



# SPEC<sup>®</sup> CFP2006 Result

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## NEC Corporation

SPECfp<sup>®</sup>\_rate2006 = 448

Express5800/R120g-1M (Intel Xeon E5-2637 v4)

SPECfp\_rate\_base2006 = 440

CPU2006 license: 9006

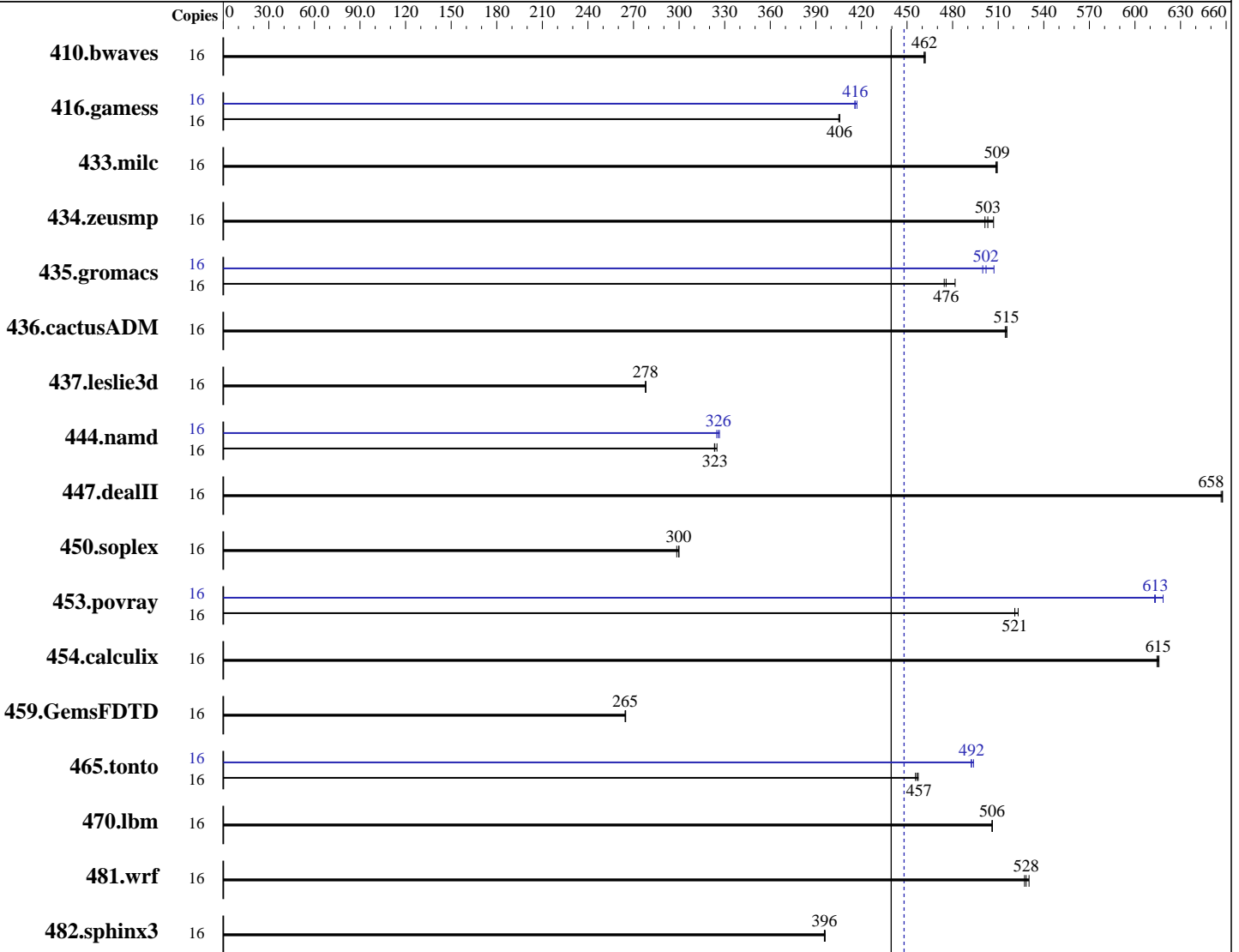
Test sponsor: NEC Corporation

Tested by: NEC Corporation

Test date: Feb-2016

Hardware Availability: Apr-2016

Software Availability: Jan-2016



SPECfp\_rate\_base2006 = 440

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### Hardware

CPU Name: Intel Xeon E5-2637 v4  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz  
 CPU MHz: 3500  
 FPU: Integrated  
 CPU(s) enabled: 8 cores, 2 chips, 4 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: 15 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: 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	16	471	461	471	462	<b>471</b>	<b>462</b>	16	471	461	471	462	<b>471</b>	<b>462</b>
416.gamess	16	772	406	<b>772</b>	<b>406</b>	773	405	16	751	417	<b>753</b>	<b>416</b>	754	416
433.milc	16	288	509	<b>288</b>	<b>509</b>	289	508	16	288	509	<b>288</b>	<b>509</b>	289	508
434.zeusmp	16	287	507	290	501	<b>289</b>	<b>503</b>	16	287	507	290	501	<b>289</b>	<b>503</b>
435.gromacs	16	241	474	<b>240</b>	<b>476</b>	237	482	16	225	507	<b>228</b>	<b>502</b>	229	500
436.cactusADM	16	372	515	371	516	<b>371</b>	<b>515</b>	16	372	515	371	516	<b>371</b>	<b>515</b>
437.leslie3d	16	541	278	541	278	<b>541</b>	<b>278</b>	16	541	278	541	278	<b>541</b>	<b>278</b>
444.namd	16	<b>397</b>	<b>323</b>	395	325	397	323	16	393	327	<b>394</b>	<b>326</b>	395	325
447.dealII	16	<b>278</b>	<b>658</b>	279	657	278	658	16	<b>278</b>	<b>658</b>	279	657	278	658
450.soplex	16	445	300	<b>445</b>	<b>300</b>	447	298	16	445	300	<b>445</b>	<b>300</b>	447	298
453.povray	16	<b>163</b>	<b>521</b>	163	523	163	521	16	<b>139</b>	<b>613</b>	139	613	138	619
454.calculix	16	214	616	<b>215</b>	<b>615</b>	215	615	16	214	616	<b>215</b>	<b>615</b>	215	615
459.GemsFDTD	16	641	265	642	265	<b>642</b>	<b>265</b>	16	641	265	642	265	<b>642</b>	<b>265</b>
465.tonto	16	346	456	<b>345</b>	<b>457</b>	344	457	16	320	492	319	494	<b>320</b>	<b>492</b>
470.lbm	16	<b>434</b>	<b>506</b>	435	506	434	506	16	<b>434</b>	<b>506</b>	435	506	434	506
481.wrf	16	337	530	339	527	<b>338</b>	<b>528</b>	16	337	530	339	527	<b>338</b>	<b>528</b>
482.sphinx3	16	788	396	787	396	<b>788</b>	<b>396</b>	16	788	396	787	396	<b>788</b>	<b>396</b>

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 E5-2637 v4) and the Express5800/R120g-2M (Intel Xeon E5-2637 v4) models are electronically equivalent. The results have been measured on the Express5800/R120g-2M (Intel Xeon E5-2637 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.lelie3d: -DSPEC\_CPU\_LP64

444.namd: -DSPEC\_CPU\_LP64

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## Base Portability Flags (Continued)

```

447.deall: -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:

```

icpc -m64

```

Fortran benchmarks:

```

ifort -m64

```

Benchmarks using both Fortran and C:

```

icc -m64 ifort -m64

```



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## 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:

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.dealIII: 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) -opt-mem-layout-trans=3(pass 2)  
-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: 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

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## Peak Optimization Flags (Continued)

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-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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