SPEC® CFP2006 Result

IBM Corporation

IBM Flex System x240
(Intel Xeon E5-2660 v2, 2.20 GHz)

$SPECfp^{®}\_rate2006 = 585$

$SPECfp\_rate\_base2006 = 571$
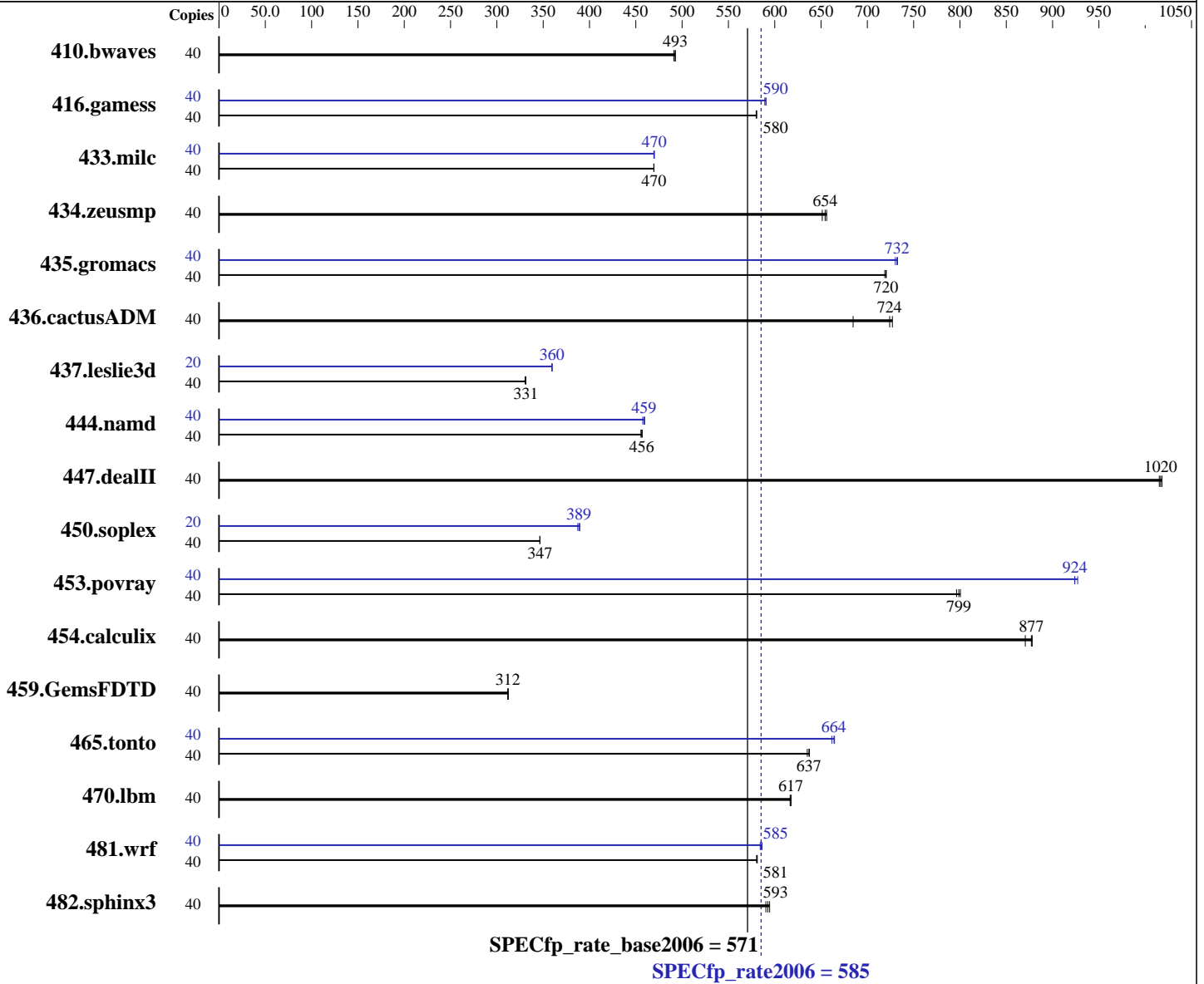
CPU2006 license: 11

Test sponsor: IBM Corporation

Tested by: IBM Corporation

Test date: Jan-2014

Hardware Availability: Dec-2013

Software Availability: Sep-2013

Benchmark	Copies	Result
410.bwaves	40	493
416.gamess	40	590
416.gamess	40	580
433.milc	40	470
433.milc	40	470
434.zeusmp	40	654
435.gromacs	40	732
435.gromacs	40	720
436.cactusADM	40	724
437.leslie3d	20	360
437.leslie3d	40	331
444.namd	40	459
444.namd	40	456
447.dealII	40	1020
450.soplex	20	389
450.soplex	40	347
453.povray	40	924
453.povray	40	799
454.calculix	40	877
459.GemsFDTD	40	312
465.tonto	40	664
465.tonto	40	637
470.lbm	40	617
481.wrf	40	585
481.wrf	40	581
482.sphinx3	40	593

SPECfp_rate_base2006 = 571

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Hardware

CPU Name: Intel Xeon E5-2660 v2
CPU Characteristics: Intel Turbo Boost Technology up to 3.00 GHz
CPU MHz: 2200
FPU: Integrated
CPU(s) enabled: 20 cores, 2 chips, 10 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 6.4 (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:	25 MB I+D on chip per chip	System State:	Run level 3 (multi-user)
Other Cache:	None	Base Pointers:	32/64-bit
Memory:	128 GB (16 x 8 GB 2Rx8 PC3-14900R-13, ECC)	Peak Pointers:	32/64-bit
Disk Subsystem:	1 x 300 GB SAS, 10000 RPM	Other Software:	None
Other Hardware:	None		

Results Table

Benchmark	Base						Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	40	1103	493	**1104**	**493**	1107	491	40	1103	493	**1104**	**493**	1107	491
416.gamess	40	**1350**	**580**	1349	581	1350	580	40	1329	589	1326	591	**1327**	**590**
433.milc	40	782	470	**782**	**470**	782	470	40	**781**	**470**	782	470	781	470
434.zeusmp	40	**556**	**654**	559	651	555	656	40	**556**	**654**	559	651	555	656
435.gromacs	40	397	719	**397**	**720**	396	720	40	390	733	**390**	**732**	391	730
436.cactusADM	40	698	685	657	727	**660**	**724**	40	698	685	657	727	**660**	**724**
437.leslie3d	40	**1135**	**331**	1138	330	1135	331	20	523	360	**523**	**360**	523	360
444.namd	40	702	457	**703**	**456**	704	456	40	698	460	**699**	**459**	701	457
447.dealII	40	**450**	**1020**	451	1020	449	1020	40	**450**	**1020**	451	1020	449	1020
450.soplex	40	963	347	**963**	**347**	963	346	20	431	387	**429**	**389**	428	390
453.povray	40	266	800	**266**	**799**	267	796	40	230	927	230	924	**230**	**924**
454.calculix	40	**376**	**877**	379	871	376	878	40	**376**	**877**	379	871	376	878
459.GemsFDTD	40	**1360**	**312**	1359	312	1361	312	40	**1360**	**312**	1359	312	1361	312
465.tonto	40	617	638	**618**	**637**	620	635	40	592	665	595	662	**593**	**664**
470.lbm	40	890	617	**890**	**617**	891	617	40	890	617	**890**	**617**	891	617
481.wrf	40	770	580	**769**	**581**	769	581	40	765	584	**764**	**585**	762	586
482.sphinx3	40	1320	590	**1316**	**593**	1311	595	40	1320	590	**1316**	**593**	1311	595

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

Operating Mode set to Maximum Perfomance in BIOS
Sysinfo program /cpu2006.1.2_14.0_binaries/config/sysinfo.rev6818
$Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191

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Platform Notes (Continued)

```
running on Blacktip Sun Jan 12 06:41:33 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 E5-2660 v2 @ 2.20GHz
      2 "physical id"s (chips)
      40 "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 : 10
      siblings  : 20
      physical 0: cores 0 1 2 3 4 8 9 10 11 12
      physical 1: cores 0 1 2 3 4 8 9 10 11 12
   cache size : 25600 KB

From /proc/meminfo
   MemTotal:       132127844 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 Blacktip 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 Jan 11 17:49

SPEC is set to: /cpu2006.1.2_14.0_binaries
   Filesystem    Type    Size  Used Avail Use% Mounted on
   /dev/mapper/vg_blacktip-lv_root
                 ext4     50G  6.8G   40G  15% /

Additional information from dmidecode:
  BIOS IBM -[B2E135OUS-1.40]- 10/17/2013
  Memory:
   16x Hynix HMT41GR7AFR8C-RD 8 GB 1867 MHz 2 rank
   8x Not Specified Not Specified

(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 = "/cpu2006.1.2_14.0_binaries/libs/32:/cpu2006.1.2_14.0_binaries/libs/64:/cpu2006.1.2_14.0_binaries/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
   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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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.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
```

```
 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/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

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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