# SPEC® CFP2006 Result

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## Dell Inc.

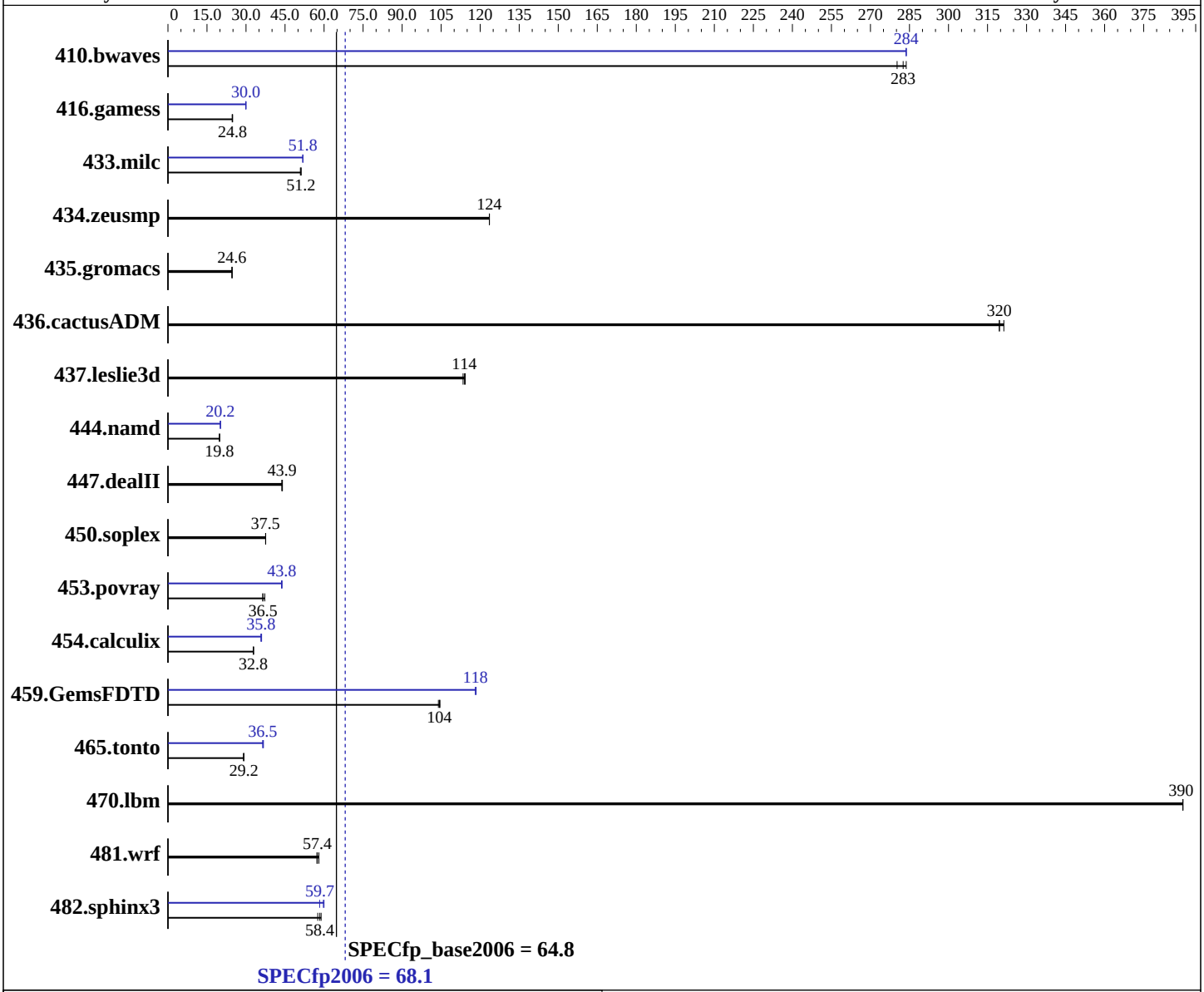
PowerEdge R520 (Intel Xeon E5-2450, 2.10 GHz)

SPECfp®2006 = 68.1

SPECfp_base2006 = 64.8

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

**Test date:** Mar-2012
**Hardware Availability:** May-2012
**Software Availability:** Feb-2012




## Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E5-2450 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 2.90 GHz |
| CPU MHz: | 2100 |
| FPU: | Integrated |
| CPU(s) enabled: | 16 cores, 2 chips, 8 cores/chip, 2 threads/core |
| CPU(s) orderable: | 1,2 chip |
| Primary Cache: | 32 KB I + 32 KB D on chip per core |
| Secondary Cache: | 256 KB I+D on chip per core |

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## Software

| | |
|---|---|
| Operating System: | SUSE Linux Enterprise Server 11 SP2 (x86_64) 3.0.13-0.9-default |
| Compiler: | C/C++: Version 12.1.0.225 of Intel C++ Studio XE for Linux;<br>Fortran: Version 12.1.0.225 of Intel Fortran Studio XE for Linux |
| Auto Parallel: | Yes |
| File System: | ext3 |
| System State: | Run level 3 (add definition here) |

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| | |
|---|---|
| L3 Cache: | 20 MB I+D on chip per chip |
| Other Cache: | None |
| Memory: | 48 GB (6 x 8 GB 2Rx4 PC3-12800R-11, ECC) |
| Disk Subsystem: | 2 x 600 GB 15000 RPM SAS, RAID 1 |
| Other Hardware: | None |

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

## Results Table

| Benchmark | Base | | | | | | Peak | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 48.5 | 280 | **48.1** | **283** | 47.9 | 284 | **47.9** | **284** | 47.9 | 284 | 47.9 | 284 |
| 416.gamess | 794 | 24.7 | 788 | 24.8 | **790** | **24.8** | 655 | 29.9 | 653 | 30.0 | **653** | **30.0** |
| 433.milc | 180 | 50.9 | **179** | **51.2** | 179 | 51.2 | **177** | **51.8** | 177 | 51.8 | 177 | 51.9 |
| 434.zeusmp | 73.7 | 124 | **73.7** | **124** | 73.7 | 124 | 73.7 | 124 | **73.7** | **124** | 73.7 | 124 |
| 435.gromacs | **290** | **24.6** | 290 | 24.7 | 290 | 24.6 | **290** | **24.6** | 290 | 24.7 | 290 | 24.6 |
| 436.cactusADM | 37.4 | 320 | 37.2 | 321 | **37.4** | **320** | 37.4 | 320 | 37.2 | 321 | **37.4** | **320** |
| 437.leslie3d | 82.3 | 114 | 82.9 | 113 | **82.5** | **114** | 82.3 | 114 | 82.9 | 113 | **82.5** | **114** |
| 444.namd | **405** | **19.8** | 405 | 19.8 | 405 | 19.8 | **398** | **20.2** | 398 | 20.2 | 398 | 20.2 |
| 447.dealII | 261 | 43.8 | 260 | 44.0 | **261** | **43.9** | 261 | 43.8 | 260 | 44.0 | **261** | **43.9** |
| 450.soplex | 222 | 37.6 | **222** | **37.5** | 222 | 37.5 | 222 | 37.6 | **222** | **37.5** | 222 | 37.5 |
| 453.povray | 143 | 37.2 | 146 | 36.4 | **146** | **36.5** | **121** | **43.8** | 122 | 43.6 | 121 | 43.8 |
| 454.calculix | 251 | 32.8 | **251** | **32.8** | 251 | 32.9 | 229 | 36.0 | **230** | **35.8** | 231 | 35.8 |
| 459.GemsFDTD | 101 | 105 | 102 | 104 | **102** | **104** | **89.8** | **118** | 89.8 | 118 | 89.6 | 118 |
| 465.tonto | 339 | 29.0 | **338** | **29.2** | 337 | 29.2 | 268 | 36.7 | **270** | **36.5** | 270 | 36.5 |
| 470.lbm | 35.2 | 390 | **35.2** | **390** | 35.2 | 390 | 35.2 | 390 | **35.2** | **390** | 35.2 | 390 |
| 481.wrf | 195 | 57.3 | **194** | **57.4** | 192 | 58.0 | 195 | 57.3 | **194** | **57.4** | 192 | 58.0 |
| 482.sphinx3 | **334** | **58.4** | 331 | 58.9 | 339 | 57.6 | 334 | 58.3 | **326** | **59.7** | 325 | 60.0 |

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

## Operating System Notes

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

## Platform Notes

```
CPU Power Management set to Maximum Performance
Memory Frequency set to Maximum Performance
Turbo Boost set to Enabled
C States/C1E set to Enabled
Sysinfo program /root/CPU2006-1.2/config/sysinfo.rev6800
$Rev: 6800 $ $Date:: 2011-10-11 #$ 6f2ebdff5032aaa42e583f96b07f99d3
running on silk-2p Tue Mar  6 17:19:43 2012

This section contains SUT (System Under Test) info as seen by
some common utilities.  To remove or add to this section, see:
```

Continued on next page

## Platform Notes (Continued)

```
      http://www.spec.org/cpu2006/Docs/config.html#sysinfo

    From /proc/cpuinfo
       model name : Intel(R) Xeon(R) CPU E5-2450 0 @ 2.10GHz
          2 "physical id"s (chips)
          32 "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 : 8
          siblings  : 16
          physical 0: cores 0 1 2 3 4 5 6 7
          physical 1: cores 0 1 2 3 4 5 6 7
       cache size : 20480 KB

    From /proc/meminfo
       MemTotal:       49381468 kB
       HugePages_Total:       0
       Hugepagesize:       2048 kB

    /usr/bin/lsb_release -d
       SUSE Linux Enterprise Server 11 (x86_64)

    From /etc/*release* /etc/*version*
       SuSE-release:
          SUSE Linux Enterprise Server 11 (x86_64)
          VERSION = 11
          PATCHLEVEL = 2

    uname -a:
       Linux silk-2p 3.0.13-0.9-default #1 SMP Mon Jan 16 17:33:03 UTC 2012
       (54ddfaf) x86_64 x86_64 x86_64 GNU/Linux

    run-level 3 Mar 6 10:23 last=S

    SPEC is set to: /root/CPU2006-1.2
       Filesystem     Type  Size  Used Avail Use% Mounted on
       /dev/sda1      ext3  443G  9.1G  412G   3% /

    Additional information from dmidecode:

    (End of data from sysinfo program)
```

## General Notes

```
  Environment variables set by runspec before the start of the run:
  KMP_AFFINITY = "granularity=fine,scatter"
  LD_LIBRARY_PATH = "/root/CPU2006-1.2/libs/32:/root/CPU2006-1.2/libs/64"
  OMP_NUM_THREADS = "16"

   Binaries compiled on a system with 1x Core i7-860 CPU + 8GB
```

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## General Notes (Continued)

```
memory using RHEL5.5
Transparent Huge Pages disabled with:
echo never  > /sys/kernel/mm/transparent_hugepage/enabled
Filesystem page cache cleared with:
echo 1>       /proc/sys/vm/drop_caches
The Dell PowerEdge R520 and
the Bull NovaScale R450 F3 models are electronically equivalent.
The results have been measured on a Dell PowerEdge R520 model
```

## 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:
```
-xAVX -ipo -O3 -no-prec-div -static -parallel -opt-prefetch
-ansi-alias
```

C++ benchmarks:
```
-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch -ansi-alias
```

Fortran benchmarks:
```
-xAVX -ipo -O3 -no-prec-div -static -parallel -opt-prefetch
```

Benchmarks using both Fortran and C:
```
-xAVX -ipo -O3 -no-prec-div -static -parallel -opt-prefetch
-ansi-alias
```

## Peak Compiler Invocation

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

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

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

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

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

433.milc: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -static -auto-ilp32 -ansi-alias

470.lbm: basepeak = yes

482.sphinx3: -xAVX -ipo -O3 -no-prec-div -unroll2 -ansi-alias -parallel

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## Peak Optimization Flags (Continued)

C++ benchmarks:

444.namd: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -fno-alias -auto-ilp32

447.dealII: basepeak = yes

450.soplex: basepeak = yes

453.povray: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll4 -ansi-alias

Fortran benchmarks:

410.bwaves: -xAVX -ipo -O3 -no-prec-div -opt-prefetch -parallel -static

416.gamess: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll2 -inline-level=0 -scalar-rep- -static

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll2 -inline-level=0 -opt-prefetch -parallel

465.tonto: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -inline-calloc -opt-malloc-options=3 -auto -unroll4

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes

436.cactusADM: basepeak = yes

454.calculix: -xAVX -ipo -O3 -no-prec-div -auto-ilp32 -ansi-alias

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-ic12.1-official-linux64.20111122.html
http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revA.20120410.00.html

You can also download the XML flags sources by saving the following links:

`http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20111122.xml`
`http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revA.20120410.00.xml`


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

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