SPEC® CFP2006 Result

NEC Corporation

Express5800/R120b-2 (Intel Xeon E5645)

$SPECfp^{®}2006 =$ 51.7

$SPECfp\_base2006 =$ 48.4

CPU2006 license:	9006	**Test date:**	May-2011
Test sponsor:	NEC Corporation	**Hardware Availability:**	Feb-2011
Tested by:	NEC Corporation	**Software Availability:**	Mar-2011

410.bwaves 159 / 155
416.gamess 23.3 / 19.4
433.milc 46.6 / 45.7
434.zeusmp 96.1
435.gromacs 19.7 / 18.4
436.cactusADM 235
437.leslie3d 97.7
444.namd 16.7 / 16.3
447.dealII 35.6
450.soplex 28.5
453.povray 32.9 / 25.8
454.calculix 28.1 / 25.2
459.GemsFDTD 81.0 / 74.3
465.tonto 28.0 / 20.1
470.lbm 251
481.wrf 42.7
482.sphinx3 47.3 / 45.6

SPECfp_base2006 = 48.4

SPECfp2006 = 51.7

Hardware

CPU Name:	Intel Xeon E5645
CPU Characteristics:	Intel Turbo Boost Technology up to 2.80 GHz
CPU MHz:	2400
FPU:	Integrated
CPU(s) enabled:	12 cores, 2 chips, 6 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 12.0.3.174 Build 20110309
Auto Parallel:	Yes
File System:	ext3
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit

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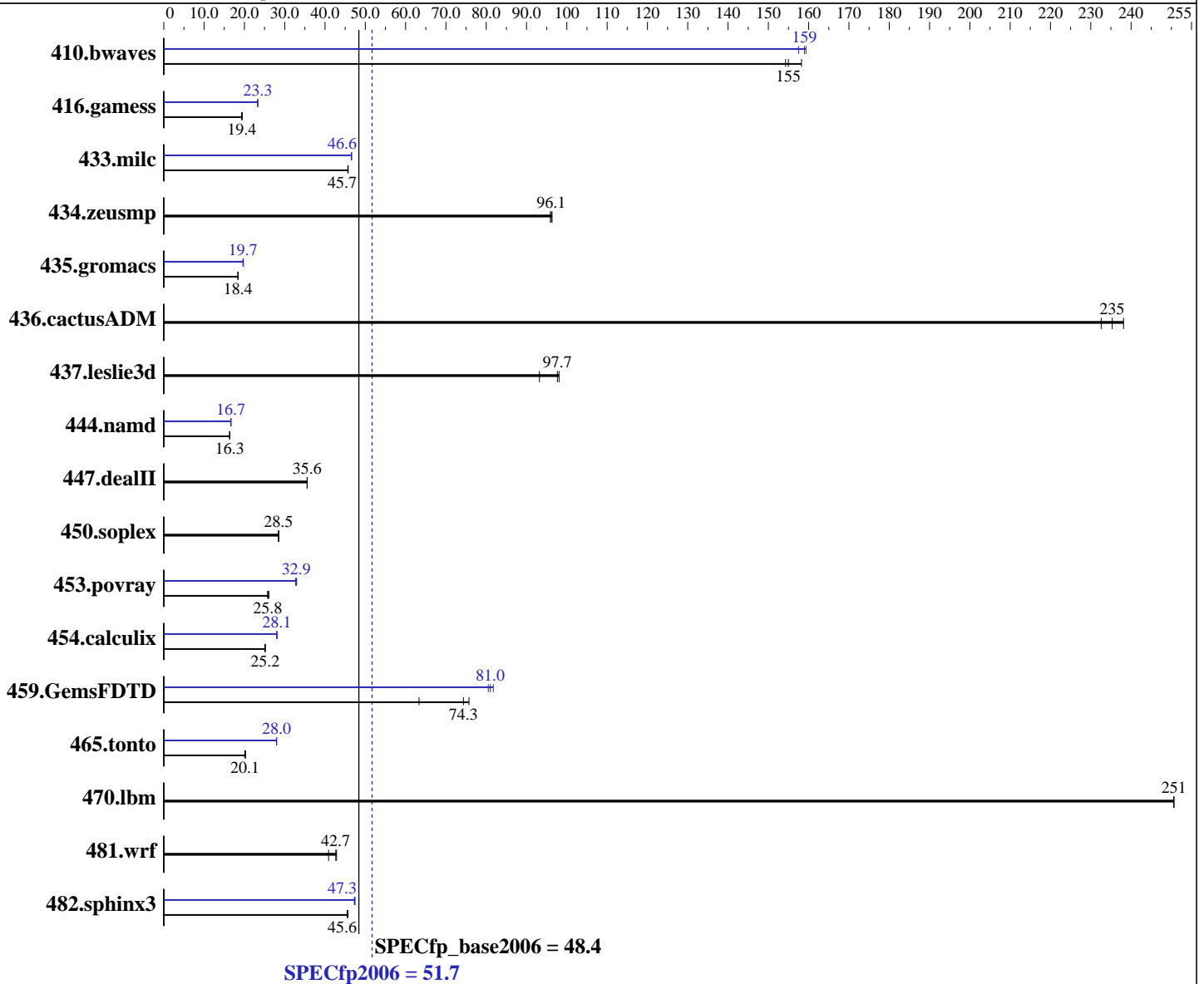**Test sponsor:** NEC Corporation
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L3 Cache:	12 MB I+D on chip per chip
Other Cache:	None
Memory:	96 GB (12 x 8 GB 2Rx4 PC3-10600R-9, ECC)
Disk Subsystem:	1 x 500 GB SATA, 7200 RPM
Other Hardware:	None
Peak Pointers:	32/64-bit
Other Software:	None

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	85.9	158	**87.7**	**155**	88.1	154	85.3	159	86.3	157	**85.5**	**159**
416.gamess	1013	19.3	1006	19.5	**1010**	**19.4**	841	23.3	840	23.3	**840**	**23.3**
433.milc	**201**	**45.7**	201	45.7	201	45.8	197	46.6	197	46.5	**197**	**46.6**
434.zeusmp	94.5	96.3	**94.7**	**96.1**	94.9	95.9	94.5	96.3	**94.7**	**96.1**	94.9	95.9
435.gromacs	**388**	**18.4**	388	18.4	388	18.4	**363**	**19.7**	361	19.8	363	19.7
436.cactusADM	**50.8**	**235**	50.2	238	51.4	233	**50.8**	**235**	50.2	238	51.4	233
437.leslie3d	95.8	98.1	101	93.2	**96.2**	**97.7**	95.8	98.1	101	93.2	**96.2**	**97.7**
444.namd	**491**	**16.3**	491	16.3	490	16.4	**481**	**16.7**	482	16.6	481	16.7
447.dealII	**322**	**35.6**	321	35.6	322	35.6	**322**	**35.6**	321	35.6	322	35.6
450.soplex	294	28.4	**293**	**28.5**	292	28.5	294	28.4	**293**	**28.5**	292	28.5
453.povray	206	25.8	**206**	**25.8**	204	26.1	161	32.9	**162**	**32.9**	163	32.7
454.calculix	327	25.2	**328**	**25.2**	329	25.1	**294**	**28.1**	294	28.1	294	28.1
459.GemsFDTD	**143**	**74.3**	140	75.7	168	63.3	132	80.5	130	81.8	**131**	**81.0**
465.tonto	485	20.3	**488**	**20.1**	489	20.1	352	28.0	**352**	**28.0**	352	28.0
470.lbm	**54.8**	**251**	54.8	251	54.8	251	**54.8**	**251**	54.8	251	54.8	251
481.wrf	261	42.9	**262**	**42.7**	273	40.9	261	42.9	**262**	**42.7**	273	40.9
482.sphinx3	427	45.7	428	45.5	**428**	**45.6**	412	47.3	411	47.5	**412**	**47.3**

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 1800 > /proc/sys/vm/nr_hugepages
export HUGETLB_MORECORE=yes
export LD_PRELOAD=/usr/lib64/libhugetlbfs.so
```

Platform Notes

```
BIOS Settings:
Hyper-Threading Technology: Disabled
Performance/Watt: Traditional
Server Class: Custom
Data Reuse Optimization: Disabled
Memory Voltage: Normal
```

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General Notes

```
OMP_NUM_THREADS set to number of cores
The Express5800/R120b-1 and
the Express5800/R120b-2 models are electronically equivalent.
The results have been measured on the Express5800/R120b-1 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
```

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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: -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: basepeak = yes
```

```
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/NEC-Intel-Linux-Settings-flags-revF.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/NEC-Intel-Linux-Settings-flags-revF.xml`

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