# SPEC® CFP2006 Result

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## NEC Corporation

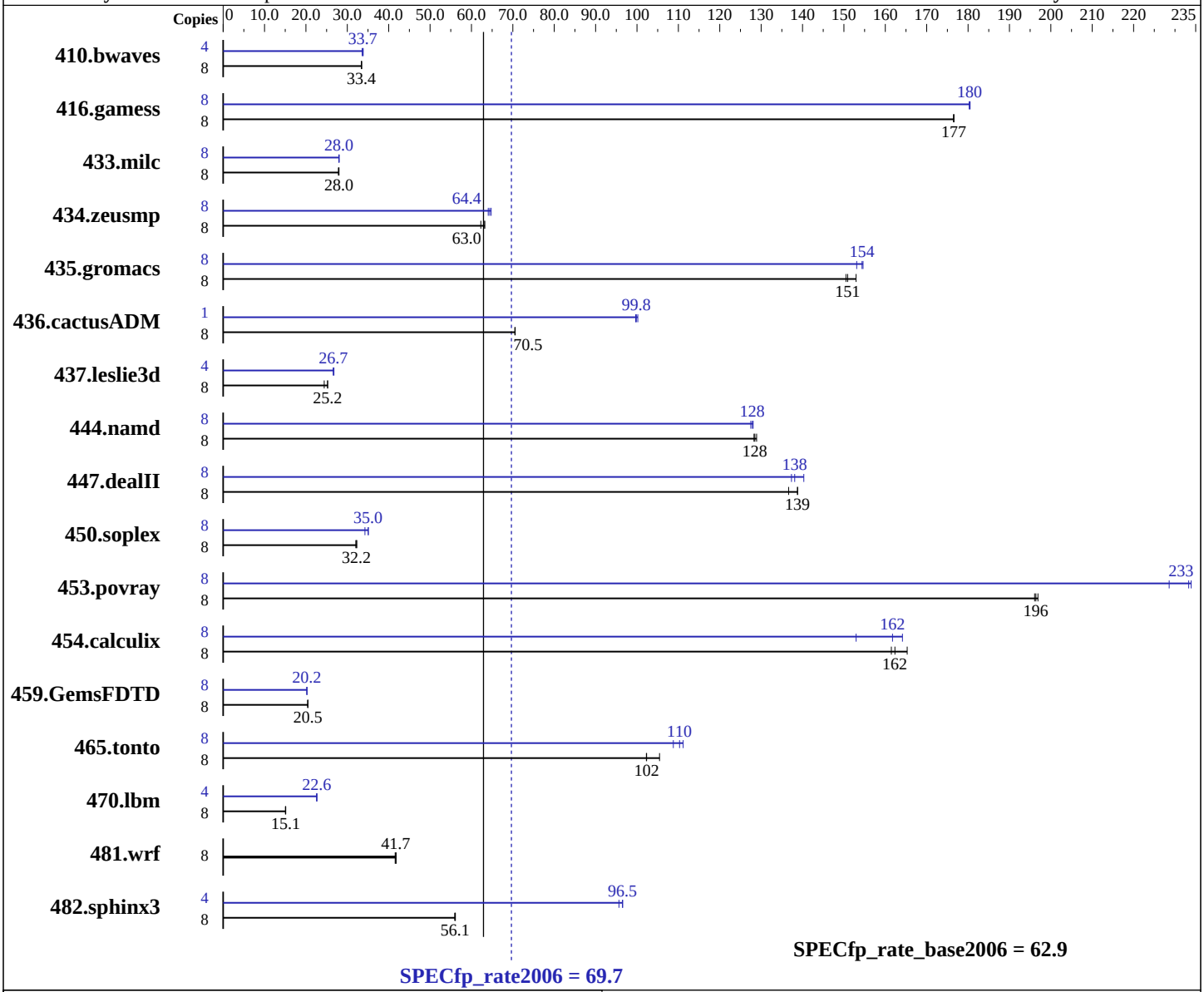
Express5800/320Fd-MR
(Intel Xeon E5450)

**SPECfp®_rate2006 = 69.7**

**SPECfp_rate_base2006 = 62.9**

**CPU2006 license:** 9006
**Test sponsor:** NEC Corporation
**Tested by:** NEC Corporation

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




### Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E5450 |
| CPU Characteristics: | 1333 MHz system bus |
| CPU MHz: | 3000 |
| FPU: | Integrated |
| CPU(s) enabled: | 8 cores, 2 chips, 4 cores/chip |
| CPU(s) orderable: | 1,2 chips (fault tolerant, see Platform Notes) |
| Primary Cache: | 32 KB I + 32 KB D on chip per core |
| Secondary Cache: | 12 MB I+D on chip per chip, 6 MB shared / 2 cores |

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### Software

| | |
|---|---|
| Operating System: | Red Hat Enterprise Linux Server release 5.2 Advanced Platform, Kernel 2.6.18-92.1.13.el5 on an x86_64 |
| Compiler: | Intel C++ and Fortran Compiler 11.0 for Linux Build 20081105 Package ID: l_cproc_p_11.0.074, l_cprof_p_11.0.074 |
| Auto Parallel: | Yes |
| File System: | ext3 |
| System State: | Run level 3 (multi-user) |

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L3 Cache: None
Other Cache: None
Memory: 24 GB (6x4 GB PC2-5300F, 2 rank, CL5-5-5, ECC)
Disk Subsystem: 2x146.5 GB SAS, 15000 RPM, Software RAID Level1
Other Hardware: None

Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other Software: ft Server Control Software 6.0.2-198

## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 8 | 3247 | 33.5 | **3254** | **33.4** | 3256 | 33.4 | 4 | 1618 | 33.6 | **1612** | **33.7** | 1606 | 33.8 |
| 416.gamess | 8 | 887 | 177 | 887 | 177 | **887** | **177** | 8 | 869 | 180 | 868 | 180 | **868** | **180** |
| 433.milc | 8 | 2638 | 27.8 | **2626** | **28.0** | 2625 | 28.0 | 8 | 2623 | 28.0 | 2624 | 28.0 | **2623** | **28.0** |
| 434.zeusmp | 8 | 1169 | 62.3 | 1151 | 63.2 | **1155** | **63.0** | 8 | 1137 | 64.1 | 1124 | 64.8 | **1130** | **64.4** |
| 435.gromacs | 8 | 380 | 151 | 373 | 153 | **378** | **151** | 8 | 369 | 155 | 373 | 153 | **370** | **154** |
| 436.cactusADM | 8 | **1355** | **70.5** | 1356 | 70.5 | 1355 | 70.6 | 1 | **120** | **99.8** | 119 | 100 | 120 | 99.7 |
| 437.leslie3d | 8 | 3079 | 24.4 | 2977 | 25.3 | **2982** | **25.2** | 4 | 1404 | 26.8 | 1413 | 26.6 | **1411** | **26.7** |
| 444.namd | 8 | 498 | 129 | 500 | 128 | **499** | **128** | 8 | **502** | **128** | 501 | 128 | 503 | 127 |
| 447.dealII | 8 | 659 | 139 | **660** | **139** | 670 | 137 | 8 | **663** | **138** | 652 | 140 | 666 | 137 |
| 450.soplex | 8 | 2082 | 32.1 | **2071** | **32.2** | 2067 | 32.3 | 8 | 1902 | 35.1 | 1947 | 34.3 | **1904** | **35.0** |
| 453.povray | 8 | 217 | 196 | 216 | 197 | **217** | **196** | 8 | **182** | **233** | 186 | 229 | 182 | 234 |
| 454.calculix | 8 | **407** | **162** | 409 | 161 | 399 | 165 | 8 | 402 | 164 | 432 | 153 | **408** | **162** |
| 459.GemsFDTD | 8 | 4155 | 20.4 | **4146** | **20.5** | 4143 | 20.5 | 8 | **4194** | **20.2** | 4195 | 20.2 | 4193 | 20.2 |
| 465.tonto | 8 | 770 | 102 | **769** | **102** | 747 | 105 | 8 | 708 | 111 | **714** | **110** | 724 | 109 |
| 470.lbm | 8 | 7311 | 15.0 | **7278** | **15.1** | 7270 | 15.1 | 4 | 2432 | 22.6 | 2427 | 22.6 | **2429** | **22.6** |
| 481.wrf | 8 | 2150 | 41.6 | 2138 | 41.8 | **2143** | **41.7** | 8 | 2150 | 41.6 | 2138 | 41.8 | **2143** | **41.7** |
| 482.sphinx3 | 8 | **2781** | **56.1** | 2787 | 55.9 | 2778 | 56.1 | 4 | **808** | **96.5** | 808 | 96.5 | 815 | 95.6 |

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.
 taskset was used to bind processes to cores except
 for 436.cactusADM peak
```

## Operating System Notes

```
'ulimit -s unlimited' was used to set the stacksize to unlimited prior to run
OMP_NUM_THREADS set to number of cores
KMP_AFFINITY set to "physical,0"
KMP_STACKSIZE set to 64M
```

## Platform Notes

This Express5800/320Fd-MR is a fault-tolerant server.
Two modules are installed in this server.
Each module physically has "2CPU chips,24GB memory", The total physical configuration is "4CPU chips,48GB memory".
Using fault-tolerant lockstep technology, these two modules communicate with each other and execute the same instructions at the same time, The operating system only sees "2CPU chips,24GB memory" as the other components add only redundancy and do not contribute to any performance benefit.

## General Notes

The NEC Express5800/320Fd-MR(Intel Xeon E5450) and
the Bull NovaScale R630 E1 MR(Intel Xeon E5450, 3.00 GHz) models are electronically equivalent.
The results have been measured on a NEC Express5800/320Fd-MR(Intel Xeon E5450) model.

# 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/11.0/074/bin/ia32/icc`
`-L/opt/intel/Compiler/11.0/074/ipp/ia32/lib`
`-I/opt/intel/Compiler/11.0/074/ipp/ia32/include`

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

450.soplex: `/opt/intel/Compiler/11.0/074/bin/ia32/icpc`
`-L/opt/intel/Compiler/11.0/074/ipp/ia32/lib`
`-I/opt/intel/Compiler/11.0/074/ipp/ia32/include`

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

437.leslie3d: `/opt/intel/Compiler/11.0/074/bin/ia32/ifort`
`-L/opt/intel/Compiler/11.0/074/ipp/ia32/lib`
`-I/opt/intel/Compiler/11.0/074/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-revD.html
http://www.spec.org/cpu2006/flags/NEC-Intel-Linux-Settings-flags-revB.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-revD.xml
http://www.spec.org/cpu2006/flags/NEC-Intel-Linux-Settings-flags-revB.xml


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