SPEC® CFP2006 Result
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IBM Corporation

IBM BladeCenter HX5 (Intel Xeon E7-4860)

$SPECfp^{®}2006 =$ 52.3

$SPECfp\_base2006 =$ 48.1

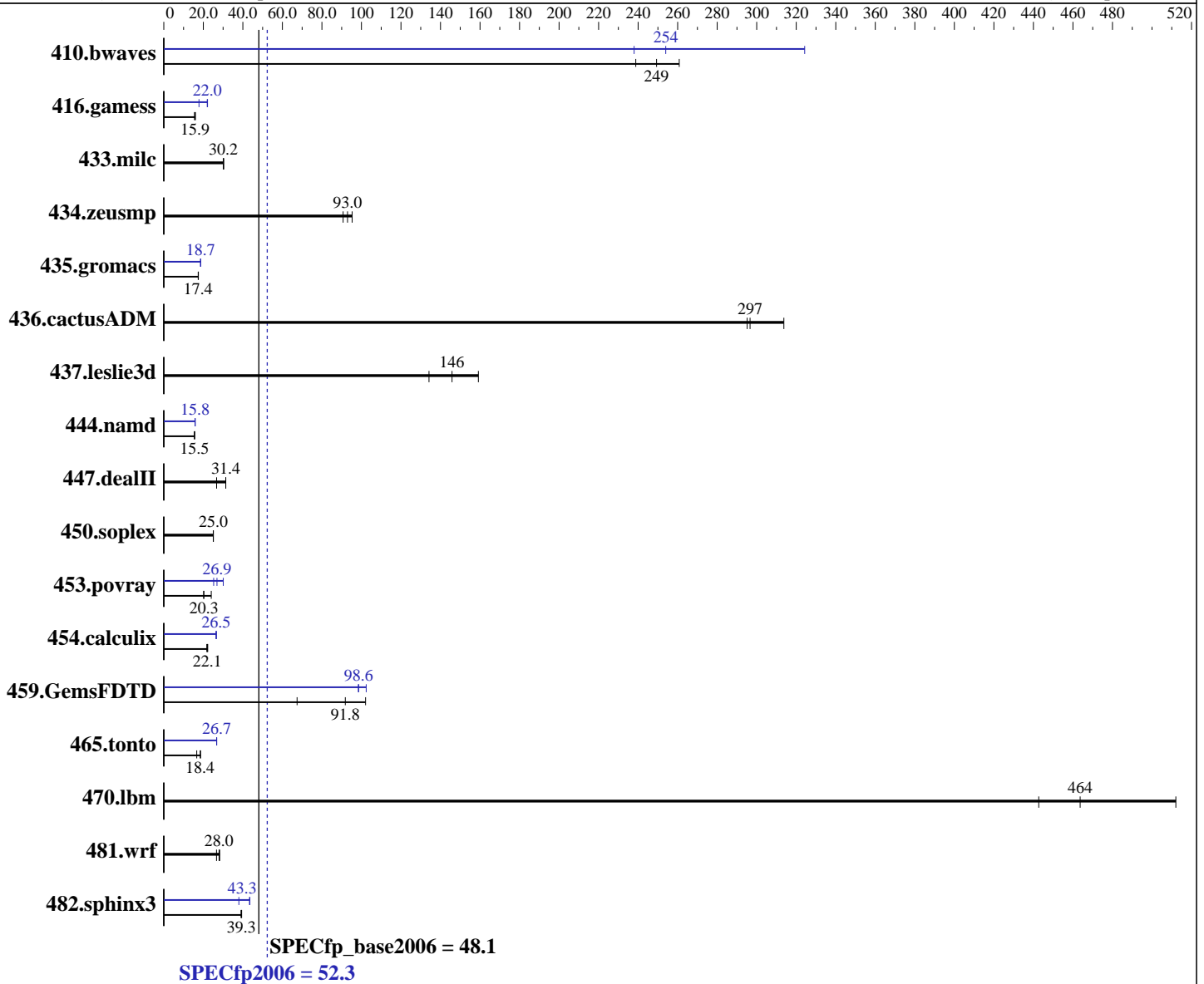**CPU2006 license:** 11　　　　　　　　　　　　　　　　　　　　　　　　**Test date:** Apr-2011
Test sponsor: IBM Corporation　　　　　　　　　　　　　　　　**Hardware Availability:** May-2011
Tested by: IBM Corporation　　　　　　　　　　　　　　　　　**Software Availability:** Apr-2011

Benchmark	Value
410.bwaves	254 / 249
416.gamess	22.0 / 15.9
433.milc	30.2
434.zeusmp	93.0
435.gromacs	18.7 / 17.4
436.cactusADM	297
437.leslie3d	146
444.namd	15.8 / 15.5
447.dealII	31.4
450.soplex	25.0
453.povray	26.9 / 20.3
454.calculix	26.5 / 22.1
459.GemsFDTD	98.6 / 91.8
465.tonto	26.7 / 18.4
470.lbm	464
481.wrf	28.0
482.sphinx3	43.3 / 39.3

SPECfp_base2006 = 48.1
SPECfp2006 = 52.3

Hardware

CPU Name: Intel Xeon E7-4860
CPU Characteristics: Intel Turbo Boost Technology up to 2.66 GHz
CPU MHz: 2266
FPU: Integrated
CPU(s) enabled: 40 cores, 4 chips, 10 cores/chip, 2 threads/core
CPU(s) orderable: 1,2,3,4 chips
Primary Cache: 32 KB I + 32 KB D on chip per core
Secondary Cache: 256 KB I+D on chip per core

Continued on next page

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

Continued on next page

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L3 Cache:	24 MB I+D on chip per chip	Peak Pointers:	32/64-bit
Other Cache:	None	Other Software:	None
Memory:	256 GB (32 x 8 GB 4Rx8 PC3-8500R-7, ECC)		
Disk Subsystem:	4 x 50 GB SSD, RAID 0		
Other Hardware:	None		

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	**54.5**	**249**	56.9	239	52.1	261	41.9	324	**53.5**	**254**	57.1	238
416.gamess	**1232**	**15.9**	1229	15.9	1261	15.5	**891**	**22.0**	885	22.1	1100	17.8
433.milc	303	30.3	305	30.1	**304**	**30.2**	303	30.3	305	30.1	**304**	**30.2**
434.zeusmp	100	90.7	**97.9**	**93.0**	95.5	95.3	100	90.7	**97.9**	**93.0**	95.5	95.3
435.gromacs	410	17.4	**410**	**17.4**	408	17.5	**383**	**18.7**	383	18.7	384	18.6
436.cactusADM	40.5	295	**40.3**	**297**	38.1	314	40.5	295	**40.3**	**297**	38.1	314
437.leslie3d	70.1	134	59.1	159	**64.5**	**146**	70.1	134	59.1	159	**64.5**	**146**
444.namd	**516**	**15.5**	515	15.6	517	15.5	507	15.8	**507**	**15.8**	506	15.8
447.dealII	**365**	**31.4**	428	26.7	365	31.4	**365**	**31.4**	428	26.7	365	31.4
450.soplex	**333**	**25.0**	332	25.1	333	25.0	**333**	**25.0**	332	25.1	333	25.0
453.povray	222	24.0	**262**	**20.3**	264	20.1	**198**	**26.9**	211	25.2	177	30.1
454.calculix	371	22.2	379	21.7	**374**	**22.1**	**311**	**26.5**	311	26.5	311	26.5
459.GemsFDTD	157	67.4	104	102	**116**	**91.8**	**108**	**98.6**	104	102	108	98.4
465.tonto	528	18.6	**534**	**18.4**	590	16.7	368	26.7	368	26.8	**368**	**26.7**
470.lbm	**29.6**	**464**	26.8	512	31.0	443	**29.6**	**464**	26.8	512	31.0	443
481.wrf	419	26.7	395	28.3	**399**	**28.0**	419	26.7	395	28.3	**399**	**28.0**
482.sphinx3	495	39.4	**496**	**39.3**	499	39.1	447	43.6	**450**	**43.3**	513	38.0

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/Intel-ic12.0-linux64-revB.html
http://www.spec.org/cpu2006/flags/IBM-platform-linux64-revA.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/IBM-platform-linux64-revA.xml

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