



SPEC[®] CFP2006 Result

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NEC Corporation

SPECfp[®]_rate2006 = **583**

Express5800/R120g-1M (Intel Xeon E5-2620 v4)

SPECfp_rate_base2006 = 572

CPU2006 license: 9006

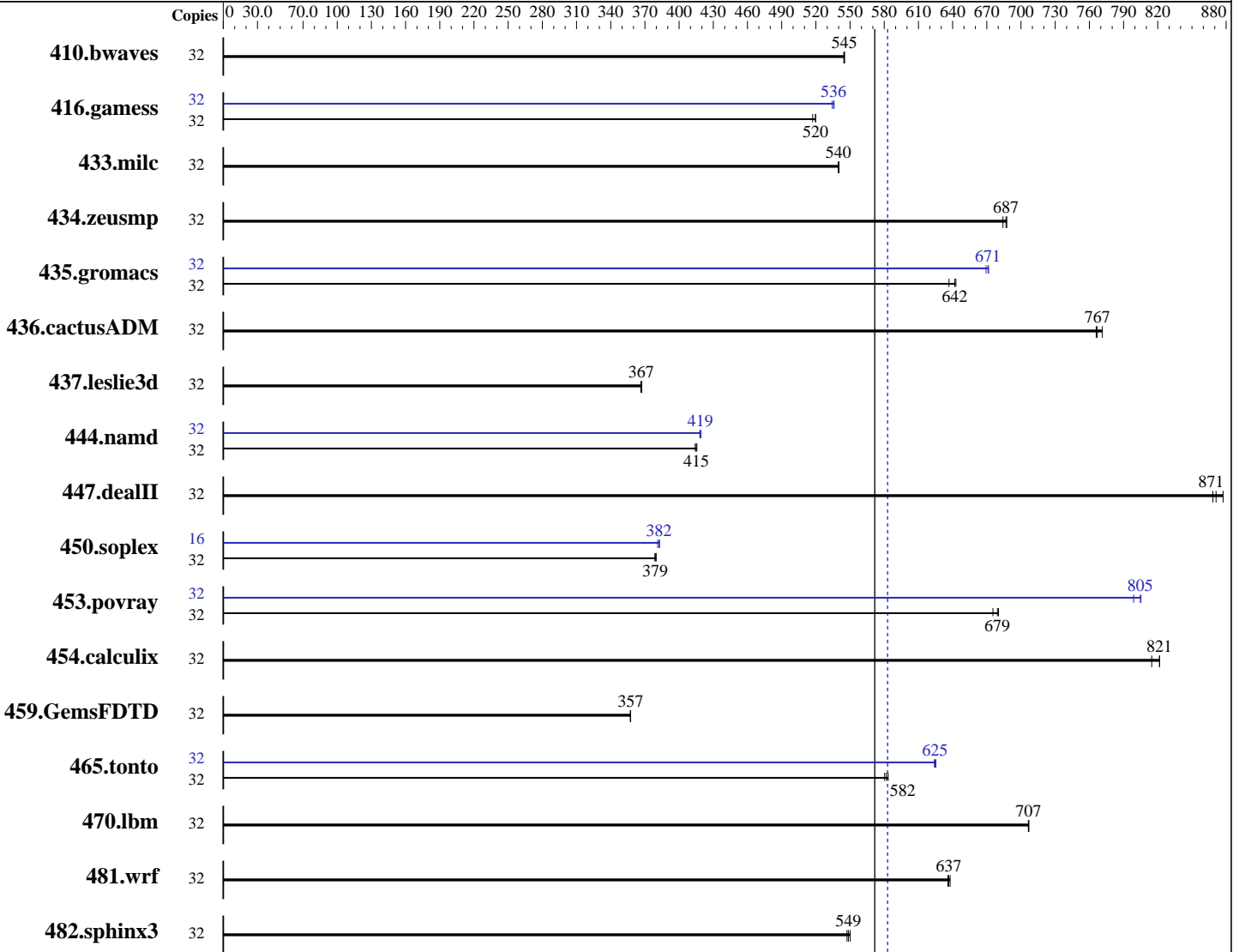
Test sponsor: NEC Corporation

Tested by: NEC Corporation

Test date: Apr-2016

Hardware Availability: Apr-2016

Software Availability: Jan-2016



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Hardware

CPU Name: Intel Xeon E5-2620 v4
 CPU Characteristics: Intel Turbo Boost Technology up to 3.00 GHz
 CPU MHz: 2100
 FPU: Integrated
 CPU(s) enabled: 16 cores, 2 chips, 8 cores/chip, 2 threads/core
 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: No
 File System: ext4

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L3 Cache: 20 MB I+D on chip per chip
 Other Cache: None
 Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R, running at 2133 MHz)
 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 | 32 | 798 | 545 | 799 | 545 | 798 | 545 | 32 | 798 | 545 | 799 | 545 | 798 | 545 | | |
| 416.gamess | 32 | 1211 | 517 | 1206 | 520 | 1206 | 520 | 32 | 1169 | 536 | 1173 | 534 | 1170 | 536 | | |
| 433.milc | 32 | 544 | 540 | 544 | 540 | 544 | 540 | 32 | 544 | 540 | 544 | 540 | 544 | 540 | | |
| 434.zeusmp | 32 | 424 | 688 | 424 | 687 | 426 | 684 | 32 | 424 | 688 | 424 | 687 | 426 | 684 | | |
| 435.gromacs | 32 | 355 | 643 | 356 | 642 | 359 | 637 | 32 | 341 | 669 | 340 | 672 | 340 | 671 | | |
| 436.cactusADM | 32 | 499 | 767 | 496 | 771 | 499 | 766 | 32 | 499 | 767 | 496 | 771 | 499 | 766 | | |
| 437.leslie3d | 32 | 821 | 366 | 819 | 367 | 820 | 367 | 32 | 821 | 366 | 819 | 367 | 820 | 367 | | |
| 444.namd | 32 | 618 | 415 | 618 | 416 | 620 | 414 | 32 | 613 | 419 | 612 | 419 | 614 | 418 | | |
| 447.dealII | 32 | 417 | 877 | 422 | 868 | 420 | 871 | 32 | 417 | 877 | 422 | 868 | 420 | 871 | | |
| 450.soplex | 32 | 705 | 379 | 704 | 379 | 702 | 380 | 16 | 349 | 383 | 349 | 382 | 350 | 381 | | |
| 453.povray | 32 | 251 | 679 | 250 | 680 | 252 | 675 | 32 | 213 | 799 | 212 | 805 | 211 | 805 | | |
| 454.calculix | 32 | 324 | 815 | 321 | 821 | 321 | 822 | 32 | 324 | 815 | 321 | 821 | 321 | 822 | | |
| 459.GemsFDTD | 32 | 950 | 357 | 950 | 357 | 950 | 357 | 32 | 950 | 357 | 950 | 357 | 950 | 357 | | |
| 465.tonto | 32 | 540 | 583 | 541 | 582 | 543 | 580 | 32 | 504 | 625 | 505 | 624 | 504 | 625 | | |
| 470.lbm | 32 | 622 | 707 | 622 | 706 | 622 | 707 | 32 | 622 | 707 | 622 | 706 | 622 | 707 | | |
| 481.wrf | 32 | 562 | 636 | 562 | 637 | 560 | 638 | 32 | 562 | 636 | 562 | 637 | 560 | 638 | | |
| 482.sphinx3 | 32 | 1137 | 549 | 1134 | 550 | 1140 | 547 | 32 | 1137 | 549 | 1134 | 550 | 1140 | 547 | | |

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

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl 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)

Patrol Scrub: Disabled
Snoop Mode: Home Snoop with Directory

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/sh"

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 E5-2620 v4) and the Express5800/R120g-2M (Intel Xeon E5-2620 v4) models are electronically equivalent. The results have been measured on the Express5800/R120g-2M (Intel Xeon E5-2620 v4) model.

Transparent Huge Pages enabled with:

echo always > /sys/kernel/mm/transparent_hugepage/enabled

Filesystem page cache cleared with:

echo 1 > /proc/sys/vm/drop_caches

runspec command invoked through numactl i.e.:

numactl --interleave=all runspec <etc>

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

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Base Portability Flags (Continued)

```

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
482.sphinx3: -DSPEC_CPU_LP64

```

Base Optimization Flags

C benchmarks:

```

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3

```

C++ benchmarks:

```

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3

```

Fortran benchmarks:

```

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch

```

Benchmarks using both Fortran and C:

```

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias -opt-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_2016/linux/compiler/lib/ia32_lin

```

Fortran benchmarks:

```

ifort -m64

```

Benchmarks using both Fortran and C:

```

icc -m64 ifort -m64

```



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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
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: -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) -opt-mem-layout-trans=3(pass 2)
         -prof-use(pass 2) -fno-alias -auto-ilp32

```

447.dealII: basepeak = yes

```

450.soplex: -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) -opt-mem-layout-trans=3(pass 2)
          -prof-use(pass 2) -opt-malloc-options=3

```

```

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) -opt-mem-layout-trans=3(pass 2)
          -prof-use(pass 2) -unroll4 -ansi-alias

```

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Peak Optimization Flags (Continued)

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: basepeak = yes

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) -unroll4 -auto
-inline-calloc -opt-malloc-options=3

Benchmarks using both Fortran and C:

435.gromacs: -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) -opt-mem-layout-trans=3(pass 2)
-prof-use(pass 2) -opt-prefetch -auto-ilp32

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-ic16.0-official-linux64.html>

<http://www.spec.org/cpu2006/flags/NEC-Platform-Settings-V1.2-120g-RevC.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-RevC.xml>



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