



# SPEC<sup>®</sup> CFP2006 Result

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## NEC Corporation

### SPECfp<sup>®</sup>\_rate2006 = 234

### Express5800/A1020a (Intel Xeon E5-2670)

### SPECfp\_rate\_base2006 = 229

CPU2006 license: 9006

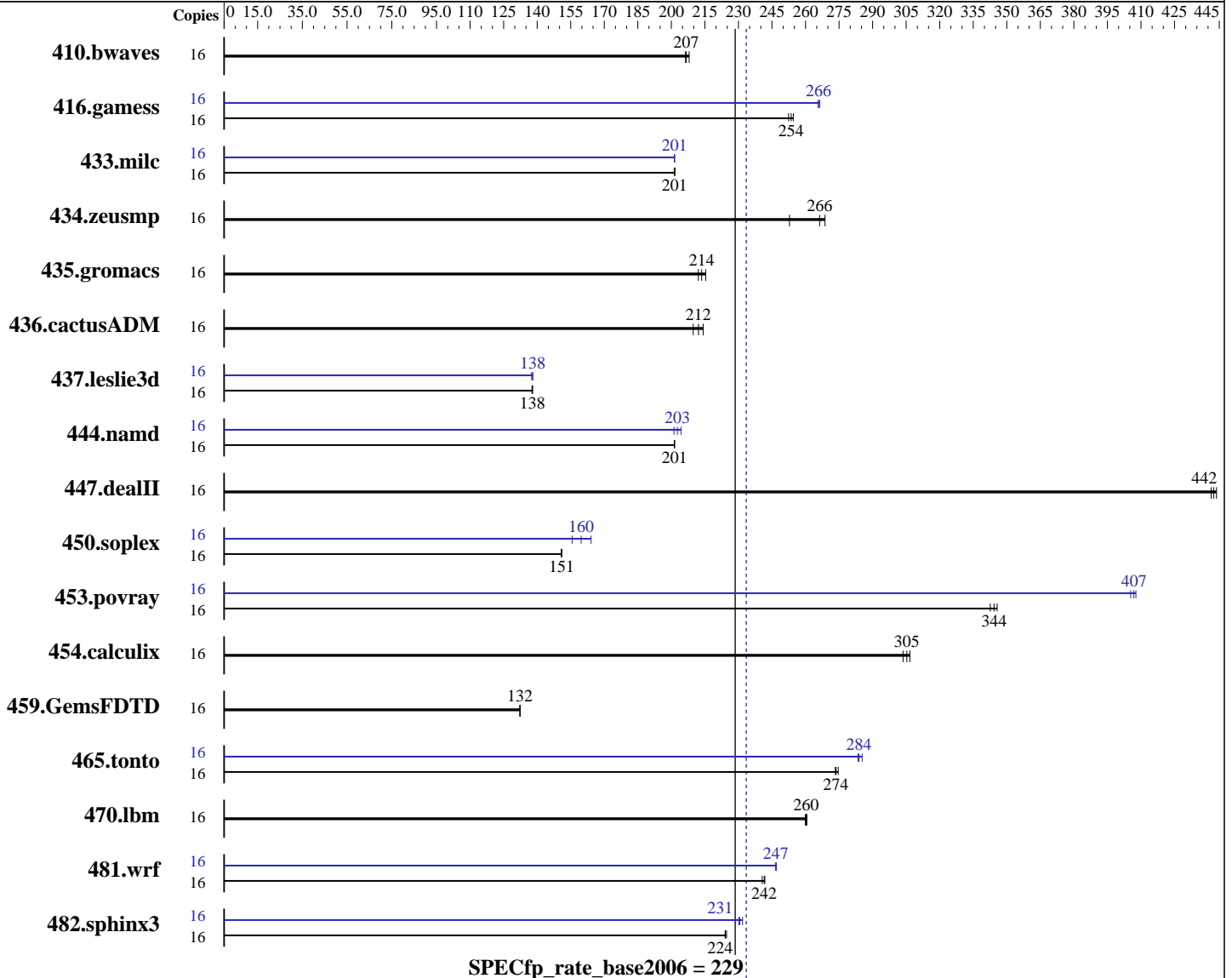
Test date: Jul-2012

Test sponsor: NEC Corporation

Hardware Availability: May-2012

Tested by: NEC Corporation

Software Availability: Dec-2011



#### Hardware

CPU Name: Intel Xeon E5-2670  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.30 GHz  
 CPU MHz: 2600  
 FPU: Integrated  
 CPU(s) enabled: 8 cores, 1 chip, 8 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

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#### Software

Operating System: Red Hat Enterprise Linux Server release 5.7 (Tikanga)  
 Kernel 2.6.18-274.el5 on an x86\_64  
 Compiler: C/C++: Version 12.1.2.273 of Intel C++ Studio XE for Linux;  
 Fortran: Version 12.1.2.273 of Intel Fortran Studio XE for Linux  
 Auto Parallel: No  
 File System: ext3

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L3 Cache: 20 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 64 GB (8 x 8 GB 2Rx4 PC3L-12800R-11, ECC)  
 Disk Subsystem: 1 x 300 GB SAS, 15000 RPM  
 Other Hardware: None

System State: Run level 3 (multi-user)  
 Base Pointers: 32/64-bit  
 Peak Pointers: 32/64-bit  
 Other Software: None

## Results Table

| Benchmark     | Base   |                    |                   |                    |                   |                   |                   | Peak   |                    |                   |                    |                   |                   |                   |
|---------------|--------|--------------------|-------------------|--------------------|-------------------|-------------------|-------------------|--------|--------------------|-------------------|--------------------|-------------------|-------------------|-------------------|
|               | Copies | Seconds            | Ratio             | Seconds            | Ratio             | Seconds           | Ratio             | Copies | Seconds            | Ratio             | Seconds            | Ratio             | Seconds           | Ratio             |
| 410.bwaves    | 16     | 1046               | 208               | <b><u>1052</u></b> | <b><u>207</u></b> | 1054              | 206               | 16     | 1046               | 208               | <b><u>1052</u></b> | <b><u>207</u></b> | 1054              | 206               |
| 416.gamess    | 16     | 1241               | 252               | <b><u>1235</u></b> | <b><u>254</u></b> | 1231              | 255               | 16     | <b><u>1179</u></b> | <b><u>266</u></b> | 1176               | 266               | 1180              | 266               |
| 433.milc      | 16     | 729                | 201               | <b><u>729</u></b>  | <b><u>201</u></b> | 729               | 202               | 16     | 729                | 201               | <b><u>729</u></b>  | <b><u>201</u></b> | 729               | 201               |
| 434.zeusmp    | 16     | 576                | 253               | 542                | 269               | <b><u>547</u></b> | <b><u>266</u></b> | 16     | 576                | 253               | 542                | 269               | <b><u>547</u></b> | <b><u>266</u></b> |
| 435.gromacs   | 16     | 530                | 215               | 539                | 212               | <b><u>535</u></b> | <b><u>214</u></b> | 16     | 530                | 215               | 539                | 212               | <b><u>535</u></b> | <b><u>214</u></b> |
| 436.cactusADM | 16     | 892                | 214               | <b><u>901</u></b>  | <b><u>212</u></b> | 911               | 210               | 16     | 892                | 214               | <b><u>901</u></b>  | <b><u>212</u></b> | 911               | 210               |
| 437.leslie3d  | 16     | 1092               | 138               | <b><u>1091</u></b> | <b><u>138</u></b> | 1090              | 138               | 16     | <b><u>1090</u></b> | <b><u>138</u></b> | 1090               | 138               | 1094              | 138               |
| 444.namd      | 16     | 637                | 201               | <b><u>637</u></b>  | <b><u>201</u></b> | 637               | 201               | 16     | 638                | 201               | <b><u>633</u></b>  | <b><u>203</u></b> | 628               | 204               |
| 447.dealII    | 16     | 415                | 441               | <b><u>414</u></b>  | <b><u>442</u></b> | 412               | 444               | 16     | 415                | 441               | <b><u>414</u></b>  | <b><u>442</u></b> | 412               | 444               |
| 450.soplex    | 16     | 883                | 151               | <b><u>884</u></b>  | <b><u>151</u></b> | 885               | 151               | 16     | <b><u>836</u></b>  | <b><u>160</u></b> | 857                | 156               | 813               | 164               |
| 453.povray    | 16     | 246                | 346               | <b><u>247</u></b>  | <b><u>344</u></b> | 248               | 343               | 16     | 209                | 408               | <b><u>209</u></b>  | <b><u>407</u></b> | 210               | 405               |
| 454.calculix  | 16     | 430                | 307               | <b><u>432</u></b>  | <b><u>305</u></b> | 435               | 304               | 16     | 430                | 307               | <b><u>432</u></b>  | <b><u>305</u></b> | 435               | 304               |
| 459.GemsFDTD  | 16     | <b><u>1283</u></b> | <b><u>132</u></b> | 1282               | 132               | 1284              | 132               | 16     | <b><u>1283</u></b> | <b><u>132</u></b> | 1282               | 132               | 1284              | 132               |
| 465.tonto     | 16     | <b><u>575</u></b>  | <b><u>274</u></b> | 573                | 275               | 576               | 273               | 16     | 555                | 283               | 552                | 285               | <b><u>555</u></b> | <b><u>284</u></b> |
| 470.lbm       | 16     | 844                | 261               | <b><u>845</u></b>  | <b><u>260</u></b> | 846               | 260               | 16     | 844                | 261               | <b><u>845</u></b>  | <b><u>260</u></b> | 846               | 260               |
| 481.wrf       | 16     | 739                | 242               | <b><u>740</u></b>  | <b><u>242</u></b> | 743               | 241               | 16     | 725                | 247               | 724                | 247               | <b><u>724</u></b> | <b><u>247</u></b> |
| 482.sphinx3   | 16     | <b><u>1391</u></b> | <b><u>224</u></b> | 1392               | 224               | 1388              | 225               | 16     | <b><u>1352</u></b> | <b><u>231</u></b> | 1355               | 230               | 1345              | 232               |

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

## Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

## Platform Notes

BIOS Settings:  
Energy Performance: Performance  
Memory Voltage: 1.5 V



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CPU2006 license: 9006

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## General Notes

Environment variables set by runspec before the start of the run:  
LD\_LIBRARY\_PATH = "/home/cpu2006/libs/32:/home/cpu2006/libs/64"

```
'mount -t hugetlbfs nodev /mnt/hugepages' was used to enable large pages
echo 19800 > /proc/sys/vm/nr_hugepages
export HUGETLB_MORECORE=yes
export LD_PRELOAD=/usr/lib64/libhugetlbfs.so
Filesystem page cache cleared with:
echo 1> /proc/sys/vm/drop_caches
runspec command invoked through numactl i.e.:
numactl --interleave=all runspec <etc>
```

## 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
```



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## Base Optimization Flags

C benchmarks:

-xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch -auto-p32  
-ansi-alias -opt-mem-layout-trans=3

C++ benchmarks:

-xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch -auto-p32  
-ansi-alias -opt-mem-layout-trans=3

Fortran benchmarks:

-xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch

Benchmarks using both Fortran and C:

-xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch -auto-p32  
-ansi-alias -opt-mem-layout-trans=3

## Peak Compiler Invocation

C benchmarks (except as noted below):

icc -m64

482.sphinx3: icc -m32

C++ benchmarks (except as noted below):

icpc -m64

450.soplex: icpc -m32

Fortran benchmarks:

ifort -m64

Benchmarks using both Fortran and C:

icc -m64 ifort -m64

## 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  
437.leslie3d: -DSPEC\_CPU\_LP64  
444.namd: -DSPEC\_CPU\_LP64  
447.deallI: -DSPEC\_CPU\_LP64  
453.povray: -DSPEC\_CPU\_LP64

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Tested by: NEC Corporation

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## Peak Portability Flags (Continued)

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: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
 -no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)  
 -prof-use(pass 2) -static -auto-ilp32

470.lbm: basepeak = yes

482.sphinx3: -xSSE4.2 -ipo -O3 -no-prec-div -opt-mem-layout-trans=3  
 -unroll2

C++ benchmarks:

444.namd: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
 -no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)  
 -prof-use(pass 2) -fno-alias -auto-ilp32

447.dealIII: basepeak = yes

450.soplex: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
 -no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)  
 -prof-use(pass 2) -opt-malloc-options=3  
 -B /usr/share/libhugetlbfs/ -Wl,-hugetlbfs-link=BDT

453.povray: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
 -no-prec-div(pass 2) -opt-mem-layout-trans=3(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: basepeak = yes

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

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## Peak Optimization Flags (Continued)

437.leslie3d: -xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch  
-B /usr/share/libhugetlbfs/ -Wl,-melf\_x86\_64 -Wl,-hugetlbfs-link=BDT

459.GemsFDTD: basepeak = yes

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) -unroll4 -auto  
-inline-calloc -opt-malloc-options=3  
-B /usr/share/libhugetlbfs/ -Wl,-melf\_x86\_64 -Wl,-hugetlbfs-link=BDT

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: -xSSE4.2 -ipo -O3 -no-prec-div -static -auto-ilp32

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20120425.html>

<http://www.spec.org/cpu2006/flags/NEC-Platform-Settings-V1.2-R120d-RevA.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20120425.xml>

<http://www.spec.org/cpu2006/flags/NEC-Platform-Settings-V1.2-R120d-RevA.xml>

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