# SPEC® CFP2006 Result

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## NEC Corporation

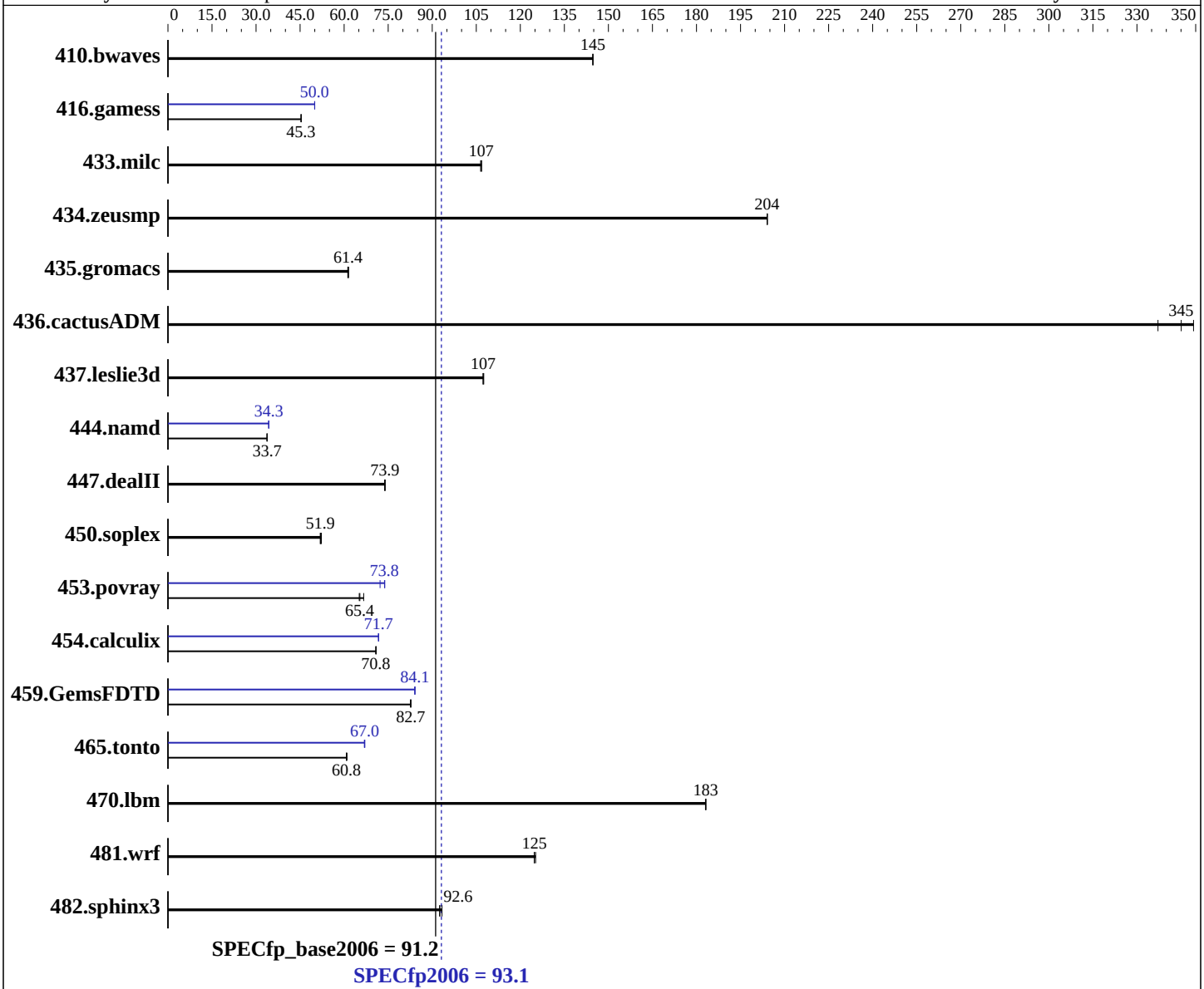
## Express5800/GT110h (Intel Xeon E3-1220 v5)

**SPECfp®2006 = 93.1**

**SPECfp_base2006 = 91.2**

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

**Test date:** Jul-2016
**Hardware Availability:** Jul-2016
**Software Availability:** Jan-2016




### Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E3-1220 v5 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 3.50 GHz |
| CPU MHz: | 3000 |
| FPU: | Integrated |
| CPU(s) enabled: | 4 cores, 1 chip, 4 cores/chip |
| CPU(s) orderable: | 1 chip |
| 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: 8 MB I+D on chip per chip
Other Cache: None
Memory: 16 GB (2 x 8 GB 2Rx8 PC4-2133P-E)
Disk Subsystem: 1 x 1 TB SATA, 7200 RPM
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 | 93.9 | 145 | 93.9 | 145 | **93.9** | **145** | 93.9 | 145 | 93.9 | 145 | **93.9** | **145** |
| 416.gamess | 432 | 45.3 | **432** | **45.3** | 432 | 45.3 | **392** | **50.0** | 392 | 50.0 | 392 | 49.9 |
| 433.milc | 85.9 | 107 | **86.0** | **107** | 86.2 | 106 | 85.9 | 107 | **86.0** | **107** | 86.2 | 106 |
| 434.zeusmp | **44.6** | **204** | 44.6 | 204 | 44.6 | 204 | **44.6** | **204** | 44.6 | 204 | 44.6 | 204 |
| 435.gromacs | 116 | 61.5 | 117 | 61.2 | **116** | **61.4** | 116 | 61.5 | 117 | 61.2 | **116** | **61.4** |
| 436.cactusADM | 34.2 | 349 | **34.6** | **345** | 35.4 | 337 | 34.2 | 349 | **34.6** | **345** | 35.4 | 337 |
| 437.leslie3d | 87.6 | 107 | 87.4 | 108 | **87.6** | **107** | 87.6 | 107 | 87.4 | 108 | **87.6** | **107** |
| 444.namd | 238 | 33.7 | **238** | **33.7** | 238 | 33.8 | **234** | **34.3** | 234 | 34.3 | 234 | 34.3 |
| 447.dealII | 155 | 73.8 | **155** | **73.9** | 155 | 74.0 | 155 | 73.8 | **155** | **73.9** | 155 | 74.0 |
| 450.soplex | 161 | 51.9 | **161** | **51.9** | 160 | 52.3 | 161 | 51.9 | **161** | **51.9** | 160 | 52.3 |
| 453.povray | **81.4** | **65.4** | 81.7 | 65.1 | 79.8 | 66.7 | 72.0 | 73.8 | 73.6 | 72.2 | **72.1** | **73.8** |
| 454.calculix | 116 | 70.9 | 117 | 70.8 | **116** | **70.8** | 115 | 71.7 | **115** | **71.7** | 115 | 71.7 |
| 459.GemsFDTD | 128 | 82.8 | **128** | **82.7** | 128 | 82.6 | 126 | 84.1 | **126** | **84.1** | 126 | 84.1 |
| 465.tonto | 161 | 61.0 | 162 | 60.7 | **162** | **60.8** | **147** | **67.0** | 147 | 67.0 | 147 | 66.9 |
| 470.lbm | 75.0 | 183 | 75.1 | 183 | **75.0** | **183** | 75.0 | 183 | 75.1 | 183 | **75.0** | **183** |
| 481.wrf | **89.5** | **125** | 89.6 | 125 | 89.2 | 125 | **89.5** | **125** | 89.6 | 125 | 89.2 | 125 |
| 482.sphinx3 | 209 | 93.3 | **210** | **92.6** | 211 | 92.5 | 209 | 93.3 | **210** | **92.6** | 211 | 92.5 |

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:
 Power Management Policy: Custom
 Energy Performance: Performance
```

## 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"
```

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## General Notes (Continued)

```
OMP_NUM_THREADS = "4"

 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
```

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## Base Optimization Flags (Continued)

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:

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`

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# Peak Optimization Flags (Continued)

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-V1.2-110h-RevA.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-V1.2-110h-RevA.xml

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Tested with SPEC CPU2006 v1.2.
Report generated on Tue Sep 6 16:55:13 2016 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 6 September 2016.