SPEC® CFP2006 Result

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Dell Inc.

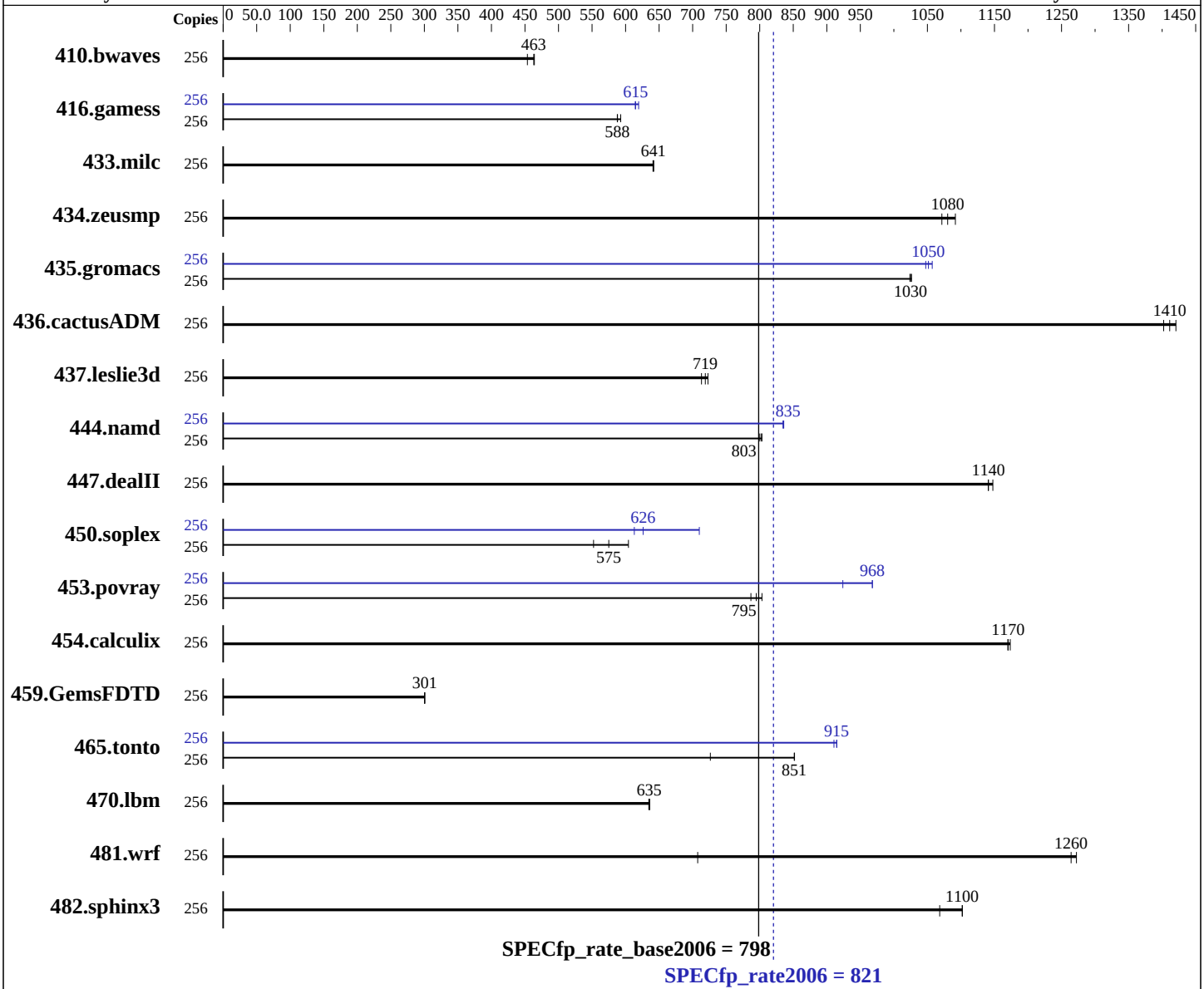
PowerEdge C6320P (Intel Xeon Phi 7230F 1.30 GHz)

SPECfp®_rate2006 = 821

SPECfp_rate_base2006 = 798

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

Test date: Apr-2017
Hardware Availability: Mar-2017
Software Availability: Jan-2016



Hardware

CPU Name:	Intel Xeon Phi 7230F
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 (x86_64) SP2 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 6400 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	7670	454	7497	464	**7513**	**463**	256	7670	454	7497	464	**7513**	**463**
416.gamess	256	**8525**	**588**	8456	593	8529	588	256	**8151**	**615**	8092	619	8158	614
433.milc	256	3667	641	**3664**	**641**	3661	642	256	3667	641	**3664**	**641**	3661	642
434.zeusmp	256	**2157**	**1080**	2134	1090	2174	1070	256	**2157**	**1080**	2134	1090	2174	1070
435.gromacs	256	**1783**	**1030**	1785	1020	1781	1030	256	1745	1050	**1738**	**1050**	1729	1060
436.cactusADM	256	**2168**	**1410**	2182	1400	2154	1420	256	**2168**	**1410**	2182	1400	2154	1420
437.leslie3d	256	3374	713	**3347**	**719**	3329	723	256	3374	713	**3347**	**719**	3329	723
444.namd	256	2566	800	**2558**	**803**	2556	803	256	**2459**	**835**	2456	836	2459	835
447.dealII	256	2567	1140	**2567**	**1140**	2552	1150	256	2567	1140	**2567**	**1140**	2552	1150
450.soplex	256	3866	552	**3713**	**575**	3533	604	256	3483	613	**3410**	**626**	3007	710
453.povray	256	**1714**	**795**	1695	803	1731	787	256	1474	924	**1407**	**968**	1407	968
454.calculix	256	1800	1170	**1804**	**1170**	1805	1170	256	1800	1170	**1804**	**1170**	1805	1170
459.GemsFDTD	256	**9036**	**301**	9035	301	9050	300	256	**9036**	**301**	9035	301	9050	300
465.tonto	256	2957	852	**2959**	**851**	3468	726	256	**2754**	**915**	2766	911	2753	915
470.lbm	256	5531	636	5543	635	**5535**	**635**	256	5531	636	5543	635	**5535**	**635**
481.wrf	256	2248	1270	**2262**	**1260**	4042	708	256	2248	1270	**2262**	**1260**	4042	708
482.sphinx3	256	4527	1100	**4528**	**1100**	4670	1070	256	4527	1100	**4528**	**1100**	4670	1070

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 Mon Apr  3 19:55:07 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) Xeon Phi(TM) CPU 7230F @ 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 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 66 67 68 69 70 71 72 73
   cache size : 1024 KB

From /proc/meminfo
   MemTotal:       396136268 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 31 22:06

SPEC is set to: /root/cpu2006-1.2
   Filesystem     Type   Size  Used Avail Use% Mounted on
   /dev/sdb2      btrfs  930G  533G  394G  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
 + 96GB DDR4 RAM 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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