



# SPEC<sup>®</sup> CFP2006 Result

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## Fujitsu

### SPECfp<sup>®</sup>\_rate2006 = 361

PRIMERGY BX920 S4, Intel Xeon E5-2420 v2, 2.20 GHz

### SPECfp\_rate\_base2006 = 353

CPU2006 license: 19

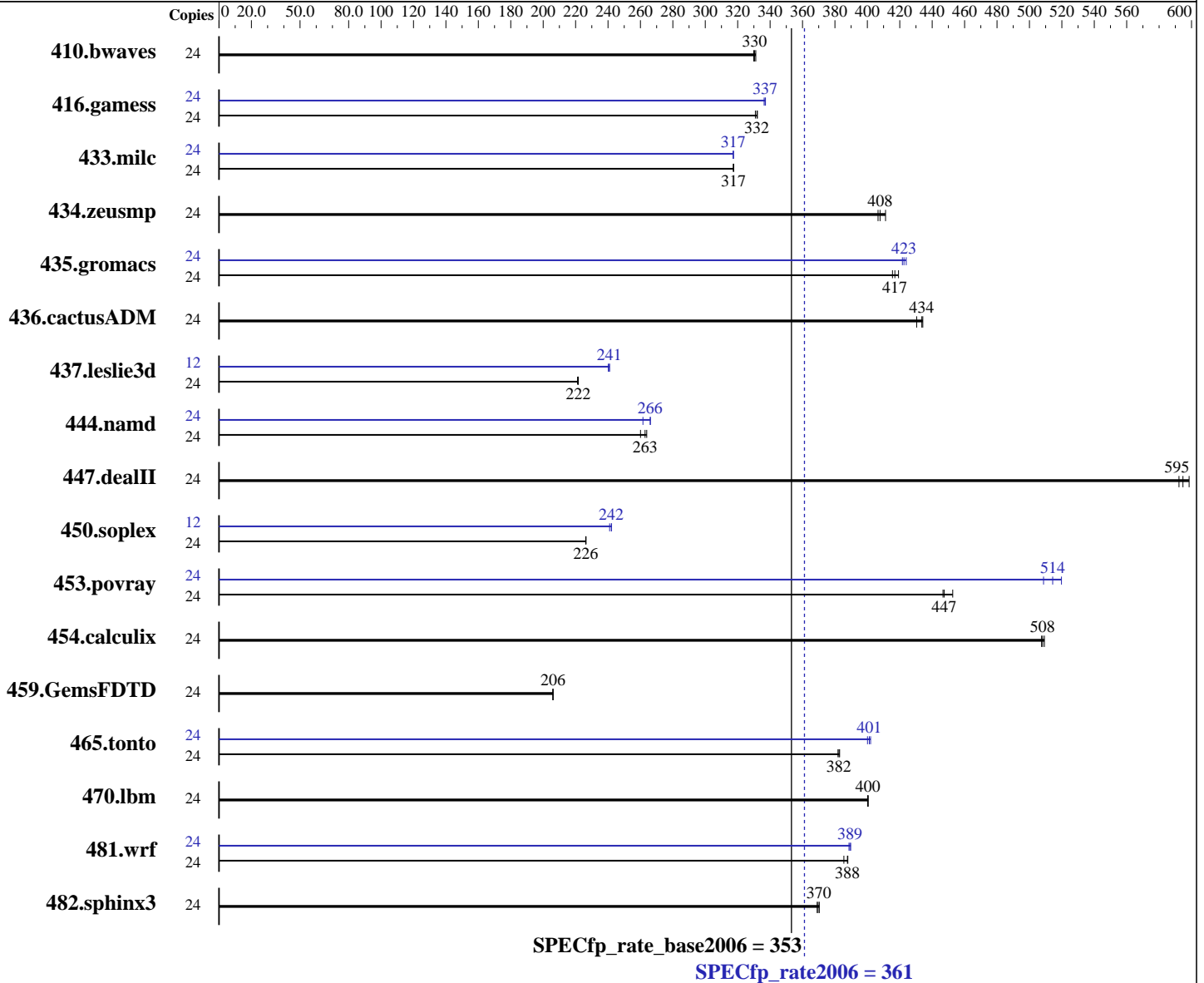
Test sponsor: Fujitsu

Tested by: Fujitsu

Test date: Dec-2013

Hardware Availability: Jan-2014

Software Availability: Sep-2013



### Hardware

CPU Name: Intel Xeon E5-2420 v2  
 CPU Characteristics: Intel Turbo Boost Technology up to 2.70 GHz  
 CPU MHz: 2200  
 FPU: Integrated  
 CPU(s) enabled: 12 cores, 2 chips, 6 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 6.4 (Santiago)  
 2.6.32-358.11.1.el6.x86\_64  
 Compiler: C/C++: Version 14.0.0.080 of Intel C++ Studio XE for Linux;  
 Fortran: Version 14.0.0.080 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: 192 GB (12 x 16 GB 2Rx4 PC3L-12800R-11, ECC)  
Disk Subsystem: 1 x SATA, 500 GB, 7200 RPM  
Other Hardware: None

System State: Run level 5 (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    | 24     | 985        | 331        | <u>987</u>  | <u>330</u> | 989         | 330        | 24     | 985        | 331        | <u>987</u>  | <u>330</u> | 989         | 330        |
| 416.gamess    | 24     | 1420       | 331        | <u>1416</u> | <u>332</u> | 1415        | 332        | 24     | 1394       | 337        | <u>1395</u> | <u>337</u> | 1397        | 336        |
| 433.milc      | 24     | 694        | 318        | <u>694</u>  | <u>317</u> | 694         | 317        | 24     | 694        | 317        | 695         | 317        | <u>694</u>  | <u>317</u> |
| 434.zeusmp    | 24     | <u>536</u> | <u>408</u> | 537         | 407        | 531         | 411        | 24     | <u>536</u> | <u>408</u> | 537         | 407        | 531         | 411        |
| 435.gromacs   | 24     | 409        | 419        | 412         | 415        | <u>411</u>  | <u>417</u> | 24     | 406        | 422        | 404         | 424        | <u>405</u>  | <u>423</u> |
| 436.cactusADM | 24     | <u>661</u> | <u>434</u> | 666         | 430        | 661         | 434        | 24     | <u>661</u> | <u>434</u> | 666         | 430        | 661         | 434        |
| 437.leslie3d  | 24     | 1018       | 222        | <u>1018</u> | <u>222</u> | 1020        | 221        | 12     | 470        | 240        | <u>468</u>  | <u>241</u> | 468         | 241        |
| 444.namd      | 24     | <u>732</u> | <u>263</u> | 740         | 260        | 729         | 264        | 24     | <u>724</u> | <u>266</u> | 723         | 266        | 736         | 262        |
| 447.dealII    | 24     | 464        | 592        | 459         | 599        | <u>462</u>  | <u>595</u> | 24     | 464        | 592        | 459         | 599        | <u>462</u>  | <u>595</u> |
| 450.soplex    | 24     | <u>884</u> | <u>226</u> | 884         | 226        | 885         | 226        | 12     | <u>413</u> | <u>242</u> | 415         | 241        | 413         | 242        |
| 453.povray    | 24     | 282        | 453        | 286         | 447        | <u>285</u>  | <u>447</u> | 24     | 251        | 509        | <u>248</u>  | <u>514</u> | 246         | 520        |
| 454.calculix  | 24     | 390        | 507        | <u>390</u>  | <u>508</u> | 389         | 509        | 24     | 390        | 507        | <u>390</u>  | <u>508</u> | 389         | 509        |
| 459.GemsFDTD  | 24     | 1236       | 206        | <u>1236</u> | <u>206</u> | 1235        | 206        | 24     | 1236       | 206        | <u>1236</u> | <u>206</u> | 1235        | 206        |
| 465.tonto     | 24     | 617        | 383        | <u>617</u>  | <u>382</u> | 618         | 382        | 24     | 587        | 402        | 590         | 400        | <u>589</u>  | <u>401</u> |
| 470.lbm       | 24     | 824        | 400        | <u>824</u>  | <u>400</u> | 823         | 401        | 24     | 824        | 400        | <u>824</u>  | <u>400</u> | 823         | 401        |
| 481.wrf       | 24     | 695        | 386        | <u>691</u>  | <u>388</u> | 691         | 388        | 24     | <u>689</u> | <u>389</u> | 688         | 390        | 690         | 389        |
| 482.sphinx3   | 24     | 1263       | 370        | 1268        | 369        | <u>1265</u> | <u>370</u> | 24     | 1263       | 370        | 1268        | 369        | <u>1265</u> | <u>370</u> |

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 configuration:  
Energy Performance = Performance



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## General Notes

Environment variables set by runspec before the start of the run:  
LD\_LIBRARY\_PATH = "/SPECcpu2006/libs/32:/SPECcpu2006/libs/64:/SPECcpu2006/sh"

Binaries compiled on a system with 1x Core i7-860 CPU + 8GB memory using RedHat EL 6.4  
Transparent Huge Pages enabled with:  
echo always > /sys/kernel/mm/redhat\_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>

For information about Fujitsu please visit: <http://www.fujitsu.com>

## 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:

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

C++ benchmarks:

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

Fortran benchmarks:

-xAVX -ipo -O3 -no-prec-div -opt-prefetch

Benchmarks using both Fortran and C:

-xAVX -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

Fortran benchmarks:

ifort -m64

Benchmarks using both Fortran and C:

icc -m64 ifort -m64

## 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  
453.povray: -DSPEC\_CPU\_LP64  
454.calculix: -DSPEC\_CPU\_LP64 -nofor\_main  
459.GemsFDTD: -DSPEC\_CPU\_LP64

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**Tested by:** Fujitsu

**Software Availability:** Sep-2013

## Peak Portability Flags (Continued)

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: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
 -no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)  
 -prof-use(pass 2) -auto-ilp32

470.lbm: basepeak = yes

482.sphinx3: basepeak = yes

### C++ benchmarks:

444.namd: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
 -no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)  
 -prof-use(pass 2) -fno-alias -auto-ilp32

447.dealIII: basepeak = yes

450.soplex: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
 -no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)  
 -prof-use(pass 2) -opt-malloc-options=3

453.povray: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
 -no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)  
 -prof-use(pass 2) -unroll4 -ansi-alias

### Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
 -no-prec-div(pass 2) -prof-use(pass 2) -unroll2  
 -inline-level=0 -scalar-rep-

434.zeusmp: basepeak = yes

437.leslie3d: -xAVX -ipo -O3 -no-prec-div -opt-prefetch

459.GemsFDTD: basepeak = yes

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## Peak Optimization Flags (Continued)

465.tonto: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -unroll4 -auto  
-inline-calloc -opt-malloc-options=3

Benchmarks using both Fortran and C:

435.gromacs: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -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: -xAVX -ipo -O3 -no-prec-div -auto-ilp32

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2006/flags/Fujitsu-Platform.20131009.html>

<http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.html>

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

<http://www.spec.org/cpu2006/flags/Fujitsu-Platform.20131009.xml>

<http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.xml>

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

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