# SPEC® CFP2006 Result

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## Dell Inc.

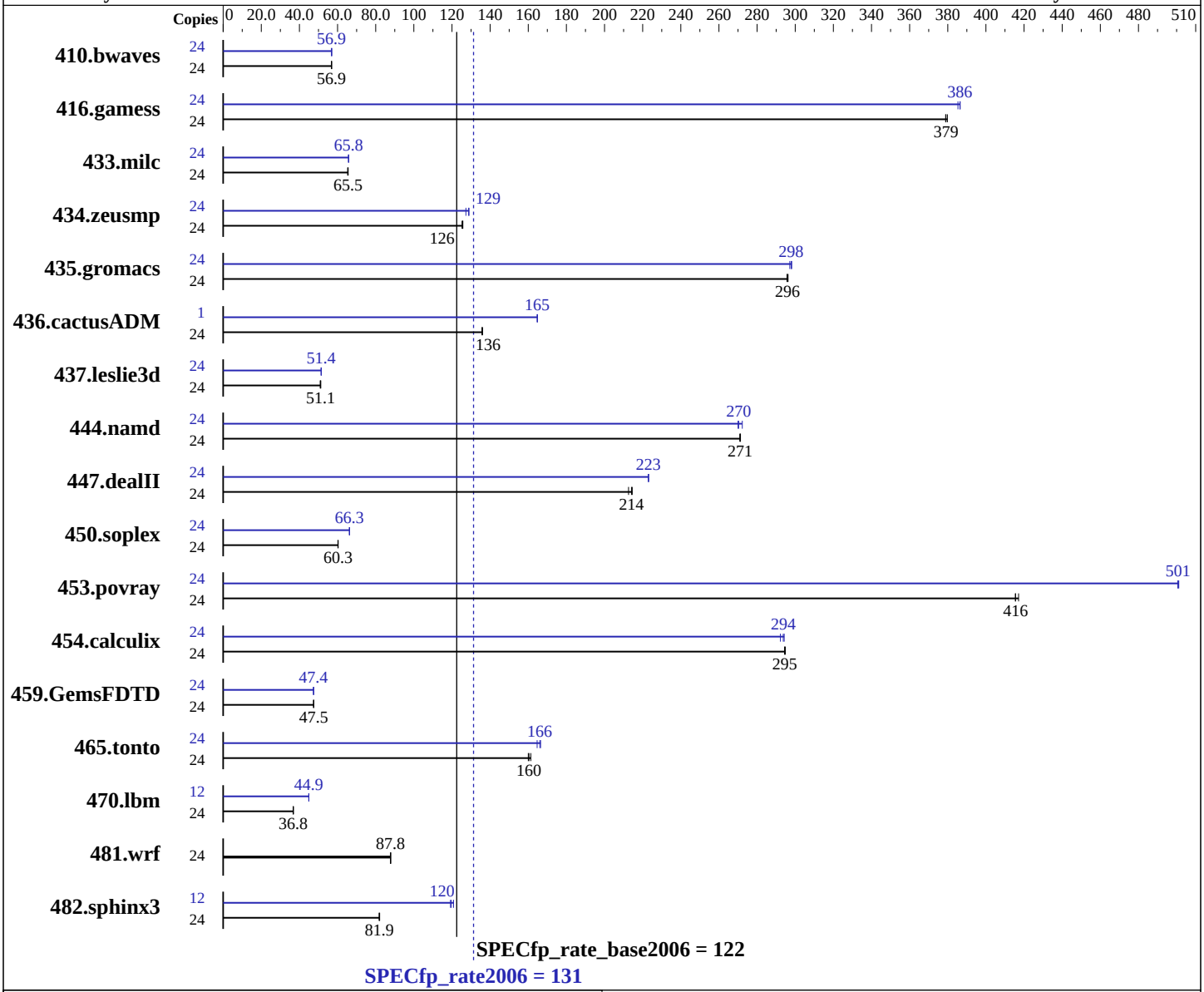
PowerEdge R900 (Intel Xeon L7455, 2.13 GHz)

SPECfp®_rate2006 = 131

SPECfp_rate_base2006 = 122

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

**Test date:** Sep-2008
**Hardware Availability:** Sep-2008
**Software Availability:** Nov-2008




## Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon L7455 |
| CPU Characteristics: | |
| CPU MHz: | 2133 |
| FPU: | Integrated |
| CPU(s) enabled: | 24 cores, 4 chips, 6 cores/chip |
| CPU(s) orderable: | 2,4 chips |
| Primary Cache: | 32 KB I + 32 KB D on chip per core |
| Secondary Cache: | 9 MB I+D on chip per chip, 3 MB shared / 2 cores |

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## Software

| | |
|---|---|
| Operating System: | SUSE Linux Enterprise Server 10 (x86_64) SP2, Kernel 2.6.16-60.0.21-smp |
| Compiler: | Intel C++ and Fortran Compiler 11.0 for Linux Build 20080730 Package ID: l_cc_b_11.0.042, l_fc_b_11.0.042 |
| Auto Parallel: | Yes |
| File System: | ReiserFS |
| 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: 64 GB (16x4GB DDR2-667 FBDIMM)
Disk Subsystem: 2x36GB SAS 15000 RPM (RAID-0) for OS, 1x73GB SAS 10000 RPM for Benchmark
Other Hardware: None

Peak Pointers: 32/64-bit
Other Software: Binutils 2.18.50.0.7.20080502

## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 24 | 5742 | 56.8 | **5736** | **56.9** | 5736 | 56.9 | 24 | 5735 | 56.9 | 5733 | 56.9 | **5735** | **56.9** |
| 416.gamess | 24 | 1240 | 379 | 1237 | 380 | **1240** | **379** | 24 | 1219 | 385 | 1216 | 386 | **1216** | **386** |
| 433.milc | 24 | 3375 | 65.3 | **3364** | **65.5** | 3362 | 65.5 | 24 | 3349 | 65.8 | 3350 | 65.8 | **3350** | **65.8** |
| 434.zeusmp | 24 | 1744 | 125 | 1738 | 126 | **1738** | **126** | 24 | **1697** | **129** | 1694 | 129 | 1716 | 127 |
| 435.gromacs | 24 | **579** | **296** | 580 | 296 | 578 | 296 | 24 | **575** | **298** | 575 | 298 | 577 | 297 |
| 436.cactusADM | 24 | 2113 | 136 | 2108 | 136 | **2112** | **136** | 1 | 72.5 | 165 | **72.5** | **165** | 72.5 | 165 |
| 437.leslie3d | 24 | 4434 | 50.9 | **4414** | **51.1** | 4408 | 51.2 | 24 | 4388 | 51.4 | **4388** | **51.4** | 4387 | 51.4 |
| 444.namd | 24 | 710 | 271 | **710** | **271** | 709 | 271 | 24 | **712** | **270** | 713 | 270 | 707 | 272 |
| 447.dealII | 24 | **1282** | **214** | 1292 | 213 | 1280 | 215 | 24 | **1231** | **223** | 1231 | 223 | 1231 | 223 |
| 450.soplex | 24 | 3326 | 60.2 | 3320 | 60.3 | **3321** | **60.3** | 24 | 3020 | 66.3 | 3023 | 66.2 | **3021** | **66.3** |
| 453.povray | 24 | 306 | 417 | **307** | **416** | 307 | 415 | 24 | 255 | 501 | **255** | **501** | 255 | 501 |
| 454.calculix | 24 | **672** | **295** | 672 | 294 | 672 | 295 | 24 | 678 | 292 | **674** | **294** | 673 | 294 |
| 459.GemsFDTD | 24 | 5371 | 47.4 | **5365** | **47.5** | 5361 | 47.5 | 24 | 5370 | 47.4 | 5372 | 47.4 | **5371** | **47.4** |
| 465.tonto | 24 | 1464 | 161 | 1476 | 160 | **1472** | **160** | 24 | 1434 | 165 | 1419 | 166 | **1422** | **166** |
| 470.lbm | 24 | 8978 | 36.7 | **8966** | **36.8** | 8958 | 36.8 | 12 | **3670** | **44.9** | 3670 | 44.9 | 3668 | 44.9 |
| 481.wrf | 24 | **3052** | **87.8** | 3051 | 87.9 | 3055 | 87.7 | 24 | **3052** | **87.8** | 3051 | 87.9 | 3055 | 87.7 |
| 482.sphinx3 | 24 | **5711** | **81.9** | 5718 | 81.8 | 5699 | 82.1 | 12 | 1936 | 121 | **1954** | **120** | 1962 | 119 |

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

## Submit Notes

```
The config file option 'submit' was used.
For peak modules using 1/2 the number of available cores, each
copy was assigned to a single L2 cache using a Perl script;
the script can be found in the flags description file.
```

## Operating System Notes

```
'ulimit -s unlimited' was used to set the stack size to unlimited prior to run
```

## Platform Notes

```
BIOS Settings:
Hardware Prefetcher = Disabled (Default = Enabled)
Adjacent Cache Line Prefetch = Disabled (Default = Enabled)
High Bandwidth = Enabled (Default = Disabled)
```

## General Notes

```
All benchmarks compiled in 64-bit mode except 437.leslie3d, 450.soplex
and 482.sphinx3, at peak, are compiled in 32-bit mode
taskset was used to bind processes to cores except
for 436.cactusADM peak
OMP_NUM_THREADS set to number of processors
KMP_AFFINITY set to "physical,0"
KMP_STACKSIZE set to 64M
```

# Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
icc ifort

# 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

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## Base Portability Flags (Continued)

481.wrf: `-DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX`
482.sphinx3: `-DSPEC_CPU_LP64`

## Base Optimization Flags

C benchmarks:
`-xSSE4.1 -ipo -O3 -no-prec-div -static -opt-prefetch`

C++ benchmarks:
`-xSSE4.1 -ipo -O3 -no-prec-div -static -opt-prefetch`

Fortran benchmarks:
`-xSSE4.1 -ipo -O3 -no-prec-div -static -opt-prefetch`

Benchmarks using both Fortran and C:
`-xSSE4.1 -ipo -O3 -no-prec-div -static -opt-prefetch`

## Peak Compiler Invocation

C benchmarks (except as noted below):
`icc`

482.sphinx3: `/opt/intel/Compiler/11.0/042/bin/ia32/icc -L/opt/intel/Compiler/11.0/042/ipp/ia32/lib -I/opt/intel/Compiler/11.0/042/ipp/ia32/include`

C++ benchmarks (except as noted below):
`icpc`

450.soplex: `/opt/intel/Compiler/11.0/042/bin/ia32/icpc -L/opt/intel/Compiler/11.0/042/ipp/ia32/lib -I/opt/intel/Compiler/11.0/042/ipp/ia32/include`

Fortran benchmarks (except as noted below):
`ifort`

437.leslie3d: `/opt/intel/Compiler/11.0/042/bin/ia32/ifort -L/opt/intel/Compiler/11.0/042/ipp/ia32/lib -I/opt/intel/Compiler/11.0/042/ipp/ia32/include`

Benchmarks using both Fortran and C:
`icc ifort`

## 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
444.namd: -DSPEC_CPU_LP64
447.dealII: -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

## Peak Optimization Flags

C benchmarks:

433.milc: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3
-no-prec-div -static -fno-alias

470.lbm: -xSSE4.1 -ipo -O3 -no-prec-div -static -opt-prefetch
-auto-ilp32

482.sphinx3: -xSSE4.1 -ipo -O3 -no-prec-div -static -unroll2

C++ benchmarks:

444.namd: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3
-no-prec-div -static -fno-alias -auto-ilp32

447.dealII: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3
-no-prec-div -static -unroll2 -ansi-alias -scalar-rep-

450.soplex: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3
-no-prec-div -static -opt-malloc-options=3

453.povray: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3
-no-prec-div -static -unroll4 -ansi-alias

Fortran benchmarks:

410.bwaves: -xSSE4.1 -ipo -O3 -no-prec-div -static -opt-prefetch

416.gamess: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3
-no-prec-div -static -unroll2 -Ob0 -ansi-alias
-scalar-rep-

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# Peak Optimization Flags (Continued)

434.zeusmp: `-prof-gen`(pass 1) `-prof-use`(pass 2) `-xSSE4.1 -ipo -O3 -no-prec-div -static`

437.leslie3d: `-prof-gen`(pass 1) `-prof-use`(pass 2) `-xSSE4.1 -ipo -O3 -no-prec-div -static -opt-malloc-options=3 -opt-prefetch`

459.GemsFDTD: `-prof-gen`(pass 1) `-prof-use`(pass 2) `-xSSE4.1 -ipo -O3 -no-prec-div -static -unroll2 -Ob0 -opt-prefetch`

465.tonto: `-prof-gen`(pass 1) `-prof-use`(pass 2) `-xSSE4.1 -ipo -O3 -no-prec-div -static -unroll4 -auto`

Benchmarks using both Fortran and C:

435.gromacs: `-prof-gen`(pass 1) `-prof-use`(pass 2) `-xSSE4.1 -ipo -O3 -no-prec-div -static -opt-prefetch -auto-ilp32`

436.cactusADM: `-prof-gen`(pass 1) `-prof-use`(pass 2) `-xSSE4.1 -ipo -O3 -no-prec-div -static -unroll2 -opt-prefetch -parallel -auto-ilp32`

454.calculix: `-xSSE4.1 -ipo -O3 -no-prec-div -static -auto-ilp32`

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-ic11.0-fp-linux64-revA.20090713.05.html
http://www.spec.org/cpu2006/flags/Intel-Linux64-Platform.20090713.02.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic11.0-fp-linux64-revA.20090713.05.xml
http://www.spec.org/cpu2006/flags/Intel-Linux64-Platform.20090713.02.xml


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Tested with SPEC CPU2006 v1.1.
Report generated on Tue Jul 22 22:16:04 2014 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 14 October 2008.