SPEC® CFP2006 Result
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IBM Corporation
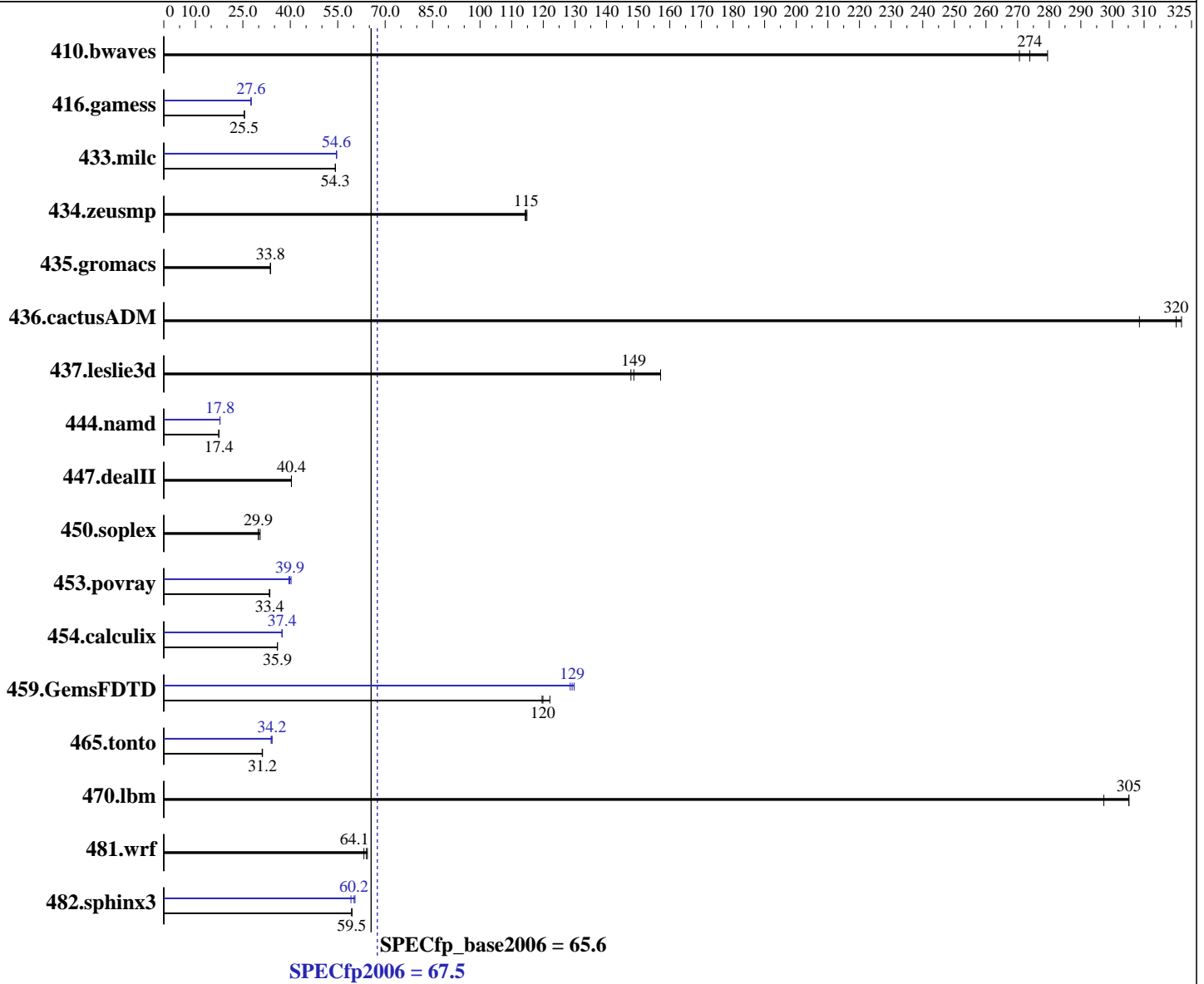
IBM System x3650 M4 HD
(Intel Xeon E5-2609 v2, 2.50 GHz)

$SPECfp^{®}2006 =$ 67.5

$SPECfp\_base2006 =$ 65.6

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

Test date: Dec-2013
Hardware Availability: Dec-2013
Software Availability: Sep-2013

Benchmark	Value
410.bwaves	274
416.gamess	27.6 / 25.5
433.milc	54.6 / 54.3
434.zeusmp	115
435.gromacs	33.8
436.cactusADM	320
437.leslie3d	149
444.namd	17.8 / 17.4
447.dealII	40.4
450.soplex	29.9
453.povray	39.9 / 33.4
454.calculix	37.4 / 35.9
459.GemsFDTD	129 / 120
465.tonto	34.2 / 31.2
470.lbm	305
481.wrf	64.1
482.sphinx3	60.2 / 59.5

SPECfp_base2006 = 65.6

SPECfp2006 = 67.5

Hardware

CPU Name:	Intel Xeon E5-2609 v2
CPU Characteristics:	
CPU MHz:	2500
FPU:	Integrated
CPU(s) enabled:	8 cores, 2 chips, 4 cores/chip
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:	Yes
File System:	ext4

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L3 Cache:	10 MB I+D on chip per chip
Other Cache:	None
Memory:	256 GB (16 x 16 GB 2Rx4 PC3-14900R-13, ECC, running at 1333 MHz)
Disk Subsystem:	1 x 400 GB SAS SSD, RAID 0
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	Base Ratio	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio
410.bwaves	48.6	279	50.2	271	**49.6**	**274**	48.6	279	50.2	271	**49.6**	**274**
416.gamess	**769**	**25.5**	768	25.5	769	25.5	710	27.6	710	27.6	**710**	**27.6**
433.milc	169	54.3	169	54.2	**169**	**54.3**	168	54.6	168	54.6	**168**	**54.6**
434.zeusmp	79.2	115	79.6	114	**79.4**	**115**	79.2	115	79.6	114	**79.4**	**115**
435.gromacs	**212**	**33.8**	211	33.8	212	33.7	**212**	**33.8**	211	33.8	212	33.7
436.cactusADM	38.7	309	**37.3**	**320**	37.1	322	38.7	309	**37.3**	**320**	37.1	322
437.leslie3d	**63.2**	**149**	63.6	148	59.8	157	**63.2**	**149**	63.6	148	59.8	157
444.namd	461	17.4	461	17.4	**461**	**17.4**	452	17.8	**452**	**17.8**	451	17.8
447.dealII	283	40.4	284	40.3	**283**	**40.4**	283	40.4	284	40.3	**283**	**40.4**
450.soplex	**279**	**29.9**	279	29.9	274	30.5	**279**	**29.9**	279	29.9	274	30.5
453.povray	159	33.5	**159**	**33.4**	159	33.4	135	39.5	**133**	**39.9**	132	40.2
454.calculix	**230**	**35.9**	230	35.9	229	36.0	**221**	**37.4**	221	37.4	221	37.4
459.GemsFDTD	86.9	122	**88.5**	**120**	88.7	120	81.8	130	82.6	129	**82.2**	**129**
465.tonto	**316**	**31.2**	315	31.2	316	31.1	**288**	**34.2**	287	34.2	290	33.9
470.lbm	**45.0**	**305**	46.2	297	45.0	305	**45.0**	**305**	46.2	297	45.0	305
481.wrf	**174**	**64.1**	176	63.3	173	64.4	**174**	**64.1**	176	63.3	173	64.4
482.sphinx3	328	59.4	**328**	**59.5**	327	59.5	**324**	**60.2**	329	59.2	322	60.5

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 setting:
Operating Mode set to Maximum Performance
Sysinfo program /home/SPECcpu-new/config/sysinfo.rev6818
$Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
running on x3650M4Plus Mon Dec  2 11:42:38 2013

This section contains SUT (System Under Test) info as seen by
```

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Platform Notes (Continued)

```
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 E5-2609 v2 @ 2.50GHz
      2 "physical id"s (chips)
      8 "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 : 4
      siblings  : 4
      physical 0: cores 0 1 2 3
      physical 1: cores 0 1 2 3
   cache size : 10240 KB

From /proc/meminfo
   MemTotal:       264655816 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 x3650M4Plus 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 Dec 2 11:31

SPEC is set to: /home/SPECcpu-new
   Filesystem     Type    Size  Used Avail Use% Mounted on
   /dev/mapper/vg_x3650m4plus-lv_home
                  ext4    309G  197G   96G  68% /home

Additional information from dmidecode:
  BIOS IBM -[TESTBUILD-1.50]- 08/09/2013
  Memory:
   8x Not Specified Not Specified
   16x Samsung M393B2G70QH0-CMA 16 GB 1333 MHz 2 rank

 (End of data from sysinfo program)
"Not Specified" memory information from dmidecode indicates unused DIMM slots.
The BIOS IBM -[TESTBUILD-1.50] is equivalent to production version [VVE134TUS-1.51]
```

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General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/home/SPECcpu-new/libs/32:/home/SPECcpu-new/libs/64:/home/SPECcpu-new/sh"
OMP_NUM_THREADS = "8"

 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
 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 -parallel -opt-prefetch -ansi-alias
```

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

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

Benchmarks using both Fortran and C:
```
-xAVX -ipo -O3 -no-prec-div -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) -auto-ilp32`
`-ansi-alias`

470.lbm: basepeak = yes

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

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Peak Optimization Flags (Continued)

C++ benchmarks:

    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: 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: 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-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

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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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