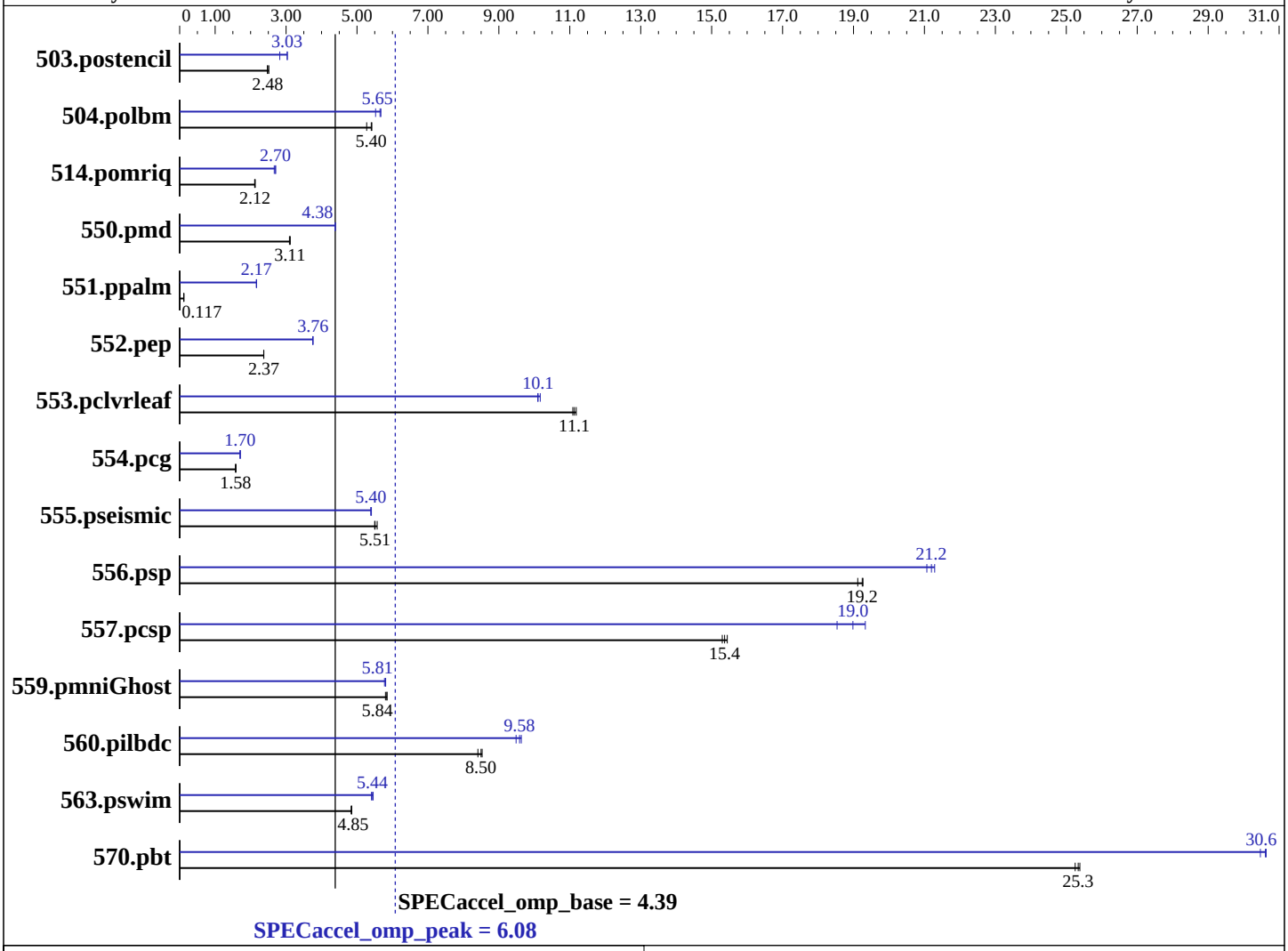
Intel Xeon Phi 7210

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 date:**	Jul-2017
Test sponsor:	Technische Universitaet Dresden	**Hardware Availability:**	Jun-2016
Tested by:	Technische Universitaet Dresden	**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

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

Platform Notes

```
Sysinfo program /tmp/spec-accel/1.2/Docs/sysinfo
$Rev: 6965 $ $Date:: 2015-04-21 #$ c05a7f14b1b1765e3fe1df68447e8a35
running on taurusknl28.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 taurusknl28.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/3.3.6pl1-gcc5.3-intelmpi5.1/include
-L/sw/taurus/libraries/fftw/3.3.6pl1-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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