



SPEC[®] CFP2006 Result

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Dell Inc.

SPECfp[®]2006 = 51.7

PowerEdge R910 (Intel Xeon E7-4860, 2.27 GHz)

SPECfp_base2006 = 48.0

CPU2006 license: 55

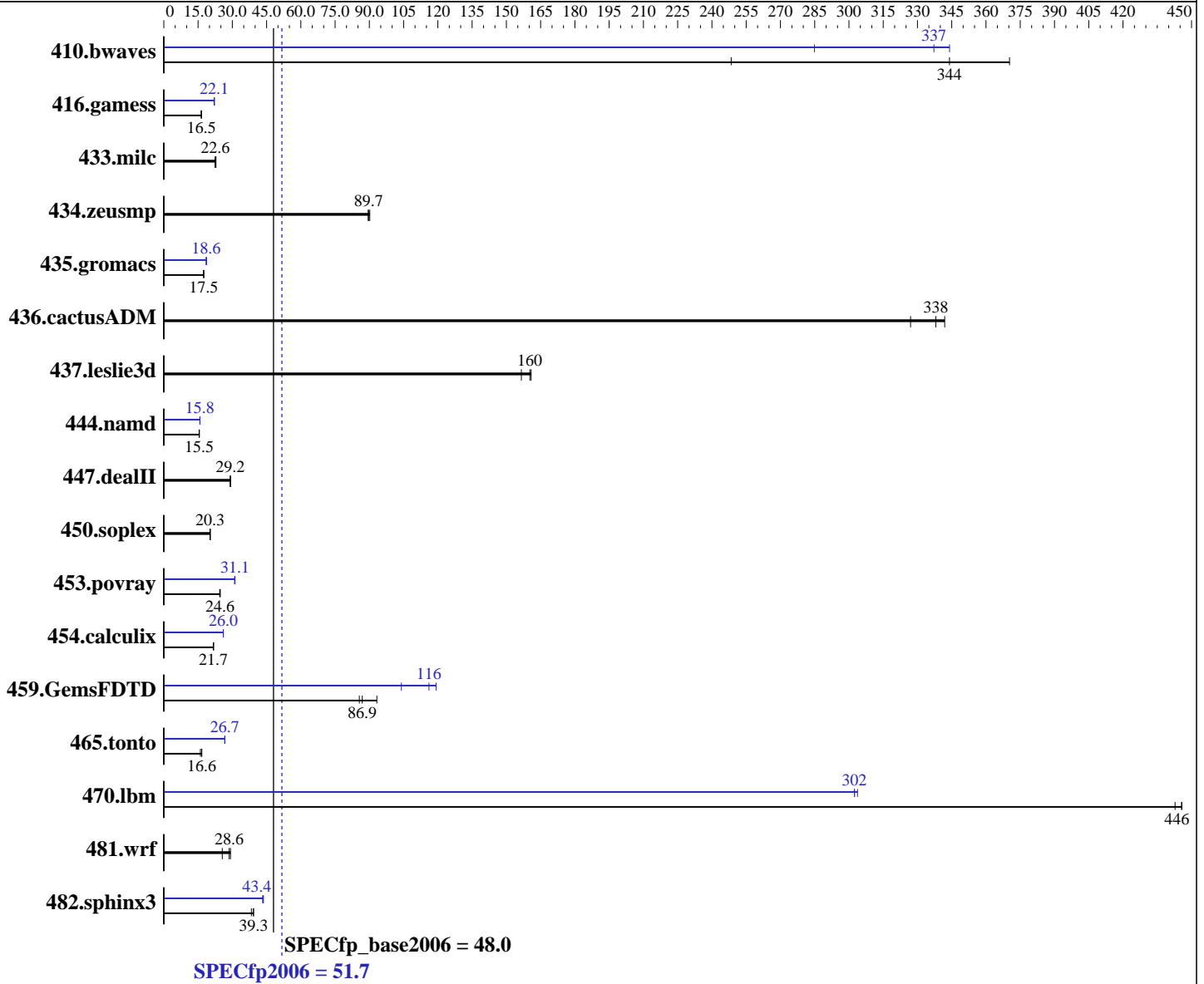
Test date: Mar-2011

Test sponsor: Dell Inc.

Hardware Availability: Apr-2011

Tested by: Dell Inc.

Software Availability: Apr-2011



Hardware

CPU Name: Intel Xeon E7-4860
 CPU Characteristics: Intel Turbo Boost Technology up to 2.67 GHz
 CPU MHz: 2267
 FPU: Integrated
 CPU(s) enabled: 40 cores, 4 chips, 10 cores/chip
 CPU(s) orderable: 2,4 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: 24 MB I+D on chip per chip
Other Cache: None
Memory: 512 GB (64 x 8 GB 4Rx8 PC3-8500R-7, ECC)
Disk Subsystem: 1 x 500 GB 7200 RPM SAS 6Gb
Other Hardware: None

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 | 54.7 | 248 | 36.7 | 370 | 39.5 | 344 | 40.3 | 337 | 47.7 | 285 | 39.5 | 344 |
| 416.gamess | 1185 | 16.5 | 1186 | 16.5 | 1199 | 16.3 | 886 | 22.1 | 885 | 22.1 | 888 | 22.1 |
| 433.milc | 406 | 22.6 | 402 | 22.8 | 409 | 22.5 | 406 | 22.6 | 402 | 22.8 | 409 | 22.5 |
| 434.zeusmp | 102 | 89.5 | 101 | 89.7 | 101 | 90.2 | 102 | 89.5 | 101 | 89.7 | 101 | 90.2 |
| 435.gromacs | 409 | 17.5 | 409 | 17.5 | 409 | 17.5 | 384 | 18.6 | 383 | 18.6 | 384 | 18.6 |
| 436.cactusADM | 36.5 | 327 | 34.9 | 342 | 35.4 | 338 | 36.5 | 327 | 34.9 | 342 | 35.4 | 338 |
| 437.leslie3d | 58.6 | 160 | 60.0 | 157 | 58.4 | 161 | 58.6 | 160 | 60.0 | 157 | 58.4 | 161 |
| 444.namd | 517 | 15.5 | 517 | 15.5 | 516 | 15.5 | 507 | 15.8 | 507 | 15.8 | 507 | 15.8 |
| 447.dealII | 393 | 29.1 | 392 | 29.2 | 392 | 29.2 | 393 | 29.1 | 392 | 29.2 | 392 | 29.2 |
| 450.soplex | 410 | 20.3 | 412 | 20.3 | 411 | 20.3 | 410 | 20.3 | 412 | 20.3 | 411 | 20.3 |
| 453.povray | 217 | 24.5 | 215 | 24.7 | 216 | 24.6 | 171 | 31.1 | 172 | 31.0 | 171 | 31.2 |
| 454.calculix | 380 | 21.7 | 378 | 21.8 | 380 | 21.7 | 317 | 26.1 | 317 | 26.0 | 317 | 26.0 |
| 459.GemsFDTD | 122 | 86.9 | 114 | 93.3 | 124 | 85.6 | 102 | 104 | 89.0 | 119 | 91.4 | 116 |
| 465.tonto | 591 | 16.6 | 614 | 16.0 | 594 | 16.6 | 369 | 26.7 | 368 | 26.8 | 368 | 26.7 |
| 470.lbm | 31.0 | 443 | 30.8 | 446 | 30.8 | 446 | 45.4 | 302 | 45.2 | 304 | 45.4 | 302 |
| 481.wrf | 382 | 29.2 | 390 | 28.6 | 436 | 25.6 | 382 | 29.2 | 390 | 28.6 | 436 | 25.6 |
| 482.sphinx3 | 496 | 39.3 | 496 | 39.3 | 508 | 38.3 | 450 | 43.3 | 449 | 43.4 | 447 | 43.6 |

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)
Memory Interleaving = Enabled (Default = Disabled)



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General Notes

The Dell PowerEdge R910 and the Bull NovaScale R480 F2 models are electronically equivalent. The results have been measured on a Dell PowerEdge R910 model. OMP_NUM_THREADS set to number of cores
Binaries were compiled on RHEL5.5

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.deallI: -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

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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: basepeak = yes

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

C++ benchmarks:

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Peak Optimization Flags (Continued)

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: -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 -opt-prefetch -parallel
-B /usr/share/libhugetlbfs/ -Wl,-melf_x86_64 -Wl,-hugetlbfs-link=BDT

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



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

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