# SPEC® CFP2006 Result

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## Dell Inc.

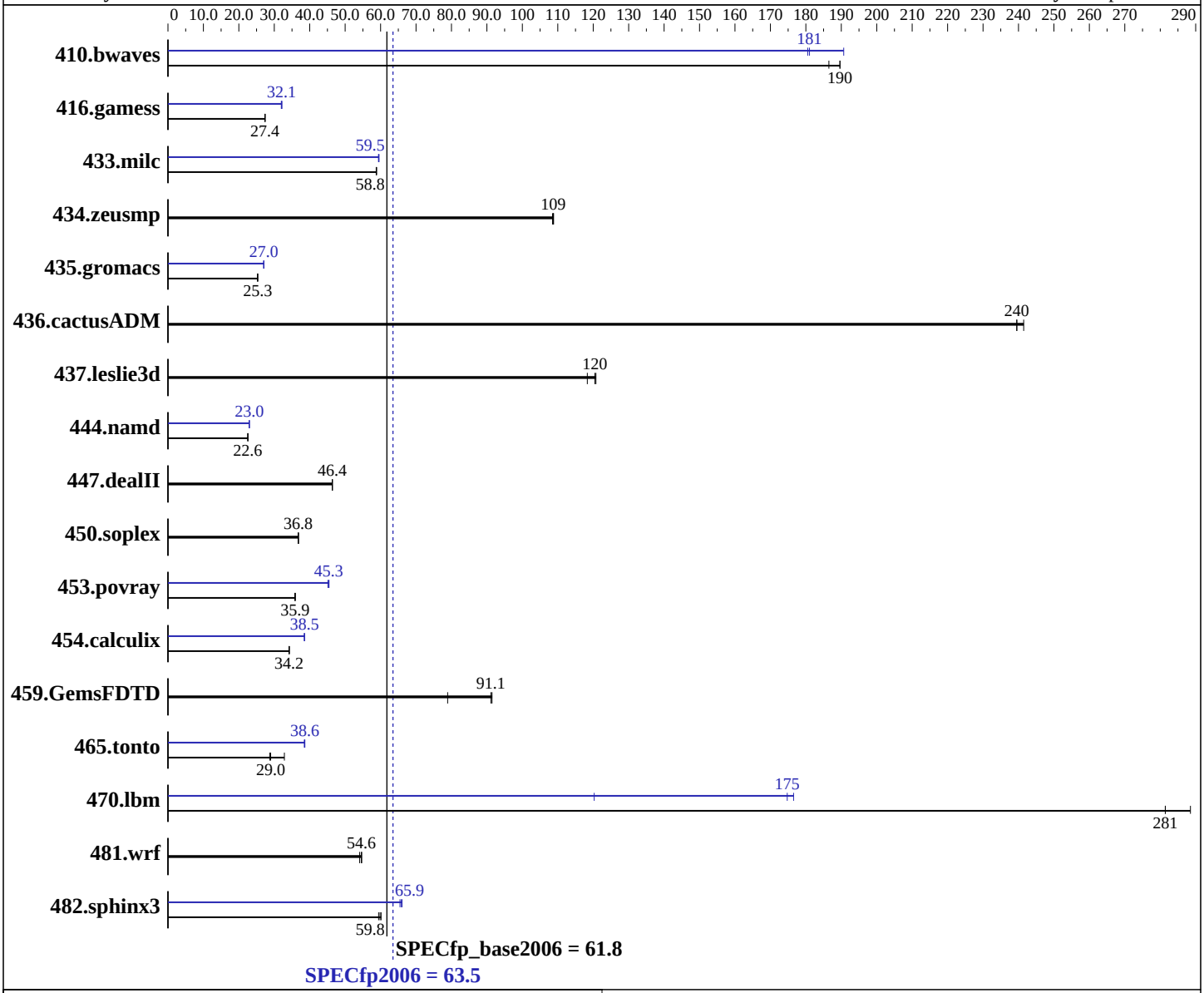
PowerEdge R610 (Intel Xeon X5687, 3.60 GHz)

SPECfp®2006 = 63.5

SPECfp_base2006 = 61.8

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

**Test date:** Feb-2011
**Hardware Availability:** Feb-2011
**Software Availability:** Apr-2011




## Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon X5687 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 3.86 GHz |
| CPU MHz: | 3600 |
| FPU: | Integrated |
| CPU(s) enabled: | 8 cores, 2 chips, 4 cores/chip |
| CPU(s) orderable: | 1,2 chips |
| 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 SP1 (x86_64), Kernel 2.6.32.12-0.7-default |
| Compiler: | Intel C++ and Fortran Intel 64 Compiler XE for applications running on Intel 64 Version 12.0 Update 3 |
| Auto Parallel: | Yes |
| File System: | ext3 |
| System State: | Run level 3 (multi-user) |
| Base Pointers: | 64-bit |

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| | |
|---|---|
| L3 Cache: | 12 MB I+D on chip per chip |
| Other Cache: | None |
| Memory: | 48 GB (12 x 4 GB 2Rx4 PC3-10600R-9, ECC) |
| Disk Subsystem: | 1 x 300 GB 15000 RPM SAS |
| Other Hardware: | None |

| | |
|---|---|
| Peak Pointers: | 32/64-bit |
| Other Software: | Binaries compiled on RHEL5.5 with binutils-2.17.50.0.6-14.el5 |

## Results Table

| Benchmark | Base | | | | | | Peak | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 72.9 | 186 | **71.7** | **190** | 71.7 | 190 | **75.1** | **181** | 75.3 | 181 | 71.3 | 191 |
| 416.gamess | 714 | 27.4 | 716 | 27.4 | **715** | **27.4** | 612 | 32.0 | 609 | 32.2 | **610** | **32.1** |
| 433.milc | **156** | **58.8** | 156 | 58.9 | 156 | 58.8 | 155 | 59.4 | 154 | 59.6 | **154** | **59.5** |
| 434.zeusmp | **83.7** | **109** | 83.7 | 109 | 83.9 | 109 | **83.7** | **109** | 83.7 | 109 | 83.9 | 109 |
| 435.gromacs | **282** | **25.3** | 283 | 25.2 | 282 | 25.4 | **264** | **27.0** | 264 | 27.0 | 264 | 27.1 |
| 436.cactusADM | **49.9** | **240** | 49.5 | 241 | 49.9 | 240 | **49.9** | **240** | 49.5 | 241 | 49.9 | 240 |
| 437.leslie3d | **78.0** | **120** | 77.8 | 121 | 79.4 | 118 | **78.0** | **120** | 77.8 | 121 | 79.4 | 118 |
| 444.namd | **356** | **22.6** | 356 | 22.5 | 355 | 22.6 | **349** | **23.0** | 349 | 23.0 | 349 | 22.9 |
| 447.dealII | **247** | **46.4** | 247 | 46.4 | 247 | 46.4 | **247** | **46.4** | 247 | 46.4 | 247 | 46.4 |
| 450.soplex | 226 | 36.9 | 227 | 36.7 | **227** | **36.8** | 226 | 36.9 | 227 | 36.7 | **227** | **36.8** |
| 453.povray | **148** | **35.9** | 148 | 36.0 | 149 | 35.8 | 117 | 45.5 | **117** | **45.3** | 118 | 45.1 |
| 454.calculix | 241 | 34.2 | **241** | **34.2** | 241 | 34.3 | 214 | 38.5 | **214** | **38.5** | 214 | 38.5 |
| 459.GemsFDTD | 116 | 91.4 | **116** | **91.1** | 134 | 78.9 | 116 | 91.4 | **116** | **91.1** | 134 | 78.9 |
| 465.tonto | **340** | **29.0** | 343 | 28.7 | 300 | 32.9 | **255** | **38.6** | 256 | 38.5 | 255 | 38.6 |
| 470.lbm | **48.8** | **281** | 48.8 | 281 | 47.6 | 289 | **78.6** | **175** | 114 | 120 | 77.8 | 177 |
| 481.wrf | **205** | **54.6** | 206 | 54.1 | 204 | 54.7 | **205** | **54.6** | 206 | 54.1 | 204 | 54.7 |
| 482.sphinx3 | **326** | **59.8** | 324 | 60.1 | 328 | 59.4 | 295 | 66.0 | **296** | **65.9** | 298 | 65.5 |

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

## Operating System Notes

```
 'ulimit -s unlimited' was used to set the stacksize to unlimited prior to run
'mount -t hugetlbfs nodev /mnt/hugepages' was used to enable large pages
echo 900 > /proc/sys/vm/nr_hugepages
export HUGETLB_MORECORE=yes
export LD_PRELOAD=/usr/lib64/libhugetlbfs.so
```

## Platform Notes

```
 BIOS Settings:
 Power Management = Maximum Performance (Default = Active Power Controller)
 Data Reuse = Disabled (Default = Enabled)
 Logical Processor = Disabled (Default = Enabled)
```

## General Notes

```
OMP_NUM_THREADS set to number of cores
The Dell PowerEdge R610 and
the Bull NovaScale R440 F2 models are electronically equivalent.
The results have been measured on a Dell PowerEdge R610 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:
-xSSE4.2 -ipo -O3 -no-prec-div -static -parallel -opt-prefetch
-ansi-alias

Continued on next page

## Base Optimization Flags (Continued)

C++ benchmarks:
`-xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch -ansi-alias`

Fortran benchmarks:
`-xSSE4.2 -ipo -O3 -no-prec-div -static -parallel -opt-prefetch`

Benchmarks using both Fortran and C:
`-xSSE4.2 -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: `-xSSE4.2`(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: `-xSSE4.2`(pass 2) `-prof-gen`(pass 1) `-ipo`(pass 2) `-O3`(pass 2) `-no-prec-div`(pass 2) `-prof-use`(pass 2) `-parallel -ansi-alias -static -auto-ilp32`

482.sphinx3: `-xSSE4.2 -ipo -O3 -no-prec-div -unroll2 -ansi-alias -parallel`

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## Peak Optimization Flags (Continued)

C++ benchmarks:

444.namd: -xSSE4.2(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: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll4 -ansi-alias -B /usr/share/libhugetlbfs/ -Wl,-melf_x86_64 -Wl,-hugetlbfs-link=BDT

Fortran benchmarks:

410.bwaves: -xSSE4.2 -ipo -O3 -no-prec-div -opt-prefetch -parallel -static

416.gamess: -xSSE4.2(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: basepeak = yes

465.tonto: -xSSE4.2(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 -B /usr/share/libhugetlbfs/ -Wl,-melf_x86_64 -Wl,-hugetlbfs-link=BDT

Benchmarks using both Fortran and C:

435.gromacs: -xSSE4.2(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

436.cactusADM: basepeak = yes

454.calculix: -xSSE4.2 -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-ic12.0-linux64-revB.html
http://www.spec.org/cpu2006/flags/Intel-Linux64-Platform.20110308.html

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

http://www.spec.org/cpu2006/flags/Intel-ic12.0-linux64-revB.xml
http://www.spec.org/cpu2006/flags/Intel-Linux64-Platform.20110308.xml


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