



# SPEC<sup>®</sup> CFP2006 Result

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## NEC Corporation

Express5800/R140a-4  
(Intel Xeon E7420)

SPECfp<sup>®</sup>\_rate2006 = 105

SPECfp\_rate\_base2006 = 101

CPU2006 license: 9006

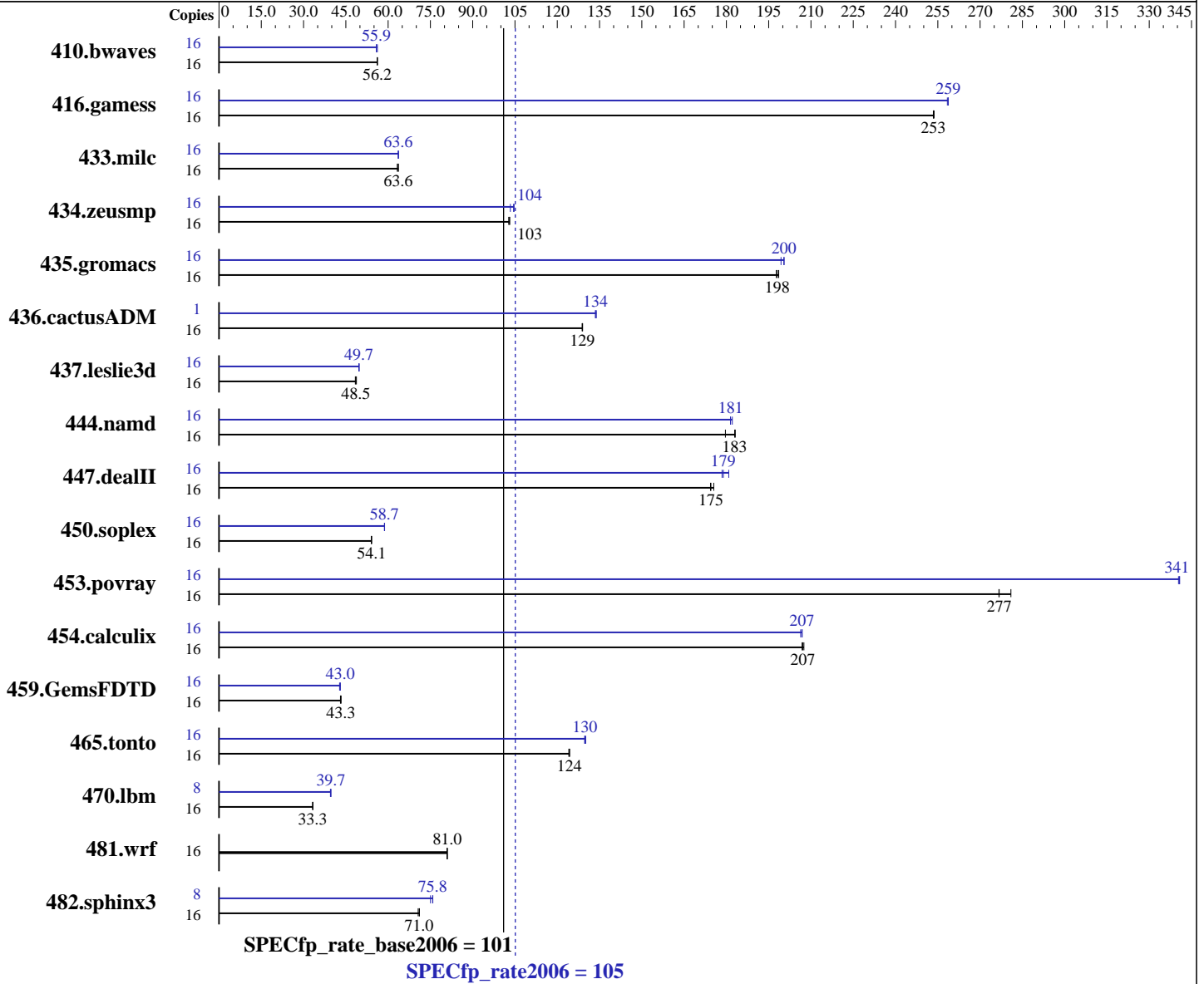
Test sponsor: NEC Corporation

Tested by: NEC Corporation

Test date: Nov-2008

Hardware Availability: Nov-2008

Software Availability: Nov-2008



### Hardware

CPU Name: Intel Xeon E7420  
 CPU Characteristics: 1066 MHz system bus  
 CPU MHz: 2133  
 FPU: Integrated  
 CPU(s) enabled: 16 cores, 4 chips, 4 cores/chip  
 CPU(s) orderable: 1,2,3,4 chips  
 Primary Cache: 32 KB I + 32 KB D on chip per core  
 Secondary Cache: 6 MB I+D on chip per chip, 3 MB shared / 2 cores

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### Software

Operating System: SUSE Linux Enterprise Server 10 (x86\_64) SP2, Kernel 2.6.16.60-0.21-smp  
 Compiler: Intel C++ and Fortran Compiler 11.0 for Linux Build 20080730 Package ID: l\_cproc\_b\_11.0.044, l\_cprof\_b\_11.0.044  
 Auto Parallel: Yes  
 File System: ext2  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit

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L3 Cache: 8 MB I+D on chip per chip  
Other Cache: None  
Memory: 32 GB (16x2 GB PC2-5300F, 2 rank, CL5-5-5, ECC)  
Disk Subsystem: 1x73.2 GB SAS, 15000RPM  
Other Hardware: None

Peak Pointers: 32/64-bit  
Other Software: Binutils 2.18.50.0.7.20080502

## Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	16	3869	56.2	3877	56.1	<b>3872</b>	<b>56.2</b>	16	3895	55.8	3869	56.2	<b>3892</b>	<b>55.9</b>
416.gamess	16	1236	253	<b>1236</b>	<b>253</b>	1235	254	16	1212	258	<b>1211</b>	<b>259</b>	1211	259
433.milc	16	2323	63.2	2309	63.6	<b>2310</b>	<b>63.6</b>	16	2310	63.6	<b>2308</b>	<b>63.6</b>	2308	63.6
434.zeusmp	16	<b>1413</b>	<b>103</b>	1412	103	1417	103	16	1391	105	1409	103	<b>1393</b>	<b>104</b>
435.gromacs	16	575	199	578	198	<b>577</b>	<b>198</b>	16	<b>570</b>	<b>200</b>	573	199	570	201
436.cactusADM	16	1484	129	1482	129	<b>1483</b>	<b>129</b>	1	<b>89.5</b>	<b>134</b>	89.3	134	89.5	134
437.leslie3d	16	3085	48.8	<b>3100</b>	<b>48.5</b>	3110	48.4	16	3030	49.6	<b>3027</b>	<b>49.7</b>	3027	49.7
444.namd	16	<b>701</b>	<b>183</b>	701	183	714	180	16	<b>707</b>	<b>181</b>	707	181	705	182
447.dealII	16	1050	174	<b>1049</b>	<b>175</b>	1043	176	16	1012	181	<b>1023</b>	<b>179</b>	1026	178
450.soplex	16	2471	54.0	<b>2465</b>	<b>54.1</b>	2465	54.1	16	2274	58.7	<b>2273</b>	<b>58.7</b>	2272	58.7
453.povray	16	308	277	303	281	<b>308</b>	<b>277</b>	16	<b>250</b>	<b>341</b>	250	341	250	340
454.calculix	16	636	207	638	207	<b>637</b>	<b>207</b>	16	638	207	640	206	<b>638</b>	<b>207</b>
459.GemsFDTD	16	3940	43.1	<b>3924</b>	<b>43.3</b>	3924	43.3	16	3969	42.8	<b>3947</b>	<b>43.0</b>	3946	43.0
465.tonto	16	1266	124	1269	124	<b>1267</b>	<b>124</b>	16	1210	130	1214	130	<b>1213</b>	<b>130</b>
470.lbm	16	<b>6611</b>	<b>33.3</b>	6605	33.3	6613	33.2	8	2781	39.5	2769	39.7	<b>2770</b>	<b>39.7</b>
481.wrf	16	2210	80.9	<b>2208</b>	<b>81.0</b>	2206	81.0	16	2210	80.9	<b>2208</b>	<b>81.0</b>	2206	81.0
482.sphinx3	16	4385	71.1	<b>4392</b>	<b>71.0</b>	4414	70.7	8	<b>2057</b>	<b>75.8</b>	2055	75.9	2078	75.0

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

## Submit Notes

The config file option 'submit' was used.  
taskset was used to bind processes to cores except for 436.cactusADM peak.  
For peak modules using 1/2 the number of available cores, copies were each assigned to a single L2 cache using mysubmit.pl script.  
See the flags description file for mysubmit.pl details.

## Operating System Notes

'ulimit -s unlimited' was used to set the stacksize to unlimited prior to run  
OMP\_NUM\_THREADS set to number of cores  
KMP\_AFFINITY set to "physical,0"  
KMP\_STACKSIZE set to 64M



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## Platform Notes

Bios settings:

Hardware Prefetcher: Disabled

Adjacent Cache Line Prefetch: Disabled

FSB High Bandwidth Optimization: Enabled

## General Notes

The NEC Express5800/R140a-4(Intel Xeon E7420) and the Bull NovaScale R480 E1(Intel Xeon E7420, 2.13 GHz) models are electronically equivalent. The results have been measured on a NEC Express5800/R140a-4(Intel Xeon E7420) model.

## Base Compiler Invocation

C benchmarks:

icc

C++ benchmarks:

icpc

Fortran benchmarks:

ifort

Benchmarks using both Fortran and C:

icc ifort

## 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:  
-xSSE4.1 -ipo -O3 -no-prec-div -static -opt-prefetch

C++ benchmarks:  
-xSSE4.1 -ipo -O3 -no-prec-div -static -opt-prefetch

Fortran benchmarks:  
-xSSE4.1 -ipo -O3 -no-prec-div -static -opt-prefetch

Benchmarks using both Fortran and C:  
-xSSE4.1 -ipo -O3 -no-prec-div -static -opt-prefetch

## Peak Compiler Invocation

C benchmarks (except as noted below):  
icc

482.sphinx3: /opt/intel/Compiler/11.0/044/bin/ia32/icc  
-L/opt/intel/Compiler/11.0/044/ipp/ia32/lib  
-I/opt/intel/Compiler/11.0/044/ipp/ia32/include

C++ benchmarks (except as noted below):  
icpc

450.soplex: /opt/intel/Compiler/11.0/044/bin/ia32/icpc  
-L/opt/intel/Compiler/11.0/044/ipp/ia32/lib  
-I/opt/intel/Compiler/11.0/044/ipp/ia32/include

Fortran benchmarks (except as noted below):  
ifort

437.leslie3d: /opt/intel/Compiler/11.0/044/bin/ia32/ifort  
-L/opt/intel/Compiler/11.0/044/ipp/ia32/lib  
-I/opt/intel/Compiler/11.0/044/ipp/ia32/include

Benchmarks using both Fortran and C:  
icc ifort

## 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

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**Hardware Availability:** Nov-2008

**Software Availability:** Nov-2008

## Peak Portability Flags (Continued)

```

436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
444.namd: -DSPEC_CPU_LP64
447.dealII: -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

```

## Peak Optimization Flags

C benchmarks:

```

433.milc: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3
         -no-prec-div -static -fno-alias

```

```

470.lbm: -xSSE4.1 -ipo -O3 -no-prec-div -static -opt-prefetch
         -auto-ilp32

```

```

482.sphinx3: -xSSE4.1 -ipo -O3 -no-prec-div -static -unroll2

```

C++ benchmarks:

```

444.namd: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3
         -no-prec-div -static -fno-alias -auto-ilp32

```

```

447.dealII: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3
          -no-prec-div -static -unroll2 -ansi-alias -scalar-rep-

```

```

450.soplex: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3
          -no-prec-div -static -opt-malloc-options=3

```

```

453.povray: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3
          -no-prec-div -static -unroll4 -ansi-alias

```

Fortran benchmarks:

```

410.bwaves: -xSSE4.1 -ipo -O3 -no-prec-div -static -opt-prefetch

```

```

416.gamess: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3
          -no-prec-div -static -unroll2 -Ob0 -ansi-alias
          -scalar-rep-

```

```

434.zeusmp: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3
          -no-prec-div -static

```

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## Peak Optimization Flags (Continued)

437.leslie3d: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3  
-no-prec-div -static -opt-malloc-options=3 -opt-prefetch

459.GemsFDTD: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3  
-no-prec-div -static -unroll2 -Ob0 -opt-prefetch

465.tonto: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3  
-no-prec-div -static -unroll4 -auto

Benchmarks using both Fortran and C:

435.gromacs: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3  
-no-prec-div -static -opt-prefetch -auto-ilp32

436.cactusADM: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3  
-no-prec-div -static -unroll2 -opt-prefetch -parallel  
-auto-ilp32

454.calculix: -xSSE4.1 -ipo -O3 -no-prec-div -static -auto-ilp32

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-ic11.0-fp-linux64-revD.html>

<http://www.spec.org/cpu2006/flags/NEC-Intel-Linux-Settings-flags-revB.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2006/flags/Intel-ic11.0-fp-linux64-revD.xml>

<http://www.spec.org/cpu2006/flags/NEC-Intel-Linux-Settings-flags-revB.xml>

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

Tested with SPEC CPU2006 v1.1.

Report generated on Tue Jul 22 21:07:13 2014 by SPEC CPU2006 PS/PDF formatter v6932.

Originally published on 9 December 2008.