



# SPEC® CFP2006 Result

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## NEC Corporation

**SPECfp®2006 = 125**

Express5800/R120g-1M (Intel Xeon E5-2698 v4)

**SPECfp\_base2006 = 117**

CPU2006 license: 9006

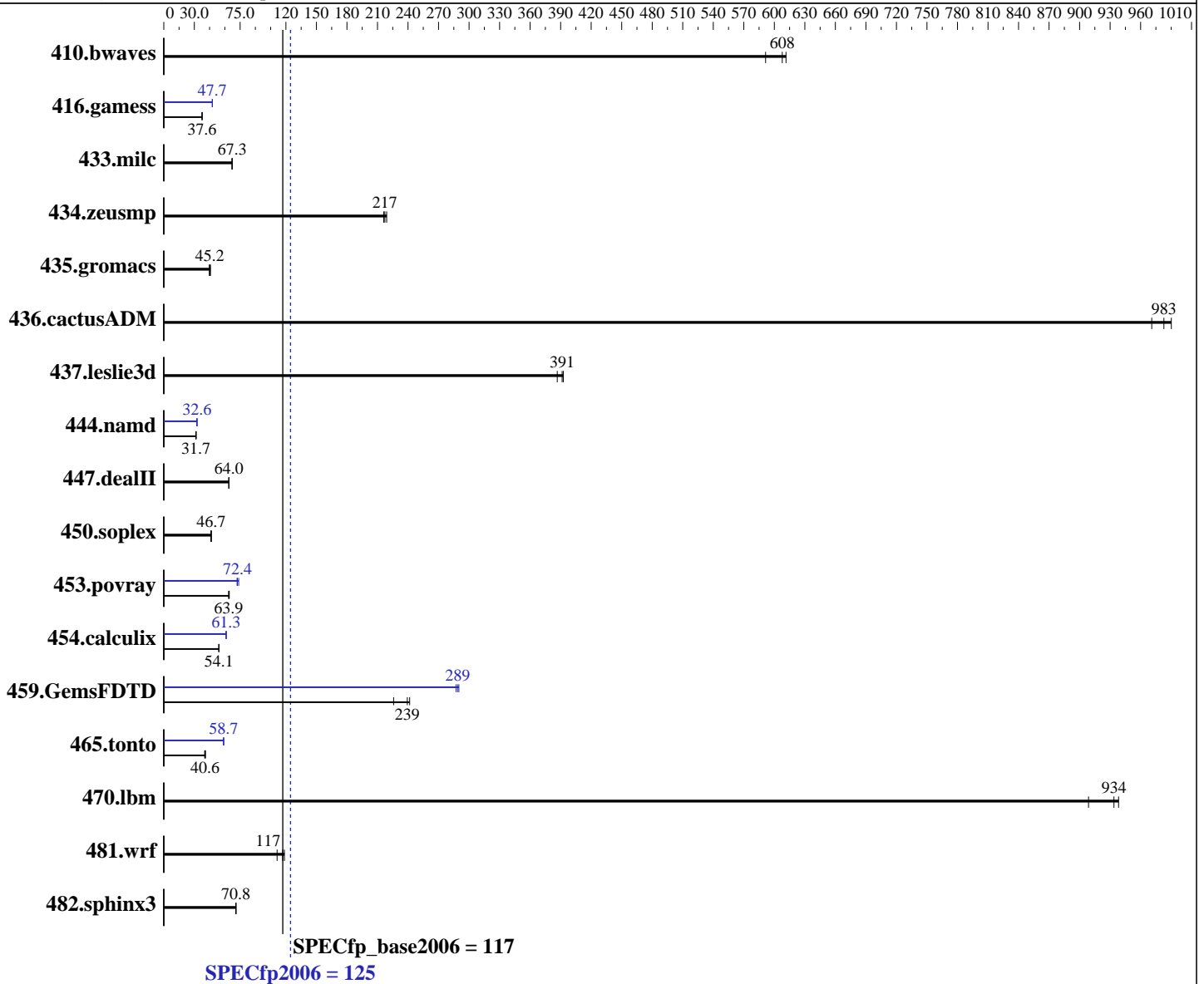
Test date: Mar-2016

Test sponsor: NEC Corporation

Hardware Availability: Apr-2016

Tested by: NEC Corporation

Software Availability: Jan-2016



**Hardware**

CPU Name: Intel Xeon E5-2698 v4  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.60 GHz  
 CPU MHz: 2200  
 FPU: Integrated  
 CPU(s) enabled: 40 cores, 2 chips, 20 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)  
 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;  
 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: 50 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R)  
 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	22.2	611	<u>22.4</u>	<u>608</u>	23.0	591	22.2	611	<u>22.4</u>	<u>608</u>	23.0	591
416.gamess	519	37.7	<u>521</u>	<u>37.6</u>	521	37.6	410	47.7	411	47.7	<u>411</u>	<u>47.7</u>
433.milc	<u>136</u>	<u>67.3</u>	136	67.3	137	66.9	<u>136</u>	<u>67.3</u>	136	67.3	137	66.9
434.zeusmp	41.5	219	<u>41.9</u>	<u>217</u>	42.1	216	41.5	219	<u>41.9</u>	<u>217</u>	42.1	216
435.gromacs	156	45.9	160	44.7	<u>158</u>	<u>45.2</u>	156	45.9	160	44.7	<u>158</u>	<u>45.2</u>
436.cactusADM	<u>12.2</u>	<u>983</u>	12.1	990	12.3	971	<u>12.2</u>	<u>983</u>	12.1	990	12.3	971
437.leslie3d	<u>24.0</u>	<u>391</u>	23.9	393	24.3	387	<u>24.0</u>	<u>391</u>	23.9	393	24.3	387
444.namd	253	31.7	<u>253</u>	<u>31.7</u>	253	31.6	246	32.6	246	32.6	<u>246</u>	<u>32.6</u>
447.dealII	<u>179</u>	<u>64.0</u>	179	63.8	179	64.0	<u>179</u>	<u>64.0</u>	179	63.8	179	64.0
450.soplex	180	46.3	179	46.7	<u>179</u>	<u>46.7</u>	180	46.3	179	46.7	<u>179</u>	<u>46.7</u>
453.povray	82.7	64.3	83.4	63.8	<u>83.3</u>	<u>63.9</u>	<u>73.5</u>	<u>72.4</u>	73.9	72.0	72.3	73.6
454.calculix	152	54.2	<u>152</u>	<u>54.1</u>	152	54.1	135	61.3	135	61.3	<u>135</u>	<u>61.3</u>
459.GemsFDTD	47.0	226	<u>44.3</u>	<u>239</u>	43.9	242	36.9	287	36.6	290	<u>36.7</u>	<u>289</u>
465.tonto	<u>242</u>	<u>40.6</u>	240	40.9	245	40.2	<u>168</u>	<u>58.7</u>	167	58.8	168	58.7
470.lbm	14.6	938	15.1	909	<u>14.7</u>	<u>934</u>	14.6	938	15.1	909	<u>14.7</u>	<u>934</u>
481.wrf	100	111	<u>95.6</u>	<u>117</u>	94.2	119	100	111	<u>95.6</u>	<u>117</u>	94.2	119
482.sphinx3	<u>275</u>	<u>70.8</u>	274	71.1	276	70.7	<u>275</u>	<u>70.8</u>	274	71.1	276	70.7

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  
 Patrol Scrub: Disabled  
 Snoop Mode: Home Snoop  
 Hyper-Threading: Disabled



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## 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 = "40"

Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB memory using RedHat EL 7.1

The Express5800/R120g-1M (Intel Xeon E5-2698 v4) and the Express5800/R120g-2M (Intel Xeon E5-2698 v4) models are electronically equivalent. The results have been measured on the Express5800/R120g-2M (Intel Xeon E5-2698 v4) model.

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.lelie3d: -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

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## Base Portability Flags (Continued)

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

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## Peak Optimization Flags (Continued)

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

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

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## Peak Optimization Flags (Continued)

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-V1.2-120g-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-V1.2-120g-RevB.xml>

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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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