SPEC® CFP2006 Result
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IBM Corporation

IBM BladeCenter HX5 (Intel Xeon E7-2870)

$SPECfp^{®}2006 =$ 50.6

$SPECfp\_base2006 =$ 46.4

CPU2006 license: 11		**Test date:** Feb-2011
Test sponsor: IBM Corporation		**Hardware Availability:** May-2011
Tested by: IBM Corporation		**Software Availability:** Apr-2011

Benchmark results chart (scale 0–390):

- 410.bwaves: 227 / 209
- 416.gamess: 22.8 / 18.1
- 433.milc: 31.8
- 434.zeusmp: 95.9
- 435.gromacs: 19.6 / 18.4
- 436.cactusADM: 200
- 437.leslie3d: 118
- 444.namd: 16.7 / 16.4
- 447.dealII: 33.1
- 450.soplex: 27.0
- 453.povray: 25.9 / 21.0
- 454.calculix: 27.9 / 23.9
- 459.GemsFDTD: 90.5 / 73.8
- 465.tonto: 28.1 / 18.4
- 470.lbm: 290
- 481.wrf: 34.9
- 482.sphinx3: 46.1 / 41.6

SPECfp_base2006 = 46.4

SPECfp2006 = 50.6

Hardware

CPU Name:	Intel Xeon E7-2870
CPU Characteristics:	Intel Turbo Boost Technology up to 2.80 GHz
CPU MHz:	2400
FPU:	Integrated
CPU(s) enabled:	20 cores, 2 chips, 10 cores/chip, 2 threads/core
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

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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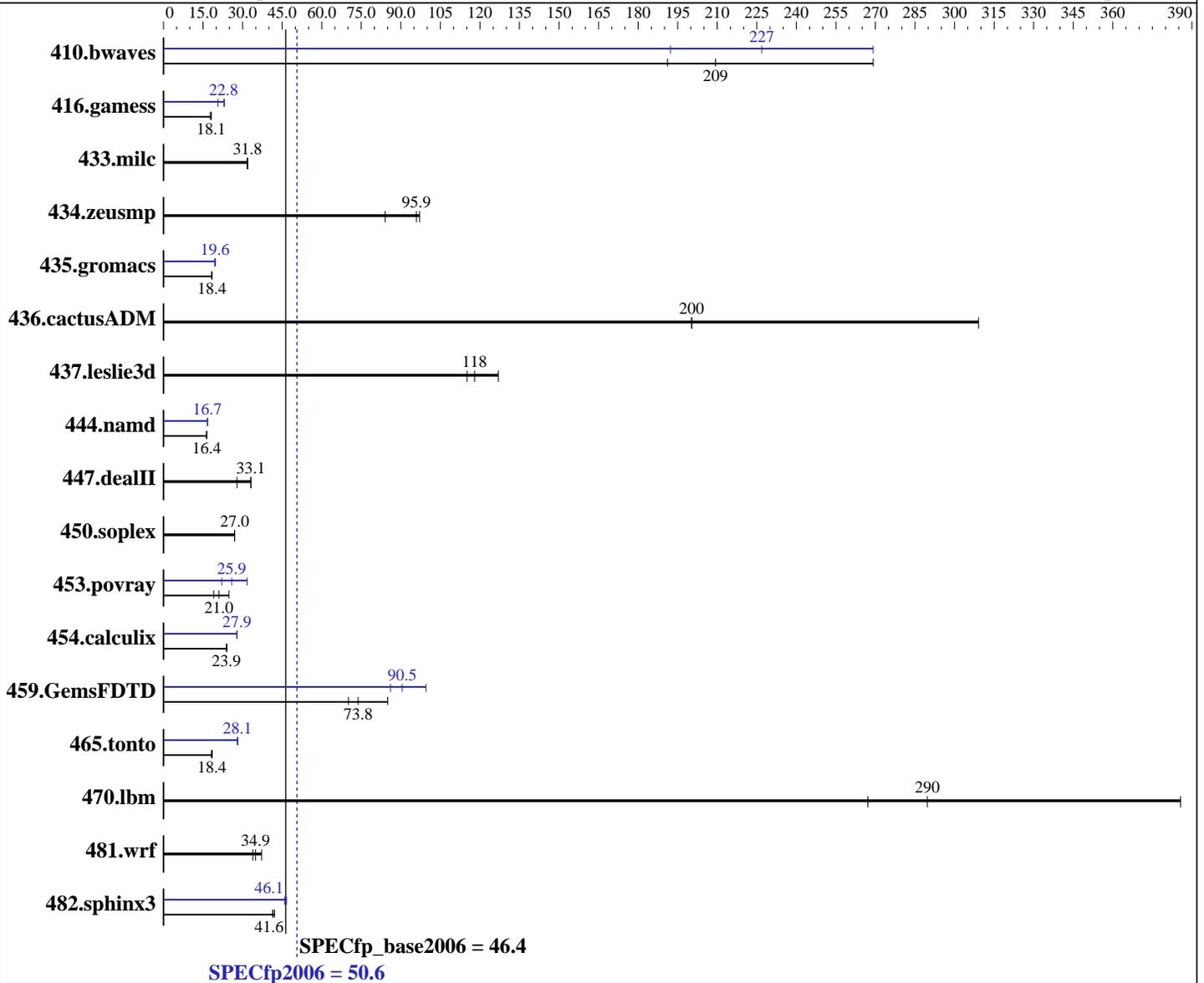| SPECfp2006 =	50.6
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L3 Cache:	30 MB I+D on chip per chip
Other Cache:	None
Memory:	128 GB (16 x 8 GB 4Rx8 PC3-8500R-7, ECC)
Disk Subsystem:	2 x 50 GB SSD, RAID 0
Other Hardware:	None
Peak Pointers:	32/64-bit
Other Software:	None

Results Table

Benchmark	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio
410.bwaves	50.5	269	**64.9**	**209**	71.1	191	70.7	192	50.5	269	**59.9**	**227**
416.gamess	**1084**	**18.1**	1104	17.7	1079	18.1	948	20.6	**857**	**22.8**	847	23.1
433.milc	289	31.8	288	31.9	**289**	**31.8**	289	31.8	288	31.9	**289**	**31.8**
434.zeusmp	93.7	97.1	108	84.0	**94.9**	**95.9**	93.7	97.1	108	84.0	**94.9**	**95.9**
435.gromacs	**389**	**18.4**	388	18.4	390	18.3	366	19.5	364	19.6	**364**	**19.6**
436.cactusADM	38.7	309	**59.7**	**200**	59.7	200	38.7	309	**59.7**	**200**	59.7	200
437.leslie3d	81.7	115	**79.7**	**118**	74.1	127	81.7	115	**79.7**	**118**	74.1	127
444.namd	490	16.4	492	16.3	**490**	**16.4**	**482**	**16.7**	482	16.7	482	16.7
447.dealII	410	27.9	**345**	**33.1**	345	33.2	410	27.9	**345**	**33.1**	345	33.2
450.soplex	309	27.0	**309**	**27.0**	309	27.0	309	27.0	**309**	**27.0**	309	27.0
453.povray	280	19.0	214	24.9	**253**	**21.0**	**206**	**25.9**	241	22.1	168	31.7
454.calculix	343	24.0	346	23.8	**345**	**23.9**	296	27.8	296	27.9	**296**	**27.9**
459.GemsFDTD	125	85.1	151	70.1	**144**	**73.8**	107	99.5	**117**	**90.5**	123	86.1
465.tonto	541	18.2	**536**	**18.4**	531	18.5	**350**	**28.1**	351	28.1	350	28.1
470.lbm	35.6	386	51.4	267	**47.4**	**290**	35.6	386	51.4	267	**47.4**	**290**
481.wrf	**320**	**34.9**	300	37.2	330	33.9	**320**	**34.9**	300	37.2	330	33.9
482.sphinx3	462	42.1	**469**	**41.6**	471	41.4	418	46.7	424	46.0	**423**	**46.1**

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
echo 1 > /proc/sys/vm/zone_reclaim_mode
'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:
Turbo Boost Power Optimization set to Traditional
```

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General Notes

```
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.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
```

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

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Base Optimization Flags (Continued)

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: basepeak = yes

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

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

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Peak Optimization Flags (Continued)

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

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/IBM-platform-linux64-revA.html
http://www.spec.org/cpu2006/flags/Intel-ic12.0-linux64-revB.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/IBM-platform-linux64-revA.xml
http://www.spec.org/cpu2006/flags/Intel-ic12.0-linux64-revB.xml

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

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