# SPEC® CFP2006 Result

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## NEC Corporation

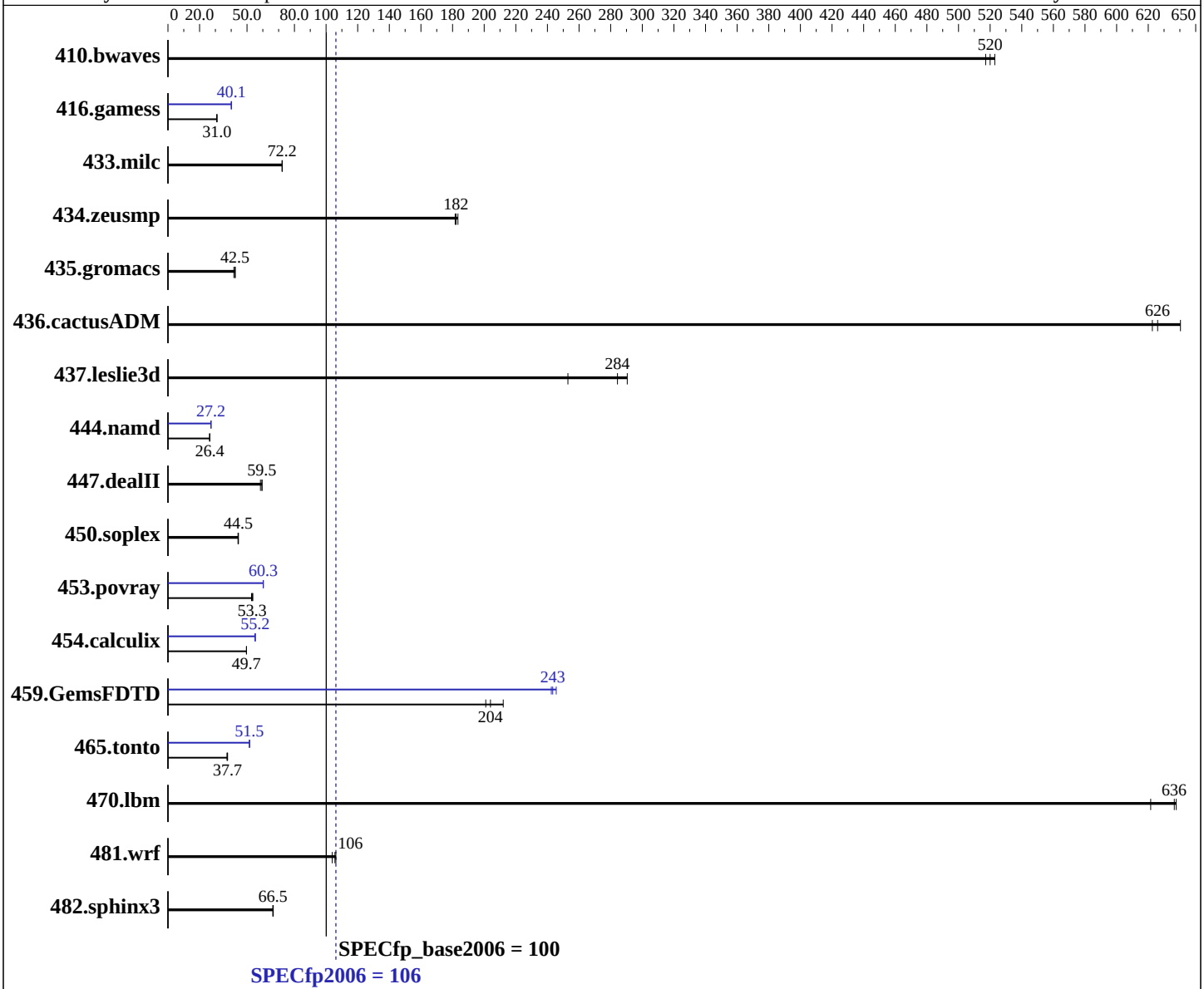
Express5800/B120g-h (Intel Xeon E5-2620 v4)

SPECfp®2006 = 106

SPECfp_base2006 = 100

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

**Test date:** Mar-2016
**Hardware Availability:** Jun-2016
**Software Availability:** Jan-2016




## Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E5-2620 v4 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 3.00 GHz |
| CPU MHz: | 2100 |
| FPU: | Integrated |
| CPU(s) enabled: | 16 cores, 2 chips, 8 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: | Red Hat Enterprise Linux Server release 7.2 (Maipo)<br>Kernel 3.10.0-327.4.5.el7.x86_64 |
| Compiler: | C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux;<br>Fortran: Version 16.0.0.101 of Intel Fortran Studio XE for Linux |
| Auto Parallel: | Yes |
| File System: | ext4 |

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L3 Cache: 20 MB I+D on chip per chip
Other Cache: None
Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R, running at 2133 MHz)
Disk Subsystem: 1 x 400 GB SATA, SSD
Other Hardware: None

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

## Results Table

| Benchmark | Base | | | | | | Peak | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | **26.1** | **520** | 26.0 | 523 | 26.3 | 517 | **26.1** | **520** | 26.0 | 523 | 26.3 | 517 |
| 416.gamess | **632** | **31.0** | 632 | 31.0 | 634 | 30.9 | 488 | 40.1 | **488** | **40.1** | 489 | 40.1 |
| 433.milc | **127** | **72.2** | 127 | 72.2 | 127 | 72.3 | **127** | **72.2** | 127 | 72.2 | 127 | 72.3 |
| 434.zeusmp | 49.6 | 183 | 50.1 | 182 | **49.9** | **182** | 49.6 | 183 | 50.1 | 182 | **49.9** | **182** |
| 435.gromacs | **168** | **42.5** | 171 | 41.7 | 168 | 42.5 | **168** | **42.5** | 171 | 41.7 | 168 | 42.5 |
| 436.cactusADM | 19.2 | 623 | **19.1** | **626** | 18.7 | 640 | 19.2 | 623 | **19.1** | **626** | 18.7 | 640 |
| 437.leslie3d | **33.1** | **284** | 32.4 | 290 | 37.2 | 253 | **33.1** | **284** | 32.4 | 290 | 37.2 | 253 |
| 444.namd | 304 | 26.4 | **304** | **26.4** | 304 | 26.4 | 295 | 27.2 | 295 | 27.2 | **295** | **27.2** |
| 447.dealII | 196 | 58.5 | **192** | **59.5** | 192 | 59.5 | 196 | 58.5 | **192** | **59.5** | 192 | 59.5 |
| 450.soplex | **187** | **44.5** | 187 | 44.5 | 188 | 44.3 | **187** | **44.5** | 187 | 44.5 | 188 | 44.3 |
| 453.povray | **99.7** | **53.3** | 99.1 | 53.7 | 101 | 52.8 | **88.3** | **60.3** | 88.4 | 60.2 | 88.2 | 60.3 |
| 454.calculix | **166** | **49.7** | 166 | 49.7 | 166 | 49.7 | 150 | 55.1 | 149 | 55.2 | **149** | **55.2** |
| 459.GemsFDTD | **52.0** | **204** | 50.0 | 212 | 52.8 | 201 | **43.6** | **243** | 43.2 | 246 | 43.8 | 242 |
| 465.tonto | 264 | 37.3 | **261** | **37.7** | 261 | 37.7 | 191 | 51.6 | 191 | 51.5 | **191** | **51.5** |
| 470.lbm | 22.1 | 622 | 21.5 | 638 | **21.6** | **636** | 22.1 | 622 | 21.5 | 638 | **21.6** | **636** |
| 481.wrf | 105 | 106 | **106** | **106** | 108 | 104 | 105 | 106 | **106** | **106** | 108 | 104 |
| 482.sphinx3 | **293** | **66.5** | 293 | 66.6 | 294 | 66.3 | **293** | **66.5** | 293 | 66.6 | 294 | 66.3 |

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

## Operating System Notes

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

## Platform Notes

```
BIOS Settings:
 Energy Performance: Performance
 Patrol Scrub: Disabled
 Snoop Mode: Home Snoop with Directory
 Hyper-Threading: Disabled
```

## General Notes

```
Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2006/libs/32:/home/cpu2006/libs/64:/home/cpu2006/sh"
OMP_NUM_THREADS = "16"

 Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB
 memory using RedHat EL 7.1
 Transparent Huge Pages enabled with:
 echo always > /sys/kernel/mm/transparent_hugepage/enabled
```

## 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:
`-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch -ansi-alias`

C++ benchmarks:
`-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias`

Fortran benchmarks:
`-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch`

Benchmarks using both Fortran and C:
`-xCORE-AVX2 -ipo -O3 -no-prec-div -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: `basepeak = yes`

C++ benchmarks:

Continued on next page

## Peak Optimization Flags (Continued)

444.namd: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -par-num-threads=1(pass 1) -prof-use(pass 2) -fno-alias -auto-ilp32

447.dealII: basepeak = yes

450.soplex: basepeak = yes

453.povray: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll4 -ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll2 -inline-level=0 -scalar-rep-

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll2 -inline-level=0 -opt-prefetch -parallel

465.tonto: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -par-num-threads=1(pass 1) -prof-use(pass 2) -inline-calloc -opt-malloc-options=3 -auto -unroll4

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes

436.cactusADM: basepeak = yes

454.calculix: -xCORE-AVX2 -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-ic16.0-official-linux64.html
http://www.spec.org/cpu2006/flags/NEC-Platform-Settings-V1.2-B120g-RevB.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/NEC-Platform-Settings-V1.2-B120g-RevB.xml


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