# SPEC® CFP2006 Result

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## NEC Corporation

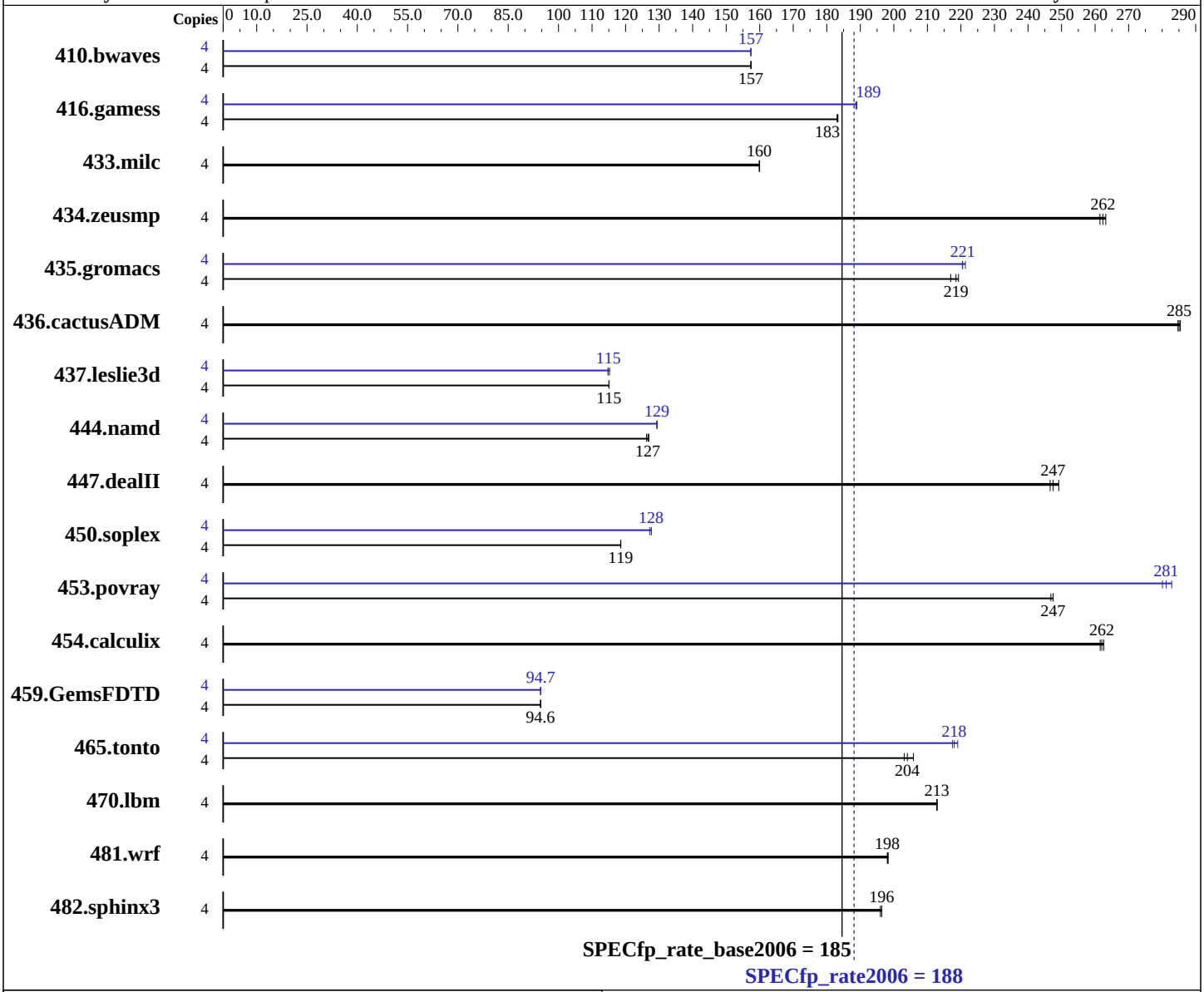
## Express5800/GT110i (Intel Xeon E3-1220 v6)

**SPECfp®_rate2006 = 188**

**SPECfp_rate_base2006 = 185**

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

**Test date:** Mar-2017
**Hardware Availability:** Apr-2017
**Software Availability:** Jan-2017




### Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E3-1220 v6 |
| 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 7.3 (Maipo)<br>Kernel 3.10.0-514.6.1.el7.x86_64 |
| Compiler: | C/C++: Version 17.0.0.098 of Intel C/C++ Compiler for Linux;<br>Fortran: Version 17.0.0.098 of Intel Fortran Compiler for Linux |
| Auto Parallel: | No |
| File System: | ext4 |

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| | |
|---|---|
| L3 Cache: | 8 MB I+D on chip per chip |
| Other Cache: | None |
| Memory: | 32 GB (2 x 16 GB 2Rx8 PC4-2400T-E) |
| Disk Subsystem: | 1 x 1 TB SATA, 7200 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 | 4 | 345 | 157 | **345** | **157** | 345 | 157 | 4 | **345** | **157** | 345 | 157 | 345 | 157 |
| 416.gamess | 4 | **427** | **183** | 427 | 183 | 428 | 183 | 4 | 415 | 189 | 415 | 189 | **415** | **189** |
| 433.milc | 4 | **230** | **160** | 230 | 160 | 230 | 160 | 4 | **230** | **160** | 230 | 160 | 230 | 160 |
| 434.zeusmp | 4 | 138 | 263 | **139** | **262** | 139 | 261 | 4 | 138 | 263 | **139** | **262** | 139 | 261 |
| 435.gromacs | 4 | 130 | 219 | 132 | 217 | **131** | **219** | 4 | 130 | 220 | **130** | **221** | 129 | 221 |
| 436.cactusADM | 4 | 167 | 285 | 168 | 285 | **168** | **285** | 4 | 167 | 285 | 168 | 285 | **168** | **285** |
| 437.leslie3d | 4 | 327 | 115 | **327** | **115** | 327 | 115 | 4 | **327** | **115** | 326 | 115 | 328 | 115 |
| 444.namd | 4 | 253 | 127 | **253** | **127** | 254 | 126 | 4 | 248 | 129 | 248 | 129 | **248** | **129** |
| 447.dealII | 4 | 184 | 249 | 186 | 247 | **185** | **247** | 4 | 184 | 249 | 186 | 247 | **185** | **247** |
| 450.soplex | 4 | 281 | 119 | **281** | **119** | 281 | 119 | 4 | 262 | 127 | **261** | **128** | 261 | 128 |
| 453.povray | 4 | 86.0 | 247 | **86.0** | **247** | 86.2 | 247 | 4 | 76.0 | 280 | 75.2 | 283 | **75.7** | **281** |
| 454.calculix | 4 | 126 | 263 | **126** | **262** | 126 | 262 | 4 | 126 | 263 | **126** | **262** | 126 | 262 |
| 459.GemsFDTD | 4 | 448 | 94.6 | 448 | 94.7 | **448** | **94.6** | 4 | **448** | **94.7** | 448 | 94.7 | 448 | 94.7 |
| 465.tonto | 4 | **193** | **204** | 191 | 206 | 194 | 203 | 4 | 181 | 217 | 180 | 219 | **181** | **218** |
| 470.lbm | 4 | **258** | **213** | 258 | 213 | 258 | 213 | 4 | **258** | **213** | 258 | 213 | 258 | 213 |
| 481.wrf | 4 | 225 | 198 | 226 | 198 | **226** | **198** | 4 | 225 | 198 | 226 | 198 | **226** | **198** |
| 482.sphinx3 | 4 | 398 | 196 | 397 | 196 | **397** | **196** | 4 | 398 | 196 | 397 | 196 | **397** | **196** |

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

## Submit Notes

```
The taskset mechanism was used to bind copies to processors. The config file option 'submit'
was used to generate taskset 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:
 Power Management Policy: Custom
 Energy Performance: Performance
```

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## Platform Notes (Continued)

```
DCU Streamer Prefetcher: Disabled
```

## General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2006/libs/32:/home/cpu2006/libs/64:/home/cpu2006/sh10.2"

 Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
 memory using Redhat Enterprise Linux 7.2
 Transparent Huge Pages enabled by default
```

## 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 -qopt-prefetch -auto-p32 -qopt-mem-layout-trans=3`

C++ benchmarks:
`-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32 -qopt-mem-layout-trans=3`

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

Benchmarks using both Fortran and C:
`-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32 -qopt-mem-layout-trans=3`

## Peak Compiler Invocation

C benchmarks:
`icc -m64`

C++ benchmarks (except as noted below):
`icpc -m64`

450.soplex: `icpc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32`

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.dealII: `-DSPEC_CPU_LP64`
450.soplex: `-D_FILE_OFFSET_BITS=64`
453.povray: `-DSPEC_CPU_LP64`
454.calculix: `-DSPEC_CPU_LP64 -nofor_main`

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## Peak Portability Flags (Continued)

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

## Peak Optimization Flags

C benchmarks:

433.milc: basepeak = yes

470.lbm: basepeak = yes

482.sphinx3: basepeak = yes

C++ benchmarks:

444.namd: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2) -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -fno-alias -auto-ilp32 -qopt-mem-layout-trans=3

447.dealII: basepeak = yes

450.soplex: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2) -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -qopt-malloc-options=3 -qopt-mem-layout-trans=3

453.povray: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2) -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -unroll4 -qopt-mem-layout-trans=3

Fortran benchmarks:

410.bwaves: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch

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

434.zeusmp: basepeak = yes

437.leslie3d: Same as 410.bwaves

459.GemsFDTD: Same as 410.bwaves

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# Peak Optimization Flags (Continued)

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

Benchmarks using both Fortran and C:

435.gromacs: `-prof-gen`(pass 1) `-prof-use`(pass 2) `-xCORE-AVX2`(pass 2) `-par-num-threads=1`(pass 1) `-qopt-prefetch -auto-ilp32 -qopt-mem-layout-trans=3`

436.cactusADM: `basepeak = yes`

454.calculix: `basepeak = yes`

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-ic17.0-official-linux64.html
http://www.spec.org/cpu2006/flags/NEC-Platform-Settings-V1.2-110i-RevA.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/NEC-Platform-Settings-V1.2-110i-RevA.xml


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