SPEC® CFP2006 Result

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IBM Corporation

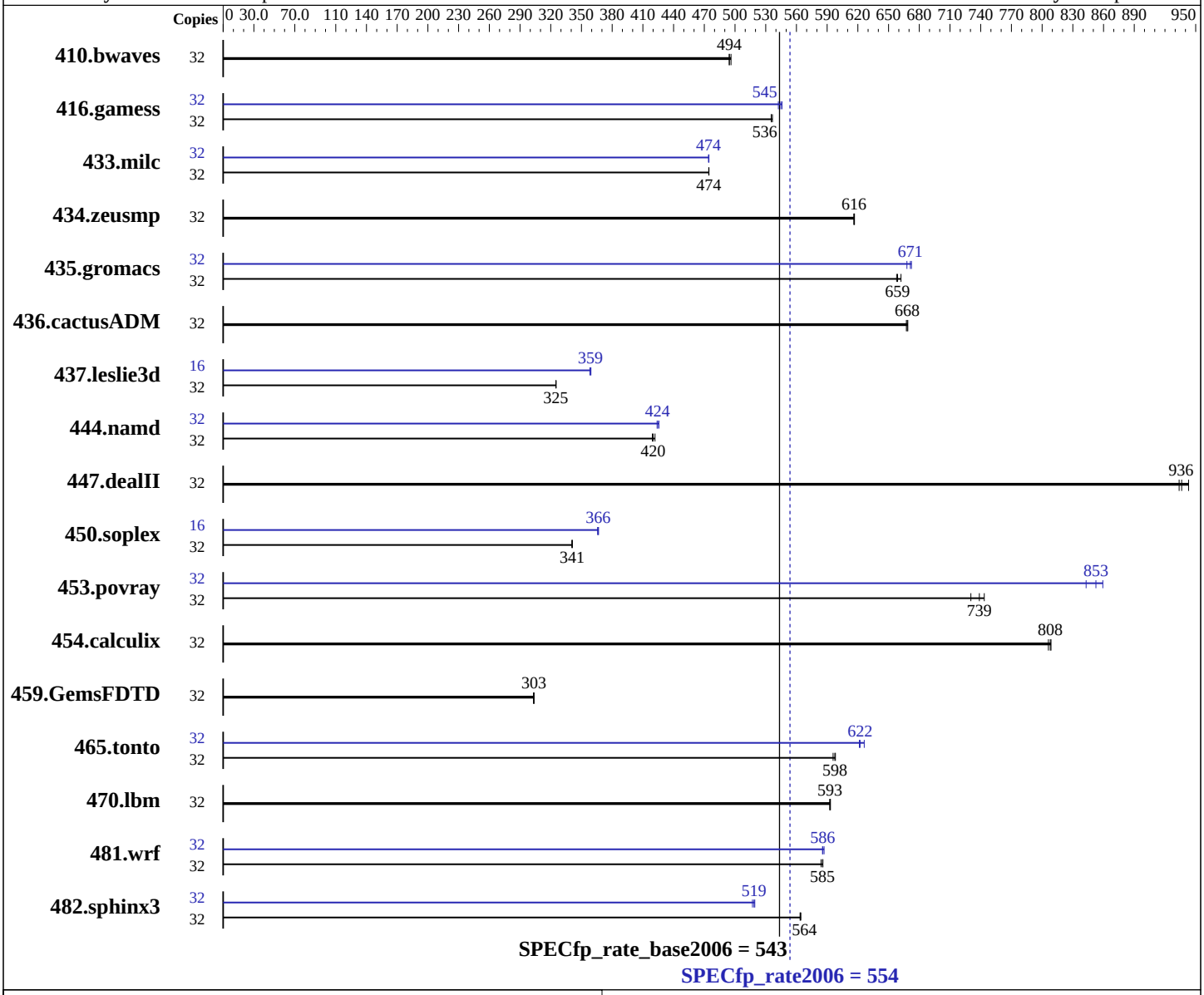
IBM System x3500 M4
(Intel Xeon E5-2650 v2, 2.60 GHz)

SPECfp®_rate2006 = 554

SPECfp_rate_base2006 = 543

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

Test date: Feb-2014
Hardware Availability: Dec-2013
Software Availability: Sep-2013



Hardware

CPU Name:	Intel Xeon E5-2650 v2
CPU Characteristics:	Intel Turbo Boost Technology up to 3.40 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

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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:	No
File System:	ext4

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L3 Cache: 20 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 1 TB SATA, 7200 RPM
Other Hardware: None

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

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	32	877	496	**879**	**494**	880	494	32	877	496	**879**	**494**	880	494
416.gamess	32	1168	537	1170	535	**1170**	**536**	32	1148	546	1155	542	**1150**	**545**
433.milc	32	619	474	619	475	**619**	**474**	32	619	475	619	474	**619**	**474**
434.zeusmp	32	**472**	**616**	472	617	473	616	32	**472**	**616**	472	617	473	616
435.gromacs	32	**347**	**659**	345	662	347	658	32	342	668	340	672	**340**	**671**
436.cactusADM	32	**572**	**668**	572	669	573	667	32	**572**	**668**	572	669	573	667
437.leslie3d	32	**925**	**325**	925	325	925	325	16	419	359	**419**	**359**	420	358
444.namd	32	**611**	**420**	612	419	608	422	32	603	426	605	424	**605**	**424**
447.dealII	32	388	943	392	934	**391**	**936**	32	388	943	392	934	**391**	**936**
450.soplex	32	**783**	**341**	782	341	784	341	16	**364**	**366**	364	367	365	366
453.povray	32	233	730	229	743	**230**	**739**	32	**200**	**853**	198	859	202	843
454.calculix	32	327	806	**327**	**808**	326	809	32	327	806	**327**	**808**	326	809
459.GemsFDTD	32	**1119**	**303**	1118	304	1120	303	32	**1119**	**303**	1118	304	1120	303
465.tonto	32	526	598	528	596	**527**	**598**	32	**506**	**622**	507	621	503	626
470.lbm	32	741	593	742	592	**742**	**593**	32	741	593	742	592	**742**	**593**
481.wrf	32	**611**	**585**	610	586	612	584	32	611	585	609	587	**610**	**586**
482.sphinx3	32	**1106**	**564**	1106	564	1105	564	32	**1203**	**519**	1201	519	1206	517

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"
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 x3500M4 Tue Feb 18 02:02:58 2014

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 E5-2650 v2 @ 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:       264654388 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 x3500M4 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 Feb 17 14:18

SPEC is set to: /home/SPECcpu-new
   Filesystem     Type    Size  Used Avail Use% Mounted on
   /dev/mapper/vg_intelcrb-lv_home
                  ext4    863G   43G  776G   6% /home

Additional information from dmidecode:
  BIOS IBM -[TKE133FUS-1.50]- 07/26/2013
  Memory:
   8x Not Specified Not Specified
   16x Samsung M393B2G70QH0-CMA 16 GB 1867 MHz 2 rank
```

Continued on next page

Platform Notes (Continued)

```
 (End of data from sysinfo program)
"Not Specified" memory information from dmidecode indicates unused DIMM slots.
```

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"

 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
 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
```

Continued on next page

Base Portability Flags (Continued)

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 -opt-prefetch -auto-p32 -ansi-alias
-opt-mem-layout-trans=3

C++ benchmarks:
-xAVX -ipo -O3 -no-prec-div -opt-prefetch -auto-p32 -ansi-alias
-opt-mem-layout-trans=3

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

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

470.lbm: basepeak = yes

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

C++ benchmarks:

444.namd: -xAVX(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: -xAVX(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: -xAVX(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:

Continued on next page

Peak Optimization Flags (Continued)

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: -xAVX -ipo -O3 -no-prec-div -opt-prefetch

459.GemsFDTD: basepeak = yes

465.tonto: -xAVX(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: -xAVX(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 -auto-ilp32

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: -xAVX -ipo -O3 -no-prec-div -auto-ilp32

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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