SPEC® CFP2006 Result

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Dell Inc.

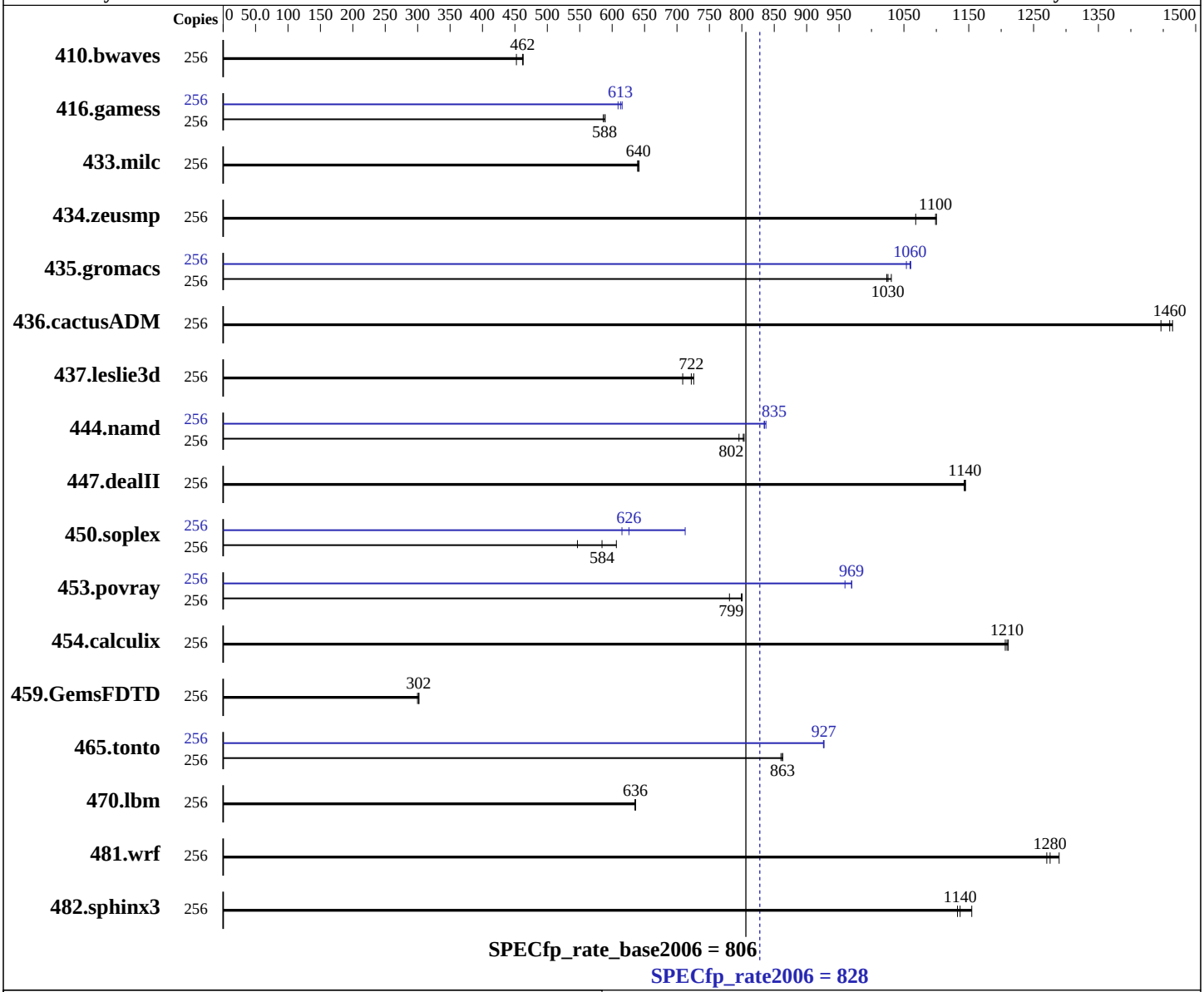
PowerEdge C6320p (Intel Xeon Phi 7230 1.30 GHz)

SPECfp®_rate2006 = 828

SPECfp_rate_base2006 = 806

CPU2006 license: 55
Test sponsor: Dell Inc.
Tested by: Dell Inc.

Test date: Mar-2017
Hardware Availability: Jan-2017
Software Availability: Jan-2017



Hardware

CPU Name:	Intel Xeon Phi 7230
CPU Characteristics:	Intel Turbo Boost Technology up to 1.50 GHz
CPU MHz:	1300
FPU:	Integrated
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 two cores

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Software

Operating System:	SUSE Linux Enterprise Server 12 SP2 (x86_64) 4.4.16-56-default
Compiler:	C/C++: Version 16.0.2.181 of Intel C++ Studio XE for Linux; Fortran: Version 16.0.2.181 of Intel Fortran Studio XE for Linux
Auto Parallel:	No
File System:	btrfs
System State:	Run level 3 (multi-user)

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L3 Cache: None
Other Cache: None
Memory: 400 GB (6 x 64 GB 2Rx8 PC4-2400T-R + 8 x 2 GB 7200 MHz MCDRAM)
Disk Subsystem: 1 x 1 TB 7.2K RPM SATA
Other Hardware: None

Base Pointers: 32/64-bit
Peak Pointers: 32/64-bit
Other Software: None

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	256	7692	452	**7535**	**462**	7517	463	256	7692	452	**7535**	**462**	7517	463
416.gamess	256	8507	589	8551	586	**8518**	**588**	256	8145	615	8230	609	**8178**	**613**
433.milc	256	**3669**	**640**	3677	639	3664	641	256	**3669**	**640**	3677	639	3664	641
434.zeusmp	256	2181	1070	**2120**	**1100**	2117	1100	256	2181	1070	**2120**	**1100**	2117	1100
435.gromacs	256	1786	1020	1774	1030	**1783**	**1030**	256	1723	1060	1734	1050	**1725**	**1060**
436.cactusADM	256	2089	1460	**2095**	**1460**	2115	1450	256	2089	1460	**2095**	**1460**	2115	1450
437.leslie3d	256	3316	726	**3333**	**722**	3395	709	256	3316	726	**3333**	**722**	3395	709
444.namd	256	**2559**	**802**	2581	796	2555	804	256	2452	837	**2458**	**835**	2460	834
447.dealII	256	2562	1140	2558	1150	**2560**	**1140**	256	2562	1140	2558	1150	**2560**	**1140**
450.soplex	256	3907	546	**3654**	**584**	3520	607	256	3471	615	**3411**	**626**	2996	713
453.povray	256	1744	781	**1704**	**799**	1701	800	256	1420	959	**1405**	**969**	1405	970
454.calculix	256	1744	1210	**1747**	**1210**	1751	1210	256	1744	1210	**1747**	**1210**	1751	1210
459.GemsFDTD	256	**9002**	**302**	9060	300	8995	302	256	**9002**	**302**	9060	300	8995	302
465.tonto	256	**2920**	**863**	2928	860	2919	863	256	2719	927	**2719**	**927**	2721	926
470.lbm	256	5531	636	**5533**	**636**	5537	635	256	5531	636	**5533**	**636**	5537	635
481.wrf	256	**2242**	**1280**	2251	1270	2218	1290	256	**2242**	**1280**	2251	1270	2218	1290
482.sphinx3	256	4405	1130	**4390**	**1140**	4321	1150	256	4405	1130	**4390**	**1140**	4321	1150

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

Submit Notes

```
The numactl mechanism was used to bind copies to processors. The config file option 'submit'
was used to generate numactl commands to bind each copy to a specific processor.
For details, please see the config file.
```

Operating System Notes

```
Stack size set to unlimited using "ulimit -s unlimited"
```

Platform Notes

```
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on linux-z6tq Sat Mar 18 16:43:10 2017
```

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Platform Notes (Continued)

```
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/cpu2006/Docs/config.html#sysinfo

From /proc/cpuinfo
   model name : Intel(R) Genuine Intel(R) CPU 0000 @ 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 8 9 12 13 14 15 18 19 20 21 22 23 24 25 26 27 28 29
      30 31 34 35 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 56 57 60 61 62
      63 64 65 66 67 68 69 70 71 72 73 74 75
   cache size : 1024 KB

From /proc/meminfo
   MemTotal:       396136360 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
   SuSE-release:
      SUSE Linux Enterprise Server 12 (x86_64)
      VERSION = 12
      PATCHLEVEL = 2
      # This file is deprecated and will be removed in a future service pack or
      release.
      # Please check /etc/os-release for details about this release.
   os-release:
      NAME="SLES"
      VERSION="12-SP2"
      VERSION_ID="12.2"
      PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
      ID="sles"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:
   Linux linux-z6tq 4.4.16-56-default #1 SMP Mon Aug 8 14:24:26 UTC 2016
   (5b281a8) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Mar 15 15:59

SPEC is set to: /root/cpu2006-1.2
   Filesystem     Type   Size  Used Avail Use% Mounted on
   /dev/sdb2      btrfs  930G  533G  395G  58% /
Additional information from dmidecode:
```

Continued on next page

Platform Notes (Continued)

```
      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.

    BIOS Dell Inc. 1.1.7 003/003/2017
    Memory:
     6x Hynix HMAA8GL7MMR4N-UH 64 GB 4 rank 2400 MHz
     8x INTEL N/A 2 GB 7200 MHz

  (End of data from sysinfo program)
```

General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/root/cpu2006-1.2/libs/32:/root/cpu2006-1.2/libs/64:/root/cpu2006-1.2/sh"

 Binaries compiled on a system with
 Intel 2nd Generation Xeon Phi CPU
 with 96 GB DDR4 memory using RedHat EL 7.2
 Filesystem page cache cleared with:
 echo 1>       /proc/sys/vm/drop_caches
 runspec command invoked through numactl i.e.:
 numactl --interleave=all runspec <etc>
```

Base Compiler Invocation

C benchmarks:
```
icc   -m64
```

C++ benchmarks:
```
icpc  -m64
```

Fortran benchmarks:
```
ifort -m64
```

Benchmarks using both Fortran and C:
```
icc   -m64 ifort -m64
```

Base Portability Flags

410.bwaves: -DSPEC_CPU_LP64
416.gamess: -DSPEC_CPU_LP64
433.milc: -DSPEC_CPU_LP64
434.zeusmp: -DSPEC_CPU_LP64
435.gromacs: -DSPEC_CPU_LP64 -nofor_main

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Base Portability Flags (Continued)

436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
447.dealII: -DSPEC_CPU_LP64
450.soplex: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64 -nofor_main
459.GemsFDTD: -DSPEC_CPU_LP64
465.tonto: -DSPEC_CPU_LP64
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
482.sphinx3: -DSPEC_CPU_LP64

Base Optimization Flags

C benchmarks:
-xMIC-AVX512 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias

C++ benchmarks:
-xMIC-AVX512 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias

Fortran benchmarks:
-xMIC-AVX512 -ipo -O3 -no-prec-div -opt-prefetch

Benchmarks using both Fortran and C:
-xMIC-AVX512 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias

Peak Compiler Invocation

C benchmarks:
icc -m64

C++ benchmarks (except as noted below):
icpc -m64

450.soplex: icpc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
icc -m64 ifort -m64

Peak Portability Flags

410.bwaves: -DSPEC_CPU_LP64
416.gamess: -DSPEC_CPU_LP64
433.milc: -DSPEC_CPU_LP64
434.zeusmp: -DSPEC_CPU_LP64
435.gromacs: -DSPEC_CPU_LP64 -nofor_main
436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
447.dealII: -DSPEC_CPU_LP64
450.soplex: -D_FILE_OFFSET_BITS=64
453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64 -nofor_main
459.GemsFDTD: -DSPEC_CPU_LP64
465.tonto: -DSPEC_CPU_LP64
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
482.sphinx3: -DSPEC_CPU_LP64

Peak Optimization Flags

C benchmarks:

433.milc: basepeak = yes

470.lbm: basepeak = yes

482.sphinx3: basepeak = yes

C++ benchmarks:

444.namd: -xMIC-AVX512 -ipo -O3 -no-prec-div -prof-gen(pass 1)
-prof-use(pass 2) -par-num-threads=1(pass 1) -fno-alias
-auto-ilp32

447.dealII: basepeak = yes

450.soplex: -xMIC-AVX512 -ipo -O3 -no-prec-div -prof-gen(pass 1)
-prof-use(pass 2) -par-num-threads=1(pass 1)
-opt-malloc-options=3

453.povray: -xMIC-AVX512 -ipo -O3 -no-prec-div -prof-gen(pass 1)
-prof-use(pass 2) -par-num-threads=1(pass 1) -unroll4
-ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes

Continued on next page

Peak Optimization Flags (Continued)

416.gamess: `-xMIC-AVX512 -ipo -O3 -no-prec-div -prof-gen`(pass 1) `-par-num-threads=1`(pass 1) `-prof-use`(pass 2) `-unroll2 -inline-level=0 -scalar-rep-`

434.zeusmp: `basepeak = yes`

437.leslie3d: `basepeak = yes`

459.GemsFDTD: `basepeak = yes`

465.tonto: `-xMIC-AVX512 -ipo -O3 -no-prec-div -prof-gen`(pass 1) `-par-num-threads=1`(pass 1) `-prof-use`(pass 2) `-unroll4 -auto -inline-calloc -opt-malloc-options=3`

Benchmarks using both Fortran and C:

435.gromacs: `-xMIC-AVX512 -ipo -O3 -no-prec-div -prof-gen`(pass 1) `-prof-use`(pass 2) `-par-num-threads=1`(pass 1) `-opt-prefetch -auto-ilp32`

436.cactusADM: `basepeak = yes`

454.calculix: `basepeak = yes`

481.wrf: `basepeak = yes`

The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64-revB.html`
`http://www.spec.org/cpu2006/flags/Default-Platform-Flags.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64-revB.xml`
`http://www.spec.org/cpu2006/flags/Default-Platform-Flags.xml`

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