



SPEC® CFP2006 Result

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IBM Corporation

IBM System x3950 X6
(Intel Xeon E7-8880 v2, 2.50 GHz)

SPECfp®_rate2006 = 3140

SPECfp_rate_base2006 = 3060

CPU2006 license: 11

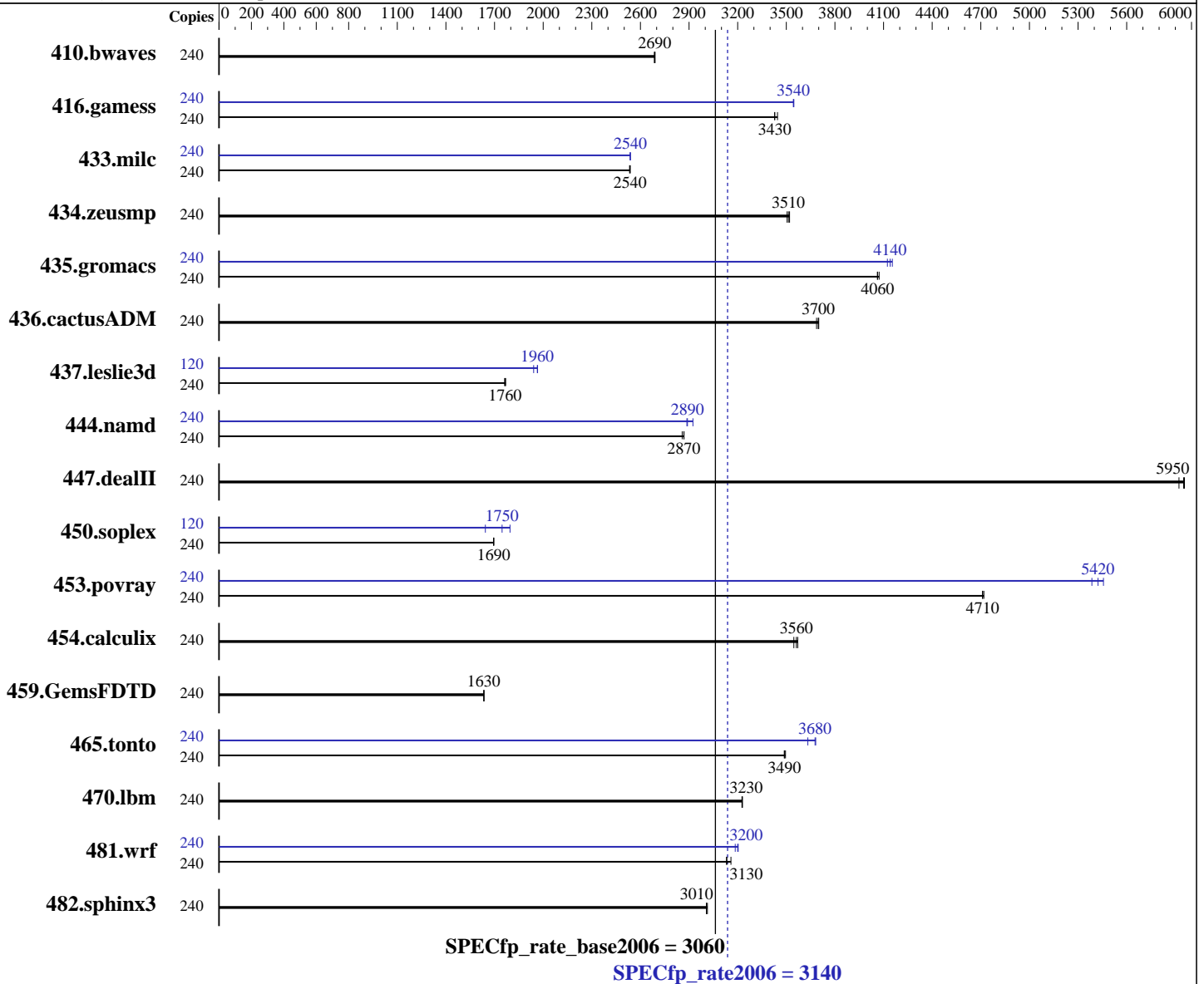
Test sponsor: IBM Corporation

Tested by: IBM Corporation

Test date: May-2014

Hardware Availability: Jun-2014

Software Availability: Nov-2013



Hardware

CPU Name: Intel Xeon E7-8880 v2
 CPU Characteristics: Intel Turbo Boost Technology up to 3.10 GHz
 CPU MHz: 2500
 FPU: Integrated
 CPU(s) enabled: 120 cores, 8 chips, 15 cores/chip, 2 threads/core
 CPU(s) orderable: 4,6,8 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: 37.5 MB I+D on chip per chip
Other Cache: None
Memory: 2 TB (128 x 16 GB 2Rx4 PC3L-12800R-11, ECC, running at 1333 MHz)
Disk Subsystem: 1 x 400 GB SATA, SSD
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	240	1215	2690	<u>1213</u>	<u>2690</u>	1213	2690	240	1215	2690	<u>1213</u>	<u>2690</u>	1213	2690
416.gamess	240	<u>1371</u>	<u>3430</u>	1371	3430	1364	3450	240	1326	3540	1325	3550	<u>1326</u>	<u>3540</u>
433.milc	240	870	2530	868	2540	<u>869</u>	<u>2540</u>	240	868	2540	868	2540	<u>868</u>	<u>2540</u>
434.zeusmp	240	<u>622</u>	<u>3510</u>	623	3500	620	3520	240	<u>622</u>	<u>3510</u>	623	3500	620	3520
435.gromacs	240	421	4070	422	4060	<u>422</u>	<u>4060</u>	240	413	4150	<u>414</u>	<u>4140</u>	416	4120
436.cactusADM	240	778	3690	<u>776</u>	<u>3700</u>	775	3700	240	778	3690	<u>776</u>	<u>3700</u>	775	3700
437.leslie3d	240	1280	1760	1276	1770	<u>1278</u>	<u>1760</u>	120	574	1970	<u>574</u>	<u>1960</u>	581	1940
444.namd	240	671	2870	<u>671</u>	<u>2870</u>	674	2860	240	658	2920	667	2890	<u>666</u>	<u>2890</u>
447.dealII	240	464	5920	461	5960	<u>461</u>	<u>5950</u>	240	464	5920	461	5960	<u>461</u>	<u>5950</u>
450.soplex	240	1180	1700	1182	1690	<u>1181</u>	<u>1690</u>	120	557	1800	<u>573</u>	<u>1750</u>	609	1640
453.povray	240	271	4720	<u>271</u>	<u>4710</u>	271	4710	240	<u>235</u>	<u>5420</u>	234	5460	237	5390
454.calculix	240	558	3550	555	3570	<u>556</u>	<u>3560</u>	240	558	3550	555	3570	<u>556</u>	<u>3560</u>
459.GemsFDTD	240	1558	1630	1558	1630	<u>1558</u>	<u>1630</u>	240	1558	1630	1558	1630	<u>1558</u>	<u>1630</u>
465.tonto	240	676	3500	<u>677</u>	<u>3490</u>	677	3490	240	641	3680	650	3630	<u>642</u>	<u>3680</u>
470.lbm	240	1022	3230	1021	3230	<u>1021</u>	<u>3230</u>	240	1022	3230	1021	3230	<u>1021</u>	<u>3230</u>
481.wrf	240	<u>856</u>	<u>3130</u>	849	3160	856	3130	240	837	3200	<u>838</u>	<u>3200</u>	842	3180
482.sphinx3	240	<u>1555</u>	<u>3010</u>	1555	3010	1552	3010	240	<u>1555</u>	<u>3010</u>	1555	3010	1552	3010

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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Platform Notes

Operating Mode set to Maximum Performance in BIOS
Memory Data Scrambling Disabled
Patrol Scrub Disabled
Sysinfo program /cpu2006.1.2_14_aug2013/config/sysinfo.rev6818
\$Rev: 6818 \$ \$Date:: 2012-07-17 #\$ e86d102572650a6e4d596a3cee98f191
running on x3950x6 Wed May 28 04:58:58 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 E7-8880 v2 @ 2.50GHz
 8 "physical id"s (chips)
240 "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     : 15
  siblings      : 30
 physical 0:    : cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
 physical 1:    : cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
 physical 2:    : cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
 physical 3:    : cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
 physical 4:    : cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
 physical 5:    : cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
 physical 6:    : cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
 physical 7:    : cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
cache size      : 38400 KB
```

From /proc/meminfo

```
MemTotal:      2117446648 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 x3950x6 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 May 27 14:52

SPEC is set to: /cpu2006.1.2_14_aug2013

```
Filesystem      Type Size Used Avail Use% Mounted on
/dev/mapper/vg_x3950x6-lv_root ext4 357G 8.4G 330G 3% /
Continued on next page
```



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Platform Notes (Continued)

Additional information from dmidecode:

BIOS IBM -[A8E107JUS-1.00]- 05/02/2014

Memory:

64x Hynix HMT42GR7AFR4A-PB 16 GB 1333 MHz 2 rank

64x NO DIMM Unknown

64x Samsung M393B2G70QH0-YK0 16 GB 1333 MHz 2 rank

(End of data from sysinfo program)

Memory speed from dmidecode lists the downclocked speed of the run.

General Notes

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

LD_LIBRARY_PATH = "/cpu2006.1.2_14_aug2013/libs/32:/cpu2006.1.2_14_aug2013/libs/64:/cpu2006.1.2_14_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

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Base Portability Flags (Continued)

```

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

```

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

```



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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
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) -unroll14 -ansi-alias

```

Fortran benchmarks:

Continued on next page



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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.
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