SPEC ACCEL™ OMP Result

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Intel
Intel Xeon Phi CPU 7250F

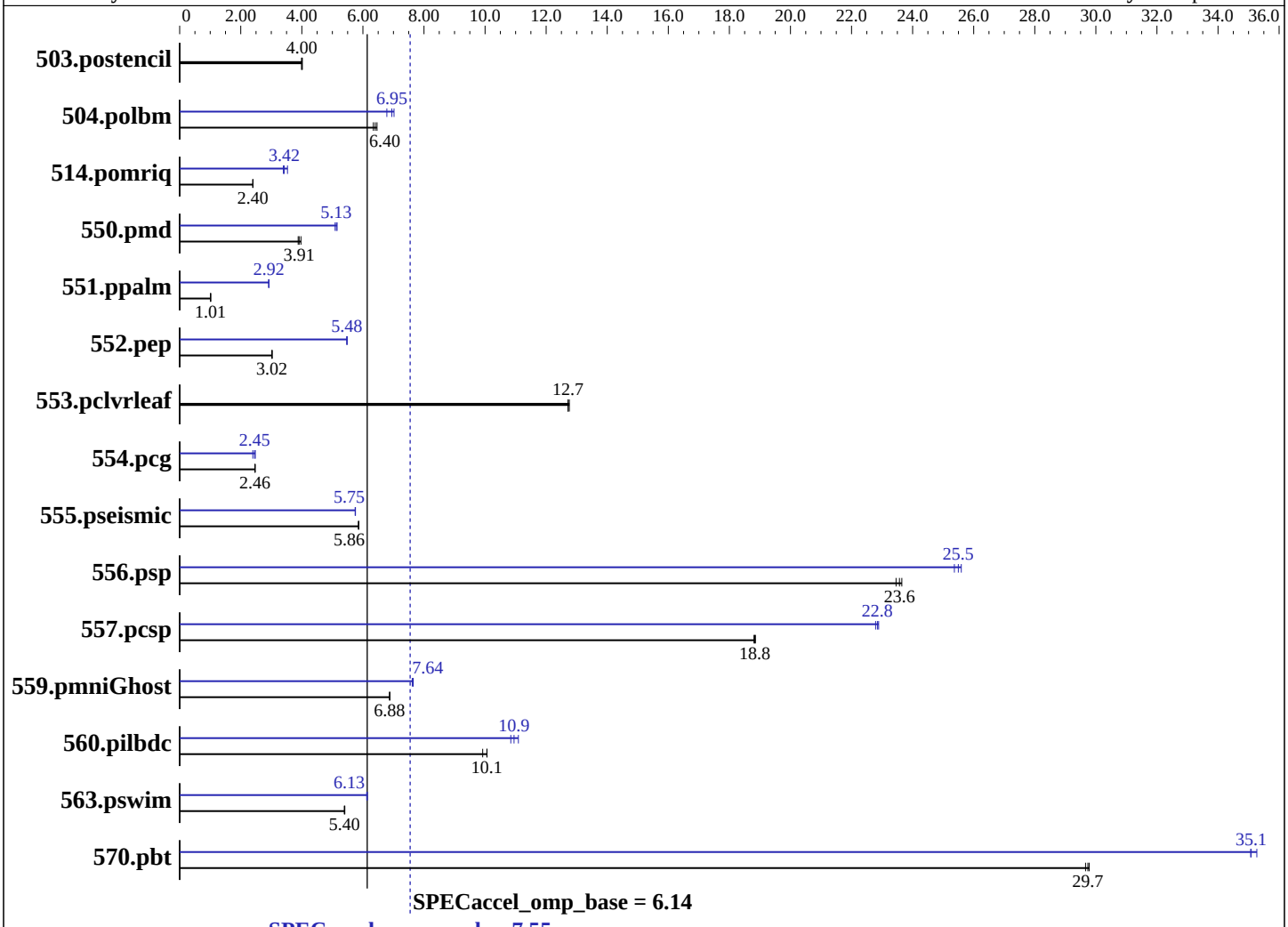
Endeavour Node(Intel Xeon Phi CPU 7250F,
1.40 GHz, SMT ON, Turbo ON, flat MCDRAM)

SPECaccel_omp_peak = 7.55

SPECaccel_omp_base = 6.14

ACCEL license: 13
Test sponsor: Intel
Tested by: Intel

Test date: Jun-2017
Hardware Availability: Dec-2016
Software Availability: Sep-2017



Hardware

CPU Name:	Intel Xeon Phi 7250F
CPU Characteristics:	Simultaneous multithreading (SMT) ON, Turbo ON
CPU MHz:	1400
CPU MHz Maximum:	1600
FPU:	Integrated
CPU(s) enabled:	68 cores, 1 chip, 68 cores/chip, 4 threads/core
CPU(s) orderable:	1 to 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:	None
Other Cache:	None

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Accelerator

Accel Model Name:	Intel Xeon Phi CPU 7250F
Accel Vendor:	Intel
Accel Name:	Intel Xeon Phi CPU 7250F
Type of Accel:	CPU
Accel Connection:	N/A
Does Accel Use ECC:	yes
Accel Description:	Second generation Xeon Phi self-bootable CPU SMT ON, Turbo ON, MCDRAM flat mode
Accel Driver:	N/A

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Hardware (Continued)

Memory: 96 GB (6 x 16 GB 2Rx8 PC4-2400T-R ECC Registered) + 16 GB MCDRAM (flat)
Disk Subsystem: 108 TB Panasas ActiveStor 14
Other Hardware: None

Software

Operating System: Red Hat Enterprise Linux Server release 7.3 (Maipo)
Red Hat Enterprise Linux Server release 7.3 (Maipo)
3.10.0-514.6.2.0.1.el7.x86_64.knl1
Compiler: C/C++/Fortran: Version 18.0 of Intel Composer XE for Linux Build
File System: panfs
System State: Run level 3 (default)
Other Software: FFTW 3.3.6

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.postencil	**27.3**	**4.00**	27.1	4.02	27.3	3.99	**27.3**	**4.00**	27.1	4.02	27.3	3.99
504.polbm	19.2	6.34	**19.0**	**6.40**	18.9	6.46	17.4	7.02	**17.6**	**6.95**	18.0	6.78
514.pomriq	259	2.40	**259**	**2.40**	259	2.40	176	3.53	183	3.39	**181**	**3.42**
550.pmd	62.1	3.88	60.7	3.97	**61.6**	**3.91**	47.4	5.09	**47.0**	**5.13**	46.7	5.16
551.ppalm	538	1.01	**537**	**1.01**	536	1.01	**186**	**2.92**	186	2.92	187	2.92
552.pep	**76.4**	**3.02**	76.4	3.02	76.4	3.02	42.1	5.48	42.2	5.47	**42.2**	**5.48**
553.pclvrleaf	**90.0**	**12.7**	89.7	12.8	90.1	12.7	**90.0**	**12.7**	89.7	12.8	90.1	12.7
554.pcg	135	2.46	134	2.48	**135**	**2.46**	139	2.39	134	2.48	**136**	**2.45**
555.pseismic	48.2	5.85	48.1	5.86	**48.1**	**5.86**	**49.0**	**5.75**	49.1	5.75	49.0	5.76
556.psp	**34.7**	**23.6**	34.6	23.6	34.9	23.5	**32.1**	**25.5**	32.2	25.4	32.0	25.6
557.pcsp	45.6	18.9	**45.6**	**18.8**	45.7	18.8	37.5	22.9	**37.6**	**22.8**	37.7	22.8
559.pmniGhost	57.7	6.88	**57.7**	**6.88**	57.8	6.87	**52.0**	**7.64**	52.1	7.61	51.9	7.65
560.pilbdc	65.8	9.92	**64.9**	**10.1**	64.9	10.1	**59.6**	**10.9**	58.9	11.1	60.2	10.8
563.pswim	**29.5**	**5.40**	29.5	5.39	29.4	5.41	**25.9**	**6.13**	26.0	6.13	25.9	6.15
570.pbt	**26.2**	**29.7**	26.3	29.7	26.2	29.8	22.1	35.3	**22.2**	**35.1**	22.2	35.1

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.
The following expression was used for the submit command:
submit = numactl -m 1 $command
```

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Submit Notes (Continued)

```
The following additional kernel-options were used:
rcu_nocbs=2-271 nohz_full=2-271
```

Platform Notes

```
Sysinfo program
/panfs/projects/innl/abobyr/SpecACCEL_OMP/kits/kit1.2_knl_18.0/Docs/sysinfo
$Rev: 6965 $ $Date:: 2015-04-21 #$ c05a7f14b1b1765e3fe1df68447e8a35
running on ekf106 Fri Jun 30 11:58:43 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 7250F @ 1.40GHz
      1 "physical id"s (chips)
      272 "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 : 68
      siblings  : 272
      physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 18 19 20 21 22 23
      24 25 26 27 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 66 67 68 69 70 71 72 73
   cache size : 1024 KB

From /proc/meminfo
   MemTotal:       115390452 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
   oracle-release: Oracle Linux Server release 7.3
   os-release:
      NAME="Oracle Linux Server"
      VERSION="7.3"
      ID="ol"
      VERSION_ID="7.3"
      PRETTY_NAME="Oracle Linux Server 7.3"
      ANSI_COLOR="0;31"
      CPE_NAME="cpe:/o:oracle:linux:7:3:server"
      HOME_URL="https://linux.oracle.com/"
   redhat-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
   ssf-release:
   SSF_VERSION=core-2016.0:hpc-cluster-2016.0:compat-base-2016.0:compat-hpc-2016.0
   system-release: Oracle Linux Server release 7.3
```

Continued on next page

Platform Notes (Continued)

```
      system-release-cpe: cpe:/o:oracle:linux:7:3:server

   uname -a:
      Linux ekf106 3.10.0-514.6.2.0.1.el7.x86_64.knl1 #1 SMP Thu Mar 2 10:19:17 MST
      2017 x86_64 x86_64 x86_64 GNU/Linux

   run-level 3 Jun 29 18:09

   SPEC is set to: /panfs/projects/innl/abobyr/SpecACCEL_OMP/kits/kit1.2_knl_18.0
      Filesystem              Type   Size  Used Avail Use% Mounted on
      panfs://36.101.212.1/innl panfs  108T   40T   69T  37% /global/panfs02/innl
   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=136 - limits number of Threads to be started
 ENV_KMP_HW_SUBSET=1S,68C,2T - control Thread distribution accross sockets, cores and hw threads
  ENV_FORT_BUFFERED=true - enables buffered I/O for Fortran
```

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

Continued on next page

Base Portability Flags (Continued)

504.polbm: -DSPEC_USE_INNER_SIMD
514.pomriq: -DSPEC_USE_INNER_SIMD
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 -xMIC-AVX512 -qopenmp -qopenmp-offload=host
-fimf-precision=low:sqrt,exp,log,/

Fortran benchmarks:
-O3 -xMIC-AVX512 -qopenmp -qopenmp-offload=host
-fimf-precision=low:sqrt,exp,log,/

Benchmarks using both Fortran and C:
-O3 -xMIC-AVX512 -qopenmp -qopenmp-offload=host
-fimf-precision=low:sqrt,exp,log,/

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
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: basepeak = yes

504.polbm: -O3 -xMIC-AVX512 -qopenmp -qopenmp-offload=host
-fimf-precision=low:sqrt,exp,log,/ -qopt-prefetch=5

514.pomriq: -O3 -xMIC-AVX512 -qopenmp -qopenmp-offload=host
-fimf-precision=low:sqrt,exp,log,/ -qopt-prefetch=5
-no-prec-sqrt

552.pep: -O3 -xMIC-AVX512 -qopenmp -qopenmp-offload=host
-fimf-precision=low:sqrt,exp,log,/
-qopt-streaming-stores always

554.pcg: Same as 504.polbm

557.pcsp: Same as 504.polbm

570.pbt: -O3 -xMIC-AVX512 -qopenmp -qopenmp-offload=host
-fimf-precision=low:sqrt,exp,log,/

Fortran benchmarks:

550.pmd: -O3 -xMIC-AVX512 -qopenmp -qopenmp-offload=host
-fimf-precision=low:sqrt,exp,log,/ -fimf-precision=low

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Peak Optimization Flags (Continued)

551.ppalm: `-O3 -xMIC-AVX512 -qopenmp -qopenmp-offload=host -no-prec-sqrt -I/home/abobyr/FFTW-3.3.6/include -L/home/abobyr/FFTW-3.3.6/lib`

555.pseismic: `-O3 -xMIC-AVX512 -qopenmp -qopenmp-offload=host -fimf-precision=low:sqrt,exp,log,/`

556.psp: `-O3 -xMIC-AVX512 -qopenmp -qopenmp-offload=host -fimf-precision=low:sqrt,exp,log,/ -qopt-prefetch=2`

560.pilbdc: `-O3 -xMIC-AVX512 -qopenmp -qopenmp-offload=host -fimf-precision=low:sqrt,exp,log,/ -qopt-prefetch=5`

563.pswim: `-O3 -xMIC-AVX512 -qopenmp -qopenmp-offload=host -fimf-precision=low:sqrt,exp,log,/ -qopt-streaming-stores always`

Benchmarks using both Fortran and C:

553.pclvrleaf: `basepeak = yes`

559.pmniGhost: `-O3 -xMIC-AVX512 -qopenmp -qopenmp-offload=host -fimf-precision=low:sqrt,exp,log,/ -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/Intel-icc18.0-linux64.html`

You can also download the XML flags source by saving the following link:
`https://www.spec.org/accel/flags/Intel-icc18.0-linux64.xml`

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

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