# SPEC® CFP2006 Result



## Dell Inc.

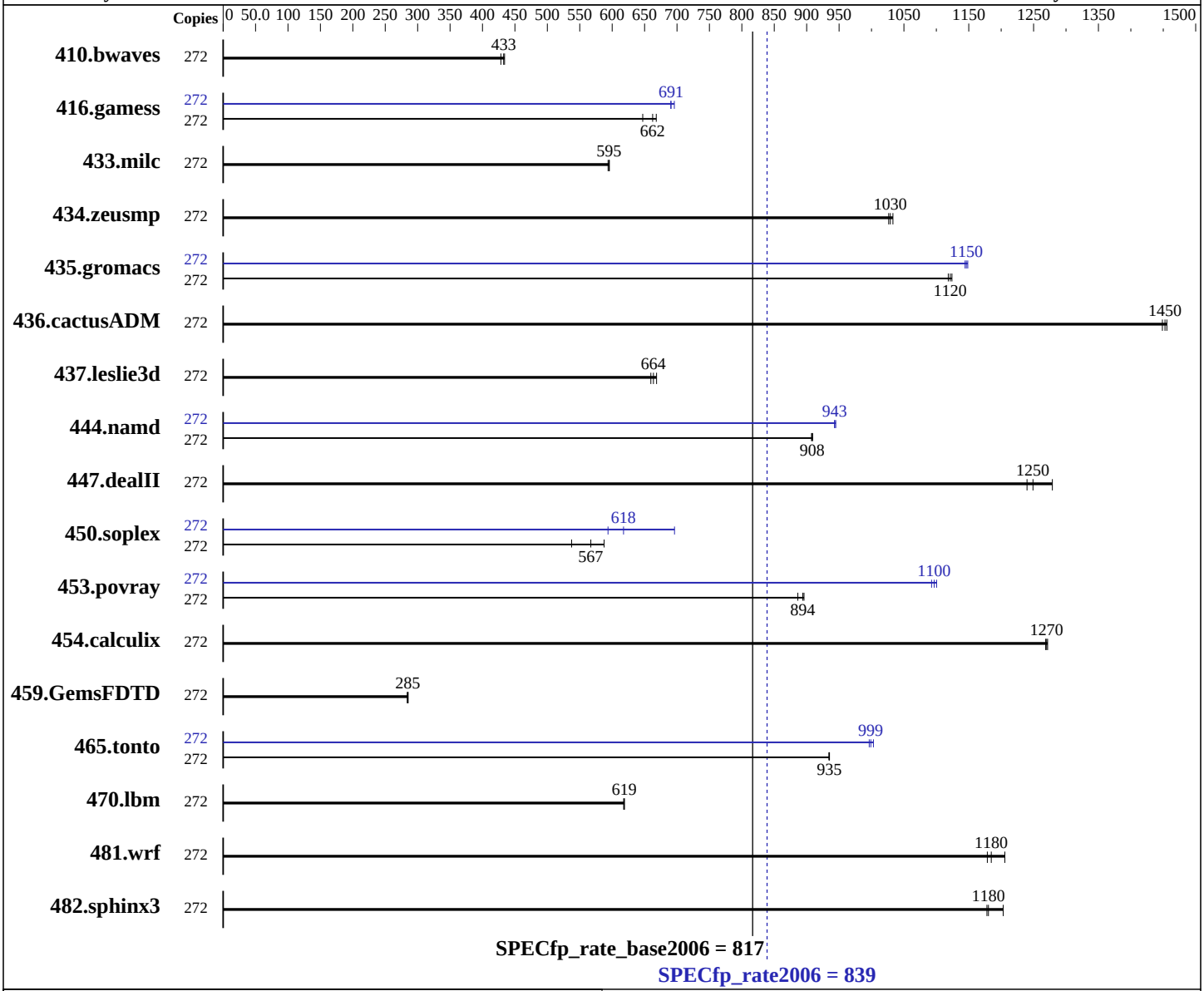
PowerEdge C6320P (Intel Xeon Phi 7250 1.40 GHz)

SPECfp®_rate2006 = 839

SPECfp_rate_base2006 = 817

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

**Test date:** Jul-2017
**Hardware Availability:** Jan-2017
**Software Availability:** Jan-2016




## Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon Phi 7250 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 1.60 GHz |
| CPU MHz: | 1400 |
| FPU: | Integrated |
| CPU(s) enabled: | 68 cores, 1 chip, 68 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 |

Continued on next page

## Software

| | |
|---|---|
| Operating System: | SUSE Linux Enterprise Server 12 SP3 (x86_64) 4.4.70-2-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: | xfs |
| System State: | Run level 3 (multi-user) |

Continued on next page

| | | | |
|---|---|---|---|
| L3 Cache: | None | Base Pointers: | 32/64-bit |
| Other Cache: | None | Peak Pointers: | 32/64-bit |
| Memory: | 400 GB (6 x 64 GB 2Rx8 PC4-2400T-R, 8 x 2 GB 7200 MHz MCDRAM) | Other Software: | None |
| Disk Subsystem: | 1 x 1 TB 7.2K SATA | | |
| Other Hardware: | None | | |

## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 272 | 8629 | 428 | 8516 | 434 | **8545** | **433** | 272 | 8629 | 428 | 8516 | 434 | **8545** | **433** |
| 416.gamess | 272 | 8230 | 647 | 7973 | 668 | **8040** | **662** | 272 | 7653 | 696 | **7710** | **691** | 7713 | 690 |
| 433.milc | 272 | 4206 | 594 | 4192 | 596 | **4195** | **595** | 272 | 4206 | 594 | 4192 | 596 | **4195** | **595** |
| 434.zeusmp | 272 | 2411 | 1030 | 2396 | 1030 | **2405** | **1030** | 272 | 2411 | 1030 | 2396 | 1030 | **2405** | **1030** |
| 435.gromacs | 272 | **1732** | **1120** | 1728 | 1120 | 1737 | 1120 | 272 | 1697 | 1140 | 1691 | 1150 | **1694** | **1150** |
| 436.cactusADM | 272 | 2233 | 1460 | 2244 | 1450 | **2238** | **1450** | 272 | 2233 | 1460 | 2244 | 1450 | **2238** | **1450** |
| 437.leslie3d | 272 | 3876 | 660 | **3853** | **664** | 3825 | 669 | 272 | 3876 | 660 | **3853** | **664** | 3825 | 669 |
| 444.namd | 272 | 2404 | 907 | **2401** | **908** | 2399 | 909 | 272 | 2313 | 943 | **2313** | **943** | 2309 | 945 |
| 447.dealII | 272 | 2510 | 1240 | 2433 | 1280 | **2491** | **1250** | 272 | 2510 | 1240 | 2433 | 1280 | **2491** | **1250** |
| 450.soplex | 272 | 4221 | 537 | **4000** | **567** | 3861 | 588 | 272 | **3673** | **618** | 3822 | 594 | 3258 | 696 |
| 453.povray | 272 | **1619** | **894** | 1615 | 896 | 1633 | 886 | 272 | **1319** | **1100** | 1315 | 1100 | 1324 | 1090 |
| 454.calculix | 272 | 1769 | 1270 | 1765 | 1270 | **1767** | **1270** | 272 | 1769 | 1270 | 1765 | 1270 | **1767** | **1270** |
| 459.GemsFDTD | 272 | 10167 | 284 | **10124** | **285** | 10119 | 285 | 272 | 10167 | 284 | **10124** | **285** | 10119 | 285 |
| 465.tonto | 272 | 2865 | 934 | **2862** | **935** | 2862 | 935 | 272 | 2669 | 1000 | 2686 | 996 | **2679** | **999** |
| 470.lbm | 272 | **6041** | **619** | 6040 | 619 | 6050 | 618 | 272 | **6041** | **619** | 6040 | 619 | 6050 | 618 |
| 481.wrf | 272 | **2565** | **1180** | 2520 | 1210 | 2578 | 1180 | 272 | **2565** | **1180** | 2520 | 1210 | 2578 | 1180 |
| 482.sphinx3 | 272 | **4491** | **1180** | 4500 | 1180 | 4406 | 1200 | 272 | **4491** | **1180** | 4500 | 1180 | 4406 | 1200 |

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

```
BIOS settings:
Virtualization Technology disabled
System Profile set to Custom
```

Continued on next page

## Platform Notes (Continued)

```
CPU Performance set to Maximum Performance
C States set to autonomous
C1E disabled
Uncore Frequency set to Dynamic
Energy Efficiency Policy set to Performance
Memory Patrol Scrub disabled
CPU Interconnect Bus Link Power Management disabled
PCI ASPM L1 Link Power Management disabled
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on linux-1j62 Mon Jul  3 13:57:57 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/cpu2006/Docs/config.html#sysinfo

From /proc/cpuinfo
   model name : Intel(R) Xeon Phi(TM) CPU 7250 @ 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 8 9 10 11 12 13 14 15 16 17 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
   cache size : 1024 KB

From /proc/meminfo
   MemTotal:       396134540 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
   SuSE-release:
      SUSE Linux Enterprise Server 12 (x86_64)
      VERSION = 12
      PATCHLEVEL = 3
      # 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-SP3"
      VERSION_ID="12.3"
      PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
      ID="sles"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:12:sp3"
```

Continued on next page

## Platform Notes (Continued)

```
uname -a:
   Linux linux-1j62 4.4.70-2-default #1 SMP Wed Jun 7 15:12:06 UTC 2017
   (4502c76) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jun 30 18:29

SPEC is set to: /root/cpu2006-1.2
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sdb1      xfs   930G  523G  407G  57% /
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.

  BIOS Dell Inc. 1.3.0 05/12/2017
  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 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
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

Continued on next page

## Peak Compiler Invocation (Continued)

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

Continued on next page

## Peak Optimization Flags (Continued)

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

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/Dell-Platform-Flags-PowerEdge14G-revC.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/Dell-Platform-Flags-PowerEdge14G-revC.xml

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

Tested with SPEC CPU2006 v1.2.
Report generated on Wed Aug 23 13:13:34 2017 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 22 August 2017.