SPEC® CFP2006 Result
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IBM Corporation

IBM System x3850 X6
(Intel Xeon E7-4880 v2, 2.50 GHz)

$SPECfp^{®}\_rate2006 =$ 1600

$SPECfp\_rate\_base2006 =$ 1560
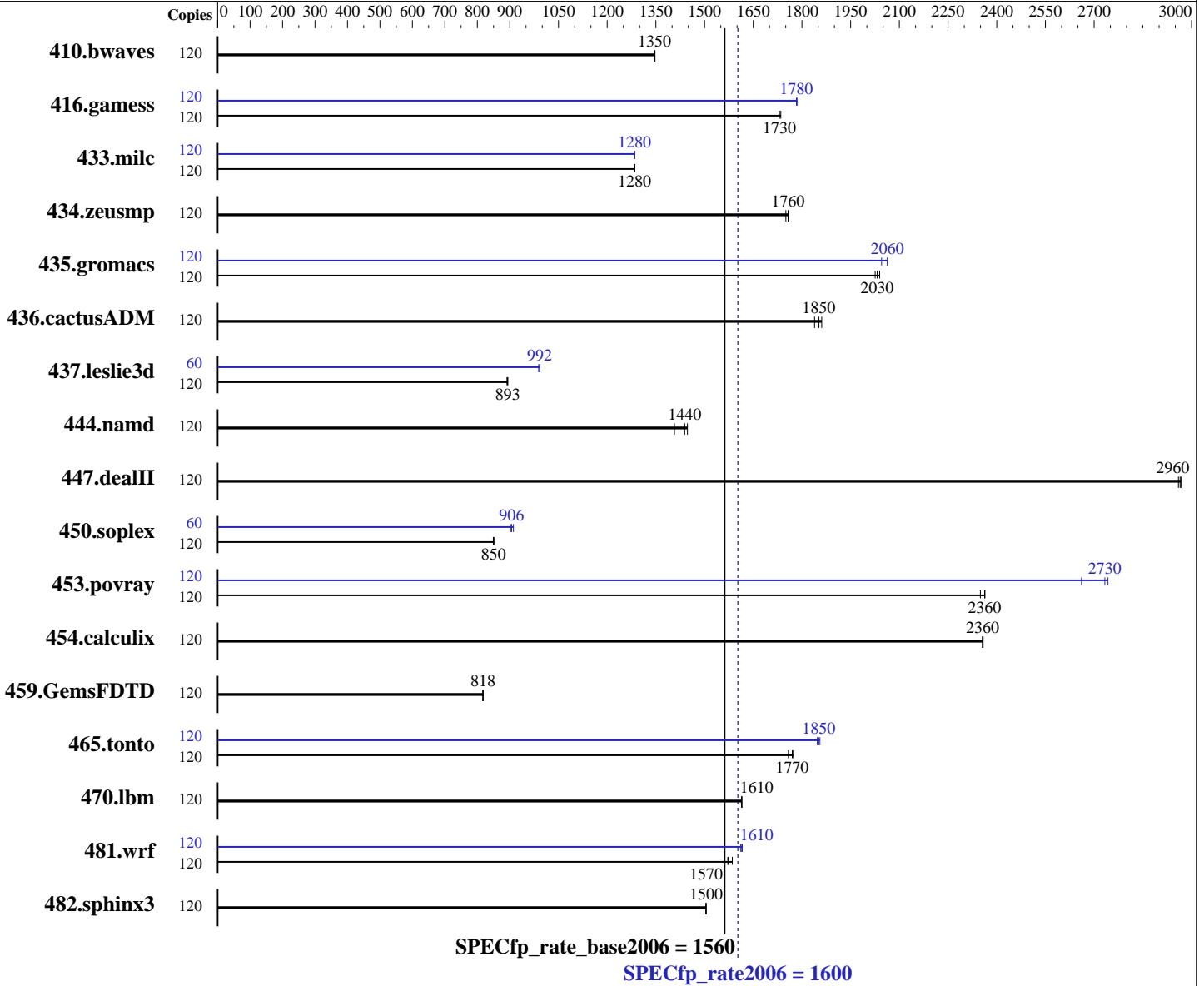
CPU2006 license: 11
Test sponsor: IBM Corporation
Tested by: IBM Corporation

Test date: Jul-2014
Hardware Availability: Mar-2014
Software Availability: Nov-2013

Copies

Benchmark	Copies	Result
410.bwaves	120	1350
416.gamess	120	1780
416.gamess	120	1730
433.milc	120	1280
433.milc	120	1280
434.zeusmp	120	1760
435.gromacs	120	2060
435.gromacs	120	2030
436.cactusADM	120	1850
437.leslie3d	60	992
437.leslie3d	120	893
444.namd	120	1440
447.dealII	120	2960
450.soplex	60	906
450.soplex	120	850
453.povray	120	2730
453.povray	120	2360
454.calculix	120	2360
459.GemsFDTD	120	818
465.tonto	120	1850
465.tonto	120	1770
470.lbm	120	1610
481.wrf	120	1610
481.wrf	120	1570
482.sphinx3	120	1500

SPECfp_rate_base2006 = 1560

SPECfp_rate2006 = 1600

Hardware

CPU Name: Intel Xeon E7-4880 v2
CPU Characteristics: Intel Turbo Boost Technology up to 3.10 GHz
CPU MHz: 2500
FPU: Integrated
CPU(s) enabled: 60 cores, 4 chips, 15 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

Continued on next page

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	System State:	Run level 3 (multi-user)
Other Cache:	None	Base Pointers:	32/64-bit
Memory:	1 TB (64 x 16 GB 2Rx4 PC3L-12800R-11, ECC, running at 1333 MHz)	Peak Pointers:	32/64-bit
		Other Software:	None
Disk Subsystem:	1 x 400 GB SATA, SSD		
Other Hardware:	None		

Results Table

Benchmark	Base						Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	120	1212	1350	1210	1350	**1212**	**1350**	120	1212	1350	1210	1350	**1212**	**1350**
416.gamess	120	**1358**	**1730**	1358	1730	1354	1730	120	1324	1780	**1318**	**1780**	1316	1780
433.milc	120	858	1280	857	1290	**858**	**1280**	120	**858**	**1280**	858	1280	857	1280
434.zeusmp	120	624	1750	621	1760	**621**	**1760**	120	624	1750	621	1760	**621**	**1760**
435.gromacs	120	420	2040	**422**	**2030**	423	2030	120	419	2050	**415**	**2060**	415	2060
436.cactusADM	120	771	1860	780	1840	**774**	**1850**	120	771	1860	780	1840	**774**	**1850**
437.leslie3d	120	1262	894	1266	891	**1263**	**893**	60	**569**	**992**	570	989	568	992
444.namd	120	665	1450	**669**	**1440**	684	1410	120	665	1450	**669**	**1440**	684	1410
447.dealII	120	464	2960	**463**	**2960**	463	2970	120	464	2960	**463**	**2960**	463	2970
450.soplex	120	1176	851	**1177**	**850**	1179	849	60	**552**	**906**	554	904	549	911
453.povray	120	272	2350	**270**	**2360**	270	2360	120	240	2660	**234**	**2730**	233	2740
454.calculix	120	420	2360	420	2360	**420**	**2360**	120	420	2360	420	2360	**420**	**2360**
459.GemsFDTD	120	1557	818	**1557**	**818**	1558	817	120	1557	818	**1557**	**818**	1558	817
465.tonto	120	666	1770	672	1760	**667**	**1770**	120	639	1850	636	1860	**638**	**1850**
470.lbm	120	1022	1610	**1021**	**1610**	1021	1610	120	1022	1610	**1021**	**1610**	1021	1610
481.wrf	120	**853**	**1570**	845	1590	853	1570	120	**830**	**1610**	832	1610	829	1620
482.sphinx3	120	1554	1500	**1554**	**1500**	1555	1500	120	1554	1500	**1554**	**1500**	1555	1500

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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Test date: Jul-2014
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Platform Notes

```
Operating Mode set to Maximum Perfomance 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 Larry-Andromeda Thu Jul 17 00:47:48 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 E7-4880 v2 @ 2.50GHz
      4 "physical id"s (chips)
      120 "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
   cache size : 38400 KB

From /proc/meminfo
   MemTotal:      1058467616 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 Larry-Andromeda 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 Jul 16 11:10

SPEC is set to: /cpu2006.1.2_14.0_aug2013
   Filesystem                         Type  Size  Used Avail Use% Mounted on
   /dev/mapper/vg_larryandromed-lv_root ext4  357G  233G  106G  69% /

Additional information from dmidecode:
   BIOS IBM -[A8E107JUS-1.00]- 05/02/2014
   Memory:
```

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Platform Notes (Continued)

```
    32x NO DIMM Unknown
    64x Samsung M393B2G70QH0-YK0 16 GB 1333 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
    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: basepeak = yes

   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-
```

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Peak Optimization Flags (Continued)

        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

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

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