



# SPEC® CFP2006 Result

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## IBM Corporation

### SPECfp®\_rate2006 = 359

### IBM System x3550 M4 (Intel Xeon E5-2648L)

### SPECfp\_rate\_base2006 = 351

CPU2006 license: 11

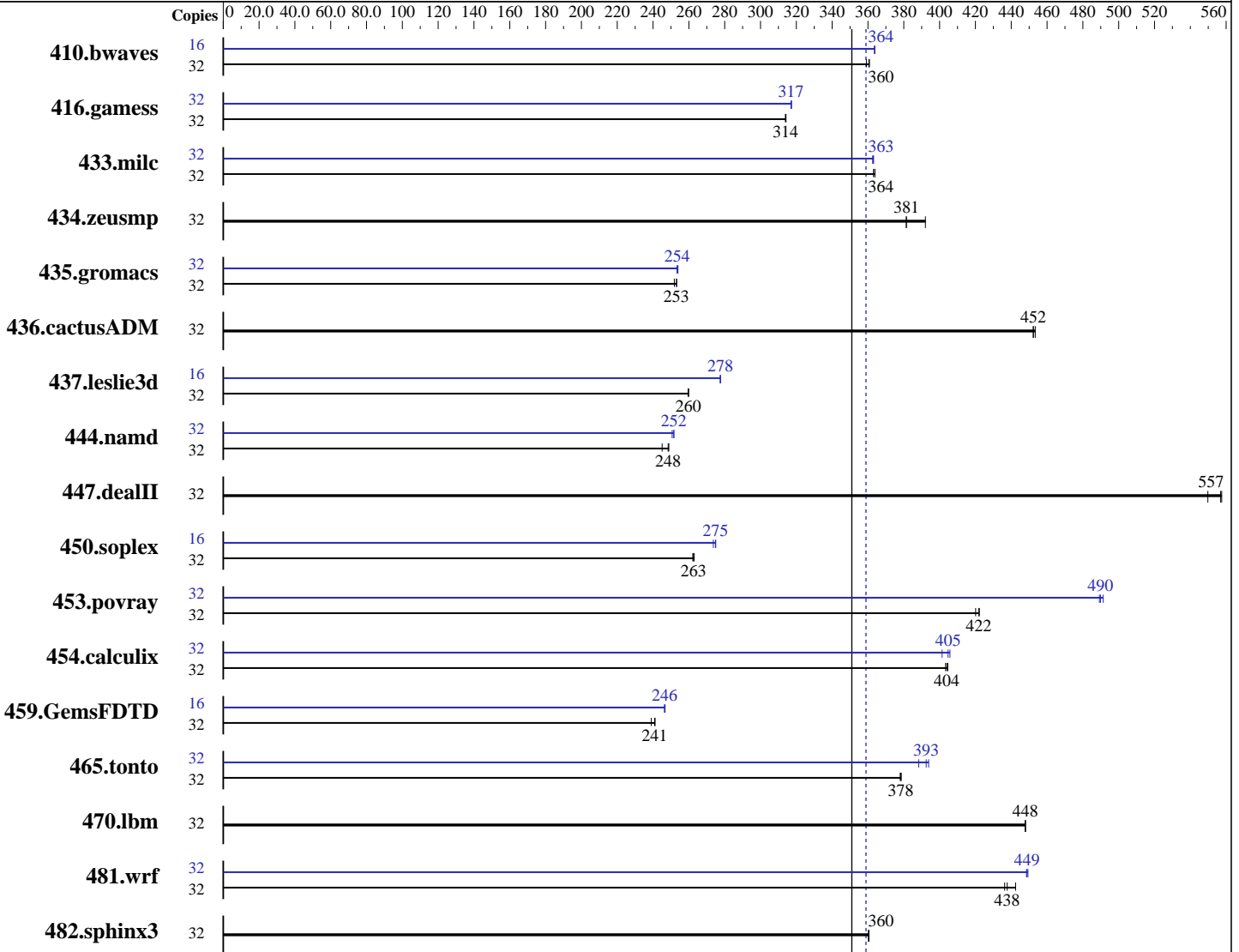
Test sponsor: IBM Corporation

Tested by: IBM Corporation

Test date: Nov-2012

Hardware Availability: Mar-2012

Software Availability: Jun-2012



SPECfp\_rate\_base2006 = 351

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### Hardware

CPU Name: Intel Xeon E5-2648L  
 CPU Characteristics: Intel Turbo Boost Technology up to 2.10 GHz  
 CPU MHz: 1800  
 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

Continued on next page

### Software

Operating System: Red Hat Enterprise Linux Server release 6.3 (Santiago)  
 2.6.32-279.el6.x86\_64  
 Compiler: C/C++: Version 12.1.0.225 of Intel C++ Studio XE for Linux;  
 Fortran: Version 12.1.0.225 of Intel Fortran Studio XE for Linux  
 Auto Parallel: No  
 File System: ext4

Continued on next page



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L3 Cache: 20 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 128 GB (16 x 8 GB 2Rx4 PC3-12800R-11, ECC)  
 Disk Subsystem: 1 x 1 TB SAS, 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     | <b><u>1206</u></b> | <b><u>360</u></b> | 1211               | 359               | 1205               | 361               | 16     | <b><u>598</u></b> | <b><u>364</u></b> | 598                | 364               | 598                | 364               |
| 416.gamess    | 32     | 1996               | 314               | 1994               | 314               | <b><u>1995</u></b> | <b><u>314</u></b> | 32     | 1976              | 317               | <b><u>1976</u></b> | <b><u>317</u></b> | 1974               | 317               |
| 433.milc      | 32     | 807                | 364               | <b><u>807</u></b>  | <b><u>364</u></b> | 809                | 363               | 32     | <b><u>810</u></b> | <b><u>363</u></b> | 810                | 363               | 809                | 363               |
| 434.zeusmp    | 32     | 763                | 381               | <b><u>763</u></b>  | <b><u>381</u></b> | 743                | 392               | 32     | 763               | 381               | <b><u>763</u></b>  | <b><u>381</u></b> | 743                | 392               |
| 435.gromacs   | 32     | <b><u>903</u></b>  | <b><u>253</u></b> | 907                | 252               | 902                | 253               | 32     | <b><u>901</u></b> | <b><u>254</u></b> | 902                | 253               | 900                | 254               |
| 436.cactusADM | 32     | <b><u>845</u></b>  | <b><u>452</u></b> | 843                | 453               | 845                | 452               | 32     | <b><u>845</u></b> | <b><u>452</u></b> | 843                | 453               | 845                | 452               |
| 437.leslie3d  | 32     | <b><u>1158</u></b> | <b><u>260</u></b> | 1159               | 260               | 1158               | 260               | 16     | <b><u>542</u></b> | <b><u>278</u></b> | 542                | 278               | 542                | 278               |
| 444.namd      | 32     | <b><u>1033</u></b> | <b><u>248</u></b> | 1031               | 249               | 1047               | 245               | 32     | 1020              | 252               | 1024               | 251               | <b><u>1020</u></b> | <b><u>252</u></b> |
| 447.dealII    | 32     | 666                | 550               | <b><u>657</u></b>  | <b><u>557</u></b> | 657                | 558               | 32     | 666               | 550               | <b><u>657</u></b>  | <b><u>557</u></b> | 657                | 558               |
| 450.soplex    | 32     | 1015               | 263               | <b><u>1016</u></b> | <b><u>263</u></b> | 1018               | 262               | 16     | 488               | 274               | <b><u>486</u></b>  | <b><u>275</u></b> | 485                | 275               |
| 453.povray    | 32     | 405                | 420               | 403                | 422               | <b><u>404</u></b>  | <b><u>422</u></b> | 32     | <b><u>348</u></b> | <b><u>490</u></b> | 346                | 491               | 348                | 489               |
| 454.calculix  | 32     | <b><u>653</u></b>  | <b><u>404</u></b> | 655                | 403               | 653                | 405               | 32     | <b><u>652</u></b> | <b><u>405</u></b> | 651                | 406               | 658                | 401               |
| 459.GemsFDTD  | 32     | 1421               | 239               | <b><u>1410</u></b> | <b><u>241</u></b> | 1408               | 241               | 16     | 688               | 247               | 689                | 246               | <b><u>689</u></b>  | <b><u>246</u></b> |
| 465.tonto     | 32     | 833                | 378               | 832                | 379               | <b><u>833</u></b>  | <b><u>378</u></b> | 32     | <b><u>802</u></b> | <b><u>393</u></b> | 799                | 394               | 811                | 388               |
| 470.lbm       | 32     | 982                | 448               | 981                | 448               | <b><u>982</u></b>  | <b><u>448</u></b> | 32     | 982               | 448               | 981                | 448               | <b><u>982</u></b>  | <b><u>448</u></b> |
| 481.wrf       | 32     | <b><u>817</u></b>  | <b><u>438</u></b> | 808                | 442               | 819                | 436               | 32     | 795               | 449               | 797                | 449               | <b><u>796</u></b>  | <b><u>449</u></b> |
| 482.sphinx3   | 32     | 1730               | 360               | 1731               | 360               | <b><u>1730</u></b> | <b><u>360</u></b> | 32     | 1730              | 360               | 1731               | 360               | <b><u>1730</u></b> | <b><u>360</u></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"  
 Zone reclaim mode enabled with:  
 echo 1 > /proc/sys/vm/zone\_reclaim\_mode



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CPU2006 license: 11

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Test date: Nov-2012

Hardware Availability: Mar-2012

Software Availability: Jun-2012

## Platform Notes

BIOS Settings:

Operating Mode set to Maximum Performance

Sysinfo program /home/SPECcpu-v1.2/config/sysinfo.rev6800

\$Rev: 6800 \$ \$Date:: 2011-10-11 #\$ 6f2ebdff5032aaa42e583f96b07f99d3

running on x3550M4 Sat Nov 3 11:04:45 2012

This section contains SUT (System Under Test) info as seen by some common utilities. To remove or add to this section, see:

<http://www.spec.org/cpu2006/Docs/config.html#sysinfo>

From /proc/cpuinfo

model name : Intel(R) Xeon(R) CPU E5-2648L 0 @ 1.80GHz

2 "physical id"s (chips)

32 "processors"

cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)

cpu cores : 8

siblings : 16

physical 0: cores 0 1 2 3 4 5 6 7

physical 1: cores 0 1 2 3 4 5 6 7

cache size : 20480 KB

From /proc/meminfo

MemTotal: 132230536 kB

HugePages\_Total: 0

Hugepagesize: 2048 kB

/usr/bin/lsc\_release -d

Red Hat Enterprise Linux Server release 6.3 (Santiago)

From /etc/\*release\* /etc/\*version\*

redhat-release: Red Hat Enterprise Linux Server release 6.3 (Santiago)

system-release: Red Hat Enterprise Linux Server release 6.3 (Santiago)

system-release-cpe: cpe:/o:redhat:enterprise\_linux:6server:ga:server

uname -a:

Linux x3550M4 2.6.32-279.el6.x86\_64 #1 SMP Wed Jun 13 18:24:36 EDT 2012

x86\_64 x86\_64 x86\_64 GNU/Linux

run-level 3 Nov 2 16:52

SPEC is set to: /home/SPECcpu-v1.2

Filesystem Type Size Used Avail Use% Mounted on

/dev/mapper/vg\_x3550m4-lv\_home

ext4 862G 32G 787G 4% /home

Additional information from dmidecode:

Memory:

16x Samsung M393B1K70DH0-CK0 8 GB 1600 MHz 2 rank

(End of data from sysinfo program)



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## General Notes

Environment variables set by runspec before the start of the run:  
LD\_LIBRARY\_PATH = "/home/SPECcpu-v1.2/libs/32:/home/SPECcpu-v1.2/libs/64"

Binaries compiled on a system with 1x Core i7-860 CPU + 8GB memory using RHEL5.5  
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>

## 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.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



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## Base Optimization Flags

C benchmarks:

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

C++ benchmarks:

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

Fortran benchmarks:

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

Benchmarks using both Fortran and C:

-xAVX -ipo -O3 -no-prec-div -static -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  
465.tonto: -DSPEC\_CPU\_LP64

Continued on next page



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## Peak Portability Flags (Continued)

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) -prof-use(pass 2) -static -auto-ilp32  
-opt-mem-layout-trans=3

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) -prof-use(pass 2) -fno-alias  
-auto-ilp32

447.dealII: basepeak = yes

450.soplex: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(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) -prof-use(pass 2) -unroll4 -ansi-alias

Fortran benchmarks:

410.bwaves: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -static

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- -static

434.zeusmp: basepeak = yes

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

459.GemsFDTD: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -opt-malloc-options=3

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

Continued on next page



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## Peak Optimization Flags (Continued)

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) -prof-use(pass 2) -opt-prefetch  
-static -auto-ilp32 -opt-mem-layout-trans=3

436.cactusADM: basepeak = yes

454.calculix: -xAVX -ipo -O3 -no-prec-div -static -auto-ilp32  
-opt-mem-layout-trans=3

481.wrf: Same as 454.calculix

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

<http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20111122.html>  
<http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-SNB-C.html>

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

<http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20111122.xml>  
<http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-SNB-C.xml>

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

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