SPEC® CFP2006 Result
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IBM Corporation
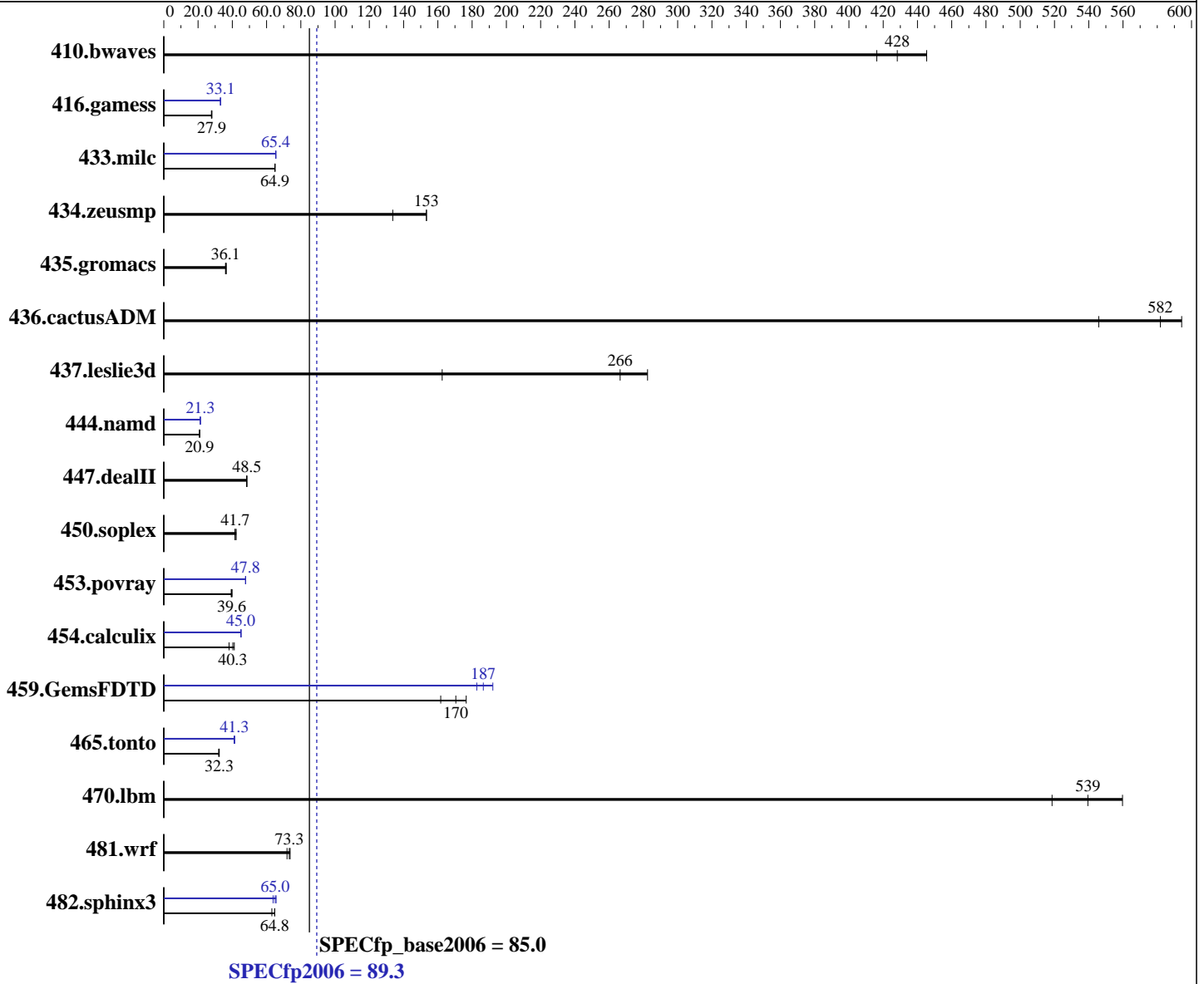
IBM System x3650 M4
(Intel Xeon E5-2660 v2, 2.20 GHz)

$SPECfp^{®}2006 =$ 89.3

$SPECfp\_base2006 =$ 85.0

CPU2006 license: 11		**Test date:**	Nov-2013
Test sponsor:	IBM Corporation	**Hardware Availability:**	Dec-2013
Tested by:	IBM Corporation	**Software Availability:**	Sep-2013

SPECfp_base2006 = 85.0

SPECfp2006 = 89.3

Hardware

CPU Name:	Intel Xeon E5-2660 v2
CPU Characteristics:	Intel Turbo Boost Technology up to 3.00 GHz
CPU MHz:	2200
FPU:	Integrated
CPU(s) enabled:	20 cores, 2 chips, 10 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

Continued on next page

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L3 Cache:	25 MB I+D on chip per chip
Other Cache:	None
Memory:	256 GB (16 x 16 GB 2Rx4 PC3-14900R-13, ECC)
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	Ratio	Seconds	Ratio	Seconds	Ratio	Peak Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	32.7	416	**31.7**	**428**	30.5	445	32.7	416	**31.7**	**428**	30.5	445
416.gamess	697	28.1	705	27.8	**701**	**27.9**	592	33.1	591	33.1	**591**	**33.1**
433.milc	141	64.9	**141**	**64.9**	141	64.9	140	65.4	140	65.4	**140**	**65.4**
434.zeusmp	59.3	153	**59.4**	**153**	68.1	134	59.3	153	**59.4**	**153**	68.1	134
435.gromacs	198	36.1	**198**	**36.1**	196	36.5	198	36.1	**198**	**36.1**	196	36.5
436.cactusADM	20.1	594	21.9	546	**20.5**	**582**	20.1	594	21.9	546	**20.5**	**582**
437.leslie3d	33.3	282	57.8	163	**35.3**	**266**	33.3	282	57.8	163	**35.3**	**266**
444.namd	**384**	**20.9**	384	20.9	384	20.9	376	21.3	**376**	**21.3**	376	21.3
447.dealII	236	48.5	236	48.4	**236**	**48.5**	236	48.5	236	48.4	**236**	**48.5**
450.soplex	**200**	**41.7**	201	41.6	197	42.3	**200**	**41.7**	201	41.6	197	42.3
453.povray	135	39.4	**134**	**39.6**	133	39.9	111	47.8	112	47.7	**111**	**47.8**
454.calculix	217	38.1	**205**	**40.3**	200	41.2	183	45.1	183	45.0	**183**	**45.0**
459.GemsFDTD	**62.2**	**170**	60.1	177	65.6	162	55.2	192	**56.9**	**187**	58.1	183
465.tonto	**305**	**32.3**	307	32.0	304	32.4	240	41.0	238	41.4	**238**	**41.3**
470.lbm	**25.5**	**539**	24.5	560	26.5	519	**25.5**	**539**	24.5	560	26.5	519
481.wrf	**152**	**73.3**	155	71.9	151	73.7	**152**	**73.3**	155	71.9	151	73.7
482.sphinx3	301	64.8	**301**	**64.8**	309	63.1	**300**	**65.0**	297	65.6	305	63.8

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
Hyper-Threading set to Disabled
Sysinfo program /home/SPECcpu-new/config/sysinfo.rev6818
$Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
running on x3650M4 Fri Nov 15 14:29:08 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 E5-2660 v2 @ 2.20GHz
        2 "physical id"s (chips)
        20 "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  : 10
        physical 0: cores 0 1 2 3 4 8 9 10 11 12
        physical 1: cores 0 1 2 3 4 8 9 10 11 12
     cache size : 25600 KB

  From /proc/meminfo
     MemTotal:       264342152 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 x3650M4 2.6.32-358.18.1.el6.x86_64 #1 SMP Fri Aug 2 17:04:38 EDT 2013
     x86_64 x86_64 x86_64 GNU/Linux

  run-level 3 Nov 13 14:55

  SPEC is set to: /home/SPECcpu-new
     Filesystem     Type    Size  Used Avail Use% Mounted on
     /dev/mapper/vg_x3650m4-lv_home
                    ext4    313G  200G   97G  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 1867 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 = "20"

 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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