SPEC® CFP2006 Result
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Dell Inc.

PowerEdge M420 (Intel Xeon E5-2470 v2, 2.40 GHz)

$SPECfp^{®}\_rate2006 =$ 493
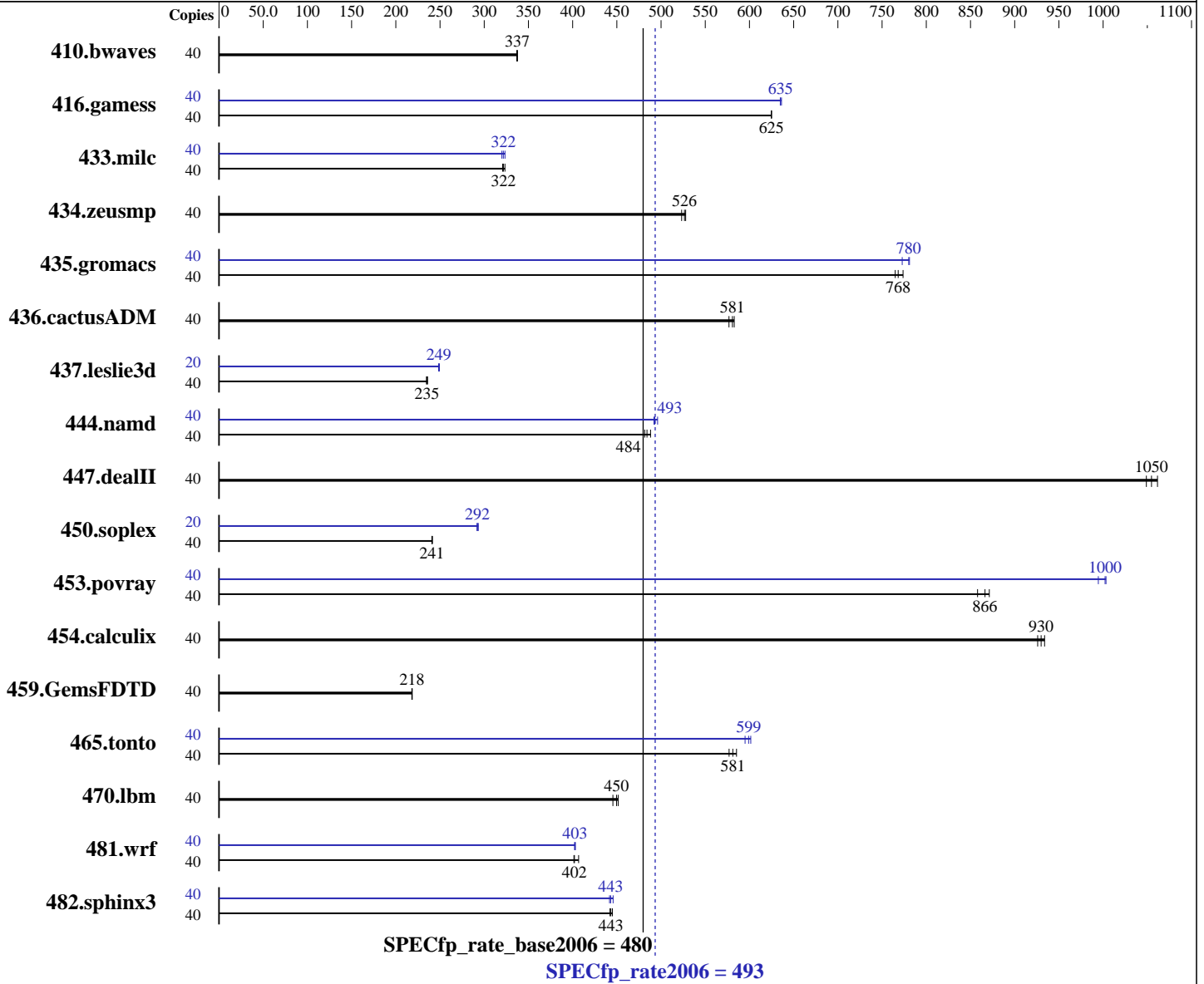
$SPECfp\_rate\_base2006 =$ 480

CPU2006 license: 55
Test sponsor: Dell Inc.
Tested by: Dell Inc.

Test date: Nov-2013
Hardware Availability: Jan-2014
Software Availability: Sep-2013

Benchmark	Copies	Result
410.bwaves	40	337
416.gamess	40 / 40	635 / 625
433.milc	40 / 40	322 / 322
434.zeusmp	40	526
435.gromacs	40 / 40	780 / 768
436.cactusADM	40	581
437.leslie3d	20 / 40	249 / 235
444.namd	40 / 40	493 / 484
447.dealII	40	1050
450.soplex	20 / 40	292 / 241
453.povray	40 / 40	1000 / 866
454.calculix	40	930
459.GemsFDTD	40	218
465.tonto	40 / 40	599 / 581
470.lbm	40	450
481.wrf	40 / 40	403 / 402
482.sphinx3	40 / 40	443 / 443

SPECfp_rate_base2006 = 480
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Hardware

CPU Name:	Intel Xeon E5-2470 v2
CPU Characteristics:	Intel Turbo Boost Technology up to 3.20 GHz
CPU MHz:	2400
FPU:	Integrated
CPU(s) enabled:	20 cores, 2 chips, 10 cores/chip, 2 threads/core
CPU(s) orderable:	2 chip
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:	SUSE Linux Enterprise Server 11 (x86_64) 3.0.76-0.11-default
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:	ext2
System State:	Run level 3 (multi-user)

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L3 Cache:	25 MB I+D on chip per chip	Base Pointers:	32/64-bit
Other Cache:	None	Peak Pointers:	32/64-bit
Memory:	96 GB (6 x 16 GB 2Rx4 PC3L-12800R-11, ECC)	Other Software:	None
Disk Subsystem:	2 x 50 GB SATA SSD, RAID 0		
Other Hardware:	None		

Results Table

	Base						Peak						
Benchmark	**Copies**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Copies**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**
410.bwaves	40	1610	338	**1612**	**337**	1614	337	40	1610	338	**1612**	**337**	1614	337
416.gamess	40	1253	625	1254	625	**1253**	**625**	40	**1233**	**635**	1234	635	1231	636
433.milc	40	1135	323	1145	321	**1142**	**322**	40	**1142**	**322**	1148	320	1135	323
434.zeusmp	40	696	523	690	528	**691**	**526**	40	696	523	690	528	**691**	**526**
435.gromacs	40	373	765	**372**	**768**	369	774	40	370	773	**366**	**780**	366	781
436.cactusADM	40	820	583	829	577	**823**	**581**	40	820	583	829	577	**823**	**581**
437.leslie3d	40	1603	235	**1598**	**235**	1594	236	20	757	248	**755**	**249**	754	249
444.namd	40	657	488	666	481	**663**	**484**	40	**651**	**493**	647	496	652	492
447.dealII	40	436	1050	**434**	**1050**	431	1060	40	436	1050	**434**	**1050**	431	1060
450.soplex	40	1386	241	1382	241	**1385**	**241**	20	569	293	**570**	**292**	572	292
453.povray	40	244	871	**246**	**866**	248	858	40	214	995	**212**	**1000**	212	1000
454.calculix	40	353	934	**355**	**930**	356	926	40	353	934	**355**	**930**	356	926
459.GemsFDTD	40	1945	218	1942	219	**1944**	**218**	40	1945	218	1942	219	**1944**	**218**
465.tonto	40	682	577	672	585	**677**	**581**	40	661	595	**657**	**599**	654	601
470.lbm	40	**1222**	**450**	1234	446	1217	451	40	**1222**	**450**	1234	446	1217	451
481.wrf	40	1098	407	1113	401	**1111**	**402**	40	**1109**	**403**	1108	403	1111	402
482.sphinx3	40	1763	442	**1759**	**443**	1752	445	40	**1760**	**443**	1765	442	1749	446

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"

Platform Notes

   BIOS settings:
   Virtualization Technology disabled
   Execute Disable disabled

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Platform Notes (Continued)

```
Logical Processor enabled
System Profile set to Performance
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6818
$Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
running on linux Fri Nov  1 22:49:28 2013

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 E5-2470 v2 @ 2.40GHz
      2 "physical id"s (chips)
      40 "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  : 20
      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:       99156164 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

/usr/bin/lsb_release -d
   SUSE Linux Enterprise Server 11 (x86_64)

From /etc/*release* /etc/*version*
   SuSE-release:
      SUSE Linux Enterprise Server 11 (x86_64)
      VERSION = 11
      PATCHLEVEL = 3

uname -a:
   Linux linux 3.0.76-0.11-default #1 SMP Fri Jun 14 08:21:43 UTC 2013 (ccab990)
   x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Nov 1 09:32 last=S

SPEC is set to: /root/cpu2006-1.2
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda2       ext2   83G   43G   40G  52% /

Additional information from dmidecode:
  BIOS Dell Inc. 2.0.22 09/23/2013
  Memory:
   6x 00CE04B300CE M393B2G70BH0-YK0 16 GB 1600 MHz
```

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Platform Notes (Continued)

```
(End of data from sysinfo program)
```

General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/root/cpu2006-1.2/libs/32:/root/cpu2006-1.2/libs/64:/root/cpu2006-1.2/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/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
   459.GemsFDTD: -DSPEC_CPU_LP64
       465.tonto: -DSPEC_CPU_LP64
```

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Base Portability Flags (Continued)

```
      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
```

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Peak Portability Flags (Continued)

```
        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:

```
       410.bwaves: basepeak = yes
```

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Peak Optimization Flags (Continued)

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/Dell-Platform-Settings-V1.2-revB.html

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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/Dell-Platform-Settings-V1.2-revB.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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