SPEC® CFP2006 Result

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IBM Corporation

IBM System x3850 X5 (Intel Xeon E7-4860, 2.27 GHz)

$SPECfp®\_rate2006 = \quad 731$

$SPECfp\_rate\_base2006 = \quad 715$
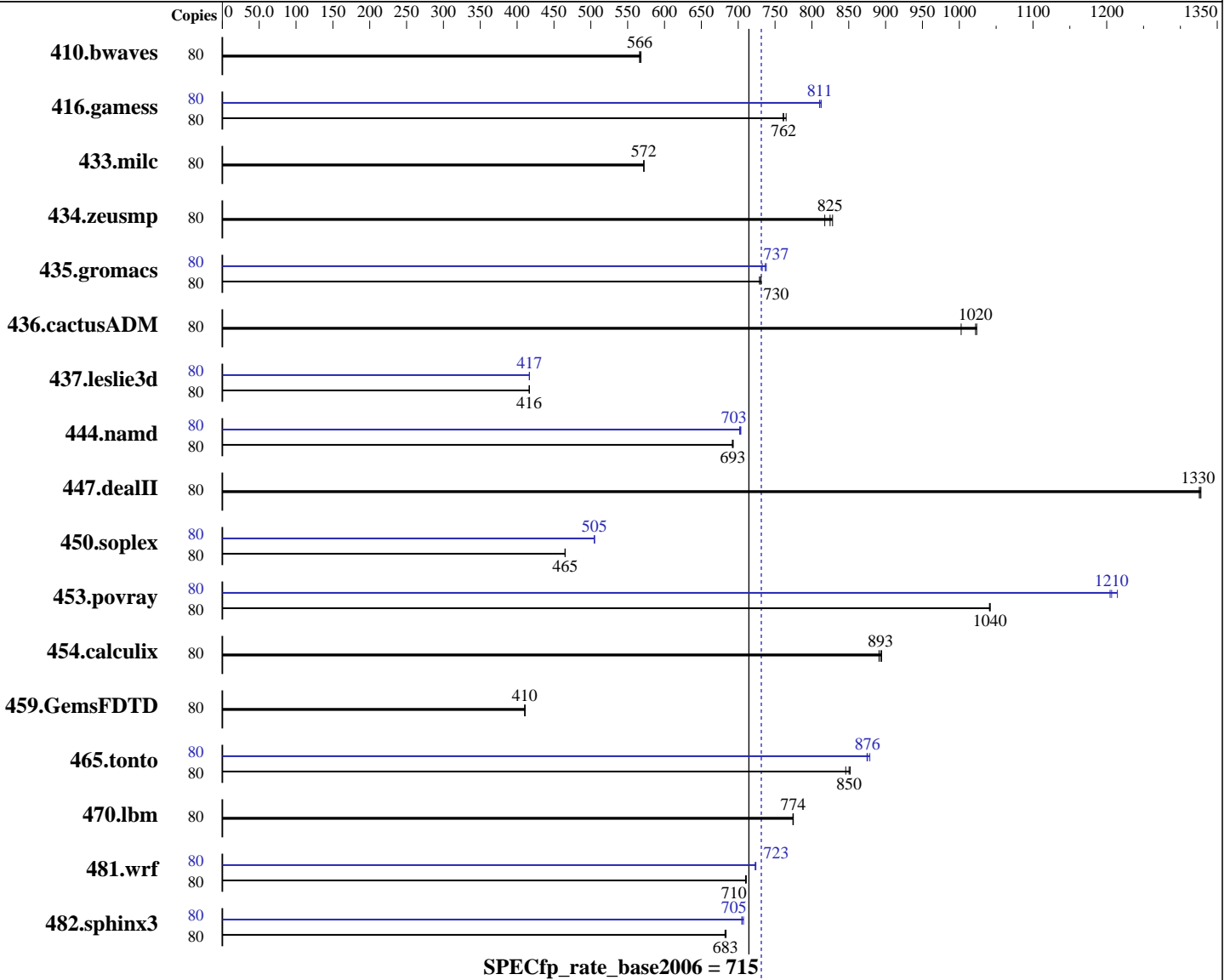
CPU2006 license: 11   **Test date:** Sep-2012
Test sponsor: IBM Corporation   **Hardware Availability:** May-2011
Tested by: IBM Corporation   **Software Availability:** Dec-2011

Benchmark	Copies	Result
410.bwaves	80	566
416.gamess	80 / 80	811 / 762
433.milc	80	572
434.zeusmp	80	825
435.gromacs	80 / 80	737 / 730
436.cactusADM	80	1020
437.leslie3d	80 / 80	417 / 416
444.namd	80 / 80	703 / 693
447.dealII	80	1330
450.soplex	80 / 80	505 / 465
453.povray	80 / 80	1210 / 1040
454.calculix	80	893
459.GemsFDTD	80	410
465.tonto	80 / 80	876 / 850
470.lbm	80	774
481.wrf	80 / 80	723 / 710
482.sphinx3	80 / 80	705 / 683

SPECfp_rate_base2006 = 715

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Hardware

CPU Name: Intel Xeon E7-4860
CPU Characteristics: Intel Turbo Boost Technology up to 2.67 GHz
CPU MHz: 2267
FPU: Integrated
CPU(s) enabled: 40 cores, 4 chips, 10 cores/chip, 2 threads/core
CPU(s) orderable: 1,2,3,4 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 6.2 (Santiago)
2.6.32-220.el6.x86_64
Compiler: C/C++: Version 12.1.0.225 of Intel C++ Studio XE for Linux;
Fortran: Version 12.1.0.225 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	System State:	Run level 3 (multi-user)
Other Cache:	None	Base Pointers:	32/64-bit
Memory:	512 GB (64 x 8 GB 4Rx8 PC3L-8500R-7, 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	80	**1920**	**566**	1914	568	1920	566	80	**1920**	**566**	1914	568	1920	566
416.gamess	80	2047	765	2059	761	**2057**	**762**	80	1927	813	1933	810	**1932**	**811**
433.milc	80	1284	572	1284	572	**1284**	**572**	80	1284	572	1284	572	**1284**	**572**
434.zeusmp	80	879	828	**883**	**825**	891	818	80	879	828	**883**	**825**	891	818
435.gromacs	80	784	729	**782**	**730**	781	731	80	780	733	**775**	**737**	774	738
436.cactusADM	80	934	1020	954	1000	**935**	**1020**	80	934	1020	954	1000	**935**	**1020**
437.leslie3d	80	1806	416	**1806**	**416**	1804	417	80	1804	417	**1805**	**417**	1806	417
444.namd	80	**926**	**693**	925	693	927	692	80	**912**	**703**	914	702	912	703
447.dealII	80	689	1330	690	1330	**690**	**1330**	80	689	1330	690	1330	**690**	**1330**
450.soplex	80	**1434**	**465**	1435	465	1434	465	80	1322	505	1321	505	**1322**	**505**
453.povray	80	408	1040	**409**	**1040**	409	1040	80	353	1200	350	1210	**353**	**1210**
454.calculix	80	**739**	**893**	741	891	738	895	80	**739**	**893**	741	891	738	895
459.GemsFDTD	80	2066	411	**2068**	**410**	2069	410	80	2066	411	**2068**	**410**	2069	410
465.tonto	80	924	852	**926**	**850**	931	846	80	**899**	**876**	896	879	900	875
470.lbm	80	**1419**	**774**	1419	775	1420	774	80	**1419**	**774**	1419	775	1420	774
481.wrf	80	**1258**	**710**	1259	710	1257	711	80	1234	724	**1235**	**723**	1236	723
482.sphinx3	80	2286	682	2281	684	**2283**	**683**	80	2205	707	**2211**	**705**	2211	705

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

    Turbo Boost Power Optimization set to Traditional in BIOS
    Sysinfo program /cpu2006.1.2/config/sysinfo.rev6800
    $Rev: 6800 $ $Date:: 2011-10-11 #$ 6f2ebdff5032aaa42e583f96b07f99d3

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Test date: Sep-2012
Hardware Availability: May-2011
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Platform Notes (Continued)

```
running on ghidorah-pete Wed Sep 26 10:06:21 2012

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- 4860 @ 2.27GHz
      4 "physical id"s (chips)
      80 "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 8 9 16 17 18 24 25
      physical 1: cores 0 1 2 8 9 16 17 18 24 25
      physical 2: cores 0 1 2 8 9 16 17 18 24 25
      physical 3: cores 0 1 2 8 9 16 17 18 24 25
   cache size : 24576 KB

From /proc/meminfo
   MemTotal:       529211644 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

/usr/bin/lsb_release -d
   Red Hat Enterprise Linux Server release 6.2 (Santiago)

From /etc/*release* /etc/*version*
   redhat-release: Red Hat Enterprise Linux Server release 6.2 (Santiago)
   system-release: Red Hat Enterprise Linux Server release 6.2 (Santiago)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server

uname -a:
   Linux ghidorah-pete 2.6.32-220.el6.x86_64 #1 SMP Wed Nov 9 08:03:13 EST 2011
   x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Sep 24 15:15

SPEC is set to: /cpu2006.1.2
   Filesystem     Type     Size  Used Avail Use% Mounted on
   /dev/mapper/vg_ghidorahpete-lv_root
                  ext4     264G  5.9G  245G   3% /

Additional information from dmidecode:
  Memory:
   64x Hynix HMT31GR7BFR8A-G7 8 GB 1067 MHz 4 rank

(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/libs/32:/cpu2006.1.2/libs/64"

 Binaries compiled on a system with 1x Core i7-860 CPU + 8GB
 memory using RHEL5.5
 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:
```
-xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3
```

C++ benchmarks:
```
-xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3
```

Fortran benchmarks:
```
-xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch
```

Benchmarks using both Fortran and C:
```
-xSSE4.2 -ipo -O3 -no-prec-div -static -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
```

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
```

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Peak 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
```

Peak Optimization Flags

C benchmarks:

```
      433.milc: basepeak = yes

       470.lbm: basepeak = yes

   482.sphinx3: -xSSE4.2 -ipo -O3 -no-prec-div -opt-mem-layout-trans=3
                -unroll2
```

C++ benchmarks:

```
     444.namd: -xSSE4.2(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: -xSSE4.2(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: -xSSE4.2(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: -xSSE4.2(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- -static

   434.zeusmp: basepeak = yes

   437.leslie3d: -xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch

   459.GemsFDTD: basepeak = yes
```

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Peak Optimization Flags (Continued)

465.tonto: -xSSE4.2(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: -xSSE4.2(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 -static -auto-ilp32

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: -xSSE4.2 -ipo -O3 -no-prec-div -static -auto-ilp32

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20111122.html
http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-WSM-C.html

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You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20111122.xml
http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-WSM-C.xml

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