SPEC® CFP2006 Result

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Dell Inc.

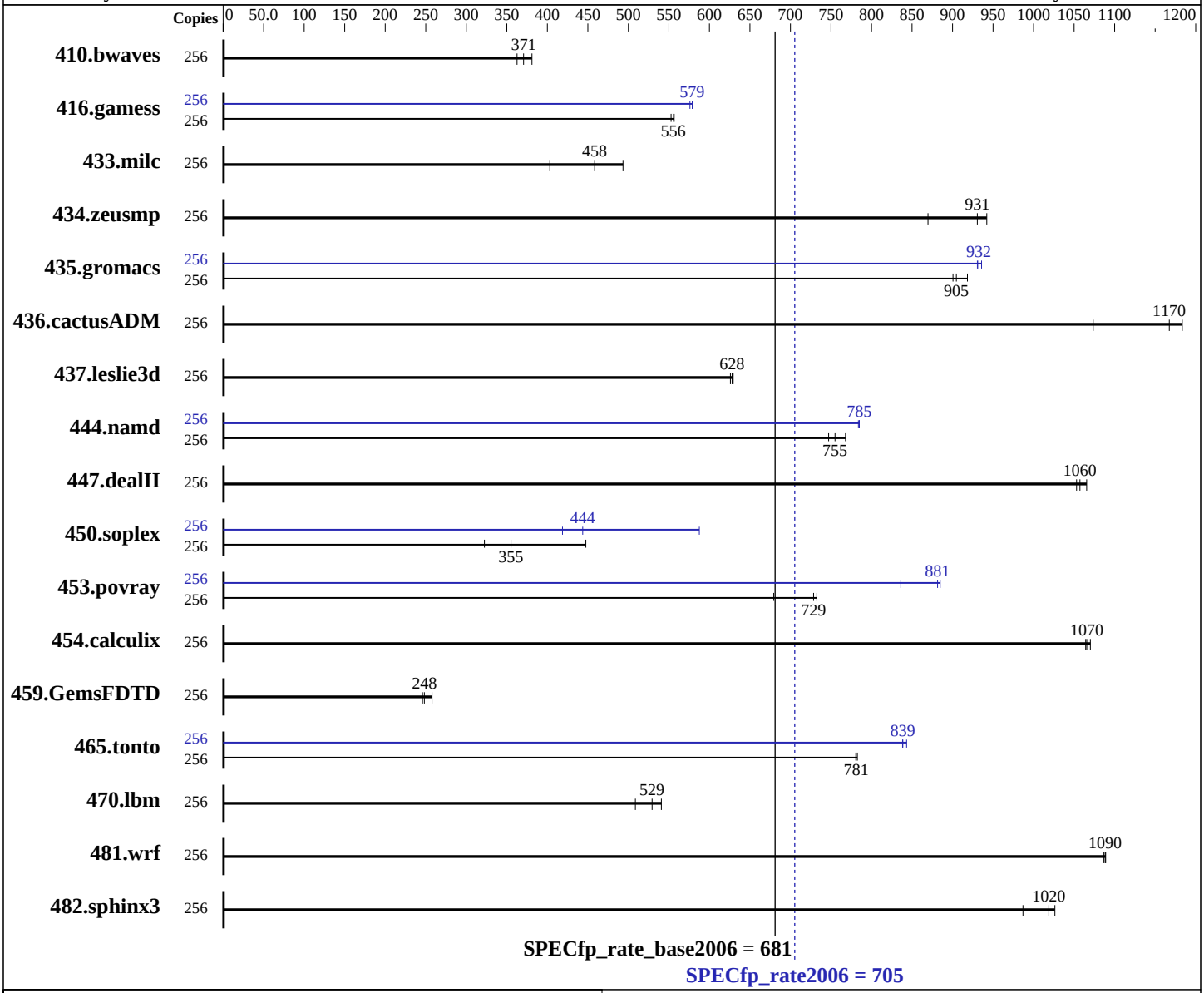
PowerEdge C6320P (Intel Xeon Phi 7210F 1.30 GHz)

SPECfp®_rate2006 = 705

SPECfp_rate_base2006 = 681

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 7210F
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:	CentOS Linux release 7.3.1611 (Core) 3.10.0-514.10.2.el7.x86_64
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:	ext4
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, running at 2133 MHz + 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	9594	363	9131	381	**9385**	**371**	256	9594	363	9131	381	**9385**	**371**
416.gamess	256	9069	553	9008	556	**9021**	**556**	256	**8659**	**579**	8657	579	8703	576
433.milc	256	4763	493	**5127**	**458**	5831	403	256	4763	493	**5127**	**458**	5831	403
434.zeusmp	256	2472	942	**2503**	**931**	2679	870	256	2472	942	**2503**	**931**	2679	870
435.gromacs	256	2030	901	**2020**	**905**	1990	918	256	1953	936	**1960**	**932**	1964	931
436.cactusADM	256	**2620**	**1170**	2585	1180	2850	1070	256	**2620**	**1170**	2585	1180	2850	1070
437.leslie3d	256	3824	629	3845	626	**3832**	**628**	256	3824	629	3845	626	**3832**	**628**
444.namd	256	2748	747	**2719**	**755**	2674	768	256	2619	784	**2616**	**785**	2615	785
447.dealII	256	2781	1050	2749	1070	**2770**	**1060**	256	2781	1050	2749	1070	**2770**	**1060**
450.soplex	256	**6011**	**355**	6623	322	4771	448	256	**4812**	**444**	5099	419	3634	588
453.povray	256	2005	679	1859	733	**1869**	**729**	256	1629	836	1539	885	**1545**	**881**
454.calculix	256	1974	1070	**1982**	**1070**	1984	1060	256	1974	1070	**1982**	**1070**	1984	1060
459.GemsFDTD	256	10539	258	**10941**	**248**	11042	246	256	10539	258	**10941**	**248**	11042	246
465.tonto	256	**3225**	**781**	3219	783	3227	781	256	2987	843	3005	838	**3004**	**839**
470.lbm	256	6505	541	6915	509	**6646**	**529**	256	6505	541	6915	509	**6646**	**529**
481.wrf	256	**2627**	**1090**	2626	1090	2631	1090	256	**2627**	**1090**	2626	1090	2631	1090
482.sphinx3	256	5056	987	4862	1030	**4897**	**1020**	256	5056	987	4862	1030	**4897**	**1020**

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 localhost.localdomain Mon Apr 17 15:51:38 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 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:       395950384 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

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 localhost.localdomain 3.10.0-514.10.2.el7.x86_64 #1 SMP Fri Mar 3
   00:04:05 UTC 2017 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Apr 14 11:54

SPEC is set to: /root/cpu2006-1.2
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda1      ext4  847G  495G  309G  62% /
Additional information from dmidecode:

   Warning: Use caution when you interpret this section. The 'dmidecode' program
```

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Platform Notes (Continued)

```
     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. 1.2.0 04/13/2017
    Memory:
     8x INTEL N/A 2 GB 6400 MHz
     6x Samsung M386A8K40BMB-CRC 64 GB 4 rank 2400 MHz, configured at 2133 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
436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
```

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Base Portability Flags (Continued)

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

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