SPEC® CFP2006 Result
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IBM Corporation

IBM System x3550 M4 (Intel Xeon E5-2670)

$SPECfp^{®}2006 =$ 84.0
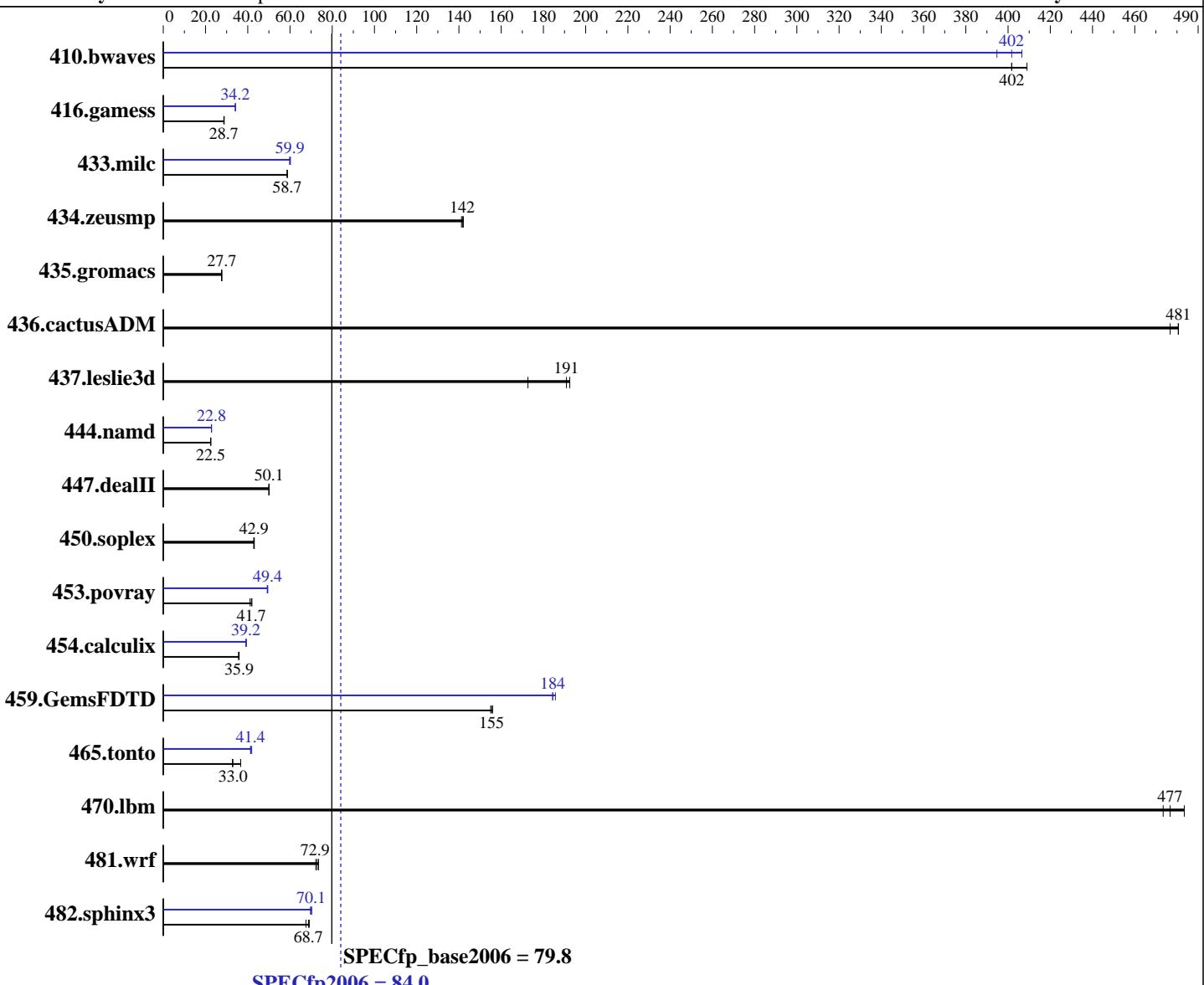
$SPECfp\_base2006 =$ 79.8

CPU2006 license: 11
Test sponsor: IBM Corporation
Tested by: IBM Corporation

Test date: Mar-2012
Hardware Availability: Mar-2012
Software Availability: Oct-2011

SPECfp_base2006 = 79.8
SPECfp2006 = 84.0

Hardware

CPU Name: Intel Xeon E5-2670
CPU Characteristics: Intel Turbo Boost Technology up to 3.30 GHz
CPU MHz: 2600
FPU: Integrated
CPU(s) enabled: 16 cores, 2 chips, 8 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 6.1 (Santiago)
2.6.32-131.0.15.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: Yes
File System: ext4

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L3 Cache:	20 MB I+D on chip per chip	System State:	Run level 3 (add definition here)
Other Cache:	None	Base Pointers:	64-bit
Memory:	128 GB (16 x 8 GB 2Rx4 PC3-12800R-11, ECC)	Peak Pointers:	32/64-bit
Disk Subsystem:	1 x 1 TB SAS, 7200 RPM	Other Software:	None
Other Hardware:	None		

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	33.8	402	33.2	409	**33.8**	**402**	**33.8**	**402**	33.4	407	34.4	395
416.gamess	678	28.9	**682**	**28.7**	682	28.7	574	34.1	**573**	**34.2**	573	34.2
433.milc	156	58.7	156	58.7	**156**	**58.7**	153	59.8	152	60.2	**153**	**59.9**
434.zeusmp	64.0	142	64.4	141	**64.2**	**142**	64.0	142	64.4	141	**64.2**	**142**
435.gromacs	**258**	**27.7**	259	27.6	258	27.7	**258**	**27.7**	259	27.6	258	27.7
436.cactusADM	25.1	477	24.9	481	**24.9**	**481**	25.1	477	24.9	481	**24.9**	**481**
437.leslie3d	48.8	192	**49.2**	**191**	54.4	173	48.8	192	**49.2**	**191**	54.4	173
444.namd	**357**	**22.5**	356	22.5	357	22.5	352	22.8	**352**	**22.8**	351	22.9
447.dealII	228	50.1	229	50.0	**229**	**50.1**	228	50.1	229	50.0	**229**	**50.1**
450.soplex	193	43.1	**194**	**42.9**	194	42.9	193	43.1	**194**	**42.9**	194	42.9
453.povray	129	41.1	**127**	**41.7**	127	42.0	**108**	**49.4**	107	49.5	108	49.2
454.calculix	232	35.6	230	35.9	**230**	**35.9**	210	39.4	**211**	**39.2**	211	39.1
459.GemsFDTD	68.4	155	68.0	156	**68.2**	**155**	57.5	184	57.1	186	**57.5**	**184**
465.tonto	301	32.7	268	36.7	**298**	**33.0**	238	41.3	235	41.9	**238**	**41.4**
470.lbm	28.4	483	29.0	473	**28.8**	**477**	28.4	483	29.0	473	**28.8**	**477**
481.wrf	152	73.5	**153**	**72.9**	155	72.2	152	73.5	**153**	**72.9**	155	72.2
482.sphinx3	282	69.1	**284**	**68.7**	289	67.6	277	70.3	**278**	**70.1**	280	69.7

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Operating System Notes

```
Stack size set to unlimited using "ulimit -s unlimited"
Zone reclaim mode enabled with:
echo 1 > /proc/sys/vm/zone_reclaim_mode
```

Platform Notes

```
BIOS Settings:
Operating Mode set to Maximum Performance
Sysinfo program /root/SPECcpu-v1.2/config/sysinfo.rev6800
$Rev: 6800 $ $Date:: 2011-10-11 #$ 6f2ebdff5032aaa42e583f96b07f99d3
running on x3550M4 Sat Mar 17 21:05:47 2012

This section contains SUT (System Under Test) info as seen by
some common utilities.  To remove or add to this section, see:
```

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Platform Notes (Continued)

```
    http://www.spec.org/cpu2006/Docs/config.html#sysinfo

  From /proc/cpuinfo
     model name : Intel(R) Xeon(R) CPU E5-2670 0 @ 2.60GHz
        2 "physical id"s (chips)
        32 "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 : 8
        siblings  : 16
        physical 0: cores 0 1 2 3 4 5 6 7
        physical 1: cores 0 1 2 3 4 5 6 7
     cache size : 20480 KB

  From /proc/meminfo
     MemTotal:       132236124 kB
     HugePages_Total:        0
     Hugepagesize:        2048 kB

  /usr/bin/lsb_release -d
     Red Hat Enterprise Linux Server release 6.1 (Santiago)

  From /etc/*release* /etc/*version*
     redhat-release: Red Hat Enterprise Linux Server release 6.1 (Santiago)
     system-release: Red Hat Enterprise Linux Server release 6.1 (Santiago)
     system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server

  uname -a:
     Linux x3550M4 2.6.32-131.0.15.el6.x86_64 #1 SMP Tue May 10 15:42:40 EDT 2011
     x86_64 x86_64 x86_64 GNU/Linux

  run-level 3 Mar 16 12:34

  SPEC is set to: /root/SPECcpu-v1.2
     Filesystem     Type     Size  Used Avail Use% Mounted on
     /dev/mapper/vg_x3550m4-lv_root
                    ext4     790G   66G  684G   9% /

  Additional information from dmidecode:
    Memory:
     16x Samsung M393B1K70DH0-CK0 8 GB 1600 MHz 2 rank

  (End of data from sysinfo program)
```

General Notes

```
Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact,1,0"
LD_LIBRARY_PATH = "/root/SPECcpu-v1.2/libs/32:/root/SPECcpu-v1.2/libs/64"
OMP_NUM_THREADS = "16"
```

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General Notes (Continued)

```
 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
```

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
```

Base Optimization Flags

C benchmarks:
```
    -xAVX -ipo -O3 -no-prec-div -static -parallel -opt-prefetch
    -ansi-alias
```

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Base Optimization Flags (Continued)

C++ benchmarks:
```
-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch -ansi-alias
```

Fortran benchmarks:
```
-xAVX -ipo -O3 -no-prec-div -static -parallel -opt-prefetch
```

Benchmarks using both Fortran and C:
```
-xAVX -ipo -O3 -no-prec-div -static -parallel -opt-prefetch
-ansi-alias
```

Peak Compiler Invocation

C benchmarks:
```
icc  -m64
```

C++ benchmarks:
```
icpc  -m64
```

Fortran benchmarks:
```
ifort -m64
```

Benchmarks using both Fortran and C:
```
icc  -m64 ifort -m64
```

Peak Portability Flags

```
Same as Base Portability Flags
```

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) -prof-use(pass 2) -static -auto-ilp32`
`-ansi-alias`

470.lbm: `basepeak = yes`

482.sphinx3: `-xAVX -ipo -O3 -no-prec-div -unroll2 -ansi-alias`
`-parallel`

C++ benchmarks:

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Peak Optimization Flags (Continued)

444.namd: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
        -no-prec-div(pass 2) -prof-use(pass 2) -fno-alias
        -auto-ilp32

447.dealII: basepeak = yes

450.soplex: basepeak = yes

453.povray: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
        -no-prec-div(pass 2) -prof-use(pass 2) -unroll4 -ansi-alias

Fortran benchmarks:

410.bwaves: -xAVX -ipo -O3 -no-prec-div -opt-prefetch -parallel
        -static

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- -static

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: -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 -opt-prefetch -parallel

465.tonto: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
        -no-prec-div(pass 2) -prof-use(pass 2) -inline-calloc
        -opt-malloc-options=3 -auto -unroll4

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes

436.cactusADM: basepeak = yes

454.calculix: -xAVX -ipo -O3 -no-prec-div -auto-ilp32 -ansi-alias

481.wrf: basepeak = yes

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-SNB-C.html

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-SNB-C.xml

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

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