# SPEC® CFP2006 Result
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## NEC Corporation

$SPECfp^{®}\_rate2006 = 1110$

Express5800/R120g-2M (Intel Xeon E5-2699 v4)
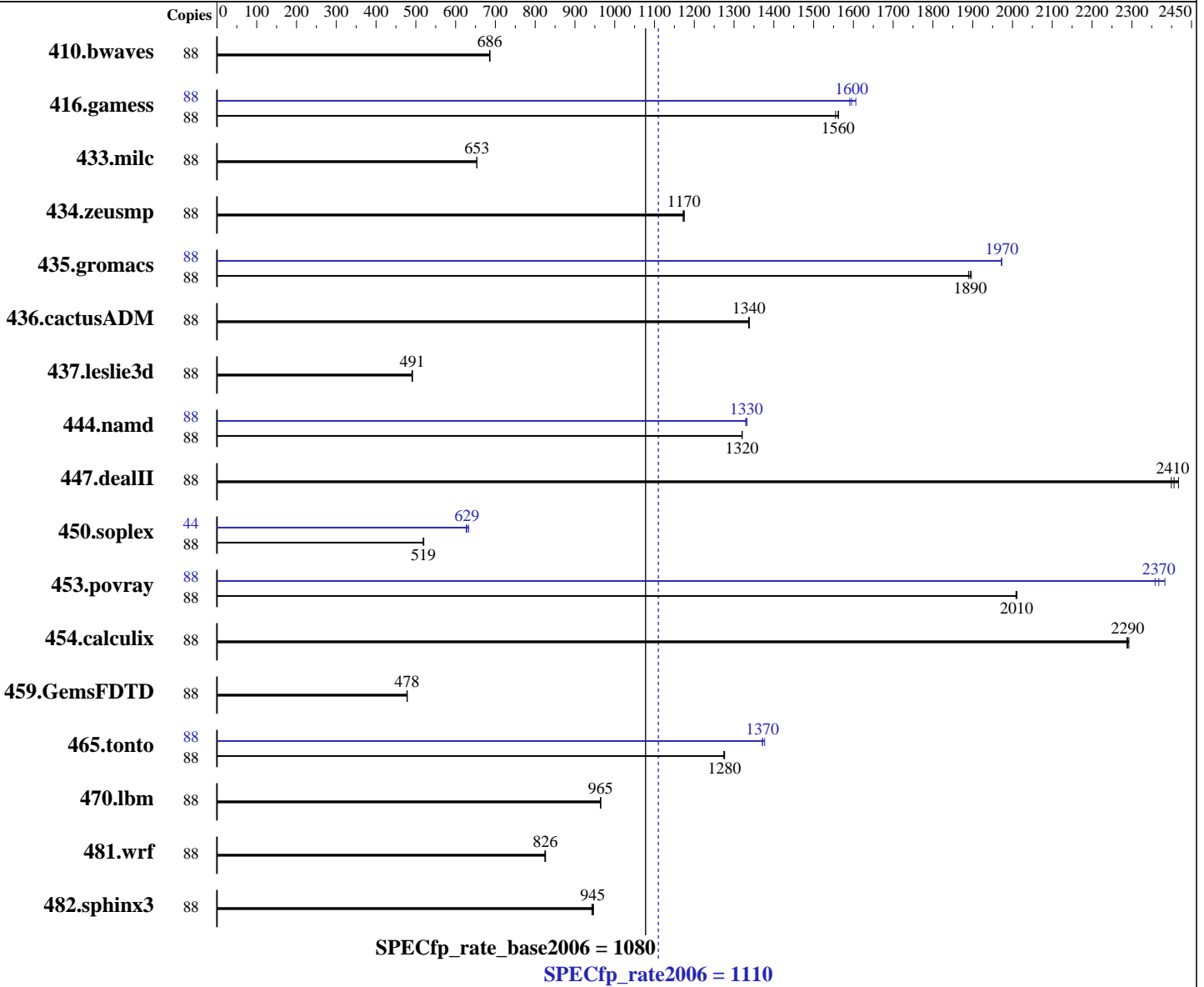
$SPECfp\_rate\_base2006 = 1080$

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

**Test date:** Apr-2016
**Hardware Availability:** Apr-2016
**Software Availability:** Jan-2016



| Benchmark | Copies | Result |
|---|---|---|
| 410.bwaves | 88 | 686 |
| 416.gamess | 88 | 1600 |
| 416.gamess | 88 | 1560 |
| 433.milc | 88 | 653 |
| 434.zeusmp | 88 | 1170 |
| 435.gromacs | 88 | 1970 |
| 435.gromacs | 88 | 1890 |
| 436.cactusADM | 88 | 1340 |
| 437.leslie3d | 88 | 491 |
| 444.namd | 88 | 1330 |
| 444.namd | 88 | 1320 |
| 447.dealII | 88 | 2410 |
| 450.soplex | 44 | 629 |
| 450.soplex | 88 | 519 |
| 453.povray | 88 | 2370 |
| 453.povray | 88 | 2010 |
| 454.calculix | 88 | 2290 |
| 459.GemsFDTD | 88 | 478 |
| 465.tonto | 88 | 1370 |
| 465.tonto | 88 | 1280 |
| 470.lbm | 88 | 965 |
| 481.wrf | 88 | 826 |
| 482.sphinx3 | 88 | 945 |

SPECfp_rate_base2006 = 1080
SPECfp_rate2006 = 1110

## Hardware

**CPU Name:** Intel Xeon E5-2699 v4
**CPU Characteristics:** Intel Turbo Boost Technology up to 3.60 GHz
**CPU MHz:** 2200
**FPU:** Integrated
**CPU(s) enabled:** 44 cores, 2 chips, 22 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
**Continued on next page**

## 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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$SPECfp\_rate2006 =$     1110

$SPECfp\_rate\_base2006 =$   1080

| | |
|---|---|
| **CPU2006 license:** 9006 | **Test date:** Apr-2016 |
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| | | | |
|---|---|---|---|
| L3 Cache: | 55 MB I+D on chip per chip | System State: | Run level 3 (multi-user) |
| Other Cache: | None | Base Pointers: | 32/64-bit |
| Memory: | 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R) | Peak Pointers: | 32/64-bit |
| Disk Subsystem: | 1 x 1 TB SATA, 7200 RPM | Other Software: | None |
| Other Hardware: | None | | |

## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 88 | 1743 | 686 | **_1743_** | **_686_** | 1745 | 685 | 88 | 1743 | 686 | **_1743_** | **_686_** | 1745 | 685 |
| 416.gamess | 88 | 1108 | 1560 | **_1103_** | **_1560_** | 1103 | 1560 | 88 | 1073 | 1610 | **_1080_** | **_1600_** | 1083 | 1590 |
| 433.milc | 88 | 1236 | 654 | **_1236_** | **_653_** | 1236 | 653 | 88 | 1236 | 654 | **_1236_** | **_653_** | 1236 | 653 |
| 434.zeusmp | 88 | 682 | 1170 | **_682_** | **_1170_** | 683 | 1170 | 88 | 682 | 1170 | **_682_** | **_1170_** | 683 | 1170 |
| 435.gromacs | 88 | **_332_** | **_1890_** | 333 | 1890 | 331 | 1900 | 88 | **_318_** | **_1970_** | 318 | 1970 | 319 | 1970 |
| 436.cactusADM | 88 | **_786_** | **_1340_** | 786 | 1340 | 787 | 1340 | 88 | **_786_** | **_1340_** | 786 | 1340 | 787 | 1340 |
| 437.leslie3d | 88 | 1683 | 491 | 1687 | 490 | **_1684_** | **_491_** | 88 | 1683 | 491 | 1687 | 490 | **_1684_** | **_491_** |
| 444.namd | 88 | 534 | 1320 | 535 | 1320 | **_535_** | **_1320_** | 88 | **_530_** | **_1330_** | 530 | 1330 | 531 | 1330 |
| 447.dealII | 88 | 416 | 2420 | **_418_** | **_2410_** | 420 | 2400 | 88 | 416 | 2420 | **_418_** | **_2410_** | 420 | 2400 |
| 450.soplex | 88 | 1411 | 520 | **_1414_** | **_519_** | 1415 | 519 | 44 | 585 | 627 | **_584_** | **_629_** | 580 | 633 |
| 453.povray | 88 | 233 | 2010 | 233 | 2010 | **_233_** | **_2010_** | 88 | 198 | 2360 | **_198_** | **_2370_** | 196 | 2380 |
| 454.calculix | 88 | **_317_** | **_2290_** | 317 | 2290 | 317 | 2290 | 88 | **_317_** | **_2290_** | 317 | 2290 | 317 | 2290 |
| 459.GemsFDTD | 88 | 1952 | 478 | **_1953_** | **_478_** | 1955 | 478 | 88 | 1952 | 478 | **_1953_** | **_478_** | 1955 | 478 |
| 465.tonto | 88 | **_679_** | **_1280_** | 678 | 1280 | 680 | 1270 | 88 | **_631_** | **_1370_** | 629 | 1380 | 631 | 1370 |
| 470.lbm | 88 | **_1254_** | **_965_** | 1254 | 964 | 1254 | 965 | 88 | **_1254_** | **_965_** | 1254 | 964 | 1254 | 965 |
| 481.wrf | 88 | **_1190_** | **_826_** | 1190 | 826 | 1193 | 824 | 88 | **_1190_** | **_826_** | 1190 | 826 | 1193 | 824 |
| 482.sphinx3 | 88 | **_1815_** | **_945_** | 1812 | 947 | 1819 | 943 | 88 | **_1815_** | **_945_** | 1812 | 947 | 1819 | 943 |

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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# SPEC CFP2006 Result
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## NEC Corporation

Express5800/R120g-2M (Intel Xeon E5-2699 v4)

SPECfp_rate2006 =    1110

SPECfp_rate_base2006 =  1080

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

**Test date:** Apr-2016
**Hardware Availability:** Apr-2016
**Software Availability:** Jan-2016

## Platform Notes (Continued)

```
    Patrol Scrub: Disabled
    Cluster on Die: Enabled
    QPI Frequency Limit: 6.4 GT/s
```

## 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 E5-2699 v4) and
   the Express5800/R120g-2M (Intel Xeon E5-2699 v4) models are electronically equivalent.
   The results have been measured on the Express5800/R120g-2M (Intel Xeon E5-2699 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
```

## NEC Corporation

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**Software Availability:** Jan-2016

## Base Portability Flags (Continued)

```
 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 -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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**Test date:**          Apr-2016
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**Software Availability:** Jan-2016

# 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

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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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For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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