SPEC® CFP2006 Result
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IBM Corporation

IBM System x3750 M4
(Intel Xeon E5-4650L, 2.60 GHz)

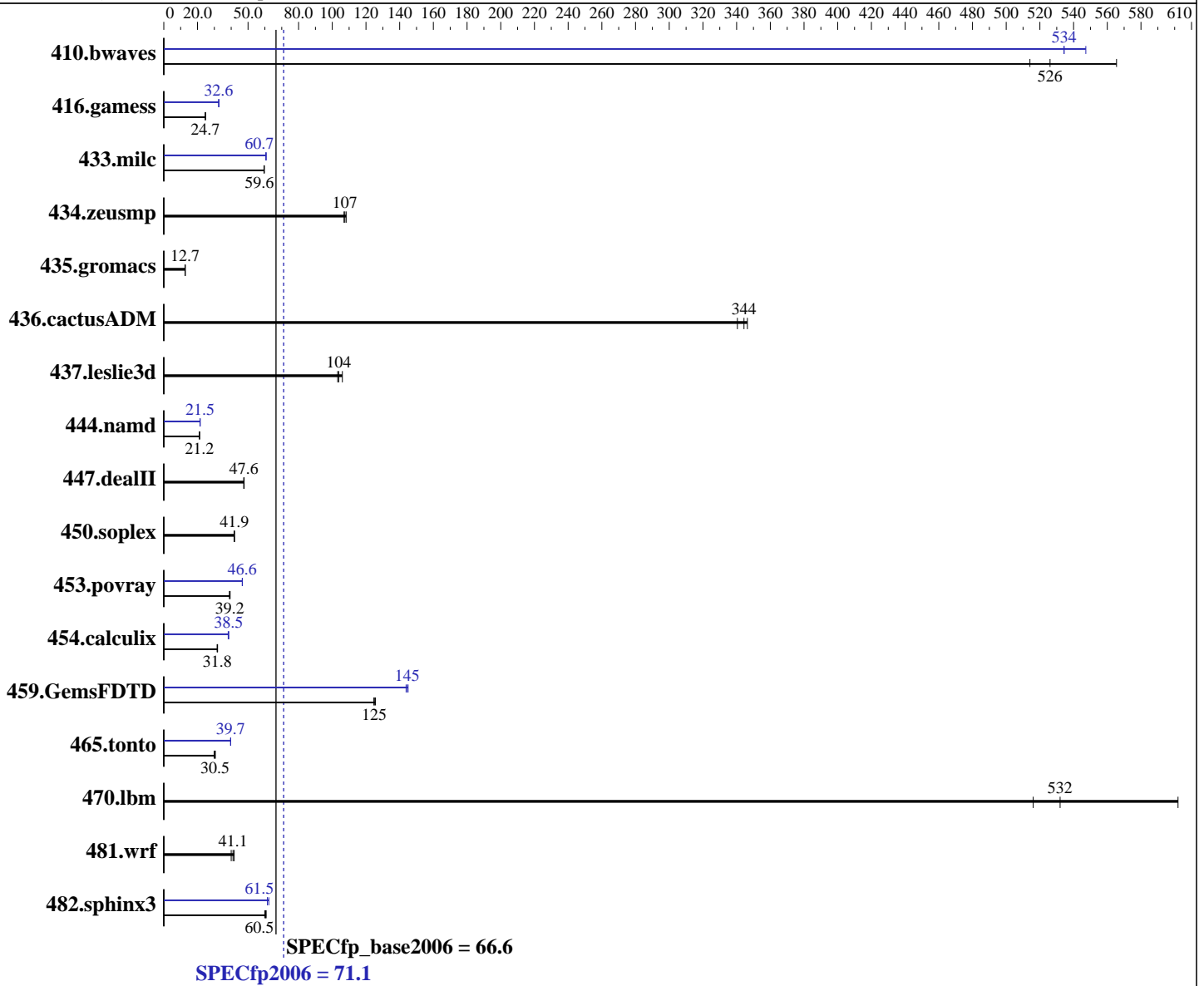$SPECfp^{®}2006 =$ 71.1

$SPECfp\_base2006 =$ 66.6

CPU2006 license:	11	**Test date:**	May-2012
Test sponsor:	IBM Corporation	**Hardware Availability:**	Jul-2012
Tested by:	IBM Corporation	**Software Availability:**	Dec-2011

0 20.0 50.0 80.0 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480 500 520 540 560 580 610

- **410.bwaves** — 534 / 526
- **416.gamess** — 32.6 / 24.7
- **433.milc** — 60.7 / 59.6
- **434.zeusmp** — 107
- **435.gromacs** — 12.7
- **436.cactusADM** — 344
- **437.leslie3d** — 104
- **444.namd** — 21.5 / 21.2
- **447.dealII** — 47.6
- **450.soplex** — 41.9
- **453.povray** — 46.6 / 39.2
- **454.calculix** — 38.5 / 31.8
- **459.GemsFDTD** — 145 / 125
- **465.tonto** — 39.7 / 30.5
- **470.lbm** — 532
- **481.wrf** — 41.1
- **482.sphinx3** — 61.5 / 60.5

SPECfp_base2006 = 66.6

SPECfp2006 = 71.1

Hardware

CPU Name:	Intel Xeon E5-4650L
CPU Characteristics:	Intel Turbo Boost Technology up to 3.10 GHz
CPU MHz:	2600
FPU:	Integrated
CPU(s) enabled:	32 cores, 4 chips, 8 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:	Yes
File System:	ext4

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L3 Cache:	20 MB I+D on chip per chip
Other Cache:	None
Memory:	256 GB (32 x 8 GB 2Rx4 PC3-12800R-11, ECC)
Disk Subsystem:	1 x 300 GB SAS, 10000 RPM
Other Hardware:	None

System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	32/64-bit
Other Software:	None

Results Table

Benchmark	Base Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Peak Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	26.4	514	24.0	565	**25.8**	**526**	**25.4**	**534**	25.4	534	24.8	547
416.gamess	794	24.6	792	24.7	**794**	**24.7**	**600**	**32.6**	599	32.7	601	32.6
433.milc	**154**	**59.6**	154	59.6	154	59.6	**151**	**60.7**	151	60.6	151	60.7
434.zeusmp	85.1	107	**84.7**	**107**	84.1	108	85.1	107	**84.7**	**107**	84.1	108
435.gromacs	562	12.7	565	12.6	**563**	**12.7**	562	12.7	565	12.6	**563**	**12.7**
436.cactusADM	34.5	346	**34.7**	**344**	35.1	340	34.5	346	**34.7**	**344**	35.1	340
437.leslie3d	91.1	103	88.7	106	**90.5**	**104**	91.1	103	88.7	106	**90.5**	**104**
444.namd	379	21.2	378	21.2	**379**	**21.2**	372	21.5	**372**	**21.5**	372	21.5
447.dealII	240	47.7	**240**	**47.6**	241	47.5	240	47.7	**240**	**47.6**	241	47.5
450.soplex	199	41.9	200	41.7	**199**	**41.9**	199	41.9	200	41.7	**199**	**41.9**
453.povray	135	39.4	137	39.0	**136**	**39.2**	114	46.6	**114**	**46.6**	114	46.6
454.calculix	258	31.9	261	31.7	**260**	**31.8**	**214**	**38.5**	216	38.2	214	38.5
459.GemsFDTD	84.5	126	85.1	125	**84.9**	**125**	**73.4**	**145**	73.2	145	73.8	144
465.tonto	329	29.9	322	30.5	**323**	**30.5**	**248**	**39.7**	248	39.7	248	39.7
470.lbm	26.6	516	**25.8**	**532**	22.8	602	26.6	516	**25.8**	**532**	22.8	602
481.wrf	**272**	**41.1**	279	40.0	267	41.8	**272**	**41.1**	279	40.0	267	41.8
482.sphinx3	321	60.8	325	59.9	**322**	**60.5**	**317**	**61.5**	313	62.4	317	61.4

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"

Platform Notes

    Operating Mode set to Maximum Perfomance in BIOS
    Sysinfo program /cpu2006.1.2/config/sysinfo.rev6800
    $Rev: 6800 $ $Date:: 2011-10-11 #$ 6f2ebdff5032aaa42e583f96b07f99d3
    running on kong-pete Sun May 20 10:44:40 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

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Hardware Availability: Jul-2012
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Platform Notes (Continued)

```
    model name : Intel(R) Xeon(R) CPU E5-4650L 0 @ 2.60GHz
       4 "physical id"s (chips)
       64 "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
       physical 2: cores 0 1 2 3 4 5 6 7
       physical 3: cores 0 1 2 3 4 5 6 7
    cache size : 20480 KB

  From /proc/meminfo
    MemTotal:       264505304 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 kong-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 May 18 15:02

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

  Additional information from dmidecode:
    Memory:
     11x Hynix HMT31GR7CFR4C-PB 8 GB 1600 MHz 2 rank
     15x Micron 36JSF1G72PZ-1G6M1 8 GB 1600 MHz 2 rank
     6x 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 = "/cpu2006.1.2/libs/32:/cpu2006.1.2/libs/64"
```

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General Notes (Continued)

```
OMP_NUM_THREADS = "32"

 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-linux64.20120425.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-linux64.20120425.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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