



# SPEC<sup>®</sup> CFP2006 Result

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## NEC Corporation

**SPECfp<sup>®</sup>2006 = 70.8**

Express5800/T120g (Intel Xeon E5-2603 v4)

**SPECfp\_base2006 = 68.9**

CPU2006 license: 9006

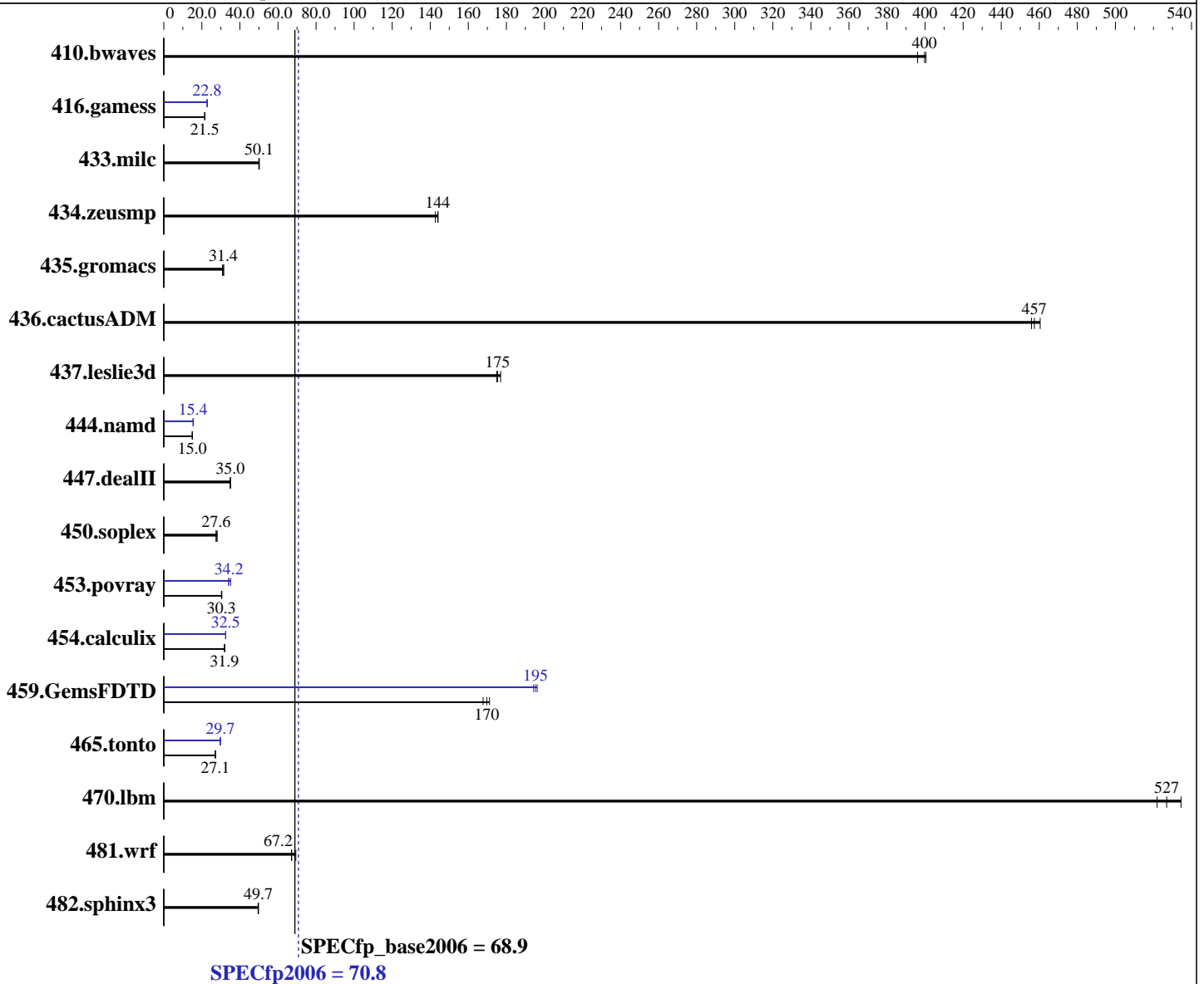
Test date: Apr-2016

Test sponsor: NEC Corporation

Hardware Availability: Apr-2016

Tested by: NEC Corporation

Software Availability: Jan-2016



### Hardware

CPU Name: Intel Xeon E5-2603 v4  
 CPU Characteristics:  
 CPU MHz: 1700  
 FPU: Integrated  
 CPU(s) enabled: 12 cores, 2 chips, 6 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: 15 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R, running at 1866 MHz)  
 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	<b><u>34.0</u></b>	<b><u>400</u></b>	33.9	400	34.3	396	<b><u>34.0</u></b>	<b><u>400</u></b>	33.9	400	34.3	396
416.gamess	911	21.5	<b><u>911</u></b>	<b><u>21.5</u></b>	910	21.5	860	22.8	<b><u>860</u></b>	<b><u>22.8</u></b>	860	22.8
433.milc	184	49.9	183	50.2	<b><u>183</u></b>	<b><u>50.1</u></b>	184	49.9	183	50.2	<b><u>183</u></b>	<b><u>50.1</u></b>
434.zeusmp	63.2	144	63.8	143	<b><u>63.2</u></b>	<b><u>144</u></b>	63.2	144	63.8	143	<b><u>63.2</u></b>	<b><u>144</u></b>
435.gromacs	227	31.5	<b><u>228</u></b>	<b><u>31.4</u></b>	232	30.8	227	31.5	<b><u>228</u></b>	<b><u>31.4</u></b>	232	30.8
436.cactusADM	<b><u>26.1</u></b>	<b><u>457</u></b>	26.2	456	26.0	460	<b><u>26.1</u></b>	<b><u>457</u></b>	26.2	456	26.0	460
437.leslie3d	53.7	175	53.1	177	<b><u>53.6</u></b>	<b><u>175</u></b>	53.7	175	53.1	177	<b><u>53.6</u></b>	<b><u>175</u></b>
444.namd	536	15.0	536	15.0	<b><u>536</u></b>	<b><u>15.0</u></b>	520	15.4	<b><u>520</u></b>	<b><u>15.4</u></b>	520	15.4
447.dealII	<b><u>327</u></b>	<b><u>35.0</u></b>	327	35.0	327	35.0	<b><u>327</u></b>	<b><u>35.0</u></b>	327	35.0	327	35.0
450.soplex	<b><u>302</u></b>	<b><u>27.6</u></b>	297	28.0	304	27.5	<b><u>302</u></b>	<b><u>27.6</u></b>	297	28.0	304	27.5
453.povray	175	30.3	174	30.5	<b><u>175</u></b>	<b><u>30.3</u></b>	156	34.1	<b><u>155</u></b>	<b><u>34.2</u></b>	151	35.2
454.calculix	258	32.0	259	31.9	<b><u>258</u></b>	<b><u>31.9</u></b>	253	32.5	254	32.5	<b><u>254</u></b>	<b><u>32.5</u></b>
459.GemsFDTD	<b><u>62.5</u></b>	<b><u>170</u></b>	62.0	171	63.2	168	54.6	194	<b><u>54.3</u></b>	<b><u>195</u></b>	54.1	196
465.tonto	<b><u>363</u></b>	<b><u>27.1</u></b>	363	27.1	362	27.1	332	29.7	<b><u>331</u></b>	<b><u>29.7</u></b>	331	29.7
470.lbm	26.3	522	25.7	534	<b><u>26.1</u></b>	<b><u>527</u></b>	26.3	522	25.7	534	<b><u>26.1</u></b>	<b><u>527</u></b>
481.wrf	167	67.1	<b><u>166</u></b>	<b><u>67.2</u></b>	161	69.4	167	67.1	<b><u>166</u></b>	<b><u>67.2</u></b>	161	69.4
482.sphinx3	392	49.7	<b><u>392</u></b>	<b><u>49.7</u></b>	393	49.5	392	49.7	<b><u>392</u></b>	<b><u>49.7</u></b>	393	49.5

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  
 Patrol Scrub: Disabled  
 Snoop Mode: Home Snoop with Directory



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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 = "12"

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



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## 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:

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## 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



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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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