SPEC® CFP2006 Result

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Dell Inc.

PowerEdge M820 (Intel Xeon E5-4640 v2, 2.20 GHz)

$SPECfp®\_rate2006 = 1130$

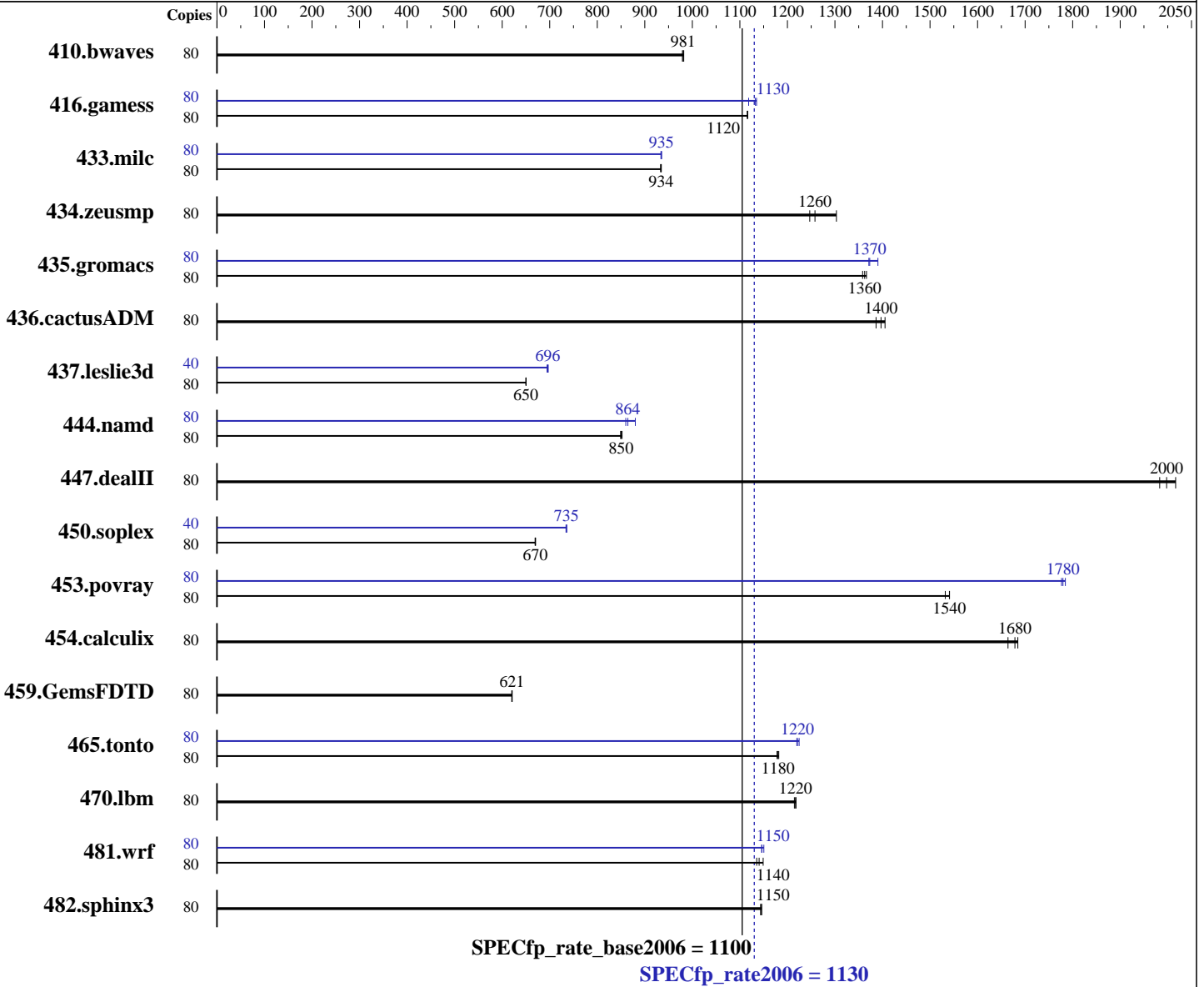$SPECfp\_rate\_base2006 = 1100$

CPU2006 license: 55

Test sponsor: Dell Inc.

Tested by: Dell Inc.

Test date: Mar-2014

Hardware Availability: Mar-2014

Software Availability: Aug-2013

SPECfp_rate_base2006 = 1100

SPECfp_rate2006 = 1130

Hardware

CPU Name:	Intel Xeon E5-4640 v2
CPU Characteristics:	Intel Turbo Boost Technology up to 2.70 GHz
CPU MHz:	2200
FPU:	Integrated
CPU(s) enabled:	40 cores, 4 chips, 10 cores/chip, 2 threads/core
CPU(s) orderable:	4 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) 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

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L3 Cache:	20 MB I+D on chip per chip	System State:	Run level 3 (multi-user)
Other Cache:	None	Base Pointers:	32/64-bit
Memory:	512 GB (32 x 16 GB 2Rx4 PC3-14900R-13, ECC)	Peak Pointers:	32/64-bit
Disk Subsystem:	1 x 1TB 7200 RPM Near-Line SAS	Other Software:	None
Other Hardware:	None		

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	80	1110	979	1107	982	**1109**	**981**	80	1110	979	1107	982	**1109**	**981**
416.gamess	80	1404	1120	1403	1120	**1404**	**1120**	80	1380	1140	**1383**	**1130**	1401	1120
433.milc	80	**786**	**934**	787	933	786	935	80	786	934	**786**	**935**	785	935
434.zeusmp	80	559	1300	584	1250	**579**	**1260**	80	559	1300	584	1250	**579**	**1260**
435.gromacs	80	**419**	**1360**	421	1360	418	1370	80	411	1390	417	1370	**416**	**1370**
436.cactusADM	80	**684**	**1400**	680	1410	690	1390	80	**684**	**1400**	680	1410	690	1390
437.leslie3d	80	**1157**	**650**	1157	650	1156	650	40	540	697	**540**	**696**	541	694
444.namd	80	753	852	756	849	**755**	**850**	80	**742**	**864**	729	880	746	860
447.dealII	80	454	2020	462	1980	**458**	**2000**	80	454	2020	462	1980	**458**	**2000**
450.soplex	80	**996**	**670**	995	670	997	669	40	**454**	**735**	453	736	454	734
453.povray	80	**276**	**1540**	276	1540	278	1530	80	240	1780	238	1780	**239**	**1780**
454.calculix	80	392	1680	397	1660	**393**	**1680**	80	392	1680	397	1660	**393**	**1680**
459.GemsFDTD	80	1367	621	1369	620	**1367**	**621**	80	1367	621	1369	620	**1367**	**621**
465.tonto	80	**667**	**1180**	666	1180	668	1180	80	645	1220	**645**	**1220**	643	1220
470.lbm	80	**903**	**1220**	905	1210	902	1220	80	**903**	**1220**	905	1210	902	1220
481.wrf	80	778	1150	787	1140	**784**	**1140**	80	777	1150	**780**	**1150**	780	1150
482.sphinx3	80	1364	1140	**1361**	**1150**	1361	1150	80	1364	1140	**1361**	**1150**	1361	1150

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

Virtualization Technology disabled
Execute Disable disabled
Logical Processor enabled

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Platform Notes (Continued)

```
System Profile set to Performance
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6818
$Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
running on linux Mon Mar  3 15:53:58 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 E5-4640 v2 @ 2.20GHz
      4 "physical id"s (chips)
      80 "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
      physical 2: cores 0 1 2 3 4 8 9 10 11 12
      physical 3: cores 0 1 2 3 4 8 9 10 11 12
   cache size : 20480 KB

From /proc/meminfo
   MemTotal:       529392220 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 Mar 3 02:03 last=S

SPEC is set to: /root/cpu2006-1.2
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda2       ext2  909G   76G  832G   9% /

Additional information from dmidecode:
  BIOS Dell Inc. 2.0.24 01/21/2014
  Memory:
   32x 00CE00B300CE M393B2G70BH0-CMA 16 GB 1866 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

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Base Portability Flags (Continued)

```
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:
```
icc    -m64
```

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
```

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Hardware Availability: Mar-2014

Software Availability: Aug-2013

Peak Portability Flags (Continued)

```
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
482.sphinx3: -DSPEC_CPU_LP64
```

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: basepeak = yes
```

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

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-
```

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Peak Optimization Flags (Continued)

```
    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-revC.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/Dell-Platform-Settings-V1.2-revC.xml

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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