



# SPEC® CFP2006 Result

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## IBM Corporation

IBM Flex System x480 X6  
(Intel Xeon E7-4850 v2, 2.30 GHz)

SPECfp®\_rate2006 = 1240

SPECfp\_rate\_base2006 = 1220

CPU2006 license: 11

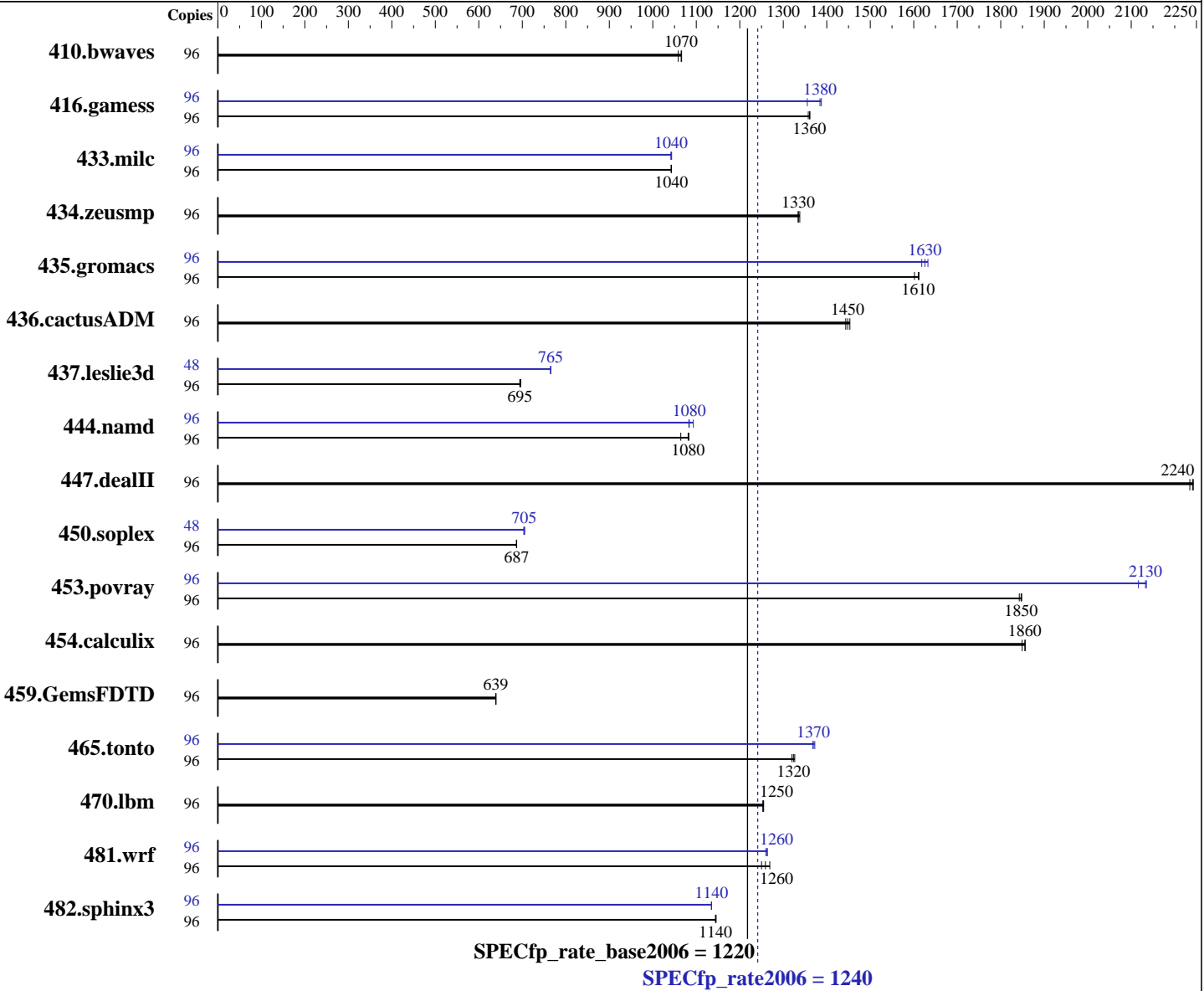
Test sponsor: IBM Corporation

Tested by: IBM Corporation

Test date: Aug-2014

Hardware Availability: Jun-2014

Software Availability: Nov-2013



### Hardware

CPU Name: Intel Xeon E7-4850 v2  
 CPU Characteristics: Intel Turbo Boost Technology up to 2.80 GHz  
 CPU MHz: 2300  
 FPU: Integrated  
 CPU(s) enabled: 48 cores, 4 chips, 12 cores/chip, 2 threads/core  
 CPU(s) orderable: 2,4 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 6.5 (Santiago)  
 2.6.32-431.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: 24 MB I+D on chip per chip  
Other Cache: None  
Memory: 1 TB (64 x 16 GB 2Rx4 PC3L-12800R-11, ECC, running at 1067 MHz)  
Disk Subsystem: 1 x 300 GB SAS, 10000 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	96	1232	1060	<u>1225</u>	<u>1070</u>	1224	1070	96	1232	1060	<u>1225</u>	<u>1070</u>	1224	1070		
416.gamess	96	<b>1382</b>	<b>1360</b>	1381	1360	1385	1360	96	1355	1390	1387	1360	<b>1358</b>	<b>1380</b>		
433.milc	96	845	1040	<b>845</b>	<b>1040</b>	846	1040	96	846	1040	<b>846</b>	<b>1040</b>	845	1040		
434.zeusmp	96	655	1330	<b>654</b>	<b>1330</b>	653	1340	96	655	1330	<b>654</b>	<b>1330</b>	653	1340		
435.gromacs	96	<b>426</b>	<b>1610</b>	425	1610	428	1600	96	424	1620	420	1630	<b>422</b>	<b>1630</b>		
436.cactusADM	96	795	1440	<b>792</b>	<b>1450</b>	789	1450	96	795	1440	<b>792</b>	<b>1450</b>	789	1450		
437.leslie3d	96	1300	694	<b>1298</b>	<b>695</b>	1296	696	48	<b>589</b>	<b>765</b>	589	766	590	765		
444.namd	96	723	1060	711	1080	<b>712</b>	<b>1080</b>	96	704	1090	<b>710</b>	<b>1080</b>	711	1080		
447.dealII	96	491	2230	490	2240	<b>490</b>	<b>2240</b>	96	491	2230	490	2240	<b>490</b>	<b>2240</b>		
450.soplex	96	<b>1165</b>	<b>687</b>	1167	686	1165	687	48	569	703	<b>568</b>	<b>705</b>	568	705		
453.povray	96	<b>277</b>	<b>1850</b>	276	1850	277	1840	96	<b>239</b>	<b>2130</b>	239	2130	241	2120		
454.calculix	96	<b>427</b>	<b>1860</b>	428	1850	427	1860	96	<b>427</b>	<b>1860</b>	428	1850	427	1860		
459.GemsFDTD	96	1593	640	<b>1594</b>	<b>639</b>	1594	639	96	1593	640	<b>1594</b>	<b>639</b>	1594	639		
465.tonto	96	<b>714</b>	<b>1320</b>	716	1320	712	1330	96	688	1370	<b>690</b>	<b>1370</b>	690	1370		
470.lbm	96	<b>1052</b>	<b>1250</b>	1051	1250	1053	1250	96	<b>1052</b>	<b>1250</b>	1051	1250	1053	1250		
481.wrf	96	858	1250	845	1270	<b>852</b>	<b>1260</b>	96	851	1260	849	1260	<b>849</b>	<b>1260</b>		
482.sphinx3	96	1633	1150	1635	1140	<b>1635</b>	<b>1140</b>	96	1648	1140	<b>1648</b>	<b>1140</b>	1649	1130		

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"



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**CPU2006 license:** 11  
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**Test date:** Aug-2014  
**Hardware Availability:** Jun-2014  
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### Platform Notes

Operating Mode set to Maximum Performance in BIOS  
Memory Data Scrambling Disabled  
Patrol Scrub Disabled  
Sysinfo program /cpu2006.1.2\_14.0\_aug2013/config/sysinfo.rev6818  
\$Rev: 6818 \$ \$Date:: 2012-07-17 #\$ e86d102572650a6e4d596a3cee98f191  
running on newport-rhel6.5 Fri Aug 29 12:25:39 2014

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 E7-4850 v2 @ 2.30GHz
 4 "physical id"s (chips)
 96 "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      : 12
  siblings       : 24
  physical 0:    cores 0 1 2 3 4 5 8 9 10 11 12 13
  physical 1:    cores 0 1 2 3 4 5 8 9 10 11 12 13
  physical 2:    cores 0 1 2 3 4 5 8 9 10 11 12 13
  physical 3:    cores 0 1 2 3 4 5 8 9 10 11 12 13
cache size      : 24576 KB
```

```
From /proc/meminfo
MemTotal:      1058506284 kB
HugePages_Total:      0
Hugepagesize:    2048 kB
```

```
/usr/bin/lsb_release -d
Red Hat Enterprise Linux Server release 6.5 (Santiago)
```

```
From /etc/*release* /etc/*version*
redhat-release: Red Hat Enterprise Linux Server release 6.5 (Santiago)
system-release: Red Hat Enterprise Linux Server release 6.5 (Santiago)
system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server
```

```
uname -a:
Linux newport-rhel6.5 2.6.32-431.el6.x86_64 #1 SMP Sun Nov 10 22:19:54 EST 2013 x86_64 x86_64 x86_64 GNU/Linux
```

```
run-level 3 Aug 28 21:45 last=5
```

```
SPEC is set to: /cpu2006.1.2_14.0_aug2013
Filesystem                Type      Size  Used Avail Use% Mounted on
/dev/mapper/vg_newportrhel6-lv_root ext4      265G   29G  223G  12% /
```

```
Additional information from dmidecode:
BIOS IBM  -[N2E107JUS-1.00]- 05/03/2014
Memory:
```

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## Platform Notes (Continued)

32x Hynix HMT42GR7AFR4A-PB 16 GB 1067 MHz 2 rank  
32x NO DIMM Unknown  
32x Samsung M393B2G70QH0-YK0 16 GB 1067 MHz 2 rank

(End of data from sysinfo program)

## General Notes

Environment variables set by runspec before the start of the run:

LD\_LIBRARY\_PATH = "/cpu2006.1.2\_14.0\_aug2013/libs/32:/cpu2006.1.2\_14.0\_aug2013/libs/64:/cpu2006.1.2\_14.0\_aug2013/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

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## Base Portability Flags (Continued)

```

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:

```

-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 (except as noted below):

```

icc -m64

```

```

482.sphinx3: icc -m32

```

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

```



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## 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
465.tonto: -DSPEC_CPU_LP64
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX

```

## 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: -xAVX -ipo -O3 -no-prec-div -opt-mem-layout-trans=3
            -unroll2

```

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:

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## Peak Optimization Flags (Continued)

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

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 questions about this result, please contact the tester.  
For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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