



# SPEC® CFP2006 Result

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## IBM Corporation

### SPECfp®\_rate2006 = 203

IBM System x3650 M4 HD  
(Intel Xeon E5-2603 v2, 1.80 GHz)

### SPECfp\_rate\_base2006 = 199

CPU2006 license: 11

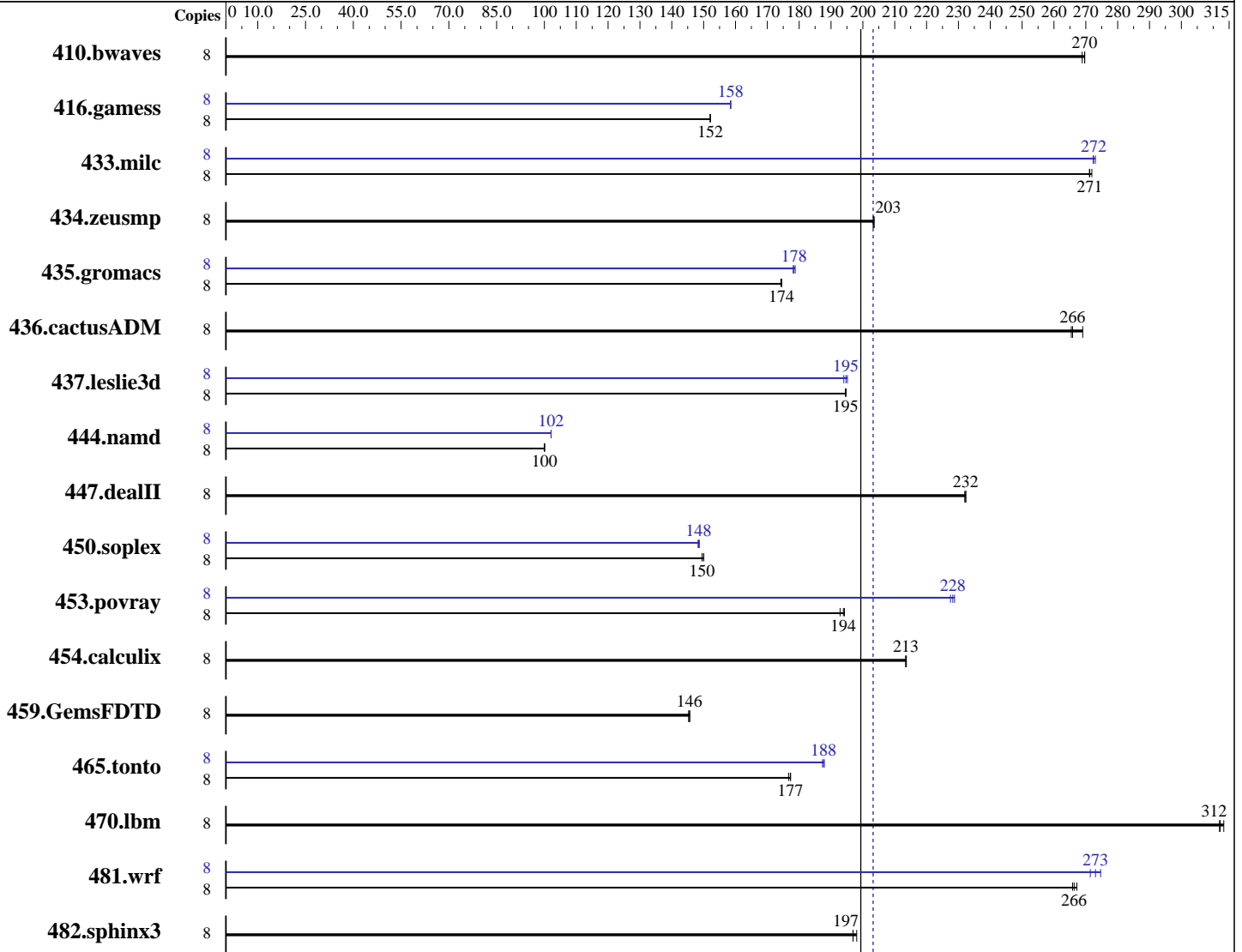
Test date: Dec-2013

Test sponsor: IBM Corporation

Hardware Availability: Dec-2013

Tested by: IBM Corporation

Software Availability: Sep-2013



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### Hardware

CPU Name: Intel Xeon E5-2603 v2  
 CPU Characteristics:  
 CPU MHz: 1800  
 FPU: Integrated  
 CPU(s) enabled: 8 cores, 2 chips, 4 cores/chip  
 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 6.4 (Santiago)  
 2.6.32-358.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:** 10 MB I+D on chip per chip  
**Other Cache:** None  
**Memory:** 256 GB (16 x 16 GB 2Rx4 PC3-14900R-13, ECC, running at 1333 MHz)  
**Disk Subsystem:** 1 x 400 GB SAS SSD, RAID 0  
**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	8	<b>403</b>	<b>270</b>	404	269	403	270	8	<b>403</b>	<b>270</b>	404	269	403	270		
416.gamess	8	1030	152	1030	152	<b>1030</b>	<b>152</b>	8	<b>989</b>	<b>158</b>	988	159	989	158		
433.milc	8	271	271	270	272	<b>271</b>	<b>271</b>	8	269	273	270	272	<b>270</b>	<b>272</b>		
434.zeusmp	8	358	204	<b>358</b>	<b>203</b>	358	203	8	358	204	<b>358</b>	<b>203</b>	358	203		
435.gromacs	8	<b>327</b>	<b>174</b>	327	175	328	174	8	<b>320</b>	<b>178</b>	320	179	321	178		
436.cactusADM	8	<b>360</b>	<b>266</b>	360	265	355	269	8	<b>360</b>	<b>266</b>	360	265	355	269		
437.leslie3d	8	<b>387</b>	<b>195</b>	386	195	387	195	8	<b>386</b>	<b>195</b>	385	195	388	194		
444.namd	8	641	100	<b>641</b>	<b>100</b>	642	100	8	629	102	628	102	<b>628</b>	<b>102</b>		
447.dealII	8	<b>394</b>	<b>232</b>	395	232	394	232	8	<b>394</b>	<b>232</b>	395	232	394	232		
450.soplex	8	<b>446</b>	<b>150</b>	445	150	446	150	8	450	148	449	149	<b>450</b>	<b>148</b>		
453.povray	8	<b>220</b>	<b>194</b>	219	194	221	193	8	187	228	186	229	<b>186</b>	<b>228</b>		
454.calculix	8	309	214	309	213	<b>309</b>	<b>213</b>	8	309	214	309	213	<b>309</b>	<b>213</b>		
459.GemsFDTD	8	584	145	583	146	<b>583</b>	<b>146</b>	8	584	145	583	146	<b>583</b>	<b>146</b>		
465.tonto	8	444	177	<b>444</b>	<b>177</b>	446	177	8	<b>419</b>	<b>188</b>	419	188	420	187		
470.lbm	8	<b>352</b>	<b>312</b>	351	313	352	312	8	<b>352</b>	<b>312</b>	351	313	352	312		
481.wrf	8	334	267	<b>336</b>	<b>266</b>	336	266	8	<b>327</b>	<b>273</b>	325	275	329	271		
482.sphinx3	8	787	198	792	197	<b>792</b>	<b>197</b>	8	787	198	792	197	<b>792</b>	<b>197</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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### Platform Notes

BIOS setting:  
Operating Mode set to Maximum Performance  
Sysinfo program /home/SPECcpu-new/config/sysinfo.rev6818  
\$Rev: 6818 \$ \$Date:: 2012-07-17 #\$ e86d102572650a6e4d596a3cee98f191  
running on x3650M4Plus Wed Dec 4 23:14:26 2013

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 E5-2603 v2 @ 1.80GHz
 2 "physical id"s (chips)
 8 "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     : 4
  siblings      : 4
  physical 0:   cores 0 1 2 3
  physical 1:   cores 0 1 2 3
cache size      : 10240 KB
```

```
From /proc/meminfo
MemTotal:        264655816 kB
HugePages_Total: 0
Hugepagesize:    2048 kB
```

```
/usr/bin/lsb_release -d
Red Hat Enterprise Linux Server release 6.4 (Santiago)
```

```
From /etc/*release* /etc/*version*
redhat-release: Red Hat Enterprise Linux Server release 6.4 (Santiago)
system-release: Red Hat Enterprise Linux Server release 6.4 (Santiago)
system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server
```

```
uname -a:
Linux x3650M4Plus 2.6.32-358.el6.x86_64 #1 SMP Tue Jan 29 11:47:41 EST 2013
x86_64 x86_64 x86_64 GNU/Linux
```

```
run-level 3 Dec 4 12:12
```

```
SPEC is set to: /home/SPECcpu-new
Filesystem      Type      Size Used Avail Use% Mounted on
/dev/mapper/vg_x3650m4plus-lv_home
  ext4          309G 208G  85G  72% /home
```

```
Additional information from dmidecode:
BIOS IBM  -[TESTBUILD-1.50]- 08/09/2013
Memory:
 8x Not Specified Not Specified
16x Samsung M393B2G70QH0-CMA 16 GB 1333 MHz 2 rank
Continued on next page
```



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### Platform Notes (Continued)

(End of data from sysinfo program)  
"Not Specified" memory information from dmidecode indicates unused DIMM slots.  
The BIOS IBM -[TESTBUILD-1.50] is equivalent to production version [VVE134TUS-1.51]

### General Notes

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

### 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

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## Base Portability Flags (Continued)

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:  
-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

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## Peak Portability Flags (Continued)

```

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
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.dealII: 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

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## Peak Optimization Flags (Continued)

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

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/Intel-ic14.0-official-linux64.20140128.html>  
<http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-IVB-A.html>

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

<http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.xml>  
<http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-IVB-A.xml>

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

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